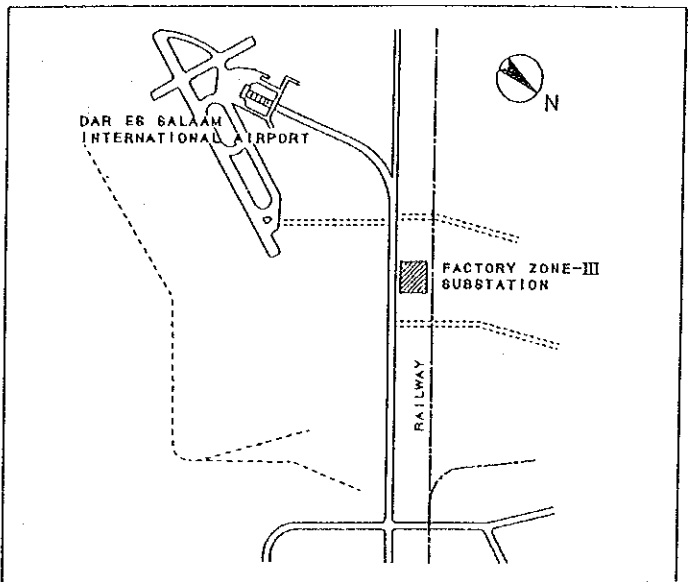


P L A N



LOCATION MAP (NONE SCALE)

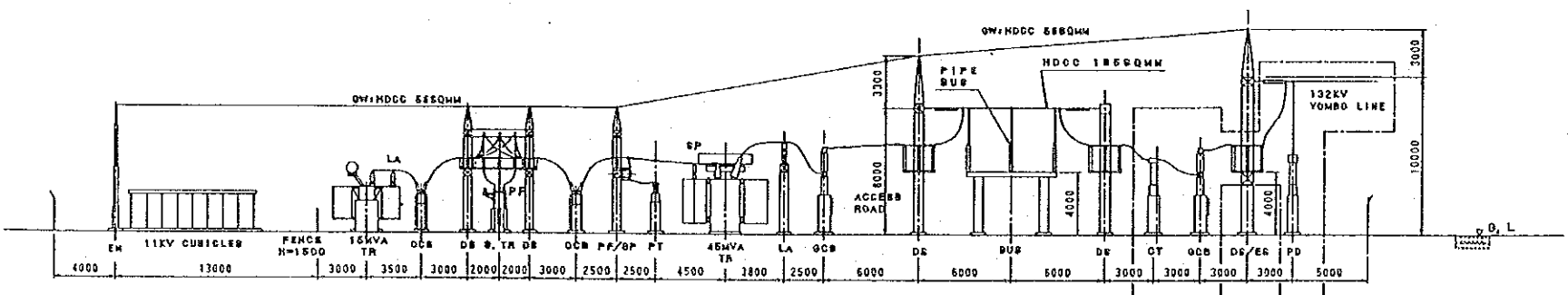
132KV UBUNGO LINE
 132KV YOMBO LINE
 33KV FZ I & NEW AIR PORT LINE
 AC6R 1006QMM
 33KV FZ II LINE
 AC6R 1006QMM
 33KV UBUNGO LINE
 AC6R 2X120SQMM

LEGEND :

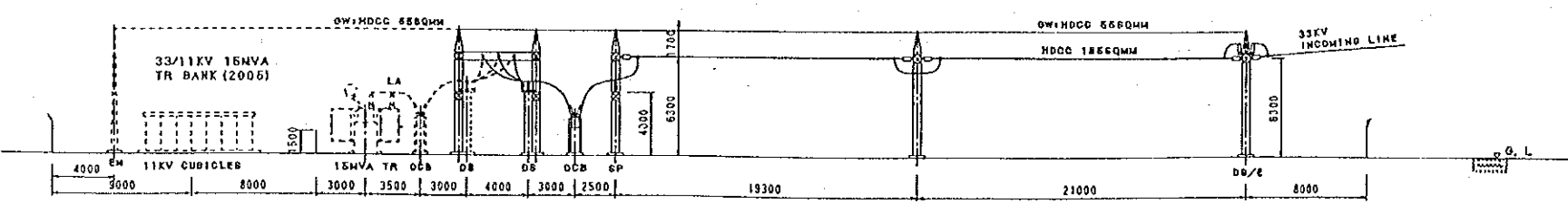
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S, TR : STATION TRANSFORMER
- EM : EARTH MAST
- PD : POTENTIAL DEVICE
- DS : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER
- PT : POTENTIAL TRANSFORMER

NOTE :

1. [Solid line] : EXPANSION AND REHABILITATION AREA
2. [Dashed line] : FUTURE EXPANSION



SECTION A-A'



SECTION B-B'

Fig. 5.4 - 28 - 2

THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**LAYOUT OF
 FACTORY ZONE III SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO. LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

FACTORY ZONE II
AIR PORT
3Φ3W 33kV 50Hz

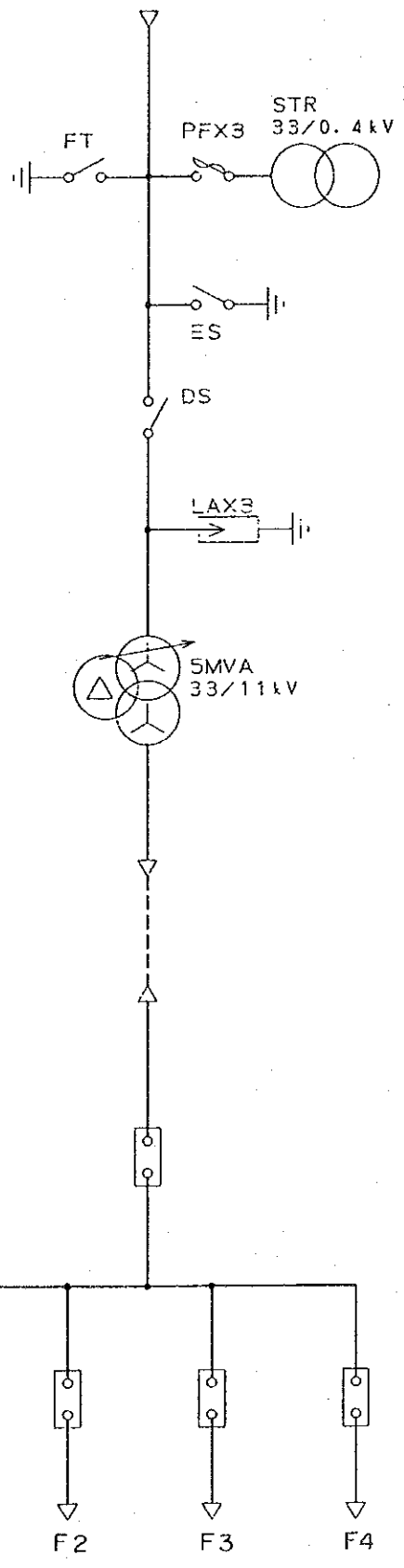


Fig. 5.4 - 29-1

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
SINGLE LINE DIAGRAM OF FACTORY ZONE II SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D. R.:	SUBMITTED:
F. R.:	RECOMMENDED:
C. K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

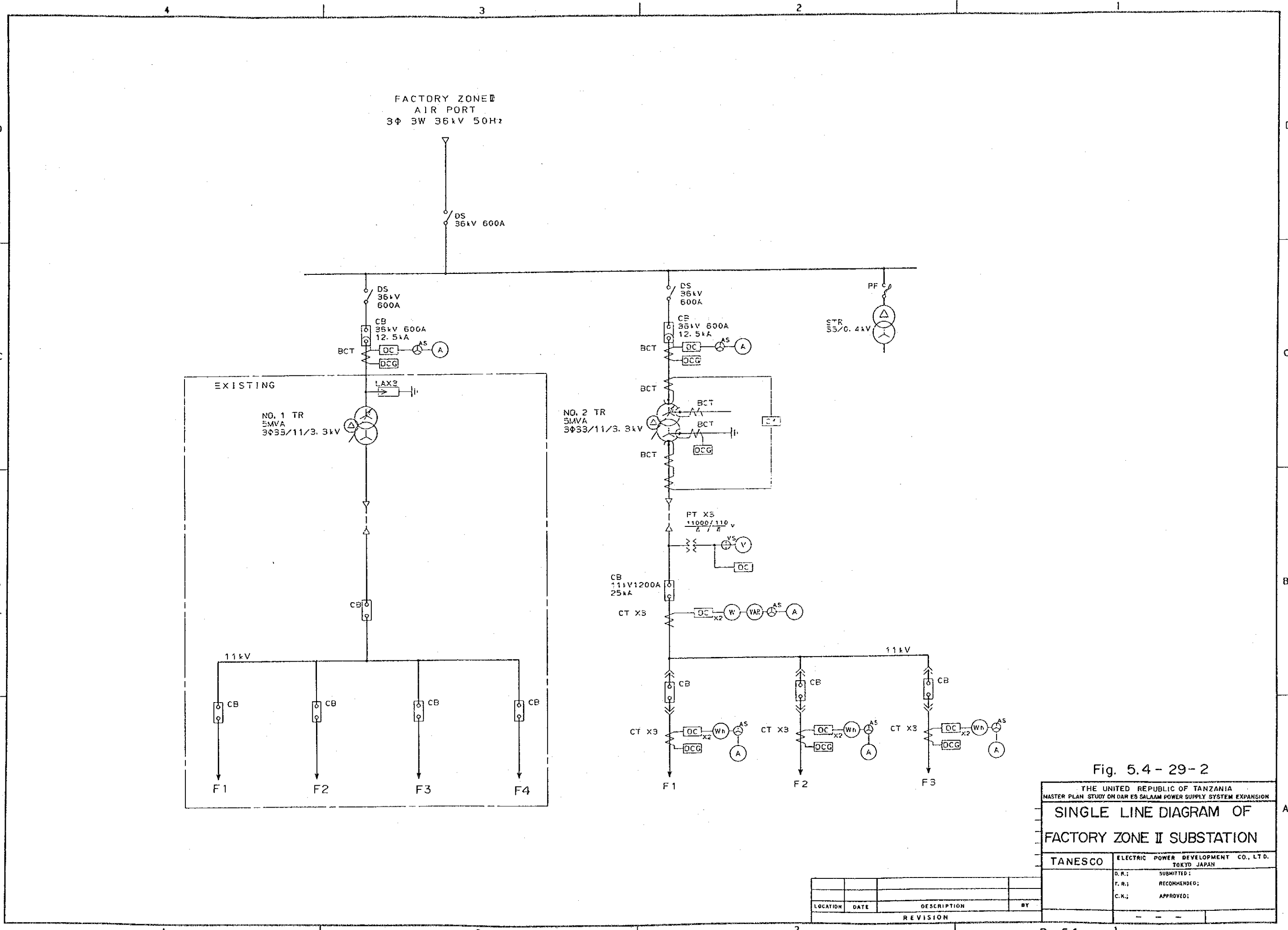
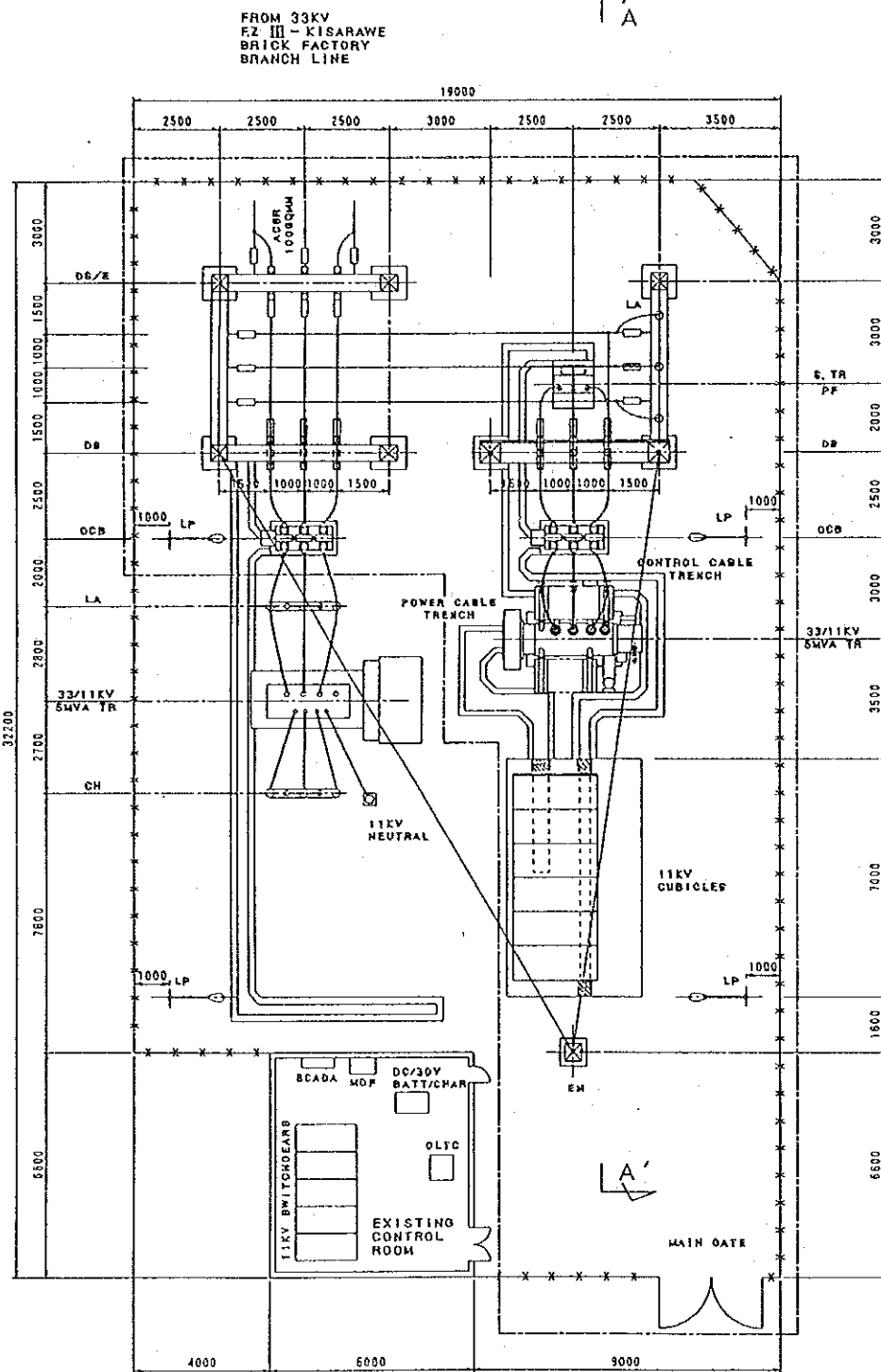


Fig. 5.4 - 29-2

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
SINGLE LINE DIAGRAM OF FACTORY ZONE II SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:
- - -	

