

K.MANIYAFUSHI POWER SYSTEM UPGRADING PROJECT

BASIC DESIGN STUDY REPORT

May 2017

STATE ELECTRIC COMPANY LIMITED

MALE'

MALDIVES

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1 INTRODUCTION

K.Maniyafushi Island located 17 kilometers SW from the Capital City Male' with just over one hectare of land area is used by the Ministry of Fisheries and Agriculture as a mariculture island. The island already consists of the necessary infra-structure which allows it to function as its core establishment.

However the existing electric power system is insufficient for its full operation and also for the planned upgrading works.

This document includes the power consumption for the future buildings and its equipment's which are anticipated to come in a near future by the Ministry.



2 BASIC CONCEPT OF THE PROJECT

Based on the data provided by the ministry and through analysis of the data, the basic concept of the proposal is to construct a new power plant along with a suitable and reliable distribution system that can cater for the existing and future demands at an optimum cost. The concept also emphasizes on providing reliable and cost effective power to the island. With this concept in mind, the capital investment is brought to a minimum.

3 OUTLINE OF THE BASIC PLAN

3.1 Load Forecast

The load forecasts for staff accommodation and hatchery and other such infrastructure areas are developed for 10 years but for street light and lighting for public spaces are considered constant. Refer Annex 2 for detailed calculations.

3.2 Generator Set Sizing and main Control Panel Board

For continuous operation of power system minimum four generator sets shall be installed. The power house and control panel shall be large enough to accommodate the diesel generator sets sizes for the 10 year period. The panel board is a synchronizing panel board with automatic load sharing for two generator sets.

3.3 Voltage Drop

Main distribution cables are selected to limit the voltage drop to maximum 5% for the 10 year period and up to 2% for the consumer cables. Existing consumer and road light cables shall be used where possible and make joints where necessary to connect new/ existing distribution boxes. Refer Annex 5 for detail calculations.

3.4 Power House Building

Existing power house insufficient for the installation of additional generators and control panel thus a new powerhouse building is designed and constructed. The new powerhouse will be equipped with sound attenuators and rockwool insulated roofs to minimize noise. Refer Annex 10 for basic design of a new power house.

3.5 Fuel tank

A fuel storage tank with a capacity of 3,600 liters shall be constructed within the powerhouse premises. Refer Annex 8.

3.6 Fire System

Fire extinguishers shall be installed at suitable locations of the powerhouse and in the premises. A fire alarm system with smoke and heat detectors shall be installed within the powerhouse.

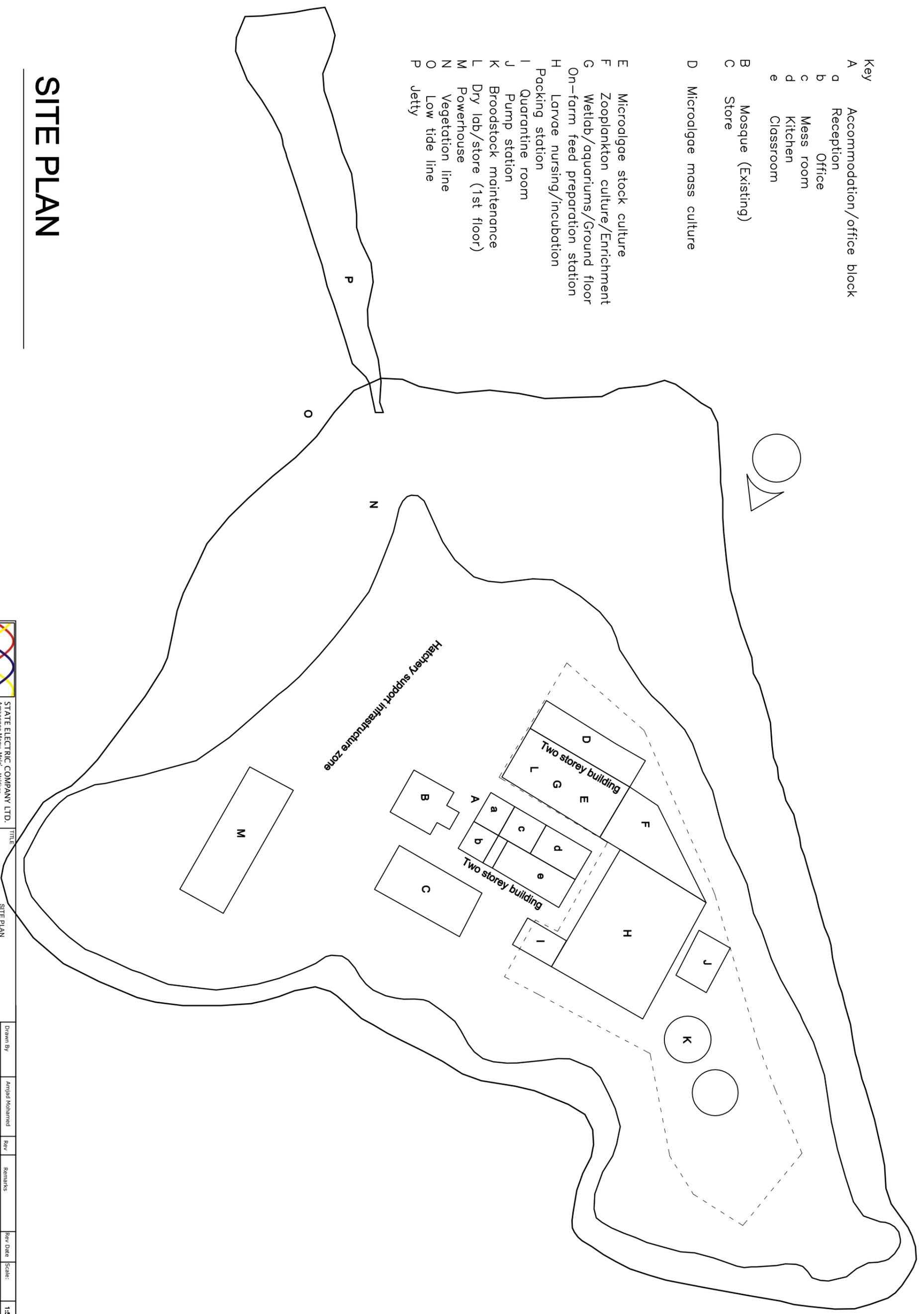
4 PROJECT EFFECTS

With the commissioning of the upgraded power system, reliable and cost effective power will be delivered to the consumers throughout the day. Generating capacity of the power station would be further upgraded only on demand. With this strategy, the consumers on the island will benefit from low cost and reliable power for their consumption.

This project, if implemented as planned, will consolidate the infrastructure of the island and is an important means for developing K.Maniyafushi further. Stable, reliable and cost-effective electricity to this island will improve the life span of the general electrical appliance and as well as the most expensive machineries used in the island. .

ANNEX 1:
Site Plan

- Key
- A Accommodation/office block
 - a Reception
 - b Office
 - c Mess room
 - d Kitchen
 - e Classroom
 - B Mosque (Existing)
 - C Store
 - D Microalgae mass culture
 - E Microalgae stock culture
 - F Zooplankton culture/Enrichment
 - G Wetlab/aquariums/Ground floor
 - H On-farm feed preparation station
 - I Larvae nursing/incubation
 - J Packing station
 - K Quarantine room
 - L Pump station
 - M Broodstock maintenance
 - N Dry lab/store (1st floor)
 - O Powerhouse
 - P Vegetation line
 - Low tide line
 - Jetty



SITE PLAN



STATE ELECTRIC COMPANY LTD.
Amman, Jordan
Phone : 332 7092
Fax : 332 7036
E-mail : admin@stelco.com.jo

TITLE: SITE PLAN
PROJECT: MANNAFUSHI POWER SYSTEM

Drawn By	Checked By	Rev	Remarks	Rev Date	Scale
Amjad Mohamed <td>Almud Shaiea <td>00 <td></td> <td>-</td> <td>1:500</td> </td></td>	Almud Shaiea <td>00 <td></td> <td>-</td> <td>1:500</td> </td>	00 <td></td> <td>-</td> <td>1:500</td>		-	1:500
HEA Licence No.	HTTL/97/0016				NA
Signature					03/05/2016
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ANNEX 2:
Build up Area and Unit Load

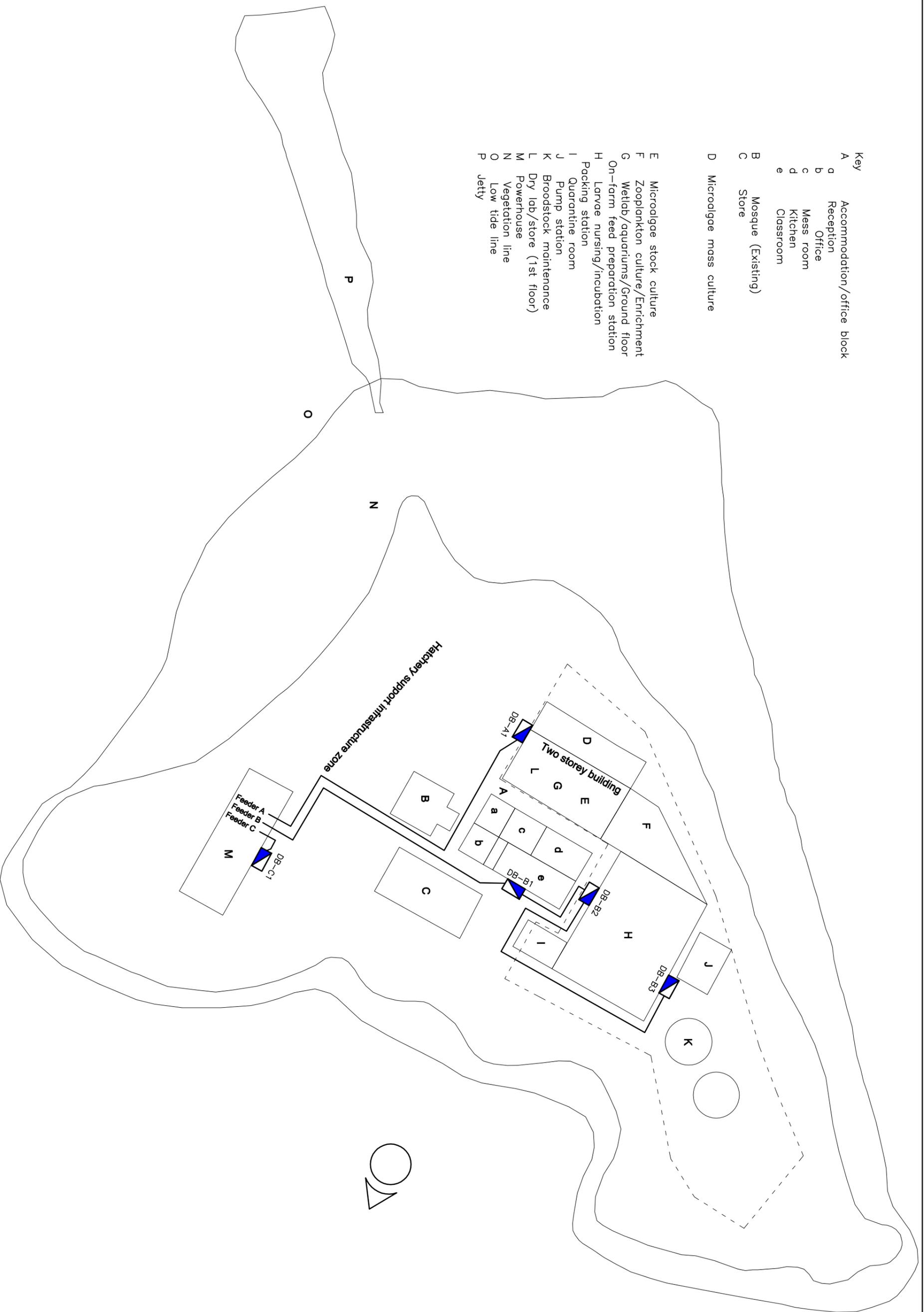
Build Up Area & Unit Load**Maniyafushi**

