

Specification



design



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SPECIFICATION

SPECIFICATION of materials to be supplied and work to be performed in the erection of the project stated on the drawing sheet **X0** according to the accompanying drawings and this specification under the supervision of :



DESIGN HUT

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SECTION (Attached)

NO.	TRADE
1	Preliminary and General
2	Monetary Allowances & Guarantees
3	Demolition
4	Excavator
5	Concrete Work
6	Structural Steel Work
7	Masonry
8	Metalwork
9	Metal Windows & Doors
10	Carpentry
11	Joinery
12	Roofing
13	Plumbing
14	Drainage
15	Mechanical
16	Gas
17	Fire Protection
18	Electrical
19	Solid Plasterwork
20	Tiling
21	Flooring
22	Painting
23	Special Finishes
24	Glazing
25	Site Works

APPENDIX (Refer drawing sheet X0)

1	The Fiji Standard Form of Building Contract without Quantities
2	Performance Bond
3	General Conditions of Tender
4	Material Supplied by Owner
5	Memoranda on General Conditions of Tender
6	Tender Forms

This specification and its attachment on the drawing sheet X0 forms the total specification for the project. Should there be other consultants involved in the project then additional specifications from consultants (Structural, Electrical and Mechanical Engineers etc.) should supersede parts of this specification.

Items and Sections not relevant to the Contract has been indicated on the drawing sheet X0 .

The Fiji Standard Form of Building Contract, without Quantities, Private Edition 1978 is part of the Contract and may be viewed at the Architects office. All appendices also form part of the contract unless stated otherwise.

This Specification has been prepared from a Computer -based Standard Specification. In the Standard Specification all clauses have a unique number. Not all clauses from the Standard Specification have been used in this Document. It follows therefore that paragraph numbers for this Specification are not necessarily consecutive and additional information maybe attached on the drawing sheet X0.

1.1 GENERAL CONDITIONS:**1.1.1**

The Contractor shall comply with the applicable Fiji Standard Form of Building Contract, either with Quantities (Private Edition) 1978 or without Quantities (Private Edition) 1978. Refer to Appendix 1 of the specification for which variation applies. The Contract forms part of this specification and may be viewed at the office of the Architect.

1.2 TENDER DOCUMENTS:**1.2.1**

Conditions relating to tendering procedure are covered by the General Conditions of Tender, Tender Form and Appendices attached to this specification (where applicable).

1.3 TENDERER TO INFORM HIMSELF FULLY :**1.3.1**

All tenderers 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 Works, and the 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 and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his tender.

1.3.2

In particular each 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.

1.3.3

If a 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.

1.3.4

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.

1.4 DRAWINGS, SPECIFICATIONS & BILL OF QUANTITIES:**1.4.1**

General: The Drawings, Specifications and Bill of Quantities (where applicable) 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 Bill 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.

1.4.2

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 mounted on hardboard sheets and covered with clear varnish or alternatively clear polythene sheet. The stamped approved drawings shall be kept on site at all times in a safe place for reference by the Building Inspector.

1.4.3

Standard Details: Although standard details are listed in the Index under the predominant trades to which they apply, all trades shall be fully conversant with them.

1.4.4

Bill of Quantities (where applicable): The Bill is deemed to be for the assistance of tenderers in making up his price and for the purposes of adjusting variations. It forms part of the Contract. Within 7 days of the acceptance of his tender, the Contractor shall forward to the Architect a fully priced Bill of Quantities.

1.4.5

Schedule of Rates (where applicable) : If No Bill of Quantities is provided, refer to Clause 3 (2) (b) of the Fiji Standard Form of Building Contract without Quantities (Private Edition) 1978. The contractor shall provide a Schedule of Rates, compiled using the Principles of Measurement (International) for Works of Construction of June 1979 published by the Royal Institute of Chartered Surveyors.

1.5 OWNERSHIP OF DRAWINGS:**1.5.1**

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.

1.6 INFERRED WORK**1.6.1**

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.

1.7 AMBIGUITY:

1.7.1

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.

1.8 BY-LAWS & PERMITS:

1.8.1

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 Architect but other necessary permits and fees required shall be obtained immediately and the costs borne by the Contractor.

1.9 PROJECT MANAGEMENT:

1.9.1

General: The Main Contractor shall be responsible for all work executed under the Contract including the work of Subcontractor, nominated or otherwise. The Main 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

Project Manager (where applicable): Immediately after signing the Contract the Contractor shall appoint an experienced Project Manager. The Appointment shall be confirmed in writing with details of his experience and the authority delegated to him.

1.9.3

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.

1.9.4

Replacement: Once approved the Contractor shall not replace or withdraw these appointments without the consent of the Architect.

1.9.5

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.

1.9.6

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 three copies 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

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.

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.

1.12.2

Inspection resulting from contractor's or subcontractors' errors or omissions which would not normally be required during the course of construction of the works, will be charged by the relevant consultant at hourly rates, and will be payable by the contractor / subcontractor to the consultant.

1.13 TEMPORARY FACILITIES :

1.13.1

Buildings: The Contractor will provide all necessary temporary buildings required for his own use, and that of subcontractors and specialist contractors. Adequate area shall be set aside specially for perusing the Contract Documents. Temporary toilet facilities shall be provided and kept in a sanitary state by the Contractor.

Where required by Local Authorities, hoarding, crossing protection, walkways, handrails, night lighting are also to be provided. If noted at the end of this section that Clerk of Works, Project Manager and/or Consultants facilities are required then these offices shall be at least 3.00m x 3.00m suitable for the purpose required of them.

1.13.2

Services: The Contractor will provide and maintain all temporary water, electrical, telephone supplies unless noted to the contrary at the end of this section. He shall make available to all subcontractors and separate subcontractors. These services shall be to a standard meeting the requirements of all authorities, including Health and Safety requirements. The Contractor shall pay for all temporary service charges and shall arrange meter reading on the date of Practical Completion.

1.13.3

Specific Facilities: The Contractor shall provide, within the tendered price, all costs associated with the following facilities which are to be provided and maintained on site throughout the construction period:

- Site telephone
- Site facsimile machine
- Mobile phone for Contractor's site supervisor
- Site accommodation for site meetings with table and chairs for at least 8 people
- All other normal facilities such as site sheds ablutions etc.
- Cyclone mesh fence 2100 high to be supplied and installed to the perimeter of the site. Gates shall be locked after hours. Remove the fence prior to Practical Completion.

1.13.4

Safety Equipment: The Contractor shall provide statutory and necessary safety and first aid equipment for workers and all other persons lawfully engaged upon the site. Include for providing safety helmets for the temporary use, whilst on site, of visitors whose presence is authorised under the Contract.

1.14 SAMPLES & TESTS:

1.14.1

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.

1.15 ATTENDANCE AND MAKING GOOD:

1.15.1

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.

1.16 HOISTING & SCAFFOLDING:

1.16.1

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 subcontractors engaged by the Employer.

1.17 NOMINATED SUBCONTRACTORS:

1.17.1

Subcontractors nominated by the Client shall be the Contractor's responsibility, who must order, coordinate, pay for and direct the work of all subcontractors and take responsibility for the quality of work and materials and time for completion.

1.17.2

The Contractor shall enter into a written agreement with all nominated subcontractors to the Works such agreement to be in the form as required by the application of the Fiji Standard Form of Building Contract.

1.17.3

The Contractor shall provide Nominated subcontractor agreements and a list of proposed sub-contractors within seven (7) days of request from the Architects.

1.18 NOMINATED SUBCONTRACTORS FACILITIES:

1.18.1

Provide all facilities, attendances, and all necessary services for the proper and complete execution of all nominated subcontractors work in accordance with the subcontract agreement, including allowing free use of scaffolding, plant, sheds, latrines, etc.

1.18.2

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

1.19 SEPARATE CONTRACTS:

1.19.1

The Owner reserves the right to award contracts in connection with other portions of the project under these or similar conditions of the Contract.

1.19.2

When separate contracts are awarded for different portions of the project, "the Contractor" in the Contract Documents in each case shall be the Contractor who signs each separate contract.

1.19.3

The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate his work with theirs.

1.19.4

If any part of the Contractor's work depends on proper execution or results upon the work of any other separate contractor, the Contractor shall inspect and promptly report to the Architect any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor so to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper to receive his Works, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's work.

1.19.5

Should the Contractor cause damage to the work or property of any separate contractor on the project, the Contractor shall, upon due notice, settle with such contractor by agreement, if he will so settle.

1.19.6

Refer Clause 29 of the Fiji Standard Form of Building Contract.

1.20 PROTECTION & STORAGE:

1.20.1

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.

1.20.2

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.

1.21 VERIFY ALL DIMENSIONS:

1.21.1

The Contractor and/or all Subcontractors shall verify all dimensions on the job before commencement of shop drawings, or any work. The Contractor shall submit all shop drawings of his and his subcontractors to the Architects for approval. Comments and/or modifications to these shop drawings will not constitute an Architect's Instruction or a Variation.

It is the contractor's responsibility to ensure that the shop drawings conform to the Contract Documents, whether or not comments are made to any part of these drawings. Only architectural dimensions and details shall be checked, and approval of shop drawings shall not relieve the Contractor and/or subcontractors from the responsibility of correcting at their own cost any errors, omissions or rectifications which may be required later.

1.22 SETTING OUT :

1.22.1

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

The Contractor must arrange for the Buildings set out to be checked and confirmed by a Registered Surveyor who shall provide a letter stating that this has been done.

1.22.2

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.

1.23 CLEANING & REMOVAL OF RUBBISH:

1.23.1

The Main Contractor shall remove all rubbish caused by the operations of all trades at regular intervals during building operations. Allow to Protect all finished surfaced from damage and discolouration caused by adjacent building operations and foot traffic, etc.

1.23.2

The Contractor shall, when directed by the Architects, clean any public or private 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.

1.24 PROTECTION OF PROPERTY:

1.24.1

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.

1.25 DEFECTS LIABILITY PERIOD:

1.25.1

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.

1.26 MATERIALS WORKMANSHIP & PLANT:

1.26.1

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.

1.26.2

Supply all materials, labour, plant and tools as necessary for the works.

1.26.3

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.

1.27 DEFECTIVE MATERIAL AND/OR WORKMANSHIP:

1.27.1

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.

1.27.2

However should the material used or work done in accordance with this specification, but which the Architects do not feel expedient to have corrected, 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.

1.28 MATERIAL ON SITE:

1.28.1

Any material 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.

1.29 ORDERING OF MATERIALS:

1.29.1

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.

1.30 GUARANTEES:

1.30.1

Where required by this specification guarantees shall be submitted in accordance with the Fiji Standard Form of Building Contract and handed to the Architect before issue of the Final Payment.

1.31 CURRENCY:

1.31.1

Tender shall only be submitted in Fiji currency and payments by the Employer to the Contractor in terms of his Contract will be in Fiji currency.

1.32 PROGRESS PAYMENTS & RETENTIONS:

1.32.1

No progress claim shall be made for the sum less than that stated in Appendix to the Fiji Standard Form of Building Contract Item 12 except for the claim at the time of Practical Completion and Final Payment.

1.32.2

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 2.5 % to cover the Defects Liability Period. (Refer Clause 15 of the Fiji Standard Form of Building Contract.)

1.33 PROCEDURE FOR VARIATIONS:

Reference should also be made to Clause 11 of the Fiji Standard Form of Building Contract which should be read in conjunction with these clauses.

1.33.1

Variation Price Request (VPR): This form will be issued for the Contractor to submit his price to cover the proposed variation. Extensions of Time in respect of the proposed variation should also be submitted. A copy should be returned within 10 working days of receipt or the Architect notified as to when he may receive it.

The Architect will advise the Contractor either that the variation will not proceed or he issue an Architects Instruction authorising it, should the price be acceptable.

1.33.2

Architects Instruction (AI): The only authority for any variation is the Architects Instruction signed by the Architect. Under no circumstances will payment in respect of variations be authorised if it is not on a Variation Order or an Unpriced Variation Order.

When due to urgency or contingency an immediate order is required, either a price will be agreed between the Contractor and the Architect and an Architects Instruction issued immediately or an Architects Instruction will be issued and the work measured upon completion and a price established as provided for in the Fiji Standard Form of Building Contract.

1.34 CONTINGENCY SUM:

1.34.1

Allow a contingency sum as set out in Section 2 Schedule of Monetary Allowances. The expenditure of this amount being solely at the discretion of the Architect in accordance with the Fiji Standard Form of Building Contract. Any unexpended balance from this sum shall be deducted from the Contract Sum.

1.35 LIQUIDATED DAMAGES FOR DELAY IN COMPLETION:

1.35.1

Refer to Appendix 1 of the Fiji Standard Form of Building Contract Item 8 for the amount of Liquidated and Ascertained Damages for delay in completion. Refer also to Clause 22 of the Fiji Standard Form of Building Contract.

1.36 INSURANCES:

1.36.1

This should be read in conjunction with Clauses 18, 19 and 20 of the Fiji Standard Form of Building Contract. Appendix 1 of the specification should be referred to confirm which of these clauses are applicable. With particular reference to clauses 19(1)(a) and 20(A)(i) (if applicable) the Contractor is required to effect insurances by way of a 'Contractor's All Risks & Third Party Insurance Policy' and is to note that full insurance against all the risks mentioned in clause 20 (A) is required from the date of Possession until the issue of the Certificate of Practical Completion of the Works.

The required insurance against the risk of storm, tempest and flood may not be readily available from the local insurance markets and recourse to an insurance broker may be necessary to obtain such cover form overseas. A "Contractors All Risks" policy may be accepted only with approval of the Architect. The policies shall include, but not be limited to, the following risks:

- (1) Aircraft and articles dropped therefrom.
- (2) Damage to works by windstorm.
- (3) Damage by concussion, whether fire ensues or not.
- (4) Riots, strikes, civil commotion and vandalism.
- (5) Water damage.
- (6) Storm and/or tempest.

1.36.2

Prior to the first Progress Payment 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.

1.37 ROYALTIES & PATENTS:

1.37.1

The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner harm from loss on account thereof.

1.38 PROVISIONAL & PRIME COST SUMS:

1.38.1

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

1.39 TENDER DEPOSIT:

1.39.1

Refer to the General Conditions of Tender for tender deposit amount.

