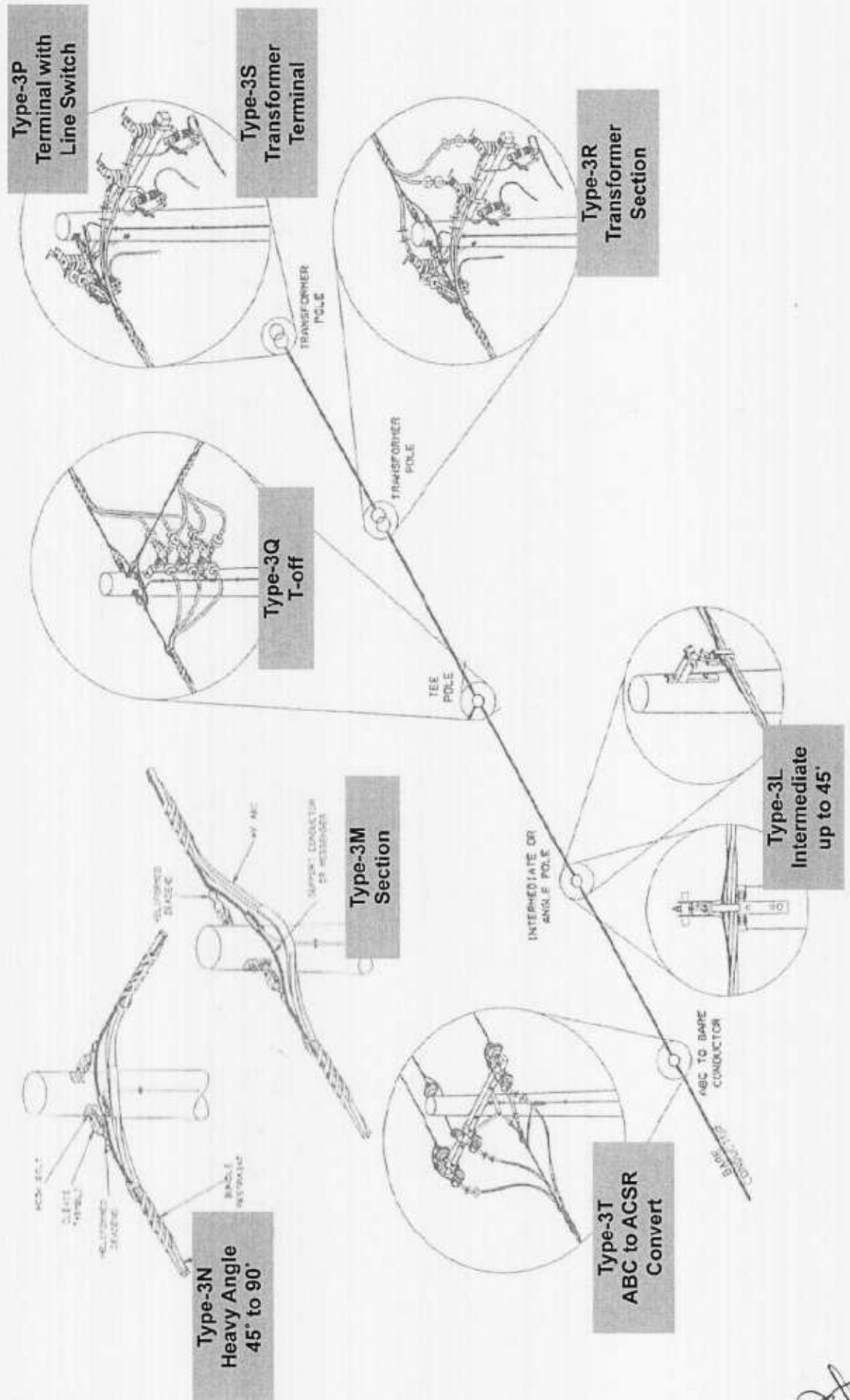


IT-11: Typical Assemblies of 33kV Distribution Lines by ABC



project sites



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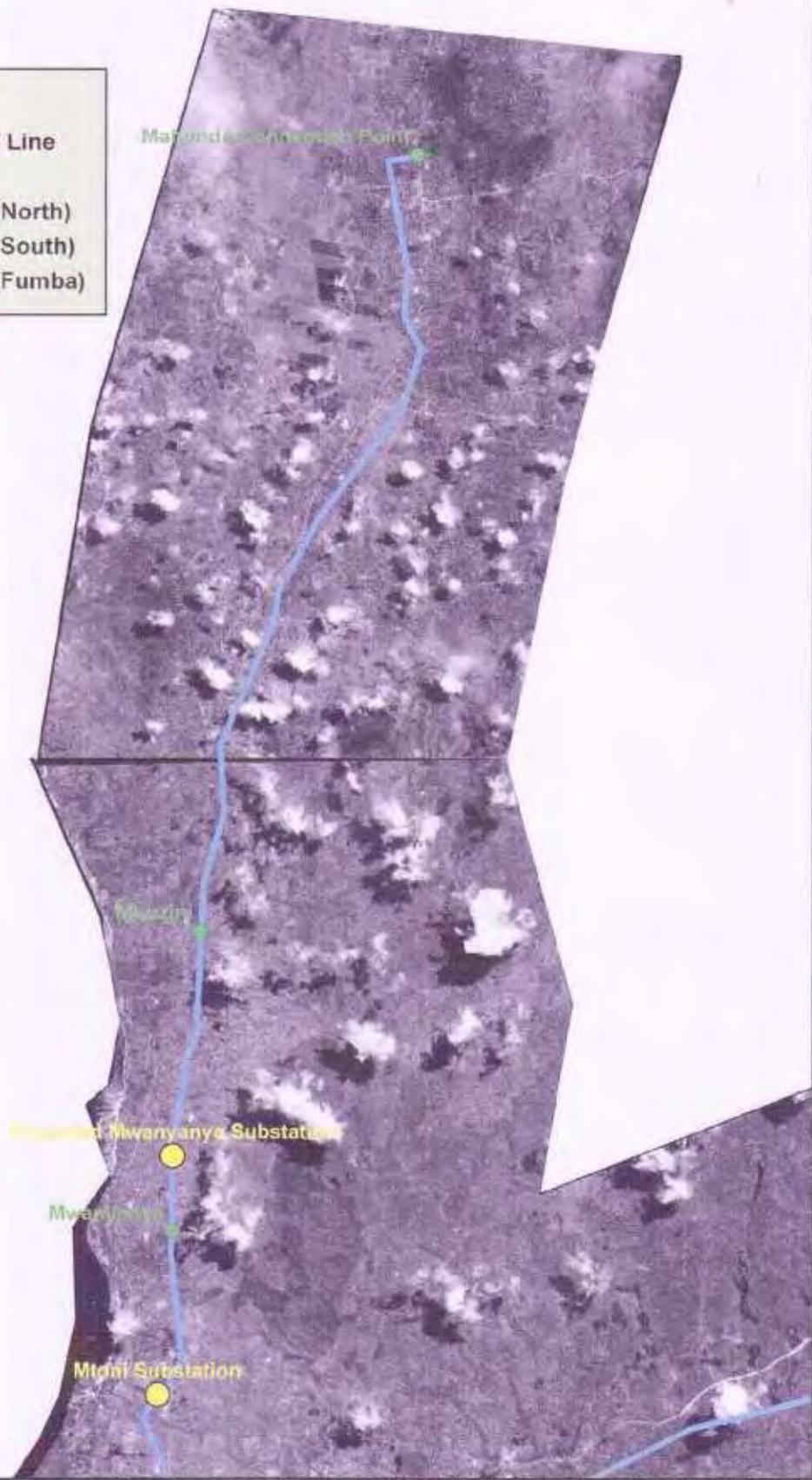
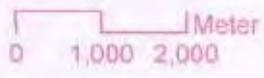
THE PROJECT FOR
THE REINFORCEMENT OF POWER DISTRIBUTION
IN ZANZIBAR ISLAND IN THE UNITED REPUBLIC OF TANZANIA
ROUTE MAP OF PROPOSED 33KV DISTRIBUTION LINE
[NORTH ROUTE]



