

**Leichhardt Park Aquatic Centre
Mary Street
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NSW 2040
Australia**

**Specification
Tender Issue - Rev T1
27/02/2015**

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Table Of Contents

- 01-100 - General Requirements
- 02-000 - Demolition
- 03-300 - Concrete Finishes (Architectural Requirements)
- 03-500 - Timber Framing
- 03-650 - Brick And Block Work
- 04-050 - Waterproof Membranes
- 04-201 - Timber Cladding
- 04-203 - Metal Roof Cladding
- 04-204 - Plastic Sheet Cladding
- 04-400 - Doors
- 04-500 - Windows/ Glazed Partitions/ Metal Louvres/ Grilles
- 04-600 - Door And Window Hardware
- 05-050 - Ceilings
- 05-100 - Wall Framing And Wall Linings
- 05-150 - Washroom Cubicle Partitions
- 05-300 - Screeds
- 05-400 - Tiling
- 05-500 - Resilient Finishes And Entrance Mats
- 05-600 - Painting/ Clear Finishing
- 05-800 - Metalwork/ Balustrades/ Handrails
- 06-150 - Trims/ Sundry Items
- 06-200 - Furniture, Fittings And Equipment
- 06-202 - Joinery
- 06-203 - Sanitary Fixtures/ Appliances/ Fittings
- 06-250 - Signage
- 08-050 - Timber And Wood Based Products
- 08-100 - Metals And Pre-Finishes
- 08-150 - Galvanised Coatings
- 08-200 - Anodising
- 08-350 - Mortar
- 08-400 - Adhesives, Sealants And Fasteners
- 08-450 - Glass And Coatings
- 08-500 - Gaskets
- 08-550 - Insulation And Barriers

End Of Table Of Contents

SECTION 01-100 -- GENERAL REQUIREMENTS	1
1. FORMAT, DEFINITIONS AND USE OF THE SPECIFICATION	1
1.1 Specification Format	1
1.2 Sections Included in this Specification	1
1.3 Drawings, Schedules and Reports	2
1.4 Definitions	2
1.5 Abbreviations	3
1.6 Copyright, Patent Rights, etc.	3
1.7 Disclosure	3
2. DETAILS OF CONTRACTOR'S RESPONSIBILITIES	3
2.1 The Contractor shall:	3
2.2 Intent:	4
3. SUBMITTALS	4
3.1 Procedure	4
3.2 Submittals Generally	4
3.3 Samples	5
3.4 Quality Benchmarks	5
3.5 Shop Drawings	5
3.6 As Built Drawings and Manuals	6
3.7 Other Submittals	6
3.8 Review of Submittals	7
4. QUALITY CONTROL	7
4.1 General Quality Control	7
4.2 Environmental Management Plan (EMP)	7
4.3 Waste Management	8
4.4 Testing and Inspection	8
4.5 Airtightness Fan Test (Permeability)	8
4.6 Standards	9
4.7 Building Codes and Regulations	9
4.8 Submissions to Authorities	9
4.9 Dilapidation Report	9
4.10 Damage Anticipation	9
4.11 Protection Generally	10
4.12 Protection of Glazed Elements	10
4.13 Vermin and Insects	10
4.14 Maintenance and Replacement Materials	10
4.15 Building Operation and Maintenance Manuals	10
4.16 Commissioning	11
4.17 Building Services And Systems Training	11
4.18 Replacement Materials/ Spares	11
5. GENERAL MATERIALS AND WORKMANSHIP REQUIREMENTS	11
5.1 General	11
5.2 Alternative Materials	12
5.3 Health Hazards	12
5.4 Deleterious Materials	12
5.5 Sourcing of Timber	13
5.6 Corrosion Protection	13
5.7 Skilled Personnel	13
5.8 Suitability of Structure	13
5.9 Setting Out	14
5.10 Project Tolerances Definitions	14
5.11 Compatibility	14
5.12 Manufacturer's Instructions	14
5.13 Suppliers	14
5.14 Site Cutting of Materials	14
5.15 Deterioration	15
5.16 Line and Level	15

Leichhardt Park Aquatic Centre
Lilyfield NSW

5.17	Repairs To Existing	15
5.18	Making Good	15
5.19	Method Statements	15

SECTION 01-100 -- GENERAL REQUIREMENTS

1. FORMAT, DEFINITIONS AND USE OF THE SPECIFICATION

1.1 Specification Format

- A. Divisions 1 and 8 of this Specification provide general requirements applicable to the work sections in Divisions 2 to 7. The work sections of Divisions 2 to 7 provide specific requirements for individual trades or elements of the Works.
- B. All sections are detailed materials and workmanship sections reflecting the Design. The Contractor may be required to provide some fabrication details to support and more clearly demonstrate component details as well as fabrication and erection procedures/methods.
- C. This Specification shall be read in conjunction with the Contract, the Preliminaries and all other contract documentation provided.
- D. Performance criteria, where specified, shall be considered as minimum standards with which the Contractor shall comply.
- E. Unless stated otherwise, all requirements of this Specification (and any related documents) refer to work to be provided by, and obligations of, the Contractor and therefore all clauses are addressed to, and refer to, the Contractor.

1.2 Sections Included in this Specification

Division 1 - General Work:

01-100 - General Requirements

Division 2 - Site and Groundwork:

02-000 - Demolition

Division 3 - Structure and Carcass Work:

03-300 - Concrete Finishes (Architectural Requirements)

03-500 - Timber Framing

03-650 - Brick And Block Work

Division 4 - Enclosure Work:

04-050 - Waterproof Membranes

04-201 - Timber Cladding

04-203 - Metal Roof Cladding

04-204 - Plastic Sheet Cladding

04-400 - Doors

04-500 - Windows/ Glazed Partitions/ Metal Louvres/ Grilles

04-600 - Door And Window Hardware

Division 5 - Finishing Work:

05-050 - Ceilings

05-100 - Wall Framing And Wall Linings

05-150 - Washroom Cubicle Partitions

05-300 - Screeds

05-400 - Tiling

05-500 - Resilient Finishes And Entrance Mats

05-600 - Painting/ Clear Finishing

05-800 - Metalwork/ Balustrades/ Handrails

Division 6 - Commissioning Work:

06-150 - Trims/ Sundry Items

06-200 - Furniture, Fittings And Equipment

06-202 - Joinery

06-203 - Sanitary Fixtures/ Appliances/ Fittings

06-250 - Signage

Division 7 - External Work:

None Included

Division 8 - General Materials:

- 08-050 - Timber And Wood Based Products
- 08-100 - Metals And Pre-Finishes
- 08-150 - Galvanised Coatings
- 08-200 - Anodising
- 08-350 - Mortar
- 08-400 - Adhesives, Sealants And Fasteners
- 08-450 - Glass And Coatings
- 08-500 - Gaskets
- 08-550 - Insulation And Barriers

1.3 Drawings, Schedules and Reports

- A. Attention is drawn to the requirements of the schedules, drawings, reports and supplemental information provided in the documents and nominated in the Contract including but not limited to the:
1. Preliminaries.
 2. Planning Approval Conditions.
 3. Geotechnical Report.
 4. Architectural Drawings.
 5. Drawings and specifications from Structural and Civil Engineers, Services Engineers and all other disciplines, including Builder's work as nominated in these specifications.
 6. Schedules:
 - a) Product & Materials Schedule.
 - b) Fittings & Fixtures Schedule.
 - c) Door & Door Hardware Schedule.

1.4 Definitions

- A. Further to those provided in the Contract and in the Preliminaries, the following definitions apply to this Specification:
1. "Specification": This document comprising Divisions 1 to 8 inclusive with sections as listed above in clause 1.2.
 2. "Design": Documents which reflect the visual and design intent, scope, layout, principal dimensions, arrangements of services and structure, technical, function and aesthetic requirements.
 3. "Drawings": Drawings issued by the Superintendent, representing the Design.
 4. "Shop Drawings": Drawings to be provided by the Contractor, where required, which:
 - a) Demonstrate compliance with the Drawings and Specification.
 - b) Identify construction and assembly methods.
 - c) Demonstrate compliance with performance requirements, if any.
 - d) Indicate methods of Site installation.
 - e) Indicate relationships with other parts of the Works, including but not limited to, engineering services.
 5. "As Built Drawings": Drawings produced by the Contractor, where required, which show the Works as finally constructed.
 6. "Inspection": Inspection carried out by the Superintendent, consultants or authorities of any part of the Works.
 7. "A(a)cccepted, A(a)ccceptance or A(a)ccceptable": Materials, components, equipment and installations accepted by the Superintendent shall be based upon Inspections (as defined above).
 8. "Contractor's Supplemental Information": Documentation produced by the Contractor demonstrating compliance with the Contract documents.
 9. "Statutory Authority": Any person or entity having jurisdiction over the Works or part thereof.
 10. "Statutory Requirement": Requirement of a Statutory Authority.

11. "Testing Authority": Competent National Association of Testing Authorities (NATA) accredited independent testing body or association, which provides appropriate testing equipment, testing environment and independent testing results which will be used to verify conformity with the Specification. A Testing Authority shall be subject to acceptance by the Superintendent.
12. "work": The scope of work covered by the Specification.
13. "Give notice, submit, advise, inform" and similar expressions mean to "give notice", etc, in writing to the Superintendent.
14. "Obtain, seek" and similar expressions mean obtain/ seek in writing from the Superintendent.
15. "Proprietary": Identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
16. "Required": Means required by the Contract or by Statutory Authorities.

1.5 Abbreviations

- A. APAS: Australian Paint Approval Scheme.
- B. AS: Australian Standard.
- C. AS/ NZS: Australian/ New Zealand Standard.
- D. BCA: Building Code of Australia.
- E. GBCA: Green Building Council of Australia.
- F. NATA: National Association of Testing Authorities.
- G. CSIRO: Commonwealth Scientific and Industrial Research Organisation.
- H. BS: British Standard.
- I. ASTM International: Formerly the American Society for Testing Materials.
- J. GECA: Good Environmental Choice Australia.
- K. QA: Quality Assurance.
- L. QC: Quality Control.
- M. FSC: Forest Stewardship Council.
- N. AFCS: Australian Forest Certification Scheme.

1.6 Copyright, Patent Rights, etc.

- A. The copyright in any designs or installation details developed for this project under the Superintendent's direction shall be vested in the Superintendent and may not be reproduced elsewhere without the Superintendent's written permission. This will not apply to standard products and designs already in existence before the date of Tender.

1.7 Disclosure

- A. Do not publish any drawings, sketches or photographs of the project, or its construction, without the prior written consent of the Superintendent.

2. DETAILS OF CONTRACTOR'S RESPONSIBILITIES

2.1 The Contractor shall:

- A. Satisfy all material and workmanship standards as specified.
- B. Provide everything which is necessary for the execution and completion of the Works and in accordance with the Drawings, this Specification and/ or instructions given by the Superintendent and deliver the Works complete in every respect, to the satisfaction of the Superintendent.
- C. Environmentally Sustainable Design (ESD) is an important component of the design of this building and as such the Contractor is required to accept the ESD concepts indicated and make use of the environmentally friendly products, materials and systems either nominated or detailed on the Drawings or nominated in this Specification.
- D. Where necessary, provide Shop Drawings and technical information to demonstrate compliance with the Drawings and Specifications and comply with the specified approvals process.
- E. Obtain and submit all approvals, certificates and any other documents required by the Statutory Authorities to permit use and/ or occupation of the Works.
- F. Comply with any approval conditions imposed by Statutory Authorities to which the Works are subject.

- G. Provide any additional bracing, reinforcing, fixings, etc. necessary to complete the Works. Convey any concerns the manufacturers may have expressed about the suitability of products for the purpose intended.
- H. Alternative products may be proposed but shall only be incorporated into the Works if accepted in writing by the Superintendent. For such alternative products, provide full performance and technical data to demonstrate that alternative proposals are of a standard at least equal to that specified and demonstrate compliance with the design intent.
- I. Ensure that all activities associated with the construction of the Works are carried out to the satisfaction of the Superintendent and all Statutory Authorities having jurisdiction over the Works and that all care is taken to minimise the effect of those activities on the amenity of the locality. All demolition and construction work shall comply with the requirements of the Environment Protection Authority's Noise Control Guidelines Publication 1254.

2.2 Intent:

- A. The general intent is to construct an aquatic facility which is complete, functionally and visually.
- B. Specific requirements are to construct an aquatic facility which:
 - 1. Is weatherproof and watertight.
 - 2. Is complete in terms of function.
 - 3. Is complete in terms of finish and trim.
 - 4. Complies with all statutory requirements.
 - 5. Complies with applicable standards and statutory regulations.
 - 6. Is constructed and finished to the standards implicit in the Contract documents, notwithstanding that not all items of work may be drawn, specified or detailed. Materials and finishes shall be consistent with those items which are fully documented.

3. SUBMITTALS

3.1 Procedure

- A. No portion of work shall commence without acceptance of the required submittals by the Superintendent.
- B. A schedule of submittals shall be provided for acceptance by the Superintendent. The Schedule shall indicate the dates on which the Superintendent will receive the required submittals. The schedule shall allow sufficient time for the review, resubmission and further review as necessary for each submittal. Revise the schedule as and when necessary.
- C. Allow for the following for the Superintendent's review and return of submittals:
 - 1. Shop Drawings: 5 working days for the initial review and 3 working days for resubmissions.
 - 2. Samples, calculations, test reports and the like: 5 working days.
- D. Provide submittals in accordance with the following:
 - 1. Addressing of submittals: Submittals shall be delivered to the premises identified by the Superintendent.
 - 2. Identification of submittals: Each submittal shall be individually identified with the project name, respective specification reference, supplier's/ manufacturer's name and product reference as appropriate. Each submittal shall be accompanied by a transmittal form containing similar information, together with the purpose for which the submittal is being made. Space shall be provided on each item submitted for stamping by the Superintendent.
 - 3. Numbering of submittals: Submittals shall be numbered consecutively and that numbering system shall be retained throughout all revisions and resubmittals.
 - 4. Completeness of submittals: All relevant information shall be included within each submittal to define completely and explain each separate system of work. Submittals may be combined from various sections as necessary and furnished at one time as a single submission.
 - 5. Variations and substitutions: Submittals that differ from the requirements of the Drawings and Specification shall be so identified.
 - 6. All submittals provided shall be written in English.
- E. The Contractor's submittals will be reviewed by the Superintendent and any alteration and/ or agreements reached shall be incorporated into the Drawings and Specification.

3.2 Submittals Generally

- A. Provide Shop Drawings, samples, quality benchmarks, calculations, test reports and other relevant data as specified in the work sections of the Specification.

- B. Other than those being issued electronically, provide the required number of sets (minimum of 2) of all submittals for review. Once accepted, one set shall be retained by the Superintendent, all other sets shall be returned to the Contractor with one set to be kept on Site.

3.3 Samples

- A. Samples shall include various products, natural materials, fabricated items, equipment, devices, appliances or components thereof, as may be required to satisfy the visual appearance and technical requirements of the Design.
- B. Samples will be reviewed for their visual characteristics only and where moving or operating elements are involved, the Superintendent shall be given the opportunity to review working samples.
- C. Ranges of samples shall be provided where a considerable range of colour, graining, texture, smoothness and other characteristics may be anticipated. The ranges shall indicate the extremes of each nominated characteristic.
- D. Where custom colours are specified, samples shall be submitted illustrating precise colours, textures, patterns and finishes for review by the Superintendent.
- E. Unless specified to the contrary in the Work Sections, the minimum sizes of samples shall be:
1. Sheet materials (bulk): 500mm x 500mm.
 2. Sheet materials (tile): One tile.
 3. Linear materials: 500mm long.
- F. Unless specified to the contrary, each sample or set/ range of samples shall be submitted in duplicate. Upon acceptance by the Superintendent, one sample/ set/ range will be returned to the Contractor to keep on Site, and the other will be retained by the Superintendent for QA/ QC purposes.
- G. Samples shall comprise materials in their final form.
- H. Do not procure, order or fabricate such items until the relevant sample has been accepted.

3.4 Quality Benchmarks

- A. Upon commencement of individual trades of the work, erect, for acceptance by the Superintendent, complete sections, products and/ or components of the work as described in this Specification. These shall be used to establish the benchmark for quality of finish and workmanship for similar elements for the remainder of the work until Practical Completion.
- B. Work shall not commence in other areas for that particular trade until the Superintendent has examined and accepted the quality benchmark. Carry out immediately any alterations or adjustments required by the Superintendent in order to achieve the required quality.
- C. Upon receipt of the Superintendent's acceptance, fully protect the quality benchmark for the duration of the Works. It will be used by the Superintendent as required to check and monitor the quality of materials and workmanship incorporated in the remaining areas of the Works.

3.5 Shop Drawings

- A. Shop Drawings shall be submitted to the Superintendent for review. Unless agreed otherwise at the first Site Meeting, Shop Drawings shall be provided in the following numbers:
1. Two hard copies (to an agreed ISO A-series paper size).
 2. Electronic file in .pdf format.
 3. Electronic files in .dwg format where applicable.
- B. The Superintendent will review the Shop Drawings for compliance with the Specification and the Drawings in visual and overall functional matters only.
- C. Submission and return of Shop Drawings/ Documents:
1. Allow sufficient time (a minimum of 10 working days) between the first submission of a Drawing/ document and receipt of comments. Allow for resubmissions for each item to achieve a "Reviewed" or "Reviewed subject to corrections" status in accordance with the schedule of submittals.
 2. Provide a list of proposed Shop Drawings within 20 working days of acceptance of tender.
 3. Information specifically requested for each element of the Works shall be provided. Additional information may be required by the Superintendent on inspection of the Contractor's submittals to allow for accurate comments to be made.
- D. The Superintendent's review of the Shop Drawings does not relieve the Contractor of his responsibility for errors, or for supplying components and materials to the full satisfaction of the Superintendent.

- E. Shop Drawings shall be fully dimensioned in metric, to an agreed scale appropriate to the detail, and include:
 - 1. Full-sized details and graphic representation describing materials, components and equipment, construction, finishes, provision for movements, fabrication and erection tolerances.
 - 2. Layouts, locations and assemblies of all types of construction detail and junctions, details of materials, method of jointing, details of all Site connections and fixing and sealing methods, finishes and all pertinent information related to:
 - a) Method of fabrication and construction.
 - b) Proper relation to adjoining work.
 - c) Finishes.
 - d) Amplification of details.
 - e) Minor changes to the Design to suit actual conditions.
 - f) Coordination with services, if required.
- F. Submit Shop Drawings and do not commence work until formally returned by the Superintendent with either "Reviewed" or "Reviewed subject to corrections made" stamped on each of the Shop Drawings. Ensure there is space on each of the Shop Drawings for stamping by the Superintendent. Shop Drawings stamped "Rejected, Correct and Re-submit" are not to be fabricated from but are to be revised and resubmitted to the Superintendent for further review.
- G. The Superintendent's final comment on the Shop Drawings shall be conditional on receipt of all documentation, certification, acceptances in respect of anchorages, fire stop assemblies, samples, mock-ups and test reports, etc, as defined in the Specification.
- H. The receipt of Shop Drawings by the Contractor from the Superintendent marked "Reviewed" or "Reviewed subject to corrections" does not constitute agreement of variation.
- I. When preparing the Shop Drawings consult the current architectural, structural and services Drawings, adjusting the Shop Drawings to allow for any changes to Site tolerances and/ or discrepancies where applicable.
- J. If, before commencing or during the preparation of the Shop Drawings, the design intent of the Drawings and/ or Specification may be affected, or where other elements of the Works may be affected, notify the Superintendent immediately.
- K. Where applicable, the Shop Drawings may use the manufacturer's standard details provided they comply.
- L. The Superintendent has the right at all reasonable times to visit the Contractor's (or his specialist Subcontractor's) design office to review progress.
- M. The Shop Drawings shall be annotated in English and titled in the manner determined for the Contract, with the title block fully indicating the part of the work to which it applies.
- N. Information contained in any of the Drawings shall be treated as confidential and shall not be used for any purpose other than for the Works. Such information shall not be communicated to third parties for other purposes without the Superintendent's consent.
- O. Maintain on Site a full set of Drawings, Shop Drawings and technical specifications.
- P. Shop Drawings will not be accepted if produced to a reduced size.

3.6 As Built Drawings and Manuals

- A. On completion of the Works and when deemed necessary by the Superintendent, provide As Built Drawings showing the Works as finally fabricated and installed, in the following format:
 - 1. Three hard copies.
 - 2. Electronic file in .pdf format.
 - 3. Electronic files in .dwg format.
- B. The As Built Drawings shall include any Site variances or installation adjustments or variations and any actual Site or setting-out dimensional modifications as installed.
- C. As Built Drawings shall be produced to a relevant and agreed scale and shall be used to complement the Maintenance Manual for the specific purpose of locating the elements within the overall structure.

3.7 Other Submittals

- A. Product Data: Provide technical information detailing the characteristics of each proprietary item, system component or material incorporated into the Works. This shall include material schedules and manufacturer's literature.

- B. Certifications: Provide independently certified reports verifying compliance of each element or component with the requirements of the Drawings and Specification. These reports shall include the chemical and physical properties of various building materials.
- C. Building Operation and Maintenance Manuals: Manuals prepared by the Contractor for the Principal/ building users detailing the maintenance and operational requirements of the various building systems and/ or components thereof.
- D. Supplemental product literature: Such literature may include manufacturer's catalogue information, product specifications, standard illustrations, diagrams and standard details. The supplemental product literature shall describe physical characteristics such as size, weight, finish, material analysis, electrical requirements and other information such as load tables, test results, assessments and industry quality standards.
- E. Technical Calculations: These shall consist of technical engineering calculations which document technical performance of various systems, system components and/ or materials, as required by the Drawings and Specification.
- F. Warranties:
 - 1. Provide to the Superintendent warranties as nominated in the documents from each Subcontractor and/ or supplier of materials. Where the warranty as nominated in the documents is not able to be obtained from the particular Subcontractor and/ or supplier, notify the Superintendent in writing prior to commencement of the work of the relevant Subcontractor/ supplier and agree alternative warranty terms.
 - 2. Warranties shall name the Principal as the beneficiary.
 - 3. All warranty periods shall commence from the Date of Practical Completion and remain in force for the periods nominated in the documents.
 - 4. The written warranties shall state:
 - a) That workmanship, materials and installation are warranted for the period as specified.
 - b) That any defects which may arise during the warranty period shall be made good.
 - c) Any work in other trades resulting from such making good must be undertaken at the expense of the warrantor upon written notice from the Superintendent.
 - 5. Do anything necessary to facilitate a warranty and do not do anything which may impair or inhibit the provision of a warranty.
 - 6. The warranty shall be confirmed prior to commencement and issued to the Superintendent prior to Practical Completion.
- G. Spares:
 - 1. Provide spares as nominated in the Specification prior to Practical Completion.
 - 2. The spares shall be suitably packaged, labelled and protected from damage, weathering and deterioration during storage. The spares shall be handed over to the Superintendent for safe storage on Site and for the future use of the Principal.

3.8 Review of Submittals

- A. The Superintendent will review submittals for general and practical conformity to the requirements of the Contract. Submittals which meet these requirements shall be stamped or marked in accordance with the procedure described herein. Submittals which are incomplete or erroneous, or which are not required, will be returned and a new submittal made as necessary.

4. QUALITY CONTROL

4.1 General Quality Control

- A. Establish and maintain a quality control system capable of verifying to the satisfaction of the Superintendent that all materials and workmanship, whatever their sources, conform to the requirements of the Contract.
- B. Quality shall be defined in a quality control manual or similar document in which procedures required to achieve quality are fully described.
- C. The quality control manual shall include an inspection and test plan for each major item of work. The inspection and test plan shall include "witness" points for which the Superintendent's attendance is requested.
- D. A "witness point" is a point on the inspection and test plan where the Superintendent's attendance is requested to witness that a particular stage of work has been reached. Reasonable advance notice shall be given.

4.2 Environmental Management Plan (EMP)

- A. Provide and implement a comprehensive Environmental Management Plan (EMP) for the Works in accordance with the requirements of the Environment Protection Authority and the Environment Protection Act.
- B. The EMP for this site shall comply with the requirements of AS/ NZS ISO 14001.
- C. Provide evidence of AS/ NZS ISO 14001 Environmental Management System accreditation prior to and for the duration of the project and confirm that the EMP was implemented during construction.

4.3 Waste Management

- A. Minimise waste and reuse or recycle by-products wherever possible, thereby reducing the impact of construction waste going to landfill.
- B. 80% of waste by weight is to be recycled or reused.
- C. Provide confirmation that the waste target was achieved for this site.

4.4 Testing and Inspection

- A. Where required, engage an accredited independent testing specialist, as agreed with the Superintendent, to verify that the requirements of the Contract have been satisfied.
- B. Provide testing on samples and materials incorporated in the Works as necessary.
- C. Include and supply detailed proposals of tests that demonstrate compliance with the requirements of the Specification and the Drawings.
- D. The following minimum provisions shall be made available to the Superintendent at all times:
 - 1. Suitably qualified personnel using appropriate validated equipment.
 - 2. All necessary access and facilities for inspection and testing in laboratories, fabrication shops and on Site.
 - 3. Regularly calibrated equipment for the purposes of load measuring.
- E. Maintain the following:
 - 1. Tests and inspection results during all stages of manufacture, assembly and installation of components.
 - 2. Certificates relating to the materials used in the work, as confirmation of tests carried out in accordance with the relevant standards and codes.
 - 3. Records of all inspections and tests performed to substantiate conformity with the Contract, including those carried out by Subcontractors and suppliers.
- F. Should any test reveal defective material and/ or workmanship, immediately carry out any remedial work and/ or retesting, including that of a special nature, under instruction from the Superintendent.
- G. Indicate on the Construction Programme the exact timing of all testing, procedural trials and trial assemblies, so the Superintendent has the opportunity to attend.
- H. If the Superintendent is of the opinion that the Works do not conform to the requirements of the Contract, undertake appropriate testing as directed by the Superintendent, to establish whether or not this is the case.
- I. Inspection Witness points: If notice of inspection is required with regards to parts of the Works, advise when these parts are ready for inspection prior to being concealed.
- J. Testing Witness points: If notice of testing is required with regards to parts of the Works, advise when these parts are to be tested so that the Superintendent can be present to witness the testing.
- K. Minimum notice for inspections to be made: four hours for on-Site inspectors, otherwise two working days.
- L. Testing authorities:
 - 1. Except for Site tests, have tests carried out by authorities accredited by the National Association of Testing Authorities (NATA) to test in the relevant field, or an organisation outside Australia recognised by NATA through a mutual recognition agreement. Cooperate as required with testing authorities.
 - 2. Reports: Submit copies of test reports, including certificates for type tests, showing the observations and results of tests and conformity or non-conformity with requirements.
 - 3. Site tests: Use instruments calibrated by authorities accredited by NATA.

4.5 Airtightness Fan Test (Permeability)

- A. The external building fabric shall be tested for airtightness on completion of the building shell, by an approved independent testing authority appointed by the Contractor.

- B. The Contractor shall be responsible for carrying out the airtightness testing and preparation of reports in accordance with the requirements of the Air Tightness Testing and Measurement Association (ATTMA) publication "Measuring Air Permeability of Building Envelopes".
- C. Variable flow portable fans shall be temporarily placed in an external doorway or similar external opening. The test fans shall be switched on and the air flow adjusted to achieve an internal pressure of 50-60 Pa. The total air flow through the fan and the pressure differential between inside and outside shall be recorded in accordance with the ATTMA requirements.
- D. A maximum air permeability rate of 3.0m³/hour.m² shall be achieved. If this rate is not achieved, undertake remedial works as necessary to further seal the building envelope.
- E. Further pressure testing shall be undertaken until the required maximum air leakage rate is achieved.
- F. Be responsible for the making good or sealing of leaks to the building envelope as necessary to achieve the required maximum air leakage rate.
- G. Testing shall be carried out prior to Practical Completion.

4.6 Standards

- A. Australian Standards shall be the governing standards for the Works, unless otherwise specified.
- B. Only where expressly stated in the Specification should other standards be applied.
- C. All reference to standards, regulations and requirements of statutory bodies shall mean the latest published editions at the time of Contract award. Where such standards, regulations and requirements are amended after Contract award and affect the Contractor's responsibilities during the course of the Works, immediately inform the Superintendent in writing.
- D. If unable to comply with the governing standards or regulations and proposing to substitute other standards, inform the Superintendent within the summary of deviations from the Specification. Provide fully detailed reasons for being unable to comply, together with any design and/ or technical implications. Failure to provide such notification prior to Contract award is deemed to be acceptance of the governing standards or regulations and later notification will be invalid.

4.7 Building Codes and Regulations

- A. All materials, components, equipment and workmanship shall comply with all Statutory Authority codes and regulations, Australian Standards, and any other regulations, rules or by-laws applicable to both the design and execution of the Works.
- B. Compliance with the Building Code of Australia shall mean the edition that is current at the Date of Practical Completion.
- C. Ensure compliance with all Statutory Requirements and relevant codes and obtain the necessary approvals in time to ensure that there is no delay to the construction programme as a result of delays of such approvals.

4.8 Submissions to Authorities

- A. Obtain any approvals required from the Statutory Authorities.
- B. When required by the Statutory Authorities, submit to them any component part of the Works for appraisal, testing, stamping or certifying.
- C. After such a component part has been satisfactorily approved, tested, stamped or certified, return the marked component or documentary evidence of its approval, as appropriate, to the Superintendent for reference purposes.
- D. If the Statutory Authority rejects components, replace the component part or parts with those that are acceptable.

4.9 Dilapidation Report

- A. Prepare a detailed and thorough Dilapidation Report recording the location, nature and condition of all built items, services, landscaping and the like, on the Site as well as on neighbouring properties and public (Council) land that may be affected by the demolition and construction works.
- B. The Dilapidation Report shall comprise both photographs and written records.
- C. Submit hard copies and an electronic version in .pdf format of the report to the Superintendent and agree its content prior to commencing work on Site. Copies of the report shall be provided to all adjoining neighbours, the building surveyor and relevant authorities.

4.10 Damage Anticipation

- A. Anticipate the possible sources of damage to the Works and take active and positive protective measures to maintain it in pristine condition until Practical Completion. The acceptance of responsibility for making good in the event of damage shall not be considered adequate.

4.11 Protection Generally

- A. Provide necessary protective devices to protect all goods and materials incorporated into the Works, at all stages through to Practical Completion, against damage arising from but not limited to weather conditions, moisture, heat, humidity, direct sunlight, construction activities, other contractors, warping, distortion, abrasion and other conditions which could have an adverse effect on any goods and/ or materials.
- B. Where components are delivered to the Site in packages or crates, each package or crate shall be labelled on the outside giving the reference and quantity of the contents so that deliveries can be accepted at the Site without needing to open any package.
- C. Carefully remove all temporary protective elements immediately before Practical Completion or at an appropriate time to the acceptance of the Superintendent and leave the Works perfectly clean and fit for immediate use.

4.12 Protection of Glazed Elements

- A. All elements of framework and associated beads and strips shall be stored on Site so they are not damaged, distorted or weathered.
- B. All finished components shall be carefully packed in stillages or crates so they are suitably separated and protected from scratching, scuffing or other surface damage.
- C. All glass panes, sealants and gaskets shall be stored on Site in accordance with their manufacturer's written recommendations.

4.13 Vermin and Insects

- A. The Works shall protect against and not contain or provide harbourage for infestation by vermin or insects.

4.14 Maintenance and Replacement Materials

- A. Replaceable materials/ components shall be maximised.
- B. Materials shall be capable of simple maintenance/ repair and integration with other maintenance systems.

4.15 Building Operation and Maintenance Manuals

- A. One month before the programmed completion of the Works, prepare and submit to the Superintendent, one draft copy of all Building Operation and Maintenance Manuals for review.
- B. When the draft Building Operation and Maintenance Manuals are returned as accepted, prepare 3 full and final sets and issue to the Superintendent. The issue of the Building Operation and Maintenance Manuals is a requirement of Practical Completion.
- C. The Building Operation and Maintenance Manuals shall contain the following as applicable:
 - 1. Emergency telephone numbers. After hours numbers must relate to personnel with project knowledge.
 - 2. Operating instructions.
 - 3. Maintenance instructions/ schedule.
 - 4. List of equipment and suppliers: This section shall be in a table format for easy reference and must include all service equipment installed by the Contractor whether supplied by the Contractor or the Principal.
 - 5. Manufacturer's literature.
 - 6. Equipment technical data/ equipment schedule.
 - 7. Equipment wiring diagrams.
 - 8. As installed drawings.
 - 9. Commissioning results.
 - 10. Test results of assistance to future maintenance.
 - 11. Certification reports/ warranties (if applicable).
 - 12. Logbooks (if applicable).
 - 13. EWIS/ Fire/ Emergency Lighting/ Generators.
 - 14. Component information: The following information shall be supplied for every item, component and/ or system:
 - a) Certified manufacturing certificate.
 - b) Full description giving any special features. A full breakdown of the parts and catalogue numbers of the constituent parts.
 - c) Warranty information including warranty periods.

d) The warranty period of any element or material where in excess of the warranty required by the Specification.

15. Full finishes specifications, paint schedules and details of suppliers and installers.

D. Maintenance procedures: The Maintenance Manual shall include fully comprehensive details in respect of:

1. Cleaning procedures for all elements of the Works.
2. Replacement procedures.
3. Regular cyclical preventative maintenance procedures (avoiding damage).
4. Inspection and lubrication requirements.
5. Repair procedures in the event of damage.
6. Washing methods, including the frequency and method of washing required to maintain performance and appearance. Details shall be provided in respect of the maximum time during which performance of components can be maintained, together with the frequency and method of washing required to achieve this.

4.16 Commissioning

- A. Provide comprehensive pre-commissioning, commissioning and quality monitoring of the building's services at Practical Completion.
- B. At Practical Completion provide a Commissioning Report as well as the Building Operation and Maintenance Manuals, As Built Drawings and Building Services and Systems Training as specified in this section.
- C. Refer to the Mechanical, Electrical and Hydraulics Services Specifications for detailed commissioning and maintenance requirements.

4.17 Building Services And Systems Training

- A. Prior to Practical Completion provide skilled operatives to instruct on the correct and efficient operation and maintenance of all systems, components, plant, equipment and controls as detailed in the Operation and Maintenance Manuals.
- B. The Principal, his/her building manager and/ or building operating personnel shall be made fully conversant with the function and operation of all the building services and the energy saving features.
- C. Provide a programme and schedule of training requirements, prior to completion of the Works, stating the minimum amount of time needed for the skilled staff to train the user's staff.
- D. Throughout the training period remain responsible for the operation and maintenance of the Works.
- E. Where such training cannot be carried out prior to Practical Completion of the Works because of the nature of the equipment, return to the Site at a later mutually agreed date to complete the training period.

4.18 Replacement Materials/ Spares

- A. Provide replacement materials and spares as specified in each work section before Practical Completion. These items shall be placed in a storage area nominated by the Superintendent.
- B. All replacement materials/ spares shall be of identical quality to those installed in the Works.

5. GENERAL MATERIALS AND WORKMANSHIP REQUIREMENTS

5.1 General

- A. Be responsible for determining the lead times associated with all specified/scheduled materials and products and program the Works accordingly. No extensions of time will be granted due to disruptions in the Construction Programme caused by delays in procuring the specified/scheduled materials and products. Alternative materials and products, with shorter lead times to those specified, may be proposed. However, lesser quality materials will not be accepted on this basis. The Superintendent is under no obligation to accept alternatives due to lead time issues.
- B. Except where otherwise specified, the Contractor shall ensure that all materials are new and that materials and workmanship comply with the requirements of the Statutory Authorities and shall be of the best merchantable quality.
- C. All materials or equipment shall be used with all cognisance of and according to directions of the respective manufacturers/suppliers. The Contractor shall supply to Site, materials and products in the manufacturer's original unbroken containers or packages. If the Contractor fails to comply with this requirement, such materials and products may be rejected by Superintendent as not complying with the terms of the Contract.

5.2 Alternative Materials

- A. Where a particular material, type of construction, dimension, size or thickness is nominated or indicated in the Specification or on the Drawings, or a particular method of construction is implied, warrant that that indicated will satisfy the design intent. If considered to be inadequate or inappropriate, raise this with the Superintendent and offer alternatives for consideration.
- B. Where the Contractor offers alternatives to that nominated or indicated in the Specification, the schedules or on the Drawings, the Contractor shall provide samples of the documented item as well as the proposed alternative, along with a full comparative analysis demonstrating that the proposed alternative is equal in quality, efficiency and performance to that documented, so that the Superintendent can make an informed decision. The Superintendent's acceptance or non acceptance of Contractor proposed alternatives is final.
- C. Generally, alternatives to the products, materials and/ or systems specified, scheduled or indicated on the Drawings will not be accepted unless a clear and real benefit to the Principal can be demonstrated. Substitutions may only occur upon prior written acceptance from the Superintendent.
- D. Acceptance of alternative proposals by the Superintendent will not relieve the Contractor from responsibility to provide suitable materials, components and assemblies fit for the purpose intended by the manufacturer and in compliance with the Contract.
- E. If no such alternative proposal to any of the preferences indicated in the Contract, Drawings and Specification is submitted then the solutions proposed in the Specification and on the Drawings will be deemed to be acceptable.
- F. Any costs incurred by the Superintendent or other consultants relating to the evaluation of Contractor proposed alternatives shall be the responsibility of the Contractor.

5.3 Health Hazards

- A. All proposed materials shall not in any way be potential health hazards. Maintain a full, up-to-date knowledge of all current published research and legislation in this respect.
- B. The Contractor shall be familiar with the National Model Regulations for the Control of Workplace Hazardous Substances [NOHSC: 1005 (1994)] and comply with the National Code of Practice for the Control of Workplace Hazardous Substances [NOHSC: 2007 (1994)].
- C. The Contractor shall also accept the exclusions contained in the Contract documents.

5.4 Deleterious Materials

- A. The following materials shall not be used:
 - 1. Asbestos or asbestos-containing products, as defined in the:
 - a) National Occupational Health and Safety Commission (NOHSC) publications: Code of Practice for the Safe Removal of Asbestos 2nd Edition [NOHSC: 2002 (2005)], and Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)], or any statutory modification or re-enactment thereof.
 - b) Regulation 1.1.4 (I) (Schedule I) of the Occupational Health and Safety Regulations 2007, or any later statutory modification or re-enactment thereof.
 - c) National Code of Practice for the Safe Use of Synthetic Mineral Fibres [NOHSC: 2006 (1990)].
 - 2. Lead, where the metal or its corrosive products may be directly ingested, inhaled or absorbed. Applications of lead such as roofing, flashings, rainwater goods and copper alloy fittings containing lead which are specifically required, are acceptable until equal or better alternatives are available.
 - 3. Lead based paints and primers.
 - 4. Urea formaldehyde foam or materials which may release formaldehyde beyond Australian Standard limits.
 - 5. Materials which generally comprise mineral fibres, either manmade or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less, or which contain any fibres not sealed, encapsulated, or otherwise stabilised to ensure that fibre migration is prevented. Products that may contain these fibres include insulation, fire protection and air filters. For all mineral wool insulation products, test evidence must be available and produced confirming that the materials fulfil the requirements of current Safe Work Australia regulations and consequently are not classified as a possible human carcinogen.

6. Chlorofluorocarbons or hydrochlorofluorocarbons or any goods and/ or materials containing the same (eg materials in which HFCs, CFCs or HCFCs have been used as blowing agents). All foamed insulation shall be manufactured using HFC, CFC and HCFC free processes, ie zero ozone depleting potential (ODP) and low global warming potential (GWP). Suitable blowing agents include pentane and CO₂.
 7. High alumina cement in structural elements.
 8. Calcium chloride in admixtures for use in reinforced concrete.
 9. Polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs) or any goods and/ or materials containing the same.
 10. Calcium silicate bricks or tiles.
 11. Sea dredged aggregates.
 12. Toxic wood preservatives including but not limited to lindane, pentachlorophenol (PCP), tributyltin (TBT) and chromated copper arsenate (CCA).
- B. If wishing to use any materials listed above, prepare detailed observations for review by the Superintendent based on the guidelines contained in the document Good Practice in the Selection of Construction Materials, by Ove Arup & Partners.
- C. Hazardous Materials Survey:
1. Refer to the Principal's Hazardous Materials Survey as it exists for demolition works. Undertake additional surveys as required to confirm and further identify existing hazardous materials, their locations and quantities.
 2. Where hazardous materials are found during the course of the works, formulate procedures and work methods to encapsulate and/ or effect their safe removal. Once removed, provide evidence by means of disposal receipts and comply with the following:
 - a) Asbestos: Occupational Health & Safety (OH&S) legislation and relevant environmental legislation.
 - b) Lead: to AS 4361.1 or AS 4361.2 as applicable.
 - c) Polychlorinated Biphenyls (PCBs): ANZECC Polychlorinated Biphenyls Management Plan.

5.5 Sourcing of Timber

- A. Refer to the requirements described in Section 08-050.

5.6 Corrosion Protection

- A. Consideration shall be given to the corrosivity of the local environment when selecting an appropriate coating thickness for steel. The atmospheric corrosivity categories are defined in AS/NZS 2312 Appendix B.
- B. The corrosive environment of the Site shall be regarded as Category C externally and Category D internally as defined in AS/NZS 2312.
- C. Metallic coatings for corrosion protection (including metal spray coatings, hot dip galvanising, and electroplating) shall comply with AS/NZS 2312 Section 5.
- D. Paint coating systems for corrosion protection shall comply with AS/NZS 2312 Sections 6 and 8.
- E. Particular care shall be taken with delivery and storage on Site, particularly if storage is prolonged. On no account should materials or components be stored or used beyond the manufacturer's expiry date.
- F. Ensure that protective measures are taken to avoid any corrosion or any deleterious effects caused by manufacturing, finishing, transportation, storage and installation of materials.
- G. Ensure full resistance to any corrosion for components that are secured or bolted to each other, paying particular attention to the surface damage caused by such bolting or securing.
- H. Ensure full resistance in repair of corrosion protection to cope with the Site cutting of components, especially at boundary and external conditions.

5.7 Skilled Personnel

- A. Execute all parts of the Works using persons skilled in the processes to be adopted. Where requested, provide documentation that demonstrates an individual's ability and qualifications to carry out the work to which he has been assigned.

5.8 Suitability of Structure

- A. Before commencing any part or element of the Works, survey the structure, checking line, level and fixing points and report immediately to the Superintendent if the structure is considered to be unsuitable and/ or will affect the proposed warranty. If the structure is unsuitable, propose remedial action.

5.9 Setting Out

- A. Establish a physical Base Reference Datum on Site from which all primary plan positioned grids and principal levels are subsequently set out. This Base Reference Datum point shall be strategically placed such that it can be referred to as necessary for the duration of the Works . It shall be physically robust and located in ground that is not prone to movement or vibration so that it is spatially fixed for the duration of the Works. The Base Reference Datum shall be located to within $\pm 2\text{mm}$ accuracy of the design dimension to the designated reference point.
- B. Suitably qualified personnel shall carry out all primary setting out. It shall be done using instruments and methods appropriate for achieving the necessary precision and accuracy.
- C. Prior to commencement of work, submit to the Superintendent the proposed method of setting out, how grid lines will be marked on Site and how their positions will be checked and maintained.
- D. The plan position of any designated mark (measured to its centre) defining a Primary Positional Grid Line shall be located to within $\pm 2\text{mm}$ of its design dimension from the Base Reference Datum.

5.10 Project Tolerances Definitions

- A. Tolerance: The defined maximum allowable dimensional deviation from a prescribed or agreed value or position.
- B. Base Reference Datum: The physical marker established on Site to define the base reference plan and level position to which all other Site setting out is referenced.
- C. Dimension: Any prescribed dimension, or any dimension which can be determined from a set of prescribed dimensions, for any element or part thereof.
- D. Primary Positional Grid Line: Any setting out grid line used to define the spatial layout of the project and to which the local setting out of elements may be referenced.
- E. Location Reference Point: A specified point that is used to define the position of certain other points and/ or elements.
- F. Location Reference Plane: A specified plane that is used to define the position of certain other planes and/ or elements. The reference plane is typically defined by a specified set of reference points.
- G. Location Reference Surface: A specified surface that is used to define the position of another surface and/ or surfaces. The reference surface may be defined mathematically (eg as part of a cylinder or as part of a sphere) where it is spatially fixed in relation to specified reference points.
- H. Reference Element: A specified element that is used to define the position of other elements. Typically a specific point on the reference element shall be defined to any other element to which it refers.

5.11 Compatibility

- A. Ensure that all materials and processes employed are compatible with each other.

5.12 Manufacturer's Instructions

- A. Where proprietary products, systems or items are specified and/ or included in the Works, ensure that the method of building, installing, handling, storage, protection, finishing, adjusting and preparation of substrates, etc, is strictly in accordance with the manufacturer's printed instructions and recommendations and that copies of all such documentation are supplied to the Superintendent prior to commencement. All such manufacturer's instructions and recommendations are deemed to be included in the Contract.
- B. All materials and associated components shall be stored in a clean, dry area, in accordance with the manufacturer's written recommendations.

5.13 Suppliers

- A. Be responsible for all materials, components and equipment supplied or manufactured by Subcontractors or suppliers, until the end of the warranty period defined where they exceed the defects liability period.

5.14 Site Cutting of Materials

- A. All methods, principles, details, etc, for Site cutting of components shall be submitted as part of the Contractor's method statement to the Superintendent for review. No manufacture shall commence until it can be demonstrated that all proposed techniques have been reviewed by the Superintendent.

- B. Cutting of metal products shall be straight and free from burrs and all joints shall be flush, without gaps or imperfections. If base metal is exposed, the surface shall be protected to the same level of protection as stated in the Specification.

5.15 Deterioration

- A. All materials shall be treated/ selected to prevent any damage/ corrosion from all possible combinations of exposure to seawater, non-saline water, wet rot, dry rot, fungi, mould, soil, high humidity, low or high temperatures, chemical acids and alkalis, abrasion and impact, bacteria and all other deleterious effects including atmospheric pollution and pH factor of the adjacent elements.
- B. Ensure that no chemical or electrolytic action takes place where dissimilar metals and/ or materials are used together.
- C. No materials shall discolour, crack or otherwise be damaged by the worst possible combination of environmental conditions.
- D. With materials subject to surface treatment, special attention shall be given to the substrate to ensure that the preparation is compatible with the surface treatment.
- E. Ensure that all superficial dust and friable materials are removed and that adequate protection is provided during the process of the surface treatment and finishes to prevent contamination by dust and other debris.
- F. Materials used in the Works must not be liable to infestation attack by micro-organisms.

5.16 Line and Level

- A. All components shall be installed such that they are plumb or horizontal and shall line up with adjacent components, in all directions, taking into account the allowable tolerances as defined in the relevant section of the Specification.

5.17 Repairs To Existing

- A. Where the Drawings or the schedules note a requirement for an existing building element, substrate, surface or finish to be repaired, do so to the acceptance of the Superintendent.
- B. Should an existing building element be found to be defective and in need of repair and has not been described as such in the documents, alert the Superintendent and await further instruction.
- C. In all instances of 'repairs to existing', agree the extent and level of quality that is required to be achieved with the Superintendent prior to commencement.

5.18 Making Good

- A. Where existing building elements have been cut away, damaged or received any other detrimental affect as a result of undertaking work, these shall be made good to the acceptance of the Superintendent.

5.19 Method Statements

- A. Provide a detailed method statement describing the sequence and methods to be employed in carrying out this work identifying proposed solutions regarding workmanship which affects the fabrication, holding, storing and handling, setting out, Site assembly, bolting, joining and welding of components and the protection of the metalwork against corrosion. Such notes shall be clearly written on the Shop Drawings to be used for Site fixing.

SECTION 02-000 -- DEMOLITION	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Interpretation	1
1.4 Submissions	1
1.5 Adjacent Occupation	2
1.6 Surveyor's Benchmarks	2
1.7 Pavements	2
1.8 Extent of Demolition/ Stripping Out	2
1.9 Features to be Retained	2
1.10 Licences/ Approvals	2
1.11 Health and Safety	2
1.12 Hazardous Materials	2
1.13 Witness Points	2
2. PRODUCTS	3
3. EXECUTION	3
3.1 Generally	3
3.2 Dilapidation Report	3
3.3 Temporary Works	3
3.4 Disposal of Water and Run-off	3
3.5 Health Hazards	3
3.6 Explosives	4
3.7 Adjoining Property/ Properties	4
3.8 Occupied Areas	4
3.9 Materials Demolished for Removal	4
3.10 Recycling	4
3.11 Noise	4
3.12 Fire	4
3.13 Rubbish	4
3.14 Interference To Existing Equipment	4
3.15 Protection	4
3.16 Services	5
3.17 Hazardous Materials	5
3.18 Asbestos-Based Materials	5
3.19 Dangerous Openings	5
3.20 Completion	5

SECTION 02-000 -- DEMOLITION

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Demolition/ stripping out.
 2. Protection of retained works (including landscaping).
 3. Termination and/ or diversion of services to and within the site.
 4. Obtaining of licences and approvals.
 5. Observance of Statutory Requirements.
- B. Ensure that all interfaces with other trades are fully coordinated prior to commencement.
- C. Coordinate and interface with the Services Engineer's documents for requirements regarding building services including termination, removal and/ or diversion of services. All terminated and/ or redundant services shall be demolished and removed.

1.3 Interpretation

- A. Materials to be salvaged and retained by the Principal:
1. Salvaged prior to Contract award: Materials, fittings, fixtures and/ or equipment that will be removed by the Principal prior to awarding the Contract. These items will remain the property of the Principal.
- B. Materials to be salvaged by the Contractor:
1. Salvaged by the Contractor: Materials, fittings, fixtures and/ or equipment as described or nominated on the Drawings. These items will require disconnection, dismantling and/or removal (as applicable), safe storage by the Contractor and maintenance, repair or remodeling as required and as described/detailed in the documents prior to being reincorporated into the new Works.
 2. Demolished for reuse: Non-scheduled demolished materials proposed by the Contractor for reuse in the Works. Acceptance shall be obtained from the Superintendent prior to such reuse.
 3. Demolished for recycling: Non-scheduled demolished materials which are recyclable or required by any Statutory Authority to be recycled.
 4. Demolished for removal: Other demolished materials.

1.4 Submissions

- A. Authorities:
1. Evidence of compliance: Before commencing demolition, submit evidence that:
 - a) Requirements of authorities relating to the Works have been met.
 - b) A permit to demolish has been obtained from the appropriate authority.
 - c) If applicable, a scaffold permit has been obtained from the appropriate authority.
 - d) Precautions necessary for protection of persons and property have been taken and suitable protective and safety devices provided for the approval of the relevant authority.
 - e) If required, treatment for rodent infestation has been carried out and a certificate obtained from the appropriate authority.
 - f) Fees and other costs have been paid.
- B. Work plan:
1. Submit the work plan required by AS 2601, at least five days before starting demolition or stripping out work. Include the following information:
 - a) The proposed sequence of operations.
 - b) The method of protection and support for adjacent property either within or outside the Site.
 - c) Locations and details of service deviations and terminations.
 - d) Methods of protection of those items required to be protected.

- C. Asbestos:
 - 1. Prepare reports in accordance with the Occupational Health and Safety Regulations.
 - 2. The removal and/ or management and control of asbestos and/ or materials containing asbestos shall be in accordance with the particular Code of Practice published by Safe Work Australia. Provide air monitoring as required during asbestos removal.
- D. Dilapidation report:
 - 1. Submit a dilapidation report, as detailed in Section 01-100 prior to commencing work on Site.
- E. Waste management report:
 - 1. Provide a waste management report including evidence of the treatment and disposal of all waste products from the Site. The report shall detail what percentage of waste (by weight) has been recycled. Confirm by providing actual receipts. Refer also to Section 01-100.
- 1.5 Adjacent Occupation**
 - A. At all times take suitable measures to ensure that users of areas adjacent to the Site including Centre staff, patrons and the general public are not unduly or unreasonably inconvenienced by the work activities.
- 1.6 Surveyor's Benchmarks**
 - A. Report any benchmarks and other survey information found which may be disturbed during demolition activities. Do not remove or destroy them unless instructed otherwise. Take whatever measures are necessary to preserve and protect these benchmarks.
- 1.7 Pavements**
 - A. Regularly clear all mud, debris, etc, deposited on the roads, landscaped areas and footpaths/ pavements by vehicles and plant arriving at or departing from the Site, or resulting from the demolition work.
- 1.8 Extent of Demolition/ Stripping Out**
 - A. Demolish all that is required to be demolished in order to undertake and complete the Works as indicated on the Drawings.
 - B. Visit the Site during the Tender period and be satisfied as to the existing Site conditions and the extent of demolition work required to meet the design intent.
- 1.9 Features to be Retained**
 - A. Existing features indicated on the Drawings as being retained shall be adequately protected and maintained for the duration of the Works. Should any damage occur, they shall be restored to the condition they were in prior to the commencement of works and to the acceptance of the Superintendent.
- 1.10 Licences/ Approvals**
 - A. Obtain all necessary licences and approvals for street closures, scaffolding, pavement crossovers and the like. Also provide any hoardings, fencing, lighting, barricades, platforms, props, handrails, etc, as required by the Statutory Authorities or the Superintendent and additional to that provided at commencement and required to undertake and complete the demolition work.
- 1.11 Health and Safety**
 - A. Carry out all demolition work in accordance with the requirements of Safe Work Australia, the Work Health and Safety Regulations and Codes of Practice.
 - B. Manage health and safety risks in accordance with the particular Safe Work Australia Code of Practice. Provide documented evidence to the Superintendent when requested.
- 1.12 Hazardous Materials**
 - A. Examine the Site and items to be demolished/ stripped out and determine the nature and extent of any hazardous materials required to be removed. Handle and dispose of them in a safe manner.
 - B. An Asbestos and Hazardous Materials Report exists for the building. The Contractor shall satisfy itself that the report is complete and correct.
 - C. Prior to the commencement of demolition works, undertake any further audits to those provided by the building owner as necessary to confirm the type and location of any hazardous materials as well obtain all approvals as required for their safe removal in compliance with the requirements of Safe Work Australia.
- 1.13 Witness Points**
 - A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):

1. Existing plant and equipment on and adjacent the Site that is required to remain operational (continuous and/ or periodic) and measures in place to ensure that this occurs.
2. Hoardings, barriers and all other such safety devices designed to protect all people on and adjacent the Site including Site personnel, visitors to the Site, occupants and visitors to adjacent areas of the Site and the general public, prior to the commencement of demolition.
3. Protective devices to trees and any other landscaping being retained and that may otherwise be affected or damaged by work activities, prior to the commencement of demolition.
4. The Site at the completion of demolition work.
5. All in ground services after diversion and/or disconnection.

