



FIJI ELECTRICITY AUTHORITY

BIDDING DOCUMENT

Momi and Nawai Substation Earthing

TENDER NO: MR 08/2016

REVISION SCHEDULE:

Date	Notes	Prepared By		Rev No.
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INVITATION FOR BIDS

Date: 30th Jan 2016
Tender No: MR 08/2016

The Fiji Electricity Authority (“The Employer”) invites sealed bids from reputable and suitable contractors for Momi and Nawai Substation Earthing.

The bidder is required to submit a bid for:

All bids for the contract shall be submitted on the appropriate forms provided and shall include the completed price schedule, technical schedule and schedules of experience etc. The bid shall be on the basis of a lump sum contract based on firm prices.

Bidders may obtain further information from, and inspect and acquire the bidding documents, at

Momi and Nawai Substation Earthing
Tuvitu Delairewa
General Manager Corporate Services
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Email: TDelairewa@fea.com.fj

The deadline for submission of bids shall be **1600hrs (local time) on Wednesday, 10th Feb, 2016.**

During evaluation of bids the Authority may invite a bidder or bidders for discussions, presentations and any necessary clarification before awarding the contract price proposal.

A site visit is planned for **Tuesday 2nd Feb, 2016 at 1100hrs (local time)**. Interested bidders are required to meet at the FEA’s Momi Substation Project Site in Momi, Viti Levu. From there the Team shall visit Nawai Substation.

Section 1

Instructions to Bidder

Section 1 - Instructions to Bidders

- | | |
|--|---|
| A. | General |
| 1. Scope of Bid | <p>1.1 The Fiji Electricity Authority (hereinafter referred to as "the Employer"), wishes to receive bids for Momi and Nawai Substation Earthing, as defined in these bidding documents (hereinafter referred to as "the Works").</p> <p>1.2 The successful bidder will be expected to complete the Works within 1 month from the date of commencement of the Works. The works should be completed by March/April, 2016.</p> |
| 2. Source of Funds | <p>2.1 The Fiji Electricity Authority has a capital works program which is self-funded and intends to use part of the funds for the contract ("the Contract") for which this Invitation to Bid is issued.</p> |
| 3. Eligible Bidders | <p>3.1 This invitation is open to all Bidders who have sound Financial Background, and have previous experience in handling such turnkey projects. Bidders shall have completed at least three (3) 33kV or higher voltage substation earthing or zone substation development related projects for in the last four years.</p> <p>3.2 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer as the Employer shall reasonably request.</p> <p>3.3 Bidders shall not be under a declaration of ineligibility for corrupt or fraudulent practice.</p> |
| 4. Eligible Materials, Equipment and Services | <p>4.1 The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies as specified by FEA and from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. Upon request, bidders may be required to provide evidence of the origin of materials, equipment, and services.</p> <p>4.2 For purposes of Sub-Clause 4.1 above, "services" means the works and all project-related services including design services.</p> <p>4.3 For purposes of Sub-Clause 4.1 above, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing or substantial or major assembling of components, a commercial recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.</p> <p>4.4 The materials, equipment and services to be supplied under the Contract shall not infringe or violate any industrial property or intellectual property rights or claim of any third party.</p> |

- 5. Qualification of the Bidder** 5.1 To be qualified for award of Contract, bidders shall:
- (a) submit a written power of attorney authorizing the signatory of the bid to commit the bidder; and
 - (b) Specify joint venture memberships, certification and qualification as equipment manufacturer, financial capability, technical capability, supplies and installation facilities with comparable technical parameters, manufacturing and installation capability, work in hand, future commitments and current litigation.
 - (c) Submit proposals regarding work methods, scheduling and resourcing which shall be, provided in sufficient detail to confirm the bidder's capability to complete the works in accordance with the specifications and the time for completion.
- 5.2 Bidders shall also submit proposals of work methods and schedule in sufficient detail to demonstrate the adequacy of the bidders' proposals to meet the Employer's Requirements and the completion time referred to in Sub-Clause 1.2 above.
- 6. One Bid per Bidder** 6.1 Each bidder shall submit only one bid either by itself, or as a partner in a joint venture. A bidder who submits or participates in more than one bid will cause all those bids to be rejected.
- 7. Cost of Bidding** 7.1 The bidder shall bear all costs associated with the preparation and submission of its bid and the Employer will in no case be responsible or liable for those costs.
- 8. Site Visit** 8.1 The bidder is advised to **visit mandatory planned on Tuesday 2nd Feb, 2016 at 1100hrs (local time) at Momi and Nawai Substation** and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for the design-build and completion of the Works. The costs of visiting the Site shall be at the bidder's own expense.
- 8.2 Site meeting attendance is compulsory.
- 8.3 The bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the bidder, its personnel and agents, will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of the inspection.

