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NSW Procurement – Contracting Services is a Business Unit of the NSW  
Department of Commerce

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**NSW Procurement – Contracting Services invites this tender for and on  
behalf of the  
NSW Government State Contracts Control Board**

Request for Tender [0801654 REMOVAL OF  
BUILDERS AND TRADE WASTE](#)

Contract Period – [Two years with the option to  
extend by three further periods each of up to 1  
year in duration.](#)

Tender Issue Date: 27 October 2008

Closing Date: [26 November 2008](#)

Closing Time: 9:30 am Sydney Time

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For the purposes of this RFT, inquiries should be directed to the Contact Officer nominated in Part B of this RFT.

RFT 0801654 REMOVAL OF BUILDERS AND TRADE WASTE

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## REQUEST FOR TENDER - PART A – OVERVIEW

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### 1 Outcome

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This Request for Tender (“RFT”) is made by the State Contracts Control Board (the “Board”) for the removal of builders and trade waste to the Department of Commerce, Heritage and Building Services under the proposed Agreement of the Services defined in the Statement of Requirements of this RFT.

The Board is responsible for the delivery of the tender process, assisted by NSW Procurement – Contracting Services, whilst the proposed Agreement will be executed between the Department of Commerce and the successful tenderer/s.

The key outcome of this RFT is to provide purchasing solution (through the proposed Agreement) for the required Services which meets the needs of the Department of Commerce, Heritage and Building Services

### 2 Objectives

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The objectives of the proposed Agreement in achieving the desired outcome, includes, but is not limited to the following:

- (a) Reduce the total cost of the Services;
- (b) Provide Services which are commercially competitive;
- (c) Establish a sustainable partnership between the Department of Commerce and the successful tenderer to deliver quality Services;
- (d) Best practice through continual review of delivery methods i.e value-engineering;
- (e) Effective management of risks;
- (f) Compliance with all applicable laws, standards, codes and policies.
- (g) To drive automation in procurement for greater efficiency and information management.

### 3 Required Benefits

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The required benefits to be achieved in delivering the objectives of the proposed Agreement are:

- (a) A sustainable, mutually beneficial supply chain partnership;
- (b) Savings and efficiency gains;
- (c) Reduced costs to the NSW Government by value-engineering its delivery methods;
- (d) Transparency of all transactions, including performance measurement, pricing and reporting;

### 4 Scope of RFT

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#### 4.1 Services

Heritage and Building Services (HABS), Department of Commerce, provide a contracted maintenance service to a number of Government agencies. A significant client of HABS is the Department of Education and Training (DET). This requirement primarily relates, but is not limited, to the removal of builders and trade waste for DET in the districts of Blacktown, Parramatta, Windsor, Liverpool, Fairfield, Lake Macquarie and Newcastle.

The winding window devices are to be replaced with like for like equipment.

Tenderers may submit a tender for either or both of the Sydney region and Newcastle region.

Tenderers must be able to provide, either directly or through sub-contractor arrangements, the full range of goods and services in the region or regions tendered. *Tenderers are to note that Schools will require flexibility of the successful Contractor to adapt their resources to accommodate the needs of the school in terms of the day-to-day function of the facility.*

NB: The services described above will require in many instances, the use of appropriate plant and machinery to access facilities that have minimal access.

The services required are to be provided throughout the metropolitan region of Sydney (including the Central Coast) and the Newcastle region (including Lake Macquarie area).

Tenderers may quote for either or both of the Sydney region and Newcastle region.

Note: work will not be allocated to successful tenderers until such time as the Work Safety Management Plan is approved by HABS.

All services performed under any eventual contract must comply with the specification for that service as provided in this RFT.

#### **4.2 Contract and Duration**

It is envisaged that the term of the proposed Agreement will be two (2) years, which may be extended for three (3) periods of up to one (1) year in duration, at the discretion of the Department of Commerce.

#### **4.3 Current Scope and Expenditure**

The current expenditure incurred by Principal for the procurement of the Services is \$50,000 per year. This amount is provided for information only and does not constitute a guarantee for future work through the proposed Agreement.

#### **4.4 NSW Government requirements**

The successful tenderer must comply with NSW Government codes, guidelines and Standards listed in Schedule 1 of Part D.

### **5 RFT Structure**

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#### **5.1 Interpretation**

5.1.1 Definitions of terms used in Parts A to C are contained in clause 1 of Part B.

#### **5.2 RFT Structure**

This RFT comprises 6 Parts as follows:

- **Overview – Part A**

It is an executive summary of main outcomes, objectives, requirements and expectations for this proposed Agreement and the Statement of Requirements. It provides the tenderer with the essential information to make an informed decision on whether to tender or not.

- **Conditions of Tender – Part B**

It provides the terms, conditions and processes governing the tender phase of the RFT.

- **Tender Response – Part C**

These are response schedules which are required by the Board to evaluate the tenderers' offers.

- **Agreement - Part D**

This is the conditions of contract to be executed between the successful tenderer and the Principal.

- **Special Conditions – Part E**

This contains the unique conditions specific to the proposed Agreement. It will form part of the Agreement to be executed between the successful tenderer/s and the Principal.

- **Statement of Requirements – Part F**

Tenderers are to note that Part F of this RFT is a description of asset maintenance for NSW Department of Education (DET) sites, however for the purposes of this RFT the description of asset maintenance in Part F is to be applied to ALL NSW Government sites, including DET sites for the required services.

If submitting a Tender, retain Parts A, B, D, E and F. Part C, once completed, forms the Tender, and is to be submitted in accordance with Parts A, B and D.

Part D and E, if applicable, are to be executed later by the successful Tenderer(s) and the Principal to form the Agreement.

## 6 Best Price and Cost Structure

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Tenderers are encouraged to provide their best price(s) with their tender. Whilst the Board reserves the right to negotiate pre award, such negotiations may not occur and it is not the Board's preference.

It is important that tenderers realise that they may not be short-listed for further consideration, if they do not provide their best price with their initial tender.

This RFT seeks transparency in the tenderer's Cost Structure in the Tender Schedules (RFT, Part C) and is required to be fully completed by the tenderer to:

- Provide the Principal transparency of the tenderer's Cost Structure;
- Act as a basis for future Price variations, where applicable.

The Board expects the successful tenderer's to reduce its pricing during the term of the proposed Agreement by:

- (a) Continually improving delivery processes to improve efficiency;
- (b) Providing lower prices and discounts for large/bulk purchases;
- (c) Passing on the benefit of rebates received from its own suppliers to the Principal;
- (d) Matching prices as identified/recommended from the benchmarking process;
- (e) Other methods of savings identified during the term of the proposed Agreement;
- (f) Price matching as identified by the Principal.
- (g) Presenting and adopting NSW government, or any other electronic procurement systems to reduce the cost of doing business with customers.

## 7 Performance Framework

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The Board is committed to engaging contractors who are able and willing to continually improve their performance during the term of the proposed Agreement.

The performance framework within the proposed Agreement provides both incentives for good performance and sanctions for poor performance.

Performance incentives and sanctions are based on the Contractor's performance. The Special Conditions (Part E) describes the performance framework in detail and the measurement/targets of all performance indicators.

Typical incentives and sanctions that may be used by the Principal include, but are not limited to :

- (a) Additional or reduced performance reporting requirements;
- (b) Temporary suspension of all or parts of a proposed Agreement for a period not exceeding 12 months;

- (c) Scope variation ie. inclusion of additional Services/reduction;
- (d) Extensions of the proposed Agreement (if available);
- (e) Non payment of price variations.



Agreement No: 0801654 REMOVAL OF BUILDERS AND TRADE WASTE

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## PART B Conditions of Tender

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### 1 Definitions

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Unless the context indicates otherwise, the following terms, where used in Parts A-C of this RFT, shall have the meanings set out below.

**“ABN”** means an Australian Business Number as provided in GST law.

**“Addendum”** means an addition to this RFT made by the Board before Closing Date and Closing Time.

**“Agreement”** means the proposed agreement to be made between the Principal and the Contractor in the form of Part D (and Part E if applicable) to this RFT.

**“Alternative Tender”** A Non-Conforming Tender that is intended to offer a different method of meeting the object and intent of the requirement.

**“Board”** The State Contracts Control Board established under the Public Sector Employment and Management Act 2002 whose responsibilities include:

- (a) Inviting and accepting tenders;
- (b) Determining the conditions under which tenders are invited or accepted;
- (c) Entering into contracts on behalf of the Crown in right of the State of New South Wales; and
- (d) On-going contract administration and management, and includes the duly authorised delegates of the Board, including officers of NSW Procurement – Contracting Services.

**“Closing Date and Closing Time”** means the Closing Date and Closing Time for receipt of tenders specified in the cover sheet of this RFT.

**“Code”** means the NSW Government Code of Practice for Procurement as amended from time to time, together with any other codes of practice relating to procurement, including any amendments to such codes that may be applicable to the particular RFT. The Code can be viewed and downloaded from: [http://www.treasury.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0015/1356/code\\_of\\_prac-curr.pdf](http://www.treasury.nsw.gov.au/__data/assets/pdf_file/0015/1356/code_of_prac-curr.pdf)

**“Conforming Tender”** means a tender that conforms in all material aspects to:

- (a) the Statement of Requirements;
- (b) the terms and conditions of Part D, and Part E if applicable.
- (c) other parts of this RFT, and
- (d) is in the prescribed form.

**“Contractor”** means a tenderer who has entered into an Agreement with the Principal.

**“Cost Structure”** means the individual tenderer's cost breakdown in accordance with the number of categories specified in Part C. Such breakdown must equate to 100% of the tenderer's cost for the supply of the Services.

**“GST”** means a goods and services tax and has the same meaning as in the GST Law.

**“GST Law”** means any law imposing a GST And includes A New Tax System (Goods & Services Tax) Act 1999 (C'th) or if that Act does not exist, means any Act imposing, or relating to a GST and any regulation made under those Acts.

**“GST Free Supplies”** and **“Input Taxed Supplies”** have the same meaning as in the GST Law.

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**“HABS”** means the Heritage and Building Services Group, a division of the Dept of Commerce.

**“Non-Conforming Tender”** means a tender that does not conform in all material aspects to:

- (a) the Statement of Requirements;
- (b) the terms and conditions of Part D, and Part E if applicable;
- (c) other Parts of this RFT;
- (d) is not in the prescribed form.

**“NSW Procurement - Contracting Services”** A business unit of the NSW Department of Commerce representing the Board and authorised to arrange and administer contracts on behalf of the Board.

**“OHS&R”** means occupational health, safety and rehabilitation.

**“Price Schedule”** means the list of Services offered by the tenderer, together with the corresponding pricing information.

**“Principal”** means the party executing the proposed Agreement with the successful tenderer.

**“RFT”** means this Request for Tender

**“Services”** means the services sought under this RFT, as detailed in the Statement of Requirements.

**“Statement of Requirements”** means the detailed description of the Services contained in Part C and Part F.

**“State Contracts Control Board”** is the Board.

**“Tender”** means the offer to supply the Services submitted in response to the RFT.

**“Tender Price”** means the price nominated in the relevant Price Schedule for that Service.

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## 2 Tender Preparation

### 2.1 Tenderer to inform itself

Before submitting its tender, a tenderer must:

- 2.1.2 Examine all information relevant to the risks and contingencies and other circumstances having an effect on its Tender; and
- 2.1.3 Satisfy itself:
  - (a) that the tender, including the tender price is correct; and
  - (b) that it is financially and practically viable for it to enter into and perform the proposed Agreement.

### 2.2 Information Supplied in Part F

The information contained in Part F has been provided with due care for the tenderer's guidance, but is not guaranteed as being completely accurate. The Board shall not be held liable for any errors or omissions contained in Part F.

Tenderers are to note that Part F of this RFT is a description of asset maintenance for NSW Department of Education (DET) sites, however for the purposes of this RFT the description of asset maintenance in Part F is to be applied to ALL NSW Government sites, including DET sites for the required services.

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### 3 Eligibility to Tender

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#### 3.1 Legal Entity of Tenderer

- 3.1.1 Tenders must be submitted by a legal entity or, if a joint tender, by legal entities, with the capacity to contract. The Principal will only enter into an Agreement with such legal entity or entities.
- 3.1.2 The Board may ask a tenderer to provide evidence of its legal status or capacity to contract. If tenders from entities propose to contract in their capacity as trustees, such evidence may include copies of the relevant trust deeds. Any evidence requested is to be provided within 3 working days of the request.

#### 3.2 Financial Capability of Tenderer

- 3.2.1 The Board reserves the right to reject any tender if the Board judges the tenderer not to have appropriate financial capability.
- 3.2.2 Where the Board forms the view that the tenderer does not have the appropriate financial capability, the Board reserves the right to make acceptance of any tender conditional upon the tenderer entering into a bank, parent company or personal guarantee, or an unconditional performance bond in a form satisfactory to the Board.

#### 3.3 ABN Requirements

- 3.3.1 The Principal will not enter into an Agreement with a company that does not have an Australian Business Number and is not registered for GST. Normally, tenderers must be registered for GST and state their ABN in their tender.
- 3.3.2 Tenders from tenderers that do not have an ABN and/or are not registered for GST, such as tenderers commencing business in Australia, may be considered at the Board's discretion if the tenderer demonstrates that it will obtain an ABN and GST registration before entering into an Agreement with the Principal. Such tenderers must state how and when they intend to obtain an ABN and register for GST in their tender response.

### 4 Tender Process

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#### 4.1 Provisional RFT Program

Given below is the Board's provisional RFT program. The Board may, at its absolute discretion, amend the provisional RFT program.

Milestone	
RFT issue	27/10/08
RFT Close Date	26/11/08
Execution of Agreement	December 08
Commencement of supply of Services	January 09

#### 4.2 Contact Officer

- 4.2.1 Tenderers should refer requests for information or advice regarding this RFT to:

**NSW Procurement  
Client Support Centre**  
P: 1800 NSW BUY (679 289)  
E: [nswbuy@commerce.nsw.gov.au](mailto:nswbuy@commerce.nsw.gov.au)  
W: <http://www.nswbuy.com.au>

- 4.2.2 Any information given to a tenderer to clarify any aspect of this RFT will also be given to all other tenderers if in the Board's opinion the information would unfairly favour the inquiring tenderer over other tenderers.

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### **4.3 Conformity of Tenders**

- 4.3.1 The Board seeks Conforming Tenders.
- 4.3.2 Non-Conforming Tenders may be excluded from the tender process without further consideration at the Board's discretion.

### **4.4 Alternative Tenders**

- 4.4.1 Tenderers may, if they choose, submit an Alternative Tender. Alternative Tenders will only be considered if submitted in conjunction with a Conforming Tender. An Alternative Tender must be clearly marked "Alternative Tender".

### **4.5 Submission of Tenders**

- 4.5.1 Prices, responses and other information provided in the tender are to be in writing and in English.
- 4.5.2 Tenderers must complete all of Part C of this RFT, as directed and must not amend any of the questions provided.
- 4.5.3 Tenderers should notify the contact officer in writing on or before the Closing Date and Closing Time if they find any discrepancy, error or omission in this RFT.
- 4.5.4 All tenders must be either provided:

#### **Electronic: the file formats and versions below:**

- 4.5.5 Tenderers must ensure that all excel or word attachments can be opened and viewed by Microsoft Excel 2003 or Microsoft Word 2003. Other formats for the attachments are only to be submitted if an arrangement has first been made with the contact officer prior to lodgment of the tender.
- 4.5.6 It is recommended that electronic files be kept as small as practical and the lodgement files below an optimum size of 7 MB, as the limitations of the Internet and communications may affect the successful transmittal and receipt of large files.

#### **Or Hard Copy**

Tenders may if they wish lodge a hard copy of their response. Hard copy tender responses must be submitted in duplicate and marked "Original" and "Copy 1".

### **4.6 Tender Lodgement**

- 4.6.1 Tenders must be fully received by the Closing Date and Closing Time.
- 4.6.2 A Tender must be lodged into the designated secure tender box/es, and must be submitted electronically to the electronic tender box for this RFT via the NSW Department of Commerce tenders website at: <https://tenders.nsw.gov.au/commerce> (Login in as a system user, locate the web page for this RFT, and follow the on screen instructions to lodge the tender).
- 4.6.3 The lodgement can only be made by a registered system user of the NSW Government eTendering system.
- 4.6.4 Hard Copy or Facsimile Lodgement
  - (a) Delivery into the Physical Tender Box at:  
Tender Box  
NSW Department of Commerce  
Level 3 McKell Building (Ground floor west)  
2-24 Rawson Place Sydney NSW
  - (b) The tender must be able to be lodged into the physical tender box deposit slot of 400mm by 90mm, and must be lodged during normal McKell Building opening hours of 7:30am to 6:30pm Monday to Friday (excluding Public Holidays).

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- (c) No receipt can be given however written acknowledgement of delivery of a container may be given by prior arrangement. Contact Tenders Office on (02) 9372 8900.
  - (d) If the tender is larger in physical size and cannot be broken down, or delivery personnel require a signature as evidence of delivery the tender must be delivered between 8:30am and 4:30pm Monday to Friday (excluding Public Holidays) and only by prior arrangement. Contact Tenders Office on (02) 9372 8900. Commerce personnel will not take delivery of containers that present an OH&S risk in terms of size or weight.
  - (e) Tenders must be clearly marked with the RFT number – **0801654**

**Or Lodgement to the Facsimile Tender Box at Ph: (02) 9372 8974**

Tenders which are sent by facsimile and which are not completely received at the specified location by the close of tenders may be excluded from consideration for acceptance even if transmission or receipt is delayed due to the receiving facsimile machine being engaged, faulty or otherwise inoperative.

If a tenderer intends to submit by facsimile it must consider the following:

The facsimile machine only allows one tender to be lodged at a time and is at its peak on the morning when tenders and tenders close. Due to the volume received on those closing dates, the State Contracts Control Board (SCCB) cannot guarantee the level or speed of access to these facilities at that time and tenderers should consider lodging in good time having regard to this

**4.7 Electronic Tenders**

- 4.7.1 A tender submitted electronically will be treated in accordance with the *Electronic Transactions Act 2000* (NSW).
- 4.7.2 A tenderer, by electronically lodging a tender, is taken to have accepted conditions shown in the conditions and rules on the NSW Department of Commerce tenders website at <https://tenders.nsw.gov.au/commerce>.
- 4.7.3 A tenderer must follow the following directions:
  - (a) A RFT for which electronic lodgement is available through the website can be identified by the blue “Lodge a Response” link on the web pages for the RFT.
  - (b) To lodge a tender electronically, the files containing the tenderer’s response must be up-loaded through the website to the NSW Government eTendering system. Access to the up-loading process is through the blue “Lodge a Response” link, then following the steps and instructions on the NSW Department of Commerce tenders website and any instructions which may have been supplied with the RFT documents, advertisement or invitation.
- 4.7.4 A tenderer must observe the following format for lodgements:
  - (a) An electronically lodged tender must be lodged in a file format required by the RFT.
  - (b) If a tenderer compresses files, it must be possible to decompress them using WinZip. A tenderer must not submit self-extracting (\*.exe) zip files.
  - (c) A tenderer must not change pre-existing text in the RFT other than to insert the required information.
  - (d) The file/s name/s must have an extension and not have invalid characters or file names/loading path names too long for the system, as detailed on the NSW Department of Commerce tenders website.
- 4.7.5 Signatures are not required for an electronic tender. A tenderer must ensure that a tender response is authorised by the person or persons who may do so on behalf of the tenderer and appropriately identify the person and indicate the person’s approval of the information communicated.

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- 4.7.6 Electronically submitted tenders may be made corrupt or incomplete, for example by computer viruses. The Board may decline to consider for acceptance a tender that cannot be effectively evaluated because it is incomplete or corrupt. Tenderers must note that:
- (a) To reduce the likelihood of viruses, a tenderer must not include any macros, applets, or executable code or files in a tender response.
  - (b) A tenderer should ensure that electronically submitted files are free from viruses by checking the files with an up to date virus-checking program before submission.
- 4.7.7 If a tenderer experiences any persistent difficulty with the NSW Department of Commerce tenders website in submitting a tender or otherwise, it is encouraged to advise the contact officer promptly in writing.
- (a) If there is an extended defect or failure of the NSW Department of Commerce tenders website or eTendering system and the Board is advised, the tender Closing Date and Closing Time may be extended provided that, in the view of the Board, the RFT process will not be compromised by such an extension.
  - (b) Tenders must be fully received by the Closing Date and Closing Time.
- 4.7.8 Tenderers may break down the lodgement of large tenders into smaller packages if clearly identified e.g. package 1 of 3; 2 of 3; 3 of 3.
- 4.7.9 If a tenderer provides multiple lodgements, the latest tender received will be the tender to be evaluated unless the tenderer provides clear directions to whether the lodgement is:
- (a) an alternative tender,
  - (b) supporting information
  - (c) a further part of a tender that has had previous lodgement

#### **4.8 Tender Validity Period**

- 4.8.1 The Tender will remain open for acceptance by the Principal for a period of six months from the Closing Date and Closing Time for tenders.

#### **4.9 Late Tenders**

- 4.9.1 Late tenders should not be considered, except where the Board is satisfied that the integrity and competitiveness of the tendering process has not been compromised. The Board shall not penalise any supplier whose tender is received late if the delay is due solely to mishandling by the Board.

#### **4.10 Extension of Closing Date and Closing Time**

- 4.10.1 The Board may, in its discretion, extend the Closing Date and Closing Time.

#### **4.11 Corruption or Unethical Conduct**

- 4.11.1 Tenderers must comply with the requirements of the Commerce Business Ethics Statement, which is available at the link below and must disclose any conflicts of interests in Part C.
- 4.11.2 If a tenderer, or any of its officers, employees, agents or sub-contractors is found to have:
- (a) offered any inducement or reward to any public servant or employee, agent or subcontractor of the Board, the Principal, or the NSW Government in connection with this RFT or the submitted Tender;
  - (b) committed corrupt conduct in the meaning of the Independent Commission Against Corruption Act 1988;
  - (c) a record or alleged record of unethical behaviour; or not complied with the requirements of Commerce Business Ethics Statement available at:

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<http://www.commerce.nsw.gov.au/About+Commerce/Business+ethics+statement/Business+ethics+statement.htm>;

this may result in the tender not receiving further consideration.

4.11.3 The Board may, in its discretion, invite a relevant tenderer to provide written comments within a specified time before the Board excludes the tenderer on this basis.

4.11.4 If the Board and/or the Principal becomes aware of improper conflict of interests by a successful tenderer after an Agreement has been executed, then the Principal reserves the right to terminate the Agreement.

#### **4.12 Code of Practice for Procurement**

4.12.1 In submitting its tender, the tenderer signifies agreement to comply with the Code.

4.12.2 Failure to comply with the Code may be taken into account by the Board when considering the tenderer's tender or any subsequent tender, and may result in the tender being passed over.

#### **4.13 Prescribed Form of Tender**

4.13.1 The Tender, including any Alternative Tender, must comprise a completed Part C and any attachments to Part C, as may be necessary. Any attachments should be labelled to identify those clauses of the RFT to which they relate.

4.13.2 The Tender will be taken to be for the provision of the Services on the terms and conditions stated in Part D (and Part E if applicable) except to the extent that these are amended by the Tender and agreed by the Principal.

#### **4.14 Addenda to RFT**

4.14.1 If, for any reason the Board, at its sole discretion, requires the RFT to be amended before the Closing Date and Closing Time, an Addendum will be issued.

4.14.2 In each case, an Addendum becomes part of the RFT.

4.14.3 The Board, during the tender period may issue Addenda altering the RFT. In such cases, it is the obligation of the tenderer to verify if any Addenda were issued prior to closing date, even if a tender has already been submitted.

4.14.4 Tenderers must check the web site address,  
<https://tenders.nsw.gov.au/commerce> and download the Addendum.

#### **4.15 Tenderer's Costs**

The tenderer acknowledges that the Board will not be liable to it for any expenses or costs incurred by it as a result of its participation in this RFT, including where the RFT has been discontinued.

#### **4.16 Custody of Tenders after Receipt**

4.16.1 Tenders lodged electronically to the NSW Department of Commerce Tenders website will be treated in accordance with the *Electronic Transactions Act 2000*.

4.16.2 On receipt of tenders lodged electronically to the NSW Government eTendering system, tenders are encrypted and stored in a secure "electronic tender box."

4.16.3 For reasons of probity and security, the Board and its agent are prevented from interrogating the electronic tender box to ascertain whether tenders have been received or for any reason, until after the Closing Date and Closing Time.

4.16.4 The e-mail receipt that is sent to system user lodging the tender after successfully lodging the tender electronically to the NSW Government eTendering system is the only evidence of tender lodgement provided.

#### **4.17 Ownership of Tenders**

4.17.1 All tenders become the property of the Board on submission.



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4.17.2 The Board may make copies of the tenders for any purpose related to this RFT.

#### **4.18 Discontinuance of Tender Process**

4.18.1 Where the Board determines that awarding a contract would not be in the public interest, the Board reserves the right to discontinue the tender process at any point, without making a determination regarding acceptance or rejection of Tenders.

#### **4.19 Variations to Tenders**

4.19.1 At any time after the Closing Date of tenders and before the Board accepts any tender received in response to this RFT, a tenderer may, subject to clause 4.19.2, vary its tenders:

- (a) by providing the Board with further information by way of explanation or clarification;
- (b) by correcting a mistake or anomaly; or
- (c) by documenting agreed changes to the tender negotiated under clause 5.5 of this Part B.

4.19.2 Such a variation may be made either:

- (a) at the request of the Board, or
- (b) with the consent of the Board at the request of the tenderer; but only if,
  - (i) in the case of variation requested by the tenderer under clause 4.19.1(a)-(b), it appears to the Board reasonable in the circumstances to allow the tenderer to provide the information or correct the mistake or anomaly; or
  - (ii) in the case of variation under clause 4.19.1(c) the Board has confirmed that the draft-documented changes reflect what has been agreed.

4.19.3 If a tender is varied in accordance with clause 4.19.1(a) or (b), the Board will provide all other tenderers whose tenders have similar characteristics with the opportunity of varying their tenders in a similar way.

4.19.4 A variation of a tender under clause 4.19.1 will not be permitted if in the Board's view:

- (a) it would substantially alter the original tender; or
- (b) in the case of variation under clause 4.19.1(a) or (b), it would result in the revising or expanding of a tender in a way that would give a tenderer an unfair advantage over other tenderers.

## **5 Evaluation Process**

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5.1.1 Tenders will be assessed against the evaluation criteria listed below which are not indicated in order of significance or be given equal weight.

5.1.2 The evaluation criteria for this RFT that do not relate to price will account for *40%* of the total evaluation score. The evaluation for this RFT that relate to price will account for *60%* of the total evaluation score.

5.1.3 Information supplied by the tenderer in Part C will contribute to the assessment against each criterion. Tenderers are advised to respond clearly to all the evaluation criteria listed in this RFT.

5.1.4 Tenders that do not include a fully completed Part C, in particular those tenders which do not contain sufficient information to permit a proper evaluation to be conducted, or electronic tenders that cannot be effectively evaluated because the file has become corrupt, may be excluded from the tender process without further consideration at the Board's discretion.

5.1.5 The Board may assess an Alternative Tender against the evaluation criteria where submitted with a Conforming Tender.

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## **5.2 Evaluation Criteria**

The evaluation criteria for this RFT (which include but are not limited to) are:

- (a) Tendered Price;
- (b) Previous experience and performance on similar agreements for the products and services covered in this RFT
- (c) Tenderer's capacity, resources, qualifications, skills and experience including suitability of sub-contractors and financial stability;
- (d) Compliance with tender requirements including contract terms and conditions
- (e) OHS&R consideration including compliance and previous record
- (f) Compliance with NSW Government procurement policy and other applicable NSW Government policies
- (g) Compliance with relevant legislation and standards.
- (h) Compliance with the Statement of Requirements.

## **5.3 Presentations/Site Inspections**

- 5.3.1 The Board, may during the evaluation of tenders, undertake site inspections of tenderer's or their subcontractor's proposed premises.
- 5.3.2 The Board, may in its discretion, and as part of the evaluation process, invite any or some of the tenderers to make personal presentations regarding their tender. The tenderer shall make any presentations at its own cost.
- 5.3.3 Receiving a presentation by a tenderer in no way represents a commitment by the Board to accept any aspect of the tender.
- 5.3.4 All information obtained during the course of presentation or site inspection may be taken into consideration in the evaluation of tenders.

## **5.4 Acceptance or Rejection of Tenders**

- 5.4.1 The Board may assess an Alternative Tender against the evaluation criteria when submitted with a Conforming Tender.
- 5.4.2 The Board expressly reserves the right to accept, in its discretion, either or both of the following:
  - (a) Any Alternative Tender or part of an Alternative Tender, when submitted with a Conforming Tender; and
  - (b) Any other Non-Conforming Tender or part of a Non-Conforming Tender (not, in either case, being an Alternative Tender or part of an Alternative Tender) that, in the Board's opinion, is substantially a Conforming Tender.
- 5.4.3 The Board is not bound to accept the lowest tender.
- 5.4.4 If the Board rejects all the tenders received it may invite fresh tenders based on the same or different criteria (specifications and details contained in Alternative Tenders will not be used as the basis for the calling of new tenders).

## **5.5 Post Tender Negotiations**

- 5.5.1 Before making any determination as to acceptance or rejection of Tenders the Board may, at its discretion, elect to conduct limited negotiations with preferred tenderers, including those who have submitted Alternative Tenders or who have submitted Conforming Tenders, to mutually improve outcomes.
- 5.5.2 The Board will generally not enter into negotiations to amend standard conditions of contract contained in Part D and Part E if applicable.
- 5.5.3 If the Board considers that none of the tenders are fully acceptable either due to the level of non-conformance or because they do not represent sufficient value for money, but considers that full conformity is achievable, negotiations may be

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conducted with the tenderer that submitted the most conforming tender based on the evaluation criteria. The purpose of the negotiations will be advised by the Board and made clear to the participants before the commencement of negotiation.

- 5.5.4 The Board may at its absolute discretion elect to conduct post tender negotiations under clause 5.5.3 with more than 1 tenderer in the event that it decides that the closeness of the tenders or timing constraints warrants doing so.

## **5.6 Exchange of Information between Government Agencies**

- 5.6.1 Lodgement of a tender will itself be an authorisation by the tenderer to the Board to make available, on request, to any NSW government agency information, including but not limited to, information dealing with the tenderer's performance on any contract that may be awarded. Such information may be used by the recipient NSW Government agency for assessment of suitability for pre-qualification, selective tender lists, expressions of interest or the award of a contract or termination of contract.
- 5.6.2 The provision of the information by the Board to any other NSW Government agency is agreed by the tenderer to be a communication falling within *section 30 of the Defamation Act 2005 (NSW)*, and the tenderer shall have no claim against the Board and the State of New South Wales in respect of any matter arising out of the provision or receipt of such information, including any claim for loss to the tenderer arising out of the communication
- 5.6.3 In the evaluation of tenders, the Board may take into account any information about the tenderer that the Board receives from any source.
- 5.6.4 To avoid doubt, information that may be collected, exchanged and used in accordance with this provision includes "personal information" about the tenderer for the purposes of the Privacy and Personal Information Protection Act 1998. Lodgement of a tender will be an authorisation by the tenderer to the Board to collect such information from third parties, and to use and exchange such information in accordance with this clause 5.6.
- 5.6.5 The tenderer's attention is drawn to the Freedom of Information Act 1989 which obliges disclosure of the contract documents resulting from the tender and may confer rights, subject to the terms of that Act, to access, and to require the correction of, information held by certain agencies, including tenders held by the Board. A summary of the provisions is contained in the Annexure 1 to Part B (Disclosure Information).

## **6 Method of Acceptance**

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- 6.1.1 Acceptance of a tender or part tender will be subject to the execution of a formal Deed of Agreement in the terms of Part D and Part E if applicable. Until the Principal and the successful tenderer(s) execute a formal Agreement there will be no legally enforceable agreement concluded between them.

## **7 Disclosure Information**

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- 7.1.1 Following the Board's decision, all tenderers will be notified in writing of the outcome of their Tenders.
- 7.1.2 Details of tenderers and the outcome of the tender process will be disclosed in accordance with the Freedom of Information Act 1989 and the NSW Government Tendering Guidelines, available at:  
<http://www.dpws.nsw.gov.au/Government+Procurement/Procurement+Policy+Framework/NSW+Government+Tendering+Guidelines.htm>
- 7.1.3 An outline of these requirements can be found in Annexure 1 to Part B of this RFT.

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## **8 Complaints Procedure**

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It is the NSW Government's objective to ensure that industry is given every opportunity to win Government contracts. Should any entity feel that it has been unfairly excluded from tendering or unfairly disadvantaged by the Conditions in Part D and/or Part E, or the Statement of Requirements in Part F, it is invited to write to:

Chairperson  
State Contracts Control Board  
Level 22, McKell Building  
2-24 Rawson Place  
Sydney NSW 2000

## ANNEXURE 1 TO PART B (Disclosure of Information)

### Disclosure of information concerning tenderers and outcome of the tender process

1. In accordance with the NSW Government Tendering Guidelines referred to in clause 7.1.2 and found at <http://www.dpws.nsw.gov.au/Government+Procurement/Procurement+Policy+Framework/NSW+Government+Tendering+Guidelines.htm>, the following **tender information** is required to be disclosed -

Tender Type	Level of disclosure	Basis of disclosure
For all public calls for tender, expressions of interest or other such public calls which may result in a contract with the private sector.	<p>As a minimum:</p> <ul style="list-style-type: none"> <li>a concise description of the proposed works, goods or services the subject of the tender call;</li> <li>the date responses to the tender call close and where responses are lodged; and</li> <li>location of the tender call documents.</li> </ul> <p>The names and addresses of all entities which submit responses.</p>	<p>Routine public disclosure at the time tender calls are advertised.</p> <p>Routine public disclosure within 7 days of the date tender calls closed.</p>
In a multi-stage tender process.	The names and addresses of the shortlisted entities, except where such disclosure is likely to compromise the competitiveness of the subsequent tender process.	Routine public disclosure within 7 days of these entities being advised of their shortlisting.

2. In accordance with the NSW Government Tendering Guidelines referred to in clause 7.1.2, the following **contract** information is required to be disclosed -

Contract size and type	Level of disclosure	Basis of disclosure
<p><b>Class 1 contracts</b></p> <p>All government contracts with estimated value \$150,000 or above).</p>	<p>a) The name and business address of the contractor;</p> <p>b) Particulars of any related body corporate (within the meaning of the Corporations Act 2001 of the Commonwealth) in respect of the contractor, or any other private sector entity in which the contractor has an interest, that will be involved in carrying out any of the contractor's obligations under the contract or will receive a benefit under the contract;</p> <p>c) The date on which the contract became effective and the duration of the contract;</p> <p>d) Particulars of the project to be undertaken, the goods or services to be provided or the real property to be leased or transferred under the contract;</p> <p>e) The estimated amount payable to the contractor under the contract;</p> <p>f) A description of any provisions under which the amount payable to the contractor may be varied;</p> <p>g) A description of any provisions with respect to the renegotiation of the contract;</p> <p>h) In the case of a contract arising from a tendering process, the method of tendering and a summary of the criteria against which the various tenders were assessed;</p>	<p>Routine public disclosure within 60 days after the contract becomes effective.</p>

	<p>and</p> <p>i) A description of any provisions under which it is agreed that the contractor is to receive payment for providing operational or maintenance services.</p>	
<p><b>Class 2 contracts</b> Class 1 contracts (i.e government contracts with estimated value \$150,000 or above) which also:</p> <ul style="list-style-type: none"> <li>- result from a direct negotiation where there has not been a tender process; or</li> <li>- have been the subject of a tender process and where the final contract terms and conditions are substantially negotiated with the successful tenderer (this includes alliance type contracts); or</li> <li>- involve operation or maintenance obligations for 10 years or longer; or</li> <li>- involve a privately financed project as defined by relevant Treasury guidelines; or</li> <li>- involve a transfer of land or other asset to a party in exchange for the transfer of land or other asset to an agency.</li> </ul>	<p>The information required for class 1 contracts and</p> <ul style="list-style-type: none"> <li>a) Particulars of future transfers of significant assets to the State at zero, or nominal, cost to the State, including the date of their proposed transfer;</li> <li>b) Particulars of future transfers of significant assets to the contractor, including the date of their proposed transfer;</li> <li>c) The results of any cost-benefit analysis of the contract conducted by the agency;</li> <li>d) The components and quantum of the public sector comparator if used;</li> <li>e) Where relevant, a summary of information used in the contractor's full base case financial model (for example, the pricing formula for tolls or usage charges);</li> <li>f) Where relevant, particulars of how risk, during the construction and operational phases of a contract to undertake a specific project (such as construction, infrastructure or property development), is to be apportioned between the parties, quantified (where practicable) in net present-value terms and specifying the major assumptions involved;</li> <li>g) Particulars as to any significant guarantees or undertakings between the parties, including any guarantees or undertakings with respect to loan agreements entered into or proposed to be entered into; and</li> <li>h) Particulars of any other key elements of the contract.</li> </ul>	<p>Routine public disclosure within 60 days after the contract becomes effective.</p>
<p><b>Class 3 contracts</b> Class 2 contracts where the estimated value of the government contract is \$5 million or more.</p>	<p>The information for class 1 and 2 contracts and the complete contract, less confidential information.</p> <p>Note: if some or all of a class 3 contract is not disclosed for reasons of confidentiality, the agency is to disclose:</p> <ul style="list-style-type: none"> <li>• the reasons for not publishing the contract or provisions;</li> <li>• a statement as to whether the contract or provisions will be published and, if so, when; and</li> <li>• where some but not all of the provisions of the contract have been disclosed, a general description of the types of provisions that have not been published.</li> </ul>	<p>Routine public disclosure within 60 days after the contract becomes effective.</p>

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### 3. Requests for disclosure of additional contract information

Tenderers must acknowledge that any person may make a specific request to the State Contracts Control Board for any item of contract information for class 1 or class 2 contracts, or for a copy of a contract where it is a class 3 contract, which is not required to be routinely disclosed under section 15A of the Freedom of Information Act 1989. ("FOI Act") The State Contracts Control Board must provide the requested contract information or the requested copy of the contract to the requesting person (less any confidential information) within 60 days of receiving the request.

Where a copy of a contract has been requested and some or all of the contract is not provided for reasons of confidentiality, the State Contracts Control Board will disclose:

- the reasons for not providing some provisions or all of the contract;
- a statement as to whether the contract or provisions will be provided and, if so, when; and
- where some but not all of the provisions of the contract have been provided, a general description of the types of provisions that have not been provided.

### 4. Disclosure of amendments or variations to contract information under the FOI Act

The FOI Act requires that, if there is an amendment to the contract terms or a material variation made under the contract that changes information already routinely disclosed under the FOI Act, the State Contracts Control Board must ensure that the information concerning the change is routinely disclosed within 60 days after such amendment or variation becomes effective, less any confidential information. In the case of class 3 contracts, the full amendment or material variation, less any confidential information, must be disclosed within the 60 day timeframe.

### 5. Confidential information

None of the disclosure obligations contained in the FOI Act, or the requirements for disclosing tender information or a copy of a contract or information in relation to a contract under these guidelines, require the disclosure of:

- the commercial-in-confidence provisions of a contract (as defined in section 15A (14) of the FOI Act) (the contractor's financing arrangements; the contractor's cost structure or profit margins; the contractor's full base case financial model; any intellectual property in which the contractor has an interest; or any matter whose disclosure would place the contractor at a substantial commercial disadvantage in relation to other contractors or potential contractors, whether at present or in the future.);
- details of any unsuccessful tender;
- any matter that could reasonably be expected to affect public safety or security; or
- information which would be exempt from disclosure if it were the subject of an application under the FOI Act.

Where such confidential information is withheld, the State Contracts Control Board must inform the requesting person that access to that information may be sought in accordance with the Freedom of Information Act. This will enable a person seeking the information to challenge that decision under the Freedom of Information Act.

6. Tenderers are invited to nominate items they consider are confidential and why.



**NSW Procurement – Contracting Services is a Business Unit of the NSW  
Department of Commerce**

**NSW Procurement – Contracting Services invites this tender for and on behalf of the  
NSW Government State Contracts Control Board**

## **TENDER RESPONSE**

Contract [0801654 - Removal of Builders and Trade Waste](#)

Contract Period – [Two years with the option to extend by three further periods each of up to 1 year in duration.](#)

RFT Number [0801654](#)

Your Company's Legal Name: [<Insert Company name>](#)

Your Company's Trading Name: [<Insert Trading name>](#)

Your Company's ABN number: [<Insert ABN number>](#)

Contact Name: [<Insert name of Contract Administration Officer>](#)

Contact Phone: [<insert telephone no>](#)



## **PART C TENDER RESPONSE**

**Note: Tenderers are required to complete a 'Schedule of Prices' for every category of trade/service as detailed below**

Tenderers may tender for either;

**Sydney Region** (including Central Coast, Blue Mountains & Wollongong) or

**Newcastle Region** (including Lake Macquarie area) or

**both Regions**

## 1. TENDERED PRICES

### SCHEDULE 1.1 TENDERED PRICES – Collection & Disposal of Builders Waste

The tendered rate shall be inclusive of drop off, collection and disposal of builders waste. Tenderers are to indicate in the column provided, the length of time (in days) that they are prepared to leave waste bins on site prior to collection.

ITEM NUMBER	DESCRIPTION OF RATE	LENGTH OF TIME AT SITE	EXACT SIZE OF BIN TENDERED	TENDERED RATE (GST EXCLUSIVE) Sydney Region	GST	TENDERED RATE (GST INCLUSIVE) Sydney Region	TENDERED RATE (GST EXCLUSIVE) Newcastle Region	GST	TENDERED RATE (GST INCLUSIVE) Newcastle Region
1.1.1	Waste/skip Bin Capacity 2 Cubic Metre			\$ _____	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
1.1.2	Waste/skip Bin 4 Cubic Metre Capacity			\$ _____	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
1.1.3	Waste/skip Bin 6 Cubic Metre Capacity			\$ _____	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
1.1.4	Waste/skip Bin 9 Cubic Metre Capacity			\$ _____	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
1.1.5	Waste/skip Bin 10 Cubic Metre Capacity			\$ _____	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
1.1.6	Waste/skip Bin 15 Cubic Metre Capacity			\$ _____	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____
1.1.7	Waste/skip Bin 24 Cubic Metre Capacity			\$ _____	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____

ITEM NUMBER	DESCRIPTION OF RATE	LENGTH OF TIME AT SITE	EXACT SIZE OF BIN TENDERED	TENDERED RATE (GST EXCLUSIVE) Sydney Region	GST	TENDERED RATE (GST INCLUSIVE) Sydney Region	TENDERED RATE (GST EXCLUSIVE) Newcastle Region	GST	TENDERED RATE (GST INCLUSIVE) Newcastle Region
1.1.8	Surcharge for disposal of Asbestos waste			_____ %	_____ %	_____ %	\$ _____	_____ %	\$ _____

**SCHEDULE 1.2      TENDERED PRICES – Removal & Disposal of Trade Waste – within the Sydney Region**

For Items 1.2.1 to 1.2.7, the tendered rate shall be inclusive of cleaning and removal and transport of trade waste from the pre-treatment systems listed in the Schedule below

<b>Grease Arrestors- Covered under Sydney Water Wastesafe System</b>				
<b>ITEM NUMBER</b>	<b>DESCRIPTION OF RATE</b>	<b>TENDERED RATE (GST EXCLUSIVE) Sydney Region</b>	<b>GST</b>	<b>TENDERED RATE (GST INCLUSIVE) Sydney Region</b>
1.2.1	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – up to 1000 litres	\$ per ea		\$ per ea
1.2.2	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 1001 to 1500 litres	\$ per ea		\$ per ea
1.2.3	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 1501 to 2000 litres	\$ per ea		\$ per ea

<b>Grease Arrestors – NOT covered under Sydney Water Wastesafe System but within the Sydney Region</b>				
<b>ITEM NUMBER</b>	<b>DESCRIPTION OF RATE</b>	<b>TENDERED RATE (GST EXCLUSIVE) Sydney Region</b>	<b>GST</b>	<b>TENDERED RATE (GST INCLUSIVE) Sydney Region</b>
1.2.4	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity - up to 100 litres	\$ per ea	\$ per ea	\$ per ea
1.2.5	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 101 to 1000 litres	\$ per ea	\$ per ea	\$ per ea
1.2.6	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 1001 to 1500 litres	\$ per ea	\$ per ea	\$ per ea
1.2.7	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 1501 to 2000 litres	\$ per ea	\$ per ea	\$ per ea

**SCHEDULE 1.3 TENDERED PRICES – Removal & Disposal of Trade Waste – within the Hunter Region**

For Items 1.3.1 to 1.3.4, the tendered rate shall be inclusive of cleaning and removal and transport of trade waste from the pre-treatment systems listed in the Schedule below

Grease Arrestors – covered within the Hunter Region				
ITEM NUMBER	DESCRIPTION OF RATE	TENDERED RATE (GST EXCLUSIVE) Hunter Region	GST	TENDERED RATE (GST INCLUSIVE) Hunter Region
1.3.1	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity - up to 100 litres	\$ per ea	\$ per ea	\$ per ea
1.3.2	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 101 to 1000 litres	\$ per ea	\$ per ea	\$ per ea
1.3.3	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 1001 to 1500 litres	\$ per ea	\$ per ea	\$ per ea
1.3.4	Cleaning & removal of trade waste from grease arrestors. Grease Trap capacity – 1501 to 2000 litres	\$ per ea	\$ per ea	\$ per ea

**SCHEDULE 1.4 TENDERED PRICES – Removal & Disposal of Trade Waste – within the Sydney Region**

For Items 1.4.1 to 1.4.5, the tendered rate shall be inclusive of cleaning and removal and transport of trade waste from the pre-treatment systems listed in the Schedule below

Dilution Pits				
ITEM NUMBER	DESCRIPTION OF RATE	TENDERED RATE (GST EXCLUSIVE) Sydney Region	GST	TENDERED RATE (GST INCLUSIVE) Sydney Region
1.4.1	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – up to 100 litres	\$ per ea	\$ per ea	\$ per ea
1.4.2	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – 101 to 1000 litres	\$ per ea	\$ per ea	\$ per ea
1.4.3	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – 1001 to 1500 litres	\$ per ea	\$ per ea	\$ per ea

Dilution Pits				
ITEM NUMBER	DESCRIPTION OF RATE	TENDERED RATE (GST EXCLUSIVE) Sydney Region	GST	TENDERED RATE (GST INCLUSIVE) Sydney Region
1.4.4	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – 1501 to 2000 litres	\$ per ea	\$ per ea	\$ per ea
1.4.5	Extra/ Over cost for pits located within a building.	\$ per ea	\$ per ea	\$ per ea

**SCHEDULE 1.5      TENDERED PRICES – Removal & Disposal of Trade Waste – within the Hunter Region**

For Items 1.5.1 to 1.5.5, the tendered rate shall be inclusive of cleaning and removal and transport of trade waste from the pre-treatment systems listed in the Schedule below

Dilution Pits				
ITEM NUMBER	DESCRIPTION OF RATE	TENDERED RATE (GST EXCLUSIVE) Hunter Region	GST	TENDERED RATE (GST INCLUSIVE) Hunter Region
1.4.1	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – up to 100 litres	\$ per ea	\$ per ea	\$ per ea
1.4.2	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – 101 to 1000 litres	\$ per ea	\$ per ea	\$ per ea
1.4.3	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – 1001 to 1500 litres	\$ per ea	\$ per ea	\$ per ea
1.4.4	Cleaning & removal of trade waste from dilution pits. Dilution Pit capacity – 1501 to 2000 litres	\$ per ea	\$ per ea	\$ per ea
1.4.5	Extra/ Over cost for pits located within a building.	\$ per ea	\$ per ea	\$ per ea

**SCHEDULE 1.6      TENDERED PRICES – Removal & Disposal of Trade Waste – within the Sydney Region**

For Items 1.6.1 to 1.6.5, the tendered rate shall be inclusive of cleaning and removal and transport of trade waste from the pre-treatment systems listed in the Schedule below

Clay Arrestors				
ITEM NUMBER	DESCRIPTION OF RATE	TENDERED RATE (GST EXCLUSIVE) Sydney Region	GST	TENDERED RATE (GST INCLUSIVE) Sydney Region
1.6.1	Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – up to 100 litres	\$ per ea	\$ per ea	\$ per ea
1.6.2	Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – 101 to 1000 litres	\$ per ea	\$ per ea	\$ per ea
1.6.3	Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – 1001 to 1500 litres	\$ per ea	\$ per ea	\$ per ea
1.6.4	Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – 1501 to 2000 litres	\$ per ea	\$ per ea	\$ per ea
1.6.5	Extra over cost for pits located within a building.	\$ per ea	\$ per ea	\$ per ea

**SCHEDULE 1.7      TENDERED PRICES – Removal & Disposal of Trade Waste – within the Hunter Region**

For Items 1.7.1 to 1.7.5, the tendered rate shall be inclusive of cleaning and removal and transport of trade waste from the pre-treatment systems listed in the Schedule below

<b>Clay Arrestors</b>			
<b>DESCRIPTION OF RATE</b>	<b>TENDERED RATE (GST EXCLUSIVE) Hunter Region</b>	<b>GST</b>	<b>TENDERED RATE (GST INCLUSIVE) Hunter Region</b>
Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – up to 100 litres	\$            per ea	\$            per ea	\$            per ea
Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – 101 to 1000 litres	\$            per ea	\$            per ea	\$            per ea
Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – 1001 to 1500 litres	\$            per ea	\$            per ea	\$            per ea
Cleaning & removal of trade waste from clay arrestors. Clay arrestor capacity – 1501 to 2000 litres	\$            per ea	\$            per ea	\$            per ea
Extra over cost for pits located within a building.	\$            per ea	\$            per ea	\$            per ea



**1.8. DISTRICTS TENDERED FOR**

Tenderers should indicate in the space below what regions they are tendering for. Tenderers are to note that the rates given in 1 above shall be the rate applied should the tenderer be successful in its tender for one region. Any discounts offered for award of contract for multiple regions are to be detailed below at clause 3.

**Sydney Region** (including Central Coast, Blue Mountains & Wollongong) or  
**Newcastle Region** (including Lake Macquarie area) or  
**both Regions**

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**1.9 MULTI-REGION DISCOUNTS**

Please provide details of any discounts that are available for the awarding of multiply districts (eg if awarded Sydney and Newcastle a discount of \_\_\_% applies, if awarded three or more districts a discount of \_\_\_% applies)

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**1.10 RICE BASIS**

Tendered Prices shall be FIRM for the first twelve (12) months of any resultant contract. Thereafter, rates shall be subject to annual adjustment at 3% per year.

## 2.1 SELECTION CRITERIA

### (a) Previous experience and performance on similar agreements for the products and services covered in this RFT;

Tenderers should provide details of similar “plant hire service” type contracts they have managed. Tenderers should provide the scope of the works performed, geographical area of coverage, who the contracts were with, how they were managed, how business relationships were maintained and any other information to demonstrate experience in the provision of similar services.

Tenderers should also provide a contact referee in each organisation used to demonstrate appropriate experience.

Site	Address	Work Undertaken	Referee Contact Details
			Name: Position Company: Tel: Email:
			Name: Position Company: Tel: Email:
			Name: Position Company: Tel: Email:
			Name: Position Company: Tel: Email:
			Name: Position Company: Tel: Email:



**State the number of years you have been in business in the form in which you are presently constituted.**

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State the number of years providing the required Service: \_\_\_\_\_

Scope of tenderer's current business activities

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**Financial Capacity and Viability of the Tenderer**

Give the annual Australian turnover for the past three (3) years in \$A.

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

If a company, please submit a copy of each of your annual financial reports for the last three financial years with your Tender.

#### **Sub-contractors**

Is any part of the required services to be provided through sub-contract? Note: In this context, suppliers of raw materials and/minor components to be incorporated into any services supplied by the Contractor are not regarded as sub-contractors.

**Yes/No**

If **"Yes"**, give details of item, name, address, ABN and services to be provided of proposed sub-contractor(s).

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Tenderers should detail their experience in managing and co-ordinating sub-contractors, providing examples of previous sub-contractor management and management strategies.

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(c) **OHS&R consideration including compliance and previous record**

Do you currently comply with the NSW Government's Occupational Health and Safety Management Systems – Guidelines (4<sup>th</sup> Edition 2004) and will you continue to do so for the duration of any agreement awarded?

**Yes/No**

If “**No**”, provide details below

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Tenderers should detail their OHS&R policies, documentation and strategies. Tenderers will need to provide a recent sample of a site specific safety management plan and safe working method statements. Tenderers should also complete Schedules 4 & 5 of Section 'C' and include with their tender response.

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(f) **Compliance With Tender Requirements Including Contract Terms & Conditions**

- Does the tenderer fully comply with the requirements of Part D and Part E

**Yes/No**

(Delete whichever is not applicable)

If **no**, a full statement detailing specific reasons for non-compliance clause-by-clause must be provided below.

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- Does the tenderer agree to perform all services in accordance with the Statement of Requirements.

**Yes/No**

(Delete whichever is not applicable)

If **no**, a full statement detailing specific reasons for non-compliance clause-by-clause must be provided below.

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- Compliance with NSW Government procurement policy and other applicable NSW Government policies

**Yes/No**

(Delete whichever is not applicable)

If **no**, a full statement detailing specific reasons for non-compliance clause-by-clause must be provided below.

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- Compliance with relevant legislation and standards

**Yes/No**

(Delete whichever is not applicable)

If **no**, a full statement detailing specific reasons for non-compliance clause-by-clause must be provided below.

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## 2.2 GUARANTEES

Tenderers shall provide full details of any guarantees or warranties relating to the services offered. The minimum extent of warranty offered is that prescribed by legislation, where applicable.

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## 2.3 CONFLICT OF INTEREST

In lodging a tender to this RFT, are you aware of any real or perceived conflict of interest (including any relevant relationships) existing, which require your disclosure.

**Yes/No** (Delete whichever is not applicable)

If yes, disclose conflict of interest.

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## 2.4 CURRENT LEGAL PROCEEDINGS

Are you or any of your directors or close associates currently, or have you, or have your directors or close associates been at any time within the last five years, the subject of any or any pending:

- (a) legal proceedings, including winding up or bankruptcy proceedings,
- (b) insolvency administrations or investigations; and/or
- (c) investigations by ICAC or any other public body?

**Yes/No**

If **“Yes”**, please supply full details below:

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**2.5 ADDENDA TO RFT AFTER ISSUE**

If there have been any Addenda by the Board to this RFT after the issue of this RFT, indicate below whether you have read and allowed for the Addenda in your RFT response.

**YES/NO/THERE HAVE BEEN NO ADDENDA BY THE BOARD**

If **NO**, provide reasons below

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**2.6 TENDER VALIDITY PERIOD**

Indicate below the period for which your Tender will remain valid for acceptance from the deadline for lodgement of tenders.

**N.B.** The minimum validity period is as stated in cl.4.8 of Part B.

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**SCHEDULE 3 TENDERER'S DETAILS INCLUDING INSURANCE and VALIDITY PERIOD**

The Department of Commerce contract only with acceptable legal entities having appropriate financial assets and does not contract with entities such as a business name, trust or firm trading under a trust arrangement.

<b>Name of Tenderer:</b>	
<b>Individual:</b> <i>(Print Name)</i>	
Trading Name	
or	
<b>Partnership</b> <i>(Trading Name of partnership)</i>	
Name of partner completing tender	
or	
<b>Company</b> <i>(Full name)</i>	
Trading Name (if applicable)	
Name and official position of authorised officer completing tender	
<b>The following information if to be provided by all tenderers, whether individual, partnership of company.</b>	
<b>Is the Organisation involved in any trust relationships?</b> (if yes, give full details)	
<b>Registered for GST Yes or No:</b>	
<b>Australian Business Number (ABN):</b>	
<b>Registered Business Address:</b>	
<b>Principal Place of Business:</b> <i>(if different from Registered Business Address)</i>	
<b>Business Postal Address:</b>	
Is the Company involved in any trust relationships? (if yes, give full details)	
<b>Contact person able to provide further information about this tender:</b>	
<b>Telephone:</b>	<b>Mobile:</b>
<b>Email:</b>	<b>Facsimile:</b>
<b>CONTACT DETAILS FOR PROPOSED CONTRACT;</b>	
<b>Main Telephone Number for use under contract:</b>	
<b>2<sup>nd</sup> Telephone No. for use under the contract:</b>	
<b>Mobile Telephone Number</b> <i>(if different from above):</i>	
<b>After Hours (24 hour) Telephone Number for Use under contract:</b>	
<b>Facsimile Number for use under contract:</b>	
<b>Email Address:</b>	
<b>Organisation's Membership of Industry Associations:</b>	

<b>Tender Validity Period</b> Please indicate period of validity if greater than 6 months (Clause 4.9 Part 'B')	<b>Months</b>
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please attach additional pages as necessary)



## INSURANCE DETAILS

Please provide details of current insurance cover.

Note: A "Certificate of Currency" from your insurance company will be required as proof of insurance cover if your organisation is awarded a contract.

### Workers Compensation Insurance

Insurance Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Policy Number: \_\_\_\_\_

Expiry Date:        /        / \_\_\_\_\_

### Death & Injury Policy

*(sole traders and partnerships, include details for each partner)*

Insurance Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Policy Number: \_\_\_\_\_

Expiry Date:        /        / \_\_\_\_\_

### Public Liability Insurance

Insurance Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Policy Number: \_\_\_\_\_

Limit of Insurance: \_\_\_\_\_

Expiry Date:        /        / \_\_\_\_\_

*(please attach additional pages as necessary)*

<b>SCHEDULE 4 REVIEW CHECK LIST SAFETY MANAGEMENT PLAN</b>
--

This checklist is used by HABS to review the Site Specific Safety Plan of a contractor.

The contractor is required to complete the checklist by indicating where in his plan the required information is to be found.

CONTRACTOR:	TELEPHONE:
CONTRACTOR MANAGEMENT REPRESENTATIVE:	
PROJECT:	
I have reviewed the Contractor's Safety Management plan and it addresses the criteria of this check list. I recommend that work be allowed to commence.  .....  <b>(Print Name and Date)</b> <b>PROJECT MANAGER or appointed delegate as per Project Plan</b> (and as referenced in the Contract Administration Brief for Programs Branch Projects)	SIGNATURE:
I have checked the completed checklist and sighted the Contractor's Safety Management Plan. I accept the above recommendation to allow commencement of work.  ..... .....  (Print Name and Date) REGIONAL PROJECT COORDINATOR/ SENIOR PROJECT MANAGER/ TEAM LEADER / PROJECT MANAGER (PROJECT/PROGRAM MANAGER for Programs Branch Projects)	SIGNATURE

Does the Safety Management Plan:-	Yes ✓	No X
Describe the work to be undertaken?		
Identify the hazards associated with the works?		
Describe the hazard control measures that the Contractor will use?		

## **Statement of Responsibilities**

***A Safety Management Plan must always include a Statement of Responsibilities.***

***The Contractor must specify the names of the Contractors management representative responsible for all the following.***

**The Safety Management Plan lists the Contractors management representative, [*name(s) and position title(s)*],**

..... **will be responsible for:** identifying and assessing the hazards associated with the works, and documenting the hazard control measures to be taken.

..... **will be responsible for:** compliance with OHS&R legislation, regulations, standards, codes, and the site-specific Sites Safety Rules.

..... **will be responsible for:** assessing and monitoring your subContractors' capabilities, and for ensuring they meet OHS&R requirements.

..... **will be responsible for:** managing the acquisition and communication of OHS&R information to managers, supervisors and people working on site.

..... **will be responsible for:** maintaining first-aid stocks.

..... **will be responsible for:** managing accident and emergency procedures.

..... **will be responsible for:** keeping OHS&R records.

..... **will be responsible for:** making sure that the Site Safety Rules are available and provided to people who may work on or visit the Site.

..... **will be responsible for:** managing workplace injury management and rehabilitation.

..... **will be responsible for:** managing communication between OH&S Workplace Committees (where applicable).

..... **will be responsible for:** displaying the Site Safety Rules on noticeboards and other suitable locations on site.

## **Occupational Health and Safety Training**

**The Safety Management Plan lists the Contractors management representative, [*name(s) and position title(s)*],**

..... **will :** identify the OHS&R training needs of management, supervisors and personnel on site.

..... **will :** make sure that appropriate training is carried out.

..... **will :** make sure that all personnel attend a general construction OHS&R induction training course before starting work.

..... **will :** make sure that all personnel attend adequate site-specific induction, work activity and refresher safety training.

..... **will :** conduct induction training, task training and refresher safety training for everyone working on site.

..... **will :** keep appropriate records of OHS&R training.

**Incident Management**

The Safety Management Plan lists the Contractors management representative, [*name(s) and position title(s)*],

..... **will** : be available (both during and outside normal working hours) to prevent, prepare for, respond to and recover from incidents.

..... **will** : ensure that the procedures for contacting these person(s) are communicated and clearly displayed on the sites.

**Site Safety Rules**

**A Site-specific Safety Management Plan must always include Site Safety Rules. The Site Safety Rules must apply to the particular site and to the procedures used on the site.**

**Site Safety Rules should not only provide information, for example on, accident and emergency procedures, the location first aid facilities. Site Safety Rules should also clearly state the Contractors expectations of those who may work on or visit the site, for example, the wearing of safety helmets and footwear, the measures to be taken to protect the public.**

<b>INDUCTION AND SAFETY TRAINING</b>	<b>Yes ✓</b>	<b>No X</b>
States that all personnel must attend general construction work health and safety induction training before starting work.		
States that all personnel must attend adequate site-specific induction and site-specific work activity safety training.		

**PPE**

States how the Contractor will make sure that appropriate personal protective equipment (PPE) such as safety helmets and safety footwear is worn by all employees, agents and visitors.		
---	--	--

**ACCESS TO THE SITE**

States how the Contractor will make sure that there is only authorised entry to, movement on or exit of persons, vehicles, and equipment.		
---	--	--

**ACCIDENT AND EMERGENCY PROCEDURES**

States how the Contractor will ensure that everyone is made aware of accident and emergency procedures and first aid facilities are clearly identified.		
---	--	--

**CHEMICALS AND HAZARDOUS SUBSTANCES**

States how the Contractor will ensure that chemicals and hazardous substances will be used and stored in compliance with Material Safety Data Sheets (MSDS) and safe work procedures in accordance with Hazardous substance regulation.		
---	--	--

**SAFE WORK PROCEDURES**

<b>Protection of all workers and the public</b> States how the Contractor will make sure that effective barricades, fencing and overhead protection are used.		
<b>Elevated work</b> States how the Contractor will make sure that all work at heights is done in accordance with the relevant construction safety legislation, standards, and codes.		
<b>Electrical work, installations and equipment</b> States how the Contractor will make sure that electrical work and equipment complies with the construction and electrical safety legislation, regulations, standards and codes.		

States how the Contractor will investigate locate and highlight the presence of any existing electricity.		
<b>EXCAVATION AND TRENCHING</b> States how the Contractor will make sure that all excavation and trenching work is done in accordance with the relevant construction safety legislation, standards and codes.		

#### SAFE WORK METHOD STATEMENTS

Review(s) of the adequacy of Safe Work Method Statements has been carried out using the Check List <u>PWF-2103</u> .		
--	--	--

Tenderer's Signature: \_\_\_\_\_

Name: \_\_\_\_\_  
(in block letters)

Organisation Name: \_\_\_\_\_

<b>SCHEDULE 5 REVIEW CHECK LIST SAFE WORK METHODS STATEMENT</b>
---

CONTRACTOR:	TELEPHONE:
CONTRACTOR MANAGEMENT REPRESENTATIVE:	
PROJECT:	
ACTIVITY / TASK	
I have reviewed the Safe Work Method Statement certified by the Principal Contractor and consider that it adequately covers the items listed below..  .....  (Print Name and Date) PROJECT MANAGER or appointed delegate as per Project Plan (and as referenced in the Contract Administration Brief for Programs Branch Projects)	SIGNATURE:

**Certified SWMS submitted by the Principal Contractor, received 14 days before the construction work for which it applies must as a minimum address the following:**

Is the Safe Work Method Statement	Yes ✓	No X
Certified by the Principal Contractor's Management Representative as complying with OH&S legislation		
On organisation's letterhead and show the name and registered office address of the organisation?		
Signed by a senior management representative of that organisation and the date?		

Does the Safe Work Method Statement include the following?	Yes ✓	No X
A description of the work to be undertaken.		
The step-by-step sequence involved in doing the work.		
The potential hazards associated with the work and with each step of the work.		
The safety controls that will be in place to minimise these hazards.		
Precautions to be taken to protect health and safety.		
Health and safety instructions to be given to persons involved with the work.		
Identification of health and safety legislation, codes or standards applicable to the work, and where these are kept. <b>(For information regarding health and safety legislation, codes or standards refer to <u>PWD-2101 Environmental &amp; Safety Legislation Check List</u>)</b>		
The names and qualifications of those who will: <ul style="list-style-type: none"> <li>➤ Supervise the work.</li> <li>➤ Inspect and approve work areas, work methods, protective measures, plant, equipment and power tools.</li> <li>➤ Independently certify certain aspects of the work, eg. formwork.</li> </ul>		
A description of what training is given to people involved with the work.		

The names of those who will be or have been trained in the work activities described in the Safe Work Method Statements, and the names and qualifications of those responsible for training them.		
Identification of the plant and equipment that will most likely be used on site eg. ladders, scaffolds, grinders, electrical leads, welding machines, fire extinguishers.		
Details of the inspection and maintenance checks that will be or have been carried out on the equipment listed.		

### **SAFE WORK METHOD STATEMENTS**

The Principal Contractor must submit certified Safe Work Method Statements

14 days before the construction work for which it applies commences for all work activities involving:

- Electrical installations and power tool (including explosive power tools) use;
- Scaffolding, formwork and temporary supports;
- Moving plant and work near traffic;
- Unloading materials and equipment;
- Excavations and trenching, particularly deeper than 1.5 metres;
- Work at heights, particularly over 3 metres;
- Confined spaces
- Hazardous substances, including handling asbestos; demolition work;
- Use of explosives;
- Gas installations;
- Work near public places; and
- Work involving drowning risks.

After the Project Manager (or delegate, eg the Project Officer) has reviewed the Safe work Method Statement which has already been certified as adequate by the Principal Contractor and completed the checklist, the following action is required;

1. If the SWMS is adequate allow work to commence
2. If the SWMS is not adequate:

Seek advice where necessary from Departmental staff with specialist skill, including the Construction Safety Coordinator

Require the Contractor to submit revised satisfactory certified SWMS prior to work commencing

Raise concerns about inadequacies with documentation with Departmental Senior Management

**WorkCover Extract - Preparing safe work method statements**

The Regulation requires Safe Work Method Statements where the cost of the work undertaken exceeds \$250,000 or for high-risk work (see definitions section). Most work with moving plant is defined as high-risk work. Even when not legally required, safe work method statements (SWMS) are a good way of demonstrating your risk control measures.

In developing safe work method statements, work activities that have safety risks must be identified, the risks must be assessed, and means to eliminate or control the risks must be adopted.

Principal Contractors and sub-Contractors (Contractors) are required to submit SWMS. Many Contractors submit 'Technical Procedures' for carrying out construction work processes as SWMS. These documents are often not a SWMS as required for the purpose of assessing risks. A SWMS must be submitted to the main Contractor prior to commencing on-site work.

A SWMS requires the work method to be presented in a logical sequence. The hazards associated with each process are to be identified, and the measures for controlling these hazards specified.

Break down each job into a series of basic job steps, to identify the hazards and potential accidents in each part of the job. The description of the process should not be so broad that it leaves out activities with the potential to cause accidents and prevents proper identification of the hazards. It is not necessary to provide fine detail of the tasks. A 'hazard', may be either intrinsic or inherent, existing or potential, an unsafe condition and/or an unsafe act, eg. a dangerous location, an unsafe (hazardous) work process, or a potentially hazardous task as a stage of the construction work process.

Where risks cannot be eliminated, the 'hierarchy of control measures' must be applied. Personal Protective equipment is the least preferred approach. In some situations a combination of control measures may need to be used. References to legislation, codes of practice or Australian Standards is not an acceptable alternative for the elimination or control of risks; the actual procedure or control must be documented.

Special Work Processes involving inherent hazards that require special safety equipment must be referred to as the Safe Work Practice to be incorporated in the Standard Work Procedure – eg. *'When grinding or disc cutting, safety spectacles or goggles **and** a full face shield shall be worn'*.

The SWMS should nominate the occupations and number of employees required to safely perform the task(s). Safety and/or skills training provided, or required, prior to commencing work is to be identified, together with any special qualifications, permits, licenses, certificates of competency the employees require under Regulation. Copies of such documents and training records should be provided with the SWMS.

The SWMS must specify the type/capacity and description of the plant that is to be used. Employees of the workforce should be involved/consulted in the development of any SWMS.

The Site Safety Induction should ensure that all persons involved in carrying out the work understand the SWMS

Tenderer's Signature: \_\_\_\_\_

Name: \_\_\_\_\_  
(in block letters)

Organisation Name: \_\_\_\_\_



## SCHEDULE 6 ACKNOWLEDGMENT AND CONFIRMATION OF TENDER

Note to tenderers: If submitting a hard copy Tender, execute cl. 6.2 If submitting an electronic Tender, only complete cl. 6.3.

- 6.1 Lodgement of a Tender will itself be an acknowledgement and representation by you that you are aware of the requirements of the Code; that you will comply with the Code; and that you agree to report to the Board any breaches of the Code for the duration of the agreement.
- 6.2 I affirm that this is my Tender to supply the Services sought in the RFT at the prices tendered, and in accordance with the conditions of the RFT except as expressly amended in my Tender, and that the information given in my Tender is correct:

---

Print Name and Title

---

Signature of tenderer (if an individual, as identified in clause 3)

**or**

---

Signature of authorised officer of tenderer (as identified in clause 3)

**or**

---

Signature of partner completing tender on behalf of partnership (as identified in clause 3)

- 6.3 If submitting an electronic Tender, do you acknowledge and accept that electronic submission in accordance with the requirements of the RFT and any conditions of the NSW Department of Commerce tenders web site is sufficient to verify and affirm that this is your Tender to supply the services at the prices tendered on the conditions contained in Part D, except as expressly amended in your Tender and that the information contained in your Tender is correct?

Note that such acknowledgment and acceptance is a necessary prerequisite to consideration of your Tender.

**Yes/No**

---

Print Name and Title

---

**Dated: <Insert Date>**

---

<Insert Principal Name>

and

<Insert Contractor name>

---

*AGREEMENT (REQUEST FOR TENDER, PART D) FOR*

*0801654 REMOVAL OF BUILDERS AND TRADE WASTE*

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THIS AGREEMENT executed by DEED is made on the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_

BETWEEN

1 The Crown in right of the State of New South Wales, acting through the State Contracts Control Board of McKell Building, 2-24 Rawson Place, Sydney in the State of New South Wales” ;

AND

2. .... [insert name of contractor] of  
 .... [insert address] in the State of  
 .... ("the Contractor")

## BACKGROUND

- A. The Principal issued the Request for Tender for the supply of the Deliverables.
- B. The Contractor submitted a tender that was accepted by the Principal.
- C. The Principal and the Contractor have agreed to enter into an Agreement for the supply of the Deliverables in the form of this Agreement.

## NOW THE PARTIES AGREE:

### 1 Interpretation

#### 1.1 Definitions

“**Agreement**” means this Deed of Agreement including the Schedules and Part E, Special Conditions of Agreement, where applicable.

“**Applicable Discount**” means an applicable discount in Schedule 3 Pricing, as varied from time to time in accordance with this Agreement, or any other Applicable Discount which may be offered by the Contractor from time to time.

“**Approved Sub-Contractors**” means the sub-contractors approved by the Principal and indicated in Schedule 4.

“**Category**” means generic categories of Deliverables comprising of multiple Products inclusive of the associated services for their supply.

“**Change in Control**” means a circumstance in which control is or may be exercised over the Contractor:

- (a) through removal or appointment of directors of the Contractor;
- (b) by virtue of the direct holding of at least 15% of the voting shares in the Contractor or a holding company of the Contractor; or
- (c) by any other means whatsoever.

“**Circumstances Beyond the Control of the Contractor**” includes:

- (a) acts of God;
- (b) fire, flood, or earthquake;
- (c) national emergency (including terrorist acts) or war; or a serious industrial dispute.

**“Client’s Representative”** means a representative of the Site Owner/Facility Manager (Site Contact).

**“Confidential Information”** means, in relation to a Party, information that:

- (a) is by its nature confidential;
- (b) is designated by that Party as confidential; or
- (c) the other Party knows or ought to know is confidential.

**“Consequential Loss”** means any loss recoverable at law (other than loss arising in the usual course of things) which is:

- (a) consequential upon other loss;
- (b) a loss of opportunity or goodwill;
- (c) a loss of profits;
- (d) a loss of anticipated savings or business;
- (e) loss of value of any equipment,

and any costs or expenses in connection with the foregoing.

**“Contract Material”** means New Contract Material and Existing Contract Material.

**“Contract Price”** means the total amount payable by the Principal to the Contractor for the Deliverables ordered under this Agreement and calculated in accordance with clause 5.2.

**“Contractor”** means the contractor under this agreement and includes its subcontractors, re-sellers and distributors.

**“Contractor’s Cost Structure”** means the Contractor’s overall cost structure comprising of individual cost components for each Product listed in Schedule 3.

**“Contractor’s Delegate”** means the individual or the position title nominated by the Contractor in its Tender.

**“Contractor Information”** means the information provided by the Contractor in Schedule 1 and includes information on Approved Subcontractors.

**“Contractor Performance Report (CPR)”** means a report on the Contractors performance relating to this Contract.

**“Contractor’s Insolvency”** means any of the following events occurring in connection with the Contractor:

- (a) insolvency;
- (b) the Contractor indicates that it does not have the resources to perform the Agreement;
- (c) an application for winding up is made and not stayed within 14 days;
- (d) a winding up order is made;
- (e) a controller, administrator, receiver and manager, provisional liquidator or liquidator is appointed;
- (f) a mortgagee enters the possession of any property of the Contractor;
- (g) notice is given of a meeting of creditors for the purposes of a deed of arrangement; or
- (h) any actions of a similar effect are taken.

**“Customer Contract”** means the contract that is made between the Contractor and the Principal under clause 3.4 of this Agreement.

**“Deed”** means a form in which a contract can be recorded which requires execution under the parties’ seal.

**“Deliverables”** means the goods and associated services, Works to be supplied by the Contractor and itemised in Schedule 2.

**“Existing Contract Material”** means any material which is existing at the date of this Agreement and which may be incorporated in to the New Contract Material.

**“Expert Determination”** means the process set out in clause 14.5.

**“Guaranteed Delivery Time”** means the guaranteed time for the supply of the Deliverables as specified in Schedule 2 of this Agreement, or such earlier time as may be agreed by the Principal and the Contractor in respect of a particular Customer Contract.

**“Information”** includes information in the form of data, text or images.

**“Intellectual Property”** includes copyright, patent, trademark, design, semi-conductor or circuit layout rights, trade, business or company names, or other proprietary rights, or any rights to registration of such rights existing in Australia, whether created before or after the date of this Agreement.

**“Key Performance Indicators”** means performance indicators in respect of the Contractor's performance of this Agreement.

**“Key Personnel”** means the personnel of the Contractor specified in Schedule 1 item 4.

**“Minimum Order Quantity”** means the minimum quantity of each Deliverable ordered by the Principal, given in Order Units.

**“New Contract Material”** means any material brought into existence as part of, or for the purpose of providing the Deliverables including records, documents and Information stored by any means.

**“Order”** means a written request by the Principal for the provision of Services under the Contract.

**“Ordering Officer”** means a representative of the Principal, who from time to time places orders under this contract.

**“Parties”** means the Principal and the Contractor.

**“Personal Information”** has the same meaning as in Privacy and Personal Information Protection Act 1998 (NSW). (Guide Note: If Personal Information is within the meaning of the Health Records and Information Privacy Act, then add 'Health Records and Information Privacy Act 2002 (NSW)').

**“Personnel”** of a Party means;

- (a) the officers, employees, agents and contractors of that Party,
- (b) in the case of the Contractor, includes subcontractors, and the Key Personnel in Schedule 1 item 4.

**“Price”** means the price payable for a Deliverable as set out in Schedule 3 and, where relevant, means the price inclusive of any Applicable Discount specified in Schedule 3.

**“Price Schedule”** means Schedule 3 to this Agreement and/or variations made to it in accordance with this Agreement.

**“Principal's Material”** means any material, document, or Information supplied by the Principal to the Contractor by whatever means.

**“Principal's Delegate”** means the Principal's employee named in Schedule 1 item 6 responsible for the overall administration of this Agreement on behalf of the Principal.

**“Product”** means an individual line item within a generic Category of products inclusive of associated services for its supply and delivery.

**“Public Service”** has the same meaning as that given to it in the *Public Sector Employment and Management Act 2002* (NSW).

**“Public Sector Service”** has the same meaning as that given to it in the *Public Sector Employment and Management Act 2002* (NSW).

**“Relationship Manager”** means the Contractor’s employee named in Schedule 1 item 4.

**“Request for Tender”** means the request for tender issued by the Principal, consequent to which this Agreement was awarded to the Contractor for the supply of the Deliverables.

**“Schedule”** means a schedule to this Agreement.

**“Service Levels”** means the service levels which need to be met by the Contractor under this Agreement in accordance with Part E.

**“Statement of Requirements”** means the detailed description of the Deliverables to be provided under this Agreement in Schedule 2.

**“Standards”** means Australian Standards, where such exist and are applicable to the Deliverables, and includes international standards in the event of the lack of an applicable Australian Standard.

**“State Contracts Control Board”** and **“the Board”** means the State Contracts Control Board established by the *Public Sector Employment and Management Act 2002* and includes the duly authorised delegates of the Board, including officers of NSW Procurement – Contracting Services.

**“State of New South Wales”** means the Crown in right of the State of New South Wales.

**“Statutory Requirements”** means the laws relating to the performance of this Agreement or the lawful requirements of any authority with respect to the performance of this Agreement.

**“Substantial Breach”** means:

- (a) in the case of this Agreement, a substantial breach of a term of this Agreement by the Contractor and includes but is not limited to, any breach of the following clauses:
  - (i) clauses 5.1 to 5.7 (Pricing),
  - (ii) clause 8.1 (Punctual Delivery) without being granted an extension of time under clause 8.2,
  - (iii) clause 9 (Confidentiality),
  - (iv) clause 11.5 (Minimum Insurance Requirements),
  - (v) clause 12.1 (Service Levels),
  - (vi) clause 16.1 (No Assignment or Novation); and
  - (vii) clause 16.2 (Conflicts of Interests).

**“Term”** means the period of this Agreement, set out in item 2 Schedule 1 and any extension of the Term in accordance with clause 2.2.

**“Warranty Period”** means, in relation to a particular Product, the period of warranty of that Product specified in Schedule 2.

**“Works”** means the whole of the work to be carried out and materials and services to be provided under the Agreement and includes the Deliverables.

## **1.2 Rules for interpreting this Agreement**

- 1.2.1 Headings are for convenience only, and do not affect the interpretation of this Agreement. The following rules also apply in interpreting this document, except where the context makes it clear that a rule is not intended to apply.
- 1.2.2 A reference to:
- (a) legislation (including subordinate legislation) is a reference to that legislation as amended, re-enacted or replaced, and includes any subordinate legislation issued under it;
  - (b) software, document or agreement, or a provision of a document or agreement, is a reference to that document, agreement or provision as amended, supplemented, replaced or novated;
  - (c) a person includes any type of entity or body of persons whether or not it is incorporated or has a separate legal entity;
  - (d) any thing (including a right, obligation or concept) includes each part of it.
- 1.2.3 Where:
- (a) the Contractor consists of more than one person or corporation, this Agreement binds each of them separately and any two or more of them jointly and severally;
  - (b) an obligation, representation or warranty made by the Contractor in this Agreement shall bind each person or corporation separately and jointly and each person or corporation shall alone be responsible for the performance of every obligation, representation or warranty contained in this Agreement.
- 1.2.4 A singular word includes the plural, and vice versa.
- 1.2.5 A word which suggests one gender includes the other genders.
- 1.2.6 If a word is defined, another part of speech of that word has a corresponding meaning.
- 1.2.7 The Parties may undertake business by the electronic exchange of information and the provisions of this Agreement will be interpreted to give effect to undertaking business in this manner.
- 1.2.8 In the event of any ambiguity, discrepancy or inconsistency in interpreting any term or terms of this Agreement, the order of priority in the interpretation of such term or terms will be in the order of:
- (a) Part E, Special Conditions to this Agreement, if applicable;
  - (b) The terms and conditions of this Agreement;
  - (c) Schedules 1 and 2 to this Agreement;
  - (d) Any other Schedules to this Agreement;
  - (e) The Customer Contract.

## **2 Term**

### **2.1 Duration**

- 2.1.1 This Agreement commences on the commencement date specified in item 2 of Schedule 1 and expires on the expiry date specified in the same item 2, unless sooner terminated in accordance with this Agreement.

### **2.2 Extension**

- 2.2.1 The Principal may in its sole discretion extend this Agreement for the period or periods specified in item 2 of Schedule 1.



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### **3 Formation**

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#### **3.1 Nature of the Agreement between the Principal and the Contractor**

- 3.1.1 This Agreement describes the terms and conditions between the Principal and the Contractor under which the Contractor agrees with the Principal that it will supply the Deliverables.
- 3.1.2 This Agreement together with Part E, Special Conditions constitutes the entire Agreement between the Parties. Any prior arrangements, Agreements, representations or undertakings are superseded.

#### **3.2 Principal's Delegate**

- 3.2.1 The Principal's Delegate is responsible for administering this Agreement.
- 3.2.2 The Contractor must comply with any reasonable direction given by the Principal's Delegate in connection with the performance of work under this Agreement.
- 3.2.3 Unless this Agreement provides otherwise, and subject to the Principal's direction, the Principal's Delegate may exercise rights and discharge obligations conferred or imposed on the Principal under this Agreement.
- 3.2.4 The Principal's Delegate is not authorised to waive or vary any provision of this Agreement, release the Contractor from any obligation under this Agreement, or terminate this Agreement without the Principal's approval.

#### **3.3 No Assurance of Volumes and Non-Exclusive Supply**

- 3.3.1 This Agreement does not:
- (a) imply that the Contractor will receive any specific volume of orders for the Deliverables,
  - (b) imply that the Contractor is the exclusive provider of the Deliverables to the Principal; or
  - (c) oblige the Principal to place Customer Contracts for the Deliverables with the Contractor.
- 3.3.2 The Contractor acknowledges that the Principal may, from time to time, in its discretion, appoint other suppliers under an agreement to supply the Deliverables and that the Contractor will make no objection to such appointment.

#### **3.4 Customer Contract**

- 3.4.1 The Contractor agrees that each time the Principal places an order, a separate Customer Contract is formed. The terms and conditions of the Customer Contract are those appearing in:
- (a) This Agreement, any variations thereto, including any Schedules; and
  - (b) The order.

#### **3.5 Provisions of Agreement to apply to the Customer Contract**

- 3.5.1 The provisions of this Agreement apply to the Customer Contract as if they were repeated in the Customer Contract, provided that in respect of the Customer Contract, "Agreement" and "Principal" wherever appearing in this Agreement shall be read as "Customer Contract" and "Customer" respectively.

### **3.6 Approved Sub-Contractors**

- 3.6.1 The Contractor may with the written consent of the Principal, sub-contract any part of this Agreement to an Approved Sub-Contractor in Schedule 4.
- 3.6.2 The Contractor must make the Approved Sub-contractor aware of the terms and conditions of this Agreement and this clause;
- 3.6.3 The terms and conditions of the sub-contract must be consistent with this Agreement.
- 3.6.4 The Contractor will continue to be bound by, and responsible for performance of this Agreement notwithstanding that part or all of it may have been sub-contracted.
- 3.6.5 The Principal may, without incurring liability, withdraw its approval of an Approved Sub-contractor if in its reasonable opinion the sub-contractor is not meeting the requirements of this Agreement. The Principal will notify the Contractor in writing that its approval is withdrawn and the Contractor will immediately terminate its arrangement with the sub-contractor.
- 3.6.6 To the extent that loss is not attributable to the Principal's withdrawal of approval of a sub-contractor:
  - (a) the Contractor will be liable for any acts or omissions of any sub-contractor or any employee or agent of the sub-contractor as fully as if they were the acts or omissions of the Contractor, and
  - (b) the Contractor will indemnify and release the Principal from any liability or loss resulting from the acts or omissions of any sub-contractor.

## **4 The Deliverables**

### **4.1 Customer Quotation**

- 4.1.1 Prior to the placement of a Customer Contract under this Agreement the Ordering Officer will require the Contractor to prepare a quotation for the completion of the Deliverables. This quotation is to be based on the schedule of rates as detailed in the Price Schedule. The Principal reserves the right to obtain quotations from more than one Contractor.

### **4.2 Customer Contracts**

- 4.2.1 The Contractor must not supply the Deliverables unless the Principal issues a Customer Contract. Such Customer Contracts may be made by:
  - (a) Written request to the Contractor by facsimile, email or by hand, containing the details outlined in clause 4.2.2;
  - (b) Electronic issue in accordance with the Customer's and/or the Contractor's ordering system and this Agreement;
  - (c) Any other method required by the Principal which is in keeping with the NSW Government's financial and audit policies.
- 4.2.2 A Customer Contract in whichever form it is issued, must provide the following details:
  - (a) a description of the Deliverables;
  - (b) the Price for the Deliverables;
  - (c) this Agreement reference number;
  - (d) delivery date;
  - (e) delivery site;
  - (f) name of officer placing the Customer Contract; and

(g) address to which the Contractor's invoice is to be sent for payment.

4.2.3 If the Customer Contract is issued in incomplete form, the Contractor must notify the officer placing the Customer Contract of the details required under clause 8.1.2 that have not been provided prior to supply of the Deliverables which are the subject of the Customer Contract.

#### **4.3 Contractor to Fulfil all Customer Contracts**

4.3.1 The Contractor must fulfil all Customer Contracts placed by the Principal during the Term in accordance with this Agreement and the Customer Contract.

4.3.2 The Principal may place a single Customer Contract for the Deliverables to be supplied in a single delivery, or a single Customer Contract to be supplied in multiple deliveries, ie. "Blanket Orders".

#### **4.4 List of Products and Categories**

4.4.1 The Deliverables are the Products and overall Categories to be supplied by the Contractor under this Agreement and listed in Schedule 3.

#### **4.5 Variation of Product Description**

4.5.1 The Contractor must notify the Principal in writing as soon as practicable of any variation to the description of a Product offered in Schedule 3.

4.5.2 A variation under clause 4.5.1 may include a variation to the description of the number or name of the Product but excludes a variation:

- (a) to the Price of the Product;
- (b) that modifies or upgrades the Product; or
- (c) that introduces a new Product to the Price Schedule.

4.5.3 The Principal will notify the Contractor of its acceptance or rejection of the variation to the description of a Product. If the variation is accepted, it shall be taken to be incorporated into Schedule 3.

#### **4.6 Improvements to Products**

4.6.1 If during the Term the Contractor makes available on a general commercial basis Products that:

- (a) are modified versions or upgrades of a Product; or
- (b) have a function or purpose similar to that performed by a Product; or
- (c) have a new function or purpose consistent with the nature of the Product,

then the Contractor must offer the Principal the same Product under this Agreement within 30 days of such Product being available on a general commercial basis.

4.6.2 The Product offered by the Contractor under clause 4.6.1 will form part of Schedule 3 when the Principal notifies its acceptance of the offer. Prior to accepting or rejecting the Contractor's offer, the Principal may request the Contractor to provide any further data reasonably required within 14 days to enable the making of an informed decision on the offer, and the Contractor must supply the same.

4.6.3 In the event that the Principal has not notified the Contractor of its acceptance of the Contractor's offer within 30 days, the offer will be deemed not to have been accepted by the Principal.

### **5 Pricing**

#### **5.1 Contractor's Obligations**

5.1.1 The Contractor must supply the Products on the basis of the Prices in Schedule 3, except where provided in this Agreement.

## 5.2 Calculating the Contract Price

- 5.2.1 The Pricing for the Products in Schedule 3, which are fixed for the periods indicated therein, includes all applicable levies, duties, taxes, insurances, packaging, imposts, overheads and profits, any Applicable Discounts as well as all costs and expenses that the Contractor incurs in their supply, but is exclusive of GST.

## 5.3 Price Variation

- 5.3.1 The Contractor may not seek to vary the Price of a Product and/or Category listed in Schedule 3 except in accordance with the frequencies and methodology indicated in Schedules 3. Subject to the Contractor having provided the Principal with sufficient documentation to justify the application, and subject to clause 12.1.2(a), the Principal may in writing, approve the application within 30 days of lodgement.
- 5.3.2 Where the Price variation is accepted, Schedule 3 will be updated to include the varied Price. The varied Price becomes the basis from which any future applications for Price variations will be calculated.
- 5.3.3 The Principal reserves the right to delete a Product and/or Category from Schedule 3 if it considers a Price variation application to be unreasonable.
- 5.3.4 Notwithstanding any other provision in this Agreement, the Contractor may apply in writing to the Principal to decrease its Prices at any time without any supporting documentation.

## 5.4 Rebates

- 5.4.1 The Contractor warrants that if at any time during the Term of this Agreement, it receives any rebate, discount, commission or other subsidy on any Product that it purchases from its subcontractors or other third party suppliers, the benefit of such rebate, discount, commission or subsidy will be directly passed on to the Principal under this Agreement.

## 5.5 Continuous Best Price

- 5.5.1 Notwithstanding any other clause in this Agreement, where the Principal has been able to confirm that the external market pricing for any Product or Category in Schedule 3 is consistently more competitive than under this Agreement, the Principal will provide the Contractor with reasonable evidence of such market situation and request the Contractor vary its Prices to align with the market.
- 5.5.2 Where the Contractor offers more favourable prices to any other purchaser of similar Deliverables in NSW purchased in similar circumstances, including volumes (where Price is volume dependent), timing and terms and conditions where they have a substantial impact on price, it must promptly make the more favourable price available to the Principal under this Agreement.

## 5.6 Goods and Services Tax

- 5.6.1 In this clause and Agreement:
- “**Consideration**”, “**Tax Invoice**”, “**Taxable Supply**” and “**Supply**” have the same meaning as provided for in the GST Law.
- “**GST**” is a goods and services tax and has the same meaning as in the GST Law.
- “**GST Law**” means any law imposing a GST and includes *A New Tax System (Goods & Services Tax) Act 1999* (Cth) or if that Act does not exist, means any Act imposing, or relating, to a GST and any regulation based on those Acts.
- 5.6.2 The Contractor must hold an Australian Business Number (ABN) and be registered for GST.
- 5.6.3 Every invoice issued by a person making a Supply must be in the form of, or be accompanied by, a valid Tax Invoice. No amount is payable until a valid Tax Invoice is received.

- 5.6.4 If there is any abolition or reduction of any tax, duty, excise or statutory charge associated with the GST, or any change in the GST, the Consideration payable for the Supply must be varied so that the Contractor's net dollar margin for the Supply remains the same.
- 5.6.5 Any contract entered into by a Party to this Agreement with a third party which involves a Supply being made, the cost of which will affect the cost of any Supply made under or in connection with this Agreement, must include a clause in equivalent terms to clause 5.9.4.

## **6 Payment**

### **6.1 Payment of Contract Price**

- 6.1.1 In consideration of the Contractor providing the Deliverables under this Agreement, the Principal shall, subject to the terms and conditions of this Agreement, pay the Contractor the Contract Price.
- 6.1.2 Failure by the Principal to pay the Contract Price at the due time will not be grounds to avoid performance of this Agreement.

### **6.2 Invoices and Time for Payment**

- 6.2.1 All claims for payment made by the Contractor shall be in the form of a Tax Invoice. A claim for payment shall be substantiated by an itemised account and the Contractor shall provide any further details in regard to the account that are reasonably requested by the Principal, including consolidated monthly invoicing on behalf of its branches/business units.
- 6.2.2 Claims for each completed Order, are to be submitted within 30 days from the completion date to the Ordering Officer for assessment and payment.
- 6.2.3 With each claim for payment, the Contractor must give the Principal a completed Statutory Declaration in accordance with Part E Schedule 4. An amount will not become payable to the Contractor in response to a payment claim unless the required statutory declaration is submitted
- 6.2.4 The Contractor shall submit with its claim the schedule rate item, the unit rate, the number of units and total line item cost. All claims shall be GST inclusive
- 6.2.5 Subject to this clause 6.2, the Principal shall make payment within 30 days from the end of the month after receipt of a valid Tax Invoice and documents necessary to evidence delivery to the Principal. However for larger projects progress payments may be negotiated.
- 6.2.6 The parties agree the making of a payment is not intended to be an acknowledgement that the Deliverables have been supplied in accordance with this Agreement.
- 6.2.7 If the Principal disputes an invoice amount the Principal shall certify the amount it believes is due for payment and shall pay that amount and the liability for the balance of payment shall be determined in accordance with this Agreement.
- 6.2.8 The Contractor will not be entitled to any credit charge, service fee or any other fee or charge for extending credit or allowing time for the payment by the Principal of money becoming due for the supply of the Deliverables.

### **6.3 Set-Off/Money Recoverable by the Principal**

- 6.3.1 The Principal may deduct from amounts which may be payable or which may become payable to the Contractor, any amount due from the Contractor to the Principal in connection with the supply of the Deliverables.
- 6.3.2 Without limiting clause 6.3.1, any damages, costs and expenses recoverable by the Principal from the Contractor in consequence of the Contractor's breach of this Agreement may be deducted from money then due to the Contractor. If that money

is insufficient for that purpose, the balance remaining unpaid will be a debt due by the Contractor to the Principal and may be:

- (a) set off against any other money due to the Contractor by the Principal under this or any other Agreement between the Principal and the Contractor; or
- (b) recovered from the Contractor by the Principal in an appropriate court.

#### **6.4 Suspension of Payments**

Should the Contractor refuse or neglect to carry out the instructions or requirements of the Principal in regard to any matter connected with this Agreement, the Principal may, suspend all payments to the Contractor until such instructions or requirements have been complied with by the Contractor.

### **7 Variations**

#### **7.1 Variations to Agreement**

- 7.1.1 This Agreement may not be varied except in writing signed by both the Principal and the Contractor.

### **8 Delivery**

#### **8.1 Punctual Delivery**

- 8.1.1 The Contractor must deliver the Deliverables within the specified Guaranteed Delivery Times in Schedule 2, or by the delivery times specified in the Agreement.
- 8.1.2 As soon as practicable after becoming aware of any matter which is likely to change or which has changed the time for delivery, the Contractor must notify the Principal in writing of the circumstances which the Contractor considers will give rise to the delay, and the extent or likely extent of the delay, and whether the Contractor will be requesting a reasonable extension of time in accordance with clause 8.2.

#### **8.2 Extension of Time**

- 8.2.1 Where there is likely to be a delay in the Contractor discharging an obligation under this Agreement because of a Circumstance Beyond the Contractor's Control (other than a circumstance arising out of any act or omission on the part of the Contractor), the Contractor will:
  - (a) within 3 days of becoming aware of the possibility of such a delay, notify the Principal, in writing of the circumstances which the Contractor considers will give rise to the delay, and the extent or likely extent of the delay and strategies proposed to manage the consequences of the delay; and
  - (b) request a reasonable extension of time.
- 8.2.2 The Principal may consent to a request for extension of time under this clause 8.2.2 provided that:
  - (a) the Contractor uses its best endeavours to minimise the delay and recover lost time; and
  - (b) where appropriate, the Contractor provides the Principal with a plan indicating in detail the steps the Contractor proposes to take to minimise the impact of the Circumstance Beyond the Control of the Contractor.
- 8.2.3 The Contractor will not be entitled to any increase in the Contract Price or damages, costs or expenses in connection with the delay.

#### **8.3 Delivery and Acceptance**

- 8.3.1 The Contractor must deliver the Deliverables to the place or places and within the Guaranteed Delivery Time and shall obtain a receipt of their delivery.
- 8.3.2 Delivery and receipt of the Deliverables shall not be taken to be an acceptance of the Deliverables by the Principal.

- 8.3.3 The Principal may reject Deliverables which are not in accordance with this Agreement.
- 8.3.4 If the Contractor is unable to provide the Deliverables for any reason, the Contractor must arrange for the supply of equivalent items from an alternative supplier within the Guaranteed Delivery Time. The Contractor is to liaise with the Principal to ensure that the alternative item is acceptable and meets the Principal's needs. Any additional cost in arranging an alternative supply is to be borne by the Contractor.
- 8.3.5 The Contractor will replace Deliverables at no cost (including freight and handling charges) where stocks are delivered with unreasonably short use-by dates.

#### **8.4 Rejection of Deliverables**

- 8.4.1 The Principal may direct the Contractor to correct Deliverables that are not in accordance with the Contract, and the Contractor must correct that work within the time specified by the Principal. If the Contractor does not correct the rejected Deliverables within the time specified, the Principal might have the Work corrected by others. The Principal will assess the reasonable costs of having the rejected Deliverables corrected by others and the Contractor must pay the Principal those costs.
- 8.4.2 The Principal may accept Deliverables that are not in accordance with any order. The resulting reasonable increase or decrease in the value to the Principal of the Deliverables and any other reasonable loss or detriment suffered by the Principal is to be assessed by the Principal and the amount paid to or deducted from the Contractor.

#### **8.5 Risk and Title**

- 8.5.1 Title in the Deliverables shall pass to the Principal on satisfactory delivery to the Principal, as evidenced by the signature on the delivery docket of a duly authorised representative of the Principal. Such signature is not an acknowledgement of the acceptability of the Deliverables. Notwithstanding that the Principal has taken delivery, the Contractor will remain liable for any loss or damage to the Deliverables, which may have occurred prior to delivery, and for any non-compliance of the Deliverables with the Customer Contract.

### **9 Confidentiality**

#### **9.1 Obligations of Parties**

- 9.1.1 Except to the extent necessary to comply with any statutory requirements or government policy relating to the public disclosure of Confidential Information, neither Party will make public, disclose or use any Confidential Information of the other Party except in accordance with this Agreement, unless the other Party gives its prior written consent.
- 9.1.2 Each Party may disclose Confidential Information to its officers, employees and sub-contractors where such disclosure is essential to carrying out their duties or in accordance with this Agreement.
- 9.1.3 Each Party must ensure the Confidential Information of the other Party is used solely in connection with or for the purposes of fulfilling its obligations under this Agreement.
- 9.1.4 This clause will survive the termination of this Agreement.

### **10 Intellectual Property**

#### **10.1 Ownership**

- 10.1.1 Intellectual Property created in relation to New Contract Material will be owned by the Contractor upon their creation.

- 10.1.2 The Contractor irrevocably grants to the Principal an exclusive royalty free transferable licence to use the Intellectual Property in the New Contract Material for so long as the Principal may require.
- 10.1.3 The Parties acknowledge and agree that the Parties or, where applicable, particular third parties, are the sole owners of their Intellectual Property rights in or in relation to the Existing Contract Material.
- 10.1.4 The Contractor must ensure all licence fees and/or consents required under law are paid and/or obtained as a result of any reproduction, adaptation or use of any Intellectual Property or Contract Material necessary for the provision of the Deliverables.
- 10.1.5 Upon completion of the Agreement, or at such other time as the Agreement or the Principal may require, the Contractor must fully and promptly disclose to the Principal all New Contract Material created or developed under or in connection with this Agreement.

## **11 Specific Obligations of Contractor**

### **11.1 Licences and Approvals**

- 11.1.1 The Contractor must obtain at its own cost all licences, approvals and consents necessary to perform this Agreement.

### **11.2 Compliance with Laws and Standards**

- 11.2.1 The Contractor must, in carrying out this Agreement, comply with:
- (a) all applicable Statutory Requirements;
  - (b) the NSW Government codes, policies, guidelines and Standards listed in item 3 of Schedule 1 or any other codes, policies, guidelines and Standards specified in writing by the Principal to the Contractor, as revised, amended, supplemented, altered or reissued from time to time; and
  - (c) any particular Standard which has been agreed between the Contractor and the Principal, and that Standard is revised, the Contractor must submit evidence of compliance with the revised Standard within a reasonable period of time.
  - (d) the obligations imposed on the Principal by the Privacy and Personal Information Protection Act 1998 (NSW) in relation to Personal Information that is disclosed to, or acquired by, or in possession of the Contractor in accordance, or in connection, with the Contract. The Contractor must, and must ensure that its officers, employees, agents and sub-contractors, comply with the obligations imposed on the Principal by the Privacy and Personal Information Protection Act as though the Contractor were, as far as reasonably practicable, the Principal in relation to any such Personal Information. The Contractor will comply with any request of the Principal in relation to Personal Information and will not do anything that would cause the Principal to be in breach of its obligations under the Privacy and Personal Information Protection Act.

### **11.3 Minimum Insurance Requirements**

- 11.3.1 The Contractor must hold and maintain, and must ensure that all subcontractors who is not taken to be a worker employed by the Contractor in accordance with the Workplace Injury Management and Workers Compensation Act 1998, are beneficiaries under or otherwise hold and maintain, the following insurances for the Term, or for such other period as may be specifically required by this Agreement for the particular policy:
- (a) a broad form liability policy of insurance which includes public liability insurance for at least the amount specified in item 5 of Schedule 1 in respect of each claim; and



- (b) products liability insurance for at least the amount specified in item 5) of Schedule 1 for the total aggregate liability for all claims arising out of the Contractor's products for the period of cover; and
  - (c) workers' compensation insurance in accordance with applicable legislation for all the Contractor's employees; and
  - (d) such other insurances as are specified in Schedule 1 item 75 of the Agreement Details.
- 11.3.2 Sole trader Contractors and sub-Contractors must hold Death and Personal Injury Insurance if they are not required by law to hold Workers' Compensation Insurance.
- 11.3.3 All policies of insurance must be effected with an insurer rated A – or better by AM Best or an equivalent rating organisation.
- 11.3.4 The Contractor must ensure that each policy is in effect for the Term of this Agreement or such other period as required by the Principal.
- 11.3.5 The Contractor shall, and shall ensure sub-contractors, as soon as practicable, inform the Principal in writing of the occurrence of an event that may give rise to a claim under a policy of insurance effected as required by the Agreement and shall ensure that the Principal is kept fully informed of subsequent action and developments concerning the claim.
- 11.3.6 The Contractor must, when requested in writing by the Principal, arrange for its insurer to complete a "Certificate of Currency of Insurance Obtained".
- 11.3.7 Where the Contractor is insured under its parent company's insurance policy, the parent company's insurance policy must clearly indicate that it applies and extends coverage to the Contractor.
- 11.3.8 The effecting of insurance shall not limit the liabilities or obligations of the Contractor under other provisions of this Agreement.

#### **11.4 General Indemnity**

- 11.4.1 The Contractor will be liable in respect of, and indemnifies, and shall keep indemnified, the Principal and their officers, employees and agents against any claim, loss or expense (including a claim, loss or expense arising out of personal injury or death or damage to property) which any of them pays, suffers, incurs or is liable for (including legal costs on a solicitor and client basis) (together "the loss") as a result of any unlawful, negligent, reckless or deliberately wrongful act or omission of the Contractor (or its employees, agents or subcontractors or their employees) in the performance of this Agreement.
- 11.4.2 The Contractor's liability in respect of, and indemnity given in, clause 11.4.1 shall be reduced proportionally to the extent that any unlawful, negligent, or deliberately wrongful act or omission of the Principal, its officers, employees or agents caused or contributed to the loss.

#### **11.5 Contractor's Warranties for the Deliverables**

- 11.5.1 In relation to the Deliverables, the Contractor warrants that:
  - (a) at the time title to a Deliverable passes to the Principal, the Deliverable will be free from any charge or liability;
  - (b) during the Warranty Period, each Deliverable:
    - (i) shall be new and shall conform with the Statement of Requirements;
    - (ii) shall conform to the description, and sample (if any) approved by the Principal in Schedules 2 (except that if a sample is inconsistent with the Statement of Requirements, the latter must prevail);
    - (iii) shall be free from defects; and

- (c) it will provide the associated services in accordance with the requirements of Schedule 2 and with due care and skill.

## **11.6 Contractor's Warranties (General)**

The Contractor warrants:

- (a) that the Deliverables do not infringe the Intellectual Property rights of a third party; and
- (b) the Deliverables shall conform to any legally applicable Australian Standards;
- (c) it has capacity to enter into this Agreement and perform the obligations imposed on the Contractor; and
- (d) the Contractor has not entered into any arrangement, whether a trust arrangement or otherwise, that impedes or is likely to impede the performance of this Agreement by the Contractor.

## **11.7 Warranty Period**

- 11.7.1 The Contractor shall rectify any error or defect in a warranted Deliverable that has been notified to it by the Principal during the Warranty Period in Schedule 2 at the Contractor's sole cost and expense.
- 11.7.2 If the Contractor fails to rectify an error or defect in a Deliverable within 30 days after notification by the Principal, the Principal may arrange for performance of the necessary remedial work by a third party at the Contractor's expense.

## **11.8 Third Party Warranties**

- 11.8.1 Where the Contractor supplies Deliverables that have been procured from third parties, the Contractor agrees to assign to the Principal, to the extent permitted by law, the benefits of any warranties given by the third parties.
- 11.8.2 The parties agree that the assignment of any third party warranties is in addition to the warranties offered directly by the Contractor under this Agreement and does not relieve the Contractor from the obligation to comply with the Contractor's own warranties.

## **11.9 Mistakes in Information**

- 11.9.1 The Contractor must pay for any additional costs incurred by the Principal by errors or omissions in material or other Information supplied by it, even though that material or Information may have been approved by the Principal.

## **11.10 Notification of Change in Control or Transfer of Ownership**

- 11.10.1 During the Term, the Contractor must immediately notify the Principal under this Agreement in writing of any Change in Control or other action to reconstruct or amalgamate itself.

## **11.11 Notification of Contractor's Insolvency**

- 11.11.1 The Contractor must immediately notify the Principal in writing of the Contractor's Insolvency and disclose the details of any:
  - (a) Action taken in relation to the Contractor's Insolvency in so far as it affects this Agreement;
  - (b) Existing orders which the Contractor has entered into under this Agreement.

## **12 Performance Management**

### **12.1 Service Levels**

- 12.1.1 The Contractor must meet the specified Service Levels in Part E during the Term of this Agreement. Performance against the Service Levels must be tracked by the

Contractor and reported to the Principal's Delegate in accordance with the frequencies and formats in Part E.

12.1.2 Where the Contractor does not meet the Service Levels in Part E, the Principal may, at its discretion, take one or more of the following actions in relation to the Contractor:

- (a) refuse to agree to all or a portion of the price variation requested by the Contractor under clause 5.3.1,
- (b) temporarily suspend the use of all or parts of this Agreement by the Principal, for a period not exceeding 12 months; and
- (c) require the Contractor to undertake more frequent performance reporting in addition to those specified in Part E, to ensure performance is improved;

until such time as the Contractor has demonstrated its ability to meet the Service Levels in accordance with Part E.

12.1.3 The remedies in clause 12.1.2 are in addition to any other provisions available to the Principal to deal with the inability of the Contractor to meet its Service Level obligations under this Agreement and at law.

12.1.4 The measurements and tolerances in the Service Levels specified in Part E may be amended, added to, or deleted by the Principal and the Contractor in writing during the Term of this Agreement.

## **12.2 Principal's Delegate**

12.2.1 The Principal has nominated the Principal's Delegate in Schedule 1 item 6 to oversee the performance of this Agreement. The Principal may, by notice in writing to the Contractor, nominate a replacement Principal's Delegate.

## **12.3 Contractor's Relationship Manager**

12.3.1 For the purpose of ensuring an efficient relationship with the Principal the Contractor has appointed the Relationship Manager indicated in Schedule 1 item 4. The Relationship Manager must:

- (a) act as the representative of the Contractor and have the legal power to bind the Contractor in all matters pertaining to this Agreement;
- (b) serve as the principal point of contact for the Contractor with respect to the overall administration of the Agreement;
- (c) have the authority to implement such actions (including issuing of directives through the Contractor's organisation), as may be required for the Contractor to comply with this Agreement;
- (d) meet with the Principal's Delegate at least once each month to provide information regarding the Contractor's performance under this Agreement, with particular reference to the Service Levels in clause 12.1.1; and
- (e) answer the Principal's queries and work with the Principal to address issues relating to matters deemed urgent by the Principal arising out of this Agreement.

12.3.2 The Relationship Manager must be available at all times during business hours and at all other times on reasonable notice by the Principal's Delegate to meet with the Principal's Delegate to discuss any queries, concerns or issues arising in connection with this Agreement.

12.3.3 The Relationship Manager must be supported by the Key Personnel in Schedule 1 item 4 in respect of the Principal. The Relationship Manager and/or the Key Personnel named in Schedule 1 item 4 must be available to attend periodic meetings as required by the Principal or the Principal's Delegate.

## **12.4 Exchange of Information Between Government Agencies**

- 12.4.1 The Contractor authorises the Principal and its employees and agents to make available to NSW Government departments or agencies Information concerning the Contractor, including any Information provided by the Contractor to the Principal and any Information relating to the Contractor's performance under the Agreement, or the Contractor's financial position.
- 12.4.2 The Contractor acknowledges that Information about the Contractor from any source including any substantiated reports of unsatisfactory performance, may be taken into account by NSW Government agencies in considering whether or not to offer the Contractor future opportunities for NSW Government work.
- 12.4.3 The Principal regards the provision of Information about the Contractor to any New South Wales Government department or agency as privileged within section 30 of the *Defamation Act 2005* (NSW).
- 12.4.4 The Contractor releases and indemnifies the Principal and the State of New South Wales from any claim in respect of any matter arising out of the provision of Information. Without limiting the above, the Contractor releases the Principal and the State of New South Wales from any claim it may have for any loss to the Contractor arising out of the provision of Information relating to the use of such Information by the recipient of the Information.

## **13 Personnel**

### **13.1 The Contractor's Personnel**

- 13.1.1 The Contractor warrants that all Personnel engaged in the provision of the Deliverables are appropriately qualified, competent and experienced including the Contractor's Relationship Manager and the Key Personnel nominated in Schedule 1 item 4.
- 13.1.2 The Contractor must:
- (a) employ only such persons as are careful, skilled and experienced in the provision of the Deliverables or similar Deliverables; and
  - (b) (where applicable) hold, or ensure appropriate personnel hold, all necessary licences, permits and authorities.
- 13.1.3 The Principal may object to and direct the Contractor to remove any of its Personnel (including the Relationship Manager and Key Personnel) who in its opinion are incompetent, unsuitable, or who has been guilty of neglect, or other improper behaviour. Such named personnel so removed may not be re-employed by the Contractor under this Agreement.
- 13.1.4 Any replacement Key Personnel provided by the Contractor must be approved by the Principal.

## **14 Conduct and Dispute Management**

### **14.1 Co-operation**

- 14.1.1 The Parties must do all they reasonably can to co-operate in matters relating to this Agreement, but their rights and responsibilities under this Agreement remain unchanged unless the Parties agree in writing to vary them.

### **14.2 Duty not to Hinder Performance**

- 14.2.1 Each Party must do all it reasonably can to avoid hindering the performance of the other under this Agreement.

### **14.3 General**

14.3.1 In order to resolve any conflicts or issues between the Parties promptly and to the satisfaction of the Parties, the issue resolution process stated below is to be followed:

- (a) Amicable Resolution (clause 14.4.);
- (b) Expert Determination (clause 14.5)

### **14.4 Amicable Resolution**

14.4.1 Either Party may give notice to the other Party of an issue, including a dispute or difference, ("the Issue Notice") about the meaning or effect of this Agreement, or about any matter arising under or out of this Agreement. The Issue Notice must be given within a reasonable time of the Party becoming aware of the issue.

14.4.2 The Party submitting the Issue Notice must submit it to the other Party's authorised representative, which in the case of the Principal is the Principal's Delegate, and in the case of the Contractor is the Relationship Manager.

14.4.3 The Parties must follow the issue resolution process in this clause before either commences proceedings or takes similar action except to seek an urgent injunction or declaration.

14.4.4 If a Party gives an Issue Notice under this clause, each Party will nominate in writing a senior executive who will promptly confer to resolve the issue.

14.4.5 A Party is not entitled to refer an issue to Expert Determination until 21 days after the giving of the Issue Notice to the person or persons specified.

14.4.6 A Party may only refer an issue to Expert Determination by giving notice in writing specifying the issue to be decided ("the Referral Notice").

14.4.7 If the Party giving the Referral Notice is the Contractor it must give the Referral Notice to the Principal and the Board.

14.4.8 If the Party giving the Referral Notice is the Principal, it must give the Referral Notice to the Contractor.

14.4.9 If a Referral Notice has not been given to the person or persons specified within 28 days, then the issue is barred from Expert Determination or any other action or proceedings (including court proceedings).

### **14.5 Expert Determination**

14.5.1 If a Referral Notice is given under clause 14.4, the expert is to be agreed between the Principal and the Contractor. If they cannot agree within 28 days of the Referral Notice, the expert is to be nominated by the Chief Executive Officer, Australian Commercial Disputes Centre, Sydney.

14.5.2 The expert nominated must be a lawyer unless otherwise agreed. The expert must not be:

- (a) an employee of the parties;
- (b) a person who has been connected with the Agreement; or
- (c) a person who the Parties have been unable to agree on.

14.5.3 When the person to be the expert has been agreed or nominated, the Principal, on behalf of both Parties, must engage the expert by letter of engagement (and provide a copy to the Contractor) setting out:

- (a) the issue referred to the expert for determination;
- (b) the expert's fees;
- (c) the procedure for determination set out in Schedule 5;
- (d) any other matter which is relevant to the engagement.

- 14.5.4 The Parties must share equally the fees and out-of-pocket expenses of the expert for the determination, and bear their own expenses.
- 14.5.5 If the expert determines that one Party must pay the other an amount exceeding the amount shown in Schedule 1 item 7 (calculating the amount without including interest on it, and after allowing for set offs), then either Party may commence litigation, but only within 56 days after receiving the determination.
- 14.5.6 Unless a party has a right to commence litigation under clause 14.5.5:
- (a) the Parties must treat each determination of the expert as final and binding and give effect to it; and
  - (b) if the expert determines that one Party owes the other money, that Party must pay the money within 28 days.

## **15 Termination by the Principal**

### **15.1 Termination for Cause**

- 15.1.1 Without prejudice to its rights at common law, the Principal may immediately terminate this Agreement, in whole or in part, by written notice to the Contractor ("Notice of Termination for Cause"):
- (a) where the Contractor makes any statement, fact, information, representation or provides material in the Tender which is false, untrue, or incorrect in a way which materially affects the Agreement;
  - (b) where proceedings or investigations are commenced or threatened by the Independent Commission Against Corruption or similar public body against the Contractor including for corrupt conduct or for collusive pricing;
  - (c) where the Contractor commits a Substantial Breach of the Agreement that is not capable of remedy;
  - (d) Poor Performance;
  - (e) where the Contractor commits a Substantial Breach of the Agreement in a manner that is capable of remedy and does not remedy the breach within 7 days of receiving a notice from the Principal requiring it to do so ("Notice of Breach"), or such further time, having regard to the nature of the breach and a reasonable time to remedy it, as the Principal may reasonably allow;
  - (f) where the Contractor assigns its rights and/or obligations, or novates this Agreement or subcontracts Agreement except in accordance with this Agreement;
  - (g) in the case of the Contractor's Insolvency;
  - (h) if in the Principal's view a conflict of interest exists for the Contractor which prevents the proper performance of this Agreement.

### **15.2 Effect of Termination for Cause**

- 15.2.1 If the Principal terminates this Agreement for cause the Principal may:
- (a) contract with any other person to complete the provision of the Deliverables including but not limited to any order remaining to be filled;
  - (b) deduct loss or damages arising from or in connection with the termination, including any loss or damages incurred by the Principal Contract from any money due, or which may become due to the Contractor from the Financial Security (if any); and
  - (c) recover from the Contractor in an appropriate court the balance of any monies remaining unpaid as a debt due and payable by the Contractor to the Principal.

### 15.3 Termination for the Principal's Convenience

- 15.3.1 The Principal may terminate this Agreement in whole or in part for its convenience by giving 14 days written notice ("Notice of Termination for Convenience") with effect from the date stated in the notice and without the need to provide reasons.

### 15.4 Effect of Termination for Convenience

- 15.4.1 The Principal's termination under clause 15.3 will not affect any outstanding Customer Contracts under this Agreement unless the context requires it.
- 15.4.2 The Principal shall reimburse the Contractor its unavoidable costs directly incurred as a result of termination under clause 15.3 provided that any claim by the Contractor:
- (a) must be supported by written evidence of the costs claimed;
  - (b) will be in total satisfaction of the liability of the Principal to the Contractor in respect of this Agreement and its termination.
- 15.4.3 The Principal shall not in any circumstances be liable for any Consequential Loss or loss of profits suffered by the Contractor as a result of the termination of this Agreement by the Principal under clause 15.3.

## 16 General

### 16.1 No Assignment or Novation

- 16.1.1 The Contractor must not assign or novate this Agreement without first obtaining the prior written consent of the Principal as applicable, which consent may be withheld in the Principal's absolute discretion.
- 16.1.2 The Contractor acknowledges that the Principal may make financial checks and due diligence checks on the entity proposing to take over this Agreement before determining whether or not to give consent to the assignment or novation.

### 16.2 Conflicts of Interest

- 16.2.1 The Contractor promises that, to the best of its knowledge, no conflict of interest of the Contractor, its employees, agents or sub-contractors exists or is likely to arise in the performance of its obligations under the Agreement.
- 16.2.2 The Contractor must:
- (a) notify in writing, and consult with, the Principal immediately upon becoming aware of the existence, or possibility, of a conflict of interest; and
  - (b) comply with any direction given by the Principal in relation to those circumstances designed to manage that conflict of interest.
- 16.2.3 For the purposes of this clause, a "conflict of interest" includes engaging in any activity, or obtaining any interest, likely to conflict with the performance by the Contractor of, or to restrict the Contractor in performing, its obligations under the Agreement.
- 16.2.4 The principal will introduce Contractors to its clients for the purposes of completing works under the Contract. **Contractors shall not solicit for direct engagement from any of the Principal's clients.**
- 16.2.5 Contractors who solicit and as a result accept engagement directly from the principal's client may be in breach. The Principal may, in writing, specify the breach and ask the Contractor to give reasons why the Principal should not take further action.
- 16.2.6 If the Contractor either fails to give a written response within 7 days of receiving the Principal's notice, or fails to give reasons satisfactory to the Principal, then the Principal may immediately terminate the Contract by notice in writing to the Contractor, in which case the respective rights and liabilities of the parties shall be

the same as they would be at common law if the Contractor had wrongfully repudiated the Contract

### **16.3 Records and Access to Records**

16.3.1 The Contractor must keep proper accounts and records in accordance with the accounting principles generally applied in commercial practice.

16.3.2 During the Term, the Contractor must, within a reasonable time of a request from the Principal, give the Principal access to, and copies of, any material relevant to the performance of the Contractor's obligations under this Agreement, and any financial information, that the Principal reasonably requires.

### **16.4 Waiver**

16.4.1 A waiver in respect of a breach of a term of this Agreement by the other Party shall not be taken to be a waiver in respect of any other breach. The failure of either Party to enforce a term of this Agreement will not be interpreted as a waiver of that term.

### **16.5 Severability**

16.5.1 If any part of this Agreement is void or voidable, then that part is severed from this Agreement but without affecting the continued operation of the remainder of the Agreement.

### **16.6 Notices**

16.6.1 Notices must be sent to the other Party at the address shown in Schedule 1 items 10 and 11, or the address last notified to the other Party in writing, or in the case of the Contractor, at the Contractor's registered office.

16.6.2 All notices must be in writing and signed by the relevant Party and must be given either by hand delivery, post or facsimile transmission.

16.6.3 If delivery or receipt of a notice is not made on a business day, then it will be taken to be made on the next business day.

### **16.7 Counterparts**

16.7.1 If there are a number of counterparts of this Agreement, the counterparts taken together constitute one and the same instrument.

### **16.8 Applicable Law**

16.8.1 This Agreement is governed by the laws of the State of New South Wales and the Parties submit to the non-exclusive jurisdiction of the courts of the State of New South Wales and the Commonwealth of Australia.

### **16.9 No agency/no employment/no partnership**

16.9.1 The Contractor agrees that the Contractor will not be taken to be, nor will it represent that it is, the employee, partner, officer and/or agent of the Principal.

### **16.10 Disengagement Period**

16.10.1 For 6 months following the expiry or termination of this Agreement (or part thereof) the Contractor will provide such assistance as is reasonably requested by the Principal for the supply of the Deliverables to continue without interruption to facilitate an orderly, prompt and efficient transition to an alternative service provider to the Principal. Such assistance includes (without limitation):

- (a) providing reasonable co-operation with a third party supplier nominated by the Principal, and
- (b) providing the Principal's data, information and materials that may be required to enable transacting with a new provider as requested by the Principal.

### **16.11 Pricing Information**

The Contractor agrees that, subject to clause 9 (Confidentiality), product pricing information (including discounts, commissions and rebates as appropriate) may be



disclosed to any person by the Board at its sole discretion in the form of a User Guide or in any medium of communication it deems appropriate.

### Executed as a Deed

**SIGNED, SEALED AND DELIVERED** )  
 )  
 by [***name and position of person signing***] ) \_\_\_\_\_  
 for and on behalf of the Principal )  
 for and on behalf of the Crown in right of )  
 the State of New South Wales but not so )  
 as to incur any personal liability in the )  
 presence of: )  
 \_\_\_\_\_  
 [insert name of Witness] ) (signature of Witness)

**SIGNED, SEALED AND DELIVERED** )  
 )  
 by \_\_\_\_\_ )  
 [insert name of Contractor] ) (signature of Contractor)  
 )  
 in the presence of \_\_\_\_\_ )  
 [insert name of Witness] ) (signature of Witness)

## Schedule 1 Agreement Details

Item 1	<b>Contractor's Name</b>
Item 2	<b>Term:</b> (clause 2.1.1) <b>Contract Term:</b> Two years commencing on 1/1/09 <b>Period of extended term</b> Three further periods each of up to one year in duration (clause 2.2.1)
Item 3	<b>Codes and Standards</b> <ol style="list-style-type: none"> <li>1. Code of Practice for Procurement</li> <li>2. Implementation Guidelines NSW Government Procurement 1999</li> <li>3. Environmental Management Systems Guidelines</li> <li>4. Occupational Health and Safety Management Systems Guidelines</li> <li>5. Code of Behaviour (for the protection of children and other vulnerable people)</li> </ol>
Item 4	<b>Contractor Key Personnel</b>  <b>Relationship Manager</b>  <b>Name:</b>  <b>Address:</b>  <b>Position:</b>  <b>Telephone:</b> <b>Facsimile</b>
Item 5	<b>Insurances</b> a) Public and Product Liability Insurance Limit of Indemnity: \$AU\$20,000,000 for any single occurrence.  b) "Dial Before You Dig" An additional insurance excess of \$200,000, payable by the contractor applies to damage to underground existing services where the contractor cannot show it has used "Dial Before You Dig" information services.
Item 6	<b>Principal's Delegate</b>  <b>Name:</b> NSW Department of Commerce, Heritage and Building Services (HABS).  <b>Address:</b>  <b>Position:</b>  <b>Telephone:</b> <b>Facsimile:</b>
Item 7	<b>Expert Determination Amount:</b>  <b>AUD:\$100,000</b>

<b>Item 8</b>	<b>Notices to:)</b>  <b>The Contractor's contact name and address:</b>  <b>Name:</b>  <b>Address:</b>  <b>Position:</b>  <b>Telephone:</b> <b>Facsimile:</b>
<b>Item 9</b>	<b>The Principal's contact name and address:</b>  <b>Name:</b>  <b>Address:</b>  <b>Telephone:</b> <b>Facsimile:</b>

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## **Schedule 2      Statement of Requirements**

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## **Schedule 3            Pricing, Price Variation Mechanism, and List of Products**

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Pricing and List of Products

Price Variation Mechanism

Contract prices are firm for the first twelve (12) months of the Contract. Thereafter, Contract rates shall be subject to annual adjustment of 3% on the anniversary of this Agreement.

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## **Schedule 4      List of Approved Sub-Contractors**

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## **Schedule 5                      Expert Determination Procedure**

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### **1.                      Questions to be determined by the Expert**

- 1.1        The expert must determine for each issue the following questions (to the extent that they are applicable to the issue):
  - 1.1.1        Is there an event, act or omission which gives the claimant a right to compensation:  
under the Agreement:
    - (a)            for damages for breach of the Agreement, or
    - (b)            otherwise in law?
  - 1.1.2        If so:  
what is the event, act or omission?
    - (a)            on what date did the event, act or omission occur?
    - (b)            what is the legal right which gives rise to the liability to compensation?
    - (c)            is that right extinguished, barred or reduced by any provision of the Agreement, estoppel, waiver, accord and satisfaction, set-off, cross-claim, or other legal right?
  - 1.1.3        In the light of the answers to clauses 1.1.1 and 1.1.2 of this Expert Determination Procedure:
    - (a)            What compensation, if any, is due from one Party to the other and when did it fall due?
    - (b)            What interest, if any, is due when the expert determines that compensation?
- 1.2        The expert must determine for each issue any other questions required by the parties, having regard to the nature of the issue.

### **2.                      Submissions**

- 2.1        The procedure for submissions to the expert is as follows:
- 2.2        The Party to the Agreement which has referred the issue to Expert Determination must make a submission in respect of the issue, within 15 business days after the date of the letter of engagement referred to in clause 15.5.3 of the Agreement.
- 2.3        The other party must respond within 15 business days after receiving a copy of that submission. That response may include cross-claims.
- 2.4        The Party referred to in clause 2.2 may reply to the response, but must do so within 10 business days after receiving the response, and must not raise new matters.
- 2.5        The other Party may comment on the reply, but must do so within 10 business days after receiving the reply, and must not raise new matters.
- 2.6        The expert must ignore any submission, response, reply, or comment not made within the time given in clauses 2.2 to 2.5 of this Expert Determination Procedure, unless the Principal and the Contractor agree otherwise.
- 2.7        The expert may request further information from either Party. The request must be in writing, with a time limit for the response. The expert must send a copy of the response to the other Party, and give the other Party a reasonable opportunity to comment on the response.

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- 2.8 All submissions, responses, replies, requests and comments must be in writing. If a Party to the Agreement gives information to the expert, it must at the same time give a copy to the other Party.

**3. Conference**

- 3.1 The expert may request a conference with both Parties to the Agreement. The request must be in writing, setting out the matters to be discussed.
- 3.2 The Parties agree that such a conference is considered not to be a hearing which would give anything under this Expert Determination Procedure the character of an arbitration.

**4. Role of Expert**

- 4.1 The Expert:
- 4.1.1 acts as an expert and not as an arbitrator;
  - 4.1.2 must make its determination on the basis of the submissions of the Parties, including documents and witness statements, and the expert's own expertise; and
  - 4.1.3 must issue a certificate in a form the expert considers appropriate, stating the expert's determination and giving reasons, within 12 weeks after the date of the letter of engagement referred to in clause 15.5.3 of the Agreement.
  - 4.1.4 If a certificate issued by the expert contains a clerical mistake, an error arising from an accidental slip or omission, a material miscalculation of figures, a mistake in the description of any person, matter or thing, or a defect of form, then the expert must correct the certificate.



**0801654 REMOVAL OF BUILDERS AND TRADE WASTE**

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## **1. Trade Qualifications**

All work shall be carried out by persons or tradespersons fully qualified and trained for the particular trade work or service required.

Apprentices, trade assistance and labourers are to be under the supervision of a qualified tradesperson, where appropriate.

## **2 Occupational Health and Safety**

2.1 The Contractor must comply with the following OH&S requirements in the performance of any contract awarded:

- (a) The *Occupational Health and Safety Act 2000* (NSW) and any regulation made under this Act, including the OHS Regulation 2001,
- (b) Codes of Practice, approved and issued pursuant to the above Act and or Regulations made under the Act, and
- (c) the NSW Government *Occupational Health and Safety Management Systems Guidelines 4<sup>th</sup> Edition* (OHSM Guidelines), and

2.2 The Contractor must ensure that the Contractor's Sub-Contractors comply with the OH&S requirements listed in clause 2.1 in the performance of any contract awarded.

## **3 Contract and Statutory Requirements**

### **3.1 Appointment as Principal Contractor**

Unless instructed otherwise at time of order, the Contractor, having responsibility for the construction work at all times until the work is completed on a site, is appointed principal contractor and controller of the premises for the construction work under Clause 210 of the *Occupational Health and Safety Regulation 2001* (NSW), and is authorised to exercise such authority of the owner as is necessary to enable it to discharge the responsibilities of principal contractor and controller of premises imposed by the *Occupational Health and Safety Act 2000* (NSW) and Chapter 8 of the *Occupational Health and Safety Regulation 2001* (NSW).

### **3.2 Site-specific Safety Management Plan**

Develop and implement a Site-specific Safety Management Plan for the contract that complies with the *OHSM Guidelines*.

Submit the Site-specific Safety Management Plan for the contract when requested by the Principal. The Contractor will not be allocated any work by the Principal until a complying Site-specific Safety Management Plan has been submitted.

Failure to obtain the Principal's approval to the Site-specific Safety Management Plan and Safe Work Method Statements within three (3) months of commencement of the contract will result in termination of the contract.

When requested by the Principal, submit a Site-specific Safety Management Plan for a specific site no later than 7 days before work commences. Do not start work before a complying Site-specific Safety Management Plan has been submitted.

### **3.3 Safe Work Method Statements**

Prepare and implement Safe Work Method Statements that comply with the *OHSM Guidelines* for all work activities under the contract.

Prepare Safe Work Method Statements for works at each site and submit to the Principal prior to commencing work. Work on site is not to proceed without authorisation by the Principal.

### 3.4 Site Safety Rules

Develop site safety rules that are equal to or better than the following minimum set of site safety rules, include them in the Site-specific Safety Management Plans and ensure implementation.

Site safety rules must make it a condition of entry to the applicable work site that all employees and visitors comply with their provisions, including:

- **Construction OHS Induction.** All persons must display evidence of completing OHS Induction training prior to being inducted to commence work on the Site.
- **Site Induction.** All persons working on the Site must attend a Site Induction prior to entering it. Visitors may enter a work site if, either, they first attend a Site Induction, or if they are accompanied by a person who has attended a Site Induction. All persons each day must sign in and out on the Site Register.
- **Safe Work Method Statements.** Safe Work Method Statements must be prepared and used for all work activities assessed as having a safety risk.
- **Toolbox Talks.** Weekly or more regular discussions must be held with workers to consult on site safety matters.
- **Safety Helmets, Safety Footwear and Safety Vests.** Safety helmets and steel-capped safety footwear must be worn by all supervisors, employees, and visitors in the construction area at all times. The footwear must comply with AS 2210. Safety vests must be worn when moving plant is present or work is undertaken near traffic.
- **Personal Protective Equipment (PPE).** PPE, such as safety eye protection, hearing protection, safety gloves and masks and the like, must be worn when welding, drilling and with all other tasks with similar risks.
- **Accidents and Incidents.** Accidents, incidents and injuries must be reported immediately to the Contractor's and applicable subcontractor's site representative in charge.
- **Alcohol and Drugs.** The consumption of, or being under the influence of, alcohol and illegal drugs on the Site is prohibited.
- **Amenities.** Access to clean toilets and meal facilities, cool, clean drinking water, and the other requirements of the WorkCover [Code of practice: Amenities for construction work](#) must be provided for all persons.
- **Electrical.** All electrical work and electrical plant must comply with the WorkCover [Code of practice: Electrical practices for construction work](#).
- **Emergency evacuation.** Arrangements must be included in the Site Induction and clearly identified.
- **Excavations.** Barricading and signage for all excavations must be provided, with excavations 1.5 metres or more deep also to be benched, battered or shored. See the WorkCover [Code of practice: Excavation](#).
- **Fire Prevention.** Fire prevention must be used by all persons on the Site. An appropriate fire extinguisher must be on hand for all welding sets and oxy acetylene work.
- **First Aid.** All persons requiring first aid treatment must contact the first aid officer who will administer the treatment and record the injury in the WorkCover Register of Injuries, including the person's name and the nature of the injury.
- **Hazardous Substances.** Chemicals and hazardous substances must be used and stored in compliance with up to date Material Safety Data Sheets (MSDS) and details recorded in the Register of Hazardous Substances.

- **Housekeeping.** Work areas must be kept clean and tidy, with rubbish and other safety hazards cleaned up promptly. All protruding nails must be removed immediately from timber.
- **Leads and Power Tools.** All leads, power tools and electrical equipment must be inspected and tagged by a qualified person prior to their use and then at monthly intervals. See the WorkCover [Code of practice: Electrical practices for construction work](#).
- **Mobile Plant.** Every owner of plant must ensure plant is registered with WorkCover when required and operators are appropriately qualified. Plant must be fitted with working hazard lights/reversing lights and beepers. See the WorkCover [Code of Practice for Moving Plant on Construction Sites](#).
- **Overhead Power Lines.** The requirements of the WorkCover [Code of Practice – Work near Overhead Power Lines](#) must be complied with.
- **Site Security and Public Access.** Security measures, including perimeter fencing, must be used to prevent unauthorised access to construction areas and ensure safe access and passage for all those on and adjacent to the Site. Security must comply with Clause 235 of the OHS Regulation 2001 and the WorkCover [Position paper: The requirements for fencing](#).
- **Underground Services.** Prior to any underground work being carried out, services must be located using Dial Before You Dig, a services locator, potholing and the other precautions identified in the WorkCover [Work Near Underground Assets Guideline](#).
- **Working at Height.** Working at heights must be in accordance with WorkCover requirements, including certification of formwork and scaffolding. See the WorkCover [Guide to Safe Working at Heights](#).

### 3.5 OHS Management Monthly Report

The Principal may request the Contractor to provide an OHS Management Monthly Report, detailing *Inspection, testing and servicing activities, Internal reviews and Incident management and corrective action*, and including the information listed below, as evidence of the implementation of the Site-specific Safety Management Plan during the previous month. Such reports are to be provided no later than the seventh (7<sup>th</sup>) day of each month,

#### Contract Details

- Contract
- Contractor
- Contractor's representative
- Signature and Date
- Period Covered

#### Implementation of **Risk management** (OHSM Guidelines Section 5, element 1)

Summary of OHS inspections and reviews carried out to identify risks and hazards and ensure risk management controls are being implemented for:

- plant and equipment
- incoming products
- work site conditions
- adherence to and completeness of Risk Assessments, Safe Work Method Statements and Site Safety Rules
- work site access and exits
- personal protective equipment

#### Implementation of **OHS training** (OHSM Guidelines Section 5, element 3)

An up to date copy of the Induction Register and details of OHS training carried out.

#### Implementation of **Incident management** (OHSM Guidelines Section 5, element 4)

Details of:

- any OHS incidents or OHS issues, including non-compliance with OHS procedures and near misses
- implementation of incident management
- implementation of corrective action
- OHS statistics for entire the Contract including:

**This Month****Total Cumulative**

Number of Lost Time Injuries

*Number of Hours Worked*

*Number of Hours Lost Due to Injury*

*Lost Time Injury Frequency Rate LTIFR*

*Number of OHS Management Audits*

*Number of OHS Inspections*

**Implementation of *Safe Work Method Statements* (OHSM Guidelines Section 5, element 6)**

An up to date copy of the register of Safe Work Method Statements, including confirmation that the principal contractor has ensured that all Safe Work Method Statements comply with the *OHS Regulation 2001* and that their implementation is being monitored.

**3.6 Incident Reports**

Ensure compliance with the notification and other requirements of *OHS Regulation 2001* Clauses 341 and 344 for accidents, incidents and non-disturbance occurrences, including immediate notification of WorkCover where required.

Immediately notify the Principal of any accident or incident defined in *OHS Regulation 2001* Clauses 341 and 344.

Provide a written report to the Principal within twenty-four hours of the incident, giving details of the incident and evidence that notification requirements have been met.

When requested, provide an incident investigation report, including identification of the cause of the incident and corrective actions taken, in the form directed.

**3.7 Prohibition and Improvement Notices and On-The-Spot Fines**

Immediately notify the Principal of any Prohibition and Improvement Notice (PIN) or on-the-spot fine issued by WorkCover. Provide the Principal with a copy of the PIN or fine notice and written details of the corrective action taken by the Contractor and/or the applicable subcontractor to rectify the breach and to prevent recurrence.

**3.8 Electrical work on electrical installations**

In compliance with section 207 of the *OHS Regulation 2001*, ensure that electrical work on an electrical installation is not carried out while the circuits and apparatus of the part of the installation that is being worked on are energised, unless it is necessary to do so in the interests of safety and the risk of harm would be greater if the circuits and apparatus were de-energised before work commenced.

### 3.9 Independent Certification of Formwork

In this clause, the terms “qualified engineer” and “formwork” have the meanings given in Clause 209 of the *OHS Regulation 2001*. “Related Entities” means businesses, one of which is owned wholly or in part by the other or that have proprietors, directors, officers, shareholders or employees in common.

Inspection and certification of formwork, if required by Clause 233 of the *OHS Regulation 2001*, must be carried out by a qualified engineer who is not a proprietor, director, officer, or employee either of the entity carrying out the formwork erection or a Related Entity to that entity. In addition, if the Contractor carries out the design of the formwork, then the qualified engineer must not be a proprietor, director, officer or employee either of the Contractor or a Related Entity to the Contractor.

If such inspection and certification are required, the Contractor and any subcontractors involved must include the inspection and certification as actions in Safe Work Method Statements for the erection and use of formwork, and they must be hold points in the Contractor's and subcontractors' Inspection and Test Plans.

Submit formwork certification before commencing the use of the formwork. Do not use the formwork before this certification is submitted.

### 3.10 Failure to Comply

If at any time the Contractor has not carried out its obligations under the Contract in relation to occupational health and safety management, then notwithstanding any other provisions of the Contract, no payment will be due to the Contractor until the 7<sup>th</sup> day after the required action has been carried out.

## 4 Hazardous Substances

### 4.1 Definition

Hazardous Substance means a substance that is listed in the document entitled *List of Designated Hazardous Substances* published by Worksafe Australia; or a substance that fits the criteria for a hazardous substance set out in the document entitled *Approved Criteria for Classifying Hazardous Substances* published by Worksafe Australia.

Asbestos, material containing asbestos, polychlorinated biphenyl (PCB) and lead based paints are recognised as hazardous substances. Other substances in certain situations are also considered hazardous and therefore require controlled handling. Examples are glues, solvents, cleaning agents, paints, and water treatment chemicals.

Work involving stone, rock, concrete, masonry and such materials containing silica, is work under the Contract whether explicitly identified in the Specification or not. The Contractor is responsible for the control of any hazard which may arise from the presence of silica.

### 4.2 Response to Unexpected Discovery

If any hazardous substance not specified in work under the Contract is discovered on the Site the Contractor must suspend all work which may result in exposure to such hazardous substance and notify the Principal's Representative immediately of the type of substance and its location.

With the initial notification, or as soon as practicable thereafter, submit details, including:



- the additional work and additional resources the Contractor estimates to be necessary to deal with the substance so that work and subsequent use of the Works may proceed safely and without risk to health
- the time the Contractor anticipates will be required to deal with the substance and the expected delay in achieving Completion;
- the Contractor's estimate of the cost of the measures necessary to deal with the substance; and
- other details reasonably required by the Principal's Representative

The Contractor must, in planning and carrying out any work dealing with the substance take all reasonable steps:

- to carry out the work concurrently with other work wherever possible; and
- to otherwise minimise effects of the work on the Contractual Completion Date.

#### **4.3 Responsibility For Decontamination**

Control and decontamination of any hazardous substances is the responsibility of:

- the Principal, in respect of any such substances not identified in the Contract Documents, which are discovered on the Site; and
- the Contractor, in respect of any such substances identified in the Contract Documents.

#### **4.4 Decontamination By Principal**

Where the Principal is responsible for the control and decontamination of any hazardous substances, the Principal's Representative may suspend the whole or any part of the Works until the hazardous substances are isolated or removed.

#### **4.5 Decontamination By Contractor**

Where the Contractor is responsible for the control and decontamination of the Site following the discovery of hazardous substances, handle, use, isolate, remove and dispose of such substances in accordance with statutory requirements.

The Environment Protection Authority or Waste Service NSW may advise of suitable disposal sites.

#### **4.6 Working Hours**

When the Contractor is required to decontaminate hazardous substances on occupied Sites, all such decontamination shall be carried out outside normal hours of occupation, unless otherwise approved in writing by the Principal's Representative.

### **5 Asbestos Removal**

#### **5.1 Requirement**

Where the Contractor is responsible for asbestos removal work, comply with the relevant statutory requirements, standards, codes and guidelines, including but not limited to the:

- Occupational Health and Safety Act 2000 (NSW)
- Occupational Health and Safety Regulation 2001 (NSW)
- WorkCover Authority of NSW requirements
- Australian Safety and Compensation Council Code of Practice for the Safe Removal of Asbestos 2<sup>nd</sup> Edition (2005)

- Australian Safety and Compensation Council Code of Practice for the Management and Control of Asbestos in Workplaces (2005)
- Australian Safety and Compensation Council Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2<sup>nd</sup> Edition (2005)
- Environmentally Hazardous Chemicals Act 1985 (NSW)
- Waste Avoidance and Resource Recovery Act 2001 (NSW)

## **5.2 Notification and Permit**

Not less than seven days prior to commencing any asbestos removal work, notify the local office of WorkCover and the Principal of the intention to carry out that work.

Where the regulations require a licence for asbestos removal work, before the work commences, submit a copy of the current licence held by the entity that will undertake the work and a copy of any WorkCover permit required for the work.

## **5.3 Monitoring**

Provide air monitoring by an independent testing authority on each day during asbestos removal and on completion of each area where removal has been undertaken.

## **5.4 Clearance Certificate**

Submit to the Principal a clearance certificate from an independent testing authority at the completion of the asbestos removal work.

## **6. Licences**

Where required under the legislation, all persons performing The Works under this Contract are required to hold a current licence. Details of licences, permits or certificates, as may be required to carry out any portion of the works, are to be clearly shown on the Safe Work method Statement.

## **7. Site and Possession**

The Principal is to give the Contractor possession of the site by the time stated in the Order.

The Principal is to give the Contractor sufficient possession to allow the Contractor to perform the Works but is not required to give the Contractor sole or uninterrupted possession of or access to the site.

The Contractor is to begin work on the site as soon as practicable after being given possession of the site by the Principal

The Contractor is to give the Ordering Officer, agents and contractors reasonable access to the site for any purpose

## **8 Care of people and Property**

From and including the date the site is made available to the Contractor to the date of completion of the Works, the Contractor is responsible for the care of the Works, construction plant and things entrusted to the Contractor by the Principal for the purpose of the works.

The Contractor is to make good at the Contractor's expense any damage which occurs to the Site and Works while the contractor is responsible for their care.

The Contractor is also liable for damage caused by the Contractor during the Defects Liability Period.

The Contractor must indemnify and keep the Principal indemnified against any loss or damage to the property of the Principal (including existing property in, about, or adjacent to the Works) and against any legal liability for injury, death or damage to property of others arising from the performance of the Works.

## **10 Tools or Plant Required to Complete the Works**

The schedule of rates detailed in the Price Schedule include the provision of all normal trade tools, plant and normal access equipment necessary to complete the Works.

## **11. Materials, Specialist Subcontract or Special Hire Costs Mark Up**

The Principal will pay the accepted percentage mark up on the cost of Materials, Specialist Subcontracts (not included in the Contractor's Contract) or the cost of approved Hiring special tools or plant used for the Works.

Personnel associated with the wet hire, erection, relocation, removal or any other activities associated with the hire are to be included in hire costs. If required by the Ordering Officer all personnel on site are to be noted on the Service Report(s) for that job. Copies of supplier's invoices to substantiate the costs of Material used in the Works, are to be provided to Ordering Officer for all individual items where costs exceed \$100, and under \$100 when requested.

Copies of supplier's invoices to substantiate the costs of Sub-Contractors or Hire costs of equipment used in the Works are to be provided to Ordering Officer for all individual items

## **12 Environmental Management**

### **12.1 Requirement**

The Contractor must comply with the NSW Government *Environmental Management Systems Guidelines* available on the Internet at:

[www.managingprocurement.commerce.nsw.gov.au/system/index\\_procurement\\_guideline\\_documents.doc](http://www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc)

### **12.2 Environmental Management Plan**

When requested by the Principal, develop and implement an Environmental Management Plan that complies with the *EMS* Guidelines.

The Contractor may elect to complete Schedule 5 Part E - **Environmental Management Plan**, adding objectives and actions as required to suit the risks/hazards associated with the work under the Contract, and implement the completed version as the Environmental Management Plan.

Submit the Environmental Management Plan no later than 7 days before construction work commences when requested by the Principal. Do not start construction work before a complying Environmental Management Plan has been submitted.

### **12.3 Incident reports**

Ensure compliance with the notification and other requirements of the *Protection of the Environment Operations Act 1997 (POEO Act)*.

Immediately notify the Principal of any pollution incident that may cause material harm to the environment, providing evidence that notification requirements of the POEO Act have been met, where applicable.

Report immediately the details of any waste removed from the Site and not disposed of at a lawful facility. When requested, provide an incident investigation report, including identification of the cause of the incident and corrective actions taken, in the form directed.

### **12.4 Failure to comply**

If at any time the Contractor has not carried out its environmental management obligations under the Contract, then notwithstanding any other provisions of the Contract, no payment is due to the Contractor until the 7<sup>th</sup> day after the required action has been carried out.

## **13 Ecologically Sustainable Development**

### 13.1 Requirement

Apply strategies to maximise the achievement of ecologically sustainable development in the design, construction and operation of the Works, including reducing pollutants, greenhouse gas emissions and demand on non-renewable resources such as energy sources and water.

### 13.2 Restricted timbers

Do not use the following timbers or their products for work under the Contract:

- rainforest timbers, unless certification is provided that they are plantation grown;
- timber from Australian high conservation forests.

## 14 Waste Management

### 14.1 Requirement

Implement waste minimisation and management measures, including:

- recycling and diverting from landfill surplus soil, rock, and other excavated or demolition materials, wherever practical;
- separately collecting and streaming quantities of waste concrete, bricks, blocks, timber, metals, plasterboard, paper and packaging, glass and plastics, and offering them for recycling where practical.

Ensure that no waste from the Site is conveyed to or deposited at any place that cannot lawfully be used as a waste facility for that waste.

### 14.2 Monitoring

Monitor and record the volumes of waste and the methods and locations of disposal.

Submit a progress report and a summary report when requested by the Principal, on the implementation of waste management measures, including the total quantity of material purchased, the quantity purchased with recycled content, the total quantity of waste generated, the total quantity recycled, the total quantity disposed of and the method and location of disposal in the form of a *Waste Recycling and Purchasing Report* available on the Internet at:

[www.managingprocurement.commerce.nsw.gov.au/contract\\_management/cm\\_sf\\_waste\\_recycling\\_and\\_purchasing\\_report.doc](http://www.managingprocurement.commerce.nsw.gov.au/contract_management/cm_sf_waste_recycling_and_purchasing_report.doc)

With the *Waste Recycling and Purchasing Report*, submit waste disposal certificates and/or company certification confirming appropriate, lawful disposal of waste.

## 15 Pest Control

Do not use any chemical pesticides or termiticides for new construction work. Use preventive treatment by physical means to minimise the risk of pest infestations.

Chemical treatments may be used in existing buildings only as a last resort for the eradication of pest and termite infestations. Chemical pesticides used for this purpose must be registered by the National Registration Authority for Agricultural and Veterinary Chemicals and applied by a Pest Control Operator licensed by WorkCover.

Pest preventive methods must comply with AS 3660.1-2000 Protection of Buildings from Subterranean Termites (except for references to chemical soil barriers), as well as supplementary standards for existing buildings.

## **16 Standards**

Where the Contract requires compliance with a standard or Code, unless otherwise specified that Standard or Code shall be the one current at the closing date for tenders, except for the Building Code of Australia, which shall be the one current at the date of completion of the Works.

## **17 Prohibition on Smoking**

The Contractor shall not permit its employees to take animals, alcohol or illegal drugs on site. Smoking is not permitted on any site.

## **18 Protection of Existing Flora**

Protect from all damage all trees and other plants that are shown or specified to be retained, or which are beyond the limits allowed to the Contractor or which need not be removed or damaged for maintenance or construction operations. All grassed areas to be fully restored to levels and growth as existing.

## **19 Register of Contractor's Personnel**

The Contractor is to maintain a register of all personnel who will carry out any part of the Works.

The Contractor is responsible for submitting the register to the Ordering Officer within 28 days of the time of acceptance.

The register is to be maintained regularly to keep it up to date and is to be submitted for inspection by the Ordering Officer at three (3) monthly intervals as advised by the Principal.

The names and identification numbers of each employee are to be included on the service reports when submitted to the Ordering Officer.

The register is to include but not be limited to:

- All details about the employee ID Card etc
- Date when persons were issued with photo identification cards.
- Date identification cards returned.
- Date Induction Session (in accordance with clause 20) was conducted and lists those in attendance.
- Material presented at the induction session
- Specific job training undertaken during the term of the contract

Dates and certificates awarded at all induction courses attended as required by Statutory Regulations or site-specific requirements (e.g. Code of Conduct when working in facilities used by children).

## **20 Induction of Contractor's Personnel**

The Contractor is to induct all personnel involved in the Works in all aspects of the Contract.

The induction of personnel is to include but not be limited to;

- Operation of the Contract
- Occupational Health and Safety and site evacuations/emergency procedures
- Site Access and Responsibilities, site risks, hazards, access and responsibilities
- Code of Conduct when working in facilities used by children
- Wearing of Identification Cards

## **21 Protection of Children and Other Vulnerable Persons**

The Contractor must not employ or permit to be employed on work under the Contract at the site or sites a person where the Principal advises the Contractor that, in the opinion of the Principal, that person poses unacceptable risks to children or other vulnerable people cared for at that site. The Contractor must not employ or permit to be employed on work under the Contract at the site or sites a person who has been convicted of a serious sex offence and is prohibited person under the Child Protection (Prohibited Employment) Act 1998.

The Contractor must obtain completed and signed Prohibited Employment Declaration and Consent to Screening forms from all employees and Sub-Contractors. The Contractor must also sight the originals of identity documents. The Contractor shall submit these documents to the Principal in accordance with Section E Clause 22.

A listing of employees and Sub-Contractors to be screened shall be forwarded to the Employment Screening Unit (ESU) of the Department of Education and Training by the Principal.

The results will be advised to the Contractor for its records and/or actions.

The Contractor must not employ a person or permit a person to be employed on work under the Contract at the site or sites unless the Contractor has provided the personal particulars and a consent to employment screening in the form instructed by the Principal.

## **22 Photographic Identification on Cards**

The Contractor is to provide all staff, employees and Sub-Contractors' staff attending all sites with an identification card as authorisation to carry out work on the Contractor's behalf.

This must take the form of a Heritage and Building Services Identification (ID) Card including the authorised person's name and photograph.

All Contractors' staff must wear their ID Card in a prominent easily seen position on their person at all times.

Contractors' staff must present this card on request from the principal, the Client's Representative, School Staff, Police or Security Patrol Officers.

By obtaining this card the Contractor is declaring that the cardholder has completed an induction into the Code for working on or near facilities used by Children.

Refer Schedule 1 FORM A at Part E – DEPARTMENT OF COMMERCE CODE FOR WORKING ON OR NEAR DET, DOCS, JUVENILE JUSTICE, SPORT & RECREATION AND OTHER FACILITIES OCCUPIED OR USED BY CHILDREN.

Schedule 1 at Part E outlines the requirements for obtaining an ID Card from the Principal. The cards can be obtained at a nominal cost per employee/subcontractor. In addition, it is a requirement that the following forms are fully completed by each employee/Sub-Contractor of the Contractor:

- Department of Commerce Code for Working On or Near DET, DOCS, Juvenile Justice, Sport & Recreation and other Facilities Occupied or Used by Children (Part E, Schedule 1, Form A)
- Prohibited Employment Declaration (Part E, Schedule 1, Form B)
- Working with Children Background Check Consent (Part E, Schedule 1, Form C)
- Photo ID Application Form (Part E, Schedule 1, Form D)

The Contractor shall ensure all Identification Cards are registered and monitored and that cards for persons no longer authorised are returned to the Principal immediately. The Contractor shall submit a copy of the register to the Principal when requested.

Cards issued will expire at the nominated completion of the Contract period.

**NOTE** – No payment will be made for persons attending site that are not in possession of, or recorded as having been issued ID cards.

## **23 Temporary Services Required by the Principal**

The Principal will provide no temporary services to the Contractor.

The Contractor may use, free of charge, water and electricity from the existing outlets within the premises, subject to the use of those services not disrupting the normal operation of the premises in any way, not causing any associated problems such as overloading and not being abused or misused. Generally, only single-phase power is available.

Liaise with the Client's Representative before connecting to any such service to ensure that no disruption occurs and to ensure that access to them does not adversely impact on other aspects of the premises such as safety, security, free movement of staff etc.

The Contractor must satisfy himself that the existing water and electrical services meet its needs and, where required, supplement them from other sources.

## **24 Interruption to Services**

Where there is a possibility of interruption to any service, the Ordering Officer is to be notified of the time and likely duration of the disruption to normal services.

## **25 Site Access and Limitations**

### **General**

The Contractor is responsible for providing and maintaining access to the Works.

As far as practicable, use existing roads and tracks. If access is gained from an adjacent property, obtain the written permission of the owner.

Install temporary barricades fences, gates, signs, temporary access bridges, lighting, etc. necessary for the safety of workers, staff, occupants of the premises and the general public at all times. Maintain such devices for the full duration of the Works.

### **Compliance with Department of Commerce Code when Working in Facilities Occupied or Used by Children is mandatory.**

Contractors and Subcontractors are to abide by the Department of Commerce Code for Working on or near DET, DOCS, Juvenile Justice, Sport & Recreation and other Facilities Occupied or Used by Children – refer Schedule 1.

The Code states “All persons must read and certify that they have read and understood the code before commencing work and/or entering premises used by children.”

The Contractor is to ensure all persons who are performing duties under this Contract have read the code and certified their understanding of the requirements contained in the code and have agreed to abide by the code.

## **26 Sites with Heritage Significance**

Contractors should be aware that sites can have heritage significance that can extend to and include fences, walls, trees, paving, etc, NOT JUST BUILDINGS.

The Contractor must ensure that all of their staff and Subcontractor's staff are aware that some sites or parts of sites have been identified as having heritage significance. In such circumstances, take care to preserve the heritage.

It is critical when carrying out work on sites that have a heritage significance that the following is adhered to: -

- When components, sub-assemblies or minimum replacement sections are to be replaced, they must be exact replicas of the original (matching profile of timber, matching roof or floor tiles, etc). If difficulties are experienced obtaining exact replicas, advise the Ordering Officer.
- Stonework, especially sandstone, often has heritage significance. Care should be taken in matching mortar and materials.
- Cleaning of masonry to reveal deterioration or to remove harmful substances or graffiti should be done with care using low-pressure water jets with soft bristle brushes. Abrasive blasting and the use of power tools to clean joints are not permitted.

## **27 Advertising Signs and Sign Boards**

The Contractor shall not display or erect any advertising signs at any site without the written approval of the Ordering Officer.

## **28 Quality of Work**

The Contractor must supply materials (which are new, free from defects and suitable for the purpose and generally like for like unless directed otherwise) and use standards of workmanship and work methods which comply with the Contract, the Building Code of Australia, relevant Australian Standards and Commonwealth and State legislation and subordinate regulations, ordinances, by-laws, orders and proclamations.

## **29 Nominated Defects Liability Period**

The Nominated defects liability period is 26 weeks from the time of completion of the job.

## **30 “Dial Before You Dig”**

### **30.1: Location of Existing Services – Dial Before You Dig**

The Contractor is responsible for locating existing services.

Before commencing excavation the Contractor must obtain, from the Dial Before You Dig information service or all relevant public authorities or owners of underground services, written confirmation of the exact position of underground services at and around the Site, and verify and prominently mark the location of all underground services at the Site.

### **30.2: Dealing with Existing Services**

Existing services (such as drains, watercourses, public utility, telecommunications, and other services) obstructing the Works or if damaged in the course of the Contract, must be dealt with as follows:

- a) if the service is to be continued: repair, divert, relocate as required;
- b) if the service is to be abandoned: cut and seal or disconnect and make safe as required

### **30.3: Resulting Cost and Delay**

Where an existing service obstructs the Works and requires diversion or relocation, the Contractor must notify the Principal immediately with a description of work and estimated cost to carry out the diversion or relocation. When approved, an approval number will be given (refer Part E Clause 13).

Where the Contractor for any reason whatsoever damages an existing service, the Contractor shall bear all costs and any delays for repairing or disconnecting the service.

### **30.4: Notification**



The Contractor is to notify the Principal immediately upon the discovery of services obstructing the Works not shown in the Principal's Documents. Attention is drawn to General Conditions of Contract clause "Site Conditions".

### **31 Contractor Performance Reporting**

The Contractors performance will be reviewed from time to time or where breaches have occurred relating to the Contract.

#### **Objective of Contractor Performance Reporting**

*The objective is to obtain a measure of the Contractor's performance under the contract. This will in turn assist both the Principal and the Contractor in reaching an understanding of the expectations of both parties in areas that the Contractor is excelling and areas that need improvement. It could also affect the contractors' opportunities to undertake work for the Principal.*

A Contractor Performance Report (CPR) will be issued evaluating the Contractors performance on the following criteria:

#### **Time Management**

- ability to achieve milestones and completion of the works
- timely allocation of appropriate resources management of delays due to inclement weather management of industrial conditions
- fair consideration of delays caused by the Principal or other parties, outside the Contractor's control

#### **Standard of Work**

- standard of work as measured against the specification.
- remedial work required
- conformance with specified performance criteria compliance with specified tolerances and finishes
- rectification of defects

#### **Personnel/Sub-Contractors**

- adequacy of the number of site personnel engaged by the Contractor in terms of efficient use of resources for the work
- control of personnel
- payment of workers of all monies due in respect of their employment
- establishment of site protocols
- effective coordination and flow of trades on site
- observance of site rules and procedures
- compliance with NSW Government Security of Payment provisions
- suitability of workers including compliance with the requirements set out in the NSW Government *for Code of Practice Procurement* including management, administrative, scientific or industry skills and overall experience relevant to the tasks undertaken.
- compliance with contractual and legal obligations with respect to subcontractors, consultants and suppliers
- payment to all subcontractors, consultants and suppliers in accordance with contract conditions

#### **Contract Administration**

- adequacy of documentation in meeting the requirements of the contract
- timeliness of the provision of information such as quotations, drawings, reports or other documentation
- timeliness of submission of claims for payment including the adequacy of supporting evidence and provision of statutory declarations required by the contract accuracy of details in claims for payment including rates charged, variations

#### **Co-Operative Relations**

- co-operation in all matters relating to the contract and facility staff and occupants.
- promptly informing of anything which is likely to affect the timing, cost or quality of the works.

- commitment to a co-operative non-adversarial approach through open and effective communication with litigation reserved as a last resort
- evidence of a co-operative culture

#### **OH&S/Environmental Management**

- compliance with requirements in the NSW Government's *OHS Management Systems Guidelines*
- compliance with Project OH&S and Environmental Management Plan or Site-specific Safety Management Plan.
- compliance with safety issues specifically nominated in the contract and/or the Contractor's OH&S Management System/plan for the contract
- quality of and compliance with Safe Work Method Statements
- risk identification, assessment and management
- the number of infringement notices and directions issued to the Contractor concerning safety or environmental management
- results of audits
- fulfilling the Contractor's obligations for subcontractor OH&S management
- compliance with WorkCover Codes of Practice
- accidents and/or serious incidents
- evidence of a safety and environmentally aware culture
- compliance with environmental obligations

Consistent unsatisfactory Contractor Performance Reviews may result in the action outlined in Part E Conditions of Contract Clause 15 (Termination).

### **32 Additional Requirements**

Each Order placed under the Standing Offer Contract may include additional clauses relating specifically to that Order.

Such additional clauses may relate to site or Works requirements, special access provisions, specific requirements or any other matter.

These additional requirements will be conveyed to the Contractor at the time of requesting a quotation and will form a part of the Contract for that Order.

### **33 Special Requirements**

Schedules 1 to 5 hereto describe requirements specific to individual Departments. These requirements form part of any Order placed with the Contractor for that Department.

## SCHEDULES TO THE SPECIAL CONDITIONS OF CONTRACT

### SCHEDULE 1 PROCEDURES FOR OBTAINING A HERITAGE AND BUILDING SERVICES CONTRACTOR PHOTO ID CARD

**When seeking Photo ID's for yourself and/or your employees/subcontractors the steps listed below must be followed, which include completion of the following four (4) documents by each person:**

- Code for working on or near facilities occupied or used by children (FORM A)
  - Prohibited Employment Declaration form (FORM B)
  - Working with Children Background Check Consent form (FORM C)
  - Application for Contractor Photo ID Card (FORM D)
- A photo ID Card application form shall be filled out for each person (FORM D), with a passport-sized photograph attached. Alternatively, arrangements can be made to have photos taken by the principal's staff at our Doonside office upon submission of all required documents (contact Ph. 9672 5158). JPG files of photos will also be accepted by email at [Vena.McGrath@commerce.nsw.gov.au](mailto:Vena.McGrath@commerce.nsw.gov.au).
  - Ensure that **all** of the information requested is supplied.
  - **Include** a payment of \$15.00 (GST inclusive) for each ID in one of the suggested forms (ie Cheque or Money Order).
  - It is essential to ensure that the applicant has been inducted in the Department of Commerce Code for working on or near facilities occupied or used by children. They must sign the acknowledgement on the ID Card application form and complete the bottom of the copy of the code/form provided (FORM A).
  - It is essential that each applicant meets the Industry OH&S Induction requirements of WorkCover and provides the required documentation as evidence of that Induction (attach copy of Construction Industry OHS Induction card – card number must start with "CGI").
  - The employer must sight the original forms of identification noted on the application form ie. Passport, licence, etc and check that the passport photo supplied is that of the applicant. Proof of identification must add to a minimum of 100 points as required by the 100 point check under the *Financial Transaction Reports Act 1988 (Details attached)*. The Employer must sight original documents and certify copies and provide these certified copies with the application.
  - The applicant and the employer must sign the forms.
  - Each person (applicant) shall complete the Prohibited Employment Declaration Form (FORM B) and return with application.
  - Each person (applicant) shall complete the Working with Children Background Check Consent Form (FORM C).
  - Photo ID's will expire at the completion of the contract during which they were issued.
  - If the information required is not supplied or if the forms are not signed, the ID Card will not be printed.
  - Submit the completed forms, payment and supporting documentation to the address noted below (the card will be manufactured and posted once Screening Unit approval of the applicant is received. Photo will not be returned).
  - When received the card must be worn on site at all times or access to the site may be refused.
  - If an employee leaves your organisation, return the card to the following address:

Department of Commerce  
Heritage and Building Services  
PO Box 285,  
Doonside NSW 2767

**FORM A      DEPARTMENT OF COMMERCE - Code for Working on or near DET, DOCS, Juvenile Justice, Sport & Recreation And other Facilities Occupied or Used by Children**

- This Code applies to all Department of Commerce staff and all contractors (and their subcontractors), suppliers and consultants, including but not limited to:
  - building and maintenance workers;
  - cleaners
  - suppliers of materials and similar
- All persons must read and certify that they have read and understood this Code before commencing work and/or entering school premises.
- Any breach of the Code is a serious offence and will lead to disciplinary and/or contractual action.
- All persons must gain permission to enter the school or other facility before commencing work and they may only enter approved areas.
- Generally, the following arrangements will apply, unless the senior person at the school or other facility gives written authority to use alternative arrangements:
  - (i) all cleaners must sign on the school register before commencing work;
  - (ii) all Department of Commerce staff, suppliers and contractors must either sign the Site Register at the Construction Site Office and/or visit the school or facility office and gain the senior person's approval.
- All persons must follow all the following rules:
  - No talking with, touching or interacting with any children or residents except in a serious emergency or safety situation.
  - No use of toilets or amenities - toilets, bubblers, bike-racks, showers, canteens or other facilities at the school/centre. Only approved separate toilets and other facilities are to be used and these must be kept separate from any area used by children.
  - The work area must not be able to be used/accessed by children. Clear signs and barricades (wherever possible) must be used to prevent any inadvertent and/or unauthorised access.
  - Where maintenance and/or cleaning of toilets and similar facilities is necessary, two persons must always be present. Wherever possible, at least one male should be present when male toilets are being maintained/repainted/cleaned and at least one female should be present when similar work is being done on female toilets.
  - Any concerns about children's behaviour must be immediately reported to a senior client representative, such as School Principal or similar person at DOCS and Juvenile Justice and other facilities.
  - An identity card must be kept at all times when on or near the site.
  - Tidy clothing must be worn at all times, including a shirt, shorts or trousers, and must be in good condition.

*I acknowledge that I have read the above Department of Commerce Code for Working on or near DET, DOCS, Juvenile Justice, Sport and Recreation and other Facilities Occupied or Used by Children and agree to abide by the conditions therein.*

EMPLOYER'S COMPANY /  
ORGANISATION NAME:

\_\_\_\_\_

(in block letters)

NAME OF APPLICANT:

\_\_\_\_\_

(in block letters)

SIGNATURE OF APPLICANT:

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**FORM B****PROHIBITED EMPLOYMENT DECLARATION**

The *Commission for Children and Young People Act 1998* makes it an offence for a prohibited person (a person convicted of a serious sex offence, the murder of a child or a child-related personal violence offence, as well as a Registrable person under the *Child Protection (Offenders Registration) Act 2000*) to apply for or otherwise attempt to obtain, undertake or remain in, child-related employment. It does not apply if an order from the Industrial Relations Commission, Administrative Decisions Tribunal or Commission for Children and Young People, declares that the Act does not apply to a person in respect of a specific offence.

For further information on what is child-related employment see the *Working With Children Employer Guidelines*.

**Section 33B of the *Commission for Children and Young People Act 1998* defines a serious sex offence as:**

- an offence, involving sexual activity or acts of indecency, committed in New South Wales and that was punishable by penal servitude or imprisonment for 12 months or more; or
- an offence, involving sexual activity or acts of indecency, committed elsewhere and that would have been punishable by penal servitude or imprisonment for 12 months or more, if it had been committed in New South Wales; or
- an offence under section 80D or 80E (sexual servitude) of the *Crimes Act 1900*, committed against a child; or
- an offence under Sections 91D-91G (child prostitution, other than if committed by a child prostitute) of the *Crimes Act 1900* or a similar offence under a law other than a law of New South Wales; or
- an offence under Section 91H, 578B or 578C (2A) (child pornography) of the *Crimes Act 1900* or a similar offence under a law other than a law of New South Wales; or
- an offence of attempting, or of conspiracy or incitement, to commit an offence referred to in the preceding paragraphs; or
- any other offence, whether under the law of New South Wales or elsewhere, prescribed by the regulations.

**NOTE: A conviction for carnal knowledge is classified as a serious sex offence under this legislation.**

Section 33B of the *Commission for Children and Young People Act 1998* defines a child-related personal violence offence as an offence committed by an adult:

- involving intentionally wounding or causing grievous bodily harm to a child; or
- of attempting, or of conspiracy or incitement, to commit such an offence.

**Under *Commission for Children and Young People Act 1998*:**

- it is an offence for a prohibited person to apply for or otherwise attempt to obtain, undertake or remain in child related employment;
- employers must ask existing employees, both paid and unpaid, and preferred applicants for child-related employment to declare if they are a prohibited person or not;
- all people in child-related employment must inform their employers if they are a prohibited person or remove themselves from child-related employment; and
- penalties are imposed for non compliance.

**I am aware that I am ineligible to apply for or otherwise attempt to obtain, undertake or remain in, child-related employment if I have been convicted of a serious sex offence or child-related personal violence offence as defined in the *Commission for Children and Young People Act 1998*, or if I am a Registrable Person under the *Child Protection (Offenders Registration) Act 2000*.**

**I have read and understood the above information in relation to the *Commission for Children and Young People Act 1998*. I am aware that it is an offence to make a false statement on this form.**

**I consent to a check of my relevant criminal records, to verify the statements I have made here, being undertaken by the NSW Commission for Children and Young People for monitoring and auditing purposes in accordance with Section 36 (1)(f) of the *Commission for Children and Young People Act 1998*.**

**I declare that I am not a person prohibited by the Act from seeking, obtaining, undertaking or remaining in child related employment.**

**I understand that this information may be referred to the Commission for Children and Young People and/or to NSW Police for law enforcement purposes and for monitoring and auditing compliance with the procedures and standards for the Working With Children Check in accordance with Section 36 (1)(f) of the *Commission for Children and Young People Act 1998*.**

All fields must be completed. Please use block letters.

Name: \_\_\_\_\_

Aliases (previous/other names): \_\_\_\_\_

Date of birth: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Contact telephone number: \_\_\_\_\_ Contact Email: \_\_\_\_\_

**NOTE: Seek legal advice if you are unsure of your status as a prohibited person  
This form should be returned to Heritage and Building Services, PO Box 285 Doonside 2767.**

# FORM C

## WORKING WITH CHILDREN BACKGROUND CHECK CONSENT



This form is to be completed by persons whose names are to be submitted for employment screening as part of the Working With Children Check.

