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**Prepared by SpecPack Pty Ltd
PO Box 2002, Oakleigh 3166**

www.specpack.com.au

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PART ONE - COMPLIANCE WITH QUALITY STANDARDS

Comply with the following Australian Standards:

AS/NZS ISO 9001 2008 Quality management systems – Requirements.

Provide, implement and maintain a quality assurance system to:

AS/NZS ISO 9001 2008

This system includes at a minimum the following elements:

Submission at time of tender of a copy of the firm's general quality management system including quality manual, technical procedures, sample forms used in the quality management system and quality checklists if used. If the firm has had a third party certification audit prepared by a registered lead assessor within the last 2 years, a copy of such audit will be accepted in lieu of the required submission.

- A. Submission within 15 (or 30) days of award of contract, a project-specific quality plan to AS/NZS ISO 9001, which describes specific quality management procedures for all sub-contracts where the sub-contract amount is 5 percent or more of the contract sum. This project quality plan describes in detail the quality reporting and quality records procedures to be implemented on the project.
- B. Submission within 15 (or 30) days of award of contract, a project-specific plan prepared by each sub-contractor whose sub-contract work includes a design component and where the trade section specification requires quality assurance to AS/NZS ISO 9001 2008.

PART TWO - TRADE SECTION REFERENCES

103 Quality Assurance

Provide, implement and maintain a quality assurance system to AS/NZS ISO 9001. This system includes at a minimum the following elements:

Submission at time of tender of a copy of the firm's general quality management system including quality manual, technical procedures, sample forms used in the quality management system and quality checklists if used. If the firm has had a third party certification audit prepared by a registered lead assessor within the last 2 years, a copy of such audit will be accepted in lieu of the required submission.

Submission within 15 days of award of contract, a project-specific quality plan.

103 Quality Assurance

Submit evidence of the firm's quality assurance system.

END OF SECTION

PART I GENERAL**101 General**

Comply with Statutory requirements for demolisher, supervisors, workers and demolition works.
Demolish all sections of the built environment as shown in the specification and described as follows:

- A. Scope
The work of this section includes but is not limited to the following items:
Manage all demolition works including:
Identification of existing services including type of service, depth of service and location of service, co-ordinate required termination, alteration or protection of services as per service provider requirements, detail same on a site plan and provide a copy to the project manager and other trades or activities undertaking work at the project.
- B. Examine documents: examine parts of the drawings and this specification for requirements which affect the work of this section. In particular, take note of related work.
- C. Ensure only competent and approved persons, working under compliant business licence for the class of demolition, are employed and perform in accordance with statutory requirements.
- D. Provide copies of all relevant documents, e.g. Asbestos clearance certificate, Dilapidation report, burial of waste and other certifications, in accordance with requirements by statutory bodies having jurisdiction.
- E. Cleaning the site thoroughly on completion.

102 Related Work

Co-ordinate with other trades affecting or affected by work of this section, co-operating as necessary to ensure steady and satisfactory progress of the work.

Disconnection of existing services by appropriate other trades

Site preparation – Excavation Asbestos removal

Water distribution Sanitary sewerage

Storm drainage

103 Quality Assurance

Relevant business licence for demolition work.

Provide data indicating a minimum of 3 years of experience in such work as required by this specification.

Supply names of contacts, with telephone numbers, who can verify performance quality.

104 References

Comply with applicable portions of the following Australian Standards:

- | | |
|----------------|--|
| AS 2187 | Explosives - Storage, transport and use. |
| | 2187.2 2006 Use of explosives. <i>There are 4 other parts, 1998 – 2006.</i> |
| AS 2436 2010 | Guide to noise and vibration control on construction, demolition and maintenance sites. |
| AS 2550.1 2011 | Cranes, hoists and winches – Safe use - General requirements |
| AS 2601 2001 | Demolition of structures. |
| AS 4687 2007 | Temporary fencing and hoardings. |
| AS 4970 2009 | Protection of trees on development sites. |

Comply also with the requirements of applicable building regulations, environmental requirements, statutory and local authority having jurisdiction, including local council.

105 Public and Property Protection

Obtain heritage, local or environmental approval to demolish where applicable.

Provide measures required by municipal and state ordinances, laws and regulations for the protection of surrounding property, footpaths, streets, kerbs, the public, occupants and workmen during demolition operations. Comply with the above ordinances, laws etc. in carrying out measures including hoardings, barricades, fences, warning lights and signs, rubbish chutes, etc.

No blasting for demolition purposes will be permitted.

Exercise due care in executing this work.

Make good to original condition, damage to structures to be retained and to adjacent property which results from demolition operations.

Perform restoration work without expense to the proprietor.

106 Fees

Pay all fees due to statutory, local or other relevant authority requiring same in connection with the work of this section.

107 Services

Before demolishing and removing parts of building having essential services installed, i.e. electrical or other wiring, gas and water pipes, tanks, conduits or similar items embedded in them, notify the project manager,

owners of services, authorities having jurisdiction, and make sure that these items are out of service so that they can be removed without danger.

108 Photographic Record

Provide a professional quality photographic record of the progress of demolition in accordance with the proprietor's requirements, showing "before and after" demolition of typical work involved in demolition.

109 Tree Preservation

Where applicable, clearly mark and protect all trees and vegetation identified on the site plan during demolition.

110 Pest Management

Where applicable, produce Pest Management Plan, e.g. fire ants in Queensland. Refer SECTION 10290 PEST CONTROL.
2050

PART II MATERIALS

201 Demolished Materials

Material required to be demolished becomes the property of the contractor. Remove it from the site. Exceptions to this clause are as follows:

202 Equipment

- A. Supply equipment required to perform the work of sufficient capacity to meet the time schedule.
- B. Provide suitable, approved, if relevant, disposal containers that prevent a spill to the environment for disposal required.
- C. No containers may be located on public streets or pavements without obtaining required municipal permits for same. Co-operate with sub-contractors doing work in or near container locations to prevent disruption of their work.

PART III EXECUTION

301 Examine The Site Conditions

Examine carefully the following site conditions:

Start of work means total acceptance of conditions.

302 Existing Reinforced Concrete

Neatly cut back or trim to new alignment with a clean true face on material to be retained. Cut with diamond saw where necessary.

303 Shoring

Provide necessary shoring in accordance with structural engineering instructions.

Alter, adapt, and maintain temporary works as necessary, and strike or withdraw them progressively as the work proceeds. Obtain the written consent of the project manager/structural engineer if such works are to be left in position at the completion of the work.

304 Exposed Excavations

Leave excavations open and protected as required by the statutory authority after removal of work below ground level until completion of inspection by project manager/structural engineer.

305 Methods and Operations

- A. Ensure, where applicable, a copy of asbestos clearance certificate is received and maintained with the demolition plan at the site.
- B. Demolish and remove completely parts of structure listed and/or drawn for demolition. The methods of cutting and removal of floors, walls, and other items to be removed are to be approved by authorities having jurisdiction, or certified practising engineer.
- C. Furnish flame-cutting required to dismantle sections of equipment too large to be otherwise removed. Flame-cutting is to be performed only by experienced and qualified mechanics. Protect combustible surfaces during flame cutting. Maintain fire extinguishers, required by the fire authority, at hand.
- D. Do not drop or throw material, other than as detailed in Safe Work Method Statement.. Lower by means of hoists, cranes or rubbish chutes etc. Wet down thoroughly during demolition to prevent nuisance of dirt and dust. Equip trucks used in hauling debris with tarpaulins to cover the loads. Do not load so excessively as to spill debris on streets.
- E. Plaster removal: in general, removal of existing plaster showing cracks, bulges or drumminess is required. Refer to project manager if in doubt.
- F. Except as placed in approved disposal containers, do not allow combustible material and rubbish to accumulate on the site. Remove daily, or as directed. Burn no debris on site.
- G. Upon completion of wrecking, demolition and the removal of rubbish and debris, remove equipment.

306 Reinstatement

Restore to original condition, without expense to the proprietor, any damaged parts of the remaining construction resulting from failure to provide adequate protection. Refer also clause 105.

307 Disposal of Waste

Dispose of asbestos and other hazardous waste as per statutory or local requirements.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

Leave the site in an entirely clean condition, ready for the work of other trades.

END OF SECTION

ADVICE TO OWNER AND PROJECT MANAGER REGARDING ASBESTOS REMOVAL

The building owner is responsible for the provision of an asbestos report on the building or structure to be demolished, supplied by a licenced person approved by the relevant statutory body.. It is a responsibility of the owner to engage a specialist consultant to identify asbestos material, hazardous or toxic substances on the site or adjacent areas and to comply with applicable laws and regulations. Building work on such sites may only proceed after the project manager has received a written document from the relevant authority which states that asbestos and hazardous materials have been totally removed.

If any such material is discovered on the site after work has started the work will be ceased immediately and licensed persons engaged to remove asbestos-containing material, certify its removal and re-issue an asbestos clearance certificate. . The project manager will require the client to indemnify the project manager in writing against any claim relating to liability or loss relating to the detection, abatement, removal and disposal of asbestos, hazardous and toxic substances.

PART I GENERAL

101 Scope

The work of this section includes but is not limited to:

Identification, removal and safe disposal of asbestos containing materials (ACM). Refer to drawings supplied as part of the contract documents. Nominate material to be removed. Examine relevant documents for requirements which will affect the work of this trade section.

102 Related Work

- A. Allow only licensed asbestos removal service provider to undertake the works in compliance with their business licence and ensure competent supervisors and workers are engaged and supervised at all times during the works.
- B. Co-ordination: co-ordinate with other trades affecting or affected by the work of this trade section. Co-operate as necessary to ensure steady and satisfactory progress of the work.
- C. Unit prices: submit with tender a schedule of rates for work required to be done not identified at time of tender. The schedule of rates is required to reflect costs on a square metre rate for sheets or panels to be removed and on a metre run basis for other work. Such costs are to cover work referred to in clause 101 above.

103 Quality Assurance

- A. Submit evidence, before starting work, of the registration, training and experience of those who will be performing the required work.
- B. Comply with relevant Act, Regulation, CODE OF PRACTICE, Australian Standard or other recognised document relating to asbestos removal work.
Supply names of contacts, with telephone numbers, who can verify performance quality.

104 References

Perform asbestos removal in accordance with:

- A. National Code of Practice for the Safe removal of Asbestos 2nd Edition [NOHSC: 2002 (2005)]. Copies of this code can be downloaded from Safe Work Australia, www.safeworkaustralia.gov.au
- B. Relevant state government department or state statutory authority, which has jurisdiction over the work of this section, and which is in force at the time of tendering.

105 Submissions

- A. Submit as and when required all of the reports and submissions required by the statutory authorities referred to in clause 104 above.
- B. Submit the data required in CODE OF PRACTICE.
- C. Submit tenders conforming with documents referred to in clause 104.

106 Planning and Programming

- A. Comply with relevant Act, Regulation, CODE OF PRACTICE, Australian Standard, ministerial notice or alert issued by a statutory body.
- B. Submit a project specific Asbestos removal plan for the works in accordance with state or local requirements.
- C. Arrange for and attend a pre-asbestos-removal demolition conference. Abide by decisions and schedules established at such conference.

107 Project Site Control

108 Notices and Fees

Provide notices to statutory and local authority which needs data relating to asbestos removal. Pay fees due to any statutory and local authority which requires, by law, fees to be paid.

PART II EQUIPMENT

201 Decontamination Facilities

Where required by regulations of the controlling statutory or local authority, provide appropriate decontamination facilities as described in CODE OF PRACTICE.

202 General Hygiene Requirements

Where required by regulation of the controlling statutory or local authority, comply with general hygiene requirements as described in the CODE OF PRACTICE.

203 Protective Clothing and Equipment

Where required by regulations of the controlling statutory or local authority, comply with protective clothing and equipment, CODE OF PRACTICE.

NOTE : the use of glove-bags is described and should be used where necessary in accordance with CODE OF PRACTICE.

204 Labelling and Warning Signs

Provide necessary labels and warning signs in accordance with the requirements of "GUIDE TO THE CONTROL OF ASBESTOS HAZARDS IN BUILDINGS AND STRUCTURES." Refer to CODE OF PRACTICE.

205 Tools and Equipment

Provide tools and equipment necessary for the work, including cleaning of same after use. Refer to CODE OF PRACTICE.

PART III EXECUTION

301 Examination

- A. Inspect relevant site conditions.
Establish conditions which may be discovered relevant to asbestos removal without disturbing material containing asbestos.
- B. Start of work means total acceptance of conditions.

302 Preparation

- A. Prepare for asbestos removal in full accordance with the requirements of CODE OF PRACTICE, including establishment of the asbestos removal area and ensure it is secured from access by unauthorised persons..
- B. Install decontamination facilities in a location agreed upon with the project manager and other relevant parties.
- C. Install required labelling and warning signs. Refer clause 204 above.
- D. Remove from the work area items which may be damaged by the work of this trade section.
- E. Protect item of furniture, surface, equipment or plant which may be damaged or soiled during the preparation for and action of asbestos removal. Clean and wipe down all furniture, surfaces, equipment and plant prior to removing from the asbestos removal area and provide records of monitoring conducted in these areas to ensure area is maintained clean of asbestos containing material. Be responsible for damage resulting from asbestos removal actions, processes and other works.

303 Asbestos Removal

- A. Advise the project manager or superintendent in advance of proposed removal methods in a document titled Asbestos Removal Plan and relevant Safe Work Method Statement..
- B. Comply with the requirements of CODE OF PRACTICE and with the instructions of the authorised superintendent of the work.
- C. Document removal techniques.
Comply with CODE OF PRACTICE and obtain Burial certificates for asbestos containing material removed where applicable.

304 Monitoring of Airborne Asbestos

Ensure an approved and independent testing organisation is engaged to monitor and report on the existence of airborne asbestos, maintain and display records at the site and supply copies to the project manager as soon as reasonably practicable and comply with any Act, Regulation, CODE OF PRACTICE, Australian Standard, Ministerial Notice or statutory issued alert.

305 Field Quality Control

Work will be performed under the supervision of an authorised superintendent. Comply with his requirements which are in accordance with any Act, regulation, CODE OF PRACTICE, Australian Standard, Ministerial Notice or statutory issued alert, and other requirements to which parties have agreed.

306 Dismantling of Asbestos Removal Area

Comply with CODE OF PRACTICE.

307 Removal of Asbestos Material From Site

Arrange with relevant local authorities the identification of the place to which asbestos material is to be taken from the demolition site and the means of transport of same. Comply with requirements of the authorities. Remove such materials to the approved location.

308 Reinstallation

309 Cleaning

Thoroughly wet and wipe clean areas in which work has been performed and those adjacent to the work area. Remove and dispose of traces of the asbestos removal process, protective materials, etc. and continue monitoring until advised by the testing authority that it is safe to discontinue testing.

310 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager, and/or authorised superintendent of the works. Leave the site in a condition suitable for the work of other trades, in co-operation with project manager and builder or contractor.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this section comprises but is not limited to excavation, disposal of surplus excavated material both on and off the site, supply of compaction and filling material and the preparation necessary to bring the areas to correct shape and level prior to building construction, and as follows:

Establishing environmental controls

Protect all trees and vegetation identified for preservation on the site plan.

Site clearing

Termite treatment

Supply and installation of waterproofing membrane.

Other:

102 Related Work

Co-ordinate and co-operate with the following trades:

Allow the following sums per cubic metre for rock excavation and removal:

Refer DOCUMENT 00870, PART I MONETARY SCHEDULES.

103 Quality Assurance

Provide data indicating that the tradesmen engaged for this project have the necessary education, training and instruction and a minimum of 3 years' experience in such work required by this specification.

Supply names of contacts, with telephone numbers, who can verify performance quality.

104 References

A. Comply with applicable portions of the following Australian Standards:

AS 1289 Methods of testing soils for engineering purposes.

AS 2159 2009 *There are many parts, 1997 - 2009; each refers to a specific application.*

AS 2187 Piling - Design and installation. *Plus 1 Amdt, 2010.*

Explosives - Storage, transport and use.

2187.2 2006 Use of explosives.

There are 4 other parts, 1998 - 2006.

AS 3660 Termite management.

3660.1 2000 New building work.

There are 2 other parts, 2000.

AS 3798 2007 Guidelines on earthworks for commercial and residential developments. *Plus 1 Amdt, 2008.*

AS/NZS 4200 Pliable building membranes and underlays.

4200.1 1994 Materials. *Plus 1 Amdt, 1994.*

4200.2 1994 Installation requirements.

AS 4687 2007 Temporary fencing and hoardings.

AS 4970 2009 Protection of trees on development sites

Comply with particular specifications in building regulations and/or local council publications.

B. Definitions

Rock: natural or artificial material encountered in the excavation which cannot be removed until broken up by mechanical means such as rippers, jack-hammers or percussion drills.

Rippable rock: rock which can be removed by a single tine, "D9" ripper.

Non-Rippable rock: all other rock.

Other than rock: other material encountered in excavation.

Sub-grade: the natural ground below the excavations.

Filling: a general term for material spread and compacted over the sub-grade to make up finished levels or levels to the under-side of the base.

Sub-base: selected filling spread and compacted over the sub-grade to make up levels to the underside of the base.

Base: a selected filling layer spread and compacted to form an acceptable working surface directly under the building.

105 Approval from Relevant Authorities

Pest Management i.e. Fire Ant Queensland, Refer SECTION 10290 PEST CONTROL.

Heritage, local authority or environmental conditions of approval.

Essential services information (dial before you dig)

Environmental requirements, i.e. stockpiles, retaining trees etc.

106 Approval for Variations

Before starting excavation work which may involve a variation (whether addition or deduction) because of the nature of the material to be excavated, obtain a determination as to the nature from the project manager. The

variation is derived from the determination. If no prior determination has been obtained, the variation, if any, is to be made only at the project manager's discretion.

107 Use of Explosives

Do not use explosives.

108 Site Investigation

A site investigation was made and a copy of the report is included in the contract documents. The site investigation information given in the report, or shown on the drawings, or both, is information on the nature of the ground at each tested part. It is not a complete description of conditions existing below the surface. The accuracy of the information is not guaranteed and will not be a basis for cost variation.

If unnatural or unhealthy material (potentially destructive) is found, notify the project manager and arrange for an inspection by a building surveyor and or health inspector.

109 Provisional Depths

The footing or strip depths shown on the drawings are provisional.

Approval of the relevant building surveyor and project manager is required for actual depths on the site.

If there have been variations to the contract levels or dimensions of excavations, do not commence back-filling or place permanent work in excavations until the project manager has made measurements and approved them.

110 Site Management

Pest Management Plan where applicable. Refer SECTION 10290 PEST CONTROL.

Inspection: give the project manager at least 1 working day's notice that the following are ready for inspection:

- rock encountered in the excavations;
- excavation completed to contract levels;
- filling completed to contract levels;
- completed placement of waterproof membrane.

111 Excess Excavation

Excessive excavation and consequent backfilling and compacting may not be claimed as a reason for extra payment.

112 Termite/Pest Treatment

Refer to trade section 02360 TERMITE CONTROL and 10290 PEST CONTROL.

113 Protection of Essential Services

Ensure all in-ground and essential services located within the zone of any excavation or trench is identified as specified in the supplier information for working near, over or under an essential service and adequately protected to prevent damage to service or disruption of the service

PART II MATERIALS

201 Termite/Pest Control

Supply approved mechanical termite shields or natural ethical substances in accordance with supplier's recommendations. Refer to trade section 02360 TERMITE CONTROL and 10290 PEST CONTROL. Comply with AS 3660 in selecting appropriate material.

202 Filling

Bring filling on to the site unless it can be provided from spoil recovered from the site. Filling is to be sound material, free of perishable material, or material that will form stable fill, but subject always to project manager's approval.

Fill generally as required or as shown on the drawings, and as follows:

Under concrete floor slabs cast on ground:

First 50mm below slab: sand blinding.

Remainder: 100mm crushed rock for non-suspended slab.

Remainder: approved excavated material for suspended slabs.

Back-fill: approved excavated material unless otherwise specified.

To retaining walls or walls below grade: free draining granular material.

The filling types are as follows:

- A. Approved excavated material: the best of the clean inorganic excavated material, approved by the project manager.
- B. Hardcore: clean hard filling such as broken brick or stone rubble, consolidated in position.
- C. Porous filling: hard core graded from 40mm to 15mm.
 - Sand: salt free, loam free, packing quality.
 - Fine crushed rock: 15 to 5mm clean crushed rock.

203 Waterproof Membrane

Approved flexible polymeric film 0.2mm thick. Deliver underlays to the site in suitable protective packaging, bearing the name of the manufacturer. Handle and store the underlay so that it is not punctured, torn or otherwise damaged. Comply with AS/NZS 4200.

PART III EXECUTION

301 Examine Conditions

Identify the correct site. Obtain written verification from the project manager of the correct site. Ensure that survey pegs or markers are in place or visible. Obtain a current copy of site survey.
Start of work means total acceptance of conditions.

302 Excavations Generally

- A. Identify, confirm and locate the type, depth and type of services at the site so as to prevent damage or contact and in compliance with service owner requirements.
- B. Suspend ground works during inclement weather which would result in unsatisfactory work.
- C. Excavate accurately to shape and profile and keep free from loose earth and stones.
- D. Excavate generally as required or as shown on the drawings, including but not necessarily limited to the following:
 - Removal of footings and unnatural items to 900mm below grade.
 - Preparation of sub-grade as necessary. Refer clause 107.
- E. Trim the sub-grade surface evenly to the profiles shown on the drawings.
- F. Make allowance for settlement and compaction.
- G. Allow for falls in slabs on grade to streets, lanes and outlets.
- H. Prepare for underground services, referred to in other trade sections of the specification.
- I. Prepare for strip footings, footing beams, pad footings, ducts and pits, to depths shown.
- J. Carry out additional excavation where necessary to permit full use of suitable mechanical equipment (e.g. rippers) and back-fill with appropriate material as specified in this trade section.
- K. Where excavation exceeds the required depth, fill back to correct depth with material as follows:
 - below slabs on ground: hardcore.
 - below footings, beams and other structural elements: concrete of strength equal to the structural element, minimum 15MPa.

303 Disposal and Stockpiling of Excavated Material

Dispose of excavated material to approved locations.
Comply with relevant authorities' requirements regarding stockpiling.

304 Bad Ground

Should unsuitable material be encountered at the prescribed depths of excavation, or soft, wet and unstable areas develop during excavation, obtain instructions from the project manager before carrying out additional excavations. Back-fill and compact to the correct levels as directed.

305 Existing Services

Remove existing services and seal beyond the site boundaries.
Before demolishing and removing parts of building having existing services, i.e., electrical wiring, gas and water pipes, tanks etc., conduit or similar items embedded in them, notify the project manager, authorities having jurisdiction, and make sure that these items are out of service, as per service provider requirements so that they can be removed without danger.

306 De-Watering

Maintain excavations, levelled and filled areas free of water by temporary catch drains, sumps, pumping, bailing or whatever means are suitable and effective and in compliance with environmental requirements so as to prevent environmental spill or damage.
Immediately before placing concrete or masonry on ground, remove free water and foreign matter.
Prevent water flow over freshly laid work.

307 Shoring, battering, benching or Geo-Technical Engineer

Provide shoring, battering, benching or the engagement of a practising professional geo-technical engineer to ensure any excavation or trench requiring statute or local compliance, meet such requirements, and as necessary to retain the sides and ends of the excavations and to ensure the controls are documented in the Safe Work Method Statement. Provide safety covers over holes greater than 100mm. Provide necessary underpinning or support for adjacent buildings or structures to the requirements of an independent practising professional geo-technical engineer..
Order the provision of additional support.
No instruction relieves the builder of sole responsibility for the sufficient support of the excavation.
Guard against the formation of voids outside sheeting or sheet piling (if used), and should voids form, fill and consolidate them to approval.

308 Filling Schedule

Refer clause 202 above.

309 Bearing Surfaces in Rock

Where structural loads bear on rock, unless otherwise specified, scabble the rock face to give even plane bearing surfaces. Level unless required to be sloping or stepped.

Bored pier holes are to be taken a minimum of 150mm below the rock surface and the bottoms cleaned of loose matter.

310 Compaction

Place filling in layers not exceeding 150mm deep when measured loose.

Bring filling to optimum water content by watering, and compact each layer thoroughly and uniformly with a vibrating roller where practicable.

Hand tamp against ground or perimeter beams or walls.

Compact each layer of filling to obtain a uniform density of not less than 95% of the maximum density at optimum moisture content as determined by the dry density/moisture content tests set out in AS 1289.

Finish the base to the following tolerances:

Variation from designed level: 5mm

Variation from 3000mm straight edge: 5mm

311 Termite Treatment

Refer to trade section 02360 TERMITE CONTROL and 10290 PEST CONTROL.

312 Polymeric Waterproof Membrane

Lay on approved sand blinding - Refer clause 203. Where necessary, cut sheets to maximum practical width, to suit the layout, and arrange laps to face away from the direction of the pour.

Provide laps as recommended by the manufacturer, but not less than 200mm. Seal laps with pressure adhesives or tapes as recommended by the manufacturer of the underlay and ensure that the adhered surface of the underlay is dry and clean.

Take the underlay up walls to level of top of future concrete slab or as otherwise instructed. Seal service pipes and similar elements when they penetrate the underlay. Allow ample slack to avoid pulling at tape junctions.

Cover vertical or inclined surfaces in an unbroken sheet where possible. Otherwise arrange laps vertically to avoid pulling at joints. Fix at the top with tape or other recommended fixing.

Inspect membrane after laying and before concrete is poured. Patch and seal punctures.

313 Maintenance of Membranes And Underlays

Maintain the membrane or underlays in their best possible condition throughout the construction period.

Repair immediately, to the approval of the project manager, damage which does occur.

314 Site Investigation Report

315 Clean Up

On completion of work specified above, remove surplus materials imported to the site, level off surplus excavated material, or pile such material on the site as directed by the project manager.

316 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section includes but is not limited to supplying and installing a complete system of monolithic stabilised earth walls exclusively by a member of the Affiliated Stabilised Earth Group (ASEG) using the "Stabilform" formwork system and also includes:

Formwork.
Earth materials.
Cement.
Waterproofing of admixture.
Sealing of completed walls.
Testing of materials by NATA approved laboratory.

102 Related Work

Co-ordinate and co-operate with the following trades:

Site preparation – Excavation	Concrete
Structural steel	Carpentry
Plumber	Electrician
Mechanical Services	Wall surfacing trades

103 Quality Assurance

Structural adequacy certified by Registered Practising Engineer (RPE).

Perform the work solely under the direct control of a member of ASEG, see clause 101, who will select the tradespeople for the work and ensure that the work complies with the requirements of relevant statutory authorities.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1289	Methods for testing soils for engineering purposes.
	1289.3.1.1 2009.
	1289.3.2.1 2009.
	1289.3.3.1 2009.
	1289.3.4.1 2008.
	1289.3.6.1 2009.
	1289.5.2.1 2003.
AS 1428	Design for access and mobility.
	1428.1 2009 General requirements for access – New building work.
	<i>There are 5 other parts. 1992 – 2010.</i>
AS 3610.1 2010	Formwork for concrete – Documentation and surface finish.
AS 4678 2002	Earth-retaining structures

105 Submissions

The sub-contractor (member of ASEG) is required to submit for approval and testing, the materials required for the construction of stabilised earth walls and to provide written description of:

The location of material source with an estimate of the quantity of material available at the source.

Method of excavation of the material.

Proposed location of stockpiling of material, if necessary, at the site.

Safe Work Method Statement prepared for high risk works associated with this trade section to be documented and approved by the contractor prior to commencement of work controlled by a requirement of an Act, regulation, Code of Practice or Australian Standard.

106 Laboratory Testing of Materials

The materials to be tested are listed in clause 201 of this specification.

Arrange for tests to be performed by a NATA registered laboratory in accordance with its terms of registration.

A. Tests required include:

Soil tests

Consistency limits (Atterberg limits)

Liquid limit: AS 1289.3.1.1

Plastic limit: AS 1289.3.2.1

Plasticity index: AS 1289.3.3.1

Linear shrinkage: AS 1289.3.4.1

Particle size distribution: AS 1289.3.6.1

B. Testing by method 5.2.1: soil compaction and density determination of the dry/moisture content relation of a soil using modified compactive effort: To AS 1289.5.2.1 - 2003.

Include in the test reports:

1. Cement content by volume.
2. Elapsed time between addition of cement and compaction.
3. Date moulded.

4. The dry density corresponding to the maximum point on the moisture content/dry density curve as the "modified maximum dry density" in tonnes per cubic metre to the nearest 0.01
 5. The percentage moisture content corresponding to the maximum dry density on the moisture content to the nearest 0.5.
 6. The percentage of oversize material retained on the 19mm sieve or the 37.5mm sieve on which the material is retained whichever is applicable, to the nearest 1.
 7. When required, the plot of dry density against moisture content.
- C. Samples to be retained in the mould for 12 hours and air cured in an open environment for 7 days. Test results on the specimens to include:
1. Material retained on the 19.0mm sieve as a percentage of the moist mass in the original sample.
 2. Details of replacement of coarse material, if applicable.
 3. When a binder is used, elapsed time between addition of the binder and compaction.
 4. Moisture content at which specimens were compacted.
 5. Details of curing.
 6. Moisture content of specimens on completion of testing.
 7. Compactive effort applied, method of compaction, and number of layers.
 8. Dry density of specimens as compacted, to the nearest 0.01 t/m³ and if required percentage of maximum dry density of each specimen.
 9. If required, the laboratory moisture ratio of the material prior to compaction.
 10. The normal height and diameter of the specimens, in millimetres.
 11. Unconfined compressive strength, as the average of the strength of 2 test specimens to the following precision:
For UCS less than 1.0 Mpa, report to the nearest 0.02 Mpa.
For UCS between 1.0 Mpa and 2.0 Mpa, report to the nearest 0.1 Mpa
For UCS greater than 2.0 Mpa, report to the nearest 0.2 Mpa.
 12. When a binder is used, the method of preparation of the test sample.
- D. Conformance tests.
Characteristic adjusted compressive strength test
Samples to be taken from batch being placed on construction site. *1 specimen to be compacted for each test. Specimens to be compacted in a 90mm diameter x 200mm high cylinder.* Samples to be retained in mould for 12 hours and air cured in an open environment for minimum 7 days.
Report to include:
1. Identification of project and the manufacturer of the specimens.
 2. Date and location of sampling if possible.
 3. Identification of particular wall sample was used to construct.
 4. Date of test.
 5. Cement content by volume.
 6. The compressive strength, in megapascals, of each specimen.
 7. Aspect ratio of each specimen.
 8. The adjusted compressive strength of each specimen.
 9. The characteristic compressive strength.

PART II MATERIALS

201 Materials

- A. Materials may be gravels, laterite soils and soil blends.
Soil contents:
Organic content Less than 2%
Clay and silt content Material below .075mm to be below 20%
Sand content Material between .075mm and 4.75mm to be not less than 50%
Gravel content Material between 4.75mm and 75mm to be above 30%
Not more than 5% to be retained on 37.5mm screen size.
Cement content by volume to be 6% minimum to 10% maximum determined by Mix Design and Strength Evaluation test.
- B. Materials may also be:
Recycled crushed brick rubble.
Crushed building rubble from nominated supplier to supplier's standard.
Cement content to be no less than 10%. Proportion to be determined by Mix Design and Strength Evaluation test.
A minimum of 8% cement by volume to be used in reinforced earth walls.
- C. Compressive strength
Minimum characteristic compressive strength (Cca) of 2.5 Mpa.
- D. ASEG Plasticure
To be added at a rate of between 0.125 and 0.75 litres per tonne (1000kg) of dry mix. Rate will be determined by specific mix designs.
- E. Anchors and Fixing
1. Structural fixings
Ramset Chem Set Injection System. Structural fixing should be located no less than 150mm from top or side edge of the stabilised earth wall. Holes should be drilled a minimum of 3mm larger

- than anchor diameter and be thoroughly blown out before injecting epoxy resin. Any overspill in visible areas will need to be wiped away immediately.
2. Securing wall frames, window frames, door frames.
Secure by one of the following means:
Ramset Ramplug Nylon Plug Fasteners
Hilti HRD-H Plastic Frame Anchors
Avdel Excalibur Screw Bolts
 3. Fastening aluminium windows, pipes and cables, timber battens and components for electrical and plumbing installations.
Secure by one of the following means:
Hilti HPS-1 Impact Anchors
Ramset Nylon Anchors
Ramset Masonry Anchors

PART III EXECUTION

301 Examination

Inspect site conditions before starting work. Arrange with contractor for rectification found necessary to facilitate wall construction.
Start of work means total acceptance of conditions.

302 Damp Proof Course

Form a damp proof course (DPC) between the footings/slab surface and the stabilised earth walls, using an embossed plastic fabric strip suitable to the thickness of the wall.
Protect the face of a stabilised earth wall below finished ground level by application of a cement slurry "Silasec" admixture or similar. Do not compromise the damp proof course with surrounding soil or pavement built up higher than the footing or slab surface.

303 Formwork

Place formwork in accordance with ASEG written instructions and maintain in position for 12 hours after placement of material. Formwork to be documented in a document titled Formwork Plan and in accordance with an Act, Regulation, Code of Practice or Australian Standard as applicable.

304 Vertical Steel Reinforcing

Avoid steel reinforcing wherever possible due to complications with vertical shrinkage along the embedded steel. Lag vertical steel reinforcing to prevent stabilised earth adhering to and shrinking along the bar. Protect vertical and horizontal ends of exposed reinforcing to prevent contact with persons at or near the work location.

305 Construction Joints

Locate construction joints as shown on drawings. Form mechanical keys at each construction joint and fix 25 x 25mm bitumen impregnated foam strip to full height of wall. Foam strip to extend 100mm along floor or footing surface to ensure a complete seal at the bottom of the construction joint. Form 25mm V joint on both wall faces.

306 Chamfers

Form 45mm chamfer at ends of wall panels or exposed corners.

307 Electrical and Other Services

Seal electrical components to be cast in wall to prevent penetration of soil during compaction. Boxes to be located at heights specified. A minimum of 100mm cover to be allowed for cast in conduit, pipes, etc. Water pipes to be suitably lagged to prevent penetration by sharp stones during compaction or chemical reaction to pipes by associated chemicals etc.
Where conduits and pipes cross construction joints provide for a suitable means of absorbing movement without fracturing.

308 Placement and Finish

Place blended material in forms in 200mm (maximum) layers and compact within 2 hours of blending.
Surface finish to be generally consistent throughout with the colour and texture of an approved sample.

309 Construction Tolerance

Finish work true and free from bulging in the wall surface. The maximum allowable deviation from true position to be 10mm horizontally and 3mm vertically per 600mm formwork lift. Trueness of surface and joints to be in accordance with AS 3610.1 Class 3.

310 Anchors and Fixing

Locate accurately penetrations required for connecting walls to structural frames, window and door frames and other installations.
Refer clause 201 E for types of anchors.

311 Sealing of Stabilised Earth Walls

Internal walls: Seal with a water born acrylic sealer diluted sufficiently with clean water to allow deep penetration and clear low sheen finish.

External walls exposed to extreme wind-driven rain: apply a flood coating of a solvent born silane-siloxane system at recommended application rate.

312 Protection of Stabilised Earth Walls

Emphasise to other sub-contractors that the stabilised earth walls are off-form finished. It will be the builder's responsibility to remove any staining or markings on the walls caused by other trades or staining caused by leeching of hardwoods onto the walls.

313 Cleaning

Remove formwork and debris from each work area after stripping forms. Leave area clean to the satisfaction of the project manager.

314 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section includes but is not limited to the control and/or management of termites on building sites for both new and existing buildings.

102 Related Work

Co-ordinate and co-operate with each trade involved in the construction of the building, and in particular: Site Preparation

103 Quality Assurance

Where specialist sub-contractors are engaged, provide formal documentary evidence of experience and skills which meet the requirements of the Australian Standards.

104 References

Comply with applicable portions of the following Australian Standards which are requirements of the Building Code of Australia:

AS 3660	Termite management. 3660.1 2000 New building work. 3660.2 2000 In and around existing buildings and structures. <i>There is 1 other part, 2000.</i>
AS 4349	Inspection of buildings. 4349.3 2010 Timber pest inspections. <i>There are 2 other parts, 2007.</i>

Comply with requirements of statutory and local authorities having jurisdiction.

105 Submissions

Obtain a written statement, from each proposed sub-contractor tendering for the work, that the work to be performed will comply with the relevant Australian Standard.

106 Warranty

Provide a written warranty from the sub-contractor stating the period of years of protection from termite damage. Provide also a written statement that the work performed complies 100% with the requirements of AS 3660.

PART II MATERIALS**201 Acceptable Manufacturers**

Contact the Australian Environmental Pest Managers Association via www.aepma.com.au. Obtain a list of approved members who may quote for the work required.

202 Materials

The materials to be used are determined by the method chosen and adopted. Require the sub-contractor to supply a list of materials to be used.

203 Equipment

Provide equipment needed to effect a treatment which complies with the Australian Standards.

PART III EXECUTION**301 Examination**

Visit site and inspect conditions, comparing conditions to the drawings before delivery of materials to site. Rectify any discrepancy or unsuitability of substrata. Start of work means total acceptance of conditions.

302 Co-ordination

Arrange for co-operation of other trades to ensure effective pest control. Take care of materials. Prevent damage before and during installation.

303 Preparation

Co-ordinate with and ensure preparatory work by other trades is done prior to commencement of work and arrange for provision and fixing grounds.

304 Installation

Comply with appropriate Australian Standard. Take care of and protect surrounding work, including other finishes, equipment and components, during installation. Provide protective covering where necessary.

305 Installation Particulars

Comply in all respects with manufacturer's recommendations contained in technical bulletins. Call for technical advice where necessary. Refer clause 105.

Comply with occupational health, safety and environmental requirements of the statutory and local authority during the conduct of the works, including preparation of Safe Work Method Statement, training, instruction and supervision of involved workers.

306 Protection

Protect finished work.

307 Cleaning

Clean the site where work of this trade is performed.

Remove surplus material.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this section includes but is not limited to the distribution of cold water to sanitary and other fittings:

Site water distribution
 Filter media for water treatment
 Roof water collection tanks
 Potable water storage tanks
 Gravity feed tanks
 Fire fighting equipment
 Water supply wells
 Irrigation
 Other:

102 Related Work

Co-ordinate and co-operate with the following trades:

Sanitary sewerage	Piped energy distribution
Storm drainage	Irrigation systems
Fire hydrants and hoses reels	Plumbing fixtures
Finishing trades	

103 Quality Assurance

Perform the work of this section using tradesmen whose experience and skills meet the requirements of controlling statutory authorities.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1254 2010	PVC-U pipes and fittings for stormwater and surface water applications.
AS/NZS 1260 2009	PVC-U pipes and fittings for drain, waste and vent application.
AS 1357	Valves primarily for use in heated water systems.
	1357.1 2009 Protection valves.
	1357.2 2005 Control valves. <i>2 Amdts 2006, 2009.</i>
AS 1432 2004	Copper tubes for plumbing, gasfitting and drainage applications.
AS/NZS 1477 2006	PVC pipes and fittings for pressure applications. <i>1 Amdt 2009.</i>
AS 1628 1999	Water supply - Metallic gate, globe and non-return valves. <i>Plus 1 Amdt 2001.</i>
AS/NZS 2032 2006	Installation of PVC pipe systems. <i>Plus 1 Amdt 2008.</i>
AS 2118	Automatic fire sprinkler systems. <i>There are numerous parts covering domestic and commercial buildings</i>
AS/NZS 2492 2007	Cross-linked polyethylene (PE-X) pipe for pressure applications.
AS 2537 2011	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. <i>There are 5 parts.</i>
AS/NZS 3500	Plumbing and drainage.
	3500.1 2003 Water services. <i>Plus 2 Amdts, 2005 - 2010.</i>
	3500.1.1 1998 Water supply - Performance requirements.
	<i>There are several other parts, 1996 – 2012, plus Amdts.</i>
AS 3688 2005	Water supply – Metallic fittings and end connectors.
AS/NZS 4130 2009	Polyethylene (PE) pipes for pressure applications. <i>Plus 1 Amdt 2009.</i>
AS/NZS 4765 2007	Modified PVC (PVC-M) pipes for pressure applications.
AS 4809 2003	Copper pipe and fittings – Installation and commissioning. <i>Plus 1 Amdt 2003.</i>
AS/NZS 5065 2005	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications. <i>Plus 1 Amdt 2010.</i>
HB 263 2004	Heated water systems.

Comply with requirements of statutory authorities having jurisdiction.

105 Submissions

Before ordering scheduled material, submit required product data to the project manager, particularly where the specified material is not available and alternatives are offered.

106 Warranty

Provide the proprietor with warranties covering:

- A. Materials: in the form supplied by manufacturers of specified components.
- B. Installation, for years from the date of Practical Completion: the complete piping installation and the specified components to which it is connected.

107 Fees

Pay fees to the relevant statutory authorities.

- 108 As Built Drawings**
Comply with clause 40 of DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT.

PART II MATERIALS

- 201 Acceptable Manufacturers**
Before ordering materials obtain and provide to the project manager a written statement that items to be installed are approved by statutory authorities having jurisdiction.

202 Materials

Item	Type Required	Diameters
Pipes	Copper, polyethylene, polybutylene or galvanised steel	
Service line		Refer drawings or 25mm, 20mm or other
Branches to fittings		Refer drawings or 15mm or other
Other lines		
Jointing	Pushfit, capillary, brazed, compression, solvent-welded or other	
Valves		
Stop taps		
Fixing devices		
Other items		
Tanks – gravity feed		
Roof water tanks	Specify the construction of the platform under the tank in the appropriate roofing trade section. Also refer to 15450 WATER STORAGE TANKS	
Filter media		
Chrome plating	All exposed brass or copper pipes	
Other finishes		

- 203 Equipment**
Provide necessary equipment to effect a complete installation of each part of this section, including seals, jointing materials, flanges, etc.

- 204 Fabrication**
Fabricate components in a manner approved by the local authority and the project manager. Comply with requirements of relevant Australian Standards where applicable.

PART III EXECUTION

- 301 Examination**
Visit the site before delivery of materials, and compare conditions with those shown on drawings. Start of work means total acceptance of conditions.

- 302 Connections to Supply**
Arrange with the supply authority, obtain and install required meter equipment complete with meter housing, and connect in accordance with the authority's requirements.

- 303 Below Ground Installation**
Prepare trenches or openings and lay pipes at approved depth on approved base material. Lay out service trenches to minimize runs of pipes, drains and cables. Ensure statutory or local authority requirements for excavations and trenches are implemented, monitored and maintained to completion of works. On completion, back-fill with approved material and cover with approved material and consolidate as required by the statutory authority and the project manager. Maintain required distances between pipes of different sorts, and pipes and the structure. Record the type, location and depth of each service installed on a plan titled "As-built services plan". The plan to also show terminations and removed existing services and approvals of same from service owner(s).

- 304 Fabrication and Jointing**
Fabricate and join components to the project manager's and the authority's approval, to applicable Australian Standards and to the manufacturers' instructions.

305 Installation

Install components to the project manager's and the authority's approval, to applicable Australian Standards and to the manufacturer's instructions.

Co-ordinate with and protect workers in other trades, particularly where pipes pass through other elements of the building and plan relevant work to produce the whole installation in proper sequence and to statutory compliance by workers involved in the installation or affected by the installation works.

Ensure that interfaces are of appropriate size and type and are properly sealed.

Seal penetrations as needed to achieve a watertight installation. Refer to the warranty clause in Part I.

306 Testing

Cover no pipes, joints or connections until tested and passed by the relevant authority, and approved by the project manager.

Submit to the project manager copies of certificates issued by relevant authorities.

307 Protection

Protect work of this section from damage until Practical Completion is achieved.

308 Cleaning

On completion, remove debris and clean visible work to the project manager's satisfaction.

309 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of this trade section includes but is not limited to supplying and laying a complete system of sewer pipes as specified below and as detailed on (architectural or hydraulics engineering) drawings, including:
Sewer drains from each fitting or installation.

Sanitary pits and cleanouts

Sewer manholes, frames, covers

Sewer pumping stations (packaged)

Septic tank, drainage field and distribution boxes

Grease interceptor

Sand filter

Siphon tank

Connection to municipal sewer drains or other means of disposal.

102 Related Work

Co-ordinate and co-operate with the following trades:

Site preparation – Excavation

Bituminous concrete pavement

Concrete pavement

Plumbing fixtures

Storm drainage

Lawns and grasses

103 Quality Assurance

Perform the work of this trade section using tradesmen whose experience and skills meet the requirements of controlling statutory authority.

The project manager and engineer will make random inspections during the execution of the work.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1254 2010 PVC-U pipes and fittings for stormwater and surface water applications.

AS/NZS 1260 2009 PVC-U pipes and fittings for drain, waste and vent application.

AS/NZS 1546.1 2008 On-site domestic wastewater treatment units - Septic tanks.

1546.2 2008 Waterless composting toilets.

1546.3 2008 Aerated wastewater treatment systems

AS 1741 1991 Vitrified clay pipes and fittings with flexible joints - Sewer quality.

AS/NZS 2032 2006 Installation of PVC pipe systems. *Plus 1 Amdt 2008.*

AS/NZS 3500 Plumbing and drainage.

3500.0 2003 Glossary of terms.

3500.2 2003 Sanitary plumbing and drainage.

3500.2.1 1996 Sanitary plumbing and drainage - Performance requirements.

There are several other parts, 1996 – 2012.

AS/NZS 4494 1998 Discharge of commercial and industrial liquid waste to sewer - General performance requirements.

Perform work also in accordance with the regulations and requirements of the council's engineer, and drawings provided by council and engineer for the purpose.

Comply with requirements of any statutory authority having jurisdiction.

105 Submissions

Evidence of payment of all relevant fees.

106 Warranty

Provide to the proprietor a warranty covering:

A. Materials: in the form supplied by manufacturers of specified components.

B. Installation for years from the date of Practical Completion: the complete drainage installation.

107 As Built Drawings

Comply with clause 40 of DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT.

PART II MATERIALS

201 Acceptable Manufacturers

Before ordering materials obtain and provide to the project manager a written statement that items to be installed are approved by statutory authorities having jurisdiction.

202 Materials

Sewer drain pipes:

Tested vitrified clay with rubber ring joints.

UPVC sewer grade pipes with solvent joints.

Conform with local authority's requirements.
Pits: 20 MPa and comply with local authority's requirements.

PART III EXECUTION

- 301 Examination**
Visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site.
Start of work means total acceptance of conditions.
- 302 Records**
Obtain essential services information (Dial Before You Dig).
Record underground services including type, depths and physical location.
- 303 Trenching**
Prepare trenches or openings and lay pipes at approved depth on approved base material. Ensure statutory or local authority requirements for excavations and trenches are implemented, monitored and maintained to completion of works. On completion, back-fill with approved material and cover with approved material and consolidate as required by the statutory authority and the project manager. Maintain required distances between pipes of different sorts, and pipes and the structure. Record the type, location and depth of each service installed on a plan titled "As-built services plan". The plan to also show terminations and removed existing services and approvals of same from service owner(s).
- 304 Pipe Laying**
Connect with rubber rings and with inspection openings at 6 metre intervals and at bends and junctions.
Connect with materials appropriate to the pipes in accordance with manufacturer's instructions.
Provide inspection openings, bends and junctions required by authorities.
- 305 Pipes Below Structures**
Where sewer or drain pipes are laid below or under structures, comply with requirements of local authority.
- 306 Connections to Other Services**
Seal thoroughly with water-tight material as recommended by component manufacturer.
Connect new lines to road or street sewer and drainage to the requirements of the relevant authority.
- 307 Testing**
Cover no pipes or joints until approved by the project manager and tested and passed by the relevant authority.
- 308 Backfill**
After inspection (and testing) where required, back-fill with approved material.
Such material requires approval from local council engineer and project manager. Remove materials not conforming to such requirements, without cost to the proprietor.
- 309 Protection**
Protect completed work from damage until Practical Completion. Make good damage if it occurs.
- 310 Cleaning**
Remove debris and clean areas where work has been performed, to project manager's satisfaction.
- 311 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

(Schedule of Sanitary Items at end of document)

END OF SECTION

PART I GENERAL

101 Scope

The work of this trade section includes but is not limited to, supplying and laying a complete system of site stormwater drainage and:
Excavation, bedding and backfilling for drain lines
Foundation drainage piping
Agricultural drains (including plastic)
Drains below slabs on ground
Culverts, pits, manholes, frames, covers
Water retention pits
Connection to main street drain or other nominated outlet.

102 Related Work

Co-ordinate and co-operate with the following trades:
Site preparation – Excavation Bituminous concrete pavement
Concrete pavement Masonry unit pavers
Concrete Landscaping trades

103 Quality Assurance

Perform the work of this trade section using tradesmen whose experience and skills meet the requirements of controlling statutory authority.
The project manager and engineer will make random inspections during the execution of the work.

104 References

Comply with applicable portions of the following Australian Standards:
AS 1379 2007 Specification and supply of concrete. *Plus Supplement 1-2008.*
AS/NZS 3500 Plumbing and drainage.
3500.3 2003 Stormwater drainage. *Plus 3 Amdts, 2006 - 2012*
3500.3.1 1998 Stormwater drainage - Performance requirements.
There are several other parts, 1996 – 2012
AS 3600 2009 Concrete structures. *Plus 2 Amdts, 2010, 2013.*
Comply with requirements of any statutory authority having jurisdiction.

105 Submissions

Evidence of payment of all relevant fees.

106 Warranty

Provide to the proprietor a warranty covering:
A. Materials: in the form supplied by manufacturers of specified components.
B. Installation for years from the date of Practical Completion: the complete drainage installation.

107 As-Built Drawings

Comply with clause 40 of DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT.

PART II MATERIALS

201 Acceptable Manufacturers

Before ordering materials obtain and provide to the project manager a written statement that items to be installed are approved by statutory authorities having jurisdiction.

202 Materials

- A. Stormwater pipes concrete:
Reinforced concrete:
Unreinforced concrete:
- B. Stormwater pipes
Untested vitrified clay with rubber ring joints
UPVC stormwater grade pipes with solvent joints
Low density polyethylene
- C. Steel pipes
Galvanised steel
- D. Agricultural drains
Aggregate:
Manufactured plastic frame type:
- E. Culverts
Concrete metal or plastic:
Pits, concrete, plastic:

Manhole frames and covers:

PART III EXECUTION

301 Examination

Visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site.
Start of work means total acceptance of conditions.

302 Records

Obtain essential services information (Dial Before You Dig).
Record underground services including type, depths and physical location.

303 Trenching

Prepare trenches or openings and lay pipes at approved depth on approved base material. Ensure statutory or local authority requirements for excavations and trenches are implemented, monitored and maintained to completion of works. On completion, back-fill with approved material and cover with approved material and consolidate as required by the statutory authority and the project manager. Maintain required distances between pipes of different sorts, and pipes and the structure. Record the type, location and depth of each service installed on a plan titled "As-built services plan". The plan to also show terminations and removed existing services and approvals of same from service owner(s).

304 Pipe Laying

Lay pipes 600mm clear of walls.
Connect with rubber rings and with inspection openings at 6 metre intervals and at bends and junctions.
Connect with materials appropriate to the pipes in accordance with manufacturer's instructions.
Provide inspection openings, bends and junctions required by authorities.

305 Pipes Below Structures

Where drain pipes are laid below or under structures, comply with requirements of local authority.

306 Connections to Other Services

Seal thoroughly with water-tight material as recommended by component manufacturer.
Connect new lines to road or street drainage to the requirements of the relevant authority.

307 Testing

Cover no pipes, joints or connections until approved by the project manager and tested and passed by the relevant authority.

308 Backfill

After inspection (and testing) where required, back-fill with approved material.
Such material requires approval from local council engineer and project manager.
Materials not conforming to such requirements or not approved will be removed without cost to the proprietor.

309 Protection

Protect completed work from damage until Practical Completion. Make good damage if it occurs.

310 Cleaning

Remove debris and clean areas where work has been performed by this trade, to the satisfaction of the project manager.

311 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete installation of bituminous concrete paving including but not limited to:
 Excavation.
 Preparation of sub-grade.
 Base courses, laying and compaction.
 Concrete kerbing.
 Bituminous concrete surfacing.
 Lane marking.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Site preparation – Excavation Sanitary sewerage
 Storm drainage Concrete pavement
 Lawns and grasses Exterior plants

103 Quality Assurance

Provide data indicating that the tradesmen engaged for this project have a minimum of 5 years of experience in such work as required by this specification.
 Supply names of contacts, with telephone numbers, who can verify performance quality.

104 References

Comply with applicable portions of the following Australian Standards:

AS 2008 2013	Bitumen for pavements
AS 2150 2005	Hot mix asphalt – A guide to good practice.
AS 2758	Aggregates and rock for engineering purposes.
	2758.1 1998 Concrete aggregates.
	2758.2 2009 Aggregate for sprayed bituminous surfacing.
	<i>There are 5 other parts, 1996 – 2009.</i>
AS 2876 2000	Concrete kerbs and channels (gutters) - Manually or machine placed.
AS 4049	Paints and related materials - Pavement marking materials.
	<i>There are 5 parts and 1 Amdt, 2005 - 2007.</i>

AUSTROADS supplies a range of technical bulletins: www.onlinepublications.austroads.com.au.

Where relevant, comply with standards of pavement construction as available from your state road construction authority.

PART II MATERIALS**201 Pavement Construction Materials**

Comply with the material specification of the appropriate state road construction authority. Such specifications define materials required for various classes of load capacity.

For this project the appropriate specification is:

which defines
 Crushed rock:
 Base course:
 Aggregate:
 Bitumen:
 Cut back bitumen:
 Bitumen emulsion:
 Tack coat:
 Concrete kerbing:

202 Lane Marking

Local council will provide specification.

203 Equipment

Provide and employ equipment required for satisfactory completion of the work.

PART III EXECUTION**301 Examination**

Inspect the site. Determine conditions and ensure that suitable conditions exist at the time of start of work.
 Prevent delay in job schedule. Start of work means total acceptance of conditions.

- 302 Preparation**
Remove surface material to required depth. Test compaction capacity of natural material. Fill soft spots with crushed rock to required compaction. Shape to specified falls.
Allow for installation by other trades of drainage and other items.
Install concrete kerbing as specified in clause 201 above. Allow concrete to cure before installing basecourse.
- 303 Installation of Base Course**
Comply with state road construction authority, Spec No:
See clause 201 above or spread base course material in layers between 100 and 150mm thick. Compact to 100% of standard maximum dry density with minimum 10 tonne roller.
Employ a vibrating roller as necessary. Maintain damp condition of material until seal is applied. Employ 15 tonne roller for final compaction.
- 304 Testing**
Allow for 3 separate compaction density tests to be conducted in random locations by a NATA approved testing organisation. Should tests prove unsatisfactory, repair the work and repeat tests to a satisfactory result without cost to the proprietor.
- 305 Pavement Courses**
Finish pavement courses consisting of layers of wet-mix crushed rock to smooth and uniform surfaces and conform to the lines, grades and cross sections shown on the drawings, within the following limits:
A. Level: the top of each pavement course: within 10 mm of level shown on drawing.
B. Thickness: of the top course of the wet mix pavement: within the tolerance of +5, -10mm.
C. Shape: finished surface of the pavement course: within 10mm either way from a 3 metre straight-edge laid parallel to the centre line of the pavement or from a template placed at right angles to the centre-line.
- 306 Prime Coat**
Prime with cut back bitumen suitable for the surface of base material and prevailing weather conditions. Apply in compliance with state authority specification.
- 307 Tack Coat**
If required, apply tack coat to clean dry surface. Consulting engineer will determine necessity for this item. Apply in compliance with state authority specification.
- 308 Bituminous Concrete**
Prepare adjacent surfaces such as longitudinal joints, kerbs, channels, headers, manholes, etc. with a thin uniform tack coat. Install bituminous concrete with approved equipment in suitable climatic conditions. Form straight and waterproof joints with even texture and density.
Compact without delay, and finish smooth and true to established grades.
Thoroughly compact areas around kerbs, channels, manholes to same density as other surfaces.
Thickness of bituminous concrete is not to vary more than 7mm from that indicated on drawings.
Replace low or defective areas immediately by cutting out and replacing with fresh hot mix and compacting to conform to surrounding areas. Entire area is to be free draining on completion.
The finished work is not to be less than 97% of laboratory tested specified density.
- 309 Lane Marking**
Comply with local authority requirements regarding sizes of parking bays and traffic control.
Mark pavement surface as instructed. Comply with AS 4049.
- 310 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete installation of concrete paving including but not limited to:

Excavation
Preparation of sub-grade
Base courses, laying and compaction
Road construction
Concrete surfacing
Pedestrian pavements
Kerbs and channels
Lane marking.

102 Related Work

Co-ordinate and co-operate with the following trades:

Site preparation – Excavation	Storm drainage
Masonry unit pavers	Bituminous concrete pavement

103 Quality Assurance

Provide data indicating that the tradesmen engaged for this project have a minimum of 5 years of experience in such work as required by this specification.

Supply names of contacts, with telephone numbers, who can verify performance quality.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1289	Methods of testing soils for engineering purposes. <i>There are many parts, 1997 - 2009; each refers to a specific application.</i>
AS 1379 2007	Specification and supply of concrete. <i>Plus Supplement 1-2008</i>
AS 2876 2000	Concrete kerbs and channels (gutters) – Manually or machine placed.
AS/NZS 3661.2 1994	Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.
AS 3727 1993	Guide to residential pavements.
AS 4049	Paints and related materials - Pavement marking materials. <i>There are 5 parts, 2005 – 2007.</i>
AS/NZS 4671 2001	Steel reinforcing materials. <i>Plus 1 Amdt, 2003.</i>
HB 197 1999	An introductory guide to the slip resistance of pedestrian surface materials.

105 Submissions

Evidence of payment of all relevant fees.

PART II MATERIALS**201 Pavement Construction Materials****A. Road pavements**

Comply with the material specification of the appropriate state road construction authority. Such specifications define materials required for various classes of load capacity.

For this project the appropriate specification is:

which defines

Crushed rock:

Base course:

Aggregate:

Formwork:

Reinforcement fabric:

Concrete:

B. Pedestrian pavements

Base course:

Aggregate:

Formwork:

Reinforcement fabric:

Concrete:

C. Kerbs and channels

Base course:

Aggregate:

Formwork:

Reinforcement fabric:

Concrete:

Surface gratings :

202 Concrete
Comply with AS 1379.
Concrete Strength: 20 MPa (unless otherwise shown on concrete drawings) at 28 days.
Admixtures: none, except at the approval of the project manager.

203 Expansion Joints
Fill expansion and construction joints with the following material:

204 Equipment
Provide and employ equipment required for satisfactory completion of the work.

PART III EXECUTION

301 Examination
Inspect the site. Determine conditions and ensure that suitable conditions exist at the time of start of work of this section. Co-operate with other trades to prevent delay in job schedule.
Ensure that other trades will not be adversely affected by work of this trade.
Start of work means total acceptance of conditions.

302 Records
Where applicable, obtain essential services information (Dial Before You Dig).

303 Preparation
Remove surface material to required depth. Test compaction capacity of natural material. Fill soft spots with crushed rock to required compaction. Shape to falls indicated on drawings.
Allow for installation by other trades of drainage and other items.

304 Kerbs and Channels
Form and pour kerbs, gutters, combined kerbs and channels to the lines levels and profiles shown on drawings.

305 Installation of Base Course
Comply with state road construction authority, specification no.:
See clause 201 above or spread base course material in layers between 100 and 150mm thick. Compact to 100% of standard maximum dry density with minimum 10 tonne roller.
Employ a vibrating roller as necessary. Maintain damp condition of material until seal is applied. Employ 15 tonne roller for final compaction.

306 Testing
Allow for 3 separate compaction density tests to be conducted in random locations by a NATA approved testing organisation. Should tests prove unsatisfactory, repair the work and repeat tests to a satisfactory result without cost to the proprietor.

307 Pavement Lines and Levels. Refer Clause 309
Finish pavement to uniform surfaces and conform to the lines, grades and cross sections shown on the drawings, within the following limits:
A. Level: within 10 mm of levels shown on drawing.
B. Thickness: the thickness of the pavement: within the tolerance of +5, -10mm.
C. Shape: finished surface of the pavement course within 10mm either way from a 3 metre straight-edge laid parallel to the centre line of the pavement or from a template placed at right angles to the centre-line.
D. Install expansion and/or contraction material.

308 In-Situ Concrete Pavements
Form extents of pavement with sufficiently robust formwork to contain the concrete in fluid state without distortion during the placing and finishing stages.
Place concrete with approved equipment in suitable climatic conditions. Form straight and even expansion joints suitable to accommodate movement at appropriate spacings and between pavements and structure.
Screed/vibrate without delay, and finish true to established grades.
Thoroughly compact areas around kerbs, channels, pits to same density as other surfaces.
Vary thickness of concrete not more than 7mm from that indicated on drawings.
Replace low or defective areas immediately by cutting out and replacing with fresh concrete suitably keyed and compacted to conform to surrounding areas.
Form entire area so that it is free draining on completion.
The finished work is not to be less than 97% of laboratory tested specified density.

309 Pavement Finish
A. Road pavement: comply with state authority specification.
B. Pedestrian pavement: comply with AS 3727 and AS/NZS 3661.2.
Broom, medium, rough

Grooved
Patterned
Non-slip application
Other

310 Lane Marking

Comply with local authority requirements regarding sizes of parking bays and traffic control.
Mark pavement surface as instructed.
Comply with AS 4049.

311 Cleaning

Clean up leaving the whole pavement to the satisfaction of the project manager.

312 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

- 101 Scope**
Supply and install tactile warning surface material with necessary accessories required for the work.
- 102 Related Work**
Co-ordinate and co-operate with the following trades:
Concrete Floor tiling
Carpet tiles Other floor finishes
- 103 Quality Assurance**
Suppliers and installers need to be widely experienced in the class of work required for the work of this trade section. At a place selected by the project manager, construct a prototype of a completed installation 2 square metres in area. On completion of the prototype and approval by the project manager of aspects of the installation, the work remains in place and becomes the standard for the remaining work.
- 104 References**
Comply with applicable portions of the following Australian Standards:
AS 1428.4.1 2009 Design for access and mobility – Means to assist the orientation of people with vision impairment - Tactile ground surface indicators. *Plus 1 Amdt, 2010.*
AS 1884 2012 Floor coverings - Resilient sheet and tiles - Laying and maintenance practices.
AS/NZS 4586 2013 Slip resistance classification of new pedestrian surface material. *Plus 1 Amdt, 2005.*
AS/NZS 4663 2004 Slip resistance measurement of existing pedestrian surfaces.
HB 197 1999 An introductory guide to the slip resistance of pedestrian surface materials.

Comply also with instructions of manufacturers of materials to be installed.
- 105 Submissions**
Provide samples and data sheets of materials.
Obtain project manager's approval for each item before ordering.
- 106 Delivery, Handling and Storage**
Deliver materials in the packaging of the supplier, bearing the brand name, colour, thickness and other relevant data.
Store materials in a secure dry area away from other materials which may cause deterioration.
- 107 Warranty**
Provide a warranty covering aspects of the installation performed by this trade, against defective materials and workmanship for a period of years from the date of Practical Completion. The warranty includes a statement that the whole of the work has been carried out in accordance with AS 1884 and the instructions of the manufacturers of components in effect at the time of installation.

PART II MATERIALS

- 201 Acceptable Manufacturer**
- 202 Materials**
Warning of hazard indicators 600mm x 300mm tiles.
Colour: to be selected from range of 5.
Tactile indicators (direction of travel) 600 x 300mm tiles.
Colour: as above.
Refer drawings for locations and sizes of areas to be tiled.
- 203 Equipment**
Supply equipment required for the preparation of floor, and installation of materials as recommended by the material manufacturer.

PART III EXECUTION

- 301 Examination**
Examine the site conditions applicable to each installation and comply with AS 1884.
Start of work means total acceptance of conditions.
- 302 Preparation**
Prepare each area to be surfaced in accordance with AS 1884. Test the dryness of concrete sub-floor in accordance with AS 1884.

- 303 Installation**
Comply throughout with manufacturer's current written instruction.
- 304 Cleaning**
Remove excess adhesive and blemishes from the completed surfaces of flooring.
- 305 Protection**
Apply suitable hardboard or plywood to completed floors and maintain in position until final cleaning prior to Practical Completion.
Remove and replace work which cannot be successfully repaired or cleaned.
- 306 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

General: supply and install the complete unit masonry paving to areas indicated, including but not limited to the following:

- A. Labour and materials.
- B. Plant and equipment.
- C. Cleaning.

Surplus units: in addition to needed paving units, supply the following spare units for the proprietor's future use in the amendment to or repair of the paving:

102 Related Work

Co-ordinate and co-operate with the following trades:

Site preparation – Excavation	Sanitary sewerage
Storm drainage	Concrete pavement
Lawns and grasses	Exterior plants

103 Quality Assurance

Provide assurance from the manufacturer that the paving units are of the nominated type and that they comply with:

Approved samples: before commencing laying, arrange with the project manager to designate a beginning section of paving as the control sample. Each section of at least 2 square metres in area which, when approved, becomes the control standard for remaining sections of the work. Include in each sample the required edge treatment of paved areas.

104 References

Comply with applicable portions of the following publications, including, as appropriate, the Australian Standards to which they refer:

AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS 2876 2000	Concrete kerbs and channels (gutters) - Manually or machine placed.
AS/NZS 3661.2	Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.
AS 3727 1993	Guide to residential pavements.
AS/NZS 4455.2 2010	Masonry units, pavers, flags and segmental retaining wall units – Pavers and flags.
AS/NZS 4586 2013	Slip resistance classification of new pedestrian surface material. <i>Plus 1 Amdt, 2005.</i>
HB 197 1999	An introductory guide to the slip resistance of pedestrian surface materials.

105 Submissions

Submissions required prior to delivery:

- A. Name of proposed manufacturer of pavers.
- B. 2 of each paver as described below.
- C. Evidence of payment of any relevant fees.
- D. Copies of minutes of pre-installation conference.

106 Delivery, Handling and Storage

Deliver and handle materials on site and store in suitable, convenient locations to ensure no damage, deterioration or contamination.

PART II MATERIALS**201 Pavers (from Approved Manufacturers)**

Pavers	
Clay Pavers A	
General	
Type	1,2,3 or 4
Name	
Colour	
Size	
Special shapes	Same colour and manufacturer, [catalogue number]
Clay Pavers B	
General	
Type	1,2,3 or 4
Name	

Pavers	
Colour	
Size	
Special shapes	Same colour and manufacturer, [catalogue number]
Concrete Pavers 1	
Shape	Type A, B, C or X
Compressive strength	30 or 40 MPa
28 day Abrasion Index	1.2, 1.5 or 2.0
Name	
Colour	
Size	
Special shapes	Similar properties[catalogue number]
Concrete Pavers 2	
Shape	Type A, B, C or X
Compressive strength	30 or 40 MPa
28 day Abrasion Index	1.2, 1.5 or 2.0
Name	
Colour	
Size	
Special shapes	Similar properties[catalogue number]

202 Capping Layer, Sub-base and Roadbase/Basecourse Materials

Comply with:

- A. Capping layer:
Refer clause 104 above.
- B. Sub-base:
Refer clause 104 above.
- C. Roadbase:
Refer clause 104 above.
- D. Basecourse:
Refer clause 104 above.

203 Bedding Sand

Comply with:

Design manual.

204 Joint-Filling Sand

Comply with:

Design manual.

205 Edge Restraints

Timber, concrete, masonry.

PART III EXECUTION

301 Examination

Visit the site, inspect the conditions and compare them with the drawings.
Start of work means total acceptance of conditions.

302 Records

Obtain essential services information (Dial Before You Dig).

303 Excavation

Create the formation, maintain the sides and keep it free from water. Refer section 02315 SITE PREPARATION – EXCAVATION.

304 Edge Restraints

Install as detailed.

305 Base Construction

Spread, roll and consolidate in layers to create the required base courses to the thicknesses shown.

- 306 Bedding Sand**
Spread and treat to create a bedding sand course to the thickness shown.
- 307 Laying Pavers**
Lay to the patterns shown including needed trimming units at edges and against interruptions.
Comply with instructions in selected publications referred to in clause 104.
- 308 Joint Filling and Vibrating**
Fill joints and vibrate to create an interlocked pavement.
- 309 Extra Stock**
Retain at the site 0.5% of each different type of paver. Place these on the site in a location nominated by the project manager.
- 310 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.
Clean up and remove broken units, plant and the like, leaving the whole pavement in first class condition to the satisfaction of the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply materials and install an effective irrigation system to garden and lawn areas including but not limited to:
 Pipework.
 Fittings including timers.
 Outlets.
 Connection to main supply.

102 Related work

Co-ordinate and co-operate with the following trades:
 Site preparation – Excavation Water distribution
 Storm drainage Lawns and grasses
 Exterior plants

103 Quality Assurance

Contractor's qualifications: minimum 5 years' experience in similar work as required by the specification.
 Submit evidence of completed similar work with contact names and telephone numbers.

104 References

Comply with applicable portions of the following Australian Standards:
 AS/NZS 1477 2006 PVC pipes and fittings for pressure applications.
 AS/NZS 2032 2006 Installation of PVC pipe systems. *Plus 1 Amdt 2008.*
 AS 2698 Plastic pipes and fittings for irrigation and rural applications.
 2698.2 2000 Polyethylene rural pipe.
 2698.3 1990 Mechanical joint fittings for use with polyethylene micro-irrigation pipes.
 AS/NZS 4455 Masonry units, pavers, flags and segmental retaining wall units
 4455.1:2008 Masonry units.
 4455.3:2008 Segmental retaining wall units.
 AS 4678 2002 Earth-retaining structures

105 Submissions

- A.
- B. Shop drawing: provide a shop drawing showing precise layout of every component of the system and the location of each.
 Comply with Document 00800 clause 27, Shop Drawings.
- C. Submit samples of each component for approval of the project manager before ordering material.

106 Project Conditions

Inspect drawings and visit site. Check aspects of required work and refer any discrepancy to builder and/or project manager, for decision.

107 Warranty and Maintenance

Maintain the system against faulty workmanship and materials for weeks after Practical Completion.
 Replace any faulty component and restore to full operation at no cost to the proprietor.
 Refer Part III.

PART II MATERIALS**201 Materials**

Item	Detail
Pipes	UPVC Sizes: Each pipe to be marked with AS/NZS 1477
Pipe jointing	Solvent cement Over 65mm diam., rubber ring
Sleeve pipes under driveways and paving	90mm Class 9 UPVC
Pipes within sleeves	20mm copper or PVC
Gate valves	Size: 1 to each supply line of size to suit end of main supply line
Sprinkler risers	
Sprinkler heads	Compatible with delivery pressure of the main supply
Spray heads	

Item	Detail
Manual timers	
Protective boxes	1 to each time and gate valve

PART III EXECUTION

301 Examination

Inspect site and compare conditions to those provided in specification and drawings.
 Notify project manager of any discrepancy. Arrange with contractor for correction of any unsatisfactory condition.
 Start of work means total acceptance of conditions.

302 Preparation

Co-ordinate with contractor responsible for site preparation, trade section 02315 SITE PREPARATION - EXCAVATION, then make final preparation before installation of materials.

303 Trenches And Excavations

Prior to excavation of trenches, obtain approval of pipe runs. Minor adjustment in the system's layout will be permitted to clear existing underground obstructions. Repair costs to services damaged are the responsibility of the contractor performing this work.

Excavate mainline trenches to a depth so as to allow a minimum of 400mm cover from the top of the pipe to the ground surface. Excavate trenches for lateral spraylines to a depth so as to allow a minimum of 300mm cover from the top of the pipe to the ground surface. Excavate trenches to sufficient width to permit proper handling and installation of the pipe and fittings.

Obtain approval prior to backfilling trenches. Pipes to be firmly and evenly supported with clean backfill material free of rubble, stones and rocks.

Where rock and stone is incurred during the excavation works, back fill material over the pipe to be clean, white packing sand free of organic matter. Place sand layer 75mm depth from the top of the pipe.

Place trench backfill material in at least 2 equal layers. Each layer to be wheel-rolled with a backhoe or other approved compaction equipment and crown completed backfill 30mm higher than the surrounding surface to allow further consolidation.

Where solid rock is encountered in trench excavation, request an inspection of the open trench prior to further trench excavation in that area.

Rock to be measured in the solid jointly by representatives of the landscape contractor and the landscape project manager within the confines of the excavation and within the limits shown on the drawings or specified prior to backfilling. No allowance will be made for overbreak.

The irrigation contractor is responsible for the erection of all necessary barriers and safety signs to make trench work safe from public pedestrian entry. Under no circumstances are trenches to remain either open or partially open over night.

304 Installing Pipes

Install sprinkler lines or mains with a minimum cover as specified above. Interior of pipes to be kept free from dirt and debris. Open ends of pipe to be closed by approved means during the laying process.

Use red priming fluid and blue dyed solvent cement to joints. Ensure that excess solvent is carefully wiped free of joints and keep joints dry for 24 hours minimum to allow solvent cement to dry. Turn on valves to each station to flush lines out with water before fitting spray heads.

Ensure that no pipe lengths will carry water at greater than 1.5 metres/second velocity.

305 Sleeve Pipes And Thrust Boring (By Builder)

Thrust bore a hole of sufficient diameter under driveways and paths shown on plan to allow for insertion of 90mm Class 9 PVC along entire width of pavement. Install top of PVC sleeve pipe 40mm below existing pavement level.

306 Valves

Inform landscape project manager of any proposed change made in supply and installation of master valve. Allow for connection of pipework tees and junction elbows from the existing pipework out of the valve.

307 Sprinkler Risers

Install sprinklers on screwed 15mm schedule 80 PVC articulated risers. Set spray heads level with topsoil or at a level determined by the landscape project manager.

Securely brace the riser against vibration where the sprinkler head is in operation.

Flush out mains, laterals and risers with water before fitting sprinkler heads to risers.

308 Sprinkler Heads

Set sprinkler heads at dimension shown on plan. Set half circle sprinklers flush to edge of grass and garden or paving and grass or kerb.

Set sprinkler heads perpendicular to finished surfaces. Set heads at grade on shrub beds.

Discharge of water from sprinkler heads to be compatible to the pipe layout and delivery pressure of the main. Refer to the Schedule which lists valve sprinkler types. Make adjustments for throw of individual spray heads

prior to commissioning of service and Practical Completion. Adjust sprinklers to give complete even coverage at completion of installation. Install the sprayheads as nominated on the schedule.

309 Commissioning

Be responsible for the testing and satisfactory performance of the complete irrigation system.

A. Static tests

Prior to commissioning ensure valve stations close satisfactorily.

Pipework and fittings to be tested to the satisfaction of the landscape project manager to ensure there are no water leaks in the system.

B. Commissioning procedure: give 48 hours' notice to the project manager.

1. Upon completion of the above static tests in the presence of the landscape project manager commission the system in accordance with the following procedure.
2. Open each valve to test sprinkler operation. During this procedure only 1 valve station is to be open at any 1 time.
3. Test sprinkler operation by continuous operation for a minimum of 15 minutes for each valve.
4. Upon satisfactory completion of the above procedures the complete system is to be continuously operated for a minimum of 1 hour.

310 As-Built Drawing

Provide landscape project manager with the instruction manual and a copy of as-built drawing when applying for the Certificate of Practical Completion.

Drawing to clearly show pipe sizes, valve types and locations, fittings and control cable routes. Clearly and accurately notate dimensions of pipes. The landscape contractor to be issued with A1 or B1 size base map transparency sheets by landscape project manager for use in the preparation of as-built drawings.

311 Clean Site

Upon completion of the contract, leave the site in a tidy condition, free from rubbish and surplus excavated materials to the satisfaction of the landscape project manager.

312 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the landscape project manager.

END OF SECTION

PART I GENERAL

101 Scope

Supply and install wooden fences and gates including but not limited to:
Fence construction
Gate construction – NOTE: self-closing gate for swimming pool/external spa application.
Pickets
Hinges
Wire
Latches
Corrugated iron cladding.

102 Related Work

Related Work

Co-ordinate and co-operate with the following trades:

Concrete	Carpentry
Brickwork	Blockwork
Painting	

103 Quality Assurance

Where applicable, survey pegging by licensed surveyor
Submit evidence of experience appropriate to the class of work requires. Install under the direct supervision of a capable foreman with a proven background in the trade.

104 **References**

References

AS 1926 Swimming pool safety. *There are 3 more parts.*
1926.1 2012 Safety barriers for swimming pools.
1926.2 2007 Location of safety barriers for swimming pools. *Amdt 2011*

AS 2820 1993 Gate units for private swimming pools.

