



Ergon Energy Corporation Limited

Technical Specification for Fuse Panels for Electricity Supply Pillars

ETS14-04-01

Technical Specification for Fuse Panels for Electricity Supply Pillars

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1. Purpose and Scope

This Specification sets out the requirements for pre-wired fuse panels to be mounted in electricity supply pillars used in low voltage Underground Distribution systems in Queensland.

Two panel types are required as follows:

- Fuse Panel Assembly, Supply Pillar, Stock Code (SC) 2421212.
- Fuse Panel Assembly, Cross-Road Pillar, SC 2421204.

2. References

2.1 Applicable Standards

The items shall be designed, manufactured and tested in accordance with the relevant parts of the following standards and all amendments issued from time to time except where varied by this specification:

Standard	Title
AS 1275	Metric screw threads for fasteners.
AS 1567	Copper and copper alloys - Wrought rods, bars and sections.
AS 1795	Sheets and boards for electrical purposes - Classification and (Withdrawn) general requirements.
AS 1856	Electroplated coatings - Silver
AS 4169	Electroplated coatings - Tin and tin alloys.
AS/NZS 4325	Compression and mechanical connectors for power cables with copper or aluminium conductors
AS/NZS 5000.1	Electric Cables - Polymetric Insulated for Working Voltages up to and Including 0.6/1kV
AS/NZS 60269	Low voltage fuses
AS/NZS 60695.2.13	Fire hazard testing-Glowing hot wire based test methods - Glow-wire ignitability test method for materials
AS/NZS 9001	Quality management systems – Requirements
IEC 60893	Insulating materials- Industrial rigid laminated sheet based on thermosetting resins for electrical purposes.

3. Drawings

3.1 Drawings by the Purchaser

The following drawings are attached and form part of this Specification.

Drawing	Title
QESI 04-03-01	Standard Base Electricity Supply Pillar Critical Dimensions
QESI 04-03-02	Standard Covers Electricity Supply Pillar Critical Dimensions
940140-01	Distribution Network Hardware Electricity LV Supply Pillar Fuse Panel – Six Fuses Panel Detail
940140-02	Distribution Network Hardware Electricity LV Supply Pillar Fuse Panel – Six Fuses Cabling Details
QESI 04-04-03	Neutral Bar Electricity Supply Pillars Manufacturing Details

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4. Service Conditions

The fuse panels will be installed in pillars which are exposed to the following environmental conditions:

Ambient Temperature	45°C summer daytime -5°C winter night time
Solar Radiation Level	1,000 Wm ⁻² with high ultraviolet content
Precipitation	Tropical summer storms with gust wind speeds exceeding 160 km/h and an annual rainfall in excess of 1500mm
Humidity	Extended periods of relative humidity in excess of 90%
Moisture	Garden sprays and sprinklers set at any height from ground level upwards causing water to be sprayed against or to fall upon the pillar at angles between 40° below and 60° above the horizontal.
Pollution	Areas of coastal salt spray and/or industrial pollution with equivalent salt deposit densities in the range 2.0 to 3.0 gm ⁻²

5. Design and Construction

5.1 General Requirements

Panels shall be manufactured in accordance with drawing 940140-01.

The fuse panel shall mount firmly in slots provided in the base of the pillar. The slots will have dimensions as detailed in drawing numbers QESI 04-03-01 and QESI 04-03-02.

Fuse panels shall be manufactured using a polymeric moulded material of high grade non-hygroscopic insulating material and shall be resistant to surface tracking, thermal degradation at 60°C and ageing. They shall comply with IEC 60893 and or other Australian and or International Standards for Fuse panels/ insulating panels or materials for electrical purposes, and shall be free of any asbestos reinforcement. Any and all such compliance shall be demonstrated through provision of type test certificates and details.

Fuse panels shall meet the requirements of the water absorption test specified in IEC 60893-2 and shall comply with the relevant sections of AS/NZS 60695.2 for glow-wire or similar tests. All solid insulating materials used will be fire resistant. They will not ignite spontaneously and will cease to smoulder or melt immediately on removal from the heat source.

The Fuse panels shall be inherently fit for electrical insulating purposes and shall have an insulation resistance of not less than 100MΩ when measured using a 500V Megger.

