No.

Japan International Cooperation Agency (JICA)

The Department of External Resources,
Ministry of Foreign Affairs, Republic of Maldives

3rd Report

VOLUME THREE : SUPPORTING REPORT-1

Third Report of
The Study on Tsunami Recovery, Rehabilitation
and Development of Islands in Maldives

February 2006

YACHIYO ENGINEERING CO.,LTD.
NIPPON KOEI CO.,LTD.

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SUPPORTING REPORT-1

3rd Report

The Study on Tsunami Recovery, Rehabilitation and Development of Islands in Maldives

February 2006

VOLUME 3:

SUPPORTING REPORT -1

THE THIRD REPORT OF
THE STUDY ON TSUNAMI RECOVERY, REHABILITATION
AND DEVELOPMENT OF ISLANDS IN THE MALDIVES

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THE PROJECT
FOR
REHABILITATION OF
POWER DISTRIBUTION SYSTEM
IN
LAAMU ATOLL

Tender Documents (Technical Specifications)

TECHNICAL SPECIFICATIONS

I. Specifications of the Goods

1. Low Voltage (LV) Cables

1.1 General Conditions

(1) The Supplier shall submit the results of type test certificates issued and approved by reputable, independent testing laboratories. Such tests would be on random samples at the discretion of the engineer and failure to meet the conditions of test could result in the rejection of a complete batch of cables.

When such tests are called, they shall comprise the following:

- Partial discharge test
- Bending test, plus discharge test
- Dielectric power factor as function of voltage and capacitance measurement, and as a function of temperature
- Heating cycle test plus partial discharge test
- Voltage AC test
- Non-electrical tests as stated in IEC 60502.

(2) Conductors

All conductors are manufactured to BS 6360 "Conductors in insulated cables and cords".

(3) Stranded Copper

These shall have to be manufactured from plain annealed high conductivity copper.

(4) Insulation

Conductors are insulated with PVC which is applied by extrusion to form a compact homogeneous layer. All PVC compounds used comply with BS 6746 "PVC insulation and sheath of electric cables".

(5) Fillers and beddings

The cable cores are laid up with fillers between the cores where necessary. Single core cables have extruded PVC beddings, whilst multicore cables have at least two layers of suitable tape to provide bedding for the armour.

(6) Over sheath

All cables shall be provided with an extruded outer sheath of black PVC complying with the requirements of BS 6746.

Core identification:	Cable cores are identified as shown below.
Twin core:	red, black
Four core:	red, yellow, blue, black

(7) Embossing and marking

The over sheath of each cable shall be embossed as follows

- Cable manufacturer name
- Length of cable in meters
- Cross sectional area of the cable

- Manufactured date.
- Voltage grade.

(8) Voltage testing

All cores shall be spark tested during manufacture, and each completed cable is subjected to an A.C. voltage test. Test voltages shall be in accordance with BS 6346.

Details of the cables are given in the tables in **Schedule V Technical Specifications sheet** in **Part V Forms of Tender.**

1.2 Conditions of the Supplier

Before manufacturing the cables, the Supplier shall send cables manufacturer's details and cables catalogues to JICS for approval. The details of the cables shall include all the characteristics of the similar tables given in the technical specifications.

Before shipping the cables, the Supplier shall submit a piece of 1000 mm length from each type of the cables, which is to be procured under the Contract, to JICS's Liaison Office in Maldives for its approval. These sample cables shall be labeled the following at least.

- CSA of the cable.
- Name of the manufacturer.
- Length of the cable.
- Name of the client embossed.
- Standard of the cables.
- Others if necessary.

1.3 Conditions of the cable manufacturer

The cable manufacturer shall have achieved the BASEC (British Approval Service for Cables) certificate or license.

2. Distribution Boxes

2.1 General

The distribution boxes (DBs) shall be GRP enclosed distribution boxes. DBs shall be designed to install the cables from the bottom entrance. The contents of DBs shall be indicated in **Schedule V Technical Specifications sheet** in **Part V Forms of Tender.**

Before shipping the DBs, the Supplier shall assemble one set of DB as a sample and send the sample to JICS's Liaison Office in Maldives for its approval. As JICS approves the sample, the Supplier can start to assemble all the other DBs according to the sample.

The sample submitted to JICS will not be returned to the Supplier. If the sample is not approved, the Supplier shall also submit another sample to JICS until obtaining the approval.

DBs shall be only the high quality branded GRP enclosure including the following at least:

- GRP enclosure IP65.
- Polyester enclosure, sealed enclosure IP65 made of Glass Reinforced Polyester (GRP).
- IP rating according to IEC 60529.
- Insulation class II according to IEC 60232.
- Body made up of one piece up to height 800mm.
- Canopies on both top and bottom.
- Plain door equipped with 2 or 3 locks with 8 mm triangular centres.
- Door easily removable for drilling gasket directly moulded on the door.
- 04 fixing bolts in the back of the enclosure for mounting plate fastening.
- Color: RAL 7032.
- Mounting Plates.
- Back plates.
- Modular chassis with front cover.

- Depth adjustment slides for enclosure.
- Three pole three step fork insulated busbars.
- Insulated neutral links
- Insulated earth links
- Flexible cables to do the internal wiring of the DBs.
- 4 pole terminal blocks.

2.2 Accessories

All the accessories shall be provided by the Supplier after submitting the samples of the accessories mentioned in **Schedule V Technical Specifications sheet** in **Part V Forms of Tender**, such as:

- Lugs from each type
- Glands from each type
- Lug sleeves from each type.
- Numbering sleeves from each type.

II. Requirement for the Installation and Commissioning Work of the Goods

1. General

The Supplier shall carry out the following works under the Project.

(1) Supply of the Goods to the concerned islands harbour in the Project Sites.

(2) Check of the Goods after delivering them to the harbour.

(3) Delivery of the packing list of the Goods to End-user and get their signatures on the packing list.

(4) Installation of all the distribution boxes at concrete frames.

(5) Supply of water pumps and their fuel to remove water from cable trench before cable installation.

(6) Installation of all the glands to the distribution boxes.

(7) Installation of all the cables from the glands.

(8) Connection of all the cables to the terminals and MCBs.

(9) Label of all the cables.

(10) Label of all the DBs.

(11) Connection of all the consumer cables to the consumer meter boards.

(12) Commissioning of the distribution network.

(13) Test of the distribution network in the presence of the authorities concerned.

(14) Obtaining all the necessary approvals for the distribution network by JICS.

(15) Handover of the distribution network to Ministry of Atolls Development (MoAD) after approval by JICS.

The Supplier shall be reminded that 55 houses in Isdhoo-Kalaidhoo are subject to be relocated to proposed new residential plots as shown in Drawing E-07-01. Final location shall be informed by End-user before awarding the Contract.

Work responsibilities of the Supplier and the Recipient (Island Committee) are shown on the following Table B-1.

Table B-1: Work demarcation between the Supplier and the Recipient

Work Item	Supplier	Island Committee (End-user)	Remarks
Procurement of LV Cables	O		
Procurement of Distribution Box	O		
Transportation of all equipment from Male' to harbour	O		
Transportation of all equipment from harbour to the site		O	
Proper storage and maintenance of equipment at the site		O	
Preparation of site to install LV Cables and Distribution Boxes		O	
Installation of LV Cables, including excavation and backfilling		O	
De-watering of LV cable trench (Removing water from cable trench before installation of cable)		O	
Supply of water pumps, supply pipes and their fuel for the above de-watering of LV cable trench	O		
Connection of LV Cables to Distribution Box	O		
Pre-inspection of existing kWh Meter Boards and procurement of ELCBs, MCBs, earthings, kWh meters etc. in order to meet MEB standard		O	Individual home (consumer) will be required to procure necessary equipment.
Installation of Distribution Box	O		
Installation of Distribution Box Concrete Frame		O*)	
Acceptance Test	O	O	

Note: *) Necessary cement shall be procured and transported to each island by the Supplier.

2. **Supply of the Goods**

The Goods to be procured under the Project shall be of its best in quality and the reliability of the Goods shall be maintained.

Details of the Goods are given in the tables in **Schedule V Technical Specifications Sheet** in **Part V Forms of Tender.**

3. **Factory Test and Inspection**

The factory test and inspection of the Goods to be procured under the Project shall be carried out by the Supplier at manufacturer's factories and/or proper places to ensure that the Goods complies with the provisions of the Contract.

Test and inspection items shall consist of the following:

- Quantity inspection
- Visual inspection
- Dimensions of the equipment and materials

The quantity inspection and visual inspection shall comprise the check of quantities and quality of workmanship for the Goods according to **Schedule V Technical Specifications Sheet in Part V Forms of Tender.** The Supplier shall provide all necessary test equipment, materials, special tools, consumable items, etc., for the factory test and inspection at his own cost.

The Supplier shall submit all the reports of the factory test and inspection to JICS for approval with evidential photographs of the Goods at the factory test and inspection.

4. Installation and Commissioning

The supplier shall install the DBs and connect all the cables to the DBs in accordance with the instruction given by JICS. The scope of work includes the followings at least.

(1) Procurement and delivery of necessary cement for DB concrete frame to each island harbour.

(2) Installation of the DBs on the concrete frame with the screws, wall plugs, etc.

(3) Meggar test of all the cables. (Phase to phase, phase to earth, phase to neutral etc.)

(4) Installation of the PVC glands inside the Distribution boxes.

(5) Preparing the cable insulation to insert the cables to the glands.

(6) Insertion of all the cables to the glands.

(7) Arrangement of all the cables from the bottom of the DB inside the concrete frame.

(8) Installation of cables ties to the cables.

(9) Installation of cable tags at the cables below the DB inside the concrete frame.

(10) Arrangement of all the main cables inside the DB.

(11) Cut of the cables to connect to the cable terminal.

(12) Installation of lug sleeves to the cables

(13) Installation of lugs to the cables.

(14) Connection of the main cables to the terminal block.

(15) Arrangement of all the branch cables inside the DB.

(16) Installation of cable ties to the cables in bunches.

(17) Installation of the numbering sleeves to the cables.

(18) Connection of the live wires to the MCBs.

(19) Connection of the neutral wires to the neutral links.

(20) Connection of the earth wires to the earth links.

(21) Label of the DB.

(22) Cleaning inside the DB very well.

(23) Other necessary works to install the DB.

(24) Commissioning the DB.

(25) Test of the voltage from the main terminals.

(26) Connection of all the consumer cables to the concerned consumer.

(27) Energizing the consumer meter board.

(28) Check of the voltage from the consumer meter boards at full load.

(29) Other necessary works to install and commission the DBs and the cables.

During the installation and commissioning works, the Supplier shall bear the following costs.

(1) Air transportation cost from Male' to Kaddhoo

(2) Inland transportation in Laamu atoll

(3) Ocean transportation in Laamu atoll

(4) Ocean transportation from Male' to Laamu atoll

(5) Inland Transportation in Male'

(6) Food and accommodation in Male' and in Laamu atoll

(7) Laundry services in Male' and in Laamu atoll

(8) Medical services in Laamu atoll as well as in Male'

(9) All other type of similar costs regarding the work

5. Drawings

The Supplier shall submit **two (2) sets** of the following drawings to JICS for approval.

Table B-2: Submission schedule of all drawings

No.	Name of Drawings	Date of Submission
1	Single line diagram of the distribution box	Not later than thirty (30) days after awarding the contract
2	Dimensional drawings of the distribution box	
3	Schematic diagram of the distribution box	
4	Equipment layout of the distribution box	
5	Detailed Equipment specifications and catalogues for ➢ All types of LV cables ➢ Distribution box ➢ Accessories ➢ Tools	
6	Factory Test/Inspection Report	Within seven (7) days after the Test/Inspection
7	As built drawings of the distribution box	At the completion of the installation work
8	As built drawings of the whole network drawn on the scaled map	
9	Installation completion report	

"No.8 As built drawings of the whole network drawn on the scaled map" shall include the name of the residence, meter board location of the residence, consumer cable route of each residence and

public facilities, main cable route indicating the cable sizes in meters, cross sectional drawings of the cable trench etc. The map shall be drawn from AutoCAD as archive file and all the services included in the map shall be drawn in separate layers.

"No.9 Installation completion report" shall have the following description and data.

- Statement that the Goods have been supplied and site installation work and commissioning has been completed, with the evidence of approval of the Acceptance Test Report.
- Description of the Supplier's activities up to the completion of the Project, including actual time schedule.
- Statement that all the documents, drawings and manuals have been supplied with all records of documentation and correspondence as evidence.
- Statement that clearing of the Project Sites has been completed with photographic evidence.
- Completion photographs showing the actual progress of the Work.

6. Acceptance Test

The Acceptance Test shall be carried out by the Supplier at the completion of the installation work of the Goods, in the presence of the all concerned parties and JICS.