- D. Submission of Bids**
- 9. Sealing and Marking of Bids**
- 9.1 The bidder shall seal the original copy of the technical proposal and the original copy of the price proposal and each copy of the technical proposal and each copy of the price proposal in separate envelopes clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. 1 -TECHNICAL & PRICE PROPOSAL", etc. as appropriate. **The Bidders are advised not to upload tender responses in the Evaluation Electronic Tender Box due to nature of submission required.**
- 9.2 The bidder shall seal the original bids and each copy of the bids in an inner and an outer envelope, duly marking the envelopes as "ORIGINAL", "COPY No. 1", etc.
- 9.3 The inner and outer envelopes shall
- (a) be addressed to the Employer at the following address:
- Tuvitu Delairewa
General Manager Corporate Services
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TuvituD@fea.com.fj
- and
- (b) bear the following identification:
- Bid for: Momi and Nawai Substation Earthing
 - Bid Tender Number: MR 08/2016
 - DO NOT OPEN BEFORE 1600Hrs **10th Feb 2016**
- 9.4 In addition to the identification required in Sub-Clause 20.3, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to Clause 22.
- 9.5 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.
- 10. Deadline for Submission of Bids**
- 10.1 Bids must be received by the Employer at the address specified above no later than **1600 hours (local time) Wednesday 10th, Feb 2016.**
- 10.2 The Employer may, at its discretion, extend the deadline for submission of bids by issuing an addendum in accordance with Clause 11, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.

Tender submission

Two (2) hard copies of the tender bids in sealed envelope shall be deposited in the tender box located at the Supply Chain Office at the FEA Head Office, 2 Marlow Street, Suva, Fiji.

Courier charges for delivery of Tender Document must be paid by the bidders.

This tender closes at 4:00pm on Wednesday 10th February, 2016. Any request for extension of the closing date by the bidders must be made 24hrs prior to the current closing date. It is the prerogative of the FEA to either accept or decline the request.

Site Inspection will be held at the FEA's Momi Substation Project Site at 11:00a.m on Tuesday, 2nd February, 2016.

Each tender shall be sealed in an envelope with:

The envelope bearing only the following marking:

MR 08/2016 – Momi and Nawai Substation Earthing

The Secretary,
Tender Committee
Fiji Electricity Authority
Supply Chain Office

Private Mail Bag, Suva

It must also indicate the name and address of the tenderer on the reverse of the envelope.

All late tenders, unmarked envelopes and envelopes without bidder's name and address on the reverse will be returned to the Tenderers unopened.

For further information or clarification please contact our Supply Chain Office on phone **(+679) 3224360 or (+679) 9991587.**

TENDER SUBMISSION CHECK LIST

The Bidders must ensure that the details and documentation mention below must submitted as part of their tender Bid

Tender Number _____

Tender Name _____

1. Full Company
Name: _____
(Attach copy of Registration Certificate)

2. Director/Owner(s): _____
3. Postal
Address: _____

4. Phone
Contact: _____
5. Fax Number: _____

6. Email
address: _____
7. Office
Location: _____
8. TIN Number: _____
(Attach copy of the VAT/TIN Registration Certificate – Local Bidders Only)

9. Company Registration
Number: _____
(Attach copy of the Business License)

10. FNPF Employer Registration
Number: _____
(For Local Bidders only)

11. Contact Person: _____

I declare that all the above information is correct.

Name: _____ Position: _____ Sign: _____

Date: _____

Section 2

Employer's Requirements – Part I

Scope of Works

PART 1 - SCOPE OF WORKS

1. GENERAL DESCRIPTION

1.0 Introduction

Momi and Nawai substations are new Greenfield 33/11kV zone substation near Momi Bay, Western division.

2.0 Scope

The scope of works is to install the buried earth grid, equipment and structure bonds and lightning protection system at the Momi substation site. FEA shall supply Part of the materials as stipulated in Section 2 Employer's Requirements – Part II Technical Specifications, Clause 1.2 Material& Equipment.

SCOPE OF WORK	Contractor Responsibility
Installation of buried earth grid, equipment and structure bonds.	
Conductivity tests on joints and main earthing system	FEA / AECOM
Supply of Tools and accessories, Exothermic connections, Welding material as per Drawing Plans.	
Install copper strap welded to underside of Transformer foundation R16 rebar.	
Copper bars for indoor control building earthing points.	
Any other materials	

Section 2

Employer's Requirements – Part II

Technical Specifications

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CHAPTER 1 - GENERAL INFORMATION

1.1 EXTENT OF CONTRACT

(i) Definite Work

This Contract is suitable for Momi and Nawai substation earthing works.

The earthing of all equipment and the provision of earthing systems, electrodes and connections shall be in accordance with the recommendations in the "Guide for safety in Substation Grounding" IEEE No. 80 and the requirements of this Chapter. Steelworks and supporting structures shall be bonded and earthed to the substation earthing system.

FEA has engaged AECOM to provide the earthing and lightning protection system designs and installation specification for the new substation.

It was determined by extensive soil resistivity testing across the substation site and CDEGS calculation that the most appropriate soil electrical resistivity model for the site is a two layer profile, comprising a high resistivity top layer, less than 1m deep, above a low resistivity bottom layer. A 33kV earth fault at Momi substation will produce the worst case grid voltage rise and was considered in the Momi and Nawai substation earth grid design. The proposed earth grid design has been marked up on the reference layout drawing of the substation. All buried conductors shall be minimum 120mm² copper conductors while all equipment connections shall be minimum 250mm² copper conductors. The entire buried earth grid will be installed in a high resistivity top soil layer. The resistivity of the soil layer below this is much lower. Numerous vertical earth rods must therefore be bonded to the horizontal earth grid to achieve a sufficiently low earth resistance.