2. PRODUCTS

- A. Not used.

3. EXECUTION

3.1 Generally

- A. Protect all trees to areas within and adjacent the Site that may be affected by the demolition work and associated activities. Seek advice from an Arborist where deemed necessary.
- B. Trees that are to be removed shall have their stumps grubbed out to the acceptance of the Superintendent.
- C. Demolish structure(s) in accordance with AS 2601.
- D. The demolition of buildings and structures shall include the removal of footings and filling in of trenches etc left behind by their removal. The Site shall be left clear of all debris and free of any hazards.
- E. Ensure that Site staff responsible for supervision and control of the demolition work are experienced in the assessment of the risks involved and in the work methods to be used.
- F. Take into account the Site limitations and restrictions with regards to access and the use of equipment and plant necessary to complete the work.
- G. Be aware and make all Site personnel aware of access limitations to and from (and within) the Site.
- H. Operatives shall be appropriately skilled and experienced for the type of work and hold the relevant certificates of competence.
- I. Carry out the demolition work carefully and systematically, removing unwanted materials progressively.
- J. Sort, stockpile and remove materials for landfill or recycling as required.
- K. Prevent nuisance from smoke, dust, rubbish, vermin and other causes.
- L. Cover loads of demolished materials to prevent spillage in transit.

3.2 Dilapidation Report

- A. The Dilapidation Report will be used to assess the responsibility for damage or making good, or both, arising out of demolition work. The Contractor shall be responsible for any damage arising during the demolition stage which cannot be demonstrated to be pre-existing.

3.3 Temporary Works

- A. Build temporary works as required to undertake and complete all aspects of the work including but not limited to secure covered ways, safety barriers/ rails, hoardings, temporary walls (fire or smoke separated where required) and the like. In all cases, temporary works shall prevent dust and noise penetration to adjacent areas.
- B. Make good to all interfaces as required upon removal of temporary works to the satisfaction of the Superintendent.

3.4 Disposal of Water and Run-off

- A. Inform the appropriate Authorities and obtain all necessary permits before disposing of water from the site.
- B. Dispose of water or other liquids from any source without causing interference or injury to the public or damage to private or public property and in accordance with Statutory Requirements.

3.5 Health Hazards

- A. Take adequate precautions to protect Site operatives, occupants of adjacent areas and the general public from health hazards associated with dangerous fumes, dust or any other hazards.
- B. Take adequate precautions to prevent fire or explosion caused by gas or vapour.

- C. Control noise and dust to avoid inconvenience to users, occupants and visitors to adjacent areas/ buildings.
- D. Record any voids, tanks, chemicals, etc, discovered during demolition activities and agree with the Superintendent methods for safe removal, filling, etc.

3.6 Explosives

- A. Explosives shall not be used for demolition works unless specifically instructed.

3.7 Adjoining Property/ Properties

- A. Cause a minimum of damage to adjoining property and leave no unnecessary or unstable projections.
- B. Do not disturb support to foundations or footings of adjoining properties.
- C. Report to the Superintendent any defects exposed or becoming apparent to adjoining properties.
- D. Promptly repair and make good any damage caused by demolition work and maintain safety, integrity, stability, weather protection, thermal properties and security to/of adjoining properties.

3.8 Occupied Areas

- A. Where areas on, or adjacent, the Site remain occupied, provide safe and convenient access, including all required services, for the benefit of the occupants. Also ensure that emergency provisions are maintained and remain in compliance with the requirements of Statutory Authorities, whether temporary or permanent.

3.9 Materials Demolished for Removal

- A. Components and materials demolished for removal shall become the property of the Contractor, unless otherwise stipulated. Remove from Site as work proceeds.
- B. In all cases demolished materials and items shall be disposed of legally. Retain all receipts and dockets for examination by the Superintendent if requested.

3.10 Recycling

- A. Generally recycle as much demolished material as practicable.
- B. Comply with any recycling requirements of the local municipal or any other Statutory Authority.

3.11 Noise

- A. Comply generally with AS 2436.
- B. Restrict noise levels to levels acceptable to Statutory Authorities.
- C. Fit all compressors, percussion tools and vehicles with effective silencers of a type recommended in writing by the manufacturers of the compressors, tools or vehicles.
- D. Do not use or permit employees to use radios, public address systems or other audio equipment in ways or at times that may cause a nuisance.

3.12 Fire

- A. Take all necessary precautions to prevent damage to the Works and/ or adjoining properties from fire.
- B. Burning on Site of materials arising from the work is not permitted.

3.13 Rubbish

- A. Remove rubbish, debris and surplus material and spoil regularly. Keep the Site clean, neat and tidy.
- B. Remove all rubbish, dirt and residues from voids and cavities before filling or closing in.
- C. Remove all waste hazardous materials and their containers regularly for disposal off Site in accordance with relevant regulations.
- D. Retain waste transfer documentation on Site.

3.14 Interference To Existing Equipment

- A. Prevent excessive vibration, electromagnetic interference or any other detrimental impact to existing equipment within, adjacent, or in close proximity to the Site that may be affected by such interference.
- B. Take all steps necessary to ensure that plant and equipment critical to the activities of adjoining owners/occupants is not impacted upon.

3.15 Protection

- A. Adequately protect everything required to be retained.
- B. Agree with the Superintendent, any perimeter fences that are required to be retained and any protection measures pertaining to those fences.

3.16 Services

- A. Refer to the respective services engineering documents for specific requirements.
- B. Existing services shall be dealt with as follows:
 - 1. Notify all service authorities and adjacent owners/ occupants of the proposed works not less than five days before commencing Site operations.
 - 2. Before starting work verify positions of existing services by means of checking on Site against service authorities' records. If documented services cannot be located or if unidentified services are found, inform the Superintendent and wait for instructions.
 - 3. Observe service authorities' requirements and recommendations for work adjacent to existing services.
 - 4. If any damage to services results from the work activities, notify the Superintendent and appropriate service authority without delay. Make good without delay; to the satisfaction of the service authority.
 - 5. Replace marker tapes or protective covers disturbed by Site operations.
 - 6. Locate and mark the positions of services affected by the Works.
 - 7. Remove all dead or unwanted services including but not limited to pipes, cables, pits and controls.
 - 8. Before starting demolition, arrange with the appropriate authorities for the disconnection of services and removal of fittings and equipment.
 - 9. Locate and disconnect all drain connections. Seal with cement mortar within the Site.
 - 10. Protect drains, manholes, gullies, vent pipes and fittings still in use and ensure they are kept free from debris at all times. Make good any damage arising from demolition work and leave clean and in working order at completion.
 - 11. Provide bypass connections as necessary to maintain continuity of services to occupied areas of the same and adjoining properties. Give a minimum of three days notice to occupiers if shutdown is necessary during changeover.

3.17 Hazardous Materials

- A. Give notice immediately if/when hazardous materials or conditions are found, (whether actual or suspected) including the following:
 - 1. Asbestos or material containing asbestos.
 - 2. Flammable or explosive liquids or gases.
 - 3. Toxic, infectious or contaminated materials.
 - 4. Radiation or radioactive materials.
 - 5. Noxious or explosive chemicals.
 - 6. Tanks or other containers which have been used for storage of explosive, toxic, pathogenic or contaminated substances.

3.18 Asbestos-Based Materials

- A. Report immediately to the Superintendent any suspected asbestos based materials discovered during demolition work. Avoid disturbing such materials. Agree with the Superintendent methods for safe removal.
- B. Carry out removal and disposal in accordance with the Safe Work Australia's Code of Practice for the Safe Removal of Asbestos.

3.19 Dangerous Openings

- A. Illuminate and protect as necessary.

3.20 Completion

- A. Clear away all debris and leave the Site in a tidy condition on completion.
- B. Notice of completion:
 - 1. Give at least seven working days notice of completion of demolition so that adjacent structures may be inspected following completion of demolition.
- C. Temporary supports: Clear away at completion of demolition.
- D. Make good as necessary and to the satisfaction of the Superintendent, any damage to existing buildings, building elements, surfaces, finishes and the like resulting from demolition activities. The Dilapidation Report shall be used where necessary to determine extent of damage and required repairs.

SECTION 03-300 -- CONCRETE FINISHES (ARCHITECTURAL REQUIREMENTS)	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Quality Benchmarks	1
1.4 Testing and Compliance Assessment	1
1.5 Slip Resistance and Slip Resistance Testing of Floors	1
2. PRODUCTS	1
2.1 General	1
2.2 Type CON-03 Worked Concrete Finish - Broom	1
2.3 Type CON-02 Worked Concrete Finish - Hand	1
2.4 Type CON-01 Worked Concrete Finish - Power	1
2.5 Type CON-04 Concrete Stair Finish	2
2.6 Concrete Waterproofing Admixture	2
2.7 Recycled Material in Concrete	2
2.8 Formwork	2
2.9 Colour Consistency	2
2.10 Builder's Film	3
2.11 Movement Joints in Structural Slab	3
2.12 Type WPM-05 Joint Sealant	3
2.13 Types EJ-02 and EJ-04 Expansion Joint Covers	3
3. EXECUTION	3
3.1 Batching, Mixing and Transport	3
3.2 Storage	3
3.3 Construction of Formwork Generally	3
3.4 Tolerances	3
3.5 Inserts, Holes and Chases	4
3.6 Built-in Components	4
3.7 Joints in Formwork	4
3.8 Cleaning Formwork	5
3.9 Protection	5

SECTION 03-300 -- CONCRETE FINISHES (ARCHITECTURAL REQUIREMENTS)

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification, the Structural Engineer's documents and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Concrete floor and pavement finishes.
 2. Movement/ expansion joints.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first formed, poured, finished and accepted section of each type of concrete floor finish.

1.4 Testing and Compliance Assessment

- A. Refer to the requirements of the Structural Engineer's specification.

1.5 Slip Resistance and Slip Resistance Testing of Floors

- A. Concrete floors and pavements left exposed in the completed works shall be stable, safe and minimise the risk of slipping or tripping due to slippery surfaces or misaligned joints. Slip resistances shall comply with the requirements of HB 197.
- B. Provide slip resistance test certificates to confirm that slip resistance values are in accordance with AS 4663.
- C. Arrange for on-site slip resistance testing of all types of concrete floor surfaces that are left exposed in the finished work and in sufficient number to cater for all areas and conditions including ramps, steps entrances etc. Testing shall be undertaken by a registered testing laboratory. Tests shall include wet pendulum and dry floor friction testing in accordance with AS 4663.
- D. Undertake accelerated wear tests to verify that slip resistance levels are able to be maintained for the long term.

2. PRODUCTS

2.1 General

- A. Quality of Finish: The quality of concrete finish shall comply with AS 3610, AS 3600 and AS 1379.
- B. Concrete shall be a mixture of cement, aggregates and water with or without the addition of chemical admixtures or other materials as specified, with finishes as defined by the following clauses:

2.2 Type CON-03 Worked Concrete Finish - Broom

- A. Brushed finish (broom finish): Brush the surface of the poured concrete with a stiff broom or wire brush while still green, to produce a lightly textured surface finish.
- B. Generally to external concrete pavements and ramps. Refer also to the civil and landscape documents. Ensure that all external pavements are constructed so that ponding of rainwater does not occur.

2.3 Type CON-02 Worked Concrete Finish - Hand

- A. Trowelled finish (hand): Float the concrete to an even surface with no ridges or steps, then immediately commence curing as specified in the Structural Engineer's specification. When the concrete is suitably stiff, hand trowel to give a uniform, smooth surface, free from trowel marks. The surface shall be suitable for receiving screeds or floor tiles on bedding adhesive as applicable and as specified.
- B. Generally to setdowns where a screed is to be applied so as to achieve required falls to floor wastes and similar drainage points of bathroom, en-suite, laundry and similar wet areas as well as to external balconies, terraces and the like.

2.4 Type CON-01 Worked Concrete Finish - Power

- A. Trowelled finish (power): Float the concrete to an even surface with no ridges or steps, then immediately commence curing as specified in the Structural Engineer's specification. When the concrete is suitably stiff, power trowel to give a uniform, smooth but not polished surface, free from trowel marks and other blemishes and suitable to receive the specified flooring material by other trades. Resume specified curing without delay. Protect the surface from construction traffic until the flooring material is laid. If, because of inadequate finishing or protection, the surface of the concrete is not suitable to receive the specified flooring material, make good by application of a smoothing compound, to the satisfaction of the Superintendent.
- B. Generally to internal areas that are to receive carpet, sheet vinyl, timber flooring or similar floor finishes. Floors nominated to receive a liquid applied finish shall achieve a similar level of finish to the concrete.

2.5 Type CON-04 Concrete Stair Finish

- A. Concrete stair soffits and stringers shall be formed to an Off Form Finish - Class 2 as specified above. The treads and risers shall be formed with an 80mm minimum setback/ setback to allow for a fine granolithic finish as specified in Section 05-300 at a later date and prior to Practical Completion.
- B. The treads and risers may be formed in the initial pour (ie without the above mentioned setback and the subsequent grano screed), if it can be demonstrated that the required level of finish can be achieved and that they can be adequately protected until Practical Completion.
- C. Tread nosings in the granolithic finish shall receive anti-slip carborundum strips or similar anti-slip treatment as detailed.

2.6 Concrete Waterproofing Admixture

- A. Where waterproofing of concrete is required to basements, lift overruns, escalator pits and the like, the following shall be added to the concrete mix at the time of batching:
 - 1. Manufacturer/ reference: Xypex Admix C-1000NF crystalline dry powder compound or acceptable equivalent.
 - 2. Quantities shall be determined by the admix manufacturer and accepted by the Structural Engineer prior to concrete manufacture.

2.7 Recycled Material in Concrete

- A. Upon acceptance by the Structural Engineer, ensure and provide adequate written evidence that a minimum of 20% of all aggregate used in the manufacture of concrete is recycled material.
- B. The recycled aggregate shall be classified as Class 1 RCA in accordance with HB 155.
- C. Upon acceptance by the Structural Engineer, ensure that a minimum of 30% of the cement used in the production of in situ concrete, 20% of the cement used in the production of precast concrete and 15% of the cement used in stressed concrete is replaced with an acceptable industrial waste product such as flyash, blast furnace slag or silica fume. Provide written evidence as necessary to confirm these percentages.

2.8 Formwork

- A. To AS 3610.
- B. Timber used in the manufacture of formwork shall comply with the requirements described in Section 08-050.

2.9 Colour Consistency

- A. The consistency of the concrete colour is of great importance. Select all suppliers, materials and all methods to ensure the specified finish and consistency, including but not limited to the following:
 - 1. The main plant shall have a consistent supply to achieve the specified finish.
 - 2. The back-up plant shall be selected to achieve an equivalent supply.
 - 3. Cement, fines and other aggregates shall be from one region/ source in order to achieve consistent concrete colour.
- B. Agree with the Superintendent the acceptable colour range, based on the benchmarks or samples which shall then become the colour standard for the project.
- C. Colour shall range within the 10 tonal scales of AS 3610.
- D. Colour consistency problems, for example inherent colour variation, aggregate transparency or loss or movement of water, shall be avoided and appropriate measures taken. These include but are not limited to:
 - 1. Ensuring the continuity of supply from one source. Any back-up plant shall have an equivalent supply.
 - 2. Batching the concrete precisely and mixing thoroughly.

3. Bracing or stiffening the formwork to reduce flexibility.
4. Ensuring that the formwork face material has a uniform absorbency.

2.10 Builder's Film

- A. To the underside of concrete slabs on ground and where there is no hydrostatic water pressure, provide a polythene builder's film with a minimum thickness of 200 microns.
- B. All polythene sheet joints shall be lapped and taped to ensure a continuous and sealed system.

2.11 Movement Joints in Structural Slab

- A. Manufacturer/ reference: Latham, Construction Specialties or acceptable equivalent expansion/ movement joints with duty and movement capabilities suitable for the particular application and as recommended by the manufacturer.
- B. Movement joints shall be set to the required height using plastic packers at the mechanical fixing position and then fixed into place. High strength, non shrink grout shall be applied under the joint to set it firmly in place. Finish off the concrete to either side of the joint for a seamless, flush and uniform finish.
- C. All movement joints shall be proprietary types as recommended by the manufacturer for the particular situation and able to cater for building movements as specified by the Structural Engineer.
- D. Unless otherwise accepted by the Superintendent, all movement joints shall be stainless steel and set flush with the adjacent floor finish.

2.12 Type WPM-05 Joint Sealant

- A. Manufacturer/reference: Sika Sikaflex Tank N one part, moisture curing, elastic joint sealant..
- B. Generally to concrete construction joints. Refer also to the Product & Materials Schedule.
- C. Joint preparation and sealant installation in shall be in accordance with the manufacturer's instructions.

2.13 Types EJ-02 and EJ-04 Expansion Joint Covers

- A. Manufacturer: Latham or acceptable equivalent. Refer also to the Product & Materials Schedule.
- B. Types:
 1. EJ-02 = CS-25 Ultimate Series. Stainless steel expansion joint cover. Including VWS Water Gutter. Generally to all expansion joints to structural slabs where a surface lining is applied.
 2. EJ-04 = SAS-25 (SSSM 104) Ultimate Series. Stainless steel floor-to-wall expansion joint cover. Including BFG Water Gutter. Generally to all expansion joints to slabs/walls where a topping screed is applied.
- C. Refer to Structural Engineers Drawings for locations. Install in accordance with the manufacturer's instructions and construction details. Coordinate with floor finishes trades.

3. EXECUTION

3.1 Batching, Mixing and Transport

- A. Ensure that accurate and consistent batching and mixing is carried out to achieve the specified quality of finish. For example, added water shall allow for the moisture content of the aggregate to achieve a similar slump for each mix.
- B. Consideration shall be given to the use of a dedicated main mixing and batching plant to avoid contamination of the mix. A standby back-up plant capable of providing equivalent mix and batching facilities shall also be available. The use or otherwise of such a plant shall be stated in the Contract documentation.

3.2 Storage

- A. Suitably store all materials on Site, clear of the ground with protection from inclement weather and contamination by other materials, and keep dry.

3.3 Construction of Formwork Generally

- A. To AS 3610.

3.4 Tolerances

- A. Unless nominated otherwise in the Structural Engineer's Specification, in situ concrete shall meet the following tolerances:
 1. Absolute plan position
 - a) The absolute plan position of any concrete element shall not exceed:
 - i) In the first storey or level: $\pm 10\text{mm}$.
 - b) The absolute position in plan of lift cores on all floors or levels shall not exceed:

2. Slab edge tolerances:
 - a) The absolute position in plan of slab edges and perimeter column faces on all floors and levels shall not exceed:
 - i) In the first storey or level: $\pm 10\text{mm}$.
3. Built-in and embedded tolerances:
 - a) The location of built-in items or embedments in any concrete element shall not exceed $\pm 15\text{mm}$ from the correct location.
4. Horizontal (as laid) tolerances:
 - a) In elevation, the absolute vertical level of any concrete element shall not exceed:
 - i) Top surface of the floor: $\pm 10\text{mm}$.
 - ii) Thickness of floor, beam or other element: $\pm 5\%$ dimensioned thickness.
 - b) The flatness of horizontal (as laid) concrete generally shall not exceed:
 - i) Floors specified or scheduled to receive carpet (broadloom or tiles) without underlay: The maximum deviation under a 3 metre straight edge laid in any direction shall be 3mm.
 - ii) Floors specified or scheduled to receive sheet or tile finishes such as vinyl, linoleum, rubber and the like: The maximum deviation under a 3 metre straight edge laid in any direction shall be 3mm.
 - iii) All other as-laid floors: The maximum deviation under a 2 metre straight edge laid in any direction shall be 5mm.
 - c) Rectify non-conforming 'as laid' concrete by suitable procedures, including levelling compounds or grinding.

3.5 Inserts, Holes and Chases

- A. Confirm all positions and details to ensure that alteration to and decisions about the size and location of inserts, holes and chases are not made without acceptance by the Superintendent.
- B. Fix inserts, or box-out as required, in the correct positions before placing concrete. Form all holes and chases. Do not cut hardened concrete without acceptance by the Superintendent.
- C. Ensure that all fixings and holding-down bolts, etc, are not disturbed or damaged during construction.
- D. Generally, only holes with a dimension greater than 150mm are indicated on the Drawings. Shop Drawings shall be submitted indicating all penetrations required to satisfy the requirements of the mechanical, electrical, hydraulics and any other services penetrations.
- E. Ensure that the formation of holes, inserts, chases, etc, meet the tolerances required for the particular services works concerned. Ensure that all holes, inserts, chases, etc, are provided.

3.6 Built-in Components

- A. Built-in components, cast-in items, void formers and box-outs shall be fixed in position before concreting. Ensure that all tolerances are met in this respect. Unless permitted by the Superintendent, void formers and box-outs shall not be used instead of built-in components. Polystyrene shall not be used for void formers and box-outs, unless permitted by the Superintendent.
- B. Do not cut hardened concrete to provide holes or chases without acceptance by the Superintendent.
- C. Correctly locate and secure pipe sleeves, inserts and ducts in place to meet the requirements for tolerances for following trades. Formwork for all openings, chases and holes in walls and floors shall be constructed in such a way that they do not interfere with the reinforcement. The Superintendent's inspection of the reinforcement before concreting does not release the Contractor from responsibility for omission of any of these works.
- D. Formwork moulds shall be rigid and free from movement that affects their performance with regard to tolerances or colour of concrete. Allow for all necessary mid-rib reinforcement of the moulds.

3.7 Joints in Formwork

- A. Joints in formwork, including joints between forms and completed work shall prevent grout loss.
- B. The overall jointing patterns shall be maintained and be regular throughout the project.
- C. Alignment of rebates and mould levelling, especially to the side of the moulds, shall be levelled to give a finished surface of $\pm 1\text{mm}$ from the adjacent panel or joint.

- D. Construct formwork, including joints in form linings and between forms and completed work to prevent loss of grout, using seals when necessary. Secure formwork tightly against adjacent concrete to prevent formation of steps.

3.8 Cleaning Formwork

- A. Remove all rubbish, chippings, shavings, sawdust or dirt from formwork before concreting in.
- B. Treat all formwork with release agent in accordance with the manufacturer's recommendations in order to achieve the required finish.
- C. Ensure that reinforcement of concrete at construction joints is not contaminated with release oil, to the satisfaction of the Superintendent.
- D. Use retarding agent only with acceptance by the Superintendent.

3.9 Protection

- A. Protection of the Works:
 - 1. Provide full and adequate protection against the effect of weather for the in situ concrete works until the building is watertight.
 - 2. Provide full and adequate protection for the concrete, against damage, until Practical Completion.
 - 3. The protective measures used shall not in any way permanently mark or damage the concrete finishes.

SECTION 03-500 -- TIMBER FRAMING	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Quality Benchmarks	1
1.4 Witness Points	1
1.5 Other Submittals	1
2. PRODUCTS	1
2.1 Timber Generally	1
2.2 Timber Framing	1
2.3 Manufacture	1
2.4 Structural Timber	1
2.5 Finger Jointed Structural Timber	1
2.6 Plywood	1
2.7 Structural plywood	2
2.8 Glued Laminated Timber	2
2.9 Wet-processed fibreboard	2
2.10 Reconstituted structural timber	2
2.11 Nail plated joined beams	2
2.12 Fixing Generally	2
3. EXECUTION	2
3.1 Workmanship Generally	2
3.2 Protection from Weather	2
3.3 Additional Supports	2
3.4 Bearings	3
3.5 Wall Plates	3
3.6 Protection Generally	3
3.7 Nailing Generally	3
3.8 Powder Actuated Fixing Systems	3
3.9 Temporary Bracing	3

SECTION 03-500 -- TIMBER FRAMING

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
 - 1. Light timber framing.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
 - 1. The first completed section of timber wall and ceiling framing as applicable, in a location as agreed with the Superintendent.

1.4 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
 - 1. Timber framing, with insulation in place and prior to being covered over.

1.5 Other Submittals

- A. Provide certification and any other required evidence to confirm compliance with the requirements described in Section 08-050.

2. PRODUCTS

2.1 Timber Generally

- A. All timber and timber based products shall comply with the requirements described in Section 08-050.
- B. Timber shall be naturally seasoned for one year per 25mm thickness of board or kiln dried in accordance with the BRE Timber Drying Manual (1997).
- C. All timber shall achieve a durability level of class 1 (above ground) as defined in AS 5604.
- D. Do not use damaged, rotten or discoloured materials.
- E. Timber shall be free from distortion, cracks or other blemishes.
- F. The size and frequency of knots must be within limits accepted by the Superintendent during the Sample Submittals process.

2.2 Timber Framing

- A. All timber framing shall be in accordance with the requirements of this section and AS 1684.
- B. All rotten or borer/termite infested timbers shall be cut out, removed and replaced with sound timber to the acceptance of the Superintendent.

2.3 Manufacture

- A. Carefully machine timber to accurate cross sectional dimensions and lengths free from twist and bowing.
- B. Minimise end splitting of timber sections by sealing the ends with Mobilcer-M clear sealing emulsion or acceptable equivalent within 48 hours of sawing. Reapply sealing emulsion to all ends of timbers where cut on Site.

2.4 Structural Timber

- A. Structural timberwork shall be as indicated on the Architectural and/ or Structural Drawings and shall comply with the requirements of AS 1684.

2.5 Finger Jointed Structural Timber

- A. Standard: To AS 5068.

2.6 Plywood

- A. Generally plywood shall comply with AS/NZS 1604.3 with Hazard Classification to Table 1 and AS/NZS 4491.
- B. WBP grade plywood shall satisfy the requirements of:
 - 1. Interior use: To AS/NZS 2270. Bond type C.
 - 2. Exterior use: To AS/NZS 2271. Bond type A.

3. Marine plywood: To AS/NZS 2272. Bond type A.

- C. Emission class: E0.
- D. Ensure that fastenings do not protrude above the surface of board. Fastenings shall be of a type recommended for the purpose by the fastenings manufacturer.

2.7 Structural plywood

- A. To AS/NZS 2269.0.
- B. Bond type A.
- C. Emission class: E0.

2.8 Glued Laminated Timber

- A. Glued laminated timber shall be manufactured to AS/NZS 1328.1, AS 5067 and AS 1684 from stress graded timber, free from active attack by insects or fungi and have the following properties:
 - 1. Moisture content at the time of manufacture: Not more than 14%.
 - 2. Adhesive type: PRF (Phenol Resorcinol/Formaldehyde).
 - 3. Surface classification: Planed.

2.9 Wet-processed fibreboard

- A. Hardboard: To AS/NZS 1859.4.

2.10 Reconstituted structural timber

- A. Proprietary reconstituted structural timber sawn from slabs manufactured from Pinus radiata thinnings.

2.11 Nail plated joined beams

- A. Standard: To AS 4446.
- B. Type: Proprietary composite member made up from butt and horizontally joining timber with pressed-in nail plates.

2.12 Fixing Generally

- A. Fixings shall be of sufficient strength, appropriate to their location, and in such locations so as to ensure the performance of the elements being attached. The fixings shall be suitable and used solely for the purposes intended by the manufacturer in order to satisfy the requirements of the Specification.
- B. Unless otherwise specified, observe the following requirements:
 - 1. Fixings shall be selected such that adequate protection against any corrosion likely to occur in their position of use is provided for the service life specified.
 - 2. Use fixings that are suited to the likely stresses, movements and vibrations in use.
- C. Supply all necessary and appropriate fasteners, fixings, bearings, brackets, etc, necessary for the safe and proper installation plus associated flashings and closures.
- D. All fixings shall conform to all statutory requirements in respect of strength and type.

3. EXECUTION

3.1 Workmanship Generally

- A. Timber members that are damaged, crushed or split beyond the limits of their grading shall not be used.
- B. The cross section dimensions of timber shown on the Drawings shall be considered the minimum sizes permitted.
- C. The warping limits set down in AS 2082 and AS 2858 for the amount of bow, spring, twist and cup in a piece of timber shall not be exceeded.
- D. Methods of fixing and fastenings shall be in accordance with Section 08-400 unless specified otherwise.

3.2 Protection from Weather

- A. Provide temporary protection for all materials both before and after erection until permanent coverings are in place.

3.3 Additional Supports

- A. Provide additional studs, noggings and/ or battens as necessary to enable fixing of appliances, fixtures, edges of linings, etc, in accordance with the manufacturer's recommendations.
- B. All additional studs, noggings or battens shall be of adequate size and have the same treatment, if any, as adjacent timber supports.

- C. Maximum spacing of noggings: 1350mm centres.

3.4 Bearings

- A. Where timber surfaces are to transmit loads ensure that contact is made over the whole of the bearing area.
- B. Where packings are required, these shall cover the whole of the bearing area and have a crushing strength not less than the timber being supported and, in external locations, be rot and corrosion proof.

3.5 Wall Plates

- A. Shall be positioned and aligned to give the correct span and level for trusses, joists, etc.
- B. Plates shall be not less than 3000mm long with half lapped joints.

3.6 Protection Generally

- A. Timber:
 - 1. Shall be kept dry and shall not be subjected to overstress, distortion or disfigurement of sections or components during transit, storage, lifting, erection or fixing.
 - 2. All timber for external use shall be kept so that it meets the requirements of 1) above but also so that its moisture content does not change significantly from when it was graded "WET".
 - 3. Timber and components shall be stored under cover, clear of the ground and with good ventilation. Level bearers on a dry firm base shall provide support at regular intervals. Packs shall be opened to ensure free movement of air through the stack.
 - 4. The sequence of construction shall be arranged so that the timber is protected prior to use in the construction, while it is being mounted in the construction and subsequently maintained.
 - 5. Trussed rafters shall be kept vertical during handling and storage.
- B. Minimise end splitting of timber sections by sealing the ends with Mobilcer-M clear sealing emulsion, or acceptable equivalent, before delivery to the Site. Reapply sealing emulsion to all ends of timbers where cut on Site.
- C. Painted Finishes: Structural timber that is to be painted shall be primed according to the paint manufacturer's recommendations, prior to delivery to Site.

3.7 Nailing Generally

- A. No fewer than two nails shall be used and where appropriate use opposed skew nailing.
- B. Nails shall be fully driven into the timber without splitting or crushing the material being attached.
- C. Nail heads shall be punched below surfaces that will be visible in the completed works.

3.8 Powder Actuated Fixing Systems

- A. Refer to Section 08-400.

3.9 Temporary Bracing

- A. Temporary bracing shall be provided as necessary to maintain structural timber components in position and to ensure complete stability during construction.
- B. Remove all temporary bracing prior to completion of the Works.

SECTION 03-650 -- BRICK AND BLOCK WORK	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Sample Panels	1
1.5 Quality Benchmarks	1
1.6 Witness Points	1
1.7 Subcontractors	1
1.8 Testing Materials	1
1.9 Testing Brick and Block Accessories	1
2. PRODUCTS	1
2.1 General	1
2.2 Concrete Blockwork	1
2.3 Levels Of Finish And Workmanship	2
2.4 Types BLK-01 to BLK-04 Blockwork	2
2.5 Mortar for Walling	2
2.6 Corrosion Resistance	2
2.7 Accessories Generally	2
2.8 Restraint Ties	3
2.9 Sliding Anchors	3
2.10 Wall Ties	3
2.11 Dovetail Slot Ties	3
2.12 Wall Starter/ Connector	3
2.13 Angle Supports	3
2.14 Joint Reinforcement	3
2.15 Lintels	3
2.16 Bond Beams	3
2.17 Movement Joint Sealants	3
2.18 Damp-Proof Courses	3
2.19 Cavity Flashing	3
2.20 Weephole Inserts	3
2.21 Cavity Insulation	4
2.22 Fire Prevention Joints	4
2.23 Sills	4
2.24 Flashings	4
3. EXECUTION	4
3.1 Workmanship Generally	4
3.2 Site Control	4
3.3 Laying	4
3.4 Mortar	5
3.5 Vertical Control Joints	5
3.6 Joints In Mortar	5
3.7 Recessed Joint Finish	5
3.8 Service Penetrations	5
3.9 Fire And Smoke Stopping	5
3.10 Site Storage, Handling And Transportation	5
3.11 Site Dimensions	6
3.12 Lintel Bearing	6
3.13 Setting Out	6
3.14 Concrete Cavity Fill	6
3.15 Weepholes	6
3.16 Templates	6
3.17 Cleanliness	6
3.18 Fixing Wall Ties	6
3.19 Joint Reinforcement	6
3.20 Restraint Ties	6

**Leichhardt Park Aquatic Centre
Lilyfield NSW**

3.21	Special Fixings	6
3.22	Cavity Flashings/ Damp-Proof Courses	7
3.23	Movement Joint With/ Without Filler	7
3.24	Sill Installation	7
3.25	Lintel Installation	7
3.26	Flashings	7
3.27	Builders Work in Connection	7
3.28	Tolerances	8
3.29	Adverse Weather	8
3.30	Final Clean	8

SECTION 03-650 -- BRICK AND BLOCK WORK

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Brickwork.
 2. Blockwork.
 3. Accessories.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. Three samples of each brick and block type.
 2. Three of each accessory.

1.4 Sample Panels

- A. Prior to commencement, sample panels of face brickwork and face blockwork, nominally 1800mm wide x 1800mm high shall be built on Site but not as part of the finished Works. The sample panels shall include movement/ control joints with backing rod and sealant. Obtain acceptance from the Superintendent prior to commencement of construction for each type. If a panel is rejected, construct further sample panels as necessary until acceptance is obtained.

1.5 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The accepted sample panels as well as the first of each type of brickwork and blockwork, in a location as agreed with the Superintendent, incorporating accessories.

1.6 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Items to be built in (located in their correct positions), including door frames, damp-proof courses, lintels, flashings and the like.
 2. Control joints ready for insertion of joint filler.

1.7 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.8 Testing Materials

- A. Test materials for durability, compressive and flexural strength in accordance with AS 3700.
B. Carry out additional testing if materials fail original test.
C. Use only materials that comply with the Specification and satisfy tests.

1.9 Testing Brick and Block Accessories

- A. Provide independently certified test literature for each type of accessory. The test result data shall meet the requirements of the Specification.

2. PRODUCTS

2.1 General

- A. Control of the manufacture of materials and construction shall comply with AS 3700 and AS/NZS 4456.4.
B. Brick and block work shall comply with AS/NZS 4455.
C. Durability of bricks and blocks below a damp-proof course shall comply with the "Exposure" category of AS/NZS 4456.10 Appendix A (salt attack resistance categories).
D. Where the brickwork or blockwork is either face finish (unpainted) or paint quality face finish, the level of workmanship shall be to the quality standards as accepted by the Superintendent and as established through the sample panel and quality benchmark approval process specified above.

2.2 Concrete Blockwork

- A. Paint quality face blockwork and common blockwork shall be Boral Masonry or acceptable equivalent Ash-Grey Blocks Series 100, 120, 150 or 200 as nominated in the Product & Materials Schedule. Standard grey. Blocks shall be scoria blend where a fire rating is required.
- B. Face blockwork shall be Boral Masonry or acceptable Designer Block Series 100, 150 or 200 in selected finish and selected colour as nominated in the Product & Materials Schedule.
- C. The level of workmanship for face blockwork and paint quality face blockwork shall be agreed and accepted by the Superintendent via construction and acceptance of sample panels as described earlier in the section.
- D. Type:
 - 1. Hollow block units.
 - 2. Nominal face size: 390mm x 190mm.
 - 3. Reinforced and core filled where nominated by the Structural Engineer.
- E. Wall thickness:
 - 1. Series 100: 90mm thick block units.
 - 2. Series 120: 110mm thick block units.
 - 3. Series 150: 140mm thick block units.
 - 4. Series 200: 190mm thick block units.
- F. Bond: Stretcher.
- G. Joints: Iron. To the acceptance of the Superintendent.
- H. Special shapes: Provide special shapes where required for bond beams, lintels, corners, jambs, sash, control joints, pilasters, headers, and other special conditions as shown on the Drawings.

2.3 Levels Of Finish And Workmanship

- A. Face Brick and Block Work
 - 1. Unpainted face quality brick and block work with a high level of quality workmanship meeting the accepted level as established through the sample panel submittals process. Mortar joints shall be consistently spaced. The brick and block work shall be well cleaned with no mortar runs or staining to the brick or block face.
 - 2. The finished blockwork shall receive a sealer coat as recommended by the manufacturer.
- B. Paint Quality Face Blockwork
 - 1. Face quality blockwork that is to be painted. A high level of quality workmanship is required meeting that as established through the sample panel submittals process. Mortar joints shall be consistently spaced. There shall be no mortar or slurry buildup to the face of the blockwork that will be evident through the paint finish.
- C. Common Blockwork
 - 1. Common quality blockwork that is to be covered over in the finished work. The level of workmanship does not need to be that of face blockwork or of paint quality face blockwork as specified above.

2.4 Types BLK-01 to BLK-04 Blockwork

- A. Blockwork as specified above and as follows (refer also to the Product & Materials Schedule):
 - 1. BLK-01 Face Blockwork = Series 150 blockwork. Natural Grey.
 - 2. BLK-02 Fire Rated Blockwork = Series 200 scoria blend blockwork to achieve a 120/120/120 FRL. Reinforced and core filled where nominated by the structural engineer.
 - 3. BLK-03 Polished Face Blockwork = Designer Block Series 150. Random pattern with even spread of smooth, shot blast and honed finish block units. Colour: Charcoal.
 - 4. BLK-03 Polished Face Blockwork = Designer Block Series 150. Random pattern with even spread of smooth, shot blast and honed finish block units. Colour: Pearl Grey.

2.5 Mortar for Walling

- A. Refer to Section 08-350.

2.6 Corrosion Resistance

- A. Corrosion protection of built-in steel products shall comply with the coating thickness requirements specified in AS/NZS 2312 as outlined in Section 01-100.

2.7 Accessories Generally

- A. Unless specified otherwise masonry ties, sliding anchors and the like shall be manufactured or supplied through M.E.T. Ties Pty. Ltd and as accepted via the sample submittals process.

2.8 Restraint Ties

- A. Material: Stainless steel grade 316.
- B. To AS/NZS 2699.2.

2.9 Sliding Anchors

- A. Material: Stainless steel grade 316.
- B. To AS/NZS 2699.2.
- C. Sized to suit cavity width.

2.10 Wall Ties

- A. To AS/NZS 2699.1:
- B. Strength classification:
 - 1. Cavities greater than 60mm wide: Heavy duty.
 - 2. Masonry veneer: Light duty.
 - 3. Normal cavity construction and at abutments: Medium duty.
- C. Plastic insulation retaining clips.

2.11 Dovetail Slot Ties

- A. Material: Stainless steel grade 316.
- B. To AS/NZS 2699.1.

2.12 Wall Starter/ Connector

- A. Material: Stainless steel grade 316.
- B. To AS/NZS 2699.2.

2.13 Angle Supports

- A. Material: Stainless steel grade 316.
- B. To AS/NZS 2699.2.

2.14 Joint Reinforcement

- A. Material: Hot dip galvanised wire.
- B. Size: 100mm or 50mm wide to suit wall thickness.

2.15 Lintels

- A. Precast concrete lintels.
- B. Fabricated steel lintels:
 - 1. Angles and flats: To AS/NZS 3679.1.
 - 2. Cold formed proprietary lintels: Designed to AS/NZS 4600.
 - 3. Do not cut after galvanising.

2.16 Bond Beams

- A. Provide bond beams made from purpose made hollow concrete blocks with reinforcement grouted in place.
- B. Reinforcement: As per the Structural Engineer's requirements.

2.17 Movement Joint Sealants

- A. Filler: Submit samples for acceptance by the Superintendent.
- B. Sealant: Manufactured by Dow Corning, Sika, Radcrete Pacific, Rhone-Poulenc or acceptable equivalent. Submit silicone type for acceptance by the Superintendent.
- C. Colour: To match mortar/ wall colour and to the acceptance of the Superintendent.

2.18 Damp-Proof Courses

- A. To AS/NZS 2904.
- B. Manufacturer/ reference: Rencourse aluminium core damp course and flashing, or acceptable equivalent.

2.19 Cavity Flashing

- A. Folded cavity flashings: Rencourse aluminium core damp course and flashing or acceptable equivalent.

2.20 Weep-hole Inserts

- A. Manufacturer and Reference: Weepa brand or acceptable equivalent plastic weepole inserts complete with non-corroding insect mesh backing.

2.21 Cavity Insulation

- A. Manufacturer/ reference: CSR Bradford or acceptable equivalent Enviroseal™ ProctorWrap™ Commercial Wall (CW) vapour permeable wall wrap fixed to the outside face of the wall framing prior to laying bricks/blocks.

2.22 Fire Prevention Joints

- A. Refer Section 05-700.
- B. To AS 4072.1 and the BCA.

2.23 Sills

- A. Provide sills from the brick or block manufacturer's standard range and as detailed on the Drawings.

2.24 Flashings

- A. To AS/NZS 2904.

3. EXECUTION

3.1 Workmanship Generally

- A. Workmanship shall comply with the requirements of AS 3700 and the relevant technical manuals as published by the Concrete Masonry Association of Australia (CMAA).

3.2 Site Control

- A. Execution shall be carried out in accordance with AS 3700, special category.
- B. Materials shall be clean and built uniform and level within the acceptable tolerances. Quoins and jambs shall be plumbed as the work proceeds. The head of all walls shall be laid level.
- C. Damaged materials shall not be used.
- D. Materials shall only be cut by a power-driven masonry saw, wet hosed down to remove any slurry, and then dried prior to laying. No cut faces shall be exposed.
- E. Where masonry is to incorporate service openings, the reveal edges to these shall be treated as fair-faced.
- F. Provide head restraints as specified, fixed to top courses, which consist of full-sized, uncut units only. Do not use cut materials that reduce the structural or fire rating integrity of the wall.

3.3 Laying

- A. Place on a full bed of mortar, properly jointed with other work, to correct lines and levels. Perpend joints to align plumb within vertical tolerance.
- B. Maintain courses to uniform widths. Vertical and horizontal joints shall be equal and of uniform thickness.
- C. Mortar shall ensure full vertical perpend joints. Slushing of perpend joints or furrowing of bed joints is not permitted.
- D. Intersections, external corners and internal corners shall be fully bonded, except where indicated otherwise.
- E. Do not shift or tap units after mortar has taken initial set. Where adjustment is necessary, mortar shall be removed and replaced.
- F. Excess mortar shall be removed as the work proceeds.
- G. Overhand laying shall be avoided unless dictated by the confines of the Site and accepted by the Superintendent.
- H. Cavities shall be kept clear of excess mortar and debris by placing battens in cavities.
- I. Walls shall be raked back when raising quoins and other advanced work. Tothing is not permitted.
- J. No portion of the work shall be raised by more than 1200mm above another at any time.
- K. Each lift of facework shall be completed in one period of operation.
- L. One leaf of a wall shall not be built more than 1500mm high in one day.
- M. Both leaves of cavity walls shall be brought to the same level at:
 - 1. Every course containing vertical twist type ties or other rigid ties.
 - 2. Every third tie course for double triangular/ butterfly ties.
 - 3. Courses in which lintels are to be bedded.

- N. Bond and gauge:
1. Lay work in the Contract in the specified bond.
 2. Four courses of bricks shall equal 340mm nominally in the vertical plane, including bed joints.
 3. Four courses of blocks shall equal 800mm nominally in the vertical plane, including bed joints.

3.4 Mortar

- A. Mixing plant, tools and banker boards shall be kept clean at all times.
- B. Materials shall be measured accurately by volume using clean gauge boxes. Proportions of mixes shall be for dry sand; allow for bulking if sand is damp.
- C. Ingredients shall be mixed thoroughly to a consistency suitable for the work and free from lumps. Mortars containing air-entraining admixtures shall be mixed by machine, but not overmixed.
- D. Mortar shall be used within about two hours of mixing at normal temperatures. Retarded mortar shall be used within the time recommended in writing by the manufacturer.
- E. The required amount of water shall be determined to achieve a workable mix.
- F. Ensure that mortar droppings at the base of walls, within wall cavities and the like is removed on a daily basis.
- G. Mortar shall not be re-tempered after its initial set.
- H. Mortar shall be cleaned from wall ties and similar accessories on a daily basis.

3.5 Vertical Control Joints

- A. Divide masonry into panels separated by vertical control joints at no greater than 12 metre centres for brickwork and 6 metre centres for blockwork. Vertical control joints shall coincide with the structural support elements where possible and use proprietary sleeved tie anchors.
- B. Control joint fillers, sealants and/ or fire stops shall be used in accordance with the manufacturer's written recommendations.

3.6 Joints In Mortar

- A. All bricks/blocks shall be well buttered with mortar before being laid and grouted at each course.
- B. All mortar joints shall be of a thickness consistent in appearance and density.
- C. Tooling of joints shall be carried out while the mortar is thumbprint hard. Any excess mortar that extrudes from the joints of fair-faced units shall be cut away as work proceeds. No washing or scrubbing of the finished face with proprietary cleaners or acids is permitted. To avoid staining of the surface, smears shall be removed by gentle brushing with a soft brush and water only.

3.7 Recessed Joint Finish

- A. Rake out joints to a nominal depth of 10mm to receive render/ plaster or tile finishes as indicated on the Drawings.

3.8 Service Penetrations

- A. Service penetrations through fire rated elements shall be provided with appropriate collars, dampers and/or similar systems as required for that service and in compliance with the relevant National Standard.

3.9 Fire And Smoke Stopping

- A. All fire and smoke stops shall be positively fixed in position in such a manner that they are not dislodged in the event of a fire. The fixing shall secure the stop in position for a period at least equal to that required for the compartment wall or floor against which the masonry abuts.

3.10 Site Storage, Handling And Transportation

- A. Deliver material to Site suitably packaged to prevent damage and contamination, clearly identified with type, grade, date of manufacture, etc. Do not remove labels or packaging until time for use. Inspect materials before use and reject any that are cracked, damaged or contaminated.
- B. Store bricks/blocks in stable stacks clear of the ground and clearly identified by type, strength, grade, etc. Protect from adverse weather, moisture, staining and contamination with earth and other foreign materials and keep clean and dry. Allow air to circulate around units.
- C. All components shall be stacked, before and after delivery to Site, in such a manner that they are not damaged in any way through excessive stresses or by atmospheric deterioration, paying particular attention to the finished surfaces.
- D. Handle block units to prevent chipping, breakage, soiling or other damage. Lift with wide-belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances that might cause staining. If required, use wood rollers and provide cushion at end of wood slides.

3.11 Site Dimensions

- A. Take Site dimensions as necessary to ensure a proper fit between the masonry and adjacent work and to achieve specified erection tolerances.

3.12 Lintel Bearing

- A. Carefully predetermine setting out to ensure that full-length block units occur below lintel ends.

3.13 Setting Out

- A. Be responsible for the true and proper setting out of the Works, the correctness of position, levels, dimensions and alignment of all walling, including openings.
- B. Before work begins on Site, submit proposed methods for dimensional setting out and crosschecking with other trades to satisfy the required accuracy.
- C. All controlling dimensions, especially at interface with surrounding elements shall be observed. All dimensions shall be checked on Site.
- D. Setting out dimensions shall be taken from grid lines as shown on the Drawings.
- E. Allow for all necessary formers to achieve required opening sizes and tolerances.

3.14 Concrete Cavity Fill

- A. Cavities shall be filled with concrete up to 225mm below ground level damp-proof course.

3.15 Weepholes

- A. Open perpend: Perpend at 900mm maximum centres shall be left completely open in the brick/block course immediately above the base of cavity, external openings and stepped damp-proof courses. Provide no fewer than two weepholes over openings.
- B. At 900mm maximum centres immediately above the base of cavity, external openings and stepped damp-proof courses, form weepholes with plastic perpend units. Provide no fewer than two weepholes over openings.

3.16 Templates

- A. Where frames are not to be built in as the work proceeds, openings using rigid templates shall be formed.

3.17 Cleanliness

- A. Keep ties and damp-proof courses free from debris and mortar.
- B. Damp-proof courses and cavity trays shall be installed in accordance with the guidelines set out in AS/NZS 2904.
- C. Keep any insulation dry and free from mortar droppings, grout and other debris.

3.18 Fixing Wall Ties

- A. Ties not less than 50mm shall be bedded into the bed joint of each leaf.
- B. Ties shall slope towards the exterior with the drip centred on cavity.
- C. Ties shall be evenly spaced, generally at 800mm centres horizontally, staggered in alternate courses and at 400mm centres vertically, unless specified otherwise.
- D. Additional ties shall be provided to sides of openings, if required.
- E. Increase frequency of ties as necessary to withstand loading and properly restrain the walls.
- F. Protect all exposed ends of wall ties from damage during construction.

3.19 Joint Reinforcement

- A. Width: Approximately 40-50mm less in width than the wall or leaf.
- B. Lay on an even bed of mortar in a continuous strip with 225mm laps at joints and full laps at angles. Keep back 20mm from the face of the external work, 12mm back from the face of the internal work and finish the mortar joint to normal thickness.

3.20 Restraint Ties

- A. Ties: One half of the length shall be debonded by wrapping with polyethylene sheet before building into the joint.

3.21 Special Fixings

- A. Details of proposed fixings selected shall be submitted to the Superintendent for acceptance.
- B. Fixings shall be of wrought or continuously cast copper alloy, or austenitic stainless steel.
- C. Fixings shall be of the type, size, strength and number necessary to resist all loads likely to occur during the life of the building, and shall prevent any lateral displacement or pulling apart of the construction.

- D. Fill the pockets with bedding mortar, neatly finished flush where exposed to view.

3.22 Cavity Flashings/ Damp-Proof Courses

- A. Seal all laps with damp-proof courses and/ or cavity trays using adhesive/ mastic/ torching in accordance with the manufacturer's written recommendations.
- B. Bed damp-proof courses/ cavity trays on an even bed of fresh mortar. On no account bed them dry.
- C. Extend damp-proof courses/ cavity trays through the full width of the wall, including any surface finish. On no account bridge by mortar.
- D. The width of damp-proof courses/ cavity trays shall allow for a 5mm projection either side of the masonry, unless otherwise described.
- E. All joints between cavity trays shall be fully sealed. Put preparatory support/ jointing boards across the joint during and after its formation.
- F. Build in carefully in accordance with the manufacturer's recommendations to ensure a fully watertight installation.
- G. At all changes in direction and to terminate all discontinuous cavity trays above and below openings, high frequency welded, factory fabricated preformed cloaks shall be used.
- H. All projections within the cavity that occur at the same level as continual cavity trays (eg columns, windposts, cavity barriers) shall be fully sealed using preformed cloaks.
- I. Obtain confirmation from the manufacturer that the detailing complies with all current legislation.

3.23 Movement Joint With/ Without Filler

- A. Movement joint with sealant:
1. Build in as the work proceeds ensuring no projections into cavities and correct depth of joint to receive sealant system.
 2. Thickness of filler shall match design width of joint.
 3. Prepare joints and apply compatible sealant.
- B. Movement joint without sealant:
1. Build in as the work proceeds and completely fill the joint without projections into cavities.
 2. Thickness of filler shall match design width of joint.
 3. In case of fire resistant filler, compress, insert and slide into place in open joint. Install with accessories or adhesives where recommended in writing by the manufacturer.

3.24 Sill Installation

- A. Leave bed joints open under one-piece sills except under end bearings. On completion, point with mortar to match adjacent work.

3.25 Lintel Installation

- A. Prefabricated steel: Bed on mortar used for adjacent work with bearing of not less than 150mm unless specified otherwise.

3.26 Flashings

- A. Sandwich flashings between mortar except where on lintels or shelf angles.
- B. Bed flashings, sills and copings in one operation to maximise adhesion.
- C. Pointing: Point up joints around flashings, filling voids.

3.27 Builders Work in Connection

- A. Generally:
1. Holes, recesses and chases shall be in locations which shall least affect the strength, stability and sound resistance of the construction, and shall be of the smallest practicable size.
 2. Holes which exceed 300mm in width shall have pre-cast concrete lintels inserted to achieve structural integrity of the construction with a minimum 150mm end bearing.
 3. No chases shall be cut in walls of hollow cellular blocks without acceptance by the Superintendent.
 4. In walls of other materials:
 - a) Vertical chases shall not be deeper than one third of the single leaf thickness.
 - b) Horizontal or raking chases shall not be longer than 1m and not deeper than one sixth of the single leaf thickness.

5. No chases or recesses shall be set back to back. They shall be offset by a clear distance not less than the wall thickness. Where sockets, etc, are shown on Drawings as nominally back to back, obtain instructions from the Superintendent.

- B. There shall be no cutting until the mortar is fully set. Cutting shall be carefully and neatly carried out, avoiding spilling, cracking or other damage to surrounding structure.
- C. The Contractor shall return to complete the builders work in connection holes after the mechanical and electrical works have been installed.

3.28 Tolerances

- A. To AS 3700.

