



# **FIJI ELECTRICITY AUTHORITY**

## **BIDDING DOCUMENT**

**MR 174/2017**

**SUPPLY OF 33kV AIR BREAK SWITCHES  
(ABS)**

## Section 1: Instructions to Bidders

- 1. Scope of Bid** The Fiji Electricity Authority (hereinafter referred to as "the purchaser"), wishes to receive bids for supply of Air Break Switch as specified in these bidding documents (hereinafter referred to as "ABS").
- 2. Eligible Bidders** This Invitation to Bid is open to bidders who have sound financial background and have previous experience in handling such projects.
- Bidders shall provide such evidence of their continued eligibility satisfactory to the purchaser as the purchaser shall reasonably request.
- Bidders shall not be under a declaration of ineligibility for corrupt or fraudulent.
- 3. Eligible Materials, Equipment and Services** The ABS to be supplied under the Contract shall have their origin from reputable companies from various countries. At the Purchaser's request, bidders may be required to provide evidence of the origin of various parts of the ABS.
- 4. Qualification of the Bidder** To be qualified for award of Contract, bidders shall submit proposals regarding work methods, scheduling and resourcing which shall be provided in sufficient detail to confirm the bidder's capability to fulfill the contract.
- 5. Cost of Bidding** The bidder shall bear all costs associated with the preparation and submission of its bid and the Purchaser will in no case be responsible or liable for those costs.
- 6. Sealing and Marking of Bids** **Bidders are required to submit only Electronic copies of the Bid in the electronic tender box.**

### **Tender Submission - Instruction to bidders: Electronic Submission of Bids**

It is mandatory for Bidders to upload an electronic submission their bid in the **TENDER LINK** Electronic Tender Box no later than the Deadline for the Submission of Bids

To register your interest and tender a response, view 'Current Tenders' at: <https://www.tenderlink.com/fea>

For further information contact The Secretary Tender Committee, by e-mail [TDeLairewa@fea.com.fj](mailto:TDeLairewa@fea.com.fj)

Tenders received after the closing date shall not be considered.

Lowest bid will not necessarily be accepted as successful bid.

- 7. Deadline for Submission of Bids** Bids must be received by the Employer before **4:00pm Fiji Time (UTC +12), on Wednesday, 2<sup>nd</sup> of August, 2017**

The purchaser may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in which case all rights and obligations of the

purchaser and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.

**8. Late Bids**

Any bid received by the purchaser after the deadline for submission of bids prescribed will be rejected and returned unopened to the bidder.

**9. Modification and  
Withdrawal of Bids**

The bidder may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by the Employer prior to the deadline for submission of bids. A withdrawal notice may also be sent by fax but must be followed by a signed confirmation copy. No bid may be modified by the bidder after the deadline for submission of bids.

**10. Purchaser's Right  
to Accept any Bid  
and to Reject any  
or all Bids**

The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the Purchaser's action.

**11. Notification of  
Award**

Prior to expiration of the period of bid validity prescribed by the Purchaser, the Purchaser will notify the successful bidder by fax/email, confirmed by registered letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") shall name the sum which the Purchaser will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").

The notification of award will constitute the formation of the Contract.

Upon the furnishing by the successful bidder of a performance security, the Purchaser will promptly notify the other bidders that their bids have been unsuccessful.

**12. Signing of Contract  
Agreement**

At the same time that he notifies the successful bidder that its bid has been accepted, the Purchaser will send the bidder the Form of Contract Agreement provided in the bidding documents, incorporating all agreements between the parties.

Within 7 days of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to the Purchaser.

**13. Corrupt or  
Fraudulent  
Practices**

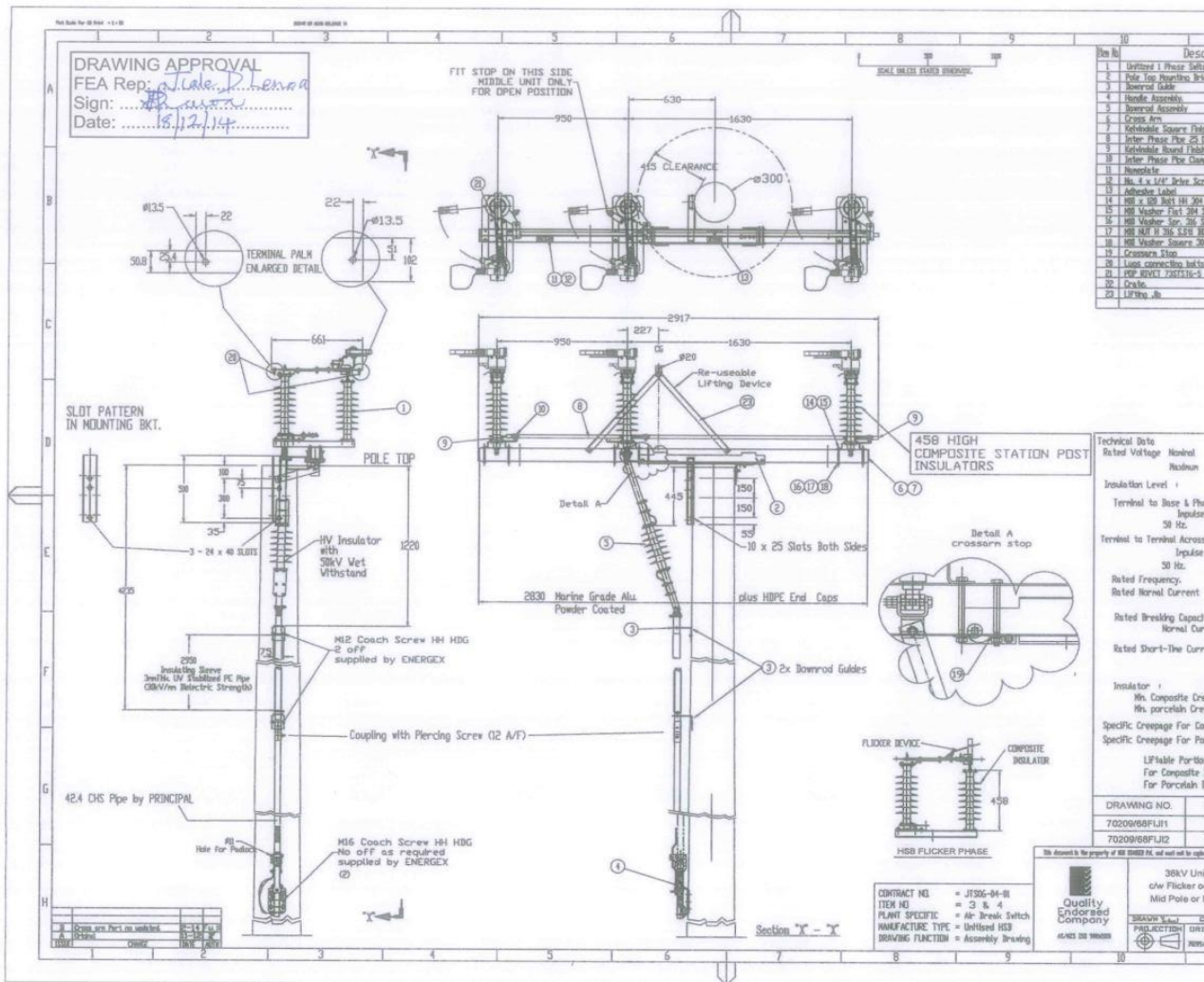
The Purchaser requires that the Contractor observe the highest standard of ethics during the procurement and execution of such contracts. In Pursuance of this policy, the Purchaser:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
  - (i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and
  - (ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition;
- (b) Will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.

