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**SECTION 01: PRELIMINARIES****1.1 GENERAL CONDITIONS:**

- 1.1.1 The Contractor shall comply with the Fiji Standard Form of Building Contract, without Quantities (Private Edition) 1978. The Contract forms part of this specification and may be viewed at the office of the Architect.
- 1.1.2 A copy of Appendix 1 to the contract is appended to this specification and is to be completed. Amendments to the Standard contract conditions is included at the end of this section

**1.2 CONSULTANTS**

- 1.2.1 **Architectural**  
**ORTON ARCHITECTS**  
 10 Tower Street, Suva  
 PO Box 15734, Suva, Fiji  
 Phone: 3370955  
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 Email: jono.orton@gmail.com  
 Represented by Jon Orton

**1.3 TENDER CONDITIONS:**

- 1.3.1 Conditions relating to tendering procedure are covered by the Appendices attached to this specification which includes the Tender Form.

**1.4 TENDERER TO INFORM HIMSELF FULLY:**

- 1.4.1 The tenderer shall inspect and examine the site, its surroundings, and shall satisfy himself before submitting his tender, as to the nature of the ground and subsoil, the form and nature of the site, the quantities and nature of the of the Works. This shall include, but is not limited to, works and materials necessary for the completion means of access to the site, the accommodation he may require, the availability, conditions and rates of pay of labour. He shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his tender.
- 1.4.2 In particular the tenderer shall make all allowances he deems necessary to ensure the Works are completed within the Contract time, including all over time, double time, weekend work and other incidental allowances as required.
- 1.4.3 All works on site shall be carried out within the restricted timeframe as approved by the client.
- 1.4.4 If the tenderer has any doubt as to the meaning of any portion of the Works, he shall, when submitting his tender include a statement of the interpretation upon which he relies and upon which his tender has been prepared and submitted.
- 1.4.5 When pricing both local and imported materials the tenderer is to inform himself fully of any delivery lead times that may affect the construction time. If these lead times affect the ability of the tenderer to complete the Works within the time designated in the Tender Form, the tenderer is to provide an alternative construction time. No

extensions of time will be granted for late delivery of goods and materials. Refer deletion of Clause 23 (j)(i) and (j)(ii) of Fiji Standard Form of Building Contract (Private Edition) 1978.

## **1.5 DRAWINGS & SPECIFICATIONS:**

1.5.1 General: The Drawings and Specifications shall be carried out to the letter and are intended to be cooperative, i.e. any work shown on the drawings and not mentioned in the Specification or work or materials herein billed, specified or described but not shown on the Drawings will be executed by the Contractor as if specifically shown or mentioned by all.

1.5.2 Site Drawings: The Contractor will maintain one complete set of bound documents to be kept in the Site Office. Drawings for use on the site shall be laminated. The stamped approved drawings shall be kept on site at all times in a safe place for reference by the Building Inspector.

## **1.6 OWNERSHIP OF DRAWINGS:**

1.6.1 Drawings, Specifications, and copies thereof, which are furnished to the Contractor, are the property of the Owner. They are not to be used on other work and are to be returned to Architect if so requested except for one copy, which may be retained by Contractor as part of the Contract Documents.

## **1.7 INFERRED WORK**

1.7.1 All work reasonable to be included as fundamentally necessary for the proper erection and completion of the Works shall be deemed to be included, and no variation to the Contract Sum will be allowed for any such items.

## **1.8 AMBIGUITY:**

1.8.1 Any errors or discrepancies between Drawings and Specifications that are notified in writing by the tenderer to the Architect at the time of tendering shall be interpreted by the Architect in accordance with the Contract. During the construction period it is the responsibility of the Contractor to request from the Architect, instructions relating to any discrepancy or divergence between the Contract Documents.

## **1.9 BY-LAWS & PERMITS:**

1.9.1 The whole of the work shall be carried out in accordance with the by-laws and Regulation of the Local Authority. The Building Permit will be supplied by the owner but other necessary permits and fees required shall be obtained immediately and the costs borne by the Contractor.

## **1.10 PROJECT MANAGEMENT:**

1.9.1 General: The Contractor shall be responsible for all work executed under the Contract including the work of Subcontractor, nominated or otherwise. The Contractor shall be responsible for the proper supervision of all works for which he is responsible and shall take all necessary measures to ensure quality control and faithful workmanship.

- 1.9.2 Foreman: A competent foreman shall also be appointed and shall be in charge of the work for the duration of the Contract. Instructions given to him shall be deemed to have been given to the Contractor. The Foreman must be able to speak English and be able to understand fully the drawings and instructions he has to administer.
- 1.9.3 Replacement: Once approved the Contractor shall not replace or withdraw these appointments without the consent of the Architect.
- 1.9.4 Subcontractor's Foreman: Each trade shall be under the constant and special direction of a trade foreman fully licensed, authorised and approved by all relevant authorities and the Architect, for that particular trade for which he is responsible.
- 1.9.5 Each trade foreman shall be constantly on the Works during the progress of same, while work on that trade is being carried out.
- 1.10 PROGRESS BAR CHART:**
- 1.10.1 The Contractor shall, within 10 days of acceptance of his tender, submit a copy of his fully detailed construction programme and order of work for approval. The work of all trades including ordering of materials, plant, and equipment shall be clearly shown.
- 1.10.2 The critical path shall be highlighted in colour to indicate the critical events of the project commencing from the date of acceptance of tender and finishing at the expiration of the time for Practical Completion inserted in the Appendix. Delay in activities that are not critical to the construction program shall not justify an extension of the time for Practical Completion of the Works.
- 1.10.3 One copy of the approved programme shall be kept on site at all times and shall indicate thereon the actual progress throughout the construction period. The programme information is to be updated and presented at each site meeting
- 1.11 SITE MEETINGS:**
- 1.11.1 A regular programme of site meetings shall be established by the Contractor at which the Architect, Client, all subcontractors and all consultants will attend as necessary. The Architect will take and distribute minutes of the meetings. At the first site meeting the names and telephone numbers of all responsible persons who may be contacted after hours are to be submitted to the Architect.
- 1.12 INSPECTION OF WORK:**
- 1.12.1 Architect or the authorised representative of Employer shall at all times during its progress have full access to all phases of the work. Contractor shall provide adequate means to facilitate inspection by Architect.
- 1.13 TEMPORARY FACILITIES:**
- Buildings: The Client will provide all temporary buildings required for contractor's own use, and that of subcontractors and specialist contractors, where required by the Local Authority, hoardings, crossing protection, walkways, handrails, night lighting are also to be provided by the client. Existing sheltered storage on site can be cleared and used as tool storage and sheltered tea/lunch areas will be provided by the client for

workers. Existing rooms, chairs and desks will be available on site for meetings.

- 1.13.1 Services: The client will provide and the contractor is to maintain all toilet, water and electrical supply. The contractor will make these services available to all subcontractors and separate contractors. The contractor's representative on site is to be issued with a mobile phone

#### **1.14 SITE SAFETY PROCEDURES**

The Fiji Health & Safety Act 1998 is to be adhered to at all times by the Contractor. The following minimum site safety requirements are mandatory and are applicable on this site or work areas:

- 1.14.1 All accidents and equipment damage shall be reported firstly and immediately to the Contractor's Site representative in charge, as well as to the Employer's representative.
- 1.14.2 All persons requiring first-aid treatment are to contact the Contractor's representative who will arrange for treatment and enter in the Site Accident and Injury Report the person's name, nature of accident and other details. The injured employee's must conform to all Authorities Regulations including medical and Government recording & Insurance provisions.
- 1.14.3 Footwear appropriate to the Site and nature of the work shall be worn. Thongs or sandals are prohibited at all times.
- 1.14.4 Safety helmets shall be worn at all times by all workers and visitors to the areas where work is taking place.
- 1.14.5 Work areas must be kept clean and tidy with rubbish and other safety hazards cleaned up promptly. Fire Hazards such as garbage, oily rags, and flammable materials must be eliminated by prompt removal or other corrective action. All protruding nails shall be removed from timber or bent over.
- 1.14.6 All openings in floors are to be adequately guarded in accordance with the applicable. Safety Regulations and any additional requirements as may be instructed by the Architect. Responsibility for compliance with all safety requirements remains with the Contractor at all times.
- 1.14.7 All working platforms, suspended or other, shall conform to the relevant Regulations.
- 1.14.8 All scaffolding to be the standards laid down by relevant Authorities and approved in writing where required.
- 1.14.9 Any ladders must be to regulation standard and tied off at all times.
- 1.14.10 Safety belts shall be worn and properly secured at heights where no other form of protection is available.
- 1.14.11 No machinery, hand tools, or any type of equipment is to be operated without proper and effective guards.
- 1.14.12 The Contractor will be required to modify, guard or remove any plant or equipment that does not meet the Safety Requirements, and/ or local regulations.

