Housing New Zealand
Housing New Zealand Corporation

Maintenance Work Programmed Specification (MWPS) for Housing New Zealand: M-215

Date: 1 July 2016

VERSION 3

SPECIFICATION of work to be done and materials to be used in carrying out the PBMC works scoped and as shown on any accompanying drawings

masterspec

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1013 DOCUMENT CONTROL

1. DOCUMENT CONTROL

Document Control

1.1 PREPARED BY

Company:	~
Postal Address:	~
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1232 INTERPRETATION & DEFINITIONS

1. GENERAL

This general section relates to interpretation and definitions that are used in this specification.

Definitions

1.1 DEFINITIONS

Required:	Required by the documents, the New Zealand Building Code or by a statutory authority.
Proprietary:	Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
Provide and fix:	"Provide" or "fix" or "supply" or "fix" if used separately mean provide and fix unless explicitly stated otherwise.
Review:	Review by the contract administrator is for general compliance only. Review does not remove the need for the contractor to comply with the stated requirements, details and specifications of the manufacturers and suppliers of individual components, materials and finishes. Neither can the review be construed as authorising departures from the contract documents.
Working day:	Working day means a calendar day other than any Saturday, Sunday, public holiday or any day falling within the period from 24 December to 5 January, both days inclusive, irrespective of the days on which work is actually carried out.
Workplace:	Workplace means the place where work is being carried out, or is customarily carried out, for a business or undertaking including any place where a worker goes, or is likely to be, while at work (under Health and Safety at Work Act 2015).

1.2 PERSONNEL

Owner:	The person defined as "owner" in the New Zealand Building Code.
Principal:	The person defined as "principal" in the conditions of contract.
Contractor:	The person contracted by the principal to carry out the contract.
Contract administrator:	The person appointed by the principal to administer the contract on the principal's behalf. Where no person has been appointed by the Principal, it means the Principal or the Principal's representative.

1.3 ABBREVIATIONS

The following abbreviations are used throughout the specification:

AAMA	American Architectural Manufacturers Association
AS	Australian Standard
AS/NZS	Joint Australian/New Zealand Standard
ASTM	American Society for Testing and Materials
AWCINZ	Association of Wall and Ceiling Industries of New Zealand Inc.
BCA	Building Consent Authority
BRANZ	Building Research Association of New Zealand
BS	British Standard
COP	Code of practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
HERA	Heavy Engineering Research Association
LBP	Licensed Building Practitioner
MBIE	Ministry of Business, Innovation and Employment
MPNZA	Master Painters New Zealand Association Inc
NZBC	New Zealand Building Code
NZS	New Zealand Standard

NZS/AS	Joint New Zealand/Australian Standard
NZTA	New Zealand Transport Agency
NUO	Network Utility Operator
PCBU	Person Conducting a Business or Undertaking (under Health and Safety at Work Act 2015)
OSH	Occupational Safety and Health
TA	Territorial Authority
TNZ	Transit New Zealand(Transit New Zealand is now New Zealand Transport Agency NZTA - some specifications are still prefixed TNZ)
RBW	Restricted Building Work
SARNZ	Scaffolding and Rigging New Zealand Inc
SED	Specific Engineering Design

1.4 DEFINED WORDS

Words defined in the conditions of contract, New Zealand Standards, or other reference documents, to have the same interpretation and meaning when used in their lower case, title case or upper case form in the specification text.

1.5 WORDS IMPORTING PLURAL AND SINGULAR

Where the context requires, words importing singular only, also include plural and vice versa.

1233 REFERENCED DOCUMENTS

1. GENERAL

1.1 REFERENCED DOCUMENTS

Throughout this specification, reference is made to various New Zealand Building Code Compliance Documents (NZBC __), acceptable solutions (__ AS_) and verification methods (__ VM_) for criteria and/or methods used to establish compliance with the New Zealand Building Code.

Reference is also made to various standards produced by Standards New Zealand (NZS, AS/NZS, NZS/AS), overseas standards and to listed Acts, Regulations and various industry codes of practice and practice guides. The latest edition (including amendments and provisional editions) at the date of this specification applies unless stated otherwise.

It is the responsibility of the contractor to be familiar with the materials and expert in the techniques quoted in these publications.

Documents cited both directly and within other cited publications are deemed to form part of this specification. However, this specification takes precedence in the event of it being at variance with the cited documents.

1.2 DOCUMENTS

Documents referred to in the GENERAL sections are:

NZBC F4/AS1	Safety from falling
NZBC F5/AS1	Construction and demolition hazards
AS/NZS 1170.2	Structural design actions - Wind loads
AS/NZS 3012	Electrical installations - Construction and demolition sites
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3404:1997	Steel structures standard
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
NZS 6803	Acoustics - Construction Noise

HNZ Contractor Code of Conduct:

- The obligations of contractors to HNZ tenants when undertaking maintenance works on rental properties. A copy of the Code of Conduct to be kept on site for the duration of the contract works and be available for reference by site personnel at all times.

HNZ Asbestos Policy and Code of Conduct:

- Minimising the risks associated with building products containing asbestos. A copy of the Code of Conduct to be kept on site for the duration of the contract works and be available for reference by site personnel at all times.

HNZ Lead Based Paint Policy and Code of Conduct:

- Minimising the risks associated with lead based paint. A copy of the Code of Conduct to be kept on site for the duration of the contract works and be available for reference by site personnel at all times.

HNZ A Guide to Driveway Safety for Property Owners
HNZ Specific Requirements for the Installation of Fire Alarms in HNZ Properties
HNZ Environmental Policy
HNZ Building Materials Procurement Schedule
Building Act 2004
Building Regulations 1992
Health and Safety at Work Act 2015
Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
Health and Safety in Employment Regulations 1995 (reprint 4 April 2016)
New Zealand Building Code

Heritage New Zealand Pouhere Taonga Act 2014
Resource Management Act 1991
Smoke-free Environments Act 1990
WorkSafe NZ Guidelines for the provision of facilities and general safety in the construction industry
SARNZ Best practice guideline for scaffolding in New Zealand

1237 WARRANTIES

1. GENERAL

This general section refers to the requirements for warranties/guarantees as listed in this section, as referred to within the body of this specification, and as referred to within separate specifications/documents relating to this project. It includes:

- Warranties for parts of the work required by the principal in a required form
- Installer/applicator warranties for parts of the work in the installer's/applicator's standard form
- Manufacturer/supplier warranties provided with products, appliances and the like in the manufacturer's/supplier's standard form
- Guarantees provided by contractor in the contractor's standard form.

These guarantees/warranties are in addition to any warranties, implied warranties, or guarantees that are required by the Building Act, the Building Regulations.

Warranties

1.1 PROVIDE WARRANTIES

Provide executed warranties in favour of the principal in respect of, but not limited to, materials, components, service, application, installation and finishing called for in that specified section of work. The terms and conditions of the warranty in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability under the terms of the warranty called for in that specified section of work.

- Commence warranties from the date of practical completion of the contract works (unless otherwise stated).
- Maintain their effectiveness for the times stated.

1.2 WARRANTIES - INSTALLER/APPLICATOR

Where installer/applicator warranties are offered covering execution and materials of proprietary products or complete installations, provide such warranties to the contract manager. These warranties may be provided in lieu of the warranties that are otherwise required provided that these warranties are subject to similar conditions and periods.

Provide warranties in favour of the principal. The terms and conditions of such warranties in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

1.3 WARRANTIES - MANUFACTURER/SUPPLIER

Where warranties are offered covering materials, equipment, appliances or proprietary products, provide all such warranties to the Contract Manager.

Provide warranties in favour of the principal. The terms and conditions of such warranties in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

Submission

1.4 REVIEW BY CONTRACTOR

Obtain the warranties from the installers, applicators, manufacturers and suppliers at the earliest possible date and review to ensure that they are correctly filled out and executed. Where warranties are executed as a deed, ensure that a duplicate copy is provided for execution by the owner/principal. Keep safe and secure until required for submission.

1.5 WARRANTIES - REQUIRED BY CONTRACT

Obtain copies of warranties listed in the contract documents. Provide all warranties at the same time. If the project has an operations and maintenance documentation provision, present the warranties with the operations and maintenance information. If no operations and maintenance documentation provision exists, present the warranties to the contract administrator in a loose-leaf binder with a contents index suitably labelled and including the project name and details. Provide a title on the binder edge "Warranties for (project name)"

2. SELECTIONS

Refer to work sections for warranty manufacturer/supplier and installer/applicator requirements.

3. SCHEDULES

Refer to work sections for warranties.

1250 ESTABLISHMENT & TEMPORARY WORKS

1. GENERAL

This general section relates to temporary works and services required for the construction of the contract works. It includes:

- Notices and approvals
- Temporary works and services including temporary fencing and hoardings
- Scaffolding and shoring
- General care and protection.

Notices and approvals

1.1 STATUTORY OBLIGATIONS
Comply with all statutory obligations and regulations of regulatory bodies controlling the execution of the works

1.2 NETWORK UTILITY APPROVALS
Attend on, statutory and network utility inspectors, as necessary to obtain approvals for and the satisfactory completion of the works

1.3 NOTIFY NETWORK UTILITY OPERATORS
Notify all network utility operators of proposed works before commencing site operations. Ascertain location of services or confirm that none exist in the vicinity of the works. Take all necessary precautions to avoid damage to existing services

Temporary works

1.4 COMPLY WITH NEW ZEALAND BUILDING CODE
Refer to New Zealand Building Code clauses and approved document paragraphs for the criteria and/or methods that must be used in this section to establish compliance with the code.

1.5 COSTS RELATING TO TEMPORARY WORKS
Pay all rates/fees in respect of temporary works.

1.6 MAINTENANCE OF TEMPORARY WORKS
Maintain alter, adapt and move temporary works and services as necessary. Clear away when no longer required and make good.

1.7 SAFEGUARD THE SITE, THE WORKS AND MATERIALS
Take all precautions to prevent unauthorised access, including access outside working hours, to the site, the works and adjoining property. Safeguard the site, the works, materials and plant from damage and theft.

1.8 SITE FENCING
Provide and maintain a site fence, 2 metres high from ground level on the side accessible to the public. Construct to comply with NZBC F5/AS1 Construction and demolition hazards. Construct as required for public areas.

Construct the fence with:

- galvanized chain link netting with a 50mm x 50mm maximum grid size
- posts at 2.5 metre centres maximum
- gap at the bottom of the fence no greater than 100mm.

1.9 SITE HOARDINGS

Provide and maintain hoardings, 2 metres high from ground level on the side accessible to the public. Construct to comply with NZBC F5/AS1 Construction and demolition hazards. Construct as required for public areas.

Construct hoardings with continuous cladding of:

- close butted timber at least 19mm thick; or
- 6mm exterior grade plywood on studs at 600mm centres maximum; or
- 9mm exterior grade plywood on studs at 1 metre centres maximum; or
- continuous metal cladding suitably supported to provide strength and rigidity.

1.10 SITE FENCING - NON-PUBLIC AREAS

Provide and maintain a 1 metre high site fence to non-public areas. Construct using:

- warratah stakes at 1.5 metre centres fitted with safety caps
- plastic safety mesh.

1.11 PROVIDE SEDIMENT AND SILT RUN OFF PROTECTION

Provide appropriate measures to prevent or minimise sediment generation and silt run off. Comply with territorial and other authority requirements relating to carrying out earthworks.

Prevent silt run off by:

- exposing only as much ground as required at any time
- providing run off channels, contour drains or earth bunds to divert clean water away from the site on to stable sealed or grassed ground
- capture silt by the use of silt fences, vegetation buffer strips, sediment ponds or earth bunds.

Provide sediment control by:

- earth bunds constructed across the slope to control and detain run off
- silt fences constructed using filter fabric stretched between posts at a maximum of 1 metre spacing.

Pump water from trenches and other areas of the site using methods to prevent sediment entering any drain or watercourse. Filter dirty water before discharging into drainage system.

1.12 PROVIDE CONCRETE WASHWATER RUN OFF PROTECTION

Provide appropriate measures to prevent cement/concrete washwater or slurry run off to; drains or waterways, landscaped areas new or remaining and adjoining public or private properties. Comply with territorial and other authority requirements relating to cement/concrete washwater.

Control run off from:

- cement/concrete based material production, placing and finishing
- hosing down and cleaning of, tools and equipment, fresh material, and spilt or surplus material, pumps and mixers etc
- wet cutting or grinding
- slab watering etc
- water cleaning of new concrete elements, fresh used formwork etc.

Small project with relatively large exposed ground areas - prevent run off by:

- directing small amounts of washwater onto the area of ground closest to the work.
- for larger amounts provide run off channels, and small soak pits
- very small amounts of washwater with no aggregate and only a small amount of sand may be spread over existing lawns.

Large project and those without suitable ground area - prevent run off by:

- plan and implement washwater control measures based on the expected volumes, allow for the timely removal and safe disposal of liquids and solids
- control the volumes of water used for washing down, the more water used the bigger the problem
- Control the flow of washwater so that it is directed to proper catchments
- providing watertight bunds, pits or tanks, filtered washwater is not to be discharged to drains.

Spilt or surplus material:
- if possible allow to set and either use or dispose of as hardfill
- pre-made concrete items, either use or dispose of as hardfill.

Pump washwater away from drains, waterways and adjoining property.

Temporary works - Existing Buildings

1.13 OCCUPIED BUILDINGS
Buildings which remain occupied during the construction must have temporary works agreed with the occupier/owner in advance.
Refer to HNZ Contractor Code of Conduct. All site personnel to have a “Summary of Codes of Contract” card on site for the duration of the contract works at all times

1.14 PARTITIONS
Provide and maintain full height temporary partitions, dust sealed and with appropriate access doors.
Construct the partitions from;
- timber or steel stud framing to suit the height
- 17mm CD plywood screw fixed to occupied side of wall only
- paint plywood white, occupied side only.

1.15 SCREENS
Provide and maintain 2.0m high temporary screens with appropriate access doors.
Construct the screens from;
- timber or steel stud framing
- 17mm CD plywood screw fixed to occupied side of wall only
- paint plywood white, occupied side only.

1.16 DUST SCREENS
Provide and maintain full height temporary dust screens.
Construct the screens from;
- dust proof flexible membrane with taped joints
- timber battens for fixing membrane to edges of building fabric.

Temporary services

1.17 WATER
Use clean, fresh water for the works and make arrangements for distributing about the site.

1.18 ELECTRICITY
To AS/NZS 3012.

1.19 TELEPHONE
Provide on-site temporary telephone facilities.

Scaffolding and shoring

1.20 GENERAL SCAFFOLDING
Provide as necessary general scaffolding for the efficient execution of the works. Placement, erection and structure to be by certified suppliers/erectors and approved by the WorkSafe NZ inspectors before being used. Comply with the SARNZ publication: "Best practice guideline for scaffolding in New Zealand."

Care and protection

1.21 PROTECT EXISTING BUILDINGS
Protect existing buildings and other designated features which are to remain in position during the execution of the works.

1.22 PROTECT ACCESS ROUTES
Protect access routes through the building and areas adjacent to the work area that are to remain in place. These include lifts and stairs. Comply with all fire egress requirements at all times.

1.23 PROTECT EXISTING SERVICES
Protect existing services and parts of service systems that are to remain in place during the execution of the works. Provide temporary caps or covers to prevent the ingress of dust and other contaminants into the systems, ducts, pipes etc.

1.24 MAKE GOOD EXISTING SERVICES
Make good all damage to existing roads, footpaths, grounds, sewers or other services, caused in carrying out the contract works.

1.25 PROTECT EXISTING TREES
Protect existing trees, fences, gates, walls, gardens and other designated site features which are to remain in position during the execution of the works.
Construct a temporary fence at the outer edge of the drip line of trees to be protected. Comply with territorial authority requirements.

1.26 EXISTING FIRE SYSTEMS
Maintain the integrity of the systems at all times. If work requires de-activation of a system, give notice to the local fire service
Follow their instructions and reinstate the system to their requirements.

1.27 CONSTRUCTION KEYING AND SECURITY
Provide locksets with temporary keying, or install with the cylinders removed.

1.28 TEMPORARY STORAGE
Provide temporary storage areas and protective covers and screens. Fillet stack and protect all framing and structural members from moisture and contamination. Completely protect finishing materials from the weather and damage and store in accordance with the manufacturer's requirements. Protect fabricated elements from the weather and damage, and store in accordance with suppliers' requirements.

1.29 PERIODIC SITE CLEANING
Carry out periodic site cleaning during the contract period. Place waste material in appropriate storage pending removal from the site.

1.30 PERIODIC RUBBISH REMOVAL
Maintain on site appropriate means for the storage and removal of construction waste material. Where required or appropriate provide for the separate storage of recyclable waste and other materials requiring special disposal. Keep food waste separate from construction waste.
Recycle polystyrene cardboard, plastic and other packaging materials to comply with HNZ Environmental Policy.

1260 PROJECT MANAGEMENT

1. GENERAL

This general section relates to project management requirements including:

- Meetings
- Cost control
- Communicating and recording
- Programming
- Health and safety
- Environmental management plan.

Site Meetings

1.1 SITE MEETINGS
Meetings to be held as stated in the conditions of contract.

The following persons to attend:

- HNZ Contract Manager
- Contractor
- Subcontractors when needed (contractor to inform them).

Reporting

1.2 CONTRACTORS DETAILED STATUS REPORT
Where required a Contractors detailed status report is to address the following:

- A progress performance report based on the current contract construction programme addressing actual progress against programme of all activities and any variance from the programme
- Details of measures being taken to get work back on programme where there has been a delay
- Details of any future events that will or are likely to affect compliance with the programme
- Variation report including progress on agreed variations, variations to be agreed and anticipated variations and the time implication of variations
- Procurement progress on parts of the work being undertaken under a monetary allowance including the time by which direction must be given on monetary allowances to conform with the construction programme
- Details of any discrepancies in the contract documents that require clarification or determination
- A list of information requests by the contractor, the date when they were made, the person who they were directed to and the date by which a response is required.
- A report on any compliance issues
- A report of site health and safety including any notifiable incidents
- A detailed environmental management plan and report of site recycling of materials and waste to comply with HNZ Environmental Policy.

Cost control

1.3 MEASUREMENT
Give reasonable notice to the HNZ Contract Manager before covering up work which requires to be measured.

1.4 DAYWORK VOUCHERS
To be signed by the contractor's representative as confirming the labour, times and materials used, before being supplied to the HNZ Contract Manager.

Communicating and recording

1.5 MEANS OF COMMUNICATION
Communications between the parties shall be as follows:
Directions: In writing delivered by email
Meeting minutes: In writing delivered by email
RFI's: (Requests for information) I'm writing delivered by email to the HNZ Contract Manager

1.6 DELIVERY OF COMMUNICATIONS
Communications must be:

- sent by email to the email address stated in the Project Directory.

The Contractor and the HNZ Contract Manager must notify the others if they change their address for delivery or transmission of communications.

1.7 RECORDS
Ensure all records specified are kept, held and collated on site in a form that makes the information easily accessible when it is needed.
Distribute copies as and when necessary to those persons entitled under the contract to that information.
Ensure records are kept for recycling waste in accordance with the contractors Environmental Management Plan.

Programming

1.8 CONTRACT PROGRAMME
Include the proposed sequence of all significant on-site and off-site activities, including any intermediate key dates mentioned in the contract. Identify the critical path. Provide a tabulated schedule of information for each activity in order of:

- brief description
- duration in suitable time unit
- earliest start and latest finish time
- total float
- key dates for the supply of information or materials by others.

Identify the dates by which particular information, material or plant need to be supplied or arranged by the HNZ Contract Manager. Also identify any constraints which may have been imposed by the programme.

Supply copies of the programme to the following:

- HNZ Contract Manager 1

Monitor the contract programme by:

- informing the Contract Manager promptly of any circumstances affecting any part of the programme structure and timing.

1.9 WORKING HOURS RESTRICTIONS
Work on site is restricted to:
Weekdays: Between 8am and 6pm
Saturdays: Between 8am and 6pm

Work outside these hours may be permitted, but 48 hours notice is required in writing to the HNZ Contract Manager before proceeding, except where work is urgent Health and Safety or urgent responsive maintenance. Obtain any necessary permits and permission for such work. Refer to HNZ Contractor Code of Conduct.

Health and safety

1.10 HEALTH AND SAFETY
Refer to the requirements of the Health and Safety at Work Act 2015. Comply with all relevant New Zealand safety legislation.

Take all practical steps to make the site and the contract works safe and to provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the rules governing site safety, are properly supervised and are not unnecessarily exposed to hazards.

Identify any significant hazards.

Maintain proper procedures for dealing with any emergencies that may arise. Immediately investigate accidents, identify their cause and maintain a register of accidents and serious harm. Provide a copy of any report which the contractor is required to make to a public authority on any accident which is associated with carrying out the contract works and results in serious harm to any person.

Refer to individual work sections for detailed requirements on this project.
Refer to HNZ Contractor Code of Conduct
Refer to HNZ Asbestos Policy and Code of Conduct
Refer to HNZ Lead Based Paint Policy and Code of Conduct
Refer to HNZ A Guide to Driveway Safety for Property Owners

1.11 SUSPENSION OF HAZARDOUS WORK
On the request of the HNZ Contract Manager, acting on reasonable grounds, suspend any identified hazardous activities and proceed to eliminate, isolate or minimise them in order to comply with the Act, without prejudice to any other rights of the principal under the contract.

1.12 SITE SAFETY PERSON
Appoint a suitably qualified site safety person to co-ordinate site safety and to attend all site meetings.

1.13 HEALTH AND SAFETY PLAN
Prepare and submit to the Contract Manager before commencing work on site a health and safety plan. Include in that plan all people on site and the general public, as well as the following items and any other necessary item:

- identification of existing and potential construction hazards and risks
- safety procedures to eliminate, isolate or minimise construction hazards
- the equipment to be used to minimise the hazards
- the maintenance of a register of hazards for the site
- the name and qualifications of the site safety person
- emergency procedures
- first aid facilities and safety equipment
- the methodology for notifying, recording and investigating accidents and injuries.

Keep a copy of the plan on the site.

1.14 COMPLY WITH SITE SAFETY PLAN
Carry out all construction operations in accordance with the submitted health and safety plan.

1.15 INFORM EMPLOYEES OF HAZARDS
Inform employees and others on the site of:

- hazards they may be exposed to while working
- hazards they may create while working which could harm others

- how these hazards may be minimised
- emergency procedures
- the location of first aid facilities and safety equipment.

1.16 HEALTH AND SAFETY REGULATIONS, CODES AND GUIDES
Comply with:
- Relevant New Zealand safety legislation including "Health and Safety in Employment Regulations 1995".
- WorkSafe NZ publications including "Guidelines for the provision of facilities for general safety in the construction industry".
- Relevant codes of practice, guides, guidelines and standards.

Until further regulations are made under the Health and Safety at Work Act 2015 to cover them, the enactments repealed by the Act continue in force until revoked.

1.17 EXPLOSIVES
Do not use explosives except with the written approval of the territorial authority/WorkSafe NZ. Comply with their safety requirements and use construction blasters holding a current certificate of competence issued under the Health and Safety in Employment Regulations 1995.

1.18 POWDER-ACTUATED FASTENING TOOLS
Powder-actuated fastening tools to be used only by workers holding current certificates of competence in their name, issued under the requirements of the Health and Safety in Employment Regulations 1995.

1.19 SMOKE FREE REQUIREMENTS
Do not smoke on site.

1.20 RESTRICTIONS
Do not:
- light rubbish fires on the site
- bring dogs on to or near the site
- bring radios/audio players on to the site.
- leave any material containing asbestos or treated timber on the site.

1.21 HEALTH AND SAFETY LEGISLATION
Refer to the requirements of the Health and Safety at Work Act 2015. Comply also with all other relevant New Zealand safety legislation.

The Contractor will ensure, so far as is reasonably practicable, that, each subcontractor they engage, each separate contractor named in the contract documents in relation to the Contract Works, is aware of and complies with its obligations under health and safety-related law.

For the purpose of health and safety-related law, the Contract Administrator and others involved in contract administration and observation and construction monitoring will not at any time have management or control of the Workplace.

1.22 HEALTH AND SAFETY REGULATIONS, CODES AND GUIDES
Comply with:
- Relevant New Zealand safety legislation including, Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, also Health and Safety in Employment Regulations 1995 as amended by that Regulation.
- WorkSafe NZ publications including "Guidelines for the provision of facilities for general safety in the construction industry".
- Relevant codes of practice, guides, guidelines and standards.

Until further regulations are made under the Health and Safety at Work Act 2015 to cover them, the transitional provisions of the Act continue in force until revoked or amended.

1.23 HEALTH AND SAFETY IMPLIMENTATION

Take all practical steps to make the site and the contract works safe and to provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the rules governing site safety, are properly supervised and are not unnecessarily exposed to hazards and risks.

Co-operate, consult and co-ordinate health and safety matters with each PCBU including all subcontractors, suppliers, separate contractors, others engaged on the project and others who may be affected by the construction of the works.

1270 CONSTRUCTION

1. GENERAL

This GENERAL section relates to common requirements for construction issues including:

- Quality assurance
- Noise and nuisance
- Set out
- Common execution requirements
- Common materials requirements
- Supply of spare materials
- Common requirements for samples and tests
- Final presentation and cleaning
- Commissioning.

Quality control and assurance

1.1 QUALITY ASSURANCE

Carry out and record regular checks of material quality and accuracy, including:

- Concrete quality and finish.
- Dimensional accuracy of structural column locations (following completion of foundations).
- All perimeter columns and frames for plumb.
- Levels of all floors relative to the site datum.
- Framing timber moisture content.

Where any material, quality or dimension falls outside specified or required tolerances, obtain written direction from the HNZ Contract Manager.

If unsatisfactory ground conditions or settlement of foundations that may affect the quality of the proposed work are observed, report in writing to the HNZ Contract Manager and obtain instructions in writing before proceeding.

Provide all materials, plant, attendances, supervision, inspections and programming to ensure the required quality standards are met by all project personnel.

Noise and nuisance

1.2 LIMIT CONSTRUCTION NOISE

Minimise the effects of noise generation by including in the planning of the work such factors as placing of plant, programming the sequence of operations and other management functions. Limit construction noise to comply with the requirements of NZS 6803, the requirements of the Resource Management Act sections 326, 327 and 328 and the Health and Safety in Employment Regulations clause 11.

1.3 ACCEPTABLE NOISE LEVELS

Refer to NZS 6803 Tables 2 and NZS 6803, tables 3 for the upper limits of construction work noise in residential and industrial areas over the various time periods, particularly 0730 to 1800 hours. Note also the allowed adjustments and exemptions in NZS 6803, 6. Do not exceed these limits.

1.4 PROVIDE INFORMATION TO NEIGHBOURS

Provide information to neighbours of any noise generation from the site liable to constitute a problem. Explain to them the means being used to minimise excessive noise and establish with them the timings most suitable for the noise generating work to be carried on.

Discuss with any complainant the measures being used to minimise noise. Where possible modify these measures to accommodate particular circumstances. Finally, determine the sound level at the location under discussion using methods and observation reporting as laid down in NZS 6803. If the noise level is above the upper limits of NZS 6803, tables 2 and NZS 6803, tables 3, cease the noise generating operation and remedy the problem.
Refer to HNZ Contractor Code of Conduct.

1.5 INCONVENIENCE TO OTHERS
When the works are to be carried out in or around occupied premises, ascertain the nature and times of occupation and use. Carry out the works in a manner to minimise inconvenience, nuisance and danger to occupants and users. Refer to HNZ Contractor Code of Conduct.

1.6 DIRT AND DROPPINGS
Remove dirt and droppings deposited on public or private thoroughfares from vehicles servicing the site to the satisfaction of the appropriate authorities and the HNZ Contract Manager.

1.7 DAMAGE AND NUISANCE
Take all precautions to prevent damage and nuisance from water, fire, smoke, dust, rubbish and all other causes resulting from the construction works.

Set-out and tolerances

1.8 SURVEY INFORMATION
Locate and verify survey marks and datum points required to set out the works. Record and maintain their position. Re-establish and replace disturbed or obliterated marks.

1.9 SET-OUT AND DATUM
Set out the work as required and as agreed to by the HNZ Contract Manager. Establish a permanent site datum to confirm the proposed building ground floor level and its relationship to all other existing and new building levels.

1.10 USE OF SET-OUT INSTRUMENTS
Permit without charge, the use of instruments already on site for checking, setting out and levels.

1.11 CHECK DIMENSIONS
Check all dimensions both on drawings and site, particularly the correlation between components and work in place. Take all dimensions on drawings to be between structural elements before linings or finishes, unless clearly stated otherwise.

1.12 TOLERANCES
All work to be level, plumb, and true to line and face. Unless otherwise specified in specific work sections of this specification, tolerances for structural work shall comply with the following:

Concrete construction:	To NZS 3109 Concrete construction Clause 3.9 Tolerances for reinforcement Table 5.1 Tolerance for precast components Table 5.2 Tolerance for in situ construction To NZS 3114 Concrete surface finishes
Masonry construction:	To NZS 4210 Masonry construction: Materials and workmanship Clause 2.6.5 Tolerances Table 2.2 Maximum tolerances
Structural steelwork:	To NZS 3404:1997 Steel structures standard Section 14.4 Tolerances (after fabrication) Section 15.3 Tolerances (erection)

Timber framing:	To NZS 3604 Timber-framed buildings Clause 2.2 Tolerances Table 2.1 Timber framing tolerances

Refer to work sections for tolerance requirements for finishes.

Execution

1.13 EXAMINE PREVIOUS WORK
Before commencing any part of the work carefully examine the previous work on which it may depend. Report in writing to the HNZ Contract Manager defects that may affect the quality of the proposed work and obtain instructions. Commencing work on any part means that previous work is accepted as being satisfactory for work of the required standard.

1.14 WORKER QUALIFICATIONS
All work to be level, plumb, and true to line and face. Employ only experienced workers familiar with the materials and techniques specified.

1.15 MINIMISE DELAYS DUE TO WEATHER
Use appropriate techniques and methods to prevent damage and minimise delays due to weather.

Materials

1.16 NEW PRODUCTS AND MATERIALS
Materials and products to be new unless stated otherwise, of the specified standard, and complying with all cited documents.

1.17 COMPATIBILITY OF MATERIALS AND FINISHES
Ensure all parts of a construction or finish are compatible and their individual use approved by the manufacturers and suppliers of other parts of the system. Source all parts of a system from a single manufacturer or supplier.

1.18 STORING PRODUCTS AND MATERIALS
Take delivery of and store products, materials and components in accordance with codes of practice and the product manufacturer's or supplier's stated requirements. Maintain the proper condition of any protective packaging, wrappings or supports during delivery, unloading and storage.

1.19 HANDLING PRODUCTS AND MATERIALS
Handle products, materials and components in accordance with codes of practice and the manufacturer's or supplier's stated guidelines. Avoid distortion and any contact with potentially damaging surfaces or conditions.

1.20 SUBSTRATE CONDITIONS
Ensure substrate conditions are within the manufacturer's or supplier's stated guidelines both before and during the installation of any material, product or system. Obtain written instructions on the necessary action to rectify unsatisfactory conditions.

1.21 INSTALLING PRODUCTS AND MATERIALS
Install in accordance with the manufacturer's or supplier's technical literature. Ensure that all installers are familiar with the required substrate conditions and the manufacturer's or supplier's specified preparation, fixing and finishing techniques.

1.22 COMPLY WITH STANDARDS
Comply with the relevant and/or cited Standard for any material or component. Obtain certificates of compliance when requested by the HNZ Contract Manager.

1.23 CONDITION OF MATERIALS AND COMPONENTS
To be in perfect condition when incorporated into the work.

1.24 INCOMPATIBLE MATERIALS AND METALS
Separate incompatible materials and metals with separation layers, sleeves or gaskets of plastic film, bituminous felt or mastic or paint coatings, installed so that none are visible on exposed surfaces.

Samples and tests

1.25 SAMPLES AND PROTOTYPES
Where requested by HNZ Contract Manager, submit samples, prepare sample panels, and construct prototypes for review as to appearance, form and conformance with specifications and to match existing . Submit all information required to assist the review process, including technical data, manufacturer's literature, independent appraisals and producer statements.

Timing for the provision and review of samples, sample panels and prototypes to be included in the contract programme. Allow a minimum of 10 working days for each review. Proceed only after instructions to proceed have been issued in writing by the HNZ Contract Manager.

In situ work may be incorporated in the finished work if so confirmed, otherwise allow to remove completely and replace.

1.26 CONTROL STANDARD
Obtain the HNZ Contract Manager's confirmation of material, component and work samples which then become the quality control standard. Remove from the site any rejected samples. Retain confirmed samples with care on site for comparison throughout the contract. Remove from the site when no longer required.

Spares

1.27 SPARES
Collect, protect and store safely all spare materials required under the contract. Give the HNZ Contract Manager an inventory of all spares.

Final presentation and cleaning

1.28 REMOVE TEMPORARY PROTECTION
Remove all temporary markings, coverings, labels and protective wrappings unless instructed otherwise.

1.29 REPLACE DAMAGED MATERIALS
Replace all materials or component damaged during the works to the standard of and integral with the original.

1.30 COMPLETE ALL SERVICES
Ensure all services are complete and operational, with all temporary labelling removed, required labelling fixed and service instructions provided.

1.31 CLEANING BY CONTRACTOR
Clear the contract works of all construction materials, waste, dirt and debris. Clean the contract works including:

- Wipe all surfaces to remove construction dust.
- Clean out service ducts and accessible concealed spaces.
- Clean out all gutters and rainwater heads.
- Wipe dust from both sides of glass. Take particular care when removing paint or cementitious materials to not damage the glass.
- Remove adhesive residue left by labels and other temporary protection/markings.

- Clean out the interior of all cabinetry.
- Wash down external concrete including driveways and concrete masonry. Take care when waterblasting to not cause damage to the surface or allow water to enter the building.
- Remove rubbish and building material from the area immediately adjacent to the contract works.

1.32 CLEANING BY COMMERCIAL CLEANER

Use a commercial cleaning firm to clean the whole of the interior of the building, including all appliances, equipment, fittings, surfaces and finishes to leave it without any blemish. Cleaning to include:

- Clean and wash down all external surfaces including walls, soffits and eaves to remove dirt, debris and marking.
- Clean all interior surfaces including ceilings, walls, doors, windows, trims, cabinetwork, joinery, appliances, heaters, light fittings, switches, cover plates and hardware items.
- Vacuum or shampoo and deodorise carpets, polish and seal vinyl, remove all stains to all floor finishes.
- Clean and disinfect all sanitary fittings, remove residue after cleaning.
- Clean mould covered surfaces with a solution of proprietary mould inhibiting product or a solution of 70% vinegar in 30% water, leave for 30 minutes and rinse well after application.
- Clean and polish all glass, both sides.
- Vacuum and test all alarms to ensure fully operational.
- Ozone treatment where advised by HNZ Contract Manager, using an electric ultra low volume sprayer. Ensure smoke alarms are disconnected, neighbours and the fire brigade notified before the treatment commences.
- Ventilate naturally after cleaning.
- Refer to HNZ Contractor Code of Conduct.

Commissioning

1.33 MOVING PARTS

Adjust, ease and lubricate all doors, windows, drawers, hardware, appliances, controls and all moving parts to give easy and efficient operation. Replace the smoke detector if the existing system is not fully operational.

1.34 SECURITY AT COMPLETION

Complete final keying prior to handing over keys to the HNZ Contract Manager on completion of the works. Leave the works secure with all accesses locked. Account for all keys/cards/codes and hand to the HNZ Contract Manager.
Refer to HNZ Contractor Code of Conduct.

2110 DEMOLITION WORKS

1. GENERAL

This section relates to the demolition of existing buildings and structures in whole or in part, to the extent necessary to carry out the new work.

1.1 DOCUMENTS

Documents referred to in this section are:

NZBC F5/AS1	Construction and demolition hazards
NZS 6803	Acoustics - Construction noise
NZDAA	Best practice guidelines for demolition in New Zealand
NZDAA	New Zealand guidelines for the management and removal of asbestos

Health and Safety at Work Act 2015
Health and Safety at Work (Asbestos) Regulations 2016

HNZ Contractor Code of Conduct:
- The obligations of contractors to HNZ tenants when undertaking maintenance works on rental properties.

HNZ Asbestos Policy and Code of Conduct:
- Minimising the risks associated with building products containing asbestos.

HNZ Lead Based Paint Policy and Code of Conduct:
- Minimising the risks associated with lead based paint.

1.2 QUALIFICATION

Carry out demolition only under the supervision of a suitably experienced person and using only experienced operators and drivers. Use only experienced, certified, construction blasters for explosives demolition.

1.3 NOISE

Refer to NZS 6803, tables 2 and 3 for the allowable upper limits of construction work noise in residential, commercial and industrial areas over the various time periods. Use silenced and noise insulated plant to ensure compliance with these requirements.

1.4 NUISANCE

Take all precautions necessary to minimise nuisance caused by dust, dirt, rubbish and water.

1.5 HEALTH AND SAFETY

Comply with the Health and Safety at Work Act in general, NZBC F5/AS1 and NZDAA Best practice guidelines for demolition in New Zealand, section 5 Demolition Safety.

1.6 INSPECTIONS

Confirm a written programme to facilitate inspections, including notification when each stage of the work is ready for inspection. Allow 48 hours advanced notice for the inspections.

1.7 SURVEY

Before commencing work, carry out a thorough survey and examination of all buildings or structures to be demolished in order to ensure the extent, sequence, technique and method of demolition proposed can be safely and efficiently carried out.
Take photographs of the works, adjacent buildings and sites, before commencing work. Provide a set of these photographs as a record of existing condition.

1.8 SERVICES

Before commencing demolition, arrange with all utility network operators to disconnect services and remove fittings and equipment. Pay all fees and charges for this work.

1.9 MATERIAL
Material from the demolition becomes the property of the contractor except where expressly provided otherwise. Remove redundant materials from the site as work proceeds.

1.10 SALVAGE
Designated items remain the property of the owner.

1.11 BURNING OF MATERIALS
Burning of materials is not permitted on site.

2. PRODUCTS

2.1 ELEMENTS FOR SALVAGE OR RE-USE
Carefully dismantle, remove and store on site where directed. Protect from damage and weather until required.

2.2 ELEMENTS FOR REMOVAL
Solid fuel fire system removal, carefully dismantle, remove completely all components, remove hearth and flue, disconnect wetback.
Refer 7556 SOLID FUEL SPACE HEATING SYSTEMS section for disconnection.

3. EXECUTION

3.1 DEMOLITION GENERALLY
Comply with the requirements of NZDAA Best practice guidelines for demolition in New Zealand. Submit a written demolition plan (method statement) and covering:

- the extent of the work
- the plant being used
- the proposed method for each roof, wall and floor
- hazard identification
- hazard assessment and control
- precautions for safety of employees on site
- precautions for persons in the vicinity
- emergency procedures
- proposed dust controls
- proposed noise controls
- proposed vibration control
- precautions for safety of the public.

3.2 ADJOINING PROPERTY
Support and protect adjoining property. Survey adjoining properties and take all precautionary measures necessary to avoid damage or nuisance.

3.3 PROTECT
Protect retained parts of existing buildings, the site and site structures, trees and shrubs. Take care in the cutting away and stripping out to reduce the amount of making good.

3.4 SUPPORT
Support and brace the existing structure during the cutting of new openings or the replacement of structural parts. Prevent debris from overloading any part of the structure. Do not remove supports until the new work is strong enough to support the existing structure. Ensure all work remains structurally stable and sound.

3.5 TEMPORARY SCREENS
Erect approved screens wherever penetration of weather, dust and dirt needs to be prevented. Adjust screens as work proceeds.

3.6 SITE SAFETY
Prevent access by unauthorised persons. Illuminate and protect all holes, unsafe buildings and other hazards. Leave site and buildings safe at the close of each day's work.

3.7 FLAMMABLE OR EXPLOSIVE CONDITIONS
Prevent fire or explosion and arrange to alert the appropriate authority where any danger exists.

3.8 DEMOLISH
Demolish buildings and structures down to the existing finished ground level. Do not remove support to adjacent properties or buildings.

Demolish chimneys:

- Full removal interior chimney to be just below floor level and complete fireplace
- Part removal interior chimney to be just above ceiling framing height and capped with cement sheet minimum 9mm thick mechanically fixed and airtight sealed with fireproof sealant and the fireplace front closed off. Fit nogs between ceiling framing for framing to laterally support brickwork to be retained.
- Full removal exterior chimney to be just below the existing finished ground level.

Refer 5122 PLYWOOD LININGS section for fireplace front cover panel.
Refer 3820 CARPENTRY section for framing.
Refer 4231 FIBRE CEMENT SHEET CLADDING section for cement sheet.

3.9 HOUSE LIFTING
Carry out house lifting for either excavating under, or for relocation, to the general requirements of the NZDAA publication: Best Practice Guidelines for Demolition in New Zealand, 5.7 Temporary supports for removal or excavation under, including the precautions required during jacking and pigsty construction.

3.10 DEMOLITION, ASBESTOS
Where demolition work includes contact with or removal of material containing asbestos, comply with, Health and Safety at Work (Asbestos) Regulations 2016, WorkSafe NZ requirements, NZBC F5 /AS1 and NZDAA: New Zealand guidelines for the management and removal of asbestos .

3.11 SALVAGE
Carefully dismantle and store safely all salvage items where directed; for removal, recycling, use on the site, or until completion of the works.

3.12 REINSTATE AND MAKE GOOD
Reinstate and make good demolition damage to adjoining properties, existing work, services, or property.

Reinstate and make good floor, walls, ceiling, roof and insulation where solid fuel fire system or chimney removal.

If the site is chemically contaminated carry out the procedures, management and control to NZDAA Best practice guidelines for demolition in New Zealand, Section 7 Guidelines for clean-up of contaminated sites.

3.13 TAKE AWAY
Take away from the site all plant and equipment, temporary access works and demolished materials and elements. Take away all debris from the ceiling cavity where chimney removal. Leave the site completely clean and tidy.

Disposal of all waste is to best practice guidelines and local authority requirements.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

2123 ASBESTOS REMOVAL

1. GENERAL

This section relates to the removal of asbestos prior to other demolition work, to the extent necessary to carry out the contract works.

1.1 ABBREVIATIONS
The following abbreviations are used throughout this part of the specification:
NZDAA New Zealand Demolition and Asbestos Association

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:
NZBC F5/AS1 Construction and demolition hazards
NZDAA New Zealand guidelines for the management and removal of asbestos
Health and Safety at Work Act 2015
Health and Safety at Work (Asbestos) Regulations 2016
HNZ Asbestos Policy and Code of Conduct Minimising the risks associated with building products containing asbestos.

Requirements

1.3 QUALIFICATIONS
Carry out asbestos removal only under the supervision of a suitably experienced person, using only workers trained for this work

1.4 NOTIFIABLE WORK
Notify the appropriate WorkSafe NZ office of work that is notifiable under the Health and Safety in Employment Regulations 1995, 24 hours before starting the work.

1.5 HEALTH AND SAFETY
Comply with the Health and Safety at Work Act 2015 in general, NZBC F5/AS1, WorkSafe NZ Requirements, Health and Safety at Work (Asbestos) Regulations 2016 and NZDAA New Zealand guidelines for the management and removal of asbestos
Refer to HNZ Asbestos Policy and Code of Conduct.

2. PRODUCTS

2.1 EQUIPMENT
Protective clothing, respirators, vacuum cleaners, decontamination facilities, isolation facilities, etc as appropriate and as required by the NZDAA. Equipment shall be cleaned or disposed of as directed by the NZDAA New Zealand guidelines for the management and removal of asbestos.

2.2 ELEMENTS FOR RE-USE
Building elements that need to be temporarily removed to allow the removal of asbestos, dismantle carefully, remove, clean and store on site where directed. Protect from damage and weather until required.

3. EXECUTION

Conditions

3.1 SAFETY DURING ASBESTOS REMOVAL
Refer to NZBC F5/AS1 and the NZDAA New Zealand guidelines for the management and removal of asbestos and carry out the requirements laid down in section 7: Safe Removal of Friable Asbestos in respect of:

- instability
- supervision
- plant, tools and equipment
- personal protective equipment
- protection of the public
- unauthorised access to site.

Application

3.2 CARRY OUT ASBESTOS REMOVAL
Carry out asbestos removal to the requirements of the NZDAA New Zealand guidelines for the management and removal of asbestos.

Completion

3.3 MAKE GOOD
Make good damage caused by asbestos removal work.

3.4 REINSTATE
Reinstate where any damage is caused by this asbestos removal to those parts of the existing building, other buildings and the remainder of the site being retained.

3.5 LEAVE
Leave work to the standard required by following procedures.

3.6 DISPOSAL OF ASBESTOS
Store, label and dispose of asbestos to the requirements of NZDAA New Zealand guidelines for the management and removal of asbestos, Section 11: Storage, labelling and Disposal of Asbestos.

3.7 TAKE AWAY
Take away from the site all plant, tools and equipment, temporary access works, and demolished materials and elements, to leave the site completely clean and tidy.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

2210 PREPARATION AND GROUNDWORK

1. GENERAL

This section relates to the clearance, excavation and backfilling of the site area in preparation for:

- footings and floor slabs
- pavements and driveways.

Refer 3101 CONCRETE section for concrete pavements and driveways.
Refer 8220 ASHPHALIC PAVING section for asphaltic pavements and driveways and concrete kerbing.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3604	Timber-framed buildings
WorkSafe NZ	Approved code of practice for safety in excavation and shafts for foundations

1.2 SITE SAFETY
Provide adequate support for all excavations. Cover holes and fence off open trenches and banks.

2. PRODUCTS

2.1 EXCAVATED CLEAN FILL
Clean, free of contamination, mineral soil from other formations in the excavation which may be selected and approved as suitable for filling by having grading and moisture content properties that will allow recompaction to 95% of maximum density.

2.2 VOLCANIC TUFF FILL
Scoriaceous tuff of variable grading excluding excessive silt or clay material, capable of being placed and compacted as specified.

2.3 ROCK FILL
Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.

2.4 SAND FILL
Clean sand of such grading in particle size to achieve mechanical compaction to 90% maximum density.

2.5 HARD FILL
Scoria or crushed rock to GAP (General All Passing) 40 grading.

2.6 GRANULAR FILL
Approved screened crushed gravel or scoria, graded in size from 20mm to 7mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.

2.7 DRESSING COURSE
Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.

2.8 FREE-DRAINING AGGREGATE
Scoria or crushed gravel graded 50 to 14 clean.

3. EXECUTION

3.1 WASHOUT BAY FOR TRUCK
Provide a designated area for trucks to be washed down to avoid mud and dirt being carried off site.

3.2 EXCAVATION GENERALLY
Carry out excavation, using plant suitable for the purpose, to the guidelines set by the WorkSafe NZ publication: Approved code of practice for safety in excavation and shafts for foundations.

3.3 EXCAVATION DIG OUTS
Surface attrition for an area more than 1 square metre. Saw cut the perimeter of the distressed area to a depth to ensure the existing seal surface is cut through completely, prior to excavation work commencing. Excavate to a minimum depth 300mm below the existing surface level.

3.4 EXCAVATION POT HOLES
Surface attrition for an area less than 1 square metre. Saw cut the perimeter of the distressed area to a depth to ensure the existing seal surface is cut through completely, prior to excavation work commencing. Excavate to remove all distressed material in the immediate surrounding area and to a firm base. Where the base course has been removed trim the sides to the excavation to sloping surfaces within the pot hole. Where the pot hole is within the structural asphaltic concrete material, trim the sides of the excavation to be near vertical and to avoid undermining the underlying layer. All loose or fractured material to be removed.

3.5 BURNING OF MATERIALS
Burning of materials is not permitted on site.

3.6 PROTECT EXISTING WORK
Protect from damage existing buildings, structures, roads, paving and services to be retained. Cut back existing pavement or driveway to be retained to a square straight line and solid edge.

3.7 PROTECT TREES
Protect from damage trees, shrubs, natural site features and existing landscaped areas to be retained. Ensure existing levels are undisturbed beneath the dripline of retained trees.

3.8 EROSION CONTROL
Ensure measures are in place to contain silt dislodged as a result of water infiltration and to prevent it being carried off site with stormwater.

3.9 SURFACE PREPARATION
Comply with NZS 3604, section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.

3.10 UNDERGROUND ELEMENTS AND SERVICES
Break out and remove old foundations, slabs, drainage pipes, manholes, tanks, cables and redundant services. Report to HNZ Contract Manager for instructions when any unexpected voids, made-up ground or services or asbestos materials are encountered.

3.11 STOCKPILE TOPSOIL
Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

3.12 SHORING AND UNDERPINNING

Carry out shoring and underpinning as necessary to prevent subsidence of adjoining public or private property and to ensure the safety of the public and site personnel. Maintain protection throughout the progress of the works, or until foundations and subgrade structures have been completed and the stability of adjoining public and private property secured.

3.13 GENERAL EXCAVATION

Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

3.14 ROCK EXCAVATION

If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the HNZ Contract Manager . Obtain written instructions from the HNZ Contract Manager on the proposed approach to rock excavation, or consequent alterations to subgrade construction.

3.15 FOUNDATION EXCAVATION

Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.

3.16 INADEQUATE BEARING

If bearing is not to NZS 3604, 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows.

Below slabs on grade: Hardfill compacted in 150mm layers
Below footings: 10 MPa concrete
Service trenches: Hardfill compacted in 150mm layers

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.

Report to HNZ Contract Manager for any changes have been observed in existing foundations or excessive settlement or soft ground conditions to be resurfaced. Obtain instructions in writing before proceeding.

3.17 STANDARD OF COMPACTION

Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.

Compact for concrete pavements and driveways a minimum thickness of 75mm.

3.18 GRANULAR BASE FOR SLABS

To conform to NZS 3604, section 7.5.3, **Granular base**. Consolidate with a vibrating roller. Blind the surface with 20mm of coarse sand or sand/cement and roll ready to receive a damp-proof membrane.

3.19 GENERAL BACKFILLING

Obtain written confirmation from the owner before using any excavated material. Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.

3.20 RETAINING WALLS

Backfill behind retaining walls with free draining granular material and compact in 200mm layers. Ensure any tanking membranes, protection sheets, drain coil and damp-proofing are not damaged.

3.21 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

2310 FOUNDATIONS

1. GENERAL

This section relates to all foundation and piling work, with the exception of in situ concrete work and concrete masonry.
Refer 3101 CONCRETE section.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3605	Timber piles and poles for use in buildings
NZS 3603	Timber structures standard
BRANZ BU 519	Fasteners selection
BRANZ BU 526	Specifying timber

Performance

1.2 INSPECTIONS
Give notice to chartered professional Engineer and Contract Manager, at least 24 hours prior to foundation inspection being required. At inspection foundation to be clear of obstructions like, backfill, site concrete and reinforcing.

2. PRODUCTS

2.1 CONCRETE PILES IN SITU
To NZS 3604 for concrete, reinforcement, footing and type.

2.2 CONCRETE PILES PRE-CAST
200mm square parallel-sided to NZS 3604 for footing and type.

2.3 ROUND TIMBER PILES
Corsican pine or radiata pine, treated H5 CCA (preservative code 01 or 02) to NZS 3602, table 1A, and complying with NZS 3605 for cross section, length, straightness, strength and branding, 140mm diameter minimum. All to NZS 3604 for footing and type.

2.4 SQUARE TIMBER PILES
Corsican pine or radiata pine, treated H5 CCA (preservative code 01 or 02) to NZS 3602, table 1A, and complying with NZS 3605 for cross-section, length, straightness, strength and branding, 125mm x 125mm minimum. All to NZS 3604 for footing and type.

Posts for exterior timber stairs, ramps, decks to be H5 CCA Radiata pine 125mm x 125mm minimum.
Refer 3820 CARPENTRY section for balustrade posts above ground.

2.5 TIMBER SUB-FLOOR FRAMING
Species, grade, moisture content in service and level of treatment as set out in NZS 3602. Grading to NZS 3603 and treated to NZS 3602, table 1C.
Refer to
BRANZ BU 526 Specifying timber.

Framing for exterior timber stairs, ramps, decks to be H3.2 CCA Radiata pine:
Joists: 140mm x 45mm minimum
Bearers: 2/140mm x 45mm minimum

Refer 4383 EXTERIOR TIMBER STAIRS & DECKING section for decking board.

2.6 NAILS
Stainless steel and galvanized steel of pattern to NZS 3604, table 6.6 **Nailing schedule for hand-driven and power-driven nails** and section 4 Durability.
Stainless steel less than 600mm from the ground.
Refer to
BRANZ BU 519 Fasteners selection

2.7 BOLTS AND SCREWS
Stainless steel and galvanized steel to NZS 3604.
Stainless steel less than 600mm from the ground.
Refer to
BRANZ BU 519 Fasteners selection

2.8 NAIL PLATES
Stainless steel and galvanized steel toothed or nailed steel plates to the plate manufacturer's design for the particular locations.
Stainless steel less than 600mm from the ground.
Refer to
BRANZ BU 519 Fasteners selection

2.9 CONCRETE
For piles and footings, 17.5 MPa prescribed mix concrete to NZS 3104, section 3, and cover to reinforcing to NZS 3604, 4.5.1, generally 50mm, against ground 75mm.
Provisions for prescribed mix concrete, and NZS 3604, section 6.4.5, Pile footings.

3. EXECUTION

3.1 FOUNDATIONS GENERALLY
Comply with NZS 3109, 3602 and NZS 3604 except as varied by this specification.
Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 EXCAVATIONS
Refer to 2210 PREPARATION AND GROUNDWORK.

3.3 INSTALL CONCRETE PILES IN SITU
Box for, reinforce and pour in 17.5 MPa concrete the footings and piles in the various types to NZS 3604.

3.4 INSTALL CONCRETE PILES PRECAST
Pour 17.5 MPa concrete footing and set in pre-cast concrete piles in the various types to NZS 3604.

3.5 INSTALL ROUND TIMBER PILES
Prepare for and drive timber piles to NZS 3604, section 6.6, **Driven timber piles**. Protect pile heads with a suitable cushion.

3.6 INSTALL SQUARE TIMBER PILES
Prepare for, place and secure.
Exterior timber stairs, ramps, decks: Posts at 1.5m spacing's maximum

3.7 SUB-FLOOR FRAMING

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6, **Foundation and subfloor framing**.

Exterior timber stairs, ramps, decks:

- Joists at 400mm centres maximum
- Bearers notch into posts 20mm each side
- Fix with 2/12mm galvanised steel bolt minimum.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

3101 CONCRETE WORK - BASIC

1. GENERAL

This section relates to formwork, reinforcement, concrete mixes and the placing of concrete.

- pavements
- driveways
- slabs and foundations
- footings.

Refer 8220 ASPHALTIC PAVING section for concrete kerbing.

1.1 ABBREVIATIONS AND DEFINITIONS

The following definitions apply specifically to this section:

ACRS	Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.

ACRS web site - www.steelcertification.com

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E2/AS3	External moisture
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction
BRANZ BU 535	Repairing cracks in concrete
BRANZ BU 382	Curing concrete
BRANZ BU 412	Concrete driveways

2. PRODUCTS

2.1 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to AS/NZS 4671. Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

2.2 NORMAL CONCRETE

Normal concrete 17.5 to 50 MPa grade, maximum aggregate size 19mm ready-mixed to NZS 3104. Provide delivery dockets listing mix and despatch details.

Pavements:	17.5 MPa minimum
Ramps/Stairs:	17.5 MPa reinforced minimum

Driveways: 20 MPa reinforced minimum and as required by NZBC E2/AS1

2.3 PRESCRIBED MIX CONCRETE
Prescribed mix concrete 17.5, 20 or 25 MPa grade minimum strength, using either separate batching of sand and builder's mix or coarse aggregate to NZS 3104, table 3.1, Grading recommendations for combined and uncombined coarse aggregates.
Prescribed mix concrete:

10 MPa:	Site concrete, bedding concrete and for setting posts
17.5 MPa:	As required by NZS 3604
25 MPa:	As required by NZS 3604 and for exposed concrete in sea spray zone

2.4 SITE CONCRETE
Concrete 10 MPa with minimum water for workability, all materials and batching to NZS 3104, table 3.1, Prescribed mixes (P).

2.5 MASS CONCRETE
Concrete having a minimum strength of 10 MPa at 28 days

2.6 REINFORCEMENT
Bars to AS/NZS 4671. Grade 300E deformed, other than for ties, stirrups and spirals.
Welded reinforcing mesh Class E to AS/NZS 4671.

2.7 MESH FOR SLABS TO NZS 3604
For slabs on ground mesh to be welded reinforcing mesh to AS/NZS 4671, Class E, minimum to B1/AS1 - Grade 500E, 2.27kg/m2 (1.14kg/m2 in each direction).

2.8 TYING WIRE
Mild drawn steel wire not less than 1.2mm diameter.

2.9 SPACERS AND CHAIRS
Precast concrete or purpose made moulded PVC. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

2.10 DAMP-PROOF MEMBRANE
0.25mm minimum polyethylene to NZS 3604, 7.5.4, Damp-proof membrane.

2.11 CELLULAR POLYSTYRENE INSULATION
Proprietary expanded polystyrene (EPS) foam board to AS 1366.3, to match existing.

Accessories

2.12 WATERPROOFING FOR EXTERIOR OPENINGS
Unreinforced wet area membrane to AS/NZS 4858 for waterproofing around openings for windows, doors, meters and other services openings, at or above floor level, also parapets and ends of masonry walls abutting other claddings to CCANZ CP 01.
Quick curing elastomeric unreinforced waterproofing membrane to AS/NZS 4858.
Do not use bituminous coatings.

3. EXECUTION

3.1 HANDLE AND STORE
Handle and store reinforcing steel and accessories without damage or contamination.
Store on timber fillets on hard ground in a secure area clear of any building operation.
Lay steel fabric flat.

Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.2 OVER EXCAVATION
Contact the HNZ Contract Manager for direction if more than minor over excavation below designed for founding levels is required.

3.3 FALSEWORK AND FORMWORK
Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Ensure timber or plywood used for formwork is non-staining to the set concrete.

Securely fix and brace formwork sufficiently to support loads and with joints and linings tight enough to prevent water loss. Do not use tie wires or rods. Provide a 19mm chamfer or fillet strip at all interior and exterior angles of beam and column forms. Mitre at intersections.

Water blast to clean formwork. Keep formwork wet before concrete is placed.

Set up soffit boxing for beams and slabs to provide a camber when forms are stripped, of 3mm rise for every 3 metres of total clear span.

3.4 INSTALL DAMP-PROOF MEMBRANE
Apply polythene membrane to prepared basecourse with 150mm laps between sheets. Tape seal laps and penetrations with 50mm wide pressure sensitive plastic tape.

3.5 INSTALL CELLULAR POLYSTYRENE INSULATION
Install EPS insulation system to manufacturer's requirements.

3.6 CUT AND BEND REINFORCEMENT
Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109: 3.3 Hooks and bends. Minimum radii of reinforcement bends to NZS 3109, table 3.1, Minimum radii of reinforcement bends. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.7 ADJUSTMENTS
Use a purpose built tool for on site bending and to deal with minor adjustments to steel reinforcement.

3.8 TOLERANCES, BENDING
To NZS 3109, 3.9, Tolerances for reinforcement.

3.9 SECURE REINFORCEMENT
Secure reinforcement adequately with tying wire and place, support and secure against displacement when concreting. Bend tying wire back well clear of the formwork. Spacing to the clear distance minimums in NZS 3109, 3.6, Spacing of reinforcement.

3.10 LAPPED SPLICES
Welded wire mesh laps to NZS 3101, lap one mesh square plus 50mm minimum (do not count bar extension beyond the outermost wire).

3.11 MESH LAPS FOR SLABS TO NZS 3604
For slabs on ground the welded reinforcing mesh to be lapped such that the outermost wires overlap by the greater of:

- the spacing of the cross wires plus 50mm
- 150mm or
- manufacturer's requirements.

Do not count bar extensions beyond the outermost cross wire.

3.12 REINFORCEMENT COVER TO NZS 3101.1

Minimum cover to NZS 3101.1, table 3.6, **Minimum required cover for a specified intended life of 50 years**. Sub-soil cover to NZS 3101.1, to suit soil and groundwater conditions. Fix chairs for top reinforcement in slabs at 1.0 metre centres or to ensure adequate support. Cover tolerances to NZS 3109, 3.9, Tolerances for reinforcement.

3.13 REINFORCEMENT COVER TO NZS 3604

For in-situ concrete, foundations and interior slabs on ground, to NZS 3604 or NZS 4229, the reinforcement and welded mesh cover to be:

Location, cover to	**NZS 3604**
Footing, to earth	75mm
Footing, to DPM	75mm
Foundation, to edge	75mm
Slab, to slab top	30mm
Slab, to slab edge	50mm to 75mm

3.14 CASTING IN

Build in all grounds, bolts and fixings for wall plates and bracing elements, holding down bolts, pipes, sleeves and fixings as required by all trades and as shown on the drawings, prior to pouring the concrete.

Do not use grounds exceeding 100mm in length. Minimum cover 40mm. Do not encase aluminium items in concrete. Do not paint steel embedded items more than 25mm into the concrete encasement. Cut back form ties to specified cover and fill the cavities with mortar.

Form all pockets, chases and flashing grooves as required by all trades and as shown on the drawings.

Wrap all pipes embedded in concrete with tape to break the bond and to accommodate expansion. Do not embed pipes for conveying liquids exceeding a temperature of 50°C in concrete.

3.15 CONSTRUCTION JOINTS

Locate and construct in accordance with NZS 3109, 5.6, Type B.

3.16 PRE-PLACEMENT INSPECTION

Do not place concrete until all excavations, boxing and reinforcing have been inspected by a chartered professional engineer.

3.17 SURFACE FINISHES

To NZS 3114, 105.
Surface finish class to NZS 3114: table 2, Classes of floor, exterior pavement and invert finishes.
Pavements, driveways, ramps: **Finish class U5 broom finish**.

Refer to
BRANZ BU 412 Concrete driveways

3.18 EXPOSED CONCRETE

Formwork linings and surface finishes as nominated for both fair face and concealed or exposed surfaces. Unless detailed, obtain written confirmation of the type and pattern of all joints.

3.19 CONCRETE SURFACE TOLERANCES

To NZS 3114, 104, Surface tolerances and NZS 3114, 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.20 PUMPING CONCRETE

Set up and supervise pump operation, placing and compaction of the mix to NZS 3109, 7.4, Handling and placing and NZS 3109, 7.6, Compaction Advise the ready-mix supplier of the type of pump and the slump required, in addition to the concrete grade, strength and quantity.

3.21 COMPACTION

Use power operated vibrators on foundations, vertical constructions and beams.

3.22 FLOOR SLABS TO NZS 3604

Generally for slabs on ground to NZS 3604 as modified by NZBC B1/AS1 and NZBC E2/AS3.

Construct to NZS 3604, 4.5 **Concrete and concrete masonry** and NZS 3604, 7.5, **Concrete slab-on-ground floors in timber buildings** as modified by NZBC B1/AS1, 3.0 **Timber**. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3114, 304, **Surface tolerances**.

Allow for free joints maximum 24m centres to NZBC B1/AS1, 3.1.13 **NZS 3604 New clause**.

Construct accessible steps and landings to comply with NZBC D1/AS1:4.0 Stairways.

Pavements:	Thickness 75mm minimum, 1 : 20 slope maximum
Ramps:	Thickness 100mm minimum and height 300mm maximum above ground, 1 : 12 slope maximum
Stairs:	Thickness 100mm minimum, riser 180mm maximum and tread 310mm minimum
Landing:	Maximum cross fall 1 : 50, landing level to be 20mm below the floor and slope away from the door threshold.
Driveways:	Thickness 100mm minimum

Refer 4851 EXTERIOR TIMBER STAIRS & DECKING section for timber ramps, landings.

3.23 SAW CUTS TO NZS 3604

Cut slabs as required to control shrinkage cracking. Form by saw cutting the slab (blade width approximately 5 mm) to a quarter of the depth of the slab after it has hardened (saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20 ºC, and 48 hours for average ambient temperatures below 20ºC).

3.24 SAW CUTS

Cut slabs as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring but not exceeding 48 hours. Where saw cuts are to be made, cut out 100mm of every second wire of the mesh for a length of 50mm each side of the saw cut position. Saw cuts: 1/3rd slab depth or 30mm minimum.

3.25 SPACING OF SAW CUTS

Spacing of sawcuts 4m maximum each way and both ways at internal corners.

