

Isthmus Group Limited

**Isthmus.**

**SPECIFICATION**

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

**Rotorua Lakefront Redevelopment - Landscape Specification**

**Landscape Specification**

Lakefront Drive, Central, Rotorua, New Zealand  
Project Ref: Stage 1 & 1a

Printed: 15 February 2019  
Tender Issue - Not for Construction

**TABLE OF CONTENTS**

1013 DOCUMENT CONTROL	3
1220 PROJECT	4
1231 CONTRACT	7
1232 INTERPRETATION & DEFINITIONS	8
1232S1 EXPLANATION OF SCHEDULE SECTIONS	10
1233 REFERENCED DOCUMENTS	11
1235 SHOP DRAWINGS	12
1237 WARRANTIES	14
1238 AS BUILT DOCUMENTATION	17
1239 OPERATION & MAINTENANCE	19
1270 CONSTRUCTION	22
1270S1 SCHEDULE OF SAMPLES & PROTOTYPES	31
2110 DEMOLITION WORKS	33
3101 CONCRETE WORK - BASIC	36
3124 FINISHES TO WET CONCRETE	41
3124PF PETERFELL COLOURED CONCRETE & SEALERS	48
3130 PRECAST CONCRETE	55
3361 STONEMWORK	62
3410 STRUCTURAL STEELWORK - BASIC	66
4383 TIMBER DECKING	70
4933 ALUMINIUM METALWORK	74
6700 PAINTING GENERAL	77
6711 PAINTING EXTERIOR	83
8226 GRAVEL & STONE PAVING	85
8231 SEGMENTAL PAVING	88
8310 LANDSCAPE SITE PREPARATION	91
8321 SOIL AND SOIL PREPARATION FOR PLANTING	95
8332 PLANTING	98
8333 TURF LAYING AND LAWN SEEDING	106
8335 TREE PLANTING & TRANSPLANTING	110
8380 LANDSCAPE MAINTENANCE	115
8410 LANDSCAPE EDGING	120
8461 STREET & LANDSCAPE FURNITURE	122
8511 IRRIGATION SYSTEM	126

**masterspec**

Specification built using Masterspec software  
Project ID: 167571 - 124334



**masterspec**

Verified spec ID: **172918-124334**

This specification has been produced using Masterspec software and completed on 15/02/2019.  
Scan to verify or go to [masterspec.co.nz/verify](https://masterspec.co.nz/verify)

## 1013 DOCUMENT CONTROL

### 1 DOCUMENT CONTROL

#### Document Control

#### 1.1 PREPARED BY

Company:	Isthmus
Contact:	Travis McGee
Postal Address:	PO Box 90366, Victoria St West
Street Address:	43 Sale Street, Freemans Bay
City:	Auckland
Telephone:	09 309 9442, 027 372 9884
Email:	travis.mcgee@isthmus.co.nz

#### 1.2 DOCUMENT DETAILS

Project Name:	Rotorua Lakefront Redevelopment: Stage 1 & 1a
Project Number:	Landscape Specification 4010
Client:	Rotorua Lakes Council
Client Contact:	Craig McMichael

#### 1.3 REVISION CONTROL

Issue:	Tender Issue
Revision:	A
Amendment Details:	n/a
Issued to:	Rotorua Lakes Council
Date of Issue:	15.02.18
Reviewed by:	TM
Approved by:	GB

## 1220 PROJECT

### 1 GENERAL

This general section describes the project including:

- A description of the work
- Site description, features and restrictions
- Design parameters for design by contractor
- Archaeological discovery

#### 1.1 READ ALL SECTIONS TOGETHER

Read all general sections together with all other sections.

#### Description of the work

#### 1.2 SCOPE OF THE WORK

The relating works are located at Rotorua Lakefront Drive and involve the construction of the stage 1 & 1a. The project is the first stages of an extensive lakefront redevelopment project. Stage 1 and 1a include works within the lake bed and the existing lake edge environment. The landscape specification should be read in conjunction with all other specifications including engineering specifications for the civil and lighting works.

The project includes design and build elements such as lawn irrigation and precast concrete. Refer to relevant sections of this and document the engineering specifications for more information.

#### 1.3 NO RESTRICTED BUILDING WORK

This project does not include Restricted Building Work.

#### Design Construction Safety

#### 1.4 DESIGN CONSTRUCTION SAFETY

The project designers are unaware of unusual or atypical features, which a reasonably experienced contractor may not be aware of, that may present a hazard or risk during a typical construction process. The Contractor is still required to undertake its own assessment, to determine if they consider there are any further safety matters and provide for these in carrying out the construction of the work.

#### 1.5 DESIGN CONSTRUCTION SAFETY REPORT

Provide particular health and safety procedures and methods to mitigate any hazards or risks in the report, and specifically include them as well as any other health and safety matters in the site Health and Safety Plan (refer to section 1260 PROJECT MANAGEMENT for Plan requirements). The Contractor is still required to undertake its own assessment, to determine if they consider there are any further safety matters and provide for these in carrying out the construction of the work.

**1.6 DESIGN CONSTRUCTION SAFETY MATTERS**

The project has the following unusual or atypical features, which a reasonably experienced contractor may not be aware of, that may present an unexpected hazard or risk during a typical construction process.

ITEM	COMMENT
Geothermal areas	Various areas of the site - refer to geotech reports
Low water table	Lake levels can fluctuate and may effect water levels
Public Access	The surrounding site will remain operational as a public space and commercial operations are to remain open with as little impact as practicable from current construction works.
Traffic	The design alters the current roading layout, the contractor is to take care with site vehicles and ensure all site entrances are well sign posted, closed off to the general public and regularly monitored to prevent access for the general public.

Provide particular health and safety procedures and methods to mitigate these hazards or risks, and specifically include them as well as any other health and safety matters in the site Health and Safety Plan (refer to section 1260 PROJECT MANAGEMENT for Plan requirements). The Contractor is still required to undertake its own assessment, to determine if they consider there are further safety matters and provide for these in carrying out the construction of the work.

**Site****1.7 SITE**

The site consists of: The lakefront edge including existing tourist operators and tour bus and public parking. An existing lake edge promenade and playspace including established gardens, defined by carparking, topography, an existing lake and mature specimen trees. An existing Whare Waka (Boat storage building) is also located at the eastern end of the site.

as shown on drawing General arrangement plan 1\_1.100 & 1a\_1.100 no.

**1.8 LEGAL DESCRIPTION**

The site of the works, the street address and the legal description are shown on the drawings.

**1.9 EXISTING BUILDINGS**

Existing buildings consist of: Whare Waka boat storage building, base slab of prior Scout building (recently removed). Adjacent the site boundary include existing tourist operator kiosks, cafe caravan, public toilets, playground and BBQ structures.

Refer to drawing(s) Overall Site Plans no(s):

**1.10 EXISTING SERVICES**

The following are the network utility services:

Electrical: transformers, lighting, power sources, CCTV  
 Telecommunication: TBC  
 Water: yes  
 Gas: TBC  
 Stormwater: yes  
 Foul water: yes

The stormwater services are located on Engineering drawings

**1.11 SITE FEATURES**

The site is heavily landscaped and the proposed path intersects with many established gardens, trees and service access routes.

**Site environment - Wind****1.12 WIND DESIGN PARAMETERS - NON SPECIFIC DESIGN**

The design wind pressures are to NZS 3604, Table 5.4 Determination of wind zone, up to and including Extra High Wind Zone.  
 Building wind zone 37m/s (refer to NZS 3604, table 5.4)

**Site environment - Durability****1.13 EXPOSURE ZONE**

The exposure zone is to NZS 3604, Section 4 Durability, 4.2 Exposure zones and NZBC E2/AS1.  
 The site zone is: SED - geothermal

**Site environment - Seismic****1.14 EARTHQUAKE ZONE - NON SPECIFIC DESIGN**

The zone is to NZS 3604, Section 5 Bracing design, 5.3 Earthquake bracing demand.  
 The earthquake zone 3 is:

**Archaeological discovery****1.15 ANTIQUITIES AND ITEMS OF VALUE**

Report the finding of any fossils, antiquities and other items of value, to the Contract Administrator. All to remain undisturbed until approval is given for removal.

Pre-1900, items or evidence of human activity on the site, come under the Heritage New Zealand Pouhere Taonga Act 2014. If such items or evidence is discovered work must stop immediately and the Contract Administrator must be notified immediately. The site may be classified as an Archaeological Site under the Act, and the Contract Administrator or Owner must contact the Heritage New Zealand for authority to proceed.

Post-1900 items remain the property of the owner, pre-1900 items may remain the property of the owner or the Crown subject to what is found.  
 Known archaeological information relating to this site includes the following: Refer resource consent cultural assessment

## 1231 CONTRACT

### 1 GENERAL

This GENERAL section refers to contract related matters.

#### 1.1 NOMINATED SUBCONTRACTORS

The contractor must appoint the following to carry out specific parts of the work.

##### **Irrigation design & build:**

Contractors choice but must provide design component.

##### **Furniture:**

Structural producer statements are to be provided by fabricator for those items labelled in section 8431 Street and Landscape Furniture.

##### **Precast concrete:**

Contractors choice but must provide evidence of competence/experience and conform to the design as documented within the drawings provided.

##### **Planting supply and installation:**

InfraCore - Nursery adjacent to site.  
Malcolm Smith,  
Operations Manager Parks & Public Spaces:  
70 Vaughan Rd, Ngapuna, Rotorua 3010  
02748713993

The contractor is permitted to submit alternative prices and methodologies for consideration but must also obtain pricing for the above.

## 1232 INTERPRETATION & DEFINITIONS

### 1 GENERAL

This general section relates to definitions and interpretation 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).
Hold point:	A stage of the construction where the Contract administrator requires notice to be given that particular work is to be carried out. Work may not proceed on that particular part until the Contract administrator or other nominated person has advised that work can continue. A notice period of 2 Working Days is required unless stated otherwise.
Notification point:	A stage of the construction where the Contract administrator requires notice to be given that particular work is to be carried out. Work may continue and the Contract administrator may choose whether or not they wish to witness the particular work being carried out. A notice period of 2 Working Days is required unless stated otherwise.

#### 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.

**1232S1 EXPLANATION OF SCHEDULE SECTIONS****1 GENERAL**

This General section provides an explanation of Schedule sections and their relationship to General sections and Work sections. Specific Schedule sections contained within this specification are also identified.

**1.1 EXPLANATION OF SCHEDULE SECTIONS**

A schedule section identifies Work sections that contain common requirements, as identified in the title of the Schedule section. For example 1235S1 SCHEDULE OF SHOP DRAWINGS identifies Work sections that have requirements for shop drawings. Details of the requirements are contained in the identified Work sections with additional requirements contained in the General section 1235 SHOP DRAWINGS.

A Schedule section is identified by the 4 digit CBI (Co-ordinated Building Information) number of the General section that it relates to, followed by the letter "S" followed by a numeral (1-9). The numeral allows for multiple schedule sections to be associated with the same General section.

**1.2 SCHEDULE SECTIONS**

The following Schedule sections are contained within the specification:  
1270S1 Schedule of Samples & Prototypes

## 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 F5/AS1	Construction and demolition hazards
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 3012	Electrical installations - Construction and demolition sites
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
AS/NZS 5131	Structural steelwork - Fabrication and erection
NZS 6803	Acoustics - Construction Noise
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 at Work (Hazardous Substances) Regulations 2017	
Health and Safety in Employment Regulations 1995	
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
WorkSafe NZ	Good Practice Guidelines - Excavation Safety
WorkSafe NZ	Scaffolding in New Zealand - Good Practice Guidelines

## 1235 SHOP DRAWINGS

### 1 GENERAL

This general section relates to common requirements for the preparation, submission and review of shop drawings 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. Detailed requirements for shop drawings for particular parts of the work are included in the specific work section.

#### 1.1 PREPARE SHOP DRAWINGS

Prepare shop drawings where specified in the work sections. Refer to SCHEDULES.

#### 1.2 SHOP DRAWING FORMAT

Prepare shop drawings at appropriate scales to enable good legibility. Unless otherwise specified in a work section, submit shop drawings in the format as listed in SELECTIONS.

#### 1.3 PROGRAMME FOR SHOP DRAWINGS

Allow time in the programme for the preparation, coordination and review of shop drawings. Allow also for such resubmission and further review as may be required prior to fabrication. No extension of time will be allowed for resubmission and further review.

#### 1.4 COMMUNICATION WITH SHOP DRAWING DETAILER

Agree and arrange for such direct contact as is appropriate between detailer, consultant and others whose input may be required in the preparation of the shop drawings. Such direct communication does not relieve the contractor of the need to carry out their own coordination and check of shop drawings.

#### 1.5 CONTRACTOR COORDINATION OF SHOP DRAWINGS

Before submitting the shop drawings for review, carry out coordination to ensure that allowance has been made for all other parts of the work that relate to the work detailed in the shop drawings.

#### 1.6 COORDINATION WITH SITE MEASURE

The contractor is solely responsible for coordination of shop drawing dimensions with site measurements. The reviewer's dimensional review is limited to visual/aesthetic matters only.

#### 1.7 SHOP DRAWING REVIEW

Submit shop drawings to the named reviewers for review, in due time to ensure conformance with the contract programme.

- Where no time is stated in a specific section allow 10 working days for review by the reviewer. Where a large number of drawings are involved more time will be necessary.
- Where no person is named as the reviewer, submit the shop drawings to the contract administrator.

Shop drawing review indicates only that the shop drawing interpretation of the design concept has been reviewed without the need for further modification, other than the corrections indicated by the reviewer.

The reviewer may advise that:

- The shop drawings have been reviewed and work may proceed; or
- The shop drawings have been reviewed and work may proceed subject to notes, annotations or comments provided; or
- The shop drawings have been reviewed and work may proceed subject to notes, annotations or comments provided. Resubmitted revised shop drawings shall be provided for the record, or
- Work may not proceed. Revise and resubmit shop drawings

#### 1.8 RESPONSIBILITY

Review of shop drawings does not relieve the contractor of responsibility for the correctness of the shop drawings, site dimensions, the overall design, coordination and performance, or for ensuring the work is carried out in compliance with the contract documents. It 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. Review cannot be construed as authorising departures from the contract documents.

**1.9 RESUBMISSION OF SHOP DRAWINGS**

Reviewed drawings which are required to be resubmitted to correct comments or notations indicating where the shop drawings are at variance with the contract documents, are to be modified and resubmitted to the reviewer for re-review. Allow 5 working days for re-review by the reviewer.

**1.10 WORK MAY PROCEED**

Before proceeding with any fabrication, installation or erection, advice must be obtained from the named reviewers that work may proceed. Where no named reviewer has been nominated advice must be obtained from the contract administrator.

**2 SELECTIONS****2.1 SHOP DRAWING FORMAT**

Submit the shop drawings in the following format

	Format/Size
Electronic copy	PDF (A3)
CAD file	AutoCAD (DWG).

**3 SCHEDULES****Schedule of shop drawings****3.1 SCHEDULE OF SHOP DRAWINGS**

Refer to the following sections:

3130	Precast Concrete
3361	Stonework
3410	Structural Steelwork - Basic
8461	Street & Landscape Furniture
4933	Aluminium Metalwork

**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, or the building consent.

**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.

- Conform to the WARRANTY AGREEMENT form included in the specification/conditions of contract.
- Commence warranties from the date of practical completion of the contract works (unless otherwise stated).
- Maintain their effectiveness for the times stated.
- Provide executed warranties prior to practical completion.

**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 administrator. 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 administrator.

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 BUILDING CONSENT AUTHORITY**

Obtain copies of warranties required as a condition of the building consent in the form required for submission to the BCA. Keep safe and secure until required at the time of the BCA final inspection and Code Compliance Certificate.

**1.6 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)"

**1.7 WARRANTIES - SUBMISSION NZS3910:2013 CONTRACT**

Refer to NZS 3910 Conditions of Contract for building and civil engineering construction, clauses 11.5 and 11.6 for requirements relating to the time for submission of warranties and guarantees. Submit all warranties/guarantees to the engineer no later than the date that the contractor notifies that it believes the contract works qualify for practical completion.

**1.8 WARRANTIES - SUBMISSION NZS3915:2005 CONTRACT**

Refer to NZS 3915 Conditions of contract for building and civil engineering construction (where no person is appointed to act as engineer to the contract), clause 11.5 for requirements relating to the time for submission for warranties and guarantees. Submit all warranties/guarantees to the principal before or at the time of the issue of the provisional defects liability certificate the end of the defects liability period.

**1.9 WARRANTIES - SUBMISSION NZS3916:2013 CONTRACT**

Refer to NZS 3916 Conditions of contract for building and civil engineering – Design and construct, clauses 11.5 and 11.6 for requirements relating to the time for submission of warranties and guarantees. Submit all warranties/guarantees to the engineer no later than the date that the contractor notifies that it believes the contract works qualify for practical completion.

**2 SELECTIONS****Guarantees - Contractor - Master Build Services Ltd****2.1 MASTER BUILD SERVICES LTD - 10 YEAR KIWI GUARANTEE**

Provide a 10 Year Kiwi Guarantee, include all costs in the contract price. Detach the guarantee application form from the guarantee agreement. Complete the form, obtain all required signatures (builder and owner). Send the completed form to Master Build Services for approval along with a copy of the building contract (include a full scope of work for any addition/alteration work), prior to any work commencing. Obtain the Master build Services acceptance letter and provide this to the owner along with the guarantee document. On completion of the building work complete the notice of practical completion form, obtain all required signatures (builder and owner) and forward the form to Master Build Services.

**2.2 MASTER BUILD SERVICES LTD - 10 YEAR STANDARD GUARANTEE**

Provide a 10 Year Standard Guarantee (including all optional cover), include all costs in the contract price. Detach the guarantee application form from the guarantee agreement. Complete the form, obtain all required signatures (builder and owner). Send the completed form to Master Build Services for approval along with a copy of the building contract (include a full scope of work for any addition/alteration work), prior to any work commencing. Obtain the Master build Services acceptance letter and provide this to the owner along with the guarantee document. On completion of the building work complete the notice of practical completion form, obtain all required signatures (builder and owner) and forward the form to Master Build Services.

**2.3 MASTER BUILD SERVICES LTD - 10 YEAR PREMIUM GUARANTEE**

Provide a 10 Year Premium Guarantee (including all optional cover), include all costs in the contract price. Detach the guarantee application form from the guarantee agreement. Complete the form, obtain all required signatures (builder and owner). Send the completed form to Master Build Services for approval along with a copy of the building contract (include a full scope of work for any addition/alteration work), prior to any work commencing. Obtain the Master build Services acceptance letter and provide this to the owner along with the guarantee document. On completion of the building work complete the notice of practical completion form, obtain all required signatures (builder and owner) and forward the form to Master Build Services.

**Guarantees - Contractor - Builtin NZ****2.4****10 YEAR WATERTIGHT WARRANTY - FOR WEATHERTIGHT REPAIRS, RECLADS & EXTERIOR RENOVATION**

Provide a WaterTight Warranty for weathertight repairs, reclads and exterior renovation. Complete the guarantee application and arrange for it to be signed by both the owner and builder before commencement of the works. Forward it to Builtin New Zealand Limited for approval, along with payment of the premium and a copy of the repair plan and building consent.

**2.5****10 YEAR HOMEFIRST BUILDERS GUARANTEE - FOR RESIDENTIAL NEW BUILDS, ALTERATIONS & ADDITIONS**

Provide a 10 Year Homefirst Builders Guarantee. Complete the guarantee application and arrange for it to be signed by both the owner and builder before commencement of the works. Forward it to Builtin New Zealand Limited for approval, along with payment of the premium, a copy of the detailed scope of works and payment schedule.

**2.6****10 YEAR BUILTIN COMMERCIAL DEFECTS GUARANTEE – FOR NEW COMMERCIAL CONSTRUCTION**

Provide a Builtin 10 Year Commercial Defects Guarantee. Complete the guarantee application and arrange for it to be signed by the parties to the building contract at any time prior to practical completion of the works. Forward it to Builtin New Zealand Limited for approval, along with payment of the premium and a copy of the building consent.

**Weathertightness and watertightness warranty****2.7****WEATHERTIGHTNESS AND WATERTIGHTNESS WARRANTY**

A warranty is required from the contractor for a minimum period of 2 years, covering the weathertightness of the complete building envelope and the watertightness of all liquid supply and disposal systems and fittings. This general warranty is in addition to any specific warranties required.

Provide this warranty in favour of the principal. The terms and conditions of this 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 for execution and materials for that part of the work.

- Conform to the standard form WARRANTY AGREEMENT included in the contract documents.
- Commence the warranty from the date of Practical Completion.
- Maintain its effectiveness for the time stated.

**3****SCHEDULES****Schedule of work section warranties****3.1****SCHEDULE OF WORK SECTION WARRANTIES**

8332	Planting
8461	Street & Landscape Furniture
4383	Timber Decking



## 1238 AS BUILT DOCUMENTATION

## 2 SCHEDULES

### 1 GENERAL

This general section relates to common requirements for the preparation, submission and review of as built documentation 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. Detailed requirements for as built documentation for particular parts of the work may be included in specific work sections.

#### 1.1 AS BUILT DOCUMENT REQUIREMENTS

The contractor is to provide a site survey to cover all as built requirements as identified within this specification. Where requirements for the as built documents and records are not stated in a specific section, they shall include:

As built drawings recording:

- The actual positions as constructed of all sewer, stormwater, subsoil drainage, sanitary plumbing, piped and ducted services, electrical and mechanical services.
- Inverts and locations of services at key points within the building and at the property lines.
- Dimension services in relation to the structure and building grid lines.
- Ductwork, piping, conduit and equipment, including such items provided for future use.
- Depth of various elements of foundations in relationship to the ground floor level
- Field changes of dimensions
- Other significant deviations and changes which are concealed in construction and cannot be identified by visual inspection
- Access doors and panels
- Hardstand areas.
- Boardwalk piles, ground pads, decking width and location.
- Tree locations.
- Planting species and quantities per area.
- Irrigation lines and system location.

Records of:

- Products and materials selected for alternatives specified
- Approved substitutions and accepted alternatives
- Other approved changes and deviations to items specified.

#### 1.2 PROVISIONAL AS BUILT DOCUMENTS

Prior to practical completion provide provisional/draft as built documents in sufficient detail to allow the principal to operate, maintain, adjust and re-assemble the contract works and to allow for review by the reviewer. Where no named reviewer has been nominated, submit the as built documentation to the contract administrator. Submit in hard copy and electronic form.

#### 1.3 AS BUILT DOCUMENT REVIEW

As built document review indicates only that the reviewer is satisfied that the documents are legible. The review is not a check of the accuracy or completeness of the documents, however the reviewer may comment on any aspect of the documentation and require the documents to be revised and resubmitted. Review of as built documents does not relieve the contractor of responsibility for their correctness.

Where no time is stated in a specific section, allow 10 working days for review by the reviewer.

Where a large amount of documentation is involved more time will be necessary.

#### 1.4 COMPLETE AS BUILT DOCUMENTS

Prior to the end of the defects notification/liability period, provide complete as built documents reflecting any review requirements, with all information of good quality and properly titled, numbered, cross-referenced and dated. Provide documents in sufficient detail to allow the principal to operate, maintain, adjust and re-assemble the contract works. Submit in hard copy and electronic form to the contract administrator.

#### 1.5 AS BUILT DOCUMENTS - ELECTRONIC COPY

Provide an electronic copy of the as built documents in the following format:

- Drawings: PDF and DWG format  
Other documents: PDF format

## 1239 OPERATION & MAINTENANCE

### 1 GENERAL

This general section relates to operation and maintenance (O&M) documentation 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. This documentation is required by the principal so that they can operate and maintain the contract works.

#### Operation and maintenance documents

#### 1.1 OPERATION AND MAINTENANCE INFORMATION - BUILDING ACT

Provide in writing the information and documentation prescribed by regulations made under the Building Act, to the owner/principal and the relevant territorial authority.

#### 1.2 OPERATION AND MAINTENANCE INFORMATION

Provide operation and maintenance documentation necessary to operate and maintain the works. This documentation is to include:

- Contractors name and contact details.
- A complete list of subcontractors' names, addresses and telephone numbers noting which portions of the contract each provided.
- A complete list of equipment and appliances including serial numbers, manufacturers' names and sources of supply.
- Copies of all manufacturers' and suppliers' product literature containing maintenance requirements/instructions, for any products in the building work.
- Information for operation and maintenance as required by work sections. Refer to SCHEDULES.
- Operation and maintenance manuals as required by work sections. Refer to SCHEDULES.
- Maintenance contract proposals as required by work sections. Refer to SCHEDULES.
- Final as built documents.
- Originals of all warranties and guarantees properly executed.
- Other information listed or referred to in this general section.
- Operation and maintenance information required by other project documents.

#### 1.3 MAINTENANCE REQUIREMENTS

Provide details of any maintenance requirements required by the Building Act. In addition provide maintenance requirements for items including:

- Details of suggested re-painting programme.
- Location of flushing points for sub soil drainage systems.
- Location of surface water filter systems requiring regular cleaning.
- Irrigation maintenance and flushing

#### 1.4 APPLIANCE MANUALS AND OPERATING INSTRUCTIONS

Provide appliance manuals and operating information for all appliances including details of all isolating valves and switches including:

- Water supply isolating valve.
- Location of isolating valves for appliances including dishwasher, clothes washer and fridge with and icemaker connection.
- Gas supply isolating valve.
- Electrical main switch and all sub boards.
- Location of isolating switches for electrical points and lighting operating and maintenance instructions.
- Pre-cast deck levelling operating instructions.
- Irrigation switches, valves, solenoids and operating and maintenance instructions.

#### 1.5 EQUIPMENT AND APPLIANCE MANUALS AND OPERATING INSTRUCTIONS

Provide equipment and appliance manuals and operating information including details of all isolating valves and switches.

### 1.6 SELECTIONS INFORMATION

Provide details of actual selections used in the construction of the works including:

- Tapware type and supplier details.
- Irrigation type, supplier details and operation manuals
- Light fitting type and supplier details.
- Pre-cast mould type and supplier details.
- Furniture type and the supplier details.
- Mulch type and colour including supplier details.
- Hoggin type and supplier details.
- Stone type and suppliers details.
- Decorative concrete type and supplier details.
- Timber types and supplier details.
- Sealers and graffiti guard type, and supplier details.
- Paint type and colours used.

Include brochures and other information included with the items supplied.

### 1.7 SELECTIONS INFORMATION - SUBSTITUTIONS

Provide details of any selections used in the construction of the works that are different from what was specified.

#### Documentation format

### 1.8 O&M DOCUMENTATION FORMAT

Unless otherwise specified in a work section,

- Provide O&M drawings at scales appropriate to the detail to enable good legibility.
- Provide manufacturers documentation at the original scale.
- Provide written text generally in A4 format using a font not less than 10 point.

Submit O&M documentation in both hard copy and as electronic portable document format (PDF) files.

#### Submission and review

### 1.9 O&M DOCUMENTATION SUBMISSION & REVIEW

Unless otherwise specified in a work section, provide draft O&M documentation no later than the date of practical completion or the date on which the principal takes occupation of the works, whichever occurs first.

Submit O&M documentation to the named reviewer for review.