The Acceptance Test shall consist of the following:

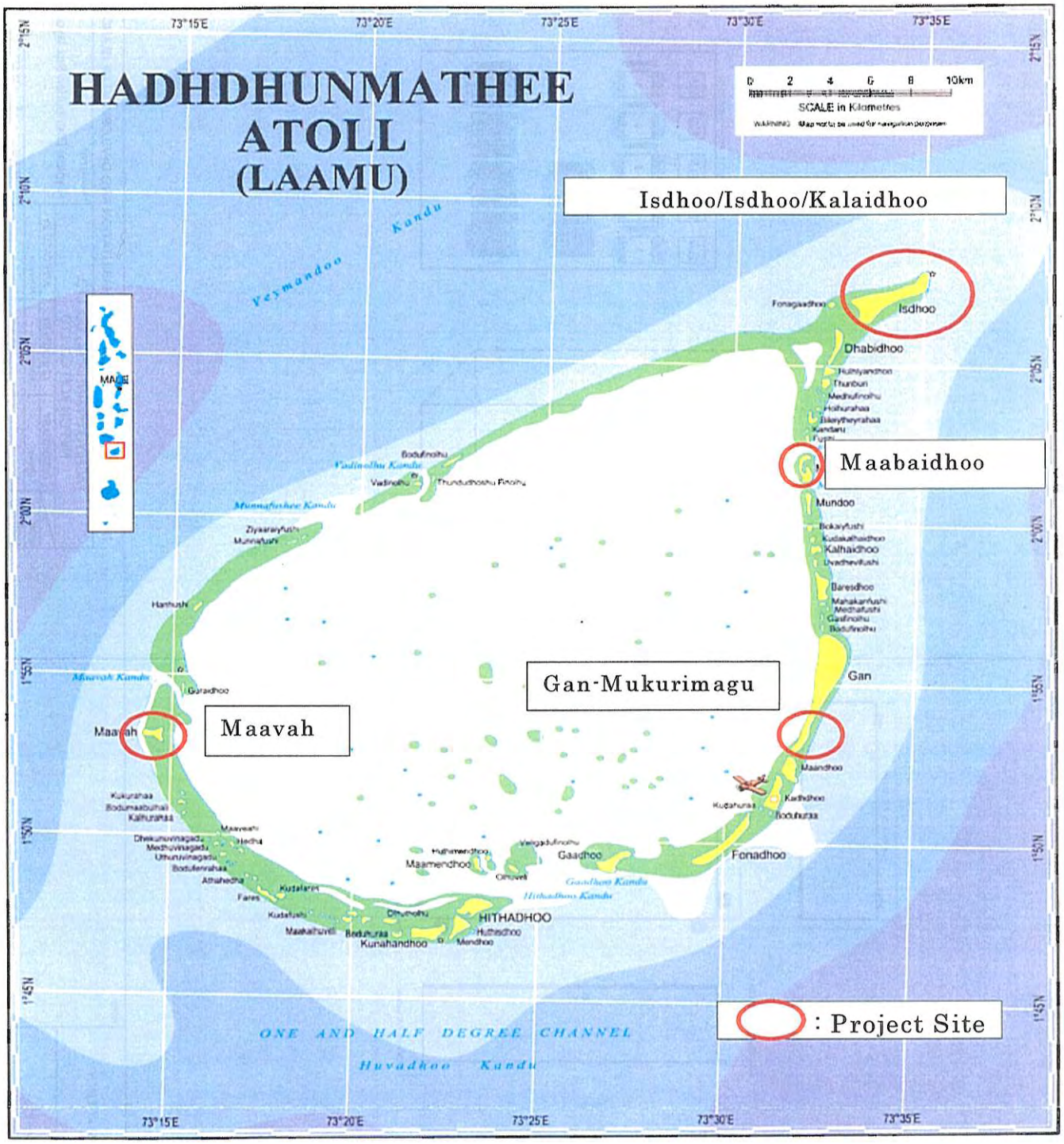
- Visual inspection
- Function and Performance test

The visual inspection shall comprise a dimensional and system check, quantity check of the Goods supplied under the Contract and the check of workmanship according to the approved drawings.

The function and performance test shall comprise the functional check and confirmation of performance through the actual operation of the facilities in accordance with the provisions of the Contract. The Supplier shall provide, at his own expense, all staff, equipment and materials, tools including consumable items for the Acceptance Test.

7. Drawings

Drawing No.	Title
E-01	Location Map of the Project Sites
E-02-01	Typical Distribution Box Layout (1)
~E-02-02	Typical Distribution Box Layout (2)
E-03-01	Single Line Diagram of Distribution Box (Type 1)
~E-03-03	Single Line Diagram of Distribution Box (Type 3)
E-04	Cross Section of Cable Trench
E-05	Distribution Box Mounting Details
E-06-01	Distribution Route Map in Isdhoo (1)
~E-06-02	Distribution Route Map in Isdhoo (2)
E-07-01	Distribution Route Map in Isdhoo-Kalaidhoo (1)
~E-07-03	Distribution Route Map in Isdhoo-Kalaidhoo (3)
E-08	Distribution Route Map in Maabaidhoo
E-09-01	Distribution Route Map in Gan-Mukurimagu (1)
~E-09-03	Distribution Route Map in Gan-Mukurimagu (3)
E-10	Distribution Route Map in Maavah
E-11	Single Line Diagram of Distribution Feeders in Isdhoo
E-12	Single Line Diagram of Distribution Feeders in Isdhoo-Kalaidhoo
E-13	Single Line Diagram of Distribution Feeders in Maabaidhoo
E-14	Single Line Diagram of Distribution Feeders in Gan-Mukurimagu
E-15	Single Line Diagram of Distribution Feeders in Maavah



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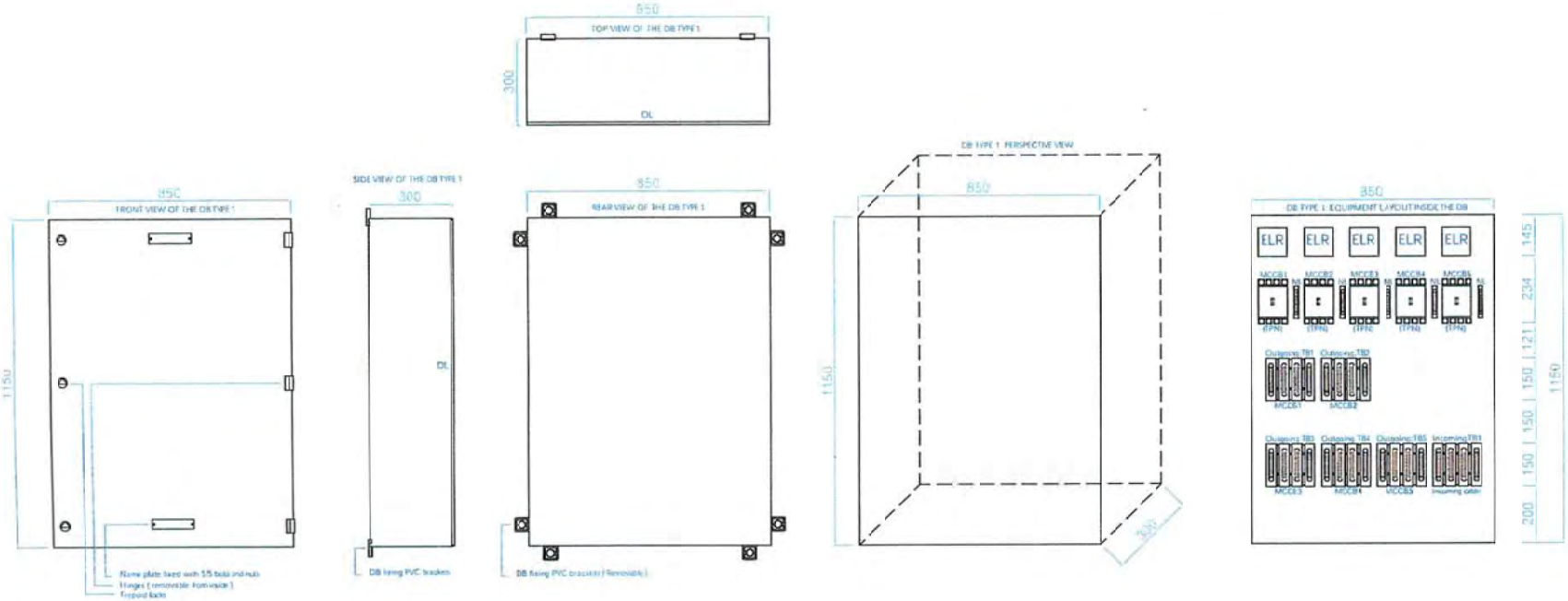
THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

YACHIYO ENGINEERING CO, LTD
NIPPON KOEI CO, LTD

DRAWING TITLE:
LOCATION MAP OF THE PROJECT SITES.

	PREPARED BY	CHECKED BY	APPROVED BY	SCALE	DWG	Rev.No
NAME	T. OGAWA	T. Kobayashi	M.Komiyo			
SIGNATURE						
DATE	MAY 22,2005			N/A	E- 01	



LEGEND TABLE

ITEM	DESCRIPTION
DB	GRP enclosed Distribution Board
GRP	Glass Reinforced Polyester
MCCB#	Moulded Case Circuit Breaker
ELR	Earth Leakage Relay (adjustable)
NL	Neutral Link
TPN	Triple Pole Neutral
TB#	Four pole Terminal Blocks
DL	Door leaf

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THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVE

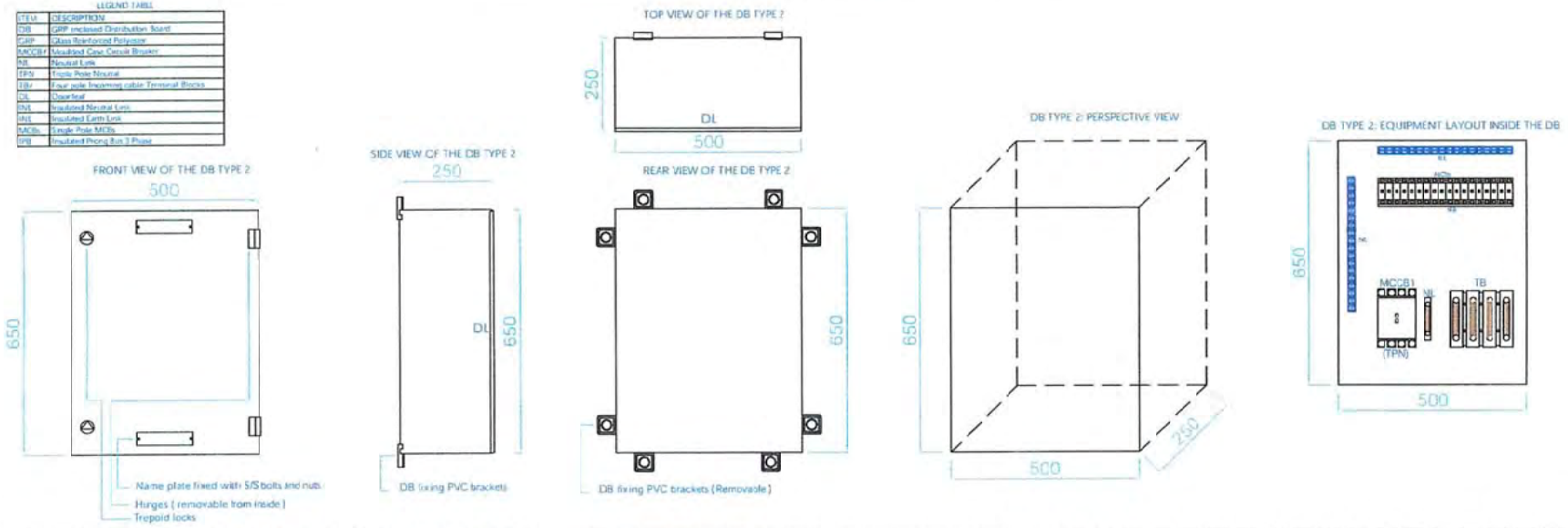
YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

