Section 7

Schedules – Part I
Schedule of Prices

1.1 *DRAWINGS, DESIGN AND DOCUMENTATION*

F/C – Foreign Currency
FJD – Fijian Dollars

Item No.	Description	Estimated		Rate		Total Price	
		Qty	Unit	F/C	FJD	F/C	FJD
1	***WAILOALOA SUBSTATION***						
1.1	**ELECTRICAL WORKS**						
1.1.1	Design and Liaison of Works	1	LS				
1.1.2	Drawings and Documentation required for Electrical works	1	LS				
1.2	**MECHANICAL WORKS**						
1.2.1	Design and Liaison of Works	1	LS				
1.2.2	Drawings and Documentation required for Mechanical works	1	LS				
1.3	**CIVIL WORKS**						
1.3.1	Design and Liaison of Works	1	LS				
1.3.2	Drawings and Documentation required for Civil works	1	LS				
TOTAL (Transfer to Grand Summary)							

3.3 PLANT EQUIPMENT INCLUDING MANDATORY SPARE PARTS

ITEM NO.	DESCRIPTION	ESTIMATE QTY	DDU FIJI Foreign Currency		DDU FIJI FJD		ERECTION ON SITE FJD		TOTAL AMOUNT (Excluding Taxes & Duties)	
			Unit Rate	Amount	Unit Rate	Amount	Unit Rate	Amount	F/C	FJD
			(1)		(2)		(3)		(4=1)	(5=2+3)
	WAILOALOA SUBSTATION									
1	**ELECTRICAL WORKS**									
1.1	INDOOR 33 kV SWITCHGEAR									
1.1.1	2000A, 36 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Bus section breaker)	1 Nos								
1.1.2	1200A, 36 kV, 3 phase circuit breaker complete with housing panel (transformer breaker)	2 Nos								
1.1.3	1200A, 36 kV, 3 phase circuit breaker complete with housing panel (feeder circuit breaker)	2 Nos								
1.1.4	36kV VT Three phase voltage transformers, ratio 33,000/√3:110/√3:110/3 V Class 0.2 for Metering and Protection	4 Nos.								
1.1.4	CTs									
1.1.4.1	800/600:1, Class 5P20	2 Nos								
1.1.4.2	2000/1200:1 Class 0.1PX	5 Nos								
1.1.4.3	2000/1200:1 Class 5P20	2 Nos								
1.1.4.4	800/600:1 Class 0.1 PX	2 Nos								
1.1.4.5	800/600:1 Class 0.1 PX	2 Nos								
1.1.4.6	800/600:1 Class 5P20	2 Nos								
1.2	INDOOR 11 kV SWITCHGEAR									

1.2.1	2000A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Bus section)	1 No								
1.2.2	1250A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Transformer breaker)	2 Nos								
1.2.3	630A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Feeder breaker)	6 Nos								
1.2.4	630A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Aux Transformer breaker)	1 Nos								
1.2.5	CTs									
1.2.6	12kV VT Three phase voltage transformers, ratio 11,000/√3:110/√3:110/3 V Class 0.2 for Metering and Protection	4 Nos.								
1.3	LVAC SWITCHBOARD									
1.3.1	The incoming supplies to each switchboard are to be interlocked to automatically establish supply to the busbar in the event of failure of selected supply and not to parallel any of incoming supplies	1 Lot								
1.4	BATTERIES, CHARGERS AND DISTRIBUTION BOARDS									
1.4.1	110 V maintenance free battery banks with the capacity of 600 Ah	1 Nos.								
1.4.2	Charging equipment	1 Nos.								
1.4.3	DC distribution board	1 Nos								
1.5	PROTECTION RELAYS									
1.5.1	33 kV Relays									
1.5.1.1	SEL311L	2 No								
1.5.1.2	SEL351S-7	5 No.								

1.5.1.3	SEL387E	2 No.								
1.5.1.4	SEL587Z	2 No								
1.5.1.5	Areva MVAJ13	2 No.								
1.5.1.6	SEL2515	As Required								
1.5.1.7	VAMP Arc Flash Protection	2 No.								
1.5.1.8	Partial Discharge Monitoring System	2 No.								
1.5.2	11 kV Relays									
1.5.2.1	SEL351	10 No.								
1.5.2.2	SEL2515	As Required								
1.5.2.3	VAMP Arc Flash Protection	2 No.								
1.5.2.4	Partial Discharge Monitoring System	2 No.								
1.5.3	Others									
1.5.3.1	33 kV Control Panel to house relays, indications and manual controls. Control panel to come complete with LED's, switches, etc.	5 sets								
1.5.3.2	11 kV Control Panel to house relays, indications and manual controls. Control panel to come complete with LED's, switches, etc.	10 sets								
1.5.3.3	SEL2488 GPS Clocks	1 No.								
1.5.3.4	SEL2730M switch	2 No.								
1.5.3.5	SEL3350	2 No.								
1.5.3.6	Contractor to add others									
1.6	COMMUNICATION EQUIPMENT									
1.6.1	SEL3530	2 No.								

1.6.2	VoIP Telephone	1 No.								
1.6.3	Radio Telephone (RT)	1 No.								
1.6.4	VHF Radio TM8250	1 No.								
1.6.5	Cisco Switch	1 No.								
1.6.6	UPS	1 No.								
1.7	SUBSTATION EARTHING									
1.7.1	The earthing installation rates shall include the excavation, backfilling and reinstatement of the ground, driving the rods and making of the connections.	1 Lot								
1.8	LIGHTNING PROTECTION SYSTEM									
1.8.1	Design and erection of lightning protection system with earth wires as specified	1 Lot								
1.8.2	Galvanised E.H.S steel wires of size 7/3.35 complete with accessories, for lightning protection of entire substation	1 Lot								
1.9	GROUNDING SYSTEM									
1.9.1	Grounding system including connections of all steel structures and electrical apparatus to earth mesh and grounding electrodes	1 Lot								
1.10	POWER AND CONTROL CABLES									
1.10.1	All low voltage AC power cables and terminations	1 Lot								
1.10.2	All DC power and control cables and terminations	1 Lot								
1.10.3	Power and lighting cable for all works, including indoor and outdoor lighting and auxiliary supply	1 Lot								

1.11	TRANSFORMERS									
1.11.1	12/15 MVA 33/11kV Dyn1 Power Transformer with On-load Tap Changer	2 Nos.								
1.11.2	Online dissolve gas analyser for each power transformer	1 No.								
1.11.3	Digital temperature monitoring equipment for power transformers	1 No								
1.12	OPTIC FIBER									
	Optic fiber equipment	1 Lot								
2	CIVIL AND ARCHITECTURAL WORKS									
2.1	Air condition and ventilation for building	1 Lot								
2.2	Firefighting system for control building	1 Lot								
2.3	Accessories for cable trench (indoor and outdoor)	1 Lot								
3	Others									
	TOTAL OF EQUIPMENT SUPPLY									

3.4 CIVIL WORKS, INSTALLATION AND OTHER SERVICES

ITEM NO.	DESCRIPTION	ESTIMATE QTY	DDU FIJI Foreign Currency		DDU FIJI FJD		ERECTION ON SITE FJD		TOTAL AMOUNT (Excluding Taxes & Duties)	
			Unit Rate	Amount	Unit Rate	Amount	Unit Rate	Amount	F/C	FJD
			(1)		(2)		(3)		(4=1)	(5=2+3)
	WAILOALOA SUBSTATION									
1	**ELECTRICAL INSTALLATION**									
1.1	INDOOR 33 kV SWITCHGEAR									
1.1.1	2000A, 36 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Bus section breaker)	1 Nos								
1.1.2	1200A, 36 kV, 3 phase circuit breaker complete with housing panel (transformer breaker)	2 Nos								
1.1.3	1200A, 36 kV, 3 phase circuit breaker complete with housing panel (feeder circuit breaker)	2 Nos								
1.1.4	36kV VT Three phase voltage transformers, ratio 33,000/√3:110/√3:110/3 V Class 0.2 for Metering and Protection	4 Nos.								
1.1.4	CTs									
1.2	INDOOR 11 kV SWITCHGEAR									
1.2.1	2000A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Bus section)	1 No								
1.2.2	1250A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Transformer breaker)	2 Nos								
1.2.3	630A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Feeder breaker)	6 Nos								