**No background checks can be completed on a person without this consent being provided.**

**Employers are required to sight applicant's original identifying documents.**

**All fields must be completed. Please use block letters.**

Surname:		Given name(s):	
Previous names/aliases:		Date of birth:	
Place of birth (city, state, country):		Gender: (Please tick) <input type="checkbox"/> Male <input type="checkbox"/> Female	
Identification type (eg. Driver's licence/passport):		Identification number:	
Address:			
Suburb/Town:		Postcode:	
Contact telephone number:		Contact Email:	
Title of position (eg. Carpenter):		Type of position: (Please tick) <input type="checkbox"/> Paid employee	

I certify that the above information is accurate and understand that if I have provided false or misleading information it may result in a decision not to employ me, or, if already employed, may lead to my dismissal.

I am aware that if considered for child-related employment, several checks will be undertaken to ascertain my suitability, including:

1. a national criminal record check for charges and/or convictions (including spent convictions) for:
  - any sexual offence (including but not limited to, sexual assault, acts of indecency, child pornography, child prostitution and carnal knowledge);
  - any child-related personal violence offence;
  - any assault, ill treatment or neglect of, or psychological harm to a child and any registrable offence;
 punishable by imprisonment for 12 months or more.

I understand that this check includes convictions or charges that:

- may have not been heard or finalised by a court; or
  - are proven but have not led to a conviction; or
  - have been dismissed, withdrawn, or discharged by a court.
2. a check for relevant Apprehended Violence Orders taken out by a police officer or other public official for the protection of a child/ren;
  3. a check for relevant employment proceedings involving an act of violence committed in the course of employment and in the presence of children or reportable conduct. Reportable conduct means any sexual offence, or sexual misconduct committed against, with or in the presence of a child (including a child pornography offence), any child-related personal violence offence, or any assault, ill treatment or neglect of a child, or any behaviour that causes psychological harm to a child.

I understand that a conviction for a serious sex offence (including, but not limited to, sexual assault, acts of indecency, child pornography, child prostitution and carnal knowledge) or child-related personal violence offence (including but not limited to, intentionally wounding or causing grievance bodily harm to a child) will automatically prohibit me from child-related employment. This includes a charge that is proven in court but does not proceed to a conviction. I am aware that if I am a Registrable person under the *Child Protection (Registrable Offenders) Act 2000*, I am prohibited from child-related employment.

I consent to these checks being conducted and am aware that if any relevant record is identified, additional information relating to that record may be sought by an Approved Screening Agency from sources such as courts, police, prosecutors and past employers to enable a full and informed estimate of risk.

I acknowledge that:

- the above information and any information obtained during the Working With Children background check may be collected and used by and/or disclosed to the Commission for Children and Young People or any Approved Screening Agency for the purposes of the Working With Children Check;
- the Commission for Children and Young People or any Approved Screening Agency may share the information obtained during the Working With Children background check with each other to support further estimates of risk arising from additional Working With Children background checks;
- the outcome of an estimate of risk conducted with information obtained through the Working with Children Check by the Approved Screening Agency may be provided to my current or prospective employers or an employer-related body (where applicable) only for background checking purposes;
- details of my relevant records will not be released to my current or prospective employers;
- any information obtained as part of this process may be used by Australian Police Services for law enforcement purposes, including the investigation of any outstanding criminal offences; and
- the information provided may be referred to the Commission for Children and Young People and/or to NSW Police for law enforcement purposes and for monitoring and auditing compliance with the procedures and standards for the Working With Children Check in accordance with Section 36 (1) (f) of the *Commission for Children and Young People Act 1998*.

Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**ATTACH CERTIFIED COPIES OF FORMS OF IDENTIFICATION AS PER 100 POINT CHECK REQUIREMENTS**

**FORM D****Application for****Heritage and Building Services****Contractor Photo ID Card**

All information requested on the form to be inserted in the spaces provided.

Please also note that the Principal / Director / Owner of the contracting organisation making the application is to sight original proof of ID supplied by the applicant and certify copies prior to forwarding the application form and copies/attachments.

**(Expiry Date: 30/06/2011)**

**Paste photo in above box.** Photo must be an original and have a light coloured background.

**Note: Do not staple**

***Applicant's Details (Please print)***

First Name: _____	Surname: _____
Address: _____	
Suburb: _____	Postcode: _____
Trade Classification: _____	Birth Date: ____ / ____ / ____
Type of ID: _____	
(note: proof of identification must add to a minimum of 100 points as required by the 100 point check specified in attached page. The Employer must sight original documents and certify copies and provide these certified copies with this application form)	
Construction Industry OH&S Induction	CGI _____ Date of Issue: ____ / ____ / ____
No. (Enter Card number & attach <u>copy</u> )	

**I acknowledge that I have read the Department of Commerce Code for Working on or near DET, DOCS, Juvenile Justice, Sport and Recreation and other Facilities Occupied or Used by Children and agree to abide by the conditions therein.**

Applicant's Signature: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

***Employer's Details (Please print)***

Employer: _____	
Address: _____	
Suburb: _____	Postcode: _____
Phone: _____	Facsimile: _____

*I have sighted the required original proof of ID and all the above information is correct. The attached photo is that of the applicant.*

Name: \_\_\_\_\_ Company Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**FORM D cont.....**

**Method of Payment:** Payment of \$15.00 (GST inc.) per person is required with application.

- ☐ Cheque payable to: NSW Department of Commerce
- ☐ Money Order payable to: NSW Department of Commerce

**FORWARD COMPLETED FORM  
WITH PAYMENT &  
ATTACHMENTS TO:**  
Department of Commerce  
Heritage & Building Services  
PO Box 285 Doonside NSW 2767

**PLEASE ATTACH COPY OF INDUSTRY INDUCTION CARD****Proof of Identification – 100 Point Check****Identifying the preferred applicant accurately**

Before you request a Photo Identification Card and Working With Children background check you must ask preferred applicants to provide documents to support their identity. This must include original documents adding up to a minimum of 100 points as required by the 100 Point Check under the *Financial Transaction Reports Act 1988*. A copy of these original documents shall be certified by the Employer and provided with the application.

The following lists set out the value of each document according to the 100 Point Check.

**70 points**

Name of preferred applicant verified from one of the following (more than one document from this list cannot be counted):

- Birth Certificate
- Birth Card issued by the NSW Registry of Births, Deaths and Marriages
- Citizenship Certificate
- Current Australian passport
- Expired Australian passport which has not been cancelled and was current within the preceding 2 years
- Current passport from another country or diplomatic documents.

For a preferred applicant under 18 years, one document from the above list, or the following, is sufficient:

- Identity of the applicant verified by an educational institution, either on a student card or a letter signed by the principal, deputy principal, head teacher, deputy head teacher or enrolment officer, confirming that the applicant currently attends the institution.

**40 points**

Name and photograph/signature of preferred applicant verified from one of the following (more than one document can be counted):

- Current driver photo licence issued by an Australian state or territory
- Identification card issued to a public employee
- Identification card issued by the Australian or any state government as evidence of a person's entitlement to a financial benefit
- Identification card issued to a student at a tertiary education institution.

**35 points**

Name and address of preferred applicant verified from any of the following (more than one document can be counted):

- Document held by a cash dealer giving security over property
- A mortgage or other instrument of security held by a financial body
- Council rates notice
- Document from current employer or previous employer within the last two years
- Land Titles Office record
- Document from the Credit Reference Association of Australia.

**25 points**



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Name of preferred applicant verified from any of the following (more than one document can be counted):

- Current credit card or account card from a bank, building society or credit union
- Local council rates notices
- Current telephone, water, gas or electricity bill
- Foreign driver's licence
- Medicare Card
- Electoral roll compiled by the Australian Electoral Commission
- Lease/rent agreement
- Current rent receipt from a licensed real estate agent
- Records of a primary, secondary, or tertiary educational institution attended by the applicant within the last 10 years
- Records of a professional or trade association of which the applicant is a member.

**SCHEDULE 2 ADDITIONAL REQUIREMENTS WHEN WORKING IN SCHOOLS**

All personnel when attending work in schools must at all times wear their photographic identity card in a prominent easily seen position on their person in addition to any site specific identity symbol.

All personnel must report to the school's administration office on arrival and before departure, to record their visit at the school and to sign the School Maintenance Site Visit Log-book.

Access to Sensitive Areas:

When working in sensitive areas, the Contractor is to erect appropriate signs advising that work is in progress and directing users elsewhere to the closest facilities available.

Special care must be taken when accessing or carrying out work in change rooms, bathrooms, toilets, showers etc. and generally work in such areas in schools is to be undertaken outside normal school hours.

The work may be performed during normal school hours only where alternative facilities are available and with the written approval of the School Principal.

The Ordering Officer is to be advised when alternative facilities are not available and that the work required will need be performed at the "outside normal hours" schedule rate

Note: Normal school hours will vary, depending on the school's timetable. Work may be able to be programmed with the School Principal for early morning, late afternoon or on sports afternoon to enable the works to be completed quickly and without the additional cost of performing the work at the "out of normal hours" rate. The hours of operation for attending may be clarified with the Ordering Officer, when accepting the Work Order.

### SCHEDULE 3 SITE-SPECIFIC SAFETY MANAGEMENT PLAN

In accordance with Conditions of Contract clause - **Occupational Health and Safety**, the Contractor must develop and implement a Site-specific Safety Management Plan that complies with the NSW Government **Occupational Health & Safety Management Systems Guidelines 2004**. Please refer to **How to prepare Site-Specific Safety Management Plans and Safe Work Method Statements** (June 2004). Both documents are available from: [www.managingprocurement.commerce.nsw.gov.au/system/index\\_procurement\\_guideline\\_documents.doc](http://www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc)

#### The Contractor's Site-specific Safety Management Plan

For this contract the Contractor's Site-specific Safety Management Plan must:

- ☐ be on the Contractor's letterhead, and
- ☐ signed and dated by a senior manager, and
- ☐ **must cover:**
  - ☐ **Statement of responsibilities** – names and positions of people on site who will be responsible for OHS management, with a description of those responsibilities.
  - ☐ **Risk Management** – identified hazards associated with each work activity, with the risks assessed and actions proposed to eliminate or minimise the risks and methods for monitoring the risk controls documented. Include OHS risks identified by the Principal.
  - ☐ **OHS Training** – arrangements for OHS training, including Induction training and toolbox meetings.
  - ☐ **Incident and Emergency Management** – arrangements for managing accidents and near misses, with the name(s) of responsible persons and their contact details, including after-hours contact.
  - ☐ **Site Safety Rules** – a copy of the rules, which must also be displayed on the site and make it a condition of entry to the site that all employees and visitors comply with their provisions, and which must include as a minimum:
    - **Construction OHS Induction.** All persons must display evidence of completing OHS Induction training prior to being inducted to commence work on the site.
    - **Site Induction.** All persons working on the site must attend a Site Induction prior to entering it. Visitors may enter the site if, either, they first attend a Site Induction, or they are accompanied by a person who has attended a Site Induction. All persons each day must sign in and out on the Site Register.
    - **Safe Work Method Statements.** Safe Work Method Statements must be prepared and used for all work activities assessed as having a safety risk.
    - **Toolbox Talks.** Weekly or more regular discussions must be held with workers to consult on site safety matters.
    - **Safety Helmets, Safety Footwear and Safety Vests.** Safety helmets and steel-capped safety footwear must be worn by all supervisors, employees, and visitors in the construction area at all times. The footwear must comply with AS 2210. Safety vests must be worn when moving plant is present or work is undertaken near traffic.
    - **Personal Protective Equipment (PPE).** PPE, such as safety eye protection, hearing protection, safety gloves and masks and the like, must be worn when welding, drilling and with all other tasks with similar risks.
    - **Accidents and Incidents.** Accidents, incidents and injuries must be reported immediately to the Contractor's and applicable subcontractor's site representative in charge.
    - **Alcohol and Drugs.** The consumption of, or being under the influence of, alcohol and illegal drugs on the site is prohibited.
    - **Amenities.** Access to clean toilets and meal facilities, cool, clean drinking water, and the other requirements of the WorkCover **Code of practice: Amenities for construction work**, must be provided for all persons.
    - **Electrical.** All electrical work and electrical plant must comply with the WorkCover **Code of practice: Electrical practices for construction work**.
    - **Emergency evacuation.** Arrangements must be included in the Site Induction and clearly identified.
    - **Excavations.** Barricading and signage for all excavations must be provided, with excavations 1.5 metres or more deep also to be benched, battered or shored. See the WorkCover **Code of practice: Excavation**.
    - **Fire Prevention.** Fire prevention must be used by all persons on the site. An appropriate fire extinguisher must be on hand for all welding sets and oxy acetylene work.
    - **First Aid.** All persons requiring first aid treatment must contact the first aid officer who will administer the treatment and record the injury in the WorkCover Register of Injuries, including the person's name and the nature of the injury.

- **Hazardous Substances.** Chemicals and hazardous substances must be used and stored in compliance with up to date Material Safety Data Sheets (MSDS) and details recorded in the Register of Hazardous Substances.
  - **Housekeeping.** Work areas must be kept clean and tidy, with rubbish and other safety hazards cleaned up promptly. All protruding nails must be removed immediately from timber.
  - **Leads and Power Tools.** All leads, power tools and electrical equipment must be inspected and tagged by a qualified person prior to their use and then at monthly intervals. See the WorkCover [Code of practice: Electrical practices for construction work](#).
  - **Mobile Plant.** Every owner of plant must ensure plant is registered with WorkCover when required and operators are appropriately qualified. Plant must be fitted with working hazard lights/reversing lights and beepers. See the WorkCover [Code of Practice for Moving Plant on Construction Sites](#).
  - **Overhead Power Lines.** The requirements of the WorkCover [Code of Practice – Work near Overhead Power Lines](#) must be complied with.
  - **Site Security and Public Access.** Security measures, including perimeter fencing, must be used to prevent unauthorised access to construction areas and ensure safe access and passage for all those on and adjacent to the site. Security must comply with Clause 235 of the OHS Regulation 2001 and the WorkCover [Position paper: The requirements for fencing](#).
  - **Underground Services.** Prior to any underground work being carried out, services must be located using Dial Before You Dig, a services locator, potholing and the other precautions identified in the WorkCover [Work Near Underground Assets Guideline](#).
  - **Working at Height.** Working at heights must be in accordance with WorkCover requirements, including certification of formwork and scaffolding. See the WorkCover [Guide to Safe Working at Heights](#).
- ❑ **Safe Work Method Statements** - for activities identified as having an OHS risk, which must:
- be on the letterhead of the organisation carrying out the work, showing the name and registered office address of the organisation;
  - be signed as authorised by a senior manager, and dated; and
  - **must describe:**
    - ❑ work activities to be undertaken, including the step-by-step sequence involved in doing the work
    - ❑ potential hazards and health and safety risks associated with each step of the work activity
    - ❑ safety controls that will be in place to minimise these hazards and risks
    - ❑ all health and safety instructions to be given to persons involved with the work activity
    - ❑ safety legislation, codes or standards applicable to the work activity and where these are kept
    - ❑ names and qualifications of those who will supervise the work activity and inspect and approve for use work areas, work methods, protective measures, plant, equipment and power tools
    - ❑ the training required, and when it was or will be given each person involved with the work activity
    - ❑ names of all those involved with the work activity and those who have been or will be or have been relevantly trained, and the names and qualifications of those responsible for training them
    - ❑ plant and equipment that will most likely be used in the work activity (eg. ladders, scaffolds, grinders, electrical leads, welding machines, fire extinguishers and the like)
    - ❑ any WorkCover permits required to complete the work activity
    - ❑ the inspection and maintenance checks that have been or will be carried out on the equipment listed prior to its use.

<b>SCHEDULE 4 STATUTORY DECLARATION</b>
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	Definitions	Oaths Act (NSW) Ninth Schedule
<i>The Principal is</i>	.....	
<i>The Contractor is</i>	.....	
	ACN/ABN.....	
<i>The Contract is</i>	Contract No. ....	
	Contract Title.....	
	Dated .....(Date of Contract) between the party identified as the Principal and the party identified as the Contractor.	

	<i>Declaration</i>
<i>Full name</i>	I, .....
<i>Address</i>	of .....
	.....

do hereby solemnly declare and affirm that:

- |   |   |  |
|---|---|--|
| <i>Insert position title of the Declarant</i> | 1 | I am the representative of the Contractor in the Office Bearer capacity of .....   |
|   | 2 | I am in a position to make this statutory declaration about the facts attested to. |

**REMUNERATION OF CONTRACTOR'S EMPLOYEES ENGAGED TO CARRY OUT WORK IN CONNECTION WITH THE CONTRACT**

- 3 All remuneration payable to the Contractor's relevant employees for work done in connection with the Contract to the date of this statutory declaration has been paid and the Contractor has made provision for all other benefits accrued in respect of the employees.

Relevant employees are those engaged in carrying out the work done in connection with the Contract.

Remuneration means remuneration or other amounts payable to relevant employees by legislation, or under an industrial instrument, in connection with work done by the employees [s127 (6) of the Industrial Relations Act 1996].

**REMUNERATION OF THE EMPLOYEES OF SUBCONTRACTORS ENGAGED TO CARRY OUT WORK IN CONNECTION WITH THE CONTRACT**

- 4 The Contractor *is/is not* a principal Contractor for the work done in connection with the Contract, as defined in section 127 of the Industrial Relations Act 1996. (Delete the words *in italics* that are not applicable.)
- 5 Where the Contractor is also a principal Contractor for work done in connection with the Contract, the Contractor has been given a written statement in its capacity of principal Contractor under section 127(2) of the Industrial Relations Act 1996 by each subContractor in connection with that work stating that all remuneration payable by each subContractor to the subContractor's relevant employees for work done in connection with the Contract to the date of this declaration has been paid, and each subContractor has made provision for all other benefits accrued in respect of each subContractor's employees.
- 6 I am aware that the Industrial Relations Act 1996 requires any written statement provided by subContractors must be retained for at least 6 years after it was given and declare that the Contractor has accordingly made arrangements for the secure retention of the written

statements.

### **WORKERS COMPENSATION INSURANCE OF THE CONTRACTOR'S WORKERS**

- 7 All workers compensation insurance premiums payable by the Contractor to the date of this statutory declaration in respect of the work done in connection with the Contract have been paid. This statutory declaration is accompanied by a copy of any relevant certificate of currency in respect of that insurance.

### **WORKERS COMPENSATION INSURANCE FOR WORKERS OF SUBCONTRACTORS**

- 8 The Contractor *is / is not* a principal Contractor for work done in connection with the Contract, as defined in section 175B of the Workers Compensation Act 1987.  
(Delete the words *in italics* that are not applicable.)
- 9 Where the Contractor is also a principal Contractor for work done in connection with the Contract, the Contractor has been given a written statement under section 175B of the Workers Compensation Act 1987 in the capacity of principal Contractor in connection with that work to the intent that all workers compensation insurance premiums payable by each subContractor in respect of that work done to the date of this statutory declaration have been paid, accompanied by a copy of any relevant certificate of currency in respect of that insurance.
- 10 I am aware that the Workers Compensation Act 1987 requires any written statement provided by subContractors and any related certificate of currency must be retained for at least 7 years after it was given and declare that the Contractor has accordingly made arrangements for the secure retention of the written statements.

### **EMPLOYER UNDER THE PAY-ROLL TAX ACT**

- 11 The Contractor *is registered as / is not required to be registered as* an employer under the Pay-roll Tax Act 1971.  
(Delete the words *in italics* that are not applicable.)
- 12 All pay-roll tax payable by the Contractor in respect of wages paid or payable to the relevant employees for work done in connection with the Contract to the date of this statutory declaration has been paid.
- 13 The Contractor *is / is not* a principal Contractor for work done in connection with the Contract, as defined in section 31G of the Pay-roll Tax Act 1971.  
(Delete the words *in italics* that are not applicable.)
- 14 Where the Contractor is also a principal Contractor for work done in connection with the Contract, the Contractor has been given a written statement under section 31H of the Pay-roll Tax Act 1971 in the capacity of principal Contractor in connection with that work to the intent that all pay-roll tax payable by each subContractor in respect of the wages paid or payable to the relevant employees for that work done to the date of this statutory declaration has been paid.
- 15 I am aware that the Pay-roll Tax Act requires any written statement provided by subContractors must be retained for at least 5 years after it was given and declare that the Contractor has accordingly made arrangements for the secure retention of the written statements.

**PAYMENTS TO SUBCONTRACTORS**

- 16 The Contractor has paid every SubContractor, Supplier and Consultant all amounts payable to each of them by the Contractor as at the date of this statutory declaration with respect to engagement of each of them for the performance of work or the supply of materials for or in connection with the Contract.
- 17 The provisions of clause “SECURITY OF PAYMENT”, if included in the Contract, have been complied with by the Contractor.
- 18 The Contractor has been informed by each SubContractor and Consultant to the Contractor (except for SubContracts and agreements not exceeding \$25,000 at their commencement) by written statement in equivalent terms to this declaration (made no earlier than the date 14 days before the date of this declaration):
1. *that their subContracts with their subContractors, consultants and suppliers comply with the requirements of clause “SECURITY OF PAYMENT”, if included in the Contract, as they apply to them; and*
  2. *that all of their employees, subContractors, consultants and suppliers, as at the date of the making of such a statement have been paid all remuneration and benefits due and payable to them by, and had accrued to their account all benefits to which they are entitled from, the SubContractor or Consultant of the Contractor or from any other of their subContractors or consultants (except for their subContracts and agreements not exceeding \$25,000 at their commencement) in respect of any work for or in connection with the Contract.*
- 19 I am not aware of anything to the contrary of any statutory declaration referred to in paragraph 18 of this declaration and on the basis of the statements provided, I believe the matters set out in paragraph 18 to be true.
- 20 And I make this solemn declaration, as to the matters aforesaid, according to the law in this behalf made, and subject to the punishment by law provided for any wilfully false statement in any such declaration.

*Signature of Declarant* .....

declared at

*Place* .....

*Date* on.....

before me

*Signature of legally authorised person\* before whom the declaration is made* .....

*Name and title of person\* before whom the declaration is made* .....

.....

**Notes:**

## 1. In this declaration:

1. the words “principal”, “Contractor”, “employee”, “employees” and “relevant employees” have the meanings applicable under the relevant Acts;
2. the word “subContractor” in paragraphs 5, 6, 9, 10, 14 and 15 has the meaning applicable under the relevant Act; and
3. otherwise the words “Contractor”, “SubContractor”, “Supplier”, “Consultant”, “subContractor”, “supplier” and “consultant” have the meanings given in or applicable under the Contract.

## 2. \* the declaration must be made before one of the following persons:

- (a) where the declaration is sworn within the State of New South Wales:

- 
- (ii) a justice of the peace of the State of New South Wales;
  - (iii) a solicitor of the Supreme Court of New South Wales with a current practising certificate;
  - (iv) a notary public; or
  - (v) another prescribed person legally authorised to administer an oath under the Oaths Act (NSW); or
- (b) where the declaration is sworn in a place outside the State of New South Wales:
- (i) a notary public; or
  - (II) any person having authority to administer an oath in that place.



## SCHEDULE 5 ENVIRONMENTAL MANAGEMENT PLAN

In accordance with the *Environmental Management* clause, the Contractor must develop and implement an acceptable site-specific Environmental Management Plan in the following form, incorporating additional objectives and actions applicable to the risks and opportunities associated with this contract.

The environmental risk management objectives	The environmental risk management measures:
<b>1. CONSERVATION OF PLANTS &amp; WILDLIFE</b>	
Protection of trees, plants and animals	<div style="margin-bottom: 10px;"> <input type="checkbox"/> Protect existing trees and plants at and around the Site from damage and do not remove flora without approval from the Principal  <input type="checkbox"/> Protect birds, fish and animals at and around the Site from harm and do not remove fauna from the Site without approval from the Principal  <input type="checkbox"/> Ensure that animals and plants are not brought onto the Site without the written agreement of the Principal  <input type="checkbox"/> Minimise the use of pesticides and herbicides and ensure minimal impact on the environment  <input type="checkbox"/> Use site roads or approved access routes for vehicular and equipment access  <input type="checkbox"/> Park all vehicles and equipment in designated or approved areas  <input type="checkbox"/> Use approved access routes for all pedestrian and goods movements to vehicles, equipment, facilities and construction sites  <input type="checkbox"/> The Contractor nominates the following additional measures:  <div style="border-top: 1px dotted black; height: 1.2em; margin-top: 5px;"></div> </div> <div> <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  <div style="border-top: 1px dotted black; height: 1.2em; margin-top: 5px;"></div> </div>
<b>2. CONSERVATION OF RESOURCES</b>	
Manage Materials used under contract to minimise: 1. resource use 2. ozone depleting effects 3. detrimental effects on air, water, quality.	<div style="margin-bottom: 10px;"> <input type="checkbox"/> Minimise the use of imported topsoil  <input type="checkbox"/> Reuse all topsoil on site  <input type="checkbox"/> Use only timber from sustainable managed sources  <input type="checkbox"/> Maximise the use of materials from a sustainable source, that are, and/or can be, recycled  <input type="checkbox"/> Use low energy usage construction, fittings and appliances (including heating/cooling and lighting)  <input type="checkbox"/> Use low potable water demand fittings and appliances (dual flush toilets, water conserving shower roses and taps)  <input type="checkbox"/> Ensure packaging is minimised and recycled  <input type="checkbox"/> Minimise the use of solvents, glues, paints and other materials which release odours or vapour  <input type="checkbox"/> The Contractor nominates the following additional measures:  <div style="border-top: 1px dotted black; height: 1.2em; margin-top: 5px;"></div> </div> <div> <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  <div style="border-top: 1px dotted black; height: 1.2em; margin-top: 5px;"></div> </div>
<b>3. POLLUTION CONTROL</b>	
Vehicles and plant	<div> <input type="checkbox"/> Do not use vehicles or plant producing excessive emissions  <input type="checkbox"/> Do not bring vehicles or plant with fuel or oil leaks to the Site  <input type="checkbox"/> Wash down vehicles only in areas approved by the Principal.         </div>

The environmental risk management objectives	The environmental risk management measures:
	<input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Stormwater is not polluted by cleaning activities and plants/grass are not adversely affected	<input type="checkbox"/> Use only water based, non-toxic paints <input type="checkbox"/> Use only water to clean brushes and rollers <input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Soil Erosion controlled	<input type="checkbox"/> Install the following sediment control devices prior to commencement of construction:  <input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Soil contamination is not disturbed or released to the environment	<input type="checkbox"/> Establish, in consultation with the Principal, if contaminated soil is present at the site prior to commencing work at the site <input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Charging and/or disposal of refrigerants meet statutory requirements, eg. for licensing and disposal	<input type="checkbox"/> Ensure procedures are used to meet statutory obligations for the charging and disposal of refrigerants <input type="checkbox"/> Use appropriately trained employees <input type="checkbox"/> Document disposal and retain documentation <input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Noise impact on neighbours, occupants or users of facility minimised	<input type="checkbox"/> Keep within EPA and Council noise limits <input type="checkbox"/> Use equipment in good repair and condition <input type="checkbox"/> Use noise suppression equipment (eg. silencers on compressors) <input type="checkbox"/> Do not expose workers and visitors to excessive noise

The environmental risk management objectives	The environmental risk management measures:
	<input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Trade Waste Licence conditions applicable to the facility are not breached.	<input type="checkbox"/> Ensure procedures are in place to avoid breaches of the trade Waste Conditions (May apply to discharges from cooling water systems, condenser water systems, heating water systems, cooking facilities, engine discharges etc where water is treated with chemicals or where large sediment loads exist) <input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Air Pollution from dust and emissions minimised	<input type="checkbox"/> Minimise areas of exposed earth <input type="checkbox"/> Use water sprays and/or other means to control dust <input type="checkbox"/> Keep emissions within statutory or required limits <input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  
Disposal of waste, including - <ul style="list-style-type: none"> <li>• Packaging materials</li> <li>• Replaced or redundant parts or materials.</li> <li>• Chemicals</li> <li>• Oils and greases from machinery and cooking processes</li> <li>• Paints and solvents including the cleaning of equipment, tools and brushes</li> <li>• Cleaning materials and rags</li> <li>• Other waste,</li> </ul> in accordance with statutory requirements	<input type="checkbox"/> Ensure appropriate procedures are used for the disposal of all waste items.  EITHER <input type="checkbox"/> Provide valid disposal certificates for each applicable item.  OR <input type="checkbox"/> Provide company certification of appropriate disposal of the following:  <input type="checkbox"/> The Contractor nominates the following additional measures:  <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures:  

The environmental risk management objectives	The environmental risk management measures:
<b>Emergencies</b> Incidents and spills are contained, and damage to the environment is minimised and rectified with appropriate and approved emergency response procedures	<input type="checkbox"/> Ensure emergency procedures are used to manage all reasonably foreseeable harm, including spills and other environmental emergencies <input type="checkbox"/> Agree with the Principal to procedures for handling oil and chemicals before placing on the Site <input type="checkbox"/> Document key contacts <input type="checkbox"/> The Contractor nominates the following additional measures: ..... <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures: .....
<b>Compliance Audit</b> Compliance with Principal environmental requirements and, where breaches are detected, rectification of defects within the time period set in the audit process	<input type="checkbox"/> Inspect the Site daily to ensure the appropriate environmental controls are in place and are operating effectively, and to ensure all environmental management requirements are being met <input type="checkbox"/> Cooperate with environmental audits by others <input type="checkbox"/> Rectify any environmental breaches identified within the time frame specified in an audit or by the Principal <input type="checkbox"/> The Contractor nominates the following additional measures: ..... <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures: .....
<b>4. RECORDS AND REPORTING</b>	
<b>Records</b> Sufficient documentation to demonstrate: <ul style="list-style-type: none"> <li>• Approved management plans</li> <li>• Training records</li> <li>• Valid disposal certificates and/or company certification of appropriate disposal as applicable</li> <li>• Correspondence with regulators including evidence that the cause of non-compliances has been fixed</li> </ul>	<input type="checkbox"/> Update the contract specific EMP <input type="checkbox"/> Report on the implementation of the contract specific EMP <input type="checkbox"/> Submit Incident reports to the Principal and to regulators where required <input type="checkbox"/> Submit waste disposal certificates or certification of appropriate disposal to the Principal where applicable <input type="checkbox"/> Keep training records for inspection <input type="checkbox"/> The Contractor nominates the following additional measures: ..... <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures: .....
<b>Incident Reporting</b> All environmental incidents are immediately reported to Principal	<input type="checkbox"/> Immediately report all environmental incidents to the Principal <input type="checkbox"/> The Contractor nominates the following additional measures: ..... <input type="checkbox"/> The Contractor identifies the following person who will be responsible for managing the above measures: .....



NSW Department of  
**Commerce**

REQUEST FOR TENDER (RFT) NO. 0801654

**Removal of Builders and Trade Waste** for NSW  
Department of Commerce Heritage and Building Services  
(HABS)

## **PART F**

**Description of asset maintenance incorporating National  
Standards for Minor Building Works and Trade Services**

Tenderers to note that Part F of RFT 0801654 is the Technical Specification for Asset Maintenance on Department of Education (DET) sites. Part F of RFT 0801654 is to be applied not only for DET sites, but all NSW Government Sites.

Part F is an extract of the DET Asset Maintenance Contract, which describes the minimum performance standards for facilities maintenance across all trades. In part, the contents of Part F may not be applicable for the purpose of this trade contract RFT 0801654.

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**GENERAL REQUIREMENTS****1 GENERAL****1.1 GENERAL****Precedence**

Requirements of individual technical worksections of the specification (Volume 1) override conflicting requirements in this worksection.

**1.2 REFERENCED DOCUMENTS****Current editions**

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

**Contractual relationships**

Responsibilities and duties of the principal, contractor and contract administrator are not altered by requirements in referenced documents.

**General standards**

Bushfire protection: To AS 3959.

Degree of electrical protection: To AS 1939.

Electrical work: To AS/NZS 3000:2000

Fixed access ways: To AS 1657.

Mechanical ventilation and airconditioning: To AS/NZS 1668.1 and AS 1668.2, as required by the Building Code of Australia.

Microbial control: To AS/NZS 3666.1.

Plumbing and drainage: To AS/NZS 3500.2.2.

Units of measurement: To AS ISO 1000.

Water supply: To AS/NZS 3500.1.2.

**1.3 INTERPRETATION****General**

Unless the context otherwise requires, the following definitions apply:

- Supply: "Supply", "furnish" and similar expressions mean "supply only".
- Provide: "Provide" and similar expressions mean "supply and install".
- Approved: "Approved", "reviewed", "directed", "rejected", "endorsed" and similar expressions mean "approved (reviewed, directed, rejected, endorsed) in writing by the contract administrator".
- Give notice: "Give notice", "submit", "advise", "inform" and similar expressions mean "give notice (submit, advise, inform) in writing to the contract administrator".
- Obtain: "Obtain", "seek" and similar expressions mean "obtain (seek) in writing from the contract administrator".
- Proprietary: "Proprietary" mean identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Samples: Includes samples, prototypes and sample panels.

**Technical**

Zinc-coated steel: Includes zinc-coated steel, zinc/iron alloy-coated steel, and aluminium/zinc-coated steel.

Pipe: Includes pipe and tube.

**Tests**

Except where otherwise defined in referenced documents, the following definitions apply:

- Pre-completion tests: Tests carried out before completion tests.
- Type tests: Tests carried out on an item identical with a production item, before delivery to the site.



- . Production tests: Tests carried out on the purchased equipment, before delivery to the site.
- . Site tests: Tests carried out on site.
- Completion tests: Acceptance tests and final tests.
  - . Acceptance tests: Tests carried out on completed installations or systems and, except for final tests, before the date for practical completion, to demonstrate that the installation or system, including components, controls and equipment, operates correctly, safely and efficiently, and meets performance and other requirements.
  - . Final tests: Acceptance tests carried out before completion of the maintenance period.

**Maintenance period**

Co-extensive with the defects liability period if applicable.

**Abbreviations**

ABS: Acrylonitrile-butadiene-styrene.

EPDM: Ethylene-propylene diene monomer.

GRP: Glass-fibre reinforced polyester.

NATA: National Association of Testing Authorities.

PTFE: Polytetrafluoroethylene.

SSL: Scientific Services Laboratory.

**1.4 CONTRACT DOCUMENTS****General**

Diagrammatic layouts: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable. Before commencing work, obtain measurements and other necessary information.

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

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**2 QUALITY****2.1 INSPECTION****Notice**

Witness points: If notice of inspection is to be given in respect of parts of the works, advise if and when those parts are to be concealed.

Hold points: If notice of inspection is to be given in respect of parts of the works, do not conceal those parts without approval.

Minimum notice for inspections to be made: 4 hours for on-site inspectors, otherwise 2 working days.

Concealed services: Give notice so that inspection may be made of services to be concealed.

**2.2 TESTS****Notice**

General: Give sufficient notice so that designated tests may be witnessed.

Hold points: Do not carry out designated tests without approval.

Minimum notice for tests to be witnessed:

- 5 working days for site tests; and
- 10 working days for local pre-delivery tests.

**Testing authorities**

General: Except for site tests, have tests carried out by authorities accredited by 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.

Site tests: Use instruments calibrated by authorities accredited by NATA.

**Reports**

General: Submit copies of test reports, including certificates for type tests, showing the observations and results of tests and compliance or non-compliance with requirements.

**Endorsement**

If tests are to be carried out on parts of the works, do not conceal those parts and do not commence further work on those parts until the tests have been satisfactorily completed and compliance verified.

**2.3 SAMPLES****Timing**

Delays: Coordinate submissions of related samples. Do not cause delays by making late submissions or submitting inadequate samples.

**Quantity**

General: Submit a sample of each designated item and 2 copies of supporting documentation. Include ancillary items such as fasteners, flashings and seals.

**Identification**

Identify the project, contractor, subcontractor or supplier, manufacturer, applicable product, model number and options, as appropriate and include pertinent contract document references. Include service connection requirements and product certification. Identify non-compliances with project requirements, and characteristics which may be detrimental to successful performance of the completed work.

**Approval**

General: Do not commence work affected by samples until the samples have been approved. Submit further samples as necessary.

**Retention**

Keep approved samples in good condition on site, until practical completion.

**Incorporation**

Incorporate in the works samples which have been approved for incorporation. Do not incorporate other samples.

**Criteria**

Match approved samples throughout the works.

**2.4 SUBMISSIONS****Timing**

General: Submit documents in a timely manner, to suit the construction program. Advise if any of the documents are to be returned.

Delays: Coordinate submissions of related items. Do not cause delays by making late or inadequate submissions.

**Quantity**

Bound documents: 3 copies.

Loose documents up to and including A3: One copy.

Loose documents larger than A3: One transparency on heavyweight plastic film the same size as the standard contract drawings.

**Identification**

Identify the project, contractor, subcontractor or supplier, manufacturer, applicable product, model number and options, as appropriate and include pertinent contract document references. Include service connection requirements and product certification. Identify non-compliances with project requirements, and characteristics which may be detrimental to successful performance of the completed work.

**Endorsement**

Witness points: Give notice before commencing work affected by contractor's submissions, unless the submissions have been endorsed as satisfactory.

Hold points: Do not commence work affected by contractor's submissions until, if appropriate, the submissions have been endorsed as satisfactory,

Errors: If a document contains errors, submit a new or amended document as appropriate, indicating changes since the previous submission.

**Design**

General: If part or all of an installation is to be designed by the contractor, submit documents showing the layout and details of the installation.

Variation documents: If it is proposed to change the installation from that shown on the contract documents, or if changes are required by statutory authorities, submit variation documents showing the proposed changes.

**Shop drawings**

General: Submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

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

**Authorities**

Correspondence: Submit copies of correspondence and notes of meetings with authorities.

Authorities' approvals: Submit documents showing approval of the authorities whose requirements apply to the work.

**Tests**

Tests program: Submit a testing and commissioning program which is consistent with the construction program. Include particulars of test stages and procedures.

Test records: For designated tests, including pre-delivery tests, record results and submit reports or certificates in a form suitable for inclusion in operation and maintenance manuals.

**Samples**

If it is intended to incorporate samples into the works, submit proposals.

**Materials and components**

Product data: For proprietary equipment, submit the manufacturer's product data including:

- technical specifications and drawings;
- type test reports;
- performance and rating tables; and
- recommendations for installation and maintenance.

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

Product certification: If products must comply with product certification schemes, submit evidence of compliance.

**Execution**

Fixing of services: Submit typical details of locations, types and methods of fixing of services to structure, before installation.

Embedded services: Submit proposals for embedding services in concrete walls or floors, or chasing into concrete or masonry walls.

Inaccessible services: If services will be enclosed and not accessible after completion, submit proposals for location of service runs and fittings.

Acceptance of substrate: Submit installers' statements verifying that the substrate is satisfactory for receiving the installation.

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**3 MATERIALS AND COMPONENTS**

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**3.1 GENERAL****Proprietary items**

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

Alternatives: If alternatives are proposed, submit proposed alternatives and include samples, available technical information, reasons for proposed substitutions and cost. If necessary, provide an English translation. State if provision of proposed alternatives will necessitate alteration to other parts of the works and advise consequent costs.

**Manufacturers' or suppliers' recommendations**

General: Select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and provide manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Instructions: Submit the recommendations and instructions, and advise of conflicts with other requirements.

Project modifications: Advise of activities that supplement, or are contrary to, manufacturer's or suppliers' written recommendations and instructions.

Product certification: If products must comply with product certification schemes, provide them in accordance with the certification requirements.

**Sealed containers**

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

**Consistency**

For the whole quantity of each material or product use the same manufacturer or source and provide consistent type, size, quality and appearance.

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**4 EXECUTION****4.1 INSTALLATION****General**

General: Install equipment and services plumb, fix securely and organise reticulated services neatly. Allow for movement in both structure and services.

Arrangement: Arrange services so that services running together are parallel with each other and with adjacent building elements. Under suspended ground floors, keep services at least 150 mm clear above ground surface, additional to insulation, and ensure access is not impeded.

Lifting: Provide permanent fixtures attached to the equipment, for lifting heavy items of equipment, as recommended by the manufacturer.

**4.2 SERVICES CONNECTIONS****Statutory authorities' requirements**

If the authorities elect to perform or supply part of the works, make the necessary arrangements. Install equipment supplied, but not installed, by the authorities.

**Connections**

Connect to statutory authorities' services or service points. Excavate to locate and expose connection points. On completion reinstate the surfaces and facilities which have been disturbed.

**4.3 SYSTEM INTEGRATION****General**

Interconnect system elements so that the installations perform their designated functions.

**4.4 BUILDING PENETRATIONS****Piping sleeves**

General: Provide metal or UPVC sleeves formed from pipe sections, for piping penetrations through building elements.

Sleeve diameter (for non fire-rated building elements): Sufficient to provide an annular space around the pipe or pipe insulation of at least 12 mm.

Minimum sleeve thickness:

- Metal: 1 mm.
- UPVC: 3 mm.

Sleeve terminations:

- If cover plates are fitted: Flush with the finished building surface.
- In floors draining to floor wastes: 50 mm above finished floor.
- In fire-rated and acoustic-rated building elements: 50 mm beyond finished building surface.

- Elsewhere: 5 mm beyond finished building surface.

Finish: Prime paint ferrous surfaces.

#### **Cable sleeves**

Provide UPVC sleeves formed from pipe sections, for penetrations through ground floor slabs and beams and external walls by cables not enclosed in conduit. In addition, for MIMS cables, provide sleeves for penetrations through masonry.

#### **Fire rated building elements**

Seal penetrations with a system conforming to AS 4072.1.

#### **Non-fire rated building elements**

Seal penetrations around conduits and sleeves. Seal around cables within sleeves. If the building element is acoustic rated, maintain the rating.

#### **Limitations**

General: Do not penetrate or fix to the following without approval:

- Structural building elements including external walls, fire walls, floor slabs and beams.
- Membrane elements including damp-proof courses, waterproofing membranes and roof coverings.

Membranes: If approval is given to penetrate membranes, provide a waterproof seal between the membrane and the penetrating component.

### **4.5 FIXING**

#### **General**

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

### **4.6 UNDERGROUND METAL PIPING**

#### **Corrosion protection**

General: Provide corrosion protection for:

- underground ferrous piping; and
- underground non-ferrous metal piping in corrosive areas.

Protection methods: Select from the following:

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

Standard: Comply with the recommendations of AS 2832.1.

### **4.7 PIPING**

#### **Cleaning**

General: Before installation, remove loose scale, burrs, fins and obstructions.

Protection: During construction, prevent the entry of foreign matter into the piping system by temporarily sealing the open ends of pipes and valves with purpose-made covers of pressed steel or rigid plastic.

#### **Installation**

General: Install piping in straight lines at uniform grades with no sags. Arrange to prevent air locks. Provide sufficient unions, flanges and isolating valves to allow removal of piping and fittings for maintenance or replacement of plant.

Arrangement: Arrange and support piping so that it remains free from vibrations whilst permitting necessary movements. Minimise the number of joints.

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

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

#### **Accessibility**

Provide access and clearance at fittings which require maintenance or servicing, including control valves and joints intended to permit pipe removal. Arrange piping

so that it does not interfere with the removal or servicing of associated equipment or valves or block access or ventilation openings.

#### **Embedded piping**

Expansion and contraction: Sheath or sleeve metal piping chased into masonry or encased in concrete so that expansion or contraction can take place without damage to the pipe or to the material or surface finish of the surrounding element.

#### **Cover plates**

If piping emerges from exposed building surfaces, provide cover plates of non-ferrous metal, finished to match the pipe, or of stainless steel, close fitting and firmly fixed in place.

#### **Cover plate sizes table**

Nominal pipe size, DN	Cover plate diameter
< 20	65 mm
≥ 20, < 50	100 mm
≥ 50	50 mm larger than pipe

#### **Support system**

General: Provide proprietary support systems of galvanized or zinc-coated steel construction.

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

### **4.8 VIBRATION SUPPRESSION**

#### **General**

Minimise the transmission of vibration and noise from rotating or reciprocating equipment to other building elements.

#### **Equipment requiring vibration isolation mountings**

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

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

#### **Selection of vibration isolation mountings**

Select mountings to achieve 95% isolation efficiency at the normal operating speeds of the equipment.

#### **Spring mountings**

Type: Free-standing laterally stable springs with at least 12 mm clearance between springs and other members such as bolts and housing.

Characteristics:

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

#### **Installation**

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

#### **Inertia bases**

General: Provide inertia bases with mass at least that of the equipment supported.

Construction: Steel, or steel-framed reinforced concrete. Position foundation bolts for equipment before pouring concrete.

Supports: Support on vibration isolation mountings using height saving support brackets.

#### **4.9 PAINTING SERVICES AND EQUIPMENT**

##### **General**

If exposed to view, paint new services and equipment including in plant rooms, except chromium, anodised aluminium, GRP, UPVC, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Repaint proprietary items only if damaged.

#### **4.10 MARKING**

##### **General**

General: Mark equipment, electrical wiring, piping, valves, conduits and ducts, to provide a ready means of identification.

Piping, conduits and ducts: To AS 1345, as applicable.

##### **Labels**

Type: Select from the following:

- For indoor applications only, engraved two-colour laminated plastic.
- Engraved and black filled lettering on stainless steel or brass, minimum thickness 1 mm.
- Cast metal.

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

##### **Minimum lettering heights**

Equipment nameplates: 40 mm.

Valve and pump identification: 20 mm.

Warning notices: 7 mm.

Automatic controls and electrical equipment: 5 mm.

Isolating switches: 5 mm.

Inside electrical enclosures: 3.5 mm.

Other: 3 mm.

##### **Location**

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

Exposed locations: Provide durable materials.

##### **Fixing**

General: Mechanical fixing. Do not penetrate vapour barriers.

Valves and pumps: Screw fix to body or attach by key ring to valve handwheels.

##### **Contents**

General: Match terminology of record drawings.

Valves and pumps: Correlate pumps to starters and valves.

##### **Pressure vessels**

Mount manufacturer's certificates in glazed frames on wall next to the vessel.

##### **Piping**

Identify throughout its length, including in concealed spaces.

##### **Electrical**

Mark operable control devices, indicators, isolating switches and outlets to provide a ready means of identification.

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## **5 COMPLETION**

### **5.1 GENERAL**

#### **Samples**

Remove unincorporated samples on completion.



**Contractor's submissions**

Within 2 weeks after practical completion, submit 3 copies of designated documents.

**Warranties**

General: Name the principal as warrantee. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

Commencement: Commence warranty periods at practical completion or at acceptance of installation, if acceptance is not concurrent with practical completion.

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

**5.2 RECORD DRAWINGS****General**

Submit record drawings. Show the "as installed" locations of building elements, plant and equipment. Show off-the-grid dimensions where applicable.

**Services**

Show dimensions, types and location of equipment, cables, piping and ductwork in relation to permanent site features and other underground services. Include relationship to building structure and other services, and changes made during commissioning and the maintenance period. Include diagrammatic drawings of each system showing piping and wiring, and principal items of equipment.

**Format**

Use the same borders and title block as the contract drawings.

**5.3 OPERATION AND MAINTENANCE MANUALS****General**

General: Submit operation and maintenance manuals for installations.

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

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

Referenced documents: If referenced documents or technical worksections require that manuals be submitted, include corresponding material in the operation and maintenance manuals.

**Format**

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

- Pagination: Number pages consecutively.
- Cover: Identify each binder with typed or printed title "*OPERATION AND MAINTENANCE MANUAL*", to spine. Identify title of project, volume number, volume subject matter, and date of issue.
- Ring size: 50 mm maximum, with compressor bars.
- Text: Manufacturers' printed data, including associated diagrams, or typewritten, single-sided on bond paper, in clear concise English.
- Dividers: Durable divider for each separate element, with typed description of system and major equipment components. Clearly print short titles under laminated plastic tabs.
- Drawings: Fold drawings to A4 size and accommodate them in the binders so that they may be unfolded without being detached from the rings. Provide with reinforced punched binder tabs.

**Contents - general**

Include the following:

- Drawings and technical data: As necessary for the efficient operation and maintenance of the installation.
- Table of contents: For each volume. Title to match cover.
- Directory: Names, addresses, and telephone and facsimile numbers of principal consultant, subconsultants, contractor, subcontractors and names of responsible parties.



- Equipment descriptions:
  - . Name, address and telephone and facsimile numbers of the manufacturer and supplier of items of equipment installed, together with catalogue list numbers.
  - . Schedules (system by system) of equipment, stating locations, duties, performance figures and dates of manufacture. Provide a unique code number cross-referenced to the record and diagrammatic drawings and schedules, including spare parts schedule, for each item of equipment installed.
- Operation procedures:
  - . Manufacturers' technical literature as appropriate.
- Maintenance procedures:
  - . Manufacturer's technical literature as appropriate. Register with manufacturer as necessary. Retain copies delivered with equipment.
  - . Detailed recommendations for preventative maintenance frequency and procedures.
  - . Safe trouble-shooting, disassembly, repair and reassembly, cleaning, alignment and adjustment, balancing and checking procedures. Provide logical step-by-step sequence of instructions for each procedure.
  - . Schedule of spares recommended to be held on site, being those items subject to wear or deterioration and which may involve the principal in extended deliveries when replacements are required. Include complete nomenclature and model numbers, and local sources of supply.
- Certificates:
  - . Copies of manufacturers' warranties.
  - . Certificates from authorities.
  - . Product certification.
- Drawings:
  - . Record drawings, full size.

**Contents - services**

Include the following in addition to *Contents - general*:

- Installation description: General description of the installation.
- Systems descriptions: Technical description of the systems installed, written to ensure that the principal's staff fully understand the scope and facilities provided. Identify function, normal operating characteristics, and limiting conditions.
- Systems performance: Technical description of the mode of operation of the systems installed.
- Equipment descriptions:
  - . Manufacturers' technical literature for equipment installed, assembled specifically for the project, excluding irrelevant matter. Mark each product data sheet to clearly identify specific products and component parts used in the installation, and data applicable to the installation.
  - . Supplements to product data to illustrate relations of component parts. Include typed text as necessary.
- Operation procedures:
  - . Safe starting up, running-in, operating and shutting down procedures for systems installed. Include logical step-by-step sequence of instructions for each procedure.
  - . Control sequences and flow diagrams for systems installed.
  - . Legend for colour-coded services.
  - . Schedules of fixed and variable equipment settings established during commissioning and maintenance.
  - . Procedures for seasonal changeovers.
- Maintenance procedures:

- Schedule of normal consumable items, local sources of supply, and expected replacement intervals up to a running time of 40,000 hours. Include lubricant and lubrication schedules for equipment.
  - Instructions for use of tools and testing equipment.
  - Emergency procedures, including telephone numbers for emergency services, and procedures for fault finding.
- Certificates:
  - Copies of test certificates for the mechanical installation and equipment used in the installation.
  - Test and balancing reports.
- Drawings:
  - Switchgear and controlgear assembly circuit schedules including electrical service characteristics, controls and communications.
  - Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

#### **Timing and quantity**

Draft manuals: Submit 2 draft manuals 8 weeks before the date for practical completion to enable the principal's staff to familiarise themselves with the installation. Include provisional record drawings and preliminary performance data.

- Format: As for the final manuals, with temporary insertions for items which cannot be finalised until the installation is commissioned and tested.

Revised draft manuals: Submit revised draft manuals 2 weeks before commissioning.

Progressive: For equipment put into service during construction and operated by principal, submit manuals within 2 weeks after acceptance.

Final drafts: Submit for review after completion of commissioning and no later than 2 weeks before the date for practical completion. If available, include certificates from authorities, and warranties.

Final copies: Submit 3 sets of final volumes within 2 weeks after practical completion. Incorporate feedback from review and from training of principal's staff, including preparation and insertion of additional data.

Revisions: Submit 3 sets of loose leaf amendments for insertion in the manuals, incorporating feedback from the maintenance period, within 2 weeks after completion.

### **5.4 TRAINING**

#### **General**

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

Format: Conduct training at agreed time, at system or equipment location.

#### **Operation**

Immediately after practical completion, explain and demonstrate to the principal's staff the purpose, function and operation of the installations.

#### **Maintenance**

Immediately after practical completion, explain and demonstrate to the principal's staff the purpose, function and maintenance of the installations.

#### **Demonstrators**

Qualified manufacturer's representatives who are knowledgeable about the installations.

#### **Seasonal operation**

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

### **5.5 SPARES**

#### **General**

Schedule: At least 8 weeks before the date for practical completion, submit a schedule of spare parts necessary for maintenance of the installation. State against

each item the recommended quantity, and the manufacturer's current price, including for:

- packaging and delivery to site;
- checking receipt, marking and numbering in accordance with the spare parts schedule;
- referencing equipment schedules in the operation and maintenance manuals; and
- painting, greasing and packing to prevent deterioration during storage.

## **5.6 TOOLS**

### **General**

General: At practical completion, supply 2 complete sets of special tools and portable indicating instruments necessary for operation and maintenance of equipment together with suitable means of identifying, storing and securing the tools and instruments. Include instructions for use.

## **5.7 COMMISSIONING**

### **Reports**

Submit reports indicating observations and results of tests and compliance or non-compliance with requirements.

### **Notice**

Give sufficient notice for inspection to be made of the commissioning of the installation.

### **Starting up**

General: Coordinate schedules for starting up of various systems and equipment. Give 5 working days notice before starting up each item.

Checks: Before starting, verify that each piece of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, circuit protection or for other conditions which may cause damage.

Tests: Verify that tests, meter readings, and specified electrical characteristics agree with those required by the manufacturer.

Wiring: Verify wiring and support components for equipment are complete and tested.

Manufacturers' representatives: Have authorised manufacturers' representatives present on site to inspect, check, and approve equipment or system installation prior to starting up, and to supervise placing equipment and operation.

- Starting up: Execute starting up under supervision of manufacturers' representative and appropriate contractors' personnel, in accordance with manufacturers' instructions.

Report: Submit a report demonstrating that equipment has been properly installed and is functioning correctly.

### **Circuit protection**

Confirm that circuit protective devices are sized and adjusted to protect installed circuits.

### **Controls**

Calibrate, set and adjust control instruments, control systems and safety controls.

## **5.8 COMPLETION TESTS**

### **General**

Carry out acceptance tests and final tests.

### **Functional checks**

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

### **Sound pressure level measurements**

Internal: To AS 2107.

External: To AS 1055.1.

Sound pressure levels: Measure the A-weighted sound pressure levels and the A-weighted background sound pressure levels at the designated positions.

Sound pressure level analysis: Measure the sound pressure level and the background sound pressure level over the full range of octave band centre frequencies from 31.5 Hz to 8 kHz at the designated positions.

Correction for background noise: To Table B1 of AS 2107.

Measurement positions: If a test position is designated only by reference to a room or space, do not take measurements less than 1 m from the floor, ground or walls.

#### **Hydraulic site tests**

Preparation for pressure testing: Securely anchor pipes and fittings in position to prevent movement during tests. Leave pipe joints exposed to enable observation during tests. Disconnect equipment which is not designed to carry the test pressure.

#### **Functional checks**

Residual current devices: Verify earth leakage tripping times and currents.

### **5.9 CLEANING**

#### **General**

At practical completion, clean the following:

- Luminaires. Relamp luminaires used during construction.
- Insides of switchgear and controlgear assemblies.
- Switchgear and contactors, and other electrical contacts. Adjust as necessary.

### **5.10 MAINTENANCE**

#### **General**

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

Emergencies: Attend emergency calls promptly.

#### **Maintenance program**

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

#### **Site control**

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

#### **Maintenance records**

General: Submit, in binders which match the manuals, loose leaf log book pages designed for recording completion activities including operational and maintenance procedures, materials used, test results, comments for future maintenance actions and notes covering the condition of the installation. Include completed log book pages recording the operational and maintenance activities performed up to the time of practical completion.

Number of pages: The greater of 100 pages or enough pages for the maintenance period and a further 12 months.

Certificates: Include test and approval certificates.

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

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

Certification: On satisfactory completion of the installation, submit certificates stating that each installation is operating correctly.

**DEMOLITION****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the demolition work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Site preparation, Earthwork

**1.2 STANDARD****General**

Demolition: To AS 2601.

**1.3 INTERPRETATION****Demolished materials classes**

Salvaged for re-use: Demolished materials scheduled for re-use in the works.

Salvaged for disposal: Demolished materials scheduled for re-use elsewhere.

Demolished for re-use: Non-scheduled demolished materials proposed by contractor for re-use in the works.

Demolished for removal: Other demolished materials.

**Dilapidation record**

The photographic and written record made before demolition work of the condition of the existing building, adjacent buildings, and other relevant structures or facilities.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice (minimum 24 hours) so that inspection may be made of the following:

- Adjacent structures before demolition.
- Services before disconnection or diversion.
- Trees specified to be retained, before demolition.
- Contents of building before demolition.
- Structure after stripping and removal of roof coverings and other external cladding.
- Underground structures after demolition above them.
- Excavations remaining after removal of underground work.
- Site after removal of demolished materials.
- Services after reconnection or diversion.

**Hold points**

As detailed by Principals Authorised Person

**2.2 SUBMISSIONS****Authorities**

Evidence of compliance: Before commencing demolition, submit evidence that

- requirements of authorities relating to the work under the contract have been ascertained;
- a permit to demolish has been obtained from the appropriate authority;
- a scaffold permit has been obtained from the appropriate authority (if scaffolding is proposed to be used);
- precautions necessary for protection of persons and property have been taken and suitable protective and safety devices provided to the approval of the relevant authority;
- treatment for rodent infestation has been carried out and a certificate has been obtained from the appropriate authority; and
- fees and other costs have been paid.

**Demolition**

Work plan: Submit the work plan before demolition or stripping work. Include the following information:

- The method of protection and support for adjacent property.
- Locations and details of necessary service deviations and terminations.
- If removal of asbestos or of material containing asbestos is required, the information specified in NOHSC 2002 Code of Practice for the Safe Removal of Asbestos.

**Records**

Dilapidation record: Submit a copy of the dilapidation record for inspection. Submit to each owner of adjacent property a copy of the part of the record relating to that property.

**3 MATERIALS AND COMPONENTS****3.1 DEMOLISHED MATERIALS****Demolished materials**

Ownership: Ownership of demolished materials is described in the **Demolished materials classes table**.

Re-use: If it is proposed to re-use demolished materials in the works, submit proposals.

Salvage: Recover without damage materials to be salvaged.

Removal: Remove from the site demolished materials which are the property of the contractor. Do not burn or bury on site.

- Transit: Prevent spillage of demolishing materials in transit.

**Demolished materials classes table**

Class	Ownership
Salvaged for re-use	Proprietor
Salvaged for disposal	Proprietor
Demolished for re-use	Proprietor
Demolished for removal	Contractor

**4 EXECUTION****4.1 SUPPORT****Temporary support**

Existing buildings: Until permanent support is provided, provide temporary support for sections of existing buildings which are to be altered and which normally rely for support on work to be demolished.

Ground support: Support excavations for demolition of underground structures.

Adjacent structures: Provide supports to adjacent structures where necessary, sufficient to prevent damage resulting from the works.

- Lateral supports: Provide lateral support at least that given by the structure to be demolished, using shoring.
- Vertical supports: Provide vertical support where necessary using piling or, underpinning or both.

#### **Permanent supports**

If permanent supports for adjacent structures are necessary and are not described, give notice and obtain instructions.

### **4.2 PROTECTION**

#### **Encroachment**

Prevent the encroachment of demolished materials onto adjoining property, including public places.

#### **Weather protection**

If walls or roofs are opened for alterations and additions or the surfaces of adjoining buildings are exposed, provide temporary covers to prevent water penetration. Provide covers to protect existing plant and equipment and materials intended for re-use.

#### **Dust protection**

Provide dust-proof screens, bulkheads and covers to protect existing finishes and the immediate environment from dust and debris.

#### **Security**

If a wall or roof is opened for alterations and additions, provide security against unauthorised entry to the building.

#### **Temporary screens**

General: Fill the whole of designated temporary openings or other spaces using dust and weatherproof temporary screens, fixed securely to the existing structure.

Type: Timber framed screens sheeted with fibre cement and painted. Seal the junctions between the screens and the openings.

#### **Temporary access**

Provide a substantial temporary doorset fitted with a rim deadlock, and remove on completion of demolition.

#### **Exposed surfaces**

General: Where necessary protect and weatherproof the surfaces of adjacent structures exposed by demolition.

### **4.3 DEMOLITION**

#### **Dilapidation record**

Purpose: Use the dilapidation record to assess the responsibility for damage or making good, or both, arising out of demolition work.

Availability: Keep the records of the investigations on site and available for inspection until practical completion of the contract.

#### **Encroachment**

If encroachments from adjacent structures are encountered and are not described, give notice and obtain instructions.

#### **Concrete slabs**

Using a diamond saw, neatly cut back or trim to new alignment with a clean true face existing concrete slabs to be partially demolished or penetrated.

#### **Explosives**

Do not use explosives.

### **4.4 HAZARDOUS MATERIALS**

#### **Hazardous materials**

Give notice immediately hazardous materials or conditions are found, including the following:

- Asbestos or material containing asbestos.
- Flammable or explosive liquids or gases.
- Toxic, infective or contaminated materials.

- Radiation or radioactive materials.
- Noxious or explosive chemicals.
- Tanks or other containers which have been used for storage of explosive, toxic, infective or contaminated substances.

**Asbestos removal**

Method: Use wet removal methods.

Covering: Use polyethylene sheet covering for non-asbestos surfaces in the working area.

Sealing: Seal in remaining fibres on the surface from which asbestos has been removed, with a spray adhesive.

Monitoring: Have dust monitoring performed by an independent testing authority.

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**5 COMPLETION****5.1 COMPLETION****Notice of completion**

Give at least 7 working days' notice of completion of demolition so that adjacent structures may be inspected following completion of demolition.

**Support**

Temporary support: Clear away at completion of demolition.



**SITE PREPARATION****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the site preparation work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Demolition, Earthwork, Service Trenching, Stormwater, Waste Water, Freshwater and Paving

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice (24 hours minimum) so that inspection may be made of the following:

- Enclosures to trees to be retained.
- Trees to be removed.

**Hold points**

As advised by Principals Authorised Person

**2.2 SUBMISSIONS****Materials**

Submit details of materials proposed, including the following:

- Provision of cleared vegetation for mulching.

**Execution**

Submit the methods and equipment proposed for the ground works, including the following:

- Dewatering and groundwater control and disposal of surface water.
- Control of erosion, contamination and sedimentation of the site, surrounding areas and drainage systems.
- Dust control.

**3 SITE MANAGEMENT****3.1 TREE PROTECTION****Warning sign**

General: Display a sign in a prominent position at each entrance to the site, warning that trees and plantings are to be protected during the contract. Remove on completion.

Lettering: Road sign type sans serif letters, 100 mm high, in red on a white background, to AS 1744.

### 3.2 TREES TO BE RETAINED

#### Marking

General: Mark trees and shrubs to be retained using suitable non-injurious, easily visible and removable means of identification.

Tags: 100 x 50 mm zincanneal tags, painted yellow and lettered to conform with the tree number on the drawings. Secure tags to trees using loose galvanized steel wire bands.

#### Protection and repair

Protection: Protect from damage the trees and shrubs to be retained, including those beyond the site area, both above and below ground.

Repair: Repair trees damaged during the work.

#### Tree enclosures

General: Provide temporary protective enclosures or guards at the drip line.

Wire enclosures: Four strands of fencing wire, or plastic mesh barrier, supported on star pickets spaced at not more than 4 m. Mesh enclosures: F62 reinforcing mesh 1800 mm high wired to 2400 mm long star pickets, driven 600 mm into the ground, spaced 1800 mm apart at a minimum distance of 1 m from the tree trunk.

Sheeting to excavations: Where excavations are to be made near trees, add continuous 900 mm high corrugated galvanized steel sheeting, bedded 150 mm into the ground, wired to the enclosure.

#### Work on trees

If it is proposed to perform work on trees, give notice and obtain instructions.

#### Removal

If a tree is damaged and repair work is considered impractical, or is attempted and fails, give notice and obtain instructions.

### 3.3 WORK NEAR TREES

#### Harmful materials

Keep the area within the drip line free of construction material and debris. Do not place bulk materials and harmful materials under or near trees. Do not place spoil from excavations against tree trunks. Prevent wind-blown materials such as cement from harming trees and plants.

#### Damage

Prevent damage to tree bark. Do not attach stays, guys and the like to trees.

#### Work under trees

General: Do not remove topsoil from, or add topsoil to, the area within the drip line of the trees.

Excavation: If excavation is required near trees to be retained, give notice and obtain instructions. Open up excavations under tree canopies for as short a period as possible.

Hand methods: Use hand methods to locate, expose and cleanly remove the roots on the line of excavation. If it is necessary to excavate within the drip line, use hand methods such that root systems are preserved intact and undamaged.

#### Roots

Do not cut tree roots exceeding 50 mm diameter. Where it is necessary to cut tree roots, use means such that the cutting does not unduly disturb the remaining root system. Immediately after cutting, apply a bituminous fungicidal sealant to the cut surface to prevent the incursion of rot or disease.

#### Backfilling

Backfill to excavations around tree roots with topsoil mixture as specified in TOPSOIL - LANDSCAPING. Add fertilizer at the rate specified in FERTILIZER - LANDSCAPING. Place the backfill in layers, each of 300 mm maximum depth, compacted to a dry density similar to that of the original or surrounding soil. Do not backfill around tree trunks or over root zone to a height above the original ground surface unless approved. Immediately after backfilling, thoroughly water the root zone surrounding the tree.

**Compacted ground**

Do not compact the ground under trees. If compaction occurs, give notice and obtain instructions.

**Watering**

Water trees as necessary, including where roots are exposed at ambient temperature > 35°C.

**3.4 EXISTING SERVICES****Marking**

Before commencing earthworks, locate and mark existing underground services in the areas which will be affected by the earthworks operations including clearing, excavating and trenching.

**Excavation**

Do not excavate by machine within 1 m of existing underground services.

**3.5 ENVIRONMENTAL PROTECTION****Erosion control**

General: Plan and carry out the work so as to avoid erosion, contamination, and sedimentation of the site, surrounding areas, and drainage systems.

**Temporary erosion control measures**

Staging: Stage operations (e.g. clearing, stripping).

Restoration: Progressively restore disturbed areas.

Drains: Provide temporary drains and catch drains.

Dispersal: Divert and disperse concentrated flows to points where the water can pass through the site without damage.

Spreader banks or other structures: Disperse concentrated run-off.

Silt traps: Construct and maintain silt traps to prevent discharge of scoured material to downstream areas.

Temporary grassing: Required.

Temporary fencing: Required.

Maintenance: After each rain inspect, clean, and repair if required, temporary erosion and sediment control works.

Removal: Remove temporary erosion control measures when they are no longer required.

**Dewatering**

General: Keep groundworks free of water. Provide and maintain slopes, crowns and drains on excavations and embankments to ensure free drainage. Place construction, including fill, masonry, concrete and services, on ground from which free water has been removed. Prevent water flow over freshly laid work.

**3.6 SITE RESTORATION****Requirement**

Where existing ground surfaces are not required to be varied as part of the works, restore them to the condition existing at the commencement of the contract.

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**4 SITE CLEARING****4.1 SITE CLEARING****Extent**

General: Clear only the following site areas:

- Areas to be occupied by works such as buildings, paving, excavation, regrading and landscaping.
- Other areas designated to be cleared.

Contractor's site areas: If not included within the areas specified above, clear generally only to the extent necessary for the performance of the works.

**Clearing operations**

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

Grubbing: Grub out stumps and roots over 75 mm diameter to a minimum depth of 500 mm below subgrade under buildings, embankments or paving, or 300 mm below finished surface in unpaved areas.

Old works: Remove old works, including slabs, foundations, pavings, drains and manholes found on the surface.

Existing grass: Remove grass to a depth just sufficient to include the root zone.

Surface Layer: Remove the surface layer of the natural ground. Keep topsoil removal to a minimum.

#### **4.2 SPOIL**

##### **Off site disposal**

General: Remove surplus excavated material and surplus site clearance material from the site.

Put cleared vegetation through a chipper. Reduce to pieces not larger than 75 x 50 x 15 mm.

##### **On site burial**

Do not bury boulders, concrete fragments and the like on site.

#### **4.3 SUB-STATION SITE**

##### **Requirements**

Clear the area indicated for the location of the sub-station easement in accordance with SITE CLEARING - SITE PREPARATION, providing a satisfactory excavatable site, free of all services and obstructions which could interfere with the installation of an earthing electrode which may extend to a depth of 10m or more.

##### **Leveling**

Level the site by removal of topsoil and/or filling and suitable compaction. Any filling material shall be clean, stable and reasonably fine. Where the site is cut into a slope, provide retention of the bank and the diversion of all surface water from the sub-station.

Carry out all work to the satisfaction of the local supply authority.

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### **5 COMPLETION**

#### **5.1 COMPLETION**

##### **Temporary works**

Tree enclosures: Remove temporary tree enclosures at completion.

Tree marking: Remove temporary marks and tags at completion.

<b>EARTHWORK</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the earthworks work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Demolition, Site Preparation, Service Trenching, Stormwater, Wastewater, Freshwater and Paving

**1.2 INTERPRETATION****Definitions**

General: To AS 1348.1.

Description and classification of soils: To AS 1726.

Bad ground: Ground unsuitable for the purposes of the works, including fill liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances and ground which is or becomes soft, wet or unstable.

Discrepancy: A difference between contract information about the site and conditions encountered on the site, including but not limited to discrepancies concerning

- the nature or quantity of the material to be excavated or placed;
- existing site levels; and
- services or other obstructions beneath the site surface.

Line of influence: A line extending downward and outward from the bottom edge of a footing, slab or pavement and defining the extent of foundation material having influence on the stability or support of the footings, slab or pavement.

Rock: Monolithic material with volume greater than 0.5 m<sup>3</sup> which cannot be removed until broken up either by explosives or by rippers or percussion tools.

Subgrade: The trimmed or prepared portion of the formation on which the pavement or slab is constructed.

### 1.3 SITE INVESTIGATION

**Notice**

If the following are encountered, give notice immediately and obtain instructions before carrying out any further work in the affected area:

- Bad ground.
- Discrepancies.
- Rock.
- Springs, seepages.
- Topsoil > 100 mm deep.

### 1.4 RECORDS OF MEASUREMENT

**Excavation and backfilling**

Agreed quantities: If a schedule of rates applies, provisional quantities are specified, or there are variations to the contract levels or dimensions of excavations, do not commence backfilling or place permanent works in the excavation until the following have been agreed and recorded:

- Depths of excavations related to the datum.
- Final plan dimensions of excavations.
- Quantities of excavations in rock.
- Quantities of fill and topsoil, imports being recorded separately.

**Rock**

Level and class: If rock is to be measured for payment purposes, whether as extra over excavation of material other than rock or for adjustment of provisional measurements, do not remove the rock until the commencing levels and the classes of rock have been determined.

## 2 QUALITY ---

### 2.1 TESTS

**Witness points**

Give sufficient notice (minimum 24 hours) so that inspection may be made of the following:

- Items to be measured as listed in *Records of measurement*.
- Areas to be cleared and/or stripped of topsoil.
- Areas stripped of topsoil.
- Excavation completed to contract levels or founding material.
- Subgrade before placing sub-base, base, working base, filter fabric or membrane, as applicable.
- Filter fabric in place before backfilling.
- Base completed to contract levels.
- Stockpiled topsoil before spreading.

**Hold points**

As advised by the Principals Authorised Person

### 2.2 TESTS

**Geotechnical testing authority**

General: Use an independent testing laboratory certified for this work by an organisation accredited by JAS-ANZ.

Level of responsibility to AS 3798 Appendix B

**Testing**

Compaction (density): Test for compliance.

Retesting: Rework and retest areas which do not achieve the required density, until that density is achieved.

**Field density**

Field dry density: To AS 1289.5.3.1, AS 1289.5.3.2, AS 1289.5.3.5 or AS 1289.5.8.1. If using AS 1289.5.8.1 calibrate the surface moisture-density gauge in accordance with AS 1289.5.8.4 before use.

Varying: Do not vary the test procedure for a given soil type.

Density index: To AS 1289.5.6.1.

**Reference density**

Standard maximum dry density: To AS 1289.5.1.1.

Modified maximum dry density: To AS 1289.5.2.1.

Minimum and maximum dry density, cohesionless soil: To AS 1289.5.5.1.

Hilf density ratio and moisture variation: To AS 1289.5.7.1.

Varying: Do not vary the test procedure for a given soil type.

Sampling: Follow the recommendations in AS 3798 clause 7.4.

Moisture curing of samples: Allow adequate curing times, or make appropriate allowances for poorly-conditioned compaction curves.

California bearing ratio: Sample and test to AS 1289.6.1.1, AS 1289.6.1.2 or AS 1289.6.1.3, as appropriate.

**Field density test locations**

Fill: Test the areas of fill which are to support non-spanning concrete ground slabs, roads and paved areas, and areas of uncertain compaction.

**Field density test frequency**

Site area > 1500 m<sup>2</sup>: At least

- 1 test per layer or 200 mm thickness per material type per 2500 m<sup>2</sup>; or
- 1 test per 500 m<sup>3</sup> distributed evenly throughout full depth and area; or
- 3 tests per visit;

whichever requires the most tests.

Site area 500 – 1500 m<sup>2</sup>: At least

- 1 test per layer or 200 mm thickness per 1000 m<sup>2</sup>; or
- 1 test per 200 m<sup>3</sup> distributed evenly throughout full depth and area; or
- 1 test per allotment per layer;

whichever requires the most tests.

Site area < 500 m<sup>2</sup>: At least

- 1 test per layer or 200 mm thickness per 500 m<sup>2</sup>; or
- 1 test per 100 m<sup>3</sup> distributed evenly throughout full depth and area; or
- 3 tests per visit;

whichever requires the most tests.

Confined operations: 1 test per 2 layers per 50 m<sup>2</sup>.

**2.3 SAMPLES****General**

Submit samples of the following:

- Each type of filter fabric.
- Each type of imported fill.

## 2.4 SUBMISSIONS

### Design

Calculations: Submit calculations to show that proposed excavations and temporary supports, including where applicable supports for adjacent structures, will be stable and safe.

### Tests

Imported fill: Submit certification or test results which establish the compliance of imported fill with the contract.

### Materials

Submit details of materials proposed, including the following:

- Sources of imported fill.

### Execution

Submit the methods and equipment proposed for the groundworks, including the following:

- Excavation methods, stages, clearances, batters and temporary supports.
- Stockpiles and borrow pits.
- Placing and compaction methods and stages.

## 3 MATERIALS AND COMPONENTS ---

### 3.1 FILL

#### Fill material

General: Inorganic, non-perishable material.

Sulfur content: Do not provide filling with sulfur content exceeding 0.5% within 500 mm of cement bound elements (for example concrete structures or masonry) unless such elements are protected by impermeable membranes or equivalent means.

#### Structural fill

Excluded materials:

- organic soils;
- materials contaminated through past site usage;
- materials which contain substances which can be dissolved or leached out, or which undergo volume change or loss of strength when disturbed and exposed to moisture;
- silts or silt-like materials;
- fill containing wood, metal, plastic, boulders or other deleterious material.

Clays of high plasticity:

Material containing large particles after compaction:

Overwet materials:

Gravels or rock fill which leave voids:

Saline soils:

Carbonate soils:

Demolition rubble:

#### Sources

Provide fill imported on to the site from suitable sources unless the fill type can be provided from

- spoil recovered from the excavations; or
- borrow material from designated borrow pits.

#### Fill types

General fill: Well graded material, maximum particle size 75 mm, plasticity index  $\leq 55\%$ .

Select fill: Granular material complying with the following:

- Particle size: 75 mm maximum.
- Proportion passing 0.075 mm sieve: 25% maximum



- Plasticity index:  $\geq 2\%$ ,  $\leq 15\%$ .
- Hardcore: Graded hard material capable of being compacted to an even stable surface.
- Particle size: 120 mm maximum.
- Proportion exceeding particle size of 50 mm: 75% minimum.

Embankment fill: Graded material for road embankments with maximum particle size determined by location and layer thickness, but in any case not exceeding two-thirds of the compacted layer thickness.

Hand-packed hardcore: Hardcore packed by hand to an even surface before compaction.

#### Subsoil filter

Subsoil filter: Coarse sand or crushed stone graded to the **Subsoil grading table**.

#### Subsoil grading table

Sieve aperture (mm)	Percentage passing (by mass)		
	Fine filter	Coarse filter	Combined filter
26.5		100	100
19.0		90 - 100	95 - 100
9.5	100	75 - 90	90 - 97
4.75	80 - 100		75 - 90
2.36	65 - 90		60 - 78
1.18		10 - 30	35 - 55
0.60		0 - 2	18 - 25
0.30	7 - 16		5 - 10
0.15	0 - 4		0 - 3

### 3.2 FILTER FABRIC

#### Material

Type: Polymeric fabric formed from a plastic yarn composed of at least 85% by weight of propylene, ethylene, amide or vinylidenechloride and containing stabilisers or inhibitors to make the filaments resistant to deterioration due to ultraviolet light.

Identification and marking: To AS 3705

#### Protection

Provide heavy duty protective covering. Store clear of the ground and out of direct sunlight. During installation do not expose the filter fabric to sunlight for more than 14 days.

### 3.3 GABIONS

#### General

Type: Steel mesh or fabric baskets wired together and filled with rock to form permeable scour protection linings and retaining walls. Place filter fabric under and behind the gabions.

#### Rock fill

Standard: To AS 2758.4.

Los Angeles value (to AS 1141.23): To AS 2758.4, Table 2.

**4 EXCAVATING**

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**4.1 TOLERANCES****Surfaces**

Finish groundworks to reasonably smooth and uniform surfaces conforming to the required tolerances.

**Subgrades**

General: The tolerances in the **Subgrade tolerances table** apply to finished subgrade levels unless overridden by the specific requirements (including tolerances) for finished surface levels and thicknesses of covering materials.

- Absolute level tolerance: Maximum deviation from design level.
- Relative level tolerance: Maximum deviation from a 3 m straight edge laid anywhere on each plane surface.

**Subgrade tolerances table**

Item	Level tolerance (maximum)	
	Absolute	Relative
Cut subgrade in earth and fill subgrade	+ 0 - Unspecified	20 mm
Cut subgrade in rock	+ 0 - Unspecified	Unspecified

**4.2 STRIPPING****General**

Extent: Areas to be cut and areas to be filled and areas to be occupied by structures, pavements, embankments and the like.

Materials to be stripped:

- Soils not suited to support loads or to be incorporated in fills.
- Topsoils, where unsuitable and where needed for subsequent revegetation.

Maximum depth: 100 mm.

**Stripped material stockpiles**

Topsoil: Stockpile site topsoil approved for re-use and imported topsoil where necessary. Establish stockpiles to heights not exceeding 1.5 m. Provide adequate drainage and erosion protection. Do not burn off or remove plant growth which may occur during storage. Do not allow traffic on stockpiles. If a stockpile is to remain for more than four weeks, sow with temporary grass. Protect the topsoil stockpiles from contamination by other excavated material, weeds and building debris.

**4.3 EXCAVATION****Extent**

Site surface: Excavate over the site to give correct levels and profiles as the basis for construction, paving, filling and landscaping. Make allowance for compaction or settlement.

Footings: Excavate for footings, pits, wells and shafts, to the required sizes and depths. Confirm that bearing capacity is adequate.

Crawl space: Provide clear space under timber floor bearers.

- Minimum clearance: 400 mm.

**Existing footings**

If excavation is required below the line of influence of an existing footing, use methods which maintain the support of the footing and ensure that the structure and finishes supported by the footing are not damaged.

**Proof rolling**

Extent: Proof roll excavations for pavements, filling and non-spanning slabs on ground to determine the extent of any bad ground.

**REMOVAL OF TOPSOIL- Topsoil Stockpiles**

Stockpile site topsoil approved for re-use, and imported topsoil before placing as specified in TOPSOIL - LANDSCAPING. Establish stockpiles in directed locations, to heights not exceeding 1.5m. Provide drainage, erosion protection and aeration. Do not remove plant growth occurring during storage unless approved. Do not allow traffic on stockpiles. If to remain for more than four weeks, sow with approved temporary grass

**4.4 PROVISIONAL DEPTHS****Contract depths**

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

#### 4.5 EXPLOSIVES

##### General

Do not use explosives.

#### 4.6 SUBGRADES AFFECTED BY MOISTURE

##### General

Where the subgrade is unable to support construction equipment, or it is not possible to compact the overlying pavement only because of a high moisture content, perform one or more of the following:

- Allow the subgrade to dry until it will support equipment and allow compaction.
- Scarify the subgrade to a depth of 150 mm, work as necessary to accelerate drying, and recompact when the moisture content is satisfactory.
- Excavate the wet material and remove to spoil, and backfill excavated areas

#### 4.7 BEARING SURFACES

##### General

Provide even plane bearing surfaces for loadbearing elements including footings. Step to accommodate level changes. Make the steps to the appropriate courses if supporting masonry.

##### Deterioration

If the bearing surface deteriorates because of water or other cause, excavate further to a sound surface before placing the loadbearing element.

#### 4.8 REINSTATEMENT OF EXCAVATION

##### General

Where excavation exceeds the required depth, or deteriorates, reinstate to the correct depth, level and bearing value.

##### Particular

Below or within the “line of influence” of footings, beams, or other structural elements: Concrete of strength equal to the structural element, minimum 15 MPa.

Below slabs or pavements: Provide selected filling compacted to the specified density. In cut subgrades if the over excavation is less than 100 mm, do not backfill, but make good by increasing the thickness of the layer above. Backfill rock depressions and over excavation of subsoil drains using coarse subsoil filter.

#### 4.9 SUPPORTING EXCAVATIONS

##### Removal of supports

Remove temporary supports progressively as backfilling proceeds.

##### Voids

Guard against the formation of voids outside sheeting or sheet piling if used. Fill and compact voids to a dry density similar to that of the surrounding material.

#### 4.10 ADJACENT STRUCTURES

##### Temporary supports

General: Provide supports to adjacent structures where necessary, sufficient to prevent damage arising from the works.

Lateral supports: Provide lateral support using shoring.

Vertical supports: Provide vertical support where necessary using piling or underpinning or both.

##### Permanent supports

If permanent supports for adjacent structures are necessary and are not described, give notice and obtain instructions.

##### Encroachments

If encroachments from adjacent structures are encountered and are not shown on the drawings, give notice and obtain instructions.

#### 4.11 ROCK BOLTING

##### General

Provide proprietary high strength steel bars or tubes anchored into holes drilled in the rock and tensioned against plates bearing on the rock face to provide temporary or permanent support for the rock face.

##### Protection

Protect permanent rock bolts by grouting the drilled hole with cement grout after tensioning the rock bolt. Protect the bearing plate and the exposed portion of rock bolt and anchorage with a protective coating or by embedment in concrete.

### 5 PLACING AND COMPACTION ---

#### 5.1 BORROW PITS

##### Site borrow pits

Location: Locate site borrow pits so that no pit edge is closer than 3 m from any fence line, site boundary, or edge of excavation or embankment. Clear the pit area, and strip and store the topsoil.

Erosion protection: Provide erosion protection during the winning operations, including drainage such that the pit is free draining.

Completion: On completion of winning operations, grade the pit to remove abrupt changes of slope or level, respread the topsoil, and grass the pit by hydroseeding.

#### 5.2 PREPARATION FOR FILLING

##### General

Prepare the ground surface before placing fill (including topsoil fill), ground slabs or load bearing elements. Shape to assist drainage. Remove materials which will inhibit or prevent satisfactory placement of fill layers, loose material, debris and organic matter. Compact the ground exposed after stripping to achieve the required density of overlying fill, if any.

##### Benching

If fill is to be placed on a surface which slopes more than 1:4, bench the surface to form a key for the fill. As each of layer of fill is placed, cut the existing ground surface progressively to form a series of horizontal steps > 1 m in width and > 100 mm deep. Recompact the excavated material as part of the filling. Shape to provide free drainage.

##### Under earth mounds

Cultivate the ground to a depth of 200 mm before mound formation.

##### Under slabs, paving and embankments

Compact the ground to achieve the densities specified for these locations. If necessary loosen the ground to a depth of > 200 mm and adjust the moisture content before compaction to a density consistent with subsequent filling.

##### Rock ledges

Remove overhanging rock ledges.

#### 5.3 FILTER FABRIC

##### Preparation

Before placing the filter fabric trim the ground to a smooth surface free from cavities and projecting rocks.

##### Placing

Lay the fabric flat, but not stretched tight, and secure it with anchor pins. Overlap joints 300 mm minimum.

## 5.4 PLACING FILL

### General

Layers: Place fill in near-horizontal layers of uniform thickness, deposited systematically across the fill area.

Extent: Place and compact fill to the designated dimensions, levels, grades, and cross sections so that the surface is always self draining.

Edges: At junctions of fill and existing surfaces, do not feather the edges.

Mix: Place fill in a uniform mixture.

Previous fill: Before placing subsequent fill layers, ensure that previously accepted layers still conform to requirements, including moisture content.

### Placing at structures

General: Place and compact fill in layers simultaneously on both sides of structures, culverts and pipelines to avoid differential loading. Carefully place first layers of fill over the top of structures.

Concrete: Do not place fill against concrete until the concrete has been in place for fourteen days.

### Moisture content

Adjustment: Where necessary to achieve the required density or moisture content or both, adjust the moisture content of the fill before compaction. Ensure the moisture distribution is uniform, and avoid saturation at the specified density.

Rain: If rain is likely, crown the placed fill, seal using plant with rubber tyres or smooth wheels, and grade to prevent ponding.

## 5.5 COMPACTING FILL

### Tolerances

Finish the surface to the required level, grade and shape within the following tolerances:

- Under slabs and loadbearing elements: + 0, - 25 mm
- Other ground surfaces:  $\pm 50$  mm, provided the area remains free draining and matches adjacent construction where required. Provide smoothness as normally produced by a scraper blade.

### Density

General: Compact each layer of fill to the required depth and density, as a systematic construction operation. Shape surfaces to provide drainage and prevent ponding.

Exposed ground surface: After stripping, compact to at least 150 mm deep.

Maximum rock and lump size in layer after compaction: 2/3 compacted layer thickness.

Fill batter faces: Either compact separately, or overfill and cut back. Form roughened surfaces to the faces.

### Protection

Protect the works from damage due to compaction operations. Where necessary, limit the size of compaction equipment or compact by hand. Commence compacting each layer at the structure and proceed away from it.

### Moisture content

Adjust the moisture content of fill during compaction within the range of 85 - 115% of the optimum moisture content determined by AS 1289.5.1.1 or AS 1289.5.2.1 as appropriate, in order to achieve the required density.

### Minimum relative compaction table

Location	Cohesive soils. Minimum dry density ratio (standard compaction) to AS 1289.5.1.1 (std) or AS 1289.5.2.1 (mod)	Cohesionless soils. Minimum density index to AS 1289.5.6.1

Location	Cohesive soils. Minimum dry density ratio (standard compaction) to AS 1289.5.1.1 (std) or AS 1289.5.2.1 (mod)	Cohesionless soils. Minimum density index to AS 1289.5.6.1
Residential: - Lot fill, house sites.	95 std	65
Commercial: - Fills to support minor loadings incl. floor loadings < 20 kPa and isolated pad or strip footings < 100 kPa.	98 std	70
Pavements: - Fill to support pavements	95 std	65
- Subgrade to 300 mm deep	98 std	80
- Sub-base courses	95 mod	n.a.
- Base course, heavily loaded	98 mod	n.a.
- Base course, other	95 mod	n.a.

**Settlement of Earthworks**

Fill, compact and trim all settlements of earthworks which take place during construction. Dig out soft spots or unsound areas and fill with sound material properly compacted to a condition equivalent to the surrounding material.

**5.6 GRADING****External areas**

Grade to give falls away from buildings, minimum 1:100.

**Subfloor areas**

General: Grade the ground surface under suspended floors to drain ground or surface water away from buildings without ponding

**6 BARRIERS AND MEMBRANES****6.1 PROTECTION TO MEMBRANES****Protective covering**

Do not disturb or damage the protective covering of membranes during backfilling.

**7 RETAINING WALLS****7.1 CRIB WALLS****General**

Type: Proprietary system of interlocking precast concrete or preservative treated timber cribs with selected backfill placed and compacted progressively with the crib to form a retaining wall.

**7.2 GABIONS****Assembly**

Assemble the baskets and join them together by wiring along edges both horizontally and vertically before placing the rock fill. Fix the top of the basket by wiring to both the sides and the diaphragms.

**7.3 EARTH REINFORCEMENT****General**

Type: Proprietary system of galvanized steel strips or steel mesh strips placed in layers with compacted selected fill and connected to precast concrete facing panels to form vertical retaining walls. Provide the necessary accessories including

levelling pad, bearing pads, and joint fillers or covers to keep the selected fill material out of the panel joints.

## **8 COMPLETION**

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### **8.1 COMPLETION**

#### **Records**

Certified records of measurement: Submit a certified copy of the agreed records of measurement.

#### **Construction records**

General: Submit the following:

- Site visit record; and
- Earthworks summary report, or Daily geotechnical reports.

Content: At least the following:

- The areas in which fill is placed.
- Levels after stripping.
- Location of any trees or large shrubs that may have been removed.
- Materials exposed after stripping and the criteria upon which the decision to cease stripping was made.
- Levels after completion of the filling.
- Types of fill materials in various zones.
- Location and level of each compliance test, together with test results. State if a test is a retest of an area which was previously rejected.
- Action taken where testing indicated that the specified criteria had not been met.
- Any areas where fill material or compaction was to be of a greater or lesser standard than elsewhere on site.

Format: To AS 3798 Appendix C.

#### **Temporary works**

Temporary supports: Remove temporary supports to adjacent structures at completion.



**SERVICE TRENCHING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the service trenching work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Earthworks, Demolition, Site Preparation, Stormwater, Wastewater, Freshwater and Paving

**1.2 DESIGN****Shoring and lining systems**

Steel shoring and trench lining systems: To AS4744.1.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Service trenches excavated before laying the service.
- Services laid in trenches and ready for backfilling.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Bedding density tests**

Testing authority: Have density tests of pipe bedding carried out by an authority accredited by NATA.

Test methods:

- Field dry density: AS 1289.5.3.2 or AS 1289.5.3.5.
- Standard maximum dry density: AS 1289.5.1.1.
- Dry density ratio: AS 1289.5.4.1.
- Density index: AS 1289.5.6.1.

### 3 SERVICE TRENCHES

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#### 3.1 EXCAVATING

##### Existing surfaces

Before excavating trenches, saw-cut existing concrete and bituminous surfaces on each side of the trench to provide a straight even joint. Lift and store unit paving for later reinstatement.

##### Excavation

Excavate for underground services, to required lines, levels and grades. Generally make the trenches straight between personnel access ways, inspection points and junctions, with vertical sides and uniform grades.

##### Trench widths

Keep trench widths to the minimum consistent with the laying and bedding of the relevant service and construction of personnel access ways and pits.

##### Trench lengths

Excavate trenches in sections of suitable length.

##### Trench depths

General: As required by the relevant service and its bedding method.

Notice: If excavation is necessary below the level of adjacent footings, give notice, and provide necessary support for the footings.

##### Obstructions

Cut back roots encountered in trenches to the edge of trench or a distance not less than 600 mm clear of the relevant service, and as specified in WORK NEAR TREES - SITE PREPARATION. Remove such other obstructions including roots, stumps, boulders and the like which may, in the opinion of the person with full authority/superintendent, interfere with the proper functioning of the service.

##### Dewatering

Keep trenches free of water. Place bedding material, services and backfilling on firm ground free of surface water.

##### Excess excavation

If trench excavation exceeds the correct depth, reinstate to the correct depth and bearing value using compacted bedding material or grade N20 concrete.

#### 3.2 BORING

##### Subcontractor

If under road boring is required in lieu of trenches, engage a suitably qualified subcontractor to do the work.

##### Process

Ensure a tight fit to the service pipes. If voids are encountered, fill by pressure grouting.

#### 3.3 BACKFILLING

##### General

Backfill service trenches as soon as possible after the service has been laid and bedded, if possible on the same working day. Place the backfill in layers  $\leq 150$  mm thick and compact to the density which applies to the location of the trenches to minimise settlement, and so that pipes are buttressed by the trench walls.

##### Marking services

Underground marking tape: To AS/NZS 2648.1.

##### Backfill material

General: General fill with no stones greater than 25 mm occurring within 150 mm of the service, or other materials as required for particular services or locations. Well graded, inorganic, non-perishable material, maximum size 75 mm, plasticity index  $\leq 55\%$ .

Under roads and paved areas and within 4 m of building: Coarse sand, controlled low strength material or fine crushed rock.

In topsoil areas: Complete the backfilling with topsoil for at least the top 50 mm.

In reactive clay: In sites classified M, H or E to AS 2870, provide an impervious material where trenches fall towards footings.

### **3.4 REINSTATEMENT OF SURFACES**

#### **General**

Reinstate existing surfaces removed or disturbed by trench excavations to match existing and adjacent work.

#### **Lawn areas**

Provide 150 mm of loam and resow the lawn over the trench and other disturbed areas.

#### **Paving and roads**

Reinstate to match adjacent work, paved surfaces and assets disturbed or removed during excavation of trenching.

#### **Concrete surfaces**

Reinstate concrete surfaces to the original level. If necessary, provide steel reinforcement keyed to the adjacent concrete and laid to prevent the reinstalled concrete from subsiding and cracking.

#### **Bituminous surfaces**

General: Provide crushed rock base and subbase to match the existing pavement. Prime coat the edges of the existing surfacing with bitumen. Lay and compact hot-mix asphalt so that the edges are flush and the centre is cambered 10 mm above the existing pavement. If hot pre-mix is not available, cold pre-mix may be used.

Minimum asphalt thickness: 50 mm or the adjacent pavement thickness, whichever is thicker.

#### **Unit paving**

Provide sand bedding and, if necessary, compacted crushed rock base. Reinstate the paving units.

**CONCRETE FORMWORK****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the concrete formwork work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

All concrete elements, Paving, Roadbase & subbase

**1.2 STANDARD****General**

Formwork design: To AS 3610.

Formwork construction: To AS 3610.

**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Completed formwork before concrete placing.
- Evaluation of the finish.
- Used formwork, after cleaning and before reuse.

**Hold points**

As advised by the Principals Authorised Person

**2.2 SAMPLES**

**Formwork test panels for surface finish classes 1, 2 or 3**

**2.3 SUBMISSIONS****Design**

Multi-storey work: Submit calculations to show that allowable concrete stresses will not be exceeded if

- formwork procedures or loadings differ from the information included in the project documentation;
- project documentation does not include formwork shoring or stripping procedures or allowable loadings from stacked materials; or
- props above a floor do not coincide with the props below.

Certification: Submit certification by a qualified structural engineer

**Tests**

Void formers: Submit test certificates to confirm that the formers comply with the following requirements, under laboratory conditions, when placed on damp sand and loaded with a mass of wet concrete at least the mass of the beams or slabs they are required to support:

- Deflection during placing and compaction of the concrete is less than the span of the beam or slab divided by 1000.
- Additional deflection between initial set and 7 days does not exceed span/400.
- Collapse and loss of load carrying capacity will occur not more than 48 hours after flooding with water, creating a void at least 60% of the original depth of the void former.

**Execution**

Documentation: Submit formwork documentation and details of proposed form linings, form facings, release agents and, where applicable, reuse of formwork. Submit details of support propping required for construction loads which exceed design loads for concrete of that age.

Reshoring: If intended, submit proposals.

Surface repair method: Before commencing repairs, submit the proposed method.

Slip formwork: Show on formwork drawings the method of lifting the forms during construction and the average rate of movement. Demonstrate that the proposed average rate will permit the production of concrete of the specified quality and surface.

Stripping single storey suspended work: If the requirements of AS 3610 cannot be met, give notice.

Stripping multi-storey suspended work: If the requirements of AS 3610 cannot be met, or if shores are not concentric floor to floor, submit formwork documentation with reference to loads and concrete properties.

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**3 MATERIALS AND COMPONENTS****3.1 MATERIALS AND COMPONENTS****Form linings and facings**

Compatible with finishes applied to concrete.

**Release agents**

Compatible with applied finishes to concrete and the contact surfaces.

**Void formers**

Unwaxed cardboard or fibreboard, collapsible on absorption of moisture.

**Lost formwork**

Permanent or lost formwork, chloride free, which will not impair the structural performance of the concrete members.

**Steel reinforcement decking**

Acts as permanent formwork and positive tensile reinforcement in one way reinforced concrete slab construction.

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**4 EXECUTION****4.1 FORMWORK****General**

General: Design and construct formwork so that the concrete, when cast in the forms, will have the required dimensions, shape, profile, location and surface finish. Allow for dimensional changes, deflections and cambers resulting from the application of prestressing forces (if any), applied loads, temperature changes and concrete shrinkage and creep.

Openings: In vertical forms provide form openings or removable panels for inspection and cleaning, at the base of columns, walls and deep beams. For thin walls and columns, provide access hatches for placing concrete.

Reshoring: Do not reshore.

**Corners**

Work above ground: Chamfer at re-entrant angles, and fillet at corners. Face of bevel 25 mm.

**Release agents**

Before placing reinforcement, apply a release agent to form linings and facings. Do not coat the reinforcement and construction joints with release agent. Do not allow the release agent to “puddle”.

**Cleaning**

Before placing concrete, remove free water, dust, debris and stains from the forms and the formed space.

**Permanent loading**

Do not place permanent loads, including masonry walls, on the concrete structure while it is still supported by formwork.

**4.2 DIMENSIONAL TOLERANCES****Dimensional tolerances**

Position: Construct formwork so that the position of finished concrete is within the tolerances stated in the **Position tolerances table**.

**Position tolerances table**

Surface finish class to AS 3610	1	2	3	4	5
Maximum deviation from correct position (mm)	10	15	20	25	40

**4.3 FORMED SURFACE FINISH****Visually important surfaces**

For concrete of surface finish classes 1, 2 or 3, set out the formwork to give a regular arrangement of panels, joints, bolt holes, and similar visible elements in the formed surface. Form 45° bevels, 25 mm on the face on corners and angles.

**4.4 FORM TIE BOLTS****Removable bolts**

Remove the bolts without causing damage to the concrete.

**Cover**

Position formwork tie bolts left in the concrete so that the tie does not project to within 50 mm of finished surface.

**Bolt hole filling**

General: Provide material matching the surface colour.

Recessed filling: Fill or plug the hole to 6 mm below the surface.

**4.5 SLIP FORMWORK****General**

Type: Slip formwork or moving formwork which consists of suitable equipment, constructed and operated by personnel experienced in its use.

**Height of the forms**

1200 mm maximum.

**Provision for inspection**

Provide a hanging scaffold below the moving formwork, from which surface treatment and inspection may be carried out.

**4.6 VOID FORMERS****General**

Cast designated suspended ground floor slabs and beams on void formers. Keep void formers dry until use, place them on a firm level surface, cover with a waterproof membrane, and place reinforcement and concrete with minimum delay.

**4.7 STEEL REINFORCEMENT DECKING****Installation**

General: Fix sheeting to structural steel supports with puddle welds, or with welded shear studs in composite construction.

Propping: Provide temporary propping during concrete placing and curing.

**4.8 STRIPPING AND REMOVAL****Formwork removal**

Extent: Remove formwork, other than steel reinforcement decking, including formwork in concealed locations.

Timing: Do not disturb forms until concrete is hard enough to withstand it. Do not remove formwork until concrete is strong enough to support loads without unacceptable deflection.

**Stripping of formwork**

General: To AS 3600 where it is more stringent than AS 3610.

Post-tensioned concrete: Do not remove form supports supporting post-tensioned concrete members until sufficient prestress has been added to support the loads.

Multi-storey work: Provide for stripping without disturbing props supporting succeeding floors.

**CONCRETE REINFORCEMENT****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the concrete reinforcements work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

All concrete elements, Paving, Roadbase & subbase

**1.2 STANDARDS****General**

Steel reinforcing materials: To AS/NZS 4671.

**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Reinforcement fixed in place.
- Cores and embedments fixed in place.

**Hold points**

As advised by Principals Authorised Person

**2.2 SUBMISSIONS****Design**

Bending schedules: Submit marking plans and schedules showing location, shape, size and grade of reinforcement.

**Tests**

Certificate of compliance: Submit either the manufacturer's certificate of compliance with the relevant standard, or an independent testing authority's test certificates demonstrating compliance.

**Execution**

Changes: Submit proposed changes, if any, in the reinforcement shown on the drawings.

Mechanical splices: If mechanical bar splices are proposed or required submit details and test certificates for each size and type of bar to be spliced.

Damaged galvanizing: If repair to AS/NZS 4680 Appendix E is intended, submit proposals.

Welding: Give notice before welding reinforcement.



Splicing: Submit details of any additional splicing not documented.

Provision for concrete placement: If spacing or cover of reinforcement does not comply give notice.

### 3 MATERIALS AND COMPONENTS

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#### 3.1 REINFORCEMENT

##### General

Ductility grade: To AS/NZS 4671 class N.

Identification: To AS/NZS 4671 Section 9.

Surface condition: Free of loose mill scale, rust, oil, grease, mud or other material which would reduce the bond between the reinforcement and concrete.

##### Dowels

Standard: To AS/NZS 4671 grade 250N.

General: Provide each dowel in one piece, straight, with square cut ends free from burrs. Apply 2 coats of bitumen emulsion to half the length of the dowel at one end.

##### Tie wire

General: Annealed iron 1.25 mm diameter (minimum).

External and corrosive applications: Galvanized.

##### Bending

General: To AS/NZS 4671 Section 19.

##### Fabrication tolerances

General: To AS/NZS 4671 Subsection 19.2.

#### 3.2 PROTECTIVE COATED REINFORCEMENT

##### Extent

For concrete elements containing protective coated reinforcement, provide the same coating type to all that element's reinforcement and embedded ferrous metal items, including tie wires, stools, spacers, stirrups, plates and ferrules, and protect other embedded metals with a suitable coating.

##### Galvanizing

Standard: To AS/NZS 4680

Zinc coating (minimum): 700 g/m<sup>2</sup>.

Preparation: Pickling to AS 1627.5.

Fabrication: Galvanize after fabrication.

Passivation: By dipping in 0.2% sodium dichromate solution.

##### Epoxy coating:

General: High build, high solids chemically resistant coating.

Thickness: 200 µm minimum.

##### Damage

If damage occurs to the coating undertake the following action:

- Galvanized coatings: Replace the damaged reinforcement.
- Epoxy coatings: Repair the damage to the **Epoxy coating** subclause.

### 4 EXECUTION

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#### 4.1 REINFORCEMENT SUPPORTS

##### Support types

General: Provide purpose-made concrete, metal or plastic supports, adequate to withstand construction and traffic loads, and in the form of chairs, spacers, stools, hangers and ties.

Exposure classification A1:

- Provide a protective coating to ferrous metal supports which extend to the surface of the concrete, or which are used with galvanized or zinc-coated reinforcement.

Exposure classifications more severe than A1: Provide either

- plastic supports of adequate strength and of a shape appropriate to the location; or

- concrete supports of the same concrete quality as the concrete element.

**Supports over membranes**

General: Prevent damage to waterproofing membranes or vapour barriers. Place a metal or plastic plate under each support.

**Support spacing**

General: Provide supports in adequate numbers and spacing to maintain reinforcement in the correct position within the tolerances under the **Fixing requirements** subclause.

Minimum spacing:

- Bars:  $\leq 60$  diameters.
- Fabric:  $\leq 750$  mm.

**4.2 FIXING REINFORCEMENT****Fixing requirements**

General: Secure the reinforcement against displacement by tying at intersections with either annealed iron 1.25 mm diameter (minimum) wire ties, or clips. Bend the ends of wire ties away from nearby faces of forms so that the ties do not project into the concrete cover.

Mats: For bar reinforcement in the form of a mat, secure each bar at alternate intersections, and at other points as required.

Beams: Tie ligatures to bars in each corner of each ligature. Fix other longitudinal bars to ligatures at 1 m maximum intervals.

Columns: Secure longitudinal column reinforcement to all ligatures at every intersection.

Bundled bars: Tie bundled bars together so that the bars are in closest possible contact. Provide tie wire at least 2.5 mm diameter at centres  $\leq 24$  times the diameter of the smallest bar in the bundle.

Tolerances: To AS/NZS 4671 Section 19.

**Dowels**

Fixing: Embed the unpainted half of the dowels in the concrete placed first.

Tolerances:

- Location:  $\pm$  half the diameter of the dowel.
- Alignment: 2 mm in 300 mm.

**Splicing**

General: To AS 3600 Subsection 13.2, for splicing additional to that documented. Obtain approval under the **Submissions** clause before implementation.

**Welding**

General: Do not weld reinforcement

- except where documented, or submitted and approved under the **Submissions** clause;
- within 75 mm of a bend with an internal radius  $< 12$  bar diameters; or
- at points which have been re-bent.

Standard: To AS 1554.3.

**4.3 REINFORCEMENT PROTECTION****Unencased reinforcement**

General: Provide protection for 'starter bars' and other items projecting from cast concrete for future additions, and exposed to the weather.

**Concrete cover**

General structures: To AS 3600.

Structures for retaining liquids: To AS 3735.

<b>IN SITU CONCRETE</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the in situ concrete work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

All concrete elements, Paving, Roadbase & subbase

**1.2 STANDARDS****General**

Concrete: To AS 1379.

Concrete structures for retaining liquids: To AS 3735.

Materials and construction: To AS 3600.

**1.3 INTERPRETATION****Definitions**

Cold weather: Surrounding outdoor shade temperature < 10°C.

Contraction joint: An unreinforced joint with a bond-breaking coating separating the concrete joint surfaces.

Control joint: A weakened plane contraction joint created by forming a groove, extending at least one quarter the depth of the section, either by using a grooving tool, by sawing, or by inserting a premoulded strip.

Expansion joint: An unreinforced joint with the joint surfaces separated by a compressible filler.

Hot weather: Surrounding outdoor shade temperature > 32°C.

Isolation joint: A joint without keying, dowelling, or reinforcement, which imposes no restraint on movement.

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**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Base or subgrade before covering.
- Membrane or film underlay installed on the base.
- Completed formwork, and reinforcement, cores, fixings and embedded items fixed in place.
- Commencement of concrete placing.

- Surfaces or elements to be concealed in the final work before covering.

**Hold points**

As advised by Principals Authorised Person

**Rejection**

Remove rejected concrete from the site.

**2.2 MATERIAL TESTS****Material tests schedule**

Material	Test method
Portland and blended cement (each type used)	To AS 3972
Fly ash	To AS 3582.1
Ground slag	To AS 3582.2
Admixtures (each type used)	To AS 1478.1
Coarse aggregate	
Dense and lightweight:	
- Particle size analysis	To AS 1141.11 and AS 1141.12
- Particle density and water absorption	To AS 1141.6.1
- Particle shape	To AS 1141.14
- LA value	To AS 1141.23
- Soundness	To AS 1141.24
Fine aggregate:	
- Particle size analysis	To AS 1141.11 and AS 1141.12
- Particle density and water absorption	To AS 1141.5
- Friable particles	To AS 1141.32
- Organic impurities	To AS 1141.34
- Soundness	To AS 1141.24
- Light particles	To AS 1141.31
- Sugar	To AS 1141.35

**Coarse Aggregate**

To AS 1141

If so directed by the Principals Authorised Person, and under his supervision, take in accordance with AS 1141 a 50 kg sample of each aggregate type, individually or in combination proposed for use in the concrete mix, and submit to the approved NATA registered independent testing authority three weeks prior to commencement of concrete supply. Accompany the samples with a written request stating the particular tests required by the Principals Authorised Person. In the case of individual aggregate samples, state the mix proportions proposed. The cost of such handling and testing of the aggregate shall be treated as a variation to the Contract.

**2.3 CONCRETE TESTS****Concrete testing**

Dissemination of production information: If concrete is manufactured off site, register the project in accordance with AS 1379 clause 6.4.3.

**Concrete testing methods**

Sampling, identification and testing: To AS 1012. Sample the concrete on site, at the point of discharge from the agitator.

**Test records**

Records and reports: To AS 1012.

**Control tests**

Acceptance criteria:

- Average strength of all samples must exceed the required value.
- Strength of any one sample must be at least 0.85 of the required value.

**Performance tests**

General: Sample, test and assess the concrete for compliance.

Standard: To AS 1379

Strength grade/Characteristic compressive strength: Spread the site sampling evenly throughout the pour. For concrete in columns and bearing walls, take one sample per batch. Use at least 2 specimens from each sample.

- Specimen size: 200 x 100 mm diameter but, if aggregate size exceeds 20 mm, 300 x 150 mm diameter.

Slump: Test at least one sample from each batch before placing concrete from that batch in the work.

Drying shrinkage: Test 3 specimens of each type of concrete every 3 months or every 3000 m<sup>3</sup> placed concrete. Base assessments on the average of the 3 specimens test results. Conduct 2 sets of tests on trial mixes.

**Performance tests schedule**

Project assessment: "Required"

**Sampling frequency table**

Number of batches for each type and grade of concrete per day	Minimum number of samples
1	1
2-5	2
6-10	3
11-20	4
each additional 10	1 additional

**Concrete tests schedule**

Property	Test method
Air entrainment	To AS 1012.4
Slump	To AS 1012.3.1
Characteristic compressive strength	To AS 1012.9
Early age strength	To AS 1012.9
Modulus of rupture	To AS 1012.11
Indirect tensile strength	To AS 1012.10
Drying shrinkage	To AS 1012.13
Density of plastic concrete	To AS 1012.5
Density of hardened concrete	To AS 1012.12.1 or AS 1012.12.2
Bleeding	To AS 1012.6

**Embedded pressure pipes**

Leak tests: Before embedment, leak test those pipes which will contain liquid or vapour at a pressure > 10 kPa.

**2.4 SAMPLE PANELS****General**

Supply sample panels to AS 3610 for the application specified.

**Manufacture**

Cast the panels using the formwork, concrete, compaction equipment, form release agents, curing and formwork removal methods which are to be used in the final work.

**Storage**

Maintain the panels on site undamaged and protected from the weather, as samples for future evaluation of completed work.

**2.5 COLOURED CONCRETE****General**

Supply sample blocks of concrete to be coloured with mineral oxides.

- Number: 4.
- Size (nominal): 300 x 300 x 50 mm.

**2.6 SUBMISSIONS****Subcontractors**

Submit names and contact details of proposed ready mixed concrete suppliers, and alternative source of supply in the event of breakdown of ready mixed or site mixed supply.

**Design**

Loading: Submit calculations to justify the adequacy of the structure to sustain any construction loads and procedures.

**Shop drawings**

Cores, fixings and embedded items: If the locations of these items are not shown or are shown diagrammatically, submit shop drawings showing the proposed locations, clearances and cover. Indicate proposed repositioning of reinforcement.

**Tests**

Material tests: Before supplying concrete submit test certificates based on samples from the most recent production or from stockpiles for the project, for the materials and properties listed in the **Material tests schedule**. Submit additional certificates at the scheduled frequency during the course of the works.

Dissemination of production information: Submit copies of the reports.

Embedded pressure pipes: Submit the results of leak tests.

Sampling and testing of specimens: Submit records providing the full history of sampling and testing. Submit test certificates, and retain results in tabular form on site.

**Materials**

General: Submit details of proposed sources of materials.

Foamed concrete: Submit details, including aggregate grading and mix proportions.

Curing compounds: If it is proposed to use a liquid membrane-forming curing compound submit the following information:

- Efficiency index.
- Certified test results for water retention to AS 3799 Appendix B.
- Evidence that an acceptable final surface colour will be obtained.
- Evidence of compatibility with concrete, and with applied finishes, if any.
- Methods of obtaining the required adhesion for toppings and render.

Concrete mixes: Submit details, including proposed admixtures and use, if any, of fly ash or granulated slag.

**Execution**

General: Submit proposals for mixing, placing, finishing and curing concrete including the following:

- Site storage, mixing and transport methods and equipment, if applicable.
- Addition of water at the site.
- Handling, placing, compaction and finishing methods and equipment, including pumping.
- Temperature control methods.
- Curing and protection methods
- Curing period for low-pressure steam curing, if proposed.
- Target strength, slump and proposed mix for each type and grade of concrete.

- High early strength cement.
- Placing under water.
- Cutting or displacing reinforcement, or cutting hardened concrete.
- Sequence and times for concrete pours, and construction joint locations and relocations.
- Changes to the plastic concrete mix.

Sawn joints: Submit proposed methods, timing and sequence of sawing joints.

#### **Ready mixed supply**

Delivery docket: For each batch, submit a docket listing the information required by AS 1379, and the following additional information:

- Name of concrete delivery supervisor.
- The concrete element or part of the works for which the concrete was ordered, and where it was placed.
- The total amount of water added at the plant and the maximum amount permitted to be added at the site.
- The amount of water, if any, added at the site.
- Method of placement and climate conditions during pour.
- Serial numbers of identification certificates of each batch.
- Project assessment carried out each day.
- For special class performance concrete, specified performance and type of cement binder.
- For special class prescription concrete, details of mix, additives, and type of cement binder.

#### **Personnel**

Personnel engaged in sampling, preparing and handling test specimens, shall be subject to the approval of the Superintendent.

### **2.7 TEST SPECIMENS**

#### **Records**

To identify samples, record the following data in the sampler's field note book:

- Job site
- Date and time sample taken
- Name of supplier (if ready-mixed)
- Delivery docket or batch number
- Method of sampling
- Location of sampling
- Cylinder numbers
- Location of concrete batch after placement
- Slump of sample

### **2.8 SPECIMEN DEMOULDING AND TRANSPORT**

#### **Standard**

To AS 1012, Part 8, clauses 1.8.1 and 1.9 except as follows:-

- The specimen shall remain in its metal mould for 24 hours, without movement, before de-moulding
- Sydney Metropolitan Area: Preference shall be given to sub-clause (a) or (b) in clause 1.8.2 of AS 1012.

Site De-moulding: When carried out, remove each specimen from its mould in the presence of the Superintendent, who will indelibly mark the side of each specimen for identification.

NATA Laboratory Handling: If cylinders have been cast by the approved independent testing authority, the authority will be permitted to de-mould and transport the concrete specimens to its laboratories, in the same manner as that in which the authority would normally process specimens. Under these circumstances, specimens for 28 day testing shall be delivered to the testing laboratory no later than 14 days prior to the due date, and specimens for 7 day testing no later than 3 days prior to the due date.

Country Areas: Where direct transport can be effected within reasonable time such as in the Newcastle and Port Kembla areas, the provisions covering the Sydney Metropolitan Area shall apply.

Remote Country Areas: The requirements of AS 1012, Clause 1.8.2 paragraph (c) or (d) may be modified such that should lime saturated water storage not be available, storage in damp sand in a purpose-made tray is permitted, provided the sand is kept continuously damp and temperature requirements are maintained.

## 2.9 TRANSPORT TO TESTING LABORATORY

### Handling

Pack samples to the Principals Authorised Person's satisfaction.

### Transport

Within 24 hours after packaging, dispatch each carton by passenger train or other approved mode of transport to ensure its arrival at the approved testing authorities laboratory within 48 hours of dispatching.

Rail: When sending by rail use passenger rail to nearest appropriate train station to the approved testing authorities laboratories.

Motor Vehicle: Secure each carton from unnecessary movement. Avoid excessive jarring and jolting.

## 2.10 TEST RESULTS

### Certificates

NATA registered independent testing authority certificates will be sent directly to the Contractor by the Testing authority.

Acceptance criteria: The test strength of each sample shall be the average of the difference in strength between the two cylinders made from it. Where the difference is greater than 4 Mpa the lower result shall be disregarded and the test strength shall be that of the remaining cylinder.

# 3 MATERIALS

## 3.1 POLYMERIC FILM UNDERLAY

### General

Under internal slabs on ground including integral ground beams and footings, provide a vapour barrier or, in areas prone to rising damp or salt attack, a damp-proofing membrane.

### Standard

Vapour barriers and damp-proofing membranes: To AS 2870.

### Base preparation

According to base type, as follows:

- Graded stone base: Blind with sufficient sand to create a smooth surface free from hard projections. Wet the sand just before laying the underlay.
- Concrete working base: Remove projections above the plane surface, and loose material.

### Installation

Lay over the base, lap joints at least 200 mm and seal the laps and penetrations with waterproof adhesive tape. Face the laps away from the direction of concrete pour. Take the underlay up vertical faces as far as the damp proof course where applicable, and fix at the top by tape sealing. Locate vertical laps only on vertical or inclined surfaces. Patch or seal punctures or tears before pouring concrete.

## 3.2 HOT-MIX UNDERLAY

### Standard

General: To AS 2734.

### Mix type

Class: SA3 (sand asphalt).

Bitumen emulsion: To AS 1160.

- Designation: AMS/170-60.

### Primer

Material: Cutback bitumen to AS 2157, Class AMC00 or AMC0.

Application rate: 0.6 L/m<sup>2</sup>.



**Tack coating**

Material: Cutback bitumen to AS 2157, Class AMC2 or AMC3.

**Surface tolerance**

± 5 mm from the correct plane, and deviation ≤ 5 mm from a 2 m straight edge.

**3.3 CONCRETE MATERIALS****General**

Cementitious materials: Dry and uncontaminated.

Aggregate: Unsegregated and uncontaminated.

Admixtures: No deterioration.

**Bagged cement**

Standard: To AS 3972.

Type: GP.

Age: Less than 6 months old.

**Cement**

Cement type: Portland cement to AS 3972 and the N.S.W. Government Quality Assurance Scheme, unless otherwise specified.

Coarse aggregate:

Types: Washed crushed river gravel, fine grained basalt, or other materials approved by the Superintendent. State the source of the aggregate on delivery dockets. Obtain approval before changing the source of the aggregate.

Metallurgical furnace slag aggregate: To AS 2758.1 Clause 16, except that non-ferrous slags must not be used.

**Chemical admixtures**

Contents: Free of chlorides, fluorides and nitrates.

**3.4 CONCRETE****Concrete performance**

General: Mix must work readily into corners and angles, and around reinforcement, without segregation or excess free water on the surface, producing sound concrete, with minimal plastic settlement and shrinkage cracking.

Drying shrinkage (maximum including tolerances): 0.65 mm for concrete up to and including strength grade 32; 0.7 mm for higher strength grades.

**Ready mixed supply**

Method: Use the batch production process. Deliver in agitator trucks.

Transport: Mode must prevent segregation, loss of material and contamination, and must not adversely affect placing or compaction.

Addition of water: Do not add water at the site after starting discharge.

**Elapsed delivery time**

Elapsed time between the wetting of the mix and the discharge of the mix at the site must be as short as possible, and must not exceed the criteria in the **Elapsed delivery time table**. Do not discharge below 10°C or above 32°C.

**Elapsed delivery time table**

Concrete temperature at time of discharge (°C)	Maximum elapsed time (hours)
10 - 24	2.00
24 - 27	1.50
27 - 30	1.00
30 - 32	0.75

**Site mixed supply**

Plant: Mix concrete in a plant located on the construction site.

Emergencies: Do not mix by hand.

### 3.5 CONCRETE TYPES

#### Foamed concrete

Cement, fine aggregate, water and foam.

#### Steel fibre concrete

Materials: Cement, coarse aggregate, fine aggregate, water and steel fibres. Admixtures and fly ash may be included.

Fibre strength:  $\geq 350$  MPa.

Fibre aspect ratio (length/cross sectional area):

- $\leq 300 \text{ mm}^{-1}$ .
- $\geq 150 \text{ mm}^{-1}$  for plain fibres.
- $\geq 60 \text{ mm}^{-1}$  for fibres with a positive mechanical bond mechanism.

Mix:

- Slump: 80 mm.
- Water:cement ratio: Maximum 0.5.
- Minimum cement content:  $350 \text{ kg/m}^3$ .
- Air content (by volume): 6% maximum.

#### Glass fibre reinforced concrete

Materials: Cement, fine aggregate, water, and alkali-resistant glass fibres. Admixtures and fly ash may be included.

Properties:

- Density: At least  $1900 \text{ kg/m}^3$ .
- Modulus of rupture (characteristic value): 21 MPa.
- Limit of proportionality (characteristic value): 8 MPa.
- Glass fibre content (by weight): At least 5%.

Proportions: Achieve and maintain uniform mixing of the glass fibres and cement during application.

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## 4 CORES, FIXINGS AND EMBEDDED ITEMS

### 4.1 CORES, FIXINGS AND EMBEDDED ITEMS

#### Adjoining elements

For adjoining elements to be fixed to or supported on the concrete, provide for the required fixings. Where applicable provide for temporary support of the adjoining elements during construction of the concrete.

#### Structural integrity

Fix cores and embedded items to prevent movement during concrete placing. In locating cores, fixings and embedded items, do not cut or displace reinforcement, or cut or core hardened concrete. Ensure that embedded pipes and conduits do not adversely affect structural integrity.

#### Placement

Maximum deviation from correct positions:

- Cores and embedded items generally:  $\pm 10 \text{ mm}$ .
- Fixings including anchor bolts:  $\pm 3 \text{ mm}$ .
- Anchor bolt groups for structural steel: To AS 4100.

Water tracking: Ensure fixings do not allow water to track to reinforcement.

#### Inserted fixings

Methods: Do not insert fixings using drilling (including masonry anchors), or using explosive tools.

#### Protection

General: Grease threads. Cover and protect embedded items against damage.

Corrosion: Galvanize inserts, anchor bolts and embedded fixings.

### 4.2 PENETRATIONS

#### Termite Barrier

Stainless steel mesh or graded stone to AS 3660.1

Chemical Soil Barriers: Must not be used (Mandatory)

## **5 PLACING AND CURING**

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### **5.1 CONCRETE WORKING BASE**

#### **Material**

N20 concrete. Lay over the base or subgrade and screed to the required level.

#### **Thickness**

Minimum 50 mm.

#### **Finish**

Membrane support: Wood float finish or equivalent.

#### **Surface tolerance**

± 5 mm from the correct plane, ± 5 mm from a 2 m straight edge.

### **5.2 PLACING AND COMPACTION**

#### **Placing**

General: Use placing methods which minimise plastic settlement and shrinkage cracking. Avoid segregation. Avoid loss of materials. Between construction joints, maintain a plastic concrete edge.

Layers: Place concrete in layers ≤ 300 mm thick, such that each succeeding layer is compacted before previous layer has taken initial set.

Placing slabs and pavements: Place concrete uniformly over the width of the slab so that the face is generally vertical and normal to the direction of placing.

Construction joints: Thoroughly roughen hard concrete joint surfaces. Remove loose or soft material, foreign matter and laitance. Dampen joint surface using clean water and coat with neat cement slurry.

#### **Horizontal movement**

Use suitable conveyors, clean chutes, troughs or pipes. Do not use water to facilitate the movement.

#### **Vertical movement**

In vertical elements, limit the free fall of concrete to 1500 mm per 100 mm element thickness, up to a maximum free fall of 3000 mm, using enclosed chutes or access hatches in forms. As far as practicable keep chutes vertical and full of concrete during placement, with ends immersed in the placed concrete.

#### **Rain**

Do not expose concrete to rain before it has set, including during mixing, transport or placing.

#### **Sequence of pours**

Minimise shrinkage effect by pouring the sections of the work between construction joints in a sequence such that there will be suitable time delays between adjacent pours.

#### **Compaction**

General: Remove air bubbles and fully compact the mix.

Methods: Use immersion and screed vibrators accompanied by hand methods as appropriate.

Vibrators: Do not allow vibrators to come into contact with partially hardened concrete, or reinforcement embedded in it. Do not use vibrators to move concrete along the forms. Avoid over-vibration that may cause segregation.

#### **Placing records**

Keep on site and make available for inspection a log book recording each placement of concrete, including the following:

- Date.
- The portion of work.
- Specified grade and source of concrete.
- Slump measurements.
- Volume placed.

### 5.3 COLD WEATHER PLACING

#### General

Formwork and reinforcement: Before and during placing maintain temperature at  $> 5^{\circ}\text{C}$ .

Concrete: Maintain the temperature of the freshly mixed concrete within the limits shown in the **Cold weather placing table**. “Outdoor” air temperature applies to the air temperature at the time of mixing and to the predicted or likely air temperature at any time during the next 48 hours.

#### Cold weather placing table

Outdoor air temperature	Temperature of concrete	
	Minimum	Maximum
$\geq 5^{\circ}\text{C}$	$10^{\circ}\text{C}$	$32^{\circ}\text{C}$
$< 5^{\circ}\text{C}$	$18^{\circ}\text{C}$	$32^{\circ}\text{C}$

#### Admixtures

Do not provide calcium chloride, salts, chemicals or other material in the mix to lower the freezing point of the concrete.

#### Frozen materials

Do not allow frozen materials or materials containing ice to enter the mixer, and keep free of frost and ice any forms, materials, and equipment coming in contact with the concrete.

#### High early strength cement

Provide in severe weather conditions to enable the concrete to develop sufficient strength to permit formwork removal within the specified time. Do not provide as a substitute for the heating of materials or for adequate protection of placed concrete against low temperatures. Do not provide high alumina cement.

#### Heating

General: Heat the concrete materials, other than cement, to the minimum temperature necessary to ensure that the temperature of the placed concrete is within the limits specified.

Maximum temperature of water:  $60^{\circ}\text{C}$  when it is placed in the mixer.

### 5.4 HOT WEATHER PLACING

#### Mixing

Surrounding outdoor shade temperature  $> 38^{\circ}\text{C}$ : Do not mix concrete.

#### Handling

Prevent premature stiffening of the fresh mix and reduce water absorption and evaporation losses. Mix, transport, place and compact the concrete as rapidly as possible.

#### Placing

Formwork and reinforcement: Before and during placing maintain at  $\leq 32^{\circ}\text{C}$ .

Concrete: When being placed in the forms, the temperature of the concrete must not exceed the criteria in the **Hot weather placing table**.

#### Hot weather placing table

Concrete element	Temperature limit
Normal concrete in footings, beams, columns, walls and slabs	$35^{\circ}\text{C}$
Concrete in large mass concrete sections; or concrete of strength 40 MPa or greater, in sections exceeding 600 mm in thickness	$27^{\circ}\text{C}$

#### Temperature control methods

Select one or more of the following methods of maintaining the specified temperature of the placed concrete:

- Use chilled mixing water.
- Spray the coarse aggregate using cold water.
- Cover the container in which the concrete is transported to the forms.
- Cool the concrete using liquid nitrogen injection before placing

**5.5 PLACING UNDER WATER****Standard**

Placing by tremie: To AS 2159.

**General**

Condition: Do not place under water if placing in the dry is practicable by pumping or other means of dewatering.

Minimum cement content for the mix: Increase by 25%.

**5.6 CURING****General**

Protection: Protect fresh concrete, during the curing period, from premature drying and from excessively hot or cold temperatures. Protect fresh concrete from physical and thermal shock, from traffic likely to damage the surface, and from rain. If temperature of surrounding air is  $> 35^{\circ}\text{C}$ , protect from wind and sun until the concrete can be covered. Maintain at a reasonably constant temperature with minimum moisture loss, during the curing period. Prevent rapid drying out at the end of the curing period.

Curing period: Cure continuously from initial set until the total cumulative number of days or fractions of days, during which the air temperature in contact with the concrete is above  $10^{\circ}\text{C}$ , is at least the following:

- Fully enclosed internal surfaces/Early high-strength cement concrete: 3 days.
- Other surfaces/Ordinary Portland cement concrete: 7 days.

**Curing compounds**

Standard: To AS 3799.

Substrates: Do not use wax-based or chlorinated rubber-based curing compounds on surfaces forming substrates to concrete toppings and cement-based render. Do not use PVA compounds.

Application: Provide a uniform continuous flexible coating without visible breaks or pinholes, which remains unbroken at least seven days after application.

**Hot weather curing**

Do not use curing compounds. After placement, either

- pond or continuously sprinkle with water;
- immediately cover the concrete using an impervious membrane, or hessian kept wet, until curing begins; or
- if the temperature exceeds  $25^{\circ}\text{C}$  or if not protected against drying winds, protect the concrete using a fog spray application of aliphatic alcohol evaporation retardant.

**Cold weather curing**

Prevent plastic concrete from freezing, but do not use salt or chemicals. Maintain concrete temperature between  $10 - 20^{\circ}\text{C}$  for curing period.

**Visually important surfaces**

Produce uniform colour on adjacent surfaces.

**5.7 PROTECTION****Loading**

Notice: Give notice before loading the concrete structure.

Protection: Protect the concrete from damage due to load overstresses, heavy shocks and excessive vibrations, particularly during the curing period. Do not place construction loads on self-supporting structures which will overstress the structures.

**Surface protection**

Protect finished and exposed aggregate concrete surfaces from damage

**6 JOINTS****6.1 CONSTRUCTION JOINTS****Location**

Do not relocate or eliminate construction joints, or make construction joints not shown on the drawings. This includes emergency construction joints made necessary by unforeseen interruptions to the concrete pour.

**Joint preparation**

Roughen and clean the hardened concrete joint surface, remove loose or soft material, free water, foreign matter and laitance. Dampen the surface just before placing the fresh concrete.

**Finish at construction joints**

Butt join the surfaces of adjoining pours. In visually important surfaces make the joint straight and true, and free from impermissible blemishes relevant to its surface finish class.

**Termite Barrier**

Stainless steel mesh or graded stone to AS 3660.1

Chemical Soil Barriers: Not permitted

**6.2 EXPANSION JOINTS****Jointing materials**

Type: Provide jointing materials compatible when used together, and non-staining to concrete in visible locations.

Foamed materials (in compressible fillers): Closed-cell or impregnated types which do not absorb water.

Bond breaking: Provide back-up materials for sealants, including backing rods, which do not adhere to the sealant. They may be faced with a non-adhering material.

**Joint filling**

Preparation: Before filling, dry and clean the joint surfaces, and prime.

Joint filling: Fill with jointing materials. Finish visible jointing material neatly flush with adjoining surfaces.

Watertightness: Apply the jointing material so that joints subject to ingress of water are made watertight.

**6.3 DOWELS****Joint dowels**

Provide galvanized steel reinforcing rod dowels in expansion and contraction joints, where required. Embed dowels normal to the plane of the joint, so that half the dowel lies on each side of the joint. Heavily grease or bitumen coat one half and fit an expansion cap to that end.

**6.4 WATERSTOPS****Locations**

Provide waterstops surrounded by fully compacted concrete, and located so that

- their correct positions in the finished work are ensured;
- the proper placing and compaction of the concrete is not inhibited; and
- reinforcement is not displaced from its correct position.

**7 PLINTHS AND DUCTS**

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**7.1 CONCRETE PLINTHS****Construction**

General: Provide galvanized steel surround at least 75 mm high and 1.6 mm thick, fixed to floor with masonry anchors. Fill with concrete.

Reinforcement: Single layer of F62 fabric.

Concrete: Grade N20.

- Finish: Steel float flush with the surround.

**7.2 INTERNAL DUCT COVERS****Type**

For open ducts, trenches or channels in flooring, provide duct covers

- consisting of a proprietary system removable cover or grating in a fixed frame, with the necessary accessories; and
- of a type suitable for the duct size and floor loading.

**Trench liner**

General: Form a trench liner to the duct profile and rivet it to the frame.

**Installation**

Fix the frame into the substrate, either by casting in or by mechanical attachments as appropriate to the system, so that the surface of the cover or grating is flush with the finished floor surface.

**CONCRETE FINISHES****1 GENERAL****1.1 CROSS REFERENCES****Cross reference**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the concrete finishes work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

All concrete elements, Paving, Roadbase & subbase

**2 QUALITY****2.1 SAMPLES****Sample panels**

Surface treatment: Do not proceed with the related work until, for surface treatments, the accepted range of treatments has been determined.

**3 MATERIALS AND COMPONENTS****3.1 MATERIALS****Clear resin sealers**

Type: Transparent acrylic resin sealer, resistant to ultraviolet rays, suitable for exterior or interior applications, rendering the surface impervious to stains of oils, grease, water and acids, non-yellowing, non-discolouring to the base surfaces, cut with a combination of hydrocarbon solvents to give good penetration into the surface.

Total solids: At least 14%.

**Surface hardeners**

Suitable for cementitious toppings or as laid surfaces.

**4 EXECUTION****4.1 TOLERANCES****Tolerance classes**

Determine tolerance classes using a straight edge placed anywhere on the surface in any direction.



**Tolerances class table**

Class	Measurement	Maximum deviation (mm)
A	3 m straight edge	3
B	3 m straight edge	6
C	600 mm straight edge	6

#### 4.2 SURFACE MODIFIERS

##### Seal stripper

Thoroughly clean the surface before the application of finishes to masonry and cementitious floors. Remove wax (buffable, self-polishing and acrylic paste types), heavy duty polymer finishes, and clear resin sealer using a seal stripper.

##### Surface hardeners

Apply to clean surfaces. Do not apply to non-slip topping.

#### 4.3 UNFORMED SURFACES

##### Screeding

Strike off, consolidate and level slab surfaces to finished levels, to tolerance class C.

##### Finishing methods

Scored or scratch finish: After screeding, give the surface a coarse scored texture using a stiff brush or rake drawn across the surface before final set.

Machine floated finish: After screeding consolidate the surface using a machine float. Hand float in locations inaccessible to the machine float. Cut and fill to tolerance class B and refloat immediately to a uniform, smooth, granular texture.

Steel trowelled finish: After machine floating, use power trowels to produce a smooth surface relatively free from defects. Then, when the surface has hardened sufficiently, use steel hand trowels to produce the final consolidated finish free of trowel marks and uniform in texture and appearance, to tolerance class A. Where floor coverings are to be installed, remove defects that would show through them.

Wood float finish: Produce the final finish using a wood float.

Broom finish: After floating draw a broom or hessian belt across the surface to produce a coarse even-textured slip-resistant transverse-scored surface.

Pattern paving: Proprietary treatment producing integral coloured and patterned surface for in situ paving and ground slabs.

Sponge finish: After machine floating, obtain an even textured sand finish by wiping the surface using a damp sponge.

#### 4.4 FORMED SURFACES

##### Evaluation of formed surfaces

If evaluation of formed surface tolerance or colour is required, complete the evaluation before surface treatment.

##### Smooth rubbed finish

Remove the forms while the concrete is green, patch immediately, and complete the rubbing not later than the following day. Wet the surface and rub using a carborundum or similar abrasive brick until a uniform colour and texture are produced. Do not provide cement grout other than the paste drawn from the green concrete by the rubbing process.

##### Exposed aggregate finish

Remove the forms while the concrete is green. Wet the surface and scrub using stiff fibre or wire brushes, using water freely, until the surface film of mortar is mechanically removed without the use of acid etching, and the aggregate uniformly exposed. Rinse the surface with clean water.

##### Bush hammered finish

Remove the minimum matrix using bush hammering to expose the coarse aggregate without recessing the matrix deeper than the aggregate, to give a uniform texture with insignificant random tool marks.

**Floated finishes**

Sand floated finish: Remove the forms while the concrete is green. Wet the surface and rub using a wood float. Rub fine sand into the surface until a uniform colour and texture are produced.

Grout floated finish: Remove the forms while the concrete is green. Dampen the surface and spread, using hessian pads or sponge rubber floats, a slurry consisting of one part cement (including an appropriate percentage of white cement) and one and a half parts sand passing a 1 mm sieve. Remove surplus until a uniform colour and texture are produced. Cure.

**Blasted finishes**

Abrasive: Blast the cured surface using hard, sharp graded abrasive fine aggregate particles until the coarse aggregate is in uniform relief.

Light abrasive: Blast the cured surface using hard, sharp graded abrasive fine aggregate particles to provide a uniform matt finish without exposing the coarse aggregate.

**STRUCTURAL TIMBER****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **structural timber** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Light Timber Framing, Timber Flooring and Decking

**1.2 STANDARD****General**

Design: To AS 1720.1.

**1.3 INTERPRETATION****Definitions**

Pole: A full length preservative treated round timber pole used as a column and extending to roof level or used as a pier or post extending to the underside of the floor frame.

Pole strut: A pole used as a horizontal or diagonal bracing member.

Pole footing: An in situ concrete pier formed in a bored pier hole as a footing for a pole, including the concrete encasing of embedded poles.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that the following may be inspected:

- Prefabricated items before priming or water-repellent treatment.
- Structural woodwork after erection but before it is covered.
- Bolts after final tightening.

**Hold points**

As advised by the Principals Authorised Person

**2.2 SUBMISSIONS****Subcontractors**

Timber portal frames: Submit name and contact details of proposed prefabricator.

**Shop drawings**

General: For items designed by the contractor, submit shop drawings certified by a structural engineer to AS 1720.1 for the span, spacing, and loading, and showing the following:

- Arrangement of members.

- Location of the members in the building.
- Loading parameters and bracing lengths assumed in the design.
- Species, stress grade, strength group and joint group of timber.
- Size of each member.
- Tolerances on member sizes.
- Joint details including connector plates.
- Lifting points.
- Method of fixing and bracing.
- Preservative treatment, if any.
- Long term deflection.
- Moisture content at time of manufacture.
- Method of fabrication.

Timber portal frames: Show the following additional information:

- Size and specification of gussets.
- Gusset fastenings (nail size and arrangement)
- Base plate details.
- Fixings for purlins, girts and bracing.
- Method of handling and erection, including temporary bracing required, if any.

Glued-laminated timber: Show the following additional information:

- Design stresses.
- Appearance grade.
- Service class.
- Strength grade.
- Precamber.

#### **Materials**

Identification:

- Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber complies with the specification.
- Inspection: Submit the inspection authority's certificate verifying that the timber complies with the specification.

Moisture content: Submit evidence of moisture content.

#### **Poles - preservative treatment**

Confirmation of pole retention: Submit a test certificate from an independent testing authority confirming that the required retention has been achieved for every pole.

Treatment record: Submit a certified copy of the charge sheet.

### **2.3 CONTRACTOR'S SUBMISSIONS**

#### **Materials**

Timber To Be Certified: All timbers.

Certification to include: Species (all timbers).

Inspection Authority: State Forests of NSW.

## **3 MATERIALS AND COMPONENTS**

### **3.1 TIMBER**

- WHITE CYPRESS PINE
- DURABLE CLASS 1 TIMBERS
- preservative treated timber to the applicable hazard class to AS1604.1.

Natural durability classification to AS 1604 Table F2 (minimum):

- Naturally termite resistant timbers to 3660.1 Appendix C
- Preservative treatment: CCA preservative treated timber to the applicable hazard class to AS1604.1.

When using CCA preservative treated timber suitable safe work method plans and waste disposal methods must be implemented (refer contract preliminaries)

Prevent direct contact between chemically treated timber and unprotected metal by either a separation layer or by applying an anti-corrosion, low moisture transmission coating to contact surfaces.

All fasteners must be treated to prevent corrosion.

All Exposed CCA treated timber must be sealed with a minimum of one coat of a premium quality semi transparent penetrating finish based on oil-alkyd resin for exterior applications.

**(ii) AUSTRALIAN INDIGENOUS TIMBER SPECIES ARE TO BE USED WHEREVER PRACTICABLE, WITH DUE REGARD TO SUITABILITY OF USE AND LOCATION. IN PREFERENCE TO IMPORTED TIMBER SPECIES, IN ACCORDANCE WITH GOVERNMENT POLICY.**

#### **Timber grades**

Structural timbers: Appearance grade if exposed to view in the finished work. Otherwise stud grade or lintel grade, as appropriate.

#### **Structural timber grading standards**

Hardwood: To AS 2082.

Softwood: To AS 2858.

Mechanical stress grading: To AS/NZS 1748.

Machine proof-grading: To AS 3519.

#### **Identification**

Method: Identify timber using branding, certification or both.

Branding: Brand structural timber, under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data:

- Stress grade.
- Method of grading.
- "Seasoned" or "s".
- The certification mark of the product certification program.
- The applicable standard.

Recognised product certification programs:

- Pine framing: Pine Australia Quality Control Scheme.
- Glued-laminated timber: Glued Laminated Timber Association of Australia (GLTAA) Product Certification System.
- Laminated veneer lumber: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.
- Finger jointed structural timber: Pine Australia Quality Control Scheme.

Certification:

Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the timber.

#### **Marine structural timber**

Sawn timber: Minimum requirements:

- Hardwood: Species of durability class 2 and strength group S3.
- Softwood: Preservative treated radiata pine, slash pine, hoop pine or Caribbean pine.
- Grading: Structural Grade No.2 to AS 2082 or AS 2858, as appropriate.

Variations to grading standard:

- No loose gum and resin veins, unsound knots, shakes, or splits.
- Sapwood only if preservative treated.
- No gum or resin pockets on the upper surfaces of decking, kerbs or other horizontal members fully exposed to the weather.
- Hardwood may have sound heart in the central one third cross-section of members with a least dimension greater than 175 mm.

- Heartwood in softwoods limited to 20% of the cross section and 50% of the surface width.

Round timber: To AS 2209.

#### **Heavy decking timber**

Variations to grading standard: No loose or unsound knots, knot holes, loose gum veins, gum pockets, shakes or termite galleries in the upper surface of decking timbers.

Seasoning:

- Decking up to 30 mm thick: Seasoned.
- Decking over 30 mm thick: Unseasoned.

Durability class (minimum): Durability class 2, or preservative treated timber of equivalent durability.

### **3.2 GLUED-LAMINATED TIMBER**

#### **Standard**

Glued-laminated structural timber: To AS/NZS 1328.1.

#### **Joints**

End joints: Scarf or finger joints generally.

- Timbers permitted to be stress grade reduced: Butt joints are permitted.

#### **Camber**

Orientation: Install cambered members with the camber up.

#### **Protection from weather**

Provide temporary protection for glued-laminated timber members until permanent covering is in place.

### **3.3 TIMBER PORTAL FRAMES**

#### **Gusset plate replacement**

If more than 10% of nail heads penetrate the outer veneer of the gusset plate, replace the gusset plate.

#### **Damp proofing**

Where timber columns are placed in contact with concrete footings, provide a damp-proof membrane between the timber and the concrete.

#### **Lifting**

Provide spreaders, strongbacks and bracing to ensure fabricated sections are lifted without racking or distress.

#### **Purlins and girts**

When fitting unseasoned purlins and girts, make provision for transverse shrinkage.

### **3.4 FINGER JOINTED STRUCTURAL TIMBER**

#### **General**

Standard: To AS/NZS 1491.

### **3.5 FASTENERS**

#### **Bolts**

Provide thread length at least four times the bolt diameter. Drill bolt holes 2 mm larger than the bolt diameter.

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## **4 EXECUTION**

### **4.1 HEAVY STRUCTURES**

#### **Outdoor structures**

Sealing: Seal the ends of members with wax emulsion or petroleum jelly immediately after sawing.

Anti splitting plates: Plate the ends of members 250 x 75 mm or larger with pressed or hammer-on galvanized nail plates equal to 50% of the cross-sectional area.

Bolt holes: Treat bolt holes with creosote or copper naphthenate emulsion before inserting the bolt.

Coating: After completion of fabrication, notching and machining, coat joints, holes and notches with a 6 mm layer of copper naphthenate emulsion.

Heart: Place the heart side of bracing members on the inside of joints. Place the heart side of other members on the downside wherever possible.

Bolts: Minimum size M20.

Washers: Minimum size 4 mm thick and 65 mm square or equivalent round area.

Bolt protection: Coat bolts with a bituminous coating before insertion in the bolt hole.

#### **4.2 HEAVY DECKING**

##### **General**

Installation: Lay in long lengths (minimum 3 spans) double spiked at each bearing with galvanized spikes driven flush. Make square butt joints over the support beams. Stagger the joints. Space the boards so that the gap will be 6 - 10 mm when the boards are at equilibrium moisture content.

Sealing: Seal the ends of members with wax emulsion or petroleum jelly immediately after sawing.

Coating: Coat the top surface of members supporting decking with copper naphthenate emulsion.

Spiking: Drill spike holes with diameter 10% less than the spike diameter, and 25 mm less in depth than the length of the spike.

Spiking planks:

- Length: At least half the span of the girder.
- Fixing: At girder ends provide M16 coach screws at least 100 mm into the girder; elsewhere provide M20 bolts.
- End joints: Locate outside the middle third of the girder span.
- Flats: Provide flats on girders supporting spiking planks, 20 mm less than the spiking plank width.
- Anti-splitting device: Provide anti-splitting bolts or nail plates to spiking planks at 1000 mm centres.

Heart: Place the heart on the downside wherever possible.

Ends and joints: Joint members over the centre line of support with square cut butt joints. Provide a 40 - 60 mm gap between the ends of girders and position the decking to cover the gap.

##### **Recessed fixing**

For fixings punched or sunk below the surface, fill the recess with a suitable wood filler or mastic.

##### **Finishing**

If a protective or decorative finish is required apply one coat of primer and one finishing coat all around before fixing.

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## **5 COMPLETION**

### **5.1 COMPLETION**

#### **Tightening**

Tighten bolts, screws and other fixings so that joints and anchorages are secure at practical completion.

<b>LIGHT TIMBER FRAMING</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **light timber framing** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Light Timber Framing, Timber Flooring and Decking

**1.2 STANDARD****General**

Light timber framing: To AS 1684 Parts 2, 3 or 4, as appropriate.

Design: To AS 1720.1.

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**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that the following may be inspected:

- Structural woodwork after erection but before it is covered.
- Prefabricated items before priming or water-repellent treatment.
- Bolts after final tightening.
- Prefabricated fixtures before installation.

**Hold points**

As advised by Principals Authorised Person

**2.2 SUBMISSIONS****Design**

High wind areas: If the locality is a high wind area which is not catered for in AS 1684 computations, submit details, certified by a suitably qualified person, of the necessary additional structural provisions.

**Shop drawings**

General: For items designed by the contractor, submit shop drawings certified by a structural engineer to AS 1720.1 for the span, spacing, and loading, and showing the following:

- Arrangement of members.
- Location of the members in the building.
- Loading parameters and bracing lengths assumed in the design.



- Species, stress grade, strength group and joint group of timber.
- Size of each member.
- Tolerances on member sizes.
- Joint details including connector plates.
- Lifting points.
- Method of fixing and bracing.
- Preservative treatment, if any.
- Long term deflection.
- Moisture content at time of manufacture.
- Method of fabrication.

Trusses: Show the following additional information:

- Camber in bottom cord.

#### **Materials**

Identification:

- Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber complies with the specification.
- Inspection: Submit the inspection authority's certificate verifying that the timber complies with the specification.

Moisture content: Submit evidence of moisture content.

Timber To Be Certified: All timbers.

Certification to include: Species (all timbers).

Inspection Authority: State Forests of NSW.

### **3 MATERIALS AND COMPONENTS**

#### **3.1 TIMBER**

##### **Timber grades**

Structural timbers: Appearance grade if exposed to view in the finished work. Otherwise stud grade or lintel grade, as appropriate.

##### *Structural timbers*

Weather exposed timbers: Timber members that are not protected from weather exposure and associated moisture ingress to be durability class 1 hardwood to AS 1720.2, unless the exposure is of a temporary or short term nature. Protection does not include surface coatings.

##### **Structural timber grading standards**

Hardwood: To AS 2082.

Softwood: To AS 2858.

Mechanical stress grading: To AS/NZS 1748.

Machine proof-grading: To AS 3519.

##### **Identification**

Method: Identify timber using branding, certification or both.

Branding: Brand structural timber, under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data:

- Stress grade.
- Method of grading.
- "Seasoned" or "s".
- The certification mark of the product certification program.
- The applicable standard.

Recognised product certification programs:

- Pine framing: Pine Australia Quality Control Scheme.
- Finger jointed structural timber: Pine Australia Quality Control Scheme.

Certification:

Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the timber.

### 3.2 SHEET PRODUCTS

#### Structural plywood

Standard: To AS/NZS 2269.

Bond: Type A.

Flooring: Tongued and grooved.

Veneer quality to visible surfaces: C (minimum).

#### Hardboard

Standard: To AS/NZS 1859.4.

#### Identification

Method: Identify plywood using branding, certification or both.

Branding: Brand structural plywood, under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data:

- Stress grade.
- Method of grading.
- The certification mark of the product certification program.
- The applicable standard.

Recognised product certification programs:

- Plywood: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.
- Blockboard: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.

Certification:

Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the plywood.

### 3.3 COMPONENTS

#### Nail plated joined beams

Standard: To AS 4446.

Type: Proprietary composite member made up by butt and horizontally joining timber with pressed in nail plates.

#### Mild steel post bases

Minimum dimensions:

- Stirrup: 75 mm wide x 6 mm thick.
- Dowel: 20 mm diameter heavy tube.

Location: To timber posts supported off concrete slabs or footings.

Finish: Galvanize after fabrication.

#### Fasteners

Installation: Do not split or otherwise damage the timber.

Coating: Before placing bolts in contact with CCA treated timber, coat the shank of the bolt in a grease or bituminous coating.

### 3.4 FINGER JOINTED STRUCTURAL TIMBER

#### General

Standard: To AS/NZS 1491.

### 3.5 RECONSTITUTED STRUCTURAL TIMBER

#### General

Type: Proprietary reconstituted structural timber sawn from slabs manufactured from pinus radiata thinnings.

#### Protection from weather

Provide temporary protection for members until permanent covering is in place.

## 4 FRAMING

### 4.1 WALL FRAMING

#### Wall framing

One of the following alternative termite resistant timber species or preservative treatments against termite attack are to be used

- WHITE CYPRESS PINE
- DURABLE CLASS 1 TIMBERS
- preservative treated timber to the applicable hazard class to AS1604.1.

Natural durability classification to AS 1604 Table F2 (minimum):

- Naturally termite resistant timbers to AS1604.1 Appendix C
- Preservative treatment: CCA preservative treated timber to the applicable hazard class to AS1604.1.

When using CCA preservative treated timber suitable safe work method plans and waste disposal methods must be implemented (refer contract preliminaries)

Prevent direct contact between chemically treated timber and unprotected metal by either a separation layer or by applying an anti-corrosion, low moisture transmission coating to contact surfaces.

All fasteners must be treated to prevent corrosion.

All Exposed CCA treated timber must be sealed with a minimum of one coat of a premium quality semi transparent penetrating finish based on oil-alkyd resin for exterior applications.

Gauging: Provide gauged timbers in studs, noggings and plates for double faced walls.

#### Hardboard bracing

Classification: Standard hardboard type GP.

#### Additional support

General: Provide additional support in the form of noggings, trimmers and studs for fixing lining, cladding, hardware, accessories, fixtures and fittings as required.

Maximum spacing of noggings: 1350 mm centres.

#### Vermin barriers

Brick veneer barrier: Close nail 10 mm steel wire mesh to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork. Stud wall barrier: Aluminium/zinc-coated steel sheet, 600 mm wide x 0.6 mm thick, fixed to each side of the external stud wall frame at the base. Lap joints 25 mm.

#### Damp-proof courses

Material: To AS/NZS 2904.

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

- External walls (not brick veneer): Turn up at least 75 mm on the inside and tack. Project 10 mm beyond the external slab edge or dwarf wall and turn down at 45°.
- Walls of bathrooms, shower rooms and laundries: Turn up at least 150 mm on the "wet" side and tack to studs.

Installation: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses, sarking and waterproof membranes.

Location: At least 150 mm above adjacent finished ground level.

#### Flashings

Material: To AS/NZS 2904.

Location: Provide flashings to external openings sufficient to prevent the entry of moisture. Form trays at the ends of sill flashings.

Brick veneer construction: Extend across cavities and build into brickwork.

### 4.2 SHEARWALLS AND DIAPHRAGMS

#### Description

Structural systems comprising sheeting fixed to structural timber framing to transmit lateral loads in shear.

**Fixing**

Fix sheeting to framing with galvanized flat head nails at maximum 150 mm centres. Drive the nails flush with the surface of the sheeting. Do not over-drive or counter punch the nails.

**4.3 ROOF AND CEILING FRAMING**

One of the following ALTERNATIVE TERMITE RESISTANT TIMBER SPECIES or preservative TREATMENTS AGAINST TERMITE ATTACK are to be used

- WHITE CYPRESS PINE
- DURABLE CLASS 1 TIMBERS
- preservative treated timber to the applicable hazard class to AS1604.1.

Natural durability classification to AS 1604 Table F2 (minimum):

- Naturally termite resistant timbers to 3660.1 Appendix C
- Preservative treatment: CCA preservative treated timber to the applicable hazard class to AS1604.1.

When using CCA preservative treated timber suitable safe work method plans and waste disposal methods must be implemented (refer contract preliminaries)

Prevent direct contact between chemically treated timber and unprotected metal by either a separation layer or by applying an anti-corrosion, low moisture transmission coating to contact surfaces.

All fasteners must be treated to prevent corrosion.

All Exposed CCA treated timber must be sealed with a minimum of one coat of a premium quality semi transparent penetrating finish based on oil-alkyd resin for exterior applications.

**Wall plates**

Fixing: Fix timber wall plates to masonry, with either straps or bolts.

Steel zinc-coated straps: In cavities. Build bottom end 75 mm into brickwork, 1200 mm below plate. Bend top end over plate and fix with galvanized fastenings.

- Coating class: Z275.
- Size: 25 x 1 mm or 30 x 0.8 mm.

Bolts: 10 mm diameter hot-dip galvanized steel, embedded at least 150 mm into the wall structure of solid masonry external walling or the top bond beam of loadbearing hollow block external walling.

**Nailing strips**

Where timber joists, rafters or purlins bear on steel members, provide 50 mm thick nailing strips bolted to the flange of the steel member at 450 mm maximum centres.

**Strutted framing**

General: Construct traditional timber pitched roof framing consisting of rafters and ceiling joists supported at intermediate points by a system of underpurlins strutted off walls or strutting beams and braced by collar ties, and ceiling hanging beams.

**Beam framing**

General: Construct framing for flat or pitched roofs where the ceiling follows the roof line, consisting of rafters or purlins acting as beams to support both ceiling and roof covering.

Blocking: Where the depth of rafters or purlins is at least 4 x width, provide solid blocking between them at the support points and at 1.8 m maximum intervals between supports.

Ridge straps: Butt ends of rafters together at ridge, and strap each pair together with 900 mm long steel strap passing over the ridge, triple nailed to each rafter.

Fixing details:

- Purlins: Timber purlins for raked ceilings to be perforated to assist in the ventilation of roof space by providing 40 mm diameter holes at 200 mm centres at mid height of member.
- Visible sawn timbers: Sawn surface (fine)

**Supports for water containers**

Where a water container or heater is located in the roof space provide a support platform to AS 3500.4.2 clause 4.5.

**Additional support**

Provide a frame member behind every joint in fibre cement sheeting or lining.

**Anti-ponding boards**

Standard: To AS/NZS 4200.2.

**Fascia, barge and eaves boards****For replacement of existing**

Replace with like for like for material type, size, grade and finish.

**For new installations**

Hardwood: To AS 2796.1.

Seasoned cypress pine: To AS 1810.

Australian grown conifers, other than radiata pine and cypress pine: AS 1787.

**4.4 TRUSSES****Fabrication**

Assembly: Factory assemble trusses.

Camber: 10 mm upward in bottom chord.

Connections: Connector plates pressed to contact with the truss members. No knots in plate area.

Joints: No gaps greater than 2 mm.

Overhangs: Free from spring or splits.

Bow in chords (maximum): Where L is chord length,  $L/200$  or 50 mm, whichever is less.

**Supports for water containers**

Where a water container or heater is located in the roof space provide a support platform to AS 3500.4 clause 4.5.

**Marking**

Permanently mark each truss, on faces or edges which will be concealed in the works, to show

- manufacturer;
- timber species;
- grade;
- location;
- pitch and span;
- support points; and
- trusses designed for additional loading such as water heater support.

**Installation**

General: To AS 4440

Support: Support trusses on bottom chord at two points only, unless designed for additional support.

Plumb: Within  $H/200$ , where H is the height.

Vertical movement: Over internal walls provide at least 10 mm vertical clearance and use bracing methods which allow for vertical movements.

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**5 COMPLETION****5.1 COMPLETION****Tightening**

Tighten bolts, screws and other fixings so that joints and anchorages are secure at practical completion.

**TIMBER FLOORING AND DECKING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **timber flooring and decking** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Light Timber Framing, Timber Flooring and Decking

**1.2 INTERPRETATION****General**

Timber decking: Timber flooring with plain, square, bevel or pencil round edge suitable for pedestrian or light vehicle loadings in balconies, decks and access ways.

**1.3 STANDARD****General**

Flooring: To AS 1684 Part 2, 3 or 4, as appropriate.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that the following may be inspected:

- Prefabricated items before priming or water-repellent treatment.
- Bolts after final tightening.

**Hold points**

As advised by Principals Authorised Person

**2.2 SUBMISSIONS****Materials**

Timber To Be Certified: All timbers.

Certification to include: Species (all timbers).

Inspection Authority: State Forests of NSW.

Identification:

- Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber complies with the specification.
- Inspection: Submit the authority's certificate verifying that the timber complies with the specification.

Moisture content: Submit evidence of moisture content.

**3 MATERIALS****3.1 MATERIALS**

One of the following ALTERNATIVE TERMITE RESISTANT TIMBER SPECIES OR preservative TREATMENTS AGAINST TERMITE ATTACK ARE TO BE used for framing of floors, walls and roof

- White Cypress Pine
- Durable Class 1 Timbers
- Preservative Treated Timber to the applicable hazard class to AS1604.1.

Natural durability classification to AS 1604 Table F2 (minimum):

- Naturally termite resistant timbers to AS 3660.1 Appendix C
- Preservative treatment: CCA preservative treated timber to the applicable hazard class to AS1604.1.

When using CCA preservative treated timber suitable safe work method plans and waste disposal methods must be implemented (refer contract preliminaries)

Prevent direct contact between chemically treated timber and unprotected metal by either a separation layer or by applying an anti-corrosion, low moisture transmission coating to contact surfaces.

All fasteners must be treated to prevent corrosion.

All Exposed CCA treated timber must be sealed with a minimum of one coat of a premium quality semi transparent penetrating finish based on oil-alkyd resin for exterior applications.

**AUSTRALIAN INDIGENOUS TIMBER SPECIES ARE TO BE USED WHEREVER PRACTICABLE, WITH DUE REGARD TO SUITABILITY OF USE AND LOCATION. IN PREFERENCE TO IMPORTED TIMBER SPECIES, IN ACCORDANCE WITH GOVERNMENT POLICY.**

**Identification**

Method: Identify timber using branding, certification or both.

Branding: Brand floor boards under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data:

- Stress grade.
- Method of grading.
- "Seasoned" or "s".
- The certification mark of the product certification program.
- The applicable standard.

Recognised product certification programs:

- Milled radiata pine products: Pine Australia Quality Control Scheme.
- Sawn radiata pineboards: Pine Australia Quality Control Scheme.

Certification:

Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the timber.

**Timber grades**

Milled timbers: Where the relevant Australian standard specifies more than one grade, provide the following:

- Timbers for transparent finishes: The highest grade.
- Timber for opaque finish: Select grade for hardwood, standard grade for softwood.
- Concealed timber: The lowest grade.

**Sawn boards**

Australian grown conifers, other than radiata pine and cypress pine: To AS 1781.

**Timber flooring and decking**

Hardwood: To AS 2796.1.

- Grade to AS 2796.2:

Seasoned cypress pine: To AS 1810.

- Grade:

Australian grown conifers, other than radiata pine and cypress pine: AS 1782.

**Particleboard flooring**

Standard: To AS/NZS 1859.1.

Grade: Class 1 flooring.

**Plywood flooring**

Standard: To AS/NZS 2269.

Type: Bond type A, tongued and grooved.

**Fibre cement flooring and decking**

Compressed sheets: To AS/NZS 2908.2.

Grade: Type A, Category 5.

## 4 FLOORING AND DECKING

### 4.1 SUBFLOORS

one of the following ALTERNATIVE TERMITE RESISTANT TIMBER SPECIES OR preservative TREATMENTS AGAINST TERMITE ATTACK ARE TO BE USED FOR FLOOR FRAMING.

- WHITE CYPRESS PINE
- DURABLE CLASS 1 TIMBERS
- preservative treated timber to the applicable hazard class to AS1604.1.

Natural durability classification to AS 1604 Table F2 (minimum):

- Naturally termite resistant timbers to AS 3660.1 Appendix C
- Preservative treatment: CCA preservative treated timber to the applicable hazard class to AS1604.1.

When using CCA preservative treated timber suitable safe work method plans and waste disposal methods must be implemented (refer contract preliminaries)

Prevent direct contact between chemically treated timber and unprotected metal by either a separation layer or by applying an anti-corrosion, low moisture transmission coating to contact surfaces.

All fasteners must be treated to prevent corrosion.

All Exposed CCA treated timber must be sealed with a minimum of one coat of a premium quality semi transparent penetrating finish based on oil-alkyd resin for exterior applications.

WHEN TIMBER (SPRUNG) - LIGHT TIMBER FRAME (SUSPENDED TIMBER FLOOR FRAMING) IS TO BE USED.

**Subfloor enclosure**

Stump battens: Fix battens horizontally to external faces of building perimeter stumps. Keep braces and battens 55 mm clear of ant caps.

Battens:

Access gate: Provide an access gate framed and braced and battened to match the stump battens. Hang on 2 galvanized mild steel hinges. Provide a galvanized mild steel pad bolt.

**Timber (Sprung)**

Neoprene Pads: Proprietary neoprene pads with Durometer reading between 40 and 45 installed beneath bearers at every stump/pier and bearing point. Neoprene pads must not be compressed by the fixing of bearers to stumps/piers.

- Size: 100 x 100 x 13mm thick.

### 4.2 FLOORING

**Generally**

One of the following alternative termite resistant timber species or preservative treatments against termite attack is to be used for framing of floors:

- Naturally termite resistant timbers To AS 3660.1 Appendix C

CCA preservative treated timber to the applicable hazard class to AS1604.1.

When using CCA preservative treated timbers suitable safe work method plans and waste disposal methods must be implemented (refer contract preliminaries).

Prevent direct contact between chemically treated timber and unprotected metal by either a separation layer or by applying an anti-corrosion, low moisture transmission coating to contact surfaces.



All fasteners must be treated to prevent corrosion.

All Exposed CCA treated timber must be sealed with a minimum of one coat of a premium quality semi transparent penetrating finish based on oil-alkyd resin for exterior applications.

### **Structural sheet flooring**

Installation: Fix particleboard and plywood flooring with elastomeric adhesive and nails.

Junctions: Sand junctions lightly to a smooth, level surface.

### **Particleboard flooring**

Installation: To AS 1860.

### **Plywood flooring**

Minimum thickness (F8):

- Joist spacing up to 450 mm: 14 mm.
- Joist spacing 450 - 600 mm: 19.5 mm.

Minimum thickness (F11):

- Joist spacing up to 450 mm: 13 mm.
- Joist spacing 450 - 600 mm: 18.5 mm.

### **Fibre cement flooring**

Installation: Lay the length of the sheets at right angles to the joists and continuous over at least 2 spans. Stagger the end joints and locate them centrally over joists. Butter edges of sheets with adhesive and firmly butt join together.

Fixing: Fix to joists with corrosion-resistant countersunk screws. Bond sheets to joists at intermediate bearing with square patches of adhesive.

### **Timber floors on slabs**

Vapour Barrier: Where the floor is supported on a concrete slab, provide a vapour barrier of 0.15mm impact resistant polyethylene. Lap 150 mm and seal laps with pressure sensitive tapes. Do not commence fixing until the moisture content of the concrete slab is less than 6% when tested to AS 1884, Appendix A. Cut and tape to drainage outlets.

Joist Fixing: Fix the joists to the concrete floor with patent floor clips, masonry anchors, or hoop iron overstraps fixed with explosive driven fastenings.

Laying: Lay on flat.

90° to length of the main playing area

Join end to end with 6mm spacings

Stagger joints

Tolerance: 10 mm minimum clearance between ends of joists and any walls or upstands.

Joist packing: Corrosion and termite-resistant non-compressible material.

- Plywood: Install plywood on top of joists (underside of strip flooring) and at 90° to joists.
  - . -Treated to prevent the attack of termites
  - . -To AS 2271
  - . -Bond: Type A
  - . -Grade: DD exterior grade
  - . -Stress grade: F11
  - . -Size: 2400 x 1200mm minimum
  - . -Thickness: 12mm
  - . -Stagger joints (masonry stretcher bond pattern). Allow a 5mm spacing between sheets (all edges).
  - . -20mm clearance between walls or upstands.

Fixing: 300mm centres

**OR**

Timber (unsprung) - Type "B" flooring system

Joist packing: Corrosion-resistant non-compressible material.

**Fixing**

On visible flooring, sink the heads of fixings below the surface and fill the sinking flush with a material tinted to match the flooring and compatible with the surface finish.

**Strip flooring installation**

Type “A” flooring system: To AS 1684.

- Lay in long lengths with accurate end joints made on joists, all joints on adjoining boards to be staggered.
- Must be used with Type “A” flooring system only (strip flooring fixed directly to joists). Specification reference TIMBER FLOORS ON SLABS
- Tolerance: 10 mm between boarding and wall.

Type “B” flooring system: To AS 1684.

- Lay in long lengths with accurate end matched joints, all joints on adjoining boards to be staggered.
- Must only be used with Type “B” flooring system (plywood sheeting between strip flooring and joists).
- Specification reference TIMBER FLOORS ON SLABS
- Tolerance: 10 mm between boarding and wall.

**Stage floor**

To have a white edge board.

**Skirting**

Nominal 100 x 25mm with splay top fixed all perimeter. Fix skirting 10 mm clear of floor for ventilation.

**Finishes**

Specification reference: PAINTING

**4.3 DECKING****Timber decking**

Arrises: Chamfered or rounded.

Installation: Lay in long lengths (minimum 3 spans) double nailed at each bearing with galvanized nails driven flush. Stagger joints and make them over joists. Leave 4 mm between edges of boards.

Finishing: Apply the first 2 coats all round before fixing.

**Fibre cement decking**

Installation: Lay the length of the sheets at right angles to the supports. Locate end joints centrally over the joists. Provide noggings or trimmer joists, cut between and fixed to the joists, to support the edges of sheets.

Joints: Make butt joints at least 5 mm wide. Insert polyethylene foam backing rod and fill the joint with a flexible sealant.

Fixing: Fix sheeting to the supports with non-corrosive countersunk screws. Fill the screw holes with sealant before fixing. After fixing, stop the screw heads with the same sealant, finished slightly below the sheet surface.

**4.4 SECURITY ENHANCEMENT****Requirement**

Screw fix 3mm steel sheet to existing floor structure.

## STRUCTURAL STEEL

**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **structural steel** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Light Steel Framing, Painting, all concrete elements

**1.2 STANDARD****General**

Materials, construction, fabrication and erection: To AS 4100.

**1.3 ADJOINING ELEMENTS****General**

Provide for the fixing of adjoining building elements to be fixed to or supported on the structural steel.

**2 QUALITY****2.1 INSPECTION****Witness points - off site**

Give sufficient notice so that inspection may be made at the following stages:

- Materials including welding consumables before fabrication.
- Testing of welding procedures and welder qualification tests.
- Commencement of shop fabrication.
- Commencement of welding.
- Before placement of root runs of complete penetration butt welds.
- Completion of fabrication before surface preparation.
- Surface preparation before shop painting.
- Completion of protective coating before delivery to site.

**Witness points - on site**

Give sufficient notice so that inspection may be made at the following stages:

- Steelwork on site before erection.
- Tensioning of bolts in categories 8.8/TB and 8.8/TF.
- Steelwork and column bases erected on site, before grouting, encasing, site painting or cladding.
- Anchor bolts in position before casting in.

- Commencement of encasing.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Ultrasonic testing of plates**

Quality class to AS 1710:

**Non destructive weld examination**

Standard: To AS/NZS 1554.1.

Radiographic and ultrasonic inspection: Have the examination performed by an independent testing authority.

Repairs: Repair faulty welds revealed by non-destructive examination and repeat the examination.

**Non-destructive weld examination (NDE) table**

Type of weld and category	Examination method	Extent (% of total length of weld type)
Fillet welds	Visual inspection	100
Butt welds, GP	Visual inspection	100
Butt welds, SP	Visual inspection	100
	Radiographic or ultrasonic inspection	10

**2.3 SAMPLES****Special finishes**

General: Submit samples of finished steel listed in the **Special finishes schedule**.

Minimum sample sizes:

- Surface finish samples: 0.1 m<sup>2</sup>.
- Weld samples: 300 mm run of weld.

**2.4 SUBMISSIONS****Subcontractors**

Submit names and contact details of proposed fabricator and installer.

**Shop drawings**

General: Submit shop drawings showing the following information:

- Relevant details of each assembly, component and connection.
- Information relative to fabrication, surface treatment, transport and erection.

Particular: Include the following information:

- Identification.
- Steel type and grade.
- Dimensions of items.
- Required camber, where applicable.
- Fabrication methods including, where applicable, hot or cold forming and post weld heat treatment.
- Location, type and size of welds or bolts.
- Weld categories and bolting categories.
- Orientation of members.
- Surface preparation methods and coating system.
- Procedures necessary for shop and site assembly, and erection.
- Temporary works such as lifting lugs, support points, temporary cleats and bracing which are required for transport and erection of the structural steelwork.
- Required fixings for adjoining building elements.

**Tests**

Steel: Submit evidence that the steel used in the work complies with the cited material standards.

Acceptable evidence: Certified mill test reports, or test certificates issued by the mill.

Alternative: Have the steel tested by an independent testing authority for compliance with the chemical composition and mechanical test requirements of the cited material standard.

#### **Materials and components**

Masonry anchors: If masonry anchors are required or proposed for the support or fixing of structural steel, submit evidence of the anchor capacity to carry the load.

#### **Execution**

Splicing: If splicing of structural members is intended, submit proposals.

Welding procedures: Submit details of proposed welding procedures, using the form in Table C2 of AS/NZS 1554.1.

Erection: If members cannot be properly erected, give notice.

Identification marks: Submit details of proposed marking for high strength structural bolted connections in work exposed to view.

Distortions: If a member is distorted during the galvanizing process, submit proposals for straightening.

### **3 MATERIALS AND COMPONENTS**

#### **3.1 STEEL TYPE AND GRADE**

##### **Standards**

Cold-formed sections: To AS/NZS 4600.

