Summary File ONLY

PLEASE BE AWARE THAT
THIS PDF FILE
CANNOT BE PRINTED

IT IS BROWSABLE ON-SCREEN ONLY AND IS PROVIDED FOR YOUR INFORMATION TO DECIDE WHETHER TO BECOME A PROSPECTIVE TENDERER ONLY

Note: This file may contain a brief scope statement, or an extract from the RFT documents, or a full exhibited copy – depending on the specific circumstances.

To participate in this tender process you MUST first download or order a full copy of the Request for Tender (RFT) documents, including the respondable components, and any addenda issued to date.

To do this return to the RFT web page on this web site and copy the RFT documents to your own computer or network – the blue "DOWNLOAD A SOFT COPY" link at the bottom provides access to the page from which you can do this.

NSW DEPARTMENT OF COMMERCE

TENDER DOCUMENT

for

BOURKE ABORIGINAL COMMUNITIES DEVELOPMENT PROGRAMME

NEW HOUSING – WORK PACKAGE 12

CONTRACT NO: 0701680

SEPTEMBER 2007

B U R N S A L D I S
COMMUNITY DEVELOPMENT CONSULTANTS

NSW DEPARTMENT OF COMMERCE

TENDER DOCUMENT

for

BOURKE ABORIGINAL COMMUNITIES DEVELOPMENT PROGRAMME

NEW HOUSING – WORK PACKAGE 12

CONTRACT NO: 0701680

SEPTEMBER 2007

TABLE OF CONTENTS

BOURKE ACDP

NEW HOUSING - WORK PACKAGE 12

CONTRACT NO: 0701680

TENDERING

CONDITIONS OF TENDERING

This section includes notices to tenderers.

The Conditions of Tendering section does not form part of the Contract.

1 GENERAL

1.1 CONTACT PERSON

Refer requests for information about the Tender to:

Name: Cliff Chenery

Telephone number: 0419 411 606

Facsimile number: 02 9948 1081

E-mail address: baldis@ozemail.com.au

1.2 NSW GOVERNMENT CODE OF PRACTICE FOR PROCUREMENT

Tenderers must comply with the NSW Government *Code of Practice for Procurement* which is available at:

www.treasury.nsw.gov.au/procurement/cpfp_ig.htm

Lodgement of a tender is evidence of the Tenderer's agreement to comply with the Code for the duration of any contract awarded as a result of the tender process. If a tenderer fails to comply with the Code, the Principal may take the failure into account when considering this or any subsequent tender from the tenderer, and may pass over such the tender.

2 TENDERER ELIGIBILITY

2.1 ACCEPTABLE LEGAL ENTITIES

The Principal contracts only with recognised and acceptable legal entities. The Principal does not contract with firms under any form of external administration. Any tender submitted by an unincorporated business such as a sole trader, partnership, or business name must identify the legal entity that proposes to enter the contract.

If the Tenderer is a trustee, the Principal may require:

- an unconditional undertaking in accordance with Preliminaries Clause - **Additional Security and Obligations for Trustees**; and
- a signed statement from the Tenderer, provided before the Contract is awarded, making the following undertaking:

'If (insert the legal name of the Tenderer) is awarded Contract No (insert the contract number) for (insert the contract description) it will provide security in the amount of (insert the amount of security advised by the Principal) in accordance with Preliminaries Clause - **Additional Security and Obligations for Trustees**, and it undertakes to ensure that, for the duration of the Contract, the total value of the trust beneficiaries' loans to the trustee is always greater than the total value of trust beneficiaries' loans from the trustee.'

Failure to provide the signed statement may result in the Tender being passed over.

2.2 QUALITY ASSURANCE

The Principal may elect to pass over a tender from a tenderer that does not demonstrate the capacity to systematically plan and manage the quality of its work in accordance with the NSW Government *Quality Management Systems Guidelines* which are available at:

www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc

Submit with the Tender the information identified in Tender Schedules - **Schedule of Quality Management Information.**

2.3 OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT

Tenderers must demonstrate their capacity to manage occupational health and safety in accordance with the NSW Government *Occupational Health and Safety Management Systems Guidelines 4th Edition (OHSM Guidelines).* The *OHSM Guidelines* are available at:

www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc

Submit with the Tender the information identified in Tender Schedules - **Schedule of Occupational Health and Safety Management Information**.

2.4 ENVIRONMENTAL MANAGEMENT SYSTEMS

Not used.

2.5 FINANCIAL ASSESSMENT CRITERIA

The main criteria considered in financial assessment of tenderers are:

- Net Worth (total assets, excluding any assets of company directors, less total liabilities less intangible assets);
- Current Ratio (ratio of current assets to current liabilities); and
- Working Capital (current assets less current liabilities).

The Principal considers tenders with the following financial capacity and no other significant detrimental financial characteristics to be financially satisfactory in respect of tenders:

- Net Worth exceeds 5% of the Contract Sum or initial Contract Price;
- Current Ratio exceeds 1; and
- Working Capital exceeds 10% of the Contract Sum or initial Contract Price.

Where a tenderer is a trustee the total value of trust beneficiaries' loans to the trustee must be greater than the total value of trust beneficiaries' loans from the trustee.

Deviations below these indicative criteria will not necessarily prevent the Principal from considering any tender.

3 CONTRACT DETAILS

3.1 INSURANCE

Works and public liability insurance

The Principal has arranged insurance of the Works (and any temporary works) and public liability. The Contractor must maintain the policy by paying the insurance premiums.

For the purpose of this tender, the following defined amounts are relevant:

Item	Amount
Contract Works cover	$30 million any one occurrence
Public Liability Cover	$20 million any one occurrence
Rate of Premium	0.4620%
Allowance for Principal Supplied Materials and Salvageable Materials	Nil

The insurance policy is at:

www.managingprocurement.commerce.nsw.gov.au/system/index_contract_management_insurance_policies.doc

The insurance broker is Marsh Pty Ltd.

Asbestos liability insurance

The Principal has arranged a policy for asbestos liability insurance. The Contractor must effect insurance under the policy if asbestos decontamination work is undertaken.

The insurance policy is at:

www.managingprocurement.commerce.nsw.gov.au/system/index_contract_management_insurance_policies.doc

The insurance broker is Marsh Pty Ltd.

The premium payable is the greater of $3,200 or 14.56% of the GST exclusive value of asbestos decontamination work and related activites, including additional site establishment and air monitoring.

The premium initially payable is based on a reasonable estimate of the cost of asbestos decontamination work. The premium is adjusted following completion of the asbestos work, subject to the limitation of the minimum payable being $3,200.

Other Insurance

The Contractor must arrange and pay all premiums for all other insurance required under General Conditions of Contract Clause – **Insurance**.

For professional indemnity insurance, a Certificate of Currency or evidence of the ability to obtain the required insurance, such as a letter from a broker or insurer, may be required as a condition of acceptance of tender.

4 CURRENT POLICIES

4.1 GOODS AND SERVICES TAX

The tendered lump sum and/or rates must include GST if it is payable.

4.2 NSW GOVERNMENT PREFERENCE SCHEME

Preference

The Principal will give a preference advantage to goods of Australian and New Zealand origin over imported goods supplied under the Contract. NSW country manufacturers may be eligible for an additional preference under the Country Industries Preference Scheme (CIPS). Details of these schemes may be obtained from the Department of State and Regional Development, telephone (02) 9338-6780; facsimile (02) 9338-6676.

The Industry Capability Network Office has been established to provide assistance in planning for, purchasing and using Australian and New Zealand made products. The office can provide professional advice on local industry capability and on the availability and efficiency of local supplies suited to Australian conditions, while retaining commercial confidentiality. The Industry Capability Network Office may be contacted on: telephone (02) 9819 7200; facsimile (02) 9181 3321; e-mail enquiry@icnnsw.org.au; internet www.icnnsw.org.au.

Imported Goods

Where imported goods are proposed, complete the Tender Schedules - **Schedule of Imported Materials and Equipment**. Provide details of alternatives to such goods which are of Australian or New Zealand origin, or give reasons why such alternatives cannot be supplied by completing the Tender Schedules - **Schedule of Alternatives to Imported Goods**.

The Principal may, but is not bound to, negotiate a reduction in price to accept the imported goods, but the reduction will be not less than 20% of the Principal's estimate of the imported value of the goods.

Refer to Preliminaries Clause - **Australian and New Zealand Goods**.

NSW Country Manufactured Goods

If the tenderer wishes to seek preference under the NSW Country Industries Preference Scheme, submit Tender Schedules – **Schedule of NSW Country Manufactured Goods** with the tender.

4.3 DISCLOSURE OF CONTRACT INFORMATION

Details of this tender and contract awarded as a result of this tender process may be disclosed in accordance with the *Freedom of Information (Open Government – Disclosure of contracts) Act 2006* , Premier's Memorandum 2007-01 and NSW Government Tendering Guidelines at:

http://www.managingprocurement.commerce.nsw.gov.au/nsw_government_guidelines/tendering_guidelines.pdf

4.4 EXCHANGE OF INFORMATION BETWEEN GOVERNMENT AGENCIES

By submitting a tender, the Tenderer authorises the Principal to gather, monitor, assess, and communicate to other NSW Government agencies or local government authorities information about the Tenderer's financial position and its performance in respect of any contract awarded as a result of the tender process. Such information may be used by those agencies or authorities in considering whether to offer the Tenderer future opportunities for work.

4.5 FINANCIAL ASSESSMENT

By tendering for this Contract, the Tenderer agrees that the Principal may engage private sector consultants to financially assess tenderers. Financial details of tenderers may be obtained by an external Financial Assessor for assessment. Financial Assessors have a contract with the Principal to safeguard the financial details obtained. Financial Assessors must not disclose such details, either in whole or in part to any party other than NSW Government departments or agencies without the express written permission of the tenderer.

The Financial Assessor is Kingsway Financial Assessments Pty Ltd.

Submit, when requested by the Financial Assessor or Principal, the Financial Assessment information shown in Tender Schedules - **Schedule of Financial Assessment Information**.

4.6 INDUSTRIAL RELATIONS MANAGEMENT

Tenderers must demonstrate their capacity to plan and manage industrial relations (IR) and implement effective IR plans in accordance with the NSW Government *Industrial Relations Management Guidelines*. The Guidelines are available at:

www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc

Submit when requested:

- Copies of any enterprise, workplace or other enforceable industrial relations agreements to which the Tenderer is bound; and
- Tender Schedules - **Schedule of Industrial Relations Information**.

4.7 UNCONDITIONAL UNDERTAKINGS - APPROVED INSTITUTIONS

For the purpose of giving unconditional undertakings, the Principal has approved banks, building societies, credit unions and insurance companies listed by the Australian Prudential Regulation Authority (APRA) as being regulated by the APRA. Lists appear at the APRA website at:

www.apra.gov.au/

The Principal is prepared to consider proposals from tenderers for the approval of Unconditional Undertakings by substantial financial institutions, not registered by APRA, which lawfully carry on business in Australia. The Principal may require the submission of evidence demonstrating the substance and status of any proposed financial institution without cost to the Principal.

4.8 ABORIGINAL PARTICIPATION

Tenderers must demonstrate their commitment and capacity to create and extend opportunities for Aboriginal people and enterprises through the Contract, in accordance with the NSW Government *Aboriginal Participation in Construction Guidelines*, which are available at:

www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc

In accordance with the guidelines, this tender is considered a Category 1 project.

Submit with the Tender the information and undertakings identified in Tender Schedules – **Schedule of Aboriginal Participation Information**.

5 FURTHER INFORMATION

5.1 ADDENDA TO TENDER DOCUMENTS

If, as a result of a request for clarification from a tenderer or for any other reason, the Principal issues an instruction amending the tender documents, the instruction will be issued in writing to all tenderers in the form of an Addendum, which becomes part of the tender documents. Written Addenda issued by the Principal are the only recognised explanations of, or amendments to, the tender documents.

5.2 SITE ACCESS RESTRICTIONS

Not used.

5.3 PRE-TENDER MEETING

Not used.

6 PREPARATION OF TENDERS

6.1 ALTERNATIVE TENDERS

The Principal may consider alternative tenders, provided the alternative tender meets the scope, functional intent and design concept expressed in the tender document. Where an alternative tender is proposed, submit a detailed description of the alternative stating clearly the manner in which it differs from the detailed requirements of the tender documents and including separate tender schedules applicable to the alternative.

6.2 TECHNICAL DATA

Submit, when requested, the details shown in Tender Schedules - **Schedule of Technical Data**.

7 SUBMISSION OF TENDERS

7.1 DOCUMENTS TO BE SUBMITTED

The following documents must be completed and submitted by the Tenderer:

- Tender Form
- Schedule of Prices
- Schedule of Imported Materials and Equipment
- Schedule of Alternatives to Imported Goods
- Schedule of NSW Country Manufactured Goods
- Schedule of Quality Management Information
- Schedule of Occupational Health and Safety Management Information
- Schedule of Aboriginal Participation Information

Where applicable, refer to each Addendum and state that the Tender allows for the instructions given in the Addendum.

7.2 SUBMISSION PROCEDURE

Submit the Tender Form, Tender Schedules marked 'Submit with the Tender Form' and other required documents or information by the date and time given in the advertisement or invitation, by any of the following methods:

- eTendering,
- Tender Box,
- Facsimile.

If more than one tender submission is made, mark each submission clearly as to whether it is a copy, an alternative tender, or whether the submission supersedes another submission.

Submit when requested, by the date, time and method stipulated in the request, Tender Schedules marked 'Submit when requested' and any other information required to allow further consideration of the Tender. Failure to meet this requirement may result in the Tender being passed over.

7.3 ETENDERING

Tenderers are encouraged to obtain Requests for Tenders (RFT) and submit tenders through NSW Government online eTendering at:

https://tenders.nsw.gov.au

Legal status

Tenders submitted electronically will be treated in accordance with the *Electronic Transactions Act 2000* (NSW), and given no lesser level of confidentiality, probity and attention than tenders submitted by other means.

Tenderers, by electronically submiting a tender, are taken to have accepted any conditions shown on the NSW Government eTendering web site.

The Principal may decline to consider for acceptance, tenders that cannot be effectively evaluated because they are incomplete or corrupt.

Electronic Format for Submissions

Tenders submitted electronically must be in a file format that can be read, formatted, displayed and printed by Microsoft Word 97, or any format required by the RFT.

File Compression

Tenderers may compress electronic tenders in any format that can be decompressed by WinZip. Tenderers must not submit self-extracting (*.exe) zip files.

Change of Tender Form Text

Tenderers must not change existing text in electronic tender forms other than to insert required information.

7.4 TENDER BOX

The Tender may be submitted in the Tender Box at:

Level 3 McKell Building, 2 – 24 Rawson Place, Sydney NSW 2000

Submit the Tender in a sealed envelope addressed to the Secretary of the Tender Opening Committee and marked with "Tender for BOURKE ACDP NEW HOUSING - WORK PACKAGE 12" and the closing date and time.

7.5 FACSIMILE

The Tender may be submitted to the facsimile number (02) 9372 8974.

Address the Tender to the Secretary of the Tender Opening Committee and mark the first page of the facsimile with "Tender for BOURKE ACDP NEW HOUSING - WORK PACKAGE 12" and the closing date and time.

Tenders sent by facsimile and not completely received 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.

7.6 ALTERNATIVE TENDER BOX AND FACSIMILE NUMBER

Not used.

7.7 LATE TENDERS

In accordance with the NSW Government *Code of Practice for Procurement* available at:

www.treasury.nsw.gov.au/procurement/cpfp_ig.htm

late tenders will not be accepted, except where the integrity and competitiveness of the tendering process will not be compromised.

8 PROCEDURES AFTER CLOSING OF TENDERS

8.1 EVALUATION OF TENDERS

In evaluating tenders, the Principal may take into consideration factors including, but not limited to: whole of life costs; ability to meet requirements of the NSW Government *Code of Practice for Procurement*; innovation; delivery time; quality offered; previous performance; experience; capability; occupational health and safety performance; industrial relations performance; environmental management performance; community relations; value adding including economic, social and environmental initiatives; and conformity.

Tenders will be assessed using a weighted scoring process based on information provided with the tender. The ratio of price to non-price criteria will be 95:05.

The non-price criteria will be as set out in Tender Schedule 11 – **Schedule of Aboriginal Participation Information**:

- Management Statement of Support for Aboriginal Participation
- Statement of Opportunities for Aboriginal Participation
- Aboriginal Participation Plan for this Contract

The Principal may treat any detail required by the tender documents which is omitted, illegible or unintelligible as failing to fulfil the relevant requirement.

8.2 ACCEPTANCE OF TENDER

The Principal may accept tenders that do not conform strictly with all requirements of the tender documents.

The Principal is not bound to accept the lowest or any tender. Tenders which do not comply with any requirement of, or which contain conditions or qualifications not required or allowed by, the tender document may be passed over.

No tender, or qualification or departure from a contract condition or specification, is accepted unless the Principal gives an acceptance or formal agreement in writing.

8.3 PROTECTION OF PRIVACY

The Tenderer warrants, in respect of any personal information provided in this Tender or any contract arising from this Tender, that the information is accurate, up to date and complete, and that nominated individuals authorise its collection and are aware:

- that the information is being collected for the purpose of evaluating tenders and administering any contracts arising from those tenders and may be made available to other NSW government agencies or local government authorities for those purposes;
- whether the supply of the information by the individual is required by law or is voluntary, and any consequences for the individual if the information (or any part of it) is not provided; and
- of the existence of any right of access to, and correction of, the information.

END OF SECTION – CONDITIONS OF TENDERING

TENDER SCHEDULES

1 TENDER FORM

Location and Fax No. of Tender Closing Office: NSW Department of Commerce, McKell Building, 2 – 24 Rawson Place, Sydney, NSW 2000 (02) 9372 8974

Name of Tenderer (in block letters): ……

A.B.N. (if applicable): ……

Address: ……

……

Telephone number: ……

Facsimile number: ……

e-mail address: ……

hereby tender(s) to perform the work for

BOURKE ACDP NEW HOUSING – WORK PACKAGE 12

(Contract No: 0701680)

in accordance with the following documents:

- MINOR WORKS CONTRACT CONDITIONS
- SPECIFICATION
- REFERENCE SPECIFICATIONS
- DRAWINGS

and Addenda Numbers: ……

For the lump sum of: ……

……

($……) including GST.

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

2 SCHEDULE OF PRICES

(SUBMIT WITH TENDER FORM)

Except for valuations determined under Clause 9.2, the Principal's Representative will use the individual prices shown below to determine the value of work the Contractor is entitled to claim and be paid for in accordance with the provisions of Clause 13.3 for that work described in and completed in accordance with the Contract.

Item	Sub-item	Description		Price (A$)
1		Preliminaries	..…	
2		General Requirements (inc any Provisional Sums)	..…	
3		36 Tudor Street (2-bed)		
	3.1	Substructure, including floor framing	…..	
	3.2	Superstructure framing	…..	
	3.3	Wall, floor and ceiling cladding and linings	..…	
	3.4	Doors and windows	…..	
	3.5	Wall, floor and ceiling finishes	…..	
	3.6	Cabinetwork	…..	
	3.7	Fitments and special fittings	…..	
	3.8	Plumbing, mechanical and electrical services	…..	
4		38 Tudor Street (3-bed)		
	4.1	Substructure, including floor framing	..…	
	4.2	Superstructure framing	…..	
	4.3	Wall, floor and ceiling cladding and linings	…..	
	4.4	Doors and windows	…..	
	4.5	Wall, floor and ceiling finishes	..…	
	4.6	Cabinetwork	…..	
	4.7	Fitments and special fittings	..…	
	4.8	Plumbing, mechanical and electrical services	…..	
		Carried forward	..…	

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

Item	Sub-item	Description		Price (A$)
		Brought forward	..…	
5		External works		
	5.1	External works, including bench and fencing	…..	
	5.2	Landscaping	…..	
6		GST (on Items 1 to 5 inclusive)	..…	
		Total to Tender Form	..…	

Signed for the Tenderer by: ……. Date:……

Name (in block letters): ……. (Authorised Officer)

In the Office Bearer capacity of: ……

3 SCHEDULE OF IMPORTED MATERIALS AND EQUIPMENT

(SUBMIT WITH TENDER FORM)

Provide brief details of all imported materials and equipment to be supplied or incorporated into the Works, and country of manufacture or origin. Do not include goods manufactured in New Zealand.

The value of the imported content must be the estimated duty paid value inclusive of the value of any services (eg. overseas freight and insurance, software in computer tenders, consultancy or engineering fees) or any charges of overseas origin, together with customs clearing charges.

This is not a Schedule of Rates within the meaning of these Minor Works General Conditions of Contract. See also Preliminaries Clause - **Australian and New Zealand goods**.

Description	**Country of Origin**	**Value A$**

Signed for the Tenderer by: ……. Date:……

Name (in block letters): ……. (Authorised Officer)

In the Office Bearer capacity of: ……

4 SCHEDULE OF ALTERNATIVES TO IMPORTED GOODS

(SUBMIT WITH TENDER FORM)

Provide brief details of materials and equipment of Australian and/or New Zealand manufacture as alternatives to imported materials and equipment as listed in the Tender Schedule – **Schedule of Imported Materials and Equipment**, or give reasons why such alternatives cannot be provided.

The Principal may accept a tender specifying all or any of the items listed below, with an adjustment to the contract price based on the difference between the prices listed in this Schedule and the Tender Schedule – **Schedule of Imported Materials and Equipment**.

Description of Australian and/or New Zealand manufactured Alternatives	**Value (A$)**

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

5 SCHEDULE OF NSW COUNTRY MANUFACTURED GOODS

(SUBMIT WITH TENDER FORM)

Complete the Schedule if you wish to seek preference under the NSW Country Industry Preference Scheme (CIPS). The preference may be given only to a Tenderer who is a NSW manufacturer registered under the scheme.

State your CIPS registration number. Give details of the materials and equipment to be supplied or incorporated into the Works, the place of manufacture, the percentage(s) applicable for preference purposes and the value added content at the Tenderer's works for the material or equipment manufactured by the Tenderer for incorporation in the Works.

This is not a Schedule of Rates within the meaning of the these Minor Works General Conditions of Contract.

CIPS Registration No: .....

Description	**Place of Manufacture**	**% Applicable**	**Value Added Content ($)**

Signed for the Tenderer by: ……. Date:……

Name (in block letters): ……. (Authorised Officer)

In the Office Bearer capacity of: ……

6 SCHEDULE OF TECHNICAL DATA

(SUBMIT WHEN REQUESTED BY PRINCIPAL)

List all information required by this Schedule, and attach details of manufactures product data together with illustrations as are necessary to fully describe the Tenderer's offer.

Item	**Tenderer's offer**

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

7 SCHEDULE OF QUALITY MANAGEMENT INFORMATION

(SUBMIT WITH TENDER FORM)

Submit one of the following, to demonstrate the capacity to plan and manage the quality of work:

- evidence of current full certification of the Tenderer's Quality Management System to AS/NZS ISO 9001:2000 by a certifying body registered with the Joint Accreditation System - Australia and New Zealand (JAS-ANZ); **or**
- evidence that the Tenderer's Quality Management System complies with the NSW Government *Quality Management Systems Guidelines (QMS Guidelines);* **or**
- a minimum of three (3) completed examples of Inspection and Test Plans used on recent past projects and complying with the requirements of the *QMS Guidelines.*

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

8 SCHEDULE OF OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT INFORMATION

(SUBMIT WITH TENDER FORM)

Provide documents and information indicated below in accordance with Conditions of Tendering Clause – **Occupational health and safety management.**

Evidence of satisfactory OHS management

Nominate at least three contracts/projects completed within the last two years that demonstrate successful management of occupational health and safety by the Tenderer:

Client	**Name & location of contract** *Eg. Sutherland Hospital Carpark; Dubbo Water Treatment Plant*	**Contract Price/ Project Value**	**Start Date**	**Completion Date**

WHEN REQUESTED, submit the following additional information for each of three contracts/projects selected from the above list:

a. a client referee report (which may be a NSW Government agency Contractor Performance Report) commenting on the Tenderer's performance in relation to occupational health and safety management, identifying the referee's name, position, organisation and telephone and email contact details; **and**

b. a copy of a third party audit report, **or** internal audit report, **or** site safety inspection report, **or** site safety review report **or** other similar evidence.

Recent OHS prosecutions and fines

Provide:

- a statement confirming that the Tenderer is not in default of any fine issued for a breach of the OHS legislation; **AND**
- details of every OHS prosecution and fine imposed on the Tenderer in Australia during the last two years, together with a description of actions taken by the Tenderer in response to each prosecution and fine; or
- a statement that the Tenderer incurred no prosecutions or fines during the last two years.

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

Hazardous substances

WHEN REQUESTED, submit details of proposed:

i) methods for surveying for hazardous materials;

ii) methods for handling and removal from the Site of hazardous materials; and

iii) Consultants and Subcontractors and licence details.

Occupational Health and Safety Management Monthly Report

The Tenderer undertakes, if awarded the Contract, to provide Monthly OHS Management Reports as described in Preliminaries Clause – **Occupational Health and Safety Management**.

Independent Certification of Formwork

The Tenderer undertakes, if awarded the Contract, to provide evidence of independent certification of formwork as required by Preliminaries Clause – **Occupational Health and Safety Management**.

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

9 SCHEDULE OF FINANCIAL ASSESSMENT INFORMATION

(SUBMIT WHEN REQUESTED BY PRINCIPAL OR FINANCIAL ASSESSOR)

Provide documents and information listed below in accordance with Clause Conditions of Tendering - **Financial assessment**.

1. Financial Statements for last three years for the entity under consideration, including:

   i) Balance Sheets;
   ii) Profit and Loss Statement;
   iii) detailed Profit and Loss Statement;
   iv) statement of Cash Flows;
   v) notes to and Forming Part of the Accounts;
   vi) an Accountant's Report; and
   vii) where existing, Auditor's Reports.

   Consolidated accounts of a parent organisation or group to which the entity belongs are not acceptable.

2. Where latest financial statement is more than 6 months old, the latest management report showing:
   i) a trading statement;
   ii) a profit and loss statement; and
   iii) a trial balance.

3. Where the company is required to lodge audited financial statements with ASIC, copies of these statements for the last three years.
4. Where any financial statement supplied is not audited, copies of the entity's tax returns for last three years.
5. A letter from the Tenderer's banker providing details of overdraft and guarantee facilities including:
   i) Bank, Branch, and Account Names,
   ii) type and limit of bank overdraft facility,
   iii) type and limit of bank guarantee facility,
   iv) current bank overdraft balance,
   v) number and amount of bank guarantees outstanding; and
   vi) details of other bank funding facilities available to the Tenderer, such as term loans, lines of credit, commercial bills and other debt instruments.
6. Current and projected cash flows for all work on hand.
7. Forecast budget for forthcoming financial year including Revenue and Profit and Loss.
8. Names and contact numbers of:
   i) major suppliers; and
   ii) major subcontractors.
9. Details relating to the Tenderer's history and Directors Profiles.

Signed for the Tenderer by: ……. Date:……

Name (in block letters): ……. (Authorised Officer)

In the Office Bearer capacity of: ……

10 SCHEDULE OF INDUSTRIAL RELATIONS INFORMATION

(SUBMIT WHEN REQUESTED)

List the Federal and NSW awards to which the Tenderer is bound:

Federal and NSW awards

……...……
……...……
……...……
……...……
……...……
……...……
……...……
……...……

List the enterprise, workplace or other enforceable industrial relations agreements to which the Tenderer is bound, and attach copies of those agreements to this Schedule

Enterprise, workplace and other enforceable industrial relations agreements

……...……
……...……
……...……
……...……
……...……
……...……
……...……
……...……
……...……

Undertaking to provide information

The Tenderer, if awarded the contract, will, on request, provide appropriate information to verify compliance with these awards, enterprise or workplace agreements and all other legal obligations relating to employment.

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

11 SCHEDULE OF ABORIGINAL PARTICIPATION INFORMATION

(SUBMIT WITH TENDER FORM)

Refer to Conditions of Tendering Clause – **Aboriginal participation**.

Management Statement of Support for Aboriginal Participation

Submit a Management Statement of Support for Aboriginal Participation, signed by the Tenderer's senior management, complying with the *Aboriginal Participation in Construction Guidelines*.

Statement of Opportunities for Aboriginal Participation

Submit a Statement of Opportunities for Aboriginal Participation complying with the *Aboriginal Participation in Construction Guidelines.*

Aboriginal Participation Plan

Submit an Aboriginal Participation Plan complying with the *Aboriginal Participation in Construction Guidelines*.

Signed for the Tenderer by: …… Date:……

Name (in block letters): …… (Authorised Officer)

In the Office Bearer capacity of: ……

12 UNDERTAKING TO COMPLY WITH THE NSW GOVERNMENT *CODE OF PRACTICE FOR PROCUREMENT*.

(SUBMIT WHEN REQUESTED)

The Tenderer, if awarded the Contract, will comply with the NSW Government *Code of Practice for Procurement*.

Signed for the Tenderer by: ……. Date:……

Name (in block letters): ……. (Authorised Officer)

In the Office Bearer capacity of: ……

END OF SECTION –TENDER SCHEDULES

SPECIFICATION

1 GENERAL CONDITIONS OF CONTRACT AND ANNEXURE

GENERAL CONDITIONS OF CONTRACT - MINOR WORKS

1 DEFINITIONS

1.1 The Principal is as stated in the Annexure.

1.2 The Principal's Representative is as stated in the Annexure and is the person appointed by the Principal to act with its full authority in all matters relating to the Contract.

1.3 The Principal's Agent is as stated in the Annexure.

1.4 The Works means the whole of the work to be carried out and materials and services to be provided under the Contract.

1.5 The Contract Sum means:

(a) where the Principal accepted a lump sum, the lump sum;

(b) where the Principal accepted rates, the amount calculated by firstly multiplying the rates by their respective quantities in the schedule of rates and then adding those products;

but excluding any additions or deductions which are made under the Contract.

1.6 day means calendar day.

1.7 Site means the lands and other places made available to the Contractor by the Principal for the purpose of the Contract.

1.8 Text within the following format denotes a definition:

2 CONTRACT

2.1 The written agreement between the Principal and the Contractor for the performance of the Works, including all documents and parts of documents to which reference may properly be made to determine the rights and obligations of the parties (the Contract Documents) shall evidence the Contract.

2.2 The Contract Documents shall be taken as mutually explanatory and anything contained in one but not in another shall be treated as if contained in all.

2.3 If the Contractor finds any discrepancy, error or ambiguity in or between the Contract Documents, the Contractor is to inform the Principal's Representative before starting such work and follow the directions given by the Principal's Representative.

3 DESIGN AND CONSTRUCTION

3.1 The Contractor is to supply all materials and construct the Works in accordance with the Principal's design and any further development of the design allowed under the Contract. Minor items not included in the Principal's design which are needed for the satisfactory completion of the Works are to be provided by the Contractor.

3.2 If the Contractor is to undertake design as part of the Works, the Contractor is to develop the Principal's design and submit the completed design comprising drawings, specifications, calculations and any statutory certificates required to the Principal's Representative within the period stated in the Annexure.

3.3 The Contractor is not to depart from the Principal's design, unless directed by the Principal's Representative.

3.4 The Contractor's completed design is to comply with the Contract and be fit for the intended purpose of the Works which can be reasonably inferred from the Contract Documents.

3.5 The Principal is not bound to check the completed design for errors, omissions or compliance with the requirements of the Contract. The Principal is not liable to the Contractor for any claim whatsoever due to the Principal not detecting or notifying the Contractor of any errors, omissions or non-compliance with the requirements of the Contract in the completed design.

3.6 Responsibility for the completed design and its satisfaction of the Contract requirements remains solely with the Contractor and the Principal is relying on the Contractor's knowledge, skill and judgment to carry out this responsibility.

3.7 The Contractor is to grant to the Principal an irrevocable licence to use the Contractor's design for the Works. Such licence is also to include any subsequent repairs to, maintenance or servicing of (including the supply of replacement parts) or additions or alterations to the Works.

4. CARE OF THE WORKS AND OTHER PROPERTY

4.1 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, constructional 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 Works while responsible for their care.

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

4.2 The Contractor is to 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.

4.3 Nothing in Clause 4 relieves the Principal from liability for the Principal's own default and defaults of others for whom the Principal is liable.

5. INSURANCE

5.1 On acceptance of the tender, the Contractor is to hold or take out an insurance policy covering Workers Compensation in the State of NSW and shall also ensure that every subcontractor, who is not taken to be a worker employed by the Contractor in accordance with the *Workplace Injury Management and Workers Compensation 1998* (NSW) Schedule 1, must hold or take out insurance covering Workers Compensation.

If insurance of the Works and public liability is to be arranged by:
the Principal, go to 5.2
the Contractor, go to 5.3

5.2 If insurance of the Works and public liability is to be arranged by the Principal (see the Annexure) a policy for insurance of the Works and public liability comes into effect on acceptance of the tender.

The Contractor is to pay all necessary premiums within 14 days of the date of invoice from the insurance broker. Payment must be made in accordance with the instructions on the invoice and must include a statement of the Contract Number.

Go to 5.4

5.3 If insurance of the Works and public liability is to be arranged by the Contractor, (see the Annexure) then, before commencing work on the Site, the Contractor is to hold or take out policies of insurance covering the Contractor, Principal and subcontractors for:

(a) public liability to an amount of not less than $5,000,000 for any single occurrence; and

(b) loss or damage to the Works, any temporary works and all materials, constructional plant and other things that are brought onto the Site by or on behalf of the Contractor or are entrusted to the Contractor by the Principal. The amount insured is not to be less than the Contract Sum.

The Principal is to be named as an insured in the policies.

The policies must include cross liability and waiver of subrogation clauses under which the insurer, in respect of liability, agrees that the term 'insured' applies to each of the persons covered as if a separate insurance policy had been issued to each of them and generally agrees to waive all rights of subrogation or action against any of the persons covered.

Go to 5.4

5.4 If the Works include work described in (a) or (b) below, the Contractor is to take out the following additional insurance policies before starting such work:

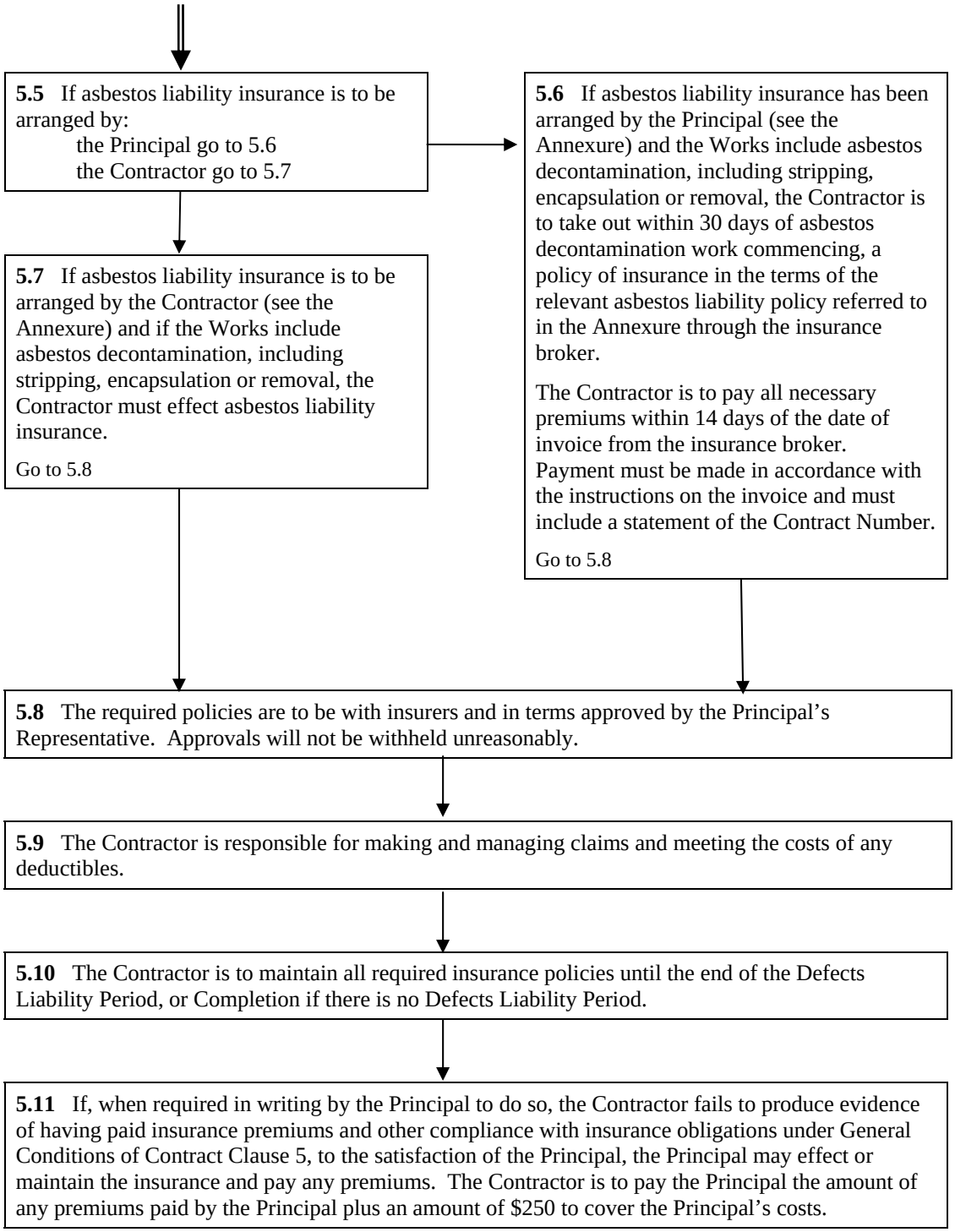
(a) For the use of water-borne craft in excess of 8 metres in length: marine liability insurance;

(b) For design of the Works undertaken by the Contractor: professional indemnity insurance.

The policy under (a) is to be in the name of the Contractor with the Principal as an additional name insured and is to cover the Contractor, the Principal, and all subcontractors employed from time to time in relation to the Works for their respective rights and interests and cover their liabilities to third parties. The policy is to be for an amount not less than $5,000,000 for any one occurrence and shall include cross-liability and waiver of subrogation clauses under which the insurer, in respect of liability, agrees that the term 'insured' applies to each of the persons covered as if a separate insurance policy had been issued to each of them and generally agrees to waive all rights of subrogation or action against any of the persons covered.

The policy under (b) is to cover the Contractor for liability to the Principal for a minimum amount of $500,000 or 20% of the Contract Sum, whichever is greater, to a maximum of $5,000,000 for loss (whether economic loss only or other loss) in a single occurrence arising from errors or omissions in design of the Works carried out by the Contractor or any subcontractor.

Go to 5.5


5.5 If asbestos liability insurance is to be arranged by:
the Principal go to 5.6
the Contractor go to 5.7
5.6 If asbestos liability insurance has been arranged by the Principal (see the Annexure) and the Works include asbestos decontamination, including stripping, encapsulation or removal, the Contractor is to take out within 30 days of asbestos decontamination work commencing, a policy of insurance in the terms of the relevant asbestos liability policy referred to in the Annexure through the insurance broker.
The Contractor is to pay all necessary premiums within 14 days of the date of invoice from the insurance broker. Payment must be made in accordance with the instructions on the invoice and must include a statement of the Contract Number.
Go to 5.8
5.7 If asbestos liability insurance is to be arranged by the Contractor (see the Annexure) and if the Works include asbestos decontamination, including stripping, encapsulation or removal, the Contractor must effect asbestos liability insurance.
Go to 5.8
5.8 The required policies are to be with insurers and in terms approved by the Principal's Representative. Approvals will not be withheld unreasonably.
5.9 The Contractor is responsible for making and managing claims and meeting the costs of any deductibles.
5.10 The Contractor is to maintain all required insurance policies until the end of the Defects Liability Period, or Completion if there is no Defects Liability Period.
5.11 If, when required in writing by the Principal to do so, the Contractor fails to produce evidence of having paid insurance premiums and other compliance with insurance obligations under General Conditions of Contract Clause 5, to the satisfaction of the Principal, the Principal may effect or maintain the insurance and pay any premiums. The Contractor is to pay the Principal the amount of any premiums paid by the Principal plus an amount of $250 to cover the Principal's costs.

6. SITE AND POSSESSION

6.1 The Principal is to give the Contractor possession of the Site by the time stated in the Annexure.

6.2 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.

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

6.4 The Contractor is to give the Principal's Representative, agents and contractors reasonable access to the Site for any purpose.

7. SITE CONDITIONS

7.1 If the Contractor discovers that the conditions on, about or below the Site differ from what ought to have reasonably been anticipated at Tender time the Contractor is to inform the Principal's Representative immediately and, where possible, before the conditions are disturbed.

7.2 The Contractor is not entitled to any extra payment for the different Site conditions. If the different conditions are such that the Principal's Representative directs the Contractor to carry out a variation, the procedure in Clause 9 is then to be followed.

8. NON-CONFORMING WORK

8.1 The Contractor is to supply materials (which are new, free from defects and suitable for the purpose) and use standards of workmanship (including design) and work methods which are in conformity with the Contract, the Building Code of Australia, relevant Australian Standards and all lawful requirements of Commonwealth, State, Territory and local legislation and subordinate regulations, ordinances, by laws, orders and proclamations.

Go to 8.2 if defective work is suspected
8.4 if defective work is to be corrected
8.7 if defective work is to be accepted

8.2 The Contractor is to comply with any direction of the Principal's Representative to:

(a) uncover and recover work; or

(b) carry out additional testing or re-testing.

8.3 Compliance with the direction is at the Contractor's cost unless the work uncovered, recovered, tested or re-tested is in conformity with the Contract, in which case the Principal's Representative is to meet with the Contractor to decide on the reasonable costs payable to the Contractor. If they are unable to agree within 14 days after the meeting, the Principal's Representative is to assess those costs.

Go to Cl 13 if assessed cost agreed
or Cl 16 if assessed cost is not agreed

8.4 The Principal's Representative may direct the Contractor to correct, including remove or replace, non-conforming work within the time specified by the Principal's Representative.

8.5 If the Contractor does not correct the non-conforming work within the time specified, the Principal's Representative may have the work corrected by others.

8.6 The Principal's Representative is to assess the reasonable costs of having the non-conforming work corrected by others and the Contractor is to pay the Principal those costs.

Go to Cl 13 if assessed cost agreed
or Cl 16 if assessed cost is not agreed

8.7 The Principal's Representative may notify the Contractor that the Principal elects to accept all or some of the non-conforming work. The resulting reasonable increase or decrease in the value to the Principal of the Works and any other reasonable loss or detriment suffered by the Principal is to be assessed by the Principal's Representative and the amount paid to or deducted from the Contractor.

Go to Cl 13 if assessed cost agreed
or Cl 16 if assessed cost is not agreed

9. VARIATIONS

9.1 The Principal's Representative may direct the Contractor to carry out a variation and the Contractor is to carry out the direction.

9.3 A variation is any change to the character, form, quality and extent of the Works directed in writing by the Principal's Representative. A variation shall not invalidate the Contract.

9.2 The Principal's Representative and Contractor are to meet to agree on the reasonable amount payable to or deducted from the Contractor for the variation. If they do not agree within 14 days after the meeting, the Principal's Representative is to assess that amount.

Go to Cl 13 if assessed amount agreed
or Cl 16 if assessed amount is disagreed

10. SUSPENSION

10.1 The Principal's Representative may direct the Contractor to suspend all or part of the Works and the Contractor is to carry out the direction.

10.2 If the direction to suspend the work is due to any act or omission of the Principal, the Principal's Representative and Contractor are to meet to agree on the reasonable extra costs payable to the Contractor which resulted from the suspension. If they do not agree within 14 days after the meeting, the Principal's Representative is to assess those extra costs.

Go to Cl 13 if assessed cost agreed
or Cl 16 if assessed cost is disagreed

10.3 The Contractor is to recommence the Works as soon as practicable after being directed to do so by the Principal's Representative.

11. COMPLETION OF THE WORKS

11.1 The Contractor is to Complete the Works within the period stated in the Annexure which starts on the date of being given possession of the Site.

11.2 The Contractor is to inform the Principal's Representative when, in the Contractor's opinion the Works have reached Completion.