- Where no time is stated in a specific section, allow 10 working days for review by the reviewer. Where a large amount of documentation is involved more time will be necessary.
- Where no person is named in a specific section as the reviewer, submit the O&M documents to the contract administrator.
- Submit a proposed index system (as required for final documentation) to the contract administrator for review.

O&M review indicates only that the reviewer is satisfied that the documents are legible. The review is not a check of the accuracy of the documents, however the reviewer may comment on any aspect of the documentation and require the documents to be revised and resubmitted. Review of operation and maintenance documentation does not relieve the contractor of responsibility for the correctness of the documentation.

The reviewer may advise that:

- The O&M documentation has been reviewed and has been accepted without the need for further modification. The information can be included in the final documentation; or
- The O&M documentation has been reviewed and the information can be included in the final documentation subject to revision required by notes, annotations or comments provided; or
- The O&M documentation has been reviewed and is not acceptable, refer to notes, annotations or comments provided. Resubmit corrected/alttered documentation for review.

Amalgamate the reviewed accepted and corrected O&M documentation into the final O&M documentation

#### Final documentation

**1.10 SUBMISSION OF FINAL DOCUMENTATION**

Prior to the end of the defects notification/liability period, provide complete O&M documentation in both hardcopy and electronic form.

**1.11 FINAL O&M DOCUMENTATION - HARDCOPY**

Provide the hard copy version of the O&M documentation in a loose-leaf binder with a contents index identifying operation and maintenance documents, requirements, manuals, operating instructions and selections. In addition include the project name, contractor's name and the date of practical completion on the index page.

Include indexed sections to identify all operation and maintenance manuals that are not contained within the binder. Provide a copy of the front cover or other identifying feature of the manual within the section with a note stating "this manual has been provided separately".

Provide a title on the binder edge "Operation and maintenance instructions for (project name)". If more than one binder is required identify each binder by number and ranking (e.g. Volume 2 of 3) and group information logically between the binders for ease of reference.

Provide operation and maintenance manuals clearly and neatly marked on the spine or front cover so as to identify the project name. Where operation and maintenance manuals are a collection of loose leaf documentation, provide documentation in a loose-leaf binder as described above.

**1.12 FINAL O&M INFORMATION - ELECTRONIC COPY**

Provide a copy of all hardcopy information in PDF format arranged in logical named folders. In addition provide DWG files of documentation if available.

**1.13 REVIEW OF FINAL DOCUMENTATION**

The contract administrator may review the final documentation and require alteration and resubmission.

**2 SELECTIONS****O&M Documentation****2.1 FINAL DOCUMENTATION - INFORMATION FOR OPERATION AND MAINTENANCE**

Provide a complete electronic copy to the contract administrator.

Provide two hardcopy sets of completed O&M documentation to the contract administrator. At least one set is to contain all available original documentation. The contractor is to retain a third hardcopy set for their records.

Provide any documentation (including required original documentation) as required to the relevant territorial authority.

**2.2 FINAL DOCUMENTATION - OPERATION AND MAINTENANCE MANUALS**

Provide a complete electronic copy to the contract administrator.

Provide two hardcopy sets of completed maintenance manuals to the contract administrator. At least one set is to contain all available original documentation. The contractor is to retain a third hardcopy set for their records.

Provide any documentation (including required original documentation) as required to the relevant territorial authority.

**Maintenance contract proposals****2.3 MAINTENANCE CONTRACT PROPOSALS**

Unless otherwise specified in a work section, provide maintenance contract proposals to the contract administrator no later than the date of Practical Completion. Provide in electronic and hardcopy form.

**3 SCHEDULES****1270 CONSTRUCTION****1 GENERAL**

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

- Quality control and assurance
- Noise and nuisance
- Set-out and tolerances
- Common execution requirements
- Qualifications
- Common product requirements
- Common requirements for samples and prototypes
- Common requirements for spare and maintenance products
- Cleaning during the works
- Removal of protection
- Completion requirements
- Commissioning
- Practical completion submission
- Defects period submissions
- Completion submissions

**1.1 SCHEDULE SECTION**

Refer to 1270S1 SCHEDULE OF SAMPLES & PROTOTYPES for work sections contained in this specification that have requirements for samples and prototypes.

Refer to 1270S2 SCHEDULE OF SPARES & MAINTENANCE PRODUCTS for work sections contained in this specification that have requirements for spares and maintenance products.

**Quality control and assurance****1.2 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 contract administrator. Where building consent approval is affected, confirm remedial action with the Building Consent Authority.

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

**1.3 PROVIDE QUALITY PLAN**

Prepare a quality plan for the execution of the contract works and submit a copy of the quality plan to the Contract Administrator within 10 Working Days of the date of award of the contract. The quality plan shall describe the procedures for meeting the requirements of the contract in respect of:

- Materials and workmanship
- Monitoring and maintaining subcontractors' performance
- Record keeping
- The level of documentation for signing off the contract works as complete
- Procedures to ensure that all persons engaged in undertaking the contract works are qualified, experienced and trained for the work they are undertaking
- Inspection and testing required by the contract
- Auditing the quality plan

**1.4 REVIEW OF QUALITY PLAN**

Within 5 working days of the contractor submitting a quality plan to the contract administrator for review, the contract administrator may advise that:

- they have completed their final review, or
- that they have undertaken a review and require resubmission of the quality plan.

Review by the contract administrator of the quality plan does not make the quality plan a contract document. The contractor at all times remains responsible for the construction of the Works. If resubmission of a quality plan is required, the contract administrator will give their reasons. The contractor shall take account of the reasons and resubmit a revised quality plan within a period of 5 working days.

**1.5 COMMENCEMENT OF WORK**

Do not commence any part of the contract works, other than establishment, setting out and site preparation until the contract administrator has completed their final review of the quality plan.

**1.6 NOTICE**

Give notice to the contract administrator and any other nominated person of hold points and notification points. Refer to work sections and 1260 PROJECT MANAGEMENT for hold points and notification points required.

**1.7 NOTIFIABLE WORK**

Lodge notice of the intention to commence any notifiable work and any work that will at any time include any notifiable work, in accordance with Health and Safety in Employment Regulations 1995.

**Noise and nuisance****1.8 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 1995 clause 11.

**1.9 ACCEPTABLE NOISE LEVELS**

Refer to NZS 6803 Tables 2 and 3 for the upper limits of construction work noise received in residential zones, dwellings in rural areas, industrial areas and commercial areas, note also the allowed adjustments. Do not exceed these limits or any limits imposed by regional councils or territorial authorities.

**1.10 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, table 2 and table 3, cease the noise generating operation and remedy the problem.

**1.11 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.

**1.12 ROADWAY AND FOOTPATH**

Keep the adjacent footpath and road clear at all times. Where work must be carried out in the roadway or footpath, obtain required consents from the territorial authority. Where temporary use is made of the footpath or roadway for deliveries and the like ensure that public safety is protected and the goods and materials moved as soon as practicable. Sweep, wash and otherwise clean the roadway/footpath and restore it to its previous condition.

**1.13 VEHICLE CROSSING**

Make good damage that has occurred as a result of carrying out the contract works. Where there has been significant damage, contact the territorial authority and obtain instructions for making good. Pay the territorial authority costs associated with making good.

**1.14 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 contract administrator.

**1.15 DAMAGE AND NUISANCE**

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

**1.16 SMOKE FREE REQUIREMENTS**

In accordance with the Smoke Free Environments Act 1990 smoking is not allowed on site.

**1.17 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

**Set-out and tolerances****1.18 SURVEY INFORMATION**

Locate and verify survey marks and datum points required to set out the works. Where these do not exist or cannot be located advise the contract administrator who will arrange for the required points to be established.

Record and maintain their position. Re-establish and replace disturbed or obliterated marks.

**1.19 DATUM**

Establish a permanent site datum to confirm the proposed levels and their relationship to all other existing and new levels.

**1.20 SET-OUT**

Set out the work to conform with the drawings.

**1.21 SET-OUT BY LICENSED CADASTRAL SURVEYOR**

Before commencing construction provide the contract administrator with a certificate prepared by a licensed cadastral surveyor that the set-out is complete and that the building is accurately placed on the site.

During construction provide the contract administrator with a certificate, prepared by the same licensed cadastral surveyor confirming the set-out of the foundations and grid lines. Necessary adjustments are to be determined and agreed to by the contract administrator before proceeding further.

**1.22 CONFIRM HEIGHT IN RELATION TO BOUNDARY**

Arrange for the licensed cadastral surveyor to provide a certificate certifying that the building has been constructed within the allowed height in relation to boundary. Obtain details from the principal of the person they have engaged to carry out this certification and advise the surveyor when they can carry out the required survey.

Provide the certificate to the local authority. Provide a copy of the certificate to the contract administrator.

**1.23 USE OF SET-OUT INSTRUMENTS**

Permit without charge, the use of instruments already on site for checking, setting out and levels.

**1.24 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.

**1.25 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 3404.1:1997 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****1.26 EXAMINE PREVIOUS WORK**

Before commencing any part of the work carefully examine the previous work on which it depends, to ensure it is of the required standard.

**1.27 REPORT DEFECTIVE PREVIOUS WORK**

Refer defects to the contractor to be remedied, if the remedy is outside the scope of the contract documents the contractor shall obtain direction from the contract administrator. Do not carry out work over previous work that is defective and will affect the required standard.

**1.28 EXECUTION GENERALLY**

Construct the work in accordance with the documents issued for construction including any direction that may have been given by the contract administrator that varies the construction document.

**1.29 EXECUTION - NO DETAIL IS PROVIDED**

The documents issued for construction will not include all details relating to every material, junction and interface with other materials.

Where the detail provided is of a general nature, or where no detail is provided, refer to the manufacturer's documents for information relating to installation and execution of that part of the work.

Where there is more than one method or detail appropriate to the part of the work in question, refer the options to the Contract Administrator for direction as to which detail or method to use.

**1.30 EXECUTION - ACCEPTABLE SOLUTION IS REFERRED TO**

Where a NZBC Acceptable Solution is referred to in the specification but not shown on the plans, obtain a copy of that Acceptable Solution and make it available to the workers carrying out that part of the work.

**1.31 MINIMISE DELAYS DUE TO WEATHER**

Use appropriate techniques and methods to prevent damage and minimise delays due to weather.

**Defective or damaged work****1.32 DEFECTIVE OR DAMAGED WORK**

Repair defective, damaged and marked elements, or replace them where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Refer to individual work sections for any special requirements.

**Qualifications****1.33 QUALIFICATIONS GENERALLY**

The work is to be carried out by workers (trades people, installers and applicators) who are experienced, competent and familiar with the materials and the techniques specified. Workers must also be familiar with the manufacturers' and suppliers' installation and application instructions and standard details provided by them in relation to the use of the products for this project. If requested provide evidence of qualification / experience.

**1.34 QUALIFICATIONS – RESTRICTED BUILDING WORK**

Where restricted building work forms part of the contract works, workers, or supervisors of that work must be licensed building practitioners holding current licenses for the particular restricted building work.

**1.35 QUALIFICATIONS – APPROVED/LICENSED APPLICATORS/INSTALLERS**

Where required by a manufacturer or supplier, applicators/installers must be specifically trained / approved / accredited / registered / licensed / certified by them. Refer to individual work sections for details.

**1.36 QUALIFICATIONS – WORKERS LICENSED UNDER STATUTE**

Where workers or supervisors of work are required to be licensed, registered or similar under legislation, they must have a current license before they start the work and maintain currency until their part of the work has been completed and all documentation that is required has been provided.

**1.37 QUALIFICATIONS – PRODUCER STATEMENTS**

Where producer statements are required for parts of the work, ensure that person is suitably qualified and authorized to issue such producer statements.

**1.38 REPLACEMENT OF PERSON**

Should it be necessary to replace a person, ensure that records of work, producer statements, warranties and the like required for the part of the work they have carried out are obtained.

Ensure that the replacement person takes responsibility for the work they carry out and that they are able to provide such records of work, producer statements, warranties and the like required as a condition of the contract and the building consent.

**Products****1.39 NEW PRODUCTS**

Products to be new unless stated otherwise, of the specified standard, and complying with all cited documents.

**1.40 COMPATIBILITY OF PRODUCTS**

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.

**1.41 DELIVERY, STORAGE & HANDLING OF PRODUCTS**

Protect products during transit and delivery on site and / or off site. Reject and replace goods that are defective or damaged or will not provide the required finish.

Handle products carefully to avoid damage and distortion and in accordance with codes of practice and the manufacturer's or supplier's requirements. Avoid any contact with potentially damaging surfaces or conditions.

Store products to avoid visual damage, environmental damage, mechanical damage and distortion. Store in accordance with codes of practice and the product manufacturer's or supplier's requirements. Maintain the proper condition of any protective packaging, wrapping and support.

Refer to individual work sections for any special requirements.

**1.42 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.

**1.43 INSTALLING PRODUCTS**

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.

**1.44 COMPLY WITH STANDARDS**

Comply with the relevant and/or cited Standard for any material or component. Obtain certificates of compliance when requested by the contract administrator.

**1.45 CONDITION OF PRODUCTS**

To be in perfect condition when incorporated into the work.

**1.46 INCOMPATIBLE PRODUCTS**

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****1.47 SAMPLES FOR REVIEW**

Where specified in the work sections submit samples and any nominated supporting documentation to the named reviewer and notify the contract administrator of the submission. Where no person is named as the reviewer, submit to the contract administrator.

Samples for review may be described as a portable sample for review, portable control sample, fixed sample for review or fixed control sample. A portable sample refers to a sample that is easily movable, convenient for carrying. A fixed sample refers to a sample that is not portable. If the location of a fixed sample is not defined in the work section, obtain direction from the contract administrator.

For samples that are located on site, or by agreement with the contract administrator are located off site, notify the reviewer and contract administrator of their location and availability for review.

Timing for the provision and review of samples is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for each review. Allow for such resubmission and further review as may be required. No extension of time will be allowed for resubmission and further review.

Obtain written instructions in relation to the samples from the contract administrator. Do not proceed further with related work items until advised to continue.

Samples may not be incorporated in the finished work, they shall be held on site in the Contractors compound for the duration of the Contract for use as quality review. Allow to completely remove any fixed samples. Remove from the site any rejected samples.

Refer to SAMPLES clauses in work sections for further detail.

**1.48 CONTROL SAMPLES**

Samples become control samples if an instruction is given by the contract administrator to that effect. Control samples will be used for comparison purposes throughout the contract. Control samples may be portable or fixed in place, refer to SAMPLES clauses in work sections for further detail.

Control samples that are to remain on site, or otherwise in the care of the contractor, are to be maintained in original condition.

Samples may not be incorporated in the finished work, they shall be held on site in the Contractors compound for the duration of the Contract for use as quality review. Allow to remove fixed control samples from site when instructed by the contract administrator.

**1.49 OTHER SAMPLE REQUIREMENTS**

Where specified in the work sections obtain samples for the purposes described.

**Prototypes****1.50 PROTOTYPES - TESTING**

Where specified in the work sections provide and test prototypes. Timing for the provision, testing, disassembling, re-assembling, retesting and review of prototypes and test results is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for each review of test results. Submit test results to the named reviewer and to the contract administrator. Where no person is named as the reviewer submit test results to the contract administrator.

Obtain written instructions in relation to the prototype from the contract administrator. Do not proceed further with related work items until advised to continue.

Refer to PROTOTYPES - TESTING clauses in work sections for further detail.

**1.51 PROTOTYPES - REVIEW**

Where specified in the work sections provide prototypes for review. Timing for the provision, disassembling, re-assembling and review of prototypes is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for review by the named reviewer. Where no person is named as the reviewer notify the contract administrator for direction.

Obtain written instructions in relation to the prototype from the contract administrator. Do not proceed further with related work items until advised to continue.

Refer to PROTOTYPES - REVIEW clauses in work sections for further detail.

**1.52 PROTOTYPES - GENERAL**

Refer to the PROTOTYPES - TESTING and PROTOTYPES - REVIEW clauses in work section for details on what is to happen after the review and or testing of the prototype is complete. Where no information is provided refer to the contract administrator for direction.

Prototypes may become control samples if an instruction is given by the contract administrator to that effect.

**Spares & maintenance products****1.53 SPARES & MAINTENANCE PRODUCTS**

Collect, protect, package, label and store safely all spares and maintenance products specified in the work sections. Give the contract administrator an inventory of all spares and maintenance products.

If no instruction is given within a work section for the location of spares and maintenance products, then deliver to the owner -.

If no instruction is given within a work section for timing in relation to the provision of spares and maintenance products, then provide at practical completion.

Refer to SPARES & MAINTENANCE PRODUCTS clauses in work sections for further detail.

**Cleaning during the works****1.54 PERIODIC SITE CLEANING**

Carry out periodic site cleaning during the contract period. Place waste material in appropriate storage pending removal from the site. Keep food waste separate from construction waste.

**1.55 TRADE CLEANING**

Keep the work area clean, remove of all debris, unused and temporary materials and elements from the site as work progresses and on completion. Refer to individual work sections for any specific requirements.

**Remove protection**

**1.56 REMOVE PROTECTION**

Remove all temporary markings, labels, packaging and coverings to products unless instructed otherwise, or where they are required for protection.

Maintain temporary protection until removal is required by the manufacturer/supplier, the execution of the work or the requirements of individual work sections. Re-establish protection as necessary.

Remove temporary protection and special protection immediately prior to practical completion or before when there is no further risk of damage.

Refer to individual work sections for any special removal requirements.

**Completion****1.57 SPECIAL REQUIREMENTS**

Refer to individual work sections for any special completion requirements.

**1.58 LEAVE WORK**

Leave work to the standard required for the following procedures.

**1.59 COMPLETION - TESTS & CERTIFICATION**

Carry out tests as detailed in the work sections. If testing identifies a failure to meet performance requirements, notify the contract administrator and any nominated recipient, identify and correct the cause of failure and repeat the test. Submit test results and certification documentation to the contract administrator and any nominated recipient.

**1.60 REMOVE CONSTRUCTION WASTE**

Remove all debris, unused materials and the like from the site. Arrange for material to be recycled to be collected or delivered to the recycler.

**1.61 COMPLETE ALL SERVICES**

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

**1.62 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. Do not use metal scrappers that may 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.

**Commissioning****1.63 SPECIAL REQUIREMENTS**

Refer to individual work sections for any special commissioning requirements.

**1.64 MOVING PARTS**

Adjust, ease and lubricate all doors, windows, drawers, hardware, appliances, controls and all moving parts to give easy and efficient operation.

**1.65 COMMISSIONING - TESTS & CERTIFICATION**

Carry out tests as detailed in the work sections. If testing identifies a failure to meet performance requirements, notify the contract administrator and any nominated recipient, identify and correct the cause of failure and repeat the test. Submit test results and certification documentation to the contract administrator and any nominated recipient.

**1.66 INSTRUCTION AND DEMONSTRATION**

Provide instruction and demonstration to the owner/occupier to the extent that is listed below and as required for them to reasonably occupy and use the building. This is to include at least the following:

- Location and isolation of all services connections.
- Operation of all emergency systems.
- Locking and security arrangements.
- Operation of basic building services including lighting, heating, mechanical ventilation, air conditioning and security.
- Special cleaning requirements and procedures.
- Any other features that the owner/occupier needs to know about.

**1.67 SECURITY AT COMPLETION**

Remove any temporary lock cylinders and complete final keying prior to handing over keys to the principal on completion of the works. Leave the works secure with all accesses locked. Account for all keys/cards/codes and hand to the principal along with an itemised schedule, retaining a duplicate schedule signed by the principal as a receipt.

**Practical completion submission****1.68 ADDITIONAL PRACTICAL COMPLETION INFORMATION**

In addition to requirements in the contract and contained elsewhere in the specification provide the following information submissions for practical completion:

- All documents which the contractor has obtained on behalf of the owner/occupier.
- Information required by the owner/occupier to be able to use the building.
- Advice that NUO accounts in the contractor's name have been closed and as appropriate changed to be in the name of the owner/occupier.
- A list of persons to be contacted to carry out any emergency or remedial work including 24 hour/7 day contact details.

**Defects period submissions****1.69 DEFECTS REMEDIATION - SUBMISSIONS**

Provide the following at periods required by the contract administrator, where no period is stated, provide this information monthly:

- A copy of the contractor's check list identifying remaining defects and omissions to be completed recording progress made in completing and correcting the items.
- A copy of lists issued by the principal/employer identifying omissions and defects recording progress made in completing and correcting the items.
- A copy of lists issued by the contract administrator identifying omissions and minor defects recording progress made in completing and correcting the items.

**Completion submissions****1.70 FINAL COMPLETION - SUBMISSIONS**

In addition to requirements in the contract and contained elsewhere in the specification provide:

- Contractors advice that all defects have been corrected and omissions and deferred work completed.
- All documents which the contractor has obtained on behalf of the owner/occupier.

## 1270S1 SCHEDULE OF SAMPLES & PROTOTYPES

### 1 GENERAL

This schedule section identifies work sections in the specification that have requirements for:

- The submission of samples
- The submission of prototypes for review
- The provision and testing of prototypes

#### 1.1 ASSOCIATED SECTIONS

Read in conjunction with:

- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- 1270 CONSTRUCTION
- Identified Work Sections

#### Samples

#### 1.2 SAMPLES

Refer to the following sections:

3124	Finishes to wet concrete
3130	Precast Concrete
3361	Stonework
8231	Segmental paving
4383	Timber Decking
8226	Gravel & Stone Paving
8332	Planting
8333	Turf laying and lawn seeding
8335	Tree Planting & Transplanting
8461	Street & Landscape Furniture
8410	Landscape edging

#### 1.3 SAMPLES - PROCESS

The following set's out the sample process for various sample requirements. Each sample type will require a different time frame and quality control. Program for each should be identified in the Contractor Quality Plan:

##### Sample type A:

Samples are required for quality of material supply only. No workmanship samples are required.

##### Sample Type B:

Samples are required for quality of material supply and for technical workmanship to carry out the works. Rework should be allowed for if the quality of the sample is not achieved to the satisfaction of the designer.

##### Sample Type C:

Samples are required for material supply and for technical workmanship to carry out the works and for level of finish carried out to confirm options to inform a design decision, such as light sandblast V's heavy sandblast, or % of concrete oxide if more than one sample is requested. Rework should be allowed for if the quality of the sample is not achieved to the satisfaction of the designer, this will exclude additional sample type should none of the samples meet the designers intent.

##### Sample Type D:

Samples are required for material supply and for technical workmanship to carry out the works and for level of finish carried out to confirm a design decision, such as depth of mould finish, or % of concrete oxide if more than one sample is requested. In addition the sample required will be a specialist process such as laser cut or CNC digital process in the manufacture of specific products such as stone or moulds for pre-casting such as concrete. For digital file process, a design file will be provided by the designer, unless a design build process has been identified with a preferred supplier. In some cases this will also involve a prototype also to confirm the specified process will achieve the design intent.

#### 1.4 SAMPLES - REVIEW

Refer to drawings and relevant specification sections for sample schedule and to selections sections of the materials specifications.

#### Prototypes

#### 1.5 PROTOTYPE REVIEW

Items for prototype include:

- Precast boardwalk egde
- Tukuruku timber edge profiles and finish
- Seating bench and table
- Light pole
- Ladder
- Bollard

#### 1.6 PROTOTYPES - TESTING

Seating and table for comfort and proportion - allow for adjustment



## 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 RELATED WORK

Refer to IGL drawings: Demolition Plans 1\_1.000 & 1a\_1.000  
Refer to 2210 Preparation & Groundwork  
Refer to 2223 Removing Subsurface Constructions  
Refer to 2241 Excavation  
Refer to 8310 Landscape Site Preparation

#### 1.2 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  
WorkSafe Management and Removal of Asbestos (Approved CoP)  
Health and Safety at Work Act 2015  
Health and Safety at Work (Asbestos) Regulations 2016

#### 1.3 QUALIFICATION

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

#### 1.4 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.

#### 1.5 NUISANCE

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

#### 1.6 HEALTH AND SAFETY

Comply with the Health and Safety at Work Act 2015 in general, NZBC F5/AS1 and NZDAA Best practice guidelines for demolition in New Zealand, section 5 Demolition Safety.

#### 1.7 BUILDING CONSENT REQUIREMENTS

Demolition work to be carried out to building consent requirements

#### 1.8 INSPECTIONS

Inspection of the demolition work to take place at each of the stages as scheduled in the building consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection. Allow 48 hours advanced notice for the inspections. Obtain and pay for any required inspections which are additional to the building consent.

#### 1.9 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.

#### 1.10 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.

#### 1.11 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.

#### 1.12 SALVAGE

Designated items remain the property of the owner.

#### 1.13 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 at Rotorua Lakes Council depot, as approved by Client. Protect from damage and weather until required.

### 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 to the requirements of section 4.7, Demolition plan (method statement).

#### 3.2 ADJOINING PROPERTY

Support and protect adjoining property. Survey adjoining properties and take all precautionary measures necessary to avoid damage or nuisance. Copy of the survey results to be sent to adjoining property owners.

#### 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.

#### 3.9 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 including WorkSafe Management and Removal of Asbestos (Approved CoP), and NZBC F5/AS1.

#### 3.10 DIG OUT

Dig out foundations, footings, basements, floor slabs, paths, drains, cesspits and manholes that are part of or service the demolished building. Do not backfill the resulting voids.

#### 3.11 SALVAGE

Carefully dismantle and store safely all salvage items where directed; for removal, 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.

**3.13 TAKE AWAY**

Take away from the site all plant and equipment, temporary access works and demolished materials and elements. Leave the site completely clean and tidy.

**4 SELECTIONS****4.1 ELEMENTS REMOVED BY CLIENT PRIOR TO CONSTRUCTION**

Element/component	Location
All plant material as agreed with client, post setting out.	Site wide.

**4.2 ELEMENTS FOR SALVAGE AND DELIVERY TO OWNER**

Salvage the following elements and deliver to the owner.

Element/component	Location	Delivery requirements
Seating, Signage, and any hard paving material	As per survey.	To depot as approved by client.

**4.3 ELEMENTS FOR SALVAGE AND DISPOSAL BY CONTRACTOR**

Salvage the following elements. As per Demolition Plans.

**4.4 ELEMENTS FOR RE-USE**

Element/component	Location	Location for re-use
Litter Bins	Site wide	As per plans
Memorial Plaques & Survey marks	Refer to plans	As per plans
Lake Edge Timbers and Bollards	Refer to plans	For reuse in future stages

**3101 CONCRETE WORK - BASIC****1 GENERAL**

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

**1.1 RELATED WORK**

3124 Finishes to Wet Concrete  
3130 Precast Concrete

**1.2 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](http://www.steelcertification.com)

**Documents****1.3 DOCUMENTS**

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

NZBC B1/AS1	Structure
NZBC B1/VM1	Structure
NZBC E2/AS3	External moisture
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
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

**Requirements****1.4 QUALIFICATIONS**

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

**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.

**2 PRODUCTS****2.1 NORMAL CONCRETE**

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

**2.2 PRESCRIBED MIX CONCRETE**

Prescribed mix concrete 17.5, 20 or 25 MPa grade (refer to SELECTIONS) 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.