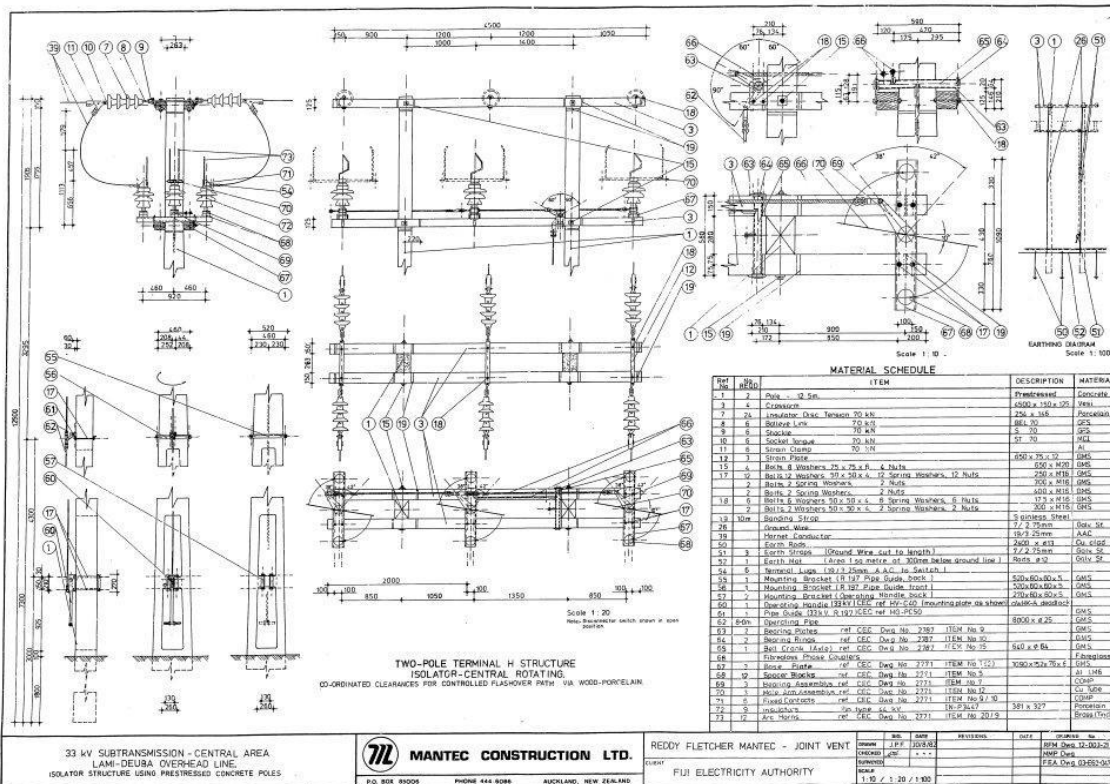
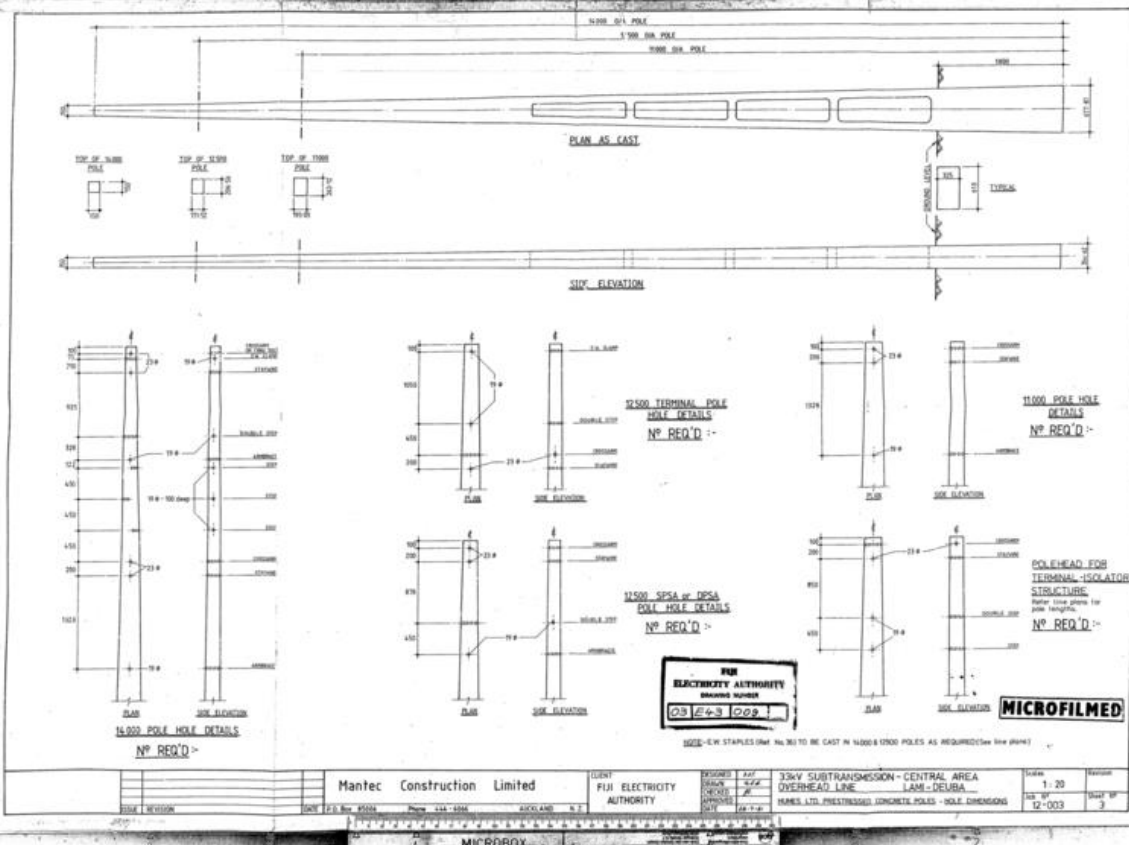
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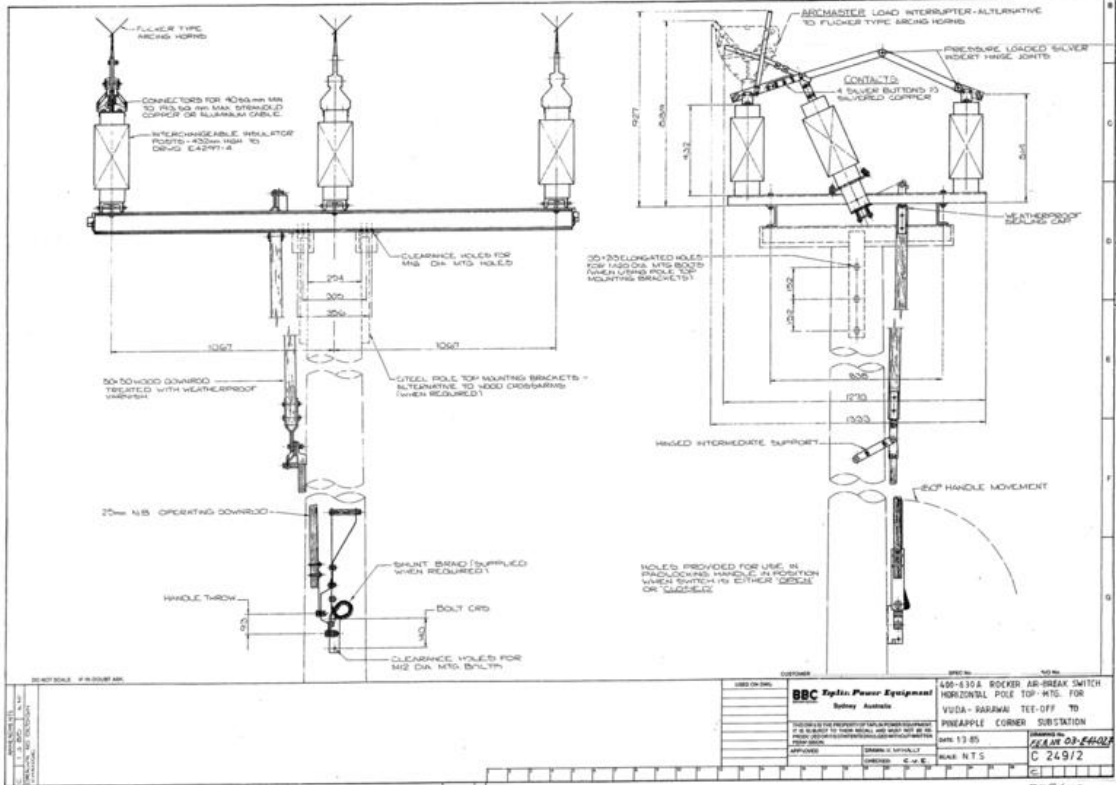


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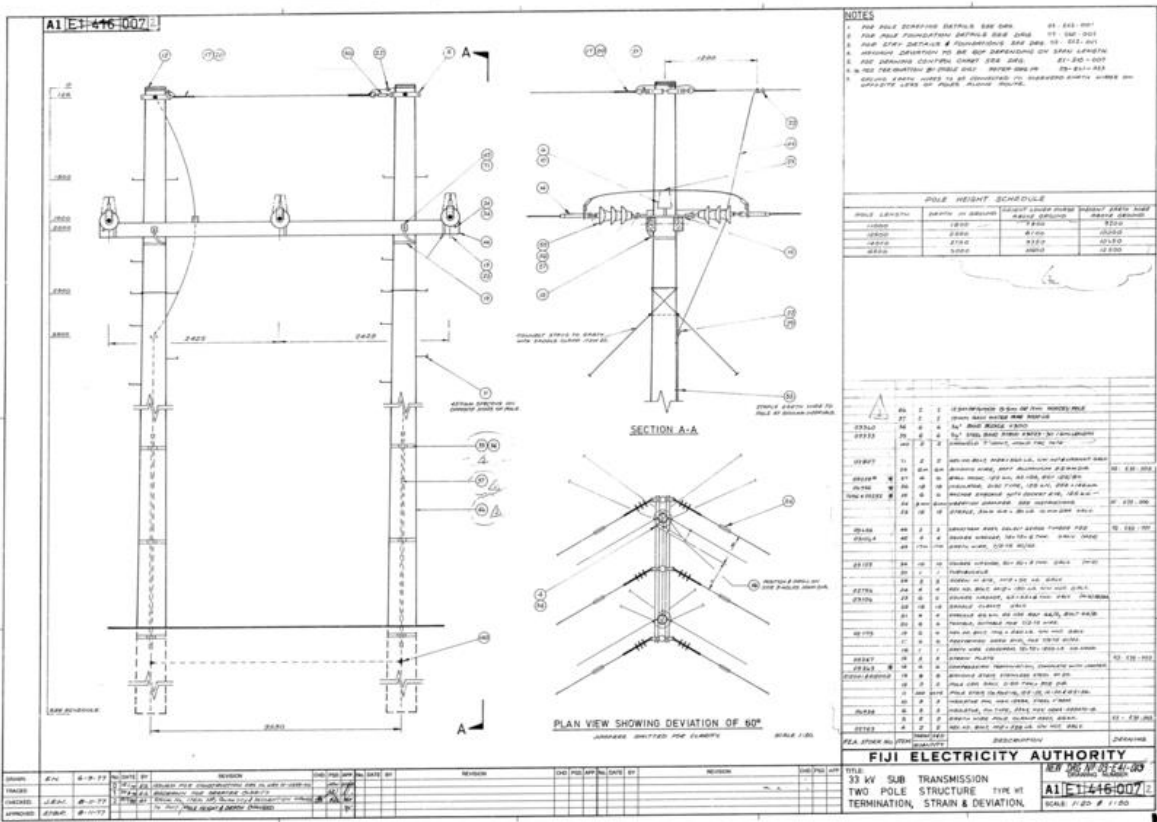
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## Section 2: Technical Specification for Air Break Switches (ABS)

### 1 General Description

This document specifies the requirements for the design, manufacture, testing and supply of Ten (10) 33,000 Volts – Rated Air Break Switch (ABS) for the installation in the Authority’s 33kV sub-transmission network.

The supplier shall provide options to retrofit possible high current (arcing horn, expulsion tube, vacuum, etc.) load breaking attachments with this bid.