11.4 The Works have reached Completion and are Complete when the Works are capable of use for their intended purpose, and should be free from any omissions or defects, and the Contractor has made good the Site and its surroundings.

11.3 The Principal's Representative is to:

(a) determine if the Works have reached Completion, and if so, the date of Completion; and

(b) give the Contractor written notice of the determination.

12. DELAY IN COMPLETION

12.1 If the Contractor is delayed in reaching Completion then the Contractor is to notify the Principal's Representative within 14 days after the commencement of the delay and to meet with the Principal's Representative to determine the cause of delay. Where such a delay is caused by:

(a) a direction given by the Principal's Representative except under:

- Clause 8; or
- Clause 10 where the event giving rise to the direction was not beyond the control of the Contractor; or

(b) a breach of the Contract by the Principal; or

(c) any event beyond the control of the Contractor,

the period for Completion is to be extended.

12.2 If the Principal's Representative and the Contractor do not agree on an extension to the period for Completion within 14 days of the meeting to determine the cause of delay, the Principal's Representative is to assess a reasonable extension of time. The Principal's Representative may for any reason and at any time extend the period for Completion.

Go to 16 if assessed extension of time is disagreed.

12.3 If the Contractor does not Complete the Works by the last day of the period for Completion then the Contractor is to pay to the Principal liquidated damages from, but excluding that date, to and including the date the Works are Complete at the rate stated in the Annexure.

13. PAYMENT AND RETENTION

13.1 *If the Contract has substantial Demolition and the 'Amount of Security' in the Annexure is >$0*:

Before commencing any work on the Site, the Contractor is to provide security in the amount stated in the Annexure and in the form as detailed in **Schedule - Unconditional Undertaking**.

13.2 *If the Contract requires the Contractor to pay the Contract Sum to the Principal:*

Before commencing any work on the Site, the Contractor is to pay the Principal the Contract Sum.

13.3 *If the Contract requires the Principal to pay the Contract Sum to the Contractor:*

The Contractor is to give the Principal's Representative a written claim for payment when a Milestone stated in the Annexure is reached. The claim is to identify the Milestone, the amount claimed, how the amount is calculated, deductions to which the Principal is entitled and, when additions are claimed, the legal and factual basis of the claim. Additions are extra costs or other amounts to which the Contractor is entitled under or in connection with the subject matter of the Contract.

When a Milestone is reached the amount which the Contractor is entitled to claim, and be paid, is the sum of:

- for work for which the Principal accepted rates, an amount calculated by applying the rates to the quantities of work carried out to that date;
- for work for which the Principal accepted a lump sum, the percentage stated in the Annexure for the Milestone;
- for any additions for which the Principal has approved an amount in writing or for which an amount has been finally determined by an Expert under Clause 16, the amount approved or determined

less payments previously made (including under Clause 16), costs payable by the Contractor to the Principal and deductions to which the Principal is entitled under or in connection with the subject matter of the Contract, including but not limited to retention moneys, liquidated damages and other damages whether liquidated or unliquidated.

With each claim for payment, and at any other time as requested by the Principal's Representative, the Contractor is to give the Principal's Representative a completed statutory declaration, as detailed in **Schedule - Statutory Declaration**.

Within 10 business days after receipt of the Contractor's payment claim, the Principal is to provide to the Contractor a payment schedule identifying the progress claim to which it relates and stating the payment, if any, which the Principal will be making. If the payment is to be less than the amount claimed by the Contractor the payment schedule is to indicate why it is less. For the purposes of this clause a business day is any day other than a Saturday, Sunday, public holiday or 27, 28, 29, 30 or 31 December.

13.3 (Continued)

Payment is to be made:

- within 20 business days after receipt of the Contractor's written payment claim; or

- within 5 business days after the statutory declaration is received; or

- by the specified time after any action required prior to payment has been carried out

whichever is the latest. If the Contractor breaches the requirement to submit a completed statutory declaration the Principal is not obliged to make any payment to the Contractor while the breach continues.

Any claim by the Contractor on the Principal is to be made within 28 days after the date of the Principal's Representative's written notice of Completion under Clause 11.3. All claims whatsoever by the Contractor against the Principal made after that time are barred. However, if the contract includes a Defects Liability Period, and the Contractor has a claim against the Principal under Clause 14.4 or because of an event which occurred during the Defects Liability Period, the Contractor may make that claim up to 28 days after the end of the Defects Liability Period. If the claim is made after that time it is barred.

Unless stated otherwise, all payments by the Principal to the Contractor are to be made by Electronic Funds Transfer to a bank, building society or credit union account nominated by the Contractor. No payment is due to the Contractor until details of the nominated account (name of financial institution, account name and account number) are notified in writing to the Principal's Representative. The Contractor is to promptly notify the Principal's Representative in writing of any changes to the nominated account and the Principal is not responsible for any payments made into a previously nominated account before notification of such change is received by the Principal's Representative.

Payment is not evidence of the value of work or an admission of liability or that the work is satisfactory but is a payment on account only.

13.4 *When the Works are Complete and the Contract requires Security*:

When the Contractor has provided an Unconditional Undertaking for Security (Annexure 13.1) the Principal is to return the Unconditional Undertaking, less any amounts the Contractor is to pay the Principal, within 14 days of Completion.

13.5 *When the Works are Complete and the Contract has a Defects Liability Period:*

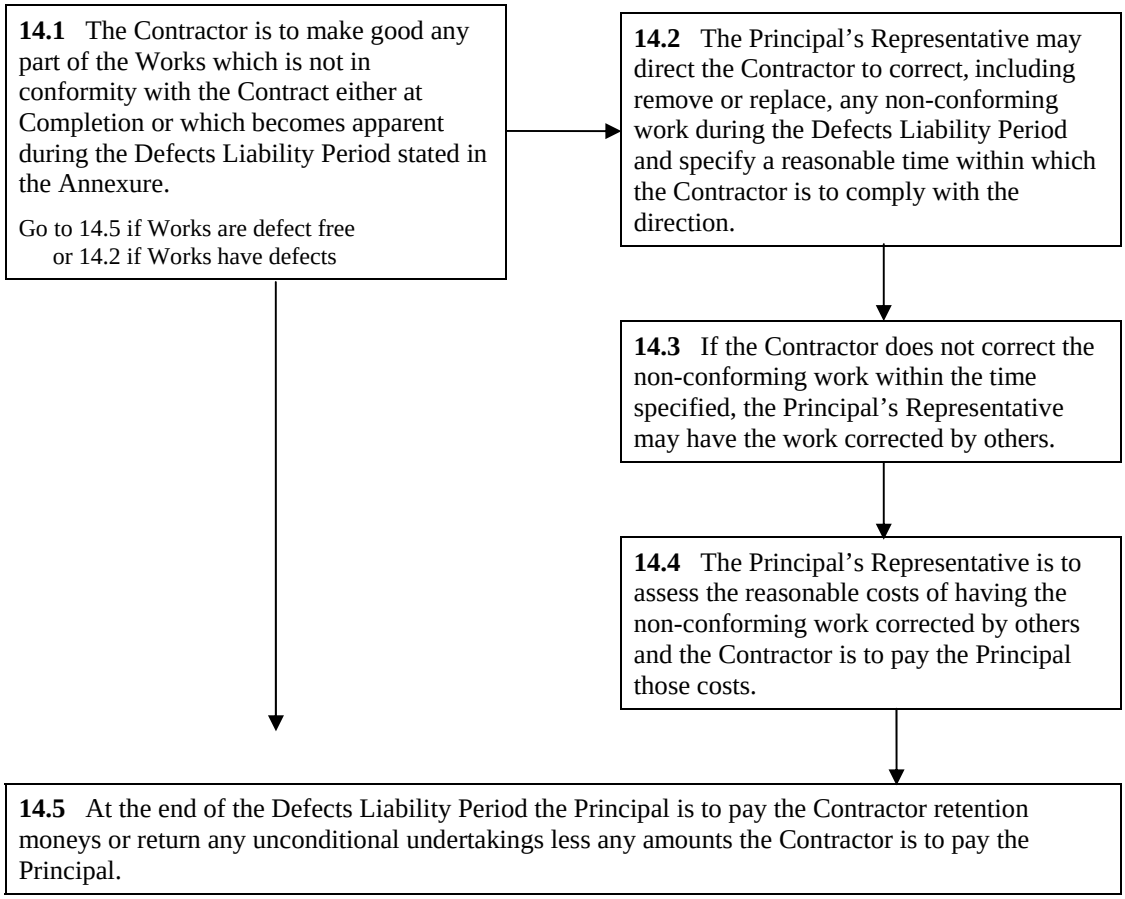
An amount of 2.5% of the Contract Sum is to be retained by the Principal against the due and proper performance of the Contract, except when there is no Defects Liability Period.

The Contractor may, instead of the retention, provide security in the amount of the retention in the form as detailed in Schedule – Unconditional Undertaking.

13.6 *If an Unconditional Undertaking is required:*

All Undertakings must be provided by a financial institution acceptable to the Principal.

14. DEFECTS LIABILITY PERIOD



15. DEFAULT AND INSOLVENCY

15.1 Without prejudice to any other rights which the Principal has, if the Contractor commits a substantial breach of the Contract, including:

(a) failing to carry out a direction of the Principal's Representative within the time specified or if no time is specified, within a reasonable time;

(b) not progressing Works at a reasonable rate;

the Principal may, in writing, specify the breach and ask the Contractor to give reasons why the Principal should not take further action.

15.2 If the Contractor is wound up or declared insolvent then:

15.3 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:

Go to 15.5 for Termination option
or 15.4 for Takeover option

15.4

(a) The Principal may immediately take over the uncompleted Works by notice in writing; and

(b) suspend payments due or which would become due under Clause 13; and

(c) have the Works Completed by others.

15.5 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.

15.6 The Principal's Representative is to calculate the difference between:

(a) the costs of having the Works Completed by others; and

(b) the amount of suspended payments and retention moneys held by the Principal.

Go to 15.7 Contractor to pay
or 15.8 Principal to pay

15.7 If the calculation results in a shortfall to the Principal, the Contractor is to pay the amount of the shortfall to the Principal within seven days of a written demand for payment.

15.8 If the calculation results in an excess to the Principal, the Principal is to pay the amount of the excess to the Contractor.

16. DISPUTES

16.1 If either party is dissatisfied with an act or omission of the other party in connection with the Contract, including assessment of a claim, failure to agree, or an instruction, that party is to notify the Principal's Agent and the other party in writing of a dispute within 14 days of the act or omission. The notifying party is to provide particulars, including the factual and legal basis of any claimed entitlement.

If a party gives notice of a dispute but not within the time provided by this Clause 16.1, then it is not entitled to interest for the period before the party gave notice.

16.2 Within 7 days of the giving of the notice, the Contractor and Principal's Agent are to meet to attempt to resolve the dispute.

16.3 If the dispute is not resolved within 14 days after the notice providing particulars of the dispute, the parties are to appoint an independent Expert.

If the parties fail to agree upon an Expert, either may request the Chief Executive Officer of the Australian Commercial Disputes Centre Ltd Sydney to nominate an Expert. If there is no Chief Executive Officer or the Chief Executive Officer fails to make a nomination within a reasonable time, the Principal is to nominate an Expert.

16.4 The person nominating the Expert is not to nominate:

- an employee of the Principal or Contractor,
- a person who has been connected with the Contract, or
- a person upon whose appointment the Principal and the Contractor have previously failed to agree.

16.5 When the person to be the Expert has been agreed on or nominated, the Principal, on behalf of both parties is to appoint the expert in writing, with a copy to the Contractor, setting out:

- the dispute being referred to the Expert for a decision,
- the Expert's fees,
- the procedures detailed in this Clause 16, and
- any other matters which are relevant to the engagement.

16.6 The Principal and the Contractor are to share equally the Expert's fees and out-of-pocket expenses, including security deposit if required. Each party is to otherwise bear their own costs and share equally any other costs of the process.

16.7 Each party is to make written submissions to the Expert and provide a copy to the other party as follows:

(a) Within 7 days after the appointment of the Expert, the notifying party is to submit details of the claimed act or omission.

(b) Within 14 days after receiving a copy of that submission, the other party is to submit a written response. That response can include cross-claims.

16.8 The Expert is to decide whether the claimed event, act or omission did occur and, if so:

- when it occurred,
- what term of the Contract or other obligation in law, if any, requires the other party to pay the claimant money in respect of it, and
- the merits in law of any defence or cross-claim raised by the other party.

The Expert then decides the amount, if any, which one party is legally bound to pay the other on account of the event, act or omission.

The Expert is also to decide any other questions required by the parties, as set out in the dispute referred to the Expert at Clause 16.5.

16.9 In making the decision, the Expert acts as an expert and not as an arbitrator and is:

(a) not liable for acts, omissions or negligence;

(b) to make the decision on the basis of the written submissions from the parties and without formalities such as a hearing;

(c) required within 35 days of appointment to give the decision in writing, with brief reasons, to each party; and

(d) bound by the rules of natural justice.

16.10 If the Expert decides that one party is to pay the other an amount exceeding $250,000 (calculating the amount without including interest on it), and within 14 days of receiving the decision of the Expert, either party gives notice in writing to the other that the party is dissatisfied, the decision is of no effect and either party may then commence litigation.

16.11 Unless a party has a right to commence litigation under Clause 16.10:

(a) The parties are to treat each determination of the Expert as final and binding and give effect to it.

(b) If the Expert decides that one party owes the other party money, that party is to pay the money within 14 days of the receiving the decision of the Expert.

17. TERMINATION FOR THE PRINCIPAL'S CONVENIENCE

17.1 The Principal may terminate the Contract by giving notice with effect from the date stated in the notice, for its convenience and without the need to give reasons. The Contractor must leave the Site by the date stated in the termination notice and remove all plant, equipment and amenities it has brought onto the Site for the construction of the Works.

If the Contract is terminated for the Principal's convenience, the Principal must pay the Contractor:

- the value of all work carried out (as determined in clause 13) up to the date of the termination notice takes effect; plus

- 2% of the difference between the Contract Sum, adjusted by any amounts agreed or assessed under clause 9.2 or finally determined under clause 16, and the total of all amounts paid and payable to the contractor for payment claims.

The payments referred to in this Clause are full compensation under this Clause, and the Contractor has no claim for damages or other entitlement whether under the Contract or otherwise.

The Contractor must, wherever possible, include in all subcontracts and supply agreements an equivalent provision to this Clause.

SCHEDULE 1

APPROVED FORM OF UNCONDITIONAL UNDERTAKING

[To be submitted* on a *Financial Institution's letterhead and show, at a minimum, the Financial Institution's name and address]

At the request of ..... ('the Contractor)

and in consideration of ..... ('the Principal')

accepting this undertaking in respect of the contract for

..... ('the Contract'),

..... ('the Financial Institution')

unconditionally undertakes to pay on demand any sum or sums which may from time to time be

demanded by the Principal to a maximum aggregate sum of

.....($.....)('the Sum').

The undertaking is to continue until notification has been received from the Principal that the Sum is no longer required by the Principal or until this undertaking is returned to the Financial Institution or until payment to the Principal by the Financial Institution of the Sum or such part as the Principal may require. The Principal must not assign the unconditional undertaking without the prior ***written*** *agreement of the Financial Institution, which must not be unreasonably withheld.*

Should the Financial Institution be notified in writing, purporting to be signed by or for and on behalf of the Principal that the Principal requires payment to be made of the whole or any part or parts of the Sum, it is unconditionally agreed that the Financial Institution will make the payment or payments to the Principal forthwith without reference to the Contractor and notwithstanding any notice given by the Contractor not to pay same.

Provided always that the Financial Institution may at any time without being required so to do pay to the Principal the Sum less any amount or amounts it may previously have paid under this undertaking or such lesser sum as may be required and specified by the Principal and thereupon the liability of the Financial Institution hereunder shall immediately cease.

DATED at this day of 20

……

[Signature]

……

[Print name of person signing the Undertaking]

…….

[Position / Title]

SCHEDULE 2

Statutory Declaration

Definitions

Oaths Act (NSW)
Ninth Schedule

The Principal is The Minister for Commerce in the State of New South Wales

The Contractor is .....……..

ACN/ABN.....

The Contract is Contract No. 0701680

Contract Title BOURKE ACDP NEW HOUSING WORK PACKAGE 12

dated .....(Date of Contract) between the party identified as the Principal and the party identified as the Contractor.

Declaration

Full name **I,** .....

Address of .....

.....

do hereby solemnly declare and affirm that:

Insert position title of the Declarant

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 as a principal contractor for the work done in connection with the Contract, as defined in section 127 of the *Industrial Relations Act 1996* (NSW).

5 Where the Contractor is 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* (NSW) 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* (NSW) 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 a principal contractor for work done in connection with the Contract, as defined in section 175B of the *Workers Compensation Act 1987* (NSW).

9 Where the Contractor is 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* (NSW) 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* (NSW) 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* (NSW).

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* (NSW).

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* (NSW) 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 1971* (NSW) 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	..... on.....
Date	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:

(a) the words "principal contractor", "employee", "employees" and "relevant employees" have the meanings applicable under the relevant Acts;

(b) the word "subcontractor" in paragraphs 5, 6, 9, 10, 14 and 15 has the meaning applicable under the relevant Act; and

(c) otherwise the words "Contractor", "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:

(i) a justice of the peace of the State of New South Wales;

(ii) a solicitor of the Supreme Court of New South Wales with a current practising certificate;

(iii) a notary public; or

(iv) another prescribed person legally authorised to administer an oath under the *Oaths Act 1900* (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.

ANNEXURE TO GENERAL CONDITIONS OF CONTRACT - MINOR WORKS

Clause

1.1

The Principal is the Minister for Commerce for the State of New South Wales.

Notices and Submissions to the Principal

Notices and Submissions to the Principal must go to the Principal's Representative.

1.2

The Principal's Representative is : Cliff Chenery

and is located at: 6/445 Sydney Road, Balgowlah

If no name is stated the Principal is to name the person in writing within 7 days after accepting the tender. The Principal may at any time change the person for any reason whatsoever by giving written notice.

1.3

The Principal's Agent is : Ron Berrington – Manager, Dispute Resolution Unit

and is located at: NSW Department of Commerce, McKell Building, 2 – 24 Rawson Place, Sydney

If no name is stated the Principal is to name the person in writing within 2 days of the Contractor giving written notice of a dispute under Clause 16. The Principal may at any time change the person for any reason whatsoever by giving written notice.

3.2

Not applicable

5.2

The Principal has arranged insurance of the Works and public liability through insurance broker Marsh Pty Ltd.

The insurance policy is at:

www.managingprocurement.commerce.nsw.gov.au/system/index_contract_management_insurance_policies.doc

5.6

The Principal has arranged asbestos liability insurance through insurance broker Marsh Pty Ltd.

The insurance policy is at

www.managingprocurement.commerce.nsw.gov.au/system/index_contract_management_insurance_policies.doc

6.1

The time to give possession of Site
is: 14 days after the Principal accepted the tender.

If no time is stated it is 7 days after the Principal accepted the tender.

11.1

The period for Completion is: 20 calendar weeks.

If no period is stated a reasonable period is to apply.

12.3

The rate per day of liquidated damages is: $160.00.

If no rate is stated common law damages are to apply.

13.1

The amount of Security is: $ -

If no amount is stated then no Security applies.

13.3

The Milestones and Percentages are as below:

Milestone	Percentage
End of calendar month	Pro rata contract lump sum

If no Milestones and Percentages are stated the Milestone is Completion of the Works and Percentage is 100%.

14.1

The Defects Liability Period, which commences at Completion of the Works is: 26 weeks.

If no Period is stated then no Defects Liability Period applies.

END OF SECTION – GENERAL CONDITIONS OF CONTRACT AND ANNEXURE

2 PRELIMINARIES

1 ADMINISTRATION AND CONTRACTING

1.1 ELECTRONIC COMMUNICATIONS

The parties agree and consent that notices and communications may be by electronic communication in accordance with the *Electronic Transactions Act 2000* (NSW).

1.2 LONG SERVICE LEVY

Before commencing the works, the Contractor must:

- pay to the Building and Construction Industry Long Service Payments Corporation or the Corporation's agent the amount of the long service levy payable under the *Building and Construction Industry Long Service Payments Act 1986* (NSW); and
- produce to the Principal the document evidencing payment of the levy.

Additional information and the Levy Payment Form are available at: *www.lspc.nsw.gov.au*

1.3 COLLUSIVE ARRANGEMENTS

The Contractor must comply with the NSW Government *Code of Practice for Procurement*, which is available at:

www.treasury.nsw.gov.au/procurement/cpfp_ig.htm.

1.4 CONTRACTOR PERFORMANCE REPORTING

During the course of the Contract, the Contractor's performance may be monitored and assessed in accordance with the *Performance management system guidelines* at:

www.managingprocurement.commerce.nsw.gov.au/system/index_performance_management.doc

1.5 EXCHANGE OF INFORMATION BETWEEN GOVERNMENT AGENCIES

The Contractor authorises the Principal and its employees and agents to make information concerning the Contractor and its performance available to other NSW government agencies and local government authorities, which may take such information into account in considering whether to offer the Contractor future opportunities for work.

The Principal regards the provision of information about the Contractor to any NSW government agency or local government authority as privileged under the *Defamation Act 2005*. The Contractor agrees that it will have no entitlement to make any claim against the Principal in respect of any matter arising out of the provision or receipt of such information.

1.6 NATSPEC SUBSCRIPTION

Not used.

1.7 GOODS AND SERVICES TAX

All prices, rates and other amounts referred to under the Contract must include GST if it is payable.

The Principal will issue payment schedules in the form of Recipient Created Tax Invoices. The Contractor must not issue Tax Invoices in respect of the Contract.

The Principal will issue Adjustment Notes in respect of adjustment events known to the Principal. The Contractor must notify the Principal of details of any adjustment event not known to the Principal.

Each party warrants it is registered for GST at the time of entering into the Contract, and must notify the other party if it ceases to be registered for GST or to satisfy any requirements for the issue of Recipient Created Tax Invoices.

1.8 PASSING OF PROPERTY AND RISK

Unless otherwise provided, items supplied by the Contractor become the property of the Principal when unloaded as required in the Contract. Such items remain at the risk of the Contractor until property therein passes to the Principal.

1.9 APPLICATION OF SCHEDULE OF RATES

Not used.

1.10 QUALITY MANAGEMENT REQUIREMENTS

Design Plan

Prior to commencing design work, prepare and implement a Design Plan complying with the NSW Government *Quality Management Systems Guidelines (QMS Guidelines)*, covering each phase of design and addressing the key activities.

The *QMS Guidelines* are available at:

www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc

Inspection and Test Plans

Prepare and implement Inspection and Test Plans, complying with the *QMS Guidelines*, incorporating the Hold and Witness points specified in the Contract.

Submit copies of Inspection and Test Plans and checklists not less than 7 days before commencing the work to which they apply. Also submit certification that the relevant Inspection and Test Plans of Subcontractors and Consultants meet the requirements of the *QMS Guidelines*. Do not start any work before this documentation is submitted.

Give at least 24 hours notice prior to reaching a Hold or Witness point.

The Contractor must not proceed beyond a Hold point without endorsement by the Principal or its authorised representative.

The Principal, at its discretion, may inspect the work at a Witness point, but work may proceed without endorsement.

Endorsement by the Principal at a Hold or Witness point does not release the Contractor from its obligations to achieve the specified requirements of the Contract.

Surveillance (monitoring) by the Principal will apply to all work associated with the Contract.

Conformance records

Submit copies of conformance records as specified, including:

Conformance records	Time when records are required
Completed Inspection & Test Plans and associated checklists:	
- Refer to Reference Specification – Part B	With each Payment Claim

Failure to Comply

If the Contractor fails to comply with the requirements of this clause, the Principal may implement such inspections and tests as the Principal determines and the cost incurred by the Principal shall be a debt due from the Contractor.

1.11 AUSTRALIAN AND NEW ZEALAND GOODS

Requirement

Do not supply or incorporate into the Works any items imported into Australia except:

- items manufactured in New Zealand;
- items included in the Tender Schedules - **Schedule of Imported Materials and Equipment** lodged with the tender and accepted by the Principal;
- a single item with an imported content valued at less than 2% of the Contract Sum or $20,000, whichever is the lesser. If an item is one of a group of similar items, the group shall be considered as one single item.

The Principal will not pay for imported goods supplied or incorporated into the Works in breach of the provisions of this clause.

1.12 SECURITY OF PAYMENT

Options as to Form of Security

Each subcontract which:

- requires the subcontractor to provide a cash security to its principal;
- allows the subcontractor's principal to deduct retention moneys from any payment made by it to the subcontractor; or
- provides for both of the above

shall allow the subcontractor the option at any time to provide an unconditional undertaking or unconditional undertakings in lieu of a cash security or retention moneys. To the extent that the subcontractor provides an unconditional undertaking or undertakings, the subcontractor's principal shall not deduct retention moneys and shall forthwith release to the subcontractor any retention moneys or cash security then held.

Trust for Cash Security and Retention Moneys

Each subcontract shall include a provision having the effect that:

- When a party receives or retains security in cash or converts security to cash, that security is held in trust by the security holder from the time of receipt, retention or conversion, as the case may be, and the security holder must forthwith deposit the money into a trust account in a bank selected by that party;
- the moneys shall be held in trust for whichever party is entitled to receive them until they are paid in favour of that party and the security holder shall maintain proper records to account for such moneys; and
- any interest earned by the trust account shall not be held in trust, and shall be owned by the party holding the security.

If the party holding security has a policy of insurance protecting subcontract payments due to the other party which is equivalent to the HIA Security of Payment Bond, then compliance with the above of this subclause is not required.

Whenever requested by the Principal to provide evidence verifying that the Contractor is holding in trust an amount which the Contractor should be holding in trust, the Contractor shall provide evidence to the reasonable satisfaction of the Principal that the amount is held in trust. If the Contractor fails to do so then, in addition to any other remedy which the Principal may have against the Contractor, the Principal may withhold an equivalent amount from payments to the Contractor.

Payments

Each subcontract shall include:

- an obligation, which takes precedence over any inconsistent provision of the subcontract, for the subcontractor's principal to pay the subcontractor regular progress payments of 100% of the value of work, goods or services provided by the subcontractor less only retention moneys, if any, paid into the trust account referred to in subclause - **Trust for cash security and retention moneys**;
- an entitlement to progress payments within the following periods after the date upon which a progress claim is lodged by the Contractor with the Principal's Representative:
  - in the case of the Contractor's subcontractors, 28 days;
  - in the case of all other subcontractors, 35 days.

Compliance with this subclause shall not prevent the Contractor from paying a subcontractor an amount in excess of that claimed from the Principal, or paying before the time stipulated in this subclause.

Alternative Dispute Resolution

Each subcontract shall include provisions incorporating the dispute resolution procedures outlined in the Contract except that, in each case, it shall not be mandatory for the subcontractor to pursue the contractual dispute resolution mechanism if the only remedy sought by the subcontractor is an order that the subcontractor's principal pay to it an amount which is not disputed to be due and payable under the subcontract.

Documents to be Provided to Subcontractors

Each subcontract shall include a provision which requires the subcontractor's principal to provide to the subcontractor, before the subcontractor commences work under the subcontract, a copy of the following provisions of the contract between the subcontractor's principal and its principal:

- the provision equivalent to this Preliminaries Clause - **Security of Payment**; and
- the clauses relating to proof of payment of subcontractors, times for payment claims and payment and alternative dispute resolution.

Register of Subcontracts

Maintain a register of all subcontracts which have a value of $25,000 or greater showing brief details of the subcontract work, the name, address and telephone number of the subcontractor, and provide an up to date copy of the register when requested by the Principal's Representative.

If further requested by the Principal's Representative, provide an unpriced copy of the subcontract agreement within 14 days of such request.

1.13 ADDITIONAL SECURITY AND OBLIGATIONS FOR TRUSTEES

If the Contractor is a trustee:

- before commencing the Works, the Contractor must give the Principal an unconditional undertaking as security for any amount previously agreed in writing by the parties. The unconditional undertaking must be in the form detailed in Schedule 1 - **Approved Form of Unconditional Undertaking** and from a financial institution acceptable to the Principal.
- The security will be retained by the Principal against the due and proper performance of the Contract by the Contractor. Unless the Principal has made or intends to make a demand against the unconditional undertaking, the Principal will return the unconditional undertaking within 14 days after the date of Completion of the Works determined or agreed by the Principal.
- The Contractor must not prevent the Principal making any demand against the unconditional undertaking, or prevent the provider of an unconditional undertaking complying with the unconditional undertaking or any demand by the Principal, but the Contractor may seek damages if the Principal makes a demand in breach of the Contract.
- The Contractor must ensure that, for the duration of the Contract, the total value of the trust beneficiaries' loans to the trustee is always greater than the total value of trust beneficiaries' loans from the company.

1.14 INDUSTRIAL RELATIONS MANAGEMENT

Requirement

The Contractor must comply with the *NSW Government Industrial Relations Management Guidelines*.

Verification of Compliance with Industrial Relations Obligations

Submit before beginning works on the Site, a statement on the Contractor's letterhead, signed by an authorised person, attesting to the Contractor's compliance, in the preceding twelve months, with all employment and legal obligations including, but not limited to:

- payment of remuneration to employees
- annual leave
- Long Service Leave Payment Scheme registration
- workers' compensation insurance, including self- insurance arrangements
- superannuation fund membership and contributions
- over-award payments such as redundancy fund contributions

If the Contractor engages an independent industry or employer association or other specialist organisation to provide an auditing service to verify compliance with employment and legal obligations, a statement or declaration from that organisation may be submitted instead of the statement by the Contractor.

Project IR Management Details

Submit, before beginning work on the Site, a statement detailing:

- the location of time and wage records and other documents that are required to be kept to verify ongoing compliance with all employment and legal obligations; and
- the names of Federal or NSW awards that are likely to cover subcontractors and other contractors on the project;
- the names of those responsible for coordinating industrial relations on the project;
- an outline of:
  - the Contractor's consultation and communication mechanisms with workers, unions, and employer or industry associations

- the measures to be implemented to coordinate the interface on the project with subcontractors, unions and other contractors
- the measures for assessing subcontractor's ability to comply with industrial relations and employment obligations
- the measures to monitor and verify subcontractors' ongoing compliance

Failure to comply

If at any time the Contractor has not carried out its obligations under this Clause - **Industrial Relations Management,** then notwithstanding any other provision of the Contract, no payment is due to the Contractor until the 7th day after the required action has been carried out.

1.15 ABORIGINAL PARTICIPATION

Requirement

The Contractor must comply with the NSW Government *Aboriginal Participation in Construction Guidelines* available at:

www.managingprocurement.commerce.nsw.gov.au/system/index_procurement_guideline_documents.doc

Submit a Statement of Opportunities for Aboriginal Participation and an Aboriginal Participation Plan before starting work on the Site.

Implement the Aboriginal Participation Plan and demonstrate compliance to the Principal whenever requested.

Local employment-related stakeholders are:

- Job Networks providers: Joblink and OEC;
- Murdi Paaki Regional Enterprise Corporation, Bourke Office.

Failure to comply

If at any time the Contractor has not carried out its obligations under this Clause – **Aboriginal Participation**, then notwithstanding any other provision of the Contract, no payment shall be due to the Contractor until the 7th day after the required action has been carried out.

1.16 PROTECTION OF CHILDREN AND OTHER VULNERABLE PEOPLE

Not used.

1.17 AUDIT AND REVIEW

Make available, on request, all records, including those of or relating to Subcontractors or suppliers, relevant to compliance with requirements of the Contract, for the purposes of audit, review or surveillance. Provide all reasonable assistance during the audits or reviews including attendance by the Contractor.

Promptly implement effective corrective action on matters disclosed by audit or review.

2 SITE AND WORKS

2.1 ORDER OF WORK

Before commencing work on site, develop and obtain approval to the sequence in which work is to be carried out.

2.2 WORKING HOURS AND WORKING DAYS

Unless the Contract provides otherwise the Site is available to the Contractor to perform the Works between 7.30 am and 5.00 pm on weekdays. Do not carry out construction activities on public holidays.

The Principal's Representative may approve additional working hours or working days, subject to conditions which may include, but are not limited to:

- restrictions on the performance of work which requires supervision; and
- a requirement that the Contractor meet the costs of supervision, by or on behalf of the Principal, of work performed during the additional working hours or working days.

2.3 EXISTING SERVICES

Locating of Existing Services – Dial Before You Dig

The Contractor is responsible for locating services.

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

Dealing with Existing Services

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

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

Cost and Delay

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

Notification

Notify the Principal's Representative immediately upon the discovery of services obstructing the Works not shown in the Contract documents.

2.4 OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT

Specification and Statutory Requirements

The Contractor must comply with the NSW Government *Occupational Health and Safety Management Systems Guidelines 4th Edition* (OHSM Guidelines) and all statutory requirements including, but not limited to, the *Occupational Health and Safety Act 2000* (NSW) and *Occupational Health and Safety Regulation 2001* (NSW). In the event of any inconsistency, the Contractor must comply with the statutory provisions.

Appointment as Principal Contractor

The Contractor, having responsibility for the construction work at all times until the work is completed under the Contract, 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).

Design

The Contractor must ensure that systematic assessments are undertaken in carrying out any design required, that:

- identify hazards and analyse the associated risks, probability and consequences of injury or illness;
- involve consultation with appropriate people on the safe construction, use and maintenance of the designed asset;
- establish a Design Hazard Register for the designed asset to record any hazards not eliminated in the design that may impose a risk to those constructing, using or maintaining the asset.

An up to date copy of the Design Hazard Register must be provided to the Principal at the date of Completion of the Works or the date the Works are occupied or taken over, whichever is earlier.

Site-specific Safety Management Plan

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

Submit the Site-specific Safety Management Plan no later than 14 days before construction work commences. Do not start construction work before a complying Site-specific Safety Management Plan has been submitted.

Ensure the following risks are covered in the Site-specific Management Plan:

- Removal of bonded asbestos material.

This list of risks is not exhaustive and must not be relied upon by the Contractor. The Contractor must undertake its own detailed analysis of all occupational health and safety risks under the Contract.

OHS Management Monthly Report

Submit, no later than the seventh (7^{th}) day of each month, 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 Project OHS Management Plan during the previous 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.

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.

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.

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.

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.

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 7th day after the required action has been carried out.

2.5 HAZARDOUS SUBSTANCES

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.

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.

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.

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.

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.

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.

2.6 ASBESTOS DECONTAMINATION

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 2nd 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 2nd Edition (2005)*
- *Environmentally Hazardous Chemicals Act 1985* (NSW)
- *Waste Avoidance and Resource Recovery Act 2001* (NSW)

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.

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.

Clearance Certificate

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

2.7 ENVIRONMENTAL MANAGEMENT SYSTEM

Requirement

The Contractor must comply with the *NSW Government Environmental Management Systems Guidelines.*

Project Environmental Management Plan

Document and implement a Project Environmental Management Plan that complies with the NSW Government *Environmental Management Systems Guidelines*.

The Contractor may elect to complete Preliminaries Schedule – **Project Environmental Management Plan** as required to suit the project and implement the completed version as the Project Environmental Management Plan.

Submit the Project Environmental Management Plan no later than 7 days before construction work commences. Submit revisions to the Plan.

Incidence Reports

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

Immediately notify the Principal of any pollution incident that may cause material harm to the environment, providing evidence that notification requirements of the *Protection of the Environment Operations Act 1997* (NSW) have been met, if applicable.

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

Failure to comply

If at any time the Contractor has not carried out its obligations under this Clause - **Environmental management**, then notwithstanding any other provisions of the Contract, no payment will be due to the Contractor until the 7th day after the required action has been carried out.

2.8 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

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.

2.9 WASTE MANAGEMENT

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.

Monitoring

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

Submit a progress report every two months, and a summary report before Completion, 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*, which is available at:

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 dockets and/or company certification confirming appropriate, lawful disposal of waste.

2.10 PEST CONTROL

Restrictions

Do not use any chemical pesticides or termicides 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.

2.11 WORK METHOD

If the Contract prescribes a particular work method or the Principal or Principal's Representative directs that a particular work method must be used to the exclusion of the other work methods, then that work method is part of the Contract.

Otherwise, the work method is not part of the Contract and the Contractor is free to use any work method. This is so even though, before or after acceptance of the tender, the Contractor made known to the Principal the Contractor's proposed work method and the Principal accepted or approved it.

If the work method is not part of the Contract, the fact that the proposed work method is impractical or impossible or the Contractor, with or without the approval of the Principal's Representative, uses another work method will:

- not entitle the Contractor to make a claim on the Principal;
- not be grounds for an extension of time for Completion;
- not cause the Contract to be frustrated.

2.12 STANDARDS

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

Where the Contract refers to an Australian Standard it does not preclude the adoption of a relevant international standard.

2.13 CLEANING UP

All visible external and internal surfaces, including fittings, fixtures and equipment, must be free of marks, dirt, dust, vermin and unwanted materials, at Completion.

2.14 PROPRIETARY ITEMS

Identification by the Principal of a proprietary item does not necessarily imply exclusive preference for that item, but indicates the required properties of the item.

The Contractor may offer an alternative to any proprietary item. Apply in writing for approval to use the alternative. The request must be accompanied by all available technical information and describe how, if at all, the alternative differs from the proprietary item and how it will affect other parts of the Works and performance of the Works.

Except to the extent that the approval, if any, of the Principal's Representative includes a contrary provision, the approval shall be deemed to include the conditions that:

- use of the alternative must not directly or indirectly result in any increase in the cost to the Principal of the Works;
- the Contractor must indemnify the Principal against any increase in costs;
- use of the alternative must not directly or indirectly cause any delay to the Works and if it does, the Contractor will compensate the Principal for any loss which the delay causes.

2.15 GUARANTEES

Generally

Obtain and ensure that the property title holder will have the benefit of warranties or guarantees as specified in the Contract or offered by suppliers, including warranties or guarantees that are obtained by, or offered to the subcontractors of the Contractor.

Floor Coverings

Not used.

2.16 SELECTED SUBCONTRACTS

Not used.

2.17 SCHEDULE TO PRELIMINARIES - ENVIRONMENTAL MANAGEMENT PLAN

ISSUE	OBJECTIVE	HOW THE OBJECTIVE WILL BE ACHIEVED. ACTIONS REQUIRED TO ACHIEVE THE OBJECTIVE	WHEN THE ACTIONS WILL BE TAKEN	WHO WILL ENSURE THAT THE OBJECTIVE IS ACHIEVED	ACTION ACTUALLY TAKEN TO ACHIEVE THE OBJECTIVE	OTHER RECORDS AND WHERE THEY ARE KEPT
General						
Vehicles and plant	Exhaust emissions are minimised	No vehicles or plant producing excessive exhaust emissions will be used				
Emergencies - Incident reporting.	All environmental incidents are reported to the Principal's Representative. immediately	All environmental incidents will be reported to the Principal's Representative immediately				
Emergencies - Spills	Spills are contained, damage to the eco-system minimised and rectification organised	Emergency procedures to handle spills including oil and chemicals will be established before delivery begins				
Other environmental emergencies	Damage to the eco-system from environmental emergencies is minimised	Emergency procedures to handle other foreseeable environmental emergencies will be established				
Compliance Audit	Compliance with environmental requirements and, if breaches are detected, rectification of defects	The Contractor will: • Cooperate with periodic environmental audits; and • Rectify any environmental breaches identified within the time frame specified in the audit				

ISSUE	OBJECTIVE	HOW THE OBJECTIVE WILL BE ACHIEVED. ACTIONS REQUIRED TO ACHIEVE THE OBJECTIVE	WHEN THE ACTIONS WILL BE TAKEN	WHO WILL ENSURE THAT THE OBJECTIVE IS ACHIEVED	ACTION ACTUALLY TAKEN TO ACHIEVE THE OBJECTIVE	OTHER RECORDS AND WHERE THEY ARE KEPT
Noise	Minimal detrimental impact	Adherence to EPA, Council and other noise limits will be mandatory. Equipment will be kept in good repair and condition. The Contractor will contact, co-operate and coordinate with neighbouring facility operators.				
Waste - Quantity of materials	Minimal quantity of waste materials generated as a consequence of the Contract	Development and implementation of a strategy to reduce the quantity of waste generated as a consequence of the Contract				
Waste Disposal	Appropriate and lawful disposal of waste associated with the Contract including: • Packaging materials; • Replaced or redundant parts or materials; • Chemicals; • Oils and grease from machinery; • Paints and solvents including the cleaning of equipment, tools and brushes; • Cleaning materials and rags; • Trade Waste; • Materials unsuitable for re-use; and • Other waste	Identify lawful places for disposal of all types of waste generated as a consequence of the Contract. 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. Record, for all waste, the method and location of disposal, and whether or not that location was a place that could lawfully be used as a waste facility for that waste. Submit to the Principal's Representative reports, including the record of waste disposal and method and location of disposal; and immediate reports of the details of any waste from the site which has been conveyed or deposited at any place that cannot lawfully be used as a waste facility for that waste.				

ISSUE	OBJECTIVE	HOW THE OBJECTIVE WILL BE ACHIEVED. ACTIONS REQUIRED TO ACHIEVE THE OBJECTIVE	WHEN THE ACTIONS WILL BE TAKEN	WHO WILL ENSURE THAT THE OBJECTIVE IS ACHIEVED	ACTION ACTUALLY TAKEN TO ACHIEVE THE OBJECTIVE	OTHER RECORDS AND WHERE THEY ARE KEPT
Records	Sufficient records to demonstrate appropriate environmental management Notifications and Fines from the EPA and the resulting Corrective Action	This Environmental Management Plan and modifications to suit this Contract will be submitted to the Principal's Representative The Environmental Management Plans will be updated as required Appropriate progress and other reports will be submitted to the Principal's Representative The Principal's Representative will be notified of all EPA action and Fines from the EPA and the resulting Corrective Action All records will be securely filed using an effective document retrieval system				
Delivery						
Vehicle access	Damage to the ecosystems on Site is minimised	All vehicles and plant will access the site along designated routes				
Parking of vehicles and plant.	Damage to the ecosystems on Site is minimised	All vehicles and plant will park in designated areas				
Movements of pedestrians, materials and equipment	Damage to the ecosystems on Site is minimised	All pedestrian materials and equipment movement from and to vehicles will be along approved access routes				
Wash down of vehicles and plant.	Stormwater is not polluted by residues from wash down	Vehicles and plant will be washed down only in areas approved by the Principal's Representative for this purpose				

ISSUE	OBJECTIVE	HOW THE OBJECTIVE WILL BE ACHIEVED. ACTIONS REQUIRED TO ACHIEVE THE OBJECTIVE	WHEN THE ACTIONS WILL BE TAKEN	WHO WILL ENSURE THAT THE OBJECTIVE IS ACHIEVED	ACTION ACTUALLY TAKEN TO ACHIEVE THE OBJECTIVE	OTHER RECORDS AND WHERE THEY ARE KEPT
Removal and Making Good						
Reinstatement	Re-instatement of damaged eco-systems to their previous condition	Relevant areas of Site will be cleaned and re-instated				

END OF SECTION - PRELIMINARIES

NSW DEPARTMENT OF COMMERCE

BOURKE ABORIGINAL COMMUNITIES DEVELOPMENT PROGRAMME
NEW HOUSING – WORK PACKAGE 12

REFERENCE SPECIFICATION
PART A

SEPTEMBER 2007

BURNS ALDIS
COMMUNITY DEVELOPMENT CONSULTANTS

NSW DEPARTMENT OF COMMERCE

BOURKE ABORIGINAL COMMUNITIES DEVELOPMENT PROGRAMME
NEW HOUSING – WORK PACKAGE 12

REFERENCE SPECIFICATION
PART A

SEPTEMBER 2007

TABLE OF CONTENTS

PRELIMINARIES

1 GENERAL

Specifications and drawings

General: Carry out the works to this specification and other specifications and drawings listed in the contract, together with any other specifications, drawings and design instructions which may be issued by the Principal's Representative from time to time.

Discrepancy: Refer any ambiguity or discrepancy found in the documents to the Principal's Representative and obtain a direction before commencing the affected part of the Works.

Limit of site

Area contained within property boundaries of the allotment(s) upon which works are to be carried out.