**1.15 SAMPLES & TESTS:**

- 1.15.1 All materials proposed or furnished for use shall be subject to inspection and testing by the Architect, either on site, or the shop where such material may be in the course of fabrication. Allow to submit all samples as directed. All costs concerned with tests are to be borne by the Contractor. Keep approved samples on site at all times.

**1.16 ATTENDANCE AND MAKING GOOD:**

- 1.16.1 The Contractor shall attend upon, cut away for, build in, etc., and make good after all trades where and when required and shall make good any damage to roads, footings, sewers, cables services or other works caused by or attributable to the carrying out of the Works in any way.

**1.17 HOISTING & SCAFFOLDING:**

- 1.17.1 The Main Contractor will be responsible for the supply, installation, maintenance and operation of all hoisting and scaffolding gear and make available to all sub contractors and any separate contractors engaged by the Employer.

**1.18 SUBCONTRACTORS:**

- 1.18.1 The Employer reserves the right to reject subcontractors proposed by the Main Contractor that he regards as unsuitable.
- 1.18.2 The Contractor shall provide a list of proposed sub-contractors within seven days of request from the Architects.

**1.19 NOMINATED SUBCONTRACTORS:**

- 1.19.1 DELETED.

**1.20 NOMINATED SUBCONTRACTORS FACILITIES:**

- 1.20.1 DELETED

**1.21 PREFERRED SUBCONTRACTORS:**

DELETED

**1.22 PREFERRED SUBCONTRACTORS FACILITIES:**

- 1.22.1 The Contractor shall provide, without cost to the Preferred Sub Contractors all normal facilities for the proper and complete performance of the Sub Contract, including but not restricted to the following:
- Access to site
  - Scaffolding and hoisting facilities (including operators) as provided for, and during the period of, the Contractor's own use, but not including labour for loading and unloading.
  - Material storage areas
  - Tool storage areas

- Statutory requirements for drinking water, change facilities, messing and toilet facilities
- First aid and safety measures
- Adequate lighting and facilities for making temporary connections to power supply.

1.22.2 Wait upon, cut away for, and make good as required.

1.22.3 Extension leads and stepladders are to be provided by the Preferred Sub Contractor.

**1.23 SEPARATE CONTRACTS:**

1.23.1 DELETED

**1.24 PROTECTION & STORAGE:**

1.24.1 The Main Contractor shall be responsible for all protection and shall provide and fix all necessary temporary protection and adequate weatherproof storage for all components of subcontractors.

1.24.2 Separate subcontractors shall be responsible for protection of their products during delivery, storage and erection. Upon completion of their respective works the Main Contractor shall inspect and when approved shall accept all responsibility for protection from date of their acceptance of such work to completion of the Contract.

**1.25 SETTING OUT:**

1.25.1 The Contractor is responsible for the accurate setting out of the whole works or to provide everything necessary for that purpose.

1.25.2 All measurements and dimensions must be checked prior to setting out. The Contractor shall coordinate the work of all subcontractors and will be responsible for all items fitting accurately into place. Figured dimensions take precedence over those scaled and large details over smaller details. Any discrepancies must be reported immediately to the Architect.

**1.26 CLEANING & REMOVAL OF RUBBISH:**

1.26.1 The Main Contractor shall remove all rubbish caused by the operations of all trades on a daily basis during building operations. Allow to protect all finished surfaces from damage and discolouration caused by adjacent building operations and foot traffic, etc.

1.26.2 The Contractor shall, when directed by the Architects, clean any road or any area of drain, watercourse or canal or any area of private land, that are considered by the Architect to be noticeably dirtied, sullied or damaged by reason of the Contractor carrying out the Works.

**1.27 PROTECTION OF PROPERTY:**

1.27.1 The Contractor will be responsible for the adequate protection and where necessary making good of all public and private property adjoining the site. The Contractor will not assume any rights of access over adjoining property unless approvals are given by



the Architect or specified to the contrary at the end of this section.

**1.28 DEFECTS LIABILITY PERIOD:**

- 1.28.1 Maintain the works specified in this Contract including preventive maintenance as required by this specification for a period as stated in Appendix to the Fiji Standard Form of Building Contract and which shall apply from the date of Certificate of Practical Completion in accordance with Clause 15 of the Fiji Standard Form of Building Contract.

**1.29 MATERIALS WORKMANSHIP & PLANT:**

- 1.29.1 Materials in all trades shall be new and the best of their respective kinds specified and where necessary complying with relevant standards mentioned herein and subject to approval or rejection by the Architect.
- 1.29.2 Supply all materials, labour, plant and tools as necessary for the works.
- 1.29.3 The work shall be carried out in a first class tradesman-like manner in all respects to the reasonable satisfaction of the Architects in accordance with relevant standards mentioned herein and with the plans and specifications, and such further drawings and detail drawings as may be provided and in accordance with such instructions, directions and explanations as from time to time may be given by the Architect, and subject to approval and rejection by him.

**1.30 DEFECTIVE MATERIAL AND/OR WORKMANSHIP:**

- 1.30.1 Should materials be used or work done contrary and/or not up to standard herein specified then the Architect may instruct that this work be dismantled and rebuilt at the expense of the Contractor.
- 1.30.2 If the material used or work done is not in accordance with this specification, the Architect shall have the power to deduct such sum or sums of money as they shall consider a proper equivalent from the amount due to the Contractor, where the Architect does not feel it expedient to have the work or materials corrected.

**1.31 MATERIAL ON SITE:**

- 1.31.1 Any materials delivered to the site for this contract are to be considered as part of the construction and shall not be removed unless approved by the Architect. However the Contractor has the right upon completion of the works to remove all his surplus materials.

**1.32 ORDERING OF MATERIALS:**

- 1.32.1 All materials including those to be imported must be ordered within 21 working days of acceptance of tender. Materials not ordered within this period shall not be used for extension of time claims.

**1.33 GUARANTEES:**

- 1.33.1 Prior to commencing operations on the site the Contractor shall furnish a Bank

Guarantee in the prescribed form and of a maximum aggregate sum of the amount stated in Appendix 1, the period of validity of which is to continue until fourteen days after the expiration of the Defects Liability Period or, if a Schedule of Defects be delivered to the Contractor within that period, until the issue of the Certificate of Completion of Making Good Defects.

**1.34 PROGRESS PAYMENTS & RETENTIONS:**

1.34.1 A retention of 5% shall be held upon progress payments up to the issue of the Practical Completion certificate. The retention will then be reduced to 2 ½ % to cover the Defects Liability Period. (Refer Clause 15 of the Fiji Standard Form of Building Contract.)

**1.35 CONTINGENCY SUM:**

1.35.1 Allow a VAT excl contingency sum as set out in Section 2 Schedule of Monetary Allowances. Expenditure of this amount will be solely at the discretion of the Architect in accordance with the Contract. Any unexpended balance from this sum shall be deducted from the Contract Sum.

**1.36 INSURANCES:**

1.36.1 The Contractor is required to effect insurance for the works and is to ensure that he has all other required insurances, such as public liability, workmen's compensation etc

1.36.2 Prior to commencing any work on site being authorised a copy of the Insurance Policy must be provided, or proof that an Insurance Cover has been arranged must be produced in the form of a Cover Note.

1.36.3 All insurance shall be maintained during the course of the Works and as required by the contract conditions.

**1.37 PROVISIONAL & PRIME COST SUMS:**

1.37.1 Where specified, shall comply with definition and shall be administered as in Clause 11 of the Fiji Standard Form of Building Contract.

**1.38 TENDER DEPOSIT:**

1.38.1 Refer to the Tender Form for tender deposit amount.

**1.39 DOCUMENT DEPOSIT:**

1.39.1 All plans and specifications are instruments of service only and must be carefully used and returned to the Architect.

1.39.2 Refer to General Conditions of Tender for amount of required document deposits for each complete set of drawings and specifications and Schedule of Quantities issued to the tenderers. It should be noted that if a tenderer wishes a second set of documents they can be purchased but are not subject to refund.