1.40 DOCUMENT DEPOSIT:

1.40.1

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

1.40.2

Refer to Memoranda on 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.

1.41 STATUTORY PERMITS:

1.41.1

Application has been made for Development Permission and a Building Permit.

1.41.2

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 (1) working day after acceptance of his tender.

1.42 EXTENSIONS OF TIME:

1.42.1

Extensions of time may be authorised as set out in Clauses 23 of the Fiji Standard Form of Building Contract.

1.43 WET WEATHER:

1.43.1

See clause 1.51 'Amendments to the Fiji Standard Form of Building Contract' - clause 23(b).

1.44 SIGN BOARD:

1.44.1

Provide and erect where directed a sign board before the project commencement date as per details provided by the Architect and maintain in good condition. No other advertising will be permitted on the site. The sign board will remain the property of the Contractor and is to be removed at the end of Practical Completion. Failure to erect a sign board would result in deduction from the contract sum.

1.45 TRADE RELATIONS:

1.45.1

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.

1.45.2

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 General 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 which would be reasonably expected at the time of tendering and from the proper perusal of this document.

1.46 CONSULTANTS (where applicable):

1.46.1

Structural, Mechanical and Electrical Consultants employed by the Architect and Quantity Surveying Consultant 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 should have the right to deal directly with the Contractor and nominated Subcontractor or within the terms of the Contract and have similar status to that of the Architect.

1.47 OR SIMILAR:

1.47.1

Where the words "Or Similar" occurs in the sections of the 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.

1.48 STANDARDS:

1.48.1

This Specification shall be read in conjunction with all Standards mentioned herein which 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.

1.49 COMPLETION:

1.49.1

At Practical Completion of the Works clean all floors, sanitary fittings, 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.

1.49.2

Final cleaning and polishing of windows, walls inside and out, floors, sanitary ware, etc. shall be carried out by a commercial cleaner.

1.49.3

If the Contractors fail to comply with this clause the Employer has the right to do so and the cost thereof shall be deducted from the Final Certificate.

1.50 BANK GUARANTEE:

1.50.1

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 Final Certificate.

1.51 AMENDMENTS TO THE FIJI STANDARD FORM OF BUILDING CONTRACT

1.51.1

Refer to Appendix 1 of the specification for which variation applies i.e. With Quantities or Without Quantities.

The following modifications to the Contract Conditions apply:

CLAUSE 3 Contract Drawings, Specification and Schedule of Rates

In sub clause (2) DELETE "Immediately after the execution of this contract" and INSERT "At the time of tender of this contract".

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.

Sub clause (2)(b) DELETE "two" and INSERT "one"

Sub clause (2)(c) DELETE "two copies of the unpriced Bills" and INSERT "one copy of the unpriced Bills", DELETE "one copy of the Contract Bills."

CLAUSE 8 Foreman-in-charge

The prospective Contractor shall before tender acceptance nominate this proposed foreman for the works together with that person's Curriculum Vitae. The accepted foreman shall remain constantly on the works and shall not be replaced without the consent of the Architect.

CLAUSE 11 Variations, provisional and prime cost sums

AFTER 'Definition of Prime Cost of Daywork carried out under a Building Contract' in sub-clause (4) (c) (i) DELETE "issued by the Fiji Association of Architects and the Fiji Master Builder's Association as current at the date of tender as defined in clause 31D (6) (a) of these Conditions" and INSERT "included in the Contract Bills".

DELETE sub-clause (4) (c) (ii).

The Definition of Prime Cost of Daywork carried out under a Building Contract is included under Dayworks, as noted in the Contract Bill.

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.

Refer to Appendix 1 for which Clause (A, B or 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 Bureau of Meteorology, Fiji, 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 the average 24 hour rainfall for the area as recorded by the meteorology Bureau for that time of year.

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.

Allow PROVISIONALLY for two such weeks delay at a rate (to be stated in the tender form by the Contractor) per week exclusive VAT.

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 28 Nominated suppliers

AFTER 'Such sums' in sub-clause (a) DELETE 'shall be deemed to include five per cent cash discount'

and

AFTER 'other discount' in sub-clause (a) DELETE '(except the said discount of five per cent)'

and

DELETE sub-clause (b) (iv)

and

AFTER 'in full' in sub-clause (b) (v) DELETE 'less only the discount for cash'.

and

AFTER 'delivery is made' in sub-clause (c) DELETE the remainder of the text

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

CLAUSE 33 Arbitration

Sub-clause (5) amend to read (Chapter 29)

DESIGN HUT

SECTION 2 : MONETARY ALLOWANCES & GUARANTEES

2.1 PRELIMINARY

2.1.1

General : 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.

The Contractor shall allow to install supply only items. Those items requiring notice time from the Contractor to the Client will be supplied direct to site by the Client. Refer to Appendix 4 – Material to be supplied by owner.

2.2 MONETARY ALLOWANCES.

2.2.1

Refer to Appendix 6 – Tender Forms for Monetary Allowances . (Provisional Sum , Prime Cost (PC) Sum and Contingency Sum) . All the above figures are considered to be nett areas and inclusive of VAT. Tiling Prime Cost Sums are for supply of tiles only.

2.3 GUARANTEE

	Material (years)	Workmanship (years)
Complete weather tightness of the building as noted below		2
Corrugated metal roofing	10	2
Butynol gutter lining and waterproofing membranes	20	2
Ceramic wall & floor tiles	2	2
Metal windows & doors	2	2
Door hardware	2	2
Underground pipework services and chambers	2	2
Plumbing	2	2
Electrical services including switchboards	2	2
Lift	2	2
Airconditioners	2	2
Linings and finishes including painting	2	2
Sealants & caulking	5	5

NOTE : The above guarantees are to be provided in writing before the Practical Completion Certificate is issued

NS : Nominated Supplier (Supply only)

NSC : Nominated SubContractor (Supply & install)

3.1 PRELIMINARY:

3.1.1

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.

3.1.2

Standards: The following standard shall form part of this specification – NZSS 95

3.2 WORKMANSHIP

3.2.1

All work in this section shall be carried out in a safe and competent manner to the satisfaction of the Architect and Engineer. Every care be taken to ensure that no more damage than is absolutely necessary is done and that existing and adjoining properties are kept free from dust.

3.3 PROTECTION OF THE WORK

3.3.1

Allow for the provision of tarpaulins, sheet polythene, screens, hoardings etc to protect the works from damage by rain and to ensure public safety. Strict security should be maintained at all times.

3.4 MAKING GOOD

3.4.1

Allow for making good to match existing after all demolition has been completed.

3.5 DEMOLISHED MATERIALS

3.5.1

If suitable, demolished materials may be reused in the new work, but only with the specific written approval of the Architect. All other Demolished material shall become the property of the Owner unless stated. Materials not required by the Owner shall be removed from the site by the contractor.

DESIGN HUT

4.1 PRELIMINARY:

4.1.1

General : 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.

4.1.2

Standards: All excavation shall be carried out in accordance with the current Labour Department regulations.

4.2 WORKMANSHIP:

4.2.1

All work to be carried out in a safe and competent manner by capable workmen.

4.2.2

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

4.3 SCOPE:

4.3.1

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.

4.4 SETTING OUT:

4.4.1

The Contractor shall be responsible for all setting out of all excavations necessary for the work to be carried out accurately.

4.5 EXCAVATION:

4.5.1

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.

4.5.2

Foundation Depth into Site : All foundations should project a minimum dimension into firm ground . If this is not clearly understood at time of tendering Contractor shall seek a clarification from the Architect.

4.5.3

Timbering: Provide all necessary timbering, shoring, sheet piling, etc., necessary to keep the excavation open and safe for working at all times.

4.5.4

Pumping: It is the Contractor's responsibility to keep excavations free of water during building operations.

4.6 BACKFILLING:

4.6.1

General : Backfilling where required shall be carried out neatly to the levels indicated. Sound granular material shall be used for this purpose. All material used shall not contain silt or clay and topsoil. Thoroughly compact in 100 layers using vibrating roller or other approved method.

4.6.2

Foundation Support : Care shall be taken when placing backfilling against foundation wall. It is the Contractor's responsibility to brace walls should this be necessary or where directed.

4.6.3

Retaining Walls : Where indicated on the drawings retaining walls shall be backfilled with sound granular graded material after the application of a damp proof course as specified later. Behind such walls, lay where indicated "Novaflo" or similar approved field drains of the sizes and positions indicated on the drawings.

4.7 HARDFILL:

4.7.1

Lay consolidated hardfill to a minimum depth as shown on the drawings, graded hardfill consisting of clean sizes between 9.5mm x 38 mm. Thoroughly compact with an approved compactor with particular attention being given to the outside edges.

4.7.2

Blinding : After compaction cover all hardfill with 50 mm minimum sand. Ensure that the sand adequately covers all hardfill and that any protruding rocks etc., are removed or adequately covered with sand.

4.8 DAMP PROOFING:

4.8.1

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

4.9 TRENCHES:

4.9.1

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.

4.10 TOPSOIL (where applicable):

4.10.1

Prior to commencing all work topsoil shall be stripped from the building site and stockpiled as shown.

4.10.2

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.

4.11 DEWATERING:

4.11.1

The Contractor shall allow in his tender for any dewatering required to allow him to excavate the areas necessary for the construction of the foundations.

4.12 LOWER BASE BACKFILLING:

4.12.1

Where asphalt paved surfaces are required by the drawings or specified elsewhere in his specification, the Contractor shall allow to backfill all asphalt paved areas to a depth of 150 below the finished surfaces with 100 depth of second grade 62 all-in, well graded crushed metal. Thus sub-basecourse shall be thoroughly compacted with vibrating rollers and graded to the general falls required of the drawings for the finished asphalt paved areas.

4.13 DISPOSAL OF EXCESS MATERIAL:

4.13.1

Excess material from excavations and from backfilling shall be distributed on the site where directed by the Architect.

4.14 BATTERS:

4.14.1

All batters shall be clean of all loose or unstable material immediately prior to back-filling.

4.15 BENCHING & SLOPE PREPARATION:

4.15.1

Where filling is to be placed on a slope steeper than one vertical to five horizontal, it shall be continuously benched before any filling is placed on it, unless directed otherwise by the Engineer. All benches shall be sufficiently wide to accommodate compaction equipment and in no case shall be less than 2700 mm in width. Benching shall be started on the lowest areas and constructed as the filling proceeds. Excavated material from the higher benches may be used as filling on the lower ones. The benches shall have a longitudinal fall of not less than one in fifty (1:50) towards drainage outlets. Each bench shall also have a cross-fall of approximately one in twenty (1:20) to drain towards the hillside.

4.15.2

Filling shall on no account be placed during heavy rain or wet conditions following rain.

4.16 FORMING OF FILL AREAS:

4.16.1

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.

4.16.2

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.

4.16.3

The surface shall be maintained at all times with sufficient falls and sufficiently even to enable surface water to drain readily from them.

4.16.4

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.

4.17 COMPACTION:

4.17.1

Separate compaction machinery shall be required. Construction traffic, by itself, will not be accepted as providing adequate compaction. A Sheepfoot or tamping type of roller or mechanical equipment that produces a similar effect shall be used to penetrate loose material and compact the layer from the bottom upwards in order to produce uniformity throughout its thickness. Refer Clause 4.18, Compaction Schedule.

4.17.2

The Engineer will carry out tests during the progress of the work, to determine if adequate compaction of the fill material is being achieved.

4.17.3

The Engineer may direct that work be suspended or methods altered, or additional machinery be brought into use if he considers that reasonable compaction is not being achieved due to weather, type of machinery, spread of earthmoving equipment across the fill, thickness of spread layers, soil type and/or moisture content, or for any other reason.

4.17.4

No additional payment or rate adjustment shall be due by the way of such directions, but permission to continue or to use accepted methods will not be unreasonably withheld by the Engineer.

4.17.3

In all cases the rate for excavation shall include the placing and compaction (or disposal) of the material to the specified standards elsewhere, not withstanding that double handling may occur.

4.18 COMPACTION SCHEDULE:

4.18.1

Compaction of fill material shall be carried out in accordance with the following schedule :

Type of Compaction Plant	Load in tonnes per metre	Max thickness of compacted layer	Minimum of passes
Smooth wheeled	2.1 - 2.7	125	8
Roller	2.7 - 5.4	125	6
	over 5.4	150	4
Grid Roller	2.7 - 5.4	150	10
Wedgefoot Roller	5.4 - 8.0	150	8
Sheepsfoot Roller	over 8.0	150	4
Pneumatic Tyred	wheel load		
	40 - 80	150	6
	80 - 160	188	4
	160 - 240	300	4
	over 240	375	4
Vibrating Roller	Static Load		
	1.25 - 1.78	125	8
	1.78 - 2.68	150	4
	2.68 - 3.57	200	4
	over 3.57	225	4

5.1 PRELIMINARY:

5.1.1

General : 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.

5.1.2

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

NZS 1900 9.3A	(1981) :	Materials and Workmanship
NZS 2086	(1967) :	Ready Mix Concrete Production
NZS 3112	(1974) :	Methods of Test for Concrete
NZS 3121	(1974) :	Water and Aggregate for Concrete
NZS 3122	(1974) :	Portland Cement
NZS 3015	(1975) :	Concrete Mixers
AS 1509	:	Formwork

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 19 mm 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 per 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.

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.

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

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.

5.2.7

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.

For concrete block fill, a plasticizer may be added but only after full discussion with, and written approval from, the Engineer.

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 Engineer who may order that the offending work be redone .

(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 recognized 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 1900 Chapter 9.3A (1970) which forms part of this specification and shall be read in conjunction with it.

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 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.

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.

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.

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.

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.

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 :

NZS 1900 9.3A	(1981)	:	Concrete – Construction
NZS 3042P	(1973)	:	Hot Rolled Bars for Reinforcement
NZS 3421	(1975)	:	Hard Drawn Wire Reinforcement
NZS 3422	(1975)	:	Welded Reinforcing Fabric
NZS 4702	(1982)	:	Metal-arc Welding of Grade 275 Reinforcing
NZS 3109	(1980)	:	Concrete Construction

Read this section in conjunction with Section 7 - Masonry.