1.2.4	630A, 12 kV, 25 kA, 3 phase circuit breaker complete with housing panel (Aux Transformer breaker)	1 Nos								
1.2.5	CTs									
1.2.6	12kV VT Three phase voltage transformers, ratio 11,000/√3:110/√3:110/3 V Class 0.2 for Metering and Protection	4 Nos.								
1.3	LVAC SWITCHBOARD									
1.3.1	The incoming supplies to each switchboard are to be interlocked to automatically establish supply to the busbar in the event of failure of selected supply and not to parallel any of incoming supplies	1 Lot								
1.4	BATTERIES, CHARGERS AND DISTRIBUTION BOARDS									
1.4.1	110 V maintenance free battery banks with the capacity of 600 Ah	1 Nos.								
1.4.2	Charging equipment	1 Nos.								
1.4.3	DC distribution board	1 Nos								
1.5	PROTECTION RELAYS									
1.5.1	33 kV Relays									
1.5.1.1	SEL311L	2 No								
1.5.1.2	SEL351S-7	5 No.								
1.5.1.3	SEL387E	2 No.								
1.5.1.4	SEL587Z	2 No								
1.5.1.5	Areva MVAJ13	2 No.								
1.5.1.6	SEL2515	As Required								
1.5.1.7	VAMP Arc Flash Protection	2 No.								

1.5.1.8	Partial Discharge Monitoring System	2 No.								
1.5.2	11 kV Relays									
1.5.2.1	SEL351S-7	10 No.								
1.5.2.2	SEL2515	As Required								
1.5.2.3	VAMP Arc Flash Protection	2 No.								
1.5.2.4	Partial Discharge Monitoring System	2 No.								
1.5.3	Others									
1.5.3.1	33 kV Control Panel to house relays, indications and manual controls. Control panel to come complete with LED's, switches, etc.	5 sets								
1.5.3.2	33 kV Control Panel to house relays, indications and manual controls. Control panel to come complete with LED's, switches, etc.	10 sets								
1.5.3.3	SEL2488 GPS Clocks	1 No.								
1.5.3.4	SEL2730M switch	2 No.								
1.5.3.5	SEL3350	2 No.								
1.5.3.6	Contractor to add others									
1.6	COMMUNICATION EQUIPMENT									
1.6.1	SEL3530	2 No.								
1.6.2	VoIP Telephone	1 No.								
1.6.3	Radio Telephone (RT)	1 No.								
1.6.4	VHF Radio TM8250	1 No.								
1.6.5	Cisco Switch	1 No.								
1.6.6	UPS	1 No.								

1.7	SUBSTATION EARTHING									
1.7.1	The earthing installation rates shall include the excavation, backfilling and reinstatement of the ground, driving the rods and making of the connections.	1 Lot								
1.8	LIGHTNING PROTECTION SYSTEM									
1.8.1	Design and erection of lightning protection system with earth wires as specified	1 Lot								
1.8.2	Galvanised E.H.S steel wires of size 7/3.35 complete with accessories, for lightning protection of entire substation	1 Lot								
1.9	GROUNDING SYSTEM									
1.9.1	Grounding system including connections of all steel structures and electrical apparatus to earth mesh and grounding electrodes	1 Lot								
1.10	POWER AND CONTROL CABLES									
1.10.1	All low voltage AC power cables and terminations	1 Lot								
1.10.2	All DC power and control cables and terminations	1 Lot								
1.10.3	Power and lighting cable for all works, including indoor and outdoor lighting and auxiliary supply	1 Lot								
1.11	TRANSFORMERS									
1.11.1	12/15 MVA 33/11kV Dyn1 Power Transformer with On-load Tap Changer	2 Nos.								
1.11.2	Online dissolve gas analyser for each power transformer	1 No.								
1.11.3	Digital temperature monitoring equipment for power transformers	1 No								

1.12	OPTIC FIBER									
	Optic fiber equipment	1 Lot								
2	CIVIL AND ARCHITECTURAL WORKS									
2.1	Carry out Environmental Impact Assessment (EIA)	1 Lot								
2.2	Soil investigation	1 Lot								
2.3	Clearing and site formation	1 Lot								
2.4	Filling of earth to a height to avoid flooding	1 Lot								
2.5	Construction of Control Building	1 Lot								
2.6	Construction of boundary fence	1 Lot								
2.7	Construction of Switchyard Fence	1 Lot								
2.8	Construction of approach road	1 Lot								
2.9	Air condition and ventilation for control building	1 Lot								
2.10	Firefighting system for control building	1 Lot								
2.11	Accessories for cable trench (indoor and outdoor)	1 Lot								
3	Others									
	TOTAL OF EQUIPMENT SUPPLY									

3.5 GRAND SUMMARY

ITEM	DESCRIPTION	TOTAL PRICE	
		F/C	FJD
1.0	Design, drawings and documentation		
2.0	Plant and equipment including mandatory spares		
3.0	Civil Works, installation and other services		
GRAND TOTAL			

3.6 *RECOMMENDED TOOLS &SPARE PARTS*

As per clause 1.10 of the technical specifications, the bidder is required to provide a list of spare parts as recommended by the Manufacturer. These shall be divided into two categories i.e. Mandatory and Optional. Thus the bidders are required to provide two separate tables for the two categories.

Item	Description	Qty	Unit Price		Total Price	
			F/C	FJD	F/C	FJD

3.7 *SUMMARY OF PRICES*

	Foreign Cost	**Local Cost**
1. MAIN OFFER: (a) Wailoaloa 33-11kV Substation (b) Recommended Spares; Tools &Equipment		
2. ALTERNATIVE OFFERS: (Briefly describe) A. B.		

TOTAL CONTRACT PRICE:

Main Offer: Foreign Currency (in words)

……
and Local Currency (in words)

……
*Alternative A: Foreign Currency (in words)

……..
and Local Currency(in words)

……..
*Alternative B: Foreign Currency (in words)

……..
and Local Currency (in words)

……..

Signature of Tenderer .....

Witness .....

Note: Details to be included in Part II of this Section in the Departures from Specifications.

3.8 *BIDDERS TOOLS & EQUIPMENTS*

During the pre-commissioning and commissioning tests, a lot of specialised tools and equipment will be required to carry out the acceptance testing. Thus the bidders shall provide a list of such tools and equipment that they currently have. These are the tools which will be used for commissioning switchgears, transformers, cables, etc.

Item No.	Description	Model No.	Manufacturer

3.9 *RATES FOR VARIATION*

The Contractor shall aim to carry out the project without any variations. However, if unforeseen circumstances and event warrant any variation, the Contractor shall only proceed with a written approval from the Employer's Representative. The agreed price variation shall be documented.

The rates stated in this schedule shall be applicable to variations ordered by the Employer's Representative and not covered by the Schedule of Prices. These rates shall be deemed to include the cost of construction facilities, professional and technical services, royalties, taxes, transport of equipment, labour and other changes necessary to perform the work.

The Contractor shall not be entitled to any allowance above unit rates stated in the schedule by reason of any amount of work being required under such items during the currency of the Contract.

3.9.1 Materials

Materials required for variations or day work shall be paid for on the basis of the net quantities actually used in accordance with the Employer's Representatives.

Payment will be at the cost on site based on evidence of purchased prices after deductions of all trade and bulk discounts, transport, and any other charges applicable to the materials plus the percentage stated below to cover contractor's profit and overheads.

