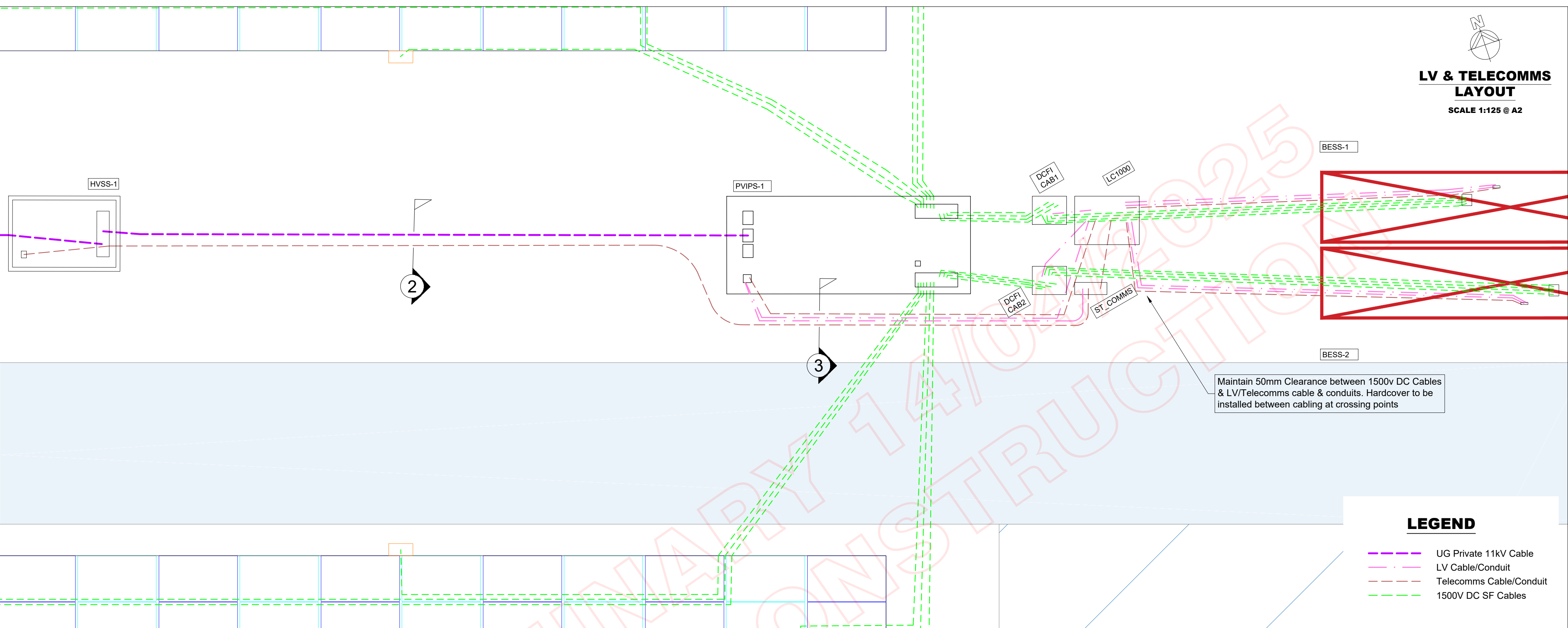




# LV & TELECOMMS LAYOUT

SCALE 1:125 @ A2



### LEGEND

- UG Private 11kV Cable
- LV Cable/Conduit
- Telecomms Cable/Conduit
- 1500V DC SF Cables

### UNDERGROUND LV & TELECOMMS CABLE & CONDUIT SCHEDULE

FROM	TO	CABLE DETAILS	ROUTE LENGTH (m)
HVSS-1 (PEG 1)	ST_COMMS	1 x 50mm WHITE TELECOMMS CONDUIT	30
PVIPS-1 (SUNGROW SG3400 POWER DISTRIBUTION CABINET)	LC1000	1 x 50mm WHITE TELECOMMS CONDUIT 1 X 50mm HD ORANGE PVC CONDUIT 1 X 25mm <sup>2</sup> Cu 4C+E XLPE CABLE 600/1000V IN CONDUIT	11
	ST_COMMS	1 x 50mm WHITE TELECOMMS CONDUIT 1 X 32mm HD ORANGE PVC CONDUIT	10
LC1000	ST_COMMS	1 x 50mm WHITE TELECOMMS CONDUIT 1 X 50mm HD ORANGE PVC CONDUIT 1 X 2.5mm <sup>2</sup> Cu PVC 2C+E 600/1000V CABLE IN CONDUIT	3
	DCF1 CAB1	1 X 50mm HD ORANGE PVC CONDUIT 1 X PVC 2C+E 600/1000V CABLE IN CONDUIT (SIZE TBC ON-SITE)	3
	DCF1 CAB2	1 X 50mm HD ORANGE PVC CONDUIT 1 X PVC 2C+E 600/1000V CABLE IN CONDUIT (SIZE TBC ON-SITE)	3
	BESS-1	1 x 50mm WHITE TELECOMMS CONDUIT 1 X 50mm HD ORANGE PVC CONDUIT 1 X 16mm <sup>2</sup> Cu 4C+E CABLE 600/1000V IN CONDUIT 1 x 2.5mm <sup>2</sup> Cu 2C+E 600/1000V CABLE IN CONDUIT	10
	BESS-2	1 x 50mm WHITE TELECOMMS CONDUIT 1 X 50mm HD ORANGE PVC CONDUIT 1 X 16mm <sup>2</sup> Cu 4C+E CABLE 600/1000V IN CONDUIT 1 x 2.5mm <sup>2</sup> Cu 2C+E 600/1000V CABLE IN CONDUIT	12
ST_COMMS	DCF1 CAB1	1 X 32mm HD ORANGE PVC CONDUIT (SPARE)	3
	DCF1 CAB2	1 X 32mm HD ORANGE PVC CONDUIT (SPARE)	3

Rev.	Date:	By:	Changes:
0.1	19/12/2024	APT	PRELIMINARY RELEASE 0.1
0.2	28/01/2025	APT	Release for Council Comment on access roads and fencing.
0.3	18/03/2025	APT	Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

