



Supply and Delivery of 2 x Electrical Control Switchboards for Mashare River and Booster Pump Stations

Procurement Reference No: G/RFQ/NW-087/2024

Name of Bidder		
Contact Person		
E-mail Address		
Postal Address		
Total Amount (Excl. VAT)		
Contact Phone number	Work:	Mobile:

Documents must be posted / delivered to:

The Quotation/Bid Box

Att: Procurement Management Unit (+264 61 71 2819, bids@namwater.com.na)

Namibia Water Corporation Ltd.

Private Bag 13389

176 Iscor Street, Aigams Building

Windhoek

Closing Date: Thursday, 28 March 2024 at 11h00

NO LATE BIDS WILL BE ACCEPTED!



Namibia Water Corporation Ltd.
Private Bag 13389, Windhoek, Namibia
Tel: +264 61 71 2066
Fax: +264 61 21 0741

Letter of Invitation

[Name and Address of Bidder _____]

[Procurement Reference Number: G/RFQ/NW-087/2024]

13 March 2024

Request for Quotations: Supply and Delivery of 2 x Electrical Control Switchboards for Mashare River and Booster Pump Stations

NamWater invites you to submit your best quote for the items described in detail hereunder.
Any resulting contract shall be subject to the terms and conditions referred to in the document.

Queries, if any, should be addressed to Procurement Management Unit, e-mail:
bids@namwater.com.na, Private Bag 13389 Windhoek, Namibia.

Please prepare and submit your quotation in accordance with the instructions given or inform the undersigned if you will not be submitting a quotation.

Yours faithfully,

Procurement Management Unit (PMU)

1. SECTION I: INSTRUCTIONS TO BIDDERS

1. Rights of Public Entity

NamWater reserves the right:

- (a) To split the contract as per the lowest evaluated cost per item, and
- (b) To accept or reject any quotation or to cancel the quotation process and reject all quotations at any time prior to contract award.

2. Preparation of Bids

You are requested to quote for the items mentioned in Section III by completing, signing and returning:

- (a) The List of Goods and Price Schedule;
- (b) The Specifications and Compliance Sheet; and
- (c) Any other attachment deemed appropriate.

You are advised to carefully read the complete Request for bids document, including the Special Conditions of Contract Section, before preparing your offer. The standard forms in this document may be retyped for completion but the Bidder is responsible for their accurate reproduction.

3. Validity of Bids

The offer validity period shall be 90 days from the date of submission deadline.

4. Eligibility Criteria

To be eligible to participate in this Quotation exercise, you should:

- (a) have a valid company Registration Certificate;
- (b) have an original valid good Standing Tax Certificate;
- (c) have an original valid good Standing Social Security Certificate;
- (d) have a valid certified copy of Affirmative Action Compliance Certificate, proof from Employment Equity Commissioner that bidder is not a relevant employer, or exemption issued in terms of Section 42 of the Affirmative Action Act, 1998;
- (e) submit signed Bid-securing Declaration;
- (f) An undertaking on the part of the Bidder that the salaries and wages payable to its personnel in respect of this proposal are compliant to the relevant laws, Remuneration Order, and Award, where applicable and that it will abide to sub-clause 4.6 of the General conditions of Contract if it is awarded the contract or part thereof.
- (g) Supporting literatures to confirm Specifications

The obligatory documents indicated above, are acceptable as follows:

- A valid original document; or
- A valid certified copy of an original document, as certified by the Namibia Police or Commissioner of Oath appointed in terms of the Justices of the Peace and Commissioners of Oaths Act.1963 (Act No. 16 of 1963)

5. Bid Securing Declaration

Bidders are required to subscribe to a Bid Securing Declaration for this procurement process

6. Delivery

Delivery shall be 30 days after acceptance/issue of Purchase Order. Deviation in delivery period shall not be accepted.

6.1. Delivery will only be considered to be complete once all equipment and documentation have been delivered, inspected and found to be in accordance with the specifications.

In the event of costs being incurred due to late deliveries, this will be on Tenderer's account and include the cost of overtime and any other such costs.

7. Sealing and Marking of Bids

Bids should be sealed in a single envelope, clearly marked with the Procurement Reference Number, addressed to NamWater with the Bidder's name and contact information at the back of the envelope.

8. Submission of Bids

Quotations should be deposited in the Quotation/Bid Box located at Namibia Water Corporation Ltd Head office, Private Bag 13389, 176 Iscor Street, Aigams Building, Windhoek, not later than **Thursday, 28 March 2024 at 11h00**. Offers by post or hand delivered should reach Private Bag 13389 by the same date and time at latest. Late Offers will be rejected.

Quotations received by e-mail will not be considered.

9. Opening of Bids

Bids will be opened internally by NamWater representatives immediately after the closing time referred to in instruction 8 above. A record of the Quotation Opening stating the name of the bidders, the amount quoted, the presence or absence of a Bid Security/Bid Securing Declaration, will be posted on the website of the Public Entity and available to any bidder on request within three working days of the Opening.

10. Evaluation of Bids

NamWater shall have the right to request for clarifications in writing during evaluation. Offers that are substantially responsive shall be compared on the basis of price or ownership cost, subject to Margin of Preference where applicable, to determine the lowest evaluated quotation.

10.1. Technical Evaluation Criteria

Item	CRITERIA	WEIGHT
1.	Stage 1: Technical Evaluation	
Specifications	Attach supporting literatures to confirm Specifications	40
2	Stage 2: Experience and Scoring Capacity	

Previous experience with Supply of goods of similar nature	Reference letters from entities whom the Bidder has supplied similar goods in the past, and handled successfully. Three (3) or more Letters (30) Two (2) Letter (25) One (1) Letter (15) Zero (0) Letters (0)	30
Total Points for Technical Evaluation		100

A BIDDER THAT SCORES LESS THAN 70% ON THE TECHNICAL EVALUATION WILL BE REGARDED AS NON-RESPONSIVE AND WILL THEREFORE NOT PROCEED TO THE FINANCIAL EVALUATION STAGE. THE CHEAPEST BIDDER WILL BE FAVOURABLE FOR BID AWARD

11. Technical Compliance

Bidders shall submit along with their quotations documents, catalogues and any other literature to substantiate compliance with the required specifications and to qualify deviations if any with respect to Public Entity's requirements. A method statement should be accompanying the document on the installation and maintenance procedure.

The Specifications, Performance Requirements and Compliance Sheet details the minimum specifications of the goods/items to be supplied. The specifications have to be met but no credit will be given for exceeding the specifications.

12. Prices and Currency of Payment

Prices shall be fixed in Namibian Dollars.

13. Margin of Preference

The applicable margins of preference and their application methodology are as follows

Margins of preference applicable for exclusive preference to local suppliers will be applied as follows:

CATEGORIES OF BIDDERS	MARGIN OF PREFERENCE	DOCUMENTARY EVIDENCE	CRITERIA
Manufacturer	2%	-Certificate of registration from a registering authority -Declaration by the bidder that the manufactured goods meet the local content as determined in Annexure 6 as per the cost structure for Value Added Calculation in Annexure 1, and as certified by an Accountant	“manufacturer” means a person or a company that is involved in the physical or chemical transformation or materials or components into new products whether or not – (a) the transformation is through work; (i) Performed by a power-driven machine or by hand; or (ii) Done in a home or factory; or

			(iii) The new products are sold on a wholesale or retail basis.
Micro, Small and Medium Enterprise	1%	-SME registration certificate - Declaration indicating the percentage of Namibian MSME ownership	A bidder who is a MSME, means an enterprise that has a valid micro, small and medium enterprise certificate issued by the Ministry responsible for trade, whose minimum equity is 51 % owned by Namibians.
Women owned enterprise	1%	- IDs of all shareholders -Founding statement/company registration indicating ownership structure/shareholder certificate - declaration indicating the percentage of Namibian female ownership	A bidder who is a woman or whose minimum equity is 51% owned by Namibian women.
Youth owned enterprise	2%	- IDs of all shareholders - Founding statement/company registration indicating ownership structure/shareholder certificate - declaration indicating the percentage of Namibian youth ownership	A bidder who is a youth or whose minimum equity is 51% owned by Namibian youths
Previously Disadvantaged Person owned enterprise	2%	-IDs of all shareholders - Founding statement/company registration indicating ownership structure/shareholder certificates - declaration indicating the percentage of Namibian PDPs ownership	A bidder who is a PDP or whose minimum equity is 51% owned by Namibian PDPs.
Suppliers providing environmental protection	1%	-declaration and proof that the bidder meets the requirements set out in the bidding document	A bidder that promotes the protection of the environment, maintain ecosystems and sustainable use of natural resources as specified by the public entity in the bidding document.
Suppliers providing employment to Namibians	1%	-declaration that the bidder employs 50% or more Namibian citizens	A bidder who employs 50% or more Namibian citizens. Submit employees Social Security certificates
TOTAL	10%		

A bidder that qualifies for margins of preferences on more than one basis, all such preferences must be granted to the bidder but not more than 10%. The bid price will be reduced with the amount determined in accordance with the following formula:

Formula to calculate margins of preference:

$$A = \frac{\text{MP} \times \text{BP}}{100}$$

in which formula -

- (a) "A" represents the amount to be determined.
- (b) "MP" represents the total percentage of all margins of preferences granted in respect of the bid; and
- (c) "BP" represents the bid price.

14. Award of Contract

The Bidder having submitted the lowest evaluated responsive quotation and qualified to supply the goods/items and related services shall be selected for award of contract. Award of contract shall be by issue of a Purchase Order/Letter of Acceptance in accordance with terms and conditions contained in Section VI: Contract Agreement and General Conditions of Contract.

No Partial award. Offers that only quote for some of the items will not be considered.

15. Notification of Award and Debriefing

NamWater shall after award of contract promptly inform all unsuccessful bidders in writing of the name and address of the successful bidder and the contract amount and post a notice of award on its website within seven days. Furthermore, NamWater shall attend to all requests for debriefing made in writing within 7 days of the unsuccessful bidders being informed of the award.

SECTION II: QUOTATION LETTER

(to be completed by Bidders)

*[Complete this form with all the requested details and submit it as the first page of your quotation with the Price list and documents requested above. A signature and authorisation on this form will confirm that the terms and conditions of the RFQ prevail over any attachments. **If your quotation is not authorised, it will be rejected.**]*

Quotation addressed to:	NamWater
Procurement Reference Number:	G/RFQ/NW-087/2024
Subject matter of Procurement:	Supply and Delivery of 2 x Electrical Control Switchboards for Mashare River and Booster Pump Stations

We offer to supply the items listed in the attached List of Goods and Price Schedule as per the defined specifications, *except for the qualified deviations [Bidder may delete this phrase in case of no deviation]* and, in accordance with the terms and conditions stated in your Request for Quotations referenced above.

We confirm that we are eligible to participate in this Quotation exercise and meet the eligibility criteria specified in Section 1: Instruction to Bidders.

We undertake to abide ethical conduct during the procurement process and the execution of any resulting contract.

We have read and understood the content of the *Bid Securing Declaration (BSD)* attached hereto and subscribe fully to the terms and conditions contained therein. We further understand that this subscription could lead to *disqualification on the grounds mentioned in the BD*.

The validity period of the Quotation is _____ **days** from the date of the bid submission deadline.

We confirm that the prices quoted in the List of Goods and Price Schedule are fixed and firm and will not be subject to revision or variation, if we are awarded the contract **prior to the expiry** date of the quotation validity.

The delivery period offered from the date of issue of Purchaser Order/ Letter of Acceptance is as shown in the List of Goods items and Price Schedule.

Quotation Authorised by:

Name of Bidder		Company's Address and seal	
Contact Person			
Name of Person Authorising the Quotation:		Position:	Signature:
Date		Phone No./Fax	

BID SECURING DECLARATION
(Section 45 of Act)
(Regulation 37(1)(b) and 37(5))

Date: *[Day/month/year]*.....

Procurement Ref No.:

To: Namibia Water Corporation Ltd., 176 Iscor Street, Aigams Building, Windhoek

I/We* understand that in terms of section 45 of the Act a public entity must include in the bidding document the requirement for a declaration as an alternative form of bid security.

I/We* accept that under section 45 of the Act, I/we* may be suspended or disqualified in the event of

- a) a modification or withdrawal of a bid after the deadline for submission of bids during the period of validity;**
- b) refusal by a bidder to accept a correction of an error appearing on the face of a bid;**
- c) failure to sign a procurement contract in accordance with the terms and conditions set forth in the bidding document, should I/We* be successful bidder; or**
- d) failure to provide security for the performance of the procurement contract if required to do so by the bidding document.**

I/We* understand this bid securing declaration ceases to be valid if I am/We are* not the successful Bidder

Signed:
[insert signature of person whose name and capacity are shown]

Capacity of:
[indicate legal capacity of person(s) signing the Bid Securing Declaration]

Name:
[insert complete name of person signing the Bid Securing Declaration]

Duly authorized to sign the bid for and on behalf of: *[insert complete name of Bidder]*

Dated on _____ day of _____, _____
[insert date of signing]

Corporate Seal (where appropriate)

[Note*: In case of a joint venture, the bid securing declaration must be in the name of all partners to the joint venture that submits the bid.]

****delete if not applicable / appropriate***



Republic Of Namibia

Ministry of Labour, Industrial Relations and Employment Creation

Written undertaking in terms of section 138 of the Labour Act, 2015 and section 50(2)(D) of the Public Procurement Act, 2015

1. EMPLOYERS DETAILS

Company Trade Name:.....

Registration Number :.....

Vat Number:

Industry/Sector:

Place of Business:.....

Physical Address:.....

Tell No.:.....

Fax No.:.....

Email Address:.....

Postal Address:.....

Full name of Owner/Accounting Officer:.....

.....

Email Address:.....

2. PROCUREMENT DETAILS

Procurement Reference No.:.....

Procurement Description:

.....

.....