3.26 SURFACE DEFECTS

Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with 1:2 mortar or plaster, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

Refer to
BRANZ BU 535 Repairing cracks in concrete

3.27 CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.
Refer to
BRANZ BU 382 Curing concrete

3.28 STRIKE FORMWORK

Strike formwork without damaging or overloading structure. Do not remove formwork before the following minimum periods:

12 hours: Sides of beams, walls and columns
4 days: Slabs in beam and slab construction

3.29 WATERPROOFING EXTERIOR OPENINGS

Apply waterproofing to the exposed face of openings for, windows, doors, meters etc, also if necessary the top of parapets/balustrades and ends of masonry walls abutting other claddings. To CCANZ CP 01, waterproofing manufacturer's requirements. Provide temporary protection from direct sunlight.

3.30 CLEAN OUT

Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.

3.31 REMOVE

Remove all unused materials and all concrete and reinforcing debris from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

3320 CONCRETE MASONRY

1. GENERAL

This section relates to the supply and installation of hollow concrete masonry to NZS 4229, as modified by NZBC E2/AS3, including;
- concrete masonry, mortar, reinforcement and grouting

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E2/AS3	External moisture
AS/NZS 2699	Built-in components for masonry
NZS 3103	Sands for mortars and plasters
NZS 3109	Concrete construction
NZS 3121	Specification for water and aggregate for concrete
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4230	Design of reinforced concrete masonry structures
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction

Requirements

1.2 QUALIFICATIONS
Carry out all masonry work with people competent and experienced in this type of work, under the supervision of a suitably qualified tradesperson as required in NZS 4229 and NZS 4210.
All work to be installed or supervised by a Registered Mason or licensed building practitioner (LBP): Licensed for Bricklaying and Blocklaying 2: Structural Masonry. RBW must be supervised by an LBP.

1.3 CONSTRUCTION CONTROL
Supervise masonry construction to NZS 4230: table 3.1, Observation type B, admissible use and nominal strengths. Keep records of materials to NZS 4210: 2.4.2.

1.4 CONSTRUCTION OBSERVATION BY ENGINEER
Inspections shall confirm compliance with the design and the required standards of construction.
Obtain from the engineer Producer Statements required relating to the masonry construction.

1.5 STEEL REINFORCING COMPLIANCE
Steel reinforcing materials for concrete to AS/NZS 4671. Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

1.6 TESTS
Carry out all required tests in accordance with NZS 4210: appendix 2A, Compressive strength tests for mortar and grout.

1.7 QUALITY RECORDS

Keep accurate records relating to strength and quality of materials used in the construction, and make the information available to the chartered professional engineer. Do not place grout until all blockwork and reinforcing have been inspected and passed by a chartered professional engineer.

The registered mason is to certify in writing that the masonry observation and work has been carried out in accordance with the relevant NZ Standards. Provide a Producer Statement - Construction (PS3).

Performance

1.8 DURABILITY

To NZS 4210, Table 2.E1 - **Masonry durability requirements**.

EXPOSURE	DURABILITY REQUIREMENT		
NZS 3604 ZONES figure 4.2	MORTAR (Note 1)	BUILT IN COMPONENTS (Note 2)	MINIMUM COVER REINFORCEMENT (Note 3)
Zone D	M4	R4	30 (60)mm
Zone C	M4	R3	20 (50)mm
Zone B	M3	R3	15 (45)mm
Closed interiors	M2	R1	5 (35)mm
Walls against earth	M4	R4	30 (60)mm
Geothermal hotspots	M4	R5	Specific engineering design
Zone E (NZBC E2/AS1)	M4	R4	30 (60)mm

Notes

1. Mortar mixes to NZS 4210, 2.2.2.1.
2. Classifications to the three parts of AS/NZS 2699, R1 is light to heavy galvanised, R3 is heavy hot-dip galvanised, R4 is 316 stainless steel, R5 specific performance.
3. Cover is measured to NZS 4210 from the inside face of the block cell (or in brackets to the outside face of the block, assuming 30mm shell thickness).

2. PRODUCTS

2.1 MASONRY UNITS

To AS/NZS 4455.1.

2.2 REINFORCEMENT

To AS/NZS 4671 deformed mild steel except for ties in plain round mild steel and as detailed.

Refer to the Concrete section for reinforcing and mesh for slabs.

2.3 MORTAR

Sand to NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand. Mortar to NZS 4210: section 2.2, Mortar. Compressive strength minimum 12.5 MPa at 28 days

2.4 GROUT

To NZS 4210: section 2.3, Grout.

2.5 WATER

To NZS 3121. Water from a territorial authority/NUO water supply is acceptable.

Accessories

2.6 WATERPROOFING FOR EXTERIOR OPENINGS
Unreinforced wet area membrane to AS/NZS 4858 for waterproofing around openings for, windows, doors, meters and other services openings, at or above floor level, also parapets and ends of masonry walls abutting other claddings, to CCANZ CP 01. Quick curing elastomeric unreinforced waterproofing membrane to AS/NZS 4858.
Do not use bituminous coatings.

3. EXECUTION

3.1 MASONRY CONSTRUCTION GENERALLY
To NZS 4210, NZS 4229 as modified by NZBC E2/AS3 (CCANZ CP 01).

3.2 STORAGE
Store masonry units clear of the ground, under cover and well ventilated until placed in the work.
Handle and store reinforcing steel and accessories without damage or contamination.
Store on timber fillets on hard ground in a secure area clear of any building operation.
Lay steel fabric flat.
Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.3 MOISTURE CONTENT
Ensure masonry units are air dry prior to laying.

3.4 CHECK BASE CONCRETE
Ensure the base concrete is true to line and level, requiring a base mortar bed of 10mm (minimum) to 20mm (maximum). Ensure that all laitance, loose aggregate, or anything preventing bond is removed prior to laying masonry units.

3.5 STARTER POSITIONS
Before commencing laying masonry units, check the location of starter reinforcement by measure or by a dry trial lay up of the first course. Do not correct misplacement by cranking bars. Where misplacement exceeds the location tolerance, obtain written direction before proceeding.

3.6 REINFORCEMENT
Reinforcement to NZS 4229 and NZS 4210: 2.6, **Reinforcing details**.
Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.7 REINFORCEMENT LAPS
Tie all lapping bars to each other.

Minimum reinforcing laps schedule

BAR TYPE	**CONCRETE MASONRY**
Deformed	40 diameters
Plain round (with hooks)	60 diameters
Plain round (no hooks)	100 diameters

3.8 COVER
Cover to NZS 4210, Table 2.E1 - **Masonry durability requirements**.

3.9 TOLERANCES
Construct within the tolerances set out in NZS 4210: clause 2.6.5, **Tolerances**, and clause 2.7.1, **General**. Lay masonry units with bedding of consistent thickness throughout.
Reinforcement to NZS 3109: 3.9 **Tolerances for reinforcement**.

3.10 PROTECTION
Protect fair-faced masonry walls, keeping them clear of mortar droppings, grout splashes, or stains of any kind.

3.11 LAY MASONRY UNITS
Ensure consistent, fully filled and tooled joints. Where walls are reinforced, prevent mortar droppings from entering the cells to be grouted. Provide clean out holes at base of wall, unless "low lift" (NZS 4210) grouting is used. Ensure reinforcement is accurately placed and tied. Lay in regular stretcher bond with all necessary special units and sill units. Cut masonry, if necessary, true and square without chipping.

3.12 MASONRY UNITS JOINTS
Not exceeding 10mm thick, or less than 8mm when the units are bedded in. Joints tooled concave, unless detailed otherwise.

3.13 VERTICAL CONTROL JOINTS
To NZS 4229 12.1 **Shrinkage control joints**.
Locate at major changes of wall height or thickness, at openings, at ground slab control joints, and at not more than 6m centres, or, as shown on the drawings. Where reinforcement passes through a control joint, provide for breaking bond using methods detailed on NZS 4229 fig. 12.2, **Control joint detail**, unless specifically detailed otherwise.

3.14 BRACING
Provide sufficient temporary lateral bracing to ensure stability until the final supporting construction is in place.

3.15 PRE-GROUTING INSPECTION
Inspect walls prior to grouting. Ensure cells are clean and reinforcement is correctly placed. Where "high lift" (to NZS 4210) grouting is used, seal the clean out holes and brace to prevent blow outs.

3.16 GROUTING OF CELLS
Only grout all masonry cells, below finished grades, in retaining walls, where fixing devices occur and all other cells containing reinforcing.

3.17 GROUT CELLS
Grout all masonry unit cells.

3.18 GROUTING PROCEDURE
Use procedures set out in NZS 4210. Methods acceptable on this project are:
- high lift grouting with expansive admixture
- high lift grouting without expansive admixtures
- low lift grouting.

3.19 CONSTRUCTION JOINTS
Form and treat construction joints between grout pours and between masonry walls and hardened concrete work to ensure bonding occurs. Comply with NZS 4210: 2.16, **Horizontal construction joints**.

3.20 MORTAR IN COMPONENTS
Mortar in components such as sills, copings, lintels, and steps, as work proceeds.

3.21 SUB-FLOOR VENTILATION
Build in sub-floor ventilators to NZS 3604: 6.14, **Prevention of dampness**. Locate 750mm from corners and at a maximum of 1.8m centres.
Refer 5521 HARDWARE section for sub-floor ventilation grilles.

3.22 BUILD IN
Build in plugs, bolts, ties, metal flashings, dowels, fastenings and fixings as required by all trades.

3.23 PROGRESSIVE CLEANING
Clean off mortar splashes and grout spills as they occur, making good any damage at the same time.

3.24 WATERPROOFING EXTERIOR OPENINGS
Apply waterproofing to the exposed face of openings for, windows, doors, meters etc, also if necessary the top of parapets/balustrades and ends of masonry walls abutting other claddings. To CCANZ CP 01, waterproofing manufacturer's requirements and as detailed.

Provide temporary protection from direct sunlight.

3.25 FINAL CLEANING
Clean down masonry work and remove waste material from adjoining surfaces and floors at completion.

3.26 REMOVE
Remove from the site materials not used.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

3820 CARPENTRY

1. GENERAL

This section relates to the supply and erection of timber framing, as a framed structure, or as partitioning. It includes prefabricated timber.

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
AS/NZS 1328.1	Glued laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1604.5	Specification for preservative treatment - Glue laminated timber products
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3622	Verification of timber properties
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4357.0	Structural laminated veneer lumber - Specification
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice
BRANZ BU 526	Specifying timber
BRANZ BU 575	Timber treatment
BRANZ BU 519	Fasteners selection

*A copy of NZS 3604 Timber-framed buildings, must be held on site.

1.2 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.3 DIMENSIONS

All timber sizes except for battens are actual minimum dried sizes.

2. PRODUCTS

2.1 TIMBER FRAMING, TREATED

Species, grade and in service moisture content to NZS 3602, NZBC B2/AS1 and treatment to NZS 3640, NZBC B2/AS1. Structural grade (SG) to NZS 3604, NZS 3622 with properties to NZS 3603.

H1.2 CCA Radiata pine:	Minimum for subfloor framing, floor framing, wall framing, roof framing
H3.2 CCA Radiata pine:	Bottom plate, jamb battens, cavity battens. Deck joists, stairs, steps, pergola, enclosed deck members
H4 CCA Radiata pine:	Minimum for exterior exposed posts
H5 CCA Radiata pine:	Ground contact members

Refer to

BRANZ BU 526	Specifying timber
BRANZ BU 575	Timber treatment

2.2 LAMINATED TIMBER
Radiata pine laminations to AS/NZS 1328.1; treated as required by NZS 3602, NZBC B2/AS1, to the requirements of NZBC B2/AS1, NZS 3640, with special attention to Appendix B "Specification advisory notes". Supply weather resistant sealed.

2.3 TIMBER TRUSSES
To FTMA CoP. Moisture content 16% at supply.

2.4 EXTERIOR CAVITY WALL BATTENS - TIMBER - NON-STRUCTURAL
H3.2 CCA Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. Temporary fix battens before being fixed into the framing with the cladding fixings. To NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

Components

2.5 NAILS
Type to NZS 3604, section 4, **Durability**, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, sections 6-10.

2.6 BOLTS AND SCREWS
Bolts and screws of engineering and/or coach type complete with washers, to the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10.

2.7 NAIL PLATES
Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Plates to the plate manufacturer's design for the particular locations.

2.8 CONNECTORS
Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations.

2.9 DPC
Refer to 4161 UNDERLAYS AND BARRIERS section

3. EXECUTION

3.1 EXECUTION GENERALLY
To NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 SEPARATION
Separate all timber framing timbers from concrete, masonry and brick by:
- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space.

3.3 ATTENDANCE
Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT
Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.

Framing at erection:	24% maximum
Framing at enclosure:	20% maximum
Framing at lining:	16% maximum

3.5 SET-OUT

Set out framing in accordance with the requirements of NZS 3604 and as required to support sheet linings and claddings.

3.6 FRAMING SUB-FLOOR

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6.10, **Framed subfloor walls**.
Refer 2310 FOUNDATIONS section for exterior timber stairs, ramps and decks.

3.7 FRAMING FLOORS

Framed and fastened to NZS 3604, section 7, **Floors**.
Refer to 5433 PLYWOOD FLOORS section for sub-floor access panel.

3.8 FRAMING WALLS

Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to NZS 3604, section 8, **Walls**.

Posts:	H4 CCA Radiata pine 100mm x 100mm minimum for verandahs, exterior handrails and balustrades above ground.
Pelmets:	Wall extends from the ceiling to 90mm below the top of the architrave for a depth of 90mm. Extend pelmet each side of the window for the curtain to clear the window when open.

Refer to 4851 EXTERIOR HANDRAILS & TIMBER BALUSTRADES section.
Refer to 4710 INSULATION section for pelmet wall insulation.
Refer to 5123 MANUFACTURED TIMBER BOARD LININGS section for pelmet lining.

3.9 FRAMING ROOFS

Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9, **Posts** and 10, **Roof framing**.

Repair broken roof truss members less than 4000mm in length:

- Less than 50% split through in cross section, repair with nail plates either side, equal to 120% minimum of the end joining plates.
- Less than 1000mm longitudinal split, repair with transverse nail plates at 150mm centres each side.

Report to the HNZ Contract Manager for further instructions for broken roof truss members more than 4000mm in length.

3.10 FRAMING CEILINGS

Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to NZS 3604, section 13, **Ceilings**.
Trim for openings in ceilings and hatches to NZS 3604 section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to NZS 3604, section 13.4, **Water tanks in roof space**.
Refer to 5122 PLYWOOD LININGS section for ceiling access panel.

3.11 INSTALLING WALL UNDERLAYS

Refer to 4161 UNDERLAYS AND BARRIERS section

3.12 FIT JAMB BATTENS

For walls with direct fix cladding, fit 20mm (nominal) jamb battens over the wall underlay, to the jambs of window and door rough openings, to NZBC E2/AS1, fig 72A. Cut around sill flashings. Fix with 60 x 2.8 flat head galvanized nails at 300mm centres.

3.13 FIT CAVITY BATTENS
Fit and fix 20mm cavity battens over wall underlay or rigid air barrier, fully nail to timber studs to the requirements of the manufacturer or to NZS 3604. Fit and fix related flashings. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc.).

3.14 DPC TO TIMBER
Refer to 4161 UNDERLAYS AND BARRIERS section.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

3897 DECAYED TIMBER & INFESTATION

1. GENERAL

This section relates to identification and testing of decayed timber and for its replacement and/or treatment to NZBC B1 and NZBC B2. It includes;

- Decay due to rot from fungal and mould growth
- De-cay due to insect attack
- Control of rodent or insect infestation.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

BAE	Boric acid equivalent

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC B2/AS1	Durability
NZS 3604	Timber-framed buildings
MBIE	Workplace Health Bulletin No. 17 - Risks to Health from Moulds and Other Fungi

Requirements

1.3 QUALIFICATIONS

Decayed timber work to be carried out by personnel experienced and familiar with identifying, treating and replacing decayed timber.

Fumigation work to be carried out by personnel experienced and familiar with control and eradication of rodent and insect pests in and around buildings and be members of the NZ Pest Control Association.

Workers to be familiar with the health and safety requirements relating to this work.

1.4 INSPECTIONS

Where (fungi and mould) decayed timber has been identified and a specialist consultant is engaged, arrange for and co-ordinate these inspections.

Fumigation contractors to confirm the property is unoccupied prior to the application of baits or poisons. Advise HNZ Contract Manager of conditions likely to lead to re-infestation.

1.5 PHOTOGRAPHIC RECORD

Decayed timber work - take a photographic record of all stages of the work including before work commences, after the decayed material has been removed and after replacement.

1.6 PROVIDE TEMPORARY PROTECTION

Decayed timber work - provide temporary protection from weather and water for all interior parts of the building exposed by the work.

Fumigation work provide notification on a written sign (yellow card minimum 300mm square) secured behind window glass adjacent to the entry door:

- Name of pest control contractor
- 24 hour contact telephone number
- Bait or poison used
- Date applied
- Date dwelling will be safe to enter.

2. PRODUCTS

Materials

2.1 BRUSH ON TIMBER TREATMENT
Boron glycol type treatment, to a minimum concentration of 20% bae. For concealed timber, add coloured dye to help with even application.

2.2 RODENT AND INSECT TREATMENT
Professional pest control poisons suitable for the control of rodents and insects in domestic environments. Bait stations tamper resistant with key.

3. EXECUTION

RODENT AND PEST ERADICATION

3.1 NESTS

- Bird nests removed and sprayed with insecticide to kill lice.
- Wasp nests destroyed and removed.
- Bee nests removed by beekeeper.

3.2 RODENTS
Pulse bait stations and poison checked, cleared and reapplied three times over a two week period.

3.3 INSECTS

- Spray for fleas.
- Spray and sticky traps for cockroaches minimum two applications.
- Chemicals and baits for ants.

3.4 REMOVING DEBRIS FROM SITE
Wash down surfaces to remove any residual chemicals and remove unused baits, containers, signs from site at the completion of treatment.

Removing fungi and mould affected timber

3.5 TAKING SAMPLES FOR TESTING
Take samples as required for testing. Samples must be of the required size and labelled to identify the source.

3.6 HEALTH AND SAFETY WHEN DEALING WITH MOULD
Where moulds and fungi have to be removed as part of the repair, comply with relevant Health and Safety requirements. Ensure workers removing moulds and fungi in the building wear suitable protective equipment including disposable overalls, appropriate breathing masks and gloves. Refer to MBIE Workplace Health Bulletin No. 17 and the MBIE WorkSafe NZ website for further information.

Disturb moulds and fungi as little as necessary.

3.7 HEAVY MOULD GROWTH

Where materials have heavy mould growth on them, replace them rather than attempting to clean off mould. Wrap the materials in polythene or put in polythene bags, and seal to prevent them drying out. Clean mould from smaller isolated areas where it would be difficult or impractical to remove materials. This should be done by thorough washing and rinsing, and collecting the cleaning solution and rinse water for disposal. A wet dry vacuum cleaner is useful for this. If areas of mould need to be cleaned, this should be done before they dry out.

3.8 PROVIDE TEMPORARY COVERS

Once suitable temporary covers are in place, cladding can be removed with the linings still in place. This avoids any potentially dangerous moulds being released into the building. The lining also acts as a wind barrier reducing the wind load on the covers.

3.9 AVOID CONTAMINATION OF OTHER AREAS

Where internal remediation work is needed, avoid contaminating other areas of the house with mould. Advice should be sought from a specialist on how to keep the work area separate from the rest of the dwelling (for example with polythene sheets and taped joints and using a negative pressure environment). The work environment must be kept well-ventilated.

3.10 REMOVING DECAYED TIMBER

If a specialist consultant is engaged, follow their recommendations for timber removal, otherwise generally as follows.

Err on the side of caution when replacing untreated timber framing. If the timber has been adequately preservative treated, then it may be possible to remove less timber.

Particular care is needed where several pieces of timber are fixed together. The timber faces exposed after the cladding is removed may appear sound but there could be fungal decay on the hidden faces of the timber which can be difficult to detect. Examples of these are multiple studs, doubling or jack studs, boundary joists and lintels.

Where the timber shows obvious signs of failure (Refer MBIE publication Dealing with timber, photos 3 and 4) there is typically no need to test the decayed portions before removal. Testing should focus on identifying where the timber is sound. Cut out any timber at least one metre beyond the last visual signs of fungal decay on any individual piece of timber (Refer MBIE publication Dealing with timber, Figures 1 and 2).

Removed timber and debris, to be disposed of offsite.

3.11 DIFFICULT TO REACH TIMBER

Where timber members are difficult to replace such as floor joists running back into a building, it may be possible to reduce the recommended one metre distance by taking samples of timber at 150mm, 300mm and 600mm distances from the visible signs of decay and getting them analysed in a laboratory. The timber will only need to be removed as far back as the first sample that has no decay present.

Removing borer affected timber

3.12 REMOVING BORER INFESTED TIMBER

Remove all timber that has significant disintegration and/or soft areas. Remove structural, framing and waterproofing timber that has significant intense areas of borer holes. Cladding, linings and trim can be temporarily removed and inspected, if unaffected or only slightly affected but sound, then treated and reused.

Native timber framing which are mostly unaffected heart wood, but with small pockets of infected sap wood, must be assessed for structural adequacy. If deemed structurally adequate, treat and leave in place.

Isolated single floor boards without disintegration or soft areas, but sound with intense areas of borer holes (above or below) can be left in place, treated and holes filled. Reinforce from underneath with minimum 12mm H3 plywood panels, screwed and glued to at least two non-infected boards on either side.

Err on the side of caution when replacing untreated timber framing.

3.13 REMOVAL SEQUENCE
Generally it is preferable to remove, treat then replace.
However, in some cases, as long as there is no fungi or mould present, it may be possible to treat insect infected timber framing, install replacement framing and then remove badly affected timber. Treat cuts afterwards.

3.14 REMOVING DEBRIS FROM SITE
Removed timber and debris, to be disposed of offsite.

Treating timber

3.15 REMOVE EXISTING COATINGS
Remove any existing coatings, paint, applied finishes etc, that will inhibit the absorption of the treatment into the timber.

3.16 TREATING SOUND TIMBER
Sound timber uncovered during repairs that is untreated or has a preservative treatment that does not meet B2/AS1, must be treated, where practical, with a brush-on preservative treatment.

To maximise the surface area of framing that can be treated, it is important to apply brush-on timber treatments after decay-affected timber has been removed, but before new treated timber is installed. Where localised repairs are carried out, any timber in the area of the repair should be treated.

3.17 BRUSH ON TREATMENT
Apply brush on timber preservative treatment to areas affected.

3.18 INJECTING TREATMENT
These methods apply to all fungi and mould treatment, but would only apply to major active insect infestation.

For studs where three faces cannot be accessed, a combination of two coats applied by brush and injection of boron glycol into holes drilled into the interface between studs is recommended. The holes to be 6mm in diameter and 80mm deep, sloping downwards (at approximately 30 degrees to the horizontal) at 300mm intervals (Refer MBIE publication Dealing with timber, Figure 7). 10ml of treatment solution to be injected into the holes followed by a second 10ml injection 30 minutes later.

For double lintels, two coats of boron glycol to be applied by brush followed by injection of boron glycol into 6mm by 45mm deep holes drilled into the outer lintel 10mm below the top edge. A drill hole spacing of 100mm is recommended starting 75mm from the end of the lintel (Refer MBIE publication Dealing with timber, Figure 8). 15ml of treatment solution to be injected into the holes followed by a second 15ml injection 30 minutes later.

Temporarily clamp the lintel timbers together if there is a large gap between them. Apply adhesive tape to the bottom of the joint before injecting the treatment to minimise treatment running out the bottom of the lintel.

Because of the variability associated with the boron injection process, use his remediation method only where there is a high degree of confidence that there is no fungi or mould decay present between studs or lintel members.

While boundary joists have some similarities to lintels, this method of treatment cannot be relied on to achieve adequate levels of site preservative treatment because of more limited access to the timber surfaces. In addition, as boundary joists have less drying potential than lintels, hidden and difficult to find decay can occur. Accordingly, the removal of the boundary joist as shown in (Refer MBIE publication Dealing with timber, Figure 5) is required, which allows for preservative application and for any timber with decay to be identified and removed.

Replacing timber

3.19 REPLACING TIMBER

- Replacement of timber work must be done in dry conditions under cover.
- Existing timber framing must be supported and protected as necessary until the new framing is installed.
- Replacement timber must be preservative-treated to B2/AS1 to at least H1.2 for timber framing and H5 for ground contact.
- Dry storage must be provided on site for replacement timber before it is installed.

3.20 WALL FRAMING

For framing, select the most cost-effective technique to replace decayed timber in a particular area either;

- remove and replace the timber framing
- or cut out the decay and flitch in new framing.

Note, NZS 3604 does not allow the jointing of studs, so replace studs as necessary.

Where more than 40% of the timber in a particular section of the framing has to be removed, replace all framing.

3.21 FLOOR FRAMING

Where decay has affected floor joists, it may be possible to insert a new beam within the floor space to support the remaining length of joist and the replacement joists, usually by using joist hangers (Refer MBIE publication Dealing with timber Figures 6a and 6b). The beam will need to be supported and the design must ensure loads are transferred to the foundations.

3.22 CLOSING IN

Do not close in timber framing until the moisture content is less than 20%. Note, some brush-on timber treatments can cause resistance moisture meters to read higher than the actual timber moisture content.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4161 UNDERLAYS & BARRIERS

1. GENERAL

This section relates to the application of:

- DPC/DPM
- wall underlays includes
- roofing underlays
- vapour barriers
- accessories.

Refer 5433 PLYWOOD FLOORS section for vinyl surfacing underlay.
Refer 4231 FIBRE CEMENT SHEET CLADDING section for sub-floor insulation lining.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.
The following abbreviations apply specifically to this section:

NZMRM	New Zealand Metal Roofing Manufacturers Inc.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZS/AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
AS/NZS 4200.1	Pliable building membranes and underlays
AS/NZS 4347.0	Damp-proof courses and flashings - Methods of test - General introduction, list of methods and test specimen requirements
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

Requirements

1.3 INSTALLATION SKILL LEVELS

Installers to be familiar with the manufacturer's technical literature and the NZMRM CoP NZ metal roof and wall cladding Code of Practice.

2. PRODUCTS

Materials

DPC

2.1 POLYETHYLENE DPC

Polyethylene film to AS/NZS 2904 and to the appropriate test methods set out in AS/NZS 4347.0. Thickness 500 microns minimum, manufactured for use as a damp-proof course and concealed flashings to doors and windows.

DPM

2.2 DAMP PROOF MEMBRANE - CONCRETE FLOOR
Polyethylene sheet with minimum thickness of 0.25mm to NZS 3604, 7.5.6, **Polyethelene (polythene) sheet damp-proof membranes**.

2.3 DAMP PROOF MEMBRANE - GROUND COVER TO SUSPENDED TIMBER FLOORS
Polyethylene sheet with minimum thickness of 0.25mm and a minimum vapour flow resistance of 50MNs/g to NZS 3604, 7.5.6, **Polyethelene (polythene) sheet damp-proof membranes**.
Enclosed sub floor ventilation: Minimum of 3,500mm2 for every 1m2 of house plan area
BRANZ BU 457 Ventilation of enclosed subfloor spaces

Wall Underlays

2.4 ABSORBENT SYNTHETIC WALL UNDERLAY - POLYPROPYLENE - FIRE
Absorbent, breathable, fire retardant, non-woven, white soft spun-bonded polypropylene membrane. Designed for use as fire retardant membrane, with Flammability Index of 1, when tested to NZS/AS 1530.2.

2.5 ABSORBENT SYNTHETIC WALL UNDERLAY - POLYOLEFIN - FIRE
Absorbent, breathable, fire retardant polyolefin (polyethylene) woven into sheet form with micro sized pores that allow the membrane to breathe with a fire retardant flammability index of 1, tested to NZS/AS 1530.2.

Rigid Wall Underlays

2.6 RIGID WALL UNDERLAYS
Plywood or fibre cement sheet over-fixed with flexible wall underlay to E2/AS1 9.1.7.2.
Refer to 4223 PLYWOOD CLADDING section for plywood.
Refer to 4231 FIBRE CEMENT SHEET CLADDING section for fibre cement sheets.

Roofing Underlay

2.7 SYNTHETIC NON-WOVEN SELF SUPPORTING ROOFING UNDERLAY
A non-woven self supporting roofing underlay, consisting of two spun-bonded polyolefin fabric layers bonded to a micro porous inner layer, designed for use as a water absorbent, breathable, water resistant roofing underlay for sloped roofs; with flammability index tested to NZS/AS 1530.2, AS/NZS 2295.

2.8 SYNTHETIC NON-WOVEN ROOFING UNDERLAY
A non-woven roofing underlay, consisting of two spun-bonded polyolefin fabric layers bonded to a micro porous inner layer, designed for use as a water absorbent, breathable, water resistant roofing underlay for sloped roofs; with flammability index tested to NZS/AS 1530.2, AS/NZS 2295

Vapour Barriers

2.9 MOISTURE VAPOUR BARRIER
Moisture vapour barrier film to AS/NZS 4200.1, complete with adhesive pressure-sensitive tape required by the film manufacturer, used for the prevention of moisture damage. Polythene or polyethylene.

Accessories

2.10 WINDOW DOOR SEALING SYSTEM
Proprietary window and door flashing tape and accessories to E2/AS1, paragraph 4.3.11, **Flexible flashing tape**, paragraph 9.1.5, **Wall underlays to wall openings**.

2.11 STUD STRAPS
19mm wide polyethylene straps, for cavity construction with framing centres greater than 450mm.

2.12 WIRE NETTING
75mm galvanized hexagonal wire netting to AS/NZS 4534.

2.13 SAFETY MESH
Galvanized or PVC coated safety mesh AS/NZS 4389.

2.14 GUTTER AND UNDER FLASHINGS
Fire retardant breather type underlay cut to width by manufacturer for use under valley, apron flashing and internal gutters. Soffit liner cut to width from fire retardant breather type underlay.

2.15 ADHESIVE TAPE
Adhesive tapes to compliment the underlay. Pressure sensitive tapes for joining vapour barriers.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
To NZBC E2/AS1 Table 23 Properties of Roof Underlays and Wall Underlays; and manufacturers technical literature.
Note: Care should be taken not to expose the underlay to continuous wet and windy conditions.

3.2 STORAGE
Store wall and roofing underlays and accessory materials, under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture.

3.3 INSPECTION
Before starting work, check that the framing will allow work of the required standard. Carry out remedial work identified before laying underlay.

Application - DPC

3.4 POLYETHYLENE DPC TO TIMBER
Lay polyethylene DPC under all timber framed walls on concrete and concrete masonry, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.

3.5 DPC TO MASONRY AND BRICK VENEER
Lay DPC along base of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

3.6 DPC BETWEEN DISSIMILAR MATERIALS
Lay DPC between dissimilar materials where required.

Application - DPM

3.7 DPM TO CONCRETE FLOOR
Lay DPM under concrete floor substrate over sand binding, in a single layer with 150mm overlaps at joints to provide a waterproof barrier.

3.8 DPM TO GROUND UNDER SUSPENDED TIMBER FLOOR

Lay DPM on ground under enclosed subfloor suspended timber floor in accordance with NZS 3604, 6.14.3, **Ground cover**, and as follows.

Ensure that:

- the vapour barrier is weighted down and held against air movement by bricks or rocks
- total subfloor ground area is covered
- polyethylene sheet is new and unpunctured
- adjacent sheets are lapped a minimum of 100mm and taped
- sheets are butted up to surrounding foundation walls, piles and other penetrating elements and fitted tight
- ground is shaped to prevent water accumulation on the vapour barrier and to drain to the exterior.

Note: In accordance with NZS 3604 the minimum requirement for subfloor ventilation under all situations is to be no less than 700mm² for every 1m² of floor area.

Application - Wall Underlay

3.9 WALL UNDERLAY

Fix horizontally to outside face of substrate in true alignment, with succeeding sheets overlapping 150mm to NZBC E2/AS1, clause 9.1.7, **Wall underlay** and refer to manufacturer for requirement for fastenings. Fix to manufacturers requirements. Scribe neatly around penetrations and openings to leave no gaps. Tape all penetrations. Keep clean, undamaged and without visible weather deterioration until closed in.

3.10 INSTALL STUD STRAPS

Over underlay, install 19mm wide polyethylene straps horizontally at 300mm centres, draw taut and fix to studs with stainless steel staples.

3.11 METAL CLADDING ON TIMBER CAVITY BATTENS

Fix strip of underlay to face of batten before fixing the metal cladding.

Application - Roofing Underlay

3.12 INSTALL WIRE NETTING

Lay 75mm galvanized wire netting at right angles across the purlins and drawn taut before fixing. Tie edges of netting together with galvanized wire clips.

3.13 INSTALL SAFETY MESH

Lay and fix safety mesh to AS/NZS 4389.

3.14 ROOF UNDERLAY

Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixing clips. Lay underlay to avoid excessive dishing between purlins. When used vertically limit individual runs to 7 metres for fire retardant underlays and 20 metres for synthetic roofing underlays. Do not lay vertically on roof pitches under 10°.

Lay horizontally across the rafter/trusses starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Scribe around and fit neatly to all penetrations. Avoid prolong exposure by installing the roof immediately. UV exposure maximum 7 days.

3.15 GUTTER AND UNDER FLASHINGS

Lay fire retardant breather type underlay cut to width by manufacturer for use as an underlay to valley, apron flashings, internal gutters and soffit liner. Lap under flashings with adjoining underlays. Fix soffit liner from top plate down 150mm past ribbon plate.

Application - Vapour Barrier

3.16 FIX VAPOUR BARRIER
Fit and fix between insulation and lining with joints lapped and sealed with pressure-sensitive tape.

Completion

3.17 CLEAN UP
Clean up as the work proceeds.

3.18 LEAVE
Leave work to the standard required by following procedures.

3.19 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4221 TIMBER BOARD CLADDING

1. GENERAL

This section relates to the supply and fixing of timber cladding:

- weatherboards
- shiplap
- board and batten.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External Moisture
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring
NZS 3631	New Zealand timber grading rules
BRANZ	Good practice guide: Timber cladding
WANZ	Installation Guide

Performance

1.2 FIXINGS, WIND
Design and use the fixings appropriate for the wind zone (R) and topographical classification (T) of this site and building height; as required by NZS 3604.

Provide evidence that the systems will comply with the existing standards of performance.

1.3 PERFORMANCE
Accept responsibility for the weather-tight performance of the completed cladding system, including all penetrations.

2. PRODUCTS

Materials

2.1 UNDERLAYS
Refer to 4161 UNDERLAYS AND BARRIERS section

2.2 EXTERIOR CAVITY WALL BATTENS
Refer to 3820 CARPENTRY section.

2.3 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING
Aluminium or stainless steel trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.4 WEATHERBOARDS
Profile to match existing to NZS 3617, radiata pine and grading to NZS 3602, NZS 3631, minimum treatment to NZS 3602, table 2, reference 2A.1, Requirements for wood-based building components to achieve a 15-year durability performance. Weatherboards in long lengths, with all knots excluded.
Advise HNZ Contract Manager where to match imperial dimensions.

2.5 BOARD AND BATTEN
In long lengths to profile to match existing with radiata pine and grading to the requirements of NZS 3602, NZS 3631, but with all knots excluded. To NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance.

2.6 COVER BOARDS, BOXED CORNERS AND SCRIBERS
Profiles to match existing, with radiata pine and grading to NZS 3602, NZS 3631, but with all knots excluded. To NZS 3602, table 2, reference 2A.3, Requirements for wood-based building components to achieve a 15-year durability performance.

2.7 RIGID BACKING
Refer to 4223 PLYWOOD CLADDING for plywood used as a rigid backing.
Refer to 4231 FIBRE CEMENT SHEET CLADDING for fibre cement sheets used as a rigid backing.

Components

2.8 NAILS, GALVANIZED
60mm x 2.8mm and 75mm x 3.15mm galvanized steel.
Refer to BRANZ Good practice guide: Timber cladding.

2.9 NAILS, STAINLESS STEEL
60mm x 2.8mm and 75mm x 3.15mm stainless steel.

2.10 FLASHINGS
Material, grade and colour to NZBC E2/AS1; table 21: Compatibility of materials in contact and table 22: Compatibility of materials subject to run-off. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

2.11 SHARKS TOOTH FLASHING
PVC compressible flashing strip.

2.12 SOAKERS, ALUMINIUM/ZINC COATED STEEL
Machine folded aluminium/zinc coated steel sheet to profile of weatherboard and mitred corner joints.

2.13 SOAKERS, COPPER
Machine folded half-hard copper sheet to profile of weatherboard and mitred corner joints.

Finishes

2.14 PRIMER
Water borne acrylic primer to suit the timber and proposed painting system.

3. EXECUTION

Conditions

3.1 GENERALLY
Execution to NZBC E2/AS1: 3.0 Weathertightness risk factors, and 9.0 Wall claddings, 9.1.8 Drained cavities.

3.2 STORAGE
Take delivery of prefinished and pre-primed timber, dry, unmarked and undamaged. Store on site, laid flat and true under cover.

3.3 SUBSTRATE
Before starting fixing ensure that the substrate conforms with NZS 3604, section 2, table 2.1, **Timber framing tolerances** and the requirements of NZS 3604, section 6, **Foundation and subfloor framing** and NZBC E2/AS1, governing support for timber board cladding.

3.4 MOISTURE CONTENT
Immediately before starting fixing, test the moisture content of the boards. Use an electrical moisture meter to test 5% of boards, but not less than 10 boards in the centre of the length. Do not start fixing until 90% of the values obtained are within the range in NZS 3602 table 4, Allowable moisture content (%) at time of installation or in the case of framing timber at time of enclosure.
Weatherboards moisture content maximum 16% at fixing.

Application - preparation

3.5 PRIMING AND SEALING
Coat to suit the paint system specified in painting sections. Allow to re-coat if exposed for more than one month before the final coating is applied.

3.6 FIX UNDERLAYS
Refer to 4161 UNDERLAYS AND BARRIERS section

3.7 INSTALL DRAINED CAVITY
Refer to 3820 CARPENTRY section.

3.8 PENETRATIONS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- wall underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

Refer to the WANZ Installation Guide.

3.9 SET-OUT
Using laser or mechanical devices set-out the overlap boards to ensure dimension to exposed face in line of weather is constant and that boards remain horizontal/vertical. Use a string line to set out all nailing that will be visible in the finished work. Align all nailing accurately in straight lines.

Application - fixing

3.10 FIXING, PAINT FINISH
Prime all cut ends before fixing. Drill all fixings located within 25mm of board ends. Punch all fixings.

3.11 FIXING BEVEL BACK WEATHERBOARDS
Nail weatherboards to every fixing point with one nail just clear of the lap. Butt end joints, mitre external corners and scribe internal corners. Back flash internal corners. Fit soakers to end joints and external corners, nailed under lap. Random stagger end joints across adjacent boards.

3.12 FIXING RUSTICATED WEATHERBOARDS
Adjust vertical set-out to provide a 2mm expansion gap between successive boards. Nail weatherboards to every fixing point with one nail just clear of the lap. Butt end joints and fit nailed soakers under each end joint. Random stagger butt joints on adjacent boards.

Scribe and back flash internal corners. Fit cover boards and scribers to all openings. Mitre external corners and fit nailed soakers under each corner. Fit corner boxes and scribers to external corners. All external corners to be back-flashed.

3.13 FIXING VERTICAL SHIPLAP WEATHERBOARDS
Adjust horizontal set-out to ensure there is a 2mm expansion gap between successive boards. Using full length boards only, clench nail tongue to every fixing point (nogs at 480mm centres). Nail other side of board just clear of lap. Line nails horizontally across the boards.

3.14 FIXING BOARD AND BATTEN
Using full length boards only, nail at the centre of the board width (nogs at 480mm centres). Nail the batten with a single fixing through the gap between boards at every fixing point.

3.15 INSTALL FLASHINGS
Install flashings, covers and soakers to NZBC E2/AS1

3.16 COMPLETE
Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

Completion

3.17 REPLACE
Replace all damaged or marked elements.

3.18 LEAVE
Leave work to the standard required for following procedures.

3.19 REMOVE
Remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4223 PLYWOOD CLADDING

1. GENERAL

This section relates to the use of plywood sheets for:

- exterior cladding
- installed as bracing (as cladding or under cladding)
- a solid plaster substrate
- installed as rigid sheathing and /or air barrier (precladding).

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E2/AS1	External moisture
AS/NZS 1604.3	Specification for preservative treatment - Plywood
AS/NZS 2269.0	Plywood - structural - Specifications
NZS 3602	Timber and Wood-based Products for Use in Building
NZS 3604	Timber-framed buildings
NZS 4251.1	Solid plastering: Cement plasters for walls, ceilings and soffits
WANZ	Installation Guide

Performance

1.2 WEATHER TIGHT PERFORMANCE

Accept responsibility for the weather-tight performance of the completed cladding system, including all penetrations.

PERFORMANCE

1.3 FIXINGS, WIND

Design and use the fixings to the manufacturer's requirements.
Provide evidence that the systems will comply with the existing standards of performance.

1.4 BRACING REQUIREMENTS

Design the system and its anchorages/fixings to the manufacturer's requirements.
Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials

2.1 PLYWOOD RIGID SHEATHING/AIR BARRIER

Rotary cut radiata pine veneer ply to AS/NZS 2269.0, minimum 7mm, H3 treated, structural plywood to NZBC E2/AS1: 9.1.4 **Barriers to Airflow** and NZBC E2/AS1: 9.1.7.2.

2.2 WALL UNDERLAYS

For flexible wall underlays, rigid wall underlays and rigid air barriers, refer to the appropriate separate section(s).

2.3 EXTERIOR CAVITY WALL BATTENS
Refer to 3801 CARPENTRY section.

2.4 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING
Perforated aluminium or stainless steel trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.5 CONSTRUCTION PLYWOOD, PINE
Rotary cut radiata pine veneer ply to AS/NZS 2269.0, face sanded. Treated H3.

2.6 PLYWOOD, RIGID BACKING
Rotary cut radiata pine veneer ply to AS/NZS 2269.0. Treated H3. Selected as specified in NZS 4251.1 table 6 Plywood sheet thickness, and to NZBC E2/AS1 9.3.6 **rigid plaster backings**.

2.7 PROPRIETARY PLYWOOD CLADDING
Rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3 to AS/NZS 1604.3.

2.8 PLYWOOD BRACING
Rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3 to AS/NZS 1604.3.
Bracing system tested to NZS 3604, section 5, **Bracing design**, NZS 3604.6.2 **Subfloor systems**, NZS 3604, 8.3 **Systems to resist horizontal loads**, to meet NZBC B1/AS1.

2.9 EXTERIOR TRIM
Radiata pine run cover battens, facings and mouldings to profiles as detailed or required by the plywood cladding manufacturer. Clears grade or finger-jointed, treated H3.1 to NZS 3602 table 2A, **Requirements for wood-based building components to achieve a 15-year durability performance**.

Components

2.10 NAILS
Refer to the panel manufacturer's requirements. Use annular grooved or twisted shank nails for soffit sarking.

To fix cladding panels use a minimum of;
- 50mm x 2.8mm FH nails for direct fix
- 65mm x 3.2mm FH nails over cavity.

To fix timber cover battens use a minimum of;
- 65mm x 3.2mm jolt head
- 65mm x 3.2mm rose head for clear finishes.

2.11 SCREWS
Refer to the manufacturer's requirements for size and use; galvanized countersunk or stainless steel to NZS 3604, Table 4.1, **Protection required for steel fixings and fastenings excluding nails**.

2.12 FLASHINGS
To NZBC E2/AS1, 4.0 **Flashings** and NZBC E2/AS1, 9.8 **Plywood sheet**. Material, grade and colour as detailed and scheduled. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

Accessories

2.13 SEALANT
Refer to the plywood manufacturer's requirements for elastomeric sealant to waterproof penetrations.

3. EXECUTION

Conditions

3.1 HANDLE
Handle sheets carefully and reject all those with damaged faces or edges.

3.2 STORE
Store sheets in stacks clear of the ground, supported flat and true, without sagging on evenly spaced horizontal bearers. Protect from damage and weather.

3.3 SUBSTRATE
To NZS 3604 and the manufacturer's requirements.

3.4 SUPPORT
Fully support all edges and joints unless plywood is tongue and groove jointed.

3.5 EXPANSION
Provide 2-3mm gap at all edges of cladding for sheet expansion.

3.6 FRAMING MOISTURE CONTENT
Maximum moisture content 18%.

Application

3.7 FIXING RIGID SHEATHING/AIR BARRIER
Fit and fix plywood to NZBC E2/AS1: 9.1.4 **Barriers to Airflow**, and the manufacturer's requirement with sheets and trim all in plumb, true alignment and face.

3.8 INSTALL DRAINED CAVITY
Refer to 3801 CARPENTRY section.

3.9 PENETRATIONS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- wall/cladding underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

Refer to WANZ Installation Guide.

3.10 SEALING
Seal cut edges of plywood before fixing with primer or sealer to suit the surface finish being used.

3.11 FIXINGS GENERALLY
A maximum of 15mm from the edge, 150mm centres along edges and 300mm centres on intermediate supports.

3.12 FIXING PLYWOOD SHEETS
Fit and fix to E2/AS1, 9.8 **Plywood sheet** and the plywood manufacturer's requirements with sheets in square, true alignment and plane.

3.13 FIXING PLYWOOD CLADDING
Fit and fix to E2/AS1, 9.8 **Plywood sheet** and the manufacturer's requirement with sheets and trim all in plumb, true alignment and face.

3.14 FIXING PLYWOOD BRACING
Ensure required hold down, strapping, angles, or bolts are in place, and that framing centres are correct.
Fit and fix to NZS 3604, NZBC E2/AS1, 9.8 **Plywood sheet** and the manufacturer's bracing requirement with sheets and trim all in plumb, true alignment and face.

3.15 INSTALL FLASHINGS
Install flashings, covers and soakers as detailed on the drawings and to NZBC E2/AS1, 4.0 **Flashings** and NZBC E2/AS1, 9.8 **Plywood sheet**.

3.16 COMPLETE
Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

Completion

3.17 REPLACE
Replace all damaged or marked elements.

3.18 LEAVE
Leave work to the standard required for following procedures.

3.19 REMOVE
Remove debris, unused materials and elements from the site.

3.20 PROTECTION
Protect this work as it proceeds, and when completed, from the weather and until it is covered, coated or sealed.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4224 EXTERIOR TIMBER TRIM

1. GENERAL

This section relates to lengths of timber fixed on site, either associated with timber cladding, or used as isolated trim with other wall cladding or soffit materials:

- trim
- fascia boards
- cover boards
- sub floor cover boards and battens.

Documents

1.1 DOCUMENTS REFERRED TO
Documents referred to in this section are:

NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
BRANZ	Good practice guide: Timber cladding

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

2. PRODUCTS

Materials

2.1 TIMBER
To NZS 3602, treated H3.2 CCA.

Components

2.2 NAILS, GALVANIZED
60mm x 2.8mm galvanized steel wire jolt/flat/raised head generally. Use other sizes to suit profiles being fixed.

2.3 NAILS, STAINLESS STEEL
60mm x 2.8mm stainless steel wire jolt/flat/raised head generally. Use other sizes to suit profiles being fixed.

Refer to
BRANZ Good practice guide: Timber cladding

Finishes

2.4 PRIMER
Water borne acrylic primer to suit the timber and proposed painting system.

3. EXECUTION

Conditions

3.1 STORAGE
Take delivery of trims undamaged and unmarked and store on site flat and true, under cover, and clear of areas where work is in progress, to ensure materials are of the required standard when fixed in place.

3.2 SUBSTRATE
Ensure that the substrate to trims will allow work of the required standard. If it does not, do not proceed until the substrate has been rectified.

Application - preparation

3.3 PRIMING AND SEALING
If not pre-finished before delivery, coat all faces and edges immediately. Then fillet stack trim until fixed. Keep dry and undamaged. Coat to suit the paint system specified in painting section/s. Allow to re-coat if exposed for more than one month before the final coating is applied.

Application

3.4 EXECUTION
To NZS 3604, except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.5 TIMBER TRIM, BOARDS AND BATTENS
Using full lengths, scribe internal joints and mitre external and running joints. Fully support all joints and fix securely, plumb, level and true to line and face, fully nailed. Prime joint edges before fixing.

3.6 NAILING, PAINT FINISH
Punch nails and patch prime external trim, before stopping as specified under painting preparation.

Completion

3.7 LEAVE
Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following procedures.

3.8 PROTECTION
Protect the completed work and make good before any surface finish is applied.

3.9 REPLACE
Replace all damaged or marked elements.

3.10 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4231 FIBRE CEMENT SHEET CLADDING

1. GENERAL

This section relates to the supply, fixing and jointing of fibre cement.
It includes:

- cladding
- weatherboards
- bracing panels
- panel (for fireplace interior chimney capping)
- fire rated systems
- sound rated systems
- solid backing for plaster installed as rigid sheathing and/or air barrier (pre cladding).

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

FRR	Fire resistance rating
STC	Sound transmission class

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in building
WANZ	Installation Guide

Requirements

1.3 QUALIFICATIONS
Fibre cement fixers to be experienced competent workers, familiar with materials and techniques specified. Submit evidence of experience on request.

Performance

1.4 FIXINGS, WIND
Design and use the fixings to the manufacturer's requirements.

Provide evidence that the systems will comply with the existing standards of performance.

1.5 SOUND AND FIRE RATING REQUIREMENTS
Provide evidence that the systems will comply with the existing standards of performance.

1.6 BRACING REQUIREMENTS
Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials

2.1 RIGID SHEATHING/AIR BARRIER
To AS/NZS 2908.2. Fibre cement autoclaved sheet, 4.5mm to 6mm thick, face and edge sealed. Suitable for residential buildings to NZBC E2/AS1: 9.1.4 **Barriers to Airflow**.

2.2 WALL UNDERLAY
Refer to 4161 UNDERLAYS AND BARRIERS section.

2.3 EXTERIOR CAVITY WALL BATTENS
Refer to 3820 CARPENTRY section.

2.4 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING
Perforated aluminium or stainless steel trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.5 MEDIUM DENSITY SHEETS
To AS/NZS 2908.2. Medium density, fibre cement autoclaved sheet, with square edges and one sanded face.
Thickness: 9mm

2.6 FLUSH JOINTED CLADDING SHEETS
To AS/NZS 2908.2. Fibre cement autoclaved sheet, with rebated edges both sides and one end, and a smooth sanded face. Tinted.

2.7 CLADDING SHEETS
To AS/NZS 2908.2. Fibre cement autoclaved sheet with arrised square edges and un-sanded face.

2.8 FIBRE CEMENT RIGID BACKING
Treated cellulose fibre in a matrix of cement and sand autoclaved sheet, 4.5mm thick, tinted.

2.9 FIBRE CEMENT WEATHERBOARD
To AS/NZS 2908.2. Fibre cement autoclaved weatherboards.

Components

2.10 SCREWS FOR TIMBER
For timber framing, countersunk Phillips-head stainless steel. Refer to the sheet manufacturer's technical literature for selection and use requirements.

2.11 SCREWS FOR STEEL
For steel framing, countersunk Phillips-head stainless steel self drilling, self tapping, gauged to suit thickness of steel. Refer to the sheet manufacturer's technical literature for selection and use requirements.

2.12 GALVANIZED NAILS
Galvanized 40mm/50mm x 2.8mm flathead minimum head diameter 6.8mm. Refer to the sheet manufacturer's technical literature for selection and use requirements.

2.13 STAINLESS STEEL NAILS
316 stainless steel 40mm x 2.8mm flathead minimum head diameter 6.8mm. Refer to the sheet manufacturer's technical literature for selection and use requirements.

2.14 HORIZONTAL SOCKET JOINTER
An aluminium socket strip, adhesive sealant bonded to the top of the compressed medium density sheet to the manufacturer's details.

2.15 HORIZONTAL JOINTER
A one-piece uPVC or aluminium jointer supplied by the sheet manufacturer.

2.16 VERTICAL JOINTER
A composite jointer formed from a 50mm or 80mm wide butyl rubber sheet and dual compressible sealant strips, to the sheet manufacturer's details.

2.17 PANEL JOINTERS
Extruded uPVC or aluminium supplied by the sheet manufacturer to suit the selected panel texture.

2.18 SUBSTRATE BOARD TRIM
PVC base mould, control joint mould, spacer angles and horizontal flashings, sealing tape. Refer to the sheet manufacturer's technical literature for selection and use requirements.

Accessories

2.19 SEALING STRIPS
Butyl rubber and/or compressible sealing strips. Refer to the sheet manufacturer's technical literature for selection and use requirements.

2.20 SEALANT
Silicone or polyurethane sealant. Refer to the sheet manufacturer's technical literature for selection and use requirements.

2.21 WINDOW FLASHING TAPE
Window flashing tape to manufacturer's requirements.

2.22 INSULATION FIRE AND SOUND SYSTEMS
Insulation from the fibre cement sheet manufacturer to meet fire or sound system requirements.

Flush finish joint system

2.23 JOINT FINISHING COMPOUND - CLADDING SYSTEM
Reinforced jointing and filling compound specifically part of the cladding system, compatible with the subsequent exterior coatings.

2.24 JOINT FINISHING COMPOUND - EXTERIOR COATING SYSTEM
Reinforced jointing and filling compound specifically part of the exterior coating system, compatible with the substrate panels.

3. EXECUTION

Conditions

3.1 STORAGE
Take delivery of sheets dry and undamaged in pallets and lay horizontally on a smooth level surface. Protect edges and corners from damage and cover to keep dry until fixed.

3.2 HANDLING
Avoid distortion and contact with potentially damaging surfaces. Do not drag sheets across each other, or across other materials. Protect edges, corner and surface finish from damage.

3.3 SUBSTRATE
Do not commence work until the substrate is of the standard required by the sheet manufacturer for the specified finish; plumb, level and in true alignment. Moisture content of timber framing to NZS 3602 moisture content maximums, to minimise shrinkage and movement after sheets are fixed.

Application - particular installations

3.4 THERMAL BREAK
Install insulation strips to steel framing, strictly in accordance with the sheet manufacturer's requirements.

3.5 FIRE RESISTANCE RATING
Fix sheets and other items in accordance with the manufacturer's technical information. Form and treat perimeters of openings and penetrations in the elements to ensure the specified performance.

3.6 SOUND RATING
Fix sheets and other items in accordance with the manufacturer's technical information. Form and treat perimeters of openings and penetrations in the elements to ensure the specified performance. Ensure absence of adjoining leak paths.

3.7 BRACING SYSTEM
Ensure required framing straps, anchors, angle braces are in place.
Fix sheets in accordance with the manufacturer's technical information.

Application - generally

3.8 FIXING RIGID SHEATHING/AIR BARRIER
Fit and fix fibre cement sheets to NZBC E2/AS1: 9.1.4 **Barriers to Airflow**, and the manufacturer's requirement with sheets and trim all in plumb, true alignment and face.

3.9 FIX WALL UNDERLAY
Refer to 4161 UNDERLAYS AND BARRIERS section.

3.10 INSTALL DRAINED CAVITY
Refer to 3820 CARPENTRY section.

3.11 PENETRATIONS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- wall/cladding underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- cladding neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

Refer to the WANZ Installation Guide.

3.12 INSTALL MEDIUM DENSITY SHEETS
Cut edges dry, drill for screws and form holes to the sheet manufacturer's requirements. Adhesive seal the aluminium socket strip to the top of sheets to form horizontal socket joints. Tack vertical joint sealing strips to framing. Scribe and fit sheets with countersunk screws or nails, forming 10mm expressed vertical and horizontal joints, all as detailed by

the sheet manufacturer and on the drawings. Horizontal socket joint to overlap the vertical sealing strips, to the manufacturer's required detail.

3.13 INSTALL FLUSH CLADDING SHEETS
Cut sheets dry, form holes and work sheets to the sheet manufacturer's requirements. Fit butyl rubber sealing strips behind joints as required, before scribe fitting and nailing sheets to all framing. Fit control joints at 5.4 metre maximum centres to limit flush areas to 25 m² and vertical structural expansion joints at 14.4 metre centres maximum. Finalise location and form of control and expansion joints on site before commencing cladding work.

3.14 INSTALL CLADDING SHEETS
Cut sheets dry, form holes and work sheets to the sheet manufacturer's requirements. Fit and nail sheets to all framing, with all joints fully supported, progressively installing PVC jointers to vertical joints, PVC flashings to horizontal joints and capping moulds to any exposed edges.

3.15 INSTALL FIBRE CEMENT RIGID BACKING
Install to NZBC E2/AS1, 9.3.6 Rigid plaster backings, and the rigid backing manufacturer's requirements, including expansion joints and control joints as required.

3.16 INSTALL WEATHERBOARDS
Cut weatherboards to required lengths and scribe fit to fully support all edges and joints. Fit concealed soakers, internal corners and sponge rubber closure strips and fix weatherboards in accordance with the weatherboard manufacturer's requirements. Fit and fix external corners and joint soakers as required. Fit metal internal corner flashings in accordance with NZBC E2/AS1, 9.5.3.4 **Internal corners** Fig 89.

Completion

3.17 REPLACE
Replace all damaged or marked elements.

3.18 LEAVE
Leave work to the standard required for following procedures.

3.19 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4239 SOFFIT CLADDING

1. GENERAL

This section relates to the supply and fixing of cladding to the underside of exterior soffits, verges and eaves and includes:

- Fibre cement sheet
- Plywood
- Timber board
- Jointers
- Trim.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
AS/NZS 1604.3	Specification for preservative treatment - Plywood
AS/NZS 2269.0	Plywood - structural - Specifications
AS/NZS 1170.2	Structural design actions - Wind actions
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring
NZS 4251.1	Solid plastering: Cement plasters for walls, ceilings and soffits

Requirements

1.2 QUALIFICATIONS

Workers / Installers / applicators to be experienced, competent trades people familiar with the materials and techniques specified.

1.3 HEALTH AND SAFETY

Comply with all manufacturer/supplier and WorkSafe New Zealand requirements for health and safety.

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

2. PRODUCTS

Fibre cement soffit cladding

2.1 FIBRE CEMENT SOFFIT CLADDING

Fibre cement soffit cladding, manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2.

2.2 FLUSH JOINTED FIBRE CEMENT SOFFIT CLADDING

Fibre cement soffit cladding with recessed edges for flush jointing. Manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2.

2.3 PRE-FINISHED FIBRE CEMENT SOFFIT CLADDING
Fibre cement soffit cladding, manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2. Pre-finished to exposed face.

2.4 IMITATION TONGUE AND GROOVE FIBRE CEMENT SOFFIT CLADDING
Fibre cement soffit cladding with grooved face to imitate TG&V timber appearance. Manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2.

2.5 NAILS - GALVANIZED
Hot-dip galvanized nails for fibre cement sheet as required by Manufacturer's / supplier's documents.

2.6 NAILS - STAINLESS STEEL
316 Stainless steel nails for fibre cement sheet as required by Manufacturer's / supplier's documents.

2.7 SCREWS - STAINLESS STEEL
Stainless steel screws for fibre cement sheet as required by Manufacturer's / supplier's documents.

2.8 PROPRIETARY FASTENERS
Proprietary nylon insert fasteners for use with pre-finished fibre cement soffit cladding.

2.9 ADHESIVE
Adhesive for fibre cement sheet, used in conjunction with mechanical fixings, as required by Manufacturer's / supplier's documents.

Fibre cement soffit cladding - Components

2.10 SOFFIT JOINTERS
Extruded uPVC jointer.

2.11 CAPPING MOULDS
Extruded uPVC capping mould.

2.12 SCOTIA MOULDS
Extruded uPVC scotia mould.

Flush finished fibre cement soffit cladding - Components

2.13 CORNER ANGLE
Extruded uPVC jointer corner angle.

2.14 CONTROL JOINT
Extruded uPVC jointer control joint.

2.15 JOINT REINFORCING TAPE
Perforated paper tape as required by Manufacturer's / supplier's documents.

2.16 JOINTING COMPOUND
Proprietary jointing compounds as required by Manufacturer's / supplier's documents.

Fibre cement - Accessories

2.17 TIMBER BATTENS
Refer to 3820 CARPENTRY section.

2.18 FLASHING TAPES
Single sided medium density closed cell PVC foam tape, with pressure sensitive acrylic adhesive on one side of tape. Tape thickness and width to manufacturer's technical literature.

2.19 SEALANT
Facade sealant or similar. Refer to the sheet manufacturer's technical literature for selection and use requirements.

2.20 SEALER
For jointed systems, seal all sheet edges prior to fixing.

Flush jointed fibre cement soffit cladding - Accessories

2.21 ACRYLIC SEALER
Acrylic sealer to site cut and site recessed sheet edges.

2.22 WATERPROOFING ADMIXTURE
Waterproofing admixture to control moisture suction prior to stopping, as required by Manufacturer's / supplier's documents.

Plywood soffit cladding

2.23 PLYWOOD SOFFIT CLADDING
Rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3 to AS/NZS 1604.3.

2.24 GROOVED PLYWOOD SOFFIT CLADDING
Proprietary plywood rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3.1 LOSP to AS/NZS 1604.3. Provided with parallel "V" grooves running the length of the sheet, to provide an imitation tongue and groove appearance. Plywood manufactured for use as an external soffit cladding.

2.25 APPEARANCE GRADE PLYWOOD SOFFIT CLADDING
Rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3.1 LOSP to AS/NZS 1604.3.

Plywood soffit cladding fastener

2.26 NAILS - GALVANIZED
Refer to the plywood cladding manufacturer's requirements. Use annular grooved or twisted shank nails for soffit cladding.

2.27 NAILS - STAINLESS STEEL
Refer to the plywood cladding manufacturer's requirements. Use annular grooved or twisted shank nails for soffit cladding.

2.28 SCREWS - STAINLESS STEEL
Refer to the manufacturer's requirements for size and use; galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

2.29 ADHESIVE
Adhesive for plywood soffit cladding, used in conjunction with mechanical fixings, as required by Manufacturer's / supplier's documents.

Plywood soffit cladding edge treatment

2.30 PLYWOOD CUT EDGE TREATMENT
A solution of 12.5% copper naphthenate in white spirits, or mineral turpentine.

Timber board soffit cladding

2.31 TIMBER BOARD
Timber board in long lengths to profile detailed, with species and grading to the requirements of NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance. Select appearance grades to NZS 3631 requirements, to match existing.

2.32 TONGUE AND GROOVE TIMBER BOARD SARKING
Tongue and groove timber board profile as detailed, in long lengths with species and grading to the requirements of NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance. Select appearance grades to NZS 3631 requirements, to match existing or replace with fibre cement soffit cladding for decayed timber.

Refer 3897 DECAYED TIMBER AND INFESTATION section for timber decay.

2.33 SHIPLAP WEATHERBOARDS
Shiplap timber weatherboard profile as per NZS 3617 or as detailed. In long lengths with species and grading to the requirements of NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance. Select appearance grades to NZS 3631 requirements, to match existing.

Timber board soffit cladding fasteners

2.34 NAILS - GALVANIZED
Galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

2.35 NAILS - STAINLESS STEEL
Galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

2.36 SCREWS - STAINLESS STEEL
Galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

Timber profiles

2.37 TIMBER COVER BATTENS
To profiles detailed/scheduled with 6x6 mm weather grooves. Species and grading to the requirements of NZS 3602 , table 2, Requirements for wood-based building components to achieve a 15-year durability performance, treated H3.1 unless durable heart wood., Select appearance grades to NZS 3631 requirements, but with all knots excluded.

2.38 TIMBER TRIM
18 x 18 mm timber trim with 6 mm minimum chamfer to internal corner. Species and grading to the requirements of NZS 3602 , table 2, Requirements for wood-based building components to achieve a 15-year durability performance, treated H3.1 unless durable heartwood. Select appearance grades to NZS 3631 requirements, but with all knots excluded.

2.39 DECORATIVE TIMBER TRIM
To profiles detailed/scheduled. Species and grading to the requirements of NZS 3602 , table 2, Requirements for wood-based building components to achieve a 15-year durability performance, treated H3.1 unless durable heartwood. Select appearance grades to NZS 3631 requirements, but with all knots excluded.

2.40 DECORATIVE EAVES BRACKET
To profiles detailed/scheduled. Species and grading to the requirements of NZS 3602 , table 2, Requirements for wood-based building components to achieve a 15-year durability performance, treated H3.1 unless durable heartwood. Select appearance grades to NZS 3631 requirements, but with all knots excluded.

Flashing

2.41 SOFFIT CLADDING/WALL CLADDING JUNCTION FLASHING
Flashing as detailed with minimum 50 mm return behind soffit cladding and 35 mm cover to wall cladding, complete with hook and kick-out.

3. EXECUTION

Conditions

3.1 STORAGE FIBRE CEMENT
Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage, cover to keep dry until fixed.

3.2 STORAGE PLYWOOD SHEET
Store sheets in stacks clear of the ground, supported flat and true, without sagging on evenly spaced horizontal bearers. Protect from damage and weather.