North Route

- Legend**
- Major Towns on 33kV Line
 - Substation
 - Proposed 33kV Line (North)
 - Proposed 33kV Line (South)
 - Proposed 33kV Line (Fumba)

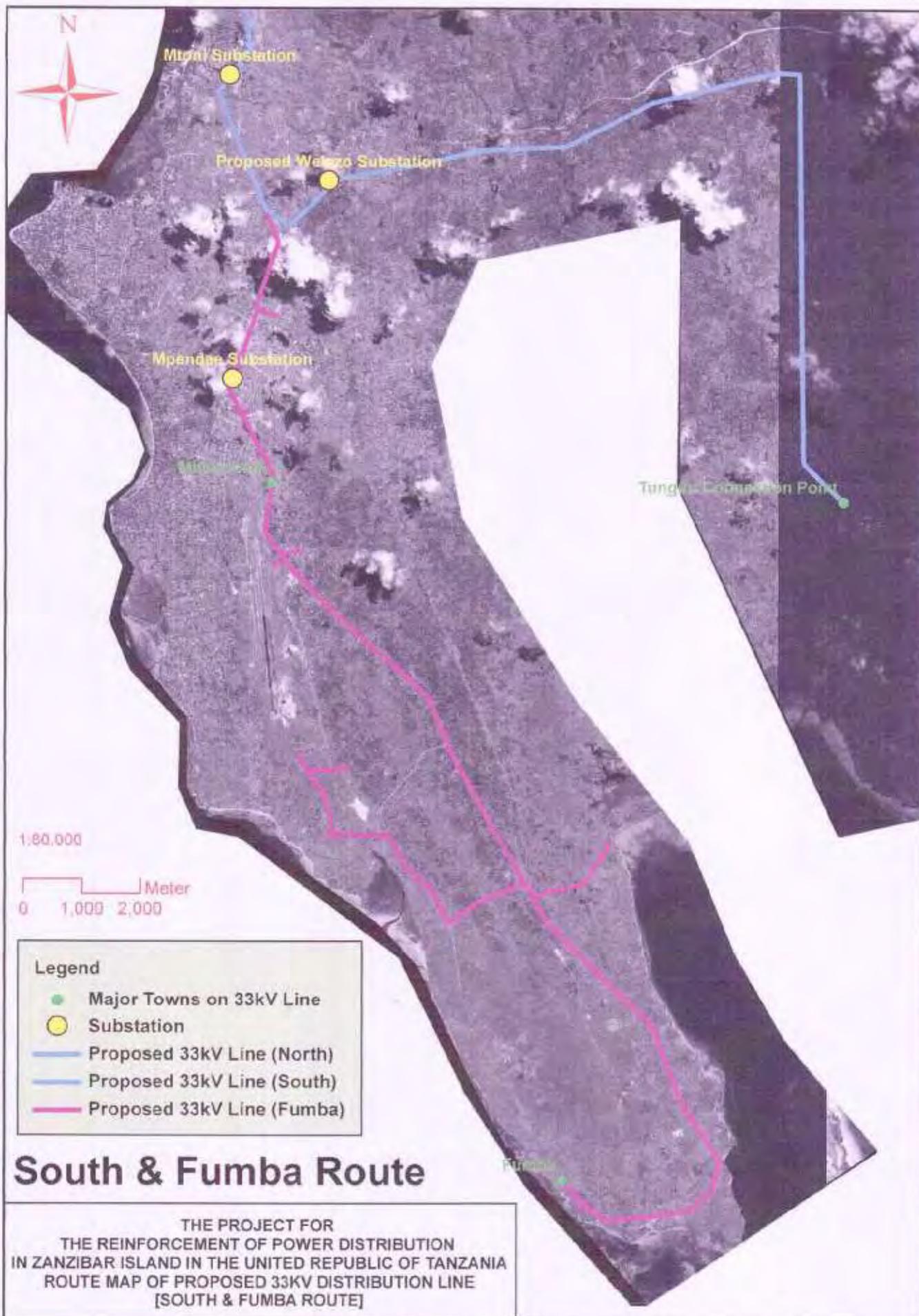
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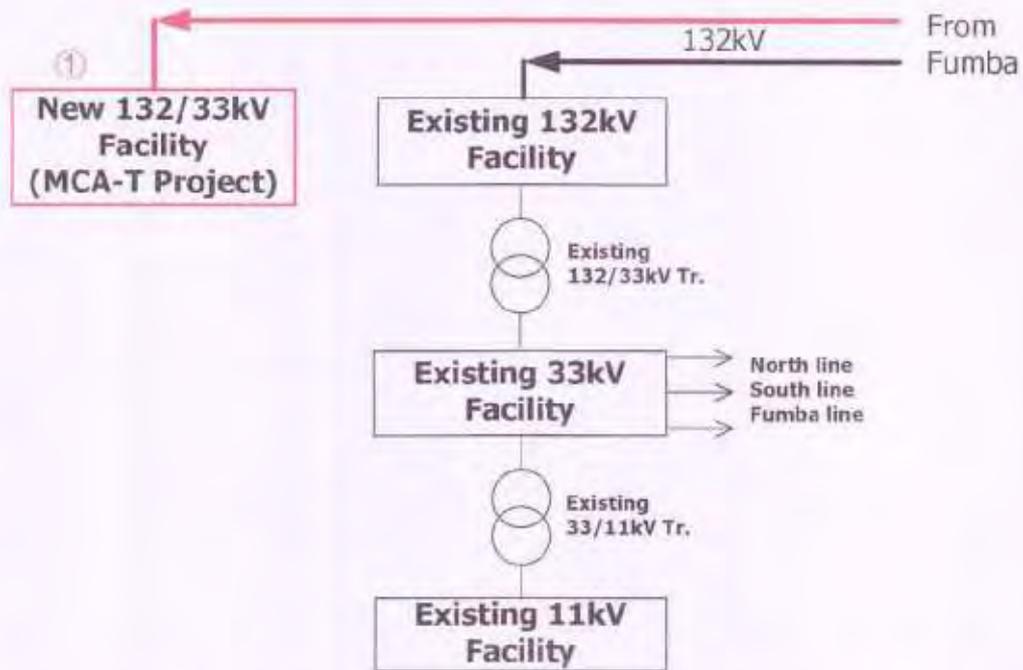
12/2