3.29 Adverse Weather

- A. Do not lay bricks or blocks when the air temperature is at or below 3°C unless mortar has a minimum temperature of 4°C when laid and walling is protected. Do not lay mortar on frozen or frost covered surfaces.
- B. Maintain temperature of the work above freezing until mortar has fully hardened.
- C. Rake out and replace mortar damaged by frost. When instructed, rebuild damaged work.
- D. When the air temperature is greater than 35°C, all materials and mixing equipment shall be shaded from direct sunlight. Sand piles shall be kept in a damp, loose condition. Use cool water for mixing mortar and thoroughly wet mixers, mortar transport containers and mortar boards with cool water prior to mixing. Use mortar while it remains workable and do not retemper. Spray newly erected masonry with a fine mist at least 3 times a day and until the masonry is 3 days old.

3.30 Final Clean

- A. Clean down all work immediately prior to completion or prior to the handing over of any part of the work and leave clean, to the satisfaction of the Superintendent.
- B. Do not use wire brushes, acid type cleaning agents or other cleaning compounds with caustic or harsh constituents.

SECTION 04-050 -- WATERPROOF MEMBRANES	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Shop Drawings	1
1.8 Warranties	1
1.9 Certification	1
1.10 Test Requirements	2
1.11 Waterproofing and Watertightness Testing	2
1.12 Adhesion Testing	2
1.13 Slip Resistance and Slip Resistance Testing	2
1.14 Flood Testing	2
2. PRODUCTS	2
2.1 General Requirements	2
2.2 Type WPM-01 Pre-Applied Sheet Membrane Below Ground Floor Slabs and Retaining Walls	3
2.3 Type WMP-03 Internal Wet Area Membrane	3
2.4 Type WPM-06 Liquid Membrane	3
2.5 Type WPM-04 Builder's Film	3
3. EXECUTION	3
3.1 Generally	3
3.2 Manufacturer's Recommendations	4
3.3 Substrate Examination	4
3.4 Substrate Preparation	4
3.5 Laying Sheet Membranes	4
3.6 Installing Liquid-Applied Membranes	5
3.7 Movement Joints	5
3.8 Reglet Finish	5
3.9 Penetrations	5
3.10 Outlets	5
3.11 Drainage Cell Installation	5
3.12 Membrane Inspections	5
3.13 Completion	6

SECTION 04-050 -- WATERPROOF MEMBRANES

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Waterproof membranes.
- B. Ensure that all interfaces with other trades are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. Each type of membrane, on a representative substrate where necessary.
 2. All miscellaneous accessories such as joint sealant, flashings, seam tapes and the like.
- B. Membrane samples shall be stepped to indicate the different layers.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. Waterproof membranes: : The first area of each type of membrane being a minimum of 10m² in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Prepared substrate prior to commencing membrane installation.
 2. Incidentals such as sealants, fillets, underflashings in place.
 3. Each completed membrane installation prior to covering over.

1.6 Subcontractors

- A. Each type of membrane shall be installed by a manufacturer approved installer. Submit names and contact details of proposed suppliers and installers.
- B. The installer of each membrane system shall be accredited under AS/NZS ISO 9001. Provide evidence of accreditation to the Superintendent.
- C. All personnel employed in the preparation and installation process shall be trained and experienced operatives.

1.7 Shop Drawings

- A. Submit Shop Drawings, calculations and specifications conveying the following information and in accordance with Section 01-100:
1. Sump and outlet details, falls, substrate details.
 2. Jointing and interfaces between waterproof membrane types.
 3. Flashings, cappings, fillets and the like.
 4. Treatment of penetrations.
 5. All junction details.

1.8 Warranties

- A. Prior to Practical Completion a written warranty against defects in labour and/ or materials shall be submitted to the Superintendent for the following:
1. Sheet and spray-on membranes: 20 years.
 2. Liquid-applied membranes: 15 years.

1.9 Certification

- A. Before starting membrane installation on Site, provide a certificate for each membrane stating that the respective substrates are satisfactory in all respects to receive the membrane. Each certificate shall be signed by both the installer and the membrane supplier.

- B. On completion of each discrete membrane type, area or zone, provide a certificate for each stating that the work has been carried out and tested in accordance with the requirements of the Specification. Each certificate shall be signed by the supplier, installer and the Contractor. The certificates shall be provided before any backfilling, covering over, decoration or other concealment occurs.
- C. Each type of certificate referred to in this clause shall be provided to the Superintendent in duplicate.

1.10 Test Requirements

- A. Carry out the specified tests and issue test reports to the Superintendent.

1.11 Waterproofing and Watertightness Testing

- A. Test the watertightness of the completed membranes using either:
 - 1. A proprietary electronic testing system.
 - 2. A flood test by ponding the nominated areas.
- B. Details of the system and a proposed method statement shall be submitted to the Superintendent for acceptance at least one month prior to the proposed testing on Site.
- C. Prior to testing, ensure that membrane work has been completed to a stage where the integrity of the membrane can be tested, drainage is in operation, that obvious defects have been made good and that the roof has been cleared of all materials, debris, dust, etc.
- D. Testing shall be carried out when membranes are complete, including that of all associated and interfacing trades.
- E. Where leaks or defects in membranes have been detected, reinstate the membranes as recommended by the manufacturer.

1.12 Adhesion Testing

- A. Adhesion to substrate to ASTM D1000.
- B. Undertake a minimum of one test per 25m² of membrane area using an Elcometer adhesion tester or equivalent. Adhesion results shall not be less than 1MPa unless otherwise agreed in advance with the Superintendent.

1.13 Slip Resistance and Slip Resistance Testing

- A. Membranes that will be exposed in the completed works and that are likely to receive pedestrian traffic shall be resistant to slipping. Slip resistances shall comply with the requirements of HB 197.
- B. Provide slip resistance test certificates to confirm that slip resistance values are in accordance with AS 4663.
- C. Arrange for on-site slip resistance testing of all exposed trafficable membranes and in sufficient number to cater for all areas and conditions. Testing shall be undertaken by a registered testing laboratory. Tests shall include wet pendulum and dry floor friction testing in accordance with AS 4663.

1.14 Flood Testing

- A. Locations: As and when directed by the Superintendent.
- B. Externally cover and seal all outlets and protect against damage from water pressure with temporary kerbs. Do not use plugs to seal outlets.
- C. Carefully flood to a minimum depth of 50mm, but in no case higher than existing kerb levels, and leave for a period of two days. Regularly inspect for leaks.
- D. On completion of testing, slowly drain tested areas ensuring that outlets do not overload or flood.
- E. Where leaks have occurred, submit to the Superintendent detailed proposals for remedial measures. After acceptance by the Superintendent and rectification of the leak, the flood test shall be re-applied. Only when a flood tested area has shown no leakage for a period of seven days will further work on that area be permitted.

2. PRODUCTS

2.1 General Requirements

- A. All products shall comply with the manufacturer's current technical data sheets.
- B. Membranes shall only be installed by manufacturer accredited and approved installers.
- C. All systems specified shall include all incidentals such as water bars, reinforcement and other such items as required to provide a complete and waterproof system.
- D. Materials which overlap, interface with or are used in conjunction with other waterproofing components or products, shall be compatible.
- E. Membranes to wet areas shall comply with AS 3740 and AS/NZS 4858.

2.2 Type WPM-01 Pre-Applied Sheet Membrane Below Ground Floor Slabs and Retaining Walls

- A. Membrane shall be Sika Sikaproof A-12 TPO pre-applied sheet membrane system. Refer to the Product & Material Schedule for further details.
- B. Generally to floor slabs (below natural ground level), walls and floors of lift overruns, retaining walls and all other areas below the natural ground level or where hydrostatic pressure is likely and where the membrane cannot be installed post concrete pour.
- C. To retaining walls, the system shall include a proprietary drainage cell and filter fabric as recommended by the manufacturer.
- D. Substrate preparation and membrane installation to be strictly in accordance with the manufacturer's instructions and only by applicators approved by the manufacturer.

2.3 Type WMP-03 Internal Wet Area Membrane

- A. Manufacturer/ reference: BASF PCI Lastogum X waterproofing system or acceptable equivalent.
- B. Generally to floors and walls prior to tiling as follows:
 - 1. Floors: Changerooms and amenities areas outside the aquatics facility (Aquatics facility tiled floors to receive WMP-06 as below) that are then to receive nominated floor tiles.
 - 2. Walls: Install behind all tiled walls across the site including in the aquatics area to a height of 300mm AFFL in non-wet areas and to 2150mm AFFL in wet areas. In the aquatics area, the membrane shall form an integral junction with the up-turned BASF PCI Seccoral 2K membrane (WMP-06).
- C. Surface preparation and membrane installation to be strictly in accordance with the manufacturer's instructions and only by applicators approved by the manufacturer.

2.4 Type WMP-06 Liquid Membrane

- A. Manufacturer/ reference: BASF PCI Seccoral 2K waterproofing slurry or acceptable equivalent.
- B. Generally to floors in aquatics areas prior to tiling as follows:
 - 1. Floors: To graded bonded screeds of all Aquatics areas that are then to receive nominated floor tiles. The system shall be turned up the wall 150mm and the wall junction reinforced. Refer to the Drawings for extent.
- C. Prior to installation, ensure all falls are towards drainage points as indicated on the Drawings and there is no possibility of ponding water.
- D. The finished dry layer thickness of the membrane material must be at least 2mm thick unless confirmed otherwise by the manufacturer. Install waterproof membrane reinforcement at all corner junctions.
- E. Surface preparation and membrane installation to be strictly in accordance with the manufacturer's instructions and only by Applicators approved by the manufacturer.

2.5 Type WPM-04 Builder's Film

- A. To the underside of concrete slabs on ground and where there is no hydrostatic water pressure, provide polythene builder's film with a minimum thickness of 200 microns.
- B. All polythene sheet joints shall be lapped and taped to ensure a continuous and sealed system.

3. EXECUTION

3.1 Generally

- A. The Contractor shall prepare all substrates in accordance with the membrane manufacturer's recommendations including the preparation of arrises, fillets and joints as required. The prepared substrate shall be witnessed and accepted by the Superintendent prior to works proceeding.
- B. Membrane installation shall only be undertaken by installers approved by the membrane manufacturer and in strict accordance with the manufacturer's instructions.
- C. Each membrane or membrane system shall be configured and installed in such a way that water or moisture entry is permanently prevented.
- D. At free edges seal or treat in such a way that a watertight seal is achieved.
- E. At interfaces with damp-proof courses, flashings and other waterproofing elements, ensure that junctions are effectively sealed using materials and methods compatible with the various elements.
- F. At kerbs, plinths, walls or other vertical obstacles, maintain continuity by turning membrane up without a break and seal free edge to vertical surface.
- G. Provide all necessary equipment to properly carry out the work.

- H. The waterproofing systems shall come complete with flashings, over-flashings, seals and the like as required to provide a complete and watertight system. Form outlets, sumps, upturns, fillets and the like as required.
- I. Prime the substrate if so required by the manufacturer/ supplier, using materials and methods as recommended by them.
- J. At internal corners (wall/ slab junctions, etc) treat as required by the manufacturer/ supplier by forming fillets and/ or using fabric reinforcement compatible with the particular system. At external corners, round off or arris.
- K. Edge laps shall be to the minimum required by the manufacturer/ supplier. Stagger all joints in multi-layer sheet membrane systems. All laps shall be rolled to achieve a total seal.
- L. Areas damaged during or following the installation shall be repaired to the satisfaction of the Superintendent by means of patching, overpainting or overspraying as appropriate and as recommended by the manufacturer/ supplier.
- M. If application continues from one day to the next, all exposed edges shall be sealed against water penetration.
- N. Sheet membranes shall be laid without folds or ripples.
- O. All horizontal surfaces shall be formed with falls to drainage outlets as indicated on the Drawings.

3.2 Manufacturer's Recommendations

- A. For each membrane type, the installation shall be carried out in accordance with the manufacturer's published recommendations and instructions, including but not limited to handling, storage, substrate preparation, use, application and finishing/ curing.
- B. Keep a reference copy of each manufacturer's recommendations and instructions on Site.
- C. Allow the manufacturer's technical personnel to observe work in progress and offer advice.
- D. Deliver materials to Site in original unopened containers and packages bearing the relevant product information.

3.3 Substrate Examination

- A. Prior to commencing installation, ensure that the moisture content of the substrate and other critical factors meet the requirements of the membrane manufacturer.
- B. Ensure that the substrate is correctly graded towards drainage points and there are no areas where ponding might occur.
- C. All surfaces to which the membrane is to be applied shall be clean, smooth, dry and free from dust, grit or sharp objects and any other contaminant likely to affect the bonding of the membrane or puncture the membrane. Remove all surface laitance, dust, etc, by stiff brooming and/ or scraping as necessary.
- D. Commencement of installation shall signify acceptance that the substrate is suitable for proper installation of the waterproofing system.

3.4 Substrate Preparation

- A. For each membrane type, provide and prepare all substrates to the standards required by the membrane manufacturer/ supplier, including but not limited to surface finishes, cleanliness and tolerances. Remove all loose material and any contaminants or any other foreign matter likely to impair adhesion. It is the responsibility of the Contractor to identify the detailed requirements.
- B. Do not install any membrane until such time as the substrate has met the level of dryness required by the manufacturer/ supplier.
- C. Dryness test:
 - 1. Method: Hygrometer.
- D. Where falls are required for drainage, check that all falls meet the minimum requirements of the manufacturer/ supplier.
- E. Should any substrates not meet the requirements of a manufacturer, rectify substrates until they comply.
- F. No Site work on any membrane shall begin until such time as each manufacturer has certified in writing that the relevant substrates are acceptable in all respects.
- G. Do not apply any membranes direct to brick or block walls unless approved by the manufacturer. Provide bagged or rendered finish where necessary to fill voids, even up irregularities and provide a uniform, smooth substrate.

3.5 Laying Sheet Membranes

- A. Prepare and prime as required by the manufacturer/ supplier.

- B. Lay sheets systematically and with minimum of joints. In the case of multiple-layer installations, stagger the joints.
- C. Ensure that sheets are fully adhered and free of any deformity in the finished surface.

3.6 Installing Liquid-Applied Membranes

- A. Brush or roll on a minimum of two coats to achieve the total film thickness recommended by the manufacturer/ supplier.
- B. Prime corners and upturns before general coating.
 - 1. Minimum height of upturns: 100mm unless nominated otherwise on the Drawings.
- C. Reinforcing: Apply polyester fabric to internal corners and around outlets and brush well in, smoothing out all wrinkles while wet. Lap edges at joins.

3.7 Movement Joints

- A. The membrane(s) shall be bonded with the structural movement joints, within the construction, to form a watertight joint while allowing for the maximum possible anticipated movement.
- B. In cases where a proprietary joint system is not used, treat the joint as recommended by the manufacturer/ supplier.

3.8 Reglet Finish

- A. Where a membrane upturn is to finish against concrete without an over-flashing, dress into a cast-in reglet or 20mm x 20mm rebate formed in the concrete. Seal the joint using a gun grade sealant as recommended by the membrane manufacturer/ supplier.

3.9 Penetrations

- A. Minimise penetrations through membranes to the greatest possible extent.
- B. Do not form penetrations in completed membranes unless accepted by the Superintendent or unless shown on Drawings. If accepted, carry out in strict accordance with the written recommendations of the manufacturer/ supplier and re-seal in such a way as to be completely and permanently watertight and be covered by the relevant warranty.
- C. Particular attention shall be given to careful workmanship around penetrations such as columns, pipes and conduits. Follow the advice of the manufacturers/ suppliers as to the materials and installation and make due allowance for differential movements.
- D. With sheet membranes, place a star-cut panel of waterproofing membrane of the appropriate width around the base of the penetrating element, ensuring that the star-cut edges are securely wrapped around to achieve a minimum lap of 150mm. Reinforce with additional layers as necessary to ensure complete sealing.
- E. With liquid-applied membranes, seal the junction with a proprietary two-component elastomeric liquid-applied detailing compound which is compatible with the membrane and applied in accordance with the manufacturer's/ supplier's recommendations.
- F. Horizontal and vertical penetrations shall be sealed with proprietary hydrophilic strips at junctions using an accepted sealing compound.
- G. Where fixings penetrate membranes, seal as recommended by the membrane manufacturer until permanently watertight.

3.10 Outlets

- A. Enter all membranes into drainage outlets such that all water and moisture above the level of the membrane (including water in tile beds) is discharged into the outlet.
- B. At floor wastes and sump outlets, turn membrane down into puddle flanges and adhere.

3.11 Drainage Cell Installation

- A. At vertical membranes below ground install the drainage cell in such a way that subterranean water is captured and carried away from the building to the subsoil drainage system. Wrap the drainage cell in geotextile fabric (including exposed edges) such that soil, silt and any other unwanted materials are prevented from entering the system.
- B. Butt the drainage cell panels tightly together such that no gaps remain.
- C. Install the geotextile fabric in such a way that laps are at least 150mm and configured so that joints do not pull apart.

3.12 Membrane Inspections

- A. Prior to covering over, membranes shall be progressively inspected and accepted by the Contractor, membrane manufacturer and the Superintendent.
- B. Acceptance of membranes shall be formally recorded as being free from defects and in a sound undamaged condition as part of the QA process.

- C. Any defects noted shall be rectified before proceeding

3.13 Completion

- A. The Contractor and membrane manufacturer shall co-jointly inspect each individual waterproofing system installation with the Superintendent.
- B. Protection:
 - 1. Protect substrates from damage after preparation for membrane application.
 - 2. Protect membranes from damage of any kind between coats/ layers and after completion. After membranes have cured, cover with protective sheeting where necessary.
- C. The completed membrane system shall be inspected and all defects corrected in accordance with the Specification.
- D. All debris, surplus material and equipment shall be removed from Site upon completion of the works.

SECTION 04-201 -- TIMBER CLADDING	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Sample Panel	1
1.5 Quality Benchmarks	1
1.6 Witness Points	1
1.7 Subcontractors	1
1.8 Warranties	1
1.9 Test Requirements	1
1.10 Wind Resistance Testing	1
1.11 Waterproofing and Weathertightness Testing	1
1.12 Site Hose Test	2
1.13 Thermal Performance Testing	2
2. PRODUCTS	2
2.1 Timber Generally	2
2.2 Durability of Timber	2
2.3 Type TM-01 & TM-02 Biowood Cladding	2
2.4 Hardwood	2
2.5 Plywood	2
2.6 Wall Wrap/Breather Membrane	2
2.7 Fixings	2
3. EXECUTION	2
3.1 Preparation and Fixing	2
3.2 Fixing Battens	3
3.3 Fixing Boards	3

SECTION 04-201 -- TIMBER CLADDING

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
 - 1. External timber cladding.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
 - 1. Sufficiently sized samples of all timber types in their finished size, dress standard etc.

1.4 Sample Panel

- A. Prior to commencement construct a sample panel of each type of external timber cladding as specified/ scheduled and as detailed. The sample panels shall be a minimum size of 1500mm wide x 2400mm high and adequately sized to clearly demonstrate the treatment of panel joints as well as the treatment at critical junctions such as window sills/heads/jambes as well as junctions with other materials/cladding. The sample panels shall include sub framing, breather membrane, plywood and wall framing as applicable. Fixing techniques shall also be clearly demonstrated.

1.5 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
 - 1. The first of each type of timber cladding installed and accepted in a location as agreed with the Superintendent.

1.6 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
 - 1. Wall framing along with plywood, wall wrap/breather membrane and secondary sub frame/ battens (where applicable) in place and immediately prior to installation of the timber cladding.

1.7 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.8 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
 - 1. Timber wall cladding systems: 15 years.

1.9 Test Requirements

- A. Include for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.
- B. Testing shall include:
 - 1. Wind loads.
 - 2. Thermal performance.
 - 3. Weather and water resistance.

1.10 Wind Resistance Testing

- A. Carry out tests on the prototypes in accordance with AS 4040.2 or AS 4040.3 or other acceptable standard as agreed with the Superintendent.
- B. At both positive and negative applications of the peak test pressure, there shall be no permanent damage to supports or cladding panels or anchors. Framing members must not buckle, panels must remain securely held and gaskets/ seals must not be displaced.

1.11 Waterproofing and Weathertightness Testing

- A. Test the weathertightness of the works using a suitable testing method as accepted by the Superintendent.
- B. Details of the test and a proposed method statement shall be submitted to the Superintendent for acceptance at least one month prior to the proposed testing on Site.

- C. All tests shall comply with the rules and standards laid down by the appropriate testing authorities.

1.12 Site Hose Test

- A. Perform hose tests on 5% of all sealed joints in accordance with the procedures prescribed in the CWCT's Standard for Systemised Building Envelopes. Check for any leaks and perform repairs, replacements and additional testing and inspections as necessary.

1.13 Thermal Performance Testing

- A. Thermography testing shall be carried out to ensure that insulation is continuous. A suitable thermal imaging method shall be proposed by the Contractor for acceptance by the Superintendent.

2. PRODUCTS

2.1 Timber Generally

- A. Do not use damaged, rotten or discoloured materials.
- B. Timber shall be free from distortion, cracks or other blemishes.
- C. The size and frequency of knots must be within limits accepted by the Superintendent prior to the supply of the timber.
- D. Select all timber for its final use.
- E. All timber shall be procured in compliance with the 'Sourcing of Timber' requirements described in Section 08-050.
- F. The moisture content of all timbers nominated as 'kiln dried' shall not exceed 13% at time of delivery.

2.2 Durability of Timber

- A. All timber used in the external wall cladding shall achieve a durability level of class 1 above ground as defined in AS 5604.

2.3 Type TM-01 & TM-02 Biowood Cladding

- A. Selected reconstituted composite wood external wall cladding system as nominated and described in the Product & Materials Schedule.
- B. Install in strict accordance with the manufacturer's instructions.
- C. Refer to the Drawings for extent. All detailing to be resolved and approved through the Shop Drawings submittals process. Manufacturer to provide all details.
- D. Concealed fixings throughout.

2.4 Hardwood

- A. To AS 2796.1.

2.5 Plywood

- A. Generally plywood shall comply with AS/NZS 1604.3 with Hazard Classification to Table 1 and AS/NZS 4491.
- B. WBP grade plywood shall satisfy the requirements of:
 - 1. Interior use: To AS/NZS 2270.
 - 2. Exterior use: To AS/NZS 2271.
 - 3. Marine plywood: To AS/NZS 2272.
 - 4. Minimum bond quality to AS/ NZS 2754.1. Thickness to suit the design requirements.
- C. Ensure that fastenings do not protrude above surface of board. Fastenings shall be of a type recommended for the purpose by the fastenings manufacturer.

2.6 Wall Wrap/Breather Membrane

- A. A light weight breather membrane shall be fixed to the outer face of the external wall framing prior to installation of timber battens or the James Hardie proprietary sub framing system.
- B. Manufacturer/ reference: CSR Bradford or acceptable equivalent Enviroseal™ ProctorWrap™ Commercial Wall (CW) vapour permeable wall wrap.

2.7 Fixings

- A. Fixing screws for boards shall be non-ferrous, galvanised or stainless steel and compatible with both board and framing system.

3. EXECUTION

3.1 Preparation and Fixing

- A. Cladding shall be kept dry and not fixed to timber supports that have a moisture content greater than 18%.
- B. Methods of fixing and fastening shall be in accordance with the manufacturer's recommendations.
- C. Materials shall be protected from dirt, stains and damage until Practical Completion, with protective coverings and boards laid as the work proceeds.

3.2 Fixing Battens

- A. Space battens evenly and fix securely. Adjust as necessary to give a true, level finished surface.

3.3 Fixing Boards

- A. Fix boards to give true surfaces free from undulations, splits, hammer marks, scratches and protruding fastenings.
- B. Allow for movement of timber when positioning boards and fastening, to prevent cupping, springing, opening of joints or other defects.
- C. Fixing screws shall be in a regular pattern both horizontally and vertically.

SECTION 04-203 -- METAL ROOF CLADDING	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Warranties	1
1.8 Test Requirements	1
1.9 Wind Resistance Testing	1
1.10 Waterproofing and Weathertightness Testing	2
1.11 Site Hose Test	2
1.12 Thermal Performance Testing	2
2. PRODUCTS	2
2.1 Roof and Façade Safety Access and Fall Arrest System	2
2.2 Type MT-01 Metal Roof Cladding - Insulated Panel	2
2.3 Type MT-02 Metal Roof Cladding	2
2.4 Type MT-03 Metal Cladding - Inside of Parapets	3
2.5 Roof Cladding Accessories	3
2.6 Type IN-01 Roof Insulation	4
2.7 Type IN-02 Thermal Insulation - Box Gutters	5
2.8 Isolating Tape	5
2.9 Cladding Support Structure	5
2.10 Mechanical Fixings	5
2.11 Fixing Anchors	5
2.12 Accessories Generally	5
2.13 Lightning Protection and Earth Bonding	5
3. EXECUTION	5
3.1 Generally	5
3.2 Metal Cladding	6
3.3 Fixing Sheets Generally	6
3.4 Fastenings Generally	6
3.5 Structure	6
3.6 Adjacent Finishes	6
3.7 Sealing Laps	6
3.8 Insulation	6
3.9 Installation Tolerances	6

SECTION 04-203 -- METAL ROOF CLADDING

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Metal external wall cladding.
 2. Metal roof cladding.
 3. Metal flashings, cappings and rainwater goods.
 4. Roof insulation.
 5. Safety access systems.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. A 500mm x 500mm minimum size sample of each type of metal cladding demonstrating material, colour, finish and jointing/ seaming techniques.
 2. A 300mm minimum length of all accessories, flashings and the like.
 3. All types of fixings.
 4. A 300mm x 300mm minimum size sample of each type of insulation.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first installed and accepted of each type of cladding in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Support structure prior to covering over with insulation and cladding.
 2. Insulation in place and prior to covering over.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.7 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
1. Metal roofing and associated flashings, cappings, fixings, accessories and the like:
 - a) Against corrosion to perforation by weathering: 20 years from installation.
 - b) Against flaking of the paint system: 15 years.
 2. Roof plumbing and downpipes: To meet that of the metal deck roofing.
 3. Safe access and fall arrest systems: 10 years.

1.8 Test Requirements

- A. Include for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.
- B. Testing shall include:
1. Wind loads.
 2. Thermal performance.
 3. Weather and water resistance.

1.9 Wind Resistance Testing

- A. Carry out tests in accordance with AS 4040.2 or AS 4040.3 or other acceptable standard as agreed with the Superintendent.

- B. At both positive and negative applications of the peak test pressure, there shall be no permanent damage to supports or cladding panels or anchors. Framing members must not buckle, panels must remain securely held and gaskets/ seals must not be displaced.

1.10 Waterproofing and Weathertightness Testing

- A. Test the weathertightness of the works using a suitable testing method as accepted by the Superintendent.
- B. Details of the test and a proposed method statement shall be submitted to the Superintendent for acceptance at least one month prior to the proposed testing on Site.
- C. All tests shall comply with the rules and standards laid down by the appropriate testing authorities.

1.11 Site Hose Test

- A. Perform hose tests on 5% of all sealed joints in accordance with the procedures prescribed in the CWCT's Standard for Systemised Building Envelopes. Check for any leaks and perform repairs, replacements and additional testing and inspections as necessary.

1.12 Thermal Performance Testing

- A. Thermography testing shall be carried out to ensure that insulation is continuous. A suitable thermal imaging method shall be proposed by the Contractor for acceptance by the Superintendent.

2. PRODUCTS

2.1 Roof and Façade Safety Access and Fall Arrest System

- A. Install a fall arrest and safe access system to all roof areas. The system shall provide safe access to the roof for maintenance purposes and shall satisfy all regulatory requirements.
- B. Supplier/ reference: Sayfa Systems or acceptable equivalent. 44 Kalman Drive Boronia (Tel: 03 8727 9000; fax: 03 8727 9002). The system shall include fall arrest anchor points, static lines, access ladders, roof/ceiling access hatches, roof walkways and all incidentals as required to provide a safe, compliant and complete system.
- C. The systems shall satisfy all current regulatory requirements for the prevention of falls during periodic roof maintenance and façade maintenance activities.
- D. The system shall include body harnesses, lanyards and all other personal protection equipment to fit out 2 people (size L and XXL). All equipment shall be handed over to the Superintendent prior to Practical Completion.

2.2 Type MT-01 Metal Roof Cladding - Insulated Panel

- A. Manufacturer/ reference: Kingspan Insulated Panels Pty Ltd. KS 1000 RW roof sandwich panels composed of outer and inner metal cover sheets over a polyisocyanurate (PIR) rigid foam core. Panel system suited for high humidity internal and standard (non-corrosive) external environments. Refer also to the Product & Materials Schedule.
- B. External face:
- 0.5mm thick steel S220GD+ZA hot-dip zinc/aluminium coated steel to BS EN10214.
 - Profile: Trapezoidal.
 - Colorbond colour: As scheduled.
- C. Internal face:
- Aquasafe liner.
 - Colour: White. 10-15 microns thick.
- D. Sealant: Bostik 5250 preformed mastic tapes.
- E. All internal joints sealed with 6x4mm butyl rubber tape.
- F. Grade 304 stainless steel fixings.
- G. System shall be FM Global (FMRC 4880 Class 1) approved and to AS 1530.4.
- H. Structural support as detailed. Refer to the Structural Engineer's documents. Structural support as detailed. Refer to the Structural Engineer's documents.
- I. Panel thickness: 100mm core thickness, 135mm overall.

2.3 Type MT-02 Metal Roof Cladding

- A. Profiled metal roof cladding system reference Lysaght Klip-lok 700 Hi-strength manufactured by BlueScope Lysaght or acceptable equivalent. Refer also to the Product & Materials Schedule.

- B. Roof decking shall be folded from 0.48mm BMT next generation Colorbond Ultra AM100 prepainted steel as manufactured by BlueScope and conforming to AS 1397 and AS/NZS 2728. Full length sheets. Colour: As scheduled.
- C. Provide insulation blanket with reflective foil backing, thermal spacers and safety mesh under as specified.

2.4 Type MT-03 Metal Cladding - Inside of Parapets

- A. Profiled metal cladding system reference Lysaght Spandek manufactured by BlueScope Lysaght or acceptable equivalent. Refer also to the Product & Materials Schedule.
- B. Folded from 0.48mm BMT next generation Colorbond Ultra AM100 prepainted steel as manufactured by BlueScope and conforming to AS 1397 and AS/NZS 2728. Colour: As scheduled.

2.5 Roof Cladding Accessories

- A. Flashings, cappings, ridges, soakers etc. shall be folded to the profiles detailed or described on the Drawings from sheet material equal to and matching the adjacent roof cladding.
- B. Horizontal or near horizontal components such as parapet cappings, soakers and the like shall be provided with marine plywood backing to safeguard against being deformed by foot traffic etc as well as to ensure positive falls with no possibility for rainwater to pond.
- C. Type FL-01 Flashings
 1. Flashings associated with Type MT-01 metal roof cladding shall be folded from material of same manufacture as the outer or inner skin of MT-01 as applicable. External flashings shall be folded from 0.8mm BMT material. Internal flashings from 0.55 BMT material. All flashings to be fully sealed with each other and with the parent cladding material. Refer to the Product & Materials Schedule for further details.
- D. Metal Gutters
 1. Gutters shall be rolled or folded to profiles as detailed on the Drawings from 0.8mm BMT Colorbond Ultra in selected colour.
 2. Unless dimensioned/ detailed otherwise on the Drawings, box gutters shall be 600mm wide x 200mm deep.
 3. Support box gutters on Spandek or acceptable equivalent gutterboard as detailed on the Drawings.
 4. Type BG-01 Box Gutter - Insulated Panel
 - a) Specially formed membrane lined Kingspan insulated panel box gutters comprising inner and outer cover sheets over an FM certified polyisocyanurate (PIR) insulation core.
 - b) Outer face: 0.6mm pre-galvanized coated steel to AS 1397 with IKO 0.6mm or IKO 1.2mm thick PVC membrane.
 - c) Underside: 0.5mm to 0.7mm thick steel S220GD+ZA hot-dip zinc/aluminium coated steel to AS 1397. Coating to be Kingspan Aquasafe standard bright white.
 - d) Form gutters to maximum lengths possible. All joints to be fully sealed/welded.
 5. Type BG-02 Box Gutters - Colorbond
 - a) Box gutters complete with sumps, overflows and the like shall be rolled or folded to profiles as detailed on the Drawings from 0.8mm BMT Colorbond Ultra. Material to match adjacent roof material.
 6. Type EG-01 Kingspan Eaves Gutter
 - a) Proprietary Highline gutter. Colour as scheduled.
 7. Type EG-02 Eaves Gutter
 - a) 100mm Quad profile eaves gutter formed from 0.8 BMT Colorbond Ultra. Colour as scheduled.
 - b) Brackets shall be concealed unless agreed otherwise and shall be of adequate strength to maintain the gutter in the required position without sag and shall be able to withstand ten times the weight of the gutter when filled with water.
- E. Rainwater Head and Spreader
 1. Rainwater heads and spreaders shall be rolled and/ or folded to the sizes and profiles indicated on the Drawings from Colorbond Ultra steel sheet material in selected colour.
 2. Provide overflow pops in the outer wall of the rainwater head equal in size to the downpipe.
- F. Type FL-03 Parapet/ Fascia Cappings

1. Parapet/ fascia cappings shall be folded from 0.8mm BMT Colorbond steel sheet material equal to and matching the metal roof cladding and as agreed with the Superintendent. Top of capping to fall inwards towards the roof/ box gutter unless detailed otherwise.
- G. Sumps
1. Form fully sealed sumps in box gutters. Material to match that of the box gutter. Provide overflow pops equal in size to the downpipe.
- H. Type DP-01 Downpipes
1. All external downpipes shall be rolled and/ or folded to the sizes and profiles indicated on the Drawings from 0.8mm BMT Colorbond® Ultra in selected colour. Unless nominated otherwise, downpipes shall be 150mm diameter. Refer also to the Product & Materials Schedule.
 2. All internal downpipes shall be sewer grade UPVC pipe with fully welded joints. All internal pipework shall be lagged with CSR Bradford or acceptable equivalent Acoustilag acoustic pipewrap. 25mm thick foil faced glasswool insulation. Wrap the insulation around the pipe and tape the butt joint with matching pressure sensitive foil tape. Where exposed in the completed works, lagging shall be carefully and accurately fitted to the acceptance to the Superintendent.
- I. Type OF-02 Overflows
1. Provide overflow pops in gutters, sumps and/ or rainwater heads as applicable and at locations to prevent the build up and eventual overflow of rainwater due to downpipe blockages. Overflows shall be sized to be at least equal in cross sectional area to that of the downpipe. Material to match adjacent roof material. Refer also to the Product & Materials Schedule.
 2. Horizontal rectangular overflow through façade. Nominally 300mm wide x 80mm high. Finish to match adjacent cladding.
- J. Syphonic Drainage
1. Outlets, pipes and fittings shall be manufactured from HDPE (high density polyethylene) or acceptable equivalent.
 2. Syphonic system gutters and downpipes shall be sized and designed to operate on syphonic principles.
 3. The system shall be installed in accordance with the manufacturer's recommendations, using proprietary fixings and bracketry.
 4. Fully sealed watertight joints.
 5. Refer to the requirements of the Hydraulic Services specification.
- K. Type FL-02 Dektite Flashings
1. Manufacturer: DEKS Industries Pty Ltd or acceptable equivalent.
 2. Reference: Dektite range of flashings to suit particular application and penetration size. Dektites shall not impede rainwater flow along the roof decking or cause rainwater to pond in any way.
- L. Gutter Mesh/ Sump Guard
1. Manufacturer/ reference: The Leaf Man or acceptable equivalent gutter guard manufactured from Bluescope Colorbond® steel equal to that used to form the gutter.
 2. Gutter guard shall be sized and fitted to all gutters and sumps and shall be installed in accordance with the manufacturer's written instructions.
 3. Provide a stainless steel wire mesh (nominally 15mm x 15mm grid) within each box gutter sump to prevent leaf matter and other rubbish from entering and blocking the downpipe.
- 2.6 Type IN-01 Roof Insulation**
- A. Refer to Section 08-550.
- B. To the underside of the metal deck roofing provide 140mm thick, 13.5kg/m² CSR Bradford or acceptable equivalent AnticonHP140 MD glasswool building blanket with medium duty foil backing and with a material R-value of Rm3.3m².K/ W. Refer also to the Product & Materials Schedule.
- C. Install Roofsafe, Roofguard or acceptable equivalent 2mm gauge wire mesh across the roof purlins. The wire shall be pulled tight so as not to sag beyond the natural sag of 25mm.
- D. The system shall include 120mm Ashgrid spacers along the roof purlins to ensure that the insulation maintains its nominal thickness. The system shall achieve total R-Values of Rt4.0m². K/ W (summer) and Rt3.7m².K/ W (winter) .

- E. Mineral fibre insulation shall comply with AS/NZS 4859.1 Section 8.
- F. Insulation shall be inert, durable, rot-proof, vermin-proof, and not be degraded by action of moisture, extreme climate temperature, water or water vapour.
- G. The selected material and its method of attachment to the supporting components shall eliminate the risk of bulging, sagging, delamination or detachment.

2.7 Type IN-02 Thermal Insulation - Box Gutters

- A. Insulation to the underside of box gutters shall comprise:
 - 1. CSR Bradford or acceptable equivalent Anticon55 glasswool building blanket. 55mm thick 11kg/m², Rm1.3m².K/ W. The blanket shall be laid over gutter support strapping and extend up the sides. Foil facing down/out.
 - 2. Dow Thermax or acceptable equivalent PIR board with silver facing, 63.5mm thick, Rm2.9m².K/ W. Cut to size, install below and to sides of box gutter prior to installation.
- B. Refer also to the Product & Materials Schedule. The system shall achieve total R-Values of Rt4.0m².K/ W (summer) and Rt3.7m².K/ W (winter) .

2.8 Isolating Tape

- A. A type recommended for the purpose by the manufacturer. Apply to those surfaces of supports that would otherwise be in contact with works or accessories after fixing.

2.9 Cladding Support Structure

- A. Provide a structural steel cladding support structure, as necessary, having due regard for any requirements in excess of that for structural steel as shown on the Structural Engineer's drawings and also any requirements shown on the Drawings.

2.10 Mechanical Fixings

- A. Fastenings shall comply with Section 08-400.

2.11 Fixing Anchors

- A. Shall be capable of adequate three-dimensional adjustment to accommodate building structure and cladding fabrication/ installation tolerances.
- B. All fixing anchors shall be stainless steel grade 316 and to the requirements of the BCA.

2.12 Accessories Generally

- A. Cappings, closure pieces, flashings, trims, sills, gutters, fillers, spacers, tapes, sealants, fixings, etc, where not specified, shall be types recommended in by the manufacturer.

2.13 Lighting Protection and Earth Bonding

- A. Bonding is required between individual sections of cladding, in accordance with AS/NZS 1768 and AS 1882, to ensure continuity between adjacent sections, both vertically and horizontally over the whole façade. Bonding between sections shall have a minimum cross section of 50mm x 50mm. Any bolts used for bonding shall be a minimum size of M10.

3. EXECUTION

3.1 Generally

- A. All work shall be true to detail with continuous profiles, free from marks, defects, flaws, steps, waves, or damage of any nature.
- B. Elements of framework and components shall be stored on Site such that they are not damaged, distorted or weathered unevenly.
- C. All finished components shall be carefully packed ensuring that they are suitably separated and protected to prevent scratching, scuffing or other surface damage.
- D. Verify dimensions and levels of the structure.
- E. Roof decking shall be turned/ folded up at ridges and down at gutters.
- F. All fixing bolts and anchors shall be installed in accordance with the manufacturer's recommended procedures.
- G. Obtain acceptance from the Superintendent before drilling or cutting parts of the structure, other than where shown on the documents.
- H. Provide isolating tape, plastic washers or other suitable means to prevent bi-metallic corrosion between dissimilar metals. Refer to PD 6484, Commentary on Corrosion at bi-metallic Contacts and its Alleviation.
- I. The finished work shall be square, regular, true to line, level and plane, with a satisfactory fit at all junctions.
- J. Design and installation shall be to AS 1562.1 and HB 39.

3.2 Metal Cladding

- A. Cladding shall be installed to minimise jointing and cutting of panels or sheets.
- B. Where fixings and /or joints are to be visible or expressed, they shall be set out equally and as agreed with the Superintendent.
- C. Allow for thermal expansion and contraction.
- D. Flashings, cappings, trims, etc, shall be provided with support backing as necessary to ensure there is no buckling, dishing or any other distortion to the material either due to thermal expansion/ contraction or any other likely cause.
- E. Where cladding abuts masonry or concrete walls, parapets, etc, flashings shall be set into purpose-made rebates to ensure a watertight junction. Silicone butt joints at these junctions will be rejected.

3.3 Fixing Sheets Generally

- A. Cut sheets shall give clean, true lines with no distortion. Remove burrs.
- B. Holes for primary fastenings shall be 1.5mm larger than diameter of fastening unless self-drilling type with pilot point is used.
- C. Remove all drilling swarf, dust and any other foreign matter before finally fixing sheets into position.
- D. Check fastenings on completion and adjust as necessary to ensure that they are watertight and sheeting is secure but not buckled or distorted.

3.4 Fastenings Generally

- A. Flashings shall be secured using stitching screws in matching finish. Pop rivet fixings will not be accepted.
- B. Type(s), size(s), material(s) and finish(es) shall be as recommended for the purpose by the cladding manufacturer.

3.5 Structure

- A. Check that the structure is in a suitable state to receive cladding before commencing fixing and obtain acceptance from the Superintendent.

3.6 Adjacent Finishes

- A. Do not fix cladding until final coats of paint have been applied to outer surfaces of supporting structure.

3.7 Sealing Laps

- A. Sealant: Type(s) recommended for the purpose by sheet manufacturer.
- B. Position in straight, unbroken lines immediately below fixing positions and parallel to edges of sheets. Place into corrugations. Do not allow to stretch or sag into position.
- C. Ensure continuity and effectiveness of seal, especially at corners of sheets. Do not overcompress.

3.8 Insulation

- A. The insulation shall be installed into the works so as not to bulge, sag, delaminate or detach during installation or at any time during the life of the building.
- B. Install insulation and secure into place as the work proceeds ensuring total and complete continuity in all situations such as between and over support structure and at wall to roof and similar junctions. Leave no gaps in the insulation. Keep the insulation dry and do not compress.

3.9 Installation Tolerances

- A. Deviations from lines, planes and verticality shall be limited to long wave formations of minimum wave length of 20m length not exceeding 1000mm, less rate of change, and a maximum amplitude of 3mm. All the above shall be measured from an optical or laser reference line.
- B. The width of any joint shall not deviate from the nominal width by more than 1mm of the joint width, whichever is the lesser. Any variation shall be equally distributed with no sudden changes. The misalignment between joints shall not exceed 1mm.
- C. Line and level shall be within 2mm of the specified level. The cumulative slope between the same locations on any panel shall not exceed 1 in 1000.
- D. Cladding shall be erected such that no point on any panel is more than 1mm from its theoretical plane. The cumulative slope between the same locations on any panel shall not exceed 1 in 1000.

- E. State the dimensional and detailed provisions intended to accommodate the construction tolerances of surrounding elements in order to ensure that all aspects of the cladding relate satisfactorily to the Works as a whole.
- F. All tolerances stated shall be measured and monitored at a mean temperature to be agreed with the Superintendent.
- G. Before work begins on Site, the proposed method of dimensional setting out and crosschecking with adjacent trades and elements shall be submitted to the Superintendent.
- H. Alternative tolerances to those specified may be permitted at the Superintendent's discretion, provided they are agreed in advance of the manufacture of components.
- I. Cladding, when installed, shall not be subject to warping or twisting, shall be strictly rigid, firm, free from vibration, knocking, rattles, squeaks and other noises when subject to the worst combination of environmental conditions and wind loads.
- J. Tolerances shall not be cumulative.

SECTION 04-204 -- PLASTIC SHEET CLADDING	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Warranties	1
1.8 Test Requirements	1
2. PRODUCTS	1
2.1 Type PLC-01 Polycarbonate Wall Cladding	1
2.2 Joints	1
2.3 Fixings	1
2.4 Tolerances for Manufacture	2
3. EXECUTION	2
3.1 Site Installation	2
3.2 Tolerances	2

SECTION 04-204 -- PLASTIC SHEET CLADDING

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
 - 1. Plastic sheet wall cladding.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
 - 1. A 300mm x 300mm sample of each type of cladding in specified profile, colour and finish.
 - 2. Samples of all fastening devices and exposed fittings.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
 - 1. The first of each type installed and accepted by the Superintendent in an agreed location.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
 - 1. Sub framing members in place and immediately prior to installation of cladding.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.7 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
 - 1. Plastic sheet wall cladding: 10 years.

1.8 Test Requirements

- A. Methods of test for determination of diffuse light transmission in plastic roof and wall cladding materials to AS/NZS 4257.4.
- B. Methods of test for determination of colourfastness, light transmission and impact resistance following ultraviolet light exposure for plastic roof and wall cladding materials to AS/NZS 4257.7.

2. PRODUCTS

2.1 Type PLC-01 Polycarbonate Wall Cladding

- A. Manufacturer/reference: Everbright Roofing Systems Pty Ltd. E610, 74mm thick, triple skin translucent polycarbonate panels installed vertically. Colour: Clear. Refer also to the Product & Materials Schedule.
- B. Install in accordance with AS 1562.3.
- C. Cladding shall be tested, meeting the requirements of AS 4040.1 (resistance to concentrated loads), AS 4040.2 (resistance to wind pressures) and AS 4040.4 (resistance to impact).
- D. Material thermal resistance (R-value) of Rm 1.85m².K/ W.
- E. Refer to the Drawings for extent.

2.2 Joints

- A. Movement joints shall be as shown on the Drawings.
- B. The cladding shall accommodate all movement of the joints in a manner that does not compromise the integrity or appearance.

2.3 Fixings

- A. Fixings shall comply with the requirements of the Specification.
- B. All bolts, screws, nuts and anchors shall be of adequate strength for their intended purpose and shall be manufactured from the specified grade of stainless steel listed in the Specification.
- C. Provide all necessary fasteners and fixings and associated flashings and closures.
- D. Fixings shall conform to all statutory requirements in respect of strength and type.

- E. Take adequate measures to prevent bi-metallic corrosion between dissimilar metals and to isolate aluminium components from cementitious surfaces. Attention is drawn to publication PD 6484 Commentary on Corrosion at Bi-metallic Contacts and its Alleviation.
- F. Fixings, within the aluminium framing components, shall not be visible unless indicated on the Drawings.
- G. Visible fixings shall be restricted to the assembly of the aluminium elements to the support steelwork using types described on the Drawings.

2.4 Tolerances for Manufacture

- A. Deviations in panel length, width and diagonal dimensions shall not exceed 1mm.
- B. The twist and warping shall not cause any point of the panel to be more than 0.5mm out of plane. The twist and warping shall not cause any point of the structural frame to be more than 2mm out of plane.
- C. Form all return edges to metal components to a minimum external bending radius of 1.5mm and a maximum of 3mm. Confirm these tolerances, which shall be consistent throughout, with the Superintendent.
- D. Tolerances shall not be cumulative.

3. EXECUTION

3.1 Site Installation

- A. To AS 1562.3.
- B. Cladding shall be manufactured with continuous profiles being free from marks, defects, flaws, steps, waves, or damage of any nature.
- C. Elements of framework and associated beads and strips shall be stored on Site such that they are not damaged, distorted or weathered unevenly.
- D. All finished components shall be carefully packed in stillages or crates such that they are separated and protected to prevent scratching, scuffing or other surface damage.
- E. Store all cladding, sealant and gaskets on Site in accordance with the manufacturer's written recommendations.
- F. Verify dimensions and levels of the structure.
- G. Carefully set out framing members and install in the correct position, within tolerance, and in the correct relationship to the building structure.
- H. All fixing bolts and anchors shall be installed in accordance with the manufacturer's recommended procedures.
- I. Internally, the protection shall remain in place until work is complete. Replace all protective measures following any inspections by the Superintendent.
- J. Inform the Superintendent before drilling or cutting parts of the structure, other than where shown on the Shop Drawings.
- K. Cladding shall be square, regular to line, level, and plane, with all junctions fitting to the stated tolerances.
- L. All cladding shall be capable of replacement. Provide a method statement showing the method of removing damaged glass and any associated metal framework and installing new components.
- M. Installation shall be carried out in accordance with the manufacturer's written recommendations and acceptable good practice.

3.2 Tolerances

- A. Employ a high degree of accuracy in the fabrication and installation of the works and associated support structures.
- B. At the time of completion, the visual requirements of the works shall be such that within any planning grid section the allowable tolerances shall be equally distributed to ensure that:
 1. The vertical joints are of equal size and at equal centres.
 2. Any support mullions are vertical and at equal centres.
 3. Cladding and supports have straight lines and flat planes.
 4. The horizontal joints are of equal size and in line between adjacent panels.
 5. The gaps between the panels and mullion structure are constant.
- C. Installation Tolerances:

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1. Erect in proper alignment in relation to established lines and grades as shown on the Shop Drawings and take into account installation tolerance requirements such that units are accurately located, relative to gridlines.
 2. The average width of any joint shall not deviate from the nominal width by more than 1mm. Any variation shall be equally distributed with no sudden changes or steps.
 3. The maximum variation in plan location from the planning grid of any part of the screen system shall be 2mm.
 4. The maximum variation in height of any part of the screen system from given datum shall be 2mm.
 5. The maximum offset in plan, level or section between any two adjacent panels shall be 1mm.
 6. The actual width of any joints shall not deviate from the nominal width by more than 1mm. Distribute any variation with no sudden changes. Align the centre of the joint with the centre of the support mullion. Misalignment between joints shall not exceed 1mm.
 7. No joint on any panel or support mullion shall be more than 1.5mm from a vertical plane. The cumulative slope between the same locations on any vertical plane shall not exceed 1 in 1000.
 8. The vertical and horizontal gaps between the glazing panels shall not be less than 5mm and not more than 7mm.
 9. Cut-outs for interfacing works shall be to the dimensions shown on the Shop Drawings ± 1 mm.
 10. Fix the base plates and floor sockets to an accuracy of ± 1 mm on line and level.
 11. All bolts in slotted holes shall be within 2mm of their intended position.
- D. Tolerances shall not be cumulative.

SECTION 04-400 -- DOORS		1
1. GENERAL		1
1.1	Related Documents	1
1.2	Outline of Work	1
1.3	Samples	1
1.4	Quality Benchmarks	1
1.5	Witness Points	1
1.6	Subcontractors	1
1.7	Shop Drawings	1
1.8	Warranties	1
1.9	Test Requirements	1
2. PRODUCTS		1
2.1	Timber	1
2.2	Door Types Generally	1
2.3	Type RS-01 Roller Shutter	2
2.4	Type RS-02 Tilt-Up Door	2
2.5	Solid Core Timber Doors	2
2.6	Hollow Core Timber Doors	2
2.7	Washroom/ Toilet Partition Doors	2
2.8	Frameless Glass Auto Sliding Entry Doors	2
2.9	Aluminium Framed Glass Doors	3
2.10	Seals to External Doors	3
2.11	Door Protection	3
2.12	Door Grilles	3
2.13	Plywood	3
2.14	Aluminium Frames	3
2.15	Steel Door Frames	3
2.16	Wall Cavity Slider	3
2.17	Glass Types	4
2.18	Visual Indicators on Glazing	4
2.19	Shop Priming of Doors and Door Frames	4
2.20	Finishes	4
2.21	Preservative Treatment	4
2.22	Flashings and Weatherings	4
2.23	Jointing Materials	5
2.24	Door Seals Generally	5
2.25	Pile Weather Strips	5
2.26	Extruded Gaskets and Seals	5
2.27	Nylon Brush Seals	5
3. EXECUTION		5
3.1	Installation	5
3.2	Protection of Components	5
3.3	Protection of Components after Installation	5
3.4	Moisture Content	5
3.5	Hardware	6
3.6	On-Site Dimensions	6
3.7	Fixing of Door Frames	6
3.8	Installation Tolerances	6
3.9	Priming/ Sealing	6
3.10	Corrosion Protection	6
3.11	Doorsets	6
3.12	Building In	6
3.13	Door Thresholds	6
3.14	Glazed Partition and Door Assemblies	6
3.15	Seals	6
3.16	Trim	6
3.17	Flashings and Weatherings	6

3.18	Weather Bars	6
3.19	Preparation for On-Site Decoration of Doors and Door Frames	7
3.20	Completion	7

SECTION 04-400 -- DOORS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification, the Preliminaries and the Door Schedule.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings and schedules, provides particular requirements with respect to the following:
1. Timber doors.
 2. Aluminium framed and frameless glass doors.
 3. Metal louvre doors.
 4. Roller shutters and roller grilles.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. Suitably sized samples of each type of door.
 2. A 300mm minimum length of each type of door frame.
 3. Sufficiently sized samples of all types of door seals.
 4. Samples of glazing materials.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first installed of each door type, in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Doors hung and prior to the installation of door furniture.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.7 Shop Drawings

- A. Submit Shop Drawings showing details of each assembly, component and connection and information relevant to fabrication, surface treatment and installation for the following:
1. Aluminium doorsets.
 2. Steel door frames.
 3. Metal clad doors.
 4. Roller shutters/ grilles.

1.8 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
1. All door types: Five years.

1.9 Test Requirements

- A. Include for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.
- B. Smoke doors and life safety doors shall be tested to AS 1530.7 and in accordance with AS 6905.
- C. Copies of test certificates shall be submitted to the Superintendent prior to installation.

2. PRODUCTS

2.1 Timber

- A. All timber and timber based products shall comply with the requirements described in Section 08-050.
- B. MDF, plywood and particleboard products shall be class E0 low formaldehyde.