Anticipated Contract Duration:

Location where work will be done, good/services will be delivered:

.....

3. UNDERTAKING

I *[insert full name]*, owner/representative

of*[insert full name of company]*

hereby undertake in writing that my company will at all relevant times comply fully with the relevant provisions of the Labour Act and the Terms and Conditions of Collective Agreements as applicable.

I am fully aware that failure to abide to such shall lead to the action as stipulated in section 138 of the labour Act, 2007, which include but not limited to the cancellation of the contract/licence/grant/permit or concession.

Signature:

Date:

Seal:.....

Please take note:

1. *A labour inspector may conduct unannounced inspections to assess the level of compliance*
2. *This undertaking must be displayed at the workplace where it will be readily accessible and visible by the employees rendering service(s) in relations to the goods and services being procured under this contract.*

2. SECTION III: LIST OF GOODS AND PRICE SCHEDULE

QUOTATION FOR: Supply and Delivery of 2 x Electrical Control Switchboards for Mashare River and Booster Pump Stations

1 ELECTRICAL CONTROL SWITCHBOARD (INCOMER = 400VAC) MASHARE RIVER PUMP STATION

Table 1 (a)– COMPONENTS FOR SWITCHBOARD (BILL OF QUANTITIES) - Excluding V.A.T

SPECIFICATIONS			EQUIPMENT OFFERED	QUANTITY AND PRICE		
SECTION	SYMBOL	ITEMS DESCRIPTION	MAKE,TYPE,RATING,YEAR OF MANUFACTURING	UNIT PRICE	QTY	TOTAL PRICE N\$
Enclosure		Enclosure	<i>Electrical Orange, 0.96m x 0.96m x 0.384m wall mounted, refer to electrical drawing (Mashare River Pump)</i>		1	
Pump Control						
1.	MPU	MPU (Motor Protection Unit)	<i>Schneider MPU 100A</i>		2	
2.	Q0	3-Pole Main Circuit Breaker with Rotary Handle on Door (Moulded Case), 10Ka, with Mechanical Interlock	60A		1	

3.	Q1	3-Pole Pump Circuit Breaker with 1xN/O + Rotary Handle on Door (Moulded Case), 6kA	40A		2	
4.		Contactator + O/L units with 1 N/O	400 Vac		2	
5.	Q3&Q4	1-Pole Circuit Breaker 6kA	16A		2	
6.	Q2 & Q5	1-Pole Circuit Breaker 6kA	10A		2	
8.	E/L	Earth Leakage unit 1-Pole + Neutral 6kA	25A		1	
9.		Single Plug 230Vac, 2-pole + E			2	
10.		Spare Plug: Single plug 230Vac, 2-pole + E			1	
Metering Requirement						
1.	PO	Voltmeter (Digital)	400 Vac		1	
2.	SO	Volt selector switch, 3phase with neutral	4 point		1	
3.		Ammeter (digital)			2	

4.		Amp selector switch. 3phase with neutral			1	
5.	CT1-CT3	Current Transformer – Class 0.5	<i>63/5</i>		3	
6.		Three phase fuse base			3	
7.		Protection fuses	<i>1A,fast blown fuses</i>		3	
8.		Hour Meter	<i>AC.SQ72R230VAC</i>		2	
9.		Energy Meter	<i>ELSTER-A1700</i>		1	
Voltage Monitoring						
1.	S1	Voltage Window Comparator SP231	<i>Rhomberg-SP231</i>		1	
2.		Protection Fuses	<i>1A, Fast Blown Fuses</i>		3	
AC Surge Arrestors						
1.		DEHNbloc M 1 255 FM Surge Arrester.	<i>M 1 255 FM</i>		3	
2.		DEHNguard S 275 FM Surge Arrester.	<i>S 275 FM</i>		3	
3.		DEHNgap M 255 FM Surge Arrester.	<i>M 255 FM</i>		1	
DC Surge Arrestors						
1.		Dehnrail M 30 Module Surge Arrester			1	
Serial Ports Protection						
1.		Serial Comms Surge Arrestors	<i>FS-9-V24</i>		1	
24V DC Power Supply						
1.		Battery charger 12V/7	<i>10A</i>		1	

2.		DC-DC Converter 12V/24V	<i>360W,10A</i>		1	
3		Battery protection 65i	<i>40A</i>			
4.		Battery Protection Fuses and fuse Holders	<i>10A</i>		2	
Operator interface requirements						
1.		Push Buttons	<i>24Vdc</i>		4	
2.		Indicators	<i>24Vdc LED</i>		12	
3.		3 Pos. Selector Switch (off/Man/Auto/Tel)	<i>24Vdc</i>		1	
4.		Serial Cable between PPI and CPU Port 1	<i>Serial Cable</i>		1	
5.		Serial Cable between PPI and CPU Port 2	<i>Serial Cable</i>		1	
PLC Requirements						
1.		06 PLC	<i>D0-06DR-D(06 base)</i>		1	
2.		Analog input card	<i>F0-4AD-1</i>		2	
3.		Coprocessor	<i>ASCII Coprocessor 06 option module</i>			
4.		Serial cable: Adam 4520-FCP128	<i>Serial Cable</i>		1	

5.		RS232-485 Converter	<i>ADAM 4520:232/485 Converter</i>		1	
Relays						
	K1M – K2M	24Vdc interface Relays			3	
Analog cards Protection						
1.		Fuses	<i>32mA;5x20mm</i>		4	
2.		Fuses	<i>500mA, 5x20mm</i>		4	
Labour						
1.		Installation and wiring of all Electrical Components, PLC, Transient Suppressors, Power supply, Energy meters etc.			1	
2		Factory Testing, Commissioning, Documentation and Packing (for all electrical switchboards)			1	
		Delivery to Windhoek (for all electrical switchboards)			1	
3		Anything to complete in accordance to the specifications, but not covered within the above items.	Specify:			

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2 ELECTRICAL CONTROL SWITCHBOARD (INCOMER = 400VAC) MASHARE BOOSTER PUMP STATION EXCLUDING V.A.T

Table 1 (b)– COMPONENTS FOR SWITCHBOARD (BILL OF QUANTITIES) - Excluding V.A.T

SPECIFICATIONS			EQUIPMENT OFFERED	QUANTITY AND PRICE		
SECTION	SYMBOL	ITEMS DESCRIPTION	MAKE,TYPE,RATING,YEAR OF MANUFACTURING	UNIT PRICE	QTY	TOTAL PRICE N\$
Enclosure		Enclosure	<i>Electrical Orange, 2.112m x 1.728m x 0.384m Foot mounted, refer to electrical drawing (Mashare Booster)</i>		1	
Pump Control						
1.	MPU	MPU (Motor Protection Unit) Complete unit set with accessories	<i>Schneider MPU 100A</i>		4	
2.	Q0	3-Pole Main Circuit Breaker with Rotary Handle on Door (Moulded Case), 10Ka, with Mechanical Interlock	60A		1	

3.	Q1, Q2	3-Pole Pump Circuit Breaker with 1xN/O + Rotary Handle on Door (Moulded Case), 6kA	<i>16A</i>		2	
4.		Contactor + O/L units with 1 N/O	<i>400 Vac</i>		2	
5.	Q3&Q4	3-Pole Pump Circuit Breaker with 1xN/O + Rotary Handle on Door (Moulded Case), 6kA	<i>20A</i>		2	
6.	Q5 & Q6	3-Pole Pump Circuit Breaker with 1xN/O + Rotary Handle on Door (Moulded Case), 6kA	<i>6A</i>		2	
7.	Q7	1-Pole Circuit Breaker 6kA	<i>10A</i>		1	
8.	Q8	1-Pole Circuit Breaker 6kA	<i>16A</i>		2	
9.	Q9 & Q10	1-Pole Circuit Breaker 6kA	<i>10A</i>			
10.	E/L	Earth Leakage unit 1-Pole + Neutral 6kA	<i>25A</i>		1	
11.		Single Plug 230Vac, 2-pole + E			1	
12.		Spare Plug: Single plug 230Vac, 2-pole + E			1	

Metering Requirement					
13.	PO	Voltmeter (Digital)	<i>400 Vac</i>		1
14.	SO	Volt selector switch, 3phase with neutral	<i>4 point</i>		1
15.		Ammeter (digital)			2
16.		Amp selector switch. 3phase with neutral			1
17.	CT1-CT3	Current Transformer – Class 0.5	<i>63/5</i>		3
18.		Three phase fuse base	<i>10A</i>		3
19.		Protection fuses	<i>1A, fast blown fuses</i>		3
20.		Hour Meter	<i>AC.SQ72R230VAC</i>		6
21.		Energy Meter	<i>ELSTER-A1700</i>		1
Voltage Monitoring					
1.	S1	Voltage Window Comparator SP231	<i>Rhomberg-SP231</i>		1
2.		Protection Fuses	<i>1A, Fast Blown Fuses</i>		3
AC Surge Arrestors					
1.		DEHNbloc M 1 255 FM Surge Arrester.	<i>M 1 255 FM</i>		3
2.		DEHNguard S 275 FM Surge Arrester.	<i>S 275 FM</i>		3
3.		DEHNgap M 255 FM Surge Arrester.	<i>M 255 FM</i>		1
DC Surge Arrestors					

1.		Dehnrail M 30 Module Surge Arrester			1	
Serial Ports Protection						
1.		Serial Comms Surge Arrestors	<i>FS-9-V24</i>		1	
24V DC Power Supply						
1.		Battery charger 12V/20 (Victron/BlueSmart)	<i>10A</i>		1	
2.		DC-DC Converter 12V/24V-10 Victron-Orion	<i>360W,10A</i>		1	
3		Battery protection BP 65i	<i>40A</i>		1	
4.		Battery Protection Fuses and fuse Holders	<i>10A</i>		2	
Operator interface requirements						
1.		HMI Siemens Touch Panel	<i>24Vdc/ TP177-7"</i>		1	
4.		Serial Cable between PPI and CPU Port 1	<i>Serial Cable</i>		1	
5.		Serial Cable between PPI and CPU Port 2	<i>Serial Cable</i>		1	
PLC Requirements						
1.		Direct Logic PLC: D2-205-1	<i>D2-205-1 (09 base)</i>		1	

			<i>Slot 0: CPU D2-262</i>		1	
			<i>Slot 1-3: D2-16ND3-2</i>		3	
			<i>Slot 4: D2—8TR</i>		1	
2.		Eight Channel Analog input card	<i>Slot 5: F2-08AD-1</i>		1	
		Eight Channel Analog Output card	<i>Slot 6: F2-08DA-1</i>		1	
3		Telemetry Comms Cable as per the drawing			1	
4.		Coprocessor	<i>ASCII Coprocessor 06 option module</i>			
5.		Serial cable: Adam 4520-FCP128	<i>Serial Cable</i>		1	
6.		RS232-485 Converter	<i>ADAM 4520:232/485 Converter</i>		1	
Relays						
	K1M – K6M	24Vdc interface Relays			6	
Analog cards Protection						
1.		Fuses	<i>32mA;5x20mm</i>		4	
2.		Fuses	<i>500mA, 5x20mm</i>		6	
Labour						
1.		Installation and wiring of all Electrical Components, PLC, Transient Suppressors, Power supply, Energy meters etc.			1	

2		Factory Testing, Commissioning, Documentation and Packing (for all electrical switchboards)			1	
		Delivery to Windhoek (for all electrical switchboards)			1	
3		Anything to complete in accordance to the specifications, but not covered within the above items.	Specify:			

Table 2 PRICE SCHEDULE FOR SWITCHBOARD

A	B	C	D	E	F	G	H	I		
Item no.	Description of Goods	Quantity required	Unit of measures	*	Price per unit NAD ¹	Total price without VAT NAD	VAT: NAD	Delivery weeks) (days/month	Country of Origin	
1.	Electrical Control Switchboards	2	Each							
						TOTAL				
NAME:		POSITION:			SIGNATURE			DATE		
NAME OF BIDDER:		ADDRESS:								

1. If Price quoted is subject to change in rate of exchange at the time of delivery of goods provide details hereunder:

Currency: Exchange Rate:

If no base rate of exchange is given, the price shall be treated as firm in Namibian Dollars for all intent and purpose.

Key notes: **NA**=NOT APPLICABLE, **NQ**=NO QUOTE

3. SECTION IV: SPECIFICATIONS AND PERFORMANCE REQUIREMENTS

GENERAL SPECIFICATIONS

3.1. GENERAL

This document is for the supply and delivery of 2x electrical control switchboard.

The design is as follows; incomer, pump, AC and control sections respectively.

The switchboard shall be design for INDOOR use.

All material supplied shall be new and undamaged.

Components will be mounted inside a sheet metal enclosure and shall work satisfactory under ambient temperatures between -5° to 40°C.

All panel equipment of identical functionality shall be of the same size, shape and appearance.

The wiring diagrams and front panel designs attached to this bid forms part of the specifications as shown in the Drawings attached

The contractor shall check the sizes and ratings specified in the design, and if he does not agree, the responsible engineer must be contacted.

Special attention shall be given to the neatness and practical layout of components and their installation. The assembly of the switchboards with its components shall comply with IEC 439 (1985) standards where applicable, unless specified otherwise in this document.

The attached front panel layouts shall be a guideline to the bidder/contractor. Should the enclosure size be too small to house the components, the contractor shall notify the Employer immediately for approval on a larger enclosure. The layout is based on a 192mm Cubic grid system as shown in the drawing

The bidder shall supply and deliver the switchboards with specific reference to the following requirements:

ELECTRICAL CONTROL SWITCHBOARD

3 SHEET METAL ENCLOSURE

Switchboard: (See attached design drawings.)

The enclosure shall be of Sabelco type, constructed of sheet metal and rigidly framed. It shall be factory powder coated,

Type: Indoor

Colour: **Electrical Orange**

The separation of assemblies shall comply with SABS IEC 439-1 standards as follows:

Mounting: floor standing

Protection: Doors closed: IP 54 (front, sides and top of enclosure)

Doors opened : IP 20

The bidder shall provide ventilation for the enclosure on the front panel.