Materials supplied by the Contractor will be at prices to be agreed, due regard being paid to the prices for similar materials if supplied from outside sources.

3.9.2 Labour

Payment of labour shall be in accordance with the table of hourly rates below which shall include Contractor's profit, overheads, superintendence, insurance, time keeping and all clerical and office work and use of hand operated tools and all incidental chargers whatsoever. The time of technicians or leading hands working with the crews will be paid for at rates stated but the time of the supervisors and foremen shall be covered by the overhead component of the hourly rates.

Item No.	Grade of Officer/Workman	Rate/hour F/C	Rate/hour FJD

Section 7

Schedules – Part II
Schedules of Supplementary Information

1 MANUFACTURERS, PLACES OF MANUFACTURE & TESTING

ITEM	*MANUFACTURER*	*PLACE OF MANUFACTURE*	*PLACE OF TESTING & INSPECTION*
36 kV Switchgear			
Indoor switchgear			
Indoor circuit breaker			
Busbar			
Current Transformer			
Voltage Transformer			
11 kV Switchgear			
Indoor switchgear			
Indoor circuit breaker			
Busbar			
Current Transformer			
Voltage Transformer			
400 V Switchboard			
Protection, Metering & Control			
36 kV panels			
11 kV panels			
Instruments			
Relays			
Meters			
DC Equipment			
Batteries			
Chargers			
Distribution Boards			
Earthing			
Copper Conductors			
Clamps			
Earthing Rods			
Site Erecting			
To be carried out by: -			
Transformers			
Power Transformer 33/11 kV			
Transformers Complete			
Windings			
33 kV terminal			
11 kV terminal			
Insulators			

Tap changers			
Copper			
Core Parts			
Tanks			
Radiators			
Fan motors			
Temperature Indicators			
Oil valves			
Pressure relief device			
Motor control equipment			
Alarm devices			
Gas and oil actuated relays			
Dissolved gas analyser			
Digital temperature monitoring			
Automatic voltage regulator panel			
Steel structures			
SCADA equipment			
Fiber optic equipment			

2 TECHNICAL PARTICULARS AND GURANTEES

2.1 BUSBARS 36KV

	Item	***Units***	***Required***	***Tendered***
			36 kV	***36 kV***
1.	Rated Normal Current	A	2000	
2.	Rated current at Max. ambient temperature	A		
3.	Conductor Material		Cu	
4.	Standard Applicable			
5.	Single conductor Cross section	mm^2		
6.	Insulation material			
7.	Fire Certification (IEC 60466, etc)			

2.2 BUSBARS 11KV

	Item	***Units***	***Required***	***Tendered***
			12 kV	***12 kV***
1.	Rated Normal Current	A	2000	
2.	Rated current at Max. ambient temperature	A		
3.	Conductor Material		Cu	
4.	Standard Applicable			
5.	Single conductor Cross section	mm^2		
6.	Insulation material			
7.	Fire Certification (IEC 60466, etc)			

2.3 12/15 MVA 33/11 kV TRANSFORMER

Employer's List of Preferred Manufacturers is:

1. Tyree Transformers of Australia
2. Wilson Transformers of Australia

ITEM	MANUFACTURER	PLACE OF MANUFACTURE	PLACE OF TESTING & INSPECTION
33/11kV TRANSFORMER			
Transformer Complete			
Windings	SAM DONG KOREA		
33 kV terminal	ABB Sweden		
Neutral terminal	ABB Sweden		
11 kV terminal	ABB Sweden		
33kV & 11kV cable end box			
33kV and 11kV Insulators	ABB Sweden Micafil		
ON LOAD Divertor Switch	MR Reinhausen		
Copper	Sam Dong Korea		
Core parts	JFE Japan		
Tanks			
Radiators	MENK Germany		
Oil level indicators	MR Reinhausen		
Oil Valves			
Pressure relief device	MR Reinhausen / Qualitrol		
Dehydrating breather	MR Reinhausen DB200 MESSKO® MTraB® DB 200		
Alarm devices			
Gas and Oil actuated relays	MR Reinhausen		
Digital Temperature Monitoring	Qualitrol 509DW		
Transformer Fan and Controller	ZHEIL ABEGG		

	Item	*Units*	*Required*	*Tendered*
(a)	**RATING & PERFORMANCE**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Continuous Maximum rating (CMR) (ONAN/ONAF)	MVA	12/15	
4.	Number of phases		3	
5.	Number of Windings		2	
6.	Applicable Standard – IEC		60076	
7.	Period the Transformer has been in commercial operation	Years		
8.	System maximum voltage for both windings Um	HV	36 kV	
		MV	12 kV	
9.	Insulation type	HV	Graded	
		MV	Uniform	
10.	Highest Voltage for equipment	HV	36 kV	
		MV	12 kV	
11.	Winding Insulation Level	HV		
		N		
		MV		
12.	Transformer Nominal ratio		33/11 kV	
13.	Phase Connections	HV	Delta	
		MV	Star	
	Vector group		Dyn1	
14.	Short circuit withstand fault level at terminals of			
	36kV busbars	kA	25	
	12kV busbars	kA	25	
15.	Type of Cooling		ONAN/ONAF	
16.	External cooling medium		Air	
17.	Service conditions :			
	Altitude not exceeding	m	200	
	Air temperature not exceeding	^{o}C	50	
	Average air temperature in any one year not exceeding	^{o}C		
	In any one day	^{o}C	32	
	Average in one year	^{o}C	30	
18.	Tap Changer (On load)		On load	
	(A) Type			
	(B) Category of voltage control		CFVV	
	(C) HV or LV winding		HV	
	(D) Range (+ & -)	%	+10.5% to -15%	
	(E) Step size	%	1.5	
	(F) Power frequency withstand test voltage between first and last contacts of the selector switch between any two adjacent contacts of the selector between diverter and switch contacts	(kV)		
	(G) Type test certificate reference			
19.	Size of tapping step with position		+7/10 x 1.5%	

	nos.			
20.	Approximate ONAN rating	MVA		
21.	Hot spot temperature rise at CMR under service and at 30°C ambient temperature	°C	55	
22.	Top oil temperature rise (average daily ambient air temperature 32°C)			
	(A) CMR	°C	50	
	(B) ONAN rating			
23.	Maximum hot spot temperature when loaded according to IEC 60354	°C		
24.	Winding hot spot temperature on emergency overload not exceeding	°C		
25.	Flux density in iron at normal voltage and frequency and at normal ratio - (no load).			
	(A) Core	Tesla		
	(B) Yokes	Tesla		
26.	Magnetising current (approx) at nominal ratio and			
	at 0.9 x nominal voltage	%		
	at 1.0 x nominal voltage	%		
	at 1.1 x nominal voltage	%		
	at 1.2 x nominal voltage	%		
27.	Guaranteed Losses at nominal ratio			
	(A) No Load losses	kW		
	(B) Copper losses at CMR	kW		
	(C) Auxiliary losses at CMR	kW		
28.	Regulation at 75°C and normal ratio -			
	(A) At unity power factor	%		
	(B) At 0.8 lagging power factor	%		
29.	Impedance voltage at 75°C and CMR. Between HV and LV Windings at Tap			
	Maximum	%		
	Nominal	%	5	
	Minimum	%		
30.	Equivalent circuit zero sequence impedance between HV and LV windings			
	Maximum Tap (1)	Ω/phase		
	Nominal Tap (5)	Ω/phase		
	Minimum Tap (9)	Ω/phase		
31.	Maximum current density in windings at C.M.R.			
	(A) HV Winding	A/mm^2		
	(B) LV Winding	A/mm^2		
32.	Efficiency	%	99.5	
33.	Digital Temperature Monitoring Equipment:			
	Manufacturer's Name		Qualitrol	
	Manufacturer's Address			
	Equipment Model		IED 509-100	
	Number of inputs			
	Number of outputs			
	Number of fiber optic sensor probes			
	Tank wall plate assembly		Welded on tank	