**1.40 STATUTORY PERMITS:**

- 1.40.1 A Building Permit has been received and a copy will be provided to the successful tender if required.
- 1.40.2 The Contractor shall apply for all other permits immediately upon acceptance of his tender and the Contractor shall be granted access to the site one day after acceptance of his tender.
- 1.41 EXTENSIONS OF TIME:**
- 1.41.1 Extensions of time may be authorised as set out in Clauses 23 of the Fiji Standard Form of Building Contract.
- 1.41.2 Further to the Conditions of Contract, the Contractor, if he believes that he is entitled to claim an extension of time, shall raise such claim progressively at each site meeting to cover the proceeding period of time since the last site meeting.
- 1.42 WET WEATHER:**
- 1.42.1 DELETED
- 1.43 SIGNBOARD:**
- 1.43.1 Allow to provide, erect where directed and maintain in good condition, a signboard as detailed. The signboard will remain the property of the Contractor and is to be removed at the end of Practical Completion.
- 1.43.2 No other advertising will be permitted on the site. No notices or signboards including those of Nominated Sub-Contractors, will be permitted to be displayed on site unless specifically approved by the Architect
- 1.44 TRADE RELATIONS:**
- 1.44.1 The Contractor shall ensure that proper provision is made for the requirements of Subcontractors, separate Contractors, nominated Subcontractors and others properly employed on the site. He shall make available to them the use of toilets and other normal workmen facilities and space for storage as far as this is reasonably possible.
- 1.44.2 All nominated subcontractors shall attend upon the job and inspect the work of any other trade against which his materials are to be placed and report immediately to the Contractor any defect that would prevent the satisfactory execution, finish or permanency of his work. He shall not proceed until unsatisfactory preparatory work is made satisfactory. In the event of any dispute regarding the condition of preparatory work the Architect shall decide whether or not such work is up to standard that would be reasonably expected at the time of tendering and from the proper perusal of this document.
- 1.45 CONSULTANTS:**
- 1.45.1 Structural or other Consultants employed by the Employer will be required from time to time to make site inspections and deal with respective subcontractors through the Contractor. These Consultants are to have the right to deal directly with the Contractor and nominated Subcontractor within the terms of the Contract and have similar status to that of the Architect.

**1.46 STANDARDS:**

1.46.1 All Standards mentioned herein are deemed to form a part of this Specification. In the event of this Specification being at variance with any provisions of these Standards, the requirements of this Specification shall take precedence over the provisions of the Standards. Reference to any Standard shall include any amendment thereto and any Standard in substitution thereof.

1.46.2 Where the words "...or similar" occurs in the drawings or specification this will be deemed to mean similar to the fitting specified but the Architect's approval is necessary before ordering of installing in the works.

**1.47 COMPLETION:**

1.47.1 At Practical Completion of the Works clean all floors, sanitary fittings, and glass inside and out, remove all paint and putty marks, replace any cracked or broken items. The site both inside and out shall be left thoroughly clean and fit for immediate occupation, weatherproof and to the approval of the Architects. All services shall be tested and left in perfect working order.

1.47.2 Final cleaning and polishing of windows, walls inside and out, floors, sanitaryware, etc. shall be carried out by a commercial cleaner to the Architect's satisfaction.

1.47.3 If the Contractors fail to comply with this clause the Employer has the right to arrange for this work to be carried out and the cost thereof shall be deducted from the Final Certificate.

**1.48 BANK GUARANTEE:**

1.48.1 Deleted

**1.49 AMENDMENTS TO THE FIJI STANDARD FORM OF BUILDING CONTRACT WITH QUANTITIES**

The following modifications to the Contract Conditions apply:

CLAUSE 3 Contract Drawings, Specification and Schedule of Rates

Sub clause (2)(a) DELETE in-toto. One certified copy of the contract shall remain in the office of the Architect and be available to the contractor for viewing upon request. In sub clause (3) DELETE "two" and INSERT "one".

CLAUSE 13 Contract Sum

AMEND TO READ '(1) The Contract Sum etc'

INSERT new sub-clause (2) The Contract Sum shall be inclusive of the Value Added Tax introduced by the Value Added Tax Decree Act 1991.

CLAUSE 20 Insurance of the Works against fire etc.  
Clause B and C is to be DELETED in-toto

CLAUSE 23 Extension of time

First paragraph AFTER 'given written notice' INSERT 'within seven days'

CLAUSE 23(b) Delay for exceptionally Inclement Weather shall be defined thus:

The contractor shall allow for average wet weather to be anticipated during the Contract period, in accordance with the records kept by the Solomon Islands Meteorological Service, for the district in which the Works are located. Unless extraordinary circumstances arise in the opinion of the Architect, extensions of time for inclement weather, if any, shall be granted only according to the number of 'wet days', which shall be determined from the figures recorded by the meteorology Bureau over the last 5 years. A 'wet day' shall be any 24-hour period during normal working days when the rainfall exceeds 12mm as recorded by the meteorology Bureau.

The Contractor is to give the Architect in support of any claims for 'wet weather' a copy of the Meteorology Bureau records for average and actual rainfalls for the period involved.

Extensions under this formula shall not apply after work has been enclosed or otherwise protected in accordance with the Contract, nor if work is behind schedule, including approved extensions and would otherwise have been protected.

CLAUSE 23 Sub-clauses (j) (i) and (ii) DELETE in-toto

CLAUSE 24 Loss and expense caused by disturbance of regular progress of the Works

INSERT NEW CLAUSE 24(3)

Loss and expenses due to causes described in clauses 24(1) shall be adjusted at a weekly rate to be calculated, exclusive of scaffolding, craneage, dayworks charges, loss of efficiency/ production (disruption) of on-site labour and Nominated Sub-Contractors work, each of which shall be treated as a separate entity.

CLAUSE 27 Nominated sub-contractors

AFTER 'Such sums' in sub-clause (a) DELETE 'shall be deemed to include two and one half percent cash discount'

and

AFTER "or (save where the Architect/Supervising Officer and the Contractor shall otherwise agree)" in sub-clause (a) DELETE the remainder of the text and INSERT 'who will not enter into the Fiji Master Builders Association Sub-Contract, the use of which is mandatory and which provides (inter alia):-'

and

AFTER 'of this Condition' in sub-clause (a) (vii) DELETE the remainder of the text  
and

AFTER 'paid in full' in sub-clause (a) (viii) DELETE the remainder of the text

and

AFTER 'any section thereof' in sub-clause (b) DELETE the remainder of the text

and

AFTER 'the amount so certified in sub-clause (e) DELETE 'less only a discount for cash of two and one half per cent'

CLAUSE 30 Certificates and payments

AFTER 'to nominated sub-contractors or nominated suppliers' in sub-clause (5) (c) DELETE '(including the discounts for cash mentioned in clauses 27 and 28 of these Conditions)'

CLAUSE 31 Fluctuations  
DELETE 31A

**SECTION 4: EXCAVATOR****4.1 SCOPE:**

- 4.1.1 The scope of this section includes the excavation of all footings, foundations and trenches, etc., and the filling and backfilling necessary to the perimeter of the building and to the floor slab areas including hardfill, sand, etc., as specified herein or shown on drawings.

**4.2 EXCAVATION:**

- 4.2.1 Excavate for all foundations, footings, etc. to the level shown. Minimum depth shall be in accordance with the structural drawings, into solid ground but should satisfactory bearing not be found at this depth excavation shall be carried further down until satisfactory ground is reached. All subsoil from the foundations, etc. shall be removed from the building platform area.
- 4.2.2 Foundation Depth into Site: All foundations should project a minimum dimension into firm ground. If this is not clearly understood the Contractor shall seek a clarification from the Architect.
- 4.2.3 Timbering: Provide all necessary timbering, shoring, sheet piling, etc., necessary to keep the excavation open and safe for working at all times.
- 4.2.4 Pumping: It is the Contractor's responsibility to keep excavations free of water during building operations.

**4.3 HARDFILL:**

- 4.3.1 Lay consolidated hardfill to a minimum depth as shown on the drawings, graded hardfill consisting of clean sizes between 10mm and 38mm. Thoroughly compact with an approved compactor with particular attention being given to the outside edges.
- 4.3.2 Blinding: After compaction cover all hardfill with 50mm minimum sand. Ensure that the sand adequately covers all hardfill and that any protruding rocks etc., are removed or adequately covered with sand.

**4.4 DAMP PROOFING:**

- 4.4.1 Where retaining walls are indicated coat walls with 3 coats Flintkote DPC and protect from damage with second grade pinex softboard or similar.

**4.5 TRENCHES:**

- 4.5.1 Cooperate with the various trades in the excavation of all trenches for drains, electrical and telephone conduits, septic tanks, rubble drains, etc. Prior to backfilling ensure that pipes have adequate cover and protection in accordance with the regulations and that all necessary tests have been carried out by the respective authorities.

**4.6 TOPSOIL:**

- 4.6.1 Prior to commencing all work topsoil shall be stripped from the building site and stockpiled as shown.
- 4.6.2 At completion of the works, stockpiled topsoil shall be spread around the building area as directed by the Architect and as necessary to provide even surrounding ground area by rolling if required.
- 4.7 DISPOSAL OF EXCESS MATERIAL:**
- 4.7.1 Excess material from excavations and from backfilling shall be distributed on the site where directed by the Architect.
- 4.8 FORMING OF FILL AREAS:**
- 4.8.1 Generally the quality of fill material, and the nature of frequency of tests to check and control this quality shall be determined and specified before fill placing commences.
- 4.8.2 All earthworks material placed in or below fill areas, below formation level in cut areas, or elsewhere in the Works shall be deposited and compacted as soon as practicable after excavation, in a systematic manner, with near horizontal layers, each being deposited progressively across the full area of a fill in 225 layers, or in layers of thickness appropriate to the compaction plant used.
- 4.8.3 The surface shall be maintained at all times with sufficient falls and sufficiently even to enable surface water to drain readily from them.
- 4.8.4 During the construction of fill areas the Contractor shall control and direct constructional traffic uniformly over the whole area of the filling. Damage to compacted layers by constructional traffic shall be made good by the Contractor.