Detail of 33kV Distribution Route

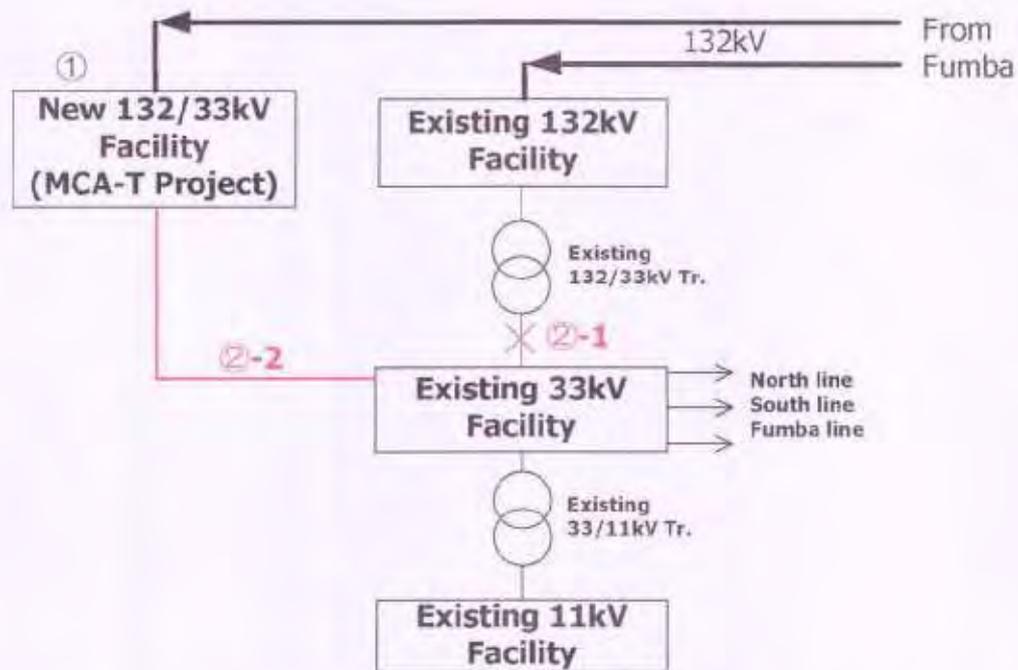
Line	Section	From	To	Type of Area	Conductor	Length (km)	Houses to be Affected
North Line	1	Mbuzini	Mahonda	Along Existing Line in Farm Area	ACSR	13.0	16
	2	Mwanyanya	Mbuzini	Along Existing Line in Residential Area	ABC	4.4	0
	3	Military Camp	Mwanyanya	Along Existing Line in Military Camp	ACSR	2.9	0
	4	Existing Mtoni S/S	Military Camp			Sub-total 20.3	
Fumba Line	5	Existing Mtoni S/S	Amani	Along Existing Line in Residential Area	ABC	8.6	0
	6	Amani	Mitondooni	Along Existing Line	ACSR	29.9	22
	7	Mitondooni	Fumba			Sub-total 38.5	
South Line	8	Existing Mtoni S/S	Welezo S/S	Along Fumba Line and Road	ABC	4.3	0
	9	Welezo S/S	Tunguu	Along Existing Line in Farm Area	ACSR	17.7 Sub-total 22.0	19
						ACSR: 63.5 km ABC: 17.3 km	57

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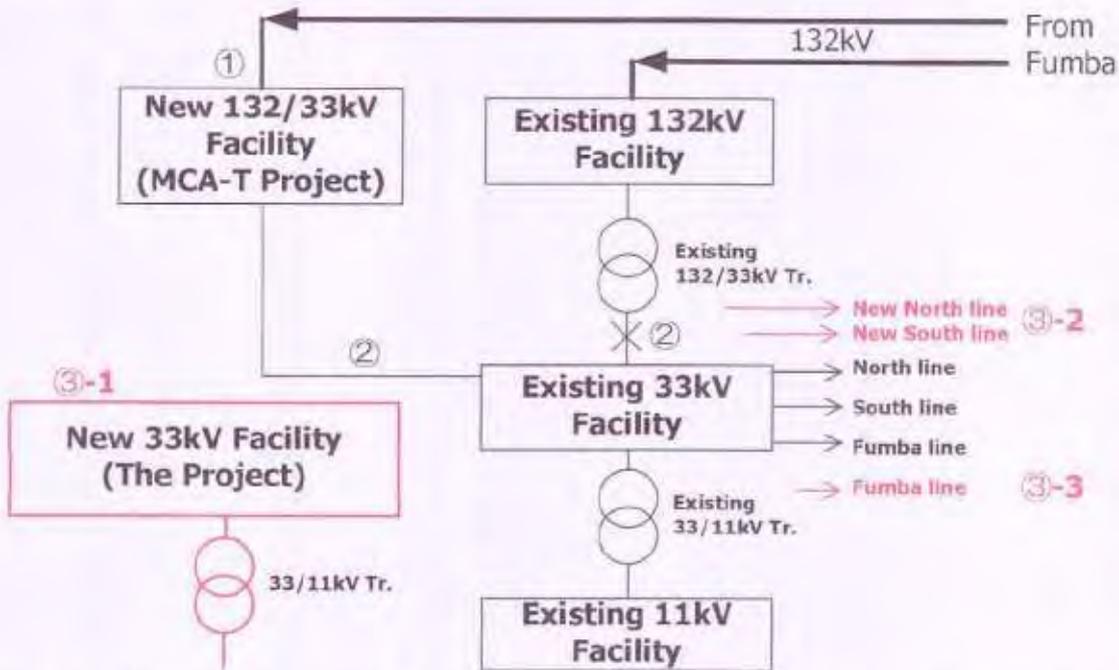
WAF



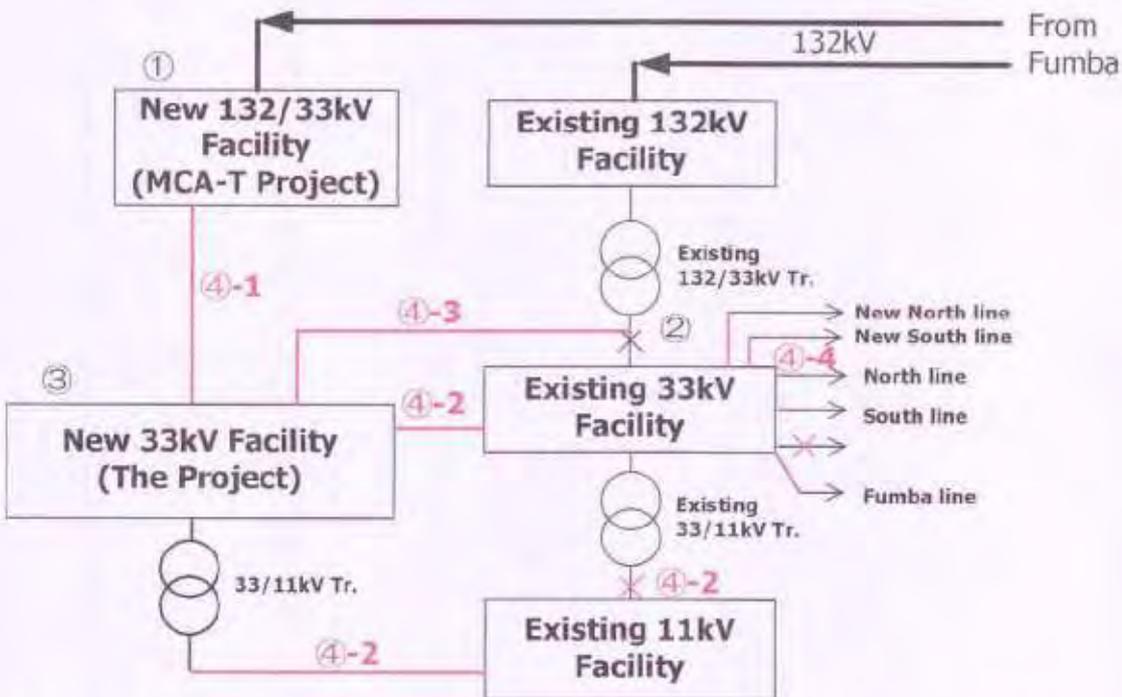
Step ① Construction and Installation for New 132/33kV Facility by MCA-T Project



Step ②-1 Switching off Existing 132kV Facility by MCA-T Project or ZECO
②-2 Lay down 33kV cable between New 132/33kV Facility and Existing 33kV Facility by MCA-T Project
(Completion of MCA-T Project: End. of Aug. 2012)