Sections shall be as indicated on the Front Panel Layout

Size

20% spare mounting area shall be provided on the mounting plate in the enclosure to allow for future extensions of the switchgear. The unused area shall already be provided with DIN rails and PVC trunking.

For bidding purposes, sizing shall be according to the dimensions given in attached drawing. If these sizes are not sufficient, the contractor shall approach the Engineer (when submitting the component layout for approval) to increase the size of the switchboard according to bid rates.

4 WIRING

- All control wiring shall be done with multi-strand, flexible control cable, with a minimum conductor size of 0.5mm².
- 1.5 mm² panel wires shall be used for all circuits carrying currents above 5A.
- Red control wires shall be used for “LIVE”, black for “NEUTRAL”, blue for 24Vdc and a blue wire labelled “0VDC”.
- Terminal blocks shall be easily but rigidly fastened onto rails.

- All cable and wire ends shall be labelled with the corresponding wiring diagram numbers (including ends of terminal blocks as well).
- All cable and wire ends shall be ferruled or terminate in lugs.
- Cable access to the switchboard shall be from the bottom. Sufficient space (min 150mm for control cables and min of 300mm for power cables) must be provided between gland-plates and the terminals for easy connection of all terminals. Further sufficient space shall be provided below the gland plate for hand and tool access for easy cable glanding.
- Trunking shall be square PVC. All trunking and cable cut-outs shall be sized to allow 50% additional cable to be drawn through. The contractor shall split power cables (380/220 Vac) from control cables (24Vdc) by means of separate trunking.
- The distance between components and trunking shall be at least 50mm.
- All cut-outs through which the cables go through are to be lined with grommets to prevent cable damage.

5 EARTHING

Earthing of the complete installation shall comply with Section 13 of the Standard Regulations for the Wiring of Premises and with Regulation C.61 of the Factories, Machinery and Building Work Act. However, all external earthing will be supplied by others.

A 25mm x 4mm earth bar with M10 Earth Studs shall be provided at the bottom of the metal enclosure. Sufficient earth terminals shall be provided and connected to the earth bar, electronic equipment (e.g. PLC) and the doors of the switchboard.

The bidder shall install the lightning surge arrester units inside the main incomer section of the switchboard using min 16mm² wires.

GENERAL

All labelling (except if specified otherwise) shall be done by engraving on sandwiched durable plastic or aluminium strips in black on white/metal. Labels shall be fixed underneath/above the applicable item using PVC pop-rivets.

The employer shall approve all labelling systems, as well as symbol types and names, before the manufacturing of the labels commences. The approval shall be given on a detailed labelling schedule submitted by the contractor to the employer.

6 SWITCH GEAR

Each isolator, circuit breaker, push button and switch shall be neatly labelled with its name (symbols such as S1 are not acceptable).

Control Gear

Relays, contactors, current monitors etc. shall be labelled with their symbol (e.g. K1 for control relays, 1K1M for contactors). This labelling can be done by engraving the symbols directly onto the cover of the PVC trunking underneath the appropriate item. Different covers shall be numbered (or cut to different length) to ensure its correct position in the switchboard. The contractor shall obtain approval from the Engineer of his proposed system.

All PLC I/O's shall be labelled by name. A legend-type label is acceptable for PLC I/O's without proper provision for labelling.

Terminals

All terminals and terminal groups provided for cables entering or leaving the enclosure shall be labelled by name. A single legend type label is preferred.

Indicators and Buttons

Indicators and buttons shall be labelled as indicated in attached drawing using label mounts.

Cables

Power Cables must be marked L1; L2; L3 or red; white (yellow); blue, for the incoming lines and U; V; W; or red; white (yellow); blue for the outgoing lines. All Control Cables must be neatly numbered with e.g. sleeve numbering, according to the circuit diagram.

Wires

All control wires shall be labelled at both wire ends using the labels

Switch-Gear

GENERAL COMPONENT SPECIFICATION

Voltage	:	400 V +15% / -10% ac for power 230 V +15% / -10% ac for controls 24 V dc \pm 15% for controls
Frequency	:	50 Hz; \pm 10%
Minimum Short circuit breaking Capacity of circuit breakers	:	As specified in the Schedule of Technical Information and Quantities.
Contactor switching capacity rating According to	:	AC-3
Rating of Components	:	10 kA
Min. & Max. Operating Temperatures	:	-5° to 40°C

All units (except if specified otherwise) shall be suitable for 100% duty cycle.

The handle mechanism for the main and pump circuit breaker shall be of mechanical metal type to ensure long lasting reliability.

Mounting of Switch-Gear

The component layout of the switchboards shall be approved by The Employer before commencement of wiring & assembly. All switchgear shall be grouped according to function. It is the responsibility of the contractor to arrange for approval of the component layout when ready.

All switch and control gear shall be mounted on DIN 35mm x 7,7mm top hat-rails, which shall be properly fixed to a mounting plate at the back of the enclosure.

The main circuit breaker only shall be properly fixed on the mounting plate with bolts.

Operator Interface

In general, it is preferred that all operator interfaces be done via indicators and pushbuttons on the front panel of borehole switchboards not requiring any touch-panel.

7 LIGHTNING SURGE ARRESTER UNITS

The Lightning Surge Protection units under section 7 shall meet SABS 0171 (1986) standards.

Reference: DEHNbloc

The unit shall comply with the following specifications: DB M 1 255 FM

Continuous Operating Voltage	: 255 Vac / 50 ... 60 Hz
Lightning Impulse Current	: 50 kA
Normal Discharge Current	: 50 kA
Voltage Protection Level	: Smaller or equal to 2.5 kV
Reaction time	: Smaller or equal to 100 ns
Short circuit withstand capability	: 50 kA _{rms}
Mounting on	: DIN-rail 35 mm to EN 60 715
Degree of protection	: IP 20
Remote alarm contacts	: Changeover contact

Visual fault indicator should indicate failure of the component.

Reference: DEHNgap

The unit shall comply with the following specifications: DGP M 255 FM

Nominal Voltage	: 255 Vac / 50 ... 60 Hz
Lightning Impulse Current	: 100 kA
Normal Discharge Current	: 100 kA
Voltage Protection Level	: Smaller or equal to 1.5 kV
Response time	: Smaller or equal to 100 ns
Short circuit withstand capability	: 100 kA _{rms}
Mounting on	: DIN-rail 35 mm to EN 60 715
Degree of protection	: IP 20
Remote alarm contacts	: Changeover contact

Visual fault indicator should indicate failure of the component.

Reference: DEHNgard

The unit shall comply with the following specifications: DG S 275 FM

Continuous operating voltage	: 275 Vac
Maximum discharge current	: 40 kA
Response time	: Smaller or equal to 25 ns
Short circuit withstand capability	: 50 kA _{rms}
Mounting on	: DIN-rail 35 mm to EN 60 715
Degree of protection	: IP 20
Remote alarm contacts	: Changeover contact

Visual fault indicator should indicate failure of the component.

8 DEHNRail FML 24 – DC LIGHTNING PROTECTION UNIT

The unit shall comply with the following specifications:

Continuous operating voltage	: 30 Vac/dc
Nominal discharge current	: 2 kA
Response time	: Smaller or equal to 25 ns
Mounting on	: DIN-rail 35 mm to EN 60 715
Degree of protection	: IP 20
Remote alarm contacts	: Break contact

Visual fault indicator to indicate failure of the component

9 TRANSIENT SUPPRESSORS FOR SERIAL COMMUNICATION

10kA 4-wire protection for 9-Pin RS 232 ports. Plug-in surge arrester with 3-stage protective circuit for use according to the lightning protection zones concept at boundaries 0B - 2 and higher

10 SINGLE PHASE EARTH LEAKAGE PROTECTION

The unit shall comply with the following specifications:

Current Capacity	: 16 A, 1-Pole and Neutral
Max. Residual Current	: 30 mA
Operating Voltage	: 230Vac \pm 10%, 50Hz
Rated Fault Current	: 6 kA
DIN Rail mounted	
SABS Approved	

11 3-PIN AC PLUG

Reference: GEWISS, GW20209

240Vac, 16 A, 2-Pole (Live & Neutral) + Earth
 DIN Rail mounted with support bracket
 SABS Approved

12 FUSES AND FUSE HOLDERS

Reference: MERLIN GERIN STI, or equivalent

The fuses and fuse-holders shall comply with the following minimum specifications:

Voltage	:	500Vac
Mounting	:	DIN-rail
Physical Fuse size	:	10,3 x 38 mm
Short Circuit Rating	:	100 kA

13 VOLTAGE WINDOW COMPARATOR

Reference: SP 231 from Rhomberg Bräsler

The voltage window comparator shall comply with the following minimum specifications:

- Combined over and under voltage detection.
- Adjustable response delay of 1-10 sec.
- Adjustable range of -20 % for Under Voltage, and +20% for Over Voltage
- Independent setting of over and under voltage.
- LED indication for type of fault and status of relay.
- Supply voltage of 400 Vac +20%, -20%.
- 10 A SPDT relay output.

Any alternative make which is offered shall be proven by the Tenderer to be completely equivalent to the SP 231 in every respect. Tamperproof sealing buttons shall be provided to replace the adjustment knobs after commissioning on site.

The unit shall be secured to a socket by an effective locking system for vibration damping.

14 MOTOR PROTECTION UNIT

The MPU (Motor Protection Unit) shall be of Schneider MPU 100A as specified in bill of qualities, any alternative make which is offered shall be proven by Engineer and it must completely be equivalent to Schneider MPU 100A in every respect.

Instrumentation

15 MONITORING DEVICES**3.1.1.1. Panel Meters and Voltmeter**

Voltmeter shall be sized 72 x 72 mm with digital display

Reference: Rhomberg, DHC7P-VAC

Display : 4 Digit, 1999 (3½ digit) 0.8 inch LED

Input: : 600V; 199.9, 19.9, 1.999 selectable

Supply : 240Vac

Accuracy : less or equal to 0.5%, ±1 digit (at 25 °C) Selector Switches

3.1.1.2. Voltmeter selector switch shall have 3 Phase with Neutral connections

Reference: ACDC, VS34-V5

Plate Marking _____ : TR, ST, RS, OFF, RN, SN, TN

Size: 48 x 60

3.1.1.3. Running Hour Meter

Technical details must comply with the following specifications:

1.	Operating Voltage	240Vac
2.	Operating Frequency	50Hz
3.	Counting Range	99,999.99 hours
4.	Number of Digits	5 integers, 2 decimals
5.	Counter type	Electro-Mechanical
6.	Operating Temperature	-25° to 70°C
7.	Power Consumption	8mA
8.	Protection Degree	IP52
9.	Dimensions	72 x 72 mm
10.	Approval	CE mark
11.	Burden	1.5 VA
12.	Accuracy	±0.02%

16 POWER SUPPLY AND CONVERTORS

The charger, DC-DC converter, battery protector will be either of the Victron or Blue Smart brand with the specifications detailed in the electrical drawing as of the annexure 1 sheet 3/7.

17 PROGRAMMABLE LOGIC CONTROLLER

All PLC equipment should be of the Koyo PLC brand and the product codes provided in the bill of quantity should be used as reference. Where the contractor feels the digital or analog input or output cards listed in the bill of quantity are not sufficient, the responsible engineer should be notified immediately.

The following PLC component is needed for this project and will be sourced by the bidder;

18 DOCUMENTATION

The bidder will adhere to the following schedule for all documentation as set out below. The documentation can be supplied preferably in software format or either in hard copy format.

The following formats are preferred:

- Text : MS Word
- Drawings : AutoCAD / AutoCAD LT
- Pamphlets and brochures : PDF Files, Powerpoint, JPG/GIF

Any special application programs required to access the documentation should be included.

No payment will be made unless all documentation has been received.

All diagrams and information shall make use of metric units.

With Delivery of the Units to the Employer

- Manufacturing (as-built) drawings of all equipment.

19 SUPPORTING DATA

Delivery will only be deemed complete if the Employer received the following data, certified by the manufacturer:

- A complete set of technical information of all equipment supplied.

SECTION VI: GENERAL CONDITIONS OF CONTRACT AND CONTRACT AGREEMENT

Any resulting contract shall be placed by means of a Purchase Order/Letter of Acceptance and shall be subject to the General Conditions of Contract (GCC) for the Procurement of Goods (Ref. **G/RFQ-GCC**) available at Namibia Water Corporation Ltd., physical address, 176 Iscor Street, Aigams Building, Windhoek, except where modified by the Special Conditions below.

SECTION VI: CONTRACT AGREEMENT

Any resulting contract shall be placed by means of a Purchase Order/Letter of Acceptance and shall be subject to the General Conditions of Contract (GCC) for the Procurement of Goods except where modified by the Special Conditions below.

SECTION VII: SPECIAL CONDITIONS OF CONTRACT

Procurement Reference Number: G/RFQ/NW-087/2024

The clause numbers given in the first column correspond to the relevant clause number of the GCC.

