L. DOORS AND WINDOWS

L1. ENVIRONMENTAL MANAGEMENT

Refer to the approved Environmental Management Plan submitted in accordance with the requirements of Section 6, ENVIRONMENTAL MANAGEMENT, and ensure the mitigation and waste management processes to counter any environmental impact are established and in place.

All materials intended for use in this project shall, as applicable, conform to the requirements of Section 6, ENVIRONMENTAL MANAGEMENT, Part 7 “SELECTION AND SUPPLY OF PRODUCTS AND MATERIALS”.

L2. DOORS

L2.1 EXTENT

Refer to drawings and Door Schedule for location and door types.

L2.2 STANDARDS

The relevant Australian Standards shall govern the materials and workmanship under the Contract unless otherwise noted.

L2.3 MATERIALS

Generally

All materials used in the Works shall be new, of good quality, sound and free from damage, defacement and unacceptable defects.

All materials shall be protected from wetting and dampness.

Timber

For all requirements relating to timber type, sourcing, quality, etc. refer to Section J CARPENTRY.

Face Veneers

Face veneers on doors shall comply with the following requirements:-

- Where a stained or transparent finish is required, face veneers shall be select grade, matched, quarter sliced cut veneers of the timber species specified and shall match in type, colour and grain.
- Joints between veneers shall be closely fitted to fine lines and matched. End butt joints, pleats and overlaps shall not be permitted.
- Where an opaque painted finish is required, face veneers may be Merchantable grade.
- Where covered by a surfacing material the veneers may be selected grade back veneers as described in AS 2270.
- Veneers which not be visible in completed joinery items shall not be of lower quality than merchantable grade back veneers as described in AS 2270.

L2.3 MATERIALS (Continued)

Plywood

Plywood for door facings shall conform to relevant standard specifications and shall be of thicknesses and types noted in the door type specifications.

Type A bond plywood to AS 2271 shall be used for exterior facing doors including the internal face and internal wet areas. Plywood used in other internal areas shall be Type D bond to AS 2270.

Particleboard

For use as door cores shall be to AS / NZS 1859 Part 1 and of thicknesses noted in the documents but no material containing urea-formaldehyde shall be used.

Generally particleboard shall be HMR grade.

Medium Density Fibreboard (MDF)

No medium density fibreboard shall be used on the project.

Hardboard

Shall be to AS 2458. All hardboard shall be tempered grade.

Plastic Laminate

Shall be decorative thermosetting laminated sheet to AS 2924 of selected manufacture and colour with a minimum thickness of 0.8mm unless otherwise noted.

L2.4 FABRICATION

Make junctions so that no fixings such as pins, screws, adhesives and the like are visible on exposed surfaces.

Moving parts shall operate freely and smoothly, without binding or sticking, at correct tensions for operating forces.

L2.5 WARRANTIES

Submit a warranty of doors covering manufacturing defects, twist and warp as defined in AS 2688. The warranty shall cover the door for normal use in the position shown and with the specified finish.

Any failure under warranty shall include for replacement, reinstallation and finishing as scheduled together with refixing and adjusting all hardware.

Hollow core doors	2 years
Solid core doors	5 years
Glazed timber doors	5 years
Fire door assemblies	5 years
Operable walls	2 years
Steel roller shutters	2 years

Accept responsibility for storage, installation and finishing to ensure that the manufacturer's warranty is not impaired or affected.

L2.6 LOCKS AND HARDWARE

Make provision for fixing the hardware specified for the relevant doorset using 5mm backplates and lugs.

Except in fire door assemblies, screw fix the hinges into tapped holes in the back plates.

Refer to the Door Schedule for details of locks and hardware.

L2.7 DOOR FRAMES GENERALLY

The design of external door frames, in conjunction with timber and aluminium framed windows are the responsibility of the Contractor as described in Clause L3.6 "Design Requirements".

Internal door frames shall be of type and size indicated on the drawings and/or described in the Door Schedule.

Cut frames straight and to required lengths. Accurately cut, fit and securely fix joints. Provide temporary bracing to prevent distortion during handling, storage and installation.

L2.8 TIMBER DOOR FRAMES

Manufacture frames and jamb linings to AS 2689; Installation to AS 1909, in accordance with Specification Part L3 and L5.