### 2 Application

The Air break Switch (ABS) shall be installed on the 33,000 Volts sub-transmission network, with the load breaking and load closing duty for normal or emergency switching purposes.

### 3 Service Conditions

The equipment shall be capable of satisfactory operation outdoors in a tropical environment, which has high solar radiation and varies from hot dry and dusty to hot and humid and subject to cyclonic wind. The following conditions apply:

1. Air Temperature
  - Extreme maximum 45 °C
  - Average maximum 35 °C
  - Average minimum 18 °C
  - Extreme minimum -5 °C
2. Relative Humidity
  - Maximum 100%
3. Solar Radiation
  - Maximum 1.2kW/m<sup>2</sup>
4. Wind Loading
  - Wind loading shall be assessed in accordance with AS 1170.2—2011, for Region C (Tropical Cyclone)

### 4 Operational Parameters

PARAMETERS	SPECIFIED VALUE FOR HIGH VOLTAGE SYSTEM
Rated Voltage (kV rms)	33
Highest System Voltage (kV rms)	36
Rated Frequency (Hz)	50

## 5 Technical Requirements

The offer shall include various model options (based on the range of high current interrupting capability @ 33kV) of air-breaking switch attachments for high current load breaking which shall be fixed at the top-most section of the main contact to control the electrical arc during load breaking switching activity.

#	Details	Requirement	Details to be furnished by bidder
1.	No. of poles	Three	
2.	Rated Frequency	50 Hz	
3.	Nominal Voltage rating	33kV	
4.	Maximum Voltage rating	36 KV	
Insulation Level			
5.	Terminal to phase and phase to phase:		
	Impulse withstand	200kV	
	50Hz withstand	70kV	
6.	Terminal to Terminal across isolating Distance		
	Impulse withstand	230kV	
	50Hz withstand	80kV	
7.	Rated Normal Current	In =	630A @ 39°
		In =	800A @ 59°
8.	Rated Short Time Current		
		1s	20kA
		Peak	50kA
9.	Insulator		
	Min Composite Creepage Ls =	1030mm	
	Min Porcelain Creepage Ls =	950mm	
10.			
	Specific creepage for composite Ls/U =	28.6mm/kV	
	Specific creepage for porcelain Ls/U =	26.4/kV	
11.	Liftable portion weight – Composite	68kg	
12.	Liftable portion weight – Porcelain	124kg	
13.	Galvanised earth Mat	1500mm x 1000mm	

## 6 ABS Characteristics

The bidders proposal shall address all functional and performance requirements within the specification and shall include sufficient information and supporting documentation in order to determine compliance with this specification without further necessary inquiries.

The characteristics of ABS are to be provided under this specification as follows:

### 6.1 Operating Mechanism

The operating mechanism shall be suitable for manual operation from ground level by one person with ease and shall be designed that all the three phases open or close simultaneously. The switches shall be robust in construction and shall be protected against over travel or straining that may adversely affect any of its parts. The load break switch shall be fitted with self-contained arc extinguishing devices example, interrupter heads with independent manual operation.

The operating rod shall be 1 ½" galvanised pipe which shall be of correct length to be installed on power poles ranging from 15 meters – 17 meters. The switch shall be operated with a torsional operating handle, which opens the switch when rotated counter clockwise and the handle shall be installed as the standard practice from man hip-height level at ground.

- The switch blades shall be assembled that all three phases operate in synchronism. Fixed guides shall be provided for proper seating of the contacts even when a blade is out of alignment to a minor extent
- A suitable arrangement for accelerating the opening of contacts shall be provided to avoid excessive sparking
- There should not be any play or backlash to produce non-uniform travel of the blades of the three phases and all the three phases shall make simultaneous closing with closed electrical conductivity
- Live parts shall be designed to avoid sharp point edges and other corona producing surfaces as far as possible
- The ABS switches shall be capable of withstanding in their closed position the dynamic and thermal effects of the short circuit current specified in the section on technical requirements. The switches shall be constructed that the blades do not open or close under the influence of a short circuit, gravity, wind pressure, vibration, shocks or accidental breaking of the operating shaft.

### 6.2 Insulators

High strength polymer insulators shall be used for supporting and insulating the fixed contacts and the moving blades.

The fiberglass core of the polymer insulators shall be protected with a rubber housing which shall be made of a silicone elastomeric compound having a minimum 30% silicon (or having a Si-O chemical backbone with fumed silica and tracking control filler, ATH). The housing shall be directly moulded on the core through high temperature vulcanization (HTV) process and shall be seamless, smooth and free of imperfections. Moulding in multiple steps may cause flaws and residual stress in the joining seams and, therefore, shall not be applied. The weather sheds shall provide an open aerodynamic profile without any under ribs.

The housing shall be manufactured of 100 percent silicone rubber before fillers are added. The housing shall be in one-piece without any rubber-to-rubber joint in any part of the housing. The end fittings (electrodes) shall not be covered with the housing to prevent electrical puncture through the housing.

The housing shall be directly bonded to the FRP core. The interface between the housing and FRP rod shall be chemically bonded to prevent contaminants and moisture ingress. The strength of core-to-housing interface shall be greater than the tearing strength of the housing material itself. The thickness of the housing shall be no less than 3.0 mm.

The colour of the housing material shall be grey, and uniform and consistent.

Polymer insulators shall be designed to withstand high-pressure water washing of 3800kPa (570 psi), with a nozzle diameter of 6mm (1/4 inch) at a distance of 3 meters (10 feet) from the nozzle to the polymer insulator.

The core shall be a high quality fibre reinforced plastic (FRP) rod. To reduce the risk of brittle fracture, the insulator FRP core shall be made of corrosion-resistant ECR glass.

The insulator core shall be mechanically and electrically sound, free of visible voids, foreign substances, and other manufacturing flaws.

### **6.3 Contacts**

All the current carrying parts shall be made of tin plated electrolytic copper of 99.98% purity. The contacts shall be silver plated to thickness of not less than 30 microns. However, the fixed or female contacts for the spring loaded pressure type shall be a firm contact with proper alignment. The springs shall not carry any current.

The fixed contact element shall be made of rolled extruded electrolytic grade copper flat and with flexible ends, where required shall be made from soft electrolytic grade copper sheet. The contacts assembly shall be so designed that while carrying the rated continuous current. The contact shall be self-release jaw-type and suitable stainless steel springs of sufficient pressure, shall be provided to ensure proper contact in the closing position.

### **6.4 Base, Mounting and Installation**

The ABS shall be designed to be mounted on Pole top with phase centres to meet system and clearance requirements. Pole brackets shall be available with fixing at the side of the pole suitable for:

1. Type 1: 15 meter or 17 meter wooden H-Pole Structures (Vuda – Rarawai Line)
2. Type 2: 15 Meter Concrete H-Pole Structures (Wailekutu –Deuba Line)

**The bidders shall design and submit a complete installation package of the Air Breaker Switch on the attached sub-transmission pole designs.**

### **6.5 Padlocking**

Suitable padlocking arrangement shall be provided for locking the operating handle both in the ON and in the OFF position.

## **6.6 Earthing Terminal**

Two earthing terminals having clamping bolts with minimum diameter of 12mm, with nuts, washers and spring washers shall be provided on the frame. The earthing terminals shall be of electroplated brass and of adequate size to carry full short circuit current.

## **6.7 Load Breaking**

Load breaking shall be self-resetting; where the tripping speed on the load break shall be independent of the switch operating speed. No component shall make contact with the closing switch blade prior to main switch contact engagement.

Alternatively, fabricated mechanically spring loaded arc rods, installed across the main contact, to control the electric arc during the load breaking switching may be offered with details on the load breaking capability.

**Bids on the offers shall be considered and technically and economically evaluated for a decision to award to the best offer.**

## **6.8 Galvanising**

All ferrous parts except springs shall be hot dip galvanised as per the [standard](#) listed.

## **6.9 Terminal Connectors**

The terminal pad shall be made of rolled/extruded electrolytic grade copper flat having a cross sectional area equal to that of the blade. It shall be so constructed that an intimate contact with the contact element is ensured. That connector shall be suitable for ACSR conductor. The aluminium connectors of appropriate size shall be supplied for each and for each phase of the switch.

## **6.10 Bearing**

The rotating stack shall be supported with ball bearings/ bearing to ensure smooth operation.

Each rotating insulator stack shall have thrust roller bearings and shall rotate into gun metal bush bearings contained in a suitable weather proof housing. The housing shall be fitted with the greasing nipple.

## **6.11 Mechanical Strength**

The isolating switches shall be capable for withstanding the rated mechanical terminal loads and electromagnetic forces, without effecting the operation and current carrying properties. The switches, complete with the operating mechanism should not come out of their own in closed position due to the effect of gravity, wind pressure, vibrations and reasonable shocks. Their construction should be such that they do not under any influence of short circuit currents.

## **6.12 Bolts & Nuts**

The required bolts, nuts, washers etc., for assembling the complete air-break switch for fixing the insulators to the metallic parts of AB switch at both top and bottom and for fixing the AB switch to the structures shall be supplied with the equipment at no extra cost. Bolts and nuts shall be provided with lock-washers and lock nuts wherever required.

### **6.13 Specifications and standards**

The bidder shall provide an original copy of the specification sheet of the Air Break Switch, insulators and all attachments. The standards used for each aspect shall also be cited.

## **7 Testing**

### **7.1 Sample Test Reports**

A sample record of all factory acceptance tests results shall be submitted with the bid documents. The test reports shall be signed by the testing engineer and the engineer witnessing the tests.