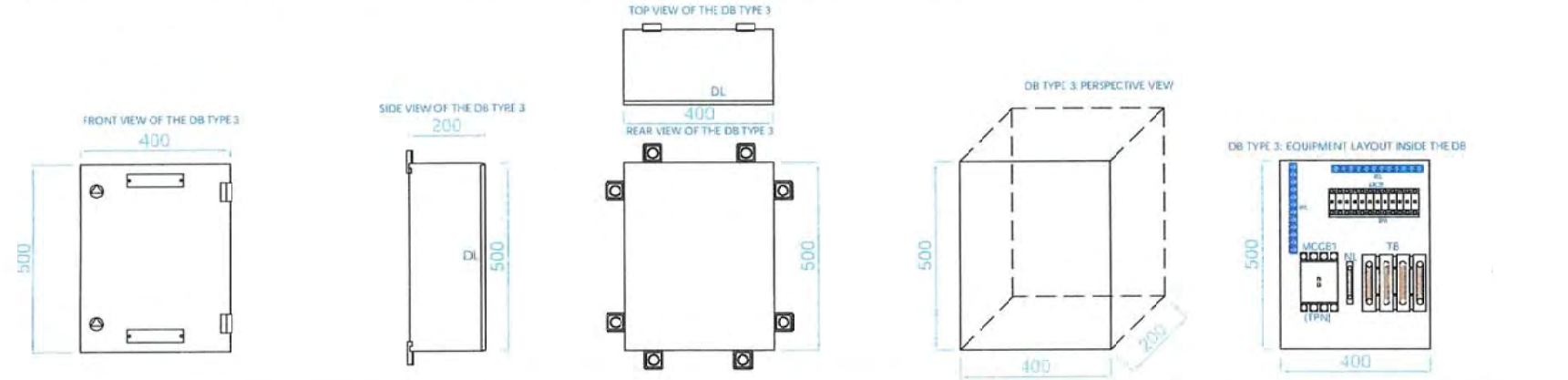
DRAWING TITLE: Typical Distribution Box layout-Type 01

	DESIGNED BY	CHECKED BY	APPROVED BY	SCALE	SHEET NO.	REV. NO.
NAME	T.Ogawa	T.Kobayashi	M.Komiya			
SIGNATURE				None	E-02-01	
DATE	22-05-05	22-05-05	22-05-05			

LEGEND TABLE

ITEM	DESCRIPTION
DB	GRP inclosed Distribution Board
GRP	Glass Reinforced Polyester
MCCB/I	Moulded Case Circuit Breaker
NE	Neutral Link
TPN	Triple Pole Neutral
TBI	Four pole Incoming cable Terminal Blocks
DL	Door leaf
INL	Insulated Neutral Link
IAL	Insulated Earth Link
MCBs	Single Pole MCBs
IPB	Insulated Phong Bus 3 Phase





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NOTES: This is a non-scaled drawing.

THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

YACHIYO ENGINEERING CO. LTD.
NIPPON KOEI CO, LTD.

DRAWING TITLE: Typical Distribution Box Layout (2)

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

SCALE	SHEET NO.	REV. NO.
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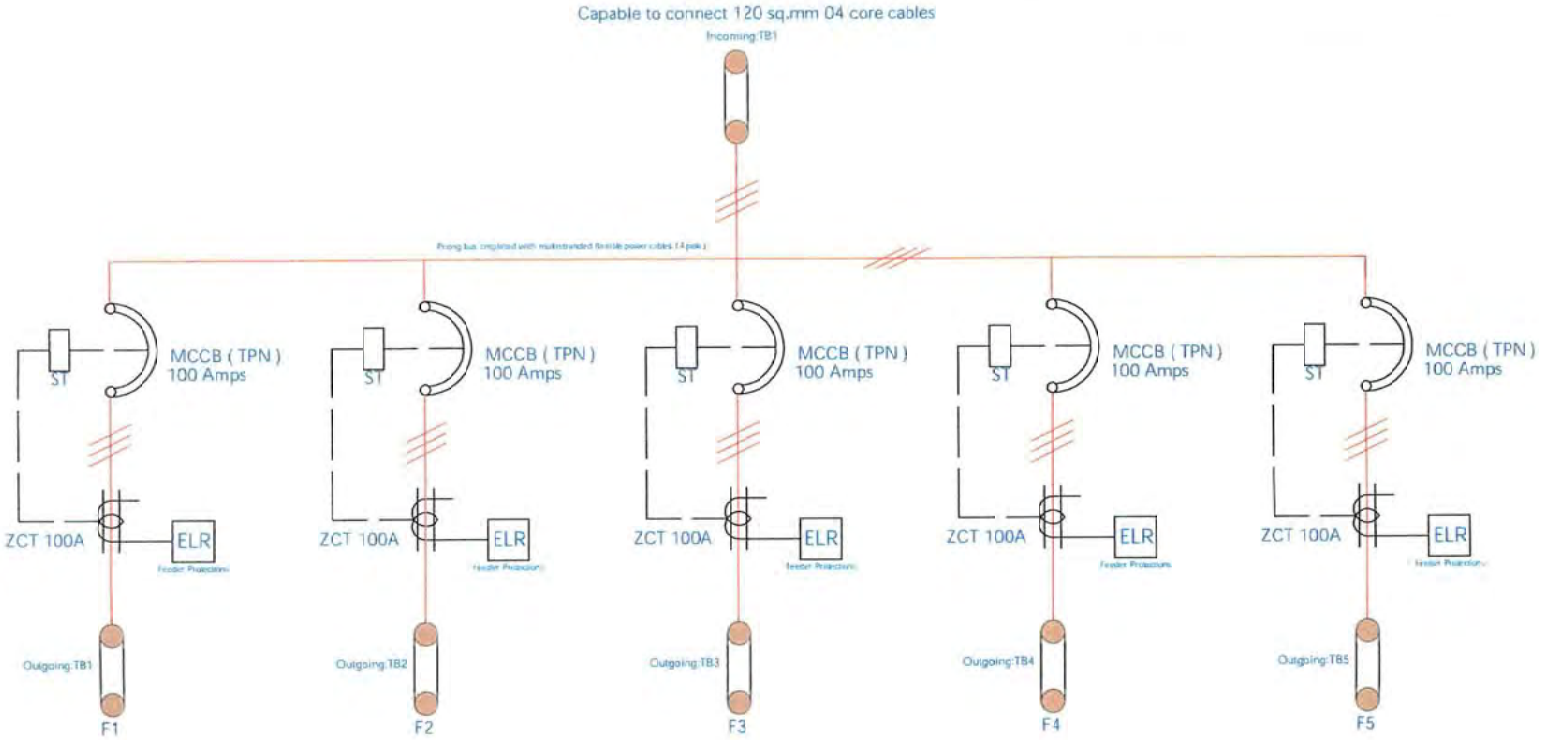

LEGEND TABLE

ITEM	DESCRIPTION
MCCB#	Moulded Case Circuit Breaker
ELR	Earth Leakage Relay (adjustable)
F1	Outgoing Feeder 01
F2	Outgoing Feeder 02
F3	Outgoing Feeder 03
F4	Outgoing Feeder 04
F5	Outgoing Feeder 05
ZCT	Zero-Phase Current Transformer
ST	Shunt Trip Coil
TPN	Triple Pole Neutral

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YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE
Single line Diagram of Distribution box
Type 01

SCALE	SHEET NO.	REV. NO.
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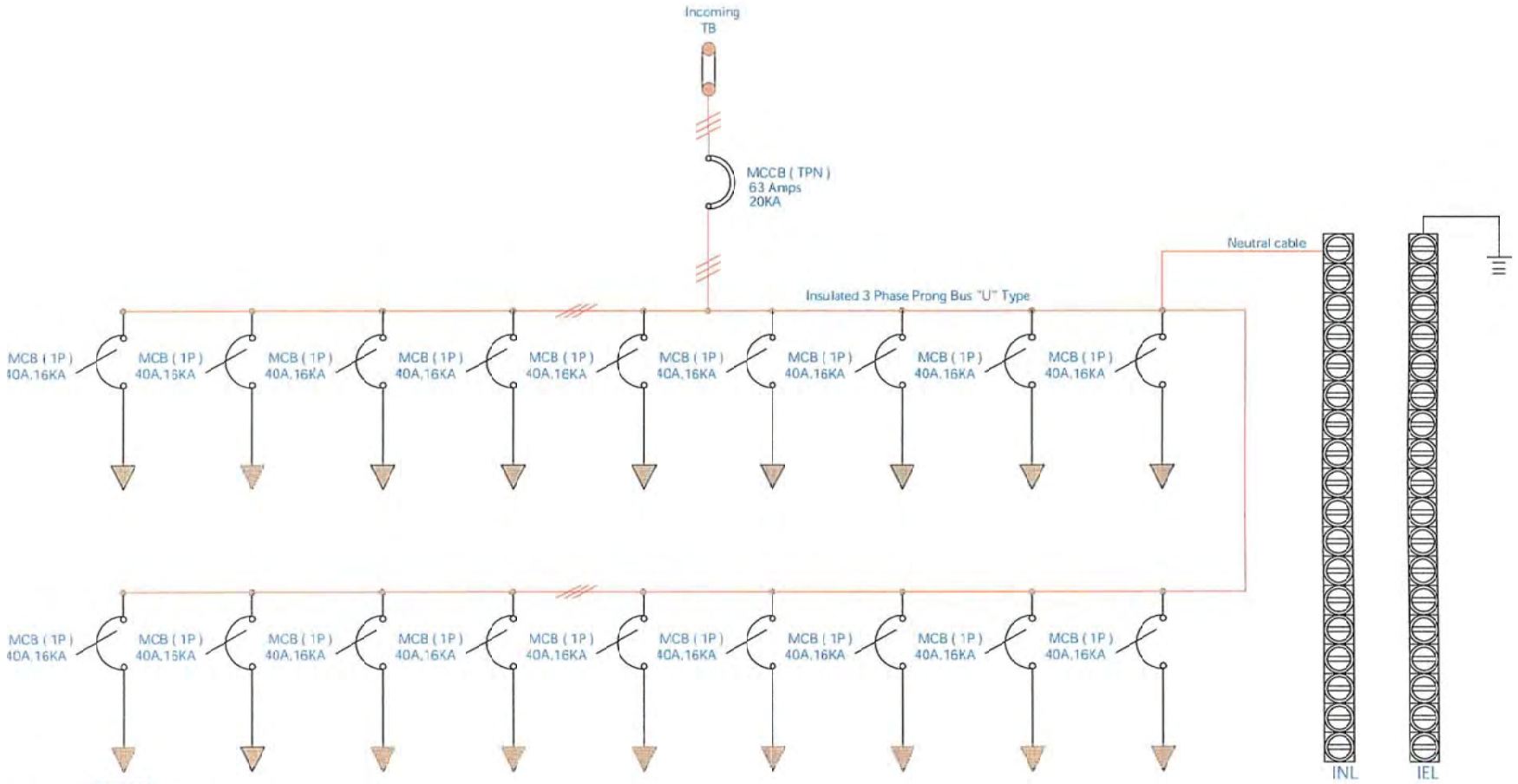

LEGEND TABLE

ITEM	DESCRIPTION
MCCB	Moulded Case Circuit breaker
TB	Four Pole Terminal Block
MCB	Miniature Circuit Breaker
INL	Insulated Neutral link
IEL	Insulated Earth Link

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NOTES: This is a non-scaled drawing.

