Matavuvale Builders

TUVALU FISHERIES DEPARTMENT

TUVALU MARICULTURE FACILITY PROJECT

- BILL OF QUANTITIES (BoQ)
- MATERIAL LISTING
- CONTRACT SPECIFICATION
- CONSTRUCTION DRAWINGS
- WORKS PROGRAM (GHANTT CHART)

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BoQ for the TUVALU GOVERNMENT DEPARTMENT OF FISHERIES

PROJECT : New Tuvalu Mariculture Facility Building

DATE : 23/08/2022

ITEM	DESCRIPTION	Unit	Quantity	Rate	Total
1.0	PRELIMINARY				
1.1	Mobilisation	LS	1.00		
1.2	Temporary Works	LS	1.00		
1.3	Project Management and Administration (inclusive of Site Management Reports, Progress Reports & reports required by relevant approving)	LS	1.00		
1.4	Allow for liaison with all authorities for services connections and approvals. Provision of Completion Certificates from the Tuvalu Approving Council, Water Authority of Tuvalu, Tuvalu Fire Authority, Tuvalu Roads Authority, etc.	LS	1.00		
1.5	Materials Testing (fill materials, compacted areas & all road/access pavement material)	LS	1.00		
1.6	Allow for provision of Site Office.	LS	1.00		
1.7	Fabricate and erect temporary project sign board (location to confirmed on site by the Engineer).	LS	1.00		
1.8	Clear all existing structure(s), tree(s), vegetation and debris which are within building sites.	LS	1.00		
1.9	As-Built Drawings and Topographical Survey of Contract Works. Contractor to provide As-Built Survey.	LS	1.00		
1.10	Demobilisation	LS	1.00		
				Sub-Total No. 1	

2.0	Mariculture Building	Unit	Quantity	Rate	Total
2.1	Allow for construction of 25MPa reinforced concrete foundation (FW1, FW2, FW3 & FW4) and Pad Foundation (P1).	LS	1.00		
2.2	Allow for construction of 100mm thick reinforced concrete ground floor slab (20MPa) inclusive of DPC on sand blinding with compacted hardcore fill.	LS	1.00		
2.4	Allow for construction of 150mm thick reinforced concrete external & internal blockwall. Blockwall to be plastered & 2 coat marine grade paint finished.	LS	1.00		
2.5	Allow for construction and installation of all doors & windows with all ancillary components.	LS	1.00		
2.6	Allow for construction and installation of all structural/architectural timber members (beams, rafters, columns, purlins, eaves, fascia/barge board) inclusive of all ancillary components. Allow for supply and application of new paint to eaves and fascia/barge board.	LS	1.00		
2.7	Allow for construction and installation of colourbond ultra trimdek 0.48BMT roofing cladding with bracing and inclusive of ridge cap, flashing and other ancillary components. Allow for supply and installation of guttering & downpipes & other ancillary components.	LS	1.00		
2.8	Allow for construction & installation of all structural steel work (braces, cleats, connection plates, etc) inclusive of all ancillary components.	LS	1.00		
2.9	Allow for the supply and installation of Shade Cloth on all designated areas as shown on Plans with appropriate fixing to Timber columns and Beams.	LS	1.00		
2.10	Allow for supply and application of new paint to all concrete walls, fascia/barge board, railings, exposed structural steel members, etc.	LS	1.00		

ITEM	DESCRIPTION	Unit	Quantity	Rate	Total
2.11	Supply and install Concrete Tank Base. Allow for supply and installtion for 6,000 liters fresh water/sea water tanks with all ancillary components, fixtures and connections.	No.	2.00		
2.12	Allow for the Construction of Floor Drains and proper grating placed on the proposed drain. Ensure all floor fall to fall to the proposed drains and discharged to approved outlet.	LS	2.00		
2.13	Allow for connection to Tuvalu's existing electricity power supply. Allow for construction of underground or overhaed power supply (Engineer to confirm on site). A certified electrician shall carry out the design and installation of the electrical works in compliance with the Tuvalu Electricty approving authorities regulations. All wirings shall be underground to building edge.	LS	1.00		
2.14	Allow for supply and installation of main switch board outside inclusive of circuit breakers and switches enclosed in a waterproof meter box. Allow for supply and installation of distribution board, lighting fixtures, fans with all ancillary components.	LS	1.00		
2.15	Allow for all electrical works (lights, wirings, GPO's, switches, etc). All wirings shall be concealed in walls / ceiling.	LS	1.00		
				Sub-Total No.2	$0.00

3.0	CIVIL WORKS/OTHER ITEMS	Unit	Quantity	Rate	Total
3.1	Clear all vegetation, trees (if any) & any debris which is within the location of the development areas.	LS	1.00		
3.2	Bulk Earthworks – Cut and fill on site to the required level to form platform for the Hatchry Building and associated structures.	LS	1.00		
				Sub-Total No.3	

4.0	ANY OTHER WORKS	Unit	Quantity	Rate	Total
4.1		LS	1.00		
4.2		LS	1.00		
4.3		LS	1.00		
				Sub-Total No.4	

Sub-Total (AUD$ VEP)	
Plus VAT (9%)	
Final Price (AUD$ VIP)	

New Tuvalu Mariculture Facilitiy Project

Material Listing_Rev A

No.	Item Description	Unit	Quantity
1.0	**Foundation**		
	Footing		
1	Concrete	Cubic	2.16
2	Cement 40Kg Bag	Bag	11
3	Sand	Cubic	1
4	Aggregate	Cubic	1
5	D12mm Reinforcement Bar	Lth	20
6	R10mm Reinforcement Bar	Lth	80
7	Black Binding Wire 25kg Coil	Coil	1
8	Form Seal Board	Sheet	20
9	50x50 Boxing Timber	L/M	100
10	100mm Galv. Nails	Kg	5
11	50mm Galv. Nails	Kg	5
12	25mm Galv. Nails	Kg	5
	Foundation Wall		
1	Concrete	Cubic	6.32
2	Cement 40Kg Bag	Bag	33
3	Sand	Cubic	4
4	Aggregate	Cubic	2
5	HD12mm Reinforcement Bar	Lth	10
6	150mm Concrete Block	Each	432
2.0	**Floor**		
1	6000x1200 665 Mesh	Sheet	15
2	Concrete	Cubic	20
3	Cement 40Kg Bag	Bag	103
4	Sand	Cubic	11
5	Aggregate	Cubic	6
6	D12mm Reinforcement Bar	Lth	16
7	Black Binding Wire 25kg Coil	Coil	1
8	Form Seal Board	Sheet	20
9	50x50 Boxing Timber	L/M	100
10	100mm Galv. Nails	Kg	5
11	50mm Galv. Nails	Kg	5
12	25mm Galv. Nails	Kg	5
13	Black Binding Wire 25kg Coil	Coil	2
14	DPC	Roll	7
3.0	**Walls**		
1	Concrete	Cubic	23
2	Cement 40Kg Bag	Bag	119
3	Sand	Cubic	13
4	Aggregate	Cubic	7
5	HD16mm Reinforcement Bar	Lth	72
6	HD12mm Reinforcement Bar	Lth	68
7	150mm Concrete Block	Each	2880

8	Concrete Mortar	Cubic	3
9	Cement 40Kg Bag	Bag	15
10	Sand	Cubic	3
11	Under Coat Paint 20L Bucket	Bucket	8
12	Finishing Coat 20L Bucket	Bucket	8
4.0	**Beams**		
1	Concrete	Cubic	7
2	Cement 40Kg Bag	Bag	36
3	Sand	Cubic	4
4	Aggregate	Cubic	2
5	D12mm Reinforcement Bar	Lth	80
6	R10mm Reinforcement Bar	Lth	40
7	200x75mm H3 Timber Bearer(H3 Timber Timber Beams)	L/M	182
5.0	**Columns**		
1	Dia200x6m Treated Pine Post (Columns)	Lth	12
2	Shade Cloth 50x3.6m Rolls	Roll	2
6.0	**Roofing**		
1	150x50mm H3 Timber Bearer(H3 Timber Rafter)	L/M	202
2	75x50mm H3 Timber Bearer(H3 Timber Purlin)	L/M	250
3	Strapping punched galvanized 25 x 1.0mm x 27 mtr / roll	Roll	15
4	Roofing Permalite Waveline®(Aluminium) 0.42mm x 11.4m Long	Sheet	15
5	Storm-Tite™ Class 4 T17 14-10x75mm Cyclonic Assembly screws	No.	972
6	Insulation Foil	Roll	8
7	Permalite (Aluminium) Flashing	L/M	32
8	Permalite (Aluminium) Box Gutter	L/M	10
9	10mm Riverts	Kg	10
10	Silicone	Tube	5
11	100mm PVC Down Pipe	Lth	5
12	100mm PVC Elbows	No.	5
13	100mm PVC Pipe Clips	No.	24
14	PVC Glue	Tin	3
7.0	**Fixing/Fasterning**		
1	75x8mm FB (Holding Down Plate)	Lth	5
2	100x8mm EA 6m/Lth	Lth	2
3	75x8mm FB 6m/Lth	Lth	16
4	4" Grinding Disc	Each	20
5	4" Cutting Disc	Each	20
6	12"Drop Down Blade	Each	5
7	M12 8.8S Threaded Rod 4m/Lth (TRB)	Lth	24
8	M12 Nuts	Each	100
9	M12 Galv.Wahers	Each	200
8.0	**Timber Façade**		
1	100x50mm H3 Timber Bearer(H3 Timber Frame)	L/M	90
2	140x20mm Weather Board (Exteror Cladding)	L/M	360
3	100mm Galv. Nails	Kg	5

4	50mm Galv. Nails	Kg	5
5	25mm Galv. Nails	Kg	5
9.0	**Doors & Windows**		
1	150x50mm H3 Timber Bearer(H3 Window Seals)	L/M	30
2	150x50mm H3 Timber Bearer(H3 Door Seals)	L/M	6
3	3 Blade Louver Frames + Louver Blade	Pair	13
4	900mmx2100mmx 45mm Thick Hollow Core Door and Painted	No.	1
5	Door Enterance Lock Set (Exterior Doors)	No.	1
6	SSS Hinges	No.	3
7	Door Stopper	No.	1
10.00	**Painting Works**		
1	Primer Coat Paint 20L Bucket (Interior Walls)	Bucket	4
2	Under Coat Paint 20L Bucket (Interior Walls)	Bucket	4
3	Finishing Coat 20L Bucket (Interior Walls)	Bucket	4
4	Primer Coat Paint 20L Bucket (Exterior Walls)	Bucket	2
5	Under Coat Paint 20L Bucket (Exterior Walls)	Bucket	2
6	Finishing Coat 20L Bucket (Exterior Walls)	Bucket	4
7	Rust Guard 4L/Tin	Tin	4
8	Consumables		
9	100mm Paint Brush	No.	10
10	50mm Paint Brush	No.	10
11	25mm Paint Brush	No.	10
12	Roller Set(Tray+Roller Handle)	Set	10
13	Roller Refill	Each	20
14	Thinner	Gal	10
15	100mm Roller Handle	No.	4
16	100mm Roller Refill (10/Pac)	Pac	5
11.00	**Electrical**		
1	2.5mm 3Core Cables 100m Coil	Coils	5
2	1.5mm 3Core Cables 100m Coil	Coils	5
3	Single Light Switch	No.	15
4	Double GPO Power Point	No.	10
5	Single GPO Power Point	No.	10
6	12mm Cable Conduit Orange	Lth	50
7	12mm 90deg Bend Orange	No.	50
8	3way Junction Box	No.	20
9	4way Junction Box	No.	20
10	PVC Glue	Tin	3

SPECIFICATION

TUVALU GOVERNMENT
Department of Fisheries

New Tuvalu Mariculture Facility Project

Matavuvale Builders

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Matavuvale Builders

SECTION 01: PRELIMINARIES

1.1 GENERAL CONDITIONS:

1.1.1 The Contractor shall comply with the Fiji Standard Form of Building Contract, without Quantities (Private Edition) 1978. The Contract forms part of this specification and may be viewed at the office of the Architect.

1.2 TENDERER TO INFORM HIMSELF FULLY:

1.2.1 The tenderer shall inspect and examine the site, its surroundings, and shall satisfy himself before submitting his tender, as to the nature of the ground and subsoil, the form and nature of the site, the quantities and nature of the of the Works. This shall include, but is not limited to, works and materials necessary for the completion means of access to the site, the accommodation he may require, the availability, conditions and rates of pay of labour. He shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his tender.

1.2.2 In particular the tenderer shall make all allowances he deems necessary to ensure the Works are completed within the Contract time, including all over time, double time, weekend work and other incidental allowances as required.

1.2.3 If the tenderer has any doubt as to the meaning of any portion of the Works, he shall, when submitting his tender include a statement of the interpretation upon which he relies and upon which his tender has been prepared and submitted.

1.2.4 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.

1.3 DRAWINGS & SPECIFICATIONS:

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

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

1.4 OWNERSHIP OF DRAWINGS:

1.4.1 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.

1.5 INFERRED WORK

1.5.1 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.

1.6 AMBIGUITY:

1.6.1 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.

1.7 BY-LAWS & PERMITS:

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

1.8 PROJECT MANAGEMENT:

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

1.9.2 Foreman: A competent foreman shall also be appointed and shall be in charge of the work for the duration of the Contract. Instructions given to him shall be deemed to have been given to the Contractor. The Foreman must be able to speak English and be able to understand fully the drawings and instructions he has to administer.

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

1.9.4 Subcontractor's Foreman: Each trade shall be under the constant and special direction of a trade foreman fully licensed, authorised and approved by all relevant authorities and the Architect, for that particular trade for which he is responsible.

1.9.5 Each trade foreman shall be constantly on the Works during the progress of

same, while work on that trade is being carried out.

1.10 PROGRESS BAR CHART:

1.10.1 The Contractor shall, within 10 days of acceptance of his tender, submit a copy of his fully detailed construction programme and order of work for approval. The work of all trades including ordering of materials, plant, and equipment shall be clearly shown.

1.10.2 The critical path shall be highlighted in colour to indicate the critical events of the project commencing from the date of acceptance of tender and finishing at the expiration of the time for Practical Completion inserted in the Appendix. Delay in activities that are not critical to the construction program shall not justify an extension of the time for Practical Completion of the Works.

1.10.3 One copy of the approved programme shall be kept on site at all times and shall indicate thereon the actual progress throughout the construction period. The programme information is to be updated and presented at each site meeting

1.11 SITE MEETINGS:

1.11.1 A regular programme of site meetings shall be established by the Contractor at which the Architect, Client, all subcontractors and all consultants will attend as necessary. The Architect will take and distribute minutes of the meetings. At the first site meeting the names and telephone numbers of all responsible persons who may be contacted after hours are to be submitted to the Architect.

1.12 INSPECTION OF WORK:

1.12.1 Architect or the authorised representative of Employer shall at all times during its progress have full access to all phases of the work. Contractor shall provide adequate means to facilitate inspection by Architect.

1.13 TEMPORARY FACILITIES:

Buildings: The Contractor will provide all temporary buildings required for his own use, and that of subcontractors and specialist contractors, Where required by the Local Authority, hoardings, crossing protection, walkways, handrails, night lighting are also to be provided.

1.13.1 Services: The Client will provide and maintain all toilet, water and electrical supply. The contractor is to ensure that the facilities are kept in a clean and sanitary condition at all times. The facilities are to be thoroughly cleaned to the satisfaction of the architect at the time of Practical Completion. Failure to do so will delay the issue of the Practical Completion certificate.

1.13.2 The contractor will make these services available to all subcontractors and separate contractors. The contractor's representative on site is to be issued with a mobile phone

1.14 SITE SAFETY PROCEDURES

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

1.14.1 All accidents and equipment damage shall be reported firstly and immediately to the Contractor's Site representative in charge, as well as to the Employer's representative.

1.14.2 All persons requiring first-aid treatment are to contact the Contractor's representative who will arrange for treatment and enter in the Site Accident and Injury Report the person's name, nature of accident and other details. The injured employee's must conform to all Authorities Regulations including medical and Government recording & Insurance provisions.

1.14.3 Footwear appropriate to the Site and nature of the work shall be worn. Thongs or sandals are prohibited at all times.

1.14.4 Safety helmets shall be worn at all times by all workers and visitor's to the areas where work is taking place.

1.14.5 Work areas must be kept clean and tidy with rubbish and other safety hazards cleaned up promptly. Fire Hazards such as garbage, oily rags, and flammable materials must be eliminated by prompt removal or other corrective action. All protruding nails shall be removed from timber or bent over.

1.14.6 All openings in floors are to be adequately guarded in accordance with the applicable. Safety Regulations and any additional requirements as may be instructed by the Architect. Responsibility for compliance with all safety requirements remains with the Contractor at all times.

1.14.7 All working platforms, suspended or other, shall conform to the relevant Regulations.

1.14.8 All scaffolding to be the standards laid down by relevant Authorities and approved in writing where required.

1.14.9 Any ladders must be to regulation standard and tied off at all times.

1.14.10 Safety belts shall be worn and properly secured at heights where no other form of protection is available.

1.14.11 No machinery, hand tools, or any type of equipment is to be operated without proper and effective guards.

1.14.12 The Contractor will be required to modify, guard or remove any plant or equipment that does not meet the Safety Requirements, and/ or local regulations.

1.15 SAMPLES & TESTS:

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

1.16 ATTENDANCE AND MAKING GOOD:

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

1.17 HOISTING & SCAFFOLDING:

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

1.18 SUBCONTRACTORS:

1.18.1 The Employer reserves the right to reject subcontractors proposed by the Main Contractor that he regards as unsuitable.

1.18.2 The Contractor shall provide a list of proposed sub-contractors within seven days of request from the Architects.

1.19 NOMINATED SUBCONTRACTORS:

1.19.1 The following nominated subcontractors will be used on this project:

- KITCHEN CABINETS – To be advised

1.20 NOMINATED SUBCONTRACTORS FACILITIES:

1.20.1 The Contractor shall provide, without cost to Nominated Sub Contractors all normal facilities for the proper and complete performance of the Nominated Sub Contract, including but not restricted to the following:

- Access to site
- Scaffolding and hoisting facilities (including operators) as provided for, and during the period of, the Contractor's own use, but not including labour for loading and unloading.
- Material storage areas
- Tool storage areas
- Statutory requirements for drinking water, change facilities, messing and toilet facilities
- First aid and safety measures
- Adequate lighting and facilities for making temporary connections to power supply.

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

1.20.3 Extension leads and stepladders are to be provided by the Nominated Sub Contractor.

1.21 SEPARATE CONTRACTS:

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

1.21.2 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.

1.21.3 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.

1.21.4 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.

1.21.5 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.

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

1.22 PROTECTION & STORAGE:

1.22.1 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.

1.22.2 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.

1.23 SETTING OUT:

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

1.23.2 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.

1.24 CLEANING & REMOVAL OF RUBBISH:

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

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

1.25 PROTECTION OF PROPERTY:

1.25.1 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.

1.26 DEFECTS LIABILITY PERIOD:

1.26.1 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.

1.27 MATERIALS WORKMANSHIP & PLANT:

1.27.1 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.

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

1.27.3 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.

1.28 DEFECTIVE MATERIAL AND/OR WORKMANSHIP:

1.28.1 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.

1.28.2 If the material used or work done is not in accordance with this specification, the Architect shall have the power to deduct such sum or sums of money as they shall consider a proper equivalent from the amount due to the Contractor, where the Architect does not feel it expedient to have the work or materials corrected.

1.29 MATERIAL ON SITE:

1.29.1 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.

1.30 ORDERING OF MATERIALS:

1.30.1 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.

1.31 GUARANTEES:

1.31.1 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.

1.32 PROGRESS PAYMENTS & RETENTIONS:

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

1.33 CONTINGENCY SUM:

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

1.34 INSURANCES:

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

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

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

1.35 PROVISIONAL & PRIME COST SUMS:

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

1.36 TENDER DEPOSIT:

1.36.1 Refer to the Tender Form for tender deposit amount.

1.37 DOCUMENT DEPOSIT:

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

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

1.38 STATUTORY PERMITS:

1.38.1 Application has been made for a Building Permit.

1.38.2 The Contractor shall apply for all other permits immediately upon acceptance of his tender and the Contractor shall be granted access to the site one day after acceptance of his tender.

1.39 EXTENSIONS OF TIME:

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

1.39.2 Further to the Conditions of Contract, the Contractor, if he believes that he is entitled to claim an extension of time, shall raise such claim progressively at each site meeting to cover the proceeding period of time since the last site meeting.

1.40 WET WEATHER:

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

1.41 SIGNBOARD:

1.41.1 Allow to provide, erect where directed and maintain in good condition, a signboard as detailed. The signboard will remain the property of the Contractor and is to be removed at the end of Practical Completion.

1.41.2 No other advertising will be permitted on the site. No notices or signboards including those of Nominated Sub-Contractors, will be permitted to be displayed on site unless specifically approved by the Architect

1.42 TRADE RELATIONS:

1.42.1 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.

1.42.2 All nominated subcontractors shall attend upon the job and inspect the work of any other trade against which his materials are to be placed and report immediately to the Contractor any defect that would prevent the satisfactory execution, finish or permanency of his work. He shall not proceed until unsatisfactory preparatory work is made satisfactory. In the event of any dispute regarding the condition of preparatory work the Architect shall decide whether or not such work is up to standard that would be reasonably expected at the time of tendering and from the proper perusal of this document.

1.43 CONSULTANTS:

1.43.1 Structural or other Consultants employed by the Employer will be required from time to time to make site inspections and deal with respective subcontractors through the Contractor. These Consultants are to have the right to deal directly with the Contractor and nominated Subcontractor within the terms of the Contract and have similar status to that of the Architect.