Technical Bulletin 8.1 Fences and gates, National Trust of Australia. Part 1 can be downloaded at
Boroondara Council site at www.boroondara.vic.gov.au/your_council/building-planning/heritage/ref
Or visit www.nationaltrust.org.au for a list of National Trust retail locations.

105 Submissions

Submissions
Where applicable, provide evidence of payment of relevant fees.

106 Delivery, Handling and Storage

Deliver, handle and store products so that damage, deterioration and loss will be prevented. Control delivery schedules to minimise long-term storage at site.

Store timber on site indoors, or above ground and cover with secure impervious material.

PART II MATERIALS

201 Material Suppliers

202 **Material**

- Material**
- A. Concrete for post bases:
20 mpa concrete. Refer drawings for size of base.
 - B. Sole plates and struts
Jarrah, or redgum, mirboo or preservative treated timber.
Size:
 - C. Posts (fence)
Material:
Size:
Post (gate)
Material:
Size:
 - D. Plinth
Material:
Thickness:
Height:
 - E. Rails
Material:
Size:
Top rail material:
Size (double splayed):
 - F. Pickets
Material:
Size:

- G. Shape at top:
Fastenings:
Galvanised nails
Galvanised screws
- H. Bracing at corners
Material:
Size:
- I. Railings
Material:
Size:
- J. Woven wire panels
Material:
Source:
Type (name):
Finish:
- K. Gates
Frame: Stiles

Item	Material	Size
Bracing		
Rails		
Panels		
Bottom rail		

- L. Hinges:
Galvanised steel
Name:
Size:
- M. Latch (bolt):
Material:
Type / name:
Finish:

PART III EXECUTION

301 Examination

Visit the site and inspect conditions. Check dimensions and compare aspects with the drawings and specification. Resolve differences before ordering materials or starting work.
Start of work means total acceptance of conditions.

302 Records

Obtain essential services information (Dial Before You Dig).

303 Preparation

Consult with project manager or proprietor before clearing site of the work. Obtain instructions regarding removing or retaining plants or trees existing near the new work. Construct adequate protection for plants to be retained. Prevent damage to plants. Remove from the site material not required. Consult with neighbours and reach agreement on methods of construction and access to work areas.

304 Installation

Establish exact location of fences and gates to be installed.
Excavate for posts to required depths and in correct locations. Prepare post bases for installation with either sole plates and struts, or for setting in concrete.
Set posts vertical and backfill around base. Check out posts for rails use galvanised fasteners throughout.
Complete the installation as detailed.

305 Hardware

Install scheduled hardware for gates. Ensure correct location for latches, keepers etc. and test satisfactory operation on completion.

306 Finishing and Cleaning

Prepare each surface scheduled to be stained or painted. Remove matter which could prevent satisfactory painting.

307

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, and install required furnishings including but not limited to:

102 Related Work

Co-ordinate and co-operate with the following trade sections:

Site preparation – Excavation	Bituminous concrete pavement
Concrete pavement	Fences and gates
Concrete	Painting

103 Quality Assurance

Work of this trade section will be performed by experienced craftsmen familiar with the quality required in this class of work.

Comply throughout with manufacturer's instructions.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1554	Structural steel welding. <i>There are 7 parts, 2003 – 2012.</i>
AS 1627	Metal finishing - Preparation and pre-treatment of surfaces. 1627.6 2003 Chemical conversion treatment of metals. <i>There are 6 other parts, 1997 – 2005.</i>
AS 4100 1998	Steel structures. <i>Plus 1 Supplement, 1999, 1 Amdt 2012.</i>
AS/NZS 4792 2006	Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialized process.

Comply with requirements of statutory and local authorities.

105 Shop Drawings

Comply with DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27.

Provide Shop Drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
Develop details not shown and in conformity with the indicative details shown.
- B. Take and confirm dimensions on site, before preparing shop drawings where possible.
- C. Submit detailed Shop Drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and full-scale templates of blocking, anchorages, sleeves and bolts installed by others.

106 Submissions

Where applicable, provide evidence of payment of relevant fees.

107 Samples

- A. Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. Approved samples establish quality of similar work of this trade section.
- B. Check on delivery: request project manager to check materials on delivery to site for quality, and materials not meeting the requirements of this specification or equal to approved samples will be rejected.
Return rejected materials to the fabricator at the fabricator's expense.
- C. Finish: provide samples of specified finishes when requested.

PART II MATERIALS**201 Materials**

Item	Manufacturer	Material	Size(s)	Model No.	Finish

202 Finish

Materials exposed to weather maybe either:

- A. Mild steel - hot dipped galvanised after fabrication or chromate pre-treated followed by polyester powder coating.
- B. Internal steel.
- C. Timber: refer section 09910 PAINTING.
- D. Other material: comply with manufacturers' recommendations.

Finish internal steel after fabrication with zinc rich organic primer, or with inorganic zinc silicate paint.
Comply with relevant codes of practice or manufacturers' recommendations.

203 Welding Steel

General: details of joints, the techniques of welding employed, the appearance and quality of welds made and the methods used to correct defective work to conform to requirements of AS/NZS 1554, Part 1.

Welds exposed to view: grind smooth to project manager's approval.

Concealed welds: grind smooth before galvanising.

Tack or skip welding: at regular intervals, very neat; not permitted if material is to be hot dip galvanised.

Remove weld spatter.

Certification: only welders who have previously been qualified by tests may weld.

204 Connection Design

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment.

Take possible care to prevent damage.

- A. Welding external items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts will be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Weld shop connections for steel fabrications, and bolt field connections.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Mill to a close fit machined joints. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.

205 Miscellaneous

- A. Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.
- B. Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.
- C. Fasten galvanised items with galvanised fasteners.
- D. Concrete bases: refer trade section 03310 CONCRETE.

PART III EXECUTION

301 Examination

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Start of work means total acceptance of relevant conditions.

302 Records

Obtain essential services information (Dial Before You Dig).

303 Preparation

Co-ordination with work of others: provide to each relevant trade foreman anchorages and drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

304 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage.
If damaged, return to shop for repair or replacement.
- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

305 Installation

- A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.
- C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field.
The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted.
Fabrications may be cut shorter with power hacksaws on site.
Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.
- D. Sharp edges: carefully remove sharp edges, corners of other material which can damage skin.

306 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

307 Protection

Cover Work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

308 Cleaning

Clean materials installed to the satisfaction of the project manager.
Remove temporary protective coatings.

309 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Provide and install plants and grassing in compliance with the requirements of the local authority, including but not limited to:

Trees.
Shrubs.
Plants.
Ground cover plants.
Fertiliser.
Mulch.
Stakes.

102 Related Work

Co-ordinate and co-operate with the following trades:
Site preparation – Excavation Irrigation systems
Lawns and grasses

103 Quality Assurance

Contractor qualifications: minimum 5 years' experience in similar work as required by this specification. Submit evidence of completed similar work with contact names and telephone numbers.

104 Submissions

Evidence of payment of relevant fees where applicable.
Submit data on sources of plant materials and manufacturers of other components.
Submit to project manager maintenance instructions for plant and other materials required by this specification.

105 Delivery, Handling and Storage

Arrange with builder for dates of delivery and installation of specified materials, completion of installation and maintenance arrangements. Move carefully. Minimise damage to plants.

106 Project Conditions

Inspect drawings and visit site. Check aspects of required work and refer any discrepancy to builder and/or project manager, for decision.

107 Warranty

Provide a warranty to the proprietor via the project manager that materials which fail within a period of year(s) from the date of Practical Completion will be replaced without cost providing maintenance is carried out as contracted, where maintenance is not performed by this contractor.

108 Maintenance

Provide an agreement form to be submitted to the project manager detailing those plants and other material for which maintenance will be undertaken and the period involved.

PART II MATERIALS**201 Material Suppliers**

Submit for approval names of suppliers of materials and manufactured items.

202 Materials Table

Name	Pot	Size	Height	Spacing	Quantity
Trees, deciduous					
Trees, evergreen					
Shrubs					
Ground covers					

203 Grasses and Mulch

Item	Type	Total Sq. Metres
Grass		
Grass		
Fertiliser		

Item	Type	Total Sq. Metres
Mulch		Average depth: Maximum size of particles:

204 Stakes

Stakes: Timber: 38 X 38mm or 50X 50mm
Ties: Refer Clause 306

PART III EXECUTION

301 Examination

Inspect site conditions, comparing conditions to drawings, before delivery of materials of performing required work. Start of work means total acceptance of conditions.

302 Records

Obtain essential services information (Dial Before You Dig).

303 Preparation

Prepare live materials in advance of installation to ensure satisfactory performance and growth rate after planting and/or placement at project site.

Co-ordinate with other trades to prevent delays.

Do not plant materials if soil is very wet or waterlogged or during extreme weather conditions, very hot, very cold, or very windy.

304 Planting Procedure, Shrubs and Ground Cover

Thoroughly soak the plant before planting.

- A. Clear mulch 500 - 1000mm around hole for replacement after planting.
- B. Over excavate each plant hole by at least twice the pot diameter and pot height.
- C. If the soil is very dry, fill with water and allow to drain completely.
- D. Fertilise at the rates recommended by manufacturer:
- E. Place the fertiliser in the bottom of the hole and cover with soil to ensure there is no contact between the roots and fertiliser. PROVIDE A SCHEDULE OF FERTILISER RATES.
- F. Place the plant into the hole and backfill with approved garden soil free from weeds, stones, clods of sub soil and other extraneous matter.
- G. Set plants plumb and level with the adjacent soil - ensure no soil is placed against the stem of the root crown.
- H. Form a "bowl" around the plant to hold at least 10 litres of water.
- I. Remove the plant label from the trunk of the plant. Tie to the stake (if available) or leave visible in the adjacent earth.

305 Advanced Trees

- A. Plant sizes: refer Planting Table for open rooted stock size. Not less than 2000mm high with root spread from 600mm - 1000mm depending on the trees height.
Pot grown plants are to be 600mm or 900mm diameter container and be 3000 - 4000mm minimum height.
- B. Handling: plants with bare roots ("open rooted stock"): protected from drying out by "healing in" i.e. roots are to be covered with mulch or good quality top soil and kept moist prior to planting by frequent watering.
Plants with a root ball may have their roots partially exposed to facilitate handling. Handling of the large container grown plants may only be done with a tree trailer and they are to be removed from the nursery and planted in a prepared hole in one operation.
- C. Planting Procedure:
 1. Thoroughly moisten plant roots before planting and soak all container grown stock.
 2. Dig hole of sufficient size, with domed bottom to take root ball without restricting the root diameter. Minimum diameter 600mm.
 3. If the soil is very dry fill with water and allow to drain completely.
 4. Cut back any roots that may have been damaged to healthy tissue.
 5. Fertilise at the rates recommended by the manufacturer (advanced deciduous trees):
Place fertiliser in the bottom of the hole and cover with soil to ensure no contact between roots and fertiliser.
 6. Planting: spread roots of open stock evenly in the hole. Do not bend tree roots to fit the hole. Place the tree into the hole to match level as it is grown in the nursery. Place by tree trailer for advanced container grown stock.
 7. Staking: allow to provide 3 hardwood stakes (50 X 50mm) per advanced tree, set a minimum of 450mm apart to avoid root damage. Use approved "webbing" type flexible monitor tree stability in prevailing winds before staking advanced trees.
 8. Gently cover the roots with approved garden soil in layers of 150mm and compacted around the perimeter of the hole with the foot to ensure no air pockets and root ends bend downwards.

Ensure roots are not pressed against bottom of hole. Do not back-fill too quickly or use lumpy soil.

9. Firm the soil gently with the foot to a level approximately 30mm below the surrounding soiled surface level to create "watering bowl."

306 Organic Mulch

Note: red gum mulch is not to be used.

After the placement and planting out of the plant material in all garden beds, supply and spread pine mulch to an average depth of 75mm (+/- 10mm). The mulch particle sizes are to be hammer-milled to a maximum of 20mm in any dimension to a minimum of 10mm, with an average of 15mm. Supply mulch free from soil clods, rocks and all other non-organic matter.

A sample is to be approved by the landscape project manager prior to supply and delivery to the site.

Mulch to finish level with timber plinths after settlement allowances of the top soil and mulch. In garden areas respread mulch over disturbed bed area. Keep mulch away from the trunks to avoid rotting at ground level.

In lawn areas place mulch after formation of the 'water bowl.'

Where the toe of a batter coincides with the edge of the garden, dig a 20mm wide x 150mm deep trench along the inside edge of the garden and back fill with mulch.

307 Staking And Tying trees

Stake evergreen trees with 2 No. 1800 x 38 x 38mm HW stakes driven 600mm into the ground.

Stake deciduous trees with 2 No. 2400 x 50 x 50mm HW stakes driven 600mm into the ground.

Tie trees to stake using "figure eight" ties of flexible rubber or canvas or approved equivalent.

308 Watering

Thoroughly water plants immediately after planting and at such times during the contract period as is required to maintain growth free from water stress. Each plant will require a minimum of 10 litres of water at the time of planting.

309 Maintenance And Establishment

A. General

Establish and maintain the works for a period of 13 weeks during which made good defects after the issue of the Certificate of Practical Completion by the landscape project manager.

Maintain horticultural practices, as well as rectifying defects that become apparent in the works under normal use including, but not limited to, the following items where required:

Watering

Mowing

Fertilising

Weeding

Reseeding

Pest and disease control

Staking

Replanting

Cultivation

Pruning

Aerating

Renovating

Top dressing

Maintaining site neat and tidy

B. Malicious unlawful damage

Rectify plants which are damaged or destroyed unlawfully by others during the Defects Liability Period.

Rectification includes replacement of stolen or severely damaged material with the proviso that the contractor's liability within the context of this clause is to be limited to the replacement once only of any individual plant or area of grass, the contractor being absolved of liability for any malicious destruction of the replacement.

Report such malicious damage to the project manager who will inspect the damage prior to replacement.

Immediately after the contractor has carried out the replacement request a further inspection and written approval of the replacement. Show such replacements on a site plan which is updated with each amendment duly authorised by the project manager.

C. Commencement of maintenance and establishment

Give the landscape project manager 7 days' notice that the works are practically complete for commencement of maintenance/establishment period. The landscape project manager will inspect the works. If any defects or deficiencies are found, rectify within 14 days.

D. Protection

Protect grassed and planted areas from damage, either malicious, irresponsible or accidental.

E. Mulched surfaces

Maintain mulched surfaces in a clean and tidy condition and reinstate if necessary.

F. Spraying

Spray against insect and fungus infestation if considered necessary by the landscape project manager in accordance with the manufacturer's directions.

G. Planted areas

Throughout the duration of the contract maintain in one of the following manners:

1. Individual trees or shrubs - a week free watering saucer of minimum diameter of 1m except in irrigated lawn areas.
 2. Planting beds - completely weed free surface within the surrounds of the bed.
 3. Mass planting areas - a completely cultivated surface (including cross cultivation) with a weed free watering saucer of minimum diameter of 500mm.
- H. Grass areas
Refer section 02920 LAWNS AND GRASSES.
- I. Watering
Grass, trees and garden bed areas are to be watered regularly so as to ensure continuous healthy growth. The minimum acceptable requirement for grass areas is 25mm of natural rainfall or its applied equivalent.
- J. Weeding and rubbish removal.
Remove rubbish and weed growth that may recur throughout the contract area, at weekly intervals, and maintain in a completely clean and tidy condition.
- K. Replacements
Replace at no cost to the proprietor plants and turf that are missing, unhealthy or dead, with replacements of a similar size and quality and identical species or variety to the plant which has failed.
- L. Soil subsidence
Make good soil subsidence or erosion which may occur after the soil filling and preparation operations.
- M. Tree ties
Tie trees to stakes as "figure 8" pattern. Refer clause 307.
- N. Pruning
Trees and shrubs as directed by the landscape project manager. Pruning will be directed for the maintenance and dense foliage or miscellaneous pruning as beneficial to the condition of the plants. Prune damaged growth.
- O. Insurance
The landscape contractor is advised to ensure adequate insurance to cover his work during the maintenance and establishment period.

310 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete installation of concrete including but not limited to reinforcement, damp-proof membrane, formwork and other items for:

Footings

Slabs

Walls

Columns

Ramps

etc. and as detailed herein and on drawings, and other incidental or consequential work which is or may become necessary to complete the work, including waterstops and other jointing devices.

102 Related Work

Co-ordinate and co-operate with the following trades:

Site preparation – Excavation

Structural steel

Concrete screeds

Concrete finishes

Coloured concrete flooring

Waterproofing and tanking

103 Quality Assurance

Supply and install required materials in compliance with drawings and specifications which form part of this contract and with further details and/or instructions issued during the currency of the contract.

The concreter is to be experienced in this class of work with an appropriately qualified foreman to supervise requirements.

104 References

Comply with the requirements of the following Australian Standards and maintain the ones marked with * on site during construction:

AS 1379 2007	Specification and supply of concrete. <i>Plus Supplement 1-2008.</i>
1554.2:2003	Stud welding (steel studs to steel) <i>Plus 1 Amdt 2003.</i>
1554.3:2008	Welding of reinforcing steel.
1554.4:2010	Welding of high strength quenched and tempered steels.
1554.5:2011	Welding of steel structures subject to high levels of fatigue loading.
1554.6:2012	Welding stainless steels for structural purposes.
1554.7:2006	Welding of sheet steel structures.
AS 1428	Design for access and mobility.
1428.1 2009	General requirements for access – New building work.
	<i>There are 5 other parts. 1992 – 2010.</i>
AS 2550.15 1994	Cranes - Safe use - Concrete placing equipment.
AS 2870 2011	Residential slabs and footings - Construction.
AS 3600 2009	Concrete structures. <i>Plus 2 Amdts, 2010, 2013.</i>
AS 3610.1 2010	Formwork for concrete – Documentation and surface finish.
AS 3799 1998	Liquid membrane-forming curing compounds for concrete.
AS 3972 2010	General purpose and blended cements.
AS/NZS 4200	Pliable building membranes and underlays.
4200.1 1994	Materials. <i>Plus 1 Amdt 1994.</i>
4200.2 1994	Installation requirements.
AS/NZS 4671 2001	Steel reinforcing materials. <i>Plus 1 Amdt, 2003.</i>
CIA Z6 2010	Reinforcement detailing handbook.
HB 71 2011	Reinforced concrete design in accordance with AS 3600 2009.
HB 84 2006	Guide to concrete repair and protection.

105 Submissions

Submissions required prior to fabrication:

- A. Builder's proposed Progress Schedule: include as a minimum, in bar chart form, the anticipated commencement and completion times of each major element, such as:
 1. Fabrication of formwork and reinforcing.
 2. Placing of concrete.
 3. Stripping of formwork.
- B. Product data including technical sheets, manufacturer's preparation and application recommendations of both formwork and reinforcing.
- C. Performance criteria: provide 2 copies of each of the following:

Waterstops and other accessories: submit manufacturer's product specifications, handling, installation and performance test data sheets for each product required.
- D. Shop Drawings: comply with the requirements of DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27 Shop Drawings. Provide the Shop Drawings showing the following information where appropriate to the item:

1. Layout of formwork and reinforcing (sectional plan and elevation) of complete assemblies.
2. Methods of assembly of formwork and reinforcing.
3. Methods of installation, including fixings, anchorage, caulking, flashings.
4. Junctions and trim to adjoining surfaces.

106 Delivery and Handling

Deliver materials in the same sequence as they are installed. Avoid double handling at the site. Co-ordinate delivery and fixing schedules to reduce use of cranes.

107 Project Conditions

- A. General:
- B. Measurements and Dimensions.
 1. Measurements: before ordering material or doing work, verify measurements and be responsible for the correctness of same. Submit differences found to the project manager in writing for consideration before proceeding with the work. No extra charge or compensation will be allowed on account of difference between actual dimensions and the dimensions indicated on the drawings.
 2. Where dimensions are given and marked "verify" or "verify in field", correct before submitting Shop Drawings. Where field conditions do not yet exist for taking or confirming of field dimensions, note Shop Drawings with "dimensions will be verified in field", before submitting.
- C. Be wholly responsible for protecting the work and the materials stored on the site. Take required measures to protect the work at times against fire, storm, theft, vandalism and other losses.

108 Warranty

Forward to the project manager a statement guaranteeing that the concrete complies with the approved mix design and attains the stated guaranteed strengths in days.

PART II MATERIALS

201 Formwork

- A. Formwork classes: comply with AS 3610.1 2010, Table 3.2.1, Formwork for concrete and as follows:
 1. Class 1 formwork for concrete surfaces visually of the highest attainable quality, best uniformity of texture. Excellent quality of edge and joint details.
 2. Class 2 formwork for concrete with uniform quality and texture over large areas. Built to close tolerances. Consistently good quality of edge and joint details.
 3. Class 3 formwork for concrete surfaces to be painted and concrete surfaces not otherwise specified or shown on the drawings. Good visual quality when viewed as a whole.
 4. Class 4 formwork for concrete surfaces to be rendered, tiled or concealed by other finishes and concrete surfaces permanently concealed in ducts, shafts and above false ceilings. Texture not important. Good general alignment.
 5. Class 5 formwork for footings, concrete surfaces in the ground and rear surfaces of retaining walls, piers, etc. Alignment and texture not important.
- B. Formwork materials: approved timber, plywood or pre-cast concrete.

202 Reinforcement

- A. General

All reinforcement: supplied, fabricated and fixed in accordance with the drawings and this specification. Refer discrepancies to the engineer for decision before proceeding with the work.

Be solely responsible for the supply, fabrication and placing of reinforcing steel.

Remove reinforcement which does not comply with the requirements of this specification and replace to the satisfaction of the engineer.

Comply with Australian Standards as follows: AS 3600 and AS/NZS 4671.
- B. Surface condition

Ensure that reinforcing is free from loose mill scale, rust, mud, oil, grease or other non-metallic coatings which would reduce the bond between the concrete and steel and is free from kinks or other defects, at the time of placing concrete.

When there is a delay between placing the reinforcement and pouring the concrete, the engineer may require the builder to restore the reinforcement to a condition satisfactory to receive concrete.

203 Concrete

- A. Cement: comply with AS 3972. Provide cement of 1 brand which has passed the standard tests not more than 3 months prior to use.

If not delivered as a component of ready-mixed concrete, deliver cement to the site in branded and sealed bags stacked under protective covers to prevent deterioration, so stacked that each batch delivered may be identified.

Remove from the site cement that does not comply with these standards or has been adversely affected in storage.
- B. Aggregate:

Maximum size of coarse aggregate: comply with AS 3600 and drawings.
- C. Water: water is to comply with AS 3600.

- D. Admixtures: none, except with prior approval of the engineer in writing.
If admixtures are used, comply with AS 3600.
- E. Ready-mixed concrete: grey ready-mixed concrete except areas as specified below, supplied by an approved manufacturer and mixed and delivered in accordance with the requirements of AS 1379.
Site-mixed concrete: subject to prior written approval of the engineer.
- F. Concrete strength: comply with stated compressive strengths at 28 days as noted or scheduled on structural drawings for various locations.
If not scheduled, provide 20MPa concrete.
- G. Waterproofing: add mixture. Refer section 07130 WATERPROOFING AND TANKING, System Type D.

204 Form Liners

205 Steel Welded Fitments in Concrete

Comply with engineer's requirements. Provide Shop Drawings. Comply in all respects with appropriate Australian Standards.

In addition, fabricated samples of each element may be required to be delivered to site and approved by the engineer before proceeding to fabricate the various production runs of the elements.

206 Fabrication of Reinforcement

- A. Fabricate, bend and weld in accordance with the standards laid down in AS 3600, the drawings, the requirements of this specification and to the satisfaction of the engineer.
 - 1. Where possible, bend steel prior to delivery, and always bend under heat.
- B. Do not bend or straighten in a manner which will damage the steel.
- C. Do not bend again a deformed bar of structural grade steel or cold work steel which has been bent and subsequently straightened or bent in the reverse direction within 20 bar diameters of the previous bend.
- D. Supply necessary support and spacer bar, though not necessarily shown on the drawings, to the satisfaction of the engineer.
 - 1. Unless otherwise shown, support top reinforcement with 12mm diameter support bars at 300mm centres on bar chairs at 1000mm centres.
- E. Paint ends of bars which are to be left projecting for longer than 3 days with a heavy coat of neat cement grout.
- F. Cover concrete reinforcement as shown on the drawings to tolerances in accordance with AS 3600.
- G. Tie wire: annealed iron wire not less than No. 16 gauge, or other approved fasteners, unless shown otherwise on the drawings. With the approval of the engineer, spot welding by the electric arc process may be used in lieu of the wire for selected locations.
- H. Welding (including spot welding) of hard grade bars is not permitted.
- I. Reinforcement from section of concrete which has been demolished and removed may only be re-used after inspection and approval by the engineer.

207 Bolts, Waterstops, etc.

Submit selected items to engineer for approval before ordering.

208 Waterproof Membrane

The supply and installation of the polymeric membrane is described in trade section 02315 SITE PREPARATION, clauses 203, 311 and 312.

PART III EXECUTION

301 Inspections

Where applicable, obtain essential services information (Dial Before You Dig).

- A. Examine ground condition upon which form props are placed. Be responsible for prop placement.
- B. The concrete works will be particularly inspected by the engineer at the stages as follows:
 - 1. After erection of formwork and before placing reinforcement.
 - 2. After placing of waterproof of membrane.
 - 3. After cores and embedments have been placed in the formwork.
 - 4. Immediately before each pour of concrete is commenced.
- C. Be responsible for the formwork and the quality of the stripped concrete.
- D. Keep records of each pour of concrete showing the following:
 - 1. Details and types of reinforcing steel.
 - 2. Date of pouring concrete.
 - 3. Area of structure where concrete placed.
 - 4. Area of structure where tests taken.
 - 5. Test results when available.
 - 6. Make these records available for inspection by the engineer.
- E. Start of work means total acceptance of conditions.

302 Formwork Generally

- A. Conform to the shape, lines, grades and dimensions of concrete as required by the drawing and construct of approved pre-cast concrete, timber or metal, in which bolts and screws in contact with concrete are countersunk. Provide sufficient strength to the structure to carry the concrete without

deflection. Tolerances of the concrete when stripped: in accordance with the appropriate clause of AS 3610.1.

- B. Be responsible for complete installation of formwork and for the condition of concrete after stripping.

303 Maximum Height Of Wall Forms

Arrange formwork so that maximum height through which concrete falls within the formwork does not exceed 2700mm for 230mm walls and thicker, 1800mm for walls 150mm thick or less, and in proportion for thickness between 150mm and 230mm.

Form openings at 1800mm horizontal spacing and tremmie pipes may be used. Pour concrete no higher than at least 150mm below the top of at least 1 of the side forms.

304 Fixing Reinforcement

- A. Unless otherwise shown on the drawings or directed by the engineer, measurements made in placing the reinforcement are to be to the centre-lines of the reinforcement.
- B. Support and wire together reinforcement with a 0.5mm soft wire ties or clips, or tack weld in accordance with AS/NZS 1554, to prevent displacement by construction loads.
- C. Use plastic-tipped metal chairs, metal hangers, metal spacers and other plastic, metal or concrete accessories as required for supporting reinforcement in accordance with the following:
Where the concrete surface is off form and exposed to view, internally or externally, provide accessories in which the portions in contact with the formwork are of plastic matching in colour the concrete paste.
Where the concrete surfaces are to be sandblasted, internally or externally, use only plastic or concrete accessories, matched in colour with the concrete paste, where in contact with the formwork.
- D. Weld, tie, clip or otherwise secure mesh reinforcement together by approved means at alternate intersections and at such other points as may be required.
- E. If necessary, support footing reinforcement on concrete blocks of adequate strength and size not to split under the loads they are required to carry.
Take particular care to ensure that wall and column steel is properly fixed in position by the use of plastic chairs clipped on to the steel and by steel spacers for wall reinforcement. Place such spacers in position prior to erecting the last shutter.
- F. Splices on reinforcement: splice only at locations approved by the engineer, with minimum lap lengths as shown on the drawings or welded to develop the full strength of the small bar in accordance with AS/NZS 1554.3
- G. Cover to reinforcement: allow clear minimum cover to reinforcing as shown on the drawings. Maintain this cover during concreting.

305 Construction Joints

Periods of stoppage in concrete of 3/4 hour or more are deemed to be construction joints.

When the location and type of construction joints are not shown on the drawings, submit proposed location and detail of construction joints to the engineer for his approval prior to the start of formwork placement. Site engineer will direct treatment before depositing the new concrete against a construction joint.

306 Bonding Fresh and Hardened Concrete

Before depositing new concrete on or against concrete which has set, re-tighten forms, roughen the set concrete surface, clean off foreign matter and laitance and thoroughly wet to engineer's approval. Remove excess water, cover the cleaned and wetted surfaces with a coating of 1:2 cement/mortar. Place the new concrete against this before the mortar has attained its initial set. Prior to placing concrete, submit a sample of concrete showing the degree of roughened and laitance removal proposed. The following procedures for preparation of construction joint faces are approved:

Vertical joints: paint face of form with an approved retarder. Strip form the following day and remove retarded concrete with air-water jet to bare exposed aggregate face.

Horizontal joints: spread 6mm bluestone chips on surface of freshly screeded concrete and blow off excess the following day with air-water jet.

Comply with instructions on engineer's drawings.

307 Building In

- A. Conduits and piping: place conduits and piping in concrete floors above the bottom steel and below the top steel. Do not dislodge reinforcement.
Where conduits and piping cross control joints, make provision for clip joints or some other means of absorbing movement without fracturing.
- B. Built-in bolts, etc.: accurately build in bolts, lugs and other fittings, provide holes and pockets as shown on the drawings. Prevent movement of these items during concrete pour.
Clear screwed or machined portions of fittings of mortar and grease.
Temporarily fill voids in sleeves, inserts and anchor slots and readily removable materials to prevent the entry of concrete into the voids.
- C. Waterstop: cast in waterstop as shown on the drawings, located in vertical wall joints or floor joints by the use of split shuttering or other means.
Use waterstop in the maximum possible lengths, mitre at corners and shop weld and seal at joints.
Make joints other than at changes of direction, in location approved by the engineer.
Adequately secure and support in the correct position during placing concrete.
- D. Grouting: attention is directed to the 05100 STRUCTURAL STEEL section of this specification.

308 Preparation for Placing of Concrete

- A. Immediately before placing concrete in excavation, ensure that the excavation is free from water and fallen materials and that the sides of excavations are such that no material will fall into freshly placed concrete.
- B. Ensure that formwork ready for the placing of concrete is complete, with surfaces smooth and clean, immediately before placing, remove excess water, mud and debris and secure reinforcement in place, remove surplus end of tie-twine, surplus nails and other extraneous metal objects in contact with the forms, make sure that expansion joint material, anchors, and other embedded items are in position. Give the engineer 1 working day's notice of the intention to pour so that approval may be given in time.

309 Access and Inspection Openings

Provide temporary openings at the base of the column and wall forms and at other points where necessary to facilitate cleaning and inspection. Intermediate openings for placing may be required by the engineer.

310 Transporting of Concrete

Convey concrete from the mixer to the place of final position without delay and by means that will prevent segregation and loss of materials.

Where necessary, transport concrete on substantial gangways or barrow runs supported on stools clear of reinforcement.

Remove hardened concrete and foreign materials from the inner surfaces of the conveying equipment.

311 Placing of Concrete

Place concrete in compliance with AS 3600.

312 Concrete Testing

- A. Generally: perform concrete tests in accordance with AS 1012 or subsequent amendment. Allow for the cost of making test specimens and for the supply of testing equipment and suitable personnel to carry out tests.
- B. Materials testing: submit in writing, test certificates from an independent laboratory registered with the NATA as evidence that materials used comply with the requirements specified. Allow the costs of such tests as required.
- C. Slump tests: provide slump tests reports on the first batch of concrete to be placed and at least once for every 20 cubic metres of concrete placed thereafter on that day.
If, in the opinion of the engineer, other batch of concrete appears to have an incorrect slump, conduct slump tests as directed by the engineer.
Slump tests are to be conducted by, and at the expense of the builder. Concrete will be considered as complying with the specified slump tests when it complies with AS 3600.
- D. Compression tests: the methods and frequency of sampling and the identification and testing of cylinders are to be in accordance with project control testing AS 3600.
- E. Acceptance and rejection of concrete: acceptance and rejection of compressive strength of concrete by the engineer will be in accordance with AS 3600.

313 Compaction of Concrete

- A. Compact concrete by mechanical vibration to the maximum practicable density, free of air or stone pockets. Concrete not vibrated will be rejected.
- B. Have on site sufficient vibrators of an approved pattern and keep 1 spare vibrator to every 2 active vibrators.
- C. To avoid segregation, place concrete in position and then vibrate. "Travelling" concrete by use of vibrators is likely to produce segregation and is not permitted.
Operate immersion type vibrators in a near-vertical position and insert and withdraw them slowly. Allow them to penetrate and revibrate the concrete in the upper portion of the underlying layer.
- D. Do not leave vibrators, when in action, lying unattended on formwork, reinforcing or in concrete. Keep vibrator heads clean and free of mud or other deleterious matter when inserted into the concrete.
- E. Vibrate concrete in layers not exceeding 450mm in thickness and avoid contact of the vibrating head with surfaces of the forms.

314 Floor Finishes

Finish floor slabs monolithically with steel trowel, or as detailed on drawings or on Schedule of Finishes.

315 Curing and Protecting Concrete

- A. Protect freshly cast concrete from premature drying and excessively hot or cold temperatures. Erect windbreaks to shield the concrete surface during and after placing. Maintain the concrete at a reasonably constant temperature with minimum moisture loss for the curing period, refer AS 3600. Take responsibility for the curing and protection of the concrete.
- B. Cure as soon as the surface of the concrete has hardened sufficiently to prevent damage but in no case later than 2 hours after the finishing operation has been completed.
 - 1. Cure by the following means:
 - 2. The use of waterproof paper, or
 - 3. The use of an approved polyethylene building film.The use of other approved moisture retaining covering.

If a method other than polyethylene film is adopted, secure the covering material against the concrete for the full length of edges and laps and at frequent intervals between so that no air circulation at the concrete surfaces occurs.

- C. Period of curing: continue final curing for 7 days for normal Portland Cement concrete.
For high early strength concrete, continue the final curing for 3 days.
Prevent rapid drying out at the end of the curing period.
Keep wet steel forms heated by the sun and wood forms in contact with the concrete during the final curing period.
- D. Temperature: when the mean temperature of the air during curing is less than 5°C, maintain the temperature of the concrete between 10°C and 20°C for the required curing period.
Where necessary, make arrangements to maintain this temperature in advance of concreting adequate for the purpose.
When the mean temperature of the air is in excess of 30°C during curing and moist curing is not employed, cover the surface with an approved heat reflecting plastic membrane. Apply this treatment for the whole of the curing period.
- E. Curing off-form concrete: take special care with curing off-form concrete to avoid differences in colour. Prevent rapid or localised drying-out during the first 7 days after pouring. Maintain the form face in contact with the concrete up to the moment of striking. Programme stripping times to ensure that surfaces throughout the job are exposed at similar ages, differing by not more than 4 and preferably 2 or less hours.
Ponding is preferable for horizontal surfaces. Use heavyweight covers, well secured and in continuous contact.
Apply curing compounds generously if used, to prevent local moisture loss.

316 Stripping of Formwork

Strip formwork in accordance with the recommendations of AS 3610.1, Table: "Recommended Minimum Stripping Times". If construction loads greater than the live load shown on the drawings are placed on the structure, fix emergency shoring and tomking to the satisfaction of the engineer.

317 Cleaning

Remove debris and form work from each area after stripping concrete as work sections are completed. Leave each area clean to the satisfaction of the project manager/engineer.

318 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

SECTION 03340 AUTOCLAVED AERATED CONCRETE PANELS

PART I GENERAL

101 Scope

Supply and install a complete installation of autoclaved aerated concrete panels, including, but not limited to all panels, inserts, panel erection, joint sealers and all accessories.
Provide all related services including transport, hoisting and equipment.

102 Related Work

Co-ordinate and co-operate with the following trades:

Structural steel	Autoclaved aerated concrete
Blockwork	Brickwork
Roof installation	Wall construction
Concrete	Waterproofing and tanking

103 Quality Assurance

- A. Carry out the work by a trained and approved contractor with previous experience in other projects of this type. Submit references, certificates and full details of their experience and supervised training in the erection and installation of aerated autoclaved concrete (AAC) panels.
- B. At a location as directed by the structural engineer, prepare a mock-up wall sample of AAC panels of approximately 1.8m². Notify the structural engineer 24 hours prior to wall construction.
Approval of wall to include adhesive mixing procedures. Designate sample as control sample for all project panel erection where procedures and sample have been approved.
Discard prototypes not approved by the structural engineer and construct additional prototypes and seek approval.
When approved for surface finish, and all tolerances, commence production. Match the approved prototype in each unit delivered to the site.
Submit samples of panels to be used and obtain approval before placing orders.
- C. As a condition of supply, the manufacturers of all panels, adhesives and surface coatings will be required to inspect the on-site construction of the sample wall and of the first batch of each type of panel and erection condition. The manufacturers/suppliers will be required to certify in writing to the structural engineer that the preparation and application procedures are in accordance with the manufacturer's product literature and have not in any respect breached the panel, adhesive or surface coating manufacturer's recommendations. This certification will identify the location and date of the inspection, the products used and include copies of the relevant manufacturer's printed instructions.
Following certification, do not vary the methods of preparation and installation from that certified by the manufacturer/supplier.

104 References

Comply with applicable portions of the following Australian and other Standards:

AS/NZS 1170	Structural design actions. <i>There are 5 parts, several Supplements and Amdts, 2002 – 2011.</i>
AS 1379 2007	Specification and supply of concrete. <i>Plus Supplement 1-2008</i>
AS 1418	Cranes (including hoists and winches). 1418.15 1994 Concrete placing equipment. <i>Plus 1 Amdt, 1995.</i> <i>There are several other parts and Amdts, 1991 – 2013.</i>
AS 3799 1998	Liquid membrane-forming curing compounds for concrete.

Comply with the requirements of local and statutory authorities.

105 Shop Drawings

- A. Refer DOCUMENT 00800, clause 27 for Shop Drawing requirements.
- B. Show on the drawings details that are necessary for manufacture, assembly, transport and installation of pre-cast members, including: sizes, dimensions and markings, reinforcement, full details of connections and inserts, concrete mix and type of cement, formwork type, project title and manufacturer's name, lifting attachments.
- C. Draw to a scale nominated by the structural engineers.
- D. The elevations are to show dimensions in mm which define the shape of the panel. Show the levels of the underside of the slabs to be supported, where corbels are required.
- E. Detail the location of adjacent ground levels, foundation heights, penetrations and door openings.
- F. Nominate lifting method and type with the drawings. Any re-design due to a nominated change by the builder will be charged for by the structural engineers at an hourly rate plus disbursements.
- G. Show on the drawings the type and location of anchorage devices, anchor rails, nailable tie plates brackets, reinforcing rods within panels or to be placed in joints, gap fillers, mortar types for joints and all other required material.
Prepare set-out drawings showing doors, windows and other openings, together with accurate sizes and location of fixings.
Ensure that all dimensions are checked at site before factory manufacture of panels

106 Approvals

Comply with all applicable requirements of the Building Code of Australia, and to the approval of the relevant authority. Perform all required tests and make all required submissions to obtain such approvals. All units are subject to inspection and approval by the structural engineer. The inspection will as far as possible be carried out at the ACC factory but the structural engineer may at his discretion defer inspection of any units until after delivery to site and such deferment is not to affect the contractor's responsibilities under the contract. Provide all requisite facilities and assistance for the structural engineer and project manager to inspect the units.

Give 2 working days' notice of:

Flashings in position

Frames in position

Panels ready for ring anchors to be poured.

Do not subcontract any part of the work of this section without prior approval of panel manufacturers.

107 Delivery, Handling And Storage

Comply with the code of practice for pre-cast and tilt-up concrete.

Protect pre-cast units from damage from the time of removal from the autoclave until the completion of the installation. In particular, protect against damage from the local crushing and chafing effects of lifting and transporting equipment, torsional loading, scraping and scouring.

During transport, protect all visible arrises with thick non-rigid inert non-absorbent crushable casings such as 50mm polyurethane foam.

Store and handle units in a manner approved by the manufacturer. Store units horizontally on edge where possible and supported on timber bearers. Handle and support to ensure that no overstress will occur during handling.

Keep units in storage clear of the ground, in positions where they cannot be walked on and are clear of materials capable of straining or marking.

Stack units so that they support their own weight only, and not that of other units.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

The acceptable manufacturer will supply all components and will be solely responsible for manufacture of panels, selection and supply of his recommended accessories as indicated on the Shop Drawings.

Materials not shown on Shop Drawings are required to be supplied by the contractor/builder.

Fixings are to be capable of developing sufficient anchorage strength in the material.

Protect reinforcement from corrosion before embedment in AAC, or mortar.

The structural engineer will be responsible for checking selected materials before installation.

203 Finish**204 Protection and Identification**

Clearly and permanently identify each pre-cast unit and relate to the units shown on the Shop Drawings. Place the identifying mark on a surface of no visual significance and include the date of casting. Do not give the same number to more than one unit.

205 Tolerances

Do not increase planar misalignment above a maximum of 2mm along butt joints. Do not vary the thickness and width of panels by more than 1 to 1.5mm from design sizes. Deviation from plumb, level or dimensioned angle is not to exceed 3mm per 3.5m of length of any member, or 6mm in any total run in any line. Deviation from theoretical position on plan or elevation, including deviation from plumb, level of dimension angle, is not to exceed 9mm total at any location. Do not exceed 3mm for any 3.5m run in any direction when there is a change in deviation.

Design panels to allow for deflection of structural supporting beams up to span/500mm.

206 Rejection Criteria

Panels are liable for rejection if any of the following defects occur:

A joint has been made at a location or in a manner not in accordance with this specification.

The construction tolerances have not been met.

The reinforcing steel has been displaced from its correct location.

Items embedded in panels or concrete have been displaced from their correct position.

The work can be shown to be otherwise defective.

Remove from the site panels requiring modification and replace with correct panels within seven days.

Inspect panels for hairline cracks before installation and on completion of each structural bay. Remove from the site panels with hairline cracks.

The structural engineer may permit panels liable to rejection to be retained on the following bases:

An appraisal of the statistical information related to the panel strength and appearance.

A structural investigation

Additional tests

Approved remedial work

Repair of damaged units

Demonstrate the proposed repair methods to the structural engineer and obtain his acceptance in writing of the method.

Repair exposed surfaces by using the same type of cement and mix proportions. The repaired unit is to have the same appearance and durability of a similar undamaged unit.

Remove panels finally rejected to the extent determined by the structural engineer.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site. Rectify conditions where necessary before start of work. Start of work means total acceptance of conditions.

302 Installation

- A. Comply with the code of practice for tilt-up and pre-cast concrete.
- B. Supply grout, temporary fixings, shims, braces, mortar, fire-proofing, protection, sealant, joining strips and flashings required for erection of units on the site.
- C. Erect pre-cast elements into their final positions with the specified tolerances and connect and joint in accordance with the requirements of the contract.
- D. Be responsible for the erection and method of erection, design and installation of bracing and shoring of the panels during construction, until the structure has been sufficiently completed to enable the panel to carry its own loads.
- E. No bracing is to be removed until approved in writing by the structural engineers.
- F. Submit a design of the braces intended to be used together with a plan detailing their use locations.
- G. Where cranes are used, comply with AS 1418.
- H. Installation of Sealants: install required sealants and jointing materials in accordance with manufacturer's instructions and to the satisfaction of the council engineer, structural engineers and project manager.
- I. Install panels in accordance with panel manufacturer's written instructions.

303 Scaffolding

Provide scaffolding where necessary.

Comply with Scaffolding Code of Practice and relevant Australian Standards.

304 Adjustment

Adjust panels to correct position in relation to support structure and each panel in relation to its neighbour.

305 Jointing

Complete joints as indicated on drawings. Joints may be varied or eliminated only with prior approval of the structural engineer.

306 Cleaning

Thoroughly clean all visible panel surfaces with brushes and approved material detergents. Achieve uniform finish throughout. Arrange for inspection by engineer and project manager on completion.

307 Protection

Protect all exposed vulnerable surfaces, edges, covers, etc. for the duration of the contract. Use materials and methods which will not harm pre-cast materials.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of this section includes but is not limited to:

- Preparation supply and execution of exposed aggregate finishes, grooved surface finishes, tooled finishes
- Preparation supply and installation of bagged finish.

102 Related Work

Co-ordinate and co-operate with the following trades:

Textured finish	Coloured concrete flooring
Cement render	Waterproofing and tanking
Concrete	

103 **Quality Assurance**

- A. The selected sub-contractor is to have a minimum of 5 years' experience in the application of the specified or similar material, and is to be known for reliability, performance and quality of work.
- B. At a location and time to be selected by the project manager construct a complete prototypical installation. Approx. 3m square of each type of finish is required. Include all elements provided under this section and finish in every respect. On approval by the project manager, the prototype will become the standard for the remaining work, and will remain as part of the work.
- Obtain approval for colour from the project manager.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS 1379 2007	Specification and supply of concrete. <i>Plus Supplement 1-2008</i>
AS 3610.1 2010	Formwork for concrete –Documentation and surface finish.
AS 3700 2011	Masonry structures. <i>There is 1 Supplement 2012</i>
AS 3799 1998	Liquid membrane-forming curing compounds for concrete.
HB 64 2002	Guide to concrete construction. Chapters 8 and 15.
CJA Z39-2008	Render finishes.

105 Delivery, Handling and Storage

Delivery, Handling and Storage
Deliver materials in sealed (where applicable) containers and store in a dry location on the site.

106 Submissions

The project manager will supply to the contractor a sample of the required material from the range obtained from the supplier.

The sample will indicate all aspects of the required finish, size of granules, colour, texture, finish etc.

An appropriate supplier's specification may be available from the project manager.

107 Warranty

Provide a warranty to the proprietor covering cracking, peeling and fading for a period of _____ years.

PART II MATERIALS

201 Acceptable Suppliers

202 **Material**

- A. Bagging
Mortar for bagging:
Same mortar as used for laying.
Colour : M3 mortar, with powdered metallic oxide pigment added to achieve a dry colour approved by the project manager.
- B. Description of finishes:

PART III EXECUTION

301 Examination

Inspect surfaces to be treated and notify project manager of any discrepancy or unsuitability of substrate.
Comply with manufacturer's recommendations regarding environmental conditions.
Start of work means total acceptance of conditions.

302 Preparation

Do not proceed with the installation in unsuitable weather.
Protect wood, metal, glass and other finished work during progress.

Make good damage in every respect at no additional cost to the proprietor.
Provide and install required scaffolding, hoisting equipment, etc. in accordance with statutory authority regulations.
Mask dissimilar materials adjacent to surfaces to be treated in order to avoid contact, e.g. metal frames and cappings. Do not apply material over soft surfaces such as jointing material.

303 Application

Apply in accordance with manufacturer's recommendations or approved sample regarding mixing of materials and application methods.

304 Finish

Match approved sample panel - refer clauses 103.

305 Protection

Protect finished surfaces against damage until Practical Completion.

306 Cleaning

At completion of work remove debris, scaffolding, erection materials, etc. and leave surfaces in a condition entirely satisfactory to the project manager.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

This trade sections specifies the requirements for finishing concrete floors. Refer Schedule of Finishes. The finishing includes but is not limited to:

Polishing
Colouring
Painting

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete	Concrete screeds
Waterproofing and tanking	

103 Quality Assurance

At a location and time to be selected by the project manager, construct a complete prototypal installation approximately 3m square. Include all elements provided under this section and finish in every respect. On approval by the project manager, the prototype will become the standard for the remaining work, and will remain as part of the work.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS 1379 2007 Specification and supply of concrete. *Plus Supplement 1-2008*

AS 2870 2011 Residential slabs and footings - Construction.

AS/NZS 3661.2 1994 Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.

AS 3799 1998 Liquid membrane-forming curing compounds for concrete.

AS 4586-2013 Slip resistance classification of new pedestrian surface materials

HB 64 2002 Guide to concrete construction.

Chapter 8, Part 2 Finishing Concrete flat work provides full descriptions of methods of finishing concrete floors.

HB 197 1999 An introductory guide to the slip resistance of pedestrian surface materials.

Cement Concrete and Aggregates Australia: Briefing 05: Polished Concrete Floors. Visit www.concrete.net.au

105 Delivery, Handling And Storage

Deliver materials properly packaged to the site in original, unopened containers with grade, type and quality indicated on the labels.

Store and protect materials raised above floor and kept dry until ready for use. Comply with hazardous substances/chemical regulation and code of practice.

PART II MATERIALS

201 Acceptable Manufacturers

202 Material

Pigment: Oxide, colours:

Concrete: N25 (25Mpa) recommended for polished concrete. 80mm slump mix.

Dry shake topping: 1 part cement

0.06 to 0.1 part oxide pigment

2 parts clean sharp sand

Chemical curing compounds: not recommended

Paint:

Bees wax

2 part clear polyurethane

PART III EXECUTION

301 Examination

Start of work means total acceptance of conditions.

302 Preparation

Prepare to apply finishing treatment at the agreed upon time arranged with the project manager.

303 Alternate Types of Finish
TYPE A: Coloured concrete

The finish is to be achieved in the following sequence:

- A. Apply wood float finish to poured concrete floor to desired smoothness
- B. Apply dry-shake mix to concrete surface. Repeat this if a variety of coloured pigment is to be obtained. Match sample approved by project manager.
- C. Machine float. "Helicopter" machine worked over the coloured concrete to required density and smoothness to match approved sample.
- D. Curing - membrane method.
Maintain damp for seven days. Cure to HB 64.

TYPE B: Procedure for grinding and polishing new and old concrete

Ensure that new concrete is cured and hard enough. (NOTE: if old concrete has a weak cement ratio, it tends to tear out the matrix when grinding. this leaves a rough finish with aggregates proud.)

- A. Avoiding or collecting generated dust to prevent persons breathing in dust, grind concrete with 60 grit diamonds to expose aggregates. Grind to a honed finish, using in stages, 36 - 60 and 120 grit to erase scratches left by diamond cutting.
- B. Thoroughly clean the surface free from slurry, grindings, grit etc.
- C. If concrete is porous or has holes or voids, grout with neat cement or approved equivalent, taking care to fill slightly above the surface by machine or by hand. May need to be re-done if grout shrinks as it sets.
- D. Next day, or sooner if grout is hard enough, polish off with 120 grit or 220 grit stone finish, depending on what is required.
- E. Thoroughly wash and clean the surface.
- F. Dry the surface to accept sealer. Check with sealer manufacturer regarding how dry the surface should be. If sealer is not dry enough, milky patches will appear after sealer is applied.
- G. Seal with approved proprietary-type, clear sealer:
 - 1. Water-based, epoxy/acrylic sealer.
 - 2. Solvent-based acrylic sealer.
 - 3. Two pack polyurethane sealer.
- H. When sealer is hard enough, buff sealer if required.

TYPE C: Application of colour finish

If floor is to be coloured with one overall colour, prepare a trial as per Clause 103.

- A. If hazardous substance or chemical is identified on Material Safety Data Sheet, for products to be used, follow manufacturer's requirements for storage, handling, decanting, mixing, use and disposal.
- B. Apply one or more coats by brush, roller or spraying with either:
 - 1. Epoxy resin.
 - 2. Solvent-based acrylic sealer.
 - 3. Colour primer coat, then two pack polyurethane sealer.
- C. Leave to cure for 24 hours or more if necessary.
- D. Buff the surface to remove any overspray or dust or pimples, then apply 2 or more coats of clear sealer. Buff for a higher gloss finish.

304 Protection

Protect the surface of the floor from damage until completion of the building by laying hardboard panels or other suitable material over the entire surface.

305 Paint

Test the finished concrete for moisture content. Refer to the paint supplier for acceptable moisture content before applying paint. Apply paint to manufacturer's instructions and to project manager's approval.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Provide and install a complete installation of pre-cast concrete work including but not limited to panels, inserts, panel erection, joint sealers and accessories.

Provide related services including transport, hoisting and equipment.

Note: the builder may choose on or off-site manufacture of pre-cast panels.

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete finishes	Structural steel
Concrete	Waterproofing and tanking

103 Quality Assurance

A. Quality is to be monitored by:

1. The builder.
2. The project manager and structural engineer.
3. Approved samples.
4. Approved installation sample.

Be fully responsible for the complete installation and the quality of:

1. Concrete mix.
2. Formwork dimensional control.
3. Reinforcement including maintenance of cover.
4. Colour matching.
5. Handling, loading and shipping.
6. Site handling, hoisting and storage.
7. Erection.
8. Sealants.

B. The engineer will provide an appropriate level of monitoring of the Quality Control Programme, which may include periodic or random (unscheduled) plant visits.

Inspections by the engineer will not relieve the builder of his responsibility to carry out his own inspection to ensure compliance with the specification and drawings.

Design of Panel Anchorage: ensure that the panels meet the requirements of fabrication, transport, unloading, handling or stacking of the panels.

Details of anchorage for lifting and fixing ferrules are to be approved by the Department of Labour and Industry.

C. The selected sub-contractor is to have a minimum of five years' experience in the application of the specified or similar material, and is to be known for reliability, performance and quality of work.

D. At a location and time to be selected by the project manager construct a complete prototypical installation approx. 3m square. Include all elements provided under this trade section and finish in every respect. On approval by the project manager, the prototype will become the standard for the remaining work, and will remain as part of the work.

Obtain approval for colour from the project manager.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1012	Methods of testing concrete. <i>There are 27 parts plus 1 Amdt, 1991 – 2000.</i>
AS 1379 2007	Specification and supply of concrete. <i>Plus Supplement 1-2008</i>
AS 1418	Cranes (including hoists and winches). 1418.15 1994 Concrete placing equipment. <i>Plus 1 Amdt 1995.</i> <i>There are several other parts and Amdts, 1991 – 2013.</i>
AS 1478.1 2000	Chemical admixtures for concrete, mortar and grout – Admixtures for concrete.
AS/NZS 1554	Structural steel welding. 1554.1 2011 Welding of steel structures. <i>Plus 1 Amdt 2005.</i> 1554.2:2003 Stud welding (steel studs to steel). <i>Plus 1 Amdt 2003.</i> 1554.3:2008 Welding of reinforcing steel 1554.4:2010 Welding of high strength quenched and tempered steels 1554.5:2011 Welding of steel structures subject to high levels of fatigue loading 1554.6:2012 Welding stainless steels for structural purposes 1554.7:2006 Welding of sheet steel structures
AS 2550	Cranes, hoists and winches - Safe use. <i>There are 14 parts, 1994 – 2001 plus 4 Amdts 1999-2009.</i>
AS 3600 2009	Concrete structures. <i>Plus 2 Amdts, 2010, 2013.</i>
AS 3610.1 2010	Formwork for concrete –Documentation and surface finish.
AS 3799 1998	Liquid membrane-forming curing compounds for concrete.
AS 3850 2003	Tilt-up concrete construction.

AS 3972 2010	General purpose and blended cements.
AS/NZS 4671 2001	Steel reinforcing materials. <i>Plus 1 Amdt, 2003.</i>
NP PCH 2009	Precast Concrete Handbook
CIA Z6 2010	Reinforcement detailing handbook.
NP 002-2006	Precast Industrial Buildings Detailing Manual. Available from www.nationalprecast.com.au

Comply with the recommendations of applicable parts of the following documents:
 "Ingal Specifier's Manual" from the Industrial Galvanizers Corporation website: www.ingal.com.au

105 Submissions

Submit a delivery, unload and placement plan.
 Certified lifting points to be identified by a registered, practising engineer.

106 Shop Drawings

- A. Refer DOCUMENT 00800, clause 27.
- B. Show on the drawings, details that are necessary for manufacture, assembly, transport and installation of pre-cast members, including: sizes, dimensions and markings, reinforcement, full details of connections and inserts, concrete mix and type of cement, formwork type, project title and manufacturer's name, lifting attachments.
- C. Draw to a scale nominated by the consulting engineers.
- D. Show dimensions in mm which define the shape of the panel. Where corbels are required, show the levels of the underside of the slabs to be supported.
- E. Detail the location of adjacent ground levels, foundation heights, penetrations and door openings.
- F. Nominate lifting method and type with the drawings. Any re-design due to a nominated change by the builder will be charged for by the consulting engineer at an hourly rate plus disbursements.

107 Delivery, Handling And Storage

Comply, as a minimum with the code of practice for tilt-up and pre-cast concrete.
 Co-ordinate delivery schedule closely with builder. Except as otherwise directed, deliver fabrications in the same sequence as they are to be installed. Avoid double handling at the site if possible, to minimise chance of damage to finishes. Co-ordinate delivery and fixing schedules with builder to reduce use of cranes.

108 Project Conditions

- A. General: refer to appropriate sections of the contract conditions.
- B. Measurements: before ordering material or doing work, verify measurements and be responsible for the correctness of same. No extra charge or compensation will be allowed on account of difference between actual dimensions and the dimensions indicated on the drawings. Submit differences which may be found to the project manager in writing for consideration before proceeding with the work.
 Dimensions: where Shop drawings are prepared by sub-contractors or suppliers, and indicate field dimensions which have not been taken, take such field dimensions before submitting shop drawings. Where dimensions are given and marked "verify" or "verify in field", correct before submitting shop drawings. Where field conditions do not yet exist for taking or confirming of field dimensions, note shop drawings with "dimensions will be verified in field", before submitting.
- C. Be wholly responsible for protecting the work from damage. Take required measures to protect the work at times against fire, storm, theft, vandalism and other losses.

109 Warranty

Forward to the project manager a statement guaranteeing that the concrete conforms with the approved mix design and that concrete has attained the required guaranteed strength in days.

PART II MATERIALS

201 Acceptable Manufacturers of Pre-cast Concrete Panels

202 Manufacturing Criteria

- A. Tolerances:
 Form pre-cast concrete within the general concrete tolerances specified for "Off Form" finishes as follows :
 Width/length thickness - dimensions up to 3,000mm +/- 3mm
 Dimensions over 3,000mm +/- 0.1% dimension.
 Plane of face and wind - dimensions up to 3,000mm +/- 6mm
 Dimensions over 3,000mm +/- 0.2% dimension.
- B. Limit cumulative error to the following criteria :
 Panel joints: minimum 10mm maximum 20mm
 Adjacent panel alignment:
 On external faces - a maximum error of 2mm
 Vertical plumb - a maximum out of plumb of 5mm
- C. Formwork
 Conform generally to the requirements of the relevant formwork sub-sections of AS 3610.1.

203 Materials

- A. Concrete and Reinforcement: comply with the requirements of the concrete specification. The concrete strengths and reinforcement properties: as noted on the drawings and/or as specified elsewhere in this specification.
- B. Jointing material to pre-cast panels: seal joints between pre-cast panels against water penetration and fire. Certify that the detail adopted is in accordance with the building regulations. Test results are to be submitted for approval by the council and consulting engineer.
Materials:
 - 1. External walls, fire-rated: (fire-rating to be determined by local council). Applied in accordance with fire-rating requirements, over closed cell polyethylene foam backer rod.
 - 2. External walls, not fire-rated: over closed cell backer rod as above.
 - 3. Internal joints: or approved equivalent.Installation of sealants: apply materials in accordance with manufacturer's instructions and to the satisfaction of council inspector and project manager.
- C. Concrete admixtures: comply with AS 1478.1. Obtain written approval from the consulting engineer for the use of admixture.
- D. Embedments: recess lifting attachments such as ferrules or other types of cast-in fixings and provide with an approved plug for sealing.
 - 1. Lifting attachments, clear holes and other temporary fixings for handling purposes are not to occur on visible faces of units unless approved as to size and position.
 - 2. Any fittings or cast-in fixings which will be exposed before or after erection: brass or hot dipped heavy duty galvanised after fabrication and drilling operations on them have been completed.
- E. Bond-breaker: use a coloured bond-breaker which will provide no suction and also no residual effects to the application of surface finishes.
- F. Waterproofing: add mixture. Refer section 07130 WATERPROOFING AND TANKING, System Type D.

204 Finish

Unless noted otherwise, the finish of the pre-cast units are to comply with the requirements for Formwork Class 3 in AS 3610.1 and as follows:

"Medium quality concrete, colour not critical but built to close tolerance."

The formwork is to be in accordance with:

205 Curing

Cure pre-cast in accordance with applicable portions of AS 3600. Steam curing is not permitted.

206 Protection and Identification

Protect pre-cast units from damage in accordance with the concrete specification from the time of removal from the mould until the completion of the project. In particular, protect units against damage from the local crushing and chafing effects of lifting and transporting equipment.

Provide additional protection which is required where concrete will be poured at levels above units which have been erected.

Clearly and permanently identify each pre-cast unit and relate to the units shown on the Shop drawings. Place the identifying mark on a surface of no visual significance and include the date of casting. Do not give the same number to more than one unit.

207 Defective Panels

Panels may be rejected by the consulting engineer or the project manager if they do not meet the specification or if they are damaged during erection.

Produce a standard of finish and general appearance of the panel commensurate with its use, location and also final surface coating. Rough finishing of surfaces, edges and arrises will not be accepted. Corbels will be finished to an off-form standard.

Rejected panel will be replaced with another panel within 7 days of notification of rejection.

208 Repairs

If the pre-cast units fail to comply with the performance requirements of the specification as applicable, and are thereby liable to rejection, the engineer may permit the units to be retained subject to approved remedial works.

209 Inspections

Give a minimum of 24 hours' notice to the consulting engineer during manufacture of the units at the following stages:

- A. The formwork being completed and ready for inspection.
- B. The completion of fixing of the reinforcement. Allow sufficient time for the carrying out of the inspection (not less than 2 working hours).
- C. The provision and fixing of cores and embedments. Allow sufficient time for inspection.
- D. The placing of concrete.

210 Testing of Concrete

Conform generally to the requirements of AS 1012.

211 Pre-Delivery Handling

- A. Follow code of practice for tilt-up and pre-cast concrete.
- B. Store and handle units in a manner approved by the engineer.
- C. Store units in a similar manner to final support conditions. Handle and support only from designed lifting points and ensure that no over-stress or permanent deformation will occur during handling. Adequately brace slender units to prevent lateral deformation.
- D. Keep units in storage clear of the ground, in positions where they cannot be walked on and clear of materials capable of staining or marking.
- E. Separations of packs used in storage are to be on inert non-absorbent materials such as polyurethane foam or PVC. Stack units so that they support their own weight only and not that of other units.
- F. Cover surfaces during storage or transport with non-staining waterproof paper or polyethylene sheet.
- G. Stresses in the units during handling and erection is not to exceed allowable stresses for concrete as set out in AS 3600.

PART III EXECUTION**301 Examination**

Inspect site before delivery of pre-cast panels.
Ensure that conditions at site are entirely satisfactory and ready to receive the work of this trade section.
Rectify base if situation found unsatisfactory.
Start of work means total acceptance of conditions.

302 Installation

- A. Ensure the code of practice for pre-cast and tilt-up concrete is used as a minimum standard for delivery, unloading, erection and installation of tilt-up and pre-cast concrete elements and other relevant statutory requirements for tasks or activities, i.e. work at height, hazardous substances etc.
- B. Supply grout, temporary fixings, shims, braces, mortar, fire-proofing, protection, sealant, joining strips and flashings required for erection of units on the site.
- C. Erect pre-cast elements into their final positions with the specified tolerances and connect and joint in accordance with the requirements of the contract.
- D. Be responsible for the erection and method of erection, design and installation of bracing and shoring of the panels during construction, until the structure has been sufficiently completed to enable the panel to carry its own loads.
- E. No bracing is to be removed until approved in writing by the consulting engineer.
- F. A design of the braces intended to be used is to be submitted together with a plan detailing their use locations.
- G. Where cranes are used, comply with AS 1418.
- H. Installation of Sealants: install required sealants and jointing materials in accordance with manufacturer's instructions and to the satisfaction of the council engineer, consulting engineer and project manager.

303 Adjustment

Adjust panels to correct positions in relation to support structure and each panel in relation to its neighbour.
Tighten bolts only after achieving optimum relationships.

304 Packing and Grout

- A. Where necessary, or specified, provide packers of the following materials: compressed fibre cement, galvanised steel, rigid high-impact plastic (where approved by the consulting engineer).
- B. Place packers so that no face is closer than 25mm to face of the panel. Size packers at least 150mm long in the direction of length of the panel.
- C. Provide "under" and "over" dowel pins as specified.
Grout pins after the panels are erected by injecting grouting using grout tubes.
- D. Fill the gap between the panel and its supporting base completely with a non-shrink inert, non-staining grout of a type to be approved by the consulting engineer. The method of application of this grout and the person applying it is to be approved prior to work commencing.
- E. Take care to ensure that the grout does not interfere with the waterproofing methods.

305 Cleaning

Thoroughly clean visible panel surfaces with brushes and approved material detergents. Achieve uniform finish throughout. Arrange for inspection by engineer and project manager on completion.

306 Protection

Protect exposed vulnerable surfaces, edges, covers, etc. for the duration of the contract. Use materials and methods which will not harm pre-cast materials.

307

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

Provide and install a complete installation of tilt-up concrete panel work including but not limited to panels, cast-in fitments, inserts, panel erection, joint sealers and accessories.

Provide related services including construction Shop Drawings, hoisting and equipment.

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete Structural steel

Waterproofing and tanking

103 Quality Assurance

A. Quality is monitored by:

1. The builder who is experienced in this form of construction.
2. The project manager and structural engineer, who will provide an appropriate level of monitoring of the Quality Control Programme, which may include periodic or random site visits.

B. Be fully responsible for the complete installation and the quality thereof, including:

1. Concrete mix.
2. Formwork dimensional control.
3. Reinforcement and cast-in connection and lifting assemblages, including the maintenance of cover.
4. Colour matching.
5. Site handling, lifting and positioning.
6. Levelling.
7. Temporary bracing.
8. Final bracing.
9. Sealants.

Submit evidence of minimum 5 years of experience in the manufacture and erection of tilt-up pre-cast concrete panels.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS 1012 Methods of testing concrete. *There are 27 parts plus 1 Amdt, 1991 – 2000*

AS 1379 2007 Specification and supply of concrete. *Plus Supplement 1, 2008.*

AS 1478.1 2000 Chemical admixtures for concrete, mortar and grout – Admixtures for concrete.

AS/NZS 1554 Structural steel welding.

1554.1 2011 Welding of steel structures.

1554.2:2003 Stud welding (steel studs to steel). *Plus 1 Amdt 2003.*

1554.3:2008 Welding of reinforcing steel.

1554.4:2010 Welding of high strength quenched and tempered steels.

1554.5:2011 Welding of steel structures subject to high levels of fatigue loading.

1554.6:2012 Welding stainless steels for structural purposes.

1554.7:2006 Welding of sheet steel structures.

AS 3600 2009 Concrete structures. *Plus 2 Amdts, 2010, 2013.*

AS 3610.1 2010 Formwork for concrete – Documentation and surface finish.

AS 3799 1998 Liquid membrane-forming curing compounds for concrete.

AS 3850 2003 Tilt-up concrete construction.

AS/NZS 4671 2001 Steel reinforcing materials. *Plus 1 Amdt.* 2003.

CIA Z6 2010 Reinforcement detailing handbook.

CCAA T55-2005 /

CIA Z10-2005 Guide to Tilt-up Design and Construction.

105 Submissions

Submit a cast, lift and management plan.

Certified lifting points to be identified by a registered, practising engineer.

Certification of completed structure, including panel retention in fire, by registered practising engineer.

106 Shop Drawings And Computations

A. Prepare Shop Drawings to requirements in DOCUMENT 00800, clause 27.

B. Submit with the above Shop Drawings, 2 copies of the computations showing that the panels have been designed in accordance with relevant regulations and Standards Australia codes, commensurate with the best current structural engineering design practice, to resist bending movements, shear forces and axial forces due to dead, live and impact loads endured in removing the panels from moulds, handling on site and in the pre-casting area, transporting and erection.

C. Draw Shop Drawings clearly and to scale and include the following information:

- Marking plans showing location of panels
- Dimensions and profiles of each member
- Reinforcement details
- Lifting, bracing and fixing insert details
- Connection and cast-in assemblage details
- Special details including openings and embedments
- Full lifting and handling details for each panel
- Concrete specification including strength at lift
- Weight of each panel.
- D. Approval of Shop Drawings relates to the consulting engineer's requirements of strength and detail only, and the builder remains responsible for the fitting together and completion of the work in accordance with the contract documents.

107 Project Conditions

- A. General: refer to appropriate sections of the contract conditions.
- B.
 1. Measurements: Before ordering material or doing work, verify measurements and be responsible for the correctness of same. No extra charge or compensation will be allowed on account of difference between actual dimensions and the dimensions indicated on the drawings. Submit differences which may be found to the project manager in writing for consideration before proceeding with the work.
 2. Dimensions: where Shop Drawings are prepared by sub-contractors or suppliers and they indicate field dimensions which have not been taken, take such field dimensions before submitting Shop Drawings. Where field conditions do not yet exist for taking or confirming same, note Shop Drawings with "dimensions will be verified in the field", before submitting.
- C. Be wholly responsible for protecting the work and the materials stored on the site. Take required measures to protect the work at times against fire, storm, theft, vandalism and other losses.

108 Warranty

Forward to the consulting engineer, a statement guaranteeing that the concrete is in accordance with the strength requirements specified, before attempt is made to lift the panels.

PART II MATERIALS

201 Acceptable Manufacturers

Connection devices, inserts:

202 Materials

- A. Concrete and reinforcement: comply with the requirements of section 03310 CONCRETE, clause 104. The concrete strengths and reinforcement properties: as noted on the drawings and/or as specified elsewhere in this specification.
- B. Jointing material to pre-cast tilt-up panels: the detail adopted is to be certified and in accordance with the state building regulations. Submit test results for approval by the council and the consulting engineer. Provide sealants and fire-rating material in accordance with the manufacturer's published recommendations. Materials:
 1. External walls, fire-rated: fire-rating to be determined by local council. Applied in accordance with fire-rating requirements, over closed cell polyethylene foam backer rod.
 2. External walls, not fire-rated: over closed cell backer rod as above.
 3. Internal joints:
- C. Admixtures: comply with AS 1478.1. Written approval from the consulting engineer is required for other admixture to be used.
- D. Embedments: lifting attachments such as ferrules or other types of cast-in fixings: recessed to allow patching with an epoxy mortar. Cast-in assemblies, fittings and fixings which will be exposed before or after erection: hot dipped heavy duty galvanised after fabrication operations of them have been completed.
- E. Bond-breaker: the curing compound and release agent (bond breaker) are to be compatible. Use a proven proprietary combined curing compound/release agent which will allow the specified finishes to adhere to the surface. Apply in accordance with the manufacturer's specification.

203 Connections, Inserts And Holes

- A. Describe on the Shop Drawings, the locations, sizes and types of fixing, hoisting, handling and erection devices.
- B. Mark distinctively the lifting ferrules on the panels so as to be easily identifiable from other types of ferrules. Locate accurately all components. Do not alter locations.
- C. Bolts, nuts, washers, lifting inserts and ferrules : hot-dip galvanised or zinc plated.
- D. Permanent brackets: mild steel, inorganic zinc silicate coated applied over completely rust-free metal.
- E. Submit design of braces intended to be used together with a plan detailing their use locations.
- F. Provide levelling pads consisting of one of the following :
Compressed fibre cement shims, in-situ concrete, or rigid high-impact PVC shims.

- G. Concrete levelling pads: at least 500 mm long x full thickness of the panel. PVC shims should be at least 150 mm long. The length of the pads is dependent on the panel bearing stresses.
- H. Grout or dry-pack the gap between the top of the supporting footing or slab recess with non-shrink mortar.
- I. Waterproofing: add mixture. Refer section 07130 WATERPROOFING AND TANKING, System Type D.

204 Testing of Concrete

Conform generally to the requirements of AS 1012.

PART III EXECUTION

301 Examination

- A. Inspect the site before commencing manufacture of pre-cast tilt-up panels.
- B. Ensure that the conditions at the site are entirely satisfactory and ready to receive the work of this section.
- C. Request rectification by builder if bases, floor slabs or situation is found unsatisfactory.
- D. Start of work means total acceptance of conditions.

302 Inspections

Give a minimum of 24 hours' notice to the consulting engineer for inspections of:

- A. The completion of fixing of reinforcement, ferrules, inserts and cast-in connection assemblies.
- B. The placing of concrete.

303 Design

- A. The reinforcement shown on the contract drawings is mandatory, and has been determined assuming expected construction procedures and in-service loads.
- B. Confirm or increase the documented reinforcement and fixtures to conform with engineer's assessment of the loads as defined above.
Modifications will be entirely at the builder's expense.

304 Formwork and Forming Panels

- A. Design formwork and construct to provide formed surfaces of a standard not lower than Class 2 as described in AS 3610.1.
- B. Support forms and brace to maintain position and shape during and after placing of concrete. Do not reduce the accuracy of the finished concrete shapes or vary the quality of the surface when repeatedly using forms.
- C. If the contractor elects to manufacture the panels using stack casting, pour a casting bed to the satisfaction of the engineer, and design stacked forms capable of withstanding manufacturing and casting operations without damage to panel lower in the stack.
- D. Approval may be given for stack casting on either internal or external floor slabs, if the contractor submits an acceptable procedure. Minimise damage to the floor slabs and repair damage to the satisfaction of the engineer.
- E. Do not proceed with stack casting of panels until the previous panel poured has attained sufficient strength not to be damaged by subsequent manufacturing operations.
- F. Stack casting of panels is not to exceed 6 no. panels or 1.2 M total thickness, whichever is the greater.
- G. Comply throughout with AS 3600 and AS 3850.
- H. Steam curing of concrete is not permitted.

305 Preparation for Lifting

- A. Prepare bracing for immediate connection after panels are lifted.
- B. Be responsible for the safety of operations at stages of the lifting and handling of the panels.
- C. Install levelling pads.

306 Tolerances

- A. Tolerances on the indicated finished dimensions of the pre-cast tilt-up panels at the time of assembly in the building: in accordance with AS 3600 and the following clauses.
- B. Exposed faces of panels: in one plane. Angles, unless otherwise shown, right angles.
- C. Maximum variation from plane is not to exceed 3 mm under any 3 metre length of a straight-edge in any position on the panel.
- D. Notwithstanding the above, do not exceed cumulative error as follows:
Panel Joints: Minimum 10mm, maximum 20mm.
Adjacent Panel Alignment:
On external faces - a maximum error of 2mm
Vertical plumb - a maximum out of plumb of 5mm
Joint plumb - a maximum out of plumb of 5mm

307 Finish

In the finish of the pre-cast tilt-up panels comply with the requirements for formwork and as follows:

Medium quality concrete, colour not critical but built to close tolerance.

Formwork: in accordance with:

308 Defective Panels

- A. Panels may be rejected by the consulting engineer or the project manager if they do not meet the specification or if they are damaged during manufacture or erection.
- B. The standard of finish and general appearance of the panels is to be of a standard commensurate with its use, location and final surface coating.
 - 1. Rough finishing of surfaces, edges and arrises will not be tolerated.
- C. Replace rejected panel with another panel without cost to the proprietor.

309 Lifting and Handling

- A. Comply, as a minimum with the crane code of practice.
- B. Be responsible for the erection and method of erection, design and installation of bracing and shoring of the panels during construction, until the structure has been sufficiently completed to enable the panels to carry their own loads.
- C. Erect pre-cast tilt-up panels into their final positions with the specified tolerances and connect and joint in accordance with these requirements.
- D. Handle, lift, and position pre-cast tilt-up panels in a manner which does not cause damage or cracking. Take up the weight gradually without snatch. When panels are being lowered, let down gently into position without impact.
- E. Adequately brace and support panels during handling. Erect and temporarily brace to ensure proper alignment and safety.
- F. Lower panels onto the levelling pads previously set at predetermined level. Locate each panel so that no alterations to the fixing are made, and that no subsequent slope or movement occurs, and that no undesirable stresses are built into the panels or connections.
- G. Provide necessary frames, braces, guys, wedges and other supports and secure in place.
- H. Grout or dry-pack the gap between the top of the supporting footing or slab recess with non-shrink mortar.
- I. Install grout, temporary fixings, shims, braces, mortar, fire-proofing, protection, sealant, joining strips and flashings required for erection of pre-cast tilt-up panels on the site.
- J. If in the opinion of the project manager or consulting engineer, panel after erection does not conform to the conditions specified for appearance and position, take down and replace at no cost to the proprietor.