Construct frames with KDRHW regrowth timber as specified in Section J unless otherwise noted, with all fixings concealed. External thresholds where applicable shall be seasoned, dressed recycled hardwood as specified in Section J.

Exterior frames shall be weathered and throated, and fitted with all seals and flashings etc. as required by the specialist subcontractor to warrant the window / frame installation in accordance with Clause L3.6 "Design Requirements".

L2.9 STEEL DOOR FRAMES

Where required provide and fix steel door frames from formed sections as shown.

Frames shall be pressed out of 1.20mm cold reduced black mild steel sheets. Each member shall be in one piece with uniform profile and all corners and other joints shall be mitred, welded and cleaned off to a smooth finish.

Frames shall be accurately dimensioned to suit the overall frame sizes scheduled and all angles and intersections shall be true and square.

Jambs and frames are to be reinforced where required and prepared to take all necessary fittings. In preparation for locks, hinges, striking plates, etc. these must be made to finish flush with metal jambs and fixed with metal thread screws to 5mm thick MS backing plates welded to frame and provided with metal cover protectors. Backing plates for door closers shall be of mild steel 5mm thick and at least 300mm long and shall be welded to frames.

Build in frames and jambs as the work proceeds and grout up solidly in masonry walls with 3:1 cement mortar. Supply and fix wire ties to the jambs of all frames at approximately 300mm centres vertically and spaced to suit the joints of the work into which the frames are built. In stud partitions fix frames with concealed fasteners.

L2.9 STEEL DOOR FRAMES (Continued)

Before delivery, clean all frames free from rust, scale and grease and apply one coat of an approved rust inhibitor and one coat of zinc phosphate primer, including all visible and hidden surfaces. Alternatively, use galvabond material with cold zinc priming over all welds and fixings.

Deliver frames to the job with spreaders at the bottom to prevent distortion. After building in, and after all mortar and grout has hardened, remove the spreaders.

Ensure that the frames are not damaged either before or after fixing. Fixing shall be done to the manufacturer's directions.

Provide and fit three black rubber buffers to each door frame. Buffers to be grommet type inserted into frame and not adhesive fixed to surface. Drill frame for buffers as required.

Door frames for fire doors shall be supplied by the fire door manufacturer and shall form part of the complete tested fire door assembly.

L2.10 ALUMINIUM DOOR FRAMES

Refer to drawings, Door Schedule and Specification Part L3 and L4 for details.

L2.11 DOOR TYPES

Generally

The design of external doors in conjunction with timber and aluminium framed windows are the responsibility of the Contractor as described in Clause L3.6 "Design Requirements".

Type D3

Solid core flush panel door constructed in accordance with AS 2688 - Section 5 (blockboard infill).

Sheet both sides of door with 4mm thick plywood veneer for paint finish as applicable.

Fit 10mm thick KDHW edge strip to each vertical edge. Door thickness - 40mm finished thickness minimum.

Frame shall be constructed of select quality KDR Hardwood with a moisture content of 12-15% at the time of door manufacture. Provide fixing blocks as required for door furniture and hardware.

Where air relief grilles are scheduled provide continuous trimmer to all four sides of grille opening. Install smoke seals to doors so scheduled.

Provide glazed viewing panels where indicated in the documents. Unless otherwise noted, glazing shall be 6 thick clear float glass flush beaded into frame.

Type D3.A

Solid core flush panel door all as for D3 but sheeted on external face with select grade slice or rotary cut (as selected) hoop pine plywood and further over sheeted in sheet steel finished in Z600 double smelted galvanised finish.

Steel facings to be laser cut for signage as shown on the drawings and fixed to plywood under-layer with full bed of elastromeric adhesive for concealed fix effect.

L2.11 DOOR TYPES (Continued)

Type D6

Solid core flush panel door all as for D3 but faced both sides in waterproof plywood and with 10mm KDHW edge strip returned across top and bottom of door panel to seal off all exposed framing and plywood edges.

Type D10

2 hour fire resistant door assembly FRL – 120 / 120 / 120.

Flush panel timber fire door assembly of approved manufacture. Door shall meet the requirements of AS 1905 and be to the approval of all authorities having jurisdiction. Door shall have been tested with lock, furniture and hardware as scheduled fitted to the door by the door manufacturer. Submit a manufacturer's compliance form conforming that the hardware, lock and furniture as scheduled have been tested and accepted with the door at the Commonwealth Building Station at Ryde and each frame and door shall be labelled as so complying.