The substation earth grid and security fence was modelled in CDEGS and the earthing system performance calculated. The calculated earth grid resistance for the substation is 0.4Ω, well below the 1Ω benchmark for zone substations. Touch, step and EPR voltages were also calculated using the CDEGS model and compared to tolerable limits for equipment, personnel and public safety in a risk assessment. The risk assessment concludes that there will be public and personnel touch and step voltage risks at the Momi and Nawai substation fence during a worst case ultimate 25kA earth fault level. These risks can be mitigated by installing a stone chipping or bituminous surface treatment along a 1.5m wide strip outside the substation fence. If stone chipping is to be installed, a small timber border is required to keep the stones in place around the outside of the fence.

The main earth system shall be installed prior to the construction of the building, transformer and equipment foundations. The Contractor will be required to prepare installation drawings and schedules of material to be provided. These drawings and schedules shall be submitted to the Employer's Representative for approval together with calculations of step, touch and mesh potentials.

The Contractor shall be responsible for making good for any defective material design or workmanship for a period of twelve months after taking over. The Contractor is to co-operate with other contractors and FEA operating staff as may be necessary.

Works must fully interact with each other in every respect. Additionally, they must properly interact with any other Contractor's work as far as an interfacing is specified or mentioned herein.

In case the Contractor finds any parts of these Specifications incomplete, contradictory or defective, he/she shall be responsible to immediately bring this to the notice of the Employer and make a proposal for the Employer's approval, for making good such incompleteness or defect at the stage of bidding. No additional cost to the Employer shall arise out of such rectification.

Main design data given in these Specifications and general layouts of the substations are available in the Drawings.

1.2 Materials & Equipment

All materials used for the earthing and lightning protection designs shall be adequately resistant to corrosion. Where tabs are welded onto metal structures and enclosures, the tab, weld joint and metal surfaces shall be adequately prepared and coated to prevent corrosion. All bolts, nuts and washers shall be galvanised steel with galvanising to meet appropriate specifications for corrosion protection. All copper earthing connection lugs shall be tinned at copper to steel connections. Bimetallic joints or compounds shall be used at copper to aluminium connections. A conductive paste shall be applied between mating surfaces for all earth connections. Joints in earthing strip shall employ chemical welding or high compression joints. Cadweld shall be used where two or more earth wires are to be joined. Sleeves should be used at both ends of bond conductors to avoid sharp bends at the lugs.

FEA shall supply the materials on site :

1. Copper conductors
2. Earth Rods
3. Lightning Mast
4. Roof earth strips

1.3 Buried Earth Grid

The buried earth grid shall be constructed of hard drawn high conductivity copper conductor. All buried earth grid conductor shall be minimum 120mm² stranded copper cable or 50x6mm copper strap for the ribber on the Transformer Pads. Earth enhancement materials (e.g. bentonite) are not required.

Earth rods shall be at least 15mm diameter copper rod electrodes, driven into undisturbed soil. Each electrode will be complete with approved non-ferrous clamps for the connection of earthing conductors and with a hardened steel tip and cap driving by means of a power hammer. Test link chambers and covers for each earthing point are to be provided. The earth rods shall be connected to a test link and there shall be duplicate conductors from each test link to the buried horizontal earth grid. Conductors interconnecting the electrodes to a test link and between the test links and the earth grid will have a cross-sectional area of not less than 120mm².

1.4 Stone Chipping

FEAs Contractor will be responsible for installing a minimum 100mm layer of stone chipping up to 1.5m outside substation fence. Stone to be held in place with timber edging. All stone chipping material shall be screened and crushed from river-run gravel or quarried aggregate. The source material shall consist of hard, sound material of uniform quality, free from soft or friable stone, wood, clay, etc. Nominal particle size shall be 40mm, with no particles smaller than 10mm.

1.5 Equipment Earth Bonds

Earthing conductors for equipment connections shall be of soft annealed high conductivity copper stranded cable in accordance with Table 4 in BS.6346. Above ground bolted equipment earth bond connections shall be minimum 200mm² stranded copper cable.

Where a strip has to be drilled to fit an earth terminal the hole shall not be greater than half the width of the strip. Earth connections shall be made approximately 200mm above the top of the finished foundation level. Earthing conductors shall where necessary be cleated to walls, fixed to cable racks or laid in the cable trenches as is convenient for connecting indoor equipment to the buried earth grid. There shall be at least two connections from each live equipment steel support etc. to the earth grid. Connections shall be made also to the earth terminals of operating mechanisms, control cubicles and marshalling kiosks. Except where the earth connection is bonded to the steelwork, insulated clamps shall be provided for supporting the earthing connection to high level equipment and the earth screen. The frames of all electrical apparatus and the bases of all structural steelwork shall be

connected by branches running to a group of equipment. All isolator bases, earth terminals and earthing switches, neutral current transformers shall be connected to the earth grid.

Switchboards shall be fitted with a copper earth bar of not less than 250mm² section, running the whole length of the switchboard, to which shall be effectively connected all metal parts not intended to be alive. All 33kV cable screens shall be bonded to the earth grid with G/Y PVC insulated 250mm² stranded copper connections.

Each control or relay panel shall be provided with a copper earth bar of not less than 80mm² cross-section and arranged so that the bars of adjacent panels can be joined together to form a common bus. The common earthing bus bar of control and relay panels shall be connected to the main station earthing system via a copper earthing connection of not less than 80mm².

The secondary circuit of each current transformer shall be earthed at one point only. The yellow phase of the three phase voltage transformer secondary winding shall be earthed. Means shall be provided for these earth connections to be disconnected at a readily accessible position.