LOCATION	DATE	DESCRIPTION	BY
REVISION			



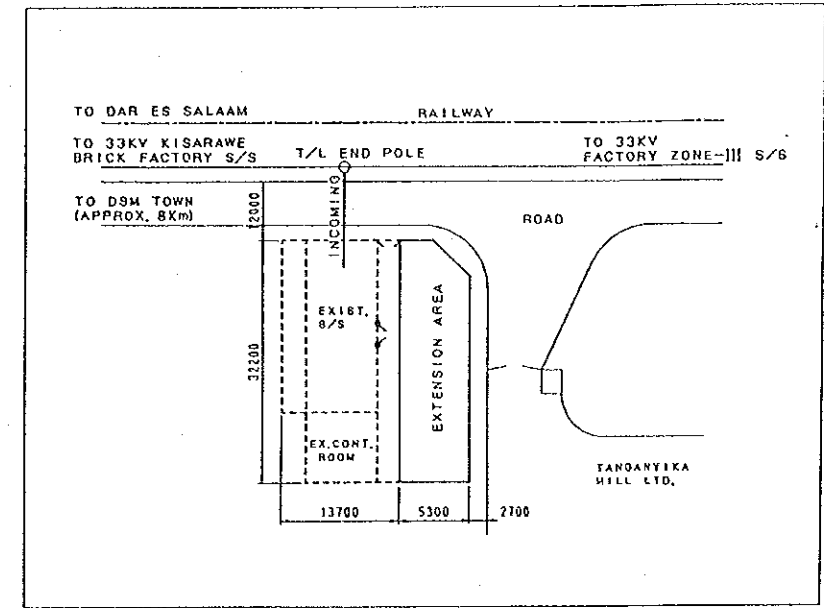
PLAN

LEGEND:

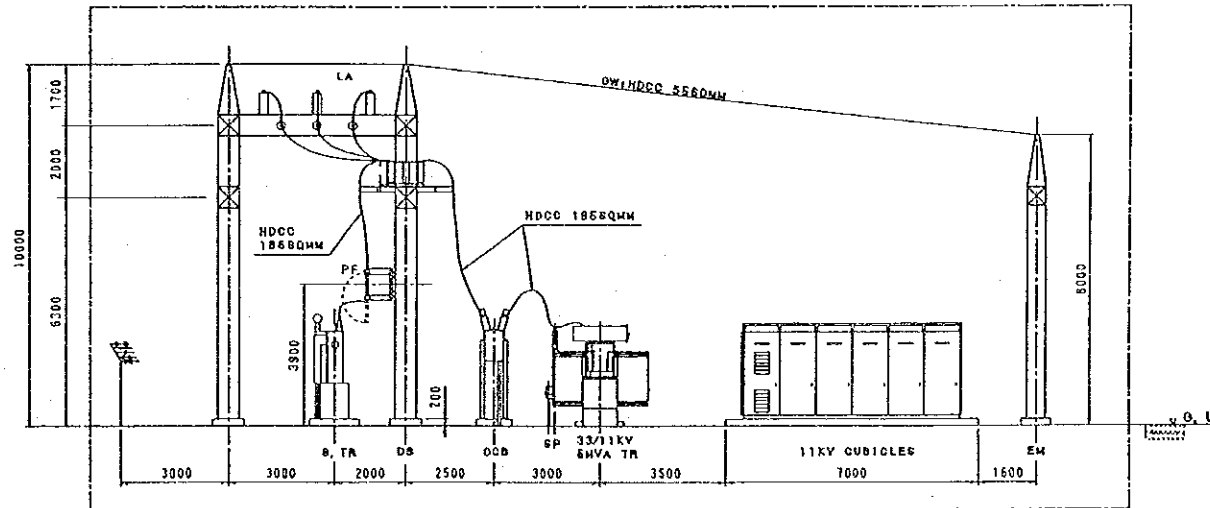
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- CH : CABLE HEAD
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST

NOTE:

- 1. [] : EXPANSION & REHABILITATION AREA



LOCATION MAP (NONE SCALE)



SECTION A-A'

Fig. 5.4 - 29-3

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

LAYOUT OF
FACTORY ZONE II SUBSTATION

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
E.R.:	RECOMMENDED:
C.R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

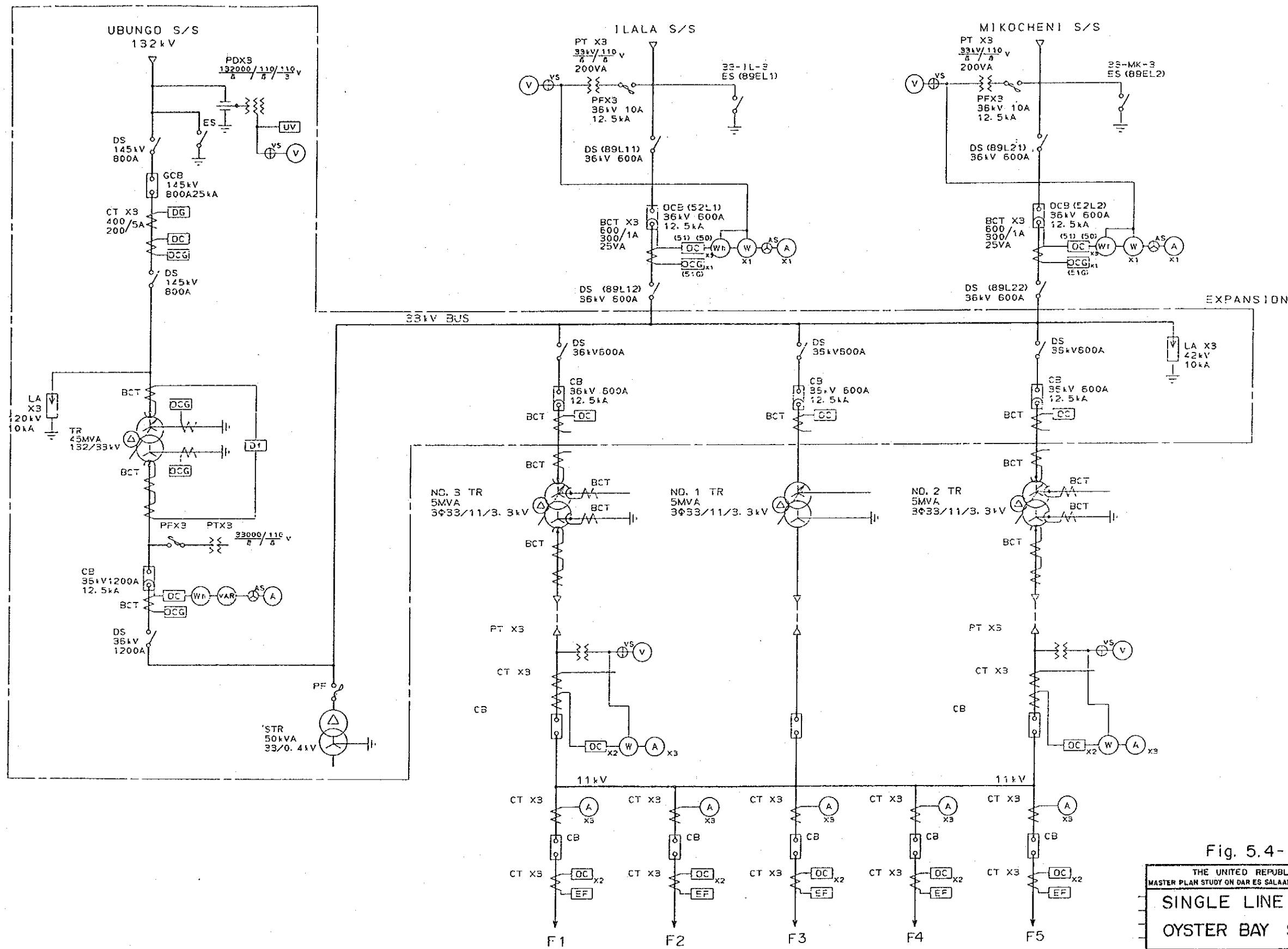
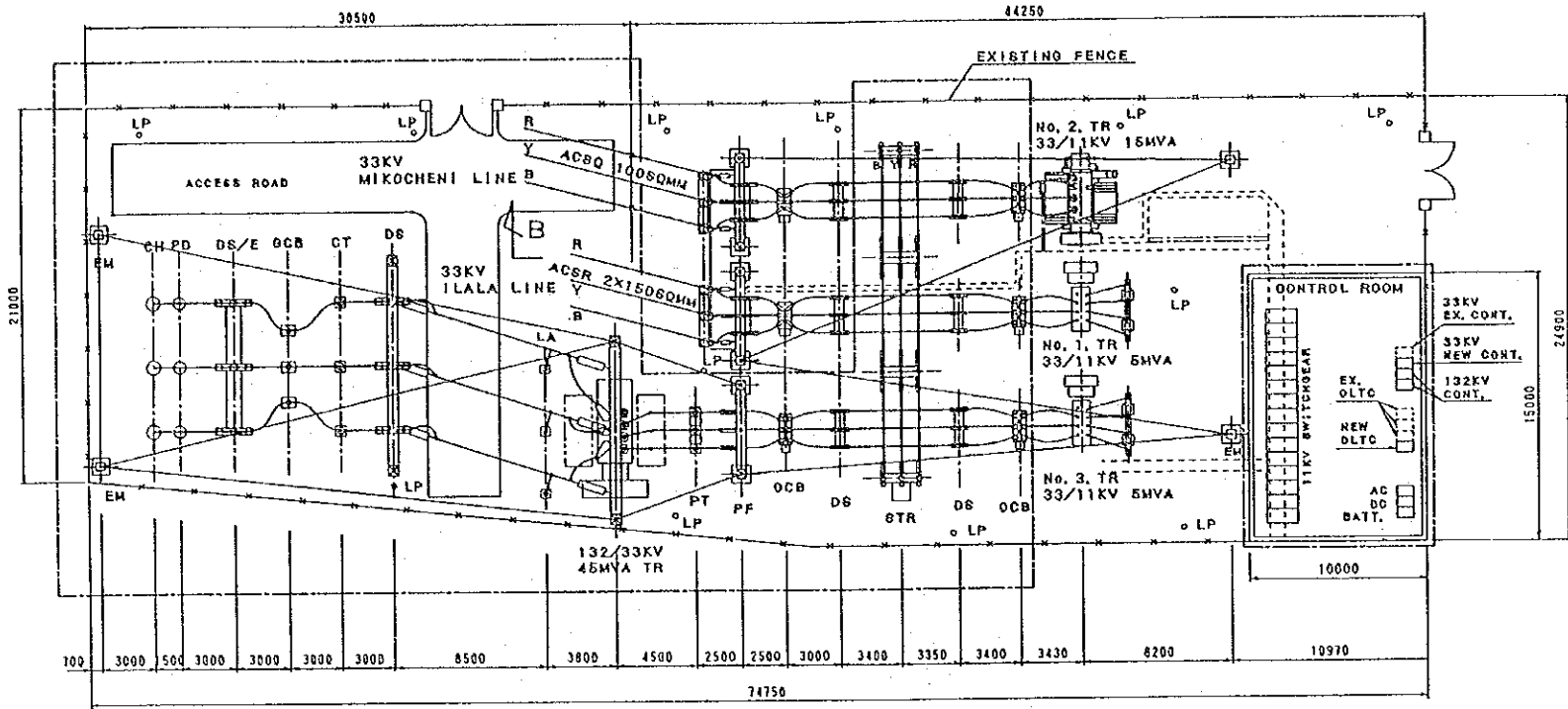
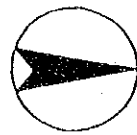
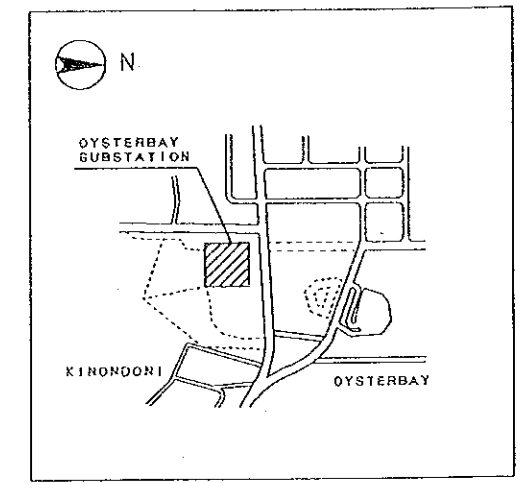


Fig. 5.4-30-1

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
SINGLE LINE DIAGRAM OF OYSTER BAY SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.R.:	APPROVED:
LOCATION	DATE
REVISION	
BY	



PLAN



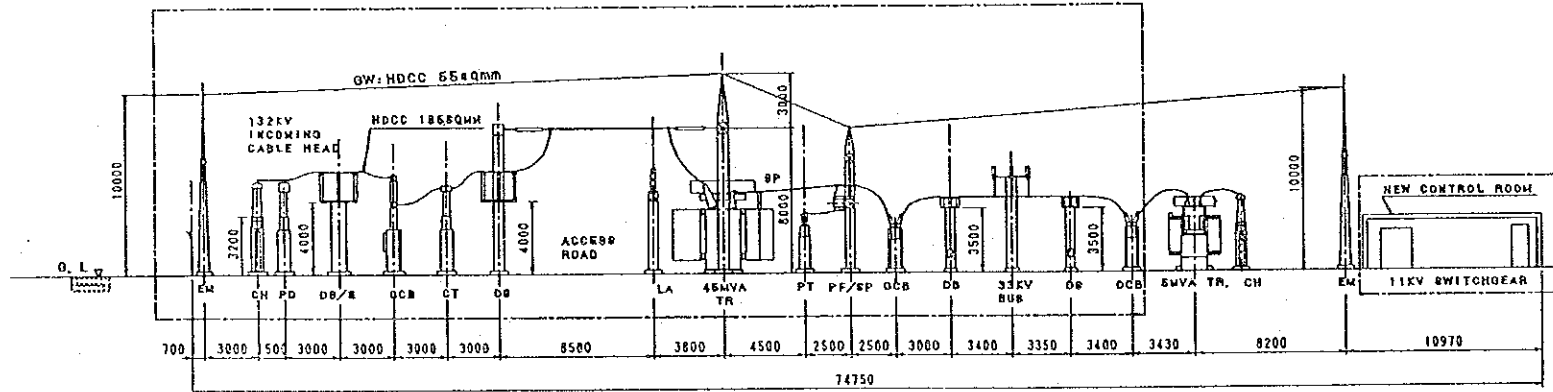
LOCATION MAP (NONE SCALE)

LEGEND:

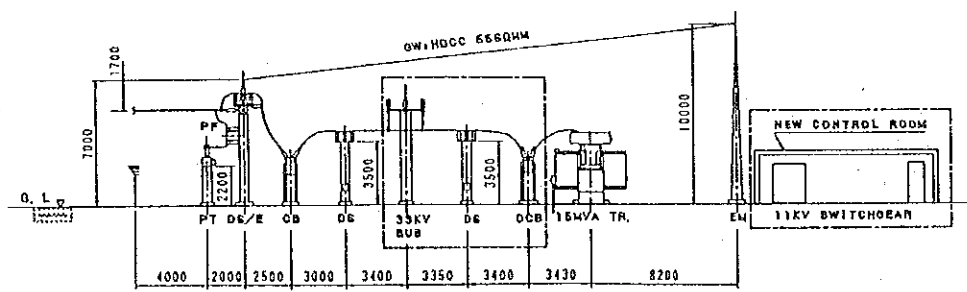
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DS : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- PT : POTENTIAL TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- CT : CURRENT TRANSFORMER
- PD : POTENTIAL DEVICE
- EM : EARTH MAST
- CH : CABLE HEAD

NOTE:

- 1. [] : EXPANSION AREA



SECTION A-A'



SECTION B-B'

Fig. 5.4 - 30-2

THE UNITED REPUBLIC OF TANZANIA	
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
LAYOUT OF OYSTER BAY SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED;
F.R.:	RECOMMENDED;
C.X.:	APPROVED;
LOCATION	DATE
REVISION	
BY	

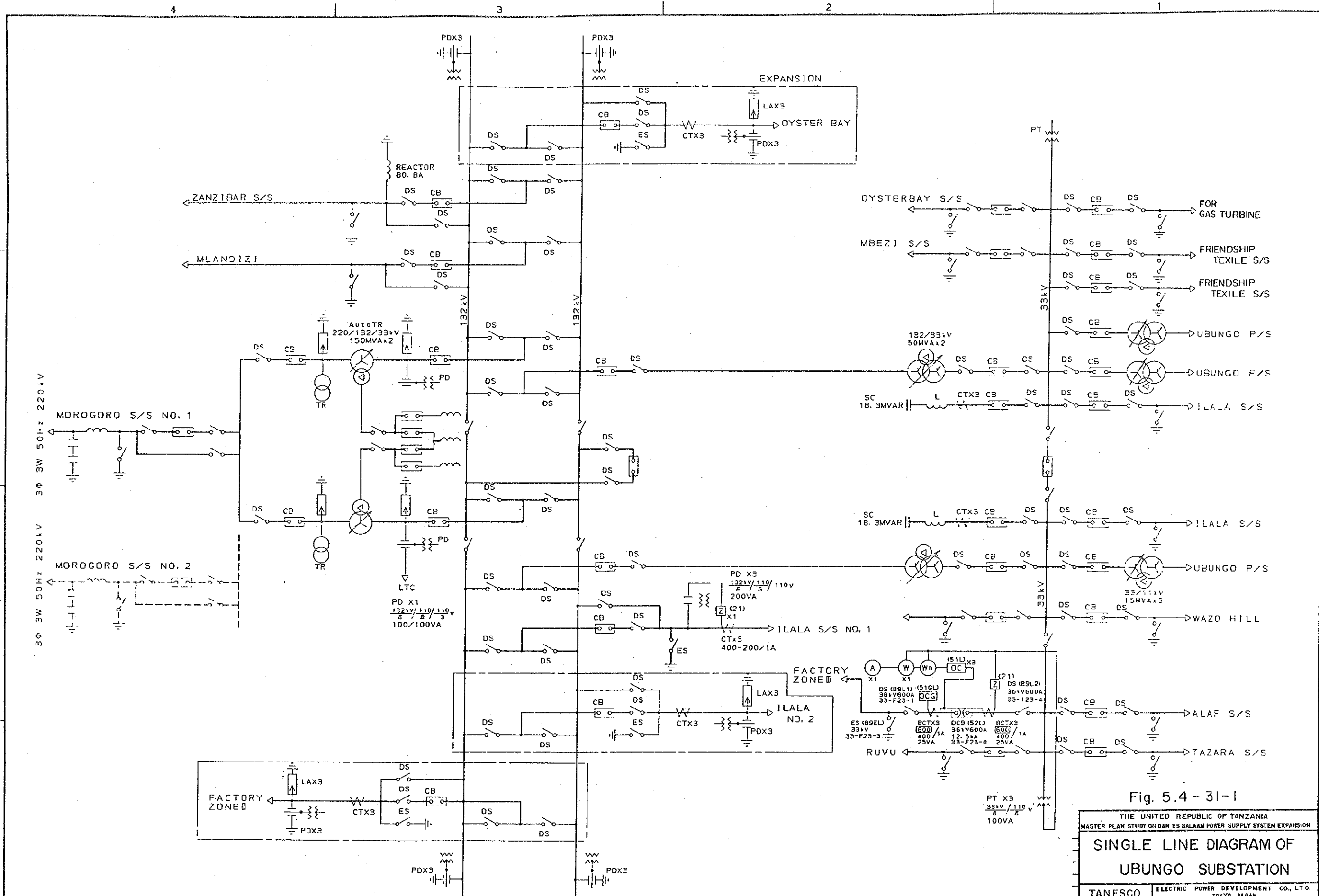


Fig. 5.4 - 31-1

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
SINGLE LINE DIAGRAM OF UBUNGO SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.N.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

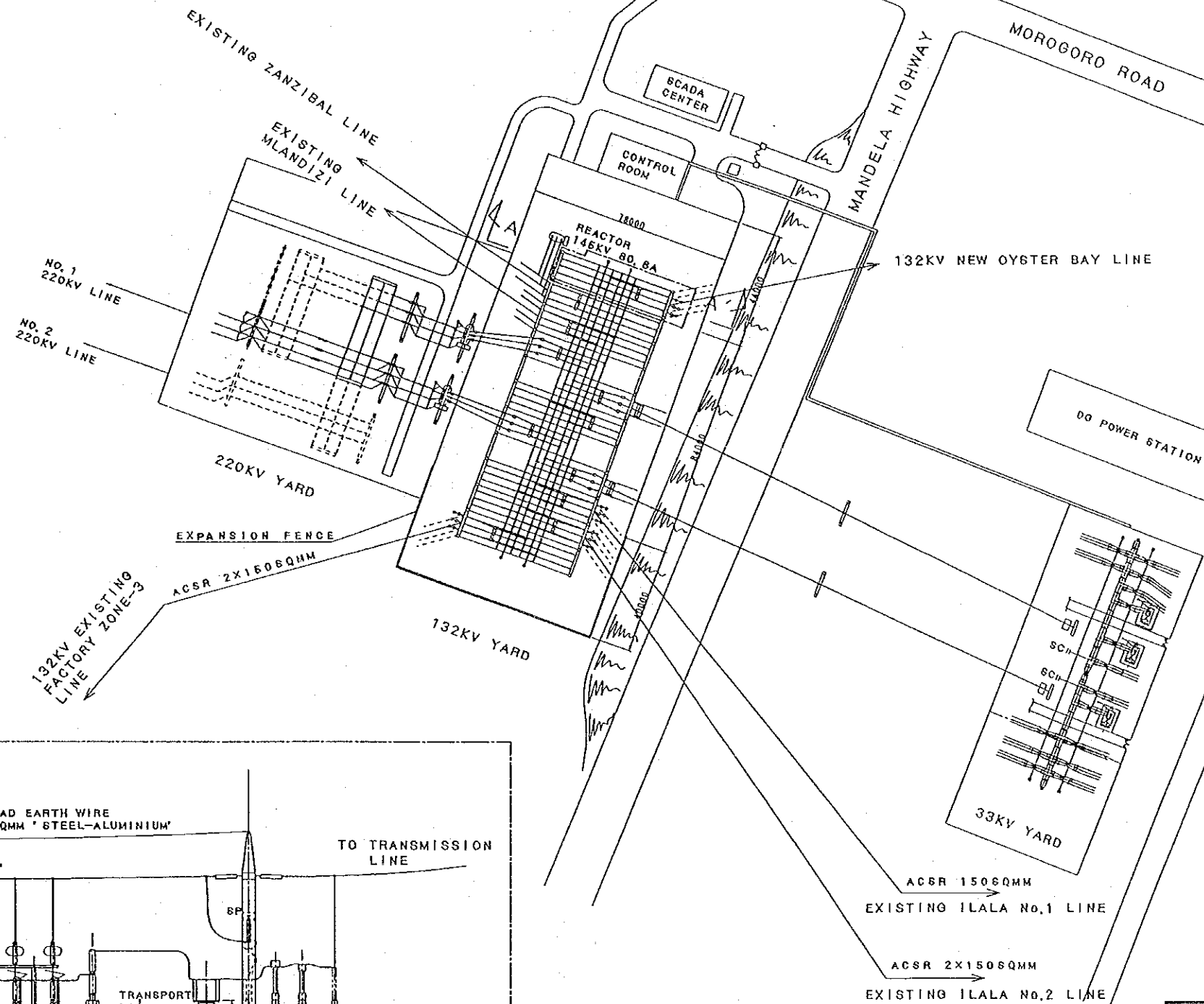
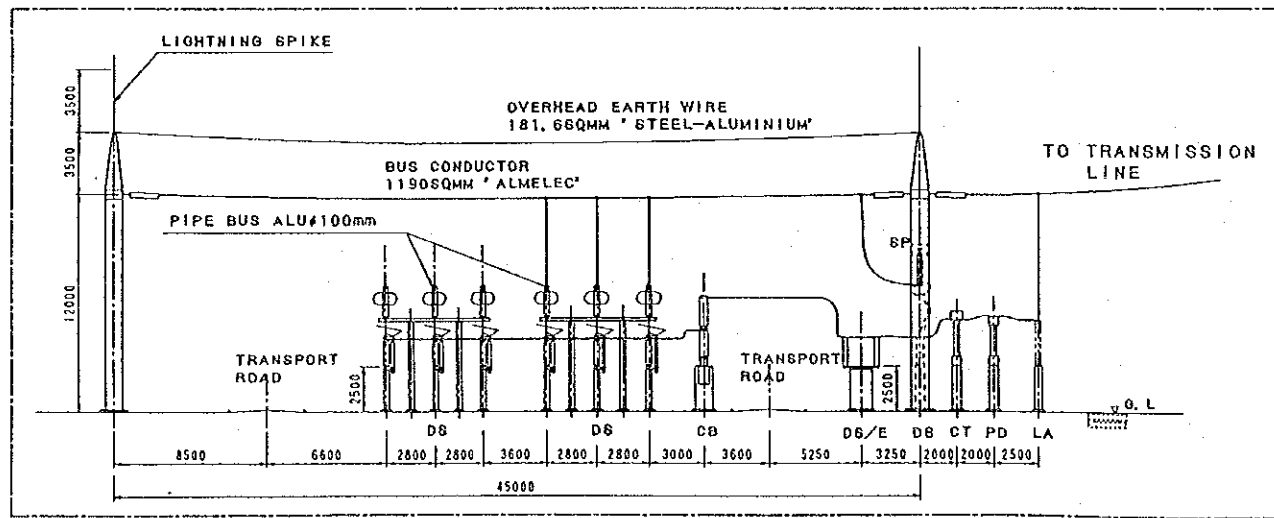


LEGEND:

- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- PD : POTENTIAL DEVICE
- DB : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER

NOTE:

1. 132KV FEEDER EXPANSION AREA



P L A N

Fig. 5.4 - 31-2

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**LAYOUT OF
UBUNGO SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

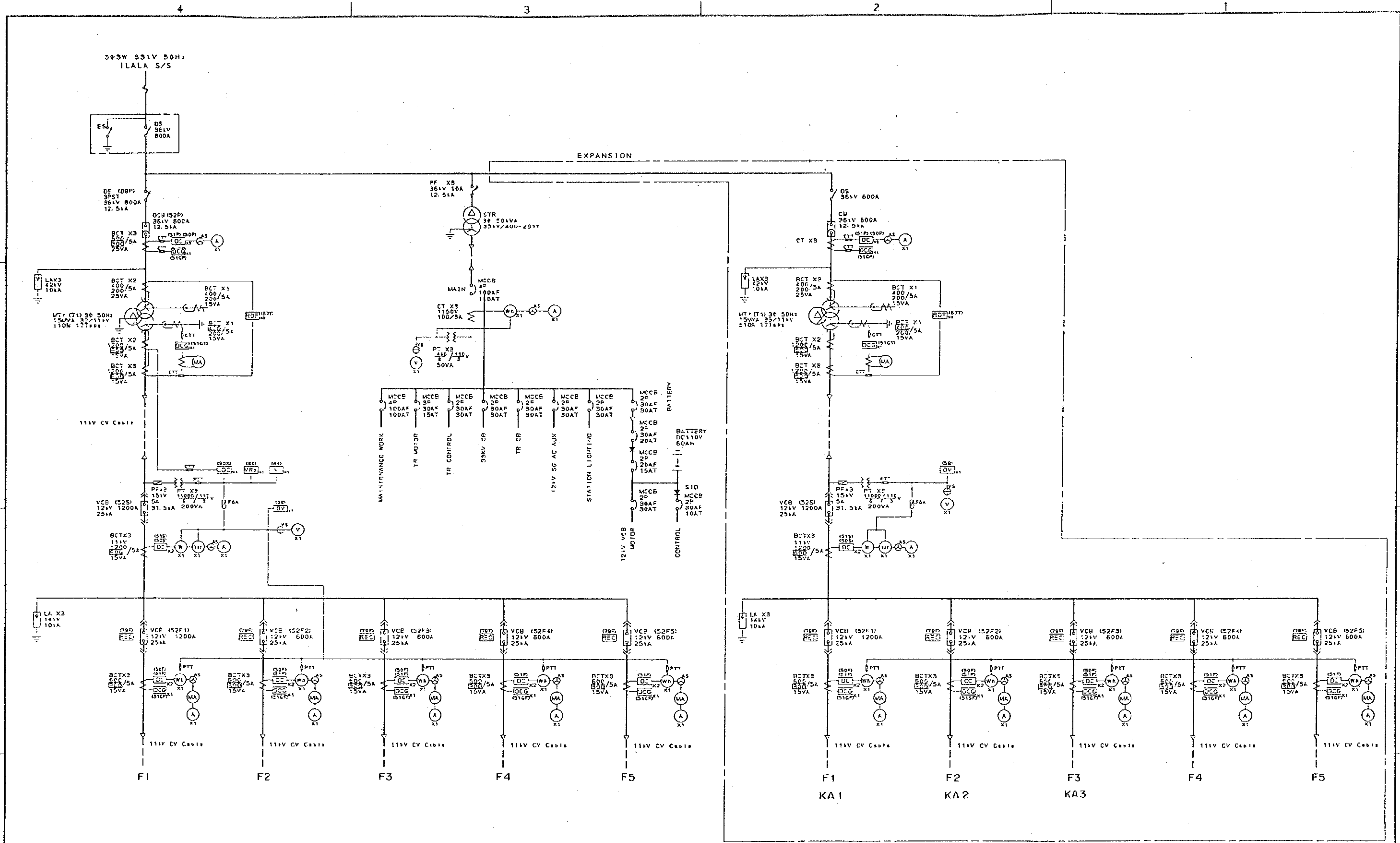


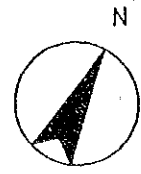
Fig.5.4 - 32-1

THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

SINGLE LINE DIAGRAM OF KARIAKOO SUBSTATION

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

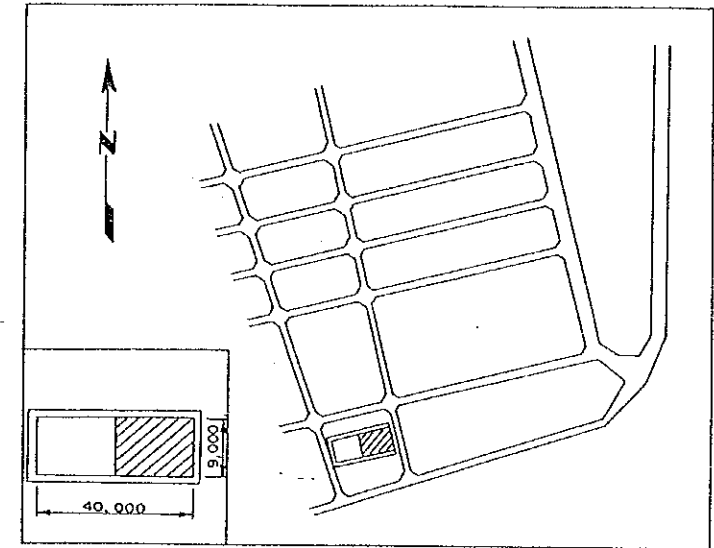


LEGEND :