##### **Steel grade table**

Type of steel	Grade
Universal beams and columns, parallel flange channels, large angles to AS/NZS 3679.1	300
Flat, small angles, taper flange beams and columns to AS/NZS 3679.1	250
Welded sections to AS/NZS 3679.2	300
Hot rolled plates, floor plates and slabs to AS/NZS 3678	250
Hollow sections to AS 1163:	
- Circular sections less than 265 mm outside diameter	C250
- Sections other than the above	C350
Cold formed purlins and girts to AS 1397	G450 Z350
Steel rails to AS 1085.1	(one grade only)

#### **3.2 MEMBERS**

##### **Members**

General: Uncontaminated.

#### **3.3 BOLTS**

##### **Bolts, nuts and washers**

General: Hot-dipped galvanized, corrosion-free coated in oil and in serviceable condition.

### **4 EXECUTION**

#### **4.1 FABRICATION**

##### **Splicing**

General: Provide structural members in single lengths.

##### **Beam camber**

If beam members have a natural camber within the straightness tolerance, fabricate and erect them with the camber up.

##### **Straightening**

Do not injure the material when straightening or flattening members.

**Site work**

Other than work shown on the shop drawings as site work, do not fabricate or weld structural steel on site.

**4.2 BOLTING****Connection bolts**

For connection bolts not shown on the drawings, provide bolting category 8.8/S.

**Bolting category 8.8/TF**

Contact surfaces: Clean, as-rolled and free from applied finishes.

**Foundation bolts**

General: Provide each foundation bolt with 2 nuts and 2 oversize washers and provide sufficient thread to permit the levelling nut to be set below the base plate.

Hexagonal bolts: To AS/NZS 1111.1.

Hexagonal nuts: Class 5.

Extra large flat washers: To AS 1237 Appendix A.

**Lock nuts**

General: Provide lock nuts for bolts in moving parts or parts subject to vibration and for vertical bolts in tension.

**Tensioning of bolting categories 8.8/TB and 8.8/TF**

Method: Do not use torque control.

**Permanent bolting**

Do not bolt until correct alignment and preset or camber have been achieved.

**4.3 WELDING****General**

Standard: To AS/NZS 1554.1.

**Weld category**

Weld categories not shown on the drawings: Category GP.

Category SP welds:

**Weld type**

Weld type not shown on the drawings: 6 mm continuous fillet weld made using E48XX electrodes or equivalent.

**Site welds**

Wherever possible locate site welds in positions for down hand welding. Do not weld until correct alignment and preset or camber have been achieved.

**4.4 ERECTION****Temporary connections**

Do not attach cleats except as shown on shop drawings.

**Temporary members**

Fix temporary members so as not to weaken or deface permanent steelwork.

**Hand flame cutting**

Do not hand flame cut bolt holes.

**Movements**

Provide for thermal movements during erection.

**Anchor bolts**

For each group of anchor bolts provide a template with setting out lines clearly marked for positioning the bolts when casting in.

**Grouting at supports**

Preparation: Before grouting steelwork to be supported by concrete, masonry and the like, set steelwork on packing or wedges.

- Permanent packing or wedges: Form with solid steel or grout of similar strength to the permanent grout.
- Temporary packing or wedges: Remove before completion of grouting.

Temperature: Do not grout if the temperature of the base plate or the footing surface exceeds 38°C.

**Handling**

Do not overstress or deform members or components.

**Drifting**

Use only to bring members into position. Do not enlarge holes or distort components.

**Work exposed to view**

Welds: Grind smooth but do not reduce the weld below its nominal size.

Shearing, flame cutting and chipping: Perform carefully and accurately.

Corners and edges: Grind fair those corners and edges which are sharp, marred, or roughened.

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**5 FINISHES****5.1 IDENTIFICATION MARKS****General**

Provide marks or other means for identifying each member, and for the setting out, location, erection and connection of the steelwork and compatible with the finish. If the work includes more than one bolting category, mark high-strength structural bolted connections with a 75 mm wide flash of colour, clear of holes.

**5.2 SURFACE PREPARATION****General**

Methods: To AS 1627.

Site connections: After completing the connection, prepare the surface of the connection, adjacent unprimed surfaces and surfaces damaged during erection.

Steel surfaces generally: Remove loose millscale, loose rust, oil, grease, dirt, globules of weld metal, weld slag and other foreign matter. Ensure surfaces are dry.

**Abrasive blast cleaning**

Do not use silica abrasive for dry blasting. Use phosphate inhibitors when wet blasting.

**Marking**

On the contact surfaces of friction type joints, confine the use of marking ink to the minimum necessary for marking hole positions.

**5.3 PROTECTIVE COATINGS****General**

Shop work: Apply the primer coat or protective system to the structural steel before delivery to the site.

Transport and handling: Do not damage the paintwork.

Site work: After erection, repair damage to the shop coating and apply coating omitted at site connections.

**Priming**

Time delay: Prime the steel surface as soon as possible after surface preparation and before the surface deteriorates, and in any case within 4 hours for shop work and 2 hours for site work. If the surface is contaminated or rust bloomed, repeat surface preparation before priming.

Conditions: Do not prime in adverse ambient conditions.

Fast drying primers: Do not provide fast drying primers where surface preparation is less than class 1.5.

Concrete encasing: Where members are part concrete encased extend the priming 25 mm into the surface to be encased.

Clearances: Keep priming clear of members and components to be site welded, and surfaces against which concrete is to be poured (including concrete encasing except as noted above). On completion of site welding, of concrete pouring and of 8.8/TF bolting, prime to give complete coverage of exposed surfaces.

**Inaccessible surfaces**

Where surfaces will be in contact or near contact after fabrication or erection, apply the finish and allow it to dry before assembly.

**5.4 GALVANIZING****Structural sections**

Cold worked items: Except for hollow sections, anneal to 650°C before galvanizing.

Coating mass: Other than nut and bolt thread surfaces:

- Minimum average: 600 g/m<sup>2</sup>.

Coating quality: Continuous, adherent, smooth, evenly distributed, free from defects detrimental to the end use of the finished article, such as lumps, blisters, gritty areas, uncoated spots, acids and black spots, dross and flux.

Hollow sections: Provide seal plates with breather holes.

**Friction-type bolted connections**

General: Treat contact surfaces to achieve the required slip factor.

Method: Wire brushing or light grit blasting.

**5.5 REPAIRS****General**

Repair finishes to ensure the full integrity of each phase and each coating.

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**6 COMPLETION****6.1 COMPLETION****Temporary connections**

Remove temporary cleats on completion and restore the surface.



<b>LIGHT STEEL FRAMING</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **light steel framing** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Structural Steel, Painting, all Concrete Elements

**1.2 STANDARDS****Standards**

Design, materials and protection: To AS/NZS 4600.

Design of domestic metal framing: To AS 3623.

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**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made of steel framing erected on site before lining or cladding.

**Hold points**

As advised by Principals Authorised Person

**2.2 SUBMISSIONS****Design**

Floor frame member sizes: Submit a schedule of proposed member sizes, certified by a suitably qualified person as meeting stated project requirements.

**Shop drawings**

Roof trusses: Submit shop drawings certified by a suitably qualified person

- stating that the trusses have been designed to AS/NZS 4600 for the span, spacing and loading;
- showing on an elevational diagram the size and section type of each member; and
- specifying the method of assembly, fixing, tying and bracing.

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**3 MATERIALS AND COMPONENTS****3.1 MATERIALS AND COMPONENTS****Corrosion protection**

Steel sheet and strip sections:

- Coating class (minimum): Z275 or AZ150.

## 4 EXECUTION

### 4.1 CONSTRUCTION GENERALLY

#### Fabrication

Length: Cut members accurately to length so that they fit firmly against abutting members.

Service holes: Form holes by drilling or punching.

- Bushes: Provide plastic bushes or grommets to site cut holes.
- Swarf: Remove swarf and other debris from cold-formed steel framing immediately.

#### Fastening

Type: Select from

- self-drilling, self-tapping screws;
- blind rivets; or
- proprietary clinching system.

#### Welding

Type: Use the metal inert gas (MIG) technique or carbon arc welding.

Touch up: Clean the weld and coated areas affected by welding and touch up with zinc rich organic primer to GPC-C-29/16.

#### Prefabricated frames

Protect frames from damage or distortion during storage, transport and erection.

#### Bracing

Provide diagonal noggings or tensioned straps.

#### Metal separation

Install lagging to separate non-ferrous service pipes and accessories from the metal framing.

#### Earthing

Permanent earthing: Required.

Temporary earthing: Provide temporary earthing during erection until the permanent earthing is installed.

#### CCA treated timber

Do not fix in contact with cold-formed steel framing.

#### Purlins

#### Primary Schools

Steel members to be perforated to assist in the ventilation of roof space. Perforations to comprise 15% of area of member.

### 4.2 WALL FRAMING

#### Wall studs

General: Provide studs in single lengths without splices. Place a stud under, or within 40 mm from, each structural load point from roof or ceiling (except for openings). Provide multiple studs at points of concentrated load.

Maximum stud spacing: 600 mm.

#### Heads to openings

Provide lintels consisting of either a stiffened top plate or a truss built up from frame members, depending on load and span.

#### Splicing

Splice plates at ends to maintain continuity and alignment.

#### Additional support

General: Provide additional support in the form of noggings, trimmers, fixing blocks for aluminium/steel door frames and aluminium windows, studs for support and fixing of lining, cladding, hardware, accessories and fittings.

Maximum spacing of noggings: 1350 mm centres.

### 4.3 TRUSSES

#### Fabrication

Assembly: Factory assemble trusses.

**Supports for water containers**

Where a water container or heater is located in the roof space provide a support platform to AS 3500.4.2 clause 4.5.

**Marking**

Permanently mark each truss to show

- manufacturer;
- location;
- support points; and
- trusses designed for additional loading such as water heater support
- .Installation

General: Fix to external wall plates, plumb to within  $H/200$ , where H is the height. Provide ties and wind bracing.

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**5 COMPLETION****5.1 COMPLETION****Cleaning**

On completion of framing remove debris from the cavities of members.

**BRICK AND BLOCK CONSTRUCTION****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **brick and block construction** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

General Requirements, Insulation & Barriers & Earthworks

**1.2 STANDARD****General**

Materials, construction and detailing: To AS 3700.

Masonry units: To AS/NZS 4455.

**1.3 INTERPRETATION****Definitions**

Face units: Masonry units used in facework, including purpose-made units such as squints, sills and thresholds.

Facework: Masonry in which the form, or form and colour, of the face units and joints is visible in the completed works.

**2 QUALITY****2.1 INSPECTION****Witness points**

Stages: Give sufficient notice so that inspection may be made at the following stages:

- Damp-proof courses, in position.
- Flashings, in position.
- Bottoms of cavities, after cleaning out.
- Bottoms of core holes, before grouting.
- Control joints, ready for insertion of joint filler.
- Lintels, in position.
- Structural steelwork, including bolts and shelf angles, in position.

**Hold points**

As advised by Principals Authorised Person

**2.2 TESTS****Masonry units test criteria**

General: The criterion for the relevant test stated or recommended in AS/NZS 4455, or the specified criterion (in which case the latter prevails).

**Masonry units tests schedule**

Attribute	Test method
Potential to effloresce	AS/NZS 4456.6
Care % and material thickness	AS/NZS 4456.7
Moisture content and dry density	AS/NZS 4456.8
Resistance to salt attack	AS/NZS 4456.10
Coefficients of expansion	AS/NZS 4456.11
Coefficient of contraction	AS/NZS 4456.12
Pitting due to lime particles	AS/NZS 4456.13
Water absorption properties	AS/NZS 4456.14
Lateral modulus of rupture	AS/NZS 4456.15
Permeability to water	AS/NZS 4456.16
Initial rate of absorption	AS/NZS 4456.17
Tensile strength	AS/NZS 4456.18

**2.3 SAMPLES****Masonry unit samples**

General: Submit face units of each type illustrating the range of variation available, including colour, texture, surface irregularities, defective arrises, and shape.

Number of each type: 6.

**Sand samples**

General: Submit a 2 kg sample of each type of sand required to be of a particular colour, grade or source.

**Facework sample panels**

Internal Face Brickwork: Prepare a separate sample of single leaf face brickwork and

build in a single gang electrical wall box of the pattern specified in this Contract, in the vertical position and with conduit attached.

Minimum Size (face of panel): 1800 x 1200 mm

Footings: 2 courses of 230 mm brickwork.

Incorporation Into The Works: An approved panel, if suitably located, may be permitted to be incorporated in the Works. Otherwise protect any approved sample panel from damage and retain until completion of brickwork, then remove all traces.

**Facework set-out**

General: Provide a trial set-out of 2 courses for each panel of facework.

**Mortar Samples**

Use if final selection of mortar colour is to be made on the site from several alternatives.

Sample Panels: Construct two sample panels, 900 x 900 mm in stretcher bond using different selected shades of mortar.

Footings: 2 Courses of 230 mm brickwork.

**2.4 SUBMISSIONS****Materials**

Mortar for refractory brickwork: Submit proposal.

### 3 MATERIALS AND COMPONENTS

#### 3.1 MATERIALS AND COMPONENTS

##### Masonry units schedule

##### Refractory bricks

Chemical constitution: 30% alumina ( $\text{Al}_2\text{O}_3$ ).

##### Steel components

Durability classification to AS 3700:

##### Connectors and accessories

Durability classification to AS/NZS 2699.2:

##### Concrete Masonry Units

Must not be used (Mandatory).

##### Mortar materials

Cement type to AS 3972: GP.

White cement: Iron salts content  $\leq 1\%$ .

Lime: To AS 1672.1.

Sand: Fine aggregate to AS 2758, Part 1 and AS A123 Clause 1.5. bush sand must not be used (Mandatory).

Premixed Mortar: Do not use.

Retempering of mortar: Prohibited. Discard any mortar that is not used within 90 minutes after adding cement.

Admixtures: Do not provide admixtures.

Cement type to AS 3972: GP.

White cement: Iron salts content  $\leq 1\%$ .

##### Mortar mix table

Mortar type to AS 3700	Mortar proportions (cement:lime:sand)	Location
M3	1:0:5 + water thickener	Concrete or calcium silicate masonry
M4	1:0:4 + water thickener	Grouted and reinforced masonry
M4	1:0 - 0.25:3	Underpinning, high strength masonry
M3	1:1:6	Other masonry

### 4 EXECUTION

#### 4.1 CONSTRUCTION GENERALLY

##### Cleaning

General: Clean masonry progressively as the work proceeds. Clean facework to remove mortar smears, stains and discolouration. Do not use acid.

- Internal Facework: Do not carry out cleaning with acidic solutions unless there is sufficient ventilation for adequate evaporation of the acid. Acid cleaning will not be permitted after the roof and/or the ceiling is fixed. Do not use high pressure water cleaning.
- External Facework: High Pressure Water Cleaning Do not use unless approval has been obtained. Use only clean water containing no acids or additives. Discontinue immediately if damage to brickwork occurs.

##### Concealed work

Joints: Cut flush, and leave unstruck.

##### “Grassing” of bricks

General: Do not lay clay bricks until they have been out of the kiln for at least 14 days.

##### Sills and thresholds

Bedding: Solidly bed masonry sills and thresholds and lay them so that the top surfaces drain away from the building. Set out so that no unit is cut smaller than 3/4 full width.

**Joints and cutting**

Set out: Set out masonry with joints of uniform width and minimise cutting of masonry units.

Holes, sleeves and chases: Build in during erection.

**Rods**

76 mm high units: 7 courses to 600 mm.

90 mm high units: 6 courses to 600 mm.

190 mm high units: 3 courses to 600 mm.

**Bonds**

Single leaf: Stretcher bond.

Facework: Stretcher bond.

**Built in steel door frames**

Fill the backs of jambs and heads solid with mortar as the work proceeds.

**Monolithic structural action**

General: Provide masonry header units, except in stretcher bond facework.

Location:

- Between leaves in solid masonry construction.
- At engagement of engaged piers.
- At intersections with supporting walls and buttresses.
- At engagement of diaphragms with the leaves in diaphragm walls.
- At intersections of flanges with shear walls.

**Clearance for timber frame shrinkage**

In seasoned timber frame brick veneer construction, leave the following clearances between window frames and brick sill and between roof frames and the brick veneer:

- Single storey frames and ground floor windows (not for slab on ground): 10 mm.
- Two storey frames and upper floor windows: 20 mm.
- Additional clearance: Accommodate additional shrinkage of unseasoned floor timbers.

**5 COMPONENTS****5.1 FACEWORK****Double face walls**

General: Select face units for uniform width and double-face qualities in single leaf masonry with facework both sides. Before starting, obtain a ruling as to which is the preferred wall face, and favour that face should a compromise be unavoidable.

**Commencement**

Position: Commence at least 1 full course for blockwork, or 2 full courses for brickwork, below adjacent finished ground level.

**Perpend**

Alignment: Vertically align perpend in alternate courses.

**Perforations**

Exposed: Provide solid face units where perforations would otherwise be visible.

**Joints**

Surface: Work with a jointing tool to a dense smooth surface, except where the surface is to be bagged.

**Colour mixing**

General: Where the colour of the face units is visible, evenly distribute the colour range of units. Prevent colour concentrations and “banding”.

**5.2 SUBFLOOR****Underpinning**

Installation: Construct underpinning in alternate panels, each panel not exceeding 1200 mm in length. Maintain bond and coursing in adjoining panels. Set out rod to leave 13 mm maximum between top of underpinning and bottom of existing footing.

Grouting: Pressure grout between underpinning and footing with 1:0.25:3 mortar within 48 hours of completion of each panel.

#### **Bearer support**

Piers: Support bearers on engaged and free standing masonry piers at 1800 mm maximum centres.

Engaged piers:

- Brickwork: 230 x 110 mm, bonded to walls.
- Blockwork: 390 x 90 mm, bonded to walls.

#### **Free standing piers table**

Height (mm)	Brickwork (mm)	Blockwork (mm)
< 1500	230 x 230	390 x 190
1500 - 2700	350 x 350	390 x 390

#### **Access openings**

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

#### **Air vents type**

Brickwork:

- Terra cotta: Perforated, 230 x 160 mm.
- Concrete framed: Bronze wire mesh in concrete frames, 470 x 160 mm.
- Cut brick: 2 cut bricks laid vertically and evenly spaced in a 230 mm wide x 2 course high opening, backed with bronze wire mesh built in.

Blockwork:

- Vent blocks: Purpose-made vent blocks.
- Concrete framed: Bronze wire mesh in concrete frame 390 x 190 mm.

#### **Air vents location**

Ventilation rate: At least 7300 mm<sup>2</sup> free ventilation area per linear metre of wall.

Location: Below damp-proof course, within 600 mm of corners, elsewhere as required by ventilation rate, to internal and external walls.

Cavity walls: Provide matching vents in the internal leaves located as near as practicable to the vents in the external leaves.

Install air vents as to AS 3660.1 (clause 2.7.4.5, Ventilation) to provide adequate cross ventilation to the space under suspended ground floors

### **5.3 PRECAST DOOR THRESHOLDS**

#### **Finish to exposed faces**

Off steel forms.

#### **Concrete mix**

1:2:4 cement:coarse aggregate 10 mm size:fine aggregate.

### **5.4 DAMP-PROOF COURSES**

#### **Material**

Standard: To AS/NZS 2904.

#### **Location**

General: Provide damp-proof courses in the following locations, if applicable:

- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.
- Cavity walls built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity and up the inner face bedded in mortar,
- turned 30 mm into the inner leaf 1 course above. Project 10 mm beyond the external slab edge and turn down at 45°.



- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level. Project 10 mm beyond the external slab edge and turn down at 45°.
- Internal walls built off slabs on ground: In the first course above floor level.
- At timber floors: In the first course below the level of the underside of ground floor timbers in internal walls and inner leaves of cavity walls.

**Installation**

General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step. Sandwich damp-proof courses between mortar.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

Location: At least 150 mm above adjacent finished ground level.

**5.5 CAVITY WALLS****Minimum cavity width**

Masonry walls: 50 ± 10 mm.

Masonry veneer walls: 25 mm, between the masonry leaf and the loadbearing frame and 40 mm between the masonry leaf and sheet bracing.

**Openings**

Closure: Do not close the cavity at the jambs of external openings.

**Cavity fill**

Height: Fill the cavity to 1 course above adjacent finished ground level with mortar weathered towards the outer leaf.

**Cavity Wall Insulation**

DO NOT USE UREA FORMALDEHYDE FOAM CAVITY INSULATION.

**Flashings material**

Standard: To AS/NZS 2904.

STANDARD BITUMINOUS COATED ALUMINIUM IS NOT TO BE USED AS A ROOF FLASHING DUE TO THE FRAGILE NATURE OF THE MATERIAL. EXTRA SUPER HEAVY BITUMINOUS COATED ALUMINIUM FLASHING (MIN 0.70 mm alum. thickness) TO BE USED.

**Flashings location**

General: Provide flashings and weatherings in the following locations, if applicable:

- Floors: Full width of outer leaf immediately above slab or shelf angle, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 2 courses above. Where the slab supports the outer skin and is not rebated, bed the flashing in a suitable sealant.
- Under sills: 30 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill.
- Over lintels to openings in cavity walls: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf 2 courses above. Extend at least 50 mm beyond the lintels.
- Over lintels to openings in masonry veneer construction: Full width of outer leaf immediately above the lintel, continuous across cavity. Turn up against the inner frame and fasten to it. Extend at least 50 mm beyond the lintels.
- At abutments with structural frames or supports: Vertical flashing in the cavity using 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At stiles where cavities are closed: Full height flashing extending 75 mm beyond the closure into the cavity, interleaved with the sill and head flashing at each end. Fix to frame stiles.

**Flashings installation**

General: Sandwich flashings between mortar except where on lintels or shelf angles.

Pointing: Point up joints around flashings, filling voids.

**Weepholes**

Form: Open perpend.

Maximum spacing: 720 mm.

Location: Provide weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at the bottoms of unfilled cavities.

#### Wall ties

Durability classification to AS/NZS 2699.1:

USE TYPE 316 STAINLESS STEEL WALL TIES IN ALL LOCATIONS.

#### Wall ties category table

Classification to AS/NZS 2699.1	Service conditions
Light duty	Masonry veneer
Medium duty	Normal cavity construction and at abutments
Heavy duty	Cavities > 60 mm wide

#### Wall ties installation

Fixing of masonry veneer ties at abutments:

- To timber frames: Clouts or integral spikes.
- To concrete: Masonry anchors.

#### Embedment of wall ties

Cavities > 60 mm wide: 75 mm minimum.

#### Wall ties in reinforced masonry

Location: In unreinforced courses.

#### Flexible wall ties

Type: Where ties or anchors extend across control joints, provide ties or anchors which do not impair the effectiveness of the joint.

### 5.6 AUTOCLAVED AERATED CONCRETE WALLS

#### General

Type: A proprietary system which

- has a current Australian Building Product and Systems Certification Scheme certificate; or
- has a current appraisal report issued by the CSIRO Building Products and Systems Appraisals stating that the system is suitable for use in walls in buildings.

### 5.7 CONTROL JOINTS

#### Filler material

Type: Provide compatible sealant and bond breaking backing materials which are non-staining to masonry. Do not provide bituminous materials with absorbent masonry units.

Foamed materials: Closed-cell or impregnated, not water-absorbing.

Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.

Primer: Required.

#### Installation

Cleaning: Clean joints thoroughly before sealing.

Sealant depth: 0.67 - 1.0 times joint width.

#### Toothed joints

General: Not permitted.

#### Fire rated control joints

General: Where a control joint occurs in an element of construction required to have a fire resistance rating, construct the control joint using fire stopping materials so that the fire resistance rating of the element is not reduced.

Fire stopping: To AS 4072.1.

### 5.8 CHIMNEY TRAYS

#### Requirement

General: Build a one-piece corrosion resistant metal tray to the chimney at roof level.

**Installation**

General: Cut an opening for the flue. Turn tray edges up 25 mm around the flue opening 13 mm clear of the flue walls. Externally turn the tray up 100 mm under the stepped flashing and down 100 mm over the apron flashing. Lap and solder joints.

**Weep holes**

General: Provide 2 weepholes through the flue walls on opposite sides immediately above the tray.

**6 REINFORCEMENT****6.1 BED JOINT REINFORCEMENT****Reinforcement**

Material: Galvanized welded wire mesh.

Width: Equal to the width of the masonry leaf, less 15 mm cover from each exposed surface of the mortar joint.

**Installation**

General: Lap 450 mm at splices. Fold and bend at corners so that the longitudinal wires are continuous. Stop 200 mm short of control joints.

In brickwork: Extend 450 mm beyond each side of openings.

Location:

- In third bed joint above bottom of wall.
- In second bed joint below top of wall.
- In first 2 bed joints above and below openings.
- In first 2 bed joints above and below head and sill flashings to openings.

Maximum vertical intervals: 500 mm.

**6.2 REINFORCED MASONRY****General**

Designation: Masonry strengthened with embedded steel reinforcement, other than bed joint reinforcement.

**Cleaning core holes**

Blockwork: Provide purpose-made cleanout blocks or machine cut a cleaning hole at the base of each reinforced core. Locate on the side of the wall which is to be rendered or otherwise concealed. Cover the hole with formwork and grout the core.

**Bond beams**

Type: Provide bond beams made from purpose-made hollow concrete blocks with reinforcement grouted in place.

Reinforcement: Two 12 mm diameter galvanized rods.

**6.3 PRESTRESSED MASONRY****General**

Designation: Masonry strengthened with embedded prestressed tendons.

**7 LINTELS****7.1 STEEL LINTELS****Material**

Type: Mild steel galvanized to AS/NZS 4680, minimum coating mass 600 g/m<sup>2</sup>. Do not cut after galvanizing.

Durability classification to AS/NZS 2699.3:

**Steel lintels table**

For design and wind speeds of not more than W41: Maximum roof span 10 m.

Steel section	Mass (kg/m)	Construction type			
		A	B	C	D
Angles		Maximum clear span of lintel (mm)			
90 x 90 x 6EA	8.22	3010	2050	2050	1570
90 x 90 x 8EA	10.6	3010	2170	2170	1810

Steel section	Mass (kg/m)	Construction type			
		A	B	C	D
Angles		Maximum clear span of lintel (mm)			
100 x 100 x 6EA	9.16	3130	2290	2290	1810
100 x 100 x 8EA	11.8	3370	2410	2410	1930
150 x 90 x 8UA	14.3	4210	3370	3370	2770
150 x 100 x 10UA	18	4330	3490	3610	3010
Flats					
75 x 8	4.71	490	250	-	-
75 x 10	5.89	610	250	250	250

**Legend:**

Construction types

A - Supporting the external leaf of brick veneer.

B - Supporting external or internal leaf of cavity brickwork and tiled roof.

C - Supporting a single-leaf wall and sheet metal roof.

D - Supporting a single-leaf wall and tiled roof.

**Cold-formed lintels**

Type: Proprietary flat-base type designed to AS/NZS 4600.

Type tests: Required.

**Tension bars**

Type tests: Required.

**Installation**

General: Provide 1 lintel to each wall leaf. Do not cut on site. Keep lintels 6 mm clear of heads of frames. Pack mortar between the angle upstand and supported masonry units.

Minimum bearing each end:

- Span ≤ 1000 mm: 100 mm.
- Span > 1000 mm: 150 mm.

Propping: To prevent deflection or excessive rotation, temporarily prop proprietary cold-formed lintels until the masonry reaches its required strength.

- Minimum propping period: 3 days.

**7.2 BLOCK MASONRY LINTELS****Description**

General: Reinforced lintels using purpose-made U-section hollow blocks as permanent formwork.

**Standard**

General: Comply with the recommendations of SAA HB237 Appendix B.

**7.3 ARCHES****Shapes and dimensions**

General: Form masonry arches using solid or cored (not hollow) masonry units.

**Arch voussoirs**

General: Cut masonry units using a masonry saw.

**8 FINISHES****8.1 BAGGING****Dry bagging**

Preparation: Cut joints flush before bagging.

Application: Apply laying mortar to the surface using a hessian bag or similar. Flush up irregularities, but leave the minimum amount of mortar on the surface.

**Textured bagging**

Preparation: Cut joints flush before bagging.

Application: Apply laying mortar to the surface using a sponge float. Flush up irregularities, but leave approximately 2 mm of mortar on the surface. When initial set is reached, texture using a hand bristle brush.

**INSULATION AND BARRIERS****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **Insulation and Barriers** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

General Requirements

**1.2 STANDARDS****Installation of mineral wool insulation**

Comply with the AMWU/CFMEU/CEPU/FARIMA Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation.

Marking: Deliver mineral wool products to site in packaging labelled FBS-1 BIO-SOLUBLE INSULATION.

**1.3 INTERPRETATION****Definitions**

Terminology: To AS 2352.

Sarking-type material: Flexible membrane material normally used for waterproofing, vapour proofing or thermal reflectance.

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.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that the sarking, vapour barrier and insulation may be inspected before they are covered up or concealed.

**3 MATERIALS AND COMPONENTS****3.1 MATERIALS AND COMPONENTS****Bulk insulation**

Cellulosic fibre (loose fill, slab): To AS 2462.

Fibre insulating board: To AS/NZS 1859.5.

Mineral wool batts and blankets: To AS 3742.

Mineral wool in loose fill: To AS 2461.

Polyester: To AS 3742.

Polyisocyanurate (rigid cellular sheets): To AS 1366.2.

Polystyrene (rigid cellular sheets): To AS 1366.3, or AS 1366.4.

Polyurethane (rigid cellular sheets): To AS 1366.1.

Seagrass: To AS 2463.

Urea-formaldehyde in situ set foam: To AS 4073.

StandardsMark: Required.

Wool: To AWRAP/A 202.

**Sarking-type material**

Standard: To AS/NZS 4200.1.

StandardsMark: Required.

Flammability index to AS 1530.2:  $\leq 5$ .

Spread of flame index to AS/NZS 1530.3:  $\leq 5$ .

Duty: Medium.

Vapour proofing: Permeance to AS 3999.

Floor insulation: Perforated, foil-faced both sides.

- Perforations: Clean holes at least 10 mm diameter, at pitch:diameter ratio not greater than 10:1.

Wall sarking: Vapour-permeable.

**Fasteners and supports**

Galvanized steel.

**Mesh support to roof insulation**

Wire netting: To AS 2423.

- Size: 51 mm mesh x 1 mm diameter.

Welded safety mesh: To AS/NZS 4389.

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## 4 EXECUTION

### 4.1 INSTALLATION

**Bulk insulation**

Standard: To AS 3999 or AS 4075.

Batts and rigid sheets: Fit tightly between framing members. If support is not otherwise provided, staple nylon twine to the framing and stretch tight.

- Under floors: Adhesive fix sheet materials.

Loose fill: Provide timber boxing or equivalent to retain loose fill on external edges, cavities and penetrations, and to prevent spilling.

Polyurethane (foamed in situ): Prepare substrate and spray to form a seamless coating.

- Protection: Where exposed to ultra-violet light, provide an elastomeric membrane.

**Sarking-type material**

Standard: To AS/NZS 4200.2.

**Reflective foil laminate**

To timber: Clouts or staples at 300 mm maximum centres.

To steel or aluminium: Double sided pressure sensitive tape.

To plywood membrane support: Water based contact adhesive.

Overlap (minimum): 150 mm and adhesive fix.

**Wall sarking**

Locations: Provide sarking under cladding which does not provide a permanent weatherproof seal including

- boards fixed vertically or diagonally;
- boards or planks fixed in exposed locations where wind driven rain can penetrate the joints; and
- unpainted or unsealed cladding.

Installation: Fix to the frame members with broad-head clouts, staples, screws or pop rivets spaced at 300 mm maximum centres. Apply to the outer face of external

stud walls from the bottom plate up, over the flashing. At the top, seal across the wall cavity.

**Roof sarking locations**

Tile roofs: To AS 2050.

Tile roofs in terrain categories 1 and 2: To AS 1170.2.

Fibre cement shingle roofs: All.

Other roofs: As recommended by the roofing product manufacturer.

**Installation**

Sarking membrane: Over joists, with a sag of 100 mm.

**4.2 WALL INSULATION****General**

Bulk insulation:

- Type: Polyester or Mineral wool Insulation batts or blankets.
- R-value: 1.5 (minimum)

**4.3 ROOF INSULATION****General**

Location: The whole of the roof area, except the following:

- Eaves, overhangs, rooflights, vents and openings.
- Roofs to outbuildings, garages, and semi-enclosed spaces such as verandahs, porches and carports.

All metal roofed buildings (including COLA, entrance canopy, and re-entrants under main building roof), excluding eaves.

**Materials**

Bulk insulation, roofs generally:

- Type: Mineral wool batts or blankets.
  - 1.5 R-value of insulation directly under metal roof
  - 2.5 R-value of insulation directly above all internal ceilings including absorptive and highly absorptive ceilings.
  - There must be a minimum continuous air gap of 30 mm between the two layers of insulations.
- Do not extend insulation across rooflights or roof vents.
- Ensure natural air flow from eaves is not interrupted.

Vapour barrier: Reflective foil laminate (sisalation) to underside of roof insulation minimum grammage of 350 g/m<sup>2</sup>.

Flammability index: 5 or less

Standards to AS 1903 and AS 1904.

- Class: A
- Grade: A
- Type: A

Mesh support to roof insulation:

- Galvanised wire netting to AS 2423.
- Mesh size: 50 mm.

**Installation**

Sound insulation: Install over the roof support frame, reflective thermal insulation (if any), and mesh support, so that the blanket is in continuous contact with the underside of the metal roofing sheets.

**Mesh support to roof insulation**

Locations: Provide mesh support to

- sarking, vapour barrier or reflective thermal insulation membranes laid over roof framing members which are spaced at more than 900 mm centres; and
- blanket type thermal insulation laid over roof framing members as sound insulation to metal roofing.



Installing wire netting: Lay over the roof framing providing sufficient slack or sag between members to suit the application.

Fixing wire netting: Staple to timber frame, wire to steel frame.

Installing welded safety mesh: To AS 4389.

- Galvanised wire netting to AS:2423
- Mesh Size 50mm

<b>ROOFING</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **roofing** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

General Requirements, Insulation & Barriers and Stormwater

**2 QUALITY****2.1 PERFORMANCE CRITERIA****Minimum requirements**

Provide a roofing system and associated work which

- remains intact and waterproof under the local or regional ambient climatic conditions;
- provides adequate means of dealing with vapour pressure, condensation, corrosion and thermal movement;
- supports the specified imposed loads and types of roof access without impairment of performance;
- in the case of dwellings within the scope of AS 2627.1, provides the minimum added thermal resistance (R) of that standard; and
- satisfies other specified performance requirements.

**Ambient climatic conditions**

Wind loading to AS 1170.2:

Snow loading to AS 1170.3:

Design rainfall intensity (mm/h) to AS/NZS 3500.3.2:

**Roof access**

Type:

**Imposed loading**

Uniformly distributed (kPa):

Concentrated (per 2000 mm<sup>2</sup> of roof space) (kN):

**Thermal insulation**

Minimum added thermal resistance (R) (m<sup>2</sup>.K/W):

**2.2 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made of

- roof supports; and
- those parts of the roofing, sarking, vapour barrier, insulation and roof plumbing installation which will be covered up or concealed.

**Hold points**

As advised by Principals Authorised Person

**2.3 TESTS****Metal roofing**

General tests: Type test the roof sheeting and fastenings to AS 1562.1 for resistance to concentrated load and to wind pressure.

Cyclone area tests: For installations in tropical cyclone regions C and D, as shown in AS 1170.2, type test the roof sheeting and fastenings to AS 1562.1 clause 5.6.

**Fibre cement roofing**

Type test the roof sheeting and fixings to AS/NZS 1562.2 for resistance to wind forces.

**Internal downpipes**

Site test each stack hydrostatically in stages 2 storeys high for two hours. Remedy defects and retest if necessary.

**2.4 SAMPLES****General**

Submit samples of the following showing the range of variation available:

- Tiles, slates and shingles.
- Bedding and pointing mortar.

**2.5 SUBMISSIONS****Shop drawings**

Fabric roofs: Submit shop drawings certified by a structural engineer and showing the following:

- Arrangement of roof and supports including the size and shape of the membrane and the location of joints, connections, support and lifting points.
- Design loading and pressure level.
- Specification, grade and finish of materials and components.
- Method of fabrication including fabric joints, cable connections and terminations and support structures.
- Cutting patterns for the fabric and, where applicable, sequence of jointing.
- Fabrication tolerances.
- Control testing of materials, fabricated components and fabric joints.
- Method of erection.
- Connection to, or junction with, adjoining structures, as applicable.

**3 MATERIALS AND COMPONENTS****3.1 MATERIALS AND COMPONENTS****Fasteners**

Self-drilling screws: Corrosion resistance Class 3.

Finish: Prefinish exposed fasteners with an oven baked polymer coating to match the roofing material, or provide matching purpose-made plastic caps.

Fastenings to timber battens: Provide fastenings just long enough to penetrate the thickness of the batten without piercing the underside.

**4 EXECUTION****4.1 INSTALLATION****Protection**

General: Keep the roofing and rainwater system free of debris and loose material during construction, and leave them clean and unobstructed on completion. Repair damage to the roofing and rainwater system.

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

**Thermal movement**

Provide for thermal movement in the roof installation and the structure, including movement in joints and fastenings.

**4.2 SAFETY MESH****Standard**

General: To AS/NZS 4389.

**4.3 TILING****Materials**

Standard: To AS 2049.

Accessories: Provide the accessories, compatible with the tiles, necessary to complete the tiling.

**Installation**

Standard: To AS 2050.

Setting out: Set out the roof to give an even tile gauge in each course, with full or saw cut tiles at verges.

Bedding and pointing: Bed and point accessories, including ridges, hips and verges, in coloured mortar.

- Colour: To match the tiles and accessories.

Tile verge: Finish the verge with cover tiles pointed to the roof tiles. Screw fix to the barge board with round head galvanized screws.

Pointed verge: Bed and point tiles on 100 x 5 mm fibre cement pointing strip.

Precautions against wind effects: Adopt the precautions given in AS 2050 Appendix A.

**4.4 FIBRE CEMENT SHINGLE ROOFING****System**

Proprietary system of autoclaved fibre cement, single faced, smooth matt surfaced shingles with square cut edges and pre-drilled fixing holes, and a combination integral colour and thermosetting acrylic finish.

**Soakers**

Provide 15 kg/m<sup>2</sup> lead soakers under ridges and hips and where shingles abut walls.

**Installation**

Standard: To AS 4597.

Bottom course: Overhang 50 mm into eaves gutter.

Verges: Overlap barge boards minimum 35 mm.

**4.5 TIMBER SHINGLES AND SHAKES ROOFING**

SHINGLES AND SHAKES ARE TO BE USED ONLY IN EXCEPTIONAL CIRCUMSTANCES AT THE APPROVAL OF THE PRINCIPALS AUTHORISED PERSON.

**4.6 SLATE ROOFING**

Standard: To AS 4597.

**4.7 TIMBER SHINGLE AND SHAKES ROOFING****Material**

General: Canadian western red cedar No.1 Grade, taper sawn or split to form shingles or shakes of set length and random widths.

**Finish**

Shingles: Sawn both sides.

Shakes: Split and resawn.

**Fixing**

To battens or plywood sheathing with either galvanized steel or silicon bronze nails.

**Installation**

Timber shingles: To AS 4597.

**4.8 SHEET METAL TILING****General**

Type: A proprietary roofing system of interlocking prefinished steel sheets profiled to resemble tiles.

**4.9 SHEET METAL ROOFING AND CLADDING****General**

Purlins are to be perforated to assist in ventilation of the roof space: light timber framing and light steel framing.

description (below) BASED xrw CORRUGATED ROOF SHEETING WITH A colorbond® TYPE FINISH.

colorbond® ultra steel roof sheeting is required in severe ENVIRONMENTS (eg generally 100 to 200 metres from the surf beach and can extend inland for up to 1000 metres depending on prevailing winds) refer to manufacturers technical publications, published recommendations, and relevant Australian standards (eg. AS 1397 and as 2728-category 3, 4 and 5).

ALL CORRUGATED ROOFING MUST HAVE A MINIMUM BMT (Base metal thickness) OF 0.48 mm (0.42 mm BMT CORRUGATED METAL ROOF SHEETING IS NOT PERMITTED).

Type: Provide a proprietary system of preformed sheet and purpose-made accessories.

Accessories: Provide material with the same finish as roofing sheets.

**Standard****Installation**

To: HB 39 Code of Common Practice for Steel Roofing.

ASTM D200 Classification System for Rubber Products in Automotive Products.

Manufacturers Roofing and Walling Installation Manual/s.

**Material**

Number of Ribs: 1 underlap, 1 overlap, 10 internal (nominal)

Rib Height: 16 mm +/- 1 mm (nominal)

Anti-Capillary Feature: Overlapping rib over-formed so as to create a crescent-shaped gap between it and the overlapping rib

Cover Width: 762 mm +/-4 mm (nominal)

Base Metal Thickness (BMT): 0.48 mm (The thickness of steel before the zinc/aluminium coating is added)

Total Coated Thickness (TCT): 0.53 mm approximately

Steel Base Description: AS 1397-G550 (550 Mpa minimum yield strength)

Metallic Coating Description: AS 1397-AZ 150 (150 g/m<sup>2</sup> minimum coating mass)

Finish: To AS 2728

Primer: Nominal film thickness 5 microns each side (0.005 mm) each side.

Finish Coat: Nominal film thickness 20 microns (0.020 mm).

Backing Coat: Shadow Grey wash coat. Nominal film thickness 5 microns (0.005 mm).

Glare is a major issue in schools. select colours that do not cause unacceptable glare (eg Off whites, light grey and other light colours are generally unacceptable).

Colour: Refer to Colour Schedule

Screws and Fasteners: Self-drilling and tapping screws to AS 3566 class 3 and are to be of the types and sizes indicated in the roof manufacturers printed technical data sheets.

Workmanship: Care, storage, handling, cutting and installation all in accordance with the relevant Australian Standards and the roof manufacturers printed technical data sheets.

Completion: On completion of roof installation obtain certification from the roof manufacturer stating that the material and installation is in accordance with the printed technical data sheets provided by the manufacturer and the specification. Hand the certification to the Principals authorised person

**Description**

Preformed continuous corrugated metal sheet roofing system complete with all necessary fasteners, accessories, trims and flashings all in accordance with AS 1562.1, AS 2180 & AS 3566.

**Ridges and eaves**

Treat ends of sheets as follows:

- Project sheets 50 mm into gutters.
- Close off ribs at bottom of sheets using mechanical means or with purpose-made fillers or end caps.
- Turn pans of sheets up at tops and down into gutters by mechanical means.
- Provide pre-cut notched eaves flashing and birdproofing where necessary.
- Close off ridges with purpose-made ridge fillers of closed cell polyethylene.

**Ridge and barge capping**

Finish off along ridge and verge lines with purpose-made ridge capping or barge rolls.

**Sprung curved ridge**

Lay the roof in single lengths from eaves to eaves by naturally curving the sheets over the ridge.

**End laps**

General: Where end laps are unavoidable, and the sheet profile is not suitable for interlocking or contact end laps, construct a stepped type lap.

**Pan type sheets**

Removal: Capable of being de-indexed and removed without damage.

**Curved corrugated sheet**

General: Form by rolling from material recommended for curving or bullnosing. Minimise crimping or creasing across the face of the sheet. Trim off crimped or creased edges and ends.

**Metal separation**

Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by either

- applying an anti-corrosion, low moisture transmission coating to contact surfaces; or
- inserting a separation layer.

**4.10 FULLY SUPPORTED COPPER ROOFING****Type**

Copper roofing laid on flush finished continuous timber decking over an underlayer and separation layer.

**Underlayer**

Bituminous felt. Lay loose over deck.

**Separation layer**

Fire resistant building paper.

**Roof sheeting**

Material: Soft temper copper to AS 1566.

Minimum thickness: 0.5 mm.

Profile: Roll form sheeting into pan profiles for forming into standing lock seam joints at 375 mm maximum centres.

**Fixing**

Fix pans to the deck with concealed copper clips at 750 mm maximum centres.

**Lock seams**

Mechanically form and welt seal in situ using a self propelled seaming machine, to stand 25 mm high on completion. Dress seams flat at gutters, ridges and hips, and fold both pan and seam down into gutters and up to form stop ends at ridges and hips.

**Ridge and hip capping**

Lock welt to the upturn of the roofing.

**4.11 FIBRE CEMENT ROOFING****Material**

Type: 6 mm thick autoclaved fibre cement sheet, corrugated to 150 mm pitch.

Standard: To AS/NZS 2908.1.

**Accessories**

Provide purpose-made accessories.

**Installation**

Standard: To AS/NZS 1562.2.

**4.12 PLASTIC SHEET ROOFING****Materials**

Unplasticised polyvinyl chloride (uPVC) sheet: To AS/NZS 4256.2.

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

**Installation**

Standard: To AS/NZS 1562.3.

**4.13 GLAZED ROOFING****Description**

General: Provide sloped overhead glazing fixed to glazing bars or directly to the roof framing. Provide the necessary trim, flashings and sealants.

Glass selection and installation: To AS 1288.

**4.14 SUSPENDED FABRIC ROOFING****Description**

General: Suspended coated fabric roof, including the supporting structure and anchorages, designed and constructed by a specialist firm.

**4.15 ROOF LIGHTS****Standard**

General: To AS 4285.

**Description**

General: A proprietary rooflight system including framing, fixing, trim, accessories and flashings.

**4.16 SKYLIGHT, LIGHTING STRIP****Description**

Industrial glass fibre reinforced polyester (GRP) roof sheeting.

Polycarbonate twin walled sheeting directly under clear roof sheeting.

Prismatic diffuser panel at ceiling level.

Effective Width: 210 mm

**Roof Material**

Glass fibre reinforced polyester (GRP) roof sheeting

Profile: Corrugated, to match corrugated roof sheeting

Surface Coating, Weathering: 20 microns protective surface coat.

Weight:

- 2400 g.s.m.

- 3050 g.s.m.

- 3660 g.s.m.

Light Transmission:

- 2400 g.s.m. 58%

- 3050 g.s.m. 50%

- 3660 g.s.m. 48%.

Colour: Opal

Early Fire Hazard Indices: In accordance with BCA requirements and tested in accordance with AS 1530.3 by a NATA or a NATA accredited testing laboratory

Identification, Fire Retardant: Identifying coloured thread in the sidelap of each sheet

Installation: As shown on drawings and all in accordance with manufacturers instructions

Standards, Installation: To AS 2424

**Clear Sheeting Under Translucent Roofing**

Type: Impact resistant, twin walled clear polycarbonate structured clear sheeting installed directly under translucent industrial glass fibre reinforced polyester (GRP) roof sheeting, to AS/NZS:4256.5

Early Fire Hazard Indices: In accordance with BCA requirements and tested in accordance with AS 1530.3 by a NATA or a NATA accredited testing laboratory.

Thickness: 8 mm

Impact resistance: To AS 2424

Installation: As shown on drawings and all in accordance with manufacturers instructions

**Diffuser Panel**

Type: Clear prismatic diffuser panel at ceiling level

Early Fire Hazard Indices: In accordance with BCA requirements and tested in accordance with AS 1530.3 by a NATA or a NATA accredited testing laboratory.

Prism: 4.5 m (nominal) square base female conical prism parallel and perpendicular to the length and width of the panel.

Installation: Install an extruded aluminium “h” channel to hold the diffuser panel in position. The “h” channel is to be ribbed internally to help grip the diffuser.

- Finish colour: White

**4.17 ROOF WINDOWS****Type**

General: A proprietary window system designed for non-vertical installation in roofs pitched between 15° and 85°, consisting of

- timber frame and sash, shop clear primed;
- external anodised aluminium protective profiles;
- sealed double glazing;
- horizontally pivoted sash, 180° reversible, on patent friction hinges;
- opening and locking by patent control bar; and
- ventilation flap.

**4.18 ROOF VENTILATORS****Description**

General: Proprietary roof mounted ventilators including fixings, trim and flashings.

Finish: Match adjacent roofing.

Roof mounted ventilator/s including power operated dampers, fixings, trim and flashings. Finish to match adjacent roofing.

Type: Rotary (turbine) roof ventilator.

Construction, Type: Spot welded or mechanically fastened at all points of connection.

Base: Tapered square to round (base/throat) construction to match roof profile and pitch.

Throat: Minimum size \*400 mm.

Performance: Minimum exhaust capacity based on a 3 metre stack and 5° temperature difference at 12 km/h wind velocity.

- 400 mm (nom) throat = 485 litres/sec.
- 450 mm (nom) throat = 610 litres/sec.
- 500 mm (nom) throat = 740 litres/sec.
- 600 mm (nom) throat = 920 litres/sec.

Bearings: Precession roller bearing type. The bearings to be located in the ventilator so that the inner case and the outer case remain parallel at all time.

- Fully isolated from the environment
- Steel or stainless steel
- Minimum two races of roller bearings
- Permanently lubricated
- Shaft: Aluminium machine grade 2011 T3 or stainless steel grade 316



**Corrosive Locations**

Within 3 km from surf beaches.

Within 1 km from bay beaches.

Highly industrialised areas.

Type: Roof ventilators in corrosive locations are to be of aluminium construction.

Turbine and Base: Aluminium grade: 5005 H34

Powder Coating: Specification Reference: PAINTER.

**Installation**

In accordance with manufacturers printed instructions. Fix ventilator base to fixing battens and securely strap fixing battens to roof members.

**Flashing**

In accordance with manufacturers printed instructions.

ROTARY ROOF VENTILATION systems installed in all habitable locations must have DAMPERS WITH REMOTE CONTROL operation. dampers are generally not required in Non habitable places such as COLA'S.

**Damper**

Location: Inside throat

Operation: Motor driven operation via a 240V AC, 50 Hz nominal 3 W rated motor driving and holding in either the fully open or fully closed position

Switches: Supplied from an external changeover switch so that either the "open" or the "close" switchwire will be continuously energised from a 240V supply.

Wiring: Prewire and fit with a minimum 1.0 m long 4 core flexible cable with a 4 pin plug top with cores for a 240V "open" switchwire, 240V "close" switchwire, neutral and earth. (The socket, changeover switch and all wiring on the line side of the socket forms part of the building work).

Switch: Control switches are required on the basis of one switch per space, and are to be a single gang plate labelled VENTILATOR DAMPER containing a two-way switch with a position also machined engraved and filled as OPEN - SUMMER and CLOSED- WINTER. Each control switch is to be at the standard lighting switch height adjacent to the ceiling fan controller.

- Drawing reference: >

Wiring and socket: Wire a 240V open switchwire (summer), 240V closed switchwire (winter), neutral, and earth to a 4-pin socket adjacent to each damper motor. The type of socket and connection diagram are as required by the damper motor supplier.

THE SUPPLY OF THE separate circuit IS TO BE UNDERTAKEN BY THE BUILDERS ELECTRICAL CONTRACTOR.

Supply: Provide a separate circuit on the relevant switchboards for motor driven dampers.

Specification reference: Electrical Installations.

**Register (ceiling grille)**

Specification Reference: lining or suspended ceilings

**Guarantee (mandatory)**

Minimum 10 year written conditional guarantee on replacement of rotary roof ventilator if defective. The guarantee is to cover vent, base, bearing/s domed top (if applicable) and surface finish.

Distribution: Hand one copy to the Principals Authorised Person.

**Certification**

Manufacturers certification of compliance with the specified requirements (including performance).

Distribution: Hand one copy to the Principals Authorised Person.

**Proprietary items**

- Edmonds Rotary Roof Ventilators.
- IVR Lowline Rotary Ventilators.
- Western Rotary Roof Ventilators

**Roof Smoke Ventilators )****Description**

Proprietary roof mounted smoke ventilator/s with remote operating dampers including fixings, trim and flashings.

Finish: Match adjacent roofing.

**Standards**

Comply with the BCA NSW H101.22 and be capable of opening against a resistance load of 0.48 Kpa/m<sup>2</sup> and remain set against 1.44 Kpa/m<sup>2</sup> uplift pressure.

**Construction**

Fabricate from galvanised steel material with stainless steel and nylon pivots, bearings etc. Spot welded or mechanically fastened at all points of connection.

Operation: Automatic fusible link operation at 71<sup>0</sup> maximum temperature.

**Installation**

All in accordance with manufacturers printed instructions. Fix ventilator base to fixing battens.

Flashing: All in accordance with manufacturers printed instructions.

Controls: Manual operation controlled by two positions on both sides of the stage.

Height From Floor: 1500 mm from finished floor level to centre of remote manual controlled mechanism.

Signs: Install signs describing the operation of the vent system, at each of the manual operating positions.

**Certification**

- manufacturers certification of compliance with the specified requirements (including performance).
- 

**4.19 ROOF PLUMBING****General**

Standard: To AS/NZS 3500.3.2.

General: Provide the flashings, cappings, gutters, rainwater heads, outlets and downpipes necessary to complete the roof system.

Pipework: All rainwater collection pipework to be suitable for use with potable water in compliance with AS 3855 and/or AS/NZS 4020

EXTRA SUPER HEAVY BITUMINOUS COATED ALUMINIUM FLASHING (MIN. 0.70 mm ALUM. THICKNESS) TO BE USED FOR ROOF FLASHING.

**Materials**

Metal rainwater goods: To AS/NZS 2179.1.

PVC rainwater goods and accessories: To AS/NZS 2179.2 (Int).

**Jointing sheet metal rainwater goods**

Butt joints: Make joints over a backing strip of the same material.

Soldered joints: Do not solder aluminium or aluminium/zinc-coated steel.

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

**Flashings and cappings**

Flashing material: To AS/NZS 2904.

Installation: Flash roof junctions, upstands, abutments and projections through the roof. Preform to required shapes where possible. Notch, scribe, flute or dress down as necessary to follow the profile of adjacent surfaces. Mitre angles and lap joints 150 mm in running lengths. Provide matching expansion joints at 6 m maximum intervals.

Upstands: Flash projections above or through the roof with two part flashings, consisting of a base flashing and a cover flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection.

Wall abutments: Provide overflashings where roofs abut walls, stepped to the roof slope in masonry and planked cladding, otherwise raking.

- In masonry: Build into the full width of the outer leaf. Turn up within cavity, sloping inward across the cavity and fixed to or built in to the inner leaf at least 75 mm above.
- In concrete: Turn 25 mm into joints or grooves, wedge at 200 mm centres with compatible material and point up.

Fixing to masonry or concrete: Step in courses to the roof slope. Interleave with damp proof course, if any.

Fixing to pipes: Solder, or seal with neutral cured silicone rubber and either

- secure with a clamping ring; or
- provide a proprietary flexible clamping shoe with attached metal surround flashing.

#### Flashings schedule

Component	Material and Finish	Thickness and Grade
Flashings	*Extra Super heavy, bituminous coated aluminium	* 0.70 mm (aluminium thickness) to AS 2904

#### Gutters

General: Prefabricate gutters to the required shape where possible. Form stop ends, downpipe nozzles, bends and returns. Dress downpipe nozzles into outlets. Provide overflows to prevent back-flooding.

Matching gutter and fascia: Provide a proprietary metal eaves gutter and accessories formed and pre-coated to match the fascia system.

Gutter and sump support: Provide framing and lining to support valley gutters, box gutters and sumps. Line the whole area under the gutters and sumps.

Valley gutters: Profile to suit the valley boarding. Turn back both edges 180° x 6 mm radius. Nail or screw to the valley boarding at the top end to prevent the gutter creeping downwards.

Gratings and guards: Provide removable gratings over rainwater heads and sumps and leaf guards to gutters and gutter units.

Expansion joints: Provide expansion joints in guttering longer than 30 m.

Matching fascia/arge: Where the selected eaves gutter is a proprietary high front pattern forming part of a combined system of gutter, fascia and barge, provide the matching proprietary fascias and barge cappings to roof verges and edges.

The gutter brackets described below are based on metalform industries gutter brackets. These brackets have been designed for use in EDUCATION buildings. Other proprietary brackets that comply with the specification described below may also be acceptable.

Gutter brackets for half round gutters: 50 x 5mm MS fabricated to match gutter. Hot dipped galvanised and pre-coated.

- Hot dipped galvanising: To BS 6497
- Epoxy primer: 250 microns
- Polyester powder: 80 microns to AS/NZS 4506

Internal fitting gutter brackets must not be used

#### Downpipes

General: Prefabricate downpipes to the required section and shape where possible. Connect heads to gutter outlets and, if applicable, connect feet to rainwater drains.

Access cover: Provide a removable watertight access cover at the foot of each downpipe stack.

Downpipe support: Provide supports and fixings for downpipes.

DOWNPIPES TO BE MIN 75 mm DIA. OR 75 mm DEEP FOR RECTANGULAR SECTIONS.

ACCEPTABLE MATERIALS ARE STAINLESS STEEL, GALVANISED WATERPIPE, CAST IRON, UPVC, ALUMINIUM, ZINCALUME STEEL AND COPPER.

FOR LIGHT GAUGE METALS, PROTECTION IS REQUIRED BELOW 2100 mm, WITH A GUARD OF MIN 1.6 mm MATERIAL, FIXED INDEPENDENTLY. DOWNPIPES TO BE FIXED HARD AGAINST WALL, COLUMN ETC. ASTRAGALS OF SIMILAR MATERIAL GENERALLY TO BE AT 1800 CRS, FIXED TO DOWNPIPE AS WELL AS SUPPORT.

IF POSSIBLE LOCATE DOWNPIPES AWAY FROM MAIN CIRCULATION, DRIVEWAYS ETC.

DOWNPIPES ARE NOT TO BE RECESSED INTO BRICKWORK OR FULLY ENCLOSED.

THEY SHOULD NOT CONNECT DIRECTLY INTO STORMWATER PIPES BUT 150MM ABOVE A COLLAR WITH A GRATE.

#### Internal downpipes

Access: Provide access openings as follows:

- At each junction and bend.
- At the foot of each stack.
- At every second floor level.

Sound insulation: Mineral fibre pipe insulation 50 mm thick, spirally bound on with 1.5 mm wire at 150 mm pitch.

Building in: Where pipes are built into masonry or concrete, spiral wrap the pipe (and insulation, if any) with building paper.

### 4.20 RAINWATER TANKS

#### General

Type: Proprietary cylindrical coated steel or reinforced concrete tanks with flat base and conical roof.

Accessories: Provide the accessories needed to complete the installation, including inlet and outlet connections, screen, overflow and access hole.

#### Coated steel tanks

Support: Fully support the tank above ground level.

Material: Hot-dipped zinc-coated steel or aluminium/zinc-coated steel.

Outlets: Double fitted so that fitting is rigid.

- Tanks  $\leq 6600$  L: 20 mm minimum.
- Tanks  $> 6600$  L: 25 mm minimum.

Access hole: Cut access hole above the highwater level, and cover with either a strainer or a top fixed securely to the tank. Provide soluble chemical protector units.

Rivetted and capped joints:

- Base: Either 6 mm grooved seams for tanks  $\leq 2.1$  m diameter, or riveted seams for tanks of any size. Space rivets at 50 mm maximum centres, and overlap sheets  $25 \pm 3$  mm.
- Walls: For corrugated sheet, rivet at every corrugation and end-lap 100 mm minimum.
- Girth seams: Space rivets at 300 mm maximum centres. Provide either 4.8 mm (minimum) blind rivets or No. 8 (minimum) solid rivets.

Overflow: Area at least the total tank inlet area.

#### Coated steel tanks material table

Component	Minimum base metal thickness (mm)		Grade to AS 1445	Coating class to AS 1397	Profile/Pitch x no. of corrugations
	$\leq 3$ m diameter or $\leq 17\,000$ L	$> 3$ m diameter or $> 17\,000$ L			
Base	0.6	0.8	G300	Z275 or AZ150	Flat
Walls	0.6	0.8	G250	Z600	76 x 8

Component	Minimum base metal thickness (mm)		Grade to AS 1445	Coating class to AS 1397	Profile/Pitch x no. of corrugations
	≤ 3 m diameter or ≤ 17 000 L	> 3 m diameter or > 17 000 L			
				AZ200	76 x 10.5
Top	0.6	0.6	G300	Z275	Flat
				AZ150	Conical

**Reinforced concrete tanks**

Trim and compact the ground and place a level bed of sand at least 50 mm thick to support the tank.

**4.21 PROVISION FOR SAFE WORKING ON ROOFS**

**General:** Provide a proprietary anchorage points system to AS/NZS 1891.4 and in accordance with WorkCover's Code of Practice for Safe Work on Roofs (Part 1 Commercial and Industrial Buildings) for the attachment of individual fall arrest devices/restraints. Anchorage points are also to be provided to prevent "pendulum effect" in corners of buildings.

**Installation:** A "competent person" (AS/NZS 1891.4-1.4.1) must install all anchorage points at appropriate intervals and in the most suitable position to make safe access to all areas of the roof and sufficient distance from the roof end to prevent a "pendulum effect".

**Anchorage System:** The complete height protection system including all installed anchorage points must be certified by an "engineer" that it is in full compliance with WorkCover requirements and that each installed anchor complies with AS/NZS 1891.4 ultimate load rating of 21kn (minimum).

**Building Structure:** Prior to the installation of the height protection system an "engineer" (AS/NZS 1891.4-1.4.2) must certify the building structure and that the elements including connections supporting the height protection system can safely carry the loads.

**Flashing:** Where the anchorage points penetrate the roof, provide a proprietary flexible roof flashing especially designed to fit narrow diameter penetrations.

**Compatibility:** All metal fittings must be non-corrosive and compatible or is isolated by inert elements between dissimilar metals.

**Ladder Fixing Points**

**Generally:** Provide an integral system of safe access by ladder for a single and 2 storey building for provision for future roof maintenance. The complete system is to be in accordance with WorkCover requirements.

**Location:** Ladder fixing point are to be located in a position to minimise visual impact. Locate the fixing points so they are unobtrusive as possible and avoid installing them on the face of a major visual building element.

**Number:** One ladder fixing point/s per roof at a location that is safely accessible with a ladder.

**Materials:** Construct the ladder fixing points out of non corrosive steel complete with all washer gaskets necessary to prevent roof leakage and corrosion. All metals and metal finishes and must be compatible with each other.

**Access:** Provide a safe system of access from the ladder fixing point to the main anchorage system. This anchorage system must provide safe access to all parts of the roof.

**Certification (mandatory)**

**Certification:** The installed anchoring system and ladder fixing points to be placed in the correct position in accordance with WorkCover requirements. The complete system including all building works must be designed and certified by a structural engineer that it is in full compliance with WorkCover requirements and is capable of withstanding the potential loads.

- One copy of the anchor and installation certification must be handed to the Person with full authority/Superintendent.

**Independent Testing Authority**

Provide a copy of a NATA registered Testing Authorities report of the ultimate load testing of the roof harness anchor.

Specification Reference: Preliminaries - Independent Testing Authority.

One copy of the test report must be handed to the PRINCIPALS AUTHORISED PERSON.

**Layout Plan**

Provide a professionally drawn layout plan for the roof anchorage and ladder fixing points, on a B1 sheet at 1:100 scale, laminated, timber frame and wall mounted in the Administration Block adjacent the enquires counter.

**Equipment Data and Maintenance Records**

Provide a log for Equipment Data and Maintenance Records to AS/NZS1891.4. Hand the log to the Principals Authorised Person

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**5 COMPLETION****5.1 COMPLETION****Warranties**

Submit the roofing materials manufacturer's published product warranties.

MEMBRANE ROOFS MUST BE GUARANTEED IN ACCORDANCE WITH DEPARTMENT'S STANDARD GUARANTEE DEED.

**Maintenance manual**

On completion submit a manual of recommendations from the roof manufacturer or supplier for the maintenance of the roofing system including, frequency of inspection and recommended methods of access, inspection, cleaning, repair and replacement.

**Spare tiles**

Number: Provide one spare matching tile for every hundred tiles on the roof.

Provide spare accessories in the same ratio.

Location: Stack spares within the roof space.

Designated locations: On or next to lines of supporting walls.

<b>CLADDING</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **cladding** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

General Requirements, Roofing, Lining and Insulation

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made of framing complete with sarking and flashings ready to receive cladding.

**Hold points**

As advised by Principals authorised person

**3 MATERIALS AND COMPONENTS****3.1 MATERIALS AND COMPONENTS****Plywood and blockboard**

Exterior use: To AS/NZS 2271.

Marine plywood: To AS/NZS 2272.

Presealed plywood: Plywood presealed both sides and edges with a machine applied sealer.

Visible surfaces with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

Bond to AS 2754.1: A.

**Hardboard**

Standard: To AS/NZS 1859.4.

Exterior cladding: Exterior hardboard.

Sheltered exterior cladding: Tempered hardboard.

**Fibre cement**

Standard: To AS/NZS 2908.2.

Cladding, eaves and soffit linings: Type A Category 3.

Compressed cladding: Type A Category 5.

- Edges: Square.

**Timber boards**

Hardwood: To AS 2796.1.

Seasoned cypress pine: To AS 1810.

Preservative treated Australian grown conifers, other than radiata pine and cypress pine: To AS 1784.

**Flashings**

Standard: To AS/NZS 2904.

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**4 EXECUTION****4.1 CONSTRUCTION GENERALLY****Substrates or framing**

Before fixing cladding check and, if necessary, adjust the alignment of substrates or framing.

**Fixing**

Nail to timber framing, screw to steel framing.

**Accessories and trim**

Provide accessories and trim necessary to complete the installation.

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**5 CLADDING TYPES****5.1 HARDBOARD CLADDING****Plank cladding**

Type: A proprietary system of hardboard planks.

Plank thickness: 9.5 mm.

Joints and edges: PVC extrusion.

External corners: Preformed metal joining pieces.

Internal corners: Scribe.

**5.2 TIMBER BOARD CLADDING****Preparation**

Preservative treatment: For cladding with a natural or stained finish, prefinish the boards by dipping or brushing with water repellent preservative. Do not apply preservative if this is incompatible with a specified pigmented stain finish.

Cut surfaces: Treat freshly cut surfaces with water repellent before fixing.

**Installation**

Single lengths: Provide single lengths when installed vertically. Whenever possible provide single lengths of boards when installed horizontally.

Crossings: Fix twice to each crossing, except fix once to each crossing for sawn weatherboard, unseasoned hardwood and secret nailed profiles.

Nailheads: Treat visible nailheads as follows:

- In stained or clear finishes: Drive flush.
- In opaque finishes: Punch below the surface and fill flush with putty after the surface has been primed.

**Joints**

Overlapping joints: Lap boards at least 30 mm.

End grain joints: Install boards so that butt joints are in compression.

Internal and external corners: Butt against a stop bead of thickness at least that of the cladding.

**5.3 PLYWOOD CLADDING****General**

Edges: Seal edges before fixing.

Horizontal joints: Provide rebated edge to give 40 mm overlap, or provide cover battens and flashing.



**5.4 FIBRE CEMENT CLADDING****Plank cladding**

General: Provide a proprietary system of single faced fibre cement building planks.

Plank thickness: 7.5 mm.

Joints and edges: UPVC extrusion.

Corners: Preformed metal joining pieces.

**Sheet cladding**

General: Provide a proprietary system of single faced fibre cement sheets.

Arrangement: Set out in even panels with joints coinciding with framing.

Sheet thickness: 6 mm.

Joints, corners and edges: UPVC extrusion.

**Eaves and soffit lining**

General: Provide single faced fibre cement sheet nailed at 150 mm centres to bearers at maximum 450 mm centres.

Sheet thickness: 4.5 mm.

**Installation**

Fixing: Refer to manufacturers printed fixing instruction for correct fasteners and fixing procedure to substrate.

Fasteners must not be overdriven as this can have a decremental effect on the holding capacity of the sheet

Joints: UPVC extrusion.

**5.5 COMPRESSED FIBRE CEMENT CLADDING****General**

Sheet thickness: 9 mm.

**Flat panels**

General: Smooth even edges free of imperfections such as chips, cut to suit the layout, allowing for a joint gap 10 mm wide between panels.

Horizontal joints: Epoxy bond a backing strip of compressed fibre cement, 4.5 mm thick, to the rear face of the panel. Seal the joint with a 3 mm epoxy fillet.

Vertical joints: Backing strip as for horizontal joints. Seal the joint gap with two continuous beads of sealant, or with a twin-bulb neoprene gasket.

**Screws**

General: 10 gauge countersunk zinc plated, chromate passivated.

Metal framing: Self drilling self tapping.

**Fixing**

Drilling: Pre-drill the panels 1 mm oversize for screw fixings and countersink so that the top of the screw is 2 - 3 mm below the surface.

Finish: Stop screw heads with epoxy filler smoothed and levelled upon application and sanded flush after curing.

**Intermediate supports**

At intermediate supports fix through a packing strip of high density fibre cement 4.5 mm thick, epoxy bonded to the rear face of the panels.

**5.6 METAL PANEL CLADDING****Type**

STANDARD "OFF-THE-SHELF" COLOURS TO BE USED AS SELECTED.

General: A proprietary cladding system comprising

- prefinished metal panels, interlocking so as to be weathertight under the applicable ambient conditions;
- a substructure of stringers, carrier rails and furring, to which the panels are fixed with proprietary concealed fixings, or with flush face fixings with heads finished to match the panels;
- matching trim where required to form parapet cappings, reveals and sills to openings;
- accessories and fixings necessary to complete the installation; and
- provision for thermal movement.

**5.7 PLASTIC CLADDING****Materials**

Unplasticised polyvinyl chloride (uPVC) sheet: To AS/NZS 4256.4.

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

Polycarbonate: To AS/NZS 4256.5.

**Installation**

Standard: To AS/NZS 1562.3.

**5.8 LOUVRED SUNSCREENS****Type**

General: A proprietary fixed louvre system comprising

- prefinished profiled metal louvres attached with proprietary concealed fixings to a supporting substructure;
- a substructure of brackets, frames and carrier members, mechanically fastened to the building structure; and
- accessories and fixings necessary to complete the installation.

**5.9 AAC CLADDING****Panel cladding**

Type: A proprietary system of AAC panels.

Joints: Thin bed adhesive.

Control joints: At all external and internal corners, adjacent to all openings and at maximum 6 m centres.

**DOORS AND HATCHES****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **doors and hatches** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following sections:

Door and window hardware, windows and glazing.

**1.2 INTERPRETATION****Definitions**

Doorset: An assembly comprising a door or doors and supporting frame, guides and tracks including the hardware and accessories necessary for satisfactory operation.

PVC covered aluminium doorsets: Doorsets in which the aluminium core sections of both doors and frames are entirely encased in watertight PVC jacket sections, seam welded at joints.

Door types: To AS 2688.

**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Door frames in place before building in to masonry.
- Door frames installed before fixing trim.

**Hold points**

As advised by Principals Authorised Person

**2.2 TESTS****Timber door tests**

Site tests: Test doors selected from doors delivered to the site for inclusion in the works, using the type tests specified in Appendices A, B and C of AS 2688, in the ratios listed in the **Door tests table**.

Testing authority:

Rejection: For each type tested, tests must not be failed by 2 or more doors or one-third or more of the number of doors tested, whichever is the greater.

**Door tests table**

Quantity of door type supplied to the works	Number of tests of that door type
< 10	0
10 - 50	2
51 - 100	3
101 - 200	4
> 200	3%

**2.3 SAMPLES****General**

Submit 2 samples of each of the following where applicable:

- Sections proposed to be used for frames, louvres and slats.
- Joints made using proposed techniques.
- Finishes to prepared surfaces.
- Colour range samples from prefinished production material (e.g. anodised or organic coated extrusions and sheet). When the colour selection has been made, submit 5 sets of samples showing the colour range.
- Door manufacturer's standard hardware items.

**2.4 SUBMISSIONS****Subcontractors**

Submit names and contact details of proposed suppliers and installers.

**Shop drawings**

General: Submit shop drawings showing details of each assembly, component and connection and information relevant to fabrication, surface treatment and installation for the following:

- Aluminium doorsets.
- Steel door frames.
- Metal clad doors.

Fire resistant doorsets: Submit shop drawings showing details of each assembly, component and connection and information relevant to fabrication, surface treatment and installation.

**Tests**

Fire resistant doorsets: Submit certification from an independent testing authority showing compliance with the required fire rating.

Acoustic doorsets: If a doorset has a weighted sound reduction index ( $R_w$ ) rating, submit certification from an independent testing authority showing compliance with the requirement.

**3 MATERIALS****3.1 MATERIALS AND COMPONENTS****Flashings and weatherings**

Standard: To AS/NZS 2904.

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

**Jointing materials**

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.

**Pile weather strips**

Standard: To AAMA 701/702.

Materials: Polypropylene or equivalent pile and backing, low friction silicone treated, ultra-violet stabilised.

Finned type: A pile weather seal with a central polypropylene fin bonded into the centre of the backing rod and raised above the pile level.

#### **Extruded gaskets and seals**

Type: Non cellular (solid) elastopressive seals.

Material:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255.1.
- Flexible polyvinyl chloride (PVC): To BS 2571. 100% solids with high consistency, ultra-violet stabilised.

#### **Nylon brush seals**

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

## **4 EXECUTION**

### **4.1 CONSTRUCTION GENERALLY**

#### **Installers**

Have proprietary doorsets installed by specialist firms.

#### **Installation**

Install doors so that the frames

- are plumb, level, straight and true within acceptable building tolerances;
- are adequately fixed or anchored to the building structure; and
- will not carry any building loads, including loads caused by structural deflection or shortening.

#### **Joints**

Make accurately fitted tight joints so that neither fasteners nor fixing devices such as pins, screws, adhesives and pressure indentations are visible on exposed surfaces.

#### **Operation**

Ensure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and that they are lubricated where appropriate.

#### **Hinged shutters (doorsets) in two leaves, Canteens**

Fix a proprietary heavy duty clear anodised aluminium "T" section for the full height to one leaf. The metal "T" strip must be of sufficient strength to provide an effective deterrent against forced leverage. Fixed to stile with compatible countersunk screws through pre drilled fixing holes.

- -Dimensions (minimum): 25 x 25 x 3mm thick

#### **Protection**

Surfaces: Protect surfaces to prevent damage or defacement.

#### **Insect screen door**

General: Provide insect screen doors

- consisting of insect screen mesh in a frame matching the doorset material;
- sliding or side hung as appropriate to the doorset;
- sized and detailed to fully screen the door opening; and
- inclusive of the necessary hardware and accessories.

#### **Window and door assemblies**

If doors are to be installed in window frames as part of a combined window and door assembly, provide a door frame as specified in the *Windows* worksection for the relevant window type, plus appropriate modification and accessories necessary for the door installation.

#### **Seals**

Provide purpose made proprietary seals to meet requirements for weather, draught, smoke and acoustic sealing. Provide fixings, rebates, grooves and clearances as

necessary for installation and operation of the seals. Allow seals unwound from coils to settle before use.

Seals must not hinder the normal operation of the door. Door closers must be able to close the door at normal latching speeds and for the doors to latch effectively without being obstructed by the seal.

Refer to DOOR AND WINDOW HARDWARE for reference to light seals for achieving privacy requirements.

#### **Trim**

General: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the door frames. Install to make neat and clean junctions between the frame and the adjoining building surfaces.

Timber: Solid timber at least 19 mm thick, mitred at corners.

#### **Flashings and weatherings**

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.

#### **Weather bars**

Location: Provide a weather bar under hinged external doors, locate under the centres of closed doors.

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## **5 COMPONENTS**

### **5.1 TIMBER DOORS**

#### **Standards**

Flush doors and joinery doors: To AS 2688.

Installation: To AS 1909.

#### **Door thickness (minimum)**

Generally: 40 mm All doors.

#### **Flush doors**

Flush laminated veneer internal/external doors: 40mm thick (nominal) solid flush door comprising of laminated veneer timber strips to required width.

Veneer layers: Peeled Radiata Pine species, nominal thickness 4mm.

Moisture content (nominal): 4 to 12%

Bonding: Glue veneers using MUF or UF in the lay-up with 2 veneers used as cross band.

Bond: Type "A" or "B" to AS/NZS 2271

#### **Strips**

Hardwood edge strip glued with XPVA to give required panel width

Butt jointed or finger jointed for the required length then edge glued as above.

Finishing: Sanded to a 120 grit finish undertaken by the manufacturer prior to delivery.

Laminated medium density fibreboard (MDF) internal doors: 40mm thick (nominal) solid flush door comprising of a single 32mm core sheet of MDF with 3mm thick MDF sheet laminated to both faces of the core. Provide 0.5mm paint grade veneer to both faces of the door. The door can only be used in internal dry locations it must not be used in exterior or internal wet locations.

Glue line: "B" Bond

Edge Strip: Hardwood edge-glued to give required panel width

Marking: In addition to the requirements of AS 2688 - 1.10 the construction of the flush door shall be marked (LA). (See AS 2688 1.10 (d)).

Blackboard Core to AS 2688 – Section 5

Sanding: Cross band veneer pressed to core plate and flush sanded to minimise core plate show through before pressing face veneer.

**Face veneer:** Close grain face veneers must be used to enable a high quality paint finish to be achieved. **Metal clad doors**

Flush doors faced both sides with 0.6 mm thick galvanized steel sheet extended over and across hardwood edge strips on all edges and fixed with waterproof adhesive using a press.

**Timber insect screen doors**

Panelled joinery doors, with insect screen mesh panels beaded into frame rebates with glazing beads.

**Priming**

Prime timber doors on top and bottom edges before installation.

## 5.2 TIMBER DOOR FRAMES

**Timber frames and jamb linings**

Standard: To AS 2689.

**Installation**

Standard: To AS 1909.

**Heads of fasteners**

Conceal where possible, otherwise sink the head below the surface and fill the sinking flush with a material compatible with the surface finish.

**Fixing to metal frames**

Provide 6 mm countersunk metal thread screws.

**Fixing to thresholds**

Dowel external door frames to thresholds other than timber with 10 mm diameter brass dowels 100 mm long.

**Timber door frames schedule**

## 5.3 SLIDING DOOR FRAMES

**General**

Suspend sliding doors from overhead tracks and wheel carriages appropriate to the size and mass of the doors.

**Cavity sliding frames**

Type: Proprietary combination steel and timber construction with rigid steel top, base, and rear supporting members, incorporating the overhead door track and assembled to accurately match the thickness of the wall into which it is fitted.

Support: Support the unit at the throat entrance by steel angles and finish with split jamb linings. Fix the frame direct to studs through top, base and rear members.

Split jamb linings: To AS 2689.

**Accessories**

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

Guides and stops: Adjustable nylon floor guides to suit grooved or ungrooved doors, as applicable, and buffer type track stop to limit the travel of the door leaf. Provide a safety device to stop inadvertent total closure of sliding patio doors.

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

## 5.4 STEEL DOOR FRAMES

**General**

Assemble frames from coated steel sections, including necessary accessories such as reinforcing backing plates, spreaders, mortar guard boxes, fixing ties, fixing brackets, fixing tube spaces, cavity flashing, weather moulds, conduits and the like. Provide suitable provision for fixing specified hardware; prefinished with protective coatings, built in or fixed to prepared openings.

**Sections**

Rebates: Incorporate rebates or double rebates where required for side hung doors or glazed transoms.

Coated sheet steel to AS 1397

Minimum sheet steel thickness:

- Generally 1.4mm
- Fire rated door sets: 1.4mm
- Category "E" and "D" security doors: 2.5mm

#### **Assembly methods**

Welded: Shop assemble fire rated and heavy duty frames by continuous welding. Grind the welds smooth and cold galvanize the welded joints before shop priming.

Shop assembly: Fully weld mitre joints and finish flush

#### **OR:**

Butt mitre joints and projection weld reinforcing backing plates.

Mortar guards and reinforcing plates: Weld to frame to suit hardware specified in HARDWARE.

#### **Finish**

Prefinish: Zinc-iron.

Shop priming: Shop prime the sections for the painting system.

#### **Hardware and accessories**

General: Provide for fixing hardware including hinges and closers, using 4 mm backplates and lugs. Screw fix the hinges into tapped holes in the back plates.

Spreader: Removable spreader bar for frames to be built into masonry construction.

Hardware accessories: Mortar guards and reinforcing plates for the hardware.

Buffers: Two resilient grommet type buffers.

Cavity flashing: For external frames in cavity masonry.

Switch boxes (for light switches on door frame): Form from steel sheet of the same type as the frame, with clearance hole top and bottom, and weld into position.

Glazing beads (for glazed transom lights): Fabricate from material of the same type as the frame. Mitre corners. Screw to frames with matching countersunk head screws at 300 mm maximum centres.

Make suitable provision for fixing the Hardware specified for the relevant doorset, including hinges, strike plates, closers and the like. Provide mortar guard boxes for all frame cutouts and hardware fixings.

Hinges: Recess frames for screw fixing hinges to 150 x 45 x 6 mm thick backing plates fully welded to frames at hinge points. Drill and tap backing plates to suit machine thread screws for hinges.

Hinge reinforcement: For door leaf widths over 1000 mm wide, reinforce the top hinge backing plate with 250 x 40 x 5 mm M.S. plate and spacers all fully welded to backing plate and frame.

Strike plate, buffers, Switch boxes: Do not provide.

Weather moulds: Form from 1.4 mm steel sheet as detailed for external doors, fix to frames on site to suit reveal openings.

#### **Installation**

Building in to masonry: Attach galvanized rod ties to stiles at 600 mm maximum centres. Build in and grout up solid.

Installing in existing masonry: To AS/NZS 1905.1, Appendix D. Fix with bonded hairpin anchors.

Fixing to stud frames: Clip galvanised brackets to frame stiles at 600 mm maximum centres and fasten to the stud frame. For metal structures screw fix clips through stud frame members into fixing blocks.

### **5.5 ALUMINIUM DOOR FRAMES**

#### **General**

Type: Frames assembled from aluminium sections, including necessary accessories such as buffers, pile strips, strike plates, fixing ties or brackets and cavity flashing,



with suitable provision for fixing specified hardware; prefinished with protective coatings, built in or fixed to prepared openings.

**Threshold**

Where the frame includes a threshold member, provide a self-draining section with anti-skid surface.

**Flashings**

Provide cavity flashings for external frames in cavity masonry.

**Finish**

Specification Reference: *WINDOWS* – Finishes

**Hardware**

Provide for fixing hardware including hinges and locksets. Mount strike plates, locksets, flush bolts and the like flush with the face of the frame. Provide suitable cutouts and fixing cleats.

**Installation**

Fixing to prepared openings: Countersunk flush or concealed screws at least 4mm diameter at 600 mm maximum centres into masonry structures and into the frame members of timber structures and frame members and fixing blocks of metal structures.

**5.6 SECURITY SCREEN DOORSETS****Hinged security screen doorsets**

Type: Proprietary system comprising a metal screen door side hung in a metal frame and inclusive of insect screen, security screen and the necessary hardware and accessories.

Hinged security screen doors: To AS/NZS 2803.1.

Installation: To AS/NZS 2804.1.

**Sliding security screen doorsets**

Type: Proprietary system comprising a metal sliding screen door and frame and inclusive of insect screen, security screen and the necessary hardware and accessories.

Sliding security screen doors: To AS/NZS 2803.2.

Installation: To AS/NZS 2804.2.

**5.7 ALUMINIUM DOORSETS****General**

Type: Proprietary doorset system comprising an aluminium framed glazed door or doors, hung to or otherwise supported by a fixed aluminium door frame, inclusive of the necessary hardware and accessories.

Construction: Construction and finish generally as for windows and as detailed.

Selection and installation: AS 2047.

**Maximum Width (door leaf)**

900 mm (each leaf)

**5.8 FIRE RESISTANT DOORSETS****Door leaf construction**

PHYSICAL TESTING OF FIRE RESISTANT DOORSETS (IRRESPECTIVE OF LOCATION) IN ACCORDANCE WITH AS 1905. PART 1-1990 APPENDIX A

Fire resistant doorsets: To AS/NZS 1905.1.

Internal materials: Inert mineral materials containing no asbestos products.

Framing: Increase the width of door leaf members or provide additional members to accommodate hardware and grooves so that items of furniture are contained within framing members and do not encroach on the core materials.

Frames: Steel.

Timber facings: Timber face veneers and edge strips.

Metal facings: Flush faces and edges pressed from metal sheet, welded at joints.

**Standard**

Evidence of Physical Testing: Submit evidence of compliance with the Standard to AS 1905 Part 1 Appendix A cl. A7.

**Two Leaf Meeting Edges**

To have extruded aluminium meeting edges as required in Door Hardware Sets Schedule - Door and Window Hardware

**Installation**

Standard: To AS/NZS 1905.1.

**Glazing**

Viewing Panel, 600 x 100 mm or 400 x 150 mm to each Science Room fire-rated door.

Specification Reference: GLASS TYPES SCHEDULE, *GLAZING*.

**5.9 AUTOMATIC SLIDING DOOR ASSEMBLIES****General**

Standard: To AS 4085.

**5.10 FRAMELESS GLASS DOORS****Type**

A proprietary door system, installed by the manufacturer, or a subcontractor approved by the manufacturer, consisting of toughened glass door panels hung with purpose-made metal patch fittings and including the manufacturer's standard or optional custom designed push bars or plates, and a means of locking.

**5.11 REVOLVING DOORS****Type**

A proprietary system, installed by the manufacturer, consisting of metal framed glazed doors mounted in a framed curved glass enclosure and including the following:

- Provision for emergency egress by means of a collapsing mechanism causing the door leaves to fold into the "bookfold" position when subjected to a preset collapsing pressure under panic loading conditions.
- Control mechanism concealed in a floor recess or overhead mounting.
- Speed controller.
- Draft resistant sweeps on door leaf edges.
- Locking device.
- Manufacturer's standard or optional custom designed push bars or plate.
- Optional power assistance for continuous revolving operation.

**5.12 SECURITY (grille) GATE - HEAVY DUTY Fabrication**

Infill mesh must NOT be used

Mild steel frame with vertical rails at even spacing not exceeding 100 mm drilled for mid stiffening rail and pivots all welded together and hot dip galvanised after fabrication as shown on the Drawings.

Pivots: Top and bottom as detailed on Drawings, with grease nipples.

Frame: 65 mm x 35 mm x 3.0mm R.H.S.

Vertical Rails: 25 mm x 25 mm x 3.0mm S.H.S.

Mid Rail: 12 mm diam.

Shoot Bolts: 20 mm hardened surface steel.

**Pipe Ferrules**

Location: Set in ground and ceiling to locate gate security in the open and closed position.

Size: 25 mm internal diameter x 30 mm long.

ALTERNATE HEAD FIXING WITH 10mm MASONRY ANCHORS BY BOLTING 150mm x 150 x 10mm STEEL ANGLE CLEAT TO BRICKWORK DRILLING 25mm DIAMETER HOLES FOR TOP PIVOT AND SHOOT BOLT.

**Fixing**

Ensure no gaps greater than 125 mm and smaller than 25 mm occur between gate and adjoining surfaces.

DUO PLB-w Padbolts with compatible padlocks may be substituted for the Brodahust lock. The doors must permit locking in both the open and closed position.

**Lock Box**

Stainless steel welded to gate to permit locking in both the open and closed position. (Refer drawing)

**Master Keying**

As specified in DOOR AND WINDOW HARDWARE.

**Manufacturer/Installer**

The installation must be carried out by a company and installer licensed in accordance with the current Security Industry Regulation and Security Industry Act.

**Certification**

Hand to the Person with full authority/Superintendent a certification that the security gate/s have been manufactured and installed by holders of current appropriate licenses in accordance with the latest Security Industry Regulations and Security Industry Acts.

**5.13 MESH GATE - LIGHT DUTY** INTENDED FOR LOW SECURITY AREAS EG; PUPIL TOILETS, PUPIL SHOWER/CHANGE AREAS ETC. (SECURITY CATEGORY A & B)

**Fabrication**

Mild steel frame with steel mesh, mid stiffening rail and pivots, all welded together and hot dip galvanised after fabrication as shown on the Drawings. All rough edges to be removed to give the gate a smooth finish.

**Frame**

Rails: 35 x 35 x 3.0mm R.H.S.

Stiles: 65 x 35 x 3.0mm R.H.S.

Mesh: 5.6mm diam. x 100mm(vertical) x 100mm(horizontal) max. spacings.

Pivots: Top and bottom as detailed on Drawings, with gunmetal bearing washers. Apply water resistant bearing grease to top and bottom pivot hinge assemblies

**Pad Bolts**

Heavy duty pad bolt as shown on drawings.

Installation: Pad bolt to be installed to permit locking in both the open and closed position.

Fixing: Ensure no gaps greater than 75mm and smaller than 25mm occur between gate and adjoining surfaces.

Bolt Keeper: 100 x 100 x 10mm bolt keeper for door to be locked in closed position.

10 mm angle bracket for door to be locked in open position.

Location: Securely bolted to wall to locate gate security in the open and closed position.

**Drawing reference**

Refer drawing: Refer to SFS Specification Standard drawing sd6112/3.

**Master Keying**

As specified in HARDWARE.

**5.14 AIR RELIEF GRILLES**

**Assembly**

Fit extruded aluminium telescopic louvres with chevron grille to frame, screw fix all and colour anodize.

Frame Size: 32mm aluminium flange.

Free Area: 70%

**5.15 SECURITY AIR RELIEF GRILLE**

Door grilles to external doors and in high security locations.

**Description**

32 x 6 mm mild steel flat vane louvre with mesh backing all welded construction.

Protective finish: Red oxide primer, refer PAINTING

Fixing: One way screw fixing or countersunk coach screw.

**5.16 INSECT SCREEN DOORS****Metal Framed Screens**

Frame: 73 x 19 x 1.6 mm aluminium extruded section with channels for mesh fixing and infill material, mitred and staked at corners.

Finish: Anodised

Frame finish: To match windows unless otherwise specified.

**Infill Materials**

Upper portions: Expanded aluminium mesh, 83 x 68 x 7 mm thick, and anodised aluminium mesh as specified in INSECT SCREENS - WINDOWS.

Lower portion: External grade plywood 6 mm thick, painted.

Drawing reference: refer to SFS Specification Standard drawing ds32/1.

**5.17 INSECT SCREEN DOORS, canteen****Metal Framed Screens**

Frame: 73 x 19 x 1.6mm aluminium extruded section with channels for mesh fixing and infill material, mitred and staked at corners.

Finish: Anodised

Frame finish: To match windows unless otherwise specified.

**Infill Materials**

Upper portions: Expanded aluminium mesh, 83 x 68 x 7mm thick, and anodised aluminium mesh as specified in INSECT SCREENS, CANTEEN - WINDOWS.

Lower portion: External grade plywood 6 mm thick, painted.

Drawing reference: refer to SFS Specification Standard drawing ds32/1.

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**6 HATCHES****6.1 ACCESS HATCHES****Hatch assembly**

Shop primed mild steel hatch frame and covers.

**Frame**

Weld from 50 x 50 x 6 mm angle, with two 40 mm cogged fixing lugs each side. Cast into concrete.

**Covers**

6.5 mm chequer plate, with 40 x 40 x 6 mm angle frame welded on all round and 32 x 6 mm diagonal stiffening flats. Cut, radius and grind off 100 x 25 mm lifting slots in each end of covers and drop into position.

**6.2 DUCT ACCESS HATCHES****Type**

Proprietary system comprising a metal faced door side hung to a steel door frame, inclusive of the necessary hardware and accessories including hinges and lock and lugs or other suitable means for installation.

**Door leaf facings**

Flush faces and edges pressed from hot dipped metal sheet to AS 1397, welded at joints. Apply zinc-rich primer to welds.

**Finish**

Factory-applied finish consisting of one coat zinc phosphate etch and one coat zinc chromate primer.

**7 COMPLETION**

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**7.1 COMPLETION****Maintenance**

Submit manufacturer's published recommendations for service use.

**Protection**

Temporary coating: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

**OVERHEAD DOORS****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **overhead doors** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related work sections**

Refer to the following worksections:

Door and Window Hardware

**1.2 INTERPRETATION****Definition**

Cycle: One complete operation from the closed position to fully open and back to closed.

**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Tracks and guides installed before doors or shutters are hung.

**Hold points**

As advised by Principals Authorised Person

**2.2 SAMPLES****General**

Submit 2 samples of each of the following where applicable:

- Sections proposed to be used for frames, louvres and slats.
- Joints made using proposed techniques.
- Finishes to prepared surfaces.
- Colour range samples from prefinished production material (e.g. anodised or organic coated extrusions and sheet). When the colour selection has been made, submit 5 sets of samples showing the colour range.
- Door manufacturer's standard hardware items.

**2.3 SUBMISSIONS****Subcontractors**

Submit names and contact details for proposed suppliers and installers.

**Shop drawings**

Submit shop drawings showing details of each assembly, component and connection and information relevant to fabrication, surface treatment and installation for the following:

- Fire shutters.
- Roller shutters and grilles.

**Tests**

Fire resistant doorsets: Submit certification from an independent testing authority showing compliance with the required fire rating.

Acoustic doorsets: If a doorset has a weighted sound reduction index ( $R_w$ ) rating, submit certification from an independent testing authority showing compliance with the requirement.

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**3 COMPONENTS****3.1 SECTIONAL OVERHEAD DOORS****Sectional overhead doors**

Type: A proprietary system comprising a door with 2 off, linked horizontal panels hinged together inclusive of the necessary operating gear, hardware and accessories. The doors are to be weather lapped at the horizontal joints and fitted with rollers running on inside tracks that guide the doors.

**Door Structure**

The door frame to be of an all welded construction.

Material: Rolled hollow section steel members.

Thickness, Material: 1.6 mm

Design: Beams to be designed for max dead load deflection of 1/300th part of the span and shall be designed for windload and operational requirements.

Preparation: The framework and fittings shall be abrasive blast cleaned to grade 2.5. Specification reference: PAINTING

Protective Coat: Factory applied inorganic zinc primer. Specification reference: PAINTING.

Undercoat: Factory applied two-pack polyurethane. Specification reference - PAINTING

Finish Polyurethane paint. Specification reference - PAINTING.

**Wind loading**

Install so that the door, in its closed position, withstands pressure on the surface of at least 550 Pa without impairment of its ability to function under ambient temperature.

**Panels**

Form from sheet to standard profiles, or fix to a surround frame. Adapt the bottom panel where necessary to follow the contour of a sloping floor or threshold. Fit a PVC seal strip.

**Side tracks**

Side tracks, pulleys, link arms and linkages are fabricated from minimum 3.0 mild steel finished equal to door structure.

**Counterbalancing**

Counterweight system with the counterweights hung on galvanised 6.19 flexible multi-strand steel cable.

Safety Factor: 6:1 (minimum)

Steel Sheaves: Machined to correctly bed the cables and having a sheave to cable dia. ratio of at least 19:1, sheaves shall have bearings of sufficient load carrying capacity.

**Operation**

Motorized:

By an electric motor incorporating a proprietary heavy duty cam drive electric operation system, designed to fully open or close the door

Travel Time (Opening or Closing): 4 to 5 seconds (approx.) per metre of opening height.

Motor & Transmission: 1 HP (0.75 kw) continuously rated 3 phase motor, close coupled to a matched reduction gearbox fitted with a torque limiting safety clutch. The power drive is to be transmitted through an overhead shaft of suitable torsion capacity.

Controls: Operated by a key switch in view of the door.

Additional Requirements: 415 volt 3 phase power with neutral, terminated at a power isolating switch where required by the Supply Authority, is required adjacent to the operating side of the doorway opening.

Seals: Brush seals to surround of door and rubber seals to hingeline.

Chain Guards: Removable.

#### **Manual operation**

Install so that the force required to operate the door manually does not exceed 220 N.

#### **Motorised operation**

General: Provide electric motor incorporating limit switches, manual safety stop and reversing mechanism, and overload cutout, operated by a battery-powered radio remote controller (supplied as part of the system), and also by a direct push-button or key switch. Provide a motorised system which is capable of manual operation in the event of power failure. Locate operating switch 1500 mm above floor level.

Automatic safety stop and reversing:

#### **Door Structure**

The door frame to be of an all welded construction.

Material: Rolled hollow section steel members.

Thickness, Material: 1.6 mm

Design: Beams to be designed for max dead load deflection of 1/300th part of the span and shall be designed for windload and operational requirements.

Preparation: The framework and fittings shall be abrasive blast cleaned to grade 2.5. Specification reference: PAINTING

Protective Coat: Factory applied inorganic zinc primer. Specification reference: PAINTING.

Undercoat: Factory applied two pack polyurethane. Specification reference – PAINTING.

Finish: Polyurethane paint. Specification reference - PAINTING.

#### **External Linings**

Type: Preformed zincalume sheet and purpose made accessories forming part of a proprietary system.

Profile: Corrugated

Standard: AS 1562.1

Thickness: 0.48 mm BMT

Rib Depth: 16 mm.

Finish: Pre-painted, silicone modified polyester.

Standards: To AS 1397-AZ 150 and AS 2728

Corrugations: Vertical

Accessories: Visible accessories to match external lining finish.

Colour: Refer Colour Schedule

#### **Internal Lining**

Specification Reference: LINING - Fire Resistant Plywood.

### **3.2 TILTING OVERHEAD DOORS**

#### **Tilting overhead doors**

Type: Proprietary system comprising a rigid framed door attached to a tilting mechanism which enables the door to be opened by tilting and retracting into an approximately horizontal overhead position, and inclusive of the manufacturer's standard operating gear, hardware, and accessories necessary for satisfactory performance.

#### **Wind loading**

Install so that the door, in its closed position, withstands pressure on the surface of at least 550 Pa without impairment of its ability to function under ambient temperature.

#### **Tilting mechanism**

Pivot and spring: Door pivots around jamb-mounted lever arms.



Pivot, spring and tracks: Door pivots around jamb-mounted lever arms. Rollers fixed to door head run in horizontal head tracks.

**Door frame**

Type: Rigid braced frame capable of resisting the sheeting load and live loads without distortion in both vertical and horizontal positions.

Steel frame: Fabricate from sections cold rolled and folded from steel sheet.

- Coating class: Z450 or AZ150.

Timber frame: Lugged framed and braced timber sections.

**Operation**

Method of raising and lowering the door:

- Direct manual: By handle attached to the door panel.
- Motorised: Connect the motor to the door through a shock absorbing connecting arm.

**Manual operation**

Install so that the force required to operate the door manually does not exceed 220 N.

**Motorised operation**

General: Provide electric motor incorporating limit switches, manual safety stop and reversing mechanism, and overload cutout, operated by a battery-powered radio remote controller (supplied as part of the system), and also by a direct push-button or key switch. Provide a motorised system which is capable of manual operation in the event of power failure. Locate operating switch 1500 mm above floor level.

### 3.3 ROLLER SHUTTERS

**Roller shutters**

Type: Proprietary system comprising a flexible curtain sliding between vertical guides, raised or lowered by rolling or unrolling around a horizontal drum (barrel) mounted above the opening, inclusive of the manufacturer's standard operating gear, hardware, and accessories necessary for satisfactory performance.

**Wind loading**

Install so that the shutter, in its closed position, withstands pressure on the surface of at least 550 Pa without impairment of its ability to function under ambient temperature.

**Curtain**

Size: 50 mm or 100 mm wide x 0.6 mm thick.

Slat end pieces: "Windlock"

Continuous curtain: A single metal sheet pressed to a horizontal ribbed profile.

Slatted curtain: A curtain of horizontal interlocking slats, incorporating interlocking hinges extending the full width of the curtain.

Bottom Curtain Rail: A box section stiffening member interlocking with the bottom edge or lowest slat of the curtain, extending between the inner face of the vertical guides, formed or adapted where necessary to follow the contour of a sloping floor or threshold. The rail may also be adapted to house the locking device

- Material: Cold rolled steel.
- Size: 2 mm thickness.
- Finish: Galvanised.

**Wind locks**

Wind lock end clips and guides to retain the curtain.

**Vertical guides**

Material: Cold rolled steel channels.

Size: 2.5 mm thickness, section to suit "Windlocks".

Finish: Galvanised.

**Drum**

Material: Solid drawn seamless steel tube.

Size: 168 mm outside diameter.

Finish: Galvanised.

Deflection: Not more than 1/400 of span manual in centre span.

**Brackets**

Material: 8 mm mild steel welded.

Finish: Galvanised.

Bracket fixing: Not less than three 12 mm diameter anchors to each bracket.

**Operation**

Method of raising and lowering the curtain:

- Spring loaded manual operation.
- Operating gear located in side.

Force required: Install so that the force required to operate the shutter manually does not exceed 220 N.

**Manual operation**

Install so that the force required to operate the door manually does not exceed 220 N.

**Motorised operation**

General: Provide electric motor incorporating limit switches, manual safety stop and reversing mechanism, and overload cutout, operated by a battery-powered radio remote controller (supplied as part of the system), and also by a direct push-button or key switch. Provide a motorised system which is capable of manual operation in the event of power failure. Locate operating switch 1500 mm above floor level.

**Wickets**

Doors side-hung on the vertical guide, to interlock with the closed curtain, consisting of a metal frame covered to match the curtain, and provided with the manufacturer's standard lockset and furniture.

**3.4 FIRE-RESISTANT ROLLER SHUTTERS****Standard**

General: To AS 1905.2.

**3.5 ROLLER GRILLES****General**

Type: A roller shutter in which the curtain consists of a grille of horizontal members spaced apart and connected by vertical links.

**3.6 GARAGE DOORS****General**

Standard: To AS/NZS 4505.

**3.7 Roller Shutters - internal timber slat type**

THE internal timber slat roller shutter DOOR SYSTEM described below is BASED doors manufactured by "Monarch Group Pty. Limited" and "Airport Doors (Richard brady and Sons P/L)". Other proprietary doors that comply with the specification requirements described Below may also be acceptable.

Type: Machined timber roller shutter with mated edge profiles. The roller shutter system must be designed to allow continuous smooth operation.

Moulded timber slats:

- Mortice slats into side guides at equal spacings with matched end profiles.
- Dimensions (nominal) (W x T): 38 to 45mm wide x 16 to 18mm thick.

Side guides:

- Recessed guides to be compatible with slates. The recess to be of sufficient depth to allow for easy continuous operation of roller door.
- OR
- Extruded aluminium channel with nylon felt buffers to allow for easy continuous operation of the roller door. The channel to be recessed flush into timber members.

Bottom Rail: To be compatible with slats.

Roller drum:

- -Must be designed to give minimum deflection over span.
- -Fitted with a spring counter balance mechanism.
- -150 to 230mm (nominal) diameter spiral ducted lock tube attached to self lubricating drum wheels and bearing, rotating on a 34 to 40mm (nominal) OD shaft.

Support brackets:

- -Galvanised mild steel plates or angles.
- -Thickness (BMT): 3mm (minimum).
- -Fixing: Securely fixed to wall or head of opening.

Mullions: Lift out type

- -Machined timber to match curtain.
- -Specifically designed to suit installation.

Operation: Manual

Size: As shown on the drawings.

Solvent or latex coatings not to be used as it may stick and hinder the smooth operation of the shutter.

Finish: Clear timber polish.

<b>WINDOWS</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **window** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following sections:

- DOOR AND WINDOW HARDWARE, GLAZING

**1.2 STANDARD****Windows**

Selection and installation: To AS 2047.

**1.3 INTERPRETATION****Definitions**

Window: The term "window" used in this worksection also means "louvre grille" and "sliding glass door", where applicable.

PVC covered aluminium windows: Windows in which the aluminium core sections are entirely encased in watertight PVC jacket sections, seam welded at joints.

**1.4 PERFORMANCE****Cleaning**

Design the window openings so that external faces of glazing can be cleaned from within the building.

**Standard**

General: To AS 2047.

**1.5 SELECTED PREFERRED SUBCONTRACTORS****List**

The following is a list of window manufacturer and installation subcontractors from which selection must be made:

- Albury Glass Pty. Ltd.(Albury)
- Beattie & McCullough (Dubbo)
- Boka Aluminium Windows (Liverpool)
- Bryow Industries P/L (Mount Druitt)
- BW Glass and Aluminium (ACT)
- C-Lite Aluminium Windows (Warilla)
- Farrawell Aluminium (Kempsey)
- Fobco Aluminium Windows (Broken Hill)
- Jim Rooney Glass Pty. Ltd. - Coffs Harbour

- Laurie's Windows and Doors Pty Ltd (Yenda)
- New England Glass & Aluminium P/L (Armidale)
- Phoenix Aluminium Industries Pty. Ltd. (Ingleburn)
- Simplex Aluminium Windows and Doors Pty. Ltd. (Heathcote)
- South Coast Glass P/L (Nowra)
- Superior Windows Pty Limited (Newcastle)
- Supreme Aluminium Windows (Moorebank)
- Taberner Glass (Orange)
- Taylor's Windows Supplies (Cootamundra)
- Tims Glass (Cardiff)
- Total Glass & Aluminium P/L (Minto)
- Vision Windows (Bateman's Bay)
- Wagga Glass & Aluminium Pty. Ltd (Wagga Wagga)
- Waldrip's Glass Service (Cooranbong)
- Western Aluminium Industries (Orange)
- Western Plains Window and Glass Pty. Ltd. (Dubbo)

## 2 QUALITY

### 2.1 INSPECTION

#### Witness points

Give sufficient notice so that inspection may be made at the following stages:

- Fabricated window assemblies at the factory ready for delivery to the site.
- Fabricated window assemblies delivered to the site, before installation.
- Openings prepared to receive windows (where windows are to be installed in prepared openings).
- Commencement of window installation.

#### Hold points

As advised by Principals Authorised Person

### 2.2 TESTS

#### Project tests

The individual window assemblies, depicted on the sheets of the PWD Suite No. 2 drawings, have been tested to AS2047 and test certificates need not be submitted for these windows provided they are fabricated and installed as specified and as shown on these drawings. However if these individual units are installed as extended fenestration without extra structural elements, then they do not necessarily meet the deflection or weatherproofing requirement of the Australian Standard, and structural certification must be submitted.

#### Project tests table

Area of window type to be supplied to the works	Number of project type tests
< 50 m <sup>2</sup>	0
50 – 150 m <sup>2</sup>	2
150 – 450 m <sup>2</sup>	3
450 – 1000 m <sup>2</sup>	4
> 1000 m <sup>2</sup>	1 per 250 m <sup>2</sup>

#### Weighted sound reduction index (R<sub>w</sub>) tests

General: Type test designated windows, to demonstrate that a representative specimen of the assembly has attained the specified R<sub>w</sub> rating.

Test method: To AS/NZS 1276.1.

Double glazed systems: Interpolation between test results for similar systems is acceptable provided that

- each tested system differs from the proposed system by not more than one variable of one of the following elements:
  - .First panel: Glass type, glass thickness.
  - .Cavity: Width dimension.
  - .Second panel: Glass type, glass thickness.
  - .Mounting: Type, seal type.
  - .Cavity reveal: Acoustic absorption treatment; and
- dimensional (thickness or width) differences do not exceed a ratio of 1:1.5.

#### **Thermal performance tests**

General: Type test designated windows to demonstrate that a representative specimen of the assembly has at least the required values for

- condensation resistance factor (CRF); and
- thermal resistance (R).

Test method: To AAMA 1503.

#### **Fire resistance level (FRL) tests**

General: Type test designated windows, to demonstrate that a representative specimen of the assembly has attained the specified FRL.

Test method: To AS 1530.4.

#### **Forced entry resistance tests**

General: Type test designated windows, to demonstrate that a representative specimen of the item has met the performance test requirements.

Test method: To AAMA 1302 or AAMA 1303, as applicable.

#### **Security grilles test**

Type test: To AS/NZS 4604 Appendix E.

### **2.3 SAMPLES**

#### **Requirement**

Submit samples of the following where applicable to the window installation:

- Sections proposed to be used for frames, sashes, louvres and slats.
- Joints made by proposed techniques.
- Colour samples of prefinished production material (e.g. anodised or organic coated extrusions and sheet) showing the limits of the range of variation in the selected colour.
- Tinted, coloured or patterned glass or glazing plastics showing the nominal colour or pattern.
- Accessory and hardware items specified descriptively or by performance (i.e. not specified as proprietary items) including locks, latches, handles, catches, sash operators, anchor brackets and attachments, masonry anchors and weather seals (pile or extruded).

#### **Labelling**

Label each sample, giving the brand name and product name, manufacturer's code reference and date of manufacture.

### **2.4 PROTOTYPES**

#### **Sample installations**

General: Install the designated typical window assemblies in their final position incorporating at least one example of each component in the system, including attachments to the structure, flashing, caulking, sealing, glazing, operating hardware, locks and keys.

### **2.5 SUBMISSIONS**

#### **Subcontractors**

Submit names and contact details of proposed manufacturers and installers.

**Shop drawings**

Submit shop drawings showing the following information: Number of copies: 4

- Layout (sectional plan and elevation) of the window assembly.
- Full size sections of members.
- Methods of assembly.
- Methods of installation, including fixing, caulking and flashing.
- Provision for vertical and horizontal expansion.
- Junctions and trim to adjoining surfaces.
- Hardware, fittings and accessories.
- Lubrication requirements.
- Glazing details.

**Tests**

Type test modifications: Submit proposed modifications.

Louvre grilles tests: Submit an independent testing authority's report, showing compliance, on either

- previous type tests of an identical grille design; or
- project tests of the actual grille or a representative prototype.

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**3 MATERIALS****3.1 MATERIALS AND COMPONENTS**

All new aluminum windows and doors shall be manufactured from "PWD Suite 2" extrusions and components only available from the saluted preferred contractors.

**Flashings**

Standard: To AS/NZS 2904.

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

**Fasteners**

General: Provide fasteners of sufficient strength and quality to perform their required function.

**Finishes**

ALUMINIUM WINDOWS ARE TO BE CLEAR ANODISED. DO NOT USE COLOUR ANODISING OR POWDER COATING AS FINISHES FOR ALUMINIUM WINDOWS UNLESS APPROVED BY THE PRINCIPALS AUTHORISED PERSON.

Finish: Anodised (clear) to AS 1231

Film thickness: 0.025 mm.

**3.2 EXTRUSIONS****Requirements**

Fabricate from the extrusions shown on the current DOC drawings which shall be issued on application to the DOC.

**Dies**

Only dies approved by the DOC will be accepted for extruding aluminium sections

**Materials**

Aluminium alloy B6063-T5 unless otherwise specified.

**Finish**

Anodised

**3.3 FIXED PANELS****Type**

As detailed.

**Fixed panels**

Type: Fire resistant aluminium faced and backed composite panels, comprising of a resin core sandwiched between two skins of aluminium.

**Face material**

- Metal type and thickness: Aluminium 0.5mm
- Finish: Stucco embossed mill finish aluminium.

**Core material**

- Type: Fully cured "A" Resol Fibre reinforced phenolic resin, chemically bonded under heat and pressure.

**Base material**

- Metal type and thickness: Aluminium 0.5mm
- Finish: Mill finish aluminium

Panel thickness: 4mm (nominal)

Finish: For painted finishes refer to Schedule of Finishes and PAINTING.

**3.4 DOOR HARDWARE )****Requirement**

Provide door hardware including locks, handles, closers, bolts, hinges and the like supplied and fixed by the aluminium fabricator.

Specification References: *DOOR AND WINDOW HARDWARE* including special keying requirements, specified in *DOOR AND WINDOW HARDWARE*.

**3.5 DOORS AND ALUMINIUM DOOR JAMBS**

Door Frames: As shown on current DOC drawings.

**3.6 ALUMINIUM DOORSETS**

Proprietary heavy commercial Superline or Shopfront design with 2mm minimum wall thickness, pocket glazing system and lock stile width to suit 45mm wide narrow stile lock case. Top rail width equal to bottom rail width and intermediate rails. Provide integral cover meeting stile to two door leaf doorsets with self-latch locks or panic bolts sets. Fit concealed weather drop seals to bottom rails of external exposed doors.

**4 EXECUTION****4.1 CONSTRUCTION GENERALLY****Standards**

Unframed toughened glass: To AS 1288.

**Installers**

Have windows installed by their manufacturer or by a subcontractor recommended by the manufacturer.

**Installation**

Install windows so that the frames

- are plumb, level, straight and true within acceptable building tolerances;
- are adequately fixed or anchored to the building structure; and
- will not carry any building loads, including loads caused by structural deflection or shortening.

**Requirements**

Fabricate and assemble aluminium windows and doors in accordance with AS 2047 and the Department of Commerce standard drawings for Suite No 2 showing joining details, hardware and extrusions profiles.

**Responsibility**

It will be the aluminium fabricators responsibility to ensure all fabricated aluminium work is carried out in accordance with the current series of PWD Suite No 2 Suite drawings.



**Joints**

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

**Operation**

Ensure moving parts operate freely and smoothly without binding or sticking, at correct tensions or operating forces.

**Protection**

Protect surfaces during the work under the Contract as necessary to prevent damage or defacement.

**Machining**

Cut edges, drilled holes, riveted joints and flat sheets be clean, neat, free from burrs, and indentations. Remove sharp edges without excessive radiusing, fit mitred joints accurately to a fine hairline.

**Hardware**

Where door closers, panic exit devices and all other surface mounted door hardware are screw fixed into aluminium sections, fix with rivnuts. Self tapping screws or pop rivets are not acceptable.

**Fixing**

Fix windows as detailed. Use PWD Suite No.2 standard fixing brackets as required and fabricate sill brackets from 40 mm x 6 mm mild steel bent to shape and hot dip galvanised. Bitumen coat steel in contact with aluminium. Fix brackets to sill at maximum 600 mm centres.

For metal structures screw fix brackets through metal structure members into fixing blocks.

**Building Loads**

Install the windows by methods that ensure that neither the window frame nor the fixings will carry building loads, including loads resulting from short or long term deflection of slabs or beams.

**Trim**

General: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the window frames. Install to make neat and clean junctions between frames and the adjoining building surfaces.

**Flashing and weatherings**

Install flashings, weather bars, drips, storm moulds, caulking and pointing so that water is prevented from penetrating the building between the window frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

**Fixing**

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

Prepared masonry openings: Where fixing of timber windows to prepared anchorages necessitates fastening from the frame face, sink the fastener heads below the surface and fill the sinking flush with a material compatible with the surface finish.

Fasteners: Conceal fasteners.

Fastener spacing (nominal): 600 mm.

**Glazing**

Carry out glazing in factory or on site. Secure glass by EDPM gaskets, snap-in beads complete with neoprene packers. Glazing shall comply with the GLAZING Section.

Laminated safety glass to be used for all external glazing. Specification reference 'Glazing'.

**Replacement Glazing**

Carry out replacement glazing on site or in factory to AS 1288.

Safety Glass: Where laminated safety glass is used to replace ordinary annealed glass, upgrade the sash/window assembly as required to enable the sash to operate correctly. (eg. Increased sash counter balances/weights for double hung or vertical sliding windows to compensate for heavier safety glass).

Specification reference: GLAZING

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**5 COMPONENTS**

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**5.1 WINDOW ASSEMBLIES****Hardware**

Standard: To AS 2047 including the following additional requirements.

**Window Hardware**

PWD Suite No. 2 standard hardware such as hinges, stays, locks, catches, strikers and the like shall be as listed and detailed on the DPWS Standard Window Drawings.

Keyed Locks: Where windows require key operated locks, submit sample window lock for approval. Master key and key alike locks as directed. Provide key quantities as specified in DOOR AND WINDOW HARDWARE.

**Related section**

Refer to the following section for additional hardware requirements: DOOR AND WINDOW HARDWARE.

**Steel**

Fabricate from steel industrial sections. Mitre and weld frame and sash joints. Tenon and rivet glazing bars.

**Double glazed**

Sealed type: Glaze with insulating glass units (sealed double glazing).

**Non sealed double glazed**

Sash frame: An inner and outer leaf, both glazed, hinged together so that they may be separated for cleaning the internal faces of the glass, and for access to internal blinds, if any.

**Pivoted sash**

Type: Proprietary sash system of proven design, fitted with suitable weather seals and incorporating a locking device which deters unauthorised use.

**5.2 LOUVRE ASSEMBLIES****Adjustable louvres**

General: Provide louvre blades clipped into blade holders pivoted to stiles or coupling mullions, linked together in banks, each bank operated by an operating handle incorporating a latching device, or by a locking bar.

Installation: Screw fix stiles and mullions to the building structure. Provide weather strips to heads and sills.

For fixed louvres refer metal louvres.

Stiles and mullions: Roll Formed aluminium channels.

- - Material: Aluminium
- - Finish: Anodised

Blade holding clips: Aluminium with double return legs at each end.

Blade material:

- - Glass blades: 6 mm thick and 152 mm deep safety glass as scheduled. Maximum width 900 mm.
- - Framed Glass Blades: 6 mm thick and 152 mm deep safety glass as scheduled. Blades shall be fully framed by aluminium extrusions mitred at each corner and fitted with concealed corner stakes, frames pop riveted to aluminium clips at each end. Maximum width 1000 mm.
- - Aluminium Blades: 152 mm deep extrusions, ribbed to a thickness of 6 mm and pop riveted to each louvre clip. Maximum width 1000 mm.  
Finish: Anodised, all components to match windows unless otherwise specified.

Installation: Screw fix the stiles and mullions to the building structure and/or frame with stainless steel screws. Provide weather strips to heads and sills.

Method of operation: Pantograph operating bars fully housed inside channels and incorporating locking device.

**Framed adjustable louvres**

Type: Louvre blades beaded into steel blade surround frames (sash) pivoted to pressed steel main frames, linked together in banks, each bank controlled by a proprietary sash operator.

Installation: Screw fix the main frame to the building structure with monel or stainless steel screws or masonry anchors of the type recommended by the louvre manufacturer.

#### **Metal louvres**

Provide metal louvre blades mounted in a metal surround frame or subframe, installed as for metal window installations.

#### **Louvre arrangement**

Horizontal: Louvres span between frame stiles or mullions.

Continuous horizontal: Louvres run continuously past, and are supported by, concealed mullions.

Vertical: Louvres span between frame heads and sills.

#### **Frames**

Include the necessary sills, jambs, mullions, transoms, internal and external corners, beads, brackets, anchors, straps and accessories.

### **5.3 INSECT SCREENS**

#### **Aluminium framed screens**

Frame: 25 x 11 x 1.6 mm anodised aluminium extruded section with mesh fixing channel, mitred and staked at corners. Provide an extended frame section where necessary to adapt to window operating gear (eg. remote control push rods).

Frame finish: Match windows.

Mesh: Anodised aluminium or fibre glass mesh (as required) beaded into the frame channel with a continuous resilient gasket, so that the mesh is taut and without distortion.

Hardware

- ❖ Hinged screens: Hinge at the top to open inwards.

#### **Fixed screens**

Attach fixed screens to the window frames with a clipping device which permits removal for cleaning.

#### **Sliding screens**

Separate screens: Provide matching aluminium head guide, sill runner, and frame stile sections for screens not part of the window frame.

Hardware: Nylon slide runners and finger pull handle. Provide pile strip closers against sash where necessary to close gaps.

#### **Hinged screens**

Hinges: Hinge at the top to give access to opening sash.

Hardware: Spring catch and handle at bottom.

#### **Roll up screens**

Proprietary retractable insect screen comprising aluminium frame with baked enamel finish, fibreglass mesh beaded into the frame, and a retraction system including tension spring, nylon bearings, positive self-locking device, and plastic sealing strip at sill.

### **5.4 BIRD MESH SCREENS**

#### **General**

Type: Corrosion resistant metal bird mesh with opening dimensions not exceeding 25 mm, fixed into corrosion resistant metal frame sections.

### **5.5 INTEGRAL BLINDS**

#### **General**

Type: Mini-venetian blinds mounted between the glazing sheets in the sash head of non sealed double glazed windows, removable without tools when the sash leaves are separated, and comprising

- baked precoated aluminium slats, spring tempered, with a yield strength of at least 350 MPa, capable of withstanding a 180° bend of 35 mm diameter without permanent deformation. Provide at least 10 slats per 300 mm; and
- cords and ladders of 4 ply Terylene (polyester fibre) 1.5 mm diameter.

Operation: Tilting only, by direct control cords on the inside face of the sash.

## 5.6 METAL LOUVRE GRILLES

### Type

Metal louver blades mounted in a metal surround frame or subframe and able to withstand the permissible-stress-design wind pressure for that location without failure or permanent distortion of members, and without blade flutter.

### Expansion joints

Provide for expansion and contraction in continuous sections (e.g. continuous louvres, interlocking mullions) at spacings not exceeding those recommended by the manufacturer, or 6 m, whichever is the lesser.

### Bird screens

Provide 12 mm x 12 mm welded galvanized wire mesh 1.0 mm dia bird screens behind louvres.

### Security fixing

General: Where possible, install the louvres and frames to resist unauthorised removal.

### Operable louvres

General: Fix louver blades to pivoted blade holders linked together in banks for operation by the specified method.

## 5.7 SECURITY WINDOW GRILLES

### General

Type: Proprietary metal security grille screen, or operable screen and frame, fixed to the building structure with tamper resistant fastenings.

Security window grilles: To AS/NZS 4604.

Installation: To AS/NZS 4605.

## 5.8 SECURITY GRILLES

### General

Metal security grille/screen and frame fitted to the building structure with tamper resistant fasteners.

### Selection

Select one type of security grille listed below, Type A, Type B or Type C and include the selection (Type) in the Security grilles schedule.

- - Security category: C or D

### Type A

Fabrication: Mild steel frame with horizontal or vertical rails with even spacings not exceeding 100 mm, welded together, frame drilled for fixing, hot dipped galvanised after fabrication. Assemble grilles after windows are constructed from site measurements only.

Welding: Prepare for welding at every join and intersection. The weld must be carried out in accordance with proper techniques necessary obtain sufficient depth of weld that will withstand substantial attack force

Frame: Perimeter frame: 30 x 10 mm solid MS flats.

Infill Paneling: 16 x 16 mm solid MS bars

Midrails: 500 mm centres (maximum). 16 x 16 mm solid MS bars

Maximum size: 3000 mm (length). For longer lengths use a 35 x 35 x 3 mm RHS MS joining mullion and bolt assembly together as described in "Fixing".

Grille Types: Use horizontal bars for sliding windows and vertical bars for double hung or awning windows.

Fixing: Internally fitted

- - To AS/NZS 5040
- - Where two grilles are to be joined bolt together through frame and mullion with galvanised M12 bolts at 400 mm centres and weld nuts to bolt post.
- - Where galvanising has been damaged by welding, coat damaged area with zinc rich paint.

-

Manufacturer/Installer: The installation must be carried out by a company and installer licensed in accordance with the current Security Industry Regulation and Security Industry Act.

Certification: Hand to the Person with full authority/Superintendent a certification that the security grilles have been manufactured and installed by holders of current appropriate licenses in accordance with the latest Security Industry Regulations and Security Industry Acts.

### Type B

Fabrication: Vertical or horizontal stainless steel rods with even spacings not exceeding 100 mm set in an aluminium RHS frame. Assemble grilles after windows are constructed from site measurements only.

Frame: Side channels: 32 x 25 x 3 mm anodised RHS aluminium with radius corners

Head, sill and anti spreaders: 25 x 25 x 3 mm square section anodised RHS aluminium with radius corners.

Centres: 500 mm (maximum)

Maximum size: 3000 mm (length). For longer lengths use a 35 x 35 x 3 mm RHS MS joining mullion and bolt assembly together as described in "Fixing".

Finishes: Stainless steel: polished, 12.7 mm diameter solid bars.

- - Grade: 304

Aluminium: Anodised (clear) to AS 1231

- - Film thickness: 0.025 mm.

Grille: Use horizontal bars for sliding windows and vertical bars for double hung or awning windows.

Fixing: Internally fitted

- - To AS/NZS 5040

- - Where two grilles are to be joined bolt together through frame and mullion with stainless bolts at 400 mm centres and bond nuts to bolt post.

Manufacturer/Installer: The installation must be carried out by a company and installer licensed in accordance with the current Security Industry Regulation and Security Industry Act.

Certification: Hand to the Person with full authority/Superintendent a certification that the security grilles have been manufactured and installed by holders of current appropriate licenses in accordance with the latest Security Industry Regulations and Security Industry Acts.

### Type C

Fabrication: Mild steel angle frame with mesh welded to the inside of the frame at 100mm intervals. Hot dip galvanize after fabrication. Assemble grilles after windows are constructed from site measurements only.

- - Frame: 50 x 50 x 6 mm MS angle.

Mesh:

- Nominal Mesh Size:	LWM	120 mm
	SWM	34 mm
- Nominal Strand Size:	Width	8.4 mm
	Thick	5 mm
- Weight:	14.0 kg/sq.m.	

Fixing: Externally fitted

- To AS/NZS 5040

- If fixing to reveals can be achieved secure a 75 x 75 x 10mm MS fixing plate to reveals.

- If fixing to reveals can not be achieved secure security grille to window frame to AS/NZS 5040.

- Maximum size: 3000 mm (length). For longer lengths use a 35 x 35 x 3 mm RHS joining mullion and bolt assembly together.
- - Where two grilles are to be joined bolt together through frame and mullion with galvanised M12 bolts at 400 mm centres and weld nuts to bolt post.
- - Where galvanising has been damaged by welding, coat damaged area with zinc rich paint.

Manufacturer/Installer: The installation must be carried out by a company and installer licensed in accordance with the current Security Industry Regulation and Security Industry Act.

Certification: Hand to the Person with full authority/Superintendent a certification that the security grilles have been manufactured and installed by holders of current appropriate licenses in accordance with the latest Security Industry Regulations and Security Industry Acts.

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## **6 COMPLETION**

### **6.1 COMPLETION**

#### **Maintenance manual**

Submit the window manufacturer's published instructions for operation, care and maintenance.

**GLAZING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works...

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **glazing** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Roofing, Partitions, Windows and Doors

**1.2 DESIGN****Glass type and thickness**

Standard: To AS 1288, where no glass type or thickness is given.

**1.3 STANDARD****Standard**

Materials and installation: To AS 1288.

Cut-to-size quality: To AS/NZS 4667.

Laminated and toughened glass process: To AS/NZS 4667.

**1.4 INTERPRETATION****General**

Twin ground plate: Plate glass ground simultaneously on both faces so that uniform glass thickness and parallel faces are maintained within close limits.

Terminology for work on glass: To AS/NZS 4668.

**2 QUALITY****2.1 SAMPLES****General**

Submit samples, each at least 200 x 200 mm, showing specified visual properties and the range of variation, if any, for each of the following types of glass or glazing plastics:

- Tinted or coloured glass or glazing plastics.
- Surface modified or surface coated glass.
- Patterned or obscured glass or glazing plastics.
- Ceramic coated glass.
- Wired glass.
- Mirror glass.

**2.2 SUBMISSIONS****Design**

Certification: Submit an engineers' certificate confirming compliance with AS 1288.

**Shop drawings**

Method of glazing, including

- rebate depth;
- edge restraint;
- clearances and tolerances; and
- glazing gaskets and sealant beads.

**Materials and components**

Insulating glass units (IGUs) to AS/NZS 4666: Submit a report from an independent testing authority accredited by the Insulating Glass Certification Council (USA), showing that the unit type has attained Class A as defined in ASTM E774 when tested to ASTM E773.

Ceramic-coated spandrel glass: Submit a report certifying that the glass meets the Fallout Resistance Test requirements of ASTM C1048.

Noise reducing glazed assemblies: Submit a certificate from an independent testing authority showing that the glazed assemblies comply with the specified weighted sound reduction index ( $R_w$ ).

**Installation**

Glass manufacturer's data: Submit statements from the manufacturers of the required glass types, certifying that the method of glazing and the sealants, materials, and conditions next to the glass

- will not be detrimental to the long term structural performance, weathering capabilities and visual qualities of the glass;
- are compatible with the edge seal of insulating glass units (IGUs); and
- will not cause delamination or other impairment to laminated glass during the service life of the curtain wall system.

Opacified glass: Submit a statement by the manufacturer certifying that the proposed method of opacifying the glass will not be detrimental to the glass or detract in any way from the glass product warranty.

Glazier's data: Submit the glazing subcontractor's statement certifying that the assembled frame provides for the required glazing clearances and tolerances and maximum and minimum joint configurations, having regard to the bow, warp and kink characteristics of the required glass types, and is ready for glazing.

Site glazing: If site glazing is intended, submit proposals.

**3 MATERIALS AND COMPONENTS****3.1 GLASS****Glass types**

Classification and description: To BS 952:1.

**Glass and glazing materials**

Glass and glazing materials generally: Free from defects which detract from appearance or interfere with performance under normal conditions of use.

Glazing plastics: Free from surface abrasions, and warranted by the manufacturer for 10 years against yellowing or other colour change, loss of strength and impact resistance, and general deterioration.

**Glass tolerances**

Size, squareness and flatness: To AS/NZS 2208.

Plate and sheet (i.e. not patterned):

- Roller wave: Maximum 0.15 mm.

**Float glass quality**

Glazing Select Quality q<sup>3</sup> to ASTM C1036.

**Bullet-resistant glazing panels**

Standard: To AS/NZS 2343.

StandardsMark: Required.



**Safety glasses**

Standard: To AS/NZS 2208.

StandardsMark: Required.

Type: Grade A when used in curtain walls.

Heat soaking: Required for toughened glass in curtain walls.

**Ceramic coated glass**

Heat strengthened or toughened glass with a coloured ceramic coating fused to and made an integral part of the surface: To ASTM C1048, Condition B.

**Opacified glass**

Glass with an opacifier permanently bonded to the inner face.

**Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)**

Standard: To ASTM C1048.

**3.2 GLAZING MATERIALS****General**

Glazing materials (including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges): Appropriate for the conditions of application and the required performance.

**Jointing materials**

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.

**Glazing tapes**

Standards: To AAMA 804.3, 806.3, 807.3, as applicable.

**Elastomeric sealants**

Sealing compound (polyurethane, polysulphide, acrylic):

- Single component: Type II, Class A.
- Multi component: To TT-S-00227E.

Sealing compound (silicone):

- Single component: Class A.
- Multi component: To TT-S-00227E.

Sealing compound (butyl): To TT-S-001657.

Glazing compounds: To AAMA 802.3 (Types I or II), or 805.2, as applicable.

Narrow joint seam sealer: To AAMA 803.3.

Exterior perimeter sealing compound: To AAMA 800.

Non drying sealant: To AAMA 800.

Expanded cellular glazing tape: To AAMA 800.

Very high bond pressure sensitive tapes: To ASTM D897, ASTM D1002, ASTM D3330M, ASTM D3652M, ASTM D3654M, and ASTM D3715M.

**Pile weather strips**

Standard: To AAMA 701/702.

Materials: Polypropylene or equivalent pile and backing, low friction silicone treated, ultra violet stabilised.

Finned type: A pile weather seal with a central polypropylene fin bonded into the centre of the backing rod and raised above the pile level.

**Extruded gaskets and seals**

Type: Non cellular (solid) elastopressive seals.

Material:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255:1.
- Flexible polyvinyl chloride (PVC): To BS 2571, E type compounds, colour fastness grade B.

**Priming**

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

**Movement joints**

Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

Foamed materials (in compressible fillers and backing rods): Closed-cell or impregnated types which do not absorb water.

Bond breaking: Provide backing rods, and other back-up materials for sealants, which do not adhere to the sealant.

**3.3 MIRRORS****Reflective surface**

Type: Silver layer deposited on the glass or glazing plastic.

Protective coatings: Electrolytic copper coating at least 5 µm thick, and 2 coats of mirror backing and edge sealing paint having a total dry film thickness of at least 50 µm.

Venetian silvered mirror (one way vision glass): 15 mm wide silvered strips alternating with 3 mm wide clear strips.

**3.4 INSULATING GLASS UNITS (IGUs)****Standard**

Selection and installation: To AS/NZS 4666.

**3.5 PRODUCT IDENTIFICATION****Safety glazing materials**

Identify each piece or panel, to AS 1288.

**Noise reducing glazed assemblies**

Label each panel with a legible non-permanent mark, self-destroying when removed, stating and certifying the  $R_w$  rating, and identifying the testing authority. Remove when directed.

**Bullet-resistant panels**

Marking: To AS/NZS 2343.

**Curtain wall glazing**

Permanently mark tempered or reflective coated glass, identifying strength grade, manufacturer and orientation.

**4 EXECUTION****4.1 GLASS PROCESSING****General**

Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access holes and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

**4.2 INSTALLATION****General**

General: Install the glass so that

- 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;
- building movements are not transferred to the glass; and
- external glazing is watertight and airtight.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, work, or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Heat absorbing glass: In locations exposed to direct sunlight, provide wheel cut edges free from damage or blemishes, with minimum feather.

- Edge grinding or arrising: Wet process, using grit no coarser than 120 - 180. Do not work across the edge from surface to surface.
- Temporary marking: Remove before installation.

Frameless installations: Join the vertical edges of adjacent glass panels with silicone jointing compound.

#### **Preglazing**

Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed unless preglazing is impracticable.

Curtain walls: Supply inclusive of glazing, shop preglazed.

#### **Glazing method**

Vision panels: Install so that they are to be removable from the inside.

External timber framed glazing: Glaze with putty.

### **4.3 FIXING MIRRORS**

#### **Screw fixing**

Direct to wall plugs with dome-headed chromium-plated screws in each corner and at 900 mm maximum centres around perimeter. Provide polyethylene sleeves and washers to prevent contact between screw and glass. Do not over-tension the screws.

#### **Frame fixing**

General: Proprietary aluminium frames to mirror perimeter, corners mitred. Bed glass edges in a continuous resilient gasket. Attach the frame to the substrate with concealed screw fixings. Seal the frame to the substrate with paintable sealant which will not react with the mirror coating. Do not allow the sealant to contact the mirror back.

#### **Bead fixing**

Rebated timber beads to mirror perimeter, corners mitred. Bed glass edges in a continuous resilient gasket. Screw fix the beads to the substrate.

#### **Clip fixing**

Direct to wall plugs with chromium-plated fixed clip and spring clip fixings at 900 mm maximum centres around perimeter. Provide polyethylene or cork washers to prevent contact between clips and mirror back.

#### **Fixing Method**

##### **Plastic Mirror**

(Polycarbonate): Adhered to substrate with a suitable brushing adhesive which is compatible with mirror backing and in accordance with the supplier/manufacturers recommendations.

Apply adhesive evenly to both surfaces.

All air pockets are to be removed while the surfaces are being adhered together.

If mirrors require joining, butt join allowing equally spaced panels and provide a 3 mm gap for expansion in each butt joint, paint substrate black behind each join.

##### **Performance Workshop Mirror**

Clear anodised frames to full perimeter of mirror assembly (not individual mirrors).

Mirrors to be adhesive or double sided tape fixed all in accordance with manufacturer's recommendations.

Vertical butt joints to have a 3 mm gap for expansion with exposed mirror edges splayed. All butt joints to be filled with a clear silicon.

#### **Replacement Glazing**

Carry out replacement glazing on site or in factory to AS 1288.

Safety Glass: Where laminated safety glass is used to replace ordinary annealed glass, upgrade the sash/window assembly as required to enable the sash to operate correctly. (eg. Increased sash counter balances/weights for double hung or vertical sliding windows to compensate for heavier safety glass).

#### 4.4 GLAZED SHOWER SCREENS

**Type**

Proprietary system comprising frames of extruded aluminium, stainless steel, or PVC, assembled around safety glass to form fixed panels and sliding, hinged or pivoted doors.

**Shower screen systems**

Hardware: Pull handles on both sides of sash, or of leading sash in multiple sash arrangements.

**Water shedding**

Provide an assembly which sheds water to the inside without retaining it on the frame surfaces. Seal the edge of the frame to adjoining surfaces with a resilient strip.

**Sliding assemblies**

Hanging: Hang the sliding sash on stainless steel or nylon sheaves on overhead channel track formed in the frame head, and fit nylon or equivalent bottom guides.

Hardware: Pull handles on both sides of sash, or of leading sash in multiple sash arrangements.

#### 4.5 PARTITION GLAZING

**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.

**Frameless installations**

Join the vertical edges of adjacent glass panels with a silicone jointing compound.

### 5 COMPLETION

#### 5.1 COMPLETION

**Warranties**

General: Submit a warranty, signed by the glazing subcontractor, undertaking to repair or replace glass and glazing materials which, within the warranty period, become defective or prove unsuitable for the specified application; provided that the manufacturers' recommendations for the maintenance of the material have been followed during the warranty period.

Glass manufacturer's warranty: An undertaking, conditional only on compliance with the manufacturer's recommendation for installation and maintenance, to supply replacement glass units to the site for replacement of defective units defined as follows:

- SIG units: Units in which the hermetic seal has failed as evidenced by intrusion of foreign matter, or internal condensation at temperature above 2°C.
- Coated glass units (including coated 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.

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.

**Maintenance manual**

Submit manufacturers' published recommendations for service use.

**Cleaning**

Replace damaged glass and leave the work clean, polished, free from defects, and in good condition.

**DOOR AND WINDOW HARDWARE****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **door and window hardware** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Windows, Doors and Partitions

**2 QUALITY****2.1 SUBMISSIONS****Subcontractors**

Automatic door operators: Submit names and contact details of proposed supplier and installer.

Pressure floor mat: Submit names and contact details of proposed supplier and installer.

**Materials and components**

Key control system: Submit details of the proprietary key control security system proposed by the lock manufacturer for locks required to accept a group key (master etc or existing).

Key schedule: Submit the Keying Schedule and factory registration details for approval prior to supply of the key system.

Locksets test report: Submit test reports to AS 4145.2 as specified in this section

**2.2 UNIFORMITY****Uniformity**

The following hardware items must have common brand of manufacture and/or service warranty:

- - locks, lock furniture and new key systems
- - door closers

**3 MATERIALS****3.1 MATERIALS****Metal finishes**

Generic items: The following minima apply to the relevant finishes on hardware items described in generic terms (i.e. not as proprietary items):

- Coating class for steel sheet: At least Z275.
- Anodising class for internal applications: At least AA15.

Clear lacquer: Provide a factory applied clear lacquer finish on copper alloy surfaces liable to corrosion.

Electroplated coatings

Chromium plating on metals: To AS 1192. Service condition number 3 unless otherwise specified. Surface finish as scheduled.

Chromium plating on plastic: To AS 1406. Service condition number 3 unless otherwise specified. Surface finish as scheduled.

Cadmium plating on threaded components: To AS 1192. Service condition number 3 unless otherwise specified.

Stainless Steel: To AS 1449 -Type 304. Hardware shall have exposed edges finished to remove sharp edges and burrs.

All hardware to be satin chrome plated or stainless steel with satin finish unless otherwise specified.

#### **Abbreviations**

SSS - No.3 satin finish stainless steel.

SCP - fine finished, then first quality copper, nickel and chrome plating.

SA - satin anodised 25 microns thickness min.

SAL - satin aluminium lacquer.

## **4 COMPONENTS**

### **4.1 COMPONENTS GENERALLY**

#### **General**

Hardware specified 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.

#### **Supply**

Deliver door hardware items, ready for installation, in individual complete sets for each door, each set

- in a separate dust and moisture proof package;
- clearly labelled to show its intended location; and
- including the necessary templates, fixings and fixing instructions.

#### **Operation**

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

#### **Handing**

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

#### **Hardware Sets**

Hardware is scheduled in sets, refer to the Door Schedule for application of the sets.

#### **Hardware Sets Packaging**

Package hardware items in individual sets in readiness for installation on each door as scheduled. Each set shall be complete with all necessary fixing instructions, templates and fixing screws. Individually label the contents of each set to indicate door and location information.

Place each individual hardware set in separate heavy duty clear polythene bags and seal against ingress of dust and water. Attach tags to the outside of each bag identifying door and location information ready for installation.

### **4.2 HINGES**

#### **Butt hinge sizes**

General: Minimum sizes are those in **Hinge table A** and **Hinge table B** (not applicable to cupboard doors), in which length (l) is the dimension along the knuckles, not including hinge tips, if any, and width (w) is the dimension across both hinge leaves when opened flat.

Steel, stainless steel, brass, bronze butt hinges for timber doors in timber or steel frames: To **Hinge table A**.

Aluminium hinges for aluminium doors, or for doors of other materials in aluminium frames: To **Hinge table B**.

**Hinge table A**

Nominal hinge size l x w x t (mm)	Door leaves not exceeding any of the following:		
	Mass (kg)	Width (mm)	Thickness (mm)
70 x 50 x 1.6	16	620	30
85 x 60 x 1.6	20	820	35
100 x 75 x 1.6	30	920	40
100 x 75 x 2.5	50	920	50
100 x 75 x 3.2	70	1020	50
125 x 100 x 3.2*	80	1220	50

\* Non standard to special order only.

**Hinge table B**

Nominal hinge size l x w x t (mm)	Door leaf not exceeding mass (kg)	Minimum construction	
		Knuckles	Screws/hinge leaf
100 x 70 x 3	30	3	3
100 x 80 x 3.5	50	5	4
130 x 50* x 3.4	75		3

\* Interfold (Fast fix) surface mounted not recommended for DET facilities

**Number of hinges****Two Hinges Per Leaf**

- Doors under 25 mm thick not exceeding 1500 mm high or 720 mm wide (eg. solid cupboard doors);
- Toilet/Shower cubicle doors;
- Internal doors and screen doors over 25 mm thick not exceeding any of the following:
  - Height 2100 mm, width 720 mm, weight 35 kg;

**Three Hinges Per Leaf**

- Doors over 25 mm thick exceeding any of the following:
  - Height 2040 mm, width 720 mm, weight 35 kg.
  - Aluminium framed doors.
- Doors under 25 mm thick exceeding 1500 mm high or 720 mm wide.

Small door leaves: Door leaves not exceeding any of the following may have 2 hinges each:

- 2040 mm high.
- 820 mm wide.
- 30 kg mass.

Other door leaves: Provide 3 hinges for leaves between 2040 mm and 2340 mm high, and 4 for door leaves between 2340 mm and 3050 mm high. Provide at least 3 low friction bearing hinges for door leaves controlled by door closers.

Fire doors: To AS/NZS 1905.1

Hinges per sash: Provide 3 hinges per sash to butt hinge-hung awning or hopper sashes over 1200 mm wide or casement sashes over 1200 mm high.

**Hinge materials**

Aluminium hinges: High tensile aluminium with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint.

Doors fitted with closers: Provide low friction bearing hinges.

Brass hinges: For brass hinges used for door leaves exceeding 30 kg or door leaves controlled by door closers, provide bronze or stainless steel washers to each knuckle joint.

#### Wide throw

Use of wide throw butt hinges to clear reveals is not recommended due to associated maintenance problems.

#### Hinge pins

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

#### Hinges schedule

<b>Stainless Steel Butts</b>	<b>Description.</b>
Hinge finish/Thickness:	Satin stainless steel/2.5mm minimum
Application	Steel Frame / Timber or Fire Door
Proprietary item:	Lane 8580 SS 100 x 75 mm (loose pin) Lane 8580 SS 100 x 100 mm (loose pin) Lane 8588 SS 100 x 75 mm (fixed pin) Lane 8588 SS 100 x 100 mm (fixed pin) OR Doric DH31 100 x 75 mm (loose pin) Doric DH30 100 x 75 mm (fixed pin) Doric DH33 100 x 100 mm (loose pin) Doric DH32 100 x 100 mm (fixed pin) OR Trio T717525LP 100 x 75 mm (loose pin) Trio T717525FP 100 x 75 mm (fixed pin) Trio T710025LP 100 x 100 mm (loose pin) Trio T710025FP 100 x 100 mm (fixed pin) NOTE: Fixing screws also stainless steel

<b>Stainless Steel Butts (Heavy Duty) with Sintered Lube Bushes</b>	<b>Description</b>
Hinge finish/Thickness:	Satin stainless steel/3mm minimum
Application	Steel Door Frame - Door leaves over 1000 mm wide
Proprietary item:	Lane SB 954SS 100 x 75 mm (loose pin) Lane SB 954SS 100 x 100 mm (loose pin) Lane SB 958SS 100 x 75 mm (fixed pin) Lane SB 958SS 100 x 100 mm (fixed pin) OR Doric DH34 100 x 75 mm (fixed pin) Doric DH35 100 x 100 mm (fixed pin) Doric DH84 100 x 75 mm (Loose pin) Doric DH87 100 x 100 mm (Loose pin) OR Trio T717532LPSSB 100 x 75 mm (loose pin) Trio T717532FPSSB 100 x 75 mm (fixed pin) Trio T710032LPSSB 100 x 100 mm (loose pin) Trio T710032FPSSB 100 x 100 mm (fixed pin) NOTE: Fixing screws also stainless steel.

<b>Brass Butts with Bronze/SS Bushes</b>	<b>Description</b>
Hinge finish:	Polished or mill finished
Application	High traffic areas
Proprietary item:	McCALLUMS 34 (102 x 76 mm)



<b>Brass Butts Foundation Access Door</b>	<b>Description</b>
Hinge Finish	Polished or mill Finished
Application	Low traffic areas
Proprietary item:	McCallums B73 mill finish (100 x 75 mm)

<b>Aluminium butts</b>	<b>Description</b>
Hinge finish:	Clear anodised to match frames.
Application	Aluminium Frame / Aluminium Door
Proprietary item:	McCallums A45 (102 x 83 mm) 82 (102 x 102 mm) OR Doric DH31 with aluminium end caps (102 x 84 mm).
Application	Aluminium Frame / Timber Door
Proprietary item:	McCallums A45/50 (102 x 79 mm) 81/82 (102 x 102 mm) OR Doric DH6 with aluminium end caps (102 x 80 mm)

<b>Stainless Steel Spring Hinges</b>	<b>Description</b>
	<b>HOLD OPEN FOR OPENING IN DOORS, HOLD CLOSED FOR OPENING OUT DOORS.</b>
Hinge finish:	Satin Stainless Steel
Application	Timber Door / Terrazzo Partitions
Proprietary Item:	Efco 555 OR Plated Products 777

<b>Gate Hinges:</b>	<b>Description</b>	<b>Gate Size</b>	<b>Capacity*</b>
Pivot Hinge:	Steel with grease nipple		
Application	Compound/Security Gates		
Hinge finish:	Zinc plated		
Installation:	Face fixed fully welded		
Proprietary item:	DUO H16 (8 mm dia pin)	2100 x 1000	40 kg
	DUO H25 (16 mm dia pin)	2100 x 1200	100 kg
	DUO H38 (25 mm dia pin)	3000 x 1500	300 kg

\* Two hinges per leaf – add 25% capacity for three hinges

<b>Cupboard hinges</b>				
Flush fitting doors suitable for blockboard core or 15 mm minimum thickness solid timber edge strip doors.				
<b>Height</b>	<b>Width</b>	<b>Thickness</b>	<b>Hinges</b>	<b>Size</b>
760 mm	450 mm	20 mm	1 pair	70 mm
2100 mm	450 mm	20 mm	1 1/2 pair	70 mm
1500 mm	600 mm	20 mm	1 pair	70 mm
2100 mm	600 mm	20 mm	1 1/2 pair	70 mm
1500 mm	900 mm	35 mm	1 pair	85 mm
2100 mm	900 mm	35 mm	1 1/2 pair	85 mm
Proprietary item:			McCallums B6 brass (SCP) or (PB) Lanes 8838 (SSS)	

Overlay Doors:	Description
Suitable for particle board doors without solid timber edge strips	All metal concealed hinge, screw fixed 3 way adjustment without self closing mechanism, minimum 170° opening.

### 4.3 KEYING

#### Key material

Pin tumbler locks: Nickel alloy, not brass.

Lever locks: Malleable cast iron or mild steel

#### Identification

##### Stamping

Code stamp keys. Code stamp key groups as scheduled. Code stamp keys and lock cylinders in an approved location.

##### Labelling

Provide plastic key tags correctly labelled with door number and area description. Attach with split rings a separate tag for each lock and hand over to the Superintendent at completion of the work. Ensure that the school name is included on the separate key tags for the additional two sets of keys specified in KEYING - NUMBER OF KEYS.

#### Records

Provide two copies of the Master Key Schedule and factory registration details indicating both new and existing Master Key codes, lock catalogue codes, door numbers and key quantities supplied. Factory Master Key Schedule to include lock manufacturers' keying reference details for future maintenance of the Master Key system.

The two copies of the Master Key Schedule and factory registration details to be handed to the Clients Representative. i.e. One for School Principal. One for Security Service Unit.

#### Master Keying

Master key locks and padlocks to appropriate groups as scheduled. Where an existing master key system is in working operation and has similar existing master key codings, key the new work to the existing appropriate codings to avoid multiple codings with similar functions. All Master Keying and coding details to be recorded in the Lockwood, Kaba Boyd or Lane factory records system.

Keying Schedule: Prepare the Factory Master Key Schedule and submit to the Person with full authority/Superintendent for approval prior to supply of the keying system.

#### Delivery

##### Master keys

Arrange for the manufacturer or supplier to deliver direct to the Person with full authority/Superintendent. The Person with full authority/Superintendent will acknowledge receipt direct to the hardware supplier.

All other keys: Deliver to the Person with full authority/Superintendent on practical completion.

#### Key Codes

Code KA "E": Keyed alike group PW "E", lockwood cylinders.

#### Project key

##### Number of Keys

Provide keys as set out hereunder:

Master Keys (existing)	MK	Nil
Master Keys (new)	MK	4 keys per code
Key to differ	KD	2 keys per lock
Key to differ (not MK)	KD	4 keys per lock
Key alike	KA	6 keys (total) 1 or 2 locks
Key alike	KA	10 keys (total) 3 to 10 locks

Key alike	KA	20 keys (total) 11 to 40 locks
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Key quantities supplied by the Contractor to be checked against Master Key Schedule key quantities.

All keys, including Master Keys, to be handed over to the clients representative.

Two Master Keys per code to be retained by the Principal. Two Master Keys per code plus two keys for designated non-mastered locks for the Schools Security Service Unit.

#### Key Control

The Superintendent may provide written approval for use of specific keys, under the master key system after installation of the master keyed system.

Where such approval is received, establish a key control register for recording and coding of keys issued, person accountable, date issued and returned.

Return all keys to the Superintendent when directed.

No keys of the master key system are to be duplicated or replaced without the appropriate written authority from the superintendent.

Re-key cylinders for any keys not returned and completely re-key all cylinders for any master key not returned. Ensure that the complete master key system still operates as originally designed and provide specified number of replacement keys, all with code stampings.

#### Key code schedule

Locks must be master keyed in MK code groups as specified. (Locks must NOT be Grand Master Keyed).

#### Secondary School Master Key System

Learning Units (L.U.)	Keying	Master Key
Circulation Entrances	Key alike to the L.U.	Code "LS"
General LU – GLS, Seminar	Key alike "GL"	
Senior LU – GLS, Seminar	Key alike "GL"	
Science LU – GLS, Lab, Seminar, Preparation, Botany/Zoology	Key alike "S"	
Visual Arts LU – GLS, Workshop	Key alike "VA"	
Visual Arts LU – Dark Room	Key to differ	
Performance LU – GLS, Workshop, Practice	Key alike "PF"	
Fitness/Performance LU – GLS, Workshop, Practice	Key alike "PF"	
Fitness LU – GLS, Laboratory, Seminar	Key alike "FT"	
Materials LU Type 1 – GLS, Kitchen, Seminar, Preparation, Laundry	Key alike "MT1"	
Materials LU Type 2 – GLS, Workshop	Key alike "MT2"	
Materials LU Type 3 – GLS, Workshop	Key alike "MT3"	
Materials LU Type 4 – GLS, Kitchen, Seminar, Preparation, Laundry	Key alike "MT4"	
Multi Media LU – GLS, Workshop	Key alike "MM"	
Multi Media LU – Studio	Key to differ	
Lecture Theatre	Key to differ	

## Secondary School Master Key System (contd.)

<b>Library</b>	<b>Keying</b>	<b>Master Key</b>
Library Entrances Library Administration, Seminar Connecting door between Library and Computer LS/Senior Study Computer Learning Space Senior Study Careers Adviser's Office System Administrator's Office Communications Room	Key alike "L" Key alike "LIB" Key alike "LIB"  Key to differ Key to differ Key to differ Key alike "SA" Key alike "SA"	Code "AF"

<b>Movement Complex</b>	<b>Keying</b>	<b>Master Key</b>
Gymnasium, Movement Studio, Chair Store, First Aid, Stage, Kitchenette Control Room Toilet – Boys/Girls, Showers, Change, Access Toilet and Shower Drinking/Wash Trough Guard	Key alike "MV"  Key to differ Key alike "T"  Key alike "T"	Code "AF"

<b>Learning Support</b>	<b>Keying</b>	<b>Master Key</b>
Covered Outdoor Workshop Kiln Space Agriculture Shed Workshop Animal/Plant Space Agriculture Covered Area	Key alike "OW" Key alike "VA" Key to differ Key alike "AG" Key alike "AG"	Code "LS"

<b>Administration Unit</b>	<b>Keying</b>	<b>Master Key</b>
Entrances Administration Offices Administration – Clerical, Executive, Utility Clinic, Clinic Toilets Compound/Security Gates	Key alike "A" Key to differ Key alike "AC"  Key alike "CL" Key alike "G"	Code "AF"

## Secondary School Master Key System (contd.)

<b>Staff Unit</b>	<b>Keying</b>	<b>Master Key</b>
Staff Study, Staff Lounge Staff Interview/Meeting Preparation/Printing Staff Toilet, Staff Shower	Key alike "SS" Key to differ Key to differ Key alike "T"	Code "AF"

<b>Student Services</b>	<b>Keying</b>	<b>Master Key</b>
Toilets – Boys/Girls Access Shower/Toilet/Change/ Laundry Drinking/Wash Trough Guard	Key alike "T"	Code "AF"

<b>Canteen</b>	<b>Keying</b>	<b>Master Key</b>
Canteen (incl. Roller shutters), Canteen Office/Store (door Category 'C' security) Vending Machines	Key alike "CAN"	Not Master Keyed

<b>Maintenance and Cleaners</b>	<b>Keying</b>	<b>Master Key</b>
Bulk Store Cleaning Supplies Store Cleaning Distributed Store Garden Store	Key to differ  Key alike "GS"	Code "MC"

<b>Security Category 'C' Stores</b>	<b>Keying</b>	<b>Master Key</b>
Stores Generally, Pantry Materials Store – Type 2, Project Store Large Equipment Store Outdoor Equipment Store	Key to differ	Code "ST"

## Secondary School Master Key System (contd.)

<b>Security Category 'D' Stores</b>	<b>Keying</b>	<b>Master Key</b>
General Learning Space (GLS) Store Apparatus Store Chemical Store (door Category 'C' security) Visual Arts Store, Pottery Store Performance Store, Fitness Store Materials Store – Type 1 Multi Media Store Lecture Theatre Store Computer Store, Archive Store Sport Equipment Store Movement Studio Store Administration Store	Key to differ	Code "ST"

<b>Services</b>	<b>Keying</b>	<b>Master Key</b>
Switchroom, E.D.B., L.P.G., Mechanical Plant	Keyed alike PW "E"	Not Master Keyed

## Primary School Master Key System

<b>Learning Facilities</b>	<b>Keying</b>	<b>Master Key</b>
Home Bases Practical Activities Area Shower/Toilet to EI Home Base, Kitchenette	Key alike "LF"	Code "LS"

<b>Library</b>	<b>Keying</b>	<b>Master Key</b>
Library Entrances, Main Area Office/Workroom Communications Room	Key alike "LIB"  Key to differ	Code "AF"

<b>Special Programs</b>	<b>Keying</b>	<b>Master Key</b>
Special Programs Room	Key to differ	Code "LS"

<b>Communal Hall</b>	<b>Keying</b>	<b>Master Key</b>
Communal Space and Entrances Chair Store, Performance Store Sound Cupboard	Key alike "CA" Key to differ	Code "AF"

<b>Administration Facilities</b>	<b>Keying</b>	<b>Master Key</b>
Entrances Administration Offices Clerical, Executive, Duplicating Sick Bay, Therapy (SSP) Community Clinic Compound/ Security Gates	Key alike "A" Key to differ Key to differ Key to differ Key alike "CL" Key alike "G"	Code "AF"

<b>Staff</b>	<b>Keying</b>	<b>Master Key</b>
Staff Room, Staff Room Annexe Staff Toilet Access Shower/Toilet	Key alike "SS" Key alike "T" Key alike "T"	Code "AF"

## Primary School Master Key System (Contd.)

<b>Student Services</b>	<b>Keying</b>	<b>Master Key</b>
Toilets – Boys/Girls Access Shower/Toilet/Change/ Laundry Access Shower/Toilet/Change/ Laundry Facility Drinking/Wash Trough Guard	Key alike "T"	Code "AF"

<b>Canteen</b>	<b>Keying</b>	<b>Master Key</b>
Canteen (incl. roller shutters)	Key alike "CAN"	Not Master Keyed
Canteen Office/Store (door Category 'C' security)	Key to differ	Not Master Keyed

<b>Maintenance and Cleaners</b>	<b>Keying</b>	<b>Master Key</b>
Bulk Store (General Assistant) Cleaning Supplies Store Cleaning Distributed Store Garden Store	Key to differ Key alike "GS"	Code "MC"

<b>Security Category 'C' Stores</b>	<b>Keying</b>	<b>Master Key</b>
Home Base Store, P.E. Store Kiln Room, Stores Generally	Key to differ	Code "ST"

Security Category 'D' Stores	Keying	Master Key
KLA Resource Store Special Programs Store Sports Store Administration Security Store	Key to differ	Code "ST"

Services	Keying	Master Key
Switchroom, E.D.B., Mechanical Plant	Keyed alike PW "E"	Not Master Keyed

#### 4.4 LOCKS AND LATCHES

##### Mechanical locksets

Standard: To AS 4145.2 and comply with the following minimum performance requirements.

Cl. 1.5.2.1	Durability	-D3
Cl. 1.5.2.2	Physical Security	-S2
Cl. 1.5.2	Keying Security	-K1

##### Furniture

Provide lock and latch furniture suitable for use with the lock or latch to which it is installed with the corresponding level of performance.

##### Strike plates

Use strike plates provided with the locks or latches. Do not provide "universal" strike plates.

##### Bolts

Provide bolts including barrel bolts, flush bolts and tower bolts with keepers, including lock plates, staples, ferrules or floor sockets.

##### Window catches

Provide 2 catches per sash to manually latched awning or hopper sashes over 1000 mm wide.

##### Mortar guards

For steel door frame installations, provide mortar guards designed to enable the full extension of the lock tongue or similar devices and the correct operation of the locking mechanism.

##### Rebated doors

For mortise locks or latches to rebated doors, provide purpose-made rebated pattern items.

##### Door Hardware Items

DOORS OVER 50mm MAXIMUM THICKNESS REQUIRE EXTENDED CYLINDERS AND/OR SPINDLES AND FURNITURE SCREWS.

Type	Description
2 point Horizontal Locking Bar (Security "D"):	2 point locking bar "Rivers" Model "DS6" silver finish OR ADI Model LB395-1 Requirement: Add Lockwood, Kaba Boyd or Astra cylinder. Doors opening out, add "Opening Out" to Model Number.
Mortice Cylinder Night Latch (Security "A, B or C"):	Lockwood 3570XT – 6007 turn and holdback 2 x 1366 escutcheons OR Kaba Boyd ML290PT and holdback with FA311 turn 2 x FA300T escutcheons OR Astra S133-120-SOC/TS turn 2 x OCE-2 escutcheons Add rebate code to lock number for rebated forend

Mortice Cylinder Classroom Locksets (Security "A, B, or C")	Lockwood 3572M-2801-2905-70. OR Kaba Boyd ML78PD-101-112-25 OR Astra S4335-100-T11-T16-L38 Add rebate code to lock number for rebated forend.
Mortice Cylinder Vestibule Locksets (Security "A, B or C"):	Lockwood 3572XT-2801-2904-70 OR Kaba Boyd ML53PD-101-113-25 OR Astra S431-10A-T11-T14S-L38 Add rebate code to lock number for rebated forend.
Two cylinder mortice classroom lock (connecting spaces)	Lockwood 3574CL-2801-2901-70 OR Kaba Boyd ML67PD-101-111-25 OR Astra S3335-200-T11
Mortice Cylinder Deadlock (Security "A, B or C"):	Lockwood 3571WT with 6007 turn 2 x 1366 escutcheons OR Kaba Boyd ML190P with FA311 turn 2 x FA300T escutcheons OR Astra S230-120-SOC/TS turn 2 x OCE-2 escutcheon Add rebate code to lock number for rebated forend
Mortice Cylinder Deadlock - Key Locking Only (Security A, B, or "C")	Lockwood 3571DE with 6007 turn 2 x 1366 escutcheons OR Kaba Boyd ML 163P with FA311 turn 2 x FA300T escutcheons OR Astra S230-120EF-SOC/TS turn 2 x OCE-2 escutcheon Add rebate code to lock number for rebated forend
Mortice Cylinder Sliding Door Lock (Security "A, B or C")	Lockwood 3573WT with 6007 turn 2 x 1366 escutcheons OR Kaba Boyd ML560P with FA311 turn 2 x FA300T escutcheons OR Astra S530-120-SOC/TS turn 2 x OCE-2 escutcheons
Mortice Cylinder Narrow Deadlock (Security "A, B or C")	Lockwood 590F-1201 and 322 escutcheon OR Kaba Boyd 950F-01 with SB311 turn 2 x SB959 escutcheons OR Astra MB220/22-120-OC/EF turn 2 x OCE-1 escutcheons
Mortice Cylinder Narrow Sliding Door Lock (Security "A, B or C")	Lockwood 591F-1201 and 322 escutcheon OR Kaba Boyd 951F-01 with SB311 turn 2 x SB959 escutcheons OR Astra MB520/22-120- OC/EF turn 2 x OCE-1 escutcheons



Two cylinder mortice narrow deadlock (connecting spaces)	Lockwood 950F-3 and 2 x 322 escutcheons OR Kaba Boyd 950F-3 and 2 x SB959 escutcheons OR Astra MB220/22-220-2 x OCE-1 escutcheons
Mortice Cylinder Anti-Lockout Vestibule Lockset (Disabled Toilet and Self Help Toilet):	Lockwood 3572XA-2801-2904-70 OR Kaba Boyd ML50PT-101-113-25 OR Astra S439-10A-T11-T14S-L38
Dual Cylinder Mortice Escape Lockset (Switchrooms)	Lockwood 3577X-2905-70- Kaba Boyd Wafe 04 Bottom cylinder Lockwood 570 key alike PW "E" and top cylinder keyed to local authorities requirements. Add rebate code to lock number for rebated forend
Mortice Cylinder Store/Plantroom Lockset (Security A, B, or C'')	Lockwood 3572X-2905-70- Kaba Boyd Wafe 03 OR Kaba Boyd ML81PD- Wafe 03-112-25 OR Astra S435-100 with Kaba Boyd Wafe 03-T16-L38. Add rebate code to lock number for rebated forend. Requirement: Lock to plant room doors to have Lockwood 570 cylinder key alike PW "E".
Mortice Sniblock (Security A, B, or C'')	Lockwood 3572T-2805-2904-70 OR Kaba Boyd ML32D-102-113-25 OR Astra S433-00A-T15-T14S-L38. Add rebate code to lock number for rebated forend
Rim Cylinder Nightlatch (Duct Cupboard)	Efco 508 or 509 or Kaba Boyd DL450 with Efco, Kaba Boyd or Astra cylinder. Requirement: For single leaf doors opening out, add RBS to lock number. For two leaves opening out, add RBP to lock number.
Rim Cylinder Nightlatch (Ducts / Electrical / Mechanical Services)	Efco 508 or 509 or Kaba Boyd DL450 add Lockwood 201-252 cylinder for Keyed alike PW "E" (Not master keyed) Requirement: For single leaf doors opening out, add RBS to lock number. For two leaves opening out, add RBP to lock number.
Rim Cylinder Nightlatch Ducts / Fire doors (Electrical / Mechanical Services)	Efco 507 or Kaba Boyd DL550 add Lockwood 201-252 cylinder for key alike PW "E" (not MK). Requirement: For single leaf doors opening out, add RBS to lock number. For two leaves opening out, add RBP to lock number.

Rim Nightlatch with Lever Handle	Lockwood 002-4N Lever Less Cylinder.
	Requirement: For aluminium door frames add 3 off lock packers 001-254 to allow strike plate to clear aluminium gasketed frame stop.
Rim Sliding Door Lock (Security "A, B or C")	Lockwood 303 with Efco, Kaba Boyd or Astra cylinder.
	Requirement: For steel door frames and pairs of doors substitute 355-252 surface mount retainer.
Padbolt with Padlock protection (Security Stores Gates)	DUO PLB-W with PLB-RP5 strike plate. Add PLB-FS for floor socket.
	Add PLB-WB 60 mm for standard wall bracket retainer. Requirement: Provide additional floor socket or wall bracket retainer to allow gates to be also locked in the open position.
Padbolt with Padlock protection (Security Stores Roller Shutters)	DUO PLB RDXT (RH or LH). (Horizontal padlock model) with strike plate
	Add PLB OOS to padbolt number for screw fix strike. Add PLB WOS to padbolt number for weld fix strike.
Padbolt – Heavy Duty (Compound Gates)	DUO XOX HGB 9522 with angle strike – horizontal model.
	DUO XOX VGB 15022 with socket (150mm throw) vertical model. DUO XOX VGB 22522 with socket (225mm throw) vertical model. Nominate bolt throw to suit installation. Requirement: Provide additional floor sockets or wall angle strikes to allow gates to be also locked in the open position.
Padlock (Security "A, B or C")	Efco 234EF/01/119 or Lockwood 234/45/119 OR Kaba Boyd 35-019S OR Astra A 45-101
Padlock For Broadhurst Lock Box (see guide note)	Efco 255 6M VIK OR Kaba Boyd 55-999 OR Astra 255-000
	DUO PLB-w PADBOLTS WITH COMPATIBLE PADLOCKS MAY BE SUBSTITUTED FOR THE BRODAHUST LOCK
Hasp and Staple (Heavy Duty)	X591 Shackle Protector – ADI Security Products
Padlock plates	Dalco 1453-1454 (Plated Brass)

Mortice Latchset	Lockwood 3574-2805-2905-70 OR Kaba Boyd ML10S-102-112-25 OR Astra S 730-000-T15-T16-L38 Add rebate code to latch number for rebated forend
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Top Latch (Fire Doors in Two Leaves)	Lockwood 8530-6-102-530 strike Requirement: Fit at top of first closing leaf. add chain extension for doors over 2100 mm high
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Mortice Roller Bolt	Kaba Boyd RB 111 Add "F" (Fabricator Kit) to roller bolt number for aluminium door fixing
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Push-Pull Latch (Fire doors in two leaves)	Two way push-pull latch-fail safe
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Pivot set and Stop	Dalco 13303 with 13302 Emergency door stop with Push Release.
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**Handles**

Requirement: Where pull handles are fitted to external doors, the outside pull handle should be specified as being "with concealed fixing externally".

Latch Handle (Timber Doors)	F.H.D 176 DC-576 (100 x 13 mm pull on 200 x 45 x 10 mm thick round end plate with cylinder hole at top)
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Pull Handle Type A (Timber doors)	Efco 194H-136 (200 x 16 mm pull on 250 x 50 x 10 mm thick round end plate).
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Pull Handle Type B (Timber doors)	Efco 194D-134 (168 x 16 mm pull on 250 x 50 x 10 mm thick round end plate).
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Pull Handle Type C (Timber doors)	F.H.D 234H-576 (100 x 13 mm pull on 165 x 45 x 10 mm thick round end plate).
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Pull Handle Type D (Aluminium Doors)	F.H.D. 892-5B (250 x 22 mm offset pull on 6mm thick oval roses) 1 pair. For single handle bolt fix from inside stile.
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Pull Handle Type E (Timber Door)	F.H.D. 587-4B (250 x 20 mm pull on 6 mm thick roses)
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Pull Handle Type F (Face fix)	F.H.D. 577-4 (150 x 12 mm pull on 38mm dia roses).
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Pull Handle Type G (Cupboards)	F.H.D. 574 or Lockwood L70 (100 x 10 mm pull).
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Flush Pull (Timber Doors)	F.H.D. HP. 1000 (225 x 65 mm or 125 x 50 mm) OR Astra FP 500 (125 x 50 mm)
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Flush Pull (Aluminium Doors)	Dalco 1961 (120 mm x 35 mm or 150 mm x 45 mm)
Flush edge pull	Dalco 1962 vis. fix (100 x 50 mm)
Flush Pull (Cupboards)	F.H.D. HP. 1114 (75 x 38 mm) OR Dalco 1951 (105 x 25 mm).
Push Plate	Satin Stainless Steel 250 x 200 x 1.2 mm countersunk screw fixed. Form hole in plate for lock turn to align push/pull plates. Width of push plate may be altered to suit door stile width.
Kick Plate	Satin Stainless Steel 200 mm high x door width x 1.2 mm countersunk screw fixed at 150 mm maximum centres. Height of kick plate may be altered to suit glazed door bottom rail.
Lock Bolt Shield (Lock bolt protector for open out doors)	Kaba Boyd SS092
Cupboard Sliding Door Lock (Timber) (Aluminium)	Bilock FA7289 (key alike) plunger bolt lock with escutcheon and striker plate. Bilock FA7287 (key alike)
Cylinder Cupboard/ Drawer Lock (Timber)	Bilock FA7250 (key alike) with escutcheon and strike plate.

**Door Stops and Door Holders**

General: Door stops should be provided to limit door travel where damage can be caused to doors, walls, frames or door hardware. Locate floor stops to avoid trip hazard.

Where doors open out externally and can be secured to walls, posts, etc, a door stop and holder should be installed approx. 2000mm from ffl.

Where this type of fastening is not practicable, provide a steel bollard or railing fitted with a doorstop and holder with protective hood to Standard Detail.

Install doorstop and holder with protective hood 50mm from top of bollard to top of hood.

Type	Description
Door Stop and Holder	F.H.D. HP. 884 (Auto Stop). Wall Fixing: Approx. 2000 mm from FFL Bollard/Rail Fixing: Refer to School Specification Standard Drawing DS32/2. Requirement: For external opening out doors Auto door stops must not be installed near brick reveals (minimum 150 mm from reveal)
Floor Stop with Hook	Kaba Boyd DS 568 Requirement: For opening in doors.
Floor Stop Type A	Kaba Boyd DS110. Requirement: For floor finishes other than carpet.

Floor Stop Type B	Lockwood 250 OR Dalco 12821
	Requirement: For carpet floor finishes

Wall Stop Type C	F.H.D. HP. 235 x 65 mm or 75 mm projection.
	Requirement: Wall fixed

Overhead Door Stay	Lockwood 8001D.
	OR
	Kaba Boyd 9109HO
	Requirement: Maximum 90° opening out external services doors.