Subject and GCC clause reference	Special Conditions
Purchaser GCC 1.1(h)	The purchaser is: Namibia Water Corporation Ltd
Site GCC 1.1(m)	The Site/final destination for delivery of the Goods is NamWater, Stores, 176 Iscor Street NamWater at the Aigams Building, Northern Industrial Area in Windhoek.
Incoterms Edition GCC 4.2(b)	Incoterms shall be governed by the rules prescribed in Incoterms 2010.
Notices GCC 8.1	<p>Any notice shall be sent to the following addresses:</p> <p>For NamWater, the address and the contact name shall be: Attention: Mr. Abraham Nehemia Street: 176, Iscor Street, Northern Industrial Area City: Windhoek Email: bids@namwater.com.na</p> <p>For the Supplier, the address and contact name shall be: _____</p>
Disputes GCC 10.2	<p>The rules of procedures for arbitration proceedings pursuant to GCC 10.2 shall be as follows:</p> <p>In the case of a dispute between the Purchaser and a Supplier who is a national of Namibia, the dispute shall be referred to adjudication or arbitration in accordance with the laws of Namibia.</p>
Delivery and Documents GCC 13.1	<p>The Goods are to be delivered within 30 days from the date of Purchase Order or Letter of Acceptance.</p> <p>The documents to be furnished by the Supplier are:</p> <ul style="list-style-type: none"> (a) signed delivery note; (b) Invoice
Price Adjustment GCC 15.1	The price charge for the Goods supplied and the related Services performed shall not be adjustable.
Terms of Payment GCC 16.1	The structure of payments shall be: full payment following delivery of the Supplies and submission of an invoice and the documents listed in clause 13.1

Subject and GCC clause reference	Special Conditions
Terms of Payment GCC 16.3	Payments shall be made not later than thirty days after submission of an invoice and its certification by the Purchaser.
Terms of Payment GCC 16.4 (a)	The price shall not be adjustable to the fluctuation in the rate of exchange.
Payment Period GCC 16.5	<p>The method and conditions of payments to be made to the Supplier under this Contract shall be as follows:</p> <p>i) On Acceptance: The Contract Price of goods received shall be paid no later than thirty (30) days of receipt of the Goods upon submission of an invoice (showing Purchaser's name; the Procurement Reference number, description of payment and total amount, signed in original, stamped or sealed with the company stamp/seal) supported by the Acceptance Certificate issued by the Purchaser.</p>
Performance Security GCC 18.1	(i) No performance security is required.
Discharge of Performance Security GCC 18.4	Not Applicable.
Insurance GCC 24.1	Not Applicable
Transportation GCC 25	The Goods shall be delivered: Delivery Duty Paid (DDP).
Inspection and Test GCC 26.1	The inspection and tests shall be: <i>(Switchboards components inspection and Operation test)</i>
Location of Inspection and Tests GCC 26.2	The inspections and tests shall be conducted at: <i>[Bidder Workshop]</i>
Warranty GCC 28.3	<p>The period of validity of the warranty shall be: 90 day(s)</p> <p>For the purpose of the Warranty, the place(s) of the final destination(s) shall be: <i>Mashare River & Boaster Pumping Stations</i></p>
Repair and Replacement GCC 28.5	The period for repair or replacement shall be: 14 day(s)

SCHEDULE 2: COST STRUCTURE FOR VALUE ADDED CALCULATION PER PRODUCT

<u>COST STRUCTURE FOR VALUE ADDED CALCULATION</u> <u>PER PRODUCT</u>		
	N\$	N\$
Raw Materials, Accessories & Components		
• Imported (CIF)	
• Local (VAT & Excise Duty Fee)
Labour Cost		
• Direct Labour
• Clerical Wages
• Salaries to Management
Utilities		
• Electricity	
• Water	
• Telephone
Depreciation	
Interest on Loans	
Rent
Other (please specify)		
•	
•	
•
TOTAL COST		

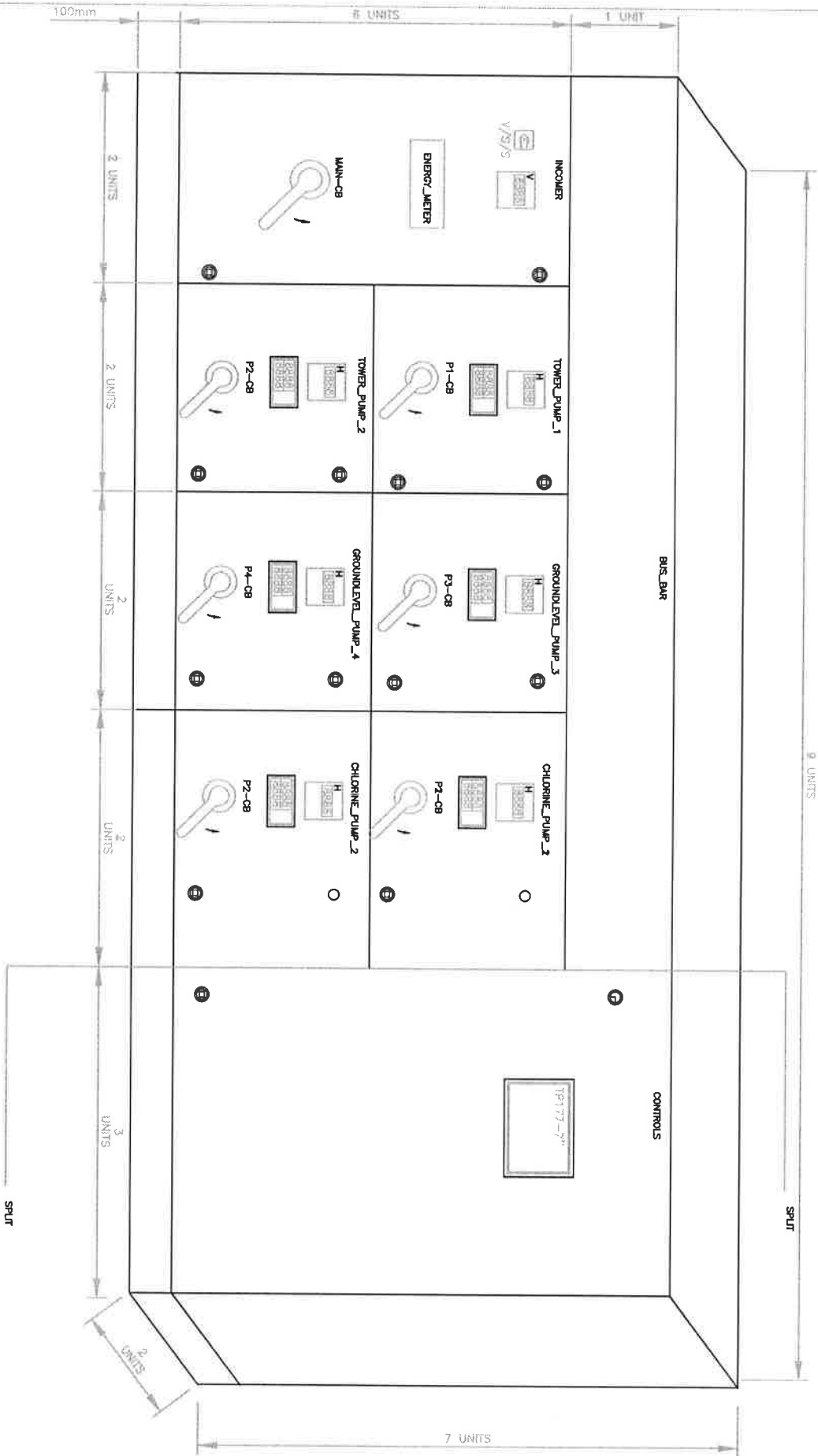
$$\text{Local Value Added} = \frac{\text{Total Cost} - \text{Cost of imported inputs}}{\text{Total Cost}} \times 100$$

NB! The cost structure should be certified by a Certified Accountant

SCHEDULE 3: QUOTATION CHECKLIST SCHEDULE**Procurement Reference No.: G/RFQ/NW-087/2023**

Description	Attached	Not Attached
List of Goods and Price Schedule		
Specification and Compliance Sheet		
Evidences for conformity of Goods		
Signed Bid Securing Declaration		
Valid company Registration Certificate Copy from Ministry of Trade and Industry		
Original valid good standing Tax Certificate from Inland Revenue		
Original valid good Standing Certificate from Social Security Commission		
Valid Affirmative Action Compliance Certificate, proof from Employment Equity Commissioner that bidder is not a relevant employer, or exemption issued in terms of Section 42 of the Affirmative Action Act, 1998;		
Supporting literatures to confirm Specifications		
Reference letters from entities whom the Bidder has performed this type of service for in the past, and handled successfully.		

Disclaimer: The list defined above is meant to assist the Bidder in submitting the relevant documents and shall not be a ground for the bidder to justify its non-submission of major documents for its quotation to be responsive. The onus remains on the Bidder to ascertain that it has submitted all the documents that have been requested and are needed for its submission to be complete and responsive.



NOTES :