Publicity restrictions

General: Do not, without the prior written approval of the Principal's Representative, disclose to any person other than the Principal's Representative or the Principal, any details of the contract, including any documentation, drawings and photographs whether in hard copy or electronic form produced as part of the contract. In giving approval, the Principal's Representative may impose such terms and conditions as the Principal's Representative thinks fit.

Media: Refer enquiries from the media concerning the project.

Community liaison

Community members: Refer enquiries from community members.

Insurances

Home Warranty Insurance: Unless an exemption is provided, effect Home Warranty Insurance.

Certification: Give original to Principal's Representative.

Long service levy

Before commencing work under the Contract:

- pay to the Building and Construction Industry Long Service Payments Corporation or the Corporation's agent the amount of the long service levy payable in respect of the construction work under the Building and Construction Industry Long Service Payments Act, 1986; and
- give to the Principal's Representative the document evidencing payment of the levy.

Building sustainability

Building sustainability indices: Before commencing work under the Contract, review project BASIX compliance requirements and plan works, including materials procurement, to achieve compliance.

Inspection: Arrange necessary checks with Principal Certifying Authority.

2 CONTRACTS AND FINANCE

Financial management

Progress claims: At commencement of the building work, submit a schedule of anticipated progress claims which will be made throughout the contract.

Progress claims breakdown: With each progress claim, submit a statement of amounts claimed in respect of each section or trade heading designated in the *Tender Schedules – Schedule of Prices*.

3 RISKS MANAGEMENT

Occupational Health and Safety

Principal standard: Implement the provisions of the Occupational Health and Safety Act 2000 and Regulation 2001, and associated WorkCover NSW Health and Safety Codes of Practice.

Safety management: Document, submit for information, implement and maintain a site-specific safety management plan. Prepare safe work method statements (SWMSs) to cover all health and safety risks which can reasonably be identified. Regularly review and amend SWMSs when conditions change. Submit SWMSs for information.

Occupational health and safety report: Submit monthly with each progress claim or otherwise on the last working day of each month, an OH&S Management Monthly Report to verify an acceptable level of health and safety risk management is implemented and maintained on the work site.

Non-compliance: Rectify any non-conformances immediately.

Audits: Cooperate with the Principal's Representative in conducting joint site-based audits when requested.

Accidents

Accidents: Promptly notify the occurrence of the following:

- Accidents involving death, or involving personal injury requiring 7 days absence, or causing a work-related illness.
- Incidents with accident potential such as plant and/or equipment failure, collapses, uncontrolled fires and/or explosions, escape of gases and/or dangerous substances, proximity to live electrical conductors.

4 AUTHORITIES AND ESTABLISHMENT

Supervision of the Works

Supervisor: Provide a qualified supervisor on site at all times to supervise the Works. Ensure supervisor is accessible, and fluent in English and technical terminology. Where the requirements of the Contractor's Contractor Licence require a qualified supervisor to be on site at all times, comply with these requirements.

Programme of work

Prior to commencement of building work, prepare a construction programme showing the sequence of work. Submit for information.

Time scale: Weeks.

Updated programme: Identify changes since the previous version and submit for information.

Site meetings

General: Hold and attend site meetings throughout the contract and ensure attendance of appropriate subcontractors when required.

Timing: When requested.

Contacts: At the first site meeting, submit names and telephone numbers of responsible persons who may be contacted after hours during the course of the contract.

Signs

General: Provide a signboard in a prominent position displaying the builder's name and licence number, allotment details, street address, the name of the person in charge of the site and emergency contact telephone number(s) at which the person in charge can be contacted at all times including outside of working hours. Include Local Authority development consent reference and date of determination.

Access: Provide a signboard in a prominent position stating that unauthorised entry to the site is prohibited.

Temporary services and works

General: Make own arrangements for the provision of services necessary for the carrying out of the Works.

Sanitary facilities: Provide temporary toilet facilities on site to the approval of the Local Authority at the rate of one toilet for every twenty persons, or part of twenty persons, employed at the site. Install standard flushing type cistern

and pan. Connect to sewerage if required by the Local Authority.

Existing services

Attend to existing services as follows:

- If the service is to be continued, repair, divert or relocate as required. If such a service crosses the line of a required trench, or will lose support when the trench is excavated, provide permanent support for the existing service.
- If the service is to be abandoned, cut and seal or disconnect and make safe.

Access by others

Network Utility Operators: Provide access to Network Utility Operators for the purpose of inspecting, repairing, maintaining, removing or renewing apparatus.

5 EXECUTION

Quality

Use new materials, components and assemblies of the best quality of their respective kinds obtained from approved manufacturers.

Hours of work

Carry out the works between the hours of 7.30 am and 5.00 pm on weekdays, and between the hours of 8.00 am and 1.00 pm on Saturdays, unless otherwise approved. Do not carry out construction activities on Sundays or public holidays.

Construction equipment

General: Provide and operate construction equipment necessary and suitable for the proper execution of the Works.

Protection of equipment: Secure heavy plant and equipment against interference with site operations when not in use.

Site restrictions

Security requirements: Provide such measures as are necessary to prevent entry of unauthorised persons onto the site at all times, including 1.8 m high perimeter security fencing. Make gate(s) lockable.

Construction fencing standard: To AS 1725.

Access: Access on to the site for construction purposes is to be from public road by way of an existing driveway crossing where present.

Use of the site: Access within the site, use of the site for temporary works and construction plant, including working and storage areas, and parking is to be coordinated with construction of permanent works to:

- Minimise disruption to construction programme.
- Minimise impact upon occupants of adjoining properties.

Parking: Park all vehicles of Contractors and subcontractors personnel, including private vehicles, on site.

Restrictions on alcohol consumption: Do not use or permit employees, including subcontractors, to consume alcohol or take illicit substances on the site at any time.

Protection against deliberately lit fires: Do not burn packaging or waste materials on site. Arrange for all combustible rubbish to be removed from site regularly.

Petroleum and flammable materials: Store all flammable liquids and gases in a proper, safe and secure manner. Provide for separation and containment.

Occupied premises

For the parts of the site which are occupied premises:

- Allow occupants to continue in secure possession and occupancy of the premises for the required period.
- Make available safe access for occupants.
- Arrange work to minimise nuisance to occupants and ensure their safety.
- Protect occupants against weather, dust, dirt, water or other nuisance, by such means as temporary screens.

Protection of persons and property

Traffic management: Prepare and implement a traffic management plan complying with AS 1742.3 or RTA QA Specification G10 – 2005 *(Control of Traffic)* that makes provision for the safe movement of pedestrians across the site frontage.

Temporary works: Provide and maintain pedestrian and vehicular guidance and safety systems, including any temporary works, signs, lighting, watching and traffic flagging.

Property: Do not interfere with or damage property which is to remain on or adjacent to the site, including trees.

Accessways: Do not obstruct or damage roadways and footpaths in use on or adjacent to the site. Do not store materials or components, or place temporary structures, on footpaths, in roadways or in reserves.

Services: Do not obstruct or damage drains and other existing services in use on or adjacent to the site. Carry out diversion of existing services or connection of new work with minimum interference to, and interruption of, services to consumers.

Maintenance of existing roads: Keep adjoining existing roads in a clean state, free of materials including materials excavated at the site, materials and items being transported to and from the site, or materials and items being stored on site.

Work in the vicinity of overhead power lines

Before commencement of work in the vicinity of overhead power lines, obtain clearance requirements for conductors from the Network Utility Operator.

Ensure jibs of cranes and other parts of any plant or equipment used in proximity to overhead transmission or other cables are of such height and are operated so that minimum clearances from conductors are achieved.

Underground services

Before commencing excavation, obtain from the Dial Before You Dig information service or relevant public authorities or owners of underground services, details in writing of the exact positions of all underground services at and adjacent to the Site. Verify and prominently mark locations of services.

Adjoining property

Notice: At least 10 working days before commencing work, submit to owners and occupants of adjoining property written notice of intention to commence work. Provide an outline description of the type and extent of work.

Revealed encroachments: If the works reveal unknown encroachments of adjoining property on to the site or of existing site structures on to adjoining property, immediately seek instructions.

Survey

Survey: Set out the works. Set out property boundaries and buildings using a Registered Surveyor.

Care: Preserve and maintain survey marks in their true positions.

Certification: If survey marks are disturbed or obliterated, immediately give notice and rectify the disturbance or obliteration.

Rectification

Accessways, services: Rectify immediately any obstruction or damage to roadways, nature strips, footpaths and drains and other existing services in use on or adjacent to the site. Provide temporary services whilst repairs are carried out.

Property: Rectify immediately any interference or damage to property which is to remain on or adjacent to the site, including adjoining property encroaching onto the site, and trees.

Costs: Bear all costs in connection with rectification.

6 COMPLETION

Completion

Final cleaning: Before practical completion, clean throughout, including interior and exterior surfaces exposed to view. Vacuum clean carpet and other soft surfaces. Polish resilient floor finishes to high shine. Clean fixed furniture inside and out, and luminaries. Clean and polish tiling and sanitaryware. Remove any remaining waste, surplus materials, demolished materials and rubbish. Clean debris from roofs, gutters and downpipes.

Operating parts: Hand over the Works in full operating condition. Ensure moving parts, and mechanical and electrical fixtures, fittings and components, operate safely and smoothly.

Pest eradication: Immediately before occupation by the Principal, treat throughout for cockroach, ant and spider pests using an accredited applicator. Remove and dispose of expired pests. Provide follow up treatment within four weeks using insect growth hormone and cockroach gel baits.

Removal of temporary work, services and plant: Remove temporary work, services and construction plant within 10 working days after occupation of the works by the Principal, including removal from site of Contractor's accommodation, toilet facilities, storage facilities, material stockpiles, soil erosion and sediment control measures, and any temporary fencing and contractor's signage. Clean debris from site, gutters, pipes and drainage systems.

Reinstatement: No later than 10 working days after practical completion:

- clean and repair damage caused by installation or use of temporary work, including reinstating any temporary site access to the satisfaction of the local authority;
- restore existing facilities used during construction to original condition; and
- restore areas disturbed by the works, including but not limited to material disposal areas and fencing, to original condition unless otherwise specified to be improved.

Performance and compliance tests

Compliance: Carry out acceptance tests and final tests. Provide a copy of test results.

GENERAL REQUIREMENTS

1 GENERAL

Precedence

General: Requirements of subsequent worksections of the specification override conflicting requirements in this worksection.

2 REFERENCED DOCUMENTS

Contractual relationships

General: Responsibilities and duties of the Principal, Contractor and Principal's Representative are not altered by requirements in the documents referenced in this specification.

Standards

Use referenced Australian or other standards (including amendments) which are current three months before the date of calling of tenders except where other editions or amendments are required.

Principal-supplied documents

Number of copies: 2

3 INTERPRETATION

Definitions

Unless the context otherwise requires, the following definitions apply:

Approved: "Approved", "reviewed", "directed", "rejected", "endorsed" and similar expressions mean "approved (reviewed, directed, rejected, endorsed) in writing by the Principal's Representative".

Attendance: 'Attendance', 'provide attendance' and similar expressions mean 'give assistance for examination and testing'.

Builder: Means the same as "contractor".

Documented: 'Documented', 'as documented' and similar terms mean contained in the contract documents.

Give notice: "Give notice", "submit", "advise", "inform" and similar expressions mean "give notice (submit, advise, inform) in writing to the Principal's Representative".

Metallic-coated steel: Includes zinc-coated steel, zinc/iron alloy-coated steel, and aluminium/zinc-coated steel.

Obtain: "Obtain", "seek" and similar expressions mean "obtain (seek) in writing from the Principal's Representative".

Pipe: Includes pipe and tube.

Professional engineer: A person who is listed on the National Professional Engineers Register (NPER) in the relevant discipline at the relevant time.

Proprietary: Means identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or item reference number. Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates the necessary properties of the item.

Provide: 'Provide' and similar expressions mean 'supply and install'. Installation shall include development of the design beyond that documented.

Required: Means required by the contract documents, the Local Authority or statutory authorities.

Submit: "Submit" means submit nominated documentation, samples and the like to the Principal's Representative unless otherwise noted.

Supply: Means "supply only" – do not install.

Verification: Provision of evidence or proof that a performance requirement has been met or a default exists.

4 CONTRACT DOCUMENTS

Specifications and drawings

Diagrammatic layouts: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or are calculable. Before commencing work:

- Obtain measurements and other necessary information.
- Coordinate the design and installation in conjunction with all trades.
- Coordinate the installation with existing services as found, or as diverted, to provide correct cover, invert, gradient, separation, and connection arrangement.

Levels: Spot levels take precedence over contour lines and ground profile lines.

5 PROPRIETARY ITEMS

Manufacturers' or suppliers' recommendations

General: Select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and use manufactured items in accordance with the current printed instructions of the manufacturer or supplier.

Proprietary systems/assemblies: Assemble, install or fix to substrate in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Substitution

Performance: Equal or greater to that specified.

Alternatives: If alternatives to the documented products or systems are proposed, submit sufficient information to permit evaluation of the proposed alternatives including:

- Samples and/or essential technical information.
- Reasons for the proposed substitutions.
- Statement of the extent of revisions to the works and to the construction program.
- Statement of cost implications including costs outside the contract.

Evidence: If the documented products or systems are unavailable within the time constraints of the construction programme submit evidence, from the supplier.

6 COMPLETION

Warranties

General: Name the housing provider/manager as warrantee(s) and give the Principal's Representative copies of manufacturers' warranties.

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.

7 CONTRACTOR SUBMISSIONS

Operation and maintenance manual

General: Within 10 working days of practical completion, submit an operation and maintenance manual for installations. Include installation guides. Consolidate in paper form into an A4 paper size 3 or 4 ring binder with hard cover, indexed, divided and titled. Fold drawings to A4 size and accommodate them in the binders so that they may be unfolded without being detached from the rings.

Number of copies: 2.

Surveyor's certificate

Submit a certificate which confirms that the work, including boundary fences, has been correctly located.

Services layout

Submit a plan which shows the location of underground, subfloor and internal hydraulic services.

Authorities' approvals

Submit evidence of approval of the Local Authority and statutory authorities whose requirements apply to the work.

Particular requirement: Provide Occupancy Certificate(s) in respect of the Works.

Keys

Give the Principal's Representative three keys for each set of locks keyed alike.

ENVIRONMENTAL MANAGEMENT

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Site preparation* for the disposal of vegetative material by mulching.

Bushfire protection

There is no requirement to provide protection to AS 3959.

2 STANDARDS

Environmental management

Standard: NSW Government *Environmental Management Systems Guidelines* (EMS Guidelines).

3 ENVIRONMENTAL CONTROLS

Noise

General: Take all reasonable precautions to ensure noise and vibration emitted by mechanical and electrical plant and equipment used on the Works, and/or methods employed in carrying out the Works, are not excessive.

Standard: Do not allow noise levels of individual items of plant or equipment to exceed the limits specified in the Protection of the Environment Operations Act 1997. Shroud plant and equipment and motors as necessary.

Dust and water

General: Protect adjoining owners, occupants and the public against dust, dirt and water nuisance and injury. Use dust screens and watering to reduce the dust nuisance.

Trucking

Covers: Cover loads before leaving the site to prevent the dropping of materials on public roads.

Shake down: Provide a shake down pad at the exit from the site to remove dust and other dry material from bodies of departing vehicles.

Washing: Wash the underside of all vehicles leaving the site sufficient to prevent the carrying of mud on to adjacent paved streets.

4 ENVIRONMENTAL MANAGEMENT PLAN

Plan

Requirement: Document and implement a Project Environmental Management Plan which complies with the *EMS Guidelines*.

Submission: Submit the Project Environmental Management Plan no later than 7 days before construction work commences. Submit revisions to the Plan.

5 ENVIRONMENTAL MANAGEMENT MEASURES

Erosion control

Implementation: Plan and carry out the work so as to avoid erosion, contamination, and sedimentation of the site, surrounding areas, and drainage systems.

Maintenance: Maintain soil erosion and sediment control measures for the duration of work activities until such time as disturbed areas are permanently restored or finished by turfing, paving or vegetation, including mulching.

Areas: Include all site areas, stockpile and storage areas and compound areas.

Infringement: Rectify any deficiencies and pay any fines incurred by the Principal as a result of non-compliance.

Waste management

Collection and storage: Provide adequate waste storage skips on site for the duration of construction activities.

Recycling: Recycle and divert from landfill surplus soil and other excavated or demolition materials, wherever this is practicable. Separately collect and stream quantities of waste concrete, bricks, blocks, timber, metals, plasterboard, paper and packaging, glass and plastics and offer them for recycling where practical.

Disposal: 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.

COMMON REQUIREMENTS

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

2 PERFORMANCE

Adhesive and sealants

General: Provide adhesives and sealants capable of transmitting imposed loads, sufficient to ensure the rigidity of the assembly, or integrity of the joint and which will not cause discolouration of finished surfaces.

Compatibility: Do not use sealants or adhesives that are incompatible with the products to which they are applied.

Movement: Where an adhered or sealed joint may be subject to movement, select a system accredited to accommodate the projected movement under the conditions of service.

Refurbishment: Use sealants that can be safely removed and prepared for refurbishment.

Fasteners

General: Provide fasteners accredited for the particular use, capable of transmitting imposed loads and maintaining the rigidity of the assembly.

3 ADHESIVES AND SEALANTS

Standards

Mastic adhesive: To AS 2329.

Non-structural adhesive for timber: To AS 2754.3.

Polymer emulsion adhesive for timber: To AS 2754.2, not inferior to Type 3 if required to be water-resistant.

Sealants: To ISO 11600.

External masonry joints

General: Provide sealant and bond breaking backing materials compatible with each other and the substrate and which are non-staining to masonry. Do not use bituminous materials with absorbent masonry units.

Bond breaking backing:

- Bond breaking materials: To be non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: To be closed-cell or impregnated, not water-absorbing.

Jointing with adhesives

Adhesives: Ensure substrates are:

- Clean and free of any deposit or finish which may impair adhesion.
- If framed or discontinuous, support members are in full lengths without splicing.
- If solid or continuous, excessive projections are removed.
- If previously painted, cracked or flaking paint is removed and the surface lightly sanded.

Precautions: Do not use contact adhesive if:

- A substrate is polystyrene foam.
- A PVC substrate may allow plasticiser migration.
- The adhesive solvent can discolour the finished surface.
- Dispersal of the adhesive solvent is impaired.

Two way method: Immediately after application press firmly to transfer adhesive and then pull both surfaces apart. Allow to tack off and then reposition and press firmly together. Tap areas in contact with a hammer and padded block.

One way method: Immediately after application bring substrates together and maintain maximum surface contact for 24 hours by clamps, nails or screws as appropriate. If highly stressed employ permanent mechanical fasteners.

Sealant jointing

Cleaning: Cut flush any joint surface protrusions and make good. Mechanically clean joint surfaces free of any deposit or finish which may impair adhesion of the sealant. Immediately before jointing remove loose particles from the joint, using oil-free compressed air.

Bond breaking: Install bond breaking backing material.

Taping: Protect the surface on each side of the joint using 50 mm wide masking tape or equivalent means. On completion of pointing remove the tape and remove any stains or marks from the surface.

Primer: Apply the recommended primer to the surfaces in contact with sealant materials.

Sealant joint proportions:

- General weatherproofing joints (width:depth):
  - 1:1 for joint widths < 12 mm.
  - 2:1 for joint widths > 12 mm.

Sealant application: Apply the sealant to dry joint surfaces using a pneumatic applicator gun. Ensure the sealant completely fills the joint to the required depth; that it is in good contact with the full depth of the sides and that there is no air trapped in the joint. Do not apply the sealant outside the recommended working time for the material or the primer.

Two pack polyurethanes: Do not apply the sealant if ambient conditions are outside the following:

- Temperature: < 5°C or > 40°C.
- Humidity: To the manufacturer's recommendations.

Joint finish: Force the sealant into the joint and finish with a smooth, slightly concave surface using a tool designed for the purpose.

Protection: Protect the joint from inclement weather during the setting or curing period of the material.

4 FASTENERS

General

Masonry anchors: Proprietary expansion or chemical type.

Concrete anchors: Proprietary expansion or chemical type, or screwbolt type.

Plugs: To be proprietary purpose-made plastic.

Powder-actuated fasteners: To AS/NZS 1873.4.

Steel nails: To AS 2334.

- Length: At least 2.5 x the thickness of the member being secured, and at least 4 x the thickness if the member is plywood or building board < 10 mm thick.

Unified hexagon bolts, screws and nuts: To AS/NZS 2465.

Bolts

Coach bolts: To AS/NZS 1390.

Hexagon bolts Grades A and B: To AS 1110.

Hexagon bolts Grade C: To AS 1111.1.

Nuts

Metric hexagon nuts: To AS 1112.

Washers

Plain washers: To AS 1237.1.

Provide washers to the heads and nuts of bolts, the nuts of coach bolts and the heads of coach screws.

Screws

Coach screws: To AS/NZS 1393.

Hexagon screws Grades A and B: To AS 1110.2.

Hexagon screws: Grade C To AS 1111.2.

Self-drilling screws: To AS 3566.1 and AS 3566.2.

Self-tapping screws: To AS/NZS 4402 to AS/NZS 4410 inclusive as appropriate to type.

Corrosion resistance table – low corrosivity category

Situation[1]	Self drilling screws to AS 3566.2 Class	Threaded fasteners and anchors		Powder actuated fasteners	
		Material	Minimum local metallic coating thickness (μm)	Material grade	Minimum local metallic coating thickness (μm)
Internal	1	Electro-plated zinc	4	Electro-plated zinc	4
External	3	Electro-plated zinc or Hot-dip galvan-ised	30	Stainless steel 316	

[1] Situation:
- Internal: Includes building fabric protected from moisture by vapour barriers, sarking and building wraps.
- External: Includes external leaf and air spaces behind single skin brickwork or blockwork walls.

Corrosion resistance table – medium corrosivity category

Situation[1]	Self drilling screws to AS 3566.2 Class	Threaded fasteners and anchors		Powder actuated fasteners	
		Material	Minimum local metallic coating thickness (μm)	Material grade	Minimum local metallic coating thickness (μm)
Internal	2	Electro-plated zinc	12	Electro-plated zinc	12
External	4	Hot-dip galvan-ised	50	Stainless steel 316	

[1] Situation:
- Internal: Includes building fabric protected from moisture by vapour barriers, sarking and building wraps.
- External: Includes external leaf and air spaces behind single skin brickwork or blockwork walls.

Finishes

Electroplating:

- Metric coarse thread: To AS 1897.
- Imperial thread: To AS 4397.

Galvanising:

- Metric coarse threaded fasteners: To AS 1214.
- Other fasteners: To AS/NZS 4680.

Mild steel fasteners: Galvanise if:

- Embedded in masonry.
- In external timbers.
- In contact with chemically treated timber, other than CCA treated timber.

5 WALL CHASING

Holes and chases

General: If holes and chases are required in masonry walls, provide proposals to demonstrate that the structural integrity of the wall is maintained. Do not chase walls nominated as fire rated or acoustic. Parallel chases or recesses on opposite faces of a wall shall not be closer than 600 mm to each other.

6 METALS AND PREFINISHES

Standards

Electrogalvanising ferrous hollow and open coated steel sections: To AS 4750.

Hot dip galvanising (zinc) coated steel:

- Ferrous open sections by an in-line process: To AS/NZS 4791.
- Ferrous hollow sections by a continuous or specialised process: To AS/NZS 4792.

Metallic-coated steel sheet: To AS 1397.

- Thickness: Metal thicknesses specified are base metal thicknesses.

Steel wire: To AS/NZS 4534.

Durability

General: Provide metals with inherent durability appropriate to the conditions of use or proprietary metallic and/or organic coatings of equivalent durability.

Minimum external requirements: To the **Stainless and coated steel table**.

Internal engineer designed steel members: Remove mill scale, rust, moisture and oil. Coat with a zinc phosphate primer to manufacturer's instructions.

Stainless and coated steel table

Situation	Heavy steel members including lintels more than 3.2 mm thick	Light steel framing, connectors and accessories less than 3.2 mm thick	Steel cladding, lining, trims and flashings
External (Includes external leaf and air spaces behind single skin brickwork walls.)	Galvanise after fabrication 600g/m^2	Galvanise after fabrication 600 g/m^2 Galvanised wire 470 g/m^2	Metallic-coated sheet AZ150
Internal (Includes building fabric protected from moisture by vapour barriers, sarking and building wraps.)	Galvanise after fabrication 300g/m^2	Galvanise after fabrication 300 g/m^2 Galvanised wire 300 g/m^2 Metallic-coated sheet Z275/AZ150	Metallic-coated sheet AZ150

Finishing

Visible joints: Finish visible joints made by welding, brazing or soldering using methods appropriate to the class of work (including grinding or buffing) before further treatment such as painting, galvanising or electroplating. Ensure self-finished metals are without surface colour variations after jointing.

Welding

Aluminium: To AS 1665.

Stainless steel: To AS/NZS 1554.6.

Steel: To AS/NZS 1554.1.

Preparation

General: Before applying decorative or protective prefinishes to metal components, complete welding, cutting, drilling and other fabrication, and prepare the surface using a suitable method.

Standard: To AS 1627.

Priming steel surfaces: If site painting is specified to otherwise uncoated mild steel or similar surfaces:

- Prime after fabrication and before delivery to the works.
- After installation, repair damaged priming and complete the coverage to unprimed surfaces.

Finishing generally
Standard: To APAS applicable to the substrate, coat and finish, and method of application.

Powder coating
Architectural applications to aluminium and aluminium alloy substrates: AS 3715.

Architectural applications to substrates other than aluminium: AS/NZS 4506.

Prepainted metal products
Standard: To AS/NZS 2728.

Completion
Damage: If prefinishes are damaged, including damage caused by unauthorised site cutting or drilling, remove and replace the damaged item.

Repair: If a repair is required to metallic coated sheet or electrogalvanised or inline galvanised steel products, clean the affected area and apply a two-pack organic primer to AS/NZS 3750.9 or APAS-2916.

7 TIMBER FINISHES AND TREATMENT

Moisture content
Milled products: Make from timbers seasoned:

- To within 3% of the equilibrium moisture content appropriate to the timber and its intended conditions of use.
- To a moisture content of 10 – 15%.
- With no more than 3% difference between any 2 pieces in any one group.

Protection: Protect timber and timber products stored on site from moisture and weather. For milled, prefinished, prefabricated and similar elements which are protected in the final structure, provide temporary weather protection until the permanent covering is in place.

Unseasoned timber
If unseasoned timber is provided, or variation in moisture content is likely, make allowance for shrinkage, swelling and differential movement.

Durability
General: Provide timbers with natural durability appropriate to the conditions of use or preservative- treated timbers of equivalent durability.

Minimum requirement: To the **Natural and treated timber durability table**.

- Natural durability class of heartwood: To AS 5604.
- Preservative treatment: To the AS 1604 series.

Natural and treated timber durability table

Exposure	Natural timber	Treated timber	Remarks
	Required durability class to AS 5604	Required hazard class to AS 1604 series	
Inside, above ground. Completely protected from the weather. Well ventilated	Class 4	H1	Treated timber resistant to lyctids. Untreated timber must be protected from termites
Inside, above ground. Protected from wetting with nil leaching. Well ventilated	Class 3	H2	Treated timber resistant to borers and termites. Untreated timber must be protected with a finish
Above ground, exposed to weather. Periodic moderate wetting and leaching	Class 2	H3	Treated timber resistant to borers, termites and moderate decay. Applicable to weatherboards, fascias, framing and decking
In-ground	Class 1	H4 (Severe wetting and leaching)	Treated timber resistant to borers, termites and severe decay. Applicable to landscaping timbers

Lyctus susceptible timbers
General: Do not provide timbers containing Lyctus susceptible sapwood.

Preservative treatment
Glued laminated timber products: To AS/NZS 1604.5.

- Hazard classification: To Table A1.

Laminated veneer lumber (LVL): To AS/NZS 1604.4.

- Hazard classification. To Table A1.

Plywood: To AS/NZS 1604.3.

- Hazard classification: To Table A1.

Reconstituted wood-based products: To AS/NZS 1604.2.

- Hazard classification: To Table A1.

Sawn and round timber: To AS 1604.1.

- Hazard classification: To Table D1.

Ploughing
General: Back plough boards liable to warp (e.g. if exposed externally on one face). Make the width, depth and distribution of ploughs appropriate to the dimensions of the board and degree of exposure.

Painting
Edges: Chamfer edges of work to receive paint or similar coatings.

Priming: For woodwork to be painted, prime hidden surfaces before assembly.

QUALITY

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Preliminaries* for risk management and safety management.

Project inspection and test plan

General: Prepare a project inspection and test plan (ITP) complete with associated checklists. Show mandatory "Hold" and "Witness" points requiring attendance by the Principal's Representative, by the Contractor, by the PCA and by Network Utility Operators and/or by statutory authorities. Include "Hold" and "Witness" points considered necessary for internal verification of work to be carried out directly by the Contractor and subcontractors.

Submission: Submit for information.

Notice

Give sufficient notice so that designated inspections, tests and reviews may be observed.

Minimum notice:

- Site tests: 5 working days.
- Inspections: 5 working days.
- Review of submissions: 10 working days after receipt.

Certifications generally

Timing: Submit test reports and compliance certification within 5 working days of test.

Certificate of compliance: If a certificate of compliance is acceptable as an alternative to testing a manufactured material, component or installation, submit the manufacturer's certificate together with the results of recent tests undertaken by the manufacturer, showing compliance with test criteria.

2 INSPECTION

Notice

Hold points: If notice of inspection is to be given in respect of parts of the works, do not conceal those parts without approval.

Witness points: If notice of inspection is required in respect of parts of the works, advise if and when those parts are to be concealed.

3 TESTS

Notice

Hold points: If notice of testing is to be given in respect of parts of the works, do not test those parts without approval.

Witness points: If notice of testing is required in respect of parts of the works, advise if, when and how those parts are to be tested.

Testing authorities

Have tests carried out by authorities accredited by NATA to test in the relevant field, or such other testing authority as may be agreed. Cooperate as required with testing authorities by providing ready access to those area(s) of the site required for testing, access to materials, components and installations, and by providing assistance with testing.

Reports

Submit copies of test reports, including certificates for type tests, showing the observations and results of tests and conformance or non-conformance with requirements.

4 SAMPLES

Timing

General: Submit samples in a timely manner, to suit the construction program. Provide assistance to any testing authority with the taking of samples.

Delays: Coordinate submission of samples. Do not cause delays by making late submissions or submitting inadequate samples.

Approval

General: Do not commence work affected by samples until the samples have been approved. Submit further samples as necessary to achieve compliance.

Criteria

Match approved samples throughout the works.

5 SUBMISSIONS

Design

General: If part or all of a system, component or installation is to be designed by the Contractor, when required submit documents showing the layout and details of the system, component or installation.

Variation documents: If it is proposed to change the system, component or installation from that shown on the contract documents, or if changes are required by statutory authorities, submit variation documents showing the proposed changes.

Checking: Ensure designed system, component or installation meets the dimensional, technical and performance requirements of the works before proceeding to fabrication and/or manufacture, and incorporation in the works.

Materials and components

System and product data: For proprietary items, submit the manufacturer's system and product data.

System and product certification: If systems and products must comply with related certification schemes, submit evidence of compliance.

Timing

General: Submit documents in a timely manner, to suit the construction program.

Delays: Coordinate submissions with the progress of the Works. Do not cause delays by making late or inadequate submissions.

Notice

Submission points: If a submission is required for a part of the works, do not commence work on the part until the submission is endorsed that the work may proceed.

Authorities

Authorities' approvals: Where required, submit documents showing approval by the authorities whose requirements apply to the work.

Contractor-supplied documents

Number of copies: 2

SITE PREPARATION

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for the soil erosion and sediment control, and waste management.
- *Quality* for inspection and testing of materials and work.
- *Site stormwater drainage* for pits.
- *Hydraulic installations* for buried hydraulic services.
- *Electrical installations* for buried electrical services and equipment.
- *Fences and external walls* for fencing generally.
- *Landscaping* for treatment of soft surfaces.
- *Paving* for trafficable pavements and footpaths.

Standard

Groundworks for slabs and footings: To AS 2870.

Interpretation

Bad ground: Ground unsuitable for the work, including fill liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances and ground which is, or becomes unavoidably soft, wet or unstable.

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.

Formation: The trimmed or prepared portion of the subgrade on which the footing, slab or pavement is constructed.

Immediate notice

If rock or bad ground is encountered, advise immediately.

2 DEMOLITION

Standard

Demolition: To AS 2601.

Demolished materials classes

Ownership and implementation: To the **Demolished materials classes table.**

Demolished materials classes table

Class	Requirement	Ownership
Salvaged items for re-use in the works	Recover without damage items identified in the **Demolished materials schedule**	Principal
Salvaged items for disposal	Recover without damage items identified in the **Demolished materials schedule** and store in designated position for re-use elsewhere	Principal
Demolished for removal	Remove from the site demolished materials identified in the **Demolished materials schedule**. Transit: Prevent spillage of demolished materials in transit	Contractor

Demolished materials

Except for materials to be salvaged and retained for re-use in the works, take possession of demolished materials and remove them from the site. Do not burn or bury demolished materials on the site.

Hazardous materials

Give notice immediately unidentified hazardous materials or conditions are found, including the following:

- Asbestos or material containing asbestos.
- Tanks or other containers which have been used for storage of explosive, inflammable, toxic, infective or contaminated substances.

Asbestos removal

Method: Use wet removal methods recommended in the Code of Practice for the Removal of Asbestos (NOHSC: 2002), including Part 4 for insulation and Part 9 for asbestos cement.

Temporary support

General: Provide support:

- To adjacent structures where necessary, sufficient to prevent damage resulting from the works.
- For sections of existing buildings which are to be altered and which rely for support on work to be demolished.

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.

Security

If walls or roofs are opened for alterations or additions, provide security against unauthorised entry.

3 TREES TO BE RETAINED

Existing trees, plants and shrubs

Trees, plants and shrubs to be retained: Any mature trees with girth exceeding 240 mm at a height of 900 mm.

Trees, plants and shrubs to be removed: All trees, plants and shrubs within 6.0 m of eaves line unless marked to be retained.

Marking

Mark trees which are required to be retained using suitable non-injurious, easily visible and removable means of identification. Remove the identification on completion.

Protection

Protection: Protect from damage trees which are required to be retained. Provide timber armouring to trunk or enclosing mesh fencing supported on star pickets.

Site clearing: Do not remove soil from the area within the dripline of the trees and keep this area free of construction material and debris.

Excavation

Excavating near trees required to be retained: Use hand methods to locate, expose and cleanly remove the roots on the line of excavation. Open up excavations under tree canopies for as short a period as possible.

4 PROTECTION FROM STORMWATER

Dewatering

Keep the site free of water and prevent water flow over new work.

5 SITE CLEARING

Extent

Limit clearing to the areas to be occupied by building structures including paving, excavation, filling regrading or landscaping, or by temporary works including site sheds and work areas.

Clearing operations

General: Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, trees noted for removal, timber, stumps, and rubble. Remove grass to a depth just sufficient to include the root zone.

Old works: Remove old works, including slabs, foundations, pavings, drains and manholes identifiable from the Drawings and/or found on the surface.

Grubbing

Removal: Grub out or grind stumps and roots over 75 mm diameter to a minimum depth of 500 mm below formation under construction, and to 300 mm below the finished surface in unpaved areas.

Filling: Fill any void under:

- Construction: With Select fill.
- Unpaved areas: With General fill.

Removal of topsoil

General: Remove the topsoil layer of the natural ground which contains substantial organic matter over the areas to be occupied by building structures including floor slabs, paving, excavation, filling regrading or landscaping, or by temporary works including site sheds and work areas.

Maximum depth: 100 mm.

Topsoil stockpiles

Stockpile site topsoil required for re-use. Protect stockpiles from contamination by other excavated material, weeds and building debris.

Mulch

Seed-free aerial vegetative matter: Where selected for re-use, put through a chipper. Reduce to pieces not larger than 75 x 50 x 15 mm and stockpile for re-use as mulch.

Surplus material

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

6 EXCAVATION GENERALLY

Standard

Excavation and filling generally: AS 3798.

Junctions with existing pavements

Where excavation involves breaking through a hard surface, such as bitumen seal and/or associated concrete elements, sawcut to full depth to form a neat, straight perpendicular edge. Ensure cut edges do not break away.

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.

Excavation

General: Excavate in all ground found to give the levels and profiles required for construction, paving, regrading or landscaping, site services, or for temporary works including site sheds and work areas. Allow for compaction or settlement.

Footings: Excavate for footings to the required sizes and depths.

Manholes: Excavate in trenches and pits to the required sizes and depths.

Unidentified services: Seek instructions.

Bearing surfaces

General: Provide even plane bearing surfaces for loadbearing elements. Step for level changes.

Footings: Confirm that bearing capacity is at least 150 kPa at 1,500 mm depth.

Reinstatement

If excavation exceeds the required depth, or deteriorates, reinstate to the correct depth, level and bearing value.

Filling: Fill any void under:

- Construction: With Select fill.
- Unpaved areas: With General fill.

Proof rolling

Extent: Proof roll excavations for non-spanning slabs on ground, vehicular pavements and filling to determine the extent of any bad ground. Roll a minimum of 5 times.

- Smooth steel wheeled roller (roller diameter 1200 mm) used without vibration having a minimum applied load intensity of 5 t/m width of wheels or drums being considered with a minimum mass of 8.0 t.
- Pneumatic tyred roller having a minimum applied load of 3 t/tyre with tyres inflated to 550 kPa.
- Highway truck with rear axle or axles loaded to no less than 8 t each with tyres inflated to 550 kPa.

Failed areas: Rectify by excavation and backfilling with approved material, and retest areas where excessive deflection is detected. Where unstable areas exceed 20% of the area being test rolled, rip, re-compact and retest the whole area tested.

Proof roll excavated surface to achieve a dry density ratio (standard compaction) of between 98% and 102%. Adjust the moisture content during compaction to within the range of ±2% of the standard optimum moisture content to achieve the required density.

7 FORMATION PREPARATION

Trimming

Trim subgrade to give correct levels and profiles within specified tolerances as the basis for construction of the works.

Surface preparation

Before forming load-bearing elements, slabs or paving, or placing fill, remove loose material, debris and organic matter remaining on the surface.

8 FILLING

Fill types

Fill material generally: Inorganic, non-perishable material.

General fill: Imported well graded, durable, stable material, maximum particle size 75 mm, plasticity index ≤ 55% capable of compaction to specified densities.

Select fill (Engineered fill): Granular material complying with the following:

- Maximum particle size: 50 mm.
- Proportion exceeding particle size of 50 mm: 75% minimum.
- Proportion passing 0.075 mm sieve: 25% maximum.
- Plasticity index: ≥ 2%, ≤ 15%.
- Linear shrinkage ≤ 10%.

Processed granular material: Graded crushed rock or gravel conforming to RTA Specification No 3051 or AS 2758.1.

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.
- Dry builders waste including bricks, plaster, metal, plastic and timber.

- Industrial waste, putrescible materials or other deleterious material.
- Fill containing boulders.
- Clays of high plasticity.

Fill sources

Provide fill imported on to the site from approved sources.

Fill schedule

Location	Fill type	Fill depth	Maximum layer thickness (loose) (mm)
Lot fill	General	Full depth	200
Benches supporting footings and non-spanning slab on ground	Select	Full depth	150
Services trenches under structures	Select	Full depth over surround	150
Services trenches not under structures	Select to 300 mm over crown then General	Full depth over surround	150

Placing fill

Generally: Place fill in near horizontal layers of uniform thickness deposited systematically across the fill area to the designated dimensions, levels, grades, and cross sections so that the surface is always self draining. Compact each layer to achieve the required density.

Mix: Place fill in a uniform mixture.

Maximum rock and lump size in layer after compaction: 1/2 compacted layer thickness.

Previous fill: Before placing subsequent fill layers, ensure that previously accepted layers still conform to requirements, including moisture content.

Edges: At junctions of fill and existing surfaces, box out. Do not feather edges.

Placing at structures

General: Place and compact fill in layers simultaneously on both sides of structures to avoid differential loading. Where necessary, limit the size of compaction equipment or compact by hand. 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

Adjust the moisture content of fill during compaction within the range -2% to +2% of standard 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. Ensure the moisture distribution is uniform.

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
Site generally		
- Lot fill	95 std	65
Fills to support 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

Quality

Compaction (density): Test bench fill for compliance.

Standard: To AS 3798, Level 1.

Geotechnical testing authority: Use an independent NATA registered soils testing laboratory approved for this work.

Compaction control tests: To AS 1289.5.4.1 or AS 1289.5.7.1.

Frequency for fill area < 500 m^2: At least:

- 1 test per layer or 200 mm thickness per 500 m^2; or
- 1 test per 100 m^3 distributed evenly throughout full depth and area; or
- 3 tests per visit, whichever requires the most tests.

Frequency in confined spaces: 1 test per 2 layers per 50 m^2.

Written notification of compaction test results: To Principal's Representative.

Corrective action: Rework and retest areas which do not achieve the required density until that density is achieved.

Grading

General: Finish final surface to the required level, grade and shape within the following tolerances:

- Under slabs and loadbearing elements: +0, -25 mm.
- Pavement subgrades; + 0, - 40 mm.
- Other ground surfaces: ±50 mm, provided the area remains free draining and matches adjacent construction where required. Smoothness as normally produced by a scraper blade.

Drainage: Grade final surface to even falls to drain away from buildings without ponding.

9 BUILDING BENCH

Working platform

Extent: Fill uniformly sub-floor area and perimeter for a distance of 2,000 mm beyond eaves line.

Material: Select fill, compacted.

Height: To 100 mm above highest point of adjacent natural surface.

Minimum depth: 200 mm.

Grading: Grade bench to drain surface water away from sub-floor area without ponding.

10 PILING

Standard

Piling: To AS 2159.

Ground conditions

Refer to Geotechnical Engineer's report(s).

11 SERVICE TRENCHES

Definitions

General: For the purposes of this work subsection the definitions given below apply:

- Pipe surround: Includes pipe overlay, pipe side support, side zone and haunch zone.

Shoring and lining systems

Steel shoring and trench lining systems: To AS 4744.1.

Boring

If under-road boring is required in lieu of trenches, engage a suitably qualified subcontractor to do the work.

Excavation

Excavate for underground services, to required lines, levels and grades. Generally, make trenches straight between manholes, inspection points and junctions, with vertical sides and uniform grades.

Obstructions: Clear trenches of sharp projections. Cut back roots encountered in trenches to at least 600 mm clear of services. Remove other obstructions including stumps which may interfere with services or bedding.

Chases: If necessary, form chases for the efficient jointing of pipes and to prevent projections such as sockets and flanges from bearing on the trench bottom.

Dewatering

General: Keep trenches free of water. Place bedding material, services and backfilling on firm ground free of surface water.

Cover

General: Lay pipes at sufficient depth to achieve cover to crown specified in **Trench cover schedule**.

Trench cover schedule

Location	Minimum cover (mm)
Public areas	
- unpaved	500
- paving or road surface	500
Private areas	
- unpaved	225
- paving subject to light traffic	300

Trench widths

Keep trench widths to the minimum consistent with the laying and bedding of the relevant service and construction of manholes.

Trench width schedule

Pipe diameter (mm)	Maximum width (mm)
50 – 100	750
150 – 200	850

Bedding

Bedding: Provide continuous 9.5 mm maximum size graded coarse sand bedding at least 75 mm thick after compaction to services. Grade bedding evenly to the gradient of the pipeline. Continue bedding to at least 0.3D (D = pipe outside diameter) above pipe obvert.

Placing surround: Place the material in the pipe surround in layers ≤ 100 mm loose thickness, and compact without damaging or displacing service.

Compaction:

- 98% standard compaction under all buildings and civil works.
- 85% standard compaction under landscaped areas except within the zone of influence of buildings and civil works.

Compaction test frequency: 1 test per layer per 40 m length of trench.

Marking services

Underground marking tape: To AS/NZS 2648.1.

Buried piping: Lay detectable plastic warning tape printed with the name of the service, 300 mm above buried piping, for the full length of the piping.

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 backfill in layers ≤ 150 mm thick and compact to the density which applies to the location of the trenches to minimise settlement and so pipes are buttressed by trench walls.

Backfill material: As **Fill schedule**.