3.3 STORAGE TIMBER PRODUCTS
Take delivery of timber, dry, unmarked and undamaged. Store on site, laid flat and true under cover.

3.4 HANDLING
Avoid distortion and contact with potentially damaging surfaces. Do not drag sheets across each other, or across other materials. Protect edges, corner and surface finish from damage. Reject all product with damaged faces or edges

3.5 SUBSTRATE
Do not commence work until the substrate is of the standard required for the specified finish; level and in true alignment. Moisture content of timber framing must not exceed the requirements specified by NZS 3602 to minimise shrinkage and movement after soffits are fixed.

3.6 MOISTURE CONTENT TIMBER BOARD
Immediately before starting fixing, test the moisture content of the boards. Use an electrical moisture meter to test 5% of boards, but not less than 10 boards in the centre of the length. Do not start fixing until 90% of the values obtained are within the range in NZS 3602 table 4, Allowable moisture content (%) at time of installation.

3.7 PLYWOOD CLADDING SUPPORT
Fully support all edges and joints.

3.8 EXPANSION PLYWOOD CLADDING
Provide 2-3mm gap at all edges of cladding for sheet expansion.

3.9 PLYWOOD CUT EDGE TREATMENT
Brush on surface treatment to all edges of plywood cut after treatment.

3.10 SEAL FIBRE CEMENT SHEET EDGES
Seal site cut sheet edges prior to installation. Seal sheet edges around penetrations.

3.11 PENETRATIONS
Form small holes to accommodate penetrations through the soffit as per the method detailed in the sheet manufacturer's technical literature.

Application - fire rated soffits

3.12 FIRE RESISTANCE RATING, FIBRE CEMENT SOFFIT CLADDING
Install fibre cement soffit cladding as part of an overall fire rated wall/soffit construction, to the drawn details and the manufacturer's requirements.

Install fibre cement sheets

3.13 SHEET LAYOUT
All sheet edges must be supported by framing and/or rebates in fascia and barge boards.

3.14 INSTALL SOFFIT CLADDING - JOINTERS AND CAPPING MOULDS
Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method. Ensure all edges and joints are fully supported. Insert uPVC jointers and capping moulds to manufacturer's requirements. Fix sheets complete with jointers and capping moulds. Refer to manufacturer's installation manual.

3.15 INSTALL SOFFIT CLADDING - EXPRESSED JOINTS
Cut sheets dry using score and snap method or hand guillotine. Ensure all edges and joints are fully supported. Install inseal sealing strip to framing at expressed joint locations. Fix sheets complete with required gap to form expressed joint detail. Refer to manufacturer's installation manual.

3.16 INSTALL FLUSH FINISHED SOFFIT CLADDING
Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method. Seal site cut and site recessed sheet edges with acrylic sealer. Ensure all edges and joints are fully supported. Fit expansion/control joints as detailed and as required by fibre cement sheet manufacturer's requirements. Flush joints with proprietary Base Coat, paper reinforcing tape and proprietary top coat to required flush finish. Refer to manufacturer's installation manual.

3.17 INSTALL PRE-FINISHED FIBRE CEMENT SOFFIT CLADDING
Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method. Ensure all edges and joints are fully supported. Install as per the pre-finished fibre cement manufacturer's requirements with adhesive, proprietary fixings and mechanical fasteners as required.

3.18 INSTALL IMITATION TONGUE AND GROOVE FIBRE CEMENT SOFFIT CLADDING
Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method Ensure all edges and joints are fully supported. Butt joint short ends of cladding (cut square and form chamfer to match) and align to provide continuation of grooved profile line. Install as per the pre-finished fibre cement manufacturer's requirements.

3.19 FIBRE CEMENT CLADDING CONTROL JOINT
Install control joint to fibre cement sheet manufacturer's requirements.

3.20 FIBRE CEMENT CLADDING FASTENER - SIZE AND LAYOUT
Fix sheets to framing using fixings and fixing methods to manufacturer's requirements.

3.21 SEALANTS - FIBRE CEMENT
Application and use of sealants to manufacturer's instructions. Check with sealant manufacturer prior to coating over sealants.

3.22 PAINTING - FIBRE CEMENT
Refer to painting section/s for protective coating system.

Install plywood sheets

3.23 EXECUTION
Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.24 PLYWOOD EDGE TREATMENT
Treat cut edges of plywood with edge treatment solution before fixing.

3.25 PLYWOOD SEALING
Seal cut edges of plywood before fixing with primer or sealer to suit the surface finish being used.

3.26 FIXING PLYWOOD SOFFIT CLADDINGS
Fit and fix to E2/AS1, 9.8 **Plywood sheet** and the plywood manufacturer's requirements with sheets and trim in square, true alignment and plane. Allow a 2-3 mm expansion gap between square edge sheets.

3.27 GROOVED PLYWOOD SOFFIT FIXINGS
Fit and fix to E2/AS1, 9.8 **Plywood sheet** and the plywood manufacturer's requirements with sheets and trim in square, true alignment and plane. Ensure alignment of grooves between adjacent sheets.

3.28 FIXING NAILS - PLYWOOD PAINT FINISH
Punch nails before finishing and apply a first coat of selected primer or sealer to suit the surface finish being used.

Install timber board soffit cladding

3.29 FIXING SHIPLAP WEATHERBOARDS AS SOFFIT CLADDING
Adjust set-out to ensure there is a 2mm expansion gap between successive boards. Using full length boards only, clench nail tongue to every fixing point. Nail other side of board just clear of lap.

3.30 FIXING SOFFIT BOARD
Using full length boards only, nail from the centre of the board width (nogs at 480mm centres). Nail the batten with a single fixing through the gap between boards at every fixing point.

3.31 FIXING TONGUE AND GROOVE SARKING
Using full length sarking as soffit cladding.

3.32 SCARF JOINTS
Where possible run boards/sarking full length. If this is not possible, provide scarf joints over framed support.

3.33 FIXING, PAINT FINISH
Prime all cut ends before fixing. Drill all fixings located within 25mm of board ends. Punch all fixings.

Install timber profiles

3.34 EXECUTION
To NZS 3604, except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.35 TIMBER TRIM
Using full lengths, scribe internal joints and mitre external and running joints. Fully support all joints and fix securely and true to line and face, fully nailed. Paint finish prime joint edges before fixing.

3.36 TIMBER COVER BATTENS
Using full lengths, scribe internal joints and mitre external and running joints. Fully support all joints and fix securely and true to line and face, fully nailed. Paint finish prime joint edges before fixing.

3.37 DECORATIVE EAVES BRACKET
Fix securely, plumb, level and true to line and face, fully nailed. Paint finish prime joint edges before fixing.

3.38 NAILING, PAINT FINISH
Punch nails and patch prime external trim being painted, before stopping as specified under painting preparation.

Completion

3.39 COMPLETE
Ensure the work is complete with all components, accessories, finishings and trim properly installed so the soffit cladding system is completely weathertight.

3.40 REPLACE
Replace all damaged or marked elements.

3.41 LEAVE
Leave work to the standard required for following procedures.

3.42 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4241 PROFILED METAL CLADDING

1. GENERAL

This section relates to the supply and fixing of proprietary overlap rigid sheet profiled metal wall cladding complete with accessories.

1.1 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS7	Protection from fire
NZBC E2/AS1	External moisture
AS/NZS 1170.2	Structural design actions - Wind actions
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 3566	Self-drilling screws for the building and construction industries
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions against materials failure.

15 years:	For failure of coating adhesion
15 years:	For weatherproofing by material penetration
Form:	Cladding manufacturers standard form

Requirements

1.4 WARRANTY - INSTALLER/APPLICATOR

Warrant this work under normal environmental and use conditions against weatherproofing failure.

5 years:	From the date of completion
Form:	Metal wall cladding installer's standard form

Include a copy of the cladding manufacturers' maintenance requirements with the warranty.

Refer to the general section 1237 WARRANTIES - INSTALLER/APPLICATOR for additional requirements.

1.5 QUALIFICATIONS

Carry out the cladding work with experienced, competent installers familiar with the products being used and preferably with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding. And for Restricted Building Work shall also be, a LBP or supervised by a LBP.

Performance

1.6 PERFORMANCE
Install cladding materials and associated flashings and accessories to form a weathertight and durable system for the completed cladding system, including all penetrations through the walls and junctions with roofs and parapets.

1.7 SPREAD OF FIRE
To NZBC C/AS1-AS7, 5.8.2 a) **Exterior surface finishes**.

PERFORMANCE

1.8 WIND DESIGN
Provide evidence that the systems will comply with the existing standards of performance.
- Non specific design installation to the wind zone parameters of NZS 3604, table 5.4.
- Specific design installation to the wind pressure parameters of AS/NZS 1170.2.

2. PRODUCTS

Materials

2.1 EXTERIOR CAVITY WALL BATTENS
Refer to 3820 CARPENTRY section.

2.2 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING
Perforated aluminium trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.3 GALVANIZED STEEL, UNPAINTED
Formability steel sheet, G550 for roll forming or for flashings, coated to AS 1397.
Profile to suit environmental conditions and to match existing:
- Coating class:ZM 275

- BMT 0.55mm

2.4 PRE-FINISHED ALUMINIUM/ZINC ALLOY COATED STEEL
Formability G550 steel sheet coated to AS 1397.
Profile, coating and colour to suit environmental conditions and to match existing:
- Coating class: AZ 150
- BMT 0.55mm

2.5 FASTENERS GENERALLY
Minimum Class 4 and durability not less than the roofing material being fixed. Screw fasteners to be head stamped identifying the manufacturer and class.

2.6 FIXING CLIPS
Galvanized steel (powder coated for aluminium) to suit the material and profile of the rigid sheet and location as required by the cladding manufacturer. Fix to steel with 16mm x 10 gauge galvanized wafer head self-drilling screws and to timber with 50mm long x 4.5mm galvanized spiral rolled flat head nails.

2.7 FIXING SCREWS
To AS 3566. To comply with AS 3566. Screws appropriate to the cladding material and the supporting structure, as required by the cladding manufacturer and with a durability no less than the material fixed. Screws into timber to penetrate by minimum 30mm.

2.8 RIVETS
Sealed aluminium, minimum diameter 4mm for use with zinc coated cladding.

Components

2.9 FLASHINGS GENERALLY
Material, grade and colour to match existing. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

2.10 FLASHINGS
To NZBC E2/AS1, 4.0 **Flashings**. Formable grade 0.55mm BMT for galvanized, aluminium/zinc-coated steel to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.11 WALL AND PARAPET FLASHINGS
To NZBC E2/AS1, 4.0 **Flashings**. Supplied by the cladding manufacturer to match or to suit the cladding.

Accessories

2.12 SEALANT
Neutral curing MS silicone or MS polymer sealant as required by the cladding manufacturer and used as directed.

2.13 CLOSURE STRIPS
Non-bituminous compressible, profiled foam strips to fit the sheet profile.

2.14 LAP SEALING TAPE
Closed cell self adhesive nitrile tape.

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the wall framing and supporting structure to ensure that it is complete and fully braced ready for cladding.

3.2 FRAMING TIMBER MOISTURE
When continuous metal cladding etc. Runs along a long continuous timber member and is directly fixed to it, the timbers equilibrium moisture content (EMC) to be 18% or less. For flashings in this situation (sometimes called transverse flashings) the framing EMC to be maximum 16%, and preferably as low as 12%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.3 STORAGE
Take delivery of and accept packs of cladding undamaged on delivery. Reject all damaged material. Store on a level firm base with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets. If sheet packs become wet, fillet or cross stack to allow air movement between sheets.

3.4 HANDLING
Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage.

3.5 SEPARATION
Isolate dissimilar materials in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials. Do not use unpainted lead sheet or copper in contact with or allow water run-off onto galvanized and aluminium/zinc-coated metals.

Application

3.6 SET-OUT
Set cladding to vertical plumb lines and maintain verticality. Set all exposed fixings with horizontal string lines. Carefully set out sheets with side laps away from the main line of sight, and with the widths of end sheets the same. Check during fixing to eliminate creep or spread and to keep fastenings in line.

3.7 AVOID END LAPS
End laps are not permitted, except where specifically detailed.

3.8 MOVEMENT JOINTS
Fixing and jointing to conform with the cladding manufacturer's requirements for thermal movement.
Over timber framing, transverse flashings (those running along continuous framing members) to have expansion joints at maximum 12m centres.

3.9 FIXING GENERALLY
Install and fix in accordance with the NZMRM CoP, and to the cladding manufacturer's required fixing patterns and details for each area of the building cladding. Use only screws as required by the cladding manufacturer. Paint colour matched fixings and accessories before installation.

3.10 INSTALL DRAINED CAVITY
20mm nominal thickness drained cavity to NZBC E2/AS1: 9.0 Wall claddings, where required. Fix vertical cavity battens to wall framing studs and provide a separation strip of metal cladding underlay over batten. The battens are fixed by the cladding fixings which will penetrate the wall framing studs over the wall underlay. Install cavity closer/vermin-proofing at base of wall, open horizontal (or raking) junctions and over openings (windows, meters etc).

3.11 PENETRATIONS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- wall/cladding underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

Refer to the WANZ Installation Guide.

3.12 MARKING AND CUTTING
Cut only by shearing tools. Do not use black lead pencils for marking aluminium/zinc coated products.

3.13 FIX SHEETS
Fix sheets in place using the fastening system required by the manufacturer of the specified profiled metal cladding, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.14 INSTALL FLASHINGS
Flash to penetrations, cap corners and edges, using sealant and rivets to detail, to the cladding manufacturer's requirements and to NZBC E2/AS1.

3.15 COMPLETE
Ensure the work is complete with all flashings, finishing and trim properly installed so the cladding system is completely weathertight.

3.16 SEPARATION
Separate metal sheeting from CCA treated timber with wall underlay or other suitable isolation material.

Completion

3.17 REPLACE
Replace all damaged or marked elements.

3.18 LEAVE
Leave this work complete with all necessary flashings and capping all properly installed as the work proceeds so the finished cladding is completely weathertight.

3.19 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4261 BRICK VENEER CLADDING

1. GENERAL

This section relates to clay brickwork as a veneer cladding.
It includes:

- Standard brick veneer cladding
- Proprietary two storey brick veneer system
- Solid fuel brick fireplaces.

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following definitions apply specifically to this section:

- Proprietary system for two storey clay brick veneer construction as contained in BRANZ Appraisal 690 - Two Storey Brick Veneer System.

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC B1/AS3	Structure
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 2699.1	Built-in components for masonry construction - Wall ties
AS/NZS 2699.3	Built-in components for masonry construction - Lintels and shelf angles (durability requirements)
AS/NZS 2918	Domestic solid fuel burning appliances - Installation
NZS 3103	Sands for mortars and plasters
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: materials and workmanship
SNZ HB 4236	Masonry veneer wall cladding
AS/NZS 4455	Masonry units and segmental pavers
BRANZ Appraisal 690	Two Storey Brick Veneer System
BRANZ	Good practice guide: Masonry veneer

Requirements

1.3 QUALIFICATIONS
Bricklayers to be experienced, competent and familiar with the materials and the techniques specified.
All work to be installed or supervised by a Registered Mason or licensed building practitioner (LBP): Licensed for Bricklaying and Blocklaying 1: Brick/masonry Veneer.
RBW must be supervised by an LBP.

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.5 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Compliance information

1.6 INFORMATION REQUIRED FOR CODE COMPLIANCE
Provide the following compliance documentation:
- Producer Statement Construction from the installer of Two Storey Brick Veneer System.

Performance

1.7 SEISMIC DESIGN
Provide evidence that the systems will comply with the existing standards of performance.
- Non specific design installation to the seismic parameters of NZS 4210 Masonry construction: materials and workmanship.
- Specific design installation to the seismic parameters of NZS 1170.5.

1.8 COMPLIANCE
Brickwork to comply with SNZ HB 4236 Masonry veneer wall cladding.

1.9 COMPLIANCE - TWO STOREY BRICK VENEER SYSTEM
Brickwork to comply with BRANZ Appraisal 690 - Two storey brick veneer system

2. PRODUCTS

Materials

2.1 CLAY BRICKS
To AS/NZS 4455, to match existing. Reuse of fire bricks are not permitted.

2.2 SILL TILES
Unglazed clay brick type to match existing.

2.3 STEEL LINTELS
To AS/NZS 2699.3. Sections to be minimum hot dip galvanised after fabrication to comply with NZBC E2/AS1.

2.4 VERMIN STOP
Galvanized hexagon 10mm mesh of 1mm diameter steel wire 100mm wide, complete with galvanized steel staples.

2.5 DAMP-PROOF COURSE
Polyethylene based strip used as a damp-proof course and flashing, also for slip joints between brick courses.

Components - standard brick veneer

2.6 WALL TIES
To AS/NZS 2699.1. Veneer ties screw fixed to framing.

2.7 REINFORCEMENT
Galvanised wire joint reinforcement

Components - two storey brick veneer system

2.8 TIMBER SUPPORT PLATE
To BRANZ Appraisal 690 Two Storey Brick Veneer System clauses 8.16 - 8.18, H3.2 treated.

2.9 METAL TIES
To AS/NZS 2699.1. Veneer metal ties screw fixed to framing.

2.10 REINFORCEMENT
Galvanized wire joint reinforcement.

Accessories

2.11 SAND FOR MORTAR
To NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand.

2.12 MORTAR
Composed of Portland cement, sand and water with an admixture to the provisions of NZS 4210: 2.2 Mortar. Obtain written approval of admixture being used. Use hydrated lime in the mortar or an admixture to the mortar manufacturer's specification.

2.13 MORTAR COLOUR
Add mineral oxide pigment conforming to requirements of NZS 4210, clause 2.2.2.2(f), to the mortar manufacturer's specification, colour to match existing.

2.14 ADMIXTURES
To NZS 4210.

2.15 WATER
Clean, fresh and free from excess alkali, salt, silt and organic materials.

3. EXECUTION

Conditions

3.1 TOLERANCES
To NZS 4210, table 2.2 Maximum tolerances.

3.2 HANDLING AND STORAGE OF MATERIALS
To NZS 4210 for aggregates, cement, bricks and reinforcement.

3.3 CONCRETE BASE
Check vertical and horizontal alignment. Any discrepancies exceeding the permitted tolerances shall be corrected before units are laid.

3.4 TIMBER FRAMING
Check timber framing stud spacing is in accordance with NZS 3604.
Check buildings with specific engineering design are in accordance with AS/NZS 1170.

3.5 TIMBER FRAMING - TWO STOREY BRICK VENEER SYSTEM
Check timber framing is minimum 90mm x 45mm at 400mm centres.

3.6 PENETRATIONS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the brick veneer. Required preparatory work includes the following:

- brick veneer wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- brick veneer neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.7 MEASURE MATERIALS
Measure materials for mortar accurately by weight or volume using suitably calibrated equipment.

3.8 WET WEATHER
Keep bricks dry at all times prior to laying. Protect the top row of uncompleted brick walls. Protect freshly laid brickwork during interruption through rain and at completion of each day's work. Protect brickwork for a minimum of 6 hours.

3.9 COLD WEATHER CONSTRUCTION
When air temperature is below 5°C take the precautions required by NZS 4210: 2.18 Cold weather construction.

3.10 HOT WEATHER CONSTRUCTION
When air temperature is above 25°C or there is a drying wind, or lower temperatures, take the precautions required by NZS 4210: 2.19 Hot weather construction.

3.11 KEEP FACE WORK CLEAN
Keep clean during erection and until completion of the contract works. Turn back scaffold boards at night and during heavy rain. Do not rub face work to remove stains.

Installation - general

3.12 COLOUR MIXING
Check all bricks delivered to site for colour variation, prior to commencing work. Ensure bricks are thoroughly blended from several pallets to ensure an even colour spread throughout the work. Distribute fireplace facing bricks of varying colour for random appearance without patches or stripping.

3.13 UNIFORMITY
Carry up work with no portion more than 1500mm above another at any time, raking back between levels.

3.14 BONDING
Lay bricks to the required bonding in the various locations, fireplace bricks laid in half bond or to match existing.

3.15 PROVIDE WEEPHOLES
Provide weepholes at the bottom of cavities and cells to SNZ HB 4236 and NZBC E2/AS1, 9.2.6, **Cavities**, and as necessary to drain moisture to the outside air. Provide vent gap at the top of the veneer.

3.16 INSTALL VERMIN STOP
Fold and staple one edge of the mesh to the substrate and with the mesh sloping outwards, set the other edge half the thickness of the veneer or 50mm, whichever is less, into the mortar joint.

3.17 CAVITY VENTILATION
Ventilate to outside air with top and bottom openings to the requirements of SNZ HB 4236 and NZBC E2/AS1, 9.2.6, **Cavities**. Seal cavity off from roof space.

3.18 CAVITY BRICKWORK BELOW GROUND
Fill all cavities below finished grade with concrete. Place a continuous damp-proof course within the first three mortar joints above ground. Seal the face of all brickwork below ground.

3.19 FORM OPENINGS
Unless detailed otherwise form openings to typical details from BRANZ Masonry veneer - Good practice guide.

3.20 SEPARATION JOINTS
Provide for wall movements of veneer with control joints to NZS 4210: 2.10 Methods of controlling wall movements. Weatherproof as necessary.

3.21 FORM REVEALS
Form lintels, jambs and sills as detailed complete with flashings and all ready for following work.

3.22 HEAD FLASHINGS
Provide a flexible flashing extending 200mm beyond ends of the opening and sloping to weepholes over all openings in cavity walls, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.23 JAMB FLASHINGS
Provide a flexible flashing to jambs of openings in cavity walls, fully lapped with horizontal damp-proof courses at head and sill, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.24 SILL FLASHINGS
Provide a flexible flashing under jointed sills, turned up at back and ends, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.25 REBATE DAMP PROOFING
Provide damp-proof course to stepped rebates supporting brick veneer in accordance with E2/AS1, 9.2.5, **Foundation support and damp-proofing**.

Installation - standard brick veneer

3.26 INSTALL LINTELS
Fit angle lintels to openings, sized to NZBC E2/AS1, 9.2.9, **Openings in masonry veneer** Table 18E and placed to NZBC E2/AS1, 9.2.9, **Openings in masonry veneer**.

3.27 CAVITY WIDTH
No cavity width less than 40mm or more than 75mm.

3.28 PLACE TIES
Place ties to:
- NZS 4210: 2.9.5 Tie anchorage, cover and fixing; and
- NZS 4210: 2.9.6 Placing of ties
- NZS 4210: 2.9.7 Tie classification and spacing
- NZBC E2/AS1, 9.2.7, **Wall ties,** for requirements, spacing, embedment, placement and materials.

At unsupported edges and at all openings through veneered walls or non-grouted cavity walls, wall ties to be provided.
At the top and bottom of the opening:
- Not more than 300mm or 2 courses, whichever is the smaller

At the sides of the opening or at an unsupported edge:
- Not more than 300mm
- Where the veneer wall continues above or is interrupted by a damp-proof course or waterproof membrane, wall ties shall be provided in each of the first two courses above the membrane.

Installation - two storey brick veneer system

3.29 INSTALL LINTELS
Install lintels for window and door openings in accordance with BRANZ Appraisal 690 - Two Storey Brick Veneer System and as follows:
- Traditional Steel Angle method - refer to section Steel Lintel Angles clause 8.15.

- Fixing Lintel Angles to the Supporting Frame method refer to section Supporting Bricks Above Roof Lines clause 8.12.
- Timber Lintel method, refer to section Steel-less Openings clauses 8.16, 8.17 and 8.18.
- Precast Reinforced Clay Lintels, refer to manufacturers details.

3.30 VENEER ON ANGLES OVER ROOF
Install shelf angles in accordance with BRANZ Appraisal 690 - Two Storey Brick Veneer System, refer to section Supporting Bricks Above Roof Lines clause 8.12.

3.31 VENEER ON ROOF FRAMING
Install shelf angles in accordance with BRANZ Appraisal 690 - Two Storey Brick Veneer System, refer to section Supporting Bricks Above Roof Lines clause 8.12.

3.32 CAVITY WIDTH
No cavity width less than 40mm or more than 60mm.

3.33 PLACE TIES
Place ties as follows:
Veneers up to 140kg/m² (70mm thick veneers):

- Horizontally - 400mm crs into studs
- Vertically - 400mm crs maximum
- Opening - Within 200mm of the edge of the all openings
- Shelf Angles - First row within 200mm of the shelf angle
- Foundation - First row within 400mm of the rebate.

Veneers between 140kg/m² and 180kg/m² (over 70mm thick veneers):If using EH (heavy duty) ties, then as above. If EM ties then as follows:

- Horizontally - 400mm crs into studs
- Vertically - 400mm crs into studs up to 3.0m from foundations, then 300mm crs max.

Note: If the positioning of ties is beyond the scope of BRANZ Appraisal 690 - Two Storey Brick Veneer System, then the placing of ties should be in accordance with NZS 4210.

Installation - fireplace work

3.34 SOLID FUEL BURNING APPLIANCE
Carry out the brick linings and hearth to the requirements of AS/NZS 2918, as detailed and to the manufacturer's recommendations.

3.35 FIREPLACE CONSTRUCTION
Foundations, firebox and chimney to NZBC B1/AS3 Structure small chimneys.
The fire back to be sloped and the throat to be no less than 115mm depth and no more than 140mm width and the finished height of the fire back to be 170mm above the underside of the lintel with the fire back sealed at the height of the lintel to from a shoot shelf. Hob to be 75mm height.
Refer 2110 DEMOLITION section for chimney removal.

3.36 LAY FIRE BRICKS
Replacement brickwork to be suitable for fitting of fire grate and ash tray. Lay fire bricks with fire mortar not more than 3mm thick, minimum 2mm correctly cured and not re-tempered. Rub and tap fire brick until fire mortar finishes with a full joint. Lay fire bricks flat at the back and leave the rear of the fire back untied, but fill the cavity with clean, fine aggregate, finishing the top with a 50mm coat of mortar. Replacement pointing existing brickwork to be retained rake out joints and point to match existing.
Refer 7556 SOLID FUEL SPACE HEATING SYSTEM section for fire grate and ash tray.

Installation - ancillary work

3.37 BUILD IN FIXINGS
Build in necessary fixing bricks or blocks for trims.

3.38 BUILD IN ELEMENTS
Build in sills, copings, lintels, steps and other elements using mortar similar to that in adjacent walls, mortar not more than 13mm thick and not less than 7mm thick and finishing the top corners with a coat of mortar.

3.39 BUILD IN DOORS AND WINDOWS
Build in door and window frames as the work proceeds and bed in mortar similar to that in adjacent work.

Completion

3.40 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.41 EFFLORESCENCE, WATER CLEANING
To remove deposits, brush with a stiff-bristle broom and take away brushings from the locality. Remove remaining deposit with a damp sponge. Wash wall thoroughly with a plentiful supply of clean water.

3.42 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4263 CONCRETE MASONRY VENEER CLADDING

1. GENERAL

This section relates to laying concrete masonry as a veneer cladding.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZS 1170.5	Structural design actions, - Earthquake actions - New Zealand
AS/NZS 2699.1	Built-in components for masonry - Wall ties
AS/NZS 2699.3	Built-in components for masonry - Lintels and shelf angles
NZS 3103	Sands for mortars and plasters
NZS 3109	Concrete construction
NZS 4210	Masonry construction: materials and workmanship
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units
BRANZ	Good Practice Guide: Masonry Veneer
CCANZ CP 01	Code of practice for weather-tight concrete and concrete masonry construction.

Requirements

1.2 SELECTED MASONRY
Select quality blocks to match existing.

1.3 QUALIFICATIONS

Carry out all masonry work with people competent and experienced in this type of work and familiar with the materials and the techniques specified.

All work to be installed or supervised by a Registered Mason or licensed building practitioner (LBP): Licensed for Bricklaying and Blocklaying 1: Brick/Masonry Veneer.. RBW must be supervised by an LBP.

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.5 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Performance

1.6 SEISMIC DESIGN
Provide evidence that the systems will comply with the existing standards of performance.

- Non specific design installation to the seismic parameters of NZS 4210 Masonry construction: materials and workmanship.
- Specific design installation to the seismic parameters of NZS 1170.5.

1.7 DESIGN PARAMETERS - SPECIFIC DESIGN
Minimum corrosion protection to NZBC E2/AS1, tables 18C and 18D, for exposure Zone B and Zone C and Zone D (NZS 3604 & NZS 4210) & Zone E (NZBC E2/AS1).

2. PRODUCTS

Materials

2.1 MASONRY
To AS/NZS 4455.1 with true and unblemished surfaces and arrises and from a single manufacturer.

2.2 LINTELS
To AS/NZS 2699.3.

2.3 METAL TIES
Metal ties of the required grade to suit the weight of the veneer wall, manufactured to AS/NZS 2699.1 and NZS 4210, 2.1.9 Wall ties.

2.4 DAMP-PROOF COURSE
Heavy duty polyethylene damp proof course.
Refer to 4161 UNDERLAYS AND BARRIERS section.

Accessories

2.5 SAND FOR MORTAR
Sand to comply with NZS 3103. Chloride levels not exceeding 0.04% by dry weight of sand.

2.6 MORTAR
To NZS 4210, 2.2 Mortar. Do not rework if not used within 1.5 hours of adding cement. A plasticiser may be used instead of lime.

Mix:	1: 0 - 0.25 : 3 - cement: hydrated lime: sandminimum
Strength:	12.5 MPa minimum
Bond strength:	200 kPaminimum

2.7 MORTAR COLOUR
Mineral oxide pigment conforming to requirements of NZS 4210, clause 2.2.2.2(f).

2.8 WATER
Clean, fresh and free from excess alkali, salt, silt and organic materials.

3. EXECUTION

Conditions

3.1 VENEER WORK
To NZBC E2/AS1, 9.2, **Masonry veneer**; NZS 4210, section 2.9, veneer and cavity wall construction and BRANZ Good practice guide: Masonry veneer.
Refer to NZBC E2/AS3 and CCANZ CP 01.

3.2 DETAILING
Carry out veneer construction to the details required by BRANZ Good practice guide: Masonry veneer and NZBC E2/AS1, 9.2, **Masonry veneer.**

3.3 STORAGE
Store masonry units clear of the ground, under cover and well ventilated until placed in the work.

3.4 TOLERANCES
Construct within the tolerances set out in NZS 4210, 2.6.5 Tolerances and 2.7 Laying the units. Lay masonry with jointing of consistent thickness throughout.

Lay masonry to an even, plane surface with no deviation exceeding 3mm in 3 metres on any surface in view in the finished work.

3.5 CHECK BASE
Check that the base concrete on which masonry is being built is true to line and level, to ensure that work can be taken up true and plumb with 10mm thick bed and perpendicular joints. If more than 20mm thickness of mortar bed is needed to correct inaccuracies obtain written direction on remedial action.

3.6 CONSTRUCTION JOINTS
Ensure the structural integration of all masonry with adjacent concrete work by providing well roughened, retarded construction joints at all junctions.

All construction joints between grout and concrete and between grout and grout similar to Type B as described in NZS 3109, clause 5.6.3, prepared using an approved retarder, except that the roughness at fine grout surfaces may be ±1.5mm above and below the average level. Use a "double strength" retarder if necessary to suit the high cement content of the grout.

Vertical joints between masonry and concrete to achieve full structural integration across the joints. Allow to construct concrete work first with prepared vertical construction joints at block junctions the same as for horizontal construction joints. Lay masonry so that all courses have open ends abutting the existing concrete work.

3.7 MOISTURE CONTENT
Ensure that blocks are air-dry prior to laying. If necessary to reduce excess absorption of water from the mortar, some dampening of the surface is permissible but no surface water may be present at the time of placing mortar.

3.8 PROTECTION
Keep fair face block walls clean of mortar droppings, grout splashes, or stains of any kind as the work proceeds and before any droppings set.

3.9 WEATHER PRECAUTIONS
When extreme temperatures prevail, either below 4°C or above 27°C, make adjustments to construction as listed in NZS 4210: 2.18 Cold weather construction, and 2.19 Hot weather construction. Do not use expansive grout for filling in temperatures below 5°C.

Application

3.10 SELECTION
For fair face walls select blocks for consistent colour, texture and lack of imperfections.

3.11 BONDING PATTERN
Unless specifically shown or described otherwise, lay masonry in running bond with full masonry bonding at intersections.

3.12 CUTTING
Use a masonry saw to provide clean, accurate cuts.

3.13 FLUSH JOINTS
Finish joints which are not visible in the completed work, or in walls to be plastered, by striking off flush with the trowel.

3.14 TOOLED JOINTS
Finish joints on exposed masonry by tooling to produce a neat joint profile.

3.15 CAVITY WIDTH
To NZS 4210, 2.9 **Veneer and cavity wall construction**.
Refer to CCANZ CP 01. 4.6.3 Cavities.

3.16 WALL TIES GENERALLY
Wall ties at unsupported edges, all openings and at bottom of veneer walls to NZS 4210: 2.9 Veneer and cavity wall construction and NZBC E2/AS1, 9.2.7, **Wall ties** Tables 18A, 18B and 18C.
Refer to CCANZ CP 01. 4.6.4 Wall Ties.

3.17 BUILD IN WALL TIES - TIMBER
Build in wall ties for timber support walls to NZS 4210, 2.9 Veneer and cavity wall construction and NZBC E2/AS1, 9.2.7; **Wall ties** Tables 18A, 18B and 18C. Fix to timber stud with screws or other non impact fasteners.

3.18 BUILD IN WALL TIES - CONCRETE AND MASONRY
To NZS 4210, table 2.3. Build in wall ties for reinforced concrete or masonry support walls, typically at 600mm horizontal and 400mm vertical maximum, or equivalent area. Set into concrete with dovetail ties slotted in as work proceeds. Fix to concrete or concrete masonry with one double-thread fastener.
Refer to CCANZ CP 01. 4.6.4 Wall Ties.

3.19 BUILD IN LINTELS
To NZS 4210, 2.9.8 **Openings** and lintel sizes to NZBC E2/AS1, table 18E. Build in angle lintels as work proceeds, with 200mm bearing each end for spans over 2m, and 100mm bearing for smaller spans.
Refer to CCANZ CP 01. 4.6.5 Openings.

3.20 CONTROL JOINTS
Provide vertically each side of an opening or window width of more than 1.8 metres and at not more than 6 metre spacing, all to NZS 4210: 2.10 Method of controlling wall movements.

3.21 WEEPHOLES
Provide where exposed to the weather above foundations, bond beams and slabs a 50mm x 10mm weep-hole in every second vertical joint.

3.22 CAVITY VENTILATION
Ventilate cavity with top and bottom openings to NZBC E2/AS1, 9.2.6 **Cavities**. Seal cavity off from floor and roof spaces.

3.23 CLEAN OUT
Clean out by removing mortar droppings from ties, any mortar protruding into cavities and all mortar droppings and other loose material in the cavities.

Completion

3.24 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including recycle and periodic removal all debris, unused and temporary materials and elements from the site.

3.25 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4281 STUCCO CLADDING

1. GENERAL

This section relates to coatings of cement based plaster, applied by hand or machine over various wall, ceiling and soffit surfaces, to external backgrounds:

- solid plaster cladding with a non-rigid backing on a cavity system
- solid plaster cladding with a rigid backing on a cavity system.

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC E2/AS1	External moisture
AS 3566	Self drilling screws
NZS 3103	Sands for mortars and plasters
NZS 3113	Chemical admixtures for concrete
NZS 3121	Water and aggregate for concrete
NZS 3122	Specification for Portland and blended cements (General and special purpose)
NZS 4251.1	Solid plastering: Cement plasters for walls, ceilings and soffits
WorkSafe NZ:	Guidelines for the provision of facilities and general safety in the construction industry

Health and Safety at Work Act 2015

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 NO SUBSTITUTIONS

Substitutions are not permitted to any specified stucco cladding system.

1.3 QUALIFICATIONS

Use only applicators licensed to apply the stucco cladding system.

1.4 HEALTH AND SAFETY

Refer to the requirements of the Health and Safety at Work Act 2015 and WorkSafe NZ: Guidelines for the provision of facilities and general safety in the construction industry. Supply protective clothing and equipment. Inform employees and others on site of the hazards and risks.

Performance

1.5 PERFORMANCE

Accept responsibility for the structural and weather-tight performance of the stucco plaster application. The substrate and application of plaster to comply with NZBC E2/AS1, 9.3, **Stucco**.

1.6 PROTECTION OF NEW PLASTER

Advise of the protection systems to be applied to fresh plaster coats. Plastering not to begin until systems are confirmed.

2. PRODUCTS

Materials

2.1 RIGID BACKING
H3 Plywood or fibre cement sheet used as a backing sheet.
Refer to 4223 PLYWOOD CLADDING section for plywood.
Refer to 4231 FIBRE CEMENT section for fibre cement sheets.

2.2 SLIP LAYER OR NON-RIGID BACKING UNDERLAY
Waterproof, breather type to NZBC E2/AS1, table 23: Properties of Roof Underlays and Wall Underlays.

2.3 FLAT METAL LATH
0.55mm Thick steel, galvanized to 400 g/m², slit and expanded complete with control joints, beads sections and fixings supplied by manufacturer.

2.4 SELF FURRING METAL LATH
0.55mm Thick steel, galvanized to 400 g/m², slit, formed and expanded complete with control joints, beads sections and fixings supplied by manufacturer.

2.5 WIRE MESH AND FIXINGS
15 to 50mm Hexagon mesh, galvanized to 400 g/m² to NZS 4251.1, clause 4.2.8 Types of reinforcement (rigid backings) or NZS 4251.1, clause 5.3 Types of reinforcement (non-rigid backing), 0.9mm diameter steel wire in 900mm (minimum) wide rolls, with 6mm deep. 25mm diameter purpose made plastic spacers and galvanized flathead nails.
Refer to 4223 PLYWOOD CLADDING section for plywood.
Refer to 4231 FIBRE CEMENT section for fibre cement sheets.
Refer to 3821 TIMBER FRAMING section for cavity battens.

2.6 BONDING AGENT
Use to form gauging liquid with water:
Bond coat: 1:1
Flanking and finish coats: 1:2
Use in accordance with the bonding agent manufacturer's requirements, maintaining the approved dosage throughout the work.

2.7 ADMIXTURES
To NZS 3113. Use in accordance with the admixture manufacturer's requirements, maintaining the approved dosage throughout the work.

2.8 PIGMENT
To NZS 3122. Use in accordance with the manufacturers requirements, maintaining the required dosage throughout the work.

2.9 SAND
To NZS 3103, the grading limits of NZS 4251.1 clause 2.2.2.4 Sand, and suitable for the nominated plaster mix. Obtain from a single source, uniform in composition and colour. Chloride levels to not exceed 0.04% by dry weight of sand.

Submit service records of sands proposed in accordance with NZS 3103, clause 8.1 and confirm that they comply. Prevent contamination or segregation of sand in storage. Do not allow it to become more than slightly damp.

2.10 CEMENT
Portland cement to NZS 4251.1 clause 2.2.2.3 Cement.

2.11 WATER
To NZS 3121, or local town supply.

2.12 LIME PUTTY
To NZS 4251.1 clause 2.2.3.2 Lime.

Accessories

2.13 TRIM GENERALLY
Formed from steel, galvanized to 400 g/m².

2.14 CONTROL JOINTS
0.55mm Thick steel galvanized to 400 g/m².

2.15 ARCHITRAVE BEAD
0.55mm Thick steel galvanized to 400 g/m².

2.16 CASING BEAD
0.55mm Thick steel galvanized to 400 g/m², slit, formed and expanded.

2.17 CORNER SECTION
0.55mm Thick steel galvanized to 400 g/m², slit, formed and expanded.

2.18 SCREED SECTION
0.55mm Thick steel galvanized to 400 g/m², slit, formed and expanded.

2.19 FLASHINGS
Head jamb sill and any other required flashings made from powder coated aluminium, stainless steel or uPVC supplied by main contractor for both recessed and faced fixed timber, aluminium and uPVC joinery to NZBC E2/AS1 and masonry construction requirements.

2.20 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING
Perforated aluminium or stainless steel trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.21 TIE WIRE
Mild drawn or annealed galvanized wire not less than 1.2mm diameter.

2.22 SEALANT
BRANZ appraised modified MS sealant.

3. EXECUTION

Conditions

3.1 DELIVERY
Keep plaster products dry in transit. Take delivery of plaster products dry and undamaged. Reject all damaged materials.

3.2 STORAGE
Deliver all materials in original unopened packaging with labels intact. Provide dry storage on site, stack carefully, protect from mechanical damage. Protect concrete surfaces from contamination by bagged render or gypsum plaster.

3.3 SOURCE OF MATERIALS
Supply materials from the same source.

3.4 PROPRIETARY PLASTERS
Conform to the various manufacturer's requirements for proprietary and special purpose plasters.

3.5 PLASTERING CONDITIONS
To NZS 4251.1 clause 2.1.7 Air temperature. Carry out plastering under conditions which will not adversely affect the finished work.

3.6 PROTECT
Before application of plaster, apply masking film and tape to all joinery, pipes, roofs and all areas likely to be marked by the plaster. Use drop cloths and ground covers to keep the working areas clean. Clean off droppings and mortar splashes on finished work immediately.

3.7 SUBSTRATE
Do not commence work until openings and apertures have been cut, pipes, fixtures, fixing pads and plugs have been fixed and flashings and other preparations are complete. All defects in substrate must be rectified prior to application of plaster coatings. Ensure that framing, sub-sheathing, battens for non-rigid work and underlays are in place and of the required standard.
Refer to NZBC E2/AS1. 9.3 Stucco.

3.8 FLASHING AND DETAILING
Comply with NZBC E2/AS1 9.3 details. Sub-trade penetrations such as waste pipes and fixing brackets shall be adequately flashed and waterproofed prior to plaster application by that trade. Carry out to the required standard of execution to ensure water does not penetrate.

3.9 PLANT AND TOOLS
Clean plant and tools to ensure they are free of previous mixes.

3.10 WORKING TIME
Do not use mixes after initial set has occurred. Do not retemper mixes.

3.11 JOINING UP
If joining up is unavoidable in large areas of work, make junctions so that they are concealed in the finished work.

3.12 SURFACE TOLERANCES
Gradual undulations over the surface and measured between rise and hollow as follows:
Trowelled wall surfaces: Not exceeding 3mm over a 1200mm straight edge
Textured wall surfaces: Not exceeding 3mm over a 900mm straight edge
No abrupt deviations permitted.
Take particular care where the surface has light hitting it at an acute angle.

3.13 THICKNESS OF PLASTER
Use the plaster coat thicknesses for the different backgrounds to NZS 4251.1, and to match existing.

3.14 EXPANSION JOINT LAYOUT AND DETAILING
Before commencing work confirm the layout of expansion joints and other visual detailing of the finished work.

Finishes - plaster systems

3.15 PLASTER MIXES
To NZS 4251.1 table 3 Mixes for plaster (by volume).

Application - background

3.16 PREPARE SURFACE
Before plastering is commenced, eliminate surface contaminants, remove dust, debris, oils, greases, retarders, paint from already painted surfaces and loose material. Leave the surface dust free and clean. Make good any defects in the background which may adversely affect the quality of the plaster coating.

3.17 INSTALL SLIP LAYER OR NON-RIGID BACKING UNDERLAY
Using galvanised or stainless steel fixings, install the:
- slip layer over the rigid backing
- non-rigid backing over cavity battens.

3.18 WIRE MESH AND NETTING FIXING
Install and fix as in NZS 4251.1 section 4.2 Materials and fixing (rigid backing) or section 5.3 Metal reinforcing and flashings (non-rigid backing). Provide necessary accessories and fix to the mesh manufacturer's requirements.

3.19 METAL LATH FIXING, GENERALLY
Install and fix as in NZS 4251.1. Provide necessary accessories. Run the long way of the mesh across supports. In vertical applications slope the strands inwards and downwards away from the face of the background. Lap ends not less than 50mm with sides not less than 50mm, or for metal lath by one overlap edge nib. Tie laps with 1.25mm galvanized wire every 150mm. Do not finish sheets at corners but bend around to provide at least two thicknesses for 100mm both sides. Fix lath to background at edges and at supports with non-corrosive fixings of an appropriate type at 150mm maximum centres. Place fixings in mesh corners so that heads cover two strands. All fixing procedures to selected lath manufacturer's requirements.

3.20 METAL LATH FIXING TO TIMBER
Use hot-dipped galvanized flat-head nails or staples.

3.21 METAL LATH FIXING TO METAL STUDS
Use non-corrosive self-tapping screws complying with AS 3566 and penetrate minimum10mm through the steel studs and located at maximum 300mm centres. Screws shall be no less than No. 8 and be hot-dipped galvanized or type 304, or 316 stainless steel.

3.22 FIX CORNER SECTIONS
Fix specified corner sections to external angles, as required by the manufacturer for the appropriate background.

3.23 FIX CASING BEADS
Fix specified casing beads at edge terminations of plaster not covered by other trim, as required by the manufacturer for the appropriate background.

3.24 FORM ARRISES
Where sections or beads are not specified:
- form arrises with 6mm pencil rounds
- soften down severe arrises by rubbing with a wet trowel when finishing.

3.25 CHECK FLASHINGS
Ensure that flashings, including flashings to recessed sills, saddle flashings to balcony to wall junctions, are in place before, or are fitted as the coating proceeds so the completed work is completely watertight.

3.26 KEYING
Press plaster through the apertures of metal lath, wings of casing beads and corner sections.

3.27 PENETRATIONS
All penetrations such as waste pipes, electrical wiring in uPVC conduits and metal plumbing piping install with a minimum 5° downward slope, through the plaster system, to be sealed using a double application of MS Silaflex.

3.28 CONTROL JOINTS POSITIONS
Control joints shall be formed in the plaster to coincide with all locations and joints in the structure where movement is likely to occur. Control joints spacings shall not be greater than 4 m both vertically and horizontally and be located above and below the sides of door and window openings, and at inter-storey level at the underside of floor joists. Galvanized mesh or lath shall be terminated each side of the control joint. Set out of joints to be agreed with owner prior to commencement of the plastering application.

3.29 CONTROL JOINT / GALVANIZED METAL TEE SECTION
Fix the proprietary made galvanized metal T section to the backing ensuring the reinforcing terminates either side of the T section. Scratch coat of plaster finishes flush with top of the T section.

3.30 CONTROL JOINT / CHASE WITH METAL ANGLE
Fix galvanized metal angle to the backing ensuring the reinforcing terminates either side of the angle. Scratch coat of plaster finishes flush with top of the angle. Apply finishing plaster coat.

3.31 CONTROL JOINT / CASING BEADS AND SEALANT JOINT
Fix galvanized casing beads to the backing 8mm apart. Plaster the scratch coat and flanking coat to finish flush with the top of the casing bead. Prime the sides of the chase prior to the insertion of a backing rod. Fill the chase with a MS silicone sealant. Apply finishing plaster coat.

3.32 CONTROL JOINT / SAW CUT AND SEALANT JOINT
After the stucco plaster has been applied form a control joint by saw cutting an 8mm chase through to the backing before the plaster has hardened. Prime the sides of the chase prior to the insertion of a backing rod. Fill the chase with a MS silicone sealant.

3.33 PARAPET AND BALUSTRADE TOPS
Parapets shall be formed with a minimum slope of 5°. On balustrade tops stucco plaster to stop at top edge of sloped packer and to be capped with a selected flashing installed by nominated sub trade. The slope of the top surface is away to the exterior. Install all parapet / balcony to wall junction flashings as required and supplied by nominated sub trade.

Application - stucco cladding

3.34 SEALANT INSTALLATION
After the completion of the scratch coat, all junctions between the joinery and the scratch coat and around penetrations, flashings and other similar details to be sealed with a minimum 6.0mm bead of MS silicone sealant.

3.35 PROPORTION AND MIXES
Substrate and underlay and reinforcing to match existing.

Scratch coat:	9 - 12mm thick
Flanking coat:	6 - 9mm thick
Finish coat:	Type and thickness to match existing
Paint system:	100 % acrylic latex
Paint coats:	Two

3.36 SMOOTH TROWEL (DADO) FINISH
Cement based plaster laid on with a trowel, skimmed with a float and trowelled down. The surface is trowelled to a smooth, dense finish as the plaster stiffens. No water is applied during trowelling.

3.37 SPONGE FINISH
The plaster is laid on thinly with a trowel, floated up with a wood float and lightly finished with a close cellular sponge in one direction.

3.38 LIGHTWEIGHT PLASTER FINISH
Contains exfoliated vermiculite or expanded perlite applied with a trowel or sprayed on by pump to achieve either a fine or medium textured finish.

3.39 TYROLEAN FINISH
Machine applied plaster finish with either a hand operated Tyrol machine or is sprayed on using a compressed air hopper gun with variable pressure to achieve either a fine or course finish. Add the mortar plasticiser admixture specified in accordance with the admixture manufacturer's requirements to both the 1:3 flanking and 1:5 finishing coat. For the finishing coat, mix cement, sand and graded crushed rock screenings as necessary to achieve the required texture. Apply the finishing coat while the flanking coat is still "green". The tyrolean effect can be pigmented to various pastel colours.

3.40 TEXTURED AND SCRAPED FINISH
The plaster is applied to a uniform thickness with a laying trowel. As soon as the coat has set, but before it has hardened excessively, the aggregate is exposed by scraping the surface with a straight edged trowel or joint rule.

3.41 COMBED FINISH
The plaster is applied to a uniform thickness and when it has set but not excessively hard a comb is used to scratch the desired effect which may be in a shadow pattern, wavy, circular, or just a vertical effect.

3.42 HAND THROWN ROUGH CAST FINISH
The plastic finish mix is thrown onto the surface with a scoop or trowel. No retouching to be done.

3.43 PEBBLE DASH FINISH
Mix the 1:3 flanking coat to include mortar plasticiser specified in accordance with the manufacturer's requirements. Finish with a wood float. While still plastic throw on washed and drained river pebbles (maximum size 5mm) to cover evenly. Lightly tap into mortar and straighten with a rule. Wash down well after setting to remove cement stains.

Application - curing

3.44 CURING
Confirm the curing and protection systems to be applied to fresh plaster coats. Plastering not to begin until systems are confirmed.

3.45 MOIST CURING, CEMENT BASED WORK
Cure by preventing rapid or uneven drying out for a suitable period as laid down in NZS 4251.1 section 2.5 Application and curing of plaster coats.

Bond Coat:	Minimum 48 hours moist curing and 24 hours drying
Flanking Coat:	Minimum 48 hours moist curing and 72 hours drying
Finish Coat:	Minimum 72 hours moist curing depending on ambient temperatures

Do not alter the above curing times.

3.46 PAINT FINISH
Exterior stucco cladding to receive two coat of, 100 % acrylic latex exterior paint tinted to the selected colour and applied by nominated subcontractor.

Refer 6711 PAINTING EXTERIOR section.

Completion

3.47 CLEANING
Remove debris, unused materials and elements from the site relating to plaster system application. Repair damaged, cracked or marked elements. Leave the whole of this work to the required standard.

3.48 FINAL INSPECTION
Arrange for a final inspection by main contractor or project assessor of the entire finished stucco cladding to take place immediately after completion of the stucco plaster work and any defects or subsequent damage identified made good immediately.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4282 SOLID PLASTER

1. GENERAL

This section relates to coatings of cement and gypsum plasters, applied by hand or pump to external and internal backgrounds, over:

- brick
- concrete block masonry
- concrete substrates.

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZS/AS 2592	Gypsum plaster for building purposes
NZS 3103	Sands for mortars and plasters
NZS 3113	Chemical admixtures for concrete
NZS 3121	Water and aggregate for concrete
NZS 3122	Portland and blended cements (General and special purpose)
NZS 4251.1	Solid plastering: Cement plasters for walls, ceilings and soffits
BS 890	Building limes

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 QUALIFICATIONS

Plasterers to be experienced, competent trades people familiar with the materials and techniques specified. If requested provide evidence of qualification / experience prior to commencing.

Qualifications to be:

- Recognised national certificate in solid plastering (National Certificate in Solid Plastering Level 4 or similar)
- LBP solid plastering (when supervising residential work).

1.3 MATERIALS AND EXECUTION

Plastering work to NZS 4251.1 Solid plastering.

2. PRODUCTS

Materials

2.1 BONDING AGENT

Use to form gauging liquid with water:

Bond coat:	1:1
Flanking and finish coats:	1:2

Use in accordance with the bonding agent manufacturer's requirements, maintaining the approved dosage throughout the work.

2.2 ADMIXTURES

To NZS 3113. Use in accordance with the admixture manufacturer's requirements, maintaining the approved dosage throughout the work.

2.3 PIGMENT
To NZS 3122. Use in accordance with the manufacturers requirements, maintaining the required dosage throughout the work.

2.4 GYPSUM PLASTER
To NZS/AS 2592.

2.5 SAND
To NZS 3103, the grading limits of NZS 4251.1 clause 2.2.2.4 Sand, and suitable for the nominated plaster mix. Obtain from a single source, uniform in composition and colour. Chloride levels to not exceed 0.04% by dry weight of sand.

Submit service records of sands proposed in accordance with NZS 3103, clause 8.1 and confirm that they comply. Prevent contamination or segregation of sand in storage. Do not allow it to become more than slightly damp.

2.6 CEMENT
Portland Cement to NZS 4251.1 clause 2.2.2.3 Cement.

2.7 WATER
To NZS 3121, or local town supply.

2.8 LIME PUTTY
To BS 890.

Accessories

2.9 TRIM GENERALLY
Formed from steel, galvanized to 400 g/m².

2.10 CONTROL JOINTS
0.55mm thick steel galvanized to 400 g/m².

2.11 ARCHITRAVE BEAD
0.55mm thick steel galvanized to 400 g/m².

2.12 CASING BEAD
0.55mm thick steel galvanized to 400 g/m², slit, formed and expanded.

2.13 CORNER SECTION
0.55mm thick steel galvanized to 400 g/m², slit, formed and expanded.

2.14 SCREED SECTION
0.55mm thick steel galvanized to 400 g/m², slit, formed and expanded.

2.15 FLAT METAL LATH
0.55mm thick steel, galvanized to 400 g/m², slit and expanded complete with control joints, beads sections and fixings supplied by manufacturer.

2.16 TIE WIRE
Mild drawn or annealed galvanized wire not less than 1.2mm diameter.

2.17 PAINT FINISH
An alkali resistant water based dispersion coating system having a dry film thickness of between 80 and 150 micro metres.

Finishes - plaster systems

2.18 PLASTER MIXES
To NZS 4251.1 table 3 Mixes for plaster (by volume).

3. EXECUTION

Conditions

3.1 STORE MATERIALS
Store materials in conditions ensuring adequate protection from contamination or deterioration.

3.2 PLASTERING CONDITIONS
To NZS 4251.1 clause 2.1.7 Air temperature. Carry out plastering under conditions (not too sunny, windy or freezing) which will not adversely affect the finished work. Complete in sufficient time to enable subsequent finishes to be applied under the proper conditions.

3.3 DO NOT BEGIN
Do not begin laying up until:
- Linings have been fitted and fixed
- Required openings, chases or other apertures have been cut
- Drained cavities have been constructed
- Pipes, fixtures, fixing pads and plugs have been fixed
- Other preparation is complete
- Work that could damage the plaster is complete.

3.4 SOURCE OF MATERIALS
Supply materials from the same source.

3.5 PROTECT
Protect existing and adjoining work and surrounds, with boards and dust sheets. Clean off immediately droppings and mortar splashes on finished work.

3.6 PROTECT CONCRETE
Protect concrete surfaces from contamination by gypsum plaster.

3.7 PLANT AND TOOLS
Clean plant and tools to ensure they are free of previous mixes (especially gypsum).

3.8 PROPRIETARY PLASTERS
Conform with the various manufacturer's requirements for proprietary and special purpose plasters.

3.9 WORKING TIME
Do not use mixes after initial set has occurred. Do not retemper mixes.

3.10 JOINING UP
If joining up is unavoidable in large areas of work, make junctions so that they are concealed in the finished work.

3.11 SURFACE TOLERANCES
Gradual undulations over the surface and measured between rise and hollow as follows:

Trowelled wall surfaces:	Not exceeding 3mm over a 1200mm straight edge
Textured wall surfaces:	Not exceeding 3mm over a 900mm straight edge

No abrupt deviations permitted.
Take particular care where the surface has light hitting it at an acute angle.

3.12 THICKNESS OF PLASTER
Use the plaster coat thicknesses for the different backgrounds to NZS 4251.1, to match existing.

3.13 ALIGNMENT
Finish surfaces evenly to line or level, with angles and corners correct and walls and reveals plumb and square.

Conditions - background

3.14 CHECK BACKGROUND
Ensure that backgrounds and adjoining surfaces are, after the preparation called for in this section, of the required standard.

3.15 PREPARE SURFACE
Before plastering is commenced, eliminate surface contaminants, remove dust and debris and make good any defects in the background which may adversely affect the quality of the plaster coating.

3.16 IRREGULARITIES
Hack off excessive projections. Fill voids, hollows and honeycomb with a mix not stronger than the background or weaker than the first coat.

3.17 ACCEPTANCE OF BACKGROUNDS
Do not commence work until the background is of the required standard.

Application - preparing the surface

3.18 CLEAN SURFACE
Remove oils, greases, retarders and loose material and leave the surface dust free and clean. Remove paint from already painted surfaces.

3.19 COVER CHASES
Cover chases and conduits in the background with 100mm wide lath bedded in the base coat, pressed down flat and trowelled in.

3.20 EMBEDDED ITEMS
Sheath or wrap water pipes and wastes passing through walls, with strip material, to permit thermal movement.

3.21 BONDING AND KEY FOR DENSE CONCRETE
Roughen dense concrete to provide a mechanical key by removing 3mm of the surface to expose the aggregate. Apply the bond coat containing the specified bonding agent thrown onto the concrete face.

3.22 BONDING AND KEY WITH METAL LATH OVER DENSE CONCRETE
Lightly scabble dense concrete to expose aggregate and fix self-furring metal lath across the faces of the concrete, using non corrosive metal anchors or concrete nails. Form overlaps horizontally and vertically in accordance with the metal lath manufacturers requirements but not less than 50mm. Apply bond coat containing the specified bonding agent through the mesh to the concrete face.

3.23 BONDING AND KEY FOR BRICKWORK
Rake out joints to a depth of 15mm if not already rough jointed. Apply the bond coat containing the specified bonding agent thrown onto the face.

3.24 BONDING AND KEY FOR CONCRETE MASONRY
Walls flush jointed. Apply the bond coat containing the specified bonding agent thrown onto the face.

3.25 CONTROL SUCTION
Control suction by dampening if necessary but without over-wetting. Allow the surface to dry back to a surface-dry condition before plastering.

3.26 METAL LATH FIXING, GENERALLY
Install and fix as in NZS 4251.1, and as required by the manufacturer.

3.27 METAL LATH FIXING
- Provide necessary accessories.
- Run the long way of the mesh across supports. In vertical applications slope the strands inwards and downwards away from the face of the background.
- Lap ends not less than 50mm with sides not less than 50mm, or for metal lath by one overlap edge nib.
- Tie laps with 1.25mm galvanized wire every 150mm.
- Do not finish sheets at corners but bend around to provide at least two thicknesses for 100mm both sides.
- Fix lath to background at edges and at supports with non-corrosive fixings of an appropriate type at 150mm maximum centres.
- Place fixings in mesh corners so that heads cover two strands.
- All to selected lath manufacturer's requirements.

3.28 METAL LATH FIXING TO CONCRETE AND MASONRY
Use non-corrosive masonry anchors or masonry/concrete nails.

Application - joints and junctions

3.29 DISSIMILAR BACKGROUNDS
At junctions between dissimilar solid backgrounds in the same plane and with the same coating, fix lath extending 300mm beyond each side of the junction.
- Fix with 38mm clout nails or staples driven into drilled and plugged holes at 100mm centres each edge, or non-corrosive masonry anchors or masonry/concrete nails.
- At columns, fix lath to extend across the face of columns and extended a minimum of 150mm beyond each junction.

3.30 DISSIMILAR BACKGROUND
Fix specified screed sections centred on the junction between dissimilar backgrounds.

3.31 CONTROL JOINTS
Provide movement control joints in the plaster to coincide with movement joints in the background and/or junctions between dissimilar backgrounds in the same plane and/or where shown on the drawings. Galvanized mesh or lath shall not be continuous across control joints.

3.32 ACCESSORY CONTROL JOINTS
Fix the specified accessory control joints to backgrounds through slots. Fill the joint with sealant before applying finishing coat.

3.33 SECRET CONTROL JOINTS
Form cut joints 3mm wide through the flanking coat plaster to the background. Fill the cut with sealant, following the sealant manufacturer's requirements for primer and masking, before applying the finish coat to provide a secret joint.

3.34 EXPOSED CONTROL JOINTS
Form neat cut joints in plaster. Rule the cut joint straight and true and cut it right through the full thickness of plaster to the background exactly on the line of the junction.

Application - trim

3.35 FIX CORNER SECTIONS
Fix specified corner sections to external angles, as required by the manufacturer for the appropriate background.

3.36 FIX CASING BEADS
Fix specified casing beads at edge terminations of plaster not covered by other trim, as required by the manufacturer for the appropriate background.

3.37 FORM ARRISES
Where sections or beads are not specified:

- form arrises with 6mm pencil rounds
- form arrises in gypsum work with Keenes cement 50mm each side of the angle before applying the gypsum finish coat
- soften down severe arrises by rubbing with a wet trowel when finishing.

3.38 CHECK FLASHINGS
Ensure that flashings, including flashings to recessed sills are in place before, or are fitted as the coating proceeds so the completed work is completely watertight.

3.39 KEYING
Press plaster through the apertures of metal lath, wings of casing beads and corner sections.

Application - plaster systems

3.40 PROPORTION AND MIXES
Plaster thickness and finish to match existing.
Refer to NZS 4251.1 Table 5 Thickness of plaster coats for solid substrates.

3.41 WATERPROOF RENDERING
Include waterproofing admixture as specified and as required by the manufacturer. Do not plug or puncture the waterproof render.

3.42 SELF-COLOURED RENDER
Colour the finishing coat to match the approved sample panel. Use white cement and white sand. Include the pigment as specified and as required by the manufacturer.

3.43 TYROLEAN RENDER
Add the mortar plasticiser admixture specified in accordance with the admixture manufacturer's requirements to both the 1:3 flanking and 1:5 finishing coat. For the finishing coat, mix cement, sand and graded crushed rock screenings as necessary to achieve the required texture. Apply the finishing coat with a Tyrolean hand texturing machine while the flanking coat is still "green".

3.44 PEBBLE DASH
Mix the 1:3 flanking coat to include mortar plasticiser specified in accordance with the manufacturer's requirements. Finish with a wood float. While still plastic throw on washed and drained river pebbles (maximum size 5mm) to cover evenly. Lightly tap into mortar and straighten with a rule. Wash down well after setting to remove cement stains.

3.45 HARDWALL GYPSUM PLASTER
Mix and apply bond coat to suit background, apply 1:3 (or 2:5) gypsum/sand flanking coat. Test the flanking coat for suction and adjust if necessary. Apply the gypsum finish in two thin coats. Steel trowel final application 3mm thick to a hard, smooth, true and even surface, applying water with a brush if necessary.

3.46 SKIM COAT GYPSUM PLASTER
Use only on very even dense concrete and masonry backgrounds. Otherwise use the HARDWALL GYPSUM PLASTER finish. Apply a thin bond coat (if necessary before finish) or finish with a gypsum skim coat direct to the background; 4-5mm maximum thickness.

3.47 FLANKING COAT AND FINISHING COAT, SOLID BACKGROUNDS
Apply in 2 coats over the bond coat to achieve a true surface in any direction with not more than 3mm deviation from a straight edge 1200mm long and a total thickness of 18mm maximum.

3.48 BASE COATS AND FINISHING COAT, METAL LATH
Apply in 3 coats to achieve a true surface in any direction not more than 3mm deviation from a straight edge 1200 m long and a total thickness of 21mm minimum. Thoroughly key between coats with a stiff broom or other appropriate tool. Allow at least 24 hours between coats.

Application - curing

3.49 CURING
Confirm the curing and protection systems to be applied to fresh plaster coats. Plastering not to begin until systems are confirmed.

3.50 PROTECT ADJOINING WORK
Protect existing and adjoining work from damage during plastering. Mask adjacent windows and provide temporary covering if necessary. Remove droppings and mortar splashes as the work proceeds.

3.51 MOIST CURING, CEMENT BASED WORK
Cure by preventing rapid or uneven drying out for a suitable period to NZS 4251.1 clause 2.5 Application and curing of plaster coats, and appendix D Plaster on curing.

