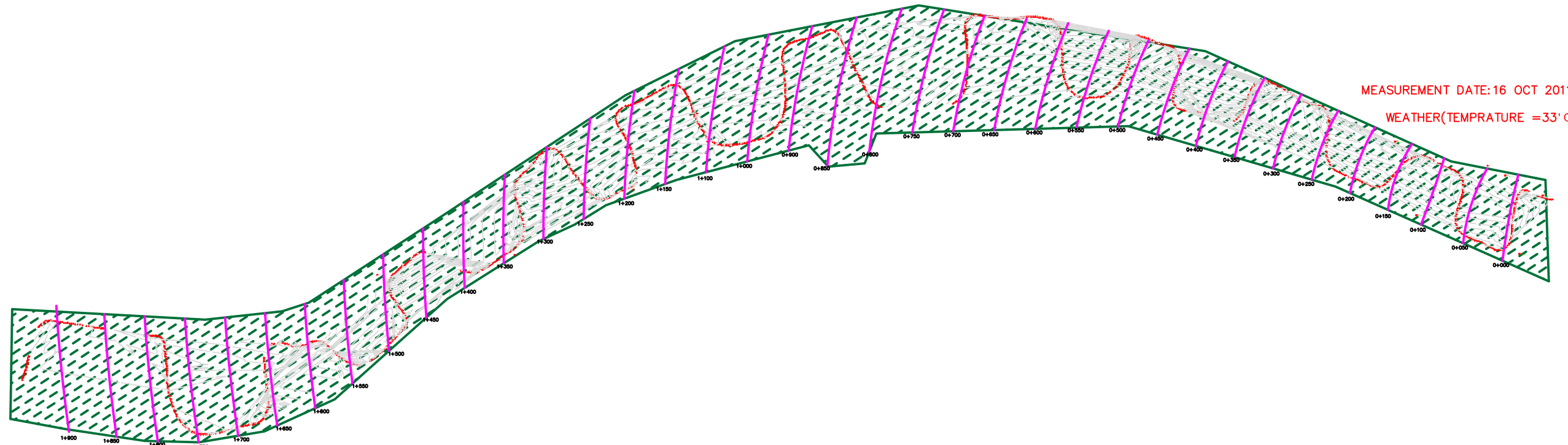


Attachment - 4 River bathymetric survey map



MEASUREMENT DATE: 16 OCT 2011
 WEATHER (TEMPERATURE = 33°C)

LOCATION MAP:

NASSIRIYA

REFERENCE:

LEGEND

These standard symbols will be found in the drawing.

EUPHRATES RIVER

SOURCE OF DATA:

Site Survey

COPYRIGHT:

STAFF :

- Eng. Majed Hassan
- Eng. Ahmed Akram
- Eng. Ahmed Raad
- Eng. Ahmed Tariq
- Eng. Haydar Taha
- Eng. Abbas Mazhir
- Eng. Aqeel Ameer
- Eng. Saif khalid
- Eng. Firas Natik

SCALE:

 1 : 2000

GEODETIC PARAMETERS:

Name : UTM Zone 38N
 Projection Type : Universal Transverse Mercator
 Datum : WGS 1984
 Units of Coordinates : Meters

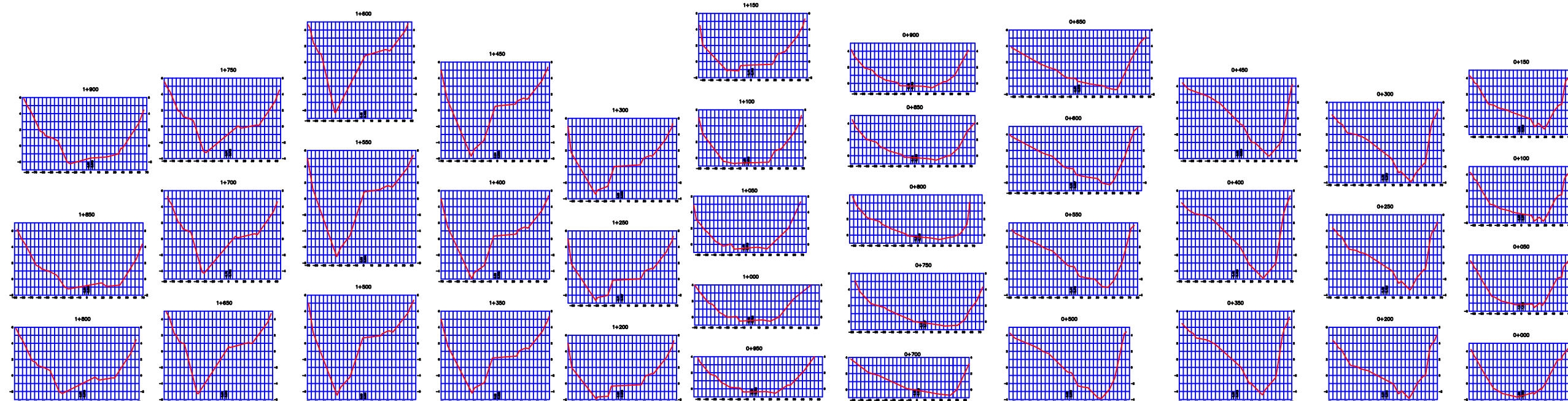
DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
OCT-2011				

AUTHOR:

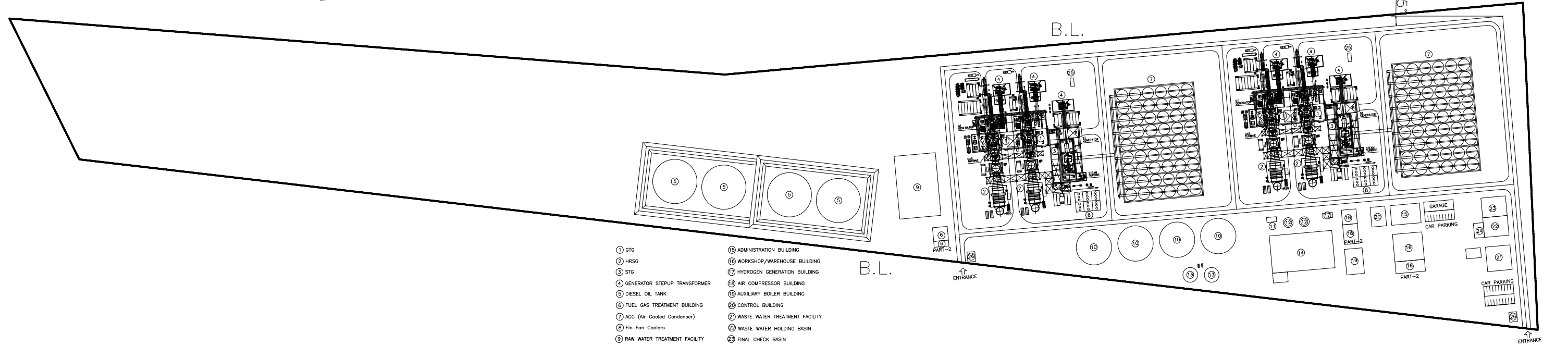
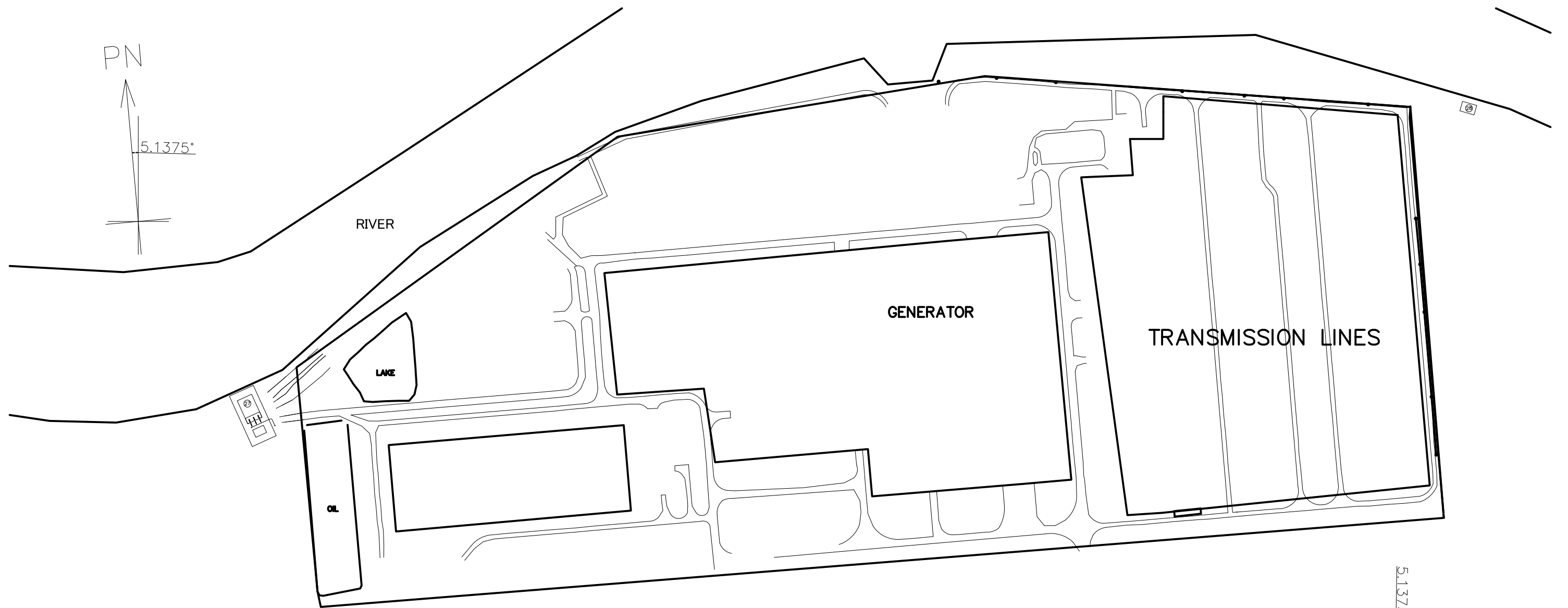
MAP TITLE :

**NASSIRIYA
 POWER STATION
 CROSS SECTION AND CONTOUR MAP**

Nassiriya Province
 Country - Iraq



Attachment - 5 Plot Plan



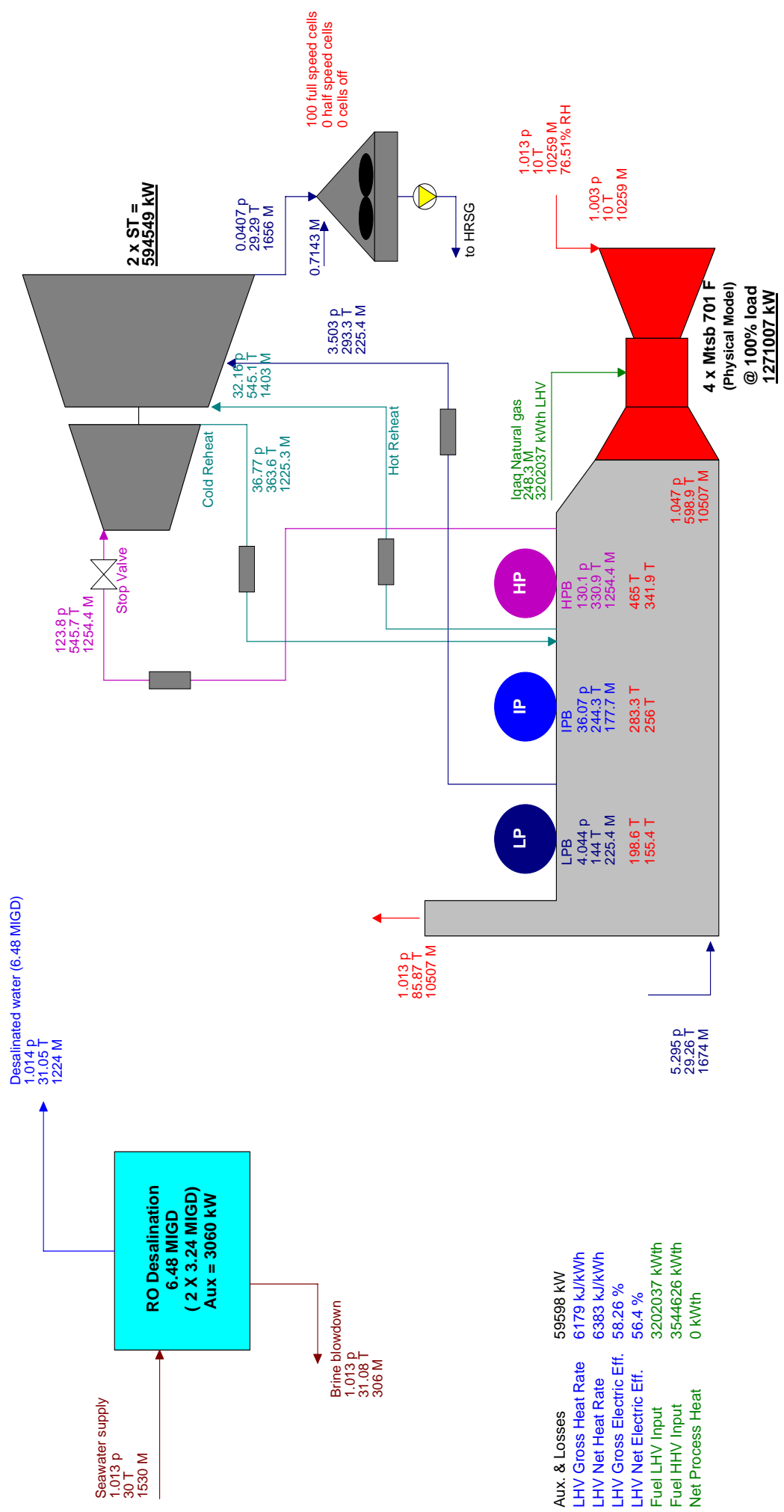
- | | |
|--------------------------------|-----------------------------------|
| ① GTG | ⑮ ADMINISTRATION BUILDING |
| ② HRSG | ⑯ WORKSHOP/WAREHOUSE BUILDING |
| ③ STG | ⑰ HYDROGEN GENERATION BUILDING |
| ④ GENERATOR STEPUP TRANSFORMER | ⑱ AIR COMPRESSOR BUILDING |
| ⑤ DIESEL OIL TANK | ⑲ AUXILIARY BOILER BUILDING |
| ⑥ FUEL GAS TREATMENT BUILDING | ⑳ CONTROL BUILDING |
| ⑦ ACC (Air Cooled Condenser) | ㉑ WASTE WATER TREATMENT FACILITY |
| ⑧ Fin Fan Coolers | ㉒ WASTE WATER HOLDING BASIN |
| ⑨ RAW WATER TREATMENT FACILITY | ㉓ FINAL CHECK BASIN |
| ⑩ DEMINERALIZED WATER TANK | ㉔ OIL SEPARATOR |
| ⑪ FIRE PUMP HOUSE | ㉕ EMERGENCY DIESEL GENERATOR SHED |
| ⑫ EQUALIZATION TANK | ㉖ GUARD HOUSE |
| ⑬ SERVICE WATER TANK | ㉗ WATER INTAKE STRUCTURE |
| ⑭ WATER TREATMENT FACILITY | ㉘ WATER DISCHARGE STRUCTURE |