Manufacture door to size as scheduled and sheet both sides with paint quality face veneer.

Supply door complete with metal door frame as detailed and with frame fixings. Build in frame to the manufacturer's specification.

Type D12

Timber framed, single light, fully glazed external door constructed with KDRHW regrowth timber as specified in Section J, and to Specification Part L3, L5.

Frames shall be weathered and rebated and fitted with all seals, flashings, meeting beads, etc. as required by the Specialist Subcontractor to warrant the window / door installation in accordance with Clause L3.6.

Type D14

Aluminium framed glazed door.

Refer to drawings, Door Schedule and Specification section L3 and L4 for details.

Type D17

Frameless Glazed Hinged Door

Provide frameless glazed single doors where scheduled. Doors to be 12mm fully toughened clear safety glass with exposed edges polished.

L2.11 DOOR TYPES (Continued)

The doors shall be hung with stainless steel patch fittings at head and base, containing pivot fittings for connection to either floor spring or transom spring as scheduled.

Provide stainless steel covers to all patch fittings in satin polished finish.

Form all pivot cut-outs and handle fixing holes in the glass prior to toughening and to suit the scheduled items.

Leave all doors thoroughly clean and without scratched surfaces or any other defect at completion.

Type D18

Frameless Glazed Sliding Doors

Provide frameless glazed automatic sliding double doors where shown on drawings. Doors to be 12mm. fully toughened clear safety glass with exposed edges polished.

Automatic Sliding System

The automatic bi-parting door operator shall be BWN AL-400 Structural Series fully housed in a concealed extruded aluminium housing. The operator must have a Class 3 Duty Cycle in accordance with AS 4085.

The equipment shall incorporate the following:-

- Constant rated 7kg torque capacitor start and run squirrel cage motor with output shaft also the gearbox drive shaft, ie. no intermediate belts, pulleys or couplings which are subject to failure, breakage, slippage, shearing or loss of tension.
- Chain drive with average tensile strength of 1950kg and 12.7mm pitch, directly connected to door leaf hanger carriage assemblies. Chains or belts of lesser tensile strength will not be permitted.
- Auto re-close circuitry to ensure doors close if partially opened (i.e high wind condition).
- Self lubricating planetary gear box with spiral bevel drive.
- Automatic reversing if obstructed during the closing sequence (fully adjustable sensitivity).
- Fully adjustable speed control with independent settings for - Opening, Closing, Final Opening, Final Closing.
- Auto stop if obstructed during opening sequence (fully adjustable sensitivity).
- The track is to be stainless steel mounted in rubber carrying adjustable hanger bars supported by fully sealed raced fibreglass reinforced track wheels. Hanger brackets to suit frameless toughened glass doors.
- Cover panel to be 1.6mm satin polished stainless steel, grade 304, fitted as detailed.

L2.11 DOOR TYPES (Continued)

Failsafe Mechanism

The operator is to incorporate a failsafe device to open doors on power failure/fire alarm in accordance with BCA requirements. Doors to automatically return to original function mode when power is returned or fire signal is deactivated.

Actuation

The operator is to have Microwave Directional Sensor. Sensor shall be concealed and mounted in location approved by the Superintendent.

Locking

Refer to Door Schedule for locking requirements.

Refer to Security Services specifications for the following (if required):-

- Key / card proximity reader interface
- Emergency lock function

Specialist Subcontractor

The whole of the automatic system shall be installed by a specialist subcontractor recommended by the manufacturer and shall be strictly in accordance with the manufacturer's instructions.

Power supply will be provided adjacent to the unit by the electrical subcontractor but final connection to the power supply shall be the responsibility of the specialist subcontractor for the doors.

Shop Drawings

Provide shop drawings of automatic doors showing full details of manufacture, assembly, installation, finish and automatic operation.

Warranty

Provide a warranty in the name of the Principal against defects in materials and workmanship for a period of not less than 5 years from the date of Practical Completion.

Type D20

BI-FOLD ACCORDIAN DOOR

Timber framed, full glazed, multiple panel sliding bi-fold door.