Kaafu Atoll, Maldives

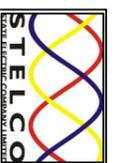
ITEM	BUILDING / FACILITY	NO	UNIT	kW	TOTAL kW	UNIT AREA (sqm)	TOTAL AREA (sqm)
1	Staff Accomodation	1	units	14	14	152.50	153
2	Reception	1	units	2	2		
3	Office	1	units	1.95	1.95		
4	Mess room	1	units	3.5	3.5		
5	Kitchen	1	units	6.35	6.35		
6	Class room	1	units	3.58	3.58		
7	Laundry	1	units	4.4	4.4		
8	Mosque	1	units	1.08	1.08	50.60	51
9	Store	1	units	0.62	0.62	96.00	96
10	Micro algae mass culture	1	units	65.15	65.15	299.50	300
11	Micro stock culture						
12	Zooplankton culture / Enritchment						
13	Wetlab / Aquariums						
14	Dry lab / store	1	units	13	13	279.60	280
15	Larvae nursing / incubation / Packing	1	units	10	10		
16	Quarantine Room	1	units	4	4	27.60	28
17	Pump station	1	units	6	6	36.20	36
18	Broodstock Maintenance	1	units	1.5	1.5	69.20	69
19	Powerhouse / desalination plant	1	units	23.5	23.5	141.00	141
	TOTAL	16	units	160.63	160.63	1152.2	1152
TOTAL BUILT UP AREA							1,152.20
TOTAL LAND AREA							9,715.00
TOTAL BUILT UP PERCENTAGE							11.86%

ANNEX 3:
Distribution Map

- Key
- A Accommodation/office block
 - a Reception
 - b Office
 - c Mess room
 - d Kitchen
 - e Classroom
 - B Mosque (Existing)
 - C Store
 - D Microalgae mass culture
 - E Microalgae stock culture
 - F Zooplankton culture/Enrichment
 - G Wetlab/aquariums/Ground floor
 - H On-farm feed preparation station
 - I Larvae nursing/incubation
 - J Packing station
 - K Quarantine room
 - L Pump station
 - M Broodstock maintenance
 - N Dry lab/store (1st floor)
 - O Powerhouse
 - P Vegetation line
 - Q Low tide line
 - R Jetty



DISTRIBUTION NETWORK



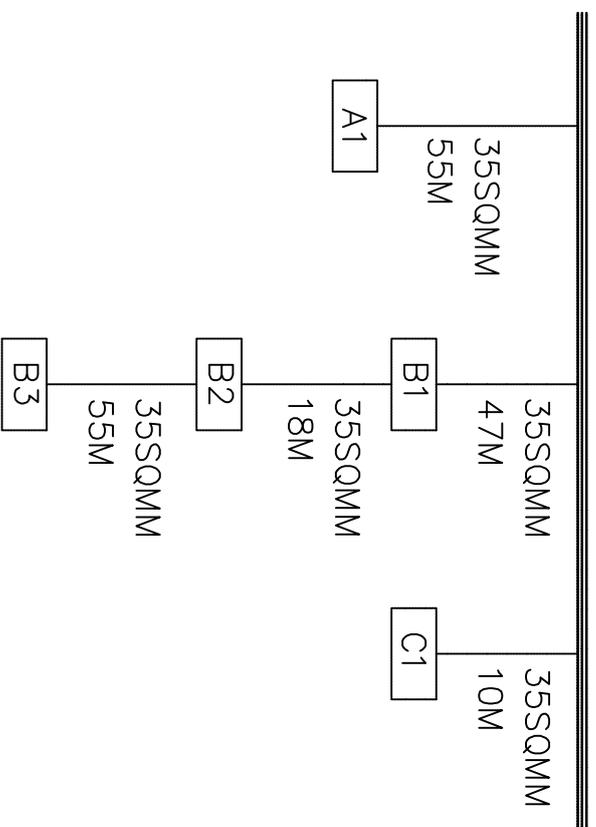
STATE ELECTRIC COMPANY LTD.
 Anaaerree Magu, Male', Maldives
 Phone : 332 0982
 Fax : 332 7036
 E-mail : admin@stelco.com.mv

TITLE : DISTRIBUTION MAP
 PROJECT : MANIYAFUSHI POWER SYSTEM

Drawn By	Checked By	Rev	Remarks	Rev Date	Scale:
Amjad Mohamed	Ahmed Shaleu	01	added DB, added 2 gensets	5/10/17	1:500
MEAL Licence No.	MTL/97/0016				Drawing No. NA
Signature				Date	03/05/2016
				Sheet No	01 of 01
					Next Sheet 0

ANNEX 4:
Distribution Schematic Diagram

BUSBAR 400V



STATE ELECTRIC COMPANY LTD.
 Amateene Magu, Male', Maldives.
 Phone : 332 0982
 Fax : 332 7036
 Email : admin@stelco.com.nv

TITLE		DRAWN BY		REV		SCALE:	
DISTRIBUTION SCHEMATIC DIAGRAM		Ahmed Mohammed		01		NA	
PROJECT		CHECKED BY		REMARKS		REV DATE	
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ANNEX 5:
Feeder Voltage Drop Calculations

VOLTAGE DROP CALCULATION

Feeder A

Voltage Drop Calculation sheet for Underground LV Copper Cables.(BS 6346)

Distance															PH-A1	Voltdrop	%
Sections		13	12	11	10	9	8	7	6	5	4	3	2	1	400 Volts		
Length (km)		0	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055			
Cab.size	16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.43		
Cab.size	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.26		
Cab.size	35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.99	8.99	2.25
Cab.size	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.62		
Cab.size	70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.66		
Cab.size	95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.51		
Cab.size	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.86		
Cab.size	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37		
Cab.size	185	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04		
Cab.size	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72		
Cab.size	300	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.55		
Cab.size	400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.31		
Kilowatts		0	78.15														

Section No.	KVA drop Per Km.	Terminal Voltage		Terminal Amps.	
				Section	Load
1	5.37	V1	380.00	I1	148.60
2	0.00	V2	400.00	I2	148.60
3	0.00	V3	400.00	I3	148.60
4	0.00	V4	400.00	I4	148.60
5	0.00	V5	400.00	I5	148.60
6	0.00	V6	400.00	I6	148.60
7	0.00	V7	400.00	I7	148.60
8	0.00	V8	400.00	I8	148.60
9	0.00	V9	400.00	I9	148.60
10	0.00	V10	400.00	I10	148.60
11	0.00	V11	400.00	I11	148.60
12	0.00	V12	400.00	I12	148.60
13	0.00	V13	400.00	I13	148.60
14	0.00	V14	400.00	I14	148.60
15	0.00	V15	400.00	I15	148.60
		V16	400.00		
Total	5.37				

VOLTAGE DROP CALCULATION

Feeder B

Voltage Drop Calculation sheet for Underground LV Copper Cables.(BS 6346)

Distance													B2-B3	B1-B2	PH-B1	Voltdrop	%
Sections		13	12	11	10	9	8	7	6	5	4	3	2	1	400 Volts		
Length (km)		0	0	0	0.000	0.055	0.018	0.047									
Cab.size	16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.99	1.85	8.37		
Cab.size	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.13	2.42	5.02		
Cab.size	35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.69	1.77	3.68		
Cab.size	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.93	1.31	2.71	8.95	2.24
Cab.size	70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.47	0.92	1.91		
Cab.size	95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.62	0.69	1.44		
Cab.size	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.13	0.56	1.17		
Cab.size	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.76	0.47	0.97		
Cab.size	185	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.52	0.40	0.84		
Cab.size	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.34	0.70		
Cab.size	300	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.31	0.64		
Cab.size	400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.26	0.54		
Kilowatts		0	0	0	0	0	0	0	0	0	0	0	11.5	10	37.48		

Section No.	KVA drop Per Km.	Terminal Voltage		Terminal Amps.	
				Section	Load
1	2.20	V1	380.00	I1	71.27
2	0.23	V2	393.69	I2	89.62
3	0.79	V3	395.09	I3	110.65
4	0.00	V4	400.00	I4	110.65
5	0.00	V5	400.00	I5	110.65
6	0.00	V6	400.00	I6	110.65
7	0.00	V7	400.00	I7	110.65
8	0.00	V8	400.00	I8	110.65
9	0.00	V9	400.00	I9	110.65
10	0.00	V10	400.00	I10	110.65
11	0.00	V11	400.00	I11	110.65
12	0.00	V12	400.00	I12	110.65
13	0.00	V13	400.00	I13	110.65
14	0.00	V14	400.00	I14	110.65
15	0.00	V15	400.00	I15	110.65
		V16	400.00		
Total	3.22				