310 Joint Sealing

- A. Do not seal joints until completion of installation of pre-cast tilt-up panels.
- B. Joint sealing to be done by an approved specialist sub-contractor who is well equipped for the work, skilled in the sealing of joints, and recommended by the manufacturer and/or supplier of the sealant as an approved applicator.
- C. Seal joints. Refer clause 202.

311 Protection

Protect the pre-cast tilt-up panels from damage from the time of removal from the forms until the completion of the project.
In particular protect panels against damage from the local crushing and chafing effects of lifting and handling equipment.
Protect vulnerable surfaces, edges, corners etc., for the duration of the contract. Use materials and methods which will not harm pre-cast materials.

312 Certification

Certification of completed structure, including panel retention in fire, to be obtained from a registered, practising engineer.

313 Cleaning

Thoroughly clean visible panel surfaces. Achieve a uniform finish throughout. Use approved detergents where necessary.
Arrange for inspection by consulting engineer and project manager on completion.

314 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

General: supply and build the brickwork shown on the drawings or needed to complete the brickwork, including but not limited to the following:

Labour and materials.

Building in of miscellaneous items provided by others.

Staging and scaffolding.

Cleaning.

102 Related Work

Co-operate and co-ordinate with the following trades:

Timber windows

Doors and door frames

Metal windows

Structural steel

Concrete

103 Quality Assurance

Approved samples: at the start of brick laying, arrange with the project manager to designate a beginning section of each type of face brickwork not less than 6 courses high x 1200 long as the control sample. When approved by the project manager, the section/s become the control standard/s for brickwork and remain part of work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1316 2003

Masonry cement.

AS/NZS 1576

Scaffolding. *There are 6 parts, 1991 – 2010 and 1 Amdt, 1992.*

AS 1672.1 1997

Limes and limestones – Limes for building.

AS/NZS 2904 1995

Damp-proof courses and flashings. *Plus 2 Amdts, 1998, 2013.*

AS 3700 2011

Masonry structures. *There is 1 Supplement 2012.*

105 Submissions

A. Submissions required with tender:

Name of proposed manufacturer of bricks.

B. Submissions required prior to ordering:

1. Product data: showing the following information where appropriate:

a. Manufacturer's name and product details including a designation of proposed types and sizes.

b. Other

2. Samples: submit if requested by the project manager.

C. Submissions required prior to delivery:

1. Four of each type of face brick to represent the range of colours, textures and surface, arris and shape irregularities.

2. Other.

106 Delivery, Handling and Storage

Co-ordination: reach agreement with the project manager about site provision for storage of sand, cement and other materials and for mixing of mortar.

Deliver, handle and store products in accordance with manufacturer's recommendations and prevent damage, deterioration or loss.

PART II MATERIALS**201 Bricks**

Type (Name):		Type (Name):	
Colour:		Colour:	
Size:		Size:	
Specials:		Vents:	
Shape:		Shape:	
Colour:		Colour:	
Size:		Size:	

202 Mortar and Grout Materials and Types

A. Materials: comply with AS 3700 as follows:

1. Mortar: restrict the amount of fine aggregate passing a 75 micron test sieve to 5% maximum.

2. Grout:
 3. Pigment: powdered metallic oxides used in accordance with the manufacturer's instructions.
 4. Refractory mortar: approved refractory mortar, treated as recommended by the manufacturer.
- B. Types: comply with AS 3700, providing materials in the proportions described below:
1. Mortar:

Classification	Mix Proportions (by volume) Type A Portland Cement	Building Lime	Sand
M1	0	1	3
M2	1	2	9
	1	2	8
M3	1	1	6
	1	0	5
M4	1	0.5	4.5

Mortar for load bearing brickwork: M3 (M4) (M2)

Mortar for grouted and reinforced brickwork: M3 (M4)

Mortar for non-load bearing brickwork: M3 (M4) (M2)

Mortar for repair of lime mortar brickwork: M1 (M2)

Mortar for bagging:

Same mortar as used for laying.

M3 mortar.

M3 mortar, with powdered metallic oxide pigment added to achieve a dry colour approved by the project manager.

Mortar for bagging:

Same mortar as used for laying.

M3 mortar.

M3 mortar, with powdered metallic oxide pigment added to achieve a dry colour approved by the project manager.

2. Grout: f_c not less than 12 MPa AS 3700.

203 Miscellaneous Materials

Comply with AS 3700 as follows:

- A. Wall ties and accessories:
Where building is to be located within 10 kilometres of the coast wall ties:
- B. Reinforcement:
- C. Lintels and other steel in brickwork:
Extend lintels 230mm minimum past each jamb of openings.
- D. Caulking: elastomeric sealing compound, coloured to match mortar; for general caulking including movement control joints:
Liquid polysulphide polymer.
Neutral silicone
- E. Head Restraint:
100 x 100 x 6 x 450 long mild steel angle masonry anchored to concrete soffit on either side of wall, at 1000 maximum centres.
- F. Damp-proof courses:
- G. Flashings:
Note: both to comply with AS/NZS 2904.
- H. Expansion joint material:
- I. Control joint material:

204 Steel Lintels

- A. Where brickwork is to be supported over openings and no special lintels are detailed, build in mild steel lintels, in accordance with the Building Code of Australia.
- B. Set angles with the first dimension vertical.
- C. Hot dip galvanise steel lintels in exterior openings.
- D. Fix angles to concrete columns or beams with the bearing leg cut and bent to the height of the vertical leg and bolted to concrete with 2 no. 16mm masonry anchors.

PART III EXECUTION

301 Mortar Mixing

Measure materials to ensure that the specified mix proportions are maintained as per AS 3700.

Mix in a suitable mixing machine until a uniform blending of the components is achieved.

Add water to create a mix that is as wet as can be conveniently used by the bricklayer.

Except for the previously specified methyl cellulose water thickener, use no chemical to affect the plastic or other properties of mortar or as a substitute for lime without the project manager's permission.

- 302 Mortar Life**
Re-tempering to replace water lost by evaporation is encouraged until initial set begins. Reject mortar which has begun its initial set and do not re-temper.
- 303 Preparation**
Ensure scaffolding, when provided is heavy duty type and compliant with the scaffolding code of practice and Australian Standards.
Review the project with other trades in relation to ducts, piping, conduits, thimbles, sleeves, etc. or other item penetrating or to be built into brickwork and co-ordinate their installation.
Obtain built-in items from their suppliers prior to starting brickwork.
Clean the surface of concrete before laying bricks thereon.
Set up pressed metal door frames plumb and level and brace as required. Maintain bracing until walls are at least 1000 high and frame grouting has set.
- 304 Laying**
General: comply with applicable provisions of AS 3700. Set out brickwork so as to reduce cutting to a minimum and, in facework, to avoid irregular or broken bond.
Make cuts in facework with a masonry saw.
Carefully position openings for other trades to eliminate cutting.
Build in accordance with the dimensions, thicknesses and heights shown on drawings, plumb, level and in the designated position within the tolerances of AS 3700.
Allow no part to rise more than 1000mm above adjacent unfinished work. Rake back advanced work, build brickwork in bond and avoid toothing wherever possible.
Build in as necessary reinforcements, arch bars, lintels, frames, straps, bolts, lugs, wall ties, metalwork, damp-proof courses and flashings, etc.
Provide weepholes 1200 mm apart over damp-proof course and flashings where these span across cavities.
Re-lay, in fresh mortar, bricks accidentally moved after initial laying.
Keep mortar stains to a minimum and protect horizontal ledges, finished sills and the like from mortar droppings as work proceeds.
Before mortar sets hard, remove excess mortar. Scrub brickwork within 24 hours of laying using a bristle brush plus detergent if necessary.
Protect new and incomplete brickwork with coverings, temporary bracing or the like - AS 3700.
- 305 Jointing and Finishing**
Joint thickness: 10mm within the tolerances given in AS 3700.
Joint finish brickwork for plaster: cut off flush.
Face brickwork:
Bagged finish: spread the mortar on exposed external/internal surfaces with a brush, sponge float, rough cloth or other suitable device and then rub to achieve a uniform texture approved by the project manager.
Protect adjacent surfaces as necessary and promptly remove bagging mortar spilt, splashed or otherwise lodged on them.
Carry out bagging as the work proceeds.
Carry out bagging as a separate operation after bricklaying has been completed.
- 306 Bonding and Tying**
Build work in stretcher bond.
Space wall ties in accordance with AS 3700.
Keep cavities clean and free from mortar droppings.
Fix to concrete or steel columns and at junction with concrete walls with frame ties built at least 250mm into brick joint and fix to the structure as close as possible to the course line.
- 307 Door Frames**
Build in door frames as the work proceeds. Generally allow for lugs at 400 to 450mm centres except FU door frames which have lugs to sizes and centres required by the fire test report pertaining to the particular type of door. Grout solid cavities behind frames.
- 308 Incidental Work**
Chases: refer to AS 3700, and, as far as possible, provide for chases to be made as the work rises. No horizontal chase may exceed 1200mm in length and no vertical chase may be closer than 600mm to an element providing lateral support. No chase may be more than 1/3 of the thickness of the wall.
Perform miscellaneous incidental brickwork as required throughout and for other trades. Make good after other trades.
- 309 Field Quality Control**
A. Tests.
Have the following tests performed in a laboratory NATA registered for the particular test. Supply copies of the resulting test certificates to the project manager.

TEST:	TEST METHOD:
For mortar: sampling method	Refer structural engineer

TEST:	TEST METHOD:
Chemical composition	
Other	
For brickwork: compressive strength	AS 3700 Appendix A
Bond strength	
Characteristic strength	AS 3700 Appendix B
Other	

- B. Test frequency.
 For mortar:
 For special masonry:
 For other masonry:

310 Cleaning of Facework

Take care to keep walls clean constantly. Should further cleaning be necessary, use hydrochloric acid not stronger than 5%, treating only a small area at one time. Wet the wall prior to applying the acid, work from the top down and thoroughly wash off after brushing. Do not leave acid solution on wall at stoppage of work.

311 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

On completion, clean up mortar droppings, debris, etc., remove scaffolding, make good put-log holes and blemishes and leave work in a first class condition.

Protect facework surfaces where necessary to avoid damage during other building operations.

END OF SECTION

PART I GENERAL**101 Scope**

General: supply and build the blockwork shown on the drawings or needed to complete the blockwork including, but not limited to the following:

Labour and materials.

Building in of miscellaneous items provided by others.

Staging and scaffolding.

Cleaning.

102 Related Work

Co-ordinate and co-operate with the following trades:

Structural steel

Doors and door frames

Concrete

Fire-rated doors and door frames

103 Quality Assurance

Provide manufacturer's certification that blocks supplied are of the specified type and strength and were manufactured in accordance with current Australian Standard.

Approved samples: at the start of blocklaying, arrange with the project manager to designate a beginning section of each type of facework not less than 6 courses high x 1200 long as the control sample/s.

When approved by the project manager, the sample/s will become the control standard/s for blockwork and remain part of work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1316 2003

Masonry cement.

AS/NZS 1576

Scaffolding. *There are 6 parts, 1991 – 2010 and 1 Amdt, 1992.*

AS 1672.1 1997

Limes and limestones – Limes for building.

AS/NZS 2699

Built-in components for masonry construction. *There are 3 parts, 2000 – 2002.*

AS 2701 2001

Methods of sampling and testing mortar for masonry constructions.

AS/NZS 2904 1995

Damp-proof courses and flashings. *Plus 2 Amdts, 1998, 2013.*

AS 3700 2011

Masonry structures. *There is 1 Supplement 2012*

105 Submissions

A. With tender: name of proposed block manufacturer.

B. Prior to ordering:

1. Product data: showing the following information where appropriate:

a. Manufacturer's name and product details including a designation of proposed types and sizes.

b. Schedule of lintels.

c. Other.

2. Samples: submit if requested by the project manager.

C. Submissions required prior to delivery:

2 of each type of unit described below.

106 Delivery, Handling and Storage

Co-ordination: reach agreement with the project manager about site provisions for storage of sand, cement and other materials and for the mixing of mortar.

Deliver, handle and store products in accordance with manufacturer's recommendations and prevent damage, deterioration or loss.

PART II MATERIALS**201 Blocks**

Machine made pre-cast concrete units with sharp arrises, free from distortion, cracks and other defects, uniform in colour and texture.

Supply hollow blocks except where otherwise specified or required.

Supply solid blocks where core holes would otherwise be visible or where required for fire-rating or other purposes. Match colour and texture of solid and hollow blocks in facework.

Supply matching half-blocks, half-height blocks, closers and lintel and bond beam blocks as required.

A. Strength Grade: 12 (other)

B. Colour:

C. Sizes and types:

202 Mortar and Grout Materials and Types

A. Materials: comply with AS 3700 as follows:

1. Mortar: restrict the amount of fine aggregate passing a 75 micron test sieve to 5% maximum.

2. Grout:
 3. Pigment: powdered metallic oxides used in accordance with the manufacturer's instructions.
- B. Types: comply with AS 3700, providing materials in the proportions described below:
1. Mortar:

Classification	Mix Proportions (by volume) Type A Portland Cement	Building Lime	Sand
M1	0	1	3
M2	1	2	9
	1	2	8
M3	1	1	6
	1	0	5
M4	1	0.5	4.5

Mortar for loadbearing blockwork: M3 (M4) (M2)
Mortar for grouted and reinforced blockwork: M3 (M4)
Mortar for non-loadbearing blockwork: M3 (M4) (M2)

Mortar for bagging:
Same mortar as used for laying.
M3 mortar.
M3 mortar, with powdered metallic oxide pigment added to achieve a dry colour approved by the project manager.

2. Grout: f_c not less than 12 MPa (AS 3700, Section 10.7).

203 Miscellaneous Materials

- A. Comply with AS 3700 as follows:
- B. Wall ties and accessories:
- C. Reinforcement:
- D. Lintels and other steel in blockwork:
Extend lintels 230mm minimum past each jamb of openings.
- E. Caulking: elastomeric sealing compound coloured to match mortar; for general caulking including movement control joints:
Liquid polysulphide polymer equal to Thioseal 5000.
Neutral silicone equal to Dow Corning 790.
- F. Head restraint:
100 x 100 x 6 mild 450 long steel angle masonry anchored to concrete soffit on either side of wall.
Proprietary anchor equal to Brunswick Sales Pty Ltd, Phone No. (03) 9768 3111 Fax No. (03) 9768 2913, MFA4/1 or MFA4/M/B at 1000 maximum centres.
- G. Damp-proof courses: Refer AS 3700.
- H. Flashings:
Note: both to comply with AS/NZS 2904.
- I. Expansion joint material: Refer AS 3700.
- J. Control joint material:

204 Steel Lintels

- A. Where blockwork is to be supported over openings and no special lintels are detailed, build in mild steel lintels, in accordance with the Building Code of Australia.
- B. Set angles with the first dimension vertical.
- C. Hot dip galvanised steel lintels in exterior openings.
- D. Fix angles to concrete columns or beams with the bearing leg cut and bent to the height of the vertical leg and bolted to concrete with 2 x 16mm masonry anchors.

PART III EXECUTION

301 Mortar Mixing

Measure materials to ensure that the specified mix proportions are maintained as per AS 3700.
Mix in a suitable mixing machine until a uniform blending of the components is achieved.
Add water to create a mix that is as wet as can be conveniently used by the blocklayer.
Except for the previously specified methyl cellulose water thickener, use no chemical to affect the plastic or other properties of mortar or as a substitute for lime without the project manager's permission.

302 Mortar Life

Re-tempering to replace water lost by evaporation is encouraged until initial set begins. Reject mortar which has begun its initial set and do not re-temper.

303 Preparation

Ensure scaffolding, if required is heavy duty type and compliant with the scaffolding code of practice and relevant Australian Standards.

Review the project with other trades in relation to ducts, piping, conduits, thimbles, sleeves, etc. or other item penetrating or to be built into blockwork and co-ordinate their installation.
 Obtain built-in items from their suppliers prior to starting blockwork.
 Clean the surface of concrete before laying blocks thereon.
 Set up pressed metal door frames plumb and level and brace as required. Maintain bracing until walls are at least 1000 high and frame grouting has set.

304 Laying

General: comply with applicable provisions of AS 3700. Set out blockwork so as to reduce cutting to a minimum and, in facework, to avoid irregular or broken bond.
 Make cuts in facework with a masonry saw.
 Carefully position openings for other trades to eliminate cutting.
 Build in accordance with the dimensions, thicknesses and heights shown on drawings, plumb, level and in the designated position within the tolerances of AS 3700.
 Allow no part to rise more than 1000mm above adjacent unfinished work. Rake back advanced work, build blockwork in bond and avoid toothing wherever possible.
 Build in as necessary reinforcements, arch bars, lintels, frames, straps, bolts, lugs, wall ties, metalwork, damp-proof courses and flashings, etc.
 Re-lay, in fresh mortar, blocks moved after initial laying.
 Keep mortar stains to a minimum and protect horizontal ledges, finished sills and the like from mortar droppings as work proceeds.
 Before mortar sets hard remove excess mortar. Scrub blockwork within 24 hours of laying using a bristle brush plus detergent if necessary.
 Protect new and incomplete blockwork with coverings, temporary bracing or the like - AS 3700.

305 Jointing and Finishing

Joint thickness: 10mm within the tolerances given in AS 3700:
 Joint finish blockwork for plaster: cut off flush.
 Face blockwork:
 Bagged finish: spread the mortar on exposed external/internal surfaces with a brush, sponge float, rough cloth or other suitable device and then rub to achieve a uniform texture approved by the project manager.
 Protect adjacent surfaces as necessary and promptly remove bagging mortar spilt, splashed or otherwise lodged on them.
 Carry out bagging as the work proceeds.
 Carry out bagging as a separate operation after blocklaying has been completed.

306 Bond Beams

Provide bond beams to block walls.
 Where possible, form bond beams continuous with lintels. Reinforce with mild steel rods bent as required to follow wall pattern. Lap a minimum of 400mm at joints and corners and tie with 18 swg wire.
 Provide clear space between rods and block shell and fill block with concrete as specified, compacted into the block and finished flush at top. Where block cavity leaves insufficient space for concrete infilling, grout with 1:2.5 cement: sand mortar.

307 Lintels, General

Refer to AS 3700, Table F4 of appendix F.
 Lintels may be of steel or reinforced masonry units, subject to approval of project manager.
 Build in steel lintels: Refer to specification in PART II, Clause 203 and 204.

308 Lintels, Concrete Masonry

Build block lintels occurring to heads of openings in block walls. Form with standard bond beam blocks of a thickness to suit the leaf and extend a minimum of 1 full block on either side of jamb or further as required to suit bonding. Allow for cutting of blocks needed to suit height of openings.
 Reinforcement: reinforce with structural grade mild steel bar in accordance with the following schedule:

Width of Bond Beam/Lintel	Span Reinforcing
90mm	Maximum 1000mm 1/12mm bar
140mm	Maximum 1800mm 1/16mm bar
Other:	

Bond beam grout: fill with 30MPa concrete.
 Where block lintels abut walls or columns, support on mild steel angle bracket, welded or bolted to wall or column.

309 Bonding and Tying

Build work in stretcher bond.
 Space wall ties in accordance with AS 3700.
 Keep cavities clean and free from mortar droppings.
 Fix to concrete or steel columns and at junction with concrete walls with frame ties built at least 250mm into block joint and fix to the structure as close as possible to the course line.

310 Door Frames

Build in door frames as the work proceeds. Generally allow for lugs at 400 to 450mm centres except FU door frames which have lugs to sizes and centres required by the fire test report pertaining to the particular type of door. Grout solid cavities behind frames.

311 Incidental Work

Chases: refer to AS 3700, and, as far as possible, provide for chases to be made as the work rises. No horizontal chase may exceed 1200mm in length and no vertical chase may be closer than 600mm to an element providing lateral support. No chase may be more than 1/3 of the thickness of the wall. Perform miscellaneous incidental blockwork as required throughout and for other trades. Make good after other trades.

312 Field Quality Control

Tests.

Have the following tests performed in a laboratory NATA registered for the particular test. Supply copies of the resulting test certificates to the project manager.

TEST:	TEST METHOD:
For mortar: sampling method	Refer structural engineer
Chemical composition	
Other:	
For blockwork:	
Compressive strength	
Bond strength	
Characteristic strength	
Other:	

313 Cleaning of Facework

Take care to keep walls clean constantly. Should further cleaning be necessary, use hydrochloric acid not stronger than 5%, treating only a small area at one time. Wet the wall prior to applying the acid, work from the top down and thoroughly wash off after brushing. Do not leave acid solution on wall at stoppage of work.

314 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

On completion clean up mortar droppings, debris, etc., remove scaffolding, make good put-log holes and blemishes and leave work in a first class condition.

Protect facework surfaces where necessary to avoid damage during other building operations.

END OF SECTION

PART I GENERAL

101 Scope

Supply and install a complete installation of autoclaved aerated concrete blocks as shown on the drawings or needed to complete the blockwork including, but not limited to the following:

All labour and materials.
Building in other materials.
Staging and scaffolding.
Cleaning.

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete	Structural steel
Carpentry	Wall construction
Floor construction	Door frames
Window frames	Finishes
Cement render	Textured finish

103 Quality Assurance

- A. Appoint an on-site representative trained by material supplier to be responsible for the training of the workmen performing the work of this section.
As a condition of supply, the manufacturer of all blocks, adhesives and surface coatings will be required to inspect the on-site construction of the sample wall and of the first batch of each type of block and laying condition. The manufacturer/supplier will be required to certify in writing to the project manager that the preparation and application procedures are in accordance with the manufacturer's product literature and have not in any respect breached the block or adhesive manufacturer's warranty. This certification will identify the location and date of the inspection, the products used and include copies of the relevant manufacturer's printed instructions.
Following certification, do not vary the methods of preparation and installation from those certified by the manufacturer/supplier.
- B. Approved samples:
Submit samples of blocks to be used and obtain approval from the project manager before ordering materials.
- C. Sample wall:
At the start of block laying, arrange with the project manager to designate a beginning section of each type of wall construction not less than 1.8 square metres in area as the control sample/s.
When approved by the project manager, the section/s will become the control standard/s for the remaining work and remain part of the work.
- D. A suitably qualified engineer, consultant, will certify drawings and the specifications for this project.

104 References

Comply with applicable portions of the following Australian and other Standards:

AS/NZS 1170	Structural design actions. <i>There are 5 parts, several Supplements and Amdts, 2002 – 2011.</i>
AS/NZS 2699	Built-in components for masonry construction. <i>There are 3 parts, 2000 - 2002.</i>
AS/NZS 2904 1995	Damp-proof courses and flashings. <i>Plus 2 Amdts, 1998, 2013.</i>
AS 3700 2011	Masonry structures. <i>There is 1 Supplement 2012</i>
BS 5628 2005	Code of practice for the use of masonry. BS 5628-2 Structural use of reinforced and prestressed masonry. BS 5628-3 Code of practice for use of masonry. Materials and components, design and workmanship. <i>There is 1 other part, 2005.</i>

Cement Concrete and Aggregates Association of Australia. "Articulated Walling". Document available at www.concrete.net.au/publications

Comply with the requirements of local and statutory authorities.

105 Submissions

- A. With tender: name of proposed block manufacturer.
- B. Prior to ordering:
 1. Product data: showing the following information where appropriate:
 - a. Manufacturer's name and product details including a designation of proposed types and sizes.
 - b. Schedule of lintels.
 - c. Other:
 2. Samples: submit if requested by the project manager.
- C. Submissions required prior to delivery:
 - 2 of each type of unit described below. Refer clause 202.

106 Delivery, Handling and Storage

Arrange with builder for the time of delivery of materials and the location of placement.

Deliver, handle and store materials in accordance with manufacturer's recommendations and prevent damage, deterioration or loss.

PART II MATERIALS

201 Acceptable Manufacturers

202 Materials

A.A.C. Concrete block: solid, size:

Mortar: for base or bottom course laid on concrete strip footing or floor slab: 1 part cement, 1 part lime, 6 parts sand. Comply with AS 3700.

Damp-proof course: polyethylene, textured

Flashings:

Wall ties: as AS 3700,

Reinforcement: as AS 3700,

Expansion joint:

Other materials:

Render: 1 part cement, 1 part lime, 8 parts sand.

203 Lintels

Standard lintels

To all areas as marked by project manager's drawing/Window Schedule, supply block manufacturer's AAC pre-manufactured lintels. Design lintels in accordance with manufacturer's standard load design tables with a minimum end bearing of 200mm depending on the length of the lintel.

Non-standard lintels

Obtain engineer's computations for non-standard lintels. Submit a copy of all non-standard lintel calculations to the relevant authority.

Provide AAC lintels in their original form and under no circumstances are they to be cut on site in any manner.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site. Rectify conditions where necessary before start of work. Start of work means total acceptance of conditions.

302 Preparation

Ensure scaffolding, if required, is heavy duty type and compliant with the scaffolding code of practice and Australian Standards.

Prepare surfaces to receive blockwork in accordance with the material manufacturer's instructions.

Review the project with other trades in relation to ducts, piping, conduits, thimbles, sleeves, etc. or other item penetrating or to be built into blockwork, and co-ordinate their installation.

Obtain built-in items from their suppliers prior to starting blockwork.

Set up door frames plumb and level and brace as required. Maintain bracing until walls are at least 1000 high and frame grouting has set where applicable.

303 Mortar Mixing

Measure materials to ensure that the specified mix proportions are maintained as per AS 3700.

Mix in a suitable mixing machine until a uniform blending of the components is achieved.

Add water to create a mix that is as wet as can be conveniently used by the blocklayer.

Use no chemical to affect the plastic or other properties of mortar or as a substitute for lime without the project manager's permission.

304 Mortar Life

Re-tempering to replace water lost by evaporation is encouraged until initial set begins. Reject mortar which has begun its initial set and do not re-temper.

Lay mortar no thicker than 20mm under first only course of blocks.

305 Laying

Comply with AAC block manufacturer's written instructions, current edition.

To all external perimeter walls, and other walls subject to moisture, apply an approved damp-proof course being of a plastic sheet type membrane. Lay membrane prior to the thick bed (first course) mortar being of no more than 20mm in thickness.

Obtain a true and level course.

General: Comply with applicable provisions of AS 3700 and manufacturer's current instructions. Set out blockwork so as to reduce cutting to a minimum. Apply thin bed adhesives using recommended notched trowel to obtain an even distribution of the minimum recommended thickness of adhesive, to joints and perpend.

Install blockwork in a format so that the vertical joint of the lower course is staggered at least 100mm relative to the vertical joint of the overlaying course.

Perform all operations necessary for the proper execution of the work, such as cutting, corbelling, chasing, beam-filling, bonding and making good.

Build in as necessary all flashings, reinforcements, arch bars, lintels, frames, straps, bolts, lugs, wall ties, metalwork, damp-proof courses, precast units, sills, partitions, joists and the like.

Carefully set out and leave openings for other trades to eliminate cutting.

306 Control Joints

Provide control joints in accordance with engineer's recommendations.

Install control joints at no more than 6-8 lineal metres apart.

Saw cut each joint of a minimum depth of 25mm or of an articulated joint form. Use sliding expansion ties in articulated joints, located at 600mm centres (usually every third course).

Install all lintels using thick bed mortar to bearing ends.

Install ACC lintels in their true form and under no circumstances are they to be cut on site in any manner.

307 Sub-Grade Applications

To areas below ground level, finish with an impervious bituminous waterproof sealant to all sub-grade walls.

Install membrane as per manufacturer's recommendations in accordance with AAC current manufacturer's requirements.

308 Waterproofing Walls

Refer block manufacturers' current written instructions.

309 Tolerances

Maximum planar misalignment is to be 2mm along butt joints. Do not vary the thickness and width of blocks by more than 5mm from design sizes. Deviation from plumb, level or dimensioned angle is not to exceed 5mm per 3.5m of length of any plane, or 6mm in any total run in any line. Deviation from theoretical position on plan or elevation, including deviation from plumb, level or dimensioned angle, is not to exceed 9mm total at any location. Do not exceed 3mm for any 3.5m run in any direction when there is a change in deviation.

310 Rejection Criteria

The AAC blockwork is liable to rejection if:

A joint has been made at a location or in a manner not in accordance with this specification.

Items embedded in blocks or jointing material have been displaced from their correct position.

Blockwork has cracks.

The work can be shown to be otherwise defective.

The project manager may permit blockwork liable to rejection to be retained on the following basis:

A structural investigation proves satisfactory.

Additional tests prove satisfactory.

Approved remedial work.

Repair of damaged units.

Demonstrate the proposed repair methods to the project manager and obtain his acceptance of the method in writing.

The repaired work is to have the same appearance and durability of similar undamaged work.

311 Cleaning

Take care at all times to keep walls clean. Remove excess adhesive progressively. Clean strictly in accordance with manufacturers' instructions.

312 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

On completion clean up mortar droppings, debris, etc., remove scaffolding, make good put-log holes and blemishes and leave work in a first class condition.

Protect facework surfaces where necessary to avoid damage during other building operations.

END OF SECTION

PART I GENERAL**101 Scope**

Supply the stone and clad the building as shown on the drawings, including but not limited to the following:
 Labour and materials.
 Waterproof membrane
 Wall ties
 Cleaning.

102 Related Work

Co-operate and co-ordinate with the following trades:
 Stud framing Window and door frames
 Structural steel Concrete

103 Quality Assurance

Approved sample: at the start of stone cladding, arrange with the project manager to designate a beginning section of stone cladding of about 3 metres x 2.5 metres high, including a door or window jamb, as the control sample. When approved by the project manager, the section become the control standard for the remaining work and stays part of the work.

104 References

Comply with applicable portions of the following Australian Standards:
 AS 1316 2003 Masonry cement.
 AS/NZS 1576 Scaffolding. *There are 6 parts, 1991 – 2009 and 2 Amdts, 1992.*
 AS 1672.1 1997 Limes and limestones – Limes for building.
 AS/NZS 2904 1995 Damp-proof courses and flashings. *2 Amdts, 1998, 2013.*
 AS 3700 2011 Masonry structures. *There is 1 Supplement 2012*

105 Submissions

- A. Submissions required with the tender:
 Name of stone supplier.
 Name of stone mason.
- B. Sample of stone cut to suitable size.
- C. Copies of minutes of pre-installation conference.

106 Delivery, Handling and Storage

Co-ordination: reach agreement with the project manager about site provision for storage of sand, cement and other materials and for mixing of mortar.
 Deliver, handle and store products in accordance with manufacturer's recommendations and prevent damage, deterioration or loss.

PART II MATERIALS**201 Stone Supplier****202 Stone**

Type (Name):	
Colour:	
Size:	
Finish	

203 Mortar and Grout Materials and Types

- A. Materials: comply with AS 3700 as follows:
 - 1. Mortar: restrict the amount of fine aggregate passing a 75 micron test sieve to 5% maximum.
 - 2. Grout:
 - 3. Pigment: powdered metallic oxides used in accordance with the manufacturer's instructions.
- B. Types: comply with AS 3700, providing materials in the proportions described below:
 - 1. Mortar:

Classification	Mix Proportions (by volume) Type A Portland Cement	Building Lime	Sand
M3	1	1	6

- 2. Grout: f'c not less than 12 MPa AS 3700.

204 Miscellaneous Materials

Comply with AS 3700 as follows:

- A. Wall ties and accessories:
Where building is to be located within 10 kilometres of the coast wall ties:
- B. Reinforcement:
- C. Lintels and other steel in masonry:
Extend lintels 230mm minimum past each jamb of openings.
- D. Caulking: elastomeric sealing compound, coloured to match mortar; for general caulking including movement control joints:
Liquid polysulphide polymer.
Neutral silicone
- E. Damp-proof courses: Viscourse embossed 0.2mm polymeric film at jambs, sills, heads.
- F. Flashings: Viscourse embossed 0.2mm polymeric film at jambs, sills, heads.
Note: both to comply with AS/NZS 2904.
- G. Expansion joint material (control joint): polysulphide.

205 Steel Lintels

- A. Where stonework is to be supported over openings and no special lintels are detailed, build in mild steel lintels, in accordance with the Building Code of Australia.
- B. Set angles with the first dimension vertical.
- C. Hot dip galvanise steel lintels in exterior openings.
- D. Fix angles to concrete columns or beams with the bearing leg cut and bent to the height of the vertical leg and bolted to concrete with 2 no. 16mm masonry anchors.

PART III EXECUTION

301 Mortar Mixing

Measure materials to ensure that the specified mix proportions are maintained as per AS 3700.
Mix in a suitable mixing machine until a uniform blending of the components is achieved.
Add water to create a mix that is as wet as can be conveniently used by the stone mason.

302 Mortar Life

Re-tempering to replace water lost by evaporation is encouraged until initial set begins. Reject mortar which has begun its initial set and do not re-temper.

303 Preparation

Ensure scaffolding, if required, is heavy duty type and compliant with the scaffolding code of practice and Australian Standards.
Review the project with other trades in relation to ducts, piping, conduits, thimbles, sleeves, etc. or other item penetrating or to be built into masonry and co-ordinate their installation.
Obtain built-in items from their suppliers prior to starting masonry.
Clean the surface of concrete before laying bricks thereon.
Set up pressed metal door frames plumb and level and brace as required. Maintain bracing until walls are at least 1000 high and frame grouting has set.

304 Laying

General: comply with applicable provisions of AS 3700. Set out masonry so as to reduce cutting to a minimum and, in facework, to avoid irregular or broken bond.
Make cuts in facework with a masonry saw.
Carefully position openings for other trades to eliminate cutting.
Build in accordance with the dimensions, thicknesses and heights shown on drawings, plumb, level and in the designated position within the tolerances of AS 3700.
Allow no part to rise more than 1000mm above adjacent unfinished work. Rake back advanced work, build masonry in bond and avoid toothing wherever possible.
Build in as necessary reinforcements, arch bars, lintels, frames, straps, bolts, lugs, wall ties, metalwork, damp-proof courses and flashings, etc.
Provide weepholes 1200 mm apart over damp-proof course and flashings where these span across cavities.
Re-lay, in fresh mortar, bricks accidentally moved after initial laying.
Keep mortar stains to a minimum and protect horizontal ledges, finished sills and the like from mortar droppings as work proceeds.
Before mortar sets hard, remove excess mortar. Scrub masonry within 24 hours of laying using a bristle brush plus detergent if necessary.
Protect new and incomplete masonry with coverings, temporary bracing or the like - AS 3700.

305 Jointing and Finishing

Joint thickness: 10mm generally.
Rake joints to depth as approved by project manager in approved sample. Remove mortar droppings from cavities.

306 Wall Ties

Space stainless steel wall ties at 600 mm horizontally and 300 – 400 vertically, depending on size of stone.

307 Door and Window Frames

Build in as the work proceeds. Provide lugs at 400 to 450mm centres.

308 Cleaning of Facework

Take care to keep walls clean constantly. Should further cleaning be necessary, use hydrochloric acid not stronger than 5%, treating only a small area at one time. Wet the wall prior to applying the acid, work from the top down and thoroughly wash off after brushing. Do not leave acid solution on wall at stoppage of work.

309 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

On completion, clean up mortar droppings, debris, etc., remove scaffolding, make good put-log holes and blemishes and leave work in a first class condition.

Protect facework surfaces where necessary to avoid damage during other building operations.

END OF SECTION

PART I GENERAL**101 Scope**

Supply all labour and material, services and equipment necessary for the preparation, application and finishing of metal surfaces as indicated on drawings, schedules and as specified herein, to internal and external metal surfaces as follows:

Refer Schedule of Finishes.

102 Related Work

Co-ordinate and co-operate with the following trades:

Metalwork	Structural steel
Metal door frames and fire doors	Metal windows
Metal decking and roof plumbing	

103 Quality Assurance

A contractor with wide experience in this class of work is required for the work of this section.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1231 2000	Aluminium and aluminium alloys - Anodic oxidation coatings.
AS 1627	Metal finishing - Preparation and pre-treatment of surfaces.
	1627.6 2003 Chemical conversion treatment of metals.
	<i>There are 6 other parts, 1997 – 2005.</i>
AS 2832	Cathodic protection of metals. <i>There are 5 parts, 2003 – 2008.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.

105 Submissions

Submit the following materials:

- A. Product literature on all proposed finishing systems.
- B. Colour samples for all approved finishing materials. Provide samples identified with:
 1. Manufacturer's colour code and colour name.
 2. Match to schedule colour code and name.
- C. Samples not less than 100 x 100mm and of the same gloss level as the scheduled colour.

106 Delivery, Handling and Storage

Handle all materials with care.

Do not store on site.

Install directly in place.

107 Warranty

Provide a written warranty stating the preparation of surfaces, materials and material application under this contract will show no deterioration and remain in good condition for a period of years from date of Practical Completion.

PART II MATERIALS**201 Materials – General**

Where manufacturer makes more than one grade of any material specified, use the highest grade of each type, whether or not the material is mentioned by trade name in these specifications.

202 Metal Finishes

- A. Anodising

Anodise to colour selected and approved by the project manager. Pre-treat and apply anodising by applicators approved by the project manager.

Minimum coating thickness of 25 microns subjected to random testing after installation. Remove and replace non-conforming material.
- B. Polyester powdercoat

Apply polyester powdercoat, to colour approved by the project manager to metal surfaces specified. Perform pre-treatment and application of powder coating by applicators approved by the project manager and by the manufacturer of the powder material.

Minimum coating thickness of 50 microns subjected to random testing after installation. Remove and replace non-conforming material.
- C. Fluoroset FP (Dulux Product).

203 Schedule

Finish	Manufacturer	Colour	Surfaces	Applied to

PART III EXECUTION**301 Examination**

Inspect all surfaces and determine that they are in proper condition to receive the work to be performed under this section.

The starting of work under this section means acceptance of such surfaces as being satisfactory and any defects in work resulting from accepting poor surfaces are to be corrected at no cost to the proprietor.

302 Preparation

- A. General: prepared to a standard not less than that described in AS 1627.
- B. Clean base metal surfaces of all mill scale, rust, grease, oil, dirt or other foreign matter then properly wash with spirit or other approved cleaning agents.
After cleaning, etch, pickle or prepare as recommended by manufacturer of the finish applied.

303 Protection

Protect finished metal surfaces as necessary during handling, transport and erection to prevent mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.

Do not use adhesive protective coating. Protect by other means with the approval of the project manager.

304 Application

Execute all work in this section in strict compliance with the manufacturer's recommendations and with the provisions of the Australian Standards which are incorporated by reference as part of this specification and apply to the work in this section to same extent as if written herein. In the event of conflict between manufacturer's recommendations and the provisions of the Australian Standards, manufacturer's recommendations govern.

305 Cleaning

At completion of work, keep and maintain finished surfaces clean and free from dust, dirt and other foreign matter.

306 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, fabricate and install a complete structural steel system including but not limited to:
 Steelwork shown on the project manager/engineer's drawings specified herein, or as described in his instructions issued during the currency of the work. It includes surface treatment, storage, delivery to the site, steel to steel connections and their fastenings, steel to concrete and their fastenings, miscellaneous attachments and anchor bolts.
 Erection of the steelwork shown on the project manager/engineer's drawings and includes off-loading, erection, field welding, making steel to steel connections, connection to anchor bolts, permanent grouting and repairs to surface treatment.

102 Related Work

Co-ordinate and co-operate with the following trades:

103 Quality Assurance

Do work in accordance with the drawings and specifications which form part of this contract, and further details and/or instructions issued by the project manager/engineer during the currency of the works.
 Submit evidence of experience appropriate to the class of work required. Install under the direct supervision of a capable foreman, experienced in the class of work under construction.

104 References

Conform to the latest edition, including amendments, of the following Australian Standards (except where varied by this specification or the contract drawings):

AS/NZS 1554	Structural steel welding.
1554.1 2011	Welding of steel structures.
1554.2 2003	Stud welding (steel studs to steel). <i>Plus 1 Amdt 2003.</i>
1554.3 2008	Welding of reinforcing steel.
1554.4 2010	Welding of high strength quenched and tempered steels.
1554.5 2011	Welding of steel structures subject to high levels of fatigue loading.
1554.6 2012	Welding stainless steels for structural purposes.
1554.7 2006	Welding of sheet steel structures.
AS 1627	Metal finishing - Preparation and pre-treatment of surfaces. <i>There are 7 parts, 1997 – 2005.</i>
AS/NZS 3678 2011	Structural steel - Hot rolled plates, floorplates and slabs.
AS/NZS 3679	Structural steel.
AS/NZS 3750	Paints for steel structures. <i>There are 24 parts, 1994 – 2009.</i>
AS 4100 1998	Steel structures <i>Plus 1 Supplement, 1999, 1 Amdt 2012.</i>
AS/NZS 4600 2005	Cold-formed steel structures. <i>Plus 1 Amdt, 2010.</i>
AS/NZS 4673 2001	Cold-formed stainless steel structures.
AS/NZS 4680 2006	Hot dip galvanised (zinc) coatings on fabricated ferrous articles.
HB 48 1999	Steel structures design handbook.

105 Delivery, Handling And Storage

Handle and store materials by methods and appliances that will not over-stress or deform the members.
 Separate materials on site from surface of ground.
 Members bent or buckled from handling or storing will be liable to rejection.
 Supply bolts, nuts and washers in grit-free containers and stored in water-tight premises. Reject burred, damaged, corroded or otherwise unserviceable bolts.

PART II MATERIALS**201 Materials****General**

Supply materials required to complete the works under this trade section in accordance with the contract documents and within the tolerances specified. Materials which do not comply will be rejected.

Steel supply

Unless otherwise shown on the drawings, comply with AS/NZS 3678 and AS/NZS 3679. Do not use other types and grades of steel without written approval.

202 Shop Drawings

Refer DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27. Provide a complete set of shop drawings for required components.

- 203 Fabrication**
Fabricate finish in accordance with AS 4100.
Do not exceed the end clearances shown on the drawings. Where these are not shown, ascertain the clearances used in the design of the connections.
- 204 Connections**
- A. General
Supply end cleats, brackets and other connections, not specifically detailed on the drawings, to suit the location and forces shown thereon with gauge and edge distances in accordance with AS 4100.
 - B. Bolting General
Supply bolts in bearing of such lengths that no threaded portion crosses the interface of the parts joined. Place at least one washer under the bolt head or nut, whichever is to be rotated. Provide taper washers where the part under the bolt head or nut is not perpendicular to the centre-line of the bolt.
 - C. Welding
Do manual welding in accordance with AS/NZS 1554.
Do semi-automatic welding in accordance with AS/NZS 1554.
 - D. Miscellaneous Attachments
Allow for the drillings, cleat and other fitments indicated on the contract drawings or shown on other relevant drawings and required by other trades.
Be entirely responsible for supply of necessary information to the steel fabricator.
- 205 Hot Dip Galvanising**
Where scheduled or specified galvanised steel after chemical descaling in accordance with AS 1627 and AS/NZS 4680, so that rust, mill scale, oil grease and other foreign matter is removed leaving a clean surface of metal.
Then immerse steel in a bath of molten zinc so that when withdrawn, the zinc coating solidifies to a dry film thickness in compliance with AS/NZS 4680.
Reinstate transport and erection abrasions, site welds, etc., by thoroughly wire brushing affected areas to achieve a clean sound substrate and patch coating with a zinc-rich paint with a film thickness of 100 microns.
- 206 Surface Treatment of Steel**
Clean steelwork free from loose rust, loose mill scale, dirt, oil and grease or by sand-blasting - Class 2.5. Apply a coat of inorganic zinc silicate, 100 microns thick. Refer AS 1627.
- 207 Inspection Before Delivery**
Material and work is subject to inspection before painting and delivery. Provide the necessary access and facilities.
Where steel has been inspected at the shop before being delivered to the site, such inspection does not relieve the contractor of his responsibility to carry out the work in accordance with the drawings and this specification.

PART III EXECUTION

- 301 Examination**
Inspect site conditions both before fabrication and delivery of steel.
Ensure that on delivery, materials can be directly installed.
Report discrepancies immediately they are found and instruction obtained before continuing with the affected portion of the work.
Start of work means total acceptance of conditions.
- 302 Erection**
Comply with the requirements of AS 4100 and relevant codes of practice, i.e. code of practice for cranes etc.
Develop an erection plan and implement erection procedure developed as Safe Work Method Statement such that members can be placed and fixed in position without distortion or harm to workers installing them..
Make safe, during erection, against wind and erection stresses and loading conditions, including those due to erection equipment.
Allow for the cost of temporary erection bracing required and of the engineer's requirements in connection with such bracing.
- 303 Grouting of Baseplates**
Set plates to precise level at centre of footing for future baseplate placement.
Set plate in high strength mortar.
After placement of column base plates, grout fill the void completely.
Trim the grout on completion.
- 304 Inspection on Site**
Advise engineer and/or project manager when erected steel is ready for inspection.
- 305 Adjustments**
Following erection, adjust the installation as required by engineer.
Touch up abraded or missing paint areas. Refer next clause.

306 Cleaning

Clean the installed steelwork and touch up with zinc-rich primer paint of matching colour.
Ensure that the touch up paint is compatible with the factory applied material.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, engineer, supply and install a complete cold formed metal framing, including but not limited to:

- Load bearing wall framing
- Non-loadbearing wall framing
- Loadbearing roof framing
- Other

102 Related Work

Co-ordinate and co-operate with the tradesmen preparing floors, installing windows and doors and weatherproofing material, including casting in of anchors where required.

103 Quality Assurance

- A. Manufacturer qualifications: not less than 6 years continuous experience in the manufacture of the product types specified.
- B. Installer Qualifications: installer is to have not less than 3 years continuous experience in the erection of specified material.

104 References

Comply with applicable portions of the following Australian Standards:

- | | |
|--------------|---|
| AS/NZS 1170 | Structural design actions. |
| 1170.1 2002 | Permanent, imposed and other actions. <i>Plus 2 Amdts, 2005 – 2009.</i> |
| 1170.2 2011 | Wind actions. |
| 1170.3 2003 | Snow and ice actions. <i>Plus 1 Amdt, 2007.</i> |
| 1170.4 2007 | Earthquake actions in Australia. |
| | <i>There is 1 other part, several Supplements and Amdts, 2002 – 2011.</i> |
| AS/NZS 1554 | Structural steel welding. |
| 1554.1 2011 | Welding of steel structures. |
| 1554.2 2003 | Stud welding (steel studs to steel) <i>Plus 1 Amdt, 2003.</i> |
| 1554.3 2008 | Welding of reinforcing steel. |
| 1554.4 2010 | Welding of high strength quenched and tempered steels. |
| 1554.5 2011 | Welding of steel structures subject to high levels of fatigue loading. |
| 1554.6 2012 | Welding stainless steels for structural purposes. |
| 1554.7 2006 | Welding of sheet steel structures. |
| AS 3623 1993 | Domestic metal framing. |
- Comply with relevant authority's requirement for fire.

105 Submissions Required Prior to Fabrication

- A. Complete system description including the following information:
 - 1. Names of manufacturers of products.
 - 2. Names, addresses and telephone numbers of local representatives for products.
 - 3. Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 - 4. Detailed information on products manufactured specifically for this project.
 - 5. Detailed system description including standard details and manufacturer's literature; and large-scale details of specially fabricated products.
- B. Statement that the proposed system meet(s) the regulatory requirements, thermal, aesthetic and wind loading, construction, warranty requirements specified; noting in detail exceptions.
- C. Shop Drawings: refer DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27. Provide Shop Drawings showing the following information where appropriate to the items:
 - 1. Layout (sectional plan and elevation of complete assembly).
 - 2. Full size section of members.
 - 3. Methods of assembly, type and location of exposed screws.
 - 4. Methods of installation, including fixings, anchorage, flashings.
 - 5. Provision for expansion (thermal).
 - 6. Junctions and trim to adjoining surfaces.
 - 7. Fittings and accessories.
- D. Engineer's calculations on wind loading, live and dead loads.

106 Delivery, Handling and Storage

Handle materials with care. Do not store on site. Install directly in place as instructed by manufacturer.

Where possible, deliver pre-assembled panels of framing, roof trusses etc., ready for immediate placement and connection.

PART II MATERIALS

201 Acceptable Manufacturers

The following manufacturers of frames are acceptable:

202 Materials

Wall, floor and roof framing components manufactured from corrosion resistant steel materials.

Match components detailed on drawings or an alternative approved in writing by the project manager.

203 Structural Criteria

Adopt Terrain Category:

Refer AS/NZS 1170.

Wind loading: design:

Frame assemblies to suit the static and dynamic wind forces as indicated on the tables in the AS/NZS 1170.

Structural members of units of such strength that when tested at the specified design wind values they do not deflect by an amount greater than span/240 and do not cause permanent deflection.

Fix members so that the above loading is generated in the members without stress causing failure or movement becoming evident at any joint.

Movement: permit free and noiseless movement of the components due to thermal effects, structural effect, wind pressure, effect of dead loads, without strain to the frames, without buckling of components and without excessive stress to members or assemblies.

Contact with other materials: coat metal surfaces in contact with mortar, concrete, plaster, masonry, wet-application of fire-proofing and absorbent materials with an anti-galvanic, moisture barrier material. Isolate, with inert material, dissimilar metals for the prevention of electrolytic action and corrosion.

Distortion: design the assembly to minimise visual distortion.

204 Detail Design Provisions

A. General: the project manager's drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated. If, in the opinion of the builder a change of profile is required in order to meet the specification, arrange through the project manager for a review of the condition. Design the assembly, reinforcing and anchorage to suit each specified condition in an acceptable manner complying with the requirements specified herein.

B. Tolerances: design frames to accommodate building tolerances, and when completed, within the following tolerances:

1. Deviation from plumb, level or dimensioned angle within 3mm per 3.5m of length of member, or 6mm in total run in line.
2. Deviation from theoretical position on plan or elevation, including deviation from plumb, level or dimensioned angle not to exceed 9mm total at location.
3. Change in deviation not to exceed 3mm for 3.5m run in direction.

205 Fabrication

Form junctions so that no fixings, such as pins, screws, pressure indentations and the like are visible on exposed faces. Show on Shop Drawings fixings which will be exposed. Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations. Remove sharp edges without excessive deformation. Fit mitred joints accurately to a fine hairline.

Pre-assemble and match mark before delivery.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, before delivery of materials. Ensure conditions are satisfactory for installation.

Perform rectification required before delivery of materials.

Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the requirements of the Act, Regulation, Code of Practice and relevant Australian Standards.

Prepare surfaces affected by the installation in accordance with material manufacturer's instructions.

303 Frame Anchorage

Fabricator is required to supply the anchorage devices to the builder for building in by others and check that devices are located as required to suit the requirements of the fabrication for positive and permanent fixing.

Insulation: isolate dissimilar metals at interfaces with bitumen based or nylon shim materials to prevent galvanic action.

Make good concrete or masonry damaged during the installation of masonry anchors at no cost to the proprietor.

304 Installation

Wall frames: vertical. Permitted maximum tolerance is 3mm in 3000mm.

Floor frames: horizontal. Permitted maximum tolerance is 3mm in 3000mm.

Except where otherwise directed.

Secure in place in accordance with manufacturer's instructions.

305 Cleaning

Debris: remove rubbish and debris resulting from the fabrication and erection operations, each day.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, engineer and install required general and architectural metalwork items including but not limited to:

102 Related Work

Co-ordinate and co-operate with the following trade sections:

103 Quality Assurance

Work of this section will be performed by experienced craftsmen familiar with the quality required in this class of work.

Comply throughout with manufacturer's instructions.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1554 Structural steel welding. *There are 7 parts, 1994 – 2012.*

AS 1627 Metal finishing - Preparation and pre-treatment of surfaces.

1627.6 2003 Chemical conversion treatment of metals.

There are 6 other parts, 1997 – 2005.

AS/NZS 1734 1997 Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate.

AS/NZS 1866 1997 Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes.

AS 4100 1998 Steel structures. *Plus 1 Supplement 1999, 1 Amdt 2012.*

AS/NZS 4673 2001 Cold-formed stainless steel structures.

AS/NZS 4680 2006 Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.

Comply with requirements of statutory and local authorities.

105 Shop Drawings

Comply with DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27.

Provide Shop Drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
Develop details not shown and in conformity with the indicative details shown.
- B. Take and confirm dimensions on site, before preparing Shop Drawings where possible.
- C. Submit detailed Shop Drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and full-scale templates of blocking, anchorages, sleeves and bolts installed by others.

106 Samples

Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. Approved samples establish quality of similar work of this section.

Check on delivery: request project manager to check materials on delivery to site for quality, and materials not meeting the requirements of this specification or equal to approved samples will be rejected.

Return rejected materials to the fabricator at the fabricator's expense.

Finish: provide samples of specified finishes when requested.

PART II MATERIALS**201 Materials**

Item	Manufacturer	Material	Size(s)	Model No.	Finish

202 Finish

Materials exposed to weather may be either:

Mild steel - hot dipped galvanised after fabrication or chromate pre-treated followed by polyester powder coating.

Finish internal steel after fabrication with zinc-rich organic primer, or with inorganic zinc silicate paint.

Comply with relevant codes of practice or manufacturers' recommendations.

203 Welding Steel

General: details of joints, the techniques of welding employed, the appearance and quality of welds made and the methods used to correct defective work; conform to requirements of AS/NZS 1554.

Welds exposed to view: grind smooth to project manager's approval.

Concealed welds: grind smooth before galvanising.

Tack or skip welding: at regular intervals, very neat. Not permitted if material is to be hot dip galvanised.
Remove weld spatter.

Certification: only welders who have previously been qualified by tests may weld.

Tack welding or skip welding will NOT be permitted where items are to be galvanised. Weld continuously form joints and connections to exclude water and to permit draining during galvanising.

Stainless steel welding: refer AS/NZS 1554.

204 Connection Design

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment.

Take possible care to prevent damage.

- A. Welding external items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts will be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Weld shop connections for steel fabrications, and bolt field connections.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Mill to a close fit machined joints. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.
- G. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop.

205 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

Fasten galvanised items with galvanised fasteners.

206 Dissimilar Metals

In moist environments, e.g. swimming pools of either fresh water or sea water etc., prevent totally contact between dissimilar metals (any metals).

This instruction takes priority over any drawing, detail or instruction and will prevent cathodic reaction between the metals.

Refer this instruction to the structural engineer.

PART III EXECUTION

301 Examination

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Start of work means total acceptance of relevant conditions.

302 Preparation

Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.

Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

Check fabrications as they are unloaded at the project site for evidence of physical damage.

Treat damaged fabrications as follows:

- A. Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.
- B. Architectural metalwork: returned to shop for repair or replacement.

Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or relevant Australian Standards,

Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed.

Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.

Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.

Finish: do not cut or abrade shop finishes which cannot be completely restored in the field.

The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted under conditions. Fabrications may be cut shorter with power hacksaws on site.
Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.

305 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Cleaning

Clean materials installed to the satisfaction of the project manager.
Remove temporary protective coatings.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

See Schedule of Metalwork at end of document.

END OF SECTION

PART I GENERAL

101 Scope

Design, fabricate, supply and install a complete system of metal stairs and handrails including but not limited to:
Treads and risers.
Landings.
Balustrading and handrails.
Openings through floors.
Painting or pre-finishing.
Installation.
Prefabricated spiral stairs.
Ladders.

102 Related Work

Co-ordinate and co-operate with the following trades:
Floor and wall framing Metalwork
Painting Metal finishes – Shop applied
Floor coverings

103 Quality Assurance

- A. Manufacturer qualifications: not less than 10 years continuous experience in the manufacture of the product types specified.
- B. Installer qualifications: installer is to have not less than 5 years continuous experience in the erection of specified material.

104 References

Comply with applicable portions of the following Australian Standards:
AS/NZS 1170 Structural design actions.
 1170.0 2002 General principles. *Plus 5 Amdts, 2003 – 2011.*
 1170.1 2002 Permanent imposed and other actions. *Plus 2 Amdts, 2005 – 2009.*
 1170.2 2011 Wind actions.
 There are 2 other parts, several Supplements and Amdts, 2002 – 2011.
AS 1428 Design for access and mobility.
 1428.1 2009 General requirements for access – New building work.
 There are 5 other parts. 1992 – 2010.
AS 1657 2013 Fixed platforms, walkways, stairways and ladders – Design, construction and installation.
AS/NZS 1664 Aluminium structures. *There are 2 parts, 2 Supplements and 4 Amdts, 1997-1999.*
AS 3715 2002 Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.
Comply with requirements of statutory and local authorities.

105 Submissions Required Prior to Fabrication

- A. Complete system description including the following information:
 - 1. Names of manufacturers of products.
 - 2. Names, addresses and telephone numbers of local representatives for products.
 - 3. Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 - 4. Detailed information on products manufactured specifically for this project.
- B. Statement that the proposed system meet(s) the regulatory requirements, certificate of accreditation, computations, design loading, construction, and warranty requirements specified; noting in detail exceptions.
- C. Shop Drawings: refer DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27. Provide Shop Drawings showing the following information where appropriate to the items:
 - 1. Layout (sectional plan and elevation of complete assembly).
 - 2. Methods of fabrication, type and location of welded and screwed joints.
 - 3. Methods of installation, including fixings, anchorage, support.
 - 4. Junctions and trim to adjoining surfaces.
 - 5. Fittings and accessories.
- D. Engineer's calculations on dead and live loading.

106 Delivery, Handling and Storage

Handle finished fabricated components with care. Do not store on site. Install directly in place.

PART II MATERIALS

201 Acceptable Manufacturers

The following manufacturers are acceptable:

202 Materials

Stair treads, balustrades, handrails:
Refer detail drawings.

203 Finish

Mild steel - hot dipped galvanised after fabrication or chromate pre-treated followed by polyester powder coating.
Finish internal steel after fabrication with zinc-rich organic primer, or with inorganic zinc silicate paint.
Comply with relevant codes of practice or manufacturer's recommendations.

204 Detail Design Provisions

General: the project manager's drawings are to be considered essentially schematic except for profiles of exposed surfaces and stair arrangement where indicated. If, in the opinion of the builder a change of profile is required in order to meet the specification, arrange through the project manager for a review of the condition. Design the assembly, to suit each specified condition in an acceptable manner complying with the requirements specified herein.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, and before ordering of materials. Ensure all conditions are satisfactory for installation. Measure at the site immediately before fabrication.
Start of work means total acceptance of conditions.

302 Fabrication

Provide factory fabricated stair and balustrade/handrail sections generally as indicated on drawings, in complete or multiple sections, as permitted by transport or access.

303 Fixings

Provide fixings as follows:
Base plates to concrete with expanding masonry anchorage fixings.
Base plates to timber with coach screws.

304 Tubular Handrails

Provide to situations shown on detail drawings, tubular handrails of the sections indicated, neatly stop ended, fixed to handrail posts by retractable pins.

305 Installation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Assemble treads, handrail and stair components in the position indicated or the stairwell provided. Join mechanically on site without site welding. Adjust to suit floor to floor heights with factory cut spacers only.
Ensure every surface is smooth with no fixings which could damage hands.

306 Painting

Finish exposed metalwork not galvanised or pre-finished with paint as indicated in Schedule of Finishes.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, fabricate, supply and install exterior and interior handrail, and rails (which form a balustrade) including but not limited to:
 Metal pipe handrails and railings.
 Associated material e.g. glass panels.
 Solid metal handrails and railings.
 Timber handrails and railings.

102 Related Work

Co-ordinate and co-operate with the following other trades:

Floor construction	Carpentry
Wall construction	Metal work
Concrete	Metal finishes – Shop applied

103 Quality Assurance

- A. Manufacturer qualifications: not less than 10 years continuous experience in the manufacture of the product types specified.
- B. Installer qualifications: installer is not to have less than 5 years continuous experience in the erection of specified material.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1554	Structural steel welding. <i>There are 7 parts, 1994 – 2012.</i>
AS 1627	Metal finishing - Preparation and pretreatment of surfaces. 1627.6 2003 Chemical conversion treatment of metals. <i>There are 6 other parts, 1997 - 2005</i>
AS 4100 1998	Steel structures. <i>Plus 1 Supplement, 1999, 1 Amdt 2012.</i>
AS/NZS 4673 2001	Cold-formed stainless steel structures.

Comply with requirements of statutory and local authorities.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

- A. Metal:
- B. Timber:
- C. Glass:

203 Finish**204 Fabrication**

Before delivery to site, pre assemble where possible all items to ensure proper fit and dimension of each item. Disassemble and pack carefully for shipping to the site. On delivery and unloading, inspect for damage and arrange immediate replacement if necessary.

205 Source Quality Control

Advise project manager when material is ready for inspection before delivery. Arrange for project manager to inspect each item and indicate approval or otherwise by marking a check list of every item required for the project.

PART III EXECUTION**301 Examination**

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.
 Start of work means total acceptance of relevant conditions.

302 Preparation

- A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which

are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage. Treat damaged fabrications as follows:
 - 1. Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.
 - 2. Architectural metalwork: returned to shop for repair or replacement.
- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

- A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
- B. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- C. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.
- D. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted under conditions. Fabrications may be cut shorter with power hacksaws on site. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.

305 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Cleaning

Clean materials installed to the satisfaction of the project manager.
Remove temporary protective coatings.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

Design, engineer, supply and install glass balustrades including but not limited to:
Structural design.
Metal frames.
Glass.
Painting or pre-finishing.
Installation.

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete	Structural steel
Carpentry	Metal windows and glazing
Ceramic tile	Stainless steel in marine environments

103 Quality Assurance

Installer qualifications: not less than 3 years' experience in the installation of glass balustrades of the product types specified.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS 1231 2000	Aluminium and aluminium alloys – Anodic oxidation coatings.
AS 1288 2006	Glass in buildings - Selection and installation. <i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i>
AS 1627	Metal finishing - Preparation and pretreatment of surfaces. <i>There are 7 parts, 1997 – 2005.</i>
AS 1657 2013	Fixed platforms, walkways, stairways and ladders – Design, construction and installation.
AS 2047 1999	Windows in buildings - Selection and installation. <i>Plus 2 Amdts 2001.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.

Comply with requirements of statutory and local authorities.

105 Submissions Required Prior to Fabrication

- Submissions Required Prior to Fabrication**
- A. Complete system description including the following information:
- Names of manufacturers of products.
 - Names, addresses and telephone numbers of local representatives for products.
 - Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 - Detailed information on products manufactured specifically for this project.
 - Detailed system description including standard details and manufacturer's literature; and large-scale details of specially fabricated products.
- B. Statement that the proposed system meet(s) the regulatory requirements, thermal and aesthetic criteria and wind loading, construction, glazing and warranty requirements specified; noting in detail exceptions.
- C. Shop drawings: refer DOCUMENT 00800, clause 27. Provide shop drawings showing the following information where appropriate to the items:
- Layout (sectional plan and elevation of complete assembly).
 - Full size section of members.
 - Methods of assembly, type and location of exposed screws.
 - Methods of glazing.
 - Methods of installation, including fixings, anchorage, caulking, flashings.
 - Provision for expansion (thermal).
 - Junctions and trim to adjoining surfaces.
 - Fittings and accessories.
- D. Engineer's calculations on wind loading.

106 Delivery, Handling and Storage

Delivery, Handling and Storage
Handle materials with care. Do not store on site. Install directly in place. Store sealants as instructed by manufacturer.

107 Warranty

Provide to the proprietor a warranty, counter-signed by the installer, on the whole of the installation, which states that work will remain intact and fully operational for the period of not less than years after date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

The following manufacturers are acceptable:

202 Materials

Metal frames:

Frames: extruded aluminium components manufactured from aluminium alloy 6063, temper T5 or T6.

Stainless steel: Type 304 or 316, CHS.

Match components detailed on drawings or an alternative approved in writing by the project manager.

Glass: refer clause 206.

203 Structural Criteria

Consult structural engineer. Obtain written approval of the design in relation to material choice, sizes, thickness and connections.

204 Finish

Anodising or Polyester powder coat.

A. Anodising:

Metal of windows, doors and shop fronts anodised to selected colour.

Pre-treat and apply anodising by applicators approved by the project manager.

Minimum coating thickness of 25 microns subjected to random testing after installation. Remove and replace non-conforming material.

Comply with requirements of AS 1231.

B. Polyester powder coat:

Polyester powdercoated, to colour approved by the project manager and by the manufacturer of the powder material, to metal of windows, doors and shop fronts.

Perform pre-treatment and application of powder coating by applicators approved by the project manager and by the manufacturer of the powder material.

Minimum coating thickness of 50 microns subjected to random testing after installation. non-conforming material will be removed and made good by the Builder.

Comply with requirements of AS 3715.

C. Stainless steel:

Refer section 05040 STAINLESS STEEL IN MARINE ENVIRONMENTS.

205 Glass

Material: Armourview Armourfloat, Pilkington 12 (or 15) thick.

206 Other Materials

Setting blocks: neoprene 100 long, 750 apart.

Grout: refer supplier.

Silicone sealant: neutral curing clear.

Metal rails, posts, base channel: aluminium, stainless steel.

Bolts through glass: stainless steel, "Planar" fittings, (Pilkington).

Refer Pilkington technical advisory service, www.pilkington.com/en/au

207 Fabrication

Comply with AS 2047.

Framing system: fabricate with materials to profiles shown on approved shop drawings.

Form junctions so that no fixings, such as pins, screws, pressure indentations and the like are visible on

exposed faces. Show on shop drawings fixings which will be exposed. Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations. Remove sharp edges without excessive deformation.

Fit mitred joints accurately to a fine hairline.

Pre-assemble and match mark before delivery.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, before delivery of materials. Ensure conditions are satisfactory for installation.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Perform rectification required before delivery of materials.

Start of work means total acceptance of conditions.

302 Preparation

Prepare surfaces affected by the installation in accordance with material manufacturer's instructions.

- 303 Frame Anchorage**
Fabricator is required to supply the anchorage devices to the builder for building in by others and check that devices are located as required to suit the requirements of frame fabrication for positive and permanent fixing. Insulation: isolate dissimilar metals at interfaces with bitumen based or nylon shim materials to prevent galvanic action.
Make good concrete or masonry damaged during the installation of masonry anchors at no cost to the proprietor.
- 304 Frame Installation**
Secure the frame to the structure as shown by project manager and/or structural engineer.
- 305 Glazing**
Secure glass in accordance with glass manufacturer's recommendations and AS 1288. Allow for thermal expansion of glass, the metal framing and spandrels.
- 306 Preparation for Sealants**
Joint preparation sealants: clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces if recommended by sealant manufacturer. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate on to adjoining surfaces.
- 307 Protection**
A. Framing system: protect metal surfaces as necessary during erection. Finish surfaces free from mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.
B. Glass: protect glass from breakage immediately upon installation and until Practical Completion. Remove and replace glass and metal panels which are broken, cracked, abraded, chipped or damaged in other ways, before, during or after installation, at no additional cost to proprietor.
C. Be responsible for breakage and damage to installation until Practical Completion.
- 308 Cleaning**
A. Remove labels, excess glazing compounds, stains, spots and other foreign matter from glass, frames, hardware and other finished surfaces immediately upon installation of glazing.
B. Debris: remove rubbish and debris resulting from glazing operations, each day.
- 309 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Provide materials and labour, equipment and services and perform operations necessary to complete the carpentry as indicated and specified. Include nailers, blocking, furring, grounds, hardware, framing, shoring, bracing, ramps, scaffolding and barriers required by the drawings and construction.

102 Related Work Co-operate and co-ordinate with the following trades:**103 Quality Assurance**

Prototype: at a location selected by the project manager on site, construct a full size prototype of:

Include in each prototype elements required by this specification, and finish in every respect. When approved by the project manager, such samples remain part of the work and become the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS 1684	Residential timber-framed construction. <i>There are many parts and Supplements, 1999 - 2010.</i> 1684.2 2010 Non-cyclonic areas. <i>Numerous supplements, 2 Amdts 2012 and 2013</i> 1684.3 2010 Cyclonic areas. <i>Numerous supplements, Amdt 2012</i> 1684.4 2010 Simplified - Non-cyclonic areas. <i>Special reprint with Amdt 1 2012 included</i>
AS 1720	Timber structures. 1720.1 2010 Design methods. <i>Plus 2 Amdts, 2010 - 2011.</i> 1720.2 2006 Timber properties. <i>Plus 1 Amdt, 2006.</i> 1720.4 2006 Fire-resistance for structural adequacy of timber members.
AS/NZS 1859	Reconstituted wood-based panels - Specifications 1859.1 2004 Particleboard. <i>Plus 2 Amdts, 2006 - 2011.</i> 1859.2 2004 Dry processed fibreboard. <i>Plus 2 Amdts, 2006.</i> 1859.3 2005 Decorative overlaid wood panels. <i>Plus 1 Amdt, 2009.</i> <i>There is 1 other part, 2004.</i>
AS 1860.2 2006	Particleboard flooring – Installation. <i>Plus 1 Amdt, 2010.</i>
AS/NZS 2904 1995	Damp-proof courses and flashings. <i>2 Amdts, 1998, 2013</i>
AS 3959 2009	Construction of buildings in bushfire-prone areas. <i>Plus 3 Amdts, 2009 - 2011.</i>
AS 4055 2012	Wind loads for housing.
AS 4226 2008	Guidelines for safe housing design.
AS/NZS 4364 2010	Timber – Bond performance of structural adhesives.
AS 4786.2 2005	Timber flooring - Sanding and finishing.
HB 44 1993	Guide to AS 1684 1992, The National Timber Framing Code.
Further advice and changes in specifications of timber are needed frequently. For latest information visit www.timber.net.au	
For timber decks visit the Outdoor Timber section of Resources at www.timber.net.au .	

105 Submissions

Submit the following prior to ordering materials:

Product literature on hardware items proposed.

Technical data on melamine laminates proposed for use.

Technical data and samples of substrate materials (particleboard etc.) Thickness of materials at typical locations and functions.

106 Delivery, Handling and Storage

Deliver, handle and store products so that damage, deterioration and loss will be prevented. Control delivery schedules to minimise long-term storage at site.

Store timber on site indoors, or above ground and cover with secure impervious material.

PART II MATERIALS

201 Timber and Related Items Table

Material Group	Size	Manufacture or Type (Strength Group) F
Sub-floor		
Stumps		
Stump braces		
Bearers		
Joists		
Beams		
Ant caps		
Insulation		
Damp-proofing		
Other:		
Wall framing		
Timber		
Plate		
Studs		
Nogging		
Bracing		
Lintels		
Trimmers		
Steel or aluminium (or refer to 05400 COLD FORMED METAL FRAMING)		
Plates		
Studs		
Nogging		
Bracing		
Lintels		
Other:		
Roof framing (or refer to 06175 TIMBER TRUSSES [NAIL PLATE])		
Rafters		
Ridge board		
Hip rafters		
Ceiling joists		
Collar ties		
Underpurlins		
Props		
Hanging beams		
Pre-fabricated beams		
Glue laminated beams		
Other:		
Roof accessories		
Roof trim		
Box gutter framing		
Fascias		
Barge		
Gutter boards		
Sump framing		
Sarking		
Other:		
Pole construction		
Piers		
Poles		
Bracing		
Steel or timber		
Waterproof Membrane		
Other:		
Flooring Materials (or refer to 09648 WOOD STRIP FLOORING)		
Boards		
Plywood		
Particleboard		
Decking		
Other:		

Material Group	Size	Manufacture or Type (Strength Group) F
Wall and cladding material External cladding of: (or refer to 06165 FIBRE CEMENT PRODUCTS)		
Weatherboard		
Hardboard		
Soffits of fibre cement		
Soffits of other material		
Internal		
Lining boards		
Particleboard		
Laminated faced		
Fibre cement (or refer to 06165 FIBRE CEMENT PRODUCTS)		
Fibrous panels		
Wood		
Straw		
Other:		
Framing		
Drop walls		
Dwarf walls		
Bulkheads		
Soffits		
Screens		
Other:		
Fences and gates (Pressure treated) (or refer to 02825 FENCES AND GATES)		
Posts		
Rails		
Plinths		
Boards		
Hinges		
Other:		
Steps, ramps and balustrades (pressure treated)		
Posts		
Joists		
Floor boards		
Other:		

202 Fastening Table

Item	Size	Location	Material	Finish (galvanised or cadmium)
Bolts				
Metal connectors				
Nails				
Screws				
Nailing strips				
Hinges				
Holding down				
Bolts				
Other:				

203 Insulation Materials Schedule Located at end of the document –Schedule of Insulation. Thermal and Acoustic.

PART III EXECUTION

301 Examination

Visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site. Start of work means total acceptance of conditions.

302 Installation General

Comply with: AS 1684 Residential timber-framed construction, and other relevant Standards.
Ensure installation of isolation material between timber and damp substrate, installed in accordance with AS/NZS 2904 1995.

303 Installation Particulars

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Perform operations including grooving, rebating, framing, housing, beading, mitring, scribing, nailing, screwing and gluing as necessary to carry out the works. Use timber in single lengths whenever possible. If joins are necessary, make them over supports unless otherwise shown or specified.

Arris visible edges in sawn work and in dressed work arris with sandpaper to 1.5mm radius unless otherwise shown or specified.

Back plough boards liable to warping (for example, if exposed on one face). Make the width, depth number and distribution of ploughs appropriate to the dimensions of the board and the degree of its exposure.

Provide necessary templates, linings, blocks, stops, ironwork and hardware, screws, bolts, plugs and fixings generally.

Install waterproof membrane to separate infrastructure from concrete or masonry.

Trim framing where necessary for openings, including those required by other trades.

Unless otherwise noted, construct framing so that floors are horizontal, i.e. no more than 3mm slope in 3000mm.

Construct wall framing vertical, so that no more than 3mm out of vertical in 3000mm of wall height.

304 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install fibre cement products and associated equipment and fixings including but not limited to:

Wall linings internal.
 Ceiling linings internal.
 Internal walls, fire-rated.
 External cladding.
 Wet area wall lining.
 Eaves linings.
 Fascias.
 Partitions.
 Wet area flooring.
 Underlays.
 External decks.
 Lattice.
 Bracing panels.
 Ceramic faced panels.
 Fibre cement pipe columns.

102 Related Work

Co-ordinate and co-operate with the following trades:

Wall framing	Ceiling framing
Floor framing	External decks
Columns	

103 Quality Assurance

A tradesman with wide experience and knowledgeable in this class of work is to undertake the work to be performed.

104 References

Comply with applicable portions of the following Australian Standards:

AS 2329 1999	Mastic adhesives for fixing wallboards.
AS/NZS 2908	Cellulose-cement products.
2908.1 2000	Corrugated sheets.
2908.2 2000	Flat sheet.

AS 3740 2010 Waterproofing of domestic wet areas. 1 Amdt, 2012

Relevant Technical Bulletins and published instructions produced by manufacturers.

Telephone Customer Services of state office for technical assistance.

Comply with requirements of relevant statutory authorities.

105 Delivery, Handling and Storage

Deliver materials in bundles or packages with care. Stack on edge or lie flat under cover and keep dry until installed. Protect edges and covers from chipping.

106 Warranty

Provide warranty covering the work against defective materials and workmanship for a period years from the date of Practical Completion. Include a statement that the whole of the work has been carried out in accordance with relevant Australian Standards and codes and manufacturer's instructions in effect at the time of installation.

PART II MATERIALS**201 Acceptable Manufacturers**

James Hardie Australia.
 Rondo Building Services Pty Ltd.
 CSR Building materials.

202 Materials

James Hardie Products		CSR Cemintel Building Materials	
Hardiflex	Thickness: 4.5, 6.0	Cladding sheet	Thickness: 4.5/6.0
Villaboard	Thickness: 6.0, 9.0, 12.0	Wallboard FC	Thickness: 6.0, 9.0
Versilux	Thickness: 6.0	Wall board FC sq. edge	Thickness: 6.0
Hardieplank Smooth	230, 300 wide	Cladding plank	230, 300 wide

James Hardie Products		CSR Cemintel Building Materials	
Hardieplank W/grain	230, 300 wide	Cladding plank woodgrain	230, 300 wide
Rusticated weatherboard	205 wide	X	
Old style weatherboard	205 wide	X	
Hardiepanel Stucco		X	
Hardieglaze Swirl		X	
Hardies eaves	4.5mm	Eaves lining	4.5mm
Compressed sheet	6.0,9.0,12.0,15.0,18.0,24.0	Compressed sheet decking	
Pineridge (impact resistant)	6.0	X	
Underlay for ceramic tile		CT Underlay	
Underlay for vinyl and cork		X	
Hardilattice, square, diamond, Tudor	Lattice, square, diamond Tudor		
Hardietex (external sheet)	7.5	Texture base sheet	7.5
Hardiebrace - QLD only	5.0	X	
Partitions toilet and shower		X	

Supply all accessories required for each application.

203 Equipment

Supply equipment required for the erection and installation of the specified materials as recommended by the manufacturer.