Dimensions for Switchboard Enclosure:
1 unit = 192mm

--- Dashed line refers to Door Separation only

— Solid line refers to Cubical with Door Separation

NO.	REVISIONS	DATE	BY



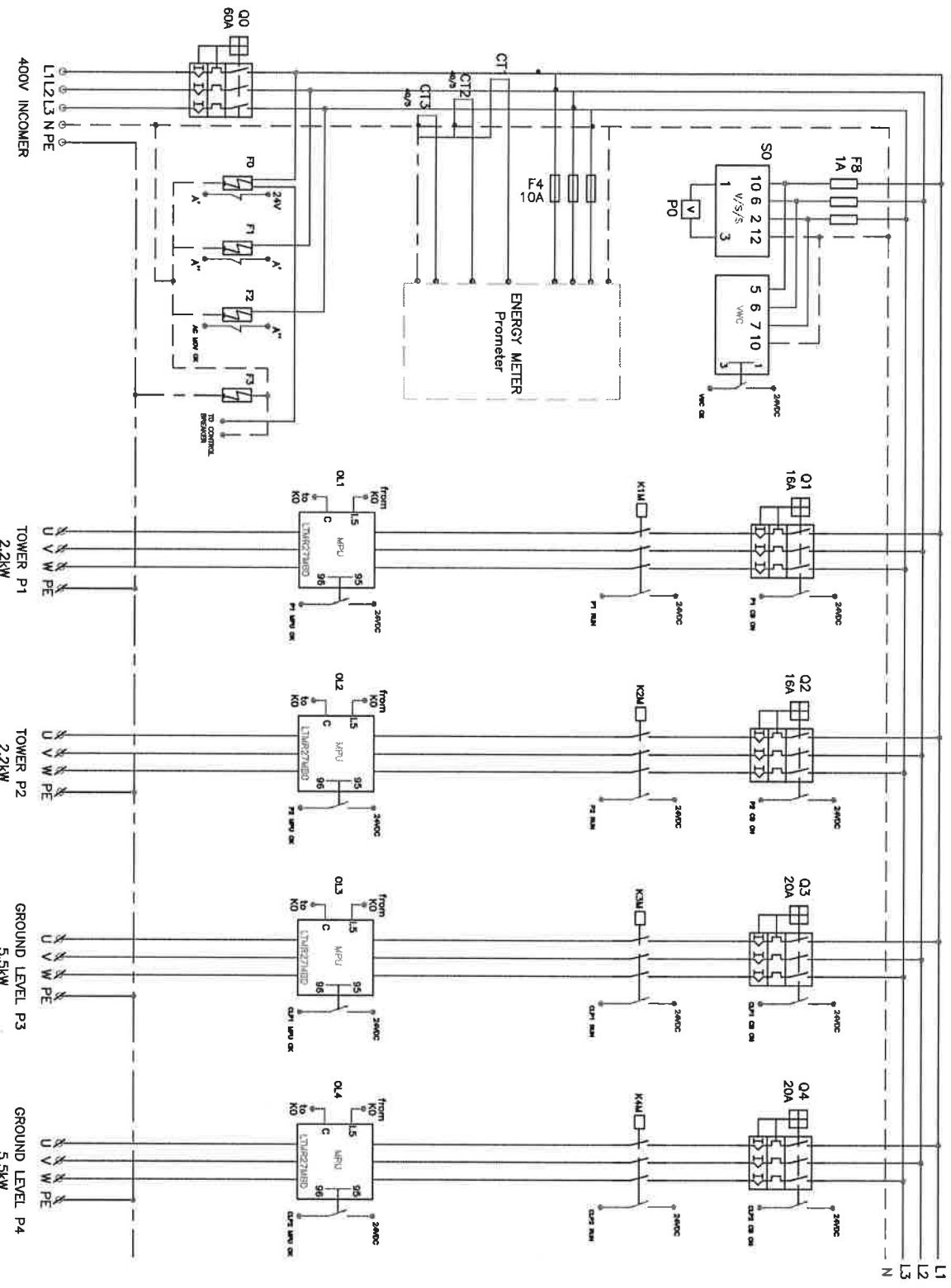
MASHARE BOOSTER


FRONT PANEL LAYOUT

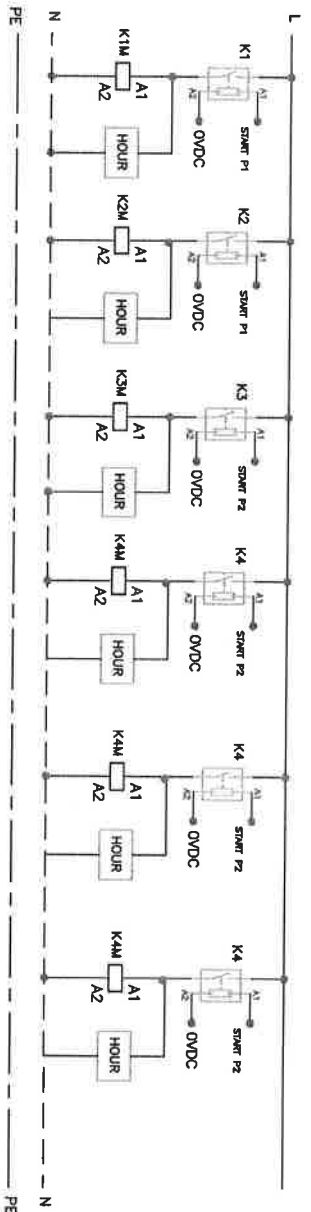
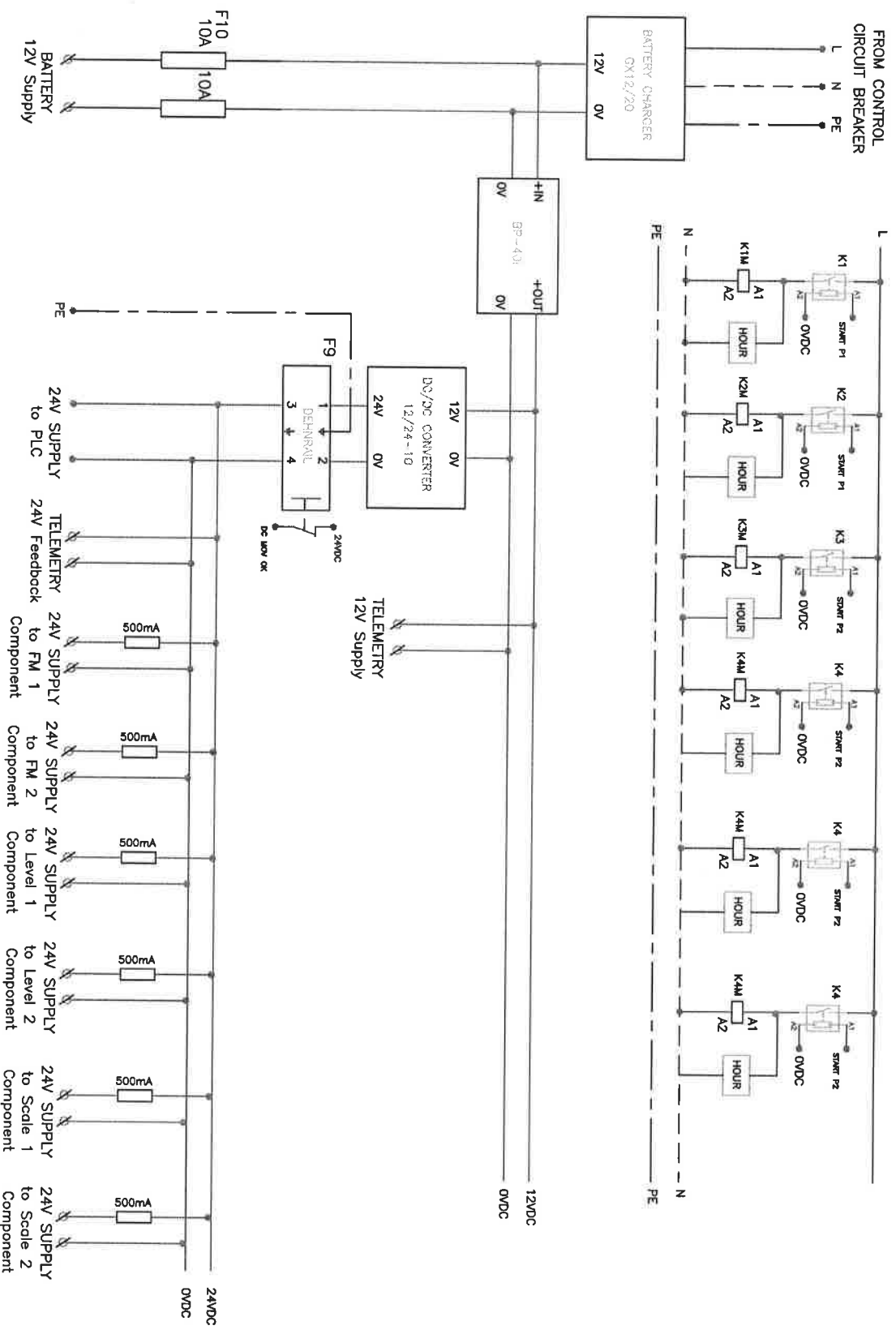
DESIGNED BY: O. TJAMBURO
CHECKED BY: C. KADHIKWA

APPROVED BY: JIN I.A. GRANGE

NOTES :

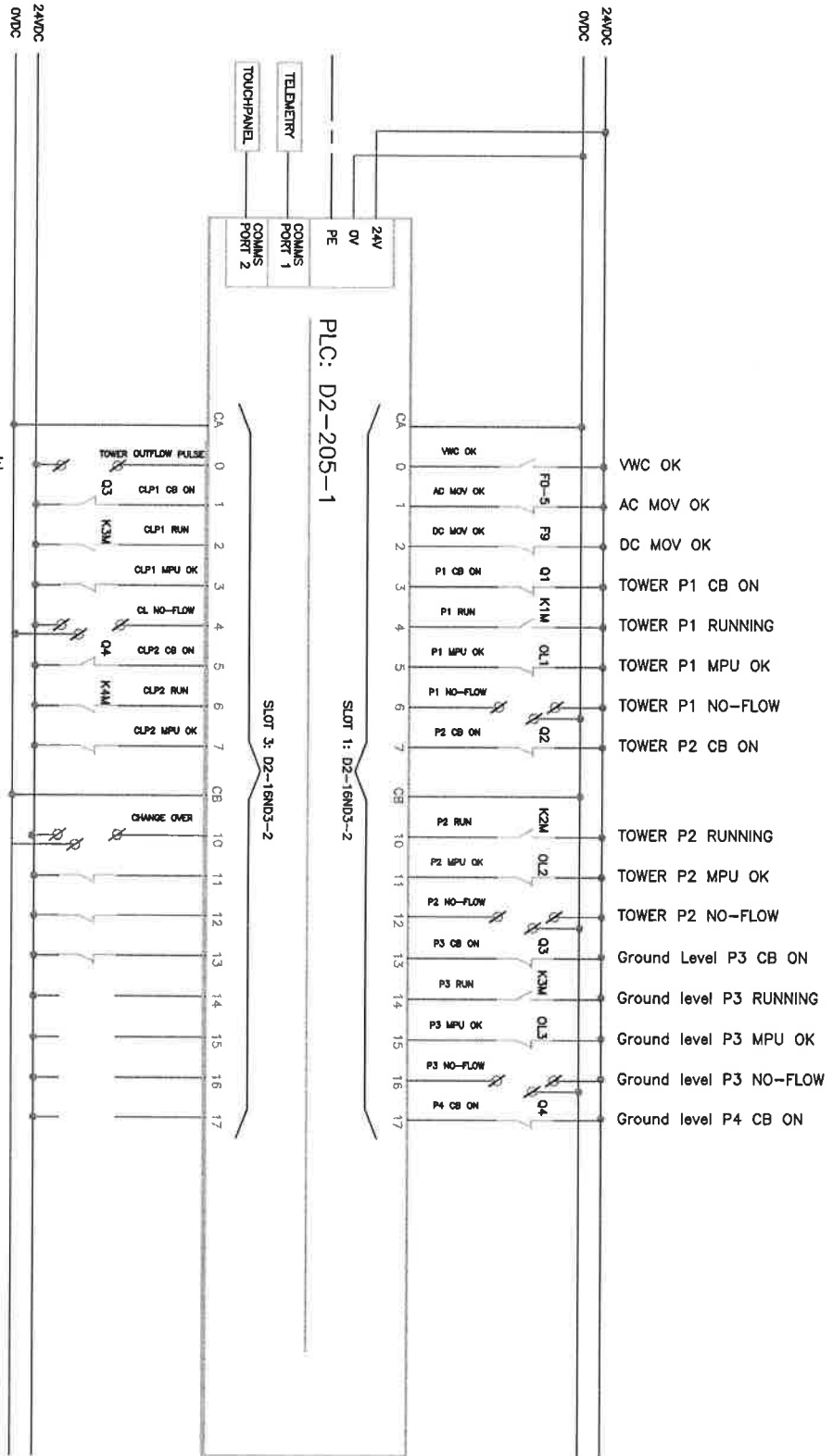


 Namibia Water Corporation Ltd	
MASHARE BOOSTER	
AC MAINS DISTRIBUTION	
DESIGNED BY:	O TAMBURU
CHECKED BY:	O KADHIKWA
APPROVED BY:	JN LA GRANGE
DATE:	JUNE 2023
SCALE:	N/A
SHEET NO.:	277




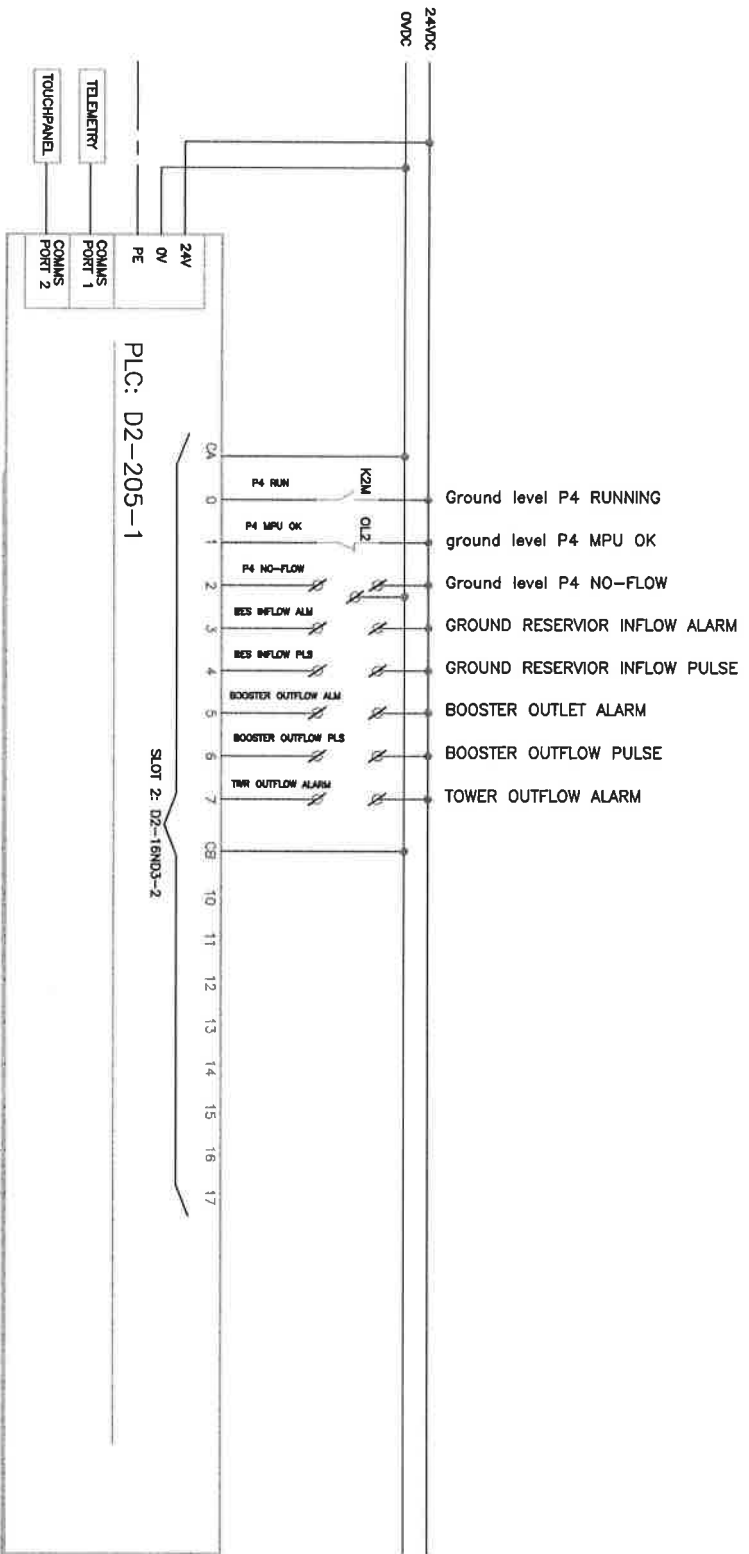
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DATE	SCALE	SHEET NO.
JULY 2023	1/1	4/7
<p>Mashore BOOSTER</p> <p>NAMBIWA WATER Namibia Water Corporation Ltd</p>		
DESIGNED BY:	0	TIAMBURO
CHECKED BY:	0	KADHIKWA
APPROVED BY:	JIN LA GRANGE	
<p>DC CONTROLS SUPPLY</p>		
NO.	AMOUNTS	DATE