**WORK AS EXECUTED**

COMPANY: \_\_\_\_\_

WORK COMPLETED: \_\_\_\_\_  
NAME (Block Letters)

SIGNED: \_\_\_\_\_

DATE COMPLETED: \_\_\_\_\_

**Sustainable Energy Design P/L**

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ORANGE NSW 2800  
Office Site: \_\_\_\_\_  
**ASP Accreditation No: 2659**

Client: Cabonne Council  
99-101 Bank St  
Molong NSW 2866

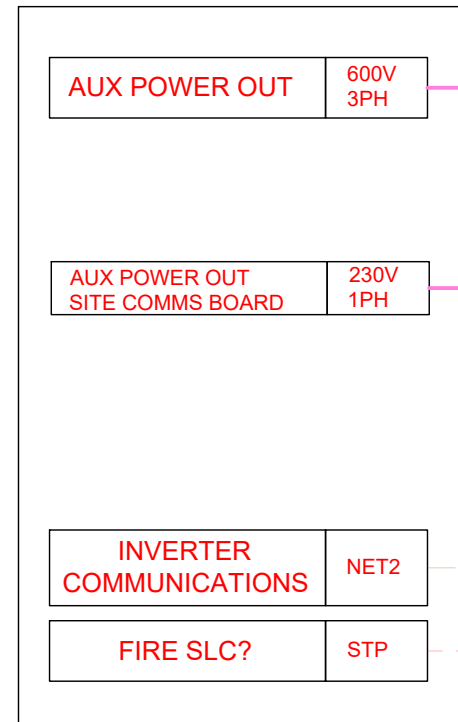
Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: **LV & TELECOMMS LAYOUT**

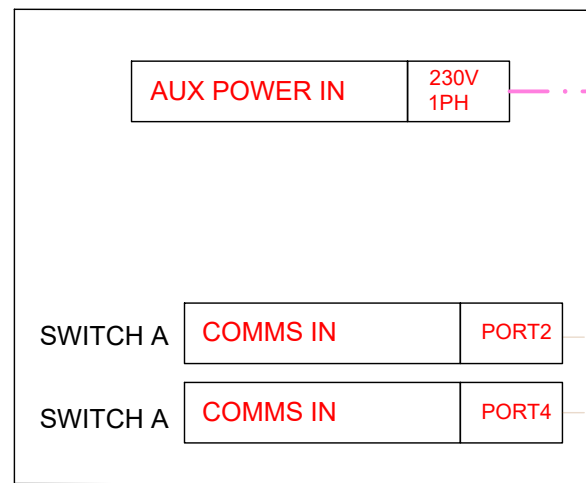
Site Address: **Eugowra Sewerage Treatment Plant  
255 Casuarina Drive  
Eugowra NSW 2866**

Scale	1:125
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	<b>S2456</b>
SHEET 1 OF 6	
Sheet Reference:	S2456-ELE-LVT-01