**SECTION 05 : CONCRETE****5.1 PRELIMINARY:**

5.1.1 This section establishes the quality of materials and workmanship and defines how quality is measured for the supply, testing, placing and curing of the concrete.

5.1.2 Standards: The following standards shall form part of this specification:

NZS 3109	Specification for Concrete Construction.
NZS 2086: 1967	Ready Mixed Concrete Production.
NZS 3105: 1975	Concrete Mixers (Batch Type & Truck Type).
NZS 3111: 1974	Methods of test for Water and Aggregate for Concrete.
NZS 3113: 1979	Chemical Admixtures for Concrete.
NZS 3121: 1974	Water and Aggregate for Concrete.
NZS 3122: 1974	Portland Cement (Ordinary, rapid hardening and modified).
ASTM C260-69	Specification for Air-Entraining Admixtures for Concrete.
ASTM G494-68	Specification for Chemical Admixtures in Concrete.
AS 11326:1972	Polyethylene (Polythene) Film for Packaging and Allied Purposes.

**5.2 MATERIALS:**

5.2.1 General: All material used shall be the best of their respective kinds free from all impurities, properly packaged and supplied in top condition.

5.2.2 Cement: Shall be Portland Cement or Rapid Hardening Portland Cement each conforming to the above standards.

5.2.3 Aggregate: Fine and coarse aggregate shall comply with the above standards. Maximum aggregate size shall be 19mm except for blockfill which shall be 10mm.

5.2.4 Concrete: Concrete for any major pour shall be ready mix in accordance with the above standards supplied by a firm approved by the Architect or shall be mixed as detailed in clause 5.2.6 below.

5.2.5 Water: Water shall be clean and free from all impurities conforming to the above standards and of such a standard that if required to do so the Contractor will drink it.

5.2.6 On Site Concrete Mixing: It is considered that any concrete mixed for a total mix volume of less than 10 cubic metres may be classified as a mixed pour and may be mixed on-site in an approved rotary bowl mixer.

5.2.7 All solid components of the mix (sand, aggregate and cement) shall be volume batched by use of measuring boxes to ensure correct proportioning of the mix. The mix for structural concrete excluding blockfill shall be 1:2:4, cement, sand, aggregate and correctly sized boxes shall be used to ensure this proportioning.

5.2.8 Dry mix shall be shall be mixed for a minimum of 3 minutes before water is added.

- 5.2.9 Ensure that sand and aggregate stockpiles are founded on free draining subsoils and they shall be covered with PVC or suitable tarpaulins to prevent saturation by rain.
- 5.2.10 Admixtures to Concrete Mixes: Except for concrete blockfill, no other admixture than Air Entraining Agent (AEA) shall be added to the mix and then only a percentage of less than 4%. Before any AEA is to be used, written permission must be received from the Engineer, who shall require details of the brand to be used and the method of measurement for each batch of concrete mix.
- 5.2.11 For concrete block fill, a plasticizer may be added but only after full discussion with, and written approval from, the Engineer.
- 5.2.12 NO FORM OF RETARDERS SHALL BE USED IN EITHER STRUCTURAL CONCRETE OR CONCRETE BLOCK FILL.

### 5.3 WORKMANSHIP:

- 5.3.1 All work in this section shall be carried out by tradesmen skilled in the mixing and placing of concrete to the satisfaction of the Architect and Engineer.
- 5.3.2 Tolerances: Dimensional tolerances for finished concrete work shall be strictly in accordance with Clause 4.4.3 of AS 1509, part of which is reproduced below. Any deviation from these tolerances shall be subject to review by the Architect who may order that the offending work be cut out and repoured at the Contractor's expense.

(a) Beams	±5 mm
(b) Columns	±5 mm
(c) Slab Thickness	±10 mm
(d) Straightness of Beams/Columns	5 mm in 2000 mm
(e) Slabs	3 mm in 2000 mm straight edge

- 5.3.3 Employ only skilled competent tradesmen appropriately qualified and registered or licensed at the time of carrying out the work.

### 5.4 COOPERATION:

- 5.4.1 General: Allow to cooperate with other trades to space, position and build in all fixing bolts, pipes, sleeves, nailing ground, chases, conduits, reinforcing starters, weather bars, inspection chambers, septic tank, etc., also cooperate with the Blocklayer in the filling of cavities.
- 5.4.2 Embedded Items: Take delivery of all embed items from the respective suppliers and cast into the concrete. The positioning of all embedded items shall be checked by the trade to which it applies before concreting and every care shall be taken to ensure that the position is not altered.

### 5.5 FORMWORK:

- 5.5.1 General: Formwork may be constructed in timber and/or steel. Reference may be made at the end of this section concerning any special conditions applicable to this contract. Formwork and falsework shall generally be in accordance with AS 1509 - SAA Formwork Code.

- 5.5.2 Timber: All timber shall be sound and free from knot holes. Timber in contact with concrete shall not be less than 22 thick, or resin bonded plywood constructed so as to produce mortar tight joints.
- 5.5.3 Form Oil: Where form oil is used to preserve forms the oil shall be of a recognised proprietary brand which shall not affect the bond of plaster to the concrete.
- 5.5.4 Workmanship: All formwork shall be securely braced and supported to prevent any distortions due to pressure of concrete and loads from building operations. Particular attention shall be given to all wall and beam surfaces to render them straight and true. Formwork shall be provided with suitable clean out points to ensure the removal of all foreign matter from the interior before each pour. Before placing concrete all forms shall be fixed to proper lines and levels and shall be saturated with water, if form oil is not used.
- 5.5.5 Stripping: Formwork shall not be stripped before the times mentioned below. (Time shown is for normal hardening cement).

Foundation side	1 day
Beam sides, walls	2 days
Columns	5 days
Slabs (props left under)	5 days
Beams soffits (props left under)	7 days
Removal of props to slabs	10 days
Removal of props to beams	28 days

## 5.6 PLACING:

- 5.6.1 The handling, placing, protection and curing of all concrete shall be strictly in accordance with NZS 3109 which forms part of this specification and shall be read in conjunction with it.
- 5.6.2 Care shall be taken to prevent segregation of the concrete, spreading of the formwork and other aspects likely to cause faulty concrete work. Concrete shall not be dropped over 1350 into forms or be dropped into any depth of water without prior approval of the Engineer. Should honeycombing be evident after stripping of boxing, the Engineer shall decide whether the honeycombing has deleterious effect on the structure effect on the structure or appearance in which case the concrete shall be cut out and replaced, or, if not of a serious nature, the surface may be repaired by plastering, all at the expense of the Contractor.
- 5.6.3 Adequate means of protecting finished concrete surfaces shall be taken and effective damp curing by use of polythene sheet or sand covering or sacks kept continuously damp is also essential.
- 5.6.4 All concrete shall be thoroughly consolidated by vibration. Minor surface blemishes on fairface concrete shall be bagged in. Concreting shall not be carried out when rain is falling.
- 5.6.5 Any concrete to be transported horizontally shall be carried by conveyor belt, wheel barrow, chute or concrete pump but the method of transportation shall be discussed with the Engineer prior to commencing the work. It shall be noted that pumped concrete requires a modified constituent mix and shall therefore be subject to approval by the Engineer.

5.6.6 Any previously poured concrete that is to receive fresh concrete shall be thoroughly cleaned down, all bacteria removed by chipping or wire brushing and the face prepared by the application of a cement/water paste brushed onto the surface.

5.6.7 No concrete older than 1.5 hours after addition of mixing water shall be used. Any batch ticket unused by a ready mix concrete plant shall be clearly noted with the mixing.

## 5.7 PROTECTION & CURING:

5.7.1 Placed concrete shall be protected from rain, sun and drying winds, by suitable coverings, immediately available on site. The whole or the surface area of concrete shall be properly cured by being continuously damp for 7 days. Artificial curing such as sand kept continuously wet shall be allowed for at all times. Polythene sheets may also be used. Great care shall be taken to avoid damage to the concrete surface by the polythene sheets.

## 5.8 REINFORCING STEEL:

5.8.1 General: Refer to the Fiji Standard Form of Building Contract and the Preliminary & General clauses which will also apply to this section of the work.

5.8.2 Standards: In addition to standards cited elsewhere the relevant provisions of the following shall apply, unless modified accordingly :

AS/ NZS 4671	(2001)	:	Reinforcing for concrete
NZS 4702	(1982)	:	Metal-arc Welding of Grade 300 Reinforcing
NZS 3101	(1995)	:	Concrete
NZS 3109	(1980)	:	Concrete Construction

5.8.3 Materials: Provide all supports, hangers, spacers, and ties to approval where not shown.

5.8.4 Plain and deformed bars shall comply with AS/ NZS 4671 (2001) and be of mild steel and shall have a guaranteed minimum yield point of 300 megapascals.