**2.3 SITE CONCRETE**

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

**2.4 MASS CONCRETE**

Concrete having a minimum strength of 10 MPa at 28 days

**2.5 REINFORCEMENT**

Bars to AS/NZS 4671. Grade 300E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings. Welded reinforcing mesh Class E to AS/NZS 4671, and 500E mesh to AS/NZS 4671 as modified by NZS B1/VM1.

**2.6 MESH FOR SLABS TO NZS 3604 OR NZS 4229**

For slabs on ground mesh to be welded reinforcing mesh to AS/NZS 4671 as modified by NZS B1/VM1, Class E, minimum to B1/AS1 - Grade 500E, 2.27kg/m<sup>2</sup> (1.14kg/m<sup>2</sup> in each direction).

**2.7 TYING WIRE**

Mild drawn steel wire not less than 1.2mm diameter.

**2.8 SPACERS AND CHAIRS**

Precast concrete or purpose made moulded PVC to approval. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

**2.9 DAMP-PROOF MEMBRANE**

0.25mm minimum polyethylene to NZS 3604, 7.5.4, Damp-proof membrane.

**2.10 CELLULAR POLYSTYRENE INSULATION**

Proprietary expanded polystyrene (EPS) foam board to AS 1366.3.

**Accessories****2.11 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. Refer to SELECTIONS. 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 contract administrator 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 unless approved in writing by the Contract Administrator. Unless detailed otherwise, 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.

Unless detailed otherwise, 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. Refer to drawings for perimeter details.

**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 as dimensioned, or if not shown, to the clear distance minimums in NZS 3109, 3.6, Spacing of reinforcement.

**3.10 LAPPED SPLICES**

Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Provide laps only where indicated on the drawings. Tie all lapping bars to each other. Plain bars lapped splices must be hooked. Wire mesh laps to NZS 3101.1, 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 OR NZS 4229**

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 all reinforcing bars, stirrups, ties and spirals, as shown on drawings. Where cover is not shown on drawings provide 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 OR NZS 4229**

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	NZS 4229
Footing, to earth	75mm	75mm
Footing, to DPM	75mm	50mm
Foundation, to edge	75mm	75mm
Slab, to slab edge	50mm to 75mm	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. Location and form of conduits to be approved in writing by the Contract Administrator. 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 as shown on the drawings or 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 and passed by the Building Consent Authority.

**3.17 SURFACE FINISHES**

To NZS 3114, 105, Specification of finishes, as scheduled or as denoted on the drawings.

**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 SAW CUTS TO NZS 3604 OR NZS 4229**

Cut concrete where indicated on the drawings as required to control shrinkage cracking. Form by saw cutting the slab (blade width approximately 5 mm) to a 20mm 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 °C, and 48 hours for average ambient temperatures below 20°C).

**3.23 SPACING OF SAW CUTS**

Spacing of sawcuts

Insitu Concrete: As shown on the Surface Finishes Plans  
site-wide

**3.24 SURFACE DEFECTS**

Make good surface defects immediately after forms are stripped.

**3.25 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.

**3.26 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 (leave props under slab spans over 2 metres)
10 days:	Props from under slab spans over 2 metres
18 days:	Beams, soffits and slab spans over 5 metres

**3.27 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.

**3.28 REMOVE**

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

**4 SELECTIONS****4.1 DAMP-PROOF MEMBRANE**

Brand/type: As approved by the Landscape Architect/Engineer.

**4.2 REINFORCEMENT LAPS**

Where reinforcement laps are not shown on the drawings, lap as follows:

Bar diameter	Grade 300E deformed
10mm	400mm
12mm	500mm
16mm	650mm

**4.3 PRESCRIBED MIX CONCRETE**

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

**4.4 SURFACE FINISHES EXTERIOR PAVEMENTS**

Surface finish class to NZS 3114: table 2, Classes of floor, exterior pavement and invert finishes.

Finish class Refer to 3124 for Finish Selections

## 3124 FINISHES TO WET CONCRETE

### 1 GENERAL

This section relates to the standard of concrete finishes, exposed aggregate surfaces, floors and pavements, plain and textured.

#### 1.1 RELATED WORK

Refer to 3124PF Peter Fell Coloured Concrete & Sealer

#### Documents

#### 1.2 DOCUMENTS

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

NZBC D1/AS1	Access routes
NZS 3114	Specification for concrete surface finishes
NZS 3121	Water and aggregate for concrete
AS 4586	Slip resistance classification of new pedestrian surface materials

#### Requirements

#### 1.3 QUALIFICATIONS

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

#### 1.4 PROVIDE SAMPLE PANEL

Provide a sample panel of the following specified finishes before commencing work. Panels to be of similar thickness to the proposed construction. Refer to SELECTIONS for type of sample panel required.

#### 1.5 CAST SAMPLE PANELS

Cast sample panels to the requirements of NZS 3114: clause 104.4, Sample reference panels in respect of casting, formwork, mix, compaction, curing, striking and including rebates. Supply also the information required by that same clause.

#### 1.6 COLOUR VARIATION

Keep inherent shade variations within the range of the grey scale in NZS 3114. Obtain written instructions regarding the colour established in the sample reference panel for matching.

#### 1.7 TECHNIQUE DISCUSSION

Before casting the sample panel arrange a meeting to confirm the method of preparing the sample. After agreement that the sample panel is truly representative of the finish specified and can be produced on site, it then becomes the standard for that finish.

#### 1.8 SLIP RESISTANCE – SURFACES EXEMPT FROM TESTING

Slip resistance for walking surfaces comply with NZBC D1/AS1, Table 2

#### 1.9 TEST - SURFACES REQUIRING SLIP RESISTANCE TESTING

Test samples for slip resistance to comply with NZBC D1/AS1, 2.1, Slip resistance. Refer to SELECTIONS for surface to be tested, minimum test value required and test method. Provide test results to contract administrator, including a statement that the surface complies with nominated test requirements.

#### 1.10 RUN OFF

Ensure run off acids, other chemicals and cement products are contained within the site. They must not damage other surfaces, enter drains or pollute landscapes or water courses.

### 2 PRODUCTS

#### 2.1 EXPOSED AGGREGATE GRADE

To NZS 3121. Crushed or pebble/round aggregates for exposing, to be gap graded for integral mixes.

#### 2.2 SURFACE RETARDER

Proprietary spray on chemical to slow down the surface set for exposing aggregate.

#### 2.3 CONCRETE COLOUR

Proprietary natural oxides added to the concrete at mixing. Refer to SELECTIONS for brand and colour.

#### 2.4 SEALERS

Proprietary penetrating or surface sealers. Refer to SELECTIONS for brand and type.

#### 2.5 SPECIAL EFFECTS

Selected materials used to provide additional decorative effects for horizontal concrete. Refer to SELECTIONS for type.

#### 2.6 ACID WASH

Proprietary acid wash.

### 3 EXECUTION

#### Conditions

#### 3.1 RESPONSIBILITY

Take responsibility for determining the method of producing the specified finished surface.

#### 3.2 PROTECTION

Protect and maintain the specified finish where necessary during any handling, erection or subsequent construction operation to ensure a clean undamaged surface at completion of the contract works.

#### 3.3 GENERAL

Except where noted otherwise on the drawings or in the specification, tolerances in regard to colour and surface to the requirements of NZS 3114 for each finish specified.

#### 3.4 SURFACE TOLERANCES

Variations from a plane surface are defined as follows:

Abrupt:	Steps or irregularities caused by displacement of form joints and measured between peak and hollow over a 200mm straight edge.
Gradual:	Undulations over the surface and measured between rise and hollow over a 1500mm straight edge.

#### 3.5 RISKS OF CRACKS FORMING

Ensure substrate is free of cracks. Follow correct procedures for curing to minimise cracks forming that may mar the finish quality.

#### Application

#### 3.6 OFF THE FORM FINISHES

#### 3.7 ROUGH SAWN BOARD FINISH

To NZS 3114: clause 105.5, F5 finish, with abrupt changes not exceeding 2mm at construction joints nor 1mm at joints between abutting shutters that form face materials. Gradual variations not exceeding 6mm. Form or form lining to consist of approved rough textured boards with moisture content of 18% to 25%. Lay out boards so that varying textures give a uniform finish overall and a joint pattern as detailed for each structural element. Soak pre-assembled shutters in clean water and apply an approved release agent before erection. Keep damp until the concrete is placed. Re-use shutters 5 times only. Leave the finish as struck and to match sample. Report any defects for instruction on the action to be taken.

## 3.8 EXPOSED AGGREGATE FINISHES FROM OFF THE FORM

CLASS	REQUIREMENTS
F4E finish	To NZS 3114:clause 105.4, F4 finish, with abrupt changes not exceeding 4mm at construction joints nor 2mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 6mm.
F5E finish	To NZS 3114:clause 105.5, F5 finish, with abrupt changes not exceeding 2mm at construction joints nor 1mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 6mm.
F6E finish	To NZS 3114:clause 105.6, F6 finish, with abrupt changes not exceeding 1mm at construction joints not 0.5mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 4mm.

## 3.9 FLOOR AND EXTERIOR PAVEMENT, UNFORMED FINISHES

CLASS	REQUIREMENTS
U1 class	Screeded finish to NZS 3114: clause 305.1, U1 finish, with abrupt changes not exceeding 5mm and gradual variations not exceeding 10mm.
U2 class	Floated finish to NZS 3114: clause 305.2 U2 finish, with abrupt changes not exceeding 3mm and gradual variations not exceeding 5mm.
U3 class	Trowelled finish to NZS 3114: clause 305.3, U3 and U4 finishes, with abrupt changes not exceeding 3mm and gradual variations not exceeding 5mm.
U5 class	Shallow textured to NZS 3114: clause 305.2, U5 finish, with abrupt changes not exceeding 3mm and gradual variations not exceeding 5mm.
U5E class	Exposed aggregate shallow textured to NZS 3114: clause 305.2, U5 finish, with abrupt changes not exceeding 3mm and gradual variations not exceeding 5mm.
U10	Special textured to NZS 3114: clause 305.2, U 10 finish, architectural effects.
U11 class	Ground finish to NZS 3114: clause 305.2, U11 finish, with no abrupt changes and gradual variations not exceeding 3mm.

**Finishing**

## 3.10 GENERAL

Achieve the standard of the specified finish required, direct from the formwork with a minimum of attention to the stripped surface.

## 3.11 FILL TIE HOLES

Fill tie holes to finishes F1, F2 and F3 with mortar 1:1½ to 2, cement: sand. Colour match the parent concrete in finish F3.

## 3.12 TIE HOLES

Fill tie holes to finish and colour match the parent concrete.

## 3.13 MINOR SURFACE DEFECTS

Repair minor surface defects to match the shade and texture of the surrounding concrete. Quality of repair to be inspected by Landscape Architect for approval. Where defect is visible and repair is evident the contractor is to remove and replace concrete to the nearest saw cut.

## 3.14 PAINTED SURFACES

Fill minor surface defects with approved plaster stopping compound/cellulose filler and rub down to match the texture of the surrounding concrete.

## 3.15 SURFACE TREATMENT

Bagging or stoning of the surface only to proceed following written instructions.

**Exposed aggregate**

## 3.16 ADDING AGGREGATE

Add aggregates to the concrete at mixing.

## 3.17 EXPOSING AGGREGATE - RETARDER AND WASH

Spray retarder on slab to manufacturers recommendations, and leave for the prescribed time to provide desired exposure depth. At the appropriate time use a suitable mild acid wash to remove surface cement paste. Wash thoroughly with water.

## 3.18 EXPOSING AGGREGATE - ABRASIVE BLASTING

Sand blast or shot blast hardened concrete.

**Colour concrete**

## 3.19 COLOUR CONCRETE - WET MIX

Add coloured oxides to the concrete to the wet mix, to the manufacturers recommendations.

**Sealer**

## 3.20 SEALER

Apply selected sealer to the manufacturers recommendations.

**Special effects**

## 3.21 SPECIAL EFFECTS - PATTERNS ON SURFACE

Apply a coloured hardener powder to the wet concrete surface and make a pattern with rubber mats or metal stamps to produce the effect. Refer to SELECTIONS.

## 3.22 SPECIAL EFFECTS - WET SURFACE

Create special effects by placing items onto the surface of the wet concrete and/or rolling or profile screeding. Refer to SELECTIONS.

**Acid washing**

## 3.23 ACID WASHING - REMOVE STAINS

Acid wash using muriatic acid to remove stains from the concrete and to prepare the surface for staining. To be applied by experienced contractors.

## 3.24 ACID WASHING - COLOURED STAINS/PATTERNS

Apply acid with opaque or semi-transparent coloured stains to create patterns and designs to old or new concrete floors. To be applied by experienced contractors. Refer to SELECTIONS.

**4 SELECTIONS**

## 4.1 TEST FOR MINIMUM SLIP RESISTANCE REQUIREMENTS

Test key	Access route	Location/surface to be tested	Minimum test value required
LW	Level access wet	Terraces and paths as agreed.	45 BPN
SW	Sloping access wet	Lake edge terrace TBC.	~ BPN
WWN	Stairs wet - without slip resistant nosings	Lake edge terrace steps as agreed.	50 BPN

**Number of samples required:** Refer below.

**Type of sample required:** Sample for all three types of concrete, including concrete sealing.

Test Key – identifying required test method

LW	SRV classification of not less than 39 from the wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
SW	Obtain BPN from the wet pendulum test method of AS 4586, Appendix A
WWN	Obtain BPN from the wet pendulum test method of AS 4586, Appendix A

## 4.2 PROVIDE SAMPLE PANEL

Relates to:	All concrete finishes, vertical and horizontal
Number of panels:	1no. per concrete type mix and or oxide selection
Size:	1000mm x 1000mm
Finish:	As per below.
Purpose:	Appearance & Quality.

The contractor is to provide a sample for each colour and surface texture identified in the samples schedule, refer to landscape drawing set. All samples are to be provided in tandem for comparison and located onsite for reference during construction. Approved samples are to remain on site until finished concrete has been poured and approved by the landscape architect. The landscape architect will then determine whether sample panels can be removed from site.

Once samples have been inspected the Landscape Architect will finalise the surface finishes selections and update the drawings. No finished concrete is to be constructed prior to the completion of this process.

## 4.3 CONCRETE FINISHES

The following surface finishes are provided for pricing purposes and are subject to change following the completion of the sampling process as identified above. Where multiple oxides,

Location:	<b>Concrete Paving Type P01</b>
Aggregate source:	Stevensons or Approved Equivalent
Aggregate name/shape:	10mm Greywacke chip 80kg/m <sup>3</sup> Crushed Shell / limestone blend similar to Stevenson's 'Jacks' mix.
Aggregate colour:	As above
Oxide colour and dose	light grey brown oxide 8kg/m <sup>3</sup> - Peter Fell 156, 172 or 184.
Maximum size / grading:	As above.
Finish:	Honed to 150 Grit
Adding method:	integral mix

Location:	<b>Concrete Paving Type P02</b>
Aggregate source:	Stevensons or Approved Equivalent
Aggregate name/shape:	35% 10mm limestone chip 65% 10mm Greywacke Chip
Aggregate colour:	As above
Oxide colour and dose	N/A
Maximum size / grading:	As above.
Finish:	Horizontal surface: Pipe rolled with a 100mm pipe along the terrace (downward weight required to avoid ripple) Vertical surface: Medium depth bush hammered & heavy depth bush hammered (2 samples)
Adding method:	integral mix

Location:	<b>Concrete Paving Type P03</b>
Aggregate source:	Stevensons or Approved Equivalent
Aggregate name/shape:	10mm Greywacke Chip
Aggregate colour:	As above
Oxide colour and dose	2kg/m <sup>3</sup> - Black
Maximum size / grading:	As above.
Finish:	Light acid wash
Adding method:	integral mix

Location:	<b>Concrete Edge Beam Type E02 &amp; E03</b>
Aggregate source:	Stevensons or Approved Equivalent
Aggregate name/shape:	50% Hawkes Bay Aggregate Mix 50% 10mm Greywacke Chip
Aggregate colour:	As above
Oxide colour and dose	grey/brown oxide 8kg/m <sup>3</sup> - Peter Fell 518 and 172 and 184 (3 samples)
Maximum size / grading:	As above.
Finish:	Light sandblast to all visible faces to approved sample
Adding method:	integral mix

Location: **Concrete Edge Beam Type E04 & Concrete wall seat WS01**  
 Aggregate source: Stevensons or Approved Equivalent  
 Aggregate name/shape: 10mm Greywhacke Chip  
 Aggregate colour: As above  
 Oxide colour and dose: N/A  
 Maximum size / grading: As above.  
 Finish: Horizontal surface: Light sandblast to approved sample.  
 Vertical surface: Medium depth bush hammered & heavy depth bush hammered (2 samples)  
 Adding method: integral mix

Location: **Concrete Edge Beam Type E08**  
 Aggregate source: Stevensons or Approved Equivalent  
 Aggregate name/shape: 19mm atlas supplied white lime ship, white sand, Peter Fell 'super white plus' oxide  
 Aggregate colour: As above  
 Oxide colour and dose: N/A  
 Maximum size / grading: As above.  
 Finish: U3 & F6 acid wash -  
 Adding method: integral mix

Location: **Concrete Lake wall type 1,2,3 & 4 - LW01 - LW05**  
 Aggregate source: Stevensons or Approved Equivalent  
 Aggregate name/shape: 10mm Greywhacke Chip  
 Aggregate colour: As above  
 Oxide colour and dose: N/A  
 Maximum size / grading: As above.  
 Finish: Horizontal surface: U3 -light acid wash  
 Vertical surface: F6 - light acid wash  
 Adding method: integral mix

#### 4.4 SEALER

Location: All visible path concrete, steps, walls and edges.  
 Manufacturer/type: Peter Fell Ltd  
 System: Peter Fell Natural Sealer  
 Application: To manufacturers specification

#### 4.5 SPECIAL EFFECTS

Location: Cast in surface stencil inlays  
 Type: Steel laser cut - provisional only  
 Pattern: TBC

## 3124PF PETERFELL COLOURED CONCRETE & SEALERS

### 1 GENERAL

This section relates to the supply and laying of **Peter Fell Limited** decorative concrete products designed for patio and paths, floors, driveways, pool surrounds, walls, public and commercial applications.

It includes:

- coloured and plain concrete
- concrete with exposed aggregate finish
- ground/polished/honed concrete
- concrete preparation products
- grout for concrete cuts
- concrete sealers and cleaning products

#### 1.1 RELATED WORK

Refer to relevant concrete sections for concrete work.

#### 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 D1/AS1	Access routes
AS 4586	Slip resistance classification of new pedestrian surface materials
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
ISO 9239.1	Reaction to fire tests for floor coverings - Determination of the fire burning behaviour using a radiant heat source

#### 1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:  
 PFL Natural Sealer Product Guide

Manufacturer/supplier contact details  
 Company: **Peter Fell Limited**  
 Web: [www.peterfell.co.nz](http://www.peterfell.co.nz)  
 Email: [info@peterfell.co.nz](mailto:info@peterfell.co.nz)  
 Telephone: 09 828 6460

#### Requirements

#### 1.4 QUALIFICATIONS

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

#### 1.5 PROVIDE SAMPLE PANEL

Provide a sample panel of the following specified finishes before commencing work. Panels to be of similar thickness to the proposed construction. Refer to SELECTIONS for type of sample panel required.

#### 1.6 CAST SAMPLE PANELS

Cast sample panels to the requirements of NZS 3114: clause 104.4, Sample reference panels in respect of casting, formwork, mix, compaction, curing, striking and including rebates. Supply also the information required by that same clause.



**1.7 TECHNIQUE DISCUSSION**

Before casting the sample panel arrange a meeting to confirm the method of preparing the sample. After agreement that the sample panel is truly representative of the finish specified and can be produced on site, it then becomes the standard for that finish.

**1.8 COLOUR VARIATION**

Concrete can vary in colour due to differences in placement methods, climate and treatment.

To minimise variations the contractor must ensure handling, placing and finishing of the concrete is consistent and that the following measures are taken:

Slump:	Emphasize importance to concrete supplier to have consistent slump. Make sure that there are enough placing staff to ensure timely placing
Finishing:	Treat every area of the concrete surface in the same way - i.e. don't hand trowel the edge if a machine has been used in the middle
Curing:	Keep all areas uniformly wet, do not allow some areas to dry out
Pouring times:	Concrete poured on different days will probably be a different colour, so avoid piecemeal pours as colour differences are likely
Shading:	Areas in full sun will set faster than areas in shade, especially in the spring and autumn and these times are to be avoided as a colour variation will likely result

**1.9 INFORMATION FOR OPERATION AND MAINTENANCE**

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the following maintenance information:

- Sealer to be re-applied as appropriate when subject to wear. Contact Peter Fell Ltd for re-application method.
- Surface to be cleaned with PFL Concrete Cleaner.
- Advise Principal of the requirement to apply one coat of Coverseal to interior concrete surfaces every six months, and /or as required in high wear areas. For interior floors only.

Provide this information prior to practical completion.

**2 PRODUCTS****2.1 READY-MIX CONCRETE**

To NZS 3104.

Ordinary grade:	Refer to drawings or Engineers Specification - min 25MPa
Aggregate size:	10mm
Maximum slump:	100mm (unless super-plasticiser used)

**Components****2.2 COLOURED CONCRETE**

PeterFell colours added to the concrete, preferably at the concrete batching plant and not on site. Refer to SELECTIONS for colour range.

**2.3 SURFACE PREPARATION - FOR ACID WASH OF FLATWORK**

PFL Surface Preparation comprised of an etching acidic solution used to prepare concrete flatwork surfaces for sealing.

**2.4 SEALERS**

PeterFell penetrating or coating sealers. PFL Glaze Sealer, PFL Epoxy Sealer and PFL Satin Sealer for use in fire escape paths, tested to ISO 9239.1. C2 Densifier and Microfilm polishing system. Clear and tinted sealers available. Refer to SELECTIONS for type.

**2.5 ADMIXTURES**

Calcium chloride accelerating admixtures not to be used. Admixtures such as accelerators, retarders and superplasticisers can be used but they must be used in every load of the pour to maintain consistency of concrete.

**2.6 EVAPORATION RETARDERS - FOR FLATWORK**

SikaFilm by Sika.

**2.7 ANTI-SLIP FINISHES**

Sufficient texture should be achieved by the concrete placer so the surface meets the project requirements.

To achieve additional slip resistance and a wet look use:

- PFL Glaze or PFL Satin Sealer, plus PFL Anti-Slip

**3 EXECUTION****Conditions****3.1 STORAGE OF 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 protection packaging, wrappings or supports during delivery, unloading and storage.

**3.2 RESPONSIBILITY**

Take responsibility for determining the method of producing the specified finished surface.

**3.3 PROTECTION**

Protect and maintain the specified finish where necessary during any handling, erection or subsequent construction operation to ensure a clean undamaged surface at completion of the contract works.

**3.4 GENERAL**

Except where noted otherwise on the drawings or in the specification, tolerances in regard to colour and surface to the requirements of NZS 3114 for each finish specified.

**3.5 SURFACE TOLERANCES**

Variations from a plane surface are defined as follows:

Abrupt:	Steps or irregularities caused by displacement of form joints and measured between peak and hollow over a 200mm straight edge.
Gradual:	Undulations over the surface and measured between rise and hollow over a 1500mm straight edge.

**3.6 SUB BASE PREPARATION**

Dig out soft areas until ground is suitable. Substrate to be a minimum of 100mm of AP20 or AP40, well compacted and with a surface that evenly follows the final concrete surface  $\pm$  2mm, i.e. no high or low points; sand blinding required.

**Application - general****3.7 FALSEWORK AND FORMWORK - VERTICAL SURFACES**

Apply Sika Formol to all vertical surfaces to help ensure clean surface.

**3.8 INSTALL DAMP-PROOF MEMBRANE**

Install damp-proof membrane under all concrete in accordance with manufacturer's requirements.

**3.9 PUMPING CONCRETE**

Ensure that enough concrete with colour has been ordered to allow for that volume to be used in the length of the pump.

**3.10 ADDED WATER**

Do not add water to the following unless absolutely necessary:

- Ready mixed truck to increase slump at any point during discharge - colour will be affected by changes in the water-cement ratio.
- Surface at any point during the screeding and finishing process - use SikaFilm evaporation retarder to retain bleed-water at the surface.

**3.11 PROTECTION OF OTHER SURFACES**

Ensure other surfaces are protected from concrete splashes during placing, and/or ensure all surfaces are cleaned of splashes while concrete is still wet.

**3.12 COMPACTION**

Compact concrete to NZS 3109.

**3.13 SCREEDING - GROUND / HONED / POLISHED OR EXPOSED FLOORS**

When screeding, turn and shake out over unscreeded concrete. Do not shake out over screeded areas.

**3.14 PENETRATIONS / FIXINGS**

Apply a compressible layer such as polystyrene wrapped around any fixed penetrations such as posts or piping to allow movement of the slab which otherwise may restrain slab movement and promote cracking.

**3.15 OFF THE FORM FINISHES**

Class	Requirements
F4 finish	To NZS 3114:clause 105.4, F4 finish, with abrupt changes not exceeding 4mm at construction joints nor 2mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 6mm.
F5 finish	To NZS 3114:clause 105.5, F5 finish, with abrupt changes not exceeding 2mm at construction joints nor 1mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 6mm.
F6 finish	To NZS 3114:clause 105.6, F6 finish, with abrupt changes not exceeding 1mm at construction joints nor 0.5mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 4mm.

**3.16 EXPOSED AGGREGATE FINISHES FROM OFF THE FORM**

Class	Requirements
F4E finish	To NZS 3114:clause 105.4, F4 finish, with abrupt changes not exceeding 4mm at construction joints nor 2mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 6mm.
F5E finish	To NZS 3114:clause 105.5, F5 finish, with abrupt changes not exceeding 2mm at construction joints nor 1mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 6mm.
F6E finish	To NZS 3114:clause 105.6, F6 finish, with abrupt changes not exceeding 1mm at construction joints nor 0.5mm at joints between abutting shutters or sheets that form face material. Gradual variations not exceeding 4mm.

**3.17 CAST IN-SITU WALLS**

Refer to appropriate concrete section for specification of cast in-situ walls.

**3.18 PRECAST / TILT PANEL WALLS**

Refer to appropriate concrete section for specification of precast / tilt panel walls.

**Coloured concrete****3.19 COLOURED CONCRETE**

Add PeterFell colours to the concrete at the concrete batching plant. Order colour from PeterFell at least five days prior to the concrete pour date.

**Surface finishing - general****3.20 GENERAL**

Achieve the standard of the specified finish required, direct from the formwork with a minimum of attention to the stripped surface.

**3.21 FINISHING METHOD**

Confirm finishing method, agreed samples and tools to be used with the contract administrator, prior to commencing work.

**3.22 MINOR SURFACE DEFECTS**

Repair minor surface defects to match the shade and texture of the surrounding concrete. If repairs are required, prepare a sand cement mortar using the same cement and sand as used by the concrete manufacturer with the same colour. To test final colour, dry surface with a blow torch or hairdryer before application.