Each fuse holder shall meet the requirements of AS/NZS 60269.3.0 - Low voltage fuses - "Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications)", as applicable to 100 amp 415 volt fuse holders, except that the fuse carrier must accept a fuse-link 22.2 mm dia. x 57 mm long, and shall meet the following requirements.

- (a) 100 amp 415 volt rating;
- (b) Single hole panel mounting;
- (c) Front entry;

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- (d) Double screw, electro-tinned double terminals up to 50 mm²;
- (e) Maximum overall dimensions at 100 mm long x 45 mm wide x 100 mm high;
- (f) All metal parts of the fuse holder shall be of non-ferrous metal or stainless steel grade 316 or 304 and all screws shall be brass. Plated ferrous parts are not acceptable;
- (g) The fuse as specified above shall be tested in accordance with the requirements of AS/NZS 60269.3.0
- (h) The ferrule contacts and carrier contacts shall be electro-tinned to 5 micrometres minimum thickness (the base contacts shall be silver plated to 2 micrometres). That portion of the base contact assembly which mates with the carrier contacts shall be silver plated to a minimum of 2 micrometres. Shell Alvania R3 grease or equivalent shall be used to fill all holes and coat contact surfaces;

The fuse panel shall be provided with a means of ensuring adjacent fuse holders do not rotate to the extent they come into contact with each other. The proposed method of achieving this requirement must be submitted with the Tender.

Fuse panels shall be fitted with a direct-mounted unenclosed all brass neutral bar in accordance with drawing no. QESI 04-04-03. All holes in the neutral bar shall be filled with Shell Alvania R3 grease or equivalent.

5.2 Panel Pre-wiring

Panels shall be pre-wired in accordance with drawing 940140-02.

Cable shall be 16mm² stranded annealed Cu XLPE X-90 insulated in accordance with AS/NZS 5000.1 in the colours shown on the drawing.

Cables from upper to lower fuse holders are required on all fuse panels and shall be arranged in the colours shown, neatly formed into the configurations shown. Insulation shall be completely stripped prior to insertion in to fuse holder tunnels and fixing screws securely tightened. Exposed conductor shall not protrude beyond the fuse holders.

Additional cables for Supply Pillar panels from lower fuse holders and neutral bar shall be installed in accordance with Clause 5.2.3 and a tinned Cu crimp lug 16mm² - M12 fitted to the lower end of each cable. Lugs shall be in accordance with AS/NZS 4325, Class A, fixed to the cable with the correct sized hexagonal or indent crimp. Intended crimping detail, including die/tool size is to be submitted with the Tender. Cables may be neatly wrapped around the fuse panel for packaging & transport.

6. Performance and Testing

6.1 Test Certificates

Suppliers shall provide with the offer full details of the fuse-holder together with test certificates to AS/NZS 60269.3.0 and test certificates for the fuse panel as specified in Clauses 5.1.3, 5.1.4 and 5.1.5. of this specification.

7. Risk Assessment

There is no requirement for manufacturer provided safety risk assessments for the items covered in this specification.

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8. Quality Assurance

8.1 Purchasers Policy

It is the Purchaser's policy to procure goods, equipment and services from sources that demonstrate the ability to supply quality products.

8.2 Documentary Evidence

Tenderers are required to submit evidence that the design and manufacture of the products offered are in accordance with AS/NZS ISO 9001 and shall include the Capability Statement associated with the Quality System Certification.

If the Tenderer is a non-manufacturing supplier, the documentary evidence shall include the quality system certifications of both the supplier and the manufacturer.

9. Samples

9.1 Production Samples

Suppliers must submit, at no cost to the Purchaser, a minimum of one (1) production sample of each item offered. Samples MUST be delivered within one (1) week of the closing date of tenders. The requirement for samples may be waived for the following conditions.

- (a) The offered item is currently under contract or has previously been supplied to the Purchaser under contract and there have been no changes to the design or material.
- (b) The offered items have been supplied to the Purchaser for approval prior to this offer and there have been no changes in design or material.

9.2 Sample Delivery

Each sample shall be delivered freight free, suitably packaged and labelled with the following information:

- (a) Name of Supplier and this Specification Number
- (b) Item numbers
- (c) Any supporting data on features or characteristics and test reports.

9.3 Samples for Tests

The Purchaser may at its discretion use samples for tests. Unused Items may be either purchased at the tender price or returned to the respective Supplier after the contract has been awarded.