5.8.5 Welded wire fabric shall conform with the AS/ NZS 4671 (2001).

5.8.6 Alternative steels for reinforcement may be approved provided that its composition, manufacture, certified tests of strength, elongation, fatigue resistance and weldability, is equivalent properties to those specified above.

5.8.7 Protection: Store steel and mesh clear of ground and under cover.

5.8.8 Provide walkways over placed reinforcing to approval if required.

5.8.9 Brace adequately all reinforcement projecting more than 3m from concrete, cut out defects around bars caused by movement as directed before resuming concreting.

5.8.10 Fabrication: Fit ties and stirrups tightly round main reinforcement.

5.8.11 Bend deformed bars around rollers, not fixed pins.

- 5.8.12 Bend deformed bars only once.
- 5.8.13 Tolerance & Protective Cover: Tolerances shall be as set out in Clause 4.4.3 of AS 1509 - Formwork.
- For protected locations e.g. internal work : slabs 20mm minimum beams & columns 25mm to stirrups or tie.  
For moderate locations e.g. external protected: 40-50mm.  
For severe locations e.g. foundations or marine: 75mm minimum
- 5.8.14 Placing & Fastening: Support top steel on high chairs or by other approved means.
- 5.8.15 Unless otherwise detailed, support slab reinforcement at maximum 1m crs, except reinforcement 10mm in diameter and smaller at maximum 600mm crs.
- 5.8.16 Tie reinforcement with not less than 1.25mm soft black iron wire sufficiently to maintain correct relative positions. Bundle bars should be tied together at 500 crs. with 2.65mm min. soft wire.
- 5.8.17 Laps: Excepting as shown no lapping of reinforcement is permitted without written approval. Where lengths of laps are not shown, ask for approval.
- 5.8.18 Welding: Welding of reinforcement shall comply with NZS 4702 - Metal-arc Welding of Grade 275 Reinforcing Bar.
- 5.8.19 Unless shown on the drawings, welding of reinforcement is not permitted without written approval.
- 5.8.20 Identify rods or bars to be welded with tags or branding.
- 5.9 INSPECTION BEFORE CONCRETING:**
- 5.9.1 Before concreting, reinforcement must be inspected by Supervising Officer. Arrange with Engineer suitable time for inspection. Work done without his approval may be rejected. 24 hours notice is required for Suva area, 48 hours elsewhere in Fiji.
- 5.9.2 Remove all formwork preventing proper inspection.
- 5.9.3 Prior approval of cleaning, fabrication and securing reinforcement subject to the reinforcement being satisfactory at times of concreting.
- 5.9.4 Extra will not be paid for remedial work caused by the inspection.
- 5.10 DAMP PROOF COURSE:**
- 5.10.1 Where shown on drawings, lay under floor slabs on ground 0.20mm polythene DPC over sand blinding. Carefully check blinding for any protrusions likely to puncture the DPC. Tape all joints, protrusions around pipes, tears, etc. with pressure sensitive tape. Carry DPC under thickenings in slab and seal DPC to foundation walls. It is essential that the DPC is continuous so that dampness cannot penetrate. Prior to the pouring of concrete the whole of the DPC shall be checked for any punctures which shall then be taped. The Engineer shall be notified prior to the pouring of concrete so that it may be inspected.

**5.11 CONSTRUCTION & CONTROL JOINTS:**

- 5.11.1 Floor slabs on ground shall be poured to a maximum area of of 25 sq m and the length of any side is not to exceed 7.5m. Reinforcement to be continuous and joints shall be chipped away and keyed and well cleaned before pouring adjacent slabs. Construction joints shall be in the positions indicated on the drawings. Construction joints in beams shall be generally located at the one-third point of the span, however the Engineer should be notified prior to the pouring so that he may approve the location. See clause regarding preparation of surface before pouring subsequent concrete.

**5.12 FOUNDATIONS:**

- 5.12.1 Set Out: The accurate set out of the foundations is very important to the satisfactory construction of the rest of the building. Refer to the drawing setting out the exact dimensions for this work.
- 5.12.2 Footings: Ensure that the bed for all footings is on solid bearing, remove all soft spots and fill with weak concrete; provide a solid even clean base for the pouring of the footings. Pour the footings to the shape and sizes indicated on the structural drawings. Cooperate with the Blocklayer in the location of all starters and construction of the block foundation walls.

**5.13 BEAMS:**

- 5.13.1 Ensure that prior to the pouring of concrete, the formwork for the bearing is adequately supported so as to prevent deflection and spreading upon the pouring of the concrete. Pour the beam to the sizes and profiles indicated on the structural drawings.

**5.14 BLOCKWORK:**

- 5.14.1 Work in and cooperate with the Blocklayer in the construction of blockwalls, the filling and reinforcing of same and location of all starters, bars, etc.

**5.15 TESTING:**

- 5.15.1 Compression Test: The Contractor shall allow to take three concrete test cylinders (of the size designated in NZS 3112) per concrete pour or as many others as may be directed by the Engineer. These cylinders shall be taken from any random delivery of concrete to the site or from every on-site mixed pour as directed by the Engineer and shall be cured on site in conditions as near as possible to those under which the pour from which they were taken is being cured. The cylinders shall be prepared from a representative sample of the delivery. These samples should be taken at the ready mix.
- 5.15.2 Cylinders shall be removed from the forms after a minimum of three days (or as discussed and approved) all shall be clearly and illegibly marked on the side of the cylinder with the date of the sample and a reference number indicating position of the pour.
- 5.15.3 The cylinders as a general rule, are to be tested and broken, one at 7 days and two at 28 days after the pour by an independent testing authority such as the Public Works Department and the results of these tests are to be submitted to the Engineer. Note that these tests are in addition to any tests taken by the control batching plant.

- 5.15.4 Slump Test: This test shall be made in accordance with the requirements of NZ 3112 (1974). A Slump Test shall be made on a trial mix before main concreting is started, if on-site mixing is employed, at all times when Compression Test samples are taken and at such other times when directed by the Engineer. If ready mix is used, the concrete shall be rejected if the slump deviates by more than 16mm to that slump value nominated by the specification.
- 5.15.5 Test Personnel : Only people experienced in preparing concrete cylinder and slump tests shall be employed to prepare the samples, as a high coefficient of variation (more than the probable C.O.V. of the concrete mix) is possible with inexperienced samplers. The Engineer may require up to 20 samples of either concrete cylinders or slump tests be taken on test mixes before the sample is approved.
- 5.15.6 Sampling Equipment : All sampling equipment, cylinders, slump cones, tamping rods, etc, shall be thoroughly cleaned before use by use of wire brush and cleaning cloths. The equipment shall be given a light coating of form oil after cleaning and this shall be removed with a soft cloth immediately before use.
- 5.15.7 The Contractor shall notify the Engineer whether the testing agency employed for crushing the cylinders employs "capping" procedures before the crushing is carried out or if they are tested "of the cylinder".
- 5.15.8 The Contractor shall note that a minimum of 9 steel cylinder forms will be required or, if "one-off" tubes are to be used, the Contractor shall submit samples of the forms to be used for approval before commencing the concrete work.

## **5.16 CONCRETE STRENGTHS:**

- 5.16.1 Unless otherwise stated, the characteristic strengths and slumps of the concrete shall be as follows :
- (a) For single storey structures, excluding heavy duty slabs  
20 MPa.
- (b) Concrete slumps (maximum):
- |                                       |       |
|---------------------------------------|-------|
| Floor slabs                           | 75mm  |
| Foundations                           | 80mm  |
| Structural concrete beams and columns | 75mm  |
| Concrete walls                        | 80mm  |
| Blinding concrete or mass filling     | 100mm |

## **5.17 PUMPED CONCRETE:**

- 5.17.1 The sand and coarse aggregate must both be properly graded, and the concrete should be free from any tendency to segregation to ensure an easy, even flow in the pipeline. The Contractor should check that the concrete mix is pumpable well in advance of pumping operations, so that there is time to modify the mix, if necessary.
- 5.17.2 Concrete for pumping shall have a slump between 40mm and 80mm and a minimum strength at 28 days of 25 Mpa. Refer to the relevant section of this specification regarding Concrete Testing. Before concrete is pumped through, the pipeline must first be lubricated by pumping through itone or two batches of thin cement grout composed of two parts of sand to one of cement. This is effected by inserting a plug into the pipeline in front of the grout.

**5.18 READY MIXED CONCRETE:**

- 5.18.1 Shall be mixed in an approved central mixing plant capable of complying with the relevant clauses of NZS 3101 (1995).
- 5.18.2 It shall be transported to the site in an agitator of revolving drum type and the discharge shall be completed within one and one-half hours, or such longer or shorter periods as shall be approved by the Engineer, after the introduction of mixing water to the cement and aggregates, or cement to the aggregates.
- 5.18.3 The concrete shall be handled at the site in suitable hoppers and chutes, etc., so as to prevent segregation and shall be placed in its final position in the formwork within 20 minutes of delivery to the site.
- 5.18.4 Remixing with or without further addition of water, cement or aggregates to concrete which has partially hardened shall not be permitted.