1.44 STANDARDS:

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

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

1.45 COMPLETION:

1.45.1 At Practical Completion of the Works clean all floors, sanitary fittings, and glass inside and out, remove all paint and putty marks, replace any cracked or broken items. The site both inside and out shall be left thoroughly clean and fit

for immediate occupation, weatherproof and to the approval of the Architects. All services shall be tested and left in perfect working order.

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

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

1.46 BANK GUARANTEE:

1.46.1 Prior to commencing operations on the site the Contractor shall furnish a Bank Guarantee in the prescribed form and of a maximum aggregate sum as stated in the Tender Form, the period of validity of which is to continue until fourteen days after the expiration of the Defects Liability Period or, if a Schedule of Defects be delivered to the Contractor within that period, until the issue of the Certificate of Completion of Making Good Defects.

1.47 AMENDMENTS TO THE FIJI STANDARD FORM OF BUILDING CONTRACT WITH QUANTITIES

The following modifications to the Contract Conditions apply:

CLAUSE 3 Contract Drawings, Specification and Schedule of Rates

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

CLAUSE 13 Contract Sum

AMEND TO READ ‘(1) The Contract Sum etc’

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

CLAUSE 20 Insurance of the Works against fire etc.
Clause A and C 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 12mm as recorded by the meteorology Bureau.

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

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

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

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

INSERT NEW CLAUSE 24(3)

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

CLAUSE 27 Nominated sub-contractors

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

and

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

and

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

and

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

and

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

and

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

CLAUSE 30 Certificates and payments

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

CLAUSE 31 Fluctuations
DELETE 31A

SECTION 3: DEMOLITION

3.1 GENERAL:

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:
Unless otherwise specified or shown, the current editions and revisions of the following codes, standards and references to other documents therein, shall apply.

NZ Labour Department Bulletin No 23 DEMOLITION
Fiji Dept of Labour Safety Standards

3.2 SCOPE:

3.2.1 The Scope of Demolition works may not be limited to, but shall include the following:

3.3 DEMOLITION PLAN

Prior to commencing any demolition work on any section of the work, the Contractor shall submit a demolition and work plan to the Engineer for approval.

3.4 SAFETY ON THE SITE

3.4.1 At all times when demolition is in progress, the Contractor shall ensure that all his staff, all legitimate visitors and all those concerned with the work (including the Principal's staff who have legitimate access to the site) are issued and wearing the required safety equipment (safety shoes or boots, helmets, ear and eye protection).

3.4.2 All mobile machinery (trucks, loaders, cranes or other mechanical plant and the like) shall be fitted with a clearly audible warning that is in full operation whenever the equipment is in reverse gear.

3.4.3 Around all areas where pneumatic, hydraulic or electric breaking, drilling or crushing equipment, electric arc or plasma cutting equipment, concrete cutting saws or similar are operating the Contractor shall erect and maintain adequate safety barriers, catch nets or screens to prevent injury to any person who has a legitimate right to be adjacent or near to the site.

3.5 OWNERSHIP OF THE PRODUCTS OF DEMOLITION

The following table clearly defines the ownership of the products of demolition and shall be strictly adhered to.

TABLE 1

ITEM	OWNERSHIP	DISPOSAL
Concrete	Contractor	Contractor to remove
Masonry	Contractor	Contractor to remove
Gypsum and masonite type linings	Contractor	Contractor to remove
Windows including hardware fittings	Contractor	Contractor to remove
Doors including hardware fittings	Principal	Contractor to remove
Roofing	Contractor	Contractor to remove
Sink Benches and associated joinery	Principal	Contractor to remove
Timber framing up to 150mm deep	Principal	Contractor to remove
Timber framing over 150mm deep	Principal	Contractor to remove
Light fittings	Principal	Contractor to remove
Burglar bars	Principal	Contractor to remove
Fixed joinery items eg vanities, wardrobes, benches etc	Principal	Contractor to remove

3.6 TOLERANCES FOR THE DEMOLITION OF CONCRETE-WORK

ITEM	TOLERANCE TO REDUCED LEVEL	TOLERANCE TO HORIZONTAL POSITION
Top of demolished foundation	+ 0mm - 30mm	Not applicable
Lateral position	Not applicable	± 30mm
Lateral or longitudinal dimension	Not applicable	± 30mm

3.7 DISPOSAL OF THE PRODUCTS OF DEMOLITION

3.7.1 Where the schedule requires that the products of demolition shall be removed to waste they shall be removed completely from the site of the works and deposited in an approved land-fill tip administered by the relevant Local Authority except, in the case of earth or rock, concrete rubble, concrete masonry rubble or clay masonry rubble, the Contractor may make arrangements to dispose of these materials in such a place and position as to NOT damage the environment.

3.7.2 Any cases found by the Architect where the products of demolition are indiscriminately dumped shall result in the Architect requiring the Contractor to remove such material to an approved site at the Contractor's cost.

3.7.3 If the products of demolition are to be disposed off by burning, the sequence, position and extent proposed shall be submitted to the Architect for approval prior to commencement. Indiscriminate, uncontrolled & unapproved disposal either by dumping, burial or burning will not be tolerated.

3.7.4 Wherever required by the Principal to arrange for disposal of materials, the contractor shall notify the Principal at least 48 hours prior to the time of removal.

SECTION 4: EXCAVATOR

4.1 SCOPE:

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

4.2 EXCAVATION:

4.2.1 Excavate for all foundations, footings, etc. to the level shown. Minimum depth shall be in accordance with the structural drawings, into solid ground but should satisfactory bearing not be found at this depth excavation shall be carried further down until satisfactory ground is reached. All subsoil from the foundations, etc. shall be removed from the building platform area.

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

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

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

4.3 HARDFILL:

4.3.1 Lay consolidated hardfill to a minimum depth as shown on the drawings, graded hardfill consisting of clean sizes between 10mm and 38mm. Thoroughly compact with an approved compactor with particular attention being given to the outside edges.

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

4.4 DAMP PROOFING:

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

4.5 TRENCHES:

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

4.6 **TOPSOIL:**

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

4.6.2 At completion of the works, stockpiled topsoil shall be spread around the building area as directed by the Architect and as necessary to provide even surrounding ground area by rolling if required.

4.7 DISPOSAL OF EXCESS MATERIAL:

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

4.8 FORMING OF FILL AREAS:

4.8.1 Generally the quality of fill material, and the nature of frequency of tests to check and control this quality shall be determined and specified before fill placing commences.

4.8.2 All earthworks material placed in or below fill areas, below formation level in cut areas, or elsewhere in the Works shall be deposited and compacted as soon as practicable after excavation, in a systematic manner, with near horizontal layers, each being deposited progressively across the full area of a fill in 225 layers, or in layers of thickness appropriate to the compaction plant used.

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

4.8.4 During the construction of fill areas the Contractor shall control and direct constructional traffic uniformly over the whole area of the filling. Damage to compacted layers by constructional traffic shall be made good by the Contractor.

SECTION 05 : CONCRETE

5.1 PRELIMINARY:

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

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

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

5.2 MATERIALS:

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

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

5.2.3 Aggregate: Fine and coarse aggregate shall comply with the above standards. Maximum aggregate size shall be 19mm except for blockfill which shall be10mm.

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

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

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

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

and correctly sized boxes shall be used to ensure this proportioning.

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

5.2.9 Ensure that sand and aggregate stockpiles are founded or free draining subsoils and they shall be covered with PVC or suitable tarpaulins to prevent saturation by rain.

5.2.10 Admixtures to Concrete Mixes: Except for concrete blockfill, no other admixture than Air Entraining Agent (AEA) shall be added to the mix and then only a percentage of less than 4%. Before any AEA is to be used, written permission must be received from the Engineer, who shall require details of the brand to be used and the method of measurement for each batch of concrete mix.

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

5.2.12 NO FORM OF RETARDERS SHALL BE USED IN EITHER STRUCTURAL CONCRETE OR CONCRETE BLOCK FILL.

5.3 WORKMANSHIP:

5.3.1 All work in this section shall be carried out by tradesmen skilled in the mixing and placing of concrete to the satisfaction of the Architect and Engineer.

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

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

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

5.4 COOPERATION:

5.4.1 General: Allow to cooperate with other trades to space, position and build in all fixing bolts, pipes, sleeves, nailing ground, chases, conduits, reinforcing starters, weather bars, inspection chambers, septic tank,etc., also cooperate with the Blocklayer in the filling of cavities.

5.4.2 Embedded Items: Take delivery of all embed items from the respective suppliers and cast into the concrete. The positioning of all embedded items shall be checked by the trade to which it applies before concreting and every care shall be taken to ensure that the position is not altered.

5.5 FORMWORK:

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

5.5.2 Timber: All timber shall be sound and free from knot holes. Timber in contact with concrete shall not be less than 22 thick, or resin bonded plywood constructed so as to produce mortar tight joints.

5.5.3 Form Oil: Where form oil is used to preserve forms the oil shall be of a recognised proprietary brand which shall not affect the bond of plaster to the concrete.

5.5.4 Workmanship: All formwork shall be securely braced and supported to prevent any distortions due to pressure of concrete and loads from building operations. Particular attention shall be given to all wall and beam surfaces to render them straight and true. Formwork shall be provided with suitable clean out points to ensure the removal of all foreign matter from the interior before each pour. Before placing concrete all forms shall be fixed to proper lines and levels and shall be saturated with water, if form oil is not used.

5.5.5 Stripping: Formwork shall not be stripped before the times mentioned below. (Time shown is for normal hardening cement).

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

5.6 PLACING:

5.6.1 The handling, placing, protection and curing of all concrete shall be strictly in accordance with NZS 3109 which forms part of this specification and shall be read in conjunction with it.

5.6.2 Care shall be taken to prevent segregation of the concrete, spreading of the formwork and other aspects likely to cause faulty concrete work. Concrete shall not be dropped over 1350 into forms or be dropped into any depth of water without prior approval of the Engineer. Should honeycombing be evident after stripping of boxing, the Engineer shall decide whether the honeycombing has deleterious effect on the structure effect on the structure or appearance in which case the concrete shall be cut out and replaced, or, if not of a serious nature, the surface may be repaired by plastering, all at the expense of the Contractor.

5.6.3 Adequate means of protecting finished concrete surfaces shall be taken and effective damp curing by use of polythene sheet or sand covering or sacks kept continuously damp is also essential.

5.6.4 All concrete shall be thoroughly consolidated by vibration. Minor surface blemishes on fairface concrete shall be bagged in. Concreting shall not be carried out when rain is falling.

5.6.5 Any concrete to be transported horizontally shall be carried by conveyor belt, wheel barrow, chute or concrete pump but the method of transportation shall be discussed with the Engineer prior to commencing the work. It shall be noted that pumped concrete requires a modified constituent mix and shall therefore be subject to approval by the Engineer.

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

5.6.7 No concrete older then 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 continously damp for 7 days. Artificial curing such as sand kept continously wet shall be allowed for at all times. Polythene sheets may also be used. Great care shall be taken to avoid damage to the concrete surface by the polythene sheets.

5.8 REINFORCING STEEL:

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

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

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

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

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

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

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

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

5.8.8 Provide walkways over placed reinforcing to approval if required.

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

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

5.8.11 Bend deformed bars around rollers, not fixed pins.

5.8.12 Bend defomed bars only once.

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

For protected locations e.g. internal work : slabs 20mm minimum beams & columns 25mm to stirrups or tie.
For moderate locations e.g. external protected: 40-50mm.
For severe locations e.g. foundations or marine: 75mm minimum

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

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

5.8.16 Tie reinforcement with not less than 1.25mm soft black iron wire sufficiently to maintain correct relative positions. Bundle bars should be tied together at 500 crs.with 2.65mm min. soft wire.

5.8.17 Laps: Excepting as shown no lapping of reinforcement is permitted without written approval. Where lengths of laps are not shown, ask for approval.

5.8.18 Welding: Welding of reinforcement shall comply with NZS 4702 - Metal-arc Welding of Grade 275 Reinforcing Bar.

5.8.19 Unless shown on the drawings, welding of reinforcement is not permitted without written approval.

5.8.20 Identify rods or bars to be welded with tags or branding.

5.9 INSPECTION BEFORE CONCRETING:

5.9.1 Before concreting, reinforcement must be inspected by Supervising Officer. Arrange with Engineer suitable time for inspection. Work done without his approval may be rejected. 24 hours notice is required for Suva area, 48 hours elsewhere in Fiji.

5.9.2 Remove all formwork preventing proper inspection.

5.9.3 Prior approval of cleaning, fabrication and securing reinforcement subject to the

reinforcement being satisfactory at times of concreting.

5.9.4 Extra will not be paid for remedial work caused by the inspection.

5.10 DAMP PROOF COURSE:

5.10.1 Where shown on drawings, lay under floor slabs on ground 0.20mm polythene DPC over sand blinding. Carefully check blinding for any protrusions likely to puncture the DPC. Tape all joints, protrusions around pipes, tears, etc. with pressure sensitive tape. Carry DPC under thickenings in slab and seal DPC to foundation walls. It is essential that the DPC is continuous so that dampness cannot penetrate. Prior to the pouring of concrete the whole of the DPC shall be checked for any punctures which shall then be taped. The Engineerr shall be notified prior to the pouring of concrete so that it may be inspected.

5.11 CONSTRUCTION & CONTROL JOINTS:

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

5.12 FOUNDATIONS:

5.12.1 Set Out: The accurate set out of the foundations is very important to the satisfactory construction of the rest of the building. Refer to the drawing setting out the exact dimensions for this work.

5.12.2 Footings: Ensure that the bed for all footings is on solid bearing, remove all soft spots and fill with weak concrete; provide a solid even clean base for the pouring of the footings. Pour the footings to the shape and sizes indicated on the structural drawings. Cooperate with the Blocklayer in the location of all starters and construction of theblock foundation walls.

5.13 BEAMS:

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

5.14 BLOCKWORK:

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

5.15 TESTING:

5.15.1 Compression Test: The Contractor shall allow to take three concrete test cylinders (of the size designated in NZS 3112) per concrete pour or as many others as may be directed by the Engineer. These cylinders shall be taken from any random delivery of concrete to the site or from every on-site mixed pour as directed by the Engineer and shall be cured on site in conditions as near as possible to those under which the pour from which they were taken is being cured .The cylinders shall be prepared from a representative sample of the delivery. These samples should be taken at the ready mix.

5.15.2 Cylinders shall be removed from the forms after a minimum of three days (or as discussed and approved) all shall be clearly and illegibly marked on the side of the cylinder with the date of the sample and a reference number indicating position of the pour.

5.15.3 The cylinders as a general rule, are to be tested and broken, one at 7 days and two at 28 days after the pour by an independent testing authority such as the Public Works Department and the results of these tests are to be submitted to the Engineer. Note that these tests are in addition to any tests taken by the control batching plant.

5.15.4 Slump Test: This test shall be made in accordance with the requirements of NZ 3112 (1974). A Slump Test shall be made on a trial mix before main concreting is started, if on-site mixing is employed, at all times when Compression Test samples are taken and at such other times when directed by the Engineer. If ready mix is used, the concrete shall be rejected if the slump deviates by more than 16mm to that slump value nominated by the specification.

5.15.5 Test Personnel : Only people experienced in preparing concrete cylinder and slump tests shall be employed to prepare the samples, as a high coefficient of variation (more than the probable C.O.V. of the concrete mix) is possible with inexperienced samplers. The Engineer may require up to 20 samples of either concrete cylinders or slump tests be taken on test mixes before the sample is approved.

5.15.6 Sampling Equipment : All sampling equipment, cylinders, slump cones, tamping rods, etc, shall be thoroughly cleaned before use by use of wire brush and cleaning cloths. The equipment shall be given a light coating of form oil after cleaning and this shall be removed with a soft cloth immediately before use.

5.15.7 The Contractor shall notify the Engineer whether the testing agency employed for crushing the cylinders employs "capping" procedures before the crushing is carried out or if they are tested "of the cylinder".

5.15.8 The Contractor shall note that a minimum of 9 steel cylinder forms will be required or, if "one-off" tubes are to be used, the Contractor shall submit samples of the forms to be used for approval before commencing the concrete work.

5.16 CONCRETE STRENGTHS:

5.16.1 Unless otherwise stated, the characteristic strengths and slumps of the concrete shall be as follows :

(a) For single storey structures, excluding heavy duty slabs

20 MPa.

(b) Concrete slumps (maximum):

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

5.17 PUMPED CONCRETE:

5.17.1 The sand and coarse aggregate must both be properly graded, and the concrete should be free from any tendency to segregation to ensure an easy, even flow in the pipeline. The Contractor should check that the concrete mix is pumpable well in advance of pumping operations, so that there is time to modify the mix, if necessary.

5.17.2 Concrete for pumping shall have a slump between 40mm and 80mm and a minimum strength at 28 days of 25 Mpa. Refer to the relevant section of this specification regarding Concrete Testing. Before concrete is pumped through, the pipeline must first be lubicated by pumping through itone or two batches of thin cement grout composed of two parts of sand to one of cement. This is effected by inserting a plug into the pipeline in front of the grout.

5.18 READY MIXED CONCRETE:

5.18.1 Shall be mixed in an approved central mixing plant capable of compying with the relevant clauses of NZS 3101 (1995).

5.18.2 It shall be transported to the site in an agitator of revolving drum type and the discharge shall be completed within one and one-half hours, or such longer or shorter periods as shall be approved by the Engineer, after the introduction of mixing water to the cement and aggregates, or cement to the aggregates.

5.18.3 The concrete shall be handled at the site in suitable hoppers and chutes, etc., so as to prevent segregation and shall be placed in its final position in the formwork within 20 minutes of delivery to the site.

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

SECTION 06 : STRUCTURAL STEELWORK

6.1 PRELIMINARY:

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

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

NZS 3404
AS 1111 : 150 Metric Hexagonal Commercial Bolts
AS 1131 : Dimensions of Hot Rolled Structural Steel Sections
AS 1163 : Structural Steel Hollow Sections
AS 1204 : Structural Steel - Ordinary Weldable Grades
AS 1237 : Flat Metal Washers for General Engineering Purposes
AS 1250 : SAA Steel Structures Code
AS 1252 : General Grade High Strength Bolts & Nuts
AS 1554 : Rules for the Design and Application of Metal Arc Welding in Steel Building Construction
Swedish Standard S.P.1
Swedish Standard 055900 Sa 2 (St 2)
Swedish Standard 055900 Sa 2/1-2(St 2/1-2)
Swedish Standard 055900 Sa 3 (St 3)

6.2 MATERIALS:

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

6.3 WORKMANSHIP:

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

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

6.3.3 Welding Procedures: All welding procedures shall be the responsibility of the Contractor and shall be such as to minimise distortion or restraint. When

required by the Engineer, the Contractor shall submit for review details of one or all welding procedures.

6.3.4 Employ only skilled competent tradesmen appropriately qualified and registered or licensedat 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 welding on site, all welding operations shall cease until such time as the weather improves to the satisfaction of the 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.

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

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

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

6.11 GALVANISED FINISH:

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

6.12 GUARANTEE:

6.12.1 The Contractor shall supply to the Owner a 3 year guarantee on all paint materials and a 1 year guarantee on allpainting 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 motar 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. Motar 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.

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SECTION 7: BLOCKWORK

7.1 PRELIMINARY:

7.1.1 Standards: The following standards shall form part of the specification unless modified in the documents:

NZS 3102 P	Concrete Masonry Units
NZS 3112 Part 4	Methods of Test for Concrete
NZS 4210 P	Masonry Construction Materials and Workmanship.

7.2 MATERIALS:

7.2.1 Supply concrete masonry units complying with NZS 3102P Grade A, 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 where practicable throughout.

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 perpends 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 SCOPE 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 placticiser and waterproofing agent in the proportions recommended by the manufacturer. Mortar shall have minimum compressive strength of 12.5 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 with the perpends 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:

7.1.1 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.

7.1.2 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 long bent ends and spaced every fourth course vertically.

7.1.3 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 800 crs in a bond beam

(b) 150 Blockwork :
Vertical : 12 dia. at 600 crs
Horizontal : 16 dia. at 800 crs in a bond beam

(c) 100 Blockwork :
Horizontal : 16 dia. every 4th course

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

7.8 CHECK BASE:

7.8.1 Check that the base concrete on which blockwork is to be built is true to line and level. If more than 20mm thickness of mortar bed will be needed to correct inaccuracies obtain direction from the architect. Ensure that all laitance, loose aggregate, or anything that would prevent bond is removed prior to block laying.

7.9 STARTER POSITIONS:

7.9.1 Before commencing block laying check location of starter reinforcement by measure or by a dry trial lay up of the first course. Do not attempt to correct misplacement by cranking bars. Where misplacement exceeds the location tolerance obtain direction from the architect.

7.10 TOLERANCES:

7.10.1 Construct within the tolerances set out in NZS 4210 Clauses 2.6.5 and 2.7.1.4. Lay blocks with jointing of consistent thickness throughout.

7.11 MOISTURE CONTENT:

7.11.1 Ensure that blocks are air-dry prior to laying.

7.12 LAYING:

7.12.1 Use good trade practice to ensure consistent fully filled and tooled joints. Where walls are reinforced prevent mortar droppings from entering cells to be grouted, or clean out by adequate means prior to grouting. Unless Low Lift grouting is used, provide clean out holes at base of wall. Ensure reinforcement is accurately placed and tied. Lay in regular running bond with all necessary special units and sill blocks. Cut blocks if necessary true and square without chipping.

7.13 CONTROL JOINTS:

7.13.1 Locate at major changes of wall height or thickness, at openings, and at not more than 8 metre centres, or as shown on the drawings. Where reinforcement passes through a control joint, provide for breaking bond using methods detailed on Fig. 2.10.1 of NZS 4210, unless specifically detailed otherwise on the drawings.

7.14 BRACING:

7.14.1 Provide adequate temporary lateral bracing where necessary to ensure stability until final supporting construction is in place.