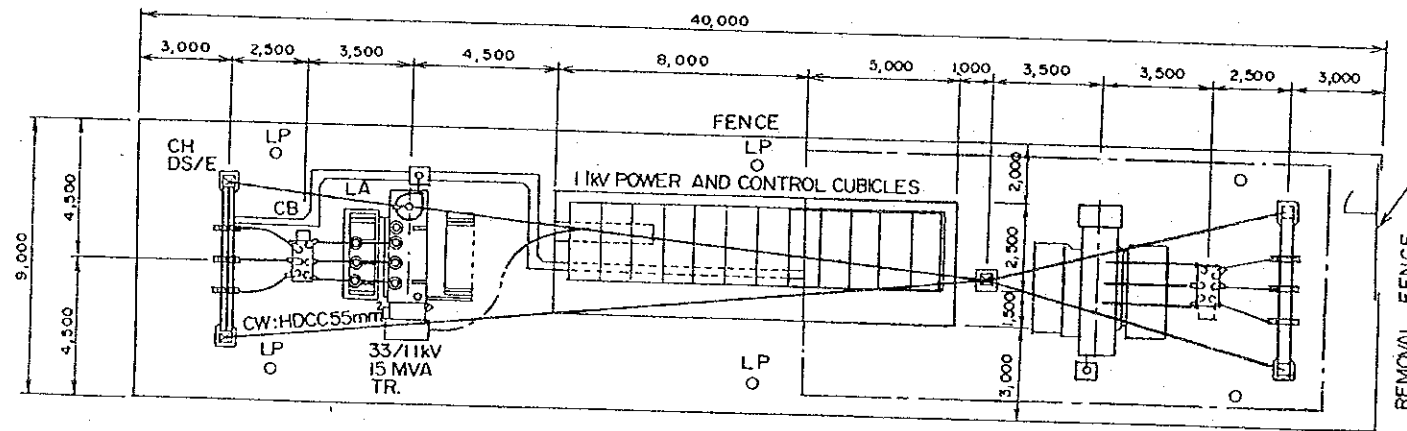
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S.TR : STATION TRANSFORMER
- EM : EARTH MAST

NOTE :

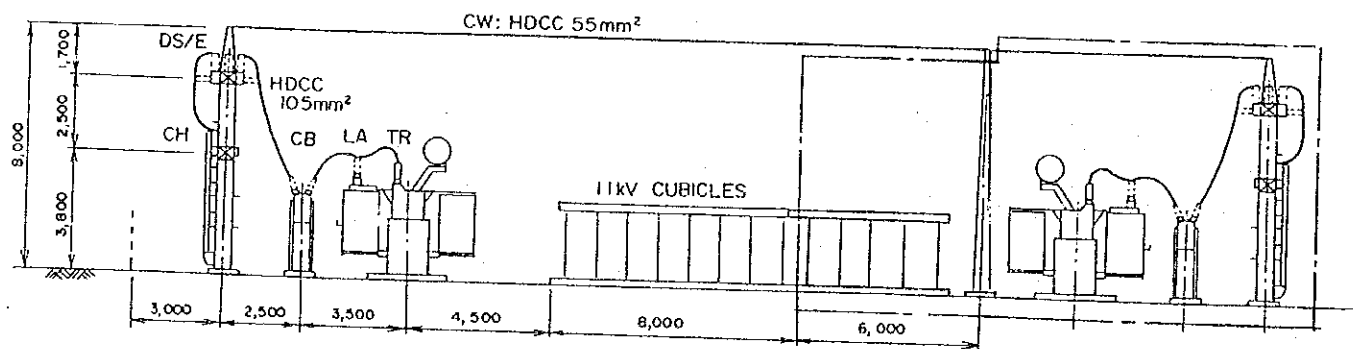
- EXPANSION



LOCATION MAP
(NONE SCALE)



PLAN



SECTION

Fig. 5.4 - 32 - 2

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

LAYOUT OF
KARIAKOO SUBSTATION

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED;
F.R.:	RECOMMENDED;
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

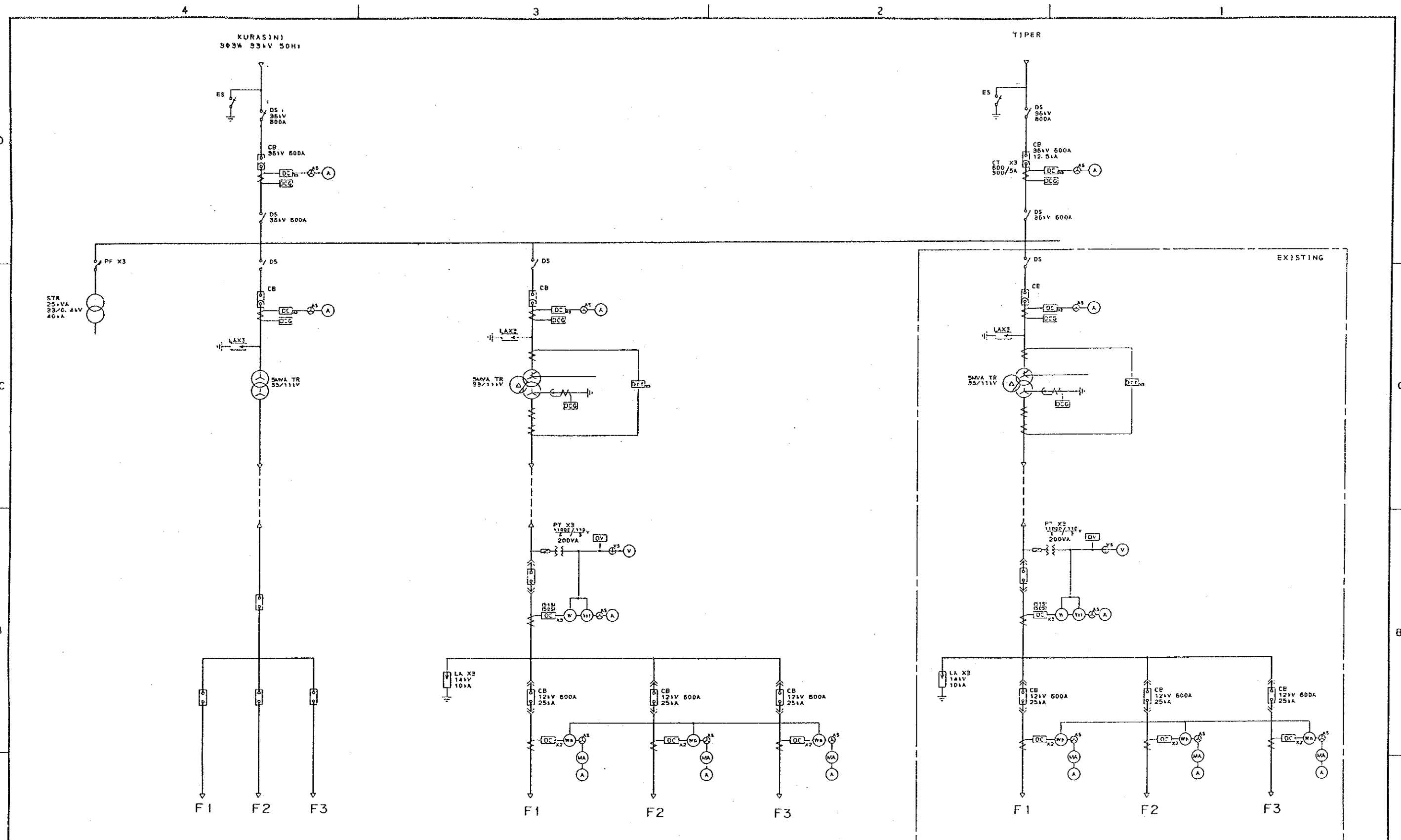


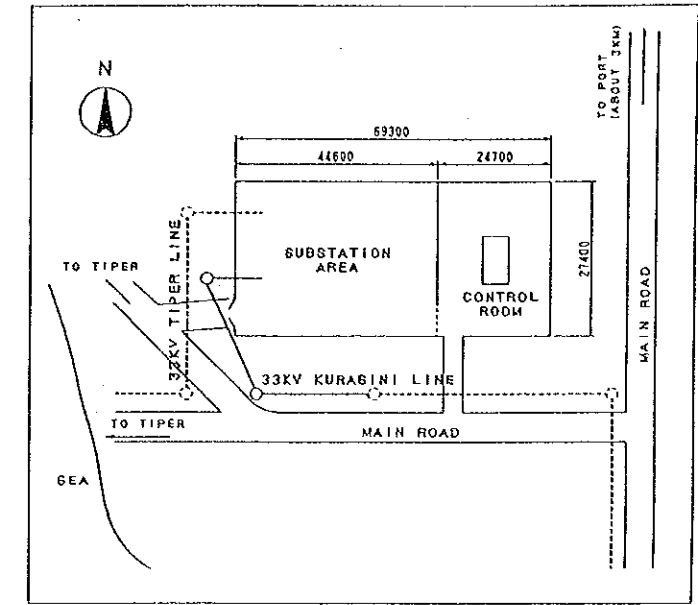
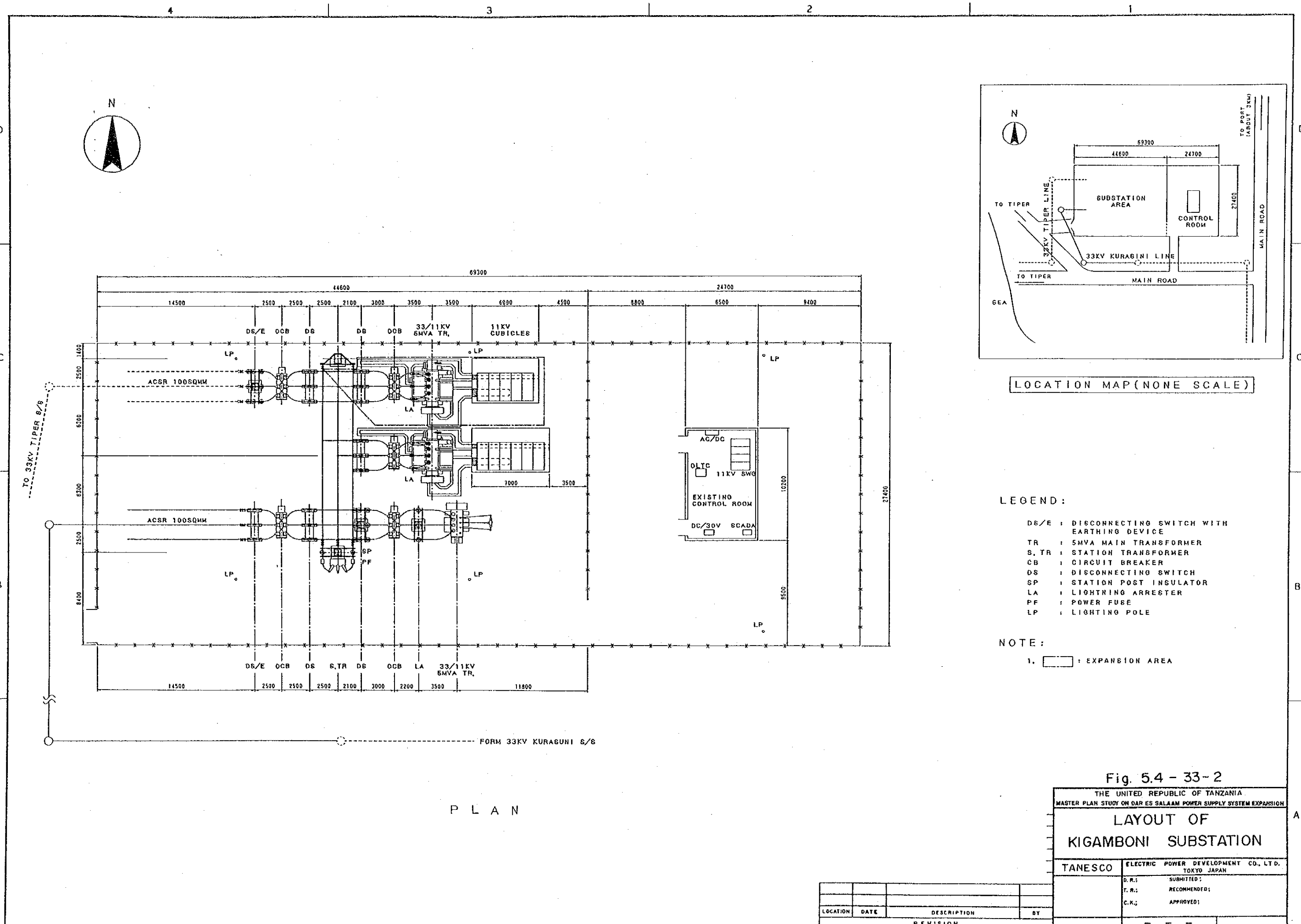
Fig. 5.4 - 33-1

THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**SINGLE LINE DIAGRAM OF
 KIGAMBONI SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



LOCATION MAP (NONE SCALE)

- LEGEND:**
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
 - TR : 5MVA MAIN TRANSFORMER
 - S, TR : STATION TRANSFORMER
 - CB : CIRCUIT BREAKER
 - DS : DISCONNECTING SWITCH
 - SP : STATION POST INSULATOR
 - LA : LIGHTNING ARRESTER
 - PF : POWER FUSE
 - LP : LIGHTING POLE