There shall be an extension of the earth bar system into the substation buildings for connecting to indoor switchgear, control, relay and ancillary equipment. The provision for earthing shall be such that no reliance is to be placed on the conductivity of metal to metal joints without the use of special connectors however lightning arresters must be directly connected to the earthing grid.

1.6 Transformer Earth Bonds

Two bare steel contact surfaces having two 14mm diameter holes on 45mm centres shall be located one on either side and near to the bottom of the Transformer tank to facilitate connection to the local earthing system with minimum 120mm² stranded copper connections.

The transformer secondary neutral shall be directly bonded to the earth grid with duplicated PVC insulated 120mm² stranded copper connections.

1.7 Foundation Earth Bonds

The rebar in the reinforced concrete foundations for the containerised generators, transformers and outdoor switchyard equipment shall be earthed. This shall be achieved by installing a dedicated R16 rebar along the length of the foundation and wire tying this earthing rebar to all other rebars at the crossing points. The earthing rebar shall be bonded to the earth grid with a single 120mm² bare stranded copper connection that shall be brazed onto the rebar prior to pouring the foundation.

Holding down bolt cages do not require connections to the earth grid.

1.8 Fence Earth Bonds

All metal fences shall be of wire mesh construction with steel poles, so as to ensure adequate electrical continuity between adjacent metal fence posts. Metal fence posts shall be bonded to the earth grid with a single 70mm² bare stranded copper connection at minimum 20m intervals.

The fence post shall be earthed by welding a minimum 50x20mm tab onto the post at about 250mm above ground level for a single bolted connection onto this tab. Brass nuts should be used to connect to studs to earth connections connected to the fence. The substation fence shall be isolated from all adjacent fences with a minimum 2.5m gap or alternatively nonconductive fence section.

1.9 Building Earth Bonds

All metal components of the substation building earth grid shall be bonded to a common earth bar within the building as is standard practice for low voltage installations. The building foundation rebar shall also be bonded to this earth bar.

1.10 Lightning Rods, Down Conductor and Earth Bonds

All lightning protection system conductor shall be 25x3mm copper strap or 35mm² stranded copper cable. The conductor shall be attached to each metal roof panel and building walls at regular intervals of 3m.

The 2 lightning rods used to protect the transformer enclosure shall be 1m long tinned copper rod, minimum 8mm diameter. The 8 off lightning down conductors shall be welded to the buried earth grid and shall have a test joint 1m above ground level.

2.0 Installation

2.1 Buried Earth Grid

Some of the existing soil will be excavated as part of the site preparation earthworks across the site. The buried horizontal earth grid shall be installed in the natural soil after this excavation in minimum 500mm deep trenches. The earth tails shall be cad welded to the buried grid as is required to make the specified above-ground equipment, structure and foundation connections. These earth tails shall be of sufficient length so as to ensure the above-ground connections can be made with no joints in the earth tails. The trenches shall be backfilled with the excavated soil and lightly compacted to form a level surface prior to the engineered backfill and compacting works. The exposed earth tails shall be protected from mechanical damage during the backfill and compacting works. All buried bare earth conductors shall be covered with a lightly compacted backfill to ensure proper contact with the soil. Crushed rock shall be laid on a level, well-compacted base course surface.

2.2 Welded Earth Grid Connections

Only exothermic welded (e.g. Cadweld or brazed) joints shall be installed for buried earth grid connections in accordance with the requirements of IEEE Std 837. The contractor shall be suitably qualified to install welded joints.

2.3 Bolted Earth Bond Connections

Bolted earth bond connection lugs shall be tin plated with a conductive paste applied between mating surfaces. All external bolted joints shall be protected from moisture ingress with a waterproof compound.

2.4 Transformer and Building Foundation Rebar Connections

The foundation's earthing rebar shall be installed along the length of the foundation by wire tying it to all other rebars at the crossing points. The earthing rebar shall be bonded to the earth grid with a single connection that shall be brazed onto the rebar prior to pouring the foundation.

The earthing rebar shall have a minimum of 50mm concrete cover.

2.5 Cable Screens

Control, protection and communication cables with single screens shall have the screens bonded to the earth grid at one end only (control room end). The unbonded screen at the other end shall be insulated from touch. The steel wire armouring of SCADA cables shall however be earthed at both ends via the glands and gland plate bonds.

2.6 Lightning Down Conductors

All components of the lightning protection system shall be bonded to the earth grid along the most direct path possible. This path shall not include any significant bends.

3.0 Testing

All tests shall be carried out by FEA and AECOM New Zealand.

Tests shall be made on the effectiveness of the bonding and earthing which will include conductivity tests on selected joints, on the main earthing system, and at the connections to equipment and structures. Continuity test results across all joints shall be reviewed prior to commissioning the earth grid installation.

Checks shall also be made on precautions taken to avoid corrosion attack on the earthing system. The resistance of the earthing system to the general mass of earth shall be tested and recorded including the method and equipment used to carry out the tests. Fall-of-potential test probe spacing at approximately 300m and 600 meters separation will normally be required to effectively test the earthing system. If the installed earth grid performance does not meet design criteria, mitigation shall be designed and installed and the testing repeated to verify the risks have successfully been eliminated.