- Next to services: Do not place any particles greater in size than 25 mm within 150 mm of service.
- Under roads and paved areas to underside of pavement and within 4 m of structures: Coarse sand or fine crushed rock.
- In reactive clay sites classified M, H or E to AS 2870: Impervious material as cut-off at the external face of footings and non-load bearing slabs on ground.

Reinstatement

Reinstate existing surfaces removed or disturbed by trench excavations to match existing and adjacent work.

12 SITE SUBSOIL DRAINAGE

Materials

Pipe and fittings: To AS 2439.1.

- Proprietary item: DN100 Class 400 Vinidex Draincoil with filter sock.
- Joints: 'Push on, clip over' type.

Geotextile fabric: To AS 3705.

- Proprietary item: Geofabrics Australasia Bidim A12.
- Material: Non-woven thermally bonded geofabric of minimum weight 100 g/m^2.

Bedding

Standard: To AS 3725 and AS 3725 Supplement 1.

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.

Trench width: ≥ 450 mm.

Minimum grade: 0.5%.

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 subgrade 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.

Trench lining

General: Line trench with geofabric.

Jointing: Overlap a minimum of 500 mm at transverse joints and the full trench width at the top.

Filter material

Material: Angular, clean, hard and durable crushed rock.

Particle size: 14 mm single size.

Completion

Cleaning: Clean and flush the whole installation.

SITE STORMWATER DRAINAGE

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings and durability, and fasteners.
- *Quality* for inspection and testing of systems, and submissions.
- *Site preparation* for service trenches and subsoil drainage.
- *Painting* for applied finishes.

2 SITE STORMWATER DRAINAGE

Definitions

General: For the purposes of this work subsection the definitions given below apply:

- Pipe surround: Includes pipe overlay, pipe side support, side zone and haunch zone.

Standard

Drainage: To AS/NZS 3500.3.

Materials

Joints:

- Solvent cement and priming fluid: To AS/NZS 3879.

Pipe and fittings:

- Fibre reinforced cement (FRC): To AS 4139.
  - . < 450 mm diameter: To be pre-socketed at one end with a factory fitted *Adcol* coupling.
- Glass-reinforced polyester (GRP): To AS 3571.
- Manhole covers and frames: To AS 1830 and AS 1831.
- Polyvinyl chloride (PVC): To AS/NZS 1254, AS/NZS 1260, AS 1273.
- Precast concrete: To AS 4058.
- Rubber ring joints/elastomeric seals: To AS 1646, Parts 1, 2 and 3.

Bedding

Standard: In accordance with AS 3725 and AS 3725 Supplement 1.

Anchor blocks

General: If necessary to restrain lateral and axial movement of the stormwater pipes provide anchor blocks at junctions and changes of grade or direction.

Pits

In-situ concrete: Grade N20 to AS 1379, 100 mm thick, reinforced with F82 fabric. Finish exposed surfaces with a smooth, seamless finish, using steel trowelled render or concrete cast in steel forms. Cove or splay internal corners.

Precast concrete: Proprietary modular precast concrete pit, suitable for stormwater application, cast with integral base slab, knockouts and rebated seating for interlocking risers.

- Proprietary item: Beresford Concrete Products drycast pits.

Metal access covers and grates: To AS 3996.

- Galvanised steel grates: Provide with hinges.

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.

Step irons: Where depth of pit exceeds 1,200 mm, install step irons at a vertical spacing of 300mm in one wall of the pit, for the full depth.

Installation: Grade floor to a point on one side and drain to the stormwater drainage system. Carry the pit walls up to required finished level. Cast in the pit cover frame flush with the top. Trowel the top smooth.

Pre-completion tests

General: Before backfilling or concealing, carry out the following tests:

- Site stormwater drains and main internal drains: Air or water pressure test to AS/NZS 3500.3 Section 10.

Leaks: If leaks are found, rectify and re-test.

Completion

Cleaning: Clean and flush the whole installation.

TERMITE MANAGEMENT

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Quality* for inspection and testing of materials and work.
- *Site preparation* for formation preparation.
- *Concrete construction* for concrete work and concrete finishes generally, and polymeric film underlay.

2 TERMITE MANAGEMENT

General

Standard: To AS 3660.1.

Termite barrier notice: Provide a durable notice permanently fixed in a prominent location to BCA Volume 2 clause 3.1.3.2(b).

Completion inspection: At the end of the defects liability period, inspect the termite control systems and submit a report on their efficacy and status.

CONCRETE CONSTRUCTION

1 GENERAL

Cross references

Requirement: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements* for fixings durability.
- *Quality* for inspection and testing of materials and work.
- *Floor coatings and coverings* for substrate tolerances.
- *Hydraulic installations* for hydraulic services.
- *Electrical installations* for electrical services.
- *Paving* for pavements generally and associated elements.

Standards

Specification and supply of concrete: AS 1379.

Concrete structures generally: To AS 3600.

Formwork design, construction and finishes: To AS 3610.

Steel reinforcing materials: To AS/NZS 4671.

- Ductility grade: Class N.

Concrete kerbs and channels: To AS 2876.

Coloured concrete: To AS 3610.

Vapour barriers and damp-proofing membranes including polymeric film underlay: To AS 2870.

Construction of footings: To AS 2870.

Cores, fixings and embedded items

Adjoining elements: For adjoining elements to be fixed to or supported on concrete structures and members, provide for the required fixings.

Protection: Galvanise inserts, anchor bolts and embedded fixings.

2 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 and deflections resulting from temperature changes and concrete shrinkage and creep.

Tie-bolts: Position formwork tie-bolts in regular pattern.

Cores, fixings and embedded items: Fix cores, fixings and embedded items to prevent movement during concrete placing. In locating cores, fixings and embedded items, reposition but do not cut reinforcement, and maintain cover to reinforcement.

Isolation: Isolate embedded items so that water cannot track to concrete providing minimum cover to reinforcement.

Alignment: Align and support formwork, and seal panel joints, so that steps in finished exposed concrete surfaces do not occur.

Lost formwork: Do not use timber formwork or formwork containing chlorides and do not use formwork which may impair the structural performance of concrete members in locations where formwork cannot be recovered.

Void formers: Use cardboard or fibreboard void formers, collapsible on absorption of moisture.

Visually important surfaces

Exposed visible faces of concrete: Set out the formwork to give a regular arrangement of joints in the formed surface. Form 45° bevels, 25 mm width on the face of corners and angles.

Tolerance

Surfaces generally (from a 3 m straightedge placed on horizontal, vertical or sloping surfaces required to be straight):

- Visible: Smooth to a 3 mm tolerance.
- Not visible: To a 6 mm tolerance.

Linear elements (kerbs, strips)

- Maximum deviation from a 3 m straightedge placed on horizontal, vertical, or sloping surfaces required to be straight: 6 mm.

Trench edges

Form up edges of trench excavations for structural elements to prevent entry of debris during concreting.

Paving

Form edges of concrete paving.

Preparation

Cleaning: Before placing concrete, remove free water, dust, debris and stains from the forms and the formed space.

Stripping of formwork

General: Remove formwork including formwork in concealed locations, but excepting lost formwork.

Removable bolts: Remove the bolts without causing damage to the concrete.

Stripping times

Leave formwork in place after pouring concrete for the following periods:

- General: To AS 3600 where it is more stringent than AS 3610.
- Vertical forms: Remove formwork that does not support weight of concrete from faces of beams not less than a cumulative 24 hours after placing concrete during which the ambient outdoor temperature has been greater than 10°C.

3 REINFORCEMENT

Standards

Product certification: Use reinforcement complying with the requirements of the Australian Certification Authority for Reinforcing Steel (ACRS) certification scheme.

Condition

Surface condition: Free of loose mill scale, rust, oil, grease, mud or other material which would reduce the bond between reinforcement and concrete.

Tie wire

General: Annealed iron 1.25 mm diameter (minimum).

External applications: Galvanised.

Bending

General: Bend and straighten reinforcement without damaging it.

Support types

General: Provide purpose-made metal plastic tipped or plastic supports, adequate to withstand construction and traffic loads, and in the form of chairs and spacers.

Cover: Size to achieve specified reinforcement cover.

Support spacing

General: Provide supports in adequate numbers and spacing to maintain reinforcement in correct position while placing concrete.

Minimum spacing:

- Bars: ≤ 60 diameter of bar supported.
- Fabric: ≤ 750 mm.

Supports against membranes

General: Prevent damage to waterproofing membranes.

Fixing

General: Secure reinforcement against displacement by tying at intersections with either wire ties or by clips. Bend the ends of wire ties away from nearby faces of forms so that the ties do not project into the concrete cover.

Beams: Tie stirrups to bars in each corner of each stirrup. Fix other longitudinal bars to stirrups at 1 m maximum intervals.

Contraction and expansion joints: Stop reinforcement 50 mm from joint face.

4 POLYMERIC FILM UNDERLAY

Location

General: Provide under slabs on ground including under integral ground beams and footings.

Material

Thickness: 200μm.

Base preparation

Blind formation with sufficient sand to create a smooth surface free from hard projections and, in any case, not less than 50 mm. Wet the sand just before laying the underlay.

Installation

Lay over the base course, lap joints at least 200 mm. Face the laps away from the direction of concrete pour. Tape laps. Take the underlay up vertical face and fix to formwork at the top by tape sealing. Patch or seal punctures or tears before pouring concrete. Cut back as required after concrete has gained strength and forms have been removed.

5 CONCRETE

Pre-mixed supply

Standard: To AS 1379 by the batch production process.

Addition of water: Do not add water at the site after starting discharge.

Delivery: Deliver in agitator trucks.

Transport: Mode must prevent segregation, loss of material and contamination, and must not adversely affect strength, placing or compaction.

Maximum slump: 80 mm.

Chemical admixtures: Free of chlorides, fluorides and nitrates.

Concrete performance

Drying shrinkage (maximum including tolerances): 0.65 mm for concrete up to and including strength grade 32.

Placement: Mix must work readily into corners and angles, and around reinforcement, without segregation or liberating excess free water to the surface, producing sound concrete, with minimal plastic settlement and shrinkage cracking.

Elapsed delivery time

General: Ensure that the elapsed time between the wetting of the mix and the discharge of the mix at the site is in conformance with the **Elapsed delivery time table**. Do not discharge at ambient temperature below 10°C or above 30°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

Concrete placing

General: Use placing methods which:

- Minimise plastic settlement and shrinkage cracking.
- Avoid segregation.
- Avoid loss of materials.
- Maintain a plastic concrete edge between formed extents or construction joints.

Resources: Provide adequate resources, and arrange concrete deliveries, to avoid advancing faces of freshly placed concrete from premature stiffening.

Depth: If concrete is deeper than 300 mm, place it in layers so that each succeeding layer is blended into the preceding one by the compaction process before setting.

Face: Place concrete uniformly over the width of slabs and paving so that the face is vertical and normal to the direction of placing.

Temperature: Place concrete when internal temperature of placed concrete can be maintained within the range ≥ 10°C, ≤ 32°C. Do not place concrete when shaded air temperature is less than 4°C.

Hot weather placing: If placing concrete in hot weather take precautions to avoid premature stiffening of the mix and reduce water absorption and evaporation losses.

Severe weather: If ambient shade temperature > 38°C, do not mix concrete.

Compaction

Vibrate concrete using immersion and screed vibrators to remove entrapped air and to fully compact the mix, but avoid over-vibration that may cause segregation.

Do not disturb reinforcement.

Formwork removal

General: Remove formwork when concrete has gained sufficient strength to support self-weight and any construction loads to be applied.

Damage: Do not damage adjacent concrete surface through premature removal of formwork.

Curing: If forms are stripped when concrete is at an age less than the minimum curing period, commence curing exposed faces as soon as the stripping is completed.

6 CONCRETE FINISHES

Tolerance

Deviation from a 3 m straight edge placed anywhere on the surface in any direction:

Formed finish

Smooth-rubbed finish: Remove 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.

- Visible: Smooth to a 3 mm tolerance.
- Not visible: To a 6 mm tolerance.

Unformed finish

Screeding: Strike off, consolidate and level surfaces to finished levels. Hand float in locations inaccessible to machine float.

Unformed surfaces:

- Generally: Machine floated finish.
- Areas for tiling: Screeded finish.
- Broom finish: After floating, broom to produce an even textured slip-resistant surface.

Unformed surfaces tolerance schedule

Concrete element or surface finish	Surface tolerance
Machine floated	Maximum deviation of 3 mm
Screeded	Maximum deviation of 6 mm
Broom	Maximum deviation of 6 mm

Pattern paving: Use proprietary treatment producing integral coloured and patterned surface for in situ paving and hardstands.

7 CURING

Curing

Protection: Protect concrete from premature drying and from excessive hot, cold and/or windy conditions.

Method: Cure concrete by either of the following:

- Using a proprietary curing compound where the compound will not interfere with the final appearance or application of further finishes.
- Keeping exposed surfaces covered and moist for the following periods:
  - . In-ground footings and fully enclosed internal surfaces: 3 days provided f_{cav} ≥ 15 MPa.
  - . Exposed footings, beams and slabs: 7 days.

8 CORES AND EMBEDDED ITEMS

Structural integrity

General: Fix cores and embedded items to prevent movement during concrete placing. In locating cores, fixings and embedded items, reposition but do not cut reinforcement, and maintain cover to reinforcement.

Approval: Obtain approval to non-specified cores and embedded items.

Isolation: Isolate embedded items so that water cannot track to concrete providing minimum cover to reinforcement.

9 JOINTS

Tolerance

Stepping: Between adjacent elements within an area of pavement or paving, ≤5 mm.

Construction joints

Joint preparation: Roughen and clean the hardened concrete joint surface, remove loose or soft material, free water, foreign matter and laitance. Dampen joint surface using clean water and coat with neat cement slurry just before placing the fresh concrete. Avoid stepping across joint.

Contraction joints

Joint preparation: Form weakened plane joints to a width of 3 mm and a depth of between one quarter and one third of the depth of concrete. Withdraw the former during finishing and tool the joint to a 6 mm radius.

Contraction joints schedule

Element	Spacing (m)	Fabric
Paving	2.0	Unreinforced
Paving – light traffic	6.0	SL62
Paving – medium traffic	6.0	SL72
Kerb and edge strips	6.0	-

Expansion joints

General: Form the edge of the concrete placed first to provide a smooth vertical face. Fix the joint filler with waterproof adhesive. Finish visible jointing material neatly flush with adjoining surfaces.

Location: Paving, kerbs and at junctions with structures and associated elements.

Joint filler: Preformed bitumen impregnated fibreboard.

- Proprietary item: Ormonoid Jointex.
- Thickness: 12mm.

Joint filler: Preformed zipped polyethylene foam.

- Proprietary item: Ormonoid Abelflex.
- Thickness: 10mm.

Expansion joints schedule

Element	Joint construction	Spacing (m)
Paving	Undowelled with joint filler	6.0
Paving – light traffic	Undowelled with joint filler	12.0
Paving – medium traffic	Dowelled	12.0
Kerb and edge strips	Undowelled with joint filler	12.0

Dowels: Grade 250N, 16 mm dia x 500 mm long, with one half slip coated; either plastic shrink wrapped or bitumen coated.

- Proprietary item: Danley Expanda joint.

Joint arrises: Tool to 6 mm radius.

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.

TIMBER FRAME CONSTRUCTION

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements*, for timber durability and fasteners.
- *Quality* for inspection of materials and work, and submissions.
- *Termite management*, for termite control measures.
- *Concrete construction*, for concrete slab on ground.
- *Steel frame construction*, for steel wall and roof framing generally.
- *Masonry,* for damp-proof courses and flashings.
- *Doors and windows*, for door and window frames.
- *Painting*, for priming timber before fixing.

Standards

Timber framing and flooring: To AS 1684.4 or AS 1720.1.

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.

Finger jointed structural timber: To AS/NZS 1491.

Recognised product certification programs:

- Pine framing: Plantation Timber Certification.
- Finger jointed structural timber: Plantation Timber Certification.

Design standard

Loadings: To AS/NZS 1170.0 to .3.

Design: To AS 4055, Wind Classification N2 (design gust wind velocity (permissible stress) = 33 m/sec).

2 MATERIALS AND COMPONENTS

Structural timber

Natural durability ratings to AS 5604 Table A1 (minimum): Durability class 2, or preservative treated timber of equivalent durability.

Structural timber framing

Timber species or group: LOSP treated seasoned radiata, minimum F5 grade for load bearing work, F17 grade hardwood for lintels.

Structural plywood

Standard: To AS/NZS 2269.

- Bond: Type A.
- Grade: C face, D back.
- Stress grade: F11.

Structural particleboard

Standard: To AS/NZS 1860.1.

- Grade: Class 1.

Compressed fibre cement sheet

Standard: To AS/NZS 2908.2.

- Grade: Type A, Category 5.

Decking

Standard: To AS 1810, seasoned cypress pine.

- Location: Suspended verandahs.
- Durability: Class 2.

Glued-laminated structural timber
Standard: To AS/NZS 1328.1.

Laminated veneer lumber
Standard: To AS/NZS 4357.

Self-drilling screws
Corrosion resistance: Class 2 and 4 to AS 3566.2 Table 1 as appropriate to situation.

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

Bracing
Steel straps: Metallic-coated steel to AS 1397, minimum size 25 x 1 mm or 30 x 0.8 mm.

Galvanising
Galvanise mild steel components (including fasteners) to AS 1214 or AS/NZS 4680 as appropriate, if:

- Exposed to weather.
- In contact with chemically treated timber.

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: Galvanise after fabrication.

3 EXECUTION

Timber flooring
Storage: Deliver timber flooring to site in unbroken wrapping or containers and store so that its moisture content is not adversely affected. Do not store on the substrate until the moisture content of the background is suitable for the installation of the floor. Do not store in areas of wet plaster.

Substrate: Ensure support members are in full lengths without splicing.

Tolerances
Walls: Conform to the **Walls tolerances table**.

Walls tolerances table

Property	Tolerance criteria: Permitted deviation (mm)
Generally: Verticality in 2000 mm	4
Generally: Flatness[1] in 2000 mm	3
Features[2]: Verticality in 2000 mm	2
Features: Horizontality in 2000 mm	2

1. Flatness: Measured under a straightedge laid in any direction on a plane surface.

2. Features: Conspicuous horizontal or vertical lines including external corners, reveals, heads, sills.

Floors: Construct floors to a tolerance of 3 mm maximum deviation in 3 m measured under a straight edge placed anywhere on the surface in any direction.

4 CONSTRUCTION GENERALLY

General
Preservative treatment: If holes are drilled in treated timber, apply a saturation coating of preservative to the sides of the holes prior to inserting fixings.

CCA (copper chrome arsenic)-treated timber
Greasing: Before placing bolts in contact with CCA-treated timber, coat the shank of the bolt in grease or a bituminous coating.

Timber fasteners
Installation: Use fasteners that do not split or otherwise damage the timber.

Sheet flooring
Adhesive: Use a urethane elastomer adhesive in addition to nails as follows:

- Continuously supported flooring: 4 mm beads at 300 mm spacing at right angles to run of flooring.
- Intermittently supported flooring: 6 mm bead along each joist or batten.

Nailing: Ensure the boards are in contact with the joists at the time of nailing, particularly where boards are machined nailed.

Skew nail in a uniform pattern**.** If nails are to be less than 10 mm from ends of sheets or boards, pre-drill nail holes 0 – 1 mm undersize:

- Secret nailing: Do not use boards of more than 85 mm cover width, and use one nail or staple skewed at 45°. Do not cramp more than one board at a time.
- Sinking: Punch nails 3 mm below finished surfaces and fill the sinking flush with a material tinted to match the flooring which is compatible with the floor finish.
- Top nailing: For boards more than 65 mm cover width, use two nails skewed 10° in opposite directions. Do not cramp more than 800 mm width of boards at one time.

Installation: Lay the length of the sheets at right angles to the supports. Stagger the end joints and locate them centrally over joists. If panels are not tongue and grooved provide noggings or trimmer joists to support the edges.

Sheet flooring fixing centres: Maximum 300 mm on each support.

- Particleboard and plywood flooring: Fix sheeting to the supports with adhesive and nail.
- Fibre-cement flooring: Butt joint sheets using epoxy adhesive and strike smooth. Fix sheeting to the supports with adhesive and 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.

Flatness: Maximum deviation of the finished floor surface under a 3 m straight edge laid in any direction: 3 mm.

Membranes: If sheet flooring is the substrate for a wet area membrane, use stainless steel countersunk head screws.

Timber decking
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.

Arrises: Chamfered or rounded.

Finishing: Apply the first 2 coats all round before fixing.

5 WALL FRAMING

Structural framing
Structural certification: Submit independent design documentation including drawings, and certification from a professional structural engineer stating that the design has been carried out in accordance with stated project and AS/NZS 1684.4 requirements for the configurations and loadings applicable to these Works.

Shop drawings: Submit shop detail drawings.

- Pre-fabricated wall frames:
  - . On plan, the wall frame layout.
  - . On elevations, the arrangement of members, and the size and section type of each member.
  - . The method of assembly, connection, holding down and bracing.

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

General: Provide vermin barriers as follows:

- 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: Metallic 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 course

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 membrane 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, flashings, sarkings and waterproof membranes.

Flashings

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.

6 ROOF AND CEILING FRAMING

Wall plates

Fixing: Fix timber wall plates to masonry, with either straps or bolts.

Nailing plates

General: Where timber joists, rafters or purlins bear on or into steel members, provide 50 mm thick nailing plates bolted to the steel member at 500 mm maximum centres.

Beam framing

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.

Supports for water containers

General: Where a water container or heater is located in the roof space provide a support platform to AS/NZS 3500.4 clause 5.5.

Additional support

General: Provide a frame member behind every joint in fibre cement sheeting or lining.

7 TRUSSES

Structural framing

Structural certification: Submit independent design documentation including drawings, and certification from a professional structural engineer stating that the design has been carried out in accordance with stated project and AS/NZS 1684.4 requirements for the configurations and loadings applicable to these Works.

Shop drawings: Submit shop detail drawings.

- Roof trusses:
  - On plan, the truss layout.
  - On elevations, the arrangement of members (allowing for the accommodation of in-roof services) and the size and section type of each member.
  - The method of assembly, connection, holding down and bracing.

Supports for equipment

General: Where mechanical plant, solar panel array, water storage unit or heater is located in or on the roof structure provide support to AS/NZS 3500.4.

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.

Battens

General: Provide a proprietary system of preformed roof battens.

- Material: Preformed steel sections G550.
- Finish: AZ150.

Splicing: Arrange battens so that, on any rafter or truss, no more than 3 battens are spliced and no more than 2 splices are adjacent.

8 TIE-DOWNS

General

Fixing: Secure framing members to framing members abutting to resist uplift. Use proprietary fixings.

Bracing: Provide to:

- Walls: 25 x 1.0 mm Pryda Strap Brace in opposing diagonal directions to resist horizontal racking forces to walls. Fix at no greater than 9.0 m intervals directly to wall framing. Tension before final fixing to take load without distorting frame.
- Roofs: 25 x 1.0 mm Pryda Strap Brace. Tension before final fixing to take load without distorting roof members.

9 COMPLETION

Tightening

Tighten bolts, screws and other fixings so that joints and anchorages are secure at completion.

STEEL FRAME CONSTRUCTION

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements*, for steel coatings, durability and fasteners.
- *Quality* for inspection of materials and work, and submissions.
- *Termite management*, for termite control measures.
- *Concrete construction*, for concrete slab on ground.
- *Timber frame construction*, for timber framing generally and structural floor sheeting.
- *Masonry,* for damp-proof courses and flashings.
- *Doors and windows*, for door and window frames.
- *Painting*, for priming of steel before fixing, and repair of zinc-coated steel after cutting and welding.

Standards

Structural steelwork: To AS 4100.

Design, materials and protection: To AS/NZS 4600.

Design of domestic metal framing: To AS 3623.

Residential and low-rise steel framing: To NASH (National Association of Steel Housing) Standard.

Preparation of metal surfaces: To AS 1627.

Design standard

Loadings: To AS/NZS 1170.0 to .3.

Design: To AS 4055, Wind Classification N2 (design gust wind velocity (permissible stress) = 33 m/sec).

2 MATERIALS

Cold-formed steel framing

Cold-form sections from metallic-coated steel: To AS 1397.

Corrosion protection: To BCA Volume 2 clause 3.4.2.2.

Ferrous hollow sections

Coated ferrous hollow sections: To AS/NZS 4792 and AS 4750.

Steel grade (minimum) table

Type of steel	Grade
Universal beams and columns, parallel flange channels, large angles to AS/NZS 3679.1	300
Welded sections to AS/NZS 3679.2	300
Flat, small angles, taper flange beams and columns to AS/NZS 3679.1	250
Hollow sections to AS 1163:	
- Circular sections less than 165 mm nominal outside diameter	C250/C350
- Sections other than the above	C350/C450
Cold formed purlins and girts to AS 1397	G450 Z350

Self-drilling screws

Corrosion resistance: Class 2 and Class 4 to AS 3566.2 Table 1 as appropriate to situation.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

Galvanising generally

Galvanise mild steel components (including fasteners) to AS 1214 or AS/NZS 4680, as appropriate, if:

- Exposed to weather.
- In contact with chemically treated timber.

Galvanising structural steelwork

Galvanise structural steel components to AS/NZS 4680 where not fully encased in concrete:

- Coating mass: 600 g/m^2 with a minimum of 550 g/m^2.

3 COMPONENTS

Framing members

Cold-formed steel framing: Provide a proprietary system designed to AS 3623.

Integrated design: Position members to provide direct support to cladding, doors and windows, fixtures and fittings.

Structural steelwork including domestic steel framing

Structural certification: Submit independent design documentation including drawings, and certification from a professional structural engineer stating that the design has been carried out in accordance with stated project and AS/NZS 4600 requirements for the configurations and loadings applicable to these Works.

Shop drawings: Submit shop detail drawings.

- Pre-fabricated wall frames: Submit drawings showing:
  - . On plan, the wall frame layout.
  - . On elevations, the arrangement of members, and the size and section type of each member.
  - . The method of assembly, connection, holding down and bracing.
- Roof trusses: Submit drawings showing:
  - . On plan, the truss layout.
  - . On elevations, the arrangement of members (allowing for the accommodation of in-roof services) and the size and section type of each member.
  - . The method of assembly, connection, holding down and bracing.

Tolerances

Walls: Conform to the **Walls tolerances table**.

Walls tolerances table

Property	Tolerance criteria: Permitted deviation (mm)
Generally: Verticality in 2000 mm	4
Generally: Flatness[1] in 2000 mm	3
Features[2]: Verticality in 2000 mm	2
Features: Horizontality in 2000 mm	2
1. Flatness: Measured under a straightedge laid in any direction on a plane surface.	
2. Features: Conspicuous horizontal or vertical lines including external corners, reveals, heads, sills.	

Floors: Construct floors to a tolerance of 3 mm maximum deviation in 3 m measured under a straight edge placed anywhere on the surface in any direction.

4 CONSTRUCTION GENERALLY

Fabrication

Splicing: Provide members in single lengths.

Length: Cut members accurately to length so that they fit firmly against abutting members.

Service holes: Form holes by drilling or punching.

Swarf: Remove swarf and other debris from cold-formed steel framing immediately after it is deposited.

Bushes: Provide plastic bushes or grommets to site cut holes.

Site work: Do not fabricate on site where welded connections are required.

Prefabricated frames
General: Protect frames from damage or distortion during handling, transport, storage and erection.

Fastening
Type: Except for proprietary wall framing system, select from the following:

- Bolting.
- Self-drilling, self-tapping screws.
- Blind rivets.
- Proprietary clinching system.

Welding
Standard: To AS/NZS 1554.1.

Weld categories not shown on the drawings: Category GP.

Weld type not shown on the drawings: 6 mm continuous fillet weld made using E48XX electrodes or equivalent.

Butt welds: Complete penetration butt welds, Category SP.

Hand flame cutting: Do not hand flame cut bolt holes.

Burning: Avoid procedures that result in greater than localised "burning" of framing members.

Grommets
Provide grommets to isolate piping and wiring from cold-formed steel framing members.

Unseasoned or CCA treated timber
General: Do not fix in contact with framing without fully painting the timber and/or the steel.

Earthing
Permanent earthing: Required.

Temporary earthing: Provide temporary earthing during erection until the permanent earthing is installed.

Protection
General: Coatings which have been damaged by welding or other causes shall be restored. Thoroughly clean affected areas to base metal and coat with zinc rich organic primer to APAS-2916.

Priming unprotected surfaces: Before fixing, prime steel which is not galvanised or metallic-coated.

Beam camber
General: If beam members have a natural camber within the straightness tolerance, fabricate and erect them with the camber up.

5 FLOOR FRAMING

General
Protection: If floor framing is for ground floor construction, ensure that it is protected from moisture.

Construction loads: If construction loading exceeds design loading, provide additional support so as to avoid overstressing of members.

6 WALL FRAMING

Wall studs
Nominal frame dimension (stud width) (mm): 100.

Maximum stud spacing: 450 mm.

Concentrated loads: 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.

Damp-proof courses
General: Sit bottom plate of external and internal wall framing on continuous damp-proof course.

Installation: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

Heads to openings
General: Provide lintels appropriate to load and span.

Additional support
General: Provide additional support in the form of noggings, trimmers and studs for support and fixing of cladding, lining, hardware, accessories, fixtures and fittings.

Lining joints: Provide a frame member behind every joint in fibre cement sheet lining.

Maximum spacing of noggings: 1350 mm centres.

Windows: Support on 70 x 35 timber trimmer fixed in line with external face of frame.

Flashings
Provide flashings to external openings sufficient to prevent the entry of moisture.

7 TRUSSES

Fabrication
Assembly: Factory assemble trusses.

Supports for equipment
General: Where mechanical plant, solar panel array, water storage unit or heater is located in or on the roof structure provide support to AS/NZS 3500.4.

Marking
General: Permanently mark each truss to show:

- Project identification.
- Manufacturer.
- Tag or number.
- Location.
- Support points.

Installation
General: Fix to support structures, plumb to within H/200, where H is the height at the apex.

8 ROOF FRAMING

Battens
General: Provide a proprietary system of preformed roof battens.

- Material: Preformed steel sections G550.
- Finish: AZ150.

Splicing: Arrange battens so that, on any rafter or truss, no more than 3 battens are spliced, and no more than 2 splices are adjacent.

9 TIE-DOWNS

General
Fixing: Secure framing members to framing members abutting to resist uplift. Use proprietary fixings.

Bracing: Provide to:

- Walls: 25 x 1.0 mm Pryda Strap Brace in opposing diagonal directions to resist horizontal racking forces to walls. Fix at no greater than 9.0 m intervals directly to wall framing. Tension before final fixing to take load without distorting frame.
- Roofs: 25 x 1.0 mm Pryda Strap Brace. Tension before final fixing to take load without distorting roof members.

10 COMPLETION

Cleaning
On completion of framing remove debris from members and any gaps between members.

Tightening
Tighten bolts, screws and other fixings so that joints and anchorages are secure at completion.

MASONRY

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements*, for steel coatings and durability.
- *Concrete construction*, for concrete slab on ground.
- *Timber frame construction*, for timber wall framing generally.
- *Steel frame construction*, for steel wall framing generally.
- *Doors and windows*, for door and window frames.

Standards

Materials, construction and detailing: To AS 3700.

Masonry units: To AS/NZS 4455.

Flashings and damp-proof courses: To AS/NZS 2904.

2 INTERPRETATION

Definitions

Face units: Masonry units used in facework, including purpose-made units such as 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.

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: 8.

4 MATERIALS AND COMPONENTS

Mortar materials

Cement type to AS 3972: GP.

Proportions: Conform to the **Mortar mix table**.

White cement: Iron salts content ≤ 1%.

Lime: To AS 1672.1.

Sand: Fine aggregate with a low clay content and free from efflorescing salts, selected for colour and grading.

Admixtures: Do not provide admixtures.

For light colours: Use off-white cement in the mix.

Mortar mix table

Mortar class to AS 3700	Cement, lime, sand ratios (by volume)			Water thickener
	Clay	Concrete	Calcium silicate	
Masonry cement				
M3	1:0:4	1:0:4	n/a	No
M4	1:0:3	n/a	n/a	No
Portland cement				
M2	1:2:9	n/a	n/a	No
M3	1:1:6	1:1:6	n/a	Optional
	1:0:5	1:0:5	1:0:5	Yes
M4	1:0.5:4.5	1:0.5:4.5	n/a	Optional
	1:0:4	1:0:4	1:0:4	Yes

Minimum mortar content table

Location	Mortar grade
Below damp-proof course	M4
Above damp-proof course	
- External	M3
- Internal	M2

Mortar colouring table

Mortar colour	Cement	Oxide type
Black	Grey	Black
Brown	Grey	Chocolate
Cream	Off white	Yellow
Natural	Grey	Nil
White	Off white	Nil
Yellow	Off white	Yellow

5 CONSTRUCTION GENERALLY

Set out

Set out: Set out masonry with joints of uniform width and minimise cutting of masonry units.

Rods: 76 mm high units: 7 courses to 600 mm.

Mortar mixing

General: Measure volumes accurately to achieve the specified proportions. Machine mix for at least six minutes.

Building in

Embedded items: Build in wall ties and accessories as the construction proceeds. If it is not practicable to obtain the required embedment wholly in the mortar joint in hollow unit brickwork, fill appropriate cores with grout or mortar.

Cleaning

General: Clean masonry progressively as work proceeds. Clean facework to remove mortar smears, stains and discolouration. Do not use acid. Do not pressure spray.

Cavities: Keep cavities clear of mortar droppings.

Concealed work

Joints: Cut flush, and leave unstruck.

Sills and thresholds

General: Solidly bed sills and thresholds on a full bed of mortar and lay them so that the top surfaces drain away from the building. Fill perpends solid.

Set out: Set out so that no unit is cut smaller than three quarters full width.

Joints

Depth of raking (other than facework): Flush unless otherwise specified.

6 FACEWORK

Single face walls

Location: External leaf of cavity walls.

Colour mixing

General: Evenly distribute the colour range of units. Prevent colour concentrations and “banding”.

Commencement

General: Commence at least 2 full courses of brickwork below adjacent finished level.

Perpends

Alignment: Vertically align perpends in alternative 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.

7 CAVITY WALLS

Bedding course
Bed on vapour barrier carried across and up inside of edge rebate.

Cavity fill
General: Fill the cavity to 1 course above adjacent finished (ground) level with mortar. Face the top surface towards the outer leaf to drain.

Minimum cavity width
Masonry veneer walls: 40 mm, between the masonry leaf and the loadbearing frame and 25 mm between the masonry leaf and sheet bracing.

Openings
Closure: Do not close the cavity at the jambs of external openings.

Weepholes
Form: Open perpends.

Location: Provide weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at bottoms of unfilled cavities.

Maximum spacing: 720 mm.

8 WALL TIES

Wall ties
Standard: To AS/NZS 2699.1.

Durability classification to AS/NZS 2699.3: R2 galvanised.

Strength classification: Medium duty.

Wall ties spacing table

Masonry	Generally	Around openings and joints	Gables
76 mm high bricks			
- vertically	7 courses	Alternate 3 and 4 courses	4 courses
- horizontally	2 bricks	Alternate 1 and 1½ bricks	Every gable stud

Wall ties to top of walls
Horizontally: Double the number of ties specified in Wall ties spacing table.

Embedment of wall ties
Cavities > 60 mm wide: 75 mm minimum.

Flexible wall ties
Type: Where ties or anchors extend across control joints, use ties or anchors which do not impair the effectiveness of the joint.

9 DAMP-PROOF COURSES

Location
General: Provide damp-proof courses as follows:

- Masonry veneer construction: In the second bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level.

Height: Not less than:

- 150 mm above the adjacent finished ground level.
- 75 mm above the finished paved or concrete area.
- 50 mm above the finished paved or concreted area and protected from the direct effect of the weather.

Material
Type: Embossed black polyethylene of nominal thickness 0.5 mm.

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 for brickwork. Sandwich damp-proof courses between mortar.

- Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

10 FLASHINGS

Location
General: Provide flashings and weatherings as follows:

- Under sills: 30 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill. Extend at least 50 mm beyond the sills.
- 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 abutment with floor bearers: Full width of outer leaf immediately below bearer seating level, continuous across cavity. Turn up against the bearers and edge blocking and fasten to it.
- At jambs 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 jambs.

Material
Type: Embossed black polyethylene of nominal thickness 0.5 mm.

Installation
General: Sandwich flashings between mortar except on lintels or shelf angles. Bed flashings and sills in one operation to maximise adhesion.

Pointing: Point up joints around flashings, filling voids.

Weepholes
Location: Provide weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at the bottoms of unfilled cavities.

Form: Open perpends.

Maximum spacing: 1200 mm.

11 CONTROL JOINTS

Control joints
Standard: To C&CA TN61.

Joints
General: Provide joints as follows:

- Expansion joints for brickwork:
  - . Maximum joint spacing: 6.0 m but 3.0 m from corners. Incorporate into window and door openings where adjacent.
  - . Width of control joint: ≥ 10 mm ≤ 20 mm.

Joint filler: Closed-cell foamed bond breaking backing rod.

Sealant: Compatible non-staining elastomeric polyurethane.

Sealant depth: 0.67 - 1.0 times joint width.

Wall tie installation
Build in masonry ties within 300 mm, and either side, of joint.

Installation
Cleaning: Clean joints thoroughly before sealing.

12 STEEL LINTELS

Material
Angles and flats: To AS/NZS 1594 or AS/NZS 3679.1.

Type: Mild steel galvanised to AS/NZS 4680, minimum coating mass 600 g/m^2. Do not cut after galvanising.

Durability classification to AS/NZS 2699.3: R2.

Cold-formed flat lintels
Type: Proprietary flat-base type designed to AS/NZS 4600.

Installation
General: Provide 1 lintel to each wall leaf. Keep lintels 10 mm clear of heads and frames. Pack mortar between an angle upstand and supported masonry units.

Minimum bearing each end:

- Span ≤ 1800 mm: 100 mm.
- Span > 1800 mm ≤ 2800 mm: 150 mm.

Cutting: Do not cut on site.

Propping: To prevent deflection or excessive rotation, temporarily prop proprietary cold-formed lintels until the masonry reaches its required strength.

- Minimum propping period: 7 days.

INSULATION AND SARKING

1 GENERAL

Cross references
General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements* for steel coatings and durability, and fasteners.
- *Timber frame construction* for timber wall and roof framing generally.
- *Steel frame construction* for steel wall and roof framing generally.
- *Acoustic insulation* for soundproofing.
- *Lining* for internal wall and ceiling finishes.
- *Mechanical installations* for insulating air-conditioning ductwork.
- *Hydraulic installations* for insulating hydraulic services.

Installation of mineral wool insulation
Comply with the ICANZ Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation.

Interpretation
Sarking-type material: Flexible membrane material normally used for waterproofing, vapour retarding or thermal reflective insulation.

2 MATERIALS AND COMPONENTS

Fire hazard properties
General: To AS/NZS 1530.3:

- Spread of flame index: ≤ 0.
- Smoke developed index: ≤ 3.
- Flammability index to AS 1530.2: ≤ 5.

Bulk insulation
Mineral wool blankets and cut pieces: To AS/NZS 4859.1, Section 8.

Reflective insulation: To AS/NZS 4859.1, Section 9.

Sarking material
Standard: To AS/NZS 4200.1.

- Flammability index: <5.
- Spread of flame index to AS/NZS 1530.3: ≤ 5.

Floor insulation: Provide perforated material.

Mesh support to roof and floor insulation and sarking
Standard: To AS 2423 Section 4.

- Size: 150 mm x 300 mm mesh x 2 mm diameter.
- Wire strength: 450 Mpa.

Welded safety mesh: To AS/NZS 4389.

3 INSTALLATION

Bulk insulation
Standard: To AS 3999 and BCA clause J1.2.

Floor batts: Fit tightly between framing members and over floor sarking and mesh support.

Wall batts: Fit tightly between framing members. If support is not otherwise provided, secure nylon twine to the framing and stretch tight.

Roof batts: Install bulk insulation over ceiling lining, to the whole of the roof area, except the following:

- Eaves, overhangs, rooflights, vents and openings.
- Roofs to semi-enclosed spaces such as porches.

Provide 150 mm clearance to light fittings.

Sarking material
Standard: To AS/NZS 4200.2.

Wall sarking
General: Provide vapour-permeable sarking under cladding and behind external brickwork to masonry veneer construction.

Installation: Apply to the outer face of external stud walls from the top plate down over the bottom plate and flashing. Run across the studs and lap at least 150 mm at joints.

Metal cladding: Provide a thermal barrier.

Fixing to steel: Use double sided pressure sensitive tape.

Roof sarking
Install reflective foil laminate over structural roof members and safety mesh but under roof battens, to the whole of the roof area, except rooflights, vents and openings.

Provide 100 mm clearance to heater flue.

Ridge ventilation: Finish sarking at least 50 mm clear of ridges.

Mesh support
Installing mesh support: Lay over floor bearers and under joists, and to roof framing, and fix without slack.

Fixing mesh support: Wire.

ACOUSTIC INSULATION

1 GENERAL

Cross references
General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements* for steel coatings and durability, and fasteners.
- *Timber frame construction* for timber wall and roof framing generally.
- *Steel frame construction* for steel wall and roof framing generally.
- *Insulation and sarking* for thermal insulation, and installation requirements generally.
- *Lining* for internal wall and ceiling finishes.

Installation of mineral wool insulation
Comply with the ICANZ Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation.

Interpretation
Acoustic material: Building material with specific acoustic properties to achieve:

- Sound transmission loss.
- Sound absorption.
- Damping of resonance.
- Resilience against impact noise.

2 MATERIALS AND COMPONENTS

Fire hazard properties
General: To AS/NZS 1530.3:

- Spread of flame index: ≤ 0.
- Smoke developed index: ≤ 3.
- Flammability index to AS 1530.2: ≤ 5.

Bulk insulation
Mineral wool blankets and cut pieces: To AS/NZS 4859.1, Section 8.

Fasteners and supports
Cavity walls with steel stud framing lined one side: Increase stud base metal thickness to 1.15 mm.

Fixing:

- Clips: 600 mm horizontally x 1200 mm vertically and a row 100 mm from the top and bottom at 1200 mm c/c.
- Vertical furring channels: 600 mm centres.

Sealants
Acoustic sealant: Non-hardening sealant compatible with the materials to be sealed and rated to R_w 65.

Fire rated: Non-hardening sealant compatible with the materials to be sealed and having a fire rating equal to that of the partition it seals.

Sealant strips: Closed cell resilient foam.

3 INSTALLATION

Bulk insulation
Suspended ceilings: Lay batts over the ceiling system close butted to each other and to the suspension rods.

Cable management
Power outlets: Do not install power outlets back to back. Separate adjoining outlets with a continuous layer of he nominated wall insulating material.

ROOFING

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements* for steel coatings and durability, and fasteners.
- *Timber frame construction* for timber wall and roof framing generally.
- *Steel frame construction* for steel wall and roof framing generally.
- *Insulation and sarking* for thermal insulation requirements generally.
- *Hydraulic installations* for rainwater tank.

Safety

Principal standards: Workcover NSW (*Safe Work on Roofs Part 2-Residential*), AS 1657-1992 (*Fixed platforms, walkways, stairways and ladders – Design, construction and installation*) and AS 1891 (*Industrial fall-arrest systems and devices*).

Signage: Provide signage DANGER – FRAGILE ROOF where the whole or any part of the roof is assessed to be fragile.

Height safety system: Provide permanent anchorage point system, including penetration flashings and rafter strengthening plates, suitable for fall and arrest certified to a load of 22kN.

- Proprietary item: Safemaster Anchor Point System Hingelink.

2 MATERIALS AND COMPONENTS

Sheet metal roofing

Prepainted and organic film/metal laminate products: To AS/NZS 2728.

Plastic sheet roofing

Unplasticised polyvinyl chloride (UPVC) sheet: To AS 4256.2.

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

Polycarbonate: To AS 4256.5.

Metal rainwater goods

Standard: To AS/NZS 2179.1.

Flashing material

Standard: To AS/NZS 2904.

Fasteners

Self-drilling screws: To AS 3566.1.

Corrosion resistance: Class 3 to AS 3566.2 Table 1.