	Number of optical feed throughs			
	Communications options			
	Rated voltage	V		
	Frequency	Hz	50	
	Power	W		
34	DGA Monitoring Equipment:			
	Manufacturer's Name		Calisto	
	Manufacturer's Address			
	Equipment Model			
	Number of inputs			
	Number of outputs			

	Item	***Units***	***Required***	***Tendered***
(b)	**CONTROL CIRCUITS**			
1.	Type of controls for cooler			
2.	Whether automatic control required and the		Yes	
	reference voltage (VT output line to line)	V	110 V AC 50 Hz	
3.	Whether load compensation required on the AVR.		N/A	
4.	Whether separate remote control panel required		No (use existing)	
5.	Estimated distance between remote control point and transformer	m	N/A	
6.	DC supply (control voltage) :			
	Nominal	V	110	
	Maximum float voltage	V	120	
7.	AC supply voltage for tap changer operating motor 3 phase.	V	415	
8.	Whether provision for supervisory control required, including AVR setting		yes	
9.	Whether marshalling kiosk required		Yes	
10.	Number of transformers for which automatic control is to be provided		All	
11.	Transformer terminals for line and neutral			
	(i) HV line		Cable box	
	(ii) Neutral		Cable box	
	(iii) MV line		Cable box	
12.	Accommodation for current transformers in bushings at			
	(i) HV line		Yes	
	(ii) Neutral		No	
	(iii) MV line		Yes	
13.	Accommodation of tank for outdoor weatherproof HV neutral current transformers		Yes	
14.	Pollution category of bushings High-25mm/kV based on system highest voltage	mm/kV	25	

	Item	*Units*	*Required*	*Tendered*
(c)	**COOLING**			
1.	Minimum number of radiators per transformer			
2.	Maximum rating of each radiator as percentage of total loss at CMR			
(d)	**GENERAL**			
1.	Type of oil preservation system		Silica Gel	
2.	Whether wheels, skid or flat bottom base required		Flat bottom	
3.	Whether anti-vibration pads required		Yes	
4.	Transformer sound pressure acceptance level	dB	65	
(d)	**DETAILS OF CONSTRUCTION**			
1.	Types of winding -			
	(A) HV			
	(B) MV			
2.	Material of Insulation			
	(A) HV Windings			
	(B) MV Windings			
3.	Insulation of tapping connections			
4.	Insulation of -			
	(A) Yoke bolts.			
	(B) Side plates.			
5.	Winding connections brazed or crimped Specify material (winding material and the joint material)			
6.	Is facility provided for adjustment of axial pressure on windings?	Yes/No		
7.	Thickness of transformer tank			
	(A) Sides	mm		
	(B) Bottom	mm		
8.	Material used for gaskets for oil tight joints.			
9.	Top Cover flange:-			
	Level: Low/High			
	Joint: WELDED/GASKETTED		Welded	

	Item	*Units*	*Required*	*Tendered*
(f)	**RADIATORS VALVES & FANS**			
1.	Thickness of radiator plates and/or cooling tubes.	mm		
2.	Valve type/material:			
	75mm and below			
	above 75mm			
3.	Equipment for ONAN cooling state (A) or (B) -		A	
	(A) Radiator on main tank			

	(B) Separate cooler bank			
4.	Number of cooling air blowers per transformer			
5.	Speed of air blowers and air flow	rpm/m^3 per min		
6.	Rating of each air blower motor	kW		
7.	Starting current of each blower motor,	A		
(g)	**OIL VOLUMES & WEIGHTS**			
1.	Total oil required including cooler system	Litres		
2.	Volume of oil to fill transformer to above the top yoke.	Litres		
3.	Total volume of conservator	Litres		
4.	Volume of oil in conservator between highest and lowest visible	Litres		
5.	Weight of core and winding assembly	Tons		
6.	Weight of each oil cooler bank complete with oil if mounted separately from transformer	Tons		
7.	Total weights of complete transformers, including attached coolers, voltage regulating equipment, all fittings and oil	Tons		
8.	Weight of transformer arranged for transport	Tons		

	Item	***Units***	***Required***	***Tendered***
(h)	**TRANSFORMER OIL**			
1.	Manufacture, type and class of oil to BS 148-1972	mm		
(i)	**TRANSFORMER PARTS SUBJECT TO SHORT-CIRCUIT TEST**			
1.	Brief description of Transformer or parts thereof subjected to short circuit test for which short-circuit calculations are available.	Yes/No		
(j)	**TRANSFORMER BUSHING (IF APPLICABLE)**			
1.	Manufacturer			
2.	Insulator material (solid/oil-paper):			
	a. HV bushing			
	b. Neutral bushing			
	c. MV bushing			
3.	Manufacturer's type reference and rated voltage			
4.	Rated current			
	a. HV bushing			
	b. Neutral bushing			
	c. MV bushing			
5.	Manufacturer of porcelain			
6.	Length of insulator (overall).			
	a. HV bushing	mm		
	b. Neutral bushing	mm		
	c. MV bushing	mm		
7.	Weight of insulator.			

	a. HV bushing	kg		
	b. Neutral bushing	kg		
	c. MV bushing	kg		
8.	Electrostatic capacity of complete bushings.			
	a. HV bushing	pF		
	b. Neutral bushing	pF		
	c. MV bushing	pF		
9.	Dry lightning impulse voltage withstand. (1.2/50 wave)			
	a. HV bushing	kV		
	b. Neutral bushing	kV		
	c. MV bushing	kV		
10.	50Hz dry voltage withstand			
	a. HV bushing	kV		
	b. Neutral bushing	kV		
	c. MV bushing	kV		
11.	50Hz wet withstand voltage without arcing horns			
	• HV bushing	kV		
	• Neutral bushing	kV		
	• MV bushing	kV		
12.	Total Creepage distance of shed (specified minimum 25mm/kV based on maximum system voltage)			
	a. HV bushing	mm		
	b. Neutral bushing	mm		
	c. MV bushing	mm		

2.3 *CIRCUIT BREAKERS 36KV*

	Item	***Units***	***Required***	***Tendered***
			36 kV	***36 kV***
1.	Manufacturer's Name			
2.	Country of Manufacture			
3.	Place of Testing			
4.	Applicable Standards – IEC62271,IEC60694, etc			
5.	Manufacturer's type designation, and type ref or model number			
6.	Type tested	Yes/No	Yes	
7.	Type test Report, Ref No.			
8.	Rated Voltage	kV	36	
9.	Rated Frequency	Hz	50	
10.	Rated Normal Current at 20°C			
	- Line feeder circuit breaker	A	1250	
	- Transformer circuit breaker	A	1250	
	- Generator Breaker	A	N/A	
	- Bus section circuit breaker	A	2000	
11.	Rated Current at Max. ambient temperature			
	- Line feeder circuit breaker	A		
	- Transformer circuit breaker	A		
	- Generator Breaker	A		
	- Bus section circuit breaker	A		
12.	Rated Lightning Impulse Withstand	kA	170	
13.	Rated 1 min Power Frequency Withstand	kV	70	
14.	Rated short circuit breaking current (symmetrical, r.m.s)	kA	25	
15.	Rated short circuit breaking current (asymmetrical, r.m.s)	kA	31.5	
16.	Rated making current (peak)	kA	50	
17.	Rated Duration of Short Circuit Current	s	3	
18.	Rated cable charging breaking current	A		
19.	Rated line charging breaking current	A		
20.	Rated small inductive breaking current	A		
21.	Voltage drop across terminals of one pole at rated current	mV		
22.	Amplitude factor			
23.	First pole-to-clear fault		1.5	
24.	Rated operating sequence		O-0.3 sec-CO-3 min-CO	
25.	Min. time t" between two successful three phase auto reclosures at full rated breaking current (sequence O-0.3-C-t"-O-0.3-C)	min		
26.	Closing time	ms		
	- tolerances	ms		
27.	Dead time (max)	ms		
	- tolerances	ms		
28.	Break time (max.) at full rated breaking current	ms		
	- tolerances	ms		
29.	Make time (max.)	ms		