**Surface finishing****3.23 MACHINE AND HARD TROWELLED BY HAND FINISH (U5) - EXTERIOR**

Before final set, machine or hard trowel concrete by hand to ensure a hard durable surface, then roughen surface for suitable non-slip finish. Finish to be class U5 in accordance with NZS 3114, part 3, tables 2 and 3.

**3.24 GROUND / HONED / POLISHED FINISH (U11)**

Refer to section 6141 GROUND, SEALED OR POLISHED CONCRETE for concrete polishing and grinding. Finish to be class U11 in accordance with NZS 3114, part 3, tables 2 and 3. Method to be discussed and approved by the contract administrator prior to commencing grinding to ensure required Visual Appearance and Final Surface Treatment is achieved.

Visual appearance options are as follows:

Salt & Pepper:	0-2mm
Light Grind:	2-3mm
Medium Grind:	3-5mm
Heavy Grind:	5-8mm

Refer to SELECTIONS for options.

**3.25 SHOT / SAND / SODA BLASTED FINISH**

Method, final appearance and texture to be discussed with contractor prior to commencement.

**Surface finishing - exposed aggregate****3.26 EXPOSING AGGREGATE - RETARDER AND WASH**

Spray retarder on slab to manufacturer's recommendations, and leave for the prescribed time to provide desired exposure depth. At the appropriate time use PFL Surface Preparation to remove residual surface cement paste. Wash thoroughly with water.

Minimise potential contamination from run off.

Do not allow cement run off to enter drains or the public storm water system.

**3.27 EXPOSING AGGREGATE - ABRASIVE BLASTING**

Sand blast or shot blast hardened concrete.

**Application - saw cuts****3.28 CONSTRUCTION SAW CUTS**

Refer to sections 3101 CONCRETE WORK - BASIC or 3102 CONCRETE WORK - STANDARD for placing of construction saw cuts.

**3.29 DECORATIVE SAW CUTS**

Carry out decorative saw cuts after 10 days to ensure a clean cut. Use a 10-12mm blade to a depth of 10mm.

For internal floors, apply decorative cuts prior to wall framing being erected so cuts are continuous up to the wall line. Refer to SELECTIONS for options.

**Curing of concrete**

**3.30 CURING OF CONCRETE - EXTERIOR**

Concrete should be kept wet for a minimum of 7 days. The most preferable option is with continuous sprinklers, as covering with polythene, sand or hessian may result in stains. If using polythene ensure it is taped, with continuous contact with the concrete surface, i.e. with minimal trapped air pockets, and that weights holding it down are off the slab to reduce potential for surface variation.

Do not use a curing compound.

**Protection****3.31 PROTECTION - OUTDOORS**

Protect concrete after the curing stage from staining with 0.25mm polythene and leave this in place until the risk of staining is minimised. The polythene must be removed in time for the concrete to dry sufficiently prior to sealing, at least 3 weeks of dry weather.

Do not leave or store anything on the above protection as it will change the colour of the concrete below.

**Clean up****3.32 CLEAN UP**

Prior to grouting and sealing clean concrete in accordance with the instructions in the PeterFell Finishing Process Guide.

**Sealing****3.33 DRYNESS TEST - PRIOR TO SEALING**

Before commencing sealing the concrete must be completely dry and not just surface dry. If in doubt perform the Plastic Sheet Test (for excessive moisture):

- Tape a plastic sheet 450mm x 450mm on to the concrete surface being tested; ensuring an airtight seal between the concrete and the plastic is formed. After 24 hours remove the plastic sheet. Concrete can be coated if no moisture / condensation is present on the underside face of the sheet, or if concrete has not darkened (compared to adjacent concrete). If moisture is present, re-test after another 14 days. Testing to be to Moisture Test ASTM D4263 "Plastic Sheet Method".

**3.34 SURFACE PREPARATION - PRIOR TO SEALING**

Remove surface laitance using PFL Surface Preparation or PFL Eco-surface Preparation in accordance with PeterFell Product Guide. Do not allow to leave the concrete surface until fully spent.

Following the surface preparation process clean concrete with PFL Neutraliser and Cleaner to ensure all residual contaminants and acid is removed.

**3.35 APPLY SEALER**

Apply the sealer in accordance with the instructions in the relevant PeterFell Product Guide. Apply the sealer when the concrete is suitably dry.

Interior: Remove protective covering 7 days before sealing to facilitate drying of slab. If other protection has been used, much longer drying will be required, probably 3 weeks and a dryness test is recommended, refer to DRYNESS TEST - PRIOR TO SEALING.

Exterior: Remove concrete protection 3 weeks before sealing to facilitate drying of slab. Refer to SELECTIONS for options suitable for the particular application.

**3.36 APPLY COVERSEAL**

Apply one coat of PFL Coverseal immediately prior to practical completion of the building in accordance with the instructions in the PeterFell Finishing Guide.

**4 SELECTIONS**

For further details on selections go to [www.peterfell.co.nz](http://www.peterfell.co.nz).

Substitutions are not permitted to the following, unless stated otherwise.

**4.1 PROVIDE SAMPLE PANEL**

Refer to 3124 Finishes to Wet Concrete for samples.

**4.2 COLOURED CONCRETE**

Location: Refer drawing and sample schedules  
 Manufacturer: Peter Fell Ltd  
 Colour: PFL Super White Plus, & 518 & 156 & 172 & 184

**4.3 SEALER**

Location: All concrete paths, walls and steps and edges.  
 Manufacturer: Peter Fell Ltd  
 System: PeterFell Natural Sealer  
 Number of coats: Refer to manufacturers specification

## 3130 PRECAST CONCRETE

### 1 GENERAL

This section relates to the off site manufacture and on site installation of precast panels.

#### 1.1 RELATED WORK

Refer to the appropriate concrete section for concrete requirements.  
Refer to Engineers specification for structural design and PS1 pre-cast requirements.

#### 1.2 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](http://www.steelcertification.com)

#### 1.3 DOCUMENTS

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

NZBC B1/VM1	Structure
NZBC D1/AS1	Access routes
AS 4586	Slip resistance classification of new pedestrian surface materials
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3112.1	Methods of test for concrete - Tests relating to fresh concrete
NZS 3114	Specification for concrete surface finishes
NZS 3121	Water and aggregate for concrete
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4672.1	Steel prestressing materials - General requirements
AS/NZS 4672.2	Steel prestressing materials - Testing requirements
AS/NZS ISO 9001	Quality management systems - Requirements
WorkSafe NZ	Approved Code of Practice for Safe Handling, Transportation and Erection of Precast Concrete

#### Requirements

#### 1.4 PREPLANNING

Prior to shop drawing/manufacture of the precast panels the Contractor, Precaster and other relevant parties, must liaise, to ensure installation/on-site requirements are coordinated with the panel production.

### 1.5 SHOP DRAWINGS

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

Provide shop drawings to show the general arrangement including, but not be limited to:

- size, spacing and cover of reinforcement
- details, position and layout of cast in items, including those for, lifting, handling, fastening and connecting
- details of panel edges
- surface finish requirements and locations
- location and size of rebates, recesses and penetrations
- grout ducts
- concrete mix requirements and strength
- concrete volume and weight of finished unit for lifting

if requested provide the following additional information:

Levelling penetrations.  
3D digital file of shop drawing.

Submit shop drawings for review to Landscape Architect and Structural Engineers.

- 10 working days (at least) before fabrication is planned to commence, provide shop drawings for review.
- Do not commence fabrication of any panel before shop drawing review of the panel is complete.
- Shop drawing review (and subsequent fabrication) can be carried out on an agreed sectional/staged basis.

#### 1.6 MANUFACTURERS STATEMENT OF COMPLIANCE

Provide a Manufacturer's Statement of Compliance from the Approved Code of Practice for Safe Handling, Transportation and Erection of Precast Concrete.

#### 1.7 PANEL SURFACE

Use appropriate mould materials, moulding systems and casting methods to achieve the specified surface finishes. Refer to SELECTIONS for surface finishes.

#### 1.8 SAMPLE PANELS

Provide 1no. of one of the boardwalk outer deck panels to the required finish. Sample to be of the same thickness and made using the same manufacturing methods as for the final panels. Refer to SELECTIONS for sample panel requirements.

#### 1.9 QUALIFICATION, PRECAST MANUFACTURE

Precast concrete panels manufactured by either;

- a Precast NZ Certified Plant
- or an off-site precast manufacturer with, an established record of panel production to a similar standard, suitable plant and an appropriate quality assurance system.

Use only precast concrete workers skilled and experienced in precast panel production.

#### 1.10 QUALIFICATION, ON-SITE WORK

Use only concrete bridge deck panels, crane and rigging, contractors skilled and experienced in the erection bridge decking panels.

#### Performance

#### 1.11 STEEL REINFORCING COMPLIANCE

Steel reinforcing and steel prestressing materials for concrete to AS/NZS 4671 or AS/NZS 4672.1, respectively. 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.

Steel that fails to meet these requirements is not to be used (or ordered) without the contract administrators written approval, further proof and/or testing may be required.

**1.12 CONFIRM STEEL REINFORCING COMPLIANCE**

Certification from the supplier confirming that the steel reinforcing supplied complies with the grades specified on the drawings by producing test results to AS/NZS 4671 or AS/NZS 4672.1 and AS/NZS 4672.2. For overseas manufactured steel provide NZ S Mark or ACRS certificate details or approved equivalent.

**1.13 TESTING - CONCRETE**

Carry out sampling and concrete acceptance tests during construction to NZS 3109: section 9, Concrete acceptance tests during construction.  
Conduct 7 day strength tests. After a 7 day test result of less than 60% of the specified strength, concrete placement to stop until it is shown the suspect concrete complies with the specification.

Carry out slump tests, yield tests and air content tests to NZS 3112.1, sections 4, 5 and 9, and evaluate to NZS 3104.2.15. Control tests and their evaluation. Make available all test records to the contract administrator on request.

**1.14 QUALITY ASSURANCE**

Carry out the whole of this work to the requirements of NZS 3109 and under the regime of a quality systems for quality assurance in production and erection.  
Advise name of the suitably experienced and qualified representative who is responsible for quality control of the concrete work. The representative is to sign a written quality control checklist for each concrete pour.

**1.15 INSPECTION NOTIFICATION REQUIREMENTS**

Pre-cast mould form in preliminary form prior to final finishing as a Hold Point.

**1.16 SLIP RESISTANCE – SURFACES EXEMPT FROM TESTING**

Top surface to underside of decking and underside surface of outer edge.

**1.17 TEST - SURFACES REQUIRING SLIP RESISTANCE TESTING**

Test samples for slip resistance to comply with NZBC D1/AS1, 2.1, Slip resistance. Refer to SELECTIONS for surface to be tested, minimum test value required and test method. Provide test results to contract administrator, including a statement that the surface complies with nominated test requirements.

**1.18 SITE LOADINGS, PERMANENT STRUCTURE**

Prevent damage to supporting structure from stacking of precast items.

**2 PRODUCTS****2.1 EXPOSED AGGREGATE**

To NZS 3121. Pebble/round aggregates, to be gap graded for integral mixes.

**2.2 CONCRETE**

To NZS 3104.  
Refer to CONCRETE section for concrete supply and to SELECTIONS for concrete strength.

**2.3 GRADE 300E STEEL**

To AS/NZS 4671. Round bars are shown by symbol "R" and deformed bars by symbol "D", followed by the diameter in millimetres.

**2.4 GRADE 500E STEEL**

To AS/NZS 4671. Round bars shown by symbol "HR" and deformed bars by symbol "HD" followed by diameter in millimetres.

**2.5 WELDED WIRE FABRIC**

Hard drawn steel wire spot welded with correct gauge to AS/NZS 4671, smooth or deformed and to the spacing and dimensions either specified or shown on the drawings.  
500E mesh to AS/NZS 4671 as modified by NZS B1/VM1.

**2.6 SPACERS AND CHAIRS**

Precast concrete or purpose made moulded PVC to approval. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

**2.7 INSULATION FOR INSULATED PANELS**

Rigid insulation sandwiched between concrete panels.

**2.8 PANEL CONNECTORS FOR INSULATED PANELS**

Low thermal conductivity connectors/ties to connect the faces of sandwich insulated panels.

**Components****2.9 LIFTING INSERTS**

No visible lifting inserts are permitted.

**2.10 CAST IN STEEL ITEMS**

Cast in items as detailed and required. Ensure items are prefinished where required.

**2.11 GASKETS**

Proprietary type.

**2.12 LEVELLING SHIMS**

Rigid plastic or other suitable levelling shims to Approved Code of Practice for Safe Handling, Transportation and Erection of Precast Concrete.  
Levelling post settling specification refer to Engineers specification.

**2.13 SEALANTS**

Polysulphide, polyurethane or silicone gap filling proprietary sealants.

**3 EXECUTION****Conditions****3.1 HANDLE, TRANSPORT AND STACK**

Handle, transport and stack panels to ensure support that avoids distortion and stress and at the same time protects the finished surfaces from chipping, scoring, cracking or other disfigurement.  
Storage methods and packing between panels should minimise colour variations to exposed surfaces.  
Arrange delivery and erection of precast panels to minimise handling, storage or restacking on site.

**Manufacture****3.2 TOLERANCES, OFF-SITE PRECAST, CRITICAL**

Manufacture panels to the following tolerances:

Item		Tolerance
Length and height:	< 3.0 metres	± 0.5mm
	Generally > 3.0 metres	± 0.5mm
Thickness overall:		± 1mm
Deviation from square:	Length	< 4.0 metres 0.0015 L
(difference in length between two diagonals)		
Twist: (any one corner out of plane passing through other three corners)		± 0.5mm
Position of panel openings and cast in items:		± 0.5mm

Other tolerances to NZS 3109, Table 5.1 - Tolerances for Pre-cast components reduced by 40%.  
Before casting, ensure moulds will result in the finished panels complying with tolerances.

**3.3 TOLERANCES, OFF-SITE PRECAST, STANDARD**

Manufacture panels with tolerances to NZS 3109, table 5.1, Tolerance for precast components.

**3.4 SECURE REINFORCEMENT**

Secure adequately with tying wire, spacers or other suitable means, and place accurately where detailed, supported and secured against displacement. Ensure minimum concrete cover is maintained.

**3.5 CONCRETE PLACING**

Carefully place concrete to ensure all parts of the mould are completely filled and full contact is made with the mould surface. Use appropriate compaction techniques to achieve the required finish.

**3.6 CASTING IN ITEMS**

Accurately cast in all embedded items and fixings as detailed, all securely located to avoid displacement during concrete placement and compaction. Where bolts are cast in, also provide the nut (free moving on the bolt).

**3.7 CURING**

Confirm in writing the system to be used for curing concrete. Cure panels, for a minimum of 7 days and until minimum strength is achieved for safe lifting, handling, transportation and erection.

**Installation****3.8 INSTALLATION**

Carry out work in accordance with the Approved Code of Practice for Safe Handling, Transportation and Erection of Precast Concrete. Prior to lifting any panels from the truck, check and make a record of any damage to the panels, and obtain approval from the Contract Administrator before incorporating a damaged panel into the work.

**3.9 SETTING OUT**

Confirm panel dimensions, set out and site conditions. Also check starter bars, grout tube positions and fixing points. Check all temporary support work is ready, correct and capable of taking imposed loads.

**3.10 TOLERANCES, ON - SITE EXECUTION**

Locate precast items to the following tolerances:

Plan:	± 1mm
Vertical:	± 1mm/metre
Panel Joint width:	± 1mm

Tolerance limitations are due to offsetting nature of precast boardwalk and pile locations.

**3.11 LIFTING**

Mobile or Tower crane positions to be arranged and prepared prior to panel delivery to provide safe lifting. Ensure that all cranes can provide safe and easy movement of panels, as well as careful positioning. Check that rigging, straps, etc, suit the panel design and lifting points. Panels are to remain attached to the crane until they are either fully fixed into their final position or adequately secured by temporary means.

**3.12 PROPPING AND BRACING**

Provide temporary adjustable props or braces to secure the panel in position until final support is provided. They must be able to withstand the expected wind loads on the panel for the site and position.

**3.13 PLACING**

On positioning of the panel, check that all reinforcing and fixings line up with the appropriate items on the preceding work. Also check fixings will function as intended, in particularly fixings required to accommodate seismic movement. Ensure that there is no damage caused to the panel, surrounding surfaces or fixings during placing.

**3.14 FINAL POSITION**

Adjust panels into final position, check alignment, verticality, joint widths etc, and fix into place.

**3.15 GROUT DUCTS**

Fill grout ducts with expansive grout, ensure ducts are completely filled.

**3.16 POST PLACING ADJUSTMENTS**

After permanent placing check and adjust as necessary;

- all fixings for correct alignment and operation, and check the torque on all nuts and bolts - not less than 1 day after final fixing.
- recheck that all props, braces and fastenings are secure and capable of performing as required - not less than 1 day and not more than 7 days after a panel is fixed into position and held by temporary means.
- if panels are subject to, high wind loads, unintended or accidental loads during construction, recheck props braces and fastenings.

**3.17 FIT GASKETS**

Fit gaskets to panel joints in sequence and achieve the flexibility required by the gasket manufacturer.

**3.18 SEALANTS**

Ensure at time of erection, that the limits of acceptable joint variation (from the manufacturer's requirements) for each product are maintained. Prepare joints, protect adjoining surfaces, seal joint surfaces, fit limiting rods and insert sealant to the manufacturer's requirements and temperature limits.

**3.19 CLEAN AND DRESS**

Clean and dress panels externally and internally to leave them to the standard of finish specified and without blemish, ensuring following work can be completed to the required standard.

**3.20 CLEAN UP**

Clean up surrounding areas of trade waste and remove temporary works required for the installation of the precast concrete items.

**3.21 REMOVE**

Remove debris, unused materials and elements from the site.

**3.22 FINISH**

No visible defects are permitted. Any damaged or poorly finished precast concrete is to be removed and replaced.

**4 SELECTIONS****4.1 TEST FOR MINIMUM SLIP RESISTANCE REQUIREMENTS**

Test key	Access route	Location/surface to be tested	Minimum test value required
LW	Level access wet	Lake edge deck - upper outer accessible edge	39 SRV

Test Key - identifying required test method

LW	SRV classification of not less than 39 from the wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
SW	Obtain BPN from the wet pendulum test method of AS 4586, Appendix A
WRN	SRV classification of not less than 39 from the wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
WWN	Obtain BPN from the wet pendulum test method of AS 4586, Appendix A
BF	Obtain classification from the ramp method of AS 4586, Appendix C
CWS	Obtain classification from the oil-wet inclining platform test method of AS 4586, Appendix D
LD	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
SD	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
DRN	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
DWN	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B

**4.2 SAMPLE PANELS**

Relates to:	Lake edge boardwalk deck outer edge precast units
Number of panels:	1no
Size:	As noted in drawings - full unit
Finish:	F6 acid wash -19mm atlas supplied white lime ship, white sand, Peter Fell 'supper white plus' oxide
Purpose:	Appearance, dimensions accuracy of form, and quality
Relates to:	Lake edge boardwalk pile precast units - 5000mm boardwalk
Number of panels:	1no
Size:	As noted in drawings - full unit
Finish:	F6 acid wash -19mm atlas supplied white lime ship, white sand, Peter Fell 'supper white plus' oxide
Purpose:	Appearance, dimensions accuracy of form, and quality
Relates to:	Lake edge boardwalk pile precast units - 3000mm boardwalk
Number of panels:	1no
Size:	As noted in drawings - full unit
Finish:	F6 acid wash -19mm atlas supplied white lime ship, white sand, Peter Fell 'supper white plus' oxide
Purpose:	Appearance, dimensions accuracy of form, and quality
Relates to:	Lake edge boardwalk lake wall edge precast units
Number of panels:	1no
Size:	As noted in drawings - full unit
Finish:	F6 acid wash - 19mm atlas supplied white limechip, white sand, Peter Fell 'supper white plus' oxide
Purpose:	Appearance, dimensions accuracy of form, and quality
Relates to:	Tukutuku boardwalk piles (large)
Number of panels:	1no
Size:	As above, noted in drawings
Finish:	F6 acid wash - 19mm atlas supplied white limechip, white sand, Peter Fell 'supper white plus' oxide
Purpose:	Appearance, dimensions accuracy of form, and quality
Relates to:	Tukutuku boardwalk piles (small)
Number of panels:	1no
Size:	As above, noted in drawings
Finish:	F6 acid wash - 19mm atlas supplied white limechip, white sand, Peter Fell 'supper white plus' oxide
Purpose:	Appearance, dimensions accuracy of form, and quality

**4.3 SURFACE FINISHES**

Formed surfaces: F6 finish to NZS 3114  
 Unformed surfaces: U3 finish to NZS 3114

**4.4 SEALANTS**

Location: Lake edge boardwalk deck - upper outer edge and underside to outer edges (not under deck or bottom flat underside)  
 Manufacturer/type: Peter Fell Natural Sealant

**3361 STONEMWORK****1 GENERAL**

This section relates to the supply, laying and fixing of non-load bearing stone, fixed to a rigid structural backing or erected as freestanding steps or wall face. In this project the stone units are of a very large size, up to 3000mm x 3000mm x 450mm thick, they are CNC 3D cut from 3D digital cutting data.

**1.1 RELATED WORK**

Refer to 8231 Segmental Paving

**Documents****1.2 DOCUMENTS**

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

AS/NZS 2699.1	Built in components for masonry construction - Wall ties
NZS 3103	Sands for mortars and plasters
NZS 4210	Masonry construction: materials and workmanship

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 PROCUREMENT AND INSTALLATION METHODOLOGY**

A full methodology including nominated supplier for stone supply, manufacture and installation to be provided by the Contractor. Given the large format units, the complexity of the CNC/ water jet 3D digital cutting and fabrication process, and the site access and crane operation required. The contractor to confirm the following:

- procurement lead in times and stone supply and source.
- confirm factory to carry out fabrication and confirm the process and the requirement for the 3D CNC/ water jet digital cutting process and post cutting tooling/ finishing works.
- outline the transportation and installation methods including lifting the placing operation.
- confirm any sub contractors to be used in placement for jointing and finishing.
- key risks identified and how they will be mitigated and managed.

**1.4 STONE SAMPLES**

Supply 3 samples of each type of stone and surface finish representing the total range of natural variation, marking and finish across the run of quarry. Refer to SELECTIONS for minimum size.

**1.5 SAMPLE PANELS**

Provide a sample panel, including a corner of each type of stone work. Refer to SELECTIONS for location and size. An approved panel, if suitably located, may be incorporated into the works. Otherwise protect from damage, retain for duration of the work, removing all traces on completion.

**1.6 QUALIFICATIONS**

Stonemasons to be experienced competent workers, familiar with the materials and the techniques specified.

**1.7 SHOP DRAWINGS**

Provide shop drawings including 3D CNC digital files (from contract supplied files) of set-out of blocks or panels complete with method of bedding and fixing.

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

**1.8 REVISED SHOP DRAWINGS**

Provide copies of shop drawings revised to include required modifications, before proceeding with any stonework.

## 2 PRODUCTS

### Materials

#### 2.1 STONE

Refer to SELECTIONS/drawings & stone schedule for type/finish.

### Components

#### 2.2 ANCHORS, CRAMPS, DOWELS

Non-corrodible, non-ferrous metal, suitably stamped.

### Accessories

#### 2.3 SEALANT

Elastomeric joint non-staining sealing compound of approved type and colour. Backing rods closed cell semi-rigid compressible plastic from the type sized to compress 33% in the joint and to the sealant manufacturer's requirements.

#### 2.4 JOINTING MATERIAL

Suitable for the location and type of stone, non-staining, and to the manufacturer's requirements.

#### 2.5 SAND FOR MORTAR

Sand to NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand.

#### 2.6 MORTAR

Provide details of the proposed mix for approval not less than 7 days before commencing work. Generally the mix to have a strength less than the stone it is bedding and a porosity equal to or greater than the stone.

## 3 EXECUTION

### Conditions

#### 3.1 TOLERANCES AS SHOWN

Construct the stone work within the tolerances shown on the drawings.

#### 3.2 BUILDING IN

Make provision for building into the structure those elements required for the erection and laying of stone.

#### 3.3 BUILT IN ITEMS

Make provision as the work proceeds for elements that need to be built in or keyed to the stone work, including partitions, straps, handrails, beams, trusses and plates.

#### 3.4 SUBSTRATE WATERPROOFING

Check substrate waterproofing is suitable, complete and undamaged before commencing stonework.

#### 3.5 TRANSPORT

Transport, unload and handle all stone units to avoid any damage or disfigurement. Stack carefully in the vehicle with packing material to prevent damage.

#### 3.6 STORE

Store stone clear of the ground on its natural bed, protected from the weather and atmospheric pollution on supports that avoid local overstraining and to promote good seasoning without staining, contamination, marking or damage.

### Application

#### 3.7 CUTTING

Cut and shape stone to profiles generally as detailed and including all weathering, jointing, chasing, forming mortises, grooves and drilling for handling and fixing. Work the bed, face and back joints of the stone square and true.

### Application - facing work

#### 3.8 SOLID BEDDING

Adequately support and restrain cladding with durable fixings and continually and solidly fill between backs and supporting structure with mortar.

#### 3.9 SPOT BEDDING

Adequately support and restrain cladding with durable fixings and provide mortar bedding continuously around fixings and in the form of mortar dabs elsewhere.

#### 3.10 JOINTING

Prime surfaces in contact, fit backing rods to ensure correct depths of jointing material and/or sealant, keeping panel surfaces completely clear and unmarked by masking, all to the jointing manufacturer's requirements.

### Application - walling work

#### 3.11 BED AND JOINT

Bed and joint stone where possible in one operation on a full bed of mortar. Solidly fill and grout vertical joints, dowels, joggles, cramps and the like as the work proceeds and point up joints around flashings.

#### 3.12 SET STONE

Set stone on its natural bed.

#### 3.13 BEDDING SEDIMENTARY STONE

Clean the bed area of dust and impurities and thoroughly damp it down before laying the mortar bed.

#### 3.14 RACKING

Raise advanced work no more than 1m above the general level and rack back. Do not tooth stonework unless shown on the drawings or when approved in writing.

#### 3.15 SUPPORT

Provide support to the stone while mortar cures by bracing or joint spacers of non-staining softwood. When curing is complete remove spacers without damage to the stonework and point to match.

### Finishing

#### 3.16 PROGRESSIVE CLEANING

Keep the stone faces clean as the work proceeds. Prevent mortar or jointing material from coming into contact with the external face of the stone. Perform the cleaning procedure, including removal of stains as necessary, without damage to the work.

### Completion

#### 3.17 PROTECT

Protect newly erected stonework against inclement weather.

#### 3.18 KEEP FACEWORK CLEAN

Keep facework clean during construction and until completion of the contract works. Clean off, rub down and leave stonework in the specified condition, immediately before handing over.

#### 3.19 REPLACE

Replace damaged, cracked or marked elements.

#### 3.20 LEAVE

Leave work to the standard required by following procedures.

#### 3.21 REMOVE

Remove debris, unused materials and elements from the site.

## 4 SELECTIONS



## 4.1 STONE SAMPLES

Minimum size: Selected specifier to coordinate with Landscape Architect prior to ordering.

## 4.2 BASALT

Selected igneous stone. Refer to Stone Cutting Schedule and associated drawings.