Panel frames shall be fabricated from recycled hardwood complying with the requirements of Section J generally, Clause J3.2 in particular and Specification Part L3, L5.

Size panel widths to an even subdivision of the travel length but maximum 850mm.

Provide glazing rebates and felt backed glazing beads to accommodate toughened clear glass panes sized in accordance with AS 1288.

L2.11 DOOR TYPES (Continued)

Hang doors on GEZE APOLL head track suited to end folding door configuration and with double roller trolleys at every second panel.

Conceal track into false ceiling space and side mount off structural floor framing.

Hinge panels with 4 no. stainless steel, ball bearing hinges between each panel and install into the floor a stainless steel flush guide channel with guide rollers fitted to each panel.

Provide shop drawing of the proposed panel design and general layout for approval and do all installation in accordance with the track manufacturer's data sheets.

Provide following fabrication, penetrating preservative coating as specified in Clause Q12 System 5.

Type D22

Steel Roller Shutters

Refer to Section H METALWORK.

Type D24

Sub-Station Doors

Provide fire rated door and frame set with all hardware in accordance with the specification for door Type D10 and to the Electrical Supply Authority's approval. All locking fittings shall also be to Authority approval.

L2.12 EDGE STRIPS

Where specified and/or indicated on the drawings, edge strips to doors shall be 10mm thick KDRH pinned and glued in position and finished flush with finish on door. The edge strips shall be finished to match the door.

L2.13 DOOR GRILLES

Fit door grilles in doors where noted in the Door Schedule. Grilles to be supplied by the Subcontractor for Mechanical Services.

Unless otherwise noted grilles shall be Cameron & Jason aluminium grilles with selected powdercoat finish and fixed in accordance with the manufacturer's recommendations.

Trim doors as required.

L2.14 CONSTRUCTION KEYING

Provide an approved construction keying system to control all lockable doors until the date of Practical Completion.

Immediately before the date of Practical Completion, remove the construction keying system from all affected doors and install the project locking system including master keying as required.

Arrange for lock manufacturer to send keys for project locking system direct to the Superintendent.

L2.15 DOOR FINISHES

General

Unless otherwise noted, finish doors and door frames as specified below.

All paint materials shall comply with and be subject to conditions set out in Section Q PAINTING of this specification.

Stained Finish

- External timber framed, glazed doors and frames
  Paint System Q12.4

- Internal timber framed, glazed doors and frames
  Paint System Q12.12

Enamel Finish

- External and Internal flush panel, ply faced doors
  Paint System Q12.6 / 13

- External and Internal galvanised steel door frames
  Paint System Q12.2 / 10

Powdercoat Finish

- Aluminium doors and frames
  METALWORK – Clause H10

L3. WINDOWS AND GLAZED SCREENS FS01 / FS02

L3.1 GENERAL

The work generally includes the manufacture, supply, erection and glazing of external and internal aluminium, and timber framed windows, glazed screens and framed glazed doors and includes all associated trims, beads, lugs, sills, flashings, hardware and seals as required to satisfactorily complete the installations.

Take delivery when necessary, store, protect and clean all units and glass. An approved protective coating shall be applied to all aluminium framing by the manufacturer to protect from damage before and after building in. Timber framing shall receive a shop applied preservative dip coating as specified in Section Q PAINTING and be sealed with plastic sheeting during construction. Remove protective coatings at Practical Completion. No cement or plaster shall be allowed to come in contact with framing faces that will be exposed to view and all visible surfaces shall be left clean and free from staining.

Provide for and correctly build in all flashings attached to windows including associated sealants. Supply and build in all other flashings necessary to make the windows weatherproof.

The manufacture and installation shall be carried out by approved specialist Subcontractors, all investigations to date for window design have been carried out with the following.

Miglas Australia Pty Ltd
57 – 59 Canterburry Road, Montrose
PH. 9728 3999
ATT – Anatol Miglas

L3.2 STANDARDS AND TESTING

All work and materials within this section shall be carried out in accordance with the following standards, including all amendments and all other standards referred to therein.