The following tests shall be carried out and results given along with certification as appropriate in the Technical Data Schedule and Test Certificates Schedules of this specifications:

1. Type testing
2. Routine testing

### **7.2 Type Tests**

The following type tests are required:

- Visual examination
- Verification of dimensions
- Visible discharge tests
- Dielectric test (impulse and one minute power frequency withstand test, dry and wet)
- Temperature cycle test
- Short time current and peak current withstand test
- Mainly active load breaking capacity test
- Line charging current breaking capacity test
- Cable charging current breaking capacity test
- Short circuit making capacity test
- Mechanical strength tests for insulator
- Operational and mechanical endurance test
- Tests for galvanisation of ferrous parts
- Porosity test on insulators
- Impulse withstand voltage test
- Power frequency-voltage dry test on main circuits.
- Power frequency-voltage wet test on main circuits.
- Temperature rise test of the main circuits.
- Measurement of the resistance of the main circuits.
- Test to prove capability of carrying the rated peak short circuit current and the rated short time current.
- Operation test
- Mechanical endurance test

Note: All the above tests shall be conducted as per the relevant IEEE, IEC, ANSI or AS/NZS specification and a copy of the test report shall be furnished along with the tender.

### 7.3 Factory Acceptance Tests

The bidder shall include in the costing the Factory Acceptance Testing whereby two Fiji Electricity Authority engineers shall witness the testing being done on the Air Breaking Switches. The cost shall be all inclusive of transportation (Air and road), accommodation and meals, visa, etc. A plan for the factory acceptance test shall be submitted with the bid.

## 8 Standards

The ABS shall be designed and manufactured in accordance to IEC 62271-102, IEC 60694 and the requirements in this specification. The medium through which the ABS should break is air. The following table highlights the expected standards.

Standard	Description
IEEE/ ANSI 37.32 - 1996	High voltage switches, bus supports and accessories
IEEE/ ANSI 37.71 – 1984	Three-Phase, Manually Operated Subsurface Load Interrupting Switches for Alternating-Current Systems
IEC 265-1 1983	High Voltage Switches for rated voltages above 1kV and less than or equal to 52kV
IEC 273	Post Insulators for systems with nominal voltage above 1,000V
IEC 61109:	Composite insulators for A.C. overhead lines with a nominal voltage greater than 1000V - Definitions, test method and acceptance criteria.
IEC 60120:	Dimensions of Ball & Socket Couplings in String Insulators
IEC 62217:	Polymeric insulators for indoor and outdoor use with a nominal voltage > 1 000 V – General definitions, test methods and acceptance criteria
AS/NZS 4680—2006	Hot-dip Galvanized (zinc) Coatings on Fabricated Ferrous Articles
AS 1154.1- 2009	Insulator and Conductor Fittings for Overhead Power Lines – Performance, material, general requirements and dimensions
IEC 168	Test on indoor and outdoor post insulators
ISO 1460	Hot Dip Galvanizing
<i>The bidder shall cite other IEEE, ANSI, AS/NZS standards used</i>	

## 9 Warranty

The supplier and/or manufacturer shall provide warranty of a minimum of 3 years from the date Fiji Electricity authority receives the equipment.

On the contrary, if the bidder cannot warranty for 3 years than a preferred warranty period shall be given by the bidder

## 10 Drawings

The bidder shall outline dimension drawings for each component, general arrangement drawing showing component layout and a complete drawing of the ABS assembly with different drawings of variable components.

The appendices gives a sample drawing of the ABS already installed in the 33kV sub-transmission network, thus, the bidders shall submit their bids for the products similar to this product.



## **11 Interchangeability**

All similar materials and removable parts of similar equipment shall be interchangeable with each other. A specific confirmation of this should be furnished in the bid.

## **12 Quality Assurance**

All the components used in the Air Break Switch as well as the assembly and construction of the switch shall comply with the ISO 9001 Quality Standard.

## Section 3: Pricing Schedule

### 1 Incoterms

All pricing shall be done on Cost, Insurance and Freight (CIF) basis, delivered to Suva or Lautoka Port, Fiji.

### 2 Currency

All pricing shall be in FJD / USD / AUD / NZD /GBP/ EUR currency.

### 3 Taxation

The pricing shall be EXCLUSIVE of any type of customs charges, duty, or taxes that needs to be paid in Fiji.

### 4 Pricing breakdown

The prices quoted shall be fixed and NOT variable.

### 5 Validity

The pricing shall be valid for 90 days.

### 6 Price Breakdown

Particulars	Price US\$ (CIF)
Option 1: ABS Unit with load breaking attachments with composite insulator Total Quantity: 15 (either option 1 or option 2)	
Option 2: ABS Unit with load breaking attachments with porcelain insulator Total Quantity: 15 (either option 1 or option 2)	
Factory Acceptance Test inclusive of Accommodation, Transport (air and road) and meals 2 Engineers	
Spare parts individual pricing (Bidders to Specify Details)	

## Section 4: Bid Documentation

The Bidder shall furnish, as part of the bid, documents establishing the Bidder's eligibility to bid and its qualifications to perform the contract if its bid is accepted.

The documentary evidence of the bidder's qualifications to perform the contract of its bid is accepted will establish to the purchaser's satisfaction.

- a) that the Bidder has the financial, technical, and production capability necessary to perform the contract ;
- b) that the Bidder meets the qualification criteria listed in Section 2.

### 1 Documents establishing equipment conformity to Bidding documents

The Bidder shall furnish as part of its bid, documents establishing conformity to the bidding documents of all materials/equipment and services, which the Bidder proposes to supply under the contract.

The documentary evidence of conformity of the materials/equipment and the services to bidding documents may be in the form of literature, drawings, and data, and will consist of:

- a) A detailed description of the essential technical and performance characteristics of the materials/equipment.
- b) The bidder should specifically mention about furnishing the test certificates and a specimen form of test certificate should be furnished along with the bid.
- c) A list giving full particulars, including available sources and current prices of spare parts, special tools etc., necessary for the proper and continuing functioning of the materials/equipment following commencement of the use of the materials/ equipment by the purchaser; and
- d) An item-by-item commentary on the purchaser's Technical specifications demonstrating substantial responsive-ness of the materials/equipment and services to those specifications, or a statement of deviations and exceptions to the provisions of the technical specifications.

For purpose of the commentary to be furnished pursuant to above, the Bidder shall note that standards for workmanship, material, and equipment, as well as references to brand names or catalogue numbers designated by the Purchaser in its Technical Specifications, are intended to be descriptive only and not restrictive.

**The Bidder may substitute alternative standards, brand names, and/or catalogue numbers in their bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.**

## 2 Submission Checklist

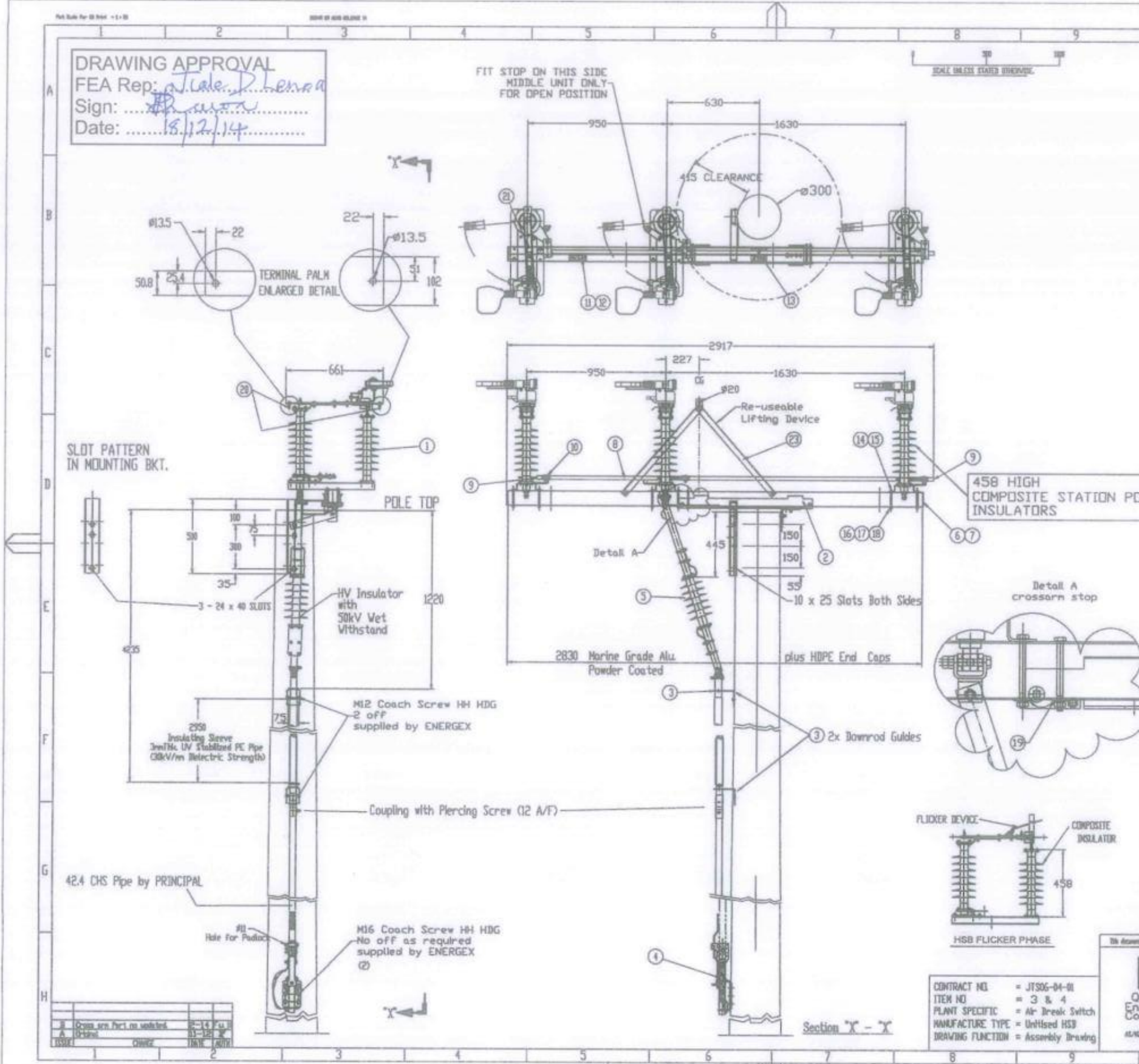
The following shall be provided in the bid submission:

Particulars	Yes	No
1. <b>Item-by-item commentary on the purchaser's <a href="#">Technical specifications</a></b>		
2. Descriptive literature giving full technical details of equipment offered;		
3. Outline dimension drawing for each component, general arrangement drawing showing component layout;		
4. type test certificates and sample routine test reports;		
5. detailed reference list of customers already using equipment offered during the last 5 years with particular emphasis on units of similar design and rating;		
6. details of manufacturer's quality assurance standards and programme and ISO 9000 series or equivalent national certification;		
7. Supplier experience details		
8. Deviations from this specification (if any).		
9. list of recommended spare parts for five years of operation with prices and spare parts catalogue with price list for future requirements.		
10. Standards Compliance and Listing		
11. Factory Acceptance Test Plan and Breakdown		
12. Completed technical data schedule;		
13. Complying and Completed pricing schedule		
14. Training		

*Note: The tender will be evaluated by the purchaser based on the availability of the documentation and evidence by the bidder as per the requirements of the submission checklist*

## Appendix: Examples of Existing Applications

**DRAWING APPROVAL**  
 FEA Rep: *Stale D. Lenna*  
 Sign: *[Signature]*  
 Date: *18/12/14*



Item No.	Description	Qty.	Part No.
1	Unilted 1 Phase Switch	3	See Table
2	Pole Top Mounting Brkt.	1	AM-73498
3	Downrod Guide	2	AM-73507
4	Handle Assembly	1	AM-73514
5	Support Assembly	1	AM-73448/4 or 7
6	Cross Arm	1	A3-73499/5
7	Kelvinole Square Finishing Plus No. 17PH	2	K57866
8	Inter Phase Pole 25 (B)	1	AM-73522/2
9	Kelvinole Round Finishing Plus No. 17DR78	2	K57867
10	Inter Phase Pole Clamp Assy.	3	AM-73523
11	Nameplate	1	AM-73517
12	No. 4 x 1/4" Drive Screw Brass	2	F120525
13	Adhesive Label	1	AM-73348
14	HSB x 20 Bolt M20 3.5H 304SS	7	F114215
15	HSB Washer Flat 304 3.5H	7	F123380
16	HSB Washer Ser. 316 3.5H 304SS	7	F123288
17	HSB Nut H 316 3.5H 304SS	7	F123300
18	HSB Washer Square 304 3.5H 30x20x2	6	F123302
19	Crossarm Stop	1	AM-73534
20	Lug connecting bolts	5	AM-69298/2
21	POP RIVET 7.6x13.5-5	6	F126628
22	Crane	1	AM-1038/230
23	Lifting Sh	1	AM-73537

Technical Data		C/V FLICKER	C/V LOAD-BREAK
Rated Voltage	Nominal $V_n =$	28kV/33 kV	28kV/33 kV
	Maximum $U =$	24kV/36 kV	24kV/36 kV
Insulation Level :			
Terminal to Base & Phase To Phase :			
	Impulse V/Stand =	280 kV	280 kV
	50 Hz V/Stand =	70 kV	70 kV
Terminal to Terminal Across Isolating Distance :			
	Impulse V/Stand =	230 kV	230 kV
	50 Hz V/Stand =	80 kV	80 kV
Rated Frequency	=	50 Hz	50 Hz
Rated Normal Current	$I_n =$	630 A at 39°	630 A at 39°
	$I_n =$	800 A at 59°	800 A at 59°
Rated Breaking Capacity :	=		
	Normal Current (8.7pF)	9A	630 A
Rated Short-Time Current	=		
	$I_s =$	20 kA	20 kA
	peak =	50 kA	50 kA
Insulator :			
	Mn. Composite Creepage, $L_s =$	1030mm	1030mm
	Mn. porcelain Creepage, $L_s =$	950mm	950mm
Specific Creepage For Composite	$L_s / U =$	28.6mm/kV	28.6mm/kV
Specific Creepage For Porcelain	$L_s / U =$	26.4mm/kV	26.4mm/kV
Liftable Portion Weight =			
	For Composite Insulator Switch	68 kg	74 kg
	For Porcelain Insulator Switch	124 kg	130 kg

DRAWING NO.	BOM PART1	BREAKING DEVICE
70209/68FIJ1	73497/36	LOAD-BREAK
70209/68FIJ2	73497/36/2	FLICKER

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**Quality Endorsed Company**  
 ALNS 200 990000

**NGK STANGER**  
 HSB ENERG Pty. Ltd. 43A St Hill St  
 MELBOURNE AUSTRALIA

38kV Unilted HSB  
 c/w Flicker or Load-Break  
 Mid Pole or Pole Top Mtg.

DRAWN: [Signature] CHECKED: [Signature] APPD: [Signature] DATE: 16-07-2014  
 PROJECTION: [Symbol] DIRECTION: [Symbol] SIZE: A3  
 DRAWING No. 70209/68FIJ1-2

CONTRACT NO = JTS05-04-01  
 ITEM NO = 3 & 4  
 PLANT SPECIFIC = Air Break Switch  
 MANUFACTURE TYPE = Unilted HSB  
 DRAWING FUNCTION = Assembly Drawing

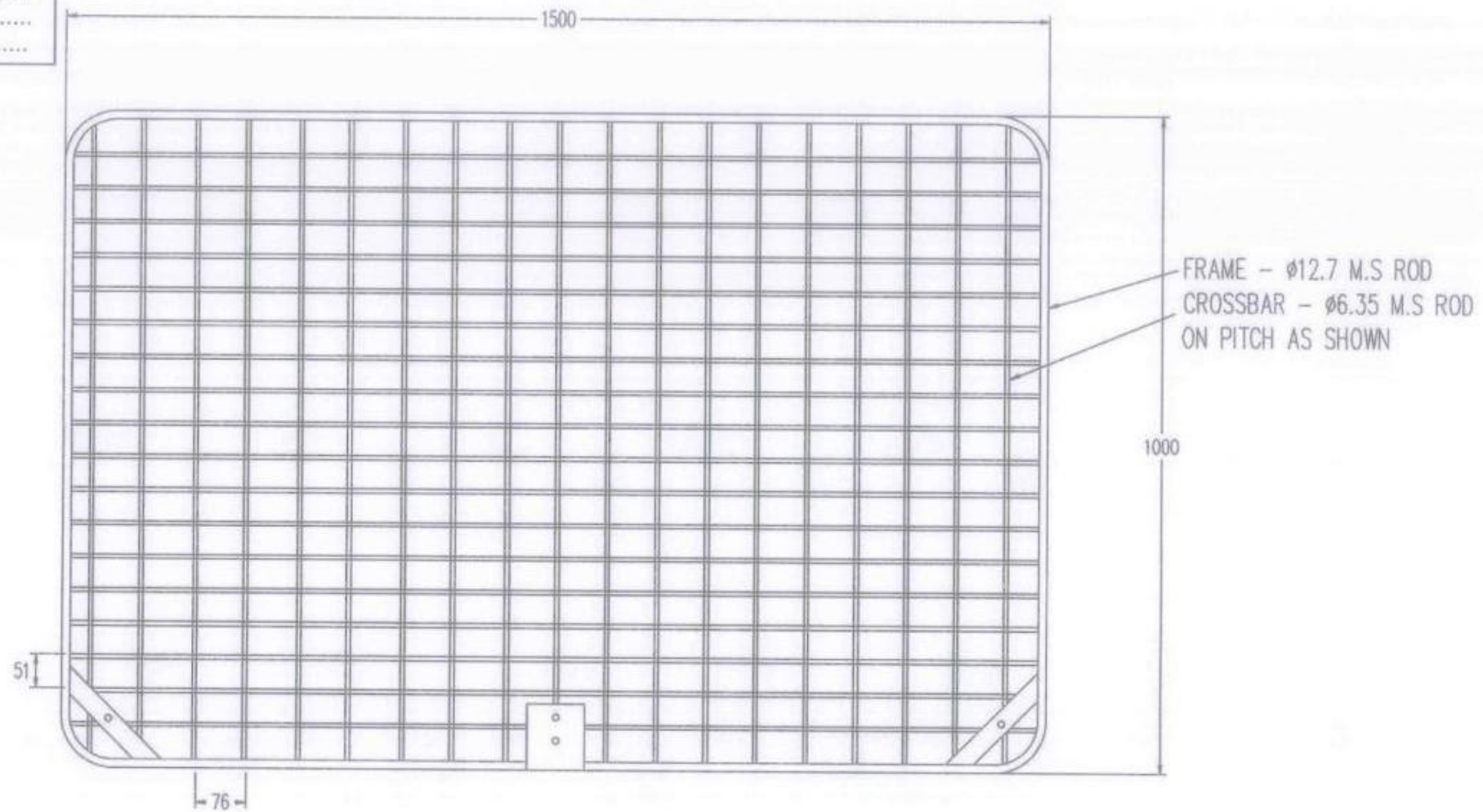
NO	DESCRIPTION	REV	DATE
1	Issue for Pric	1	14/12/14
2	Original	1	14/12/14



Plot Scale For A4 Print = 1 : 5

DRAWN ON ACAD RELEASE R12i cto

DRAWING APPROVAL  
FEA Rep: *Paul Leneva*  
Sign: *[Signature]*  
Date: *1.8/12/14*