Exposed fasteners: Provide fasteners which are prefinished with an oven baked polymer coating to match the roofing material.

Gable vents

Description: Circular steel louvre.

Proprietary item: Lysaght round 340 mm gable louvre.

Roof lights

Standard: To AS 4285.

Description: Proprietary rooflight system including framing, fixing, trim, shaft, accessories and flashings.

Roof ventilators

General: Proprietary roof mounted turbine type ventilators including fixings, trim and flashings, and ducting where venting below ceiling level.

Finish: Match adjacent roofing.

Profiled fillers

Provide purpose-made closed cell polyethylene foam profiled to match the roofing profile.

Locate profiled fillers under flashings to:

- Ridges.
- Eaves.
- Lapped joints in roof sheeting.

3 METAL SHEET ROOFING

Design and installation

Standard: To AS 1562.1.

Type: Provide a proprietary system of preformed, pre-finished, profiled sheet and purpose-made accessories.

Fixing to steel battens:

-	BMT $<$ 1.0 mm	BMT $\geq$ 1.0 mm
- Type:	17 screw	SDS
- Size:	12-11 x 40	12-14 x 35

- Seal: Hex. washer head
- Spacing (mm): 3 fixings per sheet width; 5 per end sheet.

Accessories: Provide material with the same finish as roofing sheets.

Visible accessories

Provide material with the same finish as roofing sheets.

Ridges

Treat ends of sheets as follows:

- Close off ridges with purpose-made ridge fillers of closed cell polyethylene.

Eaves

Treat ends of sheets as follows:

- Generally: Close off ribs at bottom of sheets by mechanical means or with purpose-made fillers or end caps.
- At gutters: Project sheets 50 mm into gutters.

Ridge and barge capping

Finish off along ridge and verge lines with purpose-made ridge or barge capping.

Swarf

Remove swarf and other debris as soon as it is deposited.

Protection

General: Keep the roofing and rainwater system free of debris during construction, and leave clean and unobstructed on completion. Repair any damage to 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.

4 PLASTIC SHEET ROOFING

Installation

Standard: To AS 1562.3.

Accessories

Provide support members, connectors, gaskets and edge trims to give a fully finished installation.

5 ROOF PLUMBING

Selection and installation of rainwater goods

General: Provide the flashings, matching pre-coated gutters, fascias and cappings, trims, outlets and downpipes necessary to complete the roof system.

Standard: To AS/NZS 3500.3.

Sealing: Seal fasteners and mechanically fastened joints with silicone sealant.

Flashings and cappings

Installation: Flash roof junctions, upstands and abutments 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.

Projections: Flash projections through the roof with two part flashings consisting of an apron flashing and an over-flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection.

Type: Abey Rooftite for pipe penetrations.

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.

Gutters

Minimum slope of eaves gutters: 1:200.

Minimum width overall of valley gutters: 400 mm.

Matching fascia/barge: 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.

Downpipes

General: Use preformed downpipes including preformed offsets and astragals compatible with proprietary system. Connect heads to gutter outlets and connect feet to rainwater drains.

Downpipe catchment area: 40 m^2 maximum.

Prohibition: Do not use upvc pipe and fittings.

6 RAINWATER TANK

General

Type: Provide proprietary plastic tank with flat base and pitched roof for storage of rainwater. Fully support the tank above ground level on stand not exceeding 1500 mm high.

Installation: To AS/NZS 3500.1.

Polyethylene tank: To AS/NZS 4766 (Int).

Capacity (L): 9000.

Tank nominal dimensions:

- Diameter (mm): 3000.
- Height (mm): 1240.

Accessories: Provide the accessories needed to complete the installation, including braced stand, inlet and outlet connections, screen, overflow and access hole, and 20 mm bibtap.

Outlet: Position over grated entry to stormwater drainage.

Overflow: Connect to stormwater drainage.

CLADDING

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings and durability, and fasteners.
- *Timber frame construction* for timber wall and roof framing generally.
- *Steel frame construction* for steel wall and roof framing generally.
- *Masonry* for external brickwork.
- *Insulation and sarking* for thermal insulation requirements generally.
- *Door and windows* for door and window frame details.
- *Painting* for applied finishes.

2 MATERIALS AND COMPONENTS

Flashing material

Standard: To AS/NZS 2904.

Type: Embossed black polyethylene of nominal thickness 0.5 mm.

Fasteners

Self-drilling screws: To AS 3566.1.

Corrosion resistance: Class 3 to AS 3566.2 Table 1.

3 FIBRE CEMENT CLADDING

Standard

General: To AS/NZS 2908.2 Type A, Category 3.

Plank cladding

Type: Provide a proprietary system of single-faced fibre cement planks.

- Proprietary item: James Hardie PrimeLine.
- Pattern: Heritage unless otherwise specified.
- Texture: Matt smooth.
- Thickness: 9.0 mm.
- Width x length: 300 x 4200.
- Fixing: Hardilock fixing system.
- Joints: Butt joint.

Sheet cladding

Type: Provide single-faced fibre cement sheets 6 mm thick.

- Proprietary item: James Hardie Hardiflex.

Joints, corners and edges: uPVC extrusions.

Eaves lining

Type: Provide a proprietary system of single-faced fibre cement sheets 4.5 mm thick fixed at minimum 200 mm centres to bearers placed at maximum 450 mm centres.

Minimum bearer size: For rafter/truss chord overhang:

- 300 – 600 mm: 50 x 38 mm.
- 600 – 1500 mm: 75 x 38 mm.

Joints: uPVC extrusions.

4 METAL CLADDING

Design and installation

Standard: To AS 1562.1.

Type: Proprietary system of profiled sheets.

Visible accessories

Provide proprietary corner pieces, edge trims and edge covers in the same material and with the same finish as cladding sheets.

Weather stripping
Provide proprietary complementary preformed trim channels, corner trims, feature, fascia and tee sections and cappings to seal at joints and terminations. Close ends of profiled steel sheet cladding against sealing strip bonded to inside of trim section.

5 MOISTURE PROTECTION
Flashings
Location: Provide flashings to external openings sufficient to prevent the entry of moisture. Form trays at the ends of sill flashings.

Junctions
Location: Provide purpose-made trims and sealant to junctions sufficient to prevent the entry of moisture.

DOORS AND WINDOWS

1 GENERAL
Cross references
General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for fasteners.
- *Timber frame construction* for timber wall framing generally.
- *Steel frame construction* for steel wall framing generally.
- *Masonry* for external brickwork and flashings.
- *Cladding* for external wall cladding and flashings.
- *Lining* for architraves.
- *Painting* for priming of frames and doors before installation.

2 STANDARDS
Flashings
Standard: To AS/NZS 2904.

Aluminium extrusions
Standard: To AS/NZS 1866.

Metal finishes
Zinc plating: To AS 1789, at least service condition number 2.

Thermoset powder coating: To AS 3715.

3 MATERIALS AND COMPONENTS
Aluminium frames
General: Assemble from aluminium sections, including necessary accessories such as buffers, strike plates, fixing ties or brackets and cavity flashing, with suitable provision for fixing nominated hardware.

Frame finish: Powdercoat.

- Standard: To AS 3715.
- Grade: Architectural coating.

Doors
Timber doors: To AS 2688.

Doorsets
Doorset: An assembly comprising a door or doors and supporting frame, guides and tracks including the hardware and accessories necessary for satisfactory operation.

Security screen doorsets: To AS 5039.

Timber frames and jamb linings: To AS 2689.

Security screen doors: To AS 5039.

Windows
Selection and installation: To AS 2047.

Security window grilles: To AS 5039.

Glass
Materials and installation: To AS 1288.

Safety glasses: Standard: To AS/NZS 2208.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

Preglazing
Preglaze doors and windows.

Ancillary materials
Extruded gaskets and seals: To be non cellular (solid) elastopressive seals as follows:

- Flexible polyvinyl chloride (PVC): To BS 2571, 100% solids with high consistency, ultra-violet stabilised.

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255.1.

Jointing materials: To be compatible with each other and with the contact surfaces and non staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Nylon brush seals: To be dense nylon bristles locked into galvanised steel strips and fixed in a groove in the edge of the door or in purpose-made anodised aluminium holders fixed to the door with double sided PVC foam tape.

4 CONSTRUCTION GENERALLY

Standards

Doorset installation: To AS 1909.

Window installation: To AS 2047.

Security screen doors and window grilles installation: To AS 5040.

Frame installation

Install doorsets and windows so they

- are plumb, level, straight and true within acceptable building tolerances;
- are adequately fixed or anchored to the building structure in conformance with the wind action loading requirements;
- will not carry building loads, including loads caused by structural deflection or shortening; and
- allow for thermal movement.

Aluminium frames

Fixing to stud frame openings: Screw once to studs at each fixing.

Frame fixing

Brackets: Metallic-coated steel:

- Width: ≥ 25 mm.
- Thickness: ≥ 1.5 mm.

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.

Jamb fixing centres: ≤ 600 mm.

Flashings and weatherings

Install flashings, weather bars, drips, storm moulds, caulking and pointing so that water is prevented from penetrating the building between frames and the building structure.

Fixing

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

Glazing

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.
- 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.

Linings

Provide reveal and jamb linings as necessary. Install to make neat and clean junctions between the frame and the adjoining building surfaces.

5 TIMBER DOORS

Door thickness

Generally: 35 mm.

External doors and doors over 900 mm wide: 40 mm.

Door construction

Flush doors: To be of balanced construction to AS 2688.

Door stops

Install door stops to prevent door furniture striking the wall or other surface.

6 HINGES

Butt hinge sizes

General: Conform to **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 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.

Hinge pins

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

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

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	Interfold	3

* Interfold (Fast fix) surface mounted.

Number of hinges

Door leaves: Provide 3 hinges for leaves up to 2340 mm high, and 4 for door leaves over 2340 mm high. Provide at least 3 low friction bearing hinges for door leaves controlled by door closers.

Position: Fix two hinges at the top and one at the bottom of door.

Small door leaves: Door leaves not exceeding any of the following may have 2 hinges each:

- 1,800 mm high.
- 620 mm wide.
- 30 kg mass.

7 INSECT SCREENS

Aluminium framed screens

Provide aluminium extruded or folded box frame sections with mesh fixing channel, mitred, staked and screwed at corners. Provide an extended frame section where necessary to adapt to window opening gear.

- Mesh: Bead the mesh into the frame channel with a continuous resilient gasket, so that the mesh is taut and without distortion.

Fixed screens

Attach fixed screens to window frames with a clipping device which permits removal for cleaning.

Sliding screens

Provide a 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.

8 HARDWARE

Abbreviations and definitions

General: For the purposes of this worksection the abbreviations and definitions given below apply.

Abbreviation	Term	Definition
KA	Keyed alike	All locks in the group will pass the same key, but that key will not operate any locks outside the group.

Materials and components

Hardware documented 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.

Standard: To AS 4145.2 for doors and To AS 4145.3 for windows.

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

Door lockset mounting heights

To centreline of spindle: 1,000 mm above finished floor.

Door controllers

Performance: Provide door controllers, including door closers, which are suitable for the door type, size, weight and swings required and the operating conditions, including wind pressure.

Keying

Keying system: Provide a group keying system in conformance with the **Key codes schedule**.

Keying: KA but each dwelling keyed to differ.

Stamping: Stamp keys and lock cylinders to show the key codes and/or door number as scheduled.

9 MISCELLANEOUS HARDWARE

Door stops

Fixing: Fix on the floor, skirting or wall, as appropriate, to prevent the door or door furniture striking the wall or other surface.

Seals

Provide purpose-made proprietary seals to weather and draught proof external doors.

Closers

Provide proprietary closers to hinged screen doors.

Coat hooks

Provide proprietary coat hooks to wet area doors.

10 COMPLETION

General

General: Leave the hardware properly adjusted with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.

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.

Contractor's keys

Immediately before practical completion, replace or reset cylinders to which the Contractor has had key access during construction and ensure the exclusion of the Contractor's keys.

LINING

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Environmental management* for waste management.
- *Common requirements* for steel coatings and durability, adhesives, sealants and fasteners.
- *Timber frame construction* for timber wall framing generally.
- *Steel frame construction* for steel wall framing generally.
- *Insulation and sarking* for thermal insulation requirements generally.
- *Door and windows* for door and window frame details.
- *Tile finishes*, for waterproofing of wet areas.
- *Painting* for applied finishes.

Tolerances

Surface: Flatness, twist, winding and bow: ≤ 1.5 mm deviation from a 1.5 m straightedge placed in any position.

2 MATERIALS AND COMPONENTS

Plasterboard

Standard: To AS/NZS 2588.

Thickness: 10 mm for walls, 10 mm for ceilings

Fibre cement

Standard: To AS/NZS 2908.2, Type B, Category 2.

Location: Wet area walls and ceilings.

Fibrous plaster products

Standard: To AS 2185.

3 CONSTRUCTION GENERALLY

Conditions

Do not commence lining work until such time as the building or zone in question is enclosed and weathertight and any wet trades have been completed.

Substrates or framing

General: Before fixing linings check and, if necessary, adjust the alignment of substrates or framing.

Battens

General: Fix at each crossing with structural framing members, or direct to ceilings.

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 SHEET LINING

Supports generally

Install proprietary cold-formed galvanised steel furring channels as follows:

- If framing member spacing exceeds the recommended spacing.
- If direct fixing of the sheeting is not possible due to the arrangement or alignment of the framing or substrate.
- To support fixtures and trims.

Installation

Plasterboard: To AS/NZS 2589.1, Level 4 finish.

Fibre cement: 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.

Wet areas: Do not use adhesive.

Multiple sheet layers

Application: Acoustic rated walls.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before commencing succeeding layers. Stagger all sheet joints by minimum 200 mm.

Joints

General: Provide recessed edge sheets and finish flush.

External corner joints: Make over zinc-coated steel corner beads.

Wet areas: Provide the flashings, trim and sealants necessary to ensure wet areas are waterproofed.

Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

Control joints: Install purpose-made zinc-coated control joint beads to coincide with structural movement joints.

5 JOINTS IN TILED AREAS

General

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 metallic-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

6 TRIM

General

Provide trim, such as beads, skirtings, architraves, mouldings and stops, where necessary to make neat junctions between components and finishes.

7 CEILING ACCESS

Hatch

Trim an opening and provide a loose access panel of minimum size 600 x 450 mm to each accessible ceiling space.

JOINERY

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings and durability, adhesives, sealants and fasteners.

2 MATERIALS AND COMPONENTS

Finished sizes

Provide milled timbers with actual dimensions which are at least the required dimensions, except for dimensions qualified by a term such as “nominal” or “out of” to which industry standards for finished sizes apply.

Wet processed fibreboard (including hardboard)

Standard: To AS/NZS 1859.4.

Surface properties: To AS/NZS 1859.3.

Particleboard

Standard: To AS/NZS 1859.1.

Melamine overlaid particleboard: Particleboard overlaid on both sides with low pressure melamine.

High-pressure decorative laminate sheets

Standard: To AS/NZS 2924.1.

Provide classes as follows:

High-pressure decorative laminate sheet application table

Class to AS/NZS 2924.1	Application
CG (S or F)	High performance, self supporting vertical or horizontal surfaces
HD (S or F)	High performance horizontal surfaces
HGS or HGP	General horizontal surfaces and high performance vertical surfaces
VGS or VGP	General vertical surfaces and light duty horizontal surfaces
VLS	Light duty vertical surfaces

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 edge strips: 0.4 mm.

3 DOMESTIC KITCHEN ASSEMBLIES

Standard

General: To AS/NZS 4386.1.

4 CONSTRUCTION GENERALLY

General

Construction: Build components square and install plumb.

Joints: Provide materials in single lengths whenever possible. If joints are necessary, make them over supports.

Edges: Lip external exposed edges of carcasses, doors and drawers with 2 mm ABS edging strip to match specified board finish by heat seaming.

- Proprietary item: Laminex Toughedge.

Fasteners and adhesives

General: Provide fasteners, adhesives or both to transmit the loads imposed and ensure the rigidity of the assembly. Do not split, discolour or otherwise damage components.

Joints: Select from the following:

- Proprietary mechanical connections.
- Dowels and glue.
- Screws and glue.
- Proprietary joining plates and glue.

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.

Finishing

Junctions with structure: Scribe plinths, benchtops and ends of cupboards to follow the line of floors or walls.

5 CUPBOARD AND DRAWER UNITS

Plinths, carcasses, drawer fronts, shelves and doors

Material: Provide melamine overlaid high moisture-resistant particleboard or melamine overlaid high moisture-resistant medium density fibreboard.

Thickness: 18 mm.

Finish: Provide decorative laminated sheet or veneer if necessary:

- To conceal fasteners.
- To provide selected colours and patterns.

Caps: Provide caps to conceal fasteners otherwise visible.

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

Drawer fronts: Rout for drawer bottoms.

Drawer backs and sides: 12 mm PVC film wrapped particleboard.

Drawer bottoms: 3 mm PVC film laminated hardboard.

Adjustable shelves: Support on proprietary pins in holes bored at 32 mm centres vertically.

Drawer and door hardware

Hinges: Provide concealed all-metal hinges with the following features:

- Adjustable for height, side and depth location of door.
- Self-closing action.
- Hold-open function.
- Nickel plated.

Slides: Provide metal runners and plastic rollers with the following features:

- 35 kg loading capacity.
- Closure retention.
- White thermoset powder coating or nickel plated.

Inclusions: Provide cutlery tray to top drawer to kitchen cabinetwork.

6 WORKING SURFACES

Benchtops

Material: Decorative laminate finished high moisture-resistant particleboard.

Minimum thickness: 33 mm.

Sealing underside: Laminate undersides of benchtops if:

- Likely to be subject to excessive moisture.
- The benchtop is not restrained against warping by cupboard carcass or support framing.

Installation: Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joints with sealant matching the finish colour and clamp with proprietary mechanical connectors.

Edge sealing: Seal to walls and carcasses with a sealant which matches the finish colour.

7 STORAGE ITEMS

Shelves

Material: 18 mm thick moisture resistant MDF, melamine finish.

8 DELIVERY AND STORAGE

General

General: Deliver joinery units to site in unbroken wrapping or containers and store so that the moisture content of units is not adversely affected. Do not store in areas of wet plaster. Keep storage to a minimum by delivering items only when required for installation.

Sealing: Back prime surfaces concealed by backgrounds.

Completeness: Examine joinery units for completeness and remedy deficiencies.

Acclimatisation

General: Acclimatise the joinery items by stacking it in the in-service conditions with air circulation to all surfaces after the following construction operations are complete:

- Site drainage and stormwater works are complete.
- Space fully enclosed and secure.
- Wet work complete and dry.

METALWORK

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings and durability, and fasteners.
- *Painting* for applied finishes.

2 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.

Rivets

General: Blind rivets where available in the required metal.

Masonry anchors

General: Proprietary types comprising:

- Screws or bolts in self-expanding sockets.
- Threaded screwbolt masonry anchors.

Masonry plugs

General: Screws in purpose-made resilient plastic sockets.

3 INSTALLATION

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 non-galvanic corrosion fasteners.

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.

Thermal movement: Accommodate thermal movement in joints and fastenings.

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.

Splicing
General: Provide structural members in single lengths.

4 WELDING AND BRAZING

General
Quality: Provide finished welds which are free of surface and internal cracks, slag inclusion, and porosity.

Site welds: Avoid site welding wherever possible. If required locate site welds in positions for down hand welding.

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 used butt joints relying on the filler metal fillet only.

5 STAINLESS STEEL FABRICATION

Welding stainless steel
Certification of welders: To AS 1796.

Riveting
General: 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
General: Do not solder stainless steel.

6 METAL FIXTURES

General
General: Provide metal fixtures:

- With components and their location, indicative construction details, scribes and trims, materials and section properties as detailed.
- To dimensions confirmed on site.
- To finishes selections.
- Inclusive of associated hardware and equipment.

7 STEPS

Form
Type: Open tread on fabricated RHS frame with angle seatings.

Width: 950 mm wide clear minimum with equal goings 275 mm deep and rises ≥ 150, ≤ 190 mm.

Treads
Material: 2 No 125 x 40 mm thick hardwood treads per going.

Edge: Dress edge to a pencil-round.

Top tread
Flush with finished decking or landing, otherwise to match treads.

Handrail
42.4 mm od steel tube at 1,000 mm height of welded construction.

Bottom landing
Concrete pad at foot of steps 1200 w x 400 d x 150 t. Build in stringers. Bolt stringers to floor substructure to fix.

8 SUBFLOOR ENCLOSURE

Base boards
General: Provide support posts, frames and fixings as necessary to form a rigid assembly.

Construction: C100-10 battens at 130 mm centres.

Under floor access: Provide a framed door, minimum size 720 mm wide x 600 mm high, complete with padbolt.

9 BALUSTRADE

General: Rigid assembly of 42.4 mm od steel tubes positioned at 1,000 mm height and mid-height on posts of identical tubing.

Balustrade height on stairs and ramps: 865 mm.

Joints: Welded.

EXTINGUISHERS AND BLANKETS

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Standards

General: Provide equipment listed in the SSL ActivFire Register of Fire Protection Equipment.

2 MATERIALS AND COMPONENTS

Extinguishers

General: Provide portable fire extinguishers and location signs as follows:

- General requirements: AS/NZS 1841.1.
- Wet chemical: AS/NZS 1841.3.
  - . Proprietary item: Wormald 3.4 kg.
- Powder: AS/NZS 1841.5.
  - . Proprietary item: Wormald 2.1 kg.

Selection and location: To AS 2444.

Fire blankets

General: To AS/NZS 3504.

Selection and location: To AS 2444.

MISCELLANEOUS FIXTURES

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Timber frame construction* for timber wall framing and supports.
- *Steel frame construction* for steel wall framing and supports.

2 MATERIALS AND COMPONENTS

Wood heater

Standard: To AS 2918.

Emissions standard: To AS/NZS 4012 and AS/NZS 4013.

Fan: Provide with fan boost where available.

Curtain rail

Rod ends: Acorn type closers

Brackets: Single stay 75 mm projection

Medicine cabinet

Proprietary item: Two door vertical cabinet.

Mirror

Mirror type: Silver on glass fixed with dome-headed chromium-plated screws.

Size (h x w x t) (mm): 950 x 350 x 6 mm.

Rotary clothes line

Type: Rotary with 5.0 m head diameter and 50 m of line space.

Letter box

Letter box: Provide rear opening box in natural anodised aluminium on 70 mm square aluminium stand concreted in.

- Proprietary item: Mailsafe series APR2.

Street numerals

Building street address: Provide numerals as street address on frontage adjacent to entry. Secure using stainless steel screws.

- Proprietary item: Aussie Stainless Design 150 mm high in stainless steel, screw fixed.

3 INSTALLATION

Wood heater

Installation: Install on proprietary tiled hearth with safety clearances determined by manufacturer. Screw fix heater feet to hearth to prevent movement.

Commissioning: Fire heater to fix coating where required by manufacturer's instructions.

Medicine cabinet

Installation: Fix recessed into wall. Trim all round.

TILE FINISHES

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Concrete construction* for substrate tolerances.
- *Timber frame construction* for structural floor sheeting.
- *Lining* for internal substrates to walls.

Standards

Follow the guidance given in those parts of AS 3958.1 and AS 3958.2 referenced in this worksection.

Slip resistance: To AS/NZS 4586.

Completed tiling

Conform to the **Tolerances table**.

Tolerances table

Property	Tolerance criteria
Alignment: Deviation of the finished tiles from a 3 m straight edge laid against any joints	< 2 mm
Flatness: Deviation of any plane surface under a 3 m straight edge laid in any direction on an area of uniform grade	< 2 mm
Lippage:	
- Tiles 300 x 300 mm or less	< 1 mm, with 5% not exceeding 1.5%
- Tiles over 300 x 300 mm	< 1.5 mm, with 5% not exceeding 2%

2 MATERIALS AND COMPONENTS

Tiles

Standard: To AS 4662.

Slip resistance: Provide floor tiles with a rating of:

- Pendulum: X.
- Ramp: A or R10.

Tactile ground surface indicators: To AS/NZS 1428.4.

Coves, nosings and skirtings: To be matching stop-end and internal and external angle tiles moulded for that purpose.

Accessories

If available, provide tile accessories such as round edge ceramic tiles, cove tiles, step treads to thresholds, skirtings, sills, and bath vents, which match the surrounding tiles, composition, colour and finish.

Adhesives

Standard: To AS 2358 or AS 4992.1(Int).

PVA (polyvinyl acetate)-based adhesives: Do not use in wet areas or externally.

Mortar materials

Cement: To AS 3972, type GP.

Lime: To AS 1672.1.

Sand: Fine aggregate with a low clay content selected for grading.

Bedding mortar

Proportioning: Select proportions from the range 1:3 to 1:4 cement:sand to obtain satisfactory adhesion. Provide minimum water.

Terracotta tiles: Use proprietary polymer modified mortar.

Mixing: To AS 3958.1.

Grout

Cement-based proprietary grout: Mix with water. Add fine sand as a filler in wider joints where necessary.

Terracotta tiles: Use proprietary polymer modified grout.

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.

Movement joint materials

Movement joint 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.

- Proprietary item: Latham Neoprene Expansion Loc Strip control joints for hard paving and thin set tile strips for thin tile installations.

3 WATERPROOFING WET AREAS

Standard

General: To AS 3740.

Quality

Waterproofing membranes: Submit a project report and certification of compliance with AS 3740 on completion, including photographic record.

Membrane

Standard: To AS/NZS 4858.

Provide a proprietary liquid applied or sheet membrane system as follows:

- Has a current Australian Building Products and Systems Certification Scheme certificate issued by ABCB (Australian Building Codes Board).
- Has a current appraisal report issued by the CSIRO Building Products and Systems Appraisals stating that the system is suitable for use as a waterproofing system for use in wet areas, shower recess bases and associated floors and wall/floor junctions which are to be tiled.
- A current BRANZ report.

Installation

Substrates: Ensure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion or location of tiles.
- If walls or floors are framed or discontinuous, support members are in full lengths without splicing.
- If floors are solid or continuous:
  - . Excessive projections are removed.
  - . Voids and hollows > 10 mm with abrupt edges are filled with a cement:sand mix not stronger than the substrate nor weaker than the bedding.
  - . Depressions < 10 mm are filled with a latex modified cementitious product with feathering eliminated by scabbling the edges.
  - . Cracks in substrates wider than 1.5 mm are filled with a filler compatible with the membrane system.

Joints and fillets

Internal corners: Provide 45° fillets.

External corners: Round or arris edges.

Priming

General: If required, prime the substrates with compatible primers to ensure adhesion of membrane systems.

Drains

Floor wastes: Turn membrane down onto the floor waste puddle flanges, and adhere.

Hobs

General: For hobless showers provide membrane to entire floor area of room.

Curing of liquid applied systems

General: To the manufacturers instructions.

Curing: Allow membrane to fully cure before tiling.

Overlaying finishes on membranes

Compatibility: If a membrane is to be overlayed with another system such as tiles, provide an overlaying system that is compatible with and not cause damage to the membrane.

Bonded or partially bonded systems: If the topping or bedding mortar requires to be bonded to the membrane, provide sufficient movement joints in the topping or bedding mortar to reduce the movement over the membrane.

4 TILING

Ambient temperature

General: If the ambient temperature is < 5°C or > 35°C, do not lay tiles.

Preparation

Prepare the substrates, including the following:

- Remove deleterious and loose material and leave the surface dust-free and clean.
- For mortar bedding, apply a proprietary bonding agent to the substrate to improve adhesion.

Cutting and laying

Cut tiles neatly to fit around fixtures and fittings, and at margins where necessary. Drill holes without damaging tile faces. Rub edges smooth without chipping. Return tiles into sills, reveals and openings. Butt up to returns, frames, fittings, and other finishes.

Variations

Distribute variations in hue, colour, or pattern uniformly by mixing tiles or tile batches before laying.

Protection

Keep traffic off floors until the bedding has set and attained its working strength.

Setting out

General: Set out tiles to give uniform joint widths within the following limits:

- Internal ceramic tiling: 1.5 – 3 mm.
- Mosaic tiling: As dictated by pattern.
- Quarry tiles: 6 – 8 mm.

Joint alignment: Set out tiling with joints accurately aligned in both directions and wall tiling joints level and plumb.

Joint position: Set out tiles from the centre of the floor or wall to be tiled and, if possible, ensure cut tiles are a half tile or larger.

Fixtures: If possible, position tiles so that holes for fixtures and other penetrations occur at the intersection of horizontal and vertical joints or in the centre of tiles. Continue tiling fully behind fixtures and appliances 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.

Falls and levels

General: Grade floor tiling to even and correct falls and to floor wastes. Make level junctions with walls. If falls are not required, lay level.

Minimum fall generally: 1:80.

Minimum fall in shower areas: 1:60.

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

Preparation of tiles

Adhesive bedding: Fix tiles dry.

Bedding

General: 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.

Adhesive bedding application

General: Apply adhesive by notched trowel to walls and floors and direct to tiles if required, to provide evenly distributed coverage after laying as follows:

- Walls and floors generally: > 90%.
- Wet areas: 100%.

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.

Movement joints

General: Provide movement joints as follows:

- Over structural (isolation, contraction, expansion) joints.
- Around the perimeter of the floor.
- To divide large tiled areas into bays not exceeding 6 x 6 m internally and 4 x 4 m externally.

Floor finish dividers

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

Bath ventilation

Ventilate the space below fully enclosed baths with at least 2 vermin proofed ventilating tiles.

Sealed joints

Fill joints with silicone sealant and finish flush with the tile surface where tiling joins sanitary fixtures, including tapware, and at wall/floor junctions in showers.

FLOOR COATINGS AND COVERINGS

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Concrete construction* for substrate tolerances.
- *Timber frame construction* for structural floor sheeting.
- *Tile finishes* for adjacent floor finishes.

2 MATERIALS AND COMPONENTS

Cementitious

General: Polymer modified cementitious self smoothing and levelling compound.

- Surface tolerance: To AS/NZS 2455.1 clause 1.4.
- Thickness: 3 mm minimum.

Hardboard underlay

Standard: To AS/NZS 1859.4, standard hardboard Type RD, manufactured as flooring underlay.

Soft underlay

Standard: To AS 4288, classification GC.

Synthetic foam underlay: Provide a high density synthetic latex flat cushion foam sandwiched between reinforced carrier fabric.

Vinyl

Type: Proprietary system of resilient sheet flooring.

Material: Homogeneous single layered, 2.0 mm thick.

Adhesives

Standard: To AS 3553.

General: Compatible with the floor covering material and suitable for bonding it to the subfloor.

Hot-melt adhesive tape

Provide a 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.

Carpet

Minimum class: Domestic Medium Duty under the Australian Carpet Classification Scheme.

Batching: Ensure that carpet laid in a single area and of a single specified type, quality, colour and design, comes from one manufacturing batch and dye lot.

Preformed gripper strips

General: Commercial grade plywood carpet gripper strip with 3 rows of rust-resistant angled pins of length appropriate to the carpet type.

Size (minimum): 33 mm wide x 7 mm thick.

3 SUBSTRATE

Substrate preparation

General: Ensure substrates conform to the **Substrate tolerance table** and are as follows:

- To AS/NZS 2455.1 or AS/NZS 2455.2, as appropriate.
- Clean and free of any deposit or finish which may impair adhesion or location and functioning of movement joints.

Substrate tolerance table

Property	Length of straight edge laid in any direction	Max. deviation under the straight edge
Flatness Class A	3 m	3 mm
Smoothness	150 mm	1 mm
Projections	50 mm	0.5 mm

Prepare the substrate including the following:

- Stripping and cleaning: Remove deleterious and loose material, including any surface treatment which could adversely affect adhesion.
- Repairs: Make good to the surface finish as necessary. Fill depressions with a suitable filler, and remove high spots and projections. If necessary lay a steel-trowelled underlay to concrete substrate.
- Fixtures and fittings: Remove door stops and other fixtures, and refix in position undamaged on completion of the installation.
- Basic sanding: Lightly sand the junctions of hardboard underlays.

4 LAYING RESILIENT FINISHES

Quality

Laying: Use accredited applicators.

Sequence: Lay before fixing skirting.

Temperature control

Heat flooring to achieve constant temperature of 17°C for 24 hrs before laying. Condition rolls to the same temperature.

Sheet set out

Set out sheets to give the minimum number of joints. Run sheet joints parallel with the long sides of floor areas.

Joints

Butt edges together to form tight neat joints showing no visible open seam. Cold weld.

Junctions

Scribe neatly up to returns, edges, fixtures and fittings. Finish flush with adjoining surfaces.

Rolling

General: Where rolling is required, roll the finish in 2 directions before the adhesive sets, using a 70 kg multi-wheeled roller.

Edge strip

Provide a proprietary edge strip at floor junctions with tiled surfaces. If edge strips occur at doorways, make the junction underneath the closed door.

Cleaning and protection

Keep traffic off floors until bonding has set or for 24 hours after laying, whichever period is the longer. Do not allow water in contact with the finish for 7 days.

5 LAYING CARPET

Standard

General: To AS/NZS 2455.1.

Setting out

General: Lay the carpet in continuous lengths without cross joins in the body of the area. Make unavoidable cross joins at doorways under the closed door.

Joints in underlay: Ensure joints in underlay do not coincide with carpet joints. Do not carry underlay over carpet grippers or edge strips.

Fixing underfelt

To timber floors: Secure underfelt with staples at 100 mm centres at edges and joints, in parallel lines 600 mm apart.

Seaming methods

Woven carpet: Machine or hand sew.

Tufted carpet: Provide hot-melt adhesive tapes.

Fixing

Permanent stick method: Immediately after laying, and again one hour later, roll the carpet from the centre diagonally towards each edge using a 65 kg multi-wheeled roller. Do not roll foam-backed carpet.

Gripper strip: Provide preformed gripper strip and tackless edge strip. Space fixings at 150 mm maximum centres.

Edge strip

Provide a proprietary edge strip at exposed edges of the carpet. If edge strips occur at doorways, make the junction underneath the closed door.

PAINTING

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings.
- *Paving* for pavement line marking.

Standards

Comply with the recommendations of those parts of AS/NZS 2311 and AS/NZS 2312 which are referenced in this worksection.

2 MATERIALS AND COMPONENTS

APAS specifications

General: Provide paints and other materials which are scheduled in the Australian Paint Approvals Scheme 'List of Approved Products' as complying with cited APAS specifications to the type specified and suitable for the substrate to which the paint is to be applied.

Quality: If the product is offered in a number of levels of quality, provide premium quality lines.

Combinations

Do not combine paints from different manufacturers in a paint system.

Clear timber finish systems: Use only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

Delivery

Deliver paints to the site in the manufacturers' labelled containers. Ensure containers are marked with the APAS (Australian Paint Approvals Scheme) specification number.

Tinting

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

3 PREPARATION

Preparation generally

General: To AS/NZS 2311 Section 3.

Protection of steelwork: To AS/NZS 2312 Section 4.

Order of work

Complete clear timber finishes before commencing opaque paint finishes in the same area.

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 and laying flooring materials.

Protection

Remove door furniture, switch plates, light fittings and other fixtures before starting to paint, and refix in position on completion of painting.

Adjacent surfaces: Protect adjacent finished surfaces liable to damage from painting operations.

Substrate preparation

General: Prepare substrates to receive the painting systems to achieve quality finishes free from defects.

Cleaning: Clean down the substrate. Do not cause undue damage to the substrate or damage to, or contamination of, surroundings.

Filling: Fill cracks and holes with fillers, sealants, putties or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

Provide a filler tinted to match the substrate if the finish is transparent.

Clear timber finish systems: Prepare the surface so that its attributes will show through the clear finish without blemishes, by methods which may involve the following:

- Removal of bruises.
- Removal of discolourations, including staining by oil, grease and nailheads.
- Bleaching.
- Puttying.
- Fine sanding (last abrasive no coarser than 220 grit) to show no scratches across the grain.

Repair of galvanising

If galvanised or zinc-coated surfaces have been cut or welded after galvanising, prime the affected area with a zinc-rich organic binder to APAS-2916.

4 PAINTING

Painting generally

General: To AS/NZS 2311 Section 6.

Protection of steelwork: To AS/NZS 2312 Section 8.

Paint system description

If a system is referred to only by its final coat (for example by the manufacturer's brand name, the APAS specification code or the generic name) provide stains, primers, sealers and undercoats which are suitable for the substrate and are compatible with the finish coat and each other.

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; and/or
- achieve a satisfactory opacity.

Mixing

Mix all paint in its original container before use and produce a smooth uniform product.

Paint application

Apply compatible primer and undercoat or undercoat/sealer to all surfaces to be painted after cleaning. 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.

Painting wet areas

Use an anti-mould additive when painting wet areas.

Priming before fixing

Timber: Apply a first coat (two coats to end grain) to timber door frames, to tops and bottoms of doors, and associated door and window trims before fixing in position.

Steel: Apply a priming coat of zinc-rich organic binder to APAS-2916.

Repair of galvanizing

If galvanized or zinc-coated surfaces have been cut or welded after galvanizing, prime the affected area with a zinc-rich organic binder to APAS-2916.

Finishing timber decking

After sanding, finish with clear floor finish to APAS-0054.

Restoration

Clean off marks, paint spots and stains progressively. Touch up damaged decorative paintwork or misses with the paint batch used in the original application.

MECHANICAL INSTALLATIONS

1 GENERAL

Responsibilities

Design and provide to living and sleeping areas evaporative air conditioning systems comprising:

- Evaporative air conditioner sized to suit dwelling floor area and ceiling height.
- Insulated metal ducting externally and insulated flexible ducting internally in ceiling space, including all branches and connectors.
- 350 x 350 ceiling registers.
- Fabricated air conditioner stand in SHS or RHS.
- Electrical services, controls, water supply and drainage connections.

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings and durability, and fasteners.
- *Quality* for inspection and testing of systems, and submissions.
- *Insulation and sarking* for thermal barriers.
- *Painting* for applied finishes.
- *Electrical installations* for exhaust fan requirements.

Airconditioning design

Airconditioning load calculations: Calculate the cooling and heating loads using one of the following:

- Manual methods: AIRAH DA9, ASHRAE or Carrier.
- Electronic methods: ACADS-BSG Camel, Carrier E20 or Trane Trace.

Outside design conditions: Use outdoor design conditions listed in AIRAH DA9, Table 1 or Table 1A for the location geographically closest to the site and Comfort or non-critical process conditions.

Inside design conditions:

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

Rating: Achieve at least 30 air changes per hour.

Airconditioning unit capacity table

Unit reference	Output (L/s)		
	High level	Low level	Tolerance at each level
1	2,000	1,000	±10%
2	2,500	1,250	±10%
3	3,000	2,000	±10%
4	4,000	2,750	±10%

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

Duct design

Size ductwork on the following basis:

- Rigid sheet metal duct: ≤ 6 m/s and ≤ 1.2 Pa/m.
- Flexible duct: ≤ 4.0 m/s.

2 STANDARDS

General

Mechanical ventilation: To AS/NZS 1668.1 and AS 1668.2, as required by the Building Code of Australia.

Evaporative airconditioning equipment: To AS/NZS 2913.

Energy performance: To AS/NZS 3823.2.

Microbial control: To AS/NZS 3666.1, AS/NZS 3666.2 and the recommendations of SAA HB 32.

3 SUBMISSIONS

General

Before starting work, submit the following:

- Licence numbers and type of licences held by persons responsible for the installation of airconditioning equipment.

4 EVAPORATIVE COOLERS

Equipment

Supply equipment that is as follows:

- Made by a manufacturer with a demonstrated ability to provide spare parts and service promptly to the site.
- Will operate within the specified range of outdoor design conditions under the calculated loads.
- Labelled to AS/NZS 2913.

Equipment enclosure

Provide enclosure, materials and finishes that are weatherproof and corrosion-resistant assembled, and constructed and reinforced to prevent flexing and drumming.

Materials:

- Stainless steel: Base, pillars, pad frames, sides and tops.

Outdoor equipment finishes: Stainless steel: Natural finish.

Internal fitments finish: Manufacturer's standard finish.

Moisture retention: All parts free draining with no pockets in which condensation and/or water may be retained.

Water tank

Material: Fabricate in fibreglass.

Connections: Provide drainage and overflow outlet.

Controls and electrical

Provide factory wired control panel containing the following:

- Plug-in relays.
- Terminal strips numbered to correspond to wiring diagram.
- Starter and overload protection for each motor.
- Isolating switch for each motor to break active conductors.
- Short circuit protection: Provide each 3-phase motor, where fitted, with short circuit protection by circuit breaker and a contactor with manual reset thermal or magnetic overload.
- Terminals for remote indication of run and fault conditions.
- Permanent, weatherproof, wiring diagram fixed next to the control panel.

Isolating switch: Provide system isolator for each system.

Provide proprietary remote selector switch with the following capabilities:

- Fan on/off only for ventilation at low speed and high speed.
- Water pump on/off.
- Fan and water pump operation for cooling at low speed and high speed.
- LED indicator light to show water pump on/off state.

Installation

Outdoor equipment: Provide clearance around units for air flow and maintenance access.

Orientation: Where possible, locate air conditioner on eastern or southern side of dwelling.

Location: Locate and arrange all services and equipment so that:

- Failure of installation (including leaks) does not create a hazard for occupants.
- Failure of installation (including leaks) causes no damage to the building, its finishes and contents.
- Inspection and maintenance operations can be carried out with the minimum inconvenience and disruption to occupants.
- Services and equipment are readily accessible so that inspection and maintenance can be carried out in a safe and efficient manner.

5 DUCTWORK

Standard

Ductwork: To AS 4254.

Rigid duct

Material: Metallic-coated sheet steel to AS 1397, coating class G2/Z275.

Flexible duct

Material: Alumidised fabric clamped on formed metal helix with insulation blanket wrapped around duct and covered with an outer vapour barrier.

- Proprietary item: Polyaire Firebreak 25 insulated flexible ducting and fittings.

Installation: Install flexible duct as straight as possible with minimum number of bends. Maximise bend radius. Check for and rectify any crushed flexible duct.

Support: To AS 4254. Limit sag to < 40 mm/m.

Dampers: Equalise air flow with opposed blade damper.

Duct insulation

Insulate ducts to reduce heat gain and prevent condensation. Provide continuous vapour barrier around ducts carrying conditioned air. Insulate flexible connections on ducts carrying air below ambient temperature.

Grilles and diffusers

Type: Multi-bladed, removable core 4-way blow configuration, fitted with a blanking plate for 1-, 2-, or 3-way blow, as appropriate.

Location: To provide even air distribution and temperatures with no draughts.

Cleaning

Clean interior of ductwork progressively during installation. Clean filters, grilles and diffusers on completion.

6 UNIT INSTALLATION

General

Supply all components and install to manufacturer's recommendations.

Outdoor equipment: Provide clearance around units for condenser air flow and maintenance access. Ensure discharge air does not short-circuit to condenser intake.

Equipment at ground level: Mount on 150 mm thick concrete plinth.

Vibration isolation

Suspended units: Provide ≥ 4 metal spring or rubber-in-shear isolation mountings with ≥ 25 mm static deflection and 98% isolation efficiency.

Floor mounted units: Provide neoprene waffle pads. Bolt in place.

Safety trays
If leaks or condensation from equipment could cause nuisance or damage to the building or its contents, provide a galvanised steel safety tray under the equipment.

7 COMPLETION

Commissioning
Commission the systems to manufacturer's recommendations using instruments calibrated within the past 12 months. Check ductwork for leaks. Test all safety controls by simulating fault.

Air quantities: Balance systems to accord with design air quantities.

Tolerance on air quantities: Between +10% and -0% of the design air quantities.

Temperature recording: Provide electronic data logger or thermohydrograph to record temperatures at nominated locations and times for periods of 7 days. Check that temperatures are within documented tolerance.

Check list: Submit signed commissioning check list on completion.

Cleaning
Clean filters, grilles and diffusers on completion.

Operating and maintenance instructions
Provide written operating and maintenance instructions for the day to day operation of the installation containing:

- Contractor's contact details for service calls.
- Manufacturer's maintenance and operation literature.
- Manufacturer's warranty certificates if the manufacturer's warranty period is greater than the defects liability period.
- Description of day to day operation.
- Setting of time switches.
- Schedule of recommended maintenance.

Record drawing: Provide a drawing of the system as installed.