Preparatory Study for Development of
 Southern Large Scale Thermal Power Plant
 in IRAQ
 1,800MW Class
 Gas Combined Cycle Power Plant
 2 on 1 Multi-Shaft
 (ACC Case)
 Conceptual Plot Plan

Attachment - 6 Heat Balance

GT MASTER 20.0 System Planning Group
 Gross Power 1865555 kW
 Net Power 1805957 kW
 Desalinated water 6.48 MIGD

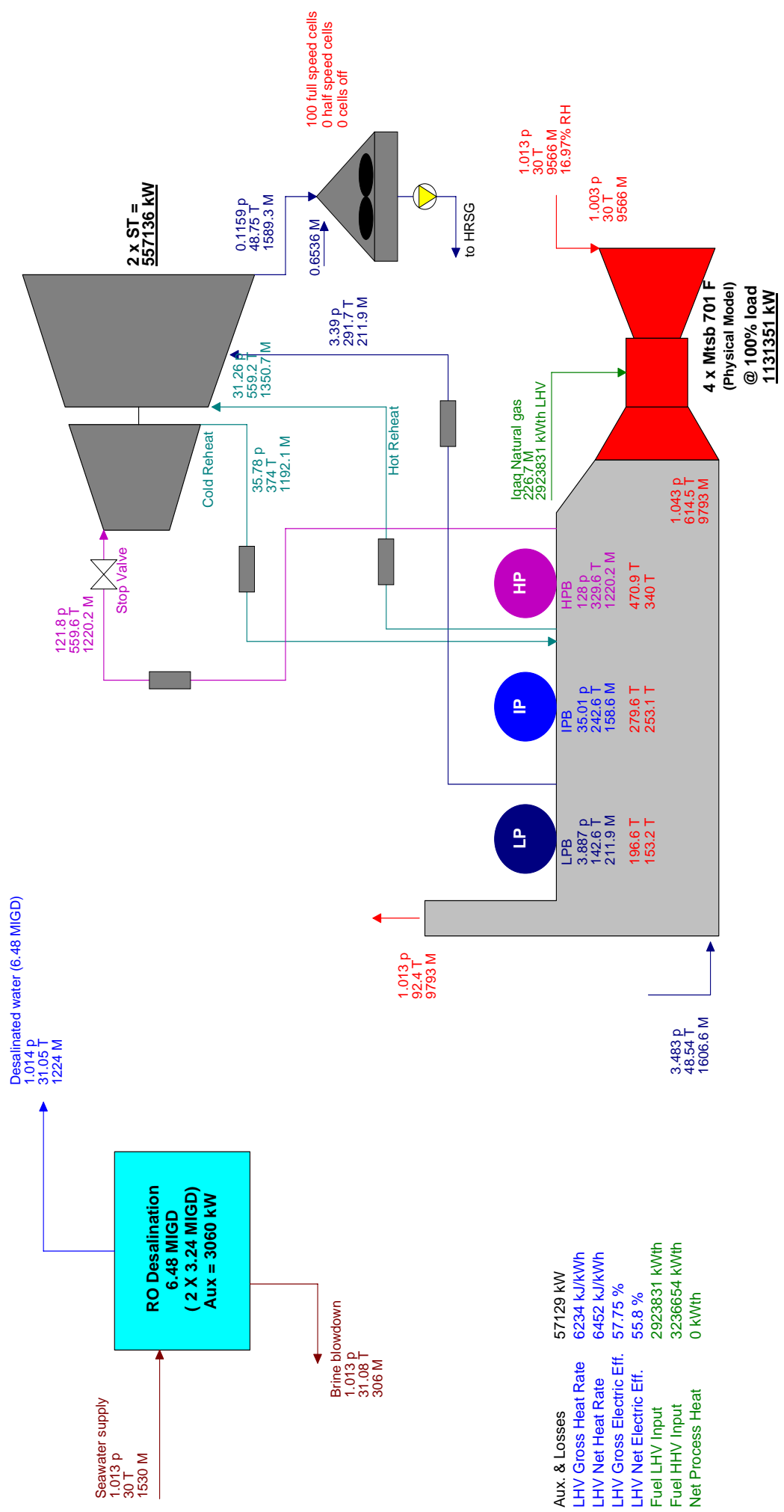
Ambient
 1.013 P
 10 T
 76.51% RH



Aux. & Losses
 59598 kW
 LHV Gross Heat Rate 6179 kJ/kWh
 LHV Net Heat Rate 6383 kJ/kWh
 LHV Gross Electric Eff. 58.26 %
 LHV Net Electric Eff. 56.4 %
 Fuel LHV Input 3202037 kW/h
 Fuel HHV Input 3544626 kW/h
 Net Process Heat 0 kW/h

GT MASTER 20.0 System Planning Group
 Gross Power 1688487 kW
 Net Power 1631358 kW
 Desalinated water 6.48 MIGD

