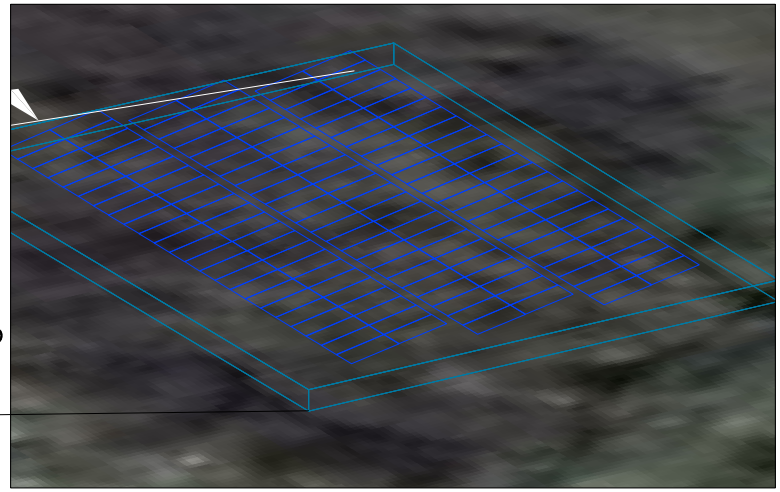
GENERAL SPECIFICATIONS		
Photovoltaic Generator	PV Capacity at STC (Wp)	≥45,000 Wp
	Inclination	10º
	Type of module	Crystalline 72 cells
	Orientation	Ground mounted, 180º
	Standards	EC 61215 edition 2, IEC 61730, IEC 62716, IEC 61701
Grid-Tied Inverter	Location	Outdoor
	Type	Three phase transformerless
	Rated power	≥40,000 W
	Number of MPP tracker	≥ 1
	Protection Class	≥ IP65
	Biggest voltage MPP range	150 V - 800 V
	Maximum DC voltage	1.000 V
	Output AC voltage	3 / N / PE 230, 400 V (adjustable)
	Output AC frequency	50 Hz (adjustable)
	Phi cosine	1
	THD	≤ 3%
	Consumption at night	≤ 3 W
	Maximum efficiency	≥ 98 %
	Euroefficiency	≥ 97 %
	Standards	Harmonic Current (IEC 61000-3-2 and / or IEC61000-3-4), IEC 62109-1/2
	Anti -islanding protection	Yes/ VDE 0126-1-1 or similar
	Comunication	RS485, ethernet, RS232
	Additional requirements	Dynamic compensation of reactive power, inverter automatic reconnection conditions, linear output power control from a third device (read and write capabilities), utility-interactive photovoltaic inverter system.
	Permissible grid characteristics (inverter not to be disconnected)	Vp-n = 230 V ±20%
		Vp-p=400 V ± 20%
		Fq = 50 ± 5 Hz
Dual mode inverter	Location	Technical room
	Nominal battery voltage	48 V
	Inverter function	Yes
	Charger function	Yes
	Transfer system	yes
	Assistance to grid	Yes
	Rated power	24 kVA (3 units of 8 kVA each)
	Designed for an electrical gird of:	230 V and 50 Hz
	Anti-islanding protection	Yes / VDE 0126-1-1 or similar
	Communication	MODBUS or CAN (with communication bridge if required), allowing reading and writing on the inverter
	Additional comments	Dynamic compensation of reactive power, inverter automatic reconnection conditions, linear output power control from a third device (read and write capabilities), utility interactive photovoltaic inverter system
Battery bank	Place of installation	Technical room
	Rated Capacity	≥170,000 Wh
	Voltage	48 V
	Maximum DOD	70%
	Type	Vented tube lead acid
	Rated cycles at DOD 70%	≥1500
PV plant controller & data logger	Type	Fuel reduction device
	Communication	RS485, Ethernet and/or RS232 (compatible with Grid-dependent inverter, existing Genset control Unit, environment sensors and electrical meters)
	Inputs	Meters, sensors, inverters, Genset Control Unit, Grid (consumption)
	Outputs	Inverters, Grid (back-feeding)
	Data logger	2 years data logging capacity, monthly evaluation report, calculation of indicators and remote monitoring



Ground Mounted PV system:

- Piling or Concrete base
- PV capacity: 45 kWp
- Inclination: 10°
- Azimuth: 180 °