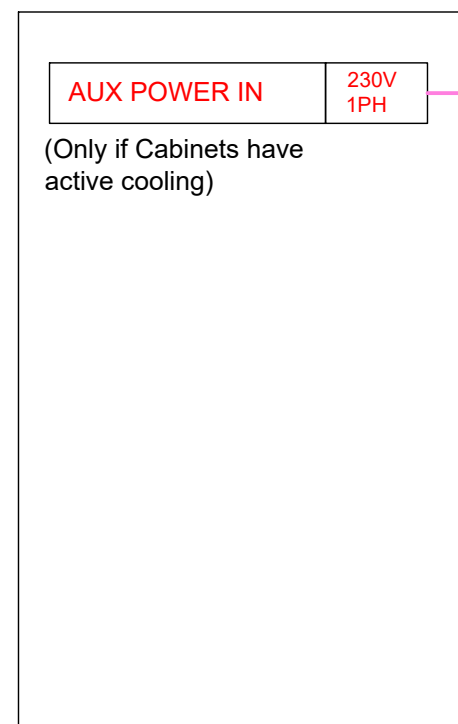
### SUNGROW SG-3400



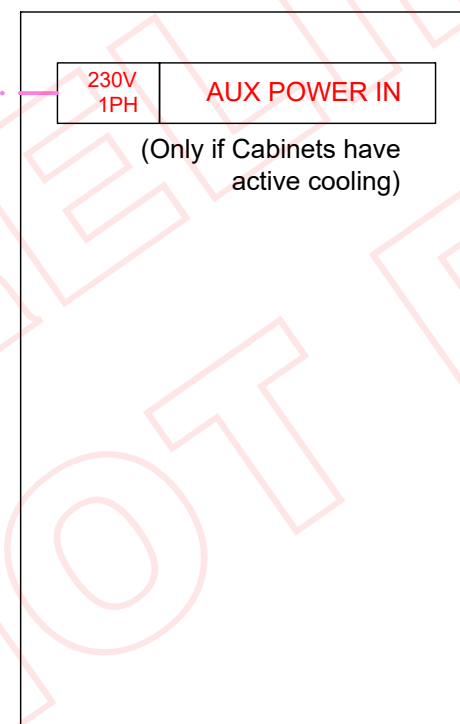
### SITE COMMS BOARD



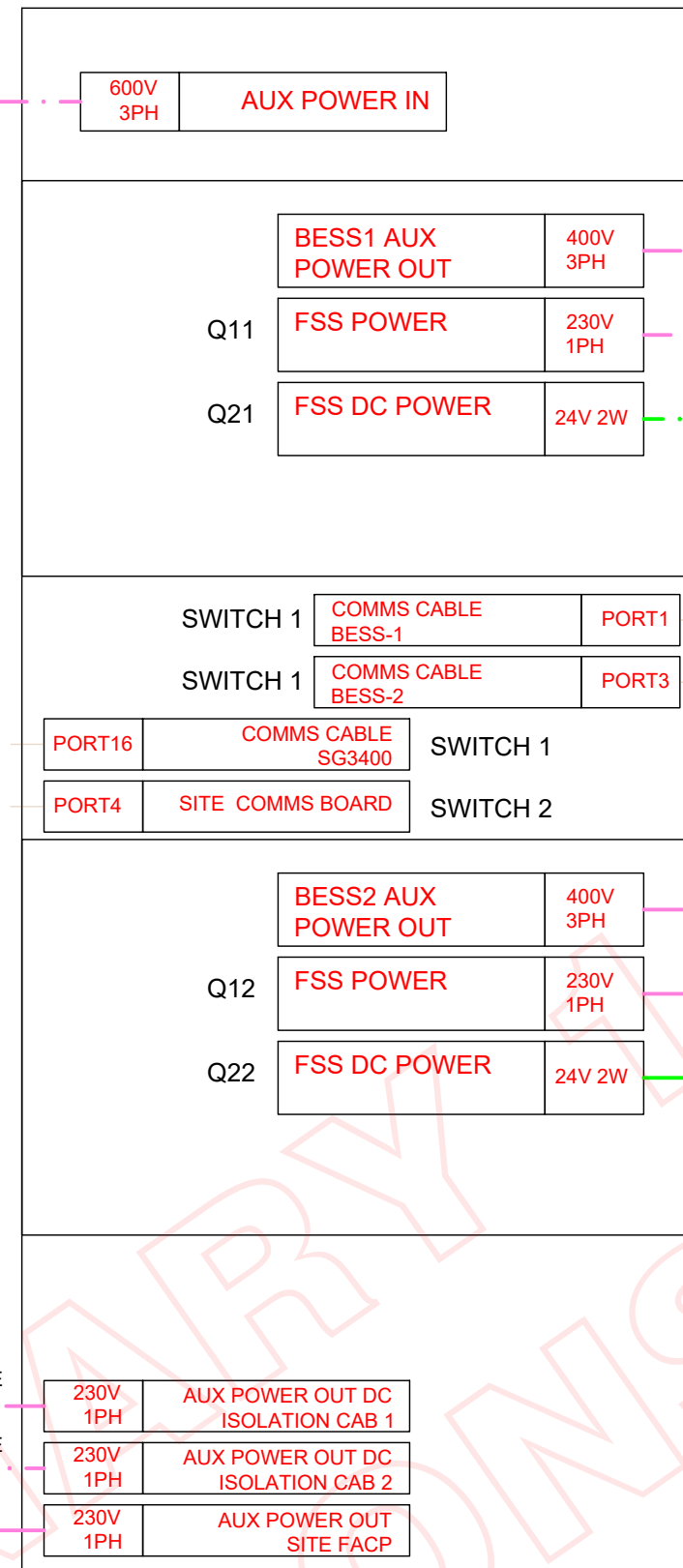
### DCFI CAB1



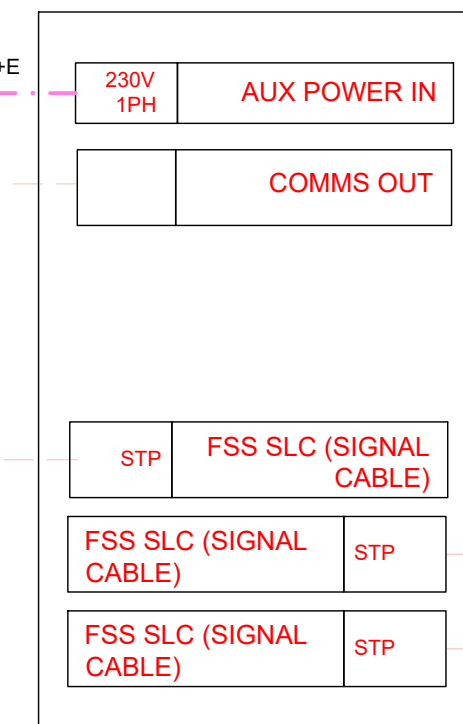
### DCFI CAB2



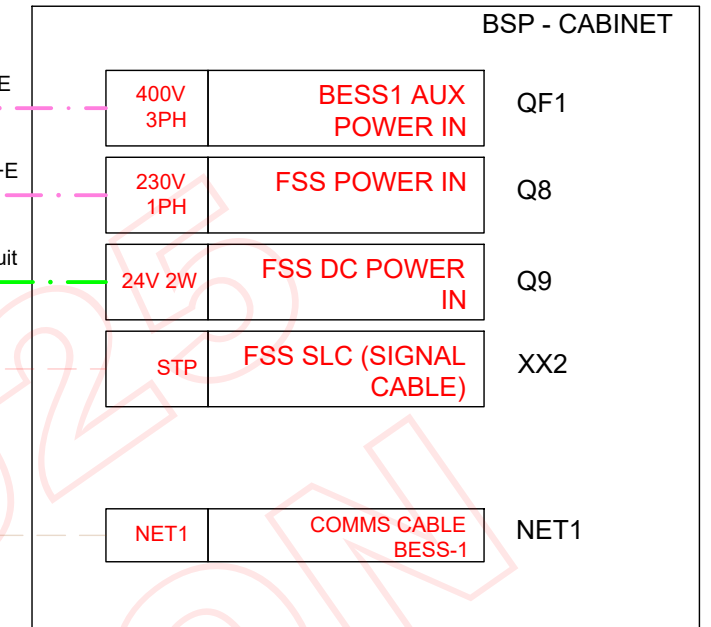
### SUNGROW LC-1000 CABINET



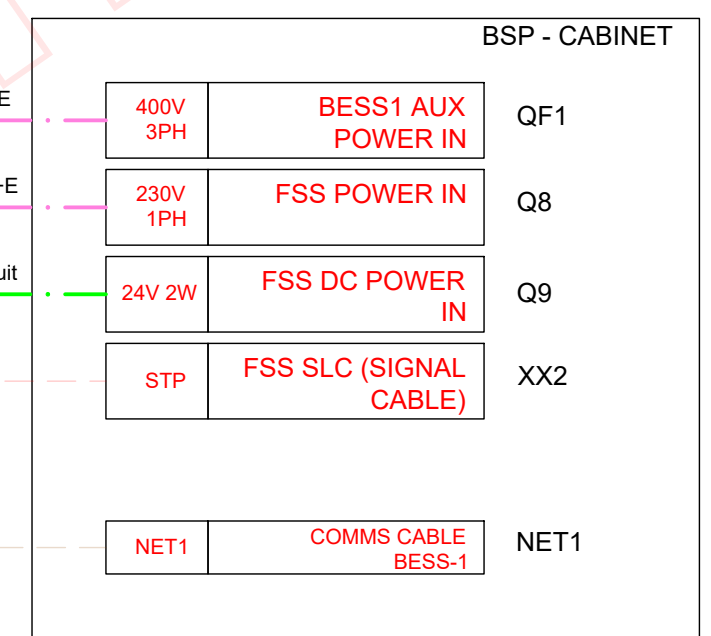
### SITE FACP (INSIDE LC1000)