10. Packaging and Marking

No technical packaging requirements apply.
Suppliers shall refer to the annex attached for the delivery packaging requirements.

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11. Service Performance

Suppliers shall state:

- (a) the period of service for manufacturing and supplying within Australian service conditions, and
- (b) Electricity supply authorities within Australia who have a service history of the panels offered.
- (c) Contact names and phone numbers of relevant employees of those supply authorities who can verify the service performance claimed.

12. Reliability

12.1 Service Life

Suppliers are required to comment on the reliability of the equipment and the performance of the materials offered for a service life of 50 years under the specified system and environmental conditions.

12.2 Evidence in Support of Reliability

Such comments shall include evidence in support of the reliability claimed including information on Failure Mode and Effect Analysis.

13. Training

Training material in the form of drawings, instructions and/or audio visuals shall be provided for the items accepted under this offer.

This material shall include but is not limited to the following topics:

- Handling
- Storage
- Application (Particularly In Areas Of Heavy Coastal Pollution)
- Installation
- Maintenance
- Environmental Performance
- Electrical Performance
- Mechanical Performance
- Disposal

14. Environmental Considerations

Suppliers are required to comment on the environmental soundness of the design and the materials used in the manufacture of the fuse panels and components. In particular, comments should address such issues as recyclability and disposal at end of service life.

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15. Information to be Provided

15.1 Specific Technical Requirements

Attachment 1 of this specification details the required characteristics of the materials to be used in the construction of the fuse panels for use in pillars. Suppliers shall complete **Attachment 1**, **Attachment 2** and **Attachment 3** of this specification with details of the equipment offered.

15.2 Checklist of Supporting Documentation

Attachment 3 details a checklist of supporting technical documentation which is required to be submitted with the offer.

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16. Attachment 1 – Technical Details

The Supplier shall complete this Schedule and shall guarantee the particulars as set out.

FUSE PANEL MATERIAL		
	Specified Requirement	Guaranteed Value
Material	Insulating material to meet the requirements of Clauses 5.1.3 and 5.1.4 and 5.1.5	
Ignitability	AS/NZS 60695.2.13 GWIT 900°C min (preferred) Provide test report	
Material Specification Sheet	Provide a copy.	
Wall Thickness	10 mm nominal at edges and to fit pillar base, 4mm minimum elsewhere	
Yield Tensile Strength (MPa) (Stress)	45 MPa (Minimum) (ASTM D638-77A @ 23°C)	
Compressive Strength (MPa)	20 MPa (Minimum)	
Izod Notched Impact Strength	200 J/m (Minimum) (ASTM D256 @ 23°C)	
Melt Flow Index (MFI)	Maximum 2.0 gm/min. (ASTM 1238 Condition E)	
Vicat Softening Point (VSP)	Minimum 128°C (ASTM D1526)	
FUSE PANELS		6 FUSE TYPE
Name of Manufacturer		
Manufacturers Catalogue Number.		
Manufacturers Drawing Number.		
Mass including all Components (kg)		
Is Neutral Bar in accordance with Drawing No QESI 04-04-03		Yes/No
Name of Fuse Manufacturer and Catalogue Number		
Fuse Holder Rating (A) (V)		
Is the fuse-holder, including terminals to suit 50mm ² cable, in accordance with Clause 5.1.6		Yes/No
Does the completed fuse panel comply with Clause 5.1.7		Yes/No
Name of 16mm ² cable manufacturer		
Name of 16mm ² crimp lug manufacturer Catalogue Number		
Type of crimp and tool/die detail	Indent/Hexagon	

SIGNATURE OF TENDERER: _____

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17. Attachment 2 – Technical Details

COMMENTS ON RELIABILITY: (Refer Clause 12)

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COMMENTS ON ENVIRONMENTAL SOUNDNESS: (Refer Clause 14)

1. Is the product recyclable? (Yes/No)
2. (a) Can the product be returned to the supplier for recycling? (Yes/No)
(b) If not, how should the product be disposed of?