2.2 Door Types Generally

- A. Refer to the Door Types drawing for individual door types and to the Door Schedule and/or Door Hardware Schedule for specific component and hardware combinations.

2.3 Type RS-01 Roller Shutter

- A. Manufacturer/reference: Austral Monsoon Panorama E85 roller shutter as nominated and described in the Fittings & Fixtures Schedule.

2.4 Type RS-02 Tilt-Up Door

- A. Manufacturer/reference: Monarch Renlita Series 3000 counterbalanced door as nominated and described in the Fittings & Fixtures Schedule.

2.5 Solid Core Timber Doors

- A. Flush panel E0 grade 4mm paint quality plywood faced solid core (medium density particleboard) timber doors with a KD hardwood edge frame to all four sides and hardwood edge strips.
- B. External doors shall have a HMR particleboard core and faced with external quality paint grade plywood.
- C. Finishes as nominated in the Door Schedule.
- D. Door frame: Pressed metal (1.2mm thick mild steel) or aluminium door frame as nominated in the Door Schedule.
- E. Where doors are hinged off an aluminium frame, provide aluminium plate reinforcement (minimum 5mm thick x 150mm long) at each hinge position, bonded to the inside of the frame with structural silicone.
- F. Leaf numbers and sizes as nominated in the Door Schedule.
- G. Door seals as nominated in the Door Schedule.
- H. All hardware as scheduled.
- I. Door grilles where nominated in the Door Schedule.
1. Sizes as required by the Mechanical Engineer.
- J. Square edged meeting stiles to 1½ leaf and double leaf doors.

2.6 Hollow Core Timber Doors

- A. Flush panel E0 grade 6mm paint quality plywood faced hollow (formcell honeycomb cellular cardboard reinforcing mesh) core timber doors with KD hardwood edge frame to all four sides and hardwood edge strips.
- B. Top/ bottom rails and stiles of frame shall be of sufficient width to provide a strong and robust door fit for the intended purpose. Provide blocks to accommodate all door hardware as scheduled.
- C. Finishes as nominated in the Door Schedule.
- D. Door frame: Pressed metal (1.2mm thick mild steel) or aluminium door frame as nominated in the Door Schedule.
- E. Leaf numbers and sizes as nominated in the Door Schedule.
- F. Door seals as nominated in the Door Schedule.
- G. All hardware as scheduled.
- H. Door grilles where nominated in the Door Schedule.
1. Sizes as required by the Mechanical Engineer.
- I. Square edged meeting stiles to 1½ leaf and double leaf doors.

2.7 Washroom/ Toilet Partition Doors

- A. Part of the washroom partition system. Refer to Section 05-150.

2.8 Frameless Glass Auto Sliding Entry Doors

- A. Frameless glass sliding doors and glazed sidelights with concealed overhead auto door operator.
- B. Materials:
1. 12mm minimum thickness safety glass.
2. Stainless steel full width rails to top and bottom edges.
- C. Mechanism:
1. Sliding operator gear shall be fully concealed above ceiling level with access facility for maintenance. Operated by microwave directional movement sensors.

2. Dorma Automatics Pty Ltd or acceptable equivalent EL301 series bi-parting door operator to suit door leaves.
 3. Flush mounted photoelectric cells in jambs to prevent door from closing if the door threshold is obstructed.
 4. Fail safe, fail secure operation to satisfy Building Code of Australia and AS 5007 upon failure or on fire signal.
- D. Hardware: Refer to Door Schedule.
- E. Glass shall comply with Section 08-450 and AS 1288.
- F. Provide a continuous strip of safety decals 75mm wide with 30% luminance between 900mm and 1000mm AFL. Decals to comply with DDA requirements.

2.9 Aluminium Framed Glass Doors

- A. Hinged/sliding aluminium framed glass doors as indicated on the ~\$design_drawings\$. Leaf sizes as nominated in the Door Schedule.
- B. Frame to suit internal glazed partition system and/or external window framing system as applicable. Refer to Section 04-500.
- C. Where doors are hinged off the aluminium frame, provide aluminium plate reinforcement (minimum 5mm thick x 150mm long) at each hinge position, bonded to the inside of the frame with structural silicone.
- D. Where floor closers are scheduled, they shall be recessed into the floor and covered with stainless steel cover plates. Pivot hinges at the door head shall be suitably reinforced.
- E. Seals as nominated in the Door Schedule.
- F. All hardware as scheduled.
- G. Glass shall comply with Section 08-450 and AS 1288.
- H. Finish as nominated in the Door Schedule.

2.10 Seals to External Doors

- A. All external doors shall be provided with draught/weather seals to all door leaf edges.

2.11 Door Protection

- A. Stainless steel or Acrovyn 3000, PVC free thermoplastic sheet door protection to both faces of nominated door leaves. Refer to the Door Schedule for applicable doors.
- B. Refer to the Door Schedule for nominated doors.

2.12 Door Grilles

- A. Refer to the Mechanical Services Specification for required sizes.
- B. Finish: Natural anodised or selected powder coat as scheduled. Refer to Sections 08-200 or 08-100 respectively.

2.13 Plywood

- A. Refer to Section 08-050.

2.14 Aluminium Frames

- A. Assemble from aluminium sections, including necessary accessories such as buffers, pile strips, strike plates, fixing ties or brackets etc., with suitable provision for fixing nominated hardware.

2.15 Steel Door Frames

- A. Frames: Assembled from folded steel sections including all necessary accessories such as buffers, strike plates, spreaders, mortar guards, fixing ties or brackets and with provision for fixing the specified hardware and furniture:
1. Sections: Formed from zinc-coated steel to AS 1397 incorporating rebates as detailed.
- B. Priming: Shop prime all frames before delivery.
- C. Frames to aquatic and other highly corrosive environments shall be primed with a zinc rich primer equal to Dulux Zincode 402.
- D. Assembly: Fully welded and ground smooth: cold galvanise welded joints before shop priming.
- E. Accessories: Provide mortar guards and reinforcing plates for the specified hardware.
- F. Reinforce frames to facilitate the attachment of hinges and closers by means of 4mm thick back plates and lugs welded on. Screw-fix hinges into tapped holes in the back plates. Frames shall receive a spreader to the full width of the jamb to prevent the frame from twisting and bowing.

2.16 Wall Cavity Slider

- A. Cavity slider shall be CS Cavity Sliders Pty Ltd or acceptable equivalent Powderseal cavity slider unit.

2.17 Glass Types

- A. Glass to doors shall be as specified and in accordance with AS 1288 and Section 08-450.
1. Vision strips to be in accordance with AS 1428.1.
- B. View panels:
1. Sizes as nominated on the Door Schedule.
 2. Clear safety glass panel with mitred hardwood beads in upper part of door.
- C. View panels to fire rated doors:
1. Sizes as nominated on the Door Schedule.
 2. The glazing shall not compromise the required fire rating of the doorset. Ensure that a fully compliant and tested system is provided. Submit documentary evidence as required.

2.18 Visual Indicators on Glazing

- A. Any glazing capable of being mistaken for a doorway or opening, where there is no chair rail, handrail or transom, should be clearly marked with a contrasting band of glazing film that complies with AS 1428.1.

2.19 Shop Priming of Doors and Door Frames

- A. External pressed metal door frames and metal clad external doors scheduled to be painted:
1. Preparation: Degrease to AS 1627.1 and in accordance with the paint manufacturer's written instructions.
 2. Primer: Dulux Professional Galvanised Iron Primer or acceptable equivalent.
 3. Site applied finishes: Refer Section 05-600.
- B. Pressed metal door frames in aquatic and similar corrosive areas:
1. Preparation: Abrasive blast to AS 1627.4.
 2. Primer: Dulux Zincode 402 or acceptable equivalent.
 3. Site applied finishes: Refer Section 05-600.
- C. Internal pressed metal door frames:
1. Preparation: Degrease to AS 1627.1 and in accordance with the paint manufacturer's written instructions.
 2. Primer: Dulux Professional Galvanised Iron Primer or acceptable equivalent.
 3. Site applied finishes: Refer Section 05-600.
- D. Timber doors:
1. Primer: Dulux Preplock Water Based Stain Blocker or acceptable equivalent.
 2. Site applied finishes: Refer Section 05-600.

2.20 Finishes

- A. Nominated finishes to aluminium sections shall be factory applied and protected as required during the entire construction period (refer to Section 08-100).
- B. Pressed metal door and door frames shall be shop primed prior to delivery to Site.
- C. Timber doors (other than timber veneer finished doors) shall be shop primed prior to delivery to Site using a spray application to the manufacturer's recommendations.
- D. Paint finishes shall be stable, fade resistant, durable and of uniform texture and colour.
- E. Minor scratches and blemishes shall be repairable with the coating manufacturer's recommended product and system, matching the original finish for colour, texture and gloss.

2.21 Preservative Treatment

- A. Treat all timber in the door construction with preservative treatment as follows:
1. Moisture content of timber at time of treatment shall be as specified for the component at the time of delivery. After treatment, timber shall be surface dry before use.
 2. Treatment: Organic solvent pressure impregnation to AS/NZS 1604. The preservative treatment shall be compatible with all applied finishes.

2.22 Flashings and Weatherings

- A. Standard: To AS/NZS 2904.

- B. General: Provide flashings and weatherings which are corrosion resistant, compatible with other materials in the installation, and coated with a non-staining compound where necessary.

2.23 Jointing Materials

- A. Provide recommended jointing and pointing materials which are compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

2.24 Door Seals Generally

- A. Seals to doors as nominated in the Door Schedule shall include:
1. Weather/ draught seals to external doors.
 2. Acoustic seals so as to achieve the specified acoustic rating of the doorset.
 3. Intumescent seals as required to meet the specified fire resistance level of the doorset.
 4. Smoke seals.

2.25 Pile Weather Strips

- A. Standard: To AAMA 701/702.
- B. Materials: Polypropylene or equivalent pile and backing, low friction silicone treated, ultraviolet stabilised.
- C. Finned type: A pile weather seal with a central polypropylene fin bonded into the centre of the backing rod and raised above the pile level.

2.26 Extruded Gaskets and Seals

- A. Type: Non cellular (solid) elasto seals.
- B. Material:
1. Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber) or flexible polyvinyl chloride (PVC): 100% solids with high consistency, ultraviolet stabilised.

2.27 Nylon Brush Seals

- A. Dense nylon bristles locked into galvanised steel strips and fixed in a groove in the edge of the door or in purpose-made anodised aluminium holders fixed to the door with double-sided PVC foam tape.

3. EXECUTION

3.1 Installation

- A. Particular attention shall be paid to the interface between the door frames and new and existing walls when preparing the Shop Drawings and during installation. Interfacing requirements shall be in accordance with the visual requirements as indicated on the Drawings.
- B. During construction, doors and hardware shall be protected after fitting, and care shall be taken to avoid fitting any doors and hardware while "wet" trades are still in progress. Doors and hardware shall be kept away from abrasives, acids and other corrosive materials.
- C. Trim door leaves where required and within the specified installation tolerances. Reinstall arisises to all edges of doors following size adjustment.
- D. Hinged doors shall comply with AS 5040.
- E. Sliding doors shall comply with AS 5040.

3.2 Protection of Components

- A. Do not arrange to have delivered to Site any components that cannot be put immediately into suitable dry, covered storage. Stack door leaves on suitable bearers and separate each door with spacers as necessary to prevent damage to projecting hardware, beads and the like.

3.3 Protection of Components after Installation

- A. Ensure all door leaves, frames and componentry are adequately protected from potential damage during on-Site operations.

3.4 Moisture Content

- A. All timber shall be subjected to controlled drying to ensure that the moisture content, if not otherwise specified, is suitable for the situation. Timber shall remain stable and free from expansion, contraction or other movements detracting from the required performance or appearance.
- B. During delivery, storage, fixing and thereafter to Practical Completion maintain conditions of temperature and humidity to suit the specified moisture content(s) of timber components. When instructed by the Superintendent, test components with an accepted electrical moisture meter used in accordance with the manufacturer's written recommendations.

3.5 Hardware

- A. Assemble and fix carefully and accurately using fastenings with a matching finish supplied by the hardware manufacturer. Prevent damage to hardware and adjacent surfaces. At completion check, adjust and lubricate as necessary to ensure correct functioning.

3.6 On-Site Dimensions

- A. Take responsibility for all dimensions and check dimensions on Site prior to installation. Ensure that the fit of door leaves within door frames is within the specified tolerances.
- B. Accommodate any given tolerances and differences between actual Site dimensions and dimensions shown on the Drawings.

3.7 Fixing of Door Frames

- A. Fixing centres for door frames: When not predrilled or specified otherwise, position fixings 150mm from each end of jamb, adjacent to each hanging point and at 600mm maximum centres.

3.8 Installation Tolerances

- A. At Practical Completion all doors shall achieve the following:
 1. Door leaves shall be straight and flat.
 2. Gaps to the head and jambs of doors to frames shall be a maximum of 3mm all round.
 3. Thresholds shall have a 5mm maximum clearance above the nominated floor finish unless accepted otherwise by the Superintendent.
 4. The maximum variation from plumb shall be ± 1.5 mm.
 5. Take responsibility for checking dimensions on Site.

3.9 Priming/ Sealing

- A. All timber doors, including all edges, shall be primed prior to delivery to Site.

3.10 Corrosion Protection

- A. Before fixing, apply two coats of bitumen solution or an accepted mastic impregnated tape, to surfaces of door components which will come into contact with concrete slab.

3.11 Doorsets

- A. Do not hang doors until rooms are weathertight and the work of wet trades is finished and dried out.

3.12 Building In

- A. Building in of door frames into block walls and/ or fire walls shall be braced and protected as necessary to prevent distortion and damage during erection of adjacent structure.
- B. Installing in existing masonry: To AS 1905.1 Appendix D.

3.13 Door Thresholds

- A. Fix 150mm from each end and at 600mm maximum centres.

3.14 Glazed Partition and Door Assemblies

- A. If doors are to be installed in glazed partition frames as part of a combined glazed partition and door assembly, provide a door that is compatible with the glazed partition system.

3.15 Seals

- A. Provide purpose-made proprietary seals to meet requirements for weather, draught, smoke and acoustic sealing as applicable. Provide fixings, rebates, grooves and clearances as necessary for installation and operation of the seals. Allow seals unwound from coils to settle before use.

3.16 Trim

- A. General: Provide mouldings, architraves, reveal linings, and other internal trim as detailed on the Drawings using materials and finishes matching the door frames. Install to make neat and clean junctions between the frame and the adjoining building surfaces.
- B. Timber: Solid timber at least 19mm thick, mitred at corners.

3.17 Flashings and Weatherings

- A. Installation: Install flashings, weather bars, drips, storm moulds, caulking and pointing to prevent water from penetrating the building between the door frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

3.18 Weather Bars

- A. Provide a brass weather bar under hinged external doors located at the centre of the door leaf in its closed position. Height to suit.

3.19 Preparation for On-Site Decoration of Doors and Door Frames

- A. Timber doors shall be filled and sanded as necessary in readiness for on-site application of paint finishes. Where shop applied primer coats have been removed these shall be reinstated to the satisfaction of the Superintendent.
- B. Timber veneer doors shall be similarly prepared in readiness for the specified clear finish.
- C. Door furniture and the like shall be removed prior to painting and then reinstated upon completion.

3.20 Completion

- A. Maintenance: Submit manufacturer's published recommendations for service use.
- B. Protection: Protect all components of the work until Practical Completion. On or immediately before Practical Completion, remove all traces of temporary coatings used as a means of protection.

SECTION 04-500 -- WINDOWS/ GLAZED PARTITIONS/ METAL LOUVRES AND SCREENS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Shop Drawings	1
1.8 Warranties	1
1.9 Test Requirements	1
1.10 Testing Requirements for Windows	2
1.11 Site Hose Testing	2
1.12 Acoustic Testing	2
1.13 Weighted Sound Reduction Index (Rw) Tests	2
2. PRODUCTS	2
2.1 Type LV-01 Plant Louvre/Screen	2
2.2 Type LV-02 Fixed Aluminium Louvres	2
2.3 Aluminium Windows Generally	3
2.4 Type GLD-01 Window Film/Decals	3
2.5 Insect Screens	3
2.6 Type GF-01 Glazed Framing System	3
2.7 Glass Types Generally	3
2.8 Support Structure	3
2.9 Lightning Protection and Earth Bonding	3
2.10 Security	4
3. EXECUTION	4
3.1 General Requirements	4
3.2 Building In	4
3.3 Window Installation	4
3.4 Sealant Joints	4
3.5 Hardware	4
3.6 Completion	4

SECTION 04-500 -- WINDOWS/ GLAZED PARTITIONS/ METAL LOUVRES AND SCREENS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. External windows.
 2. Internal glazed screens/ partitions.
 3. Screens, louvres and grilles.
 4. Glazing.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. 300mm minimum length sample of all framing and sill members in the proposed colour and finish.
 2. Sufficiently sized samples of each type of screen, louvre and grille showing relationship of all components including fixing arrangements to interfacing structure.
 3. 300mm x 300mm sample of all glass types.
 4. Typical hardware components in the proposed materials and finishes shall include operating handle, hinge and locking device.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first fully installed of each type in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Commencement of window installation.

1.6 Subcontractors

- A. Submit names and contact details of proposed manufacturers and Subcontractors.

1.7 Shop Drawings

- A. Submit Shop Drawings showing the following:
1. Full-sized sections of members.
 2. Glazing details.
 3. Hardware, fittings and accessories.
 4. Junctions and trim to adjoining surfaces.
 5. Layout (sectional plan and elevation) of the window assembly.
 6. Lubrication requirements.
 7. Methods of assembly.
 8. Methods of installation, including fixing, caulking and flashing.
 9. Provision for vertical and horizontal expansion.

1.8 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
1. External windows: 10 years.
 2. Internal glazed screens/ partitions: 5 years.
 3. Louvres and grilles: 10 years.

1.9 Test Requirements

- A. Provide for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.

1.10 Testing Requirements for Windows

- A. Where required, carry out project specific tests and provide certification to demonstrate that the windows have been tested to meet the following:
1. Air infiltration: To AS 2047 and AS 4420.4.
 2. Watertightness: To AS 2047 and AS 4420.5. No water penetration shall occur under the test conditions as specified.
 3. Wind resistance: To AS/NZS 1170.2.
 4. Operation force test: To AS 4420.3.
 5. Deflection test: To AS 4420.2.
 6. Acoustic testing data, fire testing data, solar data and other testing results shall satisfy the performance requirements specified herein as required.
 7. Acceptance testing for all finishes as specified.
 8. Site hose testing as specified.
- B. If the testing data submitted is not deemed to be satisfactory by the Superintendent, laboratory tests shall be carried out to satisfy the requirements of the Specification to be agreed with the Superintendent.
- C. Test certificates do not relieve the Contractor of his responsibilities regarding the performance and service life requirements of the works.

1.11 Site Hose Testing

- A. Carry out a Site water hose test in accordance with the recommendations of CWCT's (Centre for Window and Cladding Technology) Standard for Systemised Building Envelopes.
- B. Remedial work and retesting:
1. Wherever leakage has occurred, make joints watertight to satisfy the requirements of the Specification.
 2. After all necessary remedial work has been completed and the required curing time, if any, has elapsed, retest all repaired joints following the same procedure as before. Should leakage still be found, take further remedial measures and repeat testing until all joints in the designated area are found to be satisfactory.
- C. Extent of testing: A minimum of 5% by length of all critical joints, at locations agreed with the Superintendent.

1.12 Acoustic Testing

- A. Carry out acoustic testing in accordance with AS/NZS ISO 717.1.

1.13 Weighted Sound Reduction Index (Rw) Tests

- A. Double glazed systems: Interpolation between test results for similar systems is acceptable only if:
1. Dimensional (thickness or width) differences do not exceed a ratio of 1:1.5.
 2. Each tested system differs from the proposed system by not more than one of the following elements:
 - a) Cavity: Width dimension.
 - b) Cavity reveal: Acoustic absorption treatment.
 - c) First panel: Glass type, glass thickness.
 - d) Mounting: Seal type.

2. PRODUCTS

2.1 Type LV-01 Plant Louvre/Screen

- A. Manufacturer/ reference: Colt ERD series ventilation and rain defence louvre. Refer also to the Product & Materials Schedule.
- B. 75mm pitch, 1250mm maximum span.
- C. Finish: As scheduled.

2.2 Type LV-02 Fixed Aluminium Louvres

- A. Manufacturer/ reference: Capral 89mm fixed aluminium louvre to be fitted to Capral 419 Series frame. Powder coat finish. Colour: as scheduled and matching glazing frame, Refer also to the Product & Materials Schedule.

- B. Air flow to meet the requirements of the Mechanical Engineer.
- C. Fixed weatherproof aluminium louvre system.
- D. Provide bird proofing mesh to rear of louvre panels.
- E. Provide blanking panels to rear of louvres where there is no requirement for airflow.
- F. Refer to the Drawings and the Louvre Schedule for details and extent.

2.3 Aluminium Windows Generally

- A. Comply with the requirements of AS 2047.
- B. Exposure category (design wind pressure): To AS/NZS 1170.2 and in accordance with the terrain category for the area.
- C. Glazing details: Single glazed or thermally broken sealed double glazed units as applicable and as specified/scheduled. Windows shall be centre glazed or front glazed as indicated/detailed on the Drawings and as described in the schedules.
- D. Hardware/ accessories: All openable windows and doors shall be fitted with key locking handles as recommended by the manufacturer. Refer to the schedules for further details.
- E. Fixing: To manufacturer's written instructions.
- F. Safety glass: In accordance with Section 08-450, AS 1288 and as specified.
- G. Caulking colour to match frame and to the acceptance of the Superintendent.
- H. All openable windows shall be fitted with draught/weather seals to provide a complete seal when the windows are in the closed position.

2.4 Type GLD-01 Window Film/Decals

- A. Manufacturer: High Performance Window Films or 3M or acceptable equivalent. Refer also to the Product & Materials Schedule
- B. Reference/ colour: To the future direction of the Superintendent.
- C. Film shall be Site applied to nominated windows/ internal glazed partitions and where required to satisfy BCA and DDA requirements.
- D. To all full height glazing and in particular, to glazed full doors and sidelights. Refer to the Drawings for extent.

2.5 Insect Screens

- A. All openable windows shall be fitted with new aluminium framed insect screens in selected powder coat finish.
- B. Screens shall be formed from extruded aluminium sections, mitred and screwed at the corners. The frame shall make allowance for the scheduled window hardware.
- C. Flywire mesh shall be secured into the rear of the frame with a continuous resilient gasket, so that the mesh is taut and without distortion.

2.6 Type GF-01 Glazed Framing System

- A. Manufacturer/ reference: Reynaers or acceptable equivalent CW-50 150mm x 50mm front glazed suite. Single or double glazed units as nominated. Refer also to the Product & Materials Schedule.
- B. System shall come complete with subsills, subheads and door thresholds as applicable. Transoms and sills shall be self draining.
- C. Selected powder coat finish. Colour: As scheduled.
- D. Glass types: As specified. Refer to the Drawings and the Window Schedule for details and extent.

2.7 Glass Types Generally

- A. All glass shall be safety glass and comply with the requirements of Section 08-450 and AS 1288. Refer to the Product & Materials Schedule for glazing details.

2.8 Support Structure

- A. Provide a structural steel support structure, as necessary, having due regard for any requirements in excess of structural steel shown on the Structural Engineer's Drawings and also any requirements shown on the Drawings. The structural steelwork shall comply with the Structural Engineer's Steelwork Specification, including protective coatings.

2.9 Lighting Protection and Earth Bonding

- A. Bonding is required between individual sections of cladding, in accordance with AS/NZS 1768 and AS 1882, to ensure continuity between adjacent sections, both vertically and horizontally over the whole façade. Bonding between sections shall have a minimum cross section of 50mm x 50mm. Any bolts used for bonding shall be a minimum size of M10.

- B. Carry out bonding to structural steelwork at intervals at no greater than 10m horizontally and 20m vertically. The first level of bonding to the structural steelwork shall be at the highest floor level of each part of the building.
- C. Provide studs/ bolts for subsequent connection.
- D. All straps/ connections shall be concealed.
- E. No straps shall be fixed along copings.

2.10 Security

- A. All openable windows shall be fitted with window locks to suit the application and as recommended by the manufacturer.

3. EXECUTION

3.1 General Requirements

- A. All works shall be true to detail with continuous profiles that are free from marks, defects, flaws, steps, waves or damage of any nature.
- B. Store all elements on Site such that they are not damaged, distorted or weathered unevenly.
- C. Carefully pack all finished components in stillages or crates such that they are suitably separated and protected to prevent scratching, scuffing or other surface damage.
- D. Verify dimensions and levels of the structure.
- E. Set out the Works such that all elements are installed in the correct position, within tolerance, and in the correct relationship to the building structure.
- F. Install all fixings in accordance with the manufacturer's recommended procedures.
- G. Keep materials dry until fixed.
- H. Obtain permission from the Superintendent before drilling or cutting parts of the structure, other than where shown on the Shop Drawings.
- I. Set out material at evenly spaced centres, straight, parallel and truly aligned with other features where shown on the Drawings.
- J. Finished work shall be square, regular, true to line, level and plane, with a satisfactory fit at all junctions.

3.2 Building In

- A. Will not be permitted except where specifically stated on the Drawings.
- B. Where building in is permitted, components shall be braced and protected as necessary to prevent distortion and damage during erection of adjacent structure.

3.3 Window Installation

- A. To AS 2047.
- B. Install windows into prepared openings, maintaining a maximum gap of 5mm between the frame edge and the surrounding construction.
- C. Install windows without twist or diagonal racking.

3.4 Sealant Joints

- A. Colour: To the acceptance of the Superintendent.
- B. Prepare joints and apply sealant as Section 08-400. Finish triangular fillets with a flat or slightly convex profile.

3.5 Hardware

- A. Assemble and fix carefully and accurately using fasteners with matching finish supplied by the hardware manufacturer. Prevent damage to hardware and adjacent surfaces. At completion check, adjust and lubricate as necessary to ensure correct functioning.

3.6 Completion

- A. Maintenance manual: Submit the window manufacturer's published instructions for operation, care and maintenance.
- B. Protection: On or before completion, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

SECTION 04-600 -- DOOR AND WINDOW HARDWARE	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Subcontractors	1
1.6 Shop Drawings	1
1.7 Warranties	1
1.8 Test Requirements	1
2. PRODUCTS	1
2.1 Hardware	1
2.2 Master Key Provision	1
2.3 Hardware Ranges	1
2.4 Hardware Generally	1
2.5 Hinge Materials	1
2.6 Hinge Pins	2
2.7 Number of Hinges	2
2.8 Overhead Door Closers	2
2.9 Automatic Door Operators	2
2.10 Locks to Internal Doors	2
2.11 Latches	2
2.12 Locks/ Latches for Fire Resisting Doors	2
2.13 Escape Doors	3
2.14 Bolts Generally	3
2.15 Furniture Generally	3
2.16 Materials	3
2.17 Padlocks	3
2.18 Rebated Doors	3
2.19 Strike Plates	3
2.20 Window Hardware	3
3. EXECUTION	3
3.1 Generally	3
3.2 Fixings	3
3.3 Floor Springs	4
3.4 Hinges	4
3.5 Installation Generally	4
3.6 Window Hardware	4
3.7 Completion	4
3.8 Key Handover	4

SECTION 04-600 -- DOOR AND WINDOW HARDWARE

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings and schedules, provides particular requirements with respect to the following:
1. Hardware to internal and external doors.
 2. Hardware to windows.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. One sample of each hardware type in the specified finish.
 2. A complete sample board of standard items. The exact extent to be agreed.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first installed of each type of door/ window hardware in a location as agreed with the Superintendent.

1.5 Subcontractors

- A. Hardware generally: Submit names and contact details of proposed suppliers and Subcontractors.

1.6 Shop Drawings

- A. Submit Shop Drawings showing details of each assembly, component and connection and information relevant to fabrication, surface treatment and installation for the following:
1. Automatic door operators.

1.7 Warranties

- A. Prior to Practical Completion submit to the Superintendent the following:
1. Hardware: Submit manufacturer offered warranties and obtain acceptance from the Superintendent prior to commencement.

1.8 Test Requirements

- A. Provide manufacturer's test data.
- B. The provision of test data does not relieve the Contractor of his responsibilities with respect to guarantees provided for the hardware.

2. PRODUCTS

2.1 Hardware

- A. Refer to the Door Hardware Schedule.

2.2 Master Key Provision

- A. All cylinders and lever mechanism locks are to be keyed under an agreed master key plan.
- B. Agree master key and suiting proposals, in writing, with the Superintendent and manufacturer prior to order placement.

2.3 Hardware Ranges

- A. All hardware shall be selected from the brand and product range as scheduled. Where particular items are unavailable within the range, alternatives compatible in performance, design, style, material, colour and finish may be submitted for acceptance.
- B. Principal material/ finish: Stainless steel and/ or natural anodised aluminium as nominated in the Door Schedule/ Door Hardware Schedule.

2.4 Hardware Generally

- A. All other kick plates, door closers, escutcheons, hinges, flush bolts, panic hardware, lock cases, thumb turns, striking plates, cylinders shall be as scheduled and from a range to match the finish of the door furniture as specified above.

2.5 Hinge Materials

- A. Aluminium framed doors shall be fitted with aluminium hinges of high tensile aluminium with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint.
- B. All other doors shall be fitted with stainless steel hinges as follows:
 - 1. Grade 304 for internal doors.
 - 2. Grade 316 for external doors.
- C. Doors fitted with closers: Provide low friction bearing hinges.

2.6 Hinge Pins

- A. Exterior or security doors opening out: Provide fixed pin hinges or security hinges.

2.7 Number of Hinges

- A. Fire doors: To AS 1905.1.
- B. Provide three hinges for leaves between 2040mm and 2340mm high, and four for door leaves between 2340mm and 3050mm high. Provide at least three low friction bearing hinges for door leaves controlled by door closers.
- C. Door leaves not exceeding 2040mm high, 820mm wide and 30kg mass may be fitted with two hinges.
- D. Where necessary, provide wide throw hinges to achieve the required door swings in the presence of obstacles such as nibs, deep reveals and architraves.

2.8 Overhead Door Closers

- A. Functions:
 - 1. Closers shall be matched to the sizes and weights of the doors.
 - 2. Closers shall override latches and/ or door seals when fitted.
 - 3. Closers shall hold unlatched doors shut under normal working conditions.
- B. Fire door closers:
 - 1. Tested door assemblies similar to those for which the closers shall be proposed to BS 476: Part 22. Submit evidence of testing by an approved laboratory.
 - 2. Fix on the opening side of the door unless specified otherwise.
 - 3. Closers shall have no mechanical hold open facility.
 - 4. Closers shall close positively against smoke seals where fitted.
 - 5. Closers shall have arms of iron, steel or other metal with a melting point not less than 800° C.
- C. Surface mounted closers:
 - 1. Shall be mounted on opening face of door except where they will be obstructed or where specified otherwise.

2.9 Automatic Door Operators

- A. Automatic sliding door operator gear shall be fully concealed above ceiling level or in an overhead pelmet as detailed on the Drawings. Provide full access for maintenance purposes. Doors shall be operated by movement sensors as standard.
- B. Unless nominated otherwise in the Door Hardware Schedule, the mechanism shall be supplied by Dorma Australia. Model reference as recommended by the manufacturer for the particular installation.
- C. Flush mounted photoelectric cells in jambs to prevent doors from closing if the door threshold is obstructed.
- D. Fail safe operation to satisfy Building Code of Australia and AS 5007 upon failure or on fire signal.

2.10 Locks to Internal Doors

- A. To AS 4145.2.

2.11 Latches

- A. To BS EN 12209 or the AS equivalent. Alternatively as accepted by the Superintendent.
- B. Latch springs shall be strong enough to prevent unsprung lever handles drooping.

2.12 Locks/ Latches for Fire Resisting Doors

- A. Locks/ latches shall not compromise the fire performance of the door and shall be accepted for the purpose by the door leaf manufacturer.
- B. Components critical to the retention of the door in a closed position must not have a melting point lower than 800°C.

- C. Comply with AS 1905.1.
- 2.13 Escape Doors**
- A. Locks specified for security purposes on escape routes shall be fitted with a means of withdrawing the bolt without the use of a key.
- 2.14 Bolts Generally**
- A. Provide bolts to:
1. Match door furniture and sized to suit height, weight and function of door.
 2. Secure the first closing leaf on double doors.
- B. Privacy Bolts: Shall incorporate an external emergency release facility.
- 2.15 Furniture Generally**
- A. Lever handles, door knobs, pull handles and plates, kick plates, stops, escutcheons and seals shall comply with BS EN 1906.
- 2.16 Materials**
- A. Stainless Steel:
1. Stainless steel shall be austenitic, non-magnetic grade 304(for internal situations) and 316 (for external situations).
 2. Stainless steel hardware shall be satin finished unless nominated otherwise in the Door Hardware Schedule and be consistent in colour and texture, both individually and collectively. The accepted finish shall be established on the basis of reference samples provided to the Superintendent.
 3. Door stiles and rails shall be mortised and adequately reinforced to receive hinges, strikes, locksets, closers, floor bolts and all other hardware items nominated in the Door Hardware Schedule.
- B. Aluminium alloy and coatings shall comply with AS 1231.
- C. Chromium/ Cadmium Plating:
1. Chromium plating on metal to AS 1192, Service Condition 2, unless otherwise specified.
 2. Cadmium plating on threaded components to AS 1897, Service Condition 2, unless otherwise specified.
- 2.17 Padlocks**
- A. To AS 4145.4.
- 2.18 Rebated Doors**
- A. For mortice locks or latches to rebated doors, provide purpose-made rebated pattern items.
- 2.19 Strike Plates**
- A. Use strike plates provided with the locks or latches. "Universal" strike plates are not acceptable.
- 2.20 Window Hardware**
- A. Hardware generically: Provide hardware of sufficient strength and quality to perform its function, appropriate to the intended conditions of use, suitable for use with associated hardware, and fabricated with fixed parts firmly joined.
- B. Locks and catches shall comply with AS 4145.3.
- 3. EXECUTION**
- 3.1 Generally**
- A. The hardware supplier/ installer shall be a current member of the Locksmiths Guild of Australia Inc, hold licences where required by Commonwealth or State law, and shall ensure that their employees maintain the high professional standards expected of the craft of locksmithing.
- B. The correct installation of all the hardware is essential to achieve the performance levels specified and required. Door hardware locations from finished floor level to centre line of hardware shall be as recommended by the manufacturer unless detailed otherwise on the Drawings.
- 3.2 Fixings**
- A. All items of door hardware shall be supplied complete with stainless steel screws to the type and length recommended in writing by the manufacturer and suitable for fixing to wood or metal, as appropriate to suit the door leaf and frame. Fit lever handles positively to roses by screw thread fixing and by countersunk screws to the spindle. Fit the roses or back plates back to back with countersunk head, back to back through fixings. All other visible fixings shall have countersunk heads.

3.3 Floor Springs

- A. Form a recess in the floor slab for the floor spring box and grout the box in place so that the cover plate is flush with the finished floor.

3.4 Hinges

- A. Metal frames: Fix hinges using metal thread screws.

3.5 Installation Generally

- A. Hardware shall be installed and checked for correct operation. Each item shall be maintained and protected against damage by other trades. On completion adjust, clean and lubricate in accordance with the manufacturer's recommendations.
- B. Coordinate the hardware installation with other trades and form holes, mortices, chases, etc. Reinforce and prepare hollow constructions to receive hardware. Provide wiring, conduits, accessories, etc, for electrical items. Protect hardware during construction. Remove fixed items before finishing or decoration processes, make good finishes, execute protective and decorative painting where required and refix, check, clean and lubricate hardware on completion.
- C. All wood or metal doors shall be factory mortised to receive hardware, to ensure correct preparation and avoid the potential for negation of fire ratings. Site mortising is not acceptable.

3.6 Window Hardware

- A. Proprietary window systems: Provide the standard hardware and internal fixing points for personnel safety harness attachment, where required by and complying with the governing regulations.

3.7 Completion

- A. Adjustment:
 - 1. Leave the hardware properly adjusted with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.
 - 2. Automatic door operators: Maintain and adjust the system throughout the defects liability period.
- B. Keys:
 - 1. Immediately before Practical Completion, replace cylinders to which the Contractor has had key access during construction with new cylinders that exclude the Contractor's keys.
 - 2. For locks keyed to differ and locks keyed alike, verify quantities against key records, and deliver to the Superintendent at Practical Completion.
- C. Maintenance:
 - 1. Automatic door operators: Submit the installer's proposal for continuing maintenance after completion on an annual renewal basis.
 - 2. Manual: Submit the manufacturer's published recommendations for use, care and maintenance of the hardware provided.
- D. Record documents:
 - 1. Door hardware schedule: Submit an amended schedule, prepared by the door hardware supplier, showing changes to the contract door hardware schedule caused as follows:
 - a) By the acceptance of a hardware sample.
 - b) By the acceptance of an equivalent to a specified proprietary item.
 - c) By a contract variation to a door hardware requirement.
- E. Key codes: Submit the lock manufacturer's record of the key coding system showing each lock type, number and type of key supplied, key number for reordering, and name of supplier.

3.8 Key Handover

- A. At Practical Completion account for and adequately label all keys.
- B. Provide the Superintendent with an itemised schedule and retain a duplicate schedule as a receipt.
- C. The master keys shall be issued by the cylinder/ key supplier direct to the Superintendent.

SECTION 05-050 -- CEILINGS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Shop Drawings	1
1.8 Warranties	1
1.9 Test Requirements	1
2. PRODUCTS	1
2.1 Type CE-01 Flush Plasterboard Ceiling	1
2.2 Type CE-02 Fibre Cement Ceiling	2
2.3 Types AT-02 & CE-03 Acoustic Panel Ceiling	2
2.4 Type FC-03 Fibre Cement Soffit Lining	2
2.5 Suspension System Generally	2
2.6 Types CN-01 & CN-02 Perimeter Trims / Wall Junctions	2
2.7 Movement Joints	2
2.8 Plasterboard	2
2.9 Support Systems and Fixings	3
2.10 Type IN-05 Thermal/ Acoustic Ceiling Insulation	3
2.11 Types AP-01 & AP-02 Ceiling Access Panels	3
3. EXECUTION	3
3.1 General	3
3.2 Suspension System	3
3.3 Plasterboard Ceilings	3
3.4 Ceiling Penetrations	4
3.5 Movement Joints	4
3.6 Air Plenum Barrier	4
3.7 Installation Tolerances	4
3.8 Setting Out and Protection	4
3.9 Wire Hangers	4
3.10 Insulation	5
3.11 Bracing	5
3.12 Handling and Storage	5
3.13 Remedial Works	5
3.14 Completion	5

SECTION 05-050 -- CEILINGS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Acoustic tile ceilings.
 2. Plasterboard ceilings.
 3. Eave and soffit linings.
 4. Ceiling access panels.
 5. Insulation.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. A 300mm minimum length of all framing components.
 2. Adequately sized samples of all ceiling, eave and soffit types.
 3. All fixing types.
 4. Adequately sized samples of all insulation materials.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first of each type of ceiling in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Ceiling framing and insulation in place and prior to installing ceiling linings.
 2. Completed ceilings before the commencement of painting trades as applicable.

1.6 Subcontractors

- A. Submit name and contact details of proposed manufacturers and Subcontractors.

1.7 Shop Drawings

- A. Submit Shop Drawings showing the relevant details of the ceiling system as follows:
1. Set out and extent of all ceilings. Show all panel joints and services outlets and demonstrate that all services within the ceiling void and on the ceiling, including access hatches have been fully coordinated. Provide 3-dimensional diagrams of 'in ceiling' services reticulation where requested by the Superintendent.

1.8 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
1. All ceiling systems shall withstand temperature and humidity without visible sag for 15 years.

1.9 Test Requirements

- A. Provide evidence of independent tests carried out to demonstrate that the products comply with the Specification or carry out such tests necessary to demonstrate compliance.
- B. Such tests to demonstrate compliance in respect of the following criteria:
1. Air leakage.
 2. Acoustic integrity.
 3. Structural stability.

2. PRODUCTS

2.1 Type CE-01 Flush Plasterboard Ceiling

- A. USG Boral or acceptable equivalent Regular standard core, 13mm thick flush jointed plasterboard fixed to a concealed ceiling framing system.

- B. In amenity areas and similar wet areas where high moisture levels may be anticipated, moisture resistant plasterboard shall be used.
- C. Insulation: Thermal/acoustic insulation where scheduled and/or where detailed on the Drawings.
- D. Upstands, bulkheads, coffers and the like as shown on the Drawings shall have internal and external stainless steel corner stopping beads.
- E. Plasterboard ceiling to wall junctions shall be either square set & taped (CN-02) or Rondo P50 shadowline stopping angle (CN-01) as detailed or described on the Drawings or in the schedules and as specified below.
- F. Finish: Taped and flush jointed to provide a seamless finish. Sand as necessary to achieve a level 4 finish in accordance with AS/NZS 2589 ready for painting by other trades.

2.2 Type CE-02 Fibre Cement Ceiling

- A. 9mm fibre cement board to AS/NZS 2908.2 with exposed surface suitable for decoration and tapered edges for smooth seamless jointing. Fixed to a concealed suspended ceiling framing system. Sheet thickness to suit ceiling frame spacings. Refer also to the Product & Materials Schedule.
- B. Finish: Taped and flush jointed to provide a seamless finish. Sand as necessary to achieve a level 4 finish in accordance with AS/NZS 2589 ready for painting by other trades.
- C. Paint finish as specified. Refer Section 05-600.

2.3 Types AT-02 & CE-03 Acoustic Panel Ceiling

- A. Manufacturer/reference: Heradesign Acoustic Ceilings. Superfine. 1200mm x 600mm x 25mm thick magnesite bonded wood wool acoustic panels fixed to a concealed frame. Refer also to the Product & Materials Schedule.

2.4 Type FC-03 Fibre Cement Soffit Lining

- A. 9mm Hardies Villaboard fibre cement sheeting to AS/NZS 2908.2 with exposed surface suitable for painting and with tapered edges for smooth seamless jointing. Fixed to concealed metal framing system. Frame to be suitably braced to prevent uplift. Refer also to the Product & Materials Schedule.
- B. Flush jointed. Provide expansion joints to the manufacturer's recommendations.
- C. Where expressed jointing is indicated on the Drawings or nominated in the schedules, install 9mm Hardies Versilux cladding with 10mm expressed joints. Panel/joint layout as indicated on the Drawings.
- D. Paint finish as nominated on the Drawings. Refer to Section 05-600.

2.5 Suspension System Generally

- A. Extent of system: Include hangers, fixings, main runners, cross members, primary channels, perimeter trims, splines, clips, bracing, bridging, etc, which are necessary to complete the ceiling installation.
- B. Top fixings: Suitable for structure.
- C. Hangers: Threaded rod adjustment. Friction clips shall not be used unless prior acceptance is obtained from the Superintendent.
- D. All exposed framing members shall be white powder coat finish.

2.6 Types CN-01 & CN-02 Perimeter Trims / Wall Junctions

- A. Ceiling to wall junctions shall be either:
 1. Type CN-01 Rondo P50 Shadowline stopping angle,
 2. Type CN-02 Square set & taped.
- B. As nominated on the Drawings or in the schedules.

2.7 Movement Joints

- A. Provide proprietary movement joints in flush plasterboard ceilings at intervals as recommended by the manufacturer. Agree joint locations with the Superintendent prior to commencement.

2.8 Plasterboard

- A. Gypsum core plasterboard manufactured by Boral, CSR or acceptable equivalent, to AS/NZS 2588. Standard grade classification, with exposed surface suitable for painting and with tapered edges for smooth seamless jointing. 13mm thick unless nominated otherwise.
 1. Gyprock EC08™ Partition suitable for internal walls and ceilings. GECA certified.
 2. Gyprock EC08 Aqua™ designed for lining walls of 'wet areas' in residential and commercial buildings comprising a moisture and humidity resistant core encased in a heavy-duty green linerboard. GECA certified.

2.9 Support Systems and Fixings

- A. Manufacturer/ reference: Rondo or acceptable equivalent.
- B. Mild steel suspension systems shall be hot dip galvanised to AS/NZS 4680 with cold rolled channels and sections.
- C. Aluminium framing members shall be fabricated using only appropriate grades, strengths and thicknesses to provide full structural compliance. The wall thickness of aluminium extrusions shall be sufficient to ensure rigidity in the lengths required in the final installation.
- D. Fixings and suspension system shall be fully concealed including all hangers, fixings, main runners, cross members, primary channels, perimeter trims, splines, clips, bracing, bridging, etc, which are necessary to complete the installation and achieve the performance specified.
- E. Corrosion resistant anchors, inserts, fasteners and other such devices shall be used in accordance with Section 08-400.
- F. Use only continuous profiles free from marks, defects, flaws, steps, waves or any other damage.

2.10 Type IN-05 Thermal/ Acoustic Ceiling Insulation

- A. Refer to Section 08-550 for insulation general requirements.
- B. Manufacturer/ reference: CSR Bradford or acceptable equivalent glasswool ceiling batts or building blanket. 80mm thick, density of 11kg/ m³ and with a material thermal resistance (R-value) of Rm 1.8m².K/ W. Refer also to the Product & Materials Schedule.
- C. Batts or blanket shall be laid directly over the ceiling framing in butt joints.

2.11 Types AP-01 & AP-02 Ceiling Access Panels

- A. Manufacturer/ reference: Rondo Panther or acceptable equivalent flush ceiling access panels with CP budget rim lock and concealed metal frame. Refer also to the Product & Materials Schedule.
- B. Where located in external soffits, airlock ceilings, bathroom and other wet area ceilings where high moisture levels is expected, the panel shall be constructed from moisture resistant MDF.
- C. Size: Generally 600mm x 600mm unless nominated otherwise on the Drawings.

3. EXECUTION

3.1 General

- A. Design and Installation shall be to AS/NZS 2785.

3.2 Suspension System

- A. Install the suspension system in accordance with the manufacturer's recommendations with appropriate fixings to the substrate soffit.
- B. Install within the fixing zones indicated on the Drawings.
- C. Take every precaution to ensure that no chemical or electrolytic action takes place where dissimilar metals and/ or materials are used together, and to isolate metal components from cementitious surfaces. Necessary insulation shall be provided wherever dissimilar metals come into contact.
- D. All inaccessible steel shall be hot dip galvanised.
- E. All alloys shall be similarly finished to match accepted samples.

3.3 Plasterboard Ceilings

- A. To AS/NZS 2589.
- B. Fix, joint and finish in accordance with the system manufacturer's instructions. Provide movement joints for the area of ceiling and coordinate with structural movement joints.
- C. Boards shall be screwed neatly and accurately without damaging surfaces. Any damaged board shall be replaced.
- D. Heads of screws shall be set below the surface of boards and filled to form a flush surface.
- E. Joints of boards applied in two or more layers shall be staggered ensuring that all edges and ends are fully supported and screwed to grid members.
- F. Unless specified to a higher standard, flush plasterboard ceilings shall achieve a level 4 finish in accordance with AS/NZS 2589.
- G. The following flush plasterboard ceilings shall achieve a level 5 finish in accordance with AS/NZS 2589.
 - 1. Ceilings nominated to receive semi gloss (or higher gloss level) paints.
 - 2. Ceilings where critical lighting conditions are likely.

- H. Suspension system shall be suitably robust and installed in accordance with the manufacturer's recommendations.
- I. Install within the zones indicated on the Drawings and incorporate a sliding head connection to the primary support structure.

3.4 Ceiling Penetrations

- A. Where partitions terminate at the suspended ceiling (ie the suspended ceiling is continuous above the partition), ceiling penetrations within 600mm of the partition shall be acoustically treated.

3.5 Movement Joints

- A. Provide movement joints where shown on the Drawings and at 12 metre maximum spacings unless recommended otherwise by the manufacturer.
- B. Provide movement joints as appropriate for the area of ceiling and/ or to coincide with movement joints in the surrounding structure.

3.6 Air Plenum Barrier

- A. Air plenum barriers shall comprise rigid or semi-rigid non-porous sheets with smooth non-dusting surfaces having the same fire spread rating as that required for membrane materials exposed within the void.
- B. Air plenum barriers shall be fixed securely at perimeters and joints, using methods recommended by the barrier manufacturer to ensure permanent stability. All edges and joints shall be effectively sealed to prevent air leakage.

3.7 Installation Tolerances

- A. Grid dimensions as shown on the Drawings shall be maintained ± 1 mm.
- B. Finished ceiling levels shall be as shown on the Drawings ± 2 mm in 1000mm length.
- C. Check all Site dimensions before commencement of installation.
- D. Accommodate all specified tolerances and differences between actual Site dimensions and dimensions shown on the Shop Drawings.
- E. Joints between panels shall be consistent, square and flush, being clamped together by the support system. Where gaskets are installed in joints, they shall not vary in width by more than 10% of the width of the gasket in place.
- F. Panel to panel lipping or plan offset shall not exceed 0.5mm and shall be non-cumulative across any ceiling.
- G. Grid creep across any ceiling shall not exceed 1.5mm in a 10m length.
- H. Install square, regular to line, level and plane within specified tolerances. Do not use cartridge or power activated methods for top fixing or rivets for bottom fixing of hangers.
- I. Obtain acceptance before drilling or cutting parts of the structure.

3.8 Setting Out and Protection

- A. Adequately protect from damage and dirt.
- B. Set out accurately, free from undulations and lipping, with all lines and joints straight and parallel to the planning grid.
- C. Fix securely with additional bracing and stiffening as necessary to provide a rigid system.
- D. Light fittings, grilles, fire and smoke barriers, etc, shall be in the correct positions relative to the ceiling grid, prior to commencing installation. Common setting out points shall be used.

3.9 Wire Hangers

- A. Ensure wire hangers are straight and installed vertically without bends or kinks. Do not allow hangers to press against any fittings or services within the void.
- B. Tie securely at top and bottom with tight bends to loops to prevent any vertical movement.
- C. Angle/ strap hangers: Do not rivet for top fixing.
- D. Spacings: 1200mm maximum centres not more than 150mm from spliced joints. The last hanger shall not be greater than 60mm from the adjacent work.
- E. Length of hangers to suit ceiling and bulkhead heights as indicated on the Drawings.
- F. Where obstructions prevent vertical installation either:
 1. Brace designed hangers against lateral movement.
 2. Hang ceiling system on an appropriate rigid sub-grid bridging across obstructions and supported to prevent lateral movement.

3. Hangers shall not penetrate mechanical ductwork or any other 'in ceiling' services. The installation of ceiling framing components shall be fully coordinated with all services.

- G. Extra hangers: Provide as required to carry additional loads and as required to avoid 'in ceiling' services and access panels.

3.10 Insulation

- A. Install insulation and secure into place as the work proceeds ensuring total and complete continuity in all situations such as between and over support structure and at wall to roof/ceiling and similar junctions. Leave no gaps in the insulation. Keep the insulation dry and do not compress.
- B. Lay out insulation in the widest practical widths to suit spacings of grid members, with closely butted joints.
- C. Insulation directly above ceilings to rooms shall cover the full extent of that room and extend past the perimeter walls of that room by at least 50mm to ensure complete insulation coverage.
- D. Do not cover electrical cables (unless they have been sized accordingly). Cut insulation carefully around electrical and other services and fittings, as required, so that the insulation has no affect on the safe and effective operation of that service or fitting.

3.11 Bracing

- A. Secure with additional bracing and stiffening as necessary to give a stable ceiling system resistant to design loads and pressures.

3.12 Handling and Storage

- A. Comply with the manufacturer's recommendations and AS/NZS 2785.

3.13 Remedial Works

- A. Repair all damage when directed by the Superintendent.
- B. All remedial works to surface finishes shall only be accepted if a perfect match is achieved. Failure to comply with this requirement will require replacement of the component.

3.14 Completion

- A. Maintenance manual: Submit manuals in accordance with the requirements of Section 01-100 detailing care and maintenance requirements for all ceiling types. The manuals shall include instructions for the demounting of ceilings as applicable.
- B. The following spares shall be provided to the Superintendent in appropriately labelled and sealed boxes:
1. General: Supply spare matching tiles, 2% of area used for each type and accessories of each type for future replacement purposes. Store the spare materials on Site where directed.
 2. Supporting system: One spare member (hanger or framework member) for every 100 members (or part thereof) of the same type installed in the ceiling.
 3. Tiles, panels, strips: One spare unit for every 50 units (or part thereof) installed in the ceiling.

SECTION 05-100 -- WALL FRAMING AND WALL LININGS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Test Requirements	1
2. PRODUCTS	1
2.1 Stud Partitions Generally	1
2.2 Metal Stud Partitions	2
2.3 Metal Furrings	2
2.4 Split Batten Hanging System	2
2.5 Type AT-02 Acoustic Wall Panelling	2
2.6 Plasterboard	2
2.7 Type FC-01 Fibre Cement Sheet	2
2.8 Type FC-02 Fibre Cement Wall Lining	3
2.9 Partition Access Panels	3
2.10 Furring Channels	3
2.11 Trims to Sheet Lined Walls	3
2.12 Type IN-03 Thermal Insulation - External Walls	4
2.13 Types IN-04 Thermal/Acoustic Insulation - Internal Walls	4
2.14 Wall Wrap/Wall Breather Membrane	4
2.15 Type SK-01 Aluminium Skirting	4
2.16 Timber Skirtings	4
2.17 Accessories	4
3. EXECUTION	5
3.1 Storage and Accuracy	5
3.2 Acoustic Insulation	5
3.3 Thermal Insulation	5
3.4 Preparation of Backgrounds	5
3.5 Fixing Requirements	5
3.6 Fixing Using Dabs	5
3.7 Installing Stud Partitions	6
3.8 Fixing Furrings	6
3.9 Movement Joints	6
3.10 Joints in Plasterboard	6
3.11 Taping and Finishing	7
3.12 Aluminium Skirtings	7
3.13 Sound Barriers	7
3.14 On-Site Dimensions	7
3.15 Installation Tolerances	7

SECTION 05-100 -- WALL FRAMING AND WALL LININGS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Metal and/ or timber stud partitions.
 2. Thermal/ acoustic wall insulation.
 3. Wall/ partition linings.
 4. Wall access panels.
 5. Skirtings.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. A 500mm x 500mm sample of all wall lining types. The sample shall clearly demonstrate typical edge details, fixing techniques to substrate and quality of finish.
 2. A 500mm length of all metal framing components.
 3. Wall access panels, grilles, etc.
 4. Appropriately sized samples of all insulation materials.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first completed of each type of partition in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Completed wall framing and installation of all in-wall services and insulation as applicable and prior to covering over.
 2. Set out of all movement joints.