Name/source: **Steps**  
 Thickness: 375mm  
 Colour: Basalt G3027  
 Finish: 3D CNC digital cut finish then, bush hammered to one face, flamed to one face, honed to one face, 50mm chamfer to outer edge

3D cut texture to visible surfaces where shown on drawings.

Name/source: **Stone Seats**  
 Thickness: 450mm  
 Colour: Basalt G3027  
 Finish: 3D CNC digital cut finish then, bush hammered to one face, flamed to one face, honed to one face 50mm chamfer to outer edge

3D cut texture to visible surfaces where shown on drawings.

Name/source: **Stone Deck**  
 Thickness: 375mm  
 Colour: Basalt G3027  
 Finish: 3D CNC digital cut finish then, bush hammered to one face, flamed to one face, honed to one face 50mm chamfer to outer edge.

3D cut texture to visible surfaces where shown on drawings.

Name/source: **Stone Deck/ Wall Face**  
 Thickness: Min 375mm max. 750mm Varies.  
 Colour: Basalt G3027  
 Finish: 3D CNC digital cut finish then, bush hammered to one face, flamed to one face, honed to one face, 50mm chamfer to outer edge

3D cut texture to visible surfaces where shown on drawings.

## 3410 STRUCTURAL STEELWORK - BASIC

## 1 GENERAL

This section relates to the fabrication, erection and specialist coating of structural steelwork of a general nature. To be read in conjunction with engineers specification, where conflicts arise engineering specification is to take precedence.

## 1.1 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
AS/NZS 1252.1	High-strength steel fastener assemblies for structural engineering - Bolts, nuts and washers - Technical requirements
AS/NZS 1554.1	Structural steel welding - Welding of steel structures
AS 1627.4	Metal finishing - Preparation and pretreatment of surfaces - Abrasive blast cleaning
AS 1627.9	Metal finishing - Preparation and pretreatment of surfaces - Pictorial surface preparation standards for painting steel surfaces
AS/NZS 2312:2002	Guide to the protection of iron and steel against atmospheric corrosion by the use of protective coatings
NZS 3404.1:1997	Steel Structures Standard
AS 3828	Guidelines for the erection of building steelwork
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
GANZ:	Galvanizing Association of New Zealand - After-Fabrication Hot Dip Galvanizing. A practical reference for designers, specifiers, engineers, consultants, manufacturers and users
HERA R4-99	Specification for the fabrication, erection and surface treatment of structural steelwork

## 1.2 QUALIFICATIONS

Welders to be qualified, experienced competent workers, familiar with the materials and the techniques specified.

## 1.3 SHOP DRAWINGS

Supply 1 set of shop and erection drawings to the owner for review prior to fabrication.

## 1.4 SHOP DRAWINGS REVIEW

Shop drawings review indicates the design concept has been reviewed without the need for further modification. This does not relieve the contractor of any responsibility for the correctness of the shop drawings, site dimensions, or for ensuring the work is performed in compliance with the drawings and specifications.

## 1.5 VERIFY DETAILS AND DIMENSIONS

Refer to drawings to ensure all required details and fixings are provided for in the structural steelwork. Verify dimensions against site measurements prior to fabrication.

## 1.6 TEST WELDING

Non-destructive weld examination with method, extent and standards of acceptance to AS/NZS 1554.1, Section 7 and NZS 3404.1, Appendix D.

## 2 PRODUCTS

## 2.1 STRUCTURAL STEEL

Comply with New Zealand, Australian, British or Japanese Standards for steel as required by NZS 3404.1, section 2, including, type, category, and suppression of brittle fracture.

Grade 300, except RHS sections Grade 350, unless noted otherwise on the drawings.

**2.2 WELDING**

Electrodes to comply with and be selected for the grade of steel being welded as required by AS/NZS 1554.1. Welding wire as required by the wire manufacturer for the materials to be joined and the welding position. Welding flux: dry and used from sealed containers. Material for arc stud welding to comply with AS/NZS 1554.1.

**2.3 BOLTS, NUTS AND WASHERS**

To AS/NZS 1252.1 and to the requirements of NZS 3404.1, section 2.3 **Fasteners**. Hot-dip galvanize all bolts, nuts and washers forming a permanent part of any structure subject to a protective coating, to AS/NZS 4680.

**3 EXECUTION****3.1 SURFACE FINISH**

Grind off all burrs and sharp arrises.

**3.2 TOLERANCES**

Discard material showing visual defects affecting its structural integrity. Comply with the tolerances laid down for holding down bolts, columns, beams and other members in HERA R4-99 and NZS 3404.1. Comply with NZS 3404.1 for level and alignment of beams and alignment and plumbing of struts.  
Structural elements to comply for straightness, length, full contact splices and struts not prepared for full contact with NZS 3404.1.

**3.3 CUTTING**

To NZS 3404.1, and for existing steel HERA R4-99. Hand cut only where machine cutting is not possible.

**3.4 CONSTRUCT**

Construct the steel structure as detailed and to NZS 3404.1, section 14, Fabrication and section 15, Erection.

**3.5 WELDING**

Carry out welding in accordance with AS/NZS 1554.1 and the additional requirements of NZS 3404.1. Equipment to comply with AS/NZS 1554.1, clause 1.8.2.

**3.6 WELDING NEAR TOUCHING STEELWORK**

Shop weld together touching or near-touching steelwork all round with 5mm (one pass) continuous fillet welds unless denoted otherwise on the drawings.

**3.7 WELDING GALVANIZED OR THERMAL SPRAYED STEEL**

When welding already Galvanized steel or Thermal Sprayed steel either:

- remove coating locally and carry out a standard weld
- leave coating and adjust welding technique to those recommended in GANZ After-Fabrication Hot Dip Galvanizing document. (Among other things, this will generally mean a slower welding speed.)

Final weld shall meet all the standards and requirements of a standard weld.

**3.8 HOLLING**

Comply with NZS 3404.1 for sizes, alignment, finishing, punching and flame cutting of holes.

**3.9 BOLTING**

Bolting, including high strength bolting to NZS 3404.1. Ensure that at least one clear thread shows above the nut and at least one thread run out is clear beneath the thread after tightening.

**3.10 THREADS EXCLUDED FROM SHEAR PLANE**

Select length of bolts such that the threaded portion does not occur within the shear plane between joined parts.

**3.11 START ERECTION**

Start erection only when the holding down bolts and anchorages have achieved sufficient strength. Carry out the erection of the structural steel to the requirements of AS 3828. Comply with NZBC F5 and NZS 3404.1, section 15, Erection. Provide temporary bracing as required to achieve stability during erection.

**3.12 BASE PLATES**

Enlargement or site cutting of holes not permitted. Bending or displacement of holding down bolts not permitted.

**3.13 COLUMNS**

Plumb columns using sawn steel packs and wedges not larger than necessary for the purpose. The column base must not be raised by more than 25mm. Fill space beneath the base plate with cement-sand grout, containing a non-shrink additive, the grout having a minimum compressive strength of 30MPa at 28 days. Alternately use a dry pack of 1:2 cement with the sand mortar hammered in tight to ensure complete filling of space.

**3.14 INSPECTION**

Inspect all stages of fabrication and construction of the structure to NZS 3404.1, sections 14, Fabrication and 15 Erection.

**3.15 ENCASED STEELWORK**

Clean the steelwork to be encased in concrete to remove all loose mill scale, rust, dirt and other matter affecting bond with concrete. Achieve this by wire brushing and the use of suitable solvents.

**3.16 BRUSHING AND POWER TOOL CLEANING**

Remove oil and grease by the use of solvents. Scrape and power wire brush to a minimum Class 2 finish to AS 1627.9. Clean to bright metal, but avoid producing a polished surface. Check that no burrs or sharp arrises remain which may prevent the full coating thickness being attained.

**3.17 ABRASIVE BLASTING**

Remove oil and grease by the use of solvents. Abrasive blast clean to a Class 2.5 finish to AS 1627.4. Clean to bright metal, but avoid producing a polished surface. Select grit type and equipment such that the cleaned surface profile between peaks and valleys does not exceed one third of the dry film thickness. Check that no burrs or sharp arrises remain which may prevent the full coating thickness being attained.

**3.18 PRIMING GENERALLY**

Coat steelwork, unless specifically noted otherwise, with the specified priming paint, including patch priming on site after erection.

**3.19 STEELWORK BEING GALVANIZED**

Fabricator to provide any temporary members required by the galvanizer to strengthen prefabricated elements likely to be distorted by the subsequent hot dip galvanizing process. To galvanize, clean sections thoroughly and apply zinc coating by the hot-dip process to the requirements of AS/NZS 4680. Average zinc coating to be not less than the following:

Structural steelwork	Average coating	Minimum coating
≤ 1.5mm	45 microns	35 microns
> 1.5mm ≤ 3mm	55 microns	45 microns
> 3mm ≤ 6mm	70 microns	55 microns
> 6mm	85 microns	70 microns

**3.20 REPAIR WELD DAMAGED GALVANIZING**

Remove welding slag, power tool clean, grind off all burrs and sharp arrises, all repairs to AS/NZS 4680, 8.4 **Site repair**:

- Small repairs:- Colour matched zinc rich paint.
- Large repairs:- With approval, colour matched zinc rich paint or other agreed option.

**3.21 UNPAINTED SURFACES**

Do not paint:

- faying face of high strength friction grip bolted joints
- areas for site welding, keeping 75mm clear all round
- surfaces being embedded in concrete.

Where steel is only partly encased then extend priming 25mm maximum into the concrete encasement area.

**3.22 PATCH PRIMING**

Clean areas of damaged priming and areas left clear for site jointing to a standard comparable with that specified for shop cleaning. Wash off chemical deposits from welding fumes. Apply priming coats to the same standard as shop primers, ensuring thorough coating of bolts, nuts and connection areas. Reprime if more than 4 weeks elapse before the final coating system is applied.

**3.23 COATING SYSTEMS**

Apply all coatings in accordance with the coating manufacturer's requirements. Apply coatings to steel within 4 hours of cleaning and before condensation or light rusting can occur. Ensure steel is dry and atmospheric conditions warm and dry, with an air temperature of greater than 12°C and relative humidity less than 85%.

**3.24 TOUCH-UP**

Touch up primer. Apply protective coatings as specified.

**4 SELECTIONS****4.1 STEELWORK BEING GALVANIZED**

Furniture items - Seats, tables, and light poles.

**4383 TIMBER DECKING****1 GENERAL**

This section relates to the fabrication and installation of exterior timber

- spaced boarding to boardwalks
- boardwalks subframe

**Related work****1.1 RELATED SECTIONS**

Refer to 3130 for PRECAST CONCRETE.

**Documents****1.2 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 4586	Slip resistance classification of new pedestrian surface materials
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
BRANZ BU 497	Stair construction

**Performance****1.3 TEST - SURFACES REQUIRING SLIP RESISTANCE TESTING**

Test samples for slip resistance to comply with NZBC D1/AS1, 2.1, Slip resistance. Refer to SELECTIONS for surface to be tested, minimum test value required and test method. Provide test results to contract administrator, including a statement that the surface complies with nominated test requirements.

**Requirements****1.4 SUSTAINABLE TIMBER**

This project uses FSC Certified sustainable timber.

**Abbreviations and definitions:****FSC**

- Forest Stewardship Council
- FSC Forest Management (FM) Certification
  - A forest management unit independently FSC inspected and certified that it complies with the internationally-agreed FSC Principles.
- FSC Chain of Custody (COC) Certification
  - COC certification applies to those who process, transform or trade forest products, providing a guarantee about the production and source of FSC-certified products and tracking the production and distribution of the products.

**Organisation website details**

FSC website:- <https://nz.fsc.org/en-nz>

FSC suppliers lists:- <https://info.fsc.org/certificate.php#result>

## 1.5 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	Boardwalk 5000mm & 3000mm	Tukutuku Bridge 2400mm	Tukutuku Bridge 1050mm
Sample type:	Hardwood timber fixed in place including all finishes, jointing and cutting plan.	Hardwood timber profile fixed in place with textured decorative cuts including all finishes and jointing.	Hardwood timber profile fixed in place with butterfly joint, including all finishes and jointing.
Number:	1	1	1
Location:	on site	on site	on site
Supporting documentation:	shop drawings	shop drawings	shop drawings
Reviewer:	LANDSCAPE ARCHITECT	LANDSCAPE ARCHITECT	LANDSCAPE ARCHITECT
Time for review:	10 working days prior to procurement	15 working days prior to procurement	15 working days prior to procurement
Review criteria:	Appearance Tolerance Texture - slip resistance Fixings Timber quality	Appearance Tolerance Texture - slip resistance Fixings Timber quality	Appearance Tolerance Texture - slip resistance Fixings Timber quality

## 2 PRODUCTS

### Materials

### 2.1 CERTIFIED SUSTAINABLE TIMBER

Refer to SELECTIONS for details of amount, type, suppliers. Certified Sustainable FSC-COC Certified (or similar pre-approved) timber from forest to installation. Contractor to obtain and track all timber FSC-COC certificates and receipts showing FSC-COC numbers, including signed FSC outsourcing agreements between parties (ie FSC timber broker and non-FSC door joiner). FSC suppliers lists:- <https://info.fsc.org/certificate.php#result>

### 2.2 SOLID TIMBER COMPONENTS

Selection to NZS 3602.

### 2.3 HARDWOOD SPACED BOARDING FOR EXTERIOR DECKS

Plantation-grown hardwood. Dressed four sides and with arrises, or specifically profiled decking.

## 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.

#### 3.2 PREPARATION, PRE-COATING

For decking to be, stained, sealed or oiled, ensure underside face, edges and cuts of the decking are pre-coated prior to installation. Refer to SELECTIONS for finish.

### Application

#### 3.3 LAYING TIMBER SPACED BOARDING - EXTERIOR DECKS

Spacing and cutting modules to follow drawings and as per control samples.

#### 3.4 HIDDEN FIXING, SCREW FIXING & WOOD PLUGS

Hidden fixing using custom aluminium T fixing into pre grooved timber edge. Pre-drill for all fixings, where the screws allow, use a proprietary deck pre-drilling and countersinking tool. Use decking screws 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. Refer to SELECTIONS. Where drawings state wood plugs to fixings -plug with the same timber species, align grain with the board grain and finish flush.

#### 3.5 CORROSION RISKS

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel or silicon bronze, fixings and connectors, if decking or framing timber is 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).

### Completion

#### 3.6 LEAVE

Leave work to the standard required by following procedures.

#### 3.7 REMOVE

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

## 4 SELECTIONS

### 4.1 TEST FOR MINIMUM SLIP RESISTANCE REQUIREMENTS

Test key	Access route	Location/surface to be tested	Minimum test value required
LW	Level access wet	all timber decking types insitu	39 SRV
LD	Level access dry	all timber decking types insitu	0.4 COF

Number of samples required: 3

Type of sample required: SRV

Test Key – identifying required test method

LW	SRV classification of not less than 39 from the wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
SW	Obtain BPN from the wet pendulum test method of AS 4586, Appendix A
WRN	SRV classification of not less than 39 from the wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
WWN	Obtain BPN from the wet pendulum test method of AS 4586, Appendix A
BF	Obtain classification from the ramp method of AS 4586, Appendix C
CWS	Obtain classification from the oil-wet inclining platform test method of AS 4586, Appendix D
LD	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
SD	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
DRN	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
DWN	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B

**4.2 CERTIFIED SUSTAINABLE TIMBER - SOURCING**

The following timber from sourced to installed to be FSC FM Certified and COC Certified.

ITEM 1	Boardwalk and Tukutuku Bridges
Manuf/supplier:	TBC
Product/type:	Timber hardwood
Species:	Tonka

FSC suppliers lists:- <https://info.fsc.org/certificate.php#result>

**4933 ALUMINIUM METALWORK****1 GENERAL**

This section relates to the fabrication and installation of aluminium items of a general nature.

**Documents****1.1 DOCUMENTS REFERRED TO**

Documents referred to in this section are:

AS/NZS 1734 Aluminium and aluminium alloys - flat sheets, coiled sheet and plate

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 SAMPLES**

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide full length mounting profile and end caps for approval.

**1.3 QUALIFICATIONS**

Metalworkers to be experienced in working with aluminium and the techniques specified.

**1.4 SHOP DRAWINGS**

Provide shop drawings showing:

- plans, elevations and sections
- methods of fixing
- methods of joint forming
- finishing techniques
- methods of fabrication and site assembly of large units.

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

**2 PRODUCTS****2.1 ALUMINIUM SECTIONS**

Refer to SELECTIONS.

**Components****2.2 BOLTS**

Grade 316 stainless steel, selecting type and size to suit the work and its location.

**2.3 RIVETS**

Domed with similar composition and mechanical properties to the parent metal.

**3 EXECUTION****Conditions****3.1 HANDLING**

Do not deliver any elements to the site which cannot be unloaded immediately into suitable storage conditions. Avoid distortion of elements during transit, storage and handling. Prevent surfaces rubbing together, and any contact with mud, plaster or cement. Keep protective coverings dry.

**3.2 PREPARATION**

Ensure location and substrate is ready to receive the elements and will allow work of the required standard.

- 3.3 **FLASHINGS**  
Select and use sheet metals suited to the element, process or finish specified, jointing them as necessary to allow full development of their expected durability with a minimising of corrosion and to BRANZ BU 567.
- Assembly**
- 3.4 **PROTECTION**  
During fabrication protect all surfaces which will be visible in completed work.
- 3.5 **COLD FORMED**  
Ensure cold formed work is free from warping, buckling and fractures. Form bends with a brake press or by cold rolling.
- 3.6 **CORNERS**  
Unless specified otherwise, mitre junctions of identical sections.
- 3.7 **HOLES**  
Form without distortion of surrounding metal.
- 3.8 **MOVING PARTS**  
When assembled, all moving parts must move freely and without binding.
- 3.9 **CLEANING**  
Remove all burrs and sharp arrises which would be visible after fixing, or a hazard to the user.
- 3.10 **BONDING**  
Prepare surfaces of metals to receive adhesives by degreasing and abrading mechanically or chemically. Use adhesives in accordance with the manufacturer's requirements. Form bond under pressure.
- 3.11 **RIVETED JOINTS**  
Draw riveted joints tightly together, with rivets closed to completely fill holes.
- 3.12 **MECHANICAL JOINTS**  
Ensure mechanical joints are tight with no visible gaps.
- 3.13 **MECHANICAL JOINTS - ELEMENTS**  
Bed in mastic all mechanical joints of elements which will be located externally, including all mating surfaces, cleats and other fixings.
- 3.14 **MECHANICAL JOINTS - CLEATS**  
Unless specified otherwise connect cleats to frames with countersunk screws where they will be visible after the component has been fixed and where raised heads would interfere with any moving part.
- Application**
- 3.15 **INSTALLATION**  
Locate plugs accurately and use in accordance with the manufacturer's requirements. Fix plumb, level and true to line. Comply with the specified standards, the reviewed shop drawings and installation details, including brackets, bolts, fixings, bedding compounds and sealants.
- 3.16 **LOADING**  
Elements must not carry any structural load unless designed to do so. Do not use railings, balustrades, or similar elements as strutting or support when in place.
- Finishing**
- 3.17 **PREPARATION FOR COATINGS**  
Before applying coatings remove all welding slag, weld spatter, anti-splatter compounds, paints, grease, flux, rust, burrs and sharp arrises. Make good all defects which would show after application of coating. Finish surfaces smooth.

**Completion**

- 3.18 **ENSURE**  
Ensure all elements are free of marks or blemishes, with moving parts working fully and freely.
- 3.19 **REPLACE**  
Replace damaged, cracked or marked elements.
- 3.20 **LEAVE**  
Leave work to the standard required by following procedures.
- 3.21 **REMOVE**  
Remove debris, unused materials and elements from the site.
- 4 SELECTIONS**
- 4.1 **ALUMINIUM METALWORK MANUFACTURED ELEMENT**  
Aluminium strip light mounting profile for boardwalk.
- |           |               |
|-----------|---------------|
| Grade:    | 660           |
| Hardness: | T4            |
| Anodised: | To 25 microns |
| Finish:   | Powder Coated |
- 4.2 **HARDWARE**  
SS masonry anchors and rivets as shown on drawings.

## 6700 PAINTING GENERAL

### 1 GENERAL

This section relates to the general matters related to painting work

#### 1.1 RELATED WORK

Refer to 6711 PAINTING EXTERIOR for exterior paint systems.

#### 1.2 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

#### 1.3 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
SNZ TS 3404	Durability requirements for steel structures and components
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	Health and Safety Programme
Health and Safety at Work Act 2015	

#### Requirements

#### 1.4 NO SUBSTITUTIONS

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

#### 1.5 QUALIFICATIONS

Painters to be a member of MPNZA and experienced competent workers, familiar with the materials and the techniques specified.

#### 1.6 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 Health and Safety Programme. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

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.

#### 1.7 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

#### 1.8 WARRANTY

Warrant this work under normal environmental and use conditions against failure.  
2 years: Warranty period

Refer to the general section 1237WA WARRANTY AGREEMENT for the required format and details of when completed warranty must be submitted.

### Performance

#### 1.9 MANUFACTURER'S INSPECTION

Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested.

#### 1.10 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.

## 2 PRODUCTS

### Materials

#### 2.1 PAINT TYPES

Use the manufacturer's complete system and only the products specified.

#### 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, the MPNZA Specification manual, and WorkSafe NZ: Guidelines for the provision of facilities and general safety in the construction industry.

#### 3.2 PREPARE

Prepare surfaces to the coating manufacturer's requirements.

#### 3.3 COATED SURFACES

Ensure that substrate surfaces are able to achieve the specified finish.

#### 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 BACK PAINTING**

Co-ordinate with cladding and/or lining installer as to who will do the work and timing.

**Exterior**

For exterior cladding and trim that require on site finishing, paint the back and exposed bottom edges at the base of the cladding (generally, bottom plate overhang and horizontal flashings) to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed.

Refer to appropriate exterior paint sections SELECTION clauses for claddings to be back painted.

**Interior**

For lining and trim that require on site finishing and/or back painting (usually wet areas), paint the back and exposed bottom edges at the base of the lining, to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed, or if no front finish seal to manufacturer's requirements.

Refer to appropriate interior paint sections SELECTION clauses for linings to be back painted.

**3.9 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.

**3.10 HARDWARE**

Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion.

**3.11 PROTECTION**

Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

**Preparation - painted surfaces generally****3.12 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.

**3.13 MOULD**

Sterilise surface mould by washing or sponging the whole surface with a one part sodium hypochlorite household bleach to three parts clean water solution. Allow bleach to act for 30 minutes and wash off with clean water. Wash cloths and sponges regularly in clean water.

Reapplication may be necessary. Treat with anti-mould solution to the treatment manufacturer's requirements.

**3.14 GAP FILLING**

Fill cracks, holes, indented and damaged surfaces with putty, plaster filler, wood filler, or plastic wood, 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 putty.

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****3.15 PREPARING SURFACES**

Wash down surfaces with either:

- a chlorine based solution; 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, waterblasting or other methods as appropriate.

Lightly sand glossy surfaces to ensure good adhesion of the coatings.

**Application - before applying final coatings****3.16 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.

**3.17 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.

**3.18 CONCEALED JOINERY SURFACES**

Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

**3.19 CONCEALED METAL SURFACES**

Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

**3.20 DOORS**

Prime or seal and paint all six faces of doors before hanging.

**3.21 BEAD GLAZING**

Before glazing apply the first two coats, or the primer and one undercoat, to rebates of stained, varnished or painted joinery and beads.

**3.22 PUTTY GLAZING**

Follow putty manufacturers recommendations for application, drying, and painting. Ensure that the putty is fully protected by the coating system as soon as it is sufficiently hard.

**Application - generally****3.23 PAINTING GENERALLY**

Comply with the paint manufacturer's requirements and any additional requirements in this specification.

**3.24 MIXING**

Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.



**3.25 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
- as far as possible apply paint in the temperature range 15°C to 25°C
- do not paint if temperatures fall outside the range of 10°C and 35°C unless paints with the necessary temperature tolerance have been specified
- do not apply solvent borne paint if moisture is present on the surface

**3.26 SEQUENCE OF OPERATIONS**

Painting work to generally follow the following sequences:

- back painting and pre-installation painting, then post-installation exposed-face painting
- 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

**3.27 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.

**3.28 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.

**3.29 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.

**3.30 DEFECTIVE WORK**

Correct defective work immediately and re-coat as required, following precisely the paint system specified.

**3.31 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****3.32 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.

**3.33 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.

**3.34 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.

**3.35 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.

**3.36 REPLACE HARDWARE**

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

**4 SELECTIONS****4.1 SELECTIONS**

Refer to 6711 PAINTING EXTERIOR for selections.

## 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

#### Warranties

#### 1.1 WARRANTY

Warrant this work under normal environmental and use conditions against failure.  
2 years: Warranty period

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

#### Requirements

#### 1.2 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide samples for each specified finish for approval by the Landscape Architect.

### 2 PRODUCTS

#### 2.1 PRODUCTS

Refer to 6700 PAINTING GENERAL for product clauses.

### 3 EXECUTION

#### 3.1 EXECUTION

Refer to 6700 PAINTING GENERAL for execution clauses.

### 4 SELECTIONS

#### Paint systems

#### 4.1 GALVANIZED STEEL - ZINC/ALUMINIUM ALLOY COATED STEEL

The contractor is to provide paint systems relevant to the geothermal climate. These are to reviewed with colour options by Landscape Architect for selection.

Element: Light Poles  
Material: Galvanised Steel  
Brand: TBC  
Coating type: TBC  
System: TBC  
Colour: Dark Grey

Element: Seats and Tables  
Material: Galvanised Steel  
Brand: TBC  
Coating type: TBC  
System: TBC  
Colour: Dark Grey

Element: Strip Light Mounting Profile  
Material: Aluminium  
Brand: TBC  
Coating type: TBC  
System: TBC  
Colour: Black

## 8226 GRAVEL & STONE PAVING

### 1 GENERAL

This section relates to the installation of loose aggregate and stone paving for driveway, carpark and footpath areas.

#### 1.1 RELATED WORK

Refer to 3361 Stonework

#### Documents

#### 1.2 DOCUMENTS

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

NZS 4407	Methods of Sampling and Testing Roading Aggregates
TNZ B/02	Specification for Construction of Unbound Granular Pavement Layers

#### Requirements

#### 1.3 QUALIFICATIONS

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

#### Quality control and assurance

#### 1.4 SAMPLES

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

Provide the following samples;

- 1no. bag of aggregate mix as specified in SELECTIONS.

### 2 PRODUCTS

#### Materials

#### 2.1 BASECOURSE AGGREGATE

To NZS 4407. Crushed basecourse aggregate GAP 40. Aggregate containing excessive fines or clay fractions will not be accepted.

#### 2.2 CEMENT STABILISED AGGREGATE

1.5 to 3.75mm Finer Crushed Shell including fines, GAP 7 aggregate and cement mixed in the following proportions;

- Crushed Shell: 40%
- GAP 7: 55% (40% Fines)
- Cement: 5%

Mix in rotary mixers prior to placing onto the prepared base.

#### 2.3 HOGGIN

Natural, scoria, lime and pumice blend - TBC via sample process with supplier.