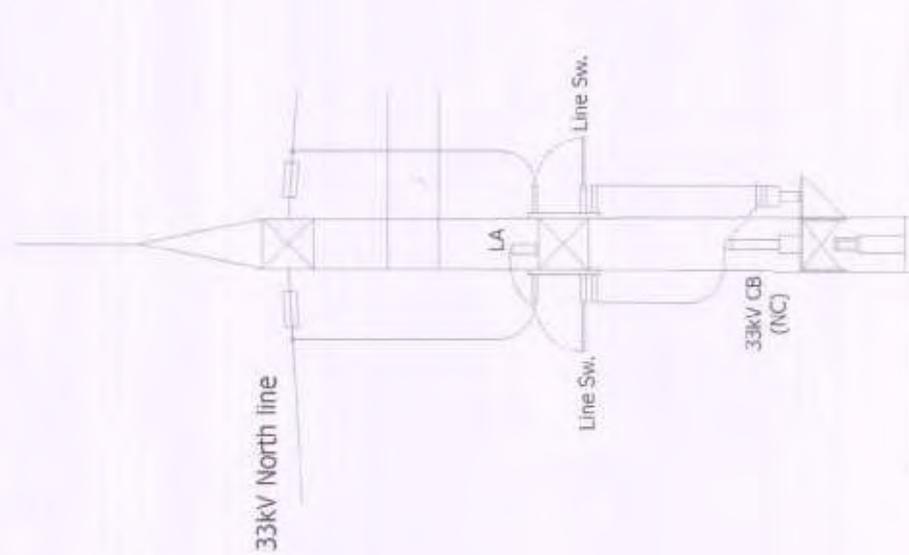


- Step 3**
- ③-1 Construction and Installation for New 33kV Facility by The Project
 - ③-2 Installation New 33kV North and South line by The Project
 - ③-3 Replacement of 33kV Fumba line

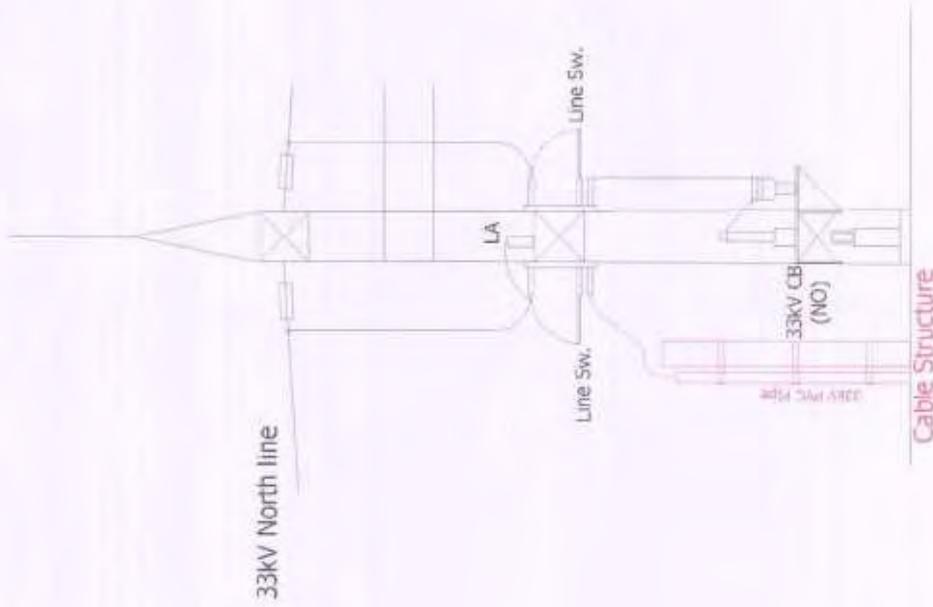
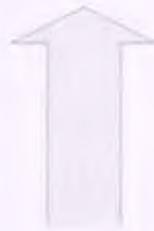


- Step 4**
- ④-1 Lay down 33kV cable between New 33kV Facility by The Project and New 132/33kV Facility by MCA-T Project
 - ④-2 Switching off Existing 11kV Facility by The Project & Connecting New 33kV Facility by The Project and Existing 33/11kV Facility
 - ④-3 Connecting New 33kV Facility by The Project and Existing 132/33kV Transformer
 - ④-4 Connecting New North, South and Fumba line by The Project

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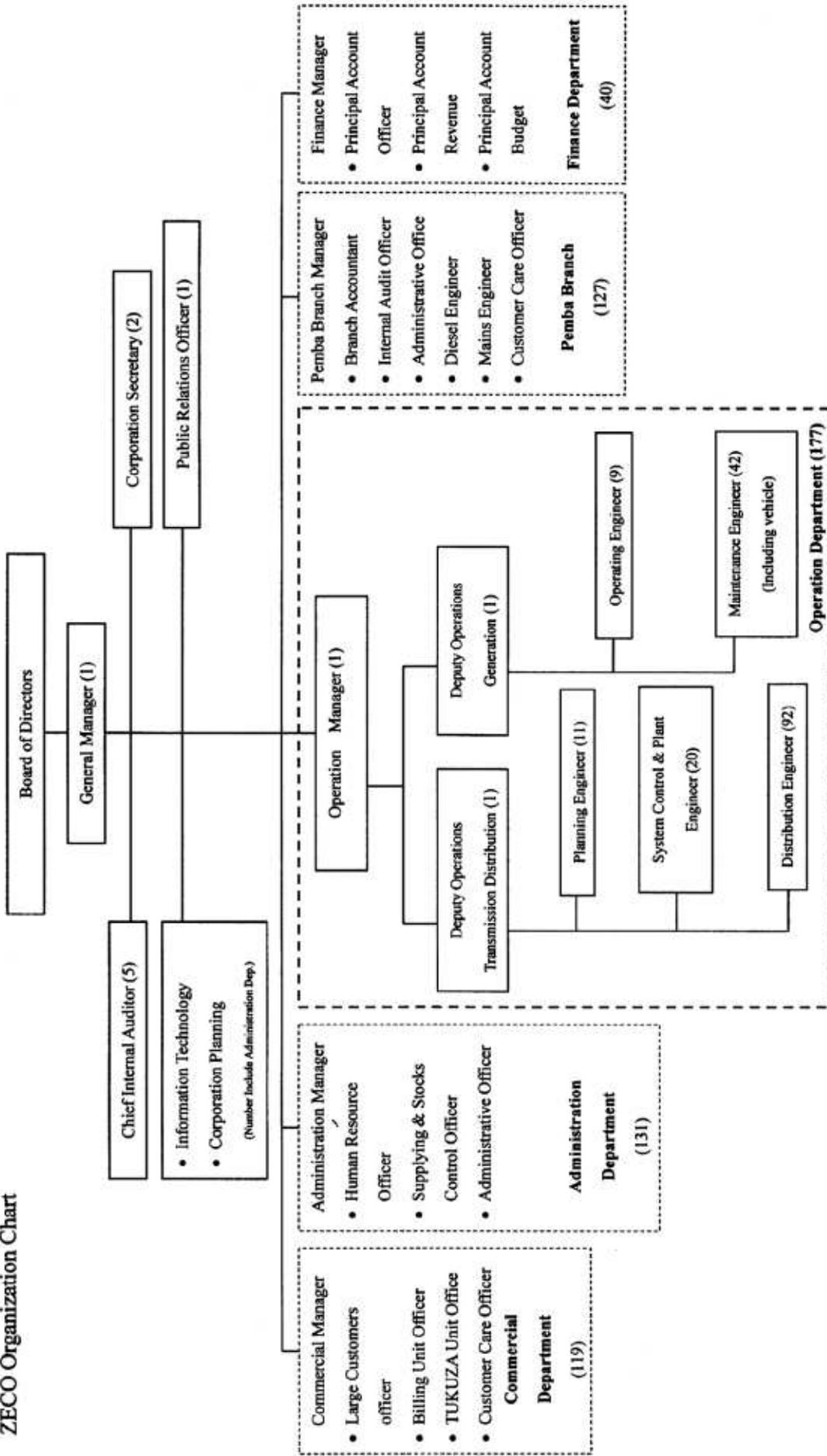


Existing 33kV gantty



Connection Plan for 33kV gantty

ZECO Organization Chart



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15/10/2010

(Shibata)

EIA Schedule (Project for the Reinforcement of Power Distribution in Zanzibar)