VOLTAGE DROP CALCULATION

Feeder C

Voltage Drop Calculation sheet for Underground LV Copper Cables.(BS 6346)

Distance															PH-A1	Voltdrop	%
Sections		13	12	11	10	9	8	7	6	5	4	3	2	1	400 Volts		
Length (km)		0	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010		
Cab.size	16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12		
Cab.size	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67		
Cab.size	35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.49	0.12
Cab.size	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36		
Cab.size	70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25		
Cab.size	95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19		
Cab.size	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16		
Cab.size	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13		
Cab.size	185	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11		
Cab.size	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09		
Cab.size	300	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08		
Cab.size	400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07		
Kilowatts		0	23.5														

Section No.	KVA drop Per Km.	Terminal Voltage		Terminal Amps.	
				Section	Load
1	0.29	V1	380.00	I1	44.68
2	0.00	V2	400.00	I2	44.68
3	0.00	V3	400.00	I3	44.68
4	0.00	V4	400.00	I4	44.68
5	0.00	V5	400.00	I5	44.68
6	0.00	V6	400.00	I6	44.68
7	0.00	V7	400.00	I7	44.68
8	0.00	V8	400.00	I8	44.68
9	0.00	V9	400.00	I9	44.68
10	0.00	V10	400.00	I10	44.68
11	0.00	V11	400.00	I11	44.68
12	0.00	V12	400.00	I12	44.68
13	0.00	V13	400.00	I13	44.68
14	0.00	V14	400.00	I14	44.68
15	0.00	V15	400.00	I15	44.68
		V16	400.00		
Total	0.29				

ANNEX 6:
DB Load Calculations

Feeder A

DB REF	DB-A1
MAIN INCOMING SWITCH RATING	100A TPN
SIZE OF INCOMING CABLE	1x 4C x 35sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Micro algae mass culture	1	1	65.15	1.00	0.70	45.61	82	55
2	Micro stock Culture								
3	Zooplankton culture / enrichment								
4	Wetlab / aquarium								
5	Dry lab / store	1	1	13	1.00	0.70	9.10	16	
				78.15			55	99	

Feeder B

DB REF	DB-B1
MAIN INCOMING SWITCH RATING	80A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Staff Accomodation	14	1	14	1.00	0.70	9.80	18	47
2	Reception	2	1	2	1.00	0.70	1.40	3	
3	office	1.95	1	1.95	1.00	0.70	1.37	2	
4	Mess room	3.5	1	3.5	1.00	0.70	2.45	4	
5	Kitchen	6.35	1	6.35	1.00	0.70	4.45	8	
6	Class room	3.58	1	3.58	1.00	0.70	2.51	5	
7	Laundry	4.4	1	4.4	1.00	0.70	3.08	6	
8	Mosque	1.08	1	1.08	1.00	0.70	0.76	1	
9	Store	0.62	1	0.62	1.00	0.70	0.43	1	
				37.48			26	47	

DB REF	DB-B2
MAIN INCOMING SWITCH RATING	63A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Lavae nurse / incubation / packing	10	1	10	1.00	0.70	7.00	13	18
				10.00			7	13	

Feeder B

DB REF	DB-B3
MAIN INCOMING SWITCH RATING	63A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Quarantine Room	4	1	4	1.00	0.70	2.80	5	55
2	Pump station	6	1	6	1.00	0.70	4.20	8	
3	Brood stock maintenance	1.5	1	1.5	1.00	0.70	1.05	2	
				11.50			8	15	

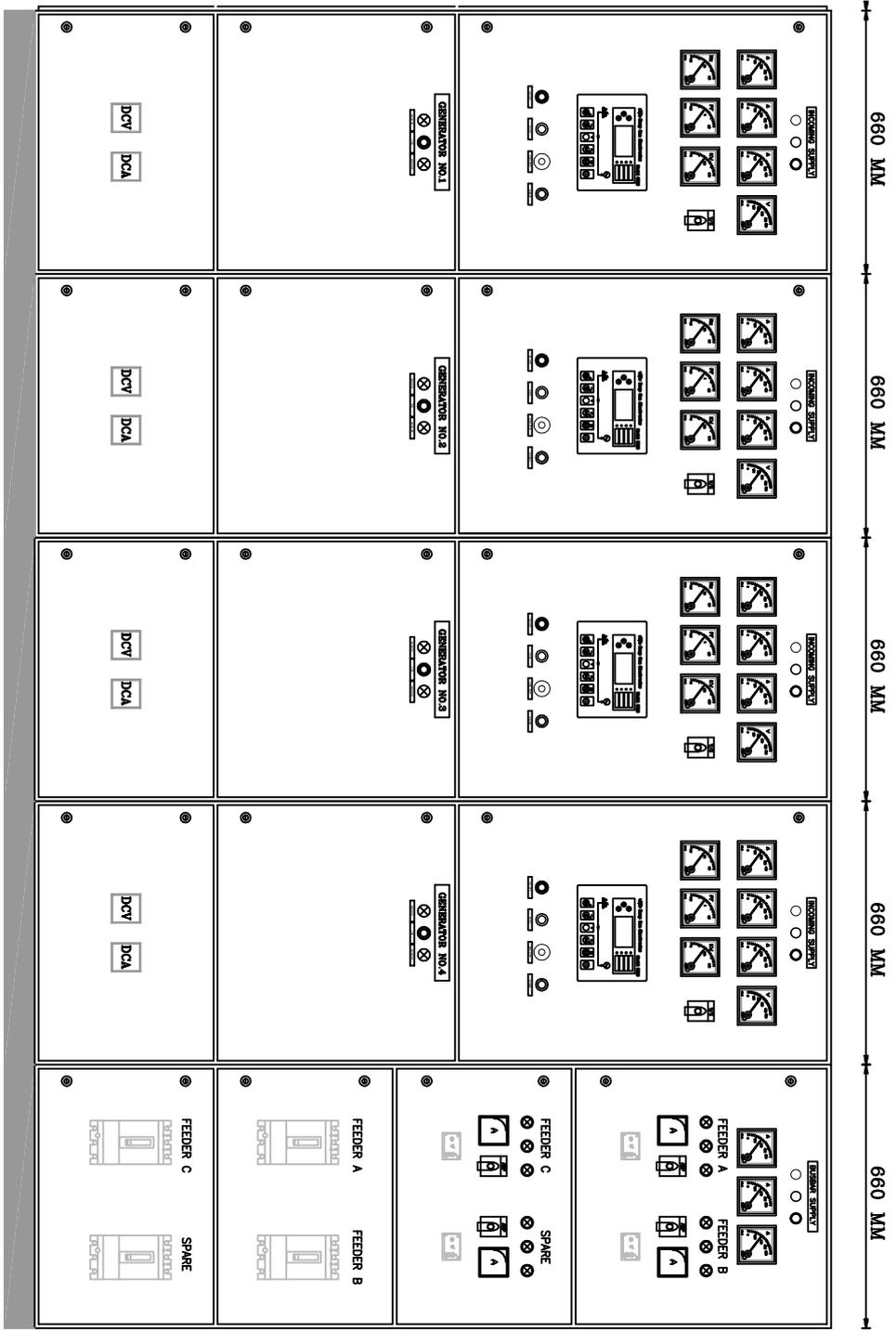
Feeder C

DB REF	DB-C1
MAIN INCOMING SWITCH RATING	63A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

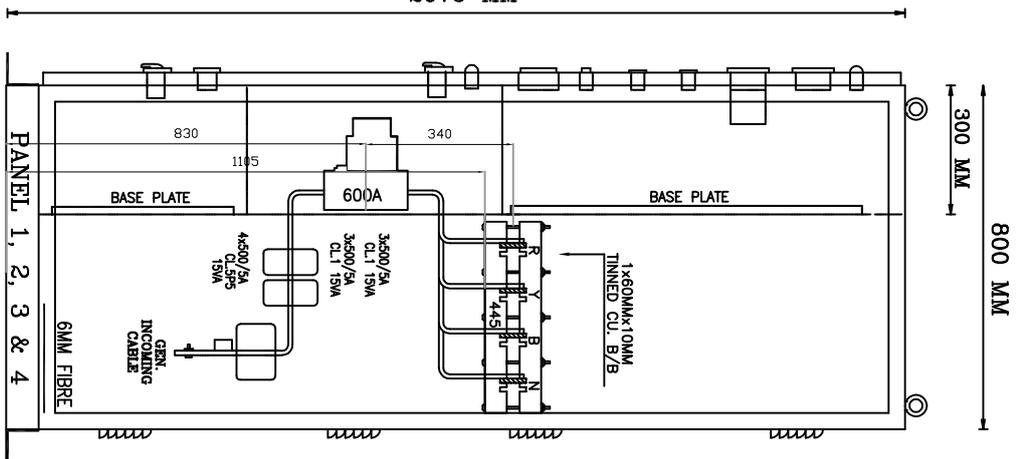
S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Powerhouse	23.5	1	23.5	1.00	0.70	16.45	30	10
				23.50			16	30	