#### 2.4 GRAVEL

Natural, unscreened stone up to 10mm maximum, with 30% to 40% less than 5mm including fines.

#### 2.5 FEATURE ROCKS

Feature rocks. Refer to SELECTIONS.

### 3 EXECUTION

#### Conditions

#### 3.1 SETTING OUT

Set out to the dimensions shown on the drawings.

Construct footpaths in to levels, grades and cross falls matching the surrounding ground levels.

Ensure that the finished level of the path matches the surrounding ground level without ponding on the path or on adjoining ground.

#### 3.2 FORMATION TO SUBGRADE LEVEL

Complete the formation to subgrade level to leave it well compacted, firm, and free from any weak spots or loose material.

Remove all topsoil from the construction width of the footpath, and remove to stockpile onsite.

Where the excavation to subgrade has not removed all the topsoil or contains weak material, undercut works material to a firm base and supply and install GAP 40 aggregate to make up levels to the subgrade level.

#### 3.3 FORMATION ON SIDLING SLOPE

Cut so that the subgrade on the low side of the path is on natural ground. Cross fall of path to fall towards the low side at a maximum of 4% grade.

Cut the upslope side so that the maximum grade of the cut batter is 1vertical: 3horizontal.

#### 3.4 BASECOURSE

To TNZ B/02. Lay basecourse on the prepared subgrade, free of loose material or surface water.

Lay in layers to achieve the design depth and compacted in layers not exceeding 100mm.

Compact with no less than 4 passes of a vibrating pedestrian roller or plate compactor. Leave the surface fully compacted with a tight surface with no loose aggregate stones.

#### 3.5 COMPACTED SURFACE MATERIAL

To TNZ B/02. Place and compact surface material to design levels with slight camber to fall to adjacent grass and kerbs. Compact with no less than 4 passes of a vibrating pedestrian roller or plate compactor. Leave the surface fully compacted with a tight surface with no loose aggregate stones.

Compact aggregate and hoggin with water added during the final compaction to bring finer aggregates to the surface.

The final surface shall be firm, even and flush with edgings where provided, and within surface tolerances.

#### 3.6 FEATURE ROCKS

Excavate a hole for the rocks accommodating one third of rock below the ground surface.

If rocks are potentially unstable, place site concrete to the base to stabilise them. Concrete shall not be visible on the finished surface.

The placed rocks shall not have water ponding around them.

#### 3.7 BACKFILL

Where paths are constructed in grassed areas, respread and compact topsoil adjacent to the paving edging to fill all depressions and voids and provide a compact and free draining surface, and re-grass. Re-use topsoil from stripping operations.

#### 3.8 CLEAN UP

Clean up as the work proceeds.

#### 3.9 LEAVE

Leave the whole of this work in a sound, coherent, voidless and level to grade condition, free of any defects.

#### 3.10 REMOVE

Remove debris, unused materials and elements from the site.

### 4 SELECTIONS

#### 4.1 CEMENT STABILISED AGGREGATE

Location:	Existing path extension - stage 1
Aggregate:	GAP7 - To match existing
Bed thickness:	100mm

**4.2 PAVING - HOGGIN**

Location: Stage 1 & stage 1a  
 Type/source: Hoggin shall be 1.5 to 3.75mm finer grade Limestone chip, GAP 7 Scoria, Pumice 5mm aggregate.

Limestone 55%  
 Pumice 25%  
 GAP 7 Scoria 20%  
 (source TBC, compacted sample to be provided, and trial period to confirm weathering).

Bed thickness: As per details

**4.3 FEATURE ROCKS**

Location: As per landscape plans  
 Size: Lake Walls/Edge: Varying - Min, 700mm Max. 2000mm

Rock Gardens: Varying - Min, 250mm Max. 700mm  
 Flat pancake style rock similar to those within existing lakefront.  
 Source: Rainbow Mountain Quarry  
 Contact: Brian Nicholl  
 027 659 7877

Notes: Rock type has been selected due to aesthetics, this has been coordinated with quarry and landscape architect. Contact landscape architect for sample photos.

Layout to be confirmed on site by landscape architect.

**8231 SEGMENTAL PAVING****1 GENERAL**

This section relates to the bedding and laying of:

- Natural stone large unit slabs (basalt) to form weighted end pavilion feature at the end of the boardwalk.
- Stone inlay pavement on insitu concrete - provisional elements

**1.1 RELATED WORK**

Refer to 3361 for STONWORK  
 Refer to concrete section/s for concrete work

**Documents****1.2 DOCUMENTS**

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

AS/NZS 1428.4.1	Design for access and mobility - Means to assist the orientation of people with vision impairment - Tactile ground surface indicators
NZS 3104	Specification for concrete production
NZS 3116	Concrete segmental and flagstone paving
AS/NZS 4455.2	Masonry units, pavers, flags, and segmental retaining wall units - Pavers and flags
AS/NZS 4456	Masonry units, segmental pavers and flags - Methods of test

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**

Pavers to be experienced competent workers, familiar with the materials and the techniques specified.

**1.4 CONFIRM APPEARANCE**

Before commencing work confirm the layout and any elements affecting the visual appearance of the work. Pavers should be mixed on site from several pallets to ensure blending and avoid colour contrasts. Ensure extra paving is required to be from the same batch number to avoid colour variation.

**2 PRODUCTS****Materials****2.1 STONE PAVERS**

Quarried natural stone pavers, to AS/NZS 4456 for transverse strength, and with a minimum compressive strength of 170 MPa.

**Components****2.2 STABILISED JOINTING SAND**

Proprietary, hard, durable, angular particles, with no pumice particles and to NZS 3116 and to the grading limits of table 5, Grading limits for jointing sand.

**2.3 CONCRETE**

Prescribed mix to NZS 3104 (except where specified otherwise).

Haunching concrete: 17.5 MPa  
 Infill concrete: 25 MPa.

**Components - bedding on concrete base**

**2.4 PRIMER**

Acrylic bonding agent. Apply to the underside of the pavers/flagstones to the manufacturer's specifications.

**2.5 MORTAR**

3: 1 Sand and cement bedding coat with liquid polymer additive, to the paving manufacturer's stated requirements.

**Accessories****2.6 SEALER**

A clear, low viscosity urethane prepolymer liquid.

**3 EXECUTION****Conditions****3.1 STORAGE**

Take delivery of blocks and pavers in protected pallets, undamaged and dry. Store on level hard standings, protect from damage and keep dry until laid.

**3.2 INSPECTION**

Before starting paving work inspect the area to ensure that kerbing, edge restraints, drainage, cesspits, channels, basecourse and other services are in place to correct falls and to allow work of the required standard.

**3.3 SURFACE TOLERANCES**

Final surface of paving:	±5mm of design level
Surface level above drainage:	5mm minimum above drainage channels or gully entries and continuously graded towards them
Maximum deviation:	8mm in 3 metres without ponding
Between adjacent blocks:	< 2mm

**Application****3.4 CUTTING PAVING**

Large format stone slabs will be CNC or water jet cut in factory from 3D digital cad file provided by landscape architects - no site cutting permitted. Lead in time for stone order to be allowed for - procurement and fabrication methodology to be submitted prior to ordering materials.

**3.5 JOINT FILLING**

All 3mm joints to be grout filled - product and colour match to approved sample. Flexible joints maybe required refer to engineers details - if required to be filled with silicone - product and colour match to approved sample.

**3.6 LAY PAVING ON MORTAR BED**

Lay paving on a wet mortar bed of nominal thickness 30mm to provide full contact with the underside of the units. Ensure that cement is kept off the surface as it can cause staining. Remove surplus mortar as work progresses. Prime the bonding face with surface primer and place to the nominated laying pattern. Bed down paving to a level of approximately 2mm higher than the desired finish level. Contractor to provide an installation methodology given the large format slab units, this will include access and crane lifting operation, lifting eyes (if required).

**3.7 COVER**

Cover slabs with hessian sheets and spray with water mist. Maintain moist for a minimum of 12 hours. In areas subject to pedestrian construction traffic install and maintain barriers, boards or other protection, for the first 12 hours of curing.

**3.8 GROUTING**

After a minimum of 12 hours curing grout the joints. Where necessary remove foreign material from within the joints. Until joints are grouted protect the paver with a complete cover at all times. Prepare grout mix. Dampen joints with a sponge and pour grout mix into joints ensuring full penetration for the thickness of the paving slab by lightly tamping down a trowel edge into the grouting mixture. Use a rubber squeegee to spread grout evenly into all joints until filled flush with the top of the paving unit. Remove excess grout, allow initial set and lightly broom off remaining excess perpendicular to joints. Wipe pavers/flagstones clean with a damp sponge.

**Finishing****3.9 SEALER**

When inspections show no loss of jointing sand or settlement of pavers/flagstones, clean paving, removing marks and stains and apply acrylic sealer to the surface to NZS 3116, clause 313.1 Surface coatings and the sealer manufacturer's requirements.

**3.10 PROTECTION**

Protect the completed work from damage and from dropping other materials during the remainder of the construction period. Do not use the completed work as a building platform or for material storage.

**Special Features****3.11 SPECIAL FEATURES**

Allow for cutting around all features - bollards, light columns, handrails, posts, water fountains etc.

**Completion****3.12 REPLACE**

Replace damaged, cracked or marked elements.

**3.13 LEAVE**

Leave work to the standard required by following procedures.

**3.14 REMOVE**

Remove debris, unused materials and elements from the site.

**4 SELECTIONS****4.1 NATURAL STONE SLAB PAVING - REFER SELECTIONS 3361 STONEMWORK**

Location:	End of boardwalk stage 1
Thickness:	Decking & steps 375mm, seats 450mm & varies up to 1000mm on deck/wall faces
Size:	varies
Bed:	SteinTec Tuffbed

**4.2 SEALER**

Brand:	Seal all stone with approved stone sealer, approved by Landscape Architect.
Type:	TBC

## 8310 LANDSCAPE SITE PREPARATION

### 1 GENERAL

This section relates to:

- clearing and disposal of existing vegetation
- removal and disposal of existing inorganic debris
- weed spraying
- pruning existing trees and shrubs
- minor landscape earthworks
- removal of existing hardstand surfaces

#### 1.1 RELATED WORK

Refer to 8321 SOIL AND SOIL PREPARATION.

#### Documents

#### 1.2 DOCUMENTS

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

TNZ F/01 Specification for Earthworks construction

#### Requirements

#### 1.3 ARCHAEOLOGICAL DISCOVERY

If fossils, Maori artefacts, antiquities and other items of value are found refer to the general section 1220 PROJECT for actions to be taken with archaeological discovery.

#### 1.4 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified. Construction plant and equipment shall only be operated by licensed or experienced operators as appropriate.

Only certified applicators shall be responsible for the application of herbicides.

#### 1.5 ACCESS FOR MACHINES

Determine working conditions and access for machines. Take into account the time of year, the nature of the ground and subsoil to be excavated, the ground water table and all matters influencing the carrying out of the work.

#### 1.6 MYRTLE RUST

For identification and treatment of myrtle rust and the growing, transporting and planting plants in the myrtle family (family Myrtaceae) follow the protocols and precautions of the NZ Plant Producers Inc. (NZPPI) website guidelines: [www.nzppi.co.nz/myrtlerust](http://www.nzppi.co.nz/myrtlerust).

Any suspected myrtle rust finds must be reported immediately to the Project Administrator. On direction of the Project Administrator immediately notify the Ministry for Primary Industries (MPI) Exotic Pest and Disease Hotline on 0800 80 99 66

#### Quality control and assurance

#### 1.7 INSPECTIONS

Notify the Contract Administrator for inspection of the works following:

- Identification of unsuitable materials requiring removal
- Prior to the placement of any fill material
- At the completion of the Site preparation

### 2 PRODUCTS

#### Materials

#### 2.1 IMPORTED FILL

Cohesive clay, clean and free of stones, rubble, organic material, contaminants, stumps, branches and construction debris. Obtain the approval of the Contract Administrator prior to importing the material to site for placement.

Imported aggregate fill shall be proprietary GAP40 or GAP65.

#### 2.2 HERBICIDES

Post-emergence selective chemical to control broadleaf weeds and/or a non-selective chemical. Submit for review the proposed chemical and area of use.

### 3 EXECUTION

#### Conditions

#### 3.1 DELIVERY

Only deliver material to the site that can be immediately placed in its final location from the delivery vehicle.

#### 3.2 REPORT

Report any survey pegs, bench marks, and the like on any features, leaving them undisturbed until approval is given for removal.

#### 3.3 RETAINED FEATURES

Refer to SELECTIONS/drawings for those features to be retained. Mark out those features to be retained with 1.0m high 50mm x 50mm timber stakes with yellow plastic tape between, to eliminate accidental damage.

#### 3.4 SETTING OUT

As described on the drawings, confirm with the Contract Administrator prior to commencing works.

#### 3.5 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. Refer to the general section 1250 TEMPORARY WORKS & SERVICES for more details.

Undertake regular inspections and maintain the erosion and sediment control measures in operational order.

On stabilisation of disturbed soil or upon sufficient ground cover, remove control measures including the disposal of silt off site.

#### Installation/application

#### 3.6 TOLERANCES

All cut and fill work shall be free draining and be constructed to the design levels and shapes to  $\pm 100$ mm. Ensure NZ Building Code ground clearances are maintained against buildings. Ensure all surfaces are graded to shed water and maintain overland flow paths.

#### 3.7 CLEARING - GENERAL

To TNZ F/01 Earthworks construction. Clear the working area of all vegetation and structures except those specifically required to remain.

Include all areas affected by cutting and filling together with sufficient additional areas on which to stockpile stripped topsoil.

Include the complete removal of all trees and other vegetation, stumps, inorganic debris, pipes, fences, stone walls, retaining walls, hardstand surfaces, boulders, and other materials as specified. Where machine clearing is not possible, remove vegetation by hand methods. Remove roots from cleared vegetation during cultivation work. Take particular care around the root zone of trees to be retained.

The clearing of hardstand surfaces shall include saw cutting where necessary, breaking and excavation of bedding materials and disposal off site. Store on site cleared materials for re-use.

#### 3.8 TREE CLEARING

Trees and shrubs to be cleared includes the removal of stumps off site. Stumps in excess of 300mm in diameter may be ground in lieu of removal.

**3.9 WEED SPRAYING**

Provide details of the proposed herbicide and spraying method prior to spraying.  
 Spray all vegetated areas to be planted with 2 applications of approved herbicide one week apart, and one week prior to clearing.  
 Clear or mow any vegetation exceeding 200mm in height prior to application of herbicide. Herbicide shall be applied to cleared or mown areas following sufficient re-growth of the weeds through the mulch as approved by the Contract Administrator.

Existing grass areas to be re-sown shall be eradicated by an application of translocated herbicide.  
 Spraying of herbicides shall not take place in windy conditions and the Contractor shall be responsible for reinstating any damage caused by drift of spray.  
 Where a translocated herbicide is used around plants in leaf to be retained, an adequate guard must be used, or a suitable hood applicator used for spot treatment.

Carefully calibrate all spraying equipment to prevent over or under dosing.  
 No herbicide containers, empty or full, are to be left unattended on site at any time.  
 Planting shall not proceed until at least two weeks after the first application of the residual herbicide, unless prior approval is obtained.

**3.10 TOPSOIL STRIPPING**

Do not start topsoil stripping until silt control measures are installed.  
 Strip all topsoil including turfs, humus and organic materials. Stockpile stripped topsoil separately and neatly outside of the stripped areas for later re-spreading or disposal. Trim the stockpiles to a free draining slope to reduce ingress of rainwater.

Unless otherwise specified, do not remove topsoil from the site, and surplus topsoil shall remain on site.

**3.11 MINOR EARTHWORKS**

Earth-worked surfaces to have sufficient fall to shed water in a controlled manner and prevent ponding.  
 Obtain suitable fill material for the earthworks from the cut areas if available, or import where there is a shortfall. Ensure fill material is free of organic material, contaminants, stumps, branches and construction debris.

Place and compact the material to be used for general landscape shaping in layers not exceeding 150mm, and compact by track rolling in 4 passes with equipment in excess of 10 tonnes weight or other approved methods to prevent undue settlement.  
 Fill material placed adjacent to pipes, walls and other structures shall be compacted by hand held vibrating plate compaction equipment. Heavy equipment shall not be operated within one metre of any pipes or structures.  
 Ensure that all batters are maintained in a stable condition at all times.

**3.12 UNSUITABLE MATERIALS**

Advise the Contract Administrator if unsuitable materials are encountered. Remove and dispose of these materials and backfill with compacted clay or hardfill as directed by the Contract Administrator.

**3.13 TOPSOIL RESREADING**

Refer to 8321 SOIL AND SOIL PREPARATION.

**3.14 SURPLUS MATERIAL**

Remove surplus excavated material from the site continually as the excavation proceeds.  
 Clean up continually any excavated material dropped on footpaths or roads.

**Completion****3.15 ROUTINE CLEANING**

Reinstate all areas affected by the works to pre-construction condition or better.  
 Remove all rubbish and spoil from the site on completion of the works, leaving the site in a clean and tidy condition.

**3.16 PROTECTION**

Provide the following temporary protection of the finished work:  
 Protect all imported topsoil from contamination and compaction.  
 Rope off all areas of completed work by appropriate means.

**4 SELECTIONS****4.1 RETAINED FEATURES**

Refer to general arrangement and surface finishes drawings or as noted in the site clearance and demolition plans.

## 8321 SOIL AND SOIL PREPARATION FOR PLANTING

### 1 GENERAL

This section relates to the supply, preparation and placement of soil and plant mix for the planting of:

- trees
- shrubs
- lawns

#### 1.1 RELATED WORK

Refer to 8310 LANDSCAPE SITE PREPARATION.

#### Documents

#### 1.2 DOCUMENTS

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

NZS 4402	Methods of testing soils for civil engineering purposes
NZS 4454	Composts, soil conditioners and mulches
TNZ F/1	Specification for Earthworks construction

#### Requirements

#### 1.3 QUALIFICATIONS

Landscapers to be experienced competent workers, familiar with the materials and the techniques specified.

### 2 PRODUCTS

#### Materials

#### 2.1 TOPSOIL

To NZS 4402 and NZS 4454. Top quality screened topsoil stripped from its original location to a maximum depth of 200mm:

- 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 PLANT MIX

Thoroughly mixed medium of 60% compost and 40% bark, pumice and fertiliser by volume.

#### 2.3 BACKFILLING

Thoroughly mixed medium of 30% peat and 70% topsoil by volume.

#### 2.4 HERBICIDES

Post-emergence selective chemical to control broadleaf weeds and/or a non-selective chemical. Submit for review the proposed chemical and area of use.

#### 2.5 IRRIGATION SYSTEM

Refer to 8511 IRRIGATION SYSTEM.

### 3 EXECUTION

#### Conditions

#### 3.1 DELIVERY

Only deliver material to the site that can be immediately placed in its final location from the delivery vehicle.

#### 3.2 SERVICES

Check for services in the area of this work. Avoid interference or damage to them. Ensure that all new services are in place before commencing work.

#### 3.3 ENSURE

Ensure that all areas are clean, ready to be worked and clear of any continuing work by others.

#### Application

#### 3.4 PREPARATION OF PLANTING AREAS

Replace substandard soil with 200mm of plant mix. Place in 100mm layers, lightly compacted by heeling or rolling and slightly mounded in the centre of the bed.

Thoroughly spray planting 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.

Spread mulch following spraying.

#### 3.5 PREPARATION OF GRASS AREAS

Replace substandard soil with 150mm 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 min 2 times prior to grassing at fortnightly intervals..

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.

#### 3.6 TOPSOIL SPREADING

Two weeks prior to spreading topsoil weed spray the site topsoil mound with approved herbicide to remove weed cover.

Spread topsoil to the compacted depth as stated in TNZ F/1 for the following areas;

Grassed areas (made good)	50mm
Parks and reserves grassed areas (new)	150mm
Shrub areas	450mm
Tree pits	1000mm (or to water table near lake edge)

Do not place and spread topsoil when the ground or topsoil are excessively wet or in a condition which would be detrimental to the work.

Carry out final grading of the top 100 - 150mm to ensure a true specified level and slope and to avoid hollows or other depressions where water may collect. Loosen unduly compacted areas (such as in traffic routes) by ripping or discing prior to final levelling. The final grade shall allow for subsidence so that after settlement the levels shall be the final specified levels.

#### 3.7 FINAL GRADING

When topsoil is reasonably dry and workable, grade it to smooth, flowing contours, with falls, for adequate drainage, removing all minor hollows and ridges. Crown all planter beds to provide a gently rounded profile.

#### Completion

#### 3.8 CLEAN UP

Clean up and remove surplus soil from the site.

#### 3.9 REMOVE

Remove debris, unused materials and elements from the site.

### 4 SELECTIONS



## 4.1 SOIL SCHEDULE

Location	Soil Type	Depth (mm)
Grass	Refer to drawings	150
Shrubs	Refer to drawings	450
Trees	Refer to drawings	900,1200

## 4.2 PLANT MIX

Refer to Planting Schedule, 3.9.01

## 8332 PLANTING

## 1 GENERAL

This section relates to Planting

It includes;

- Preparing ground conditions
- Planting trees, shrubs and groundcovers
- Applying soil, fertiliser and mulch
- Staking and generally securing trees

## 1.1 RELATED WORK

Refer to 8310 LANDSCAPE SITE PREPARATION for excavation.

Refer to 8321 SOIL AND SOIL PREPARATION for topsoil.

Refer to 1231 CONTRACT for Principle nominated planting supply and planting sub contractor.

## 1.2 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:

PB Planter Bag

**Documents**

## 1.3 DOCUMENTS

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

NZS 4454 Composts, Soil Conditioners and Mulches

## 1.4 SUPPLIER DOCUMENTS

Supplier's documents relating to this part of the work:

Council has nominated the plant supply and planting contractor as noted in 1231 CONTRACT Specification.

**Warranties**

## 1.5 WARRANTY

Provide warranty for:

36 months: For all planting

- Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.
- Commence the warranty from the date of practical completion of the contract works.

**Requirements**

## 1.6 QUALIFICATIONS

Landscape contractors to be experienced, competent landscapers familiar with the materials and techniques specified.

## 1.7 ACCEPTABLE PRODUCT SUPPLIERS

Where a product supplier is named in SELECTIONS, the product must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

## 1.8 NO SUBSTITUTIONS

Substitutions are not permitted to any of the products listed in this section.

**1.9 SAMPLES**

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

Provide the following samples for review by the Landscape Architect:

All plants and mulches to be sampled and approved by Landscape Architect, by means physical inspection (nursery visit)

Initial 100m<sup>2</sup> of each planting type to be inspected by Landscape Architect for approval. Contractor is to allow for rework if sample is not approved.

**Quality control and assurance****1.10 INSPECTIONS**

Landscape Architect to inspect all plants before planting. They shall be inspected on delivery to site or at the contractor's depot in a single batch. Any plant not approved by the Landscape Architect shall be replaced.

Plants to be first class specimens of nursery stock, true to name and type with well developed and well shaped trunk or stem and head. They shall be well hardened off to cope with the climatic conditions of the site, and free from pests and disease.

The roots shall have a high percentage of fibrous roots that are just touching the edge of their containers. Plants with roots that are wound round their containers in circular fashion shall be rejected.

Plants shall be free from disfiguring knots, bark abrasions, wind, or freezing injury or other disfigurements and shall bear evidence of proper pruning.

Where several specimens of the same species are to be selected, evenness of shape and size is required within the size range specified.

**1.11 IDENTITY**

Plants to be good and true representatives of their species, cultivar or variety and each batch shall be labelled.

**1.12 LABELLING**

Attach legible labels to each plant delivered to site as a separate unit, or to each box, bundle or bale containing plants. The labels shall give the approved botanical name, size, age and quantity and other information required to identify the plant or plants.

**1.13 PLANTER BAGS**

UV stabilised black plastic planter bags (PB). Standard bag sizes range from PB3 to PB150. Plant sizes are specified by PB bag size (pint bag) up to PB150. Thereafter specimen trees may be specified by bag size, girth or height or a combination of these.

**1.14 HEALTH**

Ensure plants are free of pests, diseases, disorders, disfiguring knots damage or pruning injury.

**1.15 RESPONSIBILITY FOR CONTINUED SURVIVAL, HEALTH AND GROWTH**

The Contractor is responsible for the survival, good health and adequate growth of plants connected with this contract during transportation, storage or when planted on the site during the contract and maintenance period.

Replace any plants which die, are significantly damaged, or which show signs of significant stress or declining health during the contract and maintenance period. Plants destroyed by vandalism by others or theft once planted are excluded from this condition.

The contractor is to allow for enrichment planting through maintenance period to ensure full coverage and 100% success rate at end of maintenance period.

**1.16 MYRTLE RUST**

For identification and treatment of myrtle rust and the growing, transporting and planting plants in the myrtle family (family Myrtaceae) follow the protocols and precautions of the NZ Plant Producers Inc. (NZPPI) website guidelines: [www.nzppi.co.nz/myrtlerust](http://www.nzppi.co.nz/myrtlerust).

Ensure:

- Plants from a commercial nursery have the appropriate completed copies of the NZPPI Nursery Management Declaration form and Plant Transport Declaration form.
- Treatment records are provided for non-commercially sourced plants
- Myrtaceous plants are within the effective period of cover for the treatment used at time of dispatch (different treatments and cover periods are on the NZPPI website).

Any suspected myrtle rust finds must be reported immediately to the Project Administrator. On direction of the Project Administrator immediately notify the Ministry for Primary Industries (MPI) Exotic Pest and Disease Hotline on 0800 80 99 66.

**Weed Control****1.17 WEED CONTROL**

Use Chemical Herbicides with caution. They shall conform in every respect to the mixture required and be applied strictly in accordance with the manufacturers instructions. Do not spray herbicide in windy conditions. Make good any damage caused by excess spray drift.

All chemical herbicides used are to be non-toxic to human beings, birds and animals under normal use and only those chemical herbicides registered under the Pesticides Act may be used.

Where a translocated herbicide such as glyphosate is used around plants in leaf, an adequate guard must be used for all spraying.

Carefully calibrate all spraying equipment to prevent under or over dosing. Replace any plants damaged by misplaced herbicide. No herbicide containers, empty or full, are to be left on site at any time.

**1.18 FLAIL MOWING WEED**

Where the height of existing weed to be sprayed is greater than 300mm, trim back to 100mm to encourage new susceptible growth and to facilitate even application of herbicide. Remove cuttings and dispose of off site.

**1.19 PRE-CULTIVATION HERBICIDE**

The Contractor is responsible for advising all necessary bodies of their intention to apply herbicide and to obtain all permissions and certificates necessary for carrying out herbicide application. Take great care to avoid spray drift onto plants to be retained and any adjacent land or other property. Pre-cultivation herbicide shall be glyphosate. Spray at least four weeks before cultivations are due, (during active growth of the target weeds), to the actively growing leafy weed, when no rain is expected for at least twelve hours. No cultivation or planting shall take place until the symptoms of herbicide effects are visible throughout the treated area, even if this takes longer than two weeks from application.

Second and further spraying visits may be necessary if all weed is not killed by the first. Weed species that are not susceptible to glyphosate shall be removed by other approved means.