8 MAINTENANCE

General
Maintenance period: The greater of 12 months from the date of commissioning of the systems and the duration of the Defects Liability Period.

Warranty: Warrant the installation for the whole of the maintenance period.

Corrective maintenance: Attend site and undertake corrective maintenance within 24 hours of receipt of verbal or written advice.

Preventative maintenance: Provide preventative maintenance recommended by the equipment manufacturer. Provide all materials including consumable items and refrigerant.

Summer preventative maintenance visit: Provide at least one preventative maintenance visit during the months of December, January or February.

Maintenance reports: Provide a maintenance report setting out the work done and any measured values after each visit.

HYDRAULIC INSTALLATIONS

1 GENERAL

Responsibilities
General: Provide hydraulic services systems subject to the site and other constraints as follows:

- Cold water services: Connect the cold water supply system to the Network Utility Operator's main through a stop valve and meter. Provide the cold water installation from the meter to the external and internal draw-off points or to connections to other services.
- Hot water services: Provide the hot water installation, including tempered water supply, from the cold water connection points to the internal draw-off points or to connections to other services, and unitary hot water heating plant.
- Wastewater. Provide the sanitary drainage installation, including fixtures and fixture wastes, from the fixture connection points, or outlets, to the point of discharge to the Network Utility Operator's wastewater piped collection system.
- Drainage. Provide stormwater drainage installation from the discharge points or outlets of building roofs and paved areas to the point of discharge to the piped collection system.

Cross references
General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings and durability, and fasteners.
- *Quality* for inspection and testing of systems, and submissions.
- *Site preparation* for service trenches.
- *Site stormwater drainage* for site drainage generally.
- *Roofing*, for roof plumbing.
- *Tile finishes*, for waterproofing of wet areas.
- *Painting*, for priming steel or iron before installation and exposed piping required to be painted.

Design
Extent: Provide all additional design work necessary to complete the documented hydraulic services.

Qualification: Use only appropriately experienced and qualified persons to undertake hydraulic design work. If requested, provide documents verifying the qualification and experience.

Connections
Construction: Excavate to locate and expose the connection points and connect to the Network Utility Operators' mains. On completion, backfill and compact the excavation and reinstate surfaces and elements which have been disturbed such as roads, pavements, kerbs, footpaths and nature strips.

Connection by Network Utility Operator: If the Network Utility Operator elects to perform or supply part of the works, make arrangements and pay the applicable fees.

Associated work
Provide as necessary for the complete functioning and maintenance of installations:

- Access openings in walls, ceilings and at other positions required for adjustment, inspection, maintenance and cleaning of hydraulic services.
- False ceilings, bulkheads and enclosures for concealing hydraulic services.
- Roof penetration upstands and underflashings.

- Signwriting, labelling and tagging and marking of system components.
- Power supply and control systems to plant and equipment.

2 STANDARDS

General

Plumbing and drainage: To AS/NZS 3500.0, AS/NZS 3500.1, AS/NZS 3500.2, AS/NZS 3500.3 and AS/NZS 3500.4 and the Plumbing Code of Australia.

Copper pipe and fittings - installation and commissioning: To AS 4809.

PE pipe and fittings: To AS 2492 and AS 2537.

Authorised products

Standard: Listed in the WaterMark Product Database, unless otherwise required by the Network Utility Operator.

Sanitary fixtures

Water closets and cisterns of 6/3L capacity: To AS 1172.1 and AS 1172.2.

Moulded plastic toilet seats: To AS 1371.

Wash and vanity basins: To AS/NZS 1730.

Sinks and drainers: To AS 1756.

3 PRE-COMPLETION TESTS

Site tests

Generally: Test system for leaks, including pipe joints, valve seats and tap washers. Repair as necessary, replace if damaged, and retest.

Pressure testing schedule

Service	Test pressure and duration
Water	Hydraulic test at 1500 kPa for not less than 30 mins
Plumbing (above ground)	Air test at 30 kPa for 3 minutes minimum
Drainage (below ground)	Hydraulic test at 3 m head maximum for 5 minutes

Isolation: Seal off items of equipment not designed to withstand applied test pressure. Securely anchor pipes and fittings in position to prevent movement during tests.

Compliance: No leakage.

UPVC pipework

Cure solvent cement joints for at least 24 hours before testing.

Pressure transients

If water hammer is present, rectify or eliminate the cause.

Certification

On completion of satisfactory testing, submit certification of compliance.

4 MATERIALS AND COMPONENTS

Accessories

General: Provide the accessories and fittings necessary for the correct installation and proper functioning of the systems, including taps, valves, outlets, pressure and temperature control and backflow prevention devices, strainers, gauges and pumps.

Thermostatic mixing valves: 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. Incorporate the following controls:

- 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.

Isolating valves: In addition to valves required to meet statutory requirements, provide valves so that isolation of parts of the system in the event of leaks or maintenance causes a minimum of inconvenience to building occupants.

Finishes

Finish exposed piping, including fittings and supports, as follows:

- Internal locations such as toilet and kitchen areas: Bright chrome plate.
- Externally: Pre-finish or full gloss solvent-borne paint system.
- Concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave unpainted except for required identification marking.

Valves

Finish valves to match connected piping.

5 CONSTRUCTION GENERALLY

Installation

General: Install piping in straight lines and to uniform grades. Arrange and support the piping, including valving, so that it remains free from vibration and pressure transients, while permitting thermal movement. Keep the number of joints to a minimum. Prevent direct contact between incompatible metals.

Concealment: If practicable, conceal piping and fittings requiring maintenance or servicing so that they are accessible within non-habitable enclosed spaces such as roof spaces and ducts. Keep pipelines in subfloor spaces at least 150 mm above ground and ensure access can be provided throughout for inspection. Provide at least 25 mm clearance between adjacent pipelines (measured from the piping insulation where applicable).

Building penetrations: If piping passes through building elements, provide purpose-made metal or plastic sleeves formed from pipe sections. Prime steel or iron before installation. If the building element is acoustically rated, maintain the rating.

Pipe support materials: The same as the piping, or galvanised or non-ferrous metals, with bonded PVC-U or glass fibre woven tape sleeves where needed to separate dissimilar metals.

Cover plates: Where exposed piping emerges from wall, floor or ceiling finishes, provide cover plates of non-ferrous metal, finished to match the piping, or of stainless steel.

Cover plate sizes table

Nominal pipe size, DN	Cover plate diameter
< 20	65 mm
≥ 20, < 50	100 mm
≥ 50	50 mm larger than pipe diameter

Differential movement: Provide movement control joints in pipes at structures to accommodate differential movements between buildings and the ground in which pipes are buried.

Cleaning

During construction, use temporary covers to openings and keep the system free of debris. On completion, flush the hydraulic systems using water and leave clean.

6 STORMWATER

Connection

General: Provide stormwater drains to connect downpipes to the outlet point or point of connection.

Outlet point: Kerb and gutter, otherwise pop-up.

Minimum diameter: DN100.

Cleaning
During construction, use temporary covers to openings and keep the system free of debris. On completion, flush the system using water and leave it clean.

Pipelaying
Lay pipelines with the spigot ends in the direction of flow.

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

Inspection openings
Where lengths of stormwater drain are not accessible from termination points, provide inspection openings with covers at bends and junctions and changes of grade.

7 WASTEWATER

Material
Minimum diameter: DN100 to underfloor sections.

Material: Internal exposed: CP copper.

Maintenance
Suspended floors: Provide IO immediately under pan.

Cleaning
During construction, use temporary covers to openings and keep the system free of debris. On completion, flush the system using water and leave it clean.

Charged wastes
Connect all floor wastes to piped drainage.

Vent pipes
Staying to roof: If fixings for stays penetrate the roof covering, seal the penetrations and make watertight.

Terminations: Provide bird-proof vent cowls made of the same material and colour as the vent pipe.

8 COLD AND HEATED WATER

Fittings and accessories
General: Provide the fittings and accessories necessary for the proper functioning of the water supply system, including taps, valves, outlets, backflow prevention devices, pressure and temperature control devices.

Tap positions: Locate hot tap to the left of, or above, the cold water tap.

Tap coding: Colour code tap handle inserts:

- Cold water: Blue
- Hot water: Red
- Warm water: Yellow

Pipework
General: Ensure that connections from internal reticulation to individual fixtures do not exceed the lengths specified in **Water piping system schedule**.

Water piping system schedule

Diameter	Location	Maximum length (m)
DN18	Service to 1 fixture or outlet	6.0
DN15	Service to 1 fixture or outlet	3.0
DN10	Hot and cold water mixing tap in a straight run	1.0

Piping insulation
Standard: To AS/NZS 3500.4 Section 8.

Underground piping
Trench at least 450 mm below finished ground or paving levels.

9 WATER HEATERS

Standards
Electric water heaters: To AS/NZS 4692.1.

Minimum energy performance: To AS/NZS 4692.2.

Tariff
General: Install so that the heating system qualifies for the tariff concession or subsidy offered by the statutory authority.

Solar water and heat pump systems
General: 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: To AS/NZS 2712.

Heater installation
Location: Locate water heaters in a position where they can be maintained or replaced without damaging adjacent structures, fixtures or finishes.

Hot water temperature
Standard: To AS/NZS 3500.4.

Temperature setting: Maximum temperature at ablution outlets: 50ºC.

Isolating valves
Water heaters: Provide with isolation valves to inlet and outlet pipes.

10 COMPLETION

Commissioning
General: Commission and test each system in conjunction with all support systems, to ensure complete and reliable operation of the system under simulated normal operational demand.

Recording details: Carefully record details of commissioning procedures, tests and results for detailed analysis and verification of compliance. Include commissioning test results and reports in the Operation and Maintenance manual.

Record drawings
General: Provide drawings of each system as installed. Include shop drawings. Show dimensions, types and location of the services in relation to permanent site features and other underground services. Show the spatial relationship to building structure and other services.

Changes: update with any changes made during commissioning and the maintenance periods and resubmit.

Diagrams: Provide drawings in diagrammatic form.

Services below ground: Where pipes and fittings are below ground show the location, invert level and depth, and dimensioned references that will allow the future location of the service for maintenance or expansion.

Stormwater: Include pipe grade.

Wastewater: Include fittings, pits and inspection openings.

ELECTRICAL INSTALLATIONS

1 GENERAL

Responsibilities

Design and provide the principal electrical systems as follows:

- Electrical services: Single phase domestic power and lighting supply.
- Telecommunications cabling systems: Domestic telephone system.
- TV systems: Domestic free-to-air TV installation.
- Smoke alarm system: Hard-wired photo-electric installation

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for steel coatings and durability, and fasteners.
- *Quality* for inspection and testing of systems, and submissions.
- *Site preparation* for service trenches.
- *Timber frame construction* for timber framing generally.
- *Steel frame construction* for steel framing generally.
- *Doors and windows* for door and window details.
- *Mechanical installations* for installed plant and equipment.
- *Hydraulic installations* for hot water heater.

Interpretation

ED S&IR: The Electricity Distributor's Service and Installation Rules.

RCD: Residual Current Device.

Telephony: Speech and low band frequencies (= 100 kHz).

System design

Calculate the maximum demand of the installation in accordance with AS/NZS 3018 and give the Principal's Representative a copy of the calculations.

Spare capacity: Provide the following:

- > 10% spare capacity in mains and submains.
- > 25% spare capacity in final subcircuits.

Load balancing: Spread electrical load equally across circuits to prevent overloading and inadvertent circuit breaker operation.

Fixed and stationary appliances: Treat socket outlets supplying fixed or stationary appliances likely to cause an RCD to trip due to earth leakage currents in accordance with AS/NZS 3000. Do not connect to circuits that supply socket outlets intended for hand held or portable appliances.

Spare spaces: Provide switchboards with ≥ 4 spare positions for future single phase circuit breakers.

Qualification

General: Use only persons appropriately experienced and qualified to undertake electrical design work on the systems documented.

Connections

General: Submit all necessary applications for electricity supply. Liaise with the electricity Network Utility Operator and comply with the ED S&IR. Arrange to connect to the existing service. Pay the applicable fees.

Connection by Network Utility Operator: If the Network Utility Operator elects to perform or supply part of the works, make arrangements and pay the applicable fees.

Consumers mains and metering

Provide consumers mains and connect them to the Network Utility Operator's mains.

Network Utility Operator's requirements: Provide metering, protection, and control equipment as required by the ED S&IR.

Performance

General: Carry out verification tests and measurements to demonstrate compliance. Submit test reports.

2 STANDARDS

General

Electrical systems: To AS/NZS 3000, AS/NZS 3008.1.1, AS/NZS 3018 and SAA HB301.

Degrees of protection (IP code): To AS 60529.

EMC: To AS/NZS 61000.

Conduits: To AS/NZS 2053 Parts 1 to 8 as appropriate.

Voice communications cabling: To AS/NZS 3080.

Fire detection and alarms: To AS 1670 Parts 1, 3, 4 and 6.

Television co-axial cabling systems: To AS/NZS 1367.

Receiving antennas for radio and television: To AS 1417.1 and AS 1417.2.

3 SUBMISSIONS

General

Before starting work, submit the following:

- Licence numbers and type of licences held by persons responsible for the electrical installation.

4 MATERIALS AND COMPONENTS

Accessories

Provide accessories necessary for a complete installation including but not limited to switches, socket outlets, and telecommunications and TV outlets. All accessories shall be from the same manufacture range, size and material.

5 INSTALLATION GENERALLY

General

Arrangement: Arrange services so that services running together are parallel with each other and with adjacent building elements.

Fixing: If non-structural building elements are not suitable for fixing equipment and services to, fix directly to structure and trim around holes or penetrations in non-structural elements.

Installation: Install equipment and services plumb, fix securely and organise reticulated services neatly. Allow for movement in both structure and services.

Installation of accessories

Flush mounting: Provide flush mounted accessories including where located in face brickwork.

Location: Confirm final location of all outlets and equipment on site prior to installation of conduits and wiring.

Default mounting heights to centre of accessory plate:

- Outlets above floor level generally: 400 mm.
- Switches and controls: 1100 mm.

Restricted location: Do not install wall boxes across junctions of wall finishes.

Wet areas: Position accessories in locations containing baths showers or other fixed water containers to comply with the requirements of AS/NZS 3000.

Installation of ceiling mounted appliances

Connections for appliances: Provide flush mounted outlets on the ceiling next to support brackets.

Connections for fixed equipment: Provide concealed permanent connections.

Fixing: Provide support brackets fixed through ceiling to the building structure. Brace appliances that are heavy or vibrate to prevent horizontal movement.

6 LOW VOLTAGE POWER SYSTEMS

General

General: Provide a complete operational low voltage power system comprising the following and as documented:

- Supply.
- Metering.
- Consumers mains.
- Submains.
- Final subcircuits.

Appliances

Provide final subcircuits and terminate at fixed appliances, hot water units, airconditioning and other plant and equipment.

Accessories

General: Provide the following:

- General power outlets.
- Isolating switches.

Wiring systems

Standard: To AS/NZS 3000, AS/NZS 3008.1.1 and AS/NZS 3013.

Selection: Provide wiring systems appropriate to the installation conditions and the function of the load.

Thermal insulation: In walls filled with thermal insulation, install cables in PVC conduit.

Power cables

General: Copper cable generally, multi-stranded except for MIMS.

Minimum size:

- Lighting subcircuits: 1.5 mm^2.
- Power subcircuits: 2.5 mm^2.
- Submains: 6 mm^2.

Voltage drop: Install final subcircuit cables within the voltage drop parameters dictated by the route length and load.

Fault loop impedance: Provide final subcircuit cables selected to satisfy the requirements for automatic disconnection under short-circuit and earth fault/touch voltage conditions.

Dummy load tests

General: Where electrical tests are required and the actual load is not available, provide a dummy load equal to at least 75% of the design load.

7 SWITCHBOARDS

General

General: Provide proprietary enclosure(s) to accommodate consumers main switchboard and metering equipment separately or combined.

Standard: To AS/NZS 3439.3.

Network Utility Operator's equipment: Refer to Network Utility Operator's service rules to determine requirements.

Construction

Construction: Enclosed type with a hinged lid.

Fixing components and equipment: Fix assemblies and metering equipment level and plumb.

Cable entries: Neatly adapt one or more cable entry plates, if fitted, to accept incoming cables. 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.

Location

Metering arrangement: To side wall closest to Network Utility Operator's supply.

Consumers main switchboard: Internally in discrete location if separate from metering equipment.

8 SWITCHBOARD COMPONENTS

Moulded case and miniature circuit breakers

Moulded case breakers: Fault capacity ≥ 10 kA: To AS/NZS 60947.1 and AS 60947.2.

Miniature circuit breakers: Fault capacity < 10 kA, current rating < 100 A: To AS/NZS 60898.1 or AS 3111.

Operation: Independent manual operation including positive *'ON/OFF'* indicator.

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.

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.

Residual current devices

Integral type: Incorporate earth leakage in circuit breaker protection operation. Use individual RCD protection to each circuit.

Standard: To AS/NZS 61009.1.

Maximum tripping current: 30 mA.

9 LIGHTING

General

General: Provide a complete operational lighting system, tested and commissioned.

Proprietary equipment: Provide only proprietary luminaires, fittings and accessories, including lamps and shades.

Lighting controls: Manual switches.

Shades: White painted metalware shade, 350ϕ.

Minimum energy performance

Standard: To AS/NZS 4783.2 and AS/NZS 4782.2.

Luminaires

Standard: to AS 3137.

Non-specified luminaires: Provide a bayonet cap batten holder at each lighting point location where no luminaire is specified.

Lamps

Standard:

- Fluorescent: To AS 4782.1.

Type:

- Compact fluorescent: 14W and 20W spiral, self-ballasted in warm white.
- Linear fluorescent: 18W and 36W multi-phosphor.

Installation

Supports: Mount luminaires on proprietary supports by means of battens, trims, noggings or packing material to suit location.

Completion

General: Install lamps in all luminaries and verify correct operation before completion. Replace lamps which have been in service for a period > 20% of the lamp life as published by the lamp manufacturer.

10 CONDUITS

General

General: Provide concealed conduits as necessary to allow wiring replacement without structural work or the removal of cladding or lining.

Sequence of work: Install conduits and cables before the installation of wall and ceiling linings, and before any external landscaping works.

Conduit sizes: Provide conduits of sufficient internal diameter and arranged so that cables are not subject to undue mechanical stress during installation.

Minimum conduit diameter: 20 mm.

Conduits for future use: Provide a non-metallic drawstring having a breaking strain > 100 kg.

11 VOICE COMMUNICATIONS

General

Submissions: Submit required applications for telecommunications services to the relevant Network Utility Operator.

Installations requiring telephony only: To AS/ACIF S009.

Pre-wiring: Have pre-wiring of telephone service carried out before installation of wall and ceiling linings, and before any external landscaping works.

General: Provide a complete operational voice communications cabling system, tested and commissioned, in accordance with AS/NZS 3080, AS/ACIF S008, AS/ACIF S009 and SAA HB29.

System requirements

Application class to AS/NZS 3080 clause 6.3: E.

Balanced system to AS/NZS 3080 clause 7 (voice): Category 6.

Conformance: Certify the design and installation for conformance with AS/NZS 3080 in accordance with the detailed requirements of clause 4.

Cable separation

Low voltage cables: Separate voice communications cables not enclosed in conduits or ducts from low voltage services by at least 150 mm.

Installation

Crossover: Install cables neatly and without crossovers between cables.

Voice communications outlets

Outlets: Provide RJ45 8 way Cat 5 modular jacks.

Face plates: Proprietary voice socket outlets.

12 AUTOMATIC FIRE DETECTION

General

General: Provide a fully operational, system connected to 240Vac mains power, tested and commissioned in accordance with the AS 1670 series and AS 7240 series.

Selection: Provide equipment listed in the ActivFire Register of Fire Protection Equipment.

Standard

Smoke detector/alarm units: To AS 3786.

Components

Type: Photoelectric smoke alarm, interconnectable, with silencing/hush facility.

Non-replaceable backup power source: 9Vdc manganese dioxide rechargeable battery.

- Proprietary item: Clipsal Lifesaver 755RP.

Installation

General: Install detectors so they can be easily inspected and tested in situ, and readily withdrawn for service.

Integral smoke detector/alarm units: To AS 1670.6.

Interconnection: Interconnect when two or more are installed in the same dwelling.

13 TELEVISION SYSTEM

General

Provide a complete operational analogue and digital television distribution system, tested and commissioned.

System design and performance: To AS/NZS 1367.

Components: Provide all necessary TV antennas, splitters, combiners, mast head and repeater amplifiers, cabling and outlets.

Power supply: Provide a switched socket outlet to power each amplifier.

Network operators

Free-to-air bands: Provide a system suitable for the reception of all local VHF and UHF Free-to-air services:

Performance criteria

Cabling and component installation: To AS 3815.

Signal levels: Differences between outlets <12dB.

Isolation between outlets >27dB, 5 to 862Mhz and >17dB 950 to 2050Mhz.

Antenna

Standard: To AS 1417.1 and AS 1417.2.

Type: Provide antenna of approved manufacture and of a type most suited to this particular installation. Incorporate a matched 75-ohm balun.

Protection: Provide mast, associated brackets and hardware hot dipped galvanised after fabrication.

Location: Install in a position least obtrusive to the overall building appearance and for best possible reception.

Tests: Carry out tests on the site to determine the ambient signal levels to derive the best possible location for the antenna.

Fixing: Pole mounted close to ridge on barge. Reinforce trim in locality to withstand transmitted loading.

Installation: Keep the projection height of the antenna above roof level to a minimum. Provide flashing as required where penetrating roof sheeting.

Cabling

Provide a coaxial cabling system terminating in 75 ohm coax outlet in standard face plate.

Conduits: ≥ 20 mm diameter.

14 EXHAUST FANS

Roof mounted fans

Type: Axial flow aerofoil or propeller, IP44 rated.

Housing: House fans in compact bases fitted with weathering skirts and manufactured from zinc-coated steel or UV stabilised plastic or composite.

Duty: 240 m^3/hr ± 10 m^3/hr.

Finish:

- Metallic-coated steel: UV stabilised powder coat to match roof colour.
- Other materials: Manufacturer's standard colour.

Accessories: Flexible ducting, branches and circular ceiling diffusers to exhaust stale air from toilets, bathrooms and showers to atmosphere. Provide butterfly backdraft shutter under fan.

Installation: Size and fabricate inlet duct to fit roof unit overflashing.

Controls: Time delay switches in each room.

Rangehood

Discharge: Exhaust via metal ducting to atmosphere over roof sheeting. Terminate with cowl.

15 CEILING FANS

Ceiling mounted fans

Type: 1,200 mm 3-blade aluminium white enamelled.

Installation: J hook.

Controls: 3-speed flush mount controller.

16 LABELLING

General

General: Label individual circuits for information of operational and maintenance personnel.

Identifying labels

General: Provide labels fixed to panels, covers and escutcheon panels indicating the circuit reference.

Marking cables

General: Identify the origin of all wiring by means of legible, indelible, proprietary marking system.

Identification labels: Provide durable labels fitted to each sheath, permanently marked with numbers, letters or both to suit the connection diagrams.

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 change of direction, and termination and building entry point.

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.

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 for electrical services: 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.

Labelling – minimum lettering heights

Small proprietary distribution boards: 10 mm.

Other labels including equipment labels within cabinets: 4 mm.

Label colours

Generally: Black lettering on white background except as follows:

- Main switch and caution labels: Red lettering on white background.
- Danger, warning labels: White lettering on red background.

Fixing

General: Fix labels securely.

Fixing methods: Use screws and double-sided adhesive. Fix in extruded aluminium sections attached to panels with rivets or countersunk screws.

Aluminium labels: Aluminium or monel rivets.

Restrictions: Do not use self-tapping or thread-cutting screws.

Permanent fixing: Fix labels permanently in place.

Label fixing table

Component	Fixing scheme	Type
Cables	Origin and destination	Self adhesive – wrap on
Wall boxes	SAA HB29 Figs 5-18	Engraved adhesive label

17 COMPLETION

Testing and certification

Electrical installations: Test to AS/NZS 3017 and AS/NZS 3018. Give the Principal's Representative a certificate showing test results and certifying compliance with AS/NZS 3018:

- correct polarity.
- no transposition of earthing and neutral conductors.
- no short circuit between conductors.
- no intermix between conductors of different circuits.
- switchboard, including mounted equipment, is correctly marked to indicate the corresponding active and neutral connections for each circuit, and the relationship of the various sections of the installation.
- number of points connected to each circuit does not exceed maximum permissible.
- installation operates in the manner intended.

Telecommunications cabling: To AS/NZS 3086 and the recommendations of SAA HB29. Give the Principal's Representative a certificate showing test results and certifying compliance with AS/NZS 3086.

Television systems: To AS/NZS 1367. Test the complete television system. Give the Principal's Representative a certificate showing test results and certifying compliance.

FENCES AND EXTERNAL WALLS

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for timber durability, steel coatings and durability, and fasteners.
- *Site preparation* for site clearance and excavations generally.
- *Concrete construction* for foundations generally.
- *Masonry* for brickwork generally.
- *Metalwork* for fabrication of metal fencing components generally.
- *Painting* for applied finishes.
- *Landscaping* for soft surfaces finishes, and sleeper retaining walls.

2 MATERIALS AND COMPONENTS

Galvanising

Galvanise mild steel components as follows:

- Threaded fasteners: To AS 1214.
- Other components: To AS/NZS 4680.

Concrete

Standard: To AS 1379 or proprietary packaged mix.

Steel panel fencing

Self-drilling screws: To AS 3566 corrosion resistant class 3.

Steel framing: Powdercoated over zinc-coated or aluminium/zinc alloy coated steel to AS 1397 Z450 or Z150.

Steel sheeting: Prepainted to AS/NZS 2728.

Steel posts

Posts, rails and verticals: To AS 1163.

Proprietary item: Capped 350/450 Duragal SHS.

3 FENCING CONSTRUCTION GENERALLY

Set out

Set out the fence line and mark the positions of posts and gates.

Clearing

Clear vegetation on 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 footings so that they have vertical sides and a firm base. Spread surplus material at base of fence.

Minimum footing size

Generally: 225 mm diameter x 600 mm deep except 900 mm deep for corner, end and gate posts.

In loose material: 250 diameter x 900 mm deep.

Line and level

Erect posts vertically. Set heights to follow the contours of natural ground in equal steps.

Concrete footings

General: Place mass concrete around posts and finish with a weathered top falling 25 mm from the post to ground level.

Concrete grade: N20.

Panel fencing

Ensure bottom rails have drain holes and are 50 mm clear of the ground.

4 GATES

General

Construction: Construct gates as follows:

- Sheeting: To match fencing.

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: Provide hand holes to give access from outside to reach locking provision.

Width

Size:

- Driveways: 2 x 1500 mm.
- Rear access: 1 x 2400 + 1 x 1200mm.
- Pedestrian pathways: 1 x 900 mm.

5 WELDED MESH FENCING

Fence dimensions

Height (mm): 1200 mm to front of building line.

Maximum post spacing: 2440 mm.

Component sizes

End and corner posts: 75 x 75 x 4.0 mm.

Intermediate posts: 50 x 50 x 2.0 mm.

Gate posts (personnel): 75 x 75 x 4.0 mm.

Gate posts (vehicle): 75 x 75 x 4.0 mm.

Installation

General: Fit tightly fitting 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, grade N20.

Gates

Frame tubes: 25 x 25 x 2.0 mm 350/450 Duragal.

Wire: Match fence.

6 STEEL PANEL FENCING

Fence dimensions

Height (mm): 1800 mm to rear of building line.

Maximum post spacing: 2440 mm.

Component sizes

End and corner posts: 75 x 75 x 4.0 mm.

Intermediate posts: 50 x 50 x 2.0 mm.

Bottom, mid and top rails: Topspan 50 – 0.75 BMT galvanised battens.

Panel: BHP Custom Orb 0.42 BMT zincalume finish.

Capping: 25d x 16w 0.42 BMT steel channel galvanised finish.

Gate posts (personnel): 75 x 75 x 4.0 mm.

Gate posts (vehicle): 75 x 75 x 4.0 mm.

Installation

General: Fit tightly fitting caps to steel posts. Attach panels to posts with 12-14 x 20 Hex Teks.

Footing type: Concrete, grade N20.

Gates

Frame tubes: 75 x 50 x 2.0 mm 350/450 Duragal.

Panel: Match fence.

LANDSCAPING

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for timber durability, steel coatings and durability, and fasteners.
- *Site preparation* for site clearance and excavations generally.
- *Masonry* for brickwork generally.
- *Fences and external walls* for fencing construction generally.
- *Paving* for adjacent hard surfaces, and kerbs.

2 MATERIALS AND COMPONENTS

Soils

General: To AS 4419.

Mulch

General: Provide mulch which is free of deleterious and extraneous matter such as soil, weeds and sticks.

Standard: To AS 4454.

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.

Concrete

Standard: To AS 1379 or proprietary packaged mix.

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

General: To AS 3818.2.

Hardwood: Sound durability class or preservative treated hardwood railway sleepers.

Softwood: Sound preservative-treated softwood sleepers.

3 SLEEPER WALLS

Set out

Set out the wall alignment.

Construction

Wall: Erect sleeper posts at a maximum of 2 m centres, buried one third. Brace at half height of wall with sleepers returned into embankment, spiked to posts. Lay sleepers horizontally in stretcher bond behind the verticals and securely spike together at joints and at 2 m centres.

Backing: Back with geotextile and place a 100 mm draining layer of compacted coarse sand, fine crushed rock or fine gravel between the fabric and backfill.

4 PREPARATION

Weed eradication

Eradicate weeds using a non-residual glyphosate herbicide in any registered formulae, at the recommended maximum rate.

Surplus spoil

Remove surplus spoil from site. Do not burn vegetative material.

5 SUBSOIL

Ripping

General: Rip parallel to the final contours wherever possible. Do not rip when the subsoil is wet or plastic.

Ripping depths: Rip the subsoil to 300 mm depth:

Planting beds

Excavated: Excavate to take the subsoil surface to at least 300 mm below finished design levels. Shape the subsoil to fall to drainage points where applicable. Break up the subsoil to a further depth of 100 mm.

Unexcavated: Remove weeds, roots, construction waste and other debris. Trim the planting bed to 75 mm below finished design levels.

Cultivation

Cultivate subsoil to a minimum depth of 100 mm. Do not disturb services or tree roots; if necessary cultivate these areas only by hand. During cultivation, thoroughly mix in materials required to be incorporated into the subsoil. Remove stones exceeding 25 mm, clods of earth exceeding 50 mm, and weeds, construction waste or other deleterious material brought to the surface during cultivation.

Additives

General: Apply additives during cultivation and incorporate into the upper 100 mm layer of the subsoil.

Gypsum: Incorporate at the rate of 0.25 kg/m^2.

Fertiliser: Provide proprietary fertilisers, delivered to the site in sealed bags marked to show manufacturer or supplier, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

Fertiliser schedule

Location	N:P:K ratio	Application rate
Areas laid to turf	10:4:6	As recommended by manufacturer
Individual plantings	Approved long release type compatible with species	
Planting beds	63:18:28	As recommended by manufacturer

6 TOPSOIL

Placing topsoil

General: Spread the topsoil on prepared subsoil and grade evenly, making the necessary allowances to permit the following:

- Required finished levels and contours to be achieved after light compaction.
- Grassed areas to 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.

Finishing: Feather edges into adjoining undisturbed ground.

Consolidation

General: Compact lightly and uniformly in 150 mm layers. Avoid differential settlement 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.
- Non-irrigated grass areas: 100 mm.

7 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 fertiliser thoroughly into the topsoil before placing the turf.

Laying

Lay turf as follows:

- In “stretcher” pattern with 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.
- To fall evenly to points of drainage discharge.

Tamping

Lightly tamp to an even surface immediately after laying. Do not use a roller.

Watering

Water immediately after laying until the topsoil is moistened to its full depth.

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

General: 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.

8 PLANTING

Plants

General: Provide plants which are as follows:

- Have large healthy root systems, with no evidence of root curl, restriction or damage.
- Are vigorous, well established, free from disease and pests, of good form consistent with the species or variety.
- Are 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 size

General: Supply plants in weed-free containers of the required size.

Trees: Provide advanced stock in the largest of 200 or 300 mm pots, or 25L tubs.

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.

Labelling

Label at least one plant of each species or variety in a batch using a durable, readable tag.

Storage

Timing: Deliver plant material to the site on a day to day basis, and plant immediately after delivery.

Planting conditions

Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain. Suspend excavation when the soil is wet, or during frost periods.

Excavation

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.

Placing

Method: 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.

Backfilling

General: Backfill with imported potting mixture. Lightly tamp and water to eliminate air pockets. Ensure that soil 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: 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.

Watering

Thoroughly water plants before planting, immediately after planting, and as required to maintain growth free of stress.

Fertilising

In planting beds and individual plantings, place fertiliser pellets around plants at the time of planting.

9 MULCHING

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.

Depth: 75 mm.

10 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 of the plant to be supported.

Stake sizes:

- For plants 1000 to 2500 mm high: Two 50 x 50 x 1800 mm stakes per plant.
- For plants smaller than 1000 mm 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.

Webbing: Provide 50 mm hessian webbing stapled to the stake.

11 EDGING

Sawn timber edging

General: Set edgings flush with adjoining surfaces to define planting, grass areas or both. Fix to pegs using galvanised 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.

12 COMPLETION

Planting establishment

Commencement: The planting establishment period commences at the date of practical completion.

Required period: Six months after the Date of Practical Completion.

Recurrent works

General: Throughout the planting establishment period, carry out maintenance work including weed control, mowing, pruning, raking and disposal of vegetable matter.

Replacement: Replace plants and areas of turf which fail to establish at no cost.

Watering

Provide two garden hoses each of length 40 m connected to front and rear yard raw water watering points. Connect moveable rotating sprinkler head to each.

PAVING

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated worksections: Conform to the following:

- *Common requirements* for timber durability, steel coatings and durability, and fasteners.
- *Quality* for inspection and testing of materials and work, and submissions.
- *Site preparation* for site clearance, preparation, excavating and filling generally, and pits.
- *Concrete construction* for formwork, reinforcement, in-situ concrete, jointing and finishes generally.
- *Painting* for applied finishes.
- *Fences and external walls* for gates.
- *Landscaping* for soft surfaces finishes.

Definitions

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.

Standards

Materials and construction for road pavement: To AS 3727.

Car parking: To AS 2890.1.

Footpath crossing

General: Provide a footpath and kerb crossing to Local Authority requirements.

Demolition: Break out and replace any redundant kerb crossing with kerb and gutter to match existing section adjacent.

2 INTERPRETATION

Definitions

Light traffic: Vehicles with a gross mass < 3 t.

Density ratio: Percentage of the maximum density at optimum moisture content as determined by AS 1289.5.2.1.

3 MATERIALS AND COMPONENTS

General

Fill for subgrade: General fill.

Mortar materials

Cement: To AS 3972, type GP.

Concrete kerbs and channels (gutters)

Manually or machine placed: To AS 2876.

Stabilised gravel pavements

Mix: 30:1 selected natural stone gravel:cement.

Gravel grading: Maximum particle size 10 mm, 30% – 40% passing 5 mm sieve.

4 CONSTRUCTION GENERALLY

Grading

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

Finished surface crossfalls: Between 1% and 3%.

General tolerances

Maximum deviations:

- Across junctions of adjacent pavement surfaces: 2 mm.

5 SUB-BASE AND BASE COURSE CONSTRUCTION

Sub-base source material

Material: In accordance with RTA QA Specification 3051 - 1998 (*Unbound and Modified Base and Sub-base Materials for Surfaced Road Pavements)*.

Base source material

Material: Dense graded base 20 (DGB20) in accordance with RTA QA Specification 3051 - 1998 (*Unbound and Modified Base and Sub-base Materials for Surfaced Road Pavements)*.

Tolerances

Surface level: Provide a finished surface which is free draining and evenly graded between level points. The tolerances in the **Surface level tolerance 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 tolerance table

Element	Level tolerance	
	Absolute	**Relative**
Sub-base	+10 mm, -20 mm	5 mm
Base	+20 mm, -0 mm	5 mm

Edges abutting gutters: Within ± 5 mm of the level of the actual gutter edge.

Thickness

The following tolerances apply to variations in the compacted layer thickness:

- Sub-base (individual layers and total thickness): + unspecified, - 10 mm.
- Base (individual layers and total thickness): + unspecified, - 10 mm.

Moisture content

Moisture content: During spreading and compaction, maintain materials at the optimum moisture content (modified compaction) within the range of -2% to +1% from the optimum moisture content.

If necessary to achieve the required density or moisture content, adjust the moisture content of the pavement material before compaction.

Subgrade preparation

General: Undertake subgrade preparation in accordance with the *Site preparation* worksection.

Placement of sub-base and base

Standard: To RTA QA Specification R71 – 1997 *(Unbound Pavement Course (Normal Duty))*.

Placing: Spread material in uniform layers without segregation as near as practicable to the required thickness and, in any event, in compacted layers of not less than 75 mm and not more than 150 mm thick after compaction. Provide equal layers in multilayer courses.

Moisture control: Moisten prepared subgrade, and subsequently, preceding layers of sub-base and base immediately before spreading succeeding layers. Keep the leading edges of sub-base or base material moist until new material is placed adjacent.

Joints: Offset in successive layers by at least 300 mm.

Compaction: Compact each layer of fill to the required depth and density, as a systematic construction operation and to conform to the **Minimum relative compaction table**. Apply uniform and sufficient compactive effort over the whole area to be compacted. Use rollers appropriate to the materials and compaction requirements specified.

Minimum relative compaction table

Item description	Minimum dry density ratio (modified compaction) to AS 1289.5.2.1
Sub-base	95
Base	98

Approval: Do not proceed to next layer until levels, grading and compaction standard of preceding layer of material is tested and verified as meeting the specified standards.

Finishing

Surfaces to be primed: Produce a tight, close textured, even surface without loose stones or a slurry of fines.

6 SPRAYED BITUMINOUS SURFACING

Materials generally

Constituents selection: To RTA QA Specification R106 – 2003 *(Sprayed Bituminous Surfacing (with Cutback Binder))*.

Design: RTA Form 395A or 395K.

Material grades

Bitumen: To AS 2008 and RTA QA Specification 3253 – 2003 *(Bitumen for Pavements)*.

- Class: 170

Refinery cutback bitumen: To AS 2157 and RTA QA Specification 3261 – 2001 *(Cutback Bitumen)*.

Primer: Cutback bitumen (AMC1 - 66/34 bitumen/cutter), containing no fluxing oil. Modify grade specified to suit prepared surface and weather conditions.

Cover aggregate

Standard: To AS 2758.2 and RTA QA Specification 3151 – 2003 *(Cover Aggregate for Sprayed Bituminous Surfacing)*.

Pavement class (To AS 2758.2): C

Particle size distribution:

- Nominal size (mm): 14 mm for initial coat and 10 mm for second coat.

Other properties:

- Grading: To AS 2758.2 Table 1.
- Shape: To AS 2758.2 Clause 8.2 and Table 4.
- Wet Strength and Wet/Dry Strength Variation: To AS 2758.2 Clause 9.2.

Quality Assurance:

- Method: Test Certificates.

Stockpiling: Stockpile aggregates on site at least 2 weeks before commencing sealing operations.

Precoating agent

Material: To RTA QA Specification 3258 – 2001 *(Aggregate Precoating Agent (for Bitumen))*.

Measuring materials

Bitumen and cutter: 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).

Precoating

Preconditions: Prime and seal in dry and reasonably calm weather, on a dry pavement surface at a temperature of at least 15°C.

Timing:

- Sealing aggregates: Precoat immediately before the aggregate is loaded into the spreader trucks.
- 10 mm cover aggregate: Precoat at least 48 hours in advance of spreading.

Precoating agents: Provide precoating agents which have satisfied plate stripping tests with the binder and aggregate to be used in the Works.

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 6 - 15 L/m^3 of aggregate.

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 40oC/h, and circulate cutback bitumen for 20 minutes to ensure thorough mixing.

Heating devices: Use devices capable of uniform heating without damaging bituminous materials.

7 SPRAYED BITUMINOUS SURFACING

SPRAYING OPERATIONS

Cleaning

Immediately prior to spraying remove loose stones, dust and foreign material from the surface of finished basecourse.

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 100 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.
- Cutback bitumen: To RTA QA Specification R106, Table R106.4.

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	Minimum application rate at 15°C (L/m^2)	Size (mm)	Minimum application rate at 15°C (m^2/m^3)
Priming	Primer	AMC1	1.0	-	-
First coat	Bitumen binder	170	1.3	14	90
Second coat	Bitumen binder	170	1.1	10	120
Resealing	Bitumen binder	170	1.2	10	120

Hand spraying

Areas not accessible to the mechanical sprayer: Spray using hand spray equipment attached to the mechanical sprayer.

Protection

Protect adjacent surfaces during spraying. Place drip trays under spray bars when the sprayer is stationary. Clean bituminous materials from adjacent surfaces. Protect freshly sprayed surfaces from contamination.

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 sprayed 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 of 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/or apply additional aggregate as required to give even coverage.

Surface finish

Provide an even, smooth riding and free draining surface.

Defective surfacing

Minimum criteria for retention:

- Actual rate of application: 90% - 110% of that ordered.

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.

Junctions with existing pavements

General: Where the pavement is to be joined to an existing pavement, remove a strip of existing bitumen pavement at least 300 mm wide for its full depth and trim to a neat edge before placing new pavement material.

8 IN SITU CONCRETE PAVING

Reinforcement

Standard: To AS/NZS 4671.

- Grade: 500L.
- Mesh: SL62/SL72.

Position: Locate in top half of slab, 40 mm minimum cover.

Control joints: Stop reinforcement 50 mm clear of control joints.

Trimming reinforcement: Required where slab surrounds another structure, and at re-entrant corners, except where isolation joints are provided.

- Type: At least one N12 bar, 600 mm minimum length.

Minimum thickness

Foot and bicycle traffic: 90 mm.

Vehicular traffic: 110 mm.

Width

Foot traffic: 1,000 mm.

Light traffic: 3,000 mm.

Preparation

Subgrade preparation: Prepare the subgrade to suit the thickness of the base course and paving. If necessary, loosen the ground to a depth of 100 mm and adjust the moisture content before compaction. Compact the ground to a firm, even surface using at least 2 passes of a vibrating plate compactor or roller. Remove and replace soft areas.

Base course thickness: Minimum 75 mm.

Base course material: Provide well-graded crushed rock or gravel, free of deleterious material, with a maximum particle size of 26.5 mm, uniformly graded and with a maximum clay content of 6% by mass.

Placing base course: Spread and compact the base course to a firm, tight, close textured surface using at least 3 passes of a vibrating plate compactor or roller. Adjust the moisture content as needed to facilitate compaction.

Abutment with building

Where concrete paving abuts the wall of a structure, provide a strip of 10 mm thick polyethylene foam space filler between paving and wall.

Finishing methods

Broom finishing: Wood float and broom to an even textured slip-resistant surface with steel tooled margins. On gradients steeper than 10%, roughen the surface by scoring.

Pattern paving: After machine floating, apply a proprietary treatment producing integral coloured and patterned surface.

9 STABILISED GRAVEL PAVEMENTS

Laying

General: Lay the mix damp but not wet, to finish 90 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).

10 PAVEMENT ANCILLARIES

Precast concrete wheel stops

Material: Precast concrete units with predrilled holes located 300 mm from each end for fixing to ground surface.

Installation: Drive 12 mm diameter galvanised 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.

Channels and kerbs

Standard: Construct kerb and/or gutters in fixed forms by extrusion or by slip forming to AS 2876.

Foundation, concrete quality, curing and testing details: To AS 2876.

Linemarking

Standard: To AS 4049.2 and RTA QA Specification R141 – 2006 *(Pavement Marking)*.

Linemarking material: Thermoplastic road marking paint.

- Wet film thickness (mm): ≥ 1.8 mm.
- Colour: White.

Set out: Set out the work to ensure that all markings are placed in accordance with the drawings.

Surface preparation: Remove any deposit which may impair adhesion of the paint finish.

Wet weather: Do not apply pavement marking during wet weather or if rain is likely to fall during the process or paint drying time.

Provision for traffic: Allow for traffic during application and protect pavement markings until the material has hardened sufficiently to carry traffic without damage.