### BESS 1



### BESS 2



### LEGEND

- - - - - LV Power Cable
- - - - - 24v DC
- - - - - Ethernet Cat 5e - Shielded Twisted Pair (STP).
- - - - - FSS SLC STP Cabling

### NOTES

1. Equipment LV Cabling sizes, protection & SLD to be confirmed by Sungrow with Site Specific project drawings. Constructor to confirm with Sungrow when these are provided.

Rev.	Date:	By:	Changes:
0.1	19/12/2024	APT	
0.2	28/01/2025	APT	
0.3	18/03/2025	APT	Preliminary Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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DATE COMPLETED: \_\_\_\_\_

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**ASP Accreditation No: 2659**

Client: Cabonne Council  
 99-101 Bank St  
 Molong NSW 2866

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

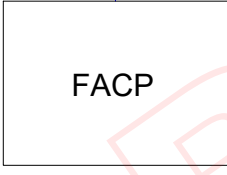
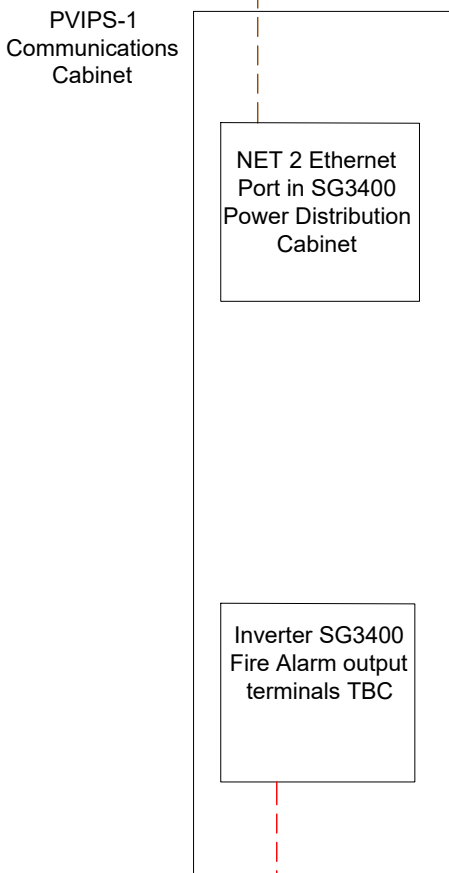
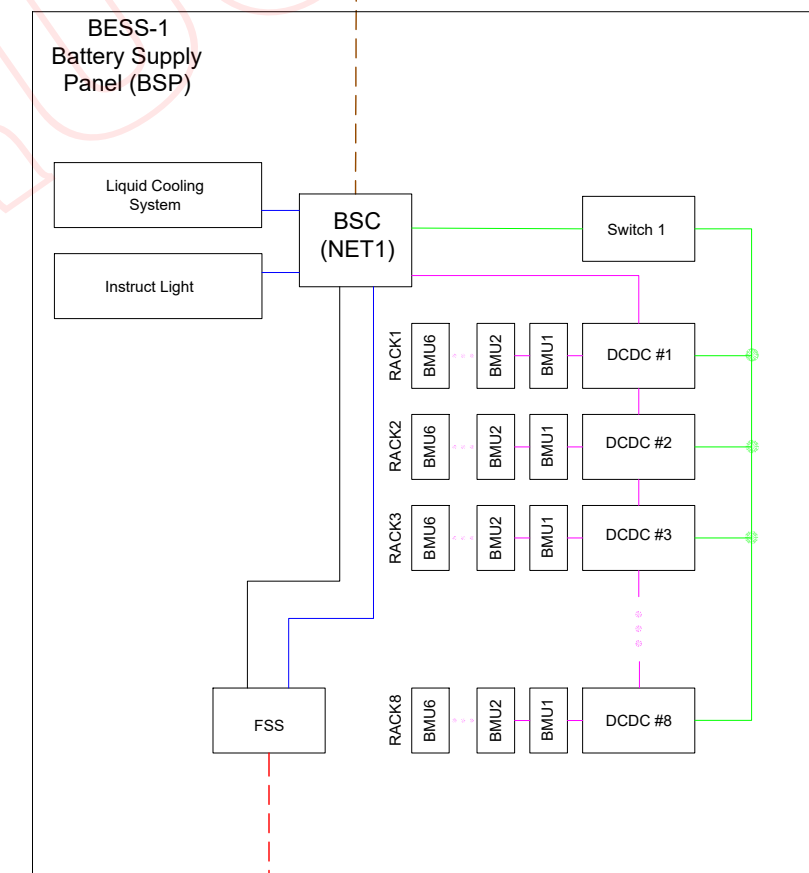
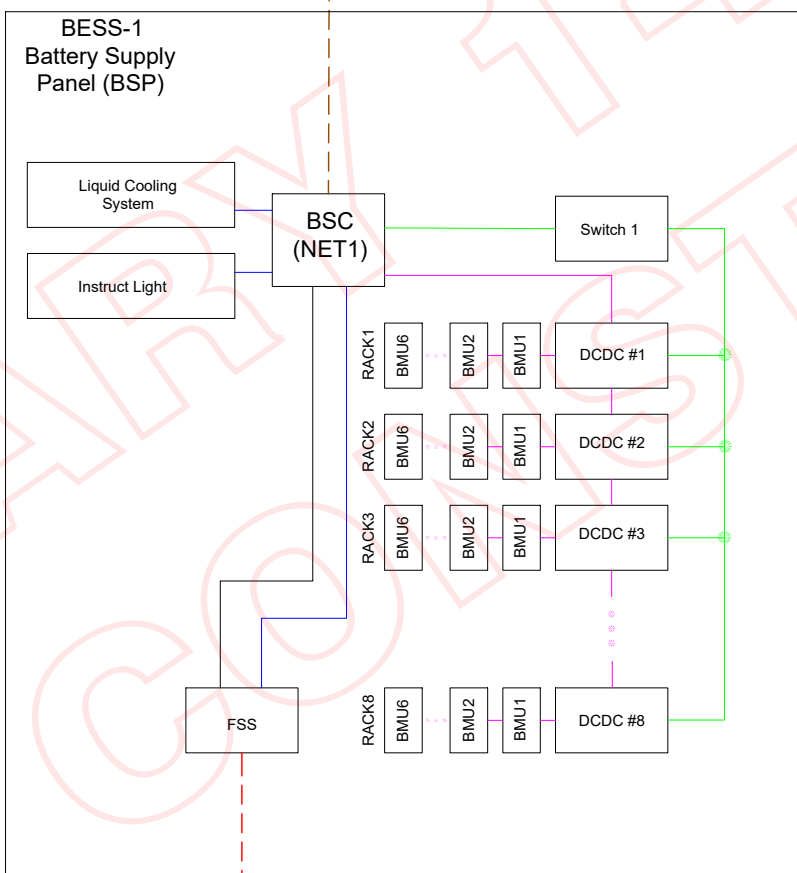
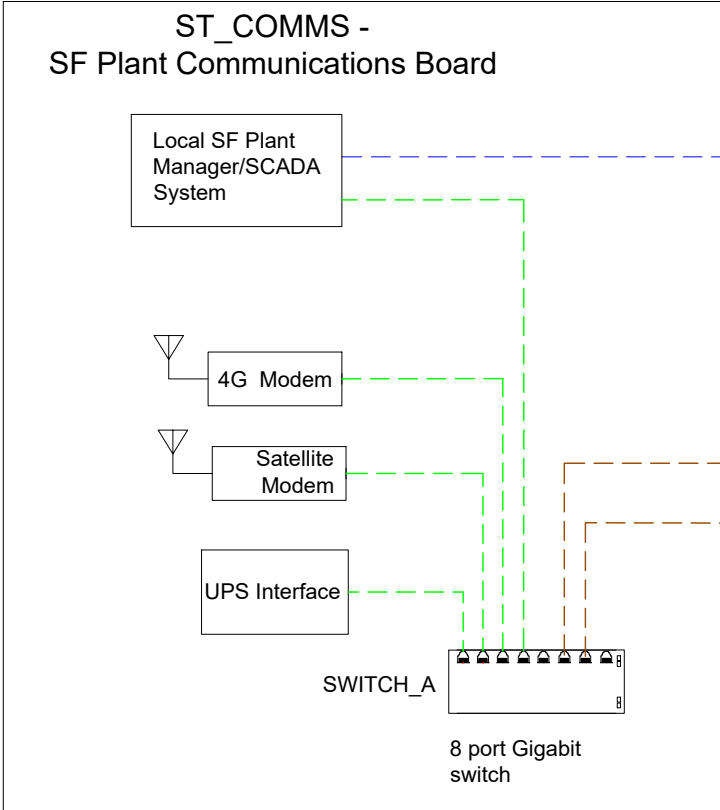
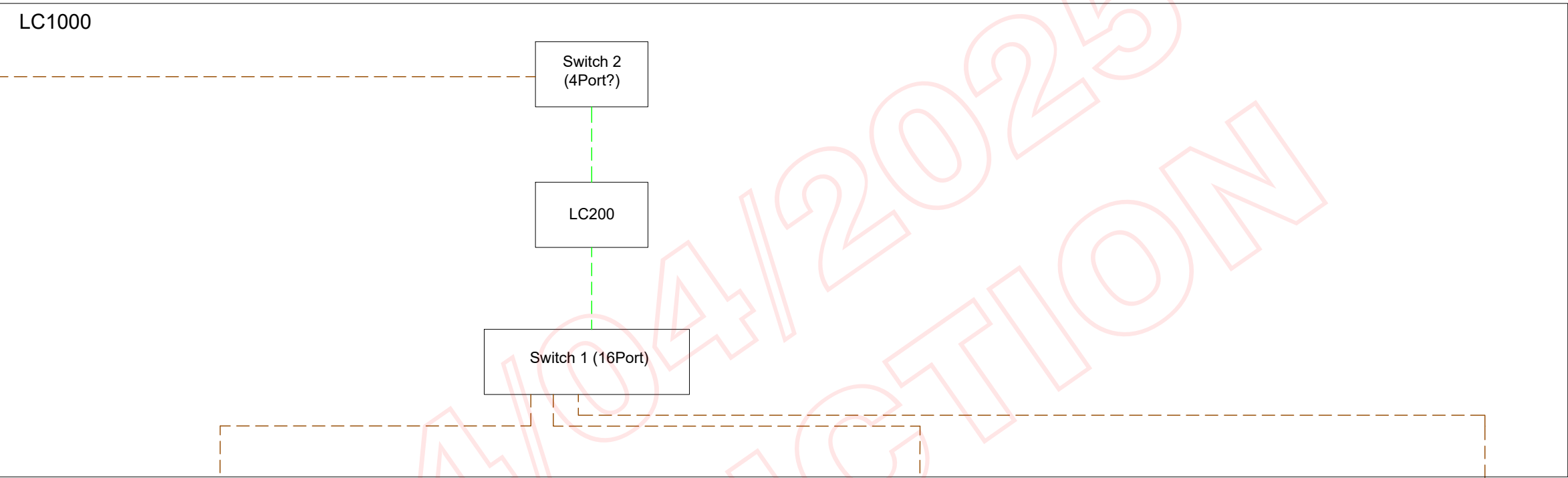
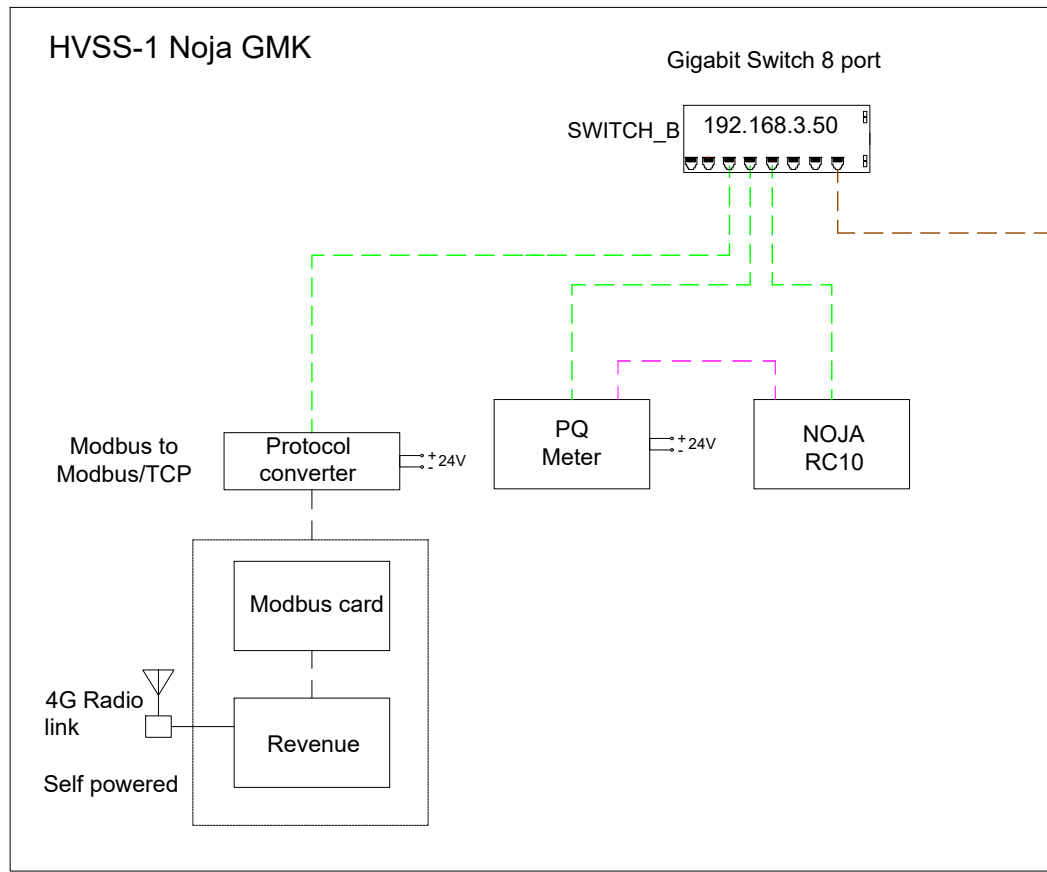
Sheet Title: **SUNGROW EQUIPMENT AUX POWER DIAGRAM**