NOTE:

1. [] : EXPANSION AREA

P L A N

Fig. 5.4 - 33-2

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**LAYOUT OF
KIGAMBONI SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
	D.R.: SUBMITTED;
	T.R.: RECOMMENDED;
	C.K.: APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			

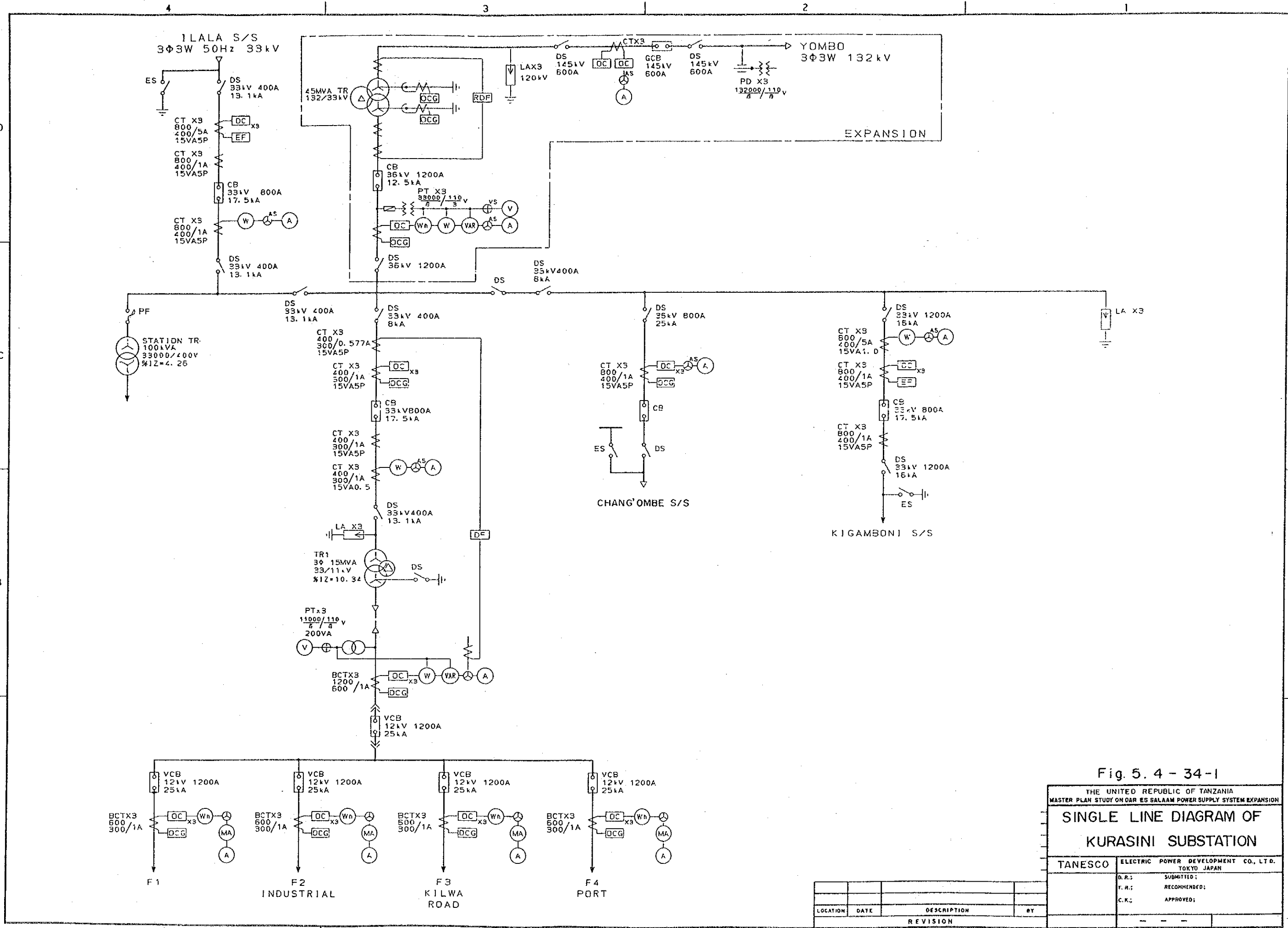
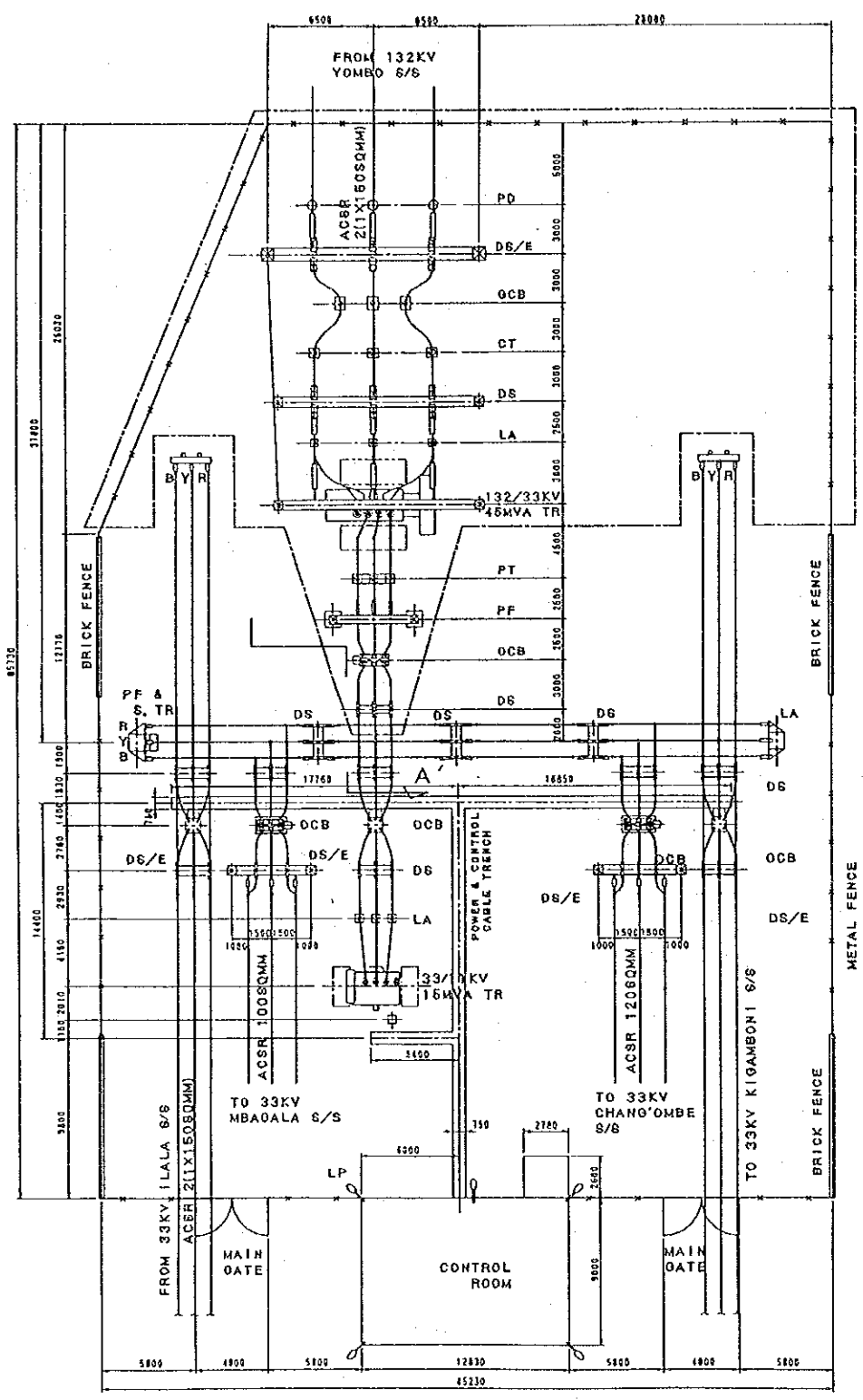
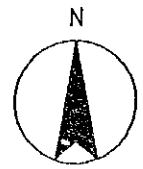


Fig. 5. 4 - 34-1

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
SINGLE LINE DIAGRAM OF KURASINI SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.K.:	APPROVED:
LOCATION	DATE
REVISION	
BY	



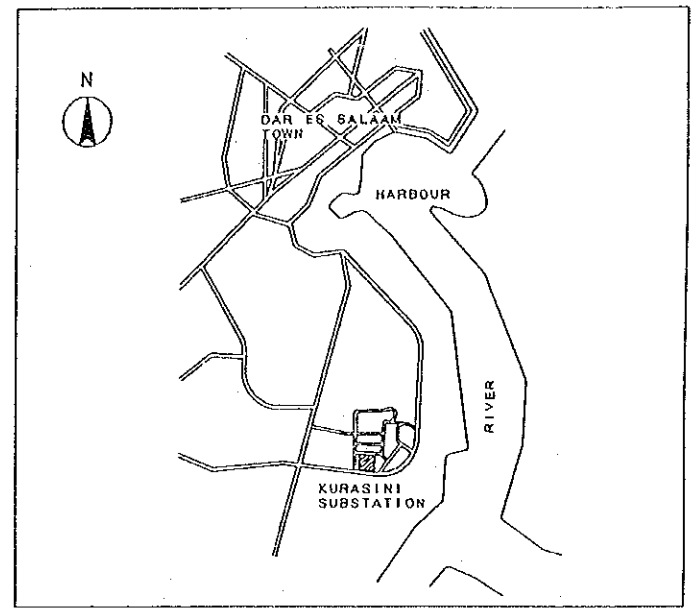
PLAN

LEGEND :

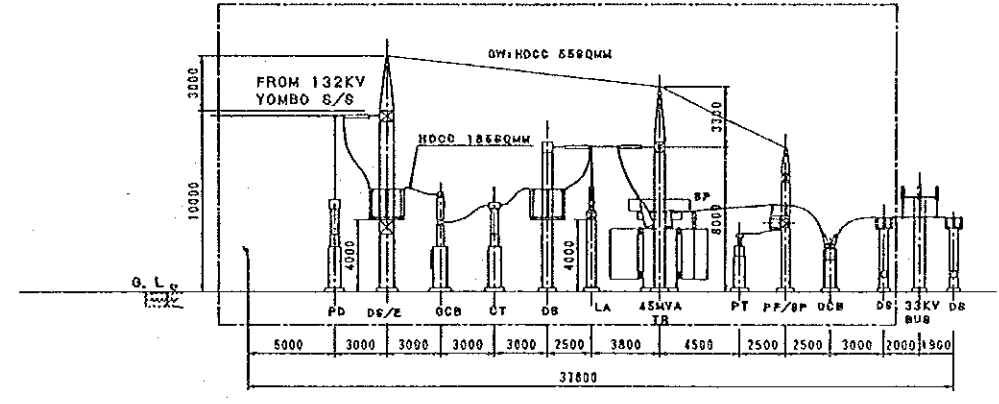
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DS : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S, TR : STATION TRANSFORMER

NOTE :

- 1. [] : EXPANSION AREA



LOCATION MAP (NONE SCALE)



SECTION A-A'

Fig. 5.4 - 34-2

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
LAYOUT OF KURASINI SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D. R.:	SUBMITTED;
F. R.:	RECOMMENDED;
C. K.:	APPROVED:
- - -	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