7.15 CLEANING DOWN:

7.15.1 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.

7.16 DEFECTS:

7.16.1 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.

7.17 CUTTING OF BLOCKWORK:

7.17.1 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.

7.18 CONCEALED PIPEWORK AND ELECTRICAL CONDUITS:

7.18.1 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.

7.19 **REINFORCEMENT TO ALL DOOR & WINDOW OPENINGS:**

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

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SECTION 10: CARPENTRY

10.1 PRELIMINARY:

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

10.1.2 Standards:

NZS 1900 Chapter 6.1 & 9.1

10.2 EXTENT OF WORK:

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

10.3 MATERIALS

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

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

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

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

USE	SPECIES	GRADE	
Exposed Roof Framing (beams, rafters, purlins, hips, ridge, trusses)	treated Kauvula treated Dakua Makadre	Fiji C Select	
Hidden Rafters	Fiji Pine	F8, Gauged	H3
Sarking	treated Dakua Makadre treated Dakua Salusalu treated Kaudamu		
Fascias	Fiji Pine	No. 1 Dressing	H3
Perimeter wall beams	Fiji Pine	F8, Gauged	H3
Wall framing	treated Dakua Makadre treated Kauvula treated Kaudamu		
Weatherboards	treated Dakua Makadre treated Dakua Salusalu treated Kaudamu		

	treated Kauvula Fiji Pine	Fiji C Select No 1 Dressing	 H3
Floor Bearers, joists	Rosarosa Sacau Yasiyasi treated Kauvula Fiji Pine	 F8, Dressed	 H3
Flooring Exterior	Sacau, Vesi, Yasiyasi		
Flooring Interior	Damanu Sacau Yasiyasi Rosarosa		
Window Frame	Fiji Pine	No 1 Dressing	H3
Window louvres	Dakua Salu Salu	Fiji Prime	
Doors Exterior	treated Dakua Makadre treated Dakua Salusalu Fiji Pine	 No 1 Dressing	 H3
Doors Interior	treated Kaudamu treated Kauvula Fiji Pine	 No. 1 Dressing	 H2
Door Frames	treated Dakua Makadre treated Dakua Salusalu treated Kauvula		
Door Sills	Rosarosa, Sacau, Yasiyasi, Vesi		
Window Frames & Sashes	treated Dakua Makadre treated Dakua Salusalu		
Window Sills	treated Dakua Makadre treated Dakua Salusalu Rosarosa Sacau Yasiyasi Vesi		
Interior joinery	Damanu (heart) Blockboard	Fiji Prime A Grade	
Interior trim	Fiji Pine	No. 1 Dressing	H2
Stairs	Rosarosa Sacau Yasiyasi Vesi		
Balustrades	Rosarosa Sacau Yasiyasi Vesi		

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

10.4 MOISTURE CONTENT:

10.4.1 The moisture content of the timbers shall be strictly adhered to. The Architects reserve the right to submit any timbers to a recognised testing authority for testing and report.
Moisture Content for Exterior Use Timbers shall be a maximum of 15 percent
Moisture Content for Interior Use Timbers shall be a maximum of 10 percent

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

10.5 WORKMANSHIP:

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

10.6 TIMBER FASTENERS

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

10.6.2 All nails spikes, brads, staples, bolts and accessories of ferrous metal shall be hot dip galvanised. All structural visible screws shall be solid brass. Bolts shall be of correct lengths protruding one and a half turns of the thread beyond the nut when tightened. Boltheads and nuts bearing against timber shall be fitted with suitable washers.

10.7 STRUCTURAL TIMBER/PRESERVATIVE TREATMENT

10.7.1 Timber for structural purposes shall be Fiji - C - Select complying with the National Grading Rules for Fijian Timber 1986 unless otherwise stated. Plates, bearers and door and window frames shall be dense local hardwood. All other framing timber shall be of strength Grade F7 unless otherwise specified in the drawings. Such timbers shall be preservative treated using full cell pressure process to give adequate protection in H2 condition in accordance with "A Guide to the Specification of Local Timbers for Building Applications" issued by the Utilisation Division of the Department of Forestry, Fiji. No substitution shall be allowed without the Architect's approval.

10.7.2 Nailed joints shall, as far as possible, be so fixed that the nails are loaded in shear, i.e. laterally. Nails to laps and scarfs of framing timber shall be 25mm

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

10.7.3 Slots in wood members for metal plate cleats, etc., shall be 1.5 mm wider than the metal. Mismatch at the abutting ends of purlins and battens shall not exceed 2 mm.

10.7.4 Treat all non heart and hardwood timbers with Cellcure AN or Tanalith NCA preservative. The degree of treatment shall be as set out in the Schedule of Treatment for timber in various positions as follows:

10.7.5 Hazard 2
Out of ground contact and continuously protected from the weather or painted and adequately ventilated 3.5kg/m^3.

10.7.6 Hazard 3
Out of ground contact but not continuously protected from the weather or situations such as in continuous contact with damp masonry in unventilated ground line floor, cellars, wet conditions, exposed verandahs, floors, garden furniture, fire escapes, barge boards, etc. 7.0kg/m^3

10.7.7 Hazard 4
Ground contact situations where timber is in contact with the ground or similar situations in normal conditions prevailing in either the wet or dry zones of Fiji.
low risk (a) 10.2 kg/m^3 e.g. fence posts

10.7.8 Hazard 5
Ground contact situations where timber is in contact with the ground or similar situations in normal conditions prevailing in either the wet or dry zones of Fiji.
high risk (b) 18.0kg/m^3 e.g. house piles or structural posts or piles

10.7.9 Hazard 6
Marine uses exposed to marine boring organisms. 48kg/m^3

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

10.8 PRIMING & SEALING:

10.8.1 The external face, ends and butts of all external finishing timbers and all finishing timbers, frames, etc, in contact with concrete or blockwork shall be primed before fixing.

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

10.8.3 This clause should be read in conjunction with the Painting Section for reference to those timbers requiring different types of priming. It is the Contractor's responsibility to ensure that timber being finished with oil stain or varnish shall receive their correct first coat.

10.9 FINISH:

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

10.10 DAMP PROOF COURSE:

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

10.11 PROTECTION:

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

10.12 HARDWARE:

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

10.12 PREPARATIONS FOR HANDING OVER:

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

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

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

10.13 JOINERY:

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

10.14 FINISHES:

10.14.1 All dressing grades shall be machine dressed and in addition all finishing timbers shall be scraped and sand papered by hand to smooth even surface ready to receive painting and polishing. No machine marks, hammer marks or surface defects shall be visible in finished work. Punch all nails and remove all arrises. Where polished work is specified, the timber shall be carefully matched

for uniformity of colour grain and texture to ensure a uniform finish. Internal doors shall be finished with a coat of stain, coat of Shellac 2 coats Matt Polyurethane, rub down with steel wool and polish with Linseed Oil.

10.15 RESAWN TIMBERS:

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

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SECTION 12 : ROOFING

12.1 GENERAL:

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

12.2 SCOPE:

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

12.3 WORKMANSHIP:

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

12.4 STORAGE OF ROOFING COMPONENTS

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

12.4.2 Nails, screws and roof accessories shall be stored undercover with adequate support.

12.5 FOOTWARE & WALK BOARDS:

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

12.6 ROOFING:

Material: Colourbond Ultra by Bluescope (or equal approved)
Colour: Surf Mist
Profile: Corrugated

12.7 ROOF FIXING:

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

12.7.2 Fixing within 1m of eaves, ridge and bargeboard: Fasteners shall be Stormtite ™, Class 4 type 17 14 G x 65mm cyclonic fastener as manufactured by Mechanical Plating Pty to comply with AS 3566

12.7.3 Fixing to Timber: Fasteners shall be N°14 – 10 x 65mm Hex head type 17 self drilling screw
Fixing to Steel: Fasteners shall be N°14 – 20 x 45mm Hex head self drilling tapping screw

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

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

12.8 ROOF INSULATION:

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

12.9 FLASHINGS, CAPPINGS:

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

12.10 JOINTS, FLASHINGS & CAPPINGS, GUTTERS & DOWNPIPES:

12.10.1 Seal all joints with suitable external quality silicone sealant

12.11 EDGE SEALING:

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

12.12 PREVENTION OF SWARF STAINING:

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

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

12.13 THATCHING:

12.13.1 A sample of thatching is to be provided for approval. Allow for minimum 3 layers treated pandanus thatching securely fixed using stainless steel screws and cord to battens as noted on the drawings. All thatching to be secured using stainless steel chicken wire, wrapped over gutters and securely fixed at minimum 1m centres both ways and along all edges to battens and fascia.

12.14 COMPLETION:

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

SECTION 13 : PLUMBING

13.1 GENERAL:

13.1.1 This section establishes the quality of materials and workmanship and defines how quality is measured for excavation and backfill for underground piping and structures.

13.1.2 Standards:

NZS Plumbing and Drainage Regulations

NZS 493	Sanitary Appliances - W.C Pans
NZS 7652	Waste Traps – Plastic
NZS 4616	Wash Basins
NZS 7601	Pipes for Cold Water
NZS 7602	Pipes for Cold Water
NZS 7641	Polyethelene Pipes for Cold Water
NZS 7602	Polyethelene Pipes for Waste and Ventilation
NZS 245	Flushing Cisterns – Toilet
NZS 2038	Flushing Cisterns – Urinals
NZS 7604	Polyethylene Pipes for Drainage & Sewerage

13.2 SCOPE OF WORK:

13.2.1 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.

13.3 WORKMANSHIP:

13.3.1 All sanitary plumbing 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 Architect.

13.3.2 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.

13.3.3 All piping shall be concealed from view unless specified otherwise. Fit flanges to all visible pipes where they pass through walls, floors and ceilings.

13.3.4 Tape all pipes where they pass through concrete with densotape. All piping shall be adequately secured to the building to prevent vibration.

13.3.5 Any exposed pipework shall be chrome plated unless advised in writing.

13.4 FLASHINGS:

13.4.1 Work in with the Carpenter in the installation and coordination of the fittings of flashings. Supply the Carpenter with gms flashings for all windows and door

frames as detailed on the drawings. Flashings shall be machine bent to the profiles indicated so that a neat true edge results and in as long lengths as possible and fixed to ensure perfect watertightness

13.5 CONCEALMENT OF PIPEWORK:

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

13.5.2 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.

13.6 RESPONSIBILITY FOR PIPEWORK:

13.6.1 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.

13.7 WATER SUPPLY PIPES:

13.7.1 All cold water supply piping within the building (except to Fire Fighting equipment) shall be 16mm upvc with 12mm upvc piping banches to each fitting. Use preformed tees, elbows etc. Joints shall be solvent adhesive type. All piping shall be concealed in walls. Terminate in brass bracket elbows at basin and shower rose. Fix bracket elbows with min 2 brass screws.

13.7.2 All hot water supply pipes are to be copper.

13.8 PIPING TO BASINS

13.8.1 From bracket elbow, supply water pipe to tap in copper pipe bent carefully to fit and fitted with crox fittings at either end. Pipe to be complete with chrome plated escutcheon plate at wall connections. After fitting, remove pipe from wall and plate with heavy duty chrome plate before refitting.

13.9 POST CONTRACT DOCUMENTS:

13.9.1 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.

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 WASTES & VENTS:

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.

13.11.2 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.

13.11.3 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.

13.12 SIZES OF WASTES & VENTS:

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

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

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

13.13 TESTING OF SYSTEMS

Following completion of the work all systems shall be pressure tested to 3 times their working pressure in the presence of the Architect or Engineer.

13.13.1 Notify the PWD, Local Authority and the Architect or Engineer giving at least 24 hours notice to enable arrangements to be made to witness the testing.

13.13.2 Before backfilling any sewer or stormwater piping, manholes, fittings etc. the section must be tested as follows. Isolate the section to be tested with expandable rubber plugs and fill the line to a depth in excess of the total head that can be carried. Observe the lines for a period of at least 12 hours (to allow any take-up by the pipes and concrete) keeping the level topped up. Any leaks found shall be marked and repaired at the end of the test period.

13.13.3 Following any necessary repairs, retest the pipe as before. Do not backfill until clearance has been given in writing by the Architect or Engineer

13.13.4 The Architect or Engineer must be given 24 hours notice that a test is to be carried out to allow attendance by a representative.

13.14 CLEAN-UP

13.14.1 Following completion and testing the entire area is to be cleaned up, toilet bowls and basins properly cleaned and cistern wiped down. Remove all packing materials, rubbish etc. from site and destroy.

SECTION 14: DRAINAGE

14.1 PRELIMINARY:

14.1.1 General: Refer to the 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 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.

NZS 3501	Copper tubes for water, gas and sanitation
NZS 3604	Light timber frame buildings not requiring specific design
NZS 4229	Concrete masonry buildings not requiring specific design
NZS 4442	Welded steel pipes and fittings for water, sewage and medium pressure gas.
NZS 4452	Construction of underground pipe sewers and drains
NZS 4610	Household septic tank systems
NZS 7604	High density polyethylene drain and sewer pipe and fittings
NZS 7609	Acrylonitrile butadiene styrene (ABS) pipes and fittings for pressure applications : Parts 1 and 2
NZS 7643	Installation of unplasticised PVC piping systems
NZS 7649	Unplasticised PVC sewer and drain pipe and fittings
BS 2494	Elastomeric joint rings for pipework and pipelines.
BS 8301	Building drainage.
AS 3500	National plumbing and drainage code Part 2: Sanitary plumbing and sanitary drainage

14.2 SCOPE OF WORK:

14.2.1 This specification covers the supply of all materials, labour, delivery, storage, construction installation and testing required to complete the drainage for the project.

14.2.2 It includes supply, construction and installation of the sewer and stormwater manholes, gulley traps, mud tanks (road sumps), and associated sewer and stormwater piping including terminal vents, connections to downpipes, inspection pits etc. as well as the excavation and backfilling of the trenches. It further includes the supply and laying of an absorption trench from a precast sludge disposal system from sedimentation tanks and filters.

14.3 MATERIALS:

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

14.3.2 Sewer Piping:
Sewer piping shall be of 100mm UPVC with a top cover of 450mm minimum and gradients as shown on the drawings. All pipes in this section shall be bedded on sand bedding

14.3.3 Manholes & Inspection Pits:
Manholes and inspection pits shall be in accordance with drawing details
Carefully match the top level to the finished ground level.

14.3.4 Terminal Vents:
Terminal vents shall be 50mm dia UPVC piping carried up inside the blockwork wall and terminated at a level approx. 450mm above the top of the finished roof. Fit top of vent with PVC ventilated cap glued and screwed to pipe. Support vent with brass stand-offs at maximum 1200 centres. Ensure that top stand-off is no further than 150mm below the soffit. At bottom of vent, bed the 90^0 bend in concrete minimum thickness 200mm and minimum area of 500 square to support weight of pipe.

14.4 WORKMANSHIP:

14.4.1 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.

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

14.5 EXTENT OF WORK:

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

14.6 PVC DRAINS:

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

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

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

14.7 SURFACE DRAINS:

14.7.1 Where shown on the drawings construct open concrete dish drains.

14.8 GULLEY TRAPS:

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

similar.

14.9 INSPECTION CHAMBERS & MANHOLES:

14.9.1 Where inspection chambers and manholes are shown on drawings, construct 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 KERB & CHANNEL OR KERB ONLY EDGES TO CARPARKS & ACCESS ROADS

14.10.1 At the outer edges of the access roads and parking areas, allow to construct kerbs & channel or kerbs only as and where shown on the drawings. Concrete for these shall be 20 MPa at 28 days.

14.11 TESTING OF SEWER AND STORMWATER DRAINAGE

14.11.1 Notify the PWD, Local Authority and the Architect giving at least 24 hours notice to enable arrangements to be made to witness the testing.

14.11.2 Before backfilling any sewer or stormwater piping, manholes, fittings etc. the section must be tested as follows. Isolate the section to be tested with expandable rubber plugs and fill the line to a depth in excess of the total head that can be carried. Observe the lines for a period of at least 12 hours (to allow any take-up by the pipes and concrete) keeping the level topped up. Any leaks found shall be marked and repaired at the end of the test period.

14.11.3 Following any necessary repairs, retest the pipe as before. Do not backfill until clearance has been given in writing by the architect

14.11.4 The Architect must be given 24 hours notice that a test is to be carried out to allow attendance by the Architect's Representative.

14.12 CLEAN UP AND REINSTATEMENT

Following backfilling clean up the works and reinstate as direted by the Architect.

SECTION 16: GAS

16.1 PRELIMINARY:

16.1.1 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.

16.2 STANDARDS:

16.2.1 The following standards form part of this specification:

NZS 2182 (1967)	:	Gas Fittings
BS 715 (1970)	:	Sheet Metal Flue Pipes & Accessories for Gas Fired Appliances
BS 1963 (1969)	:	Pressure Operated Relay Valves for Gas 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
AS/ NZS 1596 (2002)	:	Storage and handling of LP Gas

16.3 MATERIALS:

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

16.4 WORKMANSHIP:

16.4.1 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 materialswhich 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.

16.4.2 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.

16.5 EXTENT OF WORK:

16.5.1 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.

16.6 INSTALLATION:

16.6.1 All gas appliances will be supplied by the Owner and will not be included in this contract. However the Contractor is obliged to laiase with the gas subcontractor for all chasing and building in required.

16.7 WATER HEATERS:

16.7.1 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.

16.8 TESTING:

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

16.9 GUARANTEE:

16.9.1 The Gas Subcontractor shall supply to the Owner a 1 year guarantee on all materials and workmanship.

SECTION 19 : ELECTRICAL

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 Scope: This section deals with the wiring for power and lighting complete with all components and electrical fittings and connected back to the electrical authorities supply.

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

AS 3000 S.A.A. Wiring Rules
Fiji Government Electricity Regulations
F.E.A. Supplementary Regulations, where applicable.

NZ ECP 2	Electrical installations in damp situations
NZ ECP 3	Electrical safety of apparatus and materials
NZ ECP 5	Electrical installations - cold cathode discharge lighting
NZ ECP 11	Inspecting and testing low-voltage installations for certification
NZ ECP 28	Selection and installation of cables
NZ ECP 33	Electrical installations of mineral insulated cables and equipment
NZS 6401	PVC - insulated cables for electric power and lighting

19.2 MATERIALS:

19.2.1 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.

19.3 WORKMANSHIP:

19.3.1 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 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 material will be allowed.

19.3.2 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 authorised by the Architect.

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

19.4 EXTENT OF WORK:

19.4.1 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.

19.5 FEES:

19.5.1 The Electrical Subcontractor shall obtain all necessary permits and pay all fees and other charges.

19.6 MANUFACTURER'S INSTRUCTIONS:

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

19.7 ACCESSORIES:

19.7.1 All switches, 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.

19.8 FITTINGS:

19.8.1 Light Fittings: To be generally 12v dichroic recessed or 240 v florescent light fittings as noted on the drawings.

19.9 POWER POINTS AND LIGHT SWITCH LOCATION:

19.9.1 All light switches shall be positioned at 1400 from the finished floor level. All power points shall be positioned 250 from the floor level except in the following circumstances or as otherwise shown on the drawings.

Kitchen	1100 from floor level
Sideboard	1100 from floor level
Bathroom	1100 from floor level

Note: Dimensions are to the centre of the switch.

When construction has reached the correct stage the contractor is to arrange with the Architect to mark positions of all switches, power points, wall lights, and fans. Any changes 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.

19.10 WIRING:

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

a) *Within False Ceilings or Timber Partitions*: T.P.S

b) *Within Concrete or Blockwork*: T.P.S. or P.V.C. enclosed in pvc

conduit coloured orange.

19.10.2 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.

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

19.10.4 Main cable sizes shall be as follows:
Lights $1.5mm^2$
Plugs $2.5mm^2$

19.11 HOLES:

19.11.1 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 tradesmen as to the exact location of such holes, etc. before concrete is poured or framing commenced.

19.11.2 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. The Electrician shall advise the Blocklayer who shall cut holes for flush boxes. All holes shall be cut to the minimum size that will permit freedom of movement.

19.12 ELECTRICAL BOARDS:

19.12.1 The electrician shall allow for any new circuits as required, to connect to the existing distribution board. Each circuit shall be clearly labelled to identify the duty.

19.13 EARTHING:

19.13.1 Install all earthing as required by the supply authority. Test earth supply and earthing to requirements of AS 3000.

19.14 JOINT BOXES:

19.14.1 It is not acceptable to have jointing boxes exposed. Any such boxes shall be removed at the Electrical Subcontractor's expense.

19.15 CONCEALED CABLING AND CONDUITING:

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

19.15.2 Allow to build in all pvc conduiting and draw wires necessary for the

installation of telephones and tv aerials as shown on the drawings

19.16 COMPLETION AND TESTING:

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

SECTION 20: SOLID PLASTERWORK

20.1 PRELIMINARY:

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

20.1.2 Scope: This section deals with coatings of cement plaster applied by hand over concrete, masonry and fibre cement lining on timber framing.

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

NZS 2295	Building papers, (breather type)
NZS 3103	Sands for mortars and internal and external renderings
NZS 3122	Portland cement
NZS 3441	Hot dipped zinc-coated steel coil and cut lengths
NZS 3604	Light timber frame buildings not requiring specific design.
NZS 4251	Solid plastering
BS 890	Building limes
BS 1521	Waterproof building papers.

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

20.2 MATERIALS:

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

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

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

20.2.4 Metal Lath: 0.5 mm thick galvanised steel, slit and expanded and complete with all control joints, beads and sections supplied by manufacturer.

20.3 WORKMANSHIP:

20.3.1 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.

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

20.3.3 Store all materials on site in conditions ensuring adequate protection from contamination or deterioration.

20.4 PROPORTION & MIXING:

20.4.1 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.