	- tolerances	ms		
30.	Arcing time (max.) at full short circuit duty	ms		
	- tolerances	ms		
31.	Life duration of main contacts (no load mechanical operations)	Operations		
32.	Number of switching operations at rated breaking capacity before contact maintenance becomes necessary	No.	Min 100	
33.	Auxiliary contacts:			
	- number NO/NC			
	- voltage rating	V DC	110	
	- current rating	A DC		
34.	Making coil			
	- Rated voltage	V DC	110	
	- min. operating voltage	V	88	
	- Rated power each	W		
35.	Trip coil			
	- Rated voltage	V DC	110	
	- min. operating voltage	V	55	
	- Rated power each	W		
36.	Motor Voltage	V DC	110	
37.	Motor Power	W		
38.	Max. temperature rise of contacts at rated normal Current	K		
39.	Arc quenching medium		Vacuum/SF6	
40.	Material of main contacts			
41.	Maximum Shock load imposed on floor or foundation when opening under fault conditions (compression or tension)	N		
42.	Minimum Clearances in air			
	(a) Between phases	mm	480	
	(b) Phase to earth	mm		
	(c) Across CB poles	mm	700	
43.	Material of filter employed for the absorption of the products of combustion			
44.	Method of controlling voltage distribution between breaks (capacitor, resistor etc.)			
45.	Weight of complete 3 pole breaker	kg		
46.	Weight of heaviest part for shipment	kg		
47.	Period the equipment has been in commercial operation	years	> 5	

2.4 *CIRCUIT BREAKERS 12KV*

	Item	***Units***	***Required***	***Tendered***
			12 kV	***12 kV***
1.	Manufacturer's Name			
2.	Country of Manufacture			
3.	Place of Testing			
4.	Applicable Standards – IEC62271,IEC60694, etc			
5.	Manufacturer's type designation, and type ref or model number			
6.	Type tested	Yes/No	Yes	
7.	Type test Report, Ref No.			
8.	Rated Voltage	kV	12	
9.	Rated Frequency	Hz	50	
10.	Rated Normal Current at 20°C			
	- Line feeder circuit breaker	A	630	
	- Transformer circuit breaker	A	1250	
	- Generator Breaker	A	N/A	
	- Bus section circuit breaker	A	2000	
11.	Rated Current at Max. ambient temperature			
	- Line feeder circuit breaker	A		
	- Transformer circuit breaker	A		
	- Generator Breaker	A		
	- Bus section circuit breaker	A		
12.	Rated Lightning Impulse Withstand	kA	75	
13.	Rated 1 min Power Frequency Withstand	kV	28	
14.	Rated short circuit breaking current (symmetrical, r.m.s)	kA	25	
15.	Rated short circuit breaking current (asymmetrical, r.m.s)	kA	28	
16.	Rated making current (peak)	kA	50	
17.	Rated Duration of Short Circuit Current	s	3	
18.	Rated cable charging breaking current	A		
19.	Rated line charging breaking current	A		
20.	Rated small inductive breaking current	A		
21.	Voltage drop across terminals of one pole at rated current	mV		
22.	Amplitude factor			
23.	First pole-to-clear fault		1.5	
24.	Rated operating sequence		O-0.3 sec-CO-3 min-CO	
25.	Min. time t" between two successful three phase auto reclosing at full rated breaking current (sequence O-0.3-C-t"-O-0.3-C)	min		
26.	Closing time	ms		
	- tolerances	ms		
27.	Dead time (max)	ms		
	- tolerances	ms		
28.	Break time (max.) at full rated breaking current	ms		
	- tolerances	ms		
29.	Make time (max.)	ms		

	- tolerances	ms		
30.	Arcing time (max.) at full short circuit duty	ms		
	- tolerances	ms		
31.	Life duration of main contacts (no load mechanical operations)	Operations		
32.	Number of switching operations at rated breaking capacity before contact maintenance becomes necessary	No.	Min 100	
33.	Auxiliary contacts:			
	- number NO/NC			
	- voltage rating	V DC	110	
	- current rating	A DC		
34.	Making coil			
	- Rated voltage	V DC	110	
	- min. operating voltage	V	88	
	- Rated power each	W		
35.	Trip coil			
	- Rated voltage	V DC	110	
	- min. operating voltage	V	55	
	- Rated power each	W		
36.	Motor Voltage	V DC	110	
37.	Motor Power	W		
38.	Max. temperature rise of contacts at rated normal Current	K		
39.	Arc quenching medium		Vacuum	
40.	Material of main contacts			
41.	Maximum Shock load imposed on floor or foundation when opening under fault conditions (compression or tension)	N		
42.	Minimum Clearances in air			
	(d) Between phases	mm	120	
	(e) Phase to earth	mm	120	
	(f) Across CB poles	mm	120	
43.	Material of filter employed for the absorption of the products of combustion			
44.	Method of controlling voltage distribution between breaks (capacitor, resistor etc.)			
45.	Weight of complete 3 pole breaker	kg		
46.	Weight of heaviest part for shipment	kg		
47.	Period the equipment has been in commercial operation	Years	> 5	

2.5 *CURRENT TRANSFORMER*

	Item	***Units***	***Required***	***Tendered***	***Required***	***Tendered***
			12 kV	***12 kV***	***36 kV***	***36 kV***
1.	Manufacturer					
2.	Type					
3.	Applicable Standards - IEC		60044-1		60044-1	
4.	Rated secondary current	A	1		1	
5.	Rated lightning impulse withstand voltage (primary)	kV	75		170	
6.	Rated Power Frequency withstand voltage (primary)	kV	28		95	
7.	Rated short-time current					
8.	Protection cores (Transformer Diff):					
	- Rated Primary Current	A				
	- Accuracy class	Class	0.1PX		0.1PX	
	- Resistance of secondary winding at 75^{o}C	Ohms	< 3		< 3	
	- Rated Burden	VA	15		15	
9.	Protection cores(OC & EF for feeders):					
	- Rated Primary Current	A				
	- Accuracy class	Class	5P20		5P20	
	- Resistance of secondary winding protection cores at 75^{o}C	Ohms	< 3		< 3	
	- Rated Burden	VA	min 15		min 15	
10	Protection cores(Bus Section):					
	- Rated Primary Current	A				
	- Accuracy class	Class	0.1PX		0.1PX	
	- Resistance of secondary winding protection cores at 75^{o}C	Ohms	< 3		< 3	
	- Rated Burden	VA	min 15		min 15	
11.	Number of Cores	No.	See scope of works and Drawings		See scope of works and Drawings	
12.	Knee point e.m.f. of protection cores	V	Min 415		Min 415	
13.	Knee point e.m.f. of busbar protection cores	V	Min 415		Min 415	
14.	Insulation material for windings					
15.	Limits on exciting current	A				
16.	Partial discharge	pC	< 50		< 50	

2.6 *VOTLAGE TRANSFORMER*

	Item	***Units***	***Required***	***Tendered***	***Required***	***Tendered***
			12 kV	***12 kV***	***36 kV***	***36 kV***
1.	Manufacturer					
2.	Type		magnetic		magnetic	
3.	Applicable Standards - IEC		60044-2		60044-2	
4.	Method of transformation		inductive		inductive	
5.	System Voltage	kV	12		36	
6.	Type of supply		3 phase		3 phase	
7.	Frequency	Hz	50		50	
8.	Basic Insulation Level	kV	75		95	
9.	Creepage distances	Mm				
10.	Transformation ratio					
11.	Class of accuracy					
12.	Class of insulation					
13.	Number of secondaries and accuracy class		See scope of works & drawings		See scope of works & drawings	
14.	Thermal capacity of ground-fault detection winding	A/h				
15.	Rated burden (total on all secondaries)	VA				
16.	Partial discharge		Acc. IEC 60044-4		Acc. IEC 60044-4	
17.	Height	Mm				
18.	Weight of single pole unit	Kg				