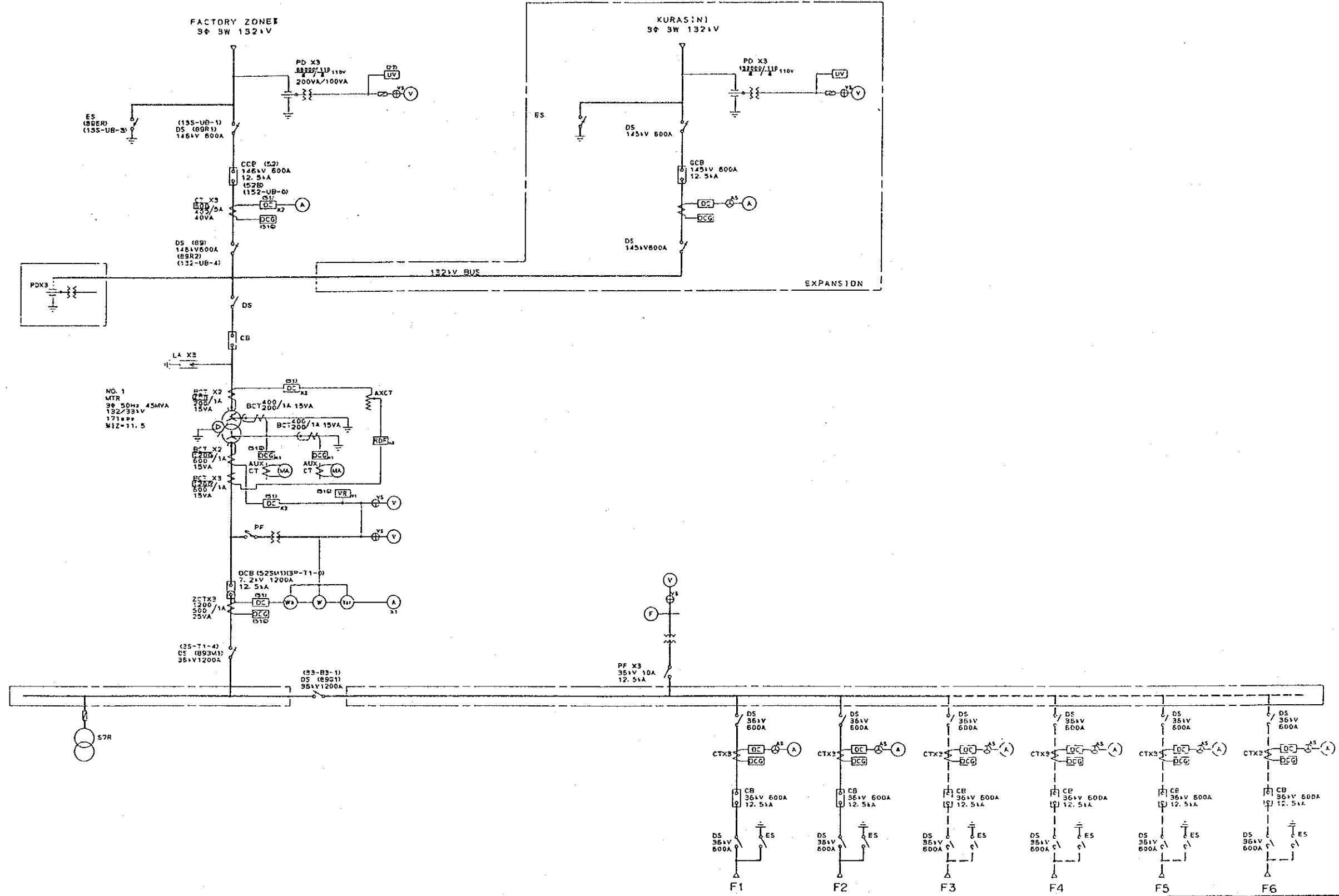


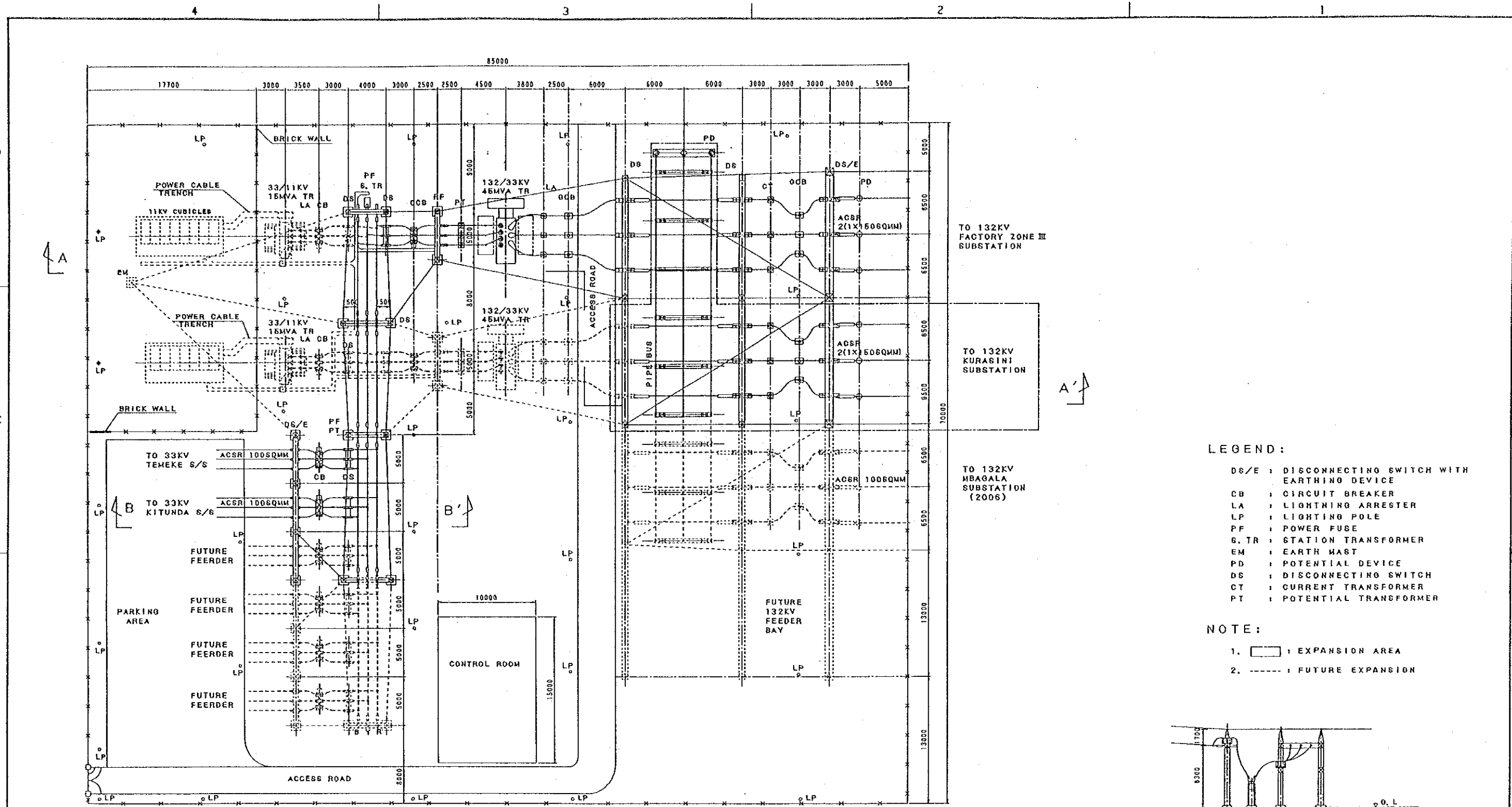
Fig. 5.4-35-1

THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

SINGLE LINE DIAGRAM OF YOMBO SUBSTATION

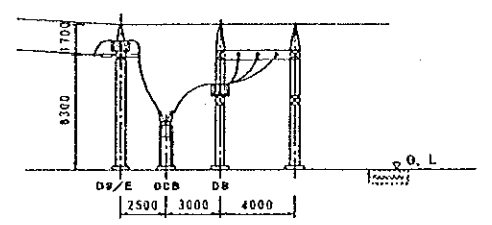
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



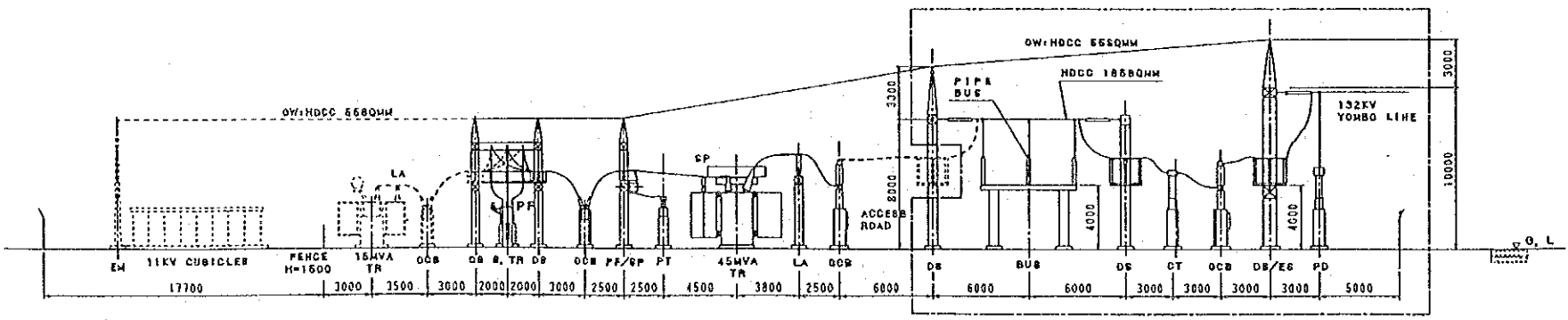
- LEGEND:**
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
 - CB : CIRCUIT BREAKER
 - LA : LIGHTNING ARRESTER
 - LP : LIGHTING POLE
 - PF : POWER FUSE
 - S. TR : STATION TRANSFORMER
 - EM : EARTH MAST
 - PD : POTENTIAL DEVICE
 - DS : DISCONNECTING SWITCH
 - CT : CURRENT TRANSFORMER
 - PT : POTENTIAL TRANSFORMER

- NOTE:**
1. [Solid Line] : EXPANSION AREA
 2. [Dashed Line] : FUTURE EXPANSION



PLAN

SECTION B-B'



SECTION A-A'

Fig. 5.4 - 35-2

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**LAYOUT OF
YOMBO SUBSTATION**

TANES CO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

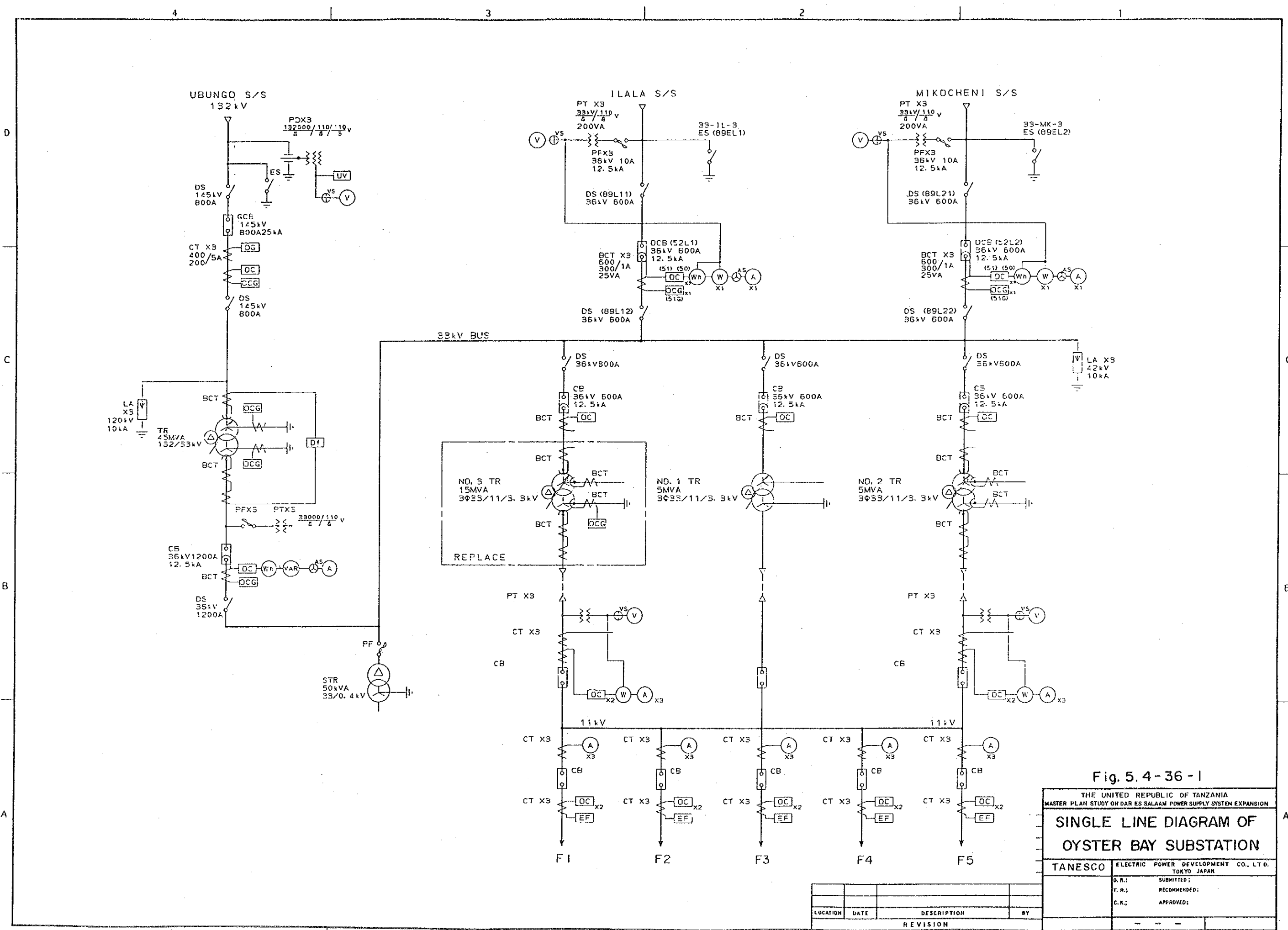


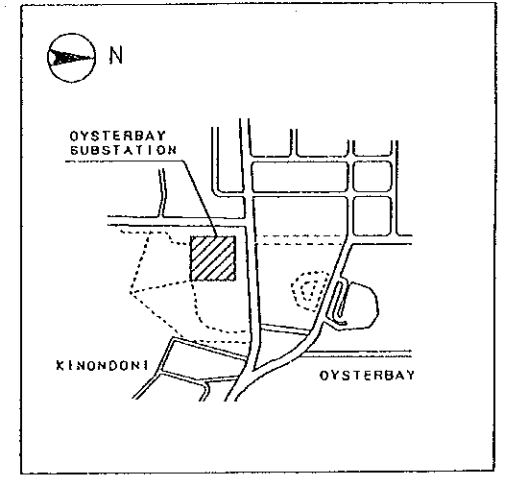
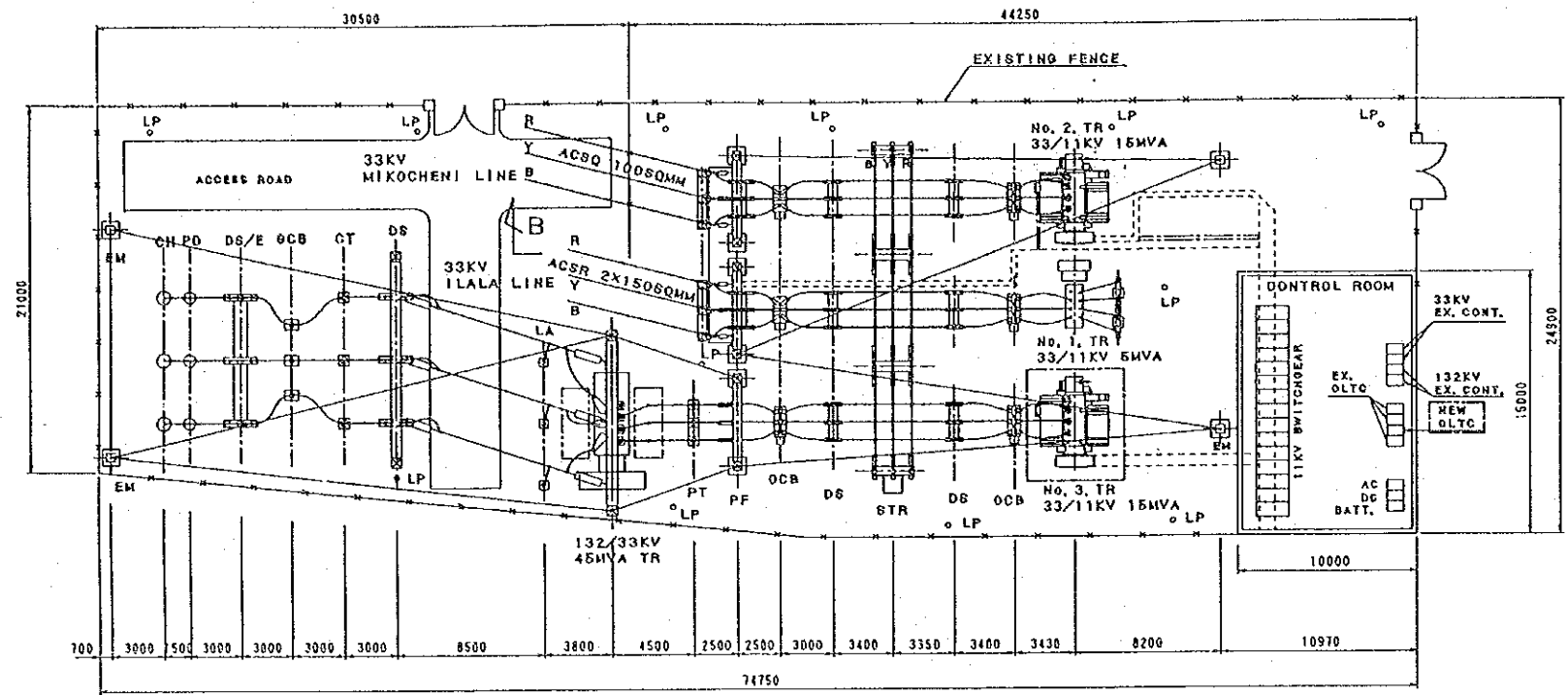
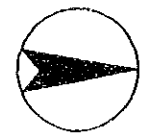
Fig. 5.4-36-1