Do not apply herbicide to water plants emerging from water and do not apply herbicide to plants in the flowing water of streams.

**Cultivation****1.20 CULTIVATION OF PLANTING AREAS**

Cultivate planting areas to a depth of 250mm to form a firm and friable tilth suitable for pit planting by hand.

During cultivations remove all weed including weed root off site. Grade to smoothly flowing or even contours to the finished levels by hand or machine as necessary.

**1.21 STONE/DEBRIS PICKING**

After cultivating remove all stones, grass sods and other debris larger than 25mm in any dimension and all roots in excess of 15mm diameter or 200mm length.

**2 PRODUCTS**

## Materials

- 2.1 **CONTAINER GROWN SHRUBS**  
Container grown shrubs to be strong well-rooted sturdy plants, without stakes or canes, with two or three main stems and a good bushy form. They must have been grown in the containers for at least 6 months over a summer period prior to planting out. The container shall be full of root but not root bound. Recently 'Containerised' or 'bagged up' plants will not be accepted. Plants shall not have been grown in the container for longer than 12 months without having been potted on.
- 2.2 **TREES**  
Tree species to have a single well defined leader and a reasonably straight main stem which is sturdy enough to easily support the crown of the tree under the environmental and climatic conditions of the planting site.
- 2.3 **SPECIMEN TREES**  
The crowns of specimen trees to be vigorous, evenly developed, well branched and with a single well defined, sturdy leader.
- 2.4 **ROOT SYSTEMS**  
All plants to have good, vigorous, fibrous root systems in keeping with the normal rooting habit of the species. Root balls and container growing medium shall be free from perennial weed and soil borne plant diseases.
- 2.5 **BRANCH SYSTEMS**  
Plants to have well developed vigorous branch systems of normal habit, dimensions and density for a well grown nursery plant of their species. Plants which have 'leggy', narrow or thin branch systems will not be accepted.
- 2.6 **HARDINESS**  
Plants to be fully hardy having been acclimatized in the nursery to sun, exposure and cold. Plants which have not been hardened off, drawn plants with soft growth or plants requiring additional support to that specified will not be accepted.
- 2.7 **DRYING OUT**  
Plants which have dried out or show signs of desiccation or wilting will not be accepted.
- 2.8 **SIZES**  
For acceptable sizes of plants refer to SELECTIONS. Plants which are larger than the maximum size may be accepted at the discretion of the Contract Administrator who may require oversize plants to be pruned. Where plants have been recently "bagged on" from a smaller nursery grade they will be deemed to only fulfil the size requirements of the smaller grade. All plants of the same species to be of similar height and stature ( $\pm 10\%$ ). Plants supplied later in the contract to replace defective plants are to match the current size of those previously planted.
- Components**
- 2.9 **TIMBER FOR STAKES (TO BE APPROVED BY CLIENT (ABG))**  
All staking timber is to be treated as follows:  
Timber in contact with the ground: H4 - stained black  
Timber not in contact with the ground: H3.2 - stained black  
Where cutting or drilling of treated timber is unavoidable, treat all exposed surfaces with an approved preservative.
- 2.10 **TREE STAKING FRAMES FOR SPECIMEN TREES**  
Construct from two 2400mm x 75mm x 75mm H4 stakes, bottoms pointed, and one 750mm x 100mm x 25mm H3.2 cross bar.
- 2.11 **TREE TIES**  
Flexible rubber or similar approved material. The belt shall be 50mm - 75mm wide and of sufficient strength to hold the tree firmly without stretching or cracking.

- 2.12 **ORGANIC MULCH**  
To NZS 4454 Composts, Soil Conditioners and Mulches. Grade 3 Bark Mulch. Supply a small sample bag to the Contract Administrator for approval prior to delivery.  
Mulch to be living earth - colour black or similar approved supply.
- 2.13 **INORGANIC MULCH**  
Local washed pumice/ lake pebble Uniform size or graded material size range 6mm - 10mm. Samples required.
- 2.14 **COMPOST**  
To NZS 4454. Provide well rotted vegetative material or animal manure, free from harmful chemicals, grass and weed growth.
- 2.15 **TOPSOIL FROM STOCKPILE**  
Top quality screened topsoil minimum depth 300mm excluding soil conditioner to all planters or planted areas. Free of weeds and stones. Screened site topsoil may be used.
- 2.16 **FERTILISER FOR PLANTING**  
Well-balanced 6 month slow release fertiliser including available nitrogen, phosphorus and potassium plus magnesium and trace elements. Fertiliser in granular form to allow distribution through the backfill mix.  
Apply slow release fertiliser at a rate of 100g per specimen tree and mixed evenly with the backfill mix.
- 3 EXECUTION**
- Conditions**
- 3.1 **DELIVERY, STORAGE AND HANDLING**  
Take delivery of materials and goods and store on site and protect from damage. Cover plants during transportation. Plant roots shall be protected at all times from sun or drying winds. Plants that cannot be planted immediately on delivery shall be kept in the shade, well protected, with soil well watered. If shoots or roots suffer slight damage they shall be carefully pruned and treated with an approved fungicidal sealant. Replace damaged plants. Remove pots and other protective materials immediately prior to planting. Do not leave roots uncovered at any time.
- 3.2 **APPROVAL**  
Do not start preparation or planting until the setting out has been inspected and approved by the Contract Administrator.
- 3.3 **PRE-INSTALLATION REQUIREMENTS**  
Prepare all planting areas indicated on the drawings including clearing out, controlling weeds, forming new planters, cultivating, and adding soil conditioner, fertiliser and bark mulch.
- 3.4 **CLEAN OUT PLANTER AREAS**  
Remove weeds, unwanted plants, stumps, rubbish, and excess earth.
- 3.5 **PROTECT EXISTING PLANTING TO BE RETAINED**  
Protect plants that are indicated on the plans to be retained. Make good any damage, including replacement where necessary.
- 3.6 **TEND EXISTING PLANTING TO BE RETAINED**  
Tend any plants that are indicated on the plans to be retained. This includes removing dead branches and pruning or cutting back so that plants are compact, tidy in appearance, healthy, and of the required size and shape.
- 3.7 **TOPSOIL**  
Supply and install topsoil to planting areas to achieve finished surface levels, and to ensure specified topsoil depths are achieved. Remove existing earth where necessary to accommodate topsoil and soil conditioner in planters to achieve finished surface levels.

**3.8 SOIL CULTIVATION AND CONDITIONER**

Supply and incorporate soil conditioner to all planting areas where indicated on the plans at the rate of 0.075m<sup>3</sup> per m<sup>2</sup> (75mm depth) worked into the top 150mm of existing soil.

**3.9 FINISHED SURFACE LEVELS**

As per levels plans

**3.10 MARKING & DIMENSIONS**

Set out the outlines of seeding, turfing and planting areas. Use sand, paint or short canes close enough together to accurately define the shapes on the ground.

**Installation/application****3.11 PLANT LAYOUT**

Place and plant at the same density throughout that species area, group or drift. Do not plant in regular rows unless this is shown on the drawings. Pay particular attention to the distribution of plants around the perimeter of areas to ensure they are evenly spaced and that the front row of plants follows the shape of the area.

**3.12 CURVED EDGES**

Achieve a smooth and even curve when setting out curved edges and outlines of planting next to grass or hard surfaces. The first row of plants in the planting area is to exactly follow this curve at a constant distance behind it.

**3.13 MAINTAINING MARKINGS**

Keep all setting out visible until planting has been finished.

**3.14 PIT SIZE**

Dig the planting pit large enough to allow the root-ball of plants to be accommodated without distortion or, in the case of bare root/open ground plants, for their roots to be fully spread. Do not distort or bend roots to fit into the planting pit.

**3.15 PRUNING**

Prune any damaged or diseased roots and branches.

**3.16 PLANT POSITIONING**

Place plants in the centre of the planting pit with their main stem vertical and at such a depth that the firmed down soil after planting is at the same height as the nursery ground level or the container soil level.

Pierce the bottom of each hole to a depth of 200mm with the tines of a fork or similar implement to ensure root penetration and free drainage. Roughen the sides of pits dug by rotary augers.

The base of each hole shall be provided with a 25mm layer of proprietary compost. Apply fertiliser to the base of the dug hole.

Remove container from container grown plants immediately prior to planting. Take care to ensure that the root ball is not disturbed during container removal or planting.

Set plants in their final positions with main stem vertical and at such a depth that the soil, when firmed down is at the same height as the nursery earth marks on the stem or the container soil level.

Spread out loose roots in a natural fashion, carefully place the soil under and amongst them to fill all voids and firmed in.

**3.17 BACKFILL**

Back fill with finely broken down topsoil free from clay lumps and large clods and thoroughly mixed with slow release planting fertiliser. Spreading of planting fertiliser on the soil surface after planting will not be accepted.

**3.18 TWIG PULL TEST**

It should not be possible to lift or disturb the roots of a properly firmed plant by pulling on leaves or un-lignified shoots.

**3.19 HEELING IN**

Heel the soil firmly after planting and thoroughly water.

**3.20 BACKFILL FERTILISER**

Incorporate slow release fertiliser tablet into the backfill of each planting hole at the following rates:

Horreq Controlled Release Fertiliser Tablets or an approved equivalent at a rate of 1-6 tablets per plant as per the manufacturer's specification for varying plant sizes

Plant Height	number of tablets
0-300mm	1
301-600mm	2
601-900mm	3
901-1200mm	4
1201-1500mm	5
1500mm and above	6

**3.21 WATER GENERALLY**

Provide water supply for watering (or water carts if necessary) and water the installed plants to the level required for the season the planting is programmed to be installed. Additional watering will be required during the drier seasons.

Attention must be paid to watering during and after planting to ensure successful establishment. All plants shall be thoroughly watered a few hours prior to planting, and again immediately after planting.

**3.22 STAKING FRAME**

Orientate all staking frames in the same direction and this shall be, as far as possible, so that the prevailing wind blows the tree towards the cross bar. Drive two stakes into the ground parallel and at 675mm centres to stand 1500mm min. above ground level and 700mm min. below. Securely nail the cross bar to the stakes at right angles with its top edge level and flush with the top of the stakes. Use two nails at each joint.

**3.23 TYING**

Secure the tree on the same side of the cross bar as the two stakes. Tie the stem in the middle of the cross bar with one tree tie. Secure the stem close to the bar, firmly and without gap or slack in the belt to avoid movement in high winds. Nail the tie pad to the crossbar. Pass the strap around the tree and through the slits in the pad before nailing the strap to the crossbar with four galvanized nails. Cut the strap so that 75mm exceeds the spacer on each side.

**3.24 MULCHING**

Dress all planter areas with a minimum 100mm depth of mulch.

Apply mulch following planting. Level the soil surface prior to mulch being applied. Ensure that soil is not mixed with the mulch.

Spread mulch to a generally even level but in particular grade away from plant stems to avoid the possibility of collar rot.

Ensure mulch is graded away from the paths and kerbs in a way that avoids mulch spilling from planters.

**Completion****3.25 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.

**3.26 DEFECTIVE OR DAMAGED WORK**

All plants shall be maintained for two full growing seasons after planting. Replace damaged or marked plants during this period.

**3.27 PROTECTION**

Provide the following temporary protection of the finished work:  
Rope off and label all planted areas to ensure no damage occurs.

**4 SELECTIONS**

**Materials**

## 4.1 PLANTING SCHEDULE

Refer to Planting Schedule

**Components**

## 4.2 MULCH &amp; TOPSOIL

Bark Mulch: Grade 4-5 bark mulch. Wood chip mulch not accepted. Provide samples to Landscape Architect for approval.

Gravel Mulch: As per 2.13 of this section.

## 4.3 FERTILISER

Horteq Controlled Release Fertiliser Tablets or and approved equivalent.

**8333 TURF LAYING AND LAWN SEEDING****1 GENERAL**

This section relates to the laying of turf and seeding of lawns. It includes, fertilizer and initial mowing

## 1.1 RELATED WORK

Refer to 8321 Soil and Soil Preparation for Planting

## 1.2 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work: TBC

**Warranties**

## 1.3 WARRANTY

Provide warranty for: Refer 1237

**Requirements**

## 1.4 QUALIFICATIONS

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

## 1.5 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

## 1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

## 1.7 SAMPLES

Supply a sample of the seed for the approval of the Contract Administrator. Ensure that all seed are similar to the approved sample.

**Quality control and assurance**

## 1.8 INSPECTIONS

Contract Administrator to inspect the works following:

- cultivation and preparatory work prior to seeding
- completion of respreading topsoil prior to final levelling and seeding
- completion of turf establishment

**2 PRODUCTS****Materials - Turf**

## 2.1 SIZES

Turf of an even thickness of approximately 20mm x 450mm wide and of a consistent length. Sufficiently fibrous for turfs to hold together when handled, but without excessive fibre of thatch.

## 2.2 WEED AND PEST FREE

Ensure the turf is free of weeds and pests.

## 2.3 GRASSES

The constituent grasses of the turf should provide a close texture of even density and green in colour. The turf should be sufficiently fibrous for turf to hold together when handled but excess fibre or thatch is undesirable.

**Materials - Seed****2.4 LAWN SEED MIX**

All seed shall be certified and less than 12 months old at the time of sowing. Ryegrass component (if used) to be certified as having greater than 80% live entophyte content.

All seed label analysis data shall comply with trade standards. Germination tests must have occurred within the past six months. The germination capacity of each constituent of the mixture should be not less than 80%, and the purity of the mixture not less than 90%.

**2.5 WEED FREE**

Ensure seed is free of noxious weeds. Other crop not to exceed 1%. Weed seed shall not exceed 0.05%.

**3 EXECUTION****Conditions****3.1 PRE-INSTALLATION REQUIREMENTS -SEEDING**

Topsoiled areas to be grassed shall be cultivated to a depth of 100 - 150mm, clod free to provide a suitable tilth for seed distribution and grass growth. Remove weeds, root material, stones, rubble and any other debris exposed during cultivation.

Cultivate by mechanical means with rotary hoes except within the root zones of trees to be retained. Within the root zone, cultivate with hand tools (spades etc). Following cultivation, spread area with 100mm compacted depth of topsoil. Carry out minor regrading to ensure an even surface with no low points, particularly at junctions with edgings, kerbs, manholes and paths etc.

**Installation/application****3.2 SOIL PH LEVEL**

Target a soil pH level of between 5.5 and 6.0. Dress clay based soils with agricultural lime, applied at the rate of 150gms/m<sup>2</sup>, and thoroughly 'work in' during cultivation (unless soil tests prove otherwise).

**3.3 STANDARDS AND TOLERANCES - SEEDING**

Completed topsoil shall be 10mm below paths, paving and tops of kerbs, and level with manhole covers and catchpit aprons, and free draining. It shall not have depressions capable of ponding.

Grass areas are required to be in an acceptable condition to be awarded practical completion. Seeded areas without sufficient grass growth will not be accepted.

Grassed surfaces shall be deemed to be in an acceptable condition when;

- fully established with vigorous growth
- no ponding of surface water occurs
- grass covers 95% of the grassed areas
- single areas of exposed soil are less than 100mm diameter in any one location
- broad leaved weeds visible by eye through 360 degrees from any location, are limited to 4 plants/m<sup>2</sup>.
- Kikuyu grass is not present

**Lawn Seeding****3.4 SOWING**

Sow the seed mix by broadcasting in two directions, in suitable calm weather, at a rate of 30 gm/m<sup>2</sup> using a mechanical spreader.

Lightly brush soil to cover seeds, and lightly roll to ensure a good moisture content. Water immediately after sowing and then as often as necessary to keep it moist until germination and grass is well established.

**3.5 TIMING**

Carry out sowing from 1st April to 31st May, or from 1st September to 30th November. When sowing takes place outside this period, when the weather changes, or when silt control requires its use, mulch the seeding area using hay.

**3.6 FERTILISER**

Apply a dressing of fertiliser and work into the top 50mm of soil immediately prior to sowing. Refer to SELECTIONS.

**3.7 FENCING**

Install "Pigs Tails" and warning tape fencing around the perimeter of the sown area to prevent damage from unauthorised access.

**3.8 WEED CONTROL**

Control weeds, which affect the establishment of the grassed surface during the establishment period.

Pre spray the ground a min. 2 times prior to seeding at fortnightly intervals. Spray weeds with spot spray or selective herbicide applied to the manufacturers specifications. Over sow areas rendered with inadequate grass plants following weed control, to re-establish the specified grassed surface species. Apply a fine layer of topsoil or straw mulch over these areas to promote germination and protect the grass. Prior to Practical Completion, remove all weeds within grassed areas and re-sow as necessary.

**3.9 FAILURE TO ESTABLISH A SUCCESSFUL GRASS SURFACE**

Make good the grass areas that fail to establish successfully. If required submit a sample of the seed used to the contract administrator for checking.

**3.10 MOWING**

Mow the grass when it has reached a height of 100mm. Cut to 50mm high. Mow only one third grass length at one mowing. Mow in dry conditions with sharp mower blades and remove clippings. Use only reel mowers on fine grasses.

For subsequent mowings, the mowing frequency shall be governed by growth rate.

Grass height at the completion of the contract to be, 15mm to 20mm for fine grasses like Fescue/Brown top etc, 20mm to 25mm for coarser grasses like Ryegrass etc.

**Generally****3.11 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.

**3.12 DEFECTIVE OR DAMAGED ELEMENTS**

Replace damaged elements.

**3.13 PROTECTION**

Provide the following temporary protection of the finished work:  
Rope off completed works until the above standards and tolerances are met.

**3.14 MAINTENANCE**

The contractor shall be required to maintain the surface of all grassed areas, and to cut the grass at intervals throughout the period of the contract works, including the defects notification/liability period.

A final cut shall be made just prior to the expiration of the defects notification/liability period, and ground surfaces shall present a uniform, dense continuous surface free from bare patches.

**4 SELECTIONS**

Substitutions are not permitted to the following, unless stated otherwise.

**Materials****4.1 SEED**

Location: As noted on plans  
Mix/Brand: TBC with client.

Species	%

**4.2 FERTILISER**

Location: To all seeded lawn areas  
 Mix: TBC with client

Type	%

**8335 TREE PLANTING & TRANSPLANTING****1 GENERAL**

This section relates to;

- tree supply
- ground preparation
- tree planting and staking
- tree transplanting

**1.1 RELATED WORK**

Refer to 8310 LANDSCAPE SITE PREPARATION for excavation.  
 Refer to 8321 SOIL AND SOIL PREPARATION for topsoil.

**1.2 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:

N:P:K The labelling of fertiliser based on the relative content of nitrogen (N), phosphorus (P), and potassium (K).

HDPE High Density Polyethylene

**Documents****1.3 DOCUMENTS**

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

NZS 4454 Composts, soil conditioners and mulches.

**1.4 SUPPLIER DOCUMENTS**

Supplier's documents relating to this part of the work:  
 Council nominated supply and planting sub contractor Refer 1231 CONTRACT.

**Requirements****1.5 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.

**1.6 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS**

Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

**1.7 NO SUBSTITUTIONS**

Substitutions are not permitted to any of the products listed in this section.

**Quality control and assurance**

**1.8 INSPECTIONS**

Landscape Architect to inspect all trees before planting. They shall be inspected on delivery to site or at the contractor's depot in a single batch. Replace any tree not approved by the Landscape Architect.

Trees to be first class specimens of nursery stock, true to name and type with well developed and well shaped trunk or stem and head. They shall be well hardened off to cope with the climatic conditions of the site, and free from pests and disease. The roots shall have a high percentage of fibrous roots that are just touching the edge of their containers. Trees with roots that are wound round their containers in circular fashion shall be rejected.

Trees shall be free from disfiguring knots, bark abrasions, wind, or freezing injury or other disfigurements and shall bear evidence of proper pruning. Where several specimens of the same species are to be selected, evenness of shape and size is required within the size range specified.

**1.9 INSPECTIONS - TRANSPLANTING**

Landscape Architect will inspect the works following:

- excavation of the trees and trimming of roots.
- completion of preparation of tree pits and immediately prior to placement of the tree.
- completion.

**1.10 LABELLING**

Attach labels to each tree delivered to site as a separate unit, or to each box, bundle or bale containing trees. The labels to show the approved botanical name, size, age and quantity and other information required to identify the trees.

**1.11 PLANTER BAGS**

UV stabilised black plastic planter bags (PB). Standard bag sizes range from PB3 to PB150. Plant sizes are specified by PB bag size (pint bag) up to PB150. Specimen trees may be specified by bag size, girth or height or a combination of these.

**1.12 HEALTH**

Ensure trees are free of pests, diseases, disorders, disfiguring knots damage or pruning injury.

**1.13 MYRTLE RUST**

For identification and treatment of myrtle rust and the growing, transporting and planting plants in the myrtle family (family Myrtaceae) follow the protocols and precautions of the NZ Plant Producers Inc. (NZPPI) website guidelines: [www.nzppi.co.nz/myrtlerust](http://www.nzppi.co.nz/myrtlerust).

Ensure:

- Plants from a commercial nursery have the appropriate completed copies of the NZPPI Nursery Management Declaration form and Plant Transport Declaration form.
- Treatment records are provided for non-commercially sourced plants.
- Myrtaceous plants are within the effective period of cover for the treatment used at time of dispatch (different treatments and cover periods are on the NZPPI website).

Any suspected myrtle rust finds must be reported immediately to the Project Administrator. On direction of the Project Administrator immediately notify the Ministry for Primary Industries (MPI) Exotic Pest and Disease Hotline on 0800 80 99 66.

**2 PRODUCTS****Materials****2.1 TREES**

Tree species to have a single well defined leader and a reasonably straight main stem which is sturdy enough to easily support the crown of the tree under the environmental and climatic conditions of the planting site.

**2.2 SPECIMEN TREES**

The crowns of specimen trees shall be vigorous, evenly developed, well branched and with a single well defined, sturdy leader.

**2.3 ROOT SYSTEMS**

All trees shall have good, vigorous, fibrous root systems in keeping with the normal rooting habit of the species. Root balls and container growing medium shall be free from perennial weed and soil borne plant diseases.

**2.4 BRANCH SYSTEMS**

Trees shall have well developed vigorous branch systems of normal habit, dimensions and density for a well grown nursery plant of their species. Trees which have 'leggy', narrow or thin branch systems will not be accepted.

**2.5 HARDINESS**

Trees to be fully hardy having been acclimatized in the nursery to sun, exposure and cold. Trees which have not been hardened off and drawn plants with soft growth or plants requiring additional support to that specified will not be accepted.

**2.6 COMPOST**

Proprietary top quality compost to NZS 4454 Composts, Soil Conditioners and Mulches.

**2.7 MULCH**

To NZS 4454 Composts, Soil Conditioners and Mulches. Grade 4-5 Bark Mulch. Supply a small sample bag to the Landscape Architect for approval prior to delivery.

**Components****2.8 GROUND ANCHORS**

Provide ground anchors to support all trees exceeding PB150 size. Three anchors shall be installed for each tree. The grade of anchors shall be appropriate for the size of the trees in accordance with the manufacturer's specifications.

Ground anchors shall be complete with anchors, wire ropes, turnbuckles, tree collars and wire clamps.

**2.9 GUYING**

Secure trees by exposed wire guys looped around main branches or trunks attached to duck - bill ground anchors, taking the prevailing winds into account. Use plastic or proprietary webbing collars to protect the tree from guy wires. Place guy wires where they will not contact tree limbs in calm or windy conditions. Guy wires shall be kept taut with an adjustable tightening system such as a turnbuckle. The Contractor shall regularly check the wires over time to ensure the wires are under tension.

**2.10 TREE TIES**

Flexible rubber or similar approved material. 50 mm - 75 mm wide belts of sufficient strength to hold the tree firmly without stretching or cracking.

**2.11 STAKING**

All staking timber is to be treated as follows:

Timber in contact with the ground: H4 stained black  
Timber not in contact with the ground: H3.2 stained black

Where cutting or drilling of treated timber is unavoidable, treat all exposed surfaces with an approved preservative.

**2.12 STAKING FRAMES FOR TREES**

Construct from two 75mm x 75mm x 2400mm long H4 stakes, bottoms pointed, and one 100mm x 25mm x 750mm long H3.2 cross bar.

**2.13 WATERING TUBES**

65mm diameter perforated HDPE pipe installed across the base of the tree pit and up the side to extend 100mm above the finished ground level.

**2.14 FERTILISERS**

All plants shall be planted with controlled, slow release fertiliser of composition 6:15:3 N:P:K. (Nitrogen, Phosphorus and Potassium). The fertiliser shall be mixed with the soil placed as backfill around the sides of the root ball - not on the base of the pit or on top of the existing root ball.

**3 EXECUTION**



**Planting Generally****3.1 DELIVERY, STORAGE AND HANDLING**

Tie branches together and cover with protective covering to limit branch damage. Trees transported more than 100m shall be transported on a truck.

For transportation less than 100m, transportation suspended in a sling or in a tree spade may be considered provided the trees are not subjected to excessive swinging or vibration.

Trees transported more than 100m shall be placed in a horizontal position on a suitable vehicle and the root ball secured during transportation. Use sandbags as packing where necessary, to support the root ball and prevent it from being crushed.

Trees to be transported for short distances on site may be transported vertically as site constraints permit.

**3.2 SERVICES**

Check for underground services prior to excavation.

**3.3 TREE PITS**

As per details.

**3.4 DRAINAGE**

As per details

**3.5 LIFTING**

Protect all tree limbs at contact points with lifting equipment.

Lift trees by straps under the root ball of the tree. Lifting by the bole of the trunk is not permitted.

Lift in one action from the transportation vehicle to the prepared tree pit.

**3.6 PLANTING**

Carry out planting with a minimum of delay.

Remove root ball wrappings prior to setting in the hole where the root ball soil is unstable. Hessian wrappings may be kept on the root ball until the tree is placed in the hole. Once the tree is set in place, remove lashing ropes and as much of the wrapping as possible, and no less than from halfway down the root ball.

If any adjustment has to be made after it is placed in the pit, the tree should be raised to add or remove soil from underneath until the correct level and shape of the supporting soil is obtained.

Prior to backfilling of the tree pit, one watering tube shall be installed commencing 100mm above ground level, extending down the side and along the bottom of the pit.

Partial backfilling and temporary guys will then be used to hold a vertical position while all other wrappings are removed. The tree pit should then be backfilled with soil mixed with the specified quantity of fertiliser. Filling should be done in 150mm layers, consolidating very firmly under the root ball to eliminate air pockets. Compaction shall be slightly less firmly towards the top of the hole to allow for good aeration and percolation of water. The final backfill shall be at a height that will allow for settlement.

**3.7 STAKING FRAME**

Orientate all staking frames in the same direction and this shall be, as far as possible, so that the prevailing wind blows the tree towards the cross bar. Drive two stakes into the ground parallel and at 675mm centres to stand 1500mm min. above ground level and 700mm min. below. Securely nail the cross bar to the stakes at right angles with its top edge level and flush with the top of the stakes. Use two nails at each joint. Ensure all stakes are at the same height and orientation to provide visual consistency across the scheme.