2.7 *SWITCH PANELS*

	Item	***Units***	***Required***	***Tendered***	***Required***	***Tendered***
			12 kV	***12 kV***	***36 kV***	***36 kV***
1.	Manufacturer					
2.	Type		Metal-Clad		Metal-Clad	
	rated voltage	kV	12		36	
3.	Applicable Standards - IEC		IEC 60694		IEC 60694	
	Impulse withstand voltage kV peak	kV	75		170	
	Power frequency withstand voltage	kV	28		70	
4.	Thickness	mm				
5.	Short time rating, 3 sec	kA	25		25	
6.	Integral earthing switch for feeder and busbar	Yes/No	Yes		Yes	
7.	Short circuit rating of earth switch					
8.	Making capacity of earth switch					
9.	Voltmeter					
	- Manufacturer		Crompton		Crompton	
	- Dial Size and scale length					
	- Scale	kV	0 - 15		0 – 40	
10.	Ammeter					
	- Manufacturer		Crompton		Crompton	
	- Dial Size and scale length					
	- Scale	A	0 - 400		0 – 200	
11.	kW/kVAR meter					
	- Manufacturer					
	- Dial Size and scale length					
	- Scale					
12.	Transducer					
	- Manufacturer and model		Areva M253		Areva M253	
	- protocol		DNP3		DNP3	
13.	Anti-Condensation heater					
	- Manufacturer					
	- Heater voltage					
	- Heater Output	W				
	Is heater switch provided		Yes		Yes	
14.	Material					
	Surface Finish					
	Dimensions					
	Length	mm				
	Width	mm				
	Height	mm				
15.	Total Net Weight	kg				
16.	Period the equipment has been in commercial operation	Years				

2.8 LVAC EQUIPMENT

	Item	*Units*	*Required*	*Tendered*
(a)	**DISTRIBUTION BOARD**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Manufacturer's type designation and type ref number or Model number			
4.	Rating	A	250	
5.	Fault Rating	kA	16	
6.	Voltage	V	415/240	
(b)	**MCCB**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Manufacturer's type designation and type ref number or Model number			
4.	Type			
5.	Rating	A		
6.	Fault Rating	kA	16	
(c)	**ACB**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Manufacturer's type designation and type ref number or Model number			
4.	Type			
5.	Rating	A		
6.	Fault Rating	kA	16	

2.9 BATTERIES & CHARGERS

	Item	*Units*	*Required*	*Tendered*
			110 V	*110 V*
(a)	**BATTERY**			
1.	Manufacturer's Name			
2.	Country of Manufacture			
3.	Place of testing			
4.	Applicable Standard – IEC		60623	
5.	Manufacturer's type designation and type ref number or Model number			
6.	Voltage	V DC	110	
7.	Capacity at 6 hour rate	Ah	600	
8.	Number of Cells			
9.	Voltage per Cell	V		
10.	Battery voltage at the end of the duty cycle	V		
11.	Normal charging current	A		
12.	Maximum charging current	A		
13.	Ampere-hour efficiency at ten hour rate	%		
14.	Ampere-hour efficiency at one hour rate	%		
15.	Dimensions of Cells	mm		
16.	Dimensions of Battery complete	mm		
17.	Weight of Cell complete with electrolyte	kg		
18.	Total weight of Battery complete	kg		
19.	Internal resistance per cell when fully charged	ohms		
20.	Material of battery case			
21.	Period Battery has been in commercial operation	Years		
(b)	**BATTERY CHARGER**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Place of testing			
4.	Manufacturer's type designation and type ref number or Model number			
5.	Applicable Standard – IEC			
6.	Number of Phases	Three	3	
7.	Type of Charger Control	Micro Processor		
8.	AC Input Nominal Voltage	V	415	
9.	AC Input Voltage range	%		
10.	Operating Frequency	Hz		
11.	AC input to charger at full load	kVa		
12.	AC Input current	A		
13.	DC Nominal voltage	V	110	
14.	DC output of the charger	kW		
15.	Constant Voltage			
	(i) Floating charge	V		
	(ii) Equalizing Charge	V		

16.	Maximum output voltage			
	(i) at automatic Control	V		
	(ii) at Boost charge	V		
17.	Regulation	%		
18.	Range of DC Voltage Control			
19.	Output ripple voltage	%	4	
20.	Protection class		IP 51	
21.	Operating ambient temperature	deg.	40°C	
22.	Dimensions			
	(i) Height	mm		
	(ii) Width	mm		
	(iii) Depth	mm		
23.	Normal and Boost charge are independent units	Yes/No		
24.	Test report reference no:			
25.	Period Battery Charger has been in commercial operation	Years		
(c)	**DC SWITCHBOARDS**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Place of testing			
4.	Type of construction			
5.	Manufacturer's type designation and type ref number or Model number			
6.	Busbars:-			
	(i) Maximum current rating	A		
	(ii) Dimensions	mm		
7.	Boost charge contactors:-			
	(i) Manufacturer			
	(ii) Maximum current rating	A		
	(iii) Coil rating	W		
	(iv) Method of interlocking			
8.	Alarm relays:-			
	(i) Manufacturer			
	(ii) Type and reference			
	(iii) Power consumption:-			
	a) Quiescent	A		
	b) Operated	mA		
9.	Number and rating of distribution circuits			
10.	Overall dimensions	mm		
11.	Total weight	kg		

2.10 FIBER OPTIC & SCADA EQUIPMENT

	Item	*Units*	*Required*	*Tendered*
(a)	**Optical Fiber Terminal Equipment**			
	Multiplexer			
1.	Manufacture's name & address			
2.	Manufacturer's type designation and model number			
3.	Applicable Standard(s)			
4.	Working temperature range	^{o}C		
5.	Relative humidity			
6.	Working Voltage	V DC		
7.	Power Consumption	W		
8.	Number of 64 Kb tributaries			
9.	Output aggregate stream	Mb		
10.	User interface	RS232		
(b)	**VoIP Telephone**			
1.	Manufacture's name & address		Mitel, USA	
2.	Communications Platform		3300 ICP	
3.	Running Version		7.2	
4.	Model of Phone			
(c)	**SCADA Equipment**			
1.	Manufacturer's Name		SEL	
2.	Model		SEL 3530	
(d)	**VHF RADIO**			
1.	Manufacturer's Name		TAIT	
2.	Model		TM8250	

2.11 GROUNDING MATERIALS

	Item	*Units*	*Required*	*Tendered*
(a)	**SHIELD WIRE SYSTEM**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Material			
4.	Overall diameter	mm		
5.	Nominal Section	mm^2		
6.	Cross Section & Make up			
7.	Maximum rated current (3 sec)	A		
8.	Maximum working tension of main connections	kg/ m^2		
9.	Resistance of conductor per 100 m at 30°C	ohm		
10.	Tensile breaking stress of material	N/ mm^2		
11.	Maximum permissible span length	m		
12.	Maximum sag under own weight of maximum span	mm		
(b)	**EARTHING GRID**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Material			
4.	Overall diameter	mm		
5.	Nominal Section	mm^2		
6.	Maximum rated current (3 sec)	A		
7.	Resistance of conductor per 100 m at 30°C	ohm		
(c)	**GROUNDING ELECTRODES**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Material			
4.	Dimensions			
5.	Number of electrode per group			
6.	Number of earthing points per substation			
7.	Calculated resistance of combined earth grid and points			

2.13 PAD MOUNT AUXILIARY/EARTHING TRANSFORMER

Not Applicable.