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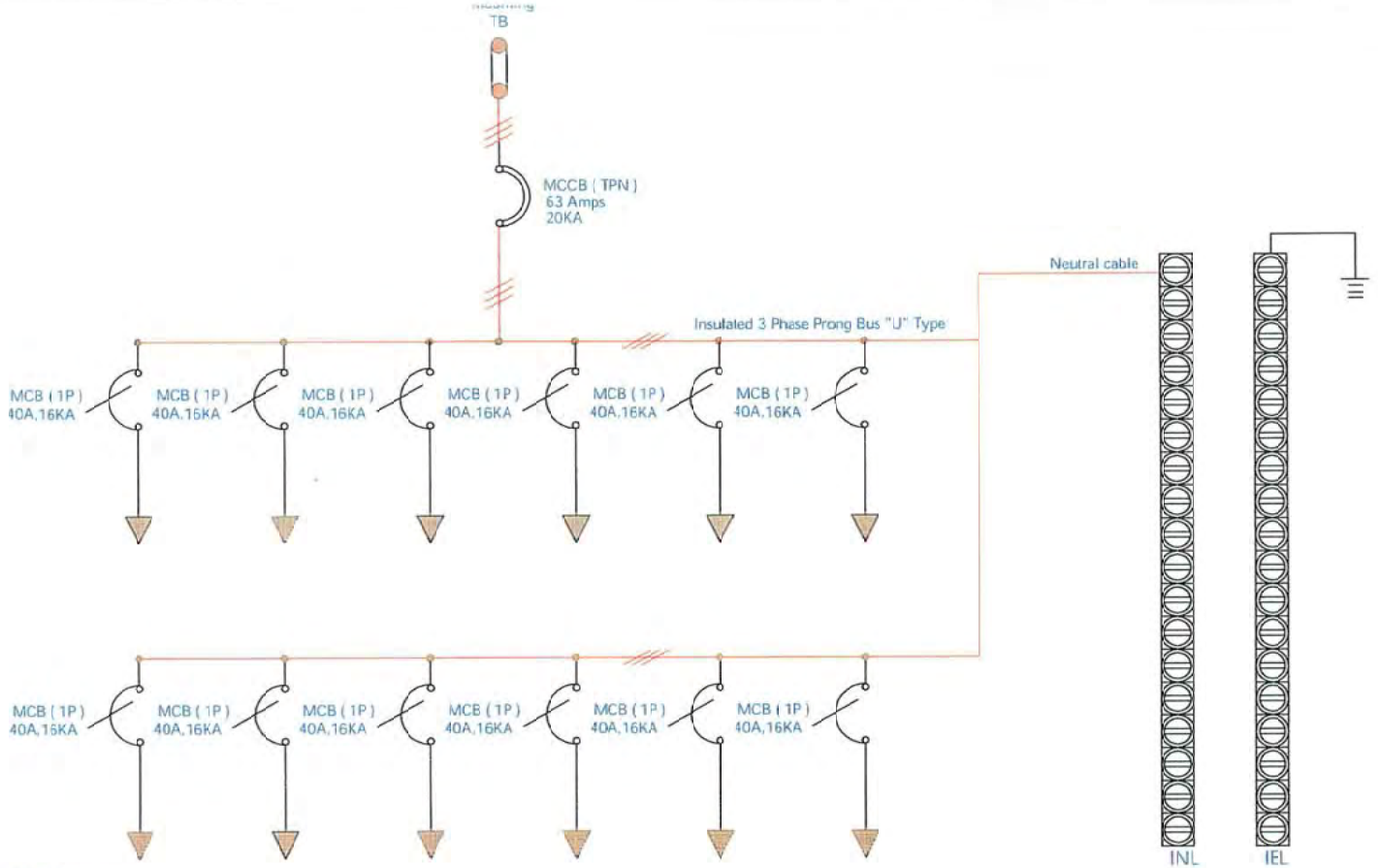
YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE
Single Line Diagram of Distribution Box: Type 2

SCALE	SHEET NO.	REV. NO.
None	E-03-02	



LEGEND TABLE

ITEM	DESCRIPTION
MCCB	Moulded Case Circuit breaker
TB	Four Pole Terminal Block
MCB	Miniature Circuit Breker
INL	Insulated Neutral link
IEL	Insulated Earth Link

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NOTES: This is a non-scaled drawing

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YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiyo
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE
Single Line Diagram of Distribution Box: Type 3

SCALE	SHEET NO.	REV. NO.
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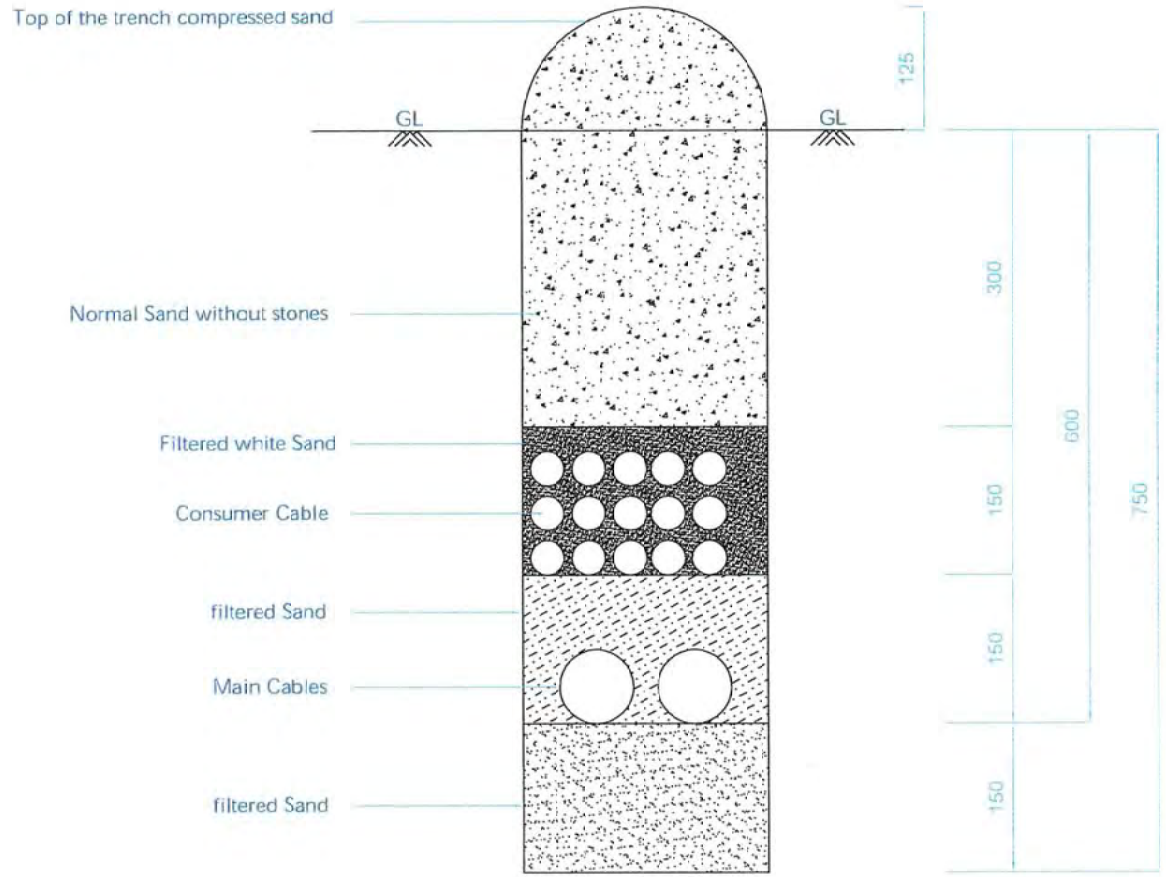
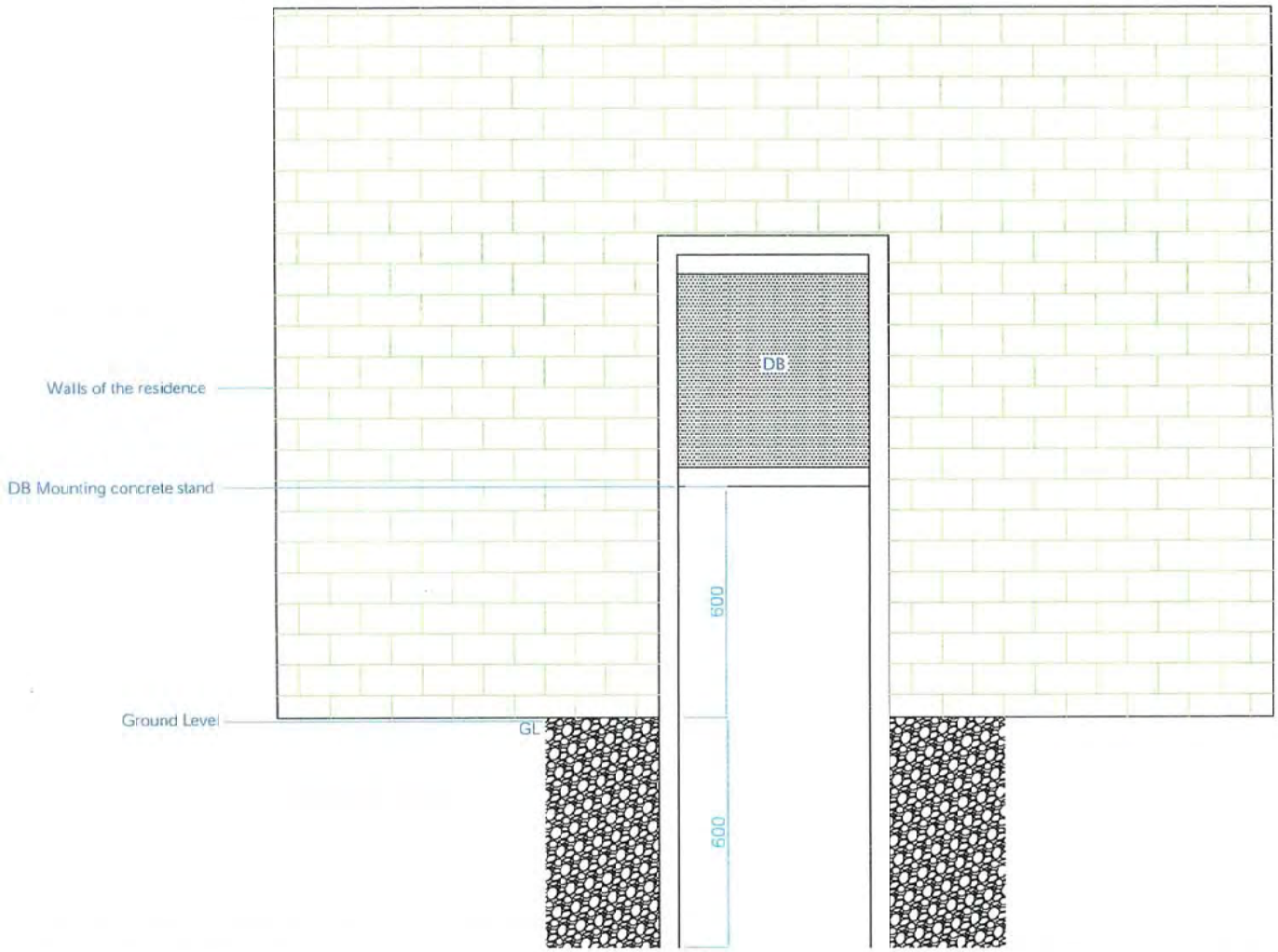


JAPAN INTERNATIONAL COOPERATION AGENCY	NOTES:	THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES
REPUBLIC OF MALDIVES MINISTRY OF FOREIGN AFFAIRS MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT		YACHIYO ENGINEERING CO, LTD. NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE: Cross Section of Cable Trench

SCALE	SHEET NO.	REV. NO.
None	E-04	



JAPAN INTERNATIONAL COOPERATION AGENCY	NOTES: This is a non-scaled drawing.	THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES			
REPUBLIC OF MALDIVES MINISTRY OF FOREIGN AFFAIRS MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT		YACHIYO ENGINEERING CO, LTD. NIPPON KOEI CO, LTD.			DRAWING TITLE Distribution Box Mounting Details
		DESIGNED BY	CHECKED BY	APPROVED BY	
		NAME: T.Ogawa	T.Kobayashi	M.Komiya	
		SIGNATURE:			SCALE: None / SHEET NO.: E-05 / REV. NO.:
		DATE: 22-05-05	22-05-05	22-05-05	

LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area

Scale

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100m

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Refer to Sheet no. E-06-02

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YACHIYO ENGINEERING CO, LTD.
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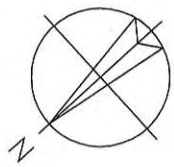
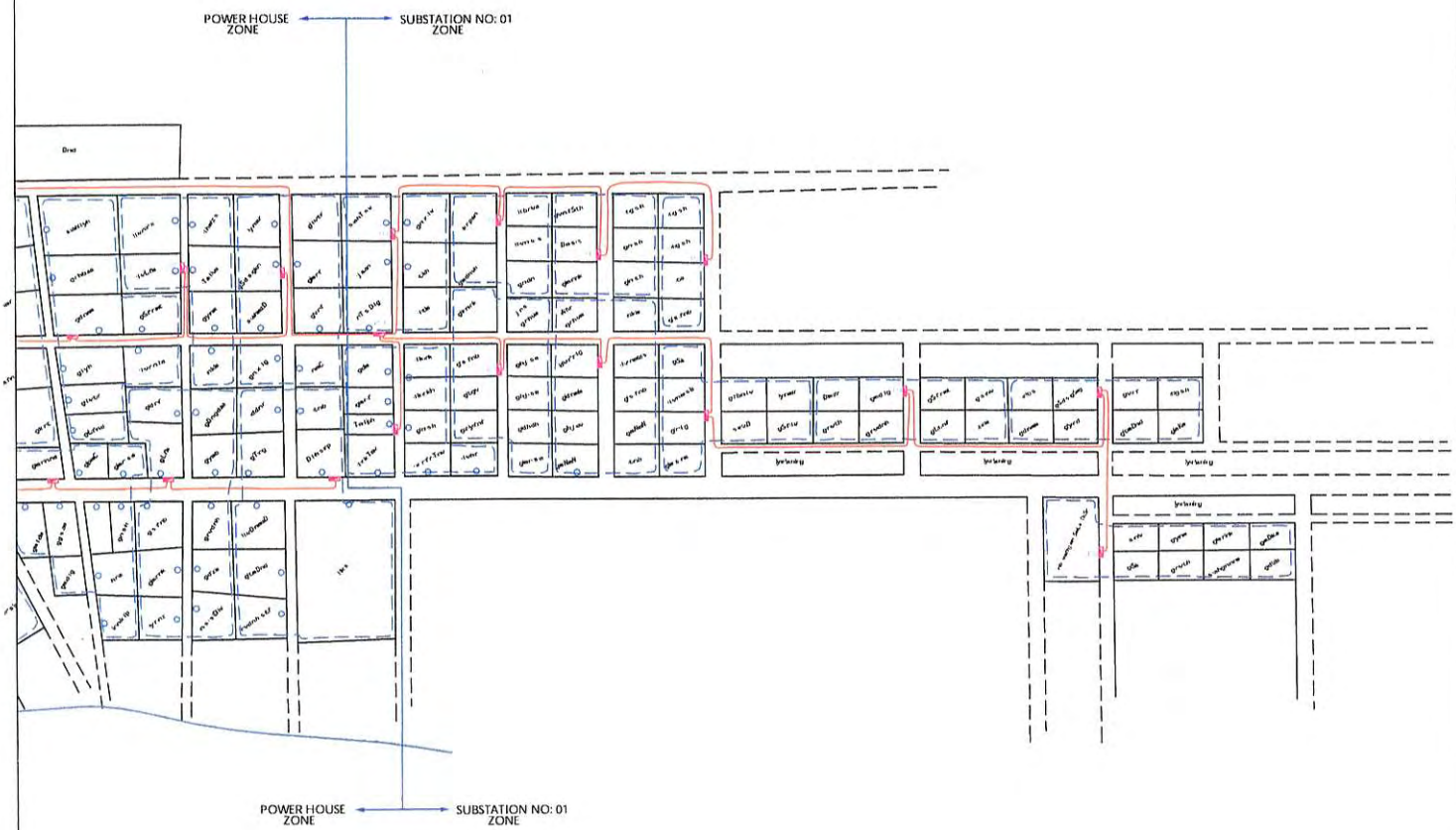
DRAWING TITLE: Distribution Route map in Isdhoo (1)

	DESIGNED BY	CHECKED BY	APPROVED BY	SCALE	SHEET NO.	REV. NO.
NAME	T.Ogawa	T.Kobayashi	M.Komiya			
SIGNATURE						



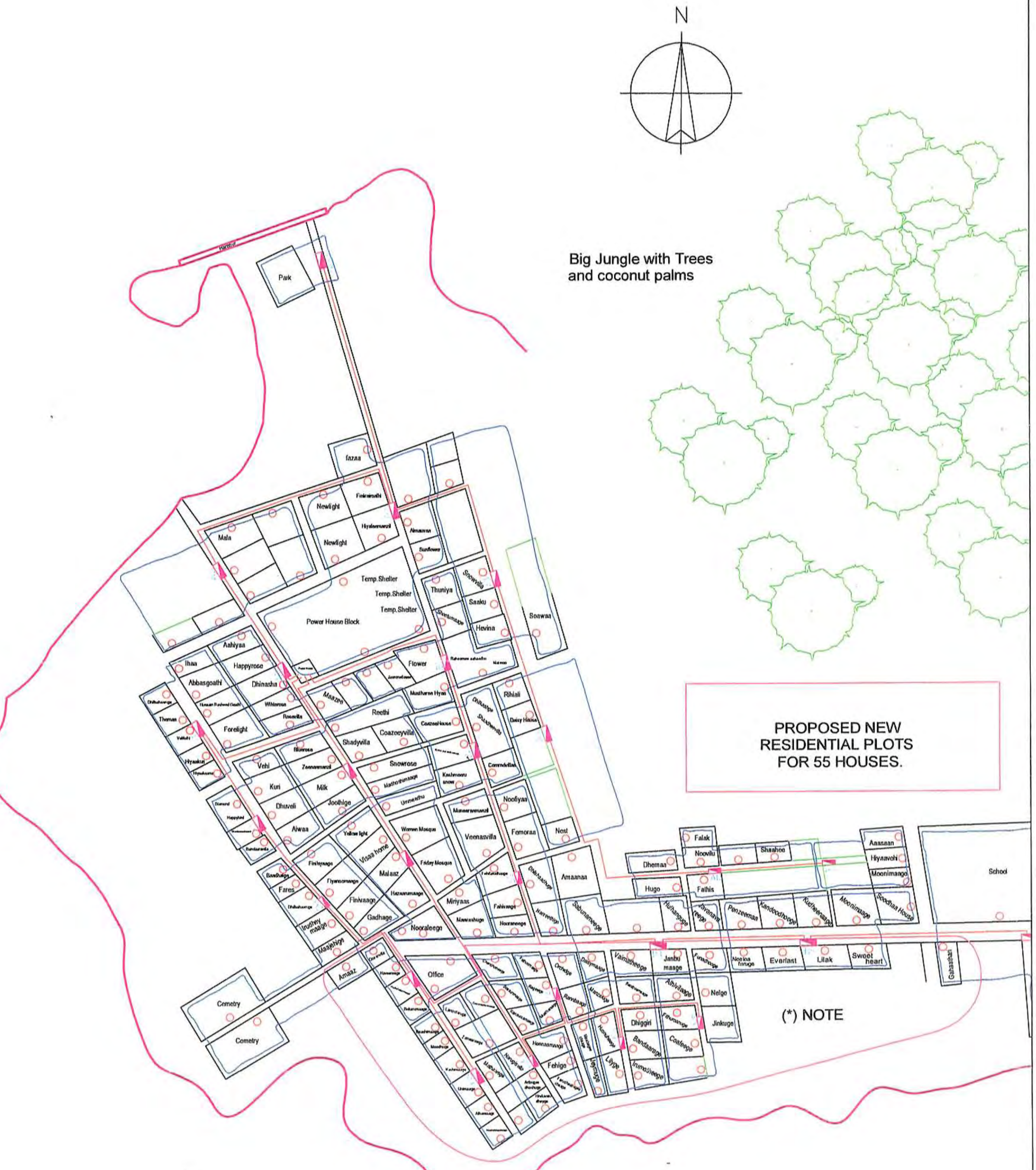


LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area

Scale

JAPAN INTERNATIONAL COOPERATION AGENCY	NOTES: Refer to Sheet no. E-06-01	THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES					
REPUBLIC OF MALDIVES MINISTRY OF FOREIGN AFFAIRS		YACHIYO ENGINEERING CO, LTD. NIPPON KOEI CO, LTD.			DRAWING TITLE: Distribution Route map in Isdhoo(2)		
			DESIGNED BY	CHECKED BY	APPROVED BY	SCALE	SHEET NO.	REV. NO.
		NAME	T.Ogawa	T.Kobayashi	M.Komiya			
		SIGNATURE						



(*) NOTE: THESE HOUSES ARE SUBJECT TO BE RELOCATED TO PROPOSED NEW RESIDENTIAL PLOTS.

FINAL LOCATION SHALL BE INFORMED BY THE END-USER BEFORE AWARDING THE CONTRACT.

LEGEND TABLE

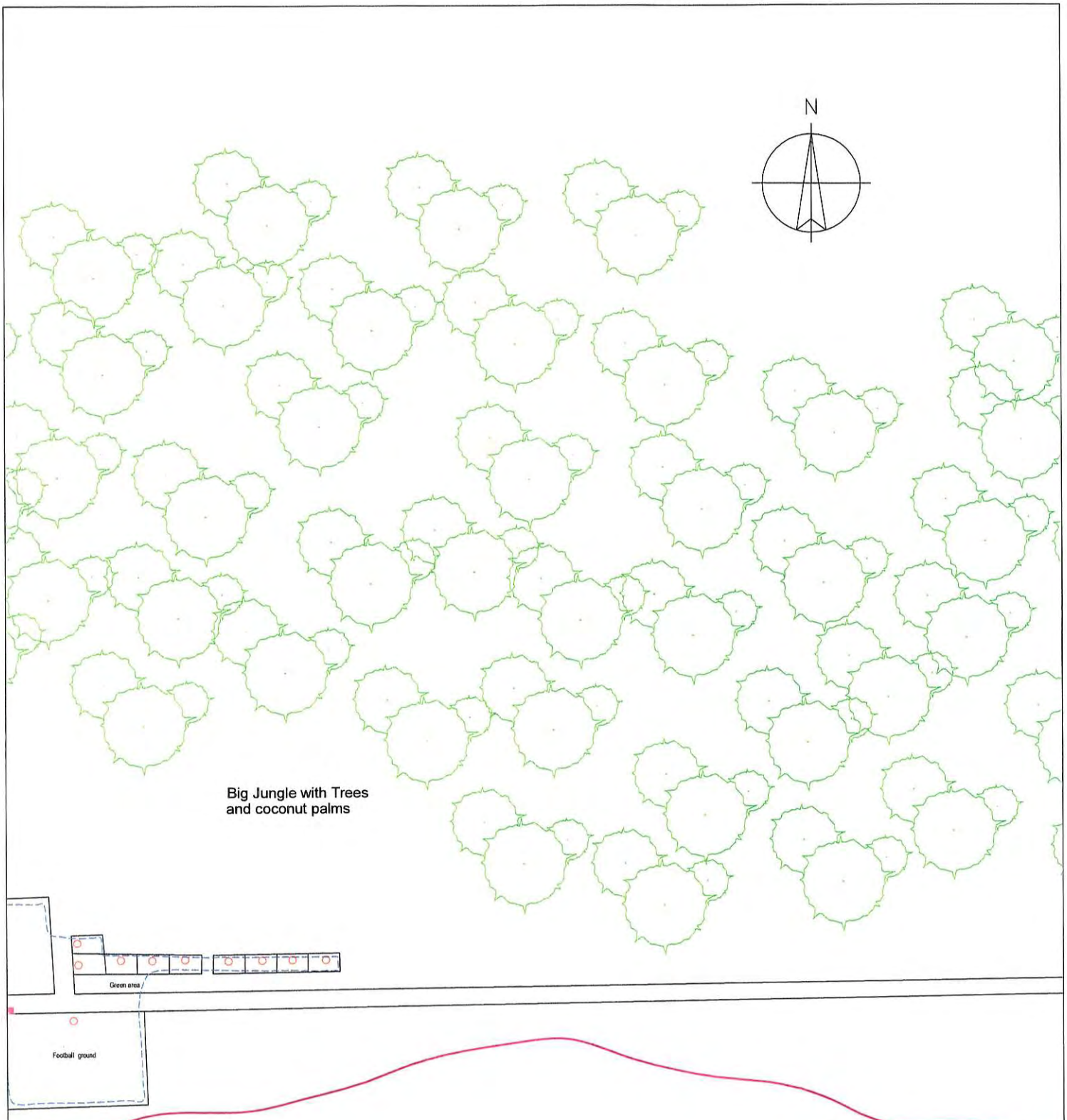
ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area

Scale 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100m

JAPAN INTERNATIONAL COOPERATION AGENCY	NOTES: REFER TO SHEET NO. E-07-02	THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES		
		YACHIYO ENGINEERING CO., LTD. NIPPON KOEI CO., LTD.		DRAWING TITLE: Dsitribution Route map in Isdhoo-Kalaidhoo (1)
REPUBLIC OF MALDIVES MINISTRY OF FOREIGN AFFAIRS				

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			

SCALE	SHEET NO.	REV. NO.