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3. Is a Safety Data Sheet available for the product? (Yes/No)

SIGNATURE OF TENDERER: _____

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18. Attachment 3 – Technical Document Checklist

CLAU E REF.	PARTICULARS	UNITS
Have full and comprehensive details been submitted WITH the tender documents associated with each of the following items?		
Attachment 1	Ignitability test report of the panel material.	Yes/No
5.1	Flame retardency additives	Yes/No
5.1	Water absorption test report of the panel material.	Yes/No
5.1	Insulation resistance test report of the panel material.	Yes/No
5.1	Means of ensuring adjacent fuse holders do not touch.	Yes/No
5.2	Details of lug crimping type and die/tool size	Yes/No
6.0	Full details of fuse holder	Yes/No
6.0	Fuse holder test certificates	Yes/No
Attachment 1	Ignitability test report	Yes/No
8.0	Quality systems of both the Tenderer and the Manufacturer.	Yes/No
11.0	Service Performance.	Yes/No
12.0	Reliability.	Yes/No
13.0	Training Materials.	Yes/No
14.0	Environmental Soundness	Yes/No

List below any variations in the items offered to the requirements of this specification:

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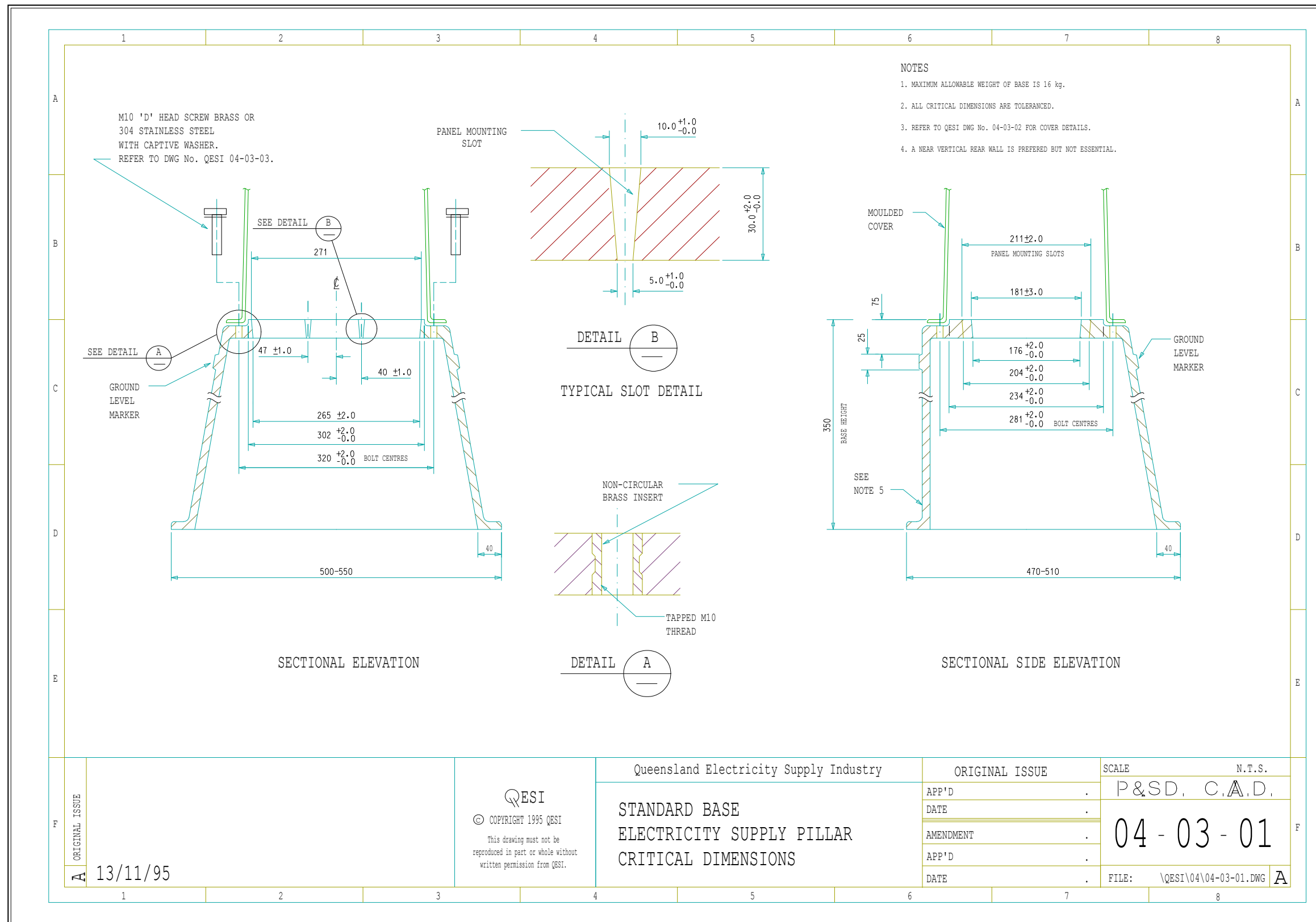
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ADDRESS OF TENDERER: _____