5.8.3

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

Plain and deformed bars shall comply with NZS 3402P (1973) and be of mild steel and shall have a guaranteed minimum yield point of 275 megapascals.

Welded wire fabric shall conform with the NZS 3422 (1975).

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.

5.8.4

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

Provide walkways over placed reinforcing to approval if required.

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

5.8.5

Fabrication: Fit ties and stirrups tightly round main reinforcement.

Bend deformed bars around rollers, not fixed pins.

Bend deformed bars only once.

5.8.6

Tolerance & Protective Cover: Tolerances shall be as set out in Clause 4.4.3 of AS 1509 - Formwork.

The concrete cover is to the surface of main reinforcement and shall be as follows:

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

5.8.7

Placing & Fastening: Support top steel on high chairs or by other approved means.

Unless otherwise detailed, support slab reinforcement at maximum 1 m crs., except reinforcement 10 mm in diameter and smaller at maximum 600mm crs.

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.

5.8.8

Laps: Excepting as shown no lapping of reinforcement is permitted without written approval.

Where lengths of laps are not shown, ask for approval.

5.8.9

Welding: Welding of reinforcement shall comply with NZS 4702 - Metal-arc Welding of Grade 275 Reinforcing Bar. Unless shown on the drawings, welding of reinforcement is not permitted without written approval. 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.

Remove all formwork preventing proper inspection.

Prior approval of cleaning, fabrication and securing reinforcement subject to the reinforcement being satisfactory at times of concreting.

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 0.20 mm 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 25 sq. m and the length of any side is not to exceed 7.5 m. 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 note in clause 5.6 above 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 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 FALLS IN CONCRETE SLAB:

5.15.1

The Contractor shall take care that all bathroom, kitchen, laundry, and other floors that have floor wastes or floor drains have a gradual fall in the finished floor towards the floor waste or drain.

5.16 TESTING:

5.16.1

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.

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.

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.

5.16.2

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 16 mm to that slump value nominated by the specification.

5.16.3

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.

5.16.4

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.

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".

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.

5.17 CONCRETE STRENGTHS:

5.17.1

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/N sq mm (or 20 MPa).
- (b) For multi storey structures, including heavy duty slabs in single storey structures - 25 N sq mm (or 25 MPa).
- (c) Concrete slumps (maximum) :

Floor slabs	75 mm
Foundations	80 mm
Structural concrete beams and columns	75 mm
Concrete walls	80 mm
Blinding concrete or mass filling	100 mm

5.18 PUMPED CONCRETE:

5.18.1

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.

Concrete for pumping shall have a slump between 40mm and 80 mm and a minimum strength at 28 days of 17.5 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 it one 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.

5.19 READY MIXED CONCRETE:

5.19.1

Shall be mixed in an approved central mixing plant capable of complying with the relevant clauses of NZS 1900 Chap. 9.3A.

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.

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.

Remixing with or without further addition of water, cement or aggregates to concrete which has partially hardened shall not be permitted.

6.1 PRELIMINARY:

6.1.1

General : 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.

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.

6.3.4

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

6.4 DRAWINGS:

6.4.1

The Contractor shall make shop drawings at his own expense. No details may be altered without the written authority of the Architect / Engineer.

6.5 PREPARATION FOR WELDING:

6.5.1

All faces to be welded shall be prepared in the manner shown on the drawings or in accordance with AS 1554. Fusion faces and adjacent areas shall be cleaned before welding commences by power wire brushing.

6.6 WELDING:

6.6.1

All welding shall be carried out in accordance with the requirements of AS 1554. Copies of these specifications shall be supplied by the Contractor and are to be freely available on the site and in the shop.

6.7 WELDING ON SITE :

6.7.1

All welding on site shall be adequately protected from wind and rain. If, in the opinion of the Architect / Engineer it is too windy or too wet for Architect / Engineer.

6.8 INSPECTION:

6.8.1

The Architect / Engineer shall have access at all reasonable times to all places where the work is being carried out and shall be provided by The Contractor with all necessary facilities for inspection during fabrication. The Contractor shall notify the Architect / Engineer when and where the work will be done before any work is commenced.

6.9 FABRICATION & ERECTION:

6.9.1

General : The fabrication and erection shall comply with the requirements of AS 1250 and the best trade practice. Columns shall be erected plumb and true to line and level. Holding down bolts should be checked for accuracy before the steel is fabricated. Base plates shall be levelled. Accuracy of fit of the frames shall be the responsibility of the Contractor.

6.9.2

Tolerances : All erection and fabrication tolerances shall be strictly in accordance with the requirements of clause 11.2 & 11.4 of AS 1250, part of which is reproduced below.

- | | |
|---|---------|
| (a) Struts L/1000 | |
| (b) Plates b/200 | |
| (c) Tubes | L/600 |
| (d) A strut finished for full contact bearing | ±2 mm |
| (e) Any other member: 9000 mm long and under | ±0-3 mm |
| over 9000 mm long | ±0-5 mm |

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.

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.

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.

6.10.4

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 galvanized 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.

7.1 PRELIMINARY:

7.1.1

General : 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.

7.1.2

Standards : The following standards shall form part of the specification except as modified herein :

NZS 3102	(1974)	:	Concrete Masonry Units.
NZS 3112	(1974)	:	Methods of Test for Concrete.
NZS 3109		:	Concrete Construction.
NZS 2086	(1967)	:	Ready Mixed Concrete Construction.
NZS 3101	(1982)	:	Code of Practice for Design of Concrete Structures.
NZS 3105	(1975)	:	Concrete Mixers (Batch Type & Truck Type).
NZS 3111	(1974)	:	Methods of test for Water and Aggregate for Concrete.
NZS 3112	(1979)	:	Chemical Admixtures for Concrete.
NZS 3121	(1974)	:	Water and Aggregate for Concrete.
NZS 3122	(1974)	:	Portland Cement (Ordinary, rapid hardening and modified).
NZS 3402	(1973)	:	Hot Rolled Steel Bars for Concrete Reinforcement.
NZS 3421	(1975)	:	Hard Drawn Mild Steel Wire for Concrete Reinforcement.
NZS 3422		:	Welded Fabric of Drawn Steel Wire for Concrete Reinforcement.
NZS 4702	(1982)	:	Metal-arc Welding of Grade 275 Reinforcing Bar.
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
NZS 4210	(1989)	:	Masonry Construction Materials and Workmanship

7.2 MATERIALS:

7.2.1

Masonry Units : All materials shall be the best of their respective kinds to grade 'A'. Supply sound units with exposed surfaces free from chips or other imperfections, of uniform colour and texture.

7.2.2

In addition to the principal units referred to, other types may be used where approved, including a restricted number of units incorporating Knock - in portions provided that portions are removed before the unit is brought to the wall. Remove these knock-in portions from the job.

7.2.3

For all cells filled construction use open end bond beam units throughout, unless otherwise specified.

7.2.4

For intermittently filled construction where the vertical reinforcement is placed prior to laying of units use open units at vertical reinforcement, and standard units elsewhere. Where vertical reinforcement is placed after laying, open end units do not have to be used.

7.3 WORKMANSHIP:

7.3.1

Concrete blocks shall be laid by experienced tradesmen in accordance with the best trade practice and approved by the Architect. Material and / or workmanship that does not reach an acceptable standard, or is out of line, or incorrectly laid, etc., will be dismantled and rebuilt at the Contractor's expense. Mortar joints must be constantly even in thickness and alternate perpend must be in line vertically. Care shall be taken to ensure that control joints maintain a vertical line.

7.3.2

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

7.4 EXTENT OF WORK:

7.4.1

Generally construct all walls complete with reinforcing bond beams, lintels, grout filling, openings, etc. as shown on the drawings and specified herein. Positions of, and nominal thickness of block walls shall be as indicated on the drawings.

7.5 MORTAR:

7.5.1

Mortar shall be mixed in proportion of one part of cement to one quarter part of lime to four parts of sand provided that the lime may be replaced by an approved plasticiser and waterproofing agent in the proportions recommended by the manufacturer. Mortar shall have minimum compressive strength of 12.4 MPa after 28 days. Mortar must be trowelled to the blockwork to give a full continuous mortar bed on each face, tamped to give 10 even mortar joints both horizontally and vertically. Mortar must also be trowelled onto the end of each block prior to laying and NOT laid and the perpend pointed after. Where indicated as fairface blockwork joints shall be finished concave. When blockwork is plastered joints shall be left raked suitable for plaster finish.

7.6 GROUT FILLING:

7.6.1

Blockwork containing reinforcement shall be filled with 17.5 MPa grout with max. aggregate size 10 mm. Clean out all debris, remove projecting mortar before filling. Cooperate with the Concretor in the filling of block cells and bond beams. Filling shall occur as the walls are built. Not more than 4 courses being built up before filling of block cells and bond beams commences. Fill all cores of block to party walls including unreinforced cores and all cells below ground level.

7.7 REINFORCEMENT:

7.7.1

General : Take delivery of reinforcing steel from the Steelworker as specified under Concretor and build in as work proceeds. Main reinforcing to blockwork shall be with deformed mild steel with plain steel for ties.

7.7.2

Ties: Use mechanical ties where bonding is not possible such as wall tee junctions. Mechanical ties shall be 34 x 10 mild steel flaps 675

7.7.3

Reinforcement: Where the reinforcement is not specified the following should be adhered to:

(a) 200 Blockwork :
Vertical : 16 dia. every 600 crs.
Horizontal : 16 dia. at 600 crs in a bond beam

(b) 150 Blockwork :
Vertical : 12 dia. at 600 crs
Horizontal : 16 dia. at 600 crs in a bond beam

(c) 100 Blockwork :
Horizontal : 16 dia. every 3rd course

At top of 100 Blockwork provide 100 x 200 bond beam reinforced with 2-12 dia.

7.8 EXPANSION JOINTS:

7.8.1

Where indicated on the drawings all masonry expansion joints are to be constructed with a performed joint filler consisting of selected impregnated fibres, such as Expandite Joint Filler. The filler is to be the same thickness as the joint width and is to extend through the full thickness of the masonry except where specified otherwise. Ordinary insulation board dipped with creosote will not be acceptable.

7.9 BUILDING - IN:

7.9.1

Frames : Build in timber door and window frames where fairface blockwork is specified and if requested to do so by the main contractor. Frames will be set out complete with fixing by the Carpenter. Protect frames from damage during construction.

7.9.2

Bolts, Plates, Etc.: Build in all bolts, straps, grounds, soap holders, etc., provided by the Carpenter.

7.9.3

Pipes, Etc.: Build in pipes, conduits, electrical switch boxes, switchboard, etc., provided by others.

7.10 CLEANING DOWN:

7.10.1

On completion clean down walls and remove all mortar projections and irregularities. Make good damaged corners, arrises, on surface of Fairface blockwork. Patch and make good around pipes, etc., penetrating blockwork. Leave walls to be plastered suitable for the application of plaster.

7.11 DEFECTS:

7.11.1

Before decorative finishes are applied to a face blockwork all surfaces shall be properly cleaned down; the work will then be inspected and the Architect will direct what attention is required if any defects exist. Generally minor defects may be carefully patched but faulty blocks or damaged blocks will be condemned and must be cut out and replaced. Where blockwork is to receive paint or other decorative treatment, minor defects may be patched provided that such patching will be completely concealed by the paint, etc. Allow to make good where pipes, etc., penetrate the block walls.

7.12 FAIRFACE BLOCKWORK (where applicable):

7.12.1

All fairface blockwork shall be laid in accordance with the relevant clauses of NZSS 1900 Chapter 9.2 (1964).

7.12.2

Block walls shall be perfectly true and plumb. Joints shall be even thickness and shall not vary beyond the tolerance of plus or minus 2 mm but shall average out at 10mm over walls. Any blockwork which shows more than 6 mm under part of a 800 mm long straight edge placed anywhere across the blockwork surface or more than 3mm under a 600 mm straight edge placed anywhere across the blockwork surface will be condemned, broken down and rebuilt to be within the above mentioned tolerances at the Contractor's expense.

7.12.3

Point up with mortar on all faces as the laying proceeds and build in all fixings required and provided by other trades. Generally stretcher bond shall be used and no continuous vertical joints will be accepted on successive courses.

7.13 CUTTING OF BLOCKWORK:

7.13.1

Note that where blocks are required to be cut they shall only be cut with a Vibrapac or other suitable masonry saw. Holes and openings in face blockwork shall be neatly cut to the required shape and size.

7.14 CONCEALED PIPEWORK AND ELECTRICAL CONDUITS:

7.14.1

It is most important that the Blocklayer study the provisions of pipework, wastes and vents which are required to be concealed in the Concrete Blockwork. No allowance will be made for any pipes not treated as specified and will be required to be concealed at the Contractor's expense.

7.15 REINFORCEMENT TO ALL DOOR & WINDOW OPENINGS:

7.15.1

Around all door and window openings reinforce with 1-16 dia. reinforcing rod tied into horizontal and vertical steel.

DESIGN HUT

8.1 PRELIMINARY:

8.1.1

General : 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.

8.1.2

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

NZSS	1900	Chapter 9.4 Steel
BS	4360 1968	Grade 43A
BS	1775	Grade 13 (Pipes)
BS	639 195	(Electrodes)

8.2 WORKMANSHIP:

8.2.1

All workmanship in this section shall be carried out by competent tradesmen to the highest possible standards.

8.2.2

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

8.3 MATERIALS:

8.3.1

All mild steel and brass used in this work shall be the best of their respective kinds complying with the standards mentioned above.

8.4 GALVANISING:

8.4.1

All mild steel angles, bolts, straps, rectangular hollow sections, etc. used shall be galvanized where specified or shown on drawings. Hot dip galvanizing is preferred where at all possible but those components that are fabricated from ungalvanized mild steel may be electro galvanized . Prime all welded joints in galvanized work with zinc epoxy primer applied in accordance with the manufacturer's instructions.

8.5 WELDING:

8.5.1

All welding and bracing shall be carried out in accordance with the above-mentioned standards so as to give full strength to welded joints.

9.1 PRELIMINARY:

9.1.1

General : 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.

9.1.2

Standards: The following standard shall form part of this specification.