ANNEX 7:
Control Panel Details

2055 MM

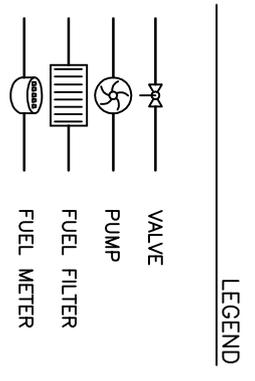
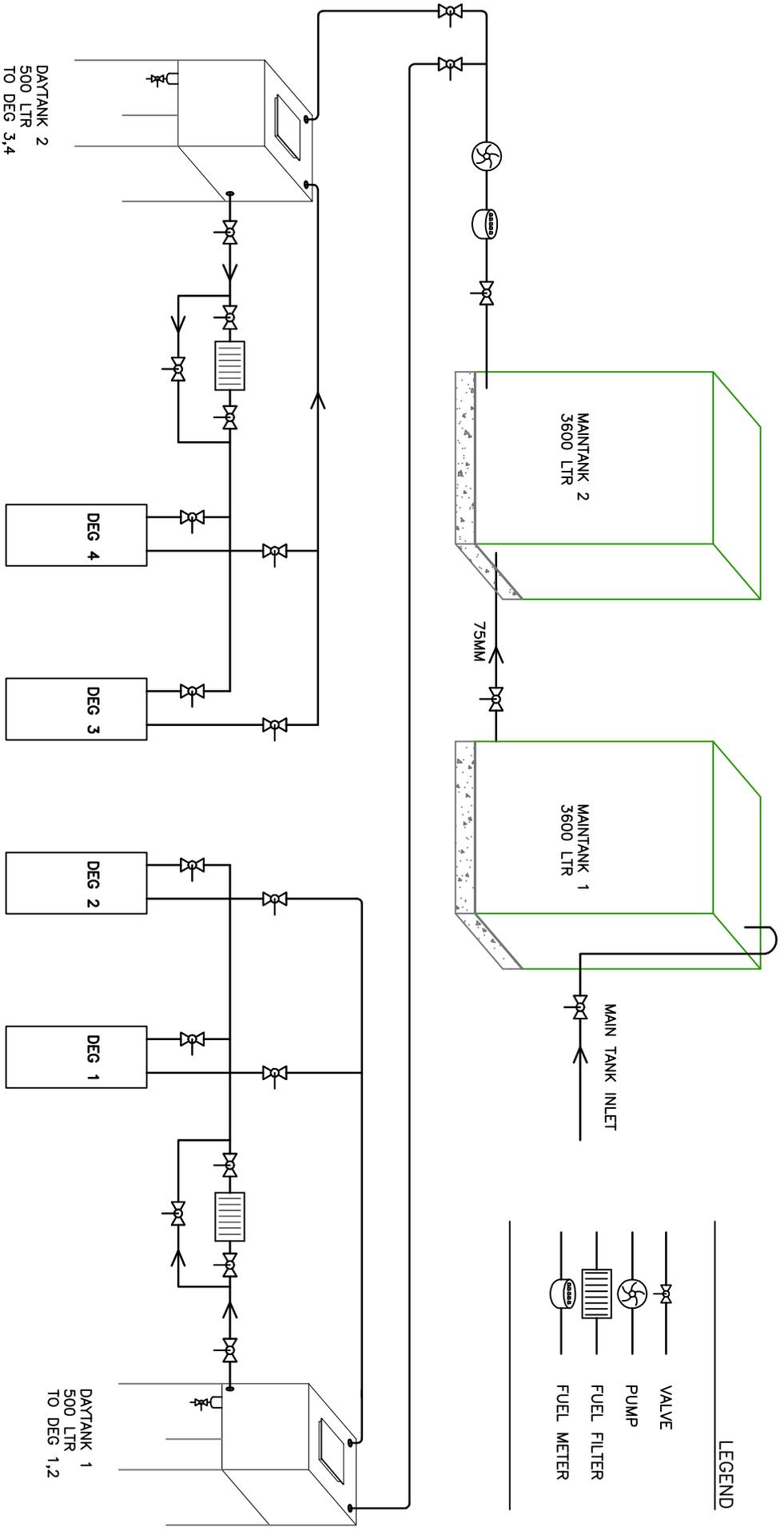


2075 MM



STATE ELECTRIC COMPANY LTD. Amraheer, Magu, Male', Maldives. Phone : 332 0982 Fax : 332 7036 E-mail : admin@stelco.com.mv		TITLE PANEL FRONT VIEW PANEL SECTION VIEW		Drawn By Checked By MEAL Licence No.	Artifd Mohamed Ahmed Saif MEB/2004/385	Rev 01	Remarks Added DB, added 2 generators	Rev Date 5/1/17	Scale: NA	Date 03/05/2016	Sht No 02 of 02	Next Sht 0
PROJECT MANIYAFUSHI POWER SYSTEM				Signature								

ANNEX 8:
Fuel Tank and Fuel Lines

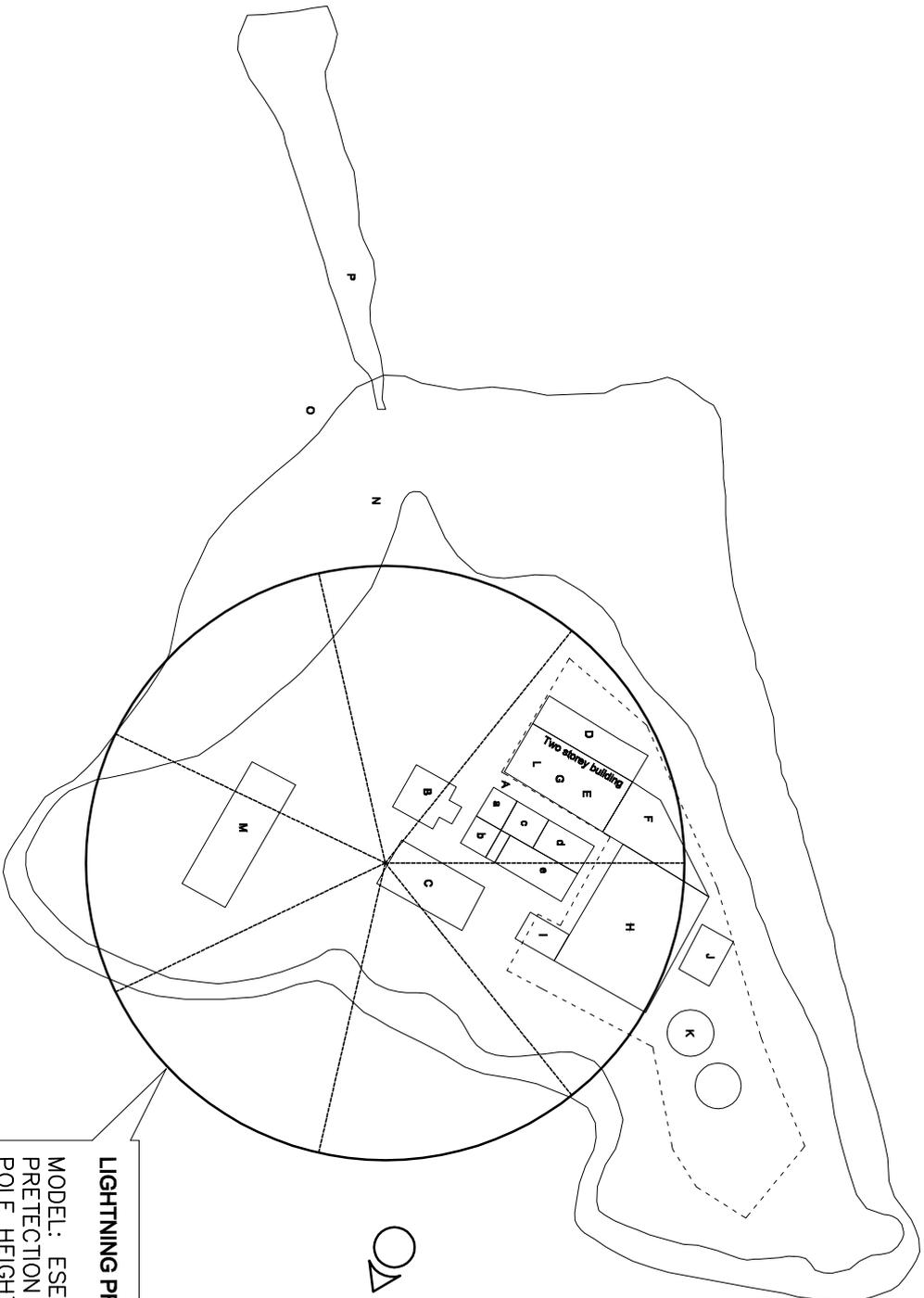


DAYTANK 2
500 LTR
TO DEG 3,4

DAYTANK 1
500 LTR
TO DEG 1,2

		STATE ELECTRIC COMPANY LTD. Amraetree Magu, Male', Maldives. Phone : 332 0982 Fax : 332 7036 E-mail : admin@stelco.com.mv		TITLE FUEL SYSTEM SCHEMATIC DIAGRAM		Drawn By Amjad Mohamed		Rev 01		Remarks added DB, added 2 genses		Rev Date 03/05/2016		Scale 1/A	
PROJECT MANYAFUSHI POWER SYSTEM		Checked By Ahmed Shaheer		ME A Licence No. MTL/97/0016		Signature		Date 03/05/2016		Date 03/05/2016		Shit No 01 of 01		Next Shit 0	