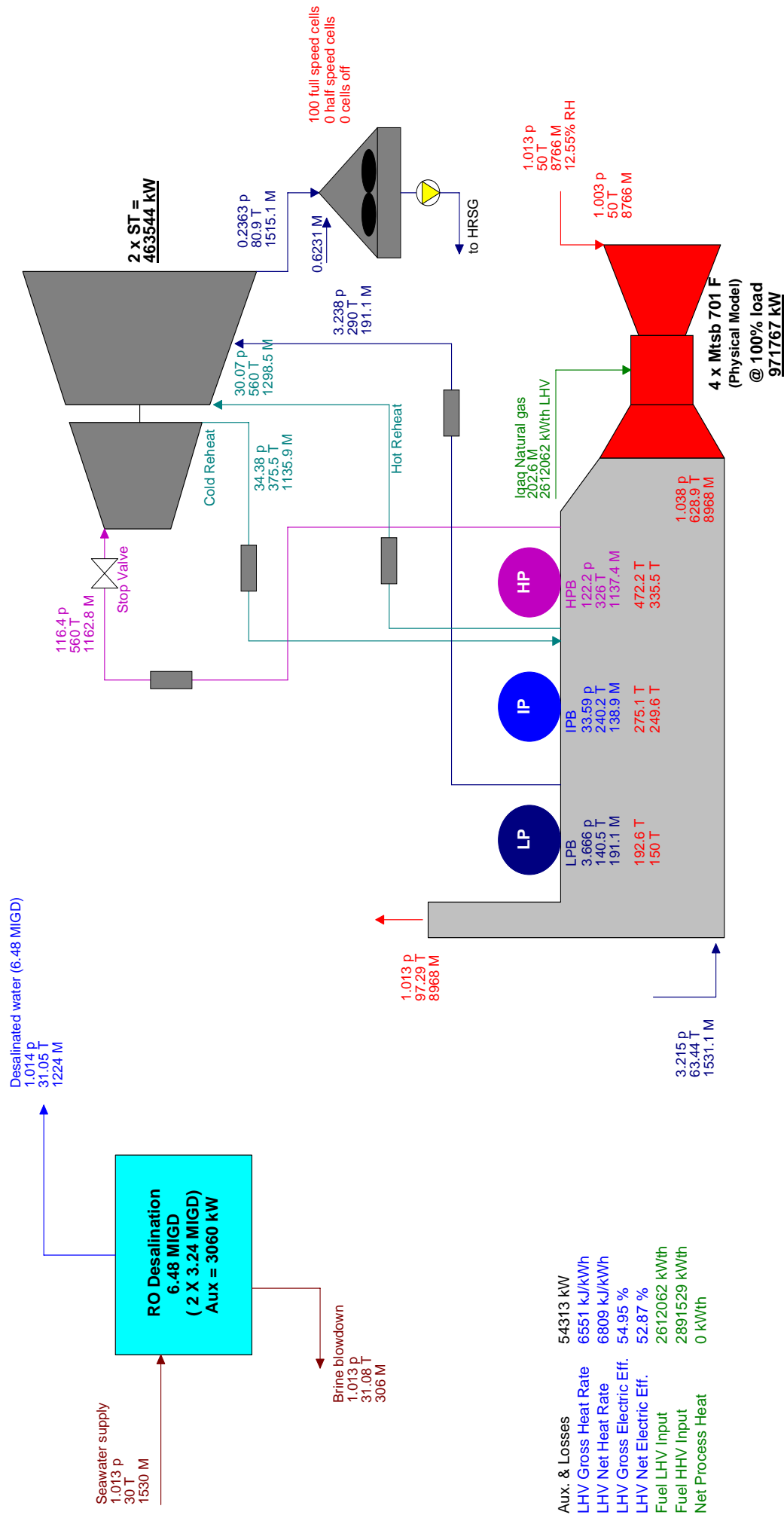
Ambient
 1.013 P
 30 T
 16.97% RH



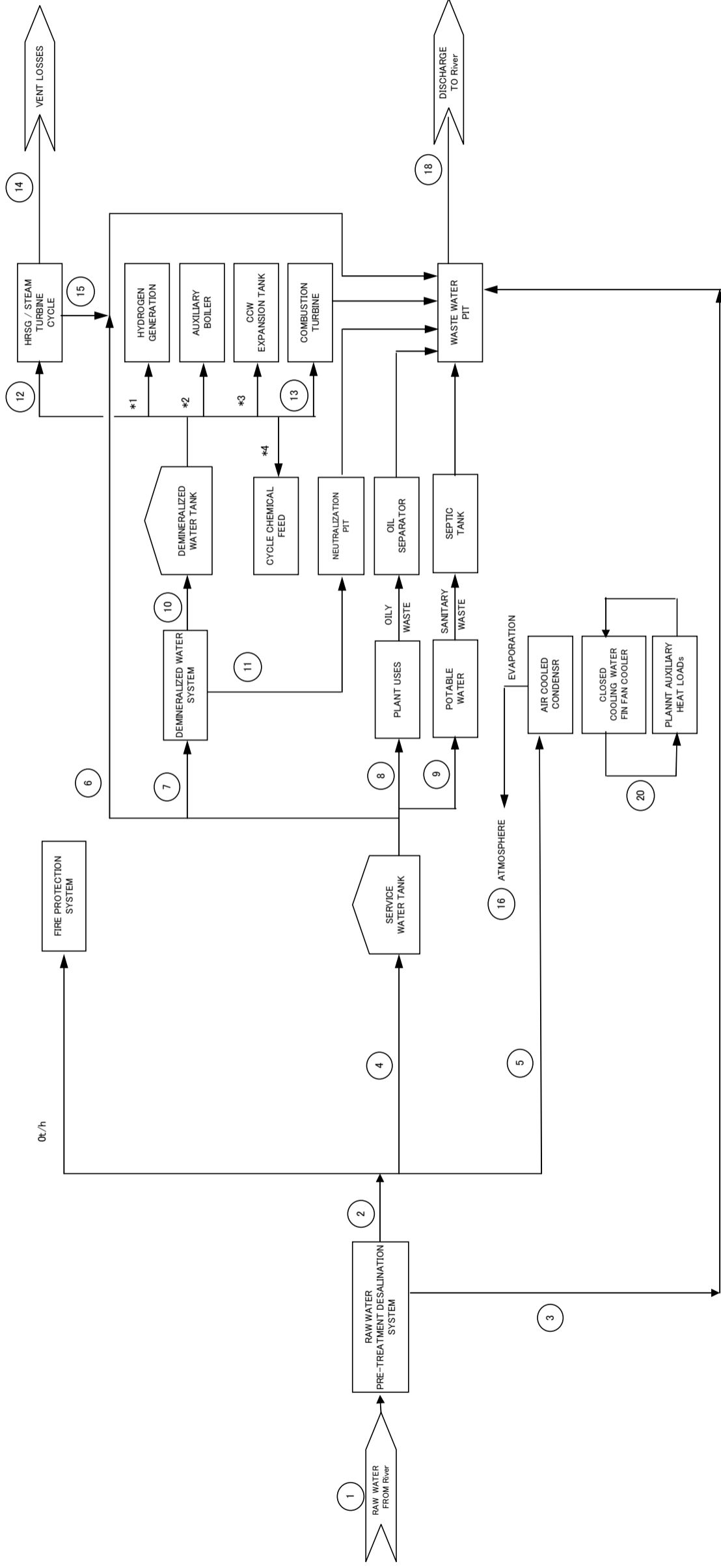
Aux. & Losses 57129 kW
 LHV Gross Heat Rate 6234 kJ/kWh
 LHV Net Heat Rate 6452 kJ/kWh
 LHV Gross Electric Eff. 57.75 %
 LHV Net Electric Eff. 55.8 %
 Fuel LHV Input 2923831 kW/h
 Fuel HHV Input 3236654 kW/h
 Net Process Heat 0 kW/h

GT MASTER 20.0 System Planning Group
 Gross Power 1435311 kW
 Net Power 1380998 kW
 Desalinated water 6.48 MIGD