Oct.2010	Date	Contents	Data collection & Reporting	Progress Report
	1	Fri.	●	● (1)
	2	Sat.	●	.
	3	Sun.		
	4	Mon.	Military Meeting(1)	●
	5	Tue.	Military Meeting(2)	●
	6	Wed.	Local Community Leader's Meeting(1)	●
	7	Thu.	Local Community Leader's Meeting(2)	●
	8	Fri.	Local Community Leader's Meeting(3)	●
	9	Sat.	Local Community Meeting(1)	● (2)
	10	Sun.		
	11	Mon.	●	
	12	Tue.	●	
	13	Wed.	Local Community Meeting(2)	●
	14	Thu.	Local Community Meeting(3) Holiday	●
	15	Fri.	Local Community Meeting(4)	○
	16	Sat.	Local Community Meeting(5)	○ (3)
	17	Sun	Staff Meeting (JICA)	○
	18	Mon.	Local Community Meeting(6)	○
	19	Tue.	Staff Meeting (JICA, ZECO & DoE) for EIA schedule in ZECO: AM9:00	○
	20	Wed.	[JICA Study Team → Dar es Salam]	○ (4)
	21	Thu.		○
	22	Fri.	Progress of EIA Report (Draft) for Japan Embassy in Tanzania & JICA	○
	23	Sat.		○
	24	Sun		
	25	Mon.	Submit EIA Report (Draft:6 copies) to DoE [JICA Study Team → Japan]	○ (5)
	26	Tue.		○
	27	Wed.		○
	28	Thu.		○
	29	Fri.	Submit EIA Report (Final:6 copies) to DoE	
	30	Sat.		
	31	Sun		

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資料 - 6 参考資料 / 入手資料リスト

6. 参考資料 / 入手資料リスト

調査名: タンザニア国ザンジバル地域配電網強化計画準備調査(その2)

番号	名称	形態 図書・ビデオ・ 地図・写真等	オリジナル・ コピー	発行機関	発行年
1	25MW EMRGENCY POWER AND BACK Report for DPs.doc	図書	コピー	ZECO	Sep. 2010
2	Meteorological Data in Zanzibar	図書	コピー	TANZANIA METEOROLOGICAL AGENCY ZANZIBAR OFFICE	2009
3	Screening Report with Terms of Reference and Guidelines for Abbreviated Resettlement Plan for Reinforcement of Power Distribution Project, Zanzibar	図書	コピー	Department of Environment (DOE)	Sep. 2009
4	END-TERM REVIEW OF THE SWEDISH SUPPORT TO THE ZANZIBAR ENERGY SECTOR 2007-2009 FINAL REPORT	図書	コピー	Ingvar Spanne	Jun. 2010
5	Zanzibar Energy Policy	図書	コピー	Ministry of Water, Construction, Energy and Lands	Dec. 2009
6	33kV and 11kV Single Line Diagram	図面	コピー	ZECO	Sep. 2010
7	Single Line Diagram and Specification of Equipments in Mtoni Substation	図書	コピー	ZECO	Oct. 2010
8	ZECO Construction Vehicle in Unguja	図書	コピー	ZECO	Oct. 2010
9	Mpendae 33/11kV Substations & Networks Rehabilitation Project Contract Draft	図書	コピー	Pauwels International	Oct. 2008
10	Rural Electrification Plan	図書	コピー	Ministry of Water, Construction, Energy and Lands	Jul. 2010
11	Workable Study for the Second Submarine Interconnector Between Unguja Island and Ubungo Power Station Dar es Salaam	図書	コピー	NORPLAN	Nov. 2006
12	Financial Statement for the Year Ended 30 th June 2009	図書	コピー	ZECO	Jun. 2009

番号	名称	形態 図書・ビデオ・ 地図・写真等	オリジナル・ コピー	発行機関	発行年
13	Terms of Reference End-review of the Phase IV and Extension of the Zanzibar Rural Electrification Project	図書	コピー	Norad	Oct. 2008
14	Business Plan 2008/09 to 2010/11	図書	コピー	ZECO	Sep. 2009
15	Environmental Impact Assessment (Guidelines and Procedures)	図書	コピー	Department of Environment (DOE)	2010
16	Zanzibar Strategy for Growth and Reduction of Poverty (ZSGRP)	図書	コピー	The Revolutionary Government of Zanzibar	2007
17	Zanzibar Strategy for Growth and Reduction of Poverty: 2010-2015 (ZSGRP II) MKUZA II Draft	図書	コピー	The Revolutionary Government of Zanzibar	2010
18	Zanzibar's Growth Strategy (2006-2015) Final Report	図書	コピー	Ministry of Finance and Economic Affairs	2007
19	Zanzibar Vision 2020	図書	コピー	The Revolutionary Government of Zanzibar	2000
20	Zanzibar Statistical Abstract 2007	図書	コピー	Office of Chief Government Statistician Zanzibar	2008
21	EIA Final Report	図書	コピー	ZECO	Dec. 2010
22	RAP Final Report	図書	コピー	ZECO	Jan. 2011

資料 - 7 相手国からのレター関連

7. 相手国からのレター関連

(1) Mtoni 変電所の変圧器追加要請に関するレター (ZECO)

ZANZIBAR ELECTRICITY CORPORATION		Head Office: P.O.Box: 235, Zanzibar, Tanzania Tel: +255 24 230237/8 Tel: +255 774 334455 Fax: +255 24 2231906 Email: zeco_znz@hotmail.com
Our Ref:		
Enquiries: 024 2238321		
Emergency: 024 2230232		
ZECO/CONF.1/JICA/VOL.1/36		
15 OCTOBER, 2010		
<p>YOUR EXCELLENCY, AMBASSADOR, EMBASSY OF JAPAN, DARES SALAAM, <u>TANZANIA.</u></p>		
<p>Sir,</p>		
<p>RE: REQUEST FOR THE INSTALLATION OF NEW 2X25MVA, 33/11kV TRANSFORMERS AT MTONI SUBSTATION UNDER REINFORCEMENT OF POWER DISTRIBUTION IN ZANZIBAR PROJECT</p>		
<p>With honors, please refer to the above mentioned subject.</p>		
<p>The Revolutionary Government of Zanzibar under the United Republic of Tanzania Government has requested the grant to the Government of Japan through Japan International Cooperation Agency (JICA), for the reinforcement of her main power distribution infrastructures to different areas in Unguja Island.</p>		
<p>As part of preparation to the approval of the request, JICA has already sent different experts to justify the need and appropriateness of the project to the peoples of Zanzibar.</p>		
<p>Previously, the contents of the project had been discussed in several times and minutes of discussions were signed between these two sides i.e. Zanzibar (Tanzanian side) and JICA (Japanese side).</p>		
<hr/> <p><i>All correspondence should be addressed to the General Manager "We deserve to serve you better, while you ensure to settle your electricity bill before due date"</i></p>		

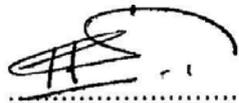
Due to its frequent and long service operation in power transforming activities, either stepping up (while generators are used in emergency mode) or stepping down (for the national grid power use), since they are commissioned in early 1980, our two transformers (33/11 kV) are now arises some abnormal functions that threat the power availability to medium voltage consumers which are now used by the whole areas around Zanzibar town. Oil leakage, water and gaseous contents in transformer oil are the normal causes of consecutive tripping occurs in these aged substation transformers.

In view of that, we request for the change in contents of the project especially in the expansion of Mtoni substation to add the installation of these two transformers as mentioned in the above topic.

On behalf of the peoples and Government of Zanzibar, we thank you (Peoples of Japan) for your endless effort in assisting us in different areas such as water, agriculture and education.

Kindly regards,

Sincerely yours,



.....
Hassan A. Mbarouk
Acting General Manager,
Zanzibar Electricity Corporation,
Zanzibar.

Cc:

Principal Secretary,
Ministry of Water, Construction,
Energy and Land,
Zanzibar.