Bond Coat:	Minimum 48 hours moist curing and 24 hours drying
Flanking Coat:	Minimum 48 hours moist curing and 72 hours drying
Finish Coat:	Minimum 72 hours moist curing depending on ambient temperatures

Do not alter the above curing times.

3.52 CURING GYPSUM BASED WORK
Curing is not required. Do not subject to persistent dampness after the work has set.

3.53 PAINT FINISH
Apply two coat of 100% acrylic latex paint tinted to the selected colour and applied by brush and roller.

Completion

3.54 PROTECT FINISHED WORK
Protect finished work from sun, wind, frost, rain and hail and from damage by building operations or other causes. Provide temporary coverings if necessary.

3.55 REINSTATE
Reinstate damaged or marked areas.

3.56 LEAVE
Leave adjacent materials, fittings and finishes clean and to the standard required by following procedures.

3.57 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4311 PROFILED METAL ROOFING

1. GENERAL

This section relates to the supply and fixing of proprietary overlap rigid sheet metal profiled roofing complete with accessories.

1.1 ABBREVIATIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
MS	Modified silyl

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External Moisture
AS/NZS 1170.2	Structural design actions - Wind actions
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
NZS 2295	Pliable, permeable building underlays
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
AS/NZS 4200.1	Pliable building membranes and underlays - Materials
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

Warranties

1.3 WARRANTY - INSTALLER/APPLICATOR
Warrant this work under normal environmental and use conditions against weatherproofing failure.

5 years:	from the date of completion of the roof
Form:	Roofing installers standard form

Include a copy of the roofing manufacturers' maintenance requirements with the warranty. Refer to the general section 1237 WARRANTIES - INSTALLER/APPLICATOR for additional requirements.

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Warrant this work under normal environmental and use conditions against materials failure.

15 years	For failure of coating adhesion
15 years	For weatherproofing by material penetration
Form:	Roofing manufacturers standard form

Requirements

1.5 QUALIFICATIONS
Carry out work with experienced, competent installers familiar with the products being used and with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding.

Performance

1.6 CO-ORDINATE
Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the roof profile or cladding to the primary structure.

1.7 PERFORMANCE
Accept responsibility for the weather-tight performance of the completed roofing system, including penetrations through the roof and junctions with walls and parapets.

1.8 FIXINGS, WIND
Design and use the fixings appropriate for the design loads of this site. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply.

- Non specific design the installation to the wind zone parameters of NZS 3604, table 5.4.
- Specific design the installation to the wind pressure parameters of AS/NZS 1170.2.

Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials

2.1 WIRE NETTING
Refer to 4161 UNDERLAYS AND BARRIERS.

2.2 UNDERLAY
Refer to 4161 UNDERLAYS AND BARRIERS.

2.3 INSULATION
Refer to appropriate insulation section.

2.4 GALVANIZED STEEL, UNPAINTED
Formability G550 steel sheet coated to AS 1397.
Profile to suit environmental conditions and to match existing.
- Coating class: ZM 450
- BMT 0.55mm

2.5 PRE-FINISHED HOT-DIPPED ALUMINIUM/ZINC COATED STEEL
Formability G550 steel sheet coated to AS 1397.
Profile, coating and colour to suit environmental conditions and to match existing.
- BMT 0.55mm

Components

2.6 FLASHINGS GENERALLY
To E2/AS1, 4.0 **Flashings**.

Formable grade 0.55mm BMT for galvanized, aluminium/zinc-coated steel to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.7 FLASHINGS TO VERGE, RIDGE AND HIP
Supplied by the roofing manufacturer to match or to suit the roofing in the same material as the roof.

2.8 BOOT FLASHINGS
Generally to E2/AS1, 8.4.17 **Roof penetrations** (note; E2/AS1, Figure.54 **Soaker flashing for pipe penetration**, has an error, use as guide only).
EPDM proprietary pipe flashing laid on 45º bias to roofing, with over-flashing (soaker flashing) if required.
A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use an over-flashing back to the ridge and fix the boot flashing to that.

Fixings

2.9 FASTENERS GENERALLY
Minimum Class 4 and durability not less than the roofing material being fixed. Screw fasteners to be head stamped identifying the manufacturer and class.

2.10 FIXING CLIPS
Galvanized steel (powder coated for aluminium) to suit the material and profile of the rigid sheet and location as required by the roofing manufacturer. Fix to steel with 16mm x 10 gauge galvanized wafer head self-drilling screws and to timber with 30mm x 10 gauge galvanized wafer head screws to NZBC E2/AS1, 8.4.9.

2.11 FIXING SCREWS
To AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by the roofing manufacturer and with a minimum Class 4 durability and not less than the material being fixed. Screws into timber to penetrate by minimum 30mm to suit the profile as required by the roofing manufacturer.
Profiled washers and oversized holes to suit the environmental conditions as required by the roofing manufacturer.

2.12 RIVETS
Sealed aluminium, minimum diameter 4mm, for use with zinc/aluminium coated roofing as required by the roofing manufacturer.

Accessories

2.13 SEALANT
Neutral Curing silicone or MS polymer sealant as required by the roofing manufacturer and used as directed.

2.14 CLOSURE STRIPS
Compressible, closed cell profiled foam strips to fit the sheet profile.

2.15 LAP SEALING TAPE
Closed cell, 3mm x 16mm self adhesive nitrile tape.

3. EXECUTION

3.1 PREPARATION
Remove roof fixtures and fittings as required to carry out the re-roofing (aerials, solar heating collectors and tanks). Strip roof and carefully lower removed material to the

ground. Do not drop roofing sheets. Remove only as much area as can be completed within the working day and weather window. Check falls. Remove all old underlay, underlay support and deteriorated materials.

3.2 REPLACE DAMAGED TIMBER
Replace damaged timber, packing and propping where necessary to provide a true plane. Remove projections and old fasteners that may damage the new roof.

Conditions

3.3 INSPECTION
Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing and free from any misalignments or protrusions that could adversely affect the roofing.

3.4 STORAGE
Take delivery of and accept packs of roofing undamaged on delivery. Reject all damaged material. Store on a level firm base with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets. If sheet packs become wet, fillet or cross stack to allow air movement between sheets.

3.5 HANDLING
Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage. Use soft, flat soled shoes when fixing and for all other work on the roof.

3.6 SEPARATION
Place isolators between dissimilar metals, also separate roofing from treated timber and cement based materials. Do not use unpainted lead sheet or copper in contact with or allow water run-off onto galvanized or Zincalume® materials.

Application

3.7 SET-OUT
Carefully set out with consideration of the position of side laps to take account of the line of sight. Ensure all sheets are square and oversailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

3.8 END LAPS
End laps are not permitted, except where specifically detailed.

3.9 MOVEMENT JOINTS
Fixing and jointing to conform with the roofing manufacturer's requirements for thermal movement.
Over timber framing, transverse flashings (those running long continuous framing members) to have expansion joints at maximum 12 centres.

3.10 FIXING GENERALLY
Install and fix in accordance with the NZMRM CoP requirements, and to roofing manufacturer's recommendations. Paint colour matched fixings and accessories before installation.

3.11 MARKING AND CUTTING
Cut only by shearing tools. Do not use black lead pencils for marking aluminium/zinc coated products.

3.12 FIX SHEETS
Fix sheets in place using the fastening system required by the roofing manufacturer for specified profiles, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.13 STOP ENDS AND DOWNTURNS
Form stop-ends at the upper end of sheets. Form downturns at the gutter line where the roof pitch is less than 8 degrees. Form using purpose made tools.

3.14 FLASHINGS
Flash roof to parapets, walls and penetrations to detail. Where no detail is provided flash to NZMRM CoP recommendations and the roofing manufacturer's requirements. Cut accurately and fix using sealant and rivets to detail and to the roofing manufacturer's requirements to form a weatherproof cover. For highly visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.15 USE OF SEALANTS
Select and use sealants only as recommended by the roofing manufacturer. Apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces.

3.16 FLASHING PENETRATIONS
Flash all penetrations through the roof. Fit pipe flashings with a proprietary collar flashing to manufacturer's requirements, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

3.17 INSTALL RIDGING
Install ridging by fastening to the purlins through the leading edge of the roofing to manufacturer's requirements.

Completion

3.18 REPLACE
Replace damaged or marked elements.

3.19 LEAVE
Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.20 REMOVE
Remove trade rubbish and unused materials from the roof and surrounds daily during the work. Sweep down at the end of each day, and clean out spoutings, gutters and rainwater pipes on completion of the roof. Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4312 PROFILED PLASTIC ROOFING

1. GENERAL

This section relates to the supply and fixing of translucent, moulded, overlapping plastic sheets as roofing, often in conjunction with proprietary overlap rigid sheet metal profiled roofing.

1.1 ABBREVIATIONS
The following abbreviations are used throughout this part of the specification:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 1170.2	Structural design actions - Wind actions
AS/NZS 1562.3	Design and installation of sheet roof and wall cladding - Plastic
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
AS/NZS 4256.5	Plastic roof and wall cladding materials - Polycarbonate
AS/NZS 4389	Roof safety Mesh
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

Warranties

1.3 WARRANTY - INSTALLER/APPLICATOR
Warrant this work under normal environmental and use conditions against weatherproofing failure.

Period:	5 years from the date of completion of the roof
Form:	Plastic roofing installers' standard form

Include a copy of the cladding manufacturers' maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES - INSTALLER/APPLICATOR for additional requirements.

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Warrant this work under normal environmental and use conditions against materials failure.

15 years	For materials
Form:	Roofing manufacturers standard form

Requirements

1.5 QUALIFICATIONS
Carry out work with experienced, competent installers familiar with the products being used and with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding.

Performance

1.6 CO-ORDINATE
Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof.

1.7 PERFORMANCE
Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

1.8 FIXINGS, WIND
Design and use the fixings appropriate for the design loads of this site. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply.

- Non specific design the installation to the wind zone parameters of NZS 3604, table 5.4.
- Specific design the installation to the wind pressure parameters of AS/NZS 1170.2

Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials

2.1 POLYCARBONATE
UV stabilised to AS/NZS 4256.5.
Profile, type and colour to match existing.

2.2 FLASHINGS GENERALLY
To E2/AS1, 4.0 **Flashings**. Compatible with associated metal roofing. Formable grade 0.55 BMT for galvanized, aluminium/zinc-coated steel to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.3 FLASHINGS TO VERGE, RIDGE AND HIP
Supplied by the roofing manufacturer to match or to suit the roofing and to E2/AS1, 4.0 **Flashings**.

Components

2.4 SAFETY MESH
Safety mesh to AS/NZS 4389.
Refer to 4161 UNDERLAYS AND BARRIERS section.

2.5 FASTENERS GENERALLY
Durability of all fasteners not less than the roofing material being fixed.

2.6 FIXING SCREWS
To comply with AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by the roofing manufacturer and with a durability not less than the material fixed. Screws into timber to penetrate by minimum 30mm, to suit the profile as required by the roofing manufacturer.

Accessories

2.7 PURLIN TAPE
6mm closed cell foam to full width of the purlin or flat sheet purlin protection strip

2.8 SEALANT
Neutral curing silicone or MS polymer sealant as required by the roofing manufacturer and used as directed.

2.9 CLOSURE STRIPS
Non-bituminous compressible, profiled foam strips to fit the sheet profile.

2.10 LAP SEALING TAPE
Closed cell, 3mm x 16mm self adhesive nitrile tape.

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing. Do not start work until all requirements are complete to the required standard.

3.2 STORAGE
Take delivery of and accept packs of sheets dry and undamaged on delivery. Reject all damaged material. Store on a level firm base with packs well ventilated and completely protected from weather and damage.

3.3 HANDLING
Use rope or webbing and not chains or wire rope for hoisting. Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage. Use soft, flat sole shoes when fixing and for all other work on the roof.

Application

3.4 GENERALLY
To AS/NZS 1562.3, to the NZMRM CoP.
Lay flat sheet purlin protection strip or tape over mesh. Carefully set out with side laps over the metal roofing edges, with widths of end sheets the same, all sheets square and oversailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

When laying either side of metal roofing sheets, ensure that side laps are neatly seated down and that side fixings are installed in accordance with the roofing manufacturer's requirements.

3.5 FORMING
Before lifting into place, set in neutral cure silicone sealant and pop rivet stop-ends to sheets.

3.6 FIXING
Install and fix to AS/NZS 1562.3, to the NZMRM CoP and to the roofing manufacturer's requirements.

Fix sheets in place using the fastening system required by the manufacturer of the specified profiled sheets, making due allowance for dynamic local wind pressures on the building and the thermal movement in the sheet.

3.7 END LAPS
End laps are only permitted where specifically detailed. Ensure any end laps are a minimum of 200mm and fully sealed at both ends of the lap using a neutral cure silicone sealant.

3.8 FLASH
Flash roof to verges, walls and penetrations to detail and the sheet roofing manufacturer's requirements for clips, laps, riveting and silicone jointing.

3.9 PENETRATIONS
Flash and overflash all penetrations through the roof.

3.10 PENETRATIONS AND JUNCTIONS
Check that adjoining walls and parapets are prepared ready for the installation of the roofing. Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof. Required work includes the following:

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- roofing installation neatly finished to all sides of openings and to all wall and parapet junctions
- installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).

Completion

3.11 REPLACE
Replace damaged or marked elements.

3.12 LEAVE
Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.13 REMOVE
Remove trade rubbish and unused materials from the roof and surrounds daily during the work. Sweep down at the end of each day, and clean out spoutings, gutters and rainwater pipes on completion of the roof. Recycle and remove debris, unused materials and elements from the site.

3.14 PROTECTION
Protect the completed work from damage for the remainder of the construction period. If access is given to the roof for later work, provide properly constructed walkways or platforms to eliminate damage.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4321 CONCRETE TILE ROOFING

1. GENERAL

This section relates to proprietary interlocking concrete roof tiles complete with underlay, battens, accessories, fixings and mortar.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External Moisture
NZS 2295	Pliable, permeable building underlays
NZS 3602	Timber and wood-based products for use in buildings
NZS 3604	Timber-framed buildings
NZS 4206	Concrete interlocking roofing tiles

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

25 years: For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of purchase.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:

5 years For installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS
Carry out all tiling work with experienced competent installers familiar with the products being used.

Performance

1.5 FIXINGS, WIND
Design and use the fixings appropriate to the manufacturer's requirements. Provide evidence that the systems will comply with the existing standards of performance.

1.6 CO-ORDINATE
Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof.

1.7 PERFORMANCE
Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

2. PRODUCTS

Materials

2.1 TIMBER BATTENS
To NZS 3604, 10.2.1.16.7 - **Tile Battens**.
Type: Radiata pine, SG8
Treatment: H1.2, Boron (code 11) or PTP (code 64)

Do not use timber treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89), as they may cause corrosion in steel and galvanised steel.

Max span of batten;
Up to 480mm: 50mm x 25mm batten
430mm - 600mm: 50mm x 40mm
600mm - 900mm: 50mm x 50mm

2.2 BIRDPROOFING
Galvanized wire netting 13mm hexagonal mesh 0.70mm wire gauge.

2.3 UNDERLAY
Refer to 4161 UNDERLAYS AND BARRIERS section.

2.4 CONCRETE TILES
Extruded high density concrete interlocking tiles with integral pigment or slurry pigment face and a polymer coating, all fully cured and complete with ridge and barge tiles and to NZS 4206.
Brand, profile and colour to match existing.

Components

2.5 ANTI-PONDING BOARD
To NZBC E2/AS1. H1.2 timber or H3 plywood to minimum 1:12 fall.

2.6 FLASHINGS GENERALLY
To E2/AS1, 4.0 **Flashings**. Formable grade 0.55mm BMT for galvanized, aluminium/zinc-coated and pre-painted steel.

2.7 FIXINGS DURABILITY
Design and use the fixings appropriate for the project Exposure Zone (to NZS 3604 & NZBC E2/AS1).

Exposure Zone	**Tile fixing type**
B, C	Hot-dip galvanised or stainless steel
D, E	Stainless steel

2.8 NAILS
For 50mm thick battens only, nails to NZS 4206, penetrating the batten by 35mm minimum but not through it.
Nail size;
Length: 35mm plus tile thickness
Diameter: 2.5mm

Type and finish to match existing.

2.9 SCREWS
Stainless steel to NZS 4206 with neoprene washer for all batten thicknesses.
Screw size;
Length: 18mm plus tile thickness
Diameter: 2.5mm

2.10 CLIPS
Stainless steel or hot-dipped galvanized steel tile clips with galvanized 2.5mm diameter clout fixing.

2.11 RIDGE CLIPS
Stainless steel or hot-dipped galvanized steel adjustable clips with galvanized 2.5mm diameter clout fixing.

Accessories

2.12 MORTAR
4:1 - Sand: cement with plasticiser added to the tile manufacturer's requirements.

2.13 POINTING
3:1 - Sand: cement with pigment added to the tile manufacturer's requirements.

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the roof framing and supporting structure and do not start work until it is complete and fully braced ready for tiling, all to the requirements of NZS 3604.

3.2 STORAGE
Stack on level hard standings and protect from damage and inclement weather.

3.3 HANDLING
Unload and handle tiles without soiling, chipping or other damage.

3.4 MORTAR USE
Discard any mortar not used within 30 minutes of mixing.

3.5 COMPLY
Lay and fix concrete tiles to NZS 4206 and NZBC E2/AS1: 8.0 Roof claddings, NZBC E2/AS1. 8.2 **Masonry Tiles**.

Application - preparation

3.6 SET-OUT
Set out the roof with a gauge rod to position the battens taking account of rafter lengths, minimum head lap, overhangs into gutters and spoutings, and verge overhangs all to minimise tile cutting.

3.7 LAY UNDERLAY
Lay roofing underlay dished 40mm maximum across the roof framing starting at the eaves with 150mm minimum laps. Lay over fascias, anti-ponding boards and verges and turned up against penetrations and vertical faces. Fix to the tile manufacturer's requirements and to NZS 4206.

3.8 FIX BATTENS
To NZS 3604,10.2.1.16.7 - **Tile Battens**. Fix battens in straight courses evenly spaced between fascia and ridge and elsewhere, to avoid cut tiles.

Tightly butt joint over rafter or counter batten with joint locations staggered to give at least 2 continuous battens between those jointed on the same member. Neatly mitre to hip rafters and valley battens. Fixings to NZS 3604,Table 10.12 - **Tile Battens for all wind zones**, fixings finish to NZS 3604, Table 4.3 - **Steel items such as nails and screws.**

3.9 LOADING
Complete sarking, counter-battening and battening over the whole roof before any tiles are loaded.

Application - tiling

3.10 LAYING
Lay courses straight and parallel and with set-out and locking to NZS 4206 and NZBC E2/AS1: 8.0 Roof claddings 8.2 Masonry Tiles.

3.11 NAIL FIXING
Nail all tiles to eaves and top courses and alternate tiles to all other courses.

3.12 SCREW FIXING
Screw all tiles to eaves, perimeters and top courses to the tile manufacturer's requirements.

3.13 CLIP FIXING
Clip all tiles to eaves and top courses and alternate tiles to all other courses in those areas of the roof that require clip fixing for handling high winds and rain in exposed environments.

3.14 RIDGE FIXING
Screw fix ridge tiles to the tile manufacturer's requirements.

3.15 FORM VALLEYS
Machine cut tiles to a neat, clean line leaving a minimum gap of 100mm. Form and fix birdproofing to valley battens. Fix all cut tiles.

3.16 FORM RIDGES AND HIPS
Support and bed edges and joints of ridge and hip tiles in mortar to the tile manufacturer's requirements.

3.17 ANTI-PONDING BOARDS
Install anti-ponding boards to NZBC E2/AS1: 8.0 Roof claddings 8.2 Masonry tiles and treated to NZS 3602 at a minimum fall of 5 degrees to concrete tile roofs with pitches less than 17 degrees.

3.18 FINISH VERGES
Finish verges to the tile manufacturer's requirements and as detailed.

3.19 ABUTMENTS
Where unavoidable, machine cut tiles to a neat, clean line to detail and to allow a full dressed down flashing.

3.20 POINTING
Point bedding mortar to ridges, hips and verges to a smooth, straight weathered face.

3.21 EXPOSED CUTS
Coat the exposed cut surfaces of tiles to match the tile face.

3.22 FIT FLASHINGS
Cut, fit and fix all elements true to line and plane, to NZBC E2/AS1: 4.0 **Flashings**, NZBC E2/AS1: 5.0 **Roof/wall junctions**, to the tile manufacturers details.

3.23 PENETRATIONS
Flash and overflash all penetrations through the roof.

3.24 PENETRATIONS AND JUNCTIONS
Check that adjoining walls and parapets are prepared ready for the installation of the roofing. Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof. Required work includes the following:

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- roofing installation neatly finished to all sides of openings and to all wall and parapet junctions
- installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).

Completion

3.25 REPLACE
Replace damaged or marked elements.

3.26 LEAVE
Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.27 REMOVE
Remove trade rubbish and unused materials from the roof and surrounds regularly during the work. Sweep down the completed roof and clean out spoutings, gutters and rainwater pipes. Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4322 CLAY TILE ROOFING

1. GENERAL

This section relates to proprietary interlocking clay roof tiles complete with underlay, battens, accessories, fixings and mortar.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
AS 2049	Roof tiles
AS 2050	Installation of roof tiles
NZS 3602	Timber and wood-based products for use in buildings
NZS 3604	Timber-framed buildings

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

25 years: For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:

5 years: For installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS
Carry out all tiling work with experienced competent installers familiar with the products being used.

Performance

1.5 FIXINGS, WIND
Design and use the fixings appropriate to the manufacturer's requirements. Provide evidence that the systems will comply with the existing standards of performance.

1.6 CO-ORDINATE
Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof.

1.7 PERFORMANCE
Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

2. PRODUCTS

Materials

2.1 TIMBER BATTENS
To NZS 3604, 10.2.1.16.7 - **Tile Battens**.
Type: Radiata pine, SG8
Treatment: H1.2, Boron (code 11) or PTP (code 64)

Do not use timber treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89), as they may cause corrosion in steel and galvanised steel.

Max span of batten;
Up to 480mm: 50mm x 25mm batten
430mm - 600mm: 50mm x 40mm
600mm - 900mm: 50mm x 50mm

2.2 BIRDPROOFING
Galvanized wire netting 13mm hexagonal mesh 0.70mm wire gauge.

2.3 UNDERLAY
Refer to 4161 UNDERLAYS AND BARRIERS section.

2.4 CLAY TILES
Selected pressed and kiln fired, complete with capping and barge tiles to AS 2049. Brand, profile and colour to match existing.

Components

2.5 ANTI-PONDING BOARD
To NZBC E2/AS1. H1.2 timber or H3 plywood to minimum 1.12 fall.

2.6 FIXINGS DURABILITY
Design and use the fixings appropriate for the project Exposure Zone (to NZS 3604 & NZBC E2/AS1).

Exposure Zone	**Tile fixing type**
B, C	Hot-dip galvanised or stainless steel
D, E	Stainless steel

2.7 NAILS
For 50mm thick battens only, nails to NZS 4206, penetrating the batten by 35mm minimum but not through it.
Nail size;
Length: 35mm plus tile thickness
Diameter: 2.5mm
Type and finish to match existing.

2.8 SCREWS
Stainless steel to NZS 4206 with neoprene washer for all batten thicknesses.
Screw size;
Length: 18mm plus tile thickness

Diameter: 2.5mm

2.9 CLIPS
Stainless steel or hot-dipped galvanized steel tile clips with galvanized 2.5mm diameter clout fixing.

2.10 RIDGE CLIPS
Stainless steel or hot-dipped galvanized steel adjustable clips with galvanized 2.5mm diameter clout fixing.

Accessories

2.11 MORTAR
4:1 - Sand: cement with plasticiser added to the tile manufacturer's requirements.

2.12 POINTING
3:1 - Sand: cement with pigment added to the tile manufacturer's requirements.

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the roof framing and supporting structure and do not start work until it is complete and fully braced ready for tiling, to the requirements of NZS 3604.

3.2 STORAGE
Stack on level hard standings and protect from damage and inclement weather.

3.3 HANDLING
Unload and handle tiles without soiling, chipping or other damage.

3.4 MORTAR
Discard any mortar not used within 30 minutes of mixing.

3.5 COMPLY
Lay and fix clay tiles to AS 2050 and NZBC E2/AS1: 8.0 Roof claddings, NZBC E2/AS1 8.2 **Masonry tiles**.

Application - preparation

3.6 SET OUT
Carefully set out the roof with a gauge rod to position the battens taking account of rafter lengths, minimum head lap, overhangs into gutters and spoutings, and verge overhangs all to minimise tile cutting.

3.7 LAY UNDERLAY
Lay roofing underlay dished a maximum of 40mm across the roof framing starting at the eaves with 150mm minimum laps. Lay over fascias, anti-ponding boards and verges and turned up against penetrations and vertical faces. Fix to the tile manufacturer's requirements and to AS 2050.

3.8 FIX BATTENS
To NZS 3604,10.2.1.16.7 - **Tile Battens**. Fix battens in straight courses evenly spaced between fascia and ridge and elsewhere, to avoid cut tiles. Tightly butt joint over rafter or counter batten with joint locations staggered to give at least 2 continuous battens between those jointed on the same member. Neatly mitre to hip rafters and valley

battens. Fixings to NZS 3604, Table 10.12 - **Tile Battens for all wind zones**, fixings finish to NZS 3604, Table 4.3 - **Steel items such as nails and screws.**

3.9 LOADING
Complete sarking, counter-battening and battening over the whole roof before any tiles are loaded.

Application - tiling

3.10 LAYING
Lay courses straight and parallel and with set-out and locking to AS 2050 and NZBC E2/AS1: 8.0 Roof claddings, 8.2 Masonry tiles.

3.11 NAIL FIXING
Nail all tiles to eaves, perimeters and top courses to the tile manufacturer's requirements.

3.12 SCREW FIXING
Screw all tiles to eaves, perimeters and top courses to the tile manufacturer's requirements.

3.13 CLIP FIXING
Clip all tiles to eaves, perimeters and top courses and alternate tiles to all other courses in those areas of the roof that require clip fixing for handling high winds and rain in exposed environments to the tile manufacturer's requirements.

3.14 RIDGE FIXING
Screw fix ridge tiles to the tile manufacturer's requirements.

3.15 FORM VALLEYS
Machine cut tiles to a neat, clean line leaving a minimum gap of 100mm. Form and fix birdproofing to valley battens. Fix all cut tiles.

3.16 FORM RIDGES AND HIPS
Support and bed edges and joints of ridge and hip tiles in mortar to the tile manufacturer's requirements.

3.17 ANTI-PONDING BOARDS
Install anti-ponding boards to NZBC E2/AS1 : 8.0 Roof Claddings **Masonry Tiles** and treated to NZS 3602 at a minimum fall of 5 degrees to clay tile roofs with pitches less than 17 degrees.

3.18 FINISH VERGES
Use gable end barge tiles to the tile manufacturer's requirements. Butt standard tiles and half tiles up to secret gutters to the tile manufacturer's requirements.

3.19 ABUTMENTS
Where unavoidable, machine cut tiles to a neat, clean line to detail and to allow a full dressed down flashing.

3.20 POINTING
Point bedding mortar to ridges, hips and verges to a smooth, straight weathered face.

3.21 EXPOSED CUTS
Coat the exposed cut surfaces of tiles to match the tile face.

3.22 PENETRATIONS
Flash and overflash all penetrations through the roof.

3.23 PENETRATIONS AND JUNCTIONS

Check that adjoining walls and parapets are prepared ready for the installation of the roofing. Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof. Required work includes the following:

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- roofing installation neatly finished to all sides of openings and to all wall and parapet junctions
- installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).

Completion

3.24 REPLACE

Replace damaged or marked elements.

3.25 LEAVE

Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.26 REMOVE

Remove trade rubbish and unused materials from the roof and surrounds regularly during the work. Sweep down the completed roof and clean out spouting, gutters and rainwater pipes. Recycle and remove debris, unused materials and elements from the site.
Refer to HNZ Environmental Policy for recycling.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4323 PRESSED STEEL TILE ROOFING

1. GENERAL

This section relates to proprietary interlocking pressed metal roofing tiles complete with underlay, battens and accessories.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/VM1	Durability
NZBC E2/AS1	External moisture
NZS 3604	Timber-framed buildings
NZS 4217	Pressed metal tile roofs
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
25 years: For material

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
5 years For installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS
Carry out the roofing work with experienced, competent installers familiar with the products being used.

Performance

1.5 FIXINGS, WIND
Design and use the fixings appropriate to the manufacturer's requirements.
To NZS 3604, table 10.12 **Tile battens for all wind zones**.
Provide evidence that the systems will comply with the existing standards of performance.

1.6 CO-ORDINATE
Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof.

1.7 PERFORMANCE
Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets. Comply with the NZMRM CoP NZ metal roof and wall cladding Code of Practice, sections 2 to 7 (Performance, Loadings, Design, Flashings, Penetrations and Installation), and section 10, Pressed metal Tiles.

2. PRODUCTS

Materials

2.1 WIRE NETTING
Refer to 4161 UNDERLAYS AND BARRIERS section.

2.2 UNDERLAY
Refer to 4161 UNDERLAYS AND BARRIERS section.

2.3 BATTENS
To NZS 3604, 10.2.1.16 **Purlins and tile battens**. Radiata pine or Douglas Fir, SG6, treated H1.2. Moisture content to NZS 3602, size, spacing and fixing to NZS 3604, table 10.12 **Tile battens for all wind zones**.

2.4 PRESSED METAL TILES
To NZS 4217, and NZBC E2/AS1, 8.3 **Pressed metal tiles**. Refer to SELECTIONS for type.
Brand, profile, finish and colour to match existing.

Components

2.5 NAILS
Hot-dipped galvanized steel flat head 50mm x 2.8mm nails.

2.6 FLASHINGS, CAPPINGS AND COVERS
To NZBC E2/AS1.8.3.4.2, and NZBC E2/AS1 Table 7. Use ridge and hip caps, barge covers, general purpose malleable-edged flashings and side flashings supplied by the manufacturer as part of the selected tile roofing system.

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the roof framing and supporting structure and do not start work until it is complete and fully braced ready for tiling, all to the requirements of NZS 3604.

3.2 STORAGE
Stack tiles on a level, hard base, ventilated and protected from damage and weather.

3.3 HANDLING
Unload and handle tiles without soiling, scratching, crushing or other damage.

3.4 COMPLY
Comply with the preparation, laying and fixing requirements of NZBC E2/AS1 and NZS 4217, or the manufacturer's requirements where these are of a higher standard.

Application

3.5 SET-OUT
Carefully set out the roof with a measuring rod to position the battens accurately taking account of rafter lengths, overhangs into gutters and spouting and verge overhangs, all to minimise tile cutting.

3.6 FIX BATTENS
To NZS 3604. Fix battens over the underlays in straight courses, spanning at least 3 rafters, between fascia and ridge and elsewhere to the tile manufacturer's required details. Nail at every crossing to NZS 3604, table 10.12. Square cut ends to form butt joint over rafters with joints staggered.

3.7 LAYING
Do not take heavy equipment onto the roof. Plan work to minimise foot traffic. Work on the roof only using appropriate footwear. Interlock, lap and lay to the tile manufacturer's requirements and finish to ridge, hip, valley, barge and eaves with the tile manufacturer's required details if not detailed elsewhere.

3.8 NAILING
Nail tiles to battens generally through the upstand and downturn of the tile lap as well as all elements, to NZBC E2/AS1 and the manufacturer's details. Fit neoprene washers under vertical nails for smooth-coated tiles.

3.9 CUTTING AND BENDING
Cut, bend and straighten tiles neatly to finish true to line and plane when in place, using installation equipment maintained in the proper condition, all to NZS 4217 and as required by the tile manufacturer.

3.10 FIT FLASHINGS, COVERS AND CAPPINGS
Cut, fit and fix all elements true to line and plane, to NZBC E2/AS1: 4.0 **Flashings**, NZBC E2/AS1: 5.0 **Roof/wall junctions**, to the tile manufacturers details, and the NZMRM CoP NZ metal roof and wall cladding Code of Practice, section 10, if not detailed elsewhere.

3.11 PENETRATIONS
Form to NZBC E2/AS1: 8.1.7 and NZS 4217, with upstands ready for flashings/overflashings. Flash and overflash all penetrations through the roof.

3.12 PENETRATIONS AND JUNCTIONS
Check that adjoining walls and parapets are prepared ready for the installation of the roofing. Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof. Required work includes the following:

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- roofing installation neatly finished to all sides of openings and to all wall and parapet junctions
- installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).

Completion

3.13 MAKE GOOD
Seal vertical nails and touch-up all chip coatings with the manufacturer's "finishing kit."

3.14 LEAVE
Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.15 REMOVE

Remove trade rubbish and unused materials from the roof and surrounds regularly during the work. Sweep down the completed roof and clean out spouting, gutters and rainwater pipes. Recycle and remove debris, unused materials and elements from the site.
Refer to HNZ Environmental Policy for recycling.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4337 PLYWOOD ROOFING & DECKING SUBSTRATE

1. GENERAL

This section relates to the use of plywood sheets for:
- decking or decking substrate
- substrate for roofing
- substrate for gutters.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E2/AS1	External moisture
AS/NZS 1170.2	Structural design actions - Wind actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1604.3	Specification for preservative treatment - Plywood
AS/NZS 2269.0	Plywood - Structural - Specifications
NZS 3604	Timber-framed buildings

PERFORMANCE

1.2 WIND DESIGN
- Non specific design the installation to the wind zone parameters of NZS 3604, table 5.1.
- Specific design the installation to the wind pressure parameters of AS/NZS 1170.2.

Provide evidence that the systems will comply with the existing standards of performance.

1.3 SEISMIC DESIGN
- Non specific design the system and its anchorages/fixings to resist the earthquake loads of the earthquake zone in accordance with NZS 3604, 5.3 Earthquake bracing demand.
- Specific design the system and its anchorages/fixings to resist the earthquake loads of the seismic zone in accordance with NZS 1170.5.

Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials

2.1 PLYWOOD
Radiata pine veneer ply to AS/NZS 2269.0, face sanded, grade CD for decking and DD for roofing.

H3 CCA treated to AS/NZS 1604.3 when used as a deck or roofing substrate. Confirm compatibility with adhesives being used with the waterproofing membrane.

F11 grade to be used as a substrate for decking membranes 19mm minimum. F11 grades to be used for roofing 17mm minimum.

Components

2.2 SCREWS
Stainless steel, counter-sunk. Refer to the plywood manufacturer's requirements for size and use.

General

17mm plywood:	No. 10 x 40mm
19 - 21mm plywood:	No. 10 x 45mm
25mm plywood:	No. 10 x 50mm

Under membranes

17 - 25mm plywood:	No. 10 x 50mm (to E2/AS1, 8.5.5.1)

2.3 SCREWS IN STEEL
Self tapping, self countersinking. Refer to the plywood manufacturer's requirements for size and use.

2.4 ADHESIVE
Single pack waterproof general purpose construction adhesive, as recommended by the manufacturer.

2.5 TIMBER FILLETS
20mm H3.2 CCA treated triangular timber internal corner fillets, for membrane installations.

3. EXECUTION

Conditions

3.1 HANDLE
Handle sheets carefully and reject those with damaged faces or edges.

3.2 STORE
Store sheets in stacks clear of the ground, supported without sagging on evenly spaced horizontal bearers. Protect from damage and weather.

3.3 SUPPORT FRAMING
Ensure support framing is completed to the plywood manufacturer's stated requirements for laying plywood sheets.

Application

3.4 SUPPORT EDGES AND JOINTS
Fully support edges and joints on square edged sheets.

3.5 FIXINGS
Minimum 7mm, maximum 15mm from the edge, 150mm centres along edges and 200mm centres on intermediate supports.

3.6 FIXING PLYWOOD SHEETS
Fix sheets to the plywood manufacturers requirements. Lay sheets in a staggered layout, face-grain of sheet at right-angles to support and with sheets in square, true alignment and plane. Allow a 3mm gap between square edge sheets.

3.7 UNDER MEMBRANES

To NZBC E2/AS1, 8.5 Membrane roofs and decks. Screw and adhesive fix sheets for membrane to the plywood and membrane manufacturers' requirements. CD grade plywood with the C face up (or better). Provide a 5mm radius chamfer to external edges where the membrane is to be wrapped over. Fix internal corner fillets.
Provide whichever is the greater falls:

- to the membrane manufacturer's requirements
- minimum to NZBC E2/AS1, 8.5.1, - 1:30 for roofs, 1:40 for decks and 1:100 for gutters.

Completion

3.8 PROTECTION

Protect work from the weather until it is covered, coated or sealed.

3.9 REPLACE

Replace damaged or marked elements.

3.10 LEAVE

Leave work to the standard required by following procedures.

3.11 REMOVE

Recycle and remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4383 EXTERIOR TIMBER STAIRS & DECKING

1. GENERAL

This section relates to the fabrication and installation of exterior timber:
- spaced boarding to decks
- steps and landings.

Refer 3101 CONCRETE section for concrete stairs, landings, ramps.
Refer 2310 FOUNDATIONS section for posts, bearers, joists.
Refer 4851 EXTERIOR HANDRAILS AND TIMBER BALUSTRADES section.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/AS1	Access routes
NZBC D1/VM1	Access routes
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
AS/NZS 3661.1	Slip resistance of pedestrian surfaces - Requirements
BRANZ BU 497	Stair construction

Performance

1.2 SLIP RESISTANCE FOR ACCESS ROUTES
Slip resistance for decking to comply with NZBC D1/AS1: 2.0 Level access routes and 3.0 Ramps; NZS 3604, 7.4.4 Surface.

2. PRODUCTS

Materials

2.1 SOLID TIMBER COMPONENTS
Selection to NZS 3602. Timbers shall be treated to H3.2 CCA (preservative code 01 or 02) radiata pine.

2.2 SOFTWOOD SPACED BOARDING FOR EXTERIOR DECKS
Selected radiata pine, H3.2 CCA to NZS 3602, table 2A. Dressed four sides and with arrises, or specifically profiled decking.

Size:	100mm x 40mm minimum or to match existing
Finish:	Uncoated

Refer 6711 PAINTING EXTERIOR section for slip resistance coatings.

3. EXECUTION

Conditions

3.1 GENERALLY
Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

Check site dimensions. Carry out machining within the practices recommended for the timber being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's recommendations. Work to be accurate, square and true to line and face.

Application

3.2 FABRICATE AND INSTALL TIMBER STEPS, RAMPS, LANDINGS
Fabricate and install accessible steps and landings to comply with NZBC D1/AS1:4.0 Stairways, and unless detailed otherwise to BRANZ BU 497.

Riser:	180mm maximum
Tread:	310mm minimum
Ramp:	1 : 12 slope maximum
Landing:	Cross fall 1 : 50 maximum

Landing level to be 20mm below the floor and slope away from the door threshold.

3.3 LAYING TIMBER SPACED BOARDING - EXTERIOR DECKS
The grooved side of the boards is face down. Avoid excessively short or long lengths. Drill for all fixings. Stagger end joints. Space boards a minimum of 3mm apart to be 5mm apart when dry. Leave a 25mm minimum gap between the exterior wall and the adjacent decking board. Leave a 12mm gap between the door sill threshold and the adjacent decking board.

3.4 SCREW FIXING
Pre-drill for all fixings, where the screws allow, use a proprietary deck pre-drilling and countersinking tool. Use stainless steel decking screws 75 x 10g and power drive into the deck surface to just slightly below the board surface (approx. 0.5mm). Take care to not overdrive the screw as this may result in the screw heads or the boards being damaged.

3.5 CORROSION RISKS
For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel fixings and connectors.

Completion

3.6 LEAVE
Leave work to the standard required by following procedures.

3.7 REMOVE
Recycle and remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4422 RUBBER SHEET MEMBRANE

1. GENERAL

This section relates to synthetic rubber sheets as single-layer external waterproof coverings with associated accessories and components, for:

- roofs
- decks
- gutters

Documents

1.1 DOCUMENTS
Documents referred to in this section are:
NZBC E2/AS1 External moisture

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
20 years: For waterproofing membrane

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
5 years: For membrane installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS
Roofing to be carried out by competent workers licensed by membrane system manufacturer and experienced with the materials and in the techniques specified.

1.5 PERFORMANCE
Accept responsibility for the weather/water-tight performance of the completed system, including all penetrations through the membrane and junctions with walls and parapets.

1.6 TEST
Flood test horizontal areas where practical with a minimum 50mm depth of water for 24 hours. Make good any watertightness deficiencies when the surface is completely dry.

2. PRODUCTS

Materials

2.1 RUBBER SHEET
Roofing surfaces thickness 1mm minimum and colour black or to match existing.
Foot trafficable surfaces thickness 1.5mm minimum and colour grey.
Thickness and colour to the membrane manufacturer's requirements to suit the specific location.

2.2 BUTYL RUBBER SHEET
Single ply membrane compounded from vulcanised isobutylene isoprene copolymer.
Thicknesses ranging from 1mm to 2.25mm available in various roll widths and lengths.

2.3 EPDM RUBBER SHEET
Single ply membrane compounded from EPDM (ethylene propylene diene monomer) synthetic elastomeric rubber.
Thicknesses ranging from 1.14mm to 1.5mm, available in various roll widths and lengths.

Components

2.4 APPROVED COMPONENTS
"As approved" means that the following materials are compatible to the membrane and are part of the system required by the membrane manufacturer for each specific location and substrate.

- Adhesives: As approved
- Primer: As approved
- Sealants: As approved
- Solvents: As approved
- Seam/lap tapes: As approved.

Accessories

2.5 TAPES
Flashing, overlay and moulding tapes to the membrane manufacturer's requirements to suit the specific location.

2.6 CAPPINGS AND FLASHINGS
As detailed and as required by the membrane manufacturer.

2.7 EDGE TRIM
Metal or timber to the membrane manufacturer's details to suit the specific location.

2.8 VENT SYSTEM
Venting tapes and one-way vents to the membrane manufacturer's requirements.

2.9 OUTLETS
As supplied and required by the membrane manufacturer.

2.10 ALUMINIUM PAINT
Compatible system approved by the manufacturer of the rubber membrane.

2.11 PAINT
Compatible system approved by the manufacturer of the rubber membrane.

3. EXECUTION

Conditions

3.1 GENERALLY
All work and materials to the membrane manufacturer's requirements and complying with the relevant requirements of NZBC E2/AS1.]

3.2 STORAGE
Take delivery of sheet in rolls undamaged and include for site handling facilities where required. Stack off the ground on a level surface and with accessories.

3.3 WEATHER
Apply coverings in a dry atmospheric condition and only when the air temperature is above 8°C.

Application - preparation

3.4 ACCEPTANCE OF SUBSTRATE
Confirm that the substrate, including wall and parapet junctions, penetrations, battens, fillets, sumps, outlets, rebates and projections, will ensure work of the required standard. Ensure the substrate fall complies with NZBC E2/AS1, including correct fall to rainwater outlets to avoid ponding.

3.5 FALLS
Exposed exterior membrane minimum falls.
1 : 30 minimum For roofs (to NZBC E2/AS1, 8.5.1 a.)
1 : 40 minimum For decks (to NZBC E2/AS1, 8.5.1 b.)
1 : 100 minimum For gutters (to NZBC E2/AS1, 8.5.1 c.)

3.6 PRELIMINARY WORK
Ensure that preliminary work, including fixing of vents and outlets to levels, is complete and properly constructed to enable the system to work as intended. This work and the substrate to be smooth, clean and dry.

3.7 CONCRETE SUBSTRATE
Ensure concrete is dry and that new concrete has cured for at least 28 days. The relative humidity of concrete substrates must be 75% or less before membrane application to NZBC E2/AS1, 10.0 - Construction moisture. Prepare the surface, including vacuum cleaning and acid etching as necessary to leave smooth, clean, dry and free of debris. Cover all minor joints and cracks with minimum 25mm PVC self adhesive tape.

3.8 PLYWOOD SUBSTRATE
Confirm plywood substrate is C-D, H3 CCA treated T&G flooring ply, C face up, with sheets butted, glued and screwed in a staggered pattern to the plywood manufacturers' specification. Ensure a 5mm expansion gap at the perimeter of roof/deck.
Ensure that all edges of plywood sheets are fully supported, rigid, with joints flush, no lumps or hollows, smooth, clean, dry and free of debris.
Plywood and the timber substructure to have a maximum moisture content of 20% when the membrane is adhered.
Tape plywood joints with 25mm self-adhesive tape (apply after priming if required by manufacturer).

Application - laying

3.9 APPLY PRIMER FOR BUTYL MEMBRANE
Apply an even layer of primer/adhesive over the whole base and allow to dry before applying covering.

3.10 APPLY VENTING TAPE
Apply venting tape to concrete in a grid pattern, to manufacturer's requirements.

3.11 RELAX SHEETS
Run out sheets and allow to relax for 20 minutes before using. Do not lay sheets in lengths exceeding 25 metres. Do not stretch sheets or tapes in laying.

3.12 APPLY ADHESIVE
Apply adhesive to both the exposed membrane and the exposed substrate, one half at a time. Do not thin adhesive with solvent.

3.13 LAY SHEETS
Lay sheets across the roof slope and lap long edges to full width of selvage, to manufacturer's requirements. Smooth down and roll to remove entrapped air. Adhesive bond and seal to the membrane manufacturer's requirements and roll or rub down as the work proceeds.
Box gutters to be lined in one continuous length with no joins adhesive fixed and top edges mechanically fixed above the flood line.

3.14 MOVEMENT JOINTS
To manufacturer's requirements and details.

3.15 INSPECT
Inspect and test joints on completion.

3.16 UPSTANDS AND DOWNTURNS
Form upstands and downturns. Upstands not less than 100mm at openings and 150mm elsewhere.

3.17 PENETRATIONS AND JUNCTIONS
Confirm that openings, penetrations and junctions have been prepared ready for the installation of the membrane. Required work includes the following:

- neatly finished to all sides of openings and to all wall and parapet junctions
- installation of membrane flashings (those required to be installed prior to installation of penetrating elements and/or wall cladding/lining).
- completion of membrane flashings after final fix of penetrating elements etc (those required to be completed as a second fix due to staged installation of penetrating elements and/or wall cladding/lining).

3.18 INSTALL VENTS
Provide vents for the appropriate area as defined by the manufacturer and fix vents to manufacturer's requirements.
For concrete substrates with a venting tape grid pattern, ensure the vent is over a grid intersection.

3.19 APPLY PAINT
Apply paint to the paint manufacturer's required system.

Completion

3.20 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic recycling and removal all debris, unused materials and elements from the site.

3.21 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked membrane. Replace damaged or marked membrane where repair is not possible or will not be acceptable. Leave work in a sound and waterproof condition to the standard required for following procedures.

3.22 PROTECTION

- Provide access boards for later operations.
- Protect the membrane until completion of the contract works.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4511 EXTERIOR TIMBER WINDOWS AND DOORS

1. GENERAL

This section relates to the supply and installation of:
- exterior timber windows
- exterior door frames and doors
- generally unglazed.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
WANZ	Installation Guide

1.2 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state

Warranties

1.3 WARRANTY
Provide warranty for: 5 years for materials

Refer to the general section 1237 WARRANTIES for additional requirements.

Performance

1.4 PERFORMANCE - STRUCTURAL/WEATHER-TIGHTNESS
The structural and weather-tight performance of the completed window installation, the glazing and infill panels is the responsibility of the window manufacturer.
Provide evidence that the systems will comply with the existing standards of performance.

Performance to NZS 4211

1.5 CERTIFICATION
Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211.

1.6 PERFORMANCE - WINDOWS AND DOORS
To NZS 4211,including:
- deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

PERFORMANCE

1.7 WIND DESIGN

- Non specific design installation to the wind zone parameters of NZS 3604, table 5.4.
- Specific design installation to the wind pressure parameters of AS/NZS 1170.2
- Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials - general

2.1 EXTERIOR TIMBER
Solid timber to NZS 3602 Treated H3.2, profiles to NZS 3610, to match existing. Moisture content 16% ex factory.

2.2 SASHES
Solid/finger jointed timber treated H3.2, profiles to NZS 3610, to match existing and complete with weather-seals and weather hoods as necessary.

2.3 EXTERIOR FACINGS AND SCRIBERS
Treated H3.1, profiles to NZS 3610, to match existing.

2.4 GLASS
Refer to 4610 Glazing section for glass type and thickness. To NZS 4223.3 Glazing in buildings - Human impact safety requirements.

2.5 STEEL PANELS
To BS 6510. Hot-dip galvanized to AS/NZS 4680.

2.6 INTERIOR TIMBER
To NZS 3602. Moisture content 10-14%. Profiles to NZS 3610, to match existing.
Jamb, head and sill liners:Radiata pine treated H3.2, clears grade or finger jointed.

2.7 STANDARD DOORS
Frames radiata pine treated H3.2, profiles to NZS 3610, to match existing.

Materials - doorsets

2.8 STANDARD DOORSETS, SIDE HUNG DOOR
Frames to profile to match existing.

Components

2.9 FLASHINGS GENERALLY
Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

2.10 WINDOW AND DOOR FURNITURE
Refer to 5521 HARDWARE section for type.

2.11 METAL FASTENINGS
Galvanized steel or non-corrodible metal.

2.12 SCREWS
Stainless steel. Length sufficient to penetrate into the background support up to the shank. Screws for fixing hinges, hardware or furniture to match the item being attached.

2.13 NAILS
Length sufficient to penetrate into the background support at least half the nail length, except if into radiata pine then three-fifths their length.

2.14 SECURITY AND SAFETY STAYS
Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Table 2, Acceptable opening sizes for barriers, 2 per sash.
Refer to 5521 HARDWARE for type..

2.15 HINGES
Size and gauge to carry door size and weight.

Doors:	Galvanised steel with fixed brass pin or stainless steel, minimum 100mm.
Windows:	Galvanised steel with fixed brass pin or stainless steel, minimum 400mm.

Finish

2.16 PRIMER
Alkyd wood primer coating system, both sides and all edges.

3. EXECUTION

Conditions

3.1 GENERALLY
Manufacture to NZS 3619 and comply with NZS 3610. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, and stairs).

3.2 DO NOT DELIVER
Do not deliver any elements which cannot be unloaded immediately into suitable storage conditions.

3.3 HANDLE
Handle, unload and store elements without distortion and avoiding pre-finished surfaces rubbing together, and contact with mud, moisture and other damaging materials.

3.4 PROTECT
Protect all elements against damage to arrises and glazing beads. Store frames and doors flat and away from moisture or direct sunlight.

3.5 FABRICATE DOORSETS
Fabricate doorsets in the factory with doors hung, provision for furniture made, finishes applied and fully operable.

3.6 FABRICATE DOORS
Fabricate doors in the factory, with provision for door furniture.

3.7 CHECK ALL OPENINGS
Check all openings on site for size and standard of execution before installing window or door frames.

3.8 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:
- wall underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 Wall underlay to wall openings.
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).

Refer to the WANZ Installation Guide.

Assembly

3.9 FABRICATION GENERALLY
Manufacture and fabricate frames, doors and sashes. Install hinges, stays and running gear.

3.10 FABRICATION SASHES
Solid/finger-jointed timber, complete with weather seals and weather hoods as necessary.

3.11 HINGES
Fit hinges to doors to support the door size and weight

3 hinges minimum	Doors up to 2.2 metres
4 hinges	Doors 2.2 - 2.6 metres
5 hinges	Doors 2.6 - 5.0 metres

Fit minimum 2 hinges per window sash

3.12 FACTORY FINISHING
Before delivery to site:
- Prime assemblies with an alkyd wood primer.
- Brace square and provide protection to assemblies during delivery to site. Where factory glazed, indicate the presence of transparent glasses with whiting, tape or signs compatible with the glass type.

3.13 ON SITE FINISHING
Before installation:
- Prime assemblies not already primed with an alkyd wood primer.
- Re-prime any subsequently cut edge.
- Refer to painting section/s for finishing.

Installation - frames

3.14 FIXING FRAMES
Fit flashings to frame and framing as required. Fix and assemble frames rigidly in place, plumb, level and true to line and face without distortion and with all opening sashes fully and easily operating. Fit facings, scribers, draught-stopping and sealants.

3.15 DISTORTION
Do not distort frames when wedging or other packing, or when tightening fixings. If necessary adjust packing and fixings to eliminate binding. Do not cut, plane or sand frames to remedy distortion.

3.16 FIXINGS
Fix frames so that nail heads are covered by applied stops and beads. Punch all nail heads below timber surfaces which will be visible in completed work. Ensure that at least one frame fixing is adjacent to each hanging point.

3.17 EXTERNAL DOOR AND WINDOW FRAMES AND SASHES
Wedge and rigidly fix in place without distortion, plumb, and true to line and face, complete with full length sill tray, jamb and cap flashings and with all doors and sashes operating freely. Fit hardware.

3.18 INSTALL FLASHINGS
Install flashings to heads, jambs and sills of frames as required by the window manufacturer. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail jamb facings by 15mm at each end. Refer to 4821 FLASHINGS section for supply and installation.

3.19 COMPLETE AIR SEAL
To NZBC E2/AS1:9.1.6 Air seals. Form an air-tight seal by means of proprietary expanding foam, compressible foam strips, or sealants used with backing rods. Ensure that in combination with the internal linings a complete air seal is created.

3.20 FIX HARDWARE
Fix all sash hardware and furniture.

3.21 SAFETY STAYS
Fit safety stays to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows. Fit safety stays to all opening windows located over 2m above the ground and to one window per room .

Installation - doorsets

3.22 PROPRIETARY ELEMENTS
Fix in accordance with the door manufacturer's requirements.

3.23 INSTALLATION GENERALLY
Frames finished to match the width of lined walls. Wedge frames into opening and nail through into the studs. Locate all wedges and fixing at hinge positions and opposite, with one fixing in the vicinity of the lock. Fixings concealed behind planted stops.

Hang doors on hinges to operate freely. Fit all hardware and door furniture.

Installation - standard doorsets

3.24 CONCRETE MASONRY WALLS - TIMBER FRAMES
Fix in place with 10mm expanding masonry anchors with countersunk heads. At hinge side fix direct to opening and pack on the other side to wedge in place. Fix at hinges and opposite, with one fixing in the vicinity of the lock. Separate steel and timber by a damp-proof membrane.

3.25 STEEL STUD WALLS - TIMBER FRAMES
Drill the timber frame and fix to steel studs with countersunk self-drilling corrosion proof screws. At hinge side fix direct to opening and pack on the other side to wedge in place. Fix at hinges and opposite, with one fixing in the vicinity of the lock.

3.26 TIMBER STUD WALLS - TIMBER FRAMES
Wedge into opening and nail through into the studs. All wedges and fixing to be at hinge positions and opposite, with one fixing in the vicinity of the lock.

3.27 BOTTOM CLEARANCE
With inward opening doors, ensure 5mm clearance over internal floor coverings by set of sill at any point of swing.

3.28 REMOVE DOORS
Remove doors from the frames if necessary to protect them, or for re-finishing, store safely and near completion refit them, all without any damage.

3.29 INSTALL PANELS
Prime rebates and beads; install sealant backing strips or silicone. Install dry beading to outside of panels as selected. Do not mitre corners of beads.

3.30 MANIFESTATIONS
To comply with NZS 4223, part 3, section 303.1, Manifestation (making glass visible).

3.31 INSTALL FURNITURE
Install latches, locks and door furniture.

3.32 CHECK
Check and adjust operation of all doors, hardware and furniture.

Completion

3.33 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic recycle and removal all debris, unused and temporary materials and elements from the site.

3.34 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Replace damaged timber with similar profiles to match existing, remove rusting screws and replace with stainless steel, reinstate weather grooves where required. Adjust operation of equipment and moving parts not working correctly. Replace hinges where required to provide an even gap between all edges of the sash and the containing frame, allowing for operational movement without binding. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4521 ALUMINIUM WINDOWS AND DOORS

1. GENERAL

This section relates to the manufacture, supply, and installation of:

- aluminium windows
- aluminium doors and frames
- hardware and furniture
- flashings.

1.1 RELATED WORK

Refer to glazing sections for glass types

1.2 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state
WANZ	Windows Association of Zealand
PQAS	Powder Coating Quality Assurance System

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1734	Aluminium and aluminium alloys - flat sheets, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
WANZ Installation Guide:	The WANZ Guide to Window Installation as described in E2/AS1 Amendment 5.
WANZ PQAS	Powder Coating Quality Assurance System
WANZ SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005).
BRANZ BU 337	Protecting Window Glass from Surface Damage
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels.
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels.

US Federal Specification

TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
5 years: For fabrication

1.5 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
2 years: For installation
Provide this warranty in the installer/applicator standard form.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 SAMPLES
Provide a sample where the supplier/fabricator system differs from preliminary details supplied at pricing stage for HNZ Contract Manager approval.

1.7 QUALIFICATIONS
Work to be carried out by tradesmen experienced, competent and familiar with the materials and techniques specified.

1.8 COMPLIANCE
Windows and doors to be manufactured and installed to NZBC E2/AS1.

1.9 SHOP DRAWINGS
Shop drawings to show the general arrangement of the aluminium joining including, but not be limited to:

Construction details (minimum scale 1:5) showing the interface between joinery elements and the building structure including:

- Jointing details and method of fixing between individual elements and between this installation and adjacent work
- Interaction between claddings and linings
- Flashing details
- Sealants and air seals
- Non standard fixing details including bracketing
- Provision for the exclusion and drainage of moisture
- Provision for sash with open section extrusions jointed by screw traces at corners
- Provision for hollow box section extrusions joined with staking angles at corners
- Provision for adjustment of fixings to ensure true alignment of windows and doors
- Provision for internal security glazing beads and re-glazing without dismantling sashes.

And where required the following:

- Provision for thermal movement
- Provision for seismic movement and movement under wind loads.

Complete shop drawing review before commencing fabrication.

1.10 SEISMIC SUB-FRAMES
Where required units to have seismic sub-frames. Refer to NZS 1170.5.

1.11 CERTIFICATION
Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211.

Performance

1.12 PERFORMANCE - WINDOWS AND DOORS
To NZS 4211, including:
- deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

1.13 PERFORMANCE - STRUCTURAL/WEATHER-TIGHTNESS
The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window manufacturer.

PERFORMANCE

1.14 WIND DESIGN
- Non specific design installation to the wind zone parameters of NZS 3604, table 5.4.
- Specific design installation to the wind pressure parameters of AS/NZS 1170.2.

Provide evidence that the systems will comply with the existing standards of performance.

Finishes

1.15 CERTIFY COATINGS - POWDER COATING
Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided.
The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2. PRODUCTS

Materials

2.1 ALUMINIUM EXTRUSIONS
Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.

2.2 ALUMINIUM SHEET AND STRIP
Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16

2.3 GLASS
Refer to 4610 Glazing section for glass types and installation.

2.4 REVEALS - TIMBER PAINTED
Timber reveals radiata pine H3.2 clears grade or finger jointed, for paint finish with all sides primed grooved for wall linings or flush finished for architraves.

2.5 FLASHINGS GENERALLY
To NZBC E2/AS1, 9.1.10 **Windows and Doors**. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill

flashings are compatible with the window frame materials and fixings and cladding materials.

Components - for direct fix systems

2.6 SILL PAN FLASHING
To NZBC E2/AS1, 9.1.10.5 Window and Door Sills. Flashing for direct fix claddings to collect and drain water that may penetrate through the window or door unit. Size to extend from the inner most point of the aluminium frame out over the external face of the cladding.

2.7 WANZ SUPPORT ANGLE
Support angle, for use below the sill pan, for deeper claddings to transfer the weight of the window back to the frame. Size to suit cladding thickness.

Components - for cavity systems

2.8 STANDARD CAVITY CLOSER
A perforated device constructed from either aluminium or PVC to close the cavity above the window or door unit, between the cladding and head flashing, to provide ventilation in accordance with NZBC E2/AS1 to the spaces above the window or door.

2.9 WANZ SUPPORT BAR
Extruded aluminium support bar with built in drainage and ventilation to NZBC E2/AS1, to provide continuous support to the window unit. Size to suit cladding type.

Components

2.10 GLAZING GASKETS
Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.11 HARDWARE AND FURNITURE
Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer.
Refer to 5521 HARDWARE for type.

2.12 SECURITY SAFETY STAYS
Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Table 2, Acceptable opening sizes for barriers, 2 per sash.
Refer to 5521 HARDWARE for type.

Sealants

2.13 STRUCTURAL SEALANT
Silicone chemically curing sealant specifically formulated and tested or approved equivalent with not less than a ± 40% movement factor complying with US Federal Specification TT S 001543A.

2.14 WEATHERING/INSTALLATION SEALANT
Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT S 0011534A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus (± 25% movement) to US Federal Specification TT S 00230C.

2.15 FOAM TAPE
Foam tape to NZBC E2/AS1, 9.1.10.7 **Closed cell foam tape**.

Finishes

2.16 ANODISED ALUMINIUM
To WANZ SFA 3503-03. Colour to match existing. Anodic coating thickness to suit the specific location, 20 microns minimum.

2.17 POWDER COATED ALUMINIUM - EXTRA DURABLE
Polyester powder organic coating in accordance with WANZ PQAS and AS 3715. Thickness and colour to the aluminium manufacturer's requirements to suit the specific location, system integrity 10 years minimum, colour integrity 7 years minimum, thickness 80 microns minimum.
Refer to
BRANZ BU 349 Finishes for Aluminium.

3. EXECUTION

Conditions - generally

3.1 DO NOT DELIVER
Do not deliver to site any elements which cannot be unloaded immediately into suitable conditions of storage.

3.2 UNLOAD WINDOW JOINERY
Unload, handle and store elements in accordance with the window manufacturer's requirements.

3.3 AVOID DISTORTION
Avoid distortion of elements during transit, storage and handling.

3.4 PREVENT DAMAGE
Prevent prefinished surfaces rubbing together, and contact with mud, plaster and cement. Keep paper and cardboard wrappings dry.

3.5 PROPRIETARY ELEMENTS
Fix in accordance with the window manufacturer's requirements.

3.6 PROTECTIVE COVERINGS
Retain protective coverings and coatings to BRANZ BU 337 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

Conditions - fixings and fastenings

3.7 SUPPLY OF FIXINGS
Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure. Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel or if not exposed to the weather may they be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.8 INSTALLATION FIXING
To NZBC E2/AS1, 9.1.10.8, **Attachments for windows and doors**. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanised jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings.
Install packers between reveals and framing at fixing points, except at the head.

Assembly

3.9 FABRICATION
Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.10 TIMBER REVEALS
Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces.

3.11 HARDWARE GENERALLY
Factory fit all required. Account for all keys and deliver separately to the HNZ Contract Manager.

3.12 SECURITY SAFETY STAYS
Fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows. Fit safety stays to all opening windows located over 2m above the ground and to one window per room .

Installation - windows and doors

3.13 CORROSION PROTECTION
Before fixing, apply suitable barriers or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.14 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.
Required preparatory work includes the following:

- wall underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 **Wall underlays to wall openings**
- full height 20mm jamb battens to NZBC E2/AS1 figure 72A (direct fix only)
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).

Refer to the WANZ Installation Guide.

3.15 INSTALLATION
Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.16 INSTALLATION DIRECT FIX
Install to window manufacturers details and drawings including sill pans to window and door units.

3.17 INSTALLATION CAVITY CONSTRUCTION
Install to WANZ Installation Guide details and drawings including WANZ sill support bars. For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to NZBC E2/AS1, figure 62(d).

3.18 INSTALL FLASHINGS
Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the shop drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 20mm minimum plus any jamb scriber width at each end.

3.19 COMPLETE AIR SEAL
To NZBC E2/AS1:9.1.6 Air seals. Form an air-tight seal by means of a proprietary expanding foam or sealants used with backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.20 FIX HARDWARE
Fix all sash and door hardware and furniture.

Application - jointing and sealing

3.21 SEAL FRAMES ON SITE
Seal frames to each other and to adjoining structure and finishes, all as required by the window manufacturer and to make the installation weathertight. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.22 PREPARE JOINTS
Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.23 BACK UP
When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.24 SEALANT FINISH
Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Completion - cleaning

3.25 REMOVE TRADE DEBRIS
Recycle and remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

3.26 TRADE CLEAN
Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion

3.27 PROTECTIVE COVERINGS
Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades.

3.28 SAFETY
Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

3.29 IN SITU TOUCH-UP TO POWDER COATED ALUMINIUM
In situ touch-up of polyester coated aluminium is only permitted only to minor surface scratching. Otherwise replace all damaged material.

3.30 REMOVE
At the appropriate stage of the project, remove safety indicators and protective coverings and wipe down all joinery thoroughly.