PART III EXECUTION

301 Examination

Visit site and inspect conditions, comparing conditions to the drawings before delivery of materials to site. Rectify any discrepancy or unsuitability of substrate. Start of work means total acceptance of conditions.

302 Preparation

Co-ordinate with and ensure preparatory work by other trades is done, prior to commencement of work and arrange for fixing grounds required for satisfactory execution of the work of this trade, including penetrations through cement sheet for services.

303 Installation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Comply with the manufacturer's installation instructions. Anchor and fasten materials and components to comply with ratings and performance requirements, and to comply with governing local regulations. Comply with appropriate Australian Standard.

Take care of and protect surrounding work, including other finishes, equipment and components, during installation. Provide protective covering where necessary.

304 Installation Particulars

Comply in all respects with manufacturers' recommendations contained in technical bulletins. Call for technical advice where necessary. Refer clause 104.

305 Finishing Details

Finish joints and secure fasteners. Remove surface defects to achieve uniform appearance of each type of installation.

306 Protection

Protect finished work. Make good damage in every respect at no additional cost to the proprietor.

307 Cleaning

Clean exposed surfaces including trim, edge moldings, and comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove splatterings, droppings and surplus material.

308

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section covers the supply and installation of site-built joinery items. It includes, but is not limited to:

Site-built cupboards.
 Service cupboard.
 Wardrobes.
 Coat cupboards.
 Benches.
 Shelves.
 Racks.
 Stairs, handrails.
 Trim, architraves, skirtings, pelmets etc.
 Hardware.
 Other:

102 Related Work

Co-ordinate and co-operate with the following trades:

Floor construction	Wall construction
Ceiling construction	Window trades
Doors and door frames	Plaster trades
Electrical installations	Manufactured casework

103 Quality Assurance

Prototype: at a location selected by the project manager construct a complete prototype installation of:

Include in each prototype elements required by this specification, finished in every respect. When approved by the project manager, each prototype remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the Australian Standards listed in SECTION 06100 CARPENTRY, plus those following, current edition:

AS/NZS 1859	Reconstituted wood-based panels - Specifications
1859.1 2004	Particleboard. <i>Plus 2 Amdts, 2006 - 2011.</i>
1859.2 2004	Dry processed fibreboard. <i>Plus 2 Amdts, 2006.</i>
1859.3 2005	Decorative overlaid wood panels. <i>Plus 1 Amdt 2009.</i>
	<i>There is 1 other part, 2004.</i>
AS 2754.2 1991	Adhesives for timber and timber products - Polymer emulsion adhesives.
AS 2796	Timber - Hardwood- Sawn and milled products. <i>There are 3 parts, 1999-2006.</i>
AS 4785 2002	Timber - Softwood- Sawn and milled products.
	4785.1 2002 Product specification.
	4785.2 2002 Grade description.
	4785.3 2002 Timber for furniture components.
AS 4786.2 2005	Timber flooring - Sanding and finishing.

105 Submissions

Submit the following prior to fabrication:

Product literature on proposed hardware items.
 Technical data on melamine laminates proposed for use.
 Technical data and samples of substrate materials (particleboard etc.).
 Thickness of materials at typical locations.

106 Delivery, Handling and Storage

Do not deliver until completion of anything which could soil, damage or deteriorate joinery. Prevent soiling, damage or deterioration during delivery, storage and handling.

Keep site storage to a minimum. If circumstances make storage necessary in areas other than the final location, store only in those that meet the requirements specified for installation areas.

PART II MATERIALS**201 Material Suppliers****202 Materials**

Particleboard: medium density: thickness

Timber:
Radiata pine:
Celery top pine:
Tasmanian oak:
Victorian ash:
Jarrah:
Silky oak:

Panels:
Hardboard: natural or pre coated
Plywood: natural or pre coated
Decorative: melamine etc.
Wood and metal laminates:
Fibreglass panels:
Glazed panels:
Glass fibre fabrications:
Cast plastic fabrications:
Solid polymer fabrications:

Fasteners:
Nails: type, size
Screws: type, size, metal

Adhesives:

203 Site-built items

- A. Service cupboards, electrical hydrant, telephone etc.
Frames of doors: timber:
metal
Doors: match other internal doors
details:
Bulkheads: same as doors
typical internal wall construction
other:
- B. Toilet Partitions
Material:
Panels:
Finish:
Doors:
Upstands:
Indicators:
Coat hooks:
- C. Stair Construction:
Material:
Custom built
Particleboard, craftwood
Prefabricated
Stringers
Treads
Blocking, etc.
Hand Rails:
Balustrades:
Posts:
- D. Benches
Material:
Frame:
Supports:
Boards:
Panels:
Brackets:
Fixings:
- E. Shelves:
Frame:
Supports:
Boards:
Panels:
Brackets:
Fixings:
- F. Trim:
Architraves: Material:

- Size:
 Type No:
 Finish:
 Skirting: Material:
 Size:
 Type No:
 Finish:
 Pelmet: Material:
 Size:
 Brackets:
- G. Finish: use only low VOC finishes on all timber surfaces with preference for finishes that can be recoated without removal of impervious hard coatings.

PART III EXECUTION

301 Examination

Visit the site and inspect conditions. Check dimensions and compare aspects with the drawings and specification. Resolve differences before ordering materials or starting work.
 Start of work means total acceptance of conditions.

302 Preparation for Joinery Installation

Prior to installing, condition joinery to the average humidity conditions prevailing in the installation areas. Deliver anchoring devices and similar inserts required to be built into substrates well in advance of the fixing of fittings and provide full details when they are to be fixed by others.
 Prior to installation, examine shop-fabricated work for completeness and remedy deficiencies. Include back priming and the removal of packing.
 Thoroughly clean floors and walls that will be permanently concealed by joinery.

303 Installation of Joinery

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 Use concealed shims as required to install the work plumb, level, straight and distortion free within the following tolerances:

- 1mm in 800mm for plumb and level (including bench tops),
- 0.5mm maximum offsets in flush adjoining surfaces,
- 2mm maximum offsets in revealed adjoining surfaces.

Scribe and cut to fit adjoining work; refinish cut surfaces or repair damaged finishes at cuts.
 Secure joinery with anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required to complete the installation. Except where pre-finished matching fastener heads are required, use fine finishing nails, countersunk and filled flush. Use a matching filler where a transparent finish is required.
 Install casework without distortion so that doors will fit openings properly and be accurately aligned.

304 Hardware

Install joinery hardware as scheduled, listed and required in full compliance with the manufacturer's recommendations.
 Adjust as needed to centre doors in openings.

305 Adjustments, Cleaning, Finishing and Protection

- A. Finish the work specified in this trade section and remedy anything not finished at the shop or other stage prior to completion.
- B. Adjust joinery to achieve a uniform appearance.
- C. Lubricate and clean hardware, making final adjustments needed for proper operation.
 Remove handling marks from visible joinery surfaces.
- D. Protection: do everything needed to ensure that work is without damage or deterioration at Practical Completion.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

This trade section identifies requirements for the supply and installation of 4 different types and areas of waterproofing. It covers preparatory and protective work and associated materials including but not limited to:

- A. System Type A, Wet Area membrane as in bathrooms, showers, laundries, garbage rooms and similar areas.
- B. System Type B, External membrane applied to outside of walls, roof decks, balconies and similar locations.
- C. System Type C, Tanking membrane applied to retaining walls, planter boxes, lift pits and other walls to be backfilled.
- D. System Type D, Waterproofing added to concrete mix before placement.
Refer to Concrete trade sections.

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete	Masonry
Surface finishes	Roofing
Excavation and fill	Windows
Concrete screeds (granolithic)	

103 Quality Assurance

Use experienced and trained installers licensed by the material manufacturer. Provide evidence of the licence to the project manager.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1884 2012	Floor coverings – Resilient sheet and tiles – Laying and maintenance practices.
AS 3600 2009	Concrete structures. <i>Plus 2 Amdts, 2010, 2013.</i>
AS 3740 2010	Waterproofing of domestic wet areas. <i>1 Amdt, 2012</i>
AS 3799 1998	Liquid membrane-forming curing compounds for concrete.
AS 4654	Waterproofing and membranes for external above-ground use
	4654.1 2012 Materials
	4654.2 2012 Design and installation
AS/NZS 4858 2004	Wet area membranes.

105 Manufactured Products

Identification of a particular manufacturer's product does not exclude alternative products by others. It is a quality standard required to be met.

Submit request for alternatives to be approved to the project manager with full description including recommended installation procedures and procedures relating to Occupational Health and Safety of applicators and other site personnel.

Do not order materials until written approval of alternatives has been received.

Submit manufacturer's approval of installers where manufacturer's own licensed installers are not employed and a warranty is required.

106 Delivery, Handling and Storage

Keep on-site storage of materials to a minimum, delivering them as required for direct installation. Be responsible for loss and damage to delivered materials, both stockpiled and in place.

Deliver materials in sealed containers showing manufacturer's name. Arrange for inspection of materials by the project manager before using them.

107 Warranty**Requirement**

Prior to completion of the waterproofing systems installation, provide each warranty, in the appropriate form; executed by the sub-contractor and the warrantor (or warrantors in the case of joint warranties); and for the required warranty period.

Warranty Conditions

Sub-contractor's obligations: the provision of a warranty does not relieve the sub-contractor of any of his contractual obligations.

Guarantee of performance: where the warrantor is a subsidiary of another organisation, provide that organisation's guarantee of performance of the warranty.

Adjustment of warranty period: where any part of the work is required to be repaired or made good under a warranty, the warranty period does not terminate until that part has been satisfactorily repaired or made good; and in respect of that part, recommences from the date of completion of the repair or making good.

Product warranties

Provide separate product warranties for each of the waterproofing systems.

System warranty

Provide separate warranties for each of the waterproofing systems, signed jointly by the manufacturer and the installer, stating that the products applied comply with this specification, are suitable for the conditions to which they will be subjected and were correctly installed in accordance with the manufacturer's published recommendations and details, the contract documents and provide a complete waterproof membrane. Warrant each of the waterproofing systems against any defects that affect their performance or appearance. Defects include failure of any element of the waterproofing system, whether or not the failure causes the system not to achieve the design criteria or specified performance.

The warranty must cover the repair and/or replacement of all other building elements, finishes etc. to which damage occurs as a consequence of a defect in, or repair work carried out, to the waterproofing system.

Warranty Period

As noted beside each of the waterproofing systems described in this specification.

PART II SYSTEM DESCRIPTION

201 Waterproofing System Type A

SYSTEM TYPE A – Wet Area Membrane

Location

Refer Waterproofing Table and drawings.

Typically to floors and walls of wet areas: including bathrooms, ensuites, laundries and garbage rooms, and to wall areas immediately adjacent to and behind a bath, sink or similar fixture.

Carry the membrane under fixtures, baths, shower bases, toilets, vanities and the like, and extend into the full area of shower recess:

to a minimum height of 2100mm to walls of shower recess extending 300mm beyond the horizontal extent of the designated tiled wall area;

to a height and width not less than 450mm to wall areas immediately adjacent to and behind a bath, sink or similar fixture.

System

Type: liquid applied, moisture curing, polyurethane liquid membrane.

Proprietary item: Vulkem non-exposed membrane system by Tremco Pty Ltd.

Substrate

Curing: allow concrete to cure for a minimum of 28 days prior to the application of the membrane.

Cleaning: clean down the substrate surface to remove all curing agents, wax, grease, oil, dirt, dust and other foreign material and leave it clean, dry, dust free, smooth and free of undulations.

Voids: patch with a non-shrinking quick setting grout and allow to cure for a minimum of 7 days prior to applying the membrane.

Application

Fillet: wherever a vertical penetration or upstand occurs, install a 12mm x 12mm fillet of Tremflex PU1 at the intersection of the vertical and horizontal surfaces.

Primer: prime porous substrate (concrete/cement) typically with Vulkem 171.

Prime non-porous materials (metals/plastics) typically with Tremco Primer No 181.

Joints and penetrations: on the same day as priming, seal joints and penetrations with Vulkem 931 sealant.

First coat: on the same day as priming, apply a coat of Tremco Vulkem non-exposed membrane to a minimum wet film thickness of 1.0mm to floors and walls in a single operation. If delayed beyond that day re-prime in accordance with manufacturer's instructions.

Detailing

Detail the membrane in accordance with the manufacturer's recommendations, as shown on the drawings and as follows:

Turn the membrane down into the puddle flange of outlets.

Turn the membrane up at, and seal to, all penetrations, pipes, waste outlets, etc.

Turn the membrane up for 100mm at all walls, plinths, and other upstands.

Dress the membrane over the horizontal leg of angle tile trims at doorways and turn up the vertical face of the angle to terminate level with the bottom of the floor tiles.

Similarly, dress the membrane up the face of door jambs to terminate at the underside of the floor tiles.

The membrane turn up is to create a complete waterproof envelope to the floor area of the space being treated.

Detail the membrane at movement joints in the substrate as detailed on the drawings.

Membrane curing: allow 72 hours for the membrane to cure prior to carrying out water tests or applying finishes, toppings etc.

Warranty

Provide a warranty for materials and application of the membrane for a period of years from the date of Practical Completion, to be in a form approved by the principal.

Alternatives

Type: any proposed alternative to the system specified below is to be a proprietary liquid applied or sheet membrane system which:

has a current Australian Building Product and Systems Certification Scheme certificate (Australian Building Codes Board); or

has a current technical opinion issued by the Australian Building Systems Appraisal Council (CSIRO) stating that the system is suitable for use as a waterproofing system for use in wet areas, shower recess bases and associated floors and wall/floor junctions which are to be tiled.

201B Waterproofing System Type B

SYSTEM TYPE B – External Membrane

Location

Refer Waterproofing Table and drawings:

System

Liquid applied, moisture curing, polyurethane rubber membrane.

Proprietary item: Vulkem 350/351 in a two coat application system by Tremco Pty Ltd.

Substrate

Curing: allow concrete to cure for a minimum of 28 days prior to the application of the membrane.

Cleaning: clean down the concrete surface to remove all curing agents, wax, grease, oil, dirt, dust and other foreign material and leave it clean, dry, dust free, smooth and free of undulations.

Voids: patch with a non-shrinking quick setting grout and allow to cure for a minimum of 7 days prior to applying the membrane.

Application

Fillet: wherever a vertical penetration or upstand occurs install a 12mm x 12mm fillet of Tremproof 60R at the intersection of the vertical and horizontal surfaces.

Primer: prime porous substrate (concrete/cement) typically with Tremco Primer No. 171.

Prime metals typically with Tremco Primer No 181.

Joints and penetrations: on the same day of priming, seal joints and penetrations with Vulkem 931 sealant to backing rods.

First coat: on the same day as priming, apply a coat of Tremco Vulkem 350 to a minimum wet film thickness of 1.5mm. If delayed beyond that day, re-prime in accordance with manufacturer's instructions.

Second coat: on the day after the first coat, apply a second coat of Tremco Vulkem 350 to a minimum wet film thickness of 1.5mm. If delayed beyond that day, reactivate the first coat with Vulkem 191 primer, in accordance with manufacturer's instructions.

Detailing

Detail the membrane in accordance with the manufacturer's recommendations, as shown on the drawings and as follows:

Turn the membrane down into the puddle flange of outlets.

Turn the membrane up at, and dress to, all penetrations, pipes, waste outlets, etc.

Turn the membrane up for a minimum of 150mm or level with the top of paving or tiles, at all walls, plinths, and other upstands. Refer to the drawings for extent as well.

Where the membrane turns up against hobs etc., and where indicated on the drawings, provide a cover flashing. Capture the horizontal leg of the flashing in the bed joint of blockwork or by sealing into saw cuts or reglets in blockwork or concrete. Dress the vertical leg down over the membrane to achieve a minimum 75mm cover. Use Colorbond finished zincalume for cover flashings generally and marine grade stainless steel where the flashing is built into concrete or cement beds, toppings or pavements.

Where indicated on the drawings, provide a K pressure seal to terminate the top of the membrane.

Provide cover flashings over the turn up of membranes at all services penetrations. Form the flashing from material that is compatible with the material of the individual service and the membrane. Seal the flashing to the service and dress down over the membrane to achieve a minimum 150mm overlap.

Detail the membrane at movement joints in the substrate as detailed on the drawings.

Outlets: proprietary funnel shaped sump cast into the roof slab, set flush with membrane, with a flat removable grating and provision (e.g. clamp ring) for sealing the membrane into the base of the outlet. To AS CA55.

Membrane curing: allow 72 hours for the membrane to cure prior to carrying out water tests or applying finishes, toppings etc.

Insulation and Protection

Extent: to the full extent of System Type C.

Insulation: following completion and successful testing of the membrane, install insulation boards loose laid over the membrane, tightly butted together and with end joints staggered.

Refer Roofing section.

Filter fabric, ballast and gravel retainers: refer Roofing trade section.

Topping screed and tiling: refer Tiling trade section.

Warranty

Provide a warranty for materials and application of the membrane for a period of years from the date of Practical Completion, to be in a form approved by the principal.

Alternatives

Any proposed alternative to this high performance polyurethane rubber membrane system will only be considered if it is equal to this system in every performance criteria, details of which are to be submitted with the proposal.

201C Waterproofing System Type C

SYSTEM TYPE C – Tanking Membrane

Location

Refer clause 101 and Waterproofing Table and drawings.

Typically to lift pits, retaining walls and other walls with backfill: to the full area of slab and wall.

System

Torch applied, AAP modified bituminous sheet membrane.

Proprietary item: Tremproof 3000 by Tremco Pty Ltd.

Substrate

Preparation: allow concrete to cure for a minimum of 28 days prior to the application of the membrane.

Clean down the concrete surface to remove all curing agents, wax, grease, oil, dirt, dust and other foreign material and leave it clean, dry, dust free, smooth and free of undulations.

Voids: patch with a non-shrinking quick setting grout and allow to cure for a minimum of 7 days prior to applying the membrane.

Application

Penetrations: wherever a vertical penetration or upstand occurs, install a 50mm x 50mm sand cement fillet at the intersection of the vertical and horizontal surfaces.

Priming: prime the entire surface that is to receive the membrane, including upstands etc., with Tremco Bituminous Primer (based on R105/15 bitumen) at the rate of 6-8 m² per litre.

Membrane: torch apply 1 layer of Tremproof 3000 and fully heat welded to the primed surfaces.

Lap the membrane 150mm at side and end joints and fully weld joints with a heated spatula.

Cover the entire membrane with a layer of Tremco Protection Board prior to the backfill being placed.

Detailing

Detail the membrane in accordance with the manufacturer's recommendations, as shown on the drawings and as follows:

Turn the membrane down into the puddle flange of outlets.

Turn the membrane up at and dress to all penetrations, pipes, waste outlets, etc.

Turn the membrane up for a minimum of 150mm or level with the top of paving or tiles, at all walls, plinths, and other upstands. Refer to the drawings for extent as well.

Where the membrane turns up against hobs etc. and where indicated on the drawings, provide a cover flashing. Capture the horizontal leg of the flashing in the bed joint of blockwork or by sealing into saw cuts or reglets in blockwork or concrete. Dress the vertical leg down over the membrane to achieve a minimum 75mm cover. Use Colorbond finish zincalume for cover flashings generally and marine grade stainless steel where the flashing is built into concrete or cement beds, toppings or pavements.

Where indicated on the drawings, provide a K pressure seal to terminate the top of the membrane.

Provide cover flashings over the turn up of membranes at all services penetrations. Form the flashing from material that is compatible with the material of the individual service and the membrane. Seal the flashing to the service and dress down over the membrane to achieve a minimum 150mm overlap.

Detail the membrane at movement joints in the substrate as detailed on the drawings.

Warranty

Provide a warranty for materials and application of the membrane for a period of years from the date of Practical Completion, to be in a form acceptable to the principal.

Alternatives

Any proposed alternative to this membrane system will only be considered if it is equal to this system in every performance criteria, details of which are to be submitted with the proposal.

201D **Waterproofing System Type D**

SYSTEM TYPE D – Xypex Additive

General

Location: to all concrete up to the floor level of the ground floor.

Proprietary item: the concrete waterproofing material is to be manufactured by Concrete Waterproofing Manufacturing Pty Ltd trading as XYPEX Australia, and is to be of the cementitious crystalline type known as XYPEX Waterproofing by Crystallization.

Note: XYPEX crystalline products should not be considered to be flexible.

Storage: store manufacturer's sealed and labelled material containers off the ground in a dry enclosed area at a minimum temperature of 7°C. The shelf life is 1 year when stored under proper conditions.

Manufacturer's warranty: on-site supervision, quality procedures, testing and all other requirements for issuance of manufacturer's warranty are to be complied with. Refer document PROCEDURE FOR SUPERVISION OF XYPEX POURS by XYPEX.

Dosage

By weight: Percentage dosage rates of XYPEX Admix C-1000NF/C-2000NF to the cementitious (ordinary Portland Cement [O.P.C.] and reactive pozzolana {e.g.; reactive fly ash}) content of the concrete.

Dosage rate must be between 0.8% and 1.0% by weight of cementitious (BWC) unless otherwise specified.

Example; 230 kg O.P.C. and 75 kg Fly Ash, total cementitious = 305 kg.

Dose rate @ 0.8% = 2.44 kg and @ 1.0% = 3.05 kg.

Refer to XYPEX Dosage Chart for applicable number of bags to be dosed in regard to cementitious content. Instances where this chart does not apply require that XYPEX Australia be contacted for determination and advice.

Cement content:: the cement (o.p.c.) content of the mix is not to be less than 10% by weight.

Special applications: chemical storage and constant high water pressure applications should be referred to Xypex Australia for suitable dose rates.

Batching and Mixing

Batching plant procedures, facilities and manpower will dictate the preferred/required batching technique. For example it is anticipated that the method described for central mix plants is not generally feasible in Australian conditions.

Ready Mix Plant – Dry Batch Operation:

Prior to batching, add XYPEX Admix in powder form to the drum of the ready-mix truck. After batching, mix the materials for 2-3 minutes to ensure the Admix is distributed evenly throughout the batch. (The batch must be agitated at high speed to ensure thorough dispersion.) A minimum of 10 minutes must elapse before discharge of the concrete. A further 1 minute of mixing at high speed immediately prior to discharge is recommended.

Ready Mix Plant – Central Mix Operation:

Mix XYPEX: admix with water to form a thin slurry (e.g. 7.0 kg of powder mixed with 13.0 litres of water). Pour the required amount of material into the drum of the ready mixed truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready mix truck). Pour the concrete into the truck and mix for at least 5 minutes, to ensure even distribution of the XYPEX Admix throughout the concrete.

Pre-cast Batch Plant:

Add XYPEX Admix to the rock and sand, then mix thoroughly for 2 – 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

NOTE: It is important to obtain a homogeneous mixture of XYPEX Admix with the concrete. Therefore, do not add dry powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur. It is however suitable to add wet concrete to dry powder ensuring that thorough mixing is achieved (as per Dry Batch Operation).

XYPEX soluble bags are most suited for use in the Dry Batch operation.

Maximum water cement ratio should not exceed **0.5**. Requirements for higher water cement ratios must be referred to XYPEX Australia.

The XYPEX Admix C-1000NF/ C-2000NF will act as a plasticiser and takes at least 10 minutes to become fully activated and will last approximately 30 minutes after placement of concrete.

Extension of set time may occur when using XYPEX Admix C-1000NF/C-2000NF. Amount of extension will depend on concrete mix design, temperatures and dosage rate of XYPEX. Care should be exercised when other admixtures are being used; when mixed with XYPEX extended set times can result. This category includes set retarders and may include water reducers, plasticisers etc.

Reinforcement

General: to be in accordance with the pertinent, current Australian Standards.

Concrete slabs: all reinforcement is to be "Rib deformed bar" or "welded wire fabric" (other than fitments) and designed in accordance with Australian Standard AS 3600.

Exposed concrete decks: joint free exposed concrete decks must contain reinforcement to minimise thermal movement, for which the content and placement of reinforcement steel required is to be sufficient to satisfy the requirements of AS 3600 clause 9.4.3.4. Refer AS 3600 section 4 para 4.3 (Exposure Classification) in its entirety.

Minimum steel: in the event that the requirements of AS 3600 be less than 1.0% (exposure classification A1 or A2) reinforcement steel requirement will in no case be less than 1.0% applied proportionately throughout the concrete and apportioned at not less than 0.5% on the top and 0.5% on the bottom face of the concrete. (i.e.; 0.25% either direction at both faces). 1.0% equates to a degree of crack control between moderate and strong as defined by AS 3600, clause 9.4.3.4.

Pre-stressing (Post Tensioning): is to conform to the above standards and or other current pertinent standard and requirements where applicable.

Compaction

Standard: must comply with AS 3600, clause 19.1.3.

General: the concrete is to be compacted until the following conditions are attained:

Entrapped air is expelled;

formwork is completely filled to the intended level;

all reinforcement, penetrations and the like are completely surrounded, and

the required properties of the concrete are achieved.

Finishing

Standard: must comply with AS 3600, clause 19.1.4.

General: finishing of the concrete is to include the process of "re-working" the surface of the concrete. This will involve either power trowelling of the surface and/or vigorous hand steel trowelling. Subsequent to this, finishing any desired finish can then be applied.

Alcohol: in hot weather (above 25°C) aliphatic alcohol **must** be used during placement and finishing to control the early loss of bleed water, and which may also assist in the control of shrinkage.

Curing

Standard: must comply with AS 3600, clause 19.1.5.

General: the concrete is to be cured in accordance with the above references, to enable the achievement of maximum potential XYPEX crystalline growth.

Curing should begin immediately following the final set. The use of aliphatic alcohol does not take the place of standard concrete curing practices.

In formed concrete, formwork provides good protection and curing for concrete, and should be left in place for a period of 7 days. Only exposed surfaces need to be kept moist.

Alternate Curing (AS 3799): curing compounds complying with the above and having retention levels of 90% or more are a satisfactory curing agent for XYPEX Admix C-1000NF/C-2000NF treated concrete.

Backfilling

Normal backfilling procedures, after curing of the concrete, may take place. If backfilling takes place within 7 days after the initial set, the backfilling material must be moist so as not to draw moisture from the concrete.

Applied Finishes

The crystalline formation of dendritic fibres will fill the pores and capillaries, thus reducing the suction characteristics of the concrete. Therefore, an additional bonding system may be required for the adhesion of applied finishes such as paint, epoxy, grout, cement parget coat, plaster, stucco or the like.

It is the responsibility of the installer of the applied finish to take whatever measures are necessary, including testing, to ensure acceptance by, or adhesion, to the concrete surface.

PART III EXECUTION

301 Examination

- A. Inspect conditions before delivery of materials and start of work on site to ensure that everything is satisfactory. Arrange with builder for needed rectification.
Start of work means total acceptance of conditions.
- B. Waterproofing Table

Waterproofing materials	Location and Extent	System Type A, B, C or D

302 Substrates

Substrates for membranes

Apply membranes to dry, smooth, firm, continuous surfaces, clean and free from loose or foreign matter.

Provide coving or fillets on internal corners. Round or arris external corners and edges.

Dryness tests for substrates: to AS 1884 Appendix A.

Acceptance of substrate: certify that the building structure, including the building tolerance, provision of reference lines and marks, is satisfactory for receiving the application of the waterproofing system.

Approval of installer: if the installation of the waterproofing system is not by the manufacturer, and a manufacturer's warranty is conditional on approval of the installer, then obtain the manufacturer's approval of the installer.

Make a photographic record of prepared substrates.

303 Protect Adjacent Surfaces

Protect adjacent surfaces from splashes over sprays and the like during the application of the waterproof membranes.

Plug drainage holes prior to the application of waterproofing membranes to prevent the material from entering outlets beyond what is necessary to dress the material into the outlet to complete the membrane system.

Remove plugs on completion.

Protect waterproofing membranes upon completion of each area of the application and maintain that protection until such time as the installation is approved and covered up by other finishes.

304 Protection of Installed Membranes

Location

Protect planter boxes, retaining walls, footings and any other location where the membrane is in direct contact with backfill or other potential damaging materials.

Type

Provide protection board made from 6mm thick fibre cement or 3mm thick, hollow polypropylene, co-polymer sheet or proprietary protection board equal Tremco Pty Limited.

Installation

Protect waterproofing membranes upon completion of each area of the application and maintain that protection until such time as the installation is approved and covered up by other finishes.

Following completion of the waterproof membrane to planter boxes install protection board to the membrane on vertical faces.

Restrain the board by trapping the top edge under the bottom edge of the K shaped pressure flashing used to terminate the top of the membrane.

Retaining Walls and Footings

Refer to 02315 SITE PREPARATION - EXCAVATION for membrane protection to retaining walls and footings built against existing site fill or rock.

- 305 Cleaning**
During the application, promptly remove foreign material from the work area without damaging the waterproofing system.
- 306 Installation of Waterproofing Systems**
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Refer to the systems specified in Part II System Description.
Follow the specified instructions.
- 307 Quality Control – Inspections**
Notice
Give sufficient notice so that inspections can be made at the following stages:
All substrate surfaces prior to the application of the waterproofing system.
Upon delivery of the system component material on site in sealed containers, prior to opening.
At completion of the application of the waterproofing systems, and prior to covering up with other finishes.
During the carrying out of flood tests.
Minimum notice required: 3 days.
- Manufacturers' Inspections**
Arrange for and pay the cost of inspections by the waterproofing systems manufacturer at each of the above stages and at regular frequent intervals during the application of the waterproofing systems.
Maintain a logbook on the site and record the time and date of each inspection, work complete and underway, at the time of each inspection, and comments by the manufacturer's representative.
Have the manufacturer's representative sign the logbook at the completion of each inspection and record the observations made.
- 308 Testing Reports**
Test installations prior to application of finishes to membranes.
To each membrane in wet areas, test 20% of area of membrane with a minimum of 10 tests.
Submit a report on the preparation of areas to be treated, working progress and on completion. In each report include a photographic record.
- 309 Cleaning**
Thoroughly clean work on completion, including affected adjacent surfaces.
- 310 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

Supply labour and materials, services and equipment necessary for the preparation, application and finishing of elastomeric and composition type waterproofing membranes exposed to weather as indicated on drawings, schedules and as specified herein, to surfaces of structures, as follows:

Traffic coatings, pedestrian

Traffic coatings, vehicular light vehicles

Lane marking

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete pavement

Substrates of concrete, steel or other stable material

103 Quality Assurance

Test samples:

- A. Prepare test samples for coating types and typical locations, where determined by the project manager. Do not commence coating of the substrate type until the sample is approved by the project manager. Apply samples in conditions approximating as closely as possible the lighting conditions of the finished work.
- B. Test samples include the suitable preparation of substrates.
- C. After approval, test samples are to be the standard for quality control of the completion of work of same type.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS/NZS 1580

Paint and related materials - Methods of test. *There are numerous parts, 1990-2006.*

AS 4049

Paints and related materials - Pavement marking materials.

4049.1 2005

Solvent-borne paint - For use with surface applied glass beads.

4049.2 2005

Thermoplastic pavement marking materials - For use with

surface applied glass beads.

4049.3 2005

Waterborne paint - For use with surface applied glass beads.

Plus 1 Amdt. 2006.

There are 2 other parts. 2006 - 2007.

105 Submissions

Submit the following materials:

- A. Product literature on proposed systems.
- B. Colour samples for approved materials. Identify samples with manufacturer's colour code and colour name (if any).
- C. Samples are not to be less than 100 x 100mm, and are to be of the same gloss level as the scheduled colour.

106 Delivery, Handling and Storage

- A. Store materials in designated spaces in a manner which meets the requirements of applicable codes and fire regulations. When not in use, keep such spaces locked and inaccessible to those not employed under this trade section. Provide each space with a fire extinguisher of carbon dioxide or dry chemical type bearing a tag of recent inspection.
- B. Bring materials to the building and store in manufacturer's original sealed containers, bearing the manufacturer's standard label, indicating type and colour. Deliver materials in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.

107 Project Conditions

Temperature: comply with the requirements of coating manufacturers with regard to both ambient temperature and relative humidity.

108 **Warranty**

Provide a written warranty stating that preparation of surfaces, materials and material application installed under this contract will show no deterioration and remain in good condition for a period of _____ years from date of Practical Completion.

PART II MATERIALS

201 Manufacturers

202 Materials

General: where manufacturer makes more than one grade of any material specified, use the highest grade of each type, whether or not the material is mentioned by trade name in these specifications.

Materials used for the project may be one of the following:

Membrane supplied in roll form

Liquid membrane in cans

Other

Other products may be approved by project manager. Apply to project manager in writing for approval of alternatives.

Provide materials necessary for preparation of surfaces, and for application.

PART III EXECUTION**301 Examination**

Inspect surfaces and determine that they are in proper condition to receive the work to be performed under this trade section. Refer 302 A, below.

The starting of work under this trade section will be taken to mean acceptance of such surfaces and other conditions as being satisfactory and defects in work resulting from accepting poor surfaces or conditions are to be corrected at no cost to the proprietor.

Refer AS 4049.1 and AS 4049.2

302 Preparation

- A. Clean all surfaces before application. Remove dust, dirt, plaster, grease and other extraneous matter affecting the finish work.
- B. Remove blisters or other imperfections in previous coats caused by foreign substances or paint skins from painted surfaces before the subsequent coat is applied.
- C. Thoroughly stir materials in containers before application, unless otherwise directed by the manufacturer of the paint used, to ensure uniformity of colour and mass. Strain out paint skins or other materials which would cause lumps or roughness. Thin only as recommended by the manufacturer.

303 Application

- A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
- B. General: execute work of this trade section in strict compliance with material manufacturer's recommendations.
- C. In the case of maintenance or reapplication, execute work of this trade section in strict compliance with manufacturer's recommendations.

304 Protection

Furnish and lay suitable drop cloths in areas where material is being applied to protect other surfaces from damage during the work.

Install protective barriers until materials are totally dry.

305 Cleaning

At completion of work in each area, remove paint spots, oil and stain from adjacent surfaces.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The scope of work includes, but is not limited to, the supply and installation of thermal insulation. It also includes the supply and installation of acoustic insulation.

102 Related Work

Co-ordinate and co-operate with the following trades:

Carpentry	Wall and roof framing
Brickwork	Blockwork
Metal roofing	Roof tiles
Plasterboard	Suspended ceiling

103 Quality Assurance

Installers are required to be widely experienced in relevant aspects of the work and with the requirements of Australian Standards appropriate to the work.

104 References

Comply with the applicable portions of these Australian Standards:

AS 1366	Rigid cellular plastic sheets for thermal insulation. <i>There are 4 parts, 1989-1992, and 2 Amdts, 1992 - 1993.</i>
AS/NZS 2107 2000	Acoustics - Recommended design sound levels and reverberation times for building interiors.
AS 3671 1989	Acoustics - Road traffic noise intrusion - Building siting and construction.
AS 3999 1992	Thermal insulation of dwellings - Bulk insulation - Installation requirements. <i>1 Amdt, 2012</i>
AS/NZS 4200	Pliable building membranes and underlays. 4200.1 1994 Materials. <i>Plus 1 Amdt, 1994.</i> 4200.2 1994 Installation requirements.
AS/NZS 4859.1 2002	Materials for the thermal insulation of buildings - General criteria and technical provisions. <i>Plus 1 Amdt, 2006.</i>

Comply with the requirements of the Building Code of Australia.

105 Submission

Provide to the project manager before ordering, samples, literature and technical data of each specified material.

106 Delivery, Handling and Storage

Deliver, handle and store products so that damage, deterioration and loss will be prevented. Control delivery schedules to minimise long-term storage at the site.
Store above ground with secure impervious material.

PART II MATERIALS**201 Approved Material Suppliers****202 Materials – Thermal**

- A. Thermal insulation (building paper type) with and without reflective facings, with and without flame retardants, sarking.
- B. Vapour barriers - with and without reflective facings - paper/foil, high density polyethylene breather membranes, aluminium foil reinforced or folded as batts.

Comply with manufacturer's recommendations and AS/NZS 4200.1 Materials
- C. Bulk thermal insulation - in sealed batts or sealed blankets semi-rigid glasswool, rockwool or cellulosic fibre, sea-grass, polyester, with or without facing. In-situ urea-formaldehyde foam.
Comply with manufacturer's recommendations and the applicable Australian Standards.
- D. Rigid cellular insulation - polystyrene polyurethane, polyisocyanurate urea-formaldehyde foam boards.
Comply with manufacturer's recommendations and the relevant Australian Standards.

203 Materials–Acoustic

- A. Acoustic insulation (attenuation type) with or without facings - flexible polyurethane foam, polyester blankets, glass and mineral wool batts, plasterboard.
- B. Acoustic insulation (absorption type) with or without facings, reinforcement - suspended mineral fibre ceilings, mineral tiles, perforated fibre cement sheet systems, and panels, metal pans and strips with or

- without absorption batts, suspended baffles sound barriers, sprayed texture finishes of plaster, cement or vermiculite.
- C. Acoustic sealants - polyethylene foam, closed cell resilient foams, polyurethane foams, non-shrinking sealants of silicone or similar type with good adhesion, door and window seals.

PART III EXECUTION

301 Examination

Visit the site and inspect conditions, comparing conditions to drawings before delivery of materials to site. Start of work means total acceptance of conditions.

302 Preparation

Prepare surfaces and/or framing material and ensure that no obstructions will prevent rapid and effective installation.

303 Installation General (Thermal)

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Comply with manufacturer's current written recommendations and the relevant Australian Standards.

Install membrane to metal roofing, tiled roofing, walls, underside of floor.

Install bulk thermal insulation to:

Walls

Roof

Ceiling space

Install rigid thermal insulation to areas shown on the drawings: roof, walls, etc.

304 Installation General (Acoustic)

Install acoustic attenuation type material in accordance with the manufacturer's current written recommendations. Comply with AS/NZS 2107.

Install acoustic absorption material in accordance with the manufacturer's current written recommendations.

Seal junctions and around penetrations where indicated by the acoustic systems designs.

Spray surface after providing protection and masking to surrounding surfaces, in accordance with manufacturer's instructions.

305 Cleaning

Remove surplus material on completion and arrange for inspection(s) by manufacturer's representative.

306 Completion

Complete contracted work in accordance with the contract document and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

Design, engineer, fabricate and install insulated panels with required components, fixings, fabrication techniques, coatings and finishes, including but not limited to:
 Wall panels, metal clad bonded to each side of expanded polystyrene foam core.
 Roof panels, metal clad bonded to each side of expanded polystyrene foam core.
 Roof plumbing.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Structural steel frame Timber structural frame
 Floor construction

103 Quality Assurance

- A. The products specified herein are proprietary items manufactured and supplied by specialist fabricators. Manufacturer is required to submit written verification of quality of aspects of performance.
- B. Provide certificates prepared by relevant testing authorities stating that the composite building panels comply with characteristics claimed by the manufacturer.
- C. Pre-installation conference
 Arrange with the contractor/builder for a conference to establish and settle matters regarding the site installation methods and time schedule.
- D. Erection of panels at the site is required to be performed in accordance with the requirements of relevant statutory authorities.

104 References

Comply with applicable portions of the following Australian Standards:
 AS/NZS 1170 Structural design actions.
 There are 5 parts, several Supplements and Amdts, 2002 – 2011.
 AS/NZS 2179 Specifications for rainwater goods, accessories and fasteners.
 2179.1 1994 Metal shape or sheet rainwater goods, and metal accessories and fasteners.
 Comply with the requirements of relevant authorities having jurisdiction on this project.
 Product manual produced by manufacturer of components.

105 Submissions

- Provide to the project manager before fabrication of components:
- A. A complete written description of the material ordered, with a description of construction and installation techniques.
 - B. 2 samples of the finish to the panels as ordered.
 - C. Manufacturer's maintenance recommendation.

106 Delivery, Handling and Storage

Deliver the materials to the site in a totally satisfactory condition. Schedule deliveries so that panels are erected and secured direct from the delivery vehicle. Reduce storage of materials on site to a minimum.
 Mark each component for easy identification. Provide security for materials not installed, from loss or damage by weather or other cause.
 Do not install damaged component or panel. Remove and replace such item.

107 Project Site Condition

Do not install wet processes in wet weather, or when temperature is less than 4°C or more than 35°C.

108 Warranty

Provide to the project manager a written warranty stating that components of the complete installation will remain intact and in a satisfactory condition for year(s) from the date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

202 Design Criteria

The panels are required to meet the following criteria when erected in place.

- A. Structural movement (of building).
- B. Thermal movement (of building).
- C. Wind load on panels.
- D. Dead load on panels.
- E. Fire resistance to requirement.

- F. Anchor bolts to secure panels to buildings.
 G. Terrain Category: refer AS/NZS 1170, Part II Wind Forces.

203 Panel Components for Walls

Trade name:	
Panel thickness:	Core material: expanded polystyrene, Grade S, SL or : 50, 75, 100mm or: Cladding metal: 0.40, 0.60mm or : inside thickness with "galvabond" steel, 0.40, 0.60mm or : outside thickness "galvabond" steel, Metal finish: Outside, "Colorbond", : "Marviplate", : Inside, "Colorbond", : "Marviplate", : 1200mm.
Panel width:	1200mm.
Jointing:	standard slip joint tongue and groove.
Fixing:	as supplied by manufacturer to suit installation requirements.
Panel arrangement:	
Base detail:	:
Horizontal panel intermediate fixing:	C type distribution cleat Concealed aluminium extrusion
Vertical panel intermediate fixing:	Recessed aluminium extrusion Concealed C type distribution cleat Recessed pressed steel top hat
Corner details:	Aluminium extrusion, square section Pressed steel cover Panel cut and folded Curved corner
Internal wall panel connection (vertical stud):	Aluminium extrusion, channel and top hat sections
Parapet details:	
Door frames:	Pressed steel, galvabond, finish to match wall panels
	Aluminium extrusions Timber
Window frames:	Aluminium extrusions Neoprene gasket frames Glass 6mm clear float :
External grille	Aluminium extrusions Aluminium grille blades
Sealant:	Backer rod: polyethylene foam, continuous Sealant: neutral curing silicone rubber

204 Panel Components for Roofs

Trade name:	
Core material:	expanded polystyrene, Grade S, SL or:
Panel thickness:	50, 75, 90mm or:
Cladding:	0.60mm or : inside thickness "galvabond" steel, 0.40, 0.60mm or : outside thickness with ribs on upper surface flat on underside "galvanised" steel,
Metal finish:	Outside, "Colorbond", : Inside, "Colorbond"
Panel width:	990mm
Fixing to purlins:	self-drilling screw with cyclone cap and neoprene washer for fixing to steel purlins.
Fixing to sidelaps:	Type 17 screws for fixing to timber purlins. point No. 8 x 12 hex head with neoprene washer.
Flashings and cappings:	G250, "Colorbond" finished to match wall or roof panel, formed to comply with recommendation of AS 2179.
Gutters: as for flashings.	
Rib end stops:	as supplied by manufacturer.
Eave closure strips:	as supplied by manufacturer.

- 205 Fabrication**
A. Provide and fabricate frame and support structures in accordance with structural engineer's requirements.
B. Check site dimensions before fabrication of components. Tolerances are not to exceed +3mm, -3mm.
C. Schedule fabrication in accordance with contractor's construction program.
D. Mark each item for easy identification.
- 206 Source Quality Control**
The engineer and project manager will make random inspections at various stages of progress of panel fabrication before delivery.
Make available item needed for inspection and verification of compliance with this specification.

PART III EXECUTION

- 301 Examination**
Examine conditions at the site before delivery of completed panels and installation. Arrange with contractor for correction of non-optimum conditions.
Ensure fixing bolts are in place, ready to receive the panels.
Start of work means total acceptance of conditions.
- 302 Preparation**
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Protect by appropriate means surface either of the building or of the panels which may be damaged during installation.
- 303 Installation**
Install panels by agreed upon means, plum, true, without warping or twisting. Tighten bolts and secure final position.
Comply with supplier's/manufacturer's installation recommendations.
- 304 Sealants**
At junction of panels with other materials, insert into opening a closed cell polyethylene backing rod, wedged firmly in place. Apply over the backing rod an approved silicone rubber, to colour selected by the project manager.
Use only material recommended by the panel fabricator.
- 305 Field Quality Control**
A representative of panel manufacturer or system supplier is required to be present during installation of panel on the building, when required by the project manager.
- 306 Repairs**
Repair surface either on the building or installed panels which may have been damaged during installation. Make good the surface and restore to uniform appearance with adjacent surfaces.
Use paint repair material provided by the panel fabricator.
- 307 Protection**
Protect the installed panels until completion of the project. Prevent damage to completed work by necessary means.
- 308 Cleaning**
On completion, clean up debris, remove support structures, scaffolding and the like. Leave work and surfaces entirely clean and uniform condition.
- 309 Completion**
Complete work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

Design, engineer and install prefabricated fire rated and acoustic rated steel faced wall panels with each shell filled with aerated concrete.
 Supply the above materials including but not limited to:
 Complete list of characteristics of the chosen panel type and install instructions:
 Training and supervision of installers.
 Other components for extended thermal insulation performance.
 Panels erected vertically or horizontally.
 Required fixings.
 Furring channels.
 Plasterboard.

102 Related Work

Co-ordinate and co-operate with the following trades:

Floor construction	Wall construction trades
Concrete	Ceiling installation
Structural steel	Plasterboard
Electrical installation	Painting

103 Quality Assurance

- A. The panels specified herein are proprietary items manufactured and supplied by specialist fabricators. Manufacturer is required to submit written verification of quality of aspects of performance.
- B. Provide certificates prepared by relevant testing authorities stating that the composite building panels comply with characteristics claimed by the manufacturer.
- C. Pre-installation conference
 Arrange with the contractor/builder for a conference to establish and settle matters regarding the site installation methods and time schedule.
- D. Erection of panels at the site is required to be performed in accordance with the requirements of relevant statutory authorities.
- E. Provide a statement that installers have been fully trained by the manufacturer.

104 References

Comply with the requirements of relevant authorities having jurisdiction on this project.
 Provide manual produced by manufacturer of components.

105 Submissions

- Provide to the project manager before fabrication of components:
- A. A complete written description of the material ordered, with a description of construction and installation techniques.
 - B. Two samples of the finish to the panels as ordered.
 - C. Manufacturer's maintenance recommendation.

106 Delivery, Handling and Storage

Deliver the materials to the site in a totally satisfactory condition. Schedule deliveries so that panels are erected and secured direct from the delivery vehicle. Reduce storage of materials on site to a minimum.
 Mark each component for easy identification. Provide security for materials not installed, from loss or damage by weather or other cause.
 Do not install damaged component or panel. Remove and replace such item.
 Co-operate with other trades. Avoid disturbance of other activities on site particularly relating to the use of moving and lifting equipment.

PART II MATERIALS

201 Acceptable Manufacturers

202 Design Criteria

The panels are non-loadbearing.
 The panels are required to meet the following criteria when installed.

- A. Structural movement (of building).
- B. Thermal movement (of building).
- C. Wind load on panels.
- D. Dead load on panels.
- E. Fire resistance to requirement.
- F. Anchor bolts to secure panels to buildings.

- G. Terrain Category: refer AS/NZS 1170, Part II Wind Forces.
Consult manufacturer who will supply a complete list of components required for each application.
Ensure that finishes of components are related in the list.

203 Panel Description

Trade name:
Core material:
Panel: width: 250mm, thickness: 78mm
Shell material: zincalume steel
thickness:
finish on steel:
Core filling: aerated concrete
Jointing: tongue and groove
Channels and angles: custom made by panel manufacturer
Floor fixing: cold formed steel:
Ceiling fixing: cold formed steel:
Stud: cold formed steel:
Top hat: cold formed steel:
Sound insulation: acoustic fibre:
Weight p.s.m:
Sealant (FYREthane): as supplied by manufacturer:

204 Fabrication

- A. Provide and fabricate frame and support structures in accordance with structural engineer's requirements.
- B. Check site dimensions before fabrication of components. Tolerances are not to exceed +3mm, -3mm.
- C. Schedule fabrication in accordance with contractor's construction program.
- D. Mark each item for easy identification.

205 Source Quality Control

The engineer and project manager will make random inspections at various stages of progress of panel fabrication before delivery and during installation.
Make available items needed for inspection and verification of compliance with this specification.

PART III EXECUTION

301 Examination

Examine conditions at the site before delivery of completed panels and installation. Arrange with contractor for correction of non-optimum conditions.
Ensure fixing bolts are in place, ready to receive the panels.
Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Protect by appropriate means surfaces either of the building or of the panels which may be damaged during installation.

303 Installation

Install panels by agreed upon means, plum, true, without warping or twisting. Tighten bolts and secure final position.
Comply with supplier's/manufacturer's installation recommendations.

304 Sealants

At junction of panels with other materials, insert into opening FYREthane sealant.
Use only material recommended by the panel fabricator, in accordance with manufacturer's installation.

305 Field Quality Control

A representative of panel manufacturer or system supplier is required to be present during installation of panel on the building, when required by the project manager.

306 Repairs

Repair surface either on the building or installed panels which may have been damaged during installation.
Make good the surface and restore to uniform appearance with adjacent surfaces.
Use paint repair material provided by the panel fabricator.

307 Protection

Protect the installed panels until completion of the project. Prevent damage to completed work by necessary means.

308 Cleaning

On completion, clean up debris, remove support structures, scaffolding and the like. Leave work and surfaces entirely clean and uniform condition.

309 Completion

Complete work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

SECTION 07500 MEMBRANE ROOFING AND PLUMBING

PART I GENERAL

101 Scope

Supply and install membrane roofing including preparatory work and associated materials including but not limited to the following:

Membrane roofing.

Concrete patching and filling.

Surface finishing.

Roof plumbing.

102 Related Work

Co-ordinate and co-operate with the following trades:

Roof plumbing

Concrete

Masonry

103 Quality Assurance

Perform work of this trade section with experienced tradesmen familiar with the quality of work required in this class of work, and approved in writing by the material supplier.

Pre-installation conference: meet at site with installer, material manufacturer, installers of relative work and project manager. Give 72 hours' notice to all. Keep record of decisions.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS/NZS 2179

Specifications for rainwater goods, accessories and fasteners.

2179.1 1994

Metal shape or sheet rainwater goods, and metal accessories and fasteners.

AS 4654

Waterproofing and membranes for external above-ground use

4654.1 2012 Materials

4654.2 2012 Design and installation.

105 Submissions

Submit prior to ordering materials:

- A. Samples and product data of specified products.
- B. Calculation of sizes of plumbing outlets.
- C. 300mm square samples of roof sheet material proposed for installation.
- D. Copies of minutes of pre-installation conference.
- E. Evidence of payment of any relevant fees.

106 Delivery, Handling and Storage

Reduce on-site storage of materials to a minimum. Deliver materials as and when required for direct installation. Be responsible for loss and damage to materials delivered whether stockpiled or in place.

107 Warranty

Provide to the proprietor a warranty, co-signed by the manufacturer and his authorised installer, covering the whole of the roof and roof plumbing system stating that such installations will remain weather-tight and waterproof for the period of years from the date of Practical Completion.

Included in the warranty roof penetrations for equipment supports, pipes, flues, upstands, flashings, etc. including those installed after the roofing membrane has been completed.

Note: this will necessitate co-operation with other trades and review of the results of the work of those tradesmen.

PART II MATERIALS

201 Acceptable Manufacturers

202 Materials

Name	Code	Thickness	System name/ No. of plys & layers	Surface finish	Accessories	Gutters, downpipes, fixings, etc.
					Roof light, access hatches, etc.	

203 Equipment

204 Fabrication

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, before delivery of materials. Ensure conditions are satisfactory for installation.

Arrange with builder for rectification required before delivery of materials.

Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Prepare surfaces affected by the installation in accordance with material manufacturer's instructions.

Comply with manufacturer's instructions and Australian Standards.

Variations are subject to project manager's written order. Execute sleeves, pockets, flashings, collars, etc. as instructed by the manufacturer.

303 Installation

Comply throughout with the requirements of Australian Standards and manufacturer of materials.

304 Field Quality Control

Arrange for attendance of manufacturer's representative every alternate day of installation. The project manager will inspect.

Comply with the project manager's request for testing he may order at the completion of part or all of the installation.

305 Cleaning

Thoroughly clean work on completion, including surfaces adjacent to the work of this trade section which has been affected. Clean out gutters, downpipes, drains, etc.

306 Protection

Protect the installation from damage by suitable means until Practical Completion.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

SECTION 07600 METAL ROOFING, SIDING AND ROOF PLUMBING

PART I GENERAL

101 Scope

Supply and install a complete roofing and siding (external cladding) installation as shown on the drawings including but not limited to the following:

- A. Metal deck of zincalume steel, aluminium, copper etc., including accessories, fastening clips, apron flashings, gutters, parapet linings, copings, sumps, overflow pipes, downpipes.
- B. Roof insulation and wire mesh.
- C. Roof penetrations and sealing thereof.
- D. Metal cladding.

102 Related Work

Co-ordinate and co-operate with the following trades:

Structural steel	Metal windows and glazing
Doors and door frames	Roller shutter doors
Carpentry	Drainage

103 Quality Assurance

Tradesmen are required to be experienced in and knowledgeable about the work to be performed and the various Standards to which the work is to comply. The project manager will make random inspections during the execution of the work.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1170	Structural design actions. <i>There are 5 parts, several Supplements and Amdts, 2002 – 2011.</i>
AS 1273 1991	Unplasticised PVC (UPVC) downpipe and fittings for rainwater.
AS/NZS 1562	Design and installation of sheet roof and wall cladding. 1562.1 1992 Metal. <i>Plus 3 Amdts, 1993 - 2012.</i> 1562.3 2006 Plastic. <i>There is 1 other part, 1999.</i>
AS/NZS 2179	Specifications for rainwater goods, accessories and fasteners. 2179.1 1994 Metal shape or sheet rainwater goods, and metal accessories and fasteners.
AS 3566 2002	Self-drilling screws for the building and construction industries. <i>There are 2 parts.</i>
AS 3999 1992	Thermal insulation of dwellings - Bulk insulation - Installation requirements. <i>1 Amdt, 2012</i>
AS/NZS 4256	Plastic roof and wall cladding materials. <i>There are 5 parts, 2006.</i>
AS/NZS 4389 1996	Safety mesh.
HB 39 1997	Installation code for metal roof and wall cladding.
HB 114 1998	Guidelines for the design of eaves and box gutters.

105 Submissions

Submit prior to ordering materials:

- A. Samples and product data of specified products.
- B. Calculation of sizes for gutters and downpipes.
- C. To roofer - supply layout showing exact roof framing member positions.

106 Delivery, Handling and Storage

Deliver to site, unload and stack in a location away from potential damage, preferably directly on to installed roof framing. Inspect on arrival and reject bent or damaged material.

107 Warranty

Provide to the proprietor a warranty on the whole of the roof and roof plumbing including penetrations for pipes, flues, upstands etc. performed for mechanical equipment sub-contractor which states that work will remain waterproof and weather-tight for the period of years from the date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

202 Materials – Schedule for Metal Roofing Located at the end of the document

203 Schedule for Metal Siding (Cladding) for Walls Located at the end of the document

- 204 Fabrication**
Form and fabricate components in accordance with AS/NZS 1562 and AS/NZS 2179.1, and other relevant Standards.
Self-drilling screws are to conform to Class 3 as described in AS 3566.
- 205 Dissimilar Metals**
In moist environments, prevent totally contact between dissimilar metals (any metals).
This instruction takes priority over any drawing, detail or instruction and will prevent cathodic reaction between the metals.
Refer this instruction to the structural engineer.

PART III EXECUTION

- 301 Examination**
Inspect site conditions before installation. Ensure framing is entirely satisfactory.
Ensure that delivery and installation will not be impeded by on-site conditions at time of delivery.
Start of work means total acceptance of conditions.
- 302 Terrain Category**
The site is zoned as Terrain Category:
Refer AS/NZS 1170.
- 303 Preparation**
Prepare framing and surfaces for installation.
- 304 Installation**
Install work in accordance with manufacturer's instructions and Australian Standards. Refer clause 104.
- 305 Flashing**
Lap flashing at least 150mm at junctions, and over flashings neatly dressed and finished. Where necessary to follow a roof slope, step flashings in even overlapping widths. Finish top corners to a line parallel to the roof slope.
Fabricated flashings in materials which are compatible with, and same finish as, gutter and roofing materials.
Complete work and leave an entirely watertight installation.
- 306 Penetrations**
Form penetration flashings neatly with material matching roofing material. Form flanged tubular collars 0.70mm sheet zinc not less than 150mm high and 12mm wider than penetrating item, or use EPDM collars.
Where the width of a penetration is wider than a roofing trough or extends across several troughs, form a back gutter, using sheet material similar to the roofing material, well lapped under the roofing, double riveted and sealed with silicone sealant. Close and seal ends of cut ribs. Form back gutters not less than 100mm wide with falls towards the sides of the penetration collars.
Form over-flashings of penetration collars neatly in material matching the roofing material but not less than 0.5mm thick, securely clipped and sealed to the penetrating items and dressed well down over the collars to finish at a straight line level with the tops of the ribs.
Do not use lead or copper for over-flashings.
- 307 Downpipes**
Install in accordance with AS/NZS 2179.1 for metal.
Install in accordance with AS 1273 for PVC. Comply also with manufacturer's instructions.
Secure to building at recommended centres, minimum 1800mm with galvanised steel straps.
Install base of downpipes into up-turned shoe of stormwater drain and seal junction with cement mortar, or other approved material.
- 308 Cleaning**
To prevent contamination and corrosion, keep clean metal roofing and rainwater goods at times during the progress of the works.
At the end of work each day, and immediately before each occurrence of rain, sweep the metal surfaces thoroughly to remove metal filing, swarf, off-cuts, dust, and other materials which could cause corrosion or blockages. Prevent waste materials from entering downpipes, rainwater heads, or drains.
Remove unsecured nails, rivets, screws, bolts and similar fixing devices, guttering, etc., at the end of work each day and at the completion of roofing installation.
- 309 Testing**
On completion, test the entire installation in the presence of and to the satisfaction of the project manager.

310

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

SECTION 07725 FALL ARREST EQUIPMENT

NOTE: THERE IS A REQUIREMENT UNDER OHS&E LEGISLATION TO DEMONSTRATE THE REASONS FOR SELECTING PERSONAL PROTECTIVE EQUIPMENT IN LIEU OF SAFER LESS RISKY METHODS OF SAFETY FOR THE INSTALLATION.

PART I GENERAL

101 Scope

Supply and install fall arrest and/or roof fence equipment including but not limited to:
Anchor points, harness gear and equipment, static line, eaves platforms and fences and associated safety signs.

102 Related Work

Co-ordinate and co-operate with the following trades:

Roof framing	Roofing materials
Eaves construction	Membrane roofing

103 Quality Assurance

Work of this trade section is to be performed by experienced craftsmen familiar with the quality required in this class of work.

Where 5 or more items of a similar product are required, construct a prototype, full size. Finish the prototype in every respect. When approved by the project manager, this sample remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1657 2013 Fixed platforms, walkways, stairways and ladders – Design, construction and installation.

AS/NZS 1891.1 2007 Industrial fall arrest systems and devices – Harnesses and ancillary equipment.

AS/NZS 4801 2001 *There are 3 other parts, 1997 - 2009, 1 Supplement 2001, 2 Amdts 2007 – 2008.*
Occupational health and safety management systems - Specification with guidance
for use.

AS 6001 1999 Working platforms for housing construction

Comply with State requirements and codes of practice in relation to work on roofs.

Comply with the requirements of relevant statutory authorities having jurisdiction on this product.

Product manual produced by manufacturers of components.

105 Shop Drawings

Comply with DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27.

Provide Shop Drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
- B. Develop details not shown and in conformity with the indicative details shown.
- C. Take and confirm dimensions on site, before preparing Shop Drawings where possible.
- D. Submit detailed Shop Drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, fasteners, anchorages and accessory items.

106 Samples

- A. Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. When approved, samples will establish quality of similar work of this section.
- B. Check on delivery: request project manager to check materials on delivery to site for quality, and he will reject materials not meeting the requirements of this specification or equal to approved samples. Return rejected materials to the fabricator at the fabricator's expense.
- C. Finish: provide samples of specified finishes when requested.

107 Warranty

Provide a warranty to the proprietor covering the whole of the work for a period of years after Practical Completion. Warranty to cover roof penetrations.

PART II MATERIALS

201 Manufacturers

Acceptable manufacturers include:

Safya Group Tel: 1300 301 755.

CAPITAL Safety Group Tel: 1800 245 002.

202 Materials

Item	Description	Manufacturer/Supplier
Anchors	Type 316 stainless for metal exposed to weather	
Static lines	Type 316 stainless for metal exposed to weather	
Equipment		
Eaves platforms temporary		
Fences temporary		

Personal harness

Provide two sets of harness equipment each containing:

1x Full body harness

1x Shock absorber

1x 15.0 metre ropeline with length adjuster

1x 1.2 metre double lanyard

3x Anchorage clip

1x Anchor strap

1x Equipment carry bag

203 Fabrication

Visit site and accurately measure openings etc. before fabrication.

Before delivery to site, pre-assemble where possible all items to ensure proper fit and dimension of each item.

Disassemble and pack carefully for shipping to the site. On delivery and unloading, inspect for damage and arrange immediate replacement if necessary.

204 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt. Fasten galvanised items with galvanised fasteners.

PART III EXECUTION**301 Examination**

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Start of work means total acceptance of relevant conditions.

302 Preparation

Check roof framing and other items to which safety equipment is to be fixed.

Ensure that structures local to the installed items are secure.

A senior technical representative of the material supplier is required to be present to check each part of the installation.

303 Installation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Secure each item in accordance with Australian Standards.

Arrange with the builder and roofer for penetrations if required through roof materials.

Ensure that penetrations are completely watertight after installation and on completion of the work.

304 Field Quality Control

Arrange for inspection of the work before and after completion.

305 Testing

Arrange for tests of each item of equipment. Replace items which fail the test.

306 Portable Equipment

After tests are completed, provide and hand over portable equipment to the builder. Store where directed.

Builder to hand over the material to proprietor on completion of the work.

307 Cleaning

Remove surplus materials and leave the area clean on completion.

308

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, fabricate and install materials with required components, fixings, fabrication techniques, coatings and finishes including but not limited to:

102 Related Work

Co-ordinate and co-operate with the following trades:

Structural steel	Concrete
Wall framing	Floor framing
Mechanical	Electrical

103 Quality Assurance

- A. The products specified herein are proprietary items manufactured and supplied by specialist fabricators. Manufacturer is required to submit written verification of quality of aspects of materials and performance.
- B. Provide certificates prepared by relevant testing authorities stating that the materials comply with fire-rating and other characteristics claimed by the manufacturer, and qualities required by the relevant statutory authorities.
- C. Pre-installation conference.
Arrange for a conference to establish and settle matters regarding the site installation methods and time schedule.
- D. Installation and application at the site is required to be performed in accordance with the requirements of relevant statutory authorities.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1530	Methods for fire tests on building materials, compounds and structures. <i>There are 7 parts, 2 Amdt, 1992 – 2007.</i>
AS 1603	Automatic fire detection and alarm systems. <i>There are 12 parts 1996 – 2011 and 4 Amdts, 1996 – 2001.</i>
AS 1670	Fire detection, warning, control and intercom systems - System design, installation and commissioning. <i>There are 4 parts, 1997 – 2004, plus 1 Amdt, 2005.</i>
AS 1682	Fire Dampers. 1682.1 1990 Specification. 1682.2 1990 Installation.
AS 2118.4	Automatic fire sprinkler systems - Residential
AS 3784.1 1990	Coatings for fire protection of building elements – Guide to selection and installation of sprayed mineral coatings.
AS 3959 2009	Construction of buildings in bushfire-prone areas. <i>Plus 3 Amdts 2009-2011</i>
AS 4072.1 2005	Components for the protection of openings in fire-resistant separating elements – Service penetrations and control joints. <i>Plus 1 Amdt, 2006.</i>
AS 5414 2012	Bushfire water spray systems
Bushfire Set 2009	
HB 37.4 1994	Handbook of Australian fire Standards – Building materials, products and construction.

105 Submission Required Prior to Fabrication

- A. Complete system description including the following information:
 1. Names of manufacturers of products.
 2. Names, addresses and telephone numbers of local representatives for products.
 3. Types, names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 4. Detailed system description including standard details and manufacturer's literature
- B. Statement that the proposed system meets the regulatory requirements, for fire protection and warranty requirements specified.
- C. Shop Drawings: refer Document 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27. Provide Shop Drawings showing the following information where appropriate to the items:
 1. Layout (sectional plan and elevation of complete assembly).
 2. Full size section of members.
 3. Methods of assembly.
 4. Methods of installation, including fixings, anchorage, caulking.
 5. Provision for expansion (thermal).
 6. Junctions and trim to adjoining surfaces.
 7. Fittings and accessories.
- D. Sealants: submit manufacturer's product specifications, handling, installation/curing instructions, and performance tested data sheets for each elastomeric product required. Submit certificate of test reports for elastomeric sealants on aged performance, including hardness, stain resistance, adhesion, cohesion

or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption and resistance (ageing, weight loss, deterioration), exposure to heat, ozone and ultraviolet light.

106 Delivery, Handling and Storage

Deliver the materials to the site in a totally satisfactory condition. Provide security for materials not installed, from loss of damage by weather or other cause.

Do not install damaged components or panels; remove and replace.

107 Project Site Conditions

Do not install wet processes in wet weather, or when temperature is less than 4°C or more than 35°C.

108 Warranty

Provide to the project manager a written warranty stating that components of the complete installation will remain intact and in a satisfactory condition for years from the date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

202 Design Criteria

All materials to be erected/applied are to meet the following criteria.

- A. Structural movement (of building).
- B. Thermal movement.
- C. Wind load on panels.
- D. Dead load of panels and support structure.
- E. Fire resistance requirements.
- F. Anchor bolts to secure panels and support structure to building.

203 System Components

Where proprietary items are specified, comply with manufacturer's/suppliers recommendations.

204 Fabrication

- A. Provide and fabricate frame and support structures.
- B. Check site dimensions before fabrication of components. Tolerances are not to exceed +3mm, -3mm.
- C. Schedule fabrication in accordance with contractor's construction program.
- D. Mark each item for easy identification.

205 Source Quality Control

The engineer and project manager will make random inspections at various stages of works during installation. Make available items needed for inspection and verification of compliance with this specification.

PART III EXECUTION

301 Examination

Examine conditions at the site before delivery of materials and prior to the commencement of installation.

Arrange with contractor for correction of non-optimum conditions.

Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Protect by appropriate means adjoining surfaces of the building which may be damaged during the installation.

303 Installation

Install/apply all fireproofing materials in locations as instructed and as detailed on the documents. Secure in final position.

Comply with supplier's/manufacturer's installation recommendations.

304 Sealants

At junctions with other materials, insert into opening a backing rod, wedged firmly in place. Apply over the backing rod an approved fireproofing sealant, to colour selected by the project manager.

Comply with supplier's/manufacturer's installation recommendations.

305 Field Quality Control

A representative or system supplier is required to be present during the installation of fireproofing materials in the building.

- 306 Repairs**
Repair damaged surfaces which may have been damaged during installation.
Make good the surfaces and reinstate material integrity, all in strict accordance with manufacturer's instructions.
- 307 Protection**
Protect the installation until completion of the project. Prevent damage to completed work by necessary means.
- 308 Cleaning**
On completion, clean up debris, remove support structures, scaffolding and the like. Leave work and surfaces in entirely clean and uniform condition.
- 309 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete system of approved fire doors, frames and hardware, including but not limited to the following:

Standard fabricated door frames

Fire doors, doors

[Fire shutters

Hinges (refer Door Schedule at the end of this document)

All required fastening systems

Factory prime painting.

102 Related Work

Co-ordinate and co-operate with the following trades:

Masonry

Concrete

Wall construction

Doors and door frames

Finish hardware (except hinges) including supply of hardware templates.

103 Quality Assurance

Approved manufacturers: refer clause 201.

Submit evidence that tradesmen are fully trained and experienced in installation methods and permit only approved personnel on the site.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1428

Design for access and mobility.

1428.1 2009

General requirements for access – New building work.

There are 5 other parts. 1992 – 2010.

AS 1530

Methods for fire tests on building materials, compounds and structures.

There are 7 parts, 1993 – 2007. 2 Amdts, 1992 - 1993

AS 1905

Components for the protection of openings in fire-resistant walls.

AS/NZS 1905.1 2005 Fire-resistant door sets.

AS 1905.2 2005 Fire-resistant roller shutters.

AS 6905 2007

Smoke doors.

105 Submissions

A. Submit schedules and samples for approval within 15 days of written notice or award of the contract has been received.

B. Test prototype: ensure that doors and frame assemblies supplied below are identical in construction to a prototype assembly which has been tested in accordance with the provisions of AS/NZS 1905 and AS 1530, except as permitted under AS/NZS 1905.

C. Marking: mark and tag doors and frames in accordance with the provisions of AS/NZS 1905.

106 Submissions Required at Completion of Work

Certification of Compliance and Log Book in accordance with AS/NZS 1905.

107 Delivery, Handling and Storage

Packing and marking: provide screws, bolts and fastenings necessary for proper installation, wrapped in paper and packed in the same package as the hardware. Legibly label each package, indicating that portion of the work for which it is intended.

Deliver doors and frames cartoned or crated to provide protection during transit and job storage.

Inspect materials upon delivery for damage. Minor damage may be repaired provided finish items are equal in respects to new work and acceptable to project manager; otherwise, remove and replace damaged items as directed.

Store doors and frames at building site under cover. Place units on wood packers at least 100mm high, or otherwise store on floors in a manner that will prevent rust and damage. Avoid use of non-vented plastic or canvas shelters which could create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 6mm spaces between stacked doors to promote air circulation.

108 Project Conditions

Refer clause 301. Check and confirm dimensions at the site before starting fabrication.

PART II MATERIALS**201 Acceptable Manufacturers**

Doors and frames:

202 Materials - Doors and Frames

Doors:

fire resistant plywood face sheets, mineral core, identical in construction to tested and approved assembly rated for opening rating required. Comply with AS/NZS 1905.

Support and anchors: fabrication of galvanised sheet steel or wire as required:

Wire ties: standard, 3mm minimum, 8 or 10 per frame, in accordance with AS/NZS 1905.

Strap: minimum 25mm x 3mm low carbon steel.

Inserts, bolts and fasteners: manufacturer's standard units, including hot-dip galvanised items to be built into exterior walls.

Fit each frame with 2 black rubber stops on the closing side.

Supply frames fitted with 1 galvanised 35mm x 12mm x 1.2mm sheet steel channel floor spreader.

Shop applied paint: rust inhibitive primer to steel ready to receive finish coats on site. Refer Schedule of Finishes for Doors.

203 Fabrication

General: fabricate steel frame units to be rigid, neat in appearance and free from defects, warp or buckle.

Electrically weld corners and grind welds flush in accordance with AS/NZS 1905.

PART III EXECUTION

301 Examination

Inspect site conditions.

Start of work means total acceptance of conditions.

Ensure that installation conditions will permit the specified requirements.

302 Manufacturer's Instructions

Comply with manufacturer's printed instructions except where more stringent requirements are shown, and except where manufacturer's technical representative directs otherwise.

303 Compliance with Standards

Be responsible for ensuring that the installation of doors and frames furnished is in full compliance with AS/NZS 1905.

Anchor and fully grout frames installed in masonry walls in conformance with the provisions of AS/NZS 1905.

Furnish required anchors and supervise installation to ensure installation is in compliance with the Standards.

304 Installation of Frames

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

In masonry walls: erect and secure frames plumb and true, providing bracing as required to maintain frames in positions until permanent anchors are set. Do not remove spreaders until frames are secure.

In off-form concrete openings: erect frames plumb and true within openings in accordance with one of the methods shown in AS/NZS 1905.

Clearance between concrete face and door frames (top and sides): nominal 20mm; maximum 25mm.

Finish hardware preparation: prepare doors and frames to receive finish hardware in accordance with Schedule of Finishes and templates provided by hardware supplier. Comply with requirements of AS/NZS 1905 for door and frame preparation for hardware. Reinforce doors and frames to receive surface-applied finish hardware.

Provide tapped holes for fittings.

Provide each frame with mortar-proof universal strike mortise blockout.

Provide each frame with provision for recessed hinges, with hinge reinforcement of not less than 3mm steel sheet, drilled and tapped to receive hinge screws.

Provide each frame to receive a closer with appropriate head stiffeners.

Frames with surface closers: 3mm steel stiffener.

Stiffen the head of each frame of doors in masonry with a welded steel section to accept the weight of masonry above.

Supply each frame with required hinges, welded to frame or loose, as specified on the Schedule of Door Furniture and Hardware.

305 Grout

Grout frames mounted in masonry openings with 1 part Portland Cement and 3 parts sand, with sufficient water for pressure grouting.

Provide bracing as required during grouting to maintain frame in true position.

Form face of grout to a nominal 5mm back from the face of the frame.

306 Finish

Clean frames thoroughly after assembly. Touch up with rust-inhibitive primer. Refer Schedule of Finishes.

Make good surface imperfection of doors.

307 Numbering of Doors

Number doors and frames to match Door Schedule.

308 Installation and Adjustment

Hang doors in strict compliance with manufacturer's recommendations and the applicable provisions of AS/NZS 1905.

Adjust doors to frames to obtain precise clearances.

Adjust door hardware to complete and proper operating conditions.

309 Cleaning and Protection

Properly clean work of this section and protect as necessary under various working conditions to avoid damage of any nature.

Repair or replace damaged parts, including repairs to adjacent work damaged in connection with work in this section.

310 Certification

Refer clause 106.

311 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install timber doors and timber [or steel] door frames including but not limited to:

- A. EXTERNAL DOORS
 - Timber doors in timber frames (jambs).
 - Timber doors in metal frames (jambs).
 - Glazed doors.
 - Solid core doors.
 - Waterproof doors.
 - Timber louvred doors.
 - Flyscreen doors.
 - Security doors.
 - Acoustic doors.
- B. INTERNAL DOORS
 - Flush panel doors - hollow core.
 - Flush panel doors - solid core.
 - Timber or metal frames (jambs).
 - Acoustic doors.
 - Glazed doors.
 - Expressed frame doors.

102 Related Work

Co-ordinate and co-operate with the following trades:

Carpentry	Joinery
Blockwork	Brickwork
Plasterboard	Fire-rated doors and frames
Metalwork	Glass and glazing
Painting	Electrical

103 Quality Assurance

Prototype: at a location selected by the project manager construct a complete prototype installation of:

Include in each prototype elements required by this specification, finished in every respect. When approved by the project manager, each prototype remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1288 2006	Glass in buildings - Selection and installation. <i>Plus 1 Supplement, 2006, and 2 Amdt, 2008 - 2011.</i>
AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS/NZS 1859	Reconstituted wood-based panels - Specifications 1859.1 2004 Particleboard. <i>Plus 2 Amdt, 2006 - 2011.</i> 1859.2 2004 Dry processed fibreboard. <i>Plus 2 Amdts, 2006.</i> 1859.3 2005 Decorative overlaid wood panels. <i>Plus 1 Amdt, 2009.</i> 1859.4 2004 Wet-processed fibreboard.
AS/NZS 2272 2006	Plywood – Marine.
AS 2688 1984	(Obsolescent) Timber doors.
AS 2689 1984	(Obsolescent) Timber doorsets.
AS 4145	Locksets and hardware for doors and windows. <i>There are 4 parts, 2001 – 2008 plus 2 Amdts, 2009.</i>
AS 5007 2007	Powered doors for pedestrian access and egress.
AS 5039 2008	Security screen doors and security window grilles.

105 Submissions

Submit the following for inspection by the project manager before installation:

- Product literature on proposed hardware items.
- Samples of items as requested by project manager.

106 Delivery, Handling and Storage

Deliver specified items shortly before installation is due to occur.
Prevent damage and deterioration during transport and handling.
Store carefully at site in a secure area. Prevent twisting and warping of doors. Note the condition requirements of clause 304.

107 Warranty

Provide to the proprietor a warranty covering faulty materials, and installation, warping of materials and other faults which may occur within years of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 External doors**

Comply with AS 2688 Timber doors.