SERVICE SPECIFICATIONS		
Output performance	Specific Yield	1,450 kWh/kWp
	Daily final average production (kWh/day)	179 kWh/day
Facility characteristics	Reference annual consumption (kWh/year)	121000
	Estimated solar fraction	~ 55%

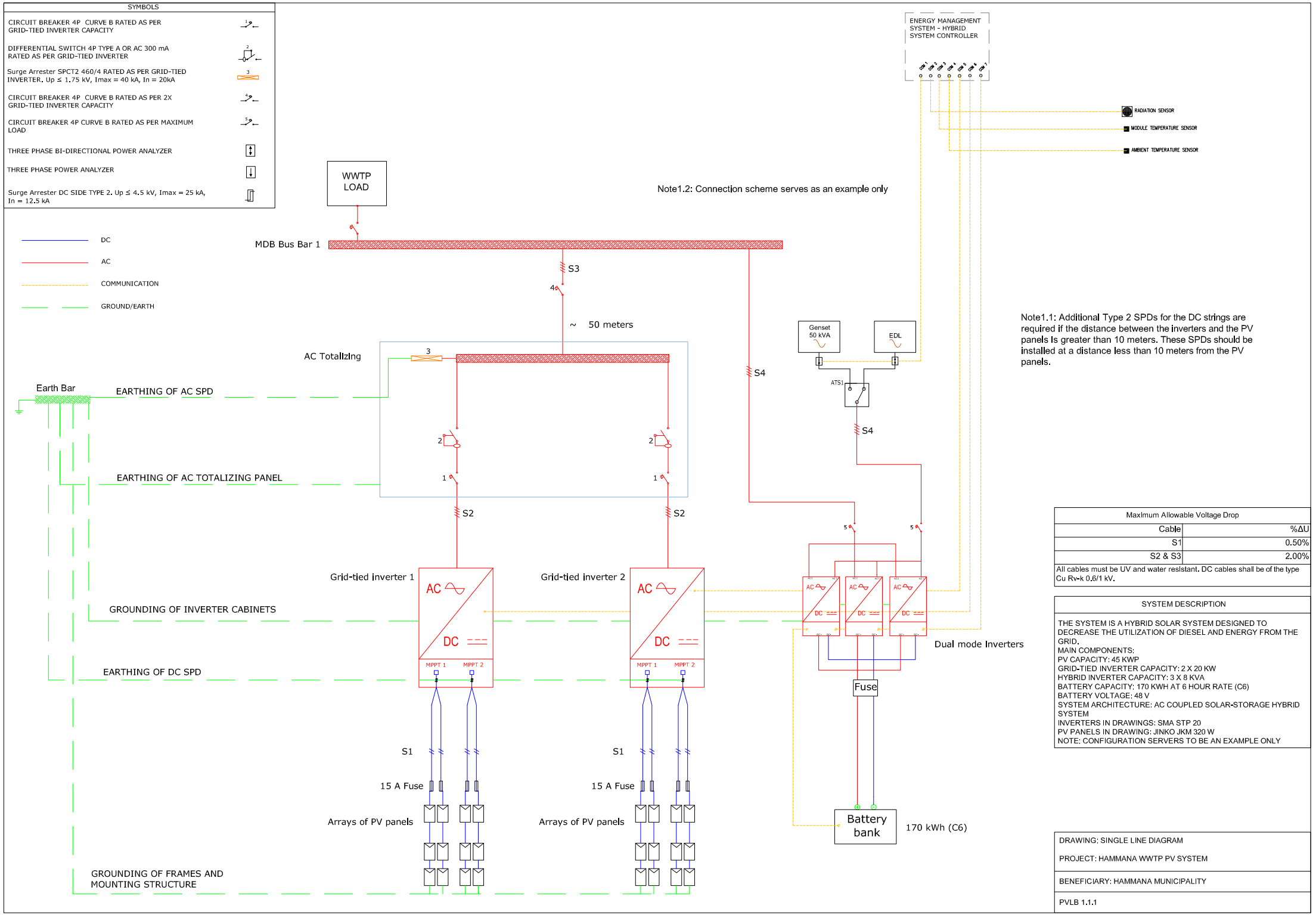
MODE OF OPERATION		
MODE	POWER SOURCE	GRID CONNECTED INVERTER OPERATION
Grid Mode	Grid	Load feeding (normal operation) Injection to the grid if any surplus
Fuel Reduction	Genset	Load feeding according fuel reduction mode

DRAWING: SYSTEM LAYOUT AND ARCHITECTURE

PROJECT: HAMMANA WWTP PV SYSTEM

BENEFICIARY: HAMMANA MUNICIPALITY

PVLB 1.1.1



Maximum Allowable Voltage Drop	
Cable	%ΔU
S1	0.50%
S2 & S3	2.00%

All cables must be UV and water resistant. DC cables shall be of the type Cu Rv-k 0.6/1 kV.