AS 1080.1	Timber – Methods of test: Moisture content
AS 1170.2	Wind forces
AS 1288	Glass in buildings
AS 1540	Timber frames and sashes for windows
AS 1664	Rules for the use of aluminium in structures
AS 2047	Windows in buildings
AS 2048	Installation and maintenance of aluminium windows in buildings
AS 2146	Performance of timber window assemblies
AS 2147	Code of practice for the installation of timber windows in buildings
AS 2796.1 / 2	Timber – Sawn hardwood, milled products
AS 4420	Windows – Methods of test
TR 92 / 6	'Sirowet' method of testing building facades
CIBSE TM23	Additional methodology for facade air-leak testing

L3.3 SHOP DRAWINGS

Submit shop drawings for approval prior to manufacture.

Such approval will be for assessing compliance with the Architectural design intent only.

The shop drawings, together with notes or specifications, shall demonstrate that the details, sections and methods of erection and completion do not impair the Architectural concept shown on the contract drawings and that the specified performance requirements are complied with.

Where required the shop drawings shall be accompanied by computations showing design provisions for structural adequacy, deflections and thermal movements.

Design responsibility to produce external windows and doors which will meet the performance criteria listed, will be as specified in Clause L3.6 "Design Requirements".

L3.4 WARRANTY

Provide a written warranty in the name of the Principal as required by the contract for a period of not less than five (5) years from the date of Practical Completion and make provision for the making good of any defects resulting in:-

- Water penetration
- Air leakage
- Failure of windows, doors or any component including glass, jointing, seals and hardware.
- Fading, non-uniformity of colour, discolouration, salt action, lifting, peeling, pitting or corrosion of any of the finished surfaces and joints.

L3.5 SAMPLES

If required by the Superintendent, provide 2 samples of each of the following:-

- Sections proposed for use in each type of frame, in specified finish and 300mm long
- Gaskets, sealing strips and baffles proposed for use, each 300mm long
- Hardware items in specified finish
- Glass sheet of each type, 300mm square
- Double glazed sealed unit, either sized to suit a particular project window or 500mm square

When approved, one sample of each submission will be kept on site and used as the standard to which final installation shall conform.

L3.6 DESIGN REQUIREMENTS

Design Responsibility

Notwithstanding the general concept indicated on the drawings and details, the Contractor shall be fully responsible for the actual arrangement, profiles, connections, weather bars, seals, rebates, pressure equalized drainage joints and the like, required to provide window systems that meet the relevant criteria for deflection, water penetration, air leakage, failure of componentry, faults of any kind in surfaces, connections, fixings, etc. in the Australian Standards or as hereunder.

The arrangements depicted in the contract documents are to be considered schematic and for purposes of indicating extent of work, modular setout, relationship to surrounding elements, etc.

Design and install the work as required to obtain approval of relevant Authorities and meet the provisions shown on the drawing and the performance requirements of this specification.

The external glazing and framing assembly shall provide complete protection against water penetration.

Window assemblies shall be proof tested as specified in Section B and also when the building shell is fully enclosed.

Computations

Computations for the design of the glazing and framing shall be prepared by a qualified Engineer engaged by the Contractor. The computations shall be prepared in accordance with the design requirements and shall show that the members and their fixings are satisfactory for strength and stiffness and that allowance has been made for thermal movement and differential movement of the structure.

Wind Pressure

Wind loading shall be determined in accordance with AS 1170 - Part 2 for the Terrain Category of the site.

Vertical Loading

Vertical loading shall be at least twice the dead weight of the window unit including glazing etc. as supported.

L3.6 DESIGN REQUIREMENTS (Continued)

Stiffness

Deflection from impact loadings on any section of the completed glazing system shall satisfy the test required by AS 2047 and in particular clause 5.3.2.

Deflection of members between fixings from vertical loading shall be limited to span/1000.

Thermal Movement

Allowance shall be made to permit thermal expansion and contraction to take place freely in the plane of the units, to comply with AS 2048.

Weather Protection Criteria

Design: External systems shall be designed and warranted to be waterproof and weatherproof.

Expansion: Design vertical and horizontal expansion joints to provide for all weather conditions likely to exist.

Water leakage and Condensation: Drain or discharge to exterior face of the wall, and vent all internal spaces by acceptable means to ensure air-pressure equalisation where possible. Water penetration shall not exceed the limit required under AS 2047.1.

Air Filtration: The maximum limit required is 0.44 l/s/m².