Plaster Mix - Concrete

Finish	Sponge and steel trowel
Bond Coat	1 : 1.5 CS (cement sand)
Flanking Coat	1 : 1 : 6 CLS (cement lime sand)
Finish Coat	1 : 1 : 6 CLS

Plaster Mix - Masonry

Finish	Sponge and steel trowel
Bond Coat	1 : 1.5 CS
Flanking Coat	1 : 1 : 6 CLS
Finish Coat	1 : 1 : 6 CLS

Plaster Mix - Metal Lath

Finish	Sponge
Bond Coat	1 : 0.25 : 3 CLS
Flanking Coat	1 : 1.5 : 4.5 CLS
Finish Coat	1 : 1 : 6 CLS

20.5 PREPARATION OF SURFACES:

20.5.1 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.

20.6 CURING:

20.6.1 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.

20.7 PATCHING:

20.7.1 No plastering is to commence until all holes, electrical chases, etc., have been cut.

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SECTION 21 : TILING

21.1 PRELIMINARY:

21.1.1 As well as the relevant Australian Standards Codes, the manufacturer's current printed code of practice for use of materials shall be regarded as the key requirement for workmanship and for method of fixing of tiling. Where brand names are cited as an example of the quality and performance expected, an alternative may be approved if the contractor furnishes documentary evidence that the product is equal or better than that specified.

Standards:
The following standards are applicable to work refereed to in this Section:

AS 1526	One-part polysulphide based sealing compounds for building industry.
AS 1527	Two-part polysulphide based sealing compounds for building industry.
AS 2358	Adhesives for ceramic wall tiles and mosaics
AS 3958	Ceramic tiles Part 1: Guide to the installation of ceramic tile

21.2 SCOPE

Works described in this section includes supply and installation of ceramic and mosaic floor and wall tiles to concrete, cement-render, concrete masonry and timber sub-strate walls and includes all materials, labour, cutting, etc.

21.3 WORKMANSHIP:

21.3.1 Employ only skilled competent tradesmen appropriately qualified and registered or licensed at the time of carrying out the work. All materials used shall be the best of their respective kinds suitable for the work.

21.3.2 The whole of the 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.

21.3.3 Employ only skilled competent tradesmen appropriately qualified and registered or licensed at the time of carrying out the work. All materials used shall be the best of their respective kinds suitable for the work.

21.3.4 Take delivery of packets of tiles undamaged and dry. Reject all others. Handle tiles with care to avoid chipping, soiling and damage. Store on hard level standings in non-traffic, non work areas that are enclosed, clean and dry.

21.3.5 Ensure that all services and accessories are located to suit tile layout, that they are in place and that, with the sub-strate to recieve the tiles, are satisfactory.

21.3.6 Before beginning this work discuss with the architect the proposed layout of tiles and other visual considerations of the finished work.

21.3.7 Do not carry out tiling in an ambient temperature below 5 C or onto sub-strate of a temperature above 40 C.

21.4 PREPARATION:

21.4.1 Ensure that all backgrounds and adjoining surfaces (with preparation called for in this section) are of the standard required for first-class work. Do not start work until they are brought up to standard by the contractor. Commencement of this work means that the sub-strate and environment are accepted by the sub-contractor as satisfactory for first class work.

21.4.2 Concrete and masonry walls to be air dried for 4 weeks before applying mortar/adhesive. Remove all contaminants including form release oil that affect bonding/adhesion. Surface to finish clean and dry with a texture to give a complete key.

21.4.3 New Sheet Linings: Remove all contaminants that affect bonding/adhesion. Surface to finish clean and dry with a texture to give a complete key to sheet manufacturers recommendations and with maximum variation in the background plane of 4mm in 2.0m.

21.5 INSTALLATION

21.5.1 Before starting the setting out of each area discuss with the architect the number and location of cuts. Minimise in number with them preferably not less than half size and at the perimeter of the work.

21.5.2 Cut edges smooth and install without jagged or flaked edges. Do not install single tiles in more than one piece unless no alternative. Maintain the heights of wall tilework in full courses to the nearest dimension. Within allowed tolerances all corners of tiles to be flush and level with corners of adjacent tiles. Keep all joint lines including mitres, straight and of even width. Fully bed all trim units, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level. plumb and true to designated projection at detailed locations and heights.

21.5.3 Light the tile work as closely as possible to that of the finished lighting to ensure that differences in plane surface will be highlighted at the time of installation.

21.5.4 Movement Joints: To be a minimum width of 6mm, carried through tile and bedding and where substantial movement anticipated through the rigid sheet to the structure. Install joints over expansion joints, at junctions between different backgrounds, abutting other materials, at storey heights horizontally and 3/4.5m vertically, at internal corners and at junctions with floors and columns. Ensure joints are clean, formed, filled and sealant inserted all to sealant manufacturer's instructions.

21.5.5 Tile Finish/Joints: Finish surface to be flat and true to tolerance of ± 4mm in 2 metres from the required plane. Clean surplus bedding material from joint spaces and surface of the tiles. Joint widths to be consistent throughout

installation with 1.5mm width for dust-pressed tiles and 6mm for extruded tiles measured at the tile face. Joint alignment to be consistent throughout the installation and to a tolerance of ± 4mm in 2 metres from the detailed joint alignment.

21.5.6 Thin Bed Fixing: Apply adhesive to a maximum 3mm bed thickness with a minimum of voids.

Notched trowel method - for internal dry applications, spread adhesive to uniform thickness and 'rib' it with a notched trowel to manufacturer's instructions. press tile and beat it into place to obtain adequate coverage by adhesive on the back of each tile.

Floating method - apply adhesive to a uniform thickness. Apply the tile with a twisting or sliding action and tap back firmly into the floated bedding.

Buttering: butter adhesive evenly over the whole of the back of the tile with a trowel slightly thicker than the final required adhesive thickness. Press and tap firmly into position leaving no voids. Do not use "spot-fixing".

Occasionally remove a tile as fixing proceeds to check the maintaining of adequate contact with the adhesive.

21.5.7 Thick Bed Fixing: Apply thick-bed cement based adhesive to an average 6mm bed thickness as a floated bed and to manufacturer's instructions. Prepare and fix tile by method recommended by the adhesive manufacturer and beat/tap them firmly into place.

21.5.8 Grouting: Remove spacers unless designed to remain in-situ. Wet the joints between tiles and apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until all joints are completely filled with no adhesive showing. Avoid damage to surface of tiles even to the use of masking tape where necessary. Finish to depth of cushion and flush with surface to cushion edge and square-edge tiles. Remove surplus grout with a damp cloth and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

21.5.9 Grouting - Proprietary: Remove spacers unless designed to remain in-situ. Prepare joints, mix and apply grout and finish off to grout manufacturer's instructions to finish the grout uniform in colour smooth and without voids, pinholes or low spots.

21.6 COMPLETION

21.6.1 Upon completion of setting and grouting thoroughly sponge and wash the tiles to leave completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

21.6.2 All trade rubbish and materials/tiles not used are to be taken away from site

SECTION 23: PAINTING

23.1 STANDARDS:

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

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

23.2 SAMPLES:

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

23.3 INSPECTION AND REVIEW:

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

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

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

23.4 MATERIALS:

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

23.4.2 Anti-mould, Anti Fungal Paint:
All paints used must be anti fungal, anti mould paints.

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

23.4.4 Combinations:

Do not combine paints from different manufacturers in a paint system.

23.4.5 Delivery:
Deliver paints to the site in the manufacturer's labelled and unopened containers.

23.4.6 Thinners:
Use only the type and quantity recommended by the paint manufacturer.

23.4.7 Tinting by Manufacturer:
Colour tinting shall be by the manufacturer unless otherwise approved.

23.4.8 Tinting by Sub-Contractor:
Add tinters or stainers only if approved, and only if in accordance with the manufacturer's recommendations as to type, quality and tinting formula, and provided the tinting produces the required colour without detriment to the durability or aesthetic performance of the product.

23.4.9 Putty
Putty shall be to AS 1263, Type 1 & 2, or an equivalent polymeric based putty. Putty may be stained to match the colour of the substrate.

23.5 GLOSS LEVEL

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

23.6 PRIMERS, SEALERS, UNDERCOATS

23.6.1 Ensure that primers, sealers and undercoats are suitable for the substrate and compatible with the finish coat and each other.

23.6.2 Except for stains and other clear or translucent finishes each coating shall be of a noticeably different tint from the preceding coat.

23.6.3 Review details of the substrata, finishes required, etc. with the relevant paint manufacturer and make sure that the current printed directions of the paint manufacturer are adhered to in all instances.

23.7 WORKMANSHIP

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

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

23.7.2 Order of Work:

Unless otherwise specified, before commencing to paint, complete the work of all other trades as far as is practicable within the area to be painted except for installation of fittings and laying of flooring materials.

23.7.3 Painting Conditions:
Do not paint in dusty conditions, or otherwise unsuitable weather. Do not paint when the relative humidity exceeds 85%, or when the surface temperature of the substrate is less than 10° C or more than 50°C, unless the paint is suitable and recommended for such conditions by the relevant paint manufacture.

23.7.4 Protection:
Before painting in any section of the Works, clean the area out and protect it against dust entry. Use drop sheets and masking wherever necessary to protect finished work or other surfaces liable to damage during painting. Repair or replace any accessories or surfaces that are damaged directly or indirectly as a result of painting. Cover all horizontal surfaces to avoid paint spatters to concrete, etc.

23.7.5 Movable Fittings:
Remove door furniture, switch plates, light fittings and the like and replace on completion of painting.

23.7.6 Light Levels:
During preparation of surfaces, painting and inspection maintain light levels such that the luminance (photometric brightness) of the surface is at least equal to that produced under daylight and/or maximum permanent artificial illumination conditions.

23.7.7 Ventilation:
Adequately ventilate the areas in which painting is being carried out.

23.7.8 Paint Storage and Waste Disposal:
Store and prepare paint and related materials in an area specifically assigned. Take necessary precautions to prevent fire and accumulation of solvent fumes. Remove paint-soiled rags, waste, and the like at the end of each day's work or store in airtight metal containers underwater. Remove empty cans and other debris arising out of the painting work from the site upon completion of work.

23.7.9 Paint Preparation:
Mix and apply paint in accordance with the manufacturer's recommendations. Do not mix paint in areas or on surfaces liable to damage from spillage.

23.7.10 Touch Up:
Clean off marks, paint spots and stains throughout, restoring damaged surfaces to their orginal condition. Touch up damaged paintwork or misses only with the paint batch used in the original application.

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

23.8 SUBSTRATE PREPARATION:

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

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

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

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

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

23.9 APPLICATION:

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

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

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

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

23.10 PAINT SCHEDULE:

Surface	1st Coat	2nd coat	3rd coat
Timber (interior)			
Resene	Resene QD undercoat	Resene Enamacryl or	Resene Enamacryl or
	Resene QD undercoat	Supergloss enamel	Supergloss enamel
Dulux			
Taubmans			
Timber (exterior)			
Resene	Resene QD undercoat	Resene Enamacryl or	Resene Enamacryl or
	Resene QD undercoat	Supergloss enamel	Supergloss enamel
Dulux			
Taubmans			
Timberstain (interior)			
Resene	Timberstain	Timberstain	Not reqd
Dulux			
Taubmans			
Timberstain (exterior)			
Resene	Woodsman	Woodsman	Not reqd
Dulux			
Taubmans			
Structural Steel			
Resene	Rust Arrest or	Supergloss or	Supergloss or
	Amourcote 220	Amourcote 510	Uracryl 403
Dulux			
Taubmans			
Concrete pavers			
Resene	Sidewalk or	Sidewalk or	Not reqd or
	Durepox primer 2 pack system	Uracryl 403	Uracryl 403
Dulux			
Taubmans			
Concrete Walls			
Resene	Resene QD primer	Sonyx 101 acrylic semigloss or Lumbersider lowsheen	Sonyx 101 acrylic semigloss or Lumbersider lowsheen
Dulux			
Taubmans			
Plasterboard			
Resene	Broad Wall - 3 gib primer	Lustacryl or	Lustacryl or
		Sonyx 101	Sonyx 101
Dulux			
Taubmans			

Compressed cement sheet			
Resene	Sureseal or Amourbond sealer	Lustacryl/ Enamacryl or Amourcote 510	Lustacryl/ Enamacryl or Uracryl 403
Dulux			
Taubmans			
Timber floor (interior)			
Resene	Polythane gloss	Polythane gloss	Polythane gloss
Dulux			
Taubmans			
Timber floor (exterior)			
Resene	Uracryl 403 gloss Uracryl 402 satin Uracryl 404 low sheen Imperite 413 gloss	Uracryl 403 gloss Uracryl 402 satin Uracryl 404 low sheen Imperite 413 gloss	Uracryl 403 gloss Uracryl 402 satin Uracryl 404 low sheen Imperite 413 gloss
Dulux			
Taubmans			
Timber Walls			
Resene	Multishield gloss Multishield satin Multishield flat	Multishield gloss Multishield satin Multishield flat	Not reqd Not reqd Not reqd
Dulux			
Taubmans			

SECTION 24 : GLAZING

24.1 PRELIMINARY :

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

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

B1/AS1	Structure - general 7.0 Glazing
F2/AS1	Hazardous materials Glazing.
NZS 4223	Glazing in buildings, parts 1 & 2.
NZS 4211	Performance of windows.
AS 1170	SAA Loading Code, Part 2 - Wind Forces
AS 1288	SAA Glass Installation Code, Part 1 - Selection of Glass & Part 2 -Glazing Techniques
AS 2047	Aluminium Windows for buildings
AS 2048	Code of Practice for the installation and maintenance of aluminium windows in buildings
AS 2208	Safety Glazing materials for use in buildings (human impact consideration)
BS 952	Glass for Glazing Part 1 - Classification Part 2 - Terminology for work on glass
TTS-001543A	Sealing compound, silicone rubber base (US Federal Interim Specification Standard)

24.2 WORKMANSHIP:

24.2.1 All work in this section shall be carried out by competent tradesmen in a workmanlike 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.

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

24.3 GENERAL:

24.3.1 Do not deliver to site any components that cannot be immediately unloaded into suitable conditions of storage.

24.3.2 Unload, handle and store components in accordance with manufacturer's

recommendations, without distortion and avoiding prefinished surfaces rubbing together, and contact with mud, plaster and cement. Keep paper and cardboard wrappings dry.

24.3.3 Proprietary Components: Fix in accordance with manufacturer's recommendations.

24.4 MATERIAL:

24.4.1 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.

24.4.2 Mirrors: 6mm selected glazing quality polished plate. Supply and fix mirrors to 4mm plywood backing and wall with chrome dome head screws. Arrise all edges. Fit rubber washers between the backing and the wall.

24.4.3 Glazed bifold and sliding doors: 6.38mm laminated glass with clear laminate

24.5 SEALING JOINTS AROUND FRAMES

24.5.1 Preparation: Ensure joints are dry. Remove all loose material, dust and grease.

24.5.2 Prepare joints in accordance with sealant manufacturer's recommendations, using recommended solvents and primers where necessary.

24.5.3 Mask adjoining surfaces that would be difficult to clean if smeared with sealant.

24.5.4 Backing: Insert back-up behind all joints to be pointed with sealant.

24.5.5 Back-up material: Polyethylene rod or tape.

24.5.6 Pointing: Tool sealant to form a smooth fillet with a profile and dimensions recommended by sealant manufacturer.

24.5.7 Finishing: Remove excess sealant from adjoining surfaces, using cleaning materials recommended by sealant manufacturer and leave clean.

24.6 BREAKAGES:

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

24.7 OBSCURE GLASS:

24.7.1 Unless otherwise specified, windows and doors to all bathrooms must be glazed using an approved obscure 6mm glass.

24.8 MAXIMUM GLASS AREAS FOR VARIOUS GLASS THICKNESS :

Based on the following criteria
(source of data AS 1288 Part 1: 1979 "Glass Installation Code"):

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

Minimum Thickness	Maximum Area (m2)	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:

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

24.9 COMPLETION:

24.9.1 Protection: Whiten or tape all glass. Any damage to finishes by following trades to be made good as required by the architect at the contractor's expense.

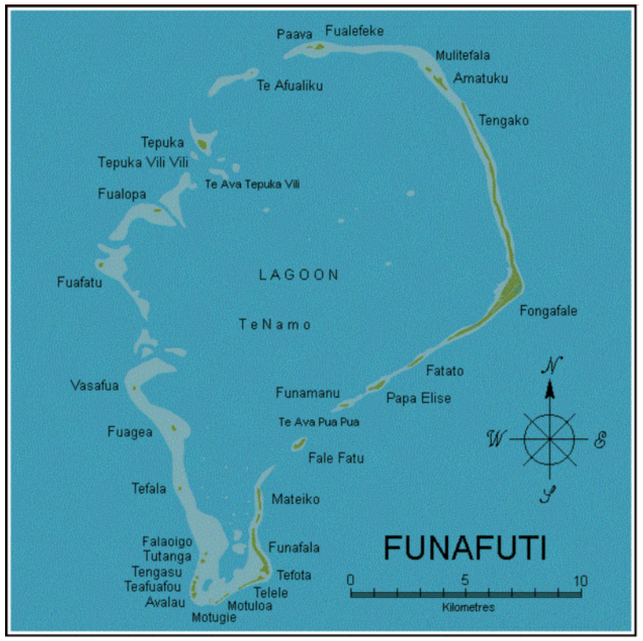
24.9.2 Clean Down: Clean down frames, sashes, glass and other surfaces at completion of installation for inspection by architect.

TUVALU FISHERIES DEPARTMENT

NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

PROJECT SITE IMAGE

DRAWING INDEX	
DRAWING TITLE	SHEET NO.
TITLE PAGE, LOCALITY & SITE PLAN & DRAWING INDEX	A-00
GENERAL NOTES	A-01
FLOOR PLAN	A-02
ELEVATIONS	A-03
SECTIONS 1-1 & ROOF DETAILS	A-04
ROOF DETAILS	A-05
ROOF PLAN	A-06
ROOF FRAMING PLAN	A-07
WINDOW & DOOR SCHDULE	A-08
ELECTRICAL PLAN	E-01
FOUNDATION PLAN & FOOTING DETAILS	S-01



LOCALITY MAP
SCALE: NTS

Matavuvale Builders
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REV	DATE	DESCRIPTION
A	20.07.22	CLIENT REVIEW (CONCEPT DRAWINGS)
B	15.08.22	WORKING DRAWINGS
C	23.08.22	ISSUED FOR APPROVAL DRAWINGS

CLIENT : TUVALU FISHERIES DEPARTMENT

PROJECT :
PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :
TITLE PAGE
LOCALITY & SITE IMAGE
DRAWING INDEX

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	A - 00

GENERAL

1) STRUCTURAL DRAWINGS TAKE PRECEDENCE OVER ENGINEERING SPECIFICATION.

2) THE STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION AND ALL OTHER PROJECT DRAWINGS.
ANY DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER FOR RESOLUTION.

3) THE LOCATION, SIZE AND DETAILS OF ALL PENETRATIONS, RECESSES, SLEEVES, HOLES etc. IN STRUCTURAL MEMBERS, MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION UNLESS SHOWN ON THE STRUCTURAL DRAWINGS. THESE ITEMS SHALL BE CAST–IN, FORMED, OR SHOP FABRICATED AND SHALL NOT BE CUT OR COVED ON SITE, U.N.O.
UNLESS APPROVED BY THE ENGINEER.

4) SUBSTITUTION FOR OR AMENDMENT OF SPECIFIED DETAILS OR MATERIALS SHALL NOT BE CARRIED OUT WITHOUT APPROVAL OF THE ENGINEER.

5) ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH STATUTORY AUTHORITIES AND LOCAL BY–LAWS, THE SPECIFICATIONS AND NZS/AS CODES.
WHERE A CONFLICT EXISTS THE MOST STRINGENT CONDITIONS SHALL APPLY.
WHERE A PROPRIETARY PRODUCT IS NAMED AN APPROVED EQUIVALENT MAY BE USED.

6) DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE WORKS IN A SAFE AND STABLE CONDITION AND ENSURING THAT NO PART SHALL BE OVERSTRESSED UNDER CONSTRUCTION ACTIVITIES.
CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN OF ALL TEMPORARY BRACING AND SUPPORT, FOR MAINTAINING STABILITY OF ALL WORK DURING CONSTRUCTION.

7) ALL CONSTRUCTION NOT SHOWN, NOT REQUIRING SPECIFIC DESIGN. IS TO COMPLY WITH THE FIJI BUILDING CODE.

DIMENSIONS

1) REFER TO ARCHITECTS DRAWINGS FOR ALL DIMENSIONS AND LEVELS.

2) REFER TO ARCHITECTS DRAWINGS AND ALL OTHER PROJECT DRAWINGS FOR THE LOCATION OF STEPS, PENETRATIONS AND REBATES.

3) ALL DIMENSIONS AND LEVELS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE VERIFIED WITH ALL OTHER PROJECT DRAWINGS PRIOR TO CONSTRUCTION COMMENCING.
ANY DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER FOR RESOLUTION.

4) LEVELS SHOWN ON STRUCTURAL DRAWINGS ARE TO THE TOP OF STRUCTURAL CONCRETE OR STEELWORK U.N.O.

5) DO NOT SCALE THE DRAWINGS.

6) ALL DIMENSIONS ARE IN MILLIMETRES.

7) ALL DIMENSIONS TO EXISTING STRUCTURE SHALL BE VERIFIED BY SITE MEASUREMENT PRIOR TO FABRICATION.