Ambient
 1.013 P
 50 T
 12.55% RH



Attachment - 7 Water Balance



per 2 on 1 Multi Shaft 900MW class CCPP one (1) Train

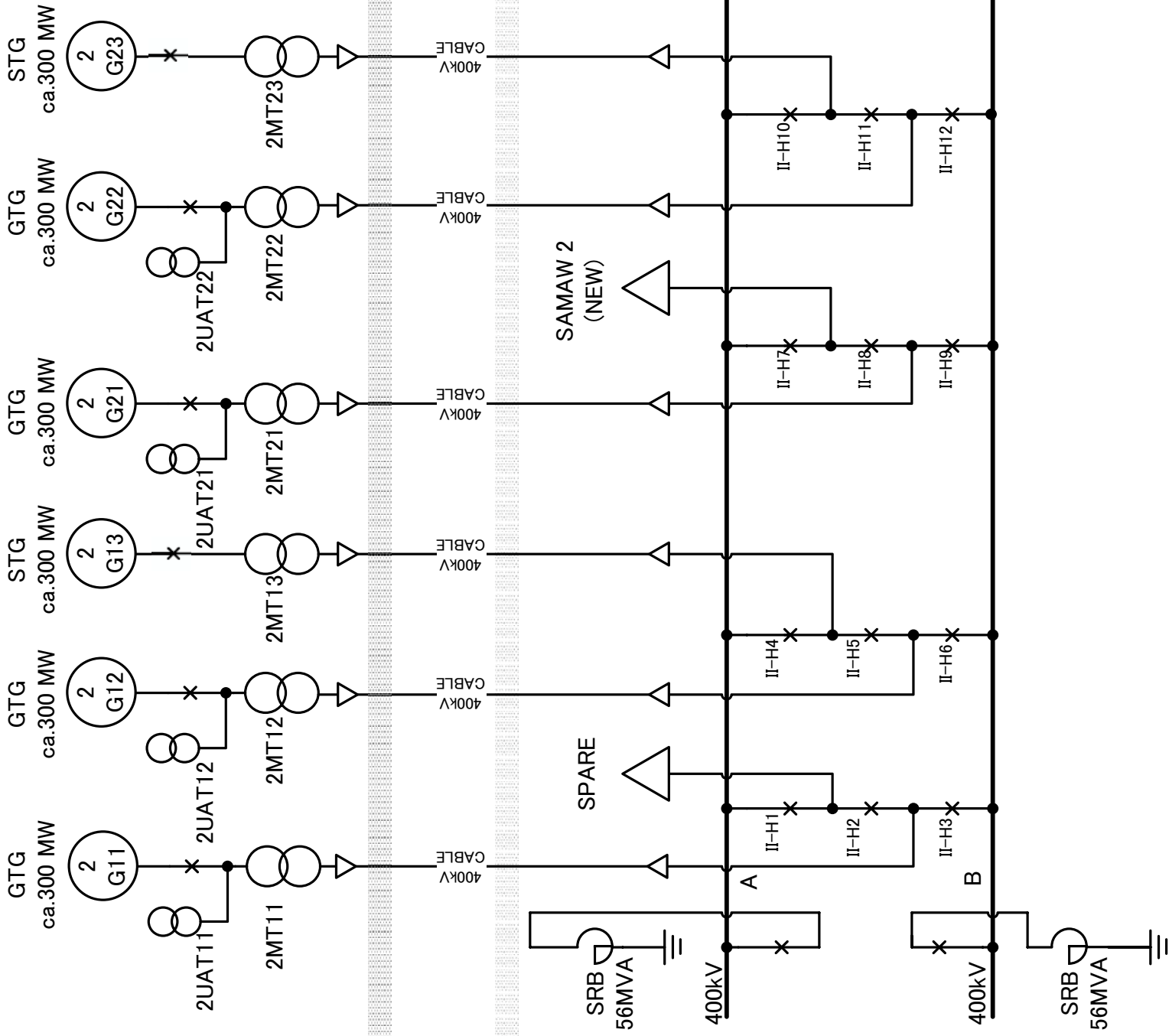
Number	Description	Unit	Water Flow
1	Raw water from river	t/h	470
2	Desalinated Water	t/h	374
3	Pre-Treatment Back-Wash and Rejection Water	t/h	96
4	Service water	t/h	74
5	ACC cooling water injection (@ ambient temperature of 50 C)	t/h	300
6	Quench water	t/h	20
7	Inlet to makeup demineralizer system	t/h	46
8	Miscellaneous service water uses	t/h	4
9	Potable water	t/h	4
10	Demineralized water produced	t/h	40
11	Demineralizer system waste water	t/h	6
12	HRSG/steam turbine cycle makeup	t/h	40
13	Combustion turbine wash water	L/day	52
14	Vent losses from HRSG/steam turbine cycle	t/h	8
15	HRSG blowdown	t/h	32
16	ACC cooling water evaporation to atmosphere	t/h	300
17	N/A	t/h	-
18	Discharge to river	t/h	228
19	N/A	t/h	-
20	Closed cooling water system cooling water	t/h	3,800

Notes:

1. All flows except combustion turbine wash water are average ton per hour.
2. Combustion turbine wash water flow is average liters per day.
3. HRSG blowdown is assumed to be 4% of total steam flow.
4. Vent losses are assumed to be 1% of total steam flow.
5. Demineralized water flow of *1, *2, *3 and *4 are included in (7).

Attachment - 8 Single Line Diagram

NSRG 2 GAS POWER STATION (JICA)



JICA SCOPE

NOTES :

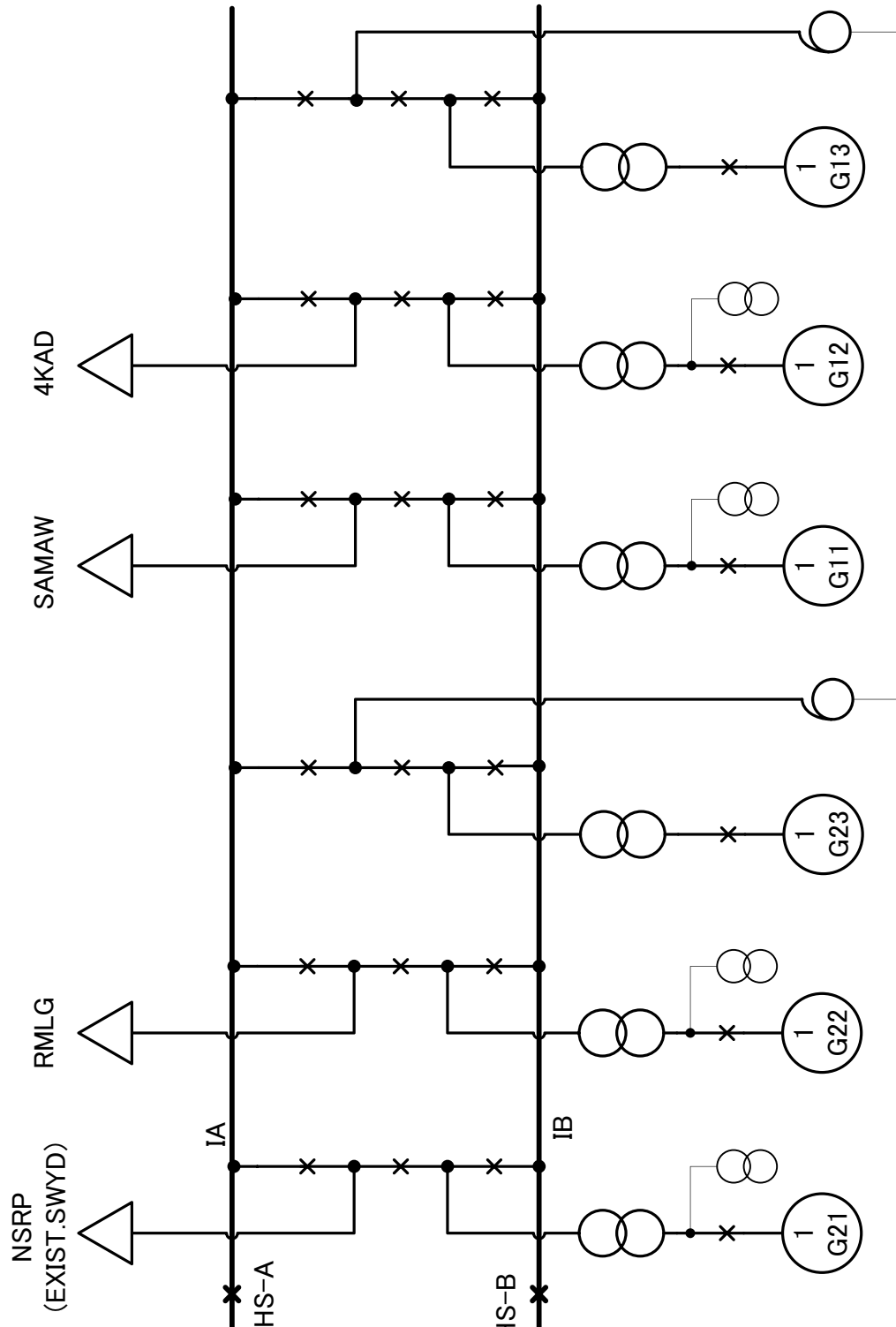
- 1) 400kV GIS : Rated Current : 4000A (Bus) / 2000A (Feeder Diameters)
Rated Short Time Withstand Current : 50kA, 1 sec.
- 2) NSRG 1 Tie-in : Busbar End at Sectionalizer Breaker (Expandable to the additional GIS for NARG 2 connections)
- 3) Overhead Lines from NSRG 1 400kV GIS : Total Nos 6 (4 OHL Cut-in, 1 OHL New, and 1 OHL Spare)
Cut-in : NSRP-RMLG, 4KAD-SAMAW. All are Facing to South.
- 4) Cable Connection to NSRG 1 400kV GIS from NSRG 2 Generators : 6 Generator Feeders
- 5) Legend:
G : Generator [1G12 : NSRG 1, Block 1, No.2 Generator (GTG) / 2G23 : NSRG 2, Block 2, No.3 Generator (STG)]
MT : Main Transformer [2MT21 : NSRG 2, Block 2, No.1 Main Generator Step-up Transformer]
UAT : Unit Auxiliary Transformer [2UAT21 : NSRG 2, Block 2, No.1 Unit Auxiliary Transformer]