3.31 REPLACE
Replace damaged, cracked or marked elements.

3.32 MANIFESTATIONS
Apply manifestations to comply with NZS 4223.3, 303.1 Manifestations.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4554 SKYLIGHTS

1. GENERAL

This section relates to the manufacture, supply, and installation of tube skylights.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
AS/NZS 1734	Aluminium and aluminium alloys - flat sheets, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
AS/NZS 2208	Safety glazing materials in buildings
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 4666	Insulating glass units

To BRANZ BU 349 "Finishes for aluminium".

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
10 years: For the supply of product

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
10 years: For the installation of product

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS
Work to be carried out by tradespeople experienced, competent and familiar with the materials and techniques specified.

1.5 SHOP DRAWINGS
Submit shop drawings showing product profile, components, installation details, including fixings flashings and accessories.

1.6 SELECTION OF GLASS
Selection of glass for sloped overhead glazing and insulated glass units to comply with NZS 4223.4, Glazing in buildings.

1.7 SAFETY GLAZING MATERIAL
Use only materials from NZS 4223.3, appendix 3.A, Schedule of safety glazing materials, that also comply with the relevant requirements of AS/NZS 2208. Ensure material is legibly marked and if cut by the distributor or installer mark each piece to NZS 4223.3, clause 303.7, Identification of safety glazing materials.

Performance

1.8 PERFORMANCE, WIND, DEAD, SNOW, AND LIVE ACTIONS
The design wind pressures, and snow loads to NZS 3604. Live loads and glazing design, for glass or equivalent plastics, to NZS 4223.4. This is within the scope of the manufacturer's literature and details.

2. PRODUCTS

2.1 TUBE SKYLIGHTS
Tube skylight consisting of a roof dome, reflective tube, and diffuser, to match existing. Passive or mechanical ventilation system ducted to the exterior, low profile polypropylene vent cap, single outlet, 150mm fire rated aluminium foil ducting:

- Passive ventilation 250mm diameter diffuser
- Mechanical ventilation 150mm diameter diffuser 62l/s extraction rate for 2m duct.

Components

2.2 ALUMINIUM EXTRUSIONS
Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.

2.3 ALUMINIUM SHEET AND STRIP
Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16.

2.4 STAINLESS STEEL SHEET AND STRIP
Type: 316 austenitic steel
Finish grade: 2B (satin lustre)

2.5 FIXINGS
Ensure all fixings and brackets are compatible with the skylight. Do not use electroplated zinc fasteners or brass fastenings.

2.6 GLAZING
IGU to AS/NZS 4666 and NZS 4223.1 Glass selection and glazing.

2.7 FLASHINGS GENERALLY
Material, grade and colour of flashings to be compatible with the roofing material. Use proprietary flashing kits where supplied by the manufacturer.

Accessories

2.8 SKYLIGHT HARDWARE
Fasteners, stays, locks, vents and other hardware. Use hardware from manufacturer's standard range.

Finishes

2.9 ORGANIC POWDER COATING FINISH
To AS 3715 for powder coatings on architectural aluminium products. All finished surfaces to show uniformity of gloss and colour (to match approved sample) free of all coating defects.

2.10 ANODISING
To BRANZ BU 349 "Finishes for aluminium".

2.11 TIMBER TREATMENT
Treated with water repellent coating, suitable for later finishing. Refer to 6721 PAINTING INTERIOR.

3. EXECUTION

Generally

3.1 CONFIRM
Confirm framed openings on site for dimensions, to suit the proprietary skylight.

3.2 EXECUTION GENERALLY
Check that the preparation of the opening is to NZBC E2/AS1 8.1.7 **Roof penetrations.**

3.3 HARDWARE GENERALLY
Factory fit all required and scheduled hardware.

3.4 HANDLING
Avoid distortion of elements during transit, handling and storage. Prevent pre-finished surfaces from rubbing together. Prevent contact with mud, plaster and cement. Do not deliver to site any elements which cannot be immediately unloaded into suitable conditions of storage.

3.5 RETAIN PROTECTIVE COVERINGS
Retain protective coverings and coatings in place during fixing wherever possible. Provide additional protection to prevent marking of surfaces visible in the completed work. Remove protection on completion.

Tube skylights

3.6 INSTALL TUBE SKYLIGHTS
Check that the roof and ceiling are formed and constructed to suit the required units. Form the roof and ceiling openings to the skylight manufacturer's requirements. Install and fix the units and tube strictly in accordance with the manufacturer's requirements and installation instructions, to make the installation completely weatherproof and the tube light tight. Repack any thermal insulation around openings where disturbed by the installation. Install proprietary flashings and overflashings as detailed by the manufacturer to make the installation completely weatherproof.

3.7 TUBE SKYLIGHTS ACCESSORIES AND OPERATING SYSTEMS
Install selected accessories and hardware and complete all operating systems.

Completion

3.8 CLEAN FRAMES AND GLAZING
On completion clean down both sides of skylight frames, using the methods required by the respective manufacturer's. Remove any manufacturer's stickers and clean glass.

Ensure all installed units are adequately protected from damage and adverse weather during construction.

3.9 CONFIRM
Confirm the proper operation of hardware and operating systems on completion of the installation and again at completion of the contract works.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4555 GARAGE DOORS

1. GENERAL

This section relates to the manufacture, supply and installation of garage door systems including required opening/operating systems.

Documents

1.1 DOCUMENTS REFERRED TO
Documents referred to in this section are:

AS/NZS 1170	Structural design actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
NZS 3604	Timber-framed buildings
AS/NZS 4505	Garage doors and other large access doors

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 INFORMATION FOR OPERATION AND MAINTENANCE
Provide operating instructions for the garage doors and associated opening equipment. Provide a list of all components requiring regular maintenance.

Performance

1.3 WIND DESIGN
Design the installation to the manufacturers requirements and as appropriate for the specific location.

1.4 LOADS - NON - SPECIFIC DESIGN - DOORS UP TO 3.0M HIGH
Garage doors complete with hinges, roller assemblies and fasteners to comply with wind performance requirements to NZS 3604.

1.5 LOADS - DOORS SPECIFIC DESIGN
For all garage doors over 3.0m high or in wind zones beyond NZS 3604. Garage doors complete with hinges, roller assemblies and fasteners to comply with wind and seismic load performance requirements to AS/NZS 1170.2 and NZS 1170.5.

1.6 RESPONSIBILITY FOR PERFORMANCE
Accept responsibility for the structural and weathertight performance of the completed garage door installation.

2. PRODUCTS

2.1 GARAGE DOOR
Manufacture to AS/NZS 4505 complete with a compliance label.

3. EXECUTION

3.1 PREPARATION FOR INSTALLATION
Check that the trimmed and lined openings are formed and constructed to suit the required door units. Do not proceed until openings are properly formed.

3.2 MANUFACTURER'S REQUIREMENT FOR INSTALLATION
Install door, track and operating equipment complete with all specified and necessary accessories and hardware to the manufacturer's requirements.

3.3 START UP
Carry out start up procedures and verify proper performance of the doors.

3.4 ADJUSTMENT
Lubricate bearings and sliding parts and adjust doors to operate easily, free of warp, twist or distortion with a weathertight fit round the entire perimeter.

3.5 DEMONSTRATION
Carry out start up procedures and verify proper performance of the door. Demonstrate the operation of the door to the HNZ Contract Manager and set security features to the HNZ Contract Manager requirements at practical completion of the contract works.

Completion

3.6 ENSURE
Ensure all elements are free of marks or blemishes, with all moving parts working fully and freely.

3.7 REPLACE
Replace damaged, cracked or marked elements.

3.8 LEAVE
Leave work to the standard required by following procedures.

3.9 REMOVE
Recycle and remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4610 GLAZING

1. GENERAL

This section relates to the supply and fixing of glass products for external and internal joinery in residential type buildings and includes:
- windows and doors
- balustrade systems
- mirrors and mirror frames

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in place

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC F2/AS1	Hazardous building materials
NZBC F4/AS1	Safety from falling
NZBC H1/AS1	Energy Efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 337	Protecting window glass from damage

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER
Warrant glass under normal environmental and use conditions against failure of materials.

10 years:	for insulating glass units
10 years:	for toughened glass

Requirements

1.4 SAMPLES
Submit samples of selected glass for review if required.

Performance

1.5 ENERGY EFFICIENCY
Provide glazing to meet the energy requirements of NZS 4218 and NZBC H1/AS1 for housing small buildings.

2. PRODUCTS

Materials

2.1 CLEAR FLOAT GLASS
Clear ordinary annealed transparent float glass for general window glazing. Thickness to NZS 4223.1 and NZS 4223. Supp 1.

2.2 TEXTURED, PATTERNED OR OBSCURE GLASS
Translucent, annealed, rolled glass with a decorative pattern on one surface to match existing or etchilte where required for privacy.

2.3 TOUGHENED GLASS
Grade A Safety Glass to AS/NZS 2208, for all door glazing, door side panels, windows over 0.4 m², fall over 1m and balustrades.

2.4 REFLECTIVE AND COATED FLOAT GLASS
Either coated float glass incorporating both solar and thermal insulation properties; or coated float glass with only the thermal insulation properties.
Heat resistant safety glass minimum 5mm thick for solid fuel heaters.

2.5 INSULATING GLASS UNITS (IGU'S)
To AS/NZS 4666 and the IGU Manufacturers Association (IGUMA) requirements, to match existing.

Materials, mirrors

2.6 SAFETY MIRROR GLASS
4mm, 5mm and 6mm annealed float glass mirror including silver, activation, passivation and two protective coats vinyl back safety glazing material to AS/NZS 2208.

Components, timber glazing

2.7 PUTTY, TIMBER FRAME
Linseed oil base glazing putty. Not to be used with laminated or IGUs.

2.8 SPRIGS
Diamond metal pieces to retain glass in timber sashes and frames.

2.9 GLAZING TAPE
Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes for bead glazing. For internal use only.

2.10 SETTING BLOCKS
Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes. Use with bead glazing and for IGUs.

COMPONENTS, ALUMINIUM GLAZING

2.11 GLAZING TAPE AND GASKETS
Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes selected to suit the glazing detail to window manufacturers' requirements.

2.12 SETTING BLOCKS
Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes.

Components, wall mounted glass (mirrors and splashbacks)

2.13 GLASS ADHESIVE
Adhesive mirror-mastic and double-sided adhesive tape.

2.14 GLASS MOUNTING CHANNELS
White powder coated aluminium mounting channel. Use for mirrors 0.3 m² to 0.6 m².

2.15 MIRROR SCREWS
Stainless steel counter-sunk head screws and chrome plated dome screw covers. Use for all mirrors.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
To NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZBC B1/AS1, 7.0 **Glazing**. All external glazing to be wind and watertight on completion.

3.2 DELIVERY
Keep glass dry and clean during delivery and bring on to site when ready to glaze directly into place. Comply also with the storage requirements set out in BRANZ BU 337.

3.3 GLASS CONDITION
All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS
If not specifically stated in the glazing schedule determine the minimum thickness of glass for each sheet as required by NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZS 4223. Supp 1. For windows tested to NZS 4211, ensure glass meets the requirements of the window testing.

Determine the final glass thickness based on whether wind loading or human impact considerations govern.

3.5 REBATE DIMENSIONS
Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to NZS 4223.1, Section 4 Glazing.

3.6 JOINTING, PUTTY AND SEALING MATERIAL COMPATIBILITY
Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Conditions - human impact safety requirements

3.7 SAFETY GLAZING, GENERAL REQUIREMENTS
Glazing of doors, side panels, low level glazing, stairwell landings and similar locations, to NZS 4223.3 and NZBC B1/AS1, 7.0 **Glazing**, in respect of, thickness, maximum areas of panel Grade A Safety Glass.

3.8 SAFETY GLAZING MATERIAL
Use only materials from NZS 4223.3, Appendix 3.A Schedule of safety glazing materials that also comply with the relevant requirements of AS/NZS 2208. Ensure material is permanently marked and if cut by the distributor or installer mark each piece to NZS 4223.3, clause 303.7 Identification of safety glazing materials.

3.9 CONTAINMENT
Edge cover to comply with NZS 4223.1, Section 4 Glazing, table 5. Otherwise to NZS 4223.3, clause 303.2 Containment.

Assembly

3.10 WORKING OF GLASS
All working of glass as required in NZS 4223.1.

3.11 EDGE WORK AND BEVELLING
Edgework other than a clean cut, remove arris to edge of mirrors.

3.12 INSTALL SAFETY GLASS
To NZS 4223.3, as modified by NZBC F2/AS1 and NZBC B1/AS1, 7.0 **Glazing**.

Application - timber glazing

3.13 PREPARE REBATES
Ensure all rebates and grooves are clean, dry and unobstructed at time of priming, sealing and glazing.

3.14 PREPARE TIMBER SURROUNDS
Ensure that all rebates have been primed with a primer suitable for this purpose and applied to the requirements of the painting sections.

3.15 PREPARE TIMBER BEADS
Before fixing ensure that timber beads are sealed and painted to match the timber surround.

3.16 LOCATE BLOCKS
Centralise the glass in the rebate opening using setting, location and spacer blocks as required in NZS 4223.1, Section 4 Glazing, to prevent movement of glass in the rebate and cushion the effect of wind loading on the sealing system.

3.17 INSTALL PUTTY FRONTING
Back putty to give a bedding of not less than 1mm to 2mm between the glass and the back of the rebate when the glass has been pressed back. Strip off squeezed out putty at a positive angle. Fix glass to wooden surrounds with diamond points or sprigs at maximum 460mm centres. Fix glass to metal surrounds with spring clips or pins provided by the sash manufacturers. Apply putty to the face to form a triangular fillet stopping 1-2 mm below sight line. Finish putty smooth and true to line and face and with a light brushing.

Leave all windows and doors closed until putty has set sufficiently to prevent glass displacement.

Prime putty fronting once surface has skinned within days of completion of glazing to manufacturer's requirements.

3.18 BEAD GLAZING, PREFORMED STRIPS

Apply the preformed tape to the rebate upstand with securely formed (or sealed) butt joints at corners. Place setting blocks, offer the glass and press back against the tape centralised in the opening and apply the second tape. Press the beads against and compressing the tapes and fix true to line and face sufficiently rigid to prevent flexing or movement. Trim off excess strip.

3.19 BEAD GLAZING, NON SETTING COMPOUNDS

Apply compound to the rebate. Push setting blocks into place with distance pieces against the rebate upstand before offering the glass to the surround on setting blocks, centralised in the opening and pushed back into the glazing compound. Fill all voids with compound and apply more compound before setting distance pieces in it opposite the distance pieces already in place. Bed the beads to the glass and rebate and fix true to line and face sufficiently rigid to prevent flexing or movement. Finish compound off at an angle both sides of the glass.

3.20 INSTALLING INSULATING GLASS UNITS

Refer to the glazing manufacturer's requirements and before glazing ensure that the materials forming the opening are strong enough to accept the weight, the rebates are the correct size and prepared to receive the units to AS/NZS 4666. Fit setting and location blocks and bead glaze units using a compatible sealant to NZS 4666 section 3 Glazing, and to the glazing manufacturer's requirements.

3.21 INSTALLING REFLECTIVE AND COATED GLASS

In addition to the type of glazing to match existing refer to the requirements of the glass manufacturer and ensure that the rebate dimensions, clearances and edge cover are sufficient to allow for the movement created by the particular solar glass being used.

Check thermal stability for the particular location and ensure any sealant or compound is compatible with the coating.

Application aluminium

3.22 INSTALL GLASS TO ALUMINIUM FRAMES

Install glass to NZS4223.1.

- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

Application - wall mounted glass (mirrors and splashbacks)

3.23 WALL MOUNTED GLASS, SCREW FIXED

For all mirrors and splashbacks, fix with proprietary stainless steel countersunk-head screws, fitted with black neoprene washers with fine-threaded upstands to receive chrome plated dome screw covers.

3.24 WALL MOUNTED GLASS, CHANNEL MOUNTED

For mirrors and splashbacks above 0.3 m², fix with proprietary mounting channels top and bottom with end caps, to the channel manufacturer's requirements.

3.25 WALL MOUNTED GLASS, ADHESIVE FIXED

For mirrors and splashbacks, fix with adhesive mirror-mastic and double-sided adhesive tape. Adhesive mastic area 0.25 m² per 1 m² of mirror.

Application miscellaneous

3.26 INSTALL GLASS BALUSTRADES
Confirm/design and carry out installation to:

NZBC B1/AS1: Structure, 7 Glazing
NZBC F2/AS1: Hazardous building materials, 1.0 Glazing
NZBC F4/AS1: Safety from falling, 1.0 Barriers in buildings.
Balustrade height is 1.1m minimum.

3.27 INSTALL GLASS SCREENS
Install shower and bath screens and doors to manufacturer's requirements.

Finishing

3.28 SAFETY
Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type.

3.29 MANIFESTATIONS
To NZS 4223.3, clause 303.1 Manifestation (making glass visible).
Glazing height over 1.5m, has one horizontal vision rail 50mm wide on the inside of the glass between 800mm and 1.5m minimum.

Completion

3.30 TRADE CLEAN
Clean off or remove safety indicators at completion of the building.

3.31 REPLACE
Replace damaged, cracked or marked glass.

3.32 LEAVE
Leave work to the standard required by following procedures.

3.33 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4710 INSULATION

1. GENERAL

This section relates to materials installed, laid, hung or fitted as thermal and/or acoustic insulation.

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

BIB	Building Insulation Blanket
EPS	Expanded polystyrene sheets

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC H1/AS1	Energy efficiency
AS/NZS 3000	Electrical installations
NZS 4218:2004	Energy efficiency - Small building envelope
NZS 4246	Energy efficiency - Installing insulation in residential buildings
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
AS/NZS 60598.2.2:2001	Luminaires- Particular Requirements - Recessed luminaires
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance
Health and Safety at Work Act 2015	

Requirements

1.3 QUALIFICATIONS
Work to be carried out by tradesmen experienced, competent and familiar with the specified insulation materials and techniques specified.

2. PRODUCTS

Materials

2.1 POLYESTER FIBRE THERMAL INSULATING PADS
Polyester fibres bonded together to form a rectangular insulating semi rigid pad.

Walls:	R2.5 minimum
Floors:	R1.9 minimum

2.2 POLYESTER FIBRE THERMAL BLANKET/ROLL
Polyester fibres bonded together to form a flexible blanket roll.

Ceilings:	R3.6 minimum

2.3 SUB FLOOR LINING AND COVER
Refer to 4223 PLYWOOD CLADDING OR 4231 FIBRE CEMENT CLADDING section for rigid sheathing under floor joists used as a separate air barrier in exposed locations.

Refer to 4224 EXTERIOR TIMBER TRIM section for sub floor cover battens used as a barrier in specific locations.

2.4 POLYTHENE FILM - VAPOUR BARRIER
Refer to 4161 UNDERLAYS AND BARRIERS section for polythene film used as a separate vapour barrier.

Components

2.5 STAPLES
Stainless steel gauge and length to suit application and to manufacturer's requirements.

2.6 SCREWS POLYESTER BLANKET
Specially coated self drilling screws with embossed or profiled washer system suitable to cover oversize predrilled holes.

2.7 STRAPPING TAPES
Proprietary plastic strapping tape, stapled over framing to retain insulation in unlined wall, ceiling and underfloor locations.

3. EXECUTION

3.1 DELIVERY
Keep insulation dry in transit. Take delivery of insulation dry and undamaged and store in a location that protects them from the weather and damage. Reject all damaged materials.

3.2 STORAGE
Accept materials undamaged and dry and store in a location that protects them from the weather and damage. Avoid distortion, stretching, puncturing and damage to edges of sheet materials. Do not use damaged sheets.

3.3 HANDLING
Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Maintain full thickness unless compression is an installation system requirement.

3.4 HAZARD MANAGEMENT
Comply with HSE Act and take all safety precautions necessary to reduce potential hazards.

3.5 INSPECTION
Before starting installation of blankets and pads, check that the location and framing are free from moisture, that the cavities are not interconnected and that mesh, wall underlay and vapour barriers are in place.

Application - general

3.6 INSTALL INSULATION - GENERAL
Lay, install, fit and fix to NZBC H1/AS1: Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to NZS 4218 and NZS 4246. Allow insulation to re-loft/relax prior to installation. Do not cover vents. Allow a clear gap around metal flues as recommended by the fireplace manufacturer. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

3.7 RECESSED LIGHT FITTINGS - CLEARANCE
Residential applications;

- In a retrofit situation where recessed downlights are unclassified or unknown, ensure 150mm clearance from the insulation to AS/NZS 3000, figure 4.9.

3.8 INSTALL INSULATION - CLEARANCE
Ensure a minimum 50mm clearance is maintained between the insulation and any non-rigid roofing underlay.
Ensure a minimum 20mm clearance is maintained between the insulation and the outer wall framing cavity.
Ensure a minimum 400mm clearance is maintained between the insulation and the ground.

3.9 FIT POLYESTER FIBRE THERMAL INSULATING BLANKET
Friction fit between studs. Hand tear across pad to fit nogs and small spaces round penetrations. Leave no gaps and maintain full thickness of blanket over the whole of the installation. Do not cover vents and cut around metal flues to the safety requirements of the fireplace manufacturer

Non BIB application
- Lay blanket parallel to ceiling joists to cover battens, tear end for length.

3.10 FIT POLYESTER FIBRE THERMAL INSULATING PADS
Friction fit insulating pads in place to completely fill the whole of the cavities. Slightly oversize length for friction fit and tear by hand across pad and fill cavity. Tear to smaller pieces for smaller spaces and around penetrations. Leave no gaps between, and maintain full thickness of the insulating segments over the whole of the installation. Do not cover vents and cut around metal flues to the safety requirements of the fireplace manufacturer.

Completion

3.11 CLEAN UP
Clean up as the work proceeds, so no spare offcuts or any other matter or item remain behind claddings or linings.

3.12 CHECK WALL WRAPS AND ROOF UNDERLAYS
Ensure these are dry, clean, undamaged and free of debris before being covered.

3.13 LEAVE
Leave a label from the insulation bag stapled to framing near the ceiling access point or sub floor access point with the date, product type, brand, manufacturer, product R value and installation company details.

3.14 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

4851 EXTERIOR HANDRAILS AND TIMBER BALUSTRADES

1. GENERAL

This section relates to the fabrication and installation of exterior timber balustrades and handrails.
Refer 2310 FOUNDATIONS section for piles, bearers and joists.
Refer 3101 CONCRETE section for concrete ramps.
Refer 3820 CARPENTRY section for posts above ground.
Refer 4383 EXTERIOR TIMBER STAIRS & DECKING section for decking board.

Documents

1.1 DOCUMENTS REFERRED TO
Documents referred to in this section are:

NZBC B2/AS1	Durability
NZBC F4/AS1	Safety from falling
NZS 3602	Timber and wood-based products for use in building

2. PRODUCTS

2.1 SOLID TIMBER COMPONENTS
Timber species, grade, installation moisture and treatment to NZS 3602, table 2, and NZBC B2/AS1. H3.2 CCA Radiata pine.

Handrail:	140mm x 45mm, dressed profiled to comply with NZBC D1/AS1 for graspable handrails
Rails:	100mm x 50mm minimum
Balusters:	40mm x 40mm minimum

2.2 NON-TIMBER HANDRAIL
Proprietary handrail or non-fabricated handrail to manufacturer/supplier specifications and instructions. Hot dip galvanised steel to AS/NZS 1163.

2.3 HARDWARE
Handrail brackets, metal supports, angles and sundry fittings.

3. EXECUTION

Conditions

3.1 GENERALLY
Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

Check site dimensions. Carry out machining within the practices recommended for the particular timber, wood product or pre-finished wood product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's recommendations. Work to be accurate, square and true to line and face.

Application

3.2 HANDRAILS
Fabricate and install the handrails complete with all associated metal componentry and hardware. Unless otherwise detailed construct to comply with NZBC F4/AS1.

Handrail:Post support at maximum 1.5m spacings maximum.

3.3 BALUSTRADING
Fabricate and install the balustrading complete with all associated metal componentry and hardware. Unless otherwise detailed construct to comply with NZBC F4/AS1.

Balusters:	Gap 95mm maximum between balusters.
Rails:	Top rail height 1.1m minimum and bottom rail height 75mm maximum above decking board.

Completion

3.4 LEAVE
Leave work to the standard required by following procedures.

3.5 REMOVE
Remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5113 PLASTERBOARD LININGS

1. GENERAL

This section relates to the supply, fixing and jointing of gypsum plasterboard sheets and accessories to timber and steel framed walls and ceilings to form:

- standard systems
- superior finish quality systems
- wet area systems
- bracing systems
- minor related fire rating
- minor related sound rating.

1.1 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

AWCINZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC C/AS1-AS7	Protection from fire
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3602	Timber and wood based products for use in building
NZS 3604	Timber-framed buildings
AS/NZS 4600	Cold-formed steel structures

ASTM C630/C630M-96a Water-resistant gypsum backing board

BRANZ Technical Paper P21 A wall bracing test and evaluation procedure (2010)

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.3 QUALIFICATIONS

Plasterboard fixers and stoppers to be experienced competent workers, familiar with materials and techniques specified. Submit evidence of experience on request. For example:

- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

1.4 INSPECTIONS AND ACCEPTANCE

Inspect the finished surface of the installed plasterboard:

- before applying sealer and
- before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, HNZ Contract Manager approval and acceptance of the surface can be given.

Performance - systems

1.5 SOUND AND FIRE RATING REQUIREMENTS
Provide evidence that the systems will comply with the existing standards of performance.

1.6 BRACING REQUIREMENTS
Provide braced wall systems using bracing rated plasterboard sheet to meet the requirements of NZS 3604, section 5, **Bracing design**, when tested in accordance with BRANZ Technical Paper P21. Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials

2.1 GYPSUM PLASTERBOARD
Gypsum plaster core encased in a durable face and backing paper formed for standard use to AS/NZS 2588.

2.2 GYPSUM PLASTERBOARD, HIGH FINISH SYSTEMS
Gypsum plaster core encased in a special fine surface durable face and backing paper formed for standard and fire rated use to AS/NZS 2588.

2.3 GYPSUM PLASTERBOARD, WATER RESISTANT SYSTEMS
Gypsum plaster core containing a wax emulsion encased in a durable face and backing paper formed for standard and fire rated use to AS/NZS 2588 and for water resistance use to ASTM C630/C630M-96a.

2.4 GYPSUM PLASTERBOARD, WALL BRACING SYSTEMS
Gypsum plaster core encased in a durable face and backing paper bracing rated sheet to AS/NZS 2588.

2.5 CORNICE
Plasterboard, scotia to match existing .

Components

2.6 CEILING BATTENS, METAL
0.55mm galvanized steel (275 g/m² zinc coating) battens and matching perimeter channels.

2.7 CEILING BATTENS, TIMBER
H1.2 treated battens. Species, in service moisture content as set out in NZS 3602.

2.8 SCREWS, TIMBER FRAME

10mm plasterboard:	Type S gypsum screws 25mm x 6 gauge
13mm plasterboard:	Type S gypsum screws 32mm x 6 gauge

Screws for fire rated and sound rated systems as required by the sheet manufacturer's approved specification.

2.9 NAILS, TIMBER FRAME

10mm plasterboard:	30mm x 2.5mm galvanized drywall clouts
13mm plasterboard:	40mm x 2.5mm galvanized drywall clouts

Nails for fire rated and sound rated systems as required by the sheet manufacturer's approved specification.

Nails for perimeter nailing for bracing systems complete with 15mm galvanized steel washers as required by the sheet manufacturer's approved specification.

2.10 SCREWS, STEEL FRAME / BATTENS

10mm plasterboard:	Type S gypsum screws 25mm x 6 gauge
13mm plasterboard:	Type S gypsum screws 32mm x 6 gauge

Screws for fire rated and sound rated systems as required by the sheet manufacturer's approved specification.

2.11 SECTIONS AND TRIM MATERIAL
Form from galvanized steel of a coating class not less than ZM275 to AS 1397 and fix with 30mm x 2.5mm galvanized clouts.

2.12 EXTERNAL ANGLE
Perforated.
Extruded corner guard for accessible units where required.

2.13 INTERNAL REINFORCING ANGLE
Perforated.

2.14 CONTROL JOINT
With plastic protective tape.

2.15 CASING BEAD
To suit sheet thickness.

2.16 TAPE ON EDGE TRIMS
Tape-on paper tape and galvanized steel trims and edges.

2.17 EDGE PROFILES
Pre-formed aluminium profiles, with perforated edge trims.

Accessories

2.18 ADHESIVE
Multi-purpose water based wallboard adhesive.

2.19 JOINTING COMPOUNDS
System match bedding compound and finishing compound. Refer to the sheet manufacturer's literature and follow their requirements on which compounds to use with which accessory and in which location, to achieve the required level of finish.

2.20 JOINTING TAPE
System match reinforcing tape.

3. EXECUTION

Conditions

3.1 STORAGE
Store plasterboard sheets and accessories in dry conditions stored indoors out of direct sunlight in neat flat stacks on either an impervious plastic sheet or clear of the floor with no sagging and avoiding damage to ends, edges and surfaces. Reject damaged material.

3.2 LEVELS OF PLASTERBOARD FINISH
Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.
Plasterboard surface prepared to AS/NZS 2589 Level 4.

3.3 SUBSTRATE
Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements.

3.4 TIMBER FRAME MOISTURE CONTENT
Refer to 3820 CARPENTRY section for moisture content framing at lining.

3.5 METAL FRAMING
Metal framing, to which gypsum lining is fixed, shall comply with AS 1397 or AS/NZS 4600, as applicable. Where adhesion of gypsum linings is required, surfaces shall be free of oil, grease, dust and other foreign materials. Refer to the metal framing manufacturers specifications where high density gypsum linings (>800 kg/m^3) are specified for fixing to light gauge steel framing.

3.6 PROTECTION
Protect surfaces, cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage.

3.7 GENERAL REQUIREMENTS
Leave a 10mm gap at floor level. Do not break the face paper. Position sheets to a "touch fit" with no forcing or springing into place. Run sheets over doors and under and over window openings. Apply adhesive in daubs 25mm diameter and 10mm thick. Do not place daubs at sheet perimeters or under nail and screw fixings.

Application - fixing

3.8 INSTALL CEILING BATTENS
Install in accordance with the batten manufacturer's requirements.

3.9 LINE CEILINGS AND WALLS
Line ceilings and walls with the various sheets and fix to the sheet manufacturer's details and requirements, using tapered edge joints as far as possible.

3.10 BOARD ORIENTATION
Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.11 END BUTT JOINTS
When end butt joints are unavoidable, locate staggered off the framing, back block, fix and stop to the sheet manufacturer's details and requirements.

Application - bracing systems

3.12 LINE BRACING WALLS
Line walls with high density plasterboard sheet to form panels or systems, clout-washer and clout fixed to the sheet manufacturer's details. Do not fix bracing sheets until steel bracing and/or straps are in place.

Application - wet area systems

3.13 LINE WET AREA WALLS
Line walls in accordance with the sheet manufacturer's requirements.

Application - finishing sections and trim

3.14 FIX EXTERNAL ANGLE
Fix full length to external corners with clouts at 100mm centres each side staggered to the sheet manufacturer's details and requirements.

3.15 FIX INTERNAL REINFORCING ANGLE
Fix full length to internal corners with clouts at 100mm centres each side staggered to the sheet manufacturer's details and requirements.

3.16 FIX CASING BEAD
Fix between dissimilar materials and caulk with sound rated sealant to the sheet manufacturer's details and requirements.

3.17 FORM CONTROL JOINTS
Provide at maximum 9 metre centres in long unbroken walls and 12 metre centres to ceilings to the sheet manufacturer's details and requirements. Fix control joint section into joint by staples at 150mm both sides. Fill gap in voids with sound rated sealant. Remove plastic tape after stopping.

3.18 FIX CORNICE
Fix with adhesive required by the sheet manufacturer and joints mitred to the sheet manufacturer's details and requirements

3.19 FORM SQUARE STOPPED CORNERS
Form taped reinforced square stopped ceiling-to-wall angles to the sheet manufacturer's requirements.

3.20 INSTALL TAPE-ON TRIMS
Install in accordance with the trim manufacturer's requirements.

3.21 INSTALL SPECIAL EDGES AND BANDS
Install in accordance with the edging manufacturer's requirements.

Finishing - stopping

3.22 FORM JOINTS
Fill recess with bedding compound, centre the reinforcing tape, apply a second coat of bedding compound followed by a coat of finishing compound. Allow to dry and lightly sand off, to the sheet manufacturer's details and requirements.

3.23 STOPPING NAILS AND SCREWS
Apply two successive coats of bedding compound and a coat of finishing compound to the sheet manufacturer's requirements.

3.24 SQUARE STOPPED CORNERS
Fill with bedding compound, centre reinforcing tape into internal angle and apply a coat of finishing compound and complete to the sheet manufacturer's details and requirements.

3.25 EXTERNAL ANGLES
Apply two coats of bedding compound followed by a coat of finishing compound to the sheet manufacturer's requirements.

3.26 END BUTT JOINTS
Fill, tape and coat as for tapered edge joints except that each stage is doubled in width.

Completion

3.27 REPLACE
Replace damaged sheets or elements.

3.28 CLEAN DOWN
Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer's requirements, to leave completely smooth and clean to the standard required for following trades.

3.29 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5122 PLYWOOD LININGS

1. GENERAL

This section relates to the use of plywood sheets for:
- interior lining (or under-lining for accessible bathrooms)
- installed as bracing
- installed as panel (for ceiling access or fireplace close off front cover).

Documents

1.1 DOCUMENTS REFERRED TO
Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC E2/AS1	External moisture
AS/NZS 2269.0	Plywood - Structural - Specifications
AS/NZS 2270	Plywood and blockboard for interior use
NZS 3604	Timber-framed buildings

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Performance

1.2 BRACING REQUIREMENTS
Provide wall/ subfloor/ floor/ ceiling systems to meet the requirements of NZS 3604, section 5, **Bracing design**, and roof systems to meet the requirements of NZS 3604, section 10, **Roof framing**.

Provide evidence that the systems will comply with the existing standards of performance.

2. PRODUCTS

Materials

2.1 PLYWOOD LINING
To AS/NZS 2270, to match existing.

Wall or ceiling:	12mm CD minimum, paint finish to match existing
Under-lining:	17mm H3.2 CCA minimum

2.2 PLYWOOD BRACING
Rotary cut, Radiata Pine veneer ply sheet to AS/NZS 2269.0.
Bracing system tested to NZS 3604.5 **Bracing design**, NZS 3604.6.2 **Subfloor systems**, NZS 3604.8.3 **Systems to resist horizontal loads**, to meet NZBC B1/AS1.

2.3 PLYWOOD PANEL

Ceiling access panel:	600mm x 600mm minimum, thickness12mm CD, paint finish to match existing ceiling
Fireplace front panel:	Thickness 12mm CD minimum, paint finish to match existing walls.

2.4 PANEL TRIMS
Run to profiles to match existing. Treated H1.2.

Components

2.5 NAILS
Refer to the panel manufacturer's requirements. Galvanized or stainless steel for H3 CCA treated sheets. Use annular grooved or twisted shank nails for roof sarking.

General
12 -15mm plywood: 50mm x 2.8mm
7 - 21mm plywood: 60mm x 2.8mm
25mm plywood: 75mm x 3.15mm

2.6 SCREWS
Refer to the manufacturer's requirements for size and use. Galvanized or stainless steel for H3 CCA treated sheets.

General
12 -15mm plywood: No. 8 x 40mm
17mm plywood: No. 10 x 40mm
19 - 21mm plywood: No. 10 x 45mm
25mm plywood: No. 10 x 50mm
Under vinyl surfacing
17 - 25mm plywood: No. 10 x 50mm (to E2/AS1, 8.5.5.1)

Accessories

2.7 ADHESIVE
Use only multi-purpose water based wallboard adhesives required by the plywood manufacturer.

3. EXECUTION

Conditions

3.1 HANDLE
Handle sheets carefully and reject those with damaged faces or edges.

3.2 STORE
Store sheets in stacks clear of the ground, supported without sagging on evenly spaced horizontal bearers. Protect from damage and weather.

3.3 FRAMING
To NZS 3604 and the plywood manufacturer's requirements.

Refer to 3820 CARPENTRY section for moisture content framing at lining.

Application - General

3.4 SUPPORT
Fully support all edges and joints, except where tongue and groove is used.

3.5 EXPANSION
Allow a 2-3mm gap at edges of linings for sheet expansion; and
2 - 3mm at each sheet joint; or
6 - 9mm at 3.6 metres; or
8 - 12mm every 4.8 metres
In areas with an expected high level of internal moisture, allow a gap of 4 - 6mm every 1.2 metres.

3.6 FIXING PLYWOOD BRACING
Fixing 7mm minimum and 3 fastener diameters maximum from the sheet edge, 75mm centres along edges and 150mm centres on intermediate supports.
Ensure required hold down, strapping, angles, or bolts are in place, and that framing centres are correct.
Fit and fix to NZS 3604 and the manufacturer's bracing requirement with sheets and trim all in plumb, true alignment and face.

Fixing: Nailing

Application - linings

3.7 FIT AND FIX PLYWOOD SHEETS
Fit and fix as detailed to the plywood manufacturer's requirements with sheets and trim in plumb, true alignment, face and grain.

Fixing: Counter-sunk screw fixed under-lining for accessible bathrooms.

APPLICATION - PANELS

3.8 PANELLING
Fit and fix and trim all in plumb, level, true alignment, face and grain.

Fixing: Counter-sunk screw fixed access panel for ceilings.
Fixing: Counter-sunk mechanical and adhesive fixed fireplace front panel.

Completion

3.9 REPLACE
Replace damaged or marked elements.

3.10 LEAVE
Leave work to the standard required by following procedures.

3.11 REMOVE
Remove debris, unused materials and elements from the site.

3.12 PROTECTION
Protect the surfaces and the finished work until coatings or finishes are applied.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5123 MANUFACTURED TIMBER BOARD LININGS

1. GENERAL

This section relates to the supply and fixing of wall and ceiling linings:

- MDF board (for pelmets)
- low density wood fibreboard sheets, tiles or panels (for Pinex and hardboard ceilings and walls).

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

AS/NZS 1859.2	Reconstituted wood-based panels - Specifications - Dry processed fibreboard
AS/NZS 1859.4	Reconstituted wood-based panels - Specifications - Wet processed fibreboard

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

2. PRODUCTS

Materials

2.1 CEILING BATTENS

Machine gauged kiln dried H1.2 treated radiata pine 50mm x 25mm to span 600mm at centres to suit ceiling panels.

2.2 MDF WALL LINING

To AS/NZS 1859.2, 12mm thick, paint finish.

2.3 LOW DENSITY WOOD FIBREBOARD

Low density insulating board, 12.5mm thick, face coated with fire retardant primer/undercoat, to match existing.

2.4 LOW DENSITY WOOD FIBRE CEILING AND WALL PANELS AND TILES

Low density insulating board, 13mm thick, tongue and grooved, to match existing.

Surface finish:	Undercoated/prefinished
Colour:	White

2.5 HARDBOARD

High density hardboard/tempered hardboard sheets to AS 1859.4, to match existing.

2.6 JOINTERS

To the board manufacturer's required profiles for particular locations to match existing.

Components

2.7 SCREWS, MDF

Corrosion resistant Twinfast-type to the sheet manufacturer's requirements for sheet thickness.

2.8 NAILS, MDF

Corrosion resistant annular grooved flooring nails, or helical spiral nails to the sheet manufacturer's requirements for sheet thickness.

2.9 NAILS, LOW DENSITY FIBREBOARD
Galvanized 40mm x 1.6mm panel pins to the board manufacturer's requirements.

2.10 STAPLES, LOW DENSITY FIBREBOARD AND MDF
Corrosion resistant 19mm leg staples to the board manufacturer's requirements.

2.11 STAPLES, LOW DENSITY PANELS AND TILES
Minimum length 12.5mm to the board manufacturer's requirements.

2.12 NAILS, LOW DENSITY PANELS AND TILES
Small flathead galvanized wallboard nails to the last row of panels/tiles, to the board manufacturer's requirements.

2.13 NAILS, HARDBOARD
Corrosion resistant plated 25mm x 1.6mm panel pins to the board manufacturer's requirements.

Accessories

2.14 ADHESIVE, MULTIPURPOSE
Multi-purpose water based wallboard adhesive to the manufacturer's recommendations.

2.15 CONTACT ADHESIVE
Contact adhesive to the board manufacturer's requirements.

2.16 FILLER
Wood dough type filler to the manufacturer's recommendations.

3. EXECUTION

Conditions

3.1 STORAGE
Take delivery and accept bundles or cartons of sheets/panels/tiles dry and undamaged. Reject all damaged material. Store on a level, firm base, well ventilated and completely protected from weather and damage to the board manufacturer's requirements.

3.2 HANDLING
Avoid distortion and contact with damaging substances. Protect edges and surfaces from damage.

3.3 SUBSTRATE
Before commencing installation the building must be completely enclosed, with timber framing dimensions and moisture content to the board manufacturer's requirements and with all other materials free from damp. Ensure the substrate is plumb, level and in true alignment.

Application

3.4 FIXING MDF LINING
Before fixing, the substrate moisture content must be less than 18% and the sheets fillet stacked on site to pre-condition. Provide edge clearances and dimensional increases to the sheet manufacturer's requirements and fix boards vertically with vee-butt joints and with all edges fully supported, arris exposed finished edges. Nail edges at 150mm centres. Seal board surfaces immediately after fixing.

3.5 FIXING LOW DENSITY WOOD FIBREBOARD SHEETS
Provide continuous support to all edges and joints. Allow a 2mm gap between all sheet edges. Prime and seal bevels and vee joints. Install and fix sheets to the board manufacturer's requirements, stop with a recommended proprietary brand stopping or filler and lightly rub while still wet with a small piece of fibreboard to achieve a matching surface.

Fixing: Nailing and stapling
Jointing: To match existing

3.6 FIXING WOOD FIBREBOARD PANELS AND TILES
Re-nail existing sagging ceilings. Provide continuous support to the perimeter of the ceiling. Lay out and fix battens to the board manufacturer's requirements, working outwards from the centre line to achieve maximum perimeter widths. Concealed staple fix panels. Cut the last row of tiles with a 10mm gap to wall lines and fix cut edge with flathead nails.
Fixing pattern: To match existing

3.7 FIXING HARDBOARD
Provide continuous support to all edges and joints. Allow a 1mm gap between all sheet edges. Install and fix sheets to the board manufacturer's requirements.

Fixing: Nailing
Jointing: Vee-Butt

3.8 FILL FASTENER HOLES
Stop nail and staple holes with filler using a flat bladed knife.

Completion

3.9 REPLACE
Replace damaged elements.

3.10 LEAVE
Leave work to the standard required by following procedures.
Leave existing lining in place for screw fixing of timber ceiling battens to existing framing and installation of new plasterboard ceiling where instructed by HNZ Contract Manager.

3.11 REMOVE
Recycle and remove debris, unused materials and elements from the site.

3.12 PROTECTION
Protect the surfaces of finished work if pre-finished or until coatings or coverings have been applied.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5134H PREFINISHED FIBRE CEMENT LININGS

1. GENERAL

This section relates to the supply and installation of James Hardie prefinished fibre cement sheet panel products for:

- internal wall linings (for wet area and splashback)
- internal ceiling linings.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in buildings
NZBC C/AS1-AS7	Protection from fire

1.2 MANUFACTURER/SUPPLIER DOCUMENTS
James Hardie documents relating to this part of the work:
HardieGlaze™ Lining installation manual
Inraw™ panel / Invibe™ panel installation manual

Manufacturer/supplier contact details

Company:	James Hardie New Zealand
Web:	www.jameshardie.co.nz
Email:	info@jameshardie.co.nz
Telephone:	Ask James Hardie™ on 0800 808 868

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

15 years:	For **HardieGlaze™ Lining** sheet (refer to James Hardie™ product warranty)
15 years:	For accessories supplied by James Hardie™ (refer to James Hardie™ product warranty)
From:	Date of purchase

Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any specified system, or associated components and products.

1.5 COMPLIANCE
Fibre cement sheets to AS/NZS 2908.2

2. PRODUCTS

Materials

2.1 HARDIEGLAZE™ SMOOTH LINING
James Hardie HardieGlaze™ Smooth Lining treated cellulose fibre in a matrix of cement and sand autoclaved sheet, 4.5mm thick, with a high gloss polyurethane coating on one side. Sealer to rear face.

Colour: White

Refer to 5122 PLYWOOD LININGS section under-lining for accessible bathrooms.

Components

2.2 BATTENS, TIMBER
Minimum 45mm wide and minimum 20mm thickness to span maximum 600mm centres.

H1.2 Radiata pine: Ceilings
H3.2 CCA Radiata pine: Walls

2.3 PACKERS
4.5mm fibre cement backing sheet.

2.4 WALL BOARD ADHESIVE
Multi-purpose water based wallboard adhesive.
Refer to James Hardie installation manual.

Accessories

2.5 NAILS
PVC jointers: C25mm stainless steel or galvanized brad nails

2.6 PVC JOINTERS AND MOULDINGS FOR 4.5MM LININGS
4.5mm PVC jointers and mouldings.
Colour: White

2.7 TAPE
Self adhesive polyethylene for use behind joints to be filled with sealant.
Bituthene for use behind drip edge detail, 50mm width x 1.5mm thickness.

2.8 SEALANT
Silicone with mould inhibitor.
Refer to the James Hardie technical specifications.

3. EXECUTION

Conditions

3.1 MOISTURE CONTENT
Maximum moisture content of timber framing to NZS 3602.
Refer to 3820 CARPENTRY section for moisture content framing at lining.

3.2 PROTECT
Protect joinery, fittings and finishes already in place from damage from lining installation.

3.3 BUILDING
Ensure building is weatherproof before lining work commences.

3.4 STORAGE
Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage and covered to keep dry until fixed.

3.5 HANDLING
Avoid distortion and contact with potentially damaging surfaces. Carry sheets vertically. Do not drag sheets across each other, or across other materials. Protect edges, corners and surface finish from damage.

3.6 SUBSTRATE
Do not commence work until the substrate is of the standard required by the relevant manufacturer's technical literature for the specified finish; plumb, level and in true alignment. Check that the framing set out matches the required sheet joint set out.
Maximum moisture content of timber framing to NZS 3602.
Leave existing lining in place for screw fixing of timber ceiling battens to existing framing and installation of prefinished fibre cement sheet lining where instructed by HNZ Contract Manager.

3.7 BATCH COLOUR
For colour matching, ensure that sheets of the same colour, to be used in a specific area, are from the same batch.

Application

3.8 ADHESIVE FIXING
Cut, prepare and fix sheets using adhesive at 200mm centres minimum and in accordance with James Hardie installation manual.
Prime sealed cut edges to manufacturer's instructions.

3.9 MOULDING JOINTING
Prepare and fix PVC jointers, corners, mouldings, in accordance with James Hardie installation manual.

Corner moulds:	Flexible edge 1 piece external and 2 piece internal
Scotia:	2 piece
Bath mould:	Flexible edge 1 piece use only for existing low lip bath
Splashback:	Cap moulds top and sides, full width and minimum 300mm up wall above the tub or basin.

3.10 WET AREA JOINTING
Silicone sealant-fill jointers, external and internal corners and cap moulds, to James Hardie installation manual recommendations. Ensure all penetrations are sealed and/or covered to prevent moisture ingress.

3.11 FLASHING DETAILS TO BATH
Form and seal to James Hardie installation manual, use only for existing low lip bath.

3.12 SHOWER AND BATH DRIP EDGE DETAIL
Form and seal to James Hardie installation manual.
Exposed drip edge lining is factory cut only and edge prime sealed 100mm minimum.
Bituthene tape is continuous along shower or bath high lip face and over the timber batten or underlining drip edge (6mm air gap minimum) to seal and prevent water ingress.

Completion

3.13 PROTECTIVE FILM
Leave the protective film as long as possible to protect the finish, remove just before final clean.

3.14 REPLACE
Replace damaged or marked elements.

3.15 CLEAN
Clean adjoining surfaces and fittings of spots, marks, dust and droppings.

3.16 LEAVE
Leave work to the standard required by following procedures.

3.17 REMOVE
Recycle and remove debris, unused materials and components from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5151 INTERIOR TIMBER TRIM

1. GENERAL

This section relates to simple lengths of trim fixed on site as of isolated internal members, with simple end joints.
It includes:

- skirtings, scotias, architraves
- beads, cover battens.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS7	Protection from fire
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3610	Specification for profiles of mouldings and joinery

2. PRODUCTS

Materials

2.1 TIMBER TRIM
To NZS 3610 and to profiles to match existing. Radiata pine finger jointed for paint finish, treated H3.1 CCA or H3.2 CCA in wet areas and to NZS 3602,

Skirtings: 60mm x 10mmminimum

Components

2.2 NAILS
Bright steel to dimension requirements of NZS 3604. Use galvanized where prone to dampness.

2.3 BRADS
Bright steel of a length three times the thickness of the member being fixed. Use cadmium plated where prone to dampness.

2.4 SCREWS, STEEL
Bright steel of a length to penetrate the substrate up to the shank. Use stainless steel in wet areas.

3. EXECUTION

Conditions

3.1 GENERALLY
To comply with NZS 3604, except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 STORAGE
Take delivery of trims undamaged and unmarked and store on site under cover, away from moisture, heat and direct sunlight in adequately ventilated area and clear of areas where work is in progress, to ensure materials are of the required standard when fixed in place.

3.3 ENSURE
Ensure that the substrate to trims will allow work of the required standard. If it does not, do not proceed until the substrate has been remedied.

Application - Generally

3.4 INSTALL TIMBER TRIM
Use full lengths. Fit with scribed internal joints, mitred external joints and, mitred and returned at stop ends. Fix plumb, level and true to line and face using nails or brads to suit. Leave secure and with no movement possible.

Finishing

3.5 PUNCH
Punch all nail heads below the face of trim ready to receive stopping, as specified under painting preparation.

3.6 COUNTERSINK
Countersink screw heads not less than 2mm below the faces of trim to be painted. Stop and finish off flush with the face, as specified under painting preparation.

Completion

3.7 LEAVE
Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following procedures.

3.8 PROTECTION
Protect the completed work and make good before any surface finish is applied.

3.9 REPLACE
Replace damaged or marked elements.

3.10 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5230 INTERIOR DOORS

1. GENERAL

This section relates to the supply and installation of interior doors.

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3602	Timber and wood-based products for use in building
NZS 3610	Specification form profiles of mouldings and joinery

2. PRODUCTS

2.1 TIMBER
To NZS 3602. Radiata pine for paint finish.

2.2 PROFILES, FACINGS, SCRIBERS AND ARCHITRAVES

Traditional profiles to NZS 3610. Pencil radius corners for paint finish, to match existing.

2.3 DOORS, PAINTED
Doors (without clashing strips), 4mm MDF skin with UV cured primer, high density solid polystyrene core, 30mm thick finger jointed radiata pine rails and styles, pine lockblock. HNZ stamp of approval on the hinged edge stile of the door, 4SPC.

Width:	410mm – 910mm, to match existing
Height:	1980mm or to match existing

2.4 SLIDERS
Doors hung within a proprietary slider frame and complete with brand-matched sliding door gear, to match existing.

2.5 DOOR HINGES
Size and gauge to carry door. 3 hinges per door minimum, to match existing.

Type:	Loose pin
Size:	90mm x 70mm
Material:	Zinc-plated steel
Pin:	Loose-pin zinc-plated steel

2.6 SLIDING DOOR GEAR
To suit door size and weight, floor guide, to match existing.

3. EXECUTION

3.1 SITE MEASURE

Confirm framed openings on site for dimension, plumb and straightness prior to fabrication or ordering of timber joinery. Confirm lintel head and sill deflection for sliding door systems is within the manufacturer's specified tolerances. Provide not less than 10mm unless otherwise required.

3.2 EXECUTION GENERALLY
Manufacture to the methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.3 FIT HARDWARE
Refer to 5521 HARDWARE section for type.

Internal doors

3.4 INTERNAL JOINERY FRAMES
Head and jamb width to match existing. Wedge and rigidly fix in place at hinge positions and adjacent to the lock-block position without distortion, plumb, and true to line and face. Pre drill for fixings through frame. Fixings concealed behind planted stops. Hang doors on hinges, or sliding gear to the door manufacturer's requirements and to operate freely. Fit hardware.

3.5 CAVITY SLIDERS
Install in accordance with the door manufacturer's requirements, allowing for removal of top trim for maintenance.

Completion

3.6 CHECK
Check and adjust operation of all sashes, doors, hardware and furniture.

3.7 TEMPORARY PROTECTION
On completion remove any temporary protection and leave ready for following work.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5432 TIMBER STRIP FLOORS

1. GENERAL

This section relates to the supply and fixing of tongue and grooved boards spanning floor joists as a floor, nail fixed.

Documents

1.1 DOCUMENTS REFERRED TO
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring

Warranties

1.2 WARRANTY
Warrant this work under normal environmental and use conditions against failure by shrinkage and/or swelling.
Warranty period: 1 year

Requirements

1.3 SAMPLES
Submit on request samples of the flooring sufficient to show the pattern and the range of colour finish, to match existing.

1.4 QUALIFICATIONS
Floor layers to be experienced competent workers, familiar with the materials and the techniques specified.

2. PRODUCTS

Materials

2.1 FLOORING
To NZS 3617, tongue and groove profile (unless selected otherwise to match existing) with species and grade to NZS 3602. Moisture content: 10% at laying.

Refer to NZS 3602; table 4: Allowable moisture content (%) at time of installation for different requirements.

Treatment to NZBC B2/AS1 for Pinus and Douglas fir species and to NZS 3602 for other species.

2.2 DAMP-PROOF COURSE
Refer 4161 UNDERLAYS AND BARRIERS section for ground cover to suspended timber floors.

Components

2.3 FLOORING NAILS
50mm x 2.4mm steel wire floor brads.

3. EXECUTION

Conditions

3.1 STORAGE
Take delivery of flooring dry and undamaged and store on site under cover to keep in that condition.

3.2 SUBSTRATE
Ensure that the substrate conforms to NZS 3604 and that the relative humidity is suitable to receive flooring.

3.3 DO NOT START
Do not start cutting down and laying and fixing flooring before the building is enclosed, external moisture is excluded from the area and all wet work is complete.
Refer 4161 UNDERLAYS AND BARRIERS section for ground cover to suspended timber floors.

Application

3.4 EXPANSION SPACE
Provide 6 - 10mm expansion space between walls, columns and pipes to NZS 3604; clause 7.2.1: Flooring installation.

3.5 LAY FLOORING - TOP NAILED
Lay flooring strips at right angles to floor joists or battens in straight parallel lines, tongues fitted into grooves and tightly cramped together. Slightly undercut end joints square, fitted tight and random staggered across adjacent boards. Drill for nails at end joints. Nail every board to every joist, two nails to a board over 75mm wide, well punched and all in a straight line.

Finishing

3.6 SAND FLOORING
Sand flooring with a machine sander to the standard required for the finish specified.
Refer 6721 PAINTING INTERIOR section for floor coatings

Completion

3.7 LEAVE
Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following work.

3.8 PROTECTION
Protect laid floor from moisture and spilled liquids at all times, and from long exposure to direct sunlight. Protect the completed work and make good before any surface finish is applied.

3.9 PROTECT FINISHED SURFACE
Ensure that the completed surface is not used for traffic until curing is complete.
Continue to protect the surface until completion of the contract works.

3.10 REPLACE
Replace damaged or marked elements.

3.11 REMOVE
Recycle and remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5433 PLYWOOD FLOORS

1. GENERAL

This section relates to the use of plywood sheets for:

- floors
- sub floor access panel
- vinyl surfacing ply underlay.

Documents

1.1 DOCUMENTS

Documents referred to in this section are:

AS/NZS 1604.3	Specification for preservative treatment - Plywood
AS/NZS 2269.0	Plywood - structural - specifications
NZS 3604	Timber-framed buildings

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 QUALIFICATIONS

Workers / Installers to be experienced, competent trades people familiar with the materials and techniques specified.

2. PRODUCTS

Materials

2.1 PLYWOOD

Radiata pine veneer ply to AS/NZS 2269.0, face sanded, H3 CCA treated to AS/NZS 1604.3

Floors:	Thickness 19mm minimum, finish CD, F11 grade.
Sub-floor access panel:	600mm x 600mm, thickness 19mm minimum, clear finish
Vinyl surfacing ply underlay:	Thickness 5.2mm minimum over existing timber strip or particle board flooring, or flooring to be covered.

Refer 3820 CARPENTRY section for access panel framing.
Refer 6721 PAINTING INTERIOR section for coatings.
Refer 6221 VINYL SURFACING section.

Components

2.2 NAILS AND STAPLES

Refer to the plywood manufacturer's requirements for size and use.

5.2mm ply underlay:	20mm divergent staples
19 - 21mm ply:	60mm x 2.8mm stainless steel annular grooved flooring nails
25mm ply:	75mm x 3.15mm stainless steel annular grooved flooring nails

Jolt head nails to be used for exposed (clear finished) plywood.

2.3 SCREWS
Counter-sunk screws, stainless steel for treated plywood, minimum Class 3. Refer to the plywood manufacturer's requirements for size and use.

19 - 21mm ply: No. 10 x 45mm
25mm ply: No. 10 x 50mm

2.4 ADHESIVE
Polyurethane adhesive to American Plywood Association specification AFG 01.
Confirm compatibility with adhesives being used with vinyl surfacing.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING
Take delivery of materials and goods and store on-site and protect from damage to manufacturer's requirements.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish.
Store ply underlay on-site for 24 hours in the environment in which it is to be laid before work commences.

3.2 SUBSTRATE
Do not commence work until the framing is plumb and level, in true alignment and to suit the floor manufacturer's requirements.
Ensure framing suits the required laying pattern.
Refer 3820 CARPENTRY section for moisture content framing at lining.
Refer 4161 UNDERLAYS AND BARRIERS section for ground cover to suspended timber floors.

3.3 FLOOR DIAPHRAGMS
Install floor diaphragms in accordance with NZS 3604, 7.3 Structural floor diaphragms and floor manufacturer's requirements.
Provide evidence that the systems will comply with the existing standards of performance.

Application

3.4 SUPPORT AND JOINTS
Fully support all edges and joints on all sheets.

3.5 SUPPORT AND JOINTS - DIAPHRAGMS
Fully support all edges and joints on all sheets, to NZS 3604, fig 7.9 **Floor Diaphragms**.

3.6 FIXING PLYWOOD SHEETS
Fix sheets to the plywood manufacturers requirements and NZS 3604, section 7.2.3, **Wood-based Sheet Flooring**. Lay sheets in a staggered layout, face-grain of sheet at right-angles to support and with sheets in square, true alignment and plane.

3.7 ADHESIVE FIXING
Apply a 10mm adhesive bead to joists. Apply adhesive to existing timber strip or particle board flooring prior to stapling ply underlay.

3.8 FIXINGS

Flooring:	10mm apart minimum and 15mm from the edge maximum. 150mm centres along edges and 300mm centres on intermediate supports. Counter-sunk screw fixing for wet areas.
Sub-floor access panel:	Counter-sunk screw fixing
Ply underlay:	30mm apart minimum and 18mm from the edge maximum. 100mm centres as marked. Punch staples below the surface.

Completion

3.9 PROTECT FROM WEATHER

Protect work from the weather until it is covered, coated or sealed. Do not allow water to pond on the floor surface. If exposed clean surface of flooring daily to remove sawdust, shavings and other items that may hold water, stain or damage the surface.

3.10 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic recycle and removal all debris, unused and temporary materials and elements from the site.

3.11 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5510 JOINERY AND PROPRIETARY FIXTURES

1. GENERAL

This section relates to custom joinery fixtures and proprietary fixtures.
It includes:

- fabrication, including off site finishing and installation of cabinetwork and joinery items
- assembly, placing, installation of proprietary fixtures
- fitting out of specialty spaces and cupboards.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 1859.2	Reconstituted wood based panels - Specifications - Dry processed fibreboard
NZS 3602	Timber and wood-based products for use in building

2. PRODUCTS

2.1 TIMBER BOARDS AND FRAMES
Carefully sawn to minimise the inherent warping, twisting and bowing of the selected species, finish to match existing. Machine sand existing timber bench tops for resurfacing to give a finish suitable for clear finishing.

Wet areas:	H3.2 radiata pine thickness 25mm for replacement shelves and custom built unit plinths
Linen and HWC cupboard:	Radiata pine thickness 20mm x width 70mm for slat shelving

2.2 PLYWOOD PANEL
Urea formaldehyde resin hot-press bonded timber veneers, select grade interior, thickness 17mm H3 CCA treated, grade BB.

Laundry tub cabinet:	Carcass and doors for replacement custom built units to match existing tub

2.3 MEDIUM DENSITY FIBRE BOARD, MELAMINE
Urea-formaldehyde resin bonded wood fibre sheet to AS/NZS 1859.2 overlaid both sides with melamine resin impregnated sheet, thickness 18mm with 2mm PVC clashing to exposed edges.

Dry areas:	For replacement shelves
Kitchen cabinetry:	For replacement of a complete set of doors/drawers.
Bathroom vanity cabinet:	Carcass and doors for replacement custom built units, to match existing.
Wardrobe and Storage cupboard:	For shelving.

2.4 BACKING BOARD
Urea-formaldehyde resin bonded very fine wood fibre sheet to AS/NZS 1859.2, thickness 6mm minimum for replacement doors and drawers, to match existing.

2.5 PRE-FINISHED BACKING BOARD
Urea-formaldehyde resin bonded fine wood fibre sheet to AS/NZS 1859.2, veneered one side with melamine sheet, thickness 6mm minimum for replacement doors and drawers, to match existing.

2.6 BENCHTOPS
Kitchen benchtops, 600mm depth minimum or to match existing.

Wet areas:	Stainless steel polished with anti spill lip front/side edges. Rear upstand or 20mm engineered stone with arised edges
Dry areas:	High pressure laminate with rolled edges and rear upstand or, 20mm engineered stone with arised edges

Refer 7151 SANITARY FIXTURES for stainless steel sink.

2.7 CARCASE CONNECTORS
One-piece steel, straight deep-cut thread, fibre board screws with press fit plastic trim cap or tight joint connectors.

2.8 CARCASE FASTENERS
Knock down type centric sphere zinc alloy connectors with connecting bolts, sleeves and dowels, to suit each particular fastening location.

2.9 BUTT HINGES
Butt, broad butt, flush butt or overlay, steel, zinc-plated steel, stainless steel, or brass, to suit the location, to match existing.
Refer 5521 HARDWARE for door hinges.

2.10 CONCEALED HINGES
All-metal zinc alloy with automatic spring and screw-fixed. Plastic button door stops.
Opening 115 degree to 170 degree.

2.11 DRAWER RUNNERS
Single action under mounted or side mounted powder coated runners or groove mounting type, precision running ball-mounted single-stage extension, bright steel finish system.
Self closing soft drawer closers.
Refer 5521 HARDWARE for drawer runners.

2.12 GLUES AND ADHESIVES
As approved by the manufacturer for the timber, timber product, or pre-finished timber product joint being used.

2.13 HANDLES
Refer 5521 HARDWARE for door and drawer handles.

2.14 COATING SYSTEM
To match existing.
Refer 6721 PAINTING INTERIOR

2.15 SEALANT
Silicone with mould inhibitor.

3. EXECUTION

3.1 JOINERY FIXTURES GENERALLY
Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs). Take responsibility for the completed joinery fixtures including fittings included within fixtures and the on site installation.

3.2 SITE MEASURE
Site check and confirm dimensions after wall linings have been fixed. Verify positions of electric power outlets, wiring to light fittings included in joinery fixtures, water supplies and waste pipe locations.

3.3 FABRICATION QUALITY
Carry out machining within the practices required for the particular timber, wood product or pre-finished wood product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's requirements. Ensure work is accurate, square and true to line and face.

3.4 FABRICATE JOINERY FIXTURES
Carry out jointing, dowelling and other operations necessary for the proper assembly of the fittings, with fixings concealed unless otherwise detailed. Use glue joints where provision for shrinkage is not required, with contact surfaces, glueing and pressure all applied to the glue manufacturer's requirements. Locate and drive connectors and fasteners to the bolt manufacturer's requirements. Scribe fit adjustable shelves with 4 shelf pins and locate force fit pin holes at 50mm maximum centres in solid cheeks. Hang doors on concealed hinges, with opening 115 degree and up to 170 degree minimum as required.

3.5 MAKE CUT OUTS FOR APPLIANCES AND FITTINGS
Obtain fitting templates from the appliances and other fittings to be installed within joinery fixtures and bench tops. Ensure appliances and fittings can be installed with the required tolerances and clearances. Where bench tops are being provided under other work sections, provide templates and confirm dimensions to others.

3.6 FABRICATE DRAWERS
Construct drawers, using proprietary metal section drawer runners. Fit drawers with 3mm clearance into the drawer space.