SYSTEM DESCRIPTION

THE SYSTEM IS A HYBRID SOLAR SYSTEM DESIGNED TO DECREASE THE UTILIZATION OF DIESEL AND ENERGY FROM THE GRID.
MAIN COMPONENTS:
PV CAPACITY: 45 KWP
GRID-TIED INVERTER CAPACITY: 2 X 20 KW
HYBRID INVERTER CAPACITY: 3 X 8 KVA
BATTERY CAPACITY: 170 KWH AT 6 HOUR RATE (C6)
BATTERY VOLTAGE: 48 V
SYSTEM ARCHITECTURE: AC COUPLED SOLAR-STORAGE HYBRID SYSTEM
INVERTERS IN DRAWINGS: SMA STP 20
PV PANELS IN DRAWING: JINKO JKM 320 W
NOTE: CONFIGURATION SERVERS TO BE AN EXAMPLE ONLY

DRAWING: SINGLE LINE DIAGRAM

PROJECT: HAMMANA WWTP PV SYSTEM

BENEFICIARY: HAMMANA MUNICIPALITY

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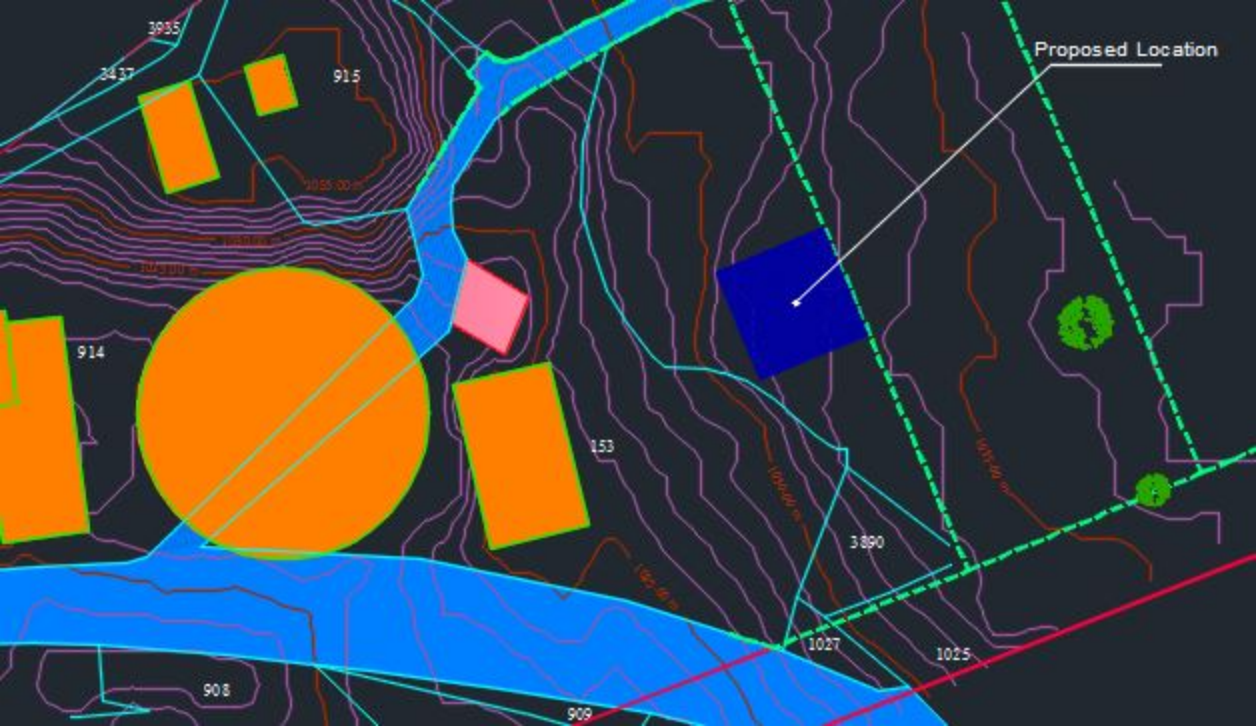
Proposed Location
3935
3437
915
914
153
3890
1027
1025
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909