ABBREVIATIONS

APPROX	APPROXIMATE	(N)	NEW
AS	AUSTRALIAN STANDARD (i.e. AS 1214.)	NA	NOT APPLICABLE
B	BOTTOM	NB	NOMINAL BORE
BM	BEAM	NF	NEAR FACE
C	COVER	NTS	NOT TO SCALE
C/C	CENTRE TO CENTRE	NZS	NEW ZEALAND STANDARD (i.e. NZS4711)
CHS	CIRCULAR HOLLOW SECTION	O/A	OVERALL
CJ	CONSTRUCTION JOINT	OD	OUTSIDE DIAMETER
	CENTRE LINE	OPP	OPPOSITE
COL	COLUMN	PL	PLATE
CONC	CONCRETE	PC	PRECAST CONCRETE
COS	CHECK ON SITE	PCD	PITCH CIRCLE DIAMETER
CRS	CENTRES	PFC, [	PARALLEL FLANGE CHANNEL
D	DEFORMED BAR GRADE 300	R	PLAIN BAR GRADE 300
DIA	DIAMETER	RAD	RADIUS
DIAG	DIAGONAL	RC	REINFORCED CONCRETE
DIM	DIMENSION	REF	REFER, REFERENCE
DP	DOWN PIPE	REINF	REINFORCING
DPC	DAMP PROOF COURSE	RHS	RECTANGULAR HOLLOW SECTION
DWG	DRAWING	RL	REDUCED LEVEL
EA	EQUAL ANGLE	RSA, L	ROLLED STEEL ANGLE
EF	EACH FACE	SIM	SIMILAR
EL, ELEV	ELEVATION	SJ	SAWCUT JOINT
EW	EACH WAY	SP	STRUCTURAL PURPOSE
EXTG, (E)	EXISTING	SQ	SQUARE
FDN	FOUNDATION	S/S	STAINLESS STEEL
FF	FAR FACE	STD	STANDARD
FFL	FINISHED FLOOR LEVEL	SYMM	SYMMETRICAL
FRR	FIRE RESISTANCE RATING	T	TOP
FW	FILLET WELD	TFB	TAPER FLANGE BEAM
FWAR	FILLET WELD ALL ROUND	THK	THICK
GL	GROUND LEVEL	TOC	TOP OF CONCRETE
HD	DEFORMED BAR GRADE 500	TOG	TOP OF GRATING
HR	PLAIN BAR GRADE 500	TORC	TOP OF ROUGH CONCRETE
H.D. BOLT	HOLDING DOWN BOLT	TOS	TOP OF STEEL
H.D. GALV.	HOT DIPPED GALVANIZED	TYP	TYPICAL
HORIZ	HORIZONTAL	UA	UNEQUAL ANGLE
ID	INSIDE DIAMETER	UB	UNIVERSAL BEAM
IL	INVERT LEVEL	UC	UNIVERSAL COLUMN
IP	INTERSECTION POINT	UNO	UNLESS NOTED OTHERWISE
MAX	MAXIMUM	U/S	UNDERSIDE
MIN	MINIMUM	VERT	VERTICAL

TIMBER

1) ALL TIMBER WORK SHALL COMPLY WITH THE FIJI 'HOME BUILDING MANUAL'.
ALL TIMBER TO BE A MINIMUM OF H3 CCA TREATED. GRADE F7.
UNLESS NOTED OTHERWISE.

2) ALL WALLS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE TIMBER FRAMED.

3) ALL STUDS SHALL BE NOGGED AT 800 CRS. REFER TO ARCHITECTS DRAWINGS FOR ACOUSTIC AND FIRE–RATING REQUIREMENTS FOR WALLS.

4) TIMBER IS TO BE KEPT AS DRY AS POSSIBLE. INTERNAL LININGS ARE NOT TO BE FIXED IN PLACE UNTIL TIMBER FRAMING IS SUITABLY DRY. ALL REMEDIAL WORK THAT IS CAUSED BY USING WET TIMBER, IS THE CONTRACTORS RESPONSIBILITY TO FIX.

5) ALL 2/100x50 AND 2/150x50 TIMBER POSTS TO BE FIXED DOWN TO CONCRETE FLOOR WITH A MINIMUM OF 2–M12 BOLTS AND 2 No 6 kn NAIL PLATE STRAPS.

REINFORCED CONCRETE

1) CONCRETE STRENGTHS:

CONCRETE STRENGTHS ARE 'SPECIFIED 28 DAY COMPRESSIVE STRENGTHS' AS DEFINED IN NZS 3101:2006.
CONCRETE STRENGTH SHALL BE 30 MPa.

2) CONCRETE SURFACE FINISHES:

SURFACE FINISHES ARE GENERALLY SPECIFIED ON INDIVIDUAL DRAWINGS.
WHERE NOT SPECIFIED, AND NOT SHOWN ON ARCHITECTURAL DRAWINGS,
SURFACE FINISHES SHALL BE AS FOLLOWING (REFER NZS 3114:1987 FOR DEFINITIONS)

a) CONCEALED FORMED FOUNDATION SURFACES – F1
b) VISIBLE FORMED SURFACES OF BEAMS, COLUMNS, WALLS, PANELS AND SLAB EDGES – F4
c) INTERNAL SLABS – U2
d) EXTERNAL SLABS – U5
e) PROVIDE 25mm CHAMFERS FOR ALL EXPOSED EDGES AND 25mm FILLET FOR ALL RE–ENTRANT CORNERS.

3) DPC TO BE TAPED AND PROTECTED FROM DAMAGE.

4) SCABBLE AND DAMPEN ALL CONCRETE JOINTS PRIOR TO POURING AGAINST.

5) ALL REINFORCING IS TO BE FREE OF GREASE, OIL, MUD, etc.

6) PLACING AND SPACING OF REINFORCEMENT – GENERAL:

a) PLACE STARTER BARS AND REINFORCING BARS ACCURATELY.
b) SPLICING OF REINFORCEMENT, WHETHER BY LAPPING, WELDING OR MECHANICAL SPLICE, SHALL ONLY BE CARRIED OUT AS SHOWN ON THE DRAWINGS OR AS SPECIFICALLY APPROVED BY THE ENGINEER, EXCEPT AS NOTED BELOW:
– WELDED WIRE MESH SHALL BE SPLICED AS REQUIRED, BUT NOT THROUGH SLAB JOINTS
– REINFORCEMENT IN SLABS ON GRADE AND IN TOPPINGS SHALL BE SPLICED AS REQUIRED, BUT NOT THROUGH SLAB JOINTS.
c) LAYERS OF BEAM REINFORCEMENT SHALL BE SEPARATED WITH R32 BARS AT 1500 CRS.
d) ALL HOOKS ON STIRRUPS & TIES MUST FIT CLOSELY AROUND MAIN BARS U.N.O.
FIRST STIRRUP TO BE PLACED NOT FURTHER THAN THE LESSER OF 1/2 STIRRUP SPACING OR 50mm FROM SUPPORT FACE.

7) CONCRETE COVER TO REINFORCEMENT

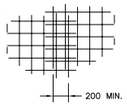
MINIMUM CONCRETE COVERS ARE GENERALLY SPECIFIED ON INDIVIDUAL DRAWINGS.
WHERE NOT SPECIFIED, MINIMUM CONCRETE COVERS SHALL BE AS FOLLOWS:

EXPOSURE SITUATION	FOUNDATIONS	BEAMS AND COLUMNS		SLABS, WALLS AND RIBS
		MAIN BARS	TIES, STIRRUPS AND SPIRALS	DIA. <24/DIA. ≥24
CAST AGAINST AND EXPOSED TO EARTH	75	75	75	75
EXPOSED TO WEATHER OR EARTH – CAST IN PLACE – PRECAST	 50 50	 50 45	 40 40	 40/45 40/40
NOT EXPOSED TO WEATHER OR EARTH – CAST IN PLACE – PRECAST	 – –	 40 35	 30 25	 30/35 25/30

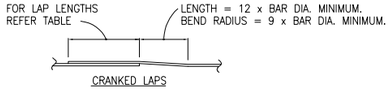
NOTES:
– TOLERANCES ON COVERS SHALL BE:
FOR BAR DIA. ≤20 – +10, –0
FOR BAR DIA. >20 – +15, –0
– PRECAST IN THE CONTEXT OF THIS TABLE MEANS CONCRETE CAST UNDER PLANT CONTROL CONDITIONS UTILISING RIGID FORMWORK AND INTENSE COMPACTION.

8) LAP SPLICES IN REINFORCEMENT

a) WELDED WIRE MESH MADE UP OF SMOOTH WIRES SHALL BE LAP SPLICED WITH A MINIMUM 200 OVERLAP BETWEEN OUTERMOST CROSS WIRES THUS:
LAP REINF BARS 300 PAST CROSS WIRE.



b) WELDED MESH MADE UP OF DEFORMED BARS SHALL BE LAP SPLICED.
c) LAP LENGTHS FOR DEFORMED BARS SHALL BE AS SHOWN IN THE FOLLOWING TABLES UNO.
d) LAP LENGTHS FOR PLAIN ROUND BARS SHALL BE TWICE THOSE SHOWN IN THE FOLLOWING TABLES.
e) ALL BEAM AND COLUMN MAIN REINFORCEMENT LAP SPLICES SHALL HAVE CRANKED LAPS UNO.
f) CRANKED LAPS SHALL BE THUS:



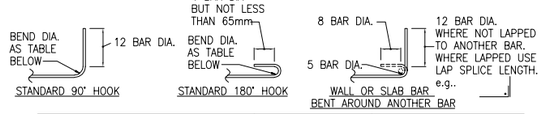
g) TABLES REINFORCEMENT LAPS:
– ALL LAPS ARE TO BE IN ACCORDANCE WITH NZS 3101. 2006

CONC. 30 MPa STEEL Gr. 500	BAR DIAMETER					
	HD10	HD12	HD16	HD20	HD25	HD32
ALL BARS EXCEPT AS BELOW	600	720	950	1200	1500	1900
FOR – COLUMNS. VERT WALL BARS. BOTTOM OF BEAMS. SLABS < 300mm	460	550	730	950	1150	1500

CONC. 30 MPa STEEL Gr. 300	BAR DIAMETER				
	D10	D12	D16	D20	D25
ALL BARS EXCEPT AS BELOW	360	430	570	750	900
FOR – COLUMNS. VERT WALL BARS. BOTTOM OF BEAMS. SLABS < 350mm	300	330	440	550	700

10) BENDING OF REINFORCEMENT:

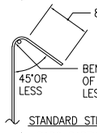
a) BENDS FOR ALL BARS EXCEPT STIRRUPS AND TIES.



STEEL GRADE	BAR DIA.(mm)	MINIMUM DIA. OF BEND
GRADE 300 and GRADE 500 FOR CONCRETE ⩾ 40 MPa or CONC < 40 MPa WITH TRIMMER TO INSIDE OF BEND	6–20	5 BAR DIA.
	24–40	6 BAR DIA.
GRADE 500 FOR CONC <40 MPa	6–20	8 BAR DIA.
	24–40	10 BAR DIA.

NOTE: CONC DENOTES CONCRETE STRENGTH

b) BENDS FOR STIRRUPS, TIES, RECTANGULAR & CIRCULAR HOOPS



STEEL GRADE	BAR DIA(mm)	MINIMUM DIA OF BEND	
		PLAIN BARS	DEFORMED BARS
300/500	6–20	2 BAR DIA.	4 BAR DIA.
300/500	24–40	3 BAR DIA.	6 BAR DIA.

c) BARS PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE SITE BENT UNLESS SHOWN ON THE DRAWINGS OR SPECIFICALLY APPROVED BY THE ENGINEER.

11) ALL REINFORCING BARS TO BE MICRO–ALLOYED 500E AND 300E GRADE BARS.
NO REINFORCING BARS ARE TO BE USED THAT HAVE BEEN MANUFACTURED USING THE QUENCHED AND TEMPERED PROCESS (QT).

12) ALL REINFORCING MESH TO BE MICRO–ALLOYED SEISMIC GRADE 500E REINFORCING MESH.

PRECAST CONCRETE SYSTEMS

1) DESIGN:

a) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE PRECAST FLOOR SYSTEM TO THE REQUIREMENTS OF NZS 4203 AND NZS 3101.

2) PRECAST UNIT TOLERANCES:

a) THE TOLERANCE FOR UNIT LENGTH SHALL BE SUCH THAT THE SEATING OF UNITS COMPLIES WITH THE SYSTEM DESIGNER's RECOMMENDATIONS AND THUS ENSURE THE DESIGN LOAD CAPACITY OF THE PRECAST SYSTEM.

b) PRECAST UNITS TO HAVE 75mm END SEATING AND 30mm SIDE SEATING. TYPICAL U.N.O.

c) THE MAXIMUM VARIATION IN CAMBER BETWEEN ADJACENT UNITS SHALL BE 15mm.

3) MANUFACTURE AND MATERIALS:

a) MANUFACTURING QUALITY CONTROL SHALL BE IN ACCORDANCE WITH THE (NZ) PRESTRESSED CONCRETE INSTITUTE's "MANUAL FOR QUALITY CONTROL FOR THE PLANTS AND PRODUCTION OF PRECAST AND PRESTRESSED CONCRETE PRODUCTS".

b) DESIGN, MATERIALS, WORKMANSHIP AND MANUFACTURE OF UNITS AND EXECUTION OF THE STRESSING OPERATIONS SHALL CONFORM TO NZS 3101 AND NZS 3109.

4) STRANDS MADE UP OF STRESS–RELIEVED COLD DRAWN WIRE SHALL COMPLY WITH BS 5896:1980.

5) CONCRETE SURFACES TO BE PRE–WETTED BEFORE PLACING TOPPING CONCRETE. CURE TOPPING CONCRETE WITH APPLICATION OF CURING MEMBRANE OR BY CONTINUALLY WETTING FOR 7 DAYS. TOPPING CONCRETE TO HAVE MAX. AGGREGATE SIZE OF 19mm AND MIN. STRENGTH OF 30 MPa.

6) PRESTRESSED FLOORING UNITS SHALL BE DESIGNED BY THE FLOOR MANUFACTURER, FOR THE FOLLOWING SUPERIMPOSED LOADS:

– LIVE LOAD Q = 5.0 kPa. (UNLESS NOTED OTHERWISE ON DRAWINGS)
– SUPERIMPOSED DEAD LOAD G = 1.0 KPa, GENERALLY.
– PLUS ADDITIONAL LINE LOADS AND POINT LOADS AS INDICATED ON PLANS.

NOTE:– THESE LOADS EXCLUDE THE WEIGHT OF THE PRECAST UNITS AND TOPPING CONCRETE.

GLAZING/ROLLER DOORS

1) ALL WINDOW/DOOR FRAMING, GLAZING AND FIXINGS TO BE ABLE TO RESIST ULTIMATE LIMIT STATE DESIGN WIND SPEED OF 70m/s AND SLS WIND SPEED OF 45 m/s. ALL DESIGN WIND PRESSURES SHALL BE OBTAINED USING AS/NZS 1170.2:2011
GLAZING TO WITHSTAND DEBRIS IMPACT AS WELL AS WIND PRESSURES AS PER AS/NZS 1170.2:2011

2) ALL GLASS DESIGN AND INSTALLATION TO BE IN ACCORDANCE TO AS/NZS 4223 PART 1–4.

3) THE CONTRACTOR TO PROVIDE FULL SET OF CALCS SHOP DWGS AND CERTIFICATION TO ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

4) ALL ROLLER SHUTTER DOORS TO BE CYCLONE RATED TO ULTIMATE WIND SPEED OF 70 m/s. CONTRACTOR TO PROVIDE CERTIFICATION OF ROLLER SHUTTER DOORS PRIOR TO INSTALLATION.

5) SEISMIC DESIGN TO BE AS PER NZS 4203:1992 USING ZONE FACTOR = 0.7.

CONCRETE BLOCK MASONRY

1) ALL MASONRY UNITS SHALL BE MANUFACTURED IN ACCORDANCE WITH AS/NZS 4455: 1997
ALL MASONRY WALLS SHALL BE CONSTRUCTED TO THE REQUIREMENTS OF NZS 4210: 2001
FOR GRADE B MASONRY.

2) ALL CELLS IN BLOCK WORK TO BE FILLED WITH GROUT, 17.5 MPa MIN STRENGTH AT 28 DAYS.

3) ALL GROUTING SHALL BE CARRIED OUT USING THE HIGH LIFT GROUTING METHOD.

4) ALL REINFORCEMENT STARTERS TO BE ACCURATELY LOCATED, TO SUIT BLOCKWORK MODULES.
BENDING REINF AT SLAB LEVEL TO ALIGN WITH BLOCKWORK CELLS WILL NOT BE PERMITTED.

5) ALLOW FOR MAKING ALL NECESSARY PENETRATIONS AND EMBEDMENT OF ALL NECESSARY CONDUITS AND FIXINGS IN BLOCKWALLS. PENETRATIONS SHALL BE FORMED, RATHER THAN CUT.

6) ALL EXPOSED BLOCKWORK RESTRAINT BRACKETS TO BE FIRE RATED TO THE EQUIVALENT FIRE RATING REQUIRED FOR THE FLOOR.

7) PROVIDE BLOCKWORK CONTROL JOINTS AT 6.0 m MAXIMUM CENTRES ALONG LENGTH OF WALLS.

8) WHERE NOT SHOWN BLOCKWALL TO BE REINFORCED VERTICALLY AT CORNERS, SIDES OF OPENINGS, END OF WALLS, INTERSECTIONS AND AT 400 CRS. WITH HD16's AND HORIZONTALLY AT TOP OF & BOTTOM OF OPENINGS AND AT 400 CRS. WITH HD16's.

STRUCTURAL STEELWORK

1) ALL STEELWORK SHALL COMPLY WITH NZS 3404:1997, AS MODIFIED BELOW

a) STRAIGHTNESS OF MEMBERS AFTER FABRICATION AND BEFORE ERECTION U.N.O. SHALL NOT DEVIATE MORE THAN:

STRUTS AND COLUMNS	= L/1000
OTHER MEMBERS	= L/600

b) LENGTH SHALL NOT DEVIATE FROM THE TRUE LENGTH BY:

STRUTS WITH END BEARING	= ±1mm
OTHER MEMBERS UP TO L = 9.0m	= +0mm, –3mm
OTHER MEMBERS OVER L = 9.0m	= +0mm, –5mm

2) BOLTING:

a) MINIMUM CONNECTION TO BE 10 PLATE AND 2–M20–8.8/S BOLTS OR 5mm FILLET WELD ALL ROUND U.N.O.
b) EDGE DISTANCES FOR BOLTS:
M16 = 30mm
M20 = 35mm
c) ALL HOLES SHALL BE DRILLED AND SHALL BE 2mm LARGER THAN THE BOLT DIAMETER U.N.O.
HOLES IN BASE PLATES MAY BE 6mm LARGER THAN THE BOLT DIAMETER U.N.O.
d) ALL BOLTS AND THREADED RODS SHALL BE M20–8.8/S U.N.O.
d) ALL BOLTS NUTS AND WASHERS INCLUDING ANCHOR BOLTS TO BE HOT DIPPED GALVANIZED BY THE MANUFACTURER TO CONFORM TO AS 1214:1983.
e) ALL BOLTS SHALL HAVE AT LEAST ONE THREAD PROJECTING THROUGH BOTH SIDES OF NUT.
f) TIGHTENING PROCEDURE SHALL COMPLY WITH AS 1252:1996.
BOLTING ABBREVIATIONS ARE TO AS 1252:1996 AND AISC PROCEDURES

No OF BOLTS X	M	DIA. OF BOLTS X	STRENGTH – GRADE	THREADS IN BEARING PLANE	TIGHTENING / PROCEDURE	FLAYING X FACE
ONE UPWARDS	ISOMETRIC THREAD PROFILE	10 12 16 20 24 30 36	4.6 – COMMERCIAL GRADE 8.8 – HIGH STRENGTH GRADE	N – NO LETTER OR THREADS NOT EXCLUDED X – THREADS EXCLUDED FROM BEARING PLANE	S – SNUG TIGHT T – FULLY TIGHT (HALF TURN OF NUT OR EQUIVALENT)	F – NO SPECIAL REQUIREMENTS B – FRICTION TYPE JOINT B – BEARING TYPE JOINT

EXAMPLES ARE: 1–M20x8.8/TB, 3–M16x4.6/S, 7–M30x8.8/TF

3) WELDING:

a) ALL WELDS SHALL BE CONTINUOUS FILLET WELDS ALL ROUND. UNLESS NOTED OTHERWISE.
SIZE SHALL BE:
5mm UP TO 12mm THICK PLATE.
8mm FOR 16mm AND 20mm THICK PLATE.

b) ALL WELDS TO BE SP (STRUCTURAL PURPOSE) CATEGORY TO AS/NZS 1554 PART 1:2000 AND MADE USING E48XX ELECTRODES TO AS/NZS 1553 PART1:1995 U.N.O.
WELDS TO EXISTING STEELWORK SHALL BE MADE USING E48XX LOW HYDROGEN WELDS.
BUTT WELDS SHALL BE QUALIFIED, COMPLETE PENETRATION FULL STRENGTH BUTT WELDS.

4) ALL STEEL MEMBERS ARE TO BE GRADE 300 OR GRADE 350 STEEL TO AS 3679 PARTS 1+2:1996 OR AS1163:1991 OR EQUIVALENT. ROD BRACING TO BE GRADE 500 REINFORCING BAR U.N.O.

5) ALL GUSSET PLATES, CLEATS AND STIFFENERS SHALL BE 10mm THICK U.N.O. AND GRADE 250 STEEL TO AS 1594:2002 OR AS 3678:1999 OR EQUIVALENT U.N.O.

6) GROUT FOR BASEPLATES SHALL BE CONBEXTRA H.F. AS MANUFACTURED BY 'FOSROC' OR 'EMBECON MASTERFLOW 713' OR EQUIVALENT.

7) STEELWORK EMBEDDED IN CONCRETE MUST NOT BE PAINTED.

8) ALL DIMENSIONS ARE TO BEAM AND COLUMN CENTRELINES OR TO THE BACK FACE OF CHANNELS.