Sealers: Joint sealers shall establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognised limitations of wear and ageing, as relevant for each application.

Dissimilar and Incompatible Materials

All materials and products proposed shall be chemically and electrolytically compatible with each other, with the substrates, with adjacent materials and shall be non-staining and non-bleeding. Submit details of coatings and spacers between dissimilar or incompatible materials for approval.

Steel clip angles or other sections shall be hot-dip galvanised to AS 1650. Aluminium sections shall be electrolytically isolated from steel and concrete by an approved coating or spacer. Bolts and nuts shall be galvanised to AS 1214 or coated with an inorganic zinc-rich primer to AS 2204.

Aluminium surfaces in contact with mortar, concrete, plaster, masonry or absorptive materials shall be coated with an antigalvanic, moisture-barrier material.

L3.7 WINDOW TESTING

Proof testing of window assemblies and further testing of building shell air infiltration rates shall be undertaken as specified in Section B.

L3.8 SPECIALIST SUBCONTRACTORS

The manufacture, supply, delivery and site installation of the complete window systems shall be undertaken by firms specialising and experienced in the system types – aluminium framed or timber framed systems. Specialist firms noted in the schedules are pre-approved, of acceptable standard and for proposed alternative or further firms the Contractor shall submit for approval evidence of such experience for assessment by the Superintendent.

L4. ALUMINIUM FRAMED WINDOWS, DOORS AND INTERNAL PARTITIONS FS03 / FS04

L4.1 WINDOW DESIGN

The following specifications are descriptive of the quality requirements in the provision of aluminium windows.

All aspects of functional window design are the responsibility of the Contractor in accordance with Clause L3.6 “DESIGN REQUIREMENTS”.

L4.2 METALS

Alloys

Aluminium shall be fully treated aluminium alloy to AS 2047 (Table 1 - Aluminium Alloys).

Alloy shall be generally Type 5005 for sheet aluminium and Type 6063 for extrusions. Sheets shall be rolled from one furnace loading of rolling blocks and each batch shall be clearly identified to ensure the consistency of the alloy in each sheet rolling.

Other alloys may be used to ensure compatibility for proprietary finishing methods, provided that they have characteristics not inferior to those listed.

Extruded Profiles

Aluminium extruded profiles shall be produced from alloy in accordance with the requirements of AS 1664 and AS 1866.

All aluminium sections shall be extruded to shapes and thicknesses to withstand the required loads and to present clean, straight and sharply defined lines free from draw marks. Materials shall be free from defects impairing strength and performance durability.

Aluminium Sheet

Aluminium sheet and plate shall be produced from alloy in accordance with the requirements of AS 1734 and AS 1664. Any item displaying “oil canning” conditions will be rejected.

L4.3 ALUMINIUM FINISH

Unless otherwise noted all aluminium components and surfaces where exposed shall be powdercoat finish to selected colour. The powdercoat system shall be complete with all required pre-treatment and shall be a durable polyester coating suitable for both internal and external application similar to Dulux or approved equivalent. Application shall be to paint manufacturer’s recommendations.

Where the exposed surfaces of aluminium components are required to be anodised, include for all pre-treatment and pre-finishing to ensure the adequate serviceability and even appearance of finished units. All coatings shall be sealed.

L4.3 ALUMINIUM FINISH (Continued)

Immediately before anodising, the aluminium shall be chemically treated to provide an even matching fine satin texture on the full areas of all significant surfaces.

After pre-treatment, the aluminium shall be anodised in an electrolyte for the time required to produce an even colour finish matching the selected sample over the full areas of all significant surfaces. The colour shall be achieved during the formation of the anodic film and not by use of a dye. The anodic film thickness shall not be less than 18 micrometres, the mass not less than 5mg / sq cm and the density not less than 2.72g / cubic cm.

The anodiser shall carry out testing on samples for coating thickness, coating weight sealing and abrasion resistance all in accordance with AS 2039 and the appropriate ASTM Standards. Results of these tests shall be reported as being representative of the whole of the work and the report submitted to the Superintendent.

L4.4 ALUMINIUM FABRICATION

General

Comply with approved Shop Drawings and AS 2047 and AS 2048 as applicable.