**3.8 TYING**

Secure the tree on the same side of the cross bar as the two stakes. Tie the stem in the middle of the cross bar with one tree tie. Secure the stem close to the bar, firmly and without gap or slack in the belt to avoid movement in high winds. Nail the tie pad to the crossbar. Pass the strap around the tree and through the slits in the pad before nailing the strap to the crossbar with four galvanized nails. Cut the strap so that 75mm exceeds the spacer on each side.

**3.9 MULCHING**

Cover the surface of the tree root ball with mulch to a depth of 100mm, as per details.

**3.10 WATERING**

Keep the root ball well watered immediately after planting and during the tree's establishment phase. Provide additional watering during the summer season. Monitor the soil's moisture content on a daily basis and apply water as necessary until any initial leaf wilt /drop has stopped and the transplant has become acclimatised to the new position.

**3.11 TOLERANCES**

The maximum period roots exposed and un-watered shall be 1 hour.

- Plant trees facing north.
- Plant single leadered trunks as vertically as possible.
- Place Multi-leadered trunks without a noticeable lean.

**Completion****3.12 REINSTATEMENT**

On completion of the work, ensure all surfaces affected by the works are reinstated to pre-construction condition unless specified otherwise.

Reinstate the ground from where transplanted trees were removed, in agreement with and to the satisfaction of the landowner/original owner of the tree.

Tree guy wires shall be taught on completion and re-tightened through the defects notification/liability period.

Remove all rubbish and spoil from the site on completion of the works, leaving the site in a clean and tidy condition.

**3.13 DEFECTIVE OR DAMAGED ELEMENTS**

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable.

**3.14 PROTECTION**

Provide the following temporary protection of the finished work:

From rabbit damage using plastic sheath/stake to vulnerable species.

**4 SELECTIONS****4.1 TREE PLANTING SCHEDULE**

Refer to Plant Schedule: 3.9.01

## 8380 LANDSCAPE MAINTENANCE

### 1 GENERAL

This section relates to Landscape Maintenance.  
It includes:

- Plants
- Grass
- Mulch
- Planting ancillaries

#### 1.1 RELATED WORK

All planting, refer schedule.

#### 1.2 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:

NPK	The labelling of fertiliser based on the relative content of Nitrogen (N), Phosphorus (P), and Potassium (K).
ESD	Environmentally Sustainable Design.

#### Requirements

#### 1.3 QUALIFICATIONS

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

#### 1.4 PERIOD

Undertake maintenance of the landscaping works regularly for:

24 months	From Practical completion of the Landscape Work for trees and plants.
12 months	From Practical completion of the landscape works to full strike of grass, even closure, no weeds and solid build up of root network

The degree required and frequency is detailed in these specifications.

#### Quality control and assurance

#### 1.5 NOTIFICATION OF MAINTENANCE VISITS

Supply to the Contract Administrator a maintenance schedule detailing the dates of proposed visits and work to be undertaken. In addition, notify the Contract Administrator immediately prior to those visits being made.

## 2 MAINTENANCE

### 2.1 GENERAL

Maintenance shall include watering, weed removal, plant trimming, cultivation, insect and disease control, checking stakes and ties, pruning and other accepted horticultural operations to ensure normal and healthy plant establishment and growth.

Ensure that the plants installed will survive and grow. Water the plants installed as frequently as necessary.

Inspect the landscaping works no less than monthly to confirm the health of the plants, existence of pests, diseases, or vandalism.

### 3 EXECUTION

### 3.1 WATERING

Where planter beds and trees are watered by an automatic irrigation system, operate and manage the system to ensure that all beds receive adequate water at all times.  
Adjust the watering periods as necessary to accommodate seasonal fluctuations.

Monitor Trees planted into paved areas for symptoms of water stress and provide additional watering as necessary.  
Carefully monitor transplanted trees for symptoms of water stress and provide additional watering as necessary.

Additional to automatic irrigation, carry out watering by hand held hoses at regular intervals as necessary during dry conditions to ensure successful plant establishment and growth.  
Water shall be applied until the top 200mm of topsoil around each plant is saturated.  
Do not water during the hot part of the day. Watering nozzles shall be fine rose or sprinkler heads to prevent damage to growth areas of the plants.

### 3.2 WEED CONTROL

Remove and control weeds regularly throughout the period of maintenance.  
Keep weed free all cultivated planted areas to the extent that perennial weed species are eradicated and annual weed species are well controlled. Take care not to disturb the shrub roots and excessive compaction of the bed surface. Additional weed control may be required in spring when the ground warms and seeds in the soil germinate.

Remove weeds by hand wherever possible. Spaying of weeds with an approved organic herbicide with all necessary safety precautions may be required for persistent weeds; however the visible portion of the weed shall be removed as soon as the weed has died. Apply herbicide by spot spraying using a protective spray nozzle/cone. Selective weed sprays may be used in appropriate circumstances.

Inadequate mulch depth may allow excessive weed growth; therefore keep mulch topped up to the original specified depth.

### 3.3 NOXIOUS PESTS AND DISEASES

Monitor the works for insect and plant disease problems. If present, identify the problem and apply appropriate remedy by accepted horticultural practices including chemical or biological methods.  
Take all suitable precautions for the safe handling and application of herbicides, fungicides and insecticides and use these strictly in accordance with the manufacturer's specifications. In all cases, apply sprays on windless days. If the site is in a public area, the public shall be advised by signage that spraying is occurring and shall be directed away from the spray area.  
Avoid damage to neighbouring properties caused by spraying.

### 3.4 FERTILISER

Apply slow release fertiliser to the bedding soil of plants at the time of plant installation.  
Apply further applications of approved, NPK balanced, slow-release fertiliser in accordance with the maintenance programme. Refer to SELECTIONS. Application rates shall be as recommended by the fertiliser manufacturer with regard to the size of plant.  
'Water-in' fertiliser after application.

Apply fertiliser to grassed areas in accordance with the maintenance programme. Refer to SELECTIONS. Fertiliser shall be slow release type, applied at a rate recommended by the manufacturer.

### 3.5 MULCH

Supply and install additional mulch and/or bark (the same material as existing) to ensure all mulch areas have a minimum depth of 100mm.

### 3.6 PERENNIALS AND BULBS

Trim and remove dead or decaying foliage back to ground level at the end of the growing season.

### 3.7 WETLAND PLANTING

Remove weeds and replace dead or damaged plants.  
Do not apply fertiliser to wetland plants.

**3.8 PROTECTION OF TREES AND STRUCTURES**

Avoid damage to existing and newly planted trees during cutting or trimming operations. Trim or cut using small appliances (weed eater or hand mower) for a minimum diameter of 1.0m from the trunk, to avoid ring barking by larger appliances. Take due care to locate and protect all structures from damage by mowers. Boundary pegs are included in structures to be protected.

**Specimen Trees****3.9 OPERATIONS - TREES**

Planted trees are to be encouraged to grow to maturity as naturally as possible to achieve their natural characteristic form. Employ sound management practices including weeding, trimming, checking of stakes and ties, pruning and other accepted horticultural operations. Pruning may also be required as a safety measure to remove overhanging branches causing obstruction to footpaths, driveways and car parking.

**3.10 STAKING**

Repair or replace staking as required. Check ties every two months, to ensure that they have not broken or become too tight around the trunk. Ties should be maintained firm but not so tight as to cause damage to the bark. They should be adjusted accordingly over the initial three growing seasons for planted trees, after which time the majority of stakes can be removed.

**3.11 PRUNING**

Undertake regular light pruning of specimen trees over a period of time to avoid one severe pruning. Excessive foliage removal should be avoided which may result in wind damage or sun scalding and loss of the tree's aesthetic appearance. Remove broken or dangerously overhanging branches. Prune back overhanging branches to a minimum clearance of 2.3m above the ground. Remove dead and broken branches. Care must be taken when removing branches to prevent further damage to the tree. Prune back to a sound healthy branch with a clean cut, in accordance with good arboricultural practice. Final cuts shall be made as close as possible to the branch collar without damaging the collar, and apply wound treatment where necessary. Dispose of all pruning waste off site.

**3.12 FORKING**

Regularly fork tree pits within paved areas to loosen the ground in order to avoid compaction, which can reduce the infiltration of water into the ground.

**Shrubs and Ground Cover****3.13 OPERATIONS - SHRUBS AND GROUND COVER**

Maintain planting beds to establish good plantings, and achieve a high level of lush vegetation with visual impact. Maintenance shall include weed control, trimming, watering and fertilising. Ground cover plants should grow to fully cover the ground and thus reduce weed growth and maintenance. Maintain planting beds to a neat and tidy appearance to at least the same condition as at Practical Completion.

**3.14 TRIMMING**

Undertake regular trimming of shrubs to maintain the following aspects:

- Removal of dead heads after flowering
- Removal of dead or old weak growth
- Cutting back to encourage growth vigour
- Thinning out mass planted areas to allow stronger plants to dominate

**Grass****3.15 GRASSED AREAS**

Protect and maintain grassed areas to produce an even sward of grass at a uniform height and healthy colour by watering, mowing and spraying. Maintain turf to a good quality with a neat appearance. Protect newly sown and grassed areas against traffic until the grass is well established.

If necessary top dress the turf with clean screened soil to eliminate minor hollows. Applications shall be less than 15mm at any one time, preferably applied in spring or autumn. Protect and maintain all grassed areas by watering, mowing and spraying to maintain a good quality turf with a neat appearance.

**3.16 GRASS CUTTING**

Undertake grass cutting in dry conditions using a suitable mower with sharp blades. The first cut shall be after the grass has reached a height of 100mm. Cut off one third of the height of the grass. Cutting thereafter shall be undertaken in accordance with the maintenance schedule. Refer to SELECTIONS. Before each cut, remove all litter, stones and other debris so that a tidy appearance is maintained at all times. Neatly trim edges to paths and around trees or structures each time the grass is mowed.

**Completion****3.17 ROUTINE CLEANING**

Carry out routine trade cleaning of this part of the work including periodic removal of all cuttings, trimmings, debris and elements from the site.

**3.18 PROTECTION**

Provide the following temporary protection of the finished work: Protect all finished areas from contamination and compaction.

**4 SELECTIONS****4.1 MAINTENANCE SCHEDULE - TREES, SHRUBS, GROUND COVER**

	Trimming	Plant Replacement	Fertilizer	Weed Control	Watering	Mulch top-up
Jan	x	x	x	x	x	x
Feb				x	x	
Mar	x	x		x	x	
Apr				x	x	
May	x	x		x	x	
Jun			x	x	x	x
Jul	x	x		x		
Aug				x		
Sep	x	x		x		
Oct				x		
Nov	x	x		x		
Dec				x	x	

## 4.2 MAINTENANCE SCHEDULE - GRASS

	Mowing (medium)	Mowing (rough)	Edge trimming	Fertilizer	Weed control	Watering	Over-sowing
Jan	x		x		x	x	
Feb	x		x			x	
Mar	x		x	x	x	x	x
Apr	x		x				
May	x		x		x		
Jun		x	x				
Jul		x	x		x		
Aug		x	x				
Sep		x	x		x		x
Oct		x	x				
Nov		x	x		x		
Dec	x		x			x	

## 8410 LANDSCAPE EDGING

## 1 GENERAL

This section relates to Landscape edging;

- Insitu concrete
- Continuous concrete edging
- Timber

## 1.1 RELATED WORK

Refer to 3410 for STRUCTURAL STEELWORK BASIC  
Refer to 4383 for TIMBER DECKING

**Documents**

## 1.2 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

## 2 PRODUCTS

**Materials**

## 2.1 CONCRETE

Prescribed mix to NZS 3104 (except where specified otherwise).

Bedding Concrete	10 MPa
Edging Concrete	15 MPa

## 2.2 CONTINUOUS CONCRETE EDGING

CAST INSITU 200mm wide x (200mm OR 300mm) high continuous concrete edging. Refer to SELECTIONS/drawings for type.

## 2.3 TIMBER EDGING

Hardwood timber edging as per details. Timber to be Tonka to match other hardwoods throughout project.

## 3 EXECUTION

**Conditions**

## 3.1 GENERAL

Concrete work shall be in accordance with NZS 3109 Concrete construction.

## 3.2 STORAGE

Take delivery of materials, cement and sand undamaged and dry. Store on level hard standings, protect from damage and keep materials dry until laid.

## 3.3 INSPECTION

Before starting work inspect the area to ensure that the preliminary works are in place to correct falls, and all services completed, to allow work of the required standard.

## 3.4 ALIGNMENT

Lay edging true and straight to grade, alignment and level. Curves to sweep evenly around bends without kinks, flats or angles. Form bends with purpose-made corner blocks.

**3.5 CONSTRUCTION JOINTS**

Form construction joints either by pouring alternate sections and painting exposed ends with bitumen emulsion paint, or by providing bituminous fabric or fibreboard stops in the formwork. Form joints in extruded kerbs by cutting.

**3.6 TOLERANCES**

Maximum deviation from alignment.  
Vertical: 5mm in 2.0m  
Horizontal: 5mm in 2.0m

**Application****3.7 INSITU CONCRETE EDGING**

To NZS 3109. Excavate, securely fix and brace formwork and install reinforcing, as shown. Pour concrete, cure as necessary and strike formwork after 12 hours.

**3.8 CONTINUOUS CONCRETE EDGING**

Excavate for and machine lay continuous concrete edging, to line and levels shown. The operation shall be carefully controlled to ensure that the edging is not displaced or damaged.

**3.9 TIMBER EDGING**

Set timber edging in a trench attached to stakes at 1.0m centres, and 750mm centres across joints, to line and levels shown. Join boards with a 400mm long x 75 x 25mm joining board, skew nailed from both sides with 50mm SS flathead nails. The fill operation shall be carefully controlled to ensure that the timber edging is not displaced or damaged

**Completion****3.10 REPLACE**

Replace damaged, cracked or marked elements.

**3.11 LEAVE**

Leave work to the standard required by following procedures.

**3.12 REMOVE**

Remove debris, unused materials and components from the site.

**4 SELECTIONS****4.1 NO SELECTIONS - REFER DRAWINGS.****8461 STREET & LANDSCAPE FURNITURE****1 GENERAL**

This section relates to the supply and installation of exterior fixtures including;

- Benches
- Seats
- Lightpoles
- Litter bins
- Bollards
- Ladders

**1.1 RELATED WORK**

Refer to 3410 for STRUCTURAL STEELWORK BASIC

Refer to 6700 and 6711 for PAINTING

and to the appropriate concrete section(s) for concrete to furniture bases.

**Documents****1.2 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 3124	Specification for concrete construction for minor works

**Warranties****1.3 WARRANTY - MANUFACTURER/SUPPLIER**

Provide a material manufacturer/supplier warranty:

10 years:	For street furniture
10 years:	For powder coating or paint finishes

- 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****1.4 PRODUCER STATEMENTS**

Structural producer statements are to be provided by furniture fabricator for those items labelled in the selections. PS1 is to be provided to the Contract Administrator and the Landscape Architect with the shop drawings for approval prior to fabrication of the furniture.

**1.5 NO SUBSTITUTIONS**

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

**1.6 QUALIFICATIONS**

Work to be carried out by trades people experienced, competent and familiar with the materials and installation requirements specified.

**1.7 INSPECTIONS**

Carry out inspections of the following:

- Custom built fixtures fabricated and ready to be delivered to the site.
- Furniture items delivered to site before installation.
- Locations or footings prepared to receive furniture or fixtures before installation.
- Services - prior to installation of Street Furniture.

**1.8 SUSTAINABLE TIMBER**

This project uses FSC Certified sustainable timber.

**Abbreviations and definitions:****FSC**

- Forest Stewardship Council
- FSC Forest Management (FM) Certification
  - A forest management unit independently FSC inspected and certified that it complies with the internationally-agreed FSC Principles.
- FSC Chain of Custody (COC) Certification
  - COC certification applies to those who process, transform or trade forest products, providing a guarantee about the production and source of FSC-certified products and tracking the production and distribution of the products.

**Organisation website details**

FSC website:- <https://nz.fsc.org/en-nz>

FSC suppliers lists:- <https://info.fsc.org/certificate.php#result>

**2 PRODUCTS****2.1 PRODUCTS**

Refer to SELECTIONS

**2.2 CERTIFIED SUSTAINABLE TIMBER**

Refer to SELECTIONS for details of amount, type, suppliers. Certified Sustainable FSC-COC Certified (or similar pre-approved) timber from forest to installation. Contractor to obtain and track all timber FSC-COC certificates and receipts showing FSC-COC numbers, including signed FSC outsourcing agreements between parties (ie FSC timber broker and non-FSC door joiner).  
FSC suppliers lists:- <https://info.fsc.org/certificate.php#result>

**2.3 CONCRETE**

Prescribed mix, maximum aggregate size 19mm to NZS 3104.

**2.4 MISCELLANEOUS METAL**

Miscellaneous metal. Refer to drawings.

**2.5 FIXINGS**

To suit application including corrosion resistance.

**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, 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.

**Installation****3.2 CONCRETE WORK**

Concrete work to NZS 3124. Excavate footings at required positions and of size specified by manufacturer.

**3.3 MISCELLANEOUS METAL WORK**

Refer to 3410 STRUCTURAL STEEL BASIC for fabrication of steel and shop drawings.

**3.4 STREET FURNITURE**

Mount street furniture onto footings in accordance with manufacturer's recommendations. Erect all posts or poles vertically. Assemble items to manufacturer's requirements. Erect/locate furniture items level.

**3.5 SERVICES**

Allow for installation and connection of services.

**Completion****3.6 IN SITU TOUCH-UP**

In situ touch-up only after receiving written authority from the Landscape Architect.

**3.7 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.

**3.8 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****4.1 CERTIFIED SUSTAINABLE TIMBER - SOURCING**

The following timber from sourced to installed to be FSC FM Certified and COC Certified.

ITEM 1	Furniture.
Manuf/supplier:	TBC - custom design
Location:	Various
Product/type:	Typical bench type A & B and Table and Bollard
Species:	Tonka

ITEM 2	Bollards
Manuf/supplier:	TBC - custom design
Location:	Various
Product/type:	N/A
Species:	Tonka

ITEM 3	Ladders
Manuf/supplier:	TBC - custom design
Location:	Various
Product/type:	N/A
Species:	Tonka

ITEM 4	Light Poles
Manuf/supplier:	TBC - custom design
Location:	Various
Product/type:	N/A
Species:	Tonka

FSC suppliers lists:- <https://info.fsc.org/certificate.php#result>

**4.2 BENCHES & SEATS**

Location:	Various
Manufacturer:	TBC custom design
Size:	2799mm x515mm x440mm
Material:	Galvanised Steel and Hardwood timber
Finish:	Paint product and colour TBC / Hardwood dressed
Fixing:	HDG screws and bolts
Producer Statement Req:	Yes

**4.3 SUN LOUNGER**

Provisional only - contractor is to allow for sun loungers as a provisional sum to be confirmed by design team at a later date.

- 4.4 **TABLES**  
 Location: Various  
 Manufacturer: TBC custom design  
 Size: 3126mm x 760mm x 965mm  
 Material: Galvanised Steel and Hardwood timber  
 Finish: Paint product and colour TBC / Hardwood dressed  
 Fixing: HDG screws and bolts  
 Producer Statement Req: Yes
- 4.5 **LITTER BINS**  
 Location: Various  
 Manufacturer: Reuse existing  
 Size: Reuse existing  
 Material: Existing  
 Finish: Repair as required  
 Fixing: HDG screws and bolts  
 Producer Statement Req: No
- 4.6 **LIGHT POLES**  
 Location: Various  
 Manufacturer: TBC custom design  
 Size: 5000mm x 200mm x 200mm  
 Material: Galvanised Steel and Hardwood timber  
 Finish: Paint product and colour TBC / Hardwood dressed  
 Fixing: HDG screws and bolts  
 Producer Statement Req: Yes
- 4.7 **BOLLARDS**  
 Location: Stage 1  
 Manufacturer: TBC custom design  
 Model: N/A  
 Size: 1200mm x 150mm x 150mm  
 Material: Hardwood timber  
 Finish: Dressed  
 Fixing: SS 316 screws and bolts  
 Producer Statement Req: Yes

## 8511 IRRIGATION SYSTEM

### 1 GENERAL

This section relates to the design and installation of a permanent automatically controlled watering system.  
 It includes Micro Irrigation, Drip Irrigation, Fixed Location Systems, fixed spray, pop-up spray, mist spray and trickle irrigation.

#### 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:

Spray line pipe: The line of pipe fitted with sprinklers and/or raised drip fittings.  
 Drip line pipe: The line of pipe fitted with perforations or integral drip fitting.  
 Main line: The supply pipe that spray or drip line pipes are connected to (sub-mains may be used on very large systems).

#### Documents

#### 1.2 DOCUMENTS

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

NZS 5103 Code of Practice for the Design, Installation, and Operation of Sprinkler Irrigation Systems.  
 AS/NZS 3500.1:2015 Plumbing and drainage - Water services  
 Irrigation CoP Irrigation Code of Practice and Irrigation Design Standards (Irrigation NZ Inc)

#### Warranties

#### 1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:  
 10 years: For Irrigation System

- 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

#### 1.4 QUALIFICATIONS

Installers to be experienced, competent trades people familiar with the materials and techniques specified.  
 Designers to hold an NZQA National Certificate in Irrigation Design or equivalent.

#### 1.5 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

#### 1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

#### 1.7 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide samples and shop drawings for approval by Landscape Architect.

**1.8 SHOP DRAWINGS**

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.  
Submit drawings and schedules showing the layout and details of the system, to NZS 5103 and AS/NZS 3500.1, section 7 Irrigation and Lawn Watering Systems, including micro-irrigation stake layout, sensor locations and controller cabinets, in hard copy paper and electronic format for approval.

**1.9 AS BUILT DOCUMENTS**

Refer to the general section 1238 AS BUILT DOCUMENTATION for the requirements for submission and review of as built documents and records.

Provide the following as built documents and records:

- Drawings and schedules showing accurate locations, dimensions and sizes of all key components in the system.
- Provide draft as built information prior to practical completion.
- Provide final as built information prior to the end of the defects notification/liability period.

**1.10 INFORMATION FOR OPERATION AND MAINTENANCE**

Provide the general operation and maintenance information as electronic PDF format documents.

Provide this information prior to practical completion.

**Compliance information****1.11 INFORMATION REQUIRED FOR CODE COMPLIANCE**

Provide the following compliance documentation:

- Manufacturer's, importer's or distributors warranty
- Installer's warranty
- Producer Statement - Construction from the installer

**Performance****1.12 DESIGN BY CONTRACTOR**

Design an irrigation system in accordance with NZS 5103, AS/NZS 3500.1 section 7, Irrigation and Lawn Watering Systems, and these specifications and prepare concept and construction drawings, to be submitted to the contract administrator for approval prior to commencement of work.  
Achieve the documented flow rates over the area to be irrigated.  
Meet statutory requirements for backflow prevention.

Identify the following key performance indicator units and associated information as required by the Irrigation CoP:

- Irrigation crop demand in mm/d, m<sup>3</sup>/ha/week, mm/hr (frost)
- System capacity (based on 24 hours) litres/s/ha, mm/day
- Management allowable deficit (MAD)
- Application rate and depth in mm
- Infiltration rate (assumed)
- Application uniformity

**Quality control and assurance****1.13 INSPECTIONS**

Give notice to the contract administrator so that inspection may be made at the following stages:  
Concealed or underground services ready for backfilling.

**2 PRODUCTS****Fixed Location System****2.1 HEADS**

Proprietary heads that maintain a preset arc of throw, are adjustable for radius during watering operations, and vandal resistant.

**2.2 POP - UP TYPE HEADS**

Proprietary heads designed to rise > 50mm out of their housings under supply pressure.

**2.3 COVERS**

Proprietary covers to cover inactive sprinkler on playing fields.

**2.4 AUTOMATIC CONTROL VALVES**

24 volt solenoid actuated hydraulic valves with flow control and a maximum operating pressure rating  $\geq$  1 MPa. Made from stainless steel and able to be serviced in-situ.

**2.5 ISOLATING VALVES**

Gate valve the same diameter as the automatic control valves

**2.6 HOUSING**

House both valves in proprietary valve box.

**2.7 VALVES AND VALVE BOX**

Proprietary UV resistant high impact plastic with high impact snap lock plastic cover containing. Check valve - if a rotating head is more than 300mm below the highest head on the same automatic valve, fit an internal or external anti-drain check valve to prevent low head drainage.

Pressure regulating valve - At take off points provide pressure regulating valves as follows;

- Adjustable between 100 and 700 kPa.
- Complete with 800  $\mu$ m filter sized to suit the flow and installed immediately upstream from the pressure regulating valve
- Installed with gate valves upstream from the filter and downstream from the pressure regulating valve.
- Fitted for backflow prevention.

Mount the assembly in an accessible position in a valve box, access pit or adjacent building.

**Components****2.8 IN LINE TIMERS**

Tap mounted or inline weatherproof timer, mechanical or battery powered.

**2.9 SOIL MOISTURE SENSORS**

Fixed ceramic moisture sensors connector to controller via moisture control units.

**2.10 IRRIGATION CONTROLLERS**

Programmable automatic controllers with the following features:

- 240 volt supply and isolating switch at the controller
- Manual cycle and individual control valve operation
- Manual on/off operation of irrigation without loss of programme
- $\geq$  4 on/off cycles/day
- Day omit
- 240 volt input and 24 volt output capable of operating 2 control valves simultaneously
- $\geq$  24 hour battery programme backup
- Power surge protection
- Lockable cabinet minimum IP 54 to AS 60529

**2.11 PUMPS AND MOTORS**

Proprietary pump and motor of sufficient power and capacity to run the system. Refer to SELECTIONS.

**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



### 3.2 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work.  
Check that back flow prevention, if required, is in place or will be provided as part of this work.

#### Installation

### 3.3 INSTALLATION - FIXED LOCATION SYSTEMS

Run double insulated cable underground and alongside piping where possible to valves, sensors and controller.

Fix DN 20 double lugged bronze quick coupling valves with neoprene seats mounted on DN 20 copper risers offset min. 150mm from the supply pipe. Install in valve boxes.

Fit impact sprinkler heads with granular fill for min. 75mm around the base of the case. Mount 'above ground' heads on fixed risers, set galvanised steel risers in 300mm x 300mm x 200mm deep concrete blocks. Mount 'in ground' heads on reticulated risers.

#### Completion

### 3.4 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.

### 3.5 DEFECTIVE OR DAMAGED WORK

Repair damaged elements. Replace damaged 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.

### 3.6 PROTECTION

Provide temporary protection of the finished work.

#### Commissioning

### 3.7 FLUSH SYSTEM

Flush system thoroughly, check heads, sprays and drippers and clean if blocked. Clean strainers. Adjust system for even distribution with no dry areas.

### 3.8 TESTING AND COMMISSIONING

The acceptable deviation from the design specification will be;

- flows  $\pm 5\%$
- pressures  $\pm 10\%$
- current (amps)  $\pm 5\%$
- uniformity - not more than 5% (or 0.05) under that specified

Pressurise pipes to 1.5 times the maximum design working pressure of the pipe for one hour.

### 3.9 HANDOVER

Provide full demonstration/instruction for the eventual users of the system.

## 4 SELECTIONS

Contractor is to submit irrigation design to Landscape architect and Civil Engineer for approval.