Hand spraying: Hand spray transverse lines, symbols, legends, arrows and chevrons with templates.

Paint thickness: Uniform wet film thickness: ≥ 0.35 mm to ≤ 0.40 mm.

Pavement markings: Straight or with smooth, even curves where intended.

Edges: Clean with a sharp cut off. Remove any marking material applied beyond the defined edge of the marking and leave a neat and smooth marking on the wearing surface of the pavement.

Tolerances:

- Longitudinal line lengths: Do not vary by more than 20 mm from the lengths shown in AS 1742.2.
- Longitudinal line widths: Do not vary by more than 10 mm from the widths shown in AS 1742.2.
- Transverse line lengths and widths: Do not vary by more than 10 mm from the lengths and widths shown in AS 1742.2.

Dimensions: Do not vary the dimensions by more than 50 mm from the dimensions shown on the drawings or in AS 1742.2 as appropriate. Place advisory markings square with the centreline of the traffic lane and/or parking bay.

REFERENCED DOCUMENTS – CODES AND STANDARDS

Australian Standards

AS 1110		ISO metric hexagon bolts and screws - Product grades A and B
AS 1110.2	2000	Screws
AS 1111		ISO metric hexagon bolts and screws - Product grade C
AS 1111.1	2000	Bolts
AS 1111.2	2000	Screws
AS 1112		ISO metric hexagon nuts
AS 1163	1991	Structural steel hollow sections
AS/NZS 1170		Structural design actions
AS/NZS 1170.0	2002	General principles
AS/NZS 1170.1	2002	Permanent, imposed and other actions
AS/NZS 1170.2	2002	Wind actions
AS/NZS 1170.3	2003	Snow and ice actions
AS 1172		Water closets of 6/3 L capacity
AS 1172.1	1993	Pans
AS 1172.2	1999	Cisterns
AS 1214	1983	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)
AS 1237		Plain washers for metric bolts, screws and nuts for general purposes
AS 1237.1	2002	General plan
AS/NZS 1254	2002	PVC (UPVC) pipes and fittings for storm and surface water applications
AS/NZS 1260	2002	PVC-U pipes and fittings for drain, waste and vent application
AS 1273	1991	Unplasticized PVC (UPVC) downpipe and fittings for rainwater
AS 1288	1994	Glass in buildings – Selection and installation
AS 1289		Methods of testing soils for engineering purposes
AS 1289.5	Various	Soil compaction and density tests
AS/NZS 1328		Glued laminated structural timber
AS/NZS 1328.1	1998	Performance requirements and minimum production requirements
AS/NZS 1367	2000	Coaxial cable systems for the distribution of analogue television and sound signals in single and multiple unit installations
AS 1371	1973	Toilet seats of moulded plastics
AS 1379	1997	Specification and supply of concrete
AS/NZS 1390	1997	Cup head bolts with ISO metric coarse pitch threads
AS/NZS 1393	1996	Coach screws - Metric series with ISO hexagon heads
AS 1397	2001	Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated
AS 1417		Receiving antennas for radio and television in the frequency range 30 MHz to 1 GHz
AS 1417.1	1987	Construction and installation
AS 1417.2	1991	Performance
AS 1428		Design for access and mobility
AS/NZS 1428.4	2002	Tactile indicators
AS/NZS 1491	1996	Finger jointed structural timber
AS/NZS 1530		Methods for fire test on building materials, components and structures
AS 1530.2	1993	Test for flammability of materials
AS/NZS 1530.3	1999	Simultaneous determination of ignitability, flame propagation, heat release and smoke release
AS/NZS 1554		Structural steel welding
AS/NZS 1554.1	2004	Welding of steel structures
AS/NZS 1554.6	1994	Welding stainless steels for structural purposes
AS 1562		Design and installation of sheet roof and wall cladding
AS 1562.1	1992	Metal
AS 1562.3	2006	Plastic
AS/NZS 1594	2002	Hot-rolled steel flat products
AS 1604		Specification for preservative treatment
AS 1604.1	2000	Sawn and round timber
AS/NZS 1604.2	2004	Reconstituted wood-based products
AS/NZS 1604.3	2004	Plywood
AS/NZS 1604.4	2004	Laminated veneer lumber (LVL)
AS/NZS 1604.5	2005	Glued laminated timber products
AS 1627	Various	Metal finishing - Preparation and pretreatment of surfaces
AS 1646		Elastomeric seals for waterworks purposes
AS 1646.1	2000	General requirements
AS 1646.2	2000	Material requirements for pipe joint seals used in water and wastewater applications–Specifies by prescription formulation
AS 1646.3	2000	Material requirements for pipe joints seals used in water and wastewater applications with the exception of natural rubber and polyisoprene compounds
AS 1657	1992	Fixed platforms, walkways, stairways and ladders – Design, construction and installation
AS/NZS 1664		Aluminium structures
AS/NZS 1664.1	1997	Limit state design
AS/NZS 1664.2	1997	Allowable stress design
AS 1665	2004	Welding of aluminium structures
AS/NZS 1668		The use of ventilation and airconditioning in buildings
AS/NZS 1668.1	1998	Fire and smoke control in multi-compartment buildings

AS 1668.2	2002	Ventilation design for indoor air contaminant control
AS 1670		Fire detection, warning control and intercom systems - System design, installation and commissioning
AS 1670.1	2004	Fire
AS 1670.3	2004	Fire alarm monitoring
AS 1670.4	2004	Sound systems and intercom systems for emergency purposes
AS 1670.6	1997	Smoke alarms
AS 1672		Limes and limestones
AS 1672.1	1997	Limes for building
AS 1684		Residential timber-framed construction
AS 1684.4	1999	Simplified – Non-cyclonic
AS 1720		Timber structures
AS 1720.1	1997	Design methods
AS 1725	2003	Chain-link fabric security fencing and gates
AS/NZS 1730	1996	Washbasins
AS 1742	Various	Manual of uniform traffic control devices
AS 1742.2	1994	Traffic control devices for general use
AS 1742.3	2002	Traffic control devices for works on roads
AS/NZS 1748	1997	Timber stress graded – Product requirements for mechanically stress-graded timber
AS 1756	1999	Household sinks
AS 1789	2003	Electroplated zinc (electrogalvanized coatings on ferrous articles (batch process)
AS 1796	2001	Certification of welders and welding supervisors
AS 1810	1995	Timber - Seasoned cypress pine - Milled products
AS 1830	2002	Grey cast iron
AS 1831	2002	Ductile cast iron
AS/NZS 1841		Portable fire extinguishers
AS/NZS 1841.1	1997	General requirements
AS/NZS 1841.3	1997	Special requirements for wet-chemical type extinguishers
AS/NZS 1841.5	1997	Special requirements for powder type extinguishers
AS/NZS 1859		Reconstituted wood-based panels – Specifications
AS/NZS 1859.1	2004	Particleboard
AS/NZS 1859.3	1996	Decorative overlaid wood panels
AS/NZS 1859.4	2004	Wet-processed fibreboard
AS 1860		Installation of particleboard flooring
AS/NZS 1860.1	2002	Specifications
AS/NZS 1866	1997	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
AS/NZS 1873		Power-actuated (PA) hand-held fastening tools
AS/NZS 1873.4	2003	Fasteners
AS 1891	Various	Industrial fall-arrest systems and devices
AS 1897	1976	Electroplated coatings on threaded components (Metric coarse series)
AS 1909	1984	Installation of timber doorsets (obsolescent)
AS 2008	1997	Residual bitumen for pavements
AS 2047	1999	Windows in buildings – Selection and installation
AS/NZS 2053		Conduits and fittings for electrical installations
AS/NZS 2053.1	2001	General requirements
AS/NZS 2053.2	2001	Rigid plain conduits and fittings of insulating material
AS/NZS 2053.3	1995	Rigid plain conduits and fittings of fibre-reinforced concrete material
AS/NZS 2053.4	1995	Flexible plain conduits and fittings of insulating material
AS/NZS 2053.5	2001	Corrugated conduits and fittings of insulating material
AS/NZS 2053.6	2001	Profile-wall, smooth-bore conduits and fittings of insulating material
AS/NZS 2053.7	2002	Rigid metal conduits and fittings
AS/NZS 2053.8	1995	Flexible conduits and fittings of metal or composite material
AS 2082	2000	Timber – Hardwood – Visually stress-graded for structural purposes
AS 2159	1995	Piling – Design and installation
AS 2157	1997	Cutback bitumen
AS/NZS 2179		Specifications for rainwater goods, accessories and fasteners
AS/NZS 2179.1	1994	Metal shape or sheet rainwater goods, and metal accessories and fasteners
AS 2185	1978	Fibrous plaster products
AS/NZS 2208	1996	Safety glazing materials in buildings
AS/NZS 2269	2004	Plywood - Structural
AS/NZS 2311	2000	The painting of buildings
AS/NZS 2312	2002	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS 2329	1999	Mastic adhesives for fixing wallboards
AS 2334	1980	Steel nails – Metric series
AS 2358	1990	Adhesives – For fixing ceramic tiles
AS 2423	2002	Coated steel wire fencing products for terrestrial, aquatic and general use
AS 2439		Perforated plastics drainage and effluent pipe and fittings
AS 2439.1	1981	Perforated drainage pipe and associated fittings
AS 2444	2001	Portable fire extinguishers and fire blankets - Selection and location
AS/NZS 2455		Textile floor coverings – Installation practice
AS/NZS 2455.1	1995	General
AS/NZS 2455.2	1996	Carpet tiles
AS/NZS 2465	1999	Unified hexagon bolts, screws and nuts (UNC and UNF threads)
AS 2492	1994	Cross-linked polyethylene (PE-X) pipe for hot and cold water applications

AS 2537	1994	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) pipe for hot and cold water applications
AS/NZS 2588	1998	Gypsum plasterboard
AS/NZS 2589		Gypsum linings in residential and light commercial construction – Application and finishing
AS/NZS 2589.1	1997	Gypsum plasterboard
AS 2601	2001	The demolition of structures
AS/NZS 2648		Underground marking tape
AS/NZS 2648.1	1995	Non-detectable tape
AS 2688	1984	Timber doors (obsolescent)
AS 2689	1984	Timber doorsets
AS 2699		Built-in components for masonry construction
AS 2699.1	2000	Wall ties
AS/NZS 2699.3	2002	Lintels and shelf angles (durability requirements)
AS/NZS 2712	2002	Solar and heat pump water heaters – Design and construction
AS/NZS 2728	1997	Prefinished/prepainted sheet metal products for interior/exterior building applications – Performance requirements
AS 2754		Adhesives for timber and timber products
AS 2754.2	1991	Polymer emulsion adhesives
AS 2754.3	1988	Adhesives for non-structural applications
AS 2758		Aggregates and rock for engineering purposes
AS 2758.2	1996	Aggregate for sprayed bituminous surfacing
AS/NZS 2785	2000	Suspended ceilings - Design and installation
AS 2858	2004	Timber – Softwood – Visually graded for structural purposes
AS 2870	1996	Residential slabs and footings – Construction
AS 2876	2000	Concrete kerbs and channels (gutters) – Manually or machine placed
AS/NZS 2890		Parking facilities
AS/NZS 2890.1	2004	Off-street car parking
AS/NZS 2904	1995	Damp-proof courses and flashings
AS/NZS 2908		Cellulose-cement products
AS/NZS 2908.2	2000	Flat sheets
AS/NZS 2913	2000	Evaporative air-conditioning equipment
AS/NZS 2918	2001	Domestic solid fuel burning appliances – Installation
AS/NZS 2924		High pressure decorative laminates – Sheets made from thermosetting resins
AS/NZS 2924.1	1998	Classification and specifications
AS/NZS 3000	2000	Wiring rules
AS/NZS 3008		Electrical installations – Selection of cables
AS/NZS 3008.1.1	1998	Cables for alternating voltages up to and including 0.6/1 kV – Typical Australian installation conditions
AS/NZS 3013	2005	Electrical installations - Classification of the fire and mechanical performance of wiring systems
AS/NZS 3017	2001	Electrical installations – Testing and inspection guidelines
AS/NZS 3018	2001	Electrical installations – Domestic installations systems
AS/NZS 3080	2003	Telecommunications installations - Generic cabling for commercial premises (ISO/IEC 11801:2002, MOD)
AS/NZS 3086	1996	Telecommunications installations – Integrated communications cabling systems for small office/home office premises
AS 3111	1994	Approval and test specification for miniature overcurrent circuit-breakers
AS 3137	1992	Approval and test specification – Luminaires (lighting fittings)
AS 3439		Low-voltage switchgear and controlgear
AS 3439.3	2002	Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use – Distribution
AS/NZS 3500		Plumbing and Drainage
AS/NZS 3500.1	2003	Water services
AS/NZS 3500.2	2003	Sanitary plumbing and drainage
AS/NZS 3500.3	2003	Stormwater drainage
AS/NZS 3500.4	2003	Heated water services
AS/NZS 3504	2006	Fire blankets
AS 3519	1993	Timber – Machine proof-grading
AS 3553	1988	Adhesives for floor and wall applications - Resilient vinyl, linoleum and rubber sheet and tiles - Interior and exterior use
AS 3566		Self-drilling screws for the building and construction industries
AS 3566.1	2002	General requirements and mechanical properties
AS 3566.2	2002	Corrosion resistance requirements
AS 3571	1989	Glass filament reinforced thermosetting plastics (GRP) pipes - Polyester based - Water supply, sewerage and drainage applications
AS 3600	2001	Concrete structures
AS 3610	1995	Formwork for concrete
AS 3623	1993	Domestic metal framing
AS 3660		Termite management
AS 3660.1	2000	New buildings
AS/NZS 3666		Air-handling and water systems of buildings - Microbial control

AS/NZS 3666.1	2002	Design, installation and commissioning
AS/NZS 3666.2	2002	Operation and maintenance
AS/NZS 3679		Structural steel
AS/NZS 3679.1	1996	Hot-rolled bars and sections
AS/NZS 3679.2	1996	Welded I sections
AS 3700	2001	Masonry structures
AS 3705	2003	Geotextiles - Identification, marking, and general data
AS 3715	2002	Metal finishing – Thermoset powder coatings for architectural applications of aluminium and aluminium alloys
AS 3725	1989	Loads on buried concrete pipes
AS 3725 Supp 1	1989	Loads on buried concrete pipes - Commentary (Supplement to AS 3725-1989)
AS 3727	1993	Guide to residential pavements
AS 3740	2004	Waterproofing of wet areas within residential buildings
AS/NZS 3750		Paints for steel structures
AS/NZS 3750.9	1994	Organic zinc-rich primer
AS 3786	1993	Smoke alarms
AS 3798	1996	Guidelines on earthworks for commercial and residential developments
AS 3815	1998	A guide to coaxial cabling in single and multiple premises
AS 3818		Timber - Heavy structural products - Visually graded
AS 3818.2	2004	Railway track timbers
AS/NZS 3823		Performance of electrical appliances - Airconditioners and heat pumps
AS/NZS 3823.2	2005	Energy labelling and minimum energy performance standard (MEPS) requirements
AS/NZS 3879	1995	Solvent cements and priming fluids for use with unplasticised PVC (UPVC) pipes and fittings
AS 3958		Ceramic tiles
AS 3958.1	1991	Guide to the installation of ceramic tiles
AS 3958.2	1992	Guide to the selection of a ceramic tiling system
AS 3959	1999	Construction of buildings in bushfire prone areas
AS 3972	1997	Portland and blended cements
AS 3996	2006	Metal access covers, road grates and frames
AS 3999	1992	Thermal insulation of dwellings – Bulk insulation – Installation requirements
AS/NZS 4012	1999	Domestic solid fuel burning appliance – Method for determination of power output and efficiency
AS/NZS 4013	1999	Domestic solid fuel burning appliances – Method for determination of flue gas emission
AS 4049		Paints and related materials - Pavement marking materials
AS 4049.2	1994	Thermoplastic road marking materials
AS 4055	1992	Wind loads for housing
AS 4058	1992	Precast concrete pipes (pressure and non-pressure)
AS 4100	1998	Steel structures
AS 4139	2003	Fibre-reinforced concrete pipes and fittings
AS 4145		Locksets
AS 4145.2	1993	Mechanical locksets for doors in buildings
AS 4145.3	2001	Mechanical locksets for windows in buildings
AS/NZS 4200		Pliable building materials and underlays
AS/NZS 4200.1	1994	Materials
AS/NZS 4200.2	1994	Installation requirements
AS 4254	2002	Ductwork for air-handling systems in buildings
AS/NZS 4256		Plastic roof and wall cladding materials
AS/NZS 4256.2	2006	Unplasticised polyvinyl chloride (uPVC) building sheets
AS/NZS 4256.3	2006	Glass fibre reinforced polyester (GRP)
AS/NZS 4256.5	2006	Polycarbonate
AS 4285	1995	Skylights
AS 4288	2003	Soft underlays for textile floor coverings
AS/NZS 4357	1995	Structural Laminated Veneer Lumber
AS/NZS 4386		Domestic kitchen assemblies
AS/NZS 4386.1	1996	Kitchen units
AS/NZS 4389	1996	Safety mesh
AS 4397	1996	Electroplated coatings of zinc on steel fasteners with imperial threads
AS/NZS 4402	1996	Hexagon head tapping screws
AS/NZS 4403	1996	Slotted pan head tapping screws
AS/NZS 4404	1996	Slotted countersunk (flat) head tapping screws (common head style)
AS/NZS 4405	1996	Slotted raised countersunk (oval) head tapping screws (common head style)
AS/NZS 4406	1996	Cross recessed pan head tapping screws
AS/NZS 4407	1996	Crossed recessed countersunk (flat) head tapping screws (common head style)
AS/NZS 4408	1996	Crossed recessed raised countersunk (oval) head tapping screws
AS/NZS 4409	1996	Hexagon washer head tapping screws
AS/NZS 4410	1996	Hexagon flange head tapping screws
AS 4419	2003	Soils for landscaping and garden use
AS 4440	2004	Installation of nailplated timber roof trusses
AS 4454	2003	Composts, soil conditioners and mulches
AS/NZS 4455	1997	Masonry units and segmental pavers
AS/NZS 4506	2005	Metal finishing - Thermoset powder coatings
AS/NZS 4534	2006	Zinc and zinc/aluminium-alloy coatings on steel wire
AS/NZS 4586	2004	Slip resistance classification of new pedestrian surface materials
AS/NZS 4667	2000	Quality requirements for cut-to-size and processed glass

AS/NZS 4600	1996	Cold-formed steel structures
AS 4662	2003	Ceramic tiles - Definitions, classification, characteristics and marking (ISO 13006:1998)
AS/NZS 4671	2001	Steel reinforcing materials
AS/NZS 4680	1999	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4692		Electric water heaters
AS/NZS 4692.1	2005	Electric water heaters – Energy consumption, performance and general requirements
AS/NZS 4692.2	2005	Electric water heaters – Minimum energy performance standard (MEPS) requirements and energy labelling
AS 4744		Steel shoring and trench lining
AS 4744.1	2000	Design
AS 4750	2003	Electrogalvanised (zinc) coatings on ferrous hollow and open sections
AS 4766 (Int)	2002	Polyethylene storage tanks for water and chemicals
AS/NZS 4782		Double-capped fluorescent lamps – performance specifications
AS/NZS 4782.1	2004	General
AS/NZS 4782.2	2004	Minimum Energy Performance Standard (MEPS)
AS/NZS 4783		Performance of electrical lighting equipment – Ballasts for fluorescent lamps
AS/NZS 4783.2	2002	Energy labelling and minimum energy performance standards requirements
AS 4785.3	2002	Timber for furniture components
AS/NZS 4791	2006	Hot-dip galvanized (zinc) coatings on ferrous open sections, applied by an in-line process
AS/NZS 4792	2006	Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialized process
AS 4809	2003	Copper pipe and fittings – Installation and commissioning
AS/NZS 4858	2004	Wet area membranes
AS/NZS 4859		Materials for the thermal insulation of buildings
AS/NZS 4859.1	2002	General criteria and technical provisions
AS 4992 (Int)		Ceramic tiles: Products for installation
AS 4992.1(Int)	2003	Adhesives: Definitions and specifications
AS 5039	2003	Security screen doors and security window grilles
AS 5040	2003	Installation of security screen doors and window grilles
AS 5604	2003	Timber – Natural durability ratings
AS 7240		Fire detection and alarm systems
AS 60529	2004	Degrees of protection provided by enclosures (IP Code)
AS/NZS 60898		Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations
AS/NZS 60898.1	2004	Circuit-breakers for a.c. operation
AS/NZS 60947		Low voltage switchgear and controlgear
AS/NZS 60947.1	2004	General rules
AS/NZS 60947.2	2005	Circuit-breakers
AS/NZS 61000		Electromagnetic compatibility (EMC)
AS/NZS 61009		Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)
AS/NZS 61009.1	2004	General rules
AS/ACIF S008	2006	Requirements for authorised cabling products
AS/ACIF S009	2006	Installation requirements for customer cabling (Wiring Rules)
SAA HB 29	2000	Communications Cabling Manual, Module 2 Communications cabling handbook
SAA HB 32	1995	Control of microbial growth in air-handling and water systems of buildings
SAA HB 301	2001	Electrical installations - Designing to the Wiring Rules
APAS-0054	2003	Two pack exterior polyurethane varnish (General Purpose)
APAS-2916	2001	Organic zinc rich coating for protection of steel
BCA 3.1.3.2(b)		Acceptable construction – Site preparation – Termite risk management – Installation of termite barriers
BCA 3.4.2.2		Acceptable construction – Framing – Steel framing – General
BCA J1.2		Energy efficiency - Building fabric - Thermal construction general
ICANZ	2003	Industry Code of Practice for the Safe use of Glass Wool and Rock Wool Insulation
NASH	2005	Residential and low-rise steel framing

British Standards

BS 2571	1990	Specification for general-purpose flexible PVC compounds for moulding and extrusion
BS 4255		Rubber used in preformed gaskets for weather exclusion from buildings
BS 4255.1	1986	Specification for non-cellular gaskets

International Standards

ISO 11600	2002	Building construction - Jointing products - Classification and requirements for sealants

Air-conditioning guides

ACADS-BSG Camel		Manual for calculating cooling and heating loads – electronic method
AIRAH DA09	1998	Load estimation and psychrometrics
ASHRAE	2001	ASHRAE fundamentals handbook
Carrier		Manual for calculating cooling and heating loads - manual method
Carrier E20		Manual for calculating cooling and heating loads - electronic method
Trane Trace		Manual for calculating cooling and heating loads - electronic method

REFERENCED DOCUMENTS – SCHEDULE OF BASIX COMMITMENTS

1 GENERAL

Cross references

General: Conform to the *General requirements* worksection.

Associated specifications: Conform to the worksections in the following:

- *Reference Specification – Part B*.

Compliance requirements

General: Comply with the commitments given below.

Inspections: Arrange for any necessary compliance checks with the PCA. Rectify any non-compliances.

Location	36 Tudor Street	38 Tudor Street
Project name	31TUD036	31TUD038
Street address	36 Tudor Street	38 Tudor Street
Suburb	Bourke	Bourke
Local Government Area	Bourke Shire Council	Bourke Shire Council
Certificate no	79351S	79351S
Project type	Separate dwelling house	Separate dwelling house
No. of bedrooms	2	2
Site area (m²	759	759
Roof area (m²)	148	148
Conditioned floor area (m2)	88	88
Unconditioned floor area (m2)	14	14
Total area of garden and lawn (m2)	220	220
Landscape		
Area of indigenous or low water use species plantings (m2)	220	220
Fixtures		
Shower heads (minimum rating)	3A	3A
Toilet flushing system (minimum rating)	3A	3A
Kitchen taps (minimum rating)	3A	3A
Basin taps (minimum rating)	3A	3A
Shower heads (minimum rating)	3A	3A
On demand hot water recirculation system	Required	Required
Alternative water		
Rainwater tank minimum capacity (L)	9,000	9,000
Minimum roof area connected to rainwater tank (m2)	90	90
Rainwater outlets	One outdoor tap	One outdoor tap
Thermal comfort		
Total window and glazed door area (m2)	≤ 20.4	≤ 20.4
No of wind-driven roof ventilators	2	2

Location	36 Tudor Street	38 Tudor Street
Energy		
Hot water heater type	Electric heat pump	Electric heat pump
Hot water heater performance (RECs)	≥ 26 to 30	≥ 26 to 30
Ventilation		
Bathroom	Individual fan	Individual fan
Kitchen	Individual fan	Individual fan
Laundry	Natural ventilation only	Natural ventilation only
Artificial lighting		
Living/dining areas	Primary	Primary
Kitchen	Dedicated	Dedicated
Bathrooms/shower rooms	Dedicated	Dedicated
Bedrooms	Primary	Primary
Laundry	Primary	Primary
Hallways	Primary	Primary

2 EXECUTION

Ventilation

Discharge: Duct discharge from individual fans to above roof.

Operation: Provide for manual switching on/off.

Artificial lighting

Ensure that primary type of artificial lighting is fluorescent lighting. Ensure fittings specified as dedicated fittings are only capable of accepting fluorescent lamps:

Shading

Position window heads so that the vertical distance to eaves does not exceed 500 mm.

Landscaping

Plantings: Select indigenous, low water use species from *Landscaping*. Mulch those residual areas of the sites not covered by building works or paving, or contained within the area specified for planting or turfing.

REFERENCED DOCUMENTS – SUPPLEMENTARY SPECIFICATIONS AND REPORTS

1 REPORTS

Geotechnical Engineer's reports

Macquarie Geotechnical, 2005 *Geotechnical Investigation – 36 Tudor Street, Bourke*, Bathurst.

Macquarie Geotechnical, 2005 *Geotechnical Investigation – 38 Tudor Street, Bourke*, Bathurst.

2 SUPPLEMENTARY SPECIFICATIONS

Structural Engineer's requirements

ZD Consulting Engineers – *General Specification and Notes*.

3 AGREEMENTS

Principal Certifying Authority

Bourke Shire Council, *Service Agreement*.

MACQUARIE GEOTECH
Macquarie Geotechnical
Unit 2/6 Kirkcaldy Street
PO Box 71
Bathurst NSW 2795
Tel: 02 6332 2011
Fax: 02 6334 4213

31 May, 2005

Cliff Chenery
Burns Aldis
PO Box 143
BALGOWLAH NSW 2093

Dear Cliff

Geotechnical Investigation – 36 Tudor Street, Bourke

As requested by you, Macquarie Geotechnical Pty Ltd has undertaken a geotechnical investigation at the above site. This work was done to classify the subject site in accordance with Australian Standard AS2870 1996 "Residential Slabs and Footings". The classification of a site involves a number of geotechnical factors such as depth of bedrock, the nature and extent of subsurface soils and any specific problems (slope stability, soft soils, filling, reactivity, etc).

One test borehole was drilled and logged on 11 May 2005 at the site. A soil profile consisting of Clayey Silty Sand to 0.5m overlying highly to extremely reactive Silty CLAY to 3.0m was encountered.

In accordance with AS2870 1996 the site is classified as **"Class E-D" with an anticipated surface movement Ys of 85mm.**

An appropriate footing system should be designed in accordance with the above code to accommodate anticipated surface movements. The possibility of additional movements, due to abnormal moisture variations, should be minimised by proper "site management" procedures as provided on the attached sheet.

It should be noted that this assessment is based on site conditions being represented by the soil profile noted above. Any change in conditions noted during development, including cut or fill in excess of **0.5m**, should be referred to Macquarie Geotechnical for appropriate inspection and assessment.

If you have any questions in relation to the foregoing please contact the undersigned.

Yours sincerely

Jason P Lewis
Geotechnical Engineer
Macquarie Geotechnical

Attached: Limitations of Geotechnical Site Investigation
Reactive Soils Notes
Borehole Log

LIMITATIONS OF GEOTECHNICAL SITE INVESTIGATION

Scope of Services

This report has been prepared for the Client in accordance with the Services Engagement Form (SEF), between the Client and Macquarie Geotechnical.

Reliance on Data

Macquarie Geotechnical has relied upon data and other information provided by the Client and other individuals. Macquarie Geotechnical has not verified the accuracy or completeness of the data, except as otherwise stated in the report. Recommendations in the report are based on the data.

Macquarie Geotechnical will not be liable in relation to incorrect recommendations should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed.

Geotechnical Investigation

Findings of Geotechnical Investigations are based extensively on judgment and experience. Geotechnical reports are prepared to meet the specific needs of individual clients. This report was prepared expressly for the Client and expressly for the Clients purposes.

This report is based on a subsurface investigation, which was designed for project-specific factors. Unless further geotechnical advice is obtained this report cannot be applied to an adjacent site nor can it be used when the nature of any proposed development is changed.

Limitations of Site investigation

As a result of the limited number of sub-surface excavations or boreholes there is the possibility that variations may occur between test locations. The investigation undertaken is an estimate of the general profile of the subsurface conditions. The data derived from the investigation and laboratory testing are extrapolated across the site to form a geological model. This geological model infers the subsurface conditions and their likely behavior with regard to the proposed development.

The actual conditions at the site might differ from those inferred to exist.

No subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

Time Dependence

This report is based on conditions, which existed at the time of subsurface exploration. Construction operations at or adjacent to the site, and natural events such as floods, or groundwater fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report.

Macquarie Geotechnical should be kept appraised of any such events, and should be consulted for further geotechnical advice if any changes are noted.

Avoid Misinterpretation

A geotechnical engineer or engineering geologist should be retained to work with other design professionals explaining relevant geotechnical findings and in reviewing the adequacy of their plans and specifications relative to geotechnical issues.

No part of this report should be separated from the Final Report.

Sub-surface Logs

Sub-surface logs are developed by geoscientific professionals based upon their interpretation of field logs and laboratory evaluation of field samples. These logs should not under any circumstances be redrawn for inclusion in any drawings.

Geotechnical Involvement During Construction

During construction, excavation frequently exposes subsurface conditions. Geotechnical consultants should be retained through the construction stage, to identify variations if they are exposed.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendations and should make their own enquiries and obtain independent advice in relation to such matters

Macquarie Geotechnical assumes no responsibility and will not be liable to any other person or organisations for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisations arising from matters dealt with or conclusions expressed in the report.

Other limitations

Macquarie Geotechnical will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Other Information

For further information reference should be made to "Guidelines for the Provision of Geotechnical Information in Construction Contracts" published by the Institution of Engineers Australia, 1987.

DESIGN & MAINTENANCE PRECAUTIONS FOR REACTIVE SOILS

These precautions apply to residential masonry buildings founded on reactive clay soils. Such soils are prone to shrink/swell movements due to moisture variations caused by natural or artificial causes.

The owner should appreciate that on reactive clays it is virtually impossible to design an economic foundation system that will totally prevent movement. Some minor aesthetic cracking, while undesirable, is likely to occur in a significant proportion of houses. The basic design philosophy is to minimise any cracking and provide a serviceable structure. It is thus a compromise between economy and performance.

The following design precautions are recommended to minimise cracking from reactive soil movements:

- All surface water runoff must be directed away from the building by appropriate grading in order to prevent ponding near foundations. Site drainage should form part of the building contract. Leaking plumbing or blocked drains should be repaired promptly and site grading maintained to prevent ponding near foundations.
- Peripheral pathways, with impermeable underliner, should be provided around the building to improve site drainage and assist in the stabilisation of moisture conditions near foundations.
- All brickwork should be suitably articulated into discrete units to accommodate the expected movements. Brickwork over doors and windows should be avoided.
- Internal and external walls should be arranged along straight lines, where possible. All house drains and water pipes should be provided with sufficient flexibility to accommodate the expected differential movements (between foundation and uncovered outside area) at the level of the service.
- The extension of services through slabs should be avoided where possible in order to prevent hidden leaks under the slab area. Most plumbing fixtures can be arranged to exit through outside walls.
- Septic systems should be located so as not to influence the house or neighbouring foundations.
- Subgrades beneath elevated and well-ventilated floors should be covered with an impermeable liner (with protective soil blanket) to minimise excessive desiccation.

In addition, certain other site management precautions must be adhered to during the life of the structure. These precautions generally relate to the control of abnormal moisture variations due to the effects of drainage and vegetation. Recommendations on site management precautions are contained in the following section.

- Leaking plumbing or blocked drains should be repaired promptly and site grading maintained to prevent ponding near foundations. Garden watering, particularly by fixed systems, should be controlled to avoid over-watering. Proper garden maintenance should produce year round uniform moisture conditions.
- Trees and some shrubs can cause a substantial drying and shrinking of reactive clays, additional to that experienced in a drought or a long dry spell. This effect is most likely to result in damage when added to the drying effects from a drought or a long dry spell. Trees should be planted at a substantial distance from the house. The distance depends upon the species and soil conditions, but generally a distance equal to 75% of the mature height is a minimum.
- Problems during a drought can be minimised by extensive pruning (thus reducing water demand) and/or providing trees with adequate water. Frequent moderate watering during dry periods should minimise the risk of the tree extracting excessive moisture from beneath the foundation of the house. The owner should also immediately undertake this action if brickwork cracking due to tree drying is noticed. Most reactive clay failures can be minimised by controlling the combined drying effects of trees and drought.

Reference should be made to Appendix A of AS2870.2 "Residential Slabs. and Footings" and CSIRO 10-91 "A Guide to Home Owners on Foundation Maintenance and Footing Performance" for more detailed recommendations regarding Design and Site management precautions.

MACQUARIE GEOTECH

MACQUARIE GEOTECHNICAL

Engineering Log

Job No: 05-122

Client: Burns Aldis
Project: Geotechnical Investigation
Address: 36 Tudor Street, Bourke
Date: 11/05/2005

Hole No: BH1
Drilled By: HJ
Checked: JL

Location: Proposed House Site
RL: n/a

Method: Christie Auger

Material Description

Water	Depth (metres)	Sampling	SOIL TYPE: colour, structure, minor constituents, USC, origin	Consistency/ Rel. Density	Moisture	DCP (blows/100m	Pocket Penetrometer
N F G	0.5	D	Clayey Silty SAND, brown, fine to medium grained, low to medium plasticity fines, (SC), (Fill-Topsoil)	L	D		
	1.0		Silty CLAY, brown, high plasticity, trace fine grained sands, (CH), (Alluvial)	St-VSt	D-SM		
	1.5						
	2.0	D		VSt	D-SM		
	2.5			VSt	D-SM		
		D	End of Borehole @ 3.0m				

Consistency/Rel. Density

VS	very soft	VL	very loose
S	soft	L	loose
F	firm	M	medium dense
St	stiff	D	dense
VSt	very stiff	VD	very dense
H	hard		

Sampling

D - Disturbed
B - Bulk
U - Undisturbed

Moisture

D	dry
SM	slightly moist
M	moist
W	wet

Water

NFG	no free groundwater
WI	water inflow
SW	standing water level

MACQUARIE GEOTECH
Macquarie Geotechnical
Unit 2/6 Kirkcaldy Street
PO Box 71
Bathurst NSW 2795
Tel: 02 6332 2011
Fax: 02 6334 4213

31 May, 2005

Cliff Chenery
Burns Aldis
PO Box 143
BALGOWLAH NSW 2093

Dear Cliff

Geotechnical Investigation – 38 Tudor Street, Bourke

As requested by you, Macquarie Geotechnical Pty Ltd has undertaken a geotechnical investigation at the above site. This work was done to classify the subject site in accordance with Australian Standard AS2870 1996 "Residential Slabs and Footings". The classification of a site involves a number of geotechnical factors such as depth of bedrock, the nature and extent of subsurface soils and any specific problems (slope stability, soft soils, filling, reactivity, etc).

One test borehole was drilled and logged on 11 May 2005 at the site. A soil profile consisting of Clayey Silty Sand to 0.5m overlying highly to extremely reactive Silty CLAY to 3.0m was encountered.

In accordance with AS2870 1996 the site is classified as "**Class E-D" with an anticipated surface movement Ys of 85mm.**

An appropriate footing system should be designed in accordance with the above code to accommodate anticipated surface movements. The possibility of additional movements, due to abnormal moisture variations, should be minimised by proper "site management" procedures as provided on the attached sheet.

It should be noted that this assessment is based on site conditions being represented by the soil profile noted above. Any change in conditions noted during development, including cut or fill in excess of **0.5m**, should be referred to Macquarie Geotechnical for appropriate inspection and assessment.

If you have any questions in relation to the foregoing please contact the undersigned.

Yours sincerely

Jason P Lewis
Geotechnical Engineer
Macquarie Geotechnical

Attached: Limitations of Geotechnical Site Investigation
Reactive Soils Notes
Borehole Log

LIMITATIONS OF GEOTECHNICAL SITE INVESTIGATION

Scope of Services

This report has been prepared for the Client in accordance with the Services Engagement Form (SEF), between the Client and Macquarie Geotechnical.

Reliance on Data

Macquarie Geotechnical has relied upon data and other information provided by the Client and other individuals. Macquarie Geotechnical has not verified the accuracy or completeness of the data, except as otherwise stated in the report. Recommendations in the report are based on the data.

Macquarie Geotechnical will not be liable in relation to incorrect recommendations should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed.

Geotechnical Investigation

Findings of Geotechnical Investigations are based extensively on judgment and experience. Geotechnical reports are prepared to meet the specific needs of individual clients. This report was prepared expressly for the Client and expressly for the Clients purposes.

This report is based on a subsurface investigation, which was designed for project-specific factors. Unless further geotechnical advice is obtained this report cannot be applied to an adjacent site nor can it be used when the nature of any proposed development is changed.

Limitations of Site investigation

As a result of the limited number of sub-surface excavations or boreholes there is the possibility that variations may occur between test locations. The investigation undertaken is an estimate of the general profile of the subsurface conditions. The data derived from the investigation and laboratory testing are extrapolated across the site to form a geological model. This geological model infers the subsurface conditions and their likely behavior with regard to the proposed development.

The actual conditions at the site might differ from those inferred to exist.

No subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

Time Dependence

This report is based on conditions, which existed at the time of subsurface exploration. Construction operations at or adjacent to the site, and natural events such as floods, or groundwater fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report.

Macquarie Geotechnical should be kept appraised of any such events, and should be consulted for further geotechnical advice if any changes are noted.

Avoid Misinterpretation

A geotechnical engineer or engineering geologist should be retained to work with other design professionals explaining relevant geotechnical findings and in reviewing the adequacy of their plans and specifications relative to geotechnical issues.

No part of this report should be separated from the Final Report.

Sub-surface Logs

Sub-surface logs are developed by geoscientific professionals based upon their interpretation of field logs and laboratory evaluation of field samples. These logs should not under any circumstances be redrawn for inclusion in any drawings.

Geotechnical Involvement During Construction

During construction, excavation frequently exposes subsurface conditions. Geotechnical consultants should be retained through the construction stage, to identify variations if they are exposed.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendations and should make their own enquiries and obtain independent advice in relation to such matters

Macquarie Geotechnical assumes no responsibility and will not be liable to any other person or organisations for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisations arising from matters dealt with or conclusions expressed in the report.

Other limitations

Macquarie Geotechnical will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Other Information

For further information reference should be made to "Guidelines for the Provision of Geotechnical Information in Construction Contracts" published by the Institution of Engineers Australia, 1987.

DESIGN & MAINTENANCE PRECAUTIONS FOR REACTIVE SOILS

These precautions apply to residential masonry buildings founded on reactive clay soils. Such soils are prone to shrink/swell movements due to moisture variations caused by natural or artificial causes.

The owner should appreciate that on reactive clays it is virtually impossible to design an economic foundation system that will totally prevent movement. Some minor aesthetic cracking, while undesirable, is likely to occur in a significant proportion of houses. The basic design philosophy is to minimise any cracking and provide a serviceable structure. It is thus a compromise between economy and performance.

The following design precautions are recommended to minimise cracking from reactive soil movements:

- All surface water runoff must be directed away from the building by appropriate grading in order to prevent ponding near foundations. Site drainage should form part of the building contract. Leaking plumbing or blocked drains should be repaired promptly and site grading maintained to prevent ponding near foundations.
- Peripheral pathways, with impermeable underliner, should be provided around the building to improve site drainage and assist in the stabilisation of moisture conditions near foundations.
- All brickwork should be suitably articulated into discrete units to accommodate the expected movements. Brickwork over doors and windows should be avoided.
- Internal and external walls should be arranged along straight lines, where possible. All house drains and water pipes should be provided with sufficient flexibility to accommodate the expected differential movements (between foundation and uncovered outside area) at the level of the service.
- The extension of services through slabs should be avoided where possible in order to prevent hidden leaks under the slab area. Most plumbing fixtures can be arranged to exit through outside walls.
- Septic systems should be located so as not to influence the house or neighbouring foundations.
- Subgrades beneath elevated and well-ventilated floors should be covered with an impermeable liner (with protective soil blanket) to minimise excessive desiccation.

In addition, certain other site management precautions must be adhered to during the life of the structure. These precautions generally relate to the control of abnormal moisture variations due to the effects of drainage and vegetation. Recommendations on site management precautions are contained in the following section.

- Leaking plumbing or blocked drains should be repaired promptly and site grading maintained to prevent ponding near foundations. Garden watering, particularly by fixed systems, should be controlled to avoid over-watering. Proper garden maintenance should produce year round uniform moisture conditions.
- Trees and some shrubs can cause a substantial drying and shrinking of reactive clays, additional to that experienced in a drought or a long dry spell. This effect is most likely to result in damage when added to the drying effects from a drought or a long dry spell. Trees should be planted at a substantial distance from the house. The distance depends upon the species and soil conditions, but generally a distance equal to 75% of the mature height is a minimum.
- Problems during a drought can be minimised by extensive pruning (thus reducing water demand) and/or providing trees with adequate water. Frequent moderate watering during dry periods should minimise the risk of the tree extracting excessive moisture from beneath the foundation of the house. The owner should also immediately undertake this action if brickwork cracking due to tree drying is noticed. Most reactive clay failures can be minimised by controlling the combined drying effects of trees and drought.

Reference should be made to Appendix A of AS2870.2 "Residential Slabs. and Footings" and CSIRO 10-91 "A Guide to Home Owners on Foundation Maintenance and Footing Performance" for more detailed recommendations regarding Design and Site management precautions.

MACQUARIE GEOTECH

MACQUARIE GEOTECHNICAL

Engineering Log

Job No: 05-122

Client: Burns Aldis
Project: Geotechnical Investigation
Address: 38 Tudor Street, Bourke
Date: 11/05/2005

Hole No: BH1
Drilled By: HJ
Checked: JL

Location: Proposed House Site
RL: n/a

Method: Christie Auger

Material Description

Water	Depth (metres)	Sampling	SOIL TYPE: colour, structure, minor constituents, USC, origin	Consistency/ Rel. Density	Moisture	DCP (blows/100m	Pocket Penetrometer
NFG	0.5		Clayey Silty SAND, brown, fine to medium grained, low to medium plasticity fines, (SC), (Fill-Topsoil)	L	D		
	1.0		Silty CLAY, brown, high plasticity, trace fine grained sands, (CH), (Alluvial)	St-VSt	D-SM		
	1.5						
	2.0			VSt	D-SM		
	2.5			VSt	D-SM		
			End of Borehole @ 3.0m				

Consistency/Rel. Density

VS	very soft	VL	very loose
S	soft	L	loose
F	firm	M	medium dense
St	stiff	D	dense
VSt	very stiff	VD	very dense
H	hard		

Sampling

D - Disturbed
B - Bulk
U - Undisturbed

Moisture

D	dry
SM	slightly moist
M	moist
W	wet

Water

NFG	no free groundwater
WI	water inflow
SW	standing water level

ZD Consulting Engineers

PO Box 878
Bathurst NSW 2795
Tel: 02 6332 9004
Fax: 02 6334 3309
Mobile: 0412 070 617
Email: ZahirDewji@bigpond.com
ABN 66 065 201 282

GENERAL SPECIFICATIONS AND NOTES

GENERAL

G1 THESE NOTES AND DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER FOR DECISION BEFORE PROCEEDING WITH THE WORK.

G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH ALL RELEVANT AND CURRENT SAA CODES AND WITH ALL BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATIONS.

G3 ALL DIMENSIONS ARE IN mm AND LEVELS IN METRES UNLESS NOTED OTHERWISE (U.N.O.). ALL LEVELS AND SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE VERIFIED ON SITE BEFORE CONSTRUCTION. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.