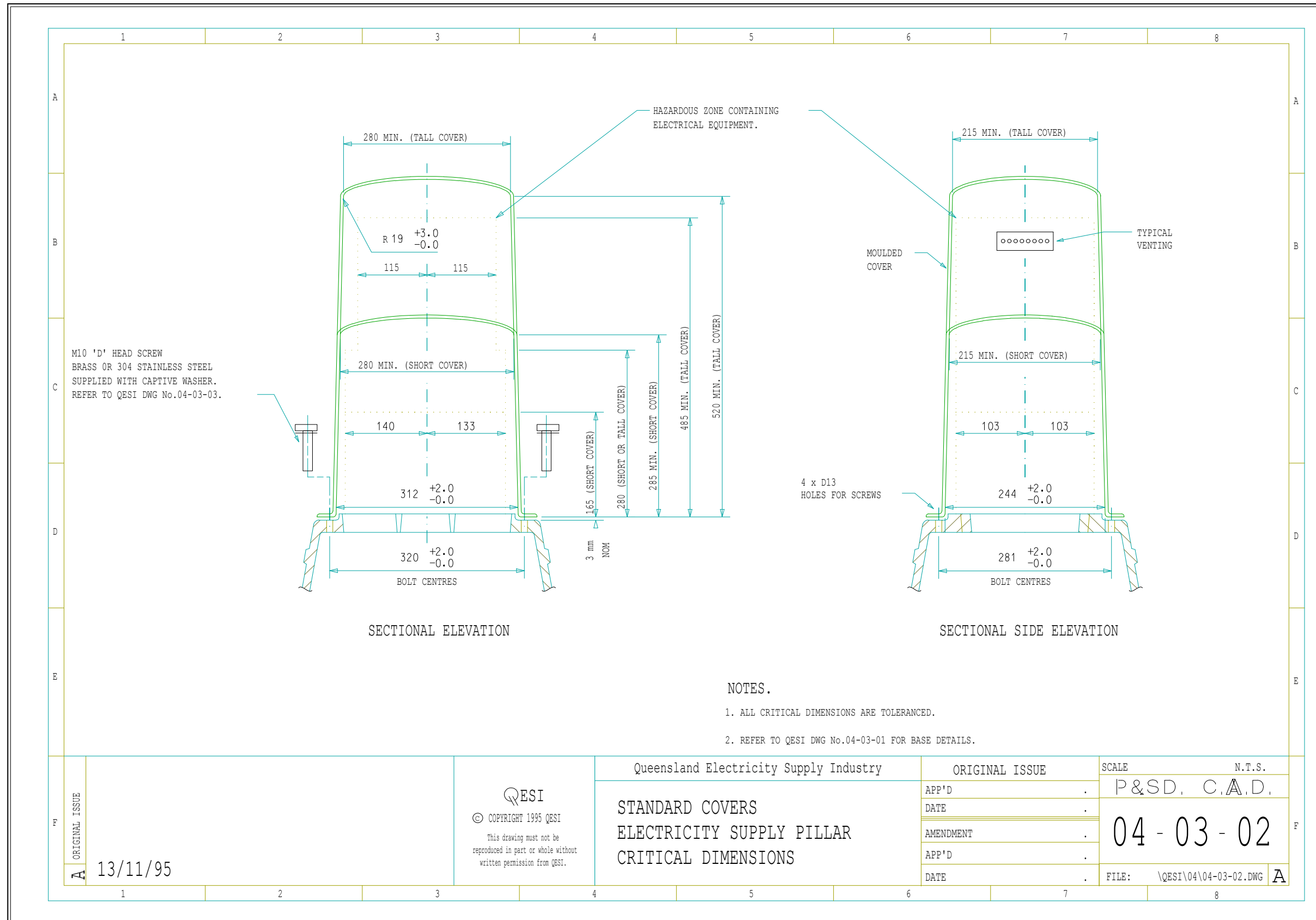
SIGNATURE: _____ FOR AND ON BEHALF OF TENDERER