1.6 Subcontractors

- A. Submit name and contact details of proposed manufacturers and Subcontractors.

1.7 Test Requirements

- A. Provide manufacturer's published and certified data to demonstrate all fire, structural and acoustic performance requirements as follows:
1. Weighted sound reduction index (Rw): To AS/NZS ISO 717.1.

2. PRODUCTS

2.1 Stud Partitions Generally

- A. Timber stud partitions shall comprise softwood studs with stud sizes and spacings designed to resist all applied loads and shall comply with the requirements of AS 1720.1 and AS 1684.
- B. Refer also to Sections 03-500 and 08-050.
- C. Metal stud partitions shall comprise lipped steel studs with stud sizes and spacings as nominated on the Drawings and detailed on the Wall Types drawings/ schedules and meeting the requirements of Rondo's Technical Manual.
- D. The minimum stud gauge shall be 0.75mm (BMT) for internal walls and 1.15mm (BMT) for external walls. Use thicker gauge studs where necessary to satisfy wall height and lining requirements as published by Rondo Building Services Pty. Ltd.
- E. Metal studwork shall be fabricated from hot dip zinc coated and iron zinc alloy coated sheet steel to AS 1397, fixed by zinc or cadmium plated self-drilling and self-tapping countersunk headed screws.
- F. Partition/ wall linings and insulation requirements shall be as nominated on the Drawings and detailed on the Wall Types drawings/ schedules.

- G. Partition/ wall heights shall be as nominated on the Drawings and detailed on the Wall Types drawings/ schedules.
- H. Plasterboard ceiling to wall junctions generally shall be either square set & taped, Rondo P50 shadowline stopping angle or selected preformed cornice as detailed or described on the Drawings or the schedules.
- I. Plasterboard and fibre cement sheet lined partitions/ walls shall be taped and flush jointed to provide a seamless finish. Sand as necessary to achieve a level 4 finish in accordance with AS/NZS 2589 ready for painting by other trades.
- J. Where partitions/ walls extend to the underside of the slab soffit, provide deflection heads of sufficient depth to absorb anticipated movements.
- K. Fire, smoke and acoustic walls shall be sealed at wall and floor junctions with appropriately rated sealants as applicable for the type and rating of the wall. Openings and penetrations through the wall shall also be appropriately sealed to maintain the fire, smoke or acoustic integrity of the wall as applicable.
- L. Additional supports shall be provided at service outlets, access hatches and other similar locations as required to provide adequate fixing points for the nominated wall linings.
- M. Provide boxed studs or similar stiffening/ strengthening techniques as recommended by the manufacturer at door openings, window openings and adjacent glazed partitions able to take anticipated dead and live loads.
- N. Provide additional studs and noggings within the stud frame as required to support wall mounted fittings and fixtures indicated on the Drawings. Where precise fixing points for wall mounted fittings and fixtures cannot be determined, provide a panel of 18mm thick plywood within the wall to allow for variable fixing locations.
- O. Skirtings : As scheduled or as nominated/detailed on the Drawings.

2.2 Metal Stud Partitions

- A. Metal stud framed internal walls/ partitions. Stud size as detailed. Stud depth, gauge and spacing shall satisfy the requirements published by Rondo Building Services Pty. Ltd. or equivalent.
- B. Where detailed, incorporate Rondo Quiet Stud (catalogue ref RQST) steel stud sections into the wall frame.
- C. For all stud partition details refer to the Wall Types drawings.
- D. Linings to one or both sides as nominated and detailed on the Wall Types drawing or as scheduled.
- E. Thermal/ acoustic insulation where nominated shall be friction fitted to ensure that it doesn't sag or drop during the life of the partition.
- F. Finish: Taped and flush jointed.
- G. Decoration: Paint finish. Refer Section 05-600.
- H. Skirtings: As scheduled or as detailed on the Drawings.

2.3 Metal Furrings

- A. 35mm deep top hat furring channels fixed to concrete or masonry substrates as applicable.
- B. Unless detailed otherwise include 12mm thick resilient mounts to provide acoustic separation.
- C. Linings: As nominated on the Wall Types drawing or as scheduled.

2.4 Split Batten Hanging System

- A. Specialist, feature wall cladding panels shall generally be concealed fixed to the solid wall substrate using a Signlink or acceptable equivalent proprietary aluminium split batten system.

2.5 Type AT-02 Acoustic Wall Panelling

- A. Manufacturer/reference: Heradesign Acoustic Ceilings. Superfine. 1200mm x 600mm x 25mm thick magnesite bonded wood wool acoustic panels fixed to a concealed framing system. Refer also to the Product & Materials Schedule.

2.6 Plasterboard

- A. Gypsum core plasterboard manufactured by Boral, CSR or acceptable equivalent to AS/NZS 2588 with exposed surface suitable for painting and with tapered edges for smooth seamless jointing. 13mm thick unless nominated otherwise.
 1. PB-01 = USG Boral or acceptable equivalent Regular standard core plasterboard. 13mm.
 2. PB-02 = USG Boral or acceptable equivalent Multistop 4Hi plasterboard. 13mm.
 3. PB-03 = USG Boral or acceptable equivalent Firestop plasterboard. 16mm.

2.7 Type FC-01 Fibre Cement Sheet

- A. Hardies Villaboard fibre cement sheeting to AS/NZS 2908.2 with exposed surface suitable for painting and with tapered edges for smooth seamless jointing. 9mm thick unless nominated otherwise. Refer to the Product & Materials Schedule.
- B. Flush jointing. Provide expansion joints to the manufacturer's recommendations.
- C. Where expressed jointing is indicated on the Drawings or nominated in the schedules, install 9mm Hardies Versilux cladding with 10mm expressed joints. Panel/joint layout as indicated on the Drawings.
- D. Paint finish. Refer to Section 05-600.

2.8 Type FC-02 Fibre Cement Wall Lining

- A. 9mm Hardies Versilux cladding with 10mm expressed joints. Panel/joint layout as indicated on the Drawings. System to include James Hardie's Exo Tec componentry of JH Top Hat and JH Intermediate Top Hat sub framing and JH Backing Strips (to horizontal joints) and JH Gasket Snap Strips (to vertical joints) as applicable. Refer to the Product & Materials Schedule for further details.
- B. Paint finish. Refer to Section 05-600.

2.9 Partition Access Panels

- A. Manufacturer/ reference: Rondo Panther or acceptable equivalent flush ceiling access panels with CP budget rim lock and concealed metal frame.
- B. Where access panels are installed in walls with acoustic insulation, the access panel shall have an acoustic value equivalent to the wall system.
- C. Access panels and cover plates to services shall not be placed 'back to back'.

2.10 Furring Channels

- A. Furring channels system comprising cold formed steel to AS 1397 and galvanised with a zinc coating class Z275.
 - 1. Rondo or acceptable equivalent 28mm deep furring channel. Part reference 129.
- B. Where fixed off masonry or concrete walls, provide 12mm thick resilient mounts to provide acoustic separation.

2.11 Trims to Sheet Lined Walls

- A. Square external corners:
 - 1. External corners shall be provided with galvanised metal (stainless steel in areas where high moisture levels are likely) external corner beads fixed to the face of the linings. Blend finishing coats into the sheets. Where installed under waterproof membranes to tiled walls, epoxy adhesive fix to wall linings.
 - 2. Proprietary Item: Rondo P32 Plasterlock corner bead or acceptable equivalent.
- B. Free ends:
 - 1. Stopping bead: Where sheets are required to finish up to a free edge, the edge shall be formed against a galvanised stopping bead adhesive fixed to face of sheet. Blend finishing coat into sheet.
 - 2. Proprietary item:
 - a) Proprietary item: Rondo P12 (10mm sheet).
 - b) Proprietary item: Rondo P13 (13mm sheet).
 - c) Proprietary item: Rondo P14 (16mm sheet).
- C. Internal angles:
 - 1. Internal stud wall corner: Internal wall angles shall be stopped up flush and smooth. Reinforce at the front with a galvanised internal corner bead adhesive fixed to face of sheets.
 - 2. Proprietary Item: Rondo PS17 Internal Corner Bead.
- D. Wall to Ceiling Junctions:
 - 1. Square set and taped, or
 - 2. Rondo P50 Shadowline Stopping Beads, or
 - 3. Selected preformed cornice as detailed/scheduled. Refer also to Section 05-050.
- E. Shadow line trim:
 - 1. Shadow line stopping bead: Where sheets are required to finish up to a shadow line, the edge of the sheet shall be formed against a galvanised shadow line stopping bead adhesive fixed to face of sheet. Blend finishing coat into sheet.
 - 2. Proprietary item: Rondo P50 Shadowline Stopping Angle as detailed on the Drawings.

3. Shadowlines shall only be provided where nominated on the Drawings.

F. Movement (control) joints:

1. Proprietary system: Provide the manufacturer's recommended movement joints in runs of plasterboard and fibre cement board lined partitions. Locations shall be accepted by the Superintendent, but they must not be greater apart in distance than that recommended by the manufacturer.
2. Type: Rondo P35 Control Joint comprising galvanised steel setting beads and PVC rubber flexible joint. Blend finishing coat into sheet.

2.12 Type IN-03 Thermal Insulation - External Walls

- A. Refer to Section 08-550 for insulation general requirements.
- B. Manufacturer/ reference: CSR Bradford or acceptable equivalent. 90mm thick Gold Wall Batts glasswool insulation with material thermal resistance (R-value) of Rm 2.5m².K/ W and density of 22kg/ m³. Refer also to the Product & Materials Schedule.
- C. External walls shall include a wall wrap membrane as specified below and as recommended by the manufacturer fixed to the outer face of the stud frame.

2.13 Types IN-04 Thermal/Acoustic Insulation - Internal Walls

- A. Refer to Section 08-550 for insulation general requirements.
- B. Manufacturer/ reference: CSR Bradford or acceptable equivalent Partition Wall Batts. 165mm thick, 11kg/m³ density and with a material thermal resistance (R-value) of Rm 3.5m².K/ W. Refer also to the Product & Materials Schedule.
- C. Batts to be friction fitted between studs ensuring no gaps and no possibility of sagging over time.

2.14 Wall Wrap/Wall Breather Membrane

- A. A light weight radiant barrier shall be fixed to the outer face of the external wall framing prior to installing the nominated external cladding (refer relevant sections within this ~\$specification\$~).
- B. Manufacturer/ reference: CSR Bradford or acceptable equivalent Enviroseal™ ProctorWrap™ Commercial Wall (CW) vapour permeable wall wrap.

2.15 Type SK-01 Aluminium Skirting

- A. 100mm high x 1.6mm thick flat aluminium skirting. Adhesive fixed.
- B. Finish: Selected powder coat or anodised finish. Refer to the Product & Materials Schedule.
- C. Joints: Internal angles: Scribed.
- D. External angles: Grooved on the back and folded.
- E. Running joints: Butted.

2.16 Timber Skirtings

- A. Refer to Section 06-150.

2.17 Accessories

- A. Beads, Joints and Angles:
 1. All metal beads, edges, angles and trims shall be obtained from Rondo Building Services, or acceptable equivalent.
 2. Beads/ angles: Galvanised mild steel (stainless steel in wet areas) edge beads to suit the plasterboard thickness shall form a positive perimeter edge.
 3. Jointing tape: Minimum 53mm wide.
 4. External wall corners shall receive Rondo P32, or acceptable equivalent, Plaster-Lock Corner Beads. High traffic areas shall receive Rondo P55 heavy duty Plaster-Lock Corner Beads.
 5. Internal wall corners shall receive Rondo PS17, or acceptable equivalent, Internal Corner Beads.
 6. Wall to ceiling junctions that are detailed as 'square' shall be square set and taped.
 7. Wall to ceiling junctions that are not detailed as 'square' shall receive Rondo P50, or acceptable equivalent, Shadowline Stopping Beads.
 8. Rondo 552, 553 or 554 steel angles shall be provided as required for support backing at internal wall corners prior to fixing of wall linings.
 9. Control joints, where required, shall be Rondo P35 Control Joints.
 10. Acoustic sealant shall be applied, as appropriate, at all junctions with walls, floors, ceilings and around openings. It shall be applied as a continuous bead leaving no gaps.

11. Air pressure sealant shall be applied, as required, to perimeter junctions of walls, floors and ceilings as well as to gaps around openings, around service penetrations and other potential leakage points. Apply as a continuous seal. Particular care shall be given to habitable rooms in order to prevent excessive leakage.
12. In wet areas and any other area where high moisture levels are anticipated, trims and beads shall be stainless steel. Sealants and jointing/ stopping compounds shall be specially formulated to suit the application.

3. EXECUTION

3.1 Storage and Accuracy

- A. Walls, partitions and linings shall be installed using continuous profiles, being free from marks, defects, flaws, steps, waves, or damage of any nature.
- B. Store all materials on Site in accordance with the manufacturer's written recommendations.
- C. Verify dimensions and levels of the structure before installation commences.
- D. Obtain permission from the Superintendent before drilling or cutting parts of the structure, other than where shown on the Drawings.
- E. Walls, partitions and linings shall be square, regular to line, level and plane at all junctions fitting to the stated tolerances.

3.2 Acoustic Insulation

- A. Acoustic insulation shall be batt or blanket with thickness and density as specified or as nominated in the Acoustic Report, whichever is greater in thickness and overall R/ Rw-value.
- B. Acoustic insulation shall be accurately trimmed to fit between studs. Staple insulation to wall top and bottom plates as well as to intermediate noggings to ensure that there is no sagging of the insulation material over time.
- C. There are to be no gaps in the acoustic insulation that will compromise the effectiveness of the system.

3.3 Thermal Insulation

- A. All external walls shall be provided with thermal insulation fitted between stud framing to prevent sagging. The insulation shall continue above the ceiling line and extend to the underside of the concrete slab soffit to fully enclose the building perimeter.
- B. Insulation to the building envelope shall be continuous. Take special care at wall to roof, wall to floor and similar junctions to ensure that insulation abuts and/or overlaps. Ensure there are no gaps in the insulation. Keep the insulation dry and do not compress.
- C. Insulation shall be installed within the stud framing and shall not come in contact with the external facade panels, external glazing or glazing frames.

3.4 Preparation of Backgrounds

- A. Remove all loose material by thoroughly brushing the structure to be lined.
- B. Noggings, bearers, etc, required to provide fixing points for heads of partitions running parallel with, but offset from, main structural supports, or to support fixtures, fittings and services, shall be accurately positioned and securely fixed. After fixing boards, the positions of noggings and bearers shall be marked for following trades. Obtain 'sign off' of correctly located fixing points from all other trades prior to sheeting of walls.
- C. Carry out all works in accordance with the materials and workmanship recommendations of the manufacturer.

3.5 Fixing Requirements

- A. Fixing, jointing and finishing, where not specified otherwise, shall be as recommended by the manufacturer.
- B. Linings shall be fixed only in areas that have been made weathertight.
- C. Boards shall be cut neatly and accurately without damage to core or tearing of paper facing. Keep cut edges to a minimum and position at internal angles wherever possible, with masked bound edges of adjacent boards at external corners.
- D. Fix boards securely and firmly to suitably prepared and levelled backgrounds, with heads of fastenings set in a depression, without breaking the paper or the gypsum core. Finishes shall appear flush, smooth and flat with surfaces free from bowing and abrupt changes of level. Damaged boards shall not be used.

3.6 Fixing Using Dabs

- A. Apply plaster dabs in accordance with the board manufacturer's written recommendations, using an appropriate adhesive recommended by the manufacturer.

- B. Apply continuous seal to all perimeters of walls in accordance with the board manufacturer's written recommendations.

3.7 Installing Stud Partitions

- A. Comply with the requirements of AS/NZS 2589.
- B. Fix metal stud partitions in accordance with the manufacturer's recommendations.
- C. Position studs at equal centres, maintaining sequence across openings. Provide additional studs, as necessary, to support all vertical edges of boards.
- D. Where more than one layer of plasterboard is applied, joints between layers shall be staggered.
- E. Fix plasterboard to each stud and along all edges with proprietary screws at appropriate centres, not less than 10mm from the edge of the board. Heads shall be set in a depression, without breaking the paper or the gypsum core.
- F. Where indicated on the Drawings, as required for fire or acoustic purposes, or where required for the integrity of the installation, partitions shall be extended to the underside of the structure over. Coordinate the location and reticulation of services as necessary. Trim sheeting around penetrations and seal as necessary to maintain the fire and/ or acoustic performance of the system.
- G. Where stud framed walls and partitions extend up to the underside of the slab soffit, provide deflection heads with sufficient depth to meet the expected structural movements as nominated by the Structural Engineer.
- H. Where equipment or handrails are to be fixed to partitions, install continuous galvanised mild steel plate, or similar approved, to the inside of the plasterboard lining to provide a secure fixing point.
- I. Carefully locate noggings and other 'in-wall' support as necessary to provide adequate fixing for all wall mounted fittings, fixtures and equipment. Ensure that the 'in-wall' support is of sufficient strength to accept the anticipated dead and live loads of the particular fittings, fixtures and equipment items.
- J. All openings shall be framed out on all sides with metal studding and be cross-braced to the metal stud uprights on two opposite sides where possible.
- K. Wet Areas including bathrooms, en suites and all areas where moisture resistant plasterboard is installed shall meet the requirements of AS 3740.
- L. Where partitions terminate at the suspended ceiling (ie the suspended ceiling is continuous above the partition), the head of the partition shall be screw fixed through the ceiling lining and into a blocking member above the ceiling. Provide compressible foam strips as detailed at the partition to wall junction to prevent sound leakage.

3.8 Fixing Furrings

- A. Furring channels shall be fixed running horizontally for vertically fixed sheet linings. They shall be placed at 600mm maximum centres. Pack using metal spacers to provide plumb and straight fixing background.

3.9 Movement Joints

- A. Provide movement joints as necessary and/ or as shown on the Drawings.
- B. Install movement joints in accordance with the manufacturer's written recommendations.

3.10 Joints in Plasterboard

- A. Lightly butt joints between tapered edges of boards, leaving a 3mm gap where cut unbound edges occur.
- B. Where plasterboard edges abut dissimilar materials and at points of stress, install appropriate edge beads as recommended by the manufacturer.
- C. Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.
- D. Butt joints: Make joints over framing members or otherwise provide back blocking.
- E. All joints shall be taped and veneer skimmed in accordance with the manufacturer's written recommendations.
 1. Walls scheduled to receive gloss or semi gloss paint finishes or walls where critical lighting conditions occur on low sheen paint finishes shall achieve a level 5 finish in accordance with AS/NZS 2589. The surface shall be ready for painting by other trades.
 2. All other wall surfaces shall achieve a level 4 finish in accordance with AS/NZS 2589 and shall be ready for painting by other trades.
- F. External corner joints: Make joints over metallic-coated steel corner beads.

- G. Dry joints: Provide square edged sheet and finish with a UPVC joining section.
- H. Control joints:
 - 1. Provide control joints in long runs of partitions and linings as recommended by the manufacturer in order to relieve stress. All control joint locations shall be agreed with the Superintendent prior to installation.
 - 2. Install purpose made metallic coated control joint beads at not more than 12m centres in walls and ceilings. They shall coincide with structural movement joints.
 - 3. Control joints shall not be provided in wet areas without prior acceptance from the Superintendent.
- I. Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

3.11 Taping and Finishing

- A. Cut edges of boards shall be lightly sanded to remove paper burrs. Apply a PVA sealer to exposed cut edges and any other plaster surface to which tape is applied.
- B. Fill joints and gaps, cover with continuous lengths of tape and fully bed. Where joints are to be covered with finish, feather out to provide a smooth seamless surface.
- C. All external angles shall be protected by the use of drywall angle beads with plasterboard edge beads at all visible jointed abutments. Joint finish shall be applied to all external angles. When jointing is complete and dry, apply drywall primer to the complete surface ready to receive decoration.
- D. All beads shall be flush with the board.
- E. Nail and screw depressions shall be filled with joint filler to provide a flush and smooth surface.
- F. On completion of joint, angle and spotting treatments a surface finish shall be applied to provide a continuous, consistent finish to the surface of boards.
- G. Flush plasterboard walls shall achieve a level 4 finish in accordance with AS/NZS 2589.

3.12 Aluminium Skirtings

- A. General: Adhesive fix aluminium skirtings to the base of the walls where indicated, using a suitable contact adhesive. Immediately remove any excess adhesive on the face of the skirtings, wall face or floor finish.

3.13 Sound Barriers

- A. Align accurately with partition heads and fix tightly at all perimeters and joints in accordance with the manufacturer's recommendations. Include steel support sections to ensure permanent stability and continuity with no gaps.
- B. Seal any gaps at junctions of sound barriers with partition head, suspended ceiling, structural soffit, walls, ducts, pipes, etc, using mineral wool or suitable sealant.

3.14 On-Site Dimensions

- A. All dimensions shall be checked on Site prior to commencement of the installation. Any discrepancies between dimensions provided on the Drawings and actual conditions on Site shall be brought to the attention of the Superintendent. Obtain direction prior to proceeding.
- B. The works shall accommodate any given tolerance as well as differences between actual Site dimensions and dimensions shown on the Shop Drawings.

3.15 Installation Tolerances

- A. Maintain the planning grid and distribute tolerances equally to achieve the following:
 - 1. Straight lines and flat planes in all directions.
 - 2. A final finished surface position within 5mm of its notional position when measured in accordance with AS/NZS 2588.
- B. All dimensions shall be checked on Site prior to commencement of installation.
- C. The installation shall accommodate all required tolerances including differences between actual Site dimensions and dimensions shown on the Drawings.
- D. Take account of the installation tolerance requirements such that repetitive units are accurately located, relative to gridlines.
- E. Erect in alignment and in relation to established lines and grades as shown on the Drawings.
- F. The maximum variation in height of any part from the given datum shall be 2mm.
- G. The maximum offset in plane, level or section between any two adjacent sections shall be 1mm.
- H. The maximum variation in plan over a distance of 1800mm shall not exceed 2mm.

SECTION 05-150 -- WASHROOM CUBICLE PARTITIONS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Shop Drawings	1
1.8 Warranties	1
1.9 Test Requirements	1
2. PRODUCTS	1
2.1 Type PS-01 Washroom Partition System	1
2.2 Cubicle Doors	2
2.3 Compact Grade Laminate	2
2.4 Fixings	2
2.5 Fabrication Tolerances	2
3. EXECUTION	2
3.1 Workmanship	2
3.2 Inspection	2
3.3 Installation	2
3.4 Adjustment and Cleaning	3
3.5 Completion	3

SECTION 05-150 -- WASHROOM CUBICLE PARTITIONS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
 - 1. Washroom cubicles.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
 - 1. 300mm x 300mm sample of each system type in specified colour and finish, including edgings and trims.
 - 2. One of each type of hardware.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
 - 1. The first washroom cubicle partition of each type installed in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
 - 1. Completed wall and floor finishes immediately prior to installation of washroom cubicle partition systems.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.7 Shop Drawings

- A. Submit Shop Drawings showing details of all washroom cubicle partitions and components including dimension set out and details of finishes.

1.8 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
 - 1. Washroom cubicle partitioning and associated hardware: 10 years.

1.9 Test Requirements

- A. Include for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.

2. PRODUCTS

2.1 Type PS-01 Washroom Partition System

- A. Manufacturer/ reference: Flush Partitions Australia or acceptable equivalent floor mounted and overhead braced washroom cubicle systems as nominated in the Fittings & Fixtures Schedule.
- B. Door hardware shall be standard hat/ coat hook, turn bolt and indicator, escape staple and bumper in satin chrome finish.
- C. Hinges shall be safety lift off gravity hinges, clear anodised set in open position.
- D. Cubicles shall be nominally 900mm wide x 1500mm deep unless nominated otherwise on the Drawings. Side divisions and doors shall be 1650mm high and mounted 200mm clear of the floor. Frontal height shall be 2050mm overall.
- E. Colour: As scheduled.
- F. Shower Partitions shall include the following:
 - 1. Seat nibs shall be 300mm wide x 1650mm high x 13mm thick. 900mm clearance shall be provided between the seat nib and the frontal nib to create a dry change area with seat.
 - 2. Cubicles shall be nominally 900mm wide x 1800mm deep unless nominated otherwise on the Drawings.

3. Seats shall be 900mm long x 200-300mm tapered depth x 18mm thick Athlon (phenolic resin). Fix to front and seat nibs and side divisions with stainless steel angle brackets and bolts.

2.2 Cubicle Doors

- A. Doors and all hardware shall be part of and compatible with the specified cubicle system.

2.3 Compact Grade Laminate

- A. Compact grade laminate to AS/NZS 2924.1.
- B. Machine cut to sizes as shown on the Drawings.
- C. Exposed edges shall have edges chamfered/ bevelled and polished to avoid sharp edges as indicated on the Drawings.
- D. Compact laminate shall be of a solid colour type (throughout) so that solid colour laminate is always visible at edges. ie no black edges will be acceptable.
- E. Concealed panel edges shall be square edged with clean cut edge.
- F. Panels shall provide Class 0 spread of flame when tested in accordance with AS 1530.
- G. Seal panel edges where exposed in wet areas.

2.4 Fixings

- A. As section 08-400.
- B. Fixings shall be concealed unless specified otherwise.

2.5 Fabrication Tolerances

- A. Take exact Site dimensions as necessary before starting fabrication.
- B. Permissible deviations for panel manufacture:
 1. Length: 1mm.
 2. Width: 1mm.
 3. Squareness: 5mm, taking the longer of two sides at any corner as a baseline, the deviation of the shorter side from perpendicular.
 4. Flatness: 1.5mm under a 1000mm straight edge.
- C. Holes/ cut-outs in rigid sheet boards to:
 1. Form 90° internal corners.
 2. Form holes for fastenings oversize.

3. EXECUTION

3.1 Workmanship

- A. Manufacture as much as possible in shop with machinery to eliminate as much hand tooling as possible. Shop manufacture shall allow for adjustments at Site for proper levelling, anchoring and joining.
- B. Accurately cut and form materials to the required shape, to be accurate in size and profile with all exposed surfaces free from irregularities and defects.
- C. Install noggings, bearers, fixing plates, support beams, etc, as necessary to provide adequate wall, floor and/ or ceiling fixing points for the toilet partition systems specified.
- D. Do not cut, plane, drill, or sand pre-finished panels unless otherwise indicated on the Drawings.
- E. Adequately protect adhesive joints during the curing process to avoid contamination by dust and other debris.
- F. Make allowance for future moisture and temperature movement of panels.
- G. Store linings and panels on Site for at least two days before fixing, in conditions similar to those that will prevail after the building has been occupied. Maintain free circulation of air to all surfaces at all times.
- H. Work shall be carried out in accordance with the manufacturer's recommendations.
- I. Verify dimensions and levels of the structure prior to manufacture of components.
- J. Factory finished boards shall be consistent in colour and texture and visible patterning shall be coordinated on multiple panel installations.

3.2 Inspection

- A. Dimensions and levels of the structure shall be checked before installation commences.

3.3 Installation

- A. Do not install the panelling before the surrounding areas are made watertight, wet trades have finished their work, wall and floor tiling is complete and the surrounding area has dried out.
- B. Partitions shall be installed rigid, straight, plumb and level and in accordance with the manufacturer's instructions.
- C. Conform to the manufacturer's written recommendations for backing and proper support.
- D. Maintain uniform clearance at vertical edges of doors.
- E. Install panels and doors with floor and ceiling clearances as indicated on the Drawings.
- F. Install the panelling securely using adequate, concealed fixing components, without causing stress or distortion to panels and doors. Unless specified otherwise, all fixings shall be concealed.
- G. Set out works accurately, true to line and level, free from undulations, with lines and joints aligned, straight and parallel unless specified otherwise.
- H. Partitions shall be fixed securely.
- I. Methods of fixing and fastenings shall be as recommended in writing by the manufacturer.
- J. Trims shall be in unjointed lengths between angles or ends of runs. Where running joints are unavoidable, acceptance of location and method of jointing mitre angle joints shall be obtained from the Superintendent, unless specified otherwise.
- K. Floor mounted frontals:
 - 1. Fix to the floor with proprietary fittings and fix at the top to a metal channel headrail, supplied as part of the system, running continuously across the fronts and fixed to the walls at each end. Form the channel into a box section over doorways by snapping in a mating channel insert.

3.4 Adjustment and Cleaning

- A. Adjust hardware for proper operation after installation.
- B. Exposed surfaces of partitions, hardware and fittings shall be cleaned after installation.

3.5 Completion

- A. Maintenance manual: On completion submit a maintenance manual including recommendations for the care and maintenance of the partitions, and instructions for demounting and relocation where applicable, for the reinstatement of acoustic properties after relocation and for the attachment of fixtures. Include a list of manufacturers and suppliers of the various partition system components.

SECTION 05-300 -- SCREEDS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
2. PRODUCTS	1
2.1 Types SCR-01 & SCR-02 Proprietary Bonded Screed	1
2.2 Self-levelling Polymer Screed	1
2.3 Proprietary Products	2
2.4 Admixtures	2
2.5 Joint Requirements	2
2.6 Entrance Matwell	2
3. EXECUTION	2
3.1 Workmanship	2
3.2 Suitability of Bases for Screeds	2
3.3 Screed Preparation and Installation	2
3.4 Proprietary Screed Preparation and Installation	2
3.5 Batching Requirements	2
3.6 Mixing Requirements	3
3.7 Weather Requirements	3
3.8 Levels of Floor Screeds	3
3.9 Flatness of Floor Screeds	3
3.10 Joint Requirements	3
3.11 Timing	3
3.12 Trowelled Finish to Receive Applied Floor Finishes	3
3.13 Smooth Floated Finish	4
3.14 Curing Requirements	4

SECTION 05-300 -- SCREEDS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Proprietary polymer/concrete screeds.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. A 300mm length sample of all movement joints and edge restraints.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first of each type of screed in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Substrate/ setdown prior to pouring screed.
 2. Drainage outlets and any other services in place prior to pouring screed.
 3. Finished screed prior to installation of waterproof membrane, as applicable, and surface finishes by other trades.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

2. PRODUCTS

2.1 Types SCR-01 & SCR-02 Proprietary Bonded Screed

- A. To slab setdowns designed to receive a bonded screed, apply the following proprietary screed unless nominated otherwise in the Product & Materials Schedule:
1. Manufacturer/ reference: Ardex or acceptable equivalent K005 Bulk Fill Levelling Compound.
 2. A high strength, rapid setting and shrinkage compensated cement based screed able to be applied in thicknesses ranging from 10mm to 100mm.
 3. The concrete substrate shall be primed with Ardex 51 Primer prior to laying the screed.
 4. The screed shall be laid to falls as indicated on the Drawings.
 5. Surface preparation, mix proportions and application as recommended by the manufacturer.
 6. Trowel the surface to a level of finish suitable for the nominated applied floor finish as noted on the Drawings or as scheduled and as follows:
 - a) SCR-01 shall receive Polysoft floor finish (type SC-02). Refer Section 05-500.
 - b) SCR-02 shall receive nominated floor tiles. Refer Section 05-400.
- B. The substrate shall be fully cured and dry with a maximum moisture content of 5.5% or 70% humidity.

2.2 Self-levelling Polymer Screed

- A. Where the structural slab does not achieve the specified tolerances for flatness and level for the nominated floor finish, the slab shall be rectified using a proprietary self-levelling polymer screed equal to:
1. Manufacturer/ reference: Ardex or acceptable equivalent K15 Rapid Drying Levelling and Smoothing Compound.
 2. A self levelling high strength cement based underlayment designed for levelling floors. The system can be feather-edged and can also be applied in multiple layers with each layer being no more than 25mm thick.
 3. With mix proportions as recommended by the manufacturer.
 4. Laid as recommended by the manufacturer.

5. Use to repair concrete floors as necessary to achieve specified flatness and finish prior to laying carpet, sheet vinyl or other floor finishes.
6. Concrete substrate shall be primed with Ardex 51 Primer prior to application of the Ardex K15.
7. Ensure that the system and its installation is compatible with the nominated floor finishes.

- B. The substrate shall be fully cured and dry with a maximum moisture content of 5.5% or 70% humidity.

2.3 Proprietary Products

- A. Where any screed/ topping is described as "proprietary", all materials, mix, proportions, mixing methods, minimum/ maximum thicknesses and workmanship shall be in accordance with the recommendations of the manufacturer even though that manufacturer may not supply all the required materials.

2.4 Admixtures

- A. Admixture water reducing shall be to the manufacturer's written recommendations.

2.5 Joint Requirements

- A. Manufacturer/ reference: Latham or acceptable equivalent.
- B. Provide structural movement joints to accommodate the following:
 1. Primary movement joints: Aluminium extrusions as recommended in writing by the manufacturer.
 2. Movement control joints. Types and spacings as recommended by the manufacturer. Locations to be agreed with the Superintendent.
 3. Perimeter movement shall be allowed for at the edges of screeds against solid walls. A 6mm closed cell compressible polyethylene strip shall be installed to suit the screed depth with a two-part polysulphide sealant.

2.6 Entrance Matwell

- A. Where a setdown has been detailed at the building entrance or within the entry airlock for a recessed entrance mat, build up the setdown depth so that the entrance mat finishes flush with the adjacent floor finish. Provide metal edgings to the perimeter of the matwell and a drainage outlet within the matwell.

3. EXECUTION

3.1 Workmanship

- A. The screed shall not be altered to accommodate other trades unless such work is clearly specified on the Drawings.

3.2 Suitability of Bases for Screeds

- A. Bases shall be deep enough to achieve the required levels and falls, as applicable, of the finished screed surface and take into consideration, the permissible minimum and maximum thicknesses of the screed.
- B. Bases shall be clean and free from contamination, eg plaster, dirt, dust and oil.

3.3 Screed Preparation and Installation

- A. Mix screeds in a force action mixer.
- B. Cure screeds using polythene sheeting or as specified by the manufacturer. Areas likely to be subject to excessive wear before the floor covering is laid, shall be suitably protected.
- C. Take account of high relative humidity levels that may be encountered on Site and adjust the curing procedures adopted accordingly.
- D. After laying screeds, the building shall not be artificially heated during the first four to six weeks, and the flooring shall not be subjected to sudden increases in temperature.

3.4 Proprietary Screed Preparation and Installation

- A. The preparation and installation of proprietary screeds shall be in strict accordance with the manufacturer's printed instructions. Any deviations from these instructions shall be approved by the manufacturer prior to works commencing.
- B. Screeds shall be laid by specialists who are trained and approved licensees of the manufacturer.

3.5 Batching Requirements

- A. Ensure that proportions of mixes made with dense aggregates are specified by weight and are batched by weight. Volume batching shall only be permitted on the basis of the previously established weight:volume relationship(s) of the particular materials, using accurate gauge boxes.

3.6 Mixing Requirements

- A. Admixtures used shall not contain calcium chloride.
- B. Water content of mixes shall be the minimum necessary to achieve full compaction and low enough to prevent excessive water being brought to the surface during compaction.
- C. Mix materials thoroughly to a uniform consistency. Mixes other than non-fines shall be mixed in a suitable forced action mechanical mixer. A free fall type (drum) mixer shall not be used.
- D. Use material while sufficiently plastic for full compaction.

3.7 Weather Requirements

- A. Do not lay screeds unless their surface temperature is maintained above 5°C for not less than four days thereafter.
- B. In hot weather reduce the time between operations with water retaining admixtures added to ensure that premature drying does not take place.

3.8 Levels of Floor Screeds

- A. The permissible deviation in level of surface of screeds (allowing for thickness of coverings) and toppings from datum to be 5mm.

3.9 Flatness of Floor Screeds

- A. No sudden irregularities shall occur. When measured with a slip gauge the variation in gap under a straightedge placed anywhere on the surface shall be not more than the following:
 - 1. Screeds to receive resilient finishes, adhesive fixed carpet, timber flooring or liquid applied sealer: 3mm under a 3m straightedge.
 - 2. Screeds to receive floor tiles bedded in adhesive:
 - a) 5mm under a 3m straightedge.
 - b) 2mm under a 1m straightedge.

3.10 Joint Requirements

- A. Screeds shall be cast continuously, as far as possible without defined joints, using "wet screeds" between strips or bays. The positions of bay joints shall be confirmed and coordinated as follows:
 - 1. Where the location of bay joints are not shown on the Shop Drawings, obtain acceptance from the Superintendent before starting work.
 - 2. Forms, where applicable, shall be square edged with surfaces securely fixed. Wet material shall be compacted thoroughly at edges to give level, closely abutted joints with no lipping.
 - 3. Alternatively, screeds shall be cast continuously, bay joints being formed with proprietary dividing strips.
- B. The structural movement joint covers shall be fixed in accordance with the manufacturer's written recommendations and installation guidelines. Also:
 - 1. Be responsible for the installation and performance of all floor interfaces and seek confirmation of movement and loading requirements.
 - 2. Structural movement joints shall be situated immediately over or cantilevered in relation to the structural joints in the slab.
 - 3. Joints shall be installed in lengths of 4m with the minimum length at the end of runs being at least 1m. At joins, joint covers shall be either invisibly spliced or joint sections staggered such that the joint is continuously linked.
 - 4. The horizontal width of the movement joint shall be set at the time of installation, taking account of thermal expansion at the time of installation.
 - 5. Movement joint covers shall be fixed to the base (and upstands) by means of expanding bolt anchors at centres recommended by the movement joint manufacturer. All anchor bolts shall be zinc plated.
 - 6. Movement joint covers shall be fixed such that the upper surface of the joint finishes flush with the top of adjacent floor finishes.

3.11 Timing

- A. All finishing operations shall be carried out at optimum times in relation to the setting and hardening of the material. Surfaces shall not be wetted to assist surface working. Cement shall not be sprinkled on to surface.

3.12 Trowelled Finish to Receive Applied Floor Finishes

- A. Screed shall be floated to an even surface with no ridges or steps.

- B. Screed shall be hand or power trowelled to give a uniform smooth appearance, but not a polished surface. It shall be free from trowel marks and other blemishes and be suitable to receive the specified flooring material as per the Specification.
- C. Adequately protect the surface from construction traffic.
- D. If the surface of the screed is not suitable to receive the specified flooring material, make good by application of a smoothing compound.
- E. Where screeds are applied to build up the base so that junctions of floor finish are flush, the screed shall be feathered out from the junction to an appropriate distance, as agreed with the Superintendent, to ensure a gradual change in level.

3.13 Smooth Floated Finish

- A. Use a hand float, skip float or power float to give an even surface with no ridges or steps.

3.14 Curing Requirements

- A. Immediately after laying, protect the screed surface from wind, draughts and strong sunlight.
- B. As soon as the screed/ topping has set, cover with polythene sheeting and protection board as necessary until installation of nominated floor coverings.
- C. After laying screeds, do not subject the flooring to sudden increases in temperature, particularly for the first four to six weeks.

SECTION 05-400 -- TILING	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Subcontractors	1
1.6 Witness Points	1
1.7 Warranties	1
1.8 Testing Generally	1
1.9 Impact Testing	1
1.10 Slip Resistance and Slip Resistance Testing	1
2. PRODUCTS	2
2.1 Tiles Generally	2
2.2 Type TL-01 Floor Tiles	2
2.3 Types TL-02 to TL-06 Wall Tiles and Tiled Splashbacks	2
2.4 Type TL-07 Skirting Tile	2
2.5 Type TI-01 Tactile Indicators	2
2.6 Tiling Ancillaries	2
2.7 Tile Grout	3
2.8 Metal Edgings	3
2.9 Sealant Movement Joints	3
2.10 Perimeter Sealant	3
2.11 Expansion Joints	3
2.12 Adhesive	3
2.13 Waterproofing	3
2.14 Tolerances	3
2.15 Damage	3
3. EXECUTION	3
3.1 Fixing Generally	3
3.2 Background Suitability	4
3.3 Preparation	4
3.4 Adhesive/ Mortar	4
3.5 Checking Tile Adhesion	4
3.6 Joint Widths	4
3.7 Grouting	4
3.8 Level of Floor Tiling	4
3.9 Level of Tiling across Joints	4
3.10 Flatness of Floor and Wall Tiling	5
3.11 Setting Out	5
3.12 Junctions with Other Floor Finishes	5
3.13 Joints	5
3.14 Completion	5

SECTION 05-400 -- TILING

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Floor and wall tiling.
 2. Tactile indicators.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. Three of each type of tile specified or scheduled.
 2. Grout sample.
 3. A 300mm minimum length sample of all movement joints and edge trims.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first of each type of tiling installed into the Works and accepted by the Superintendent.

1.5 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.6 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Substrate immediately before tiling and with waterproof membrane in place where applicable.
 2. Initial and trial set-outs.
 3. Completion of tiling.

1.7 Warranties

- A. Prior to Practical Completion a written warranty is to be submitted to the Superintendent for the following:
1. Waterproof membranes: Refer to Section 04-050.
 2. Wall and floor tiling: Submit manufacturer offered warranties and obtain acceptance from the Superintendent prior to commencement.

1.8 Testing Generally

- A. Allow for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.
- B. Ceramic tiles shall be tested to AS 4459.

1.9 Impact Testing

- A. Carry out impact tests to establish the soundness of all screeded substrates. Testing shall include both light tap and heavy weight impact using 4kg, in compliance with a screed tester. Alternative substrate testing methods may be put forward for consideration and acceptance by the Superintendent.

1.10 Slip Resistance and Slip Resistance Testing

- A. Tiled surfaces shall be stable, safe and provide minimal risk of slipping or tripping due to slippery surfaces or misaligned joints. Slip resistances shall comply with HB 197.
- B. Before installation submit manufacturer's current slip resistance test results including accelerated wear testing for all proposed product types and all proposed colours or textures. Testing shall be by a registered testing laboratory. Test results shall not be more than one year old at date of submission.
- C. After installation arrange for on-site slip resistance testing of all types of tiled floor surfaces and in sufficient number to cater for all areas and conditions including ramps, steps entrances etc. Testing shall be undertaken by a registered testing laboratory. Tests shall include wet pendulum and dry floor friction testing in accordance with AS 4663.

2. PRODUCTS

2.1 Tiles Generally

- A. Ceramic tiles shall comply with the requirements of AS 4662.
- B. Floor tiles shall meet slip resistance levels in accordance with HB 197 AND AS 4586.

2.2 Type TL-01 Floor Tiles

- A. Manufacturer/ supplier/ product reference: As nominated in the Product & Materials Schedule.
- B. Base: Steel floated in situ concrete slab or graded screed as applicable.
- C. Damp-proof membrane as specified in Section 04-050 to the full extent of floor tiling in wet areas and to the requirements of AS 3740 and AS/NZS 4858.
- D. Adhesive: In accordance with the manufacturer's recommendations and compatible with the substrate.
- E. Joint width: As recommended by the manufacturer and as agreed with the Superintendent.
- F. Grout: Coloured non shrink epoxy or cement based grout as recommended by the manufacturer. Colour to the acceptance of the Superintendent.
- G. Movement joints:
 - 1. Perimeter: As specified at all changes in floor finish.
 - 2. Structural: As specified to coincide with structural movement joints in base.
- H. Refer to the Drawings and/ or the schedules for extent.

2.3 Types TL-02 to TL-06 Wall Tiles and Tiled Splashbacks

- A. Manufacturer/ supplier/ product reference: As nominated in the Product & Materials Schedule.
- B. Background/ base: Rendered blockwork and/or fibre cement lined stud partitions as applicable. A wet area plasterboard substrate may be used in lieu of fibre cement upon prior acceptance from the Superintendent.
- C. Provide a waterproof membrane as specified in Section 04-050 to the full extent of wall tiling in wet areas and comply with the requirements of AS 3740 and AS/NZS 4858.
- D. Adhesive: In accordance with the manufacturer's recommendations.
- E. Joint width: 3mm or as recommended by the manufacturer.
- F. Grout: Coloured non shrink epoxy or cement based grout as recommended by the manufacturer. Colour to the acceptance of the Superintendent.
- G. Movement joints: Flexible sealant at all internal corners. Colour to match grout colour.
- H. At all external wall corners tiles shall be either mitred to eliminate the exposed edges or provide a corner trim to the acceptance of the Superintendent.
- I. Generally to walls of shower alcoves, vanity splashbacks and elsewhere as nominated. Refer to the Drawings and/ or Finishes Schedule for extent.

2.4 Type TL-07 Skirting Tile

- A. Skirting tiles as nominated in the Product & Materials Schedule. Height as nominated or as detailed.
- B. Tile joints to coincide with joints in floor tiles.

2.5 Type TI-01 Tactile Indicators

- A. Ground surface indicators for the vision impaired. To AS/NZS 1428.4.1.
- B. Manufacturer/ reference: CTA Australia or acceptable equivalent tactile indicator studs and directional tactiles as nominated in the Product & Materials Schedule. Suitable for the particular substrate.
- C. Individually fixed directly to the floor substrate.
- D. Generally to internal and external areas as required by the BCA and DDA.

2.6 Tiling Ancillaries

- A. To tiled surfaces of aquatic areas including change rooms, the following shall apply:
 - 1. Adhesive shall be BASF Construction Chemicals. PCI FT Extra with Lastoflex.
 - 2. Tile grout shall be BASF Construction Chemicals. PCI Nanofug Premium flexible coloured grout to accepted samples.
 - 3. Caulked joints shall be Maxisil 'S'. Applied in the following situations:
 - a) Where tiling is cut around sanitary fixtures.
 - b) Around fixtures interrupting the tile surface, eg. pipes, brackets, bolts and nibs.

- c) At junctions with elements such as window and door frames and built-in cupboards.
 - d) At internal corners.
4. Provide aluminium trims to all tiled corners and junctions. Supplier: B.A.T. Trims. Powder coat finish in Dulux White.

2.7 Tile Grout

- A. The grouting compound shall be accepted by the tile manufacturer and confirmed to the Superintendent by the Contractor.

2.8 Metal Edgings

- A. Stainless steel, brass or anodised aluminium angles, securely fixed and embedded into the floor. Profile as recommended by the manufacturer for the particular application. The top edge shall finish flush with each adjacent floor finish so as not to create a tripping hazard.
- B. Generally at junctions between different floor finishes.

2.9 Sealant Movement Joints

- A. Sealant movement joints shall be provided where necessary:
 - 1. The colour shall match the adjacent grout colour and be accepted by the Superintendent prior to installation.
 - 2. Preparation and application shall be as per the Specification, Section 08-400. Joints shall extend through tiles and bedding to substrate. Joints shall coincide with any movement joints left in the substrate.

2.10 Perimeter Sealant

- A. Provide silicone sealant to all floor to wall junctions and to all wall to wall junctions.

2.11 Expansion Joints

- A. Where shown on the Drawings, install Latham Australia Neoprene X-Pansion Loc and Tile Strip preformed expansion joints or acceptable equivalent in accordance with the manufacturer's written recommendations.

2.12 Adhesive

- A. Adhesives shall be within the TVOC (Total Volatile Organic Compound) limits nominated in Section 08-400.
- B. Standard: To AS 2358.
- C. PVA (polyvinyl) based adhesives: Do not provide in wet areas or externally.
- D. Type:
 - 1. Provide adhesives compatible with the materials and surfaces to be adhered.

2.13 Waterproofing

- A. In wet areas, waterproof behind the tiles in accordance with AS 3740.

2.14 Tolerances

- A. Tile sizes stated in the Specification are nominal and the actual sizes required to meet the joint sizes, etc, to be determined.
- B. Tiles shall be manufactured with the tolerance of $\pm 0.5\text{mm}$.

2.15 Damage

- A. Tiles that are chipped, scratched, damaged or have any other physical imperfections shall not be incorporated into the Works.

3. EXECUTION

3.1 Fixing Generally

- A. To AS 3958.1.
- B. Adhesive: Compatible with background/ base. Prime if recommended by the adhesive manufacturer.
- C. Cut tiles: Neat and accurate.
- D. Fixing: Provide adhesion over entire background/ base and tile backs.
- E. Final appearance: Before bedding material sets, make adjustments necessary to give true, regular appearance to tiles and joints when viewed under final lighting conditions.
- F. Allow no unintended colour/ shade variations within the tiles for use in each area/ room, with permissible variegated tiles being evenly distributed.
- G. Clean surplus bedding material from joints and faces of tiles, without disturbing tiles.

- H. Prepare wall surfaces for tiling using a suitable adhesive compound to fill in any excessive indentations prior to applying the suitable adhesive compound.
- I. All tiles shall be bedded fully in accordance with the manufacturer's instructions.
- J. Set out the tiling plumb and square to the floor or wall finish.
- K. Clean tiles prior to completion. The initial clean shall be according to the manufacturer's instructions.
- L. On completion, when joints are hard, polish tiling with a dry cloth and protect.

3.2 Background Suitability

- A. Before the commencement of tiling, the background and bases shall be:
 - 1. Sufficiently flat to permit specified flatness of finished surfaces, bearing in mind the permissible minimum and maximum thicknesses of the bedding material.
 - 2. Allowed to dry out by exposure to the air for not less than the base manufacturer's written recommendations.

3.3 Preparation

- A. Preparation of backgrounds to AS 3958.1.
- B. Blockwork walls shall be prepared for tiling using an accepted adhesive compound, to fill in any excessive indentations prior to applying the general adhesive.

3.4 Adhesive/ Mortar

- A. As recommended in writing by the manufacturer and applied strictly in accordance with printed recommendations.
- B. All tiles shall be bedded in accordance with the manufacturer's instructions.
- C. Thin bed adhesive, solid (walls):
 - 1. Application: Apply floated coat of adhesive to dry background in areas of about 1m² and comb surface.
 - 2. Tiling: Apply thin even coat of adhesive to backs of dry tiles. Press tiles firmly on to float coat.
 - 3. Finished adhesive thickness (maximum): 3mm.
- D. Thick bed adhesive, solid (floors):
 - 1. Application: Apply floated coat of adhesive to dry base and comb surface.
 - 2. Tiling: Apply coat of adhesive to backs of tiles filling depressions or keys. Press tiles firmly into position.
 - 3. Finished adhesive thickness: Within range recommended by the manufacturer.

3.5 Checking Tile Adhesion

- A. Verify that there is adhesion over the whole tile area.

3.6 Joint Widths

- A. Tile to tile grout joint widths between tiles shall be controlled by using spacer pegs.
- B. Tile to tile grout joint widths shall be 3mm \pm 0.5mm or as accepted by the Superintendent.
- C. Tile to tile mastic joint widths shall be 6mm \pm 1mm or as accepted by the Superintendent.

3.7 Grouting

- A. Grout shall be sanitised and match the tiles. Do not apply grout until the bedding material has hardened sufficiently. The joints shall be a minimum of 5mm deep and free from dust and debris. All joints shall be completely filled, tooled to an accepted profile and wiped down to leave free from blemishes.
- B. Tiles shall be grouted, as soon as set firm, using a proprietary tested product.
- C. All grout joints shall be installed to the full depth of the tile joint. Remove all debris from the joints prior to grouting.
- D. The grout joints shall be "washed" joints. That is the grouting shall be washed out to the bottom line of the arris.

3.8 Level of Floor Tiling

- A. The permissible deviation in level for tiling shall be \pm 2mm of the stated datum.

3.9 Level of Tiling across Joints

- A. The maximum deviation between tile surfaces either side of a joint, including movement joints, shall be:
 - 1. Joints less than 6mm wide: 1mm.

2. Joints 6mm or greater in width: 2mm.

3.10 Flatness of Floor and Wall Tiling

- A. Sudden irregularities to the finished surfaces shall not occur. The variation in gap under a 3m straightedge placed anywhere on the surface shall be not more than 2.5mm.

3.11 Setting Out

- A. Finishes to fixed areas for floor tiles shall be set out on a grid and coordinated on to this grid, except where indicated on the Drawings.
- B. Joints shall be true to line, continuous and without steps.
- C. Joints in walls shall be parallel to the main axes of the space or specified features.
- D. Cut tiles/ slabs shall be kept to the minimum, as large as possible and in unobtrusive locations.
- E. Where positions of movement joints are not specified, agree them with the Superintendent.

3.12 Junctions with Other Floor Finishes

- A. Unless detailed otherwise, provide stainless steel, brass or aluminium trims as scheduled, nominally 3mm thick, at junctions with other floor finishes suitably set at a height ensuring that the floor finish on either side are at the same height and flush with the top of the trim.

3.13 Joints

- A. Fully bed movement joints in accordance with the manufacturer's instructions.
- B. All wall tiling trims shall be of a proprietary type fit for their purpose.
- C. Margins: If it appears that minor variations in joint widths or overall dimensions will avoid cut tiles, submit a proposal for the Superintendent's consideration.

3.14 Completion

- A. At Practical Completion, provide evidence that adhesives used for wall and floor tiles are within the TVOC limits specified and undertake audits as necessary to ensure that specified products have been used. Provide a report detailing the amount, type and supplier of each type of adhesive installed into the Works.
- B. Spare Tiles: Supply spare matching tiles and accessories of each type (at least 2% of the quantity installed) for future replacement purposes. Store the spare materials on Site.
1. Storage location: Storeroom on Site as directed by the Superintendent.
- C. Clean tiled surfaces using an appropriate tile cleaning agent, and polish.