9) STEEL BEAMS TO COLUMNS SHALL BE SET OUT WITH CENTRELINES OF UB AND BACK FACE OF PFC TO CENTRELINES OF COLUMNS U.N.O.

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B	15.08.22	WORKING DRAWINGS
C	23.08.22	ISSUED FOR APPROVAL DRAWINGS

CLIENT : TUVALU FISHERIES DEPARTMENT

PROJECT :
PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

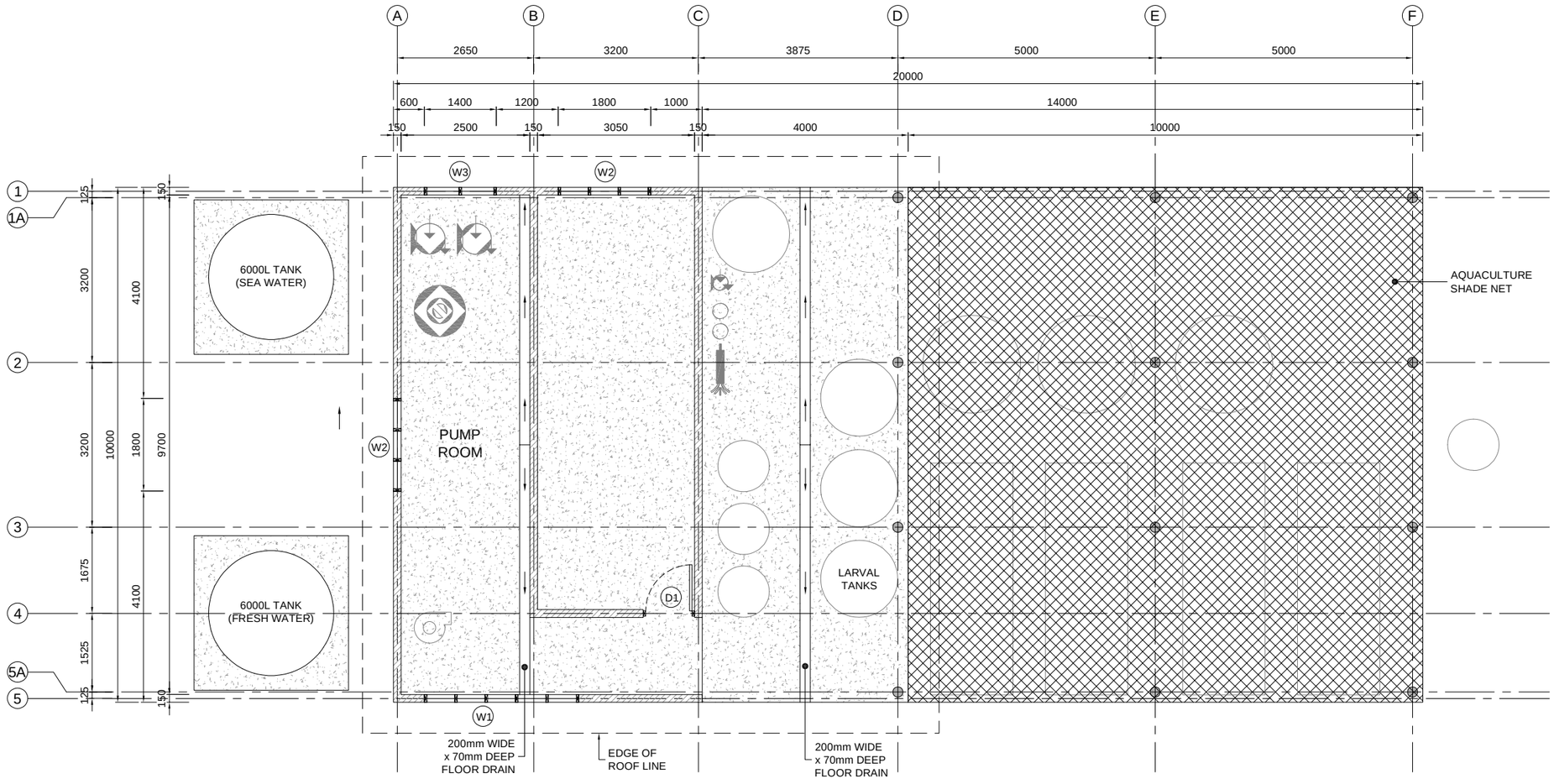
TITLE :
GENERAL NOTES

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**A - 01**

NOTES:

1. CONTRACTOR TO CONFIRM LEVELS AND DIMENSIONS ON SITE PRIOR TO ORDERING, FABRICATING & CONSTRUCTION.
2. ALL LEVELS ARE IN METERS & ALL DIMENSIONS ARE IN MILIMETERS U.N.O.
3. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS.
4. ALL CONCRETE USED TO BE 25MPa AT 28 DAYS U.N.O.
5. ALL INTERNAL & EXTERNAL WALLS TO BE 150mm THICK REINFORCED CONCRETE BLOCKWALL, PLASTERED AND PAINT FINISHED.
6. FIXTURES/TANKS SHOWN ARE FOR SCHEMATIC PURPOSES ONLY.

ELEVATION VIEWS



FLOOR PLAN

SCALE 1:100

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TUVALU FISHERIES

PROJECT :

PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :

FLOOR PLAN

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**A - 02**

NOTES:

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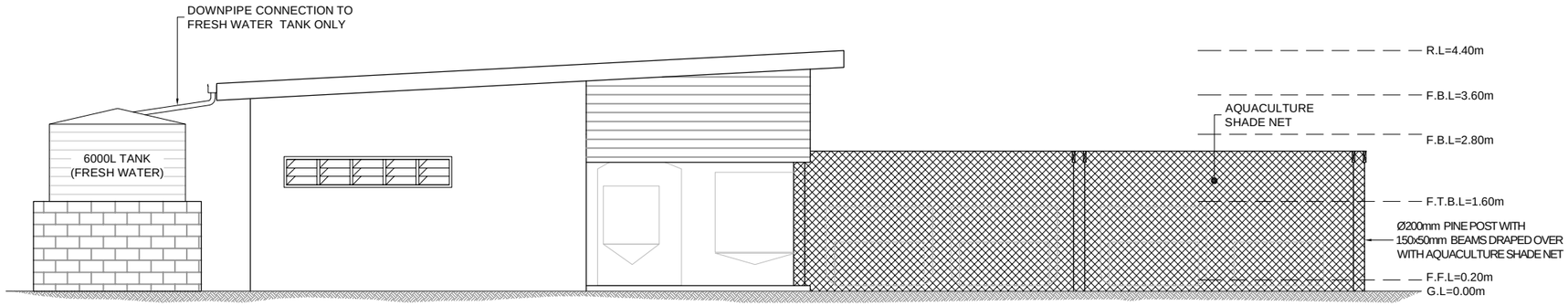
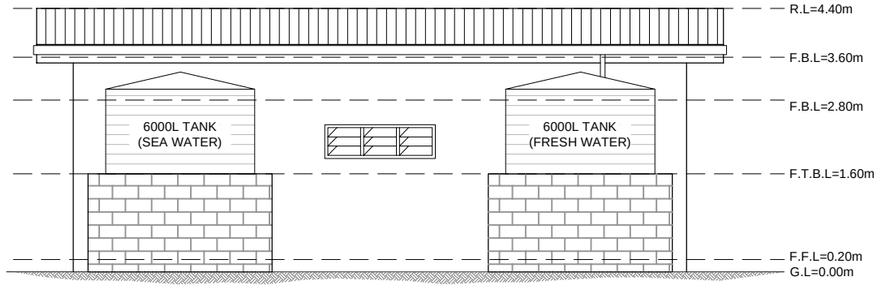
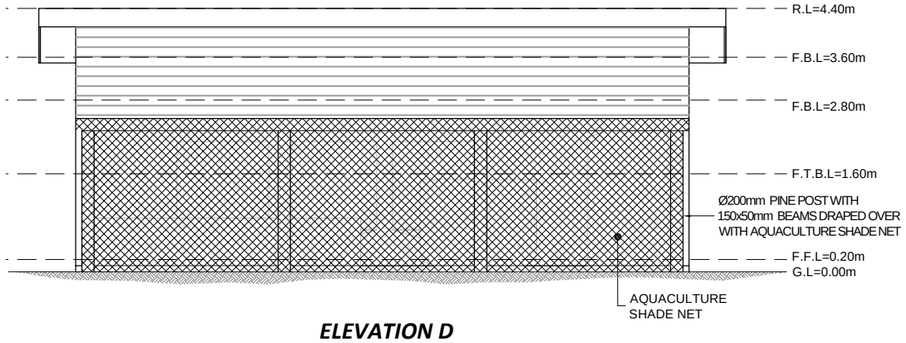


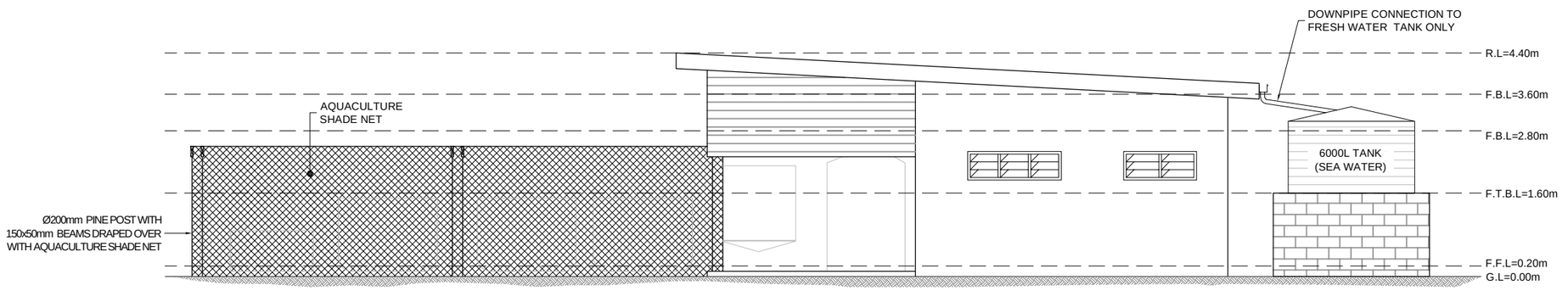
ELEVATION A
SCALE 1:100



ELEVATION B
SCALE 1:100



ELEVATION D
SCALE 1:100



ELEVATION C
SCALE 1:100

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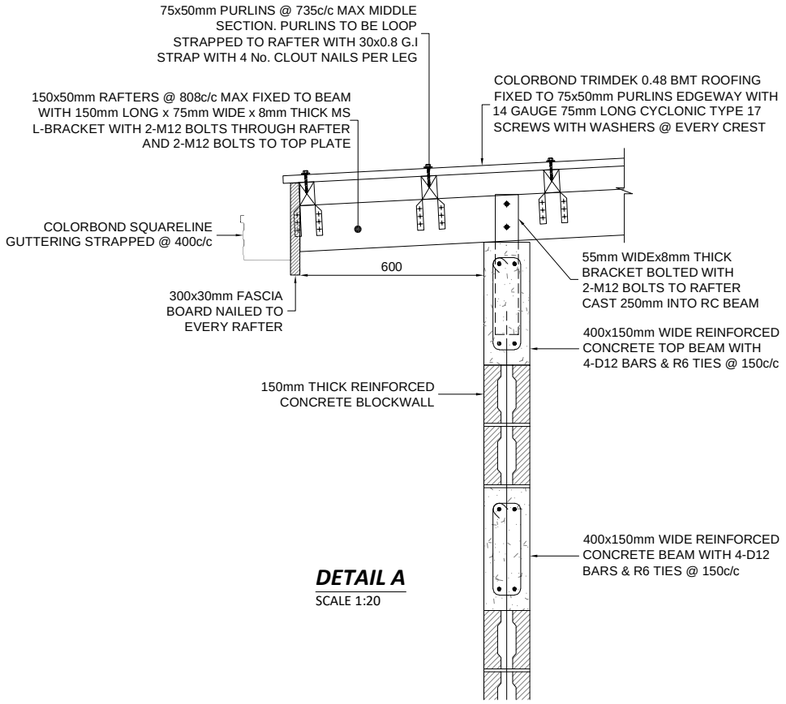
PROJECT :
PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :
ELEVATIONS

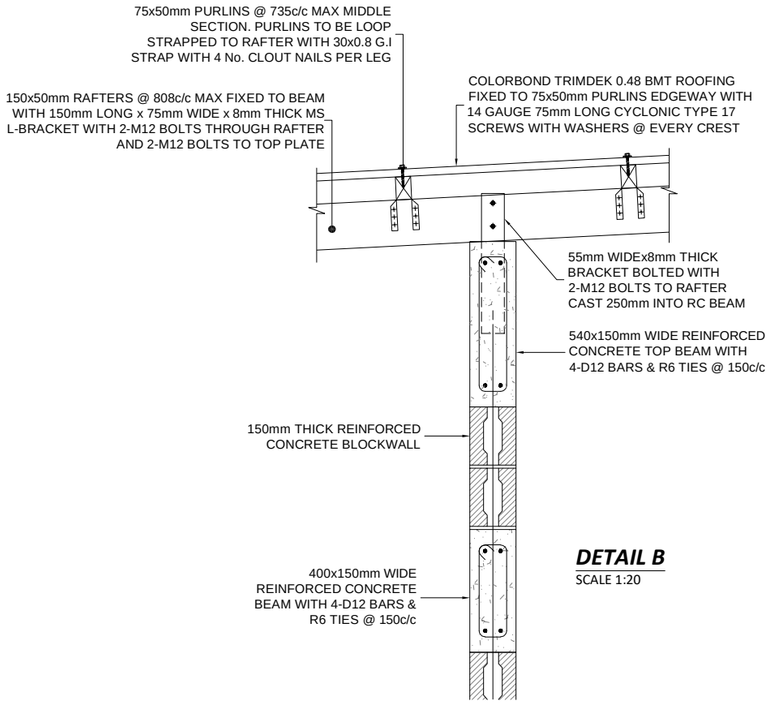
SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**A - 03**

NOTES:

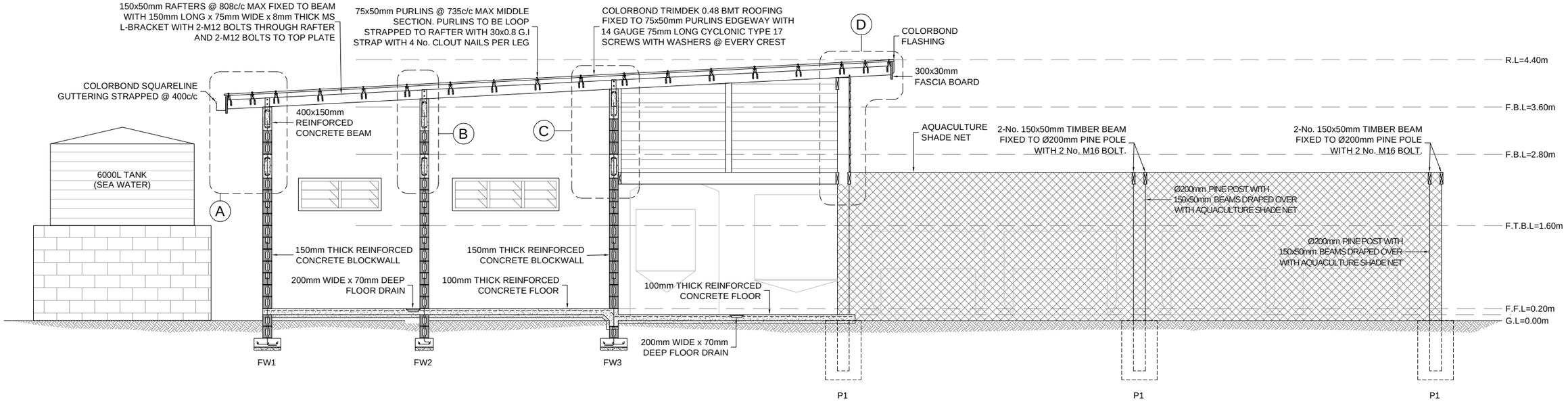
1. CONTRACTOR TO CONFIRM LEVELS AND DIMENSIONS ON SITE PRIOR TO ORDERING, FABRICATING & CONSTRUCTION.
2. ALL LEVELS ARE IN METERS & ALL DIMENSIONS ARE IN MILIMETERS U.N.O.
3. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS.
4. ALL CONCRETE USED TO BE 25MPa AT 28 DAYS U.N.O.
5. ALL INTERNAL & EXTERNAL WALLS TO BE 150mm THICK REINFORCED CONCRETE BLOCKWALL, PLASTERED AND PAINT FINISHED.
6. FIXTURES/TANKS SHOWN ARE FOR SCHEMATIC PURPOSES ONLY.



DETAIL A
SCALE 1:20



DETAIL B
SCALE 1:20



SECTION 1-1
SCALE 1:70

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PROJECT :
PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :
SECTION 1-1
ROOF DETAILS

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**A - 04**

NOTES:

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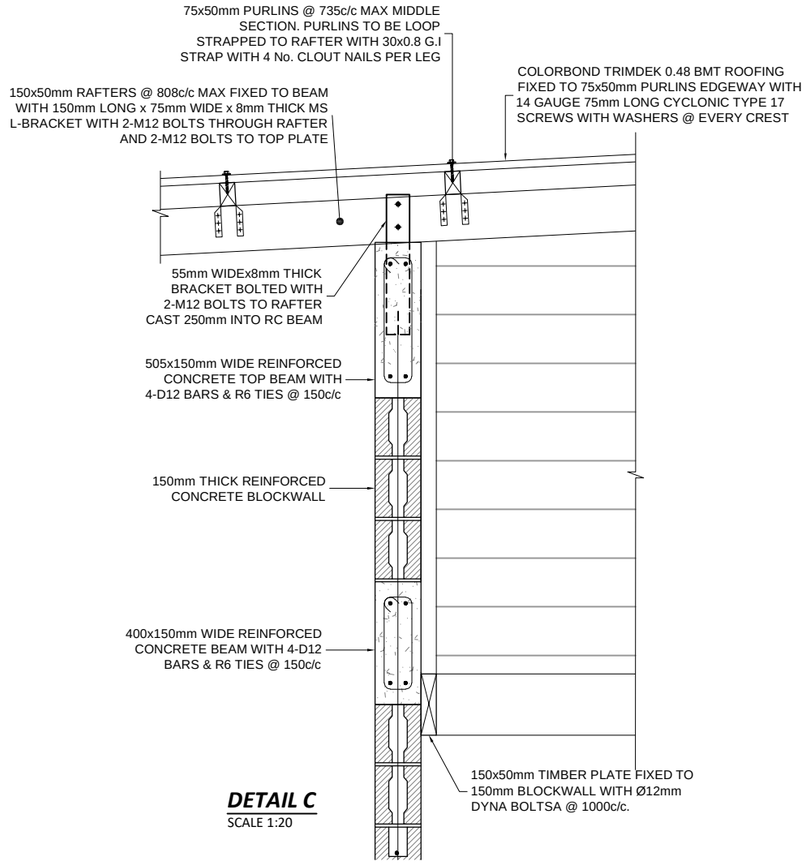
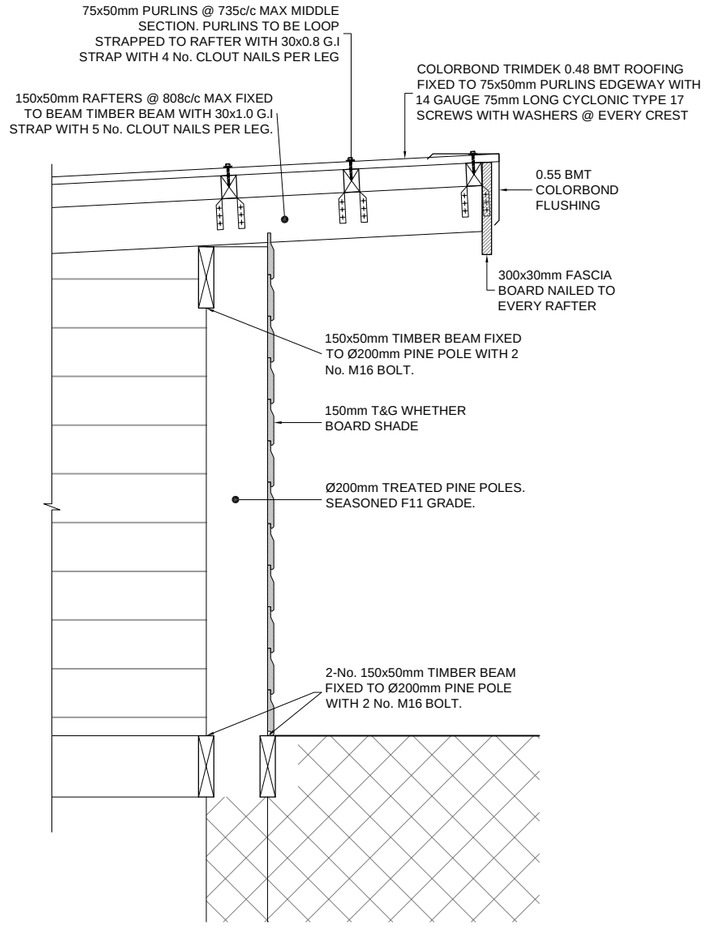
2. ALL LEVELS ARE IN METERS & ALL DIMENSIONS ARE IN MILIMETERS U.N.O.
3. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS.
4. ALL CONCRETE USED TO BE 25MPa AT 28 DAYS U.N.O.
5. ALL INTERNAL & EXTERNAL WALLS TO BE 150mm THICK REINFORCED CONCRETE BLOCKWALL, PLASTERED AND PAINT FINISHED.
6. FIXTURES/TANKS SHOWN ARE FOR SCHEMATIC PURPOSES ONLY.