- A. Timber doors
 - Size: refer Door Schedule
 - Thickness:(total): 40mm
 - Material: cedar, kiln dried hardwood.
 - Rails: top:
 - bottom:
 - centre:
- B. Timber frames (jambs)
 - Thickness: material: cedar, kiln dried hardwood
 - Rebates: single, double
- C. Fly screen doors: metal frame, timber frame,
 - Manufacturer:
 - Screen material: fibreglass, aluminium, stainless steel
- D. Security screen doors: metal frame, timber frame
 - Manufacturer:
 - Screen material: fibreglass, aluminium, stainless steel
 - Comply with AS 5039.
- E. Steel frames: pressed steel 1.6mm thick single [or double] rebated fully welded frames with floor spreader. Provide 8 or 10, 3mm wire ties per frame for building into walls and 2 black stops on closing side. Grout back of frames with cement mortar.
 - Supply steel frames with shop applied rust inhibitive paint.
- F. Fire-rated doors
 - Refer trade section 08100 FIRE-RATED DOORS AND FRAMES.
- G. Solid-core doors
 - Thickness total: minimum 40mm
 - Core: particleboard
 - Face each side: plywood veneer, hardboard, waterproof plywood, metal faced
 - Edge strips: 10mm hardwood. Total plywood thickness:
- H. Acoustic doors
 - Thickness total:
 - Core: mineral, particle board
 - Edge strips: 10mm hardwood
 - Acoustic seals:
- I. Louvred doors
 - Frame: metal or timber
 - Total thickness:
 - Louvres: aluminium, galvanised steel.
 - Inverted V shape
- J. Glazed Timber doors
 - Timber frame: cedar, hardwood
 - Glass: comply with AS 1288. Type:
 - Provide 10mm hardwood frame around glass panel.

203 Internal Doors

Comply with AS 2688.

- A. Hollow core, Flush panel
 - Core: paper, honeycomb, metal
 - Frame of door: timber with 3 Rails 125mm deep
 - Face: 4.5mm hardboard, selected veneer. Plywood thickness:
 - Edge strips: to 2,3 or 4 sides of door, 10mm thick hardwood
 - Minimum thickness: 35mm,
- B. Solid core, Flush panel
 - Frame of door: timber with top mid and bottom rails each 50mm deep
 - Core: medium density particle board
 - Face: 4.5mm hardboard. Selected veneer, plywood thickness:
 - Edge strips: to 2, 3 or 4 sides of door, 10mm thick hardwood

- Minimum thickness: 35mm,
- C. Timber jambs
Material: Selected kiln dried hardwood, cedar,
Thickness of material: Minimum 20mm
Stops: of same material, 10mm
- D. Steel jambs
See 202E above.
- E. Glazed timber doors
Material: frame of door, kiln dried hardwood or cedar or
Rails and panels: as for frames.
Frame sizes: stiles and rails 130 x 40 bottom rail 220 x 40, all rebated 12mm for glass.
Glazing beads: 12mm thick, shaped, of same material as door frame.
Glass panel: comply with AS 1288.
Lower panel:
- F. Timber louvre doors
Manufacturer:
Material: Cedar
Sizes: each leaf: 2, 3, 4 leaves.
Total opening width.

PART III EXECUTION

301 Examination

Inspect site conditions. Ensure conditions are satisfactory for installation.
Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Prepare openings in walls or other structures before installation. Install fixing grounds and inserts as required to secure frames.

303 Installation of Door Frames

Erect frames plumb and true. Brace as required until surrounding structure is complete. Comply with AS 2689.

304 Installation of Doors

Comply with manufacturer's instructions and AS 2689. Reject doors which do not comply with AS 2688 Appendix A. Condition doors to average humidity in area prior to hanging.
Align doors to frame for proper fit and uniform clearance at edge and machine for hardware. Seal cut surfaces after machining.
Provide clearance of 3mm at jambs and heads; 3mm at meeting stiles at pairs of door; 12mm from bottom of door to top of floor finishing or covering. At thresholds provide 6mm clearance.

305 Installation of Hardware

Refer Schedule of Door Furniture and Hardware. Check deliveries on arrival. Keep items locked until needed. Assume responsibility for delivered items. Fit accurately and at correct heights, protect with heavy cloth until completion of project.
Label keys, and hand over to contractor.
Master key locks as instructed.

306 Adjustment and Cleaning

Adjust each door in its frame and ensure silent operation. Oil locks and hinges. Clean all surfaces marked during the installation of door frames, doors and hardware.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, engineer and install roller shutter door(s) including but not limited to:
 Drum support.
 Door guides.
 Removable (wicket) gate.
 Manual control devices.
 Electric motors and controls.
 Remote control.
 Locking devices.
 Wind locks.
 Weatherstrips.
 Tapered bottom rail.
 Powder coating.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Structural steel Brickwork
 Blockwork Concrete
 Electrical Painting

103 Quality Assurance

Craftsmen are required to be experienced and familiar with the quality required in this class of work.
 Comply throughout with manufacturer's instructions.

104 References

Comply with applicable portion of the following Australian Standards:
 AS 1905.2 2005 Components for the protection of openings in fire-resistant walls – Fire-resistant roller shutters.
 Comply with requirements of statutory and local authorities.

105 Shop Drawings

Comply with DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27.
 Provide Shop Drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
- B. Develop details not shown and in conformity with the indicative details shown.
- C. Take and confirm dimensions on site, before preparing Shop Drawings where possible.
- D. Submit detailed Shop Drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and full-scale templates of blocking, anchorages, sleeves and bolts installed by others.

106 Samples

- A. Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. When approved, samples will establish quality of similar work of this trade section.
- B. Check on delivery: request project manager to check materials on delivery to site for quality, and materials not meeting the requirements of this specification or equal to approved samples will be rejected.
 Return rejected materials to the fabricator at the fabricator's expense.
- C. Finish: provide samples of specified finishes when requested.

107 Warranty

Provide to the proprietor a warranty, counter-signed by the installer, on the whole of the installation, which states that work will remain intact, waterproof and fully operational for the period of not less than years after date of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

- 203 Finish**
Powder coating: polyester over pre-treatment by powder coater.
Colour:
Paint: refer Schedule of Finishes.
- 204 Miscellaneous Items**
Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.
Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.
Fasten galvanised items with galvanised fasteners.

PART III EXECUTION

- 301 Examination**
Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.
Start of work means total acceptance of relevant conditions.
- 302 Preparation**
A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
B. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
C. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.
- 303 Inspection and Reinstatement**
A. Check fabrications as they are unloaded at the project site for evidence of physical damage.
Treat damaged fabrications as follows:
1. Misshaped items: return to shop for repair or replacement.
2. Damaged surface treatment: repair as recommended by application of the finish.
B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.
- 304 Installation**
A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction.
C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field.
The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted.
Fabrications may be cut shorter with power hacksaws on site.
Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.
D. Comply with manufacturers' installation instructions throughout.
- 305 Field Quality Control**
Where considered necessary by the project manager, arrange for supervision of the installation by a senior staff member of the manufacturer.
- 306 Protection**
Protect the completed installation from damage by appropriate means until completion of the project.
- 307 Cleaning**
Clean materials installed to the satisfaction of the project manager.
Apply necessary lubrication.
Remove temporary protective coating.

308

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, engineer and install folding door(s) (and grilles) including but not limited to:

Overhead support
Door guides
Manual control devices
Electric motors and controls
Remote control
Locking devices
Weatherstrips
Surface treatment

102 Related Work

Co-ordinate and co-operative with the following trades:

Structural steel	Brickwork
Blockwork	Concrete
Electrical	Painting

103 Quality Assurance

Craftsmen are required to be experienced and familiar with the quality required in this class of work.
Comply throughout with manufacturer's instructions.

104 References

AS 1428 Design for access and mobility.
1428.1 2009 General requirements for access – New building work.
There are 5 other parts. 1992 – 2010.
Comply with requirements of statutory and local authorities.

105 Shop Drawings

Comply with DOCUMENT 00800, clause 27.

Provide shop drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
- B. Develop details not shown and in conformity with the indicative details shown.
- C. Take and confirm dimensions on site, before preparing shop drawings where possible.
- D. Submit detailed shop drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and full-scale templates of blocking, anchorages, sleeves and bolts installed by others.

106 Samples

- A. Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. When approved, samples will establish quality of similar work of this trade section.
- B. Check on delivery: request project manager to check materials on delivery to site for quality, and materials not meeting the requirements of this specification or equal to approved samples will be rejected.
Return rejected materials to the fabricator at the fabricator's expense.
- C. Finish: provide samples of specified finishes when requested.

107 Warranty

Provide to the proprietor a warranty, counter-signed by the installer, on the whole of the installation, which states that work will remain intact, waterproof and fully operational for the period of not less than years after date of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials****203 Finish**

Powder coating: polyester over pre-treatment by powder coater.
Colour:
Paint: refer Schedule of Finishes.

204 Miscellaneous Items

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

Fasten galvanised items with galvanised fasteners.

PART III EXECUTION**301 Examination**

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Start of work means total acceptance of relevant conditions.

302 Preparation

- A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
- B. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- C. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage.
 - 1. Treat damaged fabrications as follows:
 - Mis-shaped items: return to shop for repair or replacement.
 - Damaged surface treatment: repair as recommended by applicator of the finish.
 - 2. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

- A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction.
- C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field.
 - 1. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted. Fabrications may be cut shorter with power hacksaws on site.
 - 2. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.
- D. Comply with manufacturers' installation instructions throughout.

305 Field Quality Control

Where considered necessary by the project manager, arrange for supervision of the installation by a senior staff member of the manufacturer.

306 Protection

Protect the completed installation from damage by appropriate means until completion of the project.

307 Cleaning

Clean materials installed to the satisfaction of the project manager.

Apply necessary lubrication.

Remove temporary protective coating.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Work to be performed includes, but is not limited to, design including structural design, manufacture, supply delivery, installation, protection, removal of protection, completion and cleaning of:

- A. Silicone butt jointed and glass finned facade panels.
- B. Metal framing to head and sill.
- C. Glazed doors and side lights.
- D. Drained sills and joint systems.
- E. Penetrations through glass for requirement, e.g. exhaust fans, drenchers, etc.
- F. Glass fin support as required in the structural glazing design as determined by the glazing contractor's structural engineer.
- G. Other items required including weather and seals, draught excluders, sealants, glazing accessories, fixings, brackets, ceiling suspensions, fastenings, attachments, packing and other items necessary to guarantee the structural sufficiency water-tightness, weather-tightness and satisfactory performance and appearance of the completed building.

102 Related Work

- A. Work of this section depends upon the proper completion of prior work by others as follows:
 - 1. Concrete.
 - 2. Structural steelwork.
 - 3. Masonry.
- B. Work of this trade section is to create conditions suitable for the proper completion of subsequent work by others including:
 - 1. Walls abutting glazed wall construction.
 - 2. Other work in close proximity to installations specified herein.
 - 3. Painting.
- C. Work of this trade section is to be performed in close co-ordination with the work of others as follows:
 - Concrete.
 - Masonry.
 - Structural steel .
 - Roofing, etc. electrical security, fireproofing and fire services.

103 Quality Assurance

- A. Manufacturer qualifications: not less than 10 years continuous experience in the manufacture of the product types specified.
Manufacturers not resident to Australia should have representation in Australia with bona fide companies for not less than 5 years.
- B. Designer qualifications: system designer or designers are to be licensed professional engineers with tertiary qualifications and specific experience in structural glazing using annealed glass fins. Qualifications and experience are to be provided to the project manager on request, whose written approval of the design engineer is to be obtained prior to the commencement of design or Shop Drawings.
- C. Installer qualifications: installation contractor is to have no less than 10 years continuous experience in the erection of structural glazing using annealed glass fins; such experience to be acceptable to the project manager. Additionally, the contractor is required to provide satisfactory evidence of sufficient staff of metalworkers, glaziers and sealant mechanics to maintain the scheduled progress of the works. The builder is to employ on site during stages of the work a foreman competent to supervise the work.
- D. Manufacturer's licence of fabricator: where part of the vision glazing, spandrel panel and framing system is manufactured by other than one manufacturer, the glass manufacturer is to license or certify the acceptability of other manufacturers/fabricators. Where frame sections are extruded or fabricated to standard framing system patterns by other than the primary manufacturer or patent-holder of such systems, the patent-holder is to license the manufacturer/fabricator of such sections and will provide quality control and source production monitoring satisfactory to the project manager. Copies of such required licenses and certifications will be provided to the project manager as well as copies of quality control and inspection reports.
- E. "Close Co-ordination Required" Items: where paragraph 102 Related Work identifies other trade sections as requiring close co-ordination, the builder is to accept full responsibility for providing the trades of such sections with complete information on the materials and equipment to be installed, the critical dimensions of such work, and other data affecting the work of the trades identified. Where submissions include such critical information, copies of the approved submissions are to be sent promptly to such trades via the project manager, builder, sub-contractors and vendors who are to make special effort to ensure the proper sequence and fit of the work to be completed. Special efforts will include as necessary:
 - 1. Frequent on-site meetings with the builder to review requirements and procedures.
 - 2. Simultaneous on-site performance of tasks by 2 or more sub-contractors.
 - 3. Review by builder of submissions by others.
 - 4. Special care given to tolerances and dimensional verifications.

5. All glazing items, techniques, sizes, tolerances, deflections, etc., are to be discussed with the glaziers and glass manufacturers and the submitted drawings will be signed by the window manufacturer and the glazier as being their true, agreed principles under which they will take out the specified guarantee for their work.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1170	Structural design actions. 1170.0 2002 General principles. <i>Plus 5 Amdts, 2003 – 2011.</i> 1170.1 2002 Permanent imposed and other actions. <i>Plus 2 Amdts, 2005 – 2009.</i> 1170.2 2011 Wind actions. <i>There are 2 other parts, several Supplements and Amdts, 2002 – 2011.</i>
AS 1288 2006	Glass in buildings - Selection and installation. <i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i>
AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS 2047 1999	Windows in buildings - Selection and installation. <i>Plus 2 Amdts, 2001.</i>
AS/NZS 2208 1996	Safety glazing materials in buildings. <i>Plus 1 Amdt, 1999.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.
AS 5007 2007	Powered doors for pedestrian access and egress.
ASTM E283-04 (2012)	Standard test method for determining rate of air leakage through exterior windows, curtain walls, and doors under specified pressure differences across the specimen.
ASTM E330-02 (2010)	Standard test method for structural performance of exterior windows, doors, skylights and curtain walls by uniform static air pressure difference.
ASTM E331-00 (2009)	Standard test method for water penetration of exterior windows, skylights, doors and curtain walls, by uniform static air pressure difference.
HB 125-2007	The glass and glazing handbook.

105 Submissions

A. Submissions required with tender:

1. Complete system description of the materials and methods of installation being tendered, including the following information:
 - a. Names of manufacturers of products.
 - b. Names, addresses and telephone numbers of local representatives for products manufactured off-shore or out-of-state.
 - c. Name, address and telephone number of glazing contractor.
 - d. Types, model numbers and names of products, and indication whether products are "off-the-shelf" or custom fabricated.
 - e. Detailed information on products manufactured specifically for this project.
 - f. Detailed system description including standard details and manufacturer's literature; and large-scale details of specially-fabricated products.
 - g. Detailed description of protective colour coating proposed for metals, with references to examples of prior use. Include description of cleaning agents, if any.
 - h. Detailed production schedule based on the working day calendar.
The schedule is to be keyed into the construction programme and co-ordinated with other contractors whose work may depend upon scheduled start or completion of this contract.
2. Tests and certifications previously performed on proposed systems, including specifically the following:
 - a. Long-term or accelerated exposure tests on structural silicone, covering maintenance of bond strength, hardness change and chemical composition.
 - b. Tests on sealants including viscosity and colour stability.
3. Examples in Australia of proposed systems, including name, address and telephone number of contact person knowledgeable about each example and not connected with the manufacturer/fabricator.

B. Submissions required prior to fabrication:

1. Samples of glazing and all sections to be used.
2. Statement that the proposed system meets the regulatory requirements, thermal, aesthetic, and weatherproofing criteria, construction, glazing and warranty requirements specified; noting in detail any exceptions.
3. Engineer's calculations on wind loading.
4. Sealants: submit manufacturer's product specification handling/installation/curing instructions, and performance tested data sheets for each elastomeric product required.
Submit certificate test reports for elastomeric sealants on resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (ageing, weight loss, deterioration) and heat and exposure to ozone and ultraviolet light.

106 Delivery, Handling and Storage

Handle all materials with care. Do not store on site. Install directly in place. Store silicone and sealants as instructed by manufacturer.

107 Project Conditions

- A. General: refer to appropriate clauses in General Conditions and Contract Conditions.
- B. Installation of any materials is to imply total acceptance of all on-site conditions.

108 Warranty

In addition to the warranty requirements of the General Conditions of Contract, provide the following:

- A. Warranty: provide glass manufacturer's written warranty, agreeing to, within specified warranty period, furnish freight paid to project site, replacement units for glass units which have defective hermetic seals (excluding that due to glass breakage), defined to include intrusion of moisture or dirt, internal condensation at temperatures above -2°C, deterioration of internal glass coatings, and other visual evidence of seal failure or performance failure; provided manufacturer's instructions for handling, installation, protection and maintenance have been adhered to during warranty period.
- B. Warranty period is years after date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

The manufacturer and installer are to be approved in writing by the project manager.

202 Structural and Environmental Performance Criteria

- A. Structural criteria:
 - 1. Terrain Category: adopt Category:
Refer AS/NZS 1170.
Computations
Computations for the design of the glazing and annealed glass fins are to be prepared by a structural engineer approved in writing by the project manager, in accordance with the design criteria specified below and will allow that the members and their fixings comply with strength and stiffness criteria, and for thermal movement and differential movement of the structure.
 - 2. Structural silicone: only high strength silicone sealants specifically designed and tested for structural glazing will be used. To facilitate application of the structural silicone to finned joints, a backer rod of self-adhesive polyethylene foam is to be used to ensure minimum structural silicone contact is maintained to the fins and the glass panels. Manufacturer's recommendations must be followed at all times to ensure that the design stresses, gaps, application and preparation techniques, etc., are compatible with type of structural silicone used.
 - 3. Movement: permit free and noiseless movement of all components due to thermal effects, structural effect, wind pressure, effect of dead loads, without strain on the glass, without buckling of components and without excessive stress to any members or assemblies.
 - 4. Wind Pressure
- B. Weather Protection:
 - 5. General: the glazed entry facade system will be designed, installed and guaranteed by the builder to be waterproof and weather-proof.
 - 6. Expansion: design vertical and horizontal expansion joints to provide for weather conditions likely to exist.
 - 7. Internal drainage: a complete drainage system will be incorporated into the system. Water leakage and condensation will be drained or discharged to exterior face, and internal spaces will be vented by acceptable means to ensure air-pressure equalisation. Movement of water behind and on exposed surfaces are to be controlled to ensure that water is not retained and that elements will not be damaged or corroded by water and to minimise the potential for algae and fungus growth as a result of standing or trapped water.
 - 8. Sealers: joint sealers are required to establish and maintain air-tight and water-proof continuous seals on a permanent basis, within recognised limitations of wear and ageing as indicated for each application. Failures of installed sealers to comply with this requirement will be recognised as failures of materials and workmanship.

203 Aesthetic Criteria – Glass

- A. Vision glass
 - Strength: toughened and/or heat strengthened and/or laminated, as required.
 - Thickness: as required by AS/NZS 1170, Part 2 - and AS 1288 or AS/NZS 2208.
 - Colour:
 - Reflectance:
- B. Glass fins - annealed
 - Glass thickness:
 - Colour:
- C. Glass adjacent to doors
 - Strength: toughened safety glass as required.
 - Thickness: as required by AS/NZS 1170, Part 2, and AS 1288 or AS/NZS 2208.

- Colour:
- Reflectance:
- D. Door glass
 - Strength: toughened safety glass and/or heat strengthened and/or laminated, as required.
 - Thickness: as required by AS/NZS 1170, Part 2, and AS 1288.
 - Colour:
 - Reflectance:
- E. Laminated glass:
 - All laminated glass is to be sealed at edges before installation to prevent entry of water to edge of inter-layer. This requirement will be rigidly enforced.
 - Colour of inter-layer:
- F. Sealants
 - Submit a full range of coloured sealants offered by an approved manufacturer from which the project manager will select. Colours available may be a factor in choice of manufacturer.
- G. Metal frames
 - Coated aluminium. Submit a full range of available colours of coating and metal frame types from which the project manager will select.
 - Refer clause 203.
- H. Distortion
 - The glazed facade is to be designed and erected to minimise distortion of reflected images.

204 Aesthetic Criteria - Metal Finish

Polyester powder coat.
 Polyester powder coat, of colour selected by the project manager, 50 microns thick minimum.
 Pre-treatment of metal is to be performed in accordance with the requirements of the manufacturer of the finish.
 Applicators of the pre-treatment and the powder coat is to be approved by the project manager.
 All treated material will be subject to random tests. Material found to have less than 50 microns coating thickness is to be removed and made good without cost to the proprietor or delay in job progress.
 Comply with AS 3715.

205 Metal Materials

- A. Aluminium extrusions throughout are to be manufactured from aluminium alloy B6063 - T5 or T6.
- B. Types of materials required: closer, strips, sills, interior linings, copings, heads.
- C. Contact with other Materials: Coat aluminium surfaces in contact with mortar, concrete, plaster, masonry, wet-application of fire-proofing and absorptive materials with an anti-galvanic, moisture barrier material.
 Isolate aluminium and dissimilar metals excluding non-magnetic stainless steel for the prevention of electrolytic action and corrosion.

206 Facade Panel Arrangement

General: refer to drawings. Exact panel and fin sizes are to be determined by system designer.

207 Fabrication

Glazing: glass is to be secured in accordance with the manufacturer's recommendations and the relevant Standards.

PART III EXECUTION

301 Examination

- A. Site conditions: inspect installation conditions. Correct conditions which may adversely affect the work.
Start of work means total acceptance of conditions.
- B. Measurements: refer clause 107.
- C. Weather conditions: do not proceed with installation of sealants under unfavourable weather conditions.
Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.

302 Manufacturer's Instructions

Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise in writing.

303 Frame Anchorage

- A. Anchorage provisions: comply with instructions of approved structural engineering consultant.
- B. Contractor's responsibility: be responsible for providing locations for the cast-in anchors well in advance of installation of the structural frame.
- C. Fastening system: steel clip angles or other sections: hot-dip galvanised. Aluminium fixing sections: electrolytically isolated from steel inserts by an approved coating or spacer. Bolts and nuts: stainless steel compatible with aluminium (non-magnetic).

- 304 Assembly**
General: assemble, secure, anchor, reinforce, seal and make weather-tight in a manner not restricting thermal or wind movements of the completed installation. Where possible, conceal sealants.
- 305 Glazing Requirements - General**
- A. Make water-tight and air-tight each installation of each glass product.
 - B. Protect glass from edge damage during handling and installation, and subsequent operation of glazed components of the work. During the installation, discard units with edge damage or other imperfections which the project manager determines may affect the completed work.
 - C. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- 306 Joint Preparation - Sealants**
- A. Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.
 - B. Prime or seal joint surfaces where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate on to adjoining surfaces.
- 307 Installation of Sealants**
- A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 - B. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
 - C. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
 - D. Install sealant to depths as recommended by sealant manufacturer.
 - E. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
 - F. Remove excess caulking compound and sealant and leave surfaces neat, smooth and clean, without smears on surrounding work. Tool joints where recommended by manufacturer or required. Remove cartons and debris from site as the work progresses.
- 308 Protection**
- A. Framing system: protect metal surfaces as necessary during erection to prevent mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.
 - B. Glass: protect glass immediately upon installation until Practical Completion. Remove and replace panels which are broken, cracked, abraded, chipped or damaged in other ways before, during or after installation, at no additional cost to the proprietor.
 - 1. Be responsible for breakage until glazing work is completed and accepted, unless responsibility can be assessed to others.
 - 2. Inspect glass regularly, until substantial completion to detect formation of staining and/or etching. Remove plaster, mortar, paint spatter, drywall joint compound or other foreign matter immediately after contact; do not permit to remain or collect on glass surface.
 - 3. Clear formed gutters of foreign matter and maintain in sound, clean condition until Practical Completion.
- 309 Protective Coating During Construction**
Adhesive protective coatings are NOT to be used. Protect by other means with the approval of the project manager.
- 310 Cleaning**
- A. Glass: remove labels, excess glazing compounds, stains, spots and other foreign matter from glass, frames and other finished surfaces.
 - B. Debris: remove rubbish and debris resulting from glazing operations, each day.
 - C. Removal of protective coatings: when and as directed by the builder, remove protective coatings from aluminium frames and clean as necessary to remove traces of protective material. Make good damaged surfaces.
 - D. Final cleaning: immediately prior to Practical Completion clean contract surfaces to the satisfaction of the project manager.
- 311 Replacement Stock**
- A. Vision glass: provide additional units to be stored on site for future replacement of damaged units as follows:
Quantity: 1% of each unit type installed, but not less than 2 units of type.
 - B. Delivery: deliver to site at Practical Completion of the project, in crates marked with the size and type of the contents, and put to storage where designated.

312 Maintenance Instruction

At a time mutually arranged, provide for a meeting between builder, permanent building maintenance staff and system installation mechanics, to review and instruct maintenance staff in the proper procedures for replacing damaged glazing panels, general maintenance and cleaning procedures for contract surfaces.

313 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, engineer, supply and install a complete system of automatic sliding doors, including but not limited to:
 Material type.
 Finish type.
 Openings.
 Glass types.
 Glazing methods.
 Door operating system.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Metal windows and glazing Timber windows
 Glass and Glazing Metal work
 Electrical Installation

103 Quality Assurance

- A. Manufacturer qualifications: not less than 10 years continuous experience in the manufacture of the product types specified.
- B. Installer qualifications: installer is to have not less than 5 years continuous experience in the erection of specified material.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1170	Structural design actions. 1170.0 2002 General principles. <i>Plus 5 Amdts, 2003 – 2011.</i> 1170.1 2002 Permanent, imposed and other actions. <i>Plus 2 Amdts, 2005 – 2009.</i> 1170.2 2011 Wind actions. <i>There are 2 other parts, several Supplements and Amdts, 2002 – 2011.</i>
AS 1231 2000	Aluminium and aluminium alloys - Anodic oxidation coatings.
AS 1288 2006	Glass in buildings - Selection and installation. <i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i>
AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS 2047 1999	Windows in buildings - Selection and installation. <i>Plus 2 Amdts, 2001.</i>
AS/NZS 2208 1996	Safety glazing materials in buildings. <i>Plus 1 Amdt, 1999.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.
AS 5007 2007	Powered doors for pedestrian access and egress.
Comply with relevant authority's requirement for fire-rated installation.	

105 Submissions Required Prior to Fabrication

- A. Complete system description including the following information:
 - 1. Names of manufacturers of products.
 - 2. Names, addresses and telephone numbers of local representatives for products.
 - 3. Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 - 4. Detailed information on products manufactured specifically for this project.
- B. Statement that the proposed system meet(s) the regulatory requirements, thermal, aesthetic and waterproofing criteria and wind loading, construction, glazing and warranty requirements specified; noting in detail exceptions.
- C. Shop Drawings: refer DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, Clause 27. Provide Shop Drawings showing the following information where appropriate to the items:
 - 1. Layout (sectional plan and elevation of complete assembly).
 - 2. Full size section of members.
 - 3. Methods of assembly, type and location of exposed screws.
 - 4. Methods of glazing.
 - 5. Methods of installation, including fixings, anchorage, caulking, flashings.
 - 6. Provision for expansion (thermal).
 - 7. Junctions and trim to adjoining surfaces.
 - 8. Fittings and accessories.
- D. Engineer's calculations on wind loading.
- E. Sealants: submit manufacturer's product specifications, handling, installation/curing instructions, and performance tested data sheets for each elastomeric product required. Submit certificate test reports for

elastomeric sealants on aged performance as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (ageing, weight loss, deterioration) and heat and exposure to ozone and ultraviolet light.

106 Delivery, Handling and Storage

Handle materials with care. Do not store on site. Install directly in place.

107 Warranty

Provide to the proprietor a warranty, counter-signed by the installer, on the whole of the installation, which states that work will remain intact, waterproof and fully operational for the period of years after date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

The following manufacturers are acceptable:

Actuator, detector, control systems.

202 Materials

Door frames:

Frame finish: see clause 205.

Glass: refer clause 206.

Sealants: see clause 207.

Actuator:

Detector:

Control systems:

203 Structural Criteria

A. Adopt Terrain Category:
Refer AS/NZS 1170.

B. Wind loading: design:

1. Glazing and frame assemblies to suit the static and dynamic wind forces as indicated on the tables in the Australian Standard 1170.
2. Structural members of glazed units of such strength that when tested at the specified design wind values they do not deflect by an amount greater than span/240 and do not cause permanent deflection.
3. Fix members so that the above loading is generated in the members without stress causing failure or movement becoming evident at joint.

C. Movement: permit free and noiseless movement of the components due to thermal effects, structural effect, wind pressure, effect of dead loads, without strain to glass, without buckling of components and without excessive stress to members or assemblies.

D. Distortion: design the glazed assembly to minimise visual distortion of reflected images.

204 Detail Design Provisions

General: the project manager's drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated. If, in the opinion of the builder a change of profile is required in order to meet the specification, arrange through the project manager for a review of the condition. Design the assembly to suit each specified condition in an acceptable manner complying with the requirements specified herein.

Where doors are part of an assembly including fixed adjacent glazing, match frames of doors to the adjacent assembly.

205 Finish

Anodising or polyester powder coat

Anodising:

Metal of windows, doors and shop fronts anodised to selected colour.

Pre-treat and apply anodising by applicators approved by the project manager.

Minimum coating thickness of 25 microns subjected to random testing after installation. Remove and replace any non-conforming material.

Comply with requirements of AS 1231.

Polyester powder coat:

Polyester powdercoated, to colour approved by the project manager and by the manufacturer of the powder material, to metal of windows, doors and shop fronts.

Perform pre-treatment and application of powder coating by applicators approved by the project manager and by the manufacturer of the powder material.

Minimum coating thickness of 50 microns subjected to random testing after installation. Non-conforming material will be removed and made good by the builder.

Comply with requirements of AS 3715.

206 Glass

- A. Glass materials for external use:
Pilkington Australia:
- B. Glass material for internal use:
Pilkington Australia:
- C. Other glass for:
Pilkington Australia:
- D. Calculations: calculate glass sizes and thicknesses in accordance with Standards, and fixing devices and connections to structure in accordance with engineer's computations where applicable.

207 Sealants and Accessory Materials

- A. Provide non-structural external weatherproofing sealants of low modulus neutral curing silicone rubber compounds by approved manufacture.
- B. Generally comply with AS 1288. Supply spacer gaskets, glazing tapes and setting blocks compatible with sealants, which do not contribute to sealant colour change or affect the sealants adhesion to substrates when exposed to ultraviolet light.
Prior to application, samples of materials receiving the silicone, including elastomeric sealants are to be evaluated by the silicone sealant manufacturer for compatibility and primer selection. Clearly identify the submitted materials as to manufacturer and product number.
Use silicone sealants generally clear in colour.
- C. Interior sealers: acrylic-emulsion or latex-rubber-modified acrylic emulsion sealant compound, permanently flexible, non-staining and non-bleeding; recommended by manufacturer for protected exterior exposure and general interior exposure.
- D. Joint primer/sealer: provide type of joint primer/sealer as recommended by sealant manufacturer to suit each surface.
- E. Bond breaker tape: polyethylene tape or other plastic as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler is to be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
- F. Sealant backer rod: compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible permanent, durable non-absorbent material as recommended by sealant manufacturer for compatibility with sealant.
- G. Glazing tape: polyisobutylene tape of type, thickness and width as recommended by glass manufacturer and project manager.
- H. Exposed screws: countersunk type, anodised aluminium or non-magnetic stainless steel evenly and neatly located in an approved manner. Exposed fasteners: finished to match aluminium.

208 Fabrication

Comply with AS 2047.

Framing system: fabricate from extrusions to profiles shown on approved Shop Drawings.

Form junctions so that no fixings, such as pins, screws, pressure indentations and the like are visible on exposed faces. Show on Shop Drawings fixings which will be exposed.

Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations. Remove sharp edges without excessive deformation. Fit mitred joints accurately to a fine hairline.

Pre-assemble and match mark before delivery.

PART III EXECUTION**301 Examination**

Inspect site conditions before start of work on site, before delivery of materials. Ensure all conditions are satisfactory for installation.

Perform rectification required before delivery of materials.

Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Prepare surfaces affected by the installation in accordance with material manufacturer's instructions.

303 Door Sets

Install door sets in close co-ordination with manufacturer of door operating equipment and in compliance with AS 5007.

304 Glazing

Secure glass in accordance with glass manufacturer's recommendations and AS 1288. Allow for thermal expansion of glass, the metal framing and spandrels.

305 Preparation for Sealants

Joint preparation sealants: clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or

caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces if recommended by sealant manufacturer. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate on to adjoining surfaces.

306 Installation of Sealants

- A. Install bond breaker tape where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- B. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface slightly below adjoining surfaces.
- C. Install sealant to depths as recommended by sealant manufacturer.
- D. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength internal cohesive strength and surface durability. Advise project manager of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of Practical Completion.
- E. Remove excess caulking compound and sealant and leave surfaces neat, smooth and clean, without smears on surrounding work. Tool joints where recommended by manufacturer or where required. Remove cartons and debris from site as the work progresses.

307 Actuators, Detectors and Control Systems

Comply with the requirements of the manufacturer and AS 5007.

308 Commissioning

Comply with the requirements of AS 5007, regarding electrical installation and commissioning.

309 Protection

- A. Framing system: protect metal surfaces as necessary during erection. Finish surfaces free from mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.
- B. Glass: protect glass from breakage immediately upon installation and until Practical Completion. Remove and replace glass and metal panels which are broken, cracked, abraded, chipped or damaged in other ways, before, during or after installation, at no additional cost to proprietor.
- C. Be responsible for breakage and damage to installation until Practical Completion.

310 Cleaning

- A. Remove labels, excess glazing compounds, stains, spots and other foreign matter from glass, frames, hardware and other finished surfaces immediately upon installation of glazing for each light.
- B. Debris: remove rubbish and debris resulting from glazing operations, each day.

311 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

<http://www.abcb.gov.au/education-events-resources/publications/~media/Files/Download%20Documents/Publications/Advisory%20Note%20-%20Protection%20of%20Openable%20Windows.pdf>

PART I GENERAL**101 Scope**

Design, engineer, supply and install a complete glazed system of windows, doors and screens, including but not limited to:

Material type
Finish type
Openings
Glass types
Glazing methods
Insect screens

102 Related Work

Co-ordinate and co-operate with the tradesmen preparing walls and frames to accept windows, including casting in of anchors.

103 Quality Assurance

Manufacturer qualifications: not less than 10 years continuous experience in the manufacture of the product types specified.

Installer qualifications: installer is to have not less than 5 years continuous experience in the erection of specified material.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1170	Structural design actions.
1170.0 2002	General principles. <i>Plus 5 Amdts, 2003 – 2011.</i>
1170.1 2002	Permanent, imposed and other actions. <i>Plus 2 Amdts, 2005 – 2009.</i>
1170.2 2011	Wind actions.
1170.3 2003	Snow and ice actions. <i>Plus 1 Amdt, 2007.</i>
1170.4 2007	Earthquake actions in Australia.
	<i>There are several Supplements and Amdts, 2002 – 2011.</i>
AS 1231 2000	Aluminium and aluminium alloys – Anodic oxidation coatings.
AS 1288 2006	Glass in buildings - Selection and installation.
	<i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i>
AS 2047 1999	Windows in buildings - Selection and installation. <i>Plus 2 Amdts, 2001.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.
AS 4145.2 2008	Locksets and hardware for doors and windows – Mechanical locksets for doors and windows in buildings. <i>Plus 2 Amdts, 2009.</i>
HB 125 2007	The glass and glazing handbook.
Comply with relevant authority's requirement for fire-rated installation.	

105 Submissions Required Prior to Fabrication

- A. Complete system description including the following information:
 - Names of manufacturers of products.
 - Names, addresses and telephone numbers of local representatives for products.
 - Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 - Detailed information on products manufactured specifically for this project.
 - Detailed system description including standard details and manufacturer's literature; and large-scale details of specially fabricated products.
- B. Statement that the proposed system meet(s) the regulatory requirements, thermal, aesthetic and waterproofing criteria and wind loading, construction, glazing and warranty requirements specified; noting in detail exceptions.
- C. Shop Drawings: refer DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27. Provide Shop Drawings showing the following information where appropriate to the items:
 - Layout (sectional plan and elevation of complete assembly).
 - Full size section of members.
 - Methods of assembly, type and location of exposed screws.
 - Methods of glazing.
 - Methods of installation, including fixings, anchorage, caulking, flashings.
 - Provision for expansion (thermal).
 - Junctions and trim to adjoining surfaces.
 - Fittings and accessories.

- D. Engineer's calculations on wind loading.
- E. Sealants: submit manufacturer's product specifications, handling, installation/curing instructions, and performance tested data sheets for each elastomeric product required. Submit certificate test reports for elastomeric sealants on aged performance as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (ageing, weight loss, deterioration) and exposure to heat, ozone and ultraviolet light.

106 Delivery, Handling and Storage

Handle materials with care. Do not store on site. Install directly in place. Store sealants as instructed by manufacturer.

107 Warranty

Provide to the proprietor a warranty, counter-signed by the installer, on the whole of the installation, which states that work will remain intact, waterproof and fully operational for the period of not less than years after date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

The following manufacturers of window frames are acceptable:

202 Materials

Window frames: extruded aluminium components manufactured from aluminium alloy 6063, temper T5 or T6. Match components detailed on drawings or an alternative approved in writing by the project manager.

Glass: refer clause 206.

Insect screens:

203 Structural Criteria

- A. Adopt Terrain Category:
Refer AS/NZS 1170.
- B. Wind loading: design:
 - 1. Glazing and frame assemblies to suit the static and dynamic wind forces as indicated on the tables in the AS/NZS 1170.
 - 2. Structural members of glazed units of such strength that when tested at the specified design wind values they do not deflect by an amount greater than span/240 and do not cause permanent deflection.
 - 3. Fix members so that the above loading is generated in the members without stress causing failure or movement becoming evident at any joint.
- C. Movement: permit free and noiseless movement of the components due to thermal effects, structural effect, wind pressure, effect of dead loads, without strain to glass, without buckling of components and without excessive stress to members or assemblies.
- D. Contact with other materials: coat metal surfaces in contact with mortar, concrete, plaster, masonry, wet-application of fire-proofing and absorbent materials with an anti-galvanic, moisture barrier material. Isolate, with inert material, dissimilar metals for the prevention of electrolytic action and corrosion.
- E. Distortion: design the glazed assembly to minimise visual distortion of reflected images.

204 Detail Design Provisions

- A. General: the project manager's drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated. If, in the opinion of the builder a change of profile is required in order to meet the specification, arrange through the project manager for a review of the condition. Design the assembly, reinforcing and anchorage to suit each specified condition in an acceptable manner complying with the requirements specified herein.
- B. Tolerances: design frames to accommodate building tolerances, and when completed, within the following tolerances:
 - 1. Deviation from plumb, level or dimensioned angle within 3mm per 3.5m of length of member, or 6mm in total run in line.
 - 2. Deviation from theoretical position on plan or elevation, including deviation from plumb, level or dimensioned angle not to exceed 9mm total at location.
 - 3. Change in deviation not to exceed 3mm for 3.5m run in direction.

205 Finish

Anodising or Polyester Powder Coat.

Anodising:

Metal of windows, doors and shop fronts anodised to selected colour.

Pre-treat and apply anodising by applicators approved by the project manager.

Minimum coating thickness of 25 microns subjected to random testing after installation. Remove and replace non-conforming material.

Comply with requirements of AS 1231.

Polyester powder coat:

Polyester powdercoated, to colour approved by the project manager and by the manufacturer of the powder material, to metal of windows, doors and shop fronts.
 Perform pre-treatment and application of powder coating by applicators approved by the project manager and by the manufacturer of the powder material.
 Minimum coating thickness of 50 microns subjected to random testing after installation. non-conforming material will be removed and made good by the builder.
 Comply with requirements of AS 3715.

206 Glass

- A. Glass materials for external use:
- B. Glass material for internal use:
- C. Other glass for:
- D. Calculations: calculate glass sizes and thicknesses in accordance with Standards, and fixing devices and connections to structure in accordance with engineer's computations where applicable.
- E. Double glazing:

207 Sealants and Accessory Materials

- A. Provide non-structural external weatherproofing sealants of low modulus neutral curing silicone rubber compounds by approved manufacturer.
- B. Generally comply with AS 1288, Part 2, Section 6 or 8. Supply spacer gaskets, glazing tapes and setting blocks compatible with sealants, which do not contribute to sealant colour change or affect the sealants adhesion to substrates when exposed to ultraviolet light.
 Prior to application, samples of materials receiving the silicone, including elastomeric sealants are to be evaluated by the silicone sealant manufacturer for compatibility and primer selection. Clearly identify the submitted materials as to manufacturer and product number.
 Silicone sealants generally will be clear in colour.
- C. Interior sealers: acrylic-emulsion or latex-rubber-modified acrylic emulsion sealant compound, permanently flexible, non-staining and non-bleeding; recommended by manufacturer for protected exterior exposure and general interior exposure.
- D. Joint primer/sealer: provide type of joint primer/sealer as recommended by sealant manufacturer to suit each surface.
- E. Bond breaker tape: polyethylene tape or other plastic as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler is to be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
- F. Sealant backer rod: compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible permanent, durable non-absorbent material as recommended by sealant manufacturer for compatibility with sealant.
- G. Glazing tape: polyisobutylene tape of type, thickness and width as recommended by glass manufacturer and project manager.
- H. Exposed screws: countersunk type, anodised aluminium or non-magnetic stainless steel evenly and neatly located in an approved manner. Exposed fasteners: finished to match aluminium.

208 Fabrication

Comply with AS 2047.
 Framing system: fabricate from extrusions to profiles shown on approved Shop Drawings.
 Form junctions so that no fixings, such as pins, screws, pressure indentations and the like are visible on exposed faces. Show on Shop Drawings fixings which will be exposed. Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations. Remove sharp edges without excessive deformation.
 Fit mitred joints accurately to a fine hairline.
 Pre-assemble and match mark before delivery.

209 Dissimilar Metals

In moist environments, prevent totally contact between dissimilar metals (any metals).
 This instruction takes priority over any drawing, detail or instruction and will prevent cathodic reaction between the metals.
 Refer this instruction to the structural engineer.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, before delivery of materials. Ensure conditions are satisfactory for installation.
 Perform rectification required before delivery of materials.
 Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 Prepare surfaces affected by the installation in accordance with material manufacturer's instructions.

- 303 Frame Anchorage**
Fabricator is required to supply the anchorage devices to the builder for building in by others and check that devices are located as required to suit the requirements of window frame fabrication for positive and permanent fixing.
Insulation: isolate dissimilar metals at interfaces with bitumen based or nylon shim materials to prevent galvanic action.
Make good concrete or masonry damaged during the installation of masonry anchors at no cost to the proprietor.
- 304 Frame Installation**
Comply with AS 2047.
- 305 Glazing**
Secure glass in accordance with glass manufacturer's recommendations and AS 1288. Allow for thermal expansion of glass, the metal framing and spandrels.
- 306 Preparation for Sealants**
Joint preparation sealants: clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces if recommended by sealant manufacturer.
Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate on to adjoining surfaces.
- 307 Installation of Sealants**
A. Install bond breaker tape where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
B. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface slightly below adjoining surfaces.
C. Install sealant to depths as recommended by sealant manufacturer.
D. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength internal cohesive strength and surface durability. Advise project manager of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of Practical Completion.
E. Remove excess caulking compound and sealant and leave surfaces neat, smooth and clean, without smears on surrounding work. Tool joints where recommended by manufacturer or where required. Remove cartons and debris from site as the work progresses.
- 308 Insect Screens**
- 309 Protection**
A. Framing system: protect metal surfaces as necessary during erection. Finish surfaces free from mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.
B. Glass: protect glass from breakage immediately upon installation and until Practical Completion. Remove and replace glass and metal panels which are broken, cracked, abraded, chipped or damaged in other ways, before, during or after installation, at no additional cost to proprietor.
C. Be responsible for breakage and damage to installation until Practical Completion.
- 310 Cleaning**
A. Remove labels, excess glazing compounds, stains, spots and other foreign matter from glass, frames, hardware and other finished surfaces immediately upon installation of glazing for each light.
B. Debris: remove rubbish and debris resulting from glazing operations, each day.
- 311 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

Supply and instal skylights where indicated, including but not limited to:
Installation in metal deck or corrugated iron roofs,
Installation in slate, shingle or tile roofs.
Preparation of openings for skylights.
Flashing and sealing at perimeter

102 Related Work

Co-ordinate and co-operate with the following trades:

Roof framework	Roof plumbing
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103 Quality Assurance

Ensure that the chosen contractor is widely experienced in the class of work required by this specification.

104 **References**

References

Comply with applicable portions of the following Australian Standards:

AS/NZS 2179	Specifications for rainwater goods, accessories and fasteners.
2179.1 1994	Metal shape or sheet rainwater goods, and metal accessories and fasteners.
AS/NZS 4200 1994	Pliable building membranes and underlays. <i>There are 2 parts and 1 Amdt, 1994.</i>
AS 4285 2007	Skylights.

Comply with Building Code of Australia and state appendices or codes.

105 Delivery, Handling and Storage

Where possible, deliver materials for direct installation, keeping on-site storage of materials to a minimum. Be responsible for loss and damage to materials whether stockpiled or in place.

106 **Warranty**

Provide a warranty to the proprietor that the whole of the roof and roof plumbing system will remain weather-tight and weatherproof, after the installation of skylights for _____ years from the date of Practical Completion.

PART II MATERIALS

201 Skylights

Square, rectangular, pyramid, circular, openable, ventilation type etc.
 Model number:
 Material:
 Finish:
 Glazing material:
 Other:

202 Related Materials

Flashing
Gutters
Other:

PART III EXECUTION

301 Examination

Visit the site, inspect the conditions and compare them with the drawings. Ensure conditions are satisfactory for installation. Arrange for rectification before delivery of materials.
Start of work means total acceptance of conditions.

302 Terrain Category

Refer roof material specification.

303 Preparation

Ensure that the installed roofing material is intact and will suit the skylights.

304 Installation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Comply with instruction of the manufacturer and with the provisions of AS 4285.

305 Testing

Comply with tests ordered by the project manager.

306 Clean Up

On completion, clean away debris. Remove plant and equipment, leaving the whole in a condition satisfactory to the project manager.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this section includes design, engineering, manufacture and installation of metal frames including metal finishing and glazing of metal-framed skylights.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Structural steel Metalwork
 Roof construction

103 Quality Assurance

- A. Manufacturer qualifications: not less than 10 years continuous experience in the manufacture of the product types specified.
- B. Installer qualifications: installer is not to have less than 5 years continuous experience in the erection of specified material.
- C. Testing agency qualifications generally:
 Perform tests, where required by a NATA laboratory or by CSIRO Division of Building Research. Tests performed by recognised overseas testing laboratories certified by the American Society of Testing Materials (ASTM) may be submitted and will be considered in evaluation of the products and systems proposed, but such tests will not relieve the builder from responsibility of providing tests from an approved testing agency.
- D. Take responsibility for providing other related trades with complete information on the materials and equipment to be installed, the critical dimensions of such work, and other data affecting the work of the trades identified.
 Ensure sub-contractors and vendors co-operate in the proper sequence and fit of the work.
- E. Review sub-contractor's Shop Drawings and obtain project manager's approval in writing. Refer DOCUMENT 00800, SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27.
- F. Take care with tolerances and dimensional verifications.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1170	Structural design actions. <i>There are 5 parts, several Supplements and Amdts, 2002 – 2011.</i>
AS 1288 2006	Glass in buildings - Selection and installation. <i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i>
AS/NZS 1664	Aluminium structures. <i>There are 2 parts, 2 Supplements and 4 Amdts, 1997-1999.</i>
AS 2047 1999	Windows in buildings - Selection and installation. <i>Plus 2 Amdts, 2001.</i>
AS/NZS 2208 1996	Safety glazing materials in buildings. <i>Plus 1 Amdt, 1999.</i>
AS 4285 2007	Skylights.

105 System Description

- A. Design requirements:
 1. Extruded aluminium structural members with appropriate means of attaching external glass and capping.
 2. Integral guttering system within the framing members for positive drainage of condensation.
 3. Structural silicone.
- B. Performance criteria:
 1. Structural members of sufficient strength to meet potential dead and live loads.
 2. Deflection of glass or other panel is not to reduce the bite or grip of framing member by more than 25% and is not to impair the joint seals.
 3. Limit the water penetration of the skylights to zero when the system is tested using a differential static pressure of 20% of the inward acting design wind load pressure.
 4. Thermal movement. Provide for expansion and contraction of component materials as will be caused by a surface temperature range of -5°C to 45°C without causing buckling, stress of glass, failure of seals or other detrimental effects.

106 Submission Required Prior to Fabrication

- A. Complete system description including the following information:
 1. Names of manufacturers of products.
 2. Names, addresses and telephone numbers of local representatives for products.
 3. Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 4. Detailed information on products manufactured specifically for this project.
 5. Detailed system description including standard details and manufacturer's literature; and large-scale details or specially fabricated products.

- B. Statement that the proposed system meet(s) the regulatory requirements, thermal, aesthetic and waterproofing criteria and wind loading construction, glazing and warranty requirements specified; noting in detail exceptions.
- C. Shop drawings: refer DOCUMENT 00800, clause 27. Provide Shop Drawings showing the following information where appropriate to the items:
 - 1. Layout (sectional plan and elevation of complete assembly)
 - 2. Full size section of members.
 - 3. Methods of assembly, type and location of exposed screws.
 - 4. Methods of installation, including fixings, anchorage, caulking, flashings.
 - 5. Provision for expansion (thermal).
 - 6. Junctions and trim to adjoining surfaces.
 - 7. Fittings and accessories.
- D. Engineer's calculations on wind loading.
- E. Sealants: submit manufacturer's product specifications, handling, installation/curing instructions and performance tested data sheets for each elastomeric product required. Submit certificate test reports for elastomeric sealants on aged performance as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption and resistance (ageing, weight loss, deterioration) and heat and exposure to ozone and ultraviolet light.

107 Deliver, Handling and Storage

Handle materials with care. Do not store on site. Install directly in place. Store sealants as instructed by manufacturer.

108 Warranty

- A. Submit manufacturer's warranty certificate that the skylight installation is provided and installed in accordance with contract documents.
- B. Certify that the installation is free from defects in design, material and construction and that the installation will be free of water penetration for a period of years from the date of Practical Completion.
- C. Submit glass, translucent and other panels warranty stating that material will retain structural integrity, will not delaminate, will not cause seal failure or other defects for years from date of Practical Completion.
- D. Certify that sealant material is provided and installed in accordance with sealant manufacturer's instructions and will perform as warranted by the sealant manufacturer for years from the date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

202 Materials

- A. Framework
 - Principal support members.
 - Extruded aluminium, 3mm wall thickness.
 - Alloy 6063 - T5, 6063 - T6 or 6061 - T6.
 - Sizes and shapes to suit design drawings.
 - Snap on covers and other trim, 1.5mm minimum.
- B. Glazing strips, non-adhesive, heat-cured silicone rubber, Type 1.
- C. Setting blocks as for glazing strips, Type 11.
- D. Fasteners, type 316 or 304, stainless steel screws.
- E. Flashings, stainless steel sheet or zinc sheet.
- F. Finish:
 - Anodising
 - Polyester powdercoat
 - Acrylic
 - Fluoroset FP
- G. Translucent panels: float, laminated
- Polycarbonate
- H. Opaque panels
 - Ceramic frit
 - Treated translucent
 - Plywood
- I. Sealants
 - 1. Structural flush glazed joints: high performance silicone sealant.
 - 2. Non-structural flush glazed joints: silicone rubber.
 - 3. Backer rod: polyethylene rod.
 - 4. Expansion joints: neoprene sheet or strip.

203 Fabrication

- A. Construct skylights using materials recommended by the manufacturer and in situations in accordance with manufacturer's instructions.
- B. Prepare materials and fabrications in accordance with measurements taken on site where possible.
 - 1. Where not possible, arrange for on site fabrication.
- C. Do as much fabrication as possible in the shop prior to delivery to site. Mark and disassemble before delivery to site.
- D. Stainless steel fasteners are required.
- E. Use snap-on cappings to conceal fasteners where possible.
- F. Use setting blocks to support glass and provide edge clearance as follows:
 - 1. Not less than 150mm from edge of glass for support of glass.
 - 2. Glass bite: not less than 12mm or more than 15mm on side of a glass panel.
 - 3. Maintain 6mm edge clearance between glass and adjacent metal framework.
 - 4. Separate glass faces from metal frame surfaces with spacer blocks.
- G. Locate weep holes in curb for condensation drainage to exterior of skylight, at each rafter connection.

PART III EXECUTION**301 Examination**

Prior to installation of the skylight system, arrange for a representative(s) of skylight manufacturer to examine the structure and substrate to determine that they are properly prepared, sized and ready to receive the skylight work included herein.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Apply a protective coating of asphaltic paint to contact between aluminium and dissimilar metals for the prevention of electrolytic action and corrosion.

303 Installation

- A. Install skylight frame, glass and accessory items as needed in accordance with manufacturer's instructions.
- B. Install skylight system under the direction of the skylight manufacturer's own experienced mechanics.
- C. Erect system plumb and true, in proper alignment and relation to established lines and grades as shown on approved Shop Drawings.
- D. Anchor skylight to structure in strict accordance with approved Shop Drawings.
- E. Use high performance silicone sealants to seal horizontal joints between glass panels and silicone sealant to wet seal joints between snap-on cap retainers and glass.
- F. Apply sealing materials in strict accordance with sealant manufacturer's instructions. Before application remove mortar, dirt, dust, moisture and other foreign matter from surfaces it will contact. Mask adjoining surfaces to maintain a clean and neat appearance. Tool sealing compounds to fill the join and provide a smooth finish.

304 Tolerances

All parts of the work, when completed, are to be within the following tolerances:

- A. Maximum variation from plane or location shown on approved Shop Drawings: 3mm per 3 metres of length or 12mm in total length.
- B. Maximum offset from true alignment between two members abutting end-to-end, edge-to-edge inline or separated by less than 75mm, 1mm.

305 Field Quality Control

Sealant Adhesion: after sealant is fully cured (14 to 21 days) perform sealant adhesion test in strict accordance with sealant manufacturer's prescribed procedure.

306 Cleaning

Install skylight frame and associated metal to avoid soiling or smudging finish.
Clean glass at time of installation.

307 Protection

Protect finished installation until Practical Completion.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

<http://www.abcb.gov.au/education-events-resources/publications/~media/Files/Download%20Documents/Publications/Advisory%20Note%20-%20Protection%20of%20Openable%20Windows.pdf>

PART I GENERAL**101 Scope**

Design, fabricate, supply and install window security items including but not limited to:

Wall mounted grilles for ventilation and other purposes	
External grilles	Hinged screens
Internal grilles	Sliding screens
External roller window screen	Remote controlled operation
Locking devices	Fire resistance or fire proofing
Microwave detection	

102 Related Work

Co-ordinate and co-operate with the following trades:

Floor construction	Metalwork
Wall construction	Metal Windows and Glazing
Ceiling construction	Metal Finishing
Concrete	Painting
Carpentry	

103 Quality Assurance

Work of this trade section is to be performed by experienced craftsmen familiar with the quality required in this class of work.

Where 5 or more items of a similar product are required, construct a prototype, full size. Finish the prototype in every respect. When approved by the project manager, this sample remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1554	Structural steel welding. <i>There are 7 parts, 1994 – 2012.</i>
AS 1627	Metal finishing - Preparation and pre-treatment of surfaces. 1627.6 2003 Chemical conversion treatment of metals. <i>There are 6 other parts, 1997 – 2005.</i>
AS 1796 2001	Certification of welders and welding supervisors. <i>Plus 1 Amdt, 2002.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.
AS 4100 1998	Steel structures <i>Plus 1 Supplement, 1999, 1 Amdt 2012.</i>
AS/NZS 4680 2006	Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.

Comply with requirements of statutory and local authorities.

105 Shop Drawings

Comply with DOCUMENT 00800, clause 27.

Provide shop drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
- B. Develop details not shown and in conformity with the indicative details shown.
- C. Take and confirm dimensions on site, before preparing shop drawings where possible.
- D. Submit detailed shop drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and full-scale templates of blocking, anchorages, sleeves and bolts installed by others.

106 Samples

- A. Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. When approved, samples are to establish quality of similar work of this trade section.
- B. Check on delivery: request project manager to check materials on delivery to site for quality, and he will reject materials not meeting the requirements of this specification or equal to approved samples. Rejected materials are to be returned to the fabricator at the fabricator's expense.
- C. Finish: provide samples of specified finishes when requested.

PART II MATERIALS**201 Manufacturers**

202 Materials

Item:	Manufacturer	Material	Model No	Size	Finish

203 Welding Steel

General: details of joints, the techniques of welding employed, the appearance and quality of welds made and the methods used to correct defective work; conform to requirements of AS/NZS 1554.

Welds exposed to view: grind smooth to project manager's approval.

Concealed welds: grind smooth before galvanising.

Tack or skip welding: at regular intervals, very neat; not permitted if material is to be hot-dip galvanised.

Remove weld spatter.

Certification: Welds are to be made only by welders who have previously been qualified by tests as prescribed in AS 1796 for the type of work required.

Tack welding or skip welding will NOT be permitted where items are to be galvanised. Weld continuously form joints and connections to exclude water and to permit draining during galvanising.

204 Fabrication

Visit site and accurately measure openings etc. before fabrication.

Before delivery to site, pre-assemble where possible all items to ensure proper fit and dimension of each item.

Disassemble and pack carefully for shipping to the site. On delivery and unloading, inspect for damage and arrange immediate replacement if necessary.

205 Connection Design

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment. Take possible care to prevent damage.

- A. Welding external items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts are to be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Shop connections for steel fabrications are to be welded, and field connections bolted.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Machined joints are to be milled to a close fit. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.
- G. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop.

206 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt. Fasten galvanised items with galvanised fasteners.

PART III EXECUTION**301 Examination**

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Start of work means total acceptance of relevant conditions.

302 Preparation

- A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
- B. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- C. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage. Damaged fabrications are to be treated as follows:

1. Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.
 2. Architectural metalwork: returned to shop for repair or replacement.
- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

- A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.
- C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field.
1. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted under conditions. Fabrications may be cut shorter with power hacksaws on site.
 2. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.

305 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation and check completed installations.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Cleaning

Clean materials installed to the satisfaction of the project manager. Remove temporary protective coatings.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install door hardware including but not limited to:
 Wall mounted grilles for ventilation and other purposes.
 Hinges.
 Pivots.
 Latches.
 Locks.
 Door holders.
 Push plates.

102 Related Work

Co-ordinate and co-operate with the following trades:

Floor construction	Painting
Wall construction	Doors and door frames
Ceiling construction	Fire-rated door and frames
Concrete	Roller shutter doors
Carpentry	Folding doors and grilles
Metal finishing	Automatic sliding door assemblies

103 Quality Assurance

Work of this trade section is to be performed by experienced craftsmen familiar with the quality required in this class of work.
 Where 5 or more items of a similar product are required, construct a prototype, full size. Finish the prototype in every respect. When approved by the project manager, this sample remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS 1909 1984	(Obsolescent) Installation of timber doorsets.
AS 2688 1984	(Obsolescent) Timber doors.
AS 2689 1984	(Obsolescent) Timber doorsets.
AS 4145	Locksets. 4145.2 2008 Mechanical locksets for doors in buildings. <i>There are 3 other parts, 2001 - 2008 plus 2 Amdts 2009.</i>
AS 4178 1994	Electromagnetic door holders.

Comply with requirements of statutory and local authorities.

105 Delivery, Handling and Storage

Deliver items to site in original packaging, each clearly labelled for the relevant door by door number.

106 Warranty

Provide to the proprietor a warranty covering faulty materials and installation for years from date of Practical Completion.

PART II MATERIALS**201 Manufacturers****202 Hardware Items**

Master key systems: refer schedule provided by manufacturer.
 Finish:
 Door stops:

203 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.
 Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

PART III EXECUTION

301 Examination

Examine the materials to which door hardware is to be fixed.
Ensure conditions are satisfactory for installation.
Start of work means total acceptance of conditions.

302 Preparation

Remove hardware from surfaces to be painted. Replace when paint is dry.

303 Installation

Comply throughout with the written instructions of manufacturer.

304 Keys

Supply duplicate labelled keys for each lock. Provide plastic tags for each key.
Arrange with project manager for location of a key cupboard.
Fit cupboard with hooks for each key with room names or numbers.
Install cupboard where instructed.

305 Testing

Check each key in relevant lock for satisfactory operation. Replace defective keys or locks.
Clean the materials installed.
Remove construction locks.

306 Co-ordination

Before finalising hardware order, review with security sub-contractor work related to reed switches, electric locks/strikes etc. Generally such items will be supplied by the security contractors and fitted to doors and frame by the builder.

307 Schedule

See Schedule of Door Furniture and Hardware at end of this document.

END OF DOCUMENT

PART I GENERAL**101 Scope**

Supply and install a complete system of glass, glazing and sealants including but not limited to:

Glass, clear float
 spandrel
 translucent patterned
 wire reinforced
 Glass, laminated
 two or more laminations
 inter-layer
 Glass, toughened and unframed glass assemblies
 Glass, tinted, heat reflecting, mirrored
 Glass, sloping
 Glazing plastics, polycarbonate, etc.
 Glazing bars
 Glazing systems - structural glass
 Glazing beads, strips
 Sealants and related materials
 Film applied to glass surface

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete
 Masonry
 Structural steel
 Roof flashings, etc.
 Electrical
 Security
 Fireproofing and fire services
 Timber windows and frames

103 Quality Assurance

- A. Manufacturer qualifications: not less than ten (10) years continuous experience in the manufacture of the product types specified.
- B. Installer qualifications: installer is to have not less than five (5) years continuous experience in the erection of specified material.
- C. Testing agency qualifications generally: Perform tests, where required, by a NATA Laboratory or by CSIRO Division of Building Research. Tests performed by recognised overseas testing laboratories certified by the American Society of Testing Materials (ASTM) may be submitted and will be considered in evaluation of the products and systems proposed, but such tests will not relieve the builder from responsibility for providing tests from an approved testing agency.
- D. Take responsibility for providing the trades of such Sections with complete information on the materials and equipment to be installed, the critical dimensions of such work, and other data affecting the work of the trades identified.
 Ensure subcontractors and vendors co-operate in the proper sequence and fit of the work.
- E. Review subcontractor's shop drawings and obtain project manager's approval in writing. Refer DOCUMENT 00800, clause 27.
- F. Take care with tolerances and dimensional verifications.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1170	Structural design actions. 1170.0 2002 General principles. <i>Plus 5 Amdts, 2003 – 2011.</i> 1170.1 2002 Permanent, imposed and other actions. <i>Plus 2 Amdts, 2005 – 2009.</i> 1170.2 2011 Wind actions. <i>There are 2 other parts, several Supplements and Amdts, 2002 – 2011.</i>
AS 1288 2006	Glass in buildings - Selection and installation. <i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i>
AS/NZS 2208 1996	Safety glazing materials in buildings. <i>Plus 1 Amdt, 1999.</i>
AS/NZS 2343 1997	Bullet-resistant panels and elements.
AS 4145.2 2008	Locksets and hardware for doors and windows – Mechanical locksets for doors and windows in buildings. <i>Plus 1 Amdt, 2009.</i>
AS 4666 2012	Insulating glass units
HB 125 2007	The glass and glazing handbook.

Comply with relevant authority's requirement for fire-rated installation.

105 Submissions Required Prior to Purchase and Fabrication

- A. Complete system description including the following information:
 - Names of manufacturers of products.
 - Names, addresses and telephone numbers of local representatives for products.
 - Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 - Detailed information on products manufactured specifically for this project. Detailed system description including standard details and manufacturer's literature; and large-scale details of specially fabricated products.
- B. Statement that the proposed system(s) meet(s) the regulatory requirements, thermal, aesthetic and waterproofing criteria and wind loading, construction, glazing and warranty requirements specified; noting in detail exceptions.
- C. Shop Drawings: pursuant to DOCUMENT 00800, clause 27 and the provisions of this document, provide the shop drawings showing the following information where appropriate to the items:
 - 1. Layout (sectional plan and elevation of complete assembly).
 - 2. Full size section of members.
 - 3. Methods of assembly.
 - 4. Methods of glazing.
 - 5. Methods of installation, including fixings, anchorage, caulking, flashings.
 - 6. Provision for expansion (thermal).
 - 7. Junctions and trim to adjoining surfaces.
 - 8. Fittings and accessories.
- D. Engineer's calculations on wind loading.
- E. Sealants: submit manufacturer's product specifications, handling, installation/curing instructions, and performance tested data sheets for each elastomeric product required. Submit certificate test reports for elastomeric sealants on aged performance as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (ageing, weight loss, deterioration) and heat and exposure to ozone and ultraviolet light.

106 Delivery, Handling and Storage

Handle materials with care. Do not store on site. Install directly in place. Store sealants as instructed by manufacturer.

107 Warranty

In addition to the warranty requirements of the General Conditions of Contract, provide the following:

- A. Warranty: provide glass manufacturer's written warranty, agreeing to, within specified warranty period, furnish freight paid to project site, replacement units for glass units which have defective hermetic seals (excluding that due to glass breakage), defined to include intrusion of moisture or dirt, internal condensation at temperatures above -2°C, deterioration of internal glass coatings, and other visual evidence of seal failure or performance failure; provided manufacturer's instructions for handling, installation, protection and maintenance have been adhered to during warranty period.
- B. Warranty period is years after date of installation and not less than years after date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

The following manufacturers are acceptable for this project:

Glass, float:

Other:

Glass, laminated:

Glass, toughened:

Glass, tinted, heat reflecting, mirrors:

Glazing plastics: polycarbonate:

Glazing bars:

Sealants:

202 Structural Criteria

- A. Adopt terrain category:
 - Refer AS/NZS 1170.
- B. Wind loading: design glazing and frame assemblies to suit the static and dynamic wind forces as indicated on the tables in the AS/NZS 1170. Structural members of glazed units: of such strength that they will not deflect by an amount greater than span/240 without causing permanent deflection when tested at the specified design wind values. Fix members so that the above loading is generated in the members without sufficient stress to cause failure or movement becoming evident at any joint.
- C. Distortion: design the glazed assembly and erect to minimise visual distortion of reflected images.

203 Selection of Glass and Glazing Materials

Refer to detailed parts and sections of AS 1288.

Part 1 deals with the selection of type and thickness of glass.

Part 3 with unframed toughened glass assemblies.

Note particularly:

Part 1, Section 4, Human Impact Safety Requirements, AS/NZS 2208.

Part 1, Section 3, Non-Vertical Situations.

Part 2, Glazing techniques. Choose the method directly from the eight sections of this part of the Standard.

204 Glass Materials - Aesthetic Criteria

Glass types (Refer drawings for location)

Vision glass:

Clear coating colour:

Reflectance:

% incident light:

Vision glass:

Clear coating colour:

Reflectance:

% incident light:

Spandrel glass:

Colour:

Reflectance:

% incident light:

Roof light glass:

Toughened or laminated:

Reinforced:

Colour:

Reflectance:

Door glass:

Toughened or laminated:

Colour:

Reflectance:

Obscure glass:

Source:

Name:

Patterned glass:

Source:

Name:

Wired glass:

Source:

Name:

205 Sealants and Accessory Materials

A. Comply with AS 1288. Refer the appropriate Trade Section, and comply with requirements stated.

B. For timber frames, use linseed oil glazing putty.

C. For metal frames:

1. Non-structural external weatherproofing sealants: low modulus neutral curing silicone rubber compounds of approved manufacture.

2. Generally comply with AS 1288. Spacer gaskets, glazing tapes and setting blocks: compatible with sealants, which do not contribute to sealant colour change or affect the sealants adhesion to substrates when exposed to ultraviolet light.

Evaluate prior to application, samples of materials receiving the silicone, including elastomeric sealants for compatibility and primer selection. Submit materials clearly identified as to manufacturer and product number.

Silicone sealants generally: clear in colour.

3. Interior Sealers: acrylic-emulsion or latex-rubber-modified acrylic-emulsion sealant compound, permanently flexible, non-staining and non-bleeding; recommended by manufacturer for protected exterior exposure and general interior exposure.

4. Joint Primer/Sealer: provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

5. Bond Breaker Tape: polyethylene tape or other plastic as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler is to be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

6. Sealant Backer Rod: compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other permanently flexible, durable non-absorptive material as recommended by sealant manufacturer for compatibility with sealant.

7. Glazing Tape: polyisobutylene tape of type, thickness and width as recommended by glass manufacturer and project manager.

8. Exposed fixings: countersunk type, anodised aluminium or non-magnetic stainless steel evenly and neatly located in an approved manner. Exposed fasteners: finished to match aluminium. Show on shop drawings or discuss with the project manager before fabrication and delivery of any fixings which will be exposed.

206 Roof Light Framing

207 Glazing Bars

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, before delivery of materials. Ensure conditions are satisfactory for installation.

Arrange for rectification required before delivery of materials.

Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Prepare surfaces affected by the installation in accordance with material manufacturer's instructions.

303 Preparation for Sealants

Joint preparation sealants: clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces if recommended by sealant manufacturer and comply with his instructions.

Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate on to adjoining surfaces.

304 Glazing

Secure glass in accordance with glass manufacturer's recommendations and AS 1288. Allow for thermal expansion of glass, the metal framing and spandrels.

305 Installation of Sealants

- A. Install bond breaker tape where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- B. Employ proven installation techniques, which will ensure that sealants are deposited in uniform continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface slightly below adjoining surfaces.
- C. Install sealant to depths as recommended by sealant manufacturer.
- D. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise project manager of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of Practical Completion.
- E. Remove excess caulking compound and sealant and leave surfaces neat, smooth and clean, without smears on surrounding work. Tool joints where recommended by manufacturer or where required. Remove cartons and debris from site as the work progresses.

306 Field Quality Control

Arrange for visits to the site by the supplier's approved technical representative of each component. Such visits are to occur at the start of and during the first stages of installations and towards the end of installations. Follow instructions of the technical representatives. Call in the project manager where appropriate for resolution of problems or difficulties.

307 Protection

- A. Framing system: protect metal surfaces as necessary during erection.
- B. Finish surfaces free from mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.
- C. Glass: protect glass from breakage immediately upon installation until Practical Completion. Remove and replace glass and metal panels which are broken, cracked, abraded, chipped or damaged in other ways, before, during or after installation, at no additional cost to the Proprietor.
- D. Be responsible for breakage and damage to installation until Practical Completion.

308 Cleaning

- A. Remove labels, excess glazing compounds, stains, spots and other foreign matter from glass, frames, hardware and other finished surfaces immediately upon completion of each panel of glazing.
- B. Debris: remove rubbish and debris resulting from glazing operations, each day.

309

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install glass splashbacks including, but not limited to:
 Measure area to be covered
 Prepare area to be covered
 Clean surface
 Apply colour to glass
 Ensure adequate fixing of glass.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Wall framing
 Wall finishing – Plasterboard
 Manufactured casework
 Glazing
 Ceramic tile
 Electrical

103 Quality Assurance

- A. Suppliers and installers are required to be widely experienced in the class of work required by this Specification.
- B. Evidence of similar work on projects is required, providing names and addresses of work to facilitate inspection and approval of qualifications.
- C. Submissions required before ordering materials:
 1. Product data including description of materials proposed and samples of each.
 2. Description of laying and/or installation methods.

104 References

Comply with applicable portions of the following Australian Standards:
 AS 1288 2006 Glass in buildings - Selection and installation.
 Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.
 Comply with requirements of statutory and local authorities.

105 Delivery and Handling

Handle materials with care. Install directly in place. Do not store on site. Store sealants as instructed by manufacturer.

106 Warranty

Provide to the proprietor a warranty covering satisfactory performance of the complete installation for years from the date of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

Glass: 6mm toughened. Clear or low iron glass. Form cut outs as required for power outlets.
 Background: plasterboard or fibre-cement fixed to bricks.
 Colour: solid colour, 2 pack polyurethane or other paint system applied by the manufacturer of the splashback. Refer to project manager for selection of colour.
 Sealant: neutral curing silicone rubber around entire perimeter of glass panel.
 Fibre cement (if used): 4.5 or 6.0mm secured to masonry as recommended by manufacturer.

PART III EXECUTION**301 Examination**

Visit the site and inspect conditions.
 Compare conditions with the data shown on drawings.
 Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 Start of work means total acceptance of conditions.
 Measure the areas to be covered with splashback, including cut-outs for power outlets etc. Advise project manager if walls are found to be out of square with each other or if the wall or substrate is not flat (flat means less than 4mm variation in surface).

302 Wall Surface To Be Covered

Clean the surface thoroughly.

Ensure a dry surface which will suit silicone rubber and double-sided adhesive tape.

303 Adjacent Surfaces

Remove obstructions from adjacent surfaces which might prevent handling of glass into place.

Clean surfaces.

Ensure that painted surface is thoroughly dry and clean.

304 Secure The Glass

Apply double-sided tape to back of glass, if used.

Apply a bead of silicone rubber to entire perimeter of glass. Leave no gaps. Press into place and maintain pressure until fully set.

305 Cleaning

Clean entire area of glass and adjacent finishes.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install mirrors including but not limited to:

- Glass mirrors - solid
- Glass mirrors - laminated safety glass
- Tinted glass mirrors - solid
- Tinted glass mirrors - laminated
- Solid glass mirrors bonded to backing
- Glassless mirrors - acrylic
- Proprietary brand sliding glass mirror-faced doors
- Clips, flannelette pad fixing system
- Face fixing via dome capped screws through mirrors.

102 Related Work

Co-ordinate and co-operate with the following trades:

- | | |
|------------------------|---------------------------------|
| Cement render | Hard plaster |
| Plasterboard | Masonry cleaning |
| Particleboard backings | Suspended exposed grid ceilings |

103 Quality Assurance

- A. Manufacturer's qualifications: not less than 10 years continuous experience in the manufacture of the product types specified.
- B. Installer qualifications: not less than 5 years continuous experience in the fixing of the specified material.
- C. Take responsibility for providing the trades with complete information on the materials and equipment to be installed.
- D. Review sub-contractor's Shop Drawings and obtain the project manager's approval in writing. Refer DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27.
- E. Take care with tolerances and dimensional variations.

104 References

Comply with applicable portions of the following Australian Standards:

- | | |
|------------------|--|
| AS 1288 2006 | Glass in buildings - Selection and installation.
<i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i> |
| AS/NZS 2208 1996 | Safety glazing materials in buildings. <i>Plus 1 Amdt, 1999.</i> |

105 Submissions

If not specified in Part II Materials, the following submissions are required before ordering materials:

106 Delivery, Handling and Storage

Handle materials with care. Do not store on site. Install directly in place. Store sealants as instructed by the manufacturers.

PART II MATERIALS**201 Acceptable Manufacturers****202 Selection of Mirror Types**

- A. 3mm, 4mm or 6mm thick, (Silver quality twin coated glass mirror)
- B. Fully toughened silver quality twin coated glass mirror.
- C. Laminated to 3mm clear glass with 0.38mm thick interlayer to comply with relevant sections of AS/NZS 2208.
- D. 300 x 300 x 3mm thick glass mirror tiles ground and polished on edges.
- E. Clear (no tint)
Bronze, grey, gold, green, blue, peach or black tinted.
- F. Clear acrylic sheet "mirror", 3mm thick.

203 Accessory Materials

- A. Neutral curing (non-acetic) clear silicone adhesive:
applied to the edges of frameless mirrors.
applied to the edges of laminated glass mirrors.
- B. Chrome plated solid brass mirror clips, type:
with flannelette pads between the mirror and the clips.
two-part brass fixing screws with domed brass heads screwed onto the fixing screws
chrome plated finish
clear lacquered polished brass
provided at all corners of each mirror

clear anodised
 anodised to selected colour
 selected colour polyester powdercoat finish applied in accordance with the manufacturer's printed instructions.
 ball bearing type extruded aluminium printed instructions
 ball bearing type extruded aluminium tracks and fittings
 Manufacturer:
 Type:
 Finish:

- C. 12.70 x 9.53 x 1.57 Alcan H 9660 or similar extruded and clear anodised aluminium angles.
- D. Free brushed flannelette fabric.
- E. Double sided foam adhesive tape 24mm wide.

204 Fixing Holes

Drill mirrors 8mm diameter at each corner to receive face fixing screws. Locate holes 75mm minimum from edges of mirrors.

205 Recessed Finger Pulls

Grind and polish, 75mm long, 20mm wide, 3mm deep recessed finger pulls, 50mm back from one vertical edge of each sliding glass mirror door.