SECTION 05-500 -- RESILIENT FINISHES AND ENTRANCE MATS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Witness Points	1
1.6 Subcontractors	1
1.7 Warranties	1
1.8 Testing	1
1.9 Moisture Content in Concrete Slabs	1
1.10 Slip Resistance and Slip Resistance Testing of Floors	1
2. PRODUCTS	1
2.1 Type SC-02 Resilient Flooring	1
2.2 Type EM-01 Entrance Matting	2
2.3 Tactile Indicators	2
3. EXECUTION	2
3.1 Workmanship Generally	2
3.2 Preparation	2
3.3 Entry Mat Installation	2
3.4 Change of Finish	2
3.5 Protection	2
3.6 Junctions Generally	2
3.7 Completion	2

SECTION 05-500 -- RESILIENT FINISHES AND ENTRANCE MATS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Resilient flooring and skirtings.
 2. Entrance mats including perimeter frame and trims.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. Suitably sized samples of each type of resilient finish illustrating the range of colour, pattern and texture to be expected in the finished work.
 2. A 500mm x 500mm entrance mat sample including edge trims.
 3. A 500mm length of all linear accessories (coving, skirting, stair nosing, edge strips and the like).

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first installed and accepted of each type, in a location as agreed with the Superintendent.

1.5 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Substrate immediately before installation of resilient linings.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.7 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
1. All resilient finishes: 10 years.
 2. Entrance mats: Five years.

1.8 Testing

- A. Manufacturer's test data: Submit independent testing authorities' reports of factory or type tests showing that materials comply with cited standards

1.9 Moisture Content in Concrete Slabs

- A. Test concrete substrates for dryness in accordance with the testing procedures of AS 1884 Appendix A.

1.10 Slip Resistance and Slip Resistance Testing of Floors

- A. Flooring shall be stable, safe and provide minimal risk of slipping or tripping due to slippery or uneven surfaces. Slip resistances shall comply with HB 197.
- B. Before installation submit manufacturer's current slip resistance test results including accelerated wear testing for all proposed product types and all proposed colours or textures. Testing shall be by a registered testing laboratory. Test results shall not be more than one year old at date of submission.
- C. After installation arrange for on-site slip resistance testing of all types of resilient floor finishes and in sufficient number to cater for all areas and conditions. Testing shall be undertaken by a registered testing laboratory. Tests shall include wet pendulum and dry floor friction testing in accordance with AS 4663.

2. PRODUCTS

2.1 Type SC-02 Resilient Flooring

- A. Manufacturer/ reference: Polysoft Pty Ltd Versatex seamless site applied, poured in place, surfacing system as nominated in the Product & Materials Schedule.

- B. Base: Power floated in-situ concrete slab or graded screed as applicable.
- C. Preparation and installation: In accordance with the manufacturer's Installation Instruction Manual and only by manufacturer approved installers.
- D. The flooring shall be covered up the wall to form an integral coved skirting.
- E. Generally to Pool Hall and other areas as nominated on the Drawings.

2.2 Type EM-01 Entrance Matting

- A. Manufacturer/ reference: CS Group Peditred as nominated in the Product & Materials Schedule.
- B. Recessed type. The frame shall be installed so that the upper edge is flush with the adjacent floor finish.
- C. Mats shall be constructed from natural anodised aluminium tread rails lightly furrowed on the exposed surface to provide a non-skid surface and include rubber support cushions mounted on base.
- D. Carpet inserts as nominated in the schedules.
- E. Matwell frame shall be natural anodised aluminium.
- F. Size: As indicated on the Drawings.

2.3 Tactile Indicators

- A. For tactile indicators associated with vinyl and other resilient floors, refer to those nominated in Section 05-400. Tactiles shall comply with the requirements of AS/NZS 1428.4.1.

3. EXECUTION

3.1 Workmanship Generally

- A. Installation shall be in accordance with the manufacturer's instructions.
- B. All bases shall be rigid, dry, sound, smooth and free from grease, dirt and other contaminants before coverings are applied.
- C. The materials shall be delivered to Site in original packaging, clearly marked with the batch number.
- D. Resilient finishes shall not be laid until the building is weathertight, wet trades have finished their work, the building has dried out, all paintwork is finished and dry, and floor service outlets, duct covers and other fixtures around which the material is to cut have been fixed. The Superintendent shall be informed not less than two days before commencing laying.
- E. Before, during and after laying, the temperature and humidity shall be maintained at the approximate levels that will prevail after the building is occupied.

3.2 Preparation

- A. Test concrete substrates for dryness in accordance with AS 1884 Appendix A. If necessary provide artificial means for drying out the substrate before installation. Do not commence resilient flooring installation unless the moisture content values in clause A3.1.2 or A3.1.3 have been obtained. Where the manufacturer's requirements are more stringent than AS 1884, they shall take precedence.
- B. Where the substrate exceeds the maximum permissible tolerances, apply a proprietary levelling compound compatible with the adhesive.

3.3 Entry Mat Installation

- A. Prepare the base of the mat recess ensuring an even transition occurs between the entrance mat and the adjacent floor finish.
- B. Mats and frames shall finish flush with surrounding floor finishes.
- C. After correct installation of frames, store mats and provide temporary infill until immediately before Practical Completion.

3.4 Change of Finish

- A. Maintain finished floor level across changes of floor finish.

3.5 Protection

- A. Keep traffic off finished work for 60 hours.

3.6 Junctions Generally

- A. Finish junctions flush with adjoining surfaces. Where changes of floor finish occur at doorways locate the joint on the centreline of the closed door leaf.

3.7 Completion

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- A. At Practical Completion, provide evidence that adhesives used are within the TVOC limits specified. Undertake audits as necessary to ensure that specified products have been used. Provide a report detailing the amount, type and supplier of each type of adhesive installed into the Works.
- B. Maintenance manual: Submit manufacturer's published use, care and maintenance requirements for each type of finish.

SECTION 05-600 -- PAINTING/ CLEAR FINISHING	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Subcontractors	1
1.6 Witness Points	1
1.7 Warranties	1
1.8 Testing	1
2. PRODUCTS	2
2.1 Source of Materials	2
2.2 Painting Generally	2
2.3 Total Volatile Organic Compounds (TVOC) in Paint	2
2.4 Type PPC-nn Powder Coat System	2
2.5 Types PCA to PCE Protective Coatings	3
2.6 Type PAC-nn Interior Acrylic Paint - Flat	3
2.7 Type PAD-nn Interior Acrylic Paint - Low Sheen	3
2.8 Type PES-nn Interior Acrylic Enamel Paint - Semi Gloss	3
2.9 Exterior Acrylic Paint - Gloss	4
2.10 Exterior Acrylic Paint - Low Sheen	4
2.11 Type PAA-nn Elastomeric Coating - Blockwork	4
2.12 Type PAB-nn Elastomeric Coating - Concrete	4
2.13 Type PAE-nn Elastomeric Coating - Fibre Cement	5
2.14 Type PTM Timber Finish	5
2.15 Type SC-01 Concrete Sealer	5
2.16 Anti Graffiti System	5
2.17 Types PT-'nn' Paint Colours	5
2.18 Combinations	6
2.19 Delivery	6
2.20 Tinting	6
2.21 Toxic Ingredients	6
2.22 Colour Selection	6
3. EXECUTION	6
3.1 Coating Generally	6
3.2 Compatibility	6
3.3 Preparation	6
3.4 Suitability of Surface	7
3.5 Priming	7
3.6 Finishes	7
3.7 Protection of Adjacent Surfaces	7
3.8 Completion	7

SECTION 05-600 -- PAINTING/ CLEAR FINISHING

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Water based acrylic and acrylic enamel paint.
 2. Concrete sealers and applied finishes.
 3. Protective coatings.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. 300mm x 300mm sample of each paint type and colour on a representative substrate.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first of each paint system on each type of substrate as applicable through the works, in a location as agreed with the Superintendent.
 2. The dry film thickness of each system shall be measured by the manufacturer and accepted as meeting the specified DFT's.

1.5 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.6 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. At the completion of surface preparation and immediately prior to application.

1.7 Warranties

- A. Prior to Practical Completion a written warranty is to be submitted to the Superintendent for the following:
1. Internal and external decorative paints: 7 years.
 2. Protective coatings to steel: 15 years.

1.8 Testing

- A. To AS 1580.0
- B. Provide technical information/ test certificates to demonstrate that materials meet the requirements of the Specification.
- C. Testing and provision of data shall not relieve the Contractor of his responsibilities regarding the performance requirements, service life and warranties provided.
- D. The VOC (Volatile Organic Compound) content of paints, varnishes and protective coatings used internally shall be determined as follows:
1. The TVOC (Total Volatile Organic Compound) content of 'ready to use paints' shall be theoretically calculated as the sum total of the VOC's of each of the raw material components comprising the paint.
 2. Where the TVOC content of individual components is not known, it shall be determined experimentally by one of the following testing methods as appropriate:
 - a) ISO 17895 for material with an assumed VOC content < 1%;
 - b) ISO 11890 part 2 for material with an assumed VOC content < 15%;
 - c) ISO 11890 part 1 for material with an assumed VOC content > 15%; or
 - d) ASTM D3960 and ASTM D2369.
- E. The paint manufacturer shall undertake random ultrasound testing of paint finishes to ensure that the minimum specified dry film thicknesses are being achieved throughout the works. Results shall be tabulated and provided directly to the Superintendent on a fortnightly basis during that phase of the works.

- F. Paints shall be tested by an accredited laboratory and in accordance with the Good Environmental Choice Australia Standard No. GECA 23-2005 'Australian Voluntary Environmental Labelling Standard: Architectural and Protective Coatings'.

2. PRODUCTS

2.1 Source of Materials

- A. Coating materials shall be obtained from one source.
- B. Use only the premium paint brands and systems specified. Alternative brands must be accepted in writing by the Superintendent prior to commencement.
- C. The Contractor shall provide a register of all internally used paints, sealers, varnishes and the like recording volume of product used, VOC level, date and location of purchase, area of application and any other relevant data as requested by the Superintendent.
- D. All materials shall be as recommended for the intended application. Provide a warranty from the manufacturer for the particular surface and the conditions of exposure.

2.2 Painting Generally

- A. Australian Paint Approval Scheme (APAS) specifications: Provide paints and other materials which are scheduled in the APAS List of Approved Products as complying with cited APAS specifications.
- B. Quality: Provide only the premium quality lines specified or alternatives only when specifically accepted in writing by the Superintendent. All products shall be delivered to, and kept on, site in their original containers.
- C. Where the Contractor offers alternative paint systems to that specified, the alternative shall be accepted by the Superintendent prior to commencement. Contractor nominated alternatives to products or systems specified shall have a TVOC level equal or better than that specified.
- D. The preparation and application of the nominated paint systems shall comply with the manufacturer's current written instructions.

2.3 Total Volatile Organic Compounds (TVOC) in Paint

- A. Paints, varnishes and protective coatings shall meet the following TVOC (Total Volatile Organic Compound) limits. Provide VOC data sheets or test certificates confirming that all paints, varnishes and protective coatings do not exceed these limits:
1. Latex primer for galvanised iron and Zinalume: <60g of TVOC per litre of ready-to-use product (rtup).
 2. Interior latex undercoat: <65g/ litre (rtup).
 3. Interior sealer: <65g/ litre (rtup).
 4. Walls and ceilings - interior gloss: <75g/ litre (rtup).
 5. Walls and ceilings - interior semi-gloss: <16g/ litre (rtup).
 6. Walls and ceilings - interior low sheen: <16g/ litre (rtup).
 7. Walls and ceilings - interior flat (washable): <16g/ litre (rtup).
 8. Ceilings - interior flat: <14g/ litre (rtup).
 9. Trim - gloss, semi-gloss, satin, varnishes and woodstains: <75g/ litre (rtup).
 10. Timber and binding primers: <30g/ litre (rtup).
 11. One and two pack performance coatings for floors: <140g/ litre (rtup).
 12. Any solvent based coatings whose purpose is not covered by the above: <200g/ litre (rtup).
- B. All liquid applied finishes used in an internal application and applied on site shall meet the above TVOC limits. This shall include exterior grade and solvent based paints used in an interior application. Values shall reflect the 'ready to use' product as mixed inclusive of tints.
- C. Provide a register of all paints, sealers and varnishes used in the Works and confirm that the correct products have been used. The register shall include the volume of product used, the VOC level, date and location of purchase, area of application and any other relevant data as requested by the Superintendent.
- D. Obtain acceptance from the Superintendent before substituting any specified paint system.
- E. Provide Material Safety Data Sheets for all paints, sealers and varnishes showing health and safety precautions to be taken during application of the product and take responsibility of same.
- F. Where available, details of third-party certification shall be provided.

2.4 Type PPC-nn Powder Coat System

- A. Powder coat finish where 'nn' denotes the colour reference number 01, 02 etc. as nominated in the schedule.
- B. Manufacturer: Dulux or acceptable equivalent.
- C. Refer to Section 08-100 and to the Product & Material Schedule.

2.5 Types PCA to PCE Protective Coatings

- A. Various protective coating systems as nominated and described in the Dulux Protective Coating System Specification included in the documents.
- B. Preparation and application shall be in strict accordance with the manufacturer's instructions.
- C. Refer to the manufacturer's recommended working procedures which shall be read in conjunction with their technical data sheet and material safety data sheet. Manufacturer supplied information shall be strictly adhered to.
- D. Systems include:
 - 1. PCA = To exposed internal mild steel in aquatic areas. Refer to Dulux Specification V14/292 / A.
 - 2. PCB = To concealed internal mild steel. Refer to Dulux Specification V14/292 / B.
 - 3. PCC = To internal concrete floors. Refer to Dulux Specification V14/292 / C.
 - 4. PCD = TBA.
 - 5. PCE = TBA.

2.6 Type PAC-nn Interior Acrylic Paint - Flat

- A. Manufacturer and product reference: Dulux or acceptable equivalent Ceiling White (tinted to colours as nominated).
- B. Surfaces: Generally to ceilings as scheduled or as nominated on the Drawings.
- C. Preparation and application: In accordance with the manufacturer's written instructions as applicable for the particular substrate.
- D. Initial coat: Dulux Professional Total Prep acrylic primer sealer undercoat.
- E. Finishing coats: A minimum of two coats of Ceiling White or as required to achieve the specified DFT.
- F. Brush, roller or spray application. Spray application shall be 'back-rolled' to the acceptance of the Superintendent.
- G. System DFT (dry film thickness): 80µm.
- H. Paint colours: As scheduled using low VOC Dulux tinters.
- I. TVOC content: < 5g/ litre.
- J. To wet areas, apply Dulux Wash & Wear Kitchen & Bathroom Ceiling Flat in lieu of the Ceiling White top coats.

2.7 Type PAD-nn Interior Acrylic Paint - Low Sheen

- A. Manufacturer and product reference: Dulux or acceptable equivalent Wash & Wear 101 Low Sheen.
- B. Surfaces: Generally to ceilings and walls as scheduled or as nominated on the Drawings.
- C. Preparation and application: In accordance with the manufacturer's written instructions as applicable for the particular substrate.
- D. Initial coat: Dulux Professional Total Prep acrylic primer sealer undercoat or Tuff-Hide™ primer surfacer as specified above where a level 5 finish is required.
- E. Finishing coats: A minimum of two coats of Dulux Wash & Wear 101 Low Sheen or as required to achieve the specified DFT.
- F. Brush, roller or spray application. Spray application shall be 'back-rolled' to the acceptance of the Superintendent.
- G. System DFT (dry film thickness): 80µm.
- H. Paint colours: As scheduled using low VOC Dulux tinters.
- I. TVOC content: < 5g/ litre.
- J. To wet areas, apply Dulux Wash & Wear Kitchen & Bathroom Low Sheen Acrylic in lieu of the Wash & Wear 101 Low Sheen top coats.

2.8 Type PES-nn Interior Acrylic Enamel Paint - Semi Gloss

- A. Manufacturer and product reference: Dulux or acceptable equivalent Aquanamel Semi Gloss.

- B. Surfaces: Generally to internal doors and frames, timber trims, timber skirtings and the like as scheduled or as nominated on the Drawings.
- C. Preparation and application: In accordance with the manufacturer's written instructions as applicable for the particular substrate.
- D. Initial coat: Dulux Professional Total Prep acrylic primer sealer undercoat. For bare timber, prime with Dulux Preplock Water Based Stain Blocker in lieu of Total Prep.
- E. Finishing coats: A minimum of three coats Dulux Aquanamel Semi Gloss or as required to achieve the specified DFT.
- F. Spray, roller or brush application to the acceptance of the Superintendent. Spray and roller applications shall be followed by brush strokes to provide an even and uniform "brushed" appearance.
- G. System DFT (dry film thickness): 120 µm.
- H. Paint colours: As scheduled using low VOC Dulux tinters.
- I. TVOC content: < 74g/ litre.

2.9 Exterior Acrylic Paint - Gloss

- A. Manufacturer and product reference: Dulux or acceptable equivalent Weathershield Gloss.
- B. Surfaces: Generally to external timber doors, door frames, timber trims and the like as scheduled or as nominated on the Drawings.
- C. Preparation and application: In accordance with the manufacturer's written instructions as applicable for the particular substrate.
- D. Initial coat: Dulux Professional Total Prep acrylic primer sealer undercoat. Bare natural timber shall be primed with a coat of Dulux 1 Step oil based primer sealer & undercoat in lieu of the acrylic undercoat to prevent tannin leaching.
- E. Finishing coats: Two coats Dulux Weathershield Gloss Acrylic.
- F. Spray, brush or roller applied to the acceptance of the Superintendent.
- G. System DFT (dry film thickness): 80 µm.
- H. Colour: As scheduled.

2.10 Exterior Acrylic Paint - Low Sheen

- A. Manufacturer and product reference: Dulux or acceptable equivalent Weathershield Low Sheen.
- B. Surfaces: Generally to external walls, soffits and similar surfaces as scheduled or as nominated on the Drawings.
- C. Preparation and application: In accordance with the manufacturer's written instructions as applicable for the particular substrate.
- D. Initial coat: Dulux Professional Total Prep acrylic primer sealer undercoat.
- E. Finishing coats: Two coats Dulux Weathershield Low Sheen Acrylic.
- F. Spray, brush or roller applied to the acceptance of the Superintendent.
- G. System DFT (dry film thickness): 80 µm.
- H. Colour: As scheduled.

2.11 Type PAA-nn Elastomeric Coating - Blockwork

- A. Where 'nn' denotes the colour reference number 01, 02 etc. noted on the Drawings / schedules.
- B. Manufacturer and product reference: Dulux or acceptable equivalent Acratex 955 Acrashield. Refer also to the Product & Material Schedule.
- C. Surfaces: Generally to new internal and external blockwork as scheduled or as nominated on the Drawings.
- D. Preparation and application: In accordance with the manufacturer's written instructions as applicable for the particular substrate.
- E. Initial coat: Dulux Acratex 501/1 Acraprime water based primer.
- F. Finishing coats: A minimum of two coats of Dulux Acratex 955 Acrashield or as required to achieve the specified DFT.
- G. Brush, roller or spray application. Spray application shall be 'back-rolled' to the acceptance of the Superintendent.
- H. System DFT (dry film thickness): 180µm.
- I. Paint colours: As specified below. Refer to the Drawings for extent.

2.12 Type PAB-nn Elastomeric Coating - Concrete

- A. Where 'nn' denotes the colour reference number 01, 02 etc. noted on the Drawings / schedules.
- B. Manufacturer and product reference: Dulux or acceptable equivalent Acratex 955 Acrashield. Refer also to the Product & Material Schedule.
- C. Surfaces: Generally to new internal and external concrete as scheduled or as nominated on the Drawings.
- D. Preparation and application: In accordance with the manufacturer's written instructions as applicable for the particular substrate.
- E. Prep coat; Dulux Acratex 400/ 4 Tiltwash.
- F. Initial coat: One coat of Dulux Acratex 501/ 2 AcraPrime solvent based primer.
- G. Finishing coat: A minimum of two coats of Dulux Acratex 955 Acrashield Low Gloss or as required to achieve the specified DFT
- H. Brush, roller or spray application. Spray application shall be 'back-rolled' to the acceptance of the Superintendent.
- I. System DFT (dry film thickness): 200µm.
- J. Paint colours: As specified below. Refer to the Drawings for extent.

2.13 Type PAE-nn Elastomeric Coating - Fibre Cement

- A. Dulux Acratex 955 Acrashield, similar to Type PAA specified above but suited to external compressed fibre cement wall and soffit cladding. Where the cladding requires taping and flushing over of joints, this shall be part on the elastomeric coating system as follows:
 - 1. 1st coat: Acrapatch Course & taping system to panel joints.
 - 2. 2nd coat: skimcoat of an Acratex Fastcoat Coventry Course.
 - 3. 3rd coat: topcoat of Acratex Acrashield.
- B. Confirm total system build-up with the manufacturer and obtain acceptance from the Superintendent prior to commencement.

2.14 Type PTM Timber Finish

- A. Manufacturer and product reference: Dulux or acceptable equivalent Intergrain NaturalStain. High performance, semi-transparent, water based matt to low sheen stain designed to protect and enhance exterior timber. Refer also to the Product & Material Schedule.
- B. Surfaces: External timber as scheduled or as nominated on the Drawings.
- C. Preparation: In accordance with the manufacturer's written instructions.
- D. Application: Three coats.

2.15 Type SC-01 Concrete Sealer

- A. Manufacturer/ reference: Sika or acceptable equivalent Sikafloor CureHard 24 one part, clear liquid, sodium silicate to cure, harden and seal concrete. Refer also to the Product & Materials Schedule.
- B. Generally to store rooms and similar areas as nominated in the documents.
- C. Preparation and application: In accordance with the manufacturer's written instructions.
- D. TVOC content: <1g/ litre.

2.16 Anti Graffiti System

- A. A high performance waterbased permanent anti-graffiti coating which enables graffiti, fly-posters and other soiling to be repeatedly removed using safe and mild agents without the loss of properties, performance or appearance of the coating itself.
- B. Manufacturer and product reference: Guardian Protective Coatings or acceptable equivalent anti graffiti system. Matt finish.
- C. Surfaces: As scheduled or as nominated on the Drawings.
- D. Initial coat: Guardian Anti Graffiti Primer selected in accordance with manufacturer's recommendations appropriate to the surface on which it is to be applied.
- E. Finishing coats: Two coats Guardian Non-Sacrificial Anti Graffiti Coating.
- F. The anti-graffiti coating shall protect and be compatible with the underlying surface finish.
- G. Provide test data and samples demonstrating the effectiveness of the proposed anti-graffiti coating.

2.17 Types PT-'nn' Paint Colours

- A. Refer to the Product & Material Schedule for paint colours associated with each of the above paint system.

2.18 Combinations

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

2.19 Delivery

- A. Deliver paints to the Site in the manufacturer's labelled and unopened containers. Ensure containers of materials specified by an APAS specification code are labelled accordingly.

2.20 Tinting

- A. Provide products that are colour tinted only by the specified manufacturer or their accredited supplier.
- B. All colour tinters for paints used internally shall be low VOC.

2.21 Toxic Ingredients

- A. Comply with the requirements of the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP), Uniform Paint Standard appendix.

2.22 Colour Selection

- A. From the standard colour chart of the nominated manufacturer.
- B. Standard: From the Australian standard colour range specified in AS 2700.
- C. From samples:
 - 1. For paint systems: By requiring the paint to be mixed or tinted to match samples provided. Consult the paint manufacturer to ensure that the colours selected are of satisfactory durability and opacity, and will comply with requirements in the specified number of coats.
 - 2. For clear timber finishes: By reference to coated samples.

3. EXECUTION

3.1 Coating Generally

- A. Application: To AS/NZS 2311 Sections 3, 6 and 7.
- B. Conditions: Maintain suitable temperature, humidity and air quality during application and drying.
- C. Surfaces: Clean and dry at time of application.
- D. Thinning and intermixing of coatings: Not permitted unless recommended by the manufacturer.
- E. Priming coats: Of adequate thickness and to suit surface porosity. Apply as soon as possible on same day as preparation is completed.
- F. Finish:
 - 1. Even, smooth and of uniform colour. Free from brush marks, sags, runs and other defects. Cut in neatly.
 - 2. In all cases where paint is spray applied, the surface shall be back-rolled to the acceptance of the Superintendent.

3.2 Compatibility

- A. Where surfaces have been treated with preservatives or fire retardants, the later coating materials shall be compatible with the treatment and not inhibit its performance.
- B. All steelwork shall have received corrosion protection treatment. The finishing coats shall be compatible and shall maintain the integrity of the protective system.

3.3 Preparation

- A. When removing or partially removing coatings, the methods used shall not damage the substrate or adjacent surfaces, or adversely affect subsequent coatings.
- B. Damaged areas of plasterboard/ dry lining shall be made good before commencing new coating finishes.
- C. Materials used in preparation shall be of the types recommended by their manufacturers and by the coating manufacturer for the situation and surfaces being prepared.
- D. Surfaces shall be fully rubbed down and prepared. Touch up the primer and corrosion protection coats of any steelwork after removing, or partially removing, existing coatings. The methods used shall not damage the substrate or adjacent surfaces, or adversely affect subsequent coatings. The preparatory coatings used shall be of the types recommended by the coating manufacturer for the situation and surfaces being prepared to receive new finishes.
- E. Apply stoppers/ fillers after priming and use water-based stoppers/ fillers before priming, unless otherwise recommended in writing by the manufacturer. Water based stoppers/ fillers shall be patched after priming.

- F. Where doors are delivered to Site in a finished condition, any necessary protection shall be provided to the doors when applying coatings to the frames and the like, allowing sufficient drying times to coatings to ensure that the doors are not marked in any way with the coating material.
- G. Timing/ making good:
 - 1. Allow an interval of at least the period recommended in writing by the manufacturer between successive coats of paint.
 - 2. Make good all unsatisfactory paintwork with additional coats of material.

3.4 Suitability of Surface

- A. Application of coatings shall not occur until the surfaces and conditions within any given area to receive the specified coatings are acceptable.
- B. The Contractor shall inspect surfaces to be painted prior to commencement and shall notify the Superintendent in writing if their condition is defective or unsuitable for work to proceed.
- C. The Contractor's commencement of work shall deem the surface as being acceptable.

3.5 Priming

- A. Primary concrete surface preparation:
 - 1. Remove mould oil by washing the surface with a detergent solution, rinsing with clean water and allowing to dry. Sand down to remove any projections or fins.
 - 2. Fill holes, cracks, blemishes and formwork marks following the coating manufacturer's recommended instructions, sanding down to achieve a smooth surface. Inspect prepared surfaces prior to the application of the finish coat.
 - 3. Remove all visible signs of organic growth by using high-pressure water jet equipment.
 - 4. All surfaces shall be clean and suitably dry. eg with a moisture content less than 5% and free from anything that may interface with the adhesion of the materials to be applied.
 - 5. Remove loose or flaking material using high-pressure water jet equipment, grit blasting, needle gunning or burning off.

3.6 Finishes

- A. Once applied the finish shall not slump, flow, crack, flake, split, sag, pit, bubble, blister, float, effloresce, craze, shrink, break, wrinkle, crinkle, yellow, chalk, fade, discolour, powder, stain, bleed or lose its finish or gloss in any way. Take full account of the extremes of all atmospheric and environmental conditions.
- B. All surface finishes shall be dry to handle.
- C. Unless otherwise specified, do not over thin paint sealant so as to change in any way its surface colour, gloss, opacity or finish. Add nothing to the paint to change in any way its consistency or constitution.
- D. Allow no variation in final surface finish.
- E. All paints shall be anti-mould and stable in humid conditions and suitable for hot climate exposure.

3.7 Protection of Adjacent Surfaces

- A. Provide adequate protection to adjacent surfaces that are completely pre-finished or have a fair-faced natural finish, eg stainless steel/ mild steel. Splashes resulting from work carried out on Site shall be cleared from floors, walls, hardware, glass and all other surfaces. On completing the work, chips, cracks, discoloration, etc, shall be made good or replaced if it cannot be adequately cleaned or repaired as directed by the Superintendent. Ensure that adjacent elements are removed and refixed where appropriate, prior to and after applying coatings.

3.8 Completion

- A. Maintenance manual: Submit the paint manufacturer's published recommendations for maintenance.
- B. At Practical Completion, provide evidence that paints used in the Works are within the TVOC limits specified and undertake audits as necessary to ensure that specified products have been used. Provide a report detailing the amount, type and supplier of each type of paint used in the Works.

SECTION 05-800 -- METALWORK/ BALUSTRADES/ HANDRAILS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Subcontractors	1
1.6 Witness Points	1
1.7 Shop Drawings	1
1.8 Other Submissions	1
1.9 Testing Generally	1
1.10 Weld Test	2
1.11 Stainless Steel Test	2
2. PRODUCTS	2
2.1 Metalwork Generally	2
2.2 Type BL-01 Galvanised Steel Balustrade	2
2.3 Types HR-01 & HR-02 Stainless Steel Handrails	2
2.4 Type SN-01 Stair Nosing	2
2.5 Materials Generally	2
2.6 Fixings	2
2.7 Welding	2
2.8 Brazing	2
2.9 Fabrication Tolerances	2
3. EXECUTION	3
3.1 Workmanship Generally	3
3.2 Installation Tolerances	3
3.3 Completion	3

SECTION 05-800 -- METALWORK/ BALUSTRADES/ HANDRAILS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Metal stairs, ladders and walkways.
 2. Balustrades and handrails.
 3. Grilles, vents and perforated metal panels.
 4. Bollards.
 5. Architectural metalwork.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. Appropriately sized samples of all handrail and balustrade types showing proposed fixings, quality of welds and any other particular feature of the system.
 2. All fixings.
 3. One sample of each type of architectural metalwork.
 4. Each type of joint.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first complete installation of each type, in a location as agreed with the Superintendent.

1.5 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.6 Witness Points

- A. Arrange to inspect the following with the Superintendent (a minimum of two working days notice shall be given):
1. Shop fabricated or assembled items prior to delivery.

1.7 Shop Drawings

- A. Submit Shop Drawings showing the following information:
1. Details of fabrication and components.
 2. Information necessary for Site assembly.

1.8 Other Submissions

- A. Materials:
1. Manufacturer's data: Submit manufacturer's published product data including standard drawings and details.
 2. Stainless steel: For each batch of stainless steel to be used, submit the certificate of compliance or test certificate specified in the applicable standard.
- B. Execution:
1. Welding procedures: Submit details of proposed welding procedures before fabrication.
 2. Welding dissimilar metals: Submit the following details:
 - a) Type and thickness of materials to be welded.
 - b) Proposed joint preparation and welding procedures.
 - c) Proposed filler metal.
 - d) Expected dilution (proportion of fused parent metal in the weld metal).
 3. Fastenings to aluminium (including aluminium alloys): If cadmium-plated steel fastenings are proposed, submit proposals to the Superintendent.

1.9 Testing Generally

- A. Provide evidence/ testing data and reports to demonstrate that all materials/ products proposed have been tested to meet the standards specified herein.
- B. Where testing has not previously been carried out on products/ materials proposed, arrange for tests to be carried out to comply with the Specification to the satisfaction of the Superintendent.
- C. The provision of testing data or the carrying out of tests shall not relieve the Contractor of his responsibilities regarding the performance requirements, durability or service life requirements, etc.

1.10 Weld Test

- A. Have welds or test plates tested by an independent testing authority. In the event of test failure, rectify the defect and repeat the test.

1.11 Stainless Steel Test

- A. Before fabrication commences, submit satisfactory evidence to the Superintendent that relevant procedure test plates have passed the tests specified in AS/NZS 1554.6.

2. PRODUCTS

2.1 Metalwork Generally

- A. All proprietary and/ or purpose built architectural metalwork shall be as detailed and described on the Drawings or in the schedules. All workmanship shall be of high quality and of a standard expected in an architect designed aquatic facility of this type and to the Superintendent's acceptance. Provide to the Superintendent for acceptance prior to the commencement of manufacture or placement of orders, sufficient samples of materials, finishes and manufacturing processes such as bends, folds, welds, connections, fixings and the like, to adequately demonstrate expected finishes to all types of metalwork.

2.2 Type BL-01 Galvanised Steel Balustrade

- A. Galvanised steel handrails and balustrades shall meet all BCA and regulatory requirements. Refer to the Product & Material Schedule and the Drawings for details and extent.

2.3 Types HR-01 & HR-02 Stainless Steel Handrails

- A. Stainless steel handrails shall meet all BCA and regulatory requirements. Refer to the Product & Material Schedule and the Drawings for details and extent.

2.4 Type SN-01 Stair Nosing

- A. Refer to Section 06-150.

2.5 Materials Generally

- A. Refer to the following sections of the Specification:
 - 1. Section 08-100.
 - 2. Section 08-150.
 - 3. Section 08-200.

2.6 Fixings

- A. Refer to Section 08-400.
- B. All fixings shall conform to all statutory requirements in respect of strength and type.
- C. Adequate measures shall be taken to prevent bimetallic corrosion between dissimilar metals and to isolate aluminium components from cementitious surfaces. Attention is drawn to PD 6484 Commentary on Corrosion at bimetallic Contacts and its Alleviation.
- D. Direct contact between aluminium or aluminium alloys and treated timber shall be avoided, unless with the prior acceptance of the Superintendent.
- E. Only fixings that are suited to the likely stresses, movements and vibrations in use without allowing any wobble, creaks or deflection of any fixtures or fittings shall be used.

2.7 Welding

- A. Provide finished welds that are free from surface and internal cracks, slag inclusion, and porosity.
- B. Butt weld quality: Not inferior to the appropriate level recommended in AS 1665 Appendix A for aluminium.

2.8 Brazing

- A. Ensure brazed joints have sufficient lap to provide a mechanically sound joint. Do not use butt joints relying on the filler metal fillet only.

2.9 Fabrication Tolerances

- A. It is to be ensured that in addition to the general requirements of the Specification:

1. A high degree of accuracy shall be employed in the fabrication of metalwork and its support structure.
2. Deviations in length, width and/or diagonal dimensions shall not exceed ± 1 mm.
3. The twist and warping shall not cause any point of the panel to be more than 0.5mm out of plane. The twist and warping shall not cause any point of the structural frame to be more than 2mm out of plane.

3. EXECUTION

3.1 Workmanship Generally

- A. Install in the correct position, within tolerance and in the correct relationship to the building structure.
- B. Protection shall remain in place until all work is complete. All protective measures shall be replaced following any inspections by the Superintendent.
- C. Acceptance shall be received from the Superintendent before drilling or cutting parts of the structure, other than where shown on Shop Drawings.
- D. Isolating tape, plastic washers, or other suitable means to prevent bimetallic corrosion shall be provided between dissimilar metals, or between preservative treated timber and metal.
- E. Support posts, stanchions, mullions and the like shall be at even centres, unless nominated otherwise.

3.2 Installation Tolerances

- A. All work shall be erected in proper alignment in relation to established lines and grids shown on the Drawings.
- B. The vertical plane of any element shall be within ± 1.5 mm of the theoretical position.
- C. Adjacent elements shall not deviate from their intended horizontal or vertical alignment by more than ± 2 mm.
- D. Any diagonal length shall not deviate by more than the lesser of ± 3 mm or $\pm 0.075\%$ of design dimension.
- E. The centre section of an element shall not bow by more than the lesser of 3mm or 0.075% of the length of the element measured from a straight line between the ends of the element.
- F. Any edge shall not deviate by more than ± 2 mm from a 2m straightedge placed against it in a direction parallel to the long axis of the element.
- G. Surfaces shall not deviate by more than ± 2 mm from a 2m straightedge placed against it in any direction.
- H. No section of the element may be twisted by more than 1° from the section at either end of the element.

3.3 Completion

- A. On or before completion of the work, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

SECTION 06-150 -- TRIMS/ SUNDRY ITEMS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Subcontractors	1
1.5 Quality Benchmarks	1
2. PRODUCTS	1
2.1 Pinboard/ Noticeboard	1
2.2 White Board	1
2.3 Type SN-01 Stair Nosing	1
2.4 Type TS-01 Threshold Strips	1
3. EXECUTION	1
3.1 Installation	1
3.2 Fixing	1
3.3 Fixing Through Finishes	2

SECTION 06-150 -- TRIMS/ SUNDRY ITEMS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Trims and sundry items.
 2. Pinboards/ white boards.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. A 300mm minimum length sample of all trims and sundry items in specified finishes.
 2. 300mm x 300mm minimum sized sample of each type of noticeboard and white board specified including perimeter frame and accessories as applicable.

1.4 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.5 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first installed and accepted of each type in a location as agreed with the Superintendent.

2. PRODUCTS

2.1 Pinboard/ Noticeboard

- A. Manufacturer/ reference: Forbo Bulletin Board or acceptable equivalent. Thermally bonded pinboard.
- B. Colours: As scheduled.
- C. Refer to the Drawings and/ or schedules for sizes, quantities and locations.

2.2 White Board

- A. Manufacturer/ reference: Maprack or acceptable equivalent. Scratch resistant ceramic steel porcelain magnetic whiteboard.
- B. Refer to the Drawings and/ or schedules for sizes, quantities and locations.

2.3 Type SN-01 Stair Nosing

- A. Manufacturer/reference: Latham Asbraloy safety stair tread nosing as nominated in the Product & Material Schedule. Nosing to run the full width of the stair tread.
- B. Comply with the requirements of AS 1428.1.
- C. Fixed as per manufacturer's instructions.

2.4 Type TS-01 Threshold Strips

- A. Manufacturer/reference: Raven RP96 low profile threshold plate as nominated in the Product & Material Schedule, used in conjunction with Raven door bottom seals. 40mm wide x 3.5mm high. Refer to the Door and Door Hardware Schedule for further details.

3. EXECUTION

3.1 Installation

- A. Joinery workmanship: Refer to Section 06-202.
- B. Methods of fixing and fastening: Refer to Section 08-400.
- C. Straight runs: Form in single lengths wherever possible.
- D. Running joints: Location and method of forming shall be agreed with the Superintendent where not detailed.
- E. Joints at angles: Mitre unless shown otherwise.
- F. Moisture content of timber and wood based boards: Maintain within the range specified for the component during storage and installation.

3.2 Fixing

- A. Fixing and jointing methods and types, sizes, quantities and spacings of fastenings shall be suitable having regard to:
1. Nature of and compatibility with product/ material being fixed and fixed to.
 2. Recommendations of manufacturers of fastenings components, products or materials being fixed and fixed to.
 3. Materials and loads to be supported.
 4. Conditions expected in use.
 5. The appearance, which shall be subject to acceptance by the Superintendent.

3.3 Fixing Through Finishes

- A. Fastenings and plugs (if used) shall have ample penetration into the backing.

SECTION 06-200 -- FURNITURE, FITTINGS AND EQUIPMENT	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
2. PRODUCTS	1
2.1 Fitout And Loose Furniture Items Generally	1
2.2 F. F. & E. Groups 1, 2 & 3	1
2.3 Portable Fire Extinguishers	1
2.4 Type LK-01 Lockers	1
3. EXECUTION	1
3.1 Installation	1
3.2 Fixtures/ Furnishing Systems	2
3.3 Hardware	2
3.4 Protection	2

SECTION 06-200 -- FURNITURE, FITTINGS AND EQUIPMENT

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Loose furniture, fittings and equipment.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

2. PRODUCTS

2.1 Fitout And Loose Furniture Items Generally

- A. Supply and install loose furniture as nominated in the schedules.

2.2 F. F. & E. Groups 1, 2 & 3

- A. The following three classifications are applicable to the supply and installation of furniture, fittings and equipment:
- B. Supply and fix (Group 1 Items):
1. Items under this classification shall be supplied and installed into the Works by the Contractor.
 2. Take delivery of the items and store them safely until they can be incorporated into the Works. The items shall be protected as necessary until the Works achieve Practical Completion.
 3. Arrange for the items to be connected to the required supply and waste services as applicable and ensure that the items are in proper working order.
- C. Fix only (Group 2 Items):
1. Items under this classification shall be supplied (ordered and purchased) by others. The Contractor shall install them into the Works.
 2. Advise when the items are required for delivery to the Site.
 3. Take delivery of the items and store them safely until they can be incorporated into the Works. The items shall be protected as necessary until the Works achieve Practical Completion.
 4. Arrange for the items to be connected to the required supply and waste services as applicable and ensure that the items are in proper working order.
- D. Supply and install by others (Group 3 Items):
1. Items under this classification shall be supplied (ordered and purchased) and installed by others.
 2. Where these items are installed into the Works by others prior to Practical Completion, protect them as necessary until the Works achieve Practical Completion.
- E. Unless specifically noted otherwise, all items nominated in the schedules shall be regarded as Group 1 items and as such, are to be procured and installed into the Works by the Contractor.

2.3 Portable Fire Extinguishers

- A. Provide fire extinguishers and fire blankets in accordance with AS/NZS 1841.1, AS 2444 and as required to satisfy the requirements of the BCA. This shall include but not be limited to a portable fire extinguisher and fire blanket in the kitchen and kiosk areas.

2.4 Type LK-01 Lockers

- A. Manufacturer/supplier/reference: Interloc Lockers as described and detailed in the Fittings & Fixtures Schedule.
- B. All lockers shall be wired to a LINKS membership system as well as a UPS battery backup system.

3. EXECUTION

3.1 Installation

- A. Do not install into the Works until the building is weathertight, wet trades have finished their work and the building is well dried out.
- B. Before, during and after installation, temperature and humidity shall be maintained at levels approximating to those that will prevail after the building is occupied.

- C. Fix securely using manufacturer's fixing components without causing distortions to frames, panels and doors.
- D. Hardware shall be checked, adjusted and lubricated as necessary to ensure correct functioning.

3.2 Fixtures/ Furnishing Systems

- A. Reinforcing shall be provided as required to ensure a rigid and secure assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints. All joints, corners and mitres shall be accurately fitted. Fastenings shall be concealed. Threaded connections shall be made up tightly so that threads are entirely concealed.
- B. Accurately cut and form the materials to the required shape and profile with all exposed surfaces free from irregularities and defects. Carefully fit and match all components before assembly to maintain continuity of line between them. Provide hairline joints between contact surfaces of non-welded joints, unless shown otherwise. Complete all cutting, drilling, welding, etc, before the application of final finishes.
- C. Accurately align components and rigidly secure all non-moving joints by welding or fixing with machine screws or bolts. Reinforce joints and components as necessary to achieve the required strength and provide proper joint fixing. Ensure that no areas of unfinished material are visible in the finished work. Drive in all exposed fasteners level and flush with the adjacent surfaces. Disassemble only to the extent necessary to facilitate transportation to Site.

3.3 Hardware

- A. Assemble and fix carefully and accurately using fastenings with matching finish supplied by the hardware manufacturer. Prevent damage to hardware and adjacent surfaces. At completion, check, adjust and lubricate as necessary to ensure correct functioning.

3.4 Protection

- A. Do not deliver components to Site until required and do not remove protective packaging/coverings until immediately before required for fixing.

SECTION 06-202 -- JOINERY	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Hold Points	1
1.6 Subcontractors	1
1.7 Warranties	1
1.8 Test Requirements	1
2. PRODUCTS	1
2.1 Joinery Finishes	1
2.2 Timber Products	1
2.3 Metalwork Finish	1
2.4 Laminate to Horizontal Work Surfaces	2
2.5 Laminate to Vertical Surfaces	2
2.6 Built-In Joinery Generally	2
2.7 Washroom Vanity Units	3
2.8 Wall Mirror	3
2.9 Glass Splashback	3
2.10 Plastic Laminate Faced Panels	3
2.11 Plywood	4
2.12 Particleboard	4
2.13 MDF	4
2.14 Stainless Steel Generally	4
2.15 Metals	4
2.16 Hardware	4
2.17 Concealment of Fixings	5
2.18 Protection	5
3. EXECUTION	5
3.1 Materials	5
3.2 Installation Generally	5
3.3 Installation Tolerances	5
3.4 Moisture Content	5
3.5 Workmanship	5
3.6 Fixtures, Fittings and Appliances.	5
3.7 Sealant Pointing	6
3.8 Fitting Trims	6
3.9 Hardware	6
3.10 Protection	6
3.11 Completion	6

SECTION 06-202 -- JOINERY

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
 - 1. Built-in and free standing, purpose built joinery and specialist furniture.
 - 2. Glass splashbacks and wall mirrors.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following prior to commencing joinery manufacture:
 - 1. A 300mm x 300mm minimum size sample of each substrate, surface and finish.
 - 2. One sample of each type of hardware.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
 - 1. The first installed of each type of joinery and/ or item of specialist furniture specified in a location as agreed with the Superintendent.

1.5 Hold Points

- A. Do not proceed with the installation of wall mounted joinery, fittings or fixtures until it has been confirmed to the Superintendent that adequate support structure has been provided within the wall.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.7 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
 - 1. All joinery items, specialist furniture and fittings: 3 years.

1.8 Test Requirements

- A. Include for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.

2. PRODUCTS

2.1 Joinery Finishes

- A. All finishes and accessories to purpose designed and purpose built joinery items, shall be as nominated in the Product & Material Schedule and to accepted samples. These shall include but not be limited to:
 - 1. GS-01 Colorback glass.
 - 2. JC-'nn' Various joinery componentry.
 - 3. JCP-01 Compact laminate.
 - 4. JL-'nn' Various laminate finishes/colours.
 - 5. JO-01 Opal acrylic diffuser.
 - 6. JSK-01 Skirting/joinery kicker.
 - 7. JTM-01 Bench seating.

2.2 Timber Products

- A. All timber and timber based products shall comply with the requirements described in Section 08-050.
- B. All MDF, plywood and particleboard products shall be class E0 low formaldehyde unless specified otherwise.

2.3 Metalwork Finish

- A. All metalwork and associated fixings concealed in the completed works shall be either:

1. Hot dip galvanised (self finish) in accordance with Section 08-150, or
2. Factory or site applied zinc coated steel, to the acceptance of the Superintendent.

- B. All metalwork and associated fixings exposed in the finished works shall be either selected powder coat finish or grade 304 stainless steel with a no 4 polished finish. Refer to the Drawings and/or schedules for specific finishes.

2.4 Laminate to Horizontal Work Surfaces

- A. Laminate shall be high-pressure laminate to AS/NZS 2924.1, unless otherwise specified.
- B. Selected 1.2mm thick plastic laminate. Brand name and colour as scheduled.
- C. Post formed to profiles as detailed and glued to substrate using an accepted waterproof adhesive as recommended by the laminate manufacturer.

2.5 Laminate to Vertical Surfaces

- A. Laminate shall be high-pressure laminate to AS/NZS 2924.1, unless otherwise specified.
- B. Selected 0.8mm thick plastic laminate. Brand name and colour as scheduled.
- C. It shall be glued to the substrate using an accepted waterproof adhesive as recommended by the laminate manufacturer.

2.6 Built-In Joinery Generally

- A. Built-in joinery as detailed on the Drawings comprising:
 1. Laminate benches and desks
 - a) Construct from 32mm moisture resistant plywood, particleboard or MDF as specified. Support on underbench joinery carcasses or on support framing system as detailed.
 - b) Selected laminate finish to all exposed faces and edges.
 - c) Mounting height:
 - i) Benches shall be set at 900mm above finished floor level unless nominated otherwise on the Drawings.
 - ii) Desks shall be set at 720mm above finished floor level unless nominated otherwise on the Drawings.
 2. Stone benchtops and vanities
 - a) Construct bench and vanity tops from natural stone/ reconstituted stone as nominated in the schedule. Support and adhere to a moisture resistant plywood, particleboard or MDF backing board as recommended by the manufacturer and support on the underbench joinery carcass or on a support framing system as detailed.
 - b) Profiles as detailed.
 3. Cupboard, drawer and shelf units
 - a) Purpose made cupboard, shelf and drawer units. Refer to the Drawings for configuration and extent.
 - b) Carcass sides, intermediate divisions, back and floor to be constructed from 18mm thick MDF, plywood or particleboard as agreed with the Superintendent. Cut back sides and intermediate divisions to allow for a toe recess as detailed.
 - c) Provide Furnco or similar adjustable levellers for true level and alignment. Secure to floor.
 - d) 18mm thick kickplate in selected finish forming a toe recess. Accurately scribe the toe recess to the floor and provide a silicone seal at the floor junction. Height as detailed.
 - e) Internal surfaces of cupboard and drawer units, including fixed/ adjustable shelves to be white laminate finish unless detailed/ scheduled otherwise..
 - f) Front and back of cupboard doors and drawer fronts shall be in the selected finish.
 - g) All edges to doors and drawer faces shall receive ABS edge strips in colour matching the door/ drawer face.
 - h) All external faces of cupboard, drawer and shelf units including toe recess/ plinth and infill fillets/ panels shall be in the selected finish.
 - i) Cupboard door hinges shall be concealed 120° opening Blum or Häfele type hinges. Number of hinges to suit size and weight of door. 90° hinges will only be accepted to doors immediately adjacent return walls.
 - j) Drawer sides and back to be constructed from 16mm MDF. Drawer base from 6mm plywood trenched into sides, front and back. White laminate finish.

- k) Drawers to be fitted with ball bearing type 'soft close' slides with adjustable stop to prevent accidental full withdrawal of drawer from carcass.
- l) Drawers and doors shall be fitted with selected handles screw fixed from the inside of the drawer/ door fronts.
- m) Fixed shelves shall be either 18mm or 25mm MDF as detailed on the Drawings recessed into sides and/ or intermediate divisions of carcass. Glued and secured with concealed non-corrosive mechanical fasteners. ABS edging to front edge.
- n) Adjustable shelves shall be as detailed on the Drawings and supported on four stainless steel shelf support lugs. Front edge shall be ABS edge stripped. All other edges to be laminate edge stripped. Provide a series of accurately drilled holes in the carcass sides/ intermediate divisions to allow for six shelf positions each spaced 50mm apart. Each hole to be fitted with a stainless steel bush to receive the shelf support lugs. Shelf thicknesses shall be:
 - i) 18mm for shelves up to 600mm wide.
 - ii) 25mm for shelves between 600mm and 1200mm wide.
- o) Where indicated on the Drawings provide cupboard and drawer locks to accepted samples. Allow for master keying of locks to later direction by the Superintendent.
- p) Provide cutlery inserts, plastic coated wire baskets and all other accessory items detailed or described on the Drawings and/or the schedules.
- q) Where indicated on the Drawings, overhead and tall joinery units shall include a fixed solid front panel plus side returns where applicable forming a bulkhead that extends to the underside of the ceiling. The bulkhead shall finish flush with cupboard doors and be 18mm proud of shelf units. Paint finish to match adjacent walls.
- r) Coordinate with electrical services where the Drawings indicate integral lighting is required to the underside of overhead cupboards.
- s) Include a 20mm nominal width scribed fillet to either side of joinery units where the joinery is 'wall to wall'.

2.7 Washroom Vanity Units

- A. Construct from 18mm moisture resistant plywood or MDF. Support back and sides of vanity unit on concealed 30mm x 30mm x 2.5mm continuous galvanised steel wall-mounted angle.
- B. Facing and finish as scheduled or as detailed on the Drawings.
- C. Laminate shall be post formed to profiles as detailed and glued to substrate with an accepted waterproof adhesive as recommended by the laminate manufacturer.
- D. Provide a concealed 50mm x 50mm stainless steel angle flashing at back and enclosed ends. Set flashing into sawcut in back of vanity bench. Seal all joints with accepted silicone.

2.8 Wall Mirror

- A. 6mm thick Viridian DecorMirror or acceptable equivalent mirror glass with polished edges. Adhere to plywood or equivalent backing board and concealed fixed into wall. Mirrors to finish flush with adjacent linings unless detailed otherwise.
- B. Refer to the Drawings for panel sizes, joint layouts and extent.
- C. Where mirrors comprise multiple panels, extreme care shall be taken to align each panel so that a perfect uninterrupted reflection is achieved.
- D. All joints shall be caulked with a manufacturer approved sealant.

2.9 Glass Splashback

- A. DecoGlaze or acceptable equivalent colourback glass splashback. Colour as scheduled.
- B. Adhesive fixed as recommended by the manufacturer.

2.10 Plastic Laminate Faced Panels

- A. The core material to all plastic laminate-faced panels shall be to the following minimum standards:
 - 1. Plywood, particleboard or MDF as follows:
 - a) Thickness: 18mm minimum unless otherwise indicated or specified.
 - b) MDF Type: MDF (HMR) (moisture resistant) to AS/NZS 1859.2.
 - c) Plywood: Type WBP.
 - d) Particleboard: Moisture resistant to AS/NZS 1859.1.
 - 2. Adhesives shall be compatible with the type and durability class of the core material and shall be as recommended by the manufacturer.

3. Preserving treatment: Organic solvent with water repellent in accordance with AS/NZS 1604.2 and AS/NZS 1604.3.
 4. Moisture content shall be appropriate to the core materials to suit the internal environmental conditions.
- B. Laminate shall be high-pressure laminate to AS/NZS 2924.1, unless otherwise specified.
- C. Laminate Thickness (minimum):
1. For horizontal surfaces fixed to a continuous background: 1.2mm.
 2. For vertical surfaces fixed to a continuous background: 0.8mm.
 3. For post formed laminate fixed to a continuous background: 0.8mm.
 4. For vertical surfaces fixed intermittently (eg to studs): 3mm.
 5. For edge strips: 0.4mm.
- D. Form edgings using solid grade high-pressure laminate to match laminate facings in colour and texture.
1. Edges including rebated edges shall be fully lipped and bevelled on all sides so as to show no black lines.