3.7 TRANSIT AND DELIVERY
Load, transport and unload fittings without distortion or damage and keep covered to protect from the weather. Do not deliver fittings until floor, wall and ceiling surfaces are in place and the fittings can be placed in their final location.

3.8 ASSEMBLE PROPRIETARY ITEMS
Check all components are included. Assemble to manufacturer's instructions and to achieve finished item.

Bathroom medicine cabinet:	Moisture resistant carcass with PVC edge, mirror front, child resistant catch, 2 shelves. Width 400mm, height 720mm and depth 115mm minimum.
Bathroom vanity:	Acrylic fused to polycarbonate composite top and basin with integral overflow and upstand. Vacuum formed thermofoil cabinet.
Laundry tub cabinet:	Stainless steel polished tub with front/side antispill edges integral overflow and rear upstand. Galvanised steel powdercoated cabinet, child resistant catch.

3.9 INSTALL JOINERY FIXTURES

Scribe fit on site and install level, square, plumb and true to line and face.

Kitchen benchtop silicon sealed behind the fitting to the wall with a flexible mould inhibiting sealant, to prevent water ingress. Kitchen cabinet plinth height 100mm minimum. Accessible kitchen cabinet plinth height 250mm and depth 150mm minimum where required.

Laundry cabinet custom built, plinth height 140mm or proprietary Laundry tub cabinet securely fixed to the wall and with a splashback securely fixed over the upstand and silicon sealed behind the splashback.

Bathroom vanity cabinet custom built, plinth height 140mm or proprietary Bathroom vanity securely fixed and with a flexible mould inhibiting sealant behind the splashback.

Bathroom medicine cabinet recess between studs, base mounted at 1.2m above the floor.

Refer PREFINISHED FIBRE CEMENT LININGS section for splashback.

3.10 WARDROBE

Fit out with 400mm wide melamine faced board shelf, across the full width of the wardrobe, screw fixed on 70mm x 25mm scotia bead to back and ends and 40mm x 20mm stiffener under the front edge. Exposed edges clashed to match. Fit a selected aluminium coat rail to the front edge of the shelf. Shelf height mounted at 1.65m above the floor.

3.11 STORAGE CUPBOARD

Fit out with 3 x 400mm wide melamine faced board shelves, across the full width of the of the cupboard screw fixed on 70mm x 25mm scotia beads along back and ends. Exposed edges clashed to match. Shelf heights spaced vertically mounted from 1.25m above the floor.

3.12 LINEN AND HWC CUPBOARD

Fit out Linen cupboard with 5 full width x 400mm depth 20mm x 70mm timber slat shelves with 10mm gaps between boards, spaced at 360mm centres vertically maximum, screw fixed on 70 x 25mm scotia bead to ends.

Fit out HWC cupboard with 1 full width x full depth 20mm x 70mm timber slat shelf minimum with 10mm gaps between boards, screw fixed on 70mm x 25mm scotia to ends.

3.13 COATING SYSTEM, PREPARATION

- Fill timber defects with proprietary wood filler. (e.g. cracks, holes, etc)
- Sand timber to a smooth even finish using 180 grit paper.
- Remove all sanding dust using air guns and tack rags.
- Ensure substrate is free from dust, grease, dirt and other contaminants.
- Ensure moisture content of the timber is less than 15% immediately before commencing painting.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule

5521 HARDWARE

1. GENERAL

This section covers the supply and installation of door and window hardware, joinery and furniture hardware and smoke alarms.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS.

Requirements

1.2 SUPPLIER
A specialist in the supply of hardware, employing an experienced architectural hardware representative available to assist during the course of the hardware installation.

1.3 SAMPLES
Submit samples on request of nominated hardware elements, along with the relevant manufacturers' technical literature for review.

2. PRODUCTS

2.1 DOOR HARDWARE
Horizontal lever type handles to all doors.
Rubber cushion door stops 38mm diameter to all doors.

Entry/Exit:	Lever type keyless exit and hold back function to inside. Single cylinder deadlatch and weather seal for timber doors. Euro cylinder lock for aluminium hinged doors. Door viewer with 200 degree angle for solid doors.
Bathroom and Toilet rooms:	Horizontal lever privacy type, access both sides.
Wardrobe/Linen/Storage/HWC:	Horizontal lever dummy type, soft close magnetic catches.
Garage internal unit access door:	Horizontal level type, door closer.
Shed door:	Padbolt, 100mm galvanised and 225mm galvanised T hinges.

2.2 WINDOW HARDWARE

Catches:	Lever type handles
Security stays:	Stainless steel, maximum opening 100mm. Factory installed restrictor for new aluminium windows.
Window controls:	Lever handles for accessible use where required.
Ventilation grilles:	Galvanised pressed steel grille, minimum 300mm x 150mm x 1mm.

2.3 JOINERY AND FURNITURE HARDWARE

Cabinet handles:	Metal bow pull style with 150mm x 25mm finger clearance.
Range:	Anti tipping device including drop down bolt.
Coat hook:	Chrome plate or bronze finish.
Grab rail:	Knurled type minimum 30mm diameter.
Wardrobe rail:	20mm diameter galvanised pipe or extruded aluminium and end brackets.

Towel rail:	19mm diameter grade 304 1.2mm stainless steel and brackets. Length 900mm per bedroom minimum.
Smoke alarms:	IoPhic universal sensing technology with a life long alkaline battery. Tamper resistant locking feature.

Components

2.4 FIXINGS
Provide matching fixings, including screws, clips, bolts and brackets for hardware supplied.

3. EXECUTION

Conditions

3.1 RETAIN
Retain hardware in the manufacturer's original packaging. Ensure that units are complete with fixings and installation instructions. Label each unit separately with its hardware number and door/window number to match the submitted and approved schedule.

Installation

3.2 INSPECTION
Before starting the hardware installation, check frames, doors, sashes and adjacent finishes are ready for the proper installation of the hardware.

3.3 LOCATE
Locate hardware units at heights and/or locations to match existing, or as required to comply with relevant Codes and Standards. Smoke alarms to comply with Type 1 domestic smoke alarm to NZBC F7/AS1. 1.2 Descriptions of alarm systems. Alarm to AS 3786. Before proceeding, confirm any dimension not known.

Door handles:	Generally mounted at 1m above the floor. Garage internal unit access door handle mounted at 1.5m above the floor.
Cabinet handles:	Horizontally mounted
Soft close magnetic catches:	Counter sunk flush finish into the top edge of the door and frame.
Door stops:	Floor mounted or skirting mounted. Glue and screw fixing with 15mm washer under the screw head.
Window controls:	Mounted at maximum 1.2m above the floor.
Coat hook:	Mounted at 1.5m above the floor.
Grab rail:	Mounted to support 200kgs in any direction.
Wardrobe rail:	Mounted below shelf with mid rail support over 1.2m width. Accessible wardrobe rail adjustable height 1m to 1.65m above the floor.
Towel rail:	Mounted at 1m above the floor with mid rail support over 1.2m width.
Smoke alarms:	Ceiling mounted. 300mm from an exposed ceiling beam or ceiling apex or a wall minimum.

Refer to HNZ Specific Requirements for the Installation of Fire Alarms in HNZ Properties.

3.4 CUTTING AND FITTING
Carry out cutting and fitting of the substrate necessary for installing any hardware unit before painting or finishing of that surface. Remove hardware when required for painting, placing it in the packaging or carton originally supplied until ready for re-installation.

3.5 INSTALL HARDWARE
Install each hardware unit in accordance with the hardware manufacturer's requirements using templates and tools supplied or recommended by them. Set units level, plumb and true to line and required location, with all moving parts and actions freely and easily operating. Do not make any modifications to supplied units.

Completion

3.6 ADJUST
Adjust and check each operating hardware unit for correct and smooth functioning. Rehang existing doors and windows with existing hinges, adjust existing catches. Replace those units that cannot be adjusted if they do not function correctly. Clean units and adjoining surfaces upon completing their installation. Only use lubricant if and when recommended by the hardware manufacturer/supplier.

3.7 REPLACE
Replace any hardware fitted for a key exit with a latch where hardware is required. Replace damaged hardware with elements to match existing to new standard.

3.8 LEAVE
Leave work with parts fully and freely working and to the standard required by following procedures.

3.9 REMOVE
Remove any lock or fitting that requires a key to exit a room or the unit. Recycle hardware sets removed for whole of unit replacement for reuse on non adjacent properties and remove debris, unused materials and elements from the site.

3.10 PROTECT
Protect hardware units from damage or marking.

3.11 FINAL KEYING
All unit entry/exit doors are keyed alike including an external access laundry door where provided. Record the property address on key tags and fit tags to keys. Use the individual key to reset the lock cylinder where a replacement cylinder has been installed for security.
Refer 1270 CONSTRUCTION section for security at completion.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5530L CURTAINS

1. GENERAL

This section relates to the supply and fixing of manual:

- proprietary curtains
- shower curtains.

Documents

1.1 DOCUMENTS REFERRED TO
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:
NZBC C/AS1-AS7 Protection from Fire

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
5 years: For proprietary curtain track
2 years: For proprietary curtains

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.3 QUALIFICATIONS
Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

1.4 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS
The product/material must be provided by the HNZ approved supplier for proprietary curtain and track system.

1.5 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

2. PRODUCTS

Materials

2.1 FABRICS
Proprietary: 100% Polyester fire resistant triple woven, colour natural
Shower: 100% Polyester, length 1.8m
Accessible shower: 100% Polyester with weighted bottom seam

2.2 CURTAIN SYSTEM
Proprietary curtain and track system.
Shower curtain and rod system.
Accessible shower curtain and track system.

Accessories

2.3 CURTAIN TRACKS
Aluminium curtain track, powdercoat finish white.

2.4 CURTAIN RODS
Stainless steel curtain rods,19mm diameter grade 304 1.2mm.

2.5 RINGS FOR CURTAIN RODS
Plastic curtain rings to go with curtain rods.

3. EXECUTION

Conditions

3.1 DELIVERY AND STORAGE
Handle and store tracks, fabrics, operating equipment and accessories to avoid damage.
Keep dry in transit, store clear of and on a level floor and cover for protection.
Avoid distortion, stretching, compression, puncturing and damage to the materials.
Do not use damaged or wet materials.

3.2 PRE-INSTALLATION REQUIREMENTS
Ensure that conditions are suitable for the installation, including painting and flooring completed. Arrange for the programming of the work to suit required practice.

Installation/application

3.3 INSTALLATION
Carry out the fixing, installation and fitting to finish rigid, plumb, true to line and face and square, to the manufacturer's requirements.

Proprietary curtain track:	Face fixed or top fixed for pelmets Extend each side of the window for the curtain to clear the window when open. Under-hang the sill and clear the floor.
Shower curtain rod:	Mounted for the curtain to fall below the shower threshold and discharge water in to the tray.
Accessible shower curtain track:	Mounted for the curtain to touch the floor and 200mm inside the sloping shower floor.

Refer 3820 CARPENTRY section for pelmets.

3.4 INSTALL COMPONENTS
Fix all components to the manufacturer's requirements.

Completion

3.5 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal of all debris, unused materials and elements from the site.

3.6 DEFECTIVE OR DAMAGED WORK
Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly.
Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5571 INTERIOR TIMBER STAIRS

1. GENERAL

This section relates to the fabrication and installation of interior timber stairs and landings.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/AS1	Access routes
AS/NZS 1860.1	Particleboard flooring - Specifications
BRANZ BU 497	Stair construction

2. PRODUCTS

Materials

2.1 SOLID TIMBER COMPONENTS
Selection to NZS 3602.

2.2 PLYWOOD
Rotary cut radiata pine veneer ply to AS/NZS 2269.0, face sanded, minimum thickness 19mm H3 CCA treated, grade CD.

3. EXECUTION

Conditions

3.1 GENERALLY
Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).
Check site dimensions. Carry out machining within the practices recommended for the particular timber being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's recommendations. Work to be accurate, square and true to line and face.

Application

3.2 FABRICATE AND INSTALL TIMBER STAIRS
Fabricate and install stair flights and landings to comply with NZBC acceptable solution D1/AS1:4.0 Stairways, closed type and unless detailed otherwise to BRANZ BU 497.
House and wedge treads and risers 15mm into strings, all glued, wedged and blocked.
Form nosing overhangs of 25mm by splaying risers forward to finish flush with the front of the treads. Screw fixing.

Strings:	Ex 50mm
Treads:	Bullnose Ex 40mm or 50mm to suit tread width
Risers:	Ex 25mm

Completion

3.3 LEAVE
Leave work to the standard required by following procedures.

3.4 REMOVE
Recycle and remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

5574 INTERIOR HANDRAILS AND TIMBER BALUSTRADES

1. GENERAL

This section relates to the fabrication and installation of interior timber balustrades.

Documents

1.1 DOCUMENTS REFERRED TO
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC F4/AS1	Safety from falling
NZS 3602	Timber and wood-based products for use in building

2. PRODUCTS

2.1 SOLID TIMBER COMPONENTS
Timber species, grade, installation moisture and treatment to NZS 3602, table 2, and NZBC B2/AS1, to match existing.
Radiata pine clears for clear finish.

2.2 NON-TIMBER HANDRAIL
Proprietary handrail or non-fabricated handrail to manufacturer/supplier specifications and instructions, to match existing.
Report to HNZ Contract Manager for replacement non-timber handrail and obtain instructions in writing before proceeding.

2.3 HARDWARE
Handrail brackets, metal supports, angles and sundry fittings, all to match existing.
Report to HNZ Contract Manager for replacement hardware and obtain instructions in writing before proceeding.

3. EXECUTION

Conditions

3.1 GENERALLY
Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

Check site dimensions. Carry out machining within the practices recommended for the particular timber product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's recommendations. Work to be accurate, square and true to line and face.

Application

3.2 BALUSTRADING
Fabricate and install the balustrading, complete with all associated metal componentry and hardware. Unless otherwise detailed construct to comply with NZBC F4/AS1.

Balustrading to a height 1.1m minimum above the floor, supports at 1.2m spacings maximum.

3.3 HANDRAILS
Fabricate and install the handrails, complete with all associated metal componentry and hardware. Unless otherwise detailed construct to comply with NZBC F4/AS1.

Handrails to comply with NZBC D1/AS1 for graspable handrails, supports at 1.2m spacings maximum.

Completion

3.4 LEAVE
Leave work to the standard required by following procedures.

3.5 REMOVE
Recycle and remove all debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6211 WALL TILING

1. GENERAL

This section relates to the supply and installation of ceramic wall tiles.

It includes:
- cement render walls
- concrete masonry walls
- timber substrate walls
- rangetop heat shield.

Refer 5134 PREFINISHED FIBRE CEMENT LININGS section for wet area splashback

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
AS ISO 13007.3	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for grouts
BRANZ	Good practice guide - Tiling

Warranties

1.2 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:

2 years: For normal environmental and use conditions against failure

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.3 QUALIFICATIONS

Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.5 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Provide samples of the tiles for review by the HNZ Contract Manager

1.6 ADHESIVES COMPATIBILITY
Adhesives selected for use on proprietary substrates to have documented compatibility approval from the respective manufacturers.

2. PRODUCTS

Materials

2.1 WALL TILES
Vitrified flat with glazed exposed edge, smooth high gloss finish, minimum thickness 6mm, to match existing.

Accessories

2.2 SAND AND CEMENT GROUT
1 part Portland cement to 2-3 parts fine sand mixed to a paste consistency with a minimum of clean water.

2.3 GROUT
Cement based, compressible and to suit particular location/use. To AS ISO 13007.3.

2.4 TILE ADHESIVE
To AS ISO 13007.1.

2.5 MOVEMENT JOINT SEALANT
To BRANZ Good practice guide: Tiling, section 5.0.
- Neutral cured mould inhibitor sealant.

3. EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery of materials and goods and store on site and protect from damage. Protect finished surfaces, edges and corners from damage.

Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish.

3.2 CHECK TILES

Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work.

Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT
Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

Rangetop heat shield minimum 100mm wall below, 150mm beyond wall side and 300mm up wall above.

3.4 SETTING OUT

Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

Conditions

3.5 SERVICES AND ACCESSORIES
Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.6 SUBSTRATE TEMPERATURE
Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

Application - preparing existing surfaces

3.7 EXISTING CONCRETE OR MASONRY WALLS
Remove paint and other finishes sufficiently to obtain a key and prepare in accordance with the tile manufacturer's requirements.

Variation in background maximum of ± 4mm in 2 metres lineal.

3.8 EXISTING SHEET LININGS
Remove paint and other finishes sufficiently to obtain a key and remove contaminants that affect bonding or adhesion. Surface to finish clean and dry with a texture to give a complete key to the stile manufacturer's requirements.

Application - tile installation

3.9 TILE FIXING GENERALLY
To AS 3958.1. Apply adhesive, prepare and fix tiles by the method required by the adhesive manufacturer and tap them firmly into place.

3.10 FITTING TILES
Ensure cut edges are smooth and installed without jagged or flaked edges. Do not install single tiles in more than one piece. Maintain the heights of wall tile work in full courses to the nearest dimension. Within allowed tolerances, ensure corners of tiles are flush and level with corners of adjacent tiles. Keep joint lines, including mitres, straight and of an even width. Fully bed trim units, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

3.11 MOVEMENT JOINTS
Provide movement joints with a minimum width of 4mm, carried through tile and bedding and where substantial movement is anticipated, through the rigid sheet to the structure. Install joints over expansion joints, at junctions between different backgrounds, abutting other materials, at storey heights horizontally and 3 to 4 metres vertically, at internal corners and at junctions with floors and columns. Ensure joints are clean, formed, filled and with sealant inserted to the sealant manufacturer's requirements.

3.12 TILE FINISH AND JOINTS
Ensure finished surfaces are flat and true to a tolerance of ± 4mm in 2 metres from the required plane. Clean surplus bedding material from joint spaces and tile surface. Ensure joint widths are consistent throughout the installation with 1.5mm width for dust-pressed tiles and 6mm for extruded tiles, measured at the tile face. Ensure joint alignment is consistent throughout the installation and to a tolerance of ± 4mm in 2 metres from the detailed joint alignment.

3.13 THIN BED FIXING
Apply adhesive to a maximum 3mm bed thickness with a minimum of voids.

Notched trowel method:

- For internal dry applications, spread adhesive to a uniform thickness and "rib" it with a notched trowel to the adhesive manufacturer's requirements. Press tiles and beat into place to obtain adequate coverage by adhesive on the back of each tile.

Floating method:
- Apply adhesive to a uniform thickness. Apply tiles with a twisting or sliding action and tap back firmly into the floated bedding.

Buttering:
- With a trowel butter adhesive evenly over the whole of the back of the tile, slightly thicker than the final required adhesive thickness. Press and tap firmly into position leaving no voids. Do not use "spot-fixing".

Occasionally remove a tile as fixing proceeds to check the maintenance of adequate contact with the adhesive.

3.14 THICK BED FIXING
Apply thick-bed cement based adhesive to an average 6mm bed thickness as a floated bed and to the tile manufacturer's requirements. Prepare and fix tiles by the method required by the tile manufacturer and beat and tap them firmly into place.

Grouting

3.15 APPLY GROUTING
Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to the depth of the cushion and flush with surface to cushion edge and square edge tiles. Remove surplus grout with a damp cloth and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.16 APPLY PROPRIETARY GROUTING
Remove spacers. Prepare joints, mix and apply grout and finish off to the tile manufacturer's requirements, uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning

3.17 CLEAN TILES
Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Wash down tiles with a water diluted acid based cleaner to the tile manufacturer’s recommendations to remove any film of grout/ adhesive residue left on the tile surface. Finally polish glazed tiles with a clean dry cloth.

Completion

3.18 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic recycle and removal all debris, unused and temporary materials and elements from the site.

3.19 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures. Ensure tiles are not disturbed by use for at least 24 hours after laying and after grouting.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6221 FLOOR TILING

1. GENERAL

This section relates to the supply and installation of ceramic floor tiles.
It includes:

- concrete substrates
- timber substrate floors
- timber floor overlays.

Refer 6411 VINYL SURFACING section for wet area flooring

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/VM1	Access routes
NZBC D1/AS1	Access routes
NZBC E3/AS1	Internal moisture
AS/NZS 3661.1	Slip resistance of pedestrian surfaces - Requirements
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
NZS 4121	Design for access and mobility - Buildings and associated facilities
AS/NZS 4671	Steel reinforcing materials
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
AS ISO 13007.3	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for grouts
BRANZ	Good practice guide: Tiling

Warranties

1.2 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
2 years: For normal environmental and use conditions against failure

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.3 QUALIFICATIONS
Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.5 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Provide samples for review by the HNZ Contract Manager

1.6 ADHESIVES COMPATIBILITY
Adhesives selected for use on proprietary substrates to have documented compatibility approval from the respective manufacturers.

Performance

1.7 SLIP RESISTANCE FOR ACCESS ROUTES
Slip resistance for tiles to comply with NZBC D1/AS1: 2.0 Level access routes and 3.0 Ramps.

1.8 CERTIFY SLIP RESISTANCE
Provide certificates and any other evidence at the time of selection/supply that the tiles comply with NZBC D1/VM1 and NZBC D1/AS1: Access routes.

2. PRODUCTS

Materials

2.1 FLOOR TILES
Vitrified flat and bullnosed, minimum thickness 6mm, to match existing.

2.2 FIBRE CEMENT FLOOR OVERLAY
6mm or 9mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish.

Accessories

2.3 SCREED
Mix of 3:1 Portland cement, coarse washed sand gauged with liquid polymer additive to the tile manufacturer's stated requirements.

2.4 CEMENT MORTAR
Sand and cement bedding coat with liquid polymer additive, to the tile manufacturer's stated requirements.

2.5 TILE ADHESIVE
To AS ISO 13007.1.

2.6 SAND AND CEMENT GROUT
1 part Portland cement to 2-3 parts fine, washed sand, mixed to a paste consistency with a minimum of clean, potable water.

2.7 PROPRIETARY GROUT
Cement based, compressible and to suit particular location/use. To AS ISO 13007.3.

2.8 MOVEMENT JOINT SEALANT
To BRANZ Good practice guide: Tiling, section 5.0.
- Neutral cured mould inhibitor sealant

3. EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING
Take delivery of materials and goods and store on site and protect from damage.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish

3.2 CHECK TILES
Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT
Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT
Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 GENERALLY
Prepare surface and complete tiling work in accordance with AS 3958.1, as modified by BRANZ Good practice guide: Tiling.

Conditions

3.6 SERVICES AND ACCESSORIES
Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.7 DO NOT START
Do not start laying tiles until the levels and surface finish will achieve tile laying of the required standard.

3.8 SUBSTRATE TEMPERATURE
Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.9 MOISTURE CONTENT
Ensure the floor is dry and if in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

3.10 SCREEDS
Form screeds with a deviation from plane of not more than 5mm over 3 metres.

3.11 FALLS
Form screeds in areas where water is used in significant amounts with a deviation from plane of not more than 5mm over 3 metres. Unless otherwise specified form screeds with the following falls:

1 : 50 maximum Cross fall to level access landing

Unless stated otherwise provide minimum fall gradients to BRANZ Good Practice Guide - Tiling, clause 6.5 Falls in floors.

Application - preparing existing surfaces

3.12 EXISTING CONCRETE FLOORS
Completely remove existing surface finishes down to the concrete. If the exposed concrete finish is not suitable then scabble or acid etch the surface to expose the coarse aggregate.

3.13 EXISTING TIMBER FLOORS
Completely remove existing surface finishes, punch nail heads and sand to a smooth, clean, dust free surface.

3.14 OVERLAY TO TIMBER FLOORS
Cover timber floors with 6mm thick fibre cement sheet overlay on the flooring and across the joists, glued and nailed with relief joints, to the overlay manufacturer's requirements.

Movement joints

3.15 MOVEMENT JOINTS

Provide movement joints with a minimum width of 4mm, carried through tile and bedding and where substantial movement is anticipated, through the rigid sheet to the structure. Install joints over expansion joints, at junctions between different backgrounds, abutting other materials, at internal corners and at junctions with floors and columns. Ensure joints are clean, formed, filled and with sealant inserted to the sealant manufacturer's requirements.

Application - tile installation

3.16 BONDED CEMENT MORTAR
Apply proprietary cement slurry bond coat over the whole of the floor to the tile manufacturer's requirements. Thoroughly mix and place the 40mm thick mortar bed over the bond coat and firmly tamp, screed and compact to the required level. Apply proprietary cement slurry bond coat to the wet mortar bed and set tiles while still tacky, firmly beating into the bedding and aligning the 3mm tile joints at the same time.

3.17 MODIFIED CEMENT BASED ADHESIVE

Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

Application - interior tile installation on timber floors

3.18 FIBRE CEMENT OVERLAY AND MODIFIED CEMENT BASED ADHESIVE
Align movement joints with overlay joints. Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.19 FIBRE CEMENT FLOOR AND MODIFIED CEMENT BASED ADHESIVE
Align movement joints with overlay joints. Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.20 TIMBER PRODUCT FLOOR AND MODIFIED CEMENT BASED ADHESIVE

Align movement joints with sheet joints. Spread adhesive to a uniform minimum thickness to manufacturer's requirements, rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.21 EXPANSION JOINT, COMPOUND
Provide expansion joints; at 4 metre intervals, at the perimeter of floors, at changes of level and around structural features. Carefully clean out the joint, insert the backing rod and fill with compound placed by gun. After the correct interval, finish the surface off flush to the compound manufacturer's requirements.

Grouting

3.22 APPLY GROUTING
Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary.

Finish to depth of cushion and flush with surface to cushion edge and square-edge tiles. Remove surplus grout with a damp sponge and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.23 APPLY PROPRIETARY GROUTING
Remove spacers. Prepare joints, mix and apply grout and finish off to the grout manufacturer's requirements, to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning

3.24 CLEAN TILES
Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Wash down tiles with a water diluted acid based cleaner to the tile manufacturer’s recommendations to remove any film of grout/ adhesive residue left on the tile surface. Finally polish glazed tiles with a clean dry cloth.

Completion

3.25 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.26 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked tiles. Replace damaged or marked tiles where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6411 VINYL SURFACING

1. GENERAL

This section relates to the supply and installation of vinyl surfacing including skirtings, nosings, trims and edges.
It includes:

- PVC sheet.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2-AS7	Protection from fire
NZBC D1/VM1	Access routes
NZBC D1/AS1	Access routes
NZS/AS 1884	Floor coverings - Resilient sheet and tiles - Installation practices
AS/NZS 3661.1	Slip resistance of pedestrian surfaces - Requirements
BRANZ BU 330	Thin flooring materials - 2 Preparation and laying

Requirements

1.2 QUALIFICATIONS
Vinyl layers to be experienced, competent trades people familiar with the materials and techniques specified.

1.3 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Performance

1.4 CERTIFY SLIP RESISTANCE
Provide certificates and any other evidence at the time of selection/supply that the vinyl complies with NZBC D1/VM1 and NZBC D1/AS1: Access routes.

2. PRODUCTS

Materials

2.1 VINYL SHEET
High vinyl content homogeneous monolayer flexible PVC sheet flooring, to match existing. Safety flooring for accessible bathrooms.
Thickness: 2mm

2.2 COVINGS
Pencil cove with butterfly mitres to all external and internal corners.
Fillet cove for safety flooring.

2.3 TRIMS AND EDGING
5mm rubber strip bevel edge tile reducer.
5.2mm curved aluminium cove capping mould.

Accessories

2.4 ADHESIVE
Standard acrylic adhesive to suit the material and substrate and to the vinyl manufacturer's requirements.

2.5 PRIMER AND SEALER
To the adhesive manufacturer's requirements for the particular substrate.

3. EXECUTION

Conditions

3.1 GENERALLY
To manufacturer's requirements and NZS/AS 1884.

3.2 STORAGE
Maintain rolls of sheet and accessories undamaged and dry. Store rolls upright with other material on level surfaces in non-traffic, non-work areas that are enclosed, clean and dry. Store rolls and adhesive on-site at 18 degrees celcius for 24 hours before commencing works.

3.3 HANDLING
Avoid distortion, stretching, marking and damage to edges while shifting, unrolling and handling sheet and accessories. Inspect for any faulty material. Do not use faulty or damaged material.

3.4 BEFORE COMMENCING WORK
Ensure that the building is enclosed, wet work complete, doors hung and lockable, finishes and trim complete, and good lighting available, before starting work.

Refer 3820 CARPENTRY section for moisture content framing at lining.
Refer 4161 UNDERLAYS AND BARRIERS section for ground cover to suspended timber floors.

3.5 INSPECT
Inspect the substrate to ensure it is of the standard required for work in this section.

3.6 LAYING
Carry out the whole of the work to NZS/AS 1884, BRANZ BU 330 and to the flooring manufacturer's requirements.

3.7 LAYOUT
Before beginning the installation confirm the proposed layout of material, location of seams and other visual considerations of the finished work. Flooring runs into linen cupboard and storage cupboard where adjacent.

Preparing substrate

3.8 PREPARATION EXISTING CONCRETE
Strip off existing floor coverings, adhesive and surface contaminants. Ensure concrete is dry and if in doubt check moisture content to NZS/AS 1884, Appendix A and do not commence laying vinyl until readings for the whole area show 75% relative humidity or less. Carry out minor repairs using a cement-based levelling compound, carefully feathered out at all perimeters of repaired areas. Grind level, then vacuum to remove all dust.

3.9 PREPARATION, EXISTING TONGUE AND GROOVE
Strip off existing floor coverings, machine sand to remove adhesive and surface contaminants. Then vacuum to remove all dust prior to installing underlay sheets.

Refer 5433 PLYWOOD FLOORS section for underlay.

3.10 PREPARATION, EXISTING PLYWOOD OR PARTICLEBOARD
Strip off existing floor coverings, machine sand to remove adhesive and surface contaminants. Then vacuum to remove all dust prior to installing underlay sheets.

Refer 5433 PLYWOOD FLOORS section for underlay.

3.11 PREPARATION FOR WALL LININGS
Prepare wall linings to requirements of wall lining manufacturer and vinyl manufacturer,for vinyl over.

Vinyl floor laying

3.12 PREPARATION
Check that each colour supplied is from the same batch. Follow the vinyl manufacturer's requirements for conditioning of rolls and the working temperatures and conditions before, during and after laying, maintain 18 degrees Celsius as a minimum before, during and for 24 hours after laying. Protect work from solar heat gain and switch off under-floor heating during and for 48 hours either side, of the work period.

3.13 ADHESIVE APPLICATION
Apply approved adhesive as required by the vinyl manufacturer and without trowel marks after setting. Follow requirements for open time, taking note of substrate porosity, ambient temperature and relative humidity. Remove excess adhesive as the work proceeds using required techniques.

3.14 LAYING VINYL SHEET
Roll out, cut, leave to condition and install sheet vinyl to the vinyl manufacturer's requirements. Ensure there are no air bubbles or twisting, that the seams are kept clear of adhesive, and immediately the sheet is adhered roll with a 68 kg roller.
Extend vinyl under Bathroom vanity cabinet, Kitchen cabinet, Laundry tub cabinet, toilet, basin, fridge and oven.
Bevel edge tile reducer under the flooring to the Bathroom, Toilet, Laundry entry threshold to retain water in the room

3.15 THERMO-WELDING VINYL SHEET
Machine groove and thermo-weld all seams to match vinyl, heating the sheet and weld rod to a sufficient temperature to melt and fuse them together into a single mass. Trim the weld to leave a smooth, flush surface with the sheet, width of the weld to 1.33 times the sheet thickness..

3.16 CROSS JOINS
Plan and allow cuts to avoid cross joins. Obtain written approval of the Contract Manager before proceeding if cross joins are unavoidable. Cross joins are not acceptable in wet areas.

3.17 COVE VINYL

Pencil cove flooring to the specified height.

Bathroom, Toilet room, Laundry:	100mm to all walls, aluminium coved capping strip to exposed top edge
Accessible bathroom:	150mm to all walls, recess behind wet wall lining.

Refer 5134 PREFINISHED FIBRE CEMENT LININGS section for wet wall lining.

3.18 MITRES
Perform butterfly method to internal and external mitres. Thermo-weld mitres.

3.19 FIT SKIRTING
Fit timber skirting for non cove flooring.

Cleaning

3.20 CLEAN VINYL
Ensure new vinyl surface is protected from stripping. Leave vinyl flooring surfaces free of adhesive, dirt and debris. Vacuum off, damp mop with a low foam neutral detergent, dry and buff with a rotary machine. Apply 1 coat of polish to dry flooring and polish off. Clean and finish vinyl to manufacturer's requirements.

Completion

3.21 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic recycle and removal all debris, unused and temporary materials and elements from the site.

3.22 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked vinyl flooring. Replace damaged or marked vinyl where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6511 CARPETING

1. GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double stuck down.
It includes:

- carpet underlay
- woven sheet carpet.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:
NZBC C/AS2-AS7 Protection from fire
AS/NZS 2455.1 Textile floor coverings - Installation practice - General

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
1 year: For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
1 year: For execution

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS
Carpet layers to be experienced, competent trades people familiar with the materials and the techniques specified, and with AS/NZS 2455.1.

1.5 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section. The product/material must be provided by the HNZ approved supplier for underlay and carpet.

2. PRODUCTS

Materials

2.1 UNDERLAY
To AS/NZS 2455.1 Soft underlay.

- 69kg/m red, 8mm thick foam chip, width 1.83m.
- 4.7mm for accessible units.

2.2 CARPET
To AS/NZS 2455.1 Textile floor coverings, 100% solution dyed nylon tufted loop pile, 3mm pile height, width 3.66m.

Components

2.3 BINDER BARS
Anodised aluminium section smooth face.

2.4 THRESHOLD STRIPS
Anodised aluminium section
- Threshold strip with bullnose
- Threshold strip with anti-slip carpet reducer insert for accessible units.

2.5 EDGE GRIPPER
To AS/NZS 2270.
High density plywood with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

Accessories

2.6 ADHESIVE, UNDERLAY
To AS/NZS 2455.1, clause 1.5.3, non staining and underlay manufacturer's requirements.

2.7 ADHESIVE, CARPET
To AS/NZS 2455.1, clause 1.5.3. and carpet manufacturer's requirements.

2.8 TAPE
Waxing seam tape, minimum width 50mm to carpet manufacturer's requirements.

3. EXECUTION

Conditions

3.1 DELIVERY
Take delivery of materials and goods and store on site and protect from damage. Accept rolls of carpet and accessories undamaged and dry.

3.2 HANDLE AND STORE
Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.3 INSPECTION
Before starting work inspect the substrate to ensure that it will allow work of the required standard, and that all fittings and fixtures around which the carpet is to be scribed are in place.

3.4 PROTECTION
Protect adjoining work surfaces and finishes during the carpet installation.

3.5 TAPE
Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

3.6 LAYOUT
Plan the general layout so that:
- seams run lengthways
- traffic runs along the seam
- light from windows is not across the seam
- pile faces away from the light source
- flooring runs into wardrobe, linen cupboard and storage cupboard where adjacent.

3.7 TEMPERATURE
Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

3.8 FLOOR PREPARATION
Prepare floor and check conditions required for laying to AS/NZS 2455.1, section 2.

Application - substrate preparation

3.9 PREPARING EXISTING CONCRETE FLOOR
Remove existing coverings completely including adhesives, bituminous materials and paints. Patch cracks and depressions with compatible latex patching compound to the carpet manufacturer's requirements. Seal large areas of patching. Leave surface level, smooth and clean with loose material and dust removed. Seal powdery surfaces.

3.10 PREPARING EXISTING TIMBER OR WOOD PRODUCT FLOOR
Remove existing coverings completely including tacks, adhesives, bituminous materials, waxes and paints. Check for soundness, replace any substandard boards or panels and nail down loose boards. Sand smooth and remove loose material and dust.

Application - carpet laying

3.11 INSTALLATION, UNDERLAY
Reuse underlay in serviceable condition. Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction or when not practicable and laid in the same direction seams are not to coincide with the carpet. Tape underlay joints.

3.12 INSTALLATION, CONVENTIONAL SYSTEM
Tape carpet joints, all cut edges are seam sealed from the side, fix grippers to floor and install underlay and carpet to AS/NZS 2455.1, section 3, pattern and texture to match existing. Power stretch carpet tight in both width and length evenly without bowing, square with walls, correct pin adjustment to carpet base only to avoid damage to pile and underlay, minimum 1% in each direction to manufacturer’s requirements.

3.13 INSTALLATION, DOUBLE BOND SYSTEM
Double bond install to AS/NZS 2455.1, section 3, for accessible units. Apply adhesive on the underlay to the carpet manufacturer's requirements. Lay carpet with edges, selvages and joins tightly butted and completely bonded to the underlay surface.

3.14 LAYING TO STAIRS
Install on stairs in accordance with AS/NZS 2455.1.

3.15 FIXING TRIMS
Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion

3.16 CLEANING
Carry out routine trade cleaning of this part of the work including periodic recycle and removal all debris, unused and temporary materials and elements from the site. On completion thoroughly vacuum the finished carpet.

3.17 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6700 PAINTING GENERAL

1. GENERAL

This section relates to the general matters related to painting work
Refer to 6711 PAINTING EXTERIOR for exterior paint systems.
Refer to 6721 PAINTING INTERIOR for interior paint systems.

1.1 ABBREVIATIONS
The following abbreviations are used throughout this part of the specification:

APAS	Australian Paint Approval Scheme
MPNZA	Master Painters New Zealand Association Inc.
VOC	Volatile organic compound

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS7	Protection from fire
AS/NZS 2311	Guide to the painting of buildings
AS/NZS 2312.1	Guide to the protection of structural steel against exterior atmospheric corrosion by the use of protective coatings - Paint Coatings
AS/NZS ISO 9001	Quality management systems - requirements
WorkSafe NZ	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe NZ	Guidelines for the management of lead-based paint
MPNZA	Specification manual
MPNZA	Painters hazard handbook

Health and Safety at Work Act 2015

Requirements

1.3 NO SUBSTITUTIONS
Substitutions are not permitted to any specified manufacturer's system, or associated components and products.

1.4 QUALIFICATIONS
Painters to be an experienced competent workers, familiar with the materials and the techniques specified.
Painters to have attended the paint manufacturer's pre start training session. Spray painters to hold a current paint manufacturer's certification qualification relevant to the work undertaken and retain proof on site.

1.5 HEALTH AND SAFETY
Refer to the requirements of the Health and Safety at Work Act 2015 and WorkSafe NZ: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards is not possible then minimise hazards in this work on site by using the proper equipment and techniques as required in the MPNZA Painters hazard handbook. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

Conduct
Refer 2123 ASBESTOS REMOVAL section and HNZ Asbestos Policy and Code of Conduct.

Report in writing to the HNZ contract manager and obtain instructions in writing before proceeding.

Refer to WorkSafe NZ: Guidelines for the management of lead-based paint for the required procedures and precautions when:

- treating/removing lead-based paint
- burning off paint
- sanding off paint
- using solvent based paint removers.

1.6 MATERIAL SAFETY DATA SHEET
Obtain from each paint manufacturer the material safety sheet for each product used. Keep sheets on site and comply with the required safety procedures.

Warranties

1.7 WARRANTY
Warrant this work under normal environmental and use conditions against failure.
10 years: Warranty of workmanship period for standard pre paint preparation
15 years: Warranty of workmanship period for full strip pre paint preparation

Performance

1.8 MANUFACTURER'S INSPECTION
Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested, 3 inspection checks by the paint manufacturers representative minimum.

1.9 INSPECTION OF WORK
Inspection of the whole of the work at each of the stages scheduled may be made. Agree a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection, inspection stages minimum:

- pre paint inspection
- post paint inspection

2. PRODUCTS

Materials

2.1 PAINT TYPES
Use the manufacturer's complete system and only the products specified.
Refer to Dulux HNZ Paint Application Manual and HNZ Colours.

2.2 MATERIALS GENERALLY
Use only the Manufacturer's products which are guaranteed for their consistency and performance under AS/NZS ISO 9001 and APAS approval, prepared, mixed and applied as directed in the Manufacturer's specification sheets, specification manuals and product data sheets.

2.3 THINNERS AND ADDITIVES
Only use thinners or additives within the stated limits for the particular situations specified.

Accessories

2.4 FILLERS
For recommendations on; fillers, stopping, paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, knotting and other commodities used for the surface preparation, refer to the manufacturer of the specified coating.

3. EXECUTION

Conditions

3.1 EXECUTION
To conform to manufacturer's requirements and those methods, practices and techniques contained in AS/NZS 2311, and WorkSafe NZ: Guidelines for the provision of facilities and general safety in the construction industry.

3.2 PREPARE
Clean all surfaces to be painted and prepare surfaces to the coating manufacturer's requirements.

Paint removal:
- Obtain instructions in writing from the HNZ Contract Manager before using the following methods for paint removal
- Burn off with the a blow torch or infra red torch
- Electric heat gun.

- On site sand, grit or soda blasting
- Water blasting.

Textured ceilings:
- Carry out laboratory testing for asbestos and obtain instructions in writing from the HNZ Contract Manger before undertaking work on textured ceilings.

Lead based paint:
- Carry out testing for lead based paint using a suitable test kit from a paint supplier and obtain instructions in writing from the HNZ Contract Manger before undertaking work on surfaces where lead based paint is identified.

3.3 COATED SURFACES
Ensure that substrate surfaces are able to achieve the specified finish.

Textured ceilings:
- Where textured ceiling finish is removed skim plaster and prime.

Wallpaper surface:
- Where wallpaper surface to be painted over, clean and allow to dry. Lightly sand the surface ensuring the wallpaper is firmly adhered to the wall. Where the substrate is not able to achieve the specified finish the wall to be stripped, stopped and primed.

Refer 5113 PLASTER LININGS section for stopping and plastering.
Refer 6721 PAINTING INTERIOR section for primer.

3.4 PRE-PRIMED SURFACES
Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

3.5 BRUSH DOWN
Brush down surfaces immediately before application, to remove dust, dirt and loose material.

3.6 COMPATIBILITY
Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.

3.7 TREATED SURFACES
Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

3.8 ANCILLARY SURFACES
The coatings listed in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

3.9 HARDWARE
Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings power point and light switch cover plates before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion. Where removal of cover plates is not practicable, loosen the screws to allow painting behind the edge of the cover plate.

3.10 PROTECTION
Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings, spaces and external features including planting, pavements and driveways from paint removal and paint drops, spots, spray and damage. Protect the interior environment from external works with temporary air and dust barriers.

Where lead based paint is suspected all power tools are to be fitted with dust bags to capture all disturbed dust. Where lead based paint is identified power tools are not to be used.

Grinder equipment to be fitted with a vacuum dust extraction system.

Spray painting to use airless equipment and tenting system to enclose the entire area, mask all glazing.

All dust, flakes and debris are collected and removed from site in sealed plastic bags to a suitable waste disposal facility.

Refer 4610 GLAZING for masking materials.

Preparation - unpainted and pre-primed timber and wood based products

3.11 MOISTURE CONTENT
Ensure moisture content at the time of application is near to the equilibrium moisture content pertaining to the particular locality in which the timber is used, without any excessive moisture content gradient between core and surface.

3.12 PREPARING DRESSED TIMBER
Ensure dressed timber is smooth, free from raised or woolly grain, planing burrs or other machining defects. Slightly round or ease sharp edges to ensure they can be properly coated. Sand timber to bring up to a smooth finish along the direction of the grain.

3.13 PREPARING ROUGH SAWN TIMBER
Thoroughly brush along the direction of the grain to remove dust and dirt.

3.14 PREPARING PRE-PRIMED TIMBER
Check pre-prime coat for damage, powdering, weathering or loss of adhesion. Where primer is sound, thoroughly brush along the direction of the grain to remove dust and dirt. If there is doubt, sand back and re-prime.

3.15 TIMBER SPECIES
Check that the preparation and paint system is suitable for the timber species.

3.16 PREPARING DAMAGE AND DEFECTS
Scrape clean loose or soft material holes, depressions, resin or gum pockets, knot holes, surface splits, checks, or any localised decay. Replace decayed timber to match existing. Apply primer and/or sealer and fill areas with linseed oil putty or other appropriate filler as required by the paint manufacturer for a suitable finish to receive the specified coating system.

Refer 3897 DECAYED TIMBER AND INFESTATION section for timber decay.

3.17 FIXINGS
Take timber fixings below the painted or clear finished surface. Leave corrosion resistant timber fixings flush with clear finished surfaces.

3.18 CLEANING
Remove grease and oil by wiping down with solvent or water-based degreasing agent or scraping. Remove sanding dust.

Preparation - unpainted metal

3.19 PREPARING STEEL
To AS/NZS 2312.1.
Remove loose rust and mill scale by hand-tool or power-tool cleaning. Use chemical pre-treatment to remove the last traces of rust and to inhibit rust formation.

3.20 PREPARING ZINC AND ALUMINIUM-ZINC ALLOY COATED STEEL
Remove grease, oil and other solvent soluble contaminants by wiping and/or brushing with mineral turpentine or white spirit. Wipe with a clean solvent. Allow to dry and proceed immediately with the next operation.

3.21 PREPARING ALUMINIUM
Remove grease, oil and dust by wiping and/or brushing with mineral turpentine or white spirit. Wash thoroughly using water with a few drops of detergent, then wash with clean water. Allow to dry and proceed immediately with the next operation.

Preparation - unpainted masonry

3.22 PREPARING BRICKS
Remove loose dirt, sand, aggregate and mortar by brushing down or blocking-off surface with a flat stone, hose with clean water. Fill holes with mortar/acrylic based filler. Remove efflorescence by dry brushing with a stiff bristle brush.

3.23 PREPARING CONCRETE

Remove grease and formwork oil with solvent or water and household detergent. Wash with clean water and allow to dry. Clean mould covered surfaces using a solution of 5% vinegar in water and wash off or treat with a proprietary anti-mould solution, and allow to dry.

Fill unwanted holes with cement grouting and allow to cure. Remove loose surface material and surface projections with a flat stone. Roughen slightly dense or glazed surfaces by sanding, rubbing with coarse abrasive stones, or by wetting the surface and treating with 10% commercial hydrochloric acid solution. Allow to react for 5 minutes, scour surface with a stiff bristle brush, wash off with clean water and allow to dry. Remove efflorescence by dry brushing or by wetting the surface and treating with 10% commercial hydrochloric acid solution as above.

Remove dust and dirt by brushing, air blast, hosing, or scrubbing as may be necessary.

Where necessary for all paint to be removed from steps and landings for an unpainted finish, the surface texture to be similar to 100 grit sandpaper without any semi-circular grinding marks.

3.24 PREPARING CEMENT PLASTER
Ensure surface is adequately cured and dry. Clean mould covered surfaces using a solution of 5% vinegar in water and wash off or treat with a proprietary anti-mould solution, and allow to dry. Remove efflorescence by brushing only.

3.25 PREPARING CONCRETE MASONRY

Remove loose dirt, sand, aggregate and mortar by brushing down or blocking-off the surface with a flat stone or hardwood block. Fill holes with mortar or acrylic based filler. Treat mould with one part sodium hypochlorite household bleach to three parts clean water solution, or a proprietary anti-mould solution, and allow to dry.

Remove efflorescence by dry brushing or by wetting the surface and treating with 10% commercial hydrochloric acid solution. Allow to react for 5 minutes, scour the surface with a stiff bristle brush, wash off with clean water and allow to dry.

Remove dust and dirt by brushing, air blast, hosing or scrubbing.

Preparation - gypsum plaster

3.26 PREPARING GYPSUM PLASTER
Fill and sand small crevices and cracks. Surface moisture content not to exceed 12% at time of coating.

Preparation - unpainted linings

3.27 PREPARING FIBROUS PLASTER
Check for and remove release agents and other contaminants by washing with clean water or solvent and allow to dry. Fill cracks and surface imperfections with patching plaster and lightly sand smooth. Remove dust.

3.28 PREPARING PLASTERBOARD
Check that joints are prepared to a smooth level surface finish. Fill cracks and surface imperfections with the sheet manufacturer's required stopping compound and lightly sand smooth. Remove dust.

Preparation - unpainted plastics

3.29 PREPARING UNPLASTICISED POLYVINYL CHLORIDE (UPVC)
Wipe surfaces with mineral turpentine, methylated spirits or white spirit. Lightly abrade with sandpaper and dust off. Proceed immediately with topcoats applicable for walls or timber finishes.

Preparation - painted surfaces generally

3.30 SURFACE PREPARATION
Refer to the Manufacturer's specification sheets and product data sheets. Carry out the preparatory work required by them for each of the substrates.

For interior surfaces such as paper faced plasterboard use the Manufacturer's recommended finishing compound as an aid to achieving a Level 5 finish.

3.31 MOULD
Clean surface mould by spraying the whole surface with a solution of 70% white vinegar and 30% water, left for 30 minutes before scrubbing or wiping, wash off with clean water and allow to dry or treat with anti-mould solution to the treatment manufacturer's requirements.

3.32 GAP FILLING
Fill cracks, holes, indented and damaged surfaces with filler as appropriate and in accordance with the paint manufacturer's requirements. Allow to dry or set before sanding back level with the surface. Prime coat or seal the timber before using filler. Wet cement or gypsum base plasters before applying filler. Use only Portland cement base types, or water-insoluble organic-based gap fillers in exterior or wet areas.

Preparation - painted surfaces in good condition

3.33 PREPARING SURFACES
Wash down surfaces with either:
- a solution of 5% vinegar in water ; or
- 5-10 millilitres of ordinary household detergent to 1 litre of warm water; or
- a solution of 30 grams of trisodium phosphate to 1 litre of water.

Replace solutions frequently and finally wipe over a second time with a clean absorbent cloth.

For surfaces containing heavy smoke and grease deposits, wash down with either:
- mineral turpentine; or
- a 5% solution of ammonia; or
- a 1:40 solution of sugar soap and water

as necessary to remove the deposits. Wipe over with a clean absorbent cloth.

Prepare coatings which have chalked by sanding, brushing, as appropriate.

Lightly sand glossy surfaces to ensure good adhesion of the coatings.

Preparation - painted surfaces in poor condition

3.34 PREPARING PAINTED TIMBER
Completely remove blistered, flaked, excessively chalked and cracked (due to exposed end grain and knots) paint to give a sound base for repainting. Scrape out damaged or decayed timber and where the area is extensive, arrange to cut out and replace with treated timber, primed (including end grain) before fixing.

Scrape clean loose or soft material, holes and depressions in timber due to damage or defects such as resin or gum pockets, knot holes and surface splits. Remove and replace sprung or loose corroded nails.

Where necessary strip paint back to the original timber surface, using the most appropriate of the following methods:
- sanding using orbital and/or belt sanders
- paint removers used to the manufacturer's requirements
- hand scraping.

Follow WorkSafe NZ guidelines for minimising the hazards of stripping.
Refer 3897 DECAYED TIMBER AND INFESTATION section for timber decay.
Refer to HNZ Lead Based Paint Policy and Code of Conduct

3.35 PREPARING PAINTED GYPSUM PLASTER

Remove flaked paint completely from powdery, loose and other unsatisfactory plaster surfaces. Treat powdery surfaces with a solution of 150 millilitres of concentrated phosphoric acid and clean water to make 1 litre. Apply the solution, allow to stand 10 minutes and wash down with clean water. Remove loose, weak and drummy plaster and replaster. Allow to cure before proceeding with coatings as for unpainted work.

Confirm that the cause of any efflorescence has been eliminated before wiping it away with a dry rag and making good the damaged surface.

Fill small cracks and damaged surfaces with gypsum plaster or cellulose gypsum compound to just proud of the surface and lightly sand smooth and flush when dry.

3.36 PREPARING PAINTED PLASTERBOARD AND FIBROUS PLASTER

Fill cracks, pores, irregularities and damaged surfaces with the appropriate filler to the paint manufacturer's requirements, trowelled smooth, allowed to dry and lightly sanded to a smooth flush surface. Treat any staining of paint films on plaster as required by the coating manufacturer.

3.37 PREPARING PAINTED CEMENT PLASTER, CONCRETE AND MASONRY

Remove the fine white powder of efflorescence by brushing and then wiping with a clean cloth. Remove faulty mortar by wire-brushing. Make good with fresh mortar to match.

Confirm that the cause of any dampness has been eliminated and that the substrate is dry before applying any coating.

Wire brush moss or lichen affected areas to remove loose, powdery growth. Treat the affected areas with a solution of 200 millilitres of formalin (40% solution) to 800 millilitres of water. Apply the solution and leave for 3 days, or until the moss and lichen turns brown. Scrub off with a hard bristle brush and hose down liberally with water. Swab the affected area using a solution of 1 volume of household bleach to 2 volumes of water. After 30 minutes wash down with clean water.

Remove grease by continued washing with a 1:40 solution of sugar soap and water until completely removed, wash with clean water and allow to dry.

Where necessary strip paint back to the original surface and if testing has confirmed no lead based paint, strip paint back by water blasting on-site or abrasive blasting off site. Remove chalk dust and dirt when dry by stiff bristle brushing. Collect paint flakes with a fine mesh drop sheet.

Where lead based paint has been identified paint stripper to be used.
Refer to HNZ Lead Based Paint Policy and Code of Conduct

Where asbestos has been identified obtain instructions in writing from the HNZ Contract Manager before undertaking repair, replacement or coating.

3.38 PREPARING PAINTED METALWORK

Remove corrosion in whatever form. Sand edges to form a smooth surface with surrounding areas unaffected by corrosion. Use a chemical pre-treatment to remove the last traces of and to inhibit future, corrosion. Clean down completely before spot priming to suit the coating system specified.

Where corrosion can not be removed obtain instructions in writing from the HNZ Contract Manager before undertaking replacement or coating.

Application - before applying final coatings

3.39 OFF-SITE WORK
Carry out off-site preparation and coating under cover, in a suitable environment and with adequate lighting. Store items both before and after coating in a clean, dry area, protected from the weather and mechanical damage, properly stacked and spaced to permit air circulation and to prevent sticking of surfaces.

3.40 PRIMING JOINERY
Before priming preservative treated timber ensure that any cut surfaces have been retreated. Liberally coat end grain, allow to soak in and then recoat. Ensure LOSP. treated joinery has dried sufficiently to lose odour.

3.41 CONCEALED JOINERY SURFACES
Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

3.42 CONCEALED METAL SURFACES
Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

3.43 DOORS
Prime or seal and paint all six faces of doors before hanging. Interior doors with the "4SPC" branding on the door edge to be retained and clearly legible at completion.

3.44 BEAD GLAZING
Before glazing apply the first two coats, or the primer and one undercoat, to cleaned rebates of stained, varnished or painted joinery and beads, to match existing.
Refer 4610 GLAZING section for materials.

3.45 PUTTY GLAZING
Follow putty manufacturers recommendations for application, drying, and painting. Prime cleaned rebates. Ensure that the putty is fully protected by the coating system as soon as it is sufficiently hard.
Refer 4610 GLAZING section for materials.

Application - generally

3.46 PAINTING GENERALLY
Comply with the paint manufacturer's requirements and any additional requirements in this specification.

3.47 MIXING
Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

3.48 ENVIRONMENT
Paint exterior surfaces only in favourable weather conditions:
- warm dry days without frost or heavy dews
- avoid painting in direct sunlight any surfaces that absorb heat excessively
- do not paint if temperatures fall outside the range of 10°C and 35°C or humidity exceeds 85%.

3.49 SEQUENCE OF OPERATIONS
Painting work to generally follow the following sequences:
- complete surface preparation before commencing painting
- apply paint in the specified sequence using the specified paint
- allow full drying time between coats to the paint manufacturer's requirements

- do not expose primers, undercoats and intermediate coats beyond manufacturers stated instructions before applying the next coat
- finish broad areas before painting trim
- ensure batch numbers of tins are matched for whole areas
- internally, paint ceilings before walls and walls before joinery, trim and other items.

3.50 PAINT APPLICATIONS
Select brush, roller, or pad and apply paint to the requirements of the paint manufacturer and to obtain a smooth even coating of correct thickness, uniform gloss and colour and to achieve a wet film thickness. .

3.51 DRYING TIME
Before handling or applying the next coat of paint, give each coat the full drying time as required by the paint manufacturer. Ensure that surfaces are dry and that condensation does not occur before the paint reaches surface-dry condition.

3.52 LIGHTLY SAND
Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. Remove dust immediately before applying the next coat.

3.53 DEFECTIVE WORK
Correct defective work immediately and re-coat as required, following precisely the paint system specified.

3.54 EACH COAT
Each coat of paint and the completed paint system to have the following qualities and properties:

- uniform finish, colour, texture, sheen and hiding power
- the specified number of coats applied
- no blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, brush marks, ladder marks and blistering
- proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application.

Completion

3.55 CLEAN
Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at completion of the building works. Clean glass inside and out to a shining finish.

3.56 CLEAN EQUIPMENT
Use the Manufacturer's environmental wash system for the cleaning of water-based paint and plasters from brushes, rollers, plastering or spray equipment to separate the solids from the water component for safe disposal.

3.57 LEAVE
Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.

3.58 REMOVE
Remove dropsheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.

Empty paint containers and surplus paints to be recycled using the paint manufacturer’s recycling system.

3.59 REPLACE HARDWARE
Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6711 PAINTING EXTERIOR

1. GENERAL

This section relates to the preparation of exterior unpainted and pre-painted surfaces, and the application of exterior:

- decorative paint coatings
- protective paint coatings
- sealers
- stains
- clear finishes.

Refer 6700 PAINTING GENERAL section.

2. PRODUCTS

2.1 PRODUCTS GENERALLY
All paint and systems to be DULUX
Refer to 6700 PAINTING GENERAL for product clauses.

2.2 WEATHERSHIELD X10 GLOSS

- Spread rate 16.1
- Wet film thickness 62
- Dry film thickness 25.

2.3 1 STEP PRIMER

- Spread rate 13.7
- Wet film thickness 73
- Dry film thickness 30.

2.4 TIMBACRYL

- Spread rate 16
- Wet film thickness 61
- Dry film thickness 25.

2.5 SILVERSHEEN

- Spread rate 15.4
- Wet film thickness 65
- Dry film thickness 24.

2.6 QUITRUST ALL METAL PRIMER

- Spread rate 9
- Wet film thickness 111
- Dry film thickness 42.

2.7 CABOTS DECK AND EXTERIOR STAIN

- Spread rate 12
- Wet film thickness 83
- Dry film thickness 25.

2.8 502-1 ACRAPRIME

- Spread rate 5.3
- Wet film thickness 188
- Dry film thickness 75.

2.9 LUXAPRIME ZP PRIMER

- Spread rate 5.8

- Wet film thickness 185
- Dry film thickness 50.

2.10 SUPER ENAMEL
- Spread rate 16.1
- Wet film thickness 62
- Dry film thickness 32.

2.11 WEATHERSHIELD ROOF AND TRIM GLOSS
- Spread rate 16.4
- Wet film thickness 61
- Dry film thickness 25.

3. EXECUTION

3.1 EXECUTION

Refer to Dulux HNZ Paint Application Manual and HNZ Colours.

Refer to 6700 PAINTING GENERAL for execution clauses.

Paint systems

3.2 TIMBER / PLYWOOD / HARDBOARD – PAINT

Cladding, trims and cover boards.
1st coat: 1 step primer for unpainted or previously painted
2nd coat: Weathershield X10 gloss
3rd coat: Weathershield X10 gloss

Doors and windows.
Preparation: 1 step primer for unfinished or previously painted
1st coat: Aquanamel
2nd coat: Aquanamel

Decks, stairs, handrails and fences.
Preparation: 1 step primer for previously stained surfaces
1st coat: Timbacryl for previously painted or stained
2nd coat: Timbacryl
3rd coat: Silica Sand

3.3 TIMBER / PLYWOOD - STAIN

Cladding, trims and cover boards.
1st coat: Cabots deck and exterior stain for previously stained
2nd coat: Cabots deck and exterior stain

3.4 CONCRETE / BLOCKWORK / FIBRE CEMENT / CEMENT PLASTER - PAINT

Roof, flashings, claddings, walls.
1st coat: 502-1 Acraprime for previously painted
2nd coat: Weathershield Roof and Trim gloss
3rd coat: Weathershield Roof and Trim gloss

Stairs.
1st coat: Timbacryl
2nd coat: Timbacryl
3rd coat: Silica Sand

3.5 UPVC

Spouting, downpipes, waste pipes.
1st coat: Weathershield X10 gloss for previously painted
2nd coat: Weathershield X10 gloss

3.6 STEEL - GALVANIZED STEEL - ZINC/ALUMINIUM ALLOY COATED STEEL - COPPER - METAL

Roof, flashings, spouting, downpipes, waste pipes, covers, vents, letter boxes.
Preparation: Quit Rust all Metal Primer for unfinished or previously painted
1st coat: Weathershield X10 gloss
2nd coat: Weathershield X10 gloss

Steel doors and windows.
1st coat: Luxa prime ZP Primer for unfinished or previously painted
2nd coat: Superenamel

Steel stairs and hardware.
1st coat: Silversheen for previously painted
2nd coat: Silversheen

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6721 PAINTING INTERIOR

1. GENERAL

This section relates to the preparation of interior unpainted and pre-painted surfaces, and the application of interior:

- decorative paint coatings
- protective paint coatings
- sealers
- stains
- clear finishes.

Refer 6700 PAINTING GENERAL section

2. PRODUCTS

2.1 PRODUCTS GENERALLY

All paint and systems to be DULUX

Refer to 6700 PAINTING GENERAL for product clauses.

2.2 WASH AND WEAR KITCHEN AND BATHROOM LOW SHEEN

- Spread rate 16
- Wet film thickness 75
- Dry film thickness 25.

2.3 WASH AND WEAR KITCHEN AND BATHROOM SEMI GLOSS

- Spread rate 16
- Wet film thickness 75
- Dry film thickness 25.

2.4 AQUANAMEL GLOSS

- Spread rate 16.1
- Wet film thickness 62
- Dry film thickness 23.

2.5 ONE STEP PRIMER

- Spread rate 13.7
- Wet film thickness 66
- Dry film thickness 29.

2.6 INTERGRAIN UNTRAFLOOR GLOSS

- Spread rate 11.8
- Wet film thickness 85
- Dry film thickness 23

2.7 SEALER AND BINDER

- Spread rate 12
- Wet film thickness 80
- Dry film thickness 40.

2.8 CABOTS VARNISH STAIN

- Spread rate 15
- Wet film thickness 67

- Dry film thickness 20.

3. EXECUTION

3.1 EXECUTION

Refer to Dulux HNZ Paint Application Manual and HNZ Colours.
Refer to 6700 PAINTING GENERAL for execution clauses.

Paint systems

3.2 PLASTERBOARD - PAINT

Ceilings and scotia (timber/plaster).
1st coat: 1 step primer for unfinished or previously painted
2nd coat: Wash and wear kitchen and bathroom low sheen
3rd coat: Wash and wear kitchen and bathroom low sheen

Walls.
1st coat: 1 step primer for unfinished or previously painted
2nd coat: Wash and wear kitchen and bathroom low sheen
3rd coat: Wash and wear kitchen and bathroom low sheen

Walls for wet areas (kitchen/dining, laundry, bathroom/toilet).
1st coat: 1 step primer for unfinished or previously painted
2nd coat: Wash and wear kitchen and bathroom semi gloss
3rd coat: Wash and wear kitchen and bathroom semi gloss
Walls for wallpaper.
Preparation: 1 step primer over plastered wall previously wallpapered

3.3 FIBROUS PLASTER - PAINT

Ceilings and scotia (timber/plaster).
1st coat: Sealer and binder for unfinished or previously painted
2nd coat: Wash and wear kitchen and bathroom low sheen
3rd coat: Wash and wear kitchen and bathroom low sheen

Walls.
1st coat: 1 step primer for unfinished or previously painted
2nd coat: Wash and wear kitchen and bathroom low sheen
3rd coat: Wash and wear kitchen and bathroom low sheen

Walls for wet area (kitchen/dining, laundry, bathroom/toilet).
1st coat: 1 step primer for unfinished or previously painted
2nd coat: Wash and wear kitchen and bathroom semi gloss
3rd coat: Wash and wear kitchen and bathroom semi gloss

3.4 TIMBER / PLYWOOD / HARDBOARD / FIBREBOARD - PAINT

Windows.
Preparation: 1 step primer for unfinished or previously painted
1st coat: Aquanamel gloss
2nd coat: Aquanamel gloss

Doors, frames, trims (skirting/architrave).
Preparation: 1 step primer for previously clear finish
1st coat: 1 step primer for unfinished or previously painted
2nd coat: Aquanamel gloss

3rd coat: Aquanamel gloss

Kitchen cabinetry doors/shelves (top surface).
Preparation: 1 step primer for previously clear finish
1st coat: 1 step primer for previously painted or previously clear finish
2nd coat: Aquanamel gloss
3rd coat: Aquanamel gloss

3.5 TIMBER / PLYWOOD - STAIN / CLEAR FINISH

Doors, frames, trims (skirting/architrave).
1st coat: Cabots varnish stain for unfinished
2nd coat: Intergrain ultrafloor gloss
3rd coat: Intergrain ultrafloor gloss

Kitchen cabinetry doors/shelves (top surface), bench tops.
1st coat: Intergrain ultrafloor gloss for unfinished or previously clear finish
2nd coat: Intergrain ultrafloor gloss

Floors
1st coat: Intergrain ultrafloor gloss for unfinished or previously clear finish
2nd coat: Intergrain ultrafloor gloss
3rd coat: Intergrain ultrafloor gloss

3.6 METAL - STEEL

Preparation: Quit Rust all Metal Primer for unfinished or previously painted
1st coat: Aquanamel gloss
2nd coat: Aquanamel gloss

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

6751 WALLPAPER FINISHES

1. GENERAL

This section relates to linings adhered to walls:

- paper-backed PVC.