GALVANISED EARTH MAT 1500x1000

A4 Z828

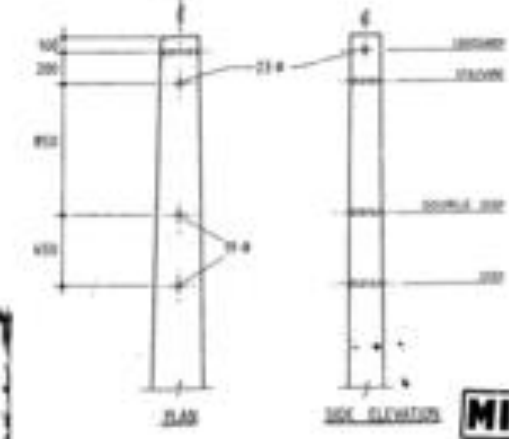
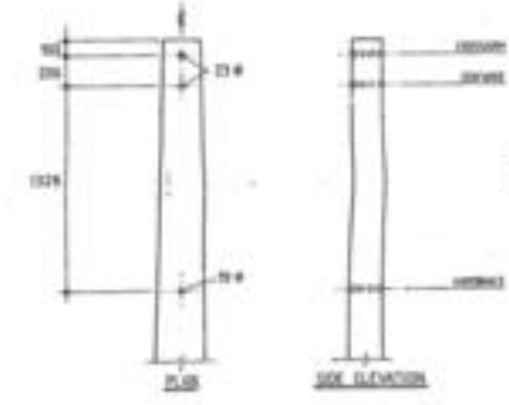
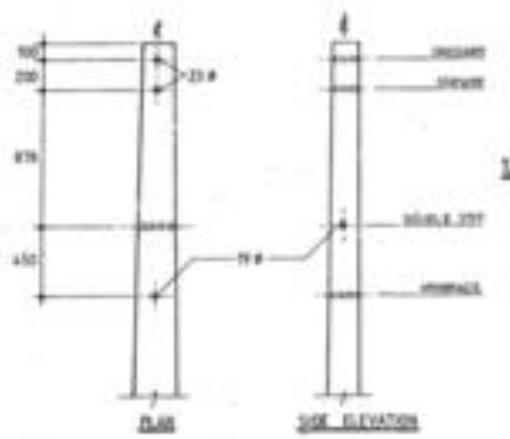
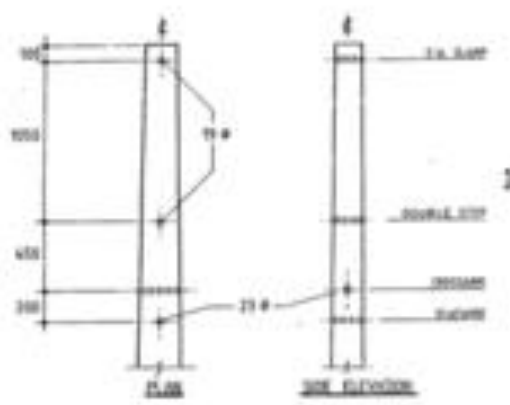
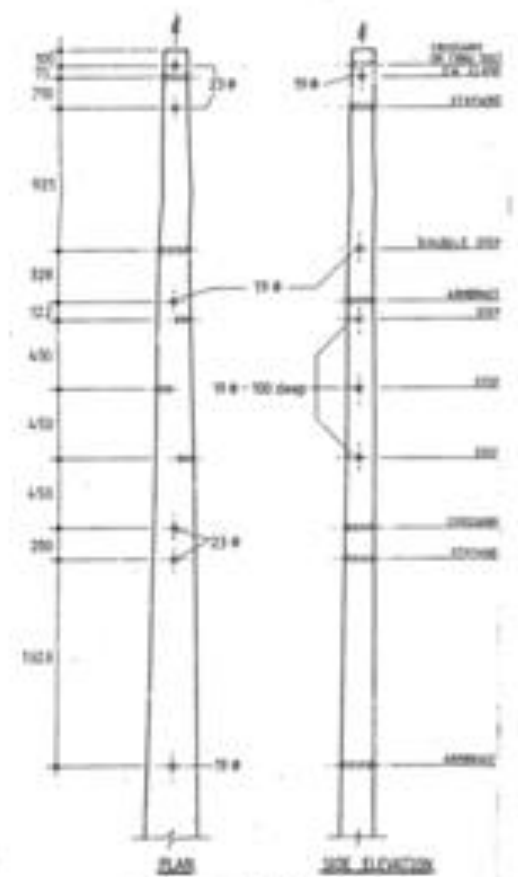
Issue	Original	Change	Date	Auth.
1	Original		08-11	<i>[Signature]</i>

0 50 100 150 200 250  
 SCALE UNLESS STATED OTHERWISE.  
 ( 1 : 5 For A4 Print )

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 Quality Endorsed Company <small>AS/NZS ISO 9001:2000 Licence Number 368 Standards Australia</small>	<b>EARTH MAT</b> 1500 x 1000		 <b>NGK STANGER</b> <small>NGK STANGER Pty. Ltd. A.B.N. 89 004 225 012 MELBOURNE AUSTRALIA</small>		
	<small>DRAWN S.Garg CHECKED S.Garg APPD [Signature] DATE 03-08-2011</small>	<small>PROJECTION</small> 		<small>ORIGIN</small> -	<small>SIZE</small> A4

UM. : EA T. : 2 C. : 60



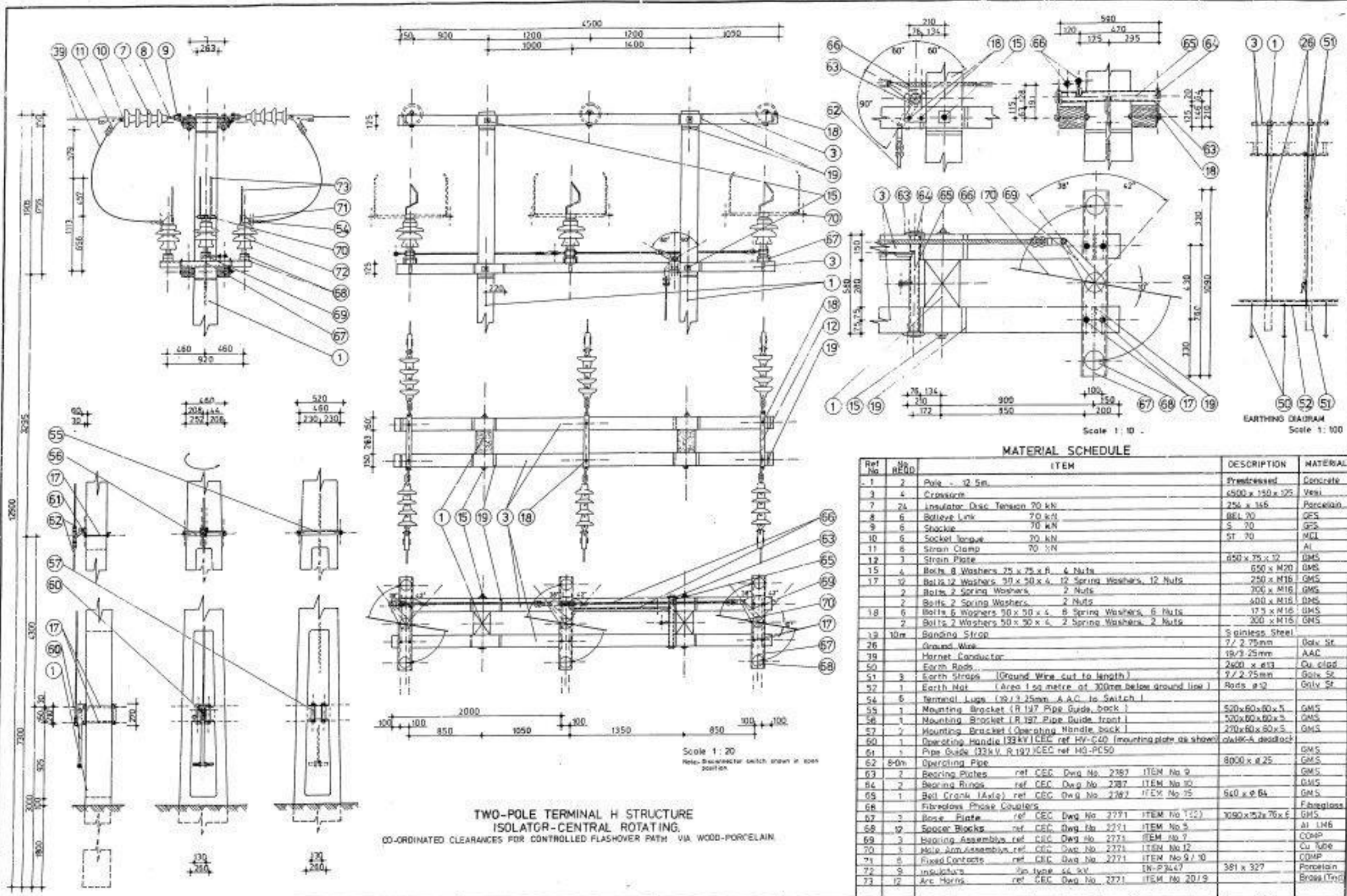
FOR  
ELECTRICITY AUTHORITY  
DRAWING NUMBER  
03 E43 009

**MICROFILMED**

NOTE - E-W STAPLES (Ref. No. 36) TO BE CAST IN 14000 & 12500 POLES AS REQUIRED (See line 1044)

Mantec Construction Limited		CLIENT FIJI ELECTRICITY AUTHORITY	DESIGNED BY AAT	33kV SUBTRANSMISSION - CENTRAL AREA OVERHEAD LINE LAMI-DEUBA	Scale 1:20	Revision 3
DATE 12-003	PHONE 444-4004	ADDRESS SUVA, FIJI	APPROVED DATE 28-7-03	MANUFACTURED BY HAMES LTD. PRESTRESSED CONCRETE POLES - HOLE DIMENSIONS	FIG. NO. 12-003	ISSUE NO. 3