Pre-manufacture, pre-finish and pre-assemble all aluminium work in the shop to maximise quality and limit work at project site. Deliver units in largest practical sizes allowing for on-site handling and installation. Where units are partly dismantled, clearly mark for re-assembly and co-ordinated installation. During assembly and erection, do not strain, twist or bend such items to bring them to their true position.

Form aluminium work to required shapes and sizes, with true and uniform lines and angles. All surfaces shall be smooth, clean and straight with sharply defined lines and arrises, unless otherwise indicated on the drawings. Machined joints shall be milled to a close fit. Mitre corner joints. Use concealed fasteners where possible. Provide all necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.

Provide holes and connections as required to accommodate the work of other trades and for site assembly of metal work. Holes shall be drilled or punched and reamed at right angles to the surface of the metal.

Fixing to Substrate

All mechanical fixings, fastenings, anchors, lugs and the like shall be of approved type to transmit loads and stresses imposed. Ensure the rigidity of the assembly is designed to allow for adequate on-site adjustment and thermal movement.

Workmanship

Junctions shall be made so that no fixings, such as pins, screws, pressure indentations and the like shall be visible on exposed faces.

Cut edges, drilled holes, riveted joints and flat sheets shall be clean, neat, free from burrs and indentations. Remove sharp edges without excessive radiusing. Fix mitred joints accurately to a fine hairline. Treat exposed and cut or drilled raw material so that salt or other contamination shall not occur.

L4.4 ALUMINIUM FABRICATION (Continued)

All parts shall be secured by concealed means, wherever possible, and where exposed to view, screw positions shall be indicated on the Shop Drawings. Exposed screws shall be of the countersunk type, aluminium or non-magnetic stainless steel, and shall be evenly and neatly located in an approved manner. Exposed fasteners shall be finished to match aluminium component.

Fastenings to aluminium or aluminium alloys shall be aluminium alloy or non-magnetic stainless steel unless otherwise specified. Cadmium-plated or galvanised steel fastenings shall not be used. Self-tapping screws shall be stainless steel.

L4.5 ALUMINIUM INSTALLATION

Acceptance of Substrates

Before commencing installation, inspect all substrates and determine that they are in proper condition to receive the work in accordance with the drawings.

Commencement of installation of any window or screen assembly attached to substrate components will be deemed to mean that the Contractor has verified the correctness and the condition of the substrate and the correct positioning of cast in items, and any defects resulting from such accepted substrates have been corrected.

Damage

Inspect all materials and fabrications as they are unloaded at the project site for evidence of any damage. Minor damage may be repaired, provided finished items are equal in all respects to new work. Otherwise remove and replace all damaged items.

L4.6 FRAME ANCHORAGE

Anchorage of the window and screen assemblies to the structure shall be included in shop drawing details.

Provide locations of any cast-in anchor fixings in the main structure in adequate time, prior to placement of steel reinforcement.

Aluminium sections shall be electrolytically isolated from steel inserts and fixings by an approved coating or spacer.

Bolts fixing metalwork to concrete shall be anchored by steel channels, levelling plates or galvanised steel bolts or ferrules cast into reinforced concrete elements of the building structure.

L4.7 ASSEMBLY

All components shall be assembled, secured, anchored, reinforced, sealed and made weathertight in a manner not restricting thermal or wind movements of the window and screen assembly.

All exposed work shall be carefully matched to produce continuity of line, design and finish. Joints in exposed work, unless otherwise shown or required for thermal movement, shall be accurately fitted, rigidly secured with hairline contacts and sealed watertight and protected against salt action.

L4.7 ASSEMBLY (Continued)

Where two or more sections of metal are used in building up members, the surfaces in contact shall be brought to a smooth, true and even surface and secured together so that the joints are absolutely tight without the use of pointing material. Exposed sealants, except where shown, will not be permitted. Extrusions shall be toleranced to eliminate any edge protection or misalignment at joints.

L4.8 ADHESIVES, CAULKING & SEALANTS

All materials for use in this project shall be selected in accordance with Specification EM2 "SELECTION AND SUPPLY OF PRODUCTS AND MATERIALS" specifically the selection of adhesives, caulkings, sealants and the like, shall conform to the requirements of Specification EM3 with the intent of utilising such products with the least emissions of harmful volatile organic compounds (VOC) in conjunction with all other performance characteristics of acceptable standard.