Requirements

1.1 QUALIFICATIONS
Paper hangers to be experienced competent workers, familiar with the materials and the techniques specified.

2. PRODUCTS

Materials

2.1 PAPER BACKED VINYL
Dry strippable vinyl paper. HNZ range.

Accessories

2.2 SIZE
PVA type size or the specified adhesive thinned, both to the wall covering manufacturer's requirements.

2.3 PRIMER
Applied to the wall covering manufacturer's requirements. Refer 6721 PAINTING INTERIOR section for plasterboard.

2.4 ADHESIVE, PAPER BACKED VINYL
To the wall covering manufacturer's requirements.

3. EXECUTION

Conditions

3.1 STORE MATERIALS

Store materials on site. Protect from discoloration, staining and damage.

3.2 SUBSTRATE

Ensure that backgrounds and adjoining surfaces, after the preparation called for in this section, will allow work of the required standard.

3.3 COMMENCEMENT

Do not start this work until the building is enclosed, doors are hung and lockable, wet work is complete and a well lit, dust free environment is available.

3.4 FIXTURES

Remove cover plates, light fittings and other fixtures as the work proceeds. Do not cross cut paper for cover plates. Replace plumb, square and true to line and face as the work is completed.

Application - preparing previously papered or painted surfaces

3.5 PREPARING PAPERED SURFACES
Dampen and remove existing papers and linings and wash the surface with clean warm water to remove old paste and size. When dry fill any cracks and irregularities with a compatible stopping agent and sand to a smooth surface that is dry and dust free. Seal with primer.

Application - hanging

3.6 CHECK SHADING
Use only rolls from the same batch number in any one area. Check each drop for colour match before hanging. Reverse alternate drops only if required by the manufacturer.

3.7 CHECK PATTERN
Before beginning hanging, confirm the set-out for each area and review any mismatch location. Use only full length drops.

3.8 PAPER JOINTS
Hang drops vertically with butt joints tight fitting, flush and not obviously visible. Do not overlap joints.

3.9 TRIM EDGES
Trim neatly to a true line and edge where edges meet other material or surfaces.

Completion

3.10 REPLACE
Replace damaged or marked elements.

3.11 LEAVE
Leave work secure and smooth and free of air bubbles, wrinkles, gaps, stains and blemishes and to the standard required by following procedures. Clean adjoining surfaces of any adhesive.

3.12 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7120 HOT & COLD WATER SYSTEM

1. GENERAL

This section relates to piped potable water supply systems from the main supply point to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC C/AS1-AS7	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS 1432	Copper tubes for plumbing, gasfitting and drainage applications
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1:2003	Plumbing and drainage - Water services
AS/NZS 3500.4: 2003	Plumbing and drainage - Heated water services
AS/NZS 3500.5	Plumbing and drainage - Housing installations
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS 3688	Water supply - Metallic fittings and end connectors
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS/NZS 5601.1: 2010	Gas installations - general installations
DIN 8077	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - General quality requirements and testing.

Gas (Safety and Measurement) Regulations 2010

Plumbers, Gasfitters and Drainlayers Act 2006

NZ Backflow Testing Standard: NZ Backflow Testing Standard 2011, Field testing of backflow prevention devices and verification of air gaps.

Requirements

1.2 QUALIFICATIONS
Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

Warranties

1.3 WARRANTY
Provide warranty for:
2 years: For the supply and installation of the plumbing system and fixtures

- Commence the warranty from the date of practical completion of the contract works.

Performance

1.4 TESTING - TO NZBC G12/AS1
Test to NZBC G12/AS1, 7.5, **Watertightness**, for hot and cold water.
- Test to a pressure of 1500 kpa for period not less than 15 minutes.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed.
Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

1.5 STANDARDS FOR COPPER PIPE
This section is based on NZS 3501 to NZBC G12/AS1 for the supply of copper pipe and fittings.
If the specified pipe is not available, pipes to AS 1432 and fittings to AS 3688 can be used, under NZBC G12/VM1 if written BCA approval is obtained by the plumber (both Standards are referenced in AS/NZS 3500.1:2003). If these Standards are used adjust diameters so that bore sizes are not compromised, otherwise comply with all other aspects of this section.
The whole project to be either to NZS 3501 or AS 1432.

1.6 GAS CERTIFICATE OF COMPLIANCE
Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the HNZ Contract Manager , and when required provide a copy to the energy supplier before connection.

1.7 GAS SAFETY CERTIFICATION
Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the HNZ Contract Manager. To be provided at completion of the work, prior to Practical Completion.

1.8 GAS APPLIANCE COMPLIANCE
Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2. PRODUCTS

2.1 COPPER PIPE
To NZS 3501 complete with copper-alloy compression fittings or crox type joints and seal ring compression joints complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, Table 1 and NZBC G12/AS1, Table 1. Copper pipe for wetback systems and to match existing.

2.2 POLYBUTYLENE PIPE
Polybutylene tubing to AS/NZS 2642.1, AS/NZS 2642.2 and AS/NZS 2642.3 complete with fittings and accessories brand-matched with durability to NZBC B2/AS1 Durability, table 1 and NZBC G12/AS1, table1, to match existing.

2.3 POLYETHYLENE PIPE
To AS/NZS 4130 Series 1 complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, table 1 and NZBC G12/AS1, table1, to match existing. Cold water only.
Water main to be high density polyethylene 32mm outside dimension pipe, minimum 25mm internal dimension complete with rubber ring compression type fittings.

2.4 POLYPROPYLENE RANDOM WATER PIPE
PP-R Polypropylene pipes to DIN 8077 and DIN 8078 complete with fusion welded fittings and accessories brand-matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, table 1 and NZBC G12/VM1, to match existing.

2.5 CROSS LINKED POLYETHYLENE PIPE
Cross Linked Polyethylene Pipe to AS/NZS 2492 and fittings to AS/NZS 2537.2 with a minimum pressure capability of 1200 kPa complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, table 1 and NZBC G12/VM1, to match existing

2.6 WATER METER
To the requirements of the network utility operator.

2.7 VALVES
Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to NZBC G12/AS1. Gate valves de-zincified brass with screwed ends.

2.8 BACKFLOW PREVENTION DEVICES
Provide backflow prevention devices to AS/NZS 2845.1 where it is possible for water or contaminants to backflow into the potable water supply. Refer to NZBC G12/AS1 3.4 Backflow protection, and NZBC G12/AS1, table 2, Selection of Backflow Protection.

2.9 TEMPERING VALVE
Tempering valve to NZS 4617 to NZBC G12/AS1, with anti tamper device for all hot water cylinders.

2.10 HEADER TANKS
Pre-formed black polyethylene or stainless steel tank, complete with access opening and lid and overflow tray, to match existing. Replacement ballcock to match existing. .

2.11 RAINWATER STORAGE TANK
Replacement tank and fittings to manufacturer’s requirements, to match existing. Tanks to be fitted with a secure fitting lid to provide internal access for cleaning or inspection.

- Above ground tank manufactured from polyethylene to AS/NZS 4766 and to AS 2070.
- Above ground tank manufactured from precast concrete to ATS 5200.026 Technical Specification for plumbing and drainage products - Cold water storage tanks.

Materials - Hot water heating appliances

2.12 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
To NZS 4305, where adequate electrical supply capacity replace existing 2kw for 3kw or match existing.

- Ceramic-coated steel thermal storage cylinder, insulated and complete with required fittings.
- Stainless steel thermal storage cylinder for wet back systems, insulated and complete with required fittings.

2.13 ELECTRIC HOT WATER CYLINDER, LOW PRESSURE
To NZS 4305 and NZS 4602, vitreous enamel or copper thermal storage cylinder insulated and complete with pressure reducing valve and required fittings, to match existing for open vented wet back system.

2.14 GAS HOT WATER HEATER, STORAGE TYPE
Insulated cylinder to NZS 4305 with an integral gas burner and flue, to match existing.

2.15 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Continuous flow unit with an integral gas burner and flue to NZS 4305, to match existing.

Components

2.16 INSULATION
Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements and to NZBC H1/AS1.

2.17 PROTECTIVE TAPE
Plasticised PVC tape system with primer, mastic fixing and outer coating.

2.18 ELECTRIC HOT WATER CYLINDER ELEMENT
Incoloy water heating element 3kw, where adequate electrical supply capacity replace existing 2kw with 3kw or match existing.

2.19 HOT WATER CYLINDER OVERFLOW TRAY
Plastic or fabricated corrosion resistant metal safe tray.

Fire stopping accessories

2.20 FIRE STOPPING SYSTEMS
Provide evidence that the systems will comply with the existing standards of performance.
Report to HNZ Contract Manager for fire stopping systems identifed and obtain instruction in writing prior to proceeding with works.

3. EXECUTION

3.1 EXECUTION GENERALLY
Generally carry out the whole of this work and tests to NZBC G12/VM1 or NZBC G12/AS1.

3.2 HANDLE AND STORE
Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES
Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL
Conceal pipework within the fabric of the building unless approved in writing by the HNZ Contract Manager. Exposed work, complete with matching ferrule at the surface penetration.

- Chrome plated copper pipe with brass nuts and fittings
- Copper pipe with brass nuts and fittings
- Stainless steel hose braid with stainlesss steel nuts.

3.5 CORROSION
Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT
Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.7 PIPE SIZE
Flow rates to each outlet to be no less than those given in NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in NZBC G12/AS1, table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION
Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE
Excavate for the water main to a firm, even trench base in straight runs. Lay a minimum 500mm below ground and 600mm under driveways from the utility network operators supply through a gate valve and meter toby to the building. Lay marker tape above the water main. Allow to backfill.

Application - Jointing

3.10 JOINTING COPPER PIPE
Braze pipe, fit alloy compression fittings, crox type joints and seal ring compression joints to NZBC G12/AS1. Install brass bushing at junction between existing galvanised pipe and copper pipe.

3.11 JOINTING POLYBUTYLENE PIPE
Aluminium clamped, seal ring compression or push fit "O" ring seal jointing to pipe system manufacturer's requirements.

3.12 JOINTING POLYETHYLENE PIPE
Seal ring compression joints and electrofusion to NZBC G12/AS1. Cold water only.

3.13 JOINTING POLYPROPYLENE PIPE
Fusion weld joints to manufacturer's requirements.

Application - Pipework installation

3.14 WATER SUPPLY CONNECTION
Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1.

3.15 RAINWATER STORAGE TANK
Pump installation to AS/NZS 3000. Backflow prevention devices to AS/NZS 2845.1, to AS/NZS 3500.1:2003 and to NZBC G12/AS1. Test the complete system to AS/NZS 3500.1:2003.16, repair and replace components to system manufacturer's requirements. Where complete system replacement is required, report to the HNZ Contract Manager and obtain instruction in writing prior to proceeding with works.

3.16 POTABLE WATER SUPPLY PIPEWORK INSTALLATION
From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

- Shower minimum flow rate 6 litres per minute
- All fixtures maximum flow rate 8 litres per minute.

3.17 HOT WATER PIPEWORK
Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to NZBC G12/VM1 or NZBC G12/AS1, table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings

Lag all pipes with rigid insulation to the manufacturer's requirements and G12/VM1 or G12/AS1.

3.18 EQUIPOTENTIAL BONDING
Earth metallic water supply pipe and metallic sanitary fixtures to NZBC G12/AS1, 9.0. Replacement pipework ensure earth continuity is permanently maintained.

3.19 IN-LINE FILTER
Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning, install where ceramic discs or ceramic cartridges for tapware or mixers.

Application - Hot water systems

3.20 HOT WATER CYLINDER INSTALLATION GENERALLY
Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6. 11, Water heater installation. Valve-vented systems to NZS 4607.
Install mains pressure hot water cylinders or low pressure hot water cylinders to match existing pressure system. Hot water cylinder thermostat set to 60 degrees Celsius.

3.21 SEISMIC RESTRAINTS - GAS WATER HEATING APPLIANCES
Gas appliances to be restrained to manufacturer's requirements, AS/NZS 5601.1 and NZBC C/AS1-AS7, 7.2 Gas-burning Appliances. Install seismic restraints to existing appliances to be retained.

3.22 SEISMIC RESTRAINTS - NON-GAS WATER HEATING APPLIANCES
Non-gas (electric, wet-back, solar etc) water heating appliances to be restrained to manufacturer's requirements and NZBC G12/AS1, 6.11, Water Heater Installation. Install seismic restraints to existing appliances to be retained.

3.23 INSTALLING HOT WATER PIPE INSULATION
Insulate all hot water pipes to NZBC H1/AS1, AS/NZS 3500.5, 3.33 **Water and Energy Efficiency**, and to the insulation manufacturer's instructions, and to within 1m of the hot water cylinder including the vent pipe and existing pipes. Cut insulation sections tight between timber framing and tight between the webs of steel studs. Flexible rubber or polyurethane insulation to be glued or taped the full length of the sleeve with the cuts on the inside bends.

3.24 INSTALL ELECTRIC HOT WATER CYLINDERS
Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with NZBC G12/AS1: 6.11. Valve-vented systems to NZS 4607.

3.25 INSTALL GAS HOT WATER HEATER, STORAGE TYPE
Install complete with the necessary fittings to the manufacturer's requirements and in accordance with NZBC G12/AS1, 6. 11 Water heater installation. Install flue in accordance with the manufacturer's details and requirements and, AS/NZS 5601.1 (for internal or external appliances) or NZBC G4/AS1 (internal appliances). Also refer to section 7221 GAS APPLIANCES section for installation of gas appliances, to match existing.

3.26 INSTALL GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Install complete with the necessary fittings to the manufacturer's requirements and in accordance with NZBC G12/AS1, 6. 11, Water heater installation. Install flue in accordance with the manufacturer's details and requirements and, AS/NZS 5601.1 (for internal or external appliances) or NZBC G4/AS1 (internal appliances). Also refer to section 7221 GAS APPLIANCES section for installation of gas appliances, to match existing.

3.27 INSTALL HOT WATER CYLINDER OVERFLOW TRAY
Install drained overflow tray to all replacement hot water cylinder to NZBC G12/AS1.

3.28 INSTALL TEMPERING VALVE
Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework. Install hot water tempering valve to all hot water cylinders including existing hot water cylinder to be retained. HNZ Thermostat Seals to indicate date of installation.

- Delivery temperature at the nearest tap set to maximum 50 degrees Celsius
- Delivery temperature set to 45 degrees Celsius at the shower
- Delivery temperature set to between 45 to 50 degrees Celsius to all other outlets.

3.29 PENETRATIONS
Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Installation - Valves

3.30 INSTALLING BELOW GROUND ISOLATING VALVE
Install all below ground items such as main isolating valves and water meters in preformed concrete pits or approved equivalent.

3.31 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED
Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

3.32 INSTALLING BACKFLOW PREVENTION DEVICE
Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS 2845.3 or NZ Backflow Testing Standard.

Completion

3.33 LABEL
Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.34 CLEAN IN-LINE FILTER
Clean all in-line filters on completion of works.

3.35 REPLACE
Replace damaged or marked elements. Refill empty water supply tank with fresh clean drinking water supplied by the local authority certified water carrier.

3.36 LEAVE
Hot water cylinder thermostat set to 60 degrees celcius, delivery temperature set to 50 degrees celcius maximum at the nearest tap and between 45 to 50 degrees celcius to all other outlets. Pressure test all water supply services and fittings to ensure no leakage and leave work to the standard required by following procedures.

3.37 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7125 SOLAR WATER HEATING SYSTEM

1. GENERAL

This section relates to solar water heating systems installed onto a building roof.

Documents

1.1 DOCUMENTS REFERRED TO
Documents referred to in this part of the specification are:

NZBC B1/AS1	Structure
NZBC G12/AS1	Water supplies
NZBC G12/AS2	Solar water heaters
NZS 3604	Timber-framed buildings
AS/NZS 1170.2	Structural design actions - Wind actions
AS/NZS 2712	Solar and heat pump water heaters - Design and construction
AS/NZS 3350.1	Safety of household and similar electrical appliances - General requirements
AS/NZS 3500.1: 2003	Plumbing and drainage - Water services
AS/NZS 3500.4: 2003	Plumbing and drainage - Heated water services
AS/NZS 4020	Testing of products for use in contact with drinking water
NZS 4617	Tempering (3-port mixing) valve
MBIE	DBH - Solar water heaters - Guidance for supplies, installers and building consent authorities - December 2009

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 QUALIFICATIONS
Work to be carried out by a specialist solar water heating installer or by a registered plumber for the installation of the solar hot water system.

1.3 INFORMATION FOR OPERATION AND MAINTENANCE
Provide details of the manufacturer's ongoing maintenance instructions and owners guide to satisfy the performance requirements of AS/NZS 3500.4, 12 Operation and maintenance. Provide a copy to the HNZ Contract Manager at the completion of the contract.

Warranties

1.4 WARRANTY
Warrant this part of the work under normal environmental and use conditions against failure of materials and execution:

Materials:	2 years from date of commissioning of the installation.
Execution:	2 years from date of commissioning of the installation.

Performance

1.5 PRODUCER STATEMENT - INSTALLATION
Provide a producer statement from the accredited installer. The Producer Statement must verify that the installation complies with NZBC G12/AS2 and AS/NZS 3500.4 Plumbing and drainage - Heated water services, naming the installer and the person responsible for verification of the installation and for the post installation tests.

1.6 MANUFACTURER'S INSPECTIONS
Permit the manufacturer's representative to inspect the work in progress by the accredited installer.

2. PRODUCTS

Materials

2.1 COMBINED WATER STORAGE TANK AND COLLECTOR
Replacement tank and fittings to manufacturer's requirements. Solar hot water system comprising of a combined insulated storage tank and collector panel and complete with electrical booster thermostat and fixing down straps. Manufacturer the solar water heating systems and components to AS/NZS 2712, to match existing.

2.2 FLAT PLATE COLLECTOR
Glazed flat plate collector in insulated weatherproof case containing a dark metal absorber plate with either low iron glass or polymer cover. Manufacturer the solar water heating systems and components to AS/NZS 2712, to match existing.

2.3 EVACUATED - TUBE COLLECTOR
Parallel rows of sealed transparent glass tubes surrounding a tubular absorber and connected to a heat exchanger manifold at the top of the tube array. Manufacturer the solar water heating systems and components to AS/NZS 2712, to match existing.

Components

2.4 PIPEWORK
Copper tubing, cross-linked polyethylene pipe, polybutylene pipe (PE-x) or polypropylene random copolymer (PP-r), each used within the temperature / pressure / service life relationship, performance limitations as recommended by the manufacturer, for this application, to match existing.

2.5 TEMPERING VALVE
Tempering valve to comply with NZS 4617 Tempering (3-port mixing) valve and NZBC G12/AS1, 5.0 Water supplies, NZBC G12/AS1, table 4, NZBC G12/AS1, figure 16, and NZBC G12/AS1, 6.14 Safe water temperatures, with anti tamper device, to match existing.

Refer 7102 HOT & COLD WATER SUPPLY section for hot water supply delivery temperature.

2.6 CIRCULATING PUMP
Electrical circulating pump complete with pressure switch, electrical connections and fittings, to match existing.

2.7 TEMPERATURE CONTROL PANEL
Proprietary control panel with temperature sensors to automatically control the use of the circulating pump, to match existing.

2.8 TIME CLOCK
Proprietary time clock suitable to automatically control the use of the electric booster to the water storage cylinder, to match existing.

3. EXECUTION

Conditions

3.1 DELIVERY
Take delivery of the solar water heating system and all accessories. Reject any damaged components.

3.2 STORAGE
Store materials and accessories on a level, firm base, in dry conditions, out of direct sunlight and completely protected from weather and damage. Cover to keep dry until installed.

3.3 BUILDING STRUCTURE
Confirm the building structure is to the standard required by the manufacturer's accredited installer for the installation of the solar water heating system, and be capable to take the filled weight of the unit.

3.4 CONFIRM LAYOUT
Before commencing work confirm the proposed location of solar water heating collector, layout of pipe runs and positions of valves and pumps, to match existing.

Report to HNZ Contract Manager and obtain instructions in writing before proceeding where location or layout of components to be altered.

3.5 CO-ORDINATE SERVICES
Co-ordinate and co-operate with other sub-trades to avoid any conflict with the installation of the system with other subcontractors work.

3.6 PROTECT SURFACES
Protect surfaces, equipment and finishes already in place from the possibility of damage during the installation process.

Application

3.7 INSTALLATION
Install solar water heating system to required configurations, to NZBC G12/AS2 and to the (MBIE) DBH - Solar water heaters - Guidance for supplies, installers and building consent authorities - December 2009.

Locate in a position as close as possible to the existing solar water heater to be replaced and at least 2.5 metres above the highest hot water outlet to be serviced to provide adequate flow. Complete installation of the solar water heating system to AS/NZS 3500.4, 6 Installation of solar water heaters.

Refer 7102 HOT & COLD WATER SUPPLY section for water supply adequate flow rates.

Report to the HNZ Contract Manager and obtain instruction in writing prior to proceeding with works where complete system replacement is required.

3.8 POSITIONING OF COLLECTOR
To NZBC G12/AS2, 4.0 **Location of Solar Water Heaters**. Locate the solar water heating collector so as to be clear of shade 3 hours either side of solar noon at any time of the year. Install at an angle ± 20° of the angle of latitude and facing as close as possible to true north. Position the unit as high as possible on the roof to provide the greatest head of water.

Report to HNZ Contract Manager and obtain instructions in writing before proceeding where inadequate solar time or head height.

3.9 MOUNTING OF COLLECTOR

To NZBC G12/AS2. Install the solar water heating collector to the manufacturer's installation manual, either directly to the roof structure or on a suitable designed frame

fixed to the roof structure. Do not rely on the pipe connections for structural strength. To fix the unit to a roof in non-cyclonic conditions for a tiled roof remove a row of tiles above the unit to expose the rafters, move the unit into place and secure the stainless steel straps to the unit using the M10 bolts supplied. Screw the straps into the rafters and replace the tiles. For a profiled steel roof secure the straps as for a tiled roof. Fix the straps through the peak of the roofing profile into a purlin below using self-tapping stainless steel screws. Isolate the fixing straps from the roofing material with a strip of neoprene rubber.

For fixing solar water heating systems in cyclonic locations use brackets that comply with AS/NZS 1170.2.

3.10 PLUMBING CONNECTIONS

Plumbing connections are to be carried out by a registered plumber and are to comply with AS/NZS 3500.1:2003, 2 Materials and products and to AS/NZS 3500.4, 2 Materials and products and the manufacturer's installation manual.

3.11 WET BACK CONNECTION FOR OPEN VENTED INSTALLATION

To G12/AS2. Connect wetback from a solid fuel heater to the solar water heating system. The piping between the solar water heating system and the wet back to be at least 20mm diameter. Kept pipe length to a minimum. The pipe returning from the wet back outlet to the solar water heating system should not at any location be less than a 30° angle to the horizontal plane. No valves or constrictions are allowed in the inlet or outlet path between the solar water heating system and the wet back. Fit a thermostat and solenoid valve set at a maximum temperature of 90°C to provide over-heating protection.

3.12 INSTALL ELECTRIC CIRCULATING PUMP

Install primary circulating pump and controller, to draw the colder water from the lower section of the container and to circulate the water through the collectors before returning it to the container. Support the pump rigidly on a properly designed base and the piping system arranged so that no perceptible vibration is transmitted to the collector or the building. Fit the controller in an accessible position with a warning notice affixed to the inside of the controller box showing the voltage used, the control wiring diagram and identification of control components fitted and the name of the supplier.

3.13 TEMPERING VALVES

Install the tempering valve that is part of the system. Where a circulating pump is installed then the tempering valve must be fitted after the circulating pump. Where a circulating pump is not fitted then a regulating device may need to be fitted to the cold water inlet to the tempering valve to avoid a large differential pressure between hot and cold water supplies. Fit a non return valve to the tempering valve.

3.14 ELECTRICAL CONNECTIONS

Connect the solar water heating system with a fixed wiring connection to the weatherproof junction box positioned at the top of the installation. Run wiring in either metal or uPVC conduit. The electrical circuit to have an isolating switch fitted at the electrical switch board to provide a means of isolating the installation in compliance with AS/NZS 3350 1 7.12.2. The element requires a 10 amp single-phase electrical supply for the 1.2kW and 2.4kW elements, or a 15 amp single-phase electrical supply for the 3.6kW element.

Ensure that the cold water inlet pipe and the hot water outlet pipe are earthed. Fill the storage tank with water before the power supply is turned on.

3.15 INSTALL TIME CLOCK

Install a time clock in a position for easy access.

3.16 FROST PROTECTION
Fit frost protection mechanism to the solar water heating system to NZBC G12/AS2, 3.6 **Protection from frost** and the manufacturer's recommendations.

Commissioning

3.17 POST INSTALLATION TESTING
Test and commission the completed system to manufacturer's installation manual and AS/NZS 3500.4, 11 Testing and commissioning.

Completion

3.18 CLEANING
Remove and recycle debris, unused materials and elements from the site. Clean soiled or marked work. Replace damaged, cracked or marked elements. Leave the whole of this work to the standard required by the manufacturer.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7151 SANITARY FIXTURES

1. GENERAL

This section relates to the supply and installation of sanitary fixtures, tapware and sanitary accessories.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E3/AS1	Internal moisture
NZBC F2/AS1	Hazardous building materials
NZBC G1/AS1	Personal hygiene
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water
NZBC G13/AS3	Plumbing and drainage
AS/NZS 1730	Washbasins
AS/NZS 2023	Baths for ablutionary purposes
AS/NZS 3500.1:2003	Plumbing and drainage - water services
AS/NZS 3500.2:2003	Plumbing and drainage - sanitary plumbing and drainage
AS/NZS 3662	Performance of showers for bathing
NZS 4223.3	Glazing in buildings - Human impact safety requirements

Plumbers, Gasfitters and Drainlayers Act 2006

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 QUALIFICATIONS
Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a Certifying Plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.3 SAMPLES
Submit samples on request of nominated tapware, along with the relevant manufacturers' technical literature for review.

1.4 SUPPLIER
A specialist in the supply of tapware, and employing experienced architectural representatives available to assist during the course of the installation.

2. PRODUCTS

2.1 SANITARY FIXTURES

- Laundry tub polished stainless steel bowl with anti drip edge and integral overflow and separate washing machine waste outlet
- Shower tray polished stainless steel with fabricated stainless threshold and easi clean waste

- Bathroom vanity with integral overflow
- Wash-hand basin with integral overflow
- Kitchen 304 grade polished stainless steel sink with integral overflow and drainage tray
- Bathtub with high lip edge and overflow
- Toilet suite close coupled or pan, cistern, seat to match existing
- Accessible toilet suite
- Accessible wall basin with shroud
- Accessible shower hose hand piece, slide, wall rail and brackets.

2.2 TAPWARE

- Sink mixer
- Basin mixer
- Shower rose mixer
- Bath taps
- Washing machine taps.

2.3 SANITARY ACCESSORIES

- Wastes to be chrome on brass or stainless steel (shower tray)
- Accessible shower easi clean waste with vinyl clamp
- Sealant silicone with mould inhibitor
- Toilet pan plastic or flexible rubber connector for P trap pans requiring side connection
- Plastic plugs on chrome plated chains for basins and baths.

3. EXECUTION

Conditions - sanitary fixtures

3.1 DELIVERY

Only deliver to the site fixtures or fittings that can be immediately unloaded into suitable storage or be placed for direct installation.

3.2 STORAGE AND HANDLING

Take delivery of and store components complete with protective casings and coverings in areas that are enclosed, clean and dry and where no work is being done. Remove protection only to the extent that will allow installation.

3.3 QUALITY STANDARDS INCLUDING NZBC G13/AS1

Installation work to comply with NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, NZBC G13/AS1 and the fixture manufacturer's requirements.

3.4 SUBSTRATE

Ensure substrate and fixings will allow work of the specified standard.

3.5 CO-ORDINATION

Do not proceed if the points of supply and drainage services do not match the points of the fixtures without force or distortion.

3.6 INSTALLATION REQUIREMENTS INCLUDING NZBC G13/AS1

Install to NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, NZBC G13/AS1, NZBC E3/AS1 and to the fixture manufacturer's installation requirements for each component. Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries and sealants in sequence.

Seal between all sanitary fixtures and wall linings, fixtures and the tops they are in, the tops and wall linings, to NZBC E3/AS1, 3.2.2. Fixtures include baths, basins, tubs or sinks, Tops include, vanities, bath surrounds, sink benches, etc, and there upstands.

3.7 PROVIDE SUPPORT
Confirm fixing points needed for each unit and provide solid blocking at each fixing bracket location.

- Laundry tub to be securely fixed to the wall on brackets each side
- Wash-hand basin to be securely fixed to the wall on brackets to manufacturer's installation requirements.

Refer 5510 JOINERY & PROPRIETARY FIXTURES section for Laundry tub cabinet and Bathroom vanity cabinet.

Conditions - tapware

3.8 RETAIN
Retain tapware in the manufacturer's original packaging and ensure that units are complete with fixings and installation instructions.

Conditions - sanitary accessories

3.9 RETAIN
Retain fixtures, fittings and hardware in the manufacturer's original packaging and ensure that units are complete with associated fixings and installation instructions.

3.10 PACKAGE
Package fixtures, fittings and hardware units required in clear plastic and label each to match the drawings and the submitted schedule. Place packages in cartons selected for 'level', 'location', and/or 'sector' and label the packages and the cartons similarly.

3.11 INSPECTION
Before starting the installation of proprietary items, check relevant spaces and wall and floor finishes for any condition that would not allow the proper installation of any unit. Do not proceed until such conditions have been remedied.

Installation - sanitary fixtures

3.12 INSTALLING TOILET PAN
Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries/bedding and sealants in sequence. Fit the toilet pan in position, plumb, level, flush and rigid without stressing the attachment points of the component. Fixings to be corrosive resistant. Fit seat.

3.13 INSTALLING CISTERNS
Fit firmly in place and connect the specified cisterns from the supply services through the flush pipes to the relative fixtures in the positions as detailed all plumb and level. Replace decayed copper lined timber cistern with white plastic dual flush cistern.

Installation - Basins

3.14 INSTALLING WASHBASINS
Install to NZBC G1/AS1, AS/NZS 1730. Set basins firmly to walls or vanities as detailed and to comply with NZBC E3/AS1. Connect to supply and drains through trap to the drainage system.

3.15 INSTALLING VANITIES - BLANK TOP
Install in accordance with the manufacturer's requirements. Cut out basin profile to basin manufacturer's template. Make penetrations for supply and drainage. Fix securely with

corrosive resistant fixings. Seal top and upstand to wall surface to comply with NZBC E3/AS1.

3.16 INSTALLING VANITIES - INTEGRAL BASINS
Install in accordance with the manufacturer's requirements. Connect to supply and drains through trap to the drainage system. Seal top and upstand to wall surface to comply with NZBC E3/AS1.

Installation - Showers

3.17 INSTALLING SHOWER FITTINGS
Shower waste, mixer and rose to be install to NZBC G1/AS1 and to AS/NZS 3662.

3.18 INSTALLING SHOWER ENCLOSURES AND WALL LININGS
Install in accordance with NZBC E3/AS1. Sit tray firmly in place level and connect to drainage service, install threshold to manufacturer's installation requirements ready for following work.
Refer 5134 PREFINISHED FIBRE CEMENT LININGS section for wet area wall linings.
Refer 6411 VINYL SURFACING section for wet area flooring.

Installation - Baths

3.19 INSTALLING BATHS
Install to NZBC G1/AS1. Set firmly in cradle with required points fully supported, level and flush. Connect to supply and drainage services.

Installation - Sinks

3.20 INSTALLING SINK BENCHES
Install in accordance with manufacturer's/supplier's requirements. Connect to supply and drainage services.

3.21 INSTALLING TUB UNITS
Install in accordance with manufacturer's requirements. Connect to supply and drainage services. Position washing machine waste beside an existing laundry tub above the tub trap and suitable location for the washing machine.

Installation - Miscellaneous

3.22 INSTALLING STAINLESS STEEL FIXTURES
Carry out preparatory work and fit elements in position plumb, level, flush and rigid without stressing the attachment points in sequence. Connect to supply and drainage services.
Refer 7701 ELECTRICAL section for earth bonding.

3.23 INSTALLING SANITARY FIXTURES & ACCESSORIES - PEOPLE WITH DISABILITIES
Install fixtures to NZBC G1/AS1: Part 3 and Part 4 and to comply with the relevant layouts shown in Figures 5,6,7,8 and 9. Provide number of facilities in accordance with NZBC G1/AS1 tables 1, and 2.

Application - tapware

3.24 GENERAL
To AS/NZS 3500.1 dated 2003 and in accordance with the manufacturer's requirements. Maintain safe water temperatures to comply with NZBC G12/AS1.

Application - sanitary accessories

3.25 INSTALLING ACCESSORIES
Fit fittings firmly in place at required dimensions relative to floor and adjoining sanitaryware fittings, all plumb and level.

3.26 LOCATE
Locate units at heights and/or locations as required to comply with NZBC G1/AS1. For any dimension not shown or known, request direction before proceeding.

3.27 CUTTING AND FITTING
Where cutting and fitting of the substrate is necessary for installing any unit, carry out this work before the painting or finishing of that surface. Remove any hardware when required for painting.

3.28 INSTALLING UNITS
Install each unit in accordance with the proprietary fixture manufacturer's requirements, using the templates and tools supplied or recommended by them. Set units level, plumb and true to line and required location, with moving parts and actions freely and easily operating. Do not make any modifications to supplied units.

Completion

3.29 REPLACE
Replace damaged or marked elements.

3.30 PROTECTIVE COVERINGS
Leave fixtures, fittings and accessories clean and unblemished with stickers and protective coverings removed, with supply and drainage connections and all parts fully operating and working. Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following work.

3.31 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7211 GAS SYSTEM

1. GENERAL

This section relates to the fabrication, installation and operation of gas systems for low pressure:

- natural gas from a piped public utility network system.
- LPG from a piped private utility network system.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

LPG	Liquid Petroleum Gas

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC G10/AS1	Piped services
NZBC G11/AS1	Gas as an energy source
AS/NZS 4129	Fittings for polyethylene pipes for pressure applications
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS 4176	Polyethylene/aluminium and cross linked polyethylene/aluminium macrocomposite pipe systems for pressure applications
NZS 5255	Safety verification of existing gas installations
NZS 5258	Gas distribution networks
AS/NZS 5601.1: 2010	Gas Installations - general installations

Electricity (Safety) Regulations 2010
Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years:	For the complete gas system

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 COMPLY

Comply with the Gas (Safety and Measurement) Regulations 2010, Electricity (Safety) Regulations 2010 and the gas supplier's requirements. Give notices for inspections and carry out tests as required.

1.5 PRIMARY CONNECTION

Include for the cost of this service complete with excavation and backfilling.

1.6 QUALIFICATIONS

Gasfitters to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying gasfitter under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.7 AS BUILT DOCUMENTS

Provide the following as built documents and records:
1:100 scale as-built plan of the gas pipe runs, sizes componentry and fittings

Provide as built information prior to practical completion.

1.8 DESIGN NATURAL GAS
Design the piping system to AS/NZS 5601.1, with pipe sizes to give a minimum pressure at any appliance inlet to AS/NZS 5601.1, Table 5.1, of 1.13 kPa for natural gas, when all appliances are in use and with a maximum design pressure drop from meter outlet to any appliance of 80 kPa.

1.9 DESIGN LPG
Design the piping system to AS/NZS 5601.1, with pipe sizes to give a minimum pressure at any appliance inlet, to AS/NZS 5601.1, Table 5.1, of 2.75 kPa for LPG, when all appliances are in use and with a maximum design pressure drop from meter outlet to any appliance of 80 kPa.

Performance

1.10 PRESSURE TEST
Pressure test the system for leakage to AS/NZS 5601.1 before pipework is concealed by linings.

1.11 FINAL INSPECTION AND TEST
Submit the work for inspection and test and prove to the satisfaction of the network utility operator/gas supplier that the installation complies with all Acts and Regulations and has been tested for leakage and proved to be sound.

1.12 CERTIFICATION CERTIFICATE
Provide a Gasfitting Certificate of Compliance as required by Clause 46 and 47 of the Gas (Safety and Measurement) Regulations 2010 and when required provide a copy to the energy supplier.

1.13 GAS CERTIFICATE OF COMPLIANCE
Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the HNZ Contract Manager , and when required provide a copy to the energy supplier before connection.

1.14 GAS SAFETY CERTIFICATION
Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the HNZ Contract Manager. To be provided at completion of the work, prior to Practical Completion.

1.15 GAS APPLIANCE COMPLIANCE
Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2. PRODUCTS

Materials

2.1 PIPEWORK GENERAL
Pipework requirements to AS/NZS 5601.1, particularly AS/NZS 5601.1, Section 4, **Materials fittings and components, to match existing.**

2.2 COPPER PIPE
Complete with fittings to AS/NZS 5601.1. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials, to match existing**.

2.3 MACROCOMPOSITE PIPE
Polyethylene/aluminium/cross linked polyethylene combination (PE/AL/PE, PE-X/AL/PE-X or PE-X/AL/PE) macrocomposite pipe systems for pressure applications to AS 4176. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**. Used for general pipework, can also be used in ground beneath a building, to match existing.

2.4 POLYETHYLENE PIPE
Polyethylene pipes to AS/NZS 4130 Series two, or AS/NZS 4130 Series three. Fittings to AS/NZS 4129. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**. For use in ground but not beneath a building, to match existing.

2.5 ISOLATING VALVES
Manual shut-off valves to AS/NZS 5601.1. Install a manual shut-off valve at point of entry to the building.

2.6 METER
Primary meter to suit design load, supply pressure and pressure drop, supplied and installed by the network utility operator/gas supplier.

3. EXECUTION

Conditions

3.1 GENERALLY
Gas system to match existing. Carry out the whole of this work to the requirements of NZBC G10/AS1, NZBC G11/AS1 and AS/NZS 5601.1.

Piping system for all appliances when in use to be 1.13 kPa for natural gas and 2.75 kPa for LPG and with a maximum design pressure drop from meter outlet to any appliance of 80 kPa.

Where repair of an existing appliance is not practicable obtain instructions in writing from the HNZ Contract Manager before undertaking replacement.

3.2 EXISTING SYSTEMS
Check the existing pipework and system to be reused, to NZS 5255.

3.3 BURIED PIPES
Pipes to be bedded in a trench, backfilled, marker taped, wrapped with tape and sheathed with tough PVC and separated from other services, to AS/NZS 5601.1, 5.4 **Installation of consumer piping underground.**

3.4 ARRANGE
Arrange for the network utility operator/gas supplier to connect their distribution system to the primary meter, to NZS 5258.

3.5 METER INSTALLATION
Confirm suitability of meter location with utility operator/gas supplier and the HNZ Contract Manager .
If the meter is in an enclosure, conceal and where recessed in an external wall install a thermal barrier to the back of the meter. Advise the utility operator/gas supplier or their agent of the location for the meter. Not all utility operators install gas meters. Meters are usually owned by retailers or meter lease companies and installed by them or their agent.

Application

3.6 INSTALL PIPING
Run the system, completely concealed, in the most suitable type of pipe for each part of the installation, bent, supported, jointed and complete with all fittings to AS/NZS 5601.1. Replace the piping system as required for all appliances when in use to be 1.13 kPa for natural gas and 2.75 kPa for LPG and with a maximum design pressure drop from meter outlet to any appliance of 80 kPa. Confirm the type of pipe and its location. Label pipework to distinguish it from other services to AS/NZS 5601.1, 5.1.12 **Identification of pipework**.

3.7 PRESSURE TEST
Pressure test the system for leakage to AS/NZS 5601.1 before pipework is concealed by linings.

Completion

3.8 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic recycle and removal all debris, unused materials and elements from the site.

3.9 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

Commissioning

3.10 FINAL INSPECTION AND TESTING
Check the system is working and ensure all connected appliances are operating correctly. Carry out final inspections and testing, pressure test the system for leakage to AS/NZS 5601.1.

3.11 HANDOVER
Provide a copy of the system operating and maintenance instructions.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7221 GAS APPLIANCES

1. GENERAL

This section relates to the supply and installation of gas-powered appliances using low pressure gas.

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS7	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G10/AS1	Piped services
NZBC G11/AS1	Gas as an energy source
NZBC G12/AS1	Water supplies
AS/NZS 5601.1: 2010	Gas Installations - general installations

Electricity (Safety) Regulations 2010
Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006

Requirements

1.2 COMPLY
Comply with the Gas (Safety and Measurement) Regulations 2010, Electricity (Safety) Regulations 2010 and the network utility operator's/gas suppliers requirements. Give notices for inspections and carry out tests as required.

1.3 QUALIFICATIONS
Gasfitters to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying gasfitter under the Plumbers, Gasfitters and Drainlayers Act 2006.

Performance

1.4 FINAL INSPECTION AND TEST
Submit the work for inspection and test and prove to the satisfaction of the network utility operator that the installation complies with all Acts and Regulations and has been tested for leakage and proved to be sound.

1.5 GAS CERTIFICATE OF COMPLIANCE
Provide a Gasfitting Certificate of Compliance as required by Clause 46 and 47 of the Gas (Safety and Measurement) Regulations 2010 and when required provide a copy to the energy supplier.

1.6 GAS SAFETY CERTIFICATION
Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the HNZ Contract Manager. To be provided at completion of the work, prior to Practical Completion.

1.7 APPLIANCE COMPLIANCE
Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2. PRODUCTS

Materials

2.1 GAS APPLIANCES

- Space heater
- Hot water cylinder
- Instantaneous shower
- Range.

Refer 5521 HARDWARE section for range anti tipping device.
Refer 6211 WALL TILING section for rangetop heat shield.

2.2 GAS TYPE
All appliance to be specifically suited to the gas type supply.

3. EXECUTION

Conditions

3.1 GENERALLY
Carry out the whole of this work to the requirements of NZBC G10/AS1, NZBC G11/AS1 and AS/NZS 5601.1.

Application

3.2 INSTALL GAS APPLIANCES
Fit and connect gas appliances to AS/NZS 5601.1, complete with isolation valves as required to the appliance manufacturer's requirements.

3.3 INSTALL FLUES
Install flues in accordance with the manufacturer's details and requirements, and AS/NZS 5601.1 (for internal or external appliances) or NZBC G4/AS1 (internal appliances).
Space heaters and hot water cylinders to be flued to the exterior.

3.4 SEISMIC RESTRAINTS - GAS APPLIANCES
Where gas appliances require seismic restraints, restrain to manufacturer's requirements, AS/NZS 5601.1 and NZBC C/AS1-AS7, 7.2 Gas-burning Appliances.

3.5 CONNECT UP GAS HOT WATER HEATERS
Connect gas hot water heaters supplied and fitted under Hot and Cold Water system section or by gas fitter, to NZBC G10/AS1, G11/AS1, G12/AS1 and to AS/NZS 5601.1 and the water heater manufacturer's requirements.

Completion

3.6 REPLACE
Replace damaged, cracked or marked elements.

3.7 LEAVE
Leave appliances clean and in full working order and leave work to the standard required by following procedures.

3.8 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7411 RAINWATER SPOUTING SYSTEMS

1. GENERAL

This section relates to rainwater disposal systems including spouting and downpipes:

- metal
- PVC.

Related work

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC E1/AS1	Surface water
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

Documents listed above and cited in the clauses that follow are part of this specification. However this specification takes precedence in the event of it being at variance with the cited document.

1.2 ABBREVIATIONS AND TERMS

The following abbreviations are used throughout this part of the specification:

BMT	Base metal thickness
MRM	New Zealand Metal Roofing Manufacturers Inc
Spouting	Roof gutter bracketed off the roof edge or fascia.
Gutter	Internal gutter or gutter formed as integral part of the roof fabric.

Requirements

1.3 QUALIFICATIONS
Work to be carried out by tradesmen experienced, competent and familiar with the materials and techniques specified.

Warranties

1.4 WARRANTY - INSTALLER/APPLICATOR
Warrant this work under normal environmental and use conditions against:

3 years:	For weatherproofing by substandard workmanship:
From:	Commence the warranty from the date of completion of installation
Form:	Installers standard warranty form

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Warrant this work under normal environmental and use conditions:

10 Years	For failure of coating adhesion
10 Years	For weatherproofing by material penetration
Form:	Manufacturer's standard warranty form
From:	Commence the warranty from the date of completion of installation

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

Performance

1.6 TEST
Test the completed rainwater disposal system with water to ensure spoutings are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in spoutings.

2. PRODUCTS

Materials - uPVC

2.1 UPVC SPOUTING
Rainwater system to AS 1273, profile, jointing, brackets, rainwater heads and fittings brand matched and complete to the manufacturer's requirements, to match existing.

2.2 UPVC DOWNPIPES

To suit the spouting system, pipes solvent cement jointed and complete with stand-off brackets, galvanized screws and accessories, brand matched and complete to the manufacturer's specifications, to match existing.

Materials - metal

2.3 SPOUTING
Complete with matching brackets to suit spouting and screws, thickness 0.55mm minimum factory colour coated zincalume or copper, to match existing.

2.4 SPOUTING BRACKETS
All exposed brackets to be colour matched before installation. Brackets to be hot-dipped galvanised, zincalume, aluminium, stainless steel or brass to suit application and to match existing . Electroplated components are not acceptable.

2.5 DOWNPIPES
Complete with stand-off brackets, screw fixed, thickness 0.55mm minimum factory colour coated zincalume or copper, to match existing.

Materials - fascia/barge system

2.6 CONCEALED FASCIA/BARGE SPOUTING SYSTEM

Fascia/barge type complete with jointing, brackets, fittings and accessories, brand matched and complete to the manufacturer's requirements, to match existing.

2.7 EXTERNAL FASCIA/BARGE SPOUTING SYSTEM

Fascia/barge type complete with jointing, brackets, fittings and accessories, brand matched and complete to the manufacturer's requirements, to match existing.

Components

2.8 DROPPERS
Metal or uPVC droppers, compatible with spouting material and sized to fit inside the downpipe. PVC mesh domes in truncated cone form with legs clipped inside the outlet opening to all downpipes.

2.9 FASTENERS GENERALLY
Minimum Class 4 durability and not less than the roofing material being fixed.

2.10 RIVETS
Sealed aluminium, minimum diameter 4mm.

2.11 SEALANT
MS Polymer sealant.

3. EXECUTION

Conditions

3.1 HANDLE AND STORE
Handle and store downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.

3.2 SUBSTRATE
Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

Existing system remove all damaged spouting, downpipes and fittings as necessary for the whole of the system to be discharging completely and freely into the stormwater system and free of all debris including algae build up. Where complete system replacement is required or asbestos cement material identified, obtain instructions in writing from the HNZ Contract Manager before preceeding.

3.3 THERMAL MOVEMENT
Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting.

3.4 CORROSION
Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips. Do not allow copper downpipes to discharge onto lower galvanized or zinc aluminium coated steel roofs.

Application - uPVC

3.5 INSTALL UPVC SPOUTINGS
From high points fix brackets true-to-line to give a fall of 1mm every 2 metres to outlets. Allowing for necessary expansion, fit expansion joiners, assemble and fit spouting to brackets complete with all accessories solvent welded or rubber sealed.

3.6 INSTALL UPVC DOWNPIPES
Assemble downpipes, solvent welded complete, fit to outlets, stainless steel screw fix 1m centres maximum with pipe clips to rigidly stand 25mm off the wall, plumb and discharging into the stormwater gully or pipe inlet to the downpipe manufacturer's required practice.

Application - metal

3.7 INSTALLATION GENERALLY
Install to NZMRM CoP NZ metal roof and wall cladding Code of Practice recommendations where not otherwise specified.

Where complete system replacement is required, obtain instructions in writing from the HNZ Contract Manager before proceeding

3.8 INSTALL VALLEY GUTTERS
Attach valley gutters to valley boards by clips allowing for thermal movement to NZMRM CoP NZ metal roof and wall cladding Code of Practice, clause 8.4.5 Valley gutters. Separate valley gutter from valley boards with a layer of fire retardant breather type roof underlay.
Refer 4161 UNDERLAYS & BARRIERS section for roof underlays.

3.9 INSTALL SECRET GUTTERS
Install secret gutters to fall allowing for thermal movement to NZMRM CoP NZ metal roof and wall cladding Code of Practice, clause 8.4.8 Secret gutters. Rivet and seal joints with MS Polymer sealant.

3.10 INSTALL PRE-PAINTED METAL SPOUTING
Establish minimum falls necessary (minimum 1:500, 2mm in 1 metre) to outlets to prevent ponding and screw fix brackets true-to-line at 750mm centres maximum for external gutters less than 175mm wide and at 600mm centres maximum for gutters 175mm to 300mm wide. In areas where snow fall is possible the centres should be reduced to 600mm maximum. Lap spouting joints a minimum of 40mm and silicone seal and pop rivet to the manufacturer's recommendations. Cut out neatly for and fit the pre-formed downpipe dropper and silicone seal around the lap joint. All installation to NZMRM CoP NZ metal roof and wall cladding Code of Practice recommendations.

3.11 INSTALL EXTERNAL FASCIA/BARGE SPOUTING SYSTEM
Install concealed fascia brackets to rafters with either screws or nails and fit fascia to a level line. Fit gutter brackets to fall to outlet. Cut and form corner junctions and barge junctions and fit spouting rigidly to brackets. Cut out neatly for and fit pre-formed downpipe droppers. Silicone seal and pop-rivet all lap joints. All installation to NZMRM CoP NZ metal roof and wall cladding Code of Practice recommendations.

3.12 INSTALL DROPPERS
Install either 2 outlets or one outlet and an overflow to each spouting section. Cut out neatly for and fit the pre-formed downpipe dropper and rivet and seal around the joint. All installation to NZMRM CoP NZ metal roof and wall cladding Code of Practice recommendations.

3.13 INSTALL METAL DOWNPIPES
Form downpipes complete with angle bends as needed with joints lapped and sealed. Screw fix with pipe clips to rigidly stand off the wall plumb and discharging into stormwater gully or inlet pipe. All installation to NZMRM CoP NZ metal roof and wall cladding Code of Practice recommendations.

3.14 INSTALL DOWNPIPE SPREADERS
Install downpipe spreaders where required to NZMRM CoP NZ metal roof and wall cladding Code of Practice, clause 8.5.1 Downpipe spreaders. Provide spreaders to downpipes that discharge on to a lower roof. Ensure spreaders do not discharge directly over fasteners or laps. Spreaders to have holes equalling twice the diameter of the downpipe.

3.15 INSTALL SUMPS
Install sumps where required to NZMRM CoP NZ metal roof and wall cladding Code of Practice, clause 8.6 Sumps.

3.16 INSTALL RAINWATER HEADS
Install rainwater heads where required to NZMRM CoP NZ metal roof and wall cladding Code of Practice, clause 8.6.1 Rainwater heads.

3.17 INSTALL OUTLETS AND OVERFLOWS
Install outlets and overflows where required to NZMRM CoP NZ metal roof and wall cladding Code of Practice, clause 8.6.2 Outlets and overflows.

3.18 INSTALL SUMP PROTECTION
Install leaf guards of the same area as the sump. Set the leaf guard above the calculated level of flow; not directly in the outlet.

Application - copper

3.19 INSTALL COPPER SPOUTING
From high points fix brackets true-to-line to give a fall of 1mm every 2 metres to outlets. Allowing for necessary expansion, assemble and fit spouting to brackets complete with outlets. Lap all joints 40mm and solder, ensuring the joint is soldered throughout the full girth and extent of the lap.

3.20 INSTALL COPPER DOWNPIPES
Form downpipes complete with offsets and shoes as needed with all joints lapped and soldered. Brass screw fix with copper pipe clips to rigidly stand 25mm off the wall, plumb and discharging into the stormwater gully or pipe inlet.

Application - concealed fascia/barge spouting system

3.21 INSTALL CONCEALED FASCIA/BARGE SPOUTING SYSTEM
Ensure rafters/outriggers are true-to-line and face and fix stand-off brackets before roofing is in place. Cut fascia/barge to required length, seal edges and clip fit rigidly to brackets. Fit corner soaker joints. Cut spouting to length to form folded lap joints elsewhere complete with downpipe droppers and expansion joints for thermal movement, all silicone sealed and riveted. Install overflows equal to the downpipe cross section area at rainwater heads and downpipe locations as required by the spouting manufacturer. Install to NZBC E1/AS1, 5.5 Overflow outlets and completed to the spouting manufacturer's required practice and fixed by the spouting manufacturer's approved installers.

Completion

3.22 REPLACE
Replace damaged or marked elements.

3.23 LEAVE
Leave the whole of this work discharging completely and freely into the stormwater system, ensuring water can not enter the building under overflow conditions and free of all debris. Leave work to the standard required by following procedures.

3.24 REMOVE
Recycle and remove debris, unused materials and elements from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7420 SANITARY SYSTEMS

1. GENERAL

This section relates to above ground gravity flow sanitary systems;

- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work.

Refer to 7151 SANITARY FIXTURES for sanitary fixtures tapware and accessories.

1.1 DOCUMENTS

Documents referred to in this section are:

NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Plumbing and drainage
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2:2003	Plumbing and drainage - Sanitary plumbing and drainage

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 QUALIFICATIONS

Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS

White polybutylene or PVC, including all associated fittings.

3. EXECUTION

3.1 EXECUTION GENERALLY - NZBC G13/AS1

Carry out this work and complete all tests to NZBC G1/AS1: 2.0, 3.0 and NZBC G13/AS1.

3.2 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 INSTALL TRAPS, WASTE AND VENT PIPES - NZBC G13/AS1

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to NZBC G13/AS1 and AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

Replace lead waste pipes with PVC where identified and sanitary fixture or flooring to be replaced.

Heat pump condensate drain tray pipe to gully trap.

Overflow waste pipes to discharge to the exterior in an easily visible location and fitted with vermin proof mesh:

- Hot water cylinder overflow tray connect to 40mm waste pipe.
- Header tank overflow tray connect to 40mm waste pipe.

Report to HNZ Contract Manager for drain tray and overflow waste pipe locations and obtain instruction in writing prior to proceeding with works.

3.4 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.5 TEST

Test soil and waste disposal systems to ensure no leakage exists and leave in proper working order.

3.6 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7430 DRAINAGE

1. GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC G13/AS2	Foul Water
NZBC G13/AS3	Plumbing and Drainage
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of Polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
NZS 3104	Specification for concrete production
AS/NZS 3500.2:2003	Plumbing and drainage - Sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 AS BUILT DOCUMENTS

Supply a 1:100 scale as-built drawing of drains and fittings to the HNZ Contract Manager on completion.

1.3 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.
Underground PVC-U pipe to be Classified as follows:

Classification	Use
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

2.4 POLYETHYLENE PIPES
Polyethylene pipes and fittings to AS/NZS 5065.

2.5 PERFORATED PIPE
Perforated corrugated coil high density polyethylene subsoil drainage pipe to AS 2439.1 with polypropylene filter sock over, for groundwater drainage.

2.6 GULLY TRAPS - NZBC G13/AS2
To NZBC G13/AS2: 3.3 Gully traps, complete with grating.

2.7 SURFACE WATER SUMP GRATINGS
Cast iron frame with lift-up grating.

2.8 STRIP DRAIN CHANNEL
Proprietary, modular, variable invert, PVC or precast concrete drainage channel sections and drainage sump, embedded in site concrete and fitted with selected metal gratings or proprietary plastic gratings minimum for foot trafficable surfaces.

2.9 INSPECTION COVERS
Cast iron frame with screw-down cover.

2.10 TRENCH BACKFILLING MATERIAL - NZBC G13/AS2 & NZBC E1/AS1

Bedding:	Clean granular non-cohesive material with a maximum particle size of 20 mm.
Bedding & surround:	Clean granular non-cohesive material with a maximum particle size of 20 mm.
Compacted selected fill:	Any Fine grain soil or granular material which is free from topsoil and rubbish and has a maximum particle size of 20 mm.
Ordinary fill:	Excavated material.
Concrete:	75 mm thick concrete pad.

2.11 DRAINAGE MATERIAL
Free draining crushed stone, 7 mm to 20 mm in size.

2.12 FILTER FABRIC
Polymeric fabric formed from a plastic yarn or a long chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, amide, ester or vinylidene chloride. Fibres to be rot proof, chemically stable and have low water absorbency. The filter network, (woven or non-woven) must be dimensionally stable and resistant to delamination.

2.13 SEPTIC TANK OR AERATED WASTEWATER TREATMENT SYSTEM
Replacement tank and fittings to manufacturer’s requirements.

- Tank construction to AS/NZS 1546.1 manufactured from 30 MPa reinforced concrete, or
- Tank construction to AS/NZS 1546.1 manufactured from 35 MPa steel fibre reinforced concrete, or
- Tank construction to AS/NZS 1546.1 manufactured from polyethylene (aerated waste water treatment system) or ribbed polyethylene (septic tank).

3. EXECUTION

3.1 EXCAVATE

Excavate for drains, remove old drains down to a firm even base with correct gradients set in straight runs.

Trenches running parallel, below and close to foundations of buildings to NZS 3604 or NZS 4229 to be separated to:

- NZBC E1/AS1, 3.9.7, **Proximity of Trench to Building**, for stormwater and subsoil drains.
- NZBC G13/AS2, 5.6, **Proximity of Trench to Building**, for foul water drains.

Report to HNZ Contract Manager and obtain instructions in writing before proceeding where correct gradients can not be set or asbestos pipes are suspected or identified.

Refer 2123 ASBESTOS REMOVAL section and HNZ Asbestos Policy and Code of Conduct

3.2 MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 DRAINAGE GENERALLY - NZBC G13/AS2 & NZBC E1/AS1

Carry out drainage work and tests to NZBC G13/AS2 (foul water), NZBC E1/AS1 (stormwater). Lay uPVC pipe systems to relevant sections of AS/NZS 2032, NZS 2566.1 and AS/NZS 2566.2. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033 and NZS 2566.1.

Replacement drainage run lines to match existing.

Report to HNZ Contract Manager and obtain instructions in writing before proceeding where run lines or gradients to be altered.

3.4 SEPTIC TANK OR WASTEWATER TREATMENT SYSTEM

Install components to manufacturer's requirements. Connect to existing pipe and electrical systems (AWTS).
Where complete system replacement is required, report to the HNZ Contract Manager and obtain instruction in writing prior to proceeding with works.

3.5 LAY FOUL WATER DRAINS

Lay drains from the high point in the existing system, in straight runs to correct gradients, to discharge into the existing sewer. Support sub floor suspended PVC pipes from 65mm diameter to 100mm diameter at maximum 1m centres. Set inspection fittings on a concrete base.

3.6 INSTALL GULLY TRAPS

Set on concrete 100mm above the surrounding ground or paving and brought up to protect the top of the fitting. Trowel off.

3.7 LAY STORMWATER DRAINS

Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete with the concrete brought up to protect the top of the bend from damage. Lay drains from the high point in the existing system in straight runs to correct gradients to discharge into the existing stormwater system. Support sub floor suspended PVC pipes from 65mm diameter to 100mm diameter at maximum 1m centres.

3.8 FILTER FABRIC TO DRAINAGE MATERIAL

Where drainage material to be encapsulated in filter fabric to prevent fines from blocking the aggregate. Place fabric and carefully hold in place by pinning and/or by controlled

use of aggregate as ballast. After drain installation and required backfilling, complete encapsulation with fabric. Ensure filter fabric is correctly placed, sufficiently overlapped and pinned and/or secured.

3.9 LAY PERFORATED GROUNDWATER PIPING

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. Lay in straight runs to discharge into surface water drainage system. The pipe must not excessively elongate during installation. Carry drainage material up and over the pipes without disturbing them. Extend the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.10 LAY PERFORATED GROUNDWATER PIPING TO BASEMENT WALLS

Ensure any required waterproofing and protection sheets are in place before starting work.

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. The pipe must not excessively elongate during installation. Lay in straight runs to 1:150 gradients with invert of the highest horizontal point 50 mm minimum below floor slab level, discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Fill with drainage material to full height of wall. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

Where damage to waterproofing systems, report to HNZ Contract Manager and obtain instructions in writing before proceeding.

3.11 LAY PERFORATED GROUNDWATER PIPING TO RETAINING WALLS

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. The pipe must not excessively elongate during installation. Lay in straight runs to correct gradients , discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Fill with drainage material to full height of wall with an allowance for the thickness of the surface finish. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.12 INSTALL STRIP DRAIN CHANNEL

Excavate trench and form site concrete base to fall. Set interlocking channel sections, sumps and accessories in place, all in accordance with the channel manufacturer's requirements. Check falls and install gratings and covers to match existing.

3.13 INSTALL SURFACE WATER SUMP

To NZBC E1/AS1, 150mm thick 20 Mpa concrete 455mm x 455mm x 1m depth minimum, complete with 225mm diameter minimum ceramic half-siphon pipe and cast iron frame with a lift out grating.

3.14 INSTALL STORMWATER INSPECTION CHAMBERS

Construct on a poured concrete footing, 75mm fall minimum across the chamber and with channels to form a cascade where necessary, to NZBC E1/AS1, 3.7, **Access for maintenance**. Provide all necessary haunching to channels, channel top 100mm above the pipe soffit, benching 1V to 10H to be 17.5 Mpa concrete vibrated to smooth finish. Fit a cast iron cover and frame.

3.15 INSTALL FOUL WATER INSPECTION CHAMBERS - NZBC G13/AS2

Construct on a poured concrete footing, 75mm fall minimum across the chamber and with channels to form a cascade where necessary to NZBC G13/AS2, 5.7 **Access points**. Provide all necessary haunching to channels, channel top 100mm above the pipe soffit, benching 1V to 10H to be 17.5 MPa concrete vibrated to smooth finish. Fit a cast iron cover and frame.

3.16 SOAKHOLES OR TRENCHES
Dispose of stormwater on site by soakage, to suit local geology and soil structure; all as directed by the HNZ Contract Manager and to match existing.

3.17 CONCRETE ENCASEMENT
Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

3.18 FIELD TEST
Field test drains for watertightness (PVC-U to AS/NZS 2032 or AS/NZS 2566. 2 Appendix N) and check existing lines are clear of debris to the satisfaction of a chartered professional engineer.

3.19 PLACING & COMPACTING TRENCH BACKFILLING MATERIAL
Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid.

Up to 300mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing the drains.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg.

3.20 PLACING & COMPACTING TRENCH BACKFILLING MATERIAL FOR PVC-U PIPE
Place and rake in bedding material so as to support the pipe once laid.
Embedment material shall be placed uniformly along and around the pipe to ensure uniform density of side support and overlay with no distortion, dislodgment or damage to the pipeline. Following placement, the embedment material shall be compacted in layers to uniformly support the pipe. Trench fill material shall be placed on the pipe embedment and compacted to fill the trench, with care taken to avoid impact loading of the pipe.

Completion

3.21 CLEAN OUT
Clean and flush out subsoil drains and remove silt and debris before handing over.

Clean out blocked drains and gully traps, reseal inspection chambers and backfill after inspection, leave in proper working order. Report to HNZ Contract Manager the material cause of the blockage.

Clean out the septic tank and transport the effluent by the local authority certified waste disposal carrier from the site.

Clear away all rubbish, reclcy and remove from site. Return the site to the standard required by following procedures and to a minimum original standard.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7556 SOLID FUEL SPACE HEATING SYSTEM

1. GENERAL

This section relates to the supply and installation of domestic, solid fuel burning, space heating appliances.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:
NZBC B2/AS1 Durability
AS/NZS 2918 Domestic solid fuel burning appliances - Installation
AS/NZS 3500.4: 2003 Plumbing and drainage - Heated water services
AS/NZS 3869 Domestic solid fuel burning appliances - Design and construction
AS/NZS 4013 Domestic solid fuel burning appliances - Method for determination of flue gas emission
National Environmental Standards for Air Quality: Woodburner design standard
Plumbers, Gasfitters and Drainlayers Act 2006

Requirements

1.2 NO SUBSTITUTIONS
Substitutions are not permitted to any specified products, or associated products, components or accessories.