NZS 3504	DATE	:	Aluminium windows.
NZS 4211	:	1985	: Specification for Performance of Windows.
Amendment 1	:	1987	
Amendment 2	:	1992	
NZS 4214		:	Methods of determining the total thermal resistance of parts of buildings.
NZS 4223		:	Code of Practise for Glazing in Buildings.
PT 1	:	1985	: Selection and Installation of Glass in Buildings.
PT 2	:	1985	: Selection and Installation of manufactured sealed insulation glass units.
Amendment 1	:	1992,	
Amendment 2	:	1993	
PT 3	:	1993	
NZS 4303	:		Ventilation for acceptable air quality.
AS 1288 Part 1	:	1979	: Glass Installation Code

9.2 WORKMANSHIP:

9.2.1

Only work consistent with the above standards shall be accepted. Frames shall be rigid. Connections shall be made with no cut edges visible.

9.2.2

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

9.3 MATERIALS:

9.3.1

All materials shall be the best of their respective kinds.

9.4 SCOPE:

9.4.1

All work in this section to be as shown on the Door & Window Schedule and shall be fixed in accordance with the manufacturer's instructions and drawings. The manufacturer and supplier of the work in this section shall be selected by the Architect and shall be in all respects a subcontractor to the main contractor.

9.5 STRENGTH CERTIFICATION

9.5.1

Refer to Section 24 Glazing for cyclone conditions.

Suppliers will be required to certify that their system complies with the requirements specified therein.

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 : This Specification shall be read in conjunction with all Standards mentioned herein which 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.

NZS 1900 Chapter 6.1 & 9.1

10.2 MATERIALS

10.2.1

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.

The Contractor shall make the necessary arrangements to have the preservative treatment level, moisture content and grading checked by the Department of Forestry before the timber is delivered to the site and before construction is initiated. 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. Timber used shall be as specified unless specifically mentioned in the drawings to the contrary.

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.

10.2.2

Ordering of Materials: Contractor shall place orders for all timbers within 2 weeks of contract commencement. Any claims arising from delay in ordering will not be allowed. If any timber size or species is unobtainable this must be notified in the tender.

10.2.3

Types of Timber: Unless specified otherwise the following timbers shall be used - exposed timbers shall be of one species only:

Roof framing:

Exposed beams	treated Dakua Makadre
rafters & purlins	treated Kouvula

Sarking

treated Dakua Makadre
treated Dakua Salusalu
treated Kaudamu

Weatherboards:

External

treated Dakua Makadre
treated Dakua Salusalu
treated Kaudamu
treated Kouvula

Floor framing:

Bearers, joists

Rosarosa, Sacau, Yasiyasi
treated Kouvula

Wall framing

treated Dakua Makadre
treated Kouvula
treated Kaudamu

Flooring:

Exterior

Sacau, Vesi, Yasiyasi,

Interior

Damanu, Sacau, Yasiyasi,
Rosarosa

Balustrades:

Exterior

Sacau, Vesi, Yasiyasi,
Rosarosa

Doors:

Exterior

treated Dakua Makadre
treated Dakua Salusalu

Interior

treated Kaudamu
treated Kouvula

Frames

treated Dakua Makadre
treated Dakua Salusalu
treated Kouvula

Sills Rosarosa, Sacau, Vesi, Yasiyasi

Windows:

Frames & Sashes treated Dakua Makadre
treated Dakua Salusalu

Sills treated Dakua Makadre
treated Dakua Salusalu
Rosarosa, Sacau, Vesi, Yasiyasi

Stairs:

Exterior & Interior Rosarosa, Sacau, Yasiyasi, Vesi

10.2.4

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

10.2.5

Moisture Content : 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 17 percent plus or minus 3 percent.

Moisture Content for Interior Use Timbers shall be within plus or minus 3 percent of the figure stated for the applicable zone in the following schedule:

Wet Zone	: Suva, Nausori, Lami, Deuba, Korovou, Savusavu, Taveuni	17%
Intermediate	: Labasa, Sigatoka, Vatukoula, Rakiraki	15 %
Dry Zone	: Lautoka, Nadi, Ba	14 %

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.

10.2.6

Nails and fastenings : All brads, nails, etc., shall be best quality of appropriate gauge, strength and shall be long enough to enter the second Timber for at least half their length before being punched. Screws shall be of sufficient length and gauge for their purpose. Screws for door furniture and other iron mongery shall be of material and pattern to match the various fittings. All screws exposed to the outside shall be solid brass. All nails and bolts shall be galvanised.

10.2.7 TIMBER FASTENERS

Proprietary and patent fasteners and fixings shall be installed in strict accordance with manufacturer's instructions.

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 square washers as follows : -

Bolt	Washers	Standard
M10 Cuphead		
M10	38 x 38 x 2.0	
M12	50 x 50 x 3.0	
M16 and over	65 x 65 x 5	

10.2.8 STRUCTURAL TIMBER/PRESERVATIVE TREATMENT

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 of moisture content not exceeding 25%. 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 Utilization Division of the Department of Forestry, Fiji. No substitution shall be allowed without the Architect's approval.

10.3 WORKMANSHIP:

10.3.1

Workmanship and details of construction not specifically stated or shown shall be of a nature that, in the opinion of the Architect, conforms to good trade practice shall be deemed to include but not restricted to those methods, practices and processes contained in current syllabuses for the Trade Certificate in Carpentry offered by the Fiji School of Technology. 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. All nail holes in exposed work shall be punched.

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 25 mm longer than the total timber thickness and the ends clinched at right angles to the grain.

Lead holes shall be drilled for screw fixing with the lead hole diameter for the thread not greater than the core diameter, and for the shank not

greater than the diameter of the shank of the screw to be used.

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.

10.4 EXTENT OF WORK:

10.4.1

This section includes all carpentry work shown on the drawings. It also includes waiting upon all trades, cutting, boring, nogging, as they may require for the proper completion of the whole contract.

10.5 PRIMING & SEALING:

10.5.1

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.

All rafters, beams and sarking which are exposed shall have a priming cost applied before erection.

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.

10.6 FINISH:

10.6.1

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

10.7 DAMP PROOF COURSE:

10.7.1

Between all faces of framing timbers in contact with concrete or concrete blockwork place a 3 ply bituminous felt weighing not less than 2.7 kg/m². Place 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.

10.8 ATTENDANCE:

10.8.1

Wait upon all trades, cut or bore timbers as they may require. Provide and fix all blocks, supports and the like. Reduce to a minimum the cutting of structural members and in no circumstances cut into or check rafters, beams and purlins within the middle third of the length. Attachments to concrete and concrete blocks shall be made by means of screws and plate and plugs, bolts either built in or engaging and expanding sockets of the approved design or as detailed.

10.9 PROTECTION:

10.9.1

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.

10.10 TREATMENT:

10.10.1

Treat all non heart and hardwood timbers with Cellcure AN or Tanalith NCA preservative with the following composition:

		Nominal Percent
Copper Sulphate	(CuSO ₄)	29.7
Sodium Dichromate	(Na ₂ Cr ₂ O ₇)	31.7
Arsenic Pentoxide	(As ₂ O ₅ ·2H ₂ O)	26.3
Sodium Pyroarsenate	(Na ₄ A ₂ O ₇)	12.3

The degree of treatment shall be as set out in the Schedule of Treatment for timber in various positions as follows :

Hazard 2

Out of ground contact the continuously protected from the weather or painted and adequately ventilated 3.5kg/m³. Note for this hazard type the Architect may direct that Immutan or Cellcure PA be the treatment type.

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/m³

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.

Hazard 4

Low risk (a) 10.2 kg / m³ e.g. fence posts

Hazard 5
High risk (b) 18.0kg / m³ e.g. house piles or structural posts or piles

Hazard 6
Marine uses exposed to marine boring organisms .48kg / m³

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

10.11 HARDWARE:

Refer Schedule of Monetary Allowances.

10.11.1
All hinged doors unless otherwise specified will be hung on 3 / 100 mm brass butt hinges.

Door furniture shall be positioned:

Knob & furniture	knob centred 800 off floor
Lever & furniture	lever centred 1100 off floor
Recessed pulls and D pulls	centred 1100 off floor

All handles, pulls, recessed pulls, should always be mounted opposite the fixed rail.

10.11.2
Allow for all doors to have floor or wall stops as applicable (unless otherwise noted on the drawings).

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. 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. 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 rises. 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 schedule on the Schedule of Finishes shall be timbers which have been resawn with a band saw to remove circular mill saw marks.

10.16 TIMBER LOUVRES:

10.16.1
With timber louvres into Naco blades or into louvre blade frames it is important that the timber blades be either screwed or rivetted in to keep them held secure.

10.17 SKIRTINGS:

10.17.1
Allow for all floor and wall junctions (except the junction between a tiled floor and tiled wall) to have timber skirtings as detailed on the drawings unless noted otherwise.

11.1 PRELIMINARY:

11.1.1

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

11.1.2

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

NZS 3601 : Metric Dimensions for Timber

NZS 632 : The Kiln Drying of Timber

11.2 WORKMANSHIP:

11.2.1

General : All joinery and finishings shall be made framed and finished in accordance with the above standards.

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

11.2.2

Priming : Exterior joinery shall have meeting faces and joints primed during assembly. All joinery shall have the first coat of finish applied immediately after manufacture and before leaving the Joiner's shop. Refer to Schedule of finishes for priming type required.

11.3 MATERIALS:

11.3.1

General: All timber shall be of the best quality of the various kinds specified, free from defects, making it unsuitable for its particular purpose and shall comply with the Department of Forestry Standard Grading Rules for Joinery No.1. Use same timber species at joint.

11.3.2

Moisture Content for Exterior Use Timbers: Shall be a maximum of 17 percent plus or minus 3 percent.

11.3.3

Moisture Content for Interior Use Timbers: Shall be within plus or minus 3 percent of the figure stated for the applicable zone in the following schedule:

Wet Zone	: Suva, Nausori, Lami, Deuba, Korovou, Savusavu, Taveuni	17%
Intermediate	: Labasa, Sigatoka, Vatukoula, Rakiraki	15 %
Dry Zone	: Lautoka, Nadi, Ba	14 %

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.

11.3.4

Schedule of Timbers: (unless otherwise specified) -

Doors:

Exterior	Dakua Makadre, Dakua Salusalu, Kaudamu, Kauvula, Yaka
Interior	Dakua Makadre, Dakua Salusalu, Kaudamu, Kauvula
Frames	Bauvudi, Kaudamu treated, Dakua, Makadre, Dakua Salusalu
Sills	Rosarosa, Sacau, Vesi, Yasiyasi

Windows:

Frames & Sashes	Bauvudi, Dakua Makadre, Dakua, Salusalu
Sills	Buabua, Salusalu, Yasiyasi

Stairs:

Exterior	Rosarosa, Sacau, Vesi, Yasiyasi
Interior	Damanu, Rosarosa, Sacau, Vesi, Yasiyasi

Shelving Cupboards Dakua Makadre, Kaudamu, Kaunicina

Benchtops Dakua Makadre, Vesi

Finishing:

Interior	Bauvudi, Dakua Makadre, Dakua Salusalu, Damanu, Yaka
Mouldings	Dakua Makadre, Dakua Salusalu, Kaudamu

Furniture Bauvudi, Dakua Makadre, Dakua Salusalu, Damanu, Yaka

Drawer Runners Buabua

Note : It is extremely important that all timber joinery finishing for doors and windows be in Dakua Salusalu. Treated Kauvula should not be used for any internal finishing joinery.

11.4 EXTENT OF WORK:

11.4.1

This includes all joinery items mentioned herein or shown on the drawings. Supply all finishing timbers to the Carpenter for fixing.

11.5 FRAMES:

11.5.1

Window Frames: Shall be of the sizes and profiles indicated on the Standard Details and Window Schedule.

11.5.2

Door Frames: Shall be of the sizes and profiles indicated on the Standard Details and Door Schedule. Frame shall be completed with 12min. thickness planted stop glued and nailed.

11.6 STAIN TO INTERNAL JOINERY:

11.6.1

All joinery shall come from the Joiner's shop with one coat of sanding sealer, one coat of "Wattyl Stain" and have eggshell varnish (70% flat 30% gloss) finished towards the end of the construction period.

11.7 SASHES:

11.7.1

Sashes shall be of the sizes, profiles and details indicated on the drawings. Complete with all rebates grooves as detailed. Construct sashes complete with mortice and tenon joints at corners.

11.8 DOORS:

11.8.1

General: All hardware will be provided and fitted by the Carpenter unless otherwise specified. Supply all doors to the Carpenter for hanging in frames. Refer to Standard Details sheet and Door Schedule.

11.9 WINDOWS:

11.9.1

General: All hardware will be supplied and fitted by the Carpenter unless otherwise specified.

Supply windows to the Carpenter for hanging on frames, refer to Standard Detail sheets in Window Schedule.

11.10 PROTECTION:

11.10.1

All timber shall be fillet stacked on arrival on site.

All joinery and dressed timber shall be protected from the weather and other damage during the contract before and after installation.

11.11 TREATMENT:

11.11.1

Treat all non heart and hardwood timbers with Cellcure AN or Tanalith NCA preservative with the following composition:

		Nominal Percent
Copper Sulphate	(CuSO ₄)	29.7
Sodium Dichromate	(Na ₂ Cr ₂ O ₇)	31.7
Arsenic Pentoxide	(As ₂ O ₅ ·2H ₂ O)	26.3
Sodium Pyroarsenate	(Na ₄ As ₂ O ₇)	12.3

The degree of treatment shall be as set out in the Schedule of Treatment for timber in various positions as follows:

Hazard 1

Out of ground contact the continuously protected from the weather or painted and adequately ventilated 3.5 kg/m³. Note for this hazard type the Architect may direct that Immutan or Cellcure PA be the treatment type.

Hazard 2

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 verandars, floors, garden furniture, fire escapes, barge boards, etc. 7.0kg/m³

Hazard 3

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/m³ e.g. fence posts

high risk (b) 18.0kg/m³ e.g. house piles or structural posts or piles

Hazard 4

Marine uses exposed to marine boring organisms - 48kg / m³

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

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

11.12 FINISH:

11.12.1

All dressing grades shall be machine dressed and in addition all finishing timbers shall be scraped and sand papered by hand to a smoother 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 arises. Where polished work is specified, the timber shall be carefully matched for uniformity of colour, grain and texture to ensure a uniform finish.