DATE: _____

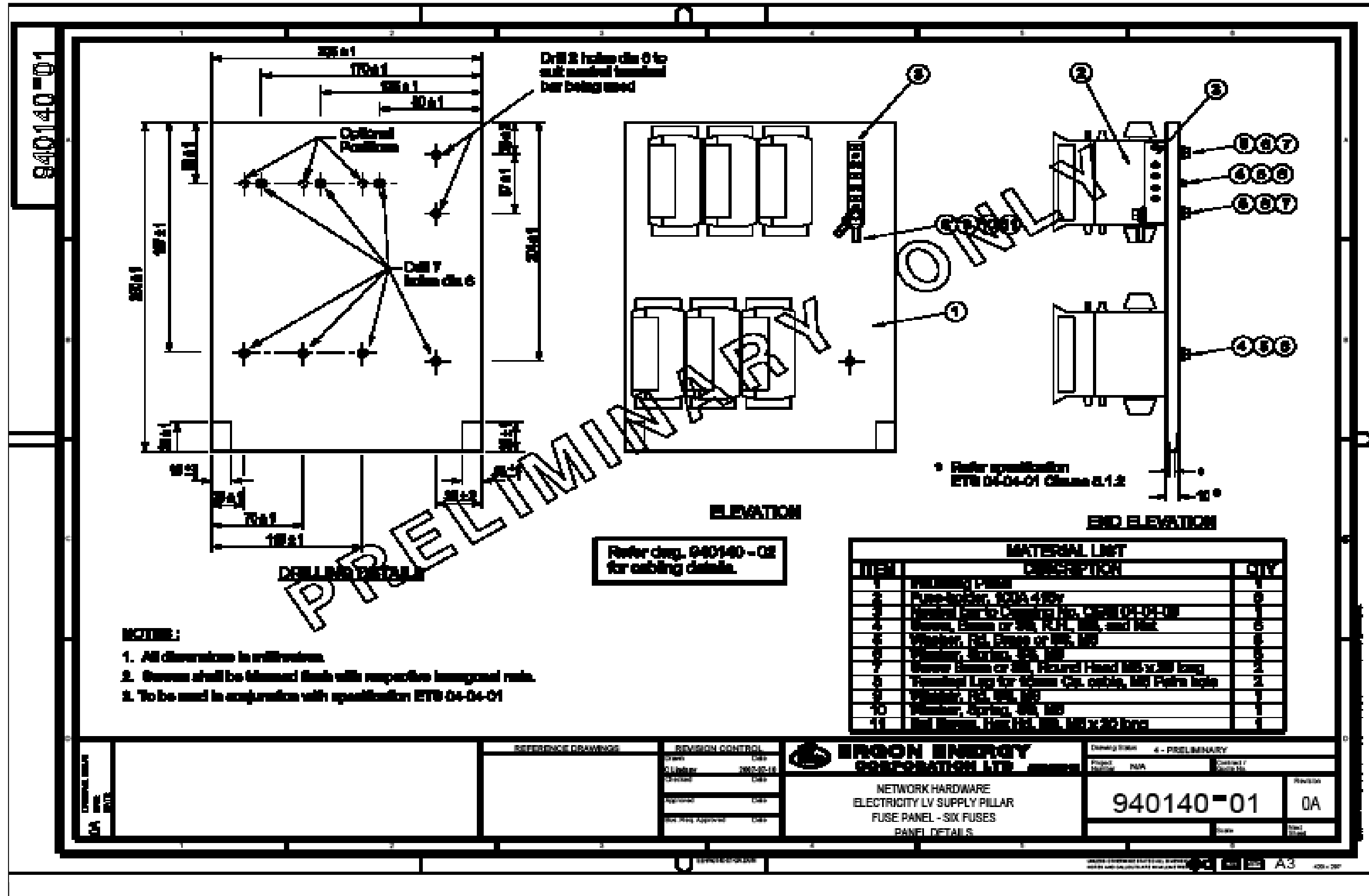
19. Attachment 4 - Drawings

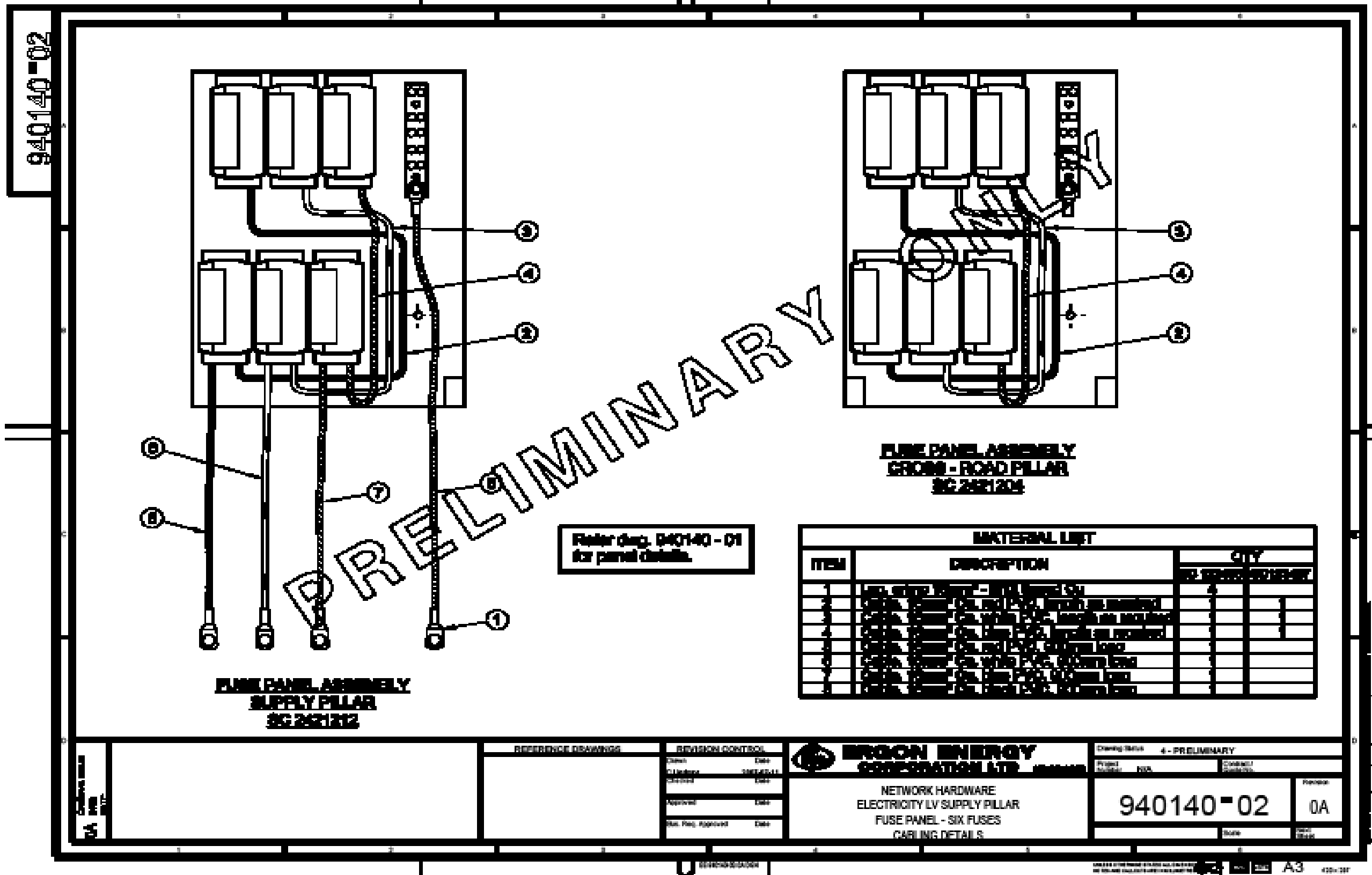


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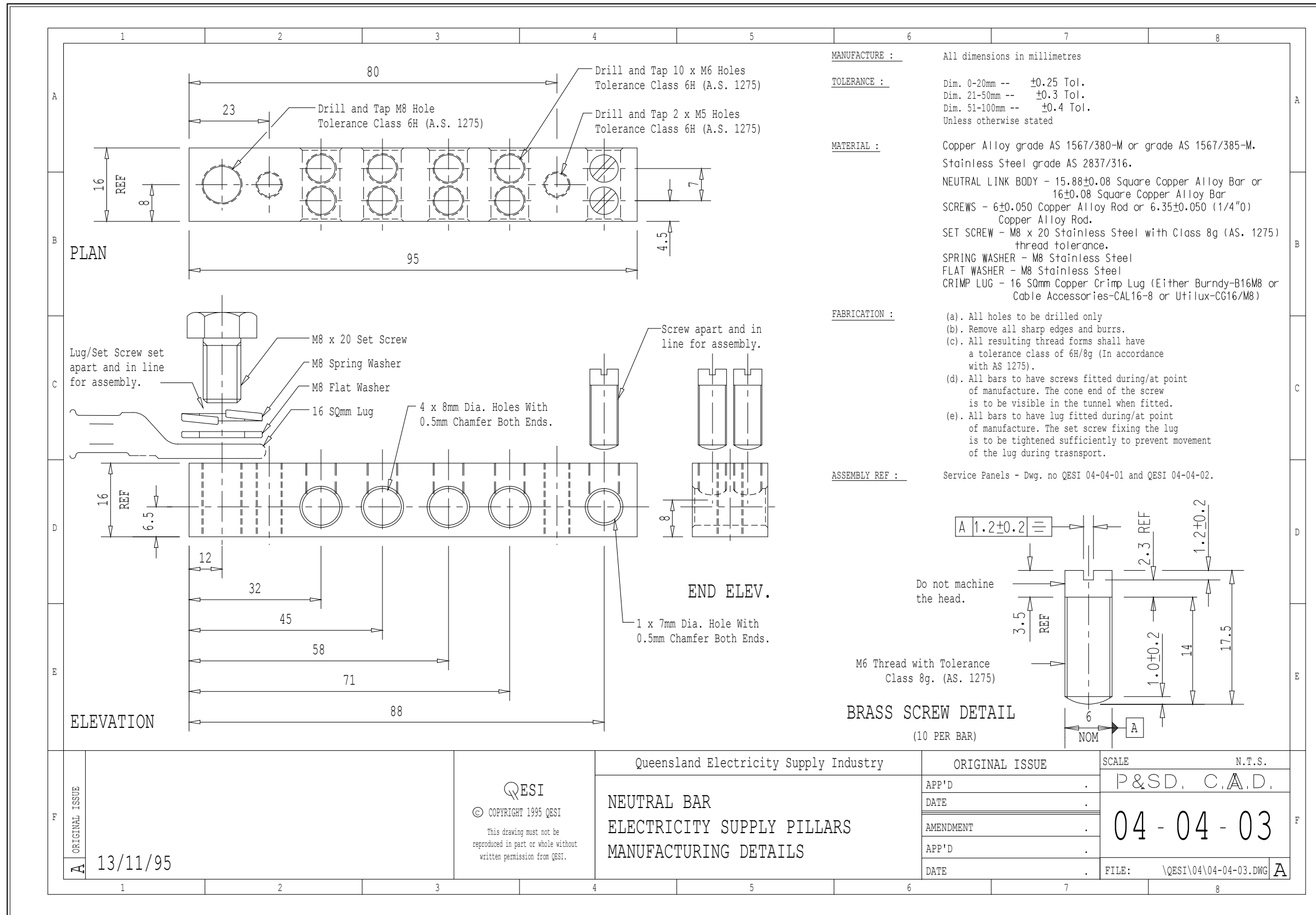


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		STANDARD COVERS ELECTRICITY SUPPLY PILLAR CRITICAL DIMENSIONS	APP'D	P&SD, C.A.D.	
			DATE	04 - 03 - 02	
			AMENDMENT		
			APP'D		
DATE	FILE:	\QESI\04\04-03-02.DWG	A		





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			NEUTRAL BAR	APP'D	P&SD, C.A.D.	
			ELECTRICITY SUPPLY PILLARS	DATE	04 - 04 - 03	
			MANUFACTURING DETAILS	AMENDMENT		
				APP'D	DATE	FILE: \QESI\04\04-04-03.DWG