4.0 QUALITY OF MATERIALS AND WORKMANSHIP

All materials used under this contract shall be new and of the quality and class most suitable for working under the conditions specified and shall withstand the variations of temperature, atmospheric conditions arising under working conditions without distortion or deterioration or the setting up of undue stresses in any part and also without affecting the strength and suitability of the various parts of the work which they have to perform.

All work shall be carried out and completed in a neat and professional manner to the approval of the Employer's Representative.

5.0 STANDARDS

IEC Standards are to be adopted in general. British or Australian standards too may be applied wherever necessary. Any other national or international standard may be used if such standards are not less exacting than corresponding IEC Standard. In all instances a copy of the relevant standard adopted should be forwarded to the Engineer.

The Works shall be constructed in accordance with the laws of Fiji and associated Acts and Regulations. These include:

The Electricity Act (Chapter 180) – 1985
Health and Safety at Work Act – 1996
Environment Management Act

In order to achieve Regulatory compliance under the Fiji Electricity Act, the Works shall comply with the Electricity Regulations and AS/NZS 3000:2007 "Wiring Rules"

In the absence of specific standards being nominated in the specifications, the following standards shall apply:

Australian/New Zealand Standards

AS	1154	Insulator and conductor fittings for overhead power lines
AS/NZS	1170	Structural Design Actions
AS/NZS	1768	Lightning Protection
AS	1824	Insulation coordination – Definitions, principles and rules
AS	1940	The storage and handling of flammable and combustible liquids
AS	2067	Switchgear Assemblies and Ancillary Equipment for Alternating Voltages above 1kV
AS/NZS	2312	
AS/NZS	2373	Electric cables – Twisted pair for control and protection circuits
AS/NZS	2650	Common specifications for high-voltage switchgear and controlgear standards
AS/NZS	3000	Wiring Rules
AS/NZS	3008.1.1	Electrical installations – Selection of cables – Cables for alternating voltages up to and including 0.6/1 (1.2) kV.
AS/NZS	3010	Electrical Installations – Generating Sets
AS	3011.2	Electrical installations – Secondary batteries installed in buildings, Part 2: Sealed cells
AS/NZS	3080	Telecommunications installations - Generic cabling for commercial premises
AS/NZS	3155	Approval and test specification - Electric cables - Neutral screened - For working voltages up to and including 0.6/1 kV
AS/NZS	3191	Electric flexible cords
AS/NZS	3439.1	Low voltage switchgear and control gear assemblies
AS/NZS	3439.2	Low-voltage switchgear and controlgear assemblies - Particular requirements for busbar trunking systems (busways)

AS	3607	Conductors-Bare overhead, aluminium and aluminium alloy – steel reinforced
AS/NZS	3835	Earth potential rise - Protection of telecommunications network users, personnel and plant
AS/NZS	3947	Low voltage switchgear and control gear, (all relevant parts)
AS	4024.1	Safety of machinery, (all relevant parts)
AS/NZS	4026	Electric cables - For underground residential distribution systems
AS/NZS	60265.1	High-voltage switches - Switches for rated voltages above 1 kV and less than 52 kV
AS	60265.2	High-voltage switches - High-voltage switches for rated voltages of 52 kV and above
AS	60529	Degrees of protection provided by enclosures (IP Code)
AS	60870	Telecontrol equipment and systems (All parts)
AS/NZS	60898	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Circuit-breakers for a.c. operation
AS	HB101	Coordination of power and telecommunications - Low Frequency Induction (LFI): Code of practice for the mitigation of hazardous voltages induced into telecommunications lines.

International Electrotechnical Commission (IEC)

IEC	11801	Information technology – Generic cabling for customer premises
IEC	14763	Information technology – Implementation and operation of customer premises cabling
IEC	24702	Information technology – Generic cabling – Industrial premises
IEC	60034	Rotating Electrical Machines – all relevant parts
IEC	60038	IEC Standard Voltages
IEC	60041	Field acceptance tests to determine the hydraulic performance of hydraulic turbines, storage pumps and pump-turbines
IEC	60044	Instrument Transformers
IEC	60051	Direct acting indicating analogue electrical measuring instruments and their accessories
IEC	60060	High Voltage Test Techniques
IEC	60076	Power Transformers
IEC	60085	Thermal Evaluation And Classification of Electrical Insulation.
IEC	60086	Primary Batteries
IEC	60099	Surge Arrestors
IEC	60137	Bushings For Alternating Voltages Above 1,000 V
IEC	60228	Conductors of Insulated Cables
IEC	60255	Electrical relays
IEC	60269	Low-voltage fuses
IEC	60304	Standard colours for insulation for low frequency cables and wires
IEC	60354	Loading Guide For Oil Immersed Transformers
IEC	60364	Electrical installations of buildings
IEC	60372	Locking devices for ball and socket couplings of string insulator
IEC	60383	Insulators for overhead lines with a nominal voltage above 1000 V
IEC	60437	Radio interference test on high-voltage insulators (RFI)
IEC	60551	Determination Of Transformer And Reactor Sound Levels
IEC	60664	Insulation coordination for equipment within low-voltage systems (All Parts)
IEC	60694	Common Specifications for high-voltage switchgear and controlgear standards
IEC	60715	Dimensions of low voltage switchgear and control gear
IEC	60895 Ed. 2.0 b:2002	Live working - Conductive clothing for use at nominal voltage up to 800 kV a.c. and +/- 600 kV d.c.
IEC	60896	Stationary Lead-Acid Batteries
IEC	60898	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations
IEC	60909	Short-circuit current calculation in three-phase AC systems
IEC	60934	Circuit breakers for equipment
IEC	61009	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)
IEC	61089	Round wire concentric lay overhead electrical stranded conductors
IEC	61232	20SA/A Aluminium clad wires for electrical purposes
IEC	61477 Ed. 1.2 b:2005	"Live working - Minimum requirements for the utilization of tools, devices and equipment"