11.13 DAMP PROOF COURSE:

11.13.1

Place a damp proof course between all faces to timber in contact with concrete to blockwork. Damp course shall be bituminous felt fabric weighing not less than 2.7Kg/m² shall be neatly cut for bolts, and shall be at least the full width of the member.

11.14 JOINERY:

11.14.1

With timber louvre doors that are wider than 600 mm a central stiffening carrier should be installed. On no account should louvres span more than 600 mm without this provision unless stated on the drawings.

DESIGN HUT

12.1 PRELIMINARY :

12.1.1

General : 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.

12.1.2

Standards : 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 Architect.

12.1.3

Guarantees : Written guarantees for the periods noted below shall be provided against defects in the materials and workmanship and handed to the Architect on completion of the works. Refer to Section 2.

12.1.4

Cooperation : Allow to cooperate with the Plumber in the installation of all flashings, location of pipes, downpipes, spoutings, vents, etc.

12.2 MATERIALS:

12.2.1

All materials shall be the best of their respective kinds free from defects and suitable for the job they have to perform. Allow to store materials in such a manner as to prevent damage. Leave the roof surface completely water tight at completion of the work.

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 SCOPE:

12.4.1

This section of the work includes the laying of all roofing types, downpipes, gutters, spoutings, flashings, skylights, etc., mentioned in the following clauses and indicated on the drawings.

12.5 BOX GUTTERS:

12.5.1

Unless detailed otherwise on the drawings Box Gutters shall be 300 mm wide a minimum depth of 75 mm. In all cases install Box Gutters with a minimum fall of 1 in 120 to gutter outlets.

12.5.2

Form gutters with tops of sides level with underside of roofing, i.e. sides of gutter are to taper with fall of bottom.

12.5.3

Internal Gutters : All internal gutters to be Butynol or Nuralite and outlets to be fitted with gratings.

12.6 GUTTER OVERFLOWS:

Provide overflows at all high points of gutter falls. Use the following types of overflows where directed by the Architects.

12.6.1

Side Outlet Overflow : Provide 35 mm high x 100 mm wide rectangular pipe outlet horizontally through side of gutters. Locate outlet with invert 50 mm below underside of roofing at gutter edge. Extend outlet 50 mm through wall of fascia to other approved discharge point.

12.6.2

Bottom Outlet Overflow : Provide 75 mm dia. pipe outlet through bottom of gutter to approved discharge point. Top of pipe shall be 50 mm below underside of roofing at gutter edge.

12.6.3 GUTTER OUTLETS: BIRDPROOF BALLOONS

Provide suitable diameter approved galvanised birdproof wire balloons at all gutter outlets including overflows through gutter.

12.7 ROOF INSULATION : FIBREGLASS BLANKET

12.7.1

Cover total area of roof with 75 mm thick fibreglass blanket insulation in strict accordance with manufacturer's directions. Lay blankets over top of and at 90 degrees to purlins. Fit tightly around all roof protrusions. Fill all gaps with offcuts to avoid heat buildup in roof space.

12.8 ROOFING :

12.8.1

Material : Ribbed profile steel sheets with interlocking side ribs manufactured from mild steel base metal with zinc / aluminium alloy coating finished with over baked silicone polyester paint.

12.8.2

Lengths: Continuous from gutter to ridge, change in pitch or gutter in curved ridge applications.

12.9 RIBBED PROFILE METAL ROOFING : END STOPS

12.9.1

Fit end stops supplied by roofing Contractor into all exposed end openings of ribbed profile metal roofing sheets. Align with top and side faces of roof fixing straps and fix before roofing sheets are laid.

12.10 ROOF FIXING:

12.10.1

Fixings : As recommended by manufacturer to withstand a design wind velocity of 57 metres per second.

12.10.2

Laying: In continuous lengths, top sheet of side lap facing away from prevailing weather. Project sheeting 50mm minimum into gutters with the maximum projection into gutter providing access for cleaning.

12.11 CLEAN UP:

12.11.1

Use soft broom. Sweep roofs and gutters, clean up all debris, (Nuts, screws, cuttings, fillings, etc.) at least at the end of each day's work.

12.12 ROOFING GUARANTEE:

12.12.1

Refer to Preliminary & General Section - Clause 1.30.

12.13 FLASHINGS, CAPPINGS, GUTTER OVERFLOWS & OUTLETS:

12.13.1

0.6 mm thick mild steel base metal with zinc / aluminium alloy coating finished with oven baked silicone polyester paint - as supplied by roofing manufacturer specified above.

12.14 JOINTS : FLASHINGS & CAPPINGS

12.14.1

Seal all joints with approved Silicone Sealer in conjunction with mechanical fasteners as recommended by roofing manufacturer.

12.15 FIXING METAL FLASHINGS & CAPPINGS:

12.15.1

As recommended by roofing manufacturer to withstand a design wind velocity of 67 metres per second. Lap all flashings 100 mm with roofing.

12.16 PLUMBING VENT PENETRATION THROUGH ROOF:

12.16.1

Flash in strict accordance with roofing manufacturer's recommendations using sealant and mechanical fasteners.

12.17 COMPLETION:

12.17.1

Overpaint minor site blemishes with manufacturer's touch up paint.

Leave roof and gutters clean and in a weathertight condition.

13.1 PRELIMINARY:

13.1.1

General : Refer to the applicable New Zealand Institute of Architects General Conditions of Contract and the Preliminary & General clauses which will also apply to this section of the work.

13.1.2

Standards : All sanitary plumbing shall conform to the AS / NZS 3500 series of specifications and shall be carried out by a Registered Plumber and be in strict accordance with the drawings and this specification and to the satisfaction of the respective Authority inspectors and the Architects.

13.2 MATERIALS:

13.2.1

All materials shall be the best of their respective kinds and if necessary are to be submitted for approval before installation.

13.3 WORKMANSHIP:

13.3.1

The Plumbing work shall be commenced as soon as the progress of the trades will permit and the Plumber shall arrange for all openings, chases, etc., for pipes and wastes to be made as the work proceeds. All piping shall be concealed from view unless specified otherwise. Fit flanges to all visible pipes where they pass through walls, floors and ceilings. Tape all pipes where they pass through concrete with densotape. All piping shall be adequately secured to the building to prevent vibration. Any pipework exposed shall be chrome plated.

13.3.2

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

13.4 EXTENT OF WORK:

13.4.1

Carry out all plumbing works as shown or indicated in the drawings and specified herein. This shall include all flashings to windows, doors and other junctions necessary to render the building watertight. All water services, supply and fittings of all sanitary fittings, special fittings, connections to wastes and vents, etc.

13.5 FLASHINGS:

13.5.1

Work in with the Carpenter in the installation and coordination of the fittings of flashings. Supply the Carpenter with galvanised iron flashings, to all windows and door frames as detailed on the drawings. Flashings shall be neatly folded to the profiles indicated so that a neat true edge results. All flashings shall be machine bent to ensure neat profiles.

13.5.2

Cooperate with the Painter in the priming of the backs of all flashings with calcium plumbate or other approved prior to installation. Flashings shall be machine bent and in as long lengths as possible and fixed to ensure perfect watertightness.

13.6 CONCEALMENT OF PIPEWORK:

13.6.1

All pipes including supply pipes, waste pipes and vent pipes shall be concealed in walls or floors unless otherwise specified.

13.6.2

Where pipes are run inside or through concrete work the Structural Engineer must give approval of the positioning before any such work is carried out.

13.7 RESPONSIBILITY FOR PIPEWORK:

13.7.1

The Plumber shall be responsible for all pipework until the end of the maintenance period. Should leakages occur the Plumber shall be responsible for making good the leaks together with the repair of adjacent surfaces and finishes.

13.8 POST CONTRACT DOCUMENTS:

13.8.1

Upon completion of the Contract the following documents shall be supplied to the Architect :

- (a) Copies of Guarantees as called for in the Specification.
- (b) Test Certificates from the Local Authorities certifying plumbing works comply with their requirements.
- (c) Plan showing "as built" installation.
- (d) Plan showing exact location of underground services.

13.9 PIPE TESTING:

13.9.1

On completion and before concealing all pressure pipework shall be tested at 3 times the working pressure.

13.9.2

Waste drains shall be tested to withstand a 2 metre head of water.

13.9.3

Notwithstanding the above all pipework and drains shall be tested to the approval of the Local Authority and the Architect.

13.10 TRAPS TO FITTINGS:

13.10.1

Trap all fittings not fitted with integral trap with white colour polypropylene "Dux Fast Fit" or similar approved.

13.11 FLOOR WASTES:

13.11.1

Install grated trapped floor wastes to all wet areas including bathrooms, WC compartments, shower compartments, laundries, kitchens and any other applicable wet areas.

13.12 WASTES & VENTS:

13.12.1

All wastes shall be in PVC in accordance with the above mentioned standards. Where pipes pass through concrete they shall be below if not shown otherwise on the drawings. Lay wastes to even falls complying with the above mentioned standards. Jointing of the pipes shall be by the socket and solvent cement junction method.

13.12.2

Vent pipes shall be PVC to a similar standard as the wastes. All vent pipes shall be carried up within partitions, shall be of the sizes shown and extend to 450 above finished roof level and be fitted with a PVC dome.

13.13 SIZES OF WASTES & VENTS:

13.13.1

Unless otherwise shown waste pipes and vents shall be as listed below :

Fitting	Min. Permissible Waste Pipe	Vent Size
WC	100 mm dia	50 mm dia
Vanity Unit	32	32
Shower	38	38
Wash Basin	32	32
Kitchen sink	38	38

Where more than 2 similar fittings are connected to one waste or vent the pipe size shall be increased accordingly. Terminal vents shall be 100 mm dia.

13.14 WASTE SUPPLY PIPES:

13.14.1

All cold water supply pipes shall be PVC except to Fire Fighting equipment in which case galvanised pipe should be used. All hot water supply pipes should be copper.

14.1 PRELIMINARY:

14.1.1

General : 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.

14.1.2

Standards : All drainage work shall conform to the New Zealand Plumbing and Drainage Regulations 1959 and shall be carried out by a licenced Drainlayer, be strictly in accordance with the drawings and this specification and to the satisfaction of the Local Authority Inspector and the Architects.

14.1.3

Code of Practice for the Installation of Unplasticised PVC Pipe Systems March 1959.

14.2 MATERIALS:

14.2.1

All materials shall be the best of their respective kinds and if necessary are to be submitted for approval before installation.

14.3 WORKMANSHIP:

14.3.1

All work shall be carried out in a neat and careful manner in accordance with the best trade practice and only experienced registered tradesmen shall be employed. Joints in PVC pipes shall be with solvent cement or O rubber ring. Interiors of pipes and fittings shall be thoroughly cleaned as the work proceeds. Mains under buildings shall be bedded and encased in concrete. PVC pipes are to be wrapped in polythene before being encased.

14.3.2

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

14.4 EXTENT OF WORK:

14.4.1

Carry out all drainage work as indicated on the drawings as specified herein and as necessary to complete the full system of drainage envisaged.

14.5 PVC DRAINS:

14.5.1

Where shown on drawings supply and lay unplasticised PVC pipes complying with qualitative clauses of BS 3506 jointed with rubber ring seals complying with BS Document No. 67/17406.

14.5.2

Bed pipes into 100min. layer of compacted sand and completely surround with sand to same thickness.

14.5.3

Lay and joint drains in strict accordance with the manufacturer's specifications.

14.6 CONCRETE DRAINS:

14.6.1

Where shown on the drawings supply and lay precast concrete pipe drains in strict accordance with the manufacturer's specifications.

14.7 SURFACE DRAINS:

14.7.1

Where shown on the drawings construct open concrete drains.

14.8 GULLEY TRAPS:

14.8.1

Gulley traps shall be set on and be encased in concrete and shall finish 75 mm above ground level and be complete with cast iron gratings. Waste pipes shall discharge below the gratings. Gully traps shall be glazed earthenware, PVC or similar.

14.9 INSPECTION CHAMBERS & MANHOLES:

14.9.1

Where shown on drawings construct inspection chambers and manholes to Local Authority's approval. Neatly bed discharging pipes into the inspection chambers at the correct levels. Neatly bench plaster at 1 in 6 slope around channels and interior of inspection chamber. Fit with approved air-tight cast iron covers complete with perimeter frame and recessed handles.

14.10 GRATED STORMWATER SUMPS & GRATED DRIVEWAY CROSSINGS:

14.10.1

Construct where shown on drawings and to standard detail included at end of this specification section.

15.1 PRELIMINARY:

15.1.1

General : 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.

15.2 STANDARDS :

15.2.1

The following standards shall form part of this specification:

- AS / NZS 3000 and AS / NZS 3008.1
- Requirements of Supply Authority

15.3 MATERIALS :

15.3.1

All materials shall be new and of first class quality without blemishes or defects and to the approval of the Architect and Engineer.

15.4 WORKMANSHIP:

15.4.1

All workmanship and finish shall be of the highest quality conforming with the best modern trade practice.

15.5 DRAWINGS :

15.5.1

The Contractor shall make at his own expense such shop drawings as he considers necessary. No details shall be altered without the written authority of the Consultant.

15.6 SCOPE OF WORK :

15.6.1

The Mechanical Subcontractor shall include the supply, delivery, installation, commissioning, testing and maintenance of the following:

- i) Ducted toilet extract system
- ii) Air conditioning system, as detailed.

Also to be allowed for is all minor works necessary for proper completion of the above works.

Allow for all provision of holes, plinths and supports. The making good shall be by the Builder.

Power to isolating switches shall be provided near the units mounted on the roof by the Electrician. The Mechanical Sub-contractor shall make all allowance for the wiring from thereon to all units including all switching and controls at appropriate convenient points inside the building to final directions nominated on site.

15.7 EQUIPMENT :

15.7.1

Shall be as specified, or equal approved, connected and installed strictly to manufacturers instructions. Obtain prior approval from Engineer on the method of installation before proceeding with any installation.

15.8 DUCTWORK:

15.8.1

Shall be to SMACNA Low Velocity standard manufactured from Lysaght galvbond sheets. All exposed ductwork to be painted.