**SECTION 06 : STRUCTURAL STEELWORK****6.1 PRELIMINARY:**

6.1.1 This section establishes the quality of materials and workmanship and defines how quality is measured for the supply, testing, placing and curing of the concrete.

6.1.2 Standards: The following standards shall form part of this specification:

NZS 3404

AS 1111	:	150 Metric Hexagonal Commercial Bolts
AS 1131	:	Dimensions of Hot Rolled Structural Steel Sections
AS 1163	:	Structural Steel Hollow Sections
AS 1204	:	Structural Steel - Ordinary Weldable Grades
AS 1237	:	Flat Metal Washers for General Engineering Purposes
AS 1250	:	SAA Steel Structures Code
AS 1252	:	General Grade High Strength Bolts & Nuts
AS 1554	:	Rules for the Design and Application of Metal Arc Welding in Steel Building Construction

Swedish Standard S.P.1

Swedish Standard 055900 Sa 2 (St 2)

Swedish Standard 055900 Sa 2/1-2(St 2/1-2)

Swedish Standard 055900 Sa 3 (St 3)

**6.2 MATERIALS:**

6.2.1 All structural steel used in this work shall be the best of their respective kinds and shall comply with the above mentioned standards. Structural steel shall be classified as 250 mm steel suitable for general structural purposes.

**6.3 WORKMANSHIP:**

6.3.1 All workmanship and finish shall be carried out by competent tradesmen/builders, in metal working and welding, and shall be of the highest standard conforming with the best trade practice. Accuracy shall be such as to ensure that all parts will fit properly together when erected, without straining or forcing. All rolled steel sections shall be quite straight before erection. Any straightening shall be done as approved by the Architect/Engineer or the bent sections shall be replaced.

6.3.2 Operators: All welding operators shall be skilled in welding in the positions required under the Contract and for each welder, the Contractor shall submit evidence of recent (no older than 6 months) tests passed which have been conducted by a recognised welding authority. At least one radiographic test and analysis shall be submitted for each welder for each type of weld to be executed. No welder shall execute welds in which he has not passed approved tests.

6.3.3 Welding Procedures: All welding procedures shall be the responsibility of the Contractor and shall be such as to minimise distortion or restraint. When required by the Engineer, the Contractor shall submit for review details of one or all welding procedures.



6.9.3 Bracing: At all stages of the erection work the steelwork shall be adequately held and braced so that the structure is stable, safe and not overstressed in any way from erection loads or windloads.

**6.10 CLEANING DOWN, PRIMING & PAINTING OF STRUCTURAL STEELWORK:**

6.10.1 General: All work involved in the application and the cleaning down of the paint and steelwork shall be to the best standards possible. All paints shall be handled and applied strictly in accordance with the manufacturer's instructions.

6.10.2 Surface Preparation: For sand blasting or shot blasting, the surface preparation should be in accordance with the Swedish Standard Sa 2, and for hand or mechanical cleaning to Swedish Standard 055900 St 2. The Contractor shall pay special regard to this cleaning down process, and shall strictly adhere to the standard mentioned above or to the paint manufacturer's instructions on cleaning down, in particular to the requirements set by the paint manufacturer regarding surface profile heights.

6.10.3 Application: All primer paints shall be applied within the shortest possible time with a maximum delay of 2 hours from cleaning.

6.10.4 Unless otherwise instructed by the Architect/Engineer, the Contractor shall apply the following: The primer type shall be a zinc epoxy primer such as Resene Zinc Epoxy Primer or equivalent to the Architect/Engineers approval, also in accordance with the manufacturer's instructions.

6.10.5 The top coat type shall be a high performance finish such as Resene High Build Epoxy or equivalent to the Architect/Engineer's approval, also in accordance with the manufacturer's instructions.

6.10.6 Inspection: The Architect/Engineer shall be informed of the period, at least 1 week in advance, during which this cleaning down and priming is being carried out. The Architect/Engineer will have the right to carry out spot checks on this priming and cleaning. The Architect/Engineer will be informed by the Contractor at least 3 days in advance of when the steelwork has been primed in order that he may carry out any inspection before the top coat is applied.

**6.11 GALVANISED FINISH:**

6.11.1 Where indicated on the drawings ( or as a general rule all those small items such as steel embeds for fixing posts, bracing, etc., or those brackets required in jointing timber members), metalwork items shall be hot dipped galvanised to a weight of 450g/sq m over the exposed areas of this item.

**6.12 GUARANTEE:**

6.12.1 The Contractor shall supply to the Owner a 3 year guarantee on all paint materials and a 1 year guarantee on all painting workmanship. See also item 1.30 - Preliminary & General Section.

**6.13 DRYPACK MORTAR:**

- 6.13.1 Drypack mortar shall be used beneath the base plates. The mortar shall consist of a dry volume mixture of cement and sand, 1 part cement to 1-1/2 parts sand with sufficient water added to form a ball without excluding water or falling apart when the hand is opened. Mortar shall be hammered under the base plate with a wooden tool and properly compacted, kept protected from direct sunlight and water cured for three (3) days.
- 6.13.2 Note: Where structural steelwork is encased in concrete it shall be cleaned such that no loose rust or mill scale exists. Any steelwork to be encased must be inspected by the Architect/Engineer. Do not paint structural steel which is to be encased in concrete.

**SECTION 10: CARPENTRY**

**10.1 PRELIMINARY:**

10.1.1 Refer to the applicable Fiji Standard Form of Building Contract and the Preliminary & General clauses which will also apply to this section of the work.

10.1.2 Standards:

NZS 1900 Chapter 6.1 & 9.1

**10.2 EXTENT OF WORK:**

10.2.1 This section includes all carpentry work shown on the drawings.

**10.3 MATERIALS**

10.3.1 General: All timber shall be preservative treated, graded and contain a moisture content in strict accordance with the Fiji Department of Forestry’s current recommendations.

10.3.2 Timber used in this contract shall be the best quality, in accordance with the above mentioned standard. Timber shall be well seasoned, have the correct respective moisture content, free from shakes, bad knots and any other defects.

10.3.3 All dimensions on the plan are relative to rough sawn sizes unless stated to the contrary. All proprietary linings, fittings, material, etc., shall be of an approved manufacture and design. All nails, bolts, etc., used shall be hot dip galvanised unless stated to the contrary.

10.3.4 Types of Timber: Unless specified otherwise on the drawings, the following timbers shall be used. Exposed timbers shall be of one species only:

USE	SPECIES	GRADE	
<b>Exposed Roof Framing</b> (beams, rafters, purlins, hips, ridge, trusses)	Fiji Pine	F8, Gauged	H3
<b>Hidden Rafters</b>	Fiji Pine	F8, Gauged	H3
<b>Perimeter beams</b>	Fiji Pine	F8, Gauged	H3
<b>Perimeter beams</b>	Fiji Pine	F8, Gauged	H3
<b>Pine Post</b>	Fiji Pine		H4

10.3.5 Treatment: All timbers noted above as being treated shall have Tanalith NCA pressure treatment as specified at end of this section.

**10.4 MOISTURE CONTENT:**

10.4.1 The moisture content of the timbers shall be strictly adhered to. The Architects reserve the right to submit any timbers to a recognised testing authority for testing and report.

Moisture Content for Exterior Use Timbers shall be a maximum of 15 percent  
 Moisture Content for Interior Use Timbers shall be a maximum of 10 percent

- 10.4.2 The Architect may require the Contractor to submit timber for testing by the Forestry Department. The Architect may require the Contractor to replace joinery in which defects occur through improper moisture content. The Contractor shall replace at his own expense any timber which has been damaged or shrunk on finished work caused through the use of imperfectly seasoned timbers.

## **10.5 WORKMANSHIP:**

- 10.5.1 Employ only skilled competent tradesmen appropriately qualified and registered or licensed at the time of carrying out the work. The whole of the work shall be properly framed and the various sections securely spiked and/or strapped together to withstand hurricane conditions. All finished or partly finished work shall be protected from discolouration, surface injury or other damage from exposure to weather or other causes.

## **10.6 TIMBER FASTENERS**

- 10.6.1 Proprietary and patent fasteners and fixings shall be installed in strict accordance with manufacturer's instructions.
- 10.6.2 All nails spikes, brads, staples, bolts and accessories of ferrous metal shall be hot dip galvanised. All structural visible screws shall be solid brass. Bolts shall be of correct lengths protruding one and a half turns of the thread beyond the nut when tightened. Boltheads and nuts bearing against timber shall be fitted with suitable washers.