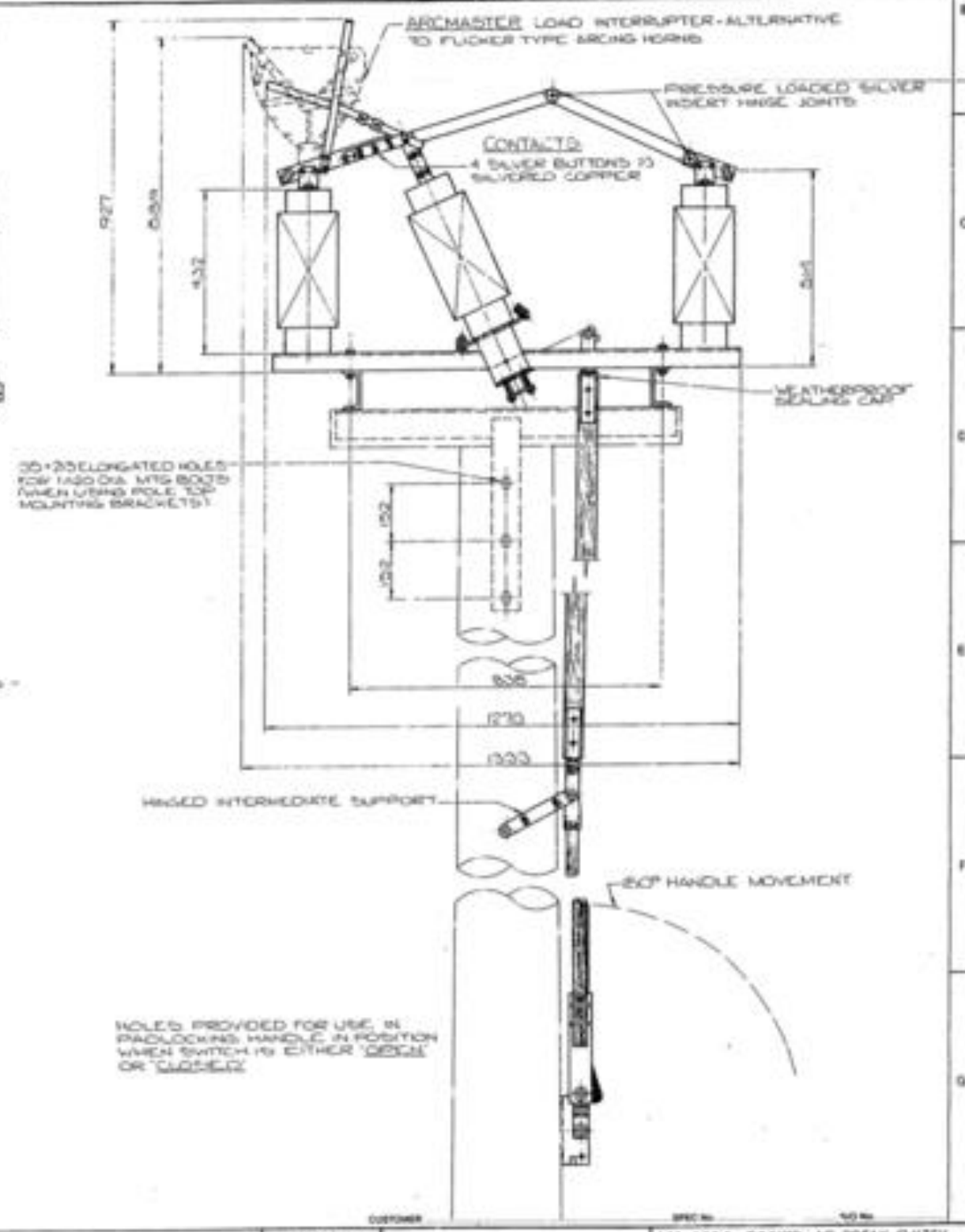
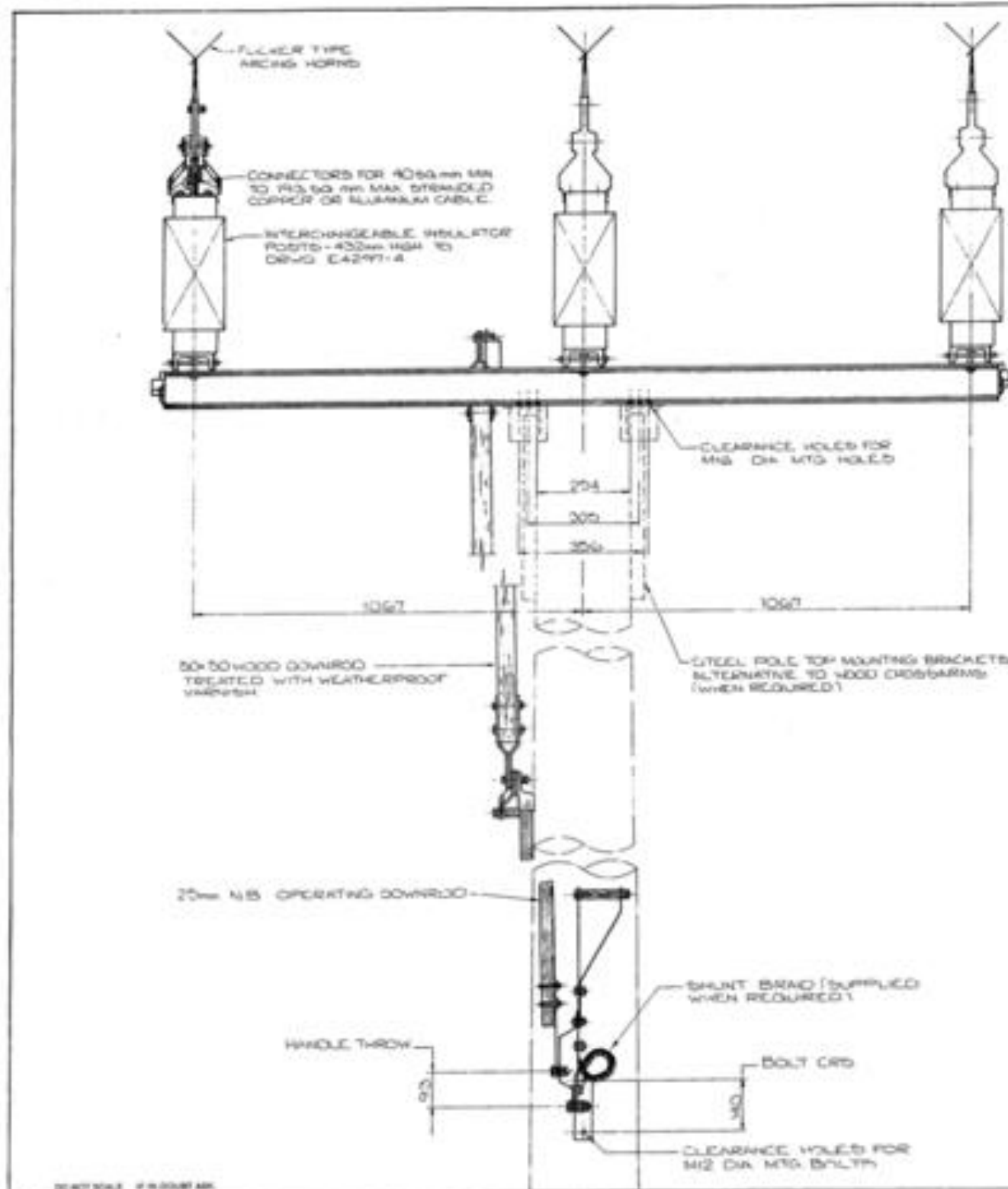
33 kV SUBTRANSMISSION - CENTRAL AREA  
LAMI-DEUBA OVERHEAD LINE  
ISOLATOR STRUCTURE USING PRESTRESSED CONCRETE POLES