206 Proprietary Brand Mirror Systems

- A. Mirror faced proprietary brand sliding door system provided complete with components recommended by its manufacturer.
- B. Or an alternative mirror faced bi-fold door system provided complete with components recommended by its manufacturer.

207 Glass Edge Finishes

Finish edges of glass mirrors as follows:

- ground smooth on edges.
- arrised, ground and polished on exposed edges.
- bevelled to angle of 80 degrees and ground and polished on edges.
- bevelled 20mm wide, 3mm deep and ground and polished on edges.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, before delivery of materials. Ensure conditions are satisfactory for installation. Perform rectification required before delivery of materials.
 Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Prepare surfaces affected by the installation in accordance with material manufacturer's instructions. Clean glass surfaces immediately before applying silicone sealants to the edges of mirrors. Remove dirt, insecure coatings, moisture and other substances that could interfere with the bond of the sealant.

Thoroughly clean down the backings to remove dust, dirt and other substances that:

- could interfere with the bond of the adhesive
- could interfere with the bond of the double sided tape

Sand down gloss surfaces of backings to provide porous type finish.

Seal new plasterboard or hard plaster backings with 1 coat of pigmented sealer.

303 Edge Sealing to Mirrors

Arris the outer corner of backings and seal around edges of the mirrors with clear neutral cure (non-acetic) silicone sealant gunned into place between the backings and the edges of the mirror and finished off to smooth even fillet lapping slightly over the back edges of the mirror.

304 Support Angles to Bonded Mirrors

12.70 x 9.53 x 1.57 Alcan H 9660 or similar extruded clear anodised aluminium angles provided continuously along the bottom edges of flannelette bonded glass mirrors. Set the support angles with the 12.70mm flange vertical.

Fix the support angles to the backings using 13mm long counter-sunk head screws spaced 150 maximum o.c.'s along the angles. Glue the angles to the backings in addition to screwing using a clear 2 pot epoxy glue. Set to true straight level lines to ensure a continuous bearing surface along the bottom edge of the mirror.

305 Fixing of Polarex/Flannelette Bonded Mirrors

Cover mirrors on the back surface with free brushed flannelette fabric pressed into the adhesive and thoroughly smoothed to remove air bubbles and wrinkles. The adhesive should not saturate the cloth, and keep the top surface of the cloth dry and fluffy. Leave to harden for approximately 12 hours.

After this adhesive has hardened, apply a full coat of adhesive to the surface of the backing and spread evenly to cover the whole area of the mirror.

When "tacky" press the mirror firmly into position until the mirror is bonded to the backing such that full adhesion is maintained over at least 90% of the mirror for approximately 1 or 2 minutes.

Provide spaces of at least 2mm width between adjacent mirrors to allow for expansion and movement in the backing material.

Paint the backing behind these spaces black. 5 litres of adhesive is sufficient for approximately 25 square metres.

306 Clip Fixing of Mirrors

Fasten mirrors to the backings using chrome plated brass mirror clips screwed to the edges of the backings using chrome plated counter-sunk Phillips head screws.

Provide flannelette pads between the clips and the mirror. The pads are to be of the same width as the clips.

307 Face Fixing of Mirrors

Fasten mirrors to the backings using proprietary brand brass screws through holes drilled through the mirror. Provide domed caps screwed onto the threaded outer ends of the screws - refer to clause 203 of this trade section.

308 Proprietary Brand Systems

- A. Proprietary brand glass mirror faced sliding door systems installed in accordance with manufacturer's printed instructions.
- B. Proprietary brand glass mirror faced bi-fold door system installed in accordance with the manufacturer's printed instructions.
- C. Install in the exposed grid, suspended metal ceiling grid in accordance with the manufacturer's printed instructions. Provide 3mm minimum clearance between the panels and the vertical flanges of the ceiling grid rails.

309 Protection

- A. Aluminium components: protect metal surfaces as necessary during erection and until Practical Completion. Finish surfaces free from mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.
- B. Mirrors: protect mirrors from breakage immediately upon installation until Practical Completion. Remove and replace mirrors and metal parts that are broken, cracked, abraded or damaged in other ways before, after or during installation up to the date of Practical Completion at no additional cost to the proprietor.

310 Cleaning

- A. Remove labels, excess silicone, stains, spots and other foreign matter from mirrors, frames, hardware and other finished surfaces immediately upon completion of the installation of each mirror. Use cleaning systems recommended by the manufacturer of the mirror type.
- B. Debris: remove rubbish and debris resulting from glazing operations each day.

311 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of this trade section includes but is not limited to the supply and installation of cement render work on new concrete and/or masonry surfaces.

102 Related Work

Co-ordinate and co-operate with the following trades:

Masonry	Ceilings
Electrical wiring	Door frames

103 Quality Assurance

- A. Supply and installation of render base and surface treatment is to be performed by an approved sub-contractor known for reliability, quality of work and performance.
- B. At a location and time to be selected by the project manager, construct a complete prototypical installation approximately 3m square. Include elements provided under this section and finish in every respect. On approval by the project manager, the prototype will become the standard for the remaining work, and will remain as part of the work.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS 1672.1 1997 Limes and limestones – Limes for building.
AS 3700 2011 Masonry structures. *There is 1 Supplement 2012*
AS 3972 2010 General purpose and blended cements.
C/A Z39 2008 Render finishes.

Render is a data sheet published by Cement Concrete & Aggregates Australia. Visit www.concrete.net.au

105 Delivery, Handling and Storage

General: deliver manufactured materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand.

Protect materials from dampness. Store off the ground or slab, under cover and away from wet walls and other damp conditions.

106 **Warranty**

On completion of the work, provide a warranty through the builder to the proprietor stating that the work is secure against defects including delamination from substrate, "blowing", "grinning", and "crazing" for the period of _____ years from the date of Practical Completion.

PART II MATERIALS

201 Render Materials

- A. Cement: Grey Portland. Conform to AS 3972.
- B. Sand: clean, sharp, washed free from loam, organic matter or soluble impurities, conforming with the following table:

Sieve size No.	Retained on each sieve %
4	0
8	5
16	30
30	65
50	95
100	100

Soluble salts content (W/W%) 0.15 max.

NOTE: When instructed by project manager, arrange for laboratory tests to be carried out on sand samples at no cost to proprietor.

- C. Lime (if required): Hydrated lime.
- D. No additives may be used without project manager's written approval.

202 Accessories

Supplied by Rondo Building Services Pty. Ltd.:

Refer www.rondo.com.au.

External Corner Bead, R01, R03 or R04

Bullnose External Corner, R06

Stopping Bead, R11, R12 or R13

Expansion Joints. R45.

Where render is applied over stud walls, fix metal lath to manufacturer's instructions.
Lathing: galvanised expanded metal lathing, Lysaght, PL25, or other approved.

203 Mixes

Render over masonry and concrete substrates: not greater than 6 parts sand, 1 part lime, 1 part cement, by volume. Machine mix materials.

PART III EXECUTION

301 Examination

Acceptance: notify project manager of discrepancy or unsuitability of substrate.
Start of work means total acceptance of conditions.

302 Preparation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Remove foreign material, dust, dirt, oil, nails and other material which could reduce bonding of render to the surface.

303 Application of Render

Where render is applied over very smooth masonry, first apply 2 separate coats of Cemstik, Bondcrete or Bondseal. If in doubt, check with project manager.
Alternatively, bag on to surface a mix of 1 part cement and 1 part sand.
Nominal thickness:
A. Single coat: 15mm of render.
B. 2 coats, base coat: 8-10mm thick.
Comb in 2 directions, and allow to dry over 5 days minimum.
Finish coat, a fine even exposed sand finish, 6-8mm thick.
Where instructed by project manager, damp roll or fine spray and lightly acid etch before thoroughly washing down.
Use material within 30 minutes of the addition of the water. Beyond this time, discard the mix. Do not re-temper.

304 Movement Control Joints

- A. Locate movement control joints to coincide with junction of differing wall materials (reinforced concrete/blockwork), at maximum 6 metre centres.
- B. Form joints continuously to extend neatly and clearly up to adjacent abutting surfaces. Form with approved mastic sealant and an approved fully compressible joint filler or similar.

305 Internal Corners

Finish square internal (re-entrant) vertical corners of walls and columns.

306 External Corners

Finish external vertical corners slightly rounded to approximately 4mm radius.

307 Extent of Rendering

Extend rendering into recesses, jambs, returns etc.

308 Covering Concealed Chases

Before rendering, form covers over chases in walls and columns for pipes, conduits, cables, etc., with galvanised expanded metal lathing lapped 150mm over recess, fixed with galvanised nails or power driven fasteners and washers, spaced at maximum 300mm centres. Fix lathing before first coat of render.

309 Door and Window Frames

Unless otherwise detailed, stop render short of door and window frames so that no bond occurs to frames. Rake back to a gap of 3mm at the surface. Finish the gap with paintable silicone rubber joint sealant.

310 V-Joints

Form V-Joints in render where steel door frames are flush with render, also where insitu concrete beams abut brickwork or blockwork and where concrete or masonry walls abut plasterboard or timber substrate.

311 Cleaning

Clean up and remove from site excess materials and debris resulting from operations. Clean and restore to original condition adjacent materials affected by the work.

312 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section includes but is not limited to:
 Preparation supply and installation of textured coating.
 Preparation supply and installation of bagged finish

102 Related Work

Co-ordinate and co-operate with the following trades:
 Masonry
 Concrete
 Window frames
 Door frame
 Fibre cement panels
 Cement render

103 Quality Assurance

- A. The selected subcontractor is to have a minimum of 5 years' experience in the application of the specified or similar material, and is to be known for reliability, performance and quality of work.
- B. At a location and time to be selected by the project manager construct a complete prototypical installation approx. 3m square. Include all elements provided under this trade section and finish in every respect. On approval by the project manager, the prototype will become the standard for the remaining work, and will remain as part of the work.
 Obtain approval for colour from the project manager.

104 References

AS/NZS 4548	Guide to long-life coatings for concrete and masonry.
4548.1 1999	Wall coatings - Latex extensible.
4548.2 1999	Latex finish coatings - High build, low profile.
4548.3 1999	Textured coatings - Non-aggregate.
4548.4 1999	Latex - Textured coatings - Aggregate filled.
4548.5 1999	Guidelines to methods of test.

105 Delivery, Handling and Storage

Deliver materials in sealed (where applicable) containers and store in a dry location on the site.

106 Submissions

The project manager will supply to the contractor a sample of the required material from the range obtained from the supplier.
 The sample will indicate all aspects of the required finish, size of granules, colour, texture, finish etc.
 An appropriate supplier's specification may be available from the project manager.

107 Warranty

Provide a warranty to the proprietor covering cracking, peeling and fading for a period of years.

PART II MATERIALS**201 Acceptable Suppliers****202 Material**

Bagging
 Mortar for bagging:
 Same mortar as used for laying
 Colour: M3 mortar, with powdered metallic oxide pigment added to achieve a dry colour approved by the project manager.

PART III EXECUTION**301 Examination**

Inspect surfaces to be treated and notify project manager of any discrepancy or unsuitability of substrate.
 Comply with manufacturer's recommendations regarding environmental conditions.
 Start of work means total acceptance of conditions.

- 302 Preparation**
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Do not proceed with the installation in unsuitable weather.
Protect wood, metal, glass and other finished work during progress.
Make good damage in every respect at no additional cost to the proprietor.
Provide and install required scaffolding, hoisting equipment, etc. in accordance with statutory authority regulations.
Mask dissimilar materials adjacent to surfaces to be treated in order to avoid contact - e.g. metal frames and cappings. Do not apply material over soft surfaces such as jointing material.
- 303 Application**
Apply in accordance with manufacturer's recommendations regarding mixing of materials and application methods.
- 304 Finish**
Match approved sample panel - refer clauses 103 and 105.
- 305 Protection**
Protect finished surfaces against damage until Practical Completion.
- 306 Cleaning**
At completion of work remove debris, scaffolding, erection materials, etc. and leave surfaces in a condition entirely satisfactory to the project manager.
- 307 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete installation of plasterboard including but not limited to:

Plasterboard
 Plasterglass
 Flexible plasterboard, 6.5mm thick in 2 layers
 Lining of concrete and masonry walls
 Lining of steel stud walls
 Lining with water-resistant plasterboard
 Ceilings, drop walls, bulkheads
 Fire-rated plasterboard walls/ceilings
 Cornices.

102 Related Work

Co-ordinate and co-operate with the following trades:

Masonry walls	Electrical
Stud walls	Other:
Suspended ceilings	

103 Quality Assurance

Prototype: at a location selected by the project manager, construct a complete prototypical installation of plasterboard on each different substrate.

Each sample, full height by 3600 wide includes elements required by this specification and finish in every respect. When approved by the project manager, this sample will remain part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 2589 2007	Gypsum linings - Application and finishing.
HB 161 2005	Guide to plastering

105 Delivery, Handling and Storage

Deliver manufactured materials in bundles and packages bearing the name of the manufacturer and the brand. Handle with care. Remove damaged materials from the site. Protect stored materials from damage and damp, or materials which may cause deterioration.

106 Warranty

Provide warranty covering the work against defective materials and workmanship for a period of years from the date of Practical Completion. The warranty includes a statement that the whole of the work has been carried out in accordance with relevant Australian Standards and Codes and manufacturer's instructions in effect at the time of installation.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

Supply materials in accordance with material supplier's recommendations for each application.

PART III EXECUTION**301 Examination**

Acceptance: visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site. Rectify any discrepancy or unsuitability of substrate.
 Start of work means total acceptance of conditions.

302 Preparation

- A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
- B. Co-ordinate with and ensure preparatory work by other trades is done prior to commencement of work; failure to do so will involve removal of plasterboard and immediate rectification.

- C. Arrange for provision of additional stud, nogging, trimmed openings, boxed studs, fixing grounds, etc., required for satisfactory execution of the work of this trade including penetrations through plasterboard for services. Co-operate in installation of frames, duct openings, etc.
 - D. Space enclosure: do not install materials until space is enclosed and weatherproof, and until wet-work in space is completed and nominally dry.
- 303 Layout and Tolerances**
- A. Check dimensions of areas and surfaces to which material is applied before installation begins.
 - B. Measure each area and establish layout pattern.
 - C. All finished work is to be within + 2mm of the sizes shown on the relevant drawings.
- 304 Installation - General**
- A. Comply with manufacturer's installation instructions. Anchor and fasten materials and components to comply with ratings and performance requirements, and to comply with governing local regulations. Comply with appropriate Australian Standard.
 - B. Take care of and protect surrounding work, including other finishes, equipment and components, during installation. Provide protective covering where necessary.
- 305 Installation Particulars**
- 306 Finishing Details**
- General: apply treatment at board joints (both directions), flanges of trim accessories, penetration, fasteners, heads, surface defects and elsewhere as required to prepare work for decoration. Pre-fill open joints and rounded or bevelled edges, using type of compound recommended by manufacturer.
Apply fibreglass joint tape at joints between boards, where a trim accessory is indicated, or where extra strength is required.
- 307 Protection**
- Protect finished work. Make good damage in every respect at no additional cost to the proprietor, and without delay to job progress.
- 308 Cleaning**
- A. Adjust and clean: clean exposed surfaces including trim, edge moldings, and comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate damage.
 - B. Remove splatterings and droppings resulting from work. Remove daily surplus materials and rubbish from the work area.
 - C. Leave floors broom clean at completion.
- 309 Completion**
- Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install drywall partitions including but not limited to:

Steelwork
Stud wall framing
Plasterboard
Fire-rated plasterboard
Other panelling materials
Pre-surfaced panels of plasterboard etc.
Other:

102 Related Work

Co-ordinate and co-operate with the following trade sections:

Floor construction	Ceiling construction
Floor treatment	Electrical wiring
Skirtings	Plumbing
Wall construction	Painting
Wall finishing	

103 Quality Assurance

Prototype: at a location selected by the project manager on site, construct a full size prototype of:

Include in each prototype all elements required by this specification, and finish in every respect.
When approved by the project manager, such samples will be the control standard and remain part of the work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS 1684	Residential timber-framed construction. <i>There are many parts and Supplements, 1999 – 2010 and Amdts 2012, 2013.</i>
AS/NZS 2589 2007	Gypsum linings - Application and finishing. 2589.1 1997 (Available Superseded) Gypsum plasterboard. 2589.2 1997 (Available Superseded) Fibre reinforced gypsum plaster.
AS 3623 1993	Domestic metal framing.
AS/NZS 4600 2005	Cold-formed steel structures. <i>Plus 1 Amdt, 2010.</i>

105 Delivery, Handling and Storage

Deliver manufactured materials in bundles and packages bearing the name and manufacturer, and the brand.
Handle with care. Remove damaged materials from the site. Protect stored materials from damage and damp, or materials which may cause deterioration.

106 Warranty

Provide warranty covering the work against defective materials and workmanship for a period of years from the date of Practical Completion. Include a statement that the whole of the work has been carried out in accordance with relevant Australian Standards and codes and manufacturer's instructions in effect at the time of installation.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

Supply materials in accordance with material supplier's recommendations for each application.

203 Material Specials**PART III EXECUTION****301 Examination**

Visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site. Rectify discrepancy or unsuitability of substrate.
Start of work means total acceptance of conditions.
Space Enclosure: do not install materials until space is enclosed and weatherproof, and until wet-work in space is completed and nominally dry.

- 302 Preparation**
- A. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 - B. Co-ordinate with and ensure preparatory work by other trades is done prior to commencement of work; failure to do so will involve removal of dry wall partition and immediate rectification.
 - C. Arrange for provision of additional stud, nogging, trimmed openings, boxed studs, fixing grounds, etc., required for satisfactory execution of the work of this trade including penetrations through plasterboard for services. Co-operate in installation of frames, duct openings, etc.
- 303 Installation General**
- A. Comply with manufacturer's installation instructions. Anchor and fasten materials and components to comply with ratings and performance requirements, and to comply with governing local regulations. Comply with appropriate Australian Standard.
 - B. Take care of and protect surrounding work, including other finishes, equipment and components, during installation. Provide protective covering where necessary.
- 304 Installation Particulars**
- 305 Protection**
- Protect finish work. Damage made good in every respect at no additional cost to the proprietor, and without delay to job progress.
- 306 Finishing Details**
- General: apply treatment at board joints (both directions), flanges of trim accessories, penetrations, fasteners, heads, surface defects and elsewhere as required to prepare work for decoration. Pre-fill open joints and rounded or bevelled edges, using type of compound recommended by manufacturer.
- Apply fibreglass joint tape at joints between boards, where a trim accessory is indicated, or where extra strength is required.
- 307 Cleaning**
- A. Adjust and Clean: clean exposed surfaces including trim, edge moldings, and comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate damage.
 - B. Remove splatterings and droppings from work. Remove daily surplus materials and rubbish from the work area.
 - C. Leave floors broom clean at completion.
- 308 Completion**
- Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

Supply and install ceramic tile work including but not limited to:
Preparation of surfaces before tiling or bedding.
Bedding screeds where required.
Wall tile.
Floor tile.
Cleaning of finished tiled surfaces.

102 Related Work

Co-ordinate and co-operate with the following trades:
Wall construction Floor construction

103 Quality Assurance

- A. Qualifications: tiling sub-contractor to submit to project manager evidence of reliability in quality of work and performance.
- B. Samples: provide samples of tiles specified; not less than 4 units of each.
- C. Sample panel: for each tile type, floor and wall, construct a sample panel, 1 metre square. When approved by the project manager this sample becomes the standard for the balance of the work and remain as part of the completed work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS/NZS 3661.2 1994	Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.
AS 3740 2010	Waterproofing of domestic wet areas. <i>1 Amdt, 2012</i>
AS 3958	Ceramic tiles. 3958.1 2007 Guide to the installation of ceramic tiles. 3958.2 1992 Guide to the selection of a ceramic tiling system.
AS 3972 2010	General purpose and blended cements.
AS 4586-2013	Slip resistance classification of new pedestrian surface materials.
HB 197 1999	An introductory guide to the slip resistance of pedestrian surface materials.
Contact	www.ardexaustralia.com for technical advice regarding waterproofing matters and technique.

105 Submissions

Copies of minutes of pre-installation conference.
Submissions required prior to installation: product specifications for: adhesives, primers, prepared grouts, moisture resisting admixtures.

106 Delivery, Handling and Storage

Deliver to the site in original, unopened containers with grade, type and quality indicated on the labels. Provide secure and dry storage.

107 Warranty

Provide a warranty covering defects in materials and installation for a period of _____ years from the date of Practical Completion.

PART II MATERIALS

201 Screed Materials for Masonry Walls, Concrete Floors

Item	Type Required	
Cement	Portland cement, comply with AS 3972, cement type A	
Sand	Clean, washed, sharp, sieved and graded, complying with the following limits:	
Sand grade	No	% Passing sieve
	4 (4.75mm)	100
	8 (2.36mm)	95-100%
	100 (150 microns)	25% max
	200 (75 microns)	10% max
Fineness modulus	1.6 to 2.5%	
Water demand ratio by weight	0.65% maximum	

Item	Type Required
Aggregate	Passing 4.75mm sieve 80% Passing 6.00mm sieve 90% Passing 8.00mm sieve 100%
Water	Clean, drinking quality
Mesh	Galvanised steel, welded wire fabric: minimum 2.5mm diameter wires at 100mm centres each way.

202 Adhesives and Sealants

- A. Bond and seal all tiles with low or zero VOC sealants.
- B. Exterior/wet area adhesives: cement-based ceramic tile adhesive.
- C. Interior/dry area adhesives: organic based adhesive.

203 Underlay and Backing Boards

- A. Underlay over timber floors:
- B. Ceramic tile wall-backing for stud walls:
- C. Fastenings: Use fastenings supplied by material manufacturers in each case.
- D. Waterproof membrane: recommended by an approved manufacturer.

204 Tile

Supply: specified tiles are available from the following suppliers:

205 Table of Tile Finishes

Refer Schedule of Finishes and drawings.

Maker	Tile Size	Tile Colour	Texture	Special

206 Grout

Prepared grout: inorganic Portland cement integrated, ready-to-use, dry-curing grout. Colours to project manager's selection.

Supply waterproof grout for wet area tiling.

207 Expansion Joints

Silicone rubber, as recommended by manufacturer. Colour to project manager's selection.

208 Spare tiles

Deliver to the site in unopened boxes, spare specified tiles equivalent to 5% of the total area of ceramic tiles laid.

Do not deliver to the site until directed by the project manager. Place in the final storage location.

PART III EXECUTION

301 Examination

Visit site and inspect conditions, comparing conditions to drawings, before delivery of materials to site. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Rectify any discrepancy or unsuitability of substrate.

Start of work means total acceptance of conditions.

302 Conditions of Installation

- A. Install backing boards or panels in accordance with manufacturer's precise instructions.
- B. Allow cement-rendered surfaces to dry out at least 7 days, and preferably 14 days, before tiling. Longer curing times are required if recommended by adhesives' manufacturers.
- C. Rectify substrate so that when checked with a 2m straightedge, gap under the straightedge does not exceed 6mm.
- D. Allow new concrete to dry out for at least 4 weeks before rendering or direct fixing of tiles.
Wall screeds: uniform in plane and lightly combed. Floor screeds: broom finished.

303 Setting Out

- A. As far as possible, set out work so that no tile less than half size occurs. Align joints in floor tile at right angles to each other and straight with walls to conform to patterns selected. Verify locations of equipment before installing tile. Co-ordinate with plumbing and other trades. Fully tile surfaces under surface-mounted items.
- B. Expansion Joints
Set out panels of tiling so that tiles may expand or contract to and from corners of tiled walls and floors. Allow for expansion in each corner of 5mm minimum. Fill expansion joints with silicone rubber.
- C. Control Joints

1. Provide control joint
At junctions of dissimilar wall construction.
 2. In walls, no more than 2.5 apart.
 3. At junctions of wall and floor in multi-storey buildings.
- D. Form junctions of different materials (e.g. tiles to carpet) so that they occur under the centre line of doors.

304 Bedding Mixing

- A. Tile fixing mortar is to be adequately cohesive and water retentive but not richer than 1:3 nor leaner than 1:4 cement/sand by volume.
Within these limits the choice of the precise proportions is governed by the need to produce a mortar of the required properties with the minimum water content. These proportions will depend on the sand in use and is found by practical trial before tile fixing starts.
- B. Once the proportions are established, make every attempt to minimise random variations. Batch by weight wherever possible. Do not batch with shovels.
- C. The mixing of mortars by a suitable machine is to be preferred whenever it is practicable.
- D. Volume batching: base batching on multiples of a whole bag of cement (50kg, approximating 0.035m³ or 35 litres). In such cases measure by volume using correctly made gauge boxes or other suitable containers of fixed, measurable volume. This method allows water addition to be checked and thus permits approximate mix proportions to be established and maintained.
- E. Where mixing by machine is not possible, mortars may be mixed on a clean non-absorbent surface using clean hand tools. Whatever method of mixing is used, blend the materials thoroughly in the dry state before water is added. Continue mixing until the batch has a uniform consistency.
- F. No water should be added once mixing is complete. Discard mortar which is unused within 2 hours of adding the mixing water.

305 Bedding Methods

- A. Portland Cement bedding, semi-dry mix method:
1. Mix: 1 part cement to 4 parts of sand by volume, mixed dry, with only sufficient water added to make a crumbly consistency which retains its shape when squeezed in the hand. It is important to ensure complete mixing of the cement and sand.
 2. Before laying the mix, establish finished floor levels by means of dots. Spread roughly to a thickness slightly greater than that required for the actual bed.
Thoroughly compact and draw-off to the required level. Lay only sufficient bedding mix for one man to deal with satisfactorily in one operation.
 3. Pour a slurry consisting of 1 part cement to 1 part sand by volume with sufficient water to make it slightly fluid, over the bedding and spread with a trowel until it is about 3mm thick.
Place tiles, which preferably are dry, in position and firmly beaten into the bedding. Form joints of at least 2mm and regulating should be done at this time.
Wash off if necessary after the joints have set thoroughly.
 4. Minimum bedding thickness 25mm.
- B. Bedding with adhesives (walls only):
1. Apply adhesive to a thin bed or thick bed according to site conditions:
 - a. Apply thin bed adhesives when the background is true to within 3mm when tested with a 2 metre straight edge, at thickness not less than 1.5mm and not more than 3mm. Apply with a notched trowel.
 - b. Apply thick bed adhesives when deviations up to 6mm, over a 2 metre length, are present in the background, or when applying tiles having deep keys or ribs on their backs. Thick bed adhesives should be used at thicknesses not less than 3mm and not exceeding 12mm. Apply with either 10 x 10 x 10mm notched trowel, solid bed or buttering method.
 2. Application methods:
 - a. Notched trowel method: apply the adhesive to the background as a screed, then form ribs by combing it with a notched trowel of the type recommended for the particular application. Do not apply adhesive in areas larger than 1 square metre at a time.
 - b. Solid bed method: apply the adhesive to the background as a screed and bring it to a true surface, working in 1 square metre area at a time.
 - c. Buttering method: spread the adhesive evenly over the back of the tile to a thickness slightly greater than the final bed thickness required, so that when the tile is pressed or tapped firmly into position, the correct thickness is achieved and the tile is solidly bedded over its entire surface.
 3. Apply dry tiles immediately into the adhesive, before it skins.
 4. Press the first tile firmly into position and then remove it to check that complete contact is being made with the adhesive. Make occasional similar checks throughout the tiling work. The whole of the back of the tile is to be in good contact with the adhesive. Do not allow voids to occur beneath tiles.
 5. Remove surplus adhesive remaining on the face of the tile or in the tile joints, after fixing, before it skins.
 6. Form joints straight and constant in width. Under no circumstances fix tiles with tight joints.
 7. Allow tiles to set for a minimum 24 hours before grouting and protect from weather, water penetration, etc. during this period.
 8. Expansion joints: refer clause 303 B, complying with AS 3958.1. See clause below.

- C. Cement based adhesive method for extruded, quarry or terracotta floor tiles:
Secure to a prepared concrete surface with cement based adhesive 10mm thick with a 10mm notched trowel. Comply with manufacturer's current instructions

306 Installation - General

- A. Wall tiling: comply with the recommendations of AS 3958.1 and AS 3740.
- B. Floor tiling: comply with the recommendations of AS 3958.1 and AS/NZS 3661.2.
- C. Adhesives: comply with recommendations of adhesive manufacturer.
- D. Sealing: where tiles are cut around penetrations for taps and outlets, seal thoroughly with silicone rubber to prevent water entry behind tiles.
- E. Membrane: install to manufacturer's instructions, with a 100% waterproof result.

307 Tolerances and Cleaning

- A. General: install tiles in true planes so that when checked with a 2m straightedge, gap under the straightedge does not exceed 3mm. In sloped floor tiling this tolerance does not apply across intersections of fall planes. Adjust tiles within 10 minutes of fixing.
- B. Cleaning: cleaned down using a damp cloth before cement smears and surplus mortar begin to harden on the surface or in the joint spaces, care being taken to avoid disturbance of the tiles during the setting of the bedding.
- C. Lighting: whenever possible the lighting at the time of applying the bedded finish is not to be appreciably different from the ultimate permanent lighting.

308 Grouting

- A. Except as otherwise required, do not commence grouting for at least 24 hours after placing of tile. Follow specific instructions of materials manufacturer.
- B. Grout mix:
 - 1. General use, except as noted below: Apply an approved pigmented prepared grout mix, 1 part Portland cement to 1 part fine dry sand by volume mixed to a paste consistency with the minimum of water; too wet a mix may result in the joint filling cracking or drying out.
 - 2. Floors: Prepared grout, acid resistive.
 - 3. Walls: Epoxy-based mortar grout, mildew resistant.
 - 4. Colours: as selected by the project manager.
- C. Grouting and curing:
 - 1. Apply the grouting mix to as large an area as can be worked before hardening commences. Apply with a squeegee working back and forth over the area until the joints are completely filled. Remove surplus grout from the tiles with the aid of a damp, not wet, cloth and the joints then tooled. After the grouting has dried, final polish using a clean, dry cloth.
 - 2. Remove surplus grout from the floor surface; on no account use sawdust for this purpose, as there is a danger that sawdust entering moist joint surfaces may break down their strength, and cause them to become porous.
 - 3. In dry weather, grout joints after maintaining damp condition for 3 days by sponging down, fog-spraying or other methods. Allow floors to set 48 hours before permitting ordinary foot traffic.

309 Protection

Prevent walking on or contact with floor or wall tiles for a minimum of 7 days. During that period, cover floor tiles.

310 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete system of suspended ceilings including but not limited to:

Plasterglass ceilings.
 Plasterboard ceilings.
 Acoustic tile ceilings.
 Bulkheads.
 Ceiling access panels.
 Insulating material.
 Mineral fibre fire resistant duct spray.
 Fire-rated ceilings.

102 Related Work

Co-ordinate and co-operate with the following trades:

Roof framing	Structural steel
Concrete	Mechanical services
Masonry	Plasterboard

103 Quality Assurance**A. Prototype**

At a location and time to be selected by the project manager construct a complete prototypical ceiling installation in one bay from one column to another of each ceiling type. Include elements provided under this trade section and finish in every respect. When approved by the project manager, the prototype becomes the standard for the remaining work, and will remain as part of the work.

B. Acoustical ceilings installer

Sub-contractor is to have not less than 3 years of successful experience in installation of ceilings similar to requirements for this project and who is acceptable to manufacturer of each ceiling type.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 2785 2000	Suspended ceilings - Design and installation.
AS 2946 1991	Suspended ceilings, recessed luminaires and air diffusers - Interface requirements for physical compatibility.
AS/NZS 4600 2005	Cold-formed steel structures. <i>Plus 1 Amdt, 2010.</i>

105 Samples

A. Acoustical ceiling tile: provide samples of tile, as selected by project manager to be supplied; not less than 2 units of each.

B. Provide one sample of each of the following elements:

1. Rounded cornice
2. Cornice internal angle
3. Cornice external angle

C. Suspension systems: provide sample of each component of suspension and acoustic suspension system, including both standard shapes and accessories.

106 Delivery, Handling and Storage

Deliver manufactured materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand.

Protect materials from dampness. Store off the ground or slab, under cover and away from wet walls and other damp conditions, in secure storage.

107 Warranty

Provide warranty covering the work against defective materials and workmanship for a period of years from the date of Practical Completion.

Include a statement that the whole of the work has been carried out in accordance with relevant Australian Standards and manufacturer's instructions in effect at the time of installation.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

- A.** Suspension system
 (one way exposed)
 (two way exposed)
- B.** Plasterboard 10mm, 13mm

- C. Plasterglass
- D. Acoustic tile
- Tile size:
- E. Ceiling access panels
- F. Cornice
- G. Beads, straps, etc.
- H. Casing beads, stop-ends, etc.
- I. Other items:

203 Accessories

Supply and install necessary accessories as indicated by component manufacturer for satisfactory and complete installation.

204 Equipment

Supply equipment, forms, scaffolding, ladders, frames, etc. necessary for the satisfactory installation of specified items.

PART III EXECUTION

301 Examination

Acceptance: visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site. Rectify unsuitable situation.

Start of work means total acceptance of conditions. Comply with referenced Standards and manufacturer's recommendations regarding environmental conditions.

302 Preparation

Space enclosure: do not install interior acoustical ceilings until space is enclosed, is weatherproof until wet-work in space is completed and nominally dry until work above ceilings completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy. Protect wood, metal, glass, flooring and other finished work during progress. Damage is to be made good in every respect at no additional cost to the proprietor.

Prepare areas and surfaces against which installation will be constructed. Ensure work by other trades is completed before erecting suspension system.

Powder driven fasteners are not approved for use.

303 Installation

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Comply throughout with applicable portions of AS/NZS 2785, or AS 2946, and with the data sheets supplied by material manufacturer.

304 Field Quality Control

When requested by project manager, arrange for manufacturer's representative to visit site and check installation.

305 Adjustment

Adjust installation to permit installation of such items as light fittings, mechanical vent registers and the like.

306 Protection

Protect completed installation from possible damage until issue of Practical Completion certificate.

307 Cleaning

Clean surfaces exposed to view. Replace sections or components which cannot be cleaned. Make good damaged sections or panels affected by later work of other trades.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete wood parquet floor installation including but not limited to:
 Surface preparation of base.
 Hardboard underlay
 Laying parquet flooring
 Sanding and sealing of complete floor

102 Related Work

Co-ordinate and co-operate with the following trades:
 Concrete
 Floor construction

103 Quality Assurance

Tradesmen engaged for this work are required to be widely experienced in the class of work specified.
 Arrange with the project manager to lay and complete as a sample of the required parquet in a chosen location, an area of three square metres of parquet complete in all respects.
 When approved by the project manager, the sample becomes the control standard for the remaining work and remain part of the completed work.
 Pre-installation conference: attend a pre-installation conference with builder and project manager to arrange for entirely satisfactory conditions to be achieved before installation.

104 References

Comply with applicable portion of the following Australian Standards:
 AS 2796.1 1999 Timber - Hardwood - Sawn and milled products - Product specification.
 AS/NZS 3661.2 1994 Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.
 AS 4586-2013 Slip resistance classification of new pedestrian surface materials.
 HB 197 1999 An introductory guide to the slip resistance of pedestrian surface materials.

105 Submissions

Submit prior to ordering materials:
 A. Samples and product data of specified materials.
 B. Test reports of similar installations.
 C. Manufacturer's instructions.
 D. Moisture level content of slab

106 Delivery, Handling and Storage

Deliver materials in manufacturer's containers and packaging.
 Store in a secure location, preferably in the space where material will be installed.
 Handle in a manner which prevents damage, deterioration or loss.

107 Project Site Conditions

Lighting level during installation is to match completed light level.
 Ensure that wet work is complete and that no liquids can affect the area in which parquet is to be laid.
 Moisture content of sub-floor is not to exceed 5.5% moisture content.
 In air conditioned buildings, ensure that equipment and blocks for parquet are exposed to full and efficient operation of the air conditioning for minimum of two weeks before installation of parquet. If not possible, consult supplier of parquet. Parquet is to achieve equilibrium moisture content (E.M.C) appropriate to the location prior to sanding and sealing (check with Floor Laying & Finishing Assoc.)
 Adhesive should not be used as a levelling compound. Avoid excessive radiant heat from sunlight through windows.

108 Warranty

Provide to the proprietor, a warranty covering defective materials and installation for year(s) from date of Practical Completion.

109 Maintenance

Supply a maintenance manual to the builder (2 copies) at completion of the work.
 The manual is to include types and frequency of maintenance, specifying materials to be applied and tools and equipment to be used.

PART II MATERIALS**201 Acceptable Suppliers**

The following are acceptable suppliers and installers of parquet and associated materials:

- 202 Materials**
 Brush box, tallowwood, Johnstone River hardwood, Tasmanian oak, cypress pine, tulip oak, spotted gum, blue gum, iron bark, turpentine, jarrah, other.
 Adhesives:
 As recommended by the supplier and installer of the parquetry.
 Underlay:
 As recommended by the supplier and installer of the parquetry.
- 203 Pattern**
 The pattern of parquetry required is
- 204 Surfacing Material**
 Sealer, spirit-based wax or polyurethane.
- 205 Ordering Materials**
 Timber for block parquetry is required to be ordered as soon as the head contract is signed and the parquetry subcontractor is selected, to allow sufficient time for preparation and drying of the timber.

PART III EXECUTION

- 301 Examination**
 Visit the site and inspect the conditions thoroughly. Note actions required following pre-installation conference. When satisfactory, advise builder in writing that sub-floor is acceptable.
 Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 Start of work means total acceptance of conditions.
- 302 Preparation**
 Arrange with builder for all required rectification. On completion of the work, make all tests required including those of the standards. Refer clause 104.
 Concrete floors are to be finished with steel trowel.
 Comply with referenced standards.
 Ensure that no liquids are used in preparation of the surface.
 Moisture content of the sub-base is not to exceed 5.5% at time of laying parquetry.
 Make random tests to ensure this limit is not exceeded.
 Record all tests.
 Ensure that no wax, curing compound, admixtures, additives, oil, grease or any deleterious matter is present on the floor.
 Ensure that the space where parquetry is to be laid is secure: windows are glazed and sealed, doors are hung and lockable, wet trades are finished and lighting matches finished light level.
 Ensure that power is available.
- 303 Installation**
 Comply with documentation regarding material and pattern of parquetry.
 Comply with specific provisions of AS 1262. Refer any options to project manager for decision in advance of laying.
 Provide for expansion joints at perimeter of areas of parquetry. Where required, fill expansion gap at perimeter with cork after neatly cutting the perimeter of the parquetry.
 Apply the adhesive in manageable areas, install parquetry to approved pattern.
 Clean the floor thoroughly.
- 304 Sanding**
 Allow a few days after completing the installation before sanding.
 Sand first with 40 grit paper.
 Second time with 60 grit paper.
 Third time with 100 grit paper.
 Fourth time with 120 grit paper.
 Sand confined areas with an electric sanding edger.
 Ensure that all scratches, blemishes and undulations have been removed.
- 305 Finishing**
 Remove all dust thoroughly and apply either:
 Three coats of polyurethane finish to manufacturer's instructions.
 OR
 Oil seal finish to oil manufacturer's instructions.
 OR
 Spirit-based wax to manufacturer's instructions.
- 306 Protection**
 Protect installation of parquetry until completion of the project.

Where necessary, lay hardboard panels in traffic areas.
Remove on completion.

307 Cleaning

At completion of work, keep and maintain finished surfaces clean and free from dust, dirt and other foreign matter.

308 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install floating floors including but not limited to:
 Timber surface tongue and grooved panels:
 of sandwich construction
 of plywood construction
 of solid timber construction
 Laminate top surface
 Cork top surface
 Foam base

102 Related Work

Co-ordinate and co-operate with the following trades:
 Concrete floor construction
 Timber floor construction
 Joinery, site built

103 Quality Assurance

- A. Perform work with experienced tradesmen familiar with the quality of work required and who are approved in writing by the manufacturer.
- B. Arrange for conference with relevant trades to establish and settle matters which may affect installation.
- C. At a location and time to be selected by the project manager, construct a complete prototypical installation, approximately 3 square metres.
- D. Include elements required by this specification and finish in every respect. On approval by the project manager, the prototype will become the standard for the remaining work and remain as part of the work.

104 References

AS/NZS 3661.2 1994 Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.
 [AS 4586-2013 Slip resistance classification of new pedestrian surface materials.
 HB 197 1999 An introductory guide to the slip resistance of pedestrian surface materials.
 Obtain most recent written installation instructions provided by the manufacturer.

105 Submissions

Submit for approval by the project manager each component required for installation. When approval is provided, order materials.

106 Delivery, Handling and Storage

Deliver materials when floor surfaces have been prepared. Deliver in the original packages. Do not store on site. Install directly in place.

107 Warranty

On completion of the work, provide a warranty to the proprietor stating that the installation is without defects and deterioration, including delamination for the period of years from the date of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

- A. Timber surface panels:
 1. Sandwich construction
 2. Solid timber construction
- B. Laminate surface panels:
- C. Cork top surface:
- D. Underlay:

203 Finish**PART III EXECUTION****301 Examination**

Visit site and inspect conditions in each area to have new floors laid.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Preparation

- A. Ensure that areas to receive floor panels:
- B. Are secure against penetration by water.
- C. Concrete, if it is the base floor material, has a moisture content not exceeding 6%.
- D. Are level with no more than 3mm variation in 3 metres.
- E. Have holes or depressions filled with stable material which dries completely.

303 Laying Pattern

Comply with project manager's instructions regarding laying pattern.

304 Laying Floor

Comply throughout with manufacturer's written instructions.

Lay underlay and panel to achieve required result.

Take care with materials. Do not damage surface during installation. Protect laid floor panels from damage by other trades.

305 Finish

Where no finish is applied before delivery, apply finish on site in accordance with manufacturer's instructions.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, prepare, install and finish complete wood strip flooring including but not limited to:
 Preparation of framing before laying flooring.
 Seasoning of flooring materials within the building before laying.
 Installation
 Sanding
 Application of finish

102 Related Work

Co-ordinate and co-operate with the following trades:
 Carpentry
 Wall construction

103 Quality Assurance

Tradesmen engaged for this work are required to be widely experienced in the class of work specified.
 Arrange with the project manager to lay and complete a sample of the required strip flooring in a chosen location, one room.
 When approved by the project manager, the sample becomes the control standard for the remaining work and will remain part of the completed work.
 Pre-installation conference: attend a pre-installation conference with Builder and project manager to arrange for entirely satisfactory conditions to be achieved before installation.

104 References

National Timber Development Association supplies a manual: "Timber Strip Floors, Fixing and Finishing" which can be downloaded from www.timber.net.au.
 Comply with applicable portions of the following Australian Standards:
 AS 1810 1995 Timber - Seasoned cypress pine - Milled products.
 AS 2796 Timber – Hardwood - Sawn and milled products.
 2796.1 1999 Product specification.
 2796.2 2006 Grade description.
 There is 1 other part, 1999.
 AS/NZS 3661.2 1994 Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.
 AS 4586-2013 Slip resistance classification of new pedestrian surface materials
 HB 197 1999 An introductory guide to the slip resistance of pedestrian surface materials.
 Selected supplier to supply full details of materials and method of installation at time of tendering for the work.

105 Submissions

Submit prior to ordering materials:
 Samples and product data of specified materials.
 Maintenance instructions for use by the owner

106 Delivery, Handling and Storage

Deliver materials in manufacturer's containers and packaging. Repair damaged packaging. Do not open packaging until the building is roofed, windows and doors are installed, wet trades complete and water below flooring is prevented.
 Store in a secure location, preferably in the space where material will be installed.
 Handle in a manner which prevents damage, deterioration or loss.

107 Project Site Conditions

- A. Test moisture content of concrete below the timber floor framing. Do not lay strip flooring until moisture content is 5.5% or less. Where conditions are damp, lay an impervious plastic membrane on the moist surfaces.
- B. Place a 3 metre straight edge on and across the top of floor joists.
Plane proud joist and pack low ones.
- C. Allow the timber to acclimatise to the conditions in the building for 3 days before fixing, by laying out the boards in each room or area.
In air-conditioned buildings, fully acclimatise the boards to those conditions or have them dried to the appropriate moisture content before delivery.

PART II MATERIALS**201 Suppliers****202 Materials**

- A. Timber Floor boards, Hardwood (or softwood)

Boards: 19 or 20mm thick, tongue and groove, maximum cover 85mm for secret nailing.

Nails: Hand or machine driven. Refer to Technical Bulletin.

- B. Check moisture content of timber; coastal areas maximum 13% moisture, dry areas and air conditioned spaces 9%.
- C. Jointing: End matched or finger jointed

203 Finishing Coats

- A. Moisture curing polyurethane, matt, satin or high gloss.
- B. Water-based polyurethane
- C. Modified oil coating
- D. Oil

204 Ordering Materials

Timber is required to be ordered as soon as the head contract is signed to allow sufficient time for preparation and drying of the timber.

PART III EXECUTION

301 Examination

Visit the site and inspect the conditions thoroughly. Note actions required following pre-installation conference. When satisfactory, advise project manager in writing that sub-floor is acceptable.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Preparation

- A. Prepare joists in accordance with clause 107B above.
- B. Provide an expansion gap 10mm wide between strip flooring and walls or steps. Where floor width exceeds 6 metres, provide 10mm gap at doorways or equally space across the 6 metre width.

Deliver material when building is at lock-up stage. Open packages and spread across battens or joists for 7 days before fixing. Check moisture content of timber. In coastal areas do not use boards with a reading exceeding 13%. In dry areas and air-conditioned spaces no greater than 9%.

Ensure concrete base is thoroughly clean before installing boards.

303 Laying Strip Floor Boards

Lay each board so that it is supported by at least 3 joists. Ensure end joints are tightly closed and distributed evenly throughout the floor. Maintain minimum 450mm between butt joints in adjacent rows and joints of end matched board.

Cramp boards and secure with secret nailing.

Apply polyurethane adhesive to the top of joists on battens before nailing boards less than 80 mm wide.

Face nailed Flooring:

Provide expansion gaps of 10-15mm around the edges of each floor area. Place straight waste wood before each board to be cramped. Nail at minimum 20mm from edge of the board. Two nails for wide boards. Pre-drill nail holes in dense boards. Nails to be no less than 2.5 times the thickness of the board. Punch nails a minimum of 3mm below the surface.

Form junctions of different materials (e.g. tiles to carpet) so that they occur under the centre line of doors.

304 Cramping For Top Nailed Boards

Cramp a maximum of 6 boards together before driving two galvanised nails with heads 3mm below board surface.

305 Secret Nailing

Apply polyurethane adhesive to top of joists before nailing.

Cramp boards singly and nail on an angle through the tongue of each board.

306 Sanding

Allow a few days after completing the installation before sanding.

Sand first with 40 grit paper.

Second time with 100 grit paper.

Sand confined areas with an electric sanding edger.

Ensure that all scratches, blemishes and undulations have been removed.

307 Finishing

Remove all dust thoroughly and apply the specified material (see clause 203) in accordance with manufacturer's instructions.

308 Protection

Protect installation until completion of the project.

Where necessary, lay hardboard panels in traffic areas.

Remove on completion.

309 Cleaning

At completion of work, keep and maintain finished surfaces clean and free from dust, dirt and other foreign matter.

310 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

- 101 Scope**
Supply and install resilient floor surfacing material with necessary accessories and related equipment required for the work including but not limited to:
Vinyl tile
Linoleum sheet
Vinyl sheet
Cork tile
Vinyl skirting
Rubber sheet or tile
- 102 Related Work**
Co-ordinate and co-operate with the following trades:
Concrete Internal wall construction
- 103 Quality Assurance**
Suppliers and installers need to be widely experienced in the class of work required for the work of this section. At a place selected by the project manager, construct a prototype of a completed installation of vinyl floor and skirtings, 3 square metres in area. On completion of the prototype and approval by the project manager of aspects of the installation, the work remains in place and becomes the standard for the remaining work.
- 104 References**
Comply with applicable portions of the following Australian Standards:
AS 1884 2012 Floor coverings - Resilient sheet and tiles - Laying and maintenance practices.
AS/NZS 3661.2 1994 Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.
AS 4586-2013 Slip resistance classification of new pedestrian surface materials
HB 197 1999 An introductory guide to the slip resistance of pedestrian surface materials.
Comply also with instructions of manufacturers of materials to be installed.
- 105 Submissions**
Provide samples and data sheets of materials.
Obtain project manager's approval for each item before ordering.
- 106 Delivery, Handling and Storage**
Deliver materials in the packaging of the supplier, bearing the brand name, colour, thickness and other relevant data.
Store materials in a secure dry area away from other materials which may cause deterioration.
- 107 Warranty**
Provide a warranty covering aspects of the installation performed by this trade, against defective materials and workmanship for a period of years from the date of Practical Completion. The warranty includes a statement that the whole of the work has been carried out in accordance with AS 1884 and the instructions of the manufacturers of components in effect at the time of installation.

PART II MATERIALS

- 201 Materials**
Vinyl sheet:
Adhesive: refer AS 1884.
Vinyl tile:
Skirting:
Fibre cement underlay:
Stair treads:
Stair nosing:
- 202 Equipment**
Supply equipment required for the preparation of floor, and installation of vinyl materials as recommended by the material manufacturer.

PART III EXECUTION

- 301 Examination**
Examine the site conditions applicable to each installation and comply with AS 1884.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Preparation

Prepare each area to be surfaced in accordance with AS 1884. Test the dryness of concrete sub-floor in accordance with AS 1884.

303 Installation

- A. Delay installation of sheet until concrete has dried to the percentage established in Appendix A of AS 1884.
- B. Adhesives: comply with AS 1884, and manufacturer's instructions.
- C. Install material in accordance with AS 1884, including conditioning of both the materials and the sub-floor.
 - 1. Weld joints of vinyl sheet.
- D. Skirting, to manufacturer's instructions.
- E. Form junctions of different materials (e.g. tiles to carpet) so that they occur under the centre line of doors.

304 Cleaning

Remove excess adhesive and blemishes from the completed surfaces of flooring and skirtings.

305 Protection

Apply suitable hardboard or plywood to completed floors and maintain in position until final cleaning prior to Practical Completion.
Remove and replace work which cannot be successfully repaired or cleaned.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply labour, materials and equipment required for supply, delivery, storage, installation and testing for the complete carpet installation.

102 Related Work

Co-ordinate and co-operate with the following trades:

Installation of floors Joinery

Preparation of surfaces under and adjacent to floors to receive carpet

103 Quality Assurance

The whole of the work is to be performed by thoroughly experienced and skilled tradesmen familiar with projects of this nature, under the direction of a similarly experienced foreman.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1385 2007 Textile floor coverings - Metric units and commercial tolerances for measurement.

AS/NZS 2270 2006 Plywood and blockboard for interior use. *Plus 1 Amdt 2007.*

AS/NZS 2455 Textile floor coverings - Installation practice.

2455.1 2007 General. *Plus 1 Amdt 2009.*

This Standard provides full instructions of pre-installation requirements and installation methods.

2455.2 2007 Carpet tiles.

AS 4288 2003 Soft underlays for textile floor coverings.

Maintain a copy of AS/NZS 2455.1 2007 General, at the project site until completion.

105 Submissions

Submit the following data and obtain approval from the project manager, before ordering materials:

- A. List of recent major projects with contact names and telephone numbers.
- B. Samples of carpet types and underfelt, 900 x 900 samples of each.
- C. Base the tender price on 3660mm carpet.
- D. Confirmation of acceptance of compliance with the requirements of the builder in relation to the time schedule for supply and laying.
- E. Schedule of laying rates per lineal metre.
This schedule is binding upon the contractor and forms the basis on which additions, omissions and varied works may be carried out.
These rates include supply and installation of underlay and accessories, making and laying and allowances for profit, overhead and administration costs.
- F. Static properties: provide test certificates from a recognised authority with the tender to confirm a reading of 2.5 kilovolts or less, when tested at 23°C and 25% relative humidity.
- G. Certification by manufacturer that materials comply with this specification.

106 Delivery, Handling and Storage

Deliver manufactured materials in the original packages, containers, or bundles bearing the name of the manufacturer.

Protect materials from dampness. Store off the ground or slab, under cover and away from wet walls and other damp conditions, in an approved secure location in the building.

107 Warranty

Provide a written warranty stating that materials supplied and installed under this contract will remain in good condition, secure against faulty workmanship and/or defective materials for a period of years from date of Practical Completion.

PART II MATERIALS**201 Manufacturers**

The following manufacturers are acceptable for this project:

202 Material

- A. Underlay:
Comply with AS/NZS 2455.1.
- B. Carpet fixings:
Comply with AS/NZS 2455.1, and is to be gripper type of an architectural standard.
Allow for installation of fixings at perimeters and around columns etc. not otherwise specified.
- C. Metal finishing bar:

Heavy duty hammer finish aluminium bar.

Allow for finishing bars to be provided at doorways and junctions with other materials, or fix carpet edge against raised vertical brass strip.

D. Carpet:

Carpet qualities similar to those specified may be submitted and if deemed by the project manager to be equivalent, may be considered:

Carpet Type A

Carpet Type:

Carpet Width:

Gauge:

Pile Height:

Carpet Type B

Carpet Type:

Carpet Width:

Gauge:

Pile Height:

Tolerances: AS/NZS 1385.

E. E Adhesives:

1. Direct stick and dual fix.

203 Testing Carpet

- A. The project manager will select the carpet testing authority and supervise the selection of samples for testing. The contractor is required to pay for carpet testing.
- B. Special runs of carpet
Before manufacture of carpet, arrange for testing of materials at fibre blending stage and the various tests to completion of manufactured carpet.
Submit test results immediately to the project manager.
- C. Stock carpet
Make available to the project manager for testing, samples in quantities suitable for applicable tests and colour confirmation.

204 Carpet Colour Sample

Before commencing the production run of the carpet, supply 3 x 200 x 200mm samples of the selected colour(s) of carpet. Obtain project manager's written approval before manufacture.

205 Laying Diagrams

Prepare laying diagrams showing locations and directions of seams and cross joints. Submit to obtain approval from the project manager before making up carpet.

206 Inspection Before Making

Inspect carpet before starting make up or laying carpet to ensure that:

- A. The width is within the specified tolerances.
 - B. Colour variations are within the specified tolerances.
 - C. The carpet is free from colour streaks, oil or grease spots, etc.
 - D. The carpet generally conforms to the specification by written substantiation of tests.
- Reject carpet not conforming to the required standards.

307 Spare Carpet

Provide spare carpet of each type laid.

Deliver to the site wrapped with secure protection.

Do not deliver to the site until directed by the project manager. Place in its final storage location.

PART III EXECUTION

301 Examination

Acceptance: visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site. Notify project manager of discrepancy or unsuitability of substrate. Comply with appropriate clauses of AS/NZS 2455.1.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Preparation

Comply with referenced Standards and manufacturer's recommendations regarding environmental conditions. Comply with AS/NZS 2455.1. Comply with Appendix B to ensure moisture content of concrete does not exceed the stated limit.

Space enclosure: do not install material until space is enclosed and weather-proof, until wet-work in space is completed and nominally dry, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

Repair by approved means imperfection of the floor surface which might impair the finished carpeted surfaces.

Broom clean or vacuum clean surfaces upon which carpet is to be laid.
On completion of cleaning, obtain project manager's approval of surface and follow such standard as he may determine for preparation throughout the project.

303 Carpet Fixings

Secure to the sub-floor in accordance with the manufacturer's instructions, and the recommendations of the Standard.

Form junctions of different materials (e.g. tiles to carpet) so that they occur under the centre line of doors.

304 Laying Underlay

Comply with AS/NZS 2455.1

Cover the whole area to be carpeted.

305 Stretching Carpet

Tightly stretch carpet between fixings, using power stretchers where necessary. Maintain seams in straight lines.

Comply with AS/NZS 2455.1.

306 Carpet Seams

Comply with AS/NZS 2455.1.

307 Demountable Partitions

Partitions which are shown having:

- A. Carpet on one side and another floor finish on the other side will be erected before the carpet is laid.
- B. Carpet on both sides, will be erected after the carpet is laid.

308 Carpets for Lifts

Supply a total of 2 removable carpets for each of the lift cars shown on drawings.

Build up the carpets on a flexible backing to which a layer of "Air-Step" and carpet are laminated with edges reinforced by binding and edging.

The lift carpets are to be fire-proofed in accordance with the requirements of the controlling authorities. Provide certificates of fire-proofing.

309 Installation on Stairs

Comply with AS/NZS 2455.1.

310 Cleaning and Protection

Comply with AS/NZS 2455.1.

On completion of laying each section of carpet, remove dirt, threads, scraps of left-over carpet, etc., and vacuum the surface clean and free from dust, etc.

After inspection by the project manager, cover the carpet in each section with an approved protective covering. Maintain the cover in good order and condition, remove the same and finally clean the carpet at Practical Completion.

311 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply labour, materials and equipment required for supply, delivery, storage, installation and testing for the complete Modular Carpet installation.

102 Related Work

Co-ordinate and co-operate with:

Installers of floors

Joinery

Preparation of surfaces under and adjacent to floors to receive carpet.

103 Quality Assurance

A thoroughly experienced and skilled tradesmen familiar with projects of this nature, under the direction of a similarly experienced foreman, is required.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1385 2007 Textile floor coverings - Metric units and commercial tolerances for measurement.

AS/NZS 2270 2006 Plywood and blockboard for interior use. *Plus 1 Amdt, 2007.*

AS/NZS 2455 Textile floor covering - Installation practice

2455.1 2007 General. *Plus 1 Amdt, 2009.*

This Standard provides full instructions of pre-installation requirements and installation methods.

2455.2 2007 Carpet tiles.

Maintain a copy of AS/NZS 2455.1 2007 General, at the project site until completion.

105 Submissions

Submit the following data and obtain approval from the project manager before ordering materials:

- A. List of recent projects with contact names and telephone numbers.
- B. Full size sample module of each carpet type.
- C. Confirmation of acceptance and compliance with the requirements of the builder in relation to the time schedule for supply and laying.
- D. Schedule of laying rates per square metre.
These rates include supply and installation of adhesive (if required) and accessories, cutting (where required) and allowances for profit, overheads and administration costs.
- E. Properties: provide test certificates from recognised authorities with the tender to confirm that the modular carpet complies with the properties set down in clause 204.
- F. Certification by the manufacturer that the materials comply with this specification.

106 Delivery, Handling and Storage

Deliver manufactured materials in the original packages, containers, or bundles bearing the name of the manufacturer.

Protect materials from dampness. Store off the ground or slab, under cover away from wet walls and other damp conditions in an approved location in the building.

107 Carpet Module Manufacturer's Guarantees

Provide a written confirmation from the manufacturer or his accredited representative that the carpet modules have been properly installed and that subject to the carpet modules being properly maintained indoors in a commercial installation, the carpet modules to the affected area/s will be replaced by the manufacturer at his expense if any of the following occur:

- A. Surface pile in area wears more than ten percent (10%) within 10 years of installation.
On stains the period of this guarantee is 5 years.
- B. Horizontal dimensions of the modules vary from the specified dimensions by more than .2 percent (0.2%) within ten years of installation as measured by the Aachen Test undertaken by an independent test authority.
- C. The modular carpet installation will not disrupt electronic office equipment (which is otherwise operating properly) to cause malfunction by induced static charges.
- D. The modular carpet installation, in a commercial installation, is guaranteed to control static shock below 3.5 kilovolts when the relative humidity is no less than 20% and the room test is 70°F. (AATCC Test 134-1975).

108 Modular Carpet Installation Contractor's Warranty

Provide a written warranty stating that materials supplied and installed under this contract will remain in good condition, secure against faulty workmanship and/or defective materials for a period of ... years from the date of Practical Completion.

PART II MATERIALS

201 Acceptable Manufacturers

202 Accessories

Provide extruded aluminium edge trims
Plain clear anodised aluminium (silver), (gold), (bronze)
Flexible p.v.c. edge trims (gold), (black)
Provide black, flexible p.v.c. stair nosing or equivalent
Provide extruded plain aluminium stair nosing or equivalent filled with a black p.v.c. insert
Provide stair tread nosing or equivalent filled with back slip resistant infill bars

203 Carpet

Modular carpet similar to those specified may be submitted and if deemed by the project manager to be equivalent, may be considered
Modular carpet type A
Manufacturer:
Type of carpet:
Module size:
Modular carpet type B:
Manufacturer:
Type of carpet:
Module size:
Tolerances: AS 1385

204 Properties

Comply with the following minimum properties:

Generic type
Face fibre
Yarn count/ply
Yarn preparation
Ends
Tufts
Tuft density
Type tuft
Density factor
Tile height
Yarn weight
Primary backing
Secondary backing
Structure
Total weight
Total thickness
Tile size
Tile per box
Dimensional stability
Pile thickness
Performance Specifications:

Name	Number	Results
Electrostatic propensity	AATCC-134	
IBM ohm resistance		
Dimensional stability	AACHEN	
Colour fastness	AATCC-8	
Flame Resistance		
	1. smoke developed index-max	
	2. spread of flame index-max	

205 Non-slip Materials

Water based substance recommended by its manufacturer as suitable for use as a pressure sensitive non-slip compound.
100mm wide double sided tape with a releasable pressure sensitive coating recommended by its manufacturer as suitable for the purpose of preventing the slippage of the modular floor tiles.

206 Testing Carpet

A. Before ordering the carpet, provide four no. tiles of the specified modular carpet for testing by the Australian Wool Testing Authority.
B. During the production run of the carpet supply an additional four no. modular tiles for testing as specified in "A" above.

Carry out tests at each of the above stages to confirm specified static properties.
Allow for and pay for the costs of tests.

- 207 Carpet Colour Sample**
Before commencing the production of the carpet, supply three (3) tiles of the selected modular carpet to the project manager for written approval of colour and pattern.
- 208 Identification**
Mark modular carpet tiles on the back to identify the manufacturer and the type of modular carpet.
- 209 Carpet Pattern Design Drawings**
Lay the modular carpet to patterns, colours and designs shown on the project manager's drawings.
- 210 Laying Diagrams**
Prepare laying diagrams showing locations and directions of joints, types, patterns and colours of the modular carpet.
- 211 Inspection Before Laying**
Inspect modular carpet tiles before laying to ensure that:
A. The tiles are of types, patterns and colours specified.
B. Colour variations are within the specified tolerances.
C. The tiles are free from colour streaks, oil or grease spots, etc.
D. The carpet generally conforms to the Specification.
Reject modular carpet tiles not conforming to the required standards.
- 212 Spare Carpet Modules**
Deliver to the site in unopened boxes spare modular carpet tiles equivalent to 5% of the total area of carpet laid.
Do not deliver to the site until directed by the project manager. Place in the final storage location.

PART III EXECUTION

- 301 Examination**
Visit the site and inspect conditions comparing conditions to drawings before delivery of materials to the site.
Notify the project manager of discrepancy or unsuitability of the substrate.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.
- 302 Preparation**
Comply with referenced standards and manufacturer's recommendations regarding environmental and other on-site conditions.
Repair by approved means imperfections of the floor surface which might impair the finished carpeted surfaces.
Broom clean or vacuum clean surfaces upon which carpet is to be laid.
On completion of cleaning, obtain project manager's approval of surface and follow such standard as he may determine for preparation throughout the project.
- 303 Space Enclosure**
Do not install material until space is enclosed and weather-proof and until wet-work in space is completed and nominally dry, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.
- 304 Nap-lok Bars**
Fix Nap-lok bars with each length fixed to the sub-floor using fastenings recommended by the manufacturer of the Nap-lok bars as suitable for the respective sub-floors.
Comply with the requirements of AS/NZS 2455.1.
Fix Nap-lok bars with each length fixed to the concrete sub-floor using Sebco "Screins" set in neatly drilled holes in the concrete and spaced at each end at 225mm centres between the end fixings.
Comply with the requirements of AS/NZS 2455.1.
- 305 Setting Out**
Before laying modular carpet tiles, accurately establish two starting chalk lines towards the centre of the room or area and at precisely 90° to each other.
Commencing only at the cross-over point of the chalk lines, complete one row of modules on each side of the centre line.
From this point proceed in accordance with the manufacturer's printed instructions.
- 306 Pressure "Sensitive" Non-slip Compounds**
Prevent modular carpet tiles for slippage in service by:

Pressure sensitive water based pressure sensitive non-slip compound, applied by paint roller at the rate of 10-15 sq. metres per litre depending on the absorption rate of the sub-floor and in strict accordance with the non-slip compound manufacturer's printed recommendations.

Pressure sensitive compound provided in a 350 gram pressure pack container, applied at the rate of 50-70 modules per container either to the whole of the sub-floor or the whole of the back of the modular carpet tiles in strict accordance with the non-slip compound manufacturer's printed recommendations.

Properly ventilate the area of use.

100mm wide double-sided tape with a releasable pressure sensitive coating laid along the centre line of modular carpet tiles in both directions.

307 Laying – General

Lay strictly in accordance with the manufacturer's printed directions.

Cut tiles from the back using a sharp knife and a cutting board.

Open boxes on site 24 hours before laying and mix up tiles of similar pattern and colour from different boxes.

Lay tiles hard up against each other and maintain tension on the tiles during laying by kneeling on the tiles as they are installed.

Use a knee kicker to ensure that tiles are laid hard up against each other.

Carefully scribe up to walls, columns, partitions and other fixed obstructions using techniques recommended by the manufacturer.

308 Partitions

Partitions will be erected prior to the laying of the modular carpet.

309 Stairs

Lay carpet tiles to treads with pile running into the step. Cut to tight fit between nosing trims and risers.

Lay modular carpet tiles to risers with pile running downwards glued only along the top edge, fitted neatly between the nosing trim and the tread and laid prior to laying the modular carpet tiles to the tread below.

Provide tread nosing (specified earlier) to the nosings of treads and landings fixed down to the stair treads before laying the modular carpet tiles to the stair and in accordance with the manufacturer's printed instructions.

310 Access Floors

Lay modular carpet tiles over access floors generally as for other floors.

Stagger joints between tiles with respect to the joints between the floor panels to prevent the flow of air from air conditioning systems causing dust to pass through the joints.

Fix down modular carpet tiles to the floor panels as specified for the other floors.

311 Carpets For Lift Cars

Modular carpet tiles for lift cars are to be fire-proofed in accordance with the requirements of the controlling authorities.

Provide certificates of fire proofing.

Permanently mark the fire-proofed carpet tiles on the back to denote that they have been fire-proofed.

Supply sufficient additional fire-proofed modular carpet tiles to provide two sets for each lift with each set cut to size where required to fit the lift floor and each tile clearly marked on the back to denote the lift car to which it belongs and its position on the car floor.

Provide two copies of floor plans of each lift and indicated on the plans the location of each modular tile utilising the identification markings on the back of the tile.

312 Cleaning And Protection

On completion of laying each section of carpet, remove dirt, scraps of left-over carpet, etc., and vacuum the surface clean and free from dust, etc.

After inspection by the project manager, cover the carpet in each section with continuous layer of 0.152mm thick clean polythene film with joints lapped 150mm minimum and continuously sealed with self-adhesive tape. Batten and nail perimeters to the floor.

Maintain the cover in good order and condition and remove the same and finally clean the carpet at Practical Completion.

314 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

SECTION 09720 WALLCOVERING (PAPER, FABRIC ETC)

PART I GENERAL

101 Scope

Supply labour and materials, services and equipment necessary for the preparation, application and finishing of wall covering as indicated on drawings, schedules and as specified herein, to internal surfaces of building. Refer to Schedule of Finishes.

102 Related Work

Co-ordinate and co-operate with the following trades:

Plasterboard

Hard plaster

Painting

Other substrates to be wallpapered

103 Quality Assurance

The installer is to be widely experienced in the class of work required for the work of this section.

At a place selected by the project manager, prepare a test sample for all types. Test samples include the suitable preparation of substrates. After approval, the test samples remain in place and become the standard of the remaining work of the same type.

104 References

In the absence of Australian Standards, comply with applicable written recommendations of the manufacturer.

105 Submissions

Submit the following materials:

Product literature on proposed systems.

Samples of approved materials which are to be identified with the manufacturer's colour code batch number and colour name or match to scheduled colour code and name.

Samples are not to be less than 2 metres long and are to be of the same colour, pattern and type as scheduled.

106 Delivery, Handling and Storage

A. Bring all materials to the site and store in manufacturer's original packaging, bearing the manufacturer's standard label, indicating type, pattern and colour.

B. Store materials in designated spaces in a safe and secure manner. When not in use, keep such spaces locked and inaccessible to those not employed under this Trade Section.

107 Warranty

Provide a written warranty stating that preparation of surfaces, materials and material application installed under this contract will show no deterioration and remain in good condition for a period of years from the date of completion.

PART II MATERIALS

201 Materials

Provide all materials necessary for preparation of surfaces and for application of wall coverings.

A. WALL COVERING:

1. Manufacturer:

a. Type:

b. Pattern:

c. Colour:

2. Manufacturer:

a. Supplier:

b. Type:

c. Pattern:

d. Colour:

B. ADHESIVES:

1. Manufacturer:

2. Type:

202 Table for Wall Covering

Room name or number	Wall	Substrate Surface	Type of Covering

PART III EXECUTION

301 Examination

Inspect all surfaces and determine that they are in proper condition to receive the work to be performed under this section.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

The starting of work under this section means acceptance of such surfaces as being satisfactory. Correct defects in work resulting from accepting poor surfaces at no cost to the Proprietor.

302 Preparation

Prepare all surfaces as required so that they are in a proper condition to receive the work.

Comply with manufacturer's instructions. Remove dust, dirt, grease and other extraneous matter affecting the finished work.

Remove lighting fixtures, switches, power outlets and similar items in place prior to installation and reposition upon completion of each space.

303 Protection

Provide suitable protection in all areas where wall covering is being done to protect adjacent surfaces from damage during work.

304 Application

Execute all work of this section in strict compliance with the manufacturer's recommendations.

305 Cleaning

At completion of work in each area, thoroughly clean the area.

Replace wall fittings and fixtures previously removed.

306 Spare Material Rolls

Supply to the proprietor's representative further material being 3% of the area of surfaces covered.

307 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply labour and materials, services and equipment necessary for the preparation, application and finishing of painting and staining as indicated on drawings, schedules and as specified herein, to internal and external surfaces of building, as follows:

Refer Schedule of Finishes.

Consult with the project manager with regard to requirements of other trade sections of the specification which require painting, and include as part of the work of this trade section the appropriate preparation, painting, and finish required to complete the installation.

102 Related Work

Co-ordinate and co-operate with the following trades:

Substrates to be painted	Cleaning and finishing
Scaffolding	

103 Quality Assurance

A. Compatibility of shop and field paints:

Determine that the materials specified in the Schedule of Finishes are compatible with shop coats.

Failure to do so will be construed as accepting the paints specified. Contractor is to correct, at his own expense, defects in his work resulting from the use of such materials.

B. Test samples:

1. Prepare test samples for painting types and typical locations, where determined by the project manager. Do not commence painting of the substrate type until the sample is approved by the project manager. Apply samples in conditions approximating as closely as possible the lighting conditions of the finished work.
2. Test samples include the suitable preparation of substrates.
3. After approval, test samples are to be the standard for quality control of the completion of work of same type.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 2311 2009	Guide to the painting of buildings. (NB: maintain this document at the project site by the contractor as a controlling general reference).
AS/NZS 2312 2002	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings. <i>Plus 1 Amdt, 2004.</i>

105 Submissions

Submit the following materials:

- A. Product literature on proposed painting systems.
- B. Colour samples for approved painting materials. Identify samples with:
 1. Manufacturer's colour code and colour name (if any).
 2. Match to Schedule colour code and name.
- C. Samples are not to be less than 100 x 100mm, and are to be of the same gloss level as the scheduled colour.
- D. Copies of pre-installation conference minutes.

106 Delivery, Handling and Storage

Store materials in designated spaces in a secure manner which meets the requirements of applicable codes and fire regulations. When not in use, keep such spaces locked and inaccessible to those not employed under this section. Provide each space with a fire extinguisher of carbon dioxide or dry chemical type bearing a tag of recent inspection.

Bring materials to the building and store in manufacturer's original sealed containers, bearing the manufacturer's standard label, indicating type and colour. Deliver materials in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.

107 Project Conditions

Temperature: comply with the requirements of clause 6.3 of AS/NZS 2311 The painting of buildings, and of paint manufacturers with regard to both ambient temperature and relative humidity.

108 Warranty

Provide a written warranty stating that preparation of surfaces, materials and material application installed under this contract will show no deterioration and remain in good condition for a period of years from date of Practical Completion.

PART II MATERIALS

201 Materials

All internal paints are to be low VOC or environmental paints.

General: where manufacturer makes more than one grade of any material specified, use the highest grade of each type, whether or not the material is mentioned by trade name in these specifications.

Paints and finishes used for the project may be manufactured by one or more of the following manufacturers: Taubmans.

Dulux.

Wattyl.

Pascol.

Other products may be approved by project manager. Apply to project manager for approval of alternatives.

Provide materials necessary for preparation of surfaces, and for application of paint finishes.

202 Schedules

A Schedule of Finishes is included in this specification.

The project manager will prepare a final Schedule of Colours in sufficient time before commencement of work.

203 Paint Types

204 Priming Materials

Colours of priming coats (and body coats where specified) are to be lighter than those of finish coat.

205 Spare Paint

Contractor to provide adequate left over paint for touching up and maintenance. To be supplied in well-sealed long-life containers of colour matched paints, clearly labelled and mapped to rooms/walls inside and outside the building (where applicable).

PART III EXECUTION

301 Examination

Inspect surfaces and determine that they are in proper condition to receive the work to be performed under this trade section. Refer 302 A, below.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

The starting of work under this trade section will be taken to mean acceptance of such surfaces as being satisfactory and defects in work resulting from accepting poor surfaces are to be corrected at no cost to the proprietor.

Refer AS/NZS 2311 Appendix C.

302 Preparation

- A. General: prepared to a standard not less than that described under AS/NZS 2311, Section 3: Preparation of Un-Painted Surfaces inclusive, and other clauses of Australian Standards referenced therein.
This Standard is incorporated by reference as part of this specification and applies to the work below to the same extent as if written herein.
- B. Broom clean floor surfaces before painting. Remove dust, dirt, plaster, grease and other extraneous matter affecting the finish work.
- C. Putty-stop or plug nail holes and cracks on both exterior and interior work, as required. Natural or stained wood finishes are to have putty coloured to match. Putty wood after prime coat or sealer coat has been applied.
- D. Clean bare metal surfaces of mill scale, rust, grease, oil, dirt, or other foreign matter, then properly washed with spirit or other approved cleaning agents. After cleaning, etch, pickle, prime, or otherwise prepare, as recommended by the paint manufacturer.
- E. Remove blisters or other imperfections in previous coats caused by foreign substances or paint skins from painted surfaces before the subsequent coat is applied.
- F. Rub down wood and metal surfaces before finishing and between coats with No. 00 and finer sandpaper or steel wool, leaving a perfectly clean surface. Sand smooth-finished surfaces before finishing and between coats as required to smooth out rough areas and to assure a smooth, even finish. Surfaces to receive paint are to be smooth and free of sandpaper scratches, mill-marks, and other imperfections.
- G. Remove hardware, accessories, plates, lighting fixtures and similar items in place prior to painting and re-position upon completion of each space, or protect as otherwise directed by the project manager.
- H. Thoroughly stir materials in containers before application, unless otherwise directed by the manufacturer of the paint used, to ensure uniformity of colour and mass. Strain out paint skins or other materials which would cause lumps or roughness. Thin only as recommended by the manufacturer.

303 Protection

Furnish and lay suitable drop cloths in areas where painting is being done to protect floors and other surfaces from damage during the work.

304 Application

- A. General: execute work of this trade section in strict compliance with paint manufacturer's recommendations, and with the provisions of AS/NZS 2311, Section 6: Paint Application, inclusive. This standard is incorporated by reference as part of this specification and applies to the work below to the same extent as if written herein. In the event of conflict between manufacturer's recommendations and the provisions of AS/NZS 2311, manufacturer's recommendations govern.
- B. Maintenance or repainting
Execute work of this trade section in strict compliance with paint manufacturer's recommendations, and with the provisions of AS/NZS 2311, Section 7: Maintenance of Painted Surfaces on inclusive and Section 8: Maintenance Painting Systems. This standard is incorporated by reference as part of this specification and applies to the work below to the same extent as if written herein. In the event of conflict between manufacturer's recommendations and the provisions of AS/NZS 2311, manufacturer's recommendations govern.

305 Cleaning

At completion of work in each area, remove paint spots, oil and stain from adjacent surfaces, including finish hardware.
Replace hardware previously removed.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

307 Schedules

END OF SECTION

PART I GENERAL

101 Scope

Supply labour and materials, services and equipment necessary for the preparation, application and finishing of graffiti resistant materials as indicated on drawings, schedules and as specified herein, to internal and external surfaces of building, as follows:

Refer Schedule of Finishes.