Cabin Hook	F.H.D. HP. 1533 x 150 mm or 200 mm.
	OR
	Lockwood L829 x 100 mm, or 150 mm

**Bolts**

General: Where door leaves exceed 2100mm in height and bolts are fitted, the top bolt should have an extended shoot bolt to allow a maximum operable height of 1800mm from the floor.

Barrel Bolt (Brass Shoot)	Dalco 1751 B/S, or F.H.D. 671, 150 mm with brass floor socket and topangle plate for opening out doors.
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Barrel Bolt - Necked (Smoke Doors)	Dalco 1731 B/S x 150 mm
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Barrel Bolt (Fire Doors)	DUO Qilin UB200-F Spring retract bolt with floor socket.
	Requirement: Fit at bottom of first closing leaf

Skeleton Bolts	F.H.D. 3141 x 150mm with flat plate (Bottom bolt) with floor plate or socket.
	F.H.D. 3141 x 750mm with angle plate (Top bolt).

Barrel Bolt-Cupboards (Brass Shoot)	Dalco 1741 100 mm (with brass floor socket or plate where required).
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Plunger Bolt (Morticed)	FHD. 875.
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Hinge Bolt:	ADI. H790
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**Flush Bolts**

General: Flush bolts generally should only be used for aluminium doors and should only be fitted to the door edge and not face fitted. The top bolt should be extended as for barrel bolts, when required. Flush bolts generally should not be used for timber doors, barrel bolts are preferred unless for multiple sliding doors.

Flush Bolt (Timber Door)	F.H.D. HP. 863, 150 or 200 mm with brass floor socket or plate.
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Flush Bolt (Aluminium Doors edge fixed)	Doric DN200 with floor socket
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Automatic Flush Bolt (Fire Doors)	Kaba Boyd AF 667 with Doric DN206 floor socket.
Flush Bolt (Cupboards)	Efco 842, 100 mm with plate.
Magnetic Cupboard Catch	Light duty 3kg. pull. Heavy duty 8kg. pull
Universal Ball Catch	McCallum 33.
Non-Indicator/Indicator Bolt Sets Cubicle Partition Doors (Opening In)	Non indicator bolt Efco 547-530-531. Indicator bolt Efco 547-548-530-531. OR Plated Products 0015-0016-0017. Plated Products 0015-0018-0016-0017.
Non-Indicator/Indicator Bolt Set Cubicle Partition Doors (Opening Out)	Non indicator bolt Efco 547-530-536. Indicator bolt Efco 547-548-530-536. OR Plated Products 0015-0017-0053. Plated Products 0015-0018-0017-0053.
Indicator Bolt	Efco 547-548 or Dalco 1461 Add Dalco 1838 strike plate for opening out doors.
Indicator Bolt (Sliding Door)	Astra mortice Sliding Indicator Bolt with Astra 'IC' indicator and RTS- 52 "T" Turn
Hat and Coat Hook/Stop (Opening in)	Efco 297 (S.S.S.), or F.H.D. 435 (cast brass).
Hat and Coat Hook (Opening out)	Efco 296 S.S.S., or F.H.D. No. 750 (cast brass).

**Panic Exit Devices**

Requirement: Approved panic exit devices should be specified for escape doors to all multi-purpose spaces, communal areas, etc. also refer floor ferrule requirements.

Panic exit devices to incorporate key operated lock cylinders to lock push bar depressed (cylinder dogging) for unlocked entry.

To avoid external manipulation of these devices, door frames should have rebate forming stops, pairs of timber doors should have rebated meeting edges and pairs of aluminium doors should have a "T" section continuous aluminium coverstrip at the meeting edges.

Capral Superline meeting stile E35912 incorporates an integral cover strip.

Panic exit devices should not be specified in conjunction with centre hung pivoted doors as they do not allow rebate forming stops to be fitted to door frames.

Doors should preferably open 90° only with a door stop and holder fitted to a wall, bollard or railing to provide positive hold open anchorage. Where doors are required to open past 90°, door frames should be positioned flush with the external wall surface to avoid the use of wide throw hinges.

Door closers should only be fitted to the first opening leaf of a pair of doors and door stops A.B.S. fitted to each leaf. Pull handles also, should only be fitted to the first opening leaf of a pair of doors.

Panic Exit Device (Timber Door - Single Leaf)	Kaba Boyd 22NL/CD with PS01 Roller Strike. OR Lockwood 9000/9100CD/80NL with angle pull fixed to case. Sprayed silver or bronze finish.
	Requirement: Where key entry is not required omit nightlatch cylinder. Cylinder dogging (CD) to be Keyed Alike (MK) to entry key.

Panic Exit Device (Timber door - two leaves rebated)	Kaba Boyd 22NL/CD- 2227/CD-1609/95. OR Lockwood 9000/9100/9300/9400CD/80NL with angle pull fixed to case. Sprayed silver or bronze finish.
	Requirement: Where key entry is not required omit nightlatch cylinder. Cylinder dogging (CD) to be Keyed Alike (MK) to entry key

Panic Exit Device (Aluminium door - 200mm mid rail - single leaf)	Kaba Boyd 22NL/CD with ps01 roller strike and countersunk screws for cylinder. OR Lockwood 9000/9100 CD/80NL with angle pull fixed to case and roller strike. Sprayed silver or bronze finish.
	Requirement: Where key entry is not required omit nightlatch cylinder. Cylinder dogging (CD) to be Keyed Alike to entry key. Where two leaf doorset is over 2100mm high, add top rod extension to panic exit device. Refer DPWS aluminium door details drawing 2/19.

Panic Exit Device (Aluminium door - 200mm mid rail - two leaves)	Kaba Boyd 22NL/CD-2227/CD with 1942B strike and countersunk screws for cylinder. OR Lockwood 9000/9100/9300/9400CD/80NL with angle pull fixed to case. Sprayed silver or bronze finish.
	Requirement: Where key entry is not required omit nightlatch cylinder. Cylinder dogging (CD) to be Keyed Alike (MK) to entry key. (Refer DPWS aluminium door details drawing 2/19. Where two leaf door set is over 2100 mm high, add top rod extension to panic exit device, (nominate door height for device.)

### Sockets

	Brass or Aluminium Alloy 6061, 40 mm long x 3 mm wall thickness with internal diameter to closely match the bolt shank diameter. Drill floor and grout in flush with the finished floor finish.
Carpeted Floor Alternative (Not to be used for external doors)	Brass or Aluminium Alloy 6061, 20 mm long x 3 mm wall thickness with solid closed base, flanged top and internal diameter to closely match the bolt shank diameter. Drill and countersink base to receive 30 mm x 5 mm diameter long thread stainless steel screw and drill and fix to floor through carpet with lead plug.

Timber Floor Alternative (Non-carpeted floors only)	Brass or stainless steel 40 mm x 25 mm x 1.2 mm thick flat plate with two fixings to suit countersink wood screws and centre drill hole to closely match bolt shank diameter. Fix to timber floor with two 25 mm x 3 mm wood screws, finish and material to match flat plate.
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#### 4.5 SASH OPERATORS

##### Chain winder

Type: Provide a proprietary device capable of opening and closing a projecting sash by means of a chain retracting into a winder box fixed to the sill, self locking in all positions, manually operable by a sill mounted winding handle without moving the internal insect screen (if fitted).

##### Remote control operator

A proprietary device for opening and closing louvres or sash, in banks if required, by means of mechanical linkage manually or power operated from a convenient level, self locking in all positions.

Control: Manually or Power

Mechanism: Closed coil spring, compressed by high tensile cable enclosed in anodised aluminium tubing and connected to each sash or louvre assembly by a non corrosive pin and stainless steel bracket.

Regulators: Gravity cast or extruded anodised aluminium body, minimum wall thickness 3 mm with a machine cut steel lead screw and gun metal nut, brass or alloy bevel gears. Regulators must have built in top and bottom stops to prevent over-winding.

Finish: Anodised or Powdercoat

Handle Height: 1350 mm/1500 mm/1800 mm above floor.

Contact: Provide two points of contact to each sash where either sash dimensions exceeds 1200 mm.

Opening Width: Generally 220 mm minimum, and for sashes over 1200 mm high, 300 mm minimum.

#### 4.6 DOOR CONTROLLERS

##### General

Door controllers specified generally: Use door controllers, including door closers, floor or head spring pivots and automatic door operators, which are suitable for the door type, size and weight, the door swings required and the operating conditions, including wind pressure. Closers to have adjustable spring strength and delayed action for disabled access.

Install door closers internal side of external doors.

Closer Adjustment: Adjust door closer latching and closer speeds to close doors without slamming. Adjust spring strength and delayed action closing time to assist disabled access.

##### Fire rated door closers

General: Provide closers tested and certified for use as components of fire door assemblies.

Standard: To AS/NZS 1905.1.

##### Radio remote door controllers

General: Provide a device, comprising a radio receiver and separate transmitter, for activating a motorised door operator so as to open and close the door by remote radio signal.

Receiver: House within a wall unit incorporating a push-button switch permanently illuminated. Mount within the enclosure and connect to power.

Transmitter: Portable battery-powered unit sending a coded signal effective up to not less than 12 m from the receiver.

Key switch: If there is no separate access to the enclosure, provide a key switch mounted externally for opening and closing the door from outside the enclosure without the transmitter. Provide two keys.



Light: Provide an internal light which any signal to the receiver also switches on and which remains on for not less than two minutes and switches off automatically.

#### Door Closers

General: Fully surface mounted door closers are required.

Concealed door closers only to be used where there is insufficient nib clearance.

Door closers should not be installed externally. For open out doors, drop plates are required for aluminium glazed door installations

Adjustable strength door closers are required.

Delayed action closers are required for all entry doors, including all areas designed for disabled access.

Slide arm closers are required for all doors not opening more than 130°. parallel arm or invert mount closers are required for external doors opening more than 130°.

Door stops are required for all doors fitted with door closers

Refer also hardware sets for special requirements for holding doors open.

Door Closers: (Slide Arm)	Kaba Boyd 5003DA, 5103DA, 5203DA OR Lockwood 414SRDA, 414SRPDA
	Requirement: For door leaves over 1000mm wide, substitute lockwood 426 series.

Door Closer: (Parallel Arm)	Kaba Boyd 4103EDA OR Lockwood 414 PDA
	Requirement: For door leaves over 1000mm wide, substitute lockwood 426 series.

Door Closer: (Invert Mount)	Kaba Boyd 4203DA with invert mount head fixing plate OR Lockwood 414DA with invert mount head fixing plate.
	Requirement: For door leaves over 1000 mm wide, substitute lockwood 426 series

Door closer: (pneumatic) Flyscreen doors	Lockwood 401 OR Whitco W8105
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Door Sequence Selector	Kaba Boyd 1234.
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#### 4.7 SLIDING DOOR GEAR

##### Sliding door gear schedule

Sliding Door Gear (Internal Doors to 1500mm Wide) Maximum Load 90Kg	Centor A3 track or equal complete with two carriers 3 CC, two track stops 13 S, one wall stop 60WS, one floor guide 40 FG (set per leaf - single track).
	Requirement: Door leaves over 1000mm wide, substitute floor guide with two roller guides 14 RGB with continuous floor channel guide 14 FCB set flush to FFL

Sliding Door Gear (External) Doors and Doors over 1500 mm wide Maximum Load Two Wheel, (steel) carrier 150kg. Max. load Four Wheel (steel) carrier 250Kg	Centor A14 mini box or equal, complete with fixing brackets, two 144 CC carriers, two track stops and angles 14 TS/14 AS, two wall stops 60 WS and two roller guides 14 RGB with continuous floor channel guide 14 FCB set flush to FFL (set per leaf - single track).
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Sliding Door Gear (Industrial Capacity) Maximum Load Two Wheel carrier 350kg. Max. load Four Wheel carrier 600kg	Centor A4 box track or equal, complete with fixing brackets, two 44CC carriers, two track stops and angles 4 TS/4 AS, two wall stops 6 WS and two roller guides 41 RGB with continuous floor channel guide 4 FC set flush to FFL (set per leaf - single track)
Sliding Door Gear (Bottom Rollers) Timber Doors (minimum thickness 40mm).	Doric DA21 aluminium sill track set flush to FFL complete with fixing brackets @ 200 mm centres; two Doric DR-138 bottom rollers and Centor 14 FCB continuous top channel guide with two Centor 14 RGB roller guides or equal (Set per leaf- single track)
Sliding Door Gear (Bottom Rollers) Aluminium Doors:	Doric DA21 aluminium sill track set flush to FFL complete with fixing brackets @ 200 mm centres; two Doric DR-137 bottom rollers and Doric DA-22 top channel guide with four DA-23 nylon button guides. (Set per leaf - single track).

#### 4.8 DOOR HARDWARE SETS SCHEDULE

S1	<p>Mortice cylinder deadlock Pull handle (Type B) Push plate with turn hole Door closer (delayed action) Door stop and holder Kick plate</p> <p>Requirement: Opening out entry doors should preferably open 90° only with a door stop and holder fitted to a wall, bollard or railing to provide positive hold open anchorage. Drawing reference: &gt;. TS 78/1 Where doors are required to open past 90°, door frames should be positioned flush with the wall surface to avoid the use of wide throw hinges. For opening in doors delete door stop and holder and substitute floor stop with hook, locate to avoid trip hazard.</p>
S2	<p>Mortice cylinder narrow deadlock Pull handle (Type D) 1 pair Door closer (delayed action) Door stop and holder</p> <p>Requirement: Refer S1 for opening out entry doors requirements.</p>
S3	<p>Mortice cylinder narrow deadlock Roller bolt Pull handle (Type D) 1 pair Flush bolt (edge fitted-2 off) Door stop and holder (2 off)</p> <p>Requirement: For opening in doors delete doorstop and holder and substitute floorstop with hook. Refer S1 for opening out entry doors requirements.</p>
S4	<p>Mortice cylinder narrow deadlock Pull handle (Type D) 2 pair Door closer (delayed action) (2 off) Flush bolt (edge fitted-2 off) Door stop and holder (2 off)</p> <p>Requirement: Refer S1 for opening out entry doors requirements.</p>

S5	Mortice latchset Door closer (delayed action) Floor stop with hook.
	Requirement: Substitute floor stop type A, B, or C for fire doors.
S6	Mortice cylinder deadlock Pull handle (Type B) Pull handle (Type A) Push plate (2 off) (with turn hole - active leaf) Door closer (delayed action) (2 off) Barrel bolt (2 off) Door stop and holder (2 off) Kick plate (2 off)
	Requirement: Door leaf meeting edges non rebated. Refer S1 for opening out entry doors requirements.
S7	Mortice cylinder deadlock Pull handle (2 off) (Type A) Push plate (2 off) Door closer (delayed action) (2 off) Kick plate (2 off) Floor stop with hook (2 off).
	Requirement: Door leaf meeting edges non rebated. Omit lock if egress is also required from the locked side.
S8	Mortice cylinder narrow deadlock Pull handle (Type D) 2 pair Door closer (delayed action) (2 off) Floor stop with hook (2 off) Flush bolt (edge fitted – 2 off)
	Requirement: Omit lock if egress is also required from the locked side.
S9	Mortice cylinder vestibule lockset Floor stop Lock bolt shield
	Requirement: For opening in doors delete lock bolt shield. Refer S1 for external opening out entry doors requirements.
S10	Mortice cylinder narrow deadlock. Pull handle (Type D) 1 pair Door closer (delayed action). Floor stop with hook
	Requirement: Omit lock if egress is also required from the locked side.
S11	Mortice cylinder classroom lockset Door stop and holder Lock Bolt Shield
	Requirement: Where key entry is not required substitute mortice snib lock. Omit lockset for internal spaces not required to be locked and substitute mortice latchset. For opening in doors delete lock bolt shield and door stop and holder and substitute floor stop with hook, locate to avoid trip hazard. Refer S1 for external opening out doors requirements.

S12	Mortice Cylinder Narrow Deadlock Mortice Roller Bolt Pull Handle (Type D) 1 pair Door Stop and Holder
	Requirement: For opening in doors delete doornstop and holder substitute floorstop with hook, locate to avoid trip hazard. Refer S1 for external opening out doors requirements.
	Alternatively: For aluminium doors incorporating a 200 mm (nom) wide lockrail. SUBSTITUTE: Mortice cylinder Classroom Lockset (90/95mm Backset) with fabricator fixing kit. Lock bolt shield.
	Requirement: For opening in doors delete lock bolt shield and door stop and holder, substitute floor stop with hook, locate to avoid trip hazard.  Refer S1 for external opening out doors requirements.
S13	Sliding door gear Mortice cylinder sliding door lock Flush pull (2 Off)
	Requirements: Where key entry is not required, omit lock cylinder. Omit the lock for internal spaces not required to be locked. For staff change room, substitute an indicator bolt (sliding door) in lieu of the sliding door lock.
S14	Sliding door gear (bottom rollers) Mortice cylinder narrow sliding door lock Flush pull (narrow stile) (2 off)
	Requirement: Where key entry is not required, omit lock cylinder, or alternatively omit lock and substitute with barrel bolts. (PW sliding door suite No. 2 is supplied complete with all hardware.)
S15	Mortice cylinder classroom lockset Barrel bolt (2 off) Door stop and holder (2 off) Lock Bolt Shield
	Requirement: Where key entry is not required, substitute mortice sniblock.
	For internal spaces not required to be locked, substitute mortice latchset.
	For opening in doors omit lock bolt shield and door stop and holder and substitute floor stop with hook, locate to avoid trip hazard. Refer S1 for external opening out doors requirements.
S16	Mortise cylinder night latch
	Requirement: Non combustible construction with smoke seals. Provide RHS (galv.) sill for bottom seal.
S17	Sliding door gear Mortice cylinder sliding door lock Flush pull (4 off) Barrel bolt (2 off) Special keeper for top barrel bolt
	Requirement: Where key entry is not required, omit lock cylinder. Omit the lock for internal spaces not required to be locked.

S18	Sliding door gear (bottom rollers) Mortice cylinder narrow sliding door lock Flush pull (narrow stile) (4 off) Barrel bolts (2 off) Special keeper for top barrel bolt
	Requirement: Where key entry is not required, omit lock cylinder. Omit the lock for internal spaces not required to be locked. (PW sliding door suite no.2 is supplied complete with all hardware.)
S19	Indicator bolt set Spring hinges (hold open) Hat and coat hook/stop
	Requirement: For opening out doors, amend hinges to hold closed and add pull handle type F.
S20	2 point horizontal locking bar (security category 'D') Mortice roller bolt Pull handle Type C Floor stop
S21	Two cylinder mortice classroom lock Floor stop with hook
S22	Two cylinder mortice narrow deadlock Mortice roller bolt Pull handle (type D) 1 pair Floor stop with hook.
S23	Mortice cylinder nightlatch Pull handle (Type B) (Door fitted with lock) Pull handle (Type A) Push plate (with turn hole for lock) Door closer Floor stop Kick plate (2 off)
	Requirement: Omit nightlatch in administration areas where students would not have access. Add indicator bolt where no separate air lock is provided.
S24	Mortice cylinder deadlock - key locking only Pull handle (Type B) (Door fitted with lock) Pull handle (Type A) Push plate (with turn hole for lock) Door closer Floor stop Kick plate (2 off)
	Requirement: Omit deadlock for internal air lock doors.
S25	Indicator bolt Hat and coat hook / stop
	Requirement: BCA f2.5 (b). Door to open out unless there is a clear space of at least 1200 mm between the closet pan and the nearest part of the doorway. Add the following hardware to allow the door to open out in an emergency. Pivot set and stop with non-rebated door frame (omit hinges). Flush edge pull Light seals, for non-rebated door frame – purpose made proprietary seals to meet privacy requirements.

S26	Non indicator bolt set Spring hinges (hold open) Rubber door stop 32 mm dia. For open out doors substitute set S27.
S27	Non indicator bolt set Spring hinges (hold closed) Pull handle Type F
S28	Panic exit device (Single Leaf) Door closer (delayed action) Pull handle (Type A timber) (Type B timber door fitted with lock) (Type D Single handle aluminium) Door stop and holder Requirement: Internal push plate optional for flush timber doors. Refer S1 for entry door requirements.
S29	Panic exit device (Two Leaves) Door closer (delayed action) (active leaf only) Pull handle (active leaf only) (Type A timber) (Type B timber door fitted with lock) (Type D Single handle aluminium) Door stop and holder (2 off) Requirement: Internal push plate (active leaf) optional for flush timber doors. Refer S1 for entry door requirements.
S30	Mortice cylinder vestibule lockset Cabin hook. Barrel bolt Floor stop
S31	Dual cylinder mortice escape lockset Door closer Lock bolt shield.
S32	Dual cylinder mortice escape lockset Door closer (2 off) Top latch Barrel bolt (Fire doors) Door sequence selector Lock bolt shield. Requirement Door leaves to have aluminium meeting edges with overlapping cover strip
S33	Push plate Pull handle (Type F) Door closer (flyscreen door) Kick plate Barrel bolt with angle plate (optional for locking Canteen door only) Requirement: For a two leaf door, the above items should be fitted to each leaf. For aluminium door omit pushplate and kickplate.
S34	Dual cylinder mortice escape lockset Overhead door stay Lock Bolt Shield

S35	Dual cylinder mortice escape lockset Overhead door stay (2 off) Barrel bolt (2 off) Lock Bolt Shield
S36	Mortice cylinder storeroom lockset Overhead door stay Lock bolt Shield Requirement: Omit overhead door stay for internal door and substitute doorstop. Omit lock bolt shield for opening in doors. Omit overhead door stay and add door closer for lift motor room doors.
S37	Mortice cylinder storeroom lockset Door closer Floor stop Lock bolt Shield Requirement: Omit lock bolt shield for opening in doors.
S38	Mortice cylinder storeroom lockset Barrel bolt (2 off) Overhead door stay (2 off) Lock Bolt Shield Requirement: Omit overhead door stay for internal door and substitute floor stop. Omit lock bolt shield for opening in doors.
S39	Mortice cylinder storeroom lockset Door closer (2 off) Top latch Barrel bolt (Fire doors) Door sequence selector Lock Bolt Shield Requirement: Door leaves to have aluminium meeting edges with overlapping cover strip. Omit lock bolt shield for opening in doors.
S40	Rim cylinder nightlatch Overhead door stay Requirement: Omit overhead door stay for internal doors. For aluminium louvre doors over 60mm thick nominate door thickness to allow extension of nightlatch tail and fixing screws. Aluminium fabricator to provide aluminium mounting plate and cylinder housing for the nightlatch. Add latch handle for opening in timber doors.
S41	Rim cylinder nightlatch Barrel bolt (2 off) Overhead door stay (2 off) Requirement: Refer S40 for requirements.
S42	Mortice cylinder classroom lockset Door closer (delayed action) Lock bolt shield Floor stop

	Requirement: Refer S1 for external opening outdoor requirements and substitute door stop and holder. Substitute floor stop types A,B,C for fire doors. Substitute hardware set S5 if egress is required from both sides of the door.
S43	Sliding door gear Flush pull 2 off Indicator bolt (sliding door) Requirement: Omit indicator bolt for laundry to change areas
S44	Padbolt Heavy Duty – Horizontal model. Padlock. Requirement: Provide additional angle strike to allow gate to be also locked in the open position.
S45	Padbolt Heavy Duty – Vertical model (2 off). Padlock (2 off). Requirement: Provide additional floor sockets or wall angle strikes to allow gates to be also locked in the open position.
S46	Padlock plates Padlock (2 off). Requirement: Omit padlock plates where gate latch incorporates padlock locking.
S47	Mortice cylinder night latch Barrel bolt - necked 2 off Requirement: Door leaves rebated, non-combustible construction with smoke seals. Provide RHS (Galv.) sill for bottom seal.
S48	Mortice cylinder vestibule lockset Barrel Bolts (2 off) Door stop and holder (2 off) Lock Bolt Shield Requirement: Where key entry is not required, substitute mortice sniblock. For opening in doors omit lock bolt shield and door stop and holder and substitute floor stop with hook. Refer S1 for opening out doors requirements.
S49	Skeleton bolts 150mm (2 off) Skeleton bolts 750mm (2 off) Door Stop and Holder (2 off) Hinge bolts (4 off) Pull handle type F with roses (active leaf internal side) Requirement: Door frame to be positioned flush with the external wall surface to allow doors to open back against walls. Where adjoining door leaves overlap when open 100 x 150mm stainless steel heavy duty wide throw butt hinges are required for one leaf. For overlapping door leaves omit one door stop and holder.



S50	Mortice cylinder classroom lockset Door closer (Delayed action) (2 off) Top latch Barrel bolt (Fire doors) Door sequence selector
	Requirement: Door leaves to have aluminium meeting edges with overlapping cover strip.
S51	Mortice Roller bolt
	Flush edge pull
S52	Mortice Roller bolt - 2 off (fit at head of doors) Flush edge pull - 2 off
	Requirement: Door leaf meeting edges non rebated.
S53	Padbolt with padlock protection (2 off) Padlocks (2 off)
	Requirements: Roller shutters: Where alternative access is not provided padbolts to be fitted externally. For gates, floor sockets to be provided. Additional floor sockets or wall brackets to be provided to also allow locking gates in the open position.
S54	Padbolt with padlock protection Padlock
	Refer S53 for requirements.
S55	Mortice latchset Floor stop with hook
	Requirement: Aluminium glazed door requires 200mm wide mid rail to accommodate mortice latchset with 90/95mm backset with fabricator fixing kit.
S56	Mortice cylinder Anti-lockout vestibule lockset Indicator Bolt Door closer (Delayed action) Floor stop Lock bolt shield Kick plate (300 mm high)
	Requirement: Omit door closer and lock bolt shield for inward opening doors. Omit internal kickplate for separate shower (lockable)
S57	Rim Cylinder Nightlatch - Fire Doors Latch Handle
	Door Closer
S58	Rim Cylinder Nightlatch - Fire Doors Latch Handle Door Closer (2 off) Barrel bolt (Fire doors) Top Latch Door Sequence Selector
	Requirement: Door leaves to have aluminium meeting edges with overlapping cover strip.

S59	2 Point Horizontal Locking Bar Pull Handle (Type C) Mortice Roller Bolt Floor Stop with hook Requirement: For connecting space door amend 2 point locking bar to double cylinder model "DS3". Also amend pull handle quantity to 2 off
S60	Top Push/Pull Latch Two way Push/Pull latch Pull Handle (2 off) (Type A) Door Closer (delayed action) (2 off) Kick Plate (2 off) Push Plate (2 off) Floor Stops (2 off) Requirement: Corridor fire doors are usually required to be held open by electro magnetic door holders (wall mounted) and activated by smoke detectors. Door leaves to have aluminium meeting edges without overlapping cover strip
S61	Rim Nightlatch with lever handle Door closer Floor stop Requirement: Aluminium doors to incorporate minimum 100mm (nom) wide lock rail.
S62	Padbolt with Padlock protection. Padlock Requirement: Additional floor sockets or wall brackets to be provided to also allow locking gates in the open position

## 5 EXECUTION

### 5.1 INSTALLATION

#### Fixings

General: Provide materials compatible with the item being fixed, matching where exposed, and of sufficient strength, size and quality to perform their function. Provide a corrosion resistant finish to concealed fixings, and match exposed fixings to the material fixed.

Support: Provide appropriate back support (for example lock stiles, blocking, wall noggings and backing plates) for hardware fixings.

- Hollow metal sections: Provide backing plates drilled and tapped for screw fixing, or provide rivet nuts with machine thread screws, not self tapping screws or pop rivets.

Security: Locate exposed fixings to lock furniture on the inside faces of external doors and on the inside faces of internal doors to lockable rooms.

#### Window hardware

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

#### Door hardware

Proprietary doorsets: Provide the standard hardware.

Mounting heights: Mount locks and latches so that the centreline of the door knob or lever spindle is 1000 mm above finished floor.

#### Hinges (NATSPEC)

Timber doorsets: Install butt hinges in housings equal in depth to the thickness of the hinge leaf (except for hinges designed for mounting without housing), and fix with countersunk screws.

Metal frames: Fix hinges using metal thread screws.

**Handing**

Determine on site, prior to supply, the correct handing of hardware.

**Hinges (DPWS)**

Steel frame fixing: Recess flush and screw fix to a 150 mm x 45 mm x 6 mm mild steel reinforcing plate, welded to the back of the frame at each hinge point. Drill and tap the plate to receive stainless steel machine thread screws to suit hinges.

Aluminium frame fixing: Slot aluminium broad butt hinges into sections and fix with eight machine thread screws per hinge. Alternatively face fix SS broad butt hinges to aluminium frame with stainless steel machine screw fixing to backing plates secured at each hinge fixing point.

**Mounting height schedule**

<b>Furniture item</b>	<b>Height from finished floor ( mm)</b>
<b>Locksets And Latchsets:</b> Centreline of door furniture spindle, or of keyway if no furniture:	1000 mm
<b>Panic Exit Device:</b> Crossbar:	1000 mm
<b>Pull Handle (Aluminium Doors)</b>	Mount centrally over lock
<b>Deadlock:</b> Centre of cylinder where pull handle/push plate is also fitted:	1100 mm

**Door stops**

General: Fix on the floor, skirting or wall, as appropriate, to prevent the door or door furniture striking the wall or other surface.

**Floor springs**

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.

**6 COMPLETION****6.1 COMPLETION****Product warranties****Record documents**

Door hardware schedule: Submit an amended schedule, prepared by the door hardware supplier, showing changes to the contract door hardware schedule caused by

- the approval of a hardware sample;
- the acceptance of an equivalent to a specified proprietary item; or
- a contract variation to a door hardware requirement.

Key codes: Submit the lock manufacturer's record of the key coding system showing each lock type, number and type of key supplied, key number for re-ordering, and name of supplier.

**Maintenance manual**

General: Submit the manufacturer's published recommendations for use, care and maintenance.

**Keys**

Contractor's keys: Immediately before practical completion, replace cylinders to which the contractor has had key access during construction with new cylinders which exclude the contractor's keys.

Keys: For locks keyed to differ and locks keyed alike, verify quantities against key records, and deliver to the contract administrator at practical completion.

**Adjustment**

General: Leave the hardware properly adjusted with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.

Automatic door operators: Maintain and adjust the system throughout the defects liability period.

**Maintenance**

Automatic door operators: Submit the installer's proposal for continuing maintenance after completion on an annual renewal basis.

**7 HEIGHT OF FITTINGS AND FIXTURES, GENERAL**

<b>Item</b>	<b>Primary Students</b>	<b>Secondary &amp; all Staff</b>	<b>Remarks</b>
Coat hook top row	1200	1700	Staggered Hooks
Coat hook bottom row between rows 150 mm	900	1200	With min. clearance
Soap dispenser	1200	1200	Nominal height from bottom of dispenser
Soap holder	1200	1200	
Window winder	2100	2100	Max. Height
Toilet paper holder	700	800	Nominal height from bottom of holder
Towel rail	900	1000	Nominal
Paper towel dispenser		1500	Nominal height from bottom of dispenser

<b>LINING</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works..

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **lining** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Light Timber Framing, Insulation & Barriers, Suspended Ceilings and Tiling

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made of substrate or framing before installation of linings.

**Hold points**

As advised by the Principals Authorised Person

**3 MATERIALS AND COMPONENTS****3.1 MATERIALS AND COMPONENTS****Plasterboard**

WHEN PLASTERBOARD TO WALLS IS NOMINATED THE PLASTERBOARD MUST BE A MINIMUM OF 13 mm THICK up to door head height. Standard: To AS/NZS 2588.

**Impact Resistant Plasterboard**

Description: Purpose designed mesh-reinforced plasterboard to withstand a high degree of "soft body impact".

Standards: Generally to AS/NZS 2588

Thickness: 13mm

Sheet Density (nominal): 10.0 kg/m<sup>2</sup>

Edge finish: Recessed

Identification: Coloured face paper or stamped on back to identify that the plasterboard sheets are especially designed to be soft body impact resistant.

**Fibrous plaster sheet**

Standard: To AS 2185.

**Glass fibre plasterboard**

Standard: To AS 2590.

Fire resistant: Formulated for additional resistance to fire exposure.

**Fibre cement**

Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 4.5 mm.

**Tongue and groove boards**

Hardwood: To AS 2796.1.

Seasoned cypress pine: To AS 1810.

Australian grown conifers: To AS 1783.

**Plywood and blockboard**

Interior use: To AS/NZS 2270.

Marine plywood: To AS/NZS 2272.

Presealed plywood: Plywood presealed both sides and edges with a machine applied sealer.

Visible surfaces with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

**Hardboard**

Standard: To AS/NZS 1859.4.

Interior use generally: Standard hardboard Type GP.

Interior use heavy duty: Tempered hardboard.

Interior moisture area: Tempered hardboard.

Veneered hardboard: Standard hardboard Type GP with a timber face veneer bonded to one side.

**High pressure decorative laminate sheet**

Standard: To AS/NZS 2924.1.

**Particleboard**

Standard: To AS/NZS 1859.1.

**Fibre insulating board**

Standard: To AS 1859.5.

**Coated steel**

Coating class: Z200.

**Fasteners**

Steel nails: Hot dip galvanized.

**Adhesives**

Contact adhesives: To AS 2131.

For plasterboard: To AS 2753.

For wallboards: Mastic adhesive.

**Perforated Plasterboard Ceiling**

Type: 13mm thick recessed edge flush finish perforated plasterboard sheets.

Polyester fibre must be purpose designed as an acoustic ceiling blanket, NORMAL Polyester fibre wall thermal insulation is not acceptable.

Acoustic Blanket: Polyester fibre black liner purpose designed acoustic blanket manufactured from thermally bonded polyester.

- Standards: To AS 3742

- Finish: Black

**Corrugated Metal Ceiling Lining**

Type: Preformed steel corrugated perforated zincalume sheet and purpose made accessories forming part of a proprietary system to AS 1562.1

Finish: Prepainted and organic film/laminate products: To AS 2728, Category 3 or 4 as appropriate to all ceiling sheets/panels and metal trims.

Thickness: 0.40 mm (minimum) B.M.T. (Base Metal Thickness).

Sheet Depth: 7 mm (minimum).

Polyester fibre must be purpose designed as an acoustic ceiling blanket, NORMAL Polyester fibre wall thermal insulation is not acceptable.

Acoustic Blanket: Polyester fibre black liner purpose designed acoustic blanket manufactured from thermally bonded polyester.

- Standards: To AS 3742
- Finish: Black

#### **Rain Noise barrier**

Specification reference: SUSPENDED CEILINGS

#### **Fibre cement**

framed walls in toilets/showers areas to be lined with 9 mm fibre cement sheeting, flush joint finish (refer to natspec).

#### **Plywood and blockwood**

plywood wallboard lining must be TREATED to prevent the attack of termites, to as1604 & as2270.

MDF BOARD MUST NOT be used as a wall board lining

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## **4 EXECUTION**

### **4.1 CONSTRUCTION GENERALLY**

#### **Substrates or framing**

Before fixing linings check and, if necessary, adjust the alignment of substrates or framing.

#### **Register (ceiling grille)**

Specification reference: ROOFING – ROOF VENTILATORS

Minimum size: The width and breadth of the register (grille) must be equal to the diameter of the rotary ventilator throat. (eg 400 mm diameter rotary ventilator throat would require a 400 x 400 mm register).

#### **Battens**

Fix at each crossing with structural framing members, or direct to solid walls or ceilings. Provide wall plugs in solid backgrounds. Do not provide explosive powered fastenings.

#### **Ceiling linings**

Do not install until at least 14 days after the timber roof structure is fully loaded.

#### **Accessories and trim**

Provide accessories and trim necessary to complete the installation.

#### **Adhesives**

General: Provide adhesives of types appropriate to their purpose, and apply them so that they transmit the loads imposed, without causing discolouration of finished surfaces.

### **4.2 PLASTERBOARD LINING**

#### **Supports**

General: Install timber battens or proprietary cold-formed galvanized steel furring channels

- where framing member spacing exceeds the recommended spacing; and
- where direct fixing of the plasterboard is not possible due to the arrangement or alignment of the framing or substrate.

Transverse walls: Locate noggings

- at least 150 mm from the horizontal joint; or
- ensure that noggings do not protrude beyond the face of studs.

#### **Installation**

Gypsum plasterboard: To AS/NZS 2589.1.

Fibre reinforced gypsum plaster: To AS/NZS 2589.2.

Framed construction: Screw or nail or combine with adhesive.

Metal stud frames: Screw using galvanized self tapping screws, or retain using proprietary clamping straps and cover trims.

Masonry construction: Fix using adhesive direct to masonry, but do not fix direct to masonry as a substrate for tiled finish.

Suspended ceilings: Fix using screw or screw and adhesive to ceiling members.

To furring channels: Fix using screw or screw and adhesive.

#### **Joints**

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or otherwise provide back blocking.

External corner joints: Make joints over zinc-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a UPVC joining section.

Control joints: Install purpose-made zinc-coated control joint beads at not more than 12 m centres in walls and ceilings and to coincide with structural movement joints.

Wet areas: Install additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

### **4.3 FIBRE CEMENT LINING**

#### **Supports**

Install timber battens or proprietary cold-formed galvanized steel furring channels

- where framing member spacing exceeds the recommended spacing; and
- where direct fixing of the fibre cement is not possible due to the arrangement or alignment of the framing or substrate.

#### **Installation**

General: Run sheets across the framing members. In flush jointed applications, stagger end joints in a brick pattern and locate them on framing members, away from the corners of large openings. Provide supports at edges and joints.

Timber framed construction: Nail only or combined with adhesive.

Steel framed construction: Screw only or combined with adhesive.

Wall framing: Do not fix to top and bottom plates or noggings.

- In tiled areas: Provide an extra row of noggings immediately above wall-to-floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet.

Masonry construction: Fix using adhesive direct to masonry, but do not fix direct to masonry as a substrate for tiled finish.

Suspended flush ceilings: Fix using screw or screw and adhesive to ceiling members or support frame. Do not fix sheets to the bottom chords of trusses.

Ceilings and soffits: Provide battens where fixing to underside of rafters, roof trusses and purlins.

Wet areas: To AS 3740.

#### **Joints**

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

- Movement joints in walls: Position a stud parallel to the joint on each side.
- Movement joints in ceilings and soffits: Provide movement joints to divide ceilings into bays not larger than 10.8 x 7.2 m and soffit linings into bays not larger than 4.2 x 4.2 m or 5.4 x 3.6 m. Provide framing parallel to the joint on each side. Do not fix the lining to abutting building surfaces.

External corner joints: Make joints over zinc-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a UPVC joining section.

Control joints: Provide purpose-made zinc-coated control joint beads at 7.2 m maximum centres in walls and ceilings and to coincide with structural movement joints.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed perforated paper tape in bedding compound. Do not apply a topping coat.

- Movement joints: Space to suit joints required in tiling.



- Internal corners: Reinforce with zinc-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

#### 4.4 TONGUE AND GROOVE TIMBER LINING

##### Installation

General: Whenever possible provide single lengths of boards when installed horizontally. Provide single lengths only when installed vertically.

Stained or clear finished boards: Select board to give a random pattern. At corners return the same board to give a continuous grain pattern.

Fixing: Nail twice to each crossing except for secret nailed profiles.

Nailheads: Treat visible nailheads as follows:

- In stained or clear finishes: Drive flush.
- In opaque finishes: Punch below surface and fill flush with putty after the surface has been primed.

##### Joints

End grain joints: Install boards so that butt joints are in compression.

Internal corners: Scribe.

External corners: Mitre.

#### 4.5 TIMBER PANEL LINING

##### General

Installation: Set out in even panels with joints coinciding with framing members.

Fixing:

- Plywood and hardboard: Wallboard adhesive or pin fixed to timber frame, screw fixed to steel frame. Punch pin heads just below surface.
- Laminated plastic: Wallboard adhesive.

#### 4.6 CALCIUM SILICATE BOARD LINING

##### Material

Rigid low-density autoclaved calcium silicate board. Provide accessories, fastenings, adhesives, fillers and protective coatings.

##### Timber floor protection

Preparation: Ensure the timber floor is flat and smooth.

Under layer: Calcium silicate board. Lay the sheets butt jointed in a brick pattern (joints staggered in one direction). Fix to the floor with screws countersunk below the board surface, and stopped with a hard setting filler. Similarly fill edge and joint irregularities. Sand flush.

Upper layer: Autoclaved fibre cement flat sheet, thickness 6 mm. Lay the sheets in a brick pattern. Stagger the joints in the upper and under layers. Fix to the under layer with countersunk self-tapping screws and ceramic tile adhesive.

##### Metal stud frame protection

Lining: 9 mm thick calcium silicate board. Screw fix with butt joints to both sides of the frame through calcium silicate frame facing strips.

Core filling:

- For 60/60/60 fire resistance level: Mineral wool of minimum density  $23 \text{ kg/m}^3$ , 60 mm thick.
- For 120/120/120 fire resistance level: Two layers, each 30 mm thick, of mineral wool of minimum density  $100 \text{ kg/m}^3$ , placed with staggered joints.

##### Timber stud frame protection

Lining: Calcium silicate board in two 9 mm thick layers. Nail fix with butt joints to both sides of the frame. In walls up to 3 m high provide full height sheets without horizontal joints.

Clearance: Leave 12 mm gap between the top and outside edges of the linings and the adjacent surfaces. Fill the gap with vermiculite plaster. Similarly fill the joints in the first layer to at least 150 mm each side of the point where a joint in the second layer will cross.

##### Joints

Make butt joints true and flush. For single layer construction provide 6 mm thick cover strip on the rear face of the joint. For multi-layer systems stagger the joints in the inner and outer layers at least 100 mm.

**Access panels**

Maximum panel size: 1500 mm long x 750 mm wide.

Panel fixing: Fix to structure with masonry anchors. For single layer systems provide 75 x 25 mm battens of calcium silicate fixed to the structure.

**4.7 CEILING ACCESS****General**

Location: Provide personnel access ways to each separate ceiling space.

Material: Match adjacent ceiling.

Minimum opening size: 600 x 600 mm.

**Types**

Trimmed personnel access ways: Plain cover supported on all sides by timber trim fixed to underside of ceiling.

Flush personnel access ways: Cover fitted with rebated frame and set flush with the surrounding ceiling.

**4.8 TRIM****General**

Provide trim such as beads, mouldings and stops to make neat junctions between lining components, finishes and adjacent surfaces.

**Timber trim**

(i) one of the following ALTERNATIVE TERMITE RESISTANT TIMBER SPECIES OR preservative TREATMENTS AGAINST TERMITE ATTACK ARE TO BE USED FOR timber trim:

- WHITE CYPRESS PINE
- DURABLE CLASS 1 TIMBERS
- preservative treated timber to as1604.1 (class H2)

(ii) AUSTRALIAN INDIGENOUS TIMBER SPECIES ARE TO BE USED WHEREVER PRACTICABLE, WITH DUE REGARD TO SUITABILITY OF USE AND LOCATION IN PREFERENCE TO IMPORTED TIMBER SPECIES, IN ACCORDANCE WITH GOVERNMENT POLICY.

(III) delete REFERENCE to timber trim in natspec building template and include the following.

Seasoned hardwood: AS 2796.1

Durability class: 1

White Cypress Pine: AS 1810

Preservative treated timber: AS 1604.1 (class H2)

**Timber skirtings**

Location: At junctions of walls (other than ceramic tiled walls) with timber floors.

Fixing:

- Masonry: Fix to wall plugs.
- Stud walls: Fix to bottom plates.

**Partition trim**

Mouldings: Mitre and return partition mouldings at junctions with surfaces of the building structure.

Cornices: Finish tops of partitions which are not full height with a cornice moulding matching the partition sections, including end caps to partition posts where applicable.

Skirtings: Provide a proprietary skirting to the partition base, incorporating accessories including angle mouldings, stop ends, junction pieces and cut-outs.

Ducted skirtings: For wiring which cannot be carried within the partition cavity, provide ducted skirtings which match those of the permanent structure.

**4.9 CEILING SECURITY**

Description: Proprietary parallel interlocking steel structural panels system

Profile size: 300 x 50 x 1 mm thick.

Protective finish: Galvanized

Wall fixing angles: 50 x 50 x 3.2 mm thick steel

**Installation**

Screw fixing to ceiling structure.

Double screw fix using 2 mm thick large washers at maximum 600 mm centres to ceiling structure. Pop rivet fix to perimeter wall angles.

#### 4.10 WALL SECURITY MESH

Where additional security is required in timber framed buildings by fixing securely expanded metal mesh to designated stud walling prior the finishes lining.

Open Area: 85%

Nominal Size of Mesh: LWM: 100 mm

SWM: 50 mm

Nominal Strand Size: Width: 4.0 mm

Thick: 2.0 mm

Weight: 2.5 kg/sq.m.

#### 4.11 PINBOARD WALL LINING

PIN BOARD WALL LININGS ARE NOT TO BE USED IN PLACES OF PUBLIC ENTERTAINMENT (POPE) EG: PRIMARY COMMUNAL SPACE, SECONDARY MULTI-PURPOSE, GYMNASIUM OR PERFORMANCE WORKSHOP.

Bottom edge: Floor height (skirting fixed over face of board).

Top edge: Ceiling springing height 2700 mm maximum.

Extent: Shown on drawings.

Bottom edge: 900 mm.

Top edge: 2100 mm (nominally) level with top of door head.

Extent: Shown on drawings.

- Home base,

Bottom edge: Floor height (skirting fixed over face of board).

Top edge: 2100 mm (nominally) level with top of door head.

Extent: Shown on drawings. Do not install behind heaters.

#### ALTERNATIVE 1

THE pinboard wall lining described below is BASED ON a product produced by melded fabrics ("melcor"). this product has BEEN DESIGNED FOR USE IN SCHOOL BUILDINGS. Other proprietary pinboard wall linings that comply with the specification requirements described Below may also be acceptable.

##### Description

Commercial wall fabric facing bonded to a laminated polyethylene foam backing and adhered to a wallboard lining substrate (organic fibre board must not be used).

Thickness: 8.5 to 10 mm.

Weight: Approx. 780 gsm.

Width: 1220 mm.

Facing: Nylon/Polyester blended, non-woven.

Backing: Composite blend of layers of polyethylene, EVA foams and a polyester interlayer.

##### Impact-resistant substrate

Description: Non-combustible plywood wall lining. The plywood must be treated to prevent the attack of termites.

Thickness: 7.5mm

Ply: 5

Stress grade: F11

Standards:

To AS 2270

AS 1604, Hazard class H2

Identification: Each sheet of ply to be stamped on the back to identify that it has been treated to prevent the attack of termites to the appropriate Australian Standard.

##### Early Fire Hazard Indices

Each layer of the pinboard wall lining material (eg. facing, backing and plywood substrate board) must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

- Submit evidence of such compliance to the Person with Full Authority/Superintendent.
- Tested in accordance with AS 1530. 3 by a NATA or a NATA accredited testing laboratory and certified accordingly.

**Manufacture**

Requirement: The bonding of the fabric faced foam backed product to the wallboard lining substrates must be undertaken by the manufacturer prior to delivery, bonding of the materials must not be done on site.

Procedure: The fabric faced foam backing must be applied to the wallboard lining substrates by the manufacturer using the following method.

Water Based Adhesive:

- -All dust particles removed by mechanically operated brushes and vacuums.
- -Water based adhesive applied to substrate panel under controlled conditions to ensure total coverage.
- -Lay face fabric on substrate, ensure all edges are squared and trimmed.
- -Pressure rollers applied to cover the full width of the panel and are to travel for the length of the panel (to ensure even coverage of adhesive).
- -Each Panel placed in a Hydraulic Cold pressing machine for 120 minutes at pressures between 40 kg/m<sup>2</sup> - 65 kg/m<sup>2</sup>.
- -All panels to be quality inspected prior to delivery.

**Ordering**

Order and confirm delivery instructions with the supplier not less than 6 weeks prior to the date required.

**Fixing**

Fix the pin board wall lining (includes: fabric, foam & lining substrate) to the wall frame/masonry wall in accordance with the manufacturers recommendations.

Joints: Butt.

Exposed ends

- -Proprietary cover end caps

**Finish**

Colour: As nominated in the Schedule of Finishes.

**ALTERNATIVE 2**

THE pinboard wall lining described below is BASED ON a product produced by forbo floor coverings ("bulletin board"). this product has BEEN DESIGNED FOR USE IN SCHOOL BUILDINGS. Other proprietary pinboard wall linings that comply with the specification requirements described Below may also be acceptable.

**Description**

Linoleum wall facing pin/bulletin board with a high cork content adhered to a wallboard lining substrate (organic fibreboard must not be used as a substrate).

Thickness: 6 mm

Weight: 4.3 kg m<sup>2</sup>

Width: 1220 mm

Colouring: Full thickness of the board.

**Impact-resistant substrate**

Description: Non-combustible plywood wall lining. The plywood must be treated to prevent the attack of termites.

Thickness: 7.5mm

Ply: 5

Stress grade: F11

Standards:

To AS 2270

AS 1604, Hazard class H2

Identification: Each sheet of ply to be stamped on the back to identify that it has been treated to prevent the attack of termites to the appropriate Australian Standard.

**Early Fire Hazard Indices**

Each layer of the pinboard wall lining material (eg. facing, and plywood substrate board) must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

- Submit evidence of such compliance to the Person with Full Authority/Superintendent.
- Tested in accordance with AS 1530. 3 by a NATA or a NATA accredited testing laboratory and certified accordingly.

**Manufacture**

Requirement: The bonding of the linoleum wall facing pin/bulletin board product to the wallboard lining substrates must be undertaken by the manufacturer prior to delivery, bonding of the materials must not be carried out on site.

Procedure: The linoleum wall facing pin/bulletin board backing must be applied to the wallboard lining substrates by the manufacturer using the following method.

- Water Based Adhesive:
- -All dust particles removed by mechanically operated brushes and vacuums.
- -Water based adhesive applied to substrate panel under controlled conditions to ensure total coverage.
- -Lay face fabric on substrate, ensure all edges are squared and trimmed.
- -Pressure rollers applied to cover the full width of the panel and are to travel for the length of the panel (to ensure even coverage of adhesive).
- -Each Panel placed in a Hydraulic Cold pressing machine for 120 minutes at pressures between 40 kg/m<sup>2</sup> - 65 kg/m<sup>2</sup>.
- -All panels to be quality inspected prior to delivery.

**Ordering**

Order and confirm delivery instructions with the supplier not less than 6 weeks prior to the date required.

**Fixing**

Fix the Pin/Bulletin board wall lining (includes: linoleum wall facing Pin/Bulletin board & lining substrate) to the wall frame/masonry wall in accordance with the manufacturers recommendations.

Joints: Butt, V jointed.

**Finish**

Colour: As nominated in the Schedule of Finishes.

**ALTERNATIVE 3**

THE pinboard wall lining described below is BASED ON a product produced by autex fabrics. this product has BEEN DESIGNED FOR USE IN SCHOOL BUILDINGS. Other proprietary pinboard wall linings that comply with the specification requirements described Below may also be acceptable.

**Description:**

A proprietary commercial wall fabric facing bonded to a 100% polyester backing and adhered to a wallboard lining substrate.

Thickness: 10 to 12mm.

Felt weight (minimum): 1150 gsm

Total weight: (nominal): 1500 gsm.

Width: 1220 mm.

Facing:

- -100% non-woven polyester.

Backing: Needle punch polyester.

Bonding (between facing and pin substrate): Proprietary high bond webbed laminate.

**Impact-resistant substrate**

Description: Non-combustible plywood wall lining. The plywood must be treated to prevent the attack of termites.

Thickness: 7.5mm

Ply: 5

Stress grade: F11

Standards:

To AS 2270

AS 1604, Hazard class H2

Identification: Each sheet of ply to be stamped on the back to identify that it has been treated to prevent the attack of termites to the appropriate Australian Standard.

#### **Early Fire Hazard Indices**

Each layer of the pinboard wall lining material (eg. facing, backing and plywood substrate board) must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

- Submit evidence of such compliance to the Person with Full Authority/Superintendent.
- Tested in accordance with AS 1530. 3 by a NATA or a NATA accredited testing laboratory and certified accordingly.

#### **Manufacture**

Requirement: The bonding of the fabric faced polyester backed product to the wallboard lining substrates must be undertaken by the manufacturer prior to delivery, bonding of the materials must not be done on site.

Procedure: The fabric faced polyester backing must be applied to the wallboard lining substrates by the manufacturer using the following method.

Water Based Adhesive:

- -All dust particles removed by mechanically operated brushes and vacuums.
- -Water based adhesive applied to substrate panel under controlled conditions to ensure total coverage.
- -Lay face fabric on substrate, ensure all edges are squared and trimmed.
- -Pressure rollers applied to cover the full width of the panel and are to travel for the length of the panel (to ensure even coverage of adhesive).
- -Each Panel placed in a Hydraulic Cold pressing machine for 120 minutes at pressures between 40 kg/m<sup>2</sup> - 65 kg/m<sup>2</sup>.
- -All panels to be quality inspected prior to delivery.

#### **Ordering**

Order and confirm delivery instructions with the supplier not less than 6 weeks prior to the date required.

#### **Fixing**

Fix the pin board wall lining (includes: facing fabric, polyester pinning layer & lining substrate) to the wall frame/masonry wall in accordance with the manufacturers recommendations.

Joints: Butt.

#### **Finish**

Colour: As nominated in the Schedule of Finishes.

### **4.12 FIRE RESISTANT PLYWOOD**

#### **Type**

Impact resistant non-combustible plywood wall lining. The plywood must be treated to prevent the attack of termites.

Thickness: 9 mm.

Bond: Type C (white glue, interior)

Surface Grade: AC

Species: Hoop Pine (face, back and core veneers).

#### **Standards**

To AS 2270

AS 1604, Hazard class H2

Identification: Each sheet of ply to be stamped on the back to identify that it has been fire retarded and treated to prevent the attack of termites to the appropriate Australian Standards.

**Fire Retardant**

- Impregnation: Non-toxic, non-corrosive fire retardant chemical.
- Method: Full impregnation of face, back and core veneers by a pressure and vacuum process. The glue lines structure and appearance must not be adversely affected by the chemical process.

**Early Fire Hazard Indices**

- Tested in accordance with AS 1530. 3 by a NATA or a NATA accredited testing laboratory. Face back and core veneers must comply with the appropriate BCA fire indices and certified accordingly.
- Hand one copy of the certification to the Person with Full Authority/Superintendent.

**Manufacture**

Manufactured by a member of the Plywood Association of Australia and carry the relevant PAA stamp to substantiate grade and origin and manufacturer.

**Acoustic**

Where acoustic absorption is required, plywood to have 5 mm diameter holes at 12 mm centres and insulation.

**Treatment**

All treatment to the plywood (eg: fire and termite retardant impregnation) must be undertaken after the machining (eg: hole boring and edge machining).

**Performance Requirement**

Impregnation treatment must not adversely affect the long-term life of the ply or the drilling cutting and fixing characteristics of the material.

Moisture Content: 12% to 15% (impregnated ply).

Certification: Hand one copy of a manufacturers certification of compliance with the specified requirements and testing details to the superintendent.

**Insulation**

Type: Acoustic and thermal R4 duct liner insulation made from molten rock and recycled blast furnace material bonded with a thermosetting resin.

Thickness: 25 mm.

Weight: Nominal 1.5 kg/sq. m.

Facing: Black matt sprayed glass fibre tissue (BMF) with a flexible skin facing on underside.

**Finishing**

Finishing coats must be applied after machining (ie after perforations).

**Fixing**

Face Grain Direction: Vertical.

Joints: Butt edges tightly and lightly aris. Mitre external angles and scribe internal corners.

**4.13 FIRE RESISTANT PIN BOARD WALL LINING****Description**

Organic fire resistant fibreboard treated with a low-pressure fire retarded system and air-dried back to normal moisture content. The board to be faced with fire retarded commercial wall fabric facing.

- Thickness: 12.5 mm (nominal)
- Standards: AS 1859.5

Facing: Laminated to face, wrapped around long edges and returned along back of board for a minimum of 40 mm, the fabric is to be adhered and stapled to back of board to prevent de-lamination.

- 100% non-woven polyester.
- OR
- Nylon/Polyester blended, non-woven.

**Impact-resistant substrate**

Description: Non-combustible plywood wall lining. The plywood must be treated to prevent the attack of termites.

Thickness: 7.5mm

Ply: 5

Stress grade: F11

Standards:

To AS 2270

AS 1604, Hazard class H2

Identification: Each sheet of ply to be stamped on the back to identify that it has been fire retarded and treated to prevent the attack of termites to the appropriate Australian Standards.

Manufacture: Manufactured by a member of the Plywood Association of Australia and carry the relevant PAA stamp to substantiate grade and origin and manufacturer.

#### **Early Fire Hazard Indices**

Each layer of the pinboard wall lining material must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

- Submit evidence of such compliance to the Person with Full Authority/Superintendent.
- Tested in accordance with AS 1530.3 by a NATA or a NATA accredited testing laboratory and certified accordingly.

#### **Manufacture**

Requirement: The bonding of the fabric faced fibreboard product to the wallboard lining substrates must be undertaken by the manufacturer prior to delivery, bonding of the materials must not be undertaken on site.

Procedure: The fabric-faced fibreboard backing must be applied to the wallboard lining substrates using a water based adhesive by the manufacturer using the following method.

- Water Based Adhesive:
  - All dust particles removed by mechanically operated brushes and vacuums.
  - Water based adhesive applied to substrate panel under controlled conditions to ensure total coverage.
  - Lay face fabric on substrate, ensure all edges are squared and trimmed.
  - Pressure rollers applied to cover the full width of the panel and are to travel the full length of the panel (to ensure even coverage of adhesive).
  - Each Panel placed in a Hydraulic Cold pressing machine for 120 \*minutes at pressures between 40 kg/m<sup>2</sup> - 65 kg/m<sup>2</sup>.
  - All panels to be quality inspected prior to delivery.

#### **Ordering:**

Order and confirm delivery instructions with the supplier not less than 6 weeks prior to the date required.

#### **Fixing**

Fix the to the wall frame/masonry wall in accordance with the manufacturers recommendations.

- Joints: Vertical butt joint. Facing fabric wrapped along edges.
- End finishing and cut ends: Extruded proprietary PVC end caps to cover unwrapped ends

#### **Finish**

Colour: As nominated in the Schedule of Finishes.

#### **Certification**

Provide certification that the fire resistant pin board wall lining has been manufactured in accordance with the specification requirements.

#### **4.14 Removable panel (operable Wall/s)**

General: Provide a removable panel to allow access to the adjustable overhead track for each operable wall.

- Size (minimum): Length of operable wall x height of the track system.



**4.15 FIRE RESISTANT PIN BOARD WALL LINING**

Fire resistant pin board wall lining used in places of public entertainment (eg: primary communal area, secondary multi-purpose, gymnasium or performance workshop).

**Description**

Linoleum wall facing pin/bulletin board adhered to a wallboard lining substrate (organic fibreboard must not be used as a substrate).

Thickness: 6mm

Weight: 4.3 kgm<sup>2</sup>

Width: 1220mm

1830mm in some colours only

Colouring: Full thickness of the board.

**Substrate**

Description: Fire resistant plywood treated to prevent the attack of termites

Standards: To AS 2270

Thickness: 6.5mm

Ply: 5, F14

**Early Fire Hazard Indices**

Each layer of the pinboard wall lining material (eg. facing, and plywood substrate board) must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

- Submit evidence of such compliance to the Person with Full Authority/Superintendent.
- Tested in accordance with AS 1530. 3 by a NATA or a NATA accredited testing laboratory and certified accordingly.

**Manufacture**

- Requirement: The bonding of the linoleum wall facing pin/bulletin board product to the wallboard lining substrates must be undertaken by the manufacturer prior to delivery, bonding of the materials must not be carried out on site.
- Procedure: The linoleum wall facing pin/bulletin board backing must be applied to the wallboard lining substrates by the manufacturer using the following method.
  - Water Based Adhesive:
  - All dust particles removed by mechanically operated brushes and vacuums.
  - Water based adhesive applied to substrate panel under controlled conditions to ensure total coverage.
  - Lay face fabric on substrate, ensure all edges are squared and trimmed.
  - Pressure rollers applied to cover the full width of the panel and are to travel the for length of the panel (to ensure even coverage of adhesive).
  - Each Panel placed in a Hydraulic Cold pressing machine for 120 \*minutes at pressures between 40 kg/m<sup>2</sup> - 65 kg/m<sup>2</sup>.
  - All panels to be quality inspected prior to delivery.

**Ordering:**

Order and confirm delivery instructions with the supplier not less than 6 weeks prior to the date required.

**Fixing**

Fix the pin/bulletin board wall lining (includes: linoleum wall facing pin/bulletin board & lining substrate) to the wall frame/masonry wall in accordance with the manufacturers recommendations.

Joints: Butt, V jointed.

**Finish**

Colour: As nominated in the Schedule of Finishes.

## SUSPENDED CEILINGS

**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **suspended ceilings** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Lining, Insulation

**1.2 STANDARDS****General**

Suspended ceilings: To AS/NZS 2785.

**1.3 INTERPRETATION****Definitions**

Corridor supporting system: Suspended ceiling system in which primary support members occur only at walls. The ceiling, or ceiling plus secondary members, spans between the primary support members.

Demountable ceiling: The ceiling material may be removed from below by hand or by hand tools without damage to the system, and subsequently reassembled without the need for finishing.

Fully demountable ceiling: Any part or all of the ceiling is demountable.

Semi demountable ceiling: Only designated parts of the ceiling are demountable.

Suspension system: An assembly of ceiling components for suspending ceiling systems.

Supporting structure: The part or parts of the building to which the suspended ceiling system is attached.

Suspended ceiling system: A ceiling or external soffit and its suspension system, suspended from a supporting structure.

**Test types**

Site test: A test made on site of the installed suspended ceiling system.

Laboratory test: A test made in a laboratory on a test specimen certified to be a full scale model of the system.

Type test: A test previously conducted by or for the manufacturer on the type of system specified.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- The suspension system before installation of the ceiling panels or lining.
- Completed ceiling before site painting, if applicable.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Strength tests**

General: To AS/NZS 2785 Section 5.

External ceilings:

- Test load: Include for upper wind load.

**Fire resistance tests**

Reaction to fire (early fire hazard properties): To AS/NZS 1530.3.

Resistance to fire: To AS 1530.4.

**Acoustic properties tests**

Sound absorption: To AS 1045, ASTM C423 or BS EN 20354.

Airborne sound transmission:

- Sound transmission loss (laboratory measurement): To AS 1191.
- Field transmission loss (site measurement): To AS 2253.
- Ceiling normalized level difference: To AS/NZS 2499.

**2.3 SAMPLES****General**

Submit samples of the following as applicable:

- Ceiling material: Sheet, panel, tile and strip, with insulation, showing the extremes and mean of variation in colour, pattern, or texture of the proposed finish.
- Suspension: Sections proposed for suspension system, including wall angles and trim.
- Methods: Methods of jointing, fixing, height adjustment, retaining and removing panels.
- Accessories: Visible accessories including light fittings, diffusers, detectors, hatches and curtain tracks.

**2.4 PROTOTYPES****Sample installation**

General: Erect a prototype of each ceiling system, including at least one example of each of the specified components.

Size: At least 10 m<sup>2</sup>.

**2.5 SUBMISSIONS****Shop drawings**

Submit shop drawings showing the relevant details of the ceiling system including the following where applicable:

- Plan: Reflected plan of ceiling, showing ceiling grid and positions of lights, diffusers, hatches and service penetrations.
- Details: Large scale details of construction, suspension system, methods of assembly, trim and fixing, showing dimensions, clearances, and tolerances.
- Demountability: Methods of achieving demountability.
- Partition attachment: Method of attaching heads of partitions to the ceiling support members.
- Vibration reduction: Method of reducing contact vibrations between structure and ceiling.

- Calculations: Structural design calculations demonstrating the ability of the system to perform to requirements.
- Specification: Specification of material to be used, finishes to exposed members, corrosion protection, performance data of components and assemblies, and other pertinent information.

**Authorities**

Submit satisfactory evidence of the building regulatory authority's acceptance of the suspended ceiling system.

**Materials and components**

Fire resistance level: Submit the manufacturer's certification that the system has the required FRL.

Cutting strawboard panels: If cutting is unavoidable, submit details of the methods proposed for maintaining the integrity of the boards at cut edges.

**Installation**

Set-out: Submit proposed set-out indicating cut panels if any, before installation.

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**3 MATERIALS AND COMPONENTS**

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**3.1 SUPPORTS AND TRIM****Coated steel**

General: To AS 1397.

- Coating class: Z200 or AZ150 as applicable.

**Aluminum**

General: To AS 1866.

- Finish: Architectural quality.

**3.2 PANELS****Plasterboard panels**

Plasterboard: To AS/NZS 2588.

Glass fibre reinforced gypsum plasterboard: To AS 2590.

**Fibrous plaster tiles**

Standard: To AS 2185 with hard cast plaster face.

**Mineral fibre tiles**

Spun mineral fibres pressed together with mineral fillers and binders.

**Glass fibre panels**

Glass fibres, bonded with a thermosetting resin into rigid panels.

**Metal louvred panels**

Metal leaves or blades hung vertically on a concealed suspension system in an approved louvred pattern diffusing the superimposed lighting and producing a luminous ceiling effect.

**Steel strips**

Pressed or roll formed from galvanized steel sheet.

**Steel tiles**

Type: Trays pressed and perforated from zincanneal sheet with sides formed to locate securely in suspension system.

Insulation: A 25 mm thick mineral fibre batt, wrapped in sound-transparent paper, sealed to prevent staining, firmly packed into each tray but separated from the perforated face by a 6 mm spacer grid.

**Corrugated aluminium foil panels**

Aluminium formed into a transverse corrugated sheet.

**Aluminium strips**

Preformed from 5005 aluminium alloy coil strip.

**Aluminium tiles**

Pressed from aluminium sheet, perforated and suitably backed to give the required acoustic and other performances.

**Aluminium screen panels**

Type: Preformed from 5005 aluminium alloy.

Blade design: Width 100 mm, with 9.5 mm deep V-shaped ribs roll formed along both longitudinal edges.

**Wood fibre tiles**

Pressed from wood fibre, waterproofing agents and binders.

**Wood wool panels**

Standard: To BS 1105.

Type: Wood wool fibre and cement binders compressed into rigid lightweight panels.

**Strawboard panels**

General: Selected wheaten straw compressed and bonded to form a slab, and bound with non-ferrous or galvanized steel wires, stitched together through the panel, restraining the straw from sagging or loosening when the panel is installed.

Panel treatment: Incorporate the following:

- Treatment to prevent infestation by vermin, including rodents.
- A fungicide or other means to inhibit mould growth.
- Flame retardant treatment if necessary.

**Compressed strawboard panels**

Standard: To BS 4046.

Type: Selected chopped straw fibre compressed under high pressure and heat between two stout kraft liners.

**Plywood panels**

Standard: To AS/NZS 2270.

**Selection**

Select a proprietary acoustic ceiling from the following ceiling applications.

**Corrugated Metal Ceiling Lining**

Type: Preformed steel corrugated perforated zincalume sheet and purpose made accessories forming part of a proprietary system to AS 1562.1

**OR**

Type: Proprietary perforated and roll formed mini corrugated steel zincalume sheet and purpose made accessories forming part of a system to AS 1562.1.

- - Furring/fixing system: Proprietary black matt finished universal carrier rails or furring system. Check with the manufacturer for recommended spacings, spans and general fixing requirements for specific locations.
- - Panel length: Manufactured to requirement
- - Panel fixing: Concealed.
- - Wall trims: Cold rolled steel angles, colour finish to match ceiling panels, fixed to walls at 600 mm centres.

**General**

Finish: Prepainted and organic film/laminate products: To AS 2728, Category 3 or 4 as appropriate to all ceiling sheets/panels and metal trims.

Colour: Refer to Colour Schedule.

Thickness: 0.40 mm (minimum) B.M.T. (Base Metal Thickness).

Sheet Depth: 7 mm (minimum).

Polyester fibre must be purpose designed as an acoustic ceiling blanket, NORMAL Polyester fibre wall thermal insulation is not acceptable.

Acoustic Blanket: Polyester fibre black liner purpose designed acoustic blanket manufactured from thermally bonded polyester.

- - Standards: To AS 3742
- - Finish: Black

**Linear Metal Ceiling Lining**

Type: Linear metal ceiling lining - school series.

Finish: T.S.A. Polar White, 5% gloss.

Thickness: 0.3 mm B.M.T., 0.39 mm T.O.T.

Perforations: >

Total open absorption area: >

**IMPACT RESISTANT LOCK CLIPS ARE REQUIRED IN LOCATIONS WHERE THERE IS RISK OF DAMAGE TO CEILINGS, DUE TO IMPACT.**

Impact Resistance: Lock clip to strengthen panel carriers.

Acoustic Blanket: Polyester fibre black liner purpose designed acoustic blanket manufactured from thermally bonded polyester.

- Standards: To AS 3742
- Finish: Black

Installation: Installed in position and secured to prevent movement by wind currents within the roof space.

**Perforated Plasterboard Ceiling** Type: 13mm thick perforated plasterboard sheets.

- Plasterboard: To AS/NZS 2588
- Suspended ceilings:
  - To AS 2785
  - Concealed suspended ceiling grid.

Acoustic Blanket: Polyester fibre black liner purpose designed acoustic blanket manufactured from thermally bonded polyester.

- Standards: To AS 3742
- Finish: Black
- Absorptive ceilings:
- Highly absorptive ceiling:

#### **Rain Noise Barrier**

13mm plasterboard noise barrier to be incorporated into the absorptive and highly adsorptive design for the above locations.

#### **Absorptive Ceiling, non dust catching**

##### **Alternative 1**

Type: Fire resistant proprietary acoustic impervious ceiling panels with a high density, resin bonded insulation with primed edges and a white microporous painted surface specially designed for use in hygienic locations. The surface must be capable of being cleaned on a regular basis with a damp cloth or sponge.

Size (nominal): 1200 x 600 x 20mm thick or 600 x 600 x 20mm thick.

Installation: The panels are to be installed in a proprietary corrosion resistant grid suspension system in accordance with the manufacturers printed instructions. Provide accessories and trim to complete installation.

Seal between panels and back face of grid with a silicone sealer. Leave two panels near entrance to room unsealed for access above ceiling.

Provide openings for, and fit the ceiling system up to, service elements such as light fittings and ventilation grilles. Seal or penetrations with a impervious joint sealing compound

Cut edges must be resealed with an impervious compatible edge sealer.

Ceiling clips: Proprietary compatible anti lift ceiling clips. Clips are to be evenly configured in accordance with the manufacturers printed instructions.

NRC: >85

Weight including grid system (nominal): 3 – 4kg/m<sup>2</sup>

Colour: White

Ordering: Order and confirm delivery instructions with the supplier not less than 6 weeks prior to the date required.

**OR**

**Alternative 2**

Type: Fire resistant proprietary acoustic impervious ceiling panels with a high density, resin bonded insulation with primed edges and a white microporous painted surface specially designed for use in hygienic locations. The surface must be capable of being cleaned on a regular basis with a damp cloth or sponge.

Each tile to have a small bevels on all edges and machined to provide a tongue and grooved joints.

Size (nominal): 600 x 600 x 20mm thick.

Installation: The panels are to be adhered directly to the soffit surface in accordance with the manufacturers printed instructions. Provide accessories and trim to complete installation.

Adhesive: Special proprietary compatible acoustic adhesive as recommended by the ceiling tile manufacturer.

Substrate: Must be smooth, clean, dry and free from any substance on the surface likely to affect adhesion. Carry out adhesion tests prior to installing ceiling panels. Provide openings for, and fit the ceiling system up to, service elements such as light fittings and ventilation grilles. Seal or penetrations with a impervious joint sealing compound

Cut edges must be resealed with an impervious compatible edge sealer.

NRC: >85

Weight including grid system (nominal): 3kg/m<sup>2</sup>

Colour: White

Ordering: Order and confirm delivery instructions with the supplier not less than 6 weeks prior to the date required.

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**4 EXECUTION****4.1 CONSTRUCTION GENERALLY****Proprietary systems**

Provide suspended ceilings as complete proprietary systems, each fabricated by one manufacturer and installed by a specialist installer of demonstrated capacity.

**Early fire hazard**

Do not provide materials which, when subject to fire conditions, emit excessive smoke or dangerous fumes.

**Protection**

Protect existing work from damage during the installation.

**Ceiling grid**

General: Set out the ceiling grid so that panel joints and centrelines of visible suspension members coincide with grid lines shown on the drawings. If not otherwise shown, set out so that opposite margins are equal.

Pattern and texture: Set out patterned or heavily textured materials to give consistency in direction of pattern or texture.

Special sized panels: Provide special sized purpose-made panels to fill non-standard margins, openings and penetrations.

**Cut tile edges**

Conceal, or finish to match prefinished edges.

**Stability**

Install the ceilings level; and fix so that under normal conditions there is no looseness or rattling of ceiling components.

**Pressurised plenum systems**

Air distribution: Incorporate a suitable method of distributing air evenly from the plenum above the ceiling to the space below, either through the panel or through the support grid.

Rate of flow: Incorporate slotted members with sliding closers, or an equivalent means of varying the rate of flow.

**Structure-borne sound**

Provide a ceiling system which does not amplify structure-borne sound. Provide suitable means of reducing contact vibrations between structure and ceiling.

**Luminaires**

Fit luminaires within the ceiling grid system to ensure that distortion, overloading or excessive vertical deflection is prevented. Support luminaires on the ceiling primary grid members.

**Partitions**

Where partitions are attached to the underside of the ceiling systems include the partition weight in the seismic mass of the ceiling.

**4.2 SUPPORTS INSTALLATION****Support members**

General: Space the support members as required by the loads on the system and the type of ceiling, and allow for the installation of services and accessories, including ductwork, light fittings and diffusers. Provide additional back support or suspension members for the fixing of such items. Do not use screw fasteners in tension.

Services: Do not suspend from services (e.g. ductwork) unless the service has been designed to accept the ceiling load. In locations where services obstruct the ceiling supports, provide bridging and suspension on each side of the services.

Grid members: If required, notch grid members at the junction with the perimeter trim to ensure the panels lie flat on the perimeter trim.

Fixing to steel:

- General: Do not use screw fasteners in tension.

Fixing to concrete:

**Suspension system**

Height adjustment: Provide height adjustment by means of a length adjustment device at each suspension point, permitting length variation of at least 50 mm. Do not attach the suspension system to the lip of purlins.

Failure: Provide a ceiling system such that failure of any one suspension point does not cause a progressive failure of the ceiling.

**Bracing**

Provide bracing to prevent lateral movement and to resist the imposed horizontal seismic force.

**Fasteners**

Install fasteners so that they are not visible in the finished ceiling. Do not use screw fasteners in tension.

**Bulkheads**

Construct bulkheads and other similar ceiling formations as an integral part of the ceiling structure. Brace bulkheads to prevent lateral movement. Provide for seismic requirements where the ceiling is terminated at a bulkhead.

**External suspended soffits**

Support external suspended soffits on rigid strutting members capable of carrying the imposed loads. Install downstrutting members to minimise any eccentricity, and ensure that the upward and downward wind loads are carried through to the supporting structure.

**Prefinishes**

Repair damaged prefinishes by recoating.

**Movement joints**

Provide control joints in sheet finishes as required in the *Lining* worksection.

Alignment: Install the ceiling with control joints to correspond in location and direction to those in the structural frame. Do not bridge any control joint in the structural frame with the ceiling.

Abutments: Install the ceiling to allow for differential movement with abutting surfaces.



### 4.3 PANELS INSTALLATION

#### General

General: Fit panels accurately and neatly, free from air leakage and staining. Provide additional support and bracing to panels which are required to carry dead loads other than the panel's own weight.

Panel lock clips: Where panels are exposed to wind loads or where required for security, insert panel lock clips at the junction of carrier rails and panels.

**Register (ceiling grille)** Specification reference: ROOFING - ROOF VENTILATORS

Minimum size: The width and breadth of the register (grille) must be equal to the diameter of the rotary ventilator throat. (eg 400 mm diameter rotary ventilator throat would require a 400 x 400 mm register).

#### Control joints

Location: Provide for control joints in sheet finishes where required by the *Lining* section. Where possible, position joints to intersect lighting fixtures, vents or air diffusers.

Movement joints: Form movement joints with purpose-made control joint beads.

#### Accessories and trim

General: Provide accessories and trim necessary to complete the installation.

Trim: Provide trim at junctions with other building elements and surfaces, such as walls, beams and penetrations, consistent with the style, materials and finishes of the ceiling system generally.

Plasterboard trim: Provide purpose-made corner beads, casing beads and stop beads.

#### Service penetrations

Provide openings for, and fit the ceiling system up to, services elements such as light fittings, ventilation outlets, detectors, sprinklers and loudspeakers.

#### Aluminium screen panels

Blade suspension system: Suspend blades vertically at 100 or 150 mm centres from the carrier rails of a proprietary suspension system from the same manufacturer. Leave 20 mm space between end junctions of panels not in single lengths.

#### Corrugated aluminium foil panels

Suspend from a visible aluminium support bar system from the same manufacturer.

#### Aluminium strips

Set out: Parallel linear pattern at 100 mm centres, butt jointed at ends with purpose-made concealed sleeve sections.

Fixing: Fix strips to a proprietary suspension system from the same manufacturer, incorporating carriers to receive the strips, preformed from 5005 aluminium alloy 1 mm thick.

Insulation: Lay 25 mm thick blankets of fibreglass insulation, black faced on the underside, treated to prevent fibre migration, continuous above the ceiling strips.

#### Curtain recesses

General: Provide curtain recesses as part of the ceiling system, including the provision of supporting brackets for curtain tracks.

Curtain tracks: Provide curtain tracks, including end stops and runners.

#### Non-demountable ceilings

General: Provide access panels supported and anchored to permit ready removal and refixing.

#### Finish

Match the ceiling panels in appearance and performance.

#### Reinforcement

Reinforce the back of the access panel to prevent warping and facilitate handling.

#### Identification

Provide each access panel with an identification mark.

**5 COMPLETION**

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**5.1 COMPLETION****Maintenance manual**

On completion, submit a manual of recommendations for the care and maintenance of the ceiling, and operating instructions for demounting if applicable.

**Spares**

General: Supply spare matching tiles and accessories of each type for future replacement purposes. Store the spare materials on site where directed.

Tiles, panels, strips: One spare unit for every 50 units (or part thereof) installed in the ceiling.

Supporting system: One spare supporting member (hanger or framework member) for every 100 members (or part thereof) of the same type installed in the ceiling.

<b>PARTITIONS</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **partitions** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Light Steel Framing, Glazing, Lining, Doors and Insulation

**1.2 INTERPRETATION****Definitions**

**Fully demountable partitions:** Dry construction is used such that components can be demounted without damage using small hand tools, and subsequently reassembled within the dimensional limitations of the original system without cutting, trimming or refinishing. The method of attachment to the original structure must cause no surface damage, requires only minor local refinishing after demounting and leaves no permanent depression on the floor covering.

**Semi-demountable partitions:** The major components (e.g. frame and panels or linings) may be demounted without damage and reassembled within the dimensional limitations of the original system without cutting or trimming. Surface refinishing or rejoining, or new minor components such as fixings or jointing materials, may be required.

**Non-demountable partitions:** Wet construction methods may be used for assembly and jointing.

**Non-demountable partitions, removable panels:** A non-demountable system in which certain designated panels are demountable and re-useable without damage except for accidental damage to surface finish.

**Frameless partitions:** The panels (including glazed panels) are joined at their edges by an edge jointing system (e.g. splines, tongues and grooves, adhesive jointing), are fixed to the building structure at head and foot, and themselves provide the necessary resistance to external forces.

**Partly framed partitions:** Structural frames occur only at designated locations, e.g. at doorways, or as glazing mullions; otherwise frameless.

**Fully framed partitions:** Each partition panel, or the partition lining is supported by a separate structural frame.

**1.3 PERFORMANCE****Strength and stability**

Provide partitions which, under normal conditions of use (including the slamming of doors), remain stable and do not show signs of deflection, permanent deformation, or rattling.

**Imposed loads**

Criteria: Provide a partition system

- which will support imposed dead loads, seismic loads, wind loads, including designated eccentric loads (e.g. loads on attached shelves or brackets); and
- in which deflection induced in the partition will not exceed:
  - . The lesser of H/240 or 30 mm for partitions subjected to wind loads and lined with a flexible cladding.
  - . The lesser of H/360 or 20 mm for partitions subjected to wind loads and lined with a brittle material.
  - . H/500 for eccentric loads.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made of framing before installation of lining.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Pressure resistance**

Type tests: Type test the partition system to demonstrate that it is capable of withstanding the uniformly distributed load normal to the plane of the partition without permanent deformation or damage, and that framing members supporting panels so loaded do not deflect more than that specified under the **Performance** clause.

**Impact resistance**

Glazing partitions:

- Type tests: Type test the partition system to demonstrate that it withstands impact at the specified energy level without permanent deformation, damage, failure of fastenings and the like, and in which door stiles do not deflect more than H/180 where H is the overall height of the partition.
- . Test method: Use the apparatus and procedure of the shot-bag test of AS/NZS 2208, Appendix D.

Lightweight partitions:

- Type tests: Type test the partition system to demonstrate that it withstands impact at the specified energy level without permanent deformation, damage, failure of fastenings and the like, and in which door stiles do not deflect more than H/120 or 30 mm, whichever is the lesser, and where H is the overall height of the partition.
- . Test method: Use the apparatus and procedure of the sand-bag test of ASTM E695.

**Sound ratings**

Type tests: Type test the partition system to demonstrate that it attains the required weighted sound reduction index ( $R_w$ ) rating.

- Test method: To AS/NZS 1276.1.

Type test partitions: Include each of the panel types including, if applicable, glazed panels, plenum baffles and doorsets.

Site tests: Site test the partition system to demonstrate that the specified site test rating has been attained for designated partitions and required extensions above the suspended ceiling level.

- Test method: To AS/NZS 1276.1.

**Fire resistance level**

Type test: Type test the partition system, including required extensions above suspended ceiling level, to demonstrate that it has attained the specified fire resistance level.

Test method: To AS 1530.4.

### 2.3 SAMPLES

#### General

Submit samples of the following where applicable:

- A sample, at least 300 mm square, of each panel type, including doors, and each panel finish type.
- Samples at least 100 mm long of each structural section, including posts, sills, transoms, door frames, ceiling channels and metal channel headrails, and each moulding, cover strip and bead.
- Skirting, skirting duct, skirting duct stop ends, returns and removable covers.
- Floor and ceiling fixings and adjustments.
- Door hardware specified generically.

### 2.4 PROTOTYPE

#### General

Extent: Erect a prototype of each partition system specified, including at least one example of each component in the system.

### 2.5 SUBMISSIONS

#### Subcontractors

Submit name and contact details of proposed manufacturers and installers.

#### Shop drawings

Submit shop drawings of each partition system, showing the following details and associated information where applicable:

- Partition layout.
- Partition elevations to a scale of 1:50 showing the partition grid and panel types.
- Large scale details of construction methods of assembly, trim, jointing and finishing.
- Door frame details.
- Methods of fixing partitions and linings.
- Glazing methods.
- Methods of achieving demountability.
- Dimensions, clearances, tolerances.
- Specification of materials and finishes.
- Performance data of components and assemblies.
- Method of providing reticulation of services, access to services, and service outlets.

#### Installation

Setting out: Submit proposed set-out.

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## 3 MATERIALS AND COMPONENTS

### 3.1 MATERIALS AND COMPONENTS

#### Coated steel

Coating class: Z200.

Mild steel panel facings and trim: A factory-applied high performance pigmented organic coating of minimum thickness 40 µm.

#### Aluminium

Framing members: Alloy 5005.

#### Metal fittings and hardware

Stainless steel surfaces: Satin self finish.

Bright finished copper alloy surfaces: Clear lacquer.

Other surfaces: Chromium plate.

#### Recoating

Provide prefinishes which do not require site recoating either before or after installation.

**Fire hazard**

General: Do not provide materials which, when subject to fire conditions, will emit excessive smoke or dangerous fumes.

**3.2 PARTITION PANELS****Solid core panels**

Standard grade particleboard with facings on both sides.

**Cell core panels**

Cellular core flush doors to AS 2688 with facings on both sides.

**Composite panels**

Two panels separated by an air space, each panel composed of several layers adhesive bonded together, as follows:

- A facing layer of plywood, hardboard, or the like.
- A core of plasterboard or organic fibreboard, or both.
- An inner layer of lead sheet.

**Laminated plasterboard panels**

Four layers of square-edge plasterboard bonded together, as follows:

- Two core sheets applied vertically between top and bottom fixings, with the long edges staggered to interlock.
- One facing sheet on each side, applied horizontally and flush jointed.

**Steel sandwich panels**

Steel sheet laminated to both sides of a core of self extinguishing grade polystyrene or 12 mm thick compressed fibre cement sheet.

**Framed steel panels**

Cold rolled furniture steel sheet, spot welded to a steel channel frame, stiffened internally, and with the internal space filled with an inorganic core filler.

**Fibre cement panels**

General: Proprietary flat sheet, smooth sanded on one face.

Panels framed at edges only: Autoclaved high density, at least 9 mm thick.

**Fibre cement panel, safety shower**

General: Proprietary flat sheet, sanded to smooth finish to both faces. Panels to be framed at edges

Type: Autoclaved high density.

Thickness (minimum): 9mm

**4 EXECUTION****4.1 CONSTRUCTION GENERALLY****Preparation and protection**

Preparation: Prepare the base to receive the partitions. If fixing partitions on carpet, fix bottom track over polyethylene film.

Protection: Protect existing work from damage during the installation and make good any damage. Provide temporary coverings if necessary.

**Set out**

General: Set out the partitions so that the partition grid, as expressed in panel joints and centrelines of frame members, coincides with the ceiling grid and the building grid, as applicable.

Misalignment (of adjoining surfaces at grid junctions): 1 mm maximum.

Deviation (from true grid lines and planes): 1:1000 up to 3 mm maximum.

Panel thickness: + 1 mm maximum, - 0.

**Installation**

General: Install the partitions plumb, level, on their correct alignments, and firmly fixed.

Building movements: Provide clearances or movement joints so that partitions are not damaged by structural building movements such as long term slab deflection. Where fire resistance or acoustic properties are specified provide a resilient foam or mastic seal having properties equal to those required for the partition.

**Fixing**

General: Conceal fixings. For demountable items provide fixings capable of being repeatedly removed and replaced without damage to finishes.

Fixing to masonry: Provide expansion type masonry anchors. Do not provide explosive-driven fastenings.

Fixing to suspended ceilings: Provide adequate top support to the partition without damage to the ceiling components.

**Exposed joints**

Hairline: Edges sharp, square and in continuous contact.

Shadowline: Edges bevelled, chamfered or splayed to 1 mm maximum radius, and in continuous contact.

**Fully demountable partitions**

Height adjustment: Provide a suitable height adjustment device in fully demountable systems, designed to minimise the permanent marking of building surfaces, and to permit height adjustment of the partition whilst remaining in contact with the floor.

**Acoustic installations**

General: Preserve the sound reduction properties of  $R_w$  rated partitions by sealing flanking sound transmission paths during installation, including junctions between partitions and other building surfaces, air gaps around doorsets, recesses, such as pelmets and blind boxes and cut-outs for services. Avoid cut-outs next to or back-to-back with each other.

Sealing methods: Use appropriate sealing methods, such as purpose-made solid profiled inserts, durable resilient gaskets or closed cell foam strips. Provide solid resilient materials in preference to foamed materials whenever possible.

Identification: Mark panels with a stamped or engraved code mark or equivalent means of identification, placed in an inconspicuous but accessible position.

**4.2 METAL FRAMES****Type**

Proprietary non-load-bearing partition wall framing system comprising cold formed steel or extruded aluminium members, or both.

**Additional support**

Provide additional support in the form of noggings, trimmers and studs for fixing hardware, fixtures and fittings. Box studs to frame door openings, and provide additional top support independent of the ceiling, where the studs are fixed to the underside of an exposed grid ceiling.

**Control joints**

Provide for control joints in sheet finishes where required by the structural frame or the *Lining* worksection.

**Erection**

Fix bottom plates at 600 mm maximum centres generally, and 100 mm maximum from ends. Provide adequate top support by fixing the top plate to the ceiling structure or slab soffit, or stabilise the partition by lapping and fastening intersecting or butting plates together. Fix studs to the bottom plates at door frames, corners and intersections with self-tapping screws, not with pop rivets or crimping.

**Stud spacing**

Space the studs as required by the lining, but in any case at 600 mm maximum centres.

**Bracing**

Independently brace the partition if sufficient bracing is not provided by the building structure.

**Splicing**

Splice plates at ends to maintain continuity and alignment.

**Fastening**

Assemble the frames at door openings with self-drilling self-tapping screws or with blind rivets.

**Service holes**

For services within the partition provide either factory precut flared holes, or site cut holes punched or drilled on the centreline of the member. Provide proprietary plastic

bushes or grommets to site cut holes. Where service holes cut on site exceed  $D/3$  provide additional strengthening to the member. D is the depth of the member.

#### 4.3 SERVICES RETICULATION

##### General

Conceal reticulation of associated building services, either within cavities in the partition structure, or within ducted skirtings supplied as part of the partition system, or both.

##### Access

Provide removable or demountable components of the partition system, for access to services concealed within partition cavities.

#### 4.4 TOILET AND SHOWER CUBICLES

##### Type

Proprietary cubicle systems complete with doors and hardware.

##### Suspension beam

For suspended systems provide a suspension beam consisting of a mild steel channel, located immediately above the ceiling framing along the line of the partition fronts. Build the ends into masonry structure or provide end fixings to the structure as necessary to transfer the load. Drill the bottom flange of the channel for the partition fixing bolts.

##### Metal system

Panels (including doors): Zincanneal steel sheet cemented to both sides and visible edges of a sound deadening core, finished with a factory applied primer, filler and surface coating.

Panel thickness: Divisions and doors 24 mm; fronts and nibs 30 mm.

##### Compressed fibre cement system

Panels: Factory prefinished double faced autoclaved high density fibre cement sheets with square stone cut edges ground smooth and arrised.

Panel thickness: Divisions 18 mm; fronts 24 mm; shower seats (where required) at least 18 mm.

Doors: Solid core flush doors to AS 2688.

- Core: Either high moisture resistant particleboard to AS/NZS 1859.1, or exterior plywood.
- Finish: Either selected face veneers with matching strips, or faced on all surfaces with laminated sheet to AS/NZS 2924.1.

##### Laminated plastic system

Panels (including doors): A core of high moisture resistant particleboard to AS/NZS 1859.1, faced on visible surfaces with 1.3 mm post forming laminated plastic sheet to AS/NZS 2924.1, factory formed into one-piece divisions and fronts with a 50 mm radius cove at the T junction.

Panel thickness (minimum): Divisions 18 mm; fronts, nibs and doors 25 mm.

##### Installation

Suspended fronts: Hang the fronts from a suspension beam with galvanized mild steel M10 bolts and attachments, incorporating a means of height adjustment, supplied as part of the system.

Floor mounted fronts: 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.

Assembly fixings: Attach divisions and nibs to walls and fronts with purpose-made proprietary fixings.

Fixing shower seats: Anodised aluminium channel to exposed edge, secured to walls at each end.

##### Door hardware

Spring hinges (hold open or hold closed) and indicator catch.



**4.5 PLENUM BAFFLES****R<sub>w</sub> rated partitions**

Except where a suspended ceiling of equivalent R<sub>w</sub> rating is to be provided, either extend the partitions to the soffit of the structural slab above, or provide plenum baffles. The ceiling and baffle to provide a combined rating equivalent to the partition rating.

**Fire rated partitions**

Except where a suspended ceiling of equivalent fire resistance is to be provided, either extend fire resistant partitions to the soffit of the structural slab above, or provide plenum baffles of equivalent fire-resistance.

**Baffles**

Install plenum baffles so that they fit closely up to the surfaces of the building structure, service ducts, pipes and conduits and to the top of the partition or to the top of the suspended ceiling structure directly above the line of the partition. Seal the joints, penetrations and intersections with a suitable material so that the required performance is maintained.

**Materials**

Plasterboard: Plasterboard sheets bonded together (if more than one layer).

Impregnated vinyl: Lead impregnated vinyl sheeting hung as a curtain from the slab soffit.

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**5 COMPLETION****5.1 COMPLETION****Installer's warranty**

General: Submit the installer's warranty against defective materials and workmanship for a minimum period of 10 years.

**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 component

<b>OPERABLE WALLS</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **operable walls** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Partitions

**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Overhead tracks installed before dividers hung.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Weighted sound reduction index**

Type test operable room dividers required to have a particular weighted sound reduction index ( $R_w$ ) rating, to AS/NZS 1276.1.

**2.3 SAMPLES****General**

Submit 2 samples of each of the following where applicable:

- Sections proposed to be used for frames, louvres and slats.
- Joints made by proposed techniques.
- Finishes to prepared surfaces.
- Colour range samples from prefinished production material (e.g. anodised or organic coated extrusions and sheet). When the colour selection has been made, submit 5 sets of samples showing the colour range.
- Divider manufacturer's standard hardware items.

**2.4 SUBMISSIONS****Subcontractors**

Submit names and contact details of proposed suppliers and installers.

**Shop drawings**

Submit shop drawings showing details of each assembly, component and connection and information relevant to fabrication, surface treatment and installation.

**3 COMPONENTS****3.1 OPERABLE ROOM DIVIDERS****General**

Type: Proprietary system comprising an overhead track and carriages supporting doors or panels which are linked, or can be linked, to provide a complete partition-type enclosure within defined limits, and which may be opened by sliding and stacking to the side or sides of the opening, inclusive of the manufacturer's standard operating gear, hardware, and accessories necessary for satisfactory performance.

Edge strips: Provide solid timber edge strips to the stiles of timber veneered room dividers.

- Thickness: 6 mm, minimum.

**3.2 FOLDING DOORS****Divider type**

Folding door: Centre-hung door panels hinged together, stacking by sliding and pivoting.

**3.3 ACCORDION DOORS****Divider type**

Accordion door: Double-walled divider in which the walls comprise a twin row of paired folding door panels, or equivalent paired folding walls of flexible material attached to a pantograph frame, the pairs linked together at the centre and suspended from the point of linkage.

**Proprietary Items**

Indeng Ltd, HUF COR Series 3800

Modernfold "Soundmaster 8"

Unifold "Soundguard 40"

Bluett and Swann Folding Walls Pty. Ltd., Model BS40

Type: Accordion Doors.

Door Arrangement: Floating.

Folding Door Panels:

Panels: 200 mm wide, arranged in a twin row, accordion configuration.

Facings: Vinyl bonded with high peel-strength plastic glue.

Vibrating Damping Material: Install on inner surface of each panel.

Suspension System: Support track from a vertical acoustic baffle in the ceiling void all in accordance with manufacturers recommendations.

Construction Tolerances:

- Floors shall be level in the path of the partition with a tolerance of no more than +/- 6 mm in 3000 mm and shall include a smooth faced threshold strip.
- Jambs shall be plumb. The max. variation in opening width shall be +10 mm. Track shall be adjusted and levelled at installation.

Operation: Partitions shall be top-supported manually operated doors. When fully extended and locked the Accordion Door shall provide a complete sound retardant closure of the opening and be laterally stable.

Stacking Arrangement: In areas nominated on the drawings.

Track material: Anodised extruded aluminium overhead track.

Carriages wheels: Two steel rimmed ball bearing, nylon tyred wheels installed to each module.

Warranty: The accordion doors shall be fully guaranteed by the manufacturer against defects in workmanship or materials for a period of 12 months from the date of installation.

Sound Rating:

Sound transmission class (STC) to AS 1276: 38

Accessories And Trim: Fit continuous vinyl finger finger-type at the top and bottom of the door. Size of seals shall be 11 mm top seal and 35 mm bottom seal. Jambs shall have a double continuous vertical acoustic seal.

### 3.4 OPERABLE WALLS

#### Divider type

Operable walls: Partition panels independently suspended and stackable, with provision for linking together at the vertical edges and for preventing lateral movement at the bottom when closed.

Proprietary Items

- -BTR Indeng Pty. Ltd, HUFCOR Series 551140
- -Trollope, Silverwood & Beck, PANELFOLD Models 200 series
- -The Enamelsteel Corporation of Australia, TECOA Symphony 500 Series Model 502.
- -BILDSPEC Series 100R: Lotus Folding Doors Pty. Ltd. (Victoria), Bildspec Distributors Pty. Ltd. (NSW), Spacial Concepts Pty. Ltd. (Queensland)
  - Unifold Industries, Unifold 7000 Series
  - Bluett and Swann Folding Walls Pty. Ltd., Model O.W. 40
- -Modernfold Series 932 with automatically operated mechanical floor seals excluding pass door. (floor seals must not protrude past door when the door is in an open position). The pass door to have an adjustable fixed floor seal.

Type: Operable Walls

Door Arrangement: Floating

Pass Door: hinged to one jamb

- -Height: Full height
- -Width: 1070 mm

Folding Door Panels: Size: Equal sized panels not more than 1200 mm wide.

Facing, Pin Board Wall Lining: Specification reference LINING, PINBOARD WALL LINING.

Suspension System: Overhead structural support with an adjustable track support system all in accordance with manufacturers recommendations.

- -Removable panel/s: Specification reference LINING, REMOVABLE PANEL.

Construction Tolerances

- -Floors shall be level in the path of the partition with a tolerance of no more than +6 mm in any direction and shall include a heavy duty threshold strip.
- -Jambs shall be plumb. The max. variation in opening width shall be +6 mm. Track shall be adjusted and levelled at installation. Provide sufficient clearance at track ends to permit future adjustments of track without damage to material adjacent to track or partition.

Operation: Partitions shall be top-supported manually operated panels. When fully extended and locked the Operable Wall shall provide a complete sound retardant closure of the opening and be laterally stable.

Stacking Arrangement: In areas nominated in the drawings.

Locating Bolt: Flush mounted locating foot bolt to be installed on the jamb of the operable wall panel adjacent to the pass door.

Track material: Anodised extruded aluminium or steel overhead track.

Carriages wheels: Steel rimmed ball-bearing, nylon tyred wheel carriers to each panel

Warranty: The Operable Room Divider shall be fully guaranteed by the manufacturer against defects in workmanship or materials for a period of 12 months from the date of installation.

Sound Rating

Sound Transmission Class

(STC) to AS 1276:

38 for Primary School

40 for Secondary School

Test Certificate: Certify that the partitions are of the same basic construction as that used to achieve the acoustical rating claimed by the manufacturer. Provide a current Australian Test Certificate from a NATA Testing Laboratory (or equivalent) for tests.

Accessories And Trim:

Vertical Sound Seals: Anodised extruded aluminium stiles with two resilient PVC gaskets between each panel..

Horizontal Top Seal:

Mechanical operated.

OR

Continuous contact vinyl balloon type.

OR

Continuous contact finger type.

Horizontal Bottom Seal: Mechanically operated expansion system.

Operation/maintenance manual (mandatory)

Provide an operation and maintenance manual clearly showing the correct use of the operable wall and recommended servicing periods and procedures.

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## **4 COMPLETION**

### **4.1 COMPLETION**

#### **Maintenance manual**

Submit manufacturer's published recommendations for service use.

#### **Cleaning**

Temporary coating: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection

**TERRAZZO****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **terrazzo** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**1.2 INTERPRETATION****General**

Substrate: The actual surface to which the terrazzo is to be bedded or attached.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that the following may be inspected:

- Completion of substrate preparation.
- Separation layer in place.
- Items to be embedded, including heating coils, reinforcement, dividing strips, in place.
- Underbed placed and surfaced to receive the topping.
- Topping placed and surfaced before finishing.
- Completion of finishing.
- Precast items on site before installation.
- Movement joints formed and ready for filling with joint filler.

**Hold points**

As advised by the Superintendent

**2.2 SAMPLES****General**

Submit samples of the following:

- Terrazzo: Three sample panels, each at least 300 mm x 300 mm, of every type of surface colour, pattern and finish specified, showing the extremes of the range.
- Facing aggregate: For each surface type, a 25 kg sample of the natural stone aggregate to be used in the facing layers, showing the range of aggregate size.
- Fine aggregate: For each surface type, a 10 kg sample of the sand (if any) to be used in the facing layers.

- Cement: For each surface type, a 1 kg sample of the cement or cement blend to be used in the facing layers.
- Divider strip: A 150 mm length of each type of section proposed.
- Movement joints: A 150 mm length of the proposed joint filler.
- Proprietary carborundum anti-slip strips: A 150 mm strip.

### 2.3 SUBMISSIONS

#### Subcontractor

Submit names and contact details of proposed suppliers and installers.

#### Shop drawings

Submit shop drawings of the terrazzo work showing relevant details, including the following, if applicable:

- Method of bedding or attachment to the base.
- Thickness of beds, underbeds and toppings.
- Separation layer type.
- Reinforcement of underbed and precast items.
- Divider strips, type and location.
- Movement joints and jointing material.
- Dimensions of precast items.

## 3 MATERIALS

### 3.1 MATERIALS

#### Water

Free from matter harmful to terrazzo or to items embedded in it or in contact with it.

#### Cement

Type to AS 3972: GP.

Colour: Grey or white, or a blend of grey and white, as required by the surface colour.

#### Aggregates

Standard: To AS 2758.1.

Sand: Fine aggregate.

Coarse aggregate (in underbeds and cores): Dense natural rock aggregate.

Facing aggregate: Dense natural rock aggregate.

- Characteristics: Natural stone, angular in shape, as distinct from elongated or flaky, graded within the required sizes, free from dust, and free from deleterious material.
- Stone type: Marble.

#### Pigments

Standard: To BS 1014.

General: Resistant to lime bloom and efflorescence.

Pigment proportion:  $\leq 5\%$  by weight of cement.

#### Reinforcement

Standard: To AS 3600.

Protective coating: Galvanized.

Reinforcement supports: Purpose-made concrete or plastic reinforcement supports, for supports which will be visible on the surface of the terrazzo in its final position.

#### Divider strips

Type: Proprietary preformed strips of metal or ebonite, of width appropriate to the topping thickness and such that the strip is anchored firmly in the underbed.

#### Coved divider strips

Select from the following:

- Provide matching divider strips formed to the cove radius, and insert in the cove to coincide with the divider strips in the adjoining plane surfaces.
- Saw cut and infill with silicon sealant.

**3.2 RESIN TERRAZZO MATERIALS****Resin terrazzo**

Facing aggregate in a resin matrix.

**Compatibility**

Ensure the compatibility of the resin terrazzo materials, grout, sealer, and primer.

**Colouring material**

Provide colouring material which is permanent, stable, compatible with the matrix, and factory-dispersed into the resin by the manufacturer.

**Grout**

Resinous material.

**Primer**

Prime the substrate before installing the resin terrazzo.

**Divider strips**

A proprietary ebonite “T” section.

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**4 EXECUTION****4.1 PROTECTION****Generally**

Protect finished work from damage during building operations.

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**5 IN SITU TERRAZZO****5.1 TERRAZZO TOPPINGS**

**NOT REQUIRED.**

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**6 JOINTS****6.1 MOVEMENT JOINTS**

**NOT REQUIRED**

**6.2 DIVISIONS**

**NOT REQUIRED**

**6.3 JOINT ACCESSORIES****Floor finish dividers**

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

**Weather bars**

General: Provide a corrosion resistant metal weather bar under hinged external doors. Locate under the centres of closed doors.

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**7 PRECAST TERRAZZO****7.1 TERRAZZO TILES**

**NOT REQUIRED**

**7.2 PRECAST UNITS**

**NOT REQUIRED**

**7.3 PRECAST PARTITIONS****Type**

Precast terrazzo partitions, consisting of divisions, fronts and nibs, with polished facing on visible surfaces including free edges, reinforced, drilled for and supplied with fixings and hardware including bolts, dowels, brackets, standards, cappings and stabilising bars.

Toilet and shower partitions as shown on the drawings.

Anti Graffiti Finish: Anti-graffiti seal to be applied to all terrazzo toilet partitions.

Specification reference - PAINTING.



**Installation**

Sequence: Set partitions in position before wall or floor finishes are applied.

Fronts extending to floors: Bed solidly to the floor with two 6 mm diameter brass dowels to each front.

Free-standing fronts: Support on a tubular floor standard grouted into drilling in the floor slab.

Heads of openings: Fix stabilising head channels, screwed to the tops of the partitions. Provide an infill strip to the channel across the opening.

**7.4 PRECAST STAIRS  
NOT REQUIRED****8 COMPLETION**

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**8.1 COMPLETION****Maintenance manual**

On or before practical completion, submit a manual of recommendations on the care and cleaning of the installed terrazzo, including published instructions for the maintenance of the terrazzo finishes.

<b>PLASTERING</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **plastering** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Concrete Finishes, Linings

**1.2 INTERPRETATION****Definitions**

The terms "plaster" and "plastering" include the terms "render" and "rendering", except where the context otherwise requires.

**1.3 STANDARD****General**

Plastering: To AS CA27.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Background immediately before plastering.
- Each completed coat before the application of subsequent coats.
- Completed work before decorative coating.

**Hold points**

As advised by the Principals Authorised Person

**2.2 SAMPLES****Sample panels**

Prepare in agreed positions, sample panels of sufficient area of each of the plaster and render finishes scheduled including samples of the junction details and trim.

**3 MATERIALS AND COMPONENTS****3.1 MATERIALS AND COMPONENTS**

BUSH SAND MUST NOT TO BE USED.

**Plaster materials**

Cement type to AS 3972: GP.

Off-white cement: Iron salts content  $\leq 2.5\%$ .

Lime: To AS 1672.1.

Sand: To AS CA27, graded to Table 1 of the Appendix.

Pigments: Manufactured either synthetically or from naturally occurring mineral ores, resistant to lime bloom and efflorescence.

- Standard: To BS 1014.
- Pigment proportions:  $\leq 5\%$  by weight of cement.

Gypsum plaster: To AS 2592.

Admixtures: Do not provide.

**Metal lath**

Galvanized sheet steel expanded to a mesh by slitting and stretching: Coating class Z275 (minimum).

Self-furring type: Metal lath with staggered indentations which hold the body of the sheet 10 mm clear of the substrate.

**Lime putty mixes**

Make a coarse mix of lime putty and sand 24 hours before use. Prevent from drying out.

**Gauged mixes**

If required to improve workability, gauge mixes specified to contain only cement and sand by the addition of lime up to 25% of the cement content (i.e. not as a substitute for the cement).

**Autoclaved aerated concrete walls**

Provide a proprietary render or premixed plaster recommended by the wall system manufacturer.

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**4 EXECUTION****4.1 SUBSTRATE****Correction of substrate**

Before plastering make good any defects in the substrate. Hack off excessive projections. Fill voids and hollows with a mix not stronger than the substrate nor weaker than the first coat.

**Untrue substrate**

One coat work: If the substrate is not sufficiently true to comply with the thickness limits for one coat, or has excessively uneven suction resulting from variations in the composition of the substrate, carry out the work in two coats.

**Cleaning**

Remove deleterious and loose material and leave the surface clean and dust free.

**Embedded items**

Ensure that water pipes and other embedded items are sheathed to permit thermal movement. If ungalvanized steel items are to be embedded in gypsum plaster, provide rust protection treatment not inferior to prime painting with zinc rich primer.

**Chases**

If chases or recesses are more than 50 mm wide, cover with metal lath extending at least 75 mm beyond each side of the recess.

**Suction**

Control suction by dampening if necessary. Avoid over-wetting.

**Dense concrete**

If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 3 mm of the surface and expose the aggregate; then dash coat. If scabbling and dash coating does not provide a good key for external render, cover with a non-corrosive expanded metal lath.

**Brickwork**

If not rough-jointed, rake out joints 5 mm deep. If raking out is impracticable, hack at close intervals to roughen the surface, or cover with expanded metal lath.

**Concrete blockwork**

Apply a dash coat or a proprietary bonding agent.

**Metal backgrounds**

Fix metal lath to provide a key.

**Previously painted surfaces**

Remove paint, hack at close intervals, or cover with expanded metal lath.

**Calcium silicate brickwork**

Select preparation from the following:

- Apply bonding agent and dash coat.
- Provide a proprietary water-retentive additive in lieu of lime in the plaster mix.

**Dash coat**

Application: Mix to the consistency of a thick slurry and forcibly dash on to the background to give a roughcast coating 3 – 5 mm thick.

Curing: Allow the dash coat to harden in damp conditions and protect it from drying out before applying the next coat.

**Fixing metal lath**

Generally: Provide the necessary accessories. Run the long way of the mesh across supports. In vertical applications slope the strands inwards and downwards away from the background face. Lap ends at least 20 mm and sides at least 10 mm. Tie laps with 1.25 mm galvanized wire every 150 mm. Do not finish edges of sheets at corners but bend around.

Fixing: Fix lath to the background at edges and at supports with fixings of appropriate type spaced at 150 mm maximum centres. Place fixings in the mesh corners so that the heads cover 2 strands.

Fixing to masonry: Use non-corrosive masonry anchors, or masonry or concrete nails. Do not provide explosive powered fastenings.

Fixing to timber studs: Use galvanized flat head nails or galvanized staples.

Fixing to metal studs or furring: Use non-corrosive self-tapping screws, or galvanized wire.

**4.2 PLASTERING****Thickness limits**

One coat work: 12 – 15 mm.

Multi-coat work:

- First coat: 9 – 15 mm.
- Floating coat (if any): 6 – 9 mm.
- Finishing coat (except setting coats): 6 – 9 mm.
- Setting coat: 2 – 3 mm.

**Tolerances**

Finish plane surfaces within a tolerance of 6 mm in 3 m, determined by a 3 m straight edge placed anywhere in any direction. Finish corners, angles, edges, and curved surfaces within equivalent tolerances.

**Proportioning**

Apply successive coats no stronger (i.e. no richer in cement) than the substrate or undercoat to which they are applied.

**Hidden surfaces**

Insides of cupboards, if any, are included in the plaster finish required to any area.

**Incidental work**

Return plastering into reveals, beads, sills, recesses and niches. Plaster faces, ends, and soffits of projections in the substrate, such as string courses, sills, pilasters and corbels. Run throating on soffits of external projections neatly finished. Trim around openings.

**Joining up**

If joining up is unavoidable in a large area of work, make joints invisible in the finished work.

**Cement based undercoats**

Before applying the next coat, allow the undercoat to dry out, dust down, and, if necessary, dampen to give correct suction.

**Keying**

General: Press plaster through the apertures of metal lath, and wings of casing beads.

Keying undercoats: In multi coat work, scratch comb each undercoat in two directions when it has stiffened.

**Surface finishes**

Wood float: Provide an even texture by wood floating the finishing coat.

Fine sand textured finish: Provide an even surface by wood float and finish with a plastic foam float to a fine sand textured finish.

Carborundum stone finish: Provide a fine sand textured finish. When the wall is set, rub down with a fine carborundum stone to a smooth finish free from sand.

Steel trowel: Provide a smooth dense surface free from texture and free from shrinkage cracks, but not glass-like.

**Curing**

Cement-based work: Prevent rapid or uneven drying out.

Gypsum-based work: Keep dry after work has set.

**Two or three coat set plaster**

Undercoats: 1:1:6 cement:lime putty:sand.

Setting coat: 1:1 lime putty:gypsum plaster.

**Hard-wall gypsum plaster**

Undercoat: 2:5 gypsum plaster:sand.

- Finish: Leave off the rule.

Setting coat: 3:1 gypsum plaster:lime.

Thickness: Maximum 4 mm.

**White-set plaster**

General: Provide 3:1 gypsum plaster:lime putty, applied as a skim coat direct to the substrate.

Thickness: Maximum 4 mm.

**Cement render**

Proportions (cement:lime:sand):

- Clay brick, concrete: 4:1:16.
- Concrete block: 1:0:6.
- Calcium silicate brick: 3:2:16.

**Waterproof render**

General: Provide cement based render with proprietary waterproofing admixture.

Protection: Avoid puncturing or plugging waterproof render. Where it is necessary to drill through waterproof render for installation of services or fixings, restore the barrier by sealing around the penetrations.

**Vermiculite plaster**

Gypsum plaster and expanded vermiculite aggregate. Apply using power spray equipment.

**Tyrolean render**

Type: A two-coat textured finish applied by a machine designed for the purpose.

Plasticiser: Add a plasticiser or air-entraining agent to both undercoat and finishing coat.

Finishing coat: Cement, sand and graded crushed rock screenings as necessary to achieve the required texture. Apply finishing coat whilst first coat is still green.

**Self coloured render**

Colour the finishing coat to match the approved sample panel. Provide white cement, white sand, and pigments. Mix the pigments with the white cement before adding sand and water. Steel trowel finish.

**Monolithic stabilised earth walling render**

Mix: 1:4 Portland cement: clean sand.

Application: Two coats, each nominally 6 mm thick.

- First coat: Moisten wall and throw mix against wall to provide a rough surface.
- Second coat: Trowel to a smooth finish.

Curing: Keep moist for 1 - 2 days after completion of rendering

#### **Pebble dash**

Undercoat: 1:3 cement:clean sharp well graded pit sand. Add mortar plasticiser or air entraining agent.

Finishing coat: Washed and drained river pebbles maximum size 5 mm.

Application: Float the undercoat using a wood float. Whilst it is still plastic throw on the pebbles to cover it evenly. Lightly tap into the mortar, and straighten with a rule. Wash down well after setting to remove cement stains.

### **4.3 JOINTS**

#### **Movement joints**

General: Provide movement joints in the finish which coincide with movement joints in the substrate. Ensure that the substrate joint is filled with the specified jointing material, and is not bridged during plastering.

Plastering on metal lath: Provide movement joints to divide the plastering area into rectangular panels not exceeding 10 m<sup>2</sup>.

Depth: Extend the joint right through the plaster to the substrate.

Width: 3 mm, or the same width as the substrate joint, whichever is greater.

Joint filling (joints more than 3 mm wide): Fill with a resilient sealant.

#### **V-joints**

Provide V-joints, cut right through the plaster to the substrate, at the following locations:

- Junctions between different substrate materials.
- Abutments with other finishes.
- Abutments with metal door frames.

### **4.4 TRIM**

#### **Terminations**

Re-entrant corners: Finish square.

Salient angles: Finish up to a 1.6 mm radius corner bead.

Edge trim: Provide the necessary corner beads, casing beads and stop beads.

- Material: Purpose-made zinc-coated steel sections.
- Fixing: Nail to structure at 300 mm centres. Wire to metal lath.

#### **Cement rendered skirtings**

General: Provide the mix proportions specified for one coat cement render and bring the surface to a true uniform finish using a steel trowel. Form a vee joint at junctions with other finishes.

## TILING

**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **tiling** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Concrete Finishes

**1.2 INTERPRETATION****Definitions**

Substrate: The building element to which the tiles are to be bedded.

Underlay: An intermediate layer (e.g. render, screed or sheeting) applied to the substrate to provide a suitable surface for tile bedding.

Separation layer: A membrane laid on the substrate beneath the bedded finish to prevent the two elements from adhering to each other.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Substrate immediately before tiling.
- Initial and trial set-outs.
- Control joints before sealing and grouting.
- Completion of tiling.

**Hold points**

As advised by the Principals Authorised Person

**2.2 SAMPLES****General**

General: Submit labelled samples of tiles, including fittings, accessories, grout and sealants, illustrating the range of variation in colour and finish.

**2.3 SAMPLE PANELS****General**

Prepare sample panels of each type of finish. Include samples of junction details and trim. Preserve each approved panel until related work is complete.

Size: At least 2 m<sup>2</sup>.

### **Trial set-out**

Trial set-out: On horizontal surfaces make a trial set-out for each area.

## **2.4 SUBMISSIONS**

### **Execution**

Grouting: Submit proposals for grouting methods and materials.

Margins: If it appears that minor variations in joint widths or overall dimensions will avoid cut tiles, submit a proposal.

## **3 MATERIALS AND COMPONENTS**

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### **3.1 TILES AND ACCESSORIES**

#### **Ceramic tiles**

Standard: To BS 6431 for tolerance limits on dimensions, surface quality, physical and chemical properties relevant to the product type.

#### **Exposed edges**

In positions where the edge is exposed provide purpose-made border tiles with the exposed edge (whether round, square or cushion) glazed to match the tile face. If such tiles are not available, mitre tiles on external corners.

#### **Accessories**

Provide tile accessories which match the composition, colour and finish of the surrounding tiles.

#### **Coves, nosings and skirtings**

Provide matching stop ends and internal and external angle tiles moulded for that purpose.

### **3.2 ADHESIVES**

#### **General**

Standard: To AS 2358.

PVA (polyvinyl acetate) based adhesives: Do not provide in wet areas or externally.

#### **Type**

Generally: Provide adhesives compatible with the materials and surfaces to be adhered.

Prohibited uses: Do not provide the following combinations:

- Cement-based adhesives on wood, metal, painted or glazed surfaces, gypsum-based plaster.
- Organic solvent-based adhesives on painted surfaces.
- Organic PVC-based adhesives and organic natural rubber latex adhesives in damp or wet conditions.

### **3.3 MORTAR**

#### **Materials**

Cement type to AS 3972: GP.

- White cement: Iron salts content  $\leq 1\%$ .
- Off-white cement: Iron salts content  $\leq 2.5\%$ .

Lime: To AS 1672.1.

Sand: Fine aggregate with a low clay content selected for grading.

Water: To AS 3958.1.

#### **Bedding mortar**

Proportioning: Select proportions from the range 1:3 - 1:4 cement:sand to obtain satisfactory adhesion. Provide minimum water.

Mixing: To AS 3958.1.

### **3.4 GROUT**

#### **Type**

Cement based proprietary grout: Mix with water. Fine sand may be added as a filler in wider joints.



Portland cement based grout: Mix with fine sand. Provide minimum water consistent with workability.

- For joints < 3 mm: 1:2 cement:sand.
- For joints ≥ 3 mm: 1:3 cement:sand.

#### **Pigments**

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

## **4 EXECUTION**

### **4.1 SUBSTRATES**

#### **Drying and shrinkage**

Before tiling, allow at least the following times to elapse (for initial drying out and shrinkage) for these substrates:

- Concrete slabs: 42 days.
- Concrete blockwork: 28 days.
- Toppings on slabs and rendering on blockwork: A further 21 days.

#### **Preparation**

Suitably prepare substrates to receive the bedded finish, including the following:

- Remove deleterious and loose material and leave the surface dust-free and clean.
- For mortar bedding wet the substrate as necessary to achieve suitable suction. Alternatively apply a bonding agent to the substrate to improve adhesion.

### **4.2 TILING GENERALLY**

#### **Sequence**

Fix wall tiles before floor tiles.

#### **Cutting and laying**

Cutting: Cut tiles neatly to fit around fixtures and fittings, and at margins where necessary. Drill holes without damaging tile faces. Cut recesses where necessary for fittings such as soapholders. Rub edges smooth without chipping.

Laying: Return tiles into sills, reveals and openings. Butt up to returns, frames, fittings, and other finishes. Strike and point up beds where exposed.

#### **Variations**

If necessary, distribute variations in hue, colour, or pattern uniformly, by mixing tiles or tile batches before laying.

#### **Protection**

Floor tiles: Keep traffic off floor tiles until the bedding has set and attained its working strength.

Cleaning: Keep the work clean as it proceeds and protect finished work from damage.

### **4.3 SETTING OUT**

#### **General**

Joint widths: Set out tiles to give uniform joint widths within the following limits:

- Internal ceramic tiling: 1.5 - 3 mm.
- External ceramic tiling: 4 - 9 mm.
- Mosaic tiling: Nominal 2 mm or as dictated by pattern.
- Quarry tiling: 6 - 12 mm.
- Chemical resistant epoxy jointed floor tiling: 5 - 6 mm.
- Vitrified floor tiling: 3 - 5 mm.

Joint alignment: Set out tiling with joints accurately aligned in both directions and wall tiling joints level and plumb, to a tolerance of  $\pm 4$  mm in 2 m from the design alignment.

Margins: Provide whole or purpose-made tiles at margins where practicable, otherwise set out to give equal margins of cut tiles. If margins less than half tile width are unavoidable, locate the cut tiles where they are least conspicuous.

Fixtures: If possible position tiles so that holes for fixtures and other penetrations occur at the intersection of horizontal and vertical joints or on the centre lines of tiles. Continue tiling fully behind fixtures which are not built in to the tiling surface. Before tiling ensure that fixtures interrupting the tile surfaces are accurately positioned in their designed or optimum locations relative to the tile layout.

### 4.4 FALLS AND LEVELS

#### General

General: Grade floor tiling to even and correct falls to floor wastes and elsewhere as required. Make level junctions with walls. Where falls are not required lay level.

Fall, general: 1:100 minimum.

Fall, in shower areas: 1:60 minimum.

Deviation: Maximum deviation of the finished floor level between points of contact under a 2 m straight edge laid in any direction on an area of uniform grade to be 1:300 or 3 mm, whichever is the lesser.

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

### 4.5 BEDDING

#### Preparation of tiles

Adhesive bedding: Fix tiles dry; do not soak.

Mortar bedding: Soak porous tiles in water for half an hour and then drain until the surface water has disappeared.

#### Bedding

Use bedding methods and materials which are appropriate to the tile, the substrate, the conditions of service, and which leave the tile firmly and solidly bedded in the bedding material and adhered to the substrate. Form falls integral with the substrate.

#### Thin adhesive beds

General: Provide only if the substrate deviation is less than 3 mm when tested with a 2 m straight edge. Cover the entire tile back with adhesive when the tile is bedded.

Thickness: 1.5 - 3 mm.

#### Thick adhesive beds

General: Provide on substrates with deviations up to 6 mm when tested with a 2 m straight edge, and with tiles having deep keys or frogs.

Nominal thickness: 6 mm.

#### Mortar beds

For floor tiles: Either lightly dust the screeded bed surface with dry cement and trowel level until the cement is damp, or spread a thin slurry of neat cement, or cement-based thin bed adhesive, on to the tile back. Do not provide mortar after initial set has occurred.

- Nominal thickness: 25 mm.

For wall tiles: Apply the bed to the substrate as a floated coat, bring up to a true surface with a wood float and allow to stiffen for up to 2 hours. Then either apply a back-up skim coat (1 - 2 mm thick) of 1:2 mortar to the bed, or butter the tile with 1:2 mortar or a cement based thin bed adhesive, before applying the tile to the bed.

- Nominal thickness: 15 mm.

Thick reinforced beds: Place mortar bed in two layers, and incorporate the mesh reinforcement in the first layer.

#### Mechanical fixing

Provide a proprietary system of support and fixing appropriate to the type of tile and the substrate conditions.

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## 5 JOINTS

### 5.1 MOVEMENT JOINTS

#### General

Location: Provide movement joints

- over structural (isolation, contraction, expansion) joints;
- at internal corners;

- at junctions between different substrates; and
- to divide large tiled areas into bays, maximum 5 m wide, maximum 16 m<sup>2</sup>.

Depth of joint: Right through to the substrate.

Sealant width: 6 - 25 mm.

Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

#### **Movement joint materials**

**Preformed strip:** A proprietary expansion joint consisting of a neoprene filler sandwiched between plates with lugs or ribs for mechanical keying. Set flush with the finished surface.

**Sealant:** Two-pack self-levelling non-hardening mould resistant, one-part silicone or polyurethane sealant applied over a backing rod. Finish flush with the tile surface.

- Floors: Trafficable.

**Backing rod:** Compressible closed cell polyethylene foam with a bond-breaking surface.

## **5.2 GROUTED AND CAULKED JOINTS**

### **Grouted joints**

**General:** Commence grouting as soon as practicable after bedding has set. Clean out joints as necessary before grouting.

**Face grouting:** Fill the joints solid and tool flush. Clean off surplus grout. Wash down when the grout has set. When grout is dry, polish the surface with a clean cloth.

**Edges of tiles:** Grout exposed edge joints.

**Epoxy grouted joints:** Ensure that tile edge surfaces are free of extraneous matter such as cement films or wax, before grouting.

**Grouting mosaics:** If paper faced mosaics are to be bedded in cement mortar, pre-grout the sheeted mosaics from the back before fixing. After fixing, rub grout into the surface of the joints to fill any voids left from pre-grouting. Clean off surplus grout. When grout has set, wash down. If necessary use a proprietary cement remover.

### **Caulked joints**

**General:** Provide caulked joints filled with sealant and finished flush with the tile surface as follows:

- Where tiling is cut around sanitary fixtures.
- Around fixtures interrupting the tile surface, for example pipes, brackets, bolts and nibs.
- At junctions with elements such as window and door frames and built-in cupboards.
- At internal corners.

Width: 5 mm.

Depth: Equal to the tile thickness.

## **5.3 JOINT ACCESSORIES**

### **Floor finish dividers**

**General:** Finish tiled floors at junctions with differing floor finishes with a corrosion resistant metal dividing strip suitably fixed to the substrate, with top edge flush with the finished floor. Where changes of floor finish occur at doorways make the junction directly below the closed door.

### **Weather bars**

**General:** Provide a corrosion resistant metal weather bar under hinged external doors. Locate under the centres of closed doors.

## **6 COMPLETION**

### **6.1 COMPLETION**

#### **Spare tiles**

**General:** Supply spare matching tiles and accessories of each type for future replacement purposes. Store the spare materials on site.

## ***TILING***

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Quantity: At least 1% of the quantity installed.

### **Cleaning**

Clean tiled surfaces using an appropriate tile cleaning agent, and polish.

**FLOOR SANDING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **floor sanding** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Timber Flooring & Decking, Painting

**2 QUALITY****2.1 SUBMISSIONS****Installation**

Finishing: Submit proposals for finishes.

**3 EXECUTION****3.1 GENERAL****Type**

Carpeted or resilient finished: Basic sanding.

Clear finished: Fine sanding. Stop with matching filler.

**Preparation**

Punch nails 3 mm below the surface. Remove tacks. Fill open grained timber with materials compatible with those used in subsequent finishing operations.

**3.2 STRIP FLOOR SANDING****Stopping**

Oil putty: Stop immediately before the last cut in basic sanding.

**Basic sanding**

General: Remove irregularities due to capping or mismatching of the boards, using drum-type sanding machines, and coarse abrasive.

Uneven or hard flooring: First cut at 45° to the length of the boards, second cut at 90° to the first cut, and third cut parallel to the length of the boards.

Even or mild flooring: First cut at 45° to the length of the boards, and second cut parallel to the length of the boards.

Boundary areas: Bring to the same surface condition as the main sanded area, using disc sanding and coarse abrasive.

Inaccessible areas: Hand scrape to produce an even, plane surface.

**Fine sanding**

Removal of scratch marks: After basic sanding, cut twice parallel to the length of the boards. For the first cut use an intermediate abrasive, and for the second cut use a fine abrasive.

Boundary areas: Bring to the same surface condition as the main sanded area, using disc sanding and fine abrasive.

Inaccessible areas: Hand scrape to produce the same surface condition as the main sanded area.

**3.3 CROSS-GRAIN FLOOR SANDING****Stopping**

Oil putty: Stop immediately before the last sanding cut.

**Basic sanding**

General: Remove irregularities caused by cupping or mismatching of the blocks, using drum type sanding machines, and coarse abrasive.

Uneven or hard flooring: First cut at 45° to the direction of the grain of the wood, second cut at 90° to the first cut, third cut at 45° to the first cut, and fourth cut at 90° to the third cut.

Even or mild flooring: First cut at 45° to the direction of the grain of the wood, second cut at 45° to the first cut, third cut at 90° to the second cut.

Boundary areas: Bring to the same surface condition as the main sanded area, using disc sanding and coarse abrasive.

Inaccessible areas: Hard scrape to produce an even, plane surface.

**Fine sanding**

Removal of scratch marks: After basic sanding, cut twice using an intermediate abrasive, parallel to the last basic sanding cuts, then cut twice in that direction using a fine abrasive.

Boundary areas: Bring to the same surface condition as the main sanded area, using a fine abrasive.

Inaccessible areas: Hand scrape to produce the same surface condition as the main sanded area.

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**4 COMPLETION****4.1 COMPLETION****Cleaning**

Clean free from dust. Apply liquid finishes immediately.

<b>RESILIENT FINISHES</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **resilient finishes** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**1.2 Preferred Subcontractors or Selected SUBCONTRACTORS****Requirement - Mandatory**

The supply and installation of resilient flooring must be sourced by one of the listed (below) Preferred Subcontractors or Selected Subcontractors [excepting "SEAMLESS FINISHES", accessories and underlay (if required)]. The supply and installation of resilient flooring obtained from alternative sources other than those listed below is not permitted.

Note: Compliance auditing will be undertaken intermittently.

Refer PRELIMINARIES - PREFERRED SUBCONTRACTORS or  
SELECTED SUBCONTRACTORS.

Refer PRELIMINARIES Clause PREFERRED SUBCONTRACTORS or  
SELECTED SUBCONTRACTORS.

**SHEET VINYL****"Homogeneous" sheet vinyl (Interim)**

Sheet vinyl (non-foamed backed) 2 mm "homogeneous" flexible sheet vinyl

Part only of the State Procurement Standing Offer Agreement No. 444 (interim)

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Tarkett/Sommer (Australia) Pty. Ltd.	Eminent
Tarkett/Sommer (Australia) Pty. Ltd.	Granit
Tarkett/Sommer (Australia) Pty. Ltd.	Monolit
Polyflor	Prestige
Armstrong World industries	Encore

**Inlaid sheet vinyl.**

State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Gerflor Australia Pty Ltd	Gerflor Forum Standard
Armstrong World industries	Corlon Impresion
Armstrong World industries	Classic Corlon
Armstrong World industries	Possibilities

**Heterogeneous sheet vinyl**

2 mm (approx.) - "heterogeneous" sheet vinyl

State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Gerflor Australia Pty Ltd	Gerflor Brazilia Standard
Tarkett/Sommer (Australia) Pty Ltd	Century Mika
Tarkett/Sommer (Australia) Pty Ltd	Century Excel
Forbo Floorcoverings Pty Ltd	Sure Step
Forbo Floorcoverings Pty Ltd	Smaragd Original
Forbo Floorcoverings Pty Ltd	Smaragd Classic
Forbo Floorcoverings Pty Ltd	Smaragd Marble

**Linoleum sheet**

State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Forbo Floor Coverings Pty Ltd	Marmoleum
Tarkett/Sommer (Australia) Pty Ltd	Linostom Veneto
Armstrong World industries (Australia) P/L	Marmorette
Armstrong World industries (Australia) P/L	Uniwalton
Armstrong World industries (Australia) P/L	Colorette
Armstrong World industries (Australia) P/L	Granette
Armstrong World industries (Australia) P/L	Linorette
Armstrong World industries (Australia) P/L	Decorette

**SHEET VINYL, FOAMED BACK****Acoustic cellular foam backed heterogeneous sheet vinyl >1.5mm wear layer.**

State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Polyflor Australia Pty. Ltd.	Polytred Acoustic
Tarkett/Sommer (Australia) Pty. Ltd.	Granit Acoustiflor



**Acoustic cellular foam backed heterogeneous sheet vinyl > 0.5mm wear layer**

State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Forbo Floorcoverings Pty. Ltd.	Novilux
Gerflor (Australia) Pty. Ltd	Gerflor Taralay Comfort
Gerflor (Australia) Pty. Ltd	Gerflor Forum Comfort
Gerflor (Australia) Pty. Ltd	Gerflor Brazilia Comfort
Tarkett/Sommer (Australia) Pty. Ltd.	Tapiflex
Karndean Australia Pty. Ltd.	Chockflex

**SHEET VINYL, FOAMED BACK – CANTEEN**

**Acoustic cellular foam backed heterogeneous sheet vinyl >1.5mm wear layer.**

State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Polyflor Australia Pty. Ltd.	Polytred Acoustic
Tarkett/Sommer (Australia) Pty. Ltd.	Granit Acoustiflor

**Acoustic cellular foam backed heterogeneous sheet vinyl > 0.5mm wear layer**

State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Forbo Floorcoverings Pty. Ltd.	Novilux
Gerflor (Australia) Pty. Ltd	Gerflor Taralay Comfort
Gerflor (Australia) Pty. Ltd	Gerflor Forum Comfort
Gerflor (Australia) Pty. Ltd	Gerflor Brazilia Comfort
Tarkett/Sommer (Australia) Pty. Ltd.	Tapiflex
Karndean Australia Pty. Ltd.	Chockflex

**SLIP RESISTANT RESILIENT FLOORING (Interim)**

**Sheet vinyl**

Sheet vinyl (non-foamed backed) 2 mm “homogeneous” flexible sheet vinyl with an “R10” Classification and “W” or “V” Class to AS/NZS 4586

Part only of the State Procurement Standing Offer Agreement No. 444

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>
Tarkett/Sommer (Australia) Pty. Ltd.	Eminent

**INDUSTRIAL SHEET FLOORING (SAFETY FLOORING)**

2.5mm thick safety flooring guaranteed to maintain characteristics for the thickness and not require scrubbing with an “R10” Classification and “W” or “V” Class to AS/NZS 4586.

State Procurement Standing Offer Agreement No. 444

Preferred Subcontractors or Selected Subcontractors	Product
Safety Floorings Pty. Ltd.	Walkeasy 2.5mm
Polyflor Australia Pty. Ltd.	Polysafe Austral 2.5mm
Polyflor Australia Pty. Ltd.	Polysafe Design 2.5mm
Australian Safety Flooring Pty. Ltd.	Altro D25

**ANTI-STATIC SHEET FLOORING**

Anti-static vinyl sheet flooring

Preferred Subcontractors or Selected Subcontractors	Product
Gerflor Australasia	Rubust EL7
Gerflor Australasia	Accord EL7
Polyflor Australia	Polyflor Antistatic
Tarkett/Sommer (Australia) Pty. Ltd	Granit AS

**RESILIENT TACTILE SURFACE INDICATORS** Rubber tactiles

State Procurement Standing Offer Agreement No. 444

Preferred Subcontractors or Selected Subcontractors	Product
Safety Floorings Pty. Ltd.	Comcork Tactiles

**General**

Resilient tactile ground surface indicators for orientation of people with vision impairment in accordance with clause D3.8 Building Code of Australia (BCA).

**Standard**

To AS 1428.4 – Part 4

**Colour selection**

Select a contrasting colour to the adjacent surface with an acceptable luminance contrast. Refer to AS 1428.4 Part 4 – 6 Installation Requirements and the manufacturer’s luminance value of their product.

**RESILIENT TACTILE SURFACE INDICATORS (Installation for existing surfaces – eg: Retrofits)****- Standards**

- To AS 1428.4

**General**

Resilient tactile ground surface indicators for orientation of people with vision impairment in accordance with clause D3.8 Building Code of Australia (BCA).

Slip resistant classification for pedestrian surface to AS/NZS 4586

- Wet Surfaces: R11 (minimum)

**Fire resistance (where applicable)**

The Early Fire Indices must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

**Description**

Hardwearing UV stable high shear strength PVC Rubber blends tile suitable for exterior and interior use.

- Dimensions (nominal): 300 x 300 x 2mm base thickness

Installation: To AS1428.4 and in accordance with the manufacturer’s printed installation instructions.

- **OR**

UV stable cork and rubber composition tile suitable for exterior and interior use.

- Dimensions (nominal): 300 x 600 x 2.5mm base thickness.
- Installation: To AS1428.4 and in accordance with the manufacturer's printed installation instructions.

**Colour selection**

Select a contrasting colour to the adjacent surface with an acceptable luminance contrast. Refer to AS 1428.4 Part 4 – 6 Installation Requirements and the manufacturer's luminance value of their product.

**1.3 ORDERING AND DELIVERY Requirement**

Order and confirm delivery instructions with the resilient flooring preferred subcontractor or selected subcontractors not less than 12 weeks prior to the date required and give 2 weeks notice to the subcontractor of the required laying date.

Give a copy of the delivery docket to the Superintendent's Representative on delivery of the material to site with the following details:

- Full description of resilient flooring and underlay (if required) and all details of accessories.

**1.4 COLOUR SELECTION**

**Selection**

The colour selection nominated in the Specifications Internal Spaces Finishes Colours Schedule for the resilient floor finishes must not be varied.

**2 EXECUTION**

**2.1 SHEET AND TILE INSTALLATION**

**Time of laying**

The resilient flooring must be laid prior to the carpet.

**Change of finish**

Junction between resilient flooring and carpet: The carpet edge stripping is to cover exposed resilient flooring edges.

Specification reference: CARPET – MATERIALS AND COMPONENTS

**TYPE 1**

Sheet Vinyl (non-foamed backed)

Sheet Linoleum

Form:

- Fully flexible sheet vinyl.
- Fully flexible sheet Linoleum

**Laying**

Laying Diagram: Provide diagram showing all proposed joins and laying directions.

Joints

Heat weld. If the floor finish can not be heat welded, cold weld. All joints are to be sealed to prevent moisture penetration.

**Sealing**

Sheet Vinyl (excluding slip resistant resilient flooring): Flooring finishes that are not factory sealed, seal immediately after laying in accordance with the manufacturer's recommendations.

Linoleum sheet flooring: Do-not seal unless otherwise specified.

Slip resistant resilient flooring: Must not be sealed.

**Finish**

Refer to COLOUR SCHEDULE for nominated colours/finishes.

**TYPE 2**

Sheet vinyl, foamed back.

Form: Acoustic cellular foam backed sheet vinyl

**Laying**

To manufacturer's written instructions.

Laying Diagram: Provide diagram showing all proposed joints and laying directions.

**Joints**

Heat weld. If floor finish can not be heat welded, cold weld. All joints are to be sealed to prevent moisture penetration.

**Sealing**

Resilient vinyl flooring finishes, which are not factory sealed, seal immediately after laying in accordance with the manufacturer's recommendations.

**Finish**

Refer to COLOUR SCHEDULE for nominated colours/finishes.

**TYPE 3**

Industrial Sheet Flooring:

Form: 2.5mm thick safety flooring guaranteed to maintain characteristics for the thickness and not require scrubbing.

**Laying**

To manufacturers written instructions

Laying Diagram: Provide diagram showing all proposed joints and laying directions.

**Joints**

Heat weld. If floor finish can not be heat welded, cold weld by applying recommended adhesive to both edges. All joints are to be sealed to prevent moisture penetration.

**Surface Preparation**

Immediately after laying sweep the floor, clean with diluted liquid cleaner recommended by manufacturer and rinse with clean warm water.

**Line Markings**

Apply operator zone line markings. Refer PAINTING.

**Sealing**

For PVC/cork composition flooring apply 3 coats of a metalised sealer recommended by manufacturer and buff when dry. Other "Safety" floor finishes must not to be sealed.

**Completion**

Furniture or equipment must not be transported or installed on the floor for a minimum of 24 hours after completion of floor laying

**Load Spreader**

Type, Flooring: PVC/cork composition flooring.

Position: Under bench legs and all heavy unfixed furniture items.

Material: Same as floor finish.

Colour: Same as floor finish.

**Finish**

Refer to COLOUR SCHEDULE for nominated colours/finishes.

**TYPE 4**

Anti-static vinyl

**Laying**

To manufacturers written instructions

Laying diagram: Provide diagram showing all proposed joints and laying directions

**Joints**

Heat weld. If floor finish can not be heat welded, cold weld by applying recommended adhesive to both edges. All joints are to be sealed to prevent moisture penetration.

**Sealing**

Linoleum Sheet Flooring: Do-not seal unless otherwise specified

**Finish**

Refer to COLOUR SCHEDULE for nominated colours/finishes.

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**3 COMPLETION**

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**3.1 COMPLETION****Maintenance manual**

In addition to the maintenance manual supply laminated instructions (see below). The instructions must clearly indicate the location of all resilient floor finishes and the required maintenance requirements showing daily, weekly, monthly and annual requirements. Include the names and addresses of the suppliers, manufacturers and range names and colour of each component

Size: A4 (minimum)

Instructions: Brief, precise with corresponding graphics.

Finish: Laminated.

Location/Distribution:

- - Cleaning Supplies.Store/s
- - Cleaning Distributed Store/s.
- - Hand one copy to the Person with Full Authority/Superintendent.

Installation: Fasten to wall in a clearly displayed position.

<b>CARPETS</b>
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## 1 GENERAL

### 1.1 CROSS REFERENCES

#### General

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **carpets** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

### 1.2 PREFERRED SUBCONTRACTORS OR SELECTED SUBCONTRACTORS

#### Requirement - Mandatory

The carpet, installation, underlay/underfelt and accessories must be sourced from one of the listed (below) Preferred Subcontractors or Selected Subcontractors. The carpet, installation, underlay/underfelt and accessories obtained from alternative sources other than those listed below is not permitted.

Note: Compliance auditing will be undertaken intermittently.

Refer PRELIMINARIES - PREFERRED SUBCONTRACTORS or SELECTED SUBCONTRACTORS.

Carpet: 100% wool level loop 1627 grams per m<sup>2</sup>. Specification reference: CARPET – CARPET TYPE (100% WOOL)

<b>Preferred Subcontractors</b>	<b>Product</b>	<b>Australian Carpet Classification Scheme (ACCS) Number.</b>
Cavalier Bremworth	Karatex	96068
Cavalier Bremworth	Karatex Encore	92024
Tuftmaster Carpets	Wentworth 48	93037W
Tuftmaster Carpets	Luminary 48	93037L
Tuftmaster Carpets	Network 48	21078
Godfrey Hirst (Aust.)	Kingsgate Heather 48oz	21002
Godfrey Hirst (Aust.)	Sisal Grid	00124G
Godfrey Hirst (Aust.)	Sisal Ridge	00124R

Westwools Carpets	Super Norsk	93184
Westwools Carpets	Kirribilli 48 oz	00087
Westwools Carpets	Barossa 48 oz	21027

OR

Carpet: 90% wool 10% space dyed nylon 1627 grams per m<sup>2</sup>. Specification reference:  
CARPET – CARPET TYPE (90% WOOL 10% SPACED DYED NYLON)

<b>Preferred Subcontractors or Selected Subcontractors</b>	<b>Product</b>	<b>Australian Carpet Classification Scheme (ACCS) Number.</b>
Tuftmaster Carpets	Phoenician 48	95051
Tuftmaster Carpets	Sirocco 48	21080
Godfrey Hirst (Aust.)	Kingsgate Town 48oz	98216
Godfrey Hirst (Aust.)	Optima	21003
Cavalier Bremworth	Electra (48 oz)	96066
Westwools Carpets	Dansk 48	96183
		<b>AWTA Test Report Reference Number.</b>
Edwardstown Carpets	Galaxy 6000	7490340

### 1.3 ORDERING AND DELIVERY

Order and confirm delivery instructions with the carpet Preferred Subcontractors not less than 12 weeks prior to the date required and give 2 weeks notice to the carpet Preferred Subcontractors of the required laying date.

Give a copy of the delivery docket to the person with full authority/superintendent on delivery of the material to site with the following details:

- Description of carpet and weight of carpet including ACCS or AWTA reference number (whichever is applicable, refer PREFERRED SUBCONTRACTORS) and underfelt and all details of accessories.

## 2 QUALITY

### 2.1 INSPECTION

#### Notice

Give sufficient notice so that inspection may be made at the following stages:

- Each batch of material upon delivery of the works.
- Back printing on carpet. Specification reference: Materials and Components – Carpets – Back Printing.
- Subfloor prepared to receive the carpet installation.
- Fixings, edge strips and underlay/underfelt ready to lay carpet.

- Completed carpet after cleaning and before covering as specified in *Cleaning and Protection*.

## 2.2 TESTS

### Sample (Where requested)

Provide a minimum 1 m<sup>2</sup> of carpet for testing purposes (the carpet can be in pieces of a minimum dimension of 200 mm x 200 mm, (ie. Preferably 5 pieces 200 mm x 1 m).

Testing of the carpet may be undertaken by Commerce in accordance with the test conditions nominated in the N.S.W. Supply Standing Offer Agreement No. 295.

## 2.3 CONTRACTOR'S SUBMISSIONS

### Floor covering plan

Provide a floor covering plan 28 days prior to installation: To AS 2455

## 2.4 WARRANTY

### Requirement

Before Practical Completion submit a written warranty on all carpet, underlay/underfelt and accessories for a minimum period of 5 years and a minimum period of 12 months on installation.

# 3 MATERIALS AND COMPONENTS

## 3.1 UNIFORMITY

### Batching

Ensure that carpet laid in a single area and of a single type, quality, colour and design comes from a one manufacturing batch and dye lot

### Fire resistance

The Early Fire Indices for carpet in school buildings must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

Submit evidence of such compliance in respect of each type of carpet used.

## 3.2 HARD UNDERLAY

### Standard

Materials and installation generally to AS 2455

### Hardboard Underlay

To AS 2458, Type RD, reduced density board manufactured specifically for flooring underlay, thickness 5.5 mm

### Fibre Cement Underlay

Sheet made from cellulose fibre and cement binders.

Thickness: 5mm minimum



### 3.3 SOFT UNDERLAY

#### Standards

Materials: To BS 5808

Installation: To AS 2455

#### Underlay Options

##### Needled Underfelt

Type: Double sided, high density needled underfelt (State Procurement Standing Offer Agreement No. 295 Item 40).

Minimum Mass (exclusive of reinforcing fabric):		1.735 kg per m <sup>2</sup> (3.175 kg per linear metre)
Nominal Thickness:		12 mm (approx.)
Width:		1830 mm
Wad Composition (minimum):	Animal hair:	60%
	Jute:	40%
Identification:		Gold or yellow identification strip needled into the product

OR

#### Synthetic Foam Underlay

Type:	High density bonded polyurethane foam underlay (NSW Supply Standing Offer Agreement No. 295 Item 42).
Minimum Mass (exclusive of reinforcing fabric):	120 kg per m <sup>3</sup> .
Nominal Thickness:	7 mm (approx.)
Width:	1830 mm
Identification:	Information printed on product: “Dunlop Excellay” or <b>MJS Project Gold</b> .

OR

#### Rubber Underlay

Type: Highly resilient natural rubber underlay, suitable for use as a conventional lay product (State Procurement Standing Offer Agreement No. 295 Item 52).

Minimum Mass (exclusive of reinforcing fabric):	3000 g/m <sup>2</sup>
Nominal Thickness:	6.9 mm
Width:	1200 mm
Identification:	Red identification strip printed on product

**OR****Textile Underlay**

Type: High performance pad underlay conforming with AS 4288 manufactured using recycled textile fabric using the following blends (State Procurement Standing Offer Agreement No. 295 Item 72).

- 30% wool (nominal)
- 25% cotton (nominal)
- 30% synthetic fabric (nominal)
- 15% virgin polyester fibre (nominal)

Thickness:	9.0 mm (+/-12%)
Width:	1830 mm standard
Weight:	900 g/m <sup>2</sup> (+/- 50)
Flammability:	Complies with AS2404
Identification:	Continuous blue identification strip printed on product

**Bonded Polyurethane Foam****Location**

Fitness Learning Unit

Type:	High density SBR latex foam, suitable for use as a double bonding or conventional lay product OR Bonded polyurethane foam (NSW Supply Standing Offer Agreement No. 295 Item 44)
Density, bonded polyurethane foam:	120kg/m <sup>3</sup> (nominal)
Thickness, bonded polyurethane foam:	10mm (nominal)
Width, bonded polyurethane foam:	1800mm (nominal)
Adhesive:	If adhesive is being used it must be approved by the underlay manufacturer.

**3.4 ADHESIVES****Standard**

Non solvent, low odour commercial grade adhesive suitable for double bonding and direct stick application to AS 2455

**Contact Adhesive**

Industrial grade thixotropic (gel) (only to be used where carpet is to be applied to vertical surfaces).

When contact adhesive is used no more than 1 x 4-litre container is permitted to be taken onto the works area.

### 3.5 TAPES

#### Heat Bonding Tapes

Conventionally laid tufted and woven carpets are to be joined using low odour and low smoke commercial grade glass fibre and cotton thermoplastic adhesive coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicon- coated release paper.

### 3.6 GRIPPER STRIP

#### Preformed Gripper Strip

All conventionally laid carpet is to be installed on commercial grade architectural type gripper.

Commercial grade architectural type carpet gripper (State Procurement Standing Offer Agreement No. 295 Item 70).

Length:	1200 mm
Thickness:	Minimum - 6.8 mm, Maximum 8.00 mm
Width:	Minimum - 33 mm
Pins:	Minimum - 3 rows in width, 98 per unit
Plywood:	Minimum 3 ply (must be evenly sized veneers)

#### Location

At all edges except where edge strips are specified.

### 3.7 EDGE STRIPS

#### Product

Heavy duty extruded aluminium (State Procurement Standing Offer Agreement No. 295 Item 55).

Material: Extruded aluminium

Type: Pin type, heavy duty (commercial quality)

#### Location

At exposed edges of carpet, and at junctions with dissimilar floor finishes or finishes of different thickness. Where edge strips occur in doorways, locate them so as to be out of sight under the closed door if possible.

Junctions between carpet and resilient flooring: The edge carpet edge strip must effectively cover the exposed edge of the resilient floor.

Specification reference: RESILIENT FLOORING – SHEET AND TILE INSTALLATION

Where edge strips occur in doorways, locate them so as to be out of sight under the closed door if possible

### 3.8 STAIR NOSING

#### Product

Aluminium stair nosing with vinyl inserts (State Procurement Standing Offer Agreement No. 295 Item 54).

Material:	Extruded aluminium
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Type:	Heavy duty (commercial quality)
Inserts:	Vinyl, black

**Location**

Specification Reference: "CARPET - LAYING ON STAIRS"

**3.9 CARPETS – BACK PRINTING**

Carpet: All carpet must have the following information printed on the back of the product for the entire length. (Refer: State Procurement Standing Offer Agreement No. 295).

All carpets (excluding Edwardstown Carpets - Galaxy 6000)

- ACCS (Australian Carpet Classification Scheme) Number. Specification reference: CARPETS - PREFERRED SUBCONTRACTORS or SELECTED SUBCONTRACTORS.

Edwardstown Carpets - Galaxy 6000

- AWTa Test Report Reference Number. Specification reference: CARPETS - PREFERRED SUBCONTRACTORS or SELECTED SUBCONTRACTORS

Carpet without the back printing is not acceptable and will be rejected.

**3.10 CARPET****Carpet Type (100% Wool)**

Tufted, Level Loop (State Procurement Standing Offer Agreement No. 295 Item 5)

Gauge:	3.175 mm or 2.54 mm	
Yarn:	100% wool, 2 or 3 ply	
Pile Fibre:	100% international blend wools containing speciality wools with crimp and/or medullation.	
Style:	Heather appearance	
Fibre Quality:	Averaging not less than 33 microns when measured according to AS 2001.2.1	
Total Pile Mass:	1627 grams per m <sup>2</sup> +/- 5% to AS 2111.11	
Width:	Standard broadloom width 3660 mm +/- 1.5% to AS 1385	
Tuft Withdrawal Force:	35 newtons (minimum) to AS 2111.15	
Pile Height (Above Backing):	4-5 mm (approx) to AS 2111.5	
Backing:	Primary:	Heat stabilised woven polypropylene with minimum mass of 117 grams per m <sup>2</sup>
	Secondary:	300 grams per m <sup>2</sup> woven jute
Secondary Backing Adhesion:		40 newtons (minimum) to AS 2111.16
Extractable Matter:		1.5% (maximum) to AS 2001.3.4
Colour Fastness To:	Light:	Minimum 5-6 to BS 1006.B02

	Shampoo:	3-4 (minimum) to AS 2111.19.2
	Rubbing:	3-4 (minimum) to AS 2111.19.1
	Dry Cleaning Solvents:	3-4 (minimum) to AS 2001.4.16
Proofing Treatment:		When tested the carpet must meet the requirements of AS 2001.6.1 for the treatment of wool fibres against moth and beetle attack.

Colour Selection: Refer: AS ADVISED BY Principals Authorised Person

**OR**

**Carpet Type (90% Wool 10%  
Spaced Dyed Nylon)**

Tufted, level loop (NSW Supply Standing Offer Agreement No. 295 Item 10).

Gauge:		3.175 mm or 2.54 mm
Pile Fibre:		90% international blend wools containing speciality wools with crimp and/or medullation, 10% space dyed nylon (as highlighter) or 100% international blend with highlight yarn
Wool Fibre Quality:		Averaging not less than 33 microns when measured according to AS 2001.2.1
Nylon Fibre Quality:		Not less than 15 denier per filament and containing carbon polymer filaments or similar sufficient to reduce electrostatic generation.
Yarn:		Wool 2 or 3 ply, with a spaced dyed nylon 2 or 3 ply yarn or wool 2 to 3 ply (as highlighter).
Style and Colouration:		Loop pile (with spaced dyed nylon or wool highlighter).
Total Pile Mass:		1627 grams per m <sup>2</sup> +/- 5% to AS 2111.11-
Width:		Standard broadloom width 3660 mm +/- 1.5% to AS 1385
Tuft Withdrawal Force:		35 newtons (minimum) to AS 2111.15
Pile Height (Above Backing):		4-5 mm (approx) to AS 2111.5/6/7
Backing:	Primary:	Heat stabilised woven polypropylene with minimum mass of 117 grams per m <sup>2</sup>
	Secondary:	300 grams per m <sup>2</sup> woven jute
Secondary Backing Adhesion:		40 newtons (minimum) to AS 2111.16
Extractable Matter:		1.5% (maximum) to AS 2001.3.4
Colour Fastness To:	Light:	5-6 (minimum) to BS 1006.B02
	Shampoo:	3-4 (minimum) to AS 2111.19.2

	Rubbing:	3-4 (minimum) to AS 2111.19.1
	Dry Cleaning Solvents:	3-4 (minimum) to AS 2001.4.16
Proofing Treatment:		When tested the carpet must meet the requirements of AS 2001.6.1 for the treatment of wool fibres against moth and beetle attack.

Colour Selection: Refer: AS ADVISED BY Principals Authorised Person

### 3.11 MATS

#### Anti static mat

##### Type

Anti static floor mat with anchors on underside to prevent slipping on carpet. The mat is to be dissipative of static electricity and free of carbon fibre and ribbon.

Standards: Anti static floor mat to comply with AS 2834 Computer Accommodation.

Colour: Clear.

#### Floor mat - Carpet overlay (electrostatic)

##### Type

Colourfast polypropylene fibre pile electrostatic mat with a polyester primary backing bonded to a high quality vinyl base designed to avoid slipping on carpet.

##### Finish (colour)

As nominated in the Principals Authorised Person

#### Cork mat

Description: Bonded cork vulcanised mat to form a dense durable resilient floor unit with anti-slip and anti-fatigue characteristics.

Alternative: Bonded rubber mat from recycled tyres to form a dense durable resilient floor unit with anti-slip and anti-fatigue characteristics.

General:

- Comply with OH&S requirements
- Anti slip surface
- Anti trip taper sides

Thickness: 10mm minimum

Colour: Grey

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## 4 EXECUTION

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### 4.1 LAYING PRACTICE

#### Standard

Where carpet is nominated, lay carpet, underlay/underfelt (except for stairs and ramps where direct stick method may be used) and accessories to AS 2455 unless otherwise specified.

#### Subfloor Preparation

Suitably prepare the subfloor to receive the carpet installation, including but not necessary limited to:

#### Stripping and Cleaning

Remove foreign and deleterious materials, including existing floor coverings and any surface treatment, that could adversely affect adhesion, and leave the surface dust-free and clean.

#### Repairs

Make good to the surface finish as necessary. Fill depressions with a suitable filler, and remove high spots and projections.

#### Fixtures

Remove doorstops and the like items, and refix in position and undamaged on completion of the installation.

#### Timber Subfloors

Basic sand to produce even plane surface.

#### Subfloor Dryness

Test the subfloor for dryness by the hygrometer test specified in AS 2455 Appendix B. Do not commence installation until the test shows a satisfactory result. If necessary provide artificial means for drying out the subfloor before installation.

### 4.2 LAYING PROCEDURE

#### Layout

Do not vary layout shown on carpet Floor Covering Plans without approval of the Superintendent's Representative.

#### Seaming Method

Tufted Carpet: Specification reference CARPET – MATERIALS AND COMPONENTS – TAPES.

Woven carpet: Specification reference CARPET – MATERIALS AND COMPONENTS – TAPES.

Seam Adhesive: To AS/NZS 2455 – 3.3.2 Methods of seaming and cross-joining.

#### Dye Batching

Carpets laid in a single area must be of a single specified type, quality, colour and design and comes from one manufacturing batch and dye lot.

#### Power Stretching

A Power Stretcher must be used in all areas where conventional installation method is used.

#### Cross Joins

Carpet in high traffic areas is to be free of cross-joins. The entire job is to be planned with a minimum of cross-joins, without resulting in excess wastage.

Do not use carpet infill strips in doorways. Avoid cross-joins in doorways where possible, where unavoidable cross-joins occur at doorways, locate the joins directly below the closed doors.

#### Fixing

Gripper Strip (Carpet Gripper): Using preformed gripper strip and tackless edge strip. Space fixings at 150mm centres

The gripper is to be fixed as necessary by a combination of:

- Nailing with suitable nails
- Sticking with anchor weld or equivalent adhesive
- Drill, plug and screw
- Edge Strip (Finishing Strip): To AS 2455

### 4.3 LAYING ON STAIRS

#### Fixing Method

To concrete stairs: Adhesive Fixing

To timber stairs:

- Closed rise types: Tackless method, with a gripper strip in each angle between treads and risers.
- Open Rise Types: Adhesive Fixing

#### Laying method

Closed rise types: Apply the floor covering continuously to the treads and risers.

Open Rise Types: Wrap the carpet around the tread and neatly butt join beneath the nosing if a separate nosing is specified, or if not, in the centre of the underside of the tread

**Stair nosing type:** Specification reference: CARPET - MATERIALS AND COMPONENTS - STAIR NOSING

### 4.4 CARPETING VERTICAL SURFACES

#### Method

Adhesive fix carpets directly to vertical surfaces to heights and areas indicated on the drawings and as indicated in the SCHEDULE OF FINISHES.

### 4.5 PENETRATIONS

#### Cutting laid carpet

Where penetrations through laid carpet are necessary for electrical, telephone and other outlets, cut the carpet either by cross cutting or by cutting rectangular or circular openings. Where approval has been obtained for the cutting of holes through the concrete floors, protect the carpet and remove concrete particles and dust on completion. Replace the cut carpet over the opening without any signs of fraying or other damage, and fix with a peel-up adhesive, or resew to approval.



## **4.6 CLEANING AND PROTECTION**

### **Cleaning up**

Progressively clean the work by removing waste, excess materials, adhesive and the like.

### **Final cleaning**

When the installation is complete, clean the carpet as necessary to remove extraneous matter, marks, soiling and the like and to lift the pile where appropriate.

### **Protection**

To AS 2455 leave the finished work undamaged on completion.

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## **5 COMPLETION**

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### **5.1 COMPLETION**

#### **Maintenance manual**

##### **Requirement**

Provide a maintenance manual containing a technical specification of the carpet installation and setting out the manufacturer's recommendation, approved by the Australian Wool Corporation for its use, care and maintenance. Include the names and addresses of the suppliers, **manufacturers and range names and colour** of each component

##### **Certification**

Provide a certification that the carpet is in accordance with the specification, include in the certification the total pile mass of the carpet to AS2111.11

PAINTING
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **painting** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following work sections and Appendices:

Structural Steel

Appendix A: Surface preparation for painting

**1.2 STANDARDS****General**

Painting: Comply with the recommendations of those parts of AS/NZS 2311 and AS/NZS 2312 which are referenced in this worksection.

**1.3 INTERPRETATION****Definitions**

Standard: To AS/NZS 2310.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection of work may be made at the following stages:

- Painting stages:
  - . Completion of surface preparation.
  - . After application of prime or seal coats.
  - . After application of undercoat.
  - . After application of each subsequent coat.
- Clear finishing stages:
  - . Before surface preparation of timber.
  - . Completion of surface preparation.
  - . After staining.
  - . After sanding of sealer.
  - . After application of each clear finishing coat.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Fire retardant systems**

Minimum indices, when tested to AS/NZS 1530.3, on a substrate representative of the intended use, for paint systems specified as “Low flame spread” or “Fire retardant”:

- Spread of flame index: 3.
- Sum of Ignitability index and Heat evolved index: 7.
- Smoke developed index: 3.

**2.3 SAMPLES****Clear finish coated samples**

Submit pieces of timber or timber veneer matching the timber to be used in the works, prepared, puttied, stained, sealed and coated in accordance with the specified system, of sufficient size so that, each piece can be cut into 4 segments, marked for identification, and distributed as directed.

**Coated samples**

Submit, on representative substrates, 1 m<sup>2</sup> samples of each coating system showing surface preparation, colour, gloss level, texture, and physical properties.

**Wet samples**

Submit two 500 mL samples, clearly labelled, of each type of paint to be tested.

**2.4 SUBMISSIONS****Materials**

Manufacturer’s data: Submit the paint manufacturer’s published material safety data sheets (MSDS) showing the health and safety precautions to be taken during application.

Proprietary materials: If the brand of paint has not been specified, submit the proposed brand of paint and paint line, at least 3 weeks before the paint is required.

**3 MATERIALS****3.1 MATERIALS AND COMPONENTS****Paints**

GPC specifications: Provide paints and other materials which are scheduled in the Australian Paint Approvals Scheme “List of Approved Products” as complying with cited GPC specifications.

Quality: Provide premium quality lines.

**Paints**

Quality: Premium quality lines must be used.

- Specification reference: PAINT SYSTEMS – PAINT SYSTEMS SCHEDULES.

Acrylic paints: To be low odour and low VOC.

**Combinations**

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

Clear timber finish systems: Provide only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

**Delivery**

Deliver paints to the site in the manufacturer's labelled and unopened containers. Ensure containers of materials specified by a GPC specification code are labelled accordingly.

**Tinting**

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

Tinting by contractor: Add tinters or stainers only if this is without detriment to the durability or aesthetic performance of the product.

**Putty**

General: Oil-based or polymeric based.

Putty for timber finishes: Lacquer or water based. Do not provide oil based or glazing putty.

**Toxic ingredients**

Comply with the requirements of Appendix P "Uniform Paint Standard" to the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

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**4 EXECUTION****4.1 PAINTING****Standards**

All work is to be carried out in a Tradesman like manner.

General: To AS/NZS 2311 Sections 3, 6 and 7.

Protection of steelwork: To AS/NZS 2312 Sections 5, 8 and 10.

**Order of work**

Other trades: Before painting, complete the work of other trades as far as practicable within the area to be painted, except for installation of fittings, floor sanding and laying flooring materials.

Clear finishes: Complete clear timber finishes before commencing opaque paint finishes in the same area.

**Protection**

Fixtures: Remove door furniture, switch plates, light fittings, notice boards, and other fixtures before starting to paint, and refix in position undamaged on completion of the installation. Protect all furniture and fittings from paint splashes. All loose and fixed furniture must be restored to its original position on completion of the paintwork within each area, and the area thoroughly cleaned.

Adjacent surfaces: Protect adjacent finished surfaces liable to damage from painting operations.

**"Wet paint" warning**

Place notices conspicuously and do not remove them until paint is dry.

**Restoration**

Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition. Touch up damaged decorative paintwork or misses only with the paint batch used in the original application.

**Substrate preparation**

**General: Prepare substrates to receive the painting systems in accordance with AS2311 Sections 3, 7 and Appendix A: Surface preparation for painting.**

Cleaning: Clean down the substrate surface. Do not cause undue damage to the substrate or damage to, or contamination of, the surroundings.

Filling: Fill cracks and holes with fillers, sealants, putties or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

Feather back all edges to remaining paint layers adjacent to areas where paint has been removed prior to applying any new paint coats.

Clear finish: Provide filler tinted to match the substrate.

Clear timber finish systems: Prepare the surface so that its attributes will show through the clear finish without blemishes, by methods which may involve

- removal of bruises;

- removal of discolourations, including staining by oil, grease and nailheads;
- bleaching where necessary to match the timber colour sample;
- puttying; or
- fine sanding (last abrasive no coarser than 220 grit) to show no scratches across the grain.

**Drying**

Use a moisture meter to demonstrate that the moisture content of the substrate is at or below the recommended maximum level for the type of paint and the substrate material.

**Paint application**

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

Any paint applied to timber surfaces with a roller must be laid off with a brush immediately.

**Light levels**

During preparation of surfaces, painting, and inspection, maintain light levels such that the luminance (photometric brightness) of the surface is equal to the specified permanent artificial illumination conditions or 400 lux, whichever is the greater.

**Spraying**

Under no circumstances is paint to be sprayed without the prior approval of the Superintendent.

General: If the paint application is by spraying, use airless equipment which

- satisfactorily atomises the paint being applied;
- does not require the paint to be thinned beyond the maximum amount recommended by the manufacturer; and
- does not introduce oil, water or other contaminants into the applied paint.

**Priming before fixing**

Apply one coat of wood primer (2 coats to end grain) to the back of the following before fixing in position:

- External fascia boards.
- Timber door and window frames.
- Bottoms of external doors.
- Associated trims and glazing beads.
- Timber board cladding.

**Sanding**

Clear finishes: Sand the sealer using the finest possible abrasive (no coarser than 320 grit) and avoid cutting through the colour. Take special care with round surfaces and edges.

**Repair of galvanizing**

General: For galvanized surfaces which have been subsequently welded, prime the affected area.

Primer: To GPC-C-29/16, two pack.

**Services**

If exposed to view, paint new services and equipment including in plant rooms, except chromium, anodised aluminium, GRP, UPVC, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Repaint proprietary items only if damaged.

**4.2 PAINT SYSTEMS****Paint system description**

Final coat: If a paint or clear finish system is referred to only by its final coat (for example by the manufacturer's brand name, or the generic name) provide in addition to the final coat, the appropriate stains, primers, sealers and undercoats, suitable for the substrate and compatible with the finish coat and each other.

No system description given: If a surface is to be painted but no system is nominated select the system from AS/NZS 2311 clause 5.1, using System 1 where a choice is offered.

#### Number of coats

Unless specified as one coat or two coat systems, each paint system consists of at least 3 coats. Provide additional coats if necessary to

- prepare porous or reactive substrates with prime or seal coats consistent with the manufacturer's recommendations;
- achieve the total film thickness or texture; or
- achieve a satisfactory opacity.

#### Tinting

Tint each coat of an opaque coating system so that each has a noticeably different tint from the preceding coat, except for top coats in systems with more than one top coat.

#### Paint systems schedules

General: These schedules specify, for each of the paint systems listed in the **Painting schedules**, and for each substrate to which those systems are applied in the project,

- the number and order of coats; and
- the paint type for each coat.

Codes: Codes are GPC Specification codes.