1.3 QUALIFICATIONS
Work to be carried out by the manufacturer's accredited tradesmen registered with the NZ Home Heating Association or certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006, competent and familiar with the materials and techniques specified.

1.4 INFORMATION FOR OPERATION AND MAINTENANCE
Provide ongoing operational and maintenance instructions to the HNZ Contract Manager at completion.

Performance

1.5 COMPLIANCE WITH STANDARDS
Solid fuel-burning appliances installed to AS/NZS 2918, and to comply with the requirements of AS/NZS 4013, where required by the regulatory authority, and the appliance identified by a compliance plate fixed to the appliance and marked 'Tested to AS/NZS 4013'.

1.6 DURABILITY
Solid fuel-burning appliances to be installed to comply with NZBC B2/AS1 Table 1 Durability requirements of nominated building elements,15 years minimum for free standing and in-built appliances and flue.

1.7 FINAL INSPECTION AND TEST
Undertake final tests to show the installation complies with AS/NZS 2918 and AS/NZS 4013, and has been tested for leakage and proved to be fully operational.

Carry out testing at the time of completion of installation. Test and demonstrate the system according to manufacturer's specification.

1.8 PRODUCER STATEMENT - INSTALLATION
Provide a producer statement by the installer. The Producer Statement must verify that the design complies with AS/NZS 2918 Domestic solid fuel burning appliances - Installation, naming the installer and the person responsible for verification of the installation and for the post installation tests.

2. PRODUCTS

Materials

2.1 IN-BUILT SOLID FUEL HEATER
Replacement heater to manufacturer's requirements, to match existing for in-built solid fuel heating appliance comprising of a firebox, firebricks, door, outer casing to firebox, front surround, wetback, stainless steel flue, flue shield, outer shield, ceiling plate and ceiling sleeve where required, flashing and weather cowl.

Fire grates and ash trays to match existing.
- Grates to be cast iron
- Ash trays to be folded mild steel minimum thickness 0.5mm.

Refer 4610 GLAZING section for replacement glass to doors.

Designed and manufactured to AS/NZS 3869 Domestic solid fuel burning appliances - Design and construction and tested to AS/NZS 2918 appendix E and F.

2.2 FREE STANDING SOLID FUEL HEATER
Replacement heater to manufacturer's requirements, to match existing for solid fuel heating appliance comprising of free standing base, firebox, firebricks, door, outer casing to firebox with hearth, wetback, and complete with stainless steel flue, flue shield, outer shield, ceiling plate and ceiling sleeve, flashing and weather cowl.

Designed and manufactured to AS/NZS 3869 Domestic solid fuel burning appliances - Design and construction and tested to AS/NZS 2918 appendix E and F.

2.3 FLUE SYSTEM
Replacement flue and fittings to manufacturer's requirements, to match existing for all seams in the stainless steel flue pipe to be lock-folded or continuously welded to AS/NZS 2918.4.2. Joints between sections of flue pipe to be push fitted with the upper section entering the lower section and secured with 3 fasteners to prevent accidental separation. For vitreous enamelled flue pipe sections within a room, these may be joined without fasteners using a series or overlapping sections having a minimum overlap of 50mm.

Flue systems beyond the wall or ceiling penetrations to be provided with either a double casing or a tested single casing to AS/NZS 2918 clause 4.5.1. Flue pipe casings fabricated from copper or brass to have at least a 25mm minimum air gap from the flue pipe.

3. EXECUTION

Conditions

3.1 DELIVERY
Keep materials dry in transit. Take delivery of materials in an undamaged in condition. Reject all damaged materials.

3.2 STORAGE
Store materials and accessories on a level, firm base, in dry conditions, out of direct sunlight and completely protected from weather and damage. Cover to keep dry until installed.

Application

3.3 INSTALLATION
Install the heater and flue to AS/NZS 2918. Refer to the manufacturer's installation instructions for specific model details. For free standing appliances, bolt base down securely to floor to manufacturer's specifications. Commission unit to ensure installation is compliant to the manufacturer's specifications. External requirements to AS/NZS 2918.4.9.

Where complete system replacement is required, report to the HNZ Contract Manager and obtain instruction in writing prior to proceeding with works.

Refer 4261 BRICK VENEER CLADDING section for replacement brick work.
Refer 2110 DEMOLITION section for complete system removal and chimney removal.

3.4 WETBACK
Install wetback system to AS/NZS 3500.4. Connect wetback from a solid fuel heater to the hot water cylinder. The piping between the hot water cylinder and the wetback, to be at least 20mm diameter. Keep pipe length to a minimum. The pipe returning from the wetback outlet to the hot water cylinder should not at any location be less than a 30° angle to the horizontal plane.

When wetback to be disconnected for replacement or removal of solid fuel heater never cap wetback end connection points to the solid fuel heater.

No valves or constraints are allowed in the inlet or outlet path between the wetback and the hot water cylinder. Fit a thermostat and solenoid valve set at a maximum temperature of 90°C to provide over-heating protection.

Where complete system replacement is required, report to the HNZ Contract Manager and obtain instruction in writing prior to proceeding with works.

Refer 7120 HOT & COLD WATER SYSTEMS section for hot water cylinder tempering valve.

Completion

3.5 CLEANING
Remove debris, unused materials and elements from the site. Clean soiled or marked work. Replace damaged, cracked or marked elements. Chimney or flue to be swept clean by a qualified operator, competent and familiar with the materials and techniques. Leave the whole of this work to the standard required by following procedures.

3.6 PROTECT
Protect new work from damage.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7673 HEAT PUMP SYSTEMS

1. GENERAL

This section relates to heat pump air conditioning systems.

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

L10 :	Centile Level, sound level that is equalled or exceeded for 10% of the time.
HFC:	Hydro-fluorocarbon
mm Hg:	mm mercury - unit of pressure
NIWA	National Institute of Water and Atmospheric Research
ASHRAE	American Society of Heating and Air Conditioning Engineers
IRHACE	Institute of Refrigeration, Heating and Air Conditioning Engineers

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External Moisture
NZBC G4/AS1	Ventilation
AS 1324.2	Air filters for use in general ventilation and air conditioning - methods of test
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1571	Copper - seamless tubes for air conditioning and refrigeration
AS/NZS 2107	Acoustics - Recommended design sound levels and reverberation times for building interiors
AS/NZS 3666.1	Air handling and water systems of buildings - Microbial control - Design, installation and commissioning
AS/NZS 3823.1.1	Performance of electrical appliances - Airconditioners and heat pumps - Part 1.1: Non-ducted airconditioners and heat pumps - Testing and rating for performance
AS/NZS 3823.1.2	Performance of electrical appliances - Airconditioners and heat pumps - Part 1.2: Ducted airconditioners and air-to-air heat pumps - Testing and rating for performance
AS/NZS 3823.2	Performance of electrical appliances - Air conditioners and heat pumps - Energy labelling and minimum energy performance standard (MEPS) requirements
AS 4254.1	Ductwork for air handling systems in buildings - Flexible duct
NZS 4303	Ventilation for acceptable indoor air quality
AIRAH DA9, ASHRAE or Carrier	Manual calculation methods
ACADS-BSG Camel, Carrier E20	Electronic calculation methods

Warranties

1.3 WARRANTY - INSTALLER/APPLICATOR
Installer's warranty for the system under normal environmental and use conditions against failure.
10 years Execution warranty
Provide this warranty on the installer's standard form.

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Manufacturer's warranty for the system under normal environmental and use conditions against failure.
10 years: Warranty
Provide this warranty on the manufacturer's standard form.

Requirements

1.5 CO-ORDINATE WORK
Co-ordinate all items with other trades, in particular cutting of penetrations and waterproofing. Exterior penetrations to NZBC E2/AS1 as consistent with the project requirements.

1.6 QUALIFICATIONS
Work to be carried out by tradesmen, qualified, experienced, competent and familiar with the equipment, systems, materials and techniques specified.
Handling or recovering refrigerant to be carried out by the appropriate Approved Filler and/or Handler, with a test certificate under the HNSO Act.

1.7 AIR CONDITIONING LOAD CALCULATIONS
General: Calculate heating loads using one of the following:
- Manual methods: AIRAH DA9, ASHRAE or Carrier.
- Electronic methods: ACADS-BSG Camel, or Carrier E20

1.8 AIR CONDITIONING DESIGN BASIS
General
Outside design conditions: Use outdoor design conditions listed in publications from NIWA, ASHRAE, IRHACE or other reliable sources for weather data, for the location geographically closest and most relevant to the site.

Inside design conditions
Summer: 22°C dry bulb, 50% relative humidity.
Winter: 21°C dry bulb.
Limit the temperature difference in air conditioned spaces served by the same zone or system to ± 1.5°C when measured:
- Between any 2 points in the space from floor level to 1500mm above floor level, > 2000mm from cooking equipment and > 1000mm from any other appliance.
- When outside conditions are in the range specified above.
- After the plant has been operating for one hour.
- In the same 5 minute period.

The systems temperature controlled zones to meet the permissible temperature variation for the space to be heated.

Heating
Reverse cycle.

Building Enclosure
Carry out a site inspection to assess the construction of windows, walls, floors, roofs and insulation, the shading of external and internal window.

Report to HNZ Contract Manager where external shading to windows from trees or planting.

Noise
Indoor noise emitted - to AS/NZS 2107, depending on space served, occupancy and activity.
Noise received in all habitable rooms shall not exceed that permitted by the applicable Territorial Authority for the time of day or day of the week for the zoning of the site. Not more then L10: 35dbA between 2300 and 0700 hours. This shall apply to both the property in question and the neighbouring properties.
Indoor unit maximum dbA when in use on medium speed to be 35dbA.
Outdoor unit maximum dbA when in use on medium speed to be 45dbA up to 6kw and to be 55dbA for units above 6kw.

1.9 INFORMATION FOR OPERATION AND MAINTENANCE
Provide general operation and maintenance information as electronic PDF format documents for all units, filters, controls, pumps, traps, drain trays, refrigerant to the HNZ Contract Manager at completion.
Provide user instruction and a hard copy manual for the operation of the system and cleaning of the filters.

2. PRODUCTS

Material

2.1 REVERSE CYCLE UNITS
Split system heat pumps shall meet the requirements of AS/NZS 3823.1.1 and AS/NZS 3823.1.2 with minimum energy performance standards (MEPS) in accordance with AS/NZS 3823.2. Co-efficient of performance minimum 4. Oscillating louvres. 240V single phase.
Provide effective outdoor coil defrost facility that prevents room temperature dropping more than 2°C during defrost.

Split system heat pump:
- Indoor unit high level wall mounted, minimum 2 metres above the floor
- Outdoor unit compressor ground level mounted.

Report to HNZ Contract Manager for alternative mounting options and obtain instruction in writing prior to proceeding with works.
Refer 7701 ELECTRICAL section for supply, circuits and switching.

2.2 CABINETS
Aluminium, powder coated steel or moulded acrylonitrile-butadiene-styrene (ABS) plastic with hot dip galvanised or zinc - coated steel or stainless steel 316 grade fasteners minimum. Insulate and vapour seal cabinet and drain trays to prevent external condensation under all operating conditions. Material and coating of all components to suit the environmental conditions.

2.3 DRAIN TRAYS
Aluminium, stainless steel or plastic to collect all moisture inside indoor and outdoor units.

2.4 FILTERS
Washable panel type.(85% of arrestance when tested to AS 1324.2, Test Dust No.4 or Class EU2 rated, to be easily removed for cleaning without the use of tools.

2.5 COILS
Copper tube with aluminium plate fins.

2.6 CONTROLS
Provide as a minimum the following functions:
- Temperature control .

- Fan speed selection for multi and variable speed fans.
- Day/night zone changeover if scheduled.
- Time switch, temperature set back, restart delay.
- Wall mounted.

2.7 DUCTS
Metallic-coated sheet steel to AS 1397, coating class G2/Z275.
Flexible ducting shall be metallized fabric clamped on formed metal helix with polyester insulation blanket wrapped around duct and covered with an outer vapour barrier.

2.8 REFRIGERATION PIPEWORK KIT
Split system manufacturer's standard pre-charged piping kit.

2.9 REFRIGERATION PIPEWORK CUSTOM
Copper tubing, de-oxidised seamless refrigeration quality, either half hard or soft drawn. Jointing shall be brazed or flared connections to equipment. Exposed pipework to be enclosed in ducting complete with top end cap and accessories, all UV stable plastic to suit the environmental conditions.

2.10 REFRIGERANT
Refrigerant HFC type with no phase out date, R410a unless approved otherwise.

3. EXECUTION

Conditions

3.1 DELIVERY
Keep materials and equipment dry in transit. Take delivery of materials and equipment in an undamaged condition. Reject all damaged materials.

3.2 STORAGE
Store materials and accessories on a level, firm base, in dry conditions, out of direct sunlight and completely protected from weather and damage. Cover to keep dry until installed.

3.3 CONFIRM LAYOUT
Before commencing work confirm the proposed location of the indoor unit and outdoor unit, pipes, ducts and controls to be approved by the HNZ Contract Manager. .

3.4 CONCEALED PIPING
All refrigeration and condensate piping shall be concealed within the building structure unless stated otherwise.

3.5 CO-ORDINATE SERVICES
Co-ordinate and co-operate with other sub-trades to avoid any conflict with the installation of the system with other subcontractors work.

3.6 PROTECT SURFACES
Protect surfaces, equipment and finishes already in place from the possibility of damage during the installation process.

Application

3.7 INSTALLATION DUCTWORK
Install flexible duct as straight as possible with minimum number of bends. Maximise bend radius. Check for and rectify any crushed flexible duct.

Install and support to AS 4254.1,2.5, limit sag to < 40mm/m.

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.

Clean interior of ductwork progressively during installation.

3.8 INSTALLATION PIPE WORK
Install general pipe work to AS/NZS 1571

Purge the system at all times with dry nitrogen when brazing or heating pipework. Pipe welding to be nitrogen flow method.

Pipes to be installed to manufacturer's requirements, adequately supported, also arranged and sized to prevent excessive pressure drop and ensure correct circulation of refrigerant and oil.

All refrigeration pipework test to 1800 kPa.

Insulate all refrigerant and drain piping that may sweat with chemically blown closed cell elastomeric insulation. Suction lines are to be insulated over the entire length between connections to indoor and outdoor units. Protect insulation from sunlight and mechanical damage.

Insulation thickness: 13mm for pipes < DN 20, 19mm otherwise.

Provide trapped (DN 20 condensate drains to AS/NZS 3666.1 from each indoor coil and safety tray, to an approved drain point. Provide drains from each reverse cycle outdoor coil unless casing freely drains to a roof or other location where condensate will not cause damage or pond.

3.9 INSTALLATION UNIT
Provide clearance around outdoor units for condenser air flow and maintenance access, clear of pavements and 1 metre from a stair landing minimum and 1.5m clear in front of the unit and 0.2m to the rear of the unit minimum and to manufacturer's requirements. Ensure discharge air does not short-circuit to condenser intake.

For equipment at ground level, ensure they are mounted on height 100mm minimum level concrete plinth or mounted on a timber or purpose made UV stable plastic plinth on a 50mm level concrete base equivalent impervious material. The base of the unit cover to be minimum 100mm above the surrounding surface and to be minimum 75mm from the edge of the plinth.
Provide internal or external flexible duct connections at indoor unit.

For vibration isolation of suspended units, provide 4 metal spring or rubber-in - shear isolation mountings with 25mm static deflection and 98% isolation efficiency. Units to be mounted more than 2 metres above the ground or floor to be securely fixed for seismic restraint to manufacturer's requirements.

For floor mounted units, provide neoprene waffle pads. Bolt in place with fixings suitable for unit replacement, hot dip galvanised or stainless steel bolts, screws and anchors. Insulate and vapour seal cabinet and drain trays to prevent external condensation under all operating conditions. Material and coating of all components to suit the environmental conditions.

If leaks or condensation from equipment could cause nuisance or damage to the building or its contents provide a galvanized steel safety drain tray under the equipment.

Refer 3101 CONCRETE section for concrete plinth or base.
Refer 3820 CARPENTRY section for timber plinth.
Refer 7420 SANITARY SYSTEMS section for condensate disposal.

Report to HNZ Contract Manager for plinth to be located adjacent to a pavement and obtain instruction in writing prior to proceeding with works.

3.10 INSTALLATION REFRIGERANT
The completed system including all pipework, to be evacuated to 0.2mm Hg or better with a vacuum pump and maintained at this pressure for 2 hours, then broken with refrigerant.

Completion

3.11 COMMISSIONING
Commission the systems to manufacturer's recommendations using instruments calibrated in the last 12 months. Submit signed commissioning check list on completion.

3.12 CLEANING
Clean filters, outdoor coils, grilles and diffusers.
Remove debris, unused materials and elements from the site. Clean soiled or marked work. Replace damaged, cracked or marked elements. Leave the whole of this work to the standard required by following procedures.

3.13 PROTECT
Protect new work from damage.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7687HV VENTILATION SYSTEM

1. GENERAL

This section relates to the supply and installation of mechanical extract systems.

It includes:
- unit
- filters
- flexible ducting
- anti-vibration straps
- outlet ports and vents
- drain hose assembly
- associated roof flashings.

Refer 4554 SKYLIGHTS section for roof dome tube skylights.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External Moisture
NZBC G4/AS1	Ventilation
NZBC G9/VM1	Electricity
AS/NZS 60335.2.80	Household and similar electrical appliances - Safety - Particular requirements for fans

Electricity (Safety) Regulations 2010

Requirements

1.2 CO-ORDINATE WORK

Co-ordinate all items with other trades, in particular cutting of penetrations and waterproofing. Exterior penetrations to NZBC E2/AS1 as consistent with the project requirements.

1.3 QUALIFICATIONS
Installers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section. The product/material must be provided by the HNZ approved supplier for mechanical extract systems.

1.5 INFORMATION FOR OPERATION AND MAINTENANCE
Provide general operation and maintenance information as electronic PDF format documents to the HNZ Contract Manager at completion.

Provide user instruction and a hard copy manual for the operation of the system.

Performance

1.6 ELECTRICAL WORK
Comply with Electricity (Safety) Regulations 2010, NZBC G9/VM1 Electricity, 1.0 Electrical installation, New Zealand Electrical Codes of Practice and AS/NZS 60335.2.80 Household and similar electrical appliances - Safety - Particular requirements for fans.

2. PRODUCTS

MATERIALS

2.1 RANGEHOOD EXTRACT SYSTEM
Unit ducted to the exterior comprised of the following:
- white canopy 500mm wide x 597mm long minimum
- twin filters washable
- 150mm fire rated duct
- 240V-50Hz, 280W maximum power consumption
- extraction rate 650 m3/hr
- 3 speed push button control
- auto shut-off
- isolation switch
- halogen lighting
- maximum noise level 60dbA.

2.2 BATHROOM EXTRACT SYSTEM
Unit ducted to the exterior comprised of the following:
- single or dual outlet
- 150mm ceiling diffuser
- filter
- mixed flow 150mm inline fan
- 150mm fire rated duct
- 110-240V-50Hz, low voltage power supply
- 223m3/hr extraction rate
- humidity sensor
- time delay auto shut-off
- maximum noise level 60dbA.

2.3 TRICKLE EXTRACT SYSTEM
Unit ducted to the exterior comprised of anti condensation device.

Components

2.4 FLASHINGS - ROOF PENETRATIONS
To NZBC E2/AS1, 8.4.17 **Roof penetrations**. Roof flashing and cowl. Formable grade flashings, material to match selected roofing, to the same standards as the profiled sheets, notched where across profile, in accordance with manufacturer's recommended details.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING
Take delivery of ERS components and store on site under cover in an enclosed space, on a flat, even and level surface, and protect it from damage and contamination.

Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish.

Preparation

3.2 CONFIRM LAYOUT
Before commencing work confirm the proposed location of unit, outlets, vents, ducts, condensate drains and controls.

3.3 GRILLE AND OUTLET OPENINGS
Ensure that all grille and outlet openings have been correctly sized and trimmed at the required location.

Installation -general

3.4 PROTECT SURFACES
Protect surfaces, equipment and finishes already in place from the possibility of damage during the installation process.

3.5 CONCEALED DUCTING
Ensure that all ducting and condensate tubing is concealed within the building structure unless stated otherwise.

3.6 CO-ORDINATE SERVICES
Co-ordinate and co-operate with other sub-trades to avoid any conflict with the installation of the system components, associated electrical and plumbing services, with other subcontractors work.

3.7 ELECTRICAL WORK
All electrical wiring to be carried out by a qualified electrician in accordance with Electricity (Safety) Regulations 2010, NZBC G9/VM1 Electricity, 1.0 Electrical installations, New Zealand Electrical Codes of Practice and AS/NZS 60335.2.80 Household and similar electrical appliances - Safety - Particular requirements for fans. This includes the connection of power supply, and setting of the limits and commissioning of the ERS unit.

INSTALLATION - SYSTEM

3.8 INSTALLATION SYSTEM
Install system in accordance with manufacturer's requirements and specifications, and as follows:

- Ensure unit is securely fastened to the supporting structure by the hanger kit.
- Install fresh air and exhaust cowls using separate roof kits. If roof option is not possible, then use gable or soffit option. Ensure a minimum of 2m separation between fresh air and exhaust cowls.
- Install insulated 150mm diameter flexible ducting between outlets with a minimum of sharp bends. Uninsulated 150mm duct may only be used to exhaust from unit to outside of building.
- Install condensate tubes to discharge into a drain sump or header tank tray in accordance with HomeTech™ recommendations and details.

Rangehood extract system duct to the exterior with the base of the canopy to be mounted 750mm above the Rangetop.

Bathroom extract system duct to the exterior with the diffuser mounted above the shower.
Trickle extract system duct to the exterior with the device mounted in the ceiling.

Refer 7701 ELECTRICAL section for power connection and isolation switch.

Report to HNZ Contract Manager for ducting through the wall or alternative mounting options and obtain instruction in writing prior to proceeding with works.

3.9 ROOF PENETRATIONS
Flash roof to cowlings and outlets to details, to NZBC E2/AS1 8.4.17 **Roof penetrations** and manufacturer's requirements. Cut flashings accurately and fix using sealant and fixings to form a weatherproof cover.

Completion

3.10 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal of all debris, unused and temporary materials and elements from the site.

3.11 CLEANING
Clean filters, grilles and fans.
Remove and recycle debris, unused materials and elements from the site. Clean soiled or marked work. Replace damaged, cracked or marked elements. Leave the whole of this work to the standard required by following procedures.

3.12 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

Commissioning

3.13 COMMISSIONING
Commission the system to manufacturer's requirements. Submit signed commissioning check list on completion.

Testing

3.14 TESTING
Carry out all necessary testing in accordance with manufacturer's requirements.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

7701 ELECTRICAL

1. GENERAL

This section relates to the wiring for domestic installations, including:

- power
- lighting
- security system
- communications systems
- electrically-powered fittings.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

CFL	compact fluorescent lamp
ELV	extra low voltage
GLS	general lighting service
IP	international (ingress) protection classification
LCD	liquid crystal display
LED	light emitting diode
MCB	miniature circuit breaker
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
RCBO	residual current-operated circuit breaker with over current protection
RCCB	residual current-operated circuit breakers
RCD	residual current device
SIA	security integration architecture
TPS	tough plastic sheathed
TCF	Telecommunications Carriers' Forum

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F6/AS1	Visibility in escape routes
NZBC F7/AS1	Warning systems
NZBC G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
AS 2293.1	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets

AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)
AS/NZS 3350.1	Safety of household and similar electrical appliances - General requirements
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards
AS 3786	Smoke alarms
NZS 4514	Interconnected smoke alarms for houses
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60598.2.2:2001	Luminaires - Particular requirements - Recessed luminaires
IEC 61643	Components for low voltage surge protection devices

Electricity (Safety) Regulations 2010
TCF Premises Wiring Code of Practice 2011

Warranties

1.3 WARRANTY
Warrant the complete or part electrical installation under normal environmental and use conditions against failure of materials and execution.
1 year: Warranty period

Requirements

1.4 COMPLY
Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2 and TCF Premises Wiring Code of Practice for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.5 QUALIFICATIONS
Carry out work under the supervision of an electrical licensed supervisor.

1.6 QUALIFICATIONS - SECURITY SYSTEM
Installation by an installer licensed under the Private Investigators and Security Guards Act. Installation of all security equipment to comply with AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance.

1.7 SAFETY OF INSTALLATION - DESIGN BY ELECTRICAL ENGINEER
Before installation work commences obtain from the electrical engineer a declaration of conformity. The declaration of conformity is to comply with the Electrical (Safety) Regulations (2010), regulations 57 and 58.

1.8 SAFETY OF INSTALLATION - DESIGN BY ELECTRICIAN
Before installation work commences provide a declaration of conformity. The declaration of conformity is to comply with the Electrical (Safety) Regulations (2010), regulations 57 and 58. It must be signed by the designer of the installation.

1.9 ELECTRICAL CERTIFICATE OF COMPLIANCE
Supply a certificate of compliance (CoC) to the owner, and if required the NUO, as required by the Electricity (Safety) Regulations (2010), prior to connection, to the HNZ Contract Manager.

- Arrange for the NUO to inspect before the meter installation, listed work inspection, polarity check and supply becoming live.
- Arrange for an inspector to inspect as required by regulation 70.

1.10 ELECTRICAL SAFETY CERTIFICATE
Provide an Electrical Safety Certificate (ESC), as required by the Electricity (Safety) Regulations 2010, to the owner. To be provided at completion of the work, prior to Practical Completion, to the HNZ Contract Manager.

2. PRODUCTS

2.1 MAINS SUPPLY, SINGLE PHASE
Tough plastic sheathed neutral screened cable to AS/NZS 4961 and AS/NZS 3008.1.2, with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES
Tough plastic sheathed copper conductors to AS/NZS 5000.2, stranded above 1.0mm², and to AS/NZS 3008.1.2. Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic: 1.5mm² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm² on 16 amp MCBs
Power circuits:	2.5mm² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres

Hot water cylinder circuits:	Single phase: 2.5mm² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm² on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C.

2.3 METER BOX
Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD
Flush surface mount boards manufactured to AS/NZS 3439.3 and installed in accordance with AS/NZS 3000. Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar.

Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION
General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with AS/NZS 3190. MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES
Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS
Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units with rocker switch. Number of switches per unit and 2 way units to match existing.

2.8 HOT WATER SYSTEM SWITCH
One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

2.9 SWITCHED SOCKET UNITS
10 amp, 230 volt flat 3 pin socket outlets fitted with safety shutters and manufactured to AS/NZS 3100, AS/NZS 3112 and AS/NZS 3113, single or multi gang to match existing.

2.10 SMOKE ALARMS
Provide evidence that the systems will comply with the existing standards of performance.

Refer 5521 HARDWARE section for battery type smoke alarms.

Refer to HNZ Specific Requirements for the Installation of Fire Alarms in HNZ Properties.

2.11 SURGE PROTECTION
Protection for the homes appliances with IEC 61643 Class ll surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class lll surge protection to switched socket outlets.

2.12 CEILING ROSES
White plastic mounting base with screwed cover, manufactured to AS/NZS 3113. Terminal type, to match existing.

2.13 BATTEN HOLDERS
Standard white plastic bayonet cap, with cap angled where wall mounted, to match existing.

2.14 DOOR BELL SYSTEM
Complete with transformer for mounting on distribution board, to match existing.

2.15 LIGHT FITTINGS
Replacement light fittings LED. Control gear suitable for dimming if this is required, to match existing. All fittings complete with lamps.

Exterior light fittings:	LED with motion sensors, IP rated for exterior use
Interior light fittings:	LED double insulated with acrylic diffuser, IP rated for wet areas where required

2.16 EMERGENCY LIGHT FITTINGS
Provide evidence that the systems will comply with the existing standards of performance.

Report to HNZ Contract Manager for emergency light fittings replacement and obtain instruction in writing prior to proceeding with works.

2.17 SPACE HEATERS
Fixed wired room heaters radiant or convector, and compliant with AS/NZS 3350.1. Surface wall mount, fitted with safety cut-outs, to be wired on a separate circuit and to be separately switched.

2.18 HEAT PUMPS
Compressors to be wired on a separate circuit from the distribution board and to be protected with a 20A MCB connected to an isolating switch.

Refer 7673 HEAT PUMP SYSTEMS section.

2.19 EXHAUST FANS
Ceiling, wall or duct mounted exhaust fans for ventilation to NZBC G4/AS1, and compliant with AS/NZS 3350.1.

Refer 7687 VENTILATION SYSTEM section for type.

2.20 OUTDOOR SWITCHES & SOCKETS
Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches to IP56 minimum, and sockets to IP53 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

Security system

2.21 CONTROL PANEL
Control panel system to suit installation.

2.22 DETECTORS
There are two main types of detectors:
- Standard passive infrared sensors: Install in stable environments with no wind flow and no direct bright sunlight.
- Passive infrared/ microwave sensors: Install in area where environmental stability is an issue.

2.23 AUDIBLE DEVICES
Internal sirens can be either a 12V Piezo Siren or a Horn speaker with a sound pressure level of no less than 95dB.

External siren can be either a stainless steel design or have hardened plastic casing. Both designs to be fully weatherproof but not limited to IP66 Rating. The siren box to contain a strobe diffuser in either blue or red. The siren shall contain a horn speaker, 12v speaker or an electronic siren. The external siren box to have both a cover and rear wall tamper mechanism.

2.24 CABLING
Security alarm wiring to NZS/AS 1125 for cables.
Security alarm wiring to be multi stranded and not single stranded, minimum 0.5mm^2.

2.25 PERIPHERALS

Fit anti-tamper devices to detectors, control panels and equipment housings, programmed to give a tamper indication when the system is unset and a tamper alarm when the system is set.

Standard keypad manufactured of moulded hardened plastic with either a LED or LCD screen, to match the style of the wiring accessories in diameter, colour and aesthetics.

2.26 COMMUNICATIONS
Digital dialler to be built into the PCB of all control panels, with the options for both monitoring and remote dial in windows based software. Digital dialler to comply with all the industry standard communication formats including contact I.D and SIA, and NZ Telepermit certification.

Remote software able to upload / download programming changes and or history events and change status of the security alarm with the ability to be turned off if required.

Communications Cabling Systems

2.27 EXTERNAL TERMINATION POINT AND HOME DISTRIBUTOR
Comply with Telecommunication Service Provider's requirements. In accordance with AS/NZS ISO/IEC 15018 or TCF Premises Wiring Code of Practice.

2.28 TV AERIAL
Aerial suitable for both VHF, UHF, analogue and digital reception, of all local free-to-air broadcast and pay channels.

FIRE RATED SEALERS AND LINERS AND ACCESSORIES

2.29 FIRE RATED SEALERS AND LINERS, WALL BOXES AND SWITCH UNITS
Provide evidence that the systems will comply with the existing standards of performance.

Report to HNZ Contract Manager for fire rated systems identifed and obtain instruction in writing prior to proceeding with works.

3. EXECUTION

3.1 MAIN SUPPLY
Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.2 METER BOX
Fit to meter box manufacturer's and Electricity Retailer's requirements. Recess into external wall in sheltered area on the road or public face of the property and flash to weatherproof to NZBC E2/AS1 fig 69. Arrange for meter installation and connection.

Report to HNZ Contract Manager for alternative mounting options and obtain instruction in writing prior to proceeding with works.

3.3 DISTRIBUTION BOARD
Fit to AS/NZS 3000 and board manufacturer's requirements. Recess into wall and ensure fire containment properties of the enclosure are maintained.

3.4 CIRCUIT PROTECTION
Install MCBs at distribution board to AS/NZS3000 to protect each final sub circuit.

3.5 EARTH BONDS
Bond together and to earth all plumbing fittings not adequately isolated, to AS/NZS 3000, the Electricity (Safety) Regulations 2010 and the fitting manufacturer's requirements.
Refer HOT & COLD WATER SYSTEM section for copper pipework.
Refer 7151 SANITARY FIXTURES section for steel fittings.

3.6 MAIN EARTH
Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

3.7 EARTH LEAKAGE PROTECTION
Install RCD protection to AS/NZS 3000.

3.8 DOMESTIC INSTALLATIONS

Install 30mA RCD protection at the distribution board for all final sub circuits to control socket outlets and lighting except for fixed or stationary cooking equipment, to AS/NZS 3000.

3.9 HIGH RISK AREA INSTALLATIONS

Install 30mA RCDs at the distribution board for areas not covered in Domestic installations, or using fixed wired RCD protected socket outlets in areas that may represent increased risk of electric shock to the user:

- Wet areas: bathrooms, laundries, kitchens.
- Where intended for use with cleaning equipment.

3.10 SET-OUT

The position of outlets and equipment, to match existing. Confirm site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.

Report to HNZ Contract Manager for VIR in conduit, VIR in wooden casing or TRS wiring identified and obtain instruction in writing prior to proceeding with works.

3.11 CABLING

Install wiring systems to AS/NZS 3000. All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.

3.12 CABLING CIRCUITS

Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.

3.13 WALL BOXES

Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

3.14 SWITCH AND SOCKET UNITS

Fit all single and double switch units, all sockets to the following heights (to the centre of the unit) unless instructed otherwise by the HNZ Contract Manager .

Switch Units: 1000mm above finished floor
Socket Units: 150mm above work benches
500mm above finished floor and 500mm away from internal corners

Mount light switches and switch socket outlets vertically and socket units horizontally. Label all switch units that control electrical equipment or special lighting circuits by colour filled engraving on the switch. Use proprietary engraved switch mechanisms where applicable.

3.15 ISOLATING SWITCHES

Locate isolating switches in positions as confirmed by the HNZ Contract Manager.

3.16 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the HNZ Contract Manager, in accordance with the fitting manufacturer's requirements.

3.17 ELECTRIC HOT WATER SYSTEM

Wire as a separate circuit through a wall-mounted isolating switch, with the cable from switch to element encased in flexible PVC conduit, clamp fixed at each end. Hot water cylinders, thermostats and 3000 watt element supplied and fitted under the hot and cold water system section.
Refer 7120 HOT & COLD WATER SYSTEM section.

3.18 SPACE HEATERS

Install to the heater manufacturer's requirements, and to AS/NZS 3000. Fit neatly and without damage to surrounding finishes. Ensure control switches and thermostats are fitted to appliance, or otherwise connect to a control switch located adjacent to the heater and a remote thermostat.

3.19 SURGE PROTECTION

Install surge protection devices to manufacturer's requirements and in accordance with AS/NZS 3000 and AS/NZS 1768. When fitting IEC 61643 Class ll protection at the switchboard, protect the device by a dedicated MCB.

3.20 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer's requirements.

Anti condensation device in the ceiling space, power outlet to be securely fixed to the framing minimum 200mm above the top of the ceiling insulation.

Rangehood to be connected to an isolating switch as per AS/NZS 3000:2007. Isolation switch location to be outside the line of the stovetop surface looped to switch socket outlet in behind flue.

3.21 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

- Heater: Install to manufacturers requirements and installed in accordance with AS/NZS 3000 and the NZBC G9/AS1
- Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with AS/NZS 3000 and NZBC G4/AS1, to be switched with the light fitting for space without a window or to be switched separately to the light fitting for space with an opening window.

3.22 OUTDOOR/EXTERIOR SERVICES

Install all wiring systems in accordance with AS/NZS 3000 and in accordance with the manufacturer's recommendations:
Provide circuits and connections for exterior installations. Where underground, ensure appropriate protection, such as thickness of sheathing, conduit, depth of cabling, and proximity to other services.

Use the appropriate rated fittings for power control and power supply. Weather protected switches to IP56, and sockets to IP53 as a minimum. Install to manufacturer's specifications using recommended fittings and sealants to maintain the products integrity.

Earth leakage protection to be provided for in areas where there is increased risk to human safety in the form of either RCDs at the distribution board, or socket outlet. RCDs are recommended for visible awareness of protection.

3.23 LABELLING

Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.

Security system

3.24 SECURITY SYSTEM
Install to the system manufacturer's requirements, control panel, detectors and associated equipment fitted neatly and without damage to surrounding finishes. Installation of security equipment to AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance. All 230v mains power connections to the security panel are to be in accordance with AS/NZS 3000. The 230V power is to be switched using a dedicated single gang Isolator switch or similar.

Communications Cabling Systems

3.25 NETWORK CONNECTION AND DISTRIBUTORS
Arrange for Telecommunication Service Provider to supply conduit for lead-in cable. Install conduit to location nominated by the Service Provider. Arrange for the Service Provider to install and terminate the lead-in cable. Install to AS/NZS ISO/IEC 15018 or PTC225, to the Service Provider's and manufacturer's requirements.

3.26 TV AERIAL AND CABLING
Fix aerial wall mounted, and ensure the system is suitable for high quality reception of all VHF, UHF, digital and satellite channels - Sky satellite TV installation practices minimum. Test to ensure adequate TV/video at every outlet with a RF field strength meter. Cable penetrations through the cladding to be weatherproofed to comply with NZBC E2/AS1.

Completion

3.27 COMPLETION
Leave installation operating correctly, with equipment clean and operational.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

8220 ASPHALTIC PAVING

1. GENERAL

This section relates to the supply and laying of kerbing and asphaltic paving.

1.1 DOCUMENTS
Documents referred to in this section are:

NZBC E1/AS1	Surface water
NZS 3104	Specification for concrete production
NZS 3604	Timber-framed buildings
NZTA M1	Specification for roading bitumens
NZTA M10	Specification for Dense Graded and Stone Mastic Asphalts

1.2 QUALIFICATIONS
Carry out all paving work using experienced, competent asphalters, familiar with the materials and techniques specified.

1.3 CONCRETE DRIVEWAYS AND PAVEMENTS
Refer to 3101 CONCRETE section.

2. PRODUCTS

2.1 CONCRETE KERBING
Pre-cast concrete kerb blocks.

2.2 CONCRETE
Prescribed mix to NZS 3104 (except where specified otherwise):

Haunching concrete:	17.5 MPa
Infill concrete:	20 MPa.

2.3 PRIME COAT
Equivalent to NZTA M1, emulsion AQ 55/200, suitable for application.

2.4 ASPHALTIC BINDER
Equivalent to NZTA M1.

2.5 ASPHALT
Mix Designation DG10 to NZTA M10.
Asphaltic concrete to be wearing mix DG10, thickness to be 25mm
Sealing chips to be grade 6

2.6 BASECOURSE

General basecourse:	GAP 40
Dressing grade:	GAP 20

3. EXECUTION

3.1 RELATIVE LEVELS
Confirm that proposed finished paving levels conform with NZS 3604, clause 7.5.2.1, **Finished floor levels and foundation edge construction** in relation to any adjoining habitable floor levels, and that proposed levels and falls comply with NZBC E1/AS1. Where any discrepancy exists, obtain the HNZ Contract Manager approval in writing before confirming adjustments to paving levels.

3.2 INSPECTION

Before starting paving work inspect the area to ensure that kerbing, edge restraints, drainage, surface water sumps, channels, basecourse and all other services are in place to correct falls for all surface water to discharge to the drainage system and are of a standard to allow paving work of the required standard. Service lids to be at the correct level to allow a waterproof seal to be installed between the lid and the asphaltic concrete. Refer 2210 PREPARATION AND GROUNDWORK section for Pot Holes and Dig Outs. Refer 7430 DRAINAGE section for services.

3.3 PLANT

Use the correct and all necessary plant to place the paving efficiently and to ensure the required work standard.

3.4 PROTECT ADJOINING WORK

Protect adjoining work at all stages.

3.5 CONSTRUCT KERBING

Excavate for and set concrete kerb blocks in place in concrete haunching, to line and levels shown. Lay kerbs straight to grade, alignment and level. Curves to sweep evenly without kinks, flats or angles. Form right-angle bends using purpose-made corner blocks. Kerb blocks to be bedded on and backed with 10MPa concrete to thickness 75mm minimum and to be flush pointed with mortar.

Box for and pour cast in situ concrete channels from 17.5 MPa concrete, with construction joints at 4 metres maximum. Set the joint flush with the surface and to a minimum 25mm deep. Construction joints to be consistent with the joints in precast kerb blocks. The top surface of channels to be finished smooth and even with no surface ponding. Allow haunching and channel concrete to cure before making good the adjoining basecourse.

3.6 INSTALL EDGE RESTRAINT

Excavate for and set paver soldier course in concrete haunching to levels shown. Allow concrete to cure before making good the adjoining basecourse.

3.7 BASECOURSE WORK

Lay GAP 40 basecourse to a minimum thickness of 200mm. Compact in layers less than 100mm. Top up with GAP 20 as required and compact to CBR7 minimum.

Pot Holes and Dig Outs depth more than 300mm, the sub-base to be backfilled up to 300mm maximum below the seal level with GAP 65 basecourse and compacted to CBR7 minimum.

Pot Holes and Dig Outs basecourse to finish 25mm below the surrounding seal level with a dense stone mosaic appearance.

Report to HNZ Contract Manager for compaction less than CBR7 and obtain instruction in writing prior to proceeding with works.

3.8 PREPARATION FOR ASPHALT PAVING

Prepare the surface to be paved to the requirements of NZTA M10. Apply an emulsion prime coat at a rate of 0.5 to 1.0 litres/metre² to suit surface conditions and to form a seal over the basecourse. Hand spread a thin coat of the mix over the prime coat and roll it to prevent damage to the surface from plant.

Pot Hole repairs a tack coat to be applied at 0.4 litres/metre² to all surfaces including the prepared base course and sides. Where the existing surface is asphaltic concrete a 100mm wide emulsion and sand bandage to be applied over the joint between the saw cut existing asphaltic concrete. Where the existing surface is chip sealed the repair to extend 200mm outside the perimeter of the squared pot hole and the emulsion sand bandage to be applied to protect joint until sealed.

3.9 ASPHALT PAVING

Lay to the requirements of NZTA M10 mix DG10 to the nominated minimum compacted thickness. Run joints with the fall and ensure that all joints are levelled to the smooth, even surface required. Lay seal to a flatness tolerance of 6mm maximum gradual deviation over a 5 metre straight-edge or for Pot Holes and Dig Outs to a flatness tolerance of 10mm maximum gradual deviation over a 2 metre straight-edge both within and to the existing surface with no sharp or ragged edges, and so that ponding does not occur. Pot Holes and Dig Outs maintain existing surface cross fall.

Pot Hole repairs where the existing surface is chip sealed the repair to be asphalic concrete then sealed with a hot bitumen and grade 5 sealing chip after 6 months. Carry out the NZTA M10 specified actions if material temperature drops below 100°C in any particular situation. Compact only with the plant and procedures laid down in NZTA M10. Finish flush to edges and fittings with a tolerance of plus 3mm to minus 0mm.

General

3.10 SERVICE LIDS

Protect prior to laying of asphalt paving to prevent intrusion of chip or bitumen. A waterproof bitumen seal to be installed around each service box and manhole cover and the finished asphaltic concrete. Clean tops of service lids within 2 days of laying of asphalt paving.

3.11 TAKE AWAY

Take away from the site any plant and material not used.

3.12 PROTECTION

Protect the completed work from damage and the dropping of other materials. Do not use the completed work as a building platform or for material storage.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

8320 LAWNS AND PLANTING

1. GENERAL

This section relates to the supply, preparation and placement of soil and planting.

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 1477	PVC pipes and fittings for pressure applications
NZS 3604	Timber-framed buildings
AS/NZS 3500	Plumbing and drainage Part 1: Water services

Requirements

1.2 QUALIFICATIONS
Landscapers to be experienced competent workers, familiar with the materials and the techniques specified. Supply evidence of experience and competence on request.

2. PRODUCTS

Materials

2.1 TOPSOIL
Good quality loam of a workable consistency:
- free of pernicious weeds, straw, stones, sticks, clay lumps
- free of foreign matter exceeding 25mm dimension.
- pH value between 6.5 and 7.5
- humus content greater than 50%.

2.2 BACKFILLING
Thoroughly mixed medium of 30% peat and 70% topsoil by volume.

2.3 HERBICIDES
Post-emergence selective chemical to control broadleaf weeds, noxious weeds and/or a non-selective chemical. Submit to the HNZ Contract Manager for review the proposed chemical and area of use.

2.4 STAKES
Rough sawn radiata pine H4 treated.

Size/length:	50mm x 50mm, length to suit tree/plant size
	20mm x 20mm, length to suit tree/plant size

2.5 MULCH
Number 3 bark.

2.6 GRASS, SOWN
Certified mixture of grass seed to suit local site conditions, with a high germination rate, fungicide and bird-repellent treated. Supply for review the proposed mixture and area of use.

2.7 WEED MAT
Woven construction stabilised polypropylene fabric.

3. EXECUTION

Conditions

3.1 RELATIVE LEVELS
All proposed finished landscaping levels to conform to NZS 3604, section 6.14, **Prevention of dampness** and section 7.5.2, **Finished floor levels and foundation edge construction**, in relation to any adjoining habitable floor levels.

Maintain the required cover over any buried services.

3.2 EXISTING SERVICES
Check for services in the area of this work. Avoid interference or damage to them.

3.3 ENSURE
Ensure that all areas are clean, ready to be worked and clear of any continuing work by others.

Application

3.4 PLANTING AREAS

Thoroughly spray planting areas which contain weed growth with a non-selective herbicide. Remove all noxious weeks. Apply using protective clothing, in dry, still-air conditions to the spray manufacturer's requirements.

Carry out all watering, weeding, controlling of insects, fungal and other diseases. Repair broken stakes and ties, trim hedges and prune shrubs.

3.5 GRASS AREAS
Replace areas of lawn that die.

Thoroughly spray grass areas which contain weed growth with a non-selective herbicide. Apply using protective clothing, in dry, still-air conditions to the spray manufacturer's requirements.

Replace substandard soil with 150mm layer of topsoil. Rotary hoe in two directions to a depth of 150mm and bring up to the required topsoil standard. Rake to a fine tilth, level and smooth with run-offs to drainage outlets. Apply selective herbicide.

Replacement lawn spread pre-plant fertiliser at the required rate for lawn. Spread grass seed at half the required rate in each of two directions at right angles, using an approved spreader. Lightly rake in and roll. Water deeply and keep moist without any run-off of water until germination is complete. Continue watering as necessary, minimum 13 weeks. First cut only when growth is a 100mm minimum and only down to 50mm.

Lawns to be cut to an even height, trim all edges and verges, trim around trees and alongside fences.

Completion

3.6 CLEAN UP
Clean up around all trees, shrubs, beds and lawns. Remove all surplus soil, unused materials and plants, from the site.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

8382 TREE PRUNING

1. GENERAL

This section relates to the pruning of mature trees. Pruning may include one or more of the following operations:

- Felling
- Crown thinning
- Crown reduction
- Lifting
- Form pruning
- Stump grinding.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

Aboriculture COP Approved Code of Practice for Safety and Health in Aboriculture

Treework COP Maintenance of Trees around Power lines - The Approved Code of Practice for Safety and Health in Tree Work - Part 2

Health and Safety at Work Act 2015

Requirements

1.2 QUALIFICATIONS

Workers to be experienced, competent landscape people familiar with the materials and techniques specified. All works shall be undertaken under the supervision of a qualified arborist in accordance with the best arboricultural practice.

Compliance information

1.3 HEALTH AND SAFETY

All works will be undertaken in accordance with the requirements of the Health and Safety at Work Act 2015, and in accordance with the following documents;

Aboriculture COP

Treework COP

1.4 WORKS AREA ISOLATION

- Isolate the area where tree work will be undertaken to prevent access to the works area by public or unauthorised personnel. The level and extent of isolation barriers shall be commensurate with the expose of the site to the public and level of hazard.
- Prepare a plan detailing the proposed means of isolation of the hazard area and submit the plan to the HNZ Contract Manager for approval. The plan and barriers to be installed shall be amended as required by the HNZ Contract Manager or representatives of WorkSafe NZ.

1.5 PUBLIC SAFETY

- Tree pruning may be undertaken while the site is accessible to the public. Undertake all works to avoid harm and minimise inconvenience to the occupants and the public.
- Where the public or occupants are likely to be at risk of harm or excessive noise or dust, isolate the work area with barriers, warning tape or signs (or a combination of these measures) to a degree commensurate with the hazards.
- Where the works will affect access by vehicles or pedestrians, supply all materials, labour and equipment to undertake appropriate measures to warn, divert or provide alternative access as necessary. Blocking of access will not be permitted unless other alternative access in impracticable.

- Barriers, warning tape, signs and works to provide alternative access shall be removed and any damage caused by those measures made good within 48 hours of the completion of the pruning works.

1.6 PRUNING STAFF SAFETY
Notify WorkSafe NZ of all notifiable work relating to tree work and heights as necessary. Comply with WorkSafe requirements. Notify the appropriate service provider and protect any overhead services within the zone of influence in accordance with their recommendations before commencing pruning operations.

Quality control and assurance

1.7 INSPECTIONS
Notify the HNZ Contract Manager for inspection of the works following:
- Identification and labelling of trees to be pruned.
- Completion of pruning.

2. PRODUCTS

Materials

2.1 TREE IDENTIFICATION
Identify and label (mark) all trees to be pruned prior to commencement of pruning operations. Arrange for the HNZ Contract Manager to review the labelling and confirm the pruning to be undertaken on each tree.
Trees without labels shall not be pruned.

2.2 LOCATION OF SERVICES
Where stumps will be ground, locate all services and confirm buried services are not located in the area of the grinding operation.

3. EXECUTION

Application

3.1 FELLING
Prune to remove all branches, limbs, and trunk material from the top downward to ground level.
Fell trees in a manner to avoid damage to other trees, services, roads or any public or private property or structures.

3.2 CROWN THINNING
This includes the following:
- Removal of dead or dying branches within the canopy.
- Removal of upper branches may be required to restore the tree to a more correct shape true to species character.
- Removal of cross-branches.
- Restoration of limb balance.

3.3 CROWN REDUCTION
Shorten the branches over the entire main branch system.

3.4 LIFTING
This includes the following:
- Removal of lower branches to allow for passage of vehicles, cyclists or pedestrians.
- Removal of other branches up the trunk to achieve a balance.

3.5 FORM PRUNING
Remove dead wood or other unsightly features to improve overall visual appearance.

3.6 STUMPS
Grind stumps below ground level and also along main roots for a distance until the root size is no greater than 100mm diameter.
Use an approved herbicide to treat the stumps (existing and newly felled) to prevent regrowth. Apply the herbicide in accordance with the manufacturers recommendations.

3.7 PRUNING
Cut timber back to a sound healthy branch with a clean cut. Final cuts shall be made as close as possible to the branch collar without damaging the collar.

Completion

3.8 WASTE DISPOSAL
If there is room on site, prunings may be stacked in neat piles in an agreed location at the end of each day but material must be removed before the end of each week. If there is not room on site then prunings must be removed continuously or at the end of each day, as appropriate.
Burning on site is not permitted. Remove all rubbish and spoil from the site on completion of the works, leaving the site in a clean and tidy condition.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

8430 FENCES

1. GENERAL

This section relates to fencing.
It includes;

- Timber fencing
- Timber bollards
- Metal fencing
- Gates.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 1163	Cold formed structural steel hollow sections
NZS 3607	Round and Part Round Timber Posts
NZS 3640	Chemical Preservation of Round and Sawn Timber
NZS 8500	Safety barriers and fences around swimming pools, spas and hot tubs.

Requirements

1.2 QUALIFICATIONS
Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.3 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Quality control and assurance

1.4 INSPECTIONS
Notify the HNZ Contract Manager for inspection of the following:

- Set out of fence line prior to commencing construction
- Excavation of foundation prior to post embedment.
- Completion of work.

2. PRODUCTS

Materials

2.1 TIMBER FENCE PALINGS, POSTS, RAILS & CAPPING
Rough sawn, treated to NZS 3640 Chemical Preservation of Round and Sawn Timber. Posts treated to H4 CCA (preservative code 01 or 02), all other timbers shall be treated to H3.2 CCA (preservative code 01 or 02) minimum.
Timber shall be sound, well seasoned and maintain figured dimensions (dimensions are nominal size - not gauged size), free from twist and bowing, tearing, wooliness, wane, chip bruising and other defects.

Posts:	100mm x 75mm minimum up to height 1.2m
Posts:	100mm x 100mm maximum height 1.8m
Palings:	150mm x 25mm or 50mm x 25mm minimum to match existing
Rails:	100mm x 50mm

Capping: 150mm x 50mm

2.2 TIMBER BOLLARDS
Bollards to NZS 3607 Round and Part Round Timber Posts. Bollards dressed and treated to H4 CCA (preservative code 01 or 02). Round posts or 150mm x 150mm square posts with a 30mm chamfer around the top and a 25mm chamfer down the edges.

2.3 METAL FENCES
To NZS 8500 and to AS/NZS 1163, hot dip galvanised steel, minimum 600gm2 coating after manufacture and powdercoat finish colour black.

Posts up to 1.5m height:	50mm x 50mm x 1.6mm
Posts up to 1.8m height:	60mm x 60mm x 2mm
Rails:	Triangular
Panels:	Gap 95mm between verticals maximum Bottom rail above the lower edge of the panel and verticals capped with a top rail.

2.4 GATES
Timber treated to H3.2 CCA (preservative code 01 or 02). Metal hot dip galvanised steel to AS/NZS 1163, 600gm2 coating minimum after manufacture and powdercoat finish colour black.

Components

2.5 NAILS, HINGES & LATCHES
All nails, hinges, latches and hardware hot dip galvanised.

- Metal gate self closing hinge and automatic latch at 1.5m above ground level.
- Metal fence post anchor bolts 2 x M12 hot dip galvanised.
- Timber fence rails 1 x M12 hot dip galvanised coach bolt and 50 x 50 x 3mm washer.
- Timber fence nails galvanised steel minimum 60mm flathead.
- Timber fence nail plates galvanised or stainless steel.
- Bolts and screws hot dip galvanised.

2.6 CONCRETE
Concrete to NZS 3104, minimum compressive strength of 17.5 MPa at 28 days.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING
Take delivery of materials and goods and store on site and protect from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish

Installation/application

3.2 STANDARDS AND TOLERANCES
Refer to the general section CONSTRUCTION for general requirements.

3.3 CLEARING
Clear a 1.0m strip within fence alignment, to allow for erection of new fence. Grub up shrubs and trees not required to be retained.

3.4 SETTING OUT

Boundaries to be defined by legal survey pegs. Do not install fences where pegs have not been located. In this event, instruction from the HNZ Contract Manager on fence location is required.
Where fences are installed on property boundaries, fence lines shall be installed parallel to and 25mm within the subject property boundary.

If using palings or similar, fix palings on the road or public face of fences and inside faces of internal boundaries.

3.5 EXCAVATIONS

Excavate by auguring to the minimum depths into solid ground. Driving of posts will not be accepted.

Fence up to height 1.2m:	Timber post holes diameter 250mm x depth 600mm Metal post holes diameter 150mm x depth 600mm
Fence up to height 1.8m:	Timber post holes diameter 250mm x depth 700mm

Report to HNZ Contract Manager for soft ground conditions and obtain instruction in writing prior to proceeding with works.

3.6 POST EMBEDMENT

Embed posts with a 100mm clearance between the base of the excavation and bottom of the post minimum.
Place concrete under and around the post and compact by tamping or vibrating. Ensure the posts are set vertical and temporarily prop for at least two days after placement of concrete.

3.7 MOWING STRIP

Excavate mowing strip to the width and full depth including allowance for bedding. This may include stripping of topsoil. Install clean formwork to the full concrete depth.
Compact bedding to the nominated depth. Construct mowing strip from 15 MPa concrete with contraction joints located at each post. Centre on posts:

- Steel fences 300mm wide x 75mm thick
- Timber fences 400mm wide x 75mm thick.

3.8 CLOSE BOARDED TIMBER FENCING

Construct parallel to the ground surface. Post spacing 2.4 metre centres maximum to height 1.8 metres maximum.
Replacement fence set the greater dimension of rails vertically, and outside face flush with the outside face of posts. Fix rails continuous between posts with M12 galvanised coach bolt and washer at each post connection, and parallel to ground, 2 rails for fence height up to 1.2 metres and 3 rails to height 1.8 metres.
Fix palings 50mm above the ground surface with 10mm gaps between palings.
Trim tops of palings parallel to the ground surface.
Fix capping with joints mitred on the top of the posts and the top edge to be bevelled 15 degress each side of the centre line.

3.9 METAL FENCES

Construct to the manufacturer's requirements and to the Fencing of Swimming Pools Act complete with self closing gate fitted with a child proof self latching device opening to swing into the secure child safe play area.
Construct parallel to the ground surface. Post spacing 2.4 metre centres maximum to height 1.8 metres maximum. Position the posts vertically and horizontally with 50mm to 100mm gap for the panel above the ground surface. Fix each panel into the post brackets in accordance with the manufacturer's requirements. Embed posts or fix with base plate supplied with holes for 2 x M12 galvanised coach bolt and washer anchor bolts minimum to the manufacturer's requirements..

3.10 TIMBER GATES
Timber framed and diagonally braced gates, similar height to the adjacent fence or wall. Leave 50mm to 100mm clearance under gates, depending on surface finish of adjacent ground. Check operation of gates to ensure that they swing clear of the ground and other features. Hang gates from galvanised hinges on the up-slope post (if any).
Place latches up to 200mm from the top of the gate to a maximum of 1.5m off the ground, and accessible from both sides of the gate, through an 'access' hole for tall gates.

3.11 INSTALL METAL GATES
Metal framed gates, similar height to the adjacent fence or wall. Leave 50mm to 100mm clearance under gates, depending on surface finish of adjacent ground. Check operation of gates to ensure that they swing clear of the ground and other features. Hang gates from corrosion resistant hinges/dogs on the up-slope post (if any).
Place latches up to 200mm from the top of the gate to a maximum of 1.5m off the ground, and accessible from both sides of the gate, through an 'access' hole for tall gates.

3.12 TIMBER BOLLARDS
Set up vertically and true to line and level. Install at 1.5m spacing without chains.

3.13 TOLERANCES
Posts shall not deviate by more than 30mm from the vertical over the height of the post.

3.14 REINSTATE
Ensure all surfaces affected by the works are reinstated to pre-construction condition (e.g. topsoiled and grassed).

Completion

3.15 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.16 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.

8434 POST AND WIRE FENCES

1. GENERAL

This section relates to Post and Wire Fencing.
It includes;

- post and wire fences
- prefabricated steel gates
- Clothes line (for Rotary or T bar type)
- Letter box

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3471	Galvanised Steel Fencing Wire Plain and Barbed
NZS 3607	Round and Part Round Timber Posts
NZS 3640	Chemical Preservation of Round and Sawn Timber

Requirements

1.2 QUALIFICATIONS
Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.3 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.4 CORROSION RISKS
Use only CCA (preservative code 01 or 02) treated timber or equivalent. Do not use timber treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89), as they may cause corrosion in steel and galvanised steel.

Quality control and assurance

1.5 INSPECTIONS
Notify the HNZ Contract Manager for inspection of the works following set out and completion.

2. PRODUCTS

Materials

2.1 POSTS TIMBER
Fence line posts, gate posts, rails radiata pine to NZS 3607. Posts treated to H4 CCA (preservative code 01 or 02), all other timbers shall be treated to H3.2 CCA (preservative code 01 or 02) minimum.
Posts shall have the following dimensions:

Fence up to height 1.2m:	Post 100mm x 75mm, post hole diameter 250mm x depth 600mm minimum
Gate up to height 1.2m:	Post 100mm x 100mm, post hole diameter 250mm x depth 600mm minimum.

Fence/Gate up to height 1.8m:	Post 100mm x 100mm, post hole diameter 250mm x depth 700mm minimum.
Rail:	Top rail 150mm x 50mm

2.2 POSTS STEEL

Hot dip galvanised steel to AS/NZS 1163. Fence posts/rail and Letter box post, 32mm x 2.5mm hot dip galvanised steel pipe. Clothes line post to match existing.

Fence up to height 1.2m:	Post hole diameter 200mm x depth 600mm minimum.
Fence up to height 1.8m:	Post hole diameter 200mm x depth 800mm minimum.
Clothes line posts:	Post hole diameter 300mm x depth 600mm minimum.
Letter box:	Post hole diameter 250mm x depth 600mm minimum.

2.3 WIRE

Wire to NZS 3471.

For areas within 500 metres of the sea or where required in particular cases, wire to be suitable for a marine environment. In all other cases, to be 2.5mm diameter galvanised High Tensile (HT) or 4.0mm diameter galvanised Mild Steel (MS).

Fence:	37.5mm x 2.5mm hot dip galvanised chain link or, 50mm x 2.5mm minimum to match existing, 2.5mm galvanised high tensile wire top, middle and bottom
Gate:	50mm x 2.5mm hot dip galvanised chain link
Clothes line:	No.2 stranded galvanised wire

2.4 CONCRETE

Concrete to NZS 3104, minimum compressive strength of 17.5 MPa at 28 days.

2.5 DIMENSIONS

Fence dimensions in accordance with the following:

- Line post centres 2.4m maximum
- Timber posts and top rail number of wires 3 up to height 1.2m and 4 up to height 1.8m.
- Steel posts and top rail number of wires 2 up to height 1.2m and 3 up to height 1.8m.

Clothes line dimensions in accordance with the following:

- Number of wires 5
- Line length 42m maximum.

Components

2.6 STAPLES

Mild steel hot dip galvanised, non-barbed 50mm x 4mm to all posts.

Accessories

2.7 STEEL GATES

Prefabricated, hot dip galvanised steel gates frame to be minimum internal dimension 20mm pipe to the manufacturer's requirements, complete with gudgeons drilled through posts, top gudgeon reversed and closed with drop over latches onto a large staple. All hardware hot dip galvanised.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery of materials and goods and store on site and protect from damage.
Protect finished surfaces from damage.
Move/handle goods in accordance with manufacturers requirements.
Reject and replace goods that are damaged or will not provide the required finish.

Installation/application

3.2 SETTING OUT

Boundaries to be defined by legal survey pegs. Do not install fences where pegs have not been located. In this event, instruction from the HNZ Contract Manager on fence location is required.
Where fences are installed on property boundaries, install fence lines immediately adjacent to, and 25mm within the subject property side of the boundary.

For fences not on boundaries, liaise with the HNZ Contract Manager to set out the fencing. Provide stakes or marker paint as necessary to record the set out location of the fence on the ground. Mark out to be sufficiently robust to be legible for 4 weeks.

3.3 EXCAVATIONS

Excavate by auguring to the minimum depths into solid ground. Driving of posts will not be accepted.

Report to HNZ Contract Manager for soft ground conditions and obtain instruction in writing prior to proceeding with works.

3.4 INSTALLATION FENCES

Post spacing 2.4 metre centres maximum. Embed posts with a 100mm clearance between the base of the excavation and bottom of the post minimum. Place concrete under and around the post and compact by tamping or vibrating. Ensure the posts are set vertical and temporarily prop for at least two days after placement of concrete.

Timber posts fix 2.5mm galvanised high tensile wire horizontally to each post to the top and bottom and evenly spaced between with 50mm gap above and parallel to the ground surface. Attached the chain link to the top wire and bottom wire at every third diamond and attach the chain link to the intermediate wires at 300mm centres with proprietary fixings. Fix the top rail vertically to the face of posts with M12 galvanised coach bolt and washer at each post connection and parallel to the ground surface.

Steel posts fix the top rail to the posts using proprietary cast alloy fittings with grub screws. Fix 2.5mm galvanised high tensile wire horizontally to each post evenly spaced between the top rail and the bottom wire with 50mm gap above and parallel to the ground surface. Attached the chain link to the top rail and bottom wire at every third diamond and attach the chain link to the intermediate wires at 300mm centres with proprietary fixings.

3.5 INSTALLATION CLOTHES LINE

Embed post with a 100mm clearance between the base of the excavation and bottom of the post minimum. Place concrete under and around the post and compact by tamping or vibrating. Ensure the post set vertical and temporarily prop for at least two days after placement of concrete.
Replacement wire complete.

3.6 INSTALLATION LETTER BOX

Embed post with a 100mm clearance between the base of the excavation and bottom of the post minimum. Place concrete under and around the post and compact by tamping or vibrating. Ensure the post set vertical and temporarily prop for at least two days after placement of concrete.

Letter box to be base mounted and side or base stainless steel screw fixed. Letter box replacement or repair to meet NZ Post standards.

3.7 WIRE TENSION
Tension wire to optimum 1500N for HT MS Wire diameter 2.5mm.

Completion

3.8 COMPLETION
On completion of the work, ensure all surfaces affected by the works are reinstated to pre-construction condition (e.g. topsoiled and grassed) unless specified otherwise.

3.9 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal of all debris, unused materials and elements from the site.

3.10 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

4. SELECTIONS

Refer to HNZ Building Materials Procurement Schedule.