2.11 Plywood

- A. WBP grade plywood, EWPA certified, to satisfy the requirements of AS/NZS 2271.
- B. Type: WBP bonding minimum class A or class B bond quality to AS/NZS 2271. Thickness to suit the design requirements.
- C. Plywood shall be E0 grade unless nominated otherwise.
- D. Ensure that fastenings do not protrude above surface of board. Fastenings shall be of a type recommended for the purpose by the fastenings manufacturer.
- E. Finish shall be suitable for its location, sanded where finished or unsanded where not visible.
- F. Preservative treatment shall be to Australian Safety and Compensation Council (ASCC) codes of practice and to AS/NZS 1604.3.

2.12 Particleboard

- A. Particleboard shall comply with AS/NZS 1859.1.
- B. Particleboard shall be E0 grade unless nominated otherwise.
- C. Use paint quality veneered moisture resistant particleboard for surfaces to be painted or plastic laminate faced.

2.13 MDF

- A. To AS/NZS 1859.2.
- B. All MDF board shall be E0 grade unless nominated otherwise.
- C. MDF shall not be cut, trimmed, planed or sanded on Site. MDF joinery requiring alteration shall be removed from Site for alteration and returned to Site ready for installation.

2.14 Stainless Steel Generally

- A. Stainless steel shall be in accordance with Section 08-100.
- B. Stainless steel shall be made from corrosion resistant nickel chromium steel to ASTM A666-03, Type 304.
- C. Type 316L shall be used in corrosive environments.
- D. Where Site or shop welding is required, use manual inert gas tungsten-arc welding in accordance with AS/NZS 1554, carried out by welders tested in accordance with AS 1796. Welds shall be continuous and of a material and technique suited to the sections being assembled. Weld finish shall be smooth with all flux residues removed and no surface defects (eg undercut, porosity, deep ridges, etc).
- E. All fixings shall be of sufficient strength for their purpose.

2.15 Metals

- A. Refer to Section 08-100.
- B. Metals shall be free from defects that will impair their strength, durability, performance or appearance. Metals used in exposed work shall be produced to the highest commercial standards of flatness, free from surface blemishes including waves, striations, tool and die marks, other defects and/ or impurities and manufacturer's names and identifying numbers. Profiles shall be true to angle or curvature as required with sharp edge and corners.

2.16 Hardware

- A. All hardware shall be assembled, installed and adjusted as necessary in accordance with the manufacturer's recommendations.
- B. Finishes of fixing screws which will be visible in the completed work shall match the finish of the particular hardware item.

2.17 Concealment of Fixings

- A. Unless specified otherwise, heads of screws and other fixing devices shall not be exposed on external surfaces which will be visible in the completed works.
- B. Where fixing screws in exposed surfaces cannot be avoided, they shall be deeply countersunk and the screw holes filled as follows:
 - 1. In opaque painted surfaces, fill with putty, finish flush and sand to achieve a smooth surface finish.
- C. Screws which are required to be removable for maintenance access or other purposes shall be chromium plated and countersunk. Provide coloured caps to match the surface finish.

2.18 Protection

- A. Protect all joinery units from potential damage by other trades until Practical Completion.

3. EXECUTION

3.1 Materials

- A. Use materials, fixers, sealing and finishing materials that satisfy current environmental legislation and do not give off emissions of any sort that may be considered harmful.

3.2 Installation Generally

- A. Do not install joinery until the surrounding areas are made watertight, wet trades have finished their work, wall and floor tiling is complete and the building is well dried out.
- B. Install joinery securely using adequate concealed fixing components, without causing stress or distortion to panels and doors. Visible fixings shall not be used.
- C. Before, during and after installation, temperature and humidity shall be maintained at levels approximating to those that will prevail after the building is occupied.

3.3 Installation Tolerances

- A. A high degree of accuracy shall be employed in the fabrication and installation of joinery and support structures.
- B. On-Site dimensions:
 - 1. All dimensions shall be checked on Site.
 - 2. The final design shall accommodate all specified tolerances and differences between actual Site dimensions and dimensions shown on the Shop Drawings.
 - 3. Cut-outs for interfacing works shall be to the dimensions shown on the Drawings $\pm 1\text{mm}$.

3.4 Moisture Content

- A. During delivery, storage, fixing and thereafter to Practical Completion, conditions of temperature and humidity shall be maintained to suit specified moisture content(s) of timber components. Components shall be tested with an agreed moisture meter, to the manufacturer's recommendations.

3.5 Workmanship

- A. Workmanship shall be of a high standard using fully proven practices.
- B. Setting out shall be accurate and in accordance with the Drawings. Check all dimensions on Site prior to manufacture.
- C. Set out accurately to ensure frames, panels and doors are plumb, level and accurately aligned.
- D. All joints shall be horizontal or vertical, with all edges and joints square, unless otherwise indicated on the Drawings.
- E. Methods of fixing and fastenings shall be according to the manufacturer's recommendations unless specified otherwise.
- F. Do not cut, plane or sand prefinished surfaces unless otherwise agreed with the Superintendent.
- G. Adjust hinges so that gaps around doors are consistent and within the tolerances specified.
- H. Doors and drawers shall be accurately aligned and not binding. Adjust as necessary to ensure smooth operation.

3.6 Fixtures, Fittings and Appliances.

- A. Taps and fixtures shall be fixed securely ensuring a watertight seal.

- B. Refer Section 06-203.

3.7 Sealant Pointing

- A. Sealant shall be silicone based. See Section 08-400.
- B. Agree sealant colour with the Superintendent prior to commencement.

3.8 Fitting Trims

- A. Wherever possible, trims shall be in unjointed lengths between angles or ends of runs. Where running joints are unavoidable, locate them appropriately and form neat butt joints. Angle joints shall be mitred unless otherwise specified.

3.9 Hardware

- A. Assemble and fix carefully and accurately using fastenings with matching finish supplied by the hardware manufacturer. Prevent damage to hardware and adjacent surfaces.

3.10 Protection

- A. Do not deliver components to Site until required and do not remove protective packaging/coverings until immediately before required for fixing.
- B. Stack boards, panels, shelving, etc, flat on bearers and separated by spacers where necessary to prevent damage to or from projections.
- C. Keep components and completed work clean and dry, and adequately protect from physical damage until Practical Completion.

3.11 Completion

- A. Doors and drawers shall be accurately aligned and not binding. Adjust as necessary to ensure smooth operation.
- B. Hardware shall be checked and adjusted as necessary to ensure correct functioning.
- C. Cleaning:
 - 1. All joinery shall be thoroughly cleaned at Practical Completion removing all finger marks, glue overruns and the like as well as all builder's rubbish, offcuts and sawdust from the inside of cupboards, drawers and shelves.
 - 2. All protective tapes, films and the like shall be removed.
- D. Ensure that all work is defect free at Practical Completion.

SECTION 06-203 -- SANITARY FIXTURES/ APPLIANCES/ FITTINGS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Samples	1
1.4 Quality Benchmarks	1
1.5 Subcontractors	1
1.6 Hold Points	1
1.7 Warranties	1
2. PRODUCTS	1
2.1 Products Generally	1
2.2 Materials Generally	2
2.3 Lagging of Pipework	2
2.4 Sealant Pointing	2
2.5 Product Data	2
2.6 Appliances, Equipment, Fittings and Fixtures Generally	2
2.7 Types FW-01 Floor Waste & FW-02 Trench Drain	2
2.8 Sanitaryware Generally	2
2.9 Tapware Generally	2
2.10 Accessories	2
3. EXECUTION	2
3.1 Installation General	2
3.2 Sanitaryware	2
3.3 Workmanship	3
3.4 Fixing of Taps	3
3.5 Sealant Pointing	3
3.6 Installation of White Goods	3
3.7 Completion	3

SECTION 06-203 -- SANITARY FIXTURES/ APPLIANCES/ FITTINGS

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Sanitaryware, fixtures and fittings.
 2. Appliances, white goods and equipment.
 3. Tapware, hardware and accessories.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. One of each fixture, fitting, appliance and accessory where different from that nominated in the schedules and where acceptance of the alternative from the Superintendent is pending acceptance of the sample.

1.4 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first installed and accepted of each type specified in a location as agreed with the Superintendent.

1.5 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.6 Hold Points

- A. Do not proceed with the installation of wall mounted fittings, fixtures or equipment until it has been confirmed to the Superintendent that adequate support structure has been provided within the wall.

1.7 Warranties

- A. Prior to Practical Completion a written warranty shall be submitted to the Superintendent for the following:
1. Sanitaryware, appliances, equipment, fittings, fixtures and accessories: 2 years.

2. PRODUCTS

2.1 Products Generally

- A. All sanitaryware, hardware, fittings, fixtures, appliances, accessories and equipment shall be as nominated in the Fittings & Fixtures Schedule. Supply and install into the works, connect to supply and/or waste services as applicable and protect as necessary until Practical Completion.
- B. Water efficient fixtures and fittings.
1. Water efficient sanitary fixtures and fittings complying with the requirements of the WELS Standard AS/NZS 6400 shall be used. Confirm the star ratings of all water using fixtures and fittings prior to installation including tapware, toilets, showers, flow controllers and dishwashers, as applicable.
 2. The following ratings shall be the minimum acceptable ratings for each sanitary fitting/ fixture type when measured in accordance with AS/NZS 6400:
 - a) Tapware to sinks, troughs and washbasins: 6 star water star rating (maximum flow rate of 4.5 litres/min).
 - b) Shower heads: 3 star water star rating (maximum flow rate of 9 litres/min).
 - c) Toilets: 4 star water star rating (dual flush with maximum 3/4.5 litres/flush).
 - d) Urinals: 4 star water star rating.
 - e) Dishwashers: 3 star water star rating (maximum water consumption of 1.3 litres /place setting).
- C. Where the Contractor seeks to install an alternative product to that nominated in the Specification or schedules, the alternative shall be accepted by the Superintendent prior to installation. Contractor nominated alternatives to products that carry a water star rating shall have a rating equal or better than that specified.

- D. Install in accordance with the manufacturer's instructions and ensure that adequate in-wall or in-ceiling support, as applicable, is provided in the form of noggings, mounting plates, Unistrut framing and the like.
- E. Coordinate with all other trades as necessary to ensure that adequate in-wall and in-ceiling support is provided.

2.2 Materials Generally

- A. All fixtures and fittings shall be free from imperfections, true to line, angles, curves and colours, smooth, watertight and complete in every respect.
- B. One manufacturer shall supply all fixtures, unless specified otherwise.

2.3 Lagging of Pipework

- A. All vertical and horizontal runs of internal waste pipework shall be lagged with CSR Bradford or acceptable equivalent Acoustilag acoustic pipewrap. 25mm thick foil faced glasswool insulation. Wrap the insulation around the pipe and tape the butt joint with matching pressure sensitive foil tape. Where exposed in the completed works, lagging shall be carefully and accurately fitted to the acceptance to the Superintendent.

2.4 Sealant Pointing

- A. Sealant shall be silicone based with fungicide. See Section 08-400.

2.5 Product Data

- A. Submit to the Superintendent for review, copies of technical data prepared for each product or material proposed, which lists the specified performance of each material and product to be used.

2.6 Appliances, Equipment, Fittings and Fixtures Generally

- A. Unless noted otherwise, all appliances, equipment, fittings and fixtures shall be procured and installed into the works by the Contractor. Services reticulation to, and connection of, the item shall be completed prior to Practical Completion. Refer to the Fittings & Fixtures Schedule.

2.7 Types FW-01 Floor Waste & FW-02 Trench Drain

- A. As nominated and described in the Product & Material Schedule.

2.8 Sanitaryware Generally

- A. Manufacturer/ reference: As nominated in the Fittings & Fixtures Schedule.
- B. Toilet suites shall comply with the requirements of AS 1172.
- C. Sinks and basins shall comply with the requirements of AS/NZS 1730.
- D. Fixtures and fittings in ambulant and/or disabled access bathrooms shall comply with the requirements of AS 1428.1.

2.9 Tapware Generally

- A. Manufacturer/ reference: As nominated in the Fittings & Fixtures Schedule.

2.10 Accessories

- A. All accessories and sundry items shall be as nominated in the Fittings & Fixtures Schedule.
- B. Install in accordance with the manufacturer's instructions and ensure that adequate in-wall support is provided in the form of noggings, mounting plates and the like.
- C. Coordinate all relevant Subcontractors and ensure that adequate in-wall support is provided.

3. EXECUTION

3.1 Installation General

- A. All appliances, fixtures and fittings shall be installed in accordance with the manufacturer's recommendations.
- B. Assemble and install fixtures, fittings and accessories so that surfaces designed with falls drain as intended.
- C. Use non-ferrous or stainless steel fastenings unless otherwise specified.
- D. On Practical Completion, remove protective coverings, tapes, etc. and check for damage and defects. Test for satisfactory operation and replace all damaged or defective components/ accessories. Thoroughly clean the whole installation.
- E. Noggings, bearers, etc, required to support appliances fixtures and fittings shall be accurately positioned and securely fixed.
- F. Apply sealant in accordance with Section 08-400.

3.2 Sanitaryware

- A. Toilet seats and lids shall be stable when raised.
- B. Cisterns:
 - 1. Cistern operating components shall be as recommended by the cistern manufacturer. The ball valve shall match the pressure of the water supply.
 - 2. Fix cisterns at heights recommended by the manufacturer unless otherwise specified or shown on the Drawings.
 - 3. Fix overflow pipe to falls and locate to give visible warning of discharge.
- C. Fix taps securely, making a watertight seal with the appliance.
- D. Wastes/ overflows shall be bedded in waterproof jointing compound and fixed with a resilient washer between appliance and back nut.

3.3 Workmanship

- A. Units shall be manufactured and rigidly assembled by skilled workmen to the complete satisfaction of the Superintendent. Reinforcing shall be provided as required to ensure a rigid and secure assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints. All joints, corners and mitres shall be accurately fitted. Fastenings shall be concealed. Threaded connections shall be made up tightly so that threads are entirely concealed.
- B. All joints and corners shall be accurately fitted to shapes and dimensions shown, with all lines, angles and surfaces in true alignment, plumb, level and in proper plane.
- C. Use the proper thickness of metal, adequate stiffeners, supports and proven details of assembly so that the finished material conforms to the highest standards of the industry. Reinforce members and joints with steel plates, bars, rods or angles for rigidity and strength as needed to comply with performance requirements.
- D. All exposed work shall be carefully matched to produce continuity of line and design. Joints in exposed metal work shall be accurately fitted and rigidly secured with hairline contacts. Exposed joints in flat surfaces shall be flush, unless otherwise shown. End joints shall have sleeves of the same outline as the exposed shapes to assure good alignment.
- E. Do not install units that have members that are warped, bowed, deformed or otherwise damaged or defaced. Remove and replace such members as directed.
- F. Accurately cut and form the materials to the required shape and profile with all exposed surfaces free from irregularities and defects. Carefully fit and match all components before assembly to maintain continuity of line between them. Provide hairline joints between contact surfaces of non-welded joints, unless shown otherwise. Complete all cutting, drilling, welding, etc, before the application of final finishes.
- G. Drill, countersink and tap components as necessary to receive threaded fasteners. Use concealed fasteners wherever possible. Set out exposed fasteners where permitted in an even manner.
- H. All elements of framework and associated beads and strips shall be stored on Site such that they do not get damaged or distorted.

3.4 Fixing of Taps

- A. Taps shall be fixed securely, making a watertight seal with the appliance or fixture.

3.5 Sealant Pointing

- A. Sealant shall be silicone based; refer to Section 08-400.
- B. Colour shall be white unless specified otherwise.

3.6 Installation of White Goods

- A. Prior to Practical Completion, install all white goods documented as being part of the Works and ensure that they are in working order.

3.7 Completion

- A. Operating and Maintenance manuals: Submit user manuals and other such documentation as provided by the manufacturer/ supplier covering installation, operating and maintenance requirements for all equipment, appliances, fixtures and fittings installed into the Works. Submit in accordance with the requirements of Section 01-100.

SECTION 06-250 -- SIGNAGE	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Outline of Work	1
1.3 Standards	1
1.4 Samples	1
1.5 Quality Benchmarks	1
1.6 Subcontractors	1
1.7 Shop Drawings	1
1.8 Warranties	1
1.9 Test Requirements	1
2. PRODUCTS	1
2.1 Signage Generally	1
2.2 Statutory Signs	1
2.3 Tactile and Braille Signage	2
2.4 Fire Hydrants and Hose-Reels	2
2.5 Amenities	2
2.6 Plant Room Signage	2
2.7 Materials	2
2.8 Manufacturing Tolerances	2
2.9 Fabrication	3
2.10 Fixings	3
3. EXECUTION	3
3.1 Installation Generally	3
3.2 Signs/ Notices Tolerances	3

SECTION 06-250 -- SIGNAGE

1. GENERAL

1.1 Related Documents

- A. This work section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Outline of Work

- A. This work section, when read in conjunction with the Drawings, provides particular requirements with respect to the following:
1. Statutory signage.
 2. General signage.
 3. Way finding signage.
- B. Ensure that all interfaces are fully coordinated prior to commencement.

1.3 Standards

- A. Signage shall comply with the following standards:
1. Design and use of signs generally: To AS 2342.
 2. Design and use of safety signs: To AS 1319.
 3. Braille and tactile signage: To AS 1428.1.

1.4 Samples

- A. In accordance with Section 01-100, provide samples of the following:
1. An appropriately sized sample of each type of sign demonstrating proposed lettering/ numbering, fonts and sizes as well as background materials, colours and finishes.
 2. Fixing devices.

1.5 Quality Benchmarks

- A. Provide the following quality benchmarks in accordance with Section 01-100:
1. The first installed of each type of sign/ notice in a location as agreed with the Superintendent.

1.6 Subcontractors

- A. Submit names and contact details of proposed suppliers and Subcontractors.

1.7 Shop Drawings

- A. Submit Shop Drawings showing the following information where relevant:
1. Layout, construction and fixing details for custom designed (non standard) sign systems.
 2. Large scale (full size if practicable) lettering layouts for individual letter signs.
 3. Full-sized spacing templates for individually mounted characters.
 4. Location template drawings for anchorages to permanent construction. Show type of anchorage.
 5. Wiring diagrams for illuminated signs.
- B. Provide a computer CD-ROM formatted to be read by the Windows operating system of the graphics in a format to be accepted by the Superintendent for future signs.

1.8 Warranties

- A. Prior to Practical Completion provide a warranty for the following:
1. Signage: 2 years.

1.9 Test Requirements

- A. Provide evidence/ testing data and reports to demonstrate that all materials/ products proposed have been tested to meet standards specified herein.

2. PRODUCTS

2.1 Signage Generally

- A. All signage shall be of a high standard of quality expected in a specially designed aquatic facility of this type. Signage shall be consistent throughout.
- B. Provide all general, directional, regulatory, room identification and room numbering signage as nominated, described and detailed in the documents.
- C. All new signage shall be equal to and marry in with existing signage.

2.2 Statutory Signs

- A. All signage shall meet the requirements of the Building Code of Australia, Australian Braille Authority, and any other relevant standards.
- B. Signage shall include, but not be limited to, the following:
 - 1. Escape doors.
 - 2. Plant rooms.
 - 3. Switch rooms.
 - 4. Cleaners.
 - 5. Window decals.

2.3 Tactile and Braille Signage

- A. Provide signs suitable for the sight impaired including Braille and tactile signage. Braille and tactile signage must comply with BCA Clause D3.6 (a) (i), AS 1428.1 Clause 8.1 (a) (i) (A) International symbol of access, raised symbols, text and Braille and the ABA Australian Braille Authority.
- B. Include Braille and tactile signage for:
 - 1. Public toilets.
 - 2. Paths of travel and changes of direction in public areas.
- C. Submit a schedule of all Braille signs indicating the plain text meanings.
- D. The mounting height for Braille signs must be nominal 1300mm above floor level. Verify mounting height.

2.4 Fire Hydrants and Hose-Reels

- A. Comply with the signage requirements for fire equipment, fire hydrant cupboards, fire hose reel cupboards, and portable fire extinguishers in accordance with the following standards:
 - 1. Portable fire extinguishers to AS/NZS 1841.
 - 2. Fire hydrant installations to AS 2419.
 - 3. Portable fire extinguishers and fire blankets to AS 2444.

2.5 Amenities

- A. Provide signage identifying all toilets and similar amenities designated for use by the public.

2.6 Plant Room Signage

- A. All services pipework must be labelled in accordance with AS 1345 and The Australian Dangerous Goods & Substances Code of Practice. Refer also to the Services Engineer's drawings and specifications.

2.7 Materials

- A. Aluminium:
 - 1. Plate for engraving: Alloy and temper designation 6063-0.
 - 2. For casting: To AS 1874.
- B. Stainless steel: Surface finish designation 4 (general purpose polished).
- C. Plastics:
 - 1. UPVC sheet: Semi-rigid sheet.
 - 2. Rigid cellular polystyrene: To AS 1366.3, class VH for cut-out shapes.
- D. Vinyl
 - 1. 1.2mm thick sheet vinyl. Individually laser cut letters.

2.8 Manufacturing Tolerances

- A. Glass and acrylic tolerances:
 - 1. Manufactured glass/ acrylic sizes shall not exceed ± 1 mm on each straight length and diagonal.
 - 2. After final processing, the deviation in flatness at any peak shall not exceed 0.13mm and the difference between adjacent peaks shall not exceed 0.08mm. Where bow tolerance and wave tolerance differ, the stricter requirements shall prevail.
- B. Metal tolerances:
 - 1. Sheet length, width and diagonal dimensions shall not exceed ± 1 mm.
 - 2. Metal and glass shall be smooth and flat. The required flatness criterion shall be 1:1000 gradient. Permitted deviation of panel widths and lengths shall not be in excess of ± 2 mm.

- C. Submit to the Superintendent a detailed list of tolerances to which signage will be fabricated.

2.9 Fabrication

- A. General: Form graphics items accurately with clean, well defined edges or arrises, free from blemishes.
- B. Engraving: Precision machine engraving resulting in sharp edges and smooth excavated surfaces, filled with the colour, or excavated to expose the substrate in two-colour sheet plastic engraving.
- C. Cut-out shapes: Cut from solid material and hand finish as necessary.

2.10 Fixings

- A. All fixings selected shall be suitable for their intended purpose and adequate to comply with the performance requirements. Fixings shall not be visible.
- B. Fixings shall conform to all statutory requirements in respect of strength and type.
- C. Prevent bimetallic corrosion between dissimilar metals.
- D. Fix items that require accessibility or removal with screws bolts and hinges.
- E. Access panels shall be removable independently of any other panels.
- F. Design to withstand all vibrations caused by traffic, aircraft, wind effects or any other such shocks, strains, stresses and movements including the operation of smoke detectors and any mechanical ventilation devices that may be imposed by the users. Suitable devices for absorbing or damping any such vibration shall be included.
- G. Design so as not to transmit any drumming noise as a result of vibration, shocks or stress. Use sound deadening material in all areas.

3. EXECUTION

3.1 Installation Generally

- A. Ensure that the final appearance of all signage is of a uniform and consistent quality.
- B. The letters to each individual sign are to be supplied on removable backing strips to allow accurate installation.
- C. Signage to doors shall be located centrally, level and according to Australian Standards.
- D. External signage will be exposed to the elements and will require regular maintenance procedures. Ensure that signage is weatherproof and moisture is prevented from penetrating any illuminated sign, light box or any other internal space or cavity. Signs shall to adequately sealed to prevent ingress of water, dirt, insects etc. as well as be provided with drain holes should moisture penetration occur.
- E. Folded edges and edge finishing shall be smooth and free of sharps, defects, oil canning, warping and dents. Folded or rebated panel skins may interlock to provide stability and sealed to prevent ingress of water and dirt. Jointing of panels shall be hairline, smooth and flush on the front face.

3.2 Signs/ Notices Tolerances

- A. A high degree of accuracy is required in the fabrication and installation of signage and its support structure.
- B. On-Site dimensions:
 - 1. Take responsibility for checking all dimensions on Site.
 - 2. Accommodate any given tolerances and differences between actual Site dimensions and dimensions shown on the Drawings.

SECTION 08-050 -- TIMBER AND WOOD BASED PRODUCTS	1
1. GENERAL	1
1.1 Related Documents	1
2. PRODUCTS	1
2.1 Timber	1
2.2 Sourcing of Timber	1
2.3 Formaldehyde Emissions	2
2.4 Plywood	3
2.5 Particleboard	3
2.6 MDF	3
2.7 Timber Veneers	3
2.8 Terminology	3
2.9 Drying Quality	4
2.10 Durability	4
2.11 Visible Work	4
2.12 Dimensions	4
2.13 Stress Grading of Timber	4
2.14 Identification	4
3. EXECUTION	5
3.1 Workmanship Generally	5
3.2 Protection Generally	5

SECTION 08-050 -- TIMBER AND WOOD BASED PRODUCTS

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

2. PRODUCTS

2.1 Timber

- A. Hardwood:
1. Milled products: To AS 2796.1.
 2. Grade description: To AS 2796.2.
- B. Softwood:
1. Milled products: To AS 4785.1.
 2. Milled products (Cyprus Pine): To AS 1810.
 3. Grade description: To AS 4785.2.
- C. Dressed timbers: Unless otherwise noted, use the following:
1. Timbers for transparent finish: The highest grade in the standard.
 2. Timbers for opaque finish: Select grade for hardwood, standard grade for softwood.
- D. Framing shall comply with AS 1684 Parts 1, 2, 3 or 4 as appropriate.
- E. The design of timber structures shall comply with AS 1720.1.
- F. Do not use damaged, rotten or discoloured materials.
- G. Materials shall be relatively knot free, free from distortion, cracks or other blemishes.
- H. Select all timber for its final use.
- I. Moisture content of timber:
1. Timber shall be naturally seasoned for one year per 25mm thickness of board or kiln dried in accordance with BRE's Timber Drying Manual.
 2. The moisture content of all timbers nominated as 'kiln dried' shall not exceed 15% at time of delivery.
 3. For external use or in other high moisture content areas, timber shall be graded and marked "WET". Such timber shall not be used internally.
 4. Moisture content at the time of erection shall not exceed:
 - a) Under cover in generally non-conditioned spaces: 24%.
 - b) Under cover in generally conditioned spaces: 20%.
 - c) Internal spaces: 20%.
 5. Moisture content shall be determined in accordance with AS/NZS 1080.1.
- J. Structural timber members which are cut from larger graded sections shall be regraded for acceptance by the Superintendent and then appropriately marked according to the new grade.

2.2 Sourcing of Timber

- A. All timber and timber based products installed into the Works shall comply with one and/ or other of the following:
1. Accredited and certified under either the Australian Forest Certification Scheme (AFCS), the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC) scheme and to the acceptance of the Superintendent.
 2. Post consumer reused or recycled timber and clearly demonstrated as such to the acceptance of the Superintendent.
- B. Any certified timber incorporated into the Works shall be supplied in accordance with the Chain of Custody (CoC) rules of the respective forest certification scheme (e.g. relevant CoC certificates or invoices including a relevant CoC code or serial number).
- C. Tropical hardwoods or timber based products (including but not limited to veneers, edgings and manufactured board) of unknown origin are prohibited from use.
- D. All timber and timber based products shall carry the FSC or AFCS trademark or other label from an equivalent internationally recognised, globally applicable, independent certification system for good forest management, that is acceptable to the Superintendent.

- E. If unable to source timber and timber based products in accordance with the above, offer for acceptance by the Superintendent timber and timber based products from known sources being well-managed forests or plantations. Provide as a minimum the following documentation:
1. The species and country of origin.
 2. The identity of the concession/ plantation.
 3. Details of the forestry policies pursued by the concession/ plantation confirming that a managed resource policy is followed.
 4. Full shipping documents confirming the chain of custody from the source to the product supplier and subsequent delivery to Site.
- F. Provide a schedule of all timber used in the project listing timber types, source, certification, quantities and where used/ incorporated into the Works.
- G. All plywood shall be manufactured from softwood or temperate hardwoods procured from well managed sources.
- H. All engineered wood products shall fall within the formaldehyde emission rates specified.
- I. Any alternative timbers to that specified require acceptance from the Superintendent prior to commencement.
- J. Provide information to the Superintendent in respect of timber products proposed for use in the Works for review and acceptance. No timber products shall be procured until they have been accepted by the Superintendent. The information shall be presented to the Superintendent in tabular form under the following headings:
1. Origin.
 2. Trade Name.
 3. Botanical Name.
 4. Wood Product Volume Category A (m³).
 5. Wood Product Volume Category B (m³).
 6. Wood Product Volume Category R (m³).
 7. Total Volume (m³), where timber is:
 - a) Category A: From an FSC or AFCS certified forest or plantation.
 - b) Category B: From a known certifiable forest.
 - c) Category R: Recycled material.
- K. Provide confirmation from the supplier:
1. Indicating the quantity, cost and type of all timber supplied to the project.
 2. Identifying properties of the timber, ie whether the timber was reused, recycled or FSC or AFCS certified.

2.3 Formaldehyde Emissions

- A. All engineered wood products (particleboard, plywood, timber veneer, MD, LVL, glulam timber, HPL, compact laminates and decorated overlaid wood panels) incorporated into the Works shall comply with the formaldehyde emission limits stated in the table below:

<i>New Table</i>	
Test Protocol	Emission limit/ Unit of measurements
Plywood: To AS/NZS 2269 and testing procedure to AS/NZS 2098.11 method 11	< 1.0 mg/litre
Particleboard: To AS/NZS 1859.1 and testing procedure to AS/NZS 4266.16 method 16	< 1.5 mg/litre
MDF: To AS/NZS 1859.2 and testing procedure to AS/NZS 4266.16 method 16	< 1.0 mg/litre
Particleboard and Plywood: To JIS A 5908 and testing procedure to JIS A 1460	< 1.0 mg/litre
MDF: To JIS A 5905 and testing procedure to JIS A 1460	< 1.0 mg/litre
JIS A1901 (not applicable to Plywood)	< 1.0 mg/litre
ASTM D5116	< 0.1 (±0.0005)mg/m ² hr (may also be represented as mg/m ² /hr)

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ISO 16000 part 9, 10 and 11 (also known as EN 13419)	< 0.1 (± 0.0005)mg/m ² hr (may also be represented as mg/m ² /hr)
ASTM D6007	0.12mg/m ³ *
ASTM E1333	0.12mg/m ³ **
EN 717-1 (also known as DIN EN 717-1)	0.12mg/m ³
EN 717-2 (also known as DIN EN 717-2)	3.5mg/m ² hr (may also be represented as mg/m ² /hr)
*The test report must confirm that the conditions of Table 1 comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98	
** The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98	

- B. Engineered wood products used externally or in formwork and raw timber products are exempt from the above
- C. Obtain the approval of the Superintendent before substituting any engineered wood products.
- D. Provide confirmation from the supplier, of the type and quantity of each product supplied to the project.
- E. Provide confirmation:
 1. Describing the application, amount, type and supplier of engineered wood products used throughout the project.
 2. Demonstrating that compliant low-formaldehyde products were used wherever specified.
- F. Provide from the manufacturer/ supplier, a formaldehyde emissions report:
 1. Quoting the formaldehyde emission level of each engineered wood product used in the project.
 2. Highlighting the compliant emission values in the test results for clarity of submittal purposes.

2.4 Plywood

- A. Generally plywood shall comply with AS/NZS 1604.3 with Hazard Classification to Table 1 and AS/NZS 4491.
- B. WBP grade plywood, EWPA certified, shall satisfy the requirements of:
 1. Interior use: To AS/NZS 2270. Bond type C.
 2. Exterior use: To AS/NZS 2271. Bond type A.
 3. Marine plywood: To AS/NZS 2272. Bond type A.
 4. Minimum bond quality: To AS/ NZS 2754.1, with thickness to suit the design requirements.
 5. Ensure that fastenings do not protrude above the surface of the sheet. Fastenings shall be of a type recommended for the purpose by the fastenings manufacturer.
- C. Finish shall be suitable for its location, sanded:
 1. Visible surfaces with clear finish: Veneer quality A.
 2. Other visible surfaces: Veneer quality B.

2.5 Particleboard

- A. Particleboard shall comply with AS/NZS 1859.1.
- B. Use paint quality veneered moisture resistant particleboard for surfaces to be painted or plastic laminate faced.

2.6 MDF

- A. To AS/NZS 1859.2.
- B. MDF shall not be cut, trimmed, planed or sanded on Site. MDF joinery requiring alteration shall be removed from Site for alteration and returned to Site ready for installation.

2.7 Timber Veneers

- A. To AS/NZS 2097 and AS/NZS 2098.

2.8 Terminology

- A. Standard: To AS/NZS 4491.

- B. Individual timbers: Standard trade common names to AS/NZS 1148.
- C. Group of timbers: Terms employed for that purpose in relevant Australian Standards.

2.9 Drying Quality

- A. Make milled or dressed timber products from timber dried to Quality Class B as specified in AS/NZS 4787 for target moisture content, residual drying stress, checking and discoloration caused by drying.
- B. The specified drying quality of timber shall be protected during the manufacturing process using appropriate storage and handling facilities and quality management procedures.
- C. The target moisture content for dried timber shall be the equilibrium moisture content appropriate for the species of timber, the geographic location and the particular environment and conditions of use.
- D. Compliance shall be established by sampling and testing in accordance with AS/NZS 4787.
- E. Submit documentary evidence if requested.
- F. If unseasoned timber is used, or if variations in moisture content are likely to occur in service, swelling, shrinkage and differential movement shall be accommodated in the design and construction of the product.

2.10 Durability

- A. General: Provide timbers having natural durability appropriate to the conditions of use, or preservative-treated timber of equivalent durability.
- B. Natural durability classification: To AS 5604.
- C. Do not provide timbers containing Lyctus susceptible sapwood.
- D. Preservative treatment:
 - 1. Sawn and round timber: To AS 1604.1.
 - 2. Reconstituted wood-based products: To AS/NZS 1604.2.
 - 3. Plywood: To AS/NZS 1604.3.
 - 4. Laminated veneer lumber (LVL): To AS/NZS 1604.4.
 - 5. Glue laminated products: To AS/NZS 1604.5.
 - 6. Hazard classification: To AS 1604.1.

2.11 Visible Work

- A. Where timber is required to have a clear or stained finish, keep all visible faces, edges and corners clean and free from blemishes, marks and bruises.

2.12 Dimensions

- A. Framing timbers: Tolerances to AS 1684.
- B. Finished sizes: Use dressed or milled timbers with actual dimensions which are not less than the stated dimensions, except for dimensions qualified by a term such as "nominal" or "out of" or equivalent, to which a machining tolerance of -4mm per dressed face applies.

2.13 Stress Grading of Timber

- A. Hardwood: To AS 2082.
- B. Softwood: To AS 2858.
- C. Mechanical stress grading: To AS/NZS 1748.
- D. Machine proof-grading: To AS 3519.
- E. Timber with a basic thickness of less than 150mm and not specified for wet exposure shall be stress graded at a moisture content not exceeding 20%, and clearly marked "DRY" or "KD" (kiln dried).

2.14 Identification

- A. Identify timber using branding, certification or both.
- B. Brand structural timber under the authority of a recognised product certification programme applicable to the product. Locate the brand mark on faces ensuring they are concealed in the finished works. Include the following data:
 - 1. Stress grade.
 - 2. Method of grading.
 - 3. "Seasoned" or "s".
 - 4. The certification mark of the product certification programme.

5. The applicable standard.
- C. Recognised product certification programmes:
 1. Pine framing: Plantation Timber Certification.
 2. Finger jointed structural timber: Plantation Timber Certification.
 3. Plywood: Engineered Wood Products Association of Australasia (EWPA) Quality Control and Product Certification scheme.
 4. Blockboard: Engineered Wood Products Association of Australasia (EWPA) Quality Control and Product Certification scheme.
- D. If neither branding nor certification is adopted, no timber shall be used unless it has been inspected and certified by an independent inspecting authority.

3. EXECUTION

3.1 Workmanship Generally

- A. Timber members that are damaged, crushed or split beyond the limits of their grading shall not be used.
- B. The cross section dimensions of timber shown on the Drawings shall be considered the minimum sizes permitted.
- C. The warping limits set down in AS 2082 and AS 2858 for the amount of bow, spring, twist and cup in a piece of timber shall not be exceeded.
- D. Scarf joints, finger joints or splice plates shall not be used without the acceptance of the Superintendent.
- E. Notches and holes shall be positioned in relation to knots and other defects so that the strength of members is not reduced.
- F. When processing treated timber, ensure that as much cutting and machining as possible is carried out before treatment.
- G. Treat exposed surfaces with two coats of a solution recommended by the manufacturer.
- H. Treated timber which is sawn along its length, ploughed, thickness planed or otherwise extensively processed shall be retreated with the original treatment.
- I. Minor cuts and drill holes that reveal untreated timber shall be treated with a solution recommended for the purpose.
- J. When instructed by the Superintendent, timber sections shall be tested with an approved electrical moisture meter which shall be used in accordance with the manufacturer's recommendation.
 1. 5% of material but not less than ten lengths of each cross section shall be tested. Testing shall occur at the centre of the length.
 2. 90% of values given shall be within the specified range. All results shall be provided to the Superintendent in writing.

3.2 Protection Generally

- A. Timber shall be kept dry and shall not be subjected to overstress, distortion or disfigurement of sections or components during transit, storage, lifting, erection or fixing.
- B. All timber for external use shall be kept so that its moisture content does not change significantly from when it was graded "WET".
- C. Timber and components shall be stored under cover, clear of the ground and with good ventilation. Level bearers on a dry firm base shall provide support at regular intervals. Packs shall be opened to ensure free movement of air through the stack.
- D. The sequence of construction shall be arranged so that the timber is protected prior to use in the construction, while it is being mounted in the construction and subsequently maintained.
- E. Minimise end splitting of timber sections by sealing the ends with Mobilcer-M clear sealing emulsion, or acceptable equivalent, before delivery to the Site. Reapply sealing emulsion to all ends of timbers where cut on Site.
- F. Painted Finishes: Structural timber that is to be painted shall be primed according to the paint manufacturer's recommendations, prior to delivery to Site.
- G. Provide temporary protection for all materials both before and after erection until permanent coverings are in place.

SECTION 08-100 -- METALS AND PRE-FINISHES	1
1. GENERAL	1
1.1 Related Documents	1
2. PRODUCTS	1
2.1 Metals	1
2.2 Powder Coating	2
3. EXECUTION	3
3.1 Fabrication Generally	3
3.2 Cold Formed Work	3
3.3 Stainless Steel Fabrication	3
3.4 Adhesive Bonding	3
3.5 Thermal Cutting of Steel	4
3.6 Welding/ Brazing Generally	4
3.7 Brazing	4
3.8 Finishing Welded/ Brazed Joints	4
3.9 Applying Coatings	4
3.10 Applying Powder Coatings	4

SECTION 08-100 -- METALS AND PRE-FINISHES

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.
- B. For requirements pertaining to structural steel, refer also to the Structural Engineer's documents.

2. PRODUCTS

2.1 Metals

- A. Components:
 - 1. The material thicknesses and the dimensions shown on the Drawings shall be maintained within specified tolerances.
 - 2. All materials and components shall be durable and to the minimum requirements set out in the Specification and shall comply with the relevant Australian Standards.
 - 3. For each material or component, obtain the total quantity from the same supplier or manufacturer unless otherwise agreed with the Superintendent.
 - 4. Protect all inaccessible steel against corrosion.
 - 5. All support systems shall be of adequate thickness and strength to meet the structural requirements and eliminate risk of distortion in finished surfaces.
 - 6. Provide protection until Practical Completion to avoid any deterioration or damage to the finished elements.
 - 7. Finish exposed metalwork in accordance with the relevant Australian Standards. Unless otherwise specified, concealed items shall be mill finished in internal conditions only, or hot dip galvanised steel in accordance with AS/NZS 4680. Treat cut edges so that the specified level of protection is maintained.
- B. Mild Steel:
 - 1. All mild steelwork shall comply with AS 4100, unless stated otherwise.
 - 2. Fabrication of steelwork shall be in accordance with the requirements of the Specification.
 - 3. Check for accuracy of fit before and after making permanent connections in frames and other structural elements which are to be assembled before delivery to Site.
 - 4. Welding procedures shall be such that distortion is reduced to a minimum and local distortion rendered negligible in the final fabrication.
 - 5. No welds other than those shown on the Shop Drawings, even for temporary attachments or repairs, are acceptable unless agreed in advance by the Superintendent. If welded temporary connections are agreed upon, then the welding and removal of the connection shall be in accordance with AS/NZS 1554.
 - 6. Vent holes in hollow sections shall be sealed in a manner to prevent the ingress of moisture.
 - 7. External visible lines and depressions caused by the internal welding of hollow section steelwork shall be positioned so as to be non visible.
- C. Aluminium:
 - 1. Unless otherwise specified, fabricate all extruded aluminium alloy members from the appropriate grade of aluminium alloy complying with AS/NZS 1734, AS/NZS 1865, AS/NZS 1866 and AS/NZS 1867.
 - 2. Unless otherwise specified, aluminium sheeting shall be a minimum of 3mm thick.
 - 3. Use only appropriate grades, strengths and thicknesses of aluminium to ensure that all structural and finishing requirements of the Specification are met. The wall thicknesses of aluminium extrusions shall be sufficient to ensure their rigidity in the lengths required in the final installation.
 - 4. All aluminium fixing brackets and cleats shall be manufactured from the appropriate grade of alloy to the requirements of AS 2848.1. If visible, the finish shall match the metal panels and framing members.
 - 5. Protect exposed aluminium with low tack adhesive film during construction and remove prior to Practical Completion.
 - 6. Aluminium to aluminium welding to AS 1665.
 - 7. Aluminium structures to AS/NZS 1664.1 or AS/NZS 1664.2.
- D. Stainless Steel:

1. The minimum grade of stainless steel for external applications shall be grade 316.
2. Stainless steel finishes:
 - a) Polished and/or lished finishes as nominated in the schedules and to accepted samples.
3. Unless otherwise specified, stainless steel shall be austenitic, non-magnetic, using either grade 304 or grade 316 to ASTM A240/A240M-09a for plate, sheet and strip and grade 304 or grade 316 to ASTM A217/A217M-08 for castings. Specific grade designations shall be either as specified in the relevant sections of the Specification or, where not identified specifically, selected to meet the performance criteria specified for the particular element or components.
4. Unless otherwise specified, welds to visible areas of stainless steel shall be ground smooth to achieve a seamless surface and to match the finish of the parent metal. Remove heat tints using light abrasives, pickling paste, wire brush or similar to achieve continuity with the specified finish. Areas difficult to access shall be manually finished if necessary.
5. When welding stainless steel minimise distortion due to thermal movement using jigs or other methods as appropriate during welding. Welding methods and consumables shall be chosen as most appropriate to the type, thickness, shape and location of joints to meet the performance levels required and have mechanical properties at least equal to the original base metal. In addition, consumables shall have an equal or superior corrosion resistance to the base metal being welded.
6. Stress corrosion or cracking will not be accepted. Undertake the necessary precautions in the fabrication and installation of stainless steel elements/ materials, avoiding the simultaneous presence of any of the following:
 - a) Tensile stresses.
 - b) Residual stresses after cold working or welding.
 - c) Aggressive local environmental conditions.
 - d) Metal temperatures that, in conjunction with the above, may induce stress corrosion cracking.
7. Stainless steel components, in high condensation, chlorine environments such as Indoor Pool Halls and similar areas, that are safety critical and/ or load bearing, which cannot be regularly washed down or cleaned and which are potentially vulnerable to stress corrosion cracking (SCC) shall be formed from either 1.4547 (254SMO), 1.4529 (1925hMo) or 1.4565 (Nirosta 4565S) high alloy stainless steel grades. This shall include but not be limited to components such as:
 - a) Brackets for suspended light fittings, loudspeakers, pipework etc.
 - b) Supports for suspended ceilings.
 - c) Supports for ventilation trunking, water slides etc.
 - d) Wire rope supports for water slides etc.
 - e) Fasteners.
8. Stainless steel castings:
 - a) Shall be of austenitic stainless steel and the casting alloy shall be determined to meet the requirements of the Specification.
 - b) Shall be manufactured using the lost wax process or such other process as may be proposed and accepted by the Superintendent.
 - c) Exposed feeder ports and die lines will not be accepted in the finished castings.
 - d) The surface finish of the castings shall be determined by the submission of samples for review and acceptance. Samples, once accepted, shall represent the required standard for all subsequent castings.
 - e) Make allowance for two post production finishing processes. The processes shall be agreed with the Superintendent and include blast finishes (including bead blasting) and electropolishing or acid pickling.
9. Stainless steel shall be protected where possible using appropriate adhesive film, to the film manufacturer's written recommendations.
10. If stainless steel has not been protected by adhesive film, thoroughly clean prior to presentation to the Superintendent for acceptance.

2.2 Powder Coating

- A. To AS 3715 and/ or AS 4506.

- B. Powder coat finish to metal substrates:
1. The powder coat system to metal substrates for external applications shall be equivalent to Dulux Duratec X15 and for internal applications shall be equivalent to Dulux Duralloy XT.
 2. Apply to aluminium substrates in accordance with AS 3715 and AAMA 2604. Application shall be by a Dulux registered aluminium applicator.
 3. Apply to zinc coated steel meeting C2 atmospheric classification as determined in AS 4506. Demonstrate compliance with the requirements of AS 4506 by providing a certificate from the coating applicator stating the atmospheric classification, substrate material and method of surface preparation.
 4. Warranty:
 - a) Aluminium substrates, externally: 15 years for colour retention (fading) and film integrity.
 - b) Aluminium substrates, internally: 7 years for colour retention (fading) and film integrity.
 - c) Steel: Not available.
 5. Refer to the Specification work sections and/ or the schedules for further details including colours and matt, satin or gloss finish levels.
- C. Powder coating shall be applied using only materials suitable for the purpose intended. Aluminium alloys shall be selected to ensure that the finished appearance of all components is consistent and identical. Aluminium shall be in a condition suitable for the application of the coating process. The sheet shall be of a suitable and agreed thickness and of suitable temper to withstand the stoving process.
- D. In conjunction with the Superintendent, ensure that the application complies with Section 01-100 and the Environment Protection Authority Victoria document Protocol for Environmental Management: Minimum Control Requirements for Stationary Sources (2002).
- E. Colour shall be selected by the Superintendent from the full colour range of the manufacturer.
- F. Assure colour consistency from batch to batch.
- G. Limits for acceptable colour variations in production shall be established and accepted by the Superintendent from samples provided by the Contractor prior to production. When metallic colours are used, top and bottom limits of colour variation and appearance shall be established and agreed prior to coating commencement. All colour samples shall be submitted and coating shall not commence before acceptance by the Superintendent.
- H. The minimum and maximum local dry film thickness on adjacent panels or elements shall not vary by more than 20%. If this is not achievable, submit samples to the Superintendent for review showing the maximum variation in coating thickness.
- I. Adhesive/ protective tapes/ films shall be a low tack type applied at room temperature, remaining in contact with the surface for a maximum period of six months. Should longer periods be required, the tape/ film shall be removed and replaced. Where adhesive/ protective tapes/ films are used, the colour shall be white or lighter in tone than the powder coating.
- J. Testing:
1. Demonstrate compliance with the test requirements outlined in AS 3715 and AS 4506.

3. EXECUTION

3.1 Fabrication Generally

- A. Fabricate components carefully and accurately to ensure compliance with the Detailed Design and the Specification.
- B. Do not permit contact between dissimilar metals in components that are to be fixed where moisture may be present or may occur.
- C. Finished components shall be rigid and free from distortion, cracks, burrs and sharp edges. Moving parts shall move freely and without binding.
- D. Unless specified otherwise, mitre corner junctions of identical sections.

3.2 Cold Formed Work

- A. Use brake presses or cold rolling to produce accurate profiles with straight arrises.

3.3 Stainless Steel Fabrication

- A. Fabrication shall only take place in workshops dedicated to stainless steel and using dedicated tools and equipment.

3.4 Adhesive Bonding

- A. Prepare surfaces of metals to receive adhesives by degreasing and abrading mechanically or chemically.

- B. Use adhesives to manufacturer's written recommendations.
- C. Form bond under pressure.

3.5 Thermal Cutting of Steel

- A. After cutting, grind off material that is liable to corrode.

3.6 Welding/ Brazing Generally

- A. Thoroughly clean surfaces to be joined.
- B. Ensure accurate fit using clamps and jigs where practicable. Use tack welds only for temporary attachment.
- C. Make joints with parent and filler metal fully bonded throughout with no inclusions, holes, porosity or cracks.
- D. Prevent weld spatter falling on surfaces of materials that will be self-finished and visible in the completed work.
- E. Remove all traces of flux residue, slag and weld spatter.

3.7 Brazing

- A. Brazing shall be in accordance with AS/NZS 1167.

3.8 Finishing Welded/ Brazed Joints

- A. Visible butt joints in the completed work shall be smooth and flush with adjacent surfaces.
- B. Visible fillet joints in the completed work shall be executed neatly and ground smooth to be flush with adjacent surfaces.

3.9 Applying Coatings

- A. Unless specified otherwise, apply coatings after fabrication is complete and all fixing holes have been drilled.
- B. Before applying coatings, remove all paint, grease, flux, rust, burrs and sharp arrises.
- C. Make good all defects that would show after application of coating and ensure surface finishes are smooth.

3.10 Applying Powder Coatings

- A. Powder coating application and stoving shall be carried out in accordance with AS 3715 and/ or AS 4506. Only one coating plant and one batch of powder shall be used, unless otherwise accepted by the Superintendent.
- B. Warranties: Make available to the Superintendent, fully documented and signed copies of the coating warranties. The duration of the warranties shall be 15 years for external applications and 7 years for internal applications or as otherwise agreed with the Superintendent. Warranties shall cover:
 - 1. Colour retention (fading).
 - 2. Film integrity and adhesion.
 - 3. Surface finish retention (powdering).
- C. The normal cleaning frequency associated with the warranty detailed above shall be 12 months unless agreed otherwise by the Superintendent.
- D. Damage shall be repaired immediately. Site rectification of damage is not generally acceptable and shall only be permitted with the Superintendent's agreement. If so agreed, a guarantee for the powder coat adhesion and colour and gloss retention equivalent to the remaining period of the guarantee shall apply.

SECTION 08-150 -- GALVANISED COATINGS	1
1. GENERAL	1
1.1 Related Documents	1
2. PRODUCTS	1
2.1 Materials	1
2.2 Finishes	1
3. EXECUTION	2

SECTION 08-150 -- GALVANISED COATINGS

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

2. PRODUCTS

2.1 Materials

- A. Appearance:
1. All finishes shall be stable, fade resistant and not affected by ultraviolet light. Provide data and samples for review by the Superintendent.
 2. All finishes shall be durable, of uniform texture and colour and shall be resilient to all known and/ or specified environmental and pollution effects. This shall include scratching and cigarette smoke and burns, etc. Submit data and samples for review by the Superintendent.
 3. Minor scratches and blemishes shall be repaired using the coating manufacturer's recommended products and system, matching original finish for colour, texture and gloss. Repaired coatings shall be visually acceptable to the Superintendent. Provide confirmation that repairs to the damaged finish complies in all respects to the requirements of the Specification. Guarantee in writing repairs to the damaged or defective coatings. Employ an independent finishing consultant to carry out an inspection and any necessary tests and supply a full report to the Superintendent.
 4. All finishes shall be within the limits of the agreed samples and without irregularities or distortions. Fixings, stiffeners, etc, not intended to be visible shall be treated so there is no discontinuity in the finished surface appearance.
- B. Surface preparation of steelwork:
1. Surface preparation shall remove all rust, scale and surface contamination to leave a clean surface to AS 1627.1. Achieve this by acid pickling, to AS 1627.5, except where the presence of paint, oil, grease, welding slag, etc, renders this ineffective, and in all weld areas the steel shall be locally blast cleaned to AS 1627.4.

2.2 Finishes

- A. Liquid organic coating:
1. Aluminium alloy components shall comply with AS 1231.
- B. Plating of surfaces:
1. Cadmium/ zinc plating of iron and steel surfaces shall comply with AS 1789.
 2. Chromium plating shall comply with AS 1192.
- C. Galvanising generally:
1. To AS/NZS 4680.
 2. Where galvanising is visible, the final finish shall be smooth, continuous, consistent and free from flux staining and other forms of staining. Coating weight shall be consistent maintaining a uniform appearance throughout the service life of the Works.
- D. Galvanised self finish surface:
1. Galvanised steelwork shall not be painted.
 2. Blast cleaning shall comply with AS 1627.4.
 3. Preparation: Edge grind, remove all grease, oil and varnish and any other surface contaminants, ensure that any oil or silicon based anti-weld spatter is removed, remove weld spatter, grind welds as required and fill pits and other surface imperfections that may cause the premature failure of the coating system.
 4. Galvanising: The steelwork shall be supplied to the galvaniser in a suitable condition to be acid pickled in dilute hydrochloric acid, passivated and then hot dip galvanised in accordance with AS/NZS 4680.
 5. Uniformity: Carry out galvanising in such a way as to maximise the smoothness and uniformity of the deposited coating. Use only double dipping where no alternative exists.
 6. Touching-up is not allowed unless agreed by the Superintendent. If touching-up is carried out it must be according to the following:
 - a) Surface preparation shall comply with AS 1627.2 and AS 1627.9.