#### Flat latex: Interior

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	L-26/6	L-26/6	
Existing paintwork (latex)	L-26/6	L-26/6	
Concrete	S-17/2	L-26/6	L-26/6
Tilt-up concrete	S-17/1	L-26/6	L-26/6
Cement render	S-17/2	L-26/6	L-26/6
Fibre cement	S-17/2	L-26/6	L-26/6
Masonry	S-17/2	L-26/6	L-26/6
Set plaster	S-17/1	L-26/6	L-26/6
Fibrous plaster	S-17/1	L-26/6	L-26/6
Glass reinforced gypsum plaster	S-17/1	L-26/6	L-26/6
Plasterboard (paper faced)	S-17/2	L-26/6	L-26/6
Iron & steel	P-32	L-26/6	L-26/6
Aluminium	P-35/4	L-26/6	L-26/6
Zinc-coated and zinc-alloy-coated steel	P-13/4	L-26/6	L-26/6
Oil-based air-drying primed metal	L-26/6	L-26/6	
Organic or inorganic zinc primed metal	S-17/1	L-26/6	L-26/6
Timber	P-18/3	L-26/6	L-26/6
Particleboard	P-18/3	L-26/6	L-26/6
Medium density fibreboard	S-17/2	L-26/6	L-26/6
Hardboard, unprimed	P-18/3	L-26/6	L-26/6
Pre-primed board	L-26/6	L-26/6	
Organic fibreboard	P-18/3	L-26/6	L-26/6
UPVC	U-16/1	L-26/6	L-26/6

Substrate	1st Coat	2nd Coat	3rd Coat
Glass reinforced plastic	C-29/7 (primer)	L-26/6	L-26/6

**Low gloss latex: Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	L-26/5	L-26/5	
Existing paintwork (latex)	L-26/5	L-26/5	
Concrete	S-17/2	L-26/5	L-26/5
Tilt-up concrete	S-17/1	L-26/5	L-26/5
Cement render	S-17/2	L-26/5	L-26/5
Sprayed ceiling	S-17/2	L-26/5	L-26/5
Fibre cement	S-17/2	L-26/5	L-26/5
Masonry	S-17/2	L-26/5	L-26/5
Set plaster	S-17/1	L-26/5	L-26/5
Fibrous plaster	S-17/1	L-26/5	L-26/5
Glass reinforced gypsum plaster	S-17/1	L-26/5	L-26/5
Plasterboard (paper faced)	S-17/2	L-26/5	L-26/5
Iron & steel	P-32	L-26/5	L-26/5
Aluminium	P-35/4	L-26/5	L-26/5
Zinc-coated and zinc-alloy-coated steel	P-13/4	L-26/5	L-26/5
Oil-based air-drying primed metal	L-26/5	L-26/5	
Organic or inorganic zinc primed metal	S-17/1	L-26/5	L-26/5
Timber	P-18/3	L-26/5	L-26/5
Particleboard	P-18/3	L-26/5	L-26/5
Medium density fibreboard	S-17/2	L-26/5	L-26/5
Hardboard, unprimed	P-18/3	L-26/5	L-26/5
Pre-primed board	L-26/5	L-26/5	
Organic fibreboard	P-18/3	L-26/5	L-26/5
UPVC	U-16/1	L-26/5	L-26/5
Glass reinforced plastic	C-29/7 (primer)	L-26/5	L-26/5

**Flat or low gloss latex: Exterior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	L-26/3	L-26/3	
Existing paintwork (latex)	L-26/3	L-26/3	
Tilt-up concrete	S-17/1	L-26/3	L-26/3
Concrete	L-26/3	L-26/3	
Cement render	L-26/3	L-26/3	
Fibre cement	L-26/3	L-26/3	
Compressed fibre cement	S-17/1	L-26/3	L-26/3
Masonry	L-26/3	L-26/3	

Substrate	1st Coat	2nd Coat	3rd Coat
Iron & steel	P-32	L-26/3	L-26/3
Aluminium	P-35/4	L-26/3	L-26/3
Zinc-coated and zinc-alloy-coated steel	P-13/4	L-26/3	L-26/3
Oil-based air-drying primed metal	L-26/3	L-26/3	
Organic or inorganic zinc primed metal	L-26/3	L-26/3	
Cat. epoxy zinc phosphate primed metal	L-26/3	L-26/3	
Timber	P-18/3	L-26/3	L-26/3
Exterior grade hardboard	P-18/1	L-26/3	L-26/3
UPVC	L-26/3	L-26/3	
Glass reinforced plastic	C-29/7 (primer)	L-26/5	L-26/3

**Semi-gloss latex: Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	L-27	L-27	
Existing paintwork (latex)	L-27	L-27	
Concrete	S-17/2	L-27	L-27
Tilt-up concrete	S-17/1	L-27	L-27
Cement render	S-17/2	L-27	L-27
Sprayed ceiling	S-17/2	L-27	L-27
Fibre cement	S-17/2	L-27	L-27
Masonry	S-17/2	L-27	L-27
Set plaster	S-17/1	L-27	L-27
Fibrous plaster	S-17/1	L-27	L-27
Glass reinforced gypsum plaster	S-17/1	L-27	L-27
Plasterboard (paper faced)	S-17/2	L-27	L-27
Iron & steel	P-32	L-27	L-27
Aluminium	P-35/4	L-27	L-27
Zinc-coated and zinc-alloy-coated steel	P-13/4	L-27	L-27
Oil-based air-drying primed metal	L-27	L-27	
Organic or inorganic zinc primed metal	S-17/1	L-27	L-27
Timber	P-18/3	L-27	L-27
Particleboard	P-18/3	L-27	L-27
Medium density fibreboard	S-17/2	L-27	L-27
Hardboard, unprimed	P-18/3	L-27	L-27
Pre-primed board	L-27	L-27	
Organic fibreboard	P-18/3	L-27	L-27
UPVC	U-16/1	L-27	L-27
Glass reinforced plastic	C-29/7 (primer)	L-27	L-27

**Semi-gloss latex: Exterior**

Substrate	1st Coat	2nd Coat	3rd Coat
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Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	L-169	L-169	
Existing paintwork (latex)	L-169	L-169	
Concrete	L-169	L-169	
Tilt-up concrete	S-17/1	L-169	L-169
Cement render	L-169	L-169	
Fibre cement	L-169	L-169	
Compressed fibre cement	S-17/1	L-169	L-169
Masonry	L-169	L-169	
Iron & steel	P-32	L-169	L-169
Aluminium	P-35/4	L-169	L-169
Zinc-coated and zinc-alloy-coated steel	P-13/4	L-169	L-169
Oil-based air-drying primed metal	L-169	L-169	
Organic or inorganic zinc primed metal	L-169	L-169	
Cat. epoxy zinc phosphate primed metal	L-169	L-169	
Timber	P-18/3	L-169	L-169
Exterior grade hardboard	P-18/3	L-169	L-169
UPVC	L-169	L-169	
Glass reinforced plastic	C-29/7 (primer)	L-169	L-169

**Gloss latex: Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	L-164	L-164	
Existing paintwork (latex)	L-164	L-164	
Concrete	S-17/2	L-164	L-164
Tilt-up concrete	S-17/1	L-164	L-164
Cement render	S-17/2	L-164	L-164
Sprayed ceiling	S-17/2	L-164	L-164
Fibre cement	S-17/2	L-164	L-164
Masonry	S-17/2	L-164	L-164
Set plaster	S-17/1	L-164	L-164
Fibrous plaster	S-17/1	L-164	L-164
Glass reinforced gypsum plaster	S-17/1	L-164	L-164
Plasterboard (paper faced)	S-17/2	L-164	L-164
Iron & steel	P-32	L-164	L-164
Aluminium	P-35/4	L-164	L-164
Zinc-coated and zinc-alloy-coated steel	P-13/4	L-164	L-164
Oil-based air-drying primed metal	L-164	L-164	
Organic or inorganic zinc primed metal	S-17/1	L-164	L-164
Timber	P-18/3	L-164	L-164
Particleboard	P-18/3	L-164	L-164
Medium density fibreboard	S-17/2	L-164	L-164

Substrate	1st Coat	2nd Coat	3rd Coat
Hardboard, unprimed	P-18/3	L-164	L-164
Pre-primed board	L-164	L-164	
Organic fibreboard	P-18/3	L-164	L-164
Glass reinforced plastic	C-29/7 (primer)	L-164	L-164

**Gloss latex: Exterior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	L-28	L-28	
Existing paintwork (latex)	L-28	L-28	
Concrete	L-28	L-28	
Tilt-up concrete	S-17/1	L-28	L-28
Cement render	L-28	L-28	
Fibre cement	L-28	L-28	
Compressed fibre cement	S-17/1	L-28	L-28
Masonry	L-28	L-28	
Iron & steel	P-32	L-28	L-28
Aluminium	P-35/4	L-28	L-28
Zinc-coated and zinc-alloy-coated steel	P-13/4	L-28	L-28
Oil-based air-drying primed metal	L-28	L-28	
Organic or inorganic zinc primed metal	L-28	L-28	
Cat. epoxy zinc phosphate primed metal	L-28	L-28	
Timber	P-18/3	L-28	L-28
Exterior grade hardboard	P-18/3	L-28	L-28
UPVC	L-28	L-28	
Glass reinforced plastic	C-29/7 (primer)	L-28	L-28

**Semi-gloss, solvent-borne - Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	U-16/1	E-10	E-10
Existing paintwork (latex)	U-16/1	E-10	E-10
Concrete	S-17/2	E-10	E-10
Tilt-up concrete	S-17/1	E-10	E-10
Cement render	S-17/2	E-10	E-10
Sprayed ceiling	S-17/2	E-10	E-10
Fibre cement	S-17/2	E-10	E-10
Masonry	S-17/2	E-10	E-10
Set plaster	S-17/1	E-10	E-10
Fibrous plaster	S-17/1	E-10	E-10
Glass reinforced gypsum plaster	S-17/1	E-10	E-10
Plasterboard (paper faced)	S-17/2	E-10	E-10

Substrate	1st Coat	2nd Coat	3rd Coat
Iron & steel	P-32	E-10	E-10
Aluminium	P-35/4	E-10	E-10
Zinc-coated and zinc-alloy-coated steel	P-13/4	E-10	E-10
Oil-based air-drying primed metal	U-16/1	E-10	E-10
Organic or inorganic zinc primed metal	P-13/4	E-10	E-10
Timber	U-16/1	E-10	E-10
Particleboard	U-16/1	E-10	E-10
Medium density fibreboard	S-17/2	E-10	E-10
Hardboard, unprimed	U-16/1	E-10	E-10
Pre-primed board	U-16/1	E-10	E-10
Organic fibreboard	U-16/1	E-10	E-10
UPVC	E-10	E-10	
Glass reinforced plastic	C-29/7 (Primer)	E-10	E-10

**Full gloss, solvent-borne: Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	U-16/1	E-15/4	E-15/4
Existing paintwork (latex)	U-16/1	E-15/4	E-15/4
Concrete	S-17/2	E-15/4	E-15/4
Tilt-up concrete	S-17/1	E-15/4	E-15/4
Cement render	S-17/2	E-15/4	E-15/4
Sprayed ceiling	S-17/2	E-15/4	E-15/4
Fibre cement	S-17/2	E-15/4	E-15/4
Masonry	S-17/2	E-15/4	E-15/4
Set plaster	S-17/1	E-15/4	E-15/4
Fibrous plaster	S-17/1	E-15/4	E-15/4
Glass reinforced gypsum plaster	S-17/1	E-15/4	E-15/4
Plasterboard (paper faced)	S-17/2	E-15/4	E-15/4
Iron & steel	P-32	E-15/4	E-15/4
Aluminium	P-35/4	E-15/4	E-15/4
Zinc-coated and zinc-alloy-coated steel	P-13/4	E-15/4	E-15/4
Oil-based air-drying primed metal	U-16/1	E-15/4	E-15/4
Organic or inorganic zinc primed metal	P-13/4	E-15/4	E-15/4
Timber	U-16/1	E-15/4	E-15/4
Particleboard	U-16/1	E-15/4	E-15/4
Medium density fibreboard	S-17/2	E-15/4	E-15/4
Hardboard, unprimed	U-16/1	E-15/4	E-15/4
Pre-primed board	U-16/1	E-15/4	E-15/4
Organic fibreboard	U-16/1	E-15/4	E-15/4
UPVC	E-15/4	E-15/4	

Substrate	1st Coat	2nd Coat	3rd Coat
Glass reinforced plastic	C-29/7 (primer)	E-15/4	E-15/4

**Full gloss, solvent-borne: Exterior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	U-16/1	E-15/3	E-15/3
Existing paintwork (latex)	U-16/1	E-15/3	E-15/3
Compressed fibre cement	S-17/1	E-15/3	E-15/3
Iron & steel	P-32	E-15/3	E-15/3
Aluminium	P-35/4	E-15/3	E-15/3
Zinc-coated and zinc-alloy-coated steel	P-13/4	E-15/3	E-15/3
Oil-based air-drying primed metal	U-16/1	E-15/3	E-15/3
Organic or inorganic zinc primed metal	P-13/4	E-15/3	E-15/3
Cat. epoxy zinc phosphate primed metal	E-15/3	E-15/3	
Timber	P-18/1	U-16/1	E-15/3
Pre-primed exterior grade hardboard	U-16/1	E-15/3	E-15/3
UPVC	E-15/3	E-15/3	
Glass reinforced plastic	C-29/7 (primer)	E-15/3	E-15/3

**Texture finish, latex - Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Concrete	C-118/3	C-118/3	
Tilt-up concrete	S-17/1	C-118/3	C-118/3
Cement render	C-118/3	C-118/3	
Fibre cement	C-118/3	C-118/3	
Masonry	C-118/3	C-118/3	
Fibrous plaster	S-17/1	C-118/3	C-118/3
Glass reinforced gypsum plaster	S-17/1	C-118/3	C-118/3
Iron & steel	P-32	C-118/3	C-118/3
Zinc-coated and zinc-alloy-coated steel	P-13/4	C-118/3	C-118/3
Timber	U-16/1	C-118/3	C-118/3
Particleboard	U-16/1	C-118/3	C-118/3
Hardboard, unprimed	U-16/1	C-118/3	C-118/3
Organic fibreboard	U-16/1	C-118/3	C-118/3

**Texture finish, latex: Exterior**

Substrate	System
Concrete	C-117/3 system
Cement render	C-117/3 system
Fibre cement	C-117 system
Masonry	C-117/3 system
Iron & steel	C-117 system

Substrate	System
Zinc-coated and zinc-alloy-coated steel	C-117/3 system
Timber	C-117 system

**One pack varnish clear - Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing clear finish	V-114		
Timber	V-114	V-114	
Particleboard	V-114	V-114	V-114
Medium density fibreboard	V-114	V-114	V-114

**One pack polyurethane clear - Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Concrete	P-208	P-208	P-208
Timber	P-205	P-205	
Particleboard	P-205	P-205	
Cork	P-205	P-205	

**Two pack polyurethane clear: Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Timber	P-206	P-206	P-206
Particleboard	P-206	P-206	P-206
Cork	P-206	P-206	P-206

**Two pack epoxy, water-borne: Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork	E-167	E-167	
Concrete	S-17/1	E-167	E-167
Cement render	S-17/1	E-167	E-167
Fibre cement	S-17/1	E-167	E-167
Masonry	S-17/1	E-167	E-167
Iron & steel	P-32	E-167	E-167
Aluminium	P-35/4	E-167	E-167
Zinc-coated and zinc-alloy-coated steel	P-13/4	E-167	E-167
Oil-based air-drying primed metal	P-32	E-167	E-167
Cat. epoxy zinc phosphate primed metal	E-167	E-167	
Timber	P-18/3	E-167	E-167

**Opaque timber finish, latex, Exterior**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing timber finish (latex)	V-115/3		
Cement render	V-115/3	V-115/3	
Fibre cement	V-115/3	V-115/3	
Masonry	V-115/3	V-115/3	

Substrate	1st Coat	2nd Coat	3rd Coat
Iron & steel	P-32	P-32	V-115/3**
Zinc-coated and zinc-alloy-coated steel	P-13/4	V-115/3	V-115/3
Oil-based air-drying primed metal	V-115/3	V-115/3	
Organic or inorganic zinc primed metal	V-115/3	V-115/3	
Timber	V-115/3	V-115/3	
Particleboard	V-115/3	V-115/3	
Pre-primed board	V-115/3	V-115/3	
Organic fibreboard	V-115/3	V-115/3	
Exterior grade hardboard	V-115/3	V-115/3	
UPVC	V-115/3	V-115/3	
Glass reinforced plastic	C-29/7 (primer)	V-115/3	V-115/3
** 4th Coat V-115/3			

**Semi-transparent oil-based timber finish**

Substrate	1st Coat	2nd Coat
Existing semi-transparent timber finish	V-115/1	
Timber	V-115/1	V-115/1

**Paving paint - Semi gloss**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork	P-200/1		
Concrete	P-200/1	P-200/1	
Fibre cement	P-200/1	P-200/1	
Clay brick	P-200/1	P-200/1	
Timber	P-200/1	P-200/1	
Particleboard	P-200/1	P-200/1	
Cork	P-200/1	P-200/1	

**Roofing paint, latex**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	P-12/3	P-12/3	
Existing paintwork (latex)	P-12/3	P-12/3	
Concrete	P-12/3	P-12/3	
Cement render	P-12/3	P-12/3	
Fibre cement	P-12/3	P-12/3	
Iron & steel	P-32	P-32	P-12/2 **
Zinc-coated and zinc-alloy-coated steel	P-13/4	P-12/2	P-12/2
Oil-based air-drying primed metal	P-12/2	P-12/2	
Organic or inorganic zinc primed metal	P-12/2	P-12/2	
Timber	P-18/3	P-12/3	P-12/3
UPVC	P-12/3	P-12/3	
** 4th Coat P-12/2			

**Roofing paint, solvent-borne**

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent-borne)	P-12/1	P-12/1	
Existing paintwork (latex)	P-12/1	P-12/1	
Iron and steel	P-32	P-12/1	P-12/1
Zinc-coated and zinc-alloy-coated steel	P-13/4	P-12/1	P-12/1
Oil-based air-drying primed metal	P-12/1	P-12/1	
Organic or inorganic zinc primed metal	P-13/4	P-12/1	P-12/1

**Clear water repellent for masonry**

Substrate	1st Coat	2nd Coat
Concrete	M-116/1	M-116/1
Masonry	M-116/1	M-116/1

**Low flame spread coating**

Substrate	System
Existing low flame spread paintwork	Topcoat of relevant system
Concrete	C-64/3
Cement render	C-64/3
Fibre cement	C-64/3
Masonry	C-64/3
Iron and steel	C-64/1 system
Zinc-coated and zinc-alloy-coated steel	C-64/2 system
Timber	C-64/4 system
Particleboard	C-64/4 system

**Clear graffiti barrier**

Substrate	System
Existing paintwork	P-144/1P
Concrete	P-144/1P
Cement render	P-144/1P
Fibre cement	P-144/1P
Masonry	P-144/1P
Timber	P-144/1P

**4.3 PAINT REMEDIATION****Lead Based Paint Remediation**

Paint systems on all school buildings and structures built before 1970 are to be treated as Lead Paint as defined in AS 4361.2–1998 and treated as such.

All work is to be undertaken as set out in Sections 4, 5, 6 and 7 of AS 4361.2–1998, as applicable or as directed by the Principal.

All work, except for minor remedial work, is to be carried out during school holidays. Minor remedial work, being work carried out under Section 4 of AS 4361.2-1998, may be undertaken during school term but not during school hours.

Any other painting or preparation work being carried out at the school at the same time as work under this Clause, shall be carried out in accordance with Sections 6 and 7 of AS 461.2-1998.

Children are to be kept out of work areas, where work is being carried out under Section 5 of AS 4361.2-1998, until the Contractor provides certification under Clause 5.6 of AS 4361.2-1998.

#### 4.4 PAINTING

##### Flat And Low Gloss Paints

Do not use flat or low gloss paints on walls or any surfaces likely to be soiled.

##### Chemical store surface preparation

Floor, new concrete (fully cured 28 days): Surface must be free of curing compounds, oils and grease. Remove laitance by acid etching or mechanical means such as shot blasting or high pressure water blasting. Allow to dry and remove loose sand and dust by vacuum cleaning or sweeping.

Wall, masonry: The surface must be free from surface defects, clean, dry and dust free prior to application.

##### Sectional overhead doors preparation

Door Structure: Abrasive blast clean to AS 1627.4 Class 2.5

##### Priming before fixing )

Apply one coat of wood primer (2 coats to end grain) to the back and ends of the following before fixing in position:

- External fascia and barge boards
- Timber door and window frames
  - bottoms and tops of external timber doors
  - associated trims and glazing beads before fixing
- Timber board cladding.

##### Reconditioning damaged surfaces in galvanised steel

General: For galvanised surfaces that has been subsequently welded or damaged.

- To AS/NZS 4680 Appendix E and AS/NZS 3750.9

#### 4.5 PAINT SYSTEMS

##### Paint systems schedules

GUIDE TO PAINT SYSTEMS.

LISTED BELOW ARE FINISH COAT REQUIREMENTS FOR SCHOOL BUILDINGS

SEMI GLOSS LATEX (ACRYLIC), FOR USE ON INTERNAL WALLS (excluding canteens).

light colour GLOSS LATEX (ACRYLIC), FOR USE ON canteen INTERNAL WALLS and ceilings.

LOW GLOSS LATEX (ACRYLIC) INTERIOR, FOR USE ON INTERNAL CEILINGS. DO-NOT USE ON SURFACES LIKELY TO BE SOILED.

FLAT LATEX (ACRYLIC) INTERIOR, FOR USE ON INTERNAL CEILINGS ONLY. DO-NOT USE ON WALLS OR ANY OTHER SURFACES LIKELY TO BE SOILED.

FULL GLOSS SOLVENT BORNE INTERIOR, USE ON DOORS, DOOR FRAMES AND TRIM.

SOLVENT-BORNE INTERIOR, must NOT be USED except for DOORS, DOOR FRAMES AND TRIM.

CLEAR POLYURETHANE, DO NOT USE ON EXTERNAL TIMBERS.



FULL GLOSS, SOLVENT-BORNE EXTERIOR, ONLY USE ON EXTERNAL DOORS, DOOR FRAMES, GATES OR OTHER AREAS SUBJECT TO HEAVY WEAR.

FLAT LATEX (ACRYLIC) EXTERIOR, DO-NOT USE ON WALLS OR AREAS LIKELY TO BE SOILED.

GLOSS LATEX (ACRYLIC) EXTERIOR, USE ON EXTERIOR OF BUILDINGS FOR FINISHING PRIMED AND UNDERCOATED TIMBER, AND METAL, FOR PRIMING AND FINISHING MASONRY AND CONCRETE SURFACES.

LOW GLOSS LATEX (ACRYLIC) EXTERIOR, USE ON EXTERIOR OF BUILDINGS FOR PRIMING AND FINISHING MASONRY AND CONCRETE SURFACES.

**PREMIUM QUALITY PAINTS must BE USED FOR THESE SUBSTRATES.**

IF OTHER PAINT SYSTEMS FOR DIFFERENT SUBSTRATES/APPLICATIONS ARE REQUIRED, REFER TO NATSPEC BUILDING TEMPLATE PAINTING SECTION (USE GPC APPROVED PAINTS FOR THESE APPLICATIONS).

ALL PAINTS MUST BE:

- PREMIUM QUALITY PAINTS
- COMPLY WITH GPC SPECIFICATION

Proprietary Items: Refer to the following Paint Manufacturers Schedule.

**Gloss latex (acrylic): Interior (canteens) (**

Substrate, Walls	1st Coat	2nd Coat	3rd Coat
Concrete, Cement render, Fibre cement, Masonry, Plasterboard (paper faced),	*Dulux Acrylic Sealer Undercoat OR *Taubmans Ultraprep undercoat OR *Pascol Easy - Prep Undercoat OR *Bristol Easy Living Sealer Undercoat	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss.  *Pascol Gloss Acrylic  *Bristol Easy Living Gloss	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss.  *Pascol Gloss Acrylic  *Bristol Easy Living Gloss
Set plaster, Fibrous plaster, Glass reinforced gypsum plaster, Organic or inorganic zinc primed non-structural metal.	*Dulux Sealer binder OR *Taubmans Petriseal All Purpose Sealer OR *Pascol Uniseal OR *Bristol Pigmented Oil Sealer	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss.  *Pascol Gloss Acrylic  *Bristol Easy Living Gloss	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss.  *Pascol Gloss Acrylic  *Bristol Easy Living Gloss

Substrate, Walls	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent borne)	*Dulux Oil Based Undercoat OR *Taubmans All Purpose Undercoat OR *Pascol All Purpose Undercoat OR *Bristol Supreme Interior Undercoat	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss (Acrylic)  *Pascol Gloss (Acrylic)  *Bristol Easy Living Gloss (Acrylic)	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss (Acrylic)  *Pascol Gloss (Acrylic)  *Bristol Easy Living Gloss (Acrylic)
Existing paintwork (latex borne)	*Dulux Wash & Wear Gloss Acrylic. OR *Taubmans Living Proof Gloss (Acrylic) OR *Pascol Gloss Acrylic OR *Bristol Easy Living Gloss (Acrylic)	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss (Acrylic)  *Pascol Gloss Acrylic  *Bristol Easy Living Gloss (Acrylic)	
Pre primed board, Oil based air-drying primed non-structural metal.	*Dulux Wash & Wear Gloss Acrylic. OR *Taubmans Living Proof Gloss (Acrylic). OR *Pascol Gloss Acrylic OR *Bristol Easy Living Gloss (Acrylic)	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss (Acrylic).  *Pascol Gloss Acrylic  *Bristol Easy Living Gloss (Acrylic)	
Timber, Particleboard, Hardboard (unprimed), Organic fibre board, Medium density fibreboard	*Dulux Exterior Acrylic Primer OR *Taubmans Ultraprep Wood Primer OR *Pascol Acrylic primer / Undercoat OR *Bristol Weathertough Sealer Undercoat	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss (Acrylic).  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Gloss (Acrylic)	*Dulux Wash & Wear Gloss Acrylic.  *Taubmans Living Proof Gloss (Acrylic).  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Gloss (Acrylic)

**Semi gloss latex (acrylic): Interior**

<b>Substrate, Walls</b>	<b>1st Coat</b>	<b>2nd Coat</b>	<b>3rd Coat</b>
Concrete, Cement render, Fibre cement, Masonry, Plasterboard (paper faced),	*Dulux Acrylic Sealer Undercoat OR *Taubmans Ultraprep undercoat OR *Pascol Easy - Prep Undercoat OR *Bristol Easy Living Sealer Undercoat	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin.  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrub Satin	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin.  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrub Satin
Set plaster, Fibrous plaster, Glass reinforced gypsum plaster, Organic or inorganic zinc primed non-structural metal.	*Dulux Sealer binder OR *Taubmans Petriseal All Purpose Sealer OR *Pascol Uniseal OR *Bristol Pigmented Oil Sealer	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin.  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrub Satin	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin.  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrub Satin
Existing paintwork (solvent borne)	*Dulux Oil Based Undercoat OR *Taubmans All Purpose Undercoat OR *Pascol All Purpose Undercoat OR *Bristol Supreme Interior Undercoat	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin (Acrylic)  *Pascol Semi Gloss (Acrylic)  *Bristol Easy Living Scrubbable Satin (Acrylic)	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin (Acrylic)  *Pascol Semi Gloss (Acrylic)  *Bristol Easy Living Scrubbable Satin (Acrylic)
Existing paintwork (latex borne)	*Dulux Wash & Wear Semi Gloss Acrylic. OR *Taubmans Living Proof Satin (Acrylic) OR *Pascol Semi Gloss Acrylic OR *Bristol Easy Living Scrubbable Satin (Acrylic)	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin (Acrylic)  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrubbable Satin (Acrylic)	

Substrate, Walls	1st Coat	2nd Coat	3rd Coat
Pre primed board, Oil based air-drying primed non-structural metal.	*Dulux Wash & Wear Semi Gloss Acrylic. OR *Taubmans Living Proof Satin (Acrylic). OR *Pascol Semi Gloss Acrylic OR *Bristol Easy Living Scrubbable Satin (Acrylic)	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin (Acrylic).  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrubbable Satin (Acrylic)	
Timber, Particleboard, Hardboard (unprimed), Organic fibre board, Medium density fibreboard	*Dulux Exterior Acrylic Primer OR *Taubmans Ultraprep Wood Primer OR *Pascol Acrylic primer / Undercoat OR *Bristol Weathertough Sealer Undercoat	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin (Acrylic).  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrubbable Satin (Acrylic)	*Dulux Wash & Wear Semi Gloss Acrylic.  *Taubmans Living Proof Satin (Acrylic).  *Pascol Semi Gloss Acrylic  *Bristol Easy Living Scrubbable Satin (Acrylic)

**Low gloss latex (acrylic): Interior**

Substrate, Ceilings	1st Coat	2nd Coat	3rd Coat
Concrete, Cement render, Fibre cement, Masonry, Plasterboard (paper faced), Medium density fibreboard	*Dulux Acrylic Sealer Undercoat OR *Taubmans Ultraprep undercoat OR *Pascol Easy Prep Undercoat  OR  *Bristol Easy Living Sealer Undercoat	*Dulux Wash & Wear Low Sheen Acrylic.  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)	*Dulux Wash & Wear Low Sheen Acrylic  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)

Substrate, Ceilings	1st Coat	2nd Coat	3rd Coat
Set plaster, Fibrous plaster, Glass reinforced gypsum plaster, Organic or inorganic zinc primed non-structural metal.	*Dulux Sealer binder OR *Taubmans Petriseal All Purpose Sealer OR *Pascol Uniseal  OR  *Bristol Pigmented Oil Sealer	*Dulux Wash & Wear Low Sheen Acrylic  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)	*Dulux Wash & Wear Low Sheen Acrylic  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)
Existing paintwork (solvent borne)	*Dulux Oil Based Undercoat  OR *Taubmans All Purpose Undercoat OR *Pascol All Purpose Undercoat  OR *Bristol Supreme Interior Undercoat	*Dulux Wash & Wear Low Sheens Acrylic.  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)	*Dulux Wash & Wear Low Sheens Acrylic.  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)
Existing paintwork (latex borne)	*Dulux Wash & Wear Low Sheens Acrylic. OR *Taubmans Living Proof Silk (Acrylic) OR *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic) OR *Bristol Easy Living Low Sheen (Acrylic)	*Dulux Wash & Wear Low Sheens Acrylic.  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)	

Substrate, Ceilings	1st Coat	2nd Coat	3rd Coat
Pre primed board, oil based air-drying primed non-structural metal.	*Dulux Wash & Wear Low Sheen Acrylic. OR *Taubmans Living Proof Silk (Acrylic) OR *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic) OR *Bristol Easy Living Low Sheen (Acrylic)	*Dulux Wash & Wear Low Sheen Acrylic  *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)	
Timber, Particleboard, Hardboard (unprimed), Organic fibre board	*Dulux Exterior Acrylic Primer OR *Taubmans Ultraprep Wood Primer OR *Pascol Acrylic primer / Undercoat  OR *Bristol Weathertough Sealer undercoat	*Dulux Wash & Wear Low Sheen Acrylic *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)	*Dulux Wash & Wear Low Sheen Acrylic *Taubmans Living Proof Silk (Acrylic)  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen (Acrylic)  *Bristol Easy Living Low Sheen (Acrylic)

**Low gloss latex (acrylic): Exterior**

Substrate	1st Coat	2nd Coat	3rd Coat
Concrete, Cement render, Fibre cement, Masonry, Oil based air-drying primed non-structural metal, Organic or inorganic zinc primed non-structural metal, UPVC	*Dulux Weathershield Low Sheen Acrylic OR *Taubmans All Weather Low Sheen OR *Pascol Sunscreen Low Sheen OR *Bristol Weathertough Low Sheen	*Dulux Weathershield Low Sheen Acrylic  *Taubmans All Weather Low Sheen  *Pascol Sunscreen Low Sheen  *Bristol Weathertough Low Sheen	

Substrate	1st Coat	2nd Coat	3rd Coat
Exterior grade hardboard	*Dulux Oil Based Primer  OR *Taubmans Wood Primer  OR *Pascol Wood primer  OR *Bristol Pink Primer	*Dulux Weathershield Low Sheen Acrylic  *Taubmans Timber Top Colour Low Sheen  *Pascol Sunscreen Low Sheen  *Bristol Weathertough Low Sheen	*Dulux Weathershield Low Sheen Acrylic  *Taubmans Timber Top Colour Low Sheen  *Pascol Sunscreen Low Sheen  *Bristol Weathertough Low Sheen
Existing paintwork (solvent & latex borne)	*Dulux Weathershield Low Sheen Acrylic OR *Taubmans Timber Top Low Sheen Acrylic OR *Pascol Sunscreen Low Sheen OR *Bristol Weathertough Low Sheen	*Dulux Weathershield Low Sheen Acrylic  *Taubmans Timber Top Low Sheen Acrylic  *Pascol Sunscreen Low Sheen  *Bristol Weathertough Low Sheen	
Compressed fibre cement	*Dulux Sealer Binder  OR *Taubmans Petriseal All Purpose Sealer OR *Pascol Uniseal  OR *Bristol Pibmented Oil Sealer	*Dulux Weathershield Low Sheen Acrylic  *Taubmans Timber Top Low Sheen Acrylic  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen  *Bristol Weathertough Low Sheen	*Dulux Weathershield Low Sheen Acrylic  *Taubmans Timber Top Low Sheen Acrylic  *Pascol Low Lustre Acrylic or Pascol Sunscreen Low Sheen  *Bristol Weathertough Low Sheen

Substrate	1st Coat	2nd Coat	3rd Coat	4th Coat
Timber	*Dulux Oil Based Primer  OR *Taubmans Wood Primer (oil based)  OR *Pascol Wood Primer (oil based)  OR *Bristol Supreme Pink Primer	*Dulux Solvent Based Undercoat  *Taubmans All Purpose Undercoat (solvent based)  *Pascol All Purpose Undercoat (solvent based)  *Bristol Supreme Exterior Undercoat	*Dulux Weathershield Low Sheen Acrylic  *Taubmans All Weather Low Sheen  *Pascol Sunscreen Low Sheen  *Bristol Timbercoat Low Sheen	*Dulux Weathershield Low Sheen Acrylic  *Taubmans All Weather Low Sheen  *Pascol Sunscreen Low Sheen  *Bristol Timbercoat Low Sheen

**Gloss latex (acrylic): Exterior**

Substrate	1st Coat	2nd Coat	3rd Coat
Concrete, Cement render, Fibre cement, Masonry, Oil based air-drying primed non-structural metal, Organic or inorganic zinc primed non-structural metal, UPVC, Cat. epoxy zinc phosphate primed non-structural metal.	*Dulux Weathershield Gloss Acrylic OR *Taubmans All Weather Gloss OR *Pascol Sunscreen Gloss OR *Bristol Weathertough Gloss Acrylic	*Dulux Weathershield Gloss Acrylic *Taubmans All Weather Gloss *Pascol Sunscreen Gloss *Bristol Weathertough Gloss Acrylic	
Exterior grade hardboard	*Dulux oil based primer  OR *Taubmans Wood Primer  OR *Pascol Wood primer  OR *Bristol Supreme Exterior Undercoat	*Dulux Weathershield Gloss Acrylic  *Taubmans All Weather Gloss  *Pascol Sunscreen Gloss  *Bristol Weathertough Gloss Acrylic	*Dulux Weathershield Gloss Acrylic  *Taubmans All Weather Gloss  *Pascol Sunscreen Gloss  *Bristol Weatherglo Gloss Acrylic



Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (solvent & latex borne)	*Dulux Weathershield Gloss Acrylic OR *Taubmans Sunproof Gloss OR *Pascol Sunscreen Gloss OR *Bristol Weathertough Gloss Acrylic	*Dulux Weathershield Gloss Acrylic *Taubmans Sunproof Gloss *Pascol Sunscreen Gloss *Bristol Weathertough Gloss Acrylic	
Compressed fibre cement	*Dulux Sealer Binder OR *Taubmans Petriseal All Purpose Sealer OR *Pascol Uniseal OR *Bristol Pigmented Oil Sealer	*Dulux Weathershield Gloss Acrylic *Taubmans All Weather Gloss *Pascol Sunscreen Gloss *Bristol Weathertough Gloss Acrylic	*Dulux Weathershield Gloss Acrylic *Taubmans All Weather Gloss *Pascol Sunscreen Gloss *Bristol Weathertough Gloss Acrylic

Timber	1st Coat	2nd Coat	3rd Coat	4th Coat
	*Dulux Oil Based Primer OR *Taubmans Wood Primer (oil based) OR *Pascol Wood Primer (oil based) OR *Bristol Supreme Pink Primer	*Dulux Solvent Based Undercoat *Taubmans All Purpose Undercoat (solvent based) *Pascol All Purpose Undercoat (solvent based) *Bristol Supreme Exterior Undercoat	*Dulux Weathershield Gloss Acrylic *Taubmans All Weather Gloss *Pascol Sunscreen Gloss *Bristol Weathertough Gloss Acrylic	*Dulux Weathershield Gloss Acrylic *Taubmans All Weather Gloss *Pascol Sunscreen Gloss *Bristol Weathertough Gloss Acrylic

**Gloss, latex (acrylic): Interior**

<b>Substrate</b>	<b>1st Coat</b>	<b>2nd Coat</b>	<b>3rd Coat</b>
Timber, Particleboard, Hardboard (unprimed), Pre primed board, Organic fibreboard.	*Dulux Exterior Acrylic Primer  *Taubmans Ultraprep Wood Primer OR *Pascol Acrylic primer/ undercoat OR *Bristol Weather-tough Sealer Undercoat	*Dulux Wash & Wear Gloss Acrylic  *Taubmans Living Proof Gloss (Acrylic)  *Pascol Gloss Acrylic  *Bristol Easy Living Scrubbable Gloss (Acrylic)	* Dulux Wash & Wear Gloss Acrylic  * Taubmans Living Proof Gloss (Acrylic)  * Pascol Gloss Acrylic  * Bristol Easy Living Scrubbable Gloss (Acrylic)
Medium density fibreboard	*Dulux Acrylic Sealer Undercoat OR *Taubmans Ultraprep Undercoat OR *Pascol Easy Prep OR *Bristol Easy Living Sealer Undercoat	* Dulux Wash & Wear Gloss Acrylic  * Taubmans Living Proof Gloss (Acrylic)  *Pascol Gloss (Acrylic)  * Bristol Easy Living Scrubbable Gloss (Acrylic)	* Dulux Wash & Wear Gloss Acrylic  * Taubmans Living Proof Gloss (Acrylic)  *Pascol Gloss (Acrylic)  * Bristol Easy Living Scrubbable Gloss (Acrylic)
Existing paintwork (solvent-borne) Note: Solvent borne topcoats must not be used as over latex (acrylic) paints. Use latex (acrylic) paints	*Dulux oil based undercoat OR *Taubmans All Purpose Undercoat (solvent based) OR *Pascol All Purpose Undercoat (solvent based) OR *Bristol Supreme Interior Undercoat	*Dulux Wash & Wear Gloss Acrylic  *Taubmans Living proof Gloss (Acrylic)  *Pascol Gloss Acrylic  *Bristol Easy Living Gloss (Acrylic)	*Dulux Wash & Wear Gloss Acrylic  *Taubmans Living proof Gloss (Acrylic)  Pascol Gloss Acrylic *Bristol Easy Living Gloss (Acrylic)  Bristol Easy Living Gloss (Acrylic)

Substrate	1st Coat	2nd Coat	3rd Coat
Existing paintwork (latex borne)	*Dulux Wash & Wear Gloss Acrylic OR *Taubmans Living Proof Gloss (Acrylic) OR *Pascol Gloss Acrylic OR *Bristol Easy Living Gloss (Acrylic)	*Dulux Wash & Wear Gloss Acrylic * Taubmans Living Proof Gloss (Acrylic) * Pascol Gloss Acrylic * Bristol Easy Living Gloss (Acrylic)	

**Full gloss, Solvent borne: Interior**

Substrate	1st Coat	2nd Coat	3rd Coat
Timber doors, door frames and trim	*Dulux oil based undercoat OR *Taubmans All Purpose Undercoat OR *Pascol All Purpose Undercoat OR *Bristol Supreme Interior Undercoat	*Dulux Super Enamel High Gloss *Taubmans Ultra Gloss Enamel *Pascol High Gloss Enamel *Bristol Supreme High Gloss Enamel	* Dulux Super Enamel High Gloss * Taubmans Ultra Gloss Enamel * Pascol High Gloss Enamel * Bristol Supreme High Gloss Enamel
Galvanised and Zincalume/ Organic or inorganic zinc primed metal, non-structural.	*Dulux Galvanised Iron Primer OR *Taubman's Ultraprep Undercoat OR Pascol Easy Prep OR *Bristol Weathertough Metal Primer	*Dulux Super Enamel High Gloss *Taubmans Ultra Gloss Enamel *Pascol High Gloss Enamel *Bristol Supreme High Gloss Enamel	*Dulux Super Enamel High Gloss *Taubmans Ultra Gloss Enamel *Pascol High Gloss Enamel *Bristol Supreme High Gloss Enamel

**Full gloss, solvent borne: Exterior**

<b>Substrate</b>	<b>1st Coat</b>	<b>2nd Coat</b>	<b>3rd Coat</b>
Timber	*Dulux Oil Based Primer  OR *Taubmans Wood Primer (oil based)  OR *Pascol Wood Primer (oil based)  OR *Bristol Supreme Pink Primer	*Dulux Oil Based Undercoat  *Taubmans All Purpose Undercoat (solvent based)  *Pascol All Purpose Undercoat (solvent based)  *Bristol Supreme Exterior Undercoat	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel
Iron and steel, non-structural.	*Dulux All Metal Primer x 2 coats OR *Taubmans Rust Stop Metal Primer x 2 coats OR *Pascol All Metal Primer x 2 coats OR *Bristol Stop Rust Red Oxide Primer x 2 coats	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel
Zinc coated and zinc-alloy-coated steel, Organic or inorganic zinc primed metal, non-structural.	*Dulux Galvanised Iron Primer OR *Taubmans Ultraprep Galvanised Iron Primer OR *Pascol Galvanised Iron Primer OR *Bristol Weathertough Metal Primer	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel
Oil based air-drying primed non-structural metal, Pre-primed exterior grade hardwood.	*Dulux oil based undercoat OR *Taubmans All Purpose Undercoat (solvent based) OR *Pascol All Purpose Undercoat (solvent based) OR *Bristol Supreme Exterior Undercoat	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel

Substrate	1st Coat	2nd Coat	3rd Coat
Cat. epoxy zinc phosphate primed metal, non-structural.	*Dulux Hi Gloss OR *Taubmans Ultra Gloss Enamel OR *Pascol High Gloss Enamel OR *Bristol Supreme High Gloss Enamel	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel	
Compress fibre cement	*Dulux Sealer Binder OR *Taubmans Petriseal All purpose sealer OR *Pascol Uniseal OR *Bristol Pigmented Oil Sealer	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel
Existing paintwork (solvent-borne) <b>Note:</b> Solvent borne topcoats must not be used as over latex (acrylic) paints. Use latex (acrylic) paints	*Dulux oil based undercoat OR *Taubmans All Purpose Undercoat (solvent based) OR *Pascol All Purpose Undercoat (solvent based) OR *Bristol Supreme Exterior Undercoat	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel	*Dulux Hi Gloss  *Taubmans Ultra Gloss Enamel  *Pascol High Gloss Enamel  *Bristol Supreme High Gloss Enamel

**Road Marking Paint**

Rapid drying solvent borne coating based on a chlorinated rubber and alkyd resin.

Substrate	1st Coat		
Concrete/Asphaltic Concrete	P-41		

**Line Marking - Operator Zones, Epoxy Finish**

Lead free pigmented polyamide cured epoxy finish.

Substrate	1st Coat	2nd Coat	3rd Coat
Industrial Sheet Flooring	C-29/7(part of system)	E-33/1, C-29/7 (part of system)	E-33/1, C-29/7C (part of system)

**Line Marking, Gymnasium, Enamel (Jun/94)**

Automotive enamel, suitably thinned with appropriated thinners.

Substrate	1st Coat	2nd Coat	
Strip Flooring/Parquet Flooring			

**Protective Coat Systems**

Two pack polyurethane opaque.

\*\*paint reference to AS 2312

Substrate	1st Coat	2nd Coat	3rd Coat
Chemical Store: Substrate Floor, concrete Wall, masonry	6** 100% solids, high build self priming two pack pigmented epoxy coating DFT(Dry Film Thickness): 150-200 microns.	3** 100% solids, high build self priming two pack pigmented epoxy coating DFT: 150-200 microns.	3**

**Coating - Anti Graffiti Barrier, Colourless**

Substrate	1st Coat	2nd coat	
Precast Partitions - Terrazzo	GPC-P-144/1	GPC-P-144/1	

**Tung Oil**

Substrate	1st Coat	2nd Coat
Strip Flooring/Parquet Flooring, Timber		

**High Solid Content Cross-Linked Acrylic Polymer Clear Wood Finish**

Substrate	1st Coat	2nd Coat	3rd Coat
Strip Flooring/Parquet Flooring, Timber			

**Rear - NSW Government Site Signs,**

White, low gloss direct to preprimed wood fibre board.

Substrate	1st Coat	2nd Coat	3rd Coat
Preprimed wood fibre board	GPC-L-26/3.	GPC-L-26/3.	

**Face - NSW Government Site Signs**

Substrate	1st Coat	2nd Coat	3rd Coat
Direct to preprimed wood fibre board.	GPC-C-29/7 (Two pack solvent borne white primer based on an epoxy resin)	Recoatable two pack epoxy acrylic gloss coating. Dry film thickness (DFT): 50 micrometres	

**Framing/Support - NSW Government Site Signs.**

Substrate	1st Coat	2nd Coat	3rd Coat
Mild Steel	AS2312: 6 Two pack solvent borne polyimide cured epoxy primer with zinc phosphate anti-corrosive pigmentation DFT: 75 micrometres	Recoatable two pack epoxy acrylic gloss coating. Dry film thickness (DFT): 50 micrometres	Recoatable two pack epoxy acrylic gloss coating. Dry film thickness (DFT): 50 micrometres

**Acoustic Ceiling - Performance Workshop Type 1 and 2**

Substrate	1st Coat	2nd Coat	3rd Coat
Corrugated metal ceiling or Linear metal ceiling	Factory applied two pack general purpose polyurethane undercoat	Factory applied two pack urethane black matt enamel system.	

**Sectional Overhead Doors, Door Structure.**

Substrate	1st Coat	2nd Coat	3rd Coat
Mild Steel	GPC-C-29/8 Factory applied inorganic zinc primer	Factory applied two pack polyurethane primer	Factory applied two pack polyurethane high gloss coating.

**Line Marking**

Operator Zones.

Application: Mark out zones as set out in the drawings with temporary guide lines and obtain approval by The Person with Full Authority/Superintendent before applying line markings. Refer: LINE MARKING SCHEDULE - PAINTING.

Apply line marking finish when surface is dry.

Seal floor according to manufacturer's recommendations. Refer RESILIENT FINISHES

Allow a minimum of 24 hours before using floor.

Location: Gymnasium .

Application: Mark out courts as set out in the drawings with temporary guide lines and obtain approval by The Person with Full Authority/Superintendent before applying line markings. Refer LINE MARKING SCHEDULE - PAINTING.

Allow first coat of Tung Oil to dry for 12 hours, prior to setting out court markings. Sand lightly the areas of line marking with a medium abrasive pad or steelwool pad. Apply final coats of tung oil and cross-linked polymer clear floor finish after line marking is completely dry and after approval of painter (apply cross-linked polymer clear floor finish after tung oil has been fully cured). Allow to dry for three days before using floor.

Court dimensions

- Basketball court markings: Refer to the current "International Basketball Federation (FIBA)" court dimensions (available through Basketball Australia).
- Netball court markings: Refer to the current "International Federation of Netball Associations" court dimensions (available through Netball Australia)
- Volleyball court markings: Refer to the current "FIVB Official Rules" (available through Sydney Volleyball).

**Road Marking**

To be applied by a specialist line marking contractor.

Games Court dimensions

- Basketball court markings: Refer to the current "International Basketball Federation (FIBA)" court dimensions (available through Basketball Australia).
- Netball court markings: Refer to the current "International Federation of Netball Associations" court dimensions (available through Netball Australia)
- Volleyball court markings: Refer to the current "FIVB Official Rules" (available through Sydney Volleyball).
- Tennis court markings: Refer to "Tennis NSW - Technical Services" for the current court dimensions.

**Coating, Anti Graffiti Barrier, Colourless**

Location: Terrazzo, toilet/shower partitions.

Application

- Must be undertaken by an applicator approved by the manufacturer
- Apply one coat with brush or roller.

**MDF HMR Doors**

Location: Laminated fibre cement toilet/shower partition System. Specification reference: PARTITIONS

Undercoat: One coat of factory applied polyurethane.

Application: Air, airless or air assisted airless equipment.

Finish: Flat.

Finish Coat: One coat of factory applied two pack urethane enamel system.

Application: Airless, air atomisation, electrostatic equipment.

Finish: Gloss.

**Chemical Resistant Finish**

Location: Chemical Store.

Application: Apply two coats of a high build self priming two pack pigmented epoxy coating direct to substrate with a roller (medium to long nap to suit surface roughness) use a brush for cutting in and for small areas.

Mixing: The mix ratio is to be in accordance with the manufacturers printed instructions.

Cure (natural): Seven days.

Cure (fan forced): 8 hrs. at 60 deg. C.

**Sectional Overhead Doors**

Door Structure: Factory applied inorganic zinc primer and two pack polyurethane coatings, in accordance with manufactures printed instructions.

Application: Conventional spray

**4.6 LINE MARKING SCHEDULE**

Location	Surface	Paint system	Colour	Width
Carpark	Asphaltic concrete	Road marking paint	Yellow	50mm
Games Court - Basketball	Asphaltic concrete	Road marking paint	Yellow	50mm
Games Court - Volleyball	Asphaltic concrete	Road marking paint	Red	50mm
Games Court - Netball	Asphaltic concrete	Road marking paint	Green	50mm
Games Court - Tennis	Asphaltic concrete	Road marking paint	White	50mm



Gymnasium - Basketball	Timber	Enamel, Vehicles	Yellow 3-Point Line - Blue	50mm
Gymnasium - Volleyball	Timber	Enamel, Vehicles	Red	50mm
Gymnasium - Badminton	Timber	Enamel, Vehicles	White	38mm
Gymnasium - Netball	Timber	Enamel, Vehicles	Green	50mm

## 5 COMPLETION

### 5.1 COMPLETION

#### Maintenance manual

Submit the paint manufacturer's published recommendations for maintenance.

#### Floor Maintenance

Provide a copy of the manufacturers written instructions for the care and maintenance of the timber floor.

Maintenance Instructions:

- Size: A4 (minimum)
- Instructions: Brief precise text with corresponding graphics.
- Finish: Laminated.
- Location/Distribution: Cleaning Supervisor/Supplies, Cleaning Distributed Stores. Hand one copy to The Person with Full Authority/Superintendent.
- Fasten to wall in a clearly displayed position.

**APPENDIX A**

**TECHNICAL SPECIFICATION OF  
SURFACE PREPARATION FOR PAINTING**

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**A-2 PAINT**

A-2.1 GPC Approved - All paint products shall be approved by the Government Paint Committee. Surface preparation, workmanship and coating procedures shall comply with the Australian Standard 2311-1992 The Painting of Buildings. All paint material on site shall conform and be labelled to the relevent paint GPC number as hereafter listed.

<b>Paint Type</b>	<b>GPC Number</b>	<b>AS number</b>
Flat paint, solvent-borne	N/A	3730.4
Low gloss paint, solvent-borne	N/A	N/A
Semi-gloss paint, solvent-borne	E-10	3730.5
Gloss paint, solvent-borne	N/A	N/A
Full gloss paint, solvent-borne:		
Exterior	E-15/3	3730.6
Interior	E-15/4	3730.11
Flat latex paint:		
Exterior	L-26/3	3730.7
Interior	L-26/4	3730.1

Paint Type	GPC Number	AS number
Low gloss latex paint:		
Exterior	L-26/3	3730.8
Interior	L-26/5	3730.3
Semi-gloss latex paint:		
Exterior	L-169	3730.9
Interior	L-27	3730.2
Gloss latex paint:		
Exterior	L-28/1	3730.10
Interior	L-164	3730.12
Wood primer, solvent-borne	P-18/1	3730.13
Wood primer, latex	P-18/3	
Metal primer: Iron & steel Aluminium	P-32 P-162	
Metal primer for zinc-coated surfaces: Solvent-borne Latex	N/A P-13/4	3730.15
Metal etch primer	P-35	3884
Zinc-rich organic priming paint	C-29/16	N/A
Concrete, plaster masonry and wallboard sealer/undercoat	S-17/1	
Concrete, masonry, wallboard and plaster sealer/undercoat	S-17/2	
Undercoat paint		
Solvent	U-16/1	3730.14
Latex	U-163	
Wood stain:		
Spirit	M-111	
Oil	N/A	
Varnish, flat, semi-gloss and gloss	V-114	
Gloss floor varnish	P-93/3	
Marine Varnish	V-114	
Exterior latex stain	V-115/3	3730.16
Exterior stain, solvent-borne	V-115/1 V-115/2	
Paving paint, solvent-borne	P-93	
Roofing paint, latex	P-12/2 P-12/3	
Roofing paint, solvent borne	P-12/1	
Anti-condensation paint	P-53	N/A
Fire-retardant paint	E-34 C-64	N/A
Epoxy paint (2 pack)	C-33	
Stain sealer	N/A	
Chalk sealer	N/A	N/A
Anti-mould	N/A	N/A
Water-repellent for masonry	M-116	N/A
Water-repellent preservatives (wood)	M-96	1607
Cresote stain	N/A	
Paint remover:		
Solvent type	R-48	
Chemical type	R-49	N/A

Paint Type	GPC Number	AS number
Bituminous paint	P-47(Black), P-46(Aluminium)	
Masonry and concrete:		
Exterior	C-117	N/A
Interior	C-118	N/A

A-2.2 Confirmation of GPC Approval - All paints must conform to GPC requirements and AS3730 in respect to lead and chromate, clearly displaying the manufacturer's name and GPC number and delivered to site in unopened containers. Where directed by the Superintendent, the Contractor shall supply a statement from the Coating Manufacturer that the product conforms to the specified standards, are GPC Approved Products, are recommended for use in the capacity intended and in the manner described in this Specification.

A-2.3 NOT USED

A-2.4 Contractor's Notice of Paint to be Used - The Contractor shall supply in writing the name of each product and surface preparation material which is proposed to be used, prior to commencement of work.

A-2.5 Not Used.

A-2.6 Compatibility of Coatings - Ensure that primers, sealers and undercoats are suitable for the finish coat, and to each other. All coatings in any one system must be from the same manufacturer.

A-2.7 Tinting of Coats - Ensure each coat is of a different tint and of sufficient difference to other coats to allow for easy identification.

A-2.8 Unsuitable Paint System - Advise the Superintendent immediately if the specified paint system is unsuited to the surface to be painted.

### A-3 WORKMANSHIP

A-3.1 General - Ensure the surface preparation and painting is performed in accordance with the paint manufacturer's recommendations and in a tradesman-like manner with coatings free from runs, pinholes, misses, patchiness, non-uniform appearance or any other surface defects.

A-3.2 Cleaning - Before commencement thoroughly clean down and prepare for painting to obtain a clean, sound substrate suitable to receive the approved paint system, as follows;

A-3.2.1 Use dust sheets and drop sheets wherever necessary to protect finished work and any other surfaces, furniture or fixtures from damage caused by dirt or paint spotting.

A-3.2.2 Upon completion of painting works, remove all paint spots, runs, etc., from all floors, concrete paving, glazed and ceramic tiled areas and all areas adjacent to the painted work

A-3.2.3 On completion of all work, ease and adjust all paint bound windows and doors and leave in correct working order. Leave all door, window and fanlight furniture, switch plates, power points, light fittings, etc. free of paint.

A-3.2.4 Remove all perished paint particles from site daily, leaving the site clean and tidy at all times.

A-3.3 Application by Spraying - Under no circumstances is paint to be sprayed to surfaces without the prior approval of the Superintendent. Such approval, if given, shall be subject to conditions including but not limited to the requirement that airless sprays only shall be used.

A-3.4 Paint Rollers - **Paint rollers shall not be used** to apply priming coats to any surface or to apply paint to woodwork or metalwork without written approval from the Superintendent. This approval, if given, shall be subject to the requirement that the paint must be laid off with a brush and may be withdrawn if a satisfactory finish is not achieved .

A-3.5 Painting Doors - When painting the surfaces of doors also paint the top and bottom edges. Remove doors (both multiple sliding and hinged doors) to carry out preparation and painting and replace the doors on completion. Paint the interior surfaces of all exterior doors when carrying out exterior painting. Paint internal and external surfaces of all internal doors when carrying out internal painting.

#### A-4 SURFACE PREPARATION

A-4.1 General - The degree of surface preparation required is dependent upon the condition of the substrate. Washing down exterior surfaces of buildings shall be carried out prior to the painter commencing sanding, etc. Wash down all surfaces with potable water and a suitable cleaning agent to remove residual loose deposits or the contaminants. The surface must be dry prior to the painter commencing work.

A-4.2 Clearing Surfaces for Painting - Remove all Blu-tac, staples, drawing pins, sticky tape, redundant clips, nails, screws and the like prior to painting. Fill all holes, cracks and depressions with an approved material.

A-4.3 Removal of Wall Mounted Fittings - Remove from walls and other surfaces all screw fixed shelves; chalk, white, pin, notice and display boards; blinds; curtains; door signage and the like and label them according to their location. Store these materials in a safe location to prevent damage and refix in their original location on completion. Move free-standing cupboards, benches and items of furniture to enable painting of complete walls and skirtings and reposition them upon completion. Remove all door and window furniture prior to painting and refix them on completion of painting.

A-4.4 Removal of Screens - Prior to painting window frames carefully remove all bird proofing wire mesh, wire window guards, insect screens, removable security screens and grilles. After painting, reinstall in a neat and tradesman-like manner and tack weld fixings to restore security.

A-4.5 Removal of Wallpaper - Strip off all wallpaper on walls or other surfaces, or surfaces to be painted. Thoroughly wash down with hot water to remove wallpaper size and paste. Do not use sugar soap solution. Allow to dry, prepare, then seal the surfaces prior to painting with appropriate sealer for the surface substrate and apply the paint system specified.



A-4.6 Removal of Kalsomine or Lime Wash Paints - Remove all water based kalsomine or lime wash paints by washing thoroughly with warm water to obtain a clean, sound substrate to receive the approved paint system.

A-4.7 Sanding Generally - Sand all surfaces, except those containing asbestos eg. fibro, to a smooth, clean, fair surface to reduce blemishes and imperfections, as well as providing a key for ensuing coats. Remove sanding dust by brushing and/or washing with water.

A-4.8 Removal of Damaged or Defective Paint - Where paintwork has failed, cracked, flaked, perished, blistered, peeled or is overloaded or otherwise defective and does not contain lead remove the paint by one or more of the following methods: burning off; abrasive grit or water blasting; grinding and sanding; solvent stripping; chemical stripping; scrapping; or hammer gun.

**FOR REMOVAL AND/OR TREATMENT OF LEAD BASED PAINTS REFER TO CLAUSE 3.5.15 IN VOLUME 1 OF THE CONTRACT DOCUMENT AND SECTION 34 OF THIS TECHNICAL SPECIFICATION.**

A-4.9 Extent of Paint Removal - Where coated areas are to be stripped, abraded off, or burnt off, carry out such preparation for the full length of that particular member. Feather edges of adjacent members.

A-4.10 Pressure Cleaning Externally - Pressure water clean all external areas to be painted to remove heavy deposits of mud, dust, grime, bird droppings, and similar contaminants to obtain a clean, sound substrate to receive the approved paint system.

A-4.11 Treatment of Mould, Etc - Treat all surfaces affected with mould, or smoke, to remove such contaminants. Mould effected areas must be thoroughly washed down with a 1% solution of Sodium Hypochlorite bleach in water then treated with proprietary brand fungicidal solution.

A-4.12 Contaminated Surfaces - Solvent clean areas contaminated with oil, grease or other materials which are not water soluble.

A-4.13 Not Used

A-4.14 Disc Sanders - Disc and circular action type grinding/sanding tools may be used providing that circular markings are not left on the finished surfaces.

A-4.15 Timing of Preparation Works - Sanding, filling and priming must be carried out within a 24 hour period between each or any operation. (Excluding glazing putty as specified in Clause A.5.3).

## **A-5 GLAZING**

A-5.1 Glazing Putty Removal - Remove all missing, perished and defective glazing putties. Prime timber window/door rebates with an oil based primer, sprig the glass where it is loose and face it with new putty.

A-5.2 Replacing Glazing Putty - Finish face putties the full angle of rebates and cleanly lay off with a putty knife to produce sharp mitred corners. The putty must be an approved linseed oil or butyl putty type, free of skins and lumps.

A-5.3 Time Limit on Re-Painting Windows - Allow re-glazed work to dry at least 36 hours prior to re-painting.

A-5.4 Aluminium Windows - Replace all missing glazing beads to aluminium windows with new to match existing.

#### **A-6 PAINTING GENERALLY**

A-6.1 Unsuitable Weather Conditions - Do not paint under adverse weather conditions or when temperatures are less than 10 °C or greater than 35 °C or when work is wet with fog, mist or dew or when work would be subject to damage by such conditions. If the work is affected by the above conditions or becomes dust impregnated, it must be prepared and repainted at the Contractor's expense.

A-6.2 Murals - Existing painted murals will be retained and not painted over unless otherwise specified. The Contractor will protect them from damage during the course of the work.

A-6.3 Paint in Heavy Wear Areas - Only apply the alkyd(ename) coating system to the following heavy wear areas in buildings unless previously painted with Acrylic paint :-

- All handrails and balusters.
- Steel gates, screens, structural steel.
- Interior surfaces to toilets, including painted ceilings.
- All walls surfaces in corridors.
- Timber windows and doors.
- Architrave's, skirtings and similar type mouldings.

#### **A-7 NOT USED**

#### **A-8 INSPECTION**

A-8.1 Inspection Points - The Contractor shall advise the Superintendent when each of the following work stages is complete and ready for inspection:-

A-8.1.1 Cleaning down and surface preparation.

A-8.2.1 On completion of each specified paint coat.

Where Inspection and Test Plans are used, the above points shall be "witness" points.

#### **A-9 SCHEDULES OF PAINT SYSTEMS**

Refer to the attached Schedules of Paint Systems A-9.1 to A-9.14 and the Schedule of Paint Thicknesses A-9.15.

Where surfaces or materials not covered by the following Schedule are found submit to the Superintendent the proposed surface preparation procedure and paint system for approval before commencing work on that surface or material.



	A-9.1 WOODWORK TO BE PAINTED	A-9.2 WOODWORK TO BE CLEAR FINISHED																											
<b>Preparation</b>  <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <b>Refer to Clauses A-3 &amp; A-4 for general requiremen ts for surface preparation</b> </div>	<ul style="list-style-type: none"> <li>- Examine surfaces for sap or pitch streaks, grease, oil, etc. and exudations from knots.</li> <li>- Scrape off any sap or gum deposits and solvent clean these areas.</li> <li>- Treat all knots with an approved knotting compound, applied before the primer coat.</li> <li>- Slightly round all edges by planing or sanding.</li> <li>- Lightly sand all surfaces to ensure they are smooth, free of raised grain, knots, burrs and other defects.</li> <li>- <b>Previously Painted Surfaces</b> in good condition showing no flaking, peeling or blistering may be recoated only. If the surface is glossy it shall be thoroughly sanded by hand to etch the surfaces and remove the gloss, undercoated with an oil based general purpose undercoat and then enamel or acrylic gloss paint applied.</li> </ul>	<ul style="list-style-type: none"> <li>- Examine surface for sap or pitch streaks, grease, oil, etc. and exudations from knots.</li> <li>- Scrape off any sap or gum deposits and solvent clean these areas.</li> <li>- Slightly round all sharp edges by planning or sanding.</li> <li>- Where required, fill with wood filler tinted to match existing timber. Allow overnight drying.</li> <li>- Lightly sand all surfaces to ensure they are smooth, free from raised grain, knots, burrs and other defects.</li> <li>- Remove all mortar splashes, dirt, dust and debris resulting from preparation.</li> <li>- For <b>Previously Painted Surfaces</b>, wash down timber with an approved cleaning solvent, lightly sand and dust down and fill cracks and nail holes with putty of a matching colour.</li> </ul>																											
<b>Paint System</b>	<table border="0"> <tr> <td>Alkyd</td> <td>Coating</td> <td>System</td> </tr> <tr> <td colspan="3"><u>100% Acrylic Coating System</u></td> </tr> <tr> <td>- One full coat oil based primer to bare and new</td> <td>-</td> <td></td> </tr> <tr> <td>to bare and new timber</td> <td>-</td> <td></td> </tr> <tr> <td>timber surfaces.</td> <td>-</td> <td></td> </tr> <tr> <td>- One full coat oil based undercoat.</td> <td>-</td> <td></td> </tr> <tr> <td>- Two full coats gloss enamel.</td> <td>-</td> <td></td> </tr> <tr> <td>See Note 1.</td> <td></td> <td></td> </tr> <tr> <td>See Note 1</td> <td></td> <td></td> </tr> </table> <u>Conversion from Alkyd(enamel) to the Acrylic Coating System :-</u> <ul style="list-style-type: none"> <li>- Ensure the existing surface is thoroughly sanded.</li> <li>- One full coat oil base primer to bare timber surfaces.</li> <li>- One full coat oil based undercoat.</li> <li>- Two full coats acrylic gloss finish.</li> </ul> See Note 1.	Alkyd	Coating	System	<u>100% Acrylic Coating System</u>			- One full coat oil based primer to bare and new	-		to bare and new timber	-		timber surfaces.	-		- One full coat oil based undercoat.	-		- Two full coats gloss enamel.	-		See Note 1.			See Note 1			<ul style="list-style-type: none"> <li>- Tinting Where the nature of the timber requires filling or colouring to match adjoining finishes, upon completion of preliminary preparations, apply an even coat of tinted filler and wipe clear and smooth after initial drying, all in accordance with the manufacturer's instructions. Not required for existing dry surfaces.</li> <li>- Coating Apply two coats of an approved single pack clear polyurethane allowing full drying time between coats in accordance with the manufacturer's instructions. Sand smooth between coats using steel wool, removing all dust and residue from sanding.</li> </ul>
Alkyd	Coating	System																											
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- One full coat oil based primer to bare and new	-																												
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- Two full coats gloss enamel.	-																												
See Note 1.																													
See Note 1																													

Notes	NOTE 1. Semi-gloss finish may be specified for interior work.	NOTE 1: New, bare or discoloured woodwork is to be stained to a uniform colour prior to application of 1st coat. NOTE 2: Filling of holes and/or cracks to be carried out after application of stain or 1st coat.
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	<b>A-9.3 INTERIOR WALLS AND CEILINGS (FIBROUS PLASTER, SET PLASTER, PLASTERBOARD, HARDBOARD AND FIBRE BOARDS)</b>	
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<ul style="list-style-type: none"> <li>- All surfaces will be thoroughly clean, dry and free of all loose dirt, dust, grease, wax and loose flaking paint. Efflorescence or mould on plaster, masonry and concrete surfaces must be treated. Refer to Clause A-4.10.</li> <li>- If <b>Previously Painted Surfaces</b> have a surface texture which is soft or powdery, even after careful cleaning, apply one full coat of white oil based primer, binder or sealer specially formulated for the treatment of thin or powdery coatings eg. Dulux Sealer/Primer, Pascol Bindacoat or similar.</li> </ul>	
<b>Paint System</b>	<u>Alkyd Coating System</u> <ul style="list-style-type: none"> <li>- One full coat oil based sealer to bare and new surfaces.</li> <li>- One full coat oil based undercoat.</li> <li>- Two full coats gloss or semi-gloss enamel.</li> </ul> <u>OR</u> <ul style="list-style-type: none"> <li>- One full coat oil based sealer to bare and new surfaces.</li> <li>- Two full coats flat enamel.</li> </ul>	<u>100% Acrylic Coating System</u> <ul style="list-style-type: none"> <li>- One coat acrylic sealer undercoat or oil based sealer to bare or new surfaces</li> <li>- Two coats acrylic paint.</li> </ul> <u>See NOTE 1</u>  <u>Conversion from the Alkyd(enamel) to the Acrylic Coating System:-</u> <ul style="list-style-type: none"> <li>- Ensure the existing surface is thoroughly sanded.</li> <li>- One full coat oil based primer/sealer to bare surfaces.</li> <li>- One full coat oil based undercoat.</li> <li>- Two full coats acrylic paint.</li> </ul>
<b>Notes</b>	1. Oil based sealer must be applied to new and patched set plaster.	

	<b>A-9.4 BRICK, CEMENT RENDER, FIBRE SHEETING AND MASONRY SURFACES</b>	
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<ul style="list-style-type: none"> <li>- Dry brush brickwork.</li> <li>- Fresh cement render and concrete must be allowed to dry for a minimum of 4 weeks.</li> <li>- Brick rub new render and dust down.</li> <li>- Treat fresh concrete stucco, etc. with a solution of Zinc Chloride (75 gm) and Phosphoric Acid (150 ml in 4 litres of potable water). Apply by brush at a rate not exceeding 1.5 m<sup>2</sup> per litre. Allow 48 hours drying. Dust surface to remove salts. Do not rinse surface with water.</li> </ul> <p>NOTE: Adequate protective clothing and eye protection must be worn to carry out this type of work.</p> <ul style="list-style-type: none"> <li>- For <b>Previously Painted Surfaces</b> fill major defects with sand/cement mixture with a polymer mixture or a proprietary non-shrink filling compound, in surface texture to match existing.</li> </ul>	
<b>Paint System</b>	<u>Alkyd Coating System</u> <ul style="list-style-type: none"> <li>- Seal new and bare surfaces with oil based sealer</li> <li>- One full coat oil based undercoat.</li> <li>- Two full coats gloss, semi-gloss or flat enamel.</li> </ul>	<u>100% Acrylic Coating System</u> <ul style="list-style-type: none"> <li>- Spot seal new and bare surfaces with acylic sealer</li> <li>- Two full coats gloss, semi-gloss or low gloss acrylic.</li> </ul> <u>Conversion from the Alkyd(enamel) to the Acrylic Coating System:-</u> <ul style="list-style-type: none"> <li>- Ensure the existing surface is thoroughly sanded.</li> <li>- One full coat oil base sealer to bare surfaces.</li> <li>- One full coat oil based undercoat.</li> <li>- Two full coats acrylic paint as above.</li> </ul>
<b>Notes</b>		

	<b>A-9.5 GALVANISED/ZINCALUME SURFACES, PREPAINTED/PREFINISHED COLOURBOND OR FACTORY FINISHED SURFACES</b>	
<b>Preparation</b>	<p><b>Steel</b></p> <ul style="list-style-type: none"> <li>- Remove salt deposits by washing down with potable water using non-metallic scouring pads or brushes</li> <li>- Remove soot, oil and grease by washing with mineral turps. Allow to dry. Within 4 hours of drying, apply priming coat.</li> <li>- On <b>Previously Painted Surfaces</b> remove dirt, rust and poorly adhered or unsound paint by wire brushing, scraping or sanding as required.</li> <li>- Treat residual rust with a phosphoric acid based emulsion rust converter.</li> <li>- Spot prime with a zinc rich oil modified primer specially manufactured for galvanised iron.</li> </ul>	<p><b>Aluminium</b></p> <ul style="list-style-type: none"> <li>- Remove salt deposits by washing with potable water and clean rags</li> <li>- Remove soot, oil, grease and debris by washing with mineral turps and clean rags. Allow to dry. Within 4 hours of drying, apply priming coat.</li> </ul> <p>For <b>Previously Painted Surfaces</b>:-</p> <ul style="list-style-type: none"> <li>- Remove defective paint by sanding.</li> <li>- Key the surface by sanding or use stainless steel wool.</li> <li>- Spot prime with etch primer.</li> </ul>
<b>Paint System</b>	<p><b>Steel</b></p> <p><u>Alkyd Coating System</u> <span style="float: right;"><u>100%</u></span></p> <p><u>Acrylic Coating System</u></p> <ul style="list-style-type: none"> <li>- One full coat galvanised iron primer. -</li> <li>- One full coat galvanised iron primer. -</li> <li>- Two full coats exterior grade high gloss enamel -</li> <li>- Two full coats structural gloss or low gloss acrylic paint. or roof paint.</li> </ul> <p><b>Aluminium</b></p> <p><u>Alkyd Coating System</u> <span style="float: right;"><u>100%</u></span></p> <p><u>Acrylic Coating System</u></p> <p><b>Previously Painted</b> with Acrylic System</p> <ul style="list-style-type: none"> <li>- Spot prime bare and unpainted surfaces -</li> <li>- Spot prime bare and unpainted surfaces with etch primer with etch primer. -</li> <li>- Two full coats gloss, semi, or low gloss acrylic paint.</li> <li>- One full coat of oil based undercoat.</li> <li>- Two full coats high gloss enamel.</li> </ul> <p><b>Previously Painted</b> with Alkyd System</p> <ul style="list-style-type: none"> <li>- Spot prime bare and unpainted surfaces with etch primer -</li> <li>- One full coat oil based all purpose undercoat. -</li> <li>- Two full coats gloss or semi gloss acrylic paint.</li> </ul>	
<b>Notes</b>	<p>1. Paint finishes and coatings for roof and internal coating of rainwater goods that are used for the catchment, reticulation or storage of drinking water shall be approved suitable proprietary products as referred to in Clause A.2.1.</p>	



	<b>A-9.6 CAST IRON, WROUGHT IRON AND STEEL</b>	
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirement s for surface preparation.</b>	<ul style="list-style-type: none"> <li>- Remove salt deposits by washing with potable water and clean rags.</li> <li>- Treat any visible rust with rust converter.</li> <li>- Remove mill scale, oxidation deposits and dust with vigorous wire brushing in accordance with AS 1627.7.</li> <li>- Remove all soot, oil, grease, dirt and debris incurred during hand cleaning by solvent cleaning in accordance with AS 1627.1. Allow to dry. Apply priming coat within 4 hours of drying.</li> <li>- On <b>Previously Painted Surfaces</b> remove thick edges of previous coatings by feathering with sandpaper.</li> </ul>	
<b>Paint System</b>	<u>Alkyd Coating System</u> <ul style="list-style-type: none"> <li>- For <b>Previously Painted Surfaces</b>, spot prime bare areas with zinc phosphate primer.</li> <li>- One full coat zinc phosphate primer to new surfaces.</li> <li>- One full coat oil based undercoat.</li> <li>- Two full coats of full gloss enamel.</li> </ul>	<u>100% Acrylic Coating System</u> <ul style="list-style-type: none"> <li>- Spot prime bare areas to <b>Previously Painted Surfaces</b> with zinc phosphate primer.</li> <li>- One full coat zinc phosphate primer to new surfaces.</li> <li>- Two coats gloss acrylic.</li> </ul>
<b>Notes</b>		

	<b>A-9.7 ELECTRICAL CONDUITS</b>
<p><b>Preparation</b></p> <p>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</p>	<ul style="list-style-type: none"> <li>- Remove loose and unsound paint and rust.</li> <li>- Remove grease, oil, soot and debris by solvent washing in accordance with AS 1627.1.</li> </ul>
<b>Paint System</b>	<p>Apply one coat approved zinc phosphate primer to bare metal conduits only.</p> <p>Apply one full coat oil based all purpose undercoat.</p> <p>Apply Two finish coats as specified for adjacent surfaces.</p>

	<b>A-9.8 WATER REPELLANT COATINGS TO BRICKWORK &amp; OTHER MASONRY SURFACES</b>
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<ul style="list-style-type: none"> <li>- Remove all efflorescence, laitance, mould, grease, oil, etc</li> <li>- Seal all surface cracks, holes, etc with a durable material compatible with the surface.</li> <li>- Thoroughly dry the surface before applying any coatings.</li> </ul>
<b>Paint System</b>	<p>Select an approved water repellant coating which does not discolour or damage the surface.</p> <p>Follow the Manufacturer's instructions carefully.</p>
<b>Notes</b>	

	<b>A-9.9 ANTI-GRAFFITI TREATMENT &amp; GRAFFITI REMOVAL</b>
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<p>Graffiti Removal (Follow the Manufacturer's instructions carefully):-</p> <ul style="list-style-type: none"> <li>- Apply a suitable graffiti remover to the affected area.</li> <li>- Keep the area soaked with remover allowing 2 - 3 minutes for full penetration.</li> <li>- Re-apply remover and scrub gently with a hard bristle brush. Wash off with water.</li> <li>- Repeat if necessary after allowing to dry.</li> </ul> <p>Preparation for Anti-Graffiti Treatment :-</p> <ul style="list-style-type: none"> <li>- Remove all graffiti, efflorescence, laitance, mould, grease, wax, oil, dust, etc.</li> <li>- Seal all surface cracks, holes, etc with a durable material compatible with the surface.</li> <li>- Thoroughly dry the surface before applying any coatings.</li> </ul>
<b>Paint System</b>	<p>Select an approved Anti-Graffiti Coating suitable for the surface which does not discolour or damage the surface.</p> <p>Follow the Manufacturer's instructions carefully.</p>
<b>Notes</b>	

	<b>A-9.10 OLD CHALK BOARDS</b>
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<ul style="list-style-type: none"><li>- Lightly sand and thoroughly clean all chalk and dust from the board with a damp cloth.</li><li>- Fill holes with an acrylic filler.</li></ul>
<b>Paint System</b>	Apply Two coats of approved chalk board paint by brush.  Follow the Manufacturer's instructions carefully.
<b>Notes</b>	

	<b>A-9.11 COATING OF SPRAYED VERMICULITE SURFACES</b>
<b>Preparation</b>  Refer to Clauses A-3 & A-4 for general requirements for surface preparation.	<ul style="list-style-type: none"> <li>- Lightly dust off.</li> <li>- Test that the surface is sound before painting. Advise the Superintendent if the surface is found to be unsound</li> </ul>
<b>Paint System</b>	Apply Two coats of flat acrylic paint by light spray.
<b>Notes</b>	

	<b>A-9.12 COATING OF CONCRETE PAVED SURFACES WITH NON-SKID TREATMENT</b>
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<ul style="list-style-type: none"> <li>- Fill major defects with sand/cement mixture with a polymer mixture or a proprietary non-shrink filling compound, in surface texture to match existing.</li> <li>- Remove all grease, oil, dust, etc and thoroughly dry the surface.</li> <li>- Carry out any special surface preparation recommended by the coating manufacturer, eg. acid etching.</li> </ul>
<b>Paint System</b>	<ul style="list-style-type: none"> <li>- Apply an approved 2 part, high build epoxy coating, with grit added, in accordance with the manufacturer's recommendations.</li> </ul>
<b>Notes</b>	

	<b>A-9.13 COATING OF INTERNAL TIMBER FLOORS (EG.HALLS)</b>
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<ul style="list-style-type: none"> <li>- Lightly sand all surfaces to ensure they are smooth, free of raised grain, knots, burrs and other defects.</li> <li>- Thoroughly clean the surface to remove all dust, grit, grease, oil, etc.</li> <li>- Thoroughly dry the surface before applying the oil.</li> </ul>
<b>Paint System</b>	Apply Two coats of Tung Oil in accordance with the manufacturer's instructions.
<b>Notes</b>	



	<b>A-9.14 LINE MARKING FOR EXTERNAL HARD SURFACES</b>
<b>Preparation</b>  <b>Refer to Clauses A-3 &amp; A-4 for general requirements for surface preparation.</b>	<ul style="list-style-type: none"> <li>- Seal all surface cracks, holes, etc with durable materials compatible with the surface.</li> <li>- Wash and clean the surface of all dust and grease.</li> <li>- Thoroughly dry the surface before applying any coatings.</li> </ul>
<b>Paint System</b>	<p>Apply Two coats of approved line marking paint similar or equal to "Anzol/2528000" Alkyd based solvent borne or "Anzol/7538000" Acrylic base water borne marking paint.</p> <p>To be applied strictly in accordance with the Manufacturer's Recommendations <b>by a specialist line marking applicator.</b></p>
<b>Notes</b>	

<b>A-9.15 Schedule of Minimum Paint Thicknesses</b>		
<b>Minimum thicknesses are set at the average spreading rate and film build as recommended by manufacturers based on premium brand products which are Government Paint Committee Approved and conform to Australian Standards. Practical spreading rates will vary depending on such factors as application methods, conditions and surface texture.</b>		
<b>SURFACE TYPE AND PAINT TYPE</b>	<b>COATING</b>	<b>MINIMUM DRY FILM THICKNESS ( microns)</b>
A-9.1 - Woodwork to be painted - Alkyd coating system	<ul style="list-style-type: none"> <li>Oil based primer</li> <li>Oil based undercoat</li> <li>High gloss enamel</li> <li>Total coating - 2 coat system</li> <li>Total coating - 3 coat system</li> </ul>	<ul style="list-style-type: none"> <li>34</li> <li>30</li> <li>34</li> <li>60</li> <li>90</li> </ul>
A-9.1 - Woodwork to be painted - 100% Acrylic coating system	<ul style="list-style-type: none"> <li>Acrylic primer</li> <li>Acrylic sealer/undercoat</li> <li>Acrylic gloss</li> <li>Total coating -2 coat system</li> <li>Total coating - 3 coat system</li> </ul>	<ul style="list-style-type: none"> <li>30</li> <li>24</li> <li>22-24</li> <li>46</li> <li>76</li> </ul>
A-9.2 - Woodwork to be clear finished - gloss and semi gloss varnish	<ul style="list-style-type: none"> <li>1st coating</li> <li>2nd coating</li> <li>Total coating- 2 coat system</li> </ul>	<ul style="list-style-type: none"> <li>24</li> <li>24</li> <li>48</li> </ul>
A-9.3 - Interior walls ad ceilings (fibrous plaster, set plaster, plasterboard, hardboard and fibre boards) - Alkyd coating system	<ul style="list-style-type: none"> <li>Oil based sealer</li> <li>Oil based undercoat</li> <li>High gloss enamel</li> <li>Semi gloss enamel</li> <li>Flat enamel</li> <li>Total coating (depending on coating type)</li> </ul>	<ul style="list-style-type: none"> <li>30-40</li> <li>30</li> <li>34</li> <li>22</li> <li>24</li> <li>82-94</li> </ul>
A-9.3 - Interior walls ad ceilings (fibrous plaster, set plaster, plasterboard, hardboard and fibre boards) - 100% Acrylic coating system	<ul style="list-style-type: none"> <li>Sealer/undercoat</li> <li>2 coats acrylic gloss</li> <li>2 coats acrylic semi gloss</li> <li>2 coats acrylic flat</li> <li>Total coating (depending on coating type)</li> </ul>	<ul style="list-style-type: none"> <li>24</li> <li>44-48</li> <li>44</li> <li>44</li> <li>64-66</li> </ul>

<b>A-9.15 Schedule of Minimum Paint Thicknesses(Continued)</b>		
<b>SURFACE TYPE AND PAINT TYPE</b>	<b>COATING</b>	<b>MINIMUM DRY FILM THICKNESS ( microns)</b>
A-9.4 - Brick, cement render, fibre sheeting and masonry surfaces - Alkyd coating system	<ul style="list-style-type: none"> <li>Oil based sealer</li> <li>Oil based undercoat</li> <li>High gloss enamel</li> <li>Semi gloss enamel</li> <li>Flat enamel</li> <li>Total coating (depending on coating type)</li> </ul>	<ul style="list-style-type: none"> <li>30-40</li> <li>30</li> <li>34</li> <li>22</li> <li>24</li> <li>82-94</li> </ul>
A-9.4 - Brick, cement render, fibre sheeting and masonry surfaces - 100% Acrylic coating system	<ul style="list-style-type: none"> <li>Sealer/undercoat</li> <li>2 coats acrylic gloss</li> <li>2 coats acrylic semi gloss</li> <li>2 coats acrylic flat</li> <li>Total coating (depending on coating type)</li> </ul>	<ul style="list-style-type: none"> <li>24</li> <li>44-48</li> <li>44</li> <li>44</li> <li>64-66</li> </ul>
A-9.5 - Galvanised/Zincalume surfaces, prepainted/prefinished colourbond or factory finished surfaces - steel Alkyd coating system	<ul style="list-style-type: none"> <li>Galvanised iron primer</li> <li>Exterior grade high gloss enamel or roof paint</li> <li>Total coating</li> </ul>	<ul style="list-style-type: none"> <li>22</li> <li>34 per coat</li> <li>90</li> </ul>
A-9.5 - Galvanised/Zincalume surfaces, prepainted/prefinished colourbond or factory finished surfaces - steel 100% acrylic coating system	<ul style="list-style-type: none"> <li>Galvanised iron primer</li> <li>Structural acrylic paint</li> <li>Total coating</li> </ul>	<ul style="list-style-type: none"> <li>22</li> <li>25 (per coat)</li> <li>72</li> </ul>
A-9.5 - Zinc rich primer for steel	N/A	<ul style="list-style-type: none"> <li>38</li> </ul>
A-9.5 - Galvanised/Zincalume surfaces, prepainted/prefinished colourbond or factory finished surfaces - Aluminium Alkyd coating system	Etch primer Full gloss enamel Total coating - 3 coat system Total coating - 2 coat system	<ul style="list-style-type: none"> <li>5-10 (per coat)</li> <li>34</li> <li>73</li> <li>68</li> </ul>

<b>A-9.15 Schedule of Minimum Paint Thicknesses(Continued)</b>		
<b>SURFACE TYPE AND PAINT TYPE</b>	<b>COATING</b>	<b>MINIMUM DRY FILM THICKNESS ( microns)</b>
A-9.5 - Galvanised/Zincalume surfaces, prepainted/prefinished colourbond or factory finished surfaces - Aluminium 100% Acrylic coating system (previously painted in acrylic system)	<ul style="list-style-type: none"> <li>• Etch primer</li> <li>• Acrylic gloss or semi gloss</li> <li>• Total coating</li> </ul>	<ul style="list-style-type: none"> <li>• 5-10</li> <li>• 25 (per coat)</li> <li>• 55</li> </ul>
A-9.5 - Galvanised/Zincalume surfaces, prepainted/prefinished colourbond or factory finished surfaces - Aluminium 100% Acrylic coating system (previously painted in alkyd system)	<ul style="list-style-type: none"> <li>• Etch primer</li> <li>• Oil based undercoat</li> <li>• Acrylic gloss or semi gloss</li> <li>• Total coating</li> </ul>	<ul style="list-style-type: none"> <li>• 5-10 (per coat)</li> <li>• 30</li> <li>• 25 (per coat)</li> <li>• 55-60</li> </ul>
A-9.6 - Cast iron, wrought iron and steel - Alkyd coating system	<ul style="list-style-type: none"> <li>• Zinc Phosphate primer</li> <li>• Oil based undercoat</li> <li>• Full gloss enamel</li> <li>• Total coating - 2 coat system</li> <li>• Total coating - 3 coat system</li> </ul>	<ul style="list-style-type: none"> <li>• 38</li> <li>• 30</li> <li>• 38</li> <li>• 68</li> <li>• 96</li> </ul>
A-9.6 - Cast iron, wrought iron and steel - 100% Acrylic coating system	<ul style="list-style-type: none"> <li>• Zinc Phosphate primer</li> <li>• Gloss acrylic</li> <li>• Total coating - 2 coat system</li> <li>• Total coating - 3 coat system</li> </ul>	<ul style="list-style-type: none"> <li>• 38</li> <li>• 48</li> <li>• 48</li> <li>• 86</li> </ul>

<b>METAL FIXTURES</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **metal fixtures** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Light Steel Framing, Brick & Block Construction, Light Timber Framing and Partitions.

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**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Shop fabricated or assembled items ready for delivery to the site.
- Commencement of shop or site welding.
- Site erected assemblies on completion of erection, before covering up by cladding and encasing.
- Steel surfaces prepared for, and immediately before, site applied finishes.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Weld testing**

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

**2.3 SAMPLES****General**

Submit samples of the following:

- Each type of joint.
- Each type of finish.
- Sections for use in fabricated work.

## 2.4 SUBMISSIONS

### Design

Calculations: Submit calculations and other data demonstrating detailed compliance with performance criteria.

### Shop drawings

Submit shop drawings showing the following information:

- Details of fabrication and components.
- Information necessary for site assembly.

### Tests

Stainless steel: Before fabrication commences, submit satisfactory evidence that relevant procedure test plates have passed the tests specified in AS/NZS 1554.6.

### Materials

Manufacturer's data: Submit manufacturer's published product data including standard drawings and details.

Stainless steel: For each batch of stainless steel supplied to the works, submit the certificate of compliance or test certificate specified in the applicable standard.

### Execution

Welding procedures: Submit details of proposed welding procedures before fabrication.

Welding dissimilar metals: Submit the following details:

- Type and thickness of materials to be welded.
- Proposed joint preparation and welding procedures.
- Proposed filler metal.
- Expected dilution (proportion of fused parent metal in the weld metal).

Fastenings to aluminium (including aluminium alloys): If cadmium-plated steel fastenings are proposed, submit proposals.

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## 3 MATERIALS

### 3.1 MATERIALS AND COMPONENTS

#### Metals

Performance: Provide metals suited to their required function, finish and method of fabrication, in sections of strength and stiffness adequate for their purpose.

#### Copper alloys (brass, bronze, etc.)

Composition and designations: To AS 2738.

#### Rivets

Blind rivets where available in the required metal.

#### Masonry anchors

Proprietary types comprising screws or bolts in self-expanding sockets.

#### Masonry plugs

Screws in purpose-made resilient plastic sockets.

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## 4 EXECUTION

### 4.1 CONSTRUCTION GENERALLY

#### Aluminium structures

Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

#### Metals

Performance: Provide metals so that they transmit the loads imposed and ensure the rigidity of the assembly without causing deflection or distortion of finished surfaces.

Incompatible metals: Separate using concealed layers of suitable materials in appropriate thicknesses.

#### Fasteners

Performance: Provide fasteners so that they do not cause galvanic corrosion.

Materials: Provide fasteners in materials of mechanical strength and corrosion resistance at least equal to that of the lowest resistant metal joined.

To copper and copper alloys: Provide copper or copper-alloy fixing devices only.

To aluminium and aluminium alloys: Provide aluminium alloy or non-magnetic stainless steel fixing devices only.

To stainless steel: Provide appropriate stainless steel materials only.

**Fabrication**

Workshop: Fabricate and pre-assemble items in the workshop wherever practicable.

Edges and surfaces: Keep clean, neat and free from burrs and indentations. Remove sharp edges without excessive radiusing.

Tube bends: Form bends in tube without visibly deforming the cross section.

Colour finished work: Match colours of sheets, extrusions and heads of fasteners.

Thermal movement: Accommodate thermal movement in joints and fastenings.

**Fabrication tolerances**

Structural work generally:  $\pm 2$  mm.

**Joints**

General: Fit joints to an accuracy appropriate to the class of work. Finish visible joints made by welding, brazing or soldering using grinding, buffing or other methods appropriate to the class of work, before further treatment.

Self-finished metals: Free of surface colour variations, after jointing.

Joints: Fit accurately to a fine hairline.

**Marking**

Provide suitable and sufficient marks or other means for identifying each member of site-erected assemblies, and for their correct setting out, location, erection and connection. Mark bolted connections to show the bolting category. Do not mark stainless steel by notching.

**Splicing**

Provide structural members in single lengths.

**4.2 WELDING AND BRAZING****General**

Quality: Provide finished welds which are free of surface and internal cracks, slag inclusion, and porosity.

Site welds: Do not weld on site.

Butt weld quality level: Not inferior to the appropriate level recommended in AS 1665 Appendix A.

**Brazing**

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

**4.3 STAINLESS STEEL FABRICATION**

Welding stainless steel

Certification of welders: To AS 1796.

**Riveting**

Riveting may be used only to join stainless steel sheet or strip less than 1 mm thick. Drill (not punch) the rivet hole, and drive the rivet cold. On completion, clean and passivate the riveted assembly.

**Soldering**

Do not solder stainless steel.

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**5 COMPONENTS****5.1 PLATFORMS AND WALKWAYS****Standard**

Materials, design and construction: Comply with the recommendations of AS 1657.

## 5.2 PIPE RAILINGS

### Standard

Materials, design and construction: Comply with the recommendations of AS 1657.

### Fabrication

Assembly: If possible, pipe railing must be fabricated, pre-assembled and hot dipped galvanised prior to site delivery.

Method: Welding

- Site welding and cutting only to be undertaken when it is not possible to fabricate and pre-assemble railing off site.

Reconditioning damaged surfaces in galvanised steel: For galvanised surfaces that has been damaged (eg by welding, cutting etc.).

- Specification reference: PAINTING

### Fixing to structure

Provide fabricated predrilled or purpose-made brackets or post bases, and attach the pipework to the building structure with fixings, including bolts into masonry anchors, and coach screws or bolts into timber, of metal compatible with the pipework.

### Galvanizing

If possible, complete fabrication before galvanizing; otherwise apply a zinc-rich primer to affected joint surfaces.

## 5.3 METAL STAIRS

### Standard

Materials, design and construction: Comply with the recommendations of AS 1657.

### Proprietary stair systems

Helical metal stairs: A proprietary system, mechanically assembled and fixed in place, comprising

- a central steel tube column;
- prefabricated metal treads sleeved over and cantilevered from the column;
- top landing;
- balustrade and handrail to stair and landing; and
- spacers, fixings and accessories necessary to complete the system.

## 5.4 FIXED LADDERS

### Standard

Materials, design and construction: Comply with the recommendations of AS 1657.

### Fixing

Fix ladder stiles securely to the building structure at tops and bottoms of flights, and at intermediate points.

## 5.5 CAST ALUMINIUM PANELS

### Description

Proprietary cast aluminium decorative panels for use as balcony or stair infill panels, or other non-structural purposes such as decorative friezes and brackets.

### Fixing

Fix to the building structure or other building elements either

- with a proprietary mechanical fixing system of integral fixing lugs, end connections and the like, and aluminium or stainless steel accessories; or
- using aluminium to aluminium welding to AS 1665.

## 5.6 CORNER GUARDS

### General

Where salient corners of the structure are required to be protected from mechanical damage, provide metal corner guards



- consisting of rolled angle sections or sections fabricated from metal sheet bent to the radius or angle of the corner;
- fitting close to adjoining surface finishes;
- solidly grouted up at the back as necessary to eliminate voids; and
- securely fixed by a method which does not cause distortion in the guard surface, and consists of either concealed built in lugs, or flush countersunk head fixings into masonry anchors.

### 5.7 RESILIENT DOCK BUMPERS

#### General

A proprietary system of fabric reinforced rubber pads pressure laminated and bolted between galvanized mild steel fixing angles.

#### Fixing

Bolt or weld the angles to the dock structure.

### 5.8 PIPE COLUMNS

#### General

Fabricate from heavy steel tube to AS 1074, welded, with predrilled fixing brackets for attachment to the building structure. Galvanize after fabrication.

#### Fixing to structure

Galvanized bolts in masonry anchors or galvanized coach screws in timber, as appropriate.

### 5.9 PIPE BOLLARDS

#### Description

Metal tubular section with welded plate capping all hot dip galvanised after fabrication set 300 mm deep in concrete footing.

Hot dip galvanising: To AS 4680

#### Installation

Set 300 mm deep in concrete footing

Pipe Size: 125 mm nominal O.D. 5.4 mm wall thickness.

Height: 900 mm from pavement level.

Capping: 6 mm thick mild steel plate.

#### Footing

300 x 300 x 450 mm concrete.

### 5.10 Lockable demountable Bollards

#### General

A proprietary lockable demountable metal tubular section bollard with a dome head capping.

Tubular section: To AS 1163

- Diameter: 115 mm OD (nominal)

- Finish: Hot dip galvanised

Head: Cast Aluminium

Height: 900 mm above ground level.

#### Demounting Plate Assembly

A proprietary compatible surface demounting plate assembly complete with pin guide and heavy duty pin with provision for padlock, all hot dip galvanised after fabrication (including pin).

Hot dip galvanising: To AS 4680

Height: 60 mm maximum

Pin: 12.5 mm hole in pin to receive padlock

Fixing holes: 2 (minimum), concealed

Fixing: Surface fixed with fasteners through mounting holes in demounting plate.

Bollard sleeve: Fill with concrete, finish in dome shape.

**Padlock**

Specification reference: DOORS AND WINDOW HARDWARE

**5.11 HOSE REEL CABINETS****Fabrication**

Form from 1.25mm sheet steel, with penetration for piping. Weld door hinges to frame.

Mounting: To AS 1221.

Finish: Primer and 2 coats enamel as specified PAINTING.

Colour: Enamel - Red.

Sign: "FIRE HOSE" in white.

Size: 1210mm x 840mm opening.

Doors: Pressed 1.25mm steel sheet, fit with chrome plated handle.

**5.12 security cover – fire hydrant valve****Design**

Adapt design to suit specific fire hydrant booster valve.

**Enclosure**

Galvanised steel frame and cover, enclosing hydrant booster valve.

**Fabrication**

Generally: Fabricate frame from 40 x 40 x 6.0mm mild steel angles. Fix frame to hydrant using U-bolts.

Cover: sheet steel, hinged to frame.

Handles: 2 off, "D" shaped, MS rod

Hot dip galvanising on completion to AS 4680.

**5.13 HYDRANT VALVE COVER****Cover**

Galvanised steel cylinder, enclosing valve, complete with chain, cap, locking bar and lock. Fabricate as shown on detail drawings.

Hot dip galvanising: To AS 4680

Material: 2 mm mild steel plate.

Size: 270 high x 190 mm diameter.

**Locking Lugs**

Two 36 x 36 x 6.5 mm plate with rounded corners, drill 2 holes 12 mm diameter to receive locking bar.

**Locking Bar**

232 x 32 x 6 mm drilled with two 12 mm diameter holes spaced 200 mm apart.

Weld riveted nut to one end.

**Chain**

560 x 0.25 x 0.3 mm

**Finish**

Primer and 2 coats enamel as specified in PAINTING.

**Padlock**

Provide padlock as specified in HARDWARE.

**5.14 ELECTRICAL PIT COVER PLATE****Location**

Main Switchroom

**Fabrication**

Fabricate mild steel frame, support channels, covers, lifting handles and hooks, weld and hot dip galvanize after fabrication.

**Frame**

Weld from 50mm x 50mm x 6mm angle with hook rods and cast securely into perimeter of concrete pit.

**Support channels**

Weld 75 x 50 x 10mm channels as intermediate supports.

**Perimeter finish strip**

Weld a continuous 20mm wide x 10mm thick mild steel flat to the outside perimeter of frame level with floor finish.

**Covers**

Provide checkerplate aluminium covers of suitable size and weight to enable one person to remove covers without difficulty. (It is intended the covers will only take the weight of foot traffic and should not be designed to take machinery or vehicular traffic), each cover is to have two "D" lifting handles. Bolt fix frame with allowances for covers to be removed for access to pit covers

**Handles**

Provide 2 x 200mm "D" lifting handles bent out of 10mm diameter rod with 50mm studs at each end.

**Hooks**

Fabricate from 6mm diameter rod 100mm long, bend last 18mm through 90°.

**5.15 FLAG POLES****Number of flagpoles**

2 (per School).

**Description**

Aluminium flagpole, machine tapered, galvanised steel spigot and base plate, internal halyard with keyed collar, finial, complete with all fittings required to fly flags.

- Height: 9000 mm.
- Dimensions: 100 mm diameter at base tapering to approx. 60 mm at top x 2 mm wall thickness.
- - Finish: Natural anodised.
- - Base Plate: 250 mm x 250 mm x 16 mm (hot dipped galvanised).
- - Anchor Bolts: No. 4 - 16 mm x 350 mm (hot dipped galvanised).

**Footings**

MPa 25 concrete, (minimum size 400 mm x 400 mm 900 mm deep).

**Installation**

To manufacturer's recommendations.

**5.16 GRILLE, WALL HUNG RADIANT HEATER****Description**

Hinged stainless steel grille to protect wall mounted radiant heaters from damage.

**Fabrication**

Weld stainless steel round bars at all cross joins and bolt fix to a welded stainless steel flat bar wall frame all as shown on drawing No. >

- Grille Bars: 8 mm diameter stainless steel welded at all cross joins
- Frame Surround: 40 mm x 5 mm stainless steel flat bars
- Stainless Steel: Grade 304 (H9 dull finish)
- Dimensions: To suit heater size.
- Clearance: 100 mm minimum clearance from heater on all sides

**Installation**

Fix frame securely to wall with 10 mm (min.) stainless steel bolts

**5.17 LIGHTING BAR**

Positioned as advised by electrical engineer.

**Type**

40mm N.B. (max 48mm O.D.) galvanised tubular bar. Rigidly fixed to ceiling structure to ensure minimum deflection when fully loaded with stage spotlights.

Provision for wiring required such that outlets are mounted vertically within 200mm above the bar (e.g. 75\*50mm duct attached 75mm above bar).

**Shop Drawings**

Submit to The Person with Full Authority/Superintendent for approval.

**5.18 CEILING HOOK****Steel Hook**

Stainless steel hook.

**Fixing**

Fix securely to ceiling structure or concrete soffit.

**Performance**

Capable of supporting the following weight:

- -Primary: 200kg (minimum)
- -Secondary 300kg (minimum)

**5.19 GRAB RAIL****Location "A"**

Moderate Unit Toilet.

**Type**

Tubular metal rail bent twice with pre drilled welded end flange plates.

**Standards**

All fittings and installation must be in compliance with AS1428.1 and 2.

**Safety Grip Rails**

Where rails are used in shower or bath areas provide safety grip rails with knurling on straight grip surfaces.

**Rail**

Size: 600 mm long.

Material: Satin finish stainless steel to AS 1449 - Type 304.

**Fabrication**

Fully welded joins, grind and polish smooth.

**Fixing**

Securely fix to wall through pre-drilled holes in flange plates. Fixing screws/bolts are to be stainless steel and are to be supplied by the manufacturer including all accessories, all fixed in accordance with the manufacturers recommendations.

**Location "B"**

Access Toilet.

Access Shower/Toilet.

**Type**

Tubular metal rail bent twice with pre drilled welded end flange plates .

**Standards**

All fittings and installation must be in compliance with AS1428.1 and 2.

**Safety Grip Rails**

Where rails are used in shower or bath areas provide safety grip rails with knurling on straight grip surfaces.

**Rail**

Height From Floor: 800 mm.

**Material**

Satin finish stainless steel AS 1449 - Type 304.

**Fabrication**

Fully welded joins, grind and polish smooth.

**Fixing**

Securely fix to wall through pre-drilled holes in flange plates. Fixing screws/bolts are to be stainless steel and are to be supplied by the manufacturer including all accessories, all fixed in accordance with the manufacturers recommendations.

**Type**

Alternative 1: Ninety degree angled tubular metal rail, bent twice with one welded intermediate wall bracket and pre drilled welded end flange plates.

**OR**

Alternative 2: Forty-five degree skew angled tubular metal rail, bent twice with one welded intermediate wall bracket and pre drilled welded end flange plates.

**Standards**

All fittings and installation must be in compliance with AS1428 and 2.

**Rail**

- -Material: Satin finish stainless steel AS 1449 - Type 304.
- -Height From Floor: 800 mm.
- -Horizontal Length: 850 mm (nominal).
- -Alternative 1 - Vertical Length: 700 mm.

**OR**

- -Alternative 2 - Skew Length: 800 mm.

Material: Satin finish stainless steel AS 1449 - Type 304.

**Fabrication**

Fully welded joints, grind and polish smooth.

**Fixing**

Securely fix to wall through pre-drilled holes in flange plates. Fixing screws/bolts are to be stainless steel and are to be supplied by the manufacturer including all accessories, all fixed in accordance with the manufacturers recommendations.

**Location "C"****Type**

Double skew angled tubular metal rail, bent at one end, complete with pre drilled welded end flange plates.

- -Size (length): 1525 mm (nominal) from internal face of wall to centre line of grab rail at wall junction (above basin).

Material: Satin finish stainless steel AS 1449 - Type 304..

**Standards**

All fittings and installation must be in compliance with AS1428.1 and 2.

**Fabrication**

Fully welded joints, grind and polish smooth.

**Fixing**

Securely fix to wall through pre-drilled holes in flange plates. Fixing screws/bolts are to be stainless steel and are to be supplied by the manufacturer including all accessories, all fixed in accordance with the manufacturers recommendations.

**5.20 DROP DOWN GRAB RAIL****Standards**

All fittings and installation must be in compliance with AS1428.1 and 2.

**Type**

Stainless steel drop down rail with plastic hand grip, wall bumper, rubber stop and catch.

**Fixing**

Securely fix to wall. Fixing screws/bolts and accessories are to be supplied by the manufacturer and fixed in accordance with the manufacturers recommendations.

**5.21 DROP DOWN SEAT****Standards**

All fittings and installation must be in compliance with AS1428.1

**Type**

Metal fold away shower seat with epoxy coated seat slats and safety spring clutch mechanism.

- -Mounting height: 470mm above finished floor.
- -Frame: Stainless steel.

- -Grade: 304 18/8.
- -Finish: Satin.
- -Mechanism: Safety spring clutch.
- -Material: Stainless steel and bronze.
- -Seat Slats: Aluminium (all ends sealed).
- -Finish: White epoxy.
  - Width (nominal): 355mm.
  - Length (nominal): 960mm

**Fixing**

To manufacturer's recommendations.

**5.22 BRACKET FOR DRINKING/WASH TROUGH****Fabrication**

Form brackets from mild steel bar comprising of welded members with pre drilled holes for fastening to wall all as shown on drawing, hot dip galvanise after fabrication.

Hot dip galvanising: To AS 4680

**Bracket**

Material: 40 x 6mm thick MS bar.

Spacing: 1200mm maximum centres.

**Fixing**

Attach securely to building structure with fixings through pre-drilled holes in vertical member with bolts into expanding masonry anchors (metal –10mm diam. minimum), coach screws or bolts into timber and bolts into metal, all fasteners to be of metal compatible with the bracket and of at least equivalent corrosion resistance.

**5.23 DRINKING/wash TROUGH GUARD****Description**

Proprietary stainless guard to suit drinking trough. The guard must have a sloping face (approx. 45°) and be capable of being locked (padlocked) in the open and closed position. The locking lugs are to be installed at both ends of the guard.

Padlocks:

- -Specification reference: DOOR AND WINDOW HARDWARE for padlocks and master keying

Length: The maximum length 2400mm. If longer lengths required provide multiple trough guards of equal length. (Eg. 3000 mm length = 2 x 1500 mm long trough guards).

- -For trough guards over 1600 mm long provide a 1.6 mm stainless steel angle stiffener to inside front of lid.

Fittings: All lugs and wall fittings must be compatible with the guard.

Stainless Steel:

- -Grade: 304.
- -Gauge: 1.6mm.
- -Finish: 2B.

Fixing: Fix securely to wall with non-corrosive fasteners and expanding masonry anchors (metal) for masonry walls.

**5.24 STEEL BRACKETS FOR VANITY BENCH****Location**

Performing Arts Change Rooms, one for each sex, total No. 2 off.

**Fabrication**

Form brackets from mild steel angle comprising of welded pre-drilled vertical and horizontal members with protruding ends splayed at 45 degrees. Hot dip galvanise after fabrication.

Hot dip galvanising: To AS 4680

**Bracket**

40 x 40 x 5mm M.S. angle.

**Size**

400 x 400mm.

**Spacing**

600mm maximum centres.

**Fixing**

Fix securely to wall and underside of shelf through pre-drilled holes with galvanised fasteners and anchors.

**Bench**

Specification Reference WOODWORK - FIXTURE AND FURNITURE

**5.25 ART TROUGH SUPPORTS****Fabrication**

From mild steel angle weld "L" shape supports with pre-drilled fixing holes as shown on Public Works drawings. Hot dip galvanize after fabrication.

Hot dip galvanising: To AS 4680

Bracket: 40 x 40 x 5 mm

Horizontal Arm Length: 50 mm back from lip of stainless steel trough.

Vertical arm length: 225 mm

Spacing: 600 mm maximum centres.

Fixing: Fix securely to wall with galvanised steel fasteners (and anchors if applicable).

**Trough Installations**

Screw or bolt fix trough fixing lugs to supports with stainless steel fasteners.

**Art Trough**

Specification reference: SANITARY FIXTURES - WASTE WATER.

**5.26 TOOL PEGS****Fabrication**

Use 32mm nominal diameter galvanised steel tubes cap and bend one end.

**Installation**

Build open end of Tool Peg into brickwork projecting 225mm.

**5.27 shelf BRACKETS FOR SHELIVING****Fabrication**

Form brackets from mild steel angle comprising of welded pre-drilled vertical and horizontal members with protruding ends splayed at 45 degrees. Hot dip galvanise after fabrication.

Bracket: 30 x 30 x 5mm M.S. angle.

Size: 200 x 200mm.

Spacing: 500mm maximum centres.

**Fixing**

Fix securely to wall and underside of shelf through pre-drilled holes with galvanised fasteners and anchors.

**5.28 FRAMES FROM STEEL PIPE - SEPARATING FRAMES****Fabrication**

Mild steel bent tubular frame with 75 x 6 mm plate fixed to front face and welded pre-drilled fixing flanges. Hot dip galvanise after fabrication.

**Frame**

Size: 900 mm high x 325 mm from wall.

Diameter: 40 mm N.B.

Protective finish: Hot dipped galvanised.

Flanges: 100 x 100 x 10 mm M.S. plate.

**Centres**

600 mm

**Fixing**

Bolt each flange securely into masonry wall and concrete floor with three 10 mm diameter masonry anchors. Plate fixed to front face of frame with M8 x 65 mm galv. bolts.

**5.29 HOOKS FOR HOSES - (FRAMES FROM STEEL PIPE)****Fabrication**

Two M.S. pipes bent and welded to M.S. plate with capping on open end of pipes hose supports. Pre-drill fixing holes weld all together and hot dip galvanise after fabrication.

**Wall Plate**

6mm thick M.S. 250mm x 300mm drilled to receive four 10mm fixing bolts.

**Hose Supports**

40mm NB M.S. pipe bent upwards at a radius of 100mm. Provide capping on open end of pipes.

**Number**

Two.

**Length**

300mm measured from the inside edge of the pipe upturn to outside edge of plate. i.e. 300mm clear space for hose storage.

**Spacings**

150mm centres fixed 50mm from edge of plate to centre of pipe and 150mm from top of plate to top of hose support pipe bracket.

**Protective finish**

Heavy galvanizing.

**Installation**

Fix securely to wall.

**Drawing**

Refer to drawing >

**5.30 GARBAGE BIN RACKS**

Number required: 2

**Fabrication**

Using metal angle brackets and tubular section rails equally space rails at 150mm maximum and weld to brackets. Pre-drill fixing holes prior to hot dip galvanizing.

Hot dip galvanising: To AS 4680

**Size**

1700 x 450mm wide

Height above floor: 750mm

Rails: 3 x 25mm diameter nominal mild steel pipe.

Brackets: 25 x 25mm mild steel angle at 1500mm maximum centres.

**Fixing**

2 x 10mm diameter galvanised expanding bolts to masonry anchors.

**5.31 RACK MODULES FOR LENGTHS OF****Fabrication**

Form brackets from mild steel angles comprising of vertical and horizontal members. Horizontal members equally spaced at a max. of 200mm with angle cleats and front plates. Front plates having a 30mm high lip. Pre-drill fixing holes, Weld all together and hot dip galvanise after fabrication.

**Brackets**

Number required: 5

**Vertical Member**

50 x 50 x 6mm

Height: 2050mm

**Horizontal Members**

50 x 50 x 6mm



Length: 290mm

Number required: 10

**Front Plates**

85 x 75 x 6mm M.S. to each horizontal arm.

**Cleats**

30 x 30 x 6 x 40mm long at 80mm maximum centres commencing from free end of horizontal arm.

**Installation**

Fix securely through vertical member into wall with approved anchors at 200mm centres.

**5.32 RACK MODULES FOR LENGTHS OF TIMBER****Fabrication**

Form brackets from mild steel angles comprising a vertical fixing member and horizontal carrying members. Horizontal members equally spaced at 300mm maximum centres with front plates having a 30mm high lip. Pre-drill fixing holes and hot dip galvanize after fabrication.

**Brackets**

Number required: As shown on drawings

**Vertical Member**

50 x 50 x 6mm

Height: 2150mm

**Horizontal Members**

50 x 50 x 6mm

Length: 500mm

Number required: 7

**Front Plates**

85mm x 75mm x 6mm M.S.

**Installation**

Fix securely through vertical members into wall at 300mm centres.

**5.33 RACKS FOR TOOL STORAGE****Fabrication**

Form mild steel angle and rod weld, pre-drill and galvanise prior to mounting with masonry anchors.

**Rack**

Height above floor: 1800mm

Length: 3500mm

Wall angle: 50 x 50 x 6mm

Rods: 18mm diameter x 225mm long bent up to 25mm radius.

**Installation**

With bent ends facing up weld from each end of angle 7 rods at 150mm maximum centres and 3 rods equally spaced in between. Fix horizontally with seven 10 mm diameter equally spaced masonry anchors.

**5.34 IRRIGATION PIPE RACKS****Fabrication**

Form brackets from mild steel angles comprising of a vertical member and three horizontal members spaced at 450mm with front plates having a 30mm high lip. Pre-drill fixing holes, weld all together and hot dip galvanise after fabrication.

**Racks**

Wall angle: 50 x 50 x 6mm M.S. angle.

Pipe support: 50 x 50 x 6mm M.S. angle. Top of bottom support to be 550mm from floor level.

**Length**

300mm.

**Front Plates**

85 x 75 x 6mm M.S. angle. with 10mm radius rounding to all edges.

**Installation**

Mount three rack assemblies at 1500mm max. centres fixing securely with four equally spaced 10mm diam. masonry anchors.

**5.35 SHELVING - ANIMAL AND PLANTS****Fabrication**

Form shelving frame from M.S. angles comprising of a vertical member and a horizontal member with M.S. bearing plates welded on each member to enable solid bearing and fixing to wall and floor. Prepare horizontal angle to receive either timber batten finished top or floor grating finished top all as detailed. Pre-drill fixing holes, weld all together and hot dip galvanise after fabrication.

**Vertical Member**

50 x 50 x 6mm M.S. angle.

**Height**

900mm

**Horizontal Member**

50 x 50 x 6mm M.S. angle.

**Length**

600mm. (From wall to outside edge of frame).

**Spacings**

Shelving frame 600mm centres.

**Floor Bearing Plate**

80 x 50 x 8mm M.S. plate.

**Wall Bearing Plate**

100 x 50 x 6mm M.S. plate

**Timber Batten Finished Top**

Refer Specification Reference: *TIMBER FIXTURES*.

**Floor Grating Finished Top**

Provide grating as detailed and spot weld to frame. (Ensure all spot welding locations are treated with approved anti-corrosive treatment immediately after welding)

**Installation**

Rest bearing plate of vertical member on finished floor and fix securely with M12 x 75mm masonry anchors into concrete floor. Rest bearing plate of horizontal member on finished wall and fix securely to wall.

**5.36 SUPPORT FRAME FOR BENCH****Location**

Severe Unit - Practical Activities,

Physically Disabled Unit - Practical Activities

**Fabrication**

Form frame from mild steel angles comprising of vertical members and a horizontal frame for supporting bench top and trough as shown on drawing. Pre-drill members, weld together and hot dip galvanise after fabrication.

**Vertical Members**

50 x 50 x 5mm

**Horizontal Frame**

50 x 50 x 5mm

**Height**

750mm (Top of bench to floor level)

**Installation**

Fix securely through vertical members to wall at 150mm centres.

**5.37 PLANT SOAKING SHELF****Location**

Science - Growing/Breeding

TAS - Plant Growing Space.

**Fabrication**

Form shelving frame from mild steel RHS comprising of vertical and horizontal members. Provide pre-drilled M.S. bearing plates welded on each horizontal member and adjustable foot inserts to each vertical member, all as shown on drawings. Pre-drill fixing holes, weld all together and hot dip galvanise after fabrication.

Hot dip galvanising: To AS 4680

Provide Exterior use plywood Bond Type "A" support platform for trough as shown on drawings and specified in PANEL AND SHEET PRODUCTS - WOODWORK.

Vertical Member: 35 x 35 x 2.5 mm M.S. RHS.

Height: 800 mm (Floor level to top of platform). Allow 1:100 fall in platform towards outlet.

Horizontal Member: 35 x 35 x 2.5 mm M.S. RHS.

Spacings: Shelving frame 600 mm max. centres.

Feet: Adjustable "knock-in" type stainless steel foot inserts (for adjusting frame to provide fall in trough).

Wall Bearing Plate: 80 x 50 x 6 mm M.S. plate

**Installation**

Securely fix horizontal members through bearing plates to finished wall.

Fix trough support platform to frame with galv. screws through pre-drilled holes in horizontal steel members.

Stainless steel angled fixing lugs on each end of trough are to be screw fixed to RHS frame through plywood platform with stainless steel screws suitable for metal fastening.

**Plant Soaking Trough**

Specification reference: WASTEWATER.

**5.38 SUPPORT BRACKETS FOR BENCH (M34 and M36)****Location**

Physically Disabled Unit - Practical Activities Size 2

**Fabrication**

Form brackets from mild steel angle comprising of welded pre-drilled vertical and horizontal members with protruding angle ends splayed at 45 degrees. Hot dip galvanise after fabrication

Bracket: 50 x 50 x 5mm MS angle.

Size: 540 x 540mm

Spacings: 600mm maximum centres.

**Fixings**

Fix securely to wall and underside of bench top through pre-drilled fixing holes with galvanised fasteners and anchors.

**5.39 RACK FOR WEIGHTS****Fabrication**

Four mild steel bar brackets with three horizontal legs each, projecting 250mm with end plate having a 20mm high lip upstand. Mitre cut vertical flanges, pre-drill fixing holes, weld all together and hot dip galvanize after fabrication.

**Bar Brackets**

50 x 50 x 6mm angle.

**Legs**

50 x 50 x 6mm angle.

**End Plates**

85 x 70 x 6mm M.S. plate with 15mm radius edges.

**Fixing**

Fix each bracket securely to the wall with galvanised 12 mm masonry anchors.

**5.40 WALL BRACKETS****Location**

P.E. Store: 6 brackets, 3 at 1500mm height 3 at 750mm height

Sports Store: 5 brackets, at 1500mm height

**Fabrication**

Fabricate from 25 x 6mm galvanized mild steel bar bent to U-shaped profile, with dimensions 150 x 100 x 75mm.

**Fixing**

Secure with 2 off 10mm diameter masonry bolts to brick walls.

**5.41 BAR BRACKET HIGH JUMP****Location**

P.E. Store

**Fabrication**

Bent out of galvanised mild steel flat and pre-drilled prior to fixing.

**Height**

1400mm

**Maximum centres**

1750mm

**Bar Bracket**

Bent 150mm fixing leg, 100mm horizontal and 75mm upstand.

- -Width: 25mm
- -Thickness: 6mm

**Fixing**

2 x 8mm diameter galvanised bolts into masonry anchors.

**5.42 GYMNASIUM EQUIPMENT****Type**

One complete proprietary system must be used (**mandatory**) for all floor inserts and net posts (do-not use a mixture of different proprietary products).

**5.43 FLOOR INSERTS****Location**

Gymnasium Size >: As shown on Drawings.

**Types:**

Volleyball post sockets

- -Number: 2

Badminton posts sockets

- Number: 6

Netball post sockets

- -Number: 2

**Description**

Zinc plated steel proprietary inserts.

**Installation**

Recessed flush with floor surface.

**5.44 BADMINTON POSTS**

> :as shown on Drawings.

**Description**

Proprietary post in mild steel complete with welded closed ends, stays, locking stud and bearing pad/s all in accordance with the International Badminton Federation.

**Posts, Base**

Fit proprietary compatible floor sockets

- -Number Required: 3 sets (total 6)

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**5.45 VOLLEY BALL POSTS****Location****Description**

Proprietary post in mild steel complete with base to fit floor sockets, locking device and bearing pad/s all in accordance with the Australian Volleyball Federation requirements.

**Height**

Adjustable

**Hooks** (if applicable):

Welded (fitted to upper section)

**Winch**

One (to tension top of net)

**Posts, Base**

Fit proprietary compatible floor sockets

Number required: 1 set (total 2)

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**5.46 netball POSTS****Description**

Proprietary post in mild steel with net and ring complete with base to fit floor sockets, locating pin, locking device and bearing pad/s all in accordance with Netball Australia requirements.

**Post**

60mm diameter pipe

**Height**

3050mm

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**Pads**

Description: 15mm high density close cell foam covered with heavy-duty nylon reinforced vinyl netball post padding.

Height (minimum): 2400mm from floor level.

Diameter (maximum): 80mm

Fastening: Held to post with an easy removable touch tape.

Colour: Red

**5.47 BASKETBALL BACKBOARD SUPPORT****Selection**

Select appropriate type of backboard (see below) either (A), (B), or (C).

**Installation**

Obtain from the manufacturer static load details for all attachment points. (must be provided by the manufacture)r. The details to show the loads on all attachment points.

Fixing details of backboard supports to building structure must be determined by a registered structural engineer.

Hand one copy of the static load details to The Person with Full Authority/Supintendent.

**5.48 (a) BASKETBALL BACKBOARD SUPPORT - FIXED****Location**

Gymnasium

**Description**

Proprietary frame work to support backboard frame and net at correct height in a fixed position. Supply and install all brackets and fixings as required.

**Support Frame**

Fix frame work securely to brickwall/structural steel in accordance with engineers requirements. The backboard support frame to be welded together with all joints mitred and ends welded closed. Provide diagonal braces across and between support arms. The cantilevered backboard should not exceed 1200mm from the fixing location.

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**Colour****5.49 (b) BASKETBALL BACKBOARD SUPPORT - LIFT-UP****Location**

Gymnasium.

**Description**

Proprietary frame work to support backboard and net at correct height. Allow backboard to be raised with winch when not in use. Supply and install all cables, brackets, winch and pulleys as required.

**Support Frame**

Fix wall mounting frame securely to brickwall/structural steel in accordance with engineers requirements. The four moveable arms to be supplied with 13mm diam. greased plain bearings at each end which connect to matching hinge points on wall and backboard frame with 12mm diam. bolts. To support backboard at correct working height attach two 5mm diam. galv. steel cables with galv. steel turnbuckles and lock nuts to shackles on top of board, fix cables securely to wall or ceiling with cable brackets. Provide a 5mm diam. galv. steel hauling cable fixed to centre of backboard and a swivel anchor sheave block fixed to wall or frame in position to provide correct operation of the lift-up action of the backboard. Fix winch securely to wall or frame in correct operating position and install cable. The handle of the winch's worm drive must be operable for both down and up movements.

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**Colour****5.50 (c) BASKETBALL BACKBOARD SUPPORT - SIDE SWINGING****Location**

Gymnasium.

**Description**

Proprietary frame work to support backboard and net at correct height. Allow backboard to swing sideways when not in use. Supply and install all cables, brackets and fixings as required.

**Support Frame**

Fix wall mounting frame securely to brickwall/structural steel in accordance with engineers requirements.

The four moveable arms are to be supplied with 13mm diam. greased plain bearings at each end which connect to matching hinge points on wall and backboard frame with 12mm diam. bolts. To support backboard at correct working height attach two 5mm diam. galv. steel cables with galv. steel turnbuckles and lock nuts to pivot brackets fixed to wall directly above backboard pivot points and fix the other end of the cables to shackles welded to backboard framework. All cables to be clamped with aluminium ferrules. Brace fix the backboard support in the working position with either cables with toggle tension device or internal telescopic device adjustable

from the floor. Install rope cleats, pulley brackets and provide ropes to enable the backboard assembly to be operated from the floor.

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**Colour**

**5.51 BASKETBALL RING**

**Location**

Gymnasium.

**Description**

Provide a 20mm diam. solid mild steel rod ring with provisions for net fastening. Fix ring to backboard assembly with a 150mm wide x 5mm thick steel plate cleat with two 10mm diam. steel rod braces. All in accordance with the Australian Basketball Federation requirements.

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**Colour**

Orange

**5.52 BASKETBALL BACKBOARD ASSEMBLIES**

**Location**

Gymnasium.

No. each space: 1 set (total 2)

**Frame Description**

Proprietary welded frame work with mitred corners and centre vertical member. Bolt holes pre drilled in frame for basketball ring. Provide lugs and if required cable fixing and hinges to connect backboard support.

**Finish**

Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

**Backboard Description**

An approved moisture resistant custom wood backboard bolted to frame with 10mm diam. countersunk bolts equally spaced at 350mm maximum centres.

- -Size: 1800 x 1050mm finished.
- -Thickness: 25mm
- -Graphics: Generally semi-gloss white enamel with edges and 50mm line markings in semi-gloss black enamel as shown on Drawings and further specified in PAINTING.

**5.53 BASKETBALL BACKBOARD SUPPORT POST AND ASSEMBLIES**

**Location**

Games Courts.

**Support post**

A proprietary gooseneck style outdoor basketball post system. The post is to be extended 750 mm (min.) into a reinforced concrete footing and secured by an anchor pin or sleeve locking device. The post or sleeve must be securely tied into the concrete to prevent any risk of the post rotating when under pressure from wind loading and/or live loads.

Horizontal section: Fabricated with a special, slotted mounting plate to the level of the backboard and ring (goal). Bolts from the front mounting goal must mount directly through the backboard and into the mounting plate.

Standards: To AS 1163, AS 1554.1, AS 1170, AS 1250, AS 4100

Galvanising: Weld, pre-drill bolt holes and hot dip galvanise whole steel assembly after fabrication (all backboard fixing bolts, washers and nuts to be galvanised).

Hot dip galvanising: To AS 4680

Footings: Minimum diameter 600 mm reinforced concrete. The top of the footing to be a minimum of 15 mm above the finished surface (where the support post penetrates the concrete footing) and sloped the edges to drain water away from support post.

Standards: To AS 3600

- Concrete: 25 MPa

Installation: In accordance with the "The Official Basketball Rules" produced by Basketball Australia unless otherwise stated. (e.g. the backboard support post distance from the end line).

- Backboard support post: Distance from the outside edge of the end line minimum 1000 mm (mandatory).

Colour: Bright UV stabilised colour in contrast with the background in order that it will be clearly visible.

- Finish: Specification reference PAINTING

#### **Protective padding, support post**

Each basketball upright support post is to be supplied with a removable cylindrical shaped polyurethane foam filler with a vinyl cover.

Filler: High density polyurethane foam

Cover: UV stabilised reinforced vinyl cover with concealed velcro closure flaps. (to enable ease of installation and removal).

Height: Minimum 2100 mm from base

Colour: Bright colour in contrast with the background in order that it will be clearly visible

Storage: Store in safe location. Hand pads to The Person with Full Authority/Superintendent on completion of project.

#### **Backboard**

Cast aluminium fan shaped or full size waterproof/rotproof ply. Fixing position to be in accordance with the "The Official Basketball Rules" produced by Basketball Australia.

Aluminium backboard: Cast from high tensile #310 aluminium.

Ribs: Cast with structural reinforcing ribs on backside with a 37 mm (nominal) deep perimeter flange.

Finish: Powder coated

- Colour: White with orange perimeter and target line markings

Size: (nominal) 1370 x 990 mm high

OR

Waterproof plywood backboard: Waterproof/rotproof

Grade: Exterior plywood to AS 2271, AS 1720

Size: 1800 x 1050 high x 20 mm (minimum) thick.

Finish: White with edges line markings in black.

#### **Rings**

Heavy duty ring with provisions for net fastening. Ring dimensions and fixing height to be in accordance with the "The Official Basketball Rules" produced by Basketball Australia.

Finish: Protective coating and paint system by manufacturer prior to delivery in accordance with the specification requirements PAINTING.

Colour: Orange

#### **Installation**

Ring and backboard mounting must be bolted directly to backboard support plate with galvanised bolts washer and security type tamper proof shear nut sleeve assembly. The tamper proof nuts are to be designed to shear when sufficient torque is applied allowing the remaining protective sleeve to turn freely preventing removal.



**Proprietary system**

One proprietary system is to be used for the complete assembly of support post, backboard and ring. Do not use a mix of different manufacturers proprietary items.

**Certification - Mandatory**

The complete system including posts reinforced footings and assembly must be certified by a registered structural engineer (mandatory). Hand one copy of the certification to The Person with Full Authority/Superintendent.

**5.54 PROVISION FOR MOVEABLE POSTS****Location**

Games Court.

**Description**

Proprietary galvanised or zinc plated metal tube insert with a moveable flange to seal top of insert when net holding posts removed.

Metal insert to be set well in concrete footing 400 x 400 x 600 mm deep and finished flush with the top of the finished surface level.

**Insert**

73 mm OD x 5.2 mm x thick x 450 mm long designed to receive 50 mm NB holding post.

**5.55 NETBALL POST AND RING****Location**

Games Court.

**Requirement**

Post and ring assembly

**Post**

Each post shall be a vertical 60 mm O.D. tubular steel pipe, 3500 mm long, capped at the top and ragged at the bottom to prevent rotation when fixed in position.

Terminate post 150 mm from bottom of footings. Fixed posts shall be set in a 300 x 300 x 600 mm deep concrete footing such that the ring fixed at the top of the post finishes horizontal and 3050 mm above the finished court surface level all in accordance with the All Australian Netball Association.

**Ring**

Each post shall be fitted with a 380 mm I.D. circular ring of

15 mm M.S. rod, welded to a 10 mm thick M.S. bracket which shall help support the ring 150 mm from the post (measured from internal edge of ring). Two 10 mm diameter M.S. rod braces shall be welded from each side of the M.S. bracket to each side of the ring. All posts shall be galvanized. Bolts and nuts shall not be welded to either post or ring supports all in accordance with the Australian Netball Association.

**5.56 BRACKET FOR MONITOR****Description**

A proprietary articulated arm monitor bracket with a tilt facility. The bracket must have a provision to accept an accessory bracket to support a VCR

Size: Accept monitors up to 680mm screen size and 45kg weight.

Platform/support: Adjustable to suit various size monitors.

Swivels 180°

Tilts 7° up 7° down

Security: Provide an adjustable security strap/cradle (to hold monitor securely) with a secure fastening device. The strap/cradle must be compatible and supplied by the suppliers of the proprietary bracket system

Height: 2100mm from floor level

Fixing (wall): Concealed

Suitable for masonry or stud walls

Colour: Black

**5.57 COVER PANEL TO STOVES****Description**

Where ovens are located back to back provide a metal capping strip with turned down flanges to the top of the stove upstands and down the sides to 90mm above floor.

**Material**

Stainless Steel.

**Width**

203mm

**Thickness**

1.2mm

**Fabrication**

Turn down flanges, 6 mm on all edges, neatly form and solder joints, buff edges to remove sharp projections.

**5.58 MASTER CONTROL BOX****Description**

A mild steel non-lockable galvanised Laboratory Master Control Box built into brickwork where shown on the Drawings.

**Size**

600 x 710 x 160 mm

**Steel Thickness**

1.6 mm

**Finish**

Baked Enamel.

**5.59 SEATING BENCH, STEEL BRACKETS****Location**

Change Rooms.

**Fabrication**

Form brackets from mild steel angle comprising of vertical and horizontal members with fixing plates on ends of both members as shown on drawings. Pre-drill horizontal member and fixing plates, weld all together and hot dip galvanise after fabrication.

Size: >

Spacing: 600mm maximum centres.

Fixing: Fix securely to wall and floor through pre-drilled cleats.

**5.60 SEATS****Description**

A complete proprietary system including seat supports, all fixings and anodised aluminum seating as shown on drawings.

**Aluminium Seating**

Extruded aluminium alloy complete with end capping.

- Nominal Wall Thickness: 2.55 mm

**Assembly**

Attach seat to seat support with either anti-vandal security bolts and "T" nuts, mono-bolts or stainless steel bolts and nuts with nylon locking inserts.

**Security Key**

If security bolts and "T" nuts are used to fix seat to seat support, hand two security keys (key for installing the anti-vandal security bolts to seat) to The Person with Full Authority/Superintendent on completion of installation.

**End Capping, Fixing**

Minimum of 5 pop rivets for each end cap ( 3 pop rivets at top and 2 at bottom).

**Finish**

Clear etched and anodised.

- Thickness: 15 microns.

**Installation**

Installation must be carried out by the manufacturer/supplier of the proprietary aluminium seating.

**OR**

An installer approved by the manufacturer/supplier of the proprietary aluminium bench seating.

**Footings**

Set seat support bracket posts in concrete footings minimum 200 x 200 x 250 mm deep.

**Above Ground Fixing, Concrete**

Fix securely with a minimum of 2 masonry anchors through pre drilled holes in 160 x 80 x 10 mm flat bottom plate. Bottom plate to be fully welded to support post.

**5.61 ALUMINUM PICNIC SETTING****Description**

A complete proprietary system including aluminium seating and table tops with galvanised steel frames.

Length: 2000 mm

Height

- Table top: 735 mm
- Seat: 420 mm

**Frame**

Hot dipped galvanised tubular steel frame.

Diameter: 37 mm (ID)

Nominal wall thickness: 2 mm

Fixing: Provisions for permanent fixing

**Seating and Table Tops**

Extruded aluminium alloy complete with end capping.

- Nominal wall thickness: 2.55 mm

Assembly: Attach to seat and table top to galvanised frame with anti-vandal security bolts.

End capping: Minimum of 5 pop rivets for each end cap (3 top and 2 bottom)

**Installation**

Securely bolt to concrete in location nominated on drawing/s

**5.62 BICYCLE ENCLOSURE****Standards:**

To AS 2890.3

**Compound**

Bicycle parking facility to AS 2890.3 – Facility Class 2 (Refer Appendix B Typical Bicycle Parking Facilities – B3 Class 2 – B3.2).

- Modular design to fit proprietary compact security bicycle racks.
- Racks to be positioned on both sides of the compound.
- Each module must allow access to bicycle racks in accordance with AS 2890.3 – B3 Class 2 Parking Facilities – B3.2

Steel frames (posts, rails)

- Hot dipped galvanised to AS 4680
- Concrete keying: If the compound support posts are to be set into concrete footings, provide an effective means for the posts to key into the concrete (e.g. dimple, deformed or horizontal bar passing through or welded to post)
- Anchorage: If the compound support posts are to be anchored to an existing concrete slab, provide pre-drilled steel flanges to the bottom of each post for secure fixing with expanding masonry anchors. The posts must have the pre-drilled flanges welded to them prior to hot dip galvanising.

Weld mesh panels

- -Hot dipped galvanised.  
To perimeter of compound including door.
- Door
- -Security steel frame door, hot dipped galvanised.
- -Lock: Hardened steel lock shoot bolt.
- -Must be capable of being securely locked by padlock in a closed position.

Footings/Anchorage

>

### Security Compact Bicycle Rack

Compact style capable of taking tyre widths up to 60 mm.

- -Finish: Hot dipped galvanised.

#### 5.63 BAG RACKS

##### Fabrication

Form frames from mild steel square hollow section (SHS) and flat MS bar comprising of vertical and horizontal members with fixed foot plates. Pre-drill holes in frame for fastening to wall, floor and for fixing battens, weld altogether as shown on drawings and hot dip galvanising after fabrication.

##### Vertical Members

25 x 25 x 3.0mm SHS.

##### Horizontal Members

25 x 25 x 3.0mm SHS.

##### Wall Plate

50 x 8mm MS.

##### Floor Plate

125 x 125 x 8mm.

##### Installation

Fix securely to wall and floor through pre-drilled holes in wall and floor plates.

##### Battens

Refer BAG RACKS - WOODWORK.

#### 5.64 EXERCISE RAIL

##### Type

Tubular metal rail bent twice with two welded intermediate wall brackets and pre-drilled end flange plates welded to brackets and curved end mounts.

Nominal size: 25mm I.D.

Material: Stainless steel

Size: 2000mm.

Height From Floor Level: 750mm

##### Fixing

Securely fix to wall through pre-drilled holes in flange plates.

#### 5.65 EXERCISE BAR (BARRE)

##### Fabrication

Fabricate from mild steel comprising of vertical and horizontal members with fixed foot plates. Weld altogether as shown on drawings.

##### Vertical Member

50 x 8 mm MS flat with radius edges.

##### Horizontal Member (Tube)

40 mm NB x 4 mm MS tube.

##### Horizontal Rail Support:

- -"T" Bracket: 32 x 8 mm MS flat with radius edges and 32 x 6 mm MS flat with radius edges pre-drilled for receiving timber rail.

- Floor Plate: 50 x 106 x 8 mm MS flat pre-drilled for fixing to floor.
- End Support Brackets: 6 mm thick MS flat 90 degree angled bracket with radius edges. Bracket to be rounded to finish flush and seal the ends of the horizontal member (tube). Pre-drill holes for fixing assembly to wall.

**Installation**

Fix securely to floor through pre-drilled holes in floor plates and at each end of mirror assembly through pre drilled holes in end support brackets.

**Timber Rail**

Specification Reference - WOODWORK.

**Finish**

Specification Reference - PAINTING.

**5.66 HANGING LINES FOR ART WORKS****Location/s**

Description: Stainless steel wire rope is to be supported by eye bolts complete with a turn buckle and all necessary accessories for securing and terminating wire rope.

Wire rope: stainless steel, nylon coated.

- Diameter: 1 mm (minimum)

Eye bolts: Stainless steel

- Diameter: 8 mm (nominal)
- Fixing: Bolt securely to masonry wall or wall frame.

Intermediate eye bolts: Stainless steel.

- Diameter: 8 mm (nominal)
- Spacings: 2400 mm (between support eye bolts)
- Fixing: Bolt securely to ceiling frame or soffit

Turnbuckle: Stainless steel

- Type: Eye and eye
- Nominal size: 8 mm (nominal)

Height from floor: 2360 mm

**5.67 DEMONSTRATION MIRROR****Fabrication**

Form support frame for demonstration mirror from M.S. angle comprising of horizontal, vertical and 35 degree raking members spaced at 1000mm centers. Mirror to be held in position on support frame by mirror framing angle bolted top and bottom to each raking member of the support frame as detailed. Cut flanges, pre-drill fixing holes, weld all together and hot dip galvanise after fabrication.

Support Frame: 40 x 40 x 6mm M.S. angle.

Height: 2700mm - (Ceiling line).

Mirror Assembly: Plastic mirror fixed to backing of 12mm HMR particle board. Support mirror securely with MS framing angle.

- M12 Bolts and washers to support mirror framing.
- 15 NB Ferrule for each mirror bolt assembly.

**Finishing**

All metal framing hot dip galvanised.

**Fixing**

Ceiling fixing - Refer to structural engineers for fixing requirements.

**Mirror**

Specification Reference GLAZING - MIRRORS.

**5.68 STAINLESS STEEL MIRROR****Description**

Mirror finished PVC coated bright annealed stainless steel 304 grade, 0.9 mm thickness, Mirror to be folded on all sides, corners welded and buffed, backed with 12 mm thick glue fixed plywood and screw fixed directly to tiled finish/brickwork.

Size: 575 mm x 575 mm for Pupil Toilets,

Height, floor to bottom: 850 mm for Primary,  
1100 mm for Secondary.

**Fixing schedule**

Type	Location	Number off: each space
Stainless Steel	Pupil Toilets	2 (Butted)
	Up to 2 WC's for girls or boys equivalent.	4 (In one group butted together or in two groups of butted pairs).
	Up to 5 WC's for girls or boys equivalent.	6 (Butted together in one or two groups).
Stainless Steel	Up to 10 WC's for girls or boys equivalent.	6 (Butted together in one or two groups).
	Shower/Change Size 1	2.
	Shower/Change Size 2	1.

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**6 COMPLETION**


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**6.1 COMPLETION****Maintenance manual**

Submit manufacturer's published recommendations for service use.

**Cleaning**

Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

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**7 Fixtures**


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**7.1 TOWEL RAIL Description**

682 mm long single type polypropylene as selected, screw to plugs in wall in position directed.

**7.2 DISPENSERS for TOILET PAPER****Type 1**

2 roll capacity white epoxy finish with lock (All keyed alike)

- Fixing: Screw fix to walls/doors.

Height from floor level: Specification reference DOOR AND WINDOW HARDWARE – HEIGHT OF FITTINGS AND FIXTURES, GENERAL.

**Type 2**

Single roll capacity, SCP or SSS finish, screw fixed to walls/doors using approved plugs.

Standards: All fittings and installation for Disabled and Self Help Units must be in compliance with AS1428.1.

**Type 3**

Recessed toilet roll holder, fixed to vanity unit (where shown).

Finish: Stainless steel

Standards: All fittings and installation must be in compliance with AS1428.1

**7.3 DISPENSERS for PAPER TOWEL****Standards**

All fittings and installation for Disabled and Self Help units must be in compliance with AS1428.1

**Description**

Roller type unit to suit 197 mm wide paper rolls. White baked enamel finish, fixed to wall where shown.

**7.4 soap dispenser****Location**

- Toilets - Boys/Girls

**Description**

Pressure die-cast in aluminium body pump action soap dispenser.

- Body: White stove enamel.

- Lid: Heavy chrome plating.

- Finger tip lever: Heavy chrome plate.

Soap valve: Corrosion resistant with an delivery system.

- Settings: Minimum 4 (0.25 to 1.0 mls)

- Setting: Pre-set to deliver 0.25 mls.

Dimensions (nominal):

- Height: 290 mm

- Width: 125 mm

- -Depth: 100 mm
- -Capacity: 1.2 litres

Locking system: Vandal resistant proprietary key to open dispenser

- -One key to operate all dispensers

Hand all keys to The Person with Full Authority/Superintendent

Proprietary item: Zalpon Model Mark 7

#### Fixing

- -Securely fix to wall by means of a backplate permanently fixed to the wall.  
The dispenser is to be locked to the back plate by means of the lid.
- -Installed in a position over the trough/basin to prevent drips from the dispenser landing on the floor.

#### Instructions

Clear instructions must be provided in accordance with the following:

- -Location
- -Brand and supplier of soap dispenser
- -The type of soap recommended by the supplier/manufacture of the soap dispenser.
- -Name and address of soap supplier/manufacture.
- -Size (instructions): A4

Finish: Laminated

Location: Cleaning distributors stores

Cleaning supervisors stores

Hand one copy to The Person with Full Authority/Superintendent

Installation: Fasten to wall in a clearly displayed position.

### 7.5 soap dispensers

#### Description

Stainless steel surface mounted lockable body pump action soap dispenser.

Stainless steel: 304 grade

- -Finish: Satin

Capacity: 1.2 litres

Soap valve: Corrosion resistant

Plunger: Semi flush. Maximum protrusion 12 mm.

Locking system: Vandal resistant proprietary key to open dispenser.

- -One key to operate all dispensers
- -Hand all keys to The Person with Full Authority/Superintendent

#### Fixing

- -Concealed
  - Securely fix to wall by means of a backplate permanently fixed to the wall and the dispenser is to be locked to the back plate by means of the lid.
  - Installed in a position over the trough/basin to prevent drips from the dispenser landing on the floor.

#### Instructions

clear instructions must be provided identifying and in accordance with the following:

- -Location
- -Brand and supplier of soap dispenser
- -The type of soap recommended by the supplier/manufacture of the soap dispenser.
- -Name and address of soap supplier.
- -Size (instructions): A4



Finish: Laminated

Location: Cleaning distributors stores

Cleaning supervisors stores

Hand one copy to The Person with Full Authority/Superintendent

Installation: Fasten to wall in a clearly displayed position.

#### **7.6 SOAP HOLDERS**

##### **Description**

CP brass soap holders screw fixed to wall in a position over the trough/basin to prevent drips from the soap holder landing on the floor.

Height from floor level: Specification reference DOOR AND WINDOW HARDWARE – HEIGHT OF FITTINGS AND FIXTURES, GENERAL.

#### **7.7 CLOTHES HOOK**

##### **Standards**

When clothes hook/s are to be installed in disabled and self help units installation must be in compliance with AS1428.1

##### **Description**

SSS or CP cast brass hat and coat hook screw fixed in position shown on drawings. (Specification reference: TIMBER FIXTURES)

#### **7.8 WASTE PAPER BIN**

Description: White plastic waste bin with swing top waste container.

Material: Polythene and high impact polystyrene.

Colour: White.

Capacity: 0.028 cubic metres.

<b>STAINLESS STEEL BENCHING</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **stainless steel benching** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Metal Fixtures

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**2 QUALITY****2.1 INSPECTION****Witness points**

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

- Fabrication complete, before delivery.
- Installation complete.

**Hold points**

As advised by the Principals Authorised Person

**2.2 SUBMISSIONS****Shop drawings**

Submit shop drawings showing the following:

- Bench/bench junctions.
- Welded joints.

**Site welding**

If site welding is proposed, submit details indicating positions and process.

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**3 MATERIALS AND COMPONENTS****3.1 MATERIALS****Stainless steel**

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

Bar: To ASTM A276.

Pipe: To ASTM A554.

Type: 304.

**Stainless steel sheet**

Surface finish: No. 4, not including to underside of shelves, and door and drawer backs.

Thickness: 1.2 mm minimum.

**Particleboard**

Standard: To AS/NZS 1859.1.

Classification: High moisture resistant.

**Plywood**

Standard: To AS/NZS 2271.

Classification: General purpose.

**3.2 COMPONENTS****Fasteners**

Material: Stainless steel.

Dimensional system: Metric.

Bolt and screw heads: Polished, pan type or countersunk.

**Hardware**

Material: Stainless steel.

**Sealants**

Type: Neutral cure one-part silicone.

Performance: Flexible. Resistant to physical and chemical damage characteristic of installed environment. Resistant to growth of mould, bacteria and fungi. Colourfast.

Curing period: Less than 4 days to a depth of 10 mm.

Peel strength (minimum): 100 kPa.

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**4 FABRICATION****4.1 FABRICATION GENERALLY****Stainless steel welding**

Process: Gas tungsten arc welding.

Weld type: Butt.

Internal weld category: Level 2.

External weld category: Class B.

Surface finish: Grade I, 120 grit.

Welding materials: Compatible with metal being welded.

Weld quality: Free from imperfections such as cracks and pits. Grind and polish to give required surface finish. Continuous exposed welds.

Joints: Strength at least that of parent metal. Free from crevices and folds. Invisible.

Joint position: At corners and edges as far as possible. Minimise joints in flat panels.

**Protection**

Provide temporary self-adhesive plastic film to stainless steel surfaces.

**Hardware fixing**

Drill and tap, or weld fix.

**Grain**

Benches and shelves: Lengthwise.

Bowls: Horizontal to sides, parallel to bench grain to bottom. Mitre at bottom corners.

Abutting surfaces: Parallel where possible.

**4.2 BENCH TOPS FABRICATION****Bench tops**

Material: Stainless steel sheet.

Thickness: 2 mm.

Bench height: To top of dry bench and to top of perimeter bead to wet bench.

Bench lengths: Maximum, to minimise number of bench/bench junctions.

Exposed corners: Radius exposed corners at least 5 mm, including back vertical corners of upstands.

Internal back vertical corners: Fuse only from behind.

Wet bench perimeter: Except at wall flashing, provide a raised bead, with a fascia.

Dry bench perimeter: Except at wall flashing, provide a fascia.

**Drainer**

Drainer falls to sinks: 1:50, 450 mm long.

Drainer surface: Plain.

Fall to dishwashing machine: Between 1:100 and 1:72, 1800 mm maximum length.

- Fascia: Fall to match.

**Wall splashback**

Type: Integral.

Ends: Return.

**Fixing to support frame**

Type: Spot weld threaded stainless steel M5 studs to underside of bench top, centred over framing members, and 2 studs per front-to-back framing member. Ensure stud fixing does not indent the bench top. Provide star washers and nuts.

**Sound deadening**

Type: Select from the following:

- Anti-drum material applied to underside of bench top.
- 16 mm particleboard, continuous, adhesive-fixed to underside of bench top, sealed at edges.
- 16 mm or 18 mm plywood, continuous, adhesive-fixed to underside of bench top, sealed at edges.

**4.3 BOWLS FABRICATION****Bowls**

Type: Deep drawn stainless steel.

Thickness:

- Capacity < 75 L: 1.6 mm.
- Capacity ≥ 75 L: 2 mm.

Internal radii: 25 mm minimum.

Minimum depth: 250 mm.

Wastes:

- Size (minimum): DN 50.
- Nut and washer: To AS 1589 or AS 2887. Locate with the washer to the underside of the bowl.
- Position: Centred in single bowls, adjacent in double bowls.
- Plug: Heavy-duty commercial.
- Pot sinks: Extended lever handle type, with 50 mm ball valve.

Falls: In the long dimension.

Fall to waste (minimum):

- Capacity < 75 L: 10 mm.
- Capacity ≥ 75 L: 25 mm.

**4.4 FRAME FABRICATION****Bench top support frame**

Support: Provide sufficient support so that no load is placed on the waste pipe or water connections.

- Design deflection (maximum): 3 mm.

Members: 31.8 x 31.8 x 1.6 mm stainless steel pipe. Seal ends.

Extent: Perimeter and at sides of bowls, with additional members spaced as follows:

- 1.6 mm sheet: 350 mm maximum centres.
- 2 mm sheet: 500 mm maximum centres.

Maximum unsupported area: 0.3 m<sup>2</sup>.

Connections: Welded.

Fixing to bench top: Predrill for studs.

**Bench legs**

Members: 31.8 x 31.8 x 1.6 mm stainless steel pipe. Seal ends.

Fixing to bench top support frame: Weld all around at junctions.

Spacing: 1200 mm maximum.

Fixing to walls: Predrilled 100 x 50 x 2 mm stainless steel plate welded to legs at 600 mm high.

Adjacent to walls: 50 - 150 mm clear of wall.

Feet: Nylon or chrome-plated aluminium, adjustable vertically  $\pm 25$  mm. Threaded section must not protrude from leg.

**4.5 SHELVING FABRICATION****Under bench shelving**

Material: Stainless steel.

Thickness: 1.6 mm.

Shelf support: 30 x 30 x 5 mm stainless steel angles.

- Extent: Perimeter, with additional angles spaced to give a maximum unsupported area of 0.3 m<sup>2</sup>.
- Connections: Welded.

Fixing of support to legs: Welded.

**Over bench shelving**

Material: Stainless steel.

Thickness: 1.6 mm.

Width:>

Shelf support: 25.4 x 25.4 x 1.6 mm stainless steel pipe. Seal ends.

- Spacing: 900 mm maximum.
- Fixing to wall: 50 x 50 x 5 mm stainless steel plate, fixed with at least two M8 bolts. Weld the support centrally on the lower edge of the plate.

Fixing of shelf to support: Threaded M5 studs through tube with nuts on underside. Seal between shelf and support.

**4.6 DRAWERS FABRICATION****Drawers**

Material: Stainless steel.

Thickness: 1.2 mm.

Construction: Welded.

Frames: Removable, and interchangeable with other drawer frames. Provide extension-type drawer slide mechanism and front panel. Open top and bottom, for insert liner. Provide rubber stops at rear.

Front panel: 20 mm thick double pan construction.

Drawer liners: Removable.

Housing: Back and 2 sides, of a neat external appearance.

Runners: Incline to rear so drawers roll closed. Provide stop so drawer cannot be pulled out accidentally.

Locks: Chrome-plated brass.

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**5 INSTALLATION****5.1 INSTALLATION GENERALLY****Welding**

General: Do not site weld.

**Sealing**

Gaps < 5 mm wide: Apply sealant at the following locations:

- Butt joints between benches.
- Between benches, including flashings, and walls.
- Spaces and gaps under benches.

Gaps  $\geq 5$  mm wide: Close with stainless steel infill panels.

**Floor fixing**

8 mm diameter stainless steel dowels, sealed to floor with silicone sealant.

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**6 COMPLETION****6.1 MAINTENANCE****Protection**

Temporary self-adhesive plastic film: Remove from stainless steel surfaces.

**Maintenance manual**

Require

<b>TIMBER FIXTURES</b>
------------------------

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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **timber fixtures** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

---

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made of items fabricated off site before delivery.

**Hold points**

As advised by the Principals Authorised Person

**2.2 SAMPLES****General**

Submit samples of the following:

- Each type of board to be used complete with finish and edge stripping.
- Each type of joint.
- Each type of hardware.

**2.3 SUBMISSIONS****Shop drawings**

Submit shop drawings to a scale not smaller than 1:50, showing

- overall dimensions;
- materials, thicknesses and finishes of elements including doors, divisions, shelves and benches;
- type of construction including mitre joints and junctions of members;
- hardware type and location;
- temporary bracing, if required;
- procedures for shop and site assembly and fixing;
- locations of benchtop joints;
- locations of sanitary fixtures, stoves, ovens, sinks, and other items to be installed in the units; and

- relationship of fixture to adjacent building elements.

### 3 MATERIALS AND COMPONENTS

#### 3.1 MATERIALS AND COMPONENTS

(i) one of the following ALTERNATIVE TERMITE RESISTANT TIMBER SPECIES OR preservative TREATMENTS AGAINST TERMITE ATTACK ARE TO BE USED.

- WHITE CYPRESS PINE
  - DURABLE CLASS 1 TIMBERS
  - preservative treated timber to the applicable hazard class to AS1604.1.
- Natural durability classification to AS 1604 Table F2 (minimum):
- Naturally termite resistant timbers to AS3660.1 Appendix C
  - Preservative treatment: CCA preservative treated timber to the applicable hazard class to AS1604.1.

When using CCA preservative treated timber suitable safe work method plans and waste disposal methods must be implemented (refer contract preliminaries)

Prevent direct contact between chemically treated timber and unprotected metal by either a separation layer or by applying an anti-corrosion, low moisture transmission coating to contact surfaces.

All fasteners must be treated to prevent corrosion.

All Exposed CCA treated timber must be sealed with a minimum of one coat of a premium quality semi transparent penetrating finish based on oil-alkyd resin for exterior applications.

(ii) AUSTRALIAN INDIGENOUS TIMBER SPECIES ARE TO BE USED WHEREVER PRACTICABLE, WITH DUE REGARD TO SUITABILITY OF USE AND LOCATION. IN PREFERENCE TO IMPORTED TIMBER SPECIES, IN ACCORDANCE WITH GOVERNMENT POLICY.

#### Decorative laminated sheets

Thickness

- For vertical surfaces fixed to continuous background 1.2 mm unless otherwise specified.

#### Joinery timber

Hardwood: To AS 2796.3.

Seasoned cypress pine: To AS 1810.

Australian grown conifers, other than radiata pine and cypress pine: To AS 1786.

#### Plywood

Interior use generally: To AS/NZS 2270.

Interior use, exposed to moisture: To AS/NZS 2271.

#### Hardboard

Standard: To AS/NZS 1859.4.

#### Particleboard

Standard: To AS/NZS 1859.1.

Melamine overlaid particleboard: Particleboard overlaid on both sides with low pressure melamine.

#### Medium density fibreboard

Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard overlaid on both sides with low pressure melamine.

#### Decorative overlays

Standard: To AS/NZS 1859.3.

#### High-pressure decorative laminate sheets

Standard: To AS/NZS 2924.1.

Thickness (minimum):



- For horizontal surfaces fixed to a continuous background: 1.2 mm.
- For vertical surfaces fixed to a continuous background: 0.8 mm.
- For post formed laminate fixed to a continuous background: 0.8 mm.
- For vertical surfaces fixed intermittently (e.g. to studs): 3.0 mm.
- For edge strips: 0.4 mm.

## 4 FURNITURE

### 4.1 CONSTRUCTION GENERALLY

#### General

Accuracy: Build components square and install plumb.

Joints: Provide materials in single lengths whenever possible. If joints are necessary make them over supports.

Framing: Frame and trim where necessary for openings, including those required by other trades.

#### Accessories and trim

Provide accessories and trim necessary to complete the installation.

#### Fasteners

Visibility: Do not provide visible fixings except in the following locations:

- Inside cupboards and drawer units.
- Inside open units in which case provide proprietary caps to conceal fixings.

Visible fixings: Where fastenings are unavoidable on visible joinery faces, sink the heads below the surface and fill the sinking flush with a material compatible with the surface finish. In surfaces which are to have clear or tinted finish provide matching wood plugs showing face grain (not end grain). In surfaces which are to have melamine finish provide proprietary screws and caps finished to match.

Fixing to building structure: Provide screws with washers for fixing into timber or steel framing, or masonry anchors.

#### Adhesives

General: Provide adhesives to transmit the loads imposed and to ensure the rigidity of the assembly, without causing discolouration of finished surfaces.

Decorative laminated sheets: Contact adhesive to AS 2131.

#### Finishing

Junctions with structure: Scribe benchtops, splashbacks, ends of cupboards, kickboards and returns to follow the line of structure.

Joints: Scribe internal and mitre external joints.

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

Matching: For surfaces which are to have clear or tinted finish, arrange adjacent pieces to match the grain and colour.

#### Labelling

Permanently mark each unit of furniture with the manufacturer's name, on an interior surface.

### 4.2 DOMESTIC KITCHEN ASSEMBLIES

#### Standard

General: To AS/NZS 4386.1.

### 4.3 CUPBOARD, SHELF AND DRAWER UNITS

#### Plinths

Material: Select from the following:

- Exterior general purpose plywood.
- High moisture resistant particleboard.
- High moisture resistant medium density fibreboard.

Thickness: 18mm.

Fabrication: Form up with front and back members and full height cross members at not more than 900 mm centres.

Finish: High-pressure decorative laminated sheet.

- Fasteners: Conceal with finish.

Installation: Scribe to floor and secure to wall to provide level platform for carcasses.

#### **Carcasses**

Material: Select from the following:

- High moisture resistant particleboard.
- High moisture resistant medium density fibreboard.

Thickness: 18mm.

Joints: Select from the following:

- Proprietary mechanical connections.
- Dowels and glue.
- Screws and glue.
- Proprietary joining plates and glue.

Adjustable shelves: Support on proprietary pins in holes bored at equal centres vertically.

- Spacing: 32 mm.

Finish: High-pressure decorative laminated sheet.

Fasteners: Conceal with finish.

Installation: Secure to walls at not more than 600 mm centres.

#### **Drawer fronts and doors**

Material: Select from the following:

- Melamine overlaid high moisture resistant particleboard.
- Melamine overlaid high moisture resistant medium density fibreboard.

Thickness: 18mm.

- Maximum door size: 1800mm high, 900mm wide.

Finish: Decorative laminated sheet.

#### **Drawer backs and sides**

Material: HMR particleboard.

Thickness: 12 mm.

Installation: Mitre corners leaving outer skin of foil intact, finish with butt joints, glue to form carcass and screw to drawer front. Route for drawer bottoms.

#### **Drawer bottoms**

Material: Ply or hardboard slotted into front, sides and fixed to back.

Thickness: 4mm.

Stiffening: 32 x 12mm finished if over 600mm wide.

Runners: 19mm square finished Talowwood screw fixed to divisions or ends.

#### **Ventilation**

Cupboards enclosing gas services must have adequate cross ventilation to prevent the build up of gas.

Ventilators: Specification reference: Metal Fixtures.

### **4.4 BENCHTOPS**

#### **Laminated benchtops**

Material: High moisture resistant particleboard.

Benchtop thickness: 25mm.

Finish: High-pressure decorative laminated sheet.

Exposed edges: Extend laminate over shaped nosing, finishing > 50 mm back on underside. Splay outside corners at 45°.

Sealing underside: Laminate undersides of benchtops if

- subject to excessive moisture from equipment such as dishwashers; or
- the benchtop is not restrained against warping by cupboard carcass or support framing.

Installation: Scribe to walls. Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joint with sealant matching finish and clamp with proprietary mechanical connectors.

#### **Benchtops concealed by finishes**

Benchtop thickness: 25mm.

### **4.5 HARDWARE**

#### **Drawer and door hardware**

Hinge types: Concealed metal hinges with the following features:

- Adjustable for height, side and depth location of door.
- Self closing action.
- Hold open function.
- Nickel plated.

Piano hinges: Chrome plates steel, extending full height of doors.

Slides: Metal runners and plastic rollers with the following features:

- 30 kg loading capacity.
- Closure retention.
- White thermoset powder coating.

### **4.6 CANTEEN**

#### **Standards**

- General: AS/NZS 4386.1

#### **Requirement**

Fabricate servery, cupboards and food preparation benches, in the locations and of the materials, species, sizes and profiles shown on the drawings and as specified as follows.

#### **Carcasses (Shelving/Divisions)**

Material: Melamine overlaid high moisture resistant medium density fibreboard. Laminate all ends (front, side and back edges) with a matching colour laminate.

Thickness: 18mm (minimum)

Joints: Select from the following

- Proprietary mechanical fasteners
  - Dowels and glue
- Screws and glue

Installation: Secure to walls no more than 600mm centres.

Joint sealing

- Fill all joints between wall and carcasses (fixed shelving against wall and divisions) with sealant.
- Fill all joints between solid plinth and base of cupboards/benches with sealant. All sealants are to match finish.
- Seal all perforations where pipes and services pass.

Adjustable shelves: Support on proprietary bush and rest pin brass shelf supports in holes bored at equal centre vertically.

- Shelf support, spacings: 32mm
- Front edges: 2 mm P.V.C. edge strips.
- Mounting: Provide locating inserts for shelf supports to enable shelves to be positively mounted 25mm from the wall.

#### **Drawer fronts and doors**

Material: Melamine overlaid high moisture resistant medium density fibreboard.

Edges: To be covered with 2 mm P.V.C. edge strips to match face finish

Thickness: 16mm (minimum)

Drawer fronts: Route for drawer bottoms

Colour: >

#### **Drawer backs and sides**

Material: PVC film laminated hardboard

Thickness: 12mm

Colour: >

Installation: Mitre corners leaving outer skin of foil intact, finish with butt joints, glue and form carcasses and screw to drawer front. Route for drawer bottoms.

#### **Drawer bottoms**

Material: PVC film laminated hardboard both faces.

Thickness: 3mm (minimum)

#### **Laminated benchtops**

Material: High moisture resistant particleboard

Thickness: 33mm (minimum)

Finish: High-pressure decorative laminated sheet

Class: HGP

Exposed edges: Extend laminate over shaped nosing, finishing >50mm back on underside. Splay outside corners at 45°.

Sealing underside: Laminate to underside of benchtops.

Installation: Scribe to walls. Fix to carcass at least twice per 600mm length of benchtop.

Joint sealing: Fill all joints with waterproof sealant. Match finishes and clamp with proprietary mechanical connectors.

Wall sealing: Fill all joints between wall and benchtop with a waterproof sealant "gunned" in. Match finish.

#### **Drawer and door hardware**

Hinge types: Specification reference DOOR AND WINDOW HARDWARE – HINGES.

Slides/runners: Proprietary heavy duty metal slides with plastic rollers with ball bearings.

- > 30kg loading capacity
- Closure retention
- White thermoset powder coating

Handles: Pull handle type "G", one per door. Specification reference DOOR AND WINDOW HARDWARE - HANDLES.

Lock: Specification Reference DOOR AND WINDOW HARDWARE - HANDLES

Catches: One catch per door. Specification reference DOOR AND WINDOW HARDWARE – FLUSH BOLTS

Cash Drawer: Plastic insert fitted into top drawer resting on screw fixed PVC film laminated battens to sides of drawer.

#### **Food Preparation Benches**

Bench top support

- Legs: 25mm diam. N.B. pipe, with M.S. fixing plates welded to top and bottom of legs drilled ready for fixing to floor and underside of bench top.
- Finish: Hot dip galvanise after fabrication
- Spacings: 900mm (maximum) intervals
- Installation: Securely fix to floor and to underside of bench top with proprietary fasteners.

Bench top

- Sealed HMR particleboard bench top sheeted with a seamless stainless steel surface and aluminium zinc coated steel sheet to underside of HMR particleboard.
- Stainless Steel (bench surface)
- . Standards: To ASTM A 240/A 240M
- . Type: 304
- . Surface finish No.4
- . Thickness: 1.2mm
- Fascia: 50mm (minimum) x 15mm return at bottom, returned to underside of bench top, form a complete seal.
- Bench surface support (core): 33mm thick (minimum) HMR particleboard, continuous, adhesive-fixed to underside of bench top and aluminium zinc coated steel sheet backing to underside of HMR particleboard, sealed at edges.
- Underside facing: Aluminium zinc coated steel sheet.
- Fabrication: The complete bench top (including HMR particleboard core) to be fabricated by the fabricator off-site.  
The aluminium zinc coated steel backing sheets must not come in direct contact with stainless steel.
- Protection: Remove temporary self-adhesive film from stainless steel surface.
- Maintenance manual: required
- Optional small shelf
  - Joint sealing: Fill all joints including bench support junctions with waterproof sealant.
  - Specification reference: TIMBER FIXTURES – CANTEEN - LAMINATED BENCHTOPS.

### Timber

All exposed timber in clear gloss varnish specification reference PAINTING.

#### 4.7 DEMONSTRATION MIRROR

##### Plastic mirror backing

Material: Particleboard.

Thickness: 12mm.

#### 4.8 MIRROR UNITS, TEXTILES

##### Location

Design LS Type 8 (textiles).

##### Requirements

Provide 3 timber framed mirror units, 1 fixed and 2 hinged secured to wall as indicated on the drawings by an approved fixing method.

Size: 600 wide x 1500 mm high set 350 mm above floor.

Mirror: As specified in MIRRORS - GLAZING.

Hinges: Continuous.

Frame: 75 x 50 mm(nominal) rebated.

#### 4.9 TOILET WALL CUPBOARD

##### Location

Self Help Toilet.

##### Requirement

To comprise two horizontal sections of which the top section is to be lockable and the bottom section is to have two shelves adjustable at 25 mm centres.

Construction: Form divisions as specified in CUPBOARD, SHELF AND DRAWER UNITS fabricate to detail as shown on the Drawings.

Shelves: 12 mm HMR PARTICLEBOARD.

Doors: As specified in CUPBOARD, SHELF AND DRAWER UNITS.

Size: 200 deep x 450 wide x 1500 mm high.

Finish: 0.8 mm thick plastic laminate sheet applied to all internal, external surfaces and edges including door but excluding counter top which shall be 1.2 mm thick.

Hardware: "D" handles, catches, hinges and lock as specified in HARDWARE.

#### 4.10 VANITY UNIT

##### Location

Self Help Toilet

##### Requirement

Fabricate to details as shown on the drawings. Secure to wall sitting unit on a 150 mm high recessed concrete plinth finished in ceramic tile.

Construction: As specified in TOILET WALL CUPBOARD - TIMBER FIXTURES.

Access Panel: For access to the hot water unit provide a removable panel, flush and matching.

Fixing: Use 45 x 42 mm battens plugged and screwed to secure carcass of unit.

#### 4.11 PRACTICAL ACTIVITIES BENCH

#### 4.12 FILM LOAD BENCH

##### Location

Darkroom.

##### Construction

Fabricate a wall mounted bench top as specified in CUPBOARD, SHELF AND DRAWER UNITS, laminate top and edges with 1.2 mm thick sheet as specified.

Size: 450 mm wide x room dimension.

Height: 900 mm.

Front edge: 100 x 38 mm (nominal) timber fascia.

Installation: Screw fix on 75 x 25 mm hardwood support battens to walls on three sides.

#### 4.13 BENCH CUPBOARD/COUNTER

##### Construction

Fabricate in the location and of the materials, sizes and profiles shown on the Drawings or as specified in CUPBOARD, SHELF AND DRAWER UNITS. Check counter dimensions on site prior to fabrication.

#### 4.14 BENCH CUPBOARD COUNTER (LIBRARY SERVICE DESK)

##### Description

Library counter service desk manufactured out of laminated MDF. The unit is to have adjustable shelves and cable management system all as shown on drawing.

- Carcases and all shelves: 16 mm moisture resistant MDF
- Top: 32mm (minimum) moisture resistant MDF
- Ends/Edges: 2 mm P.V.C. edge strips

Adjustable shelves

- Location: Centre and one bay at each end of unit
- Number: Two adjustable shelves to each bay
- Shelf supports: Bush and rest pin brass shelf supports

#### 4.15 SEATING BENCH

##### Requirement

Provide battens in the location and out of material, species, sizes and profiles shown on the Drawings.

Fixing: Secure battens to brackets through pre-drilled holes in horizontal member with galvanised screws.

**4.16 STAGE CONTROL CUPBOARD****Requirement**

Construct cupboard using framing as specified in LIGHT TIMBER FRAMING and to details as shown on the drawings. Construct bench as specified in CUPBOARD, SHELF AND DRAWER UNITS and as follows. Provide pin-up board as specified in FIBRE PIN-UP BOARDS -TIMBER FIXTURES.

Cupboard:

- -Size: 845 x 2185 long x 2400 mm high.
- -Frame: 75 x 50 mm
- -Sheeting: 12 mm thick veneered plywood to walls and ceiling.
- -Jamb linings & pelmet: Construct out of 100 x 38 mm timber sections.

Bench:

- -Benchtop: 18 mm veneered particle board.
- -Cleats & front nosing: 50 x 25 mm (finished).
- -Divisions and shelving: Veneered edge stripped particle board as specified in CUPBOARD, SHELF AND DRAWER UNITS and as shown on the drawings. Dowel fix divisions to wall.

Drawers: As specified in CUPBOARD, SHELF AND DRAWER UNITS.

Pin-Up Board:

- -Facing: Washable finish
- -Size: 900 x 450 mm
- -Fixing: Screw fix to frame

Door: Provide an approved roller door to full extent of cupboard opening.

Hardware: Provide an approved roller door system complete with all fittings and locks and install on accordance with manufacture's recommendations.

**4.17 STORAGE WALL****Requirement**

Provide the unit in the location shown and construct out of the materials, species, sizes and profiles shown on the Drawings or specified in CUPBOARD, SHELF AND DRAWER UNITS and as follows.

Materials: Internal plywood all edge stripped.

- -Grade: C-D.
- -Thickness: 19 mm.

**4.18 CHEMICAL STORAGE - SHELVING TIMBER****Construction**

Carcass unit out of 18 mm thick edge stripped particleboard with division and shelves supported on 50 x 25 timber rails and form a bottom shelf tray lined in lead. Fit two lockable timber glazed doors with metal track.

Size: 1800 wide x 425 deep x 2100 mm high.

Base: >

Supports: 100 x 50 mm.

Kickboard: Out of 25 mm (nominal) timber set back 50 mm.

Lead Lined Shelf Tray: Fix upstands to front and back and sheath in lead providing folded and sweated corners. Finish lead at top of upstand with batten.

- -Lead weight: 25 kg/m<sup>2</sup>.

Internal Finish: All surfaces to shelves and cupboard in high gloss enamel as specified in PAINTING.

Sliding Glazed Doors: Assemble from timber rails and stiles.

- -Door head: 100 x 50 mm on flat.
- -Top rail: 138 x 41 mm (finished).
- -Bottom rail: 185 x 41 mm (finished).
- -Stiles: 115 x 41 mm (finished).
- -Rebate: 10 x 20 mm.

Lock: Fit to end of external leaf a deadlock with broaching cylinders.

Finish: 2 coats of matt polyurethane to both doors internally and externally as well as pelmet and base as specified in PAINTING.

Internal Flushbolt: Fit to bottom rail of each internal leaf to engage with hole let into base.

Track: Specified in - DOOR AND WINDOW HARDWARE.

Handles: Recessed flush pull handles, 2 per door as specified in HANDLES - DOOR AND WINDOW HARDWARE.

#### **4.19 BAG RACKS**

##### **Battens**

Fix with countersunk screws from under side of brackets.

- -Size: 100 x 50 mm (nominal) D.A.R. Arris ends and top edges pencil round.

Frame: Refer BAG RACKS - METAL FIXTURES.

#### **4.20 RACK WITH HOOKS FOR CLOTHES**

##### **Construction**

Fix timber rail securely to wall with countersunk screws. Screw fix clothes hooks spaced at 600 mm centres or as shown on drawings.

Length: >

Height: 1600 mm from floor to centre of rack.

Width: 75 mm (nominal)

Thickness: 25 mm (nominal)

##### **Clothes hooks**

Specification reference: METAL FIXTURES

#### **4.21 RACK, PEG TYPE**

##### **Construction**

Fix timber rail securely to wall with 3 countersunk screws. Secure six 18 mm diam. evenly spaced pegs per rail.

Length: 900 mm.

Height: 1500 mm from floor to centre of rack.

Width: 100 mm (nominal)

Thickness: 25 mm (nominal)

#### **4.22 RACK MODULE FOR SHEETS, METAL**

##### **Requirement**

Fabricate out of 18 mm thick edge stripped particleboard providing vertical divisions and an 100 mm high kickplate.

Backing: Sheet back with 7 mm Pinus structural A bond glueline plywood.

Base: 100x 50 mm (nominal) supports at 600 mm centres.

Kickboard: 100 x 25 mm (nominal) timber set back 50 mm.

Size: > wide x > deep x 1400 mm high.

Drawing number: >

#### **4.23 RACK, TIMBER STACK**

##### **Requirement**

Provide a timber stack, framing in Radiata Pine with 18 mm thick edge stripped particleboard shelving as shown on the Drawings. On completion leave unfinished.

Stack: 1500x 1502 x 2100 mm high.

Framing: 75 x 38 mm uprights, 38 mm x 25 mm rails.

Bracing: 50 x 25 mm as detailed.

#### **4.24 RACK MODULE FOR SHEETS, WOOD**

##### **Requirement**

Fabricate rackout of 18 mm thick edge stripped particleboard providing 7 vertical intermediate divisions and an 100 mm high kickplate.