(2) 渡り鳥への影響に関するレター（農業・畜産・環境省）



**ZANZIBAR REVOLUTIONARY GOVERNMENT
MINISTRY OF AGRICULTURE, LIVESTOCK AND ENVIRONMENT**

Tel: 024-2239007

Fax: 24-2236790

E-Mail: doe_znz@yahoo.com

Department of Environment

P.O Box 159

Zanzibar

Ref No: IM/29/2/8VOL XIII

Date: 19/10/ 2010

Kiyofusa Tanaka
Chief Consultant
JICA Preparatory Survey Team
Yachiyo Engineering Co., Ltd.

Subject: The 2nd Preparatory Survey on the Project for Reinforcement of Power Distribution in Zanzibar Island in the United Republic of Tanzania

Re: Environmental Impact of the Project for Reinforcement of Power Distribution

The Screening Report of the Project for Reinforcement of Power Distribution mentions that this Project is not anticipated posing serious environmental damage as the new distribution line is going to be installed within buffer distance of 30m of the existing line. Therefore, the new distribution line shall have no serious environmental impact against wild birds and other creatures in Zanzibar.

Sincerely Yours,

A handwritten signature in black ink, appearing to be 'Ali J. Hamad', written over a horizontal line.

.....
(Ali J. Hamad)
Director
Department of Environment
The United Republic of Tanzania

(3) 渡り鳥への影響に関するレター (ZECO)

ZANZIBAR ELECTRICITY CORPORATION

Our Ref:

Enquiries: 024 2238321

Emergency: 024 2238321 **ZECO/CONF.1/JICA/VOL.1/39**



Head Office:

P.O.Box: 235,

Zanzibar, Tanzania

Tel: +255 24 230237/8

Tel: +255 774 334455

Fax: +255 24 2231906

Email: zeco_znz@hotmail.com

20th OCTOBER, 2010

Kiyofusa Tanaka,
Chief Consultant,
JICA Preparatory Survey Team,
Yachiyo Engineering Co., Ltd.

Japan.

SUBJECT: THE 2nd PREPARATORY SURVEY ON THE PROJECT FOR REINFORCEMENT OF POWER DISTRIBUTION IN ZANZIBAR ISLAND IN THE UNITED REPUBLIC OF TANZANIA

RE: ENVIRONMENTAL IMPACT OF THE PROJECT FOR REINFORCEMENT OF POWER DISTRIBUTION IN ZANZIBAR

The screening report of the Project for Reinforcement of Power Distribution mentions that this Project is not anticipated posing serious environmental damage as the new distribution line is going to be installed within buffer distance of 30m of the existing line.

Therefore, the new distribution line shall have no serious environment impact against wild birds and other creatures in Zanzibar.

Sincerely yours,

Hassan A. Mbarouk
Acting General Manager,
Zanzibar Electricity Corporation,
Zanzibar.

*All correspondence should be addressed to the General Manager
"We deserve to serve you better, while you ensure to settle your electricity bill before due date"*

(4) 供与機材の承認及び据付に関するレター (JICA Study Team)



YACHIYO ENGINEERING CO., LTD.

Consulting Engineers & Architects

Head Office: 18-12, Nishiochiai 2-chome, Shinjuku-ku, Tokyo, 161-8575 Japan

Tel: +81-3-5906-0180

Fax: +81-3-5906-0821

Date: 22nd February, 2011

Mr. Hassan A. Mbarouk
Acting General Manager
Zanzibar Electricity Corporation (ZECO)

Project: The Project for the Reinforcement of Power Distribution in Zanzibar Island in the United of Republic of Tanzania

Subject: Confirmation of Components of the Procurement of construction vehicles, tools and materials for distribution lines

In response to the letter issued by ZECO dated of 28th January 2011 (ZECO/CONF.1/JICA/VOL.1/50) regarding the priority of components in the item (7) "Procurement of construction vehicles, tools and materials for distribution lines," which is mentioned in the Minutes of Discussion (M/D) on the 3rd Preparatory Survey, the JICA Study Team (hereinafter referred to as "the Team") hereby informs ZECO of the final components of item (7) selected by the Japanese side. The necessity and urgency of the components were examined among the Ministry of Foreign Affaires, JICA Headquarter and the Team.

As a result of discussion considering the limitation of the Project budget, the component of Item (7) shall be selected as follow.

1. Components item (7) to be procured

- | | |
|----------------------------------|-------------|
| 1) 33 kV auto-recloser | : 4 sets |
| 2) Digger and pole erector truck | : 1 vehicle |
| 3) Truck with cranes (7 tons) | : 1 vehicle |

2. Reasons of selection

According to the letter from ZECO, load break switches (LBS) for 33 kV and 11 kV overhead distribution line are categorized as the third priority, and the Team



YACHIYO ENGINEERING CO., LTD.

Consulting Engineers & Architects

Head Office: 18-12, Nishiochiai 2-chome, Shinjuku-ku, Tokyo, 161-8575 Japan

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Fax: +81-3-5906-0821

understood the importance of the LBS. However, the Team considers that maintenance tools and vehicles, such as a truck with crane, are indispensable for maintaining the 33 kV distribution lines which will be constructed in the Project and for implementing the works to be undertaken by Zanzibar side. Comparing the necessity and the importance of LBS and a construction vehicle, LBSs seem less important than construction vehicles. In addition, the function of LBSs which is aimed to isolate a faulty point from distribution networks shall be (partly) covered by auto-reclosers to be procured under the Project. Thus, the Team proposes that the following equipment should be included in the scope of the Project due to the reasons explained below.

1) 33 kV auto-recloser

This equipment shall be installed near the terminal point of the 33 kV distribution lines which will be constructed in this Project by ZECO within the period of the Project. Under the present situations without sufficient equipment, such as auto-reclosers, a blackout extends widespread and it takes time for power line restorations. After the installation of the 33 kV auto re-closers, it will enable to decrease the range of blackout and to shorten the power outages.

2) Digger and pole erector truck and Truck with cranes (7 tons)

ZECO owns some construction vehicles, but it is difficult to obtain the spare parts in case of breakdowns because the vehicles were procured more than 15 years ago. Although the construction vehicles would be indispensable for the extension of the power distribution network in rural area, ZECO does not own enough number of vehicles. Moreover, a digger and pole erector truck is not owned by ZECO.

The recipient country will be required to carry out the relocation of transformers at the Fumba line immediately at the Project. Therefore, those vehicles are selected in order to facilitate the construction works by ZECO.



YACHIYO ENGINEERING CO., LTD.

Consulting Engineers & Architects

Head Office: 18-12, Nishiochiai 2-chome, Shinjuku-ku, Tokyo, 161-8575 Japan

Tel: +81-3-5906-0180

Fax: +81-3-5906-0821

3. Confirmation of the proposal by the Team

Please kindly confirm and accept our proposal described above. After the confirmation and acceptance of the proposal, ZECO is requested to submit an official letter attention to the chief consultant by the end of March 2011, which states that ZECO will surely install the procured 33 kV auto-reclosers within the Project period.

Sincerely yours,

Kiyofusa TANAKA
Chief Consultant
JICA Study Team

(5) 供与機材の承認及び据付に関するレター (ZECO)

ZANZIBAR ELECTRICITY CORPORATION

Dir. Ref:

Enquiries: 024 2235521

Emergency: 024 2230232



Head Office
P.O.Box 235,
Zanzibar, Tanzania
Tel: +255 24 2523778
Tel: +255 774 534455
Fax: +255 24 2211906
Email: zsec_znz@hotmail.com

ZECO/CONF.1/JICA/VOL.1/53

25 MARCH 2011

KIYOFUSA TANAKA,
CHIEF CONSULTANT,
YACHIYO ENGINEERING CO., LTD
TOKYO,
JAPAN.

PROJECT: REINFORCEMENT OF POWER DISTRIBUTION IN ZANZIBAR PROJECT IN THE
UNITED REPUBLIC OF TANZANIA – ZANZIBAR ISLAND

RE: CONFIRMATION FOR THE INSTALLATION OF THE PROCURED MATERIALS
FOR DISTRIBUTION LINES – 33kV AUTO-RECLOSER

Reference made in the above-mentioned heading.