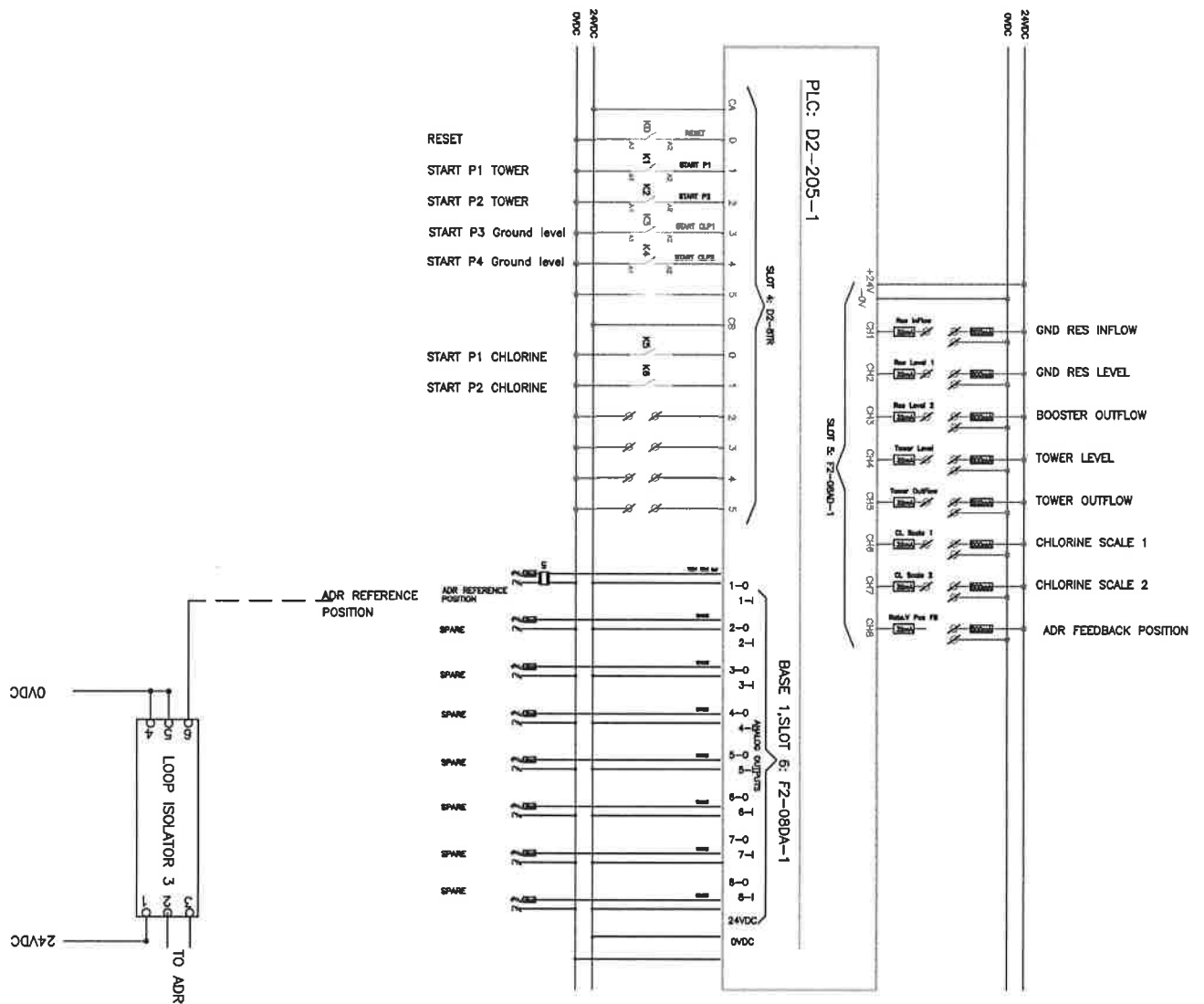
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 Namibia Water Corporation Ltd	
Mashare BOOSTER	
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APPROVED BY: JIN I.A. GRANGE	DATE: JUNE 2023
SCALE:	SHEET NO.: 5/7



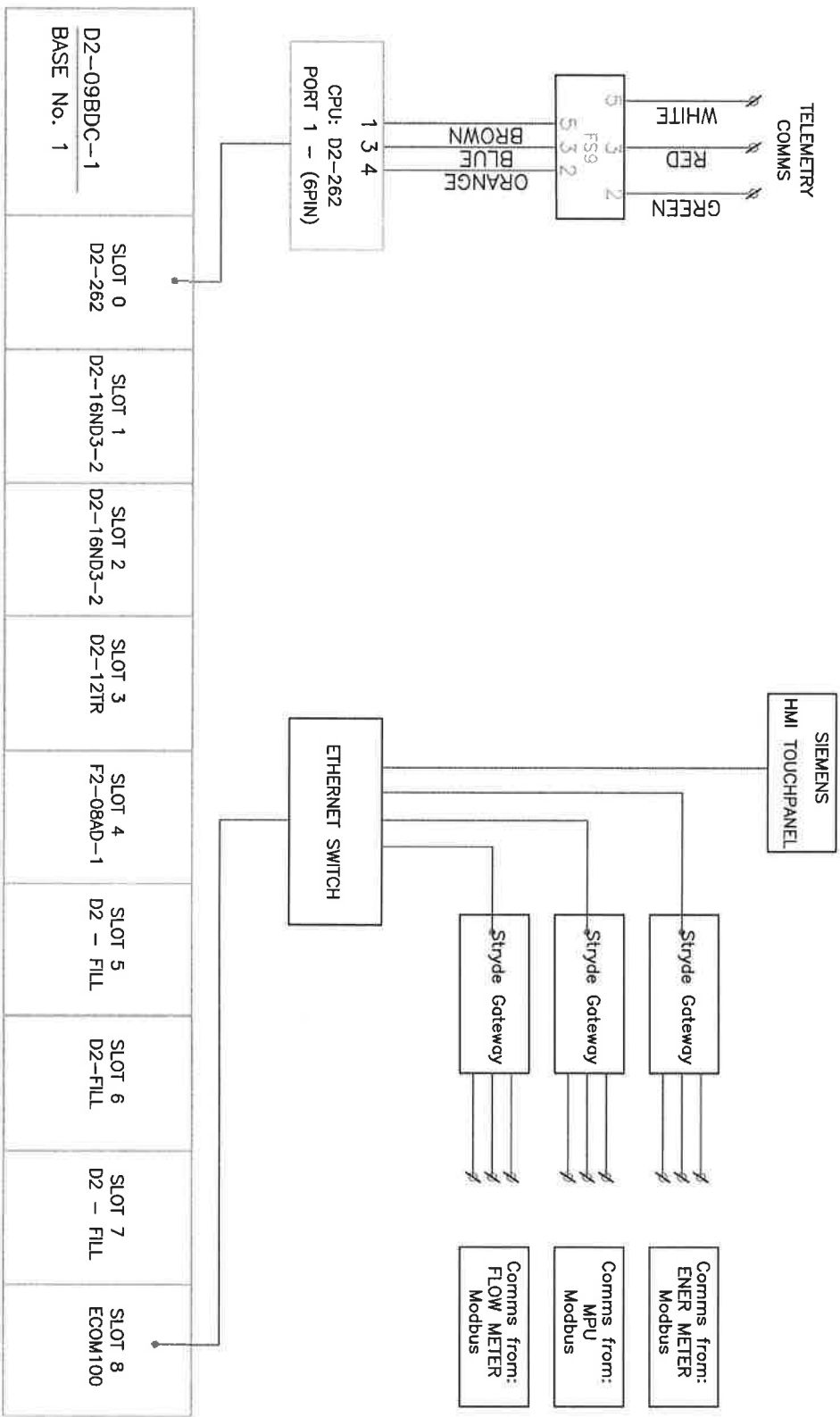
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<p>NAMWATER Namibia Water Corporation Ltd</p>	
<p>MASHARE BOOSTER</p>	
<p>PLC DIGITAL INPUTS</p>	<p>SCALE</p>
<p>DESIGNED BY: O TAMBEURO</p>	<p>DATE</p>
<p>CHECKED BY: O KADHIKWA</p>	<p>BY</p>
<p>APPROVED BY: JIN LA GRANGE</p>	<p>SHEET NO.</p>
<p>DATE: 2023</p>	<p>SHEET 5/7</p>



NOTES :

<p>NAMWAATER Nairobi Water Corporation Ltd</p>	
<p>MASHARE BOOSTER</p>	
<p>PLC DIGITAL OUTPUTS</p>	
DESIGNED BY:	O TJAMBURO
CHECKED BY:	O KACHIKIMA
APPROVED BY:	JIN LA GRANGE
DATE:	JUNE 2023
SCALE:	N/A
SHEET NO.:	8/7



NOTES :

NO.	REVISIONS	DATE	BY



MASHARE BOOSTER

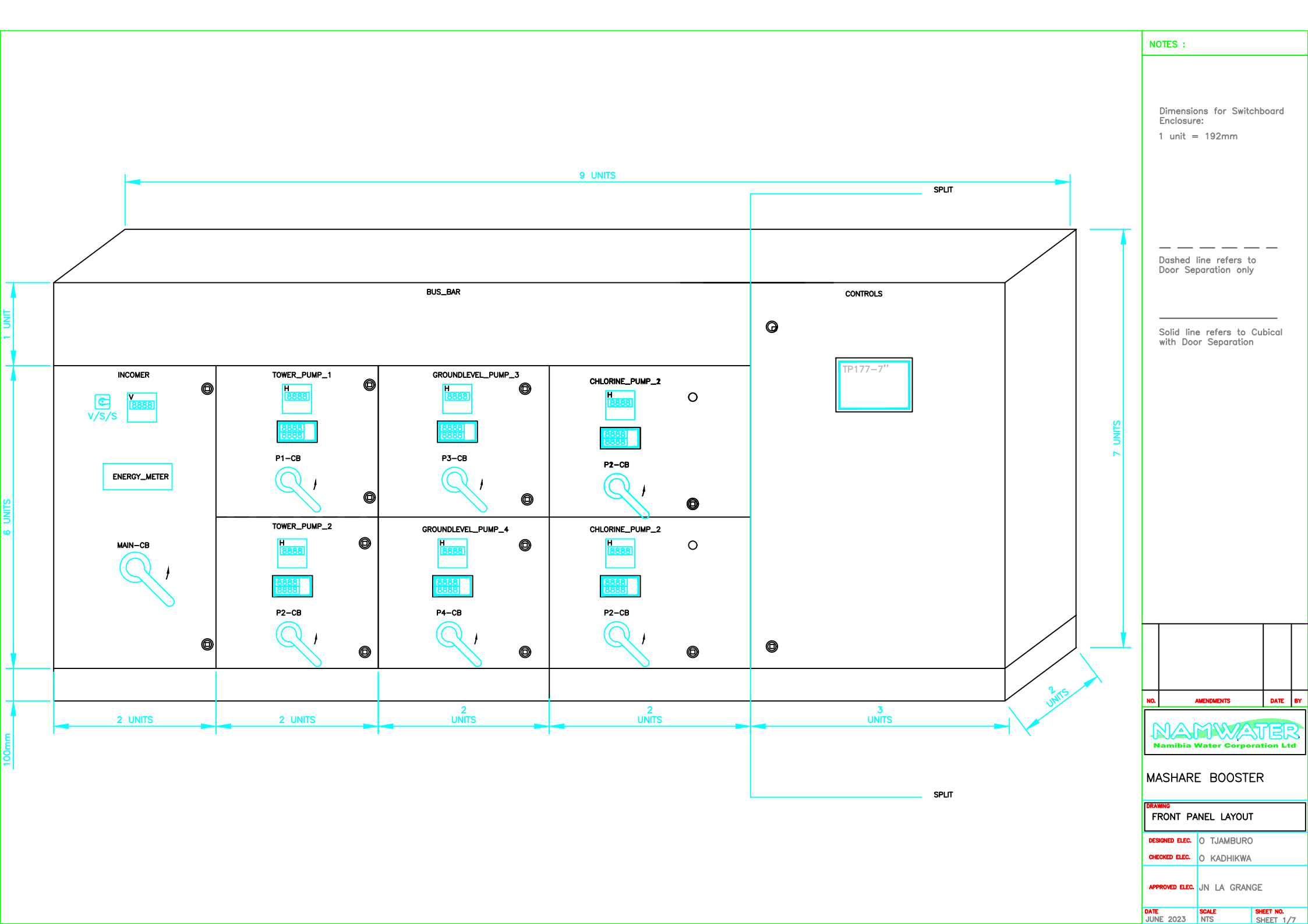
PLC COMMUNICATION LAYOUT

DESIGNED BY:	Q. TAMBURO
CHECKED BY:	Q. KADHIKWA
APPROVED BY:	JIN LA GRANGE
DATE:	JUNE 2023
SCALE:	NTS
SHEET NO.:	SHEET 7/7



Purchase Request

A ORIGIN OF REQUEST			
Cost Centre or Project Code/network number	4070280	Name of requestor	Da Costa Sidonio
GL Account	480000	Division/Region	North East
Area/Section	Maintenance		
Signature (Requester)			
B FUNDING			
Estimated Cost Of Good/ Service	200 000		
Budget Available			
Signature (Cost Centre Controller/ Project Manager/ Line Manager)		DATE	
C DESCRIPTION			
Complete Description Of Item	Supply and Delivery of 2 x Electrical Control Switchboards for Mashare River and Boaster Pump Stations		
Quantity	2		
Specification	Supply and Delivery of 2 x Electrical Control Switchboards for Mashare River and Boaster Pump Stations as per attached Drawings		
Expected Delivery Period			
Delivery Address			
E FOR PROCUREMENT USE ONLY			
Signature of recipient			
Date Received			
Date Executed			
Type of Procurement			
Procurement Reference Number			
Approval (Head: SCM)			



NOTES :