ANNEX 9:
Lightning Protection Layout



LIGHTNING PROTECTION LAYOUT

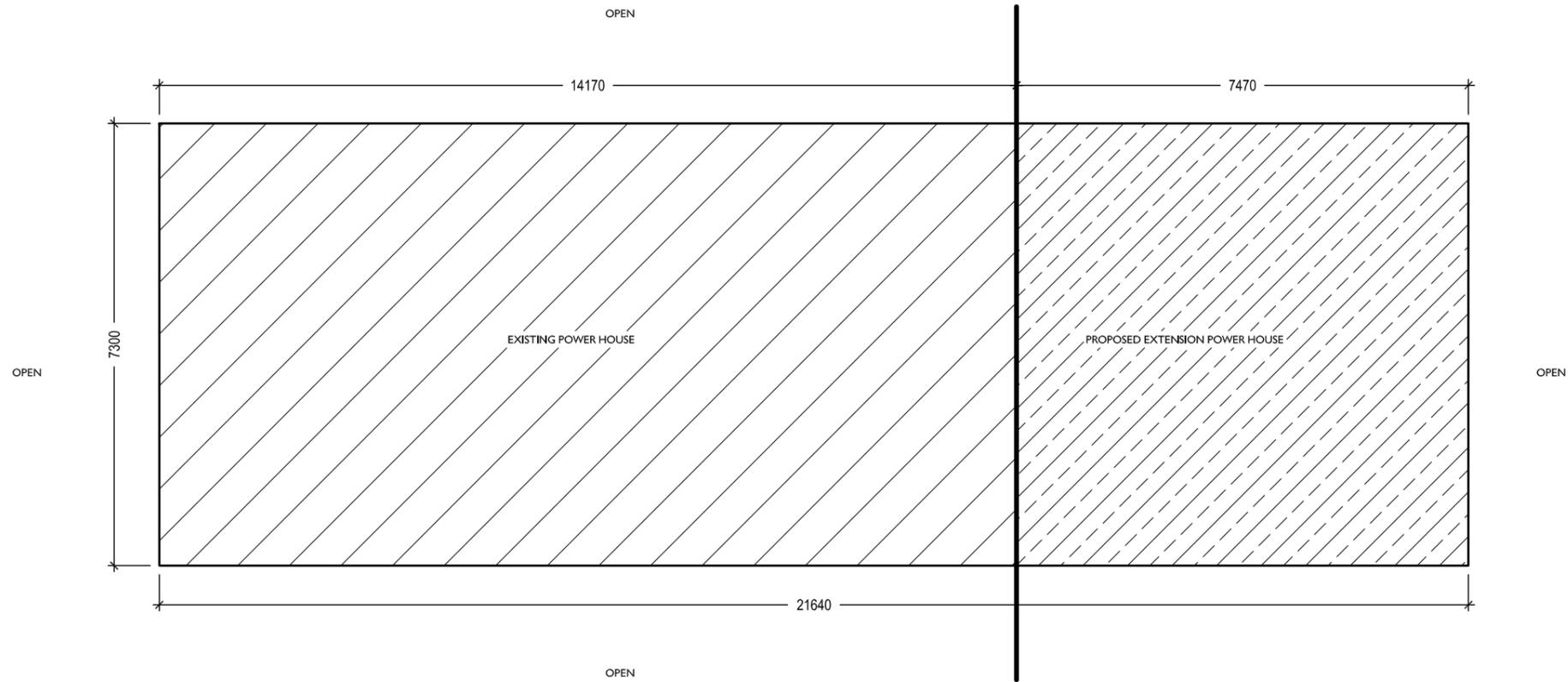


STATE ELECTRIC COMPANY LTD.
 Attaronee Magu, Male', Maldives.
 Phone : 332 0982
 Fax : 332 7036
 E-mail : admin@stelco.com.mv

TITLE	LIGHTNING PROTECTION LAYOUT
PROJECT	MANIYAFUSHI POWER SYSTEM

Drawn By	Amjad Mohamed	Rev	Remarks	Rev Date	Scale
Checked By	Ahmed Sharfeu	00		-	1:1000
MEA Licence No.	MTL/97/0016				N/A
Signature					03/05/2016
					01 of 01
					Next Sht 0

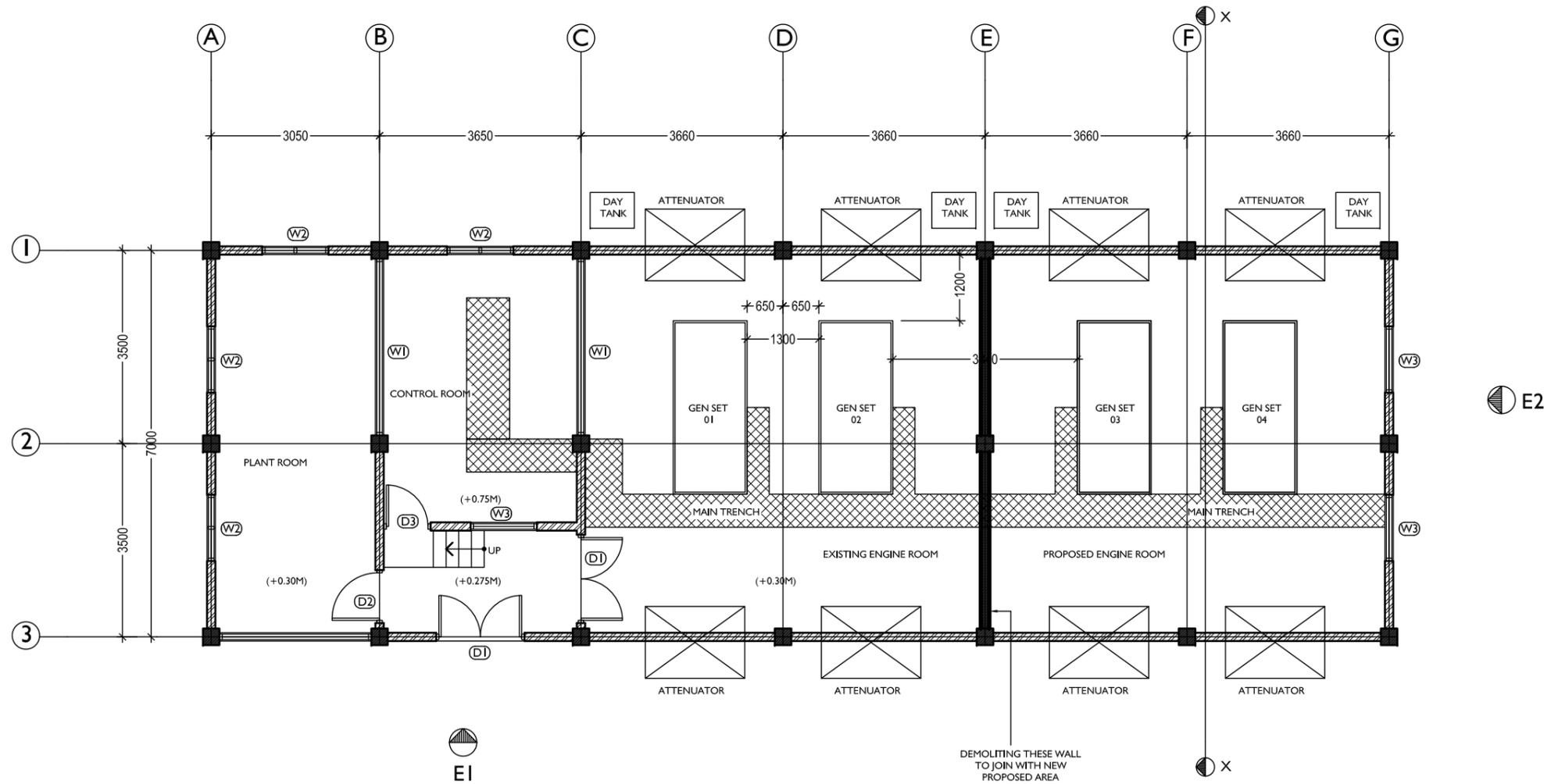
ANNEX 10:
Powerhouse Layouts



SITE PLAN 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	CLIENT :  MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE:	
			1		01- SITE PLAN	
			2		1:100	31 AUGUST 2017