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**SINGLE LINE DIAGRAM OF
OYSTER BAY SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



LOCATION MAP (NONE SCALE)

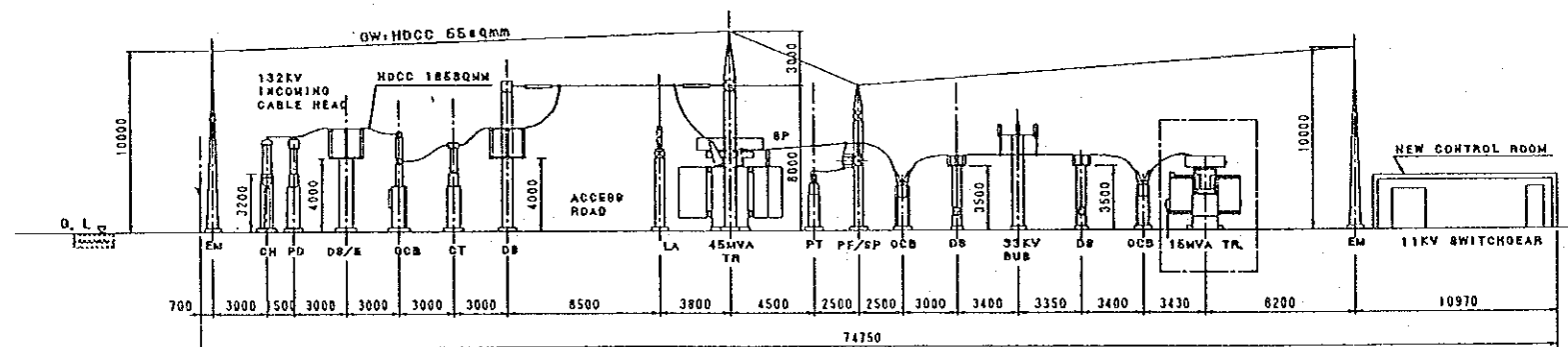
PLAN

LEGEND:

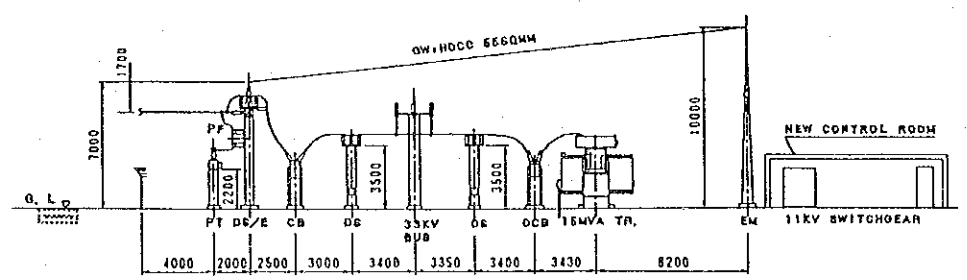
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DS : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- PT : POTENTIAL TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- CT : CURRENT TRANSFORMER
- PD : POTENTIAL DEVICE
- EM : EARTH MAST
- CH : CABLE HEAD

NOTE:

- 1. [] : EXPANSION AREA



SECTION A-A'



SECTION B-B'

Fig. 5.4 - 36 - 2

THE UNITED REPUBLIC OF TANZANIA	
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
LAYOUT OF OYSTER BAY SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.1	SUBMITTED
T.R.1	RECOMMENDED
C.K.1	APPROVED

LOCATION	DATE	DESCRIPTION	BY
REVISION			

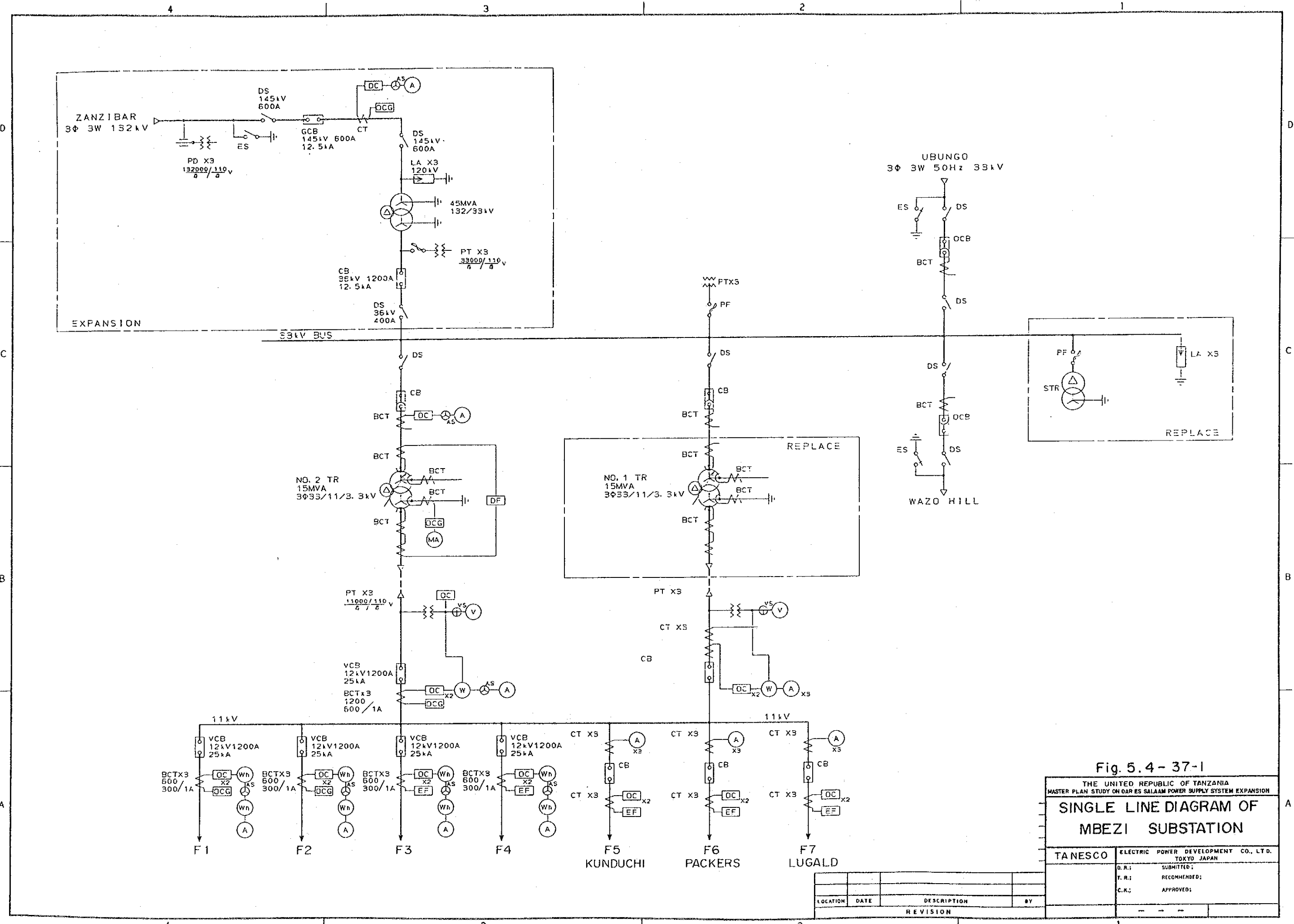


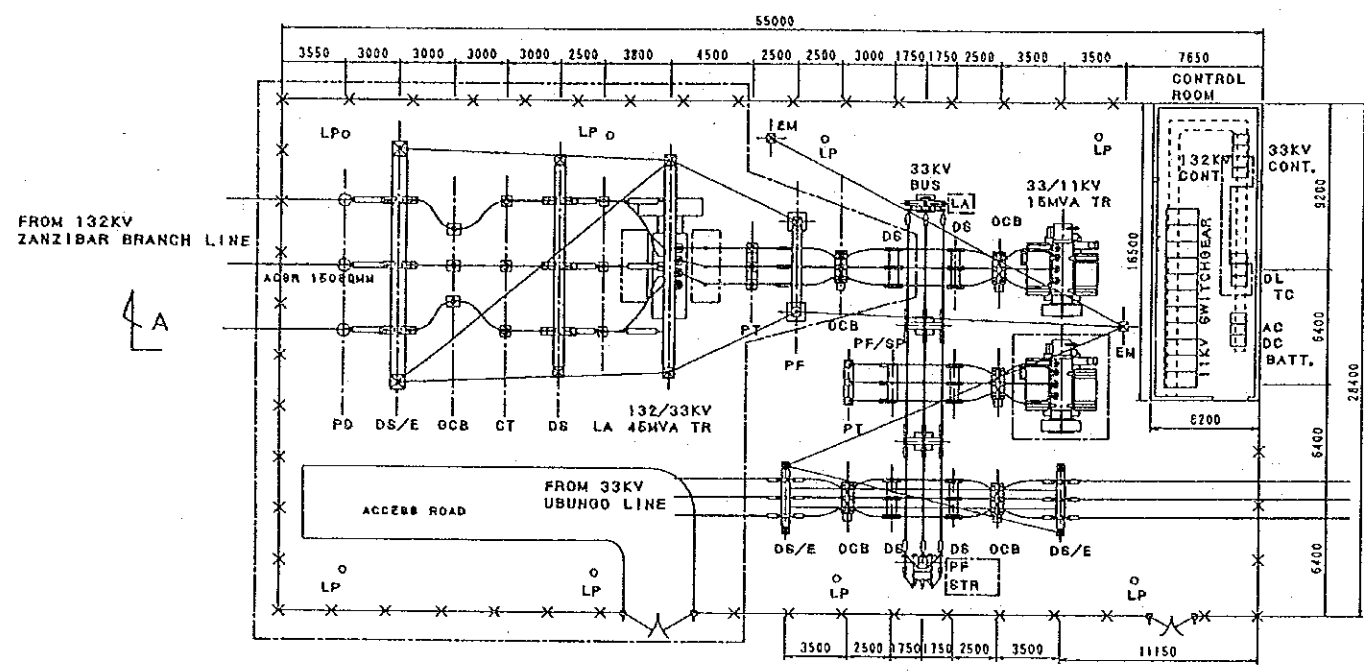
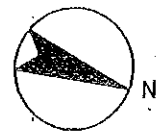
Fig. 5.4-37-1

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

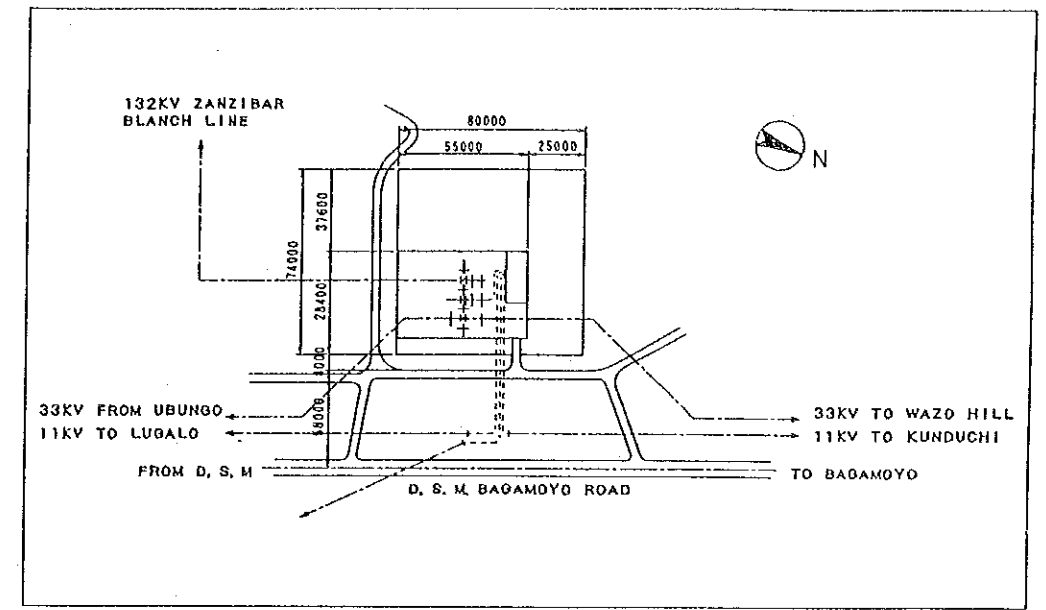
**SINGLE LINE DIAGRAM OF
MBEZI SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



P L A N



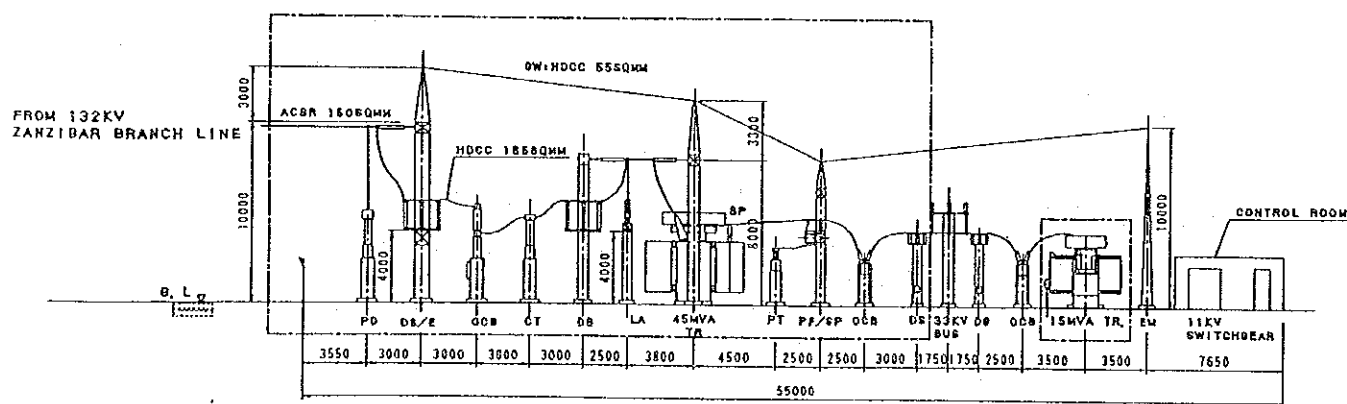
LOCATION MAP (NONE SCALE)

LEGEND :

- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- OCB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST
- DS : DISCONNECTING SWITCH
- PD : POTENTIAL DEVICE
- CT : CURRENT TRANSFORMER
- PT : POTENTIAL TRANSFORMER

NOTE :

1. [Symbol] : 132/33KV 45MVA TR. & 33/11KV TR, EXPANSION AREA



SECTION A-A'

Fig. 5.4 - 37-2

THE UNITED REPUBLIC OF TANZANIA	
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
LAYOUT OF MBEZI SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
		REVISION	