15.9 FIRE DAMPERS :

15.9.1

Rated for 4 hour fire rating and conforming to AS1668 - Part 1. Pack all spaces between damper and wall with asbestos. Provide access panels at each fire damper for checking and setting the damper.

15.10 GRILLES

15.10.1

All of aluminium construction with opposed blade volume dampers.

15.11 ELECTRICAL :

15.11.1

To conform to FEA regulations and AS / NZS Wiring Rules.

All equipment to be corrected for 0.85 power factor.

Starters to be of approved limiting type with inherent under voltage and phasefailure protection, adjustable thermal overload relays in all three phases, manual reset, 240 volt coil, enclosed in proper fully labelled enclosures.

15.12 GENERAL:

15.12.1

All works to be properly painted and corrosion protected, labelled and identified to approval.

15.13 MAINTENANCE :

15.13.1

Allow for monthly free maintenance and servicing to be carried out for the Maintenance and Guarantee Period.

15.14 SHOP DRAWINGS:

15.14.1

The Mechanical Sub-Contractor shall allow for the preparation and supply of three sets of detailed A1 sized on 1:50 scale working drawings for approval for the following prior to commencing work on site:

all ductwork
fan installation
air conditioning installation.

These are to be forwarded to the Engineer three weeks after the award of the Contract.

15.15 AS-BUILT DRAWINGS & OPERATION & MAINTENANCE MANUALS:

15.15.1

Prior to practical completion allow to supply six sets of the Operation and Maintenance Manuals and the As - Built drawings which shall include all changes carried out on the project during construction.

DESIGN HUT

16.1 PRELIMINARY:

16.1.1

General I: Refer to the applicable Fiji Standard Form of Contract and the Preliminary & General Clauses which will also apply to this section of the work.

16.1.2

Standards: The following standards form part of this specification:

NZS 2182	(1967)	:	Gas Fittings
BS 715	(1970)	:	
BS 1963	(1969)	:	Sheet Metal Flue Pipes & Accessories for Gas Fired Appliances
BS 3156		:	
BS 3554		:	
BS 389	(1969)	:	Portable Liquified Petroleum Gas Appliances Operating with Vapour Pressure from small LPG containers
BS 4161 Gas		:	Gas Meters
		:	Pressure Operated Relay Valves for Gas Appliances

16.2 MATERIALS:

16.2.1

All materials used shall be the best of their respective kinds suitable for the work.

16.3 WORKMANSHIP:

16.3.1

General: The whole of the installation shall be carried out as set out in the specification and in accordance with the drawings. All work shall be in accordance with the above regulations and to the satisfaction of the Architect. Any work or materials specified and not being in contravention to the regulations is to be carried out as specified. The whole of the work shall be concealed and nothing but first class workmanship and materials shall be allowed. Any work or materials which may be necessary and which is usual for the full and proper completion of the contract shall be supplied without extra charge whether expressly mentioned or not in this specification. The Gas Subcontractor shall coordinate with the Building Contractor for the full requirements of this contract so that the job may proceed satisfactorily for all concerned. The Architect reserves the right to supply any articles for the nett sum allowed.

16.3.2

Drawings: The gas services shall be as shown on the drawings in the positions shown. All gas fittings shall be as shown and specified herein. No work shall be done contrary to the drawings and specifications unless such is authorised by the Architect.

16.4 EXTENT OF WORK:

16.4.1

The Gas Subcontractor shall include the installation of all gas operated equipment. Supply and installation of gas storage facilities will be the responsibility of the Contractor. This contract is to include for the construction of a reinforced concrete pad to support the storage tank and the reticulation of gas to the various fittings.

16.5 INSTALLATION:

16.5.1

All gas appliances will be supplied by the Owner and will not be included in this contract.

16.6 WATER HEATERS:

16.6.1

Supply and install in accordance with the manufacturer's instructions hot water cylinders as shown on the drawings. Connect to cold water supply and work in with Roofer and Plumber.

16.7 TESTING:

16.7.1

On completion test supply of reticulation and appliances and ensure that all are in full working order and that there are no leaks.

16.8 GUARANTEE:

16.8.1

The Gas Subcontractor shall supply to the Owner a 1 year guarantee on all materials and workmanship. See also Section 2 - Clause 2.4.

SECTION 17 : FIRE PROTECTION

17.1 PRELIMINARY:

17.1.1

General : 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.

17.2 MATERIALS:

17.2.1

All materials used in this section to be the best of their respective kinds.

17.3 WORKMANSHIP:

17.3.1

The workmanship included in this section is to be carried out by skilled competent tradesmen knowledgeable in the specialized nature of this work.

17.4 SCOPE:

17.4.1

This includes the supply and installation of fire hose reels and their connection to water supply. It also includes the supply and fixing of portable fire extinguishers and fire alarm systems as shown on the drawings.

17.5 DESIGN OF FIRE DETECTION SYSTEM:

17.5.1

" Drawings and Approvals " shall be designed and installed to comply with NZS 4512 . 2003 and National Fire Authority of Fiji requirement . Before commencement of any work associated with the fire detection system the Contractor shall submit to the Engineer full drawings and details showing the complete system, layout and positioning of all items together with details of the electrical circuitry of the system.

Following review of these, the Contractor shall submit the drawings and details to the relevant Local Authority and the National Fire Authority of (Fiji), for approval. No work shall commence on site until all modifications are incorporated on the drawings and the final approvals received.

The Contractor shall allow for, and pay, all costs associated with the preparation of the drawings, the design and the approvals.

17.5.2

Commissioning : Following the installation of the system and immediately prior to handing over the project, the Contractor shall arrange for, and pay all costs associated with, commissioning the system and the connection to the local Fire Service. The commissioning must, as a minimum, contain a simulated fire call to test the connection to the relevant Fire Service or Fire monitoring point.

17.5.3

Maintenance Contract : If instructed by the Architect / Engineer, the Contractor shall submit a proposal for a maintenance contract for the alarm system, covering all the necessary statutory regular tests and the reporting on these. This maintenance contract shall be set for a three year contract with right of termination by either party (Contractor or Principal) at yearly intervals with written notice of 8 weeks by either party. The Maintenance Contract shall contain provision for re-negotiation of rates at one yearly intervals.

17.6 FIRE EXTINGUISHERS:

17.6.1

Fire Extinguishers to NZS 4503 shall be supplied where required by the Local Authority and as needed for the respective type of fire expected i.e. electrical, paper, etc. These extinguishers shall be located in a visible place and shall be clearly and illegibly marked as to the type of fire for which it is suitable.

17.7 HOSE REELS:

17.7.1

Where shown on the drawings, the Contractor shall supply a 36 m long x 20 mm hose reels fitted on swinging arm and contained in a fully or partially recessed cabinet. Surface reels are not permitted without the written approval of the Architect / Engineer. Hose reel cabinets shall be clearly marked with the words HOSE REEL in standard lettering in standard colours.

18.1 PRELIMINARY:

181.1

General : 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.

181.2

Standards : The following standards form part of this specification:

AS / NZS 3000 and AS / NZS 3008.1

Fiji Government Electricity Regulations

Fiji Electricity Authority (F.E.A.) Supplementary Regulations, where applicable.

18.2 MATERIALS:

18.2.1

All materials shall comply with the relevant standard specification and be the best of their respective kind of British or Australian or New Zealand manufacture unless specified to the contrary.

18.3 WORKMANSHIP:

183.1

General: the whole of the installation shall be carried out as set out in this specification and according to the drawings. All work shall be in accordance with the above regulations and to the satisfaction of the Architect. Any work or material specified and not being in contravention to the regulations is to be carried out as specified. The whole of the work shall be concealed and nothing but first class workshop and material will be allowed. Any work or material which may be necessary and which is usual for the full and proper completion of the contract shall be supplied without extra charge whether expressly mentioned or not in this specification.

The Electrical Subcontractor shall coordinate with the Building Contractor for the full requirements of this contract so that the job may proceed satisfactorily for all concerned. The Architect reserves the right to supply any articles for the net sum allowed.

18.3.2

Drawings : The electrical services shall be as shown on the drawings, in the position shown. All electrical fittings shall be as shown and specified herein. No work shall be done contrary to the drawings and specification unless such is authorized by the Architect.

18.3.3

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

18.4 EXTENT OF WORK:

18.4.1

For the supply and installation of all electrical services to and within the project, all mains, switches, switchboards and installation of all Lighting, power and ancillary circuits as shown on the drawings and in this specification.

18.5 FEES:

18.5.1

The Electrical Subcontractor shall allow for all connection fees to the main supply and obtain all necessary permits and pay all fees and other charges. Consumer deposits of Transformer Development shall be paid by the client. Electrical contractor shall make all necessary applications and submit to Fiji Electricity Authority (F.E.A.) as required

18.6 MANUFACTURER'S INSTRUCTIONS:

18.6.1

Where manufactures of apparatus issue special instruction, these shall be followed, but shall not be interpreted to permit work of a standard lower than the general purpose of this specification.

18.7 GUARANTEES:

18.7.1

Any of all guarantees which the manufacturer or supplier may issue covering materials, workshop and performances shall be arranged by the Electrician as between the Owner and such manufacturer or supplier. The Electrician will be responsible to see that all necessary documents are properly completed and signed and handed to the Architect at the earliest practical opportunity. Notwithstanding such guarantee being supplied the Electrician will not be absolved from his responsibility under the terms of this contract.

18.8 PLANT:

18.8.1

The Electrical Subcontractor shall provide all necessary tools, ladders, plant, etc, as required for the execution of this contract.

18.9 COOPERATION :

18.9.1

The Electrician shall cooperate with all trades so that work can be carried out with the utmost expedition. Cooperate with the main Contractor in the provision of all holes, conduits, and the like and make good after installation. It shall be the responsibility of the Electrician to advise the main Contractor as to the exact location of such holes requiring to be cut.

18.10 MAINS :

18.10.1

Arrange with the Local Authority in the removal and installation of the mains cable to the building and temporary builders supply. Connect to the relocated main switchboard and extend in correct size cables to all switchboards, power and lighting points.

18.11 SWITCHBOARD:

18.11.1

The switchboard shall be factory built or similar wall-mounted metal clad units fixed onto the walls. Minimum metal gauge of 1.7 mm (16 gauge) . Two Pack painted or powder coated finish. Colour to be specified by Architect .

18.11.2

The switchboards shall be complete with bus bars, fuses and circuit breakers as required. Also circuit breakers and fuses shall be identified to show the equipment they control. Provide neatly lettered adhesive embossed tape for such purposes. All details of the switchboard and components, including make and size, shall be submitted to the Architect for approval before manufacture.

18.12 ACCESSORIES:

18.12.1

All switch, switch, plugs, etc., shall be of the approved design type and white in colour. Switches shall be fitted with the latest earthing protection devices as required by AS 3000.

18.13 FITTINGS:

18.13.1

Fluorescent: Where shown, supply and install fluorescent light in the positions indication on plan. Fluorescent shall be fitted with premium Class ballast 'F' class insulation, power factor correction and individual built in fuses and have an unconditional five year guarantee.

18.13.2

Light Fittings: Where shown, allow to install the incandescent light fittings indicated on the drawings. Pendant light connections to be made to PDL or similar black ceiling roses. Generally the pendant lights will be hung at approx. 2100 except that the final hanging height will be determined on site.

18.14 MONETARY ALLOWANCES:

18.14.1

Refer to the applicable Fiji Standard Form of Building Contract for definitions of Monetary Allowances.

18.15 POWER POINTS AND LIGHT SWITCH LOCATION:

18.15.1

All light switches shall be positioned at 1200 mm from the finished floor level. All power points shall be positioned 400 mm from the floor level except in the following circumstances where applicable or as otherwise shown on the drawings.

Kitchen)
Laundry) 1200 from floor level
Sideboard)
Bathroom)

Note : Dimensions are to the center of the switch.

Note : It is extremely important that the Electrical Subcontractor arrange a meeting on site with the Architect (when construction has reached the correct stage), and mark position of all switches, power points, wall lights, fluorescent and pendants. Any change at this stage will not be a contract variation. This is the Electrical Subcontractor's responsibility and any of the above mentioned fittings installed incorrectly will have to be relocated at his own expense if the meeting has not been arranged.

All switches onto doors frames to be architrave switches.

18.16 EXCAVATION:

18.16.1

This shall be carried out to a depth of 600 mm for non trafficable areas and depth of 900 mm where vehicle passes and trench backfilled with 75 mm sand before laying cable pipe. Cover with a further 75 mm of sand and protect with 50 concrete blocks. Complete backfilling and make good any damage to Owner or other property.

18.16.2

Low voltage cables may be installed within the same trench provide they are also enclosed in approved pipes e.g. separate pipes for each type of circuit TV – radio/music – telephones, etc) and kept 300 mm away from the power cables.

18.17 WIRING:

18.17.1

All wiring shall be concealed and of the sizes shown and of the following types:

- (a) Within False Ceiling or Timber Partitions:
T.P.S
- (b) Within Concrete or Blockwork:
T.P.S. or P.V.C. enclosed in P.V.C conduit.

Joint or draw-in boxes used in the conduit at ground floor level will be permitted only behind light or plug outlets or within cupboards. T.P.S. cables within the false ceiling shall be clipped to the side of ceiling joists or trimmers.

Switches and switch plug boxes shall be cut neatly and fixed firmly into the blockwork. Where such boxes are fixed into timber partitions, they shall be dangled behind. Where bracket or ceiling lights occurs within the concrete or blockwork, fit a round conduit box at each outlet to provide firm fixing for the light fittings.

Min cable sizes shall be as follows:

Lights	1.5 mm ²
Plugs/Power	2.5 mm ²
Range	6.0 mm ²

18.18 HOLES:

18.18.1

The Contractor and other trades will leave holes for conduit and the like and make good after installation, but it shall be the responsibility of the Electrician to advise such tradesman as to the exact location of such holes, etc. before concrete is poured or framing commenced.

18.18.2

Any holes requiring to be cut after such work is completed shall be carried out by the respective trade and the surface to be made good at the Electrician's expense. Electrician shall advise Blocklayer who shall cut holes for flush boxes. All holes shall be cut to the minimum size that will permit freedom of movement.

18.19 EARTHING:

18.19.1

Install all earthing as required by the supply authority. Carry wire to every outlet, whether required or not at this stage. Test earth supply and earthing to requirements of AS 3000.