## **10.7 STRUCTURAL TIMBER/PRESERVATIVE TREATMENT**

- 10.7.1 Timber for structural purposes shall be Fiji - C - Select complying with the National Grading Rules for Fijian Timber 1986 unless otherwise stated. Plates, bearers and door and window frames shall be dense local hardwood. All other framing timber shall be of strength Grade F7 unless otherwise specified in the drawings. Such timbers shall be preservative treated using full cell pressure process to give adequate protection in H2 condition in accordance with "A Guide to the Specification of Local Timbers for Building Applications" issued by the Utilisation Division of the Department of Forestry, Fiji. No substitution shall be allowed without the Architect's approval.
- 10.7.2 Nailed joints shall, as far as possible, be so fixed that the nails are loaded in shear, i.e. laterally. Nails to laps and scarfs of framing timber shall be 25mm longer than the total timber thickness and the ends clinched at right angles to the grain.
- 10.7.3 Slots in wood members for metal plate cleats, etc., shall be 1.5 mm wider than the metal. Mismatch at the abutting ends of purlins and battens shall not exceed 2 mm.
- 10.7.4 Treat all non heart and hardwood timbers with Cellcure AN or Tanalith NCA preservative. The degree of treatment shall be as set out in the Schedule of Treatment for timber in various positions as follows:

- 10.7.5 Hazard 2  
Out of ground contact and continuously protected from the weather or painted and adequately ventilated 3.5kg/m<sup>3</sup>.
- 10.7.6 Hazard 3  
Out of ground contact but not continuously protected from the weather or situations such as in continuous contact with damp masonry in unventilated ground line floor, cellars, wet conditions, exposed verandahs, floors, garden furniture, fire escapes, barge boards, etc. 7.0kg/m<sup>3</sup>
- 10.7.7 Hazard 4  
Ground contact situations where timber is in contact with the ground or similar situations in normal conditions prevailing in either the wet or dry zones of Fiji.  
low risk (a) 10.2 kg/m<sup>3</sup> e.g. fence posts
- 10.7.8 Hazard 5  
Ground contact situations where timber is in contact with the ground or similar situations in normal conditions prevailing in either the wet or dry zones of Fiji.  
high risk (b) 18.0kg/m<sup>3</sup> e.g. house piles or structural posts or piles
- 10.7.9 Hazard 6  
Marine uses exposed to marine boring organisms. 48kg/m<sup>3</sup>

Additional information on timber treatment can be obtained from the Department of Forestry, Suva.

## **10.8 PRIMING & SEALING:**

- 10.8.1 The external face, ends and butts of all external finishing timbers and all finishing timbers, frames, etc, in contact with concrete or blockwork shall be primed before fixing.
- 10.8.2 All rafters, beams and sarking that are exposed shall have a priming coat applied before erection.
- 10.8.3 This clause should be read in conjunction with the Painting Section for reference to those timbers requiring different types of priming. It is the Contractor's responsibility to ensure that timber being finished with oil stain or varnish shall receive their correct first coat.

## **10.9 FINISH:**

- 10.9.1 Remove all arrises, rough and uneven patched, hammer marks, machine marks and other surface defects to the satisfaction of the Architect before any finishing medium is applied.

## **10.10 DAMP PROOF COURSE:**

- 10.10.1 Place 3 ply bituminous felt d.p.c. between all faces to timber in contact with concrete or blockwork neatly cut for bolts and trim for full width of member.

## **10.11 PROTECTION:**

- 10.11.1 All timber and joinery upon arrival at the site shall be immediately fillet stacked. All joinery, kiln dried timber and all dressed timber shall be protected from the weather and from damage continuously during the contract, before and after installation.

**10.12 HARDWARE:**

Refer Schedule of Monetary Allowances. Allow to take delivery of and fix all hardware.

**10.12 PREPARATIONS FOR HANDING OVER:**

- 10.12.1 Before handing over the building to the Owner, the Contractor shall properly prepare the building for occupation and use. He shall remove all rubbish and gear, check and adjust all hardware, present all keys and in all areas where linings are applied, employ an approved firm of commercial cleaners to wash down all washable surfaces and polish all floor coverings.

- 10.12.2 All glass throughout the building shall be washed and left free of marks, paint spots, etc., and all floors where no floor coverings are applied will be swept and hosed down after which all floor channels, traps, floor drains and sumps shall be cleaned out.

- 10.12.3 All foreign materials, nails, silt, etc., to be removed from all gutters. Refer to Preliminary & General clauses on Completion.

**10.13 JOINERY:**

- 10.13.1 Take delivery of all joinery and fix in accordance with good trade practice in accordance with positions as shown on the drawings.

**10.14 FINISHES:**

- 10.14.1 All dressing grades shall be machine dressed and in addition all finishing timbers shall be scraped and sand papered by hand to smooth even surface ready to receive painting and polishing. No machine marks, hammer marks or surface defects shall be visible in finished work. Punch all nails and remove all arrises. Where polished work is specified, the timber shall be carefully matched for uniformity of colour grain and texture to ensure a uniform finish. Internal doors shall be finished with a coat of stain, coat of Shellac 2 coats Matt Polyurethane, rub down with steel wool and polish with Linseed Oil.

**10.15 RESAWN TIMBERS:**

- 10.15.1 Timbers scheduled on the Schedule of Finishes as resawn shall be timbers which have been resawn with a band saw to remove mill circular saw marks.



**SECTION 12 : ROOFING****12.1 GENERAL:**

- 12.1.1 All roofing shall be applied strictly in accordance with the manufacturer's instructions by specialist firms approved by the Architect. Any discrepancy between the manufacturer's instructions and the specification shall be referred to the Architects.

**12.2 SCOPE:**

- 12.2.1 This section of the work includes the laying of all roofing, downpipes, gutters, spoutings, flashings, etc. indicated on the drawings.

**12.3 WORKMANSHIP:**

- 12.3.1 Workmanship shall be in accordance with the manufacturer's recommendation to the satisfaction of the manufacturer and the Architect. Employ only skilled competent tradesmen appropriately qualified and registered or licensed at the time of carrying out the work.

**12.4 STORAGE OF ROOFING COMPONENTS**

- 12.4.1 Roof sheeting shall be stored in accordance with manufacturer's recommendations. Generally flat, undercover and on suitable wooden packers to ensure that the sheeting is adequately supported at no less than 750 c/c and to a slight fall to shed condensed liquid. Before stacking on site, the sheets shall be separated, allowed to sun dry and then re-stacked.
- 12.4.2 Nails, screws and roof accessories shall be stored undercover with adequate support.

**12.5 FOOTWARE & WALK BOARDS:**

- 12.5.1 All workers on the roof shall wear soft non-metallic footware and walk boards shall be utilised to prevent damage to the roofing surface.

**12.6 ROOFING:**

Material: Colourbond 'Ultra' 0.48BMT by Bluescope (or equal approved)  
 Colour: Surf Mist  
 Profile: Trimdek

**12.7 ROOF FIXING:**

- 12.7.1 Fixings: As recommended by manufacturer to withstand a design wind velocity of 57 metres per second.
- 12.7.2 Fixing within 1m of eaves, ridge and bargeboard: Fasteners shall be Stormtite™, Class 4 type 17 14 G x 65mm cyclonic fastener as manufactured by Mechanical Plating Pty to comply with AS 3566
- 12.7.3 Fixing to Timber: Fasteners shall be N°14 – 10 x 65mm Hex head type 17 self drilling screw

Fixing to Steel: Fasteners shall be N°14 – 20 x 45mm Hex head self drilling tapping screw

12.7.4 Fasteners shall conform to AS3566 " Screws – Self Drilling for the Building and Construction Industries". Use low carbon, non-conducting sealing washers.

12.7.5 Fasteners to be factory coated to provide accurate colour match with roofing steel and shall be heavy zinc or zinc-tin coatings or zinc alloy coated heads complying with AS 3566.2 – 2002 Class 4.

**12.8 ROOF INSULATION:**

12.8.1 Cover total area of roof with double sided foil insulation, Harvifoil 425 or equal approved in strict accordance with manufacturer's directions. Lay foil over top of and at 90 degrees to purlins. Fit tightly around all roof protrusions and lap and tape all joints in accordance with the manufacturer's recommendations.

**12.9 FLASHINGS, CAPPINGS:**

12.17.1 Material: Colorbond 'Ultra' 0.48BMT. Colour to match roof sheeting. Fixings as recommended by roofing manufacturer to withstand a design wind velocity of 57 metres per second. Lap all flashings minimum 100mm or 2 corrugations over roofing.