Backing: Sheet back with 7 mm Pinus structural A bond glueline plywood.



Base: 100 x 50 mm (nominal) supports at 600 mm centres.  
 Kickboard: 100 x 25 mm (nominal) timber set back 50 mm.  
 Size: > wide x > deep x 2600 mm high.

#### 4.25 SHELVING FOR POTTERY

##### Requirement

Frame up rack fixing top and bottom shelves, brace ends with galvanised iron bracing and provide adjustable and fixed shelves as shown on the Drawings.

Rack: 600 deep x 2642 wide x 2020mm high.

Frame (DAR): 75 x 38mm.

Runners (DAR): 38 x 25mm.

Fixing: Glued and screwed.

Back: 6 mm plywood sheet glued and pinned to extent shown on detail.

Shelving (DAR): 50 x 25 mm equally spaced battens screw fixed to 50 x 25mm timber battens.

#### 4.26 RACK FOR DISCUS

##### Requirement

Provide two slotted timber rails where one is fixed to the wall and the other to an edge stripped particleboard base secured to the floor. Coincide slots in rails to vertically carry discus.

Size: 300 deep x 250 mm high x length to suit.

Base: 100 x 50 mm on edge at 600 mm maximum centres.

Particleboard: 25 mm.

Kickplate: Out of 50 mm (nominal) timber to match, set back 25 mm including both end returns.

Wall rail: 50 x 41 mm (finished).

Base rail: 60 x 50 mm (nominal) with bearing face splayed 30 degrees.

Rail fixing: Screw fix at 300 mm maximum centres.

Finish: 2 coats clear polyurethane. Specification reference: PAINTING.

#### 4.27 RACK FOR SHOT PUT

##### Requirement

Provide 3 inverted galvanised mild steel angles fixed to an edge stripped particleboard base secured to the floor.

Size: 300 deep x 165 mm high x length to suit.

Base: 100 x 50 mm on edge at 600 mm maximum centres.

Particleboard: 25 mm.

Kickplate: Out of 50 mm (nominal) timber to match, set back 25 mm including both end returns.

Angles: 50 x 50 mm screw fixed to base at 300 mm maximum centres, space inverted flanges 30 mm apart.

Finish: 2 coats clear polyurethane. Specification reference: PAINTER.

Drawing number: >

#### 4.28 RACK FOR JAVELINS

##### Assembly

Pre-drill recesses to bottom rail and secure to floor by masonry anchors: Fix proprietary stainless steel spring clips to top rail coinciding to recesses and secure to wall by masonry anchors.

Rack:

- Size: 900 wide x 1500mm high.
- Finish: 2 coats polyurethane. Specification reference: PAINTING
- Bottom Rail: 100 x 50mm (nominal) with 8mm splay.
- Recesses: 30 mm diameter x 12mm depth at 8 mm maximum centres.

Top Rail: 100 x 25mm (nominal).

- Clips: 32mm diameter at 8mm maximum centres.

Drawing number: >

#### **4.29 FLOOR BATTEN FOR SPRING BOARDS**

##### **Requirement**

Secure to floor a batten as indicated on the Drawing.

##### **Size (nominal)**

50 x 25 x 3000 mm

#### **4.30 RACK FOR BATS**

##### **Fabrication**

Construct from 18 mm thick edge stripped particleboard front, back, sides, main divisions and base. From 12 mm thick edge stripped particleboard provide "eggcrate" divisions between the main divisions as detailed on the drawings.

Size: 672 deep x 2392 long x 720 mm high.

Base Support: 100 x 50 mm on edge at 600 mm maximum centres.

Kickplate: Out of 25 mm (Nominal) timber to match set back 50 mm.

Front gap: Allow a 150 mm high gap above base fixing only the main divisions and ends to base.

Finish: 2 coats clear polyurethane. Specification reference: PAINTING.

#### **4.31 SPORTS SHELVING**

##### **Construction**

Fabricate out of 19 mm thick strip edged particleboard a base and two shelves fixed to 3 ladder frames with back and front support rails and screw fix to walling.

##### **Size**

1800 long x 600 wide x 1300 mm high.

Base Support: 100 x 50 mm on edge at 600 mm maximum centres.

Kickboard: 100 x 25 mm (nominal) timber set back 50 mm.

Ladder Frames: 50 x 25 mm.

Back And Front Rails: 50 x 25 mm.

Finish: 2 coats clear polyurethane. Specification reference: PAINTING.

#### **4.32 ADJUSTABLE SHELVING, TIMBER (MUSIC STORE)**

##### **Requirement**

Provide out of 18 mm thick edge stripped particleboard adjustable shelving to suit bush and rest pin brass shelf supports.

Shelf Bays: 600 mm wide or 900 mm wide by 2100 mm high as indicated in CUPBOARD, SHELF AND DRAWER UNITS.

Depth:>

Base: From 18 mm thick edge stripped particleboard on 75 x 50 mm supports.

Kickplate: Out of 25 mm (nominal) timber to match setback 25 mm.

Adjustable Shelves:

- -Number required: 4.

Adjustment: 50 mm centres.

#### **4.33 ACID BAY SHELVING**

##### **Requirement**

From 18 mm thick compressed fibre cement sheet provide 3 removable shelves to detail and position as shown on the Drawing.

#### **4.34 PLYWOOD SHELVES**

##### **Requirement**

Provide 5 edge stripped plywood shelves with suitable wall stripping.

Material: Interior plywood.

- -Grade: C-D.

- -Thickness: 18 mm.

Installation: Mount the wall stripping so that the lowest shelf is 300 mm and highest 1800 mm high above the floor.

#### **4.35 FLOOR LECTERN**

##### **Fabrication**

Fabricate steel framing using RHS for base members, vertical members and mitred sloping frame to support lectern. Provide veneered particle board to front and side panels with matching veneered particle board recessed lectern top and a similarly matched veneered particle board shelf 690 mm from floor level. Complete unit to stand on four rubber feet, all as shown on drawings.

Size: 600 x 480 mm wide with front height (measured from floor level) 1160 mm sloping down to a height of 1015 mm.

#### **4.36 BENCH COVER PANEL**

##### **Requirement**

Construct cover panels in the location and out of the materials, species, sizes and profiles as shown on the Drawings or specified in CUPBOARD, SHELF AND DRAWER UNITS.

#### **4.37 FOOD DISPLAY COVERS**

##### **Requirement**

Thermoform a clear acrylic food display cover with clear acrylic ends and divisions.

Material: Clear acrylic sheet.

Thickness: 5 mm.

Fold radius: 60 mm.

Fixing: Solvent adhesive and cohesive bonding.

#### **4.38 FAN SUPPORT BRACKETS**

##### **Location**

- To all fan location points under metal roof decking.

##### **Requirement**

Construct support brackets out of 100 mm x 50 mm timber noggings and blocking between roof purlins.

#### **4.39 LIGHT SUPPORT BRACKETS**

##### **Location**

- To all light fitting points under metal roof decking.

##### **Requirement**

Construct supports using 100 x 50 mm timber noggings, fixing 2 between roof purlins 900 mm apart to suit surface mounted light fitting fixing holes.

#### **4.40 ADJUSTABLE SHELVING, TIMBER (CHEMICAL STORE)**

##### **Requirement**

Provide out of 19 mm finished thickness DAR timber, adjustable shelving to suit bush and rest pin brass shelf supports.

Shelf Bays: 900 wide by 2100 mm high as indicated in CUPBOARD, SHELF AND DRAWER UNITS. Each bay is to be constructed out of 18 mm thick edge stripped HMR (water resistant) particleboard to form solid vertical divisions.

- Base: From 18 mm edge stripped HMR (water resistant) particleboard on 75 x 50 mm supports.
- Kickplate: Out of 25 mm (nominal) thick timber. Setback 25 mm.

Adjustable Shelves

- Number required: 4.
- Adjustment: 50 mm centres.

Finish: Two pack polyurethane clear: interior, as specified in PAINTING

#### **4.41 timber shelving, Adjustable (pantry)**

##### **Requirement**

Provide slotted shelf supports with laminated and edge strip particleboard.

Shelf bays: As shown on drawings.

Width: 400 mm+

**Shelf supports**

Slotted upright: Proprietary heavy duty steel double slotted U shaped uprights for wall mounting.

- Centres: 600 mm (maximum)
- Length: 2100 mm (from floor level to top of shelf support).
- Fixing: Fix securely to wall with appropriate anchors. When fixing to a stud wall the uprights must be fixed to the studs.

Brackets: Compatible proprietary brackets designed to fit the double slotted wall upright system. All brackets are to come complete with metal shelf locating/fixing clips.

- Length: The end of the brackets to finish near the edge of the shelves (maximum 50 mm).
- Number: 6 per upright.

Finish: Epoxy/polyester

**Shelving**

Type: Melamine overlaid particleboard, overlaid on both sides with low pressure melamine. All exposed edges to be edge stripped with 2 mm thick rigid PVC. All edges to match tops.

Thickness: 19 mm (minimum).

Overhang: No more than a 1/16 of the total shelf length to overhang the bracket at each end.

Number: 6 levels evenly spaced (extent of shelving shown on drawings).

**4.42 SHELF WITH DEEP EDGE - TOILET****Assembly**

Provide a particleboard shelf with a 100 mm deep edge as shown on drawings and specified in CUPBOARD, SHELF AND DRAWER UNITS.

Fixing: Fix to underside of shelf through pre-drilled holes in shelf brackets with galv. screws suitable for particle board.

Brackets: Specification reference: METAL FIXTURES.

Finish: Laminate plastic finish moulded to suit surface and as specified. Finish against wall with white silicon mastic, gunned in, waterproof seal.

**4.43 PLINTH - (UNDER B12,B13,B17)****Location**

- Physically Disabled Unit - Practical Activities Size 1

**Requirement**

Construct a 90 mm high plinth to support bench cupboards B12,B13,B17 as shown on drawings and specified in CUPBOARD, SHELF AND DRAWER UNITS.

Fixing: Securely fix plinth in position nominated on drawings.

Finish: Adhere vinyl skirting to exposed faces of plinth.

**4.44 SHELF - TOILET****Location**

- Severe Unit.
- Physically Disabled Unit.

**Assembly**

Provide a 2000 long x 300 mm wide HMR particleboard shelf at 1500 mm from floor all as specified in CUPBOARD, SHELF AND DRAWER UNITS.

**Location**

- Disabled Toilet.
- Disabled Shower/Toilet.

**Assembly**

Provide a 600 long x 150 mm wide HMR particleboard shelf at 950 mm from floor with radius corner all as specified in CUPBOARD, SHELF AND DRAWER UNITS.

Standards: All fittings and installation must be in compliance with AS1428.1 1993.

Fixing: Fix securely to underside of shelf through pre-drilled holes in shelf brackets with galvanised screws suitable for particle board.

Finish: Laminate plastic finish moulded to suit surface and as specified. Finish against wall with white silicon mastic, gunned in, waterproof seal.

Brackets: 30 x 30 x 5 mm thick mild steel angle hot dipped galvanised bracket. The bracket is to be of sufficient length to provide adequate support to shelf and secure fixing to wall.

- -Fixing: Fix securely to wall.
- -Spacing: Maximum 450 mm centres.

#### 4.45 Vanity shelf

General: Provide angle brackets with laminated and edge stripped HMR particle board shelf.

##### Shelf

Type: Melamine overlaid HMR particleboard, overlaid on both sides with low pressure melamine. All exposed edges to be edge stripped with 2 mm thick rigid PVC. All edges to match tops.

Size: 600 x 150 mm

Thickness: 19 mm (minimum).

Fixing: Screw fixed to angle brackets (2 screws over bracket).

Seal: Finish against wall with white silicon mastic, gunned in, waterproof seal.

##### Brackets

Type: Two hot dipped galvanised angle brackets to support shelf.

Fixing: Securely fix to wall with appropriate fasteners

#### 4.46 FIBRE PIN-UP BOARDS

##### Fibreboard

Specified in LINING.

Facing: Selected colour felt or 340 g/m<sup>2</sup> hessian.

Backing: 6 mm plywood.

Fixing: Facing to fibreboard: PVAC to AS 2370.

Fibreboard to suitable hard, homogeneous, unpainted surfaces: Contact adhesive to AS 2329.

Fibreboard to plywood backing: Contact adhesive to AS 2329.

Fibreboard backing assembly to masonry: No. 10 size x 50 mm chromium plated raised head screws with cup washes into wall plugs evenly spaced not exceeding 600 mm apart.

Trim: 13 x 13 mm (finished) timber, or selected aluminium section. Mitre at corners, and glue or pin to backing.

#### 4.47 BASKETBALL BACKBOARD

##### Location

- -Games Court.

##### Description

Waterproof/rotproof plywood backboard bolted securely to frame as shown on drawings

Size: 1800 x 1050 mm finished.

Thickness: 12 mm (Minimum thickness)

Graphics: Generally semi-gloss white enamel with edges and 50 mm line markings in semi-gloss black enamel as shown on Drawings and as specified in PAINTING.

#### 4.48 INFILL TO SIDE OF B11

##### Requirement

Construct infills in the location and out of the materials, species, sizes and profiles as shown on the Drawings or specified in CUPBOARD, SHELF AND DRAWER UNITS. Infills are to be finished to match surrounding bench cupboards and dividers.

**4.49 VANITY BENCH****Location**

- Performing Arts Change Room, one for each sex, total No. 2 off.

**Assembly**

Provide a HMR particleboard vanity bench all as specified in CUPBOARD, SHELF AND DRAWER UNITS.

Width: 450 mm.

Length: 3500 mm.

Height: 710 mm from floor level to top of bench.

Finish: Laminate plastic finish to face surface and exposed edges all as specified.

Finish against wall with white silicon mastic, gunned in, waterproof seal.

Fixing: Fix securely to underside of shelf through pre-drilled holes in shelf brackets with galvanised screws suitable for particle board.

Brackets: Specification reference METAL FIXTURES.

- Fixing: Fix securely to wall.
- Spacing: Maximum 600 mm centres.

**4.50 EXERCISE BAR (BARRE)****Requirement**

Dressed timber rail securely screw fixed to MS support assembly.

Rail: 50 mm (finished size) OD diameter

**Species**

Douglas Fir (Oregon) or Western Hemlock (Canada Pine): For select dressing purposes: To AS 2440.

Joints: All joints to be located over the centre of the MS rail support "T" bracket.

Finish: Transparent, Specification Reference - PAINTING.

Support Assembly: Specification Reference - METAL FIXTURES.

**5 STAIRS****5.1 TIMBER STAIRS****General**

Pre formed Anti slip metal backed step nosing in contrasting colour to delineate each tread.

**Set out**

Set out stair rod to give uniform risers and uniform treads respectively in each flight.

**Fabrication**

Closed strings: Trench for treads and risers.

Cut strings: Profile for treads and risers. Mitre riser ends.

Treads: Arris nosings pencil round. Return nosings at cut strings. Groove for riser tongue in closed rise stair. Set rise 19 mm back from nosing.

Top tread: Flush with finished floor, otherwise to match stair treads. Provide similar tread section as nosing to floor edges around stair well.

Risers: Tongue to tread. Mitre to string in cut string stairs.

**Installation**

General: Glue joints in internal work. In closed rise stairs wedge treads and risers to strings. Plant two glue blocks behind each tread to riser junction. Trim floors to carry ends of stairs and around stair well.

Stair bolts (to open rise close string stairs): 8 mm diameter mild steel, one at each end and one at centre of flight, transversely between strings. Draw strings tight against ends of treads.

Fascia: Of depth sufficient to overlap 19 mm below ceiling, fixed to floor joists hard up under nosing.

Trim: Provide beads and mouldings as necessary, including a scotia or similar planted under the tread nosing against the risers and cut strings, a bead between wall strings and wall, and a bead behind the fascia over the ceiling finish.

**Soffit lining**

Fix to 38 x 38 mm nailing battens notched and nailed to the underside of treads and risers of closed rise stairs at the centre of flights and at each side.

**5.2 TIMBER BALUSTRADES****General**

Provide a balustrade to the stair and landing, consisting of newels, handrail, balusters, and associated mouldings.

**Newels**

Halve and bolt to strings. Turn tops to detail.

**Handrails**

On edge. Bullnose arrises 13 mm radius. Stub tenon to newels.

**Balusters**

At 100 mm centres. Stub tenon to handrail at top and to tread or floor at bottom.

**5.3 PROPRIETARY CIRCULAR STAIRS****General**

Type: Proprietary spiral or geometric circular timber stair system assembled from prefabricated components, inclusive of balustrade, self supporting between floors.

## MISCELLANEOUS FURNITURE

**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **miscellaneous furniture** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Custom-built furniture items fabricated and ready to be delivered to the site.
- Furniture items delivered to site before installation.
- Building locations or substrates prepared to receive furniture before the furniture is installed.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Fire hazard limits**

If a spread of flame index or smoke developed index is required for a furniture item, type test to AS/NZS 1530.3.

**Weighted sound reduction index ( $R_w$ )**

Movable office and workstation screens: Type test screens required to have a particular weighted sound reduction index ( $R_w$ ) rating, to AS/NZS 1276.1.

**2.3 SUBMISSIONS****Subcontractors**

Submit names and contact details of proposed suppliers and installers.

**Shop drawings**

Submit shop drawings showing the following information where relevant:

- Construction, assembly and fixing details for custom designed (non standard) furniture items.
- The proposed layout for furniture installations.

**Installation**

Submit the manufacturer's standard drawings and details showing methods of construction, assembly and fixing, with dimensions and tolerances.



### 3 MATERIALS AND WORKMANSHIP

#### 3.1 HAZARDOUS MATERIALS

##### Fire hazard

General: Do not provide materials which, when subject to fire conditions, will emit excessive smoke or dangerous fumes.

#### 3.2 MATERIALS

##### Steel tube

Surface:

- For painted work: Semi-bright.
- For electroplated work: Bright.

##### Steel sheet

Surface finish:

- For electroplating: P (plating quality).
- For painting: B (bright) or M (matt).

##### Stainless steel

Finish: Surface finish 4 (general purpose polished).

##### Textile upholstery fabrics

Standard: To AS 2687.

Performance classification (minimum): 3.

Wool and woolblend fabrics:

- Insect resistance: To IWS E-10.
- Woolmark/Woolblendmark: Required.

##### Flexible cellular polyurethane

Standard: To AS 2281.

Applications: Generally as recommended in AS 2281 Appendix A.

##### Decorative overlays

Standard: To AS/NZS 1859.3.

##### High-pressure decorative laminate sheets

Standard: To AS/NZS 2924.1.

Thickness (minimum):

- For horizontal surfaces fixed to a continuous background: 1.2 mm.
- For vertical surfaces fixed to a continuous background: 0.8 mm.
- For post formed laminate fixed to a continuous background: 0.8 mm.
- For vertical surfaces fixed intermittently (e.g. to studs): 3.0 mm.
- For edge strips: 0.4 mm.

#### 3.3 WORKMANSHIP

##### Fabrics

Fabric surfacing: Prepare and apply so that the finished surface is smooth and without irregularities.

Fabric upholstery: Make the front of the upholstered component in one piece between pipings, if any, with side joins at the rear or underside. Fix with upholsterer's staples.

Piping: 3 mm diameter beads with core.

### 4 SCREENS, BARRIERS

#### 4.1 MOVABLE OFFICE SCREENS

##### General

Type: Proprietary modular floor mounted screens, consisting of purpose-made solid and semi-glazed panels forming divisions, fronts and nibs assembled and installed with purpose-made fixings.

##### Screens fire hazard schedule

Fire hazard limit	Index to AS/NZS 1530.3
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**5 CURTAINS, BLINDS****5.1 VERTICAL LOUVRE BLINDS****General**

Type: Louvres supported by a carrier system which traverses on wheels and operates with a friction spring loaded clutch mechanism.

Vertical blind fabrics: To AS 2663.3.

**Louvre blades**

General: Vinyl coated fabric blades in single, straight lengths finishing 10 mm above floor or sill level, without twists, warp, bows, edge ripples or fraying. Fix a weight into a pocket formed in the bottom of each blade.

**Installation**

Space the blades evenly with plastic spacers which lock into the carrier rail to provide a continuous linkage, and fix with sealed plastic slat holders carried by plastic rotation pivots. Connect the bottoms of the blades by a plastic link chain with reversers.

**Tracks**

Material: Extruded aluminium alloy 6063-TS, 1.2 mm thick.

Fixing: Secure the track to the ceiling with ceiling clamps so that there are neither light gaps nor fixings through the track.

**Operation**

General: Single bead continuous loop chain controlling the functions of tilting and drawing.

**Requirements**

The Early Fire Indices for curtains and stage masking assemblies must be in compliance with the Building Code of Australia (BCA).

The BCA Early Fire Indices are to be achieved after a minimum of 5 dry cleanings.

**Labels**

Provide each curtain with two tear resistant labels, one label fixed to the top of the curtain and the other to the lower extremity indicating the following information:

- -Manufacturer
- -Trade name and description of material
- -Retardant treatment, applicator and date
- -Test number (AS 1530 Pt. 2/3) and Fire Indices (see above).
- -Approved cleaning method

**Stage Maskings**

Legs: Provide four pairs of legs in treated black fabric. The fabric is to be headed to 50% fullness onto 50 mm wide 100% cotton "herringbone" pattern webbing tape, with a 4 mm electro-plated link chain sewn into a canvas covered "sausage" attached to the top of 150 mm base hem to provide suitable weighting. Legs are to swivel to suit the angle of "sight line" from side of hall, swivels should be tight to prevent accidental movement. Provide brass eyelets and polished cotton ties at 300mm centres for attachment to leg swivels.

Type, fabric:

PFZ treated black wool drape

OR

Treated black 90% wool 10% nylon drape

- -Weight: 370 g/m<sup>2</sup> minimum (Method to AS 2001.2.13)

Borders: Head three borders in treated black fabric headed to 50% fullness onto 50 mm wide 100% cotton "herringbone" pattern webbing tape, with 50 mm base hem. Provide brass eyelets and polished cotton ties at 300 mm centres for attachment to galvanised pipe battens.

Type, fabric:

PFZ treated black wool drape

OR

Treated black 90% wool 10% nylon drape.

- Weight: 370 g/m<sup>2</sup> minimum (Method to AS 2001.2.13)

#### Back Drop

Made in two halves of treated black fabric headed to 50% fullness onto 50 mm wide 100% cotton "herringbone" pattern webbing tape with a 4 mm electro-plated link chain sewn into a canvas covered "sausage" attached to the top of a 150 mm base hem to provide suitable weighting. Off-stage side hems to be 50 mm. Provide brass eyelets and polished cotton ties at 300 mm centres for attachment to the track runners.

Type, fabric:

PFZ treated black wool drape

OR

Treated black 90% wool 10% nylon drape

- Weight: 370 g/m<sup>2</sup> minimum (Method to AS 2001.2.13)

#### Track for Future Stage Front Curtains (Main Curtain Track)

Heavy duty extruded aluminium stage track or an open truss steel track with low friction ball bearings type wheeled master carriers and runners. Provide single runners for every 300 mm of track, capable of carrying a minimum weight of seven kilograms.

Operation: Curtain track to be a cord drawn assembly (minimum diameter of cord 6 mm). The track assembly is to comprise of a continuous line over a single or double pulley system with a hauling line operated by hand. Provide a fully adjustable floor mounted pulley system to take up a minimum of 200 mm of slack cord.

The overall length of the track to match the headings of the two halves of the main curtain with a centre overlap of 600 mm, and a travel offstage of the proscenium by 1.2m. Secure the main curtain track to the proscenium by means of steel brackets compatible with the track profile. Provide adequate fixing provisions for track or track supports.

#### Back Drop Track

Heavy duty extruded aluminium stage track or an open truss steel track with low friction ball bearings type wheeled master carriers and runners. Provide single runners for every 300 mm of track, capable of carrying a minimum weight of seven kilograms.

Install track to allow the Backing Curtain to be a minimum of 750 mm off the back wall.

#### Masking Fixings

Fix all legs and borders to a 40NB galvanised pipe, attached to existing roof steels or purlins with special purpose clamps. All eyebolts are to be closed after installation. Extend leg batten pipe for the full width of the stage.

## 5.2 VENETIAN BLINDS

### General

Type: A proprietary interior mounted system for sun and daylight control of glazed areas, comprising

- horizontal slats, at least ten per 300 mm, of thermoset precoated aluminium, spring tempered, with a yield strength of at least 350 MPa, capable of withstanding a 180° bend of 35 mm diameter without permanent deformation;
- rigid thermoset precoated aluminium top and bottom slats;
- polyester fibre cords and ladders for location and control; and
- cord control of tilting, raising, lowering and locking in raised or part raised positions.

### Requirements

In the manufacture of curtain use only materials which comply with the requirement of the Building Code of Australia as amended as follows:-

The following indexes are to be achieved after a minimum of 5 dry cleanings:

- Flammability Index (0 - 10) 6
- Spread of Flame Index (0 - 10): 6
- Smoke developed Index (0 - 10): 5

**Labels**

Provide each curtain with two tear resistant labels, one label fixed to the top of the curtain and the other to the lower extremity indicating the following information:-

- -Manufacturer
- -Trade name and description of material
- -Retardant treatment, applicator and date
- -Test number (AS 1530 Pt. 2/3) and indices above
- -Approved cleaning method

**Curtains**

Each curtain to be a permanently fire-retarded theatre curtain. Head to 100% fullness on to 50 mm 100% cotton "herringbone" pattern webbing tape with a 4 mm electro-plated link chain sewn into a canvas covered "sausage" attached to the top of a 200 mm base hem to provide suitable weighting. Side hems to be 50 mm. Provide brass eyelets and polished cotton ties at 300 mm centres for attachment to the track runners. Provide 200 mm turnbacks to the leading edge of each curtain.

- -Content: 100% wool
  - Width: 1880 mm (nominal)
  - Weight: 430 gsm (minimum)

**5.3 CURTAINS****General**

Uncoated woven and knitted fabrics: To AS 2663.1.

Coated woven and knitted fabrics: To AS 2663.2.

- Performance classification (minimum): 2.

**5.4 TRACK FOR STAGE TYPE CURTAINS -Curtain Tracks**

Open truss steel track with low friction ball bearings type wheeled master carriers and runners. Provide single runners for every 300 mm of track, capable of carrying a minimum weight of seven kilograms.

- -Length and Track Layout: As shown on drawings.
- -Curtain Track Switch: Positioned as shown on drawings.
- -Proprietary Items: Theatre Equipment Pty. Ltd. - TE 75 Open truss type steel track.

**Operation**

The leading edge of each curtain is to have a overlapping master carrier to provide a 100 mm overlap.

The track is to be hand drawn operation.

Track is to be secured to the roof ceiling space by means of steel brackets compatible with the track profile.

**5.5 WINDOW (holland) BLINDS****Type**

Opaque plasticised chain drive holland blind.

**Requirement**

Blind fabric fire resistant to AS1530, Parts 2 and 3.

Ball chain to finish \* > mm above floor level. Where blinds are located over gas room heaters then both chain and blind to be sized to finish above the heater in accordance with the supply authority requirements.

Blinds to be complete with brackets, fixing screws, lath or aluminium rail, chain drive units and ball chain. Install drive units either on the left or right hand side in accordance with the Person with Full Authority/Superintendents instruction. Allow two turns around top of roller on each blind over the size of the required drop.

Provide each blind with a pocket along the bottom edge if using lath or sew spline to bottom edge if using aluminium rail. Sew spline to top edge of fabric and fit spline into keyway in the roller tube. Wind fabric around the roller tube and fix with tape or adhesive at each end.

- -Extend rollers including pin 19 mm each side of blind fabric.

- -Width (preferred maximum): 1800 mm
- -Drop (maximum in single drop): 2400 mm

**Fabric**

- -Type: Luxaflex: Twilight 100% Polyester
- -Luxaflex: Seclusion 100% Polyester
- -Shaw Evershade: 100% Polyester

**Roller**

Size: 38 mm diameter tin plated or colour-bonded non-rusting steel with spline keyway.

**Brackets**

Size: Zinc plated or powdered coated white formed steel with a minimum thickness of 1.6 mm.

Fixing: 16g x 18 mm screws for fixing to timber or self-tapping metal screws for fixing to metal.

**Chain Operated Roller**

Manufactured from fibre glass filled industrial grade nylon. Idler end to have pin protruding from the end and to rotate on itself.

Ball Chain: Nylon cord with industrial grade nylon beads spaced at regular intervals to drive mechanism. The chain is to incorporate a steel ball chain joiner to allow easy replacement and to act as a pre-set stop device to prevent blinds from being overwound.

**5.6 curtain and track for shower area/access****Type**

- -Fabric: 150 denier polyester - washable.
- -Weight: 60 gram per m<sup>2</sup>
- -Width: Shower opening width x 1 1/4
- -Height: From head support to 50 mm clear of floor.
- -Hemming: Double hemmed all round with reinforced head, buttonholes sewn with heavy grade polyester thread OR sides and bottom cut with hot wire to completely seal edge.

**Accessories**

All out of brass.

- -Eyelets: 75 mm maximum centres equally spaced.
- -Strap on rings:

Finish: Heavy chrome plating.

**Track**

Height from finished floor level: 2000 mm

**Track type**

Suspended aluminium bedscreen track.

- -Material: Aluminium.
- -Extrusion: Box section.
- -Gauge: 16
- -Finish: Anodised.
- -Self Supporting: 3000 mm (max).

Glider/Hooks: Nylon.

**Track support brackets/assembly**

Aluminium

- -Finish: To match track.
- -Fixing: Suspension hanger arrangement in natural anodised finish.

**5.7 CURTAIN, WELDING**

Welding Curtain: To AS 3957

**Type**

Translucent heavy duty flexible welding curtain/s that provides protection against hazardous radiation generated during welding processes, complete with eyelets and double hem on all four sides, bottom hem chain weighted.

Clearance from floor: 100mm

Colour: Yellow/amber

Hem: 50 mm all four sides.

Hem Chain Weight: Hot dipped galvanised, 1000 gr/metre.

Eyelets: To AS 3957 - Appendix F.

**Track**

30mm galvanised steel tracks (refer Schools Facilities Standard layout).

Trolleys: Twin wheel nylon rollers on roller bearings, attached to a metal shaft and suspension with metal rings for holding curtain.

Curved Track.

Track radius: 500 mm

**OR**

Straight track

Two straight tracks at 90° to each other (see layout, delete curved section shown).

Hang curtain on each track

**Installation**

Support track securely with standard hangers to manufacturer's recommendations.

**5.8 CURTAIN, DARK ROOM Material**

100% pure cotton fabric lined with cotton sateen lining.

Dimension: 1½ times the full width of opening, with pencil pleated curtain top on 75mm rufflette tape. Provide a 150 mm high hem at bottom and finish at floor level to prevent the transmission of light.

**Manufacture**

Curtains to be measured from site dimensions.

**Track**

Track: Industrial white track complete with pulling cords, weights, nylon gliders/hooks and fixing brackets.

Fixing: To ceiling members with brackets provided by the manufacturer.

**5.9 CURTAIN, FITTING AREA Type**

100% pure cotton fabric.

- Width: Double Fullness.
- Height: From head support to 50 mm clear of floor.
- Hemming:
  - 100 mm base hem.
  - Side hemmed.
  - 50 mm heading hem.

**Accessories**

To be compatible with track system specified in HARDWARE.

**Manufacture**

Curtains to be made to the satisfaction of the Superintendent. Curtains to be measured from site dimensions.

**Track type**

Suspended track.

- Material: Aluminium.
- Extrusion: Box section.
- Gauge: 16
- Finish: Anodised.
- Self Supporting: 3000 mm (max).
- Glider/Hooks: Nylon.

**Track support fixing**

Suspension hanger arrangement in natural anodised finish.

Finish: match track.

**5.10 CURTAINS, OVER INTERNAL GLAZING Type**

Fire retarded overlapping curtain with insulating lining:

- Composition: Cotton
- Coating: Acrylic foam
- Width: 1200 mm (nominal)
- Early Fire Hazard Indices: The following indexes are to be achieved after a minimum of 5 dry cleanings:
  - . - Flammability Index (0 - 10): 6
  - . - Spread of Flame Index (0 - 10): 6
  - . - Smoke developed Index (0 - 10): 5

Labels: Provide each curtain with a tear resistant label indicating the following information:-

- Manufacturer
- Trade name and description of material
- Retardant treatment, applicator and date
- Test number (AS 1530 Pt 2/3) and indices as above
- Approved cleaning methods cleaning

**Track, over internal glazing**

Track type

Proprietary heavy-duty commercial suspended track.

- Material: Aluminium.
- Extrusion "U" section.
- 20 x 30 mm wide (minimum)
- Continuous length (without join): 6 m

Finish: Anodised or laminated PVC .

Operation: Cord-draw

Carriers:

- Heavy duty wheeled runners with roller bearings, minimum 12 per metre.
- Overlapping master carrier and master carrier with roller bearings.

Metal curtain hooks.

Track support fixing

- Wall/ceiling. Proprietary wall brackets/ceiling clips fixed at a maximum of 900mm. Brackets/ceiling clips to be compatible to track and to be supplied by the manufacturer/supplier of the track.

Finish: Match track.

**5.11 CURTAINS, OVER MIRROR Type**

Fire retarded overlapping curtain for the full height of the mirror:

- Composition: Polyester
- Width: 1400 mm (nominal)
- Early Fire Hazard Indices: The following indexes are to be achieved after a minimum of 5 dry cleanings:
  - . - Flammability Index (0 - 10): 6
  - . - Spread of Flame Index (0 - 10): 6
  - . - Smoke developed Index (0 - 10): 5

Labels: Provide each curtain with a tear resistant label indicating the following information:-

- Manufacturer
- Trade name and description of material
- Retardant treatment, applicator and date
- Test number (AS 1530 Pt 2/3) and indices as above
- Approved cleaning methods cleaning

**Track, Over Mirror****Track type**

Proprietary heavy commercial light stage curtain track.

- -Material: Aluminium.
- -Extrusion: "U" sections.
- -20 x 30 mm wide (minimum)
- -Continuos length (without join): 6 m
- -Extended to enable the curtain to cover the exercise bar (barre).

Finish Anodised or laminated PVC.

Operation: Cord-draw

Carriers:

- -Heavy duty wheeled runners with ball bearings, minimum 12 per metre.
- -Overlapping master carrier and master carrier with ball bearings.

Centre of carrier to be a minimum of 45mm from face of mirror

Metal curtain hooks.

Track support fixing

- Wall: Provisions made to allow track to extended beyond exercise bar (barre).  
Proprietary all metal brackets (ceiling clips) fixed at a maximum of 800mm centres. Brackets (ceiling clips) to be compatible to track and to be supplied by the manufacturer/supplier of the track.
- Ceiling: Proprietary all metal brackets (ceiling clips) fixed at a maximum of 800mm centres. Brackets (ceiling clips) to be compatible to track and to be supplied by the manufacturer/supplier of the track.
- Finish: Match track.

**5.12 curtains, finishing area****Type**

Fire retardant industrial PVC heavy-duty flexible curtains to effectively screen the whole Finishing Area of the Materials Workshop. Curtains to be UV stabilised, alkali and acid resistant.

Clearance from floor: 100mm

Colour: Clear

Hem: Electronically welded, 50 mm all four sides.

Eyelets: Electronically welded eyelets at 200mm centres at top and 600mm centres sides and bottom.

Fire retardant: To AS1441.13

**Track**

Two straight 30mm galvanised steel tracks at 90° to each other (refer Schools Facilities Standard layout, delete curved section shown). Curtain hung on each track.

Trolleys: Twin wheel nylon rollers on roller bearings, attached to a metal shaft and suspension with metal rings for holding curtain.

**Installation**

Support track securely with standard hangers to manufacturer's recommendations.

**5.13 Vertical Louvre blinds****Louver blades**

Blade width (mm): 127 or 110 mm

**Tracks**

Track finish: Clear anodised



**6 CONTAINERS, BINS, CABINETS****6.1 LETTER BOX****Type**

General: Proprietary metal letter box with corrosion resistant, weatherproof body, weather protected letter slot, lockable hinged door, house or unit number, and accessories necessary for correct installation.

Standard: To AS/NZS 4253.

**6.2 WASTE BINS****General**

Type: Prefinished proprietary products manufactured from metals or plastics in standard sizes and colours.

**7 SHELF UNITS****7.1 OFFICE SHELVING SYSTEMS****Steel shelving**

Standard: To AS 2143.

**Timber shelving**

A proprietary modular system incorporating

- rigidly self-braced frame, extendable in modular increments;
- shelf height adjustable in increments not exceeding 50 mm;
- shelves capable of carrying a minimum uniformly distributed load of 55 kg/m of span, without deflection exceeding 5 mm; and
- other accessories necessary for the satisfactory erection and service use of the shelving.

**Description**

Provide steel shelving with solid steel backs to the areas scheduled and where shown on the Furniture Layout drawings.

**Types**

Adjustable Shelving (SA) of the following types:

Light Duty:

- -SA 400 - 400 mm deep, 900 mm Bays.
- -SA 400S - 400 mm deep, 900 mm Single Bays.
- -SA 600 - 600 mm deep, 900 mm Bays.
- -SA 600S - 600 mm deep, 900 mm Single Bays.

Rolled Upright type for loads up to 110 kg per shelf, five (5) intermediate shelves to be fully adjustable, complete with proprietary shelf supports, 2.175m high.

Proprietary Items:

- -Steelbilt
- -Colby Demag (Acrow)
- -Email (Brownbuilt)
- -Spacerack
- -Dexion

Heavy Duty:

- -SA 750 - 750 mm (nom.) deep, 900 mm Bays.
- -SA 900 - 900 mm (nom.) deep, 900 mm Bays.

U-Post type for loads up to 350 kg per shelf, five (5) intermediate shelves to be fully adjustable, complete with proprietary shelf supports, 2.175m high.

Proprietary Items:

- -Steelbilt
- -Colby Demag (Acrow)
- -Email (Brownbuilt)

**7.2 LIBRARY SHELVING SYSTEMS****Steel shelving**

Steel shelving: To AS 2273.

**7.3 MOBILE SHELVING****System**

General: A proprietary system consisting of closed-type steel shelving units mounted on floor tracks.

Standard: To AS 2143.

**Methods of operation**

Manual: By fixed pull handle.

Mechanical: By manually operated folding crank handle and geared chain drive, incorporating a safety device for the protection of persons working in the aisles.

Semi-automatic: By power booster.

**Bases**

Mount each unit on a base of structural steel sections supporting the unit between bearings, incorporating necessary bearing and guide wheels.

**Bearing wheels**

Cast iron, ball bearing, with crowned running surface.

**Tracks**

Provide bearing and guide tracks which are bright mild steel sections adequately fixed to the structural concrete floor. Where tracks are to be flush with the finished floor surface, provide linings or edge trim for recesses required for floor guides, operating gear, or the like.

**Locking**

General: Provide a pin-tumbler lock to lock together all continuous units in a single key operation.

**Dust protection**

Provide replaceable resilient rubber strips to the contact edges of the units.

**Shelving**

Steel units, single sided in the case of end units, otherwise double sided, fitted with adjustable steel shelving, together with manufacturer's standard accessories.

**Finish**

Pre-coat with a factory-applied oven baked enamel.

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**8 DISPLAY SURFACES****8.1 CHALKBOARDS****Chalkboard panels**

General: Hardboard 5 mm minimum thickness, with an applied long life, fine finish chalkboard surface of good abrasive properties, producing clear sharp edged chalk lines.

Hardboard: To AS/NZS 1859.4 standard hardboard Type GP.

Chalkboard surface: Primer and at least 2 finishing coats of modified alkyd epoxy, infra-red heat dried, with an abrasive in the final coat.

**Wall fixing**

Fix the chalkboard to the wall with at least 4 sets of interlocking brackets, of sufficient strength to withstand the forces produced by a 90 kg load swinging on the end of an open swing leaf at right angles to the fixed board surface.

**Swinging leaves**

Fix swing leaves with reinforced pivot points at either end of the wall mounted board with minimum 10 mm diameter mild steel pivot pins through 5 mm (minimum) thick zinc plated steel pivot plates. Provide a 6 mm thick ebonite washer to the bottom plate.

**Map rails**

Continuous clear anodised aluminium extruded section incorporating a cork pin-up strip and sliding paper chart hanger rail, screwed to a rebated support rail fixed to the wall above the chalkboard, or constructed integrally with the top of the wall mounted board.

**Trim**

Trim the edges of the chalkboard and swing leaf panels with clear anodised extruded aluminium sections, mitred at corners. Reinforce the corners with steel right angled corner joints.

**Chalkrails**

Trim the bottom of the fixed board with a section incorporating an integral chalkrail.

**Applied lines**

General: 3 mm wide yellow painted lines formed straight, true and even, using durable paint of an equivalent life to the chalk surface and capable of frequent abrasion by eraser without fading or wear.

Graph surface: 1000 x 1000 mm graph marked in 100 x 100 mm squares.

Stave surface: Four staves spaced approximately 90 mm apart with individual lines of staves spaced approximately 38 mm apart.

**Projection surfaces**

A matt white projection screen wrapped at least 25 mm over the edges of a hardboard backing and fixed by adhesives and staples. Do not adhere screen material to the hardboard face surface, but allow it to set freely with sufficient stretch to achieve and hold a flat surface.

**Maintenance instructions**

In the bottom left-hand corner of the board fix an instruction sheet of pressure sensitive film listing procedures for the care and maintenance of the board surface.

**8.2 PINBOARDS****Pinboard panels**

Thickness: At least 6 mm.

Facing: Felt.

Board: Fibre insulating board to AS/NZS 1859.5.

Backing: Fix board to a 6 mm plywood backing with PVA emulsion adhesive.

Trim: Trim the edges of the pinboard panels with timber or clear anodised aluminium sections, mitred at corners.

**Installation**

Attach the panels to building substrates with

- wallboard adhesive to AS 2329;
- masonry wall plugs and chromium plated raised head screws over chromium plated cup washers; or
- (for demountable pinboards) concealed keyhole slots over screwheads in the substrate.

**8.3 WHITEBOARDS****Whiteboard panels**

General: White seamless vitreous enamel surface on sheet steel base, resistant to chipping and fracture when the base is slightly flexed, fixed with a suitable contact adhesive to a backing of primed particleboard at least 12 mm thick.

Surface: Suitable for use with fast-evaporation, dry-erase pens.

Edges: Trim the edges of the panels with hollow square aluminium sections mitred at corners.

Pen rails: Proprietary aluminium section fixed to the full width of the bottom edge of the board.

**Installation**

Attach the panels to building substrates with

- wallboard adhesive to AS 2329;
- masonry wall plugs and chromium plated raised head screws over chromium plated cup washers; or

- (for demountable whiteboards) concealed keyhole slots over screwheads in the substrate.

#### 8.4 RETRACTABLE PROJECTION SCREENS

##### General

Type: Proprietary extendible screen system for front projection, mounted on a spring-loaded roller so as to be fully retractable when not in use.

Screens: Flexible synthetic fabric, flame retardant and mildew resistant, presenting a flat plane surface when extended.

Screen surfaces: Textured to control the distribution of projected light evenly over a wide viewing angle.

Finishes: Metal components factory prefinished by plating, anodising, or a thermoset powder coating.

##### Floor mounted types

A screen system extendable from a bottom roller, with a retractable extension arm, on a floor mounting providing adequate stability when the screen is extended, and consisting of either

- a folding metal tripod; or
- a floor stand capable of assembly without tools.

##### Hanging types

A screen system extendable from a top roller, suspended from proprietary hanging brackets fixed to the building structure, with provision for mechanical locking in the fully or partially extended pull-down positions.

##### Motorised screens

Screen extension and retraction operated by an electric motor mounted in the roller, activated by a limit switch with automatic stops in the terminal (up or down) positions, and at adjustable preset intermediate positions.

## 9 WORKSTATIONS

### 9.1 WORKSTATIONS

#### General

A system comprising an assembly of demountable acoustic screens, work tops, mobile pedestal or credenza storage units, drawer units, individual bookshelves, ceiling ducted services with power poles or floor ducted cable enclosures, and accessories necessary for satisfactory assembly and installation.

#### Standard

General: AS/NZS 4443.

#### Dimensional tolerances (maximum)

Misalignment (of adjoining surfaces at grid junctions): 1 mm.

Deviation (from true grid lines and planes): 1:1000 or 3 mm.

Screen thickness: + 1 mm, - 0 mm.

#### Strength and stability

Imposed loads: Provide a screen system which

- will support the designated imposed eccentric loads (e.g. loads on attached shelves or brackets); and
- deflects under designated imposed eccentric loads less than 1:1000 or 3 mm, whichever is the lesser.

#### Installation

Install each workstation system in its required location

- using concealed fixings; and
- so that the components of the system may be demounted and reassembled using standard hand tools, or special tools supplied as part of the system.

#### Serviced equipment

General: If equipment requiring connection to power, telex, computer, telephone or other services is to be installed as part of the workstation system, make the necessary service connections.

Keyboard supports: Fit the keyboard support section of computer equipment with a mechanism capable of being operated by a seated person to raise and lower the keyboard above or below the level of the work surface.

**Product certification**

AFRDI Blue Tick:

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**10 COMPLETION**

**10.1 COMPLETION**

**Warranties**

Submit the installer's warranty against defective workmanship or wrong installation.

**Maintenance manual**

Submit the manufacturers'

- recommendations for demounting and relocation;
- recommendations for service use, care and maintenance; and
- list of manufacturers and suppliers of replacement parts.

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**11 SEATING (SUPPLIED AND INSTALLED BY CONTRACTOR)**

**11.1 SEATING: FIXTURES AND EQUIPMENT**

**Description**

Polypropylene chair shells set on cantilever brackets

Fixing: Shells 410 mm wide on epoxy powder coated cantilever brackets, drilled for bolting to concrete step risers. Bolt to anchors drilled into concrete.

<b>STORMWATER</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the stormwater work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Site Preparation, Service, Trenching, Roofing and Wastewater

**1.2 STANDARD****Stormwater drainage**

General: To AS/NZS 3500.3.2.

**1.3 INTERPRETATION****Definition**

Pipe surround: Includes pipe overlay, pipe side support, side zone and haunch zone.

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**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Excavated surfaces.
- Concealed or underground services.

**Hold points**

As advised by Principals Authorised Person

**2.2 SAMPLES****General**

Submit samples of the following:

- Each type of imported pipe bedding material.
- Each type of filter material.

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**3 EXECUTION****3.1 STORMWATER DRAINS****General**

General: Provide stormwater drains to connect downpipes, surface drains, subsoil drains and drainage pits to the outlet point or point of connection.

Turn up the drain branch pipeline with a suitable bend in direct line with the downpipe. Leave space between pipe collar and bottom of downpipe as shown on drawings.

Tolerances: Comply with the **Pipeline tolerances table**. These tolerances are conditional on falls to outlets being maintained and no part of a pipeline being at less than the designated gradient.

DOWNPIPES ARE TO FINISH 150mm ABOVE THE COLLAR OF THE STORMWATER PIPE. COLLAR TO FINISH A MIN. OF 100 mm BELOW FLOOR LEVEL, AND BE FITTED WITH A GRATE, WHICH CANNOT BE REMOVED BY UNAUTHORISED PERSONNEL. COLLAR TO BE PROTECTED FROM MECHANICAL DAMAGE. CONSIDER POSSIBLE SPLASHING/FLOODING OF SURROUNDING AREAS.

Protection, Pipe Collar : Encase in concrete surround and incorporate a dish drain.

Dish Diameter: 300 mm.

Minimum Dish Depth: 50 mm around grate.

Grate Installation: Prevent movement from unauthorised personnel.

#### **Pipeline tolerances table**

	Permissible angular deviation from alignment	Permissible displacement from alignment
Horizontal	1 in 300	15 mm
Vertical	1 in 500	5 mm

#### **Identification**

Lay a detectable strip or plastic tape in the trench after pipelaying, testing and initial backfilling.

#### **Pipe underlay**

General: Bed piping on a continuous underlay of bedding material, at least 75 mm thick after compaction. Grade the underlay evenly to the gradient of the pipeline.

Chases: If necessary, form chases to prevent projections such as sockets and flanges from bearing on the trench bottom or underlay.

#### **Pipe surrounds**

General: Place the material in the pipe surround in layers  $\leq 200$  mm loose thickness, and compact without damaging or displacing the piping.

#### **Anchor blocks**

If necessary, provide anchor blocks which restrain lateral and axial movement of the pipelines at junctions and changes of grade or direction.

#### **Encasement**

General: If necessary, encase the pipeline in concrete at least 150 mm above and below the pipe, and 150 mm each side or the width of the trench, whichever is the greater.

Concrete: Grade N20 to AS 1379.

### **3.2 LINED SURFACE DRAINS**

#### **Half round pipe drains**

Provide surface drains lined with half round pipe, including bedding and jointing.

#### **Grated trenches**

Provide precast or cast in situ concrete lined trenches with bitumen coated cast-iron or galvanized steel gratings.

### **3.3 PRECAST BOX CULVERTS**

#### **Standards**

Culverts  $< 1200$  mm span x 900 mm high: To AS 1597.1.

Culverts 1500 - 4200 mm span x 4200 mm (maximum) high: To AS 1597.2.

#### **Lifting gear**

Provide suitable attachments for lifting gear to culverts 600 x 450 mm.

**Installation**

Screed and compact the bedding to provide uniform support. Install culvert sections to provide a continuous waterway without abrupt changes in alignment or grade.

**3.4 CORRUGATED STEEL PIPE DRAINS****Standards**

Products, design and installation: To AS/NZS 2041.

**3.5 SUBSOIL DRAINS****General**

Provide subsoil drains to intercept groundwater seepage and prevent water build-up behind walls and under floors and pavements. Connect subsoil drains to surface drains or to the stormwater drainage system as applicable.

**Pipe depth**

Provide the following minimum clear depths, measured to the crown of the pipe, where the pipe passes below the following elements:

- 100 mm below formation level of the pavement, kerb or channel.
- 100 mm below the average gradient of the bottom of footings.
- 450 mm below the finished surface of unpaved ground.

**Jointing**

At junctions of subsoil pipes provide tees, couplings or adaptors to AS 2439.1.

**Trench width**

Minimum 450 mm.

**Pipe underlay**

General: Grade the trench floor evenly to the gradient of the pipeline. If the trench floor is rock, correct any irregularities with compacted bedding material. Bed piping on a continuous underlay of bedding material, at least 75 mm thick after compaction. Lay the pipe with one line of perforations at the bottom.

Chases: If necessary, form chases to prevent projections such as sockets and flanges from bearing on the trench bottom or underlay.

**Pipe surrounds**

General: Place the material in the pipe surround in layers  $\leq 200$  mm loose thickness, and compact without damaging or displacing the piping.

Depth of overlay:

- To the underside of the bases of overlying structures such as pavements, slabs and channels.
- To within 150 mm of the finished surface of unpaved or landscaped areas.

**Filter fabric**

General: Provide polymeric fabric formed from plastic yarn composed of at least 85% by weight propylene, ethylene, amide or vinylidenechloride, and containing stabilisers or inhibitors which provide resistance to deterioration due to ultraviolet light.

Marking: To AS 3705.

Protection: Provide heavy duty protective covering. Store clear of the ground and out of direct sunlight. During installation do not expose the filter fabric to sunlight for more than 14 days.

Type:

**Filter socks**

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

**3.6 PITS****Finish to exposed surfaces**

General: Provide a smooth, seamless finish, using steel trowelled render or concrete cast in steel forms.

Corners: Cove or splay internal corners.

**Metal access covers and grates**

Standard: To AS 3996.

Cover levels: Top of cover or grate, including frame:



- In paved areas: Flush with the paving surface.
- In landscaped areas: 25 mm above finished surface.
- Gratings taking surface water runoff: Locate to receive runoff without ponding.

### 3.7 PUMPED DISCHARGE

#### Description

Provide a pumping system consisting of a wet well to which stormwater or subsoil drainage discharge is gravitated, and from which it is removed by automatically operated pumps. Provide necessary piping, valves, rising main, electric wiring and alarms.

#### Fully submersible pumps

Finish outer casing and immersed equipment and fittings with anti-corrosive protective coatings. Connect the pump motor to the control panel via a single continuous length of heavy duty cable, with sufficient slack to allow for adjustment of levels. Provide corrosion-resistant chains attached to the pump casing, to enable the pump to be raised and lowered from ground level.

#### Non-submersible (centrifugal) pumps

Provide pumps capable of operating safely in a dry state. Provide priming facilities, foot valve and strainer on the suction line.

#### Pump motors

Provide electric motors matched to the pumps to give efficient, quiet running operation.

#### Controls

General: Provide a float-type differential microswitch level controller with the following control settings:

- Low.
- High.
- Stand-by pump.
- Alarm.

Control panel: Provide a panel which suits the controller. Incorporate switchgear and circuits. Mount in a lockable vandalproof metal cabinet, weatherproof if located externally. Provide a brass lock and 2 keys.

#### Alarms

Provide a remote bell and light alarm. Provide alarm silence button and pilot indicator on the control panel.

<b>WASTEWATER</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **wastewater** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Site Preparation, Service Trenching, Stormwater

**1.2 STANDARD****Sanitary plumbing and sanitary drainage**

General: To AS/NZS 3500.2.2.

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**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Excavated surfaces.
- Concealed or underground services.

**Hold points**

As advised by the Principals Authorised Person

**2.2 SUBMISSIONS****Shop drawings**

Submit drawings and schedules showing the layout and details of the system, including

- location, type, grade and finish of piping, fittings and pipe supports; and
- location, type and other relevant details of sanitary ware.

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**3 MATERIALS AND COMPONENTS****3.1 AUTHORISED PRODUCTS****Standard**

To SAA MP52, unless otherwise required by the statutory authority.

**3.2 SANITARY FIXTURES****General**

Provide the accessories necessary for correct installation.

**BATH: To AS 2023.**

Location:	P.S - Senior Student Unit Toilet/Bathroom. 1 off
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**Alternative 1**

Proprietary item:	Stylus "BIG 5"
Type:	Built in.
Material:	Acrylic (Acid resisting).
Colour:	Almond ivory.
Overall Size (nominal):	1525 long x 765mm wide.

**Alternative 2**

Proprietary item:	Caroma "Verona" 851110W
Type:	Built in.
Material:	Acrylic (Acid resisting).
Colour:	White.
Overall Size (nominal):	1525 long x 725mm wide.

**Alternative 3**

Proprietary item:	Fowler "Tasman" 842605W
Type:	Built in
Material:	Acrylic (Acid resisting).
Colour:	Almond ivory.
Overall Size (nominal):	1524 long x 765 wide

**Alternative 4**

Proprietary item:	Caroma "Stirling" 857510W
Type:	Built in
Material:	Porcelain enamel on pressed steel.
Colour:	White.
Overall Size (nominal):	1524 long x 767 wide x 330mm deep.

**BATH (square): To AS 2023.**

Location:	P.S. - Severe Unit. 1 off
Type:	Built in.
Material:	Acrylic (Acid resisting) OR Porcelain enamel on pressed steel.
Colour:	White.
Overall Size (nominal):	900 mm to 915 mm long 900 mm x 915 mm wide 285 mm x 330mm deep.

**VANITY BASIN (for the disabled): To AS 1730.**

Location:	P.S. & H.S. - Self Help Toilet, 1 off
Type:	Self riming
Material:	Stainless Steel
Bowl shape:	Rectangular
Bowl size (nominal):	320 long x 230 wide x 140mm deep
Overall size (nominal):	383 long x 294mm wide
Support:	On vanity bench specified in WOODWORK.

**VANITY BASIN (for the disabled):****To AS 1730.**

Fixing:	Bed basin against white non-setting alkali-resistant mastic. Fix with non-corroding fixing clips supplied with the basin.
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**VANITY BASIN:****To AS 1730.**

Location:	P.S - Staff Shower SSP, 1 off H.S - Staff Shower, 1 off
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**Alternative 1**

Proprietary item:	Clark Stainless Steel "Flushline" Model No. Y4110 with three tap holes.
Type:	Self riming
Material:	Stainless Steel
Bowl shape:	Rectangular
Overall size (nominal):	500 long x 410 mm wide
Bench Top Cutout:	480 x 390 mm wide
Soap recesses:	Two
Support:	On vanity bench specified in WOODWORK.

**Alternative 2**

Proprietary item:	Clark Stainless Steel basin Model No. Y4100 with three tap holes.
Type:	Self riming
Material:	Stainless Steel
Bowl shape:	Rectangular
Overall size (nominal):	500 mm long x 400 mm wide
Soap recesses:	Two
Support:	On vanity bench specified in WOODWORK.
Fixing:	Bed basin against white non-setting alkali-resistant mastic. Fix with non-corroding fixing clips supplied with the basin.

**Alternative 3**

Proprietary item:	Caroma Stainless Steel basin "Surrey" Model No. 857583W with three tap holes.
Type:	Self riming
Material:	Stainless Steel
Bowl shape:	Rectangular
Overall size (nominal):	550 long x 415 mm wide
Soap recesses:	Two

**WALL BASIN (one tap hole):**

Location:	P.S. & H.S. - Staff Toilet, 1 off each Toilet, total No. P.S. - General Assistant, 1 off. H.S. Graphic/Drawing, 1 off H.S. Materials Workshop – Type 1, 1 off. H.S. Materials Workshop – Type 3, 1 off. H.S. Kitchen Type 2 – 1 off.
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**Alternative 1**

Rim height from floor:	790mm
Proprietary item:	Caroma "Concord 500" with one tap hole. Model No: 631010W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	500 x 370mm
Soap recesses:	Two
Supports:	8mm 200 brackets.

**Alternative 2**

Proprietary item:	Fowler "Regent 500" with one tap hole. Model No: 810587W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	500 x 425mm
Soap recess:	Two
Supports:	Mounting kit (timber or masonry).

**WALL BASIN (two tap holes):**

Location:	>
Rim height from floor:	790mm

**Alternative 1**

Proprietary item:	Caroma "Concord 500" with two tap holes. Model No. 631020W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	500 x 370mm
Soap recesses:	Two
Supports:	8mm 200 brackets.

**Alternative 2**

Proprietary item:	Fowler "Regent 500" with two tap holes. Model No: 810594W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	550 x 425mm
Soap recess:	Two
Supports:	Mounting kit (timber or masonry).

**WALL BASIN (one tap hole for access toilet):**

Location:	
Rim height from floor:	790mm

**WALL BASIN (one tap hole for access toilet):**

	H.S. - Self Help Toilet, 1 off H.S. - Access Shower/Toilet, 1 off
Rim height from floor:	770mm
	P.S. – Moderate Unit - Toilet, 1 off P.S. - Physically Disabled Unit - Toilet - 1 off. P.S. - Disabled Shower/Toilet - 1 off P.S. - Disabled Toilet - 1 off
Standards	All fittings and installation must be in compliance with AS1428.1 1993.

**Alternative 1**

Proprietary item:	Caroma "Integra 500" concealed integral trap basin with one hole. Model No: 648210W
Material:	Vitreous china
Colour:	White
Overall size:	500 x 430mm (nominal)
Soap recesses:	One
Supports:	Self supporting, fixed to finished wall with 8mm dia. expansion fasteners.

**Alternative 2**

Proprietary item:	Caroma "Integra 565" concealed integral trap basin with one tap hole. Model No: 649210W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	565 x 455mm
Soap recesses:	Two
Supports:	Mounting kit (timber or masonry).

**WALL BASIN (three tap holes):**

Location:	
Rim height from floor:	770mm
	P.S. Moderate Unit - Toilet, 1 off P.S. - Physically Disabled Unit - Toilet - Size 2, 1 off
Rim height from floor:	1 at 770mm, 1 at 650mm
	P.S. - Severe Unit - Toilet, 2 off P.S. - Physically Disabled Unit - Toilet - Size 1, 2 off
Rim height from floor:	790mm
	P.S. - Senior Student Unit - Toilet/Bathroom, 1 off P.S. - Senior Student Unit - Toilet/Shower, 1 off
Standards	For disabled units all fittings and installation must be in compliance with AS1428.1 1993.

### WALL BASIN (three tap holes):

#### Alternative 1

Proprietary item:	Caroma "Integra 500" concealed integral trap basin with three holes. Model No: 648230W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	500 x 430mm
Soap recesses:	One
Supports:	Self supporting, fixed to finished wall with 8mm dia. expansion fasteners.

#### Alternative 2

Proprietary item:	Caroma "Integra 565" concealed integral trap basin with three tap holes. Model No: 649230W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	565 x 455mm
Soap recesses:	Two
Supports:	Mounting kit (timber or masonry).

### WALL BASIN, CANTEEN (three tap holes):

Location:	P.S. & H.S. - Canteen, 1 off
Rim height from floor:	790mm
Standards	For disabled units all fittings and installation must be in compliance with AS1428.1 1993.

#### Alternative 1

Proprietary item:	Caroma "Integra 500" concealed integral trap basin with three holes. Model No: 648230W
Material:	Vitreous china
Colour:	White
Overall size Nominal:	500 x 430mm
Soap recesses:	One
Supports:	Self supporting, fixed to finished wall with 8mm dia. expansion fasteners.

#### Alternative 2

Proprietary item:	Caroma "Integra 565" concealed integral trap basin with three tap holes. Model No: 649230W
Material:	Vitreous china
Colour:	White
Overall size (nominal):	565 x 430mm (nominal)
Soap recesses:	Two
Supports:	Mounting kit (timber or masonry).

**SMALL WALL BASIN (one tap hole):**

Location:	P.S. - Severe Unit - laundry, 1 off P.S. - Physically Disabled Unit - Laundry, 1 off P.S. - Senior Student Unit - Laundry, 1 off P.S. - Clinic Toilet, 1 off P.S. - Clinic Toilet, 1 off each Toilet, total; No. 2 H.S. - Clinic Toilet, 1 off each Toilet, total No. 2
Rim height from floor:	790mm
Proprietary item:	Caroma "Consul" with one tap hole.
Material:	Vitreous china
Colour:	White
Overall size (nominal):	505 x 305
Soap recesses:	One
Supports:	D61 Concealed wall clip brackets

**SMALL WALL BASIN (two tap holes):**

Location:	P.S. Sick Bay/Toilet, 1 off. P.S. - Pupil Shower. 1 off
Rim height from floor:	650mm
Proprietary item:	Caroma "Consul" with two tap holes
Material:	Vitreous china
Colour:	White
Overall size (nominal):	505 x 305
Soap recesses:	Two
Supports:	D61 Concealed wall clip brackets

**CANTEEN SINK:**

Location:	P.S. - Canteen, 1 off H.S. - Canteen, 1 off
Proprietary item:	Dorf Clark's "Café Flushline" Sink Model Y5728.
Type	Commercial low profile stainless steel bench inset sink with twin drainers complete with 50mm plugs and waste, sealing tape and fixing clips.
<b>Stainless Steel:</b>	
Grade:	304.
Finish:	Satin
Bowls:	Two.
Capacity (nominal):	45 lt (each bowl)
Sizes (nominal):	550 x 390 x 260mm deep (both bowls).
<b>Drainer</b>	
Location:	Both sides of bowls
Surface:	Fluted
Size (nominal):	348mm (each drainer)
<b>Overall size</b> (nominal):	1538 x 471mm wide
Number:	1 off.
<b>Accessory</b>	
	Plastic coated wire draining basket to fit in sink bowl.



<b>SINGLE LAUNDRY TROUGH:</b>	
Location:	P.S - Severe Unit - Laundry, 1 off P.S - Senior Student Unit - Laundry, 1 off P.S - Physically Disabled Unit - Laundry, 1 off H.S. - Laundry, 1 off
Proprietary item:	"Clark Single Mk 2" 9011 Stainless Steel New Pattern Suds Tub with cabinet and by-pass.
Material:	Stainless Steel.
Number of bowls:	Single bowl.
Bowl capacity (nominal):	70 litres.
Overall size (nominal):	634 long x 560 wide x 875mm high (to rim), including cabinet.
Splashback flange:	Required at back, 50mm high.
Finish:	Polished.
Bypass:	Required.
Trough mounting:	On white colorbond steel cabinet supplied by the trough manufacturer, having a hinged door with pull handle and cupboard catch.
Attached plug:	Stainless Steel as supplied by trough manufacturer.
<b>Splashback</b>	
Material:	Stainless Steel.
Finish:	Satin
Height:	450mm from top of rim
Length:	Width of sink/s
Installation:	Bottom edge of splashback to overlap the splashback flange for the full width.

### **DOUBLE LAUNDRY TROUGH:**

Location:	H.S. – Visual Art - Workshop, 1 off H.S. – Materials Workshop – Type 3, 1 off
Proprietary item:	"Clark Duet" Stainless Steel Suds Tub with cabinet 9311.
Material:	Stainless Steel.
Number of bowls (nominal):	Double bowl.
Bowl capacities (nominal):	70 and 40 litres (left hand 70 litre bowl).
Overall size (nominal):	1083 long x 560 wide x 875mm high (to rim), including cabinet.
Splashback flange:	Required at back, 50mm high.
Finish:	Polished.
Bypass:	Required, left hand bypass.
Trough mounting:	On white colorbond steel cabinet supplied by the trough manufacturer, having hinged doors with pull handle and cupboard catch.
Attached plug:	Stainless Steel as supplied by trough manufacturer.

**BUCKET SINK (for general use):**

Location:	P.S. Cleaning Distributed Store (when required) 1 off each Store, 1 off P.S. - Cleaning Supervisor/Supplies, 1 off H.S. – Science Learning Unit, Botany/Zoology - Growing/Breeding, 1 off H.S. Cleaning Distributed Store (When required), 1 off each store, total No> H.S. Cleaning Supplies Store 1 off each store, total No>
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**Alternative 1**

Proprietary item:	"Clark" model Y5100, Stainless Steel Cleaners Sink with plug and washer.
Material:	Stainless Steel
Finish:	Satin.
Overall size:	580 long x 500 wide x 180mm deep.
Back flange:	40mm high upstand.

**Alternative 2**

Proprietary item:	"Southern Cross" Stainless Steel Cleaners Sink with plug and washer.
Material:	Stainless Steel
Finish:	Satin.
Overall size:	540 long x 410 wide x 150mm deep.
Back flange:	140mm high upstand.
Mounting:	Stainless Steel leg supports and masonry anchors.
Mounting height:	Fix sink so that rim is 500mm above floor level.
Hinged grate material:	Stainless Steel.

**BUCKET SINK (without grate – for workshops):**

Location	H.S. – Materials Workshop Type 2 H.S. – Outdoor Covered Workshop,
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**Alternative 1**

Proprietary item:	"Clark" model Y5100, Stainless Steel Cleaners Sink without grate, with plug and washer.
Material:	Stainless Steel
Finish:	Satin.
Overall size:	580 long x 500 wide x 180mm deep.
Back flange:	40mm high upstand.

**Alternative 2**

Proprietary item:	"Southern Cross" Stainless Steel Cleaners Sink without grate, with plug and washer.
Material:	Stainless Steel
Finish:	Satin.
Overall size:	540 long x 410 wide x 150mm deep.
Back flange:	140mm high upstand.
Mounting:	Stainless Steel leg supports and masonry anchors.

<b>BUCKET SINK (without grate – for workshops):</b>	
Mounting height:	Fix sink so that rim is 700mm above floor level.
Hinged grate material:	Without grate.
<b>Splashback</b>	
Material:	Stainless Steel.
Finish:	Satin
Height:	450mm from top of rim
Length:	Width of sink.
Installation:	Bottom edge of splashback to overlap the splashback flange for the full width.

**WATER CLOSET ASSEMBLIES (access)**

Location:	H.S. - Access Toilet, total No. > H.S. - Self help Toilet, total No. > H.S. - Access Shower/Toilet, total No. > P.S. - Disabled Toilet, total No. > P.S. - Self Help Toilet, total No. > P.S. - Moderate Unit - Toilet P.S. - Severe Unit - Toilet P.S. - Physically Disabled Unit - Size 1 P.S. - Physically Disabled Unit - Size 2 P.S. - Disabled toilet P.S. - Disabled Shower/Toilet
Standards	All fittings and installation must be in compliance with AS1428.1.
<b>Pedestal Pan</b>	Vitreous china water closet to AS1172.
Proprietary item:	Caroma "Concorde Disabled".
Colour:	White
Inlet:	Back
Trap:	>
Mounting:	Floor mounted type.
<b>Seat</b>	Moulded plastic to AS 1371.
Proprietary item:	Caroma "Colani Disabled".
Type:	Rigid, single flap
Form:	Closed front
Colour:	White
<b>Cistern</b>	To AS 1218.
Proprietary item:	Caroma "Vandal Resistant Sovereign 2000".
Type:	Low level, dual flush
Material:	Vitreous china
Nominal capacity:	6/3 litres
Colour:	White
Fixing:	Provided by manufacturer Caroma "D.97 Quickfix" bracket
Overall height, from floor to seat:	460mm - Primary School
	480mm - Secondary School
Overflow:	Fit to regulatory authority requirements.

**WATER CLOSET ASSEMBLIES (for pre-school use):**

Location:	P.S. - Early Childhood Unit - Toilet, 2 off
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**WATER CLOSET ASSEMBLIES (for pre-school use):**
**Alternative 1**

<b>Pedestal pan</b>	Vitreous china water closet to AS 1172.
Proprietary item:	Caroma "Junior Pan".
Colour:	White
Inlet:	Back
Trap	>
Mounting:	Floor mounted type.
<b>Seat</b>	Moulded plastic to AS 1371.
Proprietary item:	Caroma "Junior".
Type:	Rigid, single flap
Form:	Closed front
Colour:	Black
<b>Cistern</b>	To AS 1218.
Proprietary item:	Caroma "Vandal Resistant Sovereign 2000"
Type:	Low level, dual flush
Material:	Vitreous china
Nominal capacity:	6/3 litres
Colour:	White
Fixing:	Provided by manufacturer Caroma "D.97 Quickfix" bracket
Overall height, from floor to seat:	385mm

**Alternative 2**

<b>Pedestal pan</b>	Vitreous china water closet to AS 1172.
Proprietary item:	Caroma "Funior Pan".
Colour:	White
Inlet:	Back
Trap	>
Mounting:	Floor mounted type.
<b>Seat</b>	Moulded plastic to AS 1371.
Proprietary item:	Caroma "Junior".
Type:	Rigid, single flap
Form:	Closed front
Colour:	Black
<b>Cistern</b>	To AS 1218.
Proprietary item:	Fowler "Fleur"
Type:	Low level, dual flush
Material:	Vitreous china
Nominal capacity:	6/3 litres
Colour:	White
Overall height, from floor to seat:	385mm
Overflow:	Fit to regulatory authority requirements.

<b>WATER CLOSET ASSEMBLIES (for general pupil use):</b>	
Location:	P.S. - Senior Student Unit - Toilet/Bathroom, 1 off P.S. - Senior Student Unit - Toilet/Shower, 1 off P.S. - Pupil Toilets, total No. > H.S. - Pupil Toilets, total No. > H.S. - Toilets - Boys/Girls, total No. > H.S. - Movement Complex, Shower, 1 off
<b>Pedestal pan</b>	Vitreous china water closet to AS 1172.
Proprietary item:	Caroma "Concorde"
Colour:	White
Inlet:	Back
Trap	>
Mounting:	Floor mounted type.
<b>Seat</b>	Moulded plastic to AS 1371.
Proprietary item:	Caroma "Pedigree" Commercial.
Type:	Rigid, single flap, standard hinge.
Form:	Closed front
Colour:	Black
<b>Cistern</b>	To AS 1218.
Proprietary item:	Caroma "Vandal Resistant Sovereign 2000".
Type:	Low level, dual flush
Material:	Vitreous china
Nominal capacity:	6/3 litres
Colour:	White
Fixing:	Provided by manufacturer Caroma "D.97 Quickfix" bracket
Overall height, from floor to seat:	435mm
Overflow:	Fit to regulatory authority requirements.

<b>WATER CLOSET ASSEMBLIES (for staff or special use):</b>	
Location	P.S. - Sick Bay/Toilet, 1 off P.S. - Clinic - Toilet, 1 off P.S. - Staff Toilet, 1 off each toilet, total No. > H.S. - Clinic - Toilet, 1 off each toilet, total No. 2 H.S. - Staff Toilet, 1 off each toilet, total No. >

**Alternative 1**

<b>Pedestal pan</b>	Vitreous china water closet to AS 1172.
Proprietary item:	Caroma "Concorde"
Colour:	White
Inlet:	Back
Trap	>
Mounting:	Floor mounted type.
<b>Seat</b>	Moulded plastic to AS 1371.
Proprietary item:	Caroma "Caravelle 2000".
Type:	Flexible, medium weight, double flap

<b>WATER CLOSET ASSEMBLIES (for staff or special use):</b>	
Form:	Closed front
Colour:	White
<b>Cistern</b>	To AS 1218.
Proprietary item:	Caroma "Vandal Resistant Sovereign 2000".
Type:	Low level, dual flush, low noise fill inlet
Material:	Vitreous china
Nominal capacity:	6/3 litres
Colour:	White
Fixing:	Provided by manufacturer Caroma "D.97 Quickfix" bracket.
Overall height, from floor to seat:	430mm

**Alternative 2**

<b>Pedestal pan:</b>	Vitreous china water closet to AS 1172.
Proprietary item:	Fowler "Tasman".
Colour:	White
Inlet:	Back
Trap	>
Mounting:	Floor mounted type.
<b>Seat</b>	Moulded plastic to AS 1371.
Proprietary item:	Fowler "Premier Deluxe".
Type:	Flexible, medium weight, double flap
Form:	Closed front
Colour:	White
<b>Cistern</b>	To AS 1218.
Proprietary item:	Fowler "Fleur".
Type:	Low level, dual flush
Material:	Vitreous china
Nominal capacity:	6/3 litres
Colour:	White
Overall height, from floor to seat:	415mm
Overflow:	Fit to regulatory authority requirements.

<b>URINAL ASSEMBLIES:</b>	
Location	P.S. - Pupil Toilets H.S. - Toilets - Boys
<b>Urinal</b>	
Type:	Fabricated stainless steel urinal assembly as shown on drawings.
Fixing:	As per Manufacturers recommendations.
Stainless Steel:	Grade 304.
Anti Drum Compound:	Coated to rear of urinal by manufacturer.
Length:	As shown on the Drawings.
Solenoid valve	To Standards Australia - MP52 – Specification 030. Slow shut off to reduce water hammer. Must be capable of operating in the full range of varying water pressures (minimum and maximum Kpa's) throughout NSW.

<b>URINAL ASSEMBLIES:</b>	
Outlets:	Fit with domed perforated stainless steel grating.
<b>Cisterns</b>	
Type:	Stainless steel syphon flushing cisterns with non corrosive flushing mechanism, vandal resistant lid, sparge and overflow pipes. Fix to wall with masonry anchors.
Stainless Steel:	Grade: 304
Model Number:	>
Overall Size:	330 wide x 155 deep x 355 mm high.
Overflow pipe discharge:	Shown on the Drawings.
Flushing action:	Manual pull chain.
Maximum height Cistern Pull:	1200 mm Pre-School and Primary above floor level 1600 mm Secondary.

## DRINKING FOUNTAINS

### WASH/DRINKING TROUGH:

Location:	P.S. - Pupil Toilets P.S. - Covered Area H.S. – Agriculture, Covered Area H.S. - Toilets - Boys/Girls H.S. - Drinking Facilities H.S. – Movement Complex – Shower.	
Type	Stainless steel wash/drinking trough to the PW Wallsend Pattern complete with support assembly, stainless steel splash back.  <ul style="list-style-type: none"><li>- All edges of the trough to be rounded (eg sharp edges are not acceptable).</li><li>- Overflow outlet incorporated.</li><li>- Sufficient fall within the trough to effectively drain the water to the stainless steel grate.</li></ul>	
<b>Trough</b>		
Stainless Steel	Grade: 304.	
- Thickness:	0.9 mm.	
- Finish:	Satin.	
Outlet:	50 mm with stainless steel grate.	
Identification:	The manufacturer's name must be permanently embossed in a clearly displayed position on the trough.	
Plumbing	PVC tubing (piping) and PVC waste pipes including traps must not be used (mandatory).	
<b>Rim height from floor or ground level:</b>	<b>Wash Trough</b>	<b>Drinking Trough</b>
Pre-School	550 mm	550 mm

Primary	650 mm	700 mm
Secondary	700 mm	900 mm
<b>Trough Guard</b>	Drinking trough guards are to be installed on all drinking troughs in external locations.	
Specification reference:	METAL FIXTURES – DRINKING/WASH TROUGH GUARD	
<b>Splash back</b>		
Height:	300 mm.	
Stainless Steel	Grade: 304.	
- Thickness:	0.9 mm.	
- Finish:	Satin.	
Fixing:	Fixed securely to wall as shown on drawings.	
<b>Support Assembly</b>		
Fabrication:	Welded 40 mm x 6 mm mild steel assembly with pre-drilled fixing holes.	
Finish:	Hot dipped galvanised after fabrication	
Fixing:	Fix to securely to wall through pre-drilled holes with non corrosive proprietary fasteners and proprietary 10mm diameter (minimum) masonry anchors.	
Specification reference:	METAL FIXTURES – BRACKET FOR DRINKING/WASH TROUGH	

### CHILLED DRINKING WATER SYSTEM:

Type	Mains connected storage system water cooler with tin plated reservoir fitted with drain to facilitate periodic cleaning.
Reservoir:	135lt.
Refrigerant:	Non-toxic and non-flammable.
Temperature Control:	Thermostat, factory pre-set.
Compressor:	½ hp capacity, 1120 watts. Hermetically sealed for silent running.
Condenser:	Copper tube and aluminium fin.
Rating Conditions - Performance:	Outlet water 10deg. C. (Based on inlet temp. of 27deg. C).
Installation:	In accordance with the manufacturers instructions.
Number Of Units	> .

### ART TROUGH:

Location:	P.S - Craft Room, 2 off HS - Visual Arts Workshop, 2 off HS – Materials Workshop – Type 3, 1 off
Type	Fabricated stainless steel trough assembly with stainless steel splash back and galvanised mild steel support frame all as shown on DPWS drawings.
<b>Note</b>	Requires Clay/Plaster Arrestor to filter waste.
Stainless Steel:	Grade: 304.
- Thickness:	1.2 mm.
- Finish:	Satin.
Outlet:	50 mm.
Rim height from floor:	



**ART TROUGH:**

	750 mm, P.S. - Craft Room
	700mm, HS - Visual Arts Workshop
<b>Splashback</b>	
Stainless Steel:	Grade: 304.
- Thickness:	0.9 mm.
- Finish:	Satin.
Height:	450 mm from top of trough rim.
<b>Art Trough Support</b>	Specification reference: <i>METAL FIXTURES</i> .

**CLAY/PLASTER ARRESTOR:**

Type	Stainless steel clay/plaster arrestor with removable lid, perforated stainless steel strainer basket and baffles all as shown on drawings.
Stainless Steel:	Grade: 304.
- Thickness:	0.9 mm and 1.2 mm
- Finish:	Satin.
Connection	
Inlet:	PVC 50 mm diameter on raised end of unit.
Outlet:	PVC 50 mm diameter with grate removed.
Strainer Basket	Removable
Perforations:	2 mm diameter, 15 mm centres.
Locating Springs:	Two, attached to baffle to ensure strainer basket is located under inlet lip.
<b>Baffles</b>	
Permanently Fixed	
Number:	Two.
Removable	One solid.
	One perforated.
Perforations:	5 mm diameter, 8 mm centres.
<b>Outlet Control</b>	
Type:	Box, positioned over outlet with open bottom end and a 6.4 mm diameter hole in top.
<b>Maintenance</b>	The lid, strainer basket and removable baffles must be able to be removed while the clay/plaster arrestor is in position and without disconnecting the inlet and outlet.

**PLANT SOAKING SHELF, TROUGH:**

Location:	H.S. – Botany/Zoology.
Type	Stainless steel trough with splashback, PVC waste pipe to dish drain and galvanised mild steel support assembly all as shown on DPWS drawings.
<b>Trough</b>	
Stainless Steel:	Grade: 304.
- Thickness;	0.9 mm
- Finish:	Satin.
Height:	Rim height from floor: 950 mm

**PLANT SOAKING SHELF, TROUGH:**

<b>Splashback</b>	
Stainless Steel:	Grade: 304.
- Thickness:	0.9 mm.
- Finish:	Satin.
Height:	450 mm from top of trough.
Plant Soaking Shelf, Trough Support	Specification ref.: METAL FIXTURES.

**SANITARY TOWEL DISPOSER:**

Type	A rigid zinc-coated steel cabinet finished in white stove enamel. The unit is to be complete with water and waste connections, the grinding unit, all controls and services.
Motor:	0.55kW (0.75HP) minimum
Overload protection:	Auto-reset (thermatrip)
Motor control:	Automatic via electronic control board
Operating cycle:	90 seconds (nominal)
Water control:	Automatic via solenoid valve fitted with flow regulator and filter
Water pressures:	Check with manufacturer. Higher pressures may require a pressure reducing valve to be fitted.
Water consumption:	9 to 12 litres per cycle
Mounting:	Securely fix to wall
Dimensions:	690 x 355 x 208 mm (nominal)

**GRAVITY PRESSURE TANK**

Location:	H.S. - Agriculture Animals Space, 1 off
Description	Gravity Pressure Tank shall be 56 litre capacity fitted with an automatically refilled valve operated by a copper ball cock and a stop cock all approved by the water supply authority. Provide 25mm copper pipe at 2100m and blank off.

**SPLASHBACKS -**

Type	Stainless steel splash back
Stainless Steel	Grade: 304.
- Gauge:	0.9 mm
- Finish:	Satin.
Height	450 mm from top of bench.
Installation:	Fixed securely to wall behind sink and/or bench. Seal between bottom edge of splashback and bench top with white silicon mastic, gunned in, waterproof seal.

**4 EXECUTION****4.1 SANITARY PLUMBING****Laboratory wastes**

General: If there are chemically corrosive effluent wastes, provide compatible traps and waste connections, and drain to a treatment pit.

**Vent pipes**

Staying to roof: If fixings for stays penetrate the roof covering, seal the penetrations and make watertight.

Terminations: Provide vent cowls of the same material as the vent pipe.

**4.2 SANITARY DRAINAGE****Trade wastes**

Dispose of trade waste through vitrified clay pipelines laid, bedded and jointed as necessary. Provide necessary sumps or interceptors.

**Pipeline identification**

Lay detectable plastic warning tape, 300 mm above buried piping, for the full length of the piping.

**4.3 PIPING****Finishes**

General: Finish exposed piping, including fittings and supports, as follows:

- In internal locations such as toilet and kitchen areas: Chrome plate copper piping to AS 1192 service condition 2, bright.
- Externally, and steel piping and iron fittings internally: Paint.
- In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for identification marking. Prime steel piping and iron fittings.

Valves: Finish valves to match connected piping.

**4.4 DISCHARGE FROM AIR HANDLING SYSTEMS****Trays, sumps and drainage**

Standard: To AS/NZS 3666.1.

**4.5 SEWAGE TREATMENT****Septic tanks**

Standard: To AS/NZS 1546.1.

**Effluent disposal**

Standard: To AS/NZS 1547.

Agricultural pipes: Perforated plastic pipe to AS 2439.2 type 3, class 100, DN 100.

<b>FRESHWATER</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **freshwater** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Type**

Valve mixing hot and cold water, regulating water temperature with single hand control, capable of delivering water at the temperature of either of the supply system and at any temperature in between, and suitable for controlling single or multiple outlets as required by the installation. Incorporate the following:

- Thermostatic element.
- A temperature sensitive automatic control which maintains temperature at the pre selected setting and rapidly shuts down the flow if either system fails, or if the normal discharge of water temperature of water is exceeded.
- A water temperature control device which can only be altered by a trained authorised person.
- Hot water flush facility.

The thermostatic mixing valves are to be located in a location which is inaccessible to pupils. A lockable stainless steel cabinet can be supplied by the manufacturer compete WITH the mixing valve. If a lockable cabinet is required, include an additional item for the CABINET, check with the MANUFACTURER for description of the CABINET.

**Standards**

Licensed to AS 4032

Complies with the "Code of Practice for Thermostatic Mixing Valves NSW".

**Manual**

The manufacturer of the thermostatic mixing valve must provide a printed technical manual for installation, commissioning and maintenance for thermostatic mixing valves. The manual must be applicable for installations in NSW.

Hand one copy of the above manual to The Person with Full Authority/superintendent.

**Installation**

All in accordance with the manufacturers printed technical manual for installation, commissioning and maintenance for thermostatic mixing valves.

A licensed plumber who has undertaken T.A.F.E. training in thermostatic mixing valves must install thermostatic mixing.

To effectively control microbial hazards during installation work to be in accordance with AS 3666

Water quality conditions must be checked to be sure that they do not exceed the limits listed in AS 3500.4

#### **Commissioning the valve**

When the installation is complete the valve must be tested and commissioned in accordance with the instructions in the printed technical manual for installation, commissioning and maintenance for thermostatic mixing valves.

#### **Maintenance**

Thermostatic mixing valves must be serviced/maintained in accordance with statutory requirements, WorkCover's Code of Practice for Thermostatic Mixing Valves and the manufacturers printed instructions.

Standards: To AS 4032 Appendix B – B3

### **1.2 STANDARDS**

#### **Water supply**

General: To AS/NZS 3500.1.2.

#### **Hot water supply**

General: To AS/NZS 3500.4.2.

#### **Installation of mineral wool insulation**

Comply with the AMWU/CFMEU/CEPU/FARIMA Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation.

Marking: Deliver mineral wool products to site in packaging labelled FBS-1 BIO-SOLUBLE INSULATION.

### **1.3 INTERPRETATIONS**

#### **Definitions**

Mineral wool (including glasswool and rockwool): Entangled matt of fibrous non-crystalline material derived from inorganic oxides or minerals, rock, slag or glass, processed at high temperatures from a molten state.

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## **2 QUALITY**

### **2.1 INSPECTION**

#### **Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Excavated surfaces.
- Concealed or underground services.

#### **Hold points**

As advised by the Principals Authorised Person

### **2.2 PRE-COMPLETION TESTS**

#### **Production tests**

Water heating system storage containers: Factory test uninsulated vessels at not less than 1.25 x the maximum working pressure of the system. Maintain the test pressure for 24 hours without loss.

#### **Site tests**

Test system for leaks, including pipe joints, valve seats, tap washers and strainers. Repair as necessary, replace if damaged, and retest.

#### **Early fire hazard indices**

Spread of flame index: To AS/NZS 1530.3.

Smoke developed index: To AS/NZS 1530.3.

Flammability index: To AS 1530.2.

### **2.3 SAMPLES**

#### **General**

Submit samples of accessories identified by proprietary item, including the following:

- Valves.

- Instruments, including gauges and thermostats.
- Means of identification, including adhesive labels and engraved disks or plates.

## 2.4 SUBMISSIONS

### Shop drawings

Submit drawings and schedules showing the layout and details of the system, including

- location, type, grade and finish of piping, fittings, valves, meters and pipe supports;
- location, capacity, type and other relevant details of water heaters, including supports and safe trays;
- details of control panels including control and power diagrams;
- insulation of piping, fittings and tanks; and
- access openings, cover plates, valve boxes and access pits.

## 3 MATERIALS AND COMPONENTS

### 3.1 AUTHORISED PRODUCTS

#### Standard

To SAA MP52, unless otherwise required by the statutory authority.

### 3.2 THERMOSTATIC MIXING VALVES

#### Type

General: Water temperature regulated by a single hand control, capable of delivering water at the temperature of either of the supply systems and at any temperature in between, and suitable for controlling single or multiple outlets, as appropriate.

Controls: Incorporate the following:

- A temperature sensitive automatic control which maintains temperature at the pre-selected setting and rapidly shuts down the flow if either supply system fails, or if the normal discharge water temperature is exceeded.
- Hot water flush facility.

### 3.3 PRESSURE CONTROL VALVES

#### Type

Provide reduction valves, pressure limiting valves, or ratio valves, which produce the necessary reduction in pressure.

### 3.4 LINE STRAINERS

#### Description

Type: Low resistance, Y-form bronze bodied type, with screen of dezincification resistant brass, corrosion-resistant stainless steel, or monel.

Screen perforations: 0.8 mm maximum.

### 3.5 PRESSURE GAUGES

#### General

Provide gauges with full scale reading in kPa, a minimum nominal diameter of 63 mm and capable of reading pressures at least 25% higher than the maximum static pressure of the system.

#### Standard

Bourdon tube gauges: To AS 1349.

Accuracy grade: Industrial.

#### Installation

Comply with the recommendations of AS 1349 Appendix B. Locate at inlet and outlet sides of cold water pumps. Isolate from pump vibration and provide complete with gauge cock on inlet.

## 4 PUMPS

### 4.1 WATER SUPPLY PUMPS

#### General

Provide self-priming pump and motor units operated by automatic controls. Factory assemble the pump and motor on a common base plate with mounting pads.

**Noise and vibration**

Minimise noise and vibration, using anti-vibration mountings.

**4.2 PRESSURE BOOSTER SYSTEM****Single pressure booster system**

Provide a pump, motor and pressure vessel package with in-built controls to maintain the pressure at the pump discharge between the maximum and operating pressures. Factory assemble on a steel base.

**Dual pressure booster system**

General: Provide a dual system consisting of 2 pump and motor sets, each serving its own pressure vessel and operated by an interconnected automatic control mechanism. Factory assemble the units on steel frames mounted on steel base plates.

Coupling: Connect suction and discharge pipe with flexible pipe of maximum pressure rating 2 x the system design pressure.

Pressure vessels: Diaphragm pressure tanks of fabricated steel construction, epoxy coated on metal surfaces in contact with water. Precharge the tanks with air.

Control mechanisms: Provide a device which alternates the pumps after each cycle of operation, starts the idle pump if the other fails, and activates an audible alarm and a flashing warning light to indicate a failure.

- Control panel: Mount the control panel on the wall inside the room in which the system is installed, next to the door.
- Alarm bells: Mount on an external wall. Provide bells which can be muted.
- Warning lights: Mount on the control panel, to indicate the following:
  - . Pump no.1 failure.
  - . Pump no.2 failure.
  - . Mains pressure low.
  - . Power on.
- Selector: Provide manual/automatic pump selector for on/off control of the pumps.
- Cut-out circuit: Provide an over-riding automatic cut-out circuit with manual restart which operates when suction pressure falls below the stated limit.
- Isolating switches: Provide an isolating switch next to each pump motor.
- Overload: Provide necessary thermal overload protection.
- Meters: Provide an hours-run meter to each motor.

**4.3 HOT WATER CIRCULATING PUMPS****General**

General: Provide an in-line circulator pump and motor with bronze housing and stainless steel or corrosion-resistant interior fittings.

Standard: To BS EN 1151.

After hours control: Provide time clock.

**Noise and vibration**

Minimise noise and vibration, using anti-vibration mountings.

**5 EXECUTION****5.1 MAINS CONNECTION****General**

Connect the cold water supply system to the statutory authority's main through a stop valve and meter.

**5.2 RETICULATION****Cold water system**

Provide the cold water supply system, installed from the meter to the draw-off points or connections to other services.

**Hot water system**

Provide the hot water system, installed from the cold water connection points to the draw-off points or connections to other services.

### 5.3 FITTINGS AND ACCESSORIES

#### General

Provide the fittings necessary for the proper functioning of the water supply system, including taps, valves, backflow prevention devices, pressure and temperature control devices, strainers, gauges and automatic controls and alarms.

#### Tap and valve heads

Vandalproof heads: If available, provide vandalproof or anti-tampering devices for the designated types.

Plastic heads and handles: Provide break-resistant fittings of a compact nature, to prevent fracture and exposure of jagged or rough edges.

Metal heads and handles: Provide brass fittings or suitably bush to prevent electrolysis and growth.

#### Tap positions

Locate hot tap to the left of, or above, the cold tap.

#### Valve spindles

If practicable, install in a vertical position.

### 5.4 PIPING

#### Material identification marking

Pipes with grade or class identification markings: Install so that the markings are visible for inspection.

#### Finishes

General: Finish exposed piping, including fittings and supports, as follows:

- In internal locations such as toilet and kitchen areas: Chrome plate copper piping to AS 1192 service condition 2, bright.
- Externally, and steel piping and iron fittings internally: Paint.
- In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for identification marking. Prime steel piping and iron fittings.

Valves: Finish valves to match connected piping.

### 5.5 PIPING INSULATION

#### General

Application: Fit insulation tightly to piping surfaces without gaps. Close butt ends of insulation sections. Minimise number of joints. If the insulation is in half-sections, make only half-circumferential joints at any one place. Seal longitudinal seams in foil laminate and fix insulation at maximum 500 mm centres with polypropylene, zinc-coated steel or aluminium straps.

Unions and other items requiring service: Install the insulation so that it is readily removable.

Fittings: Provide insulation of thermal resistance equivalent to the piping insulation.

#### Insulation material

Provide insulation material as listed in **Insulation schedule**:

- Mineral wool resin-bonded to form tubular sections faced with factory bonded aluminium foil laminate.
- Polyester in moulded tubular sections faced with factory bonded aluminium foil laminate or integral polyester scrim.
- Polyolefin foam: Cross linked closed cell polyolefin foam faced with factory bonded aluminium foil laminate.

Early fire hazard indices:

- Spread of flame index: 0.
- Smoke developed index:  $\leq 3$ .

#### Aluminium foil laminate sheet

Physical characteristics:

- Tensile strength (minimum):
  - .Machine direction: 14.5 kN/m.
  - .Lateral direction: 9.8 kN/m.
- Water vapour permeance:



.Creased:  $\leq 2.26$  ng/N.s.

.Uncreased:  $\leq 1.13$  ng/N.s.

Early fire hazard indices:

- Spread of flame index: 0.
- Smoke developed index: 0.
- Flammability index:  $\leq 5$ .

#### **Aluminium foil laminate tape**

Adhesive: Non-toxic, high tack synthetic pressure sensitive type.

Liner: Silicone coated paper.

Backing: Aluminium foil laminate.

Minimum width: 50 mm.

Physical properties:

- Tensile strength: 4.8 kN/m (average minimum).
- Shear adhesion: To Table 3.2 of SMACNA Fibrous Glass Duct Construction Standards.
- Peel adhesion at 180°: 0.68 kN/m (average minimum).

Water vapour permeance:

- Creased:  $\leq 2.26$  ng/N.s.
- Uncreased:  $\leq 1.13$  ng/N.s.

#### **Metal sheathing**

Provide metal sheathing to all piping insulation:

- In plant rooms.
- Where exposed to weather.
- Where exposed to view.
- Where subject to mechanical damage.
- On valves, pipeline components and pumps in sheathed pipework.

General: Cover piping with metal sheathing sprung over the insulation in one piece with laps at least 30 mm wide, and fastened with self tapping screws or snap head rivets at 150 mm maximum centres. Preform the sheathing to match the shape of the insulated pipe and fittings. Position laps to avoid water penetration. In external locations weatherproof the joints and fixings using a non-setting mastic.

Material: 0.5 mm thick zinc-coated steel sheet.

#### **Surface preparation**

Clean the surfaces to remove scale, rust, grease and dirt and prepare surfaces to suit the insulation. Restore surface coatings, which have been damaged or affected by welding.

#### **Testing**

Do not install insulation until the piping has been tested.

### **5.6 PIPE SUPPORTS**

#### **Insulated pipe**

General: Provide supports formed to fit around the insulation.

Protection: For pipes DN 25 either

- protect the insulation at the support point with metal sheathing; or
- replace the insulation at the support point with a shaped wooden spacer block. Butt the insulation up to the wooden block and seal with silicone compound. Clad the block and insulation in 0.5 mm zinc-coated steel sheet extending 100 mm each side of the support.

### **5.7 VALVE BOXES**

#### **General**

Provide cast-iron valve boxes with removable covers for access to underground gate valves. Provide cast-iron sluice valve covers for access to sluice valves.

#### **Installation**

Set beneath each box a shaft formed of UPVC pipe to give clear access to the valve wheel or spindle. Set top flush with pavement surface, or 15 mm above unpaved

surfaces, and encase in formed concrete box 150 mm thick, with top surface trowelled smooth.

## 5.8 PITS

### General

Install below-ground water meters, stop valves and control valves, in concrete access pits with removable pit covers.

### Construction

Internal dimensions: To give 300 mm clear space all around the fittings in the pit.

Concrete: Grade N20 to AS 1379, 100 mm thick, reinforced with F82 fabric.

Pit covers: To AS 3996.

### Installation

Grade floor to a point on one side and drain to the stormwater drainage system.

Carry the pit walls up to 50 mm above finished ground level. Cast in the pit cover frame flush with the top. Trowel the top smooth.

## 5.9 MARKING

### Notice plate

Provide a notice plate containing condensed emergency instructions, legibly printed or engraved on durable material resistant to defacement, at least 3 mm thick or mounted on board at least 3 mm thick, permanently fixed in a convenient position at the control valves.

# 6 WATER HEATING SYSTEMS

## 6.1 PROPRIETARY WATER HEATERS

### Tariff

Install so that the heating system qualifies for the tariff concession or subsidy offered by the statutory authority.

## 6.2 STORAGE CONTAINERS

### General

General: Provide a cylindrical vessel consisting of shell, insulation and outer casing, with cold water feed, connected to the heating unit by the primary flow and return circuit, and provided with connections, fittings and controls necessary for its proper functioning.

### Orientation

Vertical mounting.

### Shell material

Copper alloy: To AS 1566 designation C65500.

Stainless steel: To ASTM A240/A240M Grade 316L.

Nickel alloy: To AS 1566 designation C75700.

### Jointing

Weld by the inert gas shielded arc process using filler rods of the parent metal. Use suitable passivation methods on welds in stainless steel.

### Insulation

Cover external surfaces with semi-rigid mineral wool or fibreglass batts of minimum thermal resistance rating R 1.2.

### Casing

Sheath insulated surfaces with 0.8 mm zinc-coated steel sheet, or 1 mm aluminium sheet, lapped to shed water. Fix at 75 mm centres with solid sealed end aluminium rivets.

### Fittings

Include the following:

- DN 25 drain with valve and hose connection for draining the container.
- Cold water connection 100 mm above bottom, fitted with inlet spreader.
- Flow and return connection.
- 150 mm mercury-in-steel type thermometer. Mount in an easily readable position. Install in a fitted pocket and mount on a threaded chromium plated brass hexagon socket so that the sensing stem extends for its full length into the vessel.

- Pressure gauge, 150 mm Bourdon type, mounted in an easily readable position.

**Pipe connections**

Pipe < DN 50: Screwed sockets with unions.

Pipe ≥ DN 50: Flanged, extended 50 mm clear of the insulation casing.

Flanges:

- Standard: To AS 2129.
- To copper alloy shells: Brass, with copper alloy bolts to AS 1566 designation 655.
- To stainless steel shells: The same material as the shell.

**Cathodic protection**

Provide an anode inside the vessel in a readily removable location within reach of a personnel access opening.

**Personnel access**

Provide a bolted flanged cover fitted with a gasket, or a cover fitted with a gasket and clamping bar.

**Mounting**

General: Mount the vessel on a fabricated mild steel cradle or base ring.

Cradle: Insert 1.5 mm fibreglass woven tape between vessel and cradle.

Base ring: Provide the same material as the vessel for the portion of the ring in contact with the vessel.

**6.3 SOLAR WATER HEATING SYSTEMS****Description**

Provide a proprietary automatic water heater comprising solar collector and storage container, with or without supplementary heating unit, and including connections, controls and necessary fittings.

**Standard**

General: To AS 2712.

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**7 COMPLETION****7.1 GENERAL****Pressure booster system**

Test the system on completion.

**Charging**

On completion of installation, commissioning, testing and disinfection, fill the system with water, turn on control and isolating valves and the energy supply and leave the water supply system in full operational condition.

<b>FUEL GAS</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the fuel gas work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Site Preparation, Service Trenches

**1.2 STANDARDS****Reticulated gas systems**

General: To AS 5601.

**Commercial appliances**

General: To AS 3814.

**Steel mains and services**

Maximum operating pressure > 1050 kPa: To AS 1697.

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**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Excavated surfaces.
- Concealed or underground services.

**Hold points**

As advised by the Principals Authorised Person

**2.2 PRE-COMPLETION TESTS****Production tests**

Storage tanks: To AS 1210.

**2.3 SUBMISSIONS****Certificate of appliance approval**

Appliances with gas inputs < 500 MJ/hour: For each appliance where an approval code exists, submit a certificate from the manufacturer stating that the appliance has AGA/ALPGA approval for operation with the designated gas type.

**Exposed piping**

Submit proposals for location.

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**3 EXECUTION**

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**3.1 PIPING****Concealment**

If practicable, install piping so that it is concealed within service ducts or non-habitable enclosed spaces and does not appear on external walls. Otherwise, provide metal piping mounted on metal brackets and provide metal cover plates at penetrations.

**Embedded piping**

For piping embedded in concrete, install in continuous lengths without fittings. Do not lay across joints between adjoining sections of concrete through which reinforcement does not extend.

**Finishes**

General: Finish exposed piping, including fittings and supports, as follows:

- In internal locations such as toilet and kitchen areas: Chrome plate copper piping to AS 1192 service condition 2, bright.
- Externally, and steel piping and iron fittings internally: Paint.
- In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for identification marking. Prime steel piping and iron fittings.

Valves: Finish valves to match connected piping.

**3.2 VALVE BOXES****General**

General: Provide cast-iron valve boxes with removable covers for access to underground valves.

Identification: Mark the box covers with the word "GAS".

**Installation**

Set beneath each box a shaft formed of UPVC pipe to give clear access to the valve wheel or spindle. Set top flush with pavement surface, or 15 mm above unpaved surfaces, and encase in formed concrete box 150 mm thick, with top surface trowelled smooth.

**3.3 WALL BOXES****General**

Provide wall boxes to house above ground valves and regulators.

**Construction**

Body: 1.2 mm galvanized steel plate continuous welded box construction with leading edge folded twice at 90° to form 25 x 25 mm frontal surround.

Fixing: Fix to masonry backing with four 10 mm galvanized masonry bolts.

Drainage and ventilation relief: Set the bottom of the box to fall outward. Form four 10 mm diameter holes in the frontal surround section at box floor level.

Sleeves: Provide, to the box floor inlet and outlet pipes, sleeves formed of 1.2 mm thick steel pipe with 1.2 mm galvanized flanges to pipe diameter plus 50 mm. Bed each flange on epoxy mortar and rivet to the floor of the box with four 3 mm diameter rivets.

Doors to boxes: Metal frame, glazed with 2.5 mm clear float glass. Provide lock, keys and two 100 mm brass hinges.

Marking: Adhere to the glass a 200 x 100 mm white laminated plastic label, engraved with red letters "IN CASE OF EMERGENCY BREAK GLASS AND SHUT VALVES".

**3.4 PITS****General**

If below ground, house control valves and regulators in concrete access pits with removable pit covers.

**Construction**

Internal dimensions: To give 300 mm clear space all around the fittings in the pit.

Concrete: Grade N20 to AS 1379, 100 mm thick, reinforced with F82 fabric.

Pit covers: To AS 3996.

Marking: Mark pit covers with the word "GAS".

**Installation**

Grade floor to a point on one side and provide a gravity drain to remove water from the pit. Do not connect the drain to other substructures or drains. Carry the pit walls up to 50 mm above finished ground level. Cast in the pit cover frame flush with the top. Trowel the top smooth.

**3.5 LPG STORAGE SYSTEMS****Standards**

Aggregate capacity  $\leq 500$  L: To AS 5601.

Aggregate capacity  $> 500$  L: To AS/NZS 1596.

**Tank colour**

White.

**Cylinder systems**

Fittings: Supply cylinders with regulators which have AGA/ALPGA approval.

**Hoods**

Provide a weatherproof protective steel cover to the valve and regulators of 450 L capacity cylinders, together with hinge pins, padlock and key.

**Certificate holders**

General: Provide a galvanized steel pipe, one end fitted with a brass plug, one end threaded and fitted with a threaded brass cap. Weld to the support member of the tank or cylinder.

Function: For storage of current storage system approval and test certificates.

Marking: Mark the threaded cap with the phrase “LPG CERTIFICATES”.

**Notices and signs**

Required.

**3.6 MARKING****Underground installations**

General: During backfilling lay plastic warning tape 300 mm above buried piping, for the full length of the piping.

Warning tape: Minimum 100 mm width, with “GAS PIPE UNDER” marked continuously.

Marker plates: Provide galvanized steel or brass marker plates at ground level at each change of direction in the underground pipeline, engraved to show the direction of the line and name of the service. Inset marker plates in 150 x 150 x 150 mm concrete blocks, with the tops set flush with ground level.

**3.7 FITTINGS GENERALLY****Inclusions**

Accessories such as, valves and fittings shall include but not be limited to those scheduled below for specific locations or fixtures.

**Accessory****Turrets**

Anti vandal double gas turret R.A.N.B., finished in bright chrome.

Proprietary Item: Enware Type 40 LF128

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**4 COMPLETION****4.1 MANUALS****General**

Submit recommendations for the operation, care and maintenance of gas appliances, storage tanks, valves, regulators and their associated fittings.

**4.2 GENERAL****Commissioning**

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

Purging: Comply with the recommendations of AS 5601 Appendix D.

Appliances: Commission appliances.

**Charging**

General: Hand over the system fully charged with gas.

LPG systems: Fill gas storage containers and replace gas used in testing.

**FENCES AND EXTERNAL WALLS****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **fences and external walls** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made of set out before placing posts.

**Hold points**

As advised by the Principals Authorised Person

**3 MATERIALS AND COMPONENTS****3.1 TIMBER****Hardwood**

Posts and rails: To AS 2082.

**Radiata pine**

Posts and rails: To AS 2858.

**3.2 STEEL****Steel tubes**

Posts, rails, stays: To AS 1163.

- Grade: C350L0.

**Wire**

Chainwire, cable wire, tie wire and barbed wire: To AS 2423.

- Coating mass for outdoor locations: Type A.
- Coating mass for indoor locations and PVC coated wire: Type B.

Finish: Match chainwire.

**3.3 CONCRETE****General**

Standard: To AS 1379 Grade N20.



**4 EXECUTION**

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**4.1 CONSTRUCTION GENERALLY****Set out**

Set out the fence line and mark the positions of posts, gates and bracing panels.

**Clearing**

Except trees or shrubs to be retained, clear vegetation within 1 metre of the fence alignment. Grub out the stumps and roots of removed trees or shrubs and trim the grass to ground level, but do not remove the topsoil.

**Excavation**

Excavate post holes so that they have vertical sides and a firm base. Spread surplus material on the principal's side of the fence.

**Line and level**

Erect posts vertically. Set heights to follow the contours of natural ground.

**Earth footings**

Backfill with earth around posts, compacting firmly by hand or machine in 150 mm deep layers.

**Concrete footings**

In ground: Place mass concrete around posts and finish with a weathered top falling 25 mm from the post to ground level.

On slabs: Provide welded and drilled post flanges and fix with 3 masonry anchors per post.

**4.2 GATES****Hardware**

Provide the following:

- Drop bolt and ferrule to each leaf of double gates.
- Latch to one leaf of double gates.
- Provision for locking by padlock.
- Hinges to ensure smooth operation.

**Hand access**

Where required, provide hand holes to give access from outside to reach locking provision.

**5 FENCE TYPES**

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**5.1 TIMBER FENCING****Radiata pine picket fence**

Maximum post spacing: 2400 mm.

Member sizes (dressed):

- Posts: 90 x 90 mm.
- Rails: 70 x 40 mm.
- Pickets: 70 x 19 mm.

Picket spacing: 125 mm maximum.

Footing type: Earth.

Footing size: 200 mm diameter x 600 mm depth.

**Radiata pine paling fence**

Maximum post spacing:

- General: 2400 mm.
- For lap and cap: 2700 mm.

Member sizes (sawn):

- Intermediate posts: 140 x 45 mm.
- End, corner and gate posts: 100 x 100 mm.
- Rails: 75 x 50 mm.
- Capping for lap and cap type: 120 x 35 mm dressed with weathered top.

- Palings:
  - .General: 100 x 15 mm.
  - .For lap and cap: 150 x 15 mm.

Footing type: Earth.

Footing size: 250 mm diameter x 600 mm depth.

#### **Hardwood paling fence**

Maximum post spacing: 2700 mm.

Member sizes (sawn):

- Intermediate posts: 125 x 50 mm.
- End, corner and gate posts: 125 x 125 mm.
- Rails: 75 x 50 mm.
- Capping for lap and cap type: 100 x 50 mm dressed with weathered top.
- Palings:
  - .General: 100 x 13 mm.
  - .For lap and cap: 150 x 13 mm.

Footing type: Earth.

Footing size: 250 mm diameter x 600 mm depth.

#### **Installation**

General: Mortice posts, taper splice rails and nail twice in mortices. Set pickets and palings clear of the ground.

Picket fence: Nail twice to each rail.

Plain paling fence: Provide 2 rails for fences up to 1800 mm high, and locate 200 mm from the tops and bottoms of the palings. Close butt palings and nail twice to each rail.

Lap and cap paling fence: Provide 3 rails for fences up to 1800 mm high with the top rail located to receive the capping, and bottom rail located 200 mm from the bottom of the palings. Close butt larger palings and nail twice to each rail. Fix smaller palings over joints and nail twice to each rail. Nail capping to the top rail.

#### **Gates**

Ledges and braces: Match fence rails.

Pickets or palings: Match fence.

### **5.2 CHAINWIRE BARRIERS**

All fence posts to have permanently fitted end capes to tops. The end caps to be of the same material and finish as the fence posts.

General: To AS 1725.

#### **Fence dimensions**

Maximum post spacing: 3000 mm.

#### **Component sizes**

Intermediate posts: 42.4 mm diameter, 2.6 mm wall thickness.

End, corner and gate posts: 60.3 mm diameter, 2.9 mm wall thickness.

Chainwire: 3.15 mm diameter wire woven to form uniform mesh.

- Selvedges: Knuckled.
- Mesh generally: 50 mm.
- Mesh at playing end of sports enclosures: 40 mm.

Tie wire: 2 mm diameter.

Post and rail barriers:

- Rails and gooseneck stay: 33.7 mm diameter, 2.6 mm wall thickness.

Railless barriers:

- Struts: 42.4 mm diameter, 2.6 mm wall thickness.
- Cable wires:
  - .Two strands: 3.15 mm diameter wire.

.One strand: 4 mm helicoil wire.

Security barriers:

- Chainwire selvages: Twisted and barbed.
- Barbed wire to security fencing post extensions: Barbs at 95 mm maximum centres.

#### **Installation**

Posts: Do not splice members except in posts when splice is embedded at least 150 mm into concrete. Fit tightly fitting steel caps to posts, except where fixed to overhead structure.

Chainwire: Lace chainwire to end and gate posts. Tie chainwire twice around members at 250 mm maximum intervals. Twist ends twice and cut off neatly.

Cable wire: Tension cable wire(s) to support chainwire after at least 24 hour curing of concrete footings.

Footing type: Concrete.

- Footing size:
  - .Intermediate and end posts: 225 mm diameter x 600 mm depth.
  - .Corner posts and gate: 225 mm diameter x 900 mm depth.

Bracing:

- Internal partitions: If at least each alternate point is fixed to the overhead structure, bracing is not required.

Post and rail barriers:

- Rails: Connect rail(s) to posts using bolted split pipe fittings and purpose-made caps and brackets with rail apertures.
- Continuous rail type fences: Join the rails together in long lengths using purpose-made sleeves or socketed connections, and pass them through the apertures of caps and brackets on intermediate posts.

Railless barriers:

- Struts: Provide struts at ends, corners and gates.

Security barriers:

- Security fencing: Strain barbed wire between post extensions.

#### **Special purpose enclosures**

Tennis court enclosures (railless): Provide double bracing stays to corner posts and every twentieth intermediate post in multiple (side by side) enclosures. Provide support cables at top and bottom and at 900 and 1800 mm height. Fix the chainwire on the inside of single enclosures.

Cricket practice net enclosures: Provide a top rail, and support cables at the centre and bottom of the enclosure's sides and back, and additional cables at the back at 300 and 600 mm height. Fix the chainwire on the inside of single enclosures, and on the offside of the (right handed) batsman in multiple enclosures.

#### **Gates**

Frame tubes: 33.7 mm diameter, 2 mm wall thickness.

Chainwire: Match fence.

Maximum width: 3600 mm.

Security barriers:

- Barbed wire security gate extension supports: 26.9 mm diameter, 2 mm wall thickness.
- Barbed wire: Match fence.

#### **Animal Space, (External Barrier)**

Type

Post and rail type chainwire barrier. Posts are to have permanently fitted proprietary galvanised steel caps.

General Standard: To AS 1725

- -Height (Nominal): 2100 mm above ground level

**Gate**

To AS 1725

- -Number of Leaves: 2 (1 per pen)
- -Width (Nominal): 750 mm
- -Locking: Provide 200 mm padbolt and padlock.

**Installation**

Secure frame with four galvanised heavy duty mild steel saddles each bolted with two 16 mm diameter galvanised masonry anchors. Fix two to the wall and two to the floor.

Extend top rail over gate opening to opposite wall and fix with ferrule and two 16 mm diameter masonry anchors.

Fix gate to wall with two galvanised heavy duty mild steel saddles each with two 16 mm diameter masonry anchors, allow gate to swing and support with proprietary foot pivot. Spot weld chainwire to screen and gate and cut "D" shaped hand access to padbolt.

**Cricket Practice Nets**

Intermediate enclosure: Fix the chain wire on both sides of the intermediate enclosure frame.

Posts: Permanently fitted proprietary galvanised steel caps

**Sheep-Proof Fence****Type**

Railless chainwire

General Standard: To AS 1725

- -Height (Nominal): 1200 mm above ground level

**Posts**

- -Permanently fitted with proprietary galvanised steel caps
- -Maximum Spacings: 1800 mm

**Wire Strands**

5 rows

**Gate**

To AS 1725

- -Number of leaves: 1
- -Width (Nominal): 2000 mm
- -Opening Direction: Outwards
- -Locking: Horizontal shoot bolt complete with hasp and staple

**Footings/Installation**

- -Finish: Flush with surrounding ground at perimeter, trowelled to a 25 mm crown at centre.

**Dog-Proof Enclosing Fence****Type**

Railless chainwire

General Standard: To AS 1725

- -Height (Nominal): 2150 mm height above ground and 300 mm depth below ground

**Posts**

- -Permanently fitted proprietary galvanised steel caps

- -Maximum Spacings: 3000 mm
- -Bracing Stays: Double bracing stays to corner posts and to every twentieth intermediate post in multiple (side by side).

**Gate**

- -Number of Leaves: 2
- -Width (Nominal) per leaf: 1500 mm (total nominal width 3.0 metres)

Locking: Coil spring closer, gate latch, add pad bolt with ferrule imbedded in concrete for two leaf gate.

Gate latch and pad bolt to have provision for padlocks, as specified in HARDWARE Section.

Concrete Erosion Strip: 20 Mpa.

- -Location: Central across gate openings.
- -Size: 900 mm wide x width of gate x 150 mm thick. Reinforcing: F72 mesh.
- -Concrete: 20 Mpa

**Footings/Installation**

- -Finish: Flush with surrounding ground at perimeter, trowelled to a 25 mm crown at centre.

**Games Court Fence/Gates****Type**

Post and rail type chainwire barrier.

**Standard**

- -General: AS 1725
- -Height (Nominal): 2400 mm

**Posts:**

- -Permanently fitted proprietary galvanised steel caps
- -Maximum Spacings: 2400 mm
- -Bracing Stays: Double bracing stays to corner posts and to every twentieth intermediate post in multiple (side by side)

**Rails:**

- Top and bottom rails:
- Bottom rail 150mm above ground level.

**Cable:**

- -Centre support cable

Gate: To AS 1725

- -Number of Leaves: 2
- -Width (Nominal) per Leaf: 1 metre (total nominal width 2.0 metres)

**Footings/Installation:**

- -Finish: Flush with surrounding ground at perimeter, trowelled to a 25mm crown at centre.

**LPG Enclosure****Type**

Post and rail type chainwire barrier,

General Standards: To AS 1725, AS 1596

- -Height (Nominal): 2100 mm

**Posts**

- -Permanently fitted proprietary galvanised steel caps

**Gate**

To AS 1725

- -Number: 2
- -Leaves per Gate Opening: 1
- -Width (Nominal) per Leaf: 1000 mm
- -Opening Direction: Outwards
- -Location: Diagonally opposite corners
- -Locking: Fit pad bolt for 50 mm padlock, masterkey to PW "E" key.

**Warning Notice**

To AS 1596 and any other requirements by statutory authorities.

**Temporary Fence, Security**

Builders compound and the whole area of works. Refer to drawings for extent of temporary fence and position of access gates.

**General Description**

2100 mm high galvanised rail-less chain wire temporary security fence braced and strained taut, fixed to galvanised steel posts complete with gates where shown on drawings.

**General Standard**

To AS 1725.

**Fencing Wire Products**

To AS 1725.

- -Top Selvedge: Twisted and barbed.
- -Bottom Selvedge: Twisted and barbed.

**Galvanising**

To AS 1650.

- -Coating mass of Wire: Type "A" (heavily galvanised).

**Posts**

- -Height: 2100 mm
- -Nominal Size & Maximum Spacings: To AS 1725 Tables 1 and 2.
- -End Treatment: Welded and drilled flanges where required for bolted connections; otherwise permanently fitted with proprietary galvanised steel caps to post tops.
- -Post Extension: 380 mm vertically, cranked inwards at 45 deg. or vertical.

**Bracing Strut**

To AS 1725.

**Back Stay**

To AS 1725.

**Bracing Stay**

To AS 1725.

**Support Cable**

To AS 1725.

- -Number: 3 rows x 2 strands each row.

**Bracing Cable & Turnbuckle**

To AS 1725.

Barbed Wire

To AS 1725.

Footings

To AS 1725.

Gate

To AS 1725 Section 3.

Safety Signs:

- -Text: "DANGER - AUTHORISED PERSONNEL ONLY"
- -Colour: Standard red and black lettering on white background.
- -Size: 450 mm long x 300 mm high.
- -Material: Galvanised sheet metal.
- -Spacing: Displayed at 25 metre centres at 1800 mm height.

Removal

Maintain fence, gates and signs and remove on completion of project.

### 5.3 WELDED MESH FENCING

#### General

All fence posts to have permanently fitted end caps to tops. The end caps to be of the same material and finish as the fence posts.

#### Fence dimensions

Maximum post spacing: 2440 mm.

#### Component sizes

End, corner and intermediate posts: 42.4 mm diameter, 2.6 mm wall thickness.

Gate posts (personnel): 60.3 mm diameter, 2.9 mm wall thickness.

Gate posts (vehicle): 88.9 mm diameter, 3.2 mm wall thickness.

Panel wire:

- Horizontal: 4.95 mm diameter at 75 mm centres.
- Vertical: 4.95 mm diameter at 50 mm centres.

#### Installation

General: Fit tightly fittings caps to steel posts. Attach panels to posts with fixing clips and M8 x 75 mm hexagon head bolts before concreting footing.

Footing type: Concrete.

#### Gates

Frame tubes: 33.7 mm diameter, 2 mm wall thickness.

Wire: Match fence.

#### Boundary Fencing

Generally

Galvanised welded mesh panels with tops and bottoms of panels rolled and returned set between galvanised tubular posts

Protective coating: To AS 1650

Weldmesh Panels

- -Coating Mass For Wire: Type A.
- -Nominal mesh size: 50 mm (long) x 75 mm (cross)
- -Nominal dimension of wire: 5 mm
- -Top and Bottom Roll: 50 mm at 90° and then 100 mm return.
- -Height (Nominal): 900 mm above ground level.

**Posts**

To AS 1074.

Drilled for bolt fixing panels and fitted with permanent proprietary galvanised steel caps.

- -Intermediate/Corner: Nominal size: 40 NB.
- -Maximum spacing: 2500 mm
- -Gate, Single: Nominal size: 50 NB.
- -Gate, Double: Nominal size: 80 NB.

**Gates, Generally**

Proprietary gate/s including all accessories compatible with fence/panel system.

Protective Coating: Hot dipped galvanised after fabrication

- -Tube Frame: 33.7 OD
- -Tube Frame Thickness 2.6 mm
- -Nominal mesh size: 50 mm (long) x 75 mm (cross)
- -Nominal dimension of wire: 5 mm

**Gate, Single**

- -Number of Leaves: 1
- -Width (Nominal): 900 mm
- -Locking: Gate latch with provision for padlock

**Gate, Double**

- -Number of Leaves: 2
- -Width (Nominal): 2700 mm (total opening width)
- -Locking: Gate latch, add pad bolt with ferrule imbedded in concrete

**Footing To Posts**

- -Depth: 600 mm
- -Diameter: 200 mm
- -Finish: Flush with surrounding ground at perimeter, trowelled to a 25 mm crown at centre.

**Installation**

Secure panels with 5 mm diameter proprietary hooked galvanised bolts passed through pre-drilled holes in post securing the next panel with galvanised washers and nuts. Turn down bolt ends preventing removal of nuts.

Panels, finishing height: Must not finish higher than the top of the fence post cap.

Fence clearance: 50mm minimum, 200mm maximum above ground level (concrete mower strip or retaining wall whichever is higher) to underside of fence. Where ground clearance exceeds the maximum clearance the panels are to be cut, infilled, stepped etc. to achieve the appropriate clearance.

**Gates & Moveable Panels For Pens, Animal Space .****Generally**

Galvanised welded mesh panels with tops and bottoms of panels rolled and returned set between galvanised tubular posts and/or walls.

Protective coating: To AS 1650

**Weldmesh Panels**

- -Coating Mass For Wire: Type A.
- -Nominal mesh size: 50 mm (long) x 75 mm (cross)
- -Nominal dimension of wire: 5 mm



- -Top and Bottom Roll: 50 mm at 90° and then 100 mm return.
- -Panel Height (Nominal): 1200 mm above floor level.

#### Posts

To AS 1074 with permanently fitted proprietary galvanised steel caps.

- -Nominal size: 60 mm OD medium (flanged gate posts)
- -40 mm OD medium (flanged gate posts).
- -Flanges: 130 x 130 x 5 mm with 4 x 13 mm diam. holes. Flanges welded to posts and securely fixed to concrete floor.
- -Protective coating: Hot dipped galvanised after fabrication.

#### Installation

Panels are to be installed so they can be easily detached and attached.

#### Gates, Generally

Proprietary gate/s including all accessories compatible with fence/panel system.

- -Protective Coating: Hot dipped galvanised after fabrication
- -Locking: Lockable, gate latch and strike welded on gate/panel assembly .
- -Tube Frame: 33.7 OD
- -Tube Frame Thickness 2.6 mm
- -Nominal mesh size: 50 mm (long) x 75 mm (cross)
- -Nominal dimension of wire: 5 mm

#### Weldmesh Fencing, Security

Positioning of fence: The fence is to have a minimum clearance of 400mm from any obstacle that may reduce the effective height of the fence. (Eg stairs, retaining walls etc.).

Fence type: Hot dipped galvanised welded mesh double roll panels set between galvanised tubular posts in concrete footings.

- -Hot Dipped Galvanising: To AS 1650
- -Galvanised Wire: To AS 2423

Fence height:

- -Top of Fence Panel: 1825mm above ground level (concrete mower strip or retaining wall whichever is higher).
- -Panels, finishing height: Must not finish higher than the top of the fence post cap.
- -Fence clearance: 50mm minimum, 100mm maximum above ground level (concrete mower strip or retaining wall whichever is higher) to underside of fence. Where ground clearance exceeds the maximum clearance the panels are to be cut, infilled, stepped etc. to achieve the appropriate clearance.

#### Weldmesh panels:

- -Protective coating: Hot dipped galvanised after manufacture.
- -Weld: All joints
- -Nominal mesh size: 50mm (long) x 75mm (cross).
- -Nominal dimension of wire: 5mm
- -Top and Bottom Roll: 75mm at 90° and then returned at 45°.

#### Installation, weldmesh panels:

- -Secured to pre-drilled posts with hot dipped galvanised 8mm hexagonal headed bolts and nuts with galvanised “U” clips for holding mesh panels. Secure nuts by spot welding.
- -Fixing: Top, bottom and centre (each post).

Posts, general:

- -To AS 1163 grade 350 tube, drilled for bolt fixing panel and with permanently fitted proprietary galvanised steel caps.
- -Post extension: 550mm cranked inwards at 45 degrees and drilled to receive three rows of barbed wire at 180mm centres.
- -Concrete: keying: Part of the post set in concrete is to be dimpled or deformed.
- -Protective coating: Hot dipped galvanised

Posts, corner & intermediate

- -Nominal size: 50mm NB medium grade x 3.6mm wall thickness.
- -Maximum spacing: 2460mm nominal (to suit panels) unless otherwise stated.

Posts, gate

- Complete with adjustable galvanised gudgeons and gate clips at required heights to receive gate/s.
- -Fittings, security: Gudgeons and gate clips to be firmly secured with a 9.5mm diam. MS pin through a 9.5mm diam. hole drilled in gudgeons, clips and post. Pins to be spot-welded to prevent removal.
- -Nominal size, single gate: 80mm NB medium grade x 4mm wall thickness.
  - Nominal size, double gate (up to 6000mm opening): 80mm NB medium grade x 4mm wall thickness.
  - Nominal size, double gate (over to 6000mm opening): 100mm NB medium grade x 4.5mm wall thickness.

Back Stays

Location: All posts supporting double vehicular gates.

- -Nominal size: 50mm NB medium grade.
- -Fittings: Connect to posts with proprietary "T" fittings.
- -Maximum spacing: To the first intermediate post 2400mm.

Footings to posts:

- -General:
  - . . Finish: 50mm below ground level. In paved areas, finish the concrete flush with the paved surface.
  - . . Backfilling, (other than paved surfaces): Earth, well rammed to effect rigidity of posts.
- -Other than rock:
  - . . Position each post on a 75mm bed of concrete, consolidate posts in the holes to full depth (concrete) with a minimum of 100mm of concrete cover all round.
  - . . Intermediate post holes: 900 deep x 250mm minimum diameter.
  - . . Gate, change of direction and end posts: 900 deep x 300 minimum diameter.
- -Rock:
  - . . Excavate post holes to full depth to allow a minimum of 30mm of concrete cover all round. Consolidate with concrete for full depth
- -Concrete: 20MPa minimum strength for all footings

Barbed wire

- -To AS N4, Hot dipped galvanised barbed wire, comprised of two 1.57mm diameter wire twisted together with four point barbs at nominally 90mm centres.  
Barbed wire must be strained tight after concrete post footings have set (minimum 24 hrs).
- -Rows: Three.
- -Spacings: 150mm.

Gates, general

- Galvanised MS gate/s
- Fixing, weldmesh panels: All horizontal and vertical members to be welded to the outside of the frame.
- Height: Match height of fence.
  - Clearance: 25mm to 75mm between ground and bottom of gate in any position.
- Extension: Gate extension to be level with gooseneck extension on fence.
- Barbed wire: Match lines of barbed wire in fence.
  - Weldmesh panels: Cut to suit frame. Panels to match and be kept level with fence panels.
  - Hand access hole/s: 150 x 100. Frame hand access hole with 25mm NB welded to mesh ends.
- Hanging: Hang gates on adjustable gudgeon pins and gate clips fixed to gate posts. Fixing bolts to be spot welded to prevent removal.
  - Swing: Inwards.

#### Single Gates (pedestrian)

- Number: >
  - Size: 1050mm wide:
  - Frame, Nominal Size: 25mm NB
- Double gates (vehicular)
  - Frame, nominal size: 32mm NB
  - Pipe dowel keepers: Provide at ground level to lock gates in both open and closed position.
- Number: Two, equal leaves.

#### Hardware

- Refer DOOR AND WINDOW HARDWARE Section for padbolts, padlocks and keying requirements generally for gates
  - Gate catch: Galvanised single pipe gate catch, locate at hand access hole for padbolt. The catch must be installed so it does not hinder the operation of the pad bolt.

#### Protection

- After preparing surface apply two coats of zinc rich paint in accordance with the paint manufacturer's instructions to any galvanised surfaces damaged (eg: by welding, cutting etc.).

#### Square Hollow Section Fencing, Security

Positioning of fence: The fence is to have a minimum clearance of 400mm from any obstacle that may reduce the effective height of the fence. (eg stairs, retaining walls etc.).

Fence type: Proprietary galvabond square hollow section pickets and frame security fencing.

Height: 2150mm

- Fence clearance: 50mm minimum and a 100mm maximum above ground level (concrete mower strip or retaining wall whichever is higher) to underside of fence. Where ground clearance exceeds the maximum clearance the panels are to be cut, stepped, infilled etc. to achieve the appropriate clearance.
- Panels (mm): 2400 long x 2100 high x 40 square hollow section frame 1.6 thick.
  - Pickets: Pressed and cut to form spear point top, 2100mm long x 25mm square
  - Picket spacings: 100mm (nominal)
  - Welds: Silicone bronze
- Posts:

- Galvabond square hollow section posts complete with permanently fitted proprietary galvabond steel caps.
  - Posts(mm): 65 x 65 x 2.4 thick wall.
- Gate posts:
  - Galvabond square hollow section posts complete with galvabond steel cap:
  - Posts, single gates(mm): 65 x 65 x 2.4 wall thickness.
  - Posts double gates(mm): 100 x 100 x 5 wall thickness.
  - Fittings:
    - Rail brackets: Compatible rail brackets and sleeves fastened to post using 5mm stainless steel rivets.
- Footing to posts:
  - General:
    - . Finish: 50mm below ground level. In paved areas, finish the concrete flush with the paved surface.
    - . Backfilling, (other than paved surfaces): Earth, well rammed to effect rigidity of posts.
  - Other than rock:
    - . Position each post on a 75mm bed of concrete, consolidate posts in the holes to full depth (concrete) with a minimum of 100mm of concrete cover all round.
    - . Intermediate post holes: 900 deep x 250mm minimum diameter.
    - . Gate, change of direction and end posts: 900 deep x 300mm minimum diameter.
  - Rock:
    - . Excavate post holes to full depth to allow a minimum of 30mm of concrete cover all round. Consolidate with concrete for full depth
  - Concrete: 20MPa minimum strength for all footings
    - Gates, general: Galvabond frame, pickets and fittings
      - Vertical styles: 50 x50 x1.6mm
      - Horizontal rails; 40 x 40 x 1.6mm
      - Pickets: 25mm square picket to match fence panels.
    - Gates, single
      - Latch: "D" Type.
    - Gates, double
      - Pipe dowel keepers: Provide at ground level to lock bolts in both open and closed position.
      - Bottom rail: Twin bottom 40mm square rail.

#### Hardware

- Refer to DOOR AND WINDOW HARDWARE Section for gate pivots, padbolts, padlocks and keying requirements for gates generally.

#### Protection

- All damaged, cut or welded surfaces to have two coats of zinc rich paint and two coats of colour touch up paint to match original colour surface. All surfaces must receive the appropriate preparation and application in accordance with the paint manufacturer's instructions

#### Colour Finish

- All fencing panels, pickets, posts, gates and accessories are to be fully powder coated.
- Standards: To AS 3715
- Colour: >

**Swimming Pool Fencing and Gates for Play Enclosures**

Standards: To AS 1926.1 and AS 2820

Additional Hardware

- - Specification reference: DOOR AND WINDOW HARDWARE for padbolts, padlocks and master keying.

**5.4 TEMPORARY LANDSCAPE FENCING****Fence dimensions**

Height: 1200 mm.

Maximum post spacing: 5000 mm.

**Component sizes**

Corner and gate posts: Hardwood or preservative-treated softwood, 250 mm diameter.

Intermediate posts: Star picket.

Gate: Provide a suitable hinged gate with a gate latch.

Wire: Top, intermediate and bottom rows of 3.2 mm plain galvanized steel wire. Thread the top wire through pieces of plastic tube and through corner posts.

**Removal**

Completion: Remove the fence at the end of the planting establishment period.

**6 GARDEN WALLS****6.1 DRY STONE WALLS****Walling stone**

Natural stone: Stone of uniform quality in each grade, sound and free from defects liable to affect its strength, appearance, durability or proper functioning under the intended conditions of use.

Field stone: Local weathered uncut random sized natural stones.

Quarried stone: Cut or uncut random or regular size stone.

**Construction**

Generally: Select the stones for their locations and lay them in the wall with the minimum of stonecutting so that

- each stone is stable, non-rocking, and firmly interlocked with its neighbours without mortar;
- the wall face shows reasonably regular, flat and vertical stone faces;
- vertical joints or perpends between stones are spanned by the next stone above;
- stones are laid generally as through stones whenever possible; and
- at least 50% of footings, 30% of wall stones, and all coping stones are laid as through stones.

Footings: Select the largest, flattest and most regular stones for footings, and set them one third of their depth into the ground.

Copings: Select stones of reasonably uniform size and finish the top of the wall to a level line.

**Retaining walls**

Construction: Where dry stone walls act as retaining walls, construct the stonework to be free draining through the wall. Batter back the wall face 50 - 70 mm for every 300 mm in height. Cap the top of the wall. Backfill progressively, with a layer at least 300 mm thick of porous material, such as coarse aggregate or crushed rock in the size range 20 - 40 mm.

Minimum thickness: 450 mm.

**Rip-rap retaining walls**

Construct as dry stone retaining walls with large random sized boulders recovered from excavations, to form gravity walls retaining, and supported by, embankments. Place boulders with large face down and stepped back from boulders below.

## 6.2 SLEEPER WALLS

### Sleepers

Hardwood: Sound hardwood railway sleepers to AS 3818.2.

Softwood: Sound preservative-treated softwood sleepers.

### Construction

Wall: Erect sleeper posts at 2 m centres, buried one third. Brace at half height of wall with sleepers returned into embankment, spiked to posts. Lay sleepers in stretcher bond behind the verticals and securely spike together at joints and at 2 m centres. Back with hessian or geotextile and place a 100 mm draining layer of coarse sand or fine gravel between the fabric and backfill.

Backing: Backfill to ground level with compacted fine crushed rock, gravels or cement stabilised rammed earth.

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## 7 VEHICLE BARRIERS

### 7.1 LOG BARRIERS

#### General

Material: Sawn hardwood, or preservative-treated radiata posts and rails to AS 1608.1.

Size: Diameter range 125 - 150 mm.

Installation: Check out the posts to receive the rails. Set each post 600 mm into the ground and surround with compacted fine crushed rock, gravel or cement stabilised rammed earth. Bolt rails to posts with M12 diameter galvanized bolts and washers, with bolt heads and nuts recessed.

### 7.2 WHEEL STOPS

#### Precast concrete wheel stops

Material: Precast concrete units with predrilled holes located 300 mm from each end for fixing to ground surface.

Size: 2000 x 150 x 100 mm high.

Installation: Drive 12 mm diameter galvanized steel rods 600 mm into the ground to finish 25 mm below the top of the wheel stop, or bolt the stop to masonry anchors in concrete slabs. Grout the holes flush to match the concrete finish.

### 7.3 BOLLARDS

#### Steel tube bollards

Type: Bollards fabricated from heavy steel tube, to minimum nominal size DN 100, to AS 1074. Seal free ends with fabricated end caps, spot welded and ground smooth.

Finish: Galvanize after fabrication.

Footings: Encase in a concrete footing at least 600 mm deep x 250 mm diameter.

On slabs: Weld on a 10 mm thick baseplate drilled for 4 bolts, and bolt to masonry anchors.

Filling: Fill the tube with 15 MPa concrete.

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## 8 WASTE RECYCLING BAYS

### 8.1 waste recycling

#### Description

Recycling (compost) bays consisting of treated pine logs.

Material: Preservative treated pine logs

Size: 100 mm (nominal)

Standard: To AS 1604

- Hazard level: H4

#### Fixing

Fix wall to posts with proprietary galvanised barbed fixing spikes designed to twist when hammered home to lock into the core of the timber.

Ends: All cut ends not in contact with the ground must be resealed by flood brushing with a water repellent preservative.

Uncut ends should not be placed in the ground. If cut ends are placed in the ground apply a thick coat of preservative paste (copper naphthenate) emulsion on the cut ends.

**Footings**

400 mm diameter hole (minimum) x 350 mm deep.

- -50 mm thick gravel layer in bottom of each hole
- -300 mm post embedment

Concrete: 20 Mpa

- -Finish: 25 mm above ground

**LANDSCAPING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **landscaping** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Site Preparation, Stormwater, Fences & External Walls

**1.2 STANDARDS****Soils**

General: To AS 4419.

**1.3 INTERPRETATION****Definitions**

Site rock: Rocks approved for salvage.

Site topsoil: Soil excavated from the site which has the following characteristics:

- Contains organic matter.
- Supports plant life.
- Free from unwanted matter.

Unwanted matter (in topsoil):

- Stones over 25 mm diameter.
- Clay lumps.
- Weeds and tree roots.
- Sticks and rubbish.
- Material toxic to plants.

Imported topsoil:

- Fine: Clay loam, fine sandy loam, sandy clay loam, silty loam, loam.
- Medium: Sandy loam, fine sandy loam.
- Coarse: Sand, loamy sand.

Topsoil mixture: Four parts by volume of topsoil and one part of compost as specified in COMPOST AND FERTILISER, thoroughly mixed before placing.



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## 2 QUALITY

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### 2.1 INSPECTION

#### Witness points

Give sufficient notice so that inspection may be made at the following stages:

- Setting out completed.
- Subgrades cultivated or prepared for placing topsoil.
- Topsoil spread before planting.
- Grassing bed prepared before turfing, seeding, or temporary grassing.
- Plant holes excavated and prepared for planting.
- Plant material set out before planting.
- Planting, staking and tying completed.
- Grassing or turfing completed.
- Completion of planting establishment work.

#### Hold points

As advised by Principals Authorised Person

### 2.2 TESTS

#### Soil tests

Sampling: As recommended in AS 4419 Appendix A.

### 2.3 SAMPLES

#### General

General: Submit representative samples of each material, packed to prevent contamination and labelled to indicate source and content.

#### Bulk materials

Submit a 5 kg sample of each type specified. Submit bulk material samples, with required test results, at least 5 working days before bulk deliveries.

#### Plant materials

Quantity: Submit one plant sample for each 100 of each species or variety, in the condition in which it is proposed to supply that plant to the site.

### 2.4 SUBMISSIONS

#### Suppliers

Submit statements from suppliers of plants and other materials, giving the following, where applicable:

- Particulars of the supplier's experience in the required type of work.
- Production capacity for material of the required type, sizes and quantity.
- Lead times for delivery of the material to the site.

#### Materials

Supplier's data: Submit supplier's data including

- certificate identifying seed species, purity, age and germination viability; and
- material source of supply.

Compost: Submit a certificate of proof of compost pH value.

#### Execution

Program: Submit a work program in the form of a bar chart, for the landscape works.

Maintenance program: Submit a proposed planting maintenance program.

Planting machine: If a planting machine is to be used as an alternative to hand planting, submit proposal.

Spraying: Submit proposal.

Plants - open rooted stock: If open rooted stock is to be used, submit proposal.

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**3 SITE AND SOIL**

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**3.1 PREPARATION****Weed eradication**

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

Manual: Regularly remove, by hand, rubbish and weed growth throughout grassed, planted and mulched areas. Remove weed growth from an area 750 mm diameter around the base of the trees in grassed areas. Continue eradication throughout the course of the works and during the planting establishment period.

**Vegetative spoil**

Remove vegetative spoil from site. Do not burn.

**Earth mounds**

Place clean filling in layers approximately 150 mm thick compacted to 85% of the dry density ratio of the surrounding soil as determined by AS 1289.5.4.1. Minimise slumping and further internal packing down. Construct changes in grade over a minimum width of 500 mm to smooth, gradual and rounded profiles.

**Embankment stabilisation**

General: Where necessary to prevent erosion or soil movement, stabilise embankments.

Method: Either matting overlay or hydromulching.

Matting: Biodegradable fibre reinforced with lightweight polymer mesh. Provide lightweight material for seeding, medium or heavy weight material for planting.

Matting installation: Sow before matting is installed, where sowing is required. Plant after matting is installed, where planting is required. Peg the matting into 300 x 300 mm anchor trenches at top and bottom, backfill the trenches with soil and compact.

Matting pegs: U-shape galvanized steel, at 1000 x 1000 mm intervals generally, 250 mm at overlaps.

**Rock work**

General: Place rocks while ground formation work is being carried out. Provide site rock, otherwise provide imported rock. Bury rock two thirds by volume, with weathered faces exposed. Protect the weathered faces from damage.

Site rock: Stockpile for future placement and accessibility for lifting. Dispose of other rock off site.

Imported rock: Provide rock which has been selected before delivery.

**Rock outcrops**

General: Protect existing rock, rock shelves and rock outcrops from mechanical damage and surface defacement.

**3.2 SUBSOIL****Ripping**

General: Rip parallel to the final contours wherever possible. Do not rip when the subsoil is wet or plastic. Do not rip within the dripline of trees and shrubs to be retained.

Ripping depths: Rip the subsoil to the following typical depths:

- Compacted subsoil: 300 mm.
- Heavily compacted clay subsoil: 450 mm.

**Planting beds**

Excavated: Excavate to bring the subsoil to at least 300 mm below finished design levels. Shape the subsoil to fall to subsoil drains where applicable. Break up the subsoil to a further depth of 100 mm.

Unexcavated: Remove weeds, roots, builder's rubbish and other debris. Bring the planting bed to 75 mm below finished design levels.

**Cultivation**

Minimum depth: 100 mm.

Services and roots: Do not disturb services or tree roots; if necessary cultivate these areas by hand.

Cultivation: Thoroughly mix in materials required to be incorporated into the subsoil. Cultivate manually within 300 mm of paths or structures. Remove stones exceeding 25 mm, clods of earth exceeding 50 mm, and weeds, rubbish or other deleterious material brought to the surface during cultivation. Trim the surface to design levels after cultivation.

#### Additives

General: Apply additives after ripping or cultivation and incorporate into the upper 100 mm layer of the subsoil.

Gypsum: Incorporate at the rate of 0.25 kg/m<sup>2</sup>.

#### Subsoil additives schedule

### 3.3 TOPSOIL

#### Source

General: Import topsoil unless the topsoil type can be provided from material recovered from the site.

#### Additives

If using additives to raise topsoil to the required standard, ensure compliance with the relevant test criteria.

#### Topsoil particle size table (% passing by mass)

AS sieve aperture	Soil textures		
	Fine	Medium	Coarse
2.36	100	100	100
1.18	90 - 100	95 - 100	95 - 100
0.60	75 - 100	75 - 100	70 - 90
0.30	57 - 90	55 - 85	30 - 46
0.15	45 - 70	38 - 55	10 - 22
0.075	35 - 55	25 - 35	5 - 10
0.002		2 - 15	2 - 8

#### Topsoil properties schedule

Property	Type	Amount
Nutrient levels	Phosphorus (P) (mg/L)	0.7 - 4
	Potassium (K) (mg/L)	35 - 250
	Sulfur (S) (mg/L)	> 40
	Calcium (Ca) (mg/L)	50 - 350
	Nitrogen (N) (mg/L)	≤ 100
	Manganese (Mn) (mg/L)	1 - 15
Other properties	Organic matter (% by mass)	20 maximum
	Soil reaction (pH)	6 - 7
	Toxicity index to AS 3743	

#### Placing topsoil

General: Spread the topsoil on the prepared subsoil and grade evenly, making the necessary allowances to permit the following:

- Required finished levels and contours may be achieved after light compaction.
- Grassed areas may be finished flush with adjacent hard surfaces such as kerbs, paths and mowing strips.

Contamination: Where diesel oil, cement or other phytotoxic material has been spilt on the subsoil or topsoil, excavate the contaminated soil, dispose of it off the site, and replace it with site soil or imported topsoil to restore design levels.

Spreading: On steep batters, if using a chain drag, ensure there is no danger of batter disturbance.

Finishing: Feather edges into adjoining undisturbed ground.

**Consolidation**

Compact lightly and uniformly in 150 mm layers. Avoid differential subsidence and excess compaction and produce a finished topsoil surface which has the following characteristics:

- Finished to design levels.
- Smooth and free from stones or lumps of soil.
- Graded to drain freely, without ponding, to catchment points.
- Graded evenly into adjoining ground surfaces.
- Ready for planting.

**Topsoil depths**

Spread topsoil to the following typical depths:

- Excavated planting areas: If using organic mulch, 225 mm. If using gravel mulch, 250 mm.
- Irrigated grassed areas generally: 150 mm.
- Irrigated grassed areas, heavy use (e.g. playing fields, playgrounds, public parks): 200 mm.
- Non-irrigated grass areas: 100 mm.

**Surplus topsoil**

Dispose of surplus topsoil remaining on site after placing by spreading as directed over the areas already placed.

**3.4 COMPOST AND FERTILISER****Compost**

General: Provide well rotted vegetative material or animal manure, free from harmful chemicals, grass and weed growth.

Standard: To AS 4454.

**Fertiliser**

Provide proprietary fertilisers, delivered to the site in sealed bags marked to show manufacturer or vendor, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

**4 GRASS****4.1 GRASS SEEDING****Seed**

Provide seed mixtures which are thoroughly pre-mixed with a bulking material such as safflower meal. Deliver to the site in bags marked to show weight, seed species and supplier's name. Provide fresh, clean, uncoated new seed. Do not provide wet, mouldy, or otherwise impaired seed.

Purity (minimum): 98%.

Germination viability (minimum): 86%.

Age (maximum) from date of harvest: 2 years.

**Preparation**

Prepare the areas to be sown. Spread the fertiliser evenly over the cultivated bed within 48 hours before sowing, and rake lightly into the surface. If a prepared area becomes compacted from any cause before sowing can begin, rework the ground surface before sowing.

**Sowing**

Do not sow if frost is likely before the plant has reached an established state, or in periods of extreme heat, cold or wet, or when wind velocities exceed 8 km/h. Provide even distribution. Lightly rake the surface to cover the seed.

**Rolling**

General: Roll the seed bed immediately after sowing.

Roller weight (maximum):

- Clay and packing (heavy) soils: 90 kg/m width.
- Sandy and light soils: 300 kg/m width.

**Watering**

Before germination: Water the seeded area with a fine spray until the topsoil is moistened to its full depth. Continue watering until germination to keep the surface damp and the topsoil moist but not waterlogged.

After germination: Water to maintain a healthy condition, progressively hardened off to the natural climatic conditions.

**Germination**

General: Maintain sown areas until the attainment of a dense continuous sward of healthy grass over the whole of the seeded area, evenly green and of a consistent height.

Reseeding: If germination has not been attained within one month, reseed the sown areas.

Reseeding mixture: Provide the original seed mixture.

**Weeding**

Removal: Remove weeds that occur in sown areas.

Spraying: Where necessary spray with a selective herbicide for broad leaved weeds. Do not spray grass seeded areas within 3 months of germination.

**Protection**

General: Protect the newly sown areas against traffic until well established.

Protection method:

**Fertilising after germination**

Six weeks after germination: Spread fertiliser evenly over the sown area and then water in. Do not apply the fertiliser to wet grass.

Ten weeks after grass germination: If the planting establishment period carries through the summer months, spread pelleted sulphate of ammonia at the rate of 250 kg/ha.

**Mowing**

Mow to maintain the grass height within the required range. Do not remove more than one third of the grass height at any one time. Carry out the last mowing within 7 days before the end of the planting establishment period. Remove grass clippings from the site after each mowing.

**4.2 HYDROSEEDING AND HYDROMULCHING****Seed pretreatment**

General: Place in a calico bag those species of seed to be pretreated, and immerse for 10 minutes in water kept at a temperature between 80°C and 95°C. Allow to cool, soak for 24 hours, then apply immediately.

**Hydroseeding mixture**

A slurry of seed mixture, fertiliser, and water.

**Hydromulching mixture**

A slurry of seed mixture, fertiliser, mulch and water.

**Mixing**

Thoroughly mix the slurry in a purpose-made mechanical mixer.

**Binder**

Refer to *Binders*. For application to sloping areas include a bitumen emulsion or polymer binder, either as part of the mix, or applied separately.

**Application rates**

Seed mixture: The rate applicable to the mix type.

Mulch: At least 2.5 t/ha with seed, or 5 t/ha without seed.

Bitumen emulsion binder: 2000 L/ha of residual bitumen.

Polymer binder: 250 L/ha.

Water: Suitable for the site conditions, and sufficient to assist in the distribution of the seed, fertiliser and mulch.

**Preparation**

Scarify the area to be seeded to provide a firm friable seed bed. If the area is to have added topsoil, place it before scarifying.

**Application**

Moisten the topsoil to its full depth before applying the slurry. Apply the slurry using high pressure pumping equipment operated by trained personnel. Spray the

mixed slurry under pressure, maintaining a thoroughly mixed supply, operating on a front so that the mixture is evenly distributed over the area. Complete each front before commencing the next.

**Watering**

Before germination: Water the seeded area with a fine spray until the topsoil is moistened to its full depth. Continue watering until germination to keep the surface damp and the topsoil moist but not waterlogged.

After germination: Water to maintain a healthy condition, progressively hardened off to the natural climatic conditions.

**4.3 TURFING****Turf**

Obtain turf from a specialist grower of cultivated turf. Provide turf of even thickness, free from weeds and other foreign matter.

**Supply**

Deliver the turf within 24 hours of cutting, and lay it within 36 hours of cutting. Prevent it from drying out between cutting and laying.

**Fertilising**

Mix the fertiliser thoroughly into the topsoil before placing the turf. Apply lawn fertiliser at the completion of the first and last mowings, and at other times as required to maintain healthy grass cover.

**Laying**

General: Lay the turf in the following manner:

- In stretcher pattern with the joints staggered and close butted.
- Parallel with the long sides of level areas, and with contours on slopes.
- To finish flush, after tamping, with adjacent finished surfaces of ground, paving edging, or grass seeded areas.

Strip turf laying: Close butt the end joints and space the strips 300 mm apart. Apply a layer of top dressing between the strips of turf. Finish with an even surface.

**Tamping**

Lightly tamp to an even surface immediately after laying. Do not use a roller.

**Pegging**

On steep slopes peg the turf to prevent downslope movement. Remove the pegs when the turf is established.

**Watering**

Water immediately after laying until the topsoil is moistened to its full depth. Continue watering to maintain moisture to this depth. Keep the grass in a healthy condition.

**Mowing**

Mow to maintain the grass height within the required range. Do not remove more than one third of the grass height at any one time. Carry out the last mowing within 7 days before the end of the planting establishment period. Remove grass clippings from the site after each mowing.

**Maintenance**

General: Maintain turfed areas until the attainment of a dense continuous sward of healthy grass over the whole turfed area, evenly green and of a consistent height.

Failed turf: Lift failed turf and relay with new turf.

Levels: Where levels have deviated from the design levels after placing and watering, lift turf and regrade topsoil to achieve design levels.

**Top dressing**

When the turf is established mow, remove cuttings and lightly top dress to a depth of 10 mm. Rub the dressing well into the joints and correct any unevenness in the turf surface.

**4.4 STOLONISING****Stolons**

Well established fibrous runners 50 - 100 mm in length, with minimum green leaf material, obtained from a specialist grower of cultivated turf.

**Supply**

Deliver stolons to the site within 24 hours of harvesting, and plant them within 36 hours of arrival on site. Prevent them from drying out between harvesting and planting.

**Preparation**

Prepare the area to be planted by cultivating, fertilising and watering. Ensure that the topsoil is moistened to its full depth, loose, friable and weed free.

**Fertilising**

Mix the fertiliser thoroughly into the topsoil before planting the stolons.

**Planting**

Using a disk sprigger or row planter, mechanically sprig the stolons into the prepared soil to a minimum depth of half the stolon length, at maximum centre to centre spacings of 150 mm in both transverse directions over the whole of the planting area, and extending 1 m into adjacent grassed areas.

**Watering**

Water thoroughly on completion of planting. Keep the topsoil moist to its full depth.

**Stimulant**

Three days after planting, spray with hormone root growth stimulant.

**Binding**

Immediately after planting in erosion areas, including slopes greater than 1:3 and drainage swales, spray with binder at the rate of 250 L/ha.

**Making good**

Replant areas that fail to grow.

**4.5 TEMPORARY GRASSING****Preparation**

Prepare the areas to be sown. Spread fertiliser evenly over the cultivated bed within 48 hours before sowing, and rake lightly into the surface. If a prepared area becomes compacted before sowing begins, rework the ground surface before sowing.

**Sowing**

Provide even distribution. Lightly rake the surface to cover the seed.

**Watering**

Immediately after sowing, water to a depth of 100 mm. Thereafter water to obtain germination and establish grasses. After establishment water only as necessary.

**Maintenance**

Maintain temporary grassing areas until no longer required.

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**5 PLANTS****5.1 PLANTING****Plants**

General: Provide plants with the following characteristics:

- Large healthy root systems, with no evidence of root curl, restriction or damage.
- Vigorous, well established, free from disease and pests, of good form consistent with the species or variety.
- Hardened off, not soft or forced, and suitable for planting in the natural climatic conditions prevailing at the site.

Trees: Provide trees which, unless required to be multi-stemmed, have a single leading shoot.

Replacement: Replace damaged or failed plants with plants of the same type and size.

**Plant containers**

General: Supply plants in weed-free containers of the required size.

Open rooted stock: If trees are to be supplied as open rooted stock, ensure this is appropriate to the species, variety, size, and time of year for planting.

Potting-on: Do not carry out potting-on.

**Labelling**

Label at least one plant of each species or variety in a batch with a durable, readable tag.

**Storage**

Deliver plant material to the site on a day to day basis, and plant immediately after delivery.

**Individual plantings in grassed areas**

Excavate a hole to twice the diameter of the root ball and at least 100 mm deeper than the root ball. Break up the base of the hole to a further depth of 100 mm, and loosen compacted sides of the hole to prevent confinement of root growth.

**Ripline planting**

Rip the row and excavate a plant hole for each plant large enough to accept the root ball plus 0.1 m<sup>3</sup> of backfilling with topsoil. Clear weeds and other vegetative material within 300 mm radius of the plants. If planting holes are excavated by mechanical means increase the hole size by 100 mm and loosen compacted sides to prevent confinement of root growth.

**Locations**

If it appears necessary to vary plant locations and spacings to avoid service lines, or to cover the area uniformly, or for other reasons, give notice.

**Planting conditions**

Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain. In other than sandy soils, suspend excavation when the soil is wet, or during frost periods.

**Watering**

Thoroughly water the plants before planting, immediately after planting, and as required to maintain growth rates free of stress.

**Placing**

Remove the plant from the container with minimum disturbance to the root ball, ensure that the root ball is moist and place it in its final position, in the centre of the hole and plumb, and with the top soil level of the plant root ball level with the finished surface of the surrounding soil.

**Fertilising**

Pellets: In planting beds and individual plantings, place fertiliser pellets around the plants at the time of planting.

**Backfilling**

Backfill with topsoil mixture. Lightly tamp and water to eliminate air pockets. Ensure that topsoil is not placed over the top of the root ball, so that the plant stem remains the same height above ground as it was in the container.

**Watering basins for plants in grass**

Except in irrigated grassed areas and normally moist areas, construct a watering basin around the base of each individual plant, consisting of a raised ring of soil capable of holding at least 10 L.

**5.2 TRANSPLANTING****Notice**

Give sufficient notice before transplanting.

**Conditions**

Select a time for transplanting having regard to the appropriate season, time of actual operation, root ball diameter and depth, lifting methods, weather conditions and the like.

**Lifting**

Two days before transplanting of each specimen, thoroughly irrigate it to the full depth of the root ball. Minimise the cutting of roots. Cut roots with sharp tools. Do not fracture the ball of soil around the root system, but maintain it in firm condition during transplanting by wrapping in appropriate open weave material (e.g. hessian), securely tied.

**Planting**

Avoid disturbance to the root ball and plant. Remove the root ball wrapping and ties by cutting.



**Pruning**

General: Prune as directed where selective pruning of branches or canopy is necessary. Comply with the recommendations of AS 4373.

**Watering**

At the completion of transplanting, water the root ball thoroughly and continue to water until established.

**5.3 MULCHING****Mulch**

General: Provide mulch which is free of deleterious and extraneous matter such as soil, weeds and sticks.

Standard: To AS 4454.

Organic mulches: Free of stones.

Mulch material: Brush chippings and leaf litter recovered from site clearing, if available; otherwise, pine bark.

**Organic mulch types**

Brush chippings and leaf litter: Vegetative material processed through a chipper to pieces not larger than 75 x 50 x 15 mm.

- Material permitted: Leaf matter and tree loppings from Eucalyptus, Tristania and Pinus species.
- Material not permitted: Leaf matter and tree loppings from privet, camphor laurel, coral tree, poplar, willow, and noxious weeds.

Pine bark: From mature trees, graded in size from 50 x 50 x 25 mm to 25 x 15 x 15 mm, free from wood slivers.

Pine flake: Pinus species sapwood slivers of size range 250 x 25 mm to 30 x 3 mm, including fragments of pine bark.

Straw: Cereal straw, wood fibre, or other suitable vegetative material (but not meadow hay) free from weeds and seeds, applied in conjunction with a bitumen emulsion or polymer binder.

**Inorganic mulch types**

Washed river pebble: Uniform size or graded material in the size range 6 - 10 mm.

Decomposed granite gravel: Uniform size or graded material in the size range 5 - 20 mm, of uniform colour and low plasticity. Keep clear of plant stems.

Crushed quartz: Uniform size or graded material in the size range 5 - 20 mm, of uniform colour.

Marble chip gravel: Uniform size or graded material in the size range 5 - 20 mm, of uniform colour.

Slate: Plum slate slivers in the size range 5 - 25 mm.

Shale: Uniform size or graded material, no particles smaller than 0.1 mm diameter.

Scoria: Uniform size or graded material.

**Placing mulch**

General: Place mulch to the required depth, clear of plant stems, and rake to an even surface flush with the surrounding finished levels. Spread and roll mulch so that after settling, or after rolling, it is smooth and evenly graded between design surface levels sloped towards the base of plant stems in plantation beds, and not closer to the stem than 50 mm in the case of gravel mulches.

In mass planted areas: Place after the preparation of the planting bed but before planting and other work.

In smaller areas (e.g. planter boxes): Place after the preparation of the planting bed, planting and other work.

Application: Place mulch clear of plant stems, and rake to an even surface flush with the surrounding finished levels.

Extent: To surrounds of plants planted in riplines and grass areas, provide mulch to 750 mm diameter.

Depths: Spread organic mulch to a depth of 75 mm, and gravel mulch to a depth of 50 mm.

## 5.4 BINDERS

### Generally

Provide materials suitable for cold spray application to stabilise mulched or seeded surfaces on banks or high erosion areas.

### Bitumen emulsion

Standard: To AS 1160.

Designation: ASS/170-60, containing no ingredients toxic to plants.

### Polymer

A suitable polymer based emulsion.

## 5.5 SPRAYING

### Notice

Immediately give notice of evidence of insect attack or disease amongst plant material.

### Spraying

Where required, spray with insecticide, fungicide or both.

## 5.6 STAKES AND TIES

### Stakes

Material: Hardwood, straight, free from knots or twists, pointed at one end.

Installation: Drive stakes into the ground at least one third of their length, avoiding damage to the root system.

Stake sizes:

- For plants  $\geq 2.5$  m high: Three 50 x 50 x 2400 mm stakes per plant.
- For plants 1 - 2.5 m high: Two 50 x 50 x 1800 mm stakes per plant.
- For plants  $< 1$  m high: One 38 x 38 x 1200 mm stake per plant.

### Ties

General: Provide ties fixed securely to the stakes, one tie at half the height of the main stem, others as necessary to stabilise the plant.

Tie types:

- For plants  $\geq 2.5$  m high: Two strands of 2.5 mm galvanized wire neatly twisted together, passed through reinforced rubber or plastic hose, and installed around stake and stem in a figure of eight pattern.
- For plants  $< 2.5$  m high: 50 mm hessian webbing stapled to the stake.

### Marker stakes

Material: Timber offcuts 25 x 25 x 1200 mm. Dip the top 200 mm in white paint.

Installation: Drive firmly into the ground at least 300 mm from the plant. Do not tie to the plant.

Location of marker stakes:

- Trees in grass: Mark each tree.
- Ripline planting areas: Mark each ripline at every fifth plant along the line.

## 5.7 EARTH ANCHORS

### Requirement

Provide temporary support where necessary to trees, root balls or stakes using galvanized steel cables attached to proprietary aluminium anchors or drive rods, which have been hand or power driven at an angle into the ground.

## 5.8 TREE SURGERY

### Notice

Give sufficient notice before commencing tree surgery.

### Qualifications

Employ suitably qualified persons to carry out tree surgery work in a safe and progressive manner.

### Pruning

General: Comply with the recommendations of AS 4373.

**Operations**

Remove dead and decayed wood or limbs that have been broken. Make cuts into live wood. If the trees show signs of deterioration after the work has been done, carry out a program of feeding or soil amelioration such as soil aeration, irrigation or incorporation of organic material. Continue this program until the end of the planting establishment period.

**Precautions**

Avoid damage to trees being treated or to nearby trees and surroundings. Do not use trees as anchors for winching operations or bracing. Provide bracing as necessary before cutting to prevent uncontrolled breakages and damage to surroundings.

**Dressing**

Prevent incursion of rot or disease after cutting.

**Root pruning**

Do not unduly disturb the remaining root system.

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**6 COMPLETION****6.1 PLANTING ESTABLISHMENT****Period**

Commencement: The planting establishment period commences at the date of practical completion.

**Existing planting and grass**

Where existing grass or planting is within the landscape contract area, maintain it as for the corresponding classifications of new grass or planting.

**Recurrent works**

Throughout the planting establishment period, carry out maintenance work including, watering, mowing, weeding, rubbish removal, fertilising, pest and disease control, reseeding, returfing, staking and tying, replanting, cultivating, pruning, hedge clipping, aerating, reinstatement of mulch, renovating, top dressing, and keeping the site neat and tidy.

**Replacements**

Continue to replace failed, damaged or stolen plants.

**Grassed areas**

Commence grass maintenance works at the completion of sowing, hydroseeding and turfing. Maintain healthy weed-free growth.

**Log book**

Keep a log book recording when and what maintenance work has been done and what materials, including toxic materials, have been used. Make the log book available for inspection on request.

**6.2 COMPLETION****Product warranty**

Submit the supplier's written statement certifying that plants are true to the required species and type, and are free from diseases, pests and weeds.

**Maintenance manual**

Submit recommendations for maintenance of plants.

**Cleaning**

Stakes and ties: Remove those no longer required at the end of the planting establishment period.

Temporary fences: Remove temporary protective fences at the end of the planting establishment period.

**PAVING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **paving** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

All Concrete sections, Site Preparation

**1.2 INTERPRETATION****Definitions**

Class A foundation: Most sand and rock sites.

Class S foundation: Most silt and some clay sites.

Class M foundation: Moderately reactive clay sites.

Light traffic: Vehicles with a gross mass < 3 t.

Medium traffic: Vehicles with a gross mass between 3 t and 10 t, with infrequent use by heavier vehicles.

Density ratio: Percentage of the maximum density at optimum moisture content as determined by AS 1289.5.2.1.

**2 QUALITY****2.1 INSPECTION****Witness points**

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

- completed subgrade, subbase and base course preparation;
- completed trial set-out for segmental paving; and
- completed pavements.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Testing authority**

General: Independent third party, NATA-accredited.

**Masonry segmental paver tests schedule**

Attribute	Test method
Potential to effloresce	AS/NZS 4456.6
Moisture content and dry density	AS/NZS 4456.8
Abrasion resistance	AS/NZS 4456.9
Resistance to salt attack	AS/NZS 4456.10
Coefficients of expansion	AS/NZS 4456.11
Coefficient of contraction	AS/NZS 4456.12
Pitting due to lime particles	AS/NZS 4456.13
Water absorption properties	AS/NZS 4456.14
Tensile strength	AS/NZS 4456.18

**2.3 SAMPLES****Finishes**

General: Submit samples of the pavement finishes, showing the full range of texture and colour of the material.

**Sample panels**

General: Prepare sample panels of designated pavement finishes, including samples of junction details and trim.

Segmental paving pattern: Prepare a trial set-out for each area.

**2.4 SUBMISSIONS****Execution**

Segmental pattern: If it appears that minor variations to joint widths will obviate cutting, submit proposals.

**3 MATERIALS AND COMPONENTS****3.1 MATERIALS****General**

Fill for subgrade: Sand, gravel or quarry rubble.

Subbase: Well-graded. Sand, gravel or crushed rock. Maximum particle size  $\leq 1/3$  subbase layer thickness.

Basecourse: Well-graded crushed rock or gravel, free from deleterious material. Maximum particle size 26.5 mm. Uniformly graded. Maximum clay content 6% by mass.

**Concrete pavements**

Materials and construction: To AS 3600.

Concrete: To AS 1379.

**Segmental pavements**

Bedding sand: Coarse, well-graded, washed, free from deleterious material including organic material and soluble salts or other contaminants liable to cause efflorescence or reduce slip resistance.

- Grading: Maximum particle size 4.75 mm, not more than 30% passing 0.3 mm sieve.

Bedding cement: Type GP to AS 3972.

**Asphalt pavements**

Asphalt (hot mixed): To AS 2150.

Bitumen emulsion: To AS 1160.

**Stabilised gravel pavements**

Cement: Type GP to AS 3972.

Mix: 30:1 selected natural stone gravel:cement.

Gravel grading: Maximum particle size 10 mm, 30 - 40% passing 5 mm sieve.

**Crushed brick pavements**

Material: Bricks selected for consistency of colour, and crushed.

Particle size: Graded 10 - 20 mm. Remove particles smaller than 10 mm by sieving before laying.

**Concrete for edging**

Concrete: To AS 1379.

Grade: N20.

**3.2 COMPONENTS**

**Concrete pavement reinforcement**

Machine-welded mesh: To AS/NZS 4671.

Bar: To AS/NZS 4671.

**Segmental pavers**

Standard: To AS/NZS 4455.

Dimensional category: DPA1 and DPB1.

Minimum thickness:

- Foot and bicycle traffic: 40 mm.
- Light traffic: 50 mm.
- Medium Traffic: 65 mm

Unconfined compressive strength (fired clay units) (minimum): 10 MPa.

Unconfined compressive strength (concrete units) (minimum): 12 MPa.

Breaking load ( minimum):

- Foot and bicycle traffic: 2 kN.
- Light traffic: 3 kN.
- Medium traffic: 5 kN.

**Concrete kerbs and channels (gutters)**

Manually or machine placed: To AS 2876.

**Log roundels**

Softwood: Each section 75 mm thick x 200 mm minimum diameter, debarked.

**Logs for edging**

Size: At least 2.5 m long and 200 mm average diameter.

**Sawn timber for edging**

General: Select from sawn hardwood or preservative-treated softwood.

Size: 3000 x 100 x 25 mm nominal edgings; 50 mm square pegs, 400 mm long.

**Sleepers**

Hardwood: Sound hardwood railway sleepers to AS 3818.2.

Softwood: Sound preservative-treated softwood sleepers.

**Tree grates**

Sections: Proprietary cast iron grating comprising purpose-made removable equal segments.

**External duct covers**

Type: Proprietary system removable cover or grating in a fixed frame, with the necessary accessories, and suitable for the duct size and pavement loading.

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**4 EXECUTION**

**4.1 GENERAL**

**Subgrade**

General: Remove topsoil containing grass roots. Fill and compact as necessary. Ensure strength and stiffness is similar throughout, including soft spots and service trenches. If necessary, loosen the subgrade to a depth of 200 mm and adjust the moisture content before compaction.

Level tolerance: + 0, - 25 mm.

Clay fill: Moisture condition near long term equilibrium moisture condition.

Cohesive subgrade soils:

- Minimum dry density ratio (standard compaction) to AS 1289.5.4.1: 100%.

Cohesionless subgrade soils:

- Minimum density index to AS 1289.5.6.1: 80%.

#### **Subbase**

Minimum dry density ratio: 98% to AS 1289.5.2.1.

Thickness tolerance: + unspecified, - 5 mm.

Level tolerance:  $\pm$  25 mm.

#### **Basecourse**

Placing: Spread and compact the base course. Adjust the moisture content to facilitate compaction.

Minimum dry density ratio: 98% to AS 1289.5.2.1.

Thickness tolerance: + unspecified, -5 mm.

Level tolerances: Generally - 0, + 25 mm, but at existing structures - 0, + 10 mm.

Over 3 m length of design profile,  $\pm$  10 mm.

#### **Drainage**

Finished surface crossfalls: Between 1% and 10%.

Ponding: Grade pavements to even falls so as to drain away from buildings to drainage outlets without ponding.

Surface run-off: Provide channels and drains to discharge points.

Poorly drained sites: Select from the following:

- Stabilise subgrade or pavement courses.
- Provide subsurface drains or pervious granular material, slotted or pervious pipes, or both, under or beside the pavement.

At walls: Set finished level of pavements below damp-proof course, weep holes and drainage openings.

#### **General tolerances**

Surfacing layer thickness: + unspecified, - 0.

Surfacing layer level:  $\pm$  25 mm. Over 3 m length of design profile,  $\pm$  10 mm.

Maximum deviations:

- Across junctions between adjacent pavement surfaces: 2 mm.
- Across junctions between adjacent pavement unit surfaces: 2 mm.

#### **Control joints**

General: Provide movement joints over structural joints in the base (isolation, contraction, expansion) right through the paving and bed to the substrate. Fill joints with a compressible material.

#### **Pavement finish junctions**

Location: Where changes of pavement finish occur at gateways, locate the junction directly beneath the closed gate.

Dividing strip: Insert a dividing strip the full width of junctions between different pavement finishes, with the top edge flush with the finished pavement.

Fixing: Embed strip in solid finishes, or screw fix to the substrate.

## **4.2 CONCRETE PAVEMENTS**

### **Standard**

General: To AS 3600.

### **Subgrade**

Preparation for placing: Moisten the subgrade to ensure a firm, uniformly moist surface at the time of placing. Remove loose material and debris from the surface. Do not operate construction equipment on the prepared surface.

### **Subbase**

Minimum 75 mm thick.