Site Address: **Eugowra Sewerage Treatment Plant  
 255 Casuarina Drive  
 Eugowra NSW 2866**

Scale	Version
Drawn: APT	Version: 0.4
Checked: MJD	SED Project No: <b>S2456</b>
Designed: MJD	SHEET 2 OF 6
Date Issued: 18/03/25	Sheet Reference: S2456-ELE-LVT-02







Fire Panel Supplied to be able to be networked to Site SCADA management system for remote alerts to plant manager (RS485 MODBUS or MODBUS TCP/IP)

- Ethernet Cat 5e Unshielded Twisted Pair - UTP (Solar Farm Site Wired)
- RS485 MODBUS RTU - STP (Solar Farm Site Wired)
- Ethernet Cat 5e Shielded Twisted Pair - STP Outdoor Rated(Solar Farm Site Wired)
- Ethernet Cat 5e - Serial Protocol (Solar Farm Site Wired)
- FSS SLC STP Cable- (Solar Farm Site Wired)
- Ethernet Cat 5e Or Better (Internal Sungrow Wired)
- RS485 - (Internal Sungrow Wired)
- CANBUS - (Internal Sungrow Wired)
- Dry Contact Signal Cable - (Internal Sungrow Wired)

1. Equipment Cabling requirements & SLD to be confirmed by Sungrow with Site Specific project drawings. Constructor to confirm with Sungrow when these are provided.

Rev.	Date:	By:	Changes:
0.1	19/12/2024	APT	
0.2	28/01/2025	APT	
0.3	18/03/2025	APT	Preliminary Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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WORK COMPLETED: \_\_\_\_\_  
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SIGNED: \_\_\_\_\_

DATE COMPLETED: \_\_\_\_\_

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Client: Cabonne Council  
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Molong NSW 2866