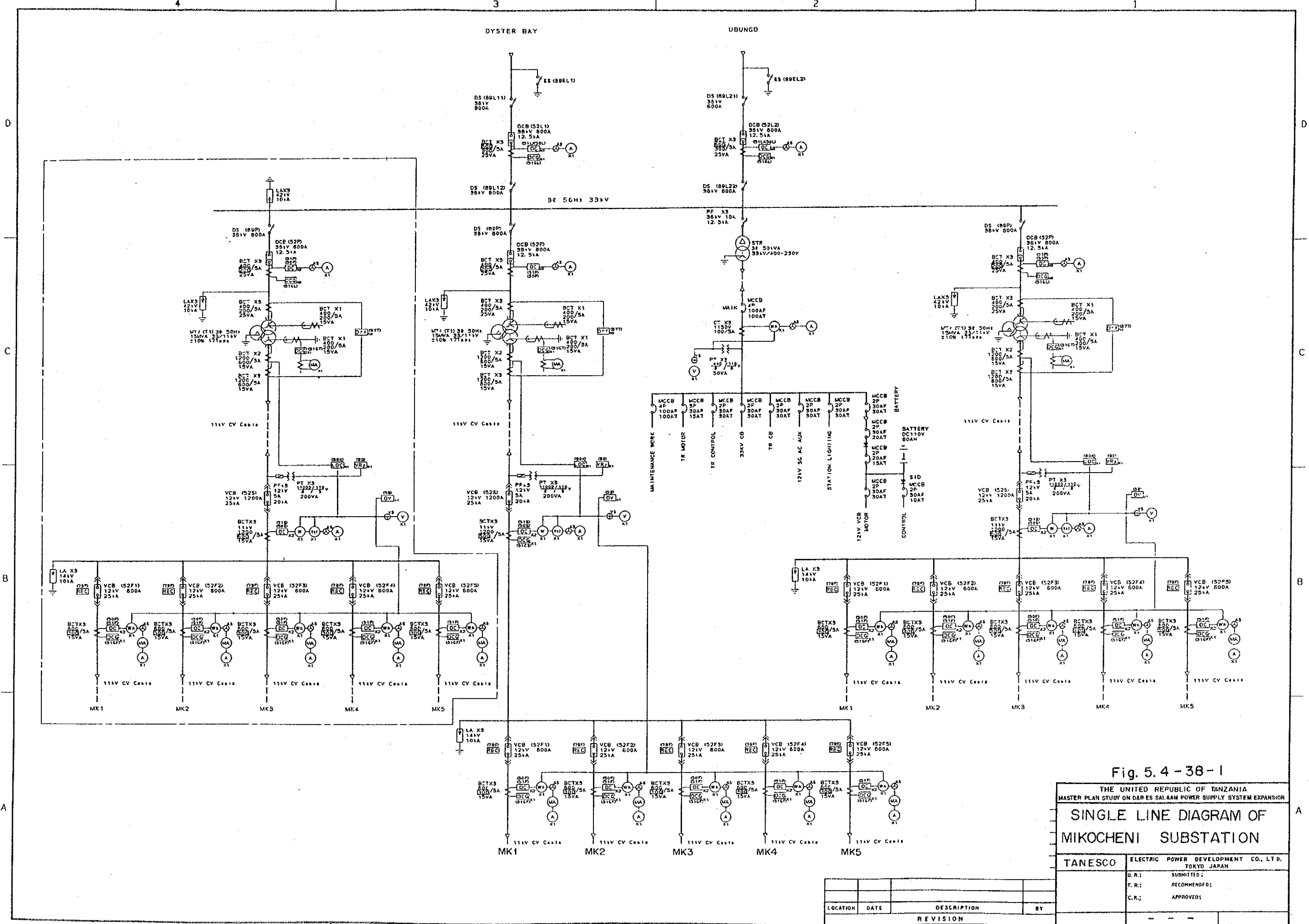
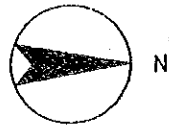


Fig. 5.4-38-1

THE UNITED REPUBLIC OF TANZANIA			
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION			
SINGLE LINE DIAGRAM OF MIKOCHENI SUBSTATION			
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN		
D.R.:	SUBMITTED:		
T.R.:	RECOMMENDED:		
C.K.:	APPROVED:		
LOCATION	DATE	DESCRIPTION	BY
REVISION			

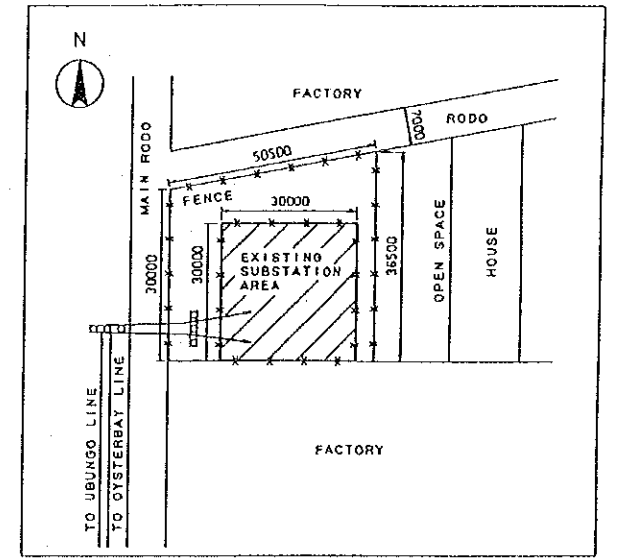


LEGEND:

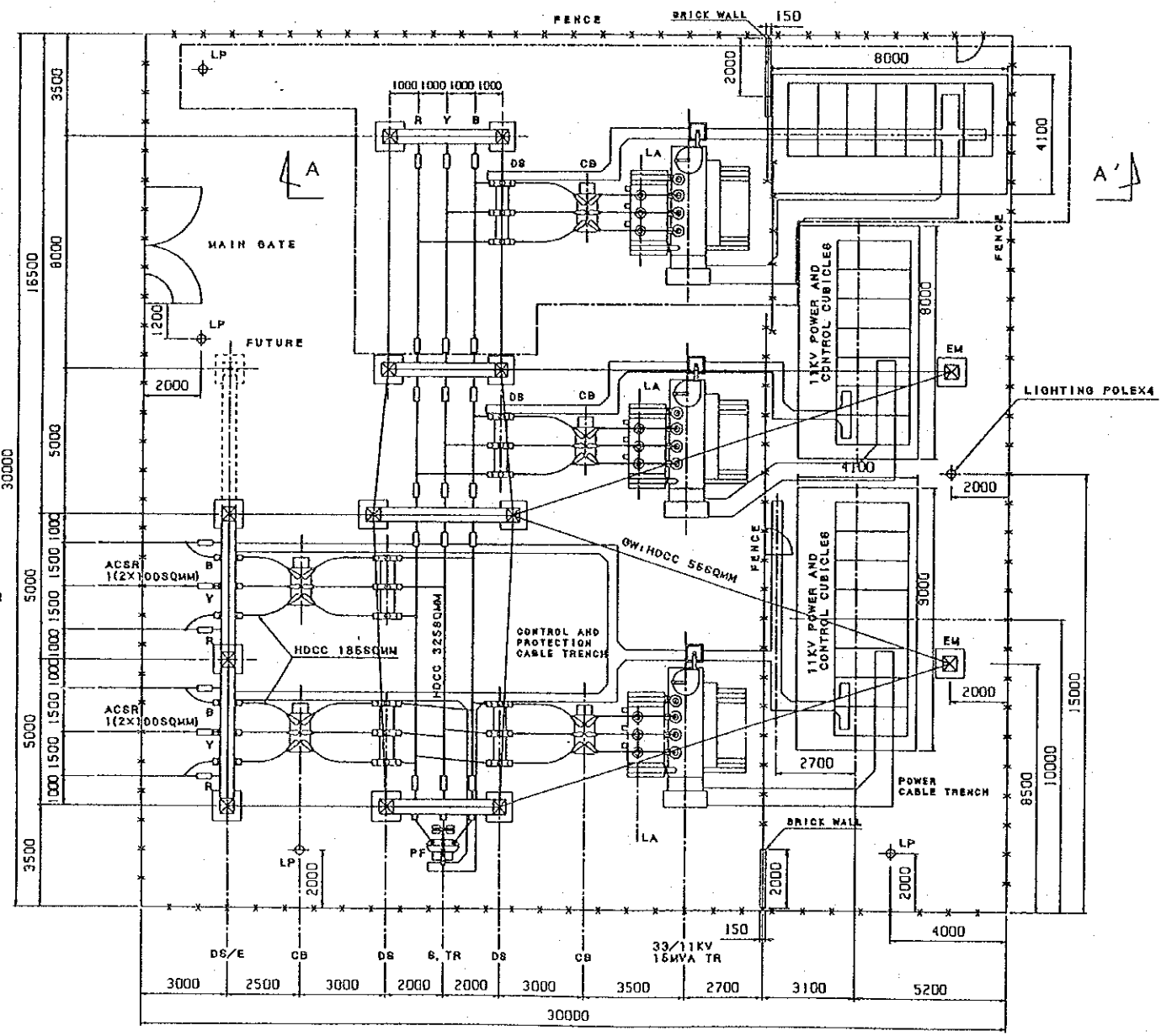
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DB : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST

NOTE:

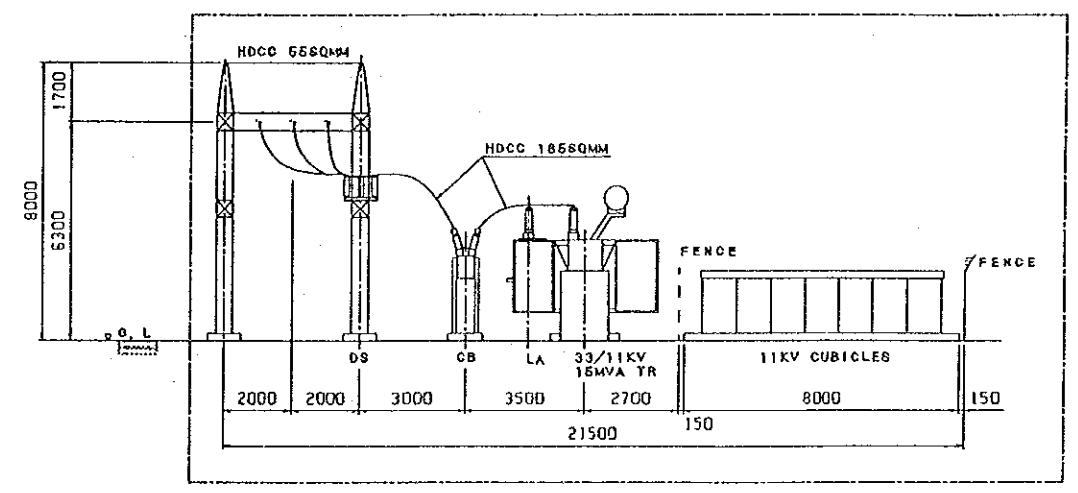
- 1. [Solid line] : EXPANSION TRANSFORMER FEEDER
- 2. [Dashed line] : FUTURE EXPANSION



LOCATION MAP (NONE SCALE)



P L A N

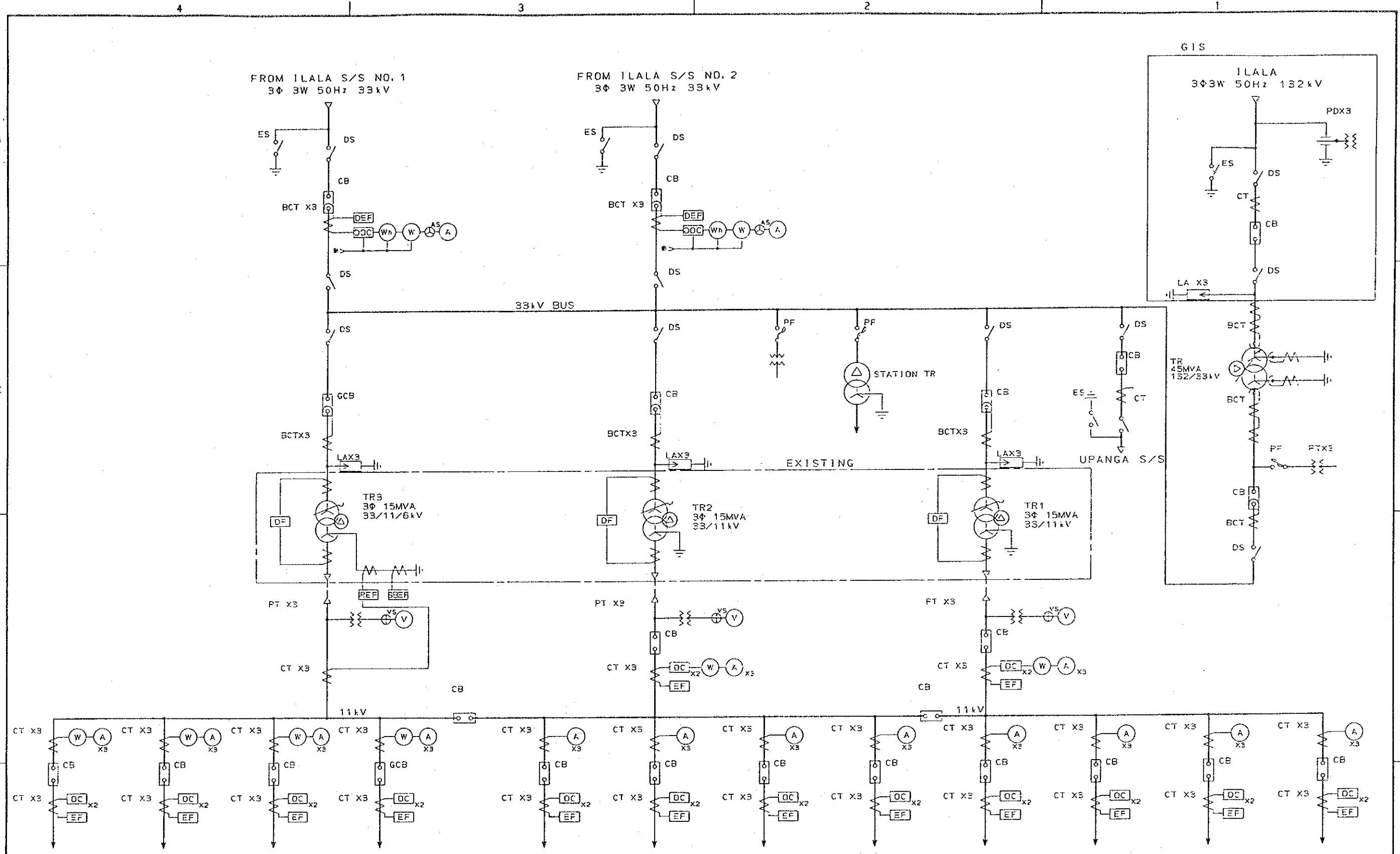


A-A' SECTION

Fig. 5.4 - 38 - 2