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DEMOLITION PLAN 1:100

NOVEA ENGINEERING
 PO Box 3013
 Male
 Maldives
 m : +9609999413



CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

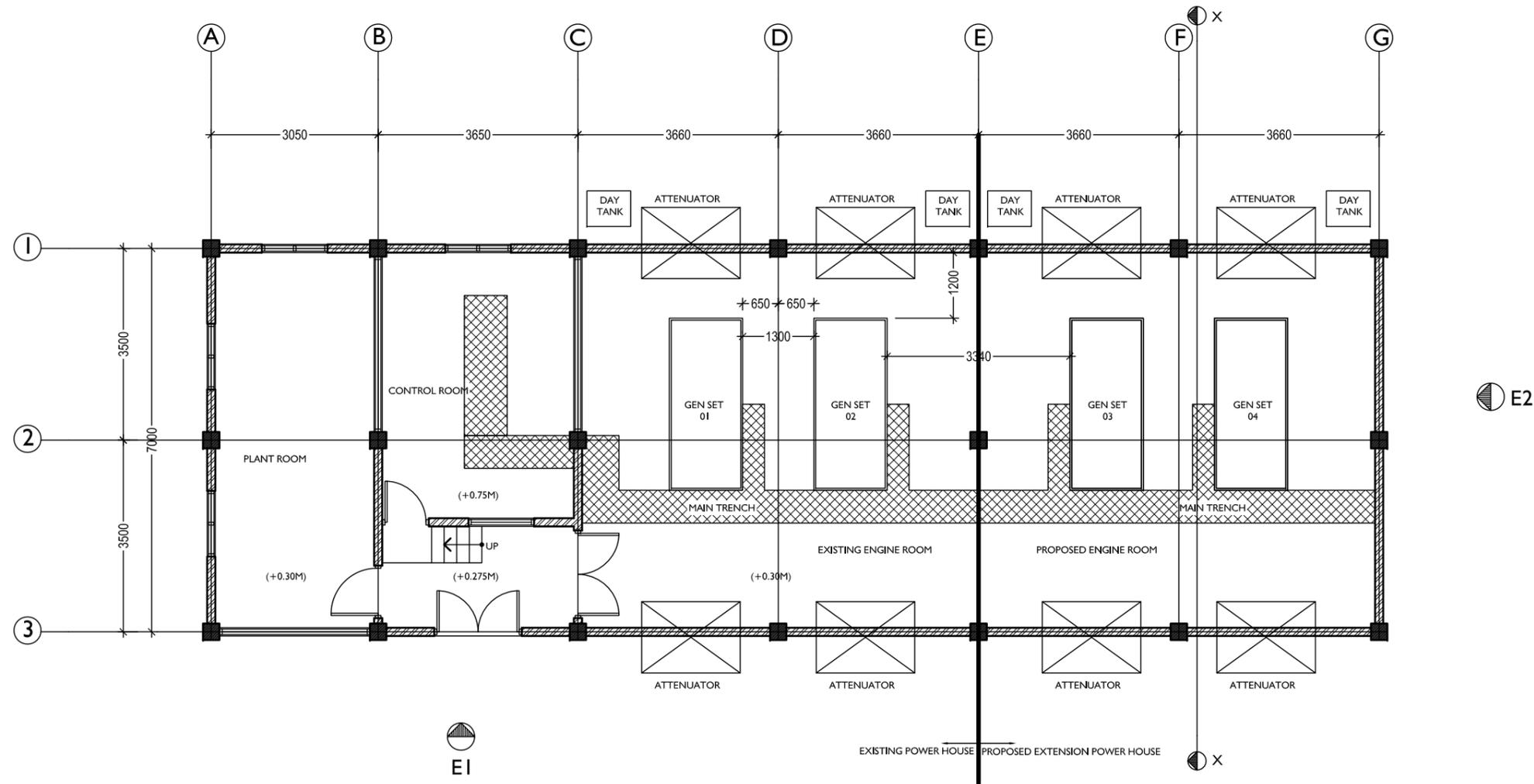
PROJECT :
EXTENSION OF K. MANIYAFARU POWER HOUSE

REVISIONS	
1	
2	

DRAWING TITLE:
02- DEMOLITION PLAN

SCALE : 1:100

DATE : 31 AUGUST 2017



GROUND FLOOR PLAN 1:100

NOVEA ENGINEERING
 PO Box 3013
 Male
 Maldives
 m : +9609999413



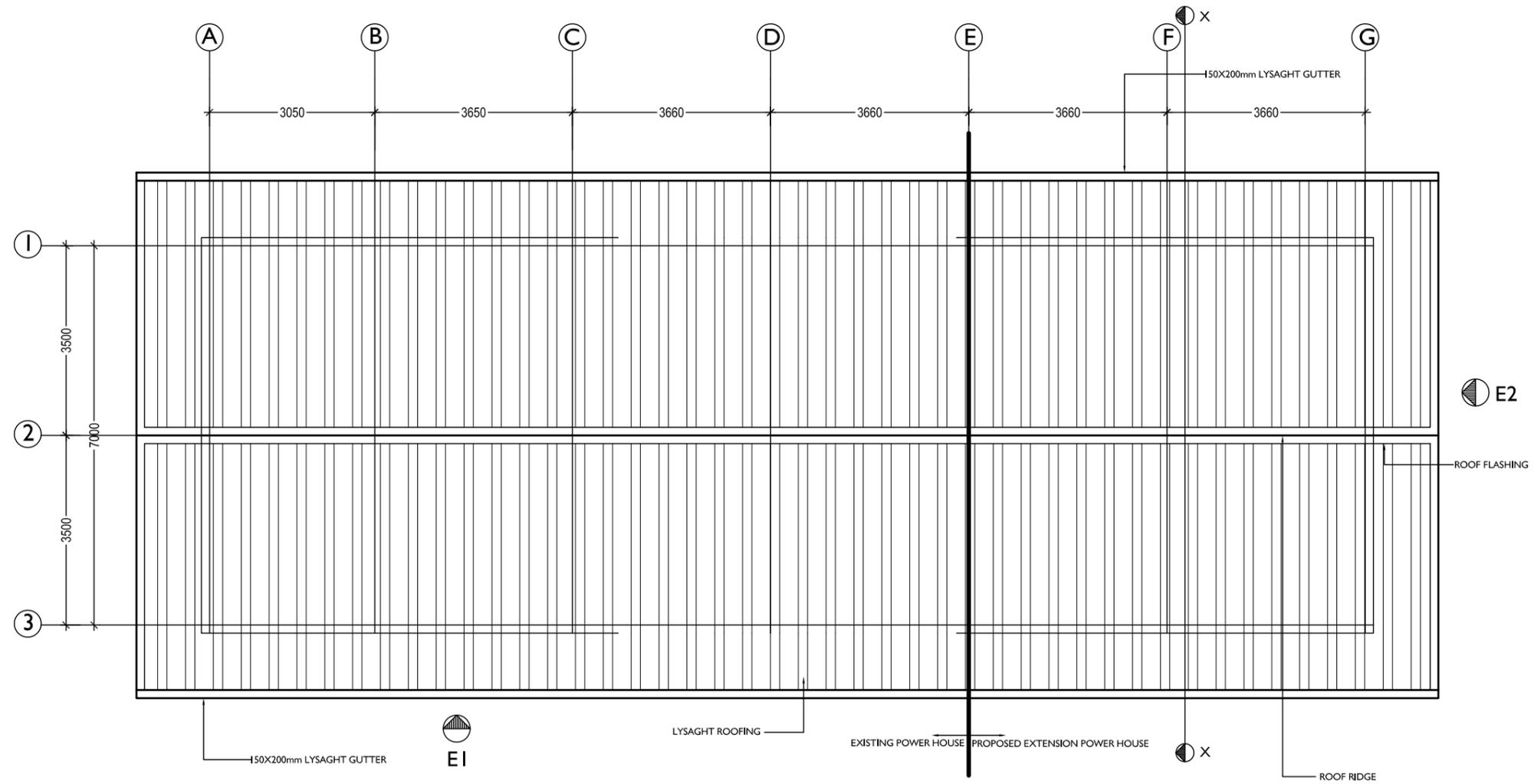
CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

PROJECT :
EXTENSION OF K. MANIYAFARU POWER HOUSE

REVISIONS	
1	
2	

DRAWING TITLE:
03- GROUND FLOOR PLAN

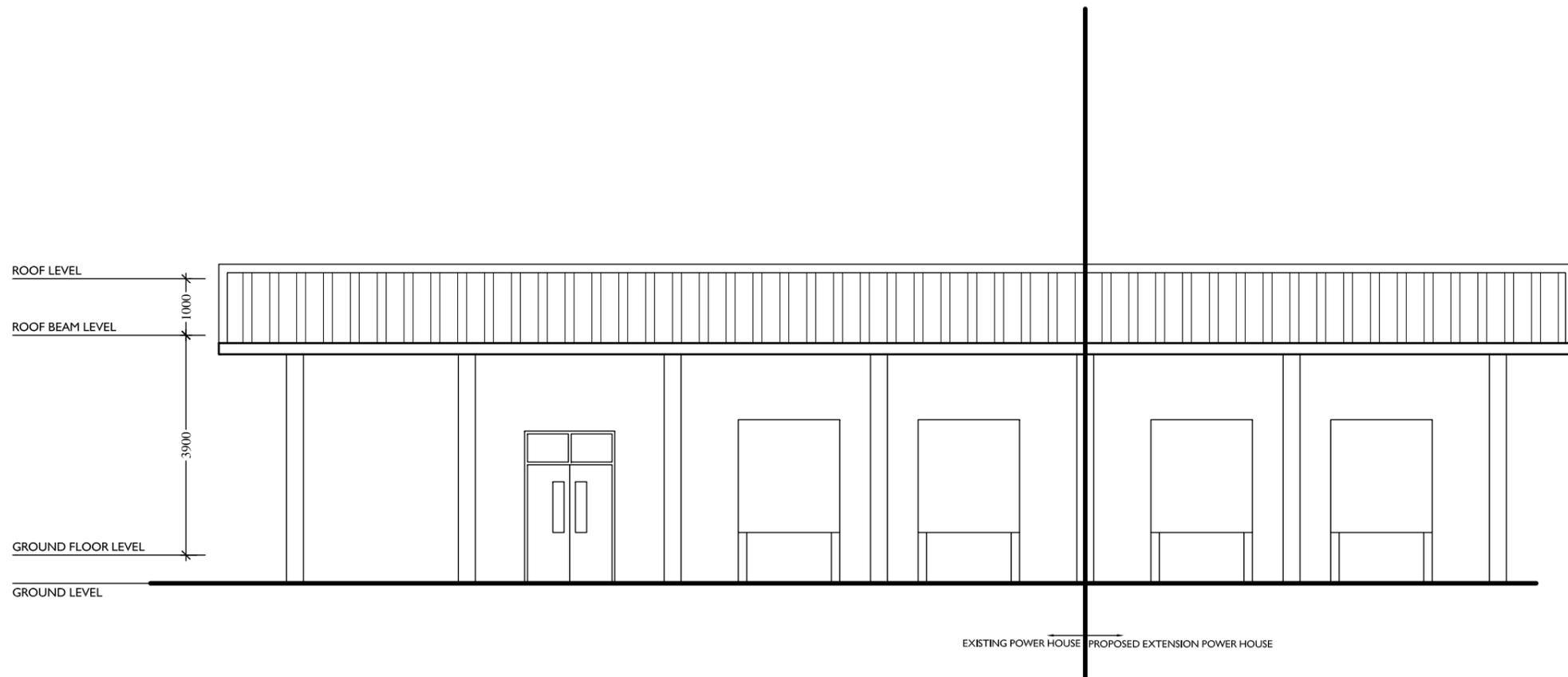
SCALE : 1:100 DATE : 31 AUGUST 2017



ROOF PLAN 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	CLIENT :  MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS	DRAWING TITLE:	
			1	04 - ROOF PLAN	
			2	SCALE :	DATE :
				1:100	31 AUGUST 2017

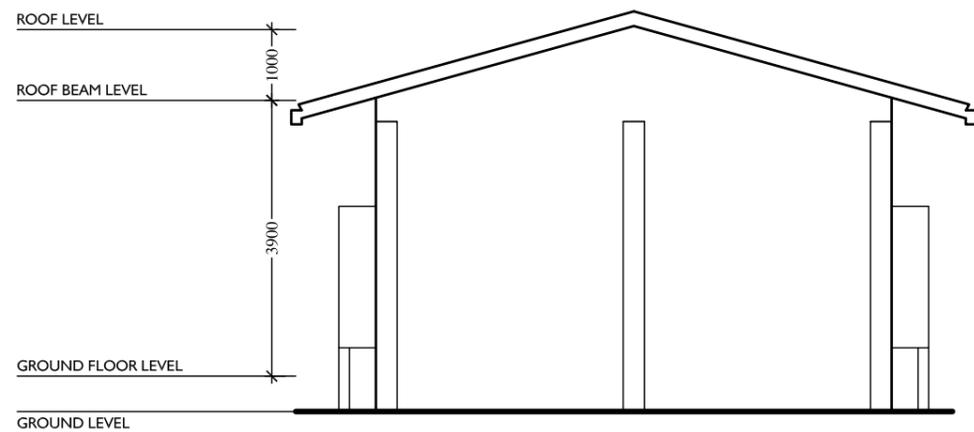
NOTE: ALL DESIGNS ABOVE ARE PROTECTED BY COPYRIGHT. NO PART SHOULD BE REPRODUCED (PHOTOCOPIED OR ANY OTHER MEANS) WITHOUT PERMISSION .