Consult with the project manager with regard to requirements of other trade sections of the specification which require protection and include as part of the work of this trade section the appropriate preparation, painting, and finish required to complete the installation.

102 Related Work

Co-ordinate and co-operate with the following trades:

Substrates to be treated

Cleaning and finishing

Scaffolding

103 Quality Assurance

Test samples:

- A. Prepare test samples of each specified type 3 sq metres, where determined by the project manager. Do not commence protection/painting of the substrate type until the sample is approved by the project manager. Apply samples in conditions approximating as closely as possible the lighting conditions of the finished work.
- B. Test samples include the suitable preparation of substrates.
- C. After approval, test samples are to be the standard for quality control of the completion of work of same type.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 2311 2009

Guide to the painting of buildings.

(NB: maintain this document at the project site by the contractor as a controlling general reference).

105 Submissions

Submit the following materials:

- A. Product literature on proposed protective systems.
- B. Colour samples for approved protective materials.
- C. Match to Schedule colour code and name.
- D. Samples are not to be less than 100 x 100mm, and are to be of the same gloss level as the scheduled colour.

106 Delivery, Handling and Storage

- A. Store materials in designated spaces in a manner which meets the requirements of applicable codes and fire regulations. When not in use, keep such spaces locked and inaccessible to those not employed under this section. Provide each space with a fire extinguisher of carbon dioxide or dry chemical type bearing a tag of recent inspection.
- B. Bring materials to the building and store in manufacturer's original sealed containers, bearing the manufacturer's standard label, indicating type and colour. Deliver materials in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.

107 Project Conditions

Temperature: comply with the requirements of the manufacturer with regard to both ambient temperature and relative humidity.

108 Warranty

Provide a written warranty stating that preparation of surfaces, materials and material application installed under this contract will show no deterioration and remain in good condition for a period of years from date of Practical Completion.

PART II MATERIALS AND PRODUCTS

201 Acceptable Manufacturers

202 **Materials**

General: where manufacturer makes more than one grade of any material specified, use the highest grade of each type:

Other products may be approved by project manager. Apply to project manager in writing for approval of alternatives and include product data from the manufacturers.
Provide materials necessary for preparation of surfaces, and for application coatings.

PART III EXECUTION

301 Examination

Inspect surfaces and determine that they are in proper condition to receive the work to be performed under this section. Refer 302, below.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

The starting of work under this section will be taken to mean acceptance of such surfaces as being satisfactory and defects in work resulting from accepting poor surfaces are to be corrected at no cost to the proprietor.

302 Preparation

Consult with manufacturer of the material to be applied. Determine which system of preparation is to be adopted and apply this treatment in a test sample. Refer clause 103 above. Continue this action until the project manager is satisfied with the preparation treatment.

303 Application

Execute work of this section in strict compliance with paint manufacturer's recommendations, and as applicable, with the provisions of AS 2311, Section 7: Maintenance of Painted Surfaces inclusive and Section 8: Maintenance Painting Systems.

304 Cleaning

At completion of work in each area, remove paint spots, oil and stain from adjacent surfaces, including finish hardware.

Replace hardware previously removed.

305 Protection

Furnish and lay suitable drop cloths in areas where painting is being done to protect floors and other surfaces from damage during the work.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, supply and install complete compartments and/or enclosures including but not limited to:
 Toilet partitions, doors, panels etc.
 Urinal partitions constructed of metal, particleboard, laminated surfaces, stone etc.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Floor construction Wall construction
 Ceiling construction Finishing trades
 Plumbing fixtures

103 Quality Assurance

Ensure that the chosen contractor is widely experienced in the class of work required by this specification.
 Provide details of similar work satisfactorily completed, including names and telephone numbers of those for whom the work was done so they can be contacted for references.

104 References

AS 1428 Design for access and mobility.
 1428.1 2009 General requirements for access – New building work.
 There are 5 other parts. 1992 – 2010.
 Comply with current written instructions of the manufacturer of the products specified.

105 Submissions

Provide to the project manager before ordering components:
 Manufacturer's printed data on the specified products and installation instructions.

106 Delivery, Handling and Storage

Deliver all the materials to the site in totally satisfactory condition. Reduce storage of materials on site to a minimum. Do not install any damaged component or panel. Remove and replace all such items.

107 Warranty

Provide to the project manager a written warranty stating that all components of the complete installation will remain intact and in a satisfactory condition for year(s) from the date of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

- A. Toilet Partitions
 - Fixed panels:
 - Front panels:
 - Doors:
 - Supports at floor, wall, ceiling:
 - Indicator bolts:
 - Coat hangers:
- B. Urinal Partitions
as for A above

203 Detail Design Provisions

- A. General: the project manager's drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated. If, in the opinion of the builder a change of profile is required in order to meet the specification, arrange through the project manager for a review of the condition. Design the assembly, reinforcing and anchorage to suit each specified condition in an acceptable manner complying with the requirements specified herein.
- B. Tolerances: design frames to accommodate building tolerances, and when completed, within the following tolerances:
 - 1. Deviation from plumb, level or dimensioned angle within 3mm per 3.5m of length of member, or 6mm in total run in line.
 - 2. Deviation from theoretical position on plan or elevation, including deviation from plumb, level or dimensioned angle not to exceed 9mm total at location.
 - 3. Change in deviation not to exceed 3mm for 3.5m run in direction.

PART III EXECUTION

301 Examination

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of relevant conditions.

302 Preparation

A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.

B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

Check each item, on arrival at the installation location, for damage. Replace damaged items.

304 Installation

A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.

B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction.

C. Comply fully with manufacturer's current written instructions.

305 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover the installations to avoid wear and tear of finish during subsequent construction.

307 Cleaning

Clean materials installed to the satisfaction of the project manager.

Remove temporary protective coatings.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, supply and install complete shower and/or dressing compartment enclosures including but not limited to:

Frame, frameless glass.
 Door, sliding, pivoted, frameless.
 Glass, toughened, laminated, wired.
 Installation devices.
 Fixed panels, solid.

102 Related Work

Co-ordinate and co-operate with the following trades:

Floor construction	Wall finishes
Wall framing	Plumbing fittings and fixtures
Floor finishes	Metal finishes

103 Quality Assurance

Ensure that the chosen contractor is widely experienced in the class of work required by this specification. Provide details of similar work satisfactorily completed, including names and telephone numbers of those for whom the work was done so they can be contacted for references.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1231 2000	Aluminium and aluminium coatings – Anodic oxidation coatings.
AS 1288 2006	Glass in buildings - Selection and installation. <i>Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.</i>
AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS/NZS 2208 1996	Safety glazing materials in buildings. <i>Plus 1 Amdt, 1999.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.
AS 3740 2010	Waterproofing of domestic wet areas. <i>1 Amdt, 2012.</i>
HB 125 2007	The glass and glazing handbook.

105 Submissions

Provide to the project manager before ordering components:
 Manufacturer's printed data on the specified products and installation instructions.

106 Delivery, Handling and Storage

Deliver all the materials to the site in totally satisfactory condition. Reduce storage of materials on site to a minimum.
 Mark each component for easy identification. Provide security for materials not installed, from any loss or damage by weather or any other cause.
 Do not install any damage component or panel. Remove and replace all such items.

107 Warranty

Provide to the project manager a written warranty stating that all components of the complete installation will remain intact and in a satisfactory condition for year(s) from the date of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

- | | | |
|----|---|----------------------|
| A. | Glass | |
| | Toughened: 10 mm thick | |
| | Wired: 10 mm thickness | |
| | Laminated: 10.38 mm thick clear interlayer | |
| B. | Metal frame | |
| | Material: aluminium alloy 6063, Temper T5 or T6 | |
| | Finish: anodising/polyester powder coat. Refer Clause 205 | |
| C. | Metal fastenings, clips etc. | Chrome plated brass: |
| | Stainless Steel: | Finish of chrome: |
| | Finish: | Other: |
| D. | Solid panels and doors | |

Material:

Colour:

203 Detail Design Provisions

- A. General: the project manager's drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated. If, in the opinion of the builder a change of profile is required in order to meet the specification, arrange through the project manager for a review of the condition. Design the assembly, reinforcing and anchorage to suit each specified condition in an acceptable manner complying with the requirements specified herein.
- B. Tolerances: design frames to accommodate building tolerances, and when completed, within the following tolerances:
 - 1. Deviation from plumb, level or dimensioned angle within 3mm per 3.5m of length of member, or 6mm in total run in line.
 - 2. Deviation from theoretical position on plan or elevation, including deviation from plumb, level or dimensioned angle not to exceed 9mm total at location.
 - 3. Change in deviation not to exceed 3mm for 3.5m run in direction.

204 Finish

Anodising or polyester powder coat.

Anodising:

Metal windows, doors anodised to selected colour.

Pre-treat and apply anodising by applicators approved by the project manager.

Minimum coating thickness of 25 microns subjected to random testing after installation. Remove and replace non-conforming material.

Comply with requirements of AS 1231.

Polyester powder coat:

Polyester powder coated, to colour approved by the project manager and by the manufacturer of the powder material, to metal of windows, doors.

Perform pre-treatment and application of powder coating by applicators approved by the project manager and by the manufacturer of the powder material.

Minimum coating thickness of 50 microns subjected to random testing after installation. Non-conforming material will be removed and made good by the builder.

Comply with requirements of AS 3715.

205 Sealants and Accessory Materials

- A. Provide non-structural external weatherproofing sealants of low modulus neutral curing silicone rubber compounds by approved manufacture.
- B. Generally comply with AS 1288. Supply spacer gaskets, glazing tapes and setting blocks compatible with sealants, which do not contribute to sealant colour change or affect the sealants adhesion to substrates when exposed to ultraviolet light.

Prior to application, evaluate samples of materials receiving the silicone, including elastomeric sealants, by the silicone sealant manufacturer for compatibility and primer selection. Clearly identify the submitted materials as to manufacturer and product number.

Silicone sealants generally are to be clear in colour.
- C. Interior sealers: acrylic-emulsion or latex-rubber-modified acrylic emulsion sealant compound, permanently flexible, non-staining and non-bleeding; recommended by manufacturer for protected exterior exposure and general interior exposure.
- D. Joint primer/sealer: provide type of joint primer/sealer as recommended by sealant manufacturer to suit each surface.
- E. Bond breaker tape: polyethylene tape or other plastic as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler is to be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
- F. Sealant backer rod: compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible permanent, durable non-absorbent material as recommended by sealant manufacturer for compatibility with sealant.
- G. Glazing tape: polyisobutylene tape of type, thickness and width as recommended by glass manufacturer and project manager.
- H. Exposed screws: countersunk type, anodised aluminium or non-magnetic stainless steel evenly and neatly located in an approved manner. Exposed fasteners: finished to match aluminium.

206 Fabrication

Framing system: fabricate from extrusions to profiles shown on approved Shop Drawings.

Form junctions so that no fixings, such as pins, screws, pressure indentations and the like are visible on exposed faces. Show fixings which will be exposed, on Shop Drawings.

Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations. Remove sharp edges without excessive deformation. Fit mitred joints accurately to a fine hairline.

Pre-assemble and match mark before delivery.

PART III EXECUTION

301 Examination

Inspect site conditions before start of work on site, before delivery of materials. Ensure conditions are satisfactory for installation.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Perform rectification required before delivery of materials.
Start of work means total acceptance of conditions.

302 Preparation

Prepare surfaces affected by the installation in accordance with material manufacturer's instructions.

303 Frame Anchorage

Fabricator is required to supply the anchorage devices to the builder for building in by others and check that devices are located as required.

304 Glazing

Secure glass in accordance with glass manufacturer's recommendations and AS 1288. Allow for thermal expansion of glass, the metal framing and spandrels.

305 Preparation for Sealants

Joint preparation sealants: clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound.

306 Installation General

Comply throughout with the current written instructions of the system manufacturer.

307 Installation of Sealants

- A. Install bond breaker tape where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- B. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface slightly below adjoining surfaces.
- C. Install sealant to depths as recommended by sealant manufacturer.
- D. Remove excess caulking compound and sealant and leave surfaces neat, smooth and clean, without smears on surrounding work. Tool joints where recommended by manufacturer or where required. Remove cartons and debris from site as the work progresses.

308 Protection

- A. Framing system: protect metal surfaces as necessary during erection. Finish surfaces free from mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks.
- B. Glass: protect glass from breakage immediately upon installation and until Practical Completion. Remove and replace glass and metal panels which are broken, cracked, abraded, chipped or damaged in other ways, before, during or after installation, at no additional cost to proprietor.
- C. Be responsible for breakage and damage to installation until Practical Completion.

309 Cleaning

- A. Remove labels, excess glazing compounds, stains, spots and other foreign matter from glass, frames, hardware and other finished surfaces immediately upon installation of glazing for each light.
- B. Debris: remove rubbish and debris resulting from glazing operations, each day.

310 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, fabricate, supply and install grilles and screens including but not limited to:
 Wall mounted grilles for ventilation and other purposes
 External grilles.
 Internal grilles.
 Floor grilles.
 Ceiling grilles.
 Freestanding screens.
 Hinged screens.
 Sliding screens.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Floor construction Metalwork
 Wall construction Metal windows and glazing
 Ceiling construction Metal finishing
 Concrete Painting
 Carpentry

103 Quality Assurance

Work of this trade section is to be performed by experienced craftsmen familiar with the quality required in this class of work.
 Where 5 or more items of a similar product are required, construct a prototype, full size. Finish the prototype in every respect. When approved by the project manager, this sample remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:
 AS 1428 Design for access and mobility.
 1428.1 2009 General requirements for access – New building work.
 There are 5 other parts. 1992 – 2010.
 AS/NZS 1554 Structural steel welding. *There are 7 parts, 1994 – 2012.*
 AS 1627 Metal finishing - Preparation and pretreatment of surfaces.
 1627.6 2003 Chemical conversion treatment of metals.
 There are 6 other parts, 1997 – 2005.
 AS 4100 1998 Steel structures *Plus 1 Supplement, 1999, 1 Amdt 2012.*
 AS/NZS 4680 2006 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles.
 AS 5039 2008 Security screen doors and security window grilles.
 AS 5040 2003 Installation of security screen doors and window grilles. *Plus 1 Amdt, 2007.*
 Comply with requirements of statutory and local authorities.

105 Shop Drawings

Comply with DOCUMENT 00800 SUPPLEMENTARY CONDITIONS OF CONTRACT, clause 27.
 Provide Shop Drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
- B. Develop details not shown and in conformity with the indicative details shown.
- C. Take and confirm dimensions on site, before preparing Shop Drawings where possible.
- D. Submit detailed Shop Drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and full- scale templates of blocking, anchorages, sleeves and bolts installed by others.

106 Samples

- A. Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. When approved, samples are to establish quality of similar work of this trade section.
- B. Check on delivery: request project manager to check materials on delivery to site for quality, and he will reject materials not meeting the requirements of this specification or equal to approved samples. Rejected materials are to be returned to the fabricator at the fabricator's expense.
- C. Finish: provide samples of specified finishes when requested.

PART II MATERIALS

201 Manufacturers

202 Materials

Manufacturer	Item	Model no.	Material	Finish	Size(s)

203 Welding Steel

General: details of joints, the techniques of welding employed, the appearance and quality of welds made and the methods used to correct defective work; conform to requirements of AS/NZS 1554.

Welds exposed to view: grind smooth to project manager's approval.

Concealed welds: grind smooth before galvanising.

Tack or skip welding: at regular intervals, very neat; not permitted if material is to be hot dip galvanised.

Remove weld spatter.

Certification: welds are to be made only by welders who certified in accordance with the Australian Standard.

Tack welding or skip welding will NOT be permitted where items are to be galvanised. Weld continuously form joints and connections to exclude water and to permit draining during galvanising.

204 Connection Design

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment. Take possible care to prevent damage.

- A. Welding external items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts are to be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Shop connections for steel fabrications are to be welded, and field connections bolted.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Machined joints are to be milled to a close fit. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.
- G. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop.

205 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

Fasten galvanised items with galvanised fasteners.

PART III EXECUTION

301 Examination

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of relevant conditions.

302 Preparation

- A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage. Damaged fabrications are to be treated as follows:
 - 1. Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.
 - 2. Architectural metalwork: returned to shop for repair or replacement.

- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

- A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.
- C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted under conditions. Fabrications may be cut shorter with power hacksaws on site. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.

305 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Cleaning

Clean materials installed to the satisfaction of the project manager.
Remove temporary protective coatings.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

- 101 Scope**
The work of this trade section includes but is not limited to the identification of apertures in the structure and the means of permanently closing apertures which could allow entry of pests, e.g., non-human life forms.
- 102 Related Work**
Co-ordinate and co-operate with the following trades:

Site preparation – excavation	Roof materials and installation
Plumber, hot and cold water	Doors external
Piper energy distribution	Windows
Concrete trades	Flooring materials
Carpentry	Air conditioning
Wall construction	Electrical
Fibre cement products	Structural framing
Termite control	
- 103 Quality Assurance**
Where specialist sub-contractors are employed, such tradespeople are required to show evidence of experience and skills which meet the requirements of the project.
Compliant to local authority or statutory requirements (i.e. fire ant Queensland)
- 104 References**
Comply with requirements of statutory and local authorities having jurisdiction.
- 105 Submissions**
Before ordering specific materials, submit product data to the project manager.
Evidence of payment of relevant fees where applicable.
- 106 Warranty**
Provide to the proprietor warranties offered by suppliers and/or installers.

PART II MATERIALS200

- 201 Acceptable Manufacturers**
- 202 Materials** Floor: concrete
 Timber
 Walls: block
 Brick
 Timber
 Steel frame
 Fibre cement
 Other
 Roof: tile
 Metal
 Window surround
 Door surround
 Eaves
 Vents: wall
 Vents: eaves
 Mesh
 OTHER

PART III EXECUTION

- 301 Examination**
Visit site and inspect conditions, comparing conditions to the drawings before delivery of materials to site.
Obtain essential services information (dial before you dig).
Rectify any discrepancy or unsuitability of substrata.
Start of work means total acceptance of conditions.
- 302 Co-ordination**
Arrange for co-operation of other trades to ensure effective pest control. Take care of materials. Prevent damage before and during installation.

- 303 Preparation**
Co-ordinate with and ensure preparatory work by other trades is done prior to commencement of work and arrange for provision and fixing grounds. Include framing and provision for services.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
- 304 Installation**
Anchor and fasten materials and components to comply with ratings and performance requirements, and to comply with governing local regulations. Comply with appropriate Australian Standard.
Take care of and protect surrounding work, including other finishes, equipment and components, during installation. Provide protective covering where necessary.
- 305 Installation Particulars**
Comply in all respects with manufacturer's recommendations contained in technical bulletins. Call for technical advice where necessary. Refer clause 104.
- 306 Finishing Details**
Finish joints and secure fasteners to details indicated. Where no specific details exist, adopt details and recommendations set out in published bulletins by the supplier complying in every respect. Remove surface defects to achieve uniform appearance of each type of installation.
- 307 Protection**
Protect finished work. Make good damage at no additional cost to the proprietor.
- 308 Cleaning**
Clean exposed surfaces including trim, edge moldings, and comply with manufacturer's instructions for cleaning and touch-up of minor finish damage.
Remove splatterings, droppings and surplus material.
- 309 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, supply and install required items including but not limited to:

Directory panel
Bulletin boards
Panels
Metal frames
Dimensional letters
Exterior/interior signs
Illuminated, non-illuminated
Plaques
Door signs
Signs for the disabled.

102 Related Work

Co-ordinate and co-operate with the following trades:

Wall construction	Concrete
Floor construction	Finishes
Tactile warning surfaces	

103 Quality Assurance

Materials, shop fabrication and on-site installation are to be supplied and performed by fully trained and experienced tradesmen in accordance with instructions of the manufacturer.

104 References

Comply with the applicable portions of the following Australian Standards:

AS 1319 1994	Safety signs for the occupational environment.
HB 123 1999	Guidelines for the selection, location and installation of visual warning devices in buildings.

105 System Description

The specified materials and systems are intended to provide a uniform image throughout the building. Where possible, materials are to be provided by the same manufacturer.

106 Submissions

Submit to the project manager for approval, the following before ordering materials:

- A. Samples of specified materials, conforming to type and finish required.
- B. Fully detailed drawings showing overall dimensions and component sizes with proposed methods of fixing and/or securing position.
- C. Check data on sign for data accuracy - spelling , phone number, etc. before manufacture.
- D. Copies of minutes of pre-installation conference.

107 Delivery, Handling and Storage

Deliver materials in accordance with the Project Schedules.

Prevent damage to materials by securely boxing or wrapping before delivery. Take care with materials during delivery and handling.

Store materials on site where directed by builder. Where possible install directly in place.

108 Warranty

Provide to the proprietor a warranty co-signed by the manufacturer and installer stating that items in this specification will remain in full operational condition for a period of years from the date of Practical Completion.

109 Maintenance

Provide a written undertaking to the proprietor that parts of the installation will be available for additional supply from time to time to suit the proprietor's needs for a period of 10 years from the date of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials****203 Finishes**

204 Signs for The Disabled

205 Fabrication

Fabricate components in accordance with manufacturer's instructions and approved drawings.
Form junctions so that fixings are concealed.
Cut edges, drill holes free from burrs and indentations. Fit joints to a fine hairline.
Pre-assemble where possible or practical and mark each item for intended location before delivery.

PART III EXECUTION

301 Examination

Visit site and inspect conditions, comparing conditions to drawings before delivery of materials to site. Rectify discrepancy or unsuitability of substrate.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.
Space enclosure: do not install materials until space is enclosed and weatherproof, and until wet-work in space is completed and nominally dry.

302 Preparation

Prepare areas and surfaces before installation, so that best conditions exist.
Where necessary, ensure that lighting cable is in place and concealed ready for connection to light fittings within the illuminated items.

303 Installation

Comply with manufacturer's written instructions. Provide appropriate anchoring devices, concrete pads for external signs.
Take care of and protect adjacent surfaces and materials. Provide protective cover to adjacent finishes where necessary.

304 Protection

Protect finished work.
Replace or make good work found damaged at time of Practical Completion.

305 Cleaning

- A. Adjust and clean: clean exposed surfaces including trim, edge moldings, and comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- B. Remove splatterings and droppings from work. Remove daily surplus materials and rubbish from the work area.
- C. Leave floors broom clean at completion.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

- 101 Scope**
Supply and install extinguishers where indicated in accordance with the statutory authority having jurisdiction.
- 102 Related Work**
Co-ordinate and co-operate with the following trades:
Wall construction
Wall finishes
- 103 Quality Assurance**
Perform work of this trade section with experienced tradesmen familiar with the quality of work required and licensed by the manufacturers of the extinguishers. Comply throughout with written instructions.
- 104 References**
Comply with applicable portion of the following Australian Standards:
AS 1603 Automatic fire detection and alarm systems.
There are 12 parts 1996 – 2011 and 4 Amdts, 1998 – 2001.
AS 1670 Fire detection, warning, control and intercom systems - System design, installation and commissioning. *There are 5 parts, 1997 – 2004, plus 1 Amdt, 2005.*
AS/NZS 1841 2007 Portable fire extinguishers. *There are 8 parts, one for each type.*
AS 2444 2001 Portable fire extinguishers and fire blankets – Selection and location.
AS/NZS 4353 1995 Portable fire extinguishers - Aerosol type.
Comply with requirements of statutory authority having jurisdiction.
- 105 Submissions**
Copies of minutes of pre-installation conference.

PART II MATERIALS

- 201 Manufacturers**
Manufacturers of materials approved in writing by the statutory authority may supply equipment.
- 202 Materials**
Supply and install extinguishers authorised by the authority in accordance with the schedule provided by the authority.
- 203 Installation Devices**
Supply brackets signs and other required items, and the means of securing them to the building.

PART III EXECUTION

- 301 Examination**
Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification if required.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of relevant conditions.
- 302 Inspection on Arrival at Site**
Inspect materials on arrival, comparing each item to the schedule provided. Ensure that no material is damaged. Return to the manufacturer damaged items and obtain a replacement.
- 303 Installation**
Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- 304 Cleaning**
Clean materials installed to the satisfaction of the project manager.
Remove temporary protective coatings.

305

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, supply and install demountable partitions and related work as indicated, including but not limited to:
 Standard modular (1200mm/other) panels, full height and/or door height solid, part glazed, fully glazed
 Closer/infill panels, full height and/or door height solid, etc.
 Door panels, including doors, full height and/or door height solid, etc.
 Door hardware and furniture.
 Floor, ceiling and wall fixing channels and skirtings.
 Reticulation provisions, both horizontal and vertical, for electricity, telephone and communications.
 Alteration to ceilings.
 Alteration to carpets.
 Alteration to sprinkler head locations.

102 Related Work

- A. Co-ordinate and co-operate with installers of walls, floors, ceilings.
 B. Schedule of Rates

Complete the following schedule of rates for fully installed partitions and submit it with the tender:

Partition Type	Description	\$ Price per metre
A.	Full height, solid	
B.	Full height, glazed above door head	
C		

103 Quality Assurance

Prototype:

In a location selected by the project manager, construct a complete prototype installation consisting of:
 Full height section complete with an infill panel at a fixed wall, a door unit and door, etc.

Include all elements listed above, finished in every respect. The prototype, when approved, is to remain as part of the work and become the control standard for the balance.

104 References

Comply with applicable portions of the following Australian Standards:

- AS 1191 2002 Acoustics - Method for laboratory measurement of airborne sound transmission insulation of building elements.
 AS/NZS 1276.1 1999 (Available Superseded) Acoustics – rating of sound insulation in buildings and of building elements – Airborne sound insulation.
 AS 1288 2006 Glass in buildings - Selection and installation.
Plus 1 Supplement, 2006 and 2 Amdts, 2008 - 2011.
 AS/NZS 2208 1996 Safety glazing materials in buildings. *Plus 1 Amdt 1999.*

105 Submissions

Submissions required prior to delivery:

e.g. evidence of required acoustic properties of the completed partitions.

106 Delivery, Handling and Storage

Where possible, deliver materials for direct installation, keeping on-site storage to a minimum. Be responsible for loss and damage to materials whether stockpiled or in place.

PART II MATERIALS**201 Approved Manufacturer****202 Panels**

- A. Fabricate off site to a finished thickness of (45mm/other), with no mullions or faces of panels flush with mullions. Provide for vertical and horizontal reticulation of electrical and telephone services throughout the whole partition system.
 Make panel and door modules capable of being individually interchanged
 B. Construction:
 45mm solid core, plasterboard each side of timber frame or approved equivalent, veneered with (slice cut ash/other), or surfaced with fabric:
 Timber frame at 400mm maximum centres faced with 13mm square edge plasterboard bonded to the frame under pressure or
 Sound transmission class (STC rating) required.
 C. Finish:

Before delivery, stain to a selected colour and finish with one coat sealer and two coats of satin glaze.
Sand and fine sand between coats to provide a smooth satin finish or unbacked vinyl bonded under pressure:
Other:

- 203 Glass**
Clear float, laminated or selected obscure glass as indicated.
Thickness in accordance with AS 1288.
Glaze in PVC gaskets finishing flush with the aluminium extrusions.
For glass and sealant particulars, refer trade section 08800, GLASS AND GLAZING.
- 204 Floor channels**
Extruded aluminium, folded or roll-formed sheet steel or other channel designed with other parts of the system, to provide adjustments to accommodate normal building inaccuracies while providing plumb partitions with sills, heads and the like level and aligned.
- 205 Mullions and Seals**
Extruded aluminium (natural anodised/powder coated a selected colour)
At door jamb mullions, provide acoustic seals: .
- 206 Wall and Ceiling Channels**
Extruded aluminium fixed to walls and ceilings. Finish as for mullions.
Seal against fixed walls with silicone rubber.
- 207 Skirting**
(90/100)mm high (extruded aluminium, steel or vinyl) held without visible fixings and no adhesive so as to allow access for electrical and power reticulation. Finish as for mullions.
- 208 Doors**
45mm solid core or equal approved, veneered and finished to match the panels. Vertical edges stripped with 10mm matching solid timber.
45mm semi-solid sheeted to match the (vinyl/other) panels. Vertical edges stripped with 10mm solid timber finished as for timber veneer.
Other:
- 209 Door Hardware**
Refer Door Schedule.
Supply and fix door hardware listed in the attached Door Schedule.
Allow for and provide the described master key system plus liaison with the supplier needed to produce the key compatibility designed for the whole project.
- 210 Acoustic Partitions**
In the location shown, provide partitions with an appearance similar to those in the rest of the job but with such additional treatment as is required to give them ASTM Transmission Class (35/40/45/50/other) sound insulation properties.
- 211 Acoustic Barriers**
Where acoustic partitions are fitted against suspended ceilings, provide and fix barriers along the lines of the partitions and between the ceiling and the underside of the floor slab above. The barriers are to have sound insulation properties at least as high as the partitions.
Provide evidence, from a laboratory NATA registered for the tests, that the proposed partition system (together with the barriers above the suspended ceiling) has the required sound insulation properties.

PART III EXECUTION

- 301 Examination**
Visit the site, inspect the conditions and compare them with the drawings.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.
- 302 Protection**
Provide polythene or building paper and cover installed carpets.
Protect other surrounding work, including other finishes, equipment and components.
- 303 Erection**
Erect the complete partition system in accordance with the agreed layout, design, installation technique and construction schedule.
Seal at ends of partitions against walls, windows etc. with material matching the partition. Thoroughly secure in place.

304 Field Acoustic Tests

Allow for on site testing, by a laboratory NATA registered for the tests, to demonstrate in (one/two/three/other) separate locations, nominated by the project manager, that the required sound reduction through acoustic partitions (and the barriers above them) has been achieved.

305 Inspection

Attend the job as needed and meet with the project manager on site when requested.
Before handing over, ensure that the whole installation is in complete working order.

306 Cleaning

Remove protection membranes and materials.
Clean surfaces exposed to view, replacing parts or components that are damaged or cannot be cleared.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, supply and install operable walls and related work as indicated, including but not limited to:
 Standard modular (1220mm/other) panels, full height and/or door height.
 Acoustic, Non acoustic.
 Overhead track, acoustic seals.
 Jambs, stacking pockets.
 Door hardware and furniture.
 Alteration to ceilings.
 Alteration to carpets.
 Alteration to sprinkler head locations.

102 Related Work

Co-ordinate and co-operate with the following trades:
 Steel studs
 Plasterboard
 Other:

103 Quality Assurance

Employ only tradespeople and technicians widely experienced in this class of work, licensed by the supplier.

104 References

Comply with applicable portions of the following Australian Standards:
 AS 1191 2002 Acoustics - Method for laboratory measurements of airborne sound transmission insulation of elements.
 AS/NZS 1276.1 1999 (Available Superseded) Acoustics - Rating of sound insulation in buildings and of building elements – Airborne sound insulation.

105 Submissions

Submissions required prior to delivery:
 e.g. evidence of required acoustic properties of the completed partitions. Data sheets of supplier's instructions and materials to be supplied.

106 Delivery, Handling and Storage

Where possible, deliver materials for direct installation, keeping on-site storage to a minimum. Be responsible for loss and damage to materials whether stockpiled or in place.

107 Warranty

Provide to the proprietor a warranty, counter-signed by the installer, on the whole of the installation, which states that work will remain fully operational for the period of year(s) after date of Practical Completion.

PART II MATERIALS**201 Approved Manufacturer****202 Panels**

Fabricate off site to a nominal thickness of (mm), constructed on a maximum module of 1220mm with each panel supported by own carrier system of four (4) ball bearing nylon wheels.
 Provide panel face laminated to appropriate acoustic and structural backing.

203 Jambs

Extruded aluminium, adjustable to compensate for plumb alignment.

204 Acoustic Seals

Provide mechanical pressure seals at head and foot of panels and pass door. Provide vertical seals of resilient gaskets set between extruded aluminium stiles.

205 Suspension Channels

Provide overhead suspension track of extruded aluminium.

206 Finish

Provide all exposed aluminium in natural and/or colour anodised finish.

207 Pass Doors

Full height pass door panel fitted with lever action door furniture finished to match the other panels.

- 208 Door Hardware**
Refer Door Schedule.
Supply and fix door hardware listed in the attached Door Schedule.
- 209 Acoustic Barriers**
Where acoustic operable walls are fitted against suspended ceilings, provide barriers along the lines of the walls and between the ceiling and the underside of the floor or roof above. Provide the barriers with sound insulation properties at least as high as the operable walls.
Provide evidence, from a laboratory NATA registered for the tests, that the proposed operable wall (together with the barriers above the suspended ceiling) has the required sound insulation properties.

PART III EXECUTION

- 301 Examination**
Visit the site, inspect the conditions and compare them with the drawings.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.
- 302 Protection**
Provide polythene or building paper and cover installed carpets.
Protect other surrounding work, including other finishes, equipment and components.
- 303 Erection**
Erect the complete operable wall system in accordance with the agreed layout, design, installation technique and construction schedule. Install barriers above ceiling where required.
Secure overhead track with steel cleats of manufacturers design fixed to overhead structural support. Level during installation. Plumb jambs to suit alignment.
- 304 Field Acoustic Tests**
Allow for on site testing, by a laboratory NATA registered for the tests, to demonstrate in (one/two/three/other) separate locations, nominated by the project manager, that the required sound reduction through acoustic panels (and the barriers above them) has been achieved.
- 305 Inspection**
Attend the job as needed and meet with the project manager on site when requested.
Before handing over, ensure that the whole installation is in complete working order.
- 306 Completion**
Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, fabricate, supply and install exterior sun control devices for openings formed by doors and windows, including but not limited to:

Metal sheet	Metal shutter
Metal perforated sheet	Roller shutter
Fibre cement sheet	Frames
Wood Panel	Support systems
Wood shutter	Other:

102 Related Work

Co-ordinate and co-operate with the following other trades:

Wall construction	Door installation
Wall finishing treatment	Metal finishes
Window installation	Painting
Metalwork	

103 Quality Assurance

- A. Manufacturer Qualifications: not less than five (5) years continuous experience in the manufacture of the product types specified.
- B. Installer Qualifications: installer is not to have less than three (3) years continuous experience in the erection of specified material.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1231 2000	Aluminium and aluminium coatings – Anodic oxidation coatings.
AS/NZS 1554	Structural steel welding. <i>There are 7 parts, 1994 – 2012.</i>
AS 3715 2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys.
AS/NZS 4791 2006	Hot-dip galvanised (zinc) coatings on ferrous open sections, applied by an in-line process.
AS/NZS 4792 2006	Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialized process.

Comply with relevant authority's requirement for fire-rated installation, plus the Building Code of Australia.

105 Submissions Required Prior to Fabrication

- A. Complete system description including the following information:
 - Names of manufacturers of products.
 - Names, addresses and telephone numbers of local representatives for products.
 - Types, model numbers and names of products, and indication whether products are "off the shelf" or custom fabricated. Include specific information on finishes - thicknesses, patented process name, process description and test data.
 - Detailed information on products manufactured specifically for this project.
 - Detailed system description including standard details and manufacturer's literature; and large-scale details of specially fabricated products.
- B. Statement that the proposed system meet(s) the regulatory requirements, thermal, aesthetic and waterproofing criteria and wind loading, construction, glazing and warranty requirements specified; noting in detail exceptions.
- C. Shop drawings: refer DOCUMENT 00800, clause 27. Provide shop drawings showing the following information where appropriate to the items:
 - 1. Layout (sectional plan and elevation of complete assembly).
 - 2. Full size section of members.
 - 3. Methods of assembly, type and location of exposed screws.
 - 4. Methods of glazing.
 - 5. Methods of installation, including fixings, anchorage, caulking, flashings.
 - 6. Provision for expansion (thermal).
 - 7. Junctions and trim to adjoining surfaces. Fittings and accessories.
- D. Engineer's calculations on wind loading.
- E. Sealants: submit manufacturer's product specifications, handling, installation/curing instructions, and performance tested data sheets for each elastomeric product required. Submit certificate test reports for elastomeric sealants on aged performance as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (ageing, weight loss, deterioration) and heat and exposure to ozone and ultraviolet light.

106 Delivery, Handling and Storage

Handle materials with care. Do not store on site. Install directly in place. Store sealants as instructed.

107 Warranty

Provide to the proprietor a warranty, counter-signed by the installer, on the whole of the installation, which states that work will remain intact, waterproof and fully operational for the period of ... years after date of installation.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

Item	Thickness	Manufacturer	Material	Model	Number	Finish	Size

203 Welding Steel

General: details of joints, the techniques of welding employed, the appearance and quality of welds made and the methods used to correct defective work; conform to requirements of AS/NZS 1554.

Welds exposed to view: grind smooth to project manager's approval.

Concealed welds: grind smooth before galvanising.

Tack or skip welding: at regular intervals, very neat; not permitted if material is to be hot dip galvanised.

Remove weld spatter.

Certification: welds are to be made only by certified welders who have previously been qualified in accordance with Australian Standards.

Tack welding or skip welding will NOT be permitted where items are to be galvanised. Weld continuously form joints and connections to exclude water and to permit draining during galvanising.

204 Connection Design

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment. Take possible care to prevent damage.

- A. Welding External Items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts are to be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Weld shop connections for steel fabrications, and bolt field connections.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Mill machined joints to a close fit. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.
- G. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop.

205 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

Fasten galvanised items with galvanised fasteners.

206 Galvanising

Where scheduled or specified galvanised steel after chemical descaling in accordance with AS/NZS 4791 and AS/NZS 4792, so that rust, mill scale, oil grease and other foreign matter is removed leaving a clean surface.

Then immerse steel in a bath of molten zinc so that when withdrawn, the zinc coating solidifies to a dry film thickness of 100 microns. Allow a 48 hour curing period before transporting steelwork.

Repair abrasions, site welds, etc., by thoroughly wire brushing affected areas to achieve a clean sound substrate and patch coating with a Zinc-rich paint with a film thickness of 100 microns.

PART III EXECUTION**301 Examination**

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of relevant conditions.

302 Preparation

- A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage. Treat damaged fabrications as follows:
 - 1. Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.
 - 2. architectural metalwork: returned to shop for repair or replacement.
- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

- A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- B. Fit: finish work accurately, plumb, level, square and true in reference to adjacent construction.
- C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted. Fabrications may be cut shorter with power hacksaws on site.

305 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Cleaning

Clean materials installed to the satisfaction of the project manager.
Remove temporary protective coatings.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, engineer and install required equipment including but not limited to:

102 Related Work

Co-ordinate and co-operate with the following trade sections:

103 Quality Assurance

Work of this trade section will be performed by experienced craftsmen familiar with the quality required in this class of work.

Comply throughout with manufacturer's instructions.

104 References

Comply with applicable portions of the following Australian Standards:

- AS/NZS 1554 Structural steel welding.
1554.6 2012 Welding stainless steel for structural purposes.
There are 6 other parts, 2002-2011.
- AS 1627 Metal finishing - Preparation and pre-treatment of surfaces.
1627.6 2003 Chemical conversion treatment of metals.
There are 6 other parts, 1997 - 2005.
- AS/NZS 1664 Aluminium structures. *There are 2 parts, 2 Supplements and 4 Amdts, 1997-1999.*
- AS/NZS 1734 1997 Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate.
- AS 1742 Manual of uniform traffic control devices. *There are 14 parts and 4 Amdts, 2007 - 2011.*
- AS/NZS 1866 1997 Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes.
- AS 4100 1998 Steel structures *Plus 1 Supplement, 1999, 1 Amdt 2012.*
- AS/NZS 4680 2006 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles.
- Comply with requirements of statutory and local authorities.

105 Shop Drawings

Comply with DOCUMENT 00800, clause 27.

Provide shop drawings for major items supplied hereunder.

- A. Contract drawings and details provided are indicative as to general and minimum requirements, and do not show conditions.
Develop details not shown and in conformity with the indicative details shown.
- B. Take and confirm dimensions on site, before preparing shop drawings where possible.
- C. Submit detailed shop drawings for fabrication and installation of major metalwork. Show plans, elevations and detailed sections; indicate materials, finishes, types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and full- scale templates of blocking, anchorages, sleeves and bolts installed by others.
- D. Evidence of payment of any relevant fees, where applicable.

106 Samples

- A. Sample welds: if requested, provide samples of weld types, including samples of railings joined at right angles and at typical acute angles, welded and ground smooth, for approval. If not acceptable, provide additional samples until approved. Approved samples establish quality of similar work of this section.
- B. Check on delivery: request project manager to check materials on delivery to site for quality, and materials not meeting the requirements of this specification or equal to approved samples will be rejected.
Return rejected materials to the fabricator at the fabricator's expense.
- C. Finish: provide samples of specified finishes when requested.

107 Warranty

Provide warranty covering the work against defective materials and workmanship for a period ... years from the date of Practical Completion. Include a statement that the whole of the work has been carried out in accordance with relevant Australian Standards and codes and manufacturer's instructions in effect at the time of installation.

PART II MATERIALS**201 Materials**

Select from: access control, auto gate, operators, barriers, bollards, car turntables, fences and gates, keycard control systems, turnstiles.

Item	Thickness	Manufacturer	Material	Model	Number	Finish	Size

Item	Thickness	Manufacturer	Material	Model	Number	Finish	Size

202 Finish

Materials exposed to weather maybe either:

Mild steel - hot dipped galvanised after fabrication or chromate pre-treated followed by polyester powder coating.

Stainless steel type 304 or 316.

Comply with relevant codes of practice or manufacturers' recommendations.

203 Welding Steel

General: details of joints, the techniques of welding employed, the appearance and quality of welds made and the methods used to correct defective work; conform to requirements of AS/NZS 1554.

Welds exposed to view: grind smooth to project manager's approval.

Concealed welds: grind smooth before galvanising.

Tack or skip welding: at regular intervals, very neat; not permitted if material is to be hot dip galvanised.

Remove weld spatter.

Certification: only welders who have previously been qualified by tests may weld.

Tack welding or skip welding will NOT be permitted where items are to be galvanised. Weld continuously form joints and connections to exclude water and to permit draining during galvanising.

Stainless steel welding: refer AS/NZS 1554.

204 Connection Design

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment. Take possible care to prevent damage.

- A. Welding external items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts will be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Weld shop connections for steel fabrications, and bolt field connections.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Mill to a close fit machined joints. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.
- G. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop.

205 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

Fasten galvanised items with galvanised fasteners.

PART III EXECUTION

301 Examination

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of relevant conditions.

302 Preparation

- A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting Drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage.

1. Treat damaged fabrications as follows:

Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.

2. Architectural metalwork: Returned to shop for repair or replacement.

- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

- A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances confirm to Australian Standards.
- C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted under conditions. Fabrications may be cut shorter with power hacksaws on site. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.

305 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Cleaning

Clean materials installed to the satisfaction of the project manager.
Remove temporary protective coatings.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section covers the supply and installation of manufactured unit kitchen items.

It includes but is not limited to:

Kitchen cabinets and cupboards

Pantry shelves

Shelving

Counters

Tearoom cupboards

Other:

102 Related Work

Co-ordinate and co-operate with the following trades:

Carpentry

Wall finishes

Floor finishes

Ceiling finishes

Plumbing

Electrical installation

Other:

103 Quality Assurance

Manufacturers and installers are required to be widely experienced in the relevant aspects and class of work required for this section.

At a place selected by the project manager, construct a prototype of a completed installation. Include in this prototype all elements required by this specification, finished in every respect. When approved by the project manager, each prototype remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the Australian Standards:

AS/NZS 1859 Reconstituted wood-based panels – Specifications.

1859.1 2004 Particleboard. *Plus 2 Amdts, 2006 - 2011.*

There are 3 other parts, 2004 – 2005, 3 Amdts, 2006, 1 Amdt 2009.

AS 2754.2 1991 Adhesives for timber and timber products - Polymer emulsion adhesives.

AS/NZS 2924 High pressure decorative laminates – Sheets made from thermosetting resins.

There are 2 parts, 1998.

AS/NZS 4386 Domestic kitchen assemblies.

4386.1 1996 Kitchen units.

4386.2 1996 Installation.

105 Submissions

Submit the following prior to fabrication:

Product literature on proposed hardware items including components.

Technical data on melamine laminates, stone or other materials

Technical data and samples of substrate materials.

Thickness of materials at typical locations.

106 Delivery, Handling and Storage

Do not deliver work to the site until after completion of other trade activities which could soil, damage or cause deterioration of manufactured joinery items.

Prevent soiling, damage or deterioration during delivery, storage and handling.

Keep site storage to a minimum. Install directly in place, but refer to clause 302.

If circumstances make storage necessary in areas other than the final location, store only in those that meet the requirements specified for installation areas.

PART II MATERIALS**201 Acceptable Manufacturers****202 Materials**

Model No.	Style	Part No.	Finish	Timber Type	Size

A. Carcass units:
(Ends and vertical divisions)

1.	Material:	Medium Density Fibreboard.
	Name:	
	Thickness:	
2.	Material:	
	Name:	
	Thickness:	

B. Floors of carcass:

1.	Material:	Medium Density Fibreboard.
	Name:	
	Thickness:	
2.	Material:	
	Name:	
	Thickness:	

C. Shelves within carcass:

1.	Material:	Medium Density Fibreboard
	Name:	
	Thickness:	
2.	Material:	
	Name:	
	Thickness:	

D. Doors of cabinets:

1.	Material:	Medium Density Fibreboard
	Name:	
	Thickness:	
2.	Material:	
	Name:	
	Thickness:	

E. Base (below floor of carcass):

1.	Material:	Medium Density Fibreboard
	Name:	
	Thickness:	
2.	Material:	
	Name:	
	Thickness:	

F. Bulkheads (above cupboards or overhead cabinets):

1.	Material:	Medium Density Fibreboard
	Name:	
	Thickness:	
2.	Material:	Plasterboard
	Thickness:	
	Frame:	Metal stud frame or timber stud frame
	Finish:	Paint as selected

G. Back of Carcass:

1.	Material:	Medium Density Fibreboard
	Name:	
	Thickness:	3mm
2.	Material:	
	Name:	
	Thickness:	

H. Edge Strips and Inserts:

1.	Material:	
	Name:	
	Thickness:	
2.	Material:	
	Name:	
	Insert:	

I. Laminates:

1. Bench top	Manufacture:	
	Type:	
	Colour:	
2. Doors	Manufacture:	
	Type:	
	Colour:	
3. Carcass	Manufacture:	
	Type:	
	Colour:	
4. Internal surfaces	Manufacture:	
	Type:	
	Colour:	
5. Front of drawers	Manufacture:	
	Type:	
	Colour:	

J. Bench Tops:

	Material: "Hytex", "Corian", "Granite", "Marble", other.	
	Type:	
	Thickness:	

203 Fasteners and Adhesives

A. Metal fasteners:

1.	Manufacturer:	
	Type:	
2.	Manufacturer:	
	Type:	

B. Plastic fasteners:

1.	Manufacturer:	
	Type:	
2.	Manufacturer:	
	Type:	

C. PVA adhesives:
Comply with AS 2754.2.

	Manufacturer:	
	Type:	

D. Contact adhesives:
Comply with relevant Australian Standard.

	Manufacturer:	
	Type:	

204 Hardware

A. Hinges:

- a. Manufacturer:
 - i. Type:
 - ii. No. per door:

B. Catches:

- a. Manufacturer:
 - i. Type:
- C. Door handles:
 - a. Manufacturer:
 - i. Type:
- D. Drawer handles:
 - a. Manufacturer:
 - i. Type:
- E. Other items:
- F. Sliding door tracks:
 - a. Manufacturer:
 - b. Type:
- G. Pot drawer runners:
 - a. Manufacturer:
 - b. Type:
- H. Adjustable shelf brackets:
 - a. Manufacturer:
 - b. Type:
- I. Glazed shelves:
 - a. Thickness:
 - b. Type:

205 Fabrication

Do not fabricate any component until a thorough series of measurements has been made at the site after the installation of finishes.

Refer clause 301 below.

Construct by screwing and gluing or other approved method. A dry stapled assembly will not be approved.

Fabricate bench tops as indicated in a manner recommended by the material's manufacturer. Fabricate units without joints unless counter length exceeds maximum available length of materials.

Seal joints between counter and splash back with matching colour silicone. Wherever possible, per-cut openings to receive hardware, appliances, plumbing fixtures, electrical work and similar items.

Locate openings accurately using templates or roughing-in diagrams for proper size and shape. Smooth edges of cut-outs and, where located in bench tops and similar exposures, seal edges of cut-outs with a water resistant coating.

Back prime all concealed solid timber surfaces prior to installation.

Install fasteners, hinges etc. in accordance with manufacturer's instructions. When in doubt about suitability, consult with manufacturer of the items specified or selected.

206 Inspection Before Delivery

Advise project manager when the first of any group of items is ready for inspection not less than four days before delivery is due at the site. Where work is found not to comply with documentation, the project manager will order rectification. The project manager will be the sole decision-maker regarding compliance or non-compliance.

PART III EXECUTION

301 Examination

Visit the site and inspect conditions. Check dimensions and compare all aspects with the drawings and specification. Resolve differences before ordering materials or starting work.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of all conditions.

302 Preparation for Installation

Prior to installing, condition joinery to the average humidity conditions prevailing in the installation areas.

Delivery anchoring devices and similar inserts required to be built into substrates well in advance of the fixing of fittings and provide full details when they are to be fixed by others.

Prior to installation, examine shop-fabricated work for completeness and remedy and deficiencies. Include back priming. Remove packing where not required.

Thoroughly clean all floors and walls that will be permanently concealed by joinery.

303 Installation

Use concealed shims as required to install the work plumb, level, straight and distortion free within the following tolerances:

- 1mm in 800mm for plumb and level (including bench tops),
- 0.5mm maximum offsets in flush adjoining surfaces,
- 2mm maximum offsets in revealed adjoining surfaces.

Scribe and cut to fit adjoining work; refinish cut surfaces or repair damaged finishes at cuts.

Secure joinery with anchors of blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required to complete the installation. Except where pre-finished matching fastener heads are required, use fine finishing nails, countersunk and filled flush. Use a matching filler where a transparent finish is required.

Install casework without distortion so that doors will fit openings properly and be accurately aligned.

304 Hardware

Install all door and joinery hardware as scheduled, listed and required in full compliance with the manufacturer's recommendations.

Adjust as needed to centre doors in openings.

305 Adjustments, Cleaning, Finishing and Protection

- A. Finish the work specified in this Trade Section and remedy anything not finished at the shop or any other stage prior to completion.
- B. Adjust joinery to achieve a uniform appearance.
- C. Lubricate and clean hardware making any final adjustments needed for proper operation. Remove all handling marks from visible joinery surfaces.
- D. Protection: do everything needed to ensure that all work is without damage or deterioration at completion.

306 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section covers the supply and installation of manufactured casework items.

It includes but is not limited to:

Kitchen cabinets and cupboards

Shelving

Display units

Bathroom cabinets

Laundry cabinets

Counters

Tearoom cupboards

Wardrobes.

102 Related Work

Co-ordinate and co-operate with the following trades:

Carpentry

Wall finishes

Floor finishes

Ceiling finishes

Plumbing

Electrical installation

103 Quality Assurance

Manufacturers and installers are required to be widely experienced in the relevant aspects and class of work required for this section.

At a place selected by the project manager, construct a prototype of a completed installation. Include in this prototype all elements required by this specification, finished in every respect. When approved by the project manager, each prototype remains part of the work and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the Australian Standards:

AS/NZS 1859

Reconstituted wood-based panels – Specifications.

1859.1 2004 Particleboard. *Plus 2 Amdts, 2006 - 2011.*

There are 3 other parts, 2004 – 2005, 3 Amdts, 2006 - 2009.

AS 2754.2 1991

Adhesives for timber and timber products - Polymer emulsion adhesives.

AS/NZS 2924

High pressure decorative laminates – Sheets made from thermosetting resins.

There are 2 parts, 1998.

AS/NZS 4386

Domestic kitchen assemblies.

4386.1 1996 Kitchen units.

4386.2 1996 Installation.

AS 4786.2 2005

Timber flooring - Sanding and finishing.

105 Submissions

Submit the following prior to fabrication:

Product literature on proposed hardware items including components.

Technical data on melamine laminates proposed for use.

Technical data and samples of substrate materials.

Thickness of materials at typical locations.

106 Delivery, Handling and Storage

Do not deliver work to the site until after completion of other trade activities which could soil, damage or cause deterioration of manufactured joinery items.

Prevent soiling, damage or deterioration during delivery, storage and handling.

Keep site storage to a minimum. Install directly in place, but refer to clause 302.

If circumstances make storage necessary in areas other than the final location, store only in those that meet the requirements specified for installation areas.

PART II MATERIALS**201 Materials**

A. Carcass units: (ends and vertical divisions).

Description	Details of materials
Material:	Medium density fibreboard
Name:	
Thickness:	

B. Floors of carcass:

Description	Details of materials
Material:	Medium density fibreboard.
Name:	
Thickness:	

C. Shelves within carcass:

Description	Details of materials
Material:	Medium density fibreboard
Name:	
Thickness:	

D. Doors of cabinets:

Description	Details of materials
Material:	Medium density fibreboard
Name:	
Thickness:	

E. Base (below floor of carcass):

Description	Details of materials
Material:	Medium density fibreboard
Name:	
Thickness:	

F. Bulkheads (above cupboards or overhead cabinets):

Description	Details of materials
Material:	Medium density fibreboard
Name:	
Thickness:	
Material:	Plasterboard
Thickness:	
Frame:	Metal stud frame or timber stud frame
Finish:	Paint as selected

G. Back of carcass:

Description	Details of materials
Material:	Medium density fibreboard
Name:	
Thickness:	3mm

H. Edge strips and inserts:

Description	Details of materials
Material:	
Name:	
Thickness:	
Insert:	
Material:	
Name:	

I. Laminates: also refer to 201 G and 201 H:

Item	Description	Details
Bench top	Manufacture:	
	Type:	
	Colour:	
Doors	Manufacture:	
	Type:	
	Colour:	
Carcass	Manufacture:	
	Type:	
	Colour:	
Internal surfaces	Manufacture:	

Item	Description	Details
	Type:	
	Colour:	
Front of drawers	Manufacture:	
	Type:	
	Colour:	

J. Bench tops:

Description	Details
Material:	Hytex, Corian, Granite, Marble.
Type:	
Thickness:	

202 Fasteners and Adhesives Note: refer Hafele catalogue.

A. Metal fasteners:

Manufacturer	Details
Type:	
Type:	

B. Plastic fasteners:

Manufacturer	Details
Type:	
Type:	

C. PVA adhesives:
Comply with AS 2754.2.

Manufacturer	Details
Type:	

D. Contact adhesives:
Supply the manufacturer's instructions and incorporate into this specification.

Manufacturer	Details
Type:	

203 Hardware

Item	Manufacturer	Type
Hinges		
Catches		
Door handles		
Drawer handles		
Sliding door tracks		
Pot drawer runners		
Adjustable shelf brackets		
Glazed shelves		
Other items		

204 Fabrication

Construct by screwing and gluing or other approved method. A dry stapled assembly will not be approved. Fabricate bench tops as indicated in a manner recommended by the material's manufacturer. Fabricate units without joints unless counter length exceeds maximum available length of materials. Seal joints between counter and splash back with matching colour silicone. Wherever possible, pre-cut openings to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately using templates or roughing-in diagrams for proper size and shape. Smooth edges of cut-outs and, where located in bench tops and similar exposures, seal edges of cut-outs with a water resistant coating. Back prime all concealed solid timber surfaces prior to installation.

Install fasteners, hinges etc. in accordance with manufacturer's instructions. When in doubt about suitability, consult with manufacturer of the items specified or selected.

205 Inspection Before Delivery

Advise project manager when the first of any group of items is ready for inspection not less than 4 days before delivery is due at the site. Where work is found not to comply with documentation, the project manager will order rectification. The project manager will be the sole decision-maker regarding compliance or non-compliance.

PART III EXECUTION

301 Examination

Visit the site and inspect conditions. Check dimensions and compare all aspects with the drawings and specification. Resolve differences before ordering materials or starting work. Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of all conditions.

302 Preparation for Installation

Prior to installing, condition joinery to the average humidity conditions prevailing in the installation areas.

Deliver anchoring devices and similar inserts required to be built into substrates well in advance of the fixing of fittings and provide full details when they are to be fixed by others.

Prior to installation, examine shop-fabricated work for completeness and remedy any deficiencies. Include back priming. Remove packing where not required.

Thoroughly clean all floors and walls that will be permanently concealed by joinery.

303 Installation

Use concealed shims as required to install the work plumb, level, straight and distortion free within the following tolerances:

- 1mm in 800mm for plumb and level (including bench tops),
- 0.5mm maximum offsets in flush adjoining surfaces,
- 2mm maximum offsets in revealed adjoining surfaces.

Scribe and cut to fit adjoining work; refinish cut surfaces or repair damaged finishes at cuts.

Secure joinery with anchors of blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required to complete the installation.

Except where pre-finished matching fastener heads are required, use fine finishing nails, countersunk and filled flush. Use a matching filler where a transparent finish is required.

Install casework without distortion so that doors will fit openings properly and be accurately aligned.

304 Hardware

Install all door and joinery hardware as scheduled, listed and required in full compliance with the manufacturer's recommendations.

Adjust as needed to centre doors in openings.

305 Adjustments, Cleaning, Finishing and Protection

- A. Finish the work specified in this trade section and remedy anything not finished at the shop or any other stage prior to completion.
- B. Adjust joinery to achieve a uniform appearance.
- C. Lubricate and clean hardware making any final adjustments needed for proper operation.
- D. Remove all handling marks from visible joinery surfaces.
- E. Protection: do everything needed to ensure that all work is without damage or deterioration at completion.

306 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of this trade section covers the supply and installation of floor mats and/or recessed mats and frames including but not limited to:

102 Related Work

Co-ordinate and co-operate with the following trades:
 Concrete Metalwork
 Floor tiling Carpet
 Resilient flooring

103 Quality Assurance

Suppliers and installers are required to be widely experienced in the relevant aspects and class of work required for this section. At a place selected by the project manager, construct a prototype of a completed installation of floor mat and frame.
 On completion of the prototype and approval of all aspects of the installation, the work will remain in place and become the standard for the remaining work.

104 References

(Not used).

105 Submissions

Provide samples and data sheets of all materials.
 Obtain project manager's approval for each item before ordering.

106 Delivery, Handling and Storage

Deliver all materials in the packaging of the supplier bearing the brand name, colour, thickness and other relevant data.
 Store all materials in a secure dry area away from other materials which may cause deterioration.

107 Warranty

Provide a warranty covering all aspects of the installation performed by this trade, against defective materials and workmanship for a period of ... years from the date of completion.
 Include a statement that the whole of the work has been carried out in accordance with the relevant Australian Standards and the instructions of the manufacturers of components in effect at the time of installation.

PART II MATERIALS

201 Materials

Item	Type Required	
Floor Mat		
Manufacturer		
Type		
Size		
Colour		
Location		
Frame		
Material	20 x 30 x 3 mm thick brass angle	
Size	To suit size of mat	
Anchors	Brass or galvanised steel	
Screed		
Cement	Portland cement	
Sand	Clean, washed, sharp, sieved and graded, complying with the following limits:	
Sand grade	No	% Passing sieve
	4 (4.75mm)	100
	8 (2.36mm)	95-100%
	100 (150 microns)	25% max
	200 (75 microns)	10% max
Fineness modulus	1.6 to 2.5%	
Water demand ratio by weight	0.65% maximum	
Aggregate	Passing 4.75mm sieve 80% Passing 6.00mm sieve 90% Passing 8.00mm sieve 100%	

Item	Type Required
Water	Clean, drinking quality
Mesh	Galvanised steel, welded wire fabric min 2.5mm diameter wires at 100mm centres each way

202 Fabrication

Comply with the relevant Standards.

Contractor to check all dimensions on site.

Contractor to provide prototype for project manager's approval prior to manufacture.

Contractor to present sample to project manager for final selection.

203 Schedule of Quantities

(Refer to drawings for locations of item numbers).

Item No	Type	Size	Material W x L x D	Remarks
FM 1				
FM 2				
FM 3				

PART III EXECUTION

301 Examination

Examine the site conditions applicable to each installation. Arrange for correction if required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Installation

Provide mat recess in floor to accept the size of mat required.

Refer to drawings for location of floor mats.

Frame to be provided with anchors and cast-in place or to be fixed in the mat recess with masonry anchors.

Place screed in mat recess up to and level with the top face of the horizontal leg of the brass angle frame.

303 Preparation

Comply with referenced Standards and manufacturer's recommendations. Do not install material until space is enclosed and weatherproof and until wet work in space is completed and dry.

304 Cleaning and Protection

On completion of mat recess or area remove all dirt, scraps of left over materials and vacuum the area clean.

Remove and replace work which cannot be successfully repaired or cleaned.

305 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

Work will be deemed complete after being inspected and approved by project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete installation of sauna equipment and finishes, including but not limited to:

Floor tiles and coving
 Wall and ceiling lining and insulation
 Benches
 Power supply
 Heating unit
 Thermometer
 Hygrometer
 Light fitting
 Door

102 Related Work

Co-ordinate and co-operate with the following trades:

Ceramic tile	Carpentry
Electrical installation	Glass and glazing

103 Quality Assurance

Engage only experienced tradespeople, licensed or approved by the suppliers of materials where applicable.
 Provide evidence of the licence to the project manager.

104 References

Comply with relevant Australian Standards where such apply to any of the work in this trade section.

AS 1428	Design for access and mobility.
	1428.1 2009 General requirements for access – New building work.
	<i>There are 5 other parts. 1992 – 2010.</i>

AS/NZS 3350.2.53 1998	Safety of household and similar electrical appliances – Particular requirements - Sauna heating appliances. <i>Plus 2 Amdts, 2001-2007.</i>
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Comply with requirements of any statutory authority having jurisdiction over the work.

105 Submissions

Before ordering materials, submit samples and/or product data of specified products to the project manager.

106 Warranty

Provide a warranty to the proprietor for a period of year(s) from the date of Practical Completion, covering the whole of the work of this trade section.

For the period of the warranty and without cost to the proprietor, provide an undertaking to make good, including any finish or thing disturbed during the making good, any defect resulting from inadequate materials or workmanship.

PART II MATERIALS**201 Acceptable Manufacturers****202 Proprietary Item**

Name of unit:

Size:

Model no.:

Power supply: single phase for light fittings.

Single phase for up to 10.0KW heater.

Three phase for 10.0KW heater.

Heating unit:

Thermometer: glass covered bi-metal type, wall-mounted.

Hygrometer:

Ventilation: inlet fixed outlet, outlet adjustable both of timber slats.

Light fitting: ceramic lamp holder with fully insulated glass cover or wood slat cover.

Bucket and ladle: cedar or birch.

Stones: diabase type.

Door: cedar frame and lining with 6.38mm thick clear laminated glass vision panel.

203 Materials

In accordance with manufacturer's recommendations.

A.	Floor tiles: ceramic tile, non-skid, size:	colour:	type:
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B.	Wall studs: oregon
	Ceiling joists: oregon

- C. Wall and ceiling lining: 100mm wide western red cedar, ship-lap or other similar profile, 10mm thick; non-corrosive secret fixed nails. Insulation batts 100mm thick between studs and above ceiling lining, R3.0 minimum.
- D. Bench seats: western red cedar rails, supporting 38mm thick benches, 500mm wide, set in two tiers. Rails to span from wall to wall.
Timber to timber fixing to be timber dowels. Metal fixings not permitted.

PART III EXECUTION

301 Examination

Examine the conditions in the Sauna Room. Arrange with the contractor for correction of any non-optimum conditions.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Preparation

Prepare each surface of floor, walls and ceiling before installation of finishing materials.

303 Installation

- A. Floor tiles: Install on level floor. Seal joints with epoxy grout as recommended by the tile and grout manufacturer.
Against walls under benches, form a 60mm radius cove in cement mortar.
Fix tiles to the curved surface.
- B. B Wall and ceiling lining: provide and fix square stopping bead covering joints at wall corners and as a cornice. Install insulation batts between wall studs and ceiling joists.
 - 1. Fix cedar boards to insulation-filled wall framing and ceiling framing with secret nailing.
- C. C Bench seats: construct rails from wall to wall, under benches.
No supports are to reach the floor.
 - 1. Secure framing to studs in walls.
 - 2. Secure benches with cedar dowels to rails.
- D. Power supply: provide power to heating unit directly wired, or externally mounted as instructed.
- E. Heating unit: install where directed and secure to wall as instructed by supplier.
- F. Thermometer and hygrometer: install on walls where directed.
- G. Light fitting: mount where instructed and connect to power.
- H. Door: install door on corrosion resistant hinges.
- I. Floor-waste: install where directed and connect to drain.

304 Field Quality Control

A representative of the material manufacturer or supplier is required to be present at the time of locating materials in each space to ensure correct installation first time.

305 Repairs

Should damage occur to any material or surface during installation, make good or replace without cost to the proprietor.

306 Cleaning

On completion, clean all surfaces, remove debris and leave in satisfactory condition.

307 Commissioning

Operate all equipment on a test basis.

Repair any faults which occur.

Commissioning is considered completed when installation has operated continuously for 24 hours without fault.

308 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, fabricate, supply and install each if the items listed below, including but not limited to:

- A. Above ground pool
- B. Prefabricated pool
- C. In-pool lighting
- D. Water pumping equipment
- E. Water filtering equipment
- F. Water treatment equipment
- G. Metalwork, ladders etc.
- H. Safety fencing and self-closing gate

102 Related Work

Co-ordinate and co-operate with the following trades:

Site preparation, excavation	Plumber, hot and cold water
Drainage	Concrete small works
Concrete screeds	Metalwork
Tanking	Cement render
Ceramic tile	Painting
Spa baths	Electrical Installation

103 Quality Assurance

Contractor qualifications: minimum 5 years' experience in each item required by this specification. Submit evidence of completed similar work with contact names and telephone numbers.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1428	Design for access and mobility. 1428.1 2009 General requirements for access – New building work. <i>There are 5 other parts. 1992 – 2010.</i>
AS/NZS 1838 1994	Swimming pools - Premoulded fibre-reinforced plastics - Design and fabrication.
AS/NZS 1839 1994	Swimming pools - Premoulded fibre-reinforced plastics – Installation.
AS 1926	Swimming pool safety. 1926.1 2012 Safety barriers for swimming pools. 1926.2 2007 Location of safety barriers for swimming pools. <i>Plus 2 Amdts, 2008 - 2011.</i> 1926.3 2010 Water recirculation systems. <i>Plus 1 Amdt, 2011.</i>
AS 2160.1 1998	Contract for the supply and construction of a swimming pool or spa – Concrete swimming pool or spa.
AS 2560.2.5 2007	Sports Lighting – Specific applications – Swimming pools.
AS 2610	Spa pools. 2610.1 2007 Public spas. <i>Plus 1 Amdt, 2011.</i> 2610.2 2007 Private spas. <i>Plus 1 Amdt, 2011.</i>
AS 2783 1992	Use of reinforced concrete for small swimming pools. <i>Plus 2 Amdts, 1992-1994.</i>
AS 2820 1993	Gate units for private swimming pools. <i>Plus 1 Amdt, 2000.</i>
AS 3634 1989	Solar heating systems for swimming pools

105 Submissions

- A. Shop Drawing: provide a shop drawing showing precise layout of every component of the system and the location of each.
Comply with Document 00800 clause 27 shop drawings.
- B. Submit samples of each component for approval of the project manager before ordering material.
- C. Evidence of payment of relevant fees, where applicable,

106 Project Conditions

Inspect drawings and visit site. Check aspects of required work and refer any discrepancy to builder and/or project manager, for decision.

107 Warranty

Provide a warranty to the proprietor for a period of year(s) from the date of Practical Completion, covering the whole of the work of this trade section.

For the period of the warranty and without cost to the proprietor, provide an undertaking to make good, including any finish or thing disturbed during the making good, any defect resulting from inadequate materials or workmanship.

PART II MATERIALS

201 Acceptable Manufacturers

The following manufacturers are acceptable for supply of the following materials:

- A. Above ground pool:
- B. Prefabricated pool:
- C. In-pool lighting:
- D. Water pumping equipment:
- E. Water filtering equipment:
- F. Water treatment equipment:
- G. Metalwork (ladders, diving boards etc.)
- H. Safety fencing and gate
- I. OTHER.

202 Materials

Item:	Manufacturer	Size	Model No.	Finish	Colour

PART III EXECUTION

301 Examination

Obtain essential services information (dial before you dig).

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of relevant conditions.

302 Preparation

Refer clause 102 above. Ensure that other trades involved in pool construction and fitout are co-operative and co-ordinated to complete the work without delay.

- A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in construction. Co-ordinate delivery of such items to the project site.

303 Installation

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage.
 - 1. Treat damaged fabrications as follows:
 - 2. Return to supplier for replacement as soon as possible.
- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to installation.
- C. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.
- D. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field.
 - 1. Fabrications may be cut shorter with power hacksaws on site.
 - 2. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.
- E. Comply throughout with the manufacturers' written instructions.

304 Field Quality Control

Where considered necessary by the project manager, arrange for the manufacturer of products to instruct installers regarding correct installation.

305 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

306 Cleaning

Clean materials installed to the satisfaction of the project manager.

Remove temporary protective coatings.

307

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply and install a complete installation of equipment for the spa, including but not limited to:

Spa bath
Water jets
Air jet with heater blower
Pumps, cold or hot
Floor waste
Stainless steel handrails
Fencing and self-closing gate for external spa.

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete	Plasterboard
Brickwork	Plumber Hot and Cold Water
Carpentry	Metalwork
Painting	Sewerage & Drainage

Note: Plumbing and controls trades are required to co-ordinate closely with concrete trade.

Piping and controls will be placed before concrete is poured for floors and for walls. Ensure careful placement of piping and controls and maintenance in position during pouring of concrete.

103 Quality Assurance

Engage only experienced tradespeople, licensed or approved by the suppliers of materials.

Provide evidence of the licence or approval to the project manager.

104 References

Comply with relevant Australian Standards where such apply to any of the work in this Trade Section.

AS 1428	Design for access and mobility.
	1428.1 2009 General requirements for access – New building work.
	<i>There are 5 other parts. 1992 – 2010.</i>
AS 2610	Spa pools.
	2610.1 2007 Public spas. <i>Plus 1 Amdt, 2011.</i>
	2610.2 2007 Private spas. <i>Plus 1 Amdt, 2011.</i>
AS 3861 1991	Spa baths.

Comply with requirements of any statutory authority having jurisdiction over the work.

105 Submissions

Before ordering materials, submit samples and/or product data of specified products to the project manager.

106 Delivery Handling and Storage

Keep on-site storage of materials to a minimum, delivering them as required for direct installation. Be responsible for loss and damage to delivered materials, both stockpiled and in place.

107 Warranty

Provide a warranty to the proprietor for a period of year(s) from the date of Practical Completion, covering the whole of the work of this trade section, as listed in clause 101.

For the period of the warranty and without cost to the proprietor, provide an undertaking to make good, including any finish or thing disturbed during the making good, any defect resulting from inadequate materials or workmanship.

PART II MATERIALS**201 Acceptable Manufacturers**

Jets:

Blowers:
Air controls:
Heater:
Pumps:
Spa Bath:

202 Materials

Spa bath:
Jets:
Air controls:
Pumps:
NOTE: 30 minute/complete turnover of water required.
Blowers:

Heater:
Piping cables and other supply lines:
Supply all necessary items and connecting devices required.
Waterproof adhesives throughout.
Handrails: stainless steel tube for handrails and standards complete with flanged ends.
Floor Waste:
Provide stainless steel bolts for fixing to structure.
Provide controls for the following items:

PART III EXECUTION

301 Examination

Examine the conditions before any installation starts. Ensure that conditions are satisfactory particularly for laying of pipes and cables.
Arrange with the contractor for correction of any non-optimum conditions.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.

302 Preparation

Prepare each surface of floor, walls etc. before installation of finishing materials and equipment.

303 Installation

Locate and install in positions shown on drawings or as directed by the project manager, the following equipment:

Spa bath	Pumps
Jets	Blowers
Air controls	Heater

Floor waste: provide floor waste adjacent to spa bath.

Make secure as instructed and install connecting piping, wiring etc. and connect to power supply.

304 Handrails

Install stainless steel handrails and all components as recommended by manufacturer.

305 Field Quality Control

A representative of the material manufacturer or supplier is required to be present at the time of locating materials in each space to ensure correct installation first time.

306 Repairs

Should damage occur to any material, equipment or surface during installation, make good or replace without cost to the proprietor

307 Cleaning

On completion, clean all surfaces, remove debris and leave in satisfactory condition.

308 Commissioning

Operate all equipment on a test basis.

Repair any faults which occur.

Installation is considered completed when it has operated continuously for 24 hours without fault.

309 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager

END OF SECTION

PART I GENERAL

101 Scope

Supply, install and commission complete system of electricity power generation including but not limited to:
Photovoltaic (PV) modules (solar electricity).
Wind turbines.
Provide also a complete system of power reticulation for the building with outlets and other needed items.

102 Related Work

Co-ordinate and co-operate with the following trades:

Metal decking and roof plumbing	Metalwork
Electrical installation	

103 Quality Assurance

- A. Provide written evidence to the project manager and/or engineer of required experience and skills of personnel proposed for this project.
- B. Ensure electrical and roof work is performed only by tradesmen with qualifications. Submit evidence of these qualifications.

104 **References**

Comply with applicable portions of the following Australian Standards:

AS/NZS 2712 2007	Solar and heat pump water heaters – Design and construction. <i>Plus 2 Amdts, 2011.</i>
AS/NZS 4234 2008	(formerly Solar water heaters) Heated water systems. <i>Plus 2 Amdts, 2011.</i>
AS/NZS 4445.1 1997	Solar heating - Domestic water heating systems – Performance rating..
AS 4509	Stand-alone power systems
4509.2 2010	Stand-alone power systems - System design guidelines.
4509.3 1999	(Available Superseded) Stand-alone power systems - Installation and maintenance. <i>Plus 1 Amdt. 2000.</i>

AS/NZS 5033 2012 Installation and safety requirements for photovoltaic (PV) arrays
AS 5389 (Int) 2013 Solar heating and cooling systems—Calculation of energy consumption
Comply also with the requirements of environmental and statutory authorities having jurisdictions.

105 Submissions

Submit data on units and manufacturers of other components.
Provide drawings of preferred locations and sizing details of roof top platforms required to support units where they are to be provided by others.
Submit to project manager operation and maintenance instructions for units and other items.
Copies of minutes of pre-installation conference.
Evidence of payment of relevant fees, where applicable.

106 Delivery, Handling and Storage

Arrange with builder dates of delivery and installation of units and associated components, crantage or handling to installed position and maintenance arrangements.
Where possible, install materials directly in place. Store other materials in a secure location on site as directed by builder.

107 Warrantv

Provide a warranty to the proprietor via the project manager that units or components which fail within the warranty period of years from the date of Practical Completion will be repaired or replaced without cost to the proprietor.

108 Maintenance

Provide an agreement form to be submitted to proprietor offering regular maintenance of the installation for the agreed upon period.
Detail the precise activities of maintenance offered.

PART II MATERIALS

201 Acceptable Manufacturers

Components to be specified may consist of the following:

- Photovoltaic modules
- Panel mounting
- Batteries suitable for solar charging
- Regulator and control board.
- Inverter charger
- Wind generator

202 Materials

Item	Manufacturer	Size	Model No	Finish	Output Rating

203 Fabrication

Before delivery to site, pre assemble where possible all items to ensure proper fit and dimension of each item. Disassemble and pack carefully for shipping to the site.

PART III EXECUTION**301 Examination**

Inspect drawings and visit site. Check aspects of required work such as plant platforms. Refer any discrepancy to builder and/or project manager for decision and correction.
Obtain essential services information (dial before you dig).
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant
Start of work on site means total acceptance of conditions.

302 Site Inspection

On delivery and unloading, inspect for damage and arrange immediate replacement if necessary.

303 Mounting

Place equipment where directed.
Co-operate with roof installer to ensure watertight installation.

304 Condensate Drains

Drain roof-top units to the nearest downpipe or gutter via a trapped 32mm dia PVC pipe.

305 Connection to Wiring

Connect the installation to reticulated wiring in accordance with relevant wiring regulations. Install required connections, outlets etc.

306 Commissioning

Operate the system for ten days and record results. Rectify any faults. Obtain engineers' and project managers' approval on completion of commissioning.