18.20 COMPLETION AND TESTING:

18.20.1

Upon completion of the work tidy up and test to supply Authority Inspector's approval. Clean all light fittings, switches and plugs.

18.21 POST CONTRACT DOCUMENTS:

18.21.1

Upon completion of the Contract the following documents shall be supplied to the Architect:

- (a) Copies of guarantees as called for in the specification
- (b) Test Certificate from the Supply Authority certifying electrical work complies with their requirements
- (c) Plan showing "as built" installation: 4 sets

Supply and fix adjacent to switchboard instructions for the treatment of electric shock in accordance with the latest faction regulations.

18.22 IDENTIFICATION:

18.22.1

All switchboards and fittings shall be identified to show the equipment they control. Inside each subboard cabinet provide a neatly lettered card, firmly attached, giving the key to the individual items and the unit of control.

18.23 CIRCUITS:

18.23.1

Unless specified otherwise, circuits shall be subdivided thus:

18.23.2

Light: Approximately ten outlets to a circuit, but not less than two circuits to a building.

18.24 PROTECTION:

18.24.1

MCB's shall be provided on all DB's thus :

Light	: 10amp
Plugs	: 16amp
Waterheaters	: 20amp or to the routine of the appliance whichever is greater
Range	: 32amp
	or as shown on the drawings.

18.24.2

Provide RCD protection on ALL lights, power and other circuits for domestic and domestic type portion of other buildings. Provide RCD protection to AS / NZS 3000 . 2002 for commercial and industrial installations .

18.25 JOINT BOXES:

18.25.1

It is not acceptable to have jointing boxes exposed. Any such boxes shall be removed at the Electrical Subcontractors expense.

18.26 SCOPE OF WORK:

18.26.1

Generally a completely new electrical services installation is to be allowed for.

The scope of work included in the electrical subcontract consist of the following:

- a) Incoming electrical supply: reuse existing but reroute to repositioned main switchboard.
- b) Switchboards, as detailed.
- c) Lighting, including reusing of lights only in areas shown
- d) Power outlets.
- e) Completely new subcircuited, all concealed, for added floors.
- f) Telephone and other provisions.

18.27 CONCEALED CABLING AND CONDUITING :

18.27.1

All cabling and conducting on existing and new walls or ceiling to be concealed.

18.27.2

On existing walls, floors and ceilings the electrician shall allow for all chasing, etc. The making good, after conduiting, shall be by the Builder.

18.27.3

The electrician shall allow for the breaking of the existing slabs, ground, etc, to lay conduits.

18.28 TELEPHONE PROVISIONS:

18.28.1

Provide all necessary ducting, conduiting and distribution boards for the installation of all telephone outlets as indicated on drawings to Telecom requirements and approval. This clause is to be read in conjunction with clauses 19.3.1 and 19.18.1 of this section.

18.29 TELEVISION PROVISIONS :

18.29.1

Provide all necessary during, conduiting and points for the installation of all television outlets as indicated on drawing to T.V requirements and approval. This clause is to be read in conjunction with clauses 19.3.3 and 19.18.1 of this section.

19.1 PRELIMINARY :

19.1.1

General : 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.

19.1.2

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

NZSS 2129 1967 Class A

NZSS 1844

19.1.3

Protection : All dressed woodwork, finished surfaces, windows, glass, etc., shall be effectively protected against droppings or damage caused by plasterwork or mortar.

19.2 MATERIALS :

19.2.1

Cement: All approved brand of grey cement to confirm with the above standards shall be used unless otherwise specified.

19.2.2

Sand : Sand shall be river or pit sand, coarse grained, sharp and free from saline, vegetable or earthy matter to pass through a 6 sieve for finishing coat and a 4.8 sieve for other coats.

19.2.3

Lime: Lime shall be best quality hydrated lime run 24 hours before use. Other approved plasticiser may be used.

19.3 WORKMANSHIP :

19.3.1

The whole of the plastering shall be carried out by experienced and skilled tradesmen only and the whole of the work shall be guaranteed. Wherever possible plastering shall be done after carpentry work is complete to avoid vibration. All mouldings, drips, weatherings, etc., shall be run into detail with clear cut angle quirks. On completion work shall be left free from cracks, blisters or marks, even in colour, free from drumminess to the satisfaction of the Architects. Where necessary make good after other trades. Any plasterwork which has cracked or drummy shall be chipped back and replastered at the Contractor's expense.

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

19.4 PROPORTION & MIXING :

19.4.1

All plaster shall be thoroughly mixed and each batch shall be used within 20 minutes of being mixed. Retempering or remixing after the initial set shall not be allowed. Where approved the proportions specified herein may be varied to suit the grading of sand available.

19.5 PREPARATION OF SURFACES :

19.5.1

Concrete and blockwork to be plastered shall be wire brushed to remove laitence. All surfaces shall be thoroughly wetted with a hose half an hour before each coat. It is the Contractor's responsibility to ensure that the base on which is to be plastered is up to standard. Check blockwork prior to plastering to ensure that the shrinkage has occurred in the mortar joints that these joints are raked and repointed. Cooperate with the Blocklayer in this respect.

19.6 CURING :

19.6.1

At least 7 days shall be allowed between each coat; and each coat must be allowed to dry thoroughly and so substantially complete the shrinkage before the final coat is applied.

19.7 PATCHING :

19.7.1

No plastering is to be commenced until all holes, electrical chases, etc., have been cut.

20.1 PRELIMINARY :

20.1.1

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

20.1.2

Protection: All dressed woodwork finished surfaces, glass, etc. shall be effectively protected against dropping or damage.

20.1.3

Application: Wherever possible tiling shall be done after other trades have completed their work to avoid damage to tiles.

20.2 MATERIALS :

All materials shall be the best of their respective kinds and styles, be stored on the site protected from damage.

20.3 WORKMANSHIP :

The whole of this work under this section shall be carried out by experienced tradesmen and shall be guaranteed. Cover and protect the work of other trades from any damage. Inspect all surfaces, before applying all finish. Finished surfaces shall be left free from stain, blemishes and clean on completion. Employ only skilled competent tradesmen appropriately qualified and registered or licensed at the time of carrying out the work.

20.4 EXTENT OF WORK :

This section of work includes the supplying and laying of tiles in accordance with the Schedule of Finishes and Drawings.

All joints to be as per drawings (e.g. mitre). Obtain Architect's confirmation before proceeding with laying .

20.5 POINTING :

Use approved pointing coloured to match the perimeter colour of the tile. Obtain Architect's approval of colour before proceeding with pointing of tiles.

20.6 FLOOR TILING & COVINGS :

20.6.1

To be selected colour glazed quarry tiles to areas shown on Finishes Schedule.

20.6.2

Groutings : Portland Cement and Approved Grout.

20.6.3

Workmanship : Lay tiles in grid pattern or in strict accordance with manufacturer's instructions. Center tile field in both directions in each space so that the minimum width of cut tiles is greater than a half tile. Use accessory tiles - round edge, round edge return, grooved step tread - as appropriate. Layout may be shown on the drawings and approved by the Architect prior installation.

20.7 WALL TILES:

20.7.1

Glazed ceramic tiles to areas indicated on Finishes Schedule and Drawings.

20.7.2

Fixing : Allow plaster to cure at least 7 (seven) days prior to tiling. Fix tiles to walls with CTF adhesive in accordance with instructions of the Manufacturers - Australian Building Adhesives Pty Ltd. Tiles to be laid in grid pattern. Centre tile field in both directions in each space so that minimum width of cut tiles is greater than a half tile. Use best trade practice and provide round edge, round edge return, as appropriate. Layout may be shown on the drawing and approved by the Architect prior installation.

20.8 QUARRY FLOOR TILE BEDDING :

Allow concrete floor to cure after 28 days prior to tiling. Floor to receive tiles shall be cleaned. Bed tiles in "Quarry Fix" in strict accordance with instructions of the manufacturers, Australian Building Adhesives Pty Ltd.

20.9 LAYING :

Ensure that the base surface is thoroughly clean and dry before laying. Carry out tests for dampness by approved means and confer with the manufacturer's representative as to the dryness of the base to suit his products before laying. The builder will be held responsible for any failure of applied flooring due to dampness in the base.

Spread adhesive evenly with correct notched tool in small areas just ahead of laying

20.10 EXPANSION JOINTS :

Allow 10mm joints at junction of all floors to walls. Fill with flexible grout, colour matched to adjacent grouting. Where tiled areas exceed 25 square metres allow to install similar expansion joints where directed on site by the Architect.

20.11 CLEANING :

At least 48 hours after laying is completed, scrub down tiles with soap and water or weak spirits of salts solution to remove excess cement and grout. On completion leave work clean to Architect's approval .

20.12 SEALING OF UNGLAZED TILES :

Allow to apply Aqua Mix Penetrating Sealer to all unglazed quarry, mosaic or ceramic tiles, both interior and exterior. Apply strictly in accordance with manufactures instructions.

21.1 PRELIMINARY:

21.1.1

General : 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.

21.2 MATERIALS:

21.2.1

All materials shall be the best of their respective kinds.

21.3 WORKMANSHIP:

21.3.1

All materials shall be laid in strict accordance with the manufacturers instructions, carried out in a neat and careful manner by experienced tradesmen. Where floor finish changes at a doorway a division strip shall occur under the centre of the closed door.

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

21.4 SCOPE OF WORK:

21.4.1

Refer to the drawings.

21.5 FLOOR FINISH AT JUNCTIONS:

21.5.1

Wherever possible the junction of all changes in types of flooring shall occur under the centre of the door separating the two spaces.

DESIGN HUT

22.1 PRELIMINARY:

22.1.1

General : 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.

22.1.2

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

NZSS 521

NZSS 1056

NZSS 2239

22.2 MATERIALS:

All materials shall be Resene or as specified and approved by Architect. All paint accessories, material and color are subject to approval of the Architect. Allow to set up samples where required, with particular emphasis on timber stains and special paint coatings and applications. Sample areas would be indicated on site by Architect.

22.3 WORKMANSHIP:

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.

Where work is specified to be finished in a particular material and manner it shall mean the provision of all work necessary to ensure a proper finish to minimize exposure to extremes of temperature and be thoroughly mixed before use. Paint shall not be applied to damp surfaces unless specially made for the purpose. External painting shall not be done during unsuitable weather. Where paint or varnish work of two colours meet particular care shall be taken to finish to a clean line. All floor, fittings, etc., shall be covered while painting and every precaution taken to keep dust down.

The Contractor shall provide all scaffolding planks, ladders, etc. necessary for the proper execution of the work. At completion clean off all marks. Clean both sides of glass. Remove all debris and leave clean and tidy.

22.4 EXTENT OF WORK:

This section of the work includes the priming, painting, staining, varnishing, etc., as scheduled on the drawings and specified herein. Include for painting, varnishing all surfaces usually painted or varnished whether specially mentioned or not. The Contractor is also called for in this section to allow to do samples of all colours and stains used on the Contract.

22.5 PREPARATION OF NEW UNPAINTED SURFACES:

22.5.1

The Painter shall inspect all surfaces to be finished and report any defects to the General Contractor. Work shall not proceed until unsatisfactory surfaces have been made good. Surfaces to be finished shall be clean and smooth except where otherwise advised by the Architects. Rub down before painting and between coats. The Architect is required to check all surfaces prior to the application of finishing coats. Any work damaged by dirt, dust, water or other causes shall be made good by rubbing down and recoating. Any joinery timbers with machining marks on the surface shall have the marks removed by sanding and scraping. Finishes will not be accepted if these marks remain visible.

Preparation of various surfaces shall be performed in accordance with the following :

22.5.2 Timber:

Sandpaper smooth, remove all traces of wax, grease, dirt and grime. Surface must be thoroughly dry. Apply priming coat then fill all nail holes, cracks, etc., with linseed oil putty. Sandpaper smooth, dust off, then apply specified coatings.

22.5.3 Hard Wallboards:

Clean surface thoroughly by removing grease, dirt, dust, etc. Surface must be thoroughly dry. Apply Sealer specified, then fill nail holes, etc. with a quality filler or patching command. Allow to dry, sandpaper smooth, dust off, then apply specified coatings.

22.5.4 Galvanized Iron:

Remove all traces of grease, surface oil, by wiping down with rags and mineral turps. Remove any white crystalline deposits by thoroughly wire brushing. Wash down with clean water, allow to dry and apply specified coatings.

22.5.5 Ferrous Metals:

Surfaces should be free of dust, grease and dirt. All rust, millrace, etc., should be removed by grit or sandblasting, scraper or wire brushing. Dust off, then apply specified coatings without delay. For best results, surface rust should be chemically converted with Rust Dissolver before applying primer.

22.5.6 Aluminum, Lead and Alloys:

Surfaces must be free of dust and dirt. Remove grease, surface oil, etc., by wiping down with rag and mineral turps. Metal oxides must be removed by sanding. Dust off, allow to dry, then apply specified coatings.

22.6 PAINTING OF NEW UNPAINTED SURFACES :

22.6.1

General: If more than four weeks elapse before the next coat of Primer to external work is applied, the work shall be reprimed. All joinery shall be primed or otherwise sealed by the Painter at the time of manufacture and again after installation. After priming or sealing, all nail holes, cracks, shrinkage and other cavities shall be filled in and stopped where necessary with colour stopping to match the finished colour. Particular care shall be taken in matching stopping to surfaces being varnished. Any that do not match shall be removed and repainted.

22.7 CLEANING :

On completion remove all paint tins, rubbish, etc. Clean off all paint and brush marks on all surfaces including door and window frames, glass mirrors, tiles, etc. Refer to the Preliminary & General clause 1.44 Completion.

22.8 PROTECTION :

All stainless steel, tiles, etc, are to be fully covered during painting operations, and in no circumstances should any paint come in contact with these materials. Where stainless steel fittings arrive on site with a protective skin coating shall not have this protection removed until the end of the project.

22.9 SCHEDULES :

All painting to comply with Resene paint specification or approved specified alternative. All preparation of undercoat and finishing coats shall be as per specification. Acrylic paint to be used. Colour scheme to be provided by Design Hut (Architects) .