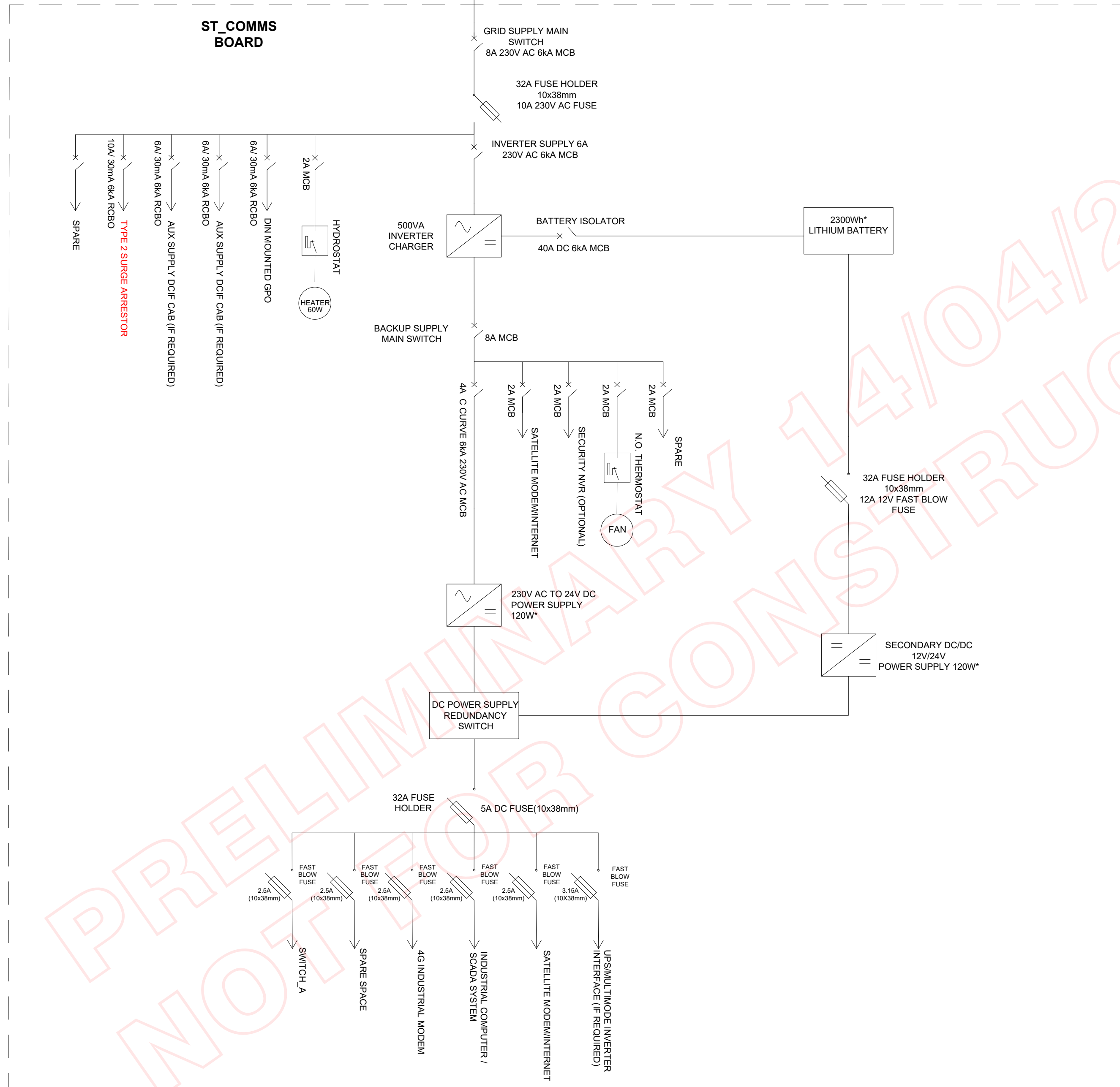
Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: Comms Design

Site Address: Eugowra Sewerage Treatment Plant  
255 Casuarina Drive  
Eugowra NSW 2866

Scale	Drawn	APT
	Checked	MJD
	Designed	MJD
	Date Issued	18/03/25
	Version	0.4
	SED Project No	<b>S2456</b>
	SHEET 4 OF 6	
	Sheet Reference:	A2
	S2456-ELE-LVT-04	

230V AUX SUPPLY FROM LC1000



**NOTE**  
\* Power supplies to be specified for final communication power requirements.

Rev.	Date:	By:	Changes:
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0.2	28/01/2025	APT	
0.3	18/03/2025	APT	Preliminary Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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ORANGE NSW 2800  
Office Site: \_\_\_\_\_  
**ASP Accreditation No: 2659**

Client: Cabonne Council  
99-101 Bank St  
Molong NSW 2866

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: Site Comms Board LV & UPS

Site Address: Eugowra Sewerage Treatment Plant  
255 Casuarina Drive  
Eugowra NSW 2866

Scale	Drawn	APT
	Checked	MJD
	Designed	MJD
	Date Issued	18/03/25
	Version	0.4
	SED Project No	<b>S2456</b>
	SHEET 5 OF 6	
	Sheet Reference:	S2456-ELE-LVT-05



COMMUNICATIONS EQUIPMENT LIST				
SITE	ASSET LABEL	DESCRIPTION	POWER SUPPLY (EST.)	QTY.
LC1000		Sungrow LC1000 Control System SUNGROW SUPPLIED	Internal	1
LC-1000	FACP	Fire Control Panel - to be selected by tenderer in conjunction with Site SCADA compatability & Sungrow communications compatibility. Fire Control Panel to be able to communicate with SCADA system to flag alerts and notify Plant Manager remotely of abnormal system status. FACP to be supplied via Sungrow LC1000 UPS system to ensure fire panel is able to send system status to Plant Manager.	240v	1
HVSS-1 (NOJA GMK)	SWITCH_B	Gigabit switch (B) installed in NOJA Communications/Metering Cabinet to connect metering to Site Communications SCADA System. Switch selected to be suitable for industrial installations.	24v / 12w	1
		ION9000 / SATEC PM180 or equivalent - PQ Meter - Installed into NOJA Metering Cabinet. This is to be connected to SWITCH_B and have MODBUS TCP_IP protocol to be able to accessed by site SCADA system and flag site Power Quality out of bounds. PQ Meter to be capable of resolution down to 40th Harmonic and also be able to store historical data for Plant Manager access.	Self Powered	1
		NOJA RC10 Controller - Supplied - Connected to SWITCH_B with MODBUS TCP/IP - protocol to be able to accessed by site SCADA system and flag HV Breaker trip status for SCADA to alert solar farm plant manager.	240v Internal supply	1
		MODBUS/RTU to TCP/IP 1-PORT Protocol Converter - this is required ONLY IF PQ meter is limited to MODBUS RTU protocol.	24v / 5w	1
ST_COMMS		REFER TO HV DESIGN SHEET 11 "Site Comms Board LV SLD & UPS" in HV Design Pack for 240v/DC power balance of system required for board.		
		Local SF Plant Manger / SCADA System - to be designed & supplied by others.	240/24v	1
		Industrial 4G Modem/Gateway for 4G backup connection.	24v / 12w	1
		Satellite Internet Connection/Fixed Wireless for main internet connectivity.	240v	1
	SWITCH_A	Managed Router required for agregating 2 x Internet Gateways with Satellite/4G back-up for redundant connections. Managed router should be capable of mulitple WAN connections and to be configurable with automatic switching of WAN connections (Hardware Failover). Suitable for industrial installation.	24v / 15W	1
	Multi-Mode Inverter Charger with Battery Back-up or UPS System Capable of supplying the Site Communications System during Power outage for 12Hours @ 200w Average Load.	240v	1	