**12.10 JOINTS, FLASHINGS & CAPPINGS, GUTTERS & DOWNPIPES:**

12.10.1 Seal all joints with suitable external quality silicone sealant

**12.11 EDGE SEALING:**

12.11.1 Seal all cut edges of sheets and accessories (ridging, guttering and flashings etc), with one coat of 'Cut Edge Protection Lacquer' (Akzo Nobel Coatings Ltd, or equal approved)

**12.12 PREVENTION OF SWarf STAINING:**

12.12.1 All loose particles from drilling, cutting and riveting operations are to be removed immediately with a soft broom

12.12.2 Power shears and hand snips produce the least amount of debris and are to be used whenever practicable. Friction blades are not to be used unless absolutely necessary. If friction blades are required to cut, the sheet should be cut away from the job and any other sheets. Where this is not practical, newly fixed roofing should be masked off with building paper or similar, to collect any swarf particles

**12.13 COMPLETION:**

12.13.1 Leave roof and gutters clean and in a weathertight condition.

**SECTION 23: PAINTING****23.1 STANDARDS:**

23.1.1 The following standards relate to work referred to in this Section:

AS 1580	Methods of test for paints and related materials
AS 1627	Code of Practice for preparation and pre-treatment of metal surfaces prior to protective coating
Part 1	Degreasing of metal surfaces using solvent or alkaline solution
Part 2	Power tool cleaning of steel surfaces
Part 4	Abrasive blast cleaning of steel surfaces
AS 2310	Glossary of paint and painting terms
AS 2311	The painting of buildings
AS 2700	Colours for general purposes.

**23.2 SAMPLES:**

23.2.1 Before commencing painting, provide on a representative portion of substrate(s), supply 300 x 300mm samples for approval by the Architect of the total coating system which meets the specified requirements for colour, gloss and texture for each different colour selected to be applied.

**23.3 INSPECTION AND REVIEW:**

23.3.1 The painting sub contractor shall review the scope and extent of all finishes and colours on site with the architect prior to proceeding with any paintwork whatsoever.

23.3.2 Give one days' notice so that inspection of work may be made by the Architect at the following stages:

- Completion of preparation of surfaces prior to applying coatings.
- After application of each successive applied finishing coat.

**23.4 MATERIALS:**

23.4.1 Painting Materials:

Use only premium quality lines from Apco, Dulux, Taubmans or Resene. Trade brands will not be accepted. The Contractor is to nominate and obtain the Architect's approval of the paint brand or brands proposed prior to committing himself to the paint brand.

23.4.2 Anti-mould, Anti Fungal Paint:

All paints used must be anti fungal, anti mould paints.

23.4.3 Proprietary Materials:

Notify the proposed brand of paint and paint line prior to placing any orders. Change neither the brand nor the paint line without approval.

- 23.4.4 Combinations:  
Do not combine paints from different manufacturers in a paint system.
- 23.4.5 Delivery:  
Deliver paints to the site in the manufacturer's labelled and unopened containers.
- 23.4.6 Thinners:  
Use only the type and quantity recommended by the paint manufacturer.
- 23.4.7 Tinting by Manufacturer:  
Colour tinting shall be by the manufacturer unless otherwise approved.
- 23.4.8 Tinting by Sub-Contractor:  
Add tinters or stainers only if approved, and only if in accordance with the manufacturer's recommendations as to type, quality and tinting formula, and provided the tinting produces the required colour without detriment to the durability or aesthetic performance of the product.
- 23.4.9 Putty  
Putty shall be to AS 1263, Type 1 & 2, or an equivalent polymeric based putty. Putty may be stained to match the colour of the substrate.

## **23.5 GLOSS LEVEL**

- 23.5.1 'Flat', 'Low Gloss', 'Semi-Gloss', 'Gloss' and 'Full Gloss': definitions to AS 2310 and AS 2311 Clause 4.1.

## **23.6 PRIMERS, SEALERS, UNDERCOATS**

- 23.6.1 Ensure that primers, sealers and undercoats are suitable for the substrate and compatible with the finish coat and each other.
- 23.6.2 Except for stains and other clear or translucent finishes each coating shall be of a noticeably different tint from the preceding coat.
- 23.6.3 Review details of the substrata, finishes required, etc. with the relevant paint manufacturer and make sure that the current printed directions of the paint manufacturer are adhered to in all instances.

## **23.7 WORKMANSHIP**

- 23.7.1 Tradesmen:  
Employ only skilled competent tradesmen appropriately qualified and registered or licensed at the time of carrying out the work.

All materials shall be applied strictly in accordance with the manufacturer's instructions. Any discrepancy between them and this specification shall be

reported immediately to the Architect.

- 23.7.2      **Order of Work:**  
Unless otherwise specified, before commencing to paint, complete the work of all other trades as far as is practicable within the area to be painted except for installation of fittings and laying of flooring materials.
- 23.7.3      **Painting Conditions:**  
Do not paint in dusty conditions, or otherwise unsuitable weather. Do not paint when the relative humidity exceeds 85%, or when the surface temperature of the substrate is less than 10° C or more than 50°C, unless the paint is suitable and recommended for such conditions by the relevant paint manufacture.
- 23.7.4      **Protection:**  
Before painting in any section of the Works, clean the area out and protect it against dust entry. Use drop sheets and masking wherever necessary to protect finished work or other surfaces liable to damage during painting. Repair or replace any accessories or surfaces that are damaged directly or indirectly as a result of painting. Cover all horizontal surfaces to avoid paint spatters to concrete, etc.
- 23.7.5      **Movable Fittings:**  
Remove door furniture, switch plates, light fittings and the like and replace on completion of painting.
- 23.7.6      **Light Levels:**  
During preparation of surfaces, painting and inspection maintain light levels such that the luminance (photometric brightness) of the surface is at least equal to that produced under daylight and/or maximum permanent artificial illumination conditions.
- 23.7.7      **Ventilation:**  
Adequately ventilate the areas in which painting is being carried out.
- 23.7.8      **Paint Storage and Waste Disposal:**  
Store and prepare paint and related materials in an area specifically assigned. Take necessary precautions to prevent fire and accumulation of solvent fumes. Remove paint-soiled rags, waste, and the like at the end of each day's work or store in airtight metal containers underwater. Remove empty cans and other debris arising out of the painting work from the site upon completion of work.
- 23.7.9      **Paint Preparation:**  
Mix and apply paint in accordance with the manufacturer's recommendations. Do not mix paint in areas or on surfaces liable to damage from spillage.
- 23.7.10     **Touch Up:**  
Clean off marks, paint spots and stains throughout, restoring damaged

surfaces to their original condition. Touch up damaged paintwork or misses only with the paint batch used in the original application.

- 23.7.11 Completion:  
At completion clean off all marks. Clean both sides of glass. Remove all debris and leave clean and tidy.

**23.8 SUBSTRATE PREPARATION:**

Prepare substrates to receive the systems specified. Procedures shall include, but not necessarily be limited to, the following:

- 23.8.1 Cleaning  
Clean down and remove oil, grease and loose foreign matter, including laitance, efflorescence, moss, lichen, mould, mildew, dirt and corrosion products, in a manner which causes neither undue damage to the substrate nor damage to, or contamination of, the surroundings.

- 23.8.2 Gloss Surfaces  
Adequately scuff and/or solvent wash or chemically etch as appropriate to provide satisfactory adhesion for subsequent paint coats.

- 23.8.3 Filling  
Fill cracks and holes with fillers, sealants or grouting cements as appropriate for the finishing system and substrate and sand smooth.

- 23.8.4 Drying  
Unless otherwise specified, ensure that surfaces are cured and dry before painting commences.

**23.9 APPLICATION:**

- 23.9.1 Procedure:  
Apply paint and related materials in accordance with the manufacturer's recommendations. Cut in between different finishing coats neatly in straight lines unless otherwise specified. Allow each coat to harden for the drying time (or time between coats) recommended by the manufacturer.

- 23.9.2 Sanding:  
Where recommended by the manufacturer, sand between coats from top to bottom and dust down before recoating.

- 23.9.3 Number of Coats:  
The application of thinned prime or seal coats, consistent with the paint manufacturer's current printed instructions and recommendations, and which may be necessary on porous surfaces, or of any additional finishing coats necessary to achieve the required colour, opacity, texture or film thickness and/or use of tinted undercoats shall be at the Builder's expense.

- 23.9.4      **Finish:**  
Ensure each coat of paint is uniform in colour, gloss, thickness and texture and free of runs, sags, blisters, or other discontinuities. The standard of workmanship with regard to final colour, gloss and texture shall match the sample area specified earlier in this Specification under Clause 04 on Page 1.

**23.10      SUBSTRATE PREPARATION:**

Prepare substrates to receive the systems specified. Procedures shall include, but not necessarily be limited to, the following:

- 23.10.1      **Cleaning**  
Clean down and remove oil, grease and loose foreign matter, including laitance, efflorescence, moss, lichen, mould, mildew, dirt and corrosion products, in a manner which causes neither undue damage to the substrate nor damage to, or contamination of, the surroundings.
- 23.10.2      **Gloss Surfaces**  
Adequately scuff and/or solvent wash or chemically etch as appropriate to provide satisfactory adhesion for subsequent paint coats.
- 23.10.3      **Filling**  
Fill cracks and holes with fillers, sealants or grouting cements as appropriate for the finishing system and substrate and sand smooth.
- 23.10.4      **Drying**  
Unless otherwise specified, ensure that surfaces are cured and dry before painting commences.