We agree with the selection made by your side based on budget constrain,
priority indicated by ZECO and its importance; and absolutely your selection
covers our real situation.

As a result of technical meeting with senior members of our distribution section
within Technical Department, we would like to assure you that the installation of
the selected components to be procured by the Japanese side in the project
mentioned above will be done in the project period.

Thanking you in advance.

Sincerely yours,

*All correspondence should be addressed to the General Manager.
"We deserve to serve you better; while you endeavor to settle your electricity bill before due date."*



Hassan A. Mbarouk
General Manager,
Zanzibar Electricity Corporation,
Zanzibar.

資料 - 8 電力潮流解析の検討

8. 電力潮流解析の検討

1. 検討条件

1.1 配電系統

既設 33kV 配電線から計画対象地域への配電ルートは、本文 3-2-2-3(4)に示す通りである。

1.2 電圧、周波数 及び負荷の力率

- ・ 系統電圧： 33kV、三相三線式、電柱架空配電方式
- ・ 周波数： 50Hz
- ・ 負荷力率： 0.8

1.3 負荷条件

計画対象地域の負荷は、ザンジバル電力公社（ZECO）より提供のあった 33 kV/11 kV 配電系統図及び同系統上の配電変圧器容量を基に、2005 年～2008 年の平均負荷率 60% を乗じた負荷を適用する。

1.4 電線サイズ・線路定数

既設及び新設配電線の種類及び線路定数は、以下のとおりとする。

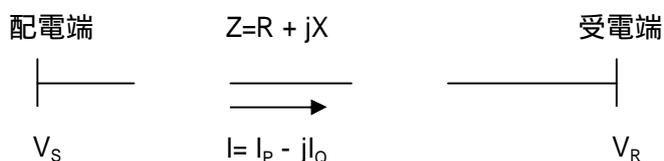
電線サイズ	適用区間	交流導体抵抗 R [/km]	リアクタンス X [Ω/km]	キャパシタンス C [μ F/km]
ACSR 50 mm ²	既設 Fumba ルート	0.467	0.212	0.022
ACSR 100 mm ²	既設/新設北ルート 既設/新設南ルート 既設/新設 Fumba ルート	0.267	0.185	0.021
ACSR 150 mm ²	新設 Fumba ルート (代替検討用)	0.169	0.178	0.020
ABC 3x150mm ²	新設北ルート 新設南ルート 新設 Fumba ルート	0.206	0.124	0.228

1.5 電圧降下の計算方法

(1) 計算手法

・ 線路定数 (R+jX) 及び負荷電流 ($I_p - jI_Q$) 共に、複素数として扱う。

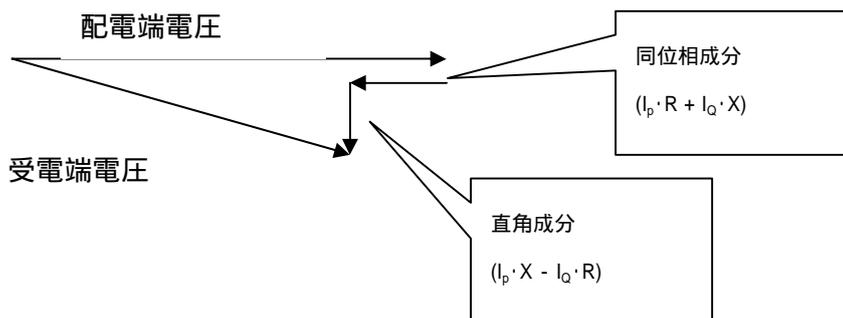
・ 電圧降下： $V=(I_p \cdot R + I_Q \cdot X) + j(I_p \cdot X - I_Q \cdot R)$



(遅れ分を で扱う。)

$$\begin{aligned}
 V_R &= V_S - I \times Z & V &= I \times Z (\text{電圧降下}) \\
 V &= (I_P - jI_Q) \times (R + jX) \\
 &= I_P \cdot R + I_P \cdot jX - jI_Q \cdot R - jI_Q \cdot jX & j^2 &= -1 \\
 &= (I_P \cdot R + I_Q \cdot X) + j(I_P \cdot X - I_Q \cdot R) \\
 &\quad \text{同位相成分} & & \text{直角成分}
 \end{aligned}$$

・但し、上式の第2項目は電源電圧に対し直角成分であり影響が小さいため無視する。



よって、三相三線式配電線の電圧降下は、 $V = 3(I_P \cdot R + I_Q \cdot X)$ として求める。

(2) 均等配分負荷扱い

同一線種の配電線に均等に負荷が分布している場合の末端の電圧降下は、配電線中央点に全負荷が集中した場合の電圧降下に等しいものとする。

1.6 計算条件

電力系統解析支援システム(Castle)を利用し、以下の3つの条件で潮流計算を行う。

条件A：現状

条件B：本計画完了時(Mwanyanya 変電所、Welezo 変電所及び新設 33kV 配電線追加)

条件C：本計画完了時(条件Bにおいて Fumba ルートのみ 150mm² とした場合)

2. 解析結果

電力系統解析支援システム(Castle)を利用した潮流解析結果を図 A8-1 から図 A8-3 に示す。また、同結果により算出された各ルートの末端電圧を下表に示す。

33 kV 配電線ルートの潮流計算結果

条件	電線サイズ				末端電圧 (kV) カッコ内は公称電圧 (33kV) に対する電圧低下率 (%)			損失 (MW)
	北ルート	南ルート	Fumba ルート	ABCケーブル 区間	北ルート	南ルート	Fumba ルート	
A	ACSR 100mm ²	ACSR 100mm ²	ACSR 50mm ²	-	25.9 (-21.57)	26.3 (-20.45)	32.2 (-2.49)	7.2
B	ACSR 100mm ²	ACSR 100mm ²	ACSR 100mm ²	ABC 3x150mm ²	28.9 (-12.56)	26.9 (-18.63)	32.2 (-2.57)	4.6
C	ACSR 100mm ²	ACSR 100mm ²	ACSR 150mm ²	ABC 3x150mm ²	28.9 (-12.56)	26.9 (-18.63)	32.2 (-2.36)	4.5

上記結果において条件 A と B を比較すると、本計画の実施により、北ルート及び南ルートの末端電圧は改善される。Fumba ルートについては、Mpendae 変電所（ベルギー支援により 2011 年完成予定、7.5 MVAx2 台）及び空港新ターミナルビル（2015 年完成予定、5.5MVA）の負荷を見込んでいることから末端電圧値は若干下がっているが、許容範囲内（±10%）に納まっている。また、条件 B と C を比較すると Fumba ルートの電線サイズを ACSR150mm² とした場合の末端電圧はほぼ同じであり、条件 C によるインパクトは小さい。

以上から、本計画では条件 B に沿った電線サイズを適用する。ただし、本計画完了時も北ルート及び南ルートの末端電圧は許容範囲を超えていることから、以下の電圧降下対策を講じることにより、需要家への安定した電力供給が可能と想定される。