**Reinforcement**

Slab reinforcement: Required for irregular panels, and rectangular panels with length:width ratio greater than 1.3:1. Lap fabric so that the 2 outermost transverse wires of one sheet overlap the 2 outermost wires of the other.

Trimming reinforcement: Required where slab surrounds another structure, and at re-entrant corners, except where isolation joints are provided.

- Type: At least one Y12 bar, 600 mm minimum length.

Position: Locate in top half of slab, 30 mm minimum cover. Support on bar chairs at 1 m centres.

Control joints: Stop reinforcement 50 mm clear of control joints.

**Concrete grade**

Foot and bicycle traffic: N20.

Light traffic: N20.

Medium traffic: N25.

**Slab thickness**

Foot and bicycle traffic: 75 mm.

Light traffic: 100 mm.

Medium traffic: 150 mm.

**Control/contraction joints**

Spacing (maximum):

- Unreinforced slabs: 2 m.
- Light traffic:
  - . F52 reinforcing fabric: 3 m.
  - . F62 reinforcing fabric: 6 m.
- Medium traffic:
  - . F72 reinforcing fabric: 4 m.
  - . F82 reinforcing fabric: 6 m.

Depth: Full depth where constructed using formwork. 1/4 to 1/3 slab thickness where constructed by scoring the plastic concrete, using a proprietary crack-inducing device, or sawing set concrete.

Width: 3 mm.

Design: Tool off arrises to 6 mm radius.

**Placing**

General: Provide formwork for sides and stop ends.

Temperature limits: The temperature of the concrete when placed in the forms must be in the range 10 – 32°C. Do not place concrete when the shaded air temperature is less than 4°C.

Hot weather placing: If placing concrete in hot weather, avoid premature stiffening of the mix and reduce water absorption and evaporation losses. If the air temperature exceeds 32°C, place and compact the concrete as quickly as possible and then cover it with an impervious membrane or hessian kept wet.

**Isolation/expansion joints**

Location: Where slab wider than 1.5 m abuts rigid structures, at path intersections, over structural joints. Maximum 6 m spacing.

Design: Permit free movement of slab, and exclude foreign matter. Do not tool off joint arrises abutting the seal.

- Joint filler: 10 mm thick bitumen impregnated fibreboard.
- Joint depth: Full thickness of slab.

Access holes and pits at pavement edges: Thicken the slab 50 mm for 100 mm from the rigid structure (tapering 300 mm), and reinforce the panel(s) containing the rigid structure with F62 fabric.

**Other joints**

Dowelled joints: Formed or sawn joints reinforced with dowels and sealed.

Tied joints: Formed or sawn joints reinforced with tie bars.



Construction joints: Locate to coincide with control or isolation joints.

#### **Finishes**

Broom finishing: Wood float and broom, using a moistened nylon broom 500 mm wide, across the pavement to give an even textured slip-resistant surface with steel tooled margins. On gradients steeper than 10% roughen the surface by scoring across the slope at 50 mm centres.

Exposed aggregate finish: Steel trowel to a smooth surface. After final set use clean water and brushes to remove the surface film of mortar until the aggregate is uniformly exposed without under cutting of the matrix.

Sponge finish: After floating, produce an even textured sand finish by wiping the surface with a damp sponge.

Stamper pattern: Use a proprietary system.

Finished pavement surface: Uniform in appearance and free from depressions in which water can lie, with a texture depth of 2 - 2.5 mm.

#### **Tolerance**

Level: Over 3 m length of design profile,  $\pm 6$  mm.

#### **Coloured (anti glare) concrete**

Pave with ready mixed coloured concrete incorporating a synthetic colouring agent in controlled quantities for the whole thickness of the slab.

Mix proportion (based on "Bayer" or "Concrete Colour Systems" pigments): 5% (of grey cement by weight).

Finish: After screeding and floating, give the surface a coarse texture (anti-slip) by scoring with a broom across the surface.

Pigments (colours):

- - Red 110.
- - Chrome oxide green GN
- - Charcoal/black 330
- - Brown 655N

Colours: Refer Colour Schedule.

Samples: Supply sample blocks of concrete to be coloured with mineral oxides to the Person with full authority/Superintendent before construction.

- Number: 4
- Size: (nominal): 150 x 150 100 mm

### **4.3 SEGMENTAL PAVEMENTS**

#### **Base course thickness**

Foot and bicycle traffic: Not required.

Light traffic: 75 mm, but not required for Class A foundation.

Medium traffic:

- Class A foundation: 75 mm.
- Class S foundation: 100 mm.
- Class M foundation: 150 mm.

#### **Bedding sand course**

Thickness: Roughly uniform, maximum 30 mm after compaction. Do not disturb the bedding course before the units are laid.

#### **Mortar bedding course**

Over concrete base slabs: Lay units on a mortar bedding course at least 12 mm thick.

- Mix: 1:3 cement:sand.

#### **Resilient pad bedding**

150 mm diameter x 50 mm thick toughened fibre rubber pads.

#### **Geotextile fabric**

Fabric separation or drainage layer: Required.

**Placing**

Laying: After laying, tamp the units using a vibrating plate compactor.

**Joints**

Thickness: 3 mm nominal, except where spacer ribs are provided.

Dry joints: Fill the joints flush with clean, fine sand or screened bedding sand passing a 1.18 mm sieve, vibrated into the joints using a vibrating plate compactor.

Mortar joints: Fill the joints flush with mortar and trowel smooth. Clean pavement progressively to remove mortar smears and discolouration.

Open joints: Close butted, or spaced as required.

**Brick surface drains**

General: Form a brick surface drain consisting of a centre row of stretchers falling 1:100, and an outer row on each side of headers sloping into the centre at progressively varying rates of slope to form a dished drain section.

**4.4 ASPHALT PAVEMENTS****Subgrade**

Spray with a soil steriliser.

**Basecourse**

Surface: Firm, free of surface water, oils, greases, retarders, loose material, dust. Tack coat immediately before placing asphalt.

Tack coating: Bituminous emulsion spray, to the recommendations of AS 2734.

**Basecourse thickness table**

Load	Class A foundation	Class S or M foundation
Foot and bicycle traffic	50 mm	100 mm
Light traffic	100 mm	150 mm
Medium traffic	150 mm	200 mm

**Asphalt**

Mixing, laying and compaction: To the recommendations of AS 2734.

Mixes:

- AC10, 10 mm nominal maximum aggregate size.
- AC7, 7 mm nominal maximum aggregate size.
- AC5, 5 mm nominal maximum aggregate size.

Bitumen binder class: 170, except 320 for areas with high ambient temperature.

**Asphalt table**

Load	Asphalt and basecourse	Full depth asphalt	
	Class A, S or M foundation	Class A foundation	Class S or M foundation
Foot and bicycle traffic	25 mm AC5	50 mm AC5	75 mm AC5
Light traffic	30 mm AC10	75 mm AC10	100 mm AC10
Medium traffic	35 mm AC10	100 mm AC10	125 mm AC10

**Surface finish**

Finish: Dense, smooth, free of roller marks and loose material.

Compaction: While above 140°C.

Site density (minimum): 95% of the 50 blow Marshall density of the laboratory compacted mix.

Level tolerance:  $\pm 10$  mm.

**4.5 STABILISED GRAVEL PAVEMENTS****Laying**

General: Lay the mix damp but not wet, to finish 100 mm thick after compaction, with an even surface, flush with edgings where provided.

Compaction: Compact to achieve a dry density ratio of 95% when tested to AS 1289.5.4.1 (standard compaction).

**4.6 CRUSHED BRICK PAVEMENTS****Laying**

Compact to a finished thickness of at least 75 mm.

**4.7 LOG ROUNDEL PAVEMENTS****Laying**

Subgrade: Compact the subgrade to at least 85% of the modified maximum dry density.

Bedding: 50 mm compacted and watered sand.

Placing: Place the roundels tight butted to an even surface. Fill the interstices with sand. Firmly tamp down the sand and water in.

**4.8 EDGING****Lateral restraint to segmental pavements**

Perimeter: Provide edge restraints to bedding and units, where not provided by other structures.

**Log edging**

General: Excavate to lay logs at least half diameter into the ground. Fix the logs in position by spiking with two 13 mm diameter galvanized mild steel rods per log, penetrating at least 500 mm into the subgrade. Drive the rods flush with the upper surface of the log. Butt the logs together to a close neat fit. Select adjacent logs for similar diameter.

**Sawn timber edging**

General: Set edgings flush with adjoining surfaces to define planting, grass areas or both. Fix to pegs using galvanized nails, two per fixing. Drive pegs into the ground at 1200 mm centres on the planting side of the edging and on both sides of joints between boards, with peg tops 15 mm below the top of the edging.

Curving: Where the timber edge is to be curved, space the pegs to hold it to a uniform curve. Reduce edging thickness to 15 mm if required to enable it to be bent.

**Sleeper edging**

General: Fix sleepers in position by spiking with two 13 mm diameter galvanized mild steel rods per sleeper, penetrating at least 400 mm into the subgrade. Drive the rods flush with the upper surface of the sleeper. Arris the upper exposed sleeper edges to produce a 15 mm wide face at 45° to the edges.

**Concrete edging**

General: Place in a shallow trench between timber forms. Wood float finish flush with the adjacent finished grass level. Provide movement joints, filled with resilient bituminous material, at 3 m maximum centres.

**4.9 ASPHALTIC CONCRETE, GAMES COURTS****Base course material.****Bituminous Paving**

Proposed Job Mix

**Asphalt surfacing schedule**

Location	Nominal mix size	Combined aggregate grading	Binder content (%)	Layer thickness (mm)
Games Courts	10 mm (levelling course). 5 mm (surface course).	Fine		2 x 25

Surface Courses :

- - 25 mm thick leveling course (between base and surface course)
- - 25 mm thick surface course.

**KERBING (Jun/94)**

Material

- - Concrete. Specification reference IN SITU CONCRETE.

Width: 150 mm.

Depth: 150 mm.

Finish: After screeding and floating, give the surface a coarse texture (anti-slip) by scoring with a broom across the surface.

Surface: Flush with the surface level of the court.

**Expansion Joints**

4.5 mm intervals.

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**5 COMPLETION**

**5.1 MAINTENANCE**

**Segmental pavements**

Refill joints as required.

**Cleaning**

Leave pavements clean on completion.

**Final inspection**

Cracking in bound pavements: Width  $\leq$  1.5 mm.

Subsidence: Offset under 1.5 m length of the design profile,  $\leq$  15 mm.

Stepping: Between adjacent elements within the pavement area,  $\leq$  5 mm.

Chipping and spalling to pavement units: Maximum 10 per 100 units with chipped or spalled arrises.

Ponding: Maximum 10 mm deep 15 minutes after rain ceases.

## ROADBASE AND SUBBASE

**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **roadbase and subbase** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Site Preparation, Earthwork, Paving

**1.2 INTERPRETATION****Definitions**

Standard: To AS 1348.1.

Absolute level tolerance: Maximum deviation from design levels.

Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface.

**Rigid pavement**

Pavement construction in which the base consists of Portland cement concrete and the subbase consists of unbound materials, or cement treated materials, or lean mix Portland cement concrete.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Materials or areas of work ready for tests.
- Testing including proof rolling.
- Each pavement layer placed and compacted.
- Automatic level control devices in place.
- Subgrade material opened up so that its nature can be assessed.
- Prepared subgrade.
- Surfaces prepared for priming, sealing or surfacing.
- Placing subbase and base.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Process control tests**

Perform tests of the type and frequency necessary to adequately control the materials and processes used in the construction of the works. Tests described in the **Process control schedule** are the minimum requirement.

**Records**

Process control: Show the results of process control tests on control charts or graphs displayed on site in a readily accessible location and updated daily.

**Methods**

Use wet preparation methods where applicable.

**Sampling**

Process control tests: Determine timing and location.

Compliance assessment tests:

- Timing: Obtain materials samples at the time of delivery to the site.
- Location: Sample from selected sample sites within designated uniform test lots, consisting of an area placed, or compacted or both in one day. Test lots must be uniform in terms of material properties and density.

**Subgrade, subbase and base**

General: Test for compliance with the specified density, and for criteria given in the **Subbase tests table** and the **Base tests table**.

Density test methods:

- Field dry density: To AS 1289.5.3.1, AS 1289.5.3.5 or AS 1289.5.8.1. If using AS 1289.5.8.1 calibrate the surface moisture-density gauge in accordance with AS 1289.5.8.4 before use on the site.
- Standard maximum dry density: To AS 1289.5.1.1.
- Maximum vibrated dry density: To AS 1289.5.5.1.
- Compaction: To AS 1289.5.4.1 (% of standard maximum dry density).
- Modified maximum dry density: To AS 1289.5.2.1.

**Subbase tests table**

Property	Test method	Test criteria	
		Subbase class 1	Subbase class 2
Liquid limit	AS 1289.3.1.1	30% maximum	35% maximum
Plasticity index	AS 1289.3.3.1	9% maximum	12% maximum
Linear shrinkage	AS 1289.3.4.1	5% maximum	6% maximum
Wet strength	AS 1141.22	80 kN minimum	50 kN minimum
Wet/dry strength variation	AS 1141.22	45% maximum	60% maximum
Unconfined cohesion	AS 1141.52	1 Mpa minimum	1 MPa minimum

**Base tests table**

Property	Test method	Test criteria
Liquid limit	AS 1289.3.1.1	25% maximum
Plasticity index	AS 1289.3.3.1	6% maximum
Linear shrinkage	AS 1289.3.4.1	3% maximum
Flakiness index	AS 1141.15	35% maximum
Wet strength	AS 1141.22	100 kN minimum
Wet/dry strength variation	AS 1141.22	35% maximum
Unconfined cohesion	AS 1141.52	1.7 MPa minimum

**Acceptance criteria**

Each section of the subgrade or unbound pavement layer required to be tested must meet the criteria in the **Density acceptance criteria table**.

**Density acceptance criteria table**

Number of tests	Maximum number of results below the required density ratio		
	0 - 2% below	1 - 2% below	More than 2% below
0 - 5	1	1	Nil
6 - 10	2	1	Nil
11 or more	20%	10%	Nil

**2.3 SAMPLES****General**

Samples: Submit samples of the following at least one month before use in the works:

- Granular materials: One 50 kg sample of each proposed type and size of material including base, subbase and cement treated subbase.

**Identification**

Attach a tag to each sample showing relevant information including description, source and nominal size of material.

**2.4 SUBMISSIONS****Tests**

Compliance assessment: If compliance assessment tests are to be carried out by an independent testing authority, have the authority submit 3 copies of each test result.

Certificate of compliance: If a certificate of compliance is acceptable as an alternative to testing a manufactured material, submit the manufacturer's certificate together with the results of recent tests undertaken by the manufacturer, showing compliance with test criteria.

**Materials**

Delivery dockets: Submit a delivery docket at the time and place of delivery for each truckload of subbase and base material, showing

- empty and loaded mass of vehicle;
- date and time of batching;
- supplier and location of mixing plant;
- registration number of the vehicle; and
- nature of material.

**Execution**

General: Submit proposals for the methods and equipment to be used for the roadworks, including the following:

- Staging of the work, access and traffic control methods.
- Disposal of surface water, control of erosion, contamination and sedimentation of the site, surrounding areas and drainage systems.
- Methods and equipment for each operation.
- Sources of materials.
- Material stockpiles.

Cement treated materials: Submit proposed method of mixing.

Compaction: If it is proposed that a layer is to exceed 150 mm in thickness, submit evidence demonstrating that the proposed compaction equipment can achieve the required density throughout the layer.

**Records of measurement**

Submit certified records of work performed as required by the Principals Authorised Person

**3 MATERIALS****3.1 BASE AND SUBBASE MATERIALS****Material properties**

Specified properties of materials apply to their condition as installed in the completed works. If it is expected that properties will change significantly during construction, adjust the delivered material accordingly.

**Source material**

Type: Crushed rock or natural gravel consisting of hard, dense, durable particles of uniform quality, free from deleterious materials or coatings including clay and organic matter, and containing at least 1% disintegrated, weathered, discoloured, soft, fractured, friable or poorly indurated fragments.

River stones: If the material is produced by crushing rounded river stones, 75% of the particles larger than 9.5 mm must have at least 2 fractured faces.

**Base material**

Type: Crushed rock, free from sand, complying with **Base particle size distribution table**. Determine particle size distribution after compaction in the pavement. Crusher run or screened and recombined materials are acceptable.

**Base particle size distribution table**

Sieve aperture (mm)	Percentage passing (by mass)
26.5	100
19.0	95 – 100
13.2	78 – 92
9.5	63 – 83
4.75	44 – 64
2.36	30 – 48
0.425	14 – 22
0.075	6 – 10

**3.2 SUBBASE****Subbase material**

Type: Crushed rock or suitable natural gravels complying with the distribution types specified in **Subbase particle size distribution table**. Determine particle size distribution after compaction in the pavement.

**Particle size distribution**

Mixing: Do not mix materials to produce a specified grading.

Grading separation: Place materials of different gradings or from different sources in separate layers or separate sections of the work.

Fines ratio: The percentage passing the 0.075 mm sieve must be # 67% of the percentage passing the 0.425 mm sieve.

**Subbase particle size distribution table**

Sieve aperture (mm)	Percentage passing (by mass) for particle size distribution class				
	A	B	C	D	E
53.0	100				
37.5	85-100	100			
26.5	70 - 90	80 - 100	100		
19.0	60 - 80	70 - 90	85 – 100	100	
13.2	48 - 72	58 - 80	70 – 90	85 - 100	
9.5	42 - 66	48 - 72	60 – 80	70 - 90	100
4.75	28 - 55	32 - 60	42 – 65	48 - 72	70 - 90
2.36	20 - 44	23 - 47	28 – 50	34 - 60	48 - 72
0.425	9 - 20	10 - 27	14 – 24	14 - 34	19 - 42



Sieve aperture (mm)	Percentage passing (by mass) for particle size distribution class				
	A	B	C	D	E
0.075	4 - 8	4 - 16	5 - 10	6 - 20	9 - 25

**Other required properties**

Classify gradings of subbase material either Subbase class 1 or Subbase class 2 as described in the **Subbase tests table**.

**Unsealed base and shoulder**

Subbase class 1:

- Plasticity index: 4% minimum.
- Unconfined cohesion: 2.8 MPa minimum.

**3.3 CEMENT TREATED MATERIALS****Cement treated subbase**

Cement type to AS 3972: GP.

- Tolerance:  $\pm 0.3\%$ .

**Mixing**

Mix cement and water with the subbase material in mixing plant before placing the material. Provide mixes which are consistently uniform and of the required proportions and moisture content.

**Particle size distribution**

Provide the distribution before mixing with cement as described in the **Cement treated materials particle size distribution table**.

**Cement treated materials particle size distribution table**

Sieve aperture (mm)	Percentage passing (by mass) for particle size distribution type:		
	B	C	D
37.5	100		
26.5	80 - 100	100	
19.0	70 - 90	85 - 100	100
13.2	58 - 80	70 - 90	85 - 100
9.5	48 - 72	60 - 80	70 - 90
4.75	32 - 60	42 - 65	48 - 72
2.36	23 - 47	28 - 50	34 - 60
0.425	10 - 27	14 - 24	14 - 34
0.075	4 - 16	5 - 10	6 - 20

**4 SUBGRADE, SUBBASE AND BASE****4.1 TOLERANCES****Surface level**

General: Provide a finished surface which is free draining and evenly graded between level points.

Edges abutting gutters: Within  $\pm 5$  mm of the level of the actual gutter edge.

Tolerances: The tolerances in the **Surface level tolerances table** apply to the finished level of each layer, unless overridden by the requirements (including tolerances) for the finished level and thickness of the surface course.

**Surface level tolerances table**

Item	Level tolerance:	
	Absolute	Relative
Cut subgrade in earth and fill subgrade	+ 0 mm - unspecified	20 mm
Cut subgrade in rock	+ 0 mm - unspecified	unspecified

Item	Level tolerance:	
	Absolute	Relative
Subbase surface	+ 5 mm	10 mm - 10 mm
Lean mix concrete subbase surface	± 10 mm	5 mm
Base surface	+ 5 mm - 20 mm	10 mm - 20 mm

**Compacted layer thickness**

Subbase and base (individual layers and total thickness): + unspecified, - 10 mm.

**4.2 SUBGRADE PREPARATION****General**

Trim the subgrade to an even surface free from loose material.

**Subgrades affected by moisture**

Where the subgrade is unable to support construction equipment, or it is not possible to compact the overlying pavement because of a high subgrade moisture content, perform one or more of the following:

- Allow the subgrade to dry until it will support equipment and allow compaction.
- Scarify the subgrade to a depth of 150 mm, work as necessary to accelerate drying, and recompact when the moisture content approximates the optimum.
- Excavate the wet material and remove to spoil.

**Draining depressions**

General: Grade depressions to drain to the edge of the formation.

Rock subgrades: In rock subgrades, drain depressions with subgrade drains at least 150 mm wide, backfilled with coarse filter, and connected to the stormwater system or to longitudinal subsoil drains.

**Unsuitable material**

Remove roots, boulders, silt, organic matter and other unsuitable materials.

**Backfilling**

Select filling: Replace over-excavation, including excavation for grub holes and removal of wet or unsuitable material, with granular material complying with the following:

- Maximum particle size: 75 mm.
- Proportion passing 0.075 mm sieve: 25% maximum.
- Plasticity index:  $\geq 2\%$ ,  $\leq 15\%$ .

Subbase material: In cut subgrades, if over-excavation, other than excavation to remove unsuitable material, requires a replacement layer less than 100 mm thick, do not backfill, but make good by increasing the thickness of the lowest pavement layer.

Coarse filter: Backfill rock depressions and subgrade drains with coarse subsoil filter.

**4.3 COMPACTION****Fill subgrades**

Maximum particle size of material in the top 150 mm: 75 mm.

**Subgrade compaction**

Dry density ratios: Compact the subgrade and backfilling to achieve the following:

- Cut subgrades in earth and fill subgrades (to a depth of 300 mm): 100%.
- Fill subgrades below 300 mm: 98%.
- Replacement of over excavation or unsuitable subgrade material: 100%.
- Backfilling grub holes: 100%.

**Proof rolling**

Proof roll the subgrade using a smooth steel-wheeled roller of at least 10 t mass. Fill or replace depressions or soft spots developed on the subgrade during proof-rolling and continue rolling until uniform compaction is obtained.

**Subbase and base compaction**

Dry density ratios: Compact each layer to achieve the following:

- Subbase: 100%.
- Cement treated subbase: 100%.
- Base: 100%.

Cement treated material: Begin compacting immediately after spreading and complete it in a continuous operation not more than 2 hours after the cement and water have been mixed into the material.

**Compaction requirements**

Apply uniform and sufficient compactive effort over the whole area to be compacted. Use rollers appropriate to the materials and compaction requirements.

**Layer thickness**

General: Compact the material in layers of 100 - 150 mm compacted thickness. Within these limits, provide layers of the same material in multi-layer courses which are of equal thickness.

**Moisture content**

General: During spreading and compaction, maintain materials at the optimum moisture content (standard compaction) appropriate to each material.

Tolerances:

- Cement treated subbase:  $\pm 2\%$ .
- Base:  $+ 1\%$ ,  $- 2\%$ .

**Moisture control**

General: Moisten prepared subgrades and preceding layers of subbase immediately before spreading subbase or base material. Keep the leading edges of subbase or base material moist until new material is added next to it. Do not wash fines from the subbase or base material.

Spraying: Maintain moisture content. Use water spraying equipment capable of distributing water uniformly in controlled quantities over uniform lane widths.

Cement treated material: Keep the compacted surface of each layer moist by watering until covered by further material or a bituminous curing seal. Apply bitumen emulsion or cut back bitumen to the final surface as soon as possible after the completion of compaction and in any case after not more than 8 hours.

**Rectification**

If a section of subgrade or pavement material fails to meet the required density or moisture content after compaction, rectify as follows:

- Fill subgrades: Remove the non-complying material, replace with fill material as specified in *Subgrade preparation*, and recompact.
- Cut subgrades: Rework the material and recompact.
- Pavement material: Remove the non-complying material, replace with new pavement material, and recompact.

**Level corrections**

Rectify incorrect levels as follows:

- High areas, unbound layers: Grade off.
- High areas, bound layers: Remove to the full depth of the layer, replace with new cement-treated material, and recompact.
- Low areas: Remove bound layers to the full depth and unbound layers to a minimum depth of 75 mm, replace with new material and recompact.

**4.4 PLACING BASE AND SUBBASE****General**

Weak surfaces: Do not place material on a surface which has been so weakened by moisture that it will not support, without damage, the constructional plant required to perform the work.

Spreading: Spread material in uniform layers without segregation, by direct tipping from suitable vehicles or using a mechanical spreader.

Segregation: Do not tip materials in heaps and then spread by grader. If material becomes segregated, remix using a rotary hoe or other suitable equipment.

Moisture content: Maintain wet mixed materials at the required moisture content before and during spreading. Add water to dry mixed materials through fine sprays to the entire surface of the layer after spreading, to bring the material to the required moisture content.

Layer thickness: 100 - 150 mm (after compaction). Provide equal layers in multilayer courses.

**Joints**

Plan spreading and delivery to minimise the number of joints. Offset joints in successive layers by at least 300 mm.

**Cement treated subbase**

Joints: Make longitudinal and transverse joints, as specified in *Junctions with existing pavements*,

- at the end of each day's work;
- where spreading has been halted for more than 2 hours; and
- where required.

**4.5 JUNCTIONS WITH EXISTING PAVEMENTS****General**

Trimming: Where the pavement is to be joined to an existing pavement remove a strip of the existing pavement at least 300 mm wide for its full depth and trim the edge to an angle of approximately 45° in steps of maximum height 150 mm before placing new pavement material.

**4.6 FINISHING BASE SURFACES****Surfaces to be primed**

Produce a tight even surface without loose stones or a slurry of fines. Construct the fine crushed rock surface slightly higher than the required levels and cut it to profile using a power grader towards the end of the compaction process.

**Disposal of cuttings**

Cuttings from the surface may be used in fills or elsewhere in the works.

**ASPHALT ROAD SURFACING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **asphalt road surfacing** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Roadbase and Subbase

**1.2 STANDARD****General**

Hot-mixed asphalt: To AS 2150.

**1.3 INTERPRETATION****Definitions**

Standard: To AS 1348.1.

Absolute level tolerance: Maximum deviation from design levels.

Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface.

Relative compaction: The ratio between the field bulk density and the bulk density of the job mix when compacted in the laboratory.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Materials or areas of work ready for tests.
- Testing including proof rolling.
- Each pavement layer placed and compacted.
- Automatic level control devices in place.
- Surface prepared for priming, sealing or asphalt surfacing.
- Commencement of asphalt surfacing.

**Hold points**

As advised by the Principals Authorised Person

## 2.2 MIX TESTS

### Process control tests

Perform tests of the type and frequency necessary to adequately control the materials and processes used in the construction of the works. Tests described in the **Process control schedule** are the minimum requirement.

### Records

Process control: Show the results of process control tests on control charts or graphs displayed on site in a readily accessible location and updated daily.

### Methods

Use wet preparation methods where applicable.

### Sampling

Process control tests: Determine timing and location.

Compliance assessment tests:

- Timing: Obtain materials samples at the time of delivery to the site.
- Location: Sample from selected sample sites within designated uniform test lots, consisting of an area placed, or compacted or both in one day. Test lots must be uniform in terms of material properties and density.
- Sample preparation: To AS 2891.2.1 and AS 2891.2.2, as applicable

### Mix properties

Take samples from trucks at the mixing plant and test for mix properties using one of the following methods as applicable:

- Tar mixes: To AS 2891.4.

### Marshall stability of compacted mix

Compactive effort: 50 - blow.

### Variations in mix properties

Ensure that the maximum variation between the mix property of each sample and the job mix value is in accordance with the **Mix property table**.

#### Mix property table

Mix property	Maximum variation from job mix value
Aggregate passing 4.75 mm sieve or larger	± 4% by mass
Aggregate passing 2.36 to 0.3 mm sieves	± 3% by mass
Aggregate passing 0.15 mm sieve	± 2% by mass
Aggregate passing 0.075 mm sieve	± 1% by mass
Bitumen content	± 0.3% by mass
Added filler content	± 0.5% by mass
Mixing temperature	± 10°C

## 2.3 COMPACTION TESTS

### Density tests

General: Perform a field bulk density test for each test site either

- on a core sample taken from the asphalt surfacing layer; or
- if the nominal layer thickness is  $\geq 50$  mm, measured in situ using a nuclear gauge.

Sample preparation: To AS 2891.2.1 and AS 2891.2.2, as applicable.

Characteristic value of relative compaction: Calculate the value of relative compaction using the formulae in the **Relative compaction table**, in which X and S are the mean and the standard deviation, respectively of the individual relative compaction test values for the lot.

#### Relative compaction table

Number of tests per lot	Characteristic value
6	$X - 0.92S$

Number of tests per lot	Characteristic value
10	$X - 0.88S$

**Acceptance criteria**

The relative compaction of each lot of pavement must meet the criteria of the **Asphalt compaction acceptance criteria table**.

**Asphalt compaction acceptance criteria table**

	Test criteria scale	
	A	B
Number of test sites per lot:		
- Core sample tests	6	3
- Nuclear gauge tests	10	5
Lot value for relative compaction	Characteristic value	Mean value
Minimum value:		
- Layer thickness up to 50 mm	96%	94%
- Layer thickness 50 mm or more	96%	96%

**2.4 SAMPLES****General**

Submit samples of the following at least one month before use in the works:

- Granular materials: One 50 kg sample of each proposed type and size of asphalt aggregate and cover aggregate.

**Identification**

Attach a tag to each sample showing relevant information including description, source and nominal size of material.

**2.5 SUBMISSIONS****Tests**

Compliance assessment: If compliance assessment tests are to be carried out by an independent testing authority, have the authority submit 3 copies of each test result.

Certificate of compliance: If a certificate of compliance is acceptable as an alternative to testing a manufactured material, submit the manufacturer's certificate together with the results of recent tests undertaken by the manufacturer, showing compliance with test criteria.

**Materials**

Proposed job-mix: Submit the following details before commencing production:

- Combined aggregate particle size distribution.
- Binder content expressed as a percentage of the total mix.
- The filler content expressed as a percentage by mass of the combined aggregates.
- The asphalt mix properties.
- The proposed mixing temperature.

Delivery dockets: Submit a delivery docket at the time and place of asphalt mix delivery showing

- empty and loaded mass of the vehicle;
- date and time of loading;
- supplier and location of mixing plant;
- registration number of the vehicle;
- size and type of asphalt mix;
- class of binder;
- temperature of load at mixing plant; and

- laboratory stamp or other mark certifying compliance with the specified properties.

**Execution**

General: Submit proposals for the methods and equipment to be used for the roadworks, including the following:

- Staging of the work, access and traffic control methods.
- Disposal of surface water, control of erosion, contamination and sedimentation of the site, surrounding areas and drainage systems.
- Methods and equipment for each operation.
- Sources of materials.
- Material stockpiles.

**Records of measurement**

Submit certified records of work performed as follows:

**3 MATERIALS****3.1 ASPHALT MATERIALS****Asphalt materials**

Primer: Medium cut back bitumen to AS 2157, containing no fluxing oil.

Tack coat mix: 3:2 bitumen emulsion:water.

Bitumen emulsion: To AS 1160.

- Designation: ARS/170-60.

**Coarse aggregate**

Standard: To AS 2758.5.

Type: Clean, sound, hard, angular, of uniform quality, free from deleterious matter.

Crushed slag: Air-cooled blast furnace slag of uniform quality, generally free from vesicular, glassy or other brittle pieces.

**Fine aggregate**

Type: Clean, sound, hard, durable particles of natural sand or particles derived from crushed stone, gravel or slag, free from injurious coating or particles of clay, silt, loam or other deleterious matter.

**Aggregate properties table**

Property	Test method	Value
Particle shape	AS 1141.14	≤ 25 for wearing course ≤ 30 for binder course and corrective course
Wet strength	AS 1141.22	≥ 50 kN
Wet/dry strength variation	-	≤ 35%

**Binder**

Type: Bitumen binder, class 170.

**Combined aggregate grading**

Provide a quantity of mineral filler at least 2% by mass of the combined aggregates.

**3.2 ASPHALT MIX DESIGN****Requirements**

General: Design the asphalt mix using the Marshall method.

**Mix properties**

Marshall stability: 4.5 kN minimum.

Marshall flow: 4.5 mm maximum.

Voids in total mix (maximum theoretical density based on apparent specific gravity of aggregates):

- Wearing courses: 3% - 5%.
- Binder courses and 7 mm mixes: 4% - 6%.



Voids in aggregate filled with bitumen:

- Wearing courses: 75% - 85%.
- Binder courses and 7 mm mixes: 70% - 80%.

#### 4 ASPHALT SURFACING

##### 4.1 TOLERANCES

###### Surface level

General: Provide a finished surface which is free draining and evenly graded between level points.

Edges abutting gutters: Within  $\pm 5$  mm of the level of the actual gutter edge.

Tolerances: The tolerances in the **Asphalt surface level tolerances table** apply to the finished level of each layer, unless overridden by the requirements (including tolerances) for the finished level and thickness of the surface course.

###### Asphalt surface level tolerances table

Item	Level tolerance:	
	Absolute	Relative
Longitudinal direction	$\pm 10$ mm	5 mm
Transverse direction	$\pm 10$ mm	10 mm

###### Thickness

Asphalt surface course: The following tolerances apply to variations in the compacted layer thickness from the specified thickness:

- Any one sample: + 10 mm, - 5 mm.
- The mean thickness of the core samples in a lot: + unspecified, - 0.

##### 4.2 PREPARATION

###### Cleaning

Immediately before priming or tack coating remove loose stones, dust and foreign material from the base surface using a power broom or blower. Keep traffic off the cleaned surface.

###### Protection

Protect adjacent surfaces during spraying. Protect freshly sprayed surfaces from contamination.

###### Priming

Timing: Prime the base surface as soon as possible after compaction and finishing.

###### Potholes

Trim to a regular shape and a uniform depth of at least 75 mm, tack coat the edges and patch with asphaltic concrete.

##### 4.3 TACK COATING

###### Tack coating

Apply tack coat 30 - 120 minutes before asphalt surfacing is placed. Cover the surface uniformly at an application rate of 0.10 - 0.30 L/m<sup>2</sup> of residual bitumen.

##### 4.4 SPREADING

###### Spreading

Preconditions: Place asphalt surfacing in dry weather on a dry pavement surface at a pavement temperature of at least 10°C.

Operations: Spread the mix in layers covering the full width of the pavement, or, in the case of carriageways and wide pavements, in lanes of minimum width 3 m. Place layers in adjoining lanes to the same compacted thickness.

##### 4.5 COMPACTING

###### Compaction

Before commencing compaction, correct any irregularities in line or level. Trim lane edges to a straight line. Compact asphalt surfacing uniformly as soon as it will

support rollers without undue displacement, and complete rolling while the mix temperature is above 80°C.

**Surface finish**

Provide a surface uniform in appearance and free from depressions in which water can lie.

**4.6 JOINTS****Joints**

General: Minimise the number of joints. Make joints that are well bonded and sealed and provide a smooth riding surface across the joint.

Transverse joints: Construct a transverse joint if the operation is stopped for more than 20 minutes or the pavement temperature falls below 90°C. Construct to a straight vertical face for the full depth of the layer, and offset in adjoining spreader runs and layer to layer by at least 2 m.

Longitudinal joints: Offset joints from layer to layer by at least 150 mm. Position longitudinal joints in the wearing course to coincide with the lane line.

Edges: Form exposed edges of each spreader run while hot to a straight line with a dense face inclined between vertical and 45°.

Cold joints: Tack coat the surface of cold longitudinal and transverse joint before placing the adjoining asphalt.

**Abutting structures**

Place asphalt surfacing to match the level of abutting surfaces such as kerbs, gutters, edge strips, manholes, or adjoining pavement in the same manner as for longitudinal and transverse joints. Fill spaces left unfilled between the spreader run and abutting edges with sufficient material to the proper height before compaction.

**Matched junctions**

General: If asphalt surfacing is to match an existing pavement, bridge deck, rail or other fixture, place the material to provide a smooth riding surface across the junction. Where necessary, remove sufficient of the existing pavement for this purpose. Where it is necessary to taper the thickness of a layer to provide a smooth riding junction, terminate the layer at a chase cut into the existing pavement about 20 mm deep and 400 mm wide. Where necessary, remove coarse particles from a layer of tapering thickness using hand raking.

Tack coat: Where the thickness of the layer tapers to less than twice the nominal size of the mix, tack coat the area upon which material of such thickness is to be placed uniformly at an application rate 0.50 - 0.75 L/m<sup>2</sup>.

**Surface finish**

Provide a surface uniform in appearance and free from depressions.

**4.7 DEFECTIVE SURFACING****Defective compaction**

Minimum criteria for retention:

- Characteristic value of relative compaction of the lot:  $\geq 90\%$ .
- Mean of the individual relative compaction test values of the lot:  $\geq 90\%$ .

**Defective layer thickness**

Minimum criterion for retention:

- Mean thickness of the core sample in the lot:  $\leq 10$  mm below the required layer thickness.

**Rejection**

Extent: Remove areas of rejected asphalt surfacing, including defective joints and finish, to the full depth of the layer, and replace with complying pavement.

Joints: Treat edges of remedial work as specified for cold joints.

**5 COMPLETION****5.1 COMPLETION****Traffic on pavement**

Give notice before opening the pavement to traffic before the work is completed. Provide adequate means of protection.

**SPRAYED BITUMINOUS ROAD SURFACING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **sprayed bituminous road surfacing** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Asphalt Road Surfacing

**1.2 INTERPRETATION****Definitions**

Standard: To AS 1348.1.

Absolute level tolerance: Maximum deviation from design levels.

Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Materials or areas of work ready for tests.
- Testing including proof rolling.
- Each pavement layer placed and compacted.
- Automatic level control devices in place.
- Surfaces prepared for priming, sealing or surfacing.
- Commencement of bituminous spraying.

**Hold points**

As advised by the Principals Authorised Person

**2.2 TESTS****Process control tests**

Perform tests of the type and frequency necessary to adequately control the materials and processes used in the construction of the works.

**Records**

Process control: Show the results of process control tests on control charts or graphs displayed on site in a readily accessible location and updated daily.

**Methods**

Use wet preparation methods where applicable.

**Sampling**

Process control tests: Determine timing and location.

Compliance assessment tests:

- Timing: Obtain materials samples at the time of delivery to the site.
- Location: Sample from selected sample sites within designated uniform test lots, consisting of an area placed, or compacted or both in one day. Test lots must be uniform in terms of material properties and density.

**2.3 SAMPLES****General**

Submit samples of the following at least one month before use in the works:

- Granular materials: One 50 kg sample of each proposed type and size of cover aggregate.

**Identification**

Attach a tag to each sample showing relevant information including description, source and nominal size of material.

**2.4 SUBMISSIONS****Tests**

Compliance assessment: If compliance assessment tests are to be carried out by an independent testing authority, have the authority submit 3 copies of each test result.

Certificate of compliance: If a certificate of compliance is acceptable as an alternative to testing a manufactured material, submit the manufacturer's certificate together with the results of recent tests undertaken by the manufacturer, showing compliance with test criteria.

**Execution**

General: Submit proposals for the methods and equipment to be used for the roadworks, including the following:

- Staging of the work, access and traffic control methods.
- Disposal of surface water, control of erosion, contamination and sedimentation of the site, surrounding areas and drainage systems.
- Methods and equipment for each operation.
- Sources of materials.
- Material stockpiles.

Spraying equipment: Submit a current certificate and calibration chart issued by the state road authority.

Hand spraying: If intended, submit proposals.

Spraying: Submit proposals for start, finish and width of each spray run.

**Bituminous surfacing records**

Submit certified records of the work carried out as requested by the Principals Authorised Person.

**Records of measurement**

Submit certified records of work performed.

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**3 MATERIALS****3.1 MATERIALS****Material grades**

Bitumen: To AS 2008.

Bitumen emulsion: To AS 1160.

Primer and primer binder: Medium cut back bitumen to AS 2157, containing no fluxing oil.

Cut back bitumen grade: To suit the prepared surface and the weather conditions.

**Cover aggregate**

Standard: To AS 2758.2.

Particle size distribution:

Stockpiling: Stockpile aggregates on site at least 2 weeks before commencing sealing operations.

### 3.2 MEASURING MATERIALS

#### Bitumen and cutter

General: Measure by volume at 15°C.

Temperatures higher than 15°C: Use the *Bitumen volume conversion formula* for primers and binders, where T is the temperature of the material at which the volume has been measured. For calculation purposes, assume that the conversion factors are the same for bitumen, bituminous mixes and cutter.

Bitumen volume conversion formula: Volume at 15°C = Volume at T°C x (1-(T-15)/1667).

## 4 SURFACING

### 4.1 TOLERANCES

#### Finished levels

General: Provide a finished surface which is free draining and evenly graded between level points.

Edges abutting gutters: Within ± 5 mm of the level of the actual gutter edge.

### 4.2 PRECOATING

#### Preconditions

Prime and seal in dry and reasonably calm weather, on a dry pavement surface at a temperature of at least 15°C.

#### General

General: Precoat sealing aggregates immediately before the aggregate is loaded into the spreader trucks.

7 mm cover aggregate: Precoat at least 48 hours in advance of spreading.

#### Precoating agents

General: Provide precoating agents which have satisfied plate stripping tests with the binder and aggregate.

#### Application

General: Apply precoating agent thinly and evenly using a fine pressure spray to a moving stream of aggregate, or by other suitable means, so that particles are fully coated but without excess material.

Wet aggregate: If the aggregate is too wet to precoat, or contains enough moisture to cause uneven distribution of the precoating agent, dry the aggregate by turning the stockpile over. Do not provide precoated aggregate containing moisture until the moisture has evaporated and the precoating agent has adhered efficiently.

Application rate: In the range 3 - 10 L/m<sup>3</sup> of aggregate.

### 4.3 CUTTING BITUMEN

#### Generally

Heat sufficient bitumen for immediate needs only. Do not keep the material at spraying temperature for longer than 10 hours. Do not reheat.

#### Mixing and heating (on site)

Heat the bitumen at a rate not exceeding 40°C/h, and circulate cutback bitumen for 20 minutes to ensure thorough mixing.

#### Heating devices

Use devices capable of uniform heating without damaging bituminous materials.

### 4.4 SPRAYING EQUIPMENT

#### Hand spraying

Areas not accessible to the mechanical sprayer: Spray using hand spray equipment attached to the mechanical sprayer.

### 4.5 PREPARATION FOR SPRAYING

#### Cleaning

General: Immediately before spraying remove loose and foreign material on the finished base surface, including dust, debris and sand spread on primed surfaces, and until a mosaic of well embedded stone shows on the surface. Keep traffic off the cleaned surface.

Method: Use suitable power blowers or power brooms (or using hand methods where inaccessible to the power equipment).

#### Potholes

Trim to a regular shape and a uniform depth of at least 75 mm. Tack coat the sides, and patch with a suitable bituminous premix, sanded after completion. Allow sufficient time for the premix to cure before spraying the surface.

### 4.6 SPRAYING OPERATIONS

#### Protection

Protect adjacent surfaces during spraying. Place drip trays under spray bars when the sprayer is stationary. Clean bituminous materials from adjacent surfaces or, if this is not possible, replace and make good the surface. Protect freshly sprayed surfaces from contamination.

#### Spraying generally

Completely and uniformly cover the surface to be treated. Prevent the spray overlapping previously treated areas, except that where part-width spraying is used, lap the longitudinal joint between adjacent runs by 50 mm.

#### Priming

Spraying temperature:

- Grade AMC1 primer: In the range 60 – 80°C.

Edges: At unkerbed edges, extend the primer 150 mm beyond the edge of the seal.

#### Sealing and primersealing

Process: Allow at least 3 days between priming and sealing and between first and second seals. Incorporate the first course of aggregate thoroughly into the binder before a second course is applied. Remove loose particles from the sealed area by sweeping lightly, without disturbing embedded aggregate.

Spraying temperature ranges:

- Bitumen without cutter: 160 – 190°C.
- Primerbinder Grade AMC3: 95 - 115°C.
- Bitumen emulsion binder: Ambient temperature.

#### Application rates

Comply with the Sprayed bituminous road surfacing schedule.

#### Sprayed bituminous road surfacing schedule

Operation	Primer or binder			Cover aggregate	
	Material	Grade or class	Application rate at 15°C (L/m <sup>2</sup> )	Size (mm)	Application rate at 15°C (m <sup>2</sup> /m <sup>3</sup> )
Priming	Primer	AMC1	1.0	-	-
Primersealing	Primerbinder	AMC3	1.5	7	100
				10	80
First sealing	Residual bitumen binder		1.0	14	80
Second sealing	Residual bitumen binder		0.5	7	160
Single sealing/resealing	Residual bitumen binder		0.75	10	120
			1.6	20	60
Bituminous emulsion sealing	Bituminous emulsion		1.1	7	160
			1.4	10	120

### 4.7 PLACING COVER AGGREGATE

#### Placing cover aggregate

Spreading: Immediately after the binder or primerbinder has been sprayed, cover with a uniform layer of dry aggregate.

Rolling: Immediately after spreading roll and drag broom the area until it is uniformly covered with aggregate thoroughly embedded in the binder. Roll

uniformly over the whole area. Complete rolling as soon as possible but not later than 3 days after spraying.

**Steel rolling**

Roll using a maximum of two coverages of a steel-wheeled roller of maximum axle load 5 t. Discontinue steel rolling if aggregate shows signs of breaking down.

**Pneumatic tyred rolling**

Roller: After steel rolling, roll the area using a pneumatic-tyred roller of minimum mass 10 t and with tyre pressures adjustable in the range 550 - 700 kPa.

Rolling:

- Minimum rate: 4 roller hours per 4500 L of binder or primerbinder sprayed.
- Timing: At least one roller pass within 2 minutes of covering, over the whole of the area. After an initial slow pass increase the speed of rolling to the maximum practicable for the area being sealed. Complete at least 25% of the rolling within 2 hours of covering, and 50% within 24 hours of covering. Roll during daylight hours.

**Loose aggregate**

When the aggregate has been evenly spread and embedded, remove loose particles remaining on the pavement and apply additional aggregate as required.

**Surface finish**

Provide an even, smooth riding and free draining surface.

**4.8 DEFECTIVE SURFACING****Primer**

Actual rate of application < 90% of that ordered: Make up the deficiency with a second spray run.

Actual rate of application > 110% of that ordered: Cover the surface with sand.

**Binder and primerbinder**

Actual rate of application < 90% or > 110% of that ordered: Reseal the surface.

**Minimum criteria for retention**

Actual rate of application: 90 - 110% of that ordered.

**4.9 JUNCTIONS WITH EXISTING PAVEMENTS****Junctions with existing pavements**

Pavement base: Protect using a suitable temporary seal or primerseal.

Primed surface: Keep traffic off the primed surface for at least 3 days after spraying. Commence sanding 4 - 24 hours after spraying.

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**5 COMPLETION****5.1 COMPLETION****Traffic on pavement**

Give notice before opening the pavement to traffic before the work is completed. Provide adequate means of protection.

**CONCRETE ROAD SURFACING****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **concrete road surfacing** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following worksections:

Roadbase and Subbase

**1.2 STANDARDS****General**

Materials and construction: To AS 3600.

Concrete: To AS 1379.

**1.3 INTERPRETATION****Definitions**

Standard: To AS 1348.1.

Absolute level tolerance: Maximum deviation from design levels.

Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface.

**2 QUALITY****2.1 INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Materials or areas of work ready for tests.
- Testing including proof rolling.
- Each pavement layer placed and compacted.
- Automatic level control devices in place.
- Concrete formwork, reinforcement and dowels in position.
- Commencement of concrete placing.



**Hold points**

As advised by Principals Authorised Person

**2.2 TESTS****Process control tests**

Perform tests of the type and frequency necessary to adequately control the materials and processes used in the construction of the works. Tests described in the **Process control schedule** are the minimum requirement.

**Records**

Process control: Show the results of process control tests on control charts or graphs displayed on site in a readily accessible location and updated daily.

**Methods**

Use wet preparation methods where applicable.

**Sampling**

Process control tests: Determine timing and location.

Compliance assessment tests:

- Timing: Obtain materials samples at the time of delivery to the site.
- Location: Sample from selected sample sites within designated uniform test lots, consisting of an area placed, or compacted or both in one day. Test lots must be uniform in terms of material properties and density.

**Concrete testing generally**

Standard: To AS 1379, including Appendix B, and the requirements for project assessment.

**Concrete testing**

Dissemination of production information: If concrete is manufactured off site, register the project in accordance with AS 1379 clause B6.4.

**Trial mix**

Prepare a trial mix of the proposed mix design, to AS 1012.2. Test the trial mix for the following properties:

- Properties related to consistency: To AS 1012.3.1, AS 1012.3.2, AS 1012.3.3 and AS 1012.3.4..
- Air content: To AS 1012 Part 4.1, 4.2 or 4.3, as appropriate.
- Mass per unit volume: To AS 1012.5.
- Compressive strength: To AS 1012.9. Prepare at least 8 specimens to AS 1012.8.1. Test at least 2 specimens after 7 days and the remainder after 28 days.
- Modulus of rupture: To AS 1012.11. Prepare at least 8 specimens to AS 1012.8.2. Test at least 2 specimens after 7 days and the remainder after 28 days.

**Discharge slump tests**

General: Carry out slump tests at approximately one quarter and three quarter points of the load during discharge.

Maximum slump variation: 25 mm.

Standard: To AS 1012.3.1.

**Maximum concrete strength**

Criterion: The average strength of any set of 3 consecutive project samples must not exceed the specified maximum value.

**Flexural strength assessment of concrete**

Standard: To AS 1012.8.2 and AS 1012.11.

**Drying shrinkage of concrete**

General: Sample and test every 3 months for each type of concrete.

Standard: To AS 1012.13.

Acceptance criterion: The average strain of 3 specimens from each sample must not exceed the required value.

**Dowels**

Pre-embedment testing: Fix and test dowels before embedment by subjecting either end to a load of 13 kg in any direction normal to the bar.

**Concrete placement**

Test section: Demonstrate by placing a test section that the proposed method of placement will produce a pavement complying with requirements. Remove test sections which do not comply with requirements and dispose of as directed.

**2.3 SAMPLES****General**

Submit samples of the following at least one month before use in the works:

- Granular materials: One 50 kg sample of concrete aggregate.

**Identification**

Attach a tag to each sample showing relevant information including description, source and nominal size of material.

**2.4 SUBMISSIONS****Tests**

Compliance assessment: If compliance assessment tests are to be carried out by an independent testing authority, have the authority submit 3 copies of each test result.

Certificate of compliance: If a certificate of compliance is acceptable as an alternative to testing a manufactured material, submit the manufacturer's certificate together with the results of recent tests undertaken by the manufacturer, showing compliance with test criteria.

Dissemination of production information: Submit copies of the reports.

Curing compounds: If it is proposed to use a liquid membrane-forming curing compound submit certified test results for water retention to AS 3799 Appendix B.

**Materials**

Reinforcement: Submit the manufacturer's certificate of compliance with AS/NZS 4671, or submit test certificates from an independent testing authority.

**Execution**

General: Submit proposals for the methods and equipment to be used for the roadworks, including the following:

- Staging of the work, access and traffic control methods.
- Disposal of surface water, control of erosion, contamination and sedimentation of the site, surrounding areas and drainage systems.
- Methods and equipment for each operation.
- Sources of materials.
- Material stockpiles.
- Methods of concrete manufacture.
- Temperature control, curing and protection methods for concrete.

Trial mix design report: Six weeks before commencing production, submit a report for each mix design containing the information required in AS 1012.2, the individual and combined aggregate particle size distribution, and the records and reports for the tests.

Mix design variation: If a variation is proposed, submit a further mix design report.

Joint sealants: Submit the proposed installation method and sealant performance.

Concrete placing: Submit proposals for size of the area to be placed and the spacing of planned construction joints before placement commences.

Slip placing: If it is intended to construct pavement by slip forming, submit evidence of the availability of suitable equipment and the contractor's ability to produce a pavement complying with requirements.

Curing by the covering sheet method: Submit the proposed covering material.

Repair materials: Submit proposals for epoxy resin/grout and elastomeric sealant.

Crack repair: Drill 100 mm diameter core holes along unplanned cracks in the finished pavement, and submit the cores for examination.

Formed weakened plant joints: Before concrete placing submit details of the proposed equipment.

**Records of measurement**

Submit certified records of work performed as follows requested by the Superintendent.

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### 3 MATERIALS

#### 3.1 REINFORCEMENT

**General**

Steel bars: To AS 1302, Grade 250S.

**Identification**

Supply reinforcement which is readily identifiable as to grade and origin.

**Dowels**

Standard: To AS 1302, Grade 250R.

General: Each dowel in one piece, straight, cut accurately to length with ends square and free from burrs. Apply 2 coats of bitumen emulsion to half the dowel, including the end.

Dowel end tolerances: Ensure that deformation of an end from its true circular shape does not exceed 1 mm nor extend more than 1 mm from the end.

#### 3.2 CONCRETE MATERIALS

**Aggregate (coarse and fine)**

Standard: To AS 2758.1.

Aggregate size (maximum):

- For fixed form placement: 40 mm.
- For slip form placement: A size compatible with the paving machine.

Washing: Wash aggregate as necessary or as directed to achieve requirements for soluble salt content or concrete drying shrinkage.

Concrete exposure classification (for durability assessment): Severe.

**Cement**

Type to AS 3972: GP.

**Concrete mix design**

Design the mix to suit the methods of concrete manufacture, placing, compaction and finishing.

**Mix design variation**

Do not vary the design mix, method of production, or source of supply of constituents.

#### 3.3 CONCRETE

Ready mixed concrete

Use the prescription ordering method.

**Accuracy of batching (% by mass)**

Cement:  $\pm 1$ .

Aggregates:  $\pm 2$ .

Water:  $\pm 1$ .

Admixture:  $\pm 3$ .

**Admixture**

Introduce in solution in a portion of the mixing water. Ensure a uniform distribution of the admixture in the batch within the mixing period.

**Mixing**

Mixing time: Measure the mixing time after solid materials are in the mixer, provided that mixing water is introduced before a quarter of the mixing time has elapsed. Increase mixing time if necessary to obtain the required uniformity and consistence of concrete. Do not overmix such that additions of water are needed.

Uniformity: Differences specified in AS 1379 apply to samples taken from 3 locations in a batch. Do not exceed 2% difference in moisture content of the 3 samples.

**Transport**

General: Transport and discharge the concrete without segregation.

**Elapsed delivery time**

Discharge truck mixed concrete within a time (t hours) determined as follows, where T is the temperature of the concrete in degrees Celsius:

$$t = 2 - 0.05T.$$

**3.4 JOINTING MATERIALS****Self-expanding cork seals**

General: Preformed self-expanding cork in factory bonded lengths, with taped top surface.

Length: Equal to the paving lane width for transverse joints, or 4 m for longitudinal joints.

Properties:

- Accelerated weathering: No evidence of disintegration.
- Resistance to test fuel (48 hours immersion in test fuel): No evidence of
  - dislodgment of cork particles by test treatment;
  - dislodgment of cork particles when the faces of the material are rubbed with fingers; and
  - loss of resilience i.e. may be broken into pieces more easily.
- Dimension tolerance (unexpanded state):
  - Width:  $\pm 1.5$  mm.
  - Depth:  $\pm 3.0$  mm.

**Cork seal properties table**

Property	Requirement	
	Minimum	Maximum
Density (kg/m <sup>3</sup> )	335	-
Lateral restraining pressure in water at 27°C $\pm$ 1°C (kPa):	-	60
- After 6 hours' immersion	-	180
- After 24 hours' immersion	-	180
Lateral free swell in water at 27°C $\pm$ 1°C (% of initial width):	25	-
- After 24 hours' immersion	30	-
- After 168 hours' immersion	30	-
Longitudinal free swell in water at 27°C $\pm$ 1°C after 168 hours' immersion (% of initial length)	-	2
Longitudinal shrinkage on drying for 12 days at 40°C – 50°C after 168 hours' immersion in water (% of initial length)	-	2
Lateral expansion in boiling water after 1 hour's immersion (expanded width as % of initial width)	140	-
Compression and recovery:		
- Pressure required to compress to 50% of uncompressed width (kPa)	350	10,500

Property	Requirement	
	Minimum	Maximum
- Recovery after 1 hour following compression to 50% of uncompressed width (recovered width as % of uncompressed width)	90	-
Extrusion of free edge following compression to 50% of uncompressed width with three edges restrained (mm)	-	6

**Preformed elastomeric seals**

Standard: To ASTM D2628.

General: Vertical sidewalls, marked durably on the top surface every 300 mm  $\pm$  2 mm at the time of manufacture.

Depth: Adequate to retain the seal in the joint, but not greater than 50 mm when the seal is compressed laterally to 50% deflection.

Lubricant adhesive: A compound of the same base polymer as the seal, blended with suitable volatile solvents of viscosity suitable to the installation equipment, with the following properties:

- Average net mass per litre: 0.784 kg  $\pm$  5%.
- Film tensile strength: 15 MPa minimum.
- Elongation before breaking: 750% minimum.

Shelf life: Show date of manufacture on the container. Provide within nine months of manufacture.

Properties testing:

- Heat aging: Heat age specimens in an oven for 70 h at 100°C under 50% deflection.

**Preformed elastomeric seal properties table**

Nominal width of seal	Deflection range (% of nominal width) before and after heat aging	Required force (N/m) range	
		Before heat aging	After heat aging
$\leq$ 10 mm	20 - 50	350 – 2100	175 - 2100
$\geq$ 12 mm	20 - 50	350 – 2100	260 - 2100

**Inert form strip**

Type: Fibreboard or polystyrene foam strip consisting of two parts:

- Removable upper section equal in depth to the preformed elastomeric seal.
- Permanent lower section.

Use: Provide only with preformed elastomeric seals. After forming, remove the upper section of the inert form strip and insert the preformed elastomeric seal.

**Sealants**

Do not provide pourable sealants.

**4 EXECUTION****4.1 TOLERANCES****Finished levels**

General: Provide a finished surface which is free draining and evenly graded between level points.

Edges abutting gutters: Within  $\pm$  5 mm of the level of the actual gutter edge.

Rigid pavement surface:

- Absolute tolerance:  $\pm$  10 mm.
- Relative tolerance: 5 mm.

**Thickness**

The following tolerances apply to variations in the compacted layer thickness from the specified thickness:

- Concrete surface course: + unspecified, - 5 mm.

**Joint locations (rigid pavement)**

Maximum horizontal deviation from required alignment: 15 mm.

**4.2 FORMWORK****Fixed formwork**

Material: Either

- steel forms; or
- seasoned, dressed timber planks, free of warps, bends or kinks, with the full width of their top and bottom edges covered with steel angle sections finishing flush with the form face.

Depth: Equal to the edge thickness of the slab and in one piece.

Tolerances on position:

- Absolute level tolerance:  $\pm 5$  mm (maximum departure of top surface from the required level).
- Relative level tolerance: 5 mm (maximum departure of top surface from a 3 m straightedge).
- Horizontal tolerance:  $\pm 10$  mm (maximum departure of face from a plane surface).
- Verticality: 3 mm departure from vertical.

Staking: Stake forms in position using at least 3 steel stakes per form, not more than 1.5 m apart. Lock joints between form sections to prevent movement.

Release agent: Before placing reinforcement, apply a release agent compatible with the contact surfaces, to the interior of the formwork, except where the concrete is to receive an applied finish for which there is no compatible release agent. Where necessary clean the reinforcement to remove all traces of release agent.

Re-use: Clean and recoat the forms each time before placing concrete.

Keyways: Form the keyways of keyed construction joints using steel form strips accurately located at the mid-depth of the slab and securely fastened flush against the formwork face.

**Stripping time**

At least 12 hours.

**4.3 FIXING REINFORCEMENT****Dowels and tie bars**

Location: Across joints at the required spacings and vertical locations correctly aligned parallel to the finished pavement surface and perpendicular to the joint in plan. If the construction methods require alterations to the designed spacing, space closer with additional dowels or tie bars.

Placing in fixed-form paving: Use the bonded-in-place method. Embed the unpainted half of the dowels in the slab placed first.

Placing in longitudinal joints in slip-form paving: Place using machine or vibrate into the plastic concrete using a suitable template.

Movement: Do not distort or displace beyond the alignment tolerances under testing or during construction. Do not remove and replace dowels in pre-formed holes.

**Dowel placement tolerances**

Horizontal and vertical location:  $\pm$  half the diameter of the dowel.

Alignment: Locate bars in the joint within 2 mm in 300 mm and adjacent bars which do not differ in alignment by more than 2 mm in 300 mm.

**5 PLACING AND CURING**

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**5.1 CONCRETE PLACING****Concrete placement**

Rate: Place at a rate of at least 25 linear metres of pavement per hour.

**Placing records**

Keep on site and make available for inspection a log book recording each placement of concrete including the following:

- Date.
- The portion of work.
- Specified grade and source of concrete.
- Slump measurements.
- Volume placed.

**5.2 COLD WEATHER PLACING****General**

Subbase: Ensure that the subbase surface is free of frost.

Aggregate: Ensure that aggregate is free of ice, snow, and frozen lumps.

Temperature: Maintain the concrete at a temperature of at least 10°C for at least 24 hours after placing. Prevent the concrete from freezing during the curing period.

**Admixtures**

Do not add calcium chloride, salts, chemicals or other material to the mix to lower the freezing point of the concrete.

**5.3 HOT WEATHER PLACING****General**

Avoid premature stiffening of the mix and reduce water absorption and evaporation losses. If the temperature of the surrounding air is higher than 32°C

- mix, transport, place and compact the concrete as rapidly as possible, and cover with an impervious membrane or hessian kept wet until moist curing begins; and
- hold the concrete to a temperature  $\leq 32^{\circ}\text{C}$  when placed.

**5.4 PLACING IN FIXED FORMS****Spreading**

Place concrete uniformly over the width of the slab or lane and so that the face is generally vertical and normal to the direction of placing. Hand spread concrete using shovels, not rakes.

**Vibration**

General: Compact concrete using internal mechanical vibration of sufficient amplitude to produce noticeable vibrations at 300 mm radius. Insert vibrators into the concrete to the depth which will provide the best compaction, but not deeper than 50 mm above the surface of the subbase, and for a duration sufficient to produce satisfactory compaction, but not longer than 30 seconds in any one location.

**5.5 SLIP FORM PLACING****Spreading**

Place the plastic concrete in a uniform layer over the width of the slab being placed. Do not damage the existing surface and edge of previously constructed concrete.

**Vibration**

Equipment: Suitable internal vibrators or surface type equipment with vibrating beam or beams of adequate power to fully compact the whole depth of the concrete.

Slab edges: Use supplementary immersion type vibrators next to slab edges if necessary to ensure that the sides of slabs present a uniform dense appearance free from honeycombing or areas deficient in fines over at least 95% of the surface.

## 5.6 CURING

### General

Protect fresh concrete from premature drying and from excessively hot or cold temperatures. Maintain the concrete at a reasonably constant temperature with minimum moisture loss for the curing period.

### Temperature

Maintain the concrete at a temperature  $\geq 5^{\circ}\text{C}$  for at least 7 days.

### Curing methods

Curing compound method: Spray the entire surface including edges using a mechanical sprayer, at a uniform application rate of at least  $0.35 \text{ L/m}^2$ . Respray defective areas within 30 minutes. Respray within 3 hours after heavy rain. Apply as a continuous coating without visible breaks or pinholes.

- Curing compounds: To AS 3799, Type 2, white pigmented or containing aluminium reflective pigments.

Covering sheet method: Immediately after finishing operations cover concrete using damp hessian or cotton mats overlapped at least 150 mm and anchored against displacement by wind or other interference. Keep the mats continuously damp until covered by the covering sheet material. Repair tears and the like immediately.

- Covering sheet materials: White opaque polyethylene film, or white burlap-polyethylene sheet, or equivalent material to ASTM C171.
- Joint sawing: Sheet materials may be removed for the minimum distance and period to permit joint sawing, provided the concrete is kept moist by other means.

Moist curing method: Immediately after finishing operations keep the concrete surface continuously damp by spraying constantly with water, fog, or mist, using suitable spraying equipment.

### Minimum curing time

7 days.

## 5.7 PROTECTION

### General

Concrete pavement: Keep traffic, including construction plant, off the pavement entirely during curing, and thereafter permit access only to necessary constructional plant vehicles until the pavement is at least 14 days old.

## 5.8 FINISHING

### General

Immediately after placement and spreading and compaction of the plastic concrete, start finishing operations, comprising transverse finishing, longitudinal straightedge finishing and broom finishing, in that order. Complete as soon as possible, and before the concrete attains initial set.

### Transverse finishing

Use either

- mechanical vibrating screed equipped with handles and twin beams at least 300 mm longer than the width of lane being finished, and a screed edge at least 100 mm wide; or
- a counter rotating tube screed of suitable design.

### Passes

Make at least two passes with the screed over each section of pavement.

### Straightedge finishing

After the transverse finishing is completed, but while the concrete is still plastic, eliminate minor irregularities and score marks in the pavement surface, particularly across formed contraction joints, using hand-operated long handled aluminium floats.



**5.9 DEFECTIVE CONCRETE****High areas**

Method: Reduce by rubbing or grinding, or both, as follows:

- Concrete < 36 hours old: Rub using carborundum brick and water. Discontinue rubbing as soon as contact with the coarse aggregate is made, and reduce further, if necessary, by grinding the concrete after it hardens.
- Hardened concrete ( $\geq 14$  days old): Machine grind.
- Retexturing: Retexture areas which have been surface ground, by cutting grooves 5 mm wide x 5 mm deep, at 25 mm centres.

Upper limit of surface ground areas: 10% of the area of a single slab, or 3% of the total surface area of the concrete pavement.

**Thickness deficiencies**

Retention: Thickness deficiency exceeding the required tolerance must not exceed 10 mm.

**5.10 REINSTATING ADJACENT SURFACES****General**

Existing pavement: Reinstate surfaces next to new pavements and associated elements. Where an existing flexible road pavement has been disturbed, trim it back to a straight and undisturbed edge 250 - 300 mm from and parallel to the new concrete for the full depth of the slab. Backfill with asphalt rammed solid, using suitable rammers.

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**6 JOINTS****6.1 CONCRETE JOINTS****General**

Construct expansion, contraction and construction joints straight and plumb. Make transverse joints normal to longitudinal joints. Extend transverse expansion and contraction joints continuously from edge to edge of the pavement through interconnected slabs.

**Longitudinal construction joints**

In fixed form paving: Formed rebated groove joints.

In slip form paving: Sawn rebated groove joints.

**Transverse construction joints**

Planned location: Terminate each day's placing operation at a transverse construction joint located to coincide with a planned contraction or expansion joint. Where the construction joint coincides with a contraction joint provide a dowelled joint.

Unplanned joints: If placement is interrupted for 30 minutes or longer, form a tied transverse construction joint within the middle third of the distance between planned joints but no closer than 1.5 m to the nearest planned joint. If necessary remove placed concrete back to the required location.

**Contraction joints**

In fixed form paving: Weakened plane joints.

In slip form paving: Sawn weakened plane joints.

**Expansion joints**

Provide formed full depth joints around structures and features which project through, into or against the pavement, and elsewhere as required.

**6.2 FORMED JOINTS****Full depth joints**

Form the edge of the concrete placed first to provide a smooth, vertical face. After stripping and cleaning fix the joint filler with a suitable waterproof adhesive to the face of the slab, and place the adjoining concrete after the adhesive has set.

**Weakened plane joints**

Machine form. Cut a crack-inducing groove in the plastic concrete during finishing of the concrete surface. Compact and refinish the plastic concrete around the groove after inserting the joint filler.

**Rebated groove joints**

General: Form the rebate by securely fixing removable steel form strips to the form or forms on the slab which is placed first, so that the top of the steel strip is flush with the top of the form. After stripping and cleaning, fix the joint filler in the rebate before placing the adjoining concrete.

Steel form strips: Width equal to half the nominal width of the groove. Depth equal to the nominal depth of the groove plus 5 mm.

**6.3 SAWN JOINTS****Weakened plane joints**

General: Saw the hardened concrete to at least 45 mm depth, and to a uniform width in the range of 3 - 5 mm.

Timing: Commence sawing, regardless of time or weather conditions, as soon as the concrete has hardened sufficiently to permit cutting without defects, occurring to such a degree as to cause structural weakness or excessive cleaning difficulty. Complete sawing at least 24 hours after concrete placement.

Sequence: If possible, saw every third transverse joint initially, then saw the intermediate joints.

Cracking: If the concrete has already cracked near the location chosen for a joint, do not saw a joint in that location. If a crack develops ahead of the saw cut, discontinue sawing. If uncontrolled cracking occurs, suspend concrete placing.

Stand-by machines: Provide one stand-by sawing machine for each machine planned to be used.

Cleaning and protection: Immediately after each joint is sawn, flush the saw cut and adjacent concrete surface using water, until the waste from sawing is removed from the joint. Temporarily caulk the joint using plastic or rubber tubing, or a suitable "Tee" shaped extrusion. Leave the caulking in place until grooving and sealing.

**Rebated groove joints**

General: Saw straight, parallel sided grooves for joint seals on top of and centred on the sawn weakened plane joints.

Timing: Commence sawing after the curing period has ended, immediately before joint sealing. Saw during daylight hours and when the concrete temperature is at least 10°C.

Cracking: If cracks occur beneath initial saw cuts, increase the width of the groove by an amount equal to the width of the crack.

**6.4 DOWELLED AND TIED JOINTS****Dowelled joints**

Formed or sawn joints reinforced with dowels and sealed.

**Tied joints**

Formed or sawn joints reinforced with tie bars. Omit grooves and sealing unless shown on the drawings.

**6.5 JOINT SEALING****Joint preparation**

General: Immediately before installation of the sealer ensure that the joint space is dry, clean and free from loose material. Remove laitance, curing compound and protrusions of hardened concrete from the sides and upper edges of the joint.

Formed full depth and rebated groove joints: After form stripping and when the concrete has cured sufficiently, clean formed arrises using a rotary saw.

Sawn joints: Remove loosened material from the joint using compressed air or high pressure water jet.

**Installing self expanding cork seals**

Jointing: Join the factory-bound lengths of seal together by skiving and gluing with suitable waterproof adhesive. Make the seal continuous for the full length or width of the slab, in longitudinal and transverse joints respectively.

Ambient conditions: Install the seal only when the concrete in the vicinity of the joints is surface dry and the surface temperature in the range 20 – 30°C. Protect the seal from moisture before installation. Do not pre-soak.

Seal location: Install seals so that the top surface is flush with, or ≤ 5 mm below, the finished concrete surface.

Formed joints:

- Tape removal: Do not remove tape from the top surface of the seal until adjoining concrete has attained final set.
- Full depth and rebated groove joints: Fix the seal to the edge of the hardened concrete with a suitable waterproof adhesive, and place the adjoining concrete after the adhesive has set.
- Weakened plane joints: Install the seal simultaneously with forming the crack inducing groove.

Sawn rebated groove joints: Coat one side of the seal with a suitable waterproof adhesive. Ease the seal, as a loose fit, into the joint and use gentle side pressure to adhere the coated side of the seal to the joint face. 24 - 48 hours after installation, remove the tape from the top surface of the seal and water thoroughly. Repeat watering for 5 days or until the cork has expanded to fill the groove completely.

**Installing preformed elastomeric seals**

Apply a bead of lubricant adhesive to the top edge of each side of the joint, then install the seal by easing it into the joint, using a suitable roller, to finish 4 - 6 mm below the finished concrete surface.

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**7 COMPLETION****7.1 COMPLETION****Traffic on pavement**

Give notice before opening the pavement to traffic before the work is completed. Provide adequate means of protection.

**WIRING AND ACCESSORIES****1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **wiring and accessories** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Related worksections**

Refer to the following sections:

Service trenching

**1.2 INTERPRETATIONS****Abbreviation**

MIMS: Mineral-insulated metal-sheathed.

**2 QUALITY****2.1 PRE-COMPLETION TESTS****Site tests**

MIMS cable systems: Test the insulation resistance

- at the time of termination; and
- 24 hours later.

Other cable systems: Test the insulation resistance before the final connection of equipment and before energisation.

**2.2 SUBMISSIONS****Cable routes**

If not shown on the drawings in detail, submit details of the following:

- Sub-main cable tray routes and signs.
- Switchboard cupboard layouts including risers.
- Busduct systems including routes, dimensions and connection details.

**Power cable ratings calculations**

General: If cable sizes are not given, submit calculations of current ratings and voltage drop.

Standard: To AS/NZS 3008.1.1.

**Shop drawings**

Submit shop drawings of column mounting bases.

### 3 WIRING SYSTEMS

#### 3.1 SELECTION

##### General

Provide the following systems:

- Cast concrete slabs: Unsheathed cable in heavy duty UPVC conduit.
- Accessible spaces: Thermoplastic insulated and sheathed cables.
- Concealed spaces: Unsheathed cable in UPVC conduit.
- Plant rooms: Unsheathed cable in heavy duty UPVC conduit.
- Plastered or rendered surfaces: Cable in UPVC conduit.
- Stud walls without bulk insulation: Thermoplastic insulated and sheathed cables.
- Stud walls with bulk insulation: Cable in UPVC conduit.

#### 3.2 INSTALLATION

##### Standard

Fire or mechanical damage: Classifications to AS/NZS 3013.

##### Installation methods table

Wall construction	Installation and concealed cabling facilities
Rendered masonry partition	Flush wall box - conduit chased into wall
Double sided face brick partition	Vertically mounted flush wall box with conduit concealed in cut bricks
Face brick external cavity wall	Flush wall box with thermoplastic insulated cables in conduit run in cavity and tied against inner brick surface, or thermoplastic sheathed cables run in cavity
Stud partition	Rewirable

##### Handling cables

Report damage to cable insulation, serving or sheathing.

##### Straight-through joints

Unless unavoidable due to length or difficult installation conditions, run cables without intermediate straight-through joints.

##### Cable joints

Locate in accessible positions in junction boxes.

##### Extra-low voltage circuits

Individual wiring of extra-low voltage circuits: Tie together at regular intervals.

##### Conductor colours

General: For fixed wiring, provide coloured conductor insulation. If this is not practicable, slide at least 150 mm of close fitting coloured sleeving on to each conductor at the termination points.

Active conductors in single phase circuits: Red.

Active conductors in polyphase circuits:

- A phase: Red.
- B phase: White.
- C phase: Blue.

##### Tagging

Identify multicore cables and trefoil groups at each end with stamped non-ferrous tags clipped around each cable or trefoil group.

##### Marking

Identify the origin of all wiring by means of legible indelible marking.

## **4 POWER CABLES**

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### **4.1 SELECTION**

#### **Cable**

General: Multi-stranded copper cable generally, except for MIMS.

Minimum size:

- Lighting sub-circuits: 1.5 mm<sup>2</sup>.
- Power sub-circuits: 2.5 mm<sup>2</sup>.
- Sub-mains: 6 mm<sup>2</sup>.

### **4.2 UNSHEATHED - INSTALLATION**

#### **General**

Provide permanently fixed conduit enclosures assembled before installing wiring. Provide draw wires to pull in conductor groups from outlet to outlet, or provide ducts with removable covers.

### **4.3 MIMS - INSTALLATION**

#### **General**

Maintain manufacturer's seals until joint or termination is made. Remove moisture by heating cable ends.

#### **Seals**

Temporary seals: Fit temporary seals to the open ends of cables cut and not immediately used.

Terminations: Fit termination seals at ends of cable runs as soon as the cable has been cut to length, stripped back, and the moisture driven out.

Through joints: Same fire-rating as the cable.

#### **Sheath earthing**

If MIMS cables enter metal enclosures, earth sheaths to non-ferrous plates secured to the enclosures. Where sheaths terminate at plates, fully insulate, colour code, and fix the conductors to the enclosures.

#### **Bonding**

Bond metal sheaths of single core cables in multi-phase circuits with proprietary earth bonding clips or clamps.

#### **Separation**

Separate MIMS cables from tough plastic sheathed (TPS) cables and UPVC conduits by at least 25 mm.

#### **Eddy currents**

Arrange single core cable entries into non-ferrous metal gland plates to minimise eddy currents.

#### **Vibration**

Connections with vibrating equipment: Loop cables in a complete circle next to the point of connection.

### **4.4 FIRE-RATED (OTHER THAN MIMS) - INSTALLATION**

#### **General**

If exposed to mechanical damage, provide protection to AS/NZS 3013.

## **5 TERMINATIONS**

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### **5.1 COPPER CONDUCTORS**

#### **General**

Other than for small accessory and luminaire terminals, terminate copper conductors to equipment, with compression-type lugs of the correct size for the conductor. Compress using the correct tool or solder.

#### **Within assemblies and equipment**

General: Loom and tie together conductors from within the same cable or conduit from the terminal block to the point of cable sheath or conduit termination. Neatly bend each conductor to enter directly into the terminal tunnel or terminal stud section, allowing sufficient slack for easy disconnection and reconnection.

- Alternative: run cables in UPVC cable duct with fitted cover.

Identification ferrules: Provide durable numbered ferrules fitted to each core, and permanently marked with numbers, letters or both to suit the connection diagrams.  
 Spare cores: Identify spare cores and terminate into spare terminals, if available. Otherwise, neatly insulate and neatly bind the spare cores to the terminated cores.

## 5.2 ALUMINIUM CONDUCTORS

### Preparation of surfaces

Conductors: Remove oxide by

- wire brushing surfaces to be connected; and
- immediately applying oxidation inhibiting abrasive grease containing zinc or similar particles. Thoroughly cover the surfaces and work the grease between the strands of stranded conductors.

Fittings: Unless joint contact surfaces are factory tinned or factory pre-filled with oxidation inhibiting abrasive grease, prepare as for conductors.

### Aluminium-to-aluminium jointing

Method: Select from the following:

- Compression method:
  - . Select aluminium or aluminium alloy crimp lugs or ferrules to suit the size and shape of the conductors.
  - . Select compression dies to suit lugs or ferrules, with hexagonal dies for stranded conductors and indent dies for solid conductors.
  - . Fill lugs or ferrules with oxidation inhibiting abrasive grease.
  - . Insert conductors into lugs or ferrules, driving out excess grease.
  - . Apply dies to provide at least 2 indentations at each joint or termination.
- Fusion weld method: Make joints by fusion welding with aluminium lugs. Protect cable insulation from heat by fixing substantial heat sinks to the cable near the joint. After completion of the weld, wire brush the joint and file sharp projections smooth.

### Aluminium-to-copper jointing

Method: Use compression method, as for **Aluminium-to-aluminium jointing**.

Connector types: Select from the following:

- Bi-metal: Lug or pin type with cast copper palm or pin, friction welded to an aluminium barrel section, subsequently factory filled with oxidation inhibiting abrasive grease.
- Case electro-tinned aluminium lug: Bolt the palm of the lug to the copper busbar or terminal by means of a stainless steel bolt and nut with a large diameter stainless steel flat washer and a spring cup washer.

## 6 WIRING ENCLOSURES AND CABLE SUPPORTS

### 6.1 CONDUITS

#### Minimum sizes

Metallic and non-metallic conduits: 20 mm.

Galvanized water pipe: Medium or heavy, to AS 1074.

#### Rigid conduits

Provide straight long runs, smooth and free from rags, burrs and sharp edges. Set conduits to minimise the number of fittings.

#### Galvanizing

If installed in damp locations, galvanize mild steel wiring enclosures and support systems.

#### Set out

If exposed to view, install conduits in parallel runs with right angle changes of direction.

#### Inspection fittings

Locate in accessible positions.

#### Draw cords

General: Provide draw cords in conduits not in use. Leave 1 m of cord coiled at each end of the run.

Material: Polypropylene cord, or insulated stranded earth wire, 2.5 mm<sup>2</sup> minimum size.

**Draw-in boxes**

General: Provide draw-in boxes at intervals not exceeding 30 m in straight runs, and at changes of level or direction.

Underground draw-in boxes: Provide gasketed covers and seal against moisture.

**6.2 CONCEALED CONDUITS****Routes**

Conduits concealed in wall chases, embedded in floor slabs or installed in inaccessible locations: Run directly between points of termination, minimising the number of sets. Do not provide inspection fittings.

**Conduits in concrete slabs**

Route: Do not run in concrete toppings. Do not run within pretensioning cable zones; cross pretensioning cable zones at right angles. Route to avoid crossovers and minimise the number of conduits in any location. Space parallel conduits at least 50 mm apart.

Minimum cover: Conduit diameter or 20 mm.

Conduit size: 25 mm maximum diameter.

Fixing: Fix directly to top of the bottom layer of reinforcing where the conduits pass above a single layer of reinforcing.

**Prohibited floor slabs**

Do not run conduits in the floor slabs of boiler rooms, plant rooms and tank rooms.

**Hollow-block floors**

Locate conduits in the core-filled sections of precast hollow-block type floors.

**Columns**

General: Do not place more than four 25 mm (maximum) diameter conduits centrally in each column.

Bends: Enter columns via bends with minimum radius of 150 mm.

Chasing: Do not chase columns.

**6.3 METALLIC CONDUITS AND FITTINGS****Standard**

Metallic conduits and fittings: AS/NZS 2053.7 or AS/NZS 2053.8.

**Type**

Screwed steel.

**Corrosion protection**

For steel conduits, paint ends and joint threads with zinc rich organic primer to GPC-C-29/16.

**Expansion joints**

General: Provide flexible couplings consisting of flexible conduit and fittings, at

- structural expansion joints; and
- in long straight runs if the ambient temperature varies by more than 40°C.

Conductivity: Maintain electrical conductivity between the two ends of rigid metallic conduit.

Movement: Provide conduit support saddles close to flexible couplings to permit free movement for expansion and contraction.

**6.4 NON-METALLIC CONDUITS AND FITTINGS****Standards**

Non-metallic conduits and fittings: AS/NZS 2053 Parts 2, 3, 4, 5 or 6.

**Conduits in roof spaces**

Locate below roof insulation and sarking. In accessible roof spaces, provide mechanical protection for light-duty conduits.

**Conduit in slabs**

High compression corrugated conduit, restrained at regular intervals to achieve a nominally straight run.



**Category A conduit**

For direct buried installations requiring the use of Category A conduit, provide protective cover strips and corrugated conduit.

**Flexible conduit**

Provide for equipment and plant subjected to vibration. If necessary, provide for adjustment or ease of maintenance. Provide the minimum possible length.

**Associated fittings**

Type: The same type and material as the conduit.

Wall boxes on UPVC conduits: For special size wall boxes not available in UPVC, provide prefabricated earthed metal boxes.

**Inspection fittings**

Provide inspection-type fittings only in accessible locations and where exposed to view.

**Joints**

Type: Cemented or snap on joints.

Expansion couplings: If encased in concrete, do not provide bellows type.

**6.5 DUCTED WIRING ENCLOSURES****Standard**

General: To AS/NZS 4296.

**Ducting**

Provide purpose-made ducts, skirting ducts and floor ducts, incorporating segregation where used for multiple services, and rigidly supported. Round off sharp edges and provide PVC bushes for cable entries into metallic ducting.

**Accessories**

General: Provide purpose-made accessories and covers to match the duct system. Provide screw-fixed covers, or clip-on covers removable only with the use of tools.

Cable support: Except for horizontal runs where the covers are on top, support wiring with retaining clips at intervals of not more than 1 m.

**6.6 CABLE SUPPORTS****System**

Provide a complete cable support system consisting of trays or ladders and including brackets, fixings and accessories.

**Manufacture**

Provide proprietary trays, ladders and accessories from a single manufacturer in the same application.

Fittings: Field fabricate horizontal elbows and vertical risers. Prefabricate tees and crosses.

Installation: Drain holes to be fitted.

Small cables: Run cables less than 13 mm diameter in cable trays or ducts.

**Fixing to building structure**

General: Fix supports to the building structure or fabric by means of direct fixing hangers or brackets.

**Cable fixing**

Provide strapping or saddles suitable for fixing cable ties.

Provide steel straps to MIMS cables.

**Bend radius**

Provide bends with a minimum inside radius of 12 times the outside diameter of the largest diameter cable carried.

**Cable protection**

Provide rounded support surfaces under cables where they leave trays or ladders.

**Access**

Provide a minimum of 150 mm free space above and 600 mm free space on one side of trays and ladders.

**Minimum clearances**

Hot water pipes: 200 mm.

Boilers or furnaces: 500 mm.

## 7 BUSDUCTS

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### 7.1 SYSTEMS

#### General

Type: Proprietary type-tested systems made up of integral lengths and fittings containing solid busbar conductors and housings, assembled in sections to form complete fully enclosed and insulated low impedance power distribution systems.

#### Standard

To AS 3439.2.

### 7.2 SELECTION

#### Ratings

Select busduct to meet nominated current ratings and, if used as consumer's mains, to match the statutory authority's substation equipment.

#### Degree of protection

For complete assembly, at least the following:

- Indoor use: IP40.
- Weatherproof (partial exposure): IP54.
- Outdoor use: IP55.

### 7.3 ACCESSORIES

#### Plug-in boxes (indoor systems only)

For current ratings  $\leq 400$  A: Provide fuse, fuse switch or circuit breaker type plug-in connection boxes. Provide interlocks to enable plug-in boxes to be safely installed or removed on an energised system. Design plug-in boxes so that earthing to the busduct housing is achieved before connection of active conductors.

For current ratings  $> 400$  A: Provide bolt on T-off boxes.

#### Expansion joints

Provide expansion joints in vertical runs, to allow for expansion and contraction of the busduct system.

#### End caps

Provide end caps or covers to fully enclose ends of busducts not connected to equipment.

### 7.4 INSTALLATION

#### Horizontal runs

Support busducts at maximum intervals of 2 m, with adjustable hangers and steel angle supports. Provide runs that are straight and level. Install hangers at least 300 mm from joint centres. Secure busducts to angle supports with proprietary clamps.

#### Vertical runs

Support with a combination of fixed and spring type hangers to allow for expansion and contraction of the busduct system.

#### Fittings

Provide elbows, offsets and junctions for changes in direction. If necessary, provide weatherproof covers and gaskets.

## 8 UNDERGROUND SERVICES

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### 8.1 CABLES IN TRENCHES

#### Sand bed and surround

Provide clean sharp sand around cables and conduits installed underground.

#### Sealing ducts and conduits

Seal buried entries to ducts and conduits with waterproof seals. Seal spare ducts and conduits immediately after installation. Seal other ducts and conduits after cable installation.

### 8.2 CABLE PITS

#### General

Draw-in pits: Sizes given are internal dimensions.

**Proprietary cable pits**

For pits  $\leq 1.2 \times 1.2$  m, provide proprietary concrete or polymer moulded pits.

**In situ construction**

For pits  $> 1.2 \times 1.2$  m, select from the following:

- Proprietary cable pits.
- Construct walls and bottoms from rendered brickwork or 75 mm thick reinforced concrete. Incorporate a waterproofing agent in the render or concrete.

**Pit covers**

General: Provide pit covers to suit expected loads. Fit flush with the top of the pit.

Standard: To AS 3996.

Maximum weight: 40 kg for any section of the cover.

Lifting handles: Provide a lifting handle for each size of cover section.

**Drainage**

General: Provide drainage from the bottom of cable pits, either to absorption trenches filled with rubble or to the stormwater drainage system.

Absorption trenches: Minimum size 300 x 300 x 2000 mm.

**8.3 UNDERGROUND CABLE ROUTES****Survey**

Accurately record the routes of underground cables before backfilling.

**Location marking**

General: Accurately mark the location of underground cables with route markers consisting of a marker plate set flush in a concrete base.

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

Concrete bases: 200 mm diameter x 200 mm deep, minimum.

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

Plates: Brass, minimum size 75 x 75 x 1 mm thick.

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

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

**Marker tape**

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

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**9 COLUMNS****9.1 COLUMNS****Definition**

Fabricated columns more than 2400 mm high, designed to support accessories outdoors.

**Design**

General: Provide columns designed, manufactured and tested by a specialist manufacturer.

Dimensions: To AS 1798.

**Construction**

General: Galvanize columns and fittings after fabrication.

Bases: Provide columns with mounting bases for fixing to reinforced concrete footings.

Accessory mountings: Provide adjustable mountings, to suit accessories, and with provision for rigidly clamping each item in position, once adjusted correctly.

Maintenance access: Provide pole stirrups secured to either side of the column for access to accessories. Locate the first stirrup at least 3 m above ground level.

Electrical connections: Provide a recess at the base of the column for access to cable connections and equipment, fitted with a flush mounted cover. For connections higher than 3 m provide a catenary wire cable support system.

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## 10 ACCESSORIES

### 10.1 LIGHTING AND SOCKET OUTLET SWITCHES

#### Minimum rating

15 A, 240 V a.c.

#### Mechanism

General: Construct the face plate and mechanism so that the mechanism cannot be displaced during normal operation, by means of retaining screws.

#### Indicators

Provide red indicators above switch toggles, to be visible with switches “on”.

### 10.2 GENERAL PURPOSE OUTLETS

#### Pin arrangement

Mount outlets with the earth pins at the 6 o'clock position.

### 10.3 3 PHASE OUTLETS

#### Minimum rating

20 A, 500 V a.c.

#### Pin arrangement

Five round pins mounted with earth pins at the 6 o'clock position, neutral pins in the centre, and the red, white and blue phases in a clockwise sequence when viewed from the front of the outlet.

#### Plug

Provide a matching plug top for each outlet.

#### Construction

Surface mounted type of high-impact resistant plastic, with flap lid on the outlet.

### 10.4 CLOCK OUTLETS

#### Pin arrangement

4 round pin outlet.

#### Plug

Provide a matching plug for each outlet.

### 10.5 LIGHTING OUTLETS

#### Pin arrangement

Standard: 3 flat pin with looping terminal.

Emergency lighting: 4 flat pin if self-contained emergency lighting is to be connected.

### 10.6 INSTALLATION

#### General

Provide flush mounted accessories except in plant rooms.

#### Surface mounting

Type: Proprietary mounting blocks.

#### Restricted location

Do not install wall boxes across junctions of wall finishes.

#### Marking

Label isolating switches and outlets to identify circuit origin.

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## 11 APPLIANCES

### 11.1 CEILING SWEEP FANS

#### Mounting height

Minimum height from blades to finished floor level: 2200 mm.

**Horizontal clearance**

Minimum 1200 mm from blade tip to wall cupboards or shelves that require access by ladder or steps.

**Speed regulators - inductive**

Surface mounted with adequate clearance for ventilation.

**Speed regulators - capacitive and electronic**

Flush mounted.

**11.2 CEILING MOUNTED APPLIANCES****Fixing**

For appliances which have unacceptable bending moments, or are heavy or vibrate, provide support brackets fixed through ceiling to the building structure. Brace to prevent horizontal movement.

**Connections**

Provide flush mounted 3 pin socket outlets on the ceiling next to support brackets.

<b>LUMINAIRES</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works.

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **luminary** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**1.2 STANDARDS****Standards**

General: To AS 3137.

Luminaires for swimming pools: To AS/NZS 60598.2.18.

Luminaires with built-in transformers for filament lamps: To AS/NZS 60598.2.6.

Road lighting luminaires: To AS 3771.

Radio interference limits: To AS/NZS 4051.

**1.3 INTERPRETATIONS****Definitions**

Proprietary luminaires: Luminaires available as a catalogue item.

Custom-built luminaires: Luminaires manufactured to order.

**1.4 DESIGN****Performance of custom-built luminaires**

Select, design and provide reflectors, accessories and control equipment to the lamp manufacturer's recommendations and which allow the lamps to achieve the performance given in the lamp manufacturer's published data sheets.

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**2 QUALITY****2.1 INSPECTION****Notice**

Give notice so that inspection of custom-built luminaires may be made when the first batch of each type is ready for delivery to site.

**2.2 SAMPLES****Prototypes**

Submit prototypes of each type of custom-built luminaire.

## 2.3 SUBMISSIONS

### Shop drawings

Submit shop drawings of custom-built luminaires showing dimensions of equipment, details and location of accessories, details of materials and labelling details.

### Photometric data

Submit photometric data for each type of custom-built luminaire.

Standard: To AS 1680.3.

## 3 LUMINAIRES

### 3.1 COMPLETE

#### Lamps

Provide luminaires complete with lamps and accessories.

### 3.2 PROPRIETARY LUMINAIRES

#### Modifications

Carry out to the original manufacturer's standards.

### 3.3 FLUORESCENT

#### Recessed

Reflectors: 8 cell parabolic.

Diffusers: K12 prismatic.

#### Surface mounted

Diffusers: K12 prismatic wrap-around.

## 4 ACCESSORIES AND CONTROL EQUIPMENT

### 4.1 BALLASTS

#### Electronic fluorescent lamp ballasts

Standards: To AS 3963 and AS 3134.

Power factor: > 0.9.

Current total harmonic distortion: < 15%.

Number of ballasts: Provide separate ballasts for each lamp.

#### Reactive fluorescent lamp ballasts

Standard: To AS 2643.

Connections: Provide quick-connect terminals or wiring, suitable for the operating temperature close to the ballast.

Number of ballasts: Provide separate ballasts for each lamp.

#### Maximum ballast losses at operating temperature table

Lamp size (W)	Ballast grade - switch start type	
	Standard (W)	Low loss (W)
18	9	5
36	9	5.5
58	12	7.5

#### Discharge lamp ballasts

High-pressure mercury vapour, low-pressure sodium vapour, high-pressure sodium vapour and metal halide type: To AS/NZS 60922 and AS/NZS 60923.

Metal halide type:

- ≤ 150 W: Reactors or electronic controlgear.
- > 150 W indoor: To the lamp manufacturer's recommendation.
- > 150 W outdoor: To the lamp manufacturer's recommendation.

Ignitors: Provide ignitors which cut out when lamp ignites.

## 4.2 CAPACITORS AND FILTERS

### Power factor correction

General: Correct each luminaire to a minimum power factor of 0.9 lagging.

Capacitors: To AS 2644.

### Fuses

Type: 25 mm long, 6 mm diameter cartridge.

### Fuses table

Lamp	Fuse
Fluorescent, 1 or 2 lamps	2 A
Discharge, 50 – 250 W	5 A
Discharge, 400 - 1000 W	10 A

### Integral fuses

Provide integral fuses for high intensity discharge (HID) lamp ballasts.

## 4.3 FLUORESCENT LAMP STARTERS

### Standard

To AS 4111 or AS/NZS 60155.

### Starter switches

Provide starter switches which are compatible with the lamp and controlgear.

## 4.4 OTHER CONTROL GEAR

### ELV transformers

General: For extra-low voltage tungsten halogen lamps provide

- one transformer per lamp with power rating matching the lamp; or
- common transformers which maintain constant secondary voltage irrespective of load and maintain primary/supply mains fluctuation within normal limits.

Transformer regulation: 5%.

### Regulation

Output voltage: Not in excess of the nominal rated lamp voltage at a load of 75% of nominal transformer rating.

# 5 LAMPS

## 5.1 GENERAL

### Standards

Fluorescent: To AS 1201.

Incandescent: To AS 2325.

High pressure mercury vapour: To IEC 60188.

Low pressure sodium vapour: To IEC 60192.

High pressure sodium vapour: To IEC 60662.

Tungsten halogen: To IEC 60357.

## 5.2 FLUORESCENT

### General

Cathodes: Low resistance.

Bi-pin caps: Standard.

Lamps: 26 mm diameter, correlated colour temperature (CCT) 4100 K.

## 5.3 INCANDESCENT

### Type

Tungsten filament for general lighting service, rated  $\leq 250$  V.

### Bulb finish

Internally frosted, unless otherwise necessary for correct operation of the lamp.

### Lamp cap type table

Lamp rating	Cap type
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Lamp rating	Cap type
≤ 100 W	Bayonet (B22), medium Edison screw (E27), small Edison screw (E14), or small bayonet
> 100, ≤ 200 W	Medium Edison screw (E27) or bayonet (B22)
> 200 W	Goliath Edison screw (E40/45)

#### 5.4 QUARTZ IODIDE

##### Discharge luminaires

Provide a quartz iodide (QI) auxiliary lamp for each luminaire, which switches off when the luminaire reaches maximum illumination.

### 6 CUSTOM-BUILT LUMINAIRES

#### 6.1 GENERAL

##### Stiffness

Provide materials, body shape and methods of manufacture so that luminaires neither warp nor sag when installed.

##### Ceiling trim

Provision for recessed mounting in suspended ceilings: To AS 2946.

#### 6.2 MOULDED PLASTIC BODIES

##### Material

Exterior use: UV stabilised.

#### 6.3 WIRING

##### Terminal blocks

Provide terminals with 2 screws each, and capable of accommodating at least three 2.5 mm<sup>2</sup> conductors.

##### Flexible cords

To recessed luminaires provide an external 1.5 m (minimum) length of 0.75 mm<sup>2</sup> 3-core V75 (minimum) PVC/PVC flexible cord, connected to a 10 A 3-pin moulded plug.

##### Minimum cable size

Screwed connectors: 24/0.2 mm.

Quick connectors: 1/0.75 mm.

##### Fluorescent luminaires

Cable: V-90HT copper cable conductor.

Loom wiring: Neatly loom the wiring and install it clear of ballasts. Fix looms to the luminaire body with clips made from soft metal or polyethylene.

##### Incandescent and discharge lamp luminaires

Cable: Wire between components and lampholder with V-90HT PVC, fibreglass, silicone, or teflon-insulated copper cable conductor, to suit the operating temperature within the luminaire.

Termination: Mount a fixed terminal block inside each luminaire.

#### 6.4 MOUNTING OF ACCESSORIES

##### Location

Select and locate accessories to

- permit easy replacement;
- limit magnetic interference with lamps; and
- minimise heat build up and its effect on other components.

##### Spacing

If 2 or more accessories are installed in a single luminaire, space them to allow removal and replacement of individual items without the need to remove others.

##### Fixing

Self tapping screws: Do not provide.

Nuts and similar devices: Captive type.

**Bayonet cap and Edison screw accessories**

Fix lampholder sockets to prevent rotation.

**Fluorescent lampholders**

General: Mount each lampholder rigidly. Space lampholders laterally to allow for the installation and replacement of two 38 mm diameter lamps.

Dimensions and tolerances: To AS 1201.

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**7 INSTALLATION**

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**7.1 GENERAL****General**

Mount luminaires on proprietary supports by means of battens, trims, noggings, roses and packing material, as necessary.

**Levelling**

Adjust the length of suspension rods or chains so that the lighting system is level and even.

Tolerance:  $\pm 3$  mm.

**Suspension**

Rods: Steel pipe suspension rods fitted with gimbal joints.

Chains: Electroplated welded link chain.

**Surface mounted luminaires**

General: Fit packing pieces to level luminaires and prevent distortion of luminaire bodies. Provide packing strips to align end to end luminaires.

Fixing: Provide 2 fixings at each end of fluorescent luminaires. A single fixing at each end in conjunction with 1.6 mm backing plates may be used for narrow luminaires.

**Recessed luminaires**

Connect recessed troffer fluorescent luminaires to a plug socket outlet.

**Lighting tracks**

Locate associated low voltage transformers within 600 mm of the track.

<b>SWITCHBOARDS</b>
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**1 GENERAL****1.1 CROSS REFERENCES****General**

The requirements below are for Major Periodic, replacement and variation type works, where the latter are directed by the Principals Authorised Person. They do not describe the scope of the Works

The requirements below are also for maintenance and repair works to the extent that they can be applied. In the case of maintenance and repairs, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the **switchboards** work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**1.2 STANDARD****General**

To AS 3439.1.

**1.3 INTERPRETATIONS****Definitions**

Proprietary assemblies: Low voltage switchgear and controlgear assemblies available as a catalogue item, consisting of manufacturer's standard layouts and equipment.

Custom-built assemblies: Low voltage switchgear and controlgear assemblies manufactured to order.

Rated currents: Rated currents are continuous uninterrupted current ratings within the assembly environment under in-service operating conditions.

**Abbreviations**

TTA: Type tested assemblies.

NTTA: Non-type tested assemblies.

PTTA: Partially type tested assemblies.

**1.4 DESIGN****Layout**

Position equipment to provide safe and easy access for operation and maintenance. Consider functional relationships between items of equipment in the laying out of equipment on the assembly.

**Service conditions**

Normal service conditions.

**Rated currents**

Rated currents: Minimum continuous uninterrupted rated currents within the assembly environment, under in-service operating conditions.

**Fault levels**

Rated short-circuit currents: Maximum prospective symmetrical r.m.s. current values at rated operational voltage, at each assembly incoming supply terminal, excluding effects of current limiting devices.

Assembly short-circuit capacity characteristic: Rate main circuit supply and functional units as follows:

- Back-up protective device not provided: Rated short-circuit current for 1 s.
- Back-up protective device provided: Rated short-circuit current for the maximum opening time of the associated protective device.

Tested levels: Do not operate equipment at fault levels higher than tested levels, unless provided with fault current limiting back-up protection.

### Separation

Generally: Form 1.

Form 4, modified: Provide forms of separation meeting Form 4 construction requirements, modified as follows:

- Separated compartments of the assembly: Lower forms of separation are acceptable for identified compartments.
- Moulded case circuit breakers: Mount < 4 functional units within a common separated subsection.
- Motor starters, rated  $\leq 22$  kW:
  - Where motor circuit protection is mounted elsewhere on the assembly, mount < 4 functional units within a common Form 1 separated subsection.
  - Where motor circuit protection is mounted with its associated motor starter, mount < 4 functional units within a common Form 2 separated subsection, by means of barriers or shrouding of incoming conductors.
- Moulded case or miniature overcurrent circuit breakers rated up to 100 A, connected to circuits for lighting, general purpose outlets and small single or multi-phase electrical accessories: Mount any number of circuit breakers within a Form 1 separated subsection, provided the circuit breakers are mounted on an approved multi-pole busbar chassis assembly, concealed with an escutcheon panel and removable door.

### Degree of protection

Minimum: IP41.

In plant rooms: IP42.

Assemblies for outdoor use: IP54W for exterior surfaces and IP41 for interior operating face.

### Spare facilities

Provide at least 20% spare pole capacity.

### Mounting

Floor mounted: Assemblies generally.

Wall mounted: Front access assemblies with frontal areas < 2 m<sup>2</sup>.

### Connection

Indoor cable entries: Top and bottom.

Outdoor cable entries: Bottom.

## 1.5 AUTHORITIES

### Statutory authority's equipment

General: Install equipment supplied by the statutory authority, and provide wiring to complete the installation.

Tariff meter compartment: Install the statutory authority's tariff metering equipment in a separated, sealed meter compartment or separate meter panel.

## 2 QUALITY

### 2.1 INSPECTION

#### Notice

Give notice so that inspection may be made at the following stages:

- Fabrication and painting completed.
- Factory assembly completed, with busbars exposed and functional units assembled.
- Assembly ready for routine testing and dispatch.

- Assembly installed and connected.
- Acceptance.

## 2.2 PRE-COMPLETION TESTS

### Type tests

To AS 3439.1.

Testing facility: Accredited by NATA or registered with the Association of Short-Circuit Testing Authorities (ASTA).

### Production tests

Carry out the following tests:

- Assemblies: Electrical and mechanical routine function tests at the factory using externally connected simulated circuits and equipment.
- Residual current devices: Test using apparatus which displays the trip current and trip time of each device.
- Dielectric testing:
  - . NTTAs and PTTAs: 2.5 kV r.m.s. for 15 s.
- Functional testing: Operate mechanical devices, relays, programmable logic controllers and logic controls, protection, interlocking and alarm equipment.
- Protection relays: Primary current injection tests or, if approved, secondary current injection tests, to verify time/current characteristics and settings.

### Site tests

Carry out secondary current injection tests on adjustable trip circuit breakers after installation and before energisation, to verify time/current characteristics and settings.

## 2.3 SUBMISSIONS

### General

Submit type test certificates for components, functional units and assemblies including internal arcing-fault tests and factory test data.

### Calculations

General: Submit detailed certified calculations verifying design characteristics.

Standard: To AS 3865 and AS 4388.

### Type test data

General: Verify that type tests and internal arcing-fault tests, if any, were carried out at not less than the designated fault currents at rated operational voltage.

Alterations to TTAs: Submit records of alterations made to assemblies since the tests.

### Product data for proprietary assemblies

Submit the following:

- Types and model numbers of items of equipment.
- Overall dimensions.
- Fault level.
- IP rating.
- Rated current of components.
- Number of poles and spare capacity.
- Mounting details.
- Door swings.
- Paint colours and finishes.
- Access details.
- Schedule of labels.

### Shop drawings of custom-built assemblies

Submit shop drawings showing:

- Types, model numbers and ratings of assemblies.
- Component details, functional units and transient protection.
- Detailed dimensions.

- Shipping sections, general arrangement, plan view, front elevations and cross-section of each compartment.
- Projections from the assembly that may affect clearances or inadvertent operation, such as handles, knobs, arcing-fault venting flaps and withdrawable components.
- Fault level and rated short circuit capacity characteristics.
- IP rating.
- Fixing details for floor or wall mounting.
- Front and back equipment connections and top and bottom cable entries.
- Door swings.
- External and internal paint colours and paint systems.
- Quantity, brand name, type and rating of control and protection equipment.
- Construction and plinth details, ventilation openings, internal arcing-fault venting and gland plate details.
- Terminal block layouts and control circuit identification.
- Single line power and circuit diagrams.
- Details of mains and submain routes within assemblies.
- Busbar arrangements, links and supports, spacing between busbar phases, and spacing between assemblies, the enclosure and other equipment and clearances to earthed metals.
- Dimensions of busbars and interconnecting cables in sufficient detail for calculations to be performed to AS/NZS 3008.1.1, AS 3768 and AS 3865.
- Internal separation and form of separation and details of shrouding of terminals
- Labels and engraving schedules.

**Alarm annunciator labelling**

Submit a schedule of window engraving text before engraving windows.

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**3 PROPRIETARY ASSEMBLIES****3.1 GENERAL****Modifications**

Carry out to the original manufacturer's standards and methods of construction.

**Doors**

Provide lockable doors with a circuit card holder unless enclosed in cupboards.

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**4 CUSTOM-BUILT ASSEMBLIES****4.1 CONSTRUCTION****General**

Provide rigid, ventilated, insect-screened enclosures consisting of panels, doors, or both, giving the designated enclosure, separation and degree of protection.

**TTAs and PTTAs**

Construction methods: Verified by required tests to at least the nominated fault level and temperature-rise limits and internal arcing-fault containment and venting.

**NTTAs**

Fabricate from sheet metal of rigid folded and welded construction. Obtain approval for non-welded forms of construction.

**Layout**

Compartments: Separate shipping sections, subsections, cable and busbar zones, functional unit modules and low voltage equipment compartments by means of vertical and horizontal steel partitions which suit the layout and form of separation.

Form 1 enclosures: Separate into compartments by means of partitions at 1.8 m maximum centres.

Equipment mounting heights above floor to the centre line of the equipment:

- Toggles and handles of circuit breakers, fused switch units and isolators:
  - Wall mounted assemblies: 500 - 1900 mm.

- . Floor mounted assemblies: 200 - 1900 mm.
  - Control switches, indicating lights, meters and instruments on doors:
    - . Wall mounted assemblies: 1 - 1.7 m.
    - . Floor mounted assemblies: 200 - 1800 mm.
  - Push-button emergency switching devices: 800 - 1600 mm.
- Equipment on doors: Set out in a logical manner in functional unit groups, so it is accessible without the use of tools or keys.
- Autotransformers: Locate each motor starter transformer in a separate, ventilated compartment.
- Degree of protection: Minimum IP4X.
- Mounting rails: To AS 2756.

**Enclosures**

Steel enclosures:

- General: Minimum 1.6 mm thick zinc-coated sheet steel, coating class Z200.
- Outdoor assemblies: Coating class Z450.

**Insect proofing**

Cover ventilation openings with non-combustible and non-corroding 1 mm mesh.

**Equipment mounting panels**

General: Strong enough to support the weight of mounted equipment. Construct with minimum 3 mm thick metal or non-metallic board with heavy metal angle supports or plates bolted or welded to enclosure sides.

Non-metallic boards: To AS 1795.1.

Front accessible cable zones: 450 mm minimum width.

**Equipment fixing**

Spacing: Provide sufficient thermal, mechanical and electrical clearance between equipment to ensure proper functioning. Provide 50 mm minimum clearance between

- busbars for lifts, fire services and building emergency services; and
- general installation services, busbars and equipment.

Mounting: Bolts, set screws fitted into tapped holes in metal mounting panels, studs or proprietary attachment clips. Provide accessible equipment fixings which allow equipment changes after assembly commissioning.

Installation: For lightweight equipment, provide combination rails and proprietary clips.

**Earth continuity**

Effectively bond equipment and assembly cabinet metal frame to the protective earth conductor. Strip painted surfaces and coat with corrosion resistant material immediately before bolting to the earth bar. Provide serrated washers under bolt heads and nuts at painted, structural metal-to-metal joints.

**Lifting provisions**

For assemblies with shipping dimensions exceeding 1.8 m high x 600 mm wide, provide fixings in the supporting structure and removable attachments for lifting.

**Supporting structure**

Provide concealed fixings or brackets to allow assemblies to be mounted and fixed in position without removing equipment.

**Wall-mounting**

Reinforce at bolt holes. For flush or semi-flush assemblies, provide angle trims of the same material and finish as the enclosure.

**Floor-mounting**

Provide mild steel channel plinth, galvanized to class Z600, with toe-out profile, nominal 75 mm high x 40 mm wide x 6 mm thick, for mounting complete assemblies on site. Drill M12 clearance holes in assembly and channel and bolt assemblies to channel. Prime drilled holes with zinc rich organic primer to GPC-C-29/16.

## 4.2 CABLE ENTRIES

### General

Provide cable entry facilities within assembly cable zones for incoming and outgoing power and control cabling. Provide sufficient clear space within each enclosure next to cable entries to allow incoming and outgoing cables and wiring to be neatly run and terminated, without undue bunching and sharp bends.

### Cover and gland plates

Cover plates: Provide 150 mm maximum width cover plates butted together and covering the continuous cable entry slot.

Gland plates: Provide removable gland plates fitted with gaskets to maintain the degree of protection.

Materials: 1.5 mm thick steel, 5 mm thick composite material or laminated phenolic. 6 mm thick brass for MIMS cables and cable glands.

## 4.3 DOORS AND COVERS

### Width

Maximum: 900 mm.

### Door swing

At least 90°.

### Door stays

General: Provide stays to outdoor assembly doors.

Adjacent doors: Space adjacent doors to allow both to open to 90° at the same time.

### Construction

Provide single right angle return on all sides and fit suitable resilient sealing rubber to provide the degree of protection and prevent damage to paintwork.

### Hanging

Provide corrosion-resistant pintle hinges or integrally constructed hinges to support doors. For removable doors, provide staggered pin lengths to achieve progressive engagement as doors are fitted. Provide 3 hinges for doors higher than 1 m. Provide restraining devices and opposed hinges for non lift-off doors.

### Door hardware

Provide the following:

- Corrosion-resistant lever-type handles, operating a latching system with latching bar and guides strong enough to withstand explosive force resulting from fault conditions within the assembly.
- Dual, edge mounted, corrosion-resistant “T” handles with provision for key locking cylinder.
- Captive, corrosion-resistant knurled thumb screws.

### Locking

General: Incorporate cylinder locks in the latching system. Key alike.

Number of keys: 2 per assembly.

### Door mounted equipment

Protect or shroud door mounted equipment and terminals to prevent inadvertent contact with live terminals, wiring, or both.

### Earthing

Maintain earth continuity to door mounted indicating or control equipment with multi-stranded, flexible earth wire, or braid of equal cross-sectional area, bonded to the door.

### Covers

Maximum dimensions: 900 mm wide and 1.2 m<sup>2</sup> surface area.

Fixing: Fix to frames with at least 4 fixings. Provide corrosion-resistant acorn nuts if the cover exceeds 600 mm in width. Rest cover edges on the cubicle body or on mullions. Do not provide interlocked covers.

Handles: Provide corrosion-resistant “D” type handles.

### Escutcheons

For doors enclosing circuit breakers, provide escutcheon plates as barriers between operating mechanisms and live parts.



**Escutcheon plates**

General: Provide plates or removable covers with neat circuit breaker toggle cut-outs allowing interchangeability of 1, 2 and 3 pole circuit breakers. Provide corrosion-resistant lifting handles or knobs. Provide unused circuit breaker toggle cut-outs with blanking in-fill pole covers.

Maximum dimensions: 900 mm wide and 1.2 m<sup>2</sup> surface area.

**4.4 FACTORY FINISHES****Extent**

Apply protective coatings to internal and external metal surfaces of assembly cabinets including covers, except to stainless steel, galvanized, electroplated, or anodised surfaces and to ventilation mesh covers.

**Finish coats**

Thermoset powder coating or two-pack liquid coating.

**Paint colours**

Standard: To AS 2700.

Colours:

- Indoor assemblies: Manufacturer's standard colour.
- Outdoor assemblies: Avocado green G34.
- Removable equipment panels: Off white Y35.
- Assembly interior: White.

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**5 BUSBARS****5.1 BUSBARS****General**

Provide main circuit supply busbars within assemblies, extending from incoming supply terminals to the line side of protective equipment for outgoing functional units and for future functional units.

**Standards**

To AS 3768, AS 3865 and AS 4388.

**Definitions**

Incoming busbars: Busbars connecting incoming terminals to line side terminals of main switches.

Main circuit supply busbars: Busbars connecting incoming functional unit terminals, or incoming busbars where no main switches are included, to outgoing functional unit terminals or outgoing functional unit tee-offs.

Tee-off busbars: Busbars connecting main busbars to incoming terminals of outgoing functional units.

**Material**

Hard-drawn high-conductivity electrolytic tough pitched copper alloy bars, designation 110.

**Temperature rise limits - active and neutral conductors**

Maximum rated current temperature rise limits: 65 ± 1.5°C by type test or calculation to AS 3768 or AS 4388.

Maximum short-circuit withstand current temperature rise limits: 160°C by calculation to AS 3865.

**Cross section**

Rectangular with radiused edges.

**Supports**

General: Sufficient to withstand thermal and magnetic stresses due to maximum prospective fault currents.

Material: Non-hygroscopic insulation capable of holding busbars at 105°C.

**Phase sequence**

For main busbars and connections to switching devices, set-out phase sequence for phases A, B and C, from left-to-right, top-to-bottom and back-to-front when viewed from the front of the assembly.

**Colour coding**

General: Provide 25 mm minimum width colour bands permanently applied to busbars at 500 mm maximum intervals with at least one colour band for each busbar section within each compartment.

Active busbars: Red, white and blue respectively for the A, B and C phase.

Neutral busbar: Black

MEN link: Green-yellow and black.

Protective earth busbar: Green-yellow.

Restrictions: Do not provide adhesive type colour bands.

**Busbar systems**

Type: Multi-pole proprietary busbar assemblies or busbar systems, verified for short circuit capacity and temperature rise-limits by type tests.

**Current carrying capacity**

Active conductors: Take into account thermal stresses due to short circuit current, assuming magnetic material enclosures located indoors in well-ventilated rooms and 90°C final temperature.

Neutral conductors: Size to match incoming neutral conductor current carrying capacity.

Protective earth conductors: Size for at least 50% of the rated short circuit withstand current for 100% of the time duration.

**Tee-off busbars current rating**

For individual outgoing functional units: Equal to maximum frame size rating of the functional unit.

For multiple functional units: Equal to the diversity factors of AS 3439.1, based on frame size rating.

**MEN links**

MEN links  $> 10 \text{ mm}^2$  in section: Bolted removable busbar links stamped "MEN LINK", located in the incoming compartment, between neutral and earth busbars.

**Fault current limiters**

Rate busbars connected to fault current limiters to 100% of the indicated fault current limiter circuit breaker frame size or fuse base rating.

**Busbar links**

For current transformers, provide removable busbar links  $\leq 450 \text{ mm}$  long.

**Cable connection flags**

General: Provide and support busbar flags for equipment with main terminals too small for cable lugs. Provide flags sized to suit cable lug termination, with current rating of at least the maximum equipment frame size.

Phase isolation: Provide phase isolation between flags where the minimum clearance distances phase-to-phase and phase-to-earth are below the component terminal spacing.

**Future extensions**

Pre-drill the main circuit supply busbar for future extensions and extend busbar droppers into future functional unit locations.

**Jointing**

Type: High tensile steel bolts, washers and nuts, with lock nuts or locking tabs. Do not use tapped holes and studs or the like for jointing current carrying sections.

**Busbar insulation**

Active and neutral busbars and joints: Select from the following:

- Polyethylene: At least 0.4 mm thick with dielectric strength of 2.5 kV r.m.s for 1 min, applied by a fluidised bed process in which the material is phase coloured and directly cured onto the bars.
- Close fitting busbar insulation mouldings at least 1 mm thick.
- Heat shrink material: Only on rounded edge busbars.

Taped joints: Apply non-adhesive stop-off type tape, coloured to match adjacent insulation and half lapped to achieve a thickness at least that of the solid insulation.

Damaged insulation: Repair damaged insulation before energising.

**6 MAIN SWITCHES**

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**6.1 SWITCH-ISOLATOR AND COMBINATION FUSE-SWITCH UNITS****Standard**

To AS 3947.3.

**Type**

Poles: 3.

Rated current: To suit unit installed in enclosure.

**Rated fault capacity**

Short circuit making capacity: At least the fault level at assembly incoming terminals.

Breaking capacity: At least the rated full load current.

**Utilisation category**

Circuits consisting of motors or other highly inductive loads: At least AC-23.

Other circuits: At least AC-22.

**Rated duty**

Uninterrupted in non-ventilated enclosure.

**Operation**

Independent manual operation including positive “ON/OFF” indicator.

**Locking**

Provide for padlocking in the “OFF” position.

**Handles**

Removable only when switch is in open position.

**Construction**

General: Either

- totally enclosed; or
- with full and direct shrouding to fixed live parts of switches and fuses, so that insertion of a screwdriver does not cause faults between phases.

Shrouding: Effective over range of air break switch positions.

Incorporate the following:

- Earthing terminal.
- Neutral link mounted within unit.
- Contact position clearly indicated whether cover is in place or not. For fuses mounted in withdrawable carriage ensuring isolation from supply before access to fuses is possible, secondary indication may be omitted.

**Fuse-switch units**

General: Provide an extended operating handle, at least 100 mm above the floor, which remains clear of other equipment over the range of positions.

Fuse links: Isolated when switch contacts are open. Provide 3 phase sets of high rupturing capacity (HRC) fuse links.

**6.2 AUTO-TRANSFER SWITCHES****Standard**

To AS 3947.6.1.

**Type**

3 pole automatic type with supervisory circuits which initiate and restore the changeover transfer operation.

**Load side connections**

Segregate from incoming side.

**Classification**

Contactors: PC.

Circuits: CB.

**Circuit breakers**

Comply with *Moulded case and miniature circuit breakers*, in the *Circuit breakers* subsection. Do not provide non-auto circuit breakers.

**Contactors**

Comply with *Contactors*, in the *Controlgear* subsection.

**Interlocks**

Provide electrical and mechanical interlocks.

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**7 CIRCUIT BREAKERS**

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**7.1 AIR CIRCUIT BREAKERS****Standard**

To AS 3947.2.

**Type**

Open construction, withdrawable 3 pole, back connected, trip free.

**Rated duty**

Based on uninterrupted duty in a non-ventilated enclosure.

**Utilisation category**

Type B for partial and full discrimination.

**Rated service short-circuit breaking capacity**

At least the fault level at incoming terminals of the assembly.

**Closing operation**

Provide trip free closing mechanisms for operation, with positive mechanically operated “ON/OFF” indications.

**Opening operation**

Provide mechanically operated release for opening.

**Auxiliary switch contacts**

Provide contacts with minimum rated operational current of 6 A at 240 V, 50 Hz.  
Provide at least one spare normally-open and one spare normally-closed contact.  
Provide shunt trip release coil circuits with an early-make/late-break series connected auxiliary contact.

**Protection system**

Integral to the circuit breaker, incorporating a solid state protection relay.

**Compartment**

House each circuit breaker in a separated self-contained enclosed subsection module within the assembly.

**Locking**

Provide for circuit breakers to be padlocked in the open position.

**Interlocking**

Electrical: Interlock control circuitry of functional units with normally-opened and normally-closed auxiliary contacts.

Mechanical: Required.

- Coded key: Captive type with squared face key with alphabetical or numerical coded operating face.

**Door interlock**

Except for compartment doors serving only as covers, provide interlocks preventing compartment doors being open while circuit breakers are closed.

**Abnormal operations**

Provide breakers which cannot be used in the following operations:

- Slow closing or opening of contacts.
- Manual independent hand closure, if springs fail.
- Release of charged springs while contacts are closed.

**Withdrawable type**

Mounting: Mount circuit breaker on a withdrawable carriage with racking gear for racking in or withdrawing, and for positively fixing the unit into any of the 3 following positions:

- Connected.
- Test/isolated.
- Disconnected.

Auxiliary contacts: Provide contacts which remain connected in the test/isolated position.

Interlocking: Provide interlocking which prevents circuit breaker being racked in or withdrawn unless it is in a tripped condition and prevents the circuit breaker being closed unless located in either the connected or test/isolated position. Provide stored energy devices which are automatically discharged by any racking operation.

Shutters: Provide automatic shutters, which can be padlocked, covering busbar and incoming/outgoing circuit connections and labelled “*BUSBARS*” and “*CIRCUIT*” respectively.

Earthing: Provide earthing connection between withdrawable carriage and assembly earth busbar which makes before, and breaks after, other contacts on the circuit breaker carriage.

#### **Maintenance**

Provide for slow closing of the circuit breaker and for adjustment when disconnected.

### **7.2 MOULDED CASE AND MINIATURE CIRCUIT BREAKERS**

#### **Type**

Fault capacity  $\geq 10$  kA: To AS 3947.2.

Fault capacity  $< 10$  kA, current rating  $< 100$  A: Miniature overcurrent circuit breakers.

#### **Mounting**

Mount circuit breakers so that the “*ON/OFF*” and current rating indications are clearly visible with covers or escutcheons in position. Align operating toggles of each circuit breaker in the same plane.

#### **Utilisation category**

Non-discrimination: Type A.

Partial or full discrimination: Type B.

#### **Adjustable current settings**

General: If trip current adjustment control is exposed with covers in position, provide for sealing to prevent tampering.

Labels: Provide labels indicating trip settings.

#### **Trip settings**

Adjustable short circuit trip settings: Set to the low position.

#### **Trip units**

Circuit breakers with interchangeable and integrally fused trip units: Connect so that trip units are not live when circuit breaker contacts are open.

#### **Locking**

Provide for locking circuit breakers in the open position.

#### **Clip tray chassis**

For miniature overcurrent circuit breakers provide clip tray assemblies capable of accepting single, double, or triple circuit breakers, and related busbars. Provide moulded clip-on pole fillers for unused portions.

#### **Accessories**

Rotary handle: Provide “*ON/OFF*” indication, and override release to open door padlocking facility.

Motor operators: Provide selector switches, controls and indicators.

Auxiliary contacts: Minimum rating 5 A.

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## **8 LINKS**

### **8.1 NEUTRAL AND EARTH LINKS**

#### **Terminals**

Provide terminals for future circuits.

#### **Links**

Assembly capacity  $> 36$  poles: Provide neutral and earth links at the top and bottom of the circuit breaker section.

Assembly capacity  $\leq 36$  poles: Provide links at the point of entry of incoming supply cables.

Mounting: Mount neutral links on an insulated base.

Control circuits: Provide separate neutral and earth links.

Labels: Provide labels for neutral and earth terminals.

**Cables  $> 10 \text{ mm}^2$**

Provide bolts or studs.

## 9 INTERNAL WIRING

### 9.1 WIRING

**Cable type**

0.6/1 kV copper cables. Provide V-90HT insulation where directly connected to active and neutral busbars.

**Cable interconnections**

General: For the main circuit supply, provide cable interconnections as follows:

- 1.5 mm<sup>2</sup> (minimum) internal cables, with minimum V75 insulation rating with stranded copper conductors rated to AS 3008.1.1. Provide cables with current ratings suitable for the internal assembly ambient air temperature and for temperature rise limits of equipment within the assembly.
- Run cables clear of busbars and metal edges.
- Provide cables capable of withstanding maximum thermal and magnetic stresses associated with relevant fault level and duration.
- Run cables neatly. Provide slotted trunking sized for future cables or tie at 150 mm maximum intervals with ties strong enough to withstand magnetic stresses created at the specified fault current. Do not provide adhesive supports.
- Ensure wiring for future equipment can be installed without removal of existing equipment.
- Identify power and control cables at both ends with neat fitting ring type ferrules agreeing with record circuit diagrams. Mark to AS/NZS 4383.
- Terminate control cables and motor control circuits in tunnel terminals or, if necessary, provide suitable palm type lugs and correct crimp tool.
- For equipment mounted on hinged doors run cables on the hinge side to avoid restricting the door opening. Bundle cables with spiral wrap PVC.
- If recommended by device manufacturers, provide shielded wiring.

Adjacent circuit breakers: If suitable proprietary multi-pole busbar assemblies are available to link adjacent circuit breakers, do not provide cable interconnections.

**Cables  $> 6 \text{ mm}^2$**

Terminations:

- Tunnel terminals: Single cables.
- Other connection points or terminals:  $\leq 2$  cables.

Doors: Do not run cables to hinged doors or removable panels.

Supports:

- Spacing at enclosure:  $\leq 200$  mm from a termination.
- Spacing generally:  $\leq 400$  mm.
- Strength: Capable of withstanding forces exerted during fault conditions.

Single core cables rated  $\geq 300$  A: Do not provide ferrous type metal cable saddles.

Marking: Terminate marked cables for connection to external controls in correspondingly marked terminals within the assembly.

**Control and indication circuits**

General: Provide conductors sized to suit the current carrying capacity of the particular circuit.

Minimum size: 1 mm<sup>2</sup> with 32/0.2 stranding.

**Cable colours**

Colour code wiring as follows:

- A phase: Red.

- B phase: White.
- C phase: Blue.
- Neutral: Black.
- Earthing: Green-yellow.

## 9.2 TERMINATIONS

### Submains, light and power circuits

Connect direct to the circuit breaker terminals.

### Other circuits

Connection to circuits  $\leq 16 \text{ mm}^2$ : Provide DIN-type tunnel terminal blocks.

Connection to circuits  $> 16 \text{ mm}^2$ : Provide stud-type terminals  $\geq 5 \text{ mm}$  diameter, sized to continuously carry the load.

Cables  $> 70 \text{ mm}^2$ : Stud type terminals, fixed to a DIN-type or G rail.

Tunnel terminals: Provide insulated sleeve ferrules to flexible cables terminated in tunnel terminals.

Identification: Identify cables at both ends with neat ring-type ferrules.

Type: Screw-tightened, clip-on, 35 mm DIN-type, flexible, non-flammable and, as a minimum, suitable for the insertion of a screwdriver blade.

Shrouded terminations:

- Form 4 separation : Cut and shaped polycarbonate solid sheet rigidly fixed into position, with cable cut-outs to underside.
- Degree of protection: IP2X minimum.

Location: Locate terminals to provide ready access to outgoing terminations.

Mounting rails: Screw or rivet mounting rails to assembly at  $\leq 500 \text{ mm}$  centres.

Provide sufficient length to accept a further 20% terminals or 3 terminals, whichever is the greater.

- Arrangement: Terminate internal wiring to one side of the terminal block, leaving the other side for outgoing circuits.
- Grouping: Provide separate terminal groups for final subcircuit and control wiring. Provide oversized barriers between each group of terminals having different voltages and terminal size.
  - . Terminals for power wiring: 3 phases or single phase and neutral.
  - . Control terminals: In alphabetical or numerical order of wire identification, with the lowest number or letter next to the power terminals.
- Shipping breaks: Provide terminal blocks for interconnecting wiring on each side of shipping breaks.

## 10 MEASUREMENT ACCESSORIES

### 10.1 CURRENT TRANSFORMERS (METERING)

#### Standard

Measurement current transformers: To AS 1675.

#### Test links

Provide test links for connection of calibration instruments and meters and for shorting of current transformer secondaries. Provide energy meters, maximum demand meters, ammeters and protection relays, with sets of rail-mounted links consisting of screw-clamped slide links and an earth link.

#### Test studs

For energy and demand meters provide rail-mounted potential test studs or plug connections next to associated current transformer links. Provide at least one set of test studs for each compartment.

#### Accuracy classification

Energy measurements: Class 0.5M.

Indicating instruments: Class 2M.

#### Ratings

Rated short time current: At least the short time withstand current equivalent of the circuit in which the transformer is installed.

Rated primary current: At least equal to the current rating of the functional unit.

Secondary windings: Rated at 5 A, burden of 0.4  $\Omega$  (10 VA) with star point earthed.

**Type**

If practicable, cast resin encapsulated window-type with busbar clamping devices. Otherwise wound-primary type with mounting feet.

**Installation**

General: Install transformers to permit easy removal.

Removable links: Provide removable links of minimum lengths for transformers fitted on busbar systems.

**10.2 INSTRUMENTS AND METERS****Electricity meters**

Energy demand type induction watthour meters: To AS 1284.3.

General purpose electronic induction watthour meters: To AS 1284.5.

General purpose induction watthour meters: To AS 1284.1.

Socket mounting system: To AS 1284.4.

**Construction**

Indicating and recording instruments: Provide damped movements and impact resistant glass cover. Provide for external adjustment of the zero. Support moving elements of indicating instruments between shock resistant jewel bearings.

Transducers: Totally enclose in flame-retardant, rail-mounted moulded cases.

- Minimum degree of protection: IP52.

**Meter scales**

Direct reading analogue type with black lettering on white background with black pointer, capable of indicating the maximum value of the measured variable.

**Transducers**

If necessary for transducer operation, provide auxiliary supply. Connect outputs to dedicated rail-mounted isolating type terminals.

**Accuracy**

Indicating instruments and accessories: Accuracy class 1.5 or lower class index number except Class 3 for thermal maximum demand indicators.

Electricity meters: Class 0.5.

Power factor meters, phase angle meters and synchrosopes: 2 electrical degrees maximum error.

Transducers: Class 0.5.

**Accessories**

General: Mount next to associated instruments, inside cabinets.

Power distribution assemblies: Provide meters of the same style and size, with bezel minimum 96 x 96 mm and 90° quadrant scale.

Motor control assemblies: On motor starter modules, provide bezel 72 x 72 mm with 90° quadrant scale.

**Mounting**

Flush mount meters on hinged panels. Wire with multi stranded flexible cables.

**Protection devices**

Meter potential protection devices: Group together behind associated meter cover or hinged door, preferably next to current transformer test links.

**Labels**

If associated exclusively with one phase, label meters “RED”, “WHITE”, or “BLUE” as applicable.

**Ammeters**

Type: Moving iron type oil dampened for motor starter circuits.

Overscale: For ammeters subject to motor starting currents, overscale to at least 5 x full load current.

Selector switches: 4-position type with positions designated “R/W/B/OFF”. Mount under or next to relevant ammeters.



**Maximum demand indicators**

General: Provide a meter in each phase with 15 minute response time. Provide for sealing the reset mechanism. Provide a combination 3 point indicator consisting of an instantaneous red ammeter pointer, a red maximum demand slave pointer with external reset facility, and a white maximum demand pointer.

Instantaneous type: Combined type with bi-metal maximum demand ammeter element and moving iron instantaneous ammeter element.

Thermal type: Combined type with bi-metal maximum demand ammeter element.

**Accuracy class**

Instantaneous: Class 1.5.

Maximum demand: Class 3.

**Voltmeters**

Type: Moving iron.

Selector switches: 7-position voltage transfer type for measurement of phase-to-phase and phase-to-neutral voltages with off. Mount under or next to relevant voltmeters.

**Wattmeters and varmeters**

Suitable for balanced 3 phase, 4 wire loads. Connect to measurement transducers.

**Hours-run meters**

Synchronous motor driven with 6 figure (minimum) cyclometer dial with last digit read-out in 0.1 hour increments.

**Scale**

Horizontal linear digits.

**Watt-hour meters**

Type: Rotating element induction disc type or electronic type.

3 phase metering: Polyphase meters suitable for balanced 3 phase, 4 wire loads.

1 or 2 phase metering: Single phase meters.

Current rating: To suit load and overload conditions. Provide direct connect meters suitable for current range of 15 - 100 A and meters with current transformers suitable to 5 A secondary.

Register: Provide a direct reading register of the large figure type. Mark on the scale the metering transformer ratios and the multiplying factor applied to the meter constant.

Covers: Seal main covers.

**Frequency meters**

Type: Either an analogue type, or vibrating reed type with 7 reeds.

Analogue type: Graduated in 0.1 Hz increments.

Scales:

- Analogue: Graduated 45/65 Hz.
- Vibrating reed: Horizontal reed bar graduated 47/53 Hz.

**Synchrosopes**

General: Continuously rated, rotating vane type movement, with spring loaded bearings and silicon fluid dampening, positive and negative arrows, black pointer and 12 o'clock marking.

Scales: 360°.

**Phase angle meters**

General: Provide for 3 phase, 4 wire balanced loads.

Scales: 0.5 leading to 0.5 lagging.

**10.3 INDICATOR LIGHTS****Standard**

To AS 3947.5.1.

**Degree of protection**

At least that of the assembly/operating face.

**Incandescent indicators**

Type: Incandescent oil tight type minimum 22 mm diameter or 22 x 22 mm.

Lamps: Changeable from front of panel without removing the holder.

Lamp rating: 1.2 - 5 W.

**Neon indicators**

240 V, 12 mm diameter with in-built resistor.

**LED indicators**

12 or 24 V as necessary, in corrosion-resistant bezel, nominal 5 mm diameter.

**Press-to-test**

Compartments/subsections with < 5 indicating lights: Provide each indicating light with a fitted integral press-to-test lamp actuator.

Compartments/subsections with  $\geq 5$  indicating lights: Provide a common press-to-test lamp push-button.

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## 11 SWITCHGEAR ACCESSORIES

### 11.1 CIRCUIT BREAKER INTEGRAL PROTECTIVE RELAYS

**General**

Provide integral protective relays which provide for tripping in the event of relay operation, and for manually resetting. Provide operation indicators with a set of change over voltage free alarm contacts, for connection to an alarm circuit.

**Mounting**

Integral type: Readily accessible for viewing and adjustment with doors and covers in position.

External type: Flush.

### 11.2 CURRENT TRANSFORMERS (PROTECTION)

**Standard**

To AS 1675.

**Type**

Cast resin encapsulated window type with busbar clamping devices.

**Rated short time current**

At least the short time current equivalent to the assembly fault level.

**Rated short-time**

At least the maximum time setting of the related protective relay. Minimum 1 s.

**Rated primary current**

Equal to assigned current rating of the associated functional unit.

**Rated secondary current**

5 A. Connect star point to earth.

**Interposing transformers**

As recommended by the protective relay manufacturer.

**Characteristics**

As recommended by the protective relay manufacturer.

**Test links**

Provide test terminals and current transformer secondary shorting links in accessible positions within instrument panels. Provide a set of DIN-type rail mounted test links, consisting of screw clamped slide links and earth links, for each current transformer group.

**Installation**

General: Install transformers to permit easy removal.

Removable links: Provide removable links of minimum lengths for transformers fitted on busbar systems.

Markings: Mount transformers in the assembly enclosure, so that polarity markings and nameplate details are readily viewed right side up without removing the transformers.

### 11.3 RESIDUAL CURRENT DEVICES

**Integral type**

General: Incorporate earth leakage in circuit breaker protection operation.

Mounting: Comply with *Moulded case and miniature circuit breakers*, in the *Circuit breakers* subsection.

#### **Tripping**

Residual current classification: Type II.

Maximum tripping current: 30 mA.

### **11.4 FUSES WITH ENCLOSED FUSE LINKS**

#### **Standards**

To AS 2005 Parts 21.1, 21.2, 29 and 40.

#### **General**

General: Provide fuses suitable for the fault level at the assembly, and which discriminate with other protective equipment.

Let-through energy and peak cut-off current: To suit protected equipment.

#### **Utilisation category**

Motor circuits: gG, gM or aM.

Back-up protection: gG.

Distribution/general purpose: gG.

#### **Fuse-holders**

Mount fuse-holders so that fuse carriers may be withdrawn directly towards the operator and away from live parts. Provide fixed insulation which shrouds live metal when the fuse carrier is withdrawn.

#### **Unenclosed fuses**

Provide barriers on both sides of each fuse link, preventing inadvertent electrical contact between phases by the insertion of screwdriver.

#### **Fuse links**

Type: Enclosed, high rupturing capacity type mounted in a fuse carrier. If necessary for safe removal and insertion of the fuse carrier, provide extraction handles. Mount on clips within the spares cabinet.

Identification: Clearly indicate Australian manufacturer or distributor.

#### **Busbar mounted fuse holders**

Provide fuse carriers with retaining clips, minimum fuse holder 32 A.

#### **Spares**

Provide 3 spare fuse links for each rating of fuse link on each assembly. Mount spares on clips within the spares cabinet.

## **12 CONTROL GEAR**

### **12.1 CONTACTORS**

#### **Standard**

A.c. and d.c. contactors: To AS 3947.4.1.

#### **Type**

Block type, air break, electro-magnetic.

#### **Poles**

Number: 3.

#### **Minimum rated values**

Rated operational current: Full load current of the load controlled.

Rated duty:

- Motors: Intermittent class 0.1.
- Heater banks: Intermittent class 1.

Rating: 16 A.

Mechanical endurance: 10.

Utilisation category:

- Motors: AC-3 or DC-3.
- Heater banks: AC-1 or DC-1.

Contacts life: 1 million operations at AC-3 or DC-3.

**Auxiliary contacts**

General: Provide auxiliary contacts with at least one normally-open and one normally-closed separate contacts with rating of 6 A at 240 V a.c.

Utilisation category: AC-1.

Slave relay: If the number of auxiliary contacts exceeds the number which can be accommodated, provide a separate slave relay.

**Mounting**

Mount with sufficient clearance to allow full access for maintenance, removal and replacement of coils and contacts, without the need to disconnect wiring or remove other equipment.

**Interconnection**

Do not connect contactors in series or parallel to achieve ratings.

**12.2 ALTERNATING CURRENT MOTOR STARTERS****Selection**

Unless regulatory limitations on starting currents preclude their use, provide direct-on-line starters.

**Minimum rated values**

Rated operational current: The full load current of the load controlled.

Rated duty: Intermittent class 0.1.

Utilisation category: AC-3.

Mechanical endurance: 3.

**Direct-on-line starters**

Standard: To AS 3947.4.1.

Type: Direct-switching electromagnetic contactor.

Overload protection: Thermal overload unit giving overload protection in each phase of supply.

**Reversing starters**

Comply with **Direct-on-line starters** and the following:

- 2 main line contactor, mechanically and electrically interlocked to prevent simultaneous closure.
- Triple pole thermal overload relay.
- Time delay relay with nominal 0 – 30 s adjustable time delay, to prevent plugging of the motor.
- Emergency stop push-button.

**Multi-speed starters**

Comply with **Direct-on-line starters** and the following:

- Mechanically and electrically interlocked.
- Time delay relay with nominal 0 - 30 s adjustable time delay.
- Separate thermal overload protection for each speed configuration.

**Star-delta starters**

Standard: To AS 3947.4.1.

Controlgear: Provide electromagnetically operated controlgear incorporating the following:

- Main line contactor or equivalent.
- Star and delta contactors mechanically and electrically interlocked to prevent simultaneous operation.
- Triple pole thermal overload relay, fitted to line contactor. If overload is connected into motor phase winding circuits, provide a name plate fixed to starter, stating full load current of motor phase winding.
- Time delay relay with nominal 0 – 30 s adjustable time delay, to control the star to delta switching contactors.

**Autotransformer starters**

Standard: To AS 3947.4.1.

Type: Parallel closed transition type to AS 1202.3 Diagram B1, Appendix G, with 3 poles of the start contactor (K1) and the run contactor (K3) to prevent simultaneous closing.

Set-up: Include the following:

- 3 phase autotransformer tapped at 50%, 65% and 80% and rated for enclosed operation. House each transformer in a separated compartment.
- Triple pole thermal overload relay with manual reset.
- Start, autotransformer and run contactor.
- $\leq 15$  kW: Provide each winding with a thermostat, manual reset and amber warning indicator light.
- $> 15$  kW: Set of 3 embedded thermistors to protect the autotransformer, with manual reset, operating relays and amber warning indicator light.
- Time delay relay with nominal 0 – 30 s adjustable time delay, to control the start and run contactors.

#### **Secondary resistance starters**

Standard: To AS 3947.4.1.

Type: Rheostatic rotor starters.

Number of accelerating steps: At least 3.

Construction: Mount air cooled resistors in separated ventilated enclosures matching appearance of other starter cabinets. Label resistor tapplings and identify connecting wiring with heat resisting tags.

Overheat protection: Provide a thermostat or thermistor operated relay to isolate starter in the event of resistor overheating. Locate measurement device in optimum position to detect abnormal heating.

Overheat indication: Warning light in starter cabinet.

#### **Semiconductor starters**

Standard: To AS 3947.4.2.

Characteristics: Provide gate firing circuits and overtemperature sensors in each phase. Provide automatic voltage control to suit load, variable control of starting current and torque, adjustable starting current limit, and silicon control rectifier (SCR) loss-of-phase protection.

Voltage regulation: Electronically controlled thyristors.

#### **Part winding starters**

To suit requirements of the machine manufacturer, with suitable motor protection devices.

### **12.3 VARIABLE SPEED DRIVE CONTROLLERS**

#### **Standard**

To AS 3947.4.2.

#### **General**

Provide high efficiency, variable motor controllers.

#### **Type**

General: Microprocessor designed, solid state electronic type, providing motor speed control of 3 phase squirrel cage induction motors by means of variable frequency, stepless sine wave output.

Controller: Offering speed ranges suitable for the load duties.

#### **Operating temperatures**

Ensure stable operation under the following operating temperatures:

- Full load: 50°C (maximum) ambient for continuous full load operation.
- Normal range: -10 to + 50°C.

#### **Selection**

Select to suit full load current stated on motor nameplate.

#### **Characteristics**

Local operator panel: Provide facilities for local display and control, including

- indication of run condition, motor speed or output frequency, input control parameters, output current and voltage, and alarm conditions;

- light emitting diode indication of power on, zero speed, enable, earth fault, short circuit, over current, under voltage, over temperature and remote trip;
- facilities for automatic/off/manual control;
- local and remote analog input, to control frequency output of controller when in manual or automatic mode; and
- for remote control, interfaces for analog input and output associated with speed control, start/stop, and voltage free contacts for alarm fault indication.

Safety protection: Include protection against the following:

- Instantaneous power failure.
- Instantaneous over current.
- Internal and external overload.
- Under and over voltage.
- Over temperature of the controller.
- Earth fault.
- Contact with live parts with door open.

Design: Provide the following:

- Soft start (initially start motors on low speed).
- Adjustable maximum current limit.
- Radio frequency suppression, harmonic and line transient filtering.
- Automatic reset/restart of system after removal of fault or power failure condition. If the number of reset/restart attempts is limited for safety and equipment protection, provide for safe shut down and manual restart in the event of an unsuccessful attempt to reset/restart.
- Ability to immediately restart a motor following momentary interruption of supply, even if the motor is rotating.
- Main line contacts.

#### Enclosure

Install each controller, together with associated equipment, in separate ventilated subsections with hinged door or forced fan ventilated with air filtering as necessary, meeting the level of separation for the overall enclosure.

### 12.4 MOTOR PROTECTION

#### General

Provide over-current protection as part of the equipment assembly for each motor starter.

#### Thermal overload protection relays

Standard: To AS 3947.4.1.

Construction: Comply with *Current transformers (protection)*, in the *Switchgear accessories* subsection. For 3 phase operation provide triple pole relays with differential trip bar operation for single phase protection, and ambient temperature compensation. Provide the following:

- One normally-open and one normally-closed set of auxiliary contacts with minimum operational current of 4 A at 240 V a.c.
- Thermal overloads connected directly to contactor by means of proprietary links, except where operated separately by current transformers.
- Current transformers to operate protection type thermal overloads, saturating at 10 - 15 x full load current, Class 10P.

Mounting: Ensure relays are not affected by the shock of mechanical contactor operation. Provide sufficient clear space for the disconnection, removal and replacement of heaters, without disconnecting other equipment and wiring.

Reset: Manual.

#### Single phase motor protection

Comply with **Thermal overload protection relays** and provide overload units matching the motor heating curve characteristics.

#### 3 phase motor protection

Provide thermal overload protection relays for each motor, or select one of the following:

- Thermistor overload relay with thermal overload relay.
- Electronic motor protection relay.
- Programmable electronic motor protection relay.

**Thermistor protection relays**

Standard: AS 1023.1.

Thermistor control unit: Compatible with thermistor installed in the motor.

Contacts: Provide at least one normally-open and one normally-closed set of contacts rated at the starter control circuit voltage and minimum 4 A. Connect contacts to open the starter at the setting temperature.

Utilisation category: AC-11.

Type: Automatic reset following power failure. Arrange the circuit so that thermistor failure, failure of other control system components, or excessive winding temperature, causes the motor circuit to trip.

Reset: Manual, to restore the motor circuit when tripped due to excessive winding temperature.

Light emitting diode indication: Provide on the thermistor control unit, to indicate that circuit is in normal operating mode.

**Electronic motor protection relays**

Standard: AS 3947.4.1.

Characteristics: Provide the following:

- Single phasing protection and phase sequence protection.
- Thermal overload protection.
- Loss of load protection.
- Excessive motor run-up and stall protection.
- Earth fault protection.
- Adjustable settings of protection parameters: LED indication of fault conditions.
- Manual reset.
- One normally-open and one normally-closed set of auxiliary contacts with minimum current rating of 4 A at 240 V a.c.
- Facilities for relay testing.

**Current transformers**

Comply with *Current transformers (protection)*, in the *Switchgear accessories* subsection. Saturating at 10 - 15 x full load current, Class 10P. Provide adjustment facilities allowing matching of current transformer characteristics.

**Programmable electronic motor protection relays**

Characteristics: Provide the following:

- Programmable micro-processor based protection: Comply with **Electronic motor protection relays**.
- Diagnostic data gathering and retrieval to determine the cause of shut-down.
- Interrogation and display of data to give actual running conditions at time of interrogation.
- Non-volatile memory retaining program and data upon loss of power.
- RS422 communications port.
- Programming key pad.
- Software for communications with IBM-compatible personal computers.

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**13 CONTROL GEAR ACCESSORIES**

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**13.1 CONTROL AND TEST SWITCHES****Standards**

To AS/NZS 3947.1 and AS/NZS 3947.5.1.

**Rated operational current**

Utilisation category: AC-22 to AS 3947.1.

**Degree of protection**

At least the degree of protection for the assembly.

**Push-buttons**

Type: Oil-tight, minimum 22 mm diameter, or 22 x 22 mm.

Rated operational current: At least 4 A at 240 V a.c.

Marking: Identify functions of each push-button. For latched “STOP” or “EMERGENCY STOP” push-buttons, state instructions for releasing latches.

Illuminated push-buttons: Comply with *Indicator lights*, in the *Measurement accessories* subsection.

**Rotary switches**

General: Cam operated type with switch positions arranged with displacement of 60°.

Off position: Locate at the 12 o'clock position. Test positions must spring return to off position.

Rated operational current: At least 6 A at 240 V a.c.

Escutcheon plates: Provide rectangular plates securely fixed to the assembly panel. Identify switch position and function.

**Time switches - dial type**

Operation: 7 day with synchronous motor or electronically controlled drive from 240 V 50 Hz supply. Provide day omit and manual override facilities.

Mains failure operation: Either by

- 24 hour spring; or
- battery with 100 hour minimum operating capacity and guaranteed 10 year minimum life.

Contact rating: 16 A at 240 V a.c.

Construction: Provide readily accessible means of adjustment. Provide operational settings which are clearly visible when switch cover is fitted.

Dial: Either analogue with 2 hands, or digital with hour and minute display.

**Proximity switches**

To AS/NZS 3947.5.2.

**13.2 CONTROL RELAYS****Standards**

To AS/NZS 3947.5.1.

**Operation**

Suitable for continuous operation. Select relays in compliance with the **Control relay selection table**.

**Control relay selection table**

Relay type	Min. mech. life (million operations)	Base	Min. contact rating	Inter-changeable	Min. no. of contact elements
1	5	Plug-in	1.25I <sub>L</sub>	Yes	2
2	10	Plug-in	5 A at 240 V	Yes	2
3	10	Fixed mounting	5 A at 240 V	Yes	4

**Construction**

Latch plug-in types to receptacle bases with captive clips which can be applied and released without using tools.

**Contact elements**

Type: Electrically separate, double break, silver alloy, non-welding contacts.

Utilization category:

- Alternating current: AC-15.
- Direct current: DC-13.



Configuration: For standard relays, provide assemblies with at least 2 sets of contacts and expandable to 8 sets of contacts in the same assembly. Provide at least one normally-open and one normally-closed contact.

On site conversion: Provide contact blocks readily convertible to either normally-open or normally-closed contacts.

**Time delay relays**

Adjustable over the full timing range with timing repeatability within  $\pm 12.5\%$  of nominal setting.

**Electronic relays**

Incorporate light emitting diodes indicating energisation states of relays.

**Pneumatic relays**

Provide sealed chamber type with internal circulating air with linear calibrated time adjustment.

**Synchronous relays**

Provide synchronous motor drive type relay fitted with anti-stalling device which protects gearing during normal operation.

**Phase failure relays**

General: Provide separate solid-state phase failure relays which release at

- 85% of normal voltage;
- single phase failure; or
- reverse phase sequence after an appropriate time delay.

Sensing circuit: Rejects induced voltage spikes, and disturbances with frequencies other than 50 Hz.

Back-up protection: Provide high rupturing capacity fuses to each phase.

**13.3 PROGRAMMABLE LOGIC CONTROLLERS****General**

Provide complete programmable logic controllers including central processing unit, input/output modules and mounting hardware, and which

- are modular in construction and of the same manufacture, with interchangeable peripherals and software;
- have an integral power supply of sufficient capacity to satisfy the requirements of the central processing unit and input/output module combinations which can be located within the mounting hardware;
- are designed and constructed to operate in electrically noisy environments; and
- are located in the low voltage control section of the associated functional unit.

**Central processing units**

General: Provide the following:

- Separate run, monitor and program functions.
- Operating system: Stored in non-volatile memory.
- Programmed software: Stored so that loss of power to the unit for a period up to 1 year will not cause corruption of data and will allow automatic restarting and correct operation immediately on power restoration.

Inputs and outputs (minimum):

- External inputs: 24.
- External outputs: 16.
- Internal relays: 128.

**Input/output modules**

Status: Clearly identified and indicated by a light emitting diode.

Diodes: Not obscured by assembly wiring.

Analogue input: 4 - 20 mA or 0 - 10 V d.c., opto-isolated.

Analogue output: 4 - 20 mA or 0 - 10 V d.c., into a burden of  $\geq 600 \Omega$ .

Digital input: 24 V d.c., opto-isolated.

Digital output: Volt-free relay contacts or opto-isolated solid state switches for switching an output load of at least 2 A at 24 V a.c. or d.c.

**Programmer**

Operation: Using ladder logic, allowing for editing without the need to re-enter the whole program. Include test and monitoring functions which facilitate testing, running and debugging of software and provide for input/output number check.

Hand-held programmers: Provide moulded connectors and 2 m connection cable.

**13.4 INDICATING COUNTERS****General**

Provide the following:

- At least 6 digits.
- Digits at least 3.5 mm high.
- Continuous duty rated.
- Non-reset type.
- 500 V surge diverters.

**13.5 EXTRA-LOW VOLTAGE TRANSFORMERS****General**

Provide the following:

- Centre tap on secondary winding.
- Primary and secondary windings wired out on opposite sides of transformer case.
- Primary and secondary windings separated by means of an earthed screen wired out to an insulated terminal.
- Output loading  $\leq 80\%$  of transformer continuous rating, taking account of degree of ventilation and ambient temperature within assembly, and supplied load.

**13.6 ALARM ANNUNCIATORS****General**

Provide the following:

- Labelled annunciator illuminated windows, to indicate status and alarm conditions.
- Lamp test acknowledge-mute and reset individual push-buttons.
- Audible alarm and associated logic circuitry.

**Mode of operation**

General: Fault conditions to initiate flashing of appropriate annunciator lamps and sounding of audible alarms. Operation of acknowledge mute buttons to silence audible alarms and change annunciator lamps to the steady state on condition. Window to extinguish only when fault condition has been cleared and alarm reset push-button has been activated.

Subsequent alarms on other inputs: To reactivate the audible alarm and flash the appropriate annunciator lamp.

Resetting: After correction of the fault condition, provide for choice on site of either automatic resetting or manual resetting at the annunciator panel.

**Type**

Extra-low voltage, solid state, flush mounted, window type.

**Lamps**

General: Provide annunciators with 2 extra-low voltage lamps per window.

Rated voltage of lamps: 5% greater than annunciator system voltage.

Replacing: Changeable from front of panel without affecting condition of annunciator.

Vibration: Provide lamps which do not disconnect due to vibration.

**Extra-low voltage power supply**

Provide an extra-low voltage power supply for the alarm annunciator.

**Windows**

Nominal size: 15 x 35 mm.

Engraving: Filled in black.

- Background colours: White for status monitoring, red for alarms and shutdown functions.

### 13.7 AUDIBLE ALARM DEVICES

#### Sound level

At least 65 dB(A) at 1 m and at least 15 dB(A) above ambient sound levels in designated areas.

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## 14 ANCILLARY EQUIPMENT

### 14.1 BATTERIES AND CHARGERS

#### Standards

Valve regulated sealed lead-acid batteries: To AS 4029.2.

Vented nickel-cadmium batteries: To AS 3731.1.

Chargers: To AS 4044 Type 2.

#### General

Provide a battery and charger system for circuit breaker tripping, closing and automatic changeover switch operation. Locate within the switchroom.

#### Circuit breaker operation

Provide a d.c. supply for circuit breaker operation from battery system and charger.

#### Performance

General: Capable of 10 consecutive air-circuit breaker or moulded case circuit breaker operations for the designated quantity of circuit breakers. Each operation consists of open-close of main contacts for 0.5 s duration, with 1 s intervals between operations, and minimum discharge current of 4 A, with batteries in 50% discharge condition. Maintain a minimum terminal voltage of 80% of rated voltage at the completion of the 10 operations.

System voltage: 110 V d.c.

#### Battery chargers

Type: Free standing, floor mounted, ventilated cabinet type with separate charger and battery subsections.

Degree of protection: IP42.

Tapping: Provide tapplings on the transformer to permit adjustment over a range of 95% - 105% of secondary winding voltage on open circuit.

Circuitry: Solid state, micro-processor type, constant voltage, fully automatic, incorporating a smoothing network to give an output wave form at least as smooth as that of a 3 phase bridge system, and automatic boost and float charge functions adequate to ensure maximum battery life and rated performance. Provide facilities for manual boost and test.

Maximum design transient: 70% of the component manufacturer's peak inverse ratings.

Instruments, controls and indicators: Group for ease of operation. Provide analogue or digital instruments for the following:

- Charger output current.
- System voltage.
- Load current.

A.c. input protection: Miniature circuit breakers. Protect outgoing tripping supply with a 2 pole d.c. miniature circuit breaker.

Provide alarm indication to monitor the following:

- A.c. supply.
- Boost charge on.
- Charge fail.
- Low battery voltage.
- High battery voltage.
- Low electrolyte for vented cells.
- Earth fault, secondary side.

**Safety signs and labels**

Standard: To AS 2676.1.

Safety signs: Provide cautionary, regulatory and emergency safety signs to charger enclosure and switchroom.

**14.2 ANTI-CONDENSATION HEATERS****General**

Rating: Provide heaters rated at not less than 20 W/m<sup>2</sup> of total external area including top of weatherproof enclosure.

Type: Black heat type which may be touched without injury, mechanically protected and thermostatically controlled.

**14.3 TRANSIENT PROTECTION****Standards**

Main assemblies connected to the MEN earthing system: To AS 4070 Category II.

Main assemblies not connected to the MEN earthing system: To AS/NZS 1768 Category C.

Distribution boards: To AS/NZS 1768 Category B.

**Primary protection**

Provide shunt connected metal oxide varistors at assembly incoming supply terminals, on the line side of incoming functional units.

**Secondary protection**

Provide metal oxide varistors or zener diode surge protection to assembly in-built equipment and semi-conductor components which are not able to withstand transient overvoltages exceeding primary protection let-through residual levels.

**Components**

Short-circuit protective devices and isolators: Back-up each arrestor active supply with a live side 32 A totally enclosed fault current limiting fuse. Provide 32 A multi-pole automatic miniature circuit breaker on load side of fuses, as an arrestor isolator.

Cables:

- Maximum length between main circuit supply active and associated fuse, isolator, arrestor, neutral and earth conductor connections including MEN link: 1 m.
- Maximum length between earth conductor and earth grid/electrode system: 5 m.
- Installation: Keep cables as short and straight as practicable with line and load side separately bunched 300 mm apart.

Minimum cable size: 6 mm<sup>2</sup> copper.

Surge arrestor enclosures: Totally ventilated sheet metal wall boxes with hinged covers, mounted within or on the wall next to designated assemblies, containing grouped surge arrestors.

Marking: Label each group of primary arrestors, stating their purpose and the necessary characteristics.

**14.4 SPARES CABINET****General**

General: Provide a spares cabinet with main name plate, labelled shelves and non-lockable door. Size for storing racking handles, special tools, spare lamps, spare fuse links and other equipment necessary for satisfactory assembly operation.

Location: Either

- incorporated into assembly enclosure; or
- wall mounted in main switchroom.

Finish: To match assembly.

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**15 INSTALLATION****15.1 ASSEMBLY INSTALLATION****Fixing**

Before making interpanel connections, fix assemblies and metering equipment enclosures into position, level and plumb.

**15.2 ASSEMBLY ENTRIES****Cable entries**

General: Neatly adapt one or more cable entry plates, if fitted, to accept incoming cable enclosure. Provide the minimum number of entry plates to leave spare capacity for future cable entries. Do not run cables into the top of weatherproof assemblies.

Single core cables rated > 300 A: Pass separately through non-ferrous gland plates. Do not provide metal saddles.

**Cable enclosures**

Continue cable enclosures to or into assemblies and fit cable entry plates so that the IP rating of the assembly and the fire rating of the cable are maintained.

**Cable supports**

Support or tie mains and submains cables within 200 mm of terminations. Provide cable supports suitable for stresses resulting from short circuit conditions.

**Bus trunking system entry**

Provide entry plates with close tolerance cut-out to accommodate busbars, fitted with a flange bolted and sealed to assembly enclosure to maintain assembly IP rating. Earth busway enclosure to assembly protective earth conductor. Fit busway flanges at assembly manufacturer's premises and retain for transportation.

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**16 MARKING****16.1 MARKING****General**

Provide labels including control and circuit equipment ratings, functional units, notices for operational and maintenance personnel, incoming and outgoing circuit rating, sizes and origin of supply and kW ratings of motor starters.

**Identifying labels**

Provide labels fixed to access panels, doors, covers and escutcheon panels and internal equipment, indicating the relevant worksection and component.

**Minimum lettering heights**

Main assembly designation: 25 mm.

Distribution assembly designations: 15 mm.

Small proprietary distribution boards: 10 mm.

Main switches: 10 mm.

Outgoing functional units: 8 mm.

Identifying labels (on outside of cabinet rear covers): 4 mm.

Danger, warning and caution notices: 10 mm for main heading, 5 mm for remainder.

Other labels including equipment labels within cabinets: 3 mm.

**Label colours**

Generally: Black lettering on white background.

Main switch and caution labels: Red lettering on white background.

Danger, warning labels: White lettering on red background.

**Fixing**

General: Fix labels securely.

Method: Select from the following:

- Screws and double-sided adhesive.
- Fixed in extruded aluminium sections fixed to panels with rivets or countersunk screws.

Aluminium labels: Aluminium or monel rivets.

Restrictions: Do not provide self-tapping or thread-cutting screws.

**Set-out**

Align horizontally and vertically with adjacent labels.

**Labels on assembly exteriors**

Manufacturer's name: Required.

Assemblies: Label with essential markings.

Designation labels: For other than main assemblies, provide designation label stating source of electrical supply. Identify separate sections of enclosures.

Assembly controls: Label controls and fault current limiters, including the following:

- Circuit designation for main switches, main controls and submains controls.
- Details of consumers mains and submains.
- Incoming busbar or cable rating to first tee-off.
- Fuse link size.

#### **Labels on assembly interiors**

General: Provide labels for equipment within assemblies. Locate so that it is clear which equipment is referred to, and lettering is not obscured by equipment or wiring.

Moulded case circuit breakers: If circuit breaker manufacturer's markings are obscured by operating handle mechanisms or motor operators, provide additional markings open to view on or next to the circuit breaker.

#### **Danger, warning and caution notices**

Busbars: If polymer membrane coating is used without further insulation, provide warning notices on the front cover near the main switch or local main switch, and on rear covers, indicating that busbars are not insulated.

Fault current limiters: In assembly sections containing fault current limiter fuses provide caution notices fixed next to the fault current limiters, stating that replacement fuse links are to match as-installed fuse link ratings, make and characteristics. Provide separate label stating fault current limiting fuse ratings.

Externally controlled equipment: To prevent accidental contact with live parts, provide warning notices for equipment on assemblies not isolated by main switch or local main switch.

Stand-by power: Provide warning notices stating that assemblies may be energised from the stand-by supply at any time.

Anti-condensation heaters: To prevent accidental switching off, provide caution notices for anti-condensation heaters.

Custom-built assemblies: For insulation or shrouding requiring removal during normal assembly maintenance, provide danger notices with appropriate wording for replacement of insulation shrouding before re-energising assemblies.

Positioning: Locate notices so that they can be readily seen, next to or, if impracticable, on busbar chamber covers of functional units, and behind the front cover of functional units. Provide circuit identification labels in the cabling chamber of each functional unit, located next to external terminations.

## **16.2 CIRCUIT SCHEDULE**

### **Schedule cards**

General: For general light and power distribution boards, provide schedule cards of minimum size 200 x 150 mm, with typewritten text showing the following as-installed information:

- Submain designation, rating and short-circuit protective device.
- Light and power circuit numbers and current ratings, cable sizes and type and areas supplied.

Mounting: Mount schedule cards in a holder fixed to the inside of the assembly or cupboard door, next to the distribution circuit switches. Protect with hard plastic transparent covers.

### **Single-line diagrams**

Custom-built assemblies: Provide single-line diagrams.

Format: Non-fading print, at least A3 size, showing the as-installed situation.

Mounting: Enclose in a non-reflective glazed metal frame and wall mount close to assembly.

**17 COMPLETION**

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**17.1 TRAINING****Programmable logic controllers**

Make available one programmer and submit associated instruction manual 5 days before start of operator training.

**17.2 SPARES****Tools**

Accessories: Supply one set of racking tools for circuit breakers, and special installation, operation and servicing tools.

Indicator lights: Provide 3 spare lamps and one lamp extractor per 10 indicating lights. Locate in spares cabinet.

Alarm annunciators: Provide 3 spare lamps, lamp remover, screen remover (if applicable), mounted on clips in the assembly enclosure or in spares cabinet.

**17.3 COMPLETION TESTS****General**

Carry out the following tests:

- Electrical operation.
- Dielectric.

**17.4 MAINTENANCE****General**

General: Carry out the following:

- Monthly inspections and maintenance work to maintain the assembly, including battery systems.
- Rectify faults, make adjustments, and replace consumable and faulty materials and equipment within 24 hours of notification.

Standard: To AS 2467.

<b>DEMOUNTABLES</b>
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**1 GENERAL**

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The requirements below are for demountable repairs and maintenance works to the extent that they can be applied. In the case of maintenance, where the existing materials are to be matched, the requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) are excluded.

Notwithstanding the above, the specified requirements for Inspection and Contractor's Submissions (eg. Samples, Product Data, Shop Drawings) will apply where the value of the light steel framing work at a single site exceeds \$10,000, unless directed otherwise.

Where specific requirements regarding particular materials or installations are included below they shall be deemed to apply when such materials or installations are required or directed unless the Principals Authorised Person approves otherwise.

**Unless specified otherwise, comply with the requirements of all other relevant Technical Specification Sections.**

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**2 FLOOR REPAIRS**

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**2.1 PLYWOOD FLOOR**

Replacement of plywood floor sheets may be directed where sheets have suffered excessive damage and are no longer suitable for reuse. The direction may be to replace a whole sheet (for a complete demountable module) or a part of a sheet.

New plywood sub-flooring shall be installed using 2400mm or 2700mm long by 1200mm wide sheets of waterproof, rotproof plywood 19 mm thick, constructed from phenolic "A" Bond glue and shall have no through scarf joints, plastic coated on the underside. The upper surface shall be rough sanded. The plywood sheet shall be of sufficient size to cover the complete building module using the above sizes. Plywood shall be secured to steel channel floor joists and channel framework with 32 x 3.25 mm self tapping counter sunk head screws at 600mm centres along all edges and along all joists.

Where, in the opinion of the Superintendent, the surface of the plywood floor can be repaired apply epoxy fill and sand smooth uneven or delaminated plywood.

Where directed, sheets showing irreparable surface damage shall be turned over and reused.

**2.2 EXISTING COMPRESSED FIBRE CEMENT FLOORS - Landing and steps**

Where directed apply a single pack non-skid finish to the existing compressed fibre cement landings and steps equal to Interlac Non Skid Deck Paint T6800 colour (Pewter) AS2700:N63 or Admiral Grey which is a British Standard colour as available from International Marine Coatings on 0249-543013. Product Code number 36210204



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**3 STEELWORK REPAIRS & PROTECTION**

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**3.1 PROTECTIVE PRIMER COATING**

All steelwork and ferrous metalwork including cleats, bolts, fixings and other parts shall be cleaned as follows:

\*Remove all grease, oil, wax, perspiration, dirt by thoroughly washing with suitable solvent to AS 1627.1.

Immediately after preparation work has been completed and within a period of four (4) hours apply a single coat of zinc rich primer to a minimum of 75 microns dry film thickness. Apply additional coats without extra cost as required to ensure the 75 microns dry film thickness is achieved on all metal surfaces.

The primer shall be two (2) pack air drying epoxy based zinc rich organic primer containing not less than 85% zinc in non-volatile mass, and shall comply with AS 3750.9, type 2.

No further finishing or other coating shall be applied until the drying time of the primer recommended by the Manufacturer has elapsed and the primer is completely dry. This clause applies also for all repairs to damaged coating.

**Repairing Damaged Primer Coating**

In all framework steel areas to be welded, primer shall be ground off to AS 1627.2 to allow bare metal to metal contact before commencing welding.

Welding joints and areas of surface damage shall be cleaned to near white metal with hand tools according to AS 1627.7 and the primer coat reinstated immediately. Recoat all welds and damaged areas with at least 2 brush coats of zinc rich organic primer as specified before to a minimum dry film thickness of 75 microns, between coats allow 8 hours minimum drying. Apply in accordance with the manufacturer's instructions.

All welds to cold formed galvanised section shall be thoroughly deslagged, cleaned and touched up with zinc primer as specified.

**3.2 FINISHING COATS**

Having prepared and primed the surface to the minimum standards above and before contamination occurs from lengthy exposure, apply finish coats of 100% acrylic FULL gloss. Finish coats to be applied by airless spray to a dry film thickness of 75 microns per coat in accordance with manufacturer's instructions..

**3.3 NEW 16 MM DIAMETER BALUSTER TO HANDRAILS**

Where directed, provide new 16 mm dia. mild steel balusters between existing balusters on existing step handrail, welded top and bottom. Refer to Drawings.

**3.4 STEELWORK REPAIRS AND REPLACEMENTS GENERALLY**

Carry out all steelwork repairs and replacements in accordance with the Drawings, this Section 38 and Sections 13 - Structural Steel and 14 - Light Steel Framing, as applicable.

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**4 WALL PANELS**

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**4.1 EXTERNAL WALL SHEETING AND/OR ALUMINIUM FACED PLYWOOD**

Provide automotive filling compound to repair dents or damage to panels as directed. Roll with a stippled roller.

Where directed, remove the existing and supply and install proprietary 5.5 mm total thickness exterior grade type "A" bond plywood having stucco embossed sheet aluminium heat and pressure bonded on one face and 0.25 mm plain aluminium mill finish sheet heat and pressure bonded on to reverse face using heavy duty thermosetting modified epoxy resin film throughout. Stucco embossed pattern shall match existing sheeting used in the demountable buildings. New external cladding is to be an aluminium faced plywood panel similar to Formica<sup>NZ</sup> – Alulam®.

Proprietary Item:– Formica® Alulam®.

Stucco embossed pattern shall match existing sheeting used in the demountable buildings.

Plywood veneer shall be rot proofed under pressure by treatment with copper chrome arsenate, and shall have flame retardant treatment in accordance with AS 1530 part 3 - 1989 to achieve zero ignitability index.

Fasten external wall panelling to steel or timber framing by continuously gluing, as recommended by the manufacturer.

Panels shall be fixed within window assembly as detailed on drawings.

Panels shall be finished all around with aluminium trim as detailed on the drawings. Supply and fix a 25 mm x 3 mm full height aluminium cover mould over joint in wall panel - End walls only.

Sheeting must be able to fit the dimensions required in one unjoined sheet.

#### 4.2 ALUMINIUM OVERSHEETING OF EXTERNAL WALL PANELS

Where the external aluminium veneer to the Alumpy panels is sufficiently damaged or has delaminatd to warrant oversheeting (as directed by the Superintendent), carry out the work as follows:-

a) New external cladding is to be an aluminium faced plywood panel similar and equal in all respects to Formica<sup>NZ</sup> – Alulam®.

Proprietary Item:– Formica® Alulam®.

Stucco embossed pattern shall match existing sheeting used in the demountable buildings.