SCADA REQUIREMENTS			
DEVICE		BRIEF	
SUNGROW LC1000		Sungrow Control & Communications Cabinet where integration of all Sungrow components are connected. Inverter & BESS Container Battery Mangement Systems are connected to the Sungrow Local Controllers. Access to Sungrow management system is acheived via MODBUS or the Local Controllers web interface.	
FACP		Fire Access Control Panels generally offer connection to SCADA Units via MODBUS RS485 RTU connections. Alert Status of components in the solar farm to be able flag for state changes and notify Solar Farm operator.	
Site Plan Management System / SCADA System		SCADA system to collect necessary information of all of plant for plant manager to easily access and check running state of the system. SCADA system be able to send alerts to Plant Managers of abnormal states and to also allow simple controls of the plant via remote access such as change maximum active power setpoint of the inverter ( to be specific, change the max active power output to 2.7 MW to suit Network configuration 2 as and when required by the Essential Energy operator), ramping Solar Farm Up/Down and switching of LV Breakers OPEN/CLOSED. SCADA System installed on site should also allow remote log-in to the site network to allow operators to connect individually to each device's interface.	
ST-2752UX - BESS		Each Battery Container (2 in total) is Connected to the Sungrow's local communications network and the LC-1000 via Ethernet Cable	
SUNGROW SG-3400 Power Station		Sungrow SG-3400 has 2 x PV String Inverters integrated into the product. These are connected to each other and a single connection from the inverter station to the LC1000 is required via Ethernet cable on Sungrow products local communications network.	
PQ Meter		PQ Meter to have the functional ability to output data and programmed to flag out of specification power quality conditions. This should be via MODBUS TCP/IP to enable connection to the broader site communications network. Device to be connected to SWITCH_B in NOJA GMK Metering Cabinet	
Revenue Meter		Revenue Metering to have output functionality via MODBUS TCP/IP (either native or add-on card) to export revenue data at intervals appropriate for LGC Metering requirements.	
NOJA RC-10 HV Relay		Site 11kV Protection Relay controller - Status and Remote trip functions available from device via MODBUS TCP/IP protocol. Device is to be connected to SWITCH_B in Metering Cabinet.	
Local Plant Revenue Controller		Local price controller should be implemented on-site for price-data control connected to NEM for price data. Controller should implement pricing structures according to peak/off-peak cycles for optimum pricing to export battery power. These functions & requirements are to be reviewed in conjunction with the client.	
DEVICE	INPUT / OUTPUT	FUNCTION	
PQ Meter	Output	Current P and Q Value	
	Output	Harmonic Distortion(HD) at POC up to harmonic order 40	
	Output	THD at POC for 2 to 40 th order harmonics	
		Flag out of Bounds Power Quality Conditions as set in the Essential Energy CAS - Send Alert to Plant Manager	
NOJA RC-10 HV Relay	Output	HV Circuit Breaker Status - Closed / Open - Send Alert to Plant Manager	
	Output	HV Trip Reason	
	Output	CB-22 Fail Indication	
	Output	RC-10 Controller Loss of Main LV Supply	
	Input	REMOTE TRIP HV Breaker CB-22	
Revenue Meter	Output	Power export revenue Data at intervals appropriate for LGC Metering & System Monitoring by Plant Manager	
FACP	Output	Status Flag of Normal/Abnormal for all devices attached (BESS Units & SG-3400 Inverter) - Send Alert to Plant Manager	
ST-2752UX - BESS	Output	Any alarms that need to be Flagged from Sungrow System Controller	
	Output	Battery System Status - Normal/Abnormal	
	Output	BESS State of Charge	
	Output	BESS Total Power Output - (Charging/Discharging)	
	Output	BESS DC/DC Converters Normal/Abnormal State	
	Output	BESS DC/DC Converters Individual Output Power	
	Output	Fire-Alarm Alert Via FACP	
	Input	Total system discharge/charge control according to revenue controller inputs.	
	Output	Any alarms that need to be Flagged from Sungrow System Controller	
	Output	Inverter RMU MV beaker trip reason/status with details	
SG -3400	Output	Under/Over frequency trips with trip values/details	
	Output	Under/Over voltage trips with trip values/details	
	Output	PV System Power/Voltage/Current at Inverter Input (Each PV Input Leg from each Subarray)	
	Output	Inverter Output Power/Voltage/Current	
	Output	Inverter AC Breaker Status Flag	
	Output	Fire-Alarm Alert Via FACP	
	Input	System Start Up/ Shut Down Control - This could also be implemented Via remot log-in to Energy Management System page of the Sungrow LC-1000 system Controller	
	Input	Total system power generation control.	
	SITE SCADA	Input	Detect Loss of Communications from SWITCH_B or any device in NOJA Metering Cabinet - Sending Alert to Plant Manager
		Input	Detect Loss of Communications from LC1000 Sungrow Controller - Sending Alert to Plant Manager
Input		Detect Loss of main internet source and that device has failed - Sending Alert to Plant Manager	
Input		Detect loss of main DC Power Supply and that Back-Up DC Power Supply to Communications Cabinet Devices - Sending Alert to Plant Manager	
Input		UPS/Backup system battery state of charge.	
	Input	Enable remote Log in to Site Communications Network to be able to access each devices unique management pages (for example Sungrow Controller Mangagement page for system control).	

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Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: **Site Communications Schedule 1**

Site Address: **Eugowra Sewerage Treatment Plant  
255 Casuarina Drive  
Eugowra NSW 2866**

Scale	Drawn	APT
	Checked	MJD
	Designed	MJD
	Date Issued	18/03/25
	Version	0.4
	SED Project No	<b>S2456</b>
	SHEET 6 OF 6	
	Sheet Reference:	S2456-ELE-TCSCH1