DETAIL C
SCALE 1:20



DETAIL D
SCALE 1:20

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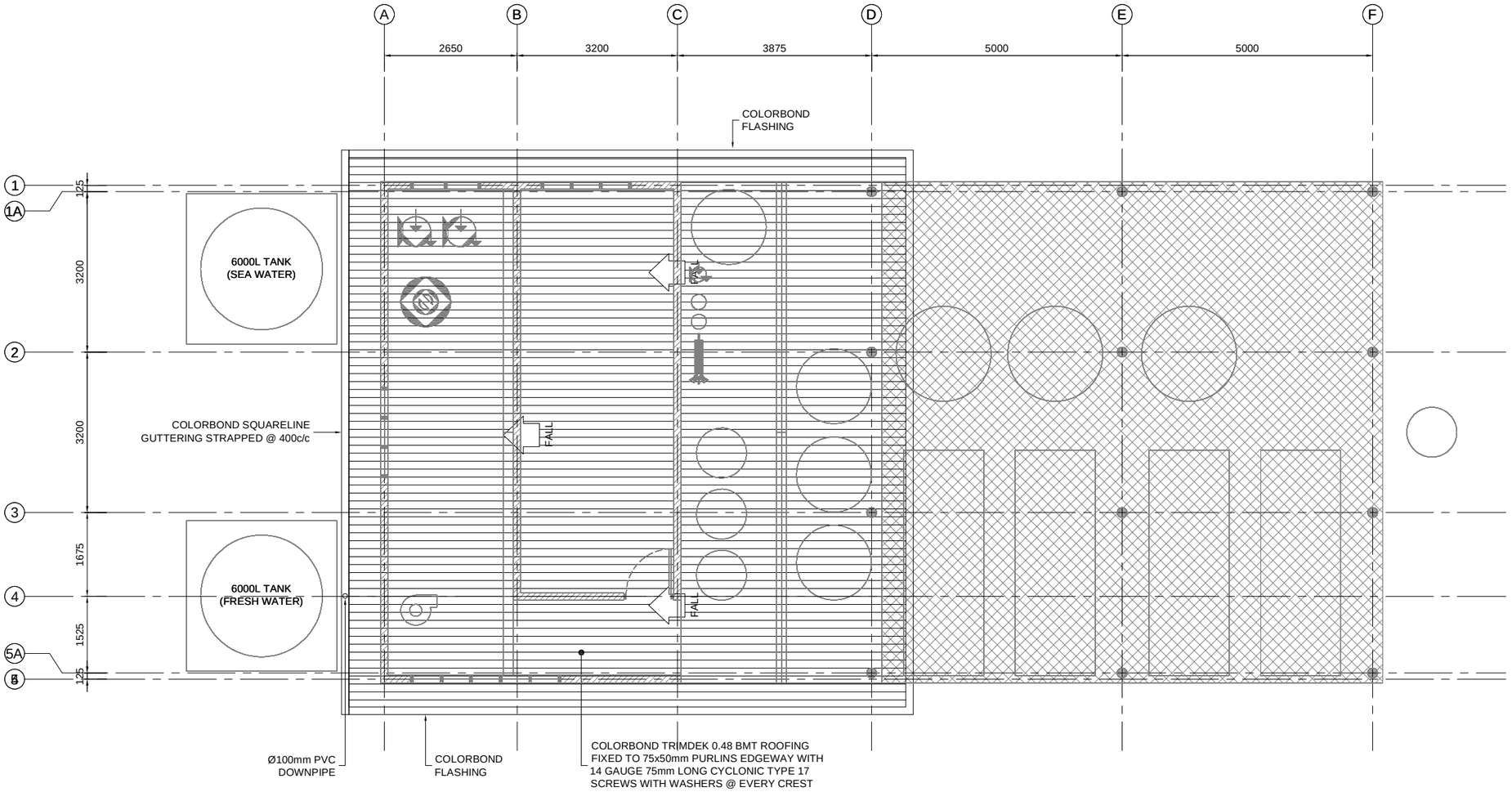
TITLE :
ROOF DETAILS

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**A - 05**

NOTES:

1. CONTRACTOR TO CONFIRM LEVELS AND DIMENSIONS ON SITE PRIOR TO ORDERING, FABRICATING & CONSTRUCTION.
2. ALL LEVELS ARE IN METERS & ALL DIMENSIONS ARE IN MILIMETERS U.N.O.
3. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS.
4. MAIN BUILDING ROOF STORMWATER TO DISCHARGE VIA Ø100mm PVC DOWNPIPES TO FRESH WATER TANK STORAGE.



ROOF PLAN

SCALE 1:100

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TUVALU FISHERIES

PROJECT :

PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :

ROOF PLAN

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	C
SHEET NO :	A - 06

NOTES:

1. CONTRACTOR TO CONFIRM LEVELS AND DIMENSIONS ON SITE PRIOR TO ORDERING, FABRICATING & CONSTRUCTION.
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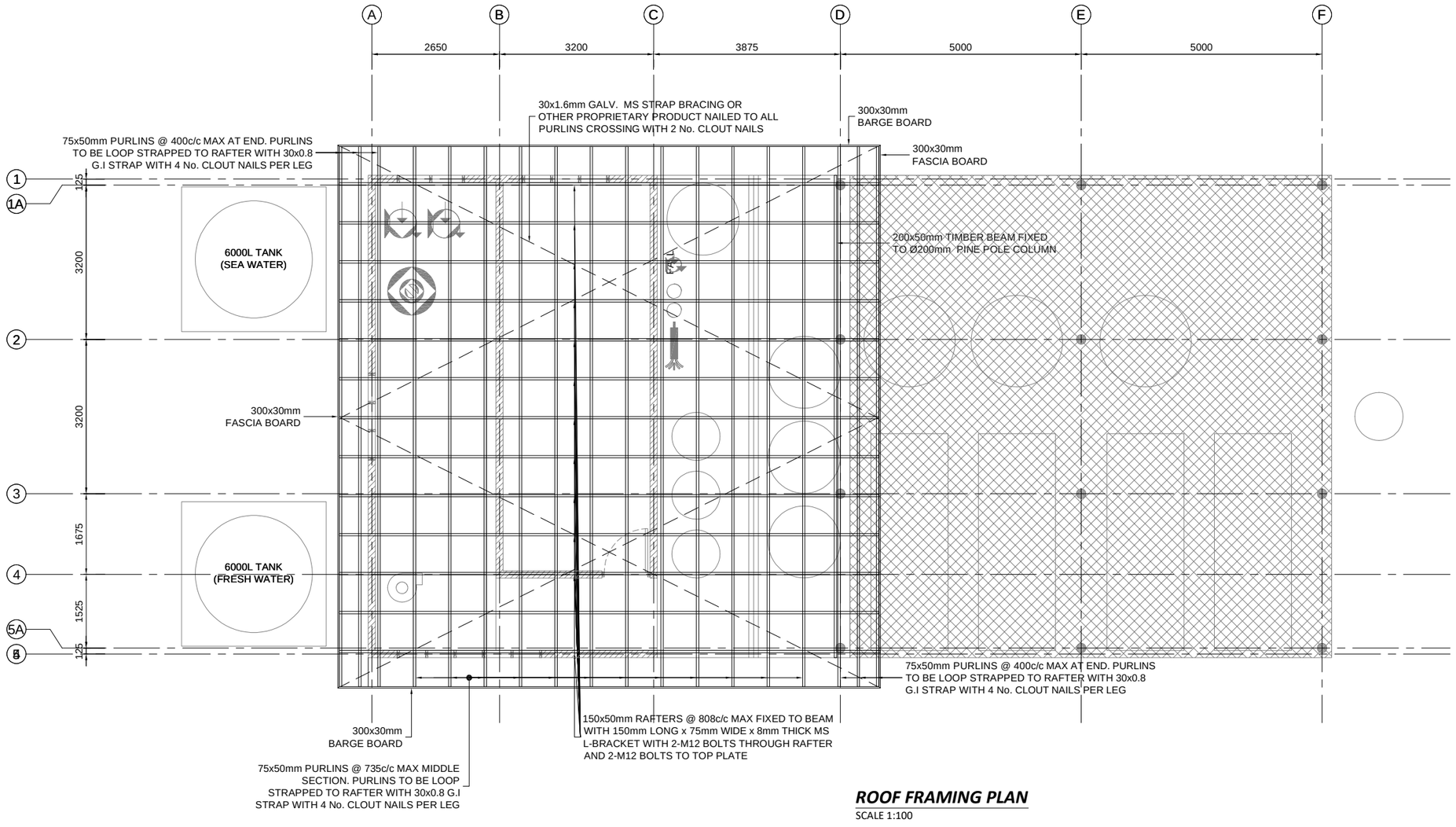
3. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS.



ROOF FRAMING PLAN

SCALE 1:100

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TUVALU FISHERIES

PROJECT :

PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :

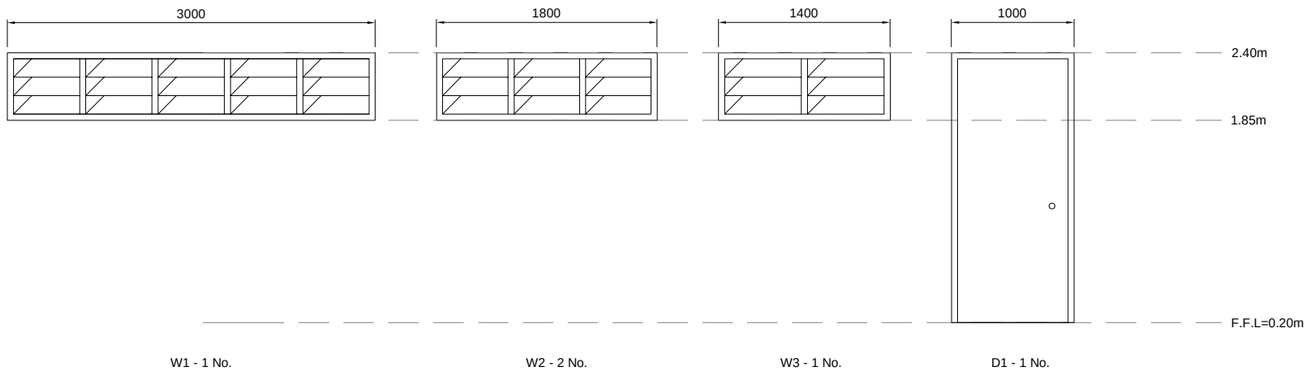
ROOF FRAMING PLAN

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**A - 07**

NOTES:

1. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND LEVELS ON SITE PRIOR TO FABRICATION, ORDERING AND CONSTRUCTION.
2. REFER TO FLOOR PLAN FOR DOOR SWING PRIOR TO FABRICATING DOOR FRAMES.
3. ALL WINDOWS AND DOORS HARDWARE AND ACCESSORIES TO BE CONFIRMED WITH THE ENGINEER AND CLIENT, PRIOR TO INSTALLATION.
4. PROVIDE 5mm CLEARANCE GAP BETWEEN FINISHED FLOOR TOP TO UNDERSIDE OF DOOR.
5. JOINER TO VERIFY WORK AND BRING TO ATTENTION OF THE DESIGNER ANY DISCREPANCIES IN DRAWING PRIOR TO ORDERING, FABRICATING & CONSTRUCTION.
6. REFER TO DRAWING No. A-02 FOR DOOR AND WINDOW NUMBER REFERENCE.

WINDOW & DOOR SCHEDULE				
WINDOW	TYPE	LOCK	BRAND	FINISH
W1 1 No.	TIMBER FRAMED 125mm WIDE GLASS BLADE LOUVRE WINDOW (3 No. BLADES).	-	BREEZWAY OR SIMILAR	CLEAR STAIN AND VANISH OR 2 PACK PAINT SYSTEM
W2 2 No.	TIMBER FRAMED 125mm WIDE GLASS BLADE LOUVRE WINDOW (3 No. BLADES).	-	BREEZWAY OR SIMILAR	CLEAR STAIN AND VANISH OR 2 PACK PAINT SYSTEM
W3 1 No.	TIMBER FRAMED 125mm WIDE GLASS BLADE LOUVRE WINDOW (3 No. BLADES).	-	BREEZWAY OR SIMILAR	CLEAR STAIN AND VANISH OR 2 PACK PAINT SYSTEM
D1 1 No.	SOLID CORE TIMBER DOOR HUNG ON 4 No. HEAVY DUTY HINGES.	HIGH QUALITY DEADLOCK	355 LOCKWOOD SERIES OR SIMILAR	CLEAR STAIN AND VANISH OR 2 PACK PAINT SYSTEM



WINDOW & DOOR SCHEDULE

SCALE 1:50

Matavuvale Builders

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B	15.08.22	WORKING DRAWINGS
C	23.08.22	ISSUED FOR APPROVAL DRAWINGS

CLIENT : TUVALU FISHERIES DEPARTMENT

TUVALU FISHERIES

PROJECT :

PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :

WINDOW & DOOR SCHDULE

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**A - 08**

NOTES:

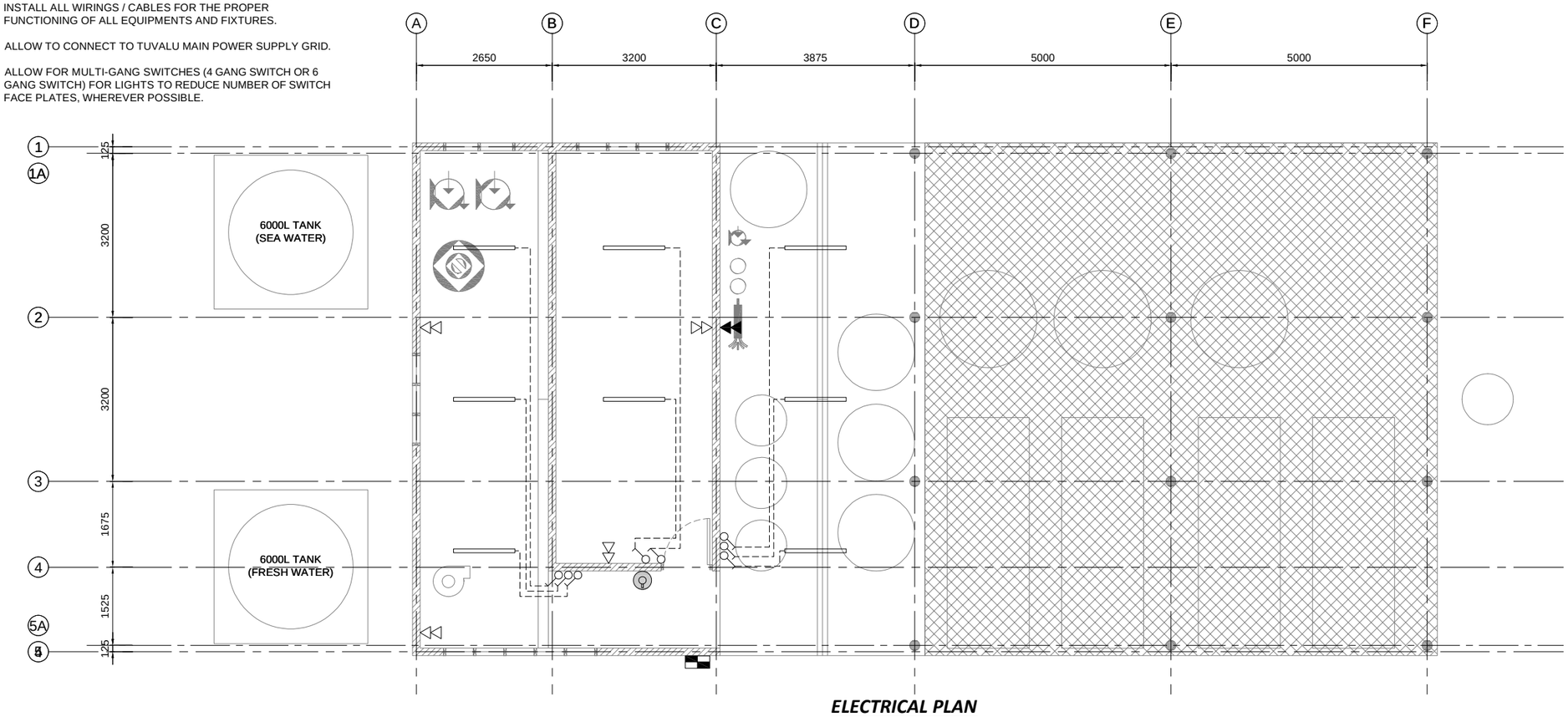
1. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND LEVELS ON SITE PRIOR TO FABRICATION, ORDERING AND CONSTRUCTION.
2. ALL ELECTRICAL WORKS TO BE CARRIED OUT BY A CERTIFIED ELECTRICAL CONTRACTOR IN ACCORDANCE TO TUVALU ELECTRICITY AUTHORITY STANDARDS & SPECIFICATIONS.
3. THE ELECTRICAL SUB-CONTRACTOR SHALL ENSURE THAT ALL CIRCUIT BREAKERS, WIRINGS & ELECTRICAL COMPONENTS IN THE DISTRIBUTION BOARD ARE ABLE TO FUNCTION CORRECTLY WITH NO OVERLOADING OR CIRCUIT TRIPPING ISSUES TO THE DISTRIBUTION BOARD AND MAIN SWITCH BOARD.
4. ENSURE THAT THE DISTRIBUTION BOARD HAS PROPER FUSES, CIRCUIT BREAKERS & OTHER ANCILLARY ELECTRICAL COMPONENTS TO ENSURE PROPER OPERATION.
5. WIRING SHOWN ON THE DRAWING IS PRESENTED DIAGRAMMATIC ALLY.
6. ALL PRODUCTS TYPES TO BE AS MENTIONED OR SIMILAR. ENGINEER & CLIENT TO CONFIRM PRIOR TO PURCHASING.
7. PROVIDE 3 PHASE DOUBLE POWER POINTS FOR PUMP ROOM AREAS OR WHERE REQUIRED FOR OTHER ELECTRICAL APPLIANCES REQUIREMENT FOR THE MARICULTURE FACILITY.
8. FINAL LOCATION OF POWER POINTS, LIGHT SWITCH, MAIN SWITCH BOARD TO BE CONFIRMED ON SITE BY THE CLIENT AND ENGINEER.
9. ALL INTERNAL WIRINGS FROM MAIN SWITCH BOARD TO DISTRIBUTION BOARD TO RESPECTIVE FIXTURES NOT SHOWN FOR CLARITY. ELECTRICAL CONTRACTOR TO ALLOW FOR AND INSTALL ALL WIRINGS / CABLES FOR THE PROPER FUNCTIONING OF ALL EQUIPMENTS AND FIXTURES.
10. ALLOW TO CONNECT TO TUVALU MAIN POWER SUPPLY GRID.
11. ALLOW FOR MULTI-GANG SWITCHES (4 GANG SWITCH OR 6 GANG SWITCH) FOR LIGHTS TO REDUCE NUMBER OF SWITCH FACE PLATES, WHEREVER POSSIBLE.

HEIGHTS OF SWITCHES, POWER POINTS, JACKS, ETC.

	PUMP ROOM	STORAGE ROOM	EXTERNAL
POWER POINT	CLIENT TO CONFIRM	CLIENT TO CONFIRM	CLIENT TO CONFIRM
LIGHT SWITCH	1200	1200	1200
DISTRIBUTION BOARD	-	-	-
NOTE: ALL LEVELS ARE IN MILLIMETERS ABOVE FINISHED FLOOR LEVEL.			

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	5Kg MULTI PURPOSE FIRE EXTINGUISHER WITH FIRE BLANKET (1.2m x 1.8m)
	DOUBLE POWER POINT (3 PHASE CONNECTION WHERE REQUIRED)
	1200mm GLITZ " DEJON" FLUORESCENT BATTENS
	MAIN SWITCH BOARD
	WEATHERPROOF DOUBLE POWER POINT (3 PHASE CONNECTION WHERE REQUIRED)



ELECTRICAL PLAN
SCALE 1:100

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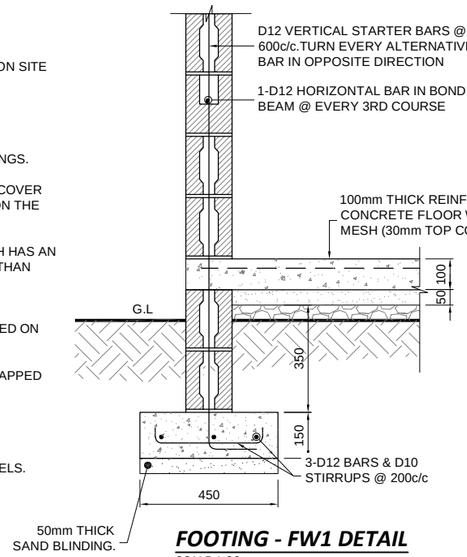
PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :
ELECTRICAL PLAN

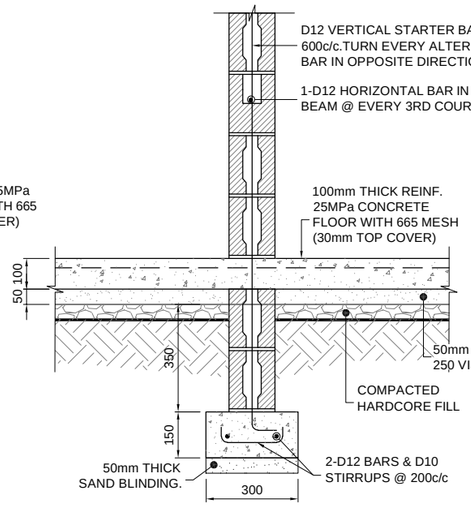
SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**E - 01**

NOTES:

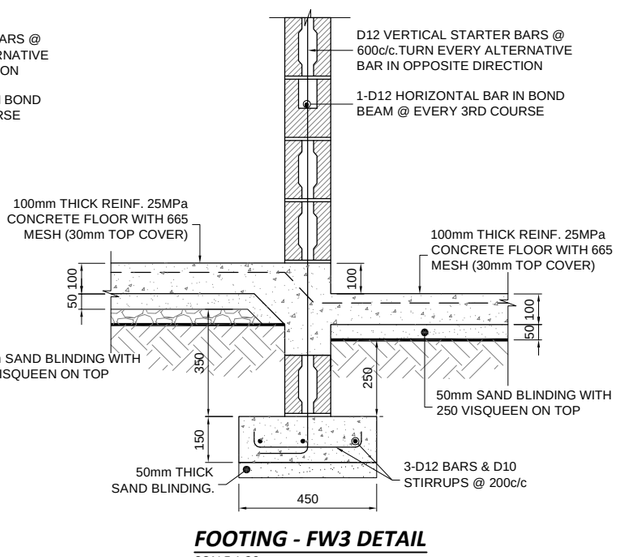
1. CONTRACTOR TO CONFIRM LEVELS AND DIMENSIONS ON SITE PRIOR TO ORDERING, FABRICATING & CONSTRUCTION.
2. ALL LEVELS ARE IN METERS & ALL DIMENSIONS ARE IN MILIMETERS U.N.O.
3. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS.
4. ALL CONCRETE USED TO BE 25MPa AT 28 DAYS U.N.O. COVER TO REINFORCEMENT SHALL BE MINIMUM 50mm U.N.O ON THE DRAWING.
5. PAD FOUNDATION SHOULD BEAR ON SUBGRADE WHICH HAS AN ALLOWABLE BEARING CAPACITY EQUAL OR GREATER THAN 100KPa (BEARING CAPACITY TO BE CONFIRMED BY THE STRUCTURAL ENGINEER).
6. LENGTH OF EACH PINE POLE MEMBER TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION.
7. POLE CAST IN CONCRETE PAD FOUNDATION TO BE WRAPPED WITH VISQUEEN.
8. PINE POSTS TO BE SEASONED F11 GRADE OR SIMILAR APPROVED.
9. REINFORCEMENT SHALL BE CONTINUOUS IN SLAB PANELS.
10. ALL BLOCKWALL CAVITIES TO BE FILLED WITH 17.5MPa CONCRETE.