SCHEDULE A

22.9.1 INTERNAL SURFACES : ACRYLIC PAINT

SURFACE	GLOSS	SATIN	SHEEN	MATT
Gib Board Ceilings	N/A	1. Prep Sealer 2. Broadwall Sealer 3. & 4. Lumbersider	1. Prep Sealer 2. Broadwall Sealer 3. & 4. Zylone Sheen	1. Prep Sealer 2. Broadwall Sealer 3. & 4. Ceiling Paint
Gib Board Walls	N/A	1. Prep Sealer 2. Broadwall Sealer 3. & 4. Lumbersider	1. Prep Sealer 2. Broadwall Sealer 3. & 4. Zylone Sheen	1. Prep Sealer 2. Broadwall Sealer 3. & 4. Ceiling Paint
Concrete, Brick, Concrete Block, Fibre Cement	1. Quick Dry Primer 2. & 3. Hi-Glo	1. Quick Dry Primer 2. & 3. Lumbersider	1. Quick Dry Primer 2. & 3. Zylone Sheen	1. Quick Dry Primer 2. & 3. Zylone 20
Hardboard	1. Sureseal 2. & 3. Hi-Glo	1. Sureseal 2. & 3. Lumbersider	1. Sureseal 2. & 3. Zylone Sheen	1. Sureseal 2. & 3. Zylone 20
Paint Finish on Fibre Board, Particle Board	1. Quick Dry Primer 2. & 3. Hi-Glo	1. Quick Dry Primer 2. & 3. Lumbersider	1. Quick Dry Primer 2. & 3. Zylone Sheen	1. Quick Dry Primer 2. & 3. Zylone 20
Timber Joinery	Water based systems not recommended for working surfaces			
Stained Timber (Coats 1-4) Polyurethaned Timber (Coats 2-4)	Not recommended			
Wallpaper, Lining Paper, Anaglypta	1. & 2. & 3. Hi-Glo	1. & 2. & 3. Lumbersider	1. & 2. & 3. Zylone Sheen	1. & 2. & 3. Zylone 20
Varnished Surfaces	1. Sureseal 2. & 3. Hi-Glo	1. Sureseal 2. & 3. Lumbersider	1. Sureseal 2. & 3. Zylone Sheen	1. Sureseal 2. & 3. Zylone 20
Clear Finish New Particle Board (Coats 1-4) Timber Floors (Coats 2-4)	Not recommended			

SCHEDULE B

22.9.2 INTERNAL SURFACES : OIL BASED PAINT

SURFACE	GLOSS	SEMI - GLOSS	MATT
Hardboard	1. Sureseal 2. Enamacryl	1. Sureseal 2. & 3. Lustacryl	1. Sureseal 2. Zylon 20
Paint Finish on Fibre Board, Particle Board	1. Quick Dry Primer 2. Enamacryl	1. Quick Dry Primer 2. & 3. Lustacryl	1. Quick Dry 2. & 3. Zylon 20
Timber Joinery	1. Timberlock 2. & 3. Enamel Undercoat 4. Super Gloss	1. Timberlock 2. Enamel Undercoat 3. & 4. Lusta Glo	1. Timberlock 2. Enamel Undercoat 3. & 4. Flatcote
Stained Timber (Coats 1-4) Polyurethaned Timber (Coats 2-4)	1. Colorwood 2. Polyflat 3. & 4. Polygloss	1. Colorwood 2. & 3. & 4. Polysatin	1. Colorwood 2. & 3. & 4. Polysatin
Varnished Surfaces	1. Sureseal 2. & 3. Super Gloss	1. Sureseal 2. & 3. Lusta Glo	1. Sureseal 2. & 3. Flatcote
Clear Finish New Particle Board (Coats 1-4) Timber Floors (Coats 2-4)	1, 2. & 3. Polythane best recommendation	1, 2. & 3. Polysatin	1, 2. & 3. Polyflat
Concrete Floors	N/A	1. & 2. Sidewalk	

SCHEDULE C

22.9.3

EXTERNAL SURFACES: ACRYLIC PAINT

SURFACE	GLOSS	SEMI – GLOSS	SATIN
Concrete, Cement Render, Concrete Block, Brick, Fibre Cement, Stucco, Rough Cast, Hardi Flex, Hardi Plank, Insulclad, Lime Plaster	1. Sureseal if powdery 2. Hi- Glo 3. Hi-Glo	1. Sureseal if powdery 2. Sonyx 101 3. Sonyx 101	1. Sureseal if powdery 2. Lumbersider 3. Lumbersider
Weatherboard, Plywood, Hardboard	1. Quick Dry or Wood Primer 2. Hi-Glo 3. Hi-Glo	1. Quick Dry or Wood Primer 2. Sonyx 101 3. Sonyx 101	1. Quick Dry or Wood Primer 2. Lumbersider 3. Lumbersider
Timber Joinery	1. Timberlock 2. Quick Dry or Wood Primer 3. & 4. Hi-Glo	1. Timberlock 2. Quick Dry or Wood Primer 3. & 4. Sonyx 101 not recommended for working surfaces	1. Timberlock 2. Quick Dry or Wood Primer 3. & 4. Lumbersider
Timber Decks, Pergolas, Fences	N/A	N/A	1. Timberlock 2. & 3. Lumbersider
Galvanised Steel	1. Glavo One 2. & 3. Hi-Glo	1. Galvo One 2. & 3. Sonyx 101	1. Galvo One 2. & 3. Lumbersider
Iron & Steel	1. Rust Arrest 2. Quick Dry Primer 3. & 4. Hi-Glo	1. Rust Arrest 2. Quick Dry Primer 3. & 4. Sonyx 101	1. Rust Arrest 2. Quick Dry Primer 3. & 4. Lumbersider
Non Ferrous Metal	1. Vinyl Etch 2. & 3. Hi-Glo	1. Vinyl Etch 2. & 3. Sonyx 101	1. Vinyl Etch 2. & 3. Lumbersider
Bitumen Surfaces	1. Membrane Roofing Primer 2. & 3. Hi-Glo	1. Membrane Roofing Primer 2. & 3. Sonyx 101	1. Membrane Roofing Primer 2. & 3. Lumbersider

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22.9.4

EXTERNAL SURFACES: OIL BASED PAINT

SURFACE	GLOSS	STAIN SEMI-GLOSS	STAIN FLAT
Weatherboard, Plywood, Hardboard	1. Quick Dry or Wood Primer 2. Enamel Undercoat/ Quick Dry 3. Super Gloss / Enamacryl	1. Timberlock 2. & 3. Timberstain not for hardboard	1. Woodsman 2. Woodsman
Timber Joinery	1. Timberlock 2. Quick Dry or Wood Primer 3. Enamel Undercoat/ Quick Dry 4. Super Gloss/ Enamacryl	N/A	N/A
Timber Decks, Pergolas, Fences	N/A	1. Timberlock 2. & 3. Timberstain	1. Woodsman 2. Woodsman
Galvanised Steel	1. Galvo One 2. Enamel Undercoat/ Quick Dry 3. Super Gloss/ Enamacryl	N/A	N/A
Iron & Steel	1. Rust Arrest 2. Enamel Undercoat/ Quick Dry 3. Super Gloss/ Enamacryl	N/A	N/A
Non Ferrous Metal	1. Vinyl Etch 2. Enamel Undercoat/ Quick Dry 3. Super Gloss/ Enamacryl	N/A	N/A
Bitumen Surfaces	N/A	N/A	N/A

23.1 PRELIMINARY :

23.1.1

General : 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.

23.2 MATERIALS :

23.2.1

Materials shall be delivered on site as manufactured in original sealed containers labelled with mixing instructions. Store materials in a dry area off the ground, and away from damp surfaces.

23.3 WORKMANSHIP :

23.3.1

The material shall be mixed in mechanical mixing equipment and applied in accordance with the manufacturer's recommendations by competent workmen with experience in this work.

Allow to mask out all surfaces where they abut material.

23.4 EXTENT OF WORK :

23.4.1

Refer Drawings.

23.5 PREPARATION OF SURFACES :

23.5.1

The surfaces to be covered shall be dry and free from all loose dust, dirt, grease, or other foreign matter. Stains from rust shall be sealed by brushing with a Portland Cement slurry to which has been added Vinstick or other approved adhesive additive in accordance with the manufacturer's instructions.

23.6 GUARANTEES :

23.6.1

The whole of the work in this section shall be guaranteed unconditionally on materials and workmanship. The guarantees being from the date of completion of the main contract. Refer to Section 2 for Guarantee Periods, etc.

23.7 COMPLETION :

23.7.1

Leave the work of this trade in perfect condition, without marks, or blemishes, etc. Clean up site, removing all empty drums and containers. Refer to Clause 1.43 of the Preliminary & General Section of this specification.

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24.1 PRELIMINARY :

24.1.1

General : 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.

24.1.2

Standards : The following standards shall form part of this specification : NZSS SR2 , AS 1170 Part 2: 1987 , AS 2047/2048 & AS 1288 Part 1: 1979 "Glass Installation Code"

24.2 MATERIAL :

24.2.1

All glass used shall be of good quality manufacture free from all blemishes and sizes suitable for each location. Refer to the Window and Door Schedule for the sizes of respective glazing. Refer Schedule of Safe Glazing Sizes for thickness.

24.2.2

Mirrors : 6 mm selected glazing quality polished plate. Supply and fix mirrors to dimensions and where shown on drawings. Fix mirrors as detailed or directed. Arise all edges back with 4.9mm (3/16") plywood. Fit rubber washers between the backing and the wall.

24.3 WORKMANSHIP:

All work in this section shall be carried out by competent tradesmen in a skillful workmanship like manner. Glaze all windows and doors with good quality glass of approved manufacture and of the types and weights indicated on the drawings or herein specified. Check all timber frames, sashes and reprime any not highly primed. Check glass sizes on the job. Allow for expansion as required. Back putty shall be best quality linseed oil putty coloured to match stain when in stained frames. Where indicated fix glazing shall be secured by timber glazing beads. Ensure that all glazing is fully back puttied and that putty also extends between the glass and the frames and glass and the glazing beads.

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

24.4 BREAKAGES :

The Glazier shall make good any reasonable amount of breakage from workmanship, accidents, etc. Any large breakage shall be adjusted with the trade responsible.

24.5 OBSCURE GLASS:

Unless otherwise specified, windows and doors, to all bathrooms, showers and WC's must be glazed using an approved obscure glass.

24.6 STRENGTH CERTIFICATION :

The Metal Window & Door supplier and the Glazier will be required to certify that the metal door & window framing & glazing system is capable of withstanding the permissible windspeed of 57 m/sec & loadings in accordance with the above standards. The height of the building should also be considered.

24.6.1

Impact Resistance : If no cyclone shutters are shown in the drawings, certification is also required that the metal door & window framing & glazing system be certified for impact resistance in accordance with the above standards.

24.7 TERRAIN CATEGORY :

The terrain category of this buildings is as defined in AS 1107.

24.8 MAXIMUM GLASS AREAS FOR VARIOUS GLASS THICKNESS :

Based on the following criteria:

Wind Terrain Category:	1 & 2
Max wind speed:	57 m/ sec at ground level
Max building height:	10 m
Max loading q_z (unfactored):	1.95kPa
Sum of internal and external pressure coefficients:	1.1

Source of data AS 1288 Part 1: 1979 "Glass Installation Code"

Minimum Thickness	Maximum Area (m ²)	Maximum Aspect Ratio
3.0mm	0.65	7.3
4.0mm	1.15	6.8
5.0mm	1.72	6.5
6.0mm	2.42	6.3
8.0mm	3.62	5.9
10.0mm	4.80	4.9
12.0mm	6.20	4.3
15.0mm	8.40	3.8
19.0mm	11.50	3.3
25.0mm	16.80	2.9

Notes:

- 1 Aspect ratio is the ratio of larger dimension of glass to smaller
- 2 If aspect ratio exceeds the allowable, refer to the Structural Engineer
- 3 Glass supported on all 4 edges
- 4 For laminated glass, multiply allowable area by 0.6

24.9 CLEANING :

The Contractor shall allow to properly clean down all glazing at the completion of his work.

SECTION 25 : SITEWORKS

25.1 PRELIMINARY :

25.1.1

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

25.1.2

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

NZS 3116 : Interlocking Concrete Block Paving

Part I

Part II

Part III

The work shall be carried out in a competent manner by approved workmen who have demonstrated their ability to do first class work.

25.2 SCOPE OF WORK :

25.2.1

The work in this section includes all excavations, carting away of surplus excavated material required for the proper execution of the work as shown or specified. It includes backfilling to grades as shown around new construction below new grades and elsewhere as required on the drawings. It includes the construction of a proper formation level and upper basecourse under asphalt areas, and also includes the supply of 600 x 600 exposed aggregate paving slabs laid where shown on the drawings and kerbs and concrete channel drains.

25.3 TOPSOIL :

25.3.1

From stockpile provided by Excavator, distribute topsoil as directed by the Architect, in a layer of 100mm minimum thickness.

25.4 PATHS :

25.4.1

Excavate for and lay 600 x 600 x 75 thick precast concrete paving slabs with exposed aggregate finish. Allow for slabs to be set level with Finished ground levels (including topsoil). Thoroughly compact ground and add hardfill where required. Spread 50 thick layer well tamped sand, cover with a proven polythene membrane and set slabs in a further 50 thick layer of sand.

25.5 PAVING BLOCKS:

25.5.1

Concrete paving blocks should comply with New Zealand Standard NZS 3116 : 1991 "Interlocking Concrete Block Paving" (18).

Situation	Minimum 28-day Abrasion Index
Public roadworks and industrial hard-standings	1.5
Car parks with vehicular traffic up to 3.5 tonne	1.2
Malls and areas with intense pedestrian traffic	2.0

Blocks of 60 mm thickness have been established to be suitable for light levels of traffic but 80 mm thick block should be used in pavements designed to carry 3 x 10(4) EDA or more. For pavements

25.6 JOINT FILLING SAND:

25.6.1

General Quality

The small gaps or joints between paving units are filled with a joint-filling sand. The joints are typically 2-4 mm wide and require a relatively fine sand, having a different grading to that required for bedding sand.

The joint-filling sand should be non-plastic and well graded with at least 90% passing the 1.18 mm sieve. Rounded sand particles are preferred.

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