Mtoni 変電所の 132/33kV 変圧器のタップを可能な限りマイナス側へ調整する。

北ルート及び南ルート上の配電変圧器のタップを可能な限りマイナス側へ調整する。

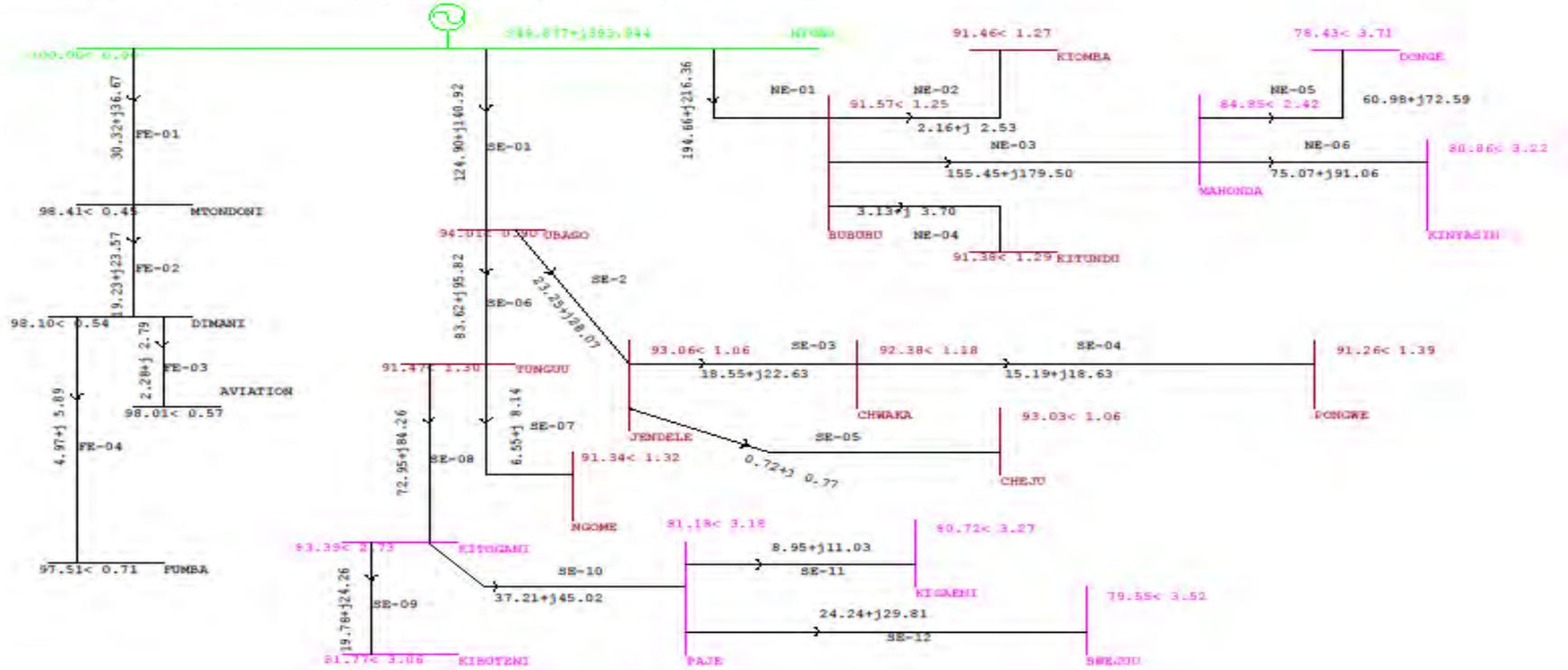
また、本計算により電力潮流を下表に示す。表中の赤字は電線の定格容量を超過した過負荷状態を示す。同表より、新設北ルート及び新設南ルートを建設することにより、負荷が分散し、現状の過負荷状態が緩和される。ただし、現在も本計算のとおり力率は約 0.7 と低い値となっており、将来的には需要の増加に伴い 132 kV 末端である Mtoni 変電所 132 kV 母線にキャパシター（電力用コンデンサー）を設置する等、ZECO にて対策のための設備投資が必要となる。このため、今後の需要増の実績と末端電圧の測定記録等から、具体的な対策時期を検討することが望ましい。

本計画完了時に想定される 33kV 配電線の電力潮流

ライン名	電圧	電線	定格容量		【条件A】 現状 (2010年)		【条件B】 本計画完了時 (2013年)	
					想定負荷	利用率	想定負荷	利用率
			MVA	A	MVA	%	MVA	%
既設北ルート	33kV	ACSR100mm ²	15.6	273	29.1	186.5	14.0	89.5
新設北ルート	33kV	ACSR100mm ²	15.6	273	-	-	14.5	92.7
既設南ルート	33kV	ACSR100mm ²	15.6	273	18.8	120.3	11.9	76.6
新設南ルート	33kV	ACSR100mm ²	15.6	273	-	-	10.1	64.9
既設Fumbaルート	33kV	ACSR50mm ²	9.1	160	4.8	52.3	-	-
新設Fumbaルート	33kV	ACSR100mm ²	15.6	273	-	-	9.7	62.4

- 図 A8-1： 潮流解析結果（現状）
- 図 A8-2： 潮流解析結果（本計画完了時）
- 図 A8-3： 潮流解析結果（本計画完了時、Fumba ルート：150mm²の場合）

以上



A-8-5

图 A8-1：潮流解析结果（现状）

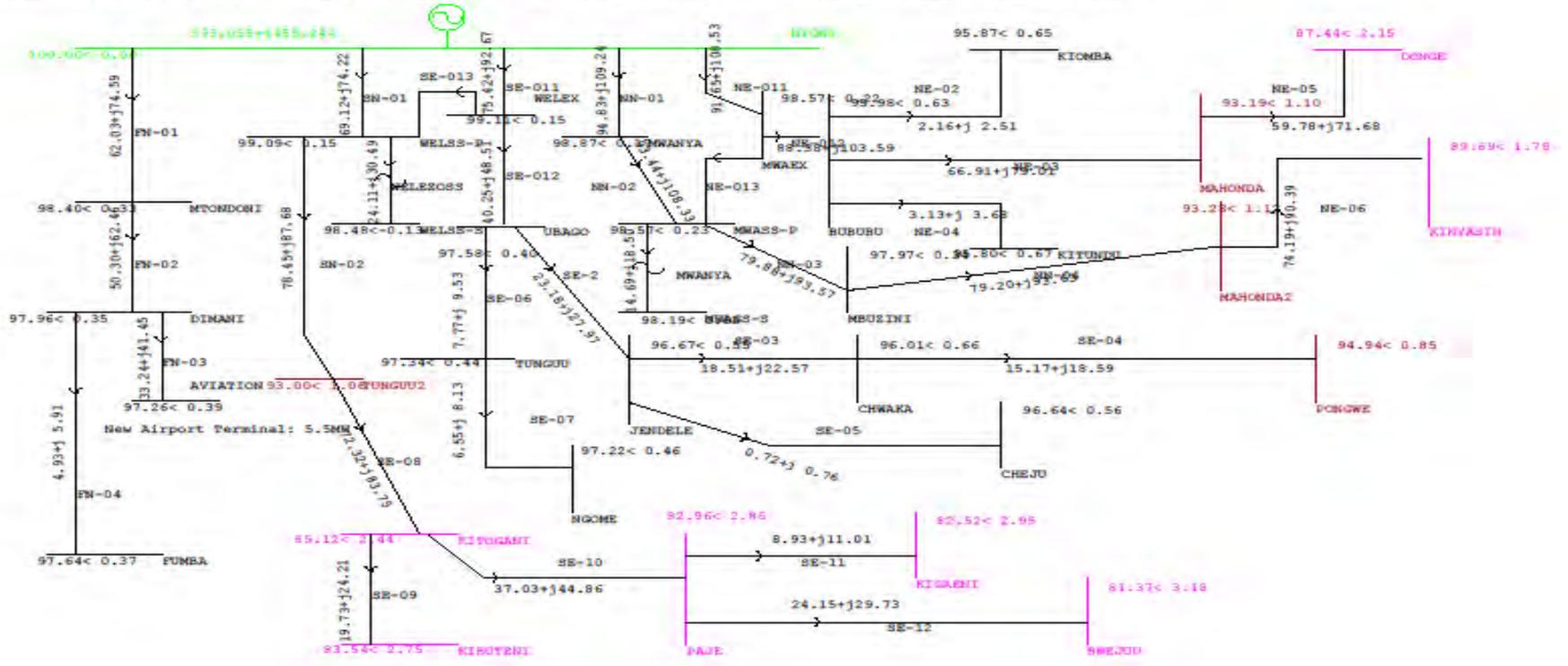


図 A8-3： 潮流解析結果（本計画完了時、Fumba ルート：150mm² の場合）

資料 - 9 EIA 認証書

9. EIA 認証書