Δ : Cable Connection ▽ : Overhead Line Connection

HS : Sectionalizer Circuit Breaker [HS-A : Connection of I-II at Bus A / HS-B : Connection of I-II at Bus B]

SRB : Busbar Shunt Reactor

NSRG 1 GAS POWER STATION



A 132kV

B

DWG No. : JICA-00T4401-001 Rev.1 / Jan-23-2012

Preparatory Study for Development of
Southern Large Scale Thermal Power Plant in IRAQ

JICA

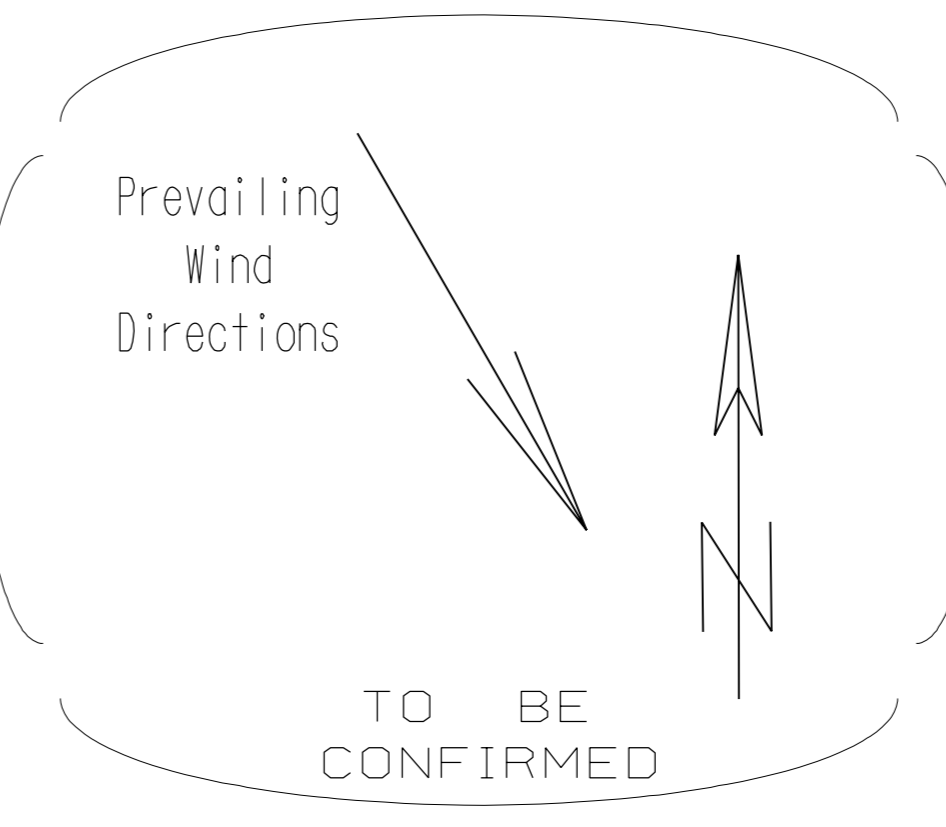
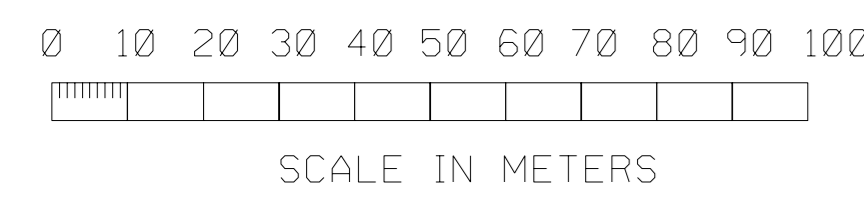
SKELETON DIAGRAM