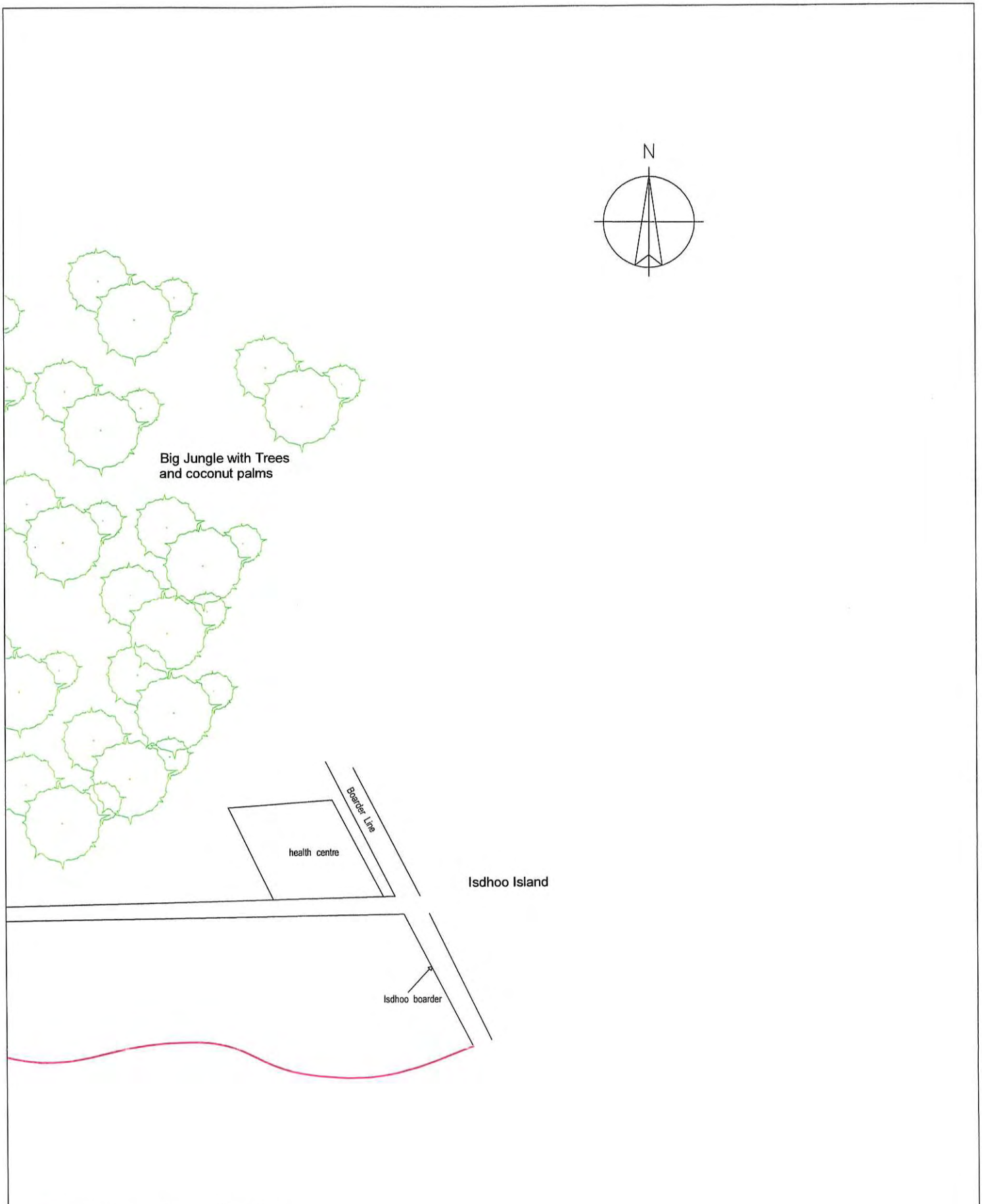


LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area

Scale

JAPAN INTERNATIONAL COOPERATION AGENCY	NOTES REFER TO SHEET NO. E-07-03	THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVI					
REPUBLIC OF MALDIVES MINISTRY OF FOREIGN AFFAIRS		YACHIYO ENGINEERING CO, LTD. NIPPON KOEI CO, LTD.			DRAWING TITLE Distribution Route map in Isdhoo Kalaidhoc (2)		
			DESIGNED BY	CHECKED BY	APPROVED BY	SCALE	SHEET NO.	REV. NO.
		NAME	T.Ogawa	T.Kobayashi	M.Komiya			
		SIGNATURE						



LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area

Scale

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100m

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS

NOTES: REFER TO SHEET NO.E-07-02

THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVI

YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	Mr.T.Ogawa	Mr.T.Kobyashi	Mr.M.Komiya
SIGNATURE			

DRAWING TITLE: Distribution Route map in Isdhoo-kalaidhoo (3)

SCALE	SHEET NO.	REV. NO.

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS
MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

NOTES: This is a non-scaled map. A scaled map will be given to the contractor during the work is in progress at site.

THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVE

YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE
Distribution Route Map in Maabaidhoo

SCALE	SHEET NO.	REV. NO.
None	E-08	04

LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area
	Future Cables

Scale
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100m

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS
MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

NOTES: Refer to drawing no. E--09--02

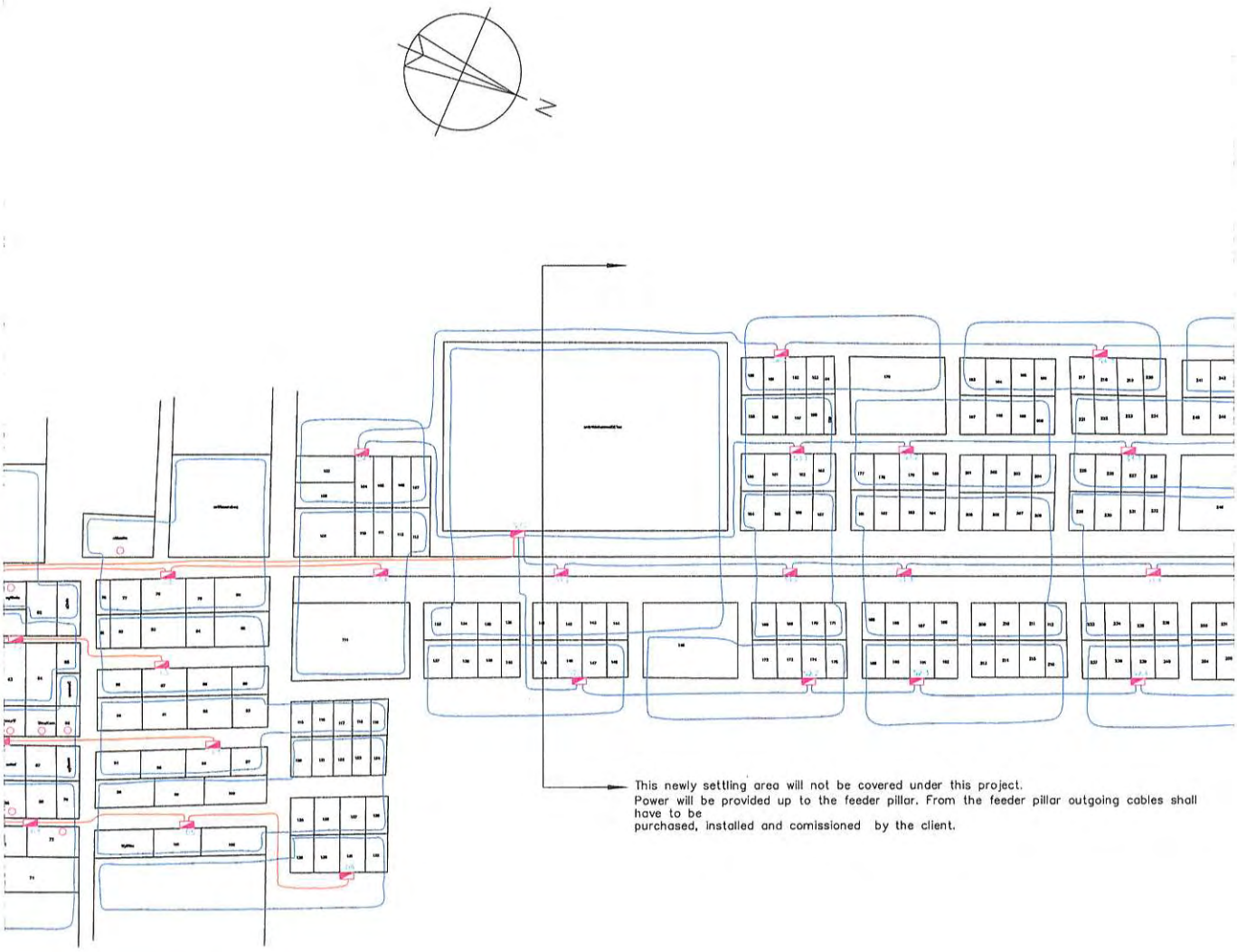
THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

DRAWING TITLE: Distribution Route map in Gan-Mukurimagu (1)

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	Ogawa	Kobayashi	M.Komiya
SIGNATURE			
DATE	22--05--05	22--05--05	22--05--05

SCALE	SHEET NO.	REV. NO.
1: 2800	E--09--01	04



LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area
	Future Cables

Scale
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100m

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS
MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

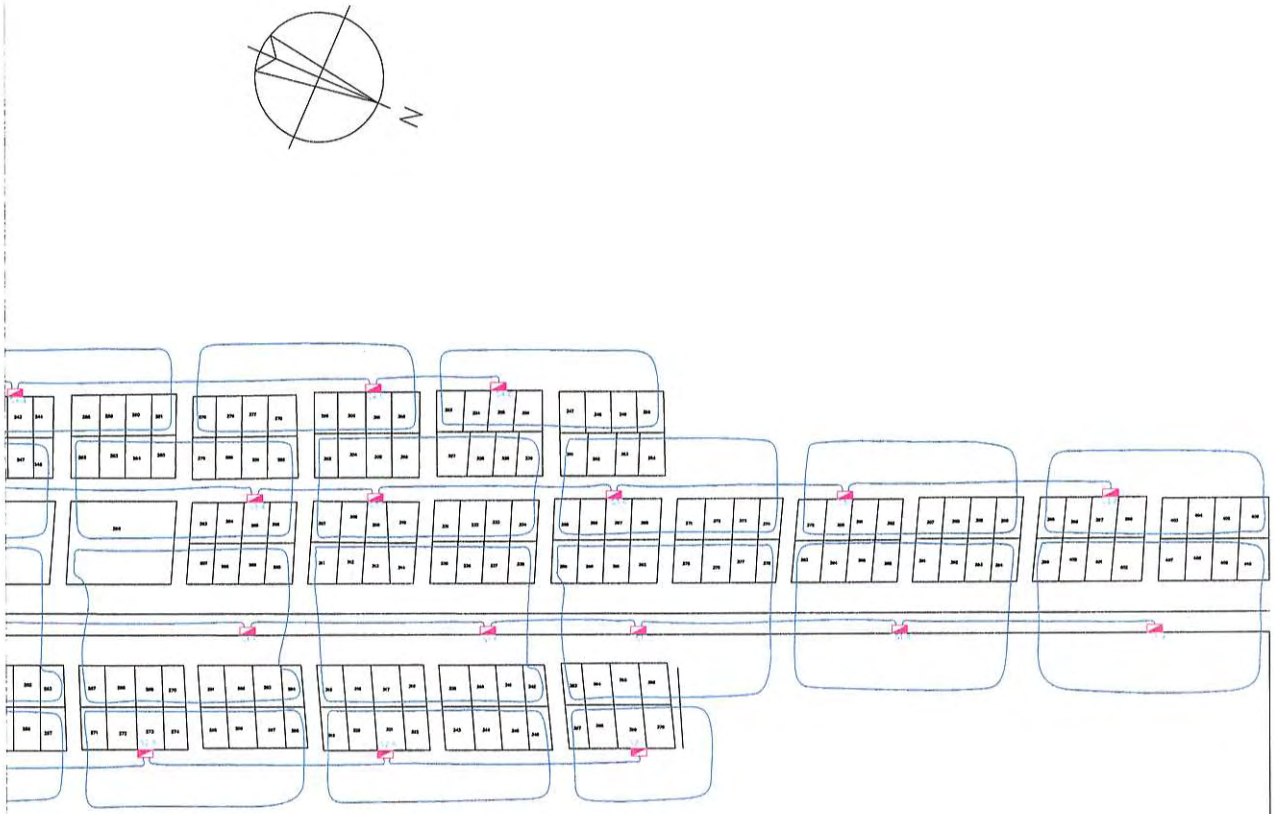
NOTES: Refer to Drawing no. E-09-03

THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

DRAWING TITLE
Distribution Route map in Gan-Mukurimagu (2)

	DESIGNED BY	CHECKED BY	APPROVED BY	SCALE	SHEET NO.	REV. NO.
NAME	T.Ogawa	T.Kobayashi	M.Komiya			
SIGNATURE				1: 2800	E-09-02	04
DATE	22-05-05	22-05-05	22-05-05			



LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area
	Future Cables

Scale
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100m

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS
MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

NOTES:
Refer to Drawing no. E-09-02

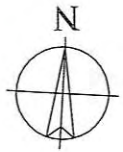
THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

DRAWING TITLE
Distribution Route map in Gan-Mukurimagu (3)

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	Mr.T.Ogawa	Mr.T.Kobayashi	Mr.M.Komiya
SIGNATURE			
DATE	19-05-05	19-05-05	19-05-05

SCALE	SHEET NO.	REV. NO.
1:2800	E-09-03	04



LEGEND TABLE

ITEM	DESCRIPTION
	Distribution Box
	Consumer cable entrance
	Four (04) core main LV cable
	DBs coverage area

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS
MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

NOTES:
This is a non-scaled map. A scaled map will be given to the contractor during the work is in progress at site.

THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

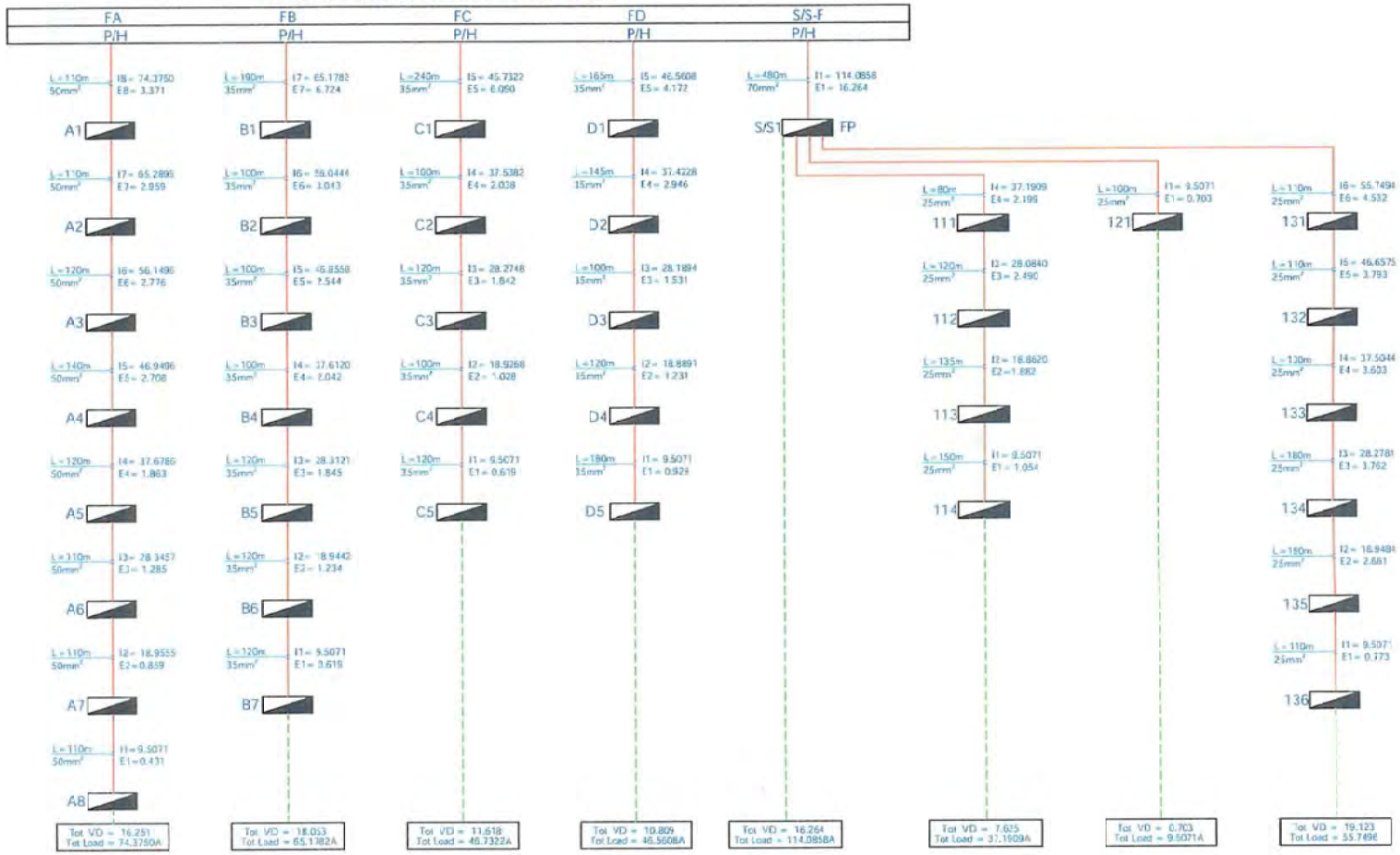
YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	Ogawa	Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE
Distribution Route Map in Maavah

SCALE	SHEET NO.	REV. NO.
None	E-10	

POWERHOUSE DISTRIBUTION PANEL



LEGEND TABLE

ITEM	DESCRIPTION
F#	Feeder Number
P/H	Power House
L=#	Length in metres
I=#	Load in Amps
E=#	Voltage drop in AC volts
VD	Voltage drop

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS
MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

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THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

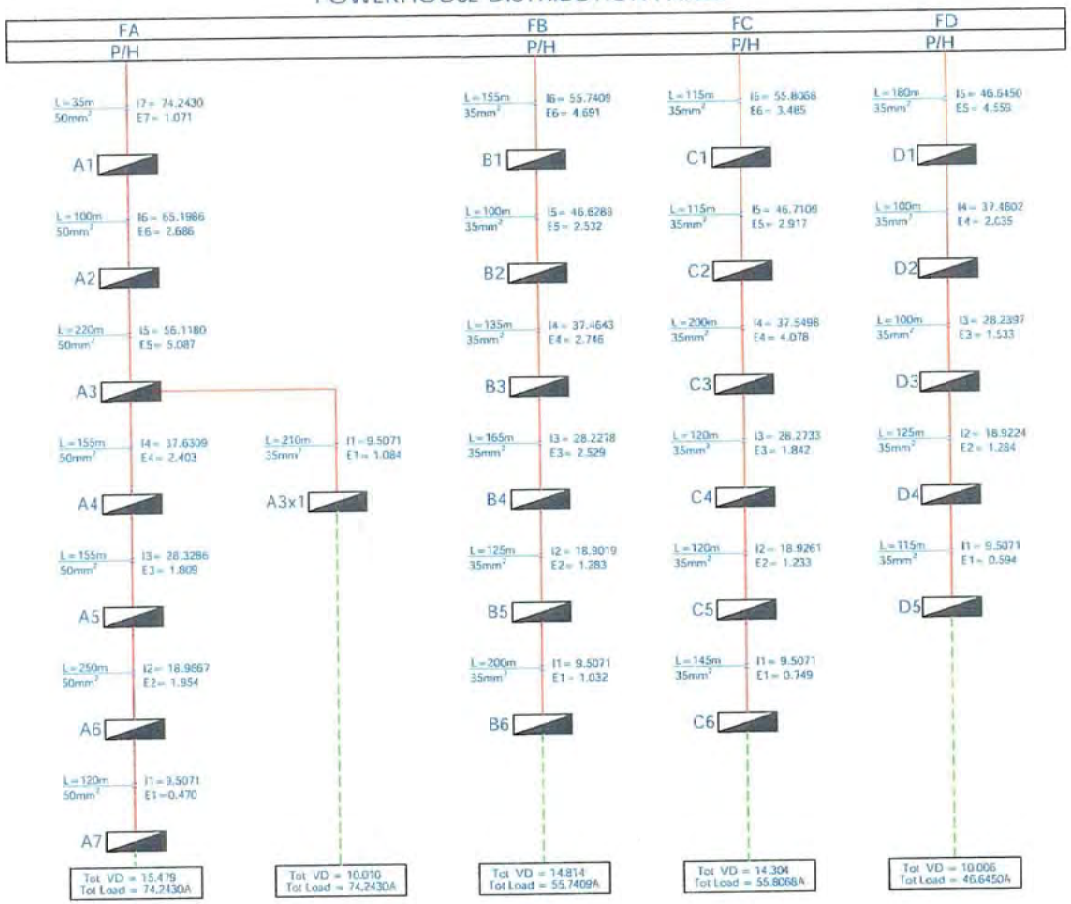
	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE

Single Line Diagram of Distribution Feeder in Isdhoo Island

SCALE	SHEET NO.	REV. NO.
None	E-11	

POWERHOUSE DISTRIBUTION PANEL



LEGEND TABLE

ITEM	DESCRIPTION
F#	Feeder Number
P/H	Power House
L=#	Length in metres
I=#	Load in Amps
E=#	Voltage drop in AC volts
VD	Voltage drop

JAPAN INTERNATIONAL COOPERATION AGENCY

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YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

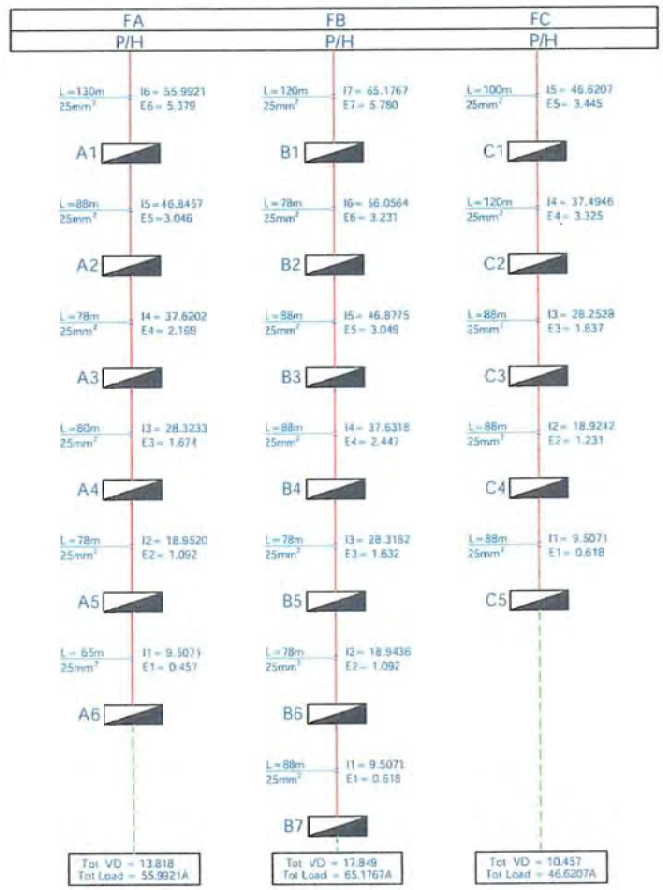
	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE

Single Line Diagram of Distribution Feeder in Isdhoo-Kalaidhoo Island

SCALE	SHEET NO.	REV. NO.
None	E-12	

POWERHOUSE DISTRIBUTION PANEL



LEGEND TABLE

ITEM	DESCRIPTION
F#	Feeder Number
P/H	Power House
L=#	Length in metres
I=#	Load in Amps
E=#	Voltage drop in AC volts
VD	Voltage drop

JAPAN INTERNATIONAL COOPERATION AGENCY

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YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

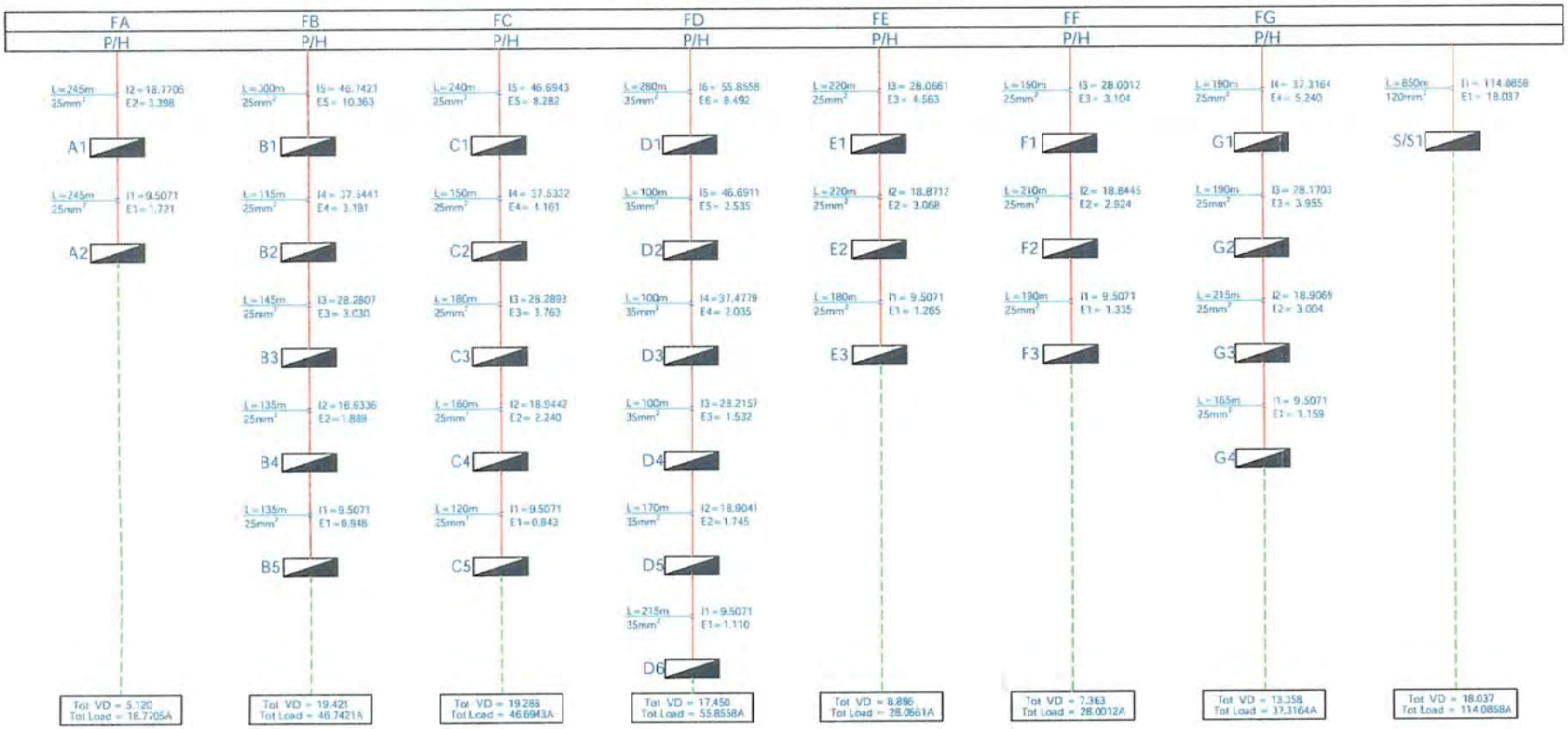
	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE

Single Line Diagram of Distribution Feeder in Maabaidhoo Island

SCALE	SHEET NO.	REV. NO.
None	E-13	

POWERHOUSE DISTRIBUTION PANEL



LEGEND TABLE

ITEM	DESCRIPTION
F#	Feeder Number
P/H	Power House
L=#	Length in metres
I=#	Load in Amps
E=#	Voltage drop in AC volts
VD	Voltage drop

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS
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THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

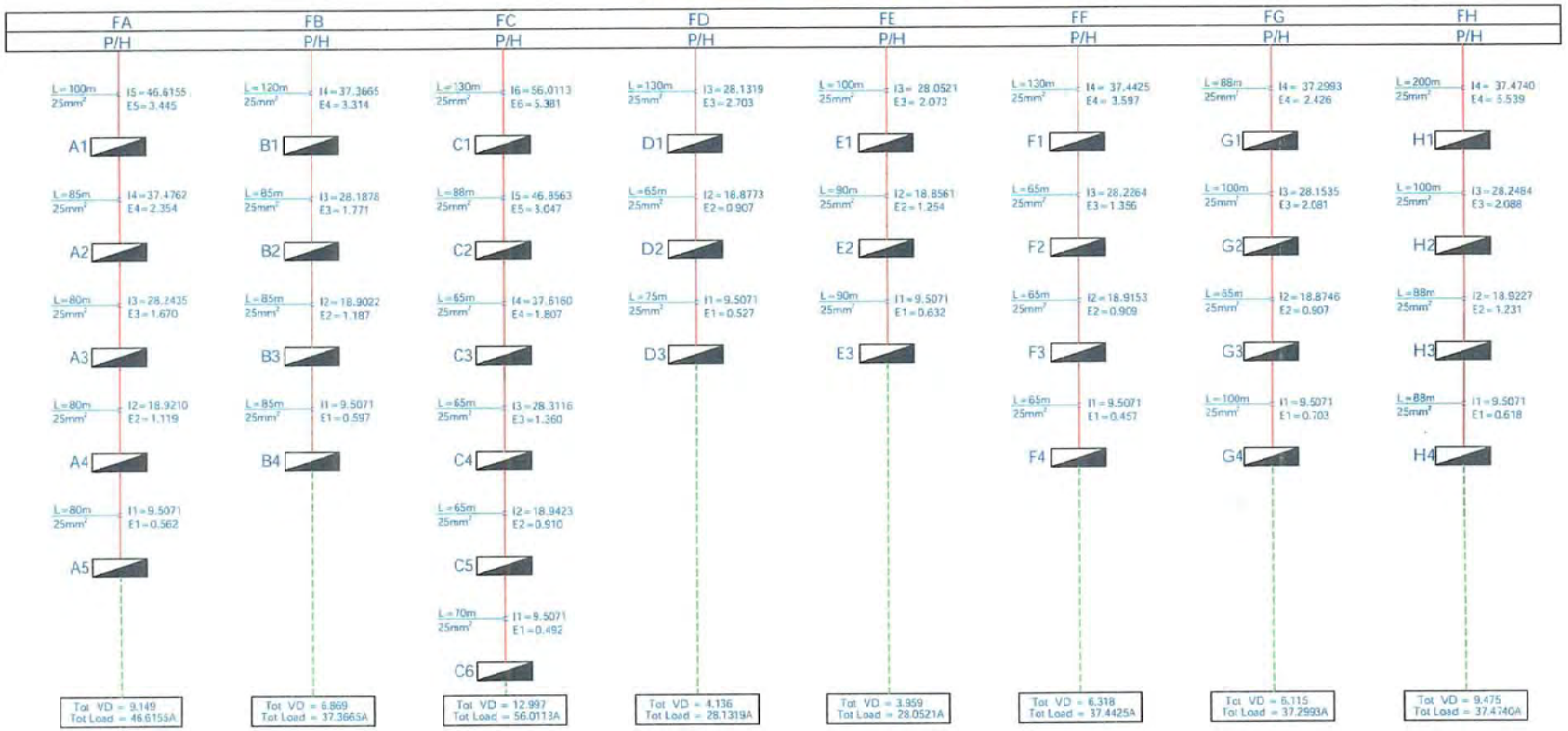
YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE
Single Line Diagram of Distribution Feeders in Gan-Mukurimagu Island

SCALE	SHEET NO.	REV. NO.
None	E-14	

POWERHOUSE DISTRIBUTION PANEL



LEGEND TABLE

ITEM	DESCRIPTION
F#	Feeder Number
P/H	Power House
L=#	Length in metres
I=#	Load in Amps
E=#	Voltage drop in AC volts
VD	Voltage drop

JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF MALDIVES
MINISTRY OF FOREIGN AFFAIRS

MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

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THE STUDY ON TSUNAMI RECOVERY, REHABILITATION AND DEVELOPMENT OF ISLANDS IN MALDIVES

YACHIYO ENGINEERING CO, LTD.
NIPPON KOEI CO, LTD.

	DESIGNED BY	CHECKED BY	APPROVED BY
NAME	T.Ogawa	T.Kobayashi	M.Komiya
SIGNATURE			
DATE	22-05-05	22-05-05	22-05-05

DRAWING TITLE

Single Line Diagram of Distribution Feeders in Maavah Island

SCALE	SHEET NO.	REV. NO.
None	E-15	

COST FACTORS (1)

(In case of the Goods procured from overseas)

Descriptions of Cost Factors	Division of Costs (S= Supplier pays, E=End-User pays, J=JICS pays)
In the country of exportation	
● Packing of the Goods	S
● Inspection of the Goods at the manufacturer's premises	S
● Loading the Goods at the manufacturer's premises	S
● Domestic transportation to carrier's terminal	S
● Contract of carriage and dispatch	S
● Trade documentation	S
● Customs clearance	S
● Export charges	S
● Inspection of the Goods at the embarkation (loading) place	S
● Loading the Goods at carrier's terminal	S
Transportation	
● Use/Hire of special transportation equipment and accessories (when necessary to ensure a smooth transportation)	S
● International transportation (Cargo) insurance (if insured)	S
● International main carriage charge (sea, air, overland)	S
In the Republic of Maldives	
● Unloading the Goods at port/airport in Male	S
● Storage cost at port/airport in Male	S
● Demurrage at terminal of discharge	S
● Import license/charges and Obtaining import license	E
● Customs Clearance	S
● Storage cost in warehouse in Male	S
● Domestic transportation cost from Male to a harbour at each island in the Project Sites	S

● Domestic transportation (Cargo) insurance(if insured)	**S**
● Unloading the Goods at a harbour at each island in the Project Sites	**S**
● Inland transportation from a harbour to power house (or other appropriate places for storage) in each island in the Project Sites	**E**
Other costs if necessary	**S**

COST FACTORS (2)

(In case of the Goods procured inside the Republic of Maldives)

Descriptions of Cost Factors	Division of Costs (S= Supplier pays, E=End-User pays, J=JICS pays)
● Packing of the Goods	**S**
● Inspection of the Goods at the manufacturer's premises	**S**
● Loading the Goods at the manufacturer's premises	**S**
● Domestic transportation documentation	**S**
● Contract of carriage and dispatch	**S**
● Storage cost at the manufacturer's warehouse or forwarder's warehouse	**S**
● Domestic transportation cost from Male to a harbour at each island in the Project Sites	**S**
● Domestic transportation (Cargo) insurance(if insured)	**S**
● Unloading the Goods at a harbour at each island in the Project Sites	**S**
● Inland transportation from a harbour to power house (or other appropriate places for storage) in each island in the Project Sites	**E**
Other costs if necessary	**S**

Detail work demarcation between the Supplier and the Recipient for the Installation Work of the Goods shall be referred to Attachment-B.

DOCUMENTS FOR PRESENTATION

	Documents to be presented	To JICS		To Consignee	
		Original	Copy	Original	Copy
1	**Signed Commercial Invoice** addressed to the Consignee signed by the Supplier.	1	1	1	-
2	**Packing List** addressed to the Consignee signed by the Supplier.	1	1	1	-
3	**Clean on Board Multimodal Bill of Lading/Through Bill of Lading** made out to the order of the Consignee, marked "Freight Prepaid" and specified the Delivery Site as final destination.	1	-	2	1
4	**Insurance Policy**	1	-		
5	**Certificate of Inspection of the Goods** at the production place issued by the manufacturer.	1	-	-	-
6	**Certificate of Specifications** issued by the Supplier.	1	-	1	-
7	**Certificate of Receipt** signed and stamped by Consignee. (Please refer to **Form-4** indicated in **PART V Forms of Tender**.)	1	-	-	1
8	**Debit Note** addressed to the JICS, issued by the Supplier.	1	1	-	-

Note:

1. The Supplier shall state the following sentence on their commercial invoice.

   "The above mentioned Goods were procured by JICS on behalf of the Republic of Maldives under Japan's Grant Aid 2004 by the Government of Japan in response to the damages caused by the great earthquake off the coast of Sumatra, the Republic of Indonesia, and by the Indian Ocean Tsunami Disaster."

2. The Supplier shall produce a pro-forma invoice one month before the first shipment of the Goods for total procurement quantity. The documents shall be sent to the Consignee and JICS. The invoice shall include the name of the Consignee.

3. The Supplier shall provide the documents as listed above to the Consignee and JICS respectively.

4. Documents No. 1 to No. 5

   These documents shall be submitted to the Consignee prior to the arrival of the Goods at the disembarkation port.

5. Documents No. 1 to No. 8

   The Supplier shall submit these documents to JICS for the payments of the Contract.

6. Document No. 3

   If the Goods are already in Maldives and import custom clearance is not necessary, the Supplier does not have to submit this document.

SPECIAL CONDITIONS

1.	**After Sales Service**	(1) The Supplier and/or the Manufacturer shall arrange after-sales service such as maintenance, repair of the Goods and supply of spare parts & consumables through the branch, registered office or local agent of the Manufacturer in Maldives. (2) Cost for the above arrangement shall be borne at the Consignee's expense.
2.	**Warranty**	The Agent on behalf of the End-User shall give the Supplier written notice of any complaint within warranty period. The warranty period shall be **12 months** after the issuing date of Certificate of Receipt/Acceptance of the Goods.
3.	**Language**	All the language used for the Goods (i.e. Panel, Instruction Signs, etc.) shall be **English.**
4.	**Import Clearance/Charges**	The Supplier or its agent shall make customs clearance at Male port on behalf of the End-User and at the Supplier's own charge. The End-User shall obtain a duty exemption permission before the Good's arrival at Male and submit it to the Supplier.
5.	**Certificate of Receipt**	(1) The End-User shall make a signature on a Certificate of Receipt to JICS within 10 days after the receipt of the Goods at the site if there is neither damage nor claim. (2) This document shall be submitted to JICS for payment.
6.	**In-Coming Inspection**	(1) In-Coming inspections for the Goods shall be arranged by the End-User at its own expense after the arrival of the Goods. (2) Payment shall be done according to the result obtained through In-Coming inspection. (3) In case that there is any problem concerning the Goods, the End-User shall submit an explanation letter to JICS within 10 days after the arrival of the Goods at the site. (4) If there is no information within the period mentioned above, JICS shall recognize that the End-User is satisfied with the performance of the Supplier. Therefore JICS will pay the Supplier.
7.	**Payment Policy**	Payment of the Goods shall be done by bank transfer from Japan to the bank account designated by the Supplier in **US Dollar.**