**MANTEC CONSTRUCTION LTD.**  
P.O. BOX 85005 PHONE 444 6086 AUCKLAND, NEW ZEALAND

REDDY FLETCHER MANTEC - JOINT VENT  
CLIENT: FIJI ELECTRICITY AUTHORITY

NO.	DATE	REVISIONS	DATE	DRAWING No.
0001	J.P.F. 10/3/03			RPM Dwg 12-002-20
0002				NMP Dwg
0003				FEA Dwg 03-ES2-047

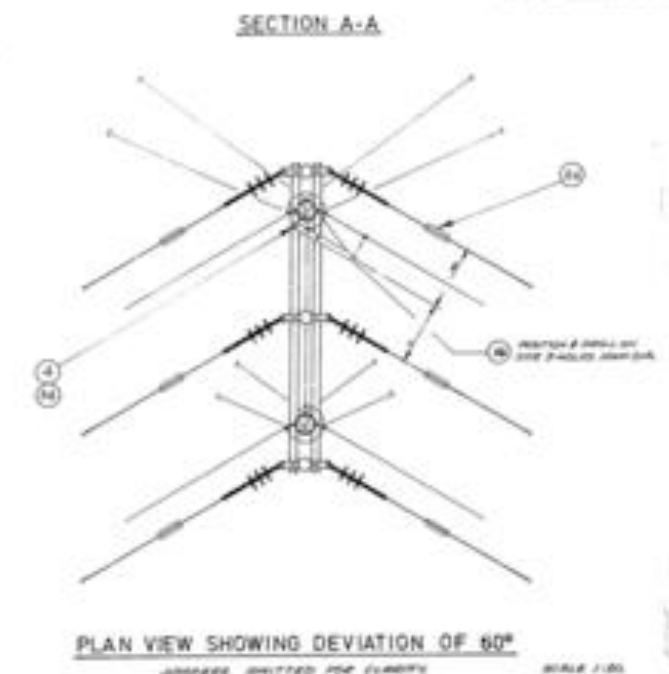
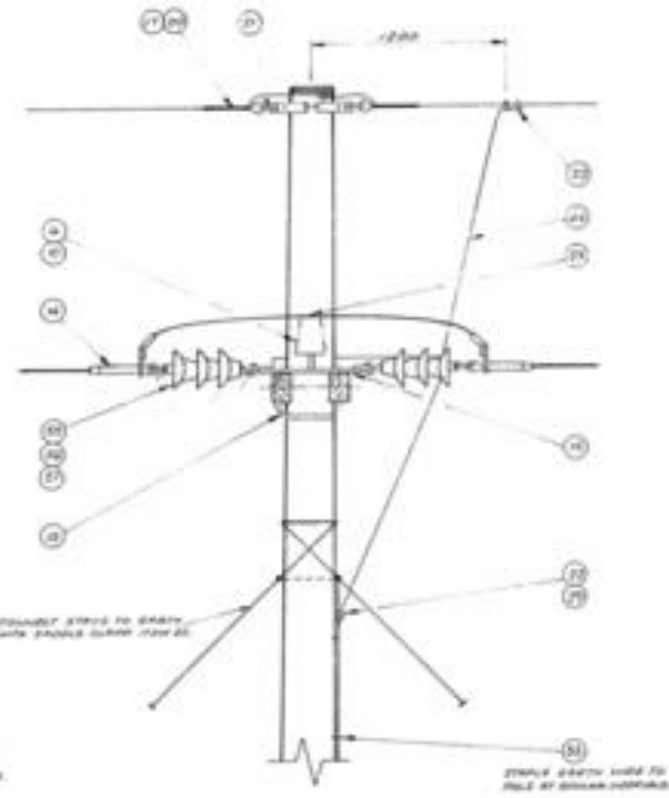
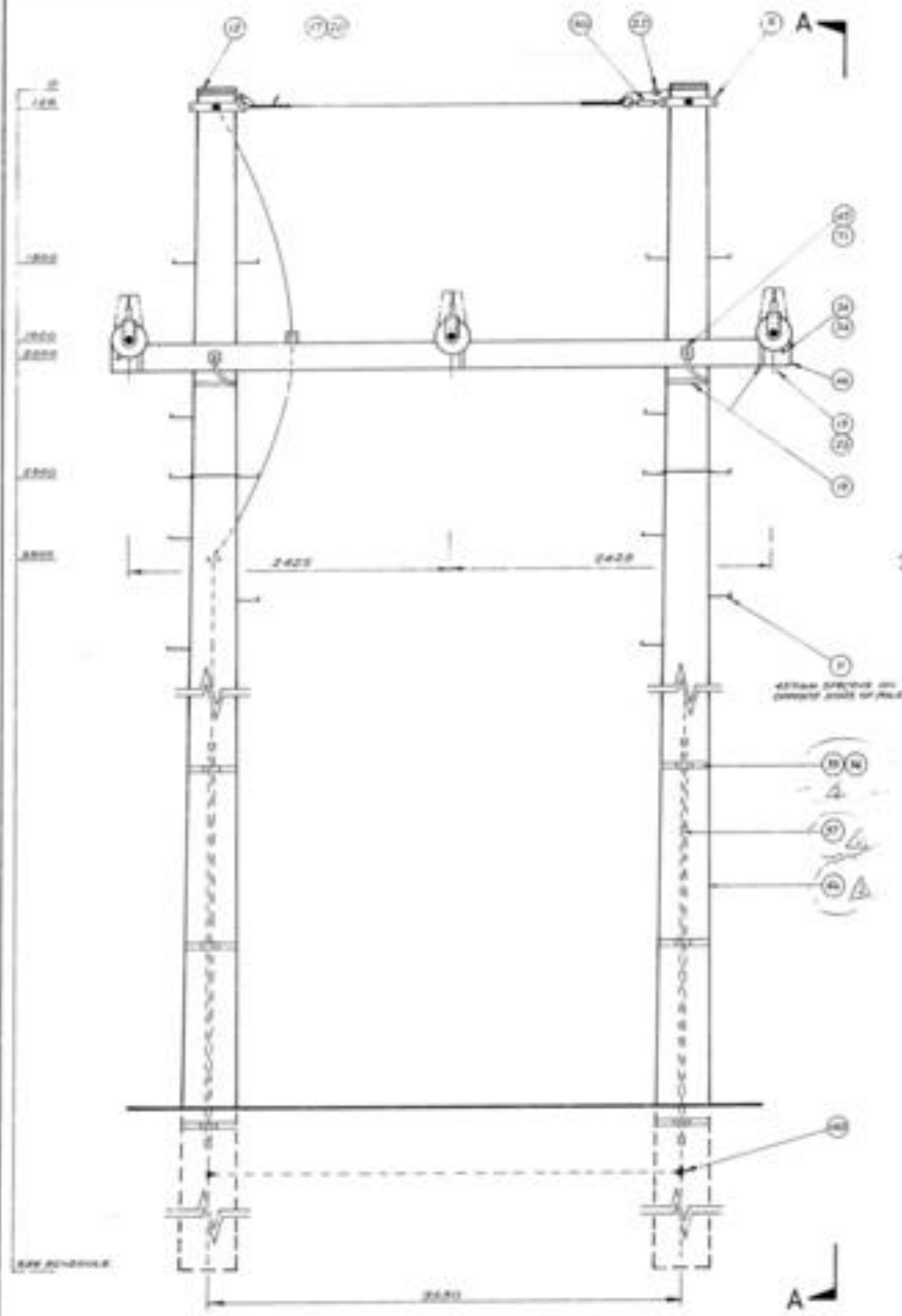
SCALE: 1:10 / 1:20 / 1:100



REVISED C. J. B. 10.11.85 DIMENSIONS IN MILLIMETERS APPROVED	DATE OF THIS DRAWING	<b>BBC Electric Power Equipment</b> Sydney Australia <small>THIS DRAWING IS THE PROPERTY OF BBC ELECTRIC POWER EQUIPMENT. IT IS LOANED TO YOUR ORGANISATION AND MUST NOT BE REPRODUCED, COPIED, OR DISTRIBUTED OUTSIDE YOUR ORGANISATION.</small> APPROVED: [Signature] CHECKED: C.J.E.	CUSTOMER: 400-630A ROCKER AIR-BREAK SWITCH HORIZONTAL POLE TOP MTS. FOR VUDA - RARAWAI TEE-OFF TO PINEAPPLE CORNER SUBSTATION DATE: 13.05.85 DRAWN BY: [Signature] NAME: N.T.S. NO: C 24912
	DRAWING NO.		
	NAME		
	NO.		

725410

A1 E1 416 007



- NOTES**
- FOR POLE SCOPING DETAILS SEE DRG. 05-243-001
  - FOR POLE FOUNDATION DETAILS SEE DRG. 11-542-001
  - FOR STRUT DETAILS & FOUNDATIONS SEE DRG. 11-542-001
  - MINIMUM DEVIATION TO BE 60° DEPENDING ON SPAN LENGTH
  - FOR DEVIATION CONTROL CHART SEE DRG. 21-20-001
  - FOR DEVIATION @ POLE ONLY REFER DRG. 21-21-001
  - GROUND EARTH WIRE TO BE CONNECTED TO SUBSTATION EARTH WIRE ON OPPOSITE SIDE OF POLES ALONG ROUTE.

**POLE HEIGHT SCHEDULE**

POLE LENGTH	DEPTH IN GROUND	HIGHEST LOWER CROSS ARM'S OFFSET	HIGHEST CROSS ARM'S OFFSET
1200	1000	750	900
1500	1300	870	1020
1800	1600	990	1140
2100	1900	1110	1260

NO.	QTY	DESCRIPTION	REMARKS
0010	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0011	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0012	4	1200x1200x100 (S&W) OF THE TOWER POLE	
0013	4	1500x1500x100 (S&W) OF THE TOWER POLE	
0014	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0015	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0016	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0017	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0018	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0019	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0020	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0021	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0022	2	1200x1200x100 (S&W) OF THE TOWER POLE	
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0025	2	1500x1500x100 (S&W) OF THE TOWER POLE	
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0027	2	1500x1500x100 (S&W) OF THE TOWER POLE	
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0040	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0041	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0042	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0043	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0044	2	1200x1200x100 (S&W) OF THE TOWER POLE	
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0046	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0047	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0048	2	1200x1200x100 (S&W) OF THE TOWER POLE	
0049	2	1500x1500x100 (S&W) OF THE TOWER POLE	
0050	2	1200x1200x100 (S&W) OF THE TOWER POLE	

**FIJI ELECTRICITY AUTHORITY**

33 KV SUB TRANSMISSION  
TWO POLE STRUCTURE TYPE HT  
TERMINATION, STRAIN & DEVIATION

SCALE 1:20 & 1:50

NO.	DATE	BY	REVISION
1	01-11-77	J.E.A.C.	ISSUED FOR CONSTRUCTION
2	01-11-77	J.E.A.C.	REVISION FOR MATERIAL CHANGE
3	01-11-77	J.E.A.C.	REVISION FOR MATERIAL CHANGE

## **Tender Submission - Instruction to bidders**

It is mandatory for Bidders to upload a copy of their bid in the **TENDER LINK** Electronic Tender Box no later than **4:00pm, on Wednesday 2<sup>nd</sup> August, 2017**

To register your interest and tender a response, view 'Current Tenders' at: <https://www.tenderlink.com/fea>

For further information contact The Secretary Tender Committee, by e-mail [TDelairewa@fea.com.fj](mailto:TDelairewa@fea.com.fj)

In additional, hard copies of the tender, one original and one copy must be deposited in the tender box located at the FEA Head Office, 2 Marlow Street, Suva, Fiji no later than **4:00pm, on Wednesday 2<sup>nd</sup> August, 2017**- Addressed as

### **Tender – MR 174/2017 Preferred Supplier for 33kV Air Break Switches**

**The Secretary Tender Committee  
Fiji Electricity Authority  
Head Office  
Suva  
Fiji**

- **Hard copies of the Tender bid will also be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and it is dispatched before the closing date and time.**

Tenders received after **4:00pm** on the closing date of **Wednesday 2<sup>nd</sup> August, 2017**

- will not be considered.
- Lowest bid will not necessarily be accepted as successful bid
- **It is the responsibility of the bidder to pay courier chargers and all other cost associated with the delivery of the hard copy of the Tender submission including any Duties/Taxes. Hard copies of the Tender submission via Post Box will not be considered.**