IEC	61634	High-voltage switchgear and control gear - Use and handling of sulphur hexafluoride (SF6) in high voltage switchgear and control gear
IEC	61660	Short-circuit currents in DC auxiliary installations in power plants and substations
IEC	62063	High-voltage switchgear and control gear - The use of electronic and associated technologies in auxiliary equipment of switchgear and control gear
IEC	62271	High Voltage Switchgear and Control gear (All parts)
IEC	62285	Application guide for non-linear coefficient measuring methods
IEC	62305	Protection against Lightning

Institute of Electrical and Electronic Engineers (IEEE)

IEEE	C37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes
IEEE	C57.13	Standard Requirements for Instrument Transformers
ANSI/IEEE	C62.1	IEEE Standard for Surge Arresters for Alternating-Current Power Circuits
ANSI/IEEE	Std 100	Standard Dictionary of Electrical and Electronic Terms
ANSI/IEEE	Std 100	Standard Dictionary of Electrical and Electronic Terms
ANSI/IEEE	Std 1050	Guide for Instrumentation and Control Equipment Grounding in Generating Stations
ANSI/IEEE	Std 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment
ANSI/IEEE	Std 141	Recommended Practice for Electrical Power Distribution for Industrial Plants
ANSI/IEEE	Std 142	Recommended Practice for Grounding of Industrial and Commercial Power Systems
ANSI/IEEE	Std 242	Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
ANSI/IEEE	Std 367	Recommended Practice for Determining the Electric Power Station Ground Potential Rise and Induced Voltage from a Power Fault
ANSI/IEEE	Std 399	Recommended Practice for Industrial and Commercial Power Systems Analysis
ANSI/IEEE	Std 446	Recommended Practice for Emergency and Standby Power Systems
ANSI/IEEE	Std 450	Recommended Practice for Maintenance, Testing and Replacement of Large Lead Storage Batteries for Generating Stations and Substations
ANSI/IEEE	Std 665	Guide for Generating Station Grounding
ANSI/IEEE	Std 80	Guide for Safety in AC Substation Grounding
ANSI/IEEE	Std 81	Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Ground System
ANSI/IEEE	Std C37.101	Guide for Generator Ground Protection

British Standards (BS)

BS	148	Unused Mineral Insulating Oils For Transformers And Switchgear
BS	EN ISO	1461 Hot dip galvanized coatings on fabricated iron and steel articles
BS	6231	Specification for PVC-insulated cables for switchgear and control gear wiring
BS	6651	Protection of structures against lightning.
BS	7354	Code of Practice for Design of high-voltage open-terminals stations, Section 7: Earthing.
BS	7430	Code of Practice for Earthing.

6.0 SITE CONDITIONS

The tenderer is required to ascertain for himself the Site Conditions, including limitations of space, geographical, climatic or other considerations. The tenderer shall satisfy himself of the suitability of the Sites for the erection of the plant and equipment to be supplied.

7.0 SITE OFFICE

The successful contractor is required to ascertain for himself the site conditions, including limitations of space, geographical, climatic or other considerations. The tenderer shall satisfy himself of the Sites for the erection of the plant and equipment to be supplied.

8.0 PROGRAMME AND PROGRESS OF WORK

Programme

Within 14 days of acceptance of the Tender the Contractor shall provide the Employer's Representative with (2) copies of the Programme of work covering design, manufacture, delivery and erection.

The programme of work shall be reviewed monthly and three copies of a comprehensive progress report shall be submitted monthly to reach the Employer's Representative by the 25th day of each calendar month or as mutually agreed. If in the judgement of the Employer's Representative the situation demands, the Contractor shall report at more frequent intervals.

These reports shall include for each item of plant manufacture, delivery and erection;

- (i) The status at the last reporting date
- (ii) The activities completed during the period
- (iii) The current status of activities and progress
- (iv) The start and completion date

The Employer's Representative shall be afforded such reasonable means of access to the Contractor or his Sub Contractors as may be required to confirm progress and delivery information.

9.0 PAYMENTS TERMS

1. All payments shall be due and payable by the Employer in accordance with the payments terms detailed below.
2. The payments shall be made on completion of milestones as identified and agreed by both the Employer's Representative and the Contractor.
3. The payments will be made based on the following schedule:

	<i>Particulars</i>	<i>Milestone</i>	<i>VIP Payment (% of contract price)</i>
1	Advance payment		NIL
2	Earthing Works	Upon Completion of all Earthing works per substation	90%
3	Retention	12 months after issuing of performance certificate	10%

3.1 GRAND SUMMARY

ITEM	DESCRIPTION	TOTAL PRICE
		FJD (VIP)
1.0	Momi Substation Earthing Works	
2.0	Nawai Substation Earthing Works	
GRAND TOTAL		

1 SCHEDULE OF FINANCIAL INFORMATION

The Tenderer shall state hereunder:

- (a) The full name, business address, nationality and type of organization.
- (b) The full name and business address of any Fijian agent.
- (c) The date of the Tenderer's formation.
- (d) The Tenderer's capitalization and total sales over the preceding three fiscal years.
- (e) Details of supply and erection contracts of a similar nature undertaken in the previous five years, giving details of at least three contracts stating the location, purchaser, dates of commencement and completion and value of the contract in the total foreign currency equivalent.
- (f) Details of any contracts on which the Tenderer has defaulted or on which liquidated damages have been applied in the previous five years giving location, purchaser, value of the contract, and nature of the default or penalty.
- (g) Name and address of two banks and the name and address of an independent accountant, all of whom shall be authorized to provide promptly on request any information about the financial status of the Tenderer which is required by the FEA on the understanding that such information will be kept confidential and will only be used to assess the financial ability of the Tenderer to undertake the Contract.