G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.

G5 WHERE TEMPORARY CONSTRUCTION ACTIVITY WILL AFFECT EXISTING BUILDINGS, ETC. PROVIDE TEMPORARY PROTECTION TO MAINTAIN THEM WEATHERPROOF AND PREVENT WATER ENTRY AT ALL TIMES UNTIL ALL PERMANENT PROTECTION INCLUDING FLASHING ETC. ARE COMPLETED. REINSTATE OR REPLACE ALL ATTACHMENTS, SIGNS, FITTINGS, SERVICES, ETC. DAMAGED OR REMOVED DURING THE CONSTRUCTION ACTIVITIES.

G6 DESIGN LOADS HAVE BEEN DETERMINED IN ACCORDANCE WITH AS 1170.1, AS 1170.2 AND AS 2870.

G7 ALL PREPARATION AND REINFORCEMENT SHALL BE INSPECTED AND APPROVED BY THE ENGINEER, PRINCIPAL CERTIFYING AUTHORITY OR PRIVATE CERTIFIER PRIOR TO PLACING CONCRETE. A MINIMUM OF 24 HRS NOTICE SHALL BE PROVIDED TO THE ENGINEER FOR SITE INSPECTIONS OF REINFORCEMENT.

G8 NO SUBSTITUTIONS WILL BE MADE WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.

SOIL REACTIVITY, SITE PRECAUTIONS AND SITE MANAGEMENT

S1. BOTH THE SITE CLASSIFICATION AND FOOTING DESIGN FOR THIS PROJECT HAVE BEEN CARRIED OUT IN ACCORDANCE WITH AS 2870 "RESIDENTIAL SLABS AND FOOTINGS". THE DESIGN PHILOSOPHY IS TO PROVIDE A FOOTING SYSTEM ADEQUATE TO ACCOMMODATE GROUND MOVEMENTS DUE TO EXTREME SEASONAL MOISTURE CHANGES ONLY.

S2. THE OWNER MUST APPRECIATE THAT ON REACTIVE CLAYS IT IS NOT ECONOMICALLY FEASIBLE TO CONSTRUCT A FOOTING SYSTEM TO TOTALLY PREVENT MOVEMENT OF THE SUPERSTRUCTURE AND THAT SOME MINOR AESTHETIC CRACKING IS TO BE EXPECTED IN A SIGNIFICANT PROPORTION OF HOUSES. PROBLEMS SUCH AS JAMMING OF DOORS AND WINDOWS MAY ALSO BE EXPECTED ESPECIALLY DURING THE SETTLING IN PERIOD OR FOLLOWING A MAJOR DRAUGHT. ANY REPAIRS SHOULD BE REGARDED AS PART OF NORMAL HOUSE MAINTENANCE. EVEN MASONRY CRACKING UP TO 5mm IN WIDTH USUALLY HAS NO INFLUENCE ON THE FUNCTION OF THE WALL AND ONLY PRESENTS AN AESTHETIC PROBLEM.

S3. GOOD PERFORMANCE OF THE FOOTING SYSTEM CAN BE ASSISTED BY A COMBINATION OF PRECAUTIONS AND SITE MANAGEMENT PROCEDURES. THE FOLLOWING PRECAUTIONS SHOULD BE CONSIDERED DURING CONSTRUCTION:

1. ALL SURFACE WATER RUNOFF MUST BE DIRECTED AWAY FROM THE BUILDING BY APPROPRIATE GRADING IN ORDER TO PREVENT PONDING NEAR THE FOUNDATIONS. SITE DRAINAGE MUST FORM PART OF THE BUILDING CONTRACT.

2. PERIPHERAL PATHWAYS WITH IMPERMEABLE UNDERLAYER SHOULD BE PROVIDED AROUND THE BUILDING. THIS SUPPLEMENTS SITE DRAINAGE AND ASSISTS IN THE STABILISATION OF MOISTURE CONDITIONS NEAR THE FOUNDATIONS.

3. ALL MASONRY WORK SHOULD BE SUITABLY ARTICULATED INTO DISCRETE UNITS TO ACCOMMODATE THE EXPECTED MOVEMENTS. IN PARTICULAR MASONRY OVER DOORS AND WINDOWS MUST BE AVOIDED.

4. INTERNAL AND EXTERNAL WALLS SHOULD BE ARRANGED ALONG STRAIGHT LINES.

5. ALL HOUSE DRAINS AND WATER PIPES MUST BE PROVIDED WITH SUFFICIENT FLEXIBILITY TO ACCOMMODATE THE EXPECTED MOVEMENTS BETWEEN THE BUILDING AND EXTERNAL AREAS AT THE LEVEL OF THE SERVICE.

6. THE EXTENSION OF SERVICES THROUGH SLABS SHOULD BE AVOIDED WHERE POSSIBLE IN ORDER TO PREVENT HIDDEN LEAKS UNDER THE SLAB AREA. MOST PLUMBING FIXTURES CAN BE ARRANGED TO EXIT THROUGH OUTSIDE WALLS.

7. SEPTIC TANKS MUST NOT BE LOCATED WITHIN ANY INFLUENCE OF THE HOUSE OR NEIGHBOURING FOUNDATIONS. DOWNHILL LOCATIONS ARE PREFERABLE. ALTERNATIVELY A PUMP OUT SYSTEM MUST BE INSTALLED.

8. SUBGRADES BENEATH ELEVATED AND WELL-VENTILATED FLOORS SHOULD BE COVERED WITH AN IMPERMEABLE LINER WITH A PROTECTIVE SOIL BLANKET TO MINIMISE EXCESSIVE DESICCATION.

S4. THE FOLLOWING LONG TERM SITE MANAGEMENT PROCEDURES MUST BE EMPLOYED TO HELP MAINTAIN A STABLE MOISTURE REGIME:

1. LEAKING PLUMBING OR BLOCKED DRAINS SHOULD BE REPAIRED PROMPTLY AND SITE GRADING MAINTAINED TO PREVENT PONDING NEAR FOUNDATIONS. GARDEN WATERING PARTICULARLY BY FIXED SYSTEMS SHOULD BE CAREFULLY CONTROLLED TO AVOID OVER WATERING. PROPER GARDEN MAINTENANCE SHOULD PRODUCE YEAR ROUND UNIFORM MOISTURE CONDITIONS.

2. TREES AND SOME SHRUBS CAN CAUSE A SUBSTANTIAL DRYING OF THE SOIL AND ASSOCIATED SHRINKING OF THE REACTIVE CLAYS. THIS EFFECT IS MOST LIKELY TO RESULT IN DAMAGE WHEN COMBINED WITH THE DRYING FROM A DRAUGHT OR A LONG DRY SPELL. THE PROBLEM CAN BE AVOIDED BY PLANTING TREES AT SUBSTANTIAL DISTANCES FROM THE HOUSE. THE DISTANCE DEPENDS UPON SPECIES AND SOIL CONDITIONS BUT GENERALLY 3/4 OF THE MATURE TREE HEIGHT IS A MINIMUM.

3. PROBLEMS DURING DRAUGHT CAN BE MINIMISED BY EXTENSIVE PRUNING THUS REDUCING WATER DEMAND AND/OR PROVIDING TREES WITH ADEQUATE WATER.

FOOTINGS

F1 ALL TOPSOIL, ORGANIC MATERIAL, PROTRUDING ROCKS, SOFT SPOTS AND RUBBISH SHALL BE REMOVED PRIOR TO PLACING OF UNDERFLOOR FILL OR ROAD BASE/CRUSHER DUST.

F2 FILL REQUIRED UNDER SUBBEAMS OR SLABS SHALL BE CLEAN GRANULAR MATERIAL OR ON SITE MATERIAL TO ENGINEERS APPROVAL. ALL UNDERFLOOR FILL SHALL BE COMPACTED TO AT LEAST 95% STANDARD COMPACTION GIVEN BY AS 1289.E1.1 IN 150mm MAX. LAYERS AND HAVE A SAFE ALLOWABLE BEARING CAPACITY OF AT LEAST 100kPa UNLESS SHOWN OTHERWISE. IF THE FILLING CONTAINS MATERIALS LIKELY TO PUNCTURE THE VAPOUR BARRIER, A LAYER OF 100mm COMPACTED ROAD BASE OR CRUSHER DUST SHALL BE PLACED OVER THIS MATERIAL.

F3 CONTROLLED FILLING IN EXCESS OF 400mm THICKNESS SHALL BE TESTED IN ACCORDANCE WITH AS3798-1990 BY A NATA REGISTERED LABORATORY.

F4 WHERE EXCAVATION TO A GREATER DEPTH THAN THAT REQUIRED TO CONSTRUCT THE EDGE BEAM OR FOOTING IS NECESSARY, IT IS PERMISSIBLE TO BRING UP TO THE REQUIRED DEPTH USING A LEAN CONCRETE (F'C=15MPa)

F5 TRENCH WALLS ARE TO BE KEPT STRAIGHT AND VERTICAL. TRENCH BOTTOMS TO BE CLEAN BEFORE AND AFTER VAPOUR BARRIER AND REINFORCEMENT IS PLACED.

F6 A LAYER OF HIGH IMPACT RESISTANT POLYTHENE WITH A MINIMUM THICKNESS OF 0.2mm (SUCH AS FORTICON OR APPROVED EQUIVALENT) IS TO BE USED AS A VAPOUR BARRIER DIRECTLY BENEATH THE SLAB AND SUBBEAMS UNLESS OTHERWISE SHOWN. ALL JOINTS TO BE LAPPED 200mm AND ALONG WITH PLUMBING FITTINGS, ETC SEALED WITH 50mm ADHESIVE PLASTIC TAPE. MEMBRANE TO BE LAID LOOSELY ON TRENCH BOTTOM TO ENABLE CONCRETE TO FORM FULL WIDTH AND DEPTH OF TRENCH.

F7 ACCURATELY FORM (CLASS 3 TO AS1510) THE EDGES OF ALL SLABS, REBATES, AND SETDOWNS TO THE REQUIRED DIMENSIONS WITH TOLERANCES TO CLAUSE 44.2 OF AS1509. FORMWORK IS TO BE FIRMLY HELD TO CONTAIN THE CONCRETE DURING POURING AND VIBRATION. FORMWORK IS TO REMAIN IN PLACE FOR A MINIMUM OF 24 HOURS AFTER COMPLETION OF POUR.

F8 SERVICE PENETRATIONS SHALL BE PERMITTED THROUGH THE MIDDLE THIRD OF THE SUBBEAMS; PROVIDED COVER TO REINFORCEMENT IS MAINTAINED. THE EFFECT OF OTHER SERVICE PENETRATIONS SHALL BE REFERRED TO THE ENGINEER FOR CONSIDERATION.

F9 ALL WATER MUST BE REMOVED FROM THE FOOTING EXCAVATIONS AND BASE OF BORED PIERS. SOFTENED MATERIALS MUST BE REMOVED BEFORE CONCRETING COMMENCES.

CONCRETE

C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 EXCEPT WHERE VARIED BY CONTRACT DOCUMENTS.

C2. CONCRETE SHALL HAVE A 28 DAY CHARACTERISTIC STRENGTH OF NOT LESS THAN 20 MPa AND A SLUMP OF 80mm WHEN TESTED IN ACCORDANCE WITH AS 1012. CONCRETE SHALL HAVE A NOMINAL MAXIMUM AGGREGATE SIZE OF 20mm AND A MAXIMUM WATER CEMENT RATIO OF 0.6.

C3. SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF ANY APPLIED FINISHES.

C4. THE SUBBEAMS AND FLOOR SLAB SHALL BE CAST IN ONE CONTINUOUS OPERATION UNLESS NOTED OTHERWISE. ALL CONCRETE SHALL BE WELL VIBRATED, WORKED AROUND THE REINFORCEMENT AND INTO THE CORNERS OF FORMS BY MECHANICAL VIBRATORS. VIBRATORS SHALL NOT BE USED TO SPREAD CONCRETE.

C5. NO CONCRETE SHALL BE MIXED OR PLACED WHEN THE AIR TEMPERATURE ON SITE EXCEEDS 35^{0}C OR FALLS BELOW 5^{0}C.

C6. CONCRETE IS TO BE CURED BY ONE OF THE FOLLOWING METHODS:

1. IMMEDIATELY AFTER CONCRETE IS PLACED THE TOP SURFACE AND SIDES SHALL BE SPRAYED WITH AN APPROVED CURING COMPOUND. THE SIDES SHALL BE SPRAYED WITHIN ONE HOUR OF THE REMOVAL OF THE FORMWORK. THE CURING COMPOUND MUST BE OF THE TYPE THAT WILL NOT HAVE A DETRIMENTAL EFFECT ON THE BOND OF RENDER, PAINT OR TILE ADHESIVE.

2. LEAVE FORMWORK ON FOR SEVEN DAYS AND COMPLETELY COVER SLAB WITH A SHEET OF POLYTHENE HELD DOWN WITH A LAYER OF SAND.

3. KEEP ALL SURFACES WET FOR SEVEN DAYS BY REGULARLY SPRAYING WITH WATER TO PREVENT DRYING OUT.

4. IT IS RECOMMENDED THAT THE SLAB BE LEFT TO CURE FOR A PERIOD OF 14 DAYS PRIOR TO CONSTRUCTION OF CLAY BRICK WALLS.

REINFORCEMENT

R1. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY ONLY. IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.

R2. REINFORCEMENT IS DESIGNATED AS FOLLOWS:

N	DENOTES GRADE 500 N HIGH STRENGTH DEFORMED BAR TO AS/NZS 4671.
R	DENOTES GRADE 230R HOT ROLLED PLAIN BAR TO AS 1302.
SL, L/TM	DENOTES HARD DRAWN WIRE WELDED FABRIC/TRENCH MESH TO AS/NZS 4671.

R3. ALL REINFORCEMENT SHALL BE HELD FIRMLY IN POSITION DURING CONCRETE PLACING. FOR EDGE BEAMS AND STRIP FOOTINGS TIMBER PACKERS MAY BE USED FOR THIS PURPOSE. THESE TEMPORARY SUPPORTS ARE TO BE REMOVED DURING CONCRETE PLACEMENT.

R4. LAPS IN BAR SPLICES TO BE NOT LESS THAN 500mm OR 25 BAR DIAMETERS. AT T AND L INTERSECTIONS THE BARS SHALL BE CONTINUED ACROSS THE FULL WIDTH OF THE INTERSECTION. AT L INTERSECTION ONE OUTER BAR SHALL BENT AND CONTINUED 500mm OR A BENT LAP BAR 500mm LONG ON EACH LEG SHALL BE PROVIDED.

R5. TRENCH MESH SHALL HAVE ALL CROSS WIRES CUT FLUSH WITH OUTER MAIN WIRES. TRENCH MESH IN BEAMS SHALL BE OVERLAPPED BY THE WIDTH OF THE FABRIC AT T AND L INTERSECTIONS. TRENCH MESH TO BE SPLICED WHERE NECESSARY BY A LAP OF 500mm.

R6. REINFORCING FABRIC FOR SLABS ON GROUND MUST BE IN PLACE BEFORE ANY CONCRETING COMMENCES. FABRIC MUST BE SUPPORTED ON PLASTIC TIPPED BAR CHAIRS AT 800mm CENTRES. BAR CHAIRS ARE TO BE LOCATED AT INTERSECTION OF FABRIC CROSS WIRES. LAPS IN FABRIC SHALL BE TWO CROSS WIRES + 25mm.

STRUCTURAL STEELWORK

S1. FABRICATION AND ERECTION OF STEELWORK TO BE IN ACCORDANCE WITH AS 4100.

S2. STRUCTURAL STEELWORK SHALL BE OF THE FOLLOWING GRADES UNLESS NOTED OTHERWISE.

ALL HOT ROLLED SECTIONS	Fy = 300 MPa
RHS, SHS AND CHS GREATER THAN 145 Dia.	Fy = 350 MPa
CHS LESS THAN 160 Dia	Fy = 200 MPa
COLD ROLLED SECTIONS (PURLINS, ETC.)	Fy = 450 MPa

S3. BOLTS DESIGNATED 4.6/S SHALL BE COMMERCIAL GRADE BOLTS TO AS 1111 AND AS 1112 (GRADE 4.6) TIGHTENED TO A SNUG FIT. BOLTS DESIGNATED:

8.8/S SHALL BE HIGH STRENGTH BOLTS (GRADE 8.8) TO AS 1252 TIGHTENED TO A SNUG FIT.

8.8/TF AND 8.8/TB SHALL BE HIGH STRENGTH BOLTS (GRADE 8.8) TO AS 1252 FULLY TENSIONED IN ACCORDANCE TO AS 1511.

ALL BOLTS SHALL BE OF SUFFICIENT LENGTH TO PROVIDE A MINIMUM OF ONE FULL THREAD BEYOND THE TIGHTENED NUT.

S4. A FLAT WASHER SHALL BE FITTED UNDER THE ROTATING COMPONENT OF EACH BOLT. ALL TAPERED WASHERS ARE TO BE FITTED UNDER THE NON-ROTATING COMPONENT WHERE POSSIBLE.

S5. ALL BOLT HOLES SHALL BE THE NOMINATED DIAMETER OF THE FASTENER + 2mm IN DIAMETER EXCEPT IN BASEPLATES WHICH SHOULD BE D + 6mm. SLOTTED HOLES SHALL ONLY BE USED WHERE SPECIFIED AND CONSIST OF 2 HOLES 25mm c/c WITH PORTION BETWEEN REMOVED. BURNING OF HOLES WILL NOT BE ALLOWED.

S6. SUBSTITUTION OF STEEL SECTIONS SHOWN ON THE DRAWINGS SHALL NOT BE MADE WITHOUT THE APPROVAL OF THE ENGINEER.

S7. STRUCTURAL STEELWORK SHALL HAVE THE SURFACES CLEANED BY POWER WIRE BRUSHING AND PAINTED WITH TWO COATS OF ZINC RICH PRIMER.

S8. ALL STEELWORK, FASTENERS, ETC. WHICH WILL BE PERMANENTLY EXPOSED TO THE WEATHER AND SUBJECT TO AN AGGRESSIVE INDUSTRIAL OF SALT MARINE ENVIRONMENT AND ALL HOLDING DOWN BOLTS, ETC. SHALL BE HOT DIPPED GALVANISED.

S9. THE CONTRACTOR SHALL PROVIDE ALL CLEATS AND DRILL ALL HOLES NECESSARY FOR FIXING STRUCTURAL AND OTHER MEMBERS WHETHER OR NOT DETAILED ON THE DRAWINGS.

S10. THE FABRICATION AND ERECTION OF STRUCTURAL STEELWORK SHALL BE SUPERVISED BY A QUALIFIED PERSON EXPERIENCED IN SUCH SUPERVISION TO ENSURE THAT ALL REQUIREMENTS OF THE DESIGN ARE MET.

S11. WELDS SHALL BE 6mm CONTINUOUS FILLET WELD, ELECTRODES E40XX. ALL BOLTS SHALL BE M20 DIAMETER, ALL GUSSET PLATES AND CLEATS 10mm THICK UNLESS OTHERWISE NOTED (U.N.O.)

S12. PROVIDE A SPACE OF 20mm (U.N.O.) BETWEEN ALL BEAMS/COLUMNS BEARING ON CONCRETE OR MASONRY AND CAULK WITH 2:1 SAND CEMENT MORTAR OF DAMP EARTH CONSISTENCY HAND RAMMED INTO POSITION OR AN APPROVED SHRINK COMPENSATING GROUT.

STRUCTURAL TIMBER

T1. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE SPECIFICATIONS AND THE FOLLOWING SAA CODES AS APPLICABLE:

AS 1720	TIMBER STRUCTURES CODE
AS 1684	TIMBER FRAMING CODE (INCLUDING SUPPLEMENTS)

WHERE AS 1684 IS USED THE REQUIREMENTS OF APPENDIX D SHALL BE APPLICABLE.

T2. ALL TIMBER SHALL BE STRESS GRADED IN ACCORDANCE WITH THE APPROPRIATE AUSTRALIAN STANDARDS. THE SPECIES AND STRESS GRADES OF TIMBER SHALL BE AS SPECIFIED ON THE DRAWINGS. THE APPENDICES OF AS 1684 SHALL BE USED WHERE FRAMING MEMBERS ARE NOT INDICATED ON THE DRAWINGS. THE SIZE OF TIMBER MEMBERS SHALL NOT DEVIATE BY MORE THAN 4mm FROM THE SPECIFIED SIZE.

T3. HOLES FOR BOLTS SHALL BE MADE OVERSIZE AS FOLLOWS U.N.O:

BOLT DIAMETER 16mm OR LESS	- 2mm OVERSIZE
BOLT DIAMETER > 16mm	- 3mm OVERSIZE

EDGE DISTANCE FOR FASTENERS IN TIMBER (FROM EDGE TO SIDES) SHALL CONFORM TO THE REQUIREMENTS OF AS 1720.

T4. BOLTS USED TO FASTEN TIMBER COMPONENTS SHALL BE GALVANISED U.N.O.

T5 BOLTS WHICH WILL BECOME INACCESSIBLE SHALL BE RE-TIGHTENED IMMEDIATELY PRIOR TO BEING BUILT-IN. ALL BOLTS SHALL BE RE-TIGHTENED AT PRACTICAL COMPLETION AND AT END OF MAINTENANCE PERIOD.

MASONRY (BRICKWORK & BLOCKWORK)

M1. ALL MASONRY (BRICKWORK AND BLOCKWORK) SHALL COMPLY WITH THE REQUIREMENTS OF THE SPECIFICATION, AS 3700 SAA MASONRY CODE AND SHALL SATISFY THE FIRE RATING REQUIREMENTS OF THE WALL. WALLS DESIGNATED F SHALL BE FIRE RATED TO THE NUMBER OF HOURS NOMINATED AFTER F, eg. F3 = 3 HOURS.

M2. MORTAR SHALL BE 1:1:6 CEMENT: LIME: SAND EXCEPT WHERE THE MASONRY IS REINFORCED IN WHICH CASE THE MORTAR SHALL BE 1:2.5:3. PLASTICISERS SHALL NOT BE USED IN THE MORTAL MIX.

M3. BRICKWORK

1. MINIMUM COMPRESSIVE STRENGTH OF BRICKS IN ACCORDANCE WITH AS 1225 SHALL BE 40 MPa UNLESS NOTED OTHERWISE.

2. THE UNRESTRAINED 5-YEAR EXPANSION OF BRICKS IN ACCORDANCE WITH NATA REGISTERED TEST No. 50.1 SHALL NOT EXCEED 1.0mm/m UNLESS LOW GROWTH BRICKWORK IS SPECIFIED IN WHICH CASE IT SHALL NOT EXCEED 0.33 mm/m.

M4. BLOCKWORK

1. ALL BLOCKS SHALL COMPLY WITH AS 2733 AND SHALL HAVE A CHARACTERISTIC UNCONFINED COMPRESSIVE STRENGTH OF 12 MPa.

2. ALL SOLID BLOCKS SHALL BE LAID WITH FULL MORTAR BEDDING TO BOTH THE HORIZONTAL AND VERTICAL JOINTS.

3. ALL HOLLOW BLOCKS ABOVE THE FOUNDATION COURSE SHALL BE LAID WITH MORTAR TO THE FACE SHELLS AND THEIR VERTICAL PROJECTION THROUGH THE PERPEND JOINTS. GROUTED BLOCKWORK SHALL HAVE FULL BEDDING INCLUDING CROSS WEBS AND FULL PERPEND JOINTS. ALL HOLLOW BLOCKS SHALL BE LAID ON A FULL BED OF MORTAR AT THE FIRST BED JOINT ON FOOTINGS.

4. BONDING OF BLOCKWALLS SHALL COMPLY WITH THE REQUIREMENTS OF AS 1475.

M5. GROUT USED TO FILL REINFORCED CAVITIES AND CORE HOLES IN BRICKWORK AND BLOCKWORK SHALL HAVE A SLUMP OF 230-260mm AT THE TIME OF POURING WHEN TESTED IN ACCORDANCE WITH AS 1012 WITH A COMPRESSIVE STRENGTH OF 20 MPa AT 28 DAYS. THE AGGREGATE SHALL BE ROUNDED GRAVEL OF A MAXIMUM SIZE OF 10mm WITH THE COURSE AGGREGATE BEING NOT MORE THAN 30% OF THE VOLUME OF GROUT. WHERE GROUT SPACE IS LESS THAN 30mm (eg. OTHER SIDE OF HORIZONTAL REINFORCEMENT) THE COARSE AGGREGATE SHALL BE OMITTED. READY-MADE GROUT SHALL BE USED. SITE MIXED GROUT WILL ONLY BE PERMITTED WHERE READY-MADE GROUT IS NOT AVAILABLE AND ONLY WITH THE APPROVAL OF THE SUPERINTENDENT.

M6. NON LOAD BEARING WALLS SHALL BE KEPT A MINIMUM OF 20mm BELOW THE SOFFIT OF SLABS AND BEAMS OVER. WHERE THE WALL HAS FIRE RATING REQUIREMENT FILL JOINTS WITH AN APPROVED FIRE RESISTANT AND EQUAL RATING MATERIAL.

M7. PROVIDE CLEAN OUT BLOCKS AT THE BASE OF ALL WALLS TO BE REINFORCED.

M8. PROVIDE CONTROL JOINTS WHERE INDICATED ON THE DRAWINGS AND TO THE REQUIREMENTS OF AS 3700

M9. BUILD IN ALL BRICK AND WALL TIE, FRAMING ANCHORS AND TIE DOWNS INCLUDING MASONRY FLEXIBLE ANCHORS AS SPECIFIED. INSTALL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND TO THE REQUIREMENTS OF SAA CODES.

M10. MASONRY FLEXIBLE ANCHORS SHALL BE FIXED TO EXISTING MASONRY WALLS, CONCRETE SURFACES OR STEELWORK USING 2 No. RAMSET POWDER ACTUATED 3.8mm Dia. X 25mm LONG DRIVE PINS WITH A 16mm DIAMETER DISC OR SIMILAR APPROVED.

M11. MASONRY ANCHORS SHALL ONLY BE FIXED INTO SOLID MASONRY AND NOT THE MORTAR. WHERE THE MASONRY CONSISTS OF HOLLOW OR PERFORATED UNITS SUBSTITUTE A SOLID ONE OR GROUT TO MAKE SOLID.

M12. WHEREVER BRICKWALLS ARE BUILT OFF CONCRETE SLABS, WITH THE EXCEPTION OF THE EXTERNAL OUTER SKIN OF CAVITY WALLS, THEY SHALL BE LAID ON LIGHT GAUGE BUILDING PAPER TO PERMIT FREE MOVEMENT OF THE SLAB IN RELATION TO THE BRICKWORK.

Class 1 Developments
SERVICE AGREEMENT
APPOINTMENT OF BOURKE SHIRE COUNCIL AS THE PRINCIPAL CERTIFYING AUTHORITY

I/we (Applicants full name – please print) _____
Being the Applicant, authorise and appoint **Bourke Shire Council** as the ***Principal Certifying Authority*** for the following development (erection of building) pursuant to s109E of the Environmental Planning and Assessment Act 1979.
(Proposed building works) _____

at (Property description and location) _____
This Appointment is made in relation to the following approvals:

Development Consent No or _____

Complying Development Certificate No _____

Construction Certificate No _____

The **Applicant** acknowledges and accepts that in appointing **Bourke Shire Council** as the ***Principal Certifying Authority*** for the subject development:

- The **Applicant** will ensure that the site complies with all relevant OH&S legislation and that access to the site is not inhibited in any way to the **Council** for the purposes of undertaking inspections or any reinspections.
- The **Applicant** accepts that responsibility to ensure that its **Agents** are aware of the necessity for the inspections to be carried out prior to covering / concealing work, and where the inspections find that the project has deficiencies, that all necessary steps are taken to ensure that the rectification works are undertaken to allow the project to continue.
- The **Applicant** agrees to make payment of fees where reinspection is required, at the rate set in Council's Management Plan, prior to **Council** conducting further scheduled inspections or issue of Occupation Certificate.
- The **Applicant** accepts the responsibility to ensure that the building is not occupied prior to **Council** conduction a satisfactory final inspection.
- The **Applicant** agrees to comply with the provisions of the attached schedules for the purposes of standards of construction and submission of certificates.
- A number of inspections, as listed in schedule 1, will be undertaken by the (PCA) **Bourke Shire Council** for the purposes of satisfying itself that during stages of the construction the nominated work is being completed in accordance with the approved Development Consent, Construction Certificate/Complying Development Certificate, the Building Code of Australia and associated legislation.
- The **Applicant** agrees that they or their **Agent** will give Council not less than twenty four (24) hours prior notice for each inspection, and that the work will not be covered until the inspection has been carried out and the work passed by the Council.

Agreement
Applicant signature: _____ Date: _____

Contact Telephone Numbers: _____

Council agrees to provide PCA services as indicated below;

- to issue Construction Certificates, Compliance Certificates and Occupation Certificates where appropriate.
- To conduct inspections as required for the approved building works.

On behalf of Council : _____ Date: _____

Schedule 1 Specifies
OBLIGATIONS OF THE CLIENT/APPLICANT
The Client shall:

- Not engage any other PCA once Council has been appointed the PCA without first notifying Council in writing in accordance with the requirements of the Environmental Planning and Assessment Act 1979, as amended.
- Use competent licenced trades persons for all aspects of the building works.
- Provide Council with all relevant drawings, plans, specifications, documentation associated with the Development Consent/Complying Development/Construction Certificate including:
    - Structural engineer's details for all footings, slabs and structural steelwork
    - Bracing and tie-down details as required by the National Timber Framing Code Australian Standard 1684, prior to frame inspection.
- Provide all information that the client can obtain to enable Council to fulfil its obligations.
- Act in good faith, in a co-operative manner and in accordance with this agreement and statutory requirements.
- Ensure a stamped copy of the approved plans are on site at all times.
- Provide Council with a Notice of Commencement form, two (2) days prior to work commencing.

OBLIGATIONS OF THE PCA:

1. Issuing the Construction Certificates

Council shall issue a construction certificate where appropriate:

- once all of the fees have been paid; and
- conditions of Development Consent required to be satisfied prior to issue of the construction certificate have been satisfied; and
- submitted plans and specifications indicate that the design and construction of the proposed building complies with the Development consent and the regulations; and
- submitted plans and specifications indicate compliance with the Building Code of Australia.

2. Inspections

Council shall nominate the specific inspections required for a development and notify the applicant with the notice of determination. Council shall carry out as many inspections as it considers necessary, in addition to those nominated in the inspection schedule, to satisfy itself that the development complies with approved plans and conditions of development consent.

Note: Where works have been found to be incomplete or non-compliant additional inspections may be charged to the client/applicant at the rate nominated in Council's Management Plan.

SCHEDULE OF REQUIRED INSPECTIONS:

1. Strip/blob footing, pier holes, preparations, prior to the placement of concrete.
2. Internal sewer pipes under water test.
3. Floor slab preparations with reinforcement in position, prior to the placement of concrete.
4. Floor framework, dampcourse and ant capping.
5. Internal hot and cold water plumbing, under pressure test of 1500Kpa (30 min.minimum).
6. Wall, roof framework, prior to erection of internal wall cladding.
7. Wet areas – Prior to covering of any water proofing in any wet areas
8. External sewer pipes under water test (including On-site disposal system).
9. Stormwater pipes.
10. Occupation inspection.
11. Final inspection, when all works required to finalise the development have been undertaken.

Note: Details of the commencement of the runoff period for an insurance contract under the Home Building Act 1989 are contained in clause 48 (Period of cover) of the Home Building Regulations 1997.

3. Issuing the Occupation Certificate/Interim Occupation Certificate

Council shall issue an Occupation Certificate for the building works when Council is satisfied that;

- Conditions of Development Consent or a Complying Development Certificate and this agreement have been complied with for the building works; and
- The building works are suitable for occupation or use in accordance with their classification under the Building Code of Australia; and
- All requirements of the Environmental Planning and Assessment Act and Local Government Act have been satisfied in relation to the development.

Note: The issue of an Occupation Certificate may not be taken to mean that all requirements of the Development Consent have been complied with. You are advised to make enquiries with Council in regard to satisfactory compliance with all conditions of Development Consent.

Schedule 2 Specifies
CONDITIONS FOR DEVELOPMENT AND CONSTRUCTION CERTIFICATE WORKS WHERE BOURKE SHIRE COUNCIL IS NOMINATED AS THE PRINCIPAL CERTIFYING AUTHORITY

CONDITIONS TO BE MET PRIOR TO COMMENCEMENT

GENERAL REQUIREMENTS

1. All work on the site shall be carried out between the hours of 7.00 am and 6.00 pm Monday to Friday inclusive, 7.00am to 5.00 pm Saturdays, and 8.00 am to 5.00 pm on Sundays and Public Holidays. Written approval must be obtained from the General Manager of Bourke Shire Council to vary these hours.

   Reason: to reduce the noise nuisance to the occupants of neighbouring properties and to satisfy the requirements of the Protection of the Environment (Operations) Act 1997 and Council Policy.

2. New or unoccupied work is to be provided with a sign clearly stating the following:

   - Unauthorised entry is prohibited
   - Builder/owner's name and licence number
   - Street address
   - Contact telephone number and after hours number
   - Date of determination
   - Consent number

   Reason: to maintain public safety and to identify the site and builder.

3. The storage of materials or the placement of sheds is not permitted on footpaths, roadways or in reserves. Rubbish and building materials must be contained within the site in a suitable waste enclosure. The enclosure must be maintained throughout the project.

   Reason: to ensure public safety and protection of the environment.

4. A temporary on-site toilet is to be provided and must remain throughout the project or until an alternative facility meeting Council's requirements is available on-site.

   Reason: to ensure the maintenance of public health.

5. All soil erosion and sedimentation control measures are to be provided within the allotment boundaries, along the lower boundary of the site, or as directed by Council. These control measures are to be maintained at maximum operational capacity until the land is effectively stabilised upon completion of construction work. Council may issue infringement notices where measures are not provided or maintained.

   Reason: for environment protection, erosion control, flood prevention and pollution of land and/or stormwater systems.

6. The dwelling is to be set out by a registered surveyor. A copy of the survey sketch indicating the position in relation to the boundaries, easements and rights of way is to be submitted to Council prior to requesting an inspection of slabs or footings.

   Reason: to ensure compliance with the requirements of the Development Consent/Complying Development Certificate and the Building Code of Australia.

WORK REQUIRED DURING CONSTRUCTION

FOOTINGS AND SITE PREPARATION

7. Floor levels are to be established to prevent surface water entering the structure. Floor level is to be not less than 150 mm above the top of the sewer overflow gully, which is to be at least 75 mm above finished ground level or 25 mm above finished paving level where there is natural drainage away from the building.

   Reason: Requirement of the Building Code of Australia to ensure adequate floor height to minimise the risk of surface water and sewerage overflow entering the building, and the entry of surface water into Council's sewer.

8. For timber floor construction a minimum underfloor clearance of 400 mm between finished ground level and any structural components or other obstructions; eg, bearers, joists or plumbing fixtures is to be maintained. Clearance may be reduced to 150 mm on a sloping site provided that the area of reduced clearance is not more than 2 m from a point with conforming clearance.

   Reason: Requirement of the Building Code of Australia to make adequate provision for visual inspections for termite activity and to provide for ventilation to the sub-floor areas.

9. Footings and slabs are to be construction and maintained in accordance with the provision of Australian Standard 2870.1:1996.

   Reason: Requirement of the Building Code of Australia to ensure structural adequacy of the building.

DRAINAGE/PLUMBING/STORMWATER

10. All plumbing and drainage (water supply, sanitary plumbing and drainage, stormwater drainage and hot water supply) is to comply with the Local Government (Approvals) Regulation 1999, Local Government (Water Services) Regulation 1999 and Australian Standard 3500 – National Plumbing and Drainage Code. Such work shall only be installed by a licensed plumber and is to be inspected and approved by Council prior to concealment.

    Reason: Requirement of the Building Code of Australia to ensure the maintenance of public health.

11. Unauthorised entry into any confined space (eg, sewer or drainage manhole/pit) under the control of Bourke Shire Council is prohibited. Approval to enter such a space may be granted by an authorised Council officer upon application.

    Reason: to ensure the safety of tradespeople and the public.

12. Hot water shall be stored at a minimum of 60^0C and be delivered to all sanitary fixtures used for personal hygiene (bathrooms/ensuites) at a temperature not exceeding 50^0C. Where tempering valves are installed, a sign is to be permanently fixed on the hot water heater adjacent to the tempering valve (clearly visible) indicating:

    "A tempering valve has been installed to prevent scalding. This valve is to be renewed at intervals as recommended by the manufacturer."

    Reason: Requirement of the Building Code of Australia to inhibit the growth of Legionella bacteria and to prevent scalding.

13. Convey all stormwater to the street gutter or stormwater mains by way of a sealed pipe system using a suitable and size of UPVC piping.

    Reason: Requirement of the Building Code of Australia to prevent damage to property and to prevent unhealthy or dangerous conditions.

FRAME/INTERNAL

14. All timber framing shall be designed and secured to withstand wind and service loads as required by Australian Standard 1684 – Residential timber framed construction. Details of provision for bracing and tiedown are to be submitted to Council prior to requesting a frame inspection.

    Reason: Requirement of the Building Code of Australia to ensure the buildings structural.

15. A system for termite management shall be provided to the building. The contractor or the builder responsible for installing the management system shall provide on completion, both the Council and the owner of the premises with a Certificate of Compliance. A durable notice is to be fixed to the building, in accordance with Australian Standard AS3660.1 – 2000 and Part 3.1 of the Building Code of Australia.

    Reason: Requirement of the Building Code of Australia to deter the concealed entry of termites.

16. External doors are to be provided with landings/patios extending the full length of the door opening and not less than 1m wide where the height of the door threshold is more than 190 mm above the finished ground level.

    Reason: Requirement of the Building Code of Australia to provide for safe access and egress.

17. An approved continuous balustrade/railing shall be provided to any landing, patio, verandah, balcony or stairway being at a height exceeding one(1) m above finished ground level.

    - A minimum balustrade height of 1 m is required on landings – 865 mm on stairs/ramps.
    - Opening in the balustrade are to be constructed on further apart that 125 mm.

    Reason: Requirement of the Building Code of Australia to provide for safe access and egress.

18. Class 1 buildings are to be provided with an automatic fire detection and alarm system complying with Part 3.7.2 (Smoke Alarms) of the Building Code of Australia – Housing Provisions.

    Reason: Requirement of the Building Code of Australia to provide safeguards so that occupants are warned of a fire in the building so that they may safely evacuate.

19. Wet areas are to be waterproofed in accordance with the Australian Standard AS3740-1994. Certification is to be provided to Council prior to occupation or use.

    Reason: Requirement of the Building Code of Australia to reduce the likelihood of damage to building elements or the creation of unhealthy or dangerous conditions.

SITE WORKS

20. Finished ground level shall be graded away from the buildings and adjoining properties to achieve natural drainage. Concentrated flows are to be dispersed down slope and contained within the allotment boundaries or are to be collected and discharged to the stormwater drainage system.

    Reason: Requirement of the Building Code of Australia to minimise the risk of surface water entering the structure or adjoining land.

21. Provide a surface water drainage system to any excavated area. The drainage line shall be connected to the stormwater drainage system.

    Reason: Requirement of the Building Code of Australia to protect the building from damage caused by water entering the structure.

22. Stormwater pits, sewer manholes, water hydrants, water shut-off valves, water meter boxes and sewer inspection shafts are initially installed flush with the ground level. These services are not to be covered by driveways, paths, landscaping or the like.

NOTE: Any alterations to these services are at the expense of the applicant/owner. If Council is required to alter these services, this will also be at the owners expense.

Reason: to ensure that Council's services are readily accessible for maintenance and to advise owners that Council will pursue recovery of costs for damage or concealment of infrastructure.

23. A retaining wall or other approved method of preventing soil movement is to be provided to all cut or filled areas to provide support for buildings on the land and neighbouring property. All cut and fill is to be undertaken with the boundaries of the allotment to which the approval relates. Full details of any retaining walls or other approved method of preventing soil movement and associated drainage are to be submitted to and approved by the Council prior to construction commencing.

Reason: Requirement of the Building Code of Australia to ensure retaining walls are constructed in accordance with accepted building practice.

24. Provide a layback in accordance with Council policy to suit the driveway indicated on the approved plan. The driveway grade between the property boundary and the kerb invert level shall be 4%. Where Council considers the access unsatisfactory, Council may order its removal.

Reason: to ensure satisfactory access to the property and to protect Councils assets.

VENTILATION

25. Kitchen exhaust fans must not discharge into the roof space. A continuous metal duct is to be used to allow the exhaust to discharge directly to the outside air.

Reason: Requirement of the Building Code of Australia to minimise the risk of the kitchen fire spreading to the roof space and ensure proper operation of the fan.

26. Provide an exhaust installation ducted directly to the outside air and wired in paralled with the light switch to any internal sanitary compartment or bathroom not provided with natural ventilation complying with the Building Code of Australia.

Reason: Requirement of the Building Code of Australia to provide adequate direct ventilation to the enclosed area and to ensure that there are not adverse effects on the occupants.

ON-SITE SEWAGE MANAGEMENT (where applicable)

27. The construction and installation of the on-site sewage management system shall be in accordance with Australian Standard 1547 (Domestic Waste Water Management), the Environmental & Health Protection Guidelines – Onsite Sewage Management for Single Households, and any additional requirements of the Council.

Reason: To comply with Clause 47 of the Local Government (Approvals) Regulation, 1993.

28. Where an Aerated Waste Water Treatment System is installed proof of the existence of a quarterly service contract between the authorised service agent and the owner shall be provided to Council prior to the commissioning of the system.

Reason: To provide evidence that the aerated waste treatment system will be serviced by a trained, competent person/company and to clearly identify that person/company.

29. Where an Aerated Waste Water Treatment System is installed the land application area shall be fenced and have a sign placed next to it that reads:

"RECLAIMED EFFLUENT – DO NOT DRINK – AVOID CONTACT"

Reason: to preserve the health of the occupants by making it clear that contact with reclaimed effluent is not advisable.

THE FOLLOWING CONDITIONS ARE TO BE MET PRIOR TO THE ISSUE OF A FINAL OR INTERM OCCUPATION CERTIFICATE

30. The use or occupation of the approved development must not commence until all conditions of development consent have been complied with and a satisfactory final inspection has been undertaken.

Reason: to ensure compliance with the requirements of the Environmental Planning and Assessment Act, 1979 and the Local Government Act, 1993.

Council will consider the following matters in the issue of a Final/Occupation Certificate
Inspection Checklist

? Compliance with Approval conditions

? Previous Inspection

? Check plan against building

? Smoke alarms installed

? Operations of doors/windows

? Plumbing fixtures operate

? Water hammers

? Check for leaks

? Secure fixtures

? Grading of tiled floors

? Shower Screen

? Adequate water pressure

? Cooking facilities installed

? Manhole access to roof space/underfloor access door

? Mechanical exhaust ventilation (to enclosed WC, bath, laundry, kitchen)

? Electricity connected

? Water connected

? Sanitary drainage connected

? Painting – external/internal

? All building waste removed

? All builders sheds etc removed

? Hot water heather support and overflow

? Septic tank/AWWTS (check approval conditions)

? Height of floor/ground level

? Finished ground graded away from house

? Height of overflow gully

? Coping to gully and inspection shaft

? Surface water inlet sumps – low areas

? Surface waters directed clear of adjoining property

? Retaining walls

? Landings to external doors

? Railing/balustrades to landings≥ 1m

? Flashing of roof penetrations

? House number

? Water meter and box

? Access/layback

? Stormwater discharge

? Grated drain to front of garage

? Council's service exposed/undamaged

CERTIFICATES

? Termite Certificate

? Wet Area Flashing Certificate

? All structural certificates received

? Builder/owner – on site/contacted

DA CONDITIONS

? Compliance with Development Approval conditions

? Final survey detailing boundary and eaves setback (if required by Conditions of Approval)

Note: Upon completion of construction all certification certificates are to be provided to Council prior to the final inspection being undertaken.

Note: The issue of an Occupation Certificate may not be taken to mean that all requirements of the Development Consent have been complied with. You are advised to make enquiries with Council in regard to satisfactory compliance with all conditions of Development Consent.