These products shall be applied by specialist applicators approved by the relevant manufacturer and shall include all preparation and associated works and materials to the manufacturer's instructions.

All exposed products shall be of selected colour from the manufacturer's standard colour range.

L5. TIMBER FRAMED WINDOWS AND DOORS

L5.1 WINDOW DESIGN

The following specifications are descriptive of the quality requirements in the provision of timber windows.

All aspects of functional window design are the responsibility of the Contractor in accordance with Clause L3.6 "DESIGN REQUIREMENTS".

L5.2 TIMBER MATERIALS

The types of timber, their source, age, durability, moisture content, etc. are specified in Section J CARPENTRY and are as follows:-

- All framing, sashes and door frames shall be machined from regrowth K.D. mountain ash (as defined).
- All external doorsills shall be of recycled Class 1 or 2 hardwood (as defined).

L5.3 FABRICATION

Machine all sections to provide the weathering rebates of adequate size, flashing grooves, compressible seal housings, etc. as required by the Contractor's design.

Properly joint members to provide rigid, square and plumb frames and in a manner to ensure end grain is not exposed to exterior weathering nor to internal view. In forming glued joints do not use urea formaldehyde products. Phenol formaldehyde will be acceptable.

Provide adequate weathering to the top surface of horizontal framing subject to weather exposure and drip grooves to their underface. All visible finished surfaces shall be milled to a surface not inferior to a No.3 dressed surface to AS 1728.

L5.4 INSTALLATION

Acceptance of Substrates

Before commencing installation, inspect all substrates and determine that they are in proper condition to receive the work in accordance with the drawings.

Commencement of installation of any window or screen assembly attached to substrate components will be deemed to mean that the Contractor has verified the correctness and the condition of the substrate and the correct positioning of cast in items, and any defects resulting from such accepted substrates have been corrected.

Damage

Inspect all materials and fabrications as they are unloaded at the project site for evidence of any damage.

Minor damage may only be repaired with the written approval of the Superintendent and then only provided finished items are equal in all respects to new work. Otherwise remove and replace all damaged items.

Anchorage

Anchorage of the windows to the structure shall be included in shop drawing details and shall be stainless steel for screw fixings, galvanised bolts for anchor fixings.

As required electrolytically isolate dissimilar metals.

L5.5 DOORS

Fully glazed doors must be fitted with cross rails of adequate depth to carry dead loading in addition to wind loading. Rails and stiles shall be solidly jointed with single or double morticed and tenoned joints, solidly wedged.

Glazing rebates shall be adequate to receive the glass thickness, sealant back bedding, felt packing and beading and arranged so that bead fixing pins or screws are not subject to weathering.

L5.6 SASHES

Automatically operated purge sashes shall be framed similarly to door frames, in relevant member sizes for their area and weather pressure sealed as outlined in Section B.

Sashes shall be fitted with control system as listed in Materials Schedule FX02, FX03.

L5.7 FLY SCREENS MM03

At each glazed sash position fabricate timber framed fly screens with mesh held with pinned or screwed beads and stretched taut.

Mesh shall be of galvanised hard drawn steel of pitch and colour nominated in the schedules.

Fit sash catch to allow access when required for cleaning, etc.

L5.8 HINGES & HARDWARE

Hang glazed doors on stainless steel ball bearing hinges – minimum 3 per door.

Hang sashes with auto-operator on stainless steel frictionless sash stays, fly screen sashes on demountable hook hinges.

Fit all scheduled hardware locks, handles, closers, push-pull plates, etc.

L5.9 TIMBER FINISH

All frames shall be pre-treated with a shop applied preservative dip coating in accordance with Paint System Q12.4.

Backs of frames which will be permanently hidden shall be prime coated with one heavy coating of water borne acrylic primer / undercoat.

Protect timber frames during remaining construction phase with protective covers, avoid all spills, splashes, etc. as well as physical damage.

Replace and make good if damage occurs.

L6. RETAIL SHOPFRONT OPTIONS

Submit with the tender a schedule of unit prices for the several optional shopfront designs shown on the drawings. Such options shall be for fully installed frames, glass, fixings, weatherings, flushings, seals, etc. and including pre-treatment coating and glazed doors with hardware if indicated as part of an option.