2.14 VENTILATION INSTALLATIONS

	Item	*Units*	*Required*	*Tendered*
(A)	**SPLIT TYPE AIR CONDITIONING UNIT**			
1	Number of Units			
2	Manufacturer's Name and Address			
3	Country of Origin			
4	Type			
5	Model No.			
6	Cooling duty (latent)	kW		
7	Cooling duty (Sensible)	kW		
8	On – Coil Condition	DB/WB ^{o}C		
9	Off – Coil Condition	DB/WB ^{o}C		
10	Total Electrical Input	kW		
11	Air Volume	m^3/hr		
(B)	**AIR COOLED CONDENSING UNITS**			
1	Number of Units			
2	Manufacturer's Name and Address			
3	Country of Origin			
4	Type			
5	Model No.			
6	Refrigeration Effect	kW each		
7	Compressor type			
8	Compressor input	kW each		
9	Suction temperature	^{o}C		
10	Condenser ambient temperature	^{o}C		
11	Fan Motor(s)	Total kW		
12	Capacity Steps	%		
(C)	**SELF CONTAINED AIR CONDITIONING UNITS**			
1	Number of Units			
2	Manufacturer's Name and Address			
3	Country of Origin			
4	Type			
5	Model No.			
6	Refrigeration Effect	kW each		
7	Compressor input	kW each		
8	Fan Motor	kW each		
(D)	**VENTILATION WORKS**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Number of units			
4.	Air volume	m^3/hr		
5.	System resistance	N/m^2		
6.	Fan Motor Size	kW		
7.	Corrosion Protection			

2.15 FIRE SAFETY EQUIPMENT

	Item	*Units*	*Required*	*Tendered*
(a)	**FIRE DETECTION SYSTEM**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Voltage	V		
4.	Power	W		
5.	Number of outputs			
6.	Number of alarms			
(b)	**TROLLY MOUNTED EXTINGUISHERS, CO_2, 50kg**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Dimensions	mm		
4.	Total Weight	kg		
5.	Length of Hose	mm		
6.	Type of Powder			
7.	Working pressure	kg/cm^2		
8.	Test Pressure	kg/cm^2		
(c)	**WALL MOUNTED EXTINGUISHERS, CF, 5.5kg**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Dimensions	mm		
4.	Total Weight	kg		
5.	Length of Hose	mm		
6.	Type of Powder			
7.	Working pressure	kg/cm^2		
8.	Test Pressure	kg/cm^2		
(d)	**TROLLY MOUNTED EXTINGUISHERS, BCF, 50kg**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Dimensions	mm		
4.	Total Weight	kg		
5.	Length of Hose	mm		
6.	Type of Powder			
7.	Working pressure	kg/cm^2		
8.	Test Pressure	kg/cm^2		

2.16 LIGHTING AND SMALL POWER

	Item	*Units*	*Required*	*Tendered*
(a)	**DISTRIBUTION BOARDS (fitted with Fuse)**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type and/or figure no.			
4.	Rating	A		
5.	Fault Rating	kA		
6.	Voltage	V		
(b)	**DISTRIBUTION BOARDS (fitted with circuit breakers)**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type and/or figure no.			
4.	Rating	A		
5.	Fault Rating	kA		
6.	Voltage	V		
(c)	**PVC CABLE**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
4.	Voltage rating	V		
(d)	**CONDUIT**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
(e)	**CONDUIT ACCESSORIES**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
(f)	**CABLE TERMINATIONS**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
4.	Material			
(g)	**SWITCHES**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
4.	Rating	W		
(h)	**SOCKET OUTLETS**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type and/or Figure No.			
4.	Rating	W		
5.	Finish			
(i)	**CONTACTORS**			
1.	Manufacturer's Name			

2.	Manufacturer's Address			
3.	Type			
4.	Rating	W		
5.	Number of Contacts			
6.	Rating of Coil AC	VA		
(j)	**MINIATURE CIRCUIT BREAKERS**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
4.	Rating	A		
5.	Fault rating	kA		
(k)	**EARTHING MATERIAL**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Material and Size			
(l)	**LIGTHING FITTINGS - FLUORESCENT**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
4.	Rating			
5.	Harmonic content			
(m)	**LIGTHING FITTINGS**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
4.	Rating	W		
(n)	**LIGTHING FITTINGS - EMERGENCY**			
1.	Manufacturer's Name			
2.	Manufacturer's Address			
3.	Type			
4.	Rating	W		

2 WORK PROGRAMME

The bidder is required to state the commencement and completion dates for the following tentative work programme based on an assumed contract signing date of July 2026. The contractor is to also submit a Gantt chart for the programme outlining the activity, duration, start date, completion date, milestones, resources, etc.

	Component	***Start Date***	***Finish Date***
	Design of plant and equipment and approval by employer		
	Manufacture of plant		
	Testing at Manufactures premises (witness testing)		
	Shipping of plant and equipment		
	Installation of equioment(may be carried out in stages)		
	Completion of wiring for controls and protection equipment		
	Inspection and pre-commissioning tests		
	Testing and commissioning		

Note that the items in the work programme are the responsibility the contractor. Certain items which have been omitted, such as removal of existing switchgear panels, and cable terminations will be carried out by the Employer. of All site tests to be carried out as per the contract are an absolute minimum. Additional tests may be required by the employer's representative.

3 DEPARTURES FROM SPECIFICATIONS

(To be completed by the Contractor)

All deviations shall be forwarded in the format given below. Any details that will lead to deductions of final Bid price shall not be inserted. **Bidder is to comment if there are no departures from the specification else to clearly list all departures from specifications if any. This is a mandatory requirement**.

Section	***Clause No.***	***Proposed Deviations***

4 BIDDER'S STATEMENT OF EXPERIENCE

Bidder shall state hereunder a brief resume of his experience in the design, supply and erection of 33 kV and 11kV indoor switchgear, stating the employer's name, contact person, telephone number and fax number. Failure to complete this schedule with full satisfactorily details and documentary proof will render the offer liable to rejection.

Country		
System Voltage kV		
Type of Construction		
Purchaser		
Consultant		
No. of Bays and Capacity of Grid Substation (MVA)		
Contract Award Date		
Contractual Completion Date		
Actual Completion Date		
Contract Value		

5 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 EFL 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.

6 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)***
Headquarters				
Project Director			10	
Project Manager			10	
Engineering Design Staff			7	
Substation Design Engineer			7	
Other key staff (Give designation)				
Site Office				
Site Manager			10	
Deputy Site Manager			7	
Supervising Engineers			7	
Construction Supervisors			7	
Safety Manager			10	
Other key staff				
Specialised Staff				
Cable Jointer			10	
Optic Fiber Splicer			10	
Substation Testing Technician/Engineer			10	
Electrical Technicians			7	

7 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	

8 SUBCONTRACTORS

Item	*Element of Work*	*Approximate Value*	*Name and Address of Sub Contractor*	*Statement of Similar works Executed*

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.

9 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)***

EMERCENGY 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 EFL 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 EFL 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 EFL 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

10 PLANT & EQUIPMENT REGISTER

Complete the following table:

Type	***Registration Include: Design, Design No. Item, Item No.***	***Purpose (Use on Site)***	***Inspection Date and Frequency***	***Inspected by***

Contractor Signature: _____

Date: _____

11 CONTRACTOR CHEMICAL REGISTER

Complete the following table:

Product Name	*Hazard*	*Controls Required*	*Location*	*Quantity*

1 Contractor Signature: _____

2 Date: _____

12 OTHER DOCUMENTS & DRAWINGS TO BE SUBMITTED WITH BID

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

1. Typical plan and section drawings.
2. Proposal for raising of land (including height, method of soil retention, retaining wall detail, etc)
3. Detail layouts of Indoor 36kV &12kV switchgear.
4. Detail layout of transformer pads, Blast wall, etc.
5. Single line diagrams
6. Manufacturer's Technical Brochures, type number, reference number and Drawings showing details of construction and dimensions of:

a. Circuit breakers
b. Disconnectors
c. Surge arresters
d. Current transformers
e. Voltage transformers
f. Energy meters and transducers
g. Power transformers
h. All HV Cables and Accessories
i. 36 kV indoor switchgear panels
j. 12 kV indoor switchgear panels
k. Communications equipment
l. Other major equipment.