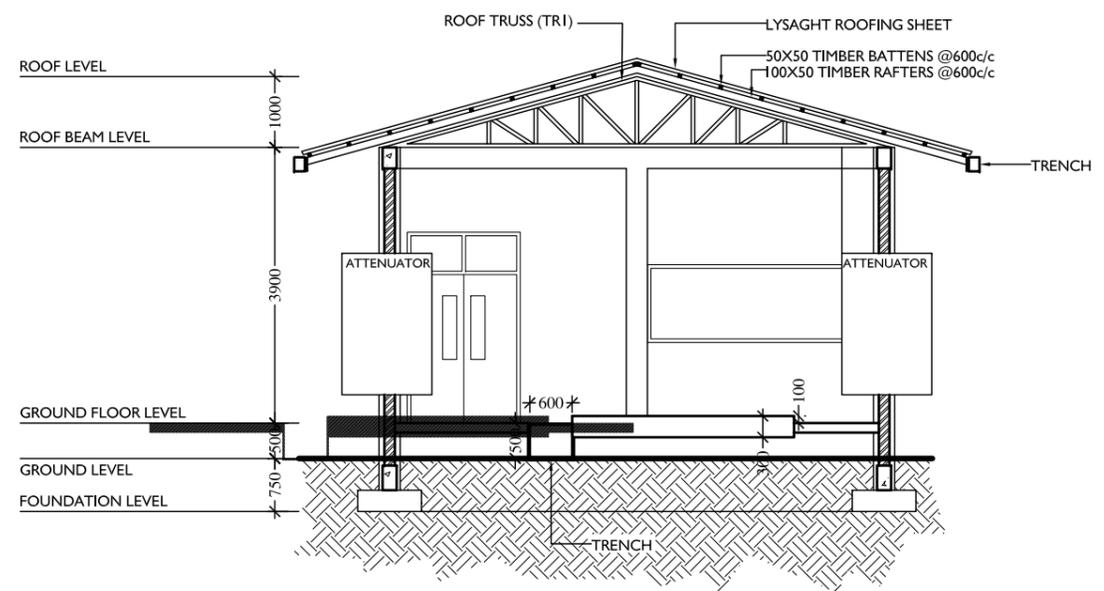
FRONT ELEVATION (EI) 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE:	
			1		05 - FRONT ELEVATION	
			2		SCALE : 1:100	DATE : 31 AUGUST 2017

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SIDE ELEVATION (E2) 1:100



SECTION X-X 1:100

NOVEA ENGINEERING
 PO Box 3013
 Male
 Maldives
 m : +9609999413



CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

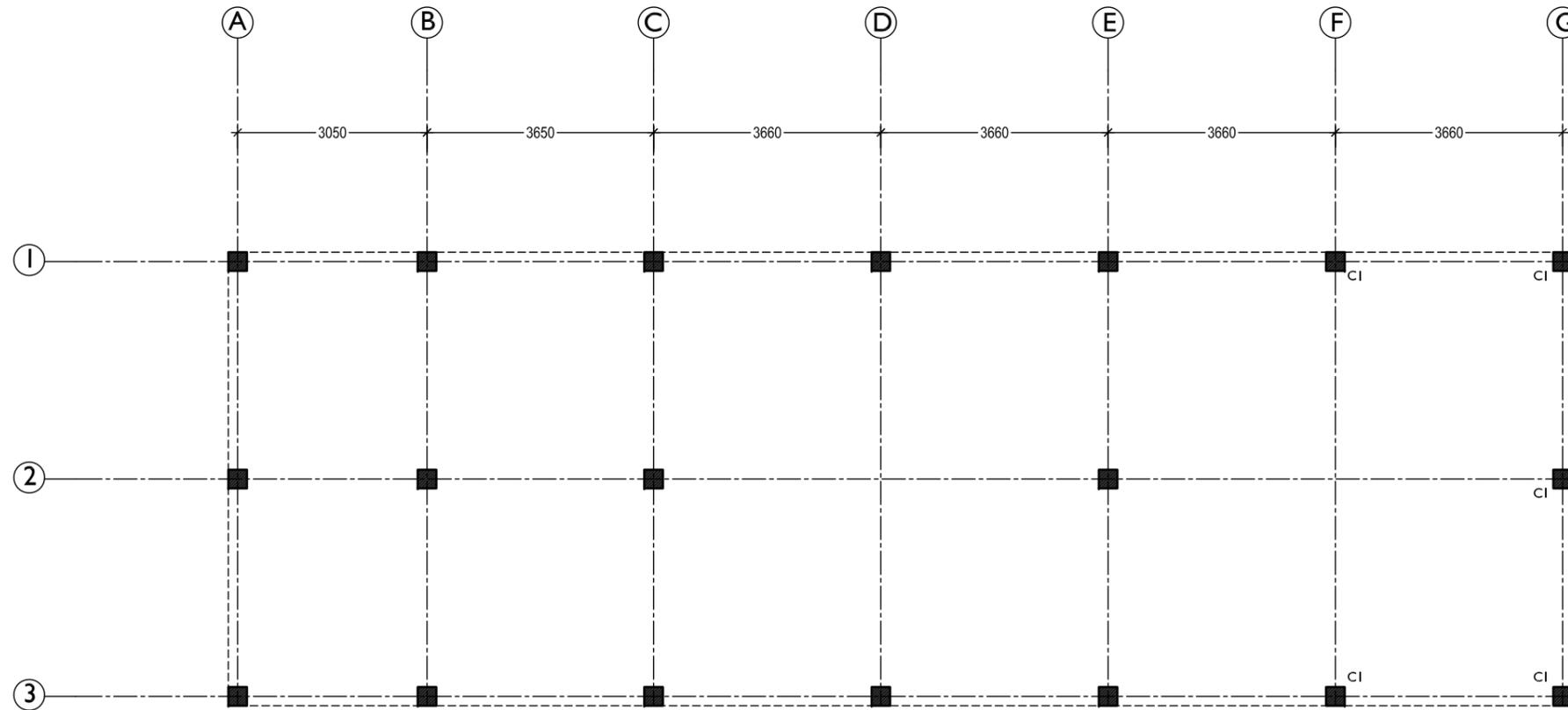
PROJECT :
EXTENSION OF K. MANIYAFARU POWER HOUSE

REVISIONS	
1	
2	

DRAWING TITLE:
06 - SIDE ELEVATION & SECTION

SCALE : 1:100

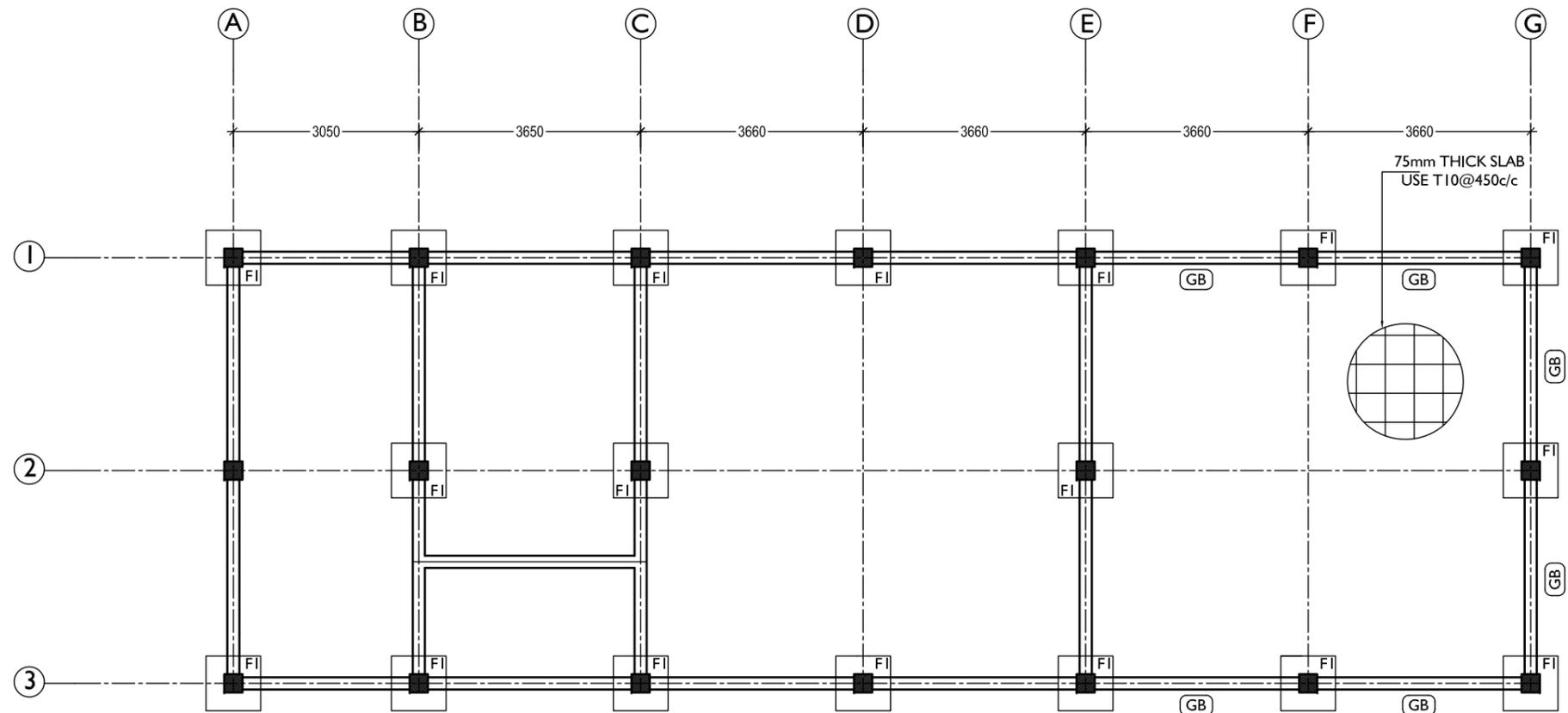
DATE : 31 AUGUST 2017



COLUMN LOCATION PLAN 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	CLIENT :  MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE:		
			1		07 - NEW COLUMN LOCATION PLAN		
			2		SCALE :	1:100	DATE :