Dimensions for Switchboard Enclosure:
1 unit = 192mm

Dashed line refers to Door Separation only

Solid line refers to Cubical with Door Separation

NO.	AMENDMENTS	DATE	BY



MASHARE BOOSTER

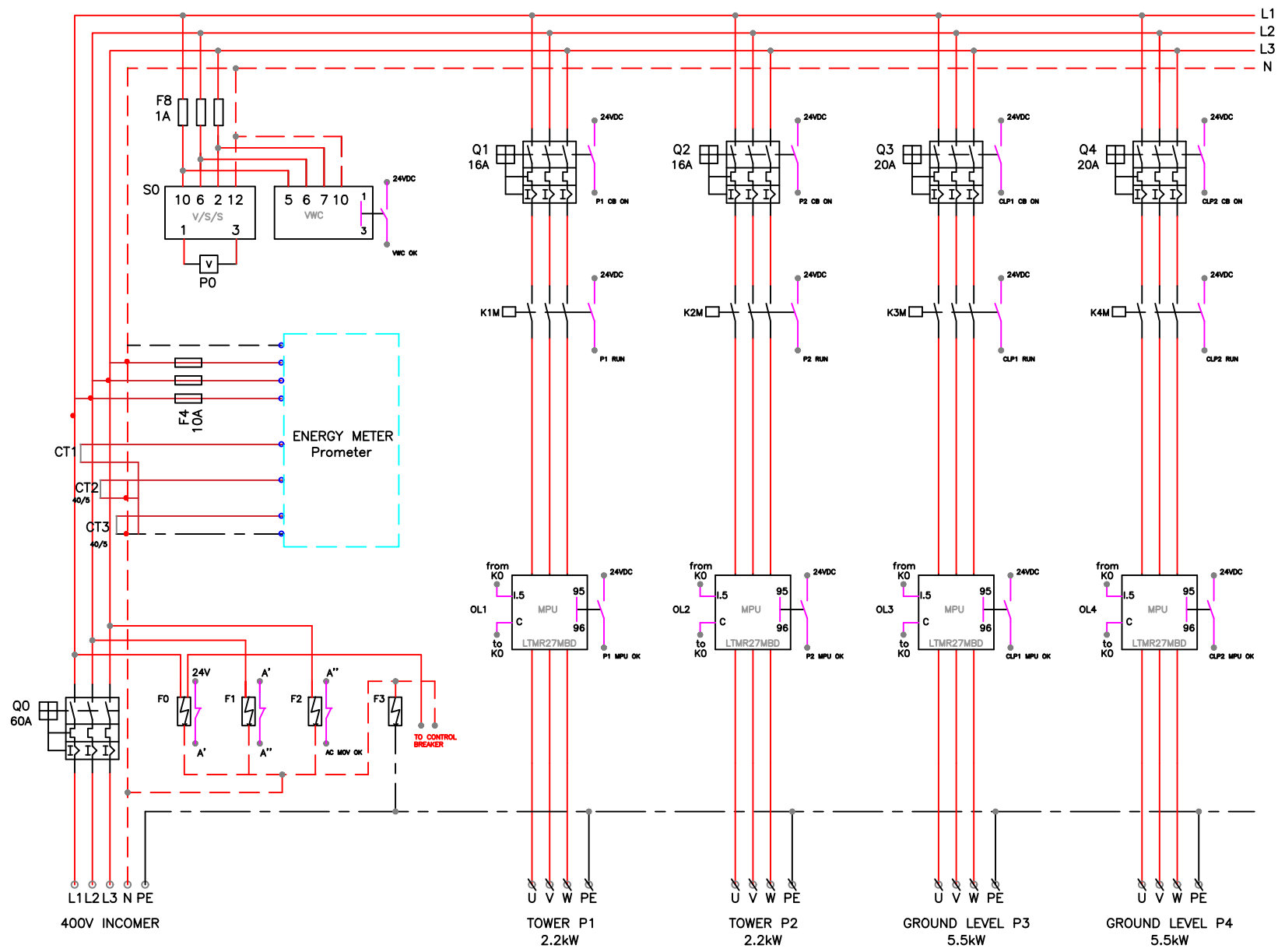
DRAWING FRONT PANEL LAYOUT

DESIGNED ELEC. O TJAMBURO
CHECKED ELEC. O KADHIKWA

APPROVED ELEC. JN LA GRANGE

DATE: JUNE 2023 SCALE: NTS SHEET NO.: SHEET 1/7

NOTES :



NO.	AMENDMENTS	DATE	BY



MASHARE BOOSTER

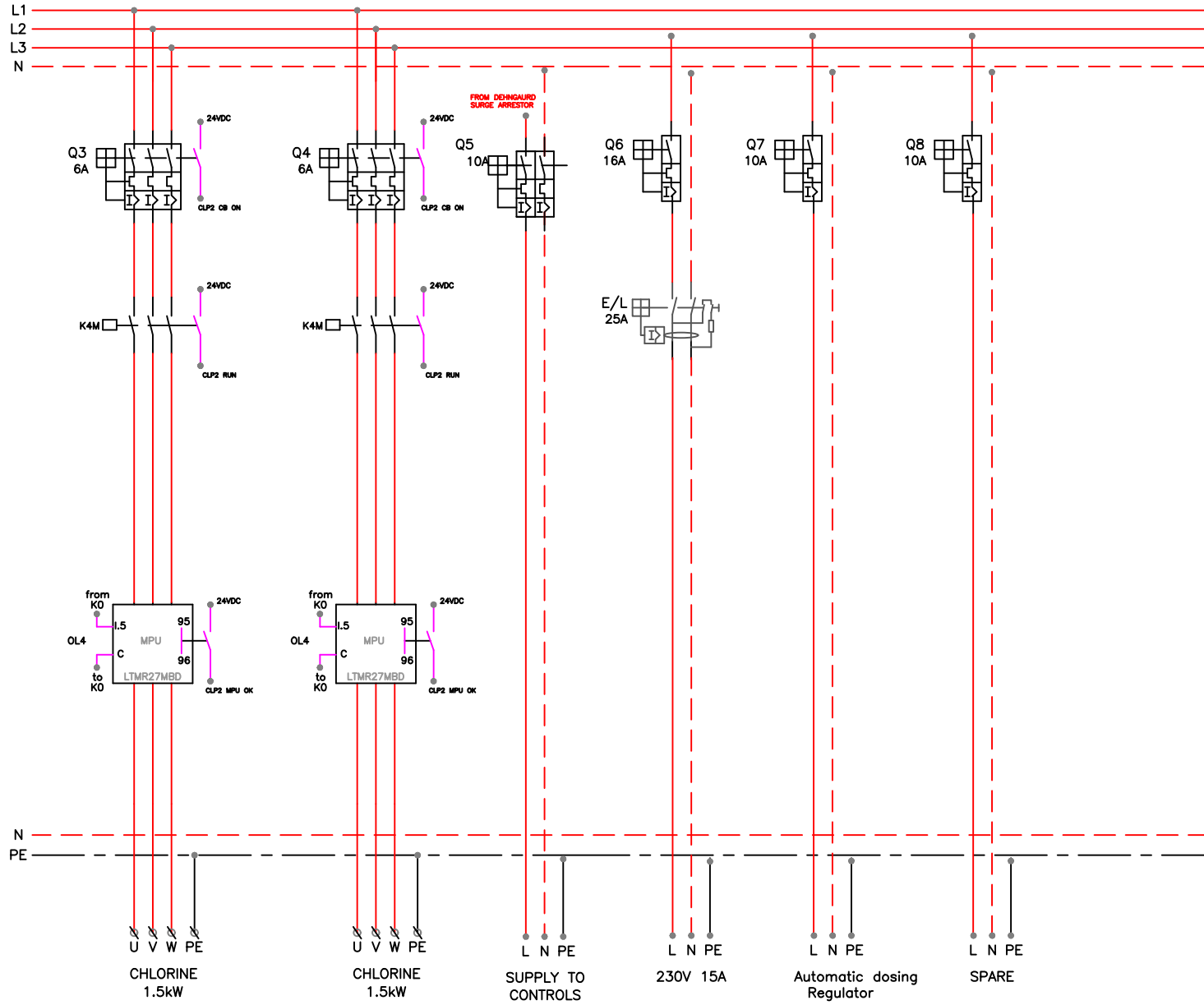
DRAWING
AC MAINS DISTRIBUTION

DESIGNED ELEC.	O TJAMBURO
CHECKED ELEC.	O KADHIKWA

APPROVED ELEC.	JN LA GRANGE
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DATE	SCALE	SHEET NO.
JUNE 2023	NTS	2/7

NOTES :



NO.	AMENDMENTS	DATE	BY



MASHARE BOOSTER

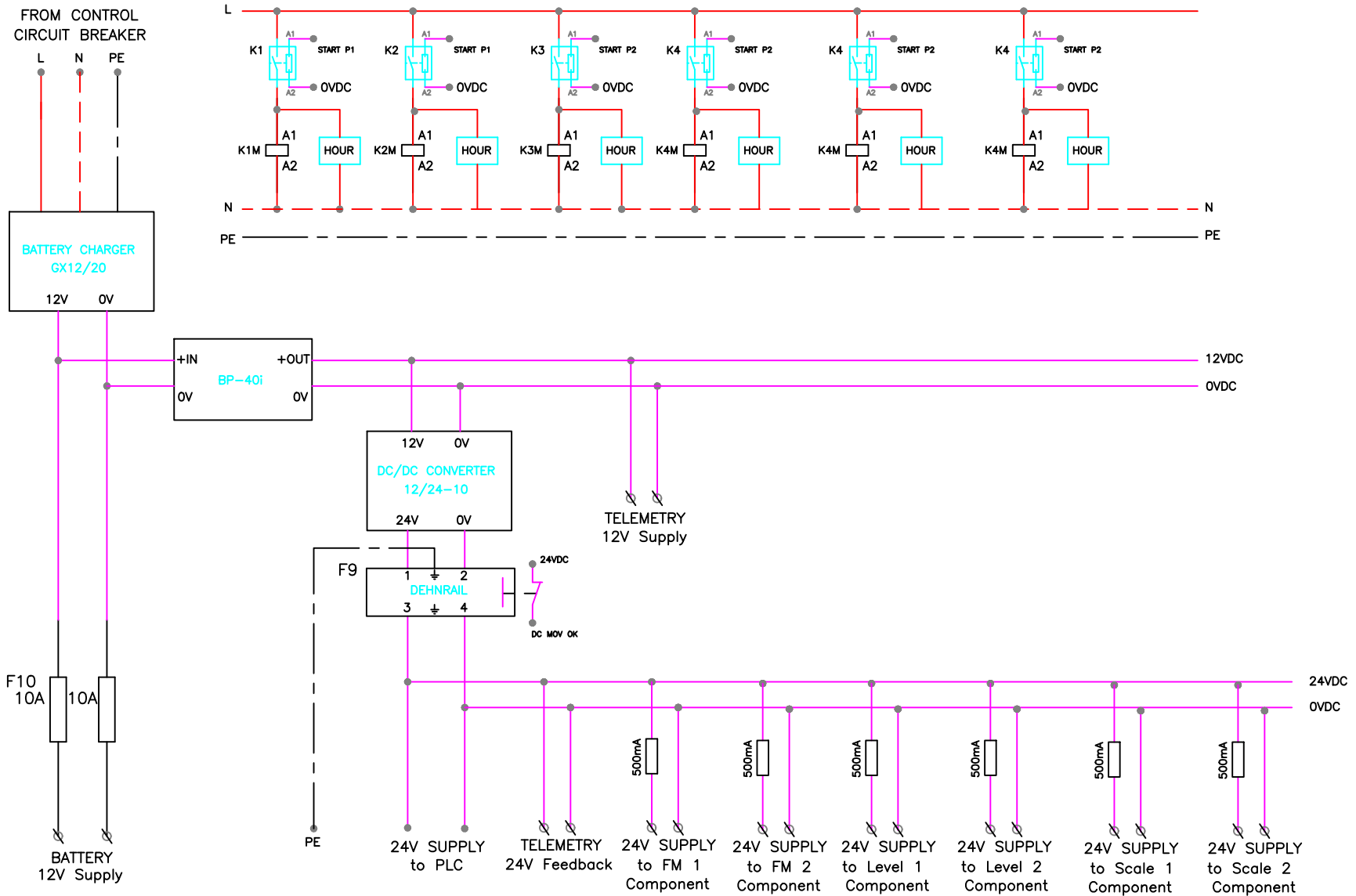
DRAWING
AC MAINS DISTRIBUTION

DESIGNED ELEC. O TJAMBURO
 CHECKED ELEC. O KADHIKWA

APPROVED ELEC. JN LA GRANGE

DATE JUNE 2023 SCALE NTS SHEET NO. SHEET 2/7

NOTES :



NO.	AMENDMENTS	DATE	BY



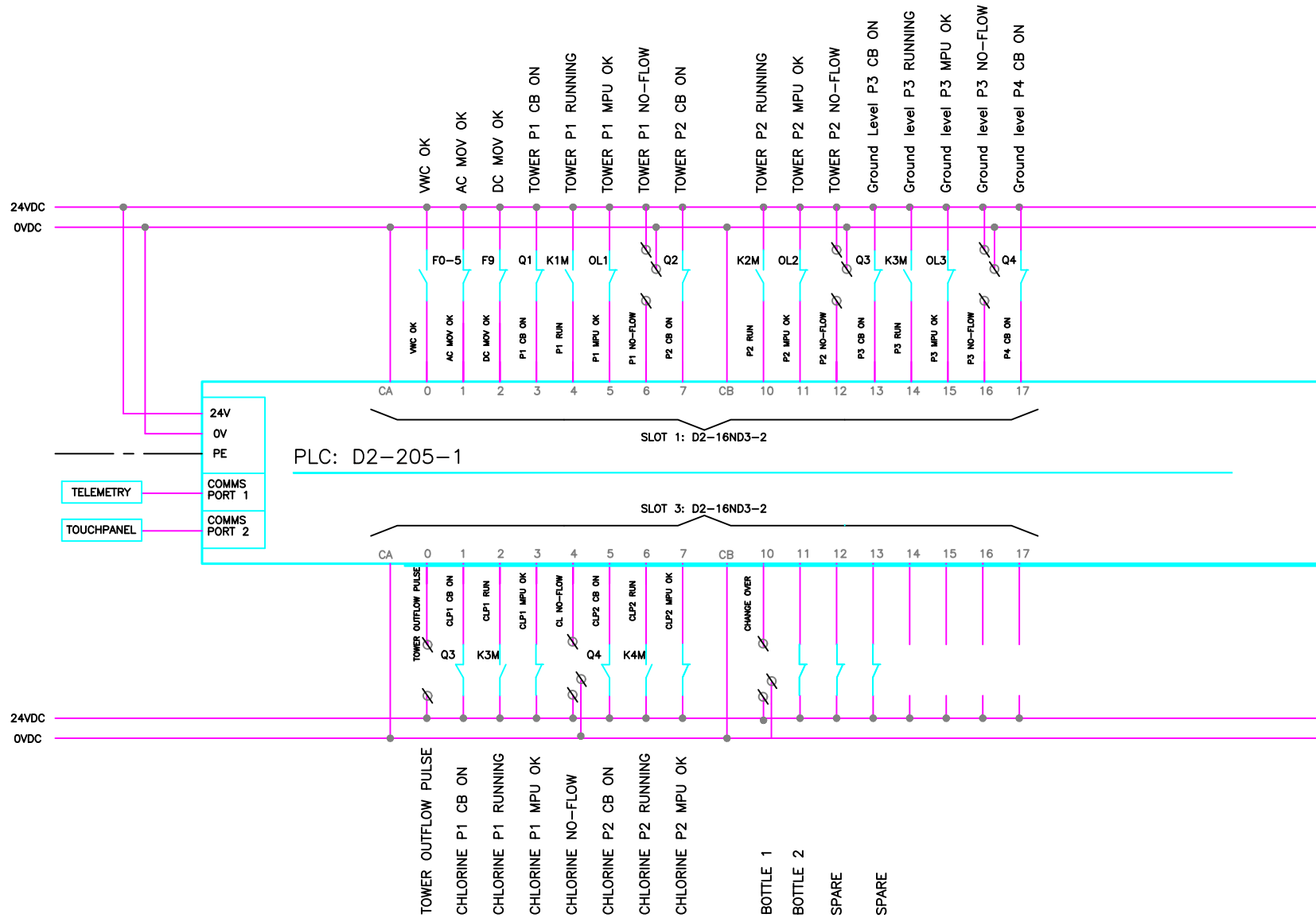
Mashare BOOSTER

DRAWING
DC CONTROLS SUPPLY

DESIGNED ELEC.	O TJAMBURO
CHECKED ELEC.	O KADHIKWA
APPROVED ELEC.	JN LA GRANGE

DATE	SCALE	SHEET NO.
JULNE 2023	NTS	SHEET 4/7

NOTES :