7. Typical arrangement drawing of control, metering and relay panel
8. Diagrams indicating functions of Control & Protection IED's in each bays
9. Protection block diagrams and typical diagrams of unit protective equipment
10. Cross section drawings of transformer terminal boxes and terminal sealing ends
11. General structural drawings of buildings
12. Foundation drawings including static and dynamic load, General arrangement drawings, plans, sections, elevations.
13. Independent type test certificates for,
    i. 36kV kV Indoor switchgear
    ii. 12 kV Indoor switchgear
    iii. Disconnecting switches
    iv. Earthing Switches
    v. Insulators
    vi. Current Transformers
    vii. Voltage Transformers

viii. Power transformers
ix. Auxiliary transformers
x. All HV cables and accessories
xi. Communication equipment
xii. Other major equipment

14. General bar chart of the design, manufacturing, shipping, erection and commissioning schedule
15. Evidence of Bidder's experience in works similar to this
16. Certificates issued by an independent International Organization to ensure compliance with the ISO 9001:2000 standards by Bidder
17. List of standards the Bidder intends to follow, for electrical ,civil and mechanical works
18. Evidence of manufacturer's experience in manufacturing comparable type of equipment or equivalent as offered under this contract
19. Descriptive information for equipment being offered including:
    a. List of recommended spare parts with prices.
    b. List of special tools or fixtures required for installation, testing, maintaining and operating the equipment
    c. List and cost of special tools, lifting devices required for installation, operation and maintenance.
    d. List of exceptions to and deviations from this specification. All exceptions shall be clarified and separately itemized. It shall not be necessary for the employer to examine the standard literature and documents of the manufacturer to determine the existence and extent of any exceptions or deviations from this specification.
    e. Evidence of field service experience of main equipment.

13 EVALUATION OF BIDS

This section provides information to the bidder of the bid screening and evaluation criteria for the bids.

SCRENING CRITERIA

The screening criteria for the bids when opening of the technical proposals will be as stipulated in Section 1 (Instruction to Bidders), Clause 13.2 (i) – (xiv). The financial proposals for those bids will be opened which have passed the technical proposal screening criteria and meet the cut-off mark of 60% in the evaluation of the Technical Proposals.

EVALUATION CRITERIA

The following criteria with corresponding scoring and weightings which will be utilised for evaluating the bids forms the Technical Evaluation Section. Those bids which score above 60% for the Technical Evaluation will be considered for further evaluation, and their financial proposals will be opened. The Financial Evaluation has a weighting of 30% on the overall Value for Money and the Technical score is 70%

	Criteria for Evaluation	***Weighting***	***Score Range***		
			10 - 8	***7 - 4***	***3 - 0***
1	Manufacturer's years of experience in production of 11kV Switchgear	5.00	Company has more than 20 years' experience	Company has 15 – 20 years' experience	Company has 10 – 15 years' experience
2	Manufacturer's experience in Similar projects – Design, Build, Supply and Install	5.00	Company has done more than 10 projects of similar nature	Company has done 5 - 10 projects of similar nature	Company has done less than 5 projects of similar nature
3	Number of years the offered model has been in production and in the market	2.50	Model has been in the market for more than 7 years	Model has been in the market for 5 – 7 years	Model has been in the market for 3 – 5 years
4	Number of units of offered model sold in Pacific – Fiji/NZ/Australia	2.50	More than 750	Less than 500	Less than 250
5	Number of years of experience of key personnel to be involved in project	5.00	More than 10 years for most of the key personnel	Less than 10 years for most of the key personnel	Less than 5 years for most of the key personnel
6	Manufacturer's Warranty on Switchgear	5.00	More than 2 years	1 – 2 years	Less than 1 year
7	Type test reports on Switchgear	5.00	Results meet and exceed the requirements as per IEC standards	Results do not meet minimum specifications	Type test reports not submitted or not as per IEC standards
8	Conformance to acceptable values for routine tests as specified in tender	2.50	Submits evidence that switchgear will conform to and exceed the requirements	Submits evidence that switchgear will conform to most of the test requirements	No evidence of conformance to test requirements
9	Comprehensiveness of proposed design	2.50	All the design details are addressed as that would be expected in an ideal proposal.	Relevant design details are addressed in terms of design as that compared to an ideal proposal. The proposal conforms to most of the items stated in the specifications	Extent of consideration placed into design is significantly less than that expected in a reasonable proposal. Most of the items stated in specifications are not met.

10	Nominal Circuit Breaker parameters	20.00	Circuit breaker parameters exceed the nominal required performance ratings	Circuit breaker parameters are equal to the nominal required performance ratings	Circuit breaker parameters are below the nominal required performance ratings
11	Evaluation of Current Transformers	5.00	Offered CT ratings exceed the specifications	Offered CT ratings are equivalent to the specifications	CTs Offered are below the specification
12	Evaluation of Voltage Transformers	5.00	Offered VT ratings exceed the specifications	Offered VT ratings are equivalent to the specifications	VTs Offered are below the specification
13	Switchgear Panel Evaluation	5.00	Meets all the technical requirements as in the specification. All technical details match with requirements for the design	Meets only the basic requirements of the specification. Proposed technical data is acceptable but does not match with specification	Meets only the mandatory requirements of the specification
14	Maintenance Requirements for Switchgear	5.00	Needs maintenance every 3 years or more or after 10000 operations	Needs Maintenance every 2 - 3 years	Needs Maintenance every 1 - 2 year
15	Safety Requirements for Switchgear	5.00	Meets and exceeds the safety requirements of the switchgear, with added consideration to safe design and operation	Meets most of the safety requirements for the switchgear	Does not meet the level of safety EFLtures for the switchgear
16	Innovation in Design	7.50	High degree of innovation incorporated into design compared to similar products in market over 5-10 years	Evidence of some innovation incorporated into design	No evidence showing any innovation in design
17	Installation of Switchgear and replacement of existing switchgear	2.50	Will require minimal tools and equipment from EFL for installation	Will require some tools and equipment from EFL for installation	Will require all tools and equipment from EFL for installation
18	Delivery period and timeline	5.00	Delivery period is within 18 - 24 weeks and installation is within 2 - 3 weeks	Delivery period is within 24 - 28 weeks and installation is within 3 - 4 weeks	Delivery period would exceed 28 weeks and installation would also exceed 4 weeks

19	Quality Control	5.00	Manufacturer has quality system in accordance with international standards and produced evidence of regular third party audits	Manufacturer appears to have a quality system in place.	Manufacturer has a record of providing reasonable quality material but provides no evidence of a quality system
	Total	**100%**			

S

14 PREFERED SUPPLIERS OF MAJOR EQUIPMENT

	EQUIPMENT	***Suppliers***
1	Power Transformer	ABB, Tyree, Wilson
2	36kV Circuit Breaker	Hawker Siddeley, ABB
3	11kV Circuit Breaker	Hawker Siddeley, Reyrolle
4	36kV Disconnector and earth Switch	ABB, NGK, Schneider
5	Current Transformers	TWS
6	Relays	SEL, Alstom/Areva
7	Voltage Transformers	ABB
8	Battery Systems	Clay Engineering
9	LV Boards	Becca
10	Temperature Monitoring on Tx	Qualitrol
11	DGA Monitoring	Calisto
12	Panels	Rittel
13	On load Tap Changer	MR, ATL, UBB