Face skin shall be stucco embossed to match Alumpy sheeting and shall be supplied in natural finish (ie. not pre-painted). Painting shall be carried out, once fully installed, in accordance with the painting specification below.

b) The " Formica<sup>NZ</sup> – Alulam®. " shall be supplied in single sheet size wherever possible to oversheet the existing Alumpy panels without joints.

However, wherever the size of the existing Alum panels cannot be oversheeted by a single sheet of " Formica<sup>NZ</sup> – Alulam®. " (eg. end panel of Classroom building), then a vertical joint only will be permitted. (No horizontal joints allowed anywhere, sheets must be single full height.)

Note: Vertical joints shall be planned symmetrically in consultation with the Superintendent prior to ordering of materials.

c) " Formica<sup>NZ</sup> – Alulam®. e" sheeting shall be rivet fixed to the existing Alumpy sheeting using 5 mm aluminium blind pop rivets at 450mm centres both ways to the body of the sheeting.

d) Paint new " Formica<sup>NZ</sup> – Alulam®. " sheeting and cover strips in accordance with the painting specification below.

#### 4.3 WALLS LINED EXTERNALLY WITH V-CRIMP

Replace damaged V Crimp sheeting and flashings in full length sections, as directed using new zincalume wall sheeting “BHP Multiclad .42 bmt” as V Crimp is no longer available

Paint as for Formica<sup>NZ</sup> – Alulam®.

#### 4.4 COMPRESSED FIBRE CEMENT TOILET PARTITIONS

Where directed, remove existing and install new toilet partitions using 18 mm thick compressed fibre cement high density sheeting, as follows:

Divisions - In two (2) 900 mm wide sections jointed horizontally with an extruded natural anodised aluminium "H" section as recommended by the sheeting manufacturer. Bottom sheet kept 150 mm off the finished floor.

Secure the divisions to the wall by the use of a vertical natural anodised aluminium channel of internal dimensions to suit sheet thickness with 40 mm deep section x 3 mm thick. The channel shall be secretly fixed to the wall by the use of approved screw fixings at 300 mm centres and the divisions shall be secured by blind riveting through the aluminium channel at 300mm centres, both sides. Fixing specifications shall be recommended by the sheeting manufacturer.

Fronts - 1950 mm long x the widths as indicated on the drawings, kept 150 mm off the finished floor. Support on two (2) proprietary chrome plated brass legs per front with head bracket and base plates to allow bolt fixing to the partition fronts and the flooring.

Attach fronts to divisions by the use of natural anodised aluminium channel of internal dimensions to suit sheet thickness with 40 mm deep section x 3 mm thick. The channel shall be secretly fixed to the front with blind rivets at 300mm centres, both sides. Fixing specifications shall be as recommended by the sheeting manufacturer.

Nibs - 1950 mm long x the widths as indicated on the drawings, kept 150 mm off the finished floor. Support on proprietary chrome plated brass leg as for "Fronts." Attach to wall as for "Fronts."

Head Channel - The nibs and fronts shall be stabilised by the use of a full length natural anodised aluminium channel as specified before, complete with matching closing infill over door openings, secured as specified before.

#### 4.5 COMPRESSED FIBRE CEMENT SHOWER PARTITIONS

Generally all in accordance with 4.4 above except that nibs and fronts are increased in length by 150 mm and divisions are increased in width by 150 mm to maintain same finished height as toilet partitions, yet fit hard down onto floor surface.

Seal partitioning against floor sheeting to maintain waterproof seal as indicated in the drawings.

#### **4.6 HIGH DENSITY FIBREBOARD TOILET PARTITIONS**

Where directed, remove existing and construct a proprietary toilet partitions system consisting of divisions, fronts and nibs using high density, highly moisture resistant fibre board with prefinished melamine surfacing. Density of board shall be 1200 Kg/m<sup>3</sup>. Edge screw holding shall be a minimum of 2500N. Surface screw holding shall be a minimum of 3000N. Melamine surface finish and colour as selected.

All installation shall be carried out in conjunction with the manufacturer's printed instructions.

Glue fix matching laminated edge strips to all exposed edges, including top and bottom edges.

Floor clearances and element dimensions shall generally comply with those previously nominated in Clause 4.4 above.

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### **5 ENTRY GLAZING**

#### **5.1 PLASTIC LAMINATED CLEAR GLASS (PLCG)**

Plastic laminated clear glass shall be 6.4 mm thick made up of two (2) 3 mm thick sheets of float glass bonded together with a 0.4 mm thick clear vinyl interlayer.

Where directed, remove existing glazing above transom to entry area and replace with plastic laminated clear glass.

Where directed, remove existing glazing below transom, part sidelights and/or full sidelights and replace with aluminium faced plywood panel as directed and paint.

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### **6 CEILINGS**

#### **6.1 PANEL CEILINGS**

Where directed, remove existing ceiling panels and replace with 6.0 mm thick fibrous cement building sheets, internal grade. Sheets shall be joined by the use of proprietary PVC joint strips in longest lengths possible.

The use of pre-painted 6.00 mm thick fibrous cement building sheets is permitted. Care shall be taken with the pre-painted surface when handling, drilling and fixing the sheets. Usage of sheets damaged by the supply and installation procedures will not be permitted

Or an alternative material that can be used as instructed is 6mm Ahlon® sheet, white in colour, quartz finish from Laminex Industries installed in accordance with the manufacturer's instructions. Sheets are to be joined using the manufacturer's recommended proprietary system – screw fixing to have counter sunk cup head washers.

PROPRIETRY ITEM: LAMINEX, ATHLON®

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**7 ROOFING**

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**7.1 ROOF CONVERSION TO A NEW TYPE ROOF SYSTEM - OLD SYSTEM DEMOUNTABLES**

Remove existing roof sheeting and supply and install a repitched complete new roof system, sheeted with 0.48 bmt thickness Colorbond Spandek Hi-Ten 700 which shall provide a fully waterproof and water-tight installation for each individual building module, with provision for connection of adjacent building modules as required.

Each building module shall be fully complete with roofing insulation, vapour barrier, flashings, fixings, penetrations, and/or roof accessories, (eg sky-lights, vents, etc.),

All new colourbond roof sheeting, gutters, downpipes and associated flashings and cappings shall be coloured ' Beige'.

Refer to Drawing CA-24A.

**7.2 MATERIAL**

All roof sheeting, flashings and accessories shall be manufactured from 0.47 mm (TCT), high tensile Colorbond zincalume steel complying with AS 1244.5.

**7.3 ROOFING SHEET**

The roofing sheet shall conform to the requirements of the Australian Standards AS 1170, Part 2, SAA Loading Code, Part 2, Wind Forces and AS 1562 Recommended Practice For Design And Installation Of Self Supporting Metal Roofing.

The sheeting shall be fully trafficable over its entire surface.

**7.4 FIXINGS**

Secure the roofing sheet to the roof structure with 12 gauge x 55 mm HI-TEK pre painted hex head roofing screws, complete with neoprene bonded washer.

**7.5 FIXING FREQUENCY**

Sheeting shall be fixed to the roof structure at every second crest at every purlin. This may be increased where required by the manufacturer, but shall not be reduced.

**7.6 SIDE LAPS**

Side laps fastening shall be carried out to the recommendations of the sheeting manufacturer.

When required, the side laps shall be stitched together using 12 gauge x 12 mm HI-TEK pre painted hex head roofing screws, with integral neoprene sealing washer fitted and shall be installed in accordance with the manufacturer's instructions and depending on the side lap configuration maximum centres shall be 600mm. Installation shall be through the sheet crests, not sides.

In addition to the above specified situation, sealing tape shall always be used where side laps with translucent sheets occur.

**7.7 ROOF SHEET EXPANSION**

Roofing sheets which are in a single fall from one end to the other shall be positively fixed at the high end and expansion shall be allowed into the gutter.

The fixing system and washers between this positive location and the gutter shall be suitable to accommodate the expected thermal movements and as per the manufacturer's recommendations.

**7.8 ROOF FLASHINGS**

Form flashings, overflashings, etc as detailed on the drawings are to be manufactured out of 0.55mm BMT Colorbond zincalume steel notched to fit profile of roof and/or tapered to match roof slope where required. Colour of Colorbond finish to be Beige.

Flashings to be in long lengths with weathering overlaps of 150mm at each joint (min) and sealed as on the drawings and pop riveted. Fix flashings using 20mm long stainless steel self tapping screws or 5mm aluminium blind rivets at 450mm centres maximum, to roof sheeting, fascia channels, etc.

At flashing joints weather laps and seal and rivet as appropriate.

Ensure that flashings fully birdproof the roof in addition to waterproofing.

Provide profile flashings at gutter, together with moulded foam closure strip where indicated on manufacturer's details. Refer to the drawings for all flashing shapes required.

**7.9 MODULE JUNCTION OVERFLASHING**

Supply and fix 0.47 mm (TCT) Colorbond zincalume steel purpose made flashings to seal the roof junction of adjoining modules.

The flashings shall be in three equal lengths.

Middle flashing shall be installed on centre over the roof ridge line and overlap the downslope flashings either side of the ridge by 300 mm.

Flashings shall have total girth of 470 mm, created by 430 mm wide horizontal with 20 mm downturn at 90° on each long edge.

**7.10 FLASHING TO VENTS, FLUES AND OTHER ROOF PENETRATIONS**

Provide proprietary flexible rubber tapered cone style vent flashing complete with integral base fixing clamp ring overflashing clamped and sealed to vent pipes, etc. all according to the manufacturer's standard details. Fix and seal to roof sheeting in accordance with the manufacturer's instructions.

**7.11 PROTECTION OF CONTACT SURFACES**

Observe the standard practices and the manufacturer's recommendations in ensuring that electrolytic or similar corrosive actions are eliminated by physical separation and by avoiding the puncturing of metals or breaking down of the surface finishes.

Fix all metals with materials that are compatible with the material fixed.

**7.12 VAPOUR BARRIER AND INSULATION**

Sark the whole of the roof area to the building module with a reflective reinforced foil 350g/m<sup>2</sup> with antiglare surface (upwards) complying with AS 1903 Class A and install in accordance with AS 1904.

Support vapour barrier over roof framing on 50mm opening size galvanised wire netting mesh with a wire diameter of not less than 1 mm. The vapour barrier shall be continuous, taped and sealed with minimum 150 mm overlaps at joints using continuous 50 mm wide adhesive tape, at sides, ends and penetrations in accordance with the manufacturer's printed recommendations. Overlaps shall be planned to ensure lap occurs in the direction of flow of any water that may enter.

#### **7.13 ROOF INSULATION**

Insulate the whole of the new roofing to the building with 50 mm thick fibreglass blankets of thermal resistance  $R-1.2m^2$  I/V nominal, in long rolls, close butt jointed and laid over vapour barrier. Support insulation and vapour barrier on 50 mm galvanised wire netting mesh. Fix the mesh securely to roof structure and tension it so that the insulation is in contact with the roof sheeting over the whole area.

As an alternative to the above separate insulation and vapour barrier, insulation with the vapour barrier pre-bonded may be used (insulation side up). Adhesive tape all joints.

#### **7.14 NEW STAINLESS STEEL FLASHINGS**

New stainless steel flashings are available from the following firms:-

- a) Marko Stainless Products  
Unit 1, Lot 5, Pennant Street, Cardiff NSW  
Phone (049) 568 968
- b) Southern Cross Stainless Steel  
23/27 Clapham Road, Regents Park NSW  
Phone (02) 644 2811

#### **Protection of Polished Surfaces**

Stainless steel chromium plate and vitreous enamel exposed surfaces shall be protected during installation by application of an approved strippable coating that will not affect the surfaces upon removal. The coating shall be applied as soon as practicable and shall not be removed until the completion of the job. On removal of the coating, the surface shall be cleaned with a solvent and polished with a soft dry cloth.

#### **7.15 EAVES GUTTER**

Provide eaves gutter, complete with outlet and overflow positioned in accordance with the drawings. Gutter shall be manufactured from 0.48mm BMT thick Colorbond zincalume steel to profile shown on drawings. Provide all necessary accessories for joints, outlets, stop ends and the like in matching Colorbond finish. Support gutter as shown on drawings or in accordance with the manufacturer's instructions. Colorbond colour to be Beige.

#### **7.16 BOX GUTTERS**

Where directed, prepare the surface of the existing galvanised box gutter and paint with 2 coats of a bituminous paint equal to Duram or Pabco products

Where directed, remove and replace existing box gutters with stainless steel box gutters to match existing size and type, including outlets and overflows .

#### **7.17 DOWNPIPES AND RAINWATER HEAD**

Provide downpipes and rainwater head for each assembly, complete with all fixings.

Rainwater heads shall be fabricated out of 0.47 mm TCT colorbond zincalume sheet steel.

Downpipes shall be 100 x 50mm fabricated out of 0.47 mm TCT colorbond zincalume steel. Supply and fix two(2) matching Colorbond finished flat strap astragals riveted to each downpipe complete with horizontally slotted holes and philips head stainless steel screws for fixing.

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## **8 ALUMINIUM WINDOWS**

### **8.1 GENERALLY**

Any aluminium work requiring fabrication shall be done by an approved aluminium fabricator.

### **8.2 Glass and Glazing**

The glass throughout shall be of approved manufacture, free from blemishes and/or flaws of any description, and shall be of the thickness specified.

Glazing shall be carried out by skilled tradesmen using only products approved by the Superintendent, and in accordance with the manufacturer's printed instructions for the particular application.

Special care is to be taken to ensure that glass is properly fitted with allowance for normal expansion.

Glass thickness shall in no case be less than five (5) mm.

Clear glass, both external and internal, shall be clear float glass.

Obscure glass shall be to an approved pattern, similar to "Satinlite." The patterned face shall be placed internally.

Plastic laminated obscure glass shall be 6.4 mm thick made up of two (2) 3 mm thick sheets of glass (one sheet being "Satinlite" as specified, the other being clear) bonded together with a 0.4 mm thick clear vinyl interlayer. The patterned "Satinlite" face shall be placed internally.

Unless as otherwise specified or directed, internal sliding glass windows shall be installed using 6 mm thick float glass. Glass must be rounded and polished on all edges and corners rounded off and polished. Provide 20 mm wide ground in handles for opening the sliding glass panels, one per pane.

### **8.3 GLAZING TAPE**

Glazing tape shall comprise a solid extrusion of grey caulking compound based on butyl rubber having 100% solids and a specific gravity of 1.5. It shall provide excellent adhesion to aluminium and glass, be permanently plastic and completely resistant to all weathering effects.

### **8.4 SEALANTS**

polysulphide based sealant - 1 part mix.



**9 FLOOR COVERINGS - CARPET****CROSS REFERENCE**

The Contractor shall supply replacement carpet and accessories where required or as directed using materials as follows, including underfelt gripper strips and accessories for the building

**PREFERRED SUBCONTRACTORS****Requirement**

The carpet, underlay/underfelt and accessories shall be supplied by one of the preferred subcontractors.

Refer PRELIMINARIES Clause PREFERRED SUBCONTRACTORS.

Carpet: 100% wool level loop 1627 grams per m<sup>2</sup>.

Preferred Subcontractors	Product
Cavalier Bremworth	Karatex
Cavalier Bremworth	Karatex Encore
Tuftmaster Carpets	Wentworth 48
Tuftmaster Carpets	Luminary 48
Tuftmaster Carpets	Network 48
Godfrey Hirst (Aust.)	Kingsgate Heather 48oz
Godfrey Hirst (Aust.)	Sisal Grid
Godfrey Hirst (Aust.)	Sisal Ridge
Westwools Carpets	Super Norsk
Westwools Carpets	Kirribilli 48 oz
Westwools Carpets	Barossa 48 oz

Carpet: 90% wool 10% space dyed nylon 1627 grams per m<sup>2</sup>

Preferred Subcontractors	Product
Tuftmaster Carpets	Phoenician 48
Tuftmaster Carpets	Sirocco 48
Godfrey Hirst (Aust.)	Kingsgate Town 48oz
Godfrey Hirst (Aust.)	Optima
Cavalier Bremworth	Electra (48 oz)
Westwools Carpets	Dansk 48
Edwardstown Carpets	Galaxy 6000

**ORDERING AND DELIVERY**

Order and confirm delivery instructions with the carpet subcontractor not less than 12 weeks prior to the date required and give 2 weeks notice to the carpet subcontractor of the required laying date.

Give a copy of the delivery docket to the Principals Authorised Person on delivery of the material to site with the following details:

description of and weight of carpet and underfelt and all details of accessories.

**10 QUALITY****10.1 INSPECTION - Notices**

Give sufficient notice so that inspection may be made at the following stages:

- - Each batch of material upon delivery of the works.
- - Subfloor prepared to receive the carpet installation.
- - Fixings, edge strips and underlay/underfelt ready to lay carpet.

- Completed carpet after cleaning and before covering as specified in *cleaning and protection*.

### 10.2 TESTS- Samples

Provide a minimum 1 m<sup>2</sup> of carpet for testing purposes (the carpet can be in pieces of a minimum dimension of 200 mm x 200 mm, (ie. Preferably 5 pieces 200 mm x 1 m)

### 10.3 CONTRACTOR'S SUBMISSIONS

#### 10.4 WARRANTY

##### Requirement

Before Practical Completion submit a written warranty on all carpet, underlay/underfelt and accessories for a minimum period of 2 years and on installation for a minimum period of 1 year.

## 11 MATERIALS AND COMPONENTS

### 11.1 UNIFORMITY

#### Batching

Ensure that carpet laid in a single area and of a single type, quality, colour and design comes from a one manufacturing batch and dye lot

#### Fire resistance

The Early Fire Indices for carpet in school buildings must be in compliance with the BCA requirements and tested in accordance with AS 1530.3.

Submit evidence of such compliance in respect of each type of carpet used.

### 11.2 HARD UNDERLAY – not used

### 11.3 SOFT UNDERLAY

#### Standards

Materials: To BS 5808

Installation: To AS 2455

#### Synthetic Foam Underlay

Type:	High density bonded polyurethane foam underlay (NSW Supply Service Contract 295 Item 42).
Minimum Mass (exclusive of reinforcing fabric):	120 kg per m <sup>3</sup>
Nominal Thickness:	7 mm (approx.)
Width:	1830 mm
Identification:	Coloured yellow with fine black mesh on top side of product.

### 11.4 ADHESIVES – NOT USED

### 11.5 TAPES

#### Heat Bonding Tapes

Conventionally laid tufted and woven carpets are to be joined using low odour and low smoke commercial grade glass fibre and cotton thermoplastic adhesive coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicon- coated release paper.

### 11.6 GRIPPER STRIP

#### Preformed Gripper Strip

All conventionally laid carpet is to be installed on commercial grade architectural type gripper.

Commercial grade architectural type carpet gripper (NSW Supply Service Contract 295 Item 69).

Length:	1200 mm
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Thickness:	Minimum - 6.8 mm, Maximum 8.00 mm
Width:	Minimum - 33 mm
Pins:	Minimum - 3 rows in width, 98 per unit
Plywood:	Minimum 3 ply (must be evenly sized veneers)

**Location**

At all edges except where edge strips are specified. Provide double gripper strips to edges.

**11.7 EDGE STRIPS****Product**

Heavy duty extruded aluminium (NSW Supply Service Item 54).

Material: Extruded aluminium

Type: Pin type, heavy duty (commercial quality)

**Location**

At exposed edges of carpet, and at junctions with dissimilar floor finishes or finishes of different thickness. Where edge strips occur in doorways, locate them so as to be out of sight under the closed door if possible.

**11.8 NOSING – NOT USED****11.9 BACK PRINTING**

Carpet: All carpet must have the following information printed on the back (NSW Supply Services Contract No. 295).

- Name of manufacturer
- Range/Product name
- Weight of product in g/m<sup>2</sup>

**11.10 CARPET****Carpet Type (100% Wool)**

Tufted, Level Loop (NSW Supply Service Contract 295 Item 10)

Gauge:	3.175 mm or 2.54 mm	
Yarn:	100% wool, 2 or 3 ply	
Pile Fibre:	100% international blend wools containing speciality wools with crimp and/or modulation.	
Style:	Heather appearance	
Fibre Quality:	Averaging not less than 33 microns when measured according to AS 2001.2.1 - 1988	
Total Pile Mass:	1627 grams per m <sup>2</sup> +/- 5% to AS 2111.11 - 1990	
Width:	Standard broadloom width 3660 mm +/- 1.5% to AS 1385-1985	
Tuft Withdrawal Force:	35 newtons (minimum) to AS 2111.15-1979	
Pile Height (Above Backing):	4-5 mm (approx) to AS 2111.5-1978	
Backing:	Primary:	Heat stabilised woven polypropylene with minimum mass of 117 grams per m <sup>2</sup>
	Secondary:	300 grams per m <sup>2</sup> woven jute
Secondary Backing Adhesion:	40 newtons (minimum) to AS 2111.16-1991	
Extractable Matter:	1.5% (maximum) to AS 2001.3.4-1981	
Colour Fastness To:	Light:	Minimum 5-6 to BS 1006.B02-1992
	Shampoo:	3-4 (minimum) to AS 2111.19.2-1983
	Rubbing:	3-4 (minimum) to AS 2111.19.1-1983
	Dry Cleaning Solvents:	3-4 (minimum) to AS 2001.4.16-1981

Proofing Treatment:	When tested the carpet must meet the requirements of AS 2001.6.1 for the treatment of wool fibres against moth and beetle attack.
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Colour Selection: Refer: COLOUR SCHEDULE.

#### Carpet Type (90% Wool 10% Spaced Dyed Nylon)

Tufted, level loop (NSW Supply Service Contract 295 Item 10).

Gauge:	3.175 mm or 2.54 mm
Pile Fibre:	90% international blend wools containing speciality wools with crimp and/or medullation, 10% space dyed nylon (as highlighter) or 100% international blend with highlight yarn
Wool Fibre Quality:	Averaging not less than 33 microns when measured according to AS 2001.2.1 - 1988
Nylon Fibre Quality:	Not less than 15 denier per filament and containing carbon polymer filaments or similar sufficient to reduce electrostatic generation.
Yarn:	Wool 2 or 3 ply, with a spaced dyed nylon 2 or 3 ply yarn or wool 2 to 3 ply (as highlighter).
Style and Colouration:	Loop pile (with spaced dyed nylon or wool highlighter).
Total Pile Mass:	1627 grams per m <sup>2</sup> +/- 5% to AS 2111.11-1990
Width:	Standard broadloom width 3660 mm +/- 1.5% to AS 1385-1985
Tuft Withdrawal Force:	35 newtons (minimum) to AS 2111.15-1979
Pile Height (Above Backing):	4-5 mm (approx) to AS 2111.5/6/7-1978
Backing:	Primary: Heat stabilised woven polypropylene with minimum mass of 117 grams per m <sup>2</sup>
	Secondary: 300 grams per m <sup>2</sup> woven jute
Secondary Backing Adhesion:	40 newtons (minimum) to AS 2111.16-1991
Extractable Matter:	1.5% (maximum) to AS 2001.3.4-1981
Colour Fastness To:	Light: 5-6 (minimum) to BS 1006.B02-1992
	Shampoo: 3-4 (minimum) to AS 2111.19.2-1983
	Rubbing: 3-4 (minimum) to AS 2111.19.1-1983
	Dry Cleaning Solvents: 3-4 (minimum) to AS 2001.4.16-1981
Proofing Treatment:	When tested the carpet must meet the requirements of AS 2001.6.1 for the treatment of wool fibres against moth and beetle attack.

Colour Selection:

Refer: COLOUR SCHEDULE.

## 12 COMPLETION

### 12.1 COMPLETION

#### Certification

Provide a certification that the carpet is in accordance with the specification, include in the certification the total pile mass of the carpet to AS2111.11

## RESILIENT FINISHES

## 1. GENERALLY: RESILIENT FINISHES

Supply and install resilient finishes in accordance with this Section fixed to sub floor as necessary to complete the Works. Resilient finishes include homogeneous sheet vinyl, foam backed sheet vinyl and non-slip sheet vinyl, accessories and coves.

NSW SUPPLY SERVICE CONTRACT: The resilient flooring, and accessories shall be supplied and laid in accordance with the terms and conditions relation to quality in the NSW Supply Service (NSW SS) Contract 969/444. This does not include the commercial condition of this contract.

The supply and laying of sheet vinyl, foam backed sheet vinyl, non-slip sheet vinyl and accessories must be carried out by the NSW Supply Service approved subcontractor as nominated.

## 2 STANDARDS: RESILIENT FINISHES

Pursuant to STANDARDS: PRELIMINARIES, relevant standards include the following:

AS 1884 Floor Covering Resilient sheet and tiles – laying and maintenance practice.

AS 2055 PVC sheet floor covering unbacked flexible.

## 3 SAMPLES: RESILIENT FINISHES

Pursuant to SAMPLES: PRELIMINARIES, submit loose samples of each type of finish specified illustrating the extremes and average of the ranges of properties available in finishes complying with the Specification.

## 4 EXTENT: RESILIENT FINISHES

The location and extent of resilient finishes is shown on the Drawings.

### SUBSECTION B - MATERIALS AND WORKMANSHIP

## 1 MATERIALS GENERALLY: RESILIENT FINISHES

Deliver materials to the Site in undamaged packages, marked with the manufacturer's identification and batch numbers, colour, dimensions and quantity. Surfaces of resilient finishes shall be flat and smooth unless otherwise specified. Edges shall be firm, unchipped, machine-cut accurately to size and square to the face.

All materials in adjoining surfaces shall be the same batch number.

## 2 ADHESIVES: RESILIENT FINISHES

Floor adhesives shall be low odour, water based acrylic adhesives as recommended by the resilient flooring manufacturer only. All floors must be primed with a primer as recommended by the adhesive manufacturer to ensure maximum adhesion.

## 3 WORKMANSHIP GENERALLY: RESILIENT FINISHES

Lay resilient finishes to AS 1884 and the vinyl manufacturer's instructions. Finish flush with adjoining surfaces. Provide approved junction strips where abutting adjacent finishes.

## 4 SETTING OUT: RESILIENT FINISHES

Set out resilient finishes to the design, pattern and direction of grain approved by the Superintendent.

Set out sheets to give the minimum number of joints. Unless otherwise specified or shown, run sheet joints parallel with long sides of floor areas.

**5 LAYING: RESILIENT FINISHES**

The supply and laying of resilient flooring and accessories must be carried out by the NSW Supply Service approved subcontractor.

Lay the sheet vinyl with the roll running in direction required by the Superintendent. Scribe sheet, cut and fit against walls, columns, pipes and other permanent projections.

Apply primer and adhesive in accordance with the vinyl manufacturer's instructions. Turn floor sheeting down into "Low Grime" floor wastes where occurring.

**6 JOINTING: RESILIENT FINISHES**

Welded joints in resilient sheets shall be made by heat welding with matching colour welding rod, in accordance with AS 1884.

**7 CLEANING AND PROTECTION: RESILIENT FINISHES**

Remove all adhesive from the surface of the vinyl and leave floors broom clean.

Sweep resilient finishes clean with a soft broom during the first forty-eight hours after laying. Thereafter scrub with manufacturer's vinyl cleaner and dry buff using a buffing pad as recommended by the vinyl manufacturer. Protect completed flooring as necessary with polythene film during all subsequent building operations.

**8 GUARANTEE: RESILIENT FINISHES**

Provide an unconditional guarantee covering replacement without charge any defective workmanship or materials of resilient finishes for a period of 12 months from Practical Completion.

**SUBSECTION C - VINYL MATERIALS****1 VINYL MATERIALS GENERALLY: RESILIENT FINISHES**

Flexible PVC (vinyl) sheet shall comply with AS 2055.

**2 SHEET VINYL (NON FOAM BACKED) 2MM "HOMOGENEOUS" FLEXIBLE SHEET VINYL**

Preferred Subcontractors (Nominated Suppliers)	Product
Tarkett	Eminent Multiflor
Tarkett	Granit Multiflo
Tarkett	Monolit
Gerflor Australasia	Elegance 500
Polyflor	Prestige
Armstrong World industries (Australia) P/L	Encoe
JOINTS:	Grooved and thermo-welded with matching colour PVC welding rod.
FINISHING:	Dry buff surface after cleaning to manufacturer's recommendations. Where

LOCATIONS:	not factory sealed, seal immediately after laying in accordance with the manufacturer's recommendations. Refer to Drawings.
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FLOORING MATERIAL:	
Acoustic cellular foam backed 1.5mm homogenous sheet vinyl. Items 4 & 5 of the NSW Supply Service Contract Number 444).	
<b>Preferred Subcontractors (Nominated Suppliers)</b>	<b>Product</b>
Polyflor Australia	Polytred Acoustic
Tarkett/Sommer Australia	Acoustiflor Granit
<b>COLOUR:</b>	To be selected
<b>DIMENSIONS:</b>	
<b>JOINTS:</b>	Grooved and thermo-welded with matching colour PVC welding rod.
<b>FINISHING:</b>	Dry buff surface after cleaning to manufacturer's recommendations. Where not factory sealed, seal immediately after laying in accordance with the manufacturer's recommendations.
<b>LOCATIONS:</b>	Refer to Drawings.
<b>FLOORING MATERIAL:</b>	

"Safety" flooring, vinyl – Non Slip 2mm

(Items 12a & 13A of the NSW Supply Service Contract Number 969/444)

Preferred Subcontractors (Nominated Suppliers)	
Tarkett/Sommer (Australia) P/L	Eminent
<b>JOINTS:</b>	Grooved and thermo-welded with matching colour PVC welding rod.
<b>FINISHING:</b>	Dry buff after cleaning to manufacturer's recommendations.
<b>LOCATIONS:</b>	Refer to Drawings.

#### SUBSECTION D - JUNCTION DETAILS

### 1 LOCATION OF JUNCTIONS: RESILIENT FINISHES

Where changes of floor finish occur in doorways, the junction shall occur directly beneath the door.

## **2 JUNCTION STRIPS: RESILIENT FINISHES**

Provide approved selected colour 25mm wide vinyl splayed edge trim strips at junctions of resilient finishes with existing floor finishes where the sub-floor is on the same level.

Provide aluminium junction strips where junctions of differing applied finishes occur.

### **SUBSECTION E – TRIM**

## **1 VINYL COVES: RESILIENT FINISHES**

Where directed, cove the flooring material 150mm minimum up the wall and fix to a planted fibreboard “skirting background”.

Make internal and external corners, heat welded at joints, adhesive fixed and firmly pressed with a pressure roller at all changes in direction as recommended by the manufacturer.

Install a suitable 1.6mm thick aluminium angle bedded in silicone sealant to the exposed top edge of the coving upstand and silicone seal to the wall to prevent ingress of water.

## **2 VINYL SKIRTING: RESILIENT FINISHES**

Where directed, supply and install proprietary feather edge 100 mm high vinyl skirting to all wall perimeters, colour black.

### **SUBSECTION F - BACKGROUNDS**

## **1 BACKGROUNDS GENERALLY: RESILIENT FINISHES**

BACKGROUNDS shall be to the satisfaction of the Contractor who if in doubt as to the dryness of the background shall, at his own expense carry out the Preliminary Test and if necessary. For plywood test to AS 2098.1 and for compressed fibre cement floors test to manufacturer's specifications.

## **2 BACKGROUND PREPARATION: RESILIENT FINISHES**

Suitably prepare backgrounds to receive the resilient finishes.

### **SUB-FLOOR PREPARATION**

Before laying operations may commence, sub-floor surfaces shall be dry, smooth, sound and vacuum cleaned. Remove all floor polish and any surface treatment from floor surfaces which could adversely affect adhesion. Prime floor as required by the adhesive manufacturer to ensure maximum adhesion.

Keep the area to be covered with vinyl sheet free of other trades during laying to ensure that the prepared sub-floor surface is not damaged or dirtied.

The contractor is responsible for filling any uneven areas of the sub-floor as required to ensure a first quality finish.



**13 DOORS****13.1 Door Frames**

Aluminium door frames, both internal and external are specified under "Metalwork" - and as detailed on the drawings.

Sealant between frames and steel shall be a polyisobutylene-butyl reinforced preformed tape 1.5 x 25mm.

**13.2 Door Types**

Doors shall be as specified hereunder and as indicated on the drawings by the following symbols:

ED - External door

SC - Solid core door (Internal)

Doors shall be manufactured to AS 2688 and stamped/marked accordingly.

Provide blocking for door hardware.

All wooden doors shall be primed and/or sealed on all surfaces. Top and bottom edges to be primed prior to hanging.

**External Door**

Supply and fix new door furniture where required, sand back and re-paint existing external entry door (2 coats) or where required supply new door complete with paint and door furniture. New door to be 40mm total finished thickness, solid core. Internal and external faces shall be 6mm waterproof plywood bonded to both sides with waterproof adhesive. Provide 15mm solid timber edge strips on all four edges, mitred at corners. External and internal surfaces to be paint finish, colour as scheduled in - "Technical Schedules".

All external entrance doors to disabled toilets modules are to have a 24 mm spacing from the underside of the door to the finished floor level. All doors are to be fitted with an aluminium louvred type vent. See drawings for details.

**Solid Core Door (Internal)**

Supply and fix new door furniture where required, sand back and repaint existing internal doors or where required supply new doors complete with paint and door furniture. New doors to be 35 40mm total finished thickness, unless specified otherwise, constructed with kiln dried timber blocks solid infill, stress free, narrow widths, full lengths sheeted on each face with approved waterproof paint grade 6mm thick plywood bonded to both sides with waterproof adhesive. Edge strip door all round with 10mm solid timber to match veneer finish, mitred at corners. Paint finish as scheduled in - "Technical Schedules."

**Cubicle Doors**

Supply and fix 20mm thick paint grade waterproof plywood doors to toilet and shower cubicles where directed. Doors shall be edge stripped all round with 10mm thick solid timber, mitred at corners.

**13.3 Door Sizes**

Door sizes are determined by the partition, from the following:

2040 x 920mm wide

2040 x 820mm wide

2040 x 720mm wide

2030 x 920mm wide - external doors.

**13.4 Door Hinges**

Doors shall be hinged as specified hereunder.

**Hinges Schedule (Dec/98)**

<b>Stainless Steel Butts</b>	<b>Description</b>
<b>Hinge finish:</b>	Satin stainless steel
<b>Application</b>	Steel Frame / Timber or Fire Door

<b>Proprietary item:</b>	Lane 8580 SS 100 X 75mm (loose pin) Lane 8580 SS 100 x 100mm (loose pin) Lane 8588 SS 100 x 75mm (fixed pin) Lane 8588 SS 100 x 100mm (fixed pin) OR Doric DH31 100 x 75mm (loose pin) Doric DH30 100 x 75 (fixed pin) Doric DH33 100 x 100mm (loose pin) Doric DH 32 100 x 100mm (fixed pin) OR Trio T717525LP 100 x 75mm (loose pin) Trio T717525FP 100 x 75mm (fixed pin) Trio T710025LP 100 x 100mm (loose pin) Trio T710025FP 100 x 100mm (fixed pin)
	NOTE: Fixing screws also stainless steel

Stainless Steel Spring Hinges	Description HOLD OPEN FOR OPENING IN DOORS, HOLD CLOSE FOR OPENING OUT DOORS
Hinge finish:	Satin Stainless Steel
Application	Timber Door / Terrazzo Partitions/compressed fibre cement
Proprietary item:	Efco 555 OR Plated Products 777

Generally, unless otherwise specified, hinges shall be arranged as follows for each door leaf:

- a) Door leaves 820mm wide and over shall be hung with three butt hinges.
- b) Hinges for internal doors opening in shall be 100 x 75mm loose pin satin chrome plated butt hinges. Where internal doors open out hinges shall be 100 x 75mm fixed pin butt hinges.  
 Note that "Hirline" style interleaved face fixed hinges are not to be used.
- c) Hinges for external doors shall be 100 mm x 75 mm heavy duty stainless steel fixed pin hinges equal to Lane 8580 SWMX75
- d) Stainless Steel spring hinges for 20mm thick toilet cubicle door to 24mm thick fibre cement partition. Supply 1 pair per leaf.

### Security

The security needs of the various areas of the school are categorised from A to E. All openings should comply with the listed requirements and the entire fabric should satisfy the performance standard for each category. See SPECIFICATION GUIDE for detailed door hardware requirements.

A Windows: Securable.

Doors Lockable, except that security is not required between adjacent spaces of this category or enclosed corridors.

Intended for ensuite rooms. All external doors and windows require locks.

- B Windows: Securable.  
Doors: Lockable.
- C Windows: Securable.  
Physically protected (eg, internal or external grilles).  
Doors: Lockable, blockboard core door leaf. Steel door frame.  
Roller shutters to be steel (50mm slats).  
Roofs: Ensure roof penetrations (ie. domelites) are protected.
- D. Windows: No windows unless Habitable Space.  
Physically protected (eg internal or external grilles).  
Doors: Blockboard core door leaf, min 40 mm thick or double sheeted steel dor (sheets min 1 mm thick) both types with 2-point deadlocking. Steel door frame 22.5 mm thick.  
Avoid return air grilles.  
Double leaf steel doors with Semaphore locking or steel roller shutters up to 1800 mm maximum.  
Walls: Single thickness masonry or stud walls protected with steel mesh under lining. For conversions stores may use steel sheet 1.6 mm thick.  
Ensure walls continue to underside of roof.  
Floors: Concrete, compressed fibrous cement or steel.  
Ceiling: Protection (eg steel mesh) for tiles roofs only.  
Metal roofs do not require additional protection.
- E Windows: No windows.  
Doors: Steel security door set (eg Rivers or CM1) 4-point locking bars. Avoid return air grilles.  
Walls: Double thickness bonded masonry min 190 mm.  
Ceiling: Concrete

**GENERALLY:**

- Louvres: Only fixed steel louvres are permissible when necessary.
- Barriers: Barriers should be located within Movement Area to restrict vandals, create fire compartments and create separable community access.

Maintenance and Cleaners	Keying	Master Key
Bulk Store Cleaning Supplies Store Cleaning Distributed Store Garden Store	Key to differ  Key alike "GS"	Code "MC"

Security Category 'C' Stores	Keying	Master Key
Stores Generally, Pantry Materials Store – Type 2, Project Store Large Equipment Store Outdoor Equipment Store	Key to differ	Code "ST"

<b>Security Category 'D' Stores</b>	<b>Keying</b>	<b>Master Key</b>
General Learning Space (GLS) Store Apparatus Store Chemical Store (door Category 'C' security) Visual Arts Store, Pottery Store Performance Store, Fitness Store Materials Store – Type 1 Multi Media Store Lecture Theatre Store Computer Store, Archive Store Sport Equipment Store Movement Studio Store Administration Store	Key to differ	Code "ST"

<b>Services</b>	<b>Keying</b>	<b>Master Key</b>
Switchroom, E.D.B., L.P.G., Mechanical Plant	Keyed alike PW "E"	Not Master Keyed
Lift Equipment	Key to differ	Code "AF"

<b>Student Services</b>	<b>Keying</b>	<b>Master Key</b>
Toilets – Boys/Girls Access Shower/Toilet Drinking/Wash Trough Guard	Key alike "T"	Code "AF"

<b>Canteen</b>	<b>Keying</b>	<b>Master Key</b>
Canteen (incl. roller shutters) Canteen Office/Store (door Category 'C' security)	Key alike "CAN" Key to differ	Not Master Keyed Not Master Keyed

<b>Maintenance and Cleaners</b>	<b>Keying</b>	<b>Master Key</b>
Bulk Store (General Assistant) Cleaning Supplies Store Cleaning Distributed Store Garden Store	Key to differ  Key alike "GS"	Code "MC"

<b>Security Category 'C' Stores</b>	<b>Keying</b>	<b>Master Key</b>
Home Base Store, P.E. Store Kiln Room, Stores Generally	Key to differ	Code "ST"

<b>Security Category 'D' Stores</b>	<b>Keying</b>	<b>Master Key</b>
KLA Resource Store Special Programs Store Sports Store Administration Security Store	Key to differ	Code "ST"

Services	Keying	Master Key
Switchroom, E.D.B., Mechanical Plant	Keyed alike PW "E"	Not Master Keyed
Lift Equipment	Keyed to differ	Code "AF"

**Door Stops and Door Holders**

General: Door stops should be provided to limit door travel where damage can be caused to doors, walls, frames or door hardware. Locate floor stops to avoid trip hazard.

Where doors open out externally and can be secured to walls, posts, etc, a door stop and holder should be installed approx. 2000mm from ffl.

Where this type of fastening is not practicable, provide a steel bollard or railing fitted with a doorstop and holder with protective hood to Standard Detail.

Install doorstop and holder with protective hood 50mm from top of bollard to top of hood.

Type	Description
Door Stop and Holder	F.H.D. HP. 884 (Auto Stop). Wall Fixing: Approx. 2000 mm from FFL Bollard/Rail Fixing: Refer to School Standards Drawing DS32/2.
	Requirement: For external opening out doors requiring hold open

Floor Stop with Hook	Kaba Boyd DS 568
	Requirement: For opening in doors requiring hold open.

Floor Stop Type A	Kaba Boyd DS110.
	Requirement: For floor finishes other than carpet.

Floor Stop Type B	Lockwood 250.
	Requirement: For carpet floor finishes

Wall Stop Type C	F.H.D. HP. 235 x 65 mm or 75 mm projection.
	Requirement: Wall fixed

Non-Indicator/Indicator Bolt Sets Cubicle Partition Doors (Opening In)	Non indicator bolt Efco 547-530-531. Indicator bolt Efco 547-548-530-531. OR Plated Products 0015-0016-0017. Plated Products 0015-0018-0016-0017.
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Non-Indicator/Indicator Bolt Set Cubicle Partition Doors (Opening Out)	Non indicator bolt Efco 547-530-536. Indicator bolt Efco 547-548-530-536. OR Plated Products 0015-0017-0053. Plated Products 0015-0018-0017-0053.
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Indicator Bolt	Efco 547-548 or Dalco 1461 Add Dalco 1838 strike plate for opening out doors.
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Indicator Bolt (Sliding Door)	Astra mortice Sliding Indicator Bolt with Astra 'IC' indicator and RTS- 52 "T" Turn
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Hat and Coat Hook/Stop (Opening in)	Efco 297 (S.S.S.), or F.H.D. 435 (cast brass).
Hat and Coat Hook (Opening out)	Efco 296 S.S.S., or F.H.D. No. 750 (cast brass).

**13.5 Door Hardware**

All door furniture and hardware shall be supplied and fixed by the Contractor with screw material and finish to match articles being fixed.

All furniture and hardware shall be satin chrome plated finish, or satin stainless steel unless otherwise specified.-

All door handles, locks and latches to be installed 1000mm above floor level.

The door hardware set required for each application will be selected from the following listed Hardware Sets Schedule. Rates tendered shall allow for the supply and installation of the various sets to the nominated security level.

Hardware Sets Schedules

**S11 Entry Door**

- Mortice cylinder classroom lockset.
- Door stop and holder.
- Lock bolt shield.
- Delayed action door closer.

**S15 Double Entry door**

- Mortice cylinder classroom lock set.
- Door stop & holder.
- Lock Bolt shield.
- Delayed action door closer.
- Barrel bolt 2 off.

**S9 Office/Store**

- Mortice cylinder Vestibule lock set.
- Floor stop.
- Lock Bolt shield.

**S23 Internal toilet door**

- Mortice cylinder night latch.
- Pull handle (type B) door fitted with lock.
- Pull handle type A.
- Push plate with turn hole for lock.
- Door closer.
- Floor stop.

**S24 External toilet block door**

- Mortice cylinder dead lock – key locking only.
- Pull handle (type B) door fitted with lock.
- Pull handle type A.
- Push plate with turn hole for lock.
- Door closer delayed action.
- Floor stop.

**S55 Other Doors**

- Mortice latch set.
- Floor stop.

**S26 Cubicle Doors**

- Non indicator bolt set.
- Spring hinges.
- Rubber door stop 32mm dia.

<b>Mortice Cylinder Classroom Lockets (Security “A, B, or C”)</b>	Lockwood 3572M-2801-2905-70. OR Kaba Boyd ML78PD-101-112-25 OR Astra S4335-100-T11-T16-L38 Add rebate code to lock number for rebated forend.
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<b>Door Stop and Holder</b>	F.H.D. HP. 884 (Auto Stop). Wall Fixing: Approx. 2000mm from FFL Bollard/Rail Fixing: Refer to School Standards Drawing TS 78/1/
	Requirement: For external opening out doors requiring hold open. Auto door stops must not be installed near brick reveals (minimum 150mm from reveal).

<b>Floor Stop Type B</b>	Lockwood 250
	Requirement: For carpet floor finishes

<b>Lock Bolt Shield (Lock bolt protector for open out doors)</b>	Kaba Boyd SS092
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<b>Mortice Cylinder Store/Plantroom Lockset (Security A, B or C):</b>	Lockwood 3572X-2905-70-Kaba Boyd Wafe 03 OR Kaba Boyd ML81PD-Wate 03-112-25 OR Astra S435-100 with Kaba Boyd Wafe 03-T16-L38. Add rebate code to lock number for rebated forend.
	Requirement: Lock to plant room doors to have Lockwood 570 cylinder key alike PW “E”.

<b>Mortice Cylinder Deadlock Key Locking Only (Security A, B, or “C”)</b>	Lockwood 3571DE with 6007/57 turn 2 x 1366 escutcheons OR Kaba Boyd ML 163P with FA311 turn 2 x FA300T escutcheons OR Astra S230 – 120E-SOC/TS turn 2 x OCE-2 escutcheon Add rebate code to lock number for rebated forend
<b>Pull Handle Type B (Timber doors)</b>	Efco 194DH-134 (168 x 16mm pull on 250 x 50 x 10mm thick round end plate).
<b>Push Plate</b>	Satin Stainless Steel Type 304 250 x 200 x 1.2mm countersunk screw fixed. Form hole in plate for lock turn to align push/pull plates. Requirement: Width of push plate may be altered to suit door stile width.
<b>Non-Indicator/Indicator Bolt Sets Cubicle Partition Doors (Opening In)</b>	Non indicator bolt Efco 547-530-531. Indicator bolt Efco 547-548-530-531. OR Plated Products 0015-0016-0017. Plated Products 0015-0018-0016-0017.
<b>Non-Indicator/Indicator Bolt Set Cubicle Partition Doors (Opening Out)</b>	Non indicator bolt Efco 547-530-536. Indicator bolt Efco 547-548-530-536 OR Plated Products 0015-0017-0053. Plated Products 0015-0018-0017-0053.

### Door Closers

Generally: Fully surface mounted door closers are required.

Concealed door closers only to be used where there is insufficient nib clearance.

Door closers should not be installed externally. For open out doors, drop plates are required for aluminium glazed door installations.

Adjustable strength door closers are required.

Delayed action closers are required for all entry doors, including other areas designed for disabled access.

Slide arm closers are required for all doors not opening more than 130° parallel arm or invert mount closers are required for external doors opening more than 130°.

Door stops are required for all doors fitted with door closers.

Refer also hardware sets for special requirements for holding doors open.



Door Closers: (Slide Arm)	Kaba Boyd 5003DA, 5103DA, 5203DA OR Lockwood 414SRDA
	Requirement: For door leaves over 1000mm wide, substitute lockwood 426 series.
Door Closer: (Parallel Arm)	Kaba Boyd 4103EDA OR Lockwood 414PDA
	Requirement: For door leaves over 1000mm wide, substitute lockwood 426 series.
Door Closer: (Invert Mount)	Kaba Boyd 4203DA with invert mount head fixing plate OR Lockwood 414DA with invert mount head fixing plate.
	Requirement: For door leaves over 1000mm wide, substitute lockwood 426 series

**Keying**

- a) All lock cylinders shall be keyed by EFCO as directed by the Superintendent.
- b) All lock cylinders and keys shall be clearly stamped to indicate key coding. Attach plastic key tags and label appropriately.
- c) Supply keys in the following quantities:
 

Master Keys	- 2 keys per master key group
Keyed to Differ	- 2 keys per lock
Keyed Alike Groups	- 2 keys (each) - first two locks
	- 6 keys (total) - three to ten locks

**Abbreviations**

KA Denotes Key Alike

MK Denotes Master Key

KD Denotes Keyed to Differ

**13.6 ROOM IDENTIFICATION**

Remove, clean and refix room identification signs or where required provide and fix door signs as specified to doors where indicated on drawings, having identification noted.

Door signs shall have an extruded aluminium nameplate holder 600mm long x 32mm wide. The holder is to be satin natural anodised to a minimum thickness of 10 microns. The flat section of the holder is to be drilled in three places and countersunk to accept 3mm diameter long thread countersunk screws. The nameplate holder is to be screw fixed and glued to door, 375mm below top of door, or as approved by Superintendent. The holder shall be fitted with a 600mm long plastic nameplate of laminated layer construction. The nameplate shall be of a colour selected by the Superintendent, the surface layer contrasting with the exposed lower layer. The nameplate shall be a "slide in" fit.

The wording shall be centrally engraved within the length of the nameplate in 16mm high Folio Medium Extended (upper case) lettering. the depth of the engraving is to be sufficient to cut through the top surface layer of the laminate to reveal the lower laminate.

After the nameplate holder has been screw-fixed and glued to the door and nameplate shall be held in position with a small "spot" of suitable waterproof adhesive and shall be capable of being removed if required.

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## **14 COAT HOOKS**

### **14.1 TIMBER BATTEN FOR COAT HOOKS**

Where directed, clean back, re-stain and re-fix existing coat hook rails or provide and fix where directed a DAR 100 x 25 mm rail of an approved kiln dried NSW hardwood batten. Recess heads of screws and plug holes with matching timber plugs without showing end grain. Round all corners and prepare for clear finish and fixings.

### **14.2 COAT HOOKS**

Hat and coat hooks shall be florentine bronze finish, cast iron, 4 hole, double hook type.

Coat hooks shall be attached to timber rails with four (4) x 6 gauge brass screws.

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## **15 PINBOARDS, CHALK BOARDS, ETC**

### **15.1 PIN BOARDS**

Remove the existing pin boards. Securely fix new pin boards supplied by the Department of School Education - Furniture Complex to the same position as existing.

### **15.2 CHALK BOARDS**

Lightly sand and clean all chalk and dust from the existing chalk boards with a damp cloth. Fill holes with an acrylic filler. Where directed, apply two coats of chalk board paint to the existing chalk boards.

Where directed, remove the existing chalk boards. Securely fix new chalk boards supplied by the Department of School Education - Furniture Complex to the same position as existing.

### **15.3 ISPLAY PANELS, CHALKBOARDS, PEGBOARDS AND BULLETIN BOARDS GENERALLY.**

Fix plumb on the walls in positions indicated. The apron moulds, brackets, etc are to be securely attached to the walls. The display panels shall be screwed to the walls through fixing blades and attached to the apron moulds or brackets with screws, all in locations as shown on the module drawings, through the batten of the units, or fixed as indicated on the instructions, or as appropriate.

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## **16 MODULE JOINING KITS**

**16.1 MODULE JOINING BOLTS (NEW AND OLD STYLE BUILDINGS)**

Contractor shall supply four 16 mm dia. x 65 mm long hot dipped galvanised steel bolts, washers and nuts for use on site in joining building module joints.

**16.2 ROOF FLASHINGS, ETC**

Contractor shall re-use where possible the existing Modular jointing kits which consist of roof flashings and cappings; new sealants; internal and external mouldings and trims required to seal, weatherproof and finish the joints between building modules.

**16.3 PROTECTION OF CONTACT SURFACES**

Observe the standard practices in ensuring that electrolytic or similar corrosive actions are eliminated by physical separation and by avoiding the puncturing of metals or breaking down of the surface finishes. Observe manufacturer's recommendations for achieving the physical separation.

Fix all metals with materials that are compatible with the material fixed.

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**17 FLOOR COVER MOULD**

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**17.1 ALUMINIUM COVER MOULD**

Supply as required new pre-drilled aluminium cover moulds to the floor junctions. (Approximately 7.6 m long).for each module, in long lengths of 40 x 4mm half round aluminium cover plate, such as Comalco Capral extrusion No. E20354. To be screwfixed with 5mm diameter countersunk head galvanised mild steel screws at 300mm centres, secured into timber battens detailed.  
Proprietary Item: Capral extrusion E20354.

**17.2 TIMBER BATTEN**

Supply and install new 10 mm x 38 mm oregon battens to the side of the perimeter channels to fix cover moulds. (Approximately 7.6 m long)

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**18 PORCH HOODS**

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**18.1 ENTRANCE PORCH HOOD (OLD STYLE BUILDINGS)**

Remove the existing entrance porch hood and provide a new hood where required as detailed on Drawing EDOO-233 B including hot dipped galvanising. Provide new fixing bolts to suit

**18.2 SUN LOUVRES**

- a) Contractor to supply and install, as required, new sun louvres where shown and detailed on drawings.
- b) Contractor is also to refurbish existing sun louvres where directed.

**18.3 Steel Framing****(Original Style Buildings)**

Perimeter steel framing shall be of MS pressed channel 76 x 38 x 2.6mm with butted joints, continuously welded. Perimeter frame to be attached to fascia with 10mm dia. hot dip galvanised bolts, 100mm long at 610mm centres. Provide 38mm OD galvanised spacers, welded onto the perimeter frame. Fix nuts to fascia by welding. Attach frame to columns with 25 x 25 x 3mm RHS struts by welding on threaded 10mm dia. section of bolt and fastening with washers and nuts as specified. All steel elements in frame to be galvanised. Drill two 10mm dia. holes in top rail. All as shown on Drawing CA/18.

All fabrication, drilling etc to be completed before the units are hot dipped galvanised.

**(New Style Buildings)**

Perimeter steel framing shall be of 51 x 51 x 2.6mm SHS with butted joints, continuously welded. Perimeter frame to be attached to mounting brackets as indicated. Attach frame to mounting brackets as for existing. All steel elements in frame to be galvanised. All as shown on Drawings C/34 and C26/.

All fabrication, drilling etc to be completed before the units are hot dipped galvanised.

**18.4 Louvre Blades****(New Sun Louvres)**

Louvres blades shall be of five (5) 1.62mm thick pressed section anodised aluminium and shall be supplied and installed as detailed on the drawings. Provide 9.5mm dia. aluminium tube spacer between blades and 6mm dia. zinc plated steel bolts 820mm long at 1/3 points of span. Louvre blades to be attached to steel perimeter frame with 4.5mm pop rivets. Provide all necessary fittings, etc all as detailed on the drawings.

**19 ELECTRICAL SERVICES****19.1 BALANCING THE LOAD**

The contractor shall allow to balance the electrical load between the individual phases of the supply, and the building, except where otherwise required by this Specification.

**19.2 WIRING TYPE**

All wiring shall be carried out using standard copper conductor cable. Unless stated otherwise on the Drawings, all wiring shall be sized in accordance with the current edition of the Standard Association of Australia Wiring Rules, but in no case be smaller than 1.5 mm<sup>2</sup>. Careful attention should be paid to Clause 2.2.2.2 of AS3000-1991 when considering cable size.

All module frames shall be earthed. A minimum 6 mm<sup>2</sup> earth wire is to connect each of the modules to the Distribution Board.

Unless otherwise indicated in the Drawings or Specification all wiring is to be carried out using TPS cable run within the building members and where the use of surface wiring is approved by the Superintendent, it shall be run within rigid PVC conduit or duct. Ducting with a clip-on cover is not acceptable.

In order to comply with AS3000-1991 Table B14, circuits shall not be bunched in groups greater than 5 mm each bunch of 5 or less must be separated by 150 mm,

except where leaving switchboards or entering terminal boxes. Adequate fixings are to be provided to maintain this spacing.

At all times the wiring methods shall as far as possible facilitate the future removal or replacement of any cable.

All wiring shall be carried out using the “loop-in” principle being drawing in from the outlet. No joints will be allowed except in the terminal boxes or at the outlets.

All cables are to be labelled at each terminal box with approved ferrule type markers.

Cables terminated with screws or on stud terminals are to be fitted with approved type lugs.

All loose wiring tails at the edge of the building module opposite the terminal boxes shall be labelled as above. It shall have a minimum of 500 mm tails for connection to the adjacent terminal box and be fitted with approved type wire pins. The tails shall be tied/taped during the transport of the building module.

### 19.3 PLUG SOCKETS AND GPOS

All plug sockets and GPOs are to have safety shutters and neons. Any GPOs not protected by ELCBs are to have traffolyte labels affixed stating “Not Protected by Earth Leakage”.

### 19.4 ISOLATING SWITCHES

Where the following items are specified or directed to be installed and/or connected by the Contractor the wiring shall be via an isolating switch adjacent to the equipment.

- 1) Undersink Hot Water Heaters
- 2) Stoves
- 3) Ovens
- 4) Fan Heaters
- 5) Exhaust Fans

### 19.5 COLOURS

Unless otherwise specified on the Drawings, all electrical accessories shall be white electric colour.

### 19.6 CONTROL DETAILS AND MOUNTING HEIGHTS

- a) GPOs - Mounted at 300mm above the floor unless otherwise noted on drawings.
- b) Lighting Switches - Flushplate mounted at 1200 mm above the floor.
- c) Fan controllers - As specified with mounting block at 1500 mm above the floor.
- d) Ceiling Fan Plug Sockets - Base plate and plug socket.
- e) Wall mounted Fan Heater Controls - Controlled by Electric Timer with mounting block at 2000 mm above the floor. Labelled “Heater Control”.

**19.7 FAN HEATER INSTALLATION**

The Contractor shall ensure adequate fixing is provided when installing fan heaters. Mounting height shall be confirmed with the Superintendent prior to installation.

**19.8 FAN CONVECTION HEATER - HIGH LEVEL**

REQUIREMENT: Supply and install a fan assisted convection heater, permanently connected to a 240 volt, single phase power supply and capable of operating, effectively when mounted at a nominal height range of 2000 mm to 2700 mm.

Ensure the fan heater is constructed from not less than 1.2 mm zinc sheet steel, suitably primed, with a painted finish incorporated following features:

- A single speed fan motor;
- Heating elements of robust construction and not subject to damage by the penetration of pencils or similar objects;
- An adjustable or staged integral thermostat;
- Protection for any electronic components from thermal or mechanical damage due to mains voltage surges that are likely to be experienced during normal operations;
- An over temperature cut-out device consisting of a fail safe mechanical device, operating independently of other controls, to disconnect all power within the unit in the event of failure of the air circulating system. This device can only be reset manually by the removal of a cover requiring the use of tools.
- Wiring to the heating elements rated for 150°C and other internal wiring rated for 105°C.
- A cable entry point provided at the rear of the unit and a suitable terminal block located within the heater for termination of fixed wiring;
- During normal operation, the external surface and emitted air temperature at 50 mm from the outlet not exceeding 90°C. In the event of over temperature operations, the surface temperature shall not exceed 90°C, while the emitted air temperature shall not exceed 120°C at 50 mm from the outlet.

**19.9 LUMINARIES INSTALLATION**

All luminaries shall be secured to the ceiling with a minimum of four (4) fixings per light fitting into ceiling support members or other suitable supports. Light fittings shall not be fixed to ceiling sheets.

Where the Superintendent directs that the building modules require a complete installation of new light fittings, the original fittings shall be held in storage for future use.

**19.10 CEILING FAN INSTALLATION**

The ceiling fan mounting hook system is detailed in the Drawings. The ceiling fan outlet shall be a plug socket mounted adjacent to the mounting hook using a base plate fixed to the ceiling panel or ceiling support. This plug socket shall be aligned so that cord outlet of the side entry plug top faces the mounting plate.

Not more than four (4) fans per controller is permitted.

**19.11 CORE BALANCE EARTH LEAKAGE PROTECTION SYSTEM**

Supply and install core balance earth leakage devices in distribution boards as indicated:

A) Three Phase Type

Each device shall be an approved type having a rated tripping current of 20 mA. It shall operate a non-auto circuit breaker via a 250V shunt trip.

Unless otherwise indicated, the non-auto breaker shall be rated at 80A and shall be the same type and manufacture as the rest of the breakers on the distribution board. This controlling breaker, the earth leakage device, the associated neutral link and the protected circuit breakers shall be mounted together. The front panel of this section shall be provided with a cut-out for the test button so that it can be operated without removal of the panel.

The front panel of this section shall be labelled:

“EARTH LEAKAGE PROTECTED CIRCUITS” (6 mm letters).

The controlling breaker shall be labelled:

“EARTH LEAKAGE BREAKER:	(4 mm letters)
PROTECTING CIRCUIT BREAKERS	(3 mm letters)
.....TO.....	(3 mm letters)
(IF TRIPPED SEE PROCEDURE NEAR	
CIRCUIT SCHEDULE)	(2 mm letters)

The test button shall be labelled :

“EARTH LEAKAGE PROTECTED CIRCUIT ONLY” (4 mm letters)

Supply and install an instruction sheet, mounted as for the circuit schedule. The wording of the instruction shall be as follows:

“EARTH LEAKAGE PROTECTION

If the earth leakage breaker is tripped (toggle in “off” position, or halfway between “on” and “off”) an earth fault has occurred.

TO RESET

- a) Turn toggle to OFF position then turn to ON position. If earth leakage breaker trips, try again then;
- b) Turn off all the circuit breakers listed on the label near the earth leakage breaker.
- c) Reset earth leakage breaker.
- d) Turn on the turned off circuit breaker, one at a time. If earth leakage breaker trips when one of the circuit breakers is turned on, disconnect all appliances (see schedule for power points concerned) on this circuit and check again. If earth leakage breaker does not trip have appliances checked.
- e) If earth breaker still trips, turn off the circuit breaker of offending circuit and have wiring checked by a licensed Electrician.

TO TEST

- a) Press test button.
- b) Earth leakage breaker should trip.

- c) If tripped, reset earth leakage breaker.
- d) If not tripped, have checked by a licensed Electrician.”

B) Single Phase Type

Each device shall comprise a current operated earth leakage sensing device with integral disconnecting switch of approved type rated at minimum 80 amp, 250 volt, with rated tripping current of 20 mA. The switch toggle shall have ON, OFF and centre tripped positions.

Devices shall be installed in a manner as specified for three phase devices. Devices on the load side of a single circuit breaker shall be mounted adjacent to that circuit breaker.

C) Combined Overload and Earth Leakage Circuits Breakers

Each device shall comprise a current operated earth leakage sensing device and an overload protection function. The device shall be rated at 20 amp, 250 volts with rated tripping current of 30 mA. The switch toggle shall have ON, OFF and centre tripped positions. The device shall have the same mounting arrangements as the standard single pole device.

**19.12 TERMINAL BOXES**

The terminal boxes shall be fabricated from sheet metal (minimum size 300 x 200) with all cable entry and exit points bushed and shall include terminal strips and mounting rail system. A spare terminal capacity of 25% shall be provided.

**Access Doors - Terminal Boxes**

Hinged access doors shall be fabricated from sheet metal (minimum of 450mm x 300mm) and mounted flush with the ceiling to give access to each terminal box. The access doors shall be fitted with a square key latch to allow easy access to the terminal boxes.

**19.13 CABLING VIA METAL COLUMNS**

Slots shall be cut on the inside face of each column above the ceiling line to allow the entry of cables. The minimum size shall be 75 mm x 32 mm.

Where cables enter the wall panels from the column, a minimum 25 mm diameter hole shall be cut.

All openings shall be completely cleaned of metal shavings or slag and any sharp edges rounded.

**19.14 MULTI-GANG SWITCH PLATES**

Supply and install multi-gang switch plates in positions as shown on drawings to control the functions as designated on the single line diagrams. The switch panels shall be 1.2 mm 316 grade stainless steel, brush finished and edges shall be rounded. Switches and other devices fitted to the panel shall be at minimum 40 mm centres.

Switch functions shall be engraved in lettering 4 mm high minimum, red infilled.



Workshop drawings of the switchplates shall be submitted for the approval of the Superintendent before fabrication commences.

The multi-gang switch plates are located in the Library and Administration Buildings.

**19.15 STRIP HEATERS**

Strip heaters shall be switched from an electronic timer and switch engraved "Heat" at 1200 mm above finished floor level immediately below the heater. Strip heaters shall be mounted at 2400 mm, above finished floor level.

**19.16 CIRCUIT DESIGNATION**

All outlets, switchgear and electrical equipment shall be labelled with circuit identification numbers.

The labels used shall be approved by the Superintendent prior to installation.

**19.17 SWITCHBOARD DESIGNATION**

Each Distribution Board shall have one individual switchboard number. This number shall be an engraved traffolyte label fixed to the door of the switchboard which generally refers to the Contractor's building reference number placed on his records, as directed by the Superintendent.

**19.18 REFURBISH EXISTING CEILING FANS**

Replace the existing capacitor and dispose of original in an approved manner. Rub back, prepare and repaint fan (including blades, canopies and rod). Test and ensure fan is in working order.

**19.19 INSTALLED EQUIPMENT**

Defects in items of equipment installed and/or connected and covered by a guarantee from the manufacturer shall be reported to the supplier and to the Superintendent. It is the responsibility of the Contractor to have these defects rectified prior to installation and/or connection.

**19.20 CLEANING**

The Contractor shall be responsible for all cleaning of luminaries, accessories, equipment and appliances which have been supplied and/or installed as part of the Works. Cleaning shall be undertaken immediately prior to hand-over.

**19.21 SCHEDULE OF EQUIPMENT**

Fans

The Contractor shall supply and install the following:

Ceiling Fans with Standard Rod	PCFS56R - supplied only by North Sydney Manufacturing Co, 70 Pitt Street, Sydney.
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Fan Speed Controller Cat. 58200-013 HPM or 58200-513  
 Clipsal - supplied by University Patron  
 Instruments Pty Ltd, 106 Belmore Rd,  
 North Riverwood.

Associated Controls (Australia) Pty Ltd  
 ACN 000 224 564  
 29 Smith Street, Hillsdale NSW 2036  
 Ph: 02 9311 3255  
 Fax 02 9311 3779

The above firms hold contracts with the Department of Public Works and Services. The equipment is available to contractors on Department of Public Works and Services projects at agreed prices ruling at the date of delivery.

The fans and fan speed controllers are guaranteed by the supplier only against faulty design, workmanship and materials for a period of twelve (12) months from the day on which they are put into service.

The guarantee covers the cost of labour and materials required to rectify any such faults to the fan and controllers in-situ in any part of the state of New South Wales for the above stated period.

Supply and install equipment, non contract luminaries and accessories similar to those listed below:

Prior to ordering the equipment, the Contractor shall submit details of the equipment to the Superintendent for approval as to its suitability to the particular application. The Superintendent may require the submission of samples for approval prior to ordering.

If the Contractor installs non-approved equipment, non-contract luminaries or accessories, the Contractor may be directed to remove and replace them with an approved type at his own expense.

Buzzer	12 volts AC complete with transformer.
Wall Fan Bracket	Cast aluminium with at least 2 fasteners
Wall Fan 400 mm	Approved 400 mm diameter oscillating fan with minimum three speeds desk type mounted on approved cast bracket.
18 Watt Low Pressure Sodium Light	Equal to Cat. No. SL/181/PE Luxalite Lighting.

Fan Heaters:

High Wall Mounting	Equal to Autohot "Highheat" ratings as shown. Mounting height to be determined by the Superintendent.
Electronic Timer	2 hour electronic time delay switch with press button illuminated "ON" position. If button is

	pressed during the timing cycle it will cancel the cycle.
Fan Heaters Thermostat/Timer	Combination timer and thermostat to suit the heater arranged for rear or surface entry. Thermostat, 20A resistive 1°C Differential timer - mechanical, 16A, 2 pole, 240 volt, 0-3 hour range. Colour will be approved by the Superintendent prior to ordering.
Infra Red Strip Heater	Supply and install radiant heaters, timed switches and associated equipment as indicated. Wall mount the heaters at a height of 2.3m, unless otherwise indicated, with the long axis horizontal. Fix with two brackets or a mounting channel. Supply a socket outlet within 300 mm of the heater connection point. Select a heater with the following characteristics (10) Zinc-seal reflector of minimum thickness 0.3 mm, 3) Quartz - tube type heating element.
Thermostat	Heavy duty tamperproof 16A resistive 240V - 4A inductive Differential 7°C - adjustable mount where shown at 1.3 m above floor level.
Suspended Outlet, Suspended GPO	With thread for protective rings and neon. Mounted in accordance with Drawing 19/198A
Keyed Switch	(Industrial Arts Area): Push to stop - key required to reset - 50mm mushroom head (red) with amber indicating light.  Push Button Mechanism - to suit keyed switch.  Pilot Light - to suit keyed switch.  Enclosure - to suit keyed switch
Wall Fan	400 mm diameter oscillating fan with adjustable horizontal axis, speed control (pull cord option), concealed mounting bracket and stop mechanism on oscillating axis. Fan to be fitted with a guard. Provide a GPO adjacent to the wall fan.

- 19.22 SUPPLY OF GOVERNMENT CONTRACT LUMINAIRES**  
 REQUIREMENT: The general requirement for the ordering and supply of contract type fluorescent luminaires and accessories are set out in Clause 18.22 "GOVERNMENT CONTRACT LUMINAIRES" below. Only luminaires supplied by Contract Suppliers shall be used unless directed otherwise.

**19.23 GOVERNMENT CONTRACT LUMINAIRES**

**19.23.1 GENERAL  
DEFINITIONS**

Contract Luminaire: Any fluorescent luminaire complete with lamps, accessories, options and all the equipment necessary for their proper installation and functioning, specified in the **GOVERNMENT CONTRACT LUMINAIRES SCHEDULES**.

Contract Supplier: The Supplier nominated in the **GOVERNMENT CONTRACT LUMINAIRES SCHEDULES** being under contract (No. 294) to NSW Government to supply fluorescent luminaires to the Government specification.

Contractor: The Contractor, Sub-Contractor or electrician engaged to perform the works covered by the Contract.

Relationship: The basic relationship between the Contractor and the Contract Supplier shall be that of buyer and seller.

Nominated Delivery Date: The date nominated by the Contractor for the delivery of luminaires or the actual delivery date whichever is the earliest.

Unit Prices: The unit prices, as adjusted monthly, ruling at the nominated delivery date.

**19.24 PURCHASING  
Luminaires Purchase**

Purchase all the Contract Luminaires from the nominated Contract Supplier.

Inability to obtain: Notify the Superintendent promptly and in writing of genuine difficulties in obtaining the Contract Luminaires.

Alternative supplier: The Superintendent, being satisfied that the Contract Supplier is unable to deliver the required Contract Luminaires, may at their discretion instruct the Contractor to purchase and install equivalent luminaires from an alternative supplier.

**Non-Conforming**

Should non-contract fittings be installed instead of the specified Contract Luminaires without a written site instruction, the Superintendent will require the Contractor to remove them from the site within such time as directed and to replace with those of the Contract Supplier.

Liability: Pay all costs of replacement and making good arising from failure to conform with the documents.

**Ordering**

Place the orders for Contract Luminaires with the Contract Suppliers at least four weeks before delivery is required.

**Delivery Time**

When placing orders, advise the Contract Supplier as to approximate delivery date(s). Advise the actual delivery date(s) to the Contract Supplier in writing, at least four weeks prior to the required delivery.

**Responsibility**

The Contractor is responsible for the completeness and correctness of the list of luminaires, accessories and options on his order.

**Special Conditions**

Obtain details of any special conditions to which the Contract Supplier is bound under the terms of the Government Contract.

**Contract Supplier's Guarantee**

The Contract Supplier guarantees the whole of the fittings, with the exception of fluorescent lamps, against faulty design, workmanship and materials for a period of 12 months from the date of supply. The guarantee covers the cost of material replacement and any reasonable labour charge.

Advice of claim: Advise the Contract Supplier of any proposed claim under guarantee before proceeding with repairs or replacement otherwise the Contract Supplier may not accept any costs incurred by the Contractor.

**Fluorescent Lamps Guarantee**

Fluorescent lamps are guaranteed by the lamp manufacturer for 12 months from the date of supply.

Extent of guarantee: Fluorescent lamps guarantee covers the cost of replacement and delivery of lamps to the site by the Contract Supplier upon return of the faulty product.

Contractor's responsibility: Install the replacement lamps and bear the cost involved.

**19.25 DELIVERY AND STORAGE****Delivery by the Contract Supplier**

The Contract Supplier has contracted to deliver luminaires FIS within the Sydney Metropolitan area defined by straight lines between Palm Beach, Asquith, Richmond, Penrith, Camden and Waterfall.

**Delivery in Country Area**

Dispatch: The Contract Luminaires will be despatched direct from the Contract Supplier to Project Site by road transport.

Transport: Arrange for and bear the cost of suitable road transport.

Transport vehicles: Shall be fully enclosed and suitable for the transportation of fragile luminaires and provide protection of the luminaires against damage by water, rain, dust, etc.

Dispatch refusal: Failure to provide a satisfactory transport vehicle may result in the luminaires not being permitted to be loaded and all costs due to delayed delivery and in providing satisfactory transport shall be at the Contractor's expense.

**Delivery Examination**

Examine the goods on delivery to ascertain conformity with the order. Check for any damage in transit.

Damages notification: Notify the Contract Supplier in writing within 10 days of dispatch of any damage or defect claimed to be the Contract Supplier's responsibility as set out in their Conditions of Sale.

**Delivery Insurance**

All luminaires and accessories are insured by the Contract Supplier against loss or damage in transit for all areas.

**Transshipment**

Note the Contract Supplier's conditions of sale. Any transshipment will make null and void the guarantee provisions and insurance. Unauthorised transshipment costs and consequential costs shall be met by the Contractor.

**Packing**

The luminaire bodies, diffusers and fluorescent lamps are packed separately in cardboard cartons suitable for road transport.

**Accessories**

Accessories may be fitted to luminaires, or supplied separately.

**Storage Facilities**

Provide dry, dust free, weatherproof storage facilities with damp proof floors.

Storage: Luminaires not immediately installed shall be stored in their original cartons or wrappings.

Stacking: Stack Contract Luminaires so as to avoid damage to luminaires, particularly diffusers and lamps.

**19.26 INSTALLATION****General**

Install the Contract Luminaires where specified, to the manufacturers recommendation and so that they are undistorted.

Site storage: Install the luminaires without site storage whenever practicable.

**Care**

Exercise all care in handling and erection of luminaires to ensure that no damage occurs.

Mishandling: Rectify any damage due to mishandling to the satisfaction of the Superintendent or replace damaged luminaires at own expense.

**Luminaires**

Types E, I and G: The luminaires type E, I and G are supplied with levelling fixing devices to enable luminaires to be installed on uneven surfaces without distortion.

Type E Luminaires: Ensure that all entries to the type E luminaires are sealed against insect entry including the cable entry and that the diffuser is properly seated against the diffuser seal.

Type V Luminaires: The luminaires type V are provided with a gap filling compound. Apply the compound to the cable entry, after cables have been terminated, to ensure moisture and insects do not enter the luminaires

Type C Cylindrical Luminaire: The type C cylindrical luminaire is a multi-lamp lighting system comprising continuous in line, rod suspended cylindrical luminaires. Suspensions are externally fitted to the body and adjustable up to 3600 mm maximum centres. Deflection of the installed luminaire shall not exceed mm.

Suspension sets: Various designs to suit flat and sloping ceilings, ceiling canopies, fish plate assemblies, various infill sections, diffuser retaining clips, joining bands, additional blocks, louvre assembly, etc. are available from the Contract Supplier.

## 19.27 ACCESSORIES AND OPTIONS

### Options

Nominate, with placement of order, either option SG or SE for each luminaire along with any other applicable option.

### I Option

Luminaires are supplied with an inverter and battery pack for emergency operation. For non-recessed fittings install the battery pack remotely and allow to connect it to the luminaire and to install the unswitched active.

### P3 Option

Luminaires are fitted with three pin plug and 1500 mm of flexible lead attached. Nominate type of pins required on plug.

### P4 Option

Luminaires fitted with four pin plug and 1500 mm of flexible lead attached required for luminaires fitted with Option I. Nominate type of pins required on plug. Supply and install socket to match plug.

### SG Option

Luminaires are fitted with switch start lamp circuits.

### SE Option

Luminaires are fitted with concealed electronic starters.

## 19.28 GOVERNMENT CONTRACT LUMINAIRES SCHEDULES

### Purchase the following under Government Contract:-

Note: Not all are to be fitted with blocking inductors:

Contract Fluorescent Luminaires:

Harcroft Lighting:-	Batten type
Thorn Lighting:-	Industrial and Troffer type
Pierlite Lighting:-	All other Contract Luminaires

The following non-contract luminaires have a proven record of suitability in schools and samples are not required. Alternatives require submissions:

Security Light:

Interior	SL/181 Luxalite Pty Ltd
Exterior	Pierlite-Luxalite VO Series
Interior H.I.D	Multilux 400W, M.H., from Versalux.
Lumminaires (MPC or Hall)	Fitted with diffuser and retaining ring.
Bollard luminaires concealed lamp.	Pierlite AB Series. Harcroft AB.Series – with
Post-top luminaires	Holophane 500mm prismsphere GEC Bathurst ALI Eurolantern.
15 Watt Dark Room Safelight	KODAK Pyramid Safelight Cat. No.402 5300 chain suspended with Kodak OC (light amber) filter.

#### 19.29 LAMPS – TUBES – ETC

All light fittings are to be supplied complete with new lamps or tubes including any re-used fittings.

All tubes are to be white light.

## 20 PAINTING

### 20.1 FINISHES General

Finish coatings for all types of surfaces to be painted to demountables shall be as specified in the Technical Specification for Surface Preparation and Painting (Section 34) and Appendix A.

### 20.2 SEALANTS

The following sealants are used in the construction of modules:

**Sealant 1 Compressible Foam Tape** - an open cell impregnated with stabilised chlorine paraffin and neoprene. It shall have a pressure sensitive adhesive on one side only. It shall have excellent resistance to fungi, water, and weak alkalies. This tape shall be supplied and shipped with each module for onsite sealing between adjacent modules. Contractor shall ship 17 metres length of 50 x 40 mm section of this tape with each module. Product shall be equal to "Will-seal".



**Sealant 2 Sealant Flashing** - weather proofing self adhesive bituminous aluminium tape flashing equal to "Flashtac". Supply with each module one roll of 96 mm wide x 10 metre long sealant flashing.

**Sealant 3 Sealant Tape** - a poly isobutylene-butyl, reinforced preformed tape sealant, 100% solids. For use in sealing corrugated roofs and where directed.

**Sealant 4 Silicone Sealant** - a one part neutral cure silicone sealant for use in wet areas such as shower area, glass to glass etc or wherever a first class sealant is required.

Sealants shall be generally located on the drawings or as required to complete the job to an adequate standard. Sealants for windows are specified in "Metalwork" - Section 5. Colour to be approved by the Superintendent.

### 20.3 MODULE IDENTIFICATION PLATES

Install two (2) stainless steel identification plates supplied by the Department of School Education. Position both plates to the fascia channel of the Entry Module above the door by installing 6 blind rivets through the pre-drilled holes of the plate. Approximate size of plates 200 x 50 x 2 mm thick.

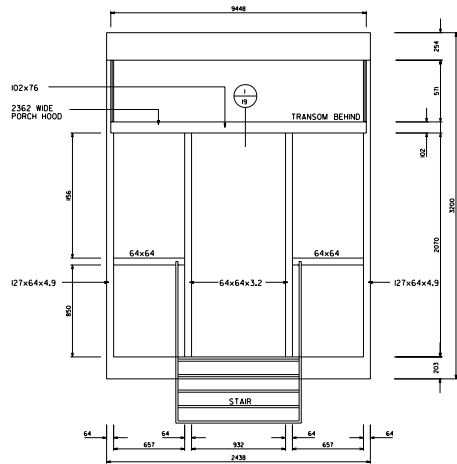
### 20.4 SUBSECTION A COLOUR AND FINISHES SCHEDULE

**Note – This colour schedule is to be used for painting Demountable buildings only.**

Where the schedule is incomplete give at least ten (10) working days notice to the Superintendent of the date on which the information will be required.

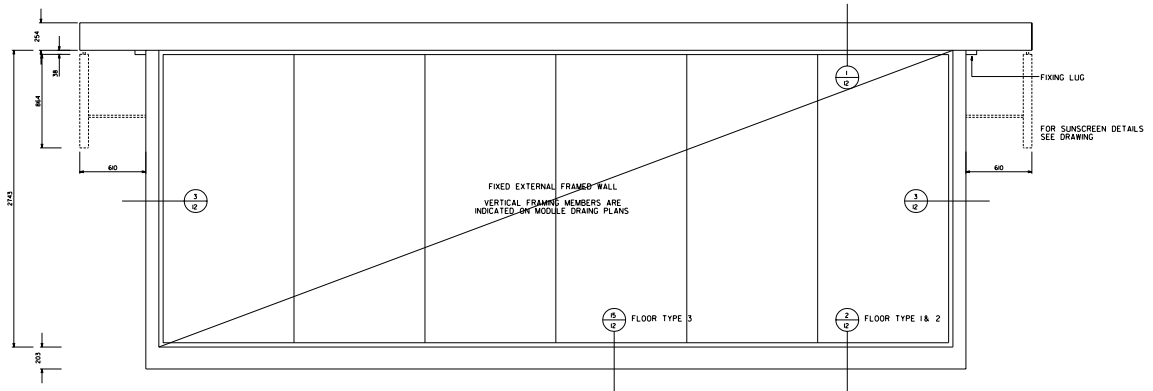
	MATERIAL	LOCATION	FINISH	COLOUR/ REMARKS
1.	External Steel	Hot Rolled & Cold Formed Mild Steel - as specified.	Paint, as specified.	B.S. 381c: 1964 No. 361, "Light Stone"
2.	Internal Steel	Hot Rolled & Cold Formed Mild Steel	Paint, as specified.	As above.
3.	External Wall Sheeting	Sheeting	Embossed Al. - as specified.	"Marzipan"
4.	Internal Wall Sheeting	Compressed Fibre Cement - as specified.	Paint, as specified.	Taubmans or Pascol semi-gloss enamel or acrylic P-39-2,, "Manilla"
		- as specified	Paint, as specified	As above
		Sheeting	Embossed Al.	"Marzipan"
5.	External Door/s	Plywood Faced Solid Core - as specified.	Paint, as specified.	Taubmans or Pascol M-36-3, "Deep Carnation"

				” gloss enamel.
6.	Internal Door/s	Plywood Faced Solid Core - as specified, (includes internal face of external doors)	Paint, as specified.	Taubmans “Smoked Salmon” gloss enamel.
7.	Ceiling	Plywood and Compressed Fibre Cement - as specified.	Paint, as specified.	“White”, Matt
8.	Soffit Lining	Compressed Fibre Cement - as specified.	Paint, as specified.	“White”, semi-gloss enamel
9.	Entry Steps	Mild Steel - as specified.	Paint, as specified.	B.S. 381c:1964 No.361 “Light Stone”
10.	Resilient Floor Finish	As directed	As selected	As selected
11.	Carpet	As directed	As selected	As selected
12.	Joinery Finish	As specified.	Paint, as specified	
13.	Plastic Laminate, Finish Textured	Splashbacks (misc) Practical Areas (benches & splashbacks)	- Laminex - Laminex	“Merino” “Pastel Apricot”
14.	Windows	le Buildings : Buildings	Powder coated Anodised	Match existing Match existing



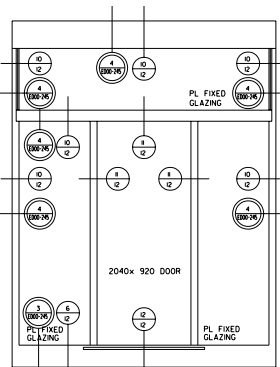
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OF FRAME

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ELEVATION

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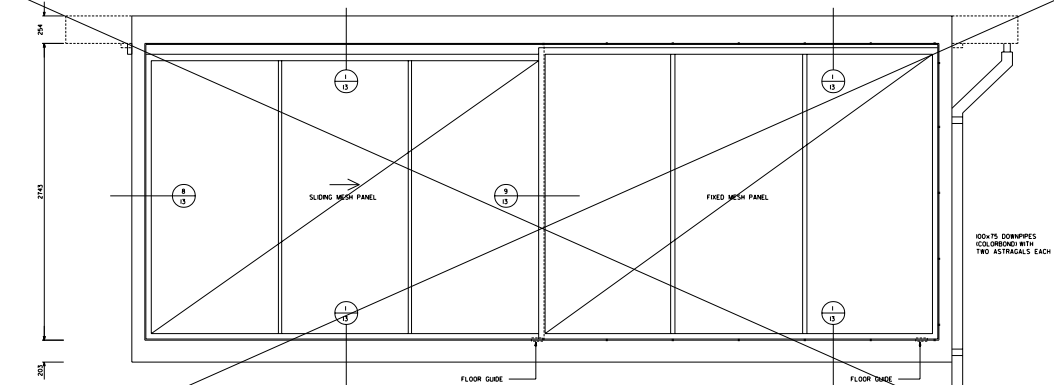


ELEVATION  
OF FRAME

- LEGEND:
- SINGLE CIRCLE SECTION INDICATOR - WHEN EXISTING PANELS ARE REUSED
  - DOUBLE CIRCLE SECTION INDICATOR - USED WHEN REPLACEMENT PANELS ARE INSTALLED

7A

NOT USED



ELEVATION

8A

NOTE:  
THIS DRAWING HAS BEEN COPIED INTO CAD FORMAT FROM THE ORIGINAL DEMOUNTABLE SCHOOL BUILDINGS TRANSPARENCIES - DRAWING NUMBER - CA/06A

NOTES  
1 ALL WINDOWS ARE FIXED GLAZING ARE N.S.W. DEPARTMENT OF PUBLIC WORKS STANDARD WINDOWS AND DETAILS

LEGEND  
PL PLASTIC LAMINATED

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Revision	Date	Amendments	Approved
B	JUNE 2000	SECTION MARKERS & LEGEND ADDED	
C	JAN 2001	GENERAL REVISION	

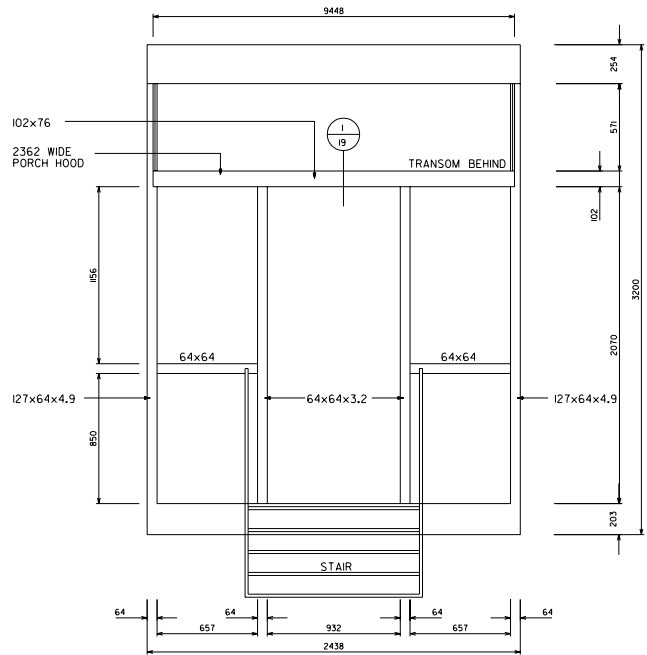
Department of Public Works  
and Services, N.S.W.  
Hunter - New England Region.  
117 Bull Street, Newcastle West, NSW, 2302  
Telephone (02) 49084998, Facsimile (02) 49084954

TITLE  
SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

CONSTRUCTION ENCLOSURE  
ELEVATIONS WALL TYPES

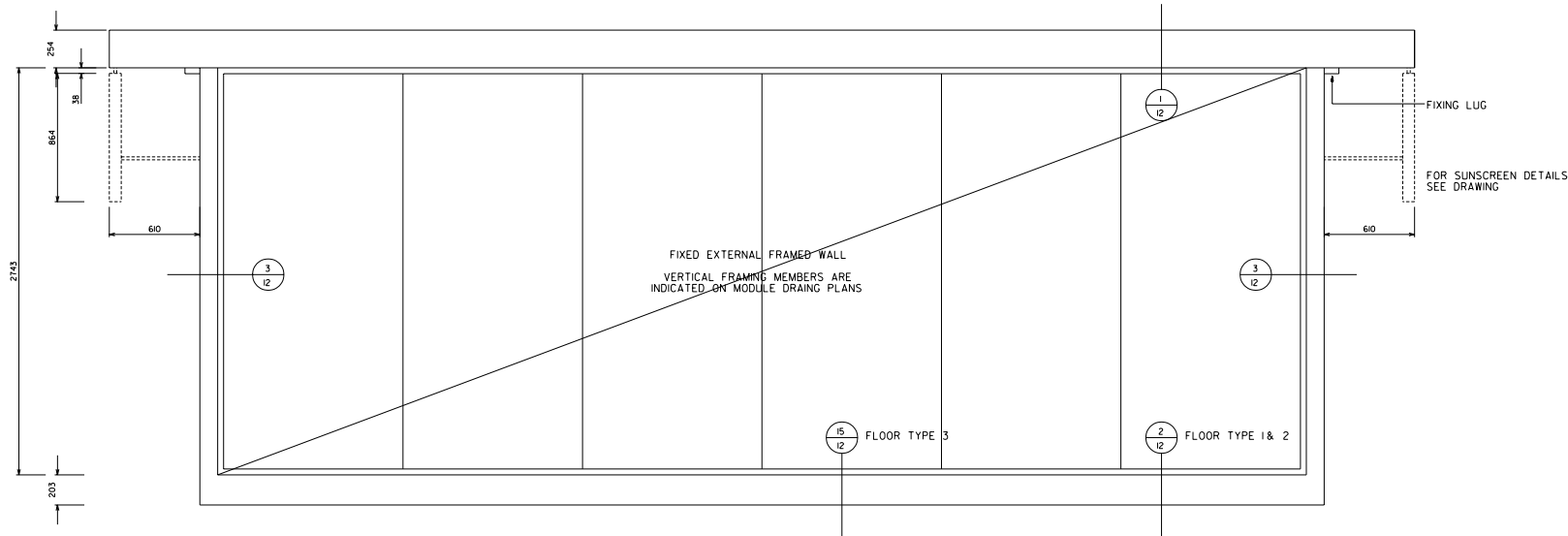
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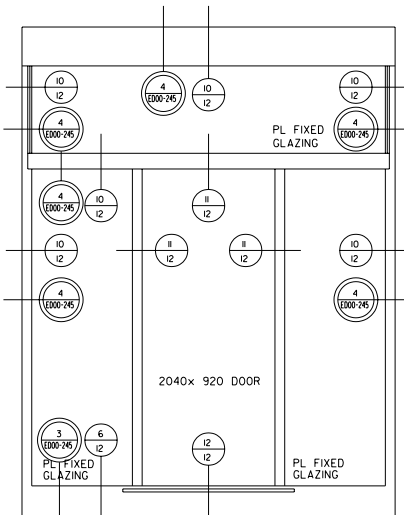
ELEVATION OF FRAME

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ELEVATION

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ELEVATION OF FRAME

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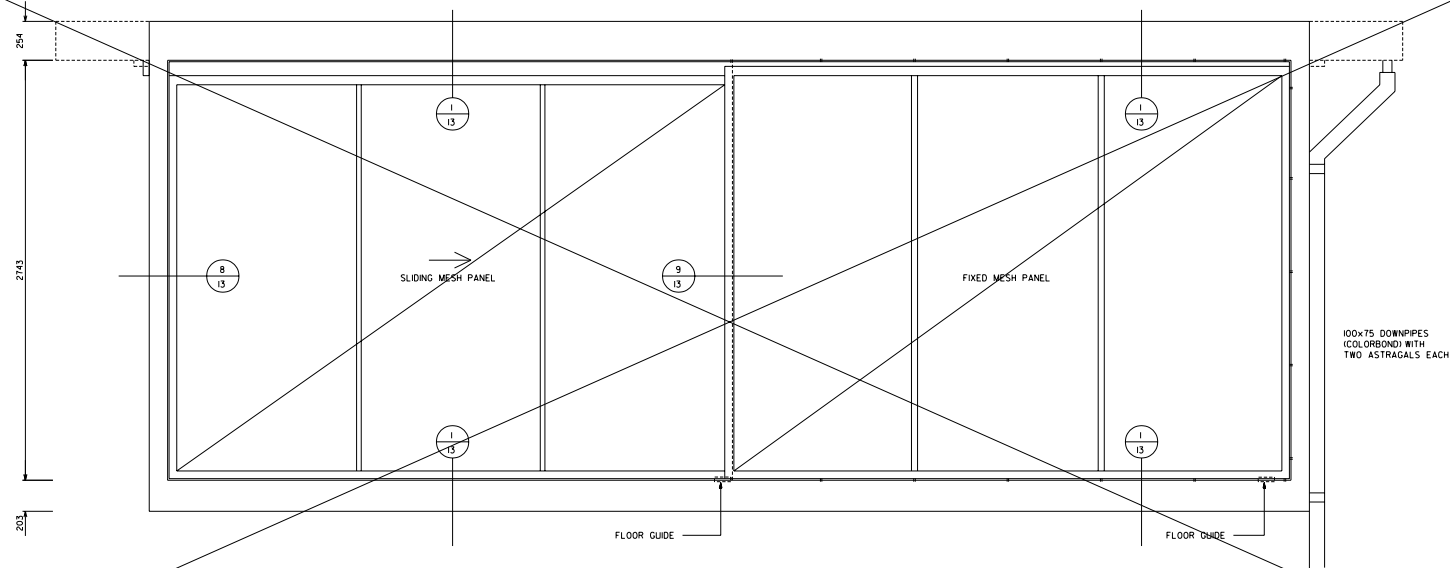
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LEGEND  
PL PLASTIC LAMINATED

NOT USED




ELEVATION

8A

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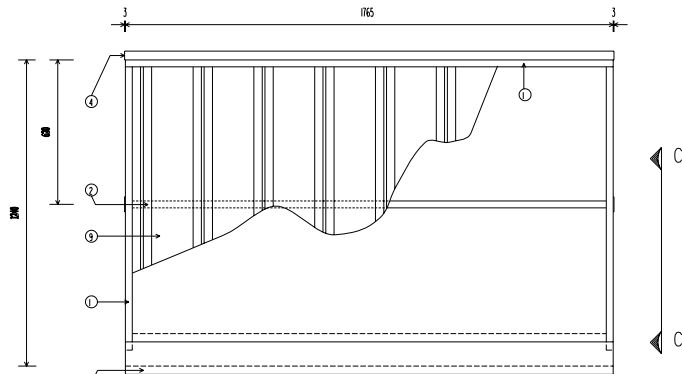
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Revision	Date	Amendments	Approved
B	JUNE 2000	SECTION MARKERS & LEGEND ADDED	
C	JAN 2001	GENERAL REVISION	

  
Department of Public Works  
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TITLE  
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CONSTRUCTION ENCLOSURE  
ELEVATIONS WALL TYPES

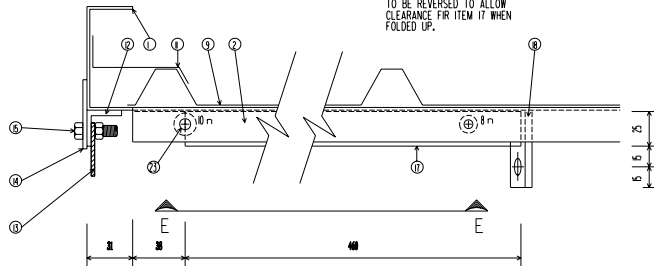
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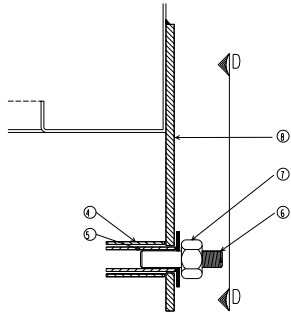
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1  
2

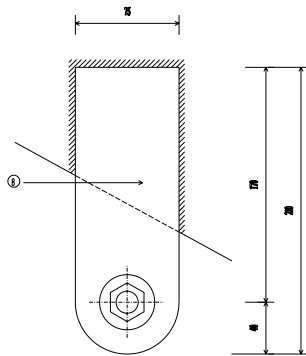
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ROOF DECK TO BE FIXED WITH  
4.8 mm SEALED AL RIVETS  
IN EACH PAN. RIVETS IN FIRST  
AND LAST 2 PANS OF ITEM 2  
TO BE REVERSED TO ALLOW  
CLEARANCE FOR ITEM 11 WHEN  
FOLDED UP.



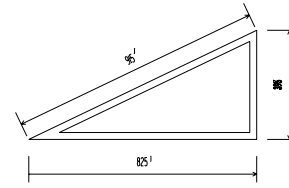
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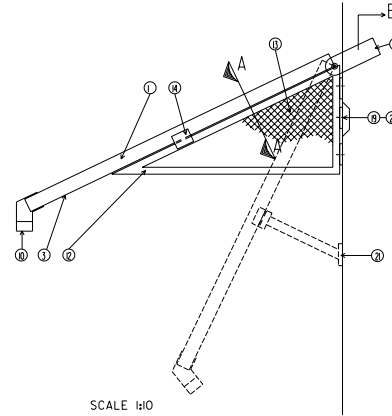
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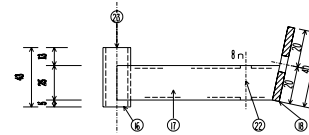
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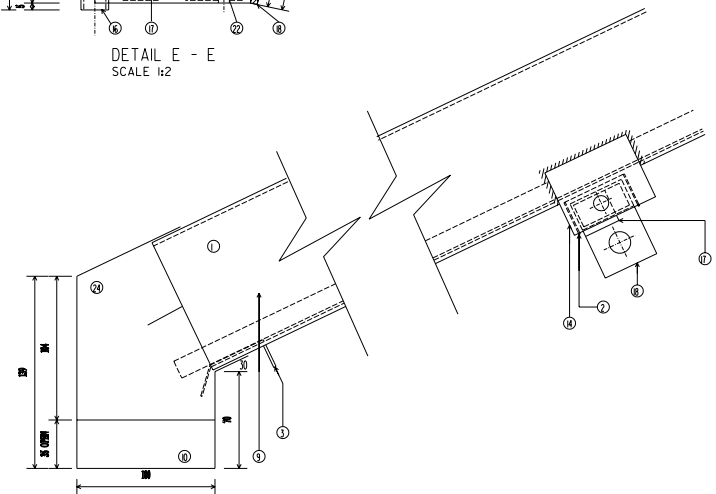
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1. REDUCE BY 40 mm IF  
SECURITY GRILLE IS FITTED



SCALE 1:10



DETAIL E - E  
SCALE 1:2



DETAIL C - C  
SCALE 1:2

ITEM	DESCRIPTION	QTY.
24	12 SHAPED END PLATE GAL.	2
25	M6 x 75 ZP BOLT/ANYLOC NUT & WASHER	2
26	M6 x 75 ZP BOLT/ANYLOC NUT & WASHER	2
27	M10 ZP ALL THREAD x 20 (SITE WELD)	2
28	40 x 40 x 2 SHS SPACER x 390	2
29	75 x 25 SS HINGE	4
30	55 x 40 x 5 MS PLATE 1x12 HOLE	2
31	25 x 25 x 1.6 SHS x 460	2
32	10 NB HEAVY GAL PIPE x 43	2
33	M8 ZP BOLT & CAPTIVE NUT 25 LONG	2
34	50 x 65 x 3 MS PLATE 1x10 HOLE	2
35	EXPANDED METAL GAL.	2
36	25 x 25 HR ANGLE 3 mm THICK GA	2
37	6 C.BOND 2 FLASHING 1270 LG	2
38	12 GAL CUTTER 1x 2430	1
39	A7 FORMULAD C.BOND 3 x 1270	3
40	75 x 75 x 6 HR ANGLE NOTCHED WITH 1x 28 HOLE	2
41	M20 ZP ANYLOC NUT & WASHER	2
42	M20 ZP ALL THREAD 50 LONG	2
43	20 NB GAL PIPE x 2444	1
44	30 NB GAL PIPE x 2436	1
45	75 x 30 x 30 x 2 GAL x 2368	1
46	51x 25 x 2 (CF) GAL x 2368	1
47	103 x 31x 2 (CF) GAL x 2426	2

NOTE:  
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DRAWING NUMBER - ED12/97 & CA/25B

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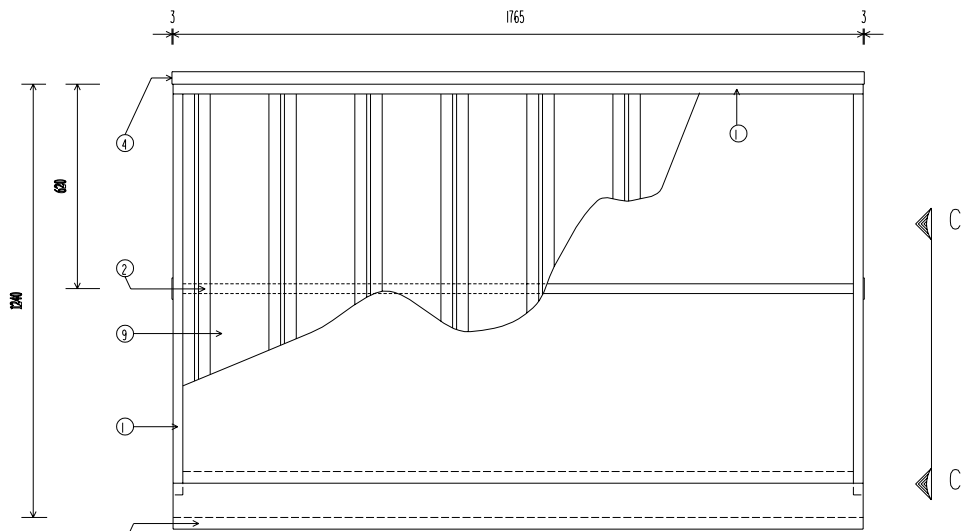
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Revision	Date	Amendments	Approved
B	JAN 2001	TITLE REVISED	

Department of Public Works  
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Hunter - New England Region  
117 Bull Street, Newcastle West, NSW, 2302  
Telephone (02) 49084999, Facsimile (02) 49084954

SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)  
NEW PORCH HOOD FRAME  
HINGED TYPE

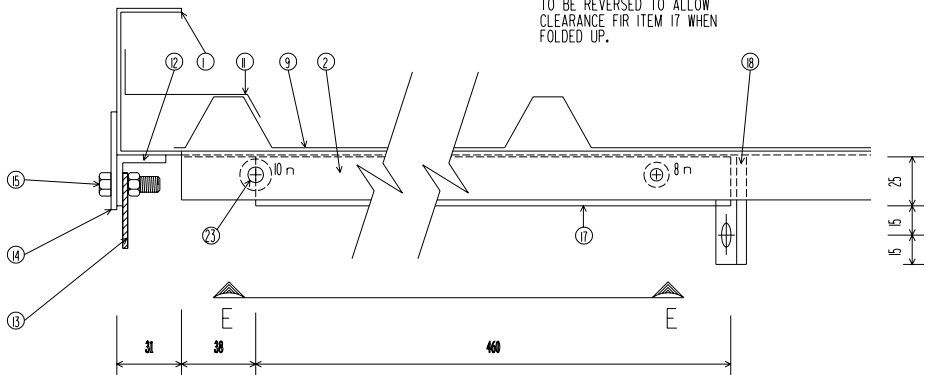
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J. BAGGS	JUNE 2000		
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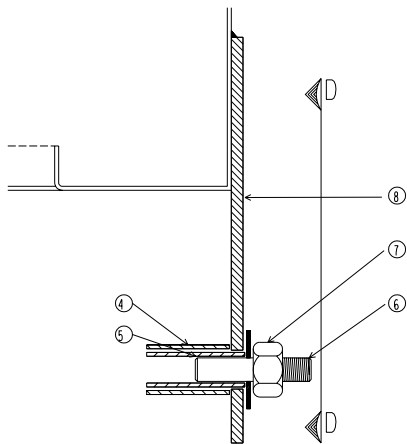
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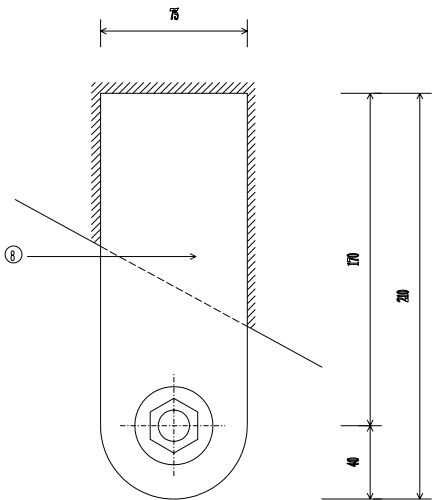
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AND LAST 2 PANS OF ITEM 2  
TO BE REVERSED TO ALLOW  
CLEARANCE FOR ITEM 17 WHEN  
FOLDED UP.



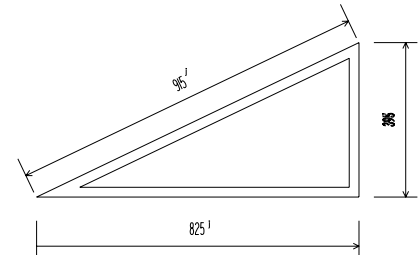
DETAIL A - A  
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DETAIL B - B  
SCALE 1:2

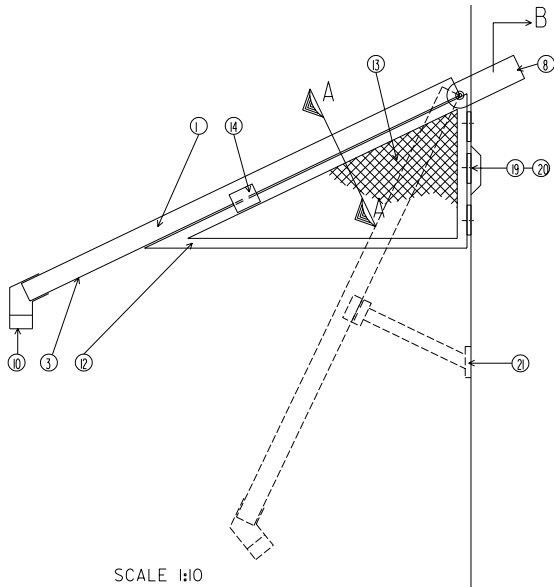


DETAIL D - D  
SCALE 1:2

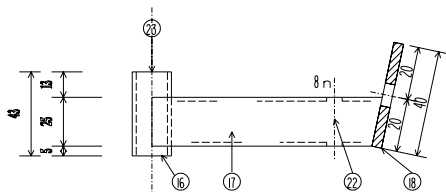


SCALE 1:10

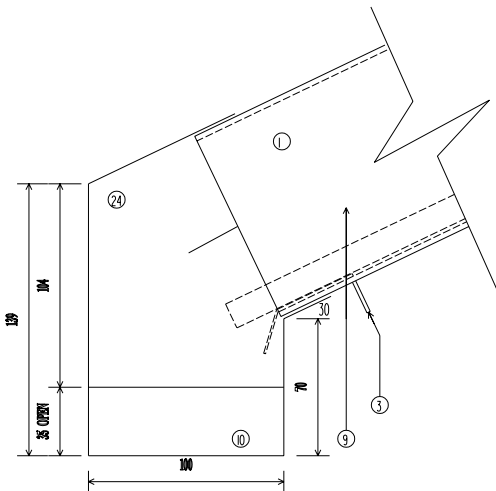
1. REDUCE BY 40 mm IF  
SECURITY GRILLE IS FITTED



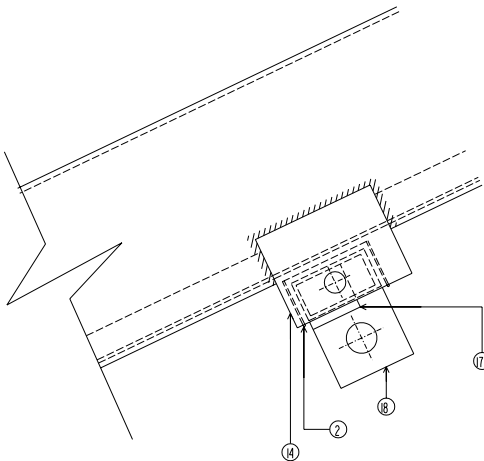
SCALE 1:10



DETAIL E - E  
SCALE 1:2



DETAIL C - C  
SCALE 1:2



ITEM	DESCRIPTION	QTY.
24	L2 SHAPED END PLATE GAL.	2
23	M8 x 75 ZP BOLT/NYLOC NUT & WASHER	2
22	M6 x 75 ZP BOLT/NYLOC NUT & WASHER	2
21	M10 ZP ALL THREAD x 20 (SITE WELD)	2
20	40 x 40 x 2 SHS SPACER x 390	2
19	75 x 25 SS HINGE	4
18	55 x 40 x 5 MS PLATE 1x12 rHOLE	2
17	25 x 25 x 1.6 SHS x 460	2
16	10 NB HEAVY GAL PIPE x 43	2
15	M8 ZP BOLT & CAPTIVE NUT 25 LONG	2
14	50 x 65 x 3 MS PLATE 1x10 rHOLE	2
13	EXPANDED METAL GAL	2
12	25 x 25 HR ANGLE 3 mm THICK OA	2
11	.6 C.BOND Z FLASHING 1270 LG	2
10	L2 GAL GUTTER 1x 2430	1
9	.47 TRIMCLAD C.BOND 3 x 1270	3
8	75 x 75 x6 HR ANGLE NOTCHED WITH 1x 28 rHOLE	2
7	M20 ZP NYLOC NUT & WASHER	2
6	M20 ZP ALL THREAD 50 LONG	2
5	20 NB GAL PIPE x 2444	1
4	32 NB GAL PIPE x 2436	1
3	75 x 30 x 30 x 2 GAL x 2336	1
2	51x 25 x 2 L CF GAL x 2368 x 1238	1 2
1	103 x 31x 2 L CF GAL x 2426	

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DO NOT SCALE OFF DRAWING

Revision	Date	Amendments	Approved
B	JAN 2001	TITLE REVISED	

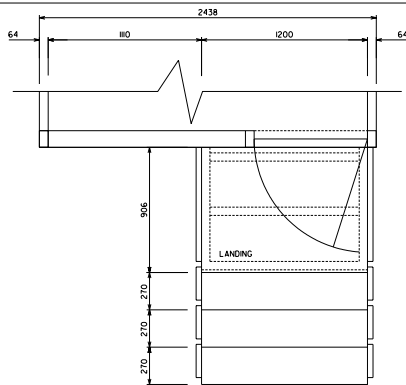
Department of Public Works  
and Services, N.S.W.  
Hunter - New England Region.  
117 Bull Street, Newcastle West, NSW, 2302  
Telephone (02) 49084999, Facsimile (02) 49084954

SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

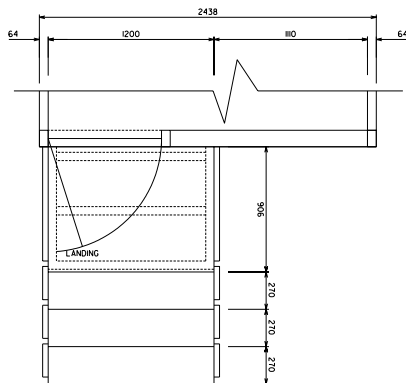
NEW PORCH HOOD FRAME  
HINGED TYPE

DRAWN	DATE	SCALE	
J. BAGGS	JUNE 2000		
DESIGN	CHECKED	APPROVED	
DPWS FILE No.	No IN SET	DRAWING No.	REVISION
ED00- 233	of	ED00- 233	B

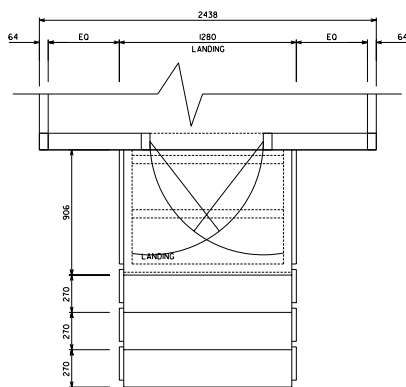
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PLAN: STAIR TO WALL TYPE 5

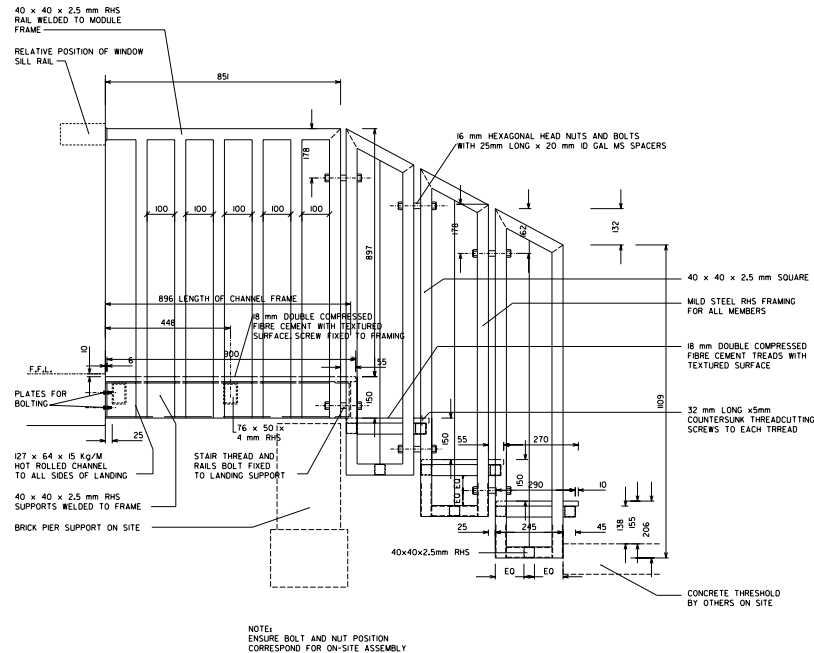


PLAN: STAIR TO WALL TYPE 6



PLAN: STAIR TO WALL TYPE 7

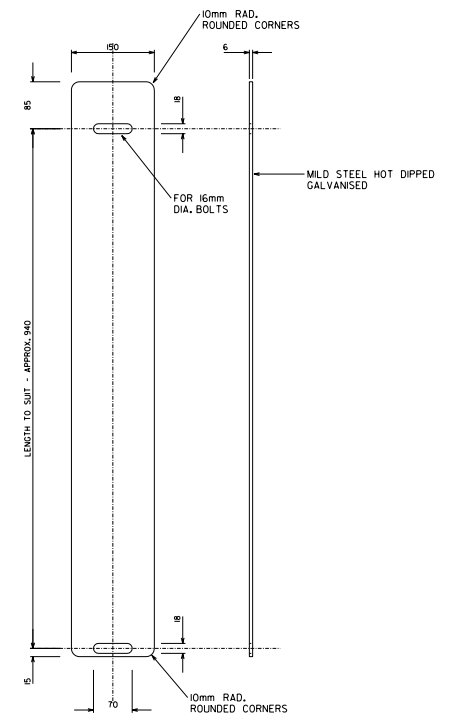
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DRAWING NUMBER - CA/17A



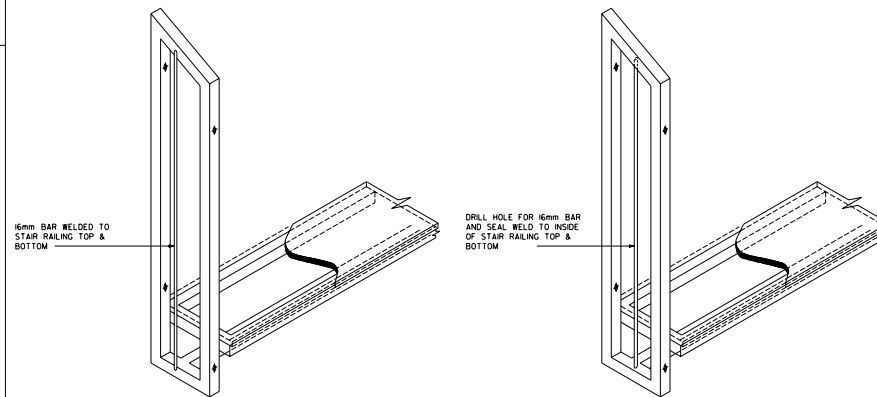
SIDE ELEVATION OF ENTRY STEPS

SCALE 1:10

2/2



ADPTOR PLATE FOR NON-STANDARD LANDINGS & STEPS

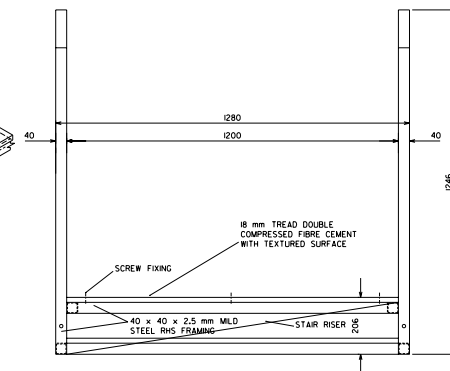


DETAIL FOR REPAIRS TO EXISTING FRAMING

ISOMETRIC VIEW OF FRAMING

SCALE 1:10

DETAIL FOR NEW FRAMING TO BE INSTALLED



FRONT ELEVATION OF ENTRY STEPS

SCALE 1:10

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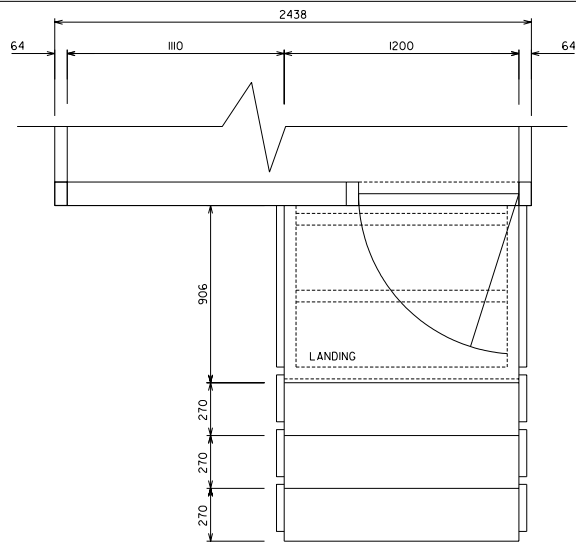
Revision	Date	Amendments	Approved
B	JUNE 2000	ADAPTER PLATE ADDED	
C	JAN 2001	REVISIONS	

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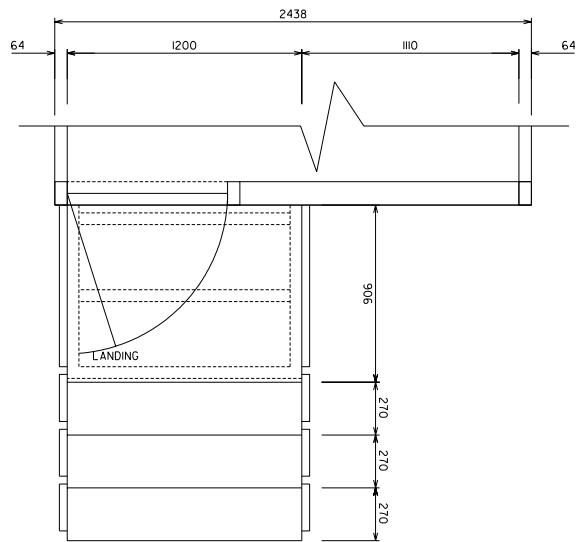
SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

CONSTRUCTION DETAILS  
LANDING DETAILS

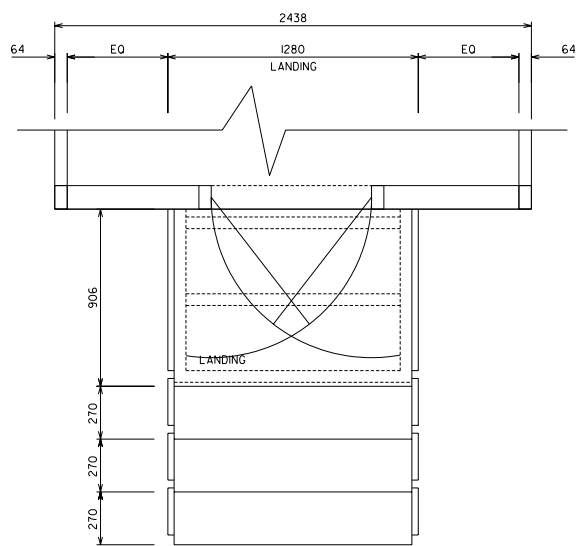
DRAWN	DATE	SCALE	
J. BAGGS	JUNE 2000	1:50, 1:100	
DESIGN	CHECKED	APPROVED	
DPWS FILE No.	No IN SET	DRAWING No.	REVISION
ED00- 234	of	CA/17	C



PLAN: STAIR TO WALL TYPE 5

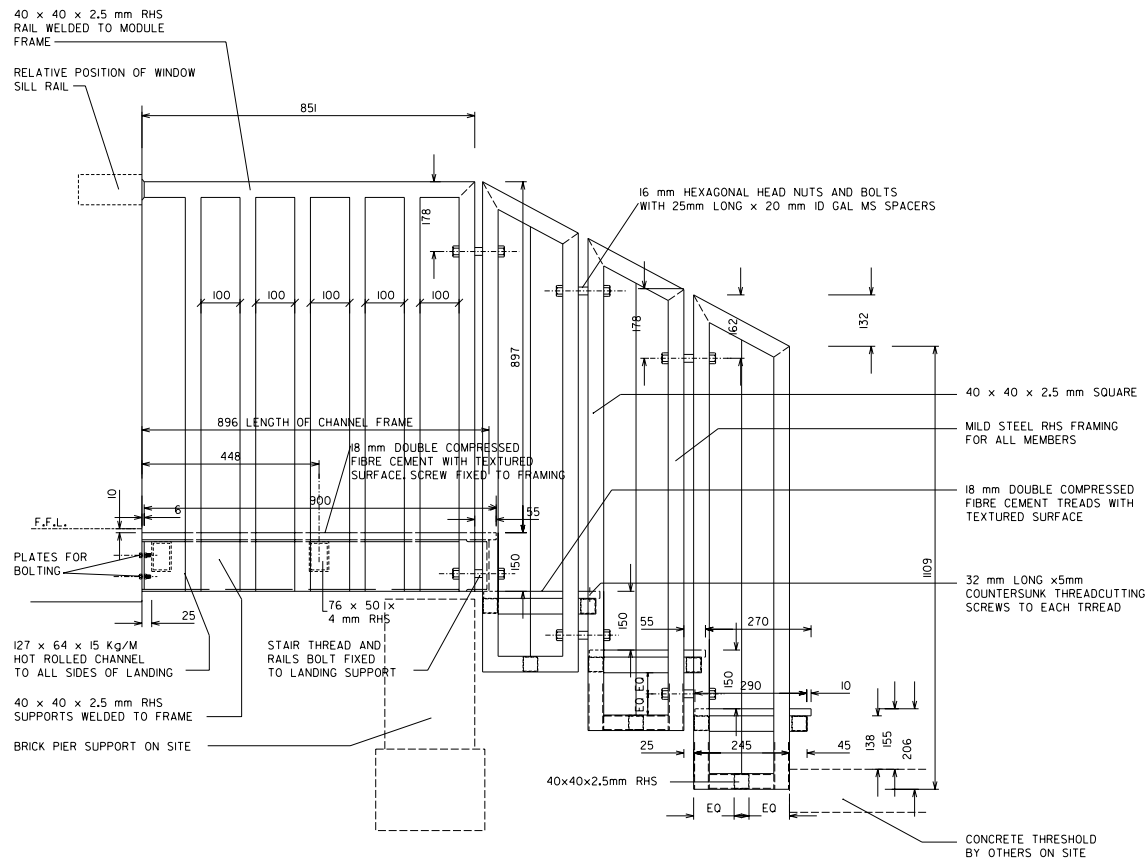


PLAN: STAIR TO WALL TYPE 6



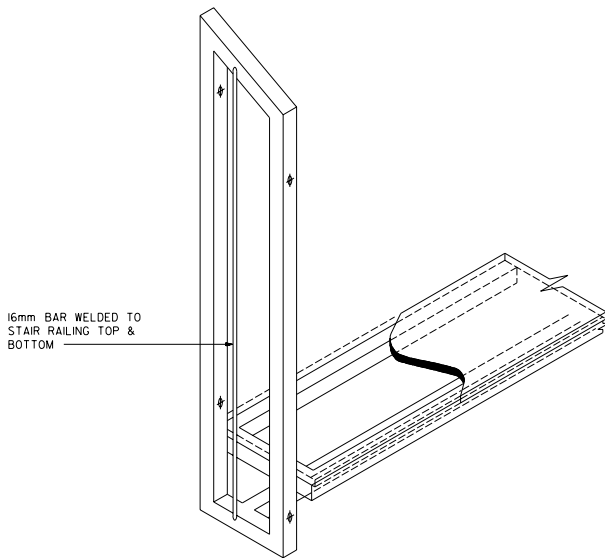
PLAN: STAIR TO WALL TYPE 7

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DRAWING NUMBER - CA/17A



SIDE ELEVATION OF ENTRY STEPS

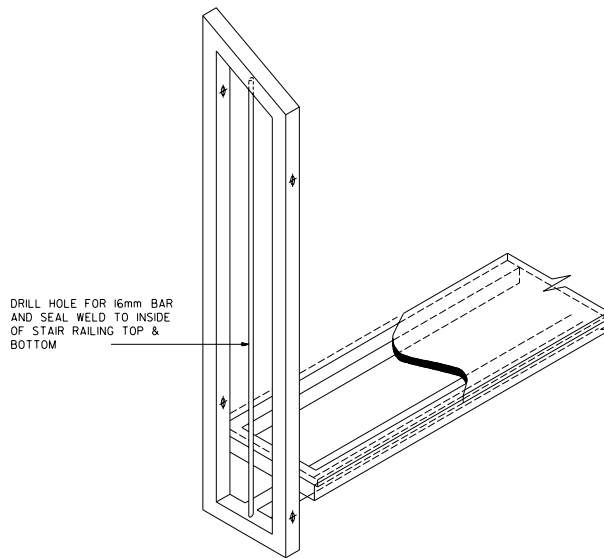
SCALE 1:10



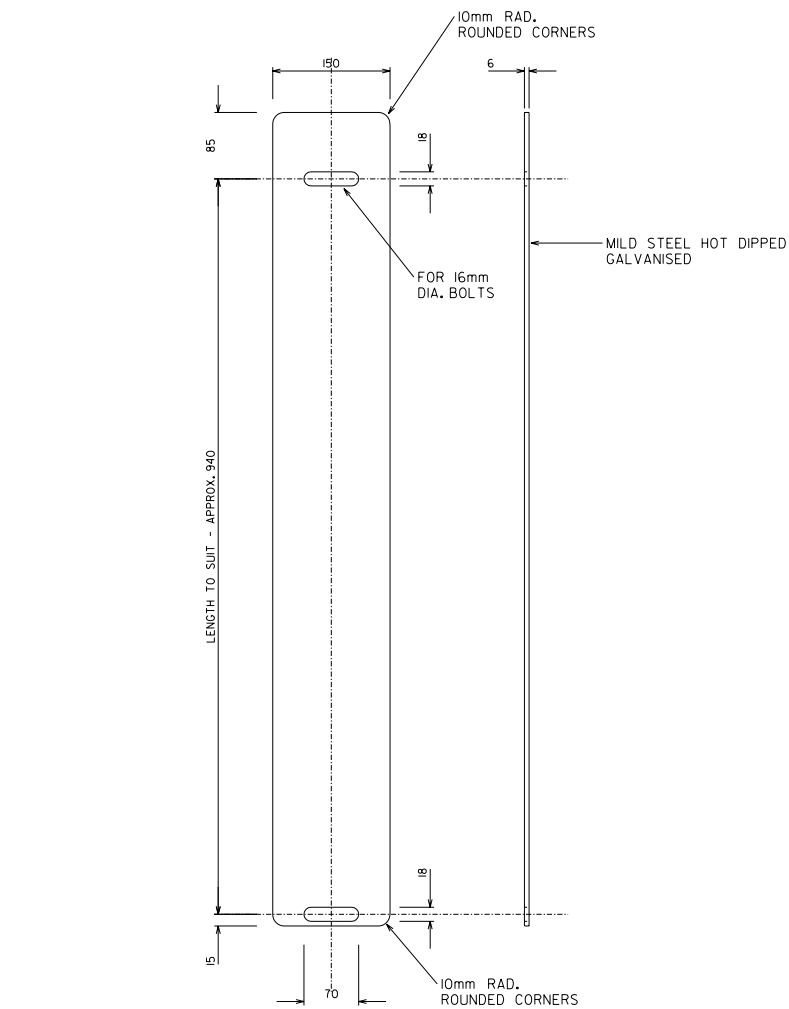
DETAIL FOR REPAIRS  
TO EXISTING FRAMING

ISOMETRIC VIEW  
OF FRAMING

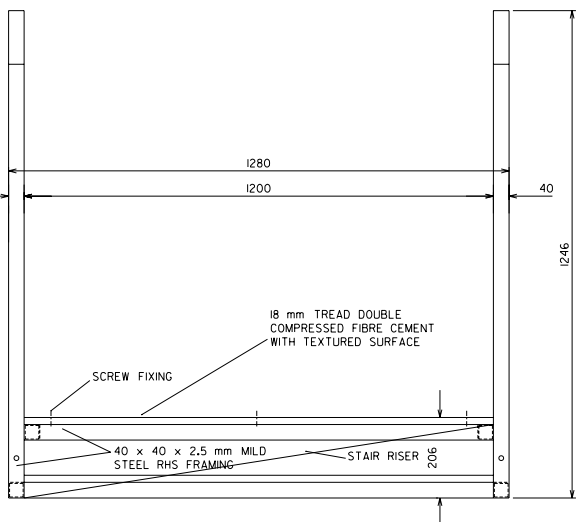
SCALE 1:10



DETAIL FOR NEW  
FRAMING TO BE  
INSTALLED



ADPTOR PLATE FOR NON-STANDARD  
LANDINGS & STEPS



FRONT ELEVATION OF ENTRY STEPS

SCALE 1:10

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK  
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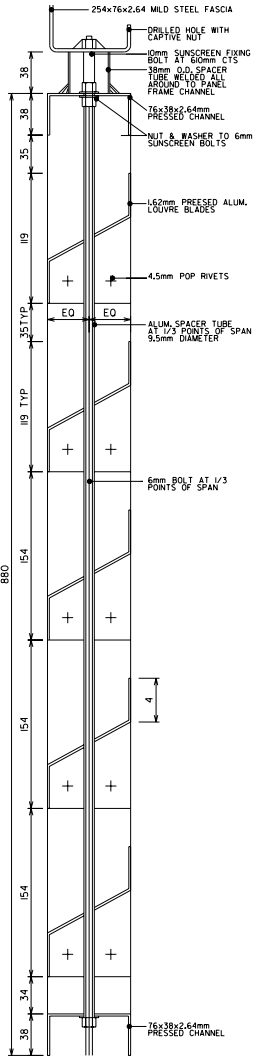
Revision	Date	Amendments	Approved
B	JUNE 2000	ADAPTER PLATE ADDED	
C	JAN 2001	REVISIONS	

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117 Bull Street, Newcastle West, NSW, 2302  
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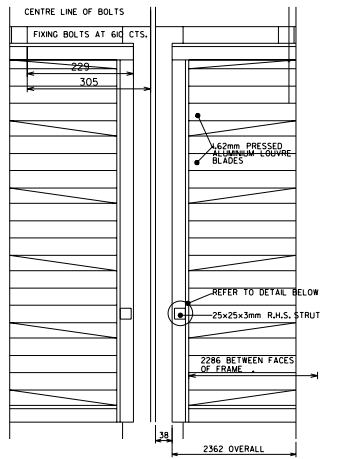
SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)  
  
CONSTRUCTION DETAILS  
LANDING DETAILS

DRAWN	DATE	SCALE	
J. BAGGS	JUNE 2000	1:50, 1:100	
DESIGN	CHECKED	APPROVED	
DPWS FILE No.	No IN SET	DRAWING No.	REVISION
ED00- 234	of	CA/17	C

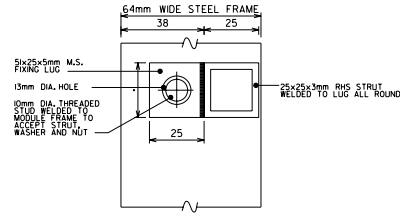




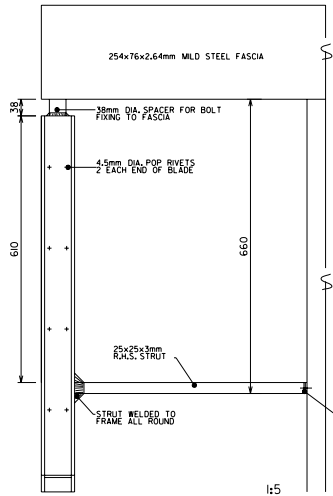
SECTION THROUGH SUNSCREEN l:2



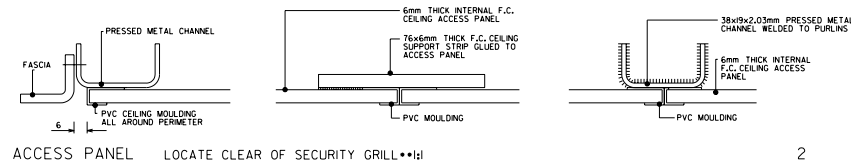
FRONT ELEVATION l:5



DETAIL OF FIXING LUG l:1

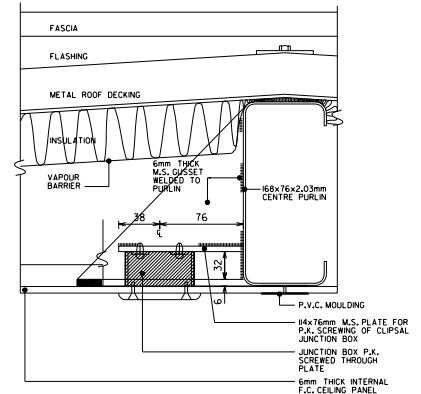


SIDE ELEVATION OF SUNSCRN. l:5

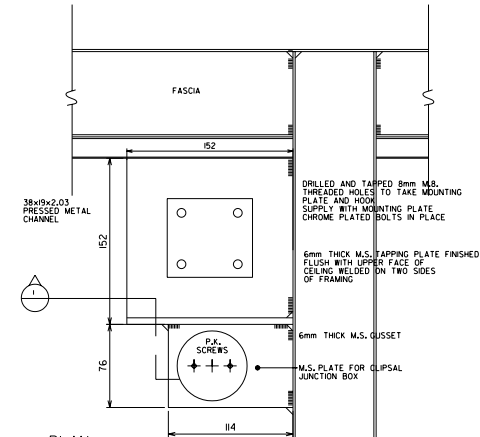


ACCESS PANEL LOCATE CLEAR OF SECURITY GRILL\*\*l:1

2

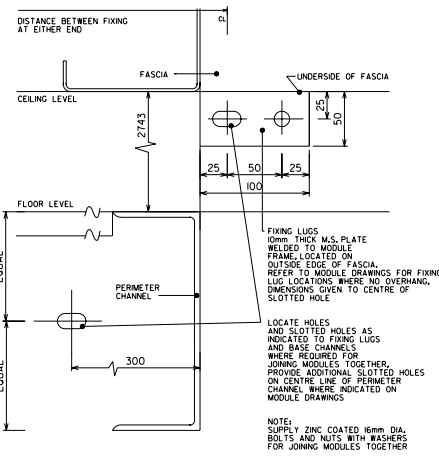


SECTION I l:2



PLAN FAN MOUNTING PLATE l:2

3



MODULE FIXINGS l:2

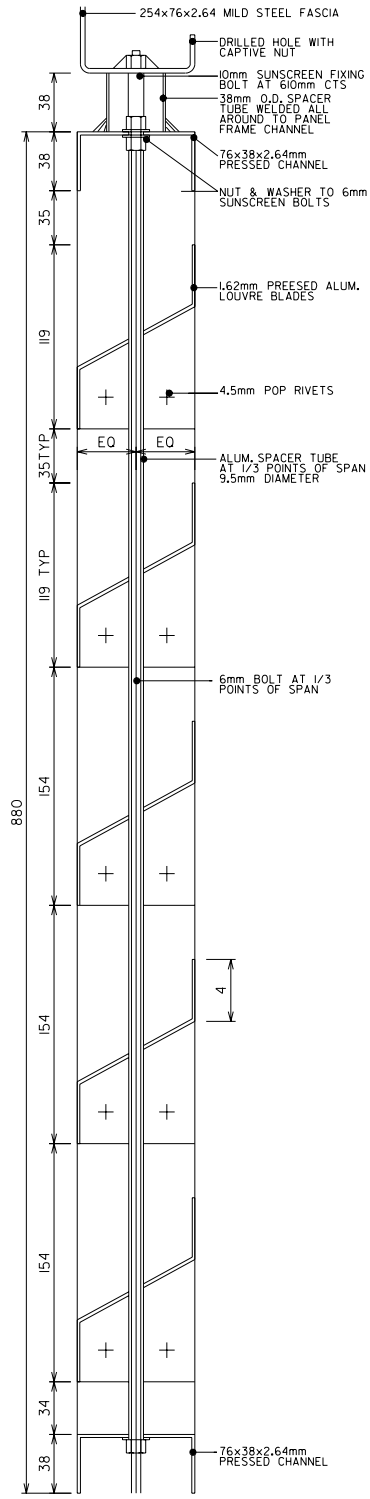
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DRAWING NUMBER - CA/18A

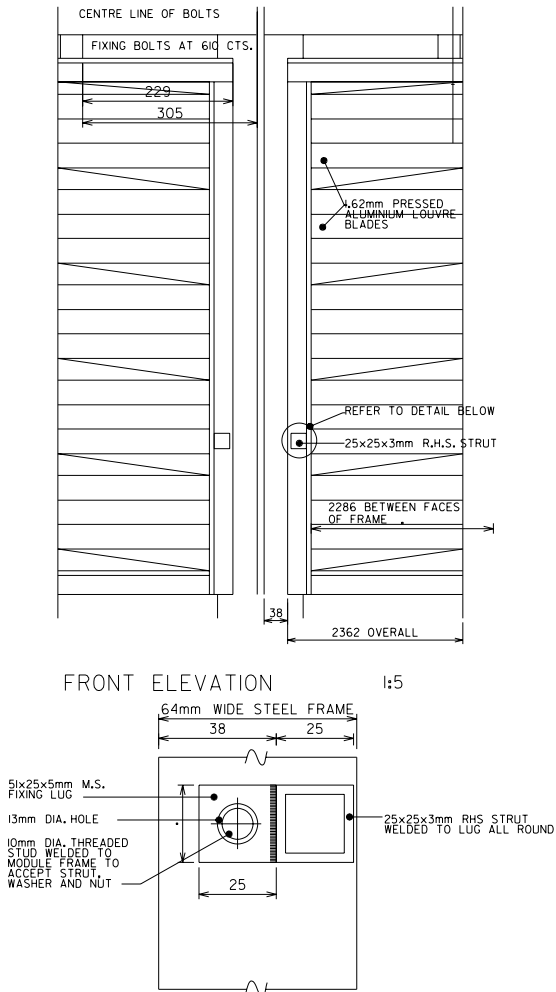
Revision	Date	Amendments	Approved
B	JUNE 2000	DETAIL 5 DELETED	

DRAWN	DATE	SCALE
J. BAGGS	JUNE 2000	
DESIGN	CHECKED	APPROVED
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ED00-235	of	CA/18
		REVISION
		B

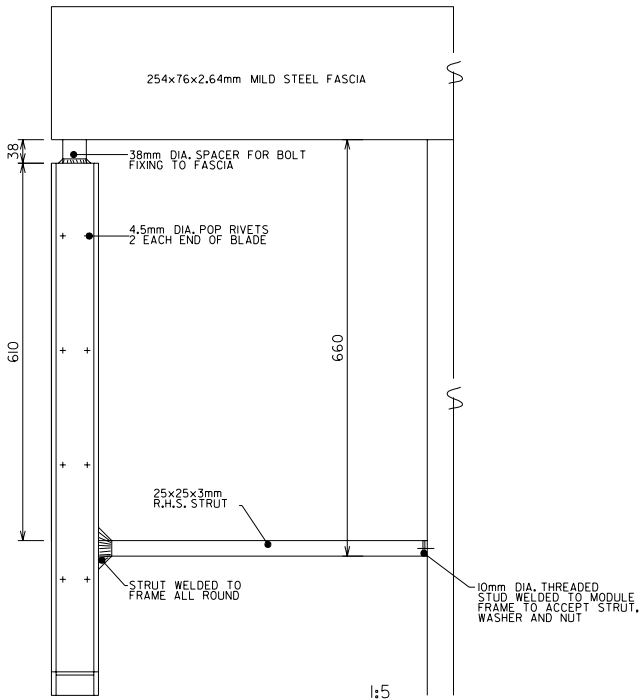
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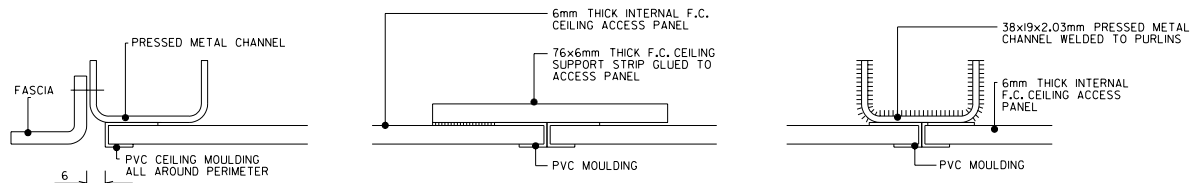
SECTION THROUGH SUNSCREEN 1:2



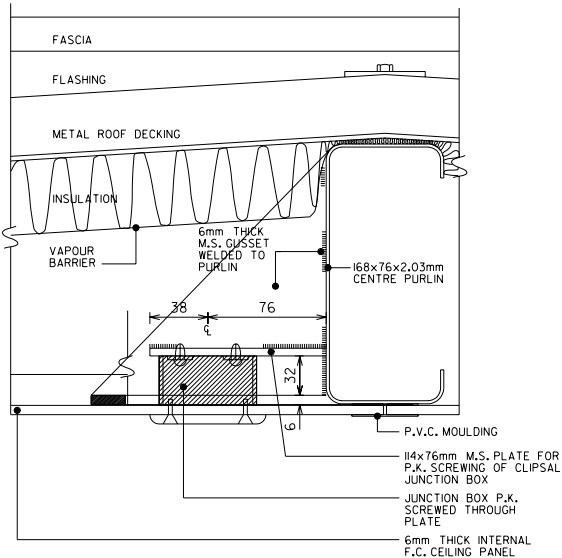
DETAIL OF FIXING LUG 1:1



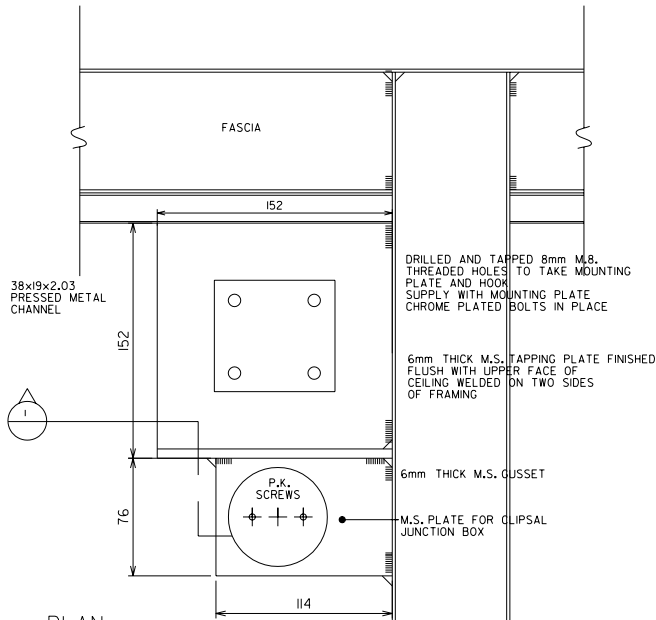
SIDE ELEVATION OF SUNSCRN. 1:5



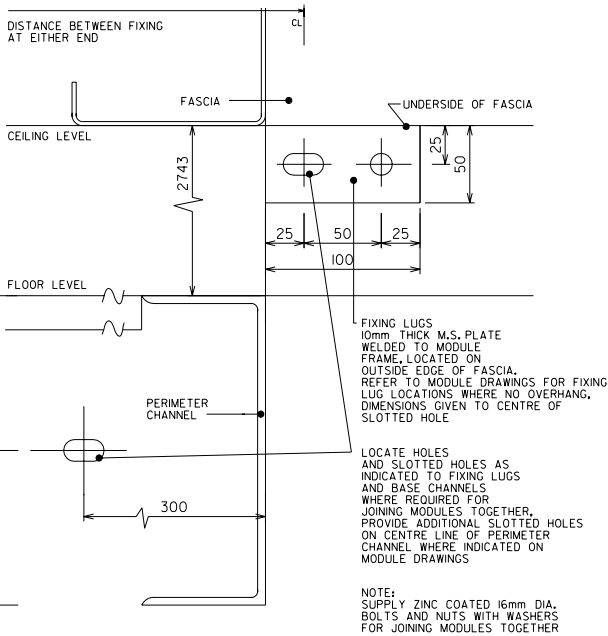
ACCESS PANEL LOCATE CLEAR OF SECURITY GRILL\*\*1:1



SECTION I 1:2



PLAN FAN MOUNTING PLATE 1:2



MODULE FIXINGS 1:2

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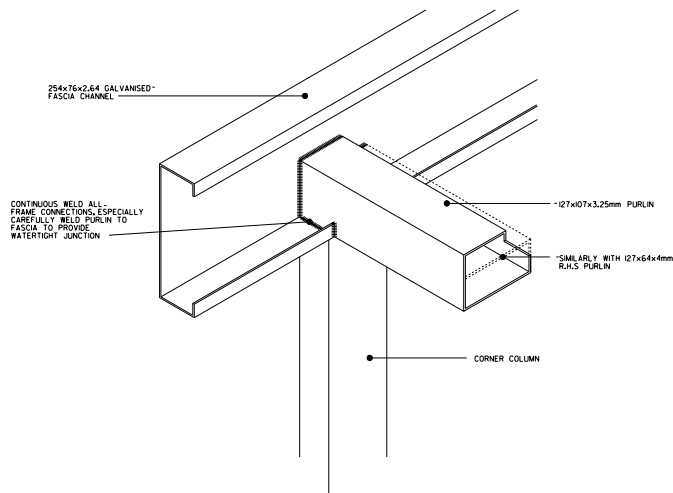
  
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Hunter - New England Region.  
117 Bull Street, Newcastle West, NSW, 2302  
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TITLE  
SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

CONSTRUCTION DETAILS  
SUNSCREEN & GENERAL

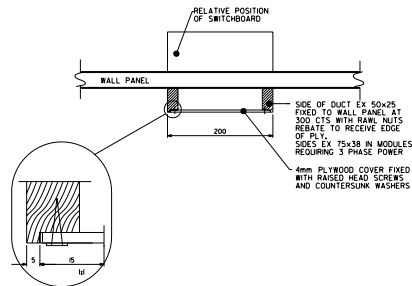
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J. BAGGS	JUNE 2000		
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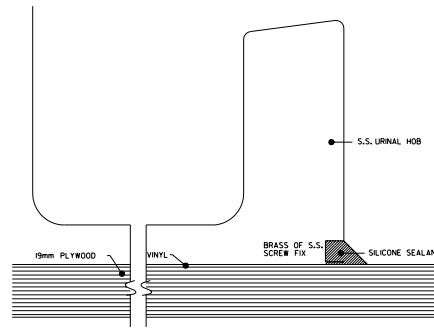


JUNCTION OF PURLIN WITH  
FASCIA OVER CORNER COLUMN 1:5

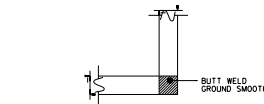
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DRAWING NUMBER - CA/19A



PLAN. ELECTRICAL DUCT

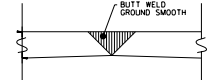


JUNCTION OF URINAL HOB WITH FLOOR  
SIDE PANELS SIMILAR 1:1



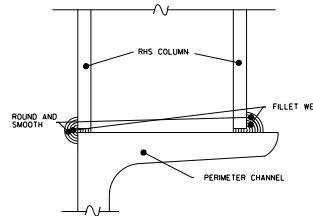
HOT ROLLED CHANNELS  
WEB JOINT

5



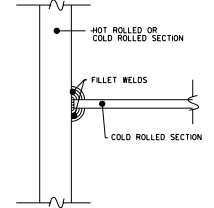
HOT ROLLED CHANNELS  
FLANGE JOINT

8



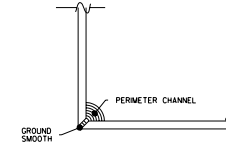
COLUMN/CHANNEL JOINT

6



NON-VISIBLE FILLET WELD

9



VISIBLE JOINT OF 2  
COLD ROLLED SECTIONS

7

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Revision	Date	Amendments	Approved



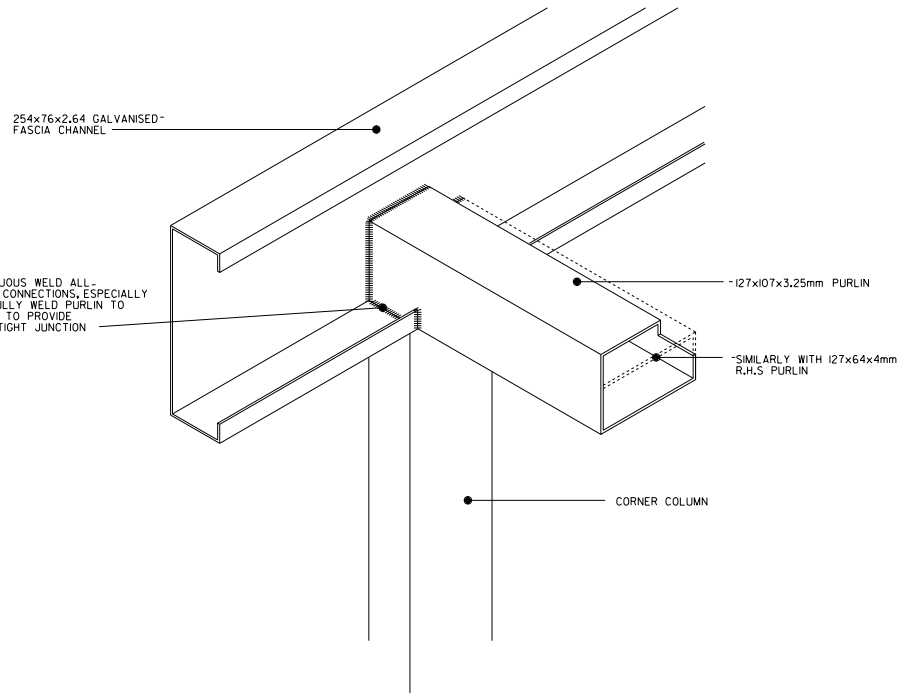
Department of Public Works  
and Services, N.S.W.  
Hunter - New England Region  
117 Bull Street, Newcastle West, NSW, 2302  
Telephone (02) 49084999, Facsimile (02) 49084954

TITLE  
SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

CONSTRUCTION DETAILS  
PORCH HOOD & MISCELLANEOUS

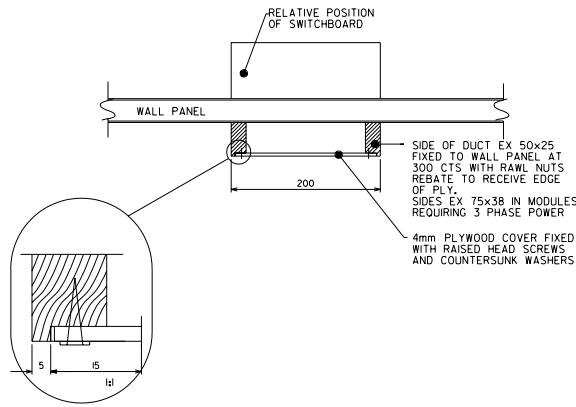
DRAWN	DATE	SCALE	
J. BAGGS	JUNE 2000	NTS	
DESIGN	CHECKED	APPROVED	
DPWS FILE No.	No IN SET	DRAWING No.	REVISION
ED00-236	of	CA/19	B

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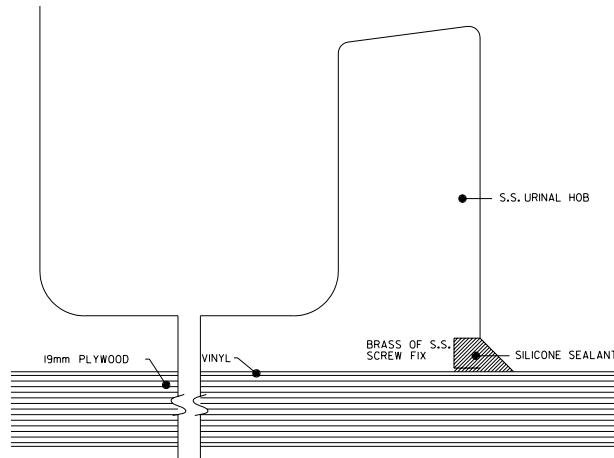


JUNCTION OF PURLIN WITH FASCIA OVER CORNER COLUMN 1:5

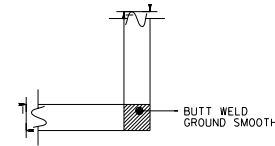
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PLAN ELECTRICAL DUCT

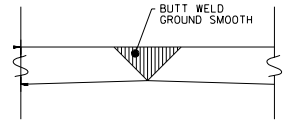


JUNCTION OF URINAL HOB WITH FLOOR SIDE PANELS SIMILAR 1:1



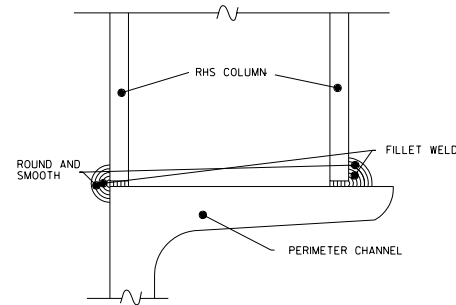
HOT ROLLED CHANNELS WEB JOINT

5



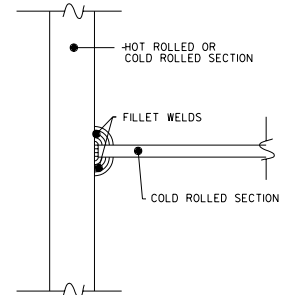
HOT ROLLED CHANNELS FLANGE JOINT

8



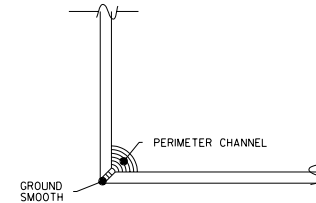
COLUMN/CHANNEL JOINT

6



NON-VISIBLE FILLET WELD

9



VISIBLE JOINT OF 2 COLD ROLLED SECTIONS

7

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Revision	Date	Amendments	Approved



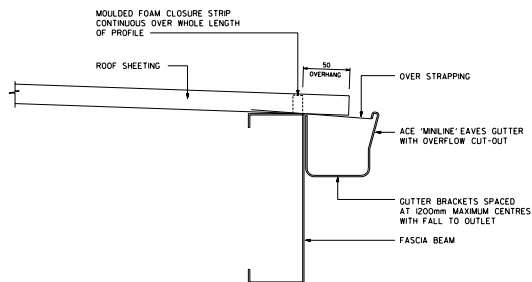
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Hunter - New England Region.  
117 Bull Street, Newcastle West, NSW, 2302  
Telephone (02) 49084999, Facsimile (02) 49084954

SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

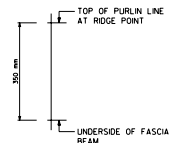
CONSTRUCTION DETAILS  
PORCH HOOD & MISCELLANEOUS

DRAWN	DATE	SCALE	
J. BAGGS	JUNE 2000	NTS	
DESIGN	CHECKED	APPROVED	
DPWS FILE No.	No IN SET	DRAWING No.	REVISION
ED00-236	of	CA/19	B

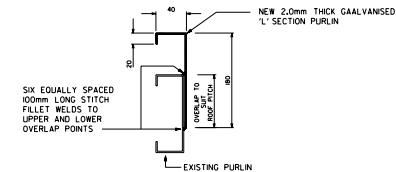
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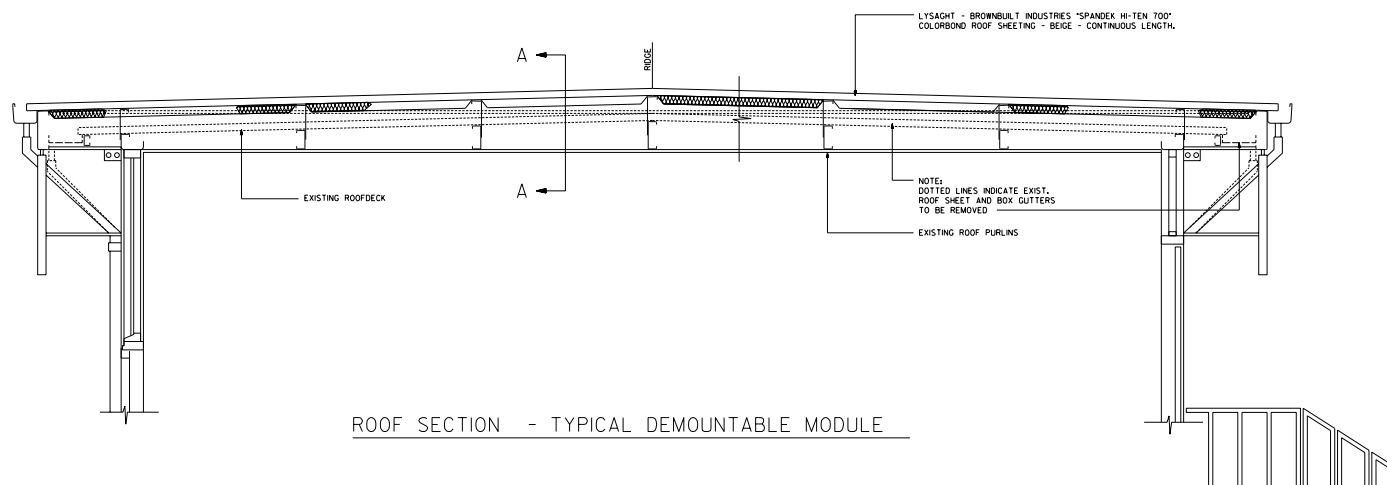
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EAVES GUTTER



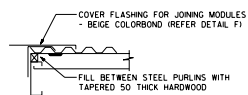
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RIDGE HEIGHT



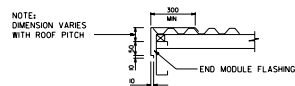
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PURLIN RAISING



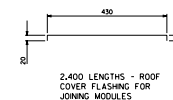
ROOF SECTION - TYPICAL DEMOUNTABLE MODULE



DETAIL D  
INTERNAL MOD. SIDE FLASHING  
SECTION A-A



DETAIL E  
END MODULE FLASHING (BARGE)  
SECTION A-A



DETAIL F  
JOINING MOD. COVER FLASHING

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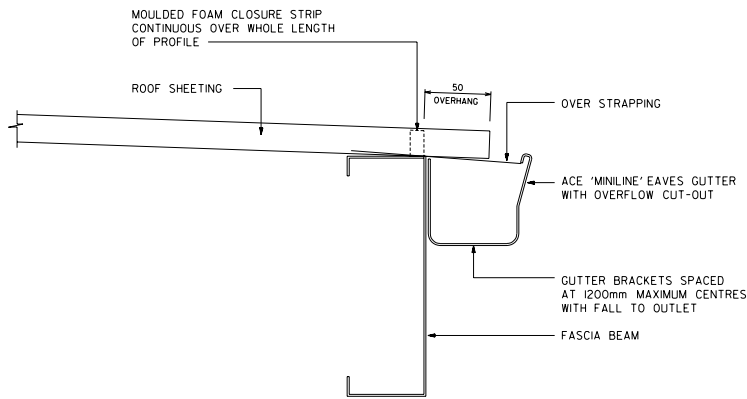
Department of Public Works  
and Services, N.S.W.  
Hunter - New England Region  
117 Bull Street, Newcastle West, NSW, 2302  
Telephone (02) 49084999, Facsimile (02) 49084954

TITLE  
SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

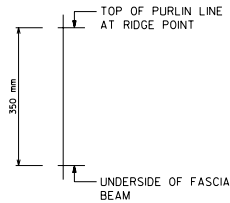
ROOF CONVERSION

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J. BAGGS	JUNE 2000	NTS	
DESIGN	CHECKED	APPROVED	
DPWS FILE No.	No IN SET	DRAWING No.	REVISION
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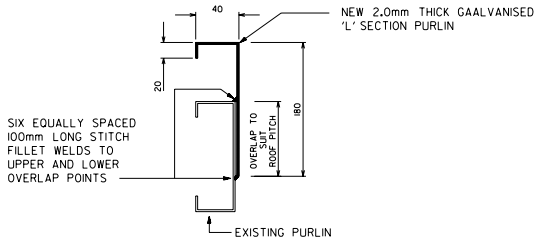
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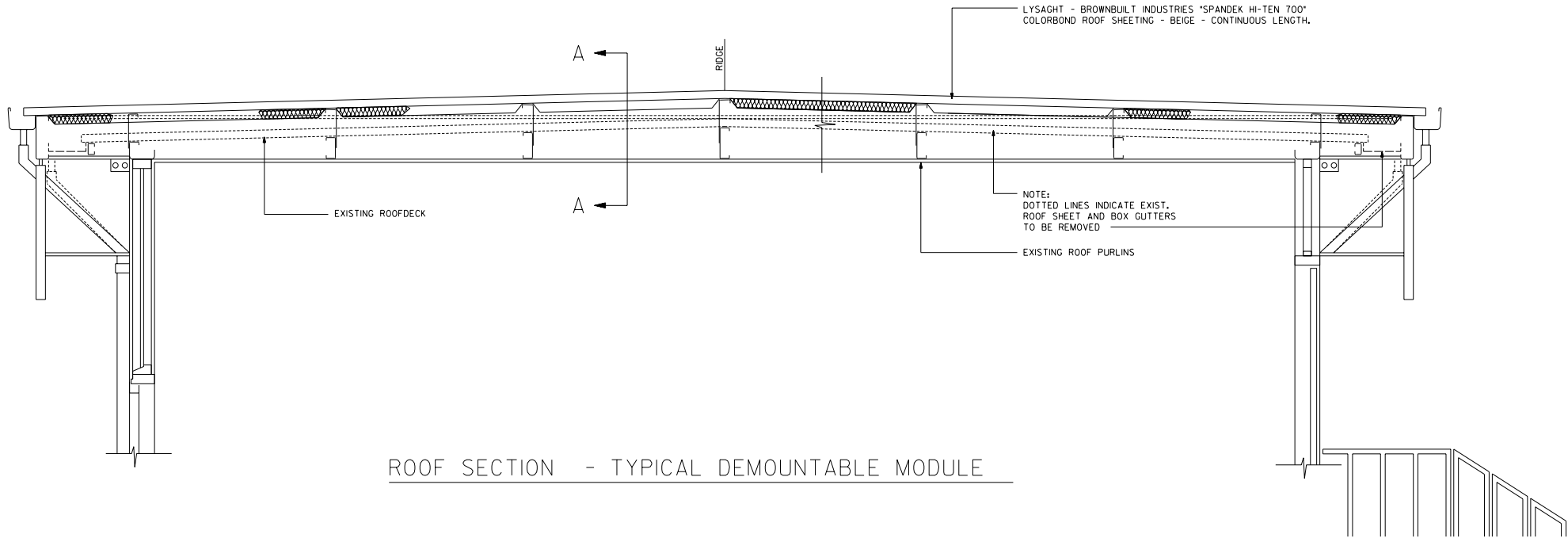
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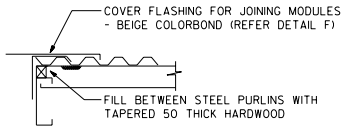
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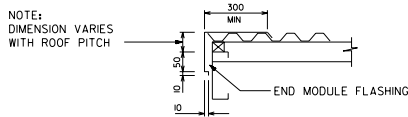
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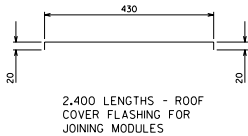
ROOF SECTION - TYPICAL DEMOUNTABLE MODULE



DETAIL D  
INTERNAL MOD. SIDE FLASHING  
SECTION A-A



DETAIL E  
END MODULE FLASHING (BARGE)  
SECTION A-A



DETAIL F  
JOINING MOD. COVER FLASHING

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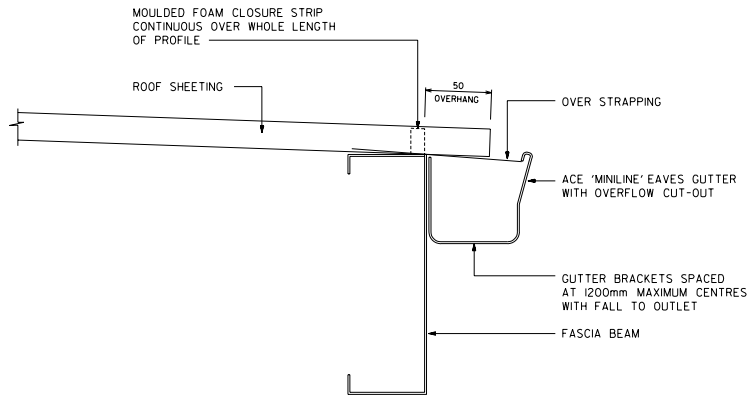
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SCHOOL DEMOUNTABLE BUILDINGS  
(ORIGINAL STYLE)

ROOF CONVERSION

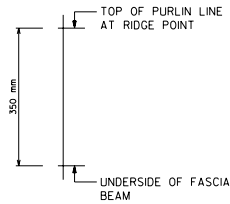
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J. BAGGS	JUNE 2000	NTS	
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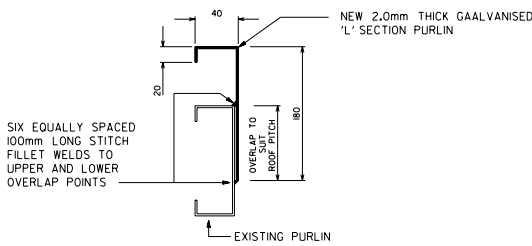
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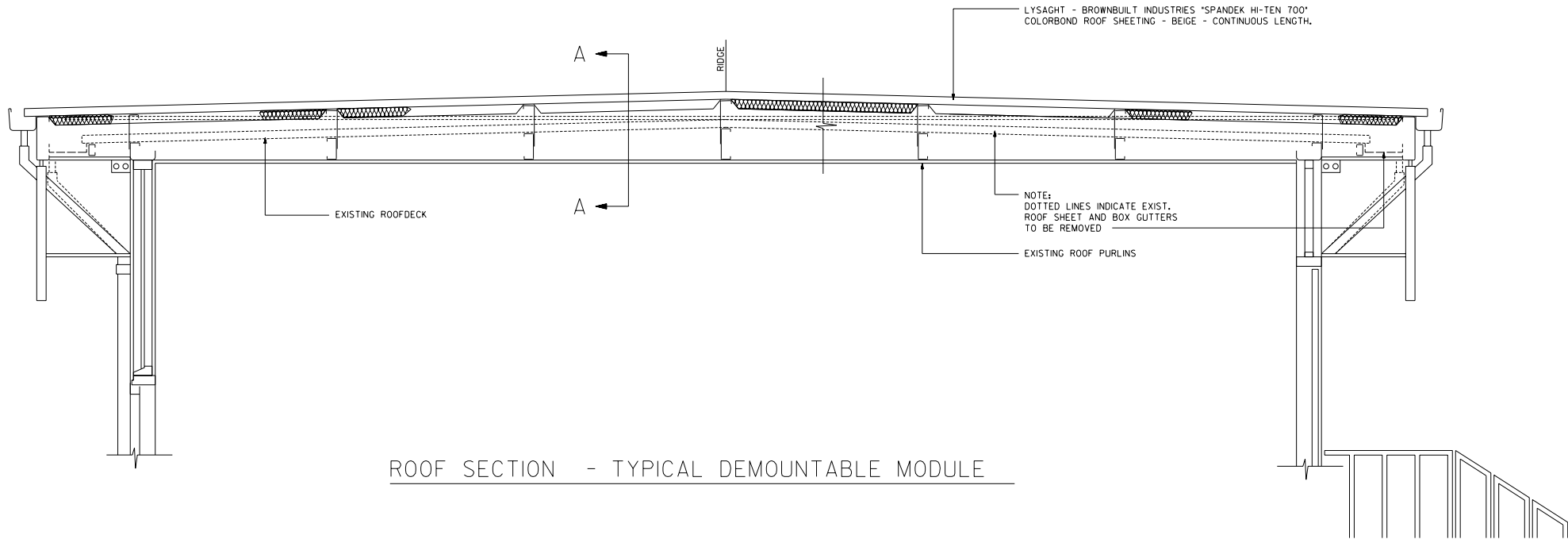
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EAVES GUTTER



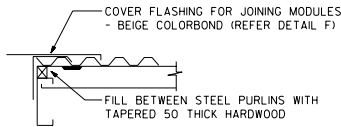
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RIDGE HEIGHT



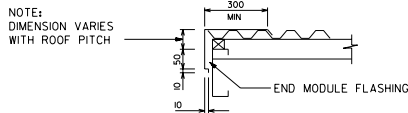
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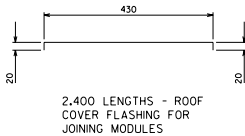
ROOF SECTION - TYPICAL DEMOUNTABLE MODULE



DETAIL D  
INTERNAL MOD. SIDE FLASHING  
SECTION A-A



DETAIL E  
END MODULE FLASHING (BARGE)  
SECTION A-A



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