2 PERSONNEL

The tenderer shall provide a detailed bio-data of all the personnel that would be involved in the execution of the project - from the design stage till the completion stage.

The Tenderer shall list herein the personnel he wishes to establish in Fiji for the periods stated, to discharge his responsibilities as laid down in the Specification.

Designation	Name of Nominee	Year of Birth	Required Experience in Similar Works (Years)	Actual Experience in Similar Works (Years)
<u>Headquarters</u>				
Project Director			10	
Project Manager			10	
Engineering Design Staff			7	
Substation Design Engineer			7	
Protection and SCADA Design Engineer			N/A	
Other key staff (Give designation)				
<u>Site Office</u>				
Site Manager			N/A	
Deputy Site Manager			N/A	
Supervising Engineers			N/A	
Construction Supervisors			N/A	
Safety Manager			N/A	
Other key staff			N/A	
<u>Specialised Staff</u>				
Optic Fiber Splicer			N/A	
Substation Testing Technician/Engineer			10	
Substation Commissioning Engineer			7	
Electrical Technicians			7	

3 CONTRACTOR'S SITE PERSONNEL

Erection Staff

The contractor shall give below the status and numbers of staff required for erection of the plant and the estimated period for which they will be retained on site.

Supervisory and expatriate staff : -	
(a) Bachelor status	
(b) Married status	

Position	Months
Headquarters	
Project Director	
Project Manager	
Other Key Staff	
Site Office	
Site Manager	
Deputy Site Manager	
Supervising Engineers	
Construction Supervisors	
Other key staff	

4 SUBCONTRACTORS

<i>Item</i>	<i>Element of Work</i>	<i>Approximate Value</i>	<i>Name and Address of Sub Contractor</i>	<i>Statement of Similar works Executed</i>

The Bidder shall enter in this schedule a list of the sections and appropriate value of the work for which the purposes to use sub-contractors, together with the names and addresses of the proposed sub-contractors. The Bidder shall also enter a statement of similar works previously executed by the proposed sub-contractors, including description, location and value of works, year completed, and name and addresses of the Employer. Notwithstanding such information the Bidder, if awarded the contract, shall remain entirely and solely responsible for the satisfactory completion of the Works.

5 CONTRACTOR HEALTH & SAFETY PLAN

The bidder shall complete the following sub-sections to provide details in relation to the Health and Safety plans for the project.

CONTRACT DETAILS

Contractor Name: _____
 Contractor Address: _____
 Contractor Representative: _____
 Contract Description: _____
 Location of Works: _____
 Timing of Works (approximate): Start Date: _____ End Date: _____

RESPONSIBILITIES

Name	Position Held	Safety Responsibilities	Contact Number (Direct)

EMERGENCY CONTACT DETAILS

Contact	Name	Position	Contact Number (Direct)
First Contact			
Second Contact			
Third Contact			
Forth Contact			

SCOPE & TASK DETAILS

List Major Tasks

RISK ASSESSMENT

Risk assessment is a fundamental tool in management of risk. It Involves the identification of hazards and control measures. Describe how you plan to carry out this process for this particular application contract.

SAFE WORK PROCEDURES

After completing the risk assessment, you must compile a safe system of work describing how you plan to control the hazards you have identified. Complete the following section outlining how you will ensure that all employees and subcontractors understand the Safe Work Procedures (SWP). Also attach copies of the relevant SWP.

PERSONAL PROTECTIVE EQUIPMENT

Where risk assessment identifies the need for personal protective equipment (PPE), then PPE must be made available. List down below the PPE you will require for this project.

ACCESSING SITE/TIMES OF WORK

If work is going to be carried out at FEA premises, then it is important to determine when you will be accessing the Site. You may need to sign a PASS and sign in and out. This will avoid conflicts with other activities which may be continuing on site during contract works. Describe below your site access requirements.

FENCING & SEPARATION OF WORK

In order to protect our employees as well as general members of the public, the work areas should, so far as is possible, be physically isolated with barriers like bollards, cones, tapes, netting, etc. Describe below how you will fence or separate your work.

SIGNS AND WARNINGS

Sufficient signs should be erected or placed so that adequate warning is afforded around the worksite. Describe the kinds of notices you will be putting up and places where you will be putting this.

GENERAL STORAGE & DISPOSAL OF WASTE

Describe below what waste you anticipate producing and how you plan to store and/or dispose off waste. You must take into account the nature of the waste e.g. hazardous/flammable.

FIRST AID & INJURY MANAGEMENT

A first aid program for contractors is outlined in FEA Safety Manual. Please describe below any additional first aid needs and specific Injury management process for this contract.