307 Completion

Complete the contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

- 101 Scope**
Supply and install surveillance equipment with associated cable installation. Equipment may include video, door answering, intrusion detection, movement detection and monitoring.
- 102 Related Work**
Co-ordinate and co-operate with the following trades:

Floor construction	Electrical installation
Wall construction	Communications cabling
Ceiling construction	Finishing trades
- 103 Quality Assurance**
Perform work employing experienced tradespeople familiar with the quality of work required and who are AUSTEL-licensed in accordance with requirements of TS 009.
Arrange for a conference with relevant other trades to decide upon matters which affect them.
- 104 References**
Comply with applicable portions of the following Australian Standards:

AS/NZS 1367 2007	Coaxial cable and optical fibre systems for the RF distribution of analog and digital television and sound signals in single and multiple dwelling installations.
HB 252 2007	Communications Cabling Manual.
- 105 Submissions**
On request of the project manager, submit for approval any item related to the installation, including: data sheets on materials; wiring diagrams - plans; samples of products; licence certificates and obtain written approval of each item so requested.
Provide project manager with copies of minutes of pre-installation conference .
- 106 Delivery, Handling and Storage**
Deliver, unload and store in a secure area, in accordance with manufacturer's instructions where applicable, to prevent damage, deterioration and loss.
- 107 Warranty**
Provide a warranty covering aspects of required work of this trade section, for a period of not less than years from the date of Practical Completion.

PART II MATERIALS

- 201 Acceptable manufacturers**
- 202 Materials**

A.	Video Equipment:
B.	Door answering;
C.	Intrusion detection:
D.	Movement detection:
- 203 Cable Materials**
As recommended by supplier of equipment.

PART III EXECUTION

- 301 Examination**
Examine carefully the proposed route for cable installation and installation of other components. Obtain project managers approval before executing the work.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.
- 302 Preparation**
Provide necessary safety or security controls where required to ensure safe practices and installations.
Provide needed penetration, openings, chases and structures for safe secure and effective installation of cable.
If installation is required in the electrical riser, co-operate with the electrician.
- 303 Installation**
Refer to installation clauses for each item.

304 Marking and Identification

305 Administration

306 Field Quality Control

- A. Where requested by supply authority supply test data obtainable from component manufacturer.
- B. Arrange for inspections by component manufacturer's representative to ensure correct application, use and installation.

307 Adjust and Clean

Adjust installations of components to ensure proper fit and alignment.
Remedy items of inefficient operation or of doubtful performance.
Clean visible items to original condition.
Remove debris from installation in concealed spaces.

308 Protection

Protect installed items from damage from any source until Practical Completion.

END OF SECTION

PART 1 GENERAL

101 Scope

- A. Design, engineer, supply, install, test and commission a complete lift service for the described functions and in locations shown on drawings. Provide a warranty and maintenance schedule for each item installed.
- B. This section of work includes but is not limited to all of the above for:
Lift service - hydraulic – passenger.
Lift service - passenger - servicing car park.
Lift service – goods.
- C. Lift requirements.
Have 2 button fully collective control.
Have fully automatic levelling with a tolerance of +/- 12mm.
Be fitted with horizontally sliding centre opening doors of adequate fireproof rating.
Be smooth and quiet in operation.
Be in accordance with the current SAA Lift Code and the requirements of all authorities having jurisdiction over the works.
- D. Schedule of required installation is provided on page 2 of this specification section.

102 Related Work

Co-ordinate and co-operate with other trades responsible for:

- A. Construction of the lift shaft and ventilated lift motor room.
- B. Forming lift motor floors to this contractor's drawings and/or directions.
- C. Building in of inserts supplied by this contractor to this contractor's drawings and/or directions.
- D. Building in of door frames after erection by this contractor.
- E. Forming of sill supports.
- F. Lighting to motor room.
- G. Forming and making good of recesses at landings for car position indicators and call buttons.
- H. The supply and installation of electrical MIMS submains to a point designated by this contractor in the plant room.
- I. Guards to well openings.
- J. Sign writing "DANGER" notices as instructed on lift motor supply room doors.
- K. Supply and installation of lift floor finish.
- L. Provision of fire protection (dry type sprinkler heads) within lift motor room.
- M. Provision for a fire extinguisher to the satisfaction of the appropriate codes.
 - 1. Electric fans, luminaries and power outlets, including cabling, are to be supplied and installed by others
 - 2. Participate in pre-installation conferences arranged by mechanical engineer and comply with decisions made at each.

103 Quality Assurance

- A. Materials supplied, installed and made fully operational are required to be of the best quality available.
- B. Formal Quality Assurance procedures in accordance with the requirements of AS/NZS 9001 are mandatory.
- C. Provide evidence with tender of means by which the above is to be implemented, together with tenderer's qualifications as required by 103 (b) above.
- D. Take measurements at site during construction of structures related to installation of lifts. Report discrepancies to contractor if they occur.

104 References

Comply with applicable portions of the following Australian Standard.

- AS 1428 Design for access and mobility.
1428.1 2009 General requirements for access – New building work.
There are 5 other parts. 1992 – 2010.
 - AS/NZS 1554 Structural steel welding. *There are 7 parts, 1994 – 2012.*
 - AS 1735 Lifts, escalators and moving walks. *There are several parts.*
 - AS/NZS 2311 2009 Guide to the painting of buildings.
 - AS/NZS 4431 1996 Guidelines for safe working on new lift installations in new constructions.
- Comply with requirements of statutory authorities having jurisdiction.

105 Submissions

- A. Submit with tender data containing component manufacturer's description of material proposed for installation.
- B. Provide fully detailed shop drawings when required in compliance with Document 00800 clause 27.
 - 1. Provide full and complete drawings of all the equipment that is proposed to be supplied and copies of all layout drawings. Submit for approval, detail drawings of manufactured items before manufacture commences. All drawings are to be approved in writing before work is commenced.

2. Submit all layout drawings, giving details of all access requirements and of any holes or items of equipment to be built, in sufficient time for approval and for the completion of such work.
 3. Thoroughly check all shop drawings prior to submission as regards measurements, materials and details to satisfy himself that they conform to the intent of the drawings and specifications.
 4. All checking and approving of shop drawings are to be construed as gratuitously assisting the contractor and approval is given for the manufacture without prejudice to the responsibility of the contractor for the errors or omissions which may exist thereon.
 5. Approval of drawings is not to be construed as authorising variations or increased costs.
 6. Where errors or omissions are discovered later, make good at the contractor's expense, irrespective of any prior approval.
 7. The layout as shown on the architectural drawings is to be considered as diagrammatic and approximate only. Locate fittings to suit the actual equipment to be installed and building details.
 8. Submit, when requested, quality control schedules and documents to be used in notification of quality of materials and installation.
- C. Within 7 days of notification of acceptance of tender submit 3 copies of detail drawings showing:
1. Maximum loads and reactions on the building structure created by the movement of the lift, locations of bond blocks.
 2. The location and dimensions of openings required in the lift motor room slab and at landings for call buttons and lift car position indicators.
 3. The construction and details and dimensions of the lift cars, landing doors and the landing door frames and surrounds.
 4. The location and apparatus required to be provided in the lift motor room for the installation, servicing and removal of the motor room plant, together with loads required to be handled by the foregoing equipment.
 5. The extent of lift over runs top and bottom of the lift shaft.
 6. The maximum electrical current per phase and neutral to be carried by the lift supply cable.
 7. The minimum size of HRC fuse that will adequately carry peak loads without operation.
 8. Terminal position of lift submains.

106 Delivery Handling and Storage

Arrange with contractor for delivery of equipment at times appropriate to meet installation schedules. Comply with decision made at pre-installation conference.
When installed, protect equipment from damage. Make good damage which does occur at no cost to the proprietor.

107 Maintenance

The contract maintenance period of the lift is to commence on the date on which the lifts are placed in regular service following the satisfactory completion of tests and final painting.
The contractor is to fully maintain the lifts in proper working order for a period of twelve (12) months from the above date, free of cost.
In the event of the maintenance proving unsatisfactory or if any breakage or serious defect occurring in any part of the equipment, or if unsatisfactory operation of the lift, the maintenance period is to be extended until such time as the lifts have been operated to the satisfaction of the consulting engineer for a period of one (1) calendar month.
Tenderers will include, as a separate item, the annual cost of a twenty (20) year comprehensive maintenance contract covering regular maintenance and breakdown calls made during normal working hours. The cost "out-of-hours" calls are to be charged separately. The maintenance contract is to commence immediately on the date of expiration of the free maintenance period. Full particulars of the maintenance agreement are to be supplied with tenders.

PART II MATERIALS

201 Lift Machines and Equipment

Refer Schedule of required items which appears at the end of this document.

- A. Traction Type
Details
1. The driving sheaves: accurately machined grooves to suit the lifting ropes. Driving mechanism to operate under maximum loading without overheating or vibration.
 2. The bearings: not to leak oil and are to be dust-tight, self-lubricating and, where necessary fitted with oil level indicators.
 3. The lift cars: propelled smoothly and to start and stop without vibration, noise or abrupt accelerations.
 4. The brakes: fitted with adj table and renewable brake shoes. The brake to operate automatically upon activation of any of the electrical safety devices or failure of the main electrical supply. The brakes to be capable of stopping the lifts in a smooth manner. The safety brake gear to be capable of repeated operation without adjustment and operate without damage to, or distortion of; guide rails.
- B. Hydraulic
The lift machines to comprise an integrated pump, oil tank and control valves unit, electric controls and, in shaft, hydraulic rams. The system to be free from leaks and smooth and quiet in operation.

- 202 Levelling**
Fit each lift machine with accurate levelling devices, which are to operate on the main hoist motor progressively, so that the lift comes to a stop by progressive deceleration and without discontinuity. The equipment is to level the lifts automatically and independently of operation by passengers and without the required tolerance independent of load, speed or stretch of rope. The tenderer is required to set out in the schedule, the accuracy of levelling which he is prepared to guarantee. Any error in levelling under any condition, loading and regardless of direction of travel, is not to exceed +/- 12mm.
- 203 Guides**
Lift cars and counterweights with roller type guide shoes. Pay particular attention to the sound isolation of guide and rollers from guest rooms in residential buildings.
- 204 Well Equipment**
Guide Rails
Guide rails for both cars and counterweights: planed "T" section steel rails of sufficient rigidity to withstand such stresses as may be expected during both normal and emergency operation. Fix the guide rails to the building to allow for the settling of the building and compression of columns and acoustically isolate from the building structure in the accommodation areas. The counterweights frames: arrange so that fillers can be added or removed without disturbing the ropes. The ropes: of a type specifically intended for duty, make provision for easy adjustment to ensure that equal tension is applied to all ropes. Buffers for the lifts: of approved design. The completed installation: quiet in operation and be designed with this in view. Determine the cause and eliminate, at contractor's expense, any undue noise. No noise from the lift motor room and shaft may be audible on any of the occupied floors. This contractor is required to carry out the well flushing and supply and install all necessary trimming beams.
- 205 Lift Cars**
Refer Schedule of Required Items and drawings.
- 206 Car and Landing Doors**
Flush panel centre bi-parting car and landing doors. Provide "meat rail" type door suspension and track arranged and mounted to allow adjustment to ensure that doors are in correct alignment. Provide door operating mechanism capable of operating the doors at the maximum speed permitted by the regulations without undue noise, vibration or shock.
- 207 Landing Door Surrounds**
Provide the landing door surrounds with a one (1) piece welded door surround. Set the frames plumb and true in the wall opening for grouting in by others. Provide frames in public areas of a nonstandard profile and of special finish e.g. mirror stainless steel.
- 208 Landing Indicators and Controls**
Supply over each landing door an approved illuminated indicator designed to show when a lift is about to stop at the floor and its direction of travel. At the same time, the gong is to sound to attract the attention of the intending passengers. The indicators are to give sufficient advance warning to enable passengers to reach the landing doors prior to their actual opening. Provide each with an "UP" and "DOWN", button, (except on terminals), which automatically illuminate to indicate that the call has been registered, and a digital display to indicate if lift is out of service. Install the call button panel to the requirements of the BCA warning against the use of lifts in the event of fire.
- 209 Controls**
Equip the lifts with fully automatic microprocessor controls. Where multiple lifts are arranged in a bank provide fully interconnected group control. Software based which continuously monitors the lift traffic to automatically adjust the lift operation to provide minimum waiting intervals.
- 210 Keys**
Provide 3 sets of keys to operate each type of key operated switch and lock associated with lifts.
- 211 Lift Distribution Board**
Allow for terminations of 1 lighting circuit, 1 power sub-circuit and 1 ventilation sub-circuit. Supply and install 2 x No 1 phase and 1 x No 3 phase 20A circuit breakers on the lift distribution board for the before mentioned sub-circuits. Fully co-ordinate with both electrical and mechanical contractors for this work.
- 212 Performance Monitoring System**
Provide for the supply and installation of a complete remote monitoring system to detect irregularities in operating sequence and performance of lifts. Items and function required include but are not limited to:

- A. Diagnose lift performance.
 - B. Detect developing faults.
 - C. Pinpoint maintenance needs.
 - D. Record intermittent faults.
 - E. Provide a record of events leading up to a fault, or unsatisfactory performance.
 - F. Provide notification of lift failure.
 - G. Relay an alarm signal in the event of someone being trapped in the lift.
 - H. High level interface with BAS system.
- Tenderers are to submit full monitoring details of the proposed system on the Tender Form.

213 Access Control

Supply and install in each hotel lift a magnetic card reader to allow access to secured or restricted floors. The placing or removal of lifts on security or restriction is to be by the BAS and the performance monitoring interface, as well as the engineers P.C.

214 Fireman's Control

Arrange all lifts for fireman's control in accordance with the regulations.

215 Shop Fabrication

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment. Take possible care to prevent damage.

- A. Welding External Items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts will be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Weld shop connections for steel fabrications, and bolt field connections.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Mill to a close fit machined joints. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.
- G. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop.

216 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

Fasten galvanised items with galvanised fasteners.

PART III EXECUTION

301 Examination

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of relevant conditions.

302 Preparation

- A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.
- B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

- A. Check fabrications as they are unloaded at the project site for evidence of physical damage.
 - 1. Treat damaged fabrications as follows:
Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.
 - 2. Architectural metalwork: returned to shop for repair or replacement.
- B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

- A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.
- B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.
- C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted. Fabrications may be cut shorter with power hacksaws on site. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.
- D. Install equipment to the satisfaction of the project manager and consulting engineer.

305 Field Quality Control

When requested arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Painting

Paint machinery and equipment installed in lift motor room which has not been painted by component manufacturer.

Paint system for steel.

2 coats metal primer (zinc rich).

2 coats full gloss acrylic or alkyd.

Stainless steel is not to be painted.

Comply with AS/NZS 2311 Guide to the painting of buildings, and the paint manufacturer's instructions.

308 Commissioning

Perform each test necessary to prove that each item of equipment performs as intended by the manufacturer and the consulting engineer. Include the supply of necessary standard test weights. Repeat tests on items which fail to perform as required until approval is achieved.

Provide required calculations certifications etc. to the satisfaction of statutory authorities.

309 Cleaning

Clean materials installed to the satisfaction of the consulting engineer.

Remove temporary protective coatings.

310 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the consulting engineer.

END OF SECTION

PART I GENERAL

101 Scope

- A. Design, engineer, supply, install, test and commission a complete mechanical car parking to Australian or Australian-approved standards for the described functions and in locations shown on drawings. Provide a warranty and maintenance schedule for each item installed.
- B. This section of work includes but is not limited to all of the above for:
 - 1. Mechanical Car Parking – hydraulic/electric – Dependent Mechanical Parkers
 - 2. Mechanical Car Parking – hydraulic/electric – Independent Mechanical Parkers
 - 3. Mechanical Car Parking – hydraulic/electric – Semi-Automatic Mechanical Parkers
 - 4. Mechanical Parking – Fully automated machines – no Passengers
 - 5. OTHER.
- C. Mechanical Parker requirements.
 - 1. Comply with all statutory and other legal requirements for the location of installation.
 - 2. Comply with BCA and/or disabled access provisions so as to ensure compliance.
 - 3. Have a dead man key control switch or programmed access key fob/card with emergency stop.
 - 4. Have mechanical safety devices to protect against hydraulic failure.
 - 5. Be fitted with horizontally sliding gates or roller doors as required with a level of visual transparency.
 - 6. Be smooth and reasonably quiet in operation.
 - 7. Be in accordance with the current DIN EN 14010.
- D. Schedule of required installation is provided on page 2 of this specification section.

102 Related Work

Co-ordinate and co-operate with other trades responsible for:

- A. Construction of the mechanical parking pit and any enclosure as required.
- B. Forming Mechanical Parker floors to this contractor's drawings and/or directions.
- C. Building in of inserts as required by this contractor to this contractor's drawings and/or directions.
- D. Building in vehicle entry cabin as required after erection by this contractor.
- E. Forming of pits, pit edge supports, drainage sumps.
- F. Lighting to mechanical parking zones.
- G. Forming and making good of recesses as required at landings for indicators and call buttons.
- H. The supply and installation of electrical MIMS submains to a point designated by this contractor in the plant room.
- I. Guards to pit openings.
- J. Sign writing "DANGER" notices as instructed on any access doors to the vehicle storage areas of fully automated machines.
- K. Supply and installation stormwater drainage system.
- L. Provision of fire protection (dry type sprinkler heads) within Mechanical Parker configuration or any motor room required.
- M. Provision for a fire extinguisher to the satisfaction of the appropriate codes.
 - 1. Electric fans, luminaries and power outlets, including cabling, are to be supplied and installed by others.
 - 2. Participate in pre-installation conferences arranged by mechanical engineer and comply with decisions made at each.
- N. Forming of ramps and access paths.
- O. Provision of vehicle lifts.
- P. Comply with requirements indicated in DOCUMENT 00819 OHS & ENVIRONMENTAL REQUIREMENTS.

103 Quality Assurance

- A. Materials supplied, installed and made fully operational are required to be of the best quality available.
- B. Formal Quality Assurance procedures in accordance with the requirements of AS/NZS 9001 or DIN EN 14010 are mandatory.
- C. Provide evidence with tender of means by which the above is to be implemented, together with tenderer's qualifications as required by 103 (b) above.
- D. Take measurements at site during construction of structures related to installation of Mechanical Parkers. Report discrepancies to contractor if they occur.

104 References

Comply with applicable portions of the following Australian Standard.

- | | |
|--------------------|--|
| AS 1319 1994 | Safety signs for the occupational environment. |
| AS 1428 | Design for access and mobility. |
| | 1428.1 2009 General requirements for access – New building work. |
| | <i>There are 5 other parts. 1992 – 2010.</i> |
| AS/NZS 2890.1:2004 | Parking facilities – Off street car parking. |
| AS/NZS 2311 2009 | Guide to the painting of buildings. |

AS/NZS 3000 2007 Electrical Installation (known as the Australian/New Zealand Wiring Rules). *There are 2 Amdts, 2012.*

AS/NZS 3012 2010 Electrical installation – Construction and demolition sites.

Comply with applicable portions of the following European Standard:
 DIN EN 14010 Equipment for power driven parking of motor vehicles.

EU Machinery Directive (98/37/EEC).

Comply with requirements of statutory authorities having jurisdiction.

105 Submissions

- A. Submit with tender data containing component manufacturer's description of material proposed for installation.
- B. Provide fully detailed shop drawings when required in compliance with Document 00800 clause 27.
 - 1. Provide full and complete drawings of all the equipment that is proposed to be supplied and copies of all layout drawings. Submit for approval, detail drawings of manufactured items before manufacture commences. All drawings are to be approved in writing before work is commenced.
 - 2. Submit all layout drawings, giving details of all access requirements and of any holes or items of equipment to be built, in sufficient time for approval and for the completion of such work.
 - 3. Thoroughly check all shop drawings prior to submission as regards measurements, materials and details to satisfy himself that they conform to the intent of the drawings and specifications.
 - 4. All checking and approving of shop drawings are to be construed as gratuitously assisting the contractor and approval is given for the manufacture without prejudice to the responsibility of the contractor for the errors or omissions which may exist thereon.
 - 5. Approval of drawings is not to be construed as authorising variations or increased costs.
 - 6. The layout as shown on the architectural drawings is to be considered as diagrammatic and approximate only. Locate fittings to suit the actual equipment to be installed and building details.
 - 7. Submit, when requested, quality control schedules and documents to be used in notification of quality of materials and installation.
- C. Within 7 days of notification of acceptance of tender submit 3 copies of detail drawings showing:
 - 1. Maximum loads and reactions on the building structure created by the movement of the Mechanical Parker, locations of bond blocks.
 - 2. The location and dimensions of openings required in the lift motor room slab and at landings for call buttons and lift car position indicators.
 - 3. The construction and details and dimensions of the platforms, any gates, landing doors and the landing door frames, and surrounds.
 - 4. The location and apparatus required to be provided in the control room for the installation, servicing and removal of the control room plant, together with loads required to be handled by the foregoing equipment.
 - 5. The extent of the required dimensions of spaces required for pits, vehicle storage areas and equipment.
 - 6. The maximum electrical current per phase and neutral to be carried by the particular system.
 - 7. The minimum size of HRC fuse that will adequately carry peak loads without operation.
 - 8. Terminal position of Mechanical Parker submains.
- D. Develop and submit to person in control of workplace copies of all required OHSE documentation, that is specific to the project and its hazard and risk profile, including, as a minimum, OHSE Management plan, OHSE Hazard and risk assessment, OHSE safe work method statement, training, supervision, induction, inspections and recording of findings and corrective actions and any incident reporting and investigation caused by the undertaking of the works at the construction location or in transit from manufacture to construction site.

106 Delivery Handling and Storage

Comply with all OHSE requirement relating to delivery handling and storage of plant and equipment in compliance with legal, other and client requirements

Arrange with contractor for delivery of equipment at times appropriate to meet installation schedules. Comply with decision made at pre-installation conference.

When installed, protect equipment from damage. Make good damage which does occur at no cost to the proprietor.

107 Maintenance

Comply with all OHSE requirements relating to maintenance of plant and equipment in compliance with legal, other and client requirements.

The contract maintenance period of the Mechanical Parker is to commence on the date on which the Mechanical Parkers are placed in regular service following the satisfactory completion of tests. The contractor is to fully maintain the Mechanical Parkers in proper working order for a period of twelve (12) months from the above date, free of cost. In the event of the maintenance proving unsatisfactory or if any breakage or serious defect occurring in any part of the equipment, or if unsatisfactory operation of the lift, the maintenance period is to be extended until such time as the Mechanical Parkers have been operated to the satisfaction of the consulting engineer for a period of one (1) calendar month.

Tenderers will include, as a separate item, the annual cost of a twenty (20) year comprehensive maintenance contract covering regular maintenance and parts and breakdown calls. The maintenance contract is to

commence immediately on the date of expiration of the free maintenance period. Full particulars of the maintenance agreement are to be supplied with tenders.

PART II MATERIALS

201 Mechanical Car Parking and Equipment

Refer Schedule of required items which appears at the end of this document.

Hydraulic: the lift machines to comprise an integrated pump, oil tank and control valves unit, electric controls and, in-shaft, hydraulic rams. The system to be free from leaks, and to be smooth and quiet in operation.

202 Gates and Doors

Provide door suspension and track arranged and mounted to allow adjustment to ensure that doors are in correct alignment.

Provide door operating mechanism capable of operating the doors without undue noise, vibration or shock.

203 Materials Operating Controls

Supply machines accordingly with either clear marked key switch controls or user interface panels located centrally to the machines with clear visual surveillance of the surrounds and located in a safe and clear position away from moving parts.

204 Keys

Provide 1 set of keys to operate each type of key-operated switch and lock associated with machines.

205 Lift Distribution Board

Allow for terminations of 1 lighting circuit, 1 power sub-circuit and 1 ventilation sub-circuit. Supply and install 2 x No 1 phase and 1 x No 3 phase 20A circuit breakers on the Mechanical Parker distribution board for the before-mentioned sub-circuits.

Fully co-ordinate with both electrical and mechanical contractors for this work.

206 Performance Monitoring System – Fully Automated Systems Only

When required provide for the supply and installation of a complete remote monitoring system to detect irregularities in operating sequence and performance of Mechanical Parker. If requested tenderers are to submit full monitoring details of the proposed system on the Tender Form.

207 Fireman's Control

Arrange all Mechanical Parkers for fireman's control in accordance with the regulations.

208 Shop Fabrication

General: design fabricated items so that possible work is done before delivery. Fully protect for shipment. Take all possible care to prevent damage.

- A. Welding External Items: conform to the recommendations of AS/NZS 1554, noting particularly the design criteria.
- B. Flanges: concealed where possible. Sleeve connecting railings inside railing sections and secure with flush or set screws. Except where access is impossible, connection screws and bolts will be on the underside of joints.
- C. Fasteners on the top of railing sections will not be permitted.
- D. Weld shop connections for steel fabrications, and bolt field connections.
- E. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Mill to a close fit machined joints. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
- F. Provide ample strength and stiffness by using appropriate metal thickness of assembly and supports.
- G. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop.

209 Queuing Times

System to be designed so as not to unnecessarily create queuing risk in accordance with AS 2890.1 – 2004.

210 Vehicle Access

Vehicle entry and exit to parking platform to only be from the same point of access.

211 Platform Surface

The finished platform surface to be designed as a continuous impervious surface that allows the appropriate drainage of discharged fluids to a safe discharge point whilst preventing any leakage onto any vehicle, platform or accessible space allocated below it.

212 Platform Deflection

Deflection of platforms when loaded with vehicles to be engineered and restricted to +50mm to ensure specified vehicle heights are not compromised.

213 Miscellaneous

Fasteners: provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to project manager if in doubt.

Fasten galvanised items with galvanised fasteners.

PART III EXECUTION**301 Examination**

Inspect site conditions before fabrication, where possible, and before delivery of materials. Ensure conditions are satisfactory for installation. Arrange for rectification required.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of relevant conditions unless agreed otherwise.

302 Preparation

A. Field measurements: do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay.

B. Co-ordination with work of others: furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Co-ordinate delivery of such items to the project site.

303 Inspection and Reinstatement

A. Check fabrications as they are unloaded at the project site for evidence of physical damage.

1. Treat damaged fabrications as follows:

Damage through galvanising: perform immediate inorganic zinc silicate paint or cold-galvanising repair. Do not install until reinstated.

2. Architectural metalwork: returned to shop for repair or replacement.

B. Verify anchors, bolts and other required anchorage items for proper size and accurate location prior to erection.

304 Installation

Comply with all OHSE requirement relating to the installation of plant and equipment in compliance with legal, other and client requirements.

A. Anchorage: except for anchorages furnished herein but placed by other trades, set and secure necessary anchorages, including concrete and masonry inserts, bolts, wood screws and other connectors as needed. Perform cutting, drilling and fitting as needed, locating anchorages and holes to ensure proper positioning of completed work.

B. Fit: during installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finish work accurately, plumb, level, square and true in reference to adjacent construction. Make tolerances conform to Australian Standards.

C. Finish: do not cut or abrade shop finishes which cannot be completely restored in the field. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted. Fabrications may be cut shorter with power hacksaws on site. Isolate dissimilar metals likely to be subject to moisture with inert materials, not visible on completion of installation.

D. Install equipment to the satisfaction of the project manager and consulting engineer.

305 Field Quality Control

When requested arrange for the manufacturer of products to instruct installers regarding correct installation.

306 Protection

Cover work: immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent construction.

307 Commissioning

Perform each test necessary to prove that each item of equipment performs as intended by the manufacturer and the consulting engineer if applicable. Include the supply of necessary standard test weights. Repeat tests on items which fail to perform as required until approval is achieved.

Provide required calculations certifications etc. to the satisfaction of statutory authorities.

308 Cleaning

Clean materials installed to the satisfaction of the consulting engineer.

Remove temporary protective coatings.

309 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the consulting engineer.

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section includes but is not limited to, supplying and installation of floor drains built into impervious floors and roofs of concrete or other materials. Connect floor drains to the piped waste water system.

102 Related Work

Co-ordinate and co-operate with the following trades:

Concrete floor construction
Other floor construction
Floor finishes, e.g. Ceramic Tile
Storm Drainage
Sanitary Sewerage

103 Quality Assurance

Engage tradesmen whose experience and skills meet the requirements of any controlling statutory authorities. Comply with regulations of the authority.

104 Reference Standards

Comply with applicable portions of the following Australian Standards:

AS/NZS 3500	Plumbing and drainage.
3500.3 2003	Stormwater drainage. <i>Plus 3 Amdts, 1996 - 2012.</i>
3500.3.1 1998	Stormwater drainage - Performance requirements.
3500.5 2012	Housing installations. <i>Plus 4 Amdts, 2002 - 2012</i>
	<i>There are several parts, 1996 – 2003.</i>

Comply throughout with the current edition of the Building Code.

105 Submissions

Before ordering materials, submit product data to the project manager, particularly where alternatives to the specified material is offered.

106 Warranty

Provide copies of manufacturer's warranty covering materials and a year warranty from the installer of components.

107 Fees

Pay all fees to the relevant statutory authorities.

PART II MATERIALS**201 Acceptable Manufacturers**

Stormtech Pty Ltd, Tel: (02) 4423 1989.

Refer www.stormtech.com.au. Email, info@stormtech.com.au.

Refer www.aquadux.com.au.

Alternatives may be offered.

202 Materials**203 Equipment**

Provide necessary equipment required by manufacturer and/or installer. Include seals, jointing materials etc.

PART III EXECUTION**301 Examination**

Visit the site before delivery of materials, and compare conditions with those shown on drawings.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of all conditions.

302 Installation

Subsurface pipes and other items.

Place the materials and secure to formwork. Comply with AS 3500.3.1. Allow for falls of pipe and channel drains. Ensure that formwork stays intact during concrete pour.

Co-operate with other trades affected by this work.

Comply with manufacturer's written instructions and those of statutory authorities.

Connect outlet pipes from the installation to the stormwater pipe system.

303 Testing

Before pouring concrete, test the arrangement of drainage channels and pipes for full drainage of the system in the presence of an inspector from the relevant authority or the project manager.

304 Floor Installation

Construct the floor around the drainage system with care.

Ensure that the finished floor level is flush with the top of the floor channel, grilles etc., so that no water will lie on the floor surface.

305 Cleaning

On completion, remove all debris and clean all visible work to the project manager's satisfaction.

306 Completion

Complete all contracted work in accordance with the contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

- A. Installation of a new sprinkler system. Design, supply and install automatic sprinkler system including but not limited to main supply, distribution pipes, isolating valves, sprinkler heads, fire indicator panel, connection to fire brigade, flow switches and other essential equipment.
- B. Alterations to existing sprinkler system. Design, supply, removal and repositioning of pipe branches, valves, sprinkler heads and each required item for execution of the work.
Advise the building superintendent and fire brigade in writing of the extent of and period the system will be out of service.

102 Related Work

Co-ordinate and co-operate with the following trades:

Water supply	Fire hydrants and hose reels
Concrete floors	Suspended Ceilings
Plasterboard	Electrical Installation

Provide a unit cost in tender to isolate and reinstate the FIP and appropriate circuits. Cost to include advice to authorities.

103 Quality Assurance

Perform the work of this trade section using skilled tradespeople whose training complies with the requirements of the controlling statutory authority.

104 Reference Standards

Comply with applicable portions of the following Australian Standards:

AS 1074 1989	Steel tubes and tubulars for ordinary service.
AS 1851 2012	Routine service of fire protection systems.
AS 2118	Automatic fire sprinkler systems. 2118.1 General systems. <i>There are 8 other parts plus 2 Amdts, 1995 – 2012</i>
AS 4118	Fire sprinkler systems. <i>There are 9 parts, 1994 – 1999. Plus 1 Amdt 2005.</i>
ATS 5200.486 2008	Technical specification for plumbing and drainage products – Sprinklers for home applications.

Comply also with:

Building Code of Australia.

Statutory authority requirements.

Fire brigade requirements.

Independent fire protection services organisation.

Building surveyor.

105 Delivery, Handling and Storage

Deliver materials when required for installation. Minimise on-site storage. Handle with care. Damage to existing materials and surfaces of the building are to be made good, to the satisfaction of the project manager without cost to the proprietor.

106 Fees

Pay required fees to the relevant statutory authorities.

107 Drawings

- A. Drawings provided for sprinkler installation are diagrammatic and do not show all structural and architectural details.
Before ordering materials, measure and record accurate dimensions on site.
- B. Prepare shop drawings and submit for approval prior to fabrication. Comply with Document 00800, clause 27.
- C. Provide two sets of "as-built" drawings of the completed work on the CAD disk provided by the project manager or engineer for this purpose.

108 Site Access

Use access and entrances nominated for the purpose by the site superintendent. Do not use other access.

109 Warranty

Provide the proprietor with warranties covering:

- A. Materials: in the form supplied by manufacturers of specified components.
- B. Installation: complete installation for year(s) from the date of Practical Completion.

PART II MATERIALS

- 201** **Acceptable Manufacturers**
Acceptable manufacturers of each component type are required to submit written evidence of statutory authority approval of their equipment.

- 202** **Materials**
- A. Independent water supply from main:
 - B. Main valve:
 - C. Flow switch, connected to fire brigade:
 - D. Piping: black steel to AS 1074 with one coat of zinc rich paint.
 - E. Pipe supports (galvanised steel).
 - F. Sprinkler heads (METAL, GLASS OR SILICONE BULB)
 - G. Sleeves:
 - 1. for pipes through walls: 1.6mm galv. steel or UPVC.
 - 2. for pipes through concrete floors: galv. Steel.
 - 3. extending 100 mm above top of floor.Allow 25mm space between pipe and sleeve.
 - H. Fill with high density mineral wool.
 - I. Fire indicator panel.

PART III EXECUTION

- 301** **Examination**
Visit the site before delivery of materials, and compare conditions with those shown on drawings.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions. Refer Clause 108 above.
- 302** **Connections to Supply**
Connect to existing water supply Co-ordinate with cold water supply Plumber.
- 303** **Fire Precautions**
- A. In making alterations to an existing sprinkler system, comply strictly with the requirements of AS 2118.1 and AS 1851.
 - B. Before making alterations to the sprinkler system, notify the proprietor and the Fire Brigade before turning off supply valve. Restore to operation on completion of work each day or if work ceases at the site for any reason.
- 304** **Fabrication and Jointing**
Shop fabricate components where possible and provide threaded pipe junctions. Where welding is unavoidable, comply with current, relevant Australian Standard to achieve safe welding practice. Use fire blanket to prevent damage to materials. Only certificated welders may perform welding.
- 305** **Installation**
- A. Install all components to the project manager's and the authority's approval, to applicable Australian Standards and to the manufacturer's instructions.
 - 1. Co-ordinate with other trades, particularly where pipes pass through other elements of the building and plan relevant work to produce the whole installation in proper sequence.
 - 2. Ensure that interfaces are of appropriate size and type and are properly sealed.
 - 3. Seal penetrations as needed to achieve a watertight installation. Refer to the warranty clause 109.
 - 4. Provide and fix expansion joints at positions indicated on drawing and as required by the authority.
 - 5. Water Hammer: take precautions to prevent water hammer and rectify it where it occurs.
 - B. Sprinkler Pipes and Heads:
 - 1. Piping shall run at least 200mm above the ceiling suspension to enable installation of light fittings.
 - 2.
 - 3. Notwithstanding the design shown on the drawings, ensure new and relocated sprinkler heads are clear of full height door swings and are not within 2 metres of existing sprinkler heads and comply with Section 5 of AS 2118.
 - 4. Allow to supply and install additional sprinkler heads complete with escutcheon plate, arm pieces and hangers including draw down and re-instating of system as shown.
 - 5. Upon completion of the works, allow for the system to be certified by an independent approved certifier confirming conformity to the relevant Australian Standard.Allow to provide necessary test certificates, hydraulic calculations etc. for approval of alteration works to the sprinkler system.
 - C. Reticulation:
 - 1. Reticulate as indicated on the drawings throughout the building.

2. Provide isolating valves with stuffing boxes of appropriate diameter where indicated on drawings at branches to fixtures or groups of fixtures.
3. Co-ordinate the work of lining up services with other trades.
4. Where joints are required between piping and screwed fittings, provide suitable teflon tape.

306 Testing and Commissioning

- A. Pressure test pipe installation in accordance with rule 7.2 of AS 2118, witnessed by the consulting engineer. Obtain certificate of satisfactory completion before ceiling is installed or enclosed in a duct.
- B. Arrange for a second test and inspection after all work is finished so that the engineer can issue a completion certificate.
Should a part of the installation fail to pass a test by the services certifying organisation, correct the fault and arrange for further inspection until satisfactory.

307 Protection

Protect all work of this trade section from damage until Practical Completion is achieved.

308 Cleaning

On completion, remove all debris and clean all visible work to the project manager's satisfaction.

309 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of this trade section includes but is not limited to, supplying and fixing of a complete system of hydrants and hose reels, including all associated isolating valves, stop taps and outlets to connect the following items:

Hydrant and hose reel service

Builder is to provide:

Penetrations and associated constructional works.

102 Related Work

Co-ordinate and co-operate with the following trades:

Sewerage and drainage

Metal cabinets

Water distribution.

103 Quality Assurance

Perform the work of this trade section using tradesmen whose experience and skills meet the requirements of any controlling statutory authority.

Comply with regulations of the authority and recent changes in the NCC.

104 Reference Standards

Comply with applicable portions of the following Australian Standards:

AS/NZS 1221 1997 Fire hose reels. *There is 1 Amdt, 2003.*

AS 1851 2012 Maintenance of fire protection equipment..

AS 2419 Fire hydrant installations.

2419.1 2005 System design, installation and commissioning. *Plus Amdt, 2007.*

2419.2 2009 Fire hydrant valves.

2419.3 2012 Fire brigade booster connections.

AS 2441 2005 Installation of fire hose reels. *Plus 1 Amdt, 2009.*

105 Warranty

Provide the proprietor with warranties covering:

A. Material: in the forms supplied by manufacturers of specified components.

B. Installation, for years from the date of Practical Completion: the complete piping installation and the specified components to which it is connected.

106 Fees

Pay all fees to the relevant statutory authorities.

107 As-Built Drawings

At Practical Completion, complete and supply copies of all installation drawings correctly brought up to date to present true and actual representation of the actual installation and to a scale of not less than one to a hundred.

Include the following in these drawings:

Complete piping layout drawings showing the actual size and locations of all water and other lines applicable to the system.

The hydraulic services subcontractor is to keep a complete set of the contract drawings and specifications on site with all latest amendments, revisions and the like.

As the work progresses, the sub-contractor is to make all deviations from the contract drawings thereon, due to site conditions, variations and other reasons, keeping an accurate record of work as installed.

PART II MATERIALS

201 Acceptable Manufacturers

Ensure that all items to be installed are approved for installation by local authorities before ordering.

Approved manufacturers are:

202 Materials

The domestic cold water reticulation comprises generally the branched extension from the fire service and reticulated as shown on the drawings.

A. Tubing for cold water

1. Material:

2. Diameter: as shown on drawings.

B. Hose reels

1. Material:

2. Hose diameter: length:

3. Nozzles:
 - C. Hose reel cabinets
 1. Material:
 2. Painting and lettering to comply with regulations.
 3. Allow for inspection by the engineer before concealing any work.
 4. Painting and lettering to comply with regulations.
- 203 Pipe Supports**
 Conceal all pipes where possible within walls.
 Ensure that no pipe movement except expansion or contraction can occur.
 Cause no damage to structural capacity of structural elements.
- 204 Pipe Penetrations**
 Sleeves where pipes pass through walls: galvanised 1.6mm steel or UPVC.
 Through floor slabs, galvanised steel extending 100 above top of floor.
 Allow for 25mm space between pipe and sleeve, fill with high density mineral wool or fibre glass insulation.
- 205 Internal Reticulation**
 Reticulate as indicated on the drawings throughout the building.
 Provide stop valves with stuffing boxes of appropriate diameter where indicated on drawings at branches to fixtures or groups of fixtures.
 Co-ordinate the work of lining up services with other trades.
 Where joints are required between piping and screwed fittings, provide suitable teflon tape.
- 206 Fire Hydrant and Hose Reel System**
 General: provide fire service complete with necessary piping, valve branches, fittings and relevant hydrant and hose reel.
 Excavate for, provide and connect to mains tapping as indicated on the drawings, complete with branch for domestic supply.
 Excavate for service piping and fittings indicated.
 Pipes below ground: minimum of 600mm cover. Under vehicular traffic: minimum 750 mm.
 Install valves of sizes shown. Provide cast iron covers over external valves.
 Conform to the requirements of AS/NZS 1221.

PART III EXECUTION

- 301 Examination**
 Visit the site before delivery of materials, and compare conditions with those shown on drawings.
 Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 Start of work means total acceptance of all conditions.
- 302 Connections to Supply**
 Arrange with the supply authority, obtain and install any required meter equipment complete with meter housing, and connect in accordance with the authority's requirements.
- 303 Below Ground Installation**
 Prepare trenches or openings and lay pipes at approved depth on approved base material. On completion, back-fill with approved material and cover with approved material and consolidate as required by the statutory authority and the project manager.
 Maintain required distances between pipes of different sorts and pipes and the structure.
- 304 Fabrication and Jointing**
 Fabricate and join all components to the project manager's and the authority's approval, to applicable Australian Standards and to the manufacturers' instructions. Refer clause 202.
- 305 Installation**
 Install all components to the project manager's and the authority's approval, to applicable Australian Standards and to the manufacturer's instructions.
 Do not expose pipes in external walls.
 Co-ordinate with other trades, particularly where pipes pass through other elements of the building and plan all relevant work to produce the whole installation in proper sequence.
 Ensure that all interfaces are of appropriate size and type and are properly sealed.
 Seal penetrations as needed to achieve a watertight installation. Refer to the warranty clause 106.
 Provide and fix expansion joints to all positions indicated on drawing and as required by the authority.
 Water hammer: take all precautions to prevent water hammer and rectify it where it occurs.
- 306 Testing and Commissioning**
 A. This section of the specification covers the testing and commissioning requirements. Comply with AS 2419.1.

1. Provide all necessary competent personnel and equipment to carry out testing and commissioning of the installations covered by this specification.
 2. Carefully pre-plan and schedule all tests to ensure that they are co-ordinated with the work of other contractors and sub-contractors involved and that they are carried out in a safe and efficient manner with the minimum of inconvenience to all concerned.
 3. Where the work is being carried out in an occupied or partially occupied building, take the responsibility to advise the owners and/or management of the building regarding the nature of the tests and co-ordinate with them to minimise any possible hazards or inconvenience that may arise due to the tests. In addition, give notification at least three (3) days in advance of carrying out any tests so that a representative may observe the test.
 4. Carry out all tests required by statutory authorities to prove that the systems operate to their satisfaction and in accordance with the appropriate codes and regulations.
- B. Pre-commissioning procedures: prior to commencement of the commissioning of the systems, carry out the following procedures:
1. Pressure test all water systems to 1400 kPa for a period of two hours.
 2. Thoroughly clean out and flush out all water systems to ensure only clean water is within the system.
- C. Commissioning:
1. General: carry out all commissioning tests necessary to put the system into commercial use and to approval before Practical Completion is granted.
 2. Check and adjust to the design duties, each item of equipment individually, each service and each complete system as a whole.
 3. Permanently mark final settings of all regulating valves in an appropriate manner.
- D. Test and installation instruments: supply for the duration of the tests all instruments and appliances necessary to complete the performance tests specified.
1. Gauges, instruments and materials provided as permanent parts of the installation, may be used during performance testing.
 2. Have checked for accuracy by the manufacturer or an approved laboratory all test instruments proposed for use during performance testing.
 3. Provide calibration certificates for each of the instruments to be used prior to the commencement of tests.
- E. Performance tests: in addition to the commissioning requirements to above, carry out performance tests and carry out any necessary final adjustments arising therefrom at a time to be nominated during the maintenance and guarantee period or, in the event of failure of the installation to meet the minimum requirements of the specification, such extended period as may be permitted.
- F. Replace any section or part which fails the tests.
Re-install and repeat test.
- G. Post-contract drawings:
1. After consultation with the consulting engineer for correct presentation and content of "as built" drawings, the sub-contractor is to supply a full set of prints of these documents to the engineer through the builder for approval, within 30 days of Practical Completion.
 2. Do not use shop drawings as record drawings or "as built" drawings unless suitable.
 3. Do not make reference on record drawings or "as built" drawings to any item as being supplied and for installed "by others".
 4. Upon approval of these record drawings, the hydraulic services subcontractor is to present the drawings in the following formats and quantities to the consulting engineer:
 5. One set of full-sized transparencies.
 6. All drawings and prints are made at the subcontractor's expense.

307 Protection

Protect all work of this Trade Section from damage until Practical Completion is achieved.

308 Cleaning

On completion, remove all debris and clean all visible work to the project manager's satisfaction.

309 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

- 101 Scope**
The work of this trade section includes but is not limited to, supplying and fixing of a complete range of plumbing fixtures and fittings as indicated on the attached schedule. Include in this work the connection of the fittings to floors, walls, other fittings, waste outlets, water supply pipes and vent pipes.
- 102 Related Work**
Co-ordinate and co-operate with the following trades:

Wall construction	Floor construction
Water Distribution	Piped Energy Distribution
Sanitary Sewerage	Ceramic Tile
Finishing Trades	
- 103 Quality Assurance**
Perform the work of this trade section using tradesmen whose experience and skills meet the requirements of controlling statutory authorities.
- 104 References**
Comply with applicable portions of the following Australian Standards:

AS/NZS 1229 2002	Laundry troughs and tubs.
AS/NZS 1730 1996	Washbasins.
AS/NZS 2023 1995	Baths for ablutionary purposes.
AS 3494 1997	Bidettes and Bidets.
AS 3588 1996	Shower bases and shower modules.
AS 3861 1991	Spa baths.
AS/NZS 3982 1996	Urinals.

 Comply with requirements of statutory authorities having jurisdiction.
- 105 Submissions**
Before ordering scheduled material, submit required product data to the project manager, particularly where the specified material is not available and alternatives are offered.
- 106 Warranty**
Provide the proprietor with warranties covering:
 A. Materials: in the form supplied by manufacturers of specified components.
 B. Installation, for years from the date of Practical Completion: the specified components.
- 107 Fees**
Pay fees to the relevant statutory authorities.

PART II MATERIALS

- 201 Acceptable Manufacturers**
Refer Schedule of Plumbing Fixtures.
Ensure that items to be installed are approved for installation by local authorities before ordering.
- 202 Materials**
- 203 Equipment**
Provide necessary equipment to affect a complete installation of each part of this Trade Section, including seals, jointing materials, flanges, etc.
- 204 Fabrication**
Install components in a manner approved by the local authority and the project manager. Comply with requirements of relevant Australian Standards where applicable.

PART III EXECUTION

- 301 Examination**
Visit the site before delivery of materials, and compare conditions with those shown on drawings.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.

302 Connections to Supply

Connect supply and waste pipes to the fittings scheduled in accordance with the written instructions of the manufacturers of the items and the requirements of the responsible authority.

303 Installation

Install components to the project manager's and the authority's approval, to applicable Australian Standards and to the manufacturer's instructions.

Co-ordinate with other trades.

304 Testing

Cover no pipes, joints or connections until tested and passed by the relevant authority, and approved by the project manager.

Submit to the project manager copies of certificates issued by relevant authorities.

305 Protection

Protect work of this trade section from damage until Practical Completion is achieved.

306 Cleaning

On completion, remove debris and clean visible work to the project manager's satisfaction.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

NOTE: PLUMBING FIXTURES SCHEDULE AT END OF DOCUMENT .

END OF SECTION

PART I GENERAL**101 Scope**

The work of this trade section includes but is not limited to, supplying and fixing of water storage tanks and plumbing fixtures and fittings as indicated on the attached schedule. Include in this work the connection of the fittings to floors, walls, other fittings, bases, downpipes, waste outlets, water supply pipes and related materials.

102 Related Work

Co-ordinate and co-operate with the following trades:

Wall construction	Floor construction
Water Distribution	Concrete
Finishing Trades	Roofing and Roof Plumbing

103 Quality Assurance

Perform the work of this section using tradesmen whose experience and skills meet the requirements of controlling statutory authorities.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1229 2002	Laundry troughs and tubs.
AS/NZS 1730 1996	Washbasins.
AS/NZS 2023 1995	Baths for ablutionary purposes.
AS 3494 1997	Bidettes and bidets.
AS 3588 1996	Shower bases and shower modules.
AS 3861 1991	Spa baths.
AS/NZS 3982 1996	Urinals.
HB 230 2008	Rainwater Tank Design and Installation Handbook.

Comply with requirements of statutory authorities having jurisdiction.

105 Submissions

Before ordering scheduled material, submit required product data to the project manager, particularly where the specified material is not available and alternatives are offered.

106 Warranty

Provide the proprietor with warranties covering:

- A. Materials: in the form supplied by manufacturers of specified components.
- B. Installation, for years from the date of Practical Completion of the specified components.

107 Fees

Pay fees to the relevant statutory authorities.

PART II MATERIALS**201 Acceptable Manufacturers**

Refer to Schedule in the next clause.

Ensure that items to be installed are approved for installation by local authorities before ordering.

202 Materials

Item	Description	Manufacturer
Tank stands		
Tanks		
Filters		
Pipes		
Connections		

203 Equipment

Provide necessary equipment to effect a complete installation of each part of this section, including seals, jointing materials, flanges, etc.

204 Fabrication

Install components in a manner approved by the local authority and the project manager. Comply with requirements of relevant Australian Standards where applicable.

PART III EXECUTION

301 Examination

Visit the site before delivery of materials, and compare conditions with those shown on drawings.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.

302 Connections To Supply

Connect supply and waste pipes to the fittings scheduled in accordance with the written instructions of the manufacturers of the items and the requirements of the responsible authority.

303 Installation

Install components to the project manager's and the authority's approval, to applicable Australian Standards and to the manufacturer's instructions.
Co-ordinate with other trades.

304 Testing

Cover no pipes, joints or connections until tested and passed by the relevant authority, and approved by the project manager.
Submit to the project manager copies of certificates issued by relevant authorities.

305 Protection

Protect work of this section from damage until Practical Completion is achieved.

306 Cleaning

On completion, remove debris and clean visible work to the project manager's satisfaction.

307 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Supply, install and commission complete packaged system air conditioning consisting of, but not limited to the following items:

Packaged air conditioning units complete with integral air-cooled condensers, coils, hermetic compressor unit(s), refrigeration piping and fittings, evaporator-air side fan, condenser-air side fan, all housed in a single cabinet.

Exhaust system.

With reverse cycle capacity.

As split type consisting of separate outdoor condensing units and indoor fan coil units.

Roof penetrations, underflashings, overflashings and trimming members.

Other

102 Related Work

Co-ordinate and co-operate with the following trades:

Metal decking and roof plumbing

Metalwork

Air distribution ductwork

Electrical installation

103 Quality Assurance

A. Provide written evidence to the project manager and/or engineer of required experience and skills of personnel proposed for this project.

B. Ensure electrical and plumbing work is performed only by electricians and plumbers with qualifications. Submit evidence of these qualifications.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1324 Air filters for use in general ventilation and air-conditioning. *There are 2 parts, 2001 and 2003.*

AS 2913 2000 Evaporative air-conditioning equipment.

AS/NZS 3666 Air-handling and water systems of buildings - Microbial control.

3666.1 2011 Design, installation and commissioning.

3666.2 2011 Operation and maintenance.

3666.3 2011 Performance-based maintenance of cooling water systems.

3666.4 2011 Performance-based maintenance of air-handling systems (ducts and components)

Comply also with the requirements of environmental and statutory authorities having jurisdictions.

105 Submissions

Submit data on packaged units and manufacturers of other components.

Provide drawings of preferred locations and sizing details of roof top platforms required to support units and service personnel where they are to be provided by others.

Submit to project manager operation and maintenance instructions for units and other items.

106 Delivery, Handling and Storage

Arrange with builder dates of delivery and installation of units and associated components, craneage or handling to installed position and maintenance arrangements.

Where possible, install materials directly in place. Store other materials in a secure location on site as directed by builder.

107 Warranty

Provide a warranty to the proprietor via the project manager that units which fail within the warranty period of years from the date of Practical Completion will be repaired or replaced contracted, where maintenance is not performed by this contractor.

108 Maintenance

Provide an agreement form to be submitted to proprietor offering regular maintenance of the entire installation for the agreed upon period.

Detail the precise activities of maintenance offered.

PART II MATERIALS**201 Manufacturers**

The following manufacturers and installers are acceptable:

202 Equipment

Item:

Equipment No.
 Zone:
 Make:
 Model:
 Type:
 Capacities
 Supply air quantity: L/s
 Fresh air quantity: L/s
 Cooling duty
 Total cooling: kW
 Air on temperature DB: C
 Air on temperature WB: C
 Heating duty kW
 Air on temperature: C

203 Coils

Provide coils constructed of copper tubes with aluminium fins
 Ensure maximum face velocity does not exceed 2.75 m/sec over the coils. Provide coils complete with distributor, correctly sized for duty.
 Heating coil:

204 Compressor and Pipe Work

Provide units equipped with hermetically sealed compressor motor, complete with expansion valve or capillary tube type expansion device, liquid line filter/drier and refrigeration pipe work.
 On reverse cycle units, ensure the refrigeration circuit includes reversing valve, accumulator and check valve, plus additional refrigeration pipe work to bypass drier on reverse cycle operation.
 For split units provide refrigeration pipe work sized and installed to equipment manufacturer's recommendations.

205 Fans

Provide supply air fans of forward-curved centrifugal type, balanced to prevent vibration.

206 Motors and Drive Units

For small units evaporator and condenser fans are permitted to be direct coupled to their respective motors.
 Fans to larger units are to be provided with vee-belt driven continuously rated induction motors.
 Supply all fan motors sized for duty, plus 20%.
 Supply with bearing of permanently lubricated ball type.

207 Controls

Provide units with a control panel containing all controls needed to operate and protect the components of the units.
 Controls required include contractors, thermal overloads on each phase of the motors, cut-off switches on the refrigeration system, control systems and lockout relays.
 Ensure all protective devices automatically reset.
 Provide reverse-cycle units with an automatic de-ice control included.
 Use only low voltage thermostats and control wiring.

208 Cabinets

Provide cabinets of 1.2mm min thickness galvanised steel finished in baked enamel.
 Line internal surfaces, including access doors with insulation of 25mm min thickness.

209 Filters

Fit filters, either within the unit itself, or in the return air ductwork, accessible and removable without the aid of tools.
 Seal between filters and casing to prevent air bypass.
 Supply filters of the dry washable type with an efficiency of 70%.

210 Brackets Sleeves etc.

Hot dip-galvanised steel, as required for secure installation.

PART III EXECUTION

301 Examination

Inspect drawings and visit site. Check aspects of required work such as plant platforms, refer any discrepancy to builder and/or project manager for decision and correction.
 Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
 Start of work on site means total acceptance of conditions.

- 302 Mounting**
Mount roof-top units on suitable vibration eliminators to prevent the transmission of noise or vibration to the building.
Co-operate with roof installer to ensure watertight installation.
- 303 Condensate Drains**
Drain roof-top units to the nearest downpipe or gutter via a trapped 32mm dia PVC pipe.
For split units, drain to nearest tundish or as directed by project manager.
- 304 Connection**
Provide electrical connection to temporary power supply until permanent power is available.
Connect direct to main switchboard to space allocated for mechanical services and for future equipment.
Provide flexible ductwork between unit and supply air fixed ducts. Provide weatherproof coverings over connections to external units.
- 305 Commissioning**
Operate the system for ten days in summer and record results with a hydrograph. Operate also in winter with similar recording of results for 5 days. Rectify any faults. Obtain engineers' and project managers' approval on completion of commissioning.
- 306 Completion**
Complete the contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL**101 Scope**

Design, fabricate, supply, install and test a complete air distribution and associated exhaust system ductwork consisting of but not limited to:

Ductwork and fittings
 Insulation to ductwork
 Exhaust and intake grilles
 Supply only of door grilles
 Painting of all exposed ductwork
 Testing
 Warranty

102 Related Work

Co-ordinate and co-operate with trades in the following other sections:

Metal decking and roof plumbing	Metalwork
Packaged roof top air conditioning units	Electrical installation

103 Quality Assurance

Provide written evidence to the project manager/consulting engineer of required experience and skills of personnel proposed for this project.

104 References

Comply, as a minimum requirement, with the applicable parts for supply and installation of the following publication:

Refer to the SMACNA website (American Sheet Metal & Air Conditioning Contractor's Association),
www.smacna.org

Comply with applicable portions of the following Australian Standards:

AS 1324	Air filters for use in general ventilation and air-conditioning. <i>There are 2 parts, 2001 and 2003.</i>
AS/NZS 1530	Methods for fire tests on building materials, components and structures. 1530.3 1999 Simultaneous determination of ignitability, flame propagation, heat release and smoke release. <i>There are 6 other parts and 2 Amdt, 1992 – 2007.</i>
AS 1668	The use of ventilation and air-conditioning in buildings. 1668.2 2012 Mechanical ventilation in buildings. <i>Amdt 2013</i> 1668.4 2012 Natural ventilation of buildings <i>There are 3 other parts, 3 Amdts and 1 Supplement, 1998 - 2012.</i>
AS 1682	Fire Dampers. 1682.1 1990 Specification. 1682.2 1990 Installation.
AS/NZS 2107 2000	Acoustics - Recommended design sound levels and reverberation times for building interiors.
AS/NZS 3666	Air-handling and water systems of buildings - Microbial control. 3666.1 2011 Design, installation and commissioning. 3666.2 2011 Operation and maintenance. 3666.3 2011 Performance-based maintenance of cooling water systems. 3666.4 2011 Performance-based maintenance of air-handling systems (ducts and components)
AS 4254 2012	Ductwork for air-handling systems in buildings.

105 Submissions

Submit for approval to consulting engineer and project manager details of the proposed materials listed in clauses 201-209 of PART II of this specification.

106 Shop Drawings

- A. Refer DOCUMENT 00800, clause 27.
- B. Show on drawings details that are necessary for fabrication, assembly transport and installation of ductwork and associated fittings, including: sizes, dimensions and markings, full details of connection legend for symbols and hatching, etc.
- C. Draw to a scale nominated by the consulting engineers/project manager.
- D. Sizes are to be in millimetres and represent clear internal dimensions of the ductwork.

107 Delivery, Handling and Storage

Arrange with builder dates of delivery and installation of ductwork and associated fittings, craning or handling to installed position and handling arrangements.

Where possible, install materials directly in place. Store other materials in a secure location on site as directed by builder.

- 108 Project Conditions**
Inspect drawings and visit site. Check aspects of required work and refer any discrepancy to builder and/or project manager, for decision.
Determine final locations and dimensions from site measurements prior to fabrication.
- 109 Warranty**
Provide a statement that the capacity of the ductwork will be as documented, and that the completed installation complies with the requirements of documents listed in clause 104 above.

PART II MATERIALS

- 201 Rectangular Ductwork**
Galvanised steel sheet specifically manufactured for roll forming such as "Galvabond" or other, approved in writing by the engineer.
- 202 Flexible Ductwork**
Patent aluminium spiral wound type.
PVC is not acceptable.
Provide fire dampers as required by engineer. Refer drawings.
- 203 Insulation**
Comply with ASNZS 1530.3: Test for early fire hazard properties of materials and have the following results certified:
Ignitability Index 0
Spread of Flame Index 0
Heat Evolved Index 0
Smoke Developed Index 0
Material:
Colour:
"R" rating:
- 204 Diffusers**
Aluminium louvre, powder coat/enamel finished:
Manufacture:
Type:
Model No.:
Size:
Finish: Colour:
Air deflection is required to be adjustable horizontally and vertically.
- 205 Return and Exhaust Air Grilles**
Aluminium eggcrate, powdercoat/natural anodised/enamel finished:
Manufacture:
Type:
Model no.:
Size:
Finish: Colour:
- 206 Fresh Air Grilles**
Powdercoat/Natural anodised aluminium louvre weather and vermin proof.
Manufacture:
Type:
Model no.:
Size:
Finish: Colour:
- 207 Door Relief Grilles**
Powdercoat/Natural anodised aluminium fixed louvre minimum 55% free air area.
Manufacture:
Type:
Model no.:
Size:
Finish: Colour:
- 208 Flexible Connections**
Waterproof canvas secured with galvanised steel straps and fixing.
- 209 Fabrication Waterproof Canvas**
Shop fabricate in long lengths suitable for cartage and access to building, with a minimum of site joints.

PART III EXECUTION

301 Examination

Inspect site conditions.
Ensure that conditions will permit installation.
Arrange with Builder for correction of unsatisfactory conditions.
Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.
Start of work means total acceptance of conditions.

302 Preparation

Builder is to provide for the mechanical services contractors, a clear opening, access opening, cutting patching. Check associated air conditioning units and equipment are of the correct type and able to be operational. Report any discrepancy to project manager/ consulting engineer, and request correction.

303 Installation

Install ductwork complete with transitions, bends, tees, supports, dampers, off-sets, flexible connections, take-offs and similar fittings necessary for the balancing and full operation of the system.
Form bends in flexible ductwork to manufacturer's recommendations. Bends to remain at full cross section.
Ensure galvanising remains unbroken after fabrication and installation.
Adequately stiffen to prevent 'drumming'.
Adequately support ductwork with cushioned hanging straps, located to prevent sagging.

304 Duct Supports

Hanging and supporting systems to SMACNA standards and of the trapeze type of hanging system. Install hot dip galvanised steel supports.
Fix supports for ductwork to the building structure at recommended spacings and at each change of direction.

305 Insulation

Install insulation as scheduled, indicated or required, over entire surface of ductwork fixed with adhesive, adhesive tape or bands avoiding any damage to insulation blanket or foil.

306 Flexible Connections

Use to prevent transmission of vibration from moving equipment to adjacent ducting. Also use between main ducts and unit casings and to prevent excessive movement of long ducts and where ducts cross building expansion joints.

307 Balancing Dampers

Fit to branches and where a branch serves more than one outlet.
Control air volumes by means of dampers in branches, opposed blade dampers in necks, behind grilles, or stream splitter dampers as appropriate. Ensure that factory manufactured opposed blade dampers are fitted at the air outlet to balance and straighten the air flow across the face of the grille. Do not use plastic cogs.

308 Air Outlets

Install supply and return air outlets as indicated on the drawings or arrange with builder to have other trades install.
Ensure diffusers have provision for air pattern adjustment, both horizontally and vertically.

309 Testing

Balance air quantities at air grilles to within $\pm 10\%$ of specified quantity.
Measure air quantities in air ducts. Include an N.E.B.B. or N.A.T.A. certification for air and water balancing.
Perform final balancing under the supervision of the engineer, and complete to his satisfaction.

310 Completion

Complete the contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of the Trade section includes but is not limited to the design, supply and installation of electrical transmission and reticulation materials from the mains supply to parts of the building, site, and connection for:
Power reticulation
Lighting reticulation
Mechanical equipment
Control systems

102 Related Work

Co-ordinate and co-operate with the following trades:
Floor Construction Low voltage lighting
Wall Construction Joinery
Ceiling Construction Carpentry

103 Quality Assurance

- A. Licensed electrical technicians only may perform work, experienced in the requirements of the project. Licences are those issued by the state authority having direct control or interest in the work.
- B. Perform the entire installation in accordance with the requirements of the statutory authority having jurisdiction.

104 References

Comply with applicable portions of the following Australian Standards:
AS/NZS 1680 Interior lighting. *There are numerous parts 1997- 2012*
AS/NZS 2053 Conduits and fittings for electrical installations. *There are 8 parts, 1995 - 2002.*
AS 2293 Emergency escape lighting and exit signs for buildings.
2293.2 1995 Inspection and maintenance. *Plus 3 Amdts, 1998 – 2012.*
There are 3 parts and 5 Amdts, 1995 – 2012.
AS 2560 Sports Lighting.
2560.2.3 2007 Sports Lighting – Specific applications – Lighting for football (all codes).
2560.2.5 2007 Sports Lighting – Specific applications – Swimming pools.
2560.2.8 2007 Sports Lighting – Specific applications – Outdoor bowling greens. *Plus 1 Amdt, 2008.*
There are 6 other parts, 1986 – 2003, plus 2 Amdts, 1994 – 2008.
AS/NZS 3000 2007 Electrical Installation (known as the Australian/New Zealand Wiring Rules). *There are 2 Amdts, 2009 & 2012. This Standard is in constant revision and comes in 4 different forms.*
AS/NZS 3018 2001 (Obsolescent) Electrical installations - Domestic installations. *Changed in 2010.*
AS 3786 1993 Smoke alarms. *There are 4 Amdts, 1995 - 2004.*

105 Submissions

On request of the project manager, submit for approval any item related to the installation, including: data sheets on materials; wiring diagrams - plans; samples of products; licence certificates and obtain written approval of each item so requested.
Evidence of payment of fees where applicable.

106 Delivery, Handling and Storage

Deliver, unload and store in a secure area, in accordance with manufacturer's instructions where applicable, to prevent damage, deterioration and loss.

107 Warranty

Provide a warranty covering aspects of required work of this Trade section, for a period of not less than years from the date of Practical Completion.

108 Fees and Notices

Pay fees, and submit notices to supply authority.
Arrange for inspections by authority inspector and obtain final certificate.

PART II MATERIALS

201 General

Supply only products which bear the required indication of approval of the statutory authority having jurisdiction. At project manager's request supply list of proposed materials, showing name of manufacturer where not named below.

202 Materials

- A. Mains connection to building:
By supply authority.
- B. Meters:
By Supply Authority.
- C. Switchboards and other controls:
- D. Reticulation cable:
- E. Power outlets:
- F. Light fittings:
- G. Conduits:
- H. Cable tray:
- I. Cable ducts:
- J. Identification materials:
- K. Power factor correction:
- L. Lamps:
- M. Floodlighting:
- N. Site lighting:
- O. Earthing:
- P. Alarm and detection systems:
- Q. Clock systems:
- R. Telephone system:
- S. Inter-communication system:
- T. Television system:
- U. Heating cables and units:
- V. Fans, exhaust and heating:
- W. Temporary supply:
- X. Smoke alarms (to be inter-connected)

203 Fabrication

Components manufactured off-site are to be compatible with the requirements of the project and to project manager's approval.

Refer to project manager for approval of finishes of components where item will be exposed to view after installation.

204 Source Quality Control

Where supply authority or project manager requires, submit data relating to manufactured components in the form of:

- A. Test reports.
- B. Certificates issued following inspection of products.
- C. Verification of performance statement.

PART III EXECUTION**301 Examination**

Request rectification of existing work or preparation of additional or new work by builder where necessary to facilitate electrical installations.

Obtain essential services information (dial before you dig).

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Preparation

Provide necessary safety or security controls where required to ensure safe practices and installations.

- A. Slab penetrations for floor-mounted general purpose outlets (GPOs), telephone outlets etc.
- B. Chasing and making good for conduit access for skirting
- C. Chasing and wiring duct, GPO's switches etc.
- D. Supply and installation for access opening where required.
- E. Provision of electrical riser.
- F. Provision of signwriting to main switchroom and distribution board.
- G. Forming, trimming, patching and making good of openings for luminaries to sizes required by the Electrician.
- H. Provision of concrete
- I. Making good existing roadway etc.

303 Installation

Comply with regulatory requirements relating to installation methods and systems.

Ensure that installations are within the regulatory maximum loads and tolerances.

- A. Chases
Form chases, in co-operation with builder, where necessary in structural items within limits set by project manager and builder.

- B. Cable
Secure cable, using materials specified above, at centres recommended by regulations and/or manufacturer.
 - C. Conceal wiring and cable equipment. Conduit cable where necessary or required in approved material.
- 304 Field Quality Control**
- A. Where requested by supply authority supply test data obtainable from component manufacturer.
 - B. Arrange for inspections by component manufacturer's representative to ensure correct application, use and installation.
- 305 Adjust and Clean**
- Adjust installations of components to ensure proper fit and alignment.
Remedy items of inefficient operation or of doubtful performance.
Clean visible items to original condition.
Remove debris from installation in concealed spaces.
- 306 Protection**
- Protect installed items from damage from any source until Practical Completion.
- 307 Schedules**
- Refer to attached schedule of installed fittings and items of equipment.
Refer electrical drawings.
- 308 Completion**
- Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of this trade section includes but is not limited to supply and installation of low voltage lighting and:
Reticulation
Transformers
Quartz or Tungsten Halogen lamps with dichroic reflectors
Mounting devices
Baffles

102 Related Work

Co-ordinate and co-operate with the following other trades:
Electrical installation
Ceiling construction and finishes
Wall construction and finishes

103 Quality Assurance

- A. Licensed electrical technicians only may perform work, experienced in the requirements of the project. Licences are those issued by the state authority having direct control or interest in the work.
- B. Perform the entire installation in accordance with the requirements of the statutory authority having jurisdiction.

104 References

Comply with applicable portions of the following Australian Standards:
AS/NZS 1680 Interior lighting. *There are numerous parts and 1 Amdt, 1997- 2012.*
AS/NZS 3000 2007 Electrical Installation (known as the Australian/New Zealand Wiring Rules).
There is 2 Amdts, 2012. This Standard is in constant revision.

105 Submissions

On request of the project manager, submit for approval any item related to the installation, including: data sheets on materials; wiring diagrams - plans; samples of products; licence certificates and obtain written approval of each item so requested.
Provide evidence of payment of relevant fees, where applicable,

106 Delivery, Handling and Storage

Deliver, unload and store in a secure area, in accordance with manufacturer's instructions where applicable, to prevent damage, deterioration and loss.

107 Warranty

Provide a warranty covering all aspects of required work of this trade section, for a period of not less than years from the date of Practical Completion.

108 Fees and Notices

Pay fees and submit notices to supply authority.
Arrange for inspections by authority Inspector and obtain final certificate.

PART II MATERIALS

201 Approved Manufacturers

Lamps with integral reflectors:

202 Materials

- A. Lamps:
 1. 12 volt system AC +3% -6%.
 2. Low voltage tungsten or quartz halogen. Refer schedule for VA and watt ratings for each lamp. Provide lamps integral with dichroic reflector permanently cemented as a unit, factory pre-focused within tolerances stated in the Supplier's data sheets. Comply with AS 3137 Category A.
- B. Transformers:
 1. Fully enclosed designed to be concealed from view, with performance compatible with lamp. Provide transformers on a ratio of 1 transformer to 1 lamp.
 2. Provide mounting for securing each transformer in place.
 3. Transformer properties: 5% regulation or better short circuit protected, fitted with fuse on the secondary output.
- C. Cable:
Provide cable sizes in accordance with the following table:

LAMP	LAMP	NOMINAL	CABLE SIZE		
WATTS	VOLTS	1mm	1.5mm	2.5mm	4mm
6V		3.5m	5m	8.5m	13.5m
20W	12V	7m	10m	17m	27m
24V		13.5m	20m	34m	84m
6V		1.5m	2m	3.5m	5.5m
50W	12V	2.5m	4m	7m	11m
24V		5m	8m	14m	22m
6V		-	-	2m	3.5m
75W	12V	-	3m	4m	7m
24V		4m	6m	8m	14m

203 Material Particulars

Where light dimmers are used, of the thyristor type, provide a tuned inductance between the dimmer and the primary of the isolating transformer.

PART III EXECUTION

301 Examination

Examine the conditions, comparing drawings with site conditions. Request rectification of situation which is unsuitable via the project manager. Start of work means total acceptance of conditions.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

302 Preparation

Provide necessary safety or security control where required to ensure safe practices and installations. Remove material or insulation from within 150mm above or beside lamp reflectors. Ensure adequate ventilation.

303 Installation

Comply with regulatory requirements relating to installation methods and systems.

Ensure that installations are within the regulatory maximum loads and tolerances.

- A. Chases:
Form chases, in co-operation with builder, where necessary in structural items within limits set by project manager and builder.
- B. Cable:
Secure cable, using materials specified above, at centres recommended by regulations and/or manufacturer.
- C. Conceal wiring and cable equipment. Conduit cable where necessary or required in approved material.

304 Installation Particulars

Connect transformers to the 240 volt supply via a 3-core flexible cable with plug top connected to the switched socket.

Mount transformers in well ventilated location, always accessible for inspection and maintenance.

Install components of the system in accordance with manufacturer's instructions.

Terminate lighting power circuits at each fitting with wiring plate.

305 Field Quality Control

- A. Where requested by supply authority supply test data obtainable from component manufacturer.
- B. Arrange for inspections by component manufacturer's representative to ensure correct application, use and installation.

306 Adjust and Clean

Adjust installations of components to ensure proper fit and alignment.

Remedy items of inefficient operation or of doubtful performance.

Clean visible items to original condition.

Remove debris from installation in concealed spaces.

307 Protection

Protect installed items from damage from installation until Practical Completion.

308

Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

PART I GENERAL

101 Scope

The work of this trade section includes but is not limited to supply and installation of cabling, including ISDN, systems for home and office units in single or multiple unit buildings. The cabling provides for telephone and high speed data communication systems with a limit of four lines into each unit.

The work includes:

Connection to the carrier's main cable (by carrier)

Cabling routing design

Use of cabling

Distribution devices

Compliance with Australian Standards.

102 Related Work

Co-ordinate and co-operate with the following trades:

Electrical installation

Floor construction

Wall construction

Ceiling Construction

Finishing trades

103 Quality Assurance

Perform work employing experienced tradespeople familiar with the quality of work required and who are AUSTEL-licensed in accordance with requirements of TS 009.

Arrange for a conference with relevant other trades to decide upon matters which affect them.

104 References

Comply with applicable portions of the following Australian Standards:

AS/NZS 1367 2007 Coaxial cable and optical fibre systems for the RF distribution of analog and digital television and sound signals in single and multiple dwelling installations.

AS/NZS 3080 2013 Information technology – Generic cabling for customer premises.

HB 252 2007 Communications Cabling Manual – Module 3: Residential communications cabling handbook.

AUSTEL TS 008 Requirements for authorised cabling rules (wiring rules) (Superseded).

AUSTEL TS 009 Installation requirements for customer cabling (Superseded).

AS/NZS ISO/

IEC 15018 2005 Information technology – Generic cabling for homes.

AS/ACIF S008 2006 Requirements for customer cabling products.

AS/ACIF S009 2006 Installation requirements for customer cabling (Wiring Rules).

CCM Package 2007 Communications Cabling Manual Package 2007 (Volumes 1 and 2).

105 Submissions

On request of the project manager, submit for approval any item related to the installation, including: data sheets on materials; wiring diagrams - plans; samples of products; licence certificates and obtain written approval of each item so requested.

Provide evidence of payment of relevant fees, where applicable.

106 Delivery, Handling and Storage

Deliver, unload and store in a secure area, in accordance with manufacturer's instructions where applicable, to prevent damage, deterioration and loss.

107 Warranty

Provide a warranty covering aspects of required work of this trade section, for a period of not less than years from the date of Practical Completion.

108 Fees and Notices

Pay fees, and submit notices to supply authority

Arrange for inspections by authority inspector and obtain final certificate.

PART II MATERIALS

201 Acceptable Manufacturers

202 Materials

A. Building cable and cord:

Cable colour code to comply with AS/NZS 3085.

B. Disconnect test points:

C. Distribution device:

- D. Telecommunications outlet
- E. Network termination device:
- F. Other:

203 Carrier's Recommendations

Before ordering materials for the project, submit to the carrier a list of the components and their descriptions. The carrier then has the opportunity to approve materials chosen.

PART III EXECUTION

301 Examination

Obtain essential services information (dial before you dig).

Examine carefully the proposed route for cable installation and installation of other components. Obtain project manager's approval before executing the work.

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Start of work means total acceptance of conditions.

302 Preparation

Provide necessary safety or security controls where required to ensure safe practices and installations.

Provide needed penetration, openings, chases and structures for safe secure and effective installation of cable.

If installation is required in the electrical riser, co-operate with the electrician.

303 Installation

Comply with AS/NZS 1367. Refer also to installation clauses for each item.

304 Marking and Identification

Comply with AS/NZS 1367.

305 Administration

Comply with AS/NZS 1367.

306 Field Quality Control

A. Where requested by supply authority supply test data obtainable from component manufacturer.

B. Arrange for inspections by component manufacturer's representative to ensure correct application, use and installation.

307 Adjust and Clean

Adjust installations of components to ensure proper fit and alignment.

Remedy items of inefficient operation or of doubtful performance.

Clean visible items to original condition.

Remove debris from installation in concealed spaces.

308 Protection

Protect installed items from damage from any source until Practical Completion.

309 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the project manager.

END OF SECTION

Following are the schedules for this specification.

NOTE : THERE ARE SUGGESTED ADDITIONS IN THE SUSTAINABILITY GUIDE FOR SOME OF THE SCHEDULES