NO.	AMENDMENTS	DATE	BY



Mashare BOOSTER

DRAWING
PLC DIGITAL INPUTS

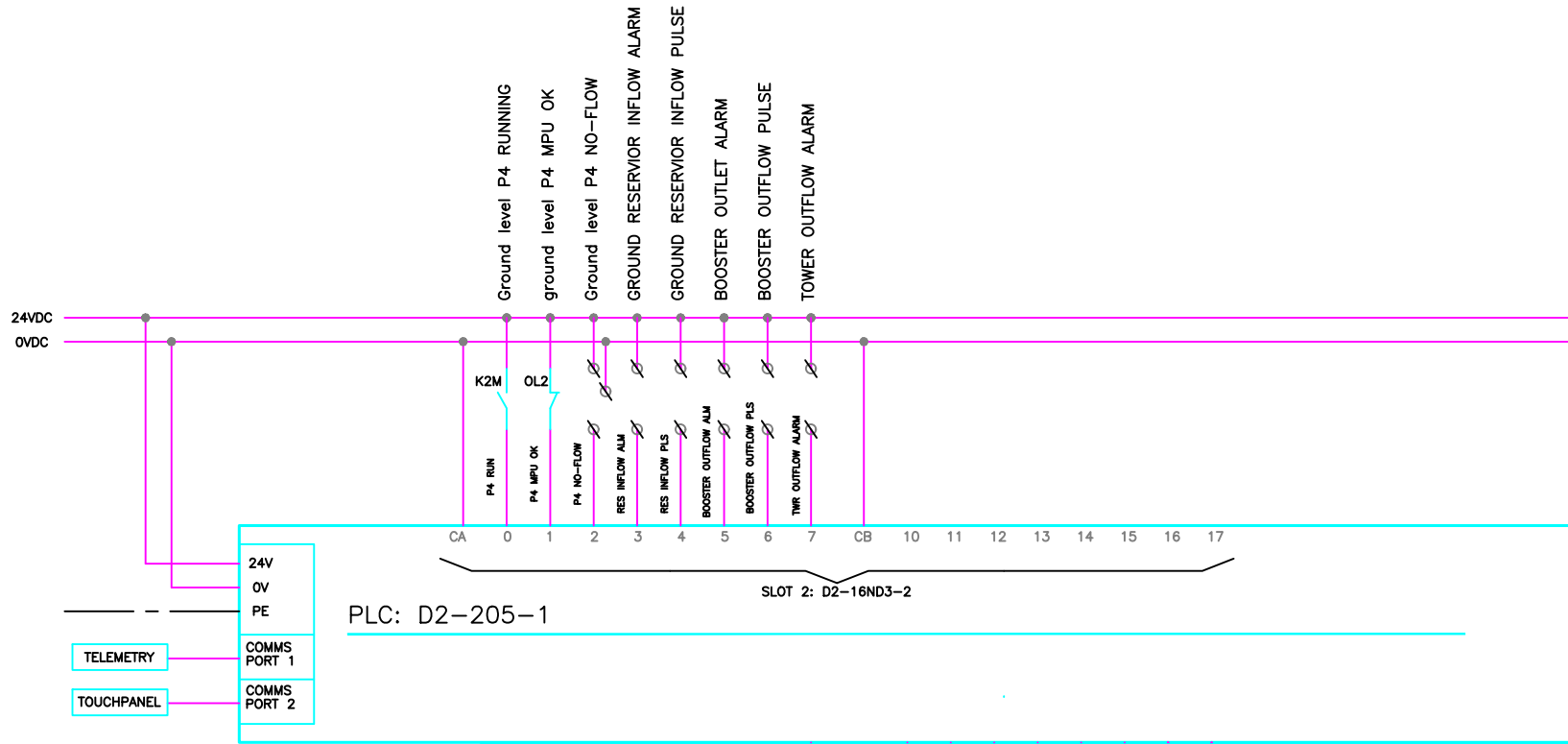
DESIGNED ELEC. O TJAMBURO

CHECKED ELEC. O KADHIKWA

APPROVED ELEC. JN LA GRANGE

DATE JUNE 2023	SCALE NTS	SHEET NO. SHEET 5/7
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NOTES :



NO.	AMENDMENTS	DATE	BY

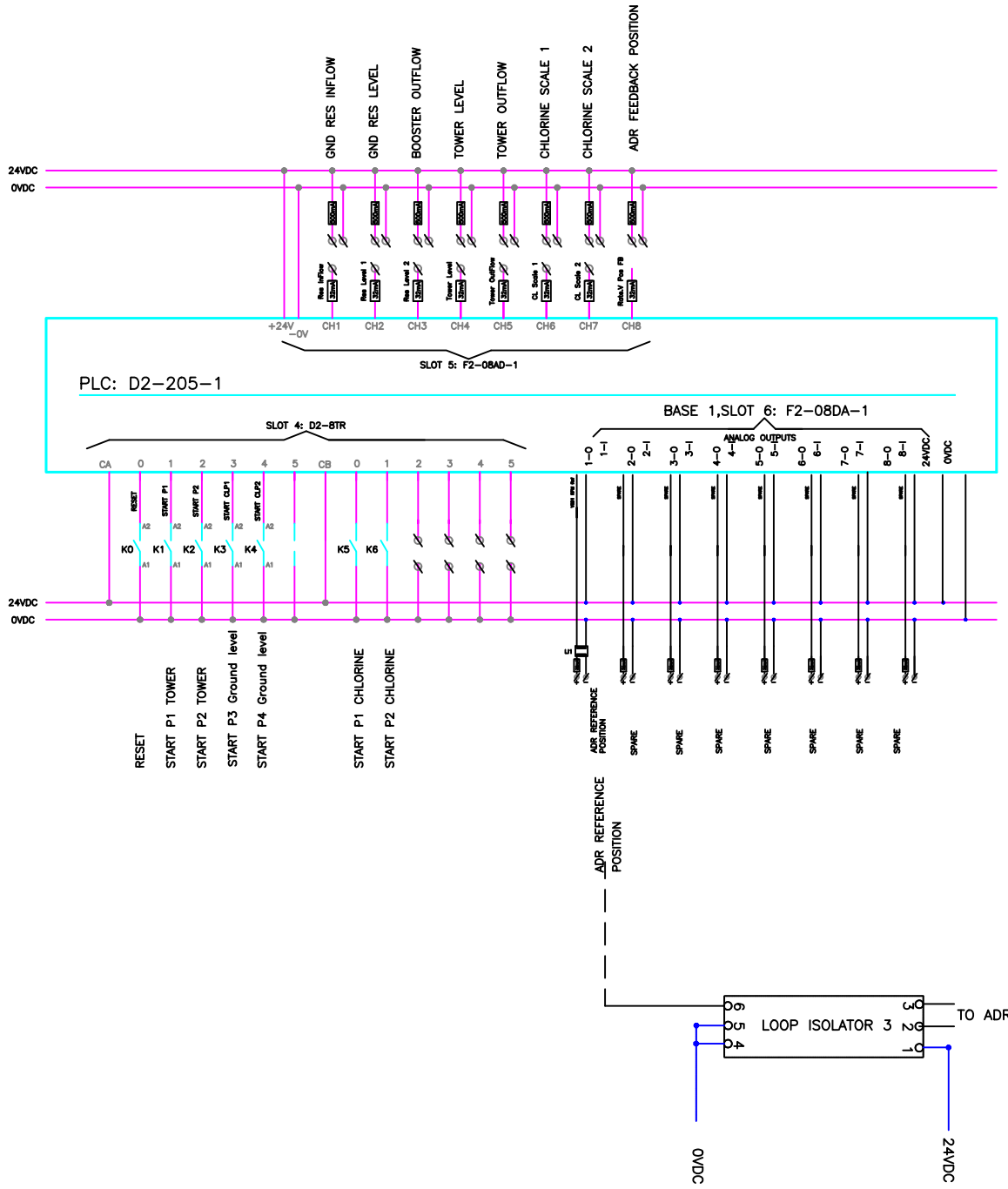


MASHARE BOOSTER

DRAWING
PLC DIGITAL INPUTS

DESIGNED ELEC.	O TJAMBURO
CHECKED ELEC.	O KADHIKWA
APPROVED ELEC.	JN LA GRANGE

DATE	SCALE	SHEET NO.
JUNE 2023	NTS	SHEET 5/7



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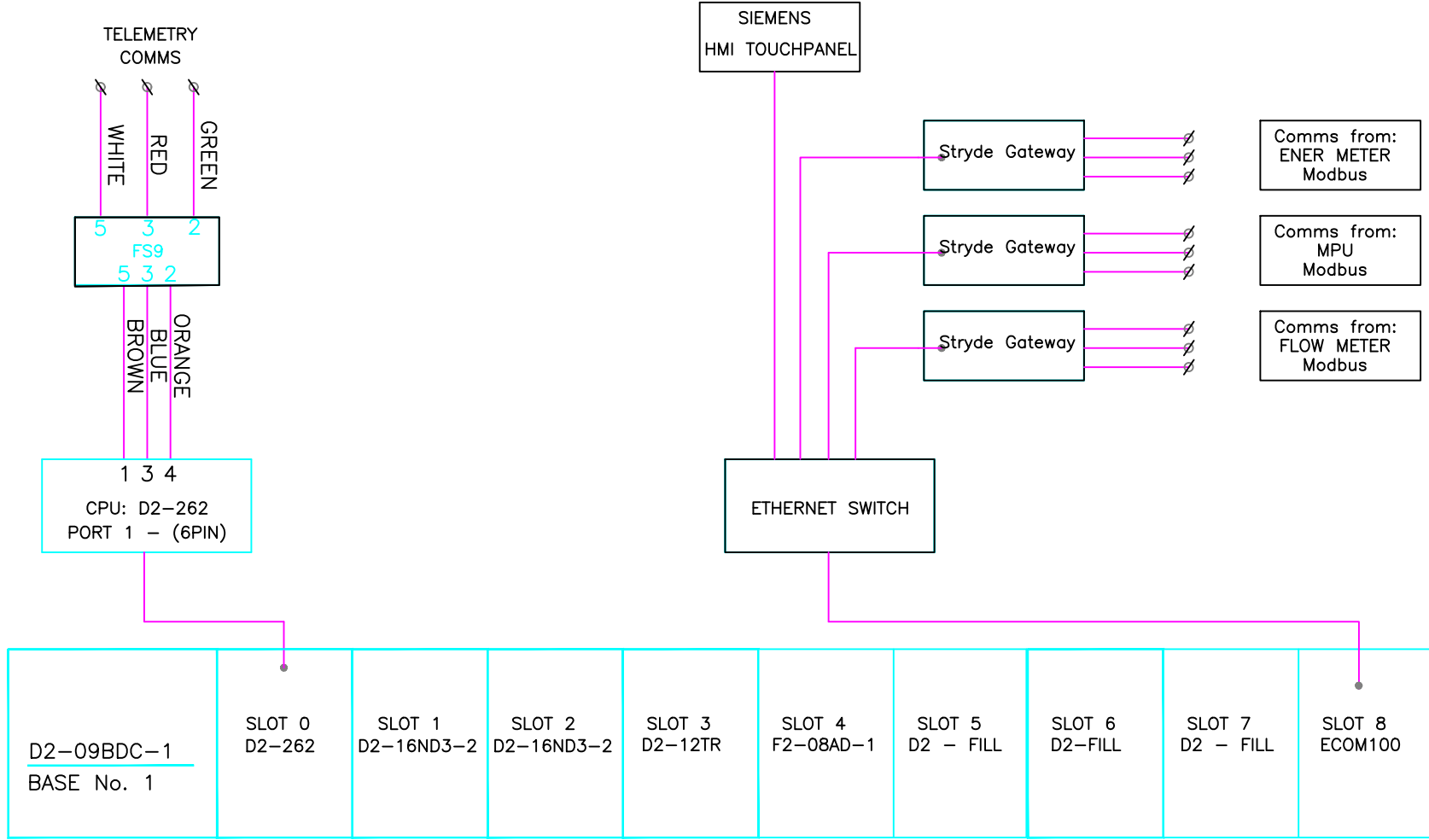
NO.	AMENDMENTS	DATE	BY



MASHARE BOOSTER

DRAWING PLC DIGITAL OUTPUTS	
DESIGNED ELEC.	O TJAMBURO
CHECKED ELEC.	O KADHIKWA
APPROVED ELEC.	JN LA GRANGE
DATE JUNE 2023	SCALE NTS
SHEET NO. SHEET 6/7	

NOTES :



NO.	AMENDMENTS	DATE	BY



MASHARE BOOSTER

DRAWING
PLC COMMUNICATION LAYOUT

DESIGNED ELEC.	O TJAMBURO
CHECKED ELEC.	O KADHIKWA
APPROVED ELEC.	JN LA GRANGE