EMERGENCY PROCEDURES

Identify specific emergency procedures or equipment required for the contract.

INCIDENT REPORTING & INVESTIGATION

Describe how incidents will be reported and investigated during the contract.

SPECIALISED WORK OR LICENSING

List any special licences required for the contract.

TRAINING & INDUCTION REQUIREMENTS

Training and inductions for contractors are to be completed in accordance with the FEA Training requirements. List any training required for the contract works in relation to safety, for example safe procedure training and attach training certificates:

SAFETY MONITORING

List any ongoing inspections, hazards management or incident reporting or investigation processes to be used during the works, if relevant.

Describe below your site access requirements.

SUBCONTRACTOR MANAGEMENT

Complete the attached Subcontractor List detailing the subcontractors to be used and the details of the subcontractor management:

Sub Contractor Name	Sub Contractor Representative Name	Description of Work	Date of Local Induction

6 OTHER DOCUMENTS & DRAWINGS TO BE SUBMITTED WITH BID

As a minimum, the following documents & drawings shall be submitted with the Bid.

1. Evidence of Bidder's experience in works similar to this
2. Certificates issued by an independent International Organization to ensure compliance with the ISO 9001:2000 standards by Bidder
3. List of standards the Bidder intends to follow, for electrical ,civil and mechanical works

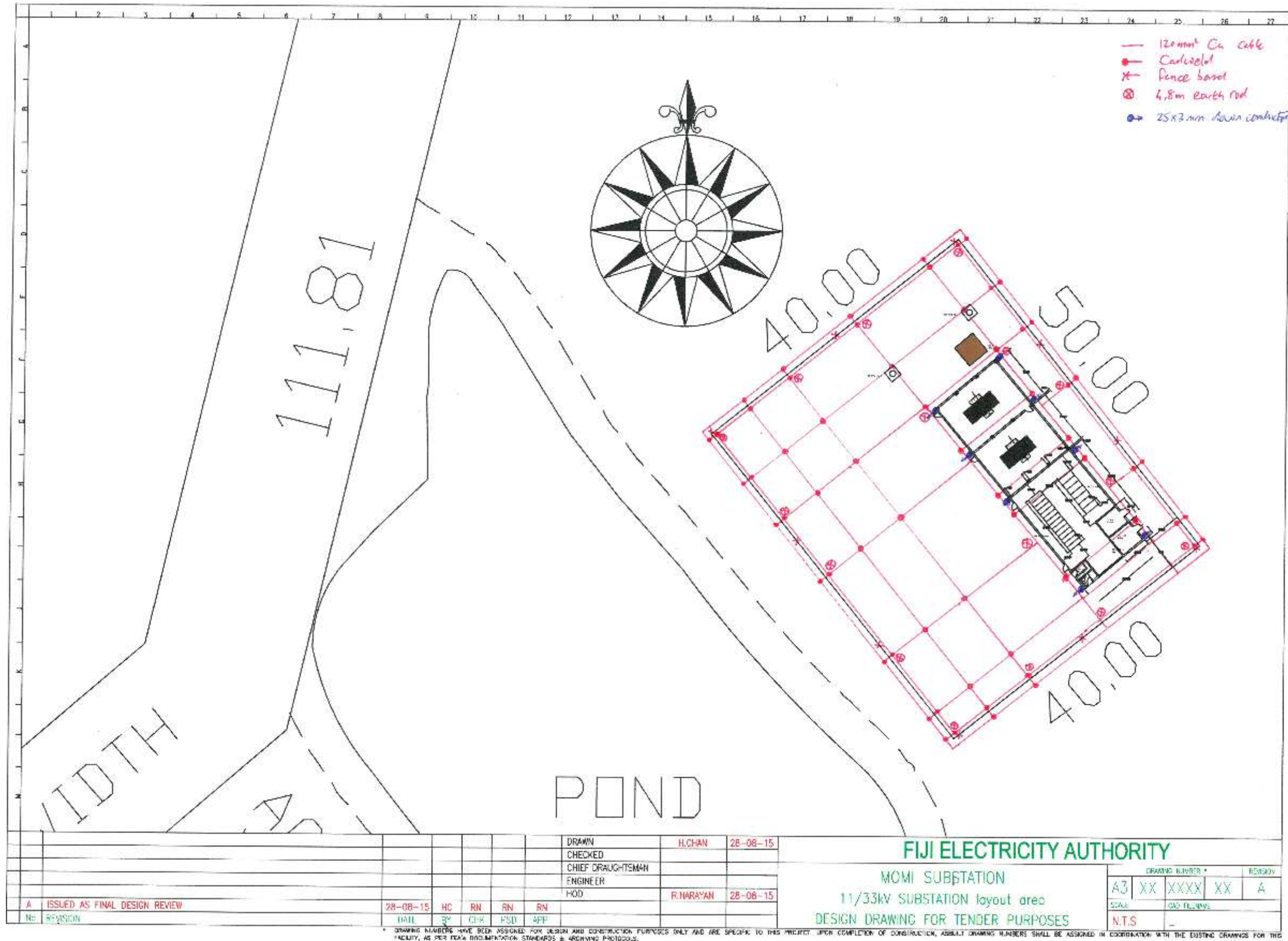
Section 6

Drawings

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1. Momi Substation – New Site Layout



1. Nawai Substation – New Site Layout