- b) Where acceptance is given, use the Zilt-Stick system in accordance with the manufacturer's recommendations. Zilt-Stick is a self-fluxing and galvanising system applied by hand. The stick is made up from a galvanising compound with a "foil" wrapping, which is rubbed over the affected area until completely covered. The black flux residue shall be removed using a damp cloth.
 - c) The maximum size of an area of touch-up shall be determined by locating the point on the damaged surface that is furthest from an intact galvanised coating. If the distance from this point to the galvanising is in excess of 10mm, the member shall be re-galvanised or rejected.
 - d) Galvafruid or paint applied finishes are not permitted under any circumstances.
 - 7. Refer to the recommendations of the Galvanizers Association of Australia (GAA) for galvanising and zinc metal-spraying.
 - 8. Immersion process shall be discussed and agreed with the Superintendent and submitted for formal comment. This is to ensure that during the galvanising process drips are not allowed to run off fair-faced surfaces and thus disfiguring them. Fair-faced surfaces are all those surfaces that will be visible in the completed Works. Agree location of all fair-faced surfaces with the Superintendent before application.
 - 9. Breathing holes: Locate in unobtrusive places. Agree the location of these holes with the Superintendent and mark clearly on the Shop Drawings.
 - 10. Distortion: Ensure that no distortion of fabricated elements occurs during galvanising. Advise the Superintendent on the possibility for distortion of the steelwork elements during the galvanising process to enable design modifications of components to be made before fabrication of these components.
 - 11. Maintenance/ corrosion protection:
 - a) The interval to first maintenance shall be no less than 20 years from completion of the Works.
 - b) Refer to AS 1247.
 - c) Average coating thickness shall be a minimum of 85 microns.
 - E. Galvanised steelwork to be painted:
 - 1. Preparation: The minimum average coating thickness shall meet the requirements of AS/NZS 4680 and AS/NZS 2312.
- 3. EXECUTION**
- A. Not used.

SECTION 08-200 -- ANODISING	1
1. GENERAL	1
1.1 Related Documents	1
2. PRODUCTS	1
2.1 Aluminium Anodising	1
3. EXECUTION	1
3.1 General	1
3.2 Testing	2

SECTION 08-200 -- ANODISING

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

2. PRODUCTS

2.1 Aluminium Anodising

- A. Materials
1. Unless otherwise specified anodising shall comply with AS 1231 and a certificate shall be provided to that effect for each batch.
 2. The colour anodising process shall be agreed with the Superintendent. Colouring of the anodic film shall be achieved using a two-stage electrolytic process using cobalt or nickel as the colouring metal or by using a single stage integral process. On no account use tin electrolytes for anodic film colouring. Any proposal for using an alternative colouring technique will be considered only if the anodiser confirms in writing that the alternative process meets all the visual, physical and documentary requirements detailed in the Specification. Satisfactory independent evidence and samples shall be required to prove that an alternative colouring process will provide an equal or superior standard of performance and life expectancy.
 3. Colour control limits shall be submitted as samples with the Tender for review and comment by the Superintendent. The anodic finish shall be within these limits agreed and held by the Superintendent.
 4. All aluminium alloys shall be selected to ensure that the finished visual appearance of all components is identical. The alloy for extrusions shall be grade 6063, or acceptable equivalent, and for sheet material grade J57S, or acceptable equivalent. Obtain a certificate from the material supplier stating the grade of the material being supplied.
 5. Base metal batching shall be controlled so that areas match. Critical visible areas shall be from a single batch. Agree base metal batching with the Superintendent prior to production.

3. EXECUTION

3.1 General

- A. Anodic oxidation coating shall be carried out at a single place of manufacture. All critical visible areas shall be anodised in a single batch.
- B. Wherever possible anodising shall commence after fabrication/ machining is complete.
- C. Any fabrication of pre-finished lengths shall be previously agreed with the Superintendent. Uncoated edges in assemblies shall be non visible and not exposed to the atmosphere. Fabricated pieces shall meet the thickness requirements of AS 1231.
- D. The processes adopted shall be compatible, offering weather resistance, abrasion resistance, impact resistance and protection against chemical attacks as follows:
1. Corrosion resistance shall be equal to or greater than that of an anodised aluminium finish thickness of minimum average 25 microns and sealing in accordance with AS 1231 and the Specification.
 2. For production control the abrasion resistance of the anodising shall be determined in accordance with AS 1231. Films that continue to be scratched by glass coated abrasive paper when tested by this method are deemed not to conform to the Specification.
 3. For production control the sealing value of the anodising shall be determined in accordance with AS 1231.
 4. For production control the film thickness of the anodising shall be determined in accordance with AS 1231.
 5. Anodic oxidation coating shall be carried out by the sulphuric acid bath process. The temperatures of the anodising bath and chemical content shall be set and maintained to achieve good quality control of the finished product in accordance with AS 1231.
 6. Notwithstanding AS 1231 visible surfaces shall be free from coating or metallurgical defects when viewed from 100cm.
- E. A quality control system for cleaning extrusion dies shall be adopted such that no lines appear on the face of the extrusions. As a minimum check every fifth extrusion.
- F. Rejected anodised extrusions shall only be reprocessed once.
- G. Anodised finishes shall be within the control limits (established from range samples) or standards accepted by the Superintendent.

- H. The finish shall be agreed with the Superintendent from the range samples provided.
- I. The finish shall be sealed in accordance with AS 1231.
- J. Finishes shall be tested to AS 1231.
- K. Warranties: Make available to the Superintendent, fully documented and signed copies of the manufacturer's/ applicator's warranties. Unless otherwise agreed in advance with the Superintendent, the duration of the warranties shall be:
 - 1. Internal applications: 15 years.
 - 2. External applications: 25 years.
- L. Variation of final surface finish shall be limited to tolerances agreed with the Superintendent prior to commencement. If such variation occurs, the components that, in the opinion of the Superintendent, fail to achieve a uniform final surface finish shall be replaced.
- M. Lines produced at the location of die connection points shall only occur on non-visible surfaces in the completed work. The contact marks on sections resulting from electrical connection shall not be on visible surfaces of the completed work.
- N. The normal cleaning frequency associated with the warranty for anodised finishes shall be 12 months, unless agreed otherwise by the Superintendent.
- O. Repair of damage: Surface areas likely to be damaged during handling, fixing or by other building trades shall be fully protected until completion of all other work in the area of the installation. If during fixing or glazing any damage occurs, it shall be rectified immediately. Site rectification of damage shall only be carried out with the Superintendent's acceptance and shall carry a 25-year warranty for colour retention, avoidance of discoloration and corrosion resistance.

3.2 Testing

- A. Carry out a minimum of three independent acceptance inspections, sampling procedures and plans, as set out in AS 1199.1, for general inspection level 2. Acceptable Quality Level (AQL) shall be 1% on each colour and finish used in the Works. These inspections shall be carried out at the finishing plant prior to fabrication, by a competent independent inspector from an approved laboratory.
- B. Where there is damage or the production test reports have not been provided, the Superintendent may commission an independent investigation of all finishes on Site-fixed units. The Contractor shall be responsible for all costs in connection with such Site inspections. This investigation shall be carried out within the guidelines of AS 1199.2, LQ (Limited Quality) (Pa = 10%) = 5%. For the purpose of this inspection each section shall be taken as an individual component in assessing the overall batch number to allow certification and compliance with the Specification. For units that are finished in fewer than three production runs, acceptance inspections shall also be made using AS 1199.2 to the same LQ.
- C. Certificates of Practical Completion or any other document of authority accepting responsibility may not be signed by the Superintendent until he has received the testing reports.

SECTION 08-350 -- MORTAR	1
1. GENERAL	1
1.1 Related Documents	1
2. PRODUCTS	1
2.1 Materials	1
3. EXECUTION	1
3.1 Workmanship	1
3.2 Testing	2
3.3 Transportation, Handling and Storage of Materials	2

SECTION 08-350 -- MORTAR

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

2. PRODUCTS

2.1 Materials

- A. Mortar Generally:
1. Mortar mix shall be cement, lime and sand as specified, with proportions to AS 3700 and AS 1316.
- B. Sand for mortar:
1. Shall be fine aggregate with a low clay content and free from efflorescing salts, selected for colour and grading.
 2. Shall be from one source to ensure consistency of colour and texture, unless specified otherwise.
 3. Shall be well graded from 2mm maximum.
 4. Where a mix range is specified (eg 1:1:5-6) the lower proportion for grade 'g' sands and higher proportion for grade 's' sands shall be used.
 5. Marine sand shall not be used with sulphate resisting or super sulphated cement.
 6. All sand used in face work shall be thoroughly washed to remove all contaminants and shall be guaranteed not to contain any efflorescing salts.
 7. Submit samples of sand proposed in accordance with the requirements of the Specification and identify:
 - a) Name of supplier.
 - b) The pit of origin.
 - c) Sieve analysis.
- C. Cement:
1. Portland cement shall comply with AS 3972.
 2. Masonry cement shall comply with AS 1316.
 3. White cement shall have iron salts content less than 1%.
- D. Water shall be clean and free from any deleterious material.
- E. Mortar class shall comply with AS 3700.
- F. Unless otherwise stated, Portland cement shall be Type GP and be delivered in the original sealed bags of the manufacturer or in acceptable bulk containers.
- G. All cement used shall be obtained from a supplier capable of complying with the requirements of the Specification.
- H. Lime shall comply with AS 1672.1.
- I. No mortar plasticiser or other additive shall be used unless the Superintendent has given prior acceptance. Additives shall be used in the proportions recommended by the manufacturer. Alter mortar mixes in accordance with the manufacturer's recommendations. The suitability of the mixture for use in any particular mortar shall be demonstrated.
- J. Admixtures shall not be used in mortar unless specified or agreed in writing. If used they shall comply with the following:
1. Air-entraining agents shall comply with AS 1478.1.
 2. Methyl cellulose water thickeners shall be designed for use in brickwork and/ or blockwork.
 3. Plasticisers or workability agents shall be designed for use in brickwork and/ or blockwork.
- K. Pigments shall comply with BS EN 12878.
- L. Calcium chloride, or any admixtures containing calcium chloride, shall not be used.
- M. Ready-mixed mortar may be used, subject to prior acceptance by the Superintendent.

3. EXECUTION

3.1 Workmanship

- A. Mixing plant, tools and banker boards shall be kept clean at all times.

- B. Materials shall be measured accurately by volume using clean gauge boxes. Proportions of mixes shall be for dry sand, making allowance for bulking if damp.
- C. Ingredients shall be mixed thoroughly to a consistency suitable for the work and free from lumps. Mortars containing air-entraining admixtures shall be mixed by machine, but not overmixed.
- D. Mortar shall be used within two hours of mixing, at normal temperatures. Retarded mortar shall be used within the time recommended in writing by the manufacturer, taking into account any extreme temperatures that may be experienced on Site. Mortar may be retempered to restore workability, but only within manufacturer's time limits and without the introduction of additional water.
- E. Determine the minimum amount of water required to achieve a workable mix.
- F. If pre-mixed mortars are used, the characteristics, product data, and testing criteria shall be submitted to the Superintendent for review.

3.2 Testing

- A. Mortar Testing:
 - 1. Tests:
 - a) Testing of mortars shall be carried out in accordance with AS/NZS 2350 and AS 2701, or to equal standards acceptable to the Superintendent.
 - b) All testing shall be carried out by a NATA accredited laboratory.
 - c) Specimens for preliminary tests of the mortars shall be prepared at least six weeks in advance of any walling commencing.
 - d) All material sources shall be identified to the Superintendent for acceptance prior to commencement of preliminary tests.
 - e) Samples shall be taken at the point of mixing or use.
 - f) Additional tests and sampling shall be performed if the mortar does not comply with the Specification.
 - g) Subject to the test results, the specified nominal mix proportions shall be adjusted and tested.
 - h) Half the samples shall be tested at seven days, the remainder at 28 days. The 28-day crushing strength of the cubes shall not be less than 3.6N/ mm² for the preliminary test and 2.5N/ mm² for the work test.
 - 2. Testing apparatus:
 - a) Ensure that on-Site apparatus is maintained in good repair.
 - b) Maximum and minimum thermometers as required.
 - c) Soil thermometers as required for measuring the mortar and ground temperatures.
 - d) Syphon can apparatus for measuring the moisture content of aggregate.
 - 3. Frequency of testing: Cubes shall be prepared for each type of mortar and for each type of brick/ block walling or for every storey, whichever is the more frequent.
 - 4. Failure of mortars: Masonry walling containing mortar that does not comply with the requirements of the Specification shall be demolished, debris removed from the Site, and rebuilt.

3.3 Transportation, Handling and Storage of Materials

- A. Storage of Materials:
 - 1. Cements and lime shall be stored off the ground, under cover, away from damp and in such a manner as to enable them to be used in order of delivery.
 - 2. Sands shall be stored separately, according to type, on clean, hard, dry standings and be protected from contamination.
 - 3. Pre-mix mortars, if used, shall be stored in accordance with the manufacturer's instructions.

SECTION 08-400 -- ADHESIVES, SEALANTS AND FASTENERS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Performance Criteria	1
1.3 Fire Resistance	1
2. PRODUCTS	1
2.1 Fixing Generally	1
2.2 Adhesives and Sealants	1
2.3 Fasteners	2
3. EXECUTION	3
3.1 Adhesives	3
3.2 Sealants	4
3.3 Acoustic Caulking	4
3.4 Fixings	4
3.5 Screw Fixings	4
3.6 Packings Generally	4
3.7 Nail Fixings	4
3.8 Plugs Generally	4

SECTION 08-400 -- ADHESIVES, SEALANTS AND FASTENERS

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Performance Criteria

- A. Provide adhesives and sealants capable of transmitting imposed loads, sufficient to ensure the rigidity of the assembly, or integrity of the joint and which will not cause discoloration or deterioration of finished surfaces or materials.

1.3 Fire Resistance

- A. Where sealants occur in a location where fire resistance levels are required, use only those sealant types installed in such a way so the required fire resistance levels will be achieved when tested to AS 1530.
- B. Provide test results from an independent NATA approved testing laboratory confirming that sealants have been adequately tested to meet the required fire resistance levels.
- C. Refer to the Drawings and the Fire Engineering Report for the required fire resistance levels.

2. PRODUCTS

2.1 Fixing Generally

- A. Fixings shall be of sufficient strength, appropriate to their location, and in such locations so as to ensure the performance of the elements being attached. The fixings shall be suitable and used solely for the purposes intended by the manufacturer in order to satisfy the requirements of the Specification.
- B. Unless otherwise specified, observe the following requirements:
1. Fixings shall be selected such that adequate protection against any corrosion likely to occur is provided for the service life specified.
 2. Use fixings that are suited to the likely stresses, movements and vibrations in use.
 3. Fixings shall be non visible. Where fixings are visible these shall match or suit the items being fixed or comply with the Drawings.
- C. Supply all necessary and appropriate fasteners, fixings, bearings, brackets, etc, necessary for the safe and proper installation, plus associated flashings and closures.
- D. All fixings shall conform to all statutory requirements in respect of strength and type.
- E. Take adequate measures to prevent bi-metallic corrosion between dissimilar metals and to isolate aluminium components from cementitious surfaces. To this end attention is drawn to publication PD 6484, Commentary on Corrosion at bi-metallic Contacts and its Alleviation.
- F. Generally, fixings within aluminium framing components shall be non visible, with the exception of capping pieces fixed to vertical mullions.

2.2 Adhesives and Sealants

- A. Adhesives and sealants used internally (ie applied on-site and regardless of exposed or concealed applications) shall be within the TVOC (Total Volatile Organic Compound) limits nominated below.
- B. The TVOC content, expressed in grams of VOC per litre (g/L) of ready to use product, shall fall within the following TVOC limits:
1. Indoor carpet adhesive: <50 grams of TVOC per litre of product.
 2. Carpet pad adhesive: <50g/L.
 3. Wood flooring adhesive: <100g/L.
 4. Rubber flooring adhesive: <60g/L.
 5. Sub-floor adhesive: <50g/L.
 6. Ceramic tile adhesive: <65g/L.
 7. Cove base adhesive: <50g/L.
 8. Dry wall and panel adhesive : <50g/L.
 9. Multipurpose construction adhesive: <70g/L.
 10. Structural glazing adhesive: <100g/L.
 11. Architectural sealants: <250g/L.

- C. TVOC content for internally applied adhesive & sealant products shall be demonstrated through the provision of VOC data sheets.
- D. Sealants and adhesives used externally or for temporary formwork as well as plumbing pipe cements and glazing film are excluded from the above requirements.
- E. Obtain acceptance from the Superintendent before substituting any specified adhesive and sealant products.
- F. Mastic adhesive: To AS 2329.
- G. Polymer emulsion adhesive for timber: To AS 2754.2, not inferior to Type 3 if required to be water resistant.
- H. Sealing compound (polyurethane, polysulphide, acrylic):
 - 1. Single component: To ASTM C920-08.
- I. Sealing compound (silicone):
 - 1. Single component: To TT-S-1543B.
- J. Where caulking is required to perimeters of, or penetrations in, acoustic-attenuated elements use only 100% polyurethane mastic.
- K. Where visible or exposed in the finished work, sealants shall match the colour of the material (s) being joined or sealed, whether natural or coated. Where the colours of the materials to be sealed vary, obtain confirmation from the Superintendent as to which colour is to be matched.
- L. Where sealant occurs in floors or paved areas, use only trafficable grade.
- M. Where sealant is nominated as anti-bacterial it shall achieve a rating of 0 for fungal growth when assessed in accordance with AS 1157.1.

2.3 Fasteners

- A. Masonry anchors: To be proprietary expansion or chemical types.
- B. Plain washers: To AS 1237.1.
- C. Provide washers to the heads and nuts of bolts, and the heads of coach screws.
- D. Plugs: To be proprietary purpose-made plastic.
- E. Powder-actuated fasteners: To AS/NZS 1873.4.
- F. Steel nails:
 - 1. To AS 2334.
 - 2. Length: At least 2.5 x the thickness of the member being secured, and at least 4 times the thickness if the member is plywood or building board less than 10mm thick.
 - 3. Do not use masonry nails unless accepted in advance by the Superintendent.
- G. Bolts:
 - 1. Unified hexagon bolts, screws and nuts: To AS/NZS 2465.
 - 2. Coach bolts: To AS/NZS 1390.
 - 3. Hexagon bolts Grades A and B: To AS 1110.1.
 - 4. Hexagon bolts Grade C: To AS 1111.1.
- H. Screw fixings:
 - 1. Coach screws: To AS/NZS 1393.
 - 2. Hexagon screws Grades A and B: To AS 1110.2.
 - 3. Hexagon screws: Grade C To AS 1111.2.
 - 4. Hexagon socket screws: To AS 1420 and AS/NZS 1421.
 - 5. Machine screws: To AS/NZS 1427.
 - 6. Self-drilling screws: To AS 3566.1 and AS 3566.2.
 - 7. Tapping screws:
 - a) Crossed recessed countersunk (flat - common head style): To AS/NZS 4407.
 - b) Crossed recessed pan: To AS/NZS 4406.
 - c) Crossed recessed raised countersunk (oval): To AS/NZS 4408.
 - d) Hexagon: To AS/NZS 4402.
 - e) Hexagon flange: To AS/NZS 4410.
 - f) Hexagon washer: To AS/NZS 4409.

- g) Slotted countersunk (flat - common head style): To AS/NZS 4404.
 - h) Slotted pan: To AS/NZS 4403.
 - i) Slotted raised countersunk (oval - common head style): To AS/NZS 4405.
8. Washers and screw cups shall be of the same material as the screw.
- I. Nuts:
- 1. Hexagon chamfered thin nuts Grades A and B: To AS 1112.4.
 - 2. Hexagon nuts Grade C: To AS 1112.3.
 - 3. Hexagon nuts Style 1 Grades A and B: To AS 1112.1.
 - 4. Hexagon nuts Style 2 Grades A and B: To AS 1112.2.
- J. Packings generally:
- 1. Provide suitable, tight packings at fixing points to take up tolerances and prevent distortion.
 - 2. Use non-compressible, rot-proof, non-corroding materials positioned adjacent to fixing points.
 - 3. All packings shall be concealed in the finished work.
- K. Plugs generally:
- 1. Use proprietary types selected to suit the background, loads to be supported and conditions expected in use.
- L. Finishes:
- 1. Electroplating:
 - a) Metric thread: To AS 1897.
 - b) Imperial thread: To AS 4397.
 - 2. Galvanising:
 - a) Threaded fasteners: To AS 1214.
 - b) Other fasteners: To AS/NZS 4680.
 - 3. Galvanise mild steel fasteners if:
 - a) Exposed to weather or dampness.
 - b) Embedded in masonry.
 - c) In external timbers such as weatherboards or decking.
 - d) In contact with chemically treated timber.
- M. Explosive fasteners:
- 1. Explosive fasteners shall be used only by persons licensed to operate them, and they shall be used in accordance with manufacturer's instructions.
 - 2. The Contractor shall arrange for the manufacturer or his representative to be present on Site to give directions concerning safety, the types of charge, types of pin and method of operation and application under all circumstances applicable to the Works and to provide on-Site testing of the fasteners to verify they comply with the manufacturer's warranty.
 - 3. At completion of work involving use of these fixing devices, the manufacturer shall supply to the Superintendent through the Contractor a written guarantee that they have provided the specified on-Site service and that the fastenings have been made in accordance with their directions.

3. EXECUTION

3.1 Adhesives

- A. Surfaces to receive adhesive shall be sound, unfrozen and free from dust, grease and any other contamination likely to affect bond. Where necessary, clean surfaces using methods and materials recommended by the adhesive manufacturer.
- B. Surfaces shall be sufficiently smooth and even to suit the gap-filling and bonding characteristics of the adhesive. Prepare as necessary.
- C. Observe both the manufacturer's recommendations and statutory requirements for storage and safe usage of adhesives.
- D. Adhesives shall not be used in unsuitable environmental conditions or beyond the manufacturer's recommended maximum shelf life or open-pot time periods.

- E. Adhesives shall be applied using recommended spreaders/ applicators to ensure correct coverage. Bring surfaces together within the recommended time period and apply pressure evenly over the full area of contact surfaces to ensure full bonding.
- F. Remove surplus adhesive using methods and materials recommended by the adhesive manufacturers and without damage to affected surfaces.

3.2 Sealants

- A. Only polyurethane based sealants shall be incorporated into the works unless prior acceptance has been obtained from the Superintendent.

3.3 Acoustic Caulking

- A. Install and tool in such that all gaps and openings are completely filled, caulking is continuous and no air gaps remain.

3.4 Fixings

- A. Carry out all necessary preparation work such as drilling, plugging, screwing, bolting, cutting for anchor bolts or sockets to be cast-in and for making good, including grouting-in of anchor bolts and fixings where necessary.
- B. The method of fixing shall not damage any item being fixed or any item receiving fixings.
- C. Site welding is not permitted unless accepted by the Superintendent.
- D. Fasteners shall be installed with a coordinated purpose-designed tooling system that incorporates a mechanical depth locator to ensure consistent depth setting and which facilitates perpendicular installation. The fastener manufacturer shall be capable of providing on-Site instruction in the use of the fastener installation tooling system.
- E. All fixings shall comply with the BCA requirements.
- F. Submit QA/ QC procedures for inspection of fixings to the Superintendent. This shall include, but not be limited to, the checking of each fixing for correct torques, mortice depths, alignment, etc.
- G. Ensure that no lock-up stresses are generated.

3.5 Screw Fixings

- A. All screws shall have clearance holes. Pilot holes of approximately half the diameter of the shank shall be provided for screws of 8 gauge or more and for all screws into hardwood.
- B. Before using brass, aluminium or other soft metal wood screws, pre-cut the thread with a matching steel wood screw.
- C. Do not hammer screws unless specifically designed to be hammered.
- D. Unless specified otherwise, countersink screw heads not less than 2mm below timber surfaces that will be visible in the completed work.

3.6 Packings Generally

- A. Ensure that packings do not intrude into zones that are to be filled with sealants.

3.7 Nail Fixings

- A. In joints, use no fewer than two nails of opposed skew unless specified otherwise.
- B. Drive nails in fully without splitting or crushing the material being fixed.
- C. Punch nail heads below surfaces that will be visible in the completed work.

3.8 Plugs Generally

- A. Locate plugs accurately in correctly sized holes in accordance with the manufacturer's recommendations.

SECTION 08-450 -- GLASS AND COATINGS	1
1. GENERAL	1
1.1 Related Documents	1
2. PRODUCTS	1
2.1 Glazing Generally	1
2.2 Certification	2
2.3 Safety Glass	2
2.4 Annealed Glass	2
2.5 Laminated Glass	2
2.6 Toughened Glass	2
2.7 Heat Strengthened Glass	4
2.8 Coatings	4
2.9 Unitised Systems	4
2.10 Structural Silicone Glazing	5
2.11 Mirror Glass	6
2.12 Product Identification	6
3. EXECUTION	6
3.1 Glass Processing Generally	6
3.2 Installation Generally	6
3.3 Preglazing	6
3.4 Partition Glazing	6
3.5 Completion	6

SECTION 08-450 -- GLASS AND COATINGS

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

2. PRODUCTS

2.1 Glazing Generally

- A. All glass types shall be cut to accurate sizes with clean cut, arrised edges. Damage, such as shark teeth, serration hackle, sharp flare, flake chips, rough chips, feathered edges, shells or other imperfections is not acceptable if detrimental to the visual and performance criteria of the glass. Glass delivered to Site shall be of the required size. No cutting or nipping of glass is allowed on Site. Variations in manufacture and performance of the glass shall not affect its colour or appearance, while all glass of the same type shall be visually consistent in appearance and colour at all times, having due regard for the direction and angle of view within manufacturing tolerances and the agreed range of samples or observations of previous installations of the same type of glass.
- B. All glass shall be of the type specified in the relevant AS/ NZS series range, or other international standard as specified, while the glazing shall be carried out in accordance with the manufacturer's recommendations.
- C. Unless otherwise specified and accepted in advance by the Superintendent, all sheet glass shall be manufactured using the float process.
- D. All glass panes within frames shall be installed to give the necessary edge cover and clearance to ensure a permanent and safe installation. Glass panes with damaged edges, including shelling and impact markings, shall not be fixed into the building under any circumstances.
- E. Provide a warranty from the glass manufacturer stating that the glazing systems comply with the manufacturer's requirements.
- F. Distortion shall be kept to an absolute minimum and local defects (such as tong marks) that produce irregular reflections are not allowed. All glass shall be manufactured and processed in accordance with quality control procedures to AS/NZS ISO 9001 and be independently maintained.
- G. Stresses in glazing: Ensure that no glass or glazing combination develops stresses that may lead to damage of glass, glazing materials, components and/ or framing systems:
1. Conduct a thermal stress analysis and make due allowance for any thermally treated or edge working of annealed glass which may be required.
 2. Take into account shading stresses that might occur from adjacent components, including solar shading devices.
- H. The method of glazing adopted shall take into account the manufacturing tolerances in the glass, thus minimising the effects of any distortion.
- I. The glass shall be replaceable without undue difficulty. Provide a method statement showing how to remove damaged glass and any associated metal framework, and how to install new components.
- J. A highly uniform, low reflection and durable quality is required of any surface coated glass. The glass shall have no unacceptable hue and be capable of reflecting or refracting light without chromatic aberration.
- K. Provide glass with a suitable colour rendering index (Ra), both for the transmittance and the reflected spectrum and provide detailed reflected and transmitted spectrum data for the purpose of identifying/ anticipating the possible problems with colour reflection. Demonstrate this by providing samples of each glass type, which shall be viewed under reproduction lighting conditions and accepted prior to material manufacture.
- L. Provide all glass from a single supplier unless agreed otherwise by the Superintendent, and provide certification proving the origin of the glass.
- M. Each type of coated glass shall be supplied from the same batch.
- N. Ensure that glass does not contain imperfections in excess of the tolerances stated in AS/NZS 4667.
- O. All exposed glass edges shall be ground and polished.
- P. Mirror glass is not acceptable, unless described as acceptable elsewhere in the Specification.
- Q. Where combinations of glass types are used in a unit, the least stringent criteria for viewing shall be used in accordance with the relevant standards.

- R. Prior to placing an order for any glazing materials, obtain all necessary confirmation and/ or calculations in writing from the glass manufacturer on all aspects of the glazing systems for review, including but not limited to the following:
1. Ventilating and draining provisions of the glazing rebates.
 2. Thickness of individual glass panes and of insulating glass units due to consideration of the wind loadings specified.
 3. Access loads for horizontal/ inclined glazing conditions with consideration of the wind loadings specified.
 4. Visible colour variations shall be within the tolerances established through the sample submittals process.
 5. Determination as to whether or not heat strengthening or toughening of glass will be required.
 6. Thickness and number of PVB interlayers (laminated glass).
 7. Thermal and shading performance of insulating glass units.
 8. Thermal safety of insulating glass units.
 9. Hardness, location, shape and dimensions of setting blocks and glazing gaskets.
 10. Depth and width of glazing rebates.
 11. Expansion, tolerances, glass bite and clearance shall meet all specified performance requirements.

2.2 Certification

- A. Provide supplier certification for all glazing installed into the Works showing the type, quantities and manufacturer's data sheets demonstrating all glazing properties and minimum visual transmittance levels.

2.3 Safety Glass

- A. Select safety glass categories for use in critical locations as defined and recommended in AS/NZS 2208, and as required to comply with the Building Code of Australia, local authority requirements and other relevant health and safety requirements. The glass type and thickness shall meet the performance requirements of the Specification and shall minimise the risk to persons during construction and during the service life of the Works.
- B. Test safety glass to meet the requirements of AS/NZS 2208.
- C. Provide manifestation where required by AS/NZS 2208, the Building Code of Australia, DDA and any other health and safety requirements. Agree the type of manifestation with the Superintendent and provide samples for acceptance.

2.4 Annealed Glass

- A. The tolerances on thickness shall comply with AS 1288 and AS/NZS 4667.
- B. Visual quality testing of annealed glass for dimensional requirements and visual defects shall comply with AS 1288 and AS/NZS 4667.

2.5 Laminated Glass

- A. Laminated glass shall be Grade A in accordance with AS 1288 and AS/NZS 2208.
- B. Laminated glass shall consist of a number of sheets of flat glass with polyvinyl butyral (PVB) with a thickness of not less than 0.375mm, or methyl methacrylate resin interleaving between each layer. The layers can be clear, translucent or coloured depending on the design intentions of the glazing. The glass may be annealed, heat strengthened, or heat soaked toughened, as required to meet the performance requirements of the Specification.
- C. The Drawings show the visual requirements of the Superintendent. Final selection of glass type and thickness of each layer, together with type, opacity, density and location of interlayer and coatings shall be accepted by the Superintendent prior to ordering materials.
- D. The bottom supported edges of laminated glass panes shall be cut flush over the width of the pane to provide even distribution of vertical load to the setting blocks.

2.6 Toughened Glass

- A. Justify the use of toughened glass by risk assessment and/ or calculations, with the general aim of minimising its use.

- B. All toughened glass to be heat soaked to DIN 18516: Part 4, paying particular attention to temperature and duration of treatment. Prior to heat soaking, provide a written report to demonstrate oven and thermocouple calibration and temperature tolerances. Demonstrate that, despite temperature tolerances, the air temperature in all parts of the oven was maintained at or above 280°C for eight hours. Provide detailed records of heat soaking for each batch prior to delivery to Site.
- C. Toughened glass shall be Grade A in accordance with AS/NZS 2208.
- D. The glass shall conform to the following requirements in the horizontal toughening process:
 - 1. Maximum overall bow: 0.003mm per millimetre measured along the glass edge.
 - 2. Maximum local bow: The maximum deviation for flatness from peak to trough not to exceed 0.3mm per 300mm or 0.15mm at the edge or 0.08mm in the middle.
 - 3. Rollerwave: Glass shall be sized to provide for consistent and horizontal alignment of ripples. Provide proposals describing the control the extent of rollerwave, if any. Provide full-sized samples of all types of heat treated glass to demonstrate the range of rollerwave applicable to the Works, prior to commencing glass production.
 - 4. Edge dip: 0.25mm maximum.
- E. Exposed edge working shall be flat ground with small ground arris and have a frosted appearance. Small shells and/ or chips, exceeding a maximum diameter of 2mm, shall be ground out prior to toughening.
- F. The surface compressive stress shall be demonstrated by non-destructive testing, to be controlled at the Works at at 120N/ mm².
- G. Cut all glass to accurate sizes and deliver to the Site in the required sizes. No on-Site cutting or nipping allowed. The glass shall be clearly marked to show its intended final position and orientation.
- H. Ensure that glass heat treatment requirements are satisfactory to meet wind, impact or thermal, or other loads anticipated in the Works. The manufacturer of the toughened glass shall be made aware of its intended use in the construction. Carry out any drilling and notching with the agreement of the manufacturer of the toughened glass and prior to the toughening being carried out. All toughened glass shall be tempered on a roller hearth furnace eliminating tong marks.
- I. Ensure that the toughening process does not produce iridescence, distortion, roll marks or ripples in the glass. Demonstrate such anticipated imperfections by the provision of samples prior to commencement of glass production. The Superintendent shall examine the samples provided and advise what is acceptable and what is unacceptable. All glass shall comply with the accepted samples.
- J. Prior to commencement of manufacture, advise the Superintendent of the glass supplier and the premises where fabrication and processing shall be carried out. The Superintendent shall be given the opportunity to visit the glass manufacturer's premises during fabrication and/ or processing.
- K. Prior to installation of the toughened glass, demonstrate with documentary evidence that the glass has been heat soaked for the prescribed periods. Such evidence shall include, as a minimum, the following:
 - 1. Source of supply and evidence of batching.
 - 2. Dates and records of toughening/ heat soaking of all glass.
 - 3. Certification that the glass meets the performance requirements of the Specification.
 - 4. Records shall include details of all units that failed during the heat soak test.
- L. The toughening process shall not create any stresses in the glass that are visible within the limits specified.
- M. Cooling jet marks shall not affect the visible appearance of the finished surface of toughened glass unless the variation is no greater than that established through the sample submittals process.
- N. Any discoloration or distortion caused by the toughening process is unacceptable outside of rollerwave distortion and glass bow specified.
- O. If it is considered that the glass panel configuration within the completed installation is susceptible to anisotropy, when viewed in polarised light, notify the Superintendent and submit proposals in the Tender to minimise this characteristic. Take all reasonable measures to control the toughening process so as to avoid the occurrence of anisotropy at the time of manufacture. Reject glass if it does not fall within the range of agreed samples.

- P. Demonstrate that all necessary control has been taken to ensure that the effect of anisotropy in the manufactured glass has been controlled and minimised taking into account the thickness of glass and its orientation on the façade of the building. Glass will be rejected if it does not fall within the range of agreed samples. Any coatings applied to the glass must not increase the tendency to show the effects of anisotropy.

2.7 Heat Strengthened Glass

- A. Unless otherwise specified, all heat strengthened glass shall comply with AS 1288 and AS/NZS 2208.
- B. Visual quality testing of heat strengthened glass for dimensional requirements and visual defects shall be in accordance with AS/NZS 4667.
- C. Heat strengthened glass shall not be considered a "safety" glass. If heat strengthened glass is proposed for use in situations that require a safety glazing material, it shall be laminated.

2.8 Coatings

- A. Glass coatings generally:
1. Submit to the Superintendent detailed proposals in respect of coatings.
 2. Surface coatings: A highly uniform, low reflection and durable quality is required of any surface modified glass. Such coatings shall be consistent in colour, durable and sufficiently hard on exposed surfaces to avoid damage.
 3. Body tinting:
 - a) Provide evidence from the glass manufacturer that the correct body tinting has been incorporated into the materials at the appropriate stage, when this has been specified on the Drawings.
 - b) Provide evidence that the correct surface modified tinting has been applied by the glass manufacturer, where this has been specified on the Drawings.
 4. Ceramic frit coatings:
 - a) Tolerances for positioning and sizes of prints shall comply with optical quality determined by viewing from a distance of 3 metres using daylight without direct sunlight or direct spotlight, perpendicularly to the glass, for no more than 10 seconds.
 - b) Apply smoothly and consistently over the whole, or part, of each glazed area as indicated on the Drawings.
 - c) Fuse into the surface of the glass, thus providing a permanent layer (with the exception of the exposed internal surface).
 - d) The coatings shall have similar sheen, chromaticity and luminosity, to give a non-discernible colour difference when viewed by eye and illuminated by a standard light source, and shall colour match. All ceramic fritting shall be opaque and to a colour as agreed with the Superintendent.
- B. High performance glass coatings:
1. Panes of glass with high performance coatings shall be examined for defects in accordance with BS EN 1096: Part 1, viewed from a distance of 3 metres from the outside face of the glazing, for both the main area and the edge area of the glass panes.
 2. Soft coatings in double glazed units:
 - a) The glass shall be edge stripped on the coating side to a width corresponding to the width of the spacer bar (complete with butyl strip) such that when the panes are sealed together no discoloration to the coating by the butyl strip occurs around the perimeter of the double glazed unit. Any red or blue line around the perimeter of the glass pane will not be accepted.
 - b) Up until the time of installation, all handling of glass shall be carried out using protective cotton or surgical gloves so as not to damage the surface of the coating with fingerprints. After protection is removed from the coated glass panes, the panes shall be installed into the double glazed units and sealed within the time period recommended by the coating manufacturer, to avoid any atmospheric deformation of the surface.

2.9 Unitised Systems

- A. Double glazed units:
1. Unless otherwise specified, double glazed units shall be hermetically sealed units complying with AS/NZS 4666.

2. The system shall include spacers to separate the glass panes. Fill with moisture absorbing desiccant and mechanically apply a primary polyisobutylene seal to a minimum width of 1mm between the glass and spacer to provide a continuous vapour-proof barrier, as well as a secondary two-part silicone seal to the perimeter of the units capable of carrying anticipated wind loads.
3. Visual inspection by the Superintendent of the glass edges, edge seals and spacers shall be unhindered, prior to glazing.
4. Drainage of water along edge seals is not permitted.
5. All double glazed units shall be assembled in controlled temperature and humidity conditions. Breather tubes shall be used, if necessary, during manufacture and transportation. Remove and seal units prior to manufacture.
6. State the maximum concavity and convexity that will occur under the anticipated ambient climatic conditions and barometer pressure differentials.
7. The bottom supported edges of laminated glass panes within vertical double glazed units shall be ground flush over the width of the pane to provide even distribution of load to the setting blocks.

2.10 Structural Silicone Glazing

A. General:

1. To AS 1288.
2. Be responsible for the final selection of materials, testing, fabrication, transportation and installation of the structural silicone glazing and submit samples for review by the Superintendent prior to manufacture.
3. The structural silicone glazing shall be carried out in such a manner that will not compromise the integrity of the double glazed unit's edge seals and the specified warranties.
4. Structural silicone glazing application shall be carried out in accordance with the manufacturer's instructions and in a strictly controlled environment in order to maintain temperature, humidity, dust, dirt-free and similar conditions.

B. Materials:

1. Provide structural silicone adhesive, obtained from a single source manufacturer and apply in strict in accordance with the manufacturer's recommendations.
2. For marine and similar environments, the structural silicone shall be suitable for this purpose. Proposals shall be submitted to the Superintendent for review and acceptance.

C. Installation/ fabrication:

1. Structural silicone glazing application shall not be carried out on Site unless agreed otherwise with the Superintendent.
2. Provide documentation of the sealant manufacturer's requirements for the particular substrate including joint dimensions, limitations and requirements for mixing, cleaning, surface preparation, priming and application.
3. Provide evidence that the sealant has been selected taking into account the sealant manufacturer's recommendation as to use and compatibility with the contact surfaces.
4. Joint design shall be in accordance with the sealant manufacturer's recommendations for glue-line and bite to glue-line ratio, taking into account the design wind pressures and panel sizes.
5. Provide details of tensometer and any other required testing equipment.
6. Glazing procedures shall include frame assembly, cleaning, priming (if necessary), gunning, tooling and frame handling after glazing and curing. Sealant shall not be applied when the temperature is below 4°C and units shall not be moved until the silicone has achieved the level of cure recommended by the silicone supplier.
7. Log and record details of all structural silicone incorporated into the Works including date of manufacture and dates of delivery and adoption of each and every batch. Each structural silicone glazed panel shall be located on the As Built Drawings and reference the recorded structural silicone batch data as well as results of tests conducted to establish silicone installation quality standards.
8. The structural silicone glazing shall be recorded at the time of assembly and include identification marks of every panel by a unique number, readable from the inside of the building. Provide glazing records with information on each panel including silicone type, batch, date of application, glazier's name and temperature and humidity measured inside the factory on the day of assembly.

9. Provide a periodic maintenance programme for acceptance by the Superintendent. This shall be incorporated into the Operation and Maintenance Manuals. Acceptance criteria shall be consistent with the requirements of the testing criteria, which as a minimum shall be:
 - a) A standard "peel test" on any broken panels that require replacement.
 - b) A close visual inspection shall be carried out externally from the cleaning apparatus, including application of hand pressure to verify continued adhesion. This exercise shall be carried out for 1% of the cladding, once a year for the first three years, then at a frequency of every five years. The panels shall be randomly selected around the elevations at varying heights.
 - c) The sealant supplier or other qualified body shall carry out tests.

2.11 Mirror Glass

- A. To AS 1288.
- B. Type: Silver layer deposited on the glass or glazing plastic.

2.12 Product Identification

- A. Safety glazing materials: Identify each piece or panel in accordance with AS 1288.
- B. Noise reducing glazed assemblies: Label each panel with a legible non-permanent, self-destroying when removed mark, stating and certifying the Rw rating and identifying the testing authority. Remove when directed.

3. EXECUTION

3.1 Glass Processing Generally

- A. Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access holes and speaking holes.

3.2 Installation Generally

- A. Install the glass so that:
 1. Each piece is held firmly in place by permanent means which enable it to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
 2. Building movements are not transferred to the glass.
 3. External glazing is watertight and airtight.
- B. Install to AS 1288.
- C. Temporary marking: Use a method which does not harm the glass. Remove marking on completion.
- D. Toughened glass: Do not cut, work, or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.
- E. Heat absorbing glass: In locations exposed to direct sunlight, provide wheel cut edges free from damage or blemishes, with minimum feather.
 1. Edge grinding or arising: Wet process, using grit no coarser than 120-180. Do not work across the edge from surface to surface.
 2. Temporary marking: Remove before installation.
- F. Frameless installations: Join the vertical edges of adjacent glass panels with silicone jointing compound.

3.3 Preglazing

- A. Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed unless preglazing is impracticable.

3.4 Partition Glazing

- A. General: Assembly: Provide beads or snap-in beads and resilient (PVC, butyl or similar) glazing tapes, gaskets and inserts, so that the glass is held firmly without distortion and withstands the specified loadings.
- B. Frameless installations: Join the vertical edges of adjacent glass panels with a silicone jointing compound.

3.5 Completion

- A. Warranties:

1. General: Submit a warranty, undertaking to repair or replace glass and glazing materials which, within the warranty period, become defective, provided that the manufacturer's recommendations for the maintenance of the material have been followed during the warranty period.
 2. Glass manufacturer's warranties: An undertaking, conditional only on compliance with the manufacturer's recommendations for installation and maintenance, to supply replacement glass units to the Site for replacement of defective units defined as follows:
 - a) IGU units: Units in which the hermetic seal has failed as evidenced by intrusion of foreign matter, or internal condensation at temperatures above 2°C.
 - b) Coated glass units (including coated SIG units): Units in which the metallic coating shows evidence of manufacturing defects, including but not necessarily limited to cracking or peeling, as determined in accordance with ASTM C1048-04.
 3. Toughened glass warranty: The manufacturer's warranty certifying that toughened glass supplied for use in curtain walls has been subjected to a heat soaking process which has converted at least 95% of the nickel sulphide content to the stable beta-phase.
- B. Maintenance manual: Submit manufacturer's published recommendations for service use.
- C. Cleaning: Replace damaged glass and leave the work clean, polished, free from defects, and in good condition.

SECTION 08-500 -- GASKETS	1
1. GENERAL	1
1.1 Related Documents	1
2. PRODUCTS	1
2.1 Materials	1
3. EXECUTION	1

SECTION 08-500 -- GASKETS

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

2. PRODUCTS

2.1 Materials

- A. Gaskets shall accommodate the maximum movements anticipated in the particular application.
- B. All gasket to gasket joints shall be butt jointed and heat sealed. The bonding of gaskets using other materials is not acceptable. The gaskets shall perform and appear as a single continuous material.
- C. The gasket system shall comprise both extruded and moulded elements. These shall perform and appear as a single element.
- D. All gaskets shall be fabricated to the most appropriate grade and hardness. Design and select all gaskets in order to:
1. Ensure the most appropriate solution is chosen for the particular application.
 2. Ensure that glass retention and weatherproofing requirements are maintained.
 3. Ensure that they retain their shape and function and do not permanently distort over their working life.
- E. Gaskets shall be kept free from contact with materials that have stain characteristics and shall be compatible with all substrates, sealants and any other materials used in the Works.
- F. Provide written confirmation from the gasket manufacturer that the gasket material and designs are suitable for their specific use in all parts of the Works and that they are compatible with all other materials and sealants used within the installation and at interfaces with other materials/ components.
- G. The colour of all gaskets shall be black unless specified otherwise.
- H. Gaskets shall not shrink, warp or deteriorate during the periods nominated in the Contractor's stated times for replacement.
- I. Gasket corners in frames shall be preformed and factory vulcanised in layers.
- J. The choice of seals and gaskets shall not compromise sound insulation performance.
- K. Gaskets and seals used to achieve the required airtightness shall be selected to accommodate fully the range of dimensional tolerances and movements associated with the design, fabrication and installation of the Works. Gaskets shall be formed from materials capable of maintaining their elastic qualities and dimensions and shall be resistant to physical and chemical attack.
- L. The Contractor shall be responsible for ensuring that the glazing framework is effectively sealed to the building structure to such an extent that the acoustic performance of the installation is equivalent to that measured under the test conditions detailed in the Specification.

3. EXECUTION

- A. Not Used.

SECTION 08-550 -- INSULATION AND BARRIERS	1
1. GENERAL	1
1.1 Related Documents	1
1.2 Definitions	1
1.3 Testing	1
2. PRODUCTS	1
2.1 Insulation Generally	1
2.2 EPS, PU and PIR Insulation	1
2.3 Pliable Building Membranes	1
2.4 Insulation Batts and Blankets	1
2.5 Reflective Insulation	2
2.6 Vapour Barriers	2
2.7 Breather Membranes	2
2.8 Polyester Insulation	2
2.9 Mineral Wool Insulation	2
2.10 Sarking	2
2.11 Fasteners and Supports	2
2.12 Mesh Support to Roof Insulation	2
2.13 Packaging and Labelling	2
3. EXECUTION	2
3.1 Installation of Mineral Wool Insulation	2
3.2 Insulation	2
3.3 Vapour Barriers/ Breather Membranes	3
3.4 Cavity Barrier	3
3.5 Sarking Type Material	3

SECTION 08-550 -- INSULATION AND BARRIERS

1. GENERAL

1.1 Related Documents

- A. This section shall be read in conjunction with Section 01-100, other related sections of this Specification and the Preliminaries.

1.2 Definitions

- A. Terminology: To AS/NZS 4859.1.
- B. Mineral wool (including glasswool and rockwool): Entangled mat of fibrous non-crystalline material derived from inorganic oxides or minerals, rock, slag or glass, processed at high temperatures from a molten state.
- C. Pliable building membrane (or underlay): a flexible sheet material, which may be installed to act as a sarking membrane, thermal insulation or vapour barrier, or any combination of the three.
- D. Polyester: polyester fibres bonded into resilient batts or blankets using either heat bonding of low-melt temperature polyester fibres as a fraction of the fibre mix or using spray-adhesive bonding.
- E. Sarking membrane (or water barrier): a material intended to collect and discharge any water that may penetrate a building element.
- F. Vapour barrier: a material intended to restrict the transmission of vapour (generally water vapour) and minimise the results of condensation.

1.3 Testing

- A. Provide testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification and AS/NZS 4859.1.
- B. The provision of testing data or the carrying out of tests does not relieve the Contractor of his responsibilities regarding the performance requirements, durability or service life requirements, etc.

2. PRODUCTS

2.1 Insulation Generally

- A. Insulation shall be inert, durable, rot-proof, vermin-proof, environmentally friendly and not be degraded by action of moisture, extreme climate temperature or water and water vapour.
- B. All thermal and acoustic insulation used in the Works shall avoid ozone depleting substances in both their manufacture and composition. All applicable products shall have an Ozone Depleting Potential (ODP) of zero.
- C. At completion of the works, provide a schedule identifying all uses of thermal and acoustic insulation. The schedule shall outline each insulation product supported by documentary evidence in the form of product technical literature confirming compliance.
- D. Obtain acceptance from the Superintendent before substituting any specified thermal or acoustic insulation products.
- E. Insulation shall have zero ODP (ozone depleting potential) be CFC and HFC free in both its manufacture and composition and have a GWP (global warming potential) of less than 5. Provide material safety data sheets (MSDS) or other such evidence from the manufacturer demonstrating compliance.
- F. The insulation shall satisfy the acoustic and thermal requirements nominated in particular work sections of the Specification.
- G. The selected material and its method of attachment to the supporting components shall eliminate the risk of bulging, sagging, delamination or detachment.
- H. Insulation shall comply with the requirements of AS/NZS 4859.1.

2.2 EPS, PU and PIR Insulation

- A. Use of extruded or expanded polystyrene (EPS), rigid foam polyurethane (PU) and/ or polyisocyanurate (PIR) insulation products other than those specified are not acceptable unless formally accepted by the building owner's insurance underwriters.

2.3 Pliable Building Membranes

- A. Pliable building membranes shall comply with the requirements of AS/NZS 4200.1.

2.4 Insulation Batt and Blankets

- A. Biosoluble glasswool and rockwool insulation with or without facings.
- B. Polyester insulation.
- C. Comply with AS/NZS 1530.3.

2.5 Reflective Insulation

- A. Insulation that incorporates a reflective metallic surface in the form of either a rolled metallic foil or a metallic deposit.
- B. Shall meet the requirements of the Specification and AS/NZS 4859.1, Section 9.

2.6 Vapour Barriers

- A. Shall meet the requirements of the Specification.
- B. Shall effectively prevent the passage of water vapour into the system.
- C. Vapour barriers shall be installed as a fully sealed and airtight assembly without holes or tears.

2.7 Breather Membranes

- A. A proprietary reinforced breather membrane.
- B. Breather membranes shall meet the requirements of the Specification and AS/NZS 4201.6.
- C. The breather membrane shall permit the passage of air through the system without giving rise to the risk of interstitial condensation.

2.8 Polyester Insulation

- A. Shall comply with the Specification and AS/NZS 4859.1, Section 7.

2.9 Mineral Wool Insulation

- A. Shall comply with the Specification and AS/NZS 4859.1, Section 8.

2.10 Sarking

- A. Installed under the outer roofing surface of tiled or metal roofs as water or weatherproofing material.
- B. Shall comply with AS/NZS 4200.1 and AS/NZS 4200.2.

2.11 Fasteners and Supports

- A. Galvanised steel.

2.12 Mesh Support to Roof Insulation

- A. Wire netting shall comply with AS 2423.
- B. Welded safety mesh shall comply with AS/NZS 4389.

2.13 Packaging and Labelling

- A. Packaging and labelling shall comply with AS/NZS 4859.1.
- B. Mineral wool packaging shall be labelled FBS-1 Bio-soluble Insulation in accordance with Safe Work Australia guidelines.

3. EXECUTION

3.1 Installation of Mineral Wool Insulation

- A. Comply with the AMWU/ CFMEU/ CEPU/ ICANZ Industry Code of Practice for the Safe Use of Glasswool and Rockwool Insulation.
- B. Ensure total and complete continuity of all insulation systems throughout the building such as between and over support structure and at wall to roof and similar building junctions. Leave no gaps in the insulation. Keep the insulation dry and do not compress.
- C. Attach and/ or support insulation so that it does not bulge, sag, delaminate or detach during installation or at any point during the life of the building.

3.2 Insulation

- A. Installation of bulk insulation shall comply with AS 3999.
- B. All components shall be stored on Site such that they are not damaged, distorted or weathered unevenly. Keep dry at all times.
- C. Before installation, holes shall be sealed and all debris removed.
- D. Material shall fit tightly with closely butted joints. There shall be no gaps.
- E. Ensure total and complete continuity of all insulation systems throughout the building such as between and over support structure, at wall to roof and similar building junctions, etc. Leave no gaps in the insulation. Keep the insulation dry and do not compress.
- F. Attach and/ or support insulation so that it does not bulge, sag, delaminate or detach during installation or at any point during the life of the building.
- G. The placement of insulation shall be such that it does not affect the safe or effective operation of a service or fitting.
- H. Electric cables shall not be covered over by insulation (unless they have been sized accordingly).

3.3 Vapour Barriers/ Breather Membranes

- A. Before fixing, the moisture content of timber shall be checked and vapour barrier shall only be installed if moisture content is below 20%.
- B. Material shall be fixed carefully and neatly to provide a fully sealed barrier free from tears, punctures, open seams and sagging.
- C. Staples shall be used for fixing at not more than 250mm centres along all supports. Sheets shall be lapped only at supports and laps shall not be less than 150mm. Material shall lap over and be fixed to reveals of openings.
- D. All joints and edges, including around pipes, ducts, etc, shall be sealed with adhesive tape recommended by the vapour barrier manufacturer.
- E. Immediately before covering over, membranes shall be checked for perforations and any found shall be repaired or replaced to the satisfaction of the Superintendent.

3.4 Cavity Barrier

- A. Material shall be cut to fit tightly and shall be securely fixed along all edges. All joints shall be wired or stapled together to provide a complete barrier to smoke and flame.
- B. There shall be no gaps.
- C. Sleeved Fibre Small Cavity Barriers:
 - 1. Fix securely with staples at not more than 150mm centres. Fix vertical barriers by both flanges, horizontal barriers by upper flange only.
 - 2. Closely butt at joints and intersections and ensure that the barriers are compressed along their full length to give a complete seal.
- D. Wired Fibre Small Cavity Barriers:
 - 1. Fix securely with staples, folding if necessary to ensure a tight fit. Closely butt at joints and intersections, leaving no gaps.

3.5 Sarking Type Material

- A. Installation shall comply with AS/NZS 4200.2.