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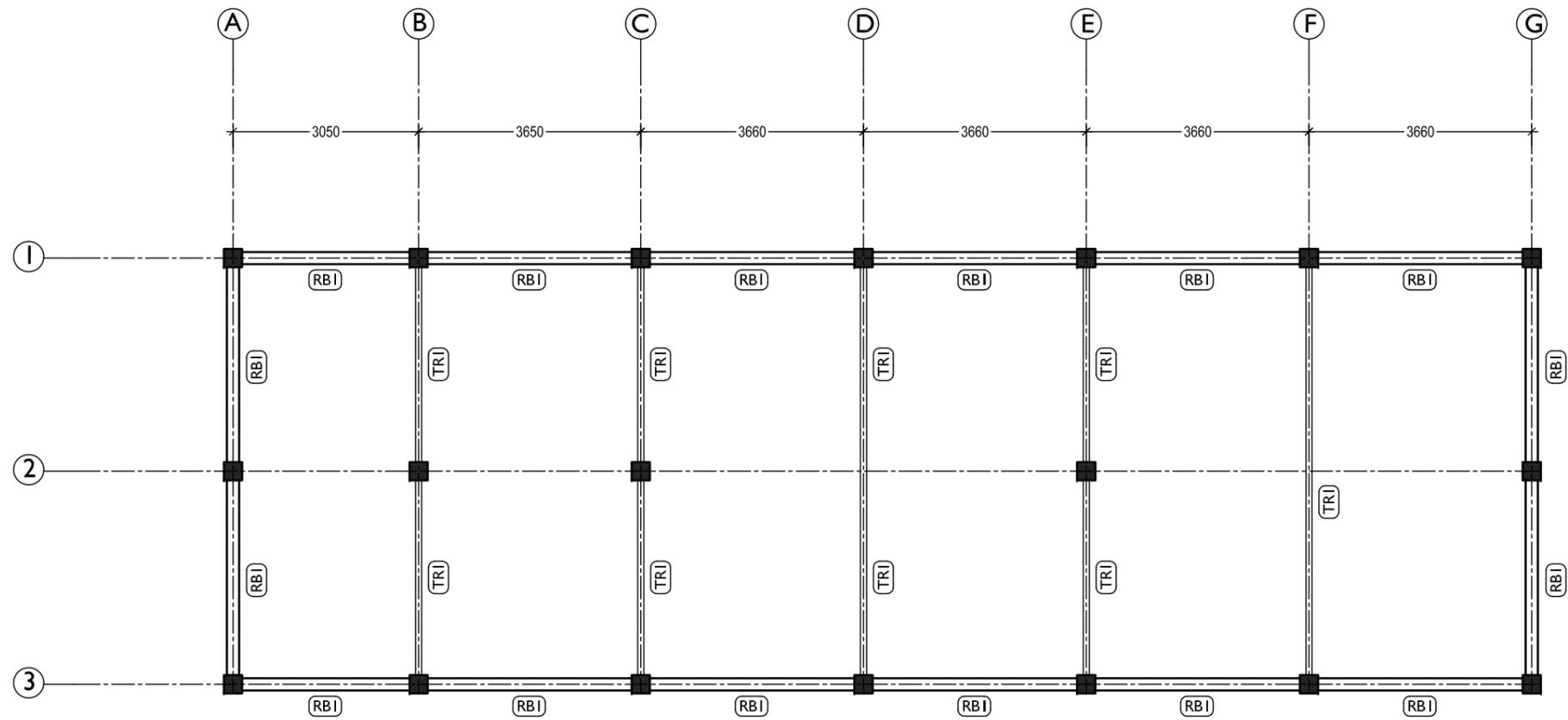
NOTE:-
 FOUNDATION DEPTH = 750mm
 FOOTING DETAIL

#	SIZE	REINFORCEMENT
FI	900 X 900 X 300	T12@200c/c BW(B)

FOUNDATION PLAN 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	CLIENT :  MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE: 08 - FOUNDATION PLAN			
			1		SCALE :	1:100	DATE :	31 AUGUST 2017
			2					

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ROOF BEAM/ TRUSS LAYOUT 1:100

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 Male
 Maldives
 m : +9609999413



CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

PROJECT :
EXTENSION OF K. MANIYAFARU POWER HOUSE

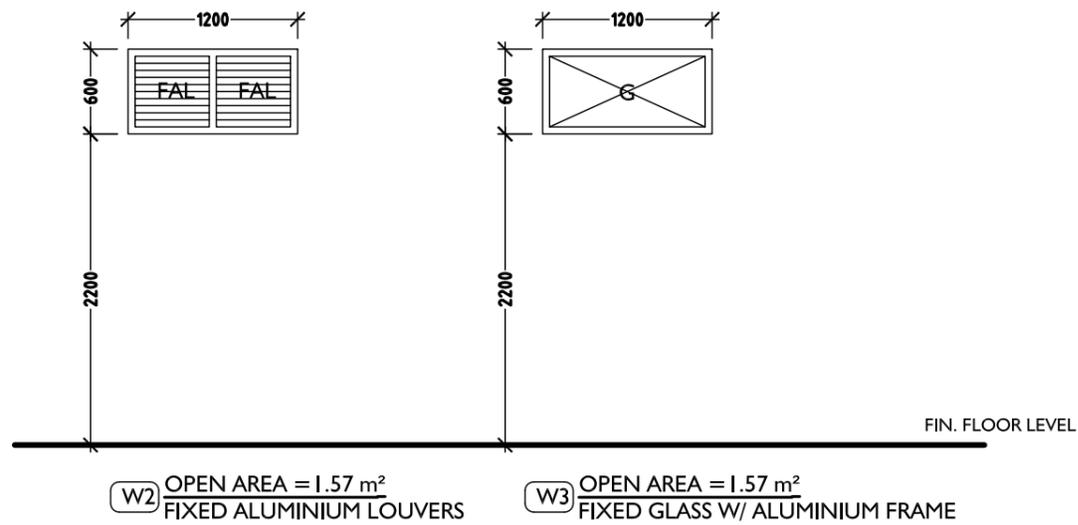
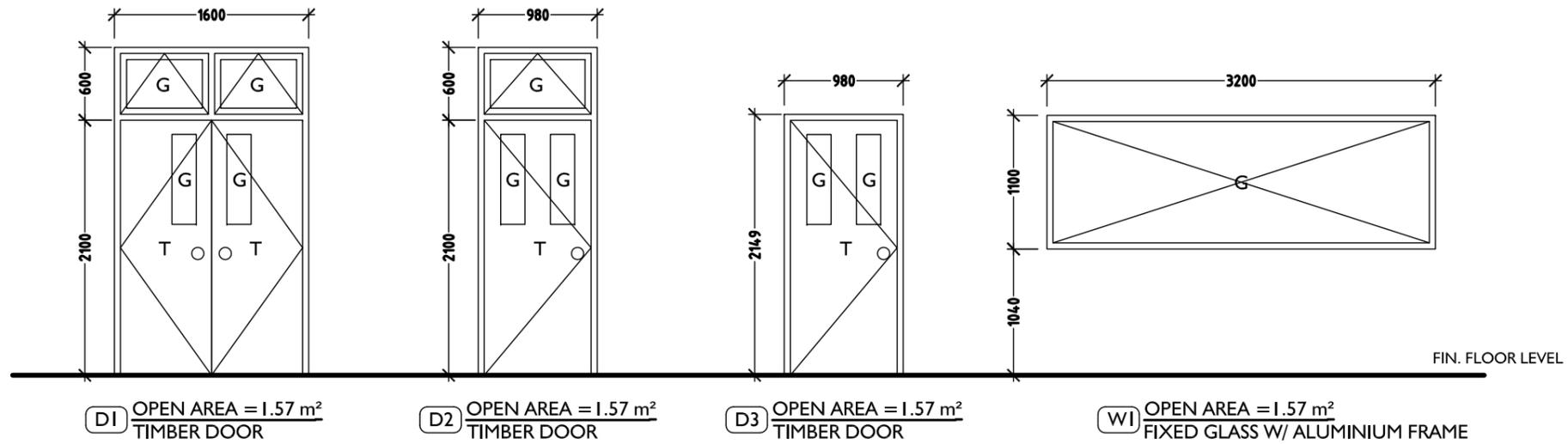
REVISIONS

1
2

DRAWING TITLE:
09 - ROOF BEAMS & TRUSS LAYOUT

SCALE : 1:100

DATE : 31 AUGUST 2017

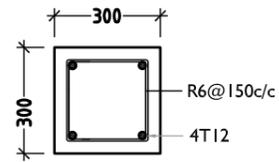


- ALL DOORS/WINDOWS ARE ALUMINIUM (WHITE COLOUR POWDER COATED ALUMINIUM) UNLESS OTHERWISE STATED
 - ALL DIMENSIONS TO BE CHECKED ON SITE PRIOR TO FABRICATION
 - ALL DOOR/WINDOWS VIEWED FROM EXTERIOR
 - FOR THE DOOR SWING REFER TO FLOOR PLANS
 G - 6MM THK CLEAR GLASS
 T - TIMBER
 FAL - FIXED ALUMINIUM LOUVERS
 PV - PVC

DOOR WINDOW DETAILS 1:50

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	CLIENT :  MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE: 10 - DOORS & WINDOWS	
			1			
			2			

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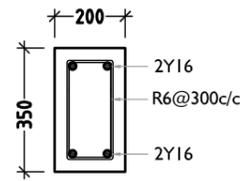
CI

COLUMN DETAILS 1:20

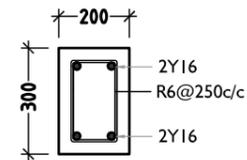
NOTES:

MINIMUM COVER TO REINFORCEMENT:

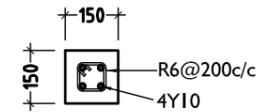
FOUNDATION	= 50MM
SLAB	= 25MM
BEAMS	= 35MM
COLUMNS	= 40MM
BEAMS BEND-UP BARS	= 12XDIA
ANCHOR BARS	= 55XDIA
LAPPING BARS	= 45XDIA
MID BARS	= 0.85 X SPAN
SUPPORT BARS	= 1/3 X SPAN



GB



RBI



LINTEL BEAM

BEAM DETAILS 1:20

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 Male
 Maldives
 m : +9609999413



CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

PROJECT :
EXTENSION OF K. MANIYAFARU POWER HOUSE

REVISIONS	
1	
2	

DRAWING TITLE:
11 - STRUCTURAL DETAILS

SCALE : 1:20 DATE : 31 AUGUST 2017