NASIRYAH GAS POWER STATION 1 & 2

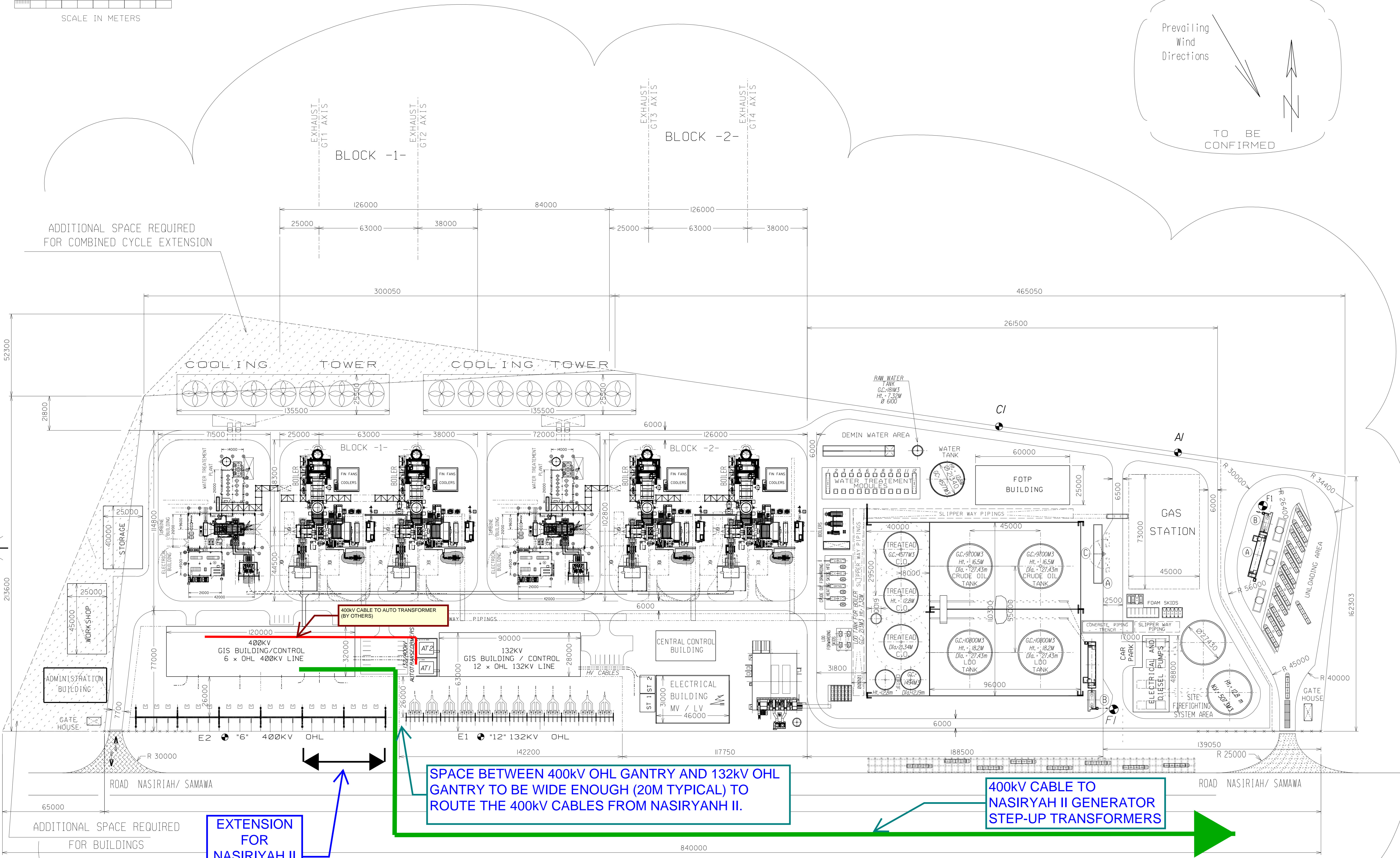
Attachment - 9 Nasiryah I Conceptual Plant Layout

PLANT VIEW

Scale : 1/1000



- NOTES:
- THE PURPOSE OF THIS DRAWING IS TO PROPOSE A CONCEPTUAL LAYOUT OF A POWER PLANT BASED ON THE BELOW CONFIGURATION AND ASSUMPTIONS:
 - CONFIGURATION:
 - 1ST PHASE: INSTALLATION OF 4X9E GT UNITS IN SC (SIMPLE CYCLE), RUNNING WITH DISTILLATE OIL, CRUDE OIL AND NATURAL GAS.
 - 2ND PHASE: ADD ON OF 4X9E GT UNITS IN COMBINED CYCLE, RUNNING WITH DISTILLATE OIL, CRUDE OIL AND NATURAL GAS.
 - ASSUMPTIONS:
 - THIS DOCUMENT IS BASED ON MOE SITE SURVEY AND INFORMATION HANDED OVER TO GE.
 - L IQUID FUEL STORAGE CAPACITY ENOUGH FOR 5 DAYS LDO AND 5 DAYS CRUDE OIL FOR 4 GT CONSUMPTION.
 - THE CONSTRUCTION AREA IS SUPPOSED FREE OF ANY ABOVE AND UNDERGROUND OBSTRUCTION AND NETWORK. ALL EXISTING ABOVE AND UNDERGROUND STRUCTURES TO BE REMOVED BY MOE.
 - PREVAILING WINDS DIRECTION TO BE CONFIRMED BY MOE. WIND FROM SOUTH IS VERY DUSTY AND SANDY.
 - PROPOSAL TAPPING POINTS :
 - A1: NATURAL GAS PROPOSED TAPPING POINT. (NOT APPLICABLE)
 - B1: (NOT APPLICABLE)
 - C1: RIVER WATER SUPPLY. (RAW WATER WILL BE BROUGHT FROM THE RIVER BY EPC TO PLANT BATTERIES LIMITS UNTIL POINT C)
 - E1: 132 KV OUTGOING LINES
 - E2: 400 KV OUTGOING LINES
 - F1: SITE DRAINAGE NETWORK DISCHARGE
 - THE SIZE (FOOT PRINT) OF ALL EQUIPMENT THAT ARE NOT SUPPLIED BY GE, ARE ASSUMED SIZES AND NEED TO BE CONFIRMED BY MOE AND OWNER ENGINEER ONCE THE EQUIPMENT HAS BEEN SELECTED AND ACTUAL FOOT PRINT HAS BEEN DETERMINED.
 - GAS PIPE LOCATION AND DISTANCE FROM THE SITE TO BE CHECKED (SURVEY) AND CONFIRMED BY OWNER ENGINEER AND MOE.
 - BASED ON THE SITE INFORMATION RECEIVED FROM MOE, THIS CONCEPTUAL DESIGN DRAWING IS PROPOSED TO THE EPC CONTRACTOR FOR DEVELOPING HIS PROPOSAL FOR THIS PROJECT. PREPARATION OF THE SITE SPECIFIC POWER PLANT DETAILED DESIGN IS THE SOLE RESPONSIBILITY OF THE EPC CONTRACTOR.
 - SITE BENCHMARK AND BONDARY COORDINATES TO BE CONFIRMED BY MOE.



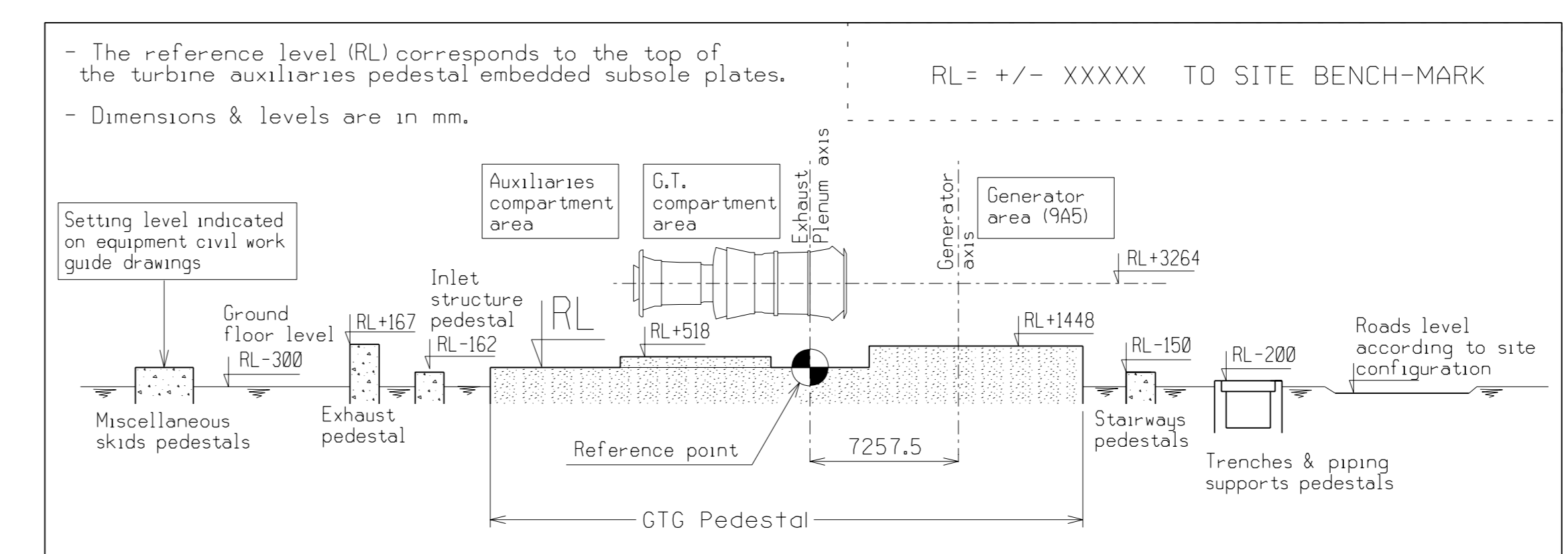
- (A) OIL AND PETROL SEPARATOR According To API 421
- (B) OIL AND PETROL SEPARATOR According To NFEN 858 PART 1 CLASS I (5 mg / L .)
- (C) CONCRETE PITS FOR UNLOADING SKIS

EXTENSION FOR NASIRIYAH II PROJECT OHL

SPACE BETWEEN 400KV OHL GANTRY AND 132KV OHL GANTRY TO BE WIDE ENOUGH (20M TYPICAL) TO ROUTE THE 400KV CABLES FROM NASIRYANH II.

400KV CABLE TO NASIRIYAH II GENERATOR STEP-UP TRANSFORMERS

DWG No. 143 E 9054, Rev.G
JICA MARK-UP
Rev.1 (Feb-12-2012)



MINISTRY OF ELECTRICITY
- IRAQ -

MEGA DEAL POWER PLANT

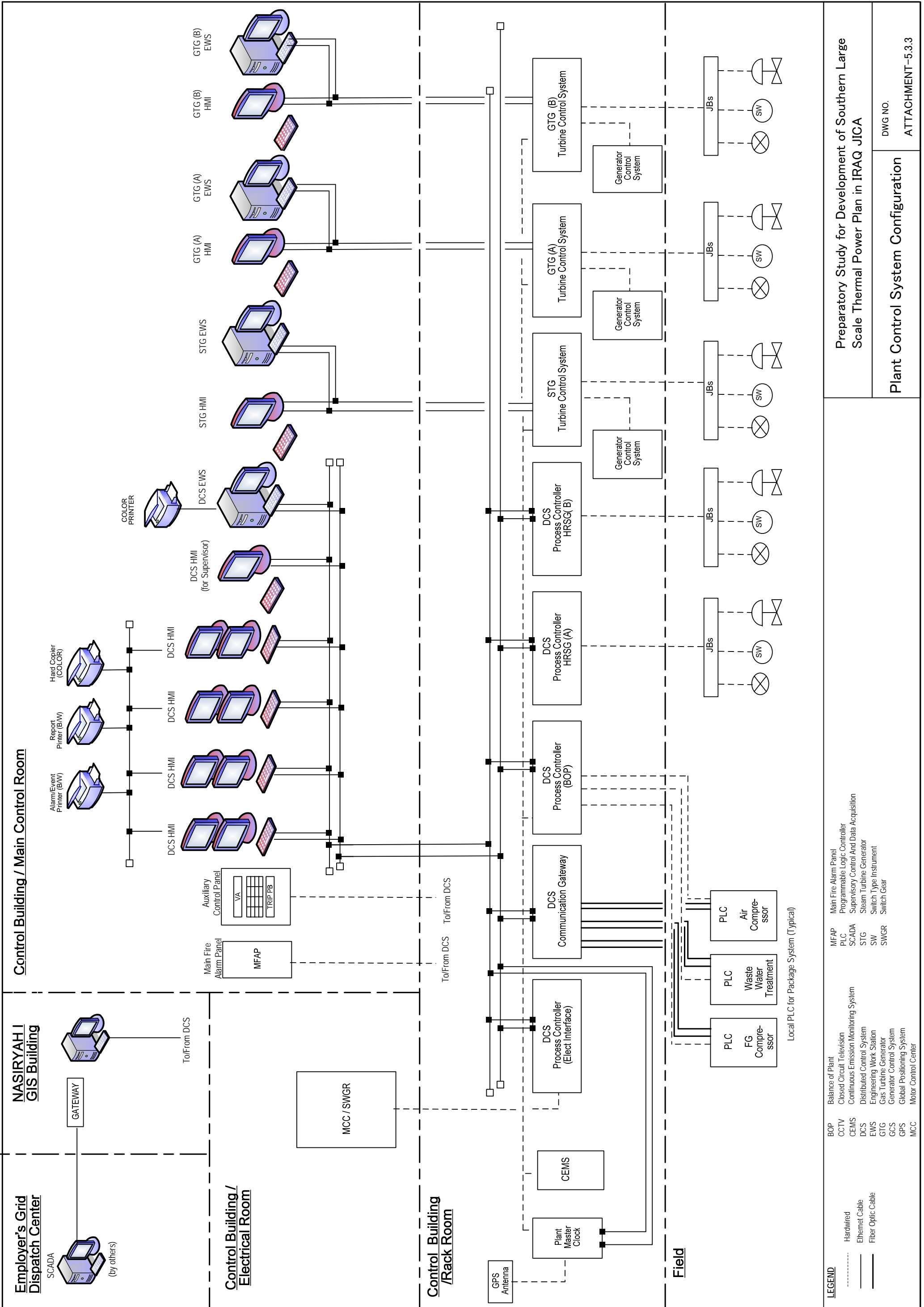
NASIRIAH 4 x GT9E

REFERENCE NBER :			
EDL / SCALE	DATE	24/01/12	24/01/12
1/1000	NOV / NAME	ZWISLER	PREVITALI
FORMAT/SIZE	VISA		DELA TOUR
AO	REDGE / MADE	VERIFIE / CHECKED	APPROVE/APPROVED

TITRE/TITLE
ENGINEERING DOCUMENTATION
CONCEPTUAL
PLANT LAYOUT

<p>GE Energy</p>	<p>N° 143 E 9054</p> <p>1 / F</p>	<p>SECTION DIS.</p>

Attachment - 10 Plant control system configuration



Preparatory Study for Development of Southern Large Scale Thermal Power Plan in IRAQ JICA

Plant Control System Configuration

DWG NO. ATTACHMENT-5.3.3

LEGEND	Balance of Plant	MFAP	Main Fire Alarm Panel
BOP	Closed Circuit Television	PLC	Programmable Logic Controller
CCTV	Continuous Emission Monitoring System	SCADA	Supervisory Control And Data Acquisition
CEMS	Distributed Control System	STG	Steam Turbine Generator
DCS	Engineering Work Station	SW	Switch Type Instrument
EWS	Gas Turbine Generator	SWGR	Switch Clear
GTG	Generator Control System		
GCS	Global Positioning System		
GPS	Motor Control Center		
MCC			

Local PLC for Package System (Typical)

- PLC FG Compressor
- PLC Waste Water Treatment
- PLC Air Compressor

To/From DCS

To/From DCS

Control Building / Main Control Room

Control Building / Electrical Room

Control Building / Rack Room

Field