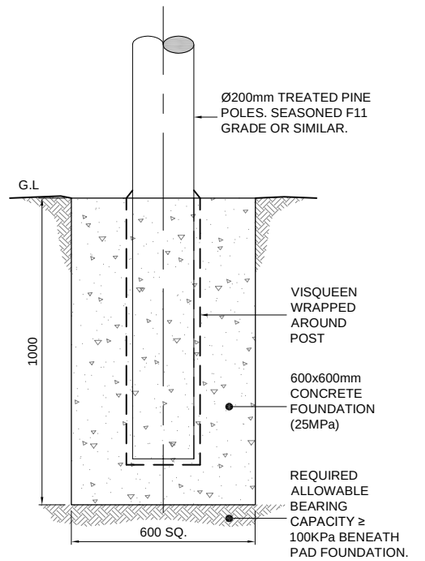
FOOTING - FW1 DETAIL
SCALE 1:20



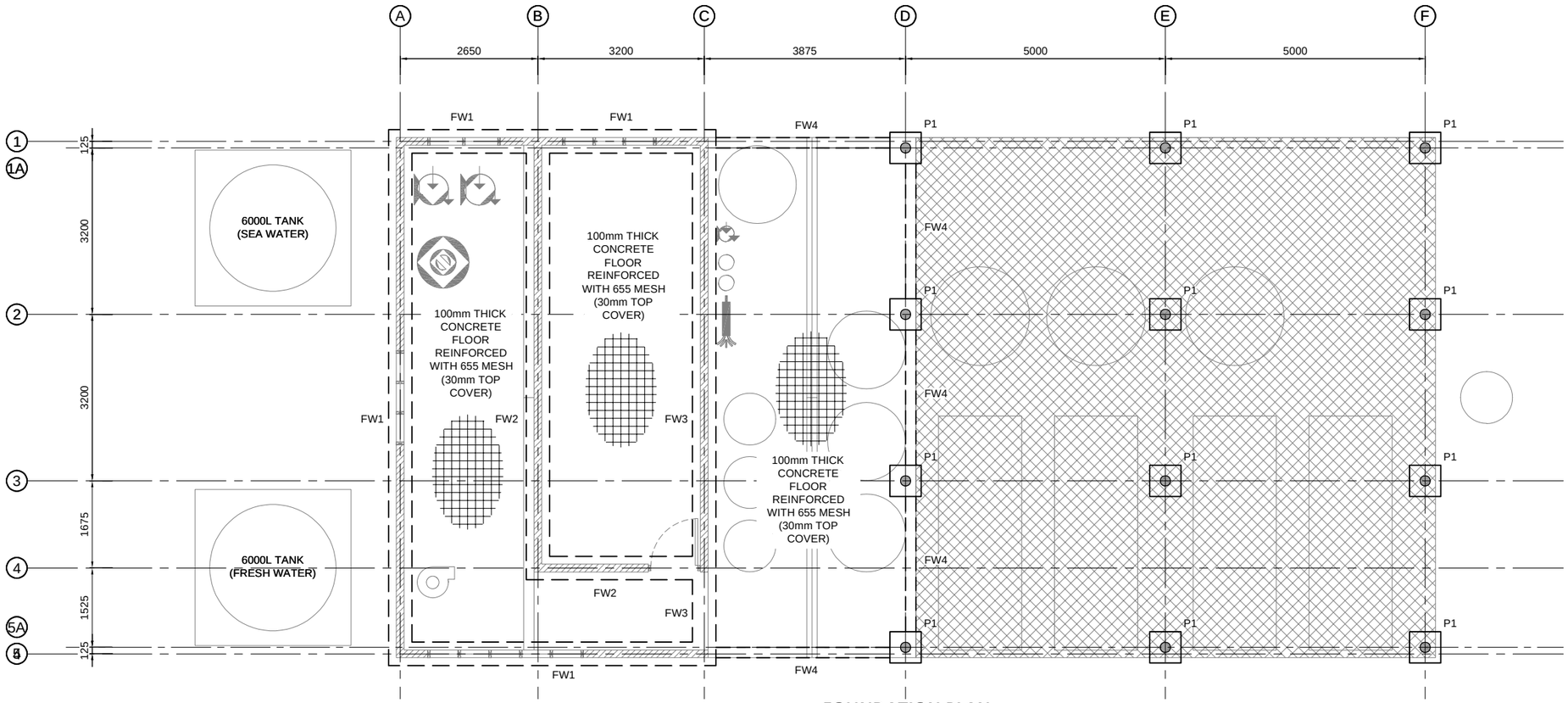
FOOTING - FW2 DETAIL
SCALE 1:20



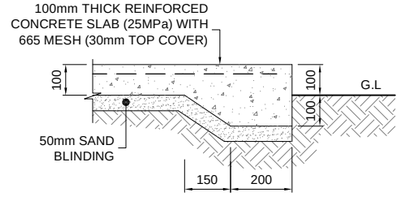
FOOTING - FW3 DETAIL
SCALE 1:20



PAD P1
SCALE 1:20



FOUNDATION PLAN
SCALE 1:100



FOOTING - FW4 DETAIL
SCALE 1:20

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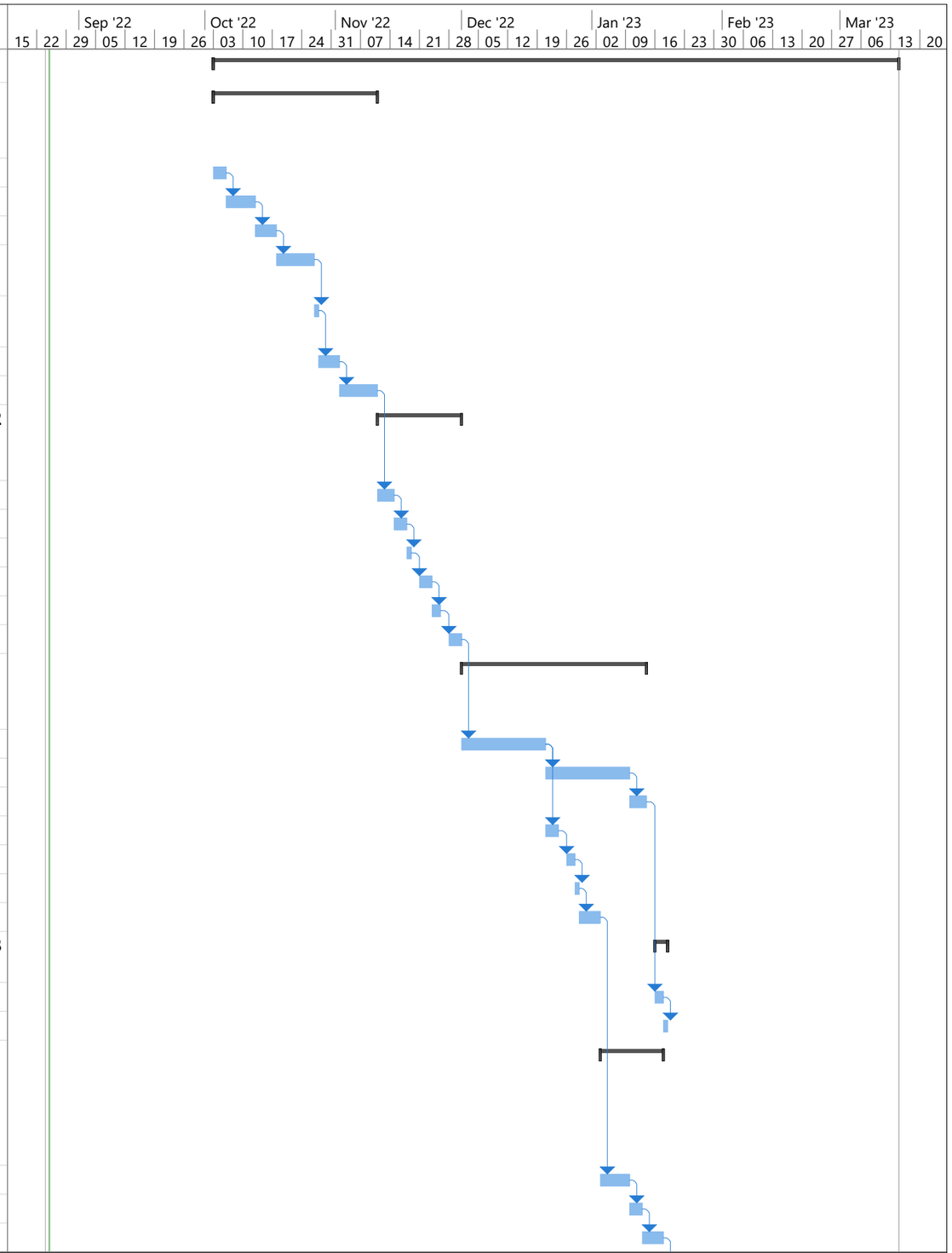
PROJECT :
PROSED NEW TUVALU MARICULTURE FACILITY PROJECT, FUNAFUTI, TUVALU

TITLE :
FOUNDATION PLAN

SCALE :	AS SHOWN
DRAWN :	L. ELAISE & S.L.NAILETANI
CHECKED :	F. SHACKELY
DATE :	23/08/2022
REV NO :	SHEET NO :
C	**S - 01**

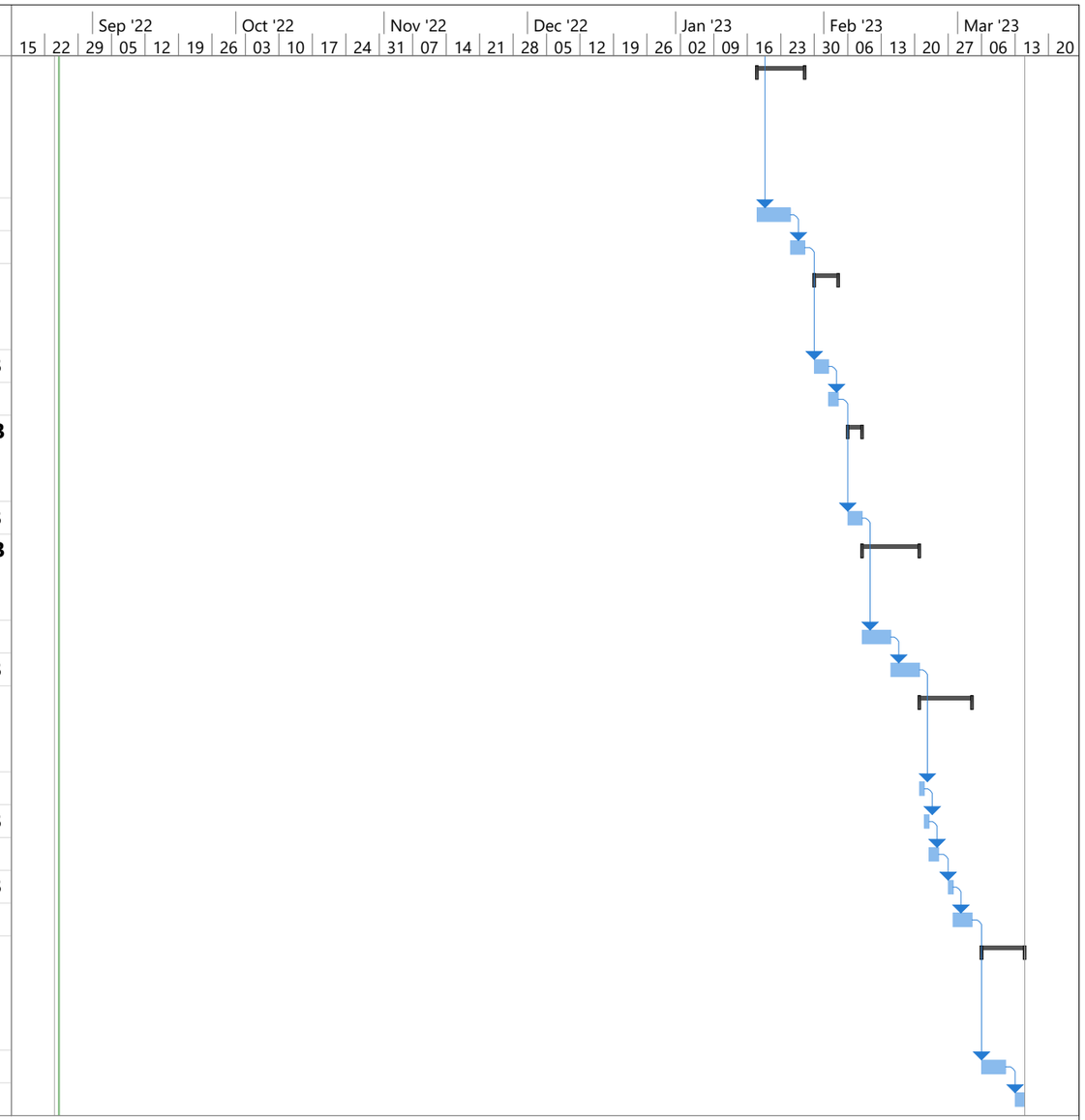
ID	Task Mode	Task Name	Duration	Start	Finish
1		**New Tuvalu Mariculture Facility Building**	**117 days**	**Mon 03/10/22**	**Tue 14/03/23**
2		**Allow for construction of 25MPa reinforced concrete foundation (FW1, FW2, FW3 & FW4) and Pad Foundation (P1).**	**29 days**	**Mon 03/10/22**	**Thu 10/11/22**
3		Setting-out Works	3 days	Mon 03/10/22	Wed 05/10/22
4		Excavation of Trenchers	5 days	Thu 06/10/22	Wed 12/10/22
5		Formwork for Pads(FW1,FW2,FW3,FW4)	3 days	Thu 13/10/22	Mon 17/10/22
6		Foundation (FW1,FW2,FW3,FW4) Rebar Fabrication and Bending	7 days	Tue 18/10/22	Wed 26/10/22
7		Concreting Works Fouindation Pads (FW1,FW2,FW3,FW4)	1 day	Thu 27/10/22	Thu 27/10/22
8		Concrete Curing (FW1,FW2,FW3,FW4)	3 days	Fri 28/10/22	Tue 01/11/22
9		Block Laying of Foundation Wall	7 days	Wed 02/11/22	Thu 10/11/22
10		**Allow for construction of 100mm thick reinforced concrete ground floor slab (20MPa) inclusive of DPC on sand blinding with compacted hardcore fill.**	**14 days**	**Fri 11/11/22**	**Wed 30/11/22**
11		Soil stabilization and Adding of Sind Blinding	2 days	Fri 11/11/22	Mon 14/11/22
12		Rebar Fabrication and Bending Floor Slab	3 days	Tue 15/11/22	Thu 17/11/22
13		Laying of 665 Mesh	1 day	Fri 18/11/22	Fri 18/11/22
14		Formwork Floor Slab	3 days	Mon 21/11/22	Wed 23/11/22
15		Concreting Works Floor Slab	2 days	Thu 24/11/22	Fri 25/11/22
16		Concrete Curing Floor Slab	3 days	Mon 28/11/22	Wed 30/11/22
17		**Allow for construction of 150mm thick reinforced concrete external & internal blockwall. Blockwall to be plastered & 2 coat marine grade paint finished.**	**32 days**	**Thu 01/12/22**	**Fri 13/01/23**
18		Block Laying Works	14 days	Thu 01/12/22	Tue 20/12/22
19		Plastering Works	14 days	Wed 21/12/22	Mon 09/01/23
20		Painting Works	4 days	Tue 10/01/23	Fri 13/01/23
21		Beam Rebar Fabrication and Bending	3 days	Wed 21/12/22	Fri 23/12/22
22		Beam Formwork	2 days	Mon 26/12/22	Tue 27/12/22
23		Beam Concreting Works	1 day	Wed 28/12/22	Wed 28/12/22
24		Beam Concrete Curing	3 days	Thu 29/12/22	Mon 02/01/23
25		**Allow for construction and installation of all doors & windows with all ancillary components.**	**3 days**	**Mon 16/01/23**	**Wed 18/01/23**
26		Installation Of Windows	2 days	Mon 16/01/23	Tue 17/01/23
27		Installation Of Door Frames and Doors	1 day	Wed 18/01/23	Wed 18/01/23
28		**Allow for construction and installation of all structural/architectural timber members (beams, rafters, columns, purlins, eaves, fascia/barge board) inclusive of all ancillary components. Allow for supply and application of new paint to eaves and fascia/b**	**11 days**	**Tue 03/01/23**	**Tue 17/01/23**
29		Construction & Installation of Rafters	5 days	Tue 03/01/23	Mon 09/01/23
30		Installation of Purlins	3 days	Tue 10/01/23	Thu 12/01/23
31		Installation of Facia Boards	3 days	Fri 13/01/23	Tue 17/01/23



Project: Project1
Date: Thu 25/08/22

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

ID	Task Mode	Task Name	Duration	Start	Finish
32		**Allow for construction and installation of colourbond ultra trimdek 0.48BMT roofing cladding with bracing and inclusive of ridge cap, flashing and other ancillary components. Allow for supply and installation of guttering & downpipes & other ancillary com**	**8 days**	**Wed 18/01/23**	**Fri 27/01/23**
33		Installation of Corrugated Zincalum Roofing Iron+Ridge	5 days	Wed 18/01/23	Tue 24/01/23
34		Installation of Guttering and Down Pipe	3 days	Wed 25/01/23	Fri 27/01/23
35		**Allow for construction & installation of all structural steel work (braces, cleats, connection plates, etc) inclusive of all ancillary components.**	**5 days**	**Mon 30/01/23**	**Fri 03/02/23**
36		Fabrication of all Steel Brackets and Braces	3 days	Mon 30/01/23	Wed 01/02/23
37		Installation of all Brackets and Bracers	2 days	Thu 02/02/23	Fri 03/02/23
38		**Allow for the supply and installation of Shade Cloth on all designated areas as shown on Plans with appropriate fixing to Timber columns and Beams.**	**3 days**	**Mon 06/02/23**	**Wed 08/02/23**
39		Supply and install Shade Cloth	3 days	Mon 06/02/23	Wed 08/02/23
40		**Allow for supply and application of new paint to all concrete walls, fascia/barge board, railings, exposed structural steel members, etc.**	**8 days**	**Thu 09/02/23**	**Mon 20/02/23**
41		Painting Works Interior	4 days	Thu 09/02/23	Tue 14/02/23
42		Painting Works Exerior	4 days	Wed 15/02/23	Mon 20/02/23
43		**Supply and install Concrete Tank Base. Allow for supply and installtion for 6,000 liters fresh water/sea water tanks with all ancillary components, fixtures and connections.**	**9 days**	**Tue 21/02/23**	**Fri 03/03/23**
44		Setting Out	1 day	Tue 21/02/23	Tue 21/02/23
45		Excavation	1 day	Wed 22/02/23	Wed 22/02/23
46		Fabrication and Bending of Rebar	2 days	Thu 23/02/23	Fri 24/02/23
47		Formwork	1 day	Mon 27/02/23	Mon 27/02/23
48		Block Laying	4 days	Tue 28/02/23	Fri 03/03/23
49		**Allow for the Construction of Floor Drains and proper grating placed on the proposed drain. Ensure all floor fall to fall to the proposed drains and discharged to approved outlet.**	**7 days**	**Mon 06/03/23**	**Tue 14/03/23**
50		Installation of Box drains	5 days	Mon 06/03/23	Fri 10/03/23
51		Installation of Grattings	2 days	Mon 13/03/23	Tue 14/03/23



Project: Project1
Date: Thu 25/08/22

Task	Project Summary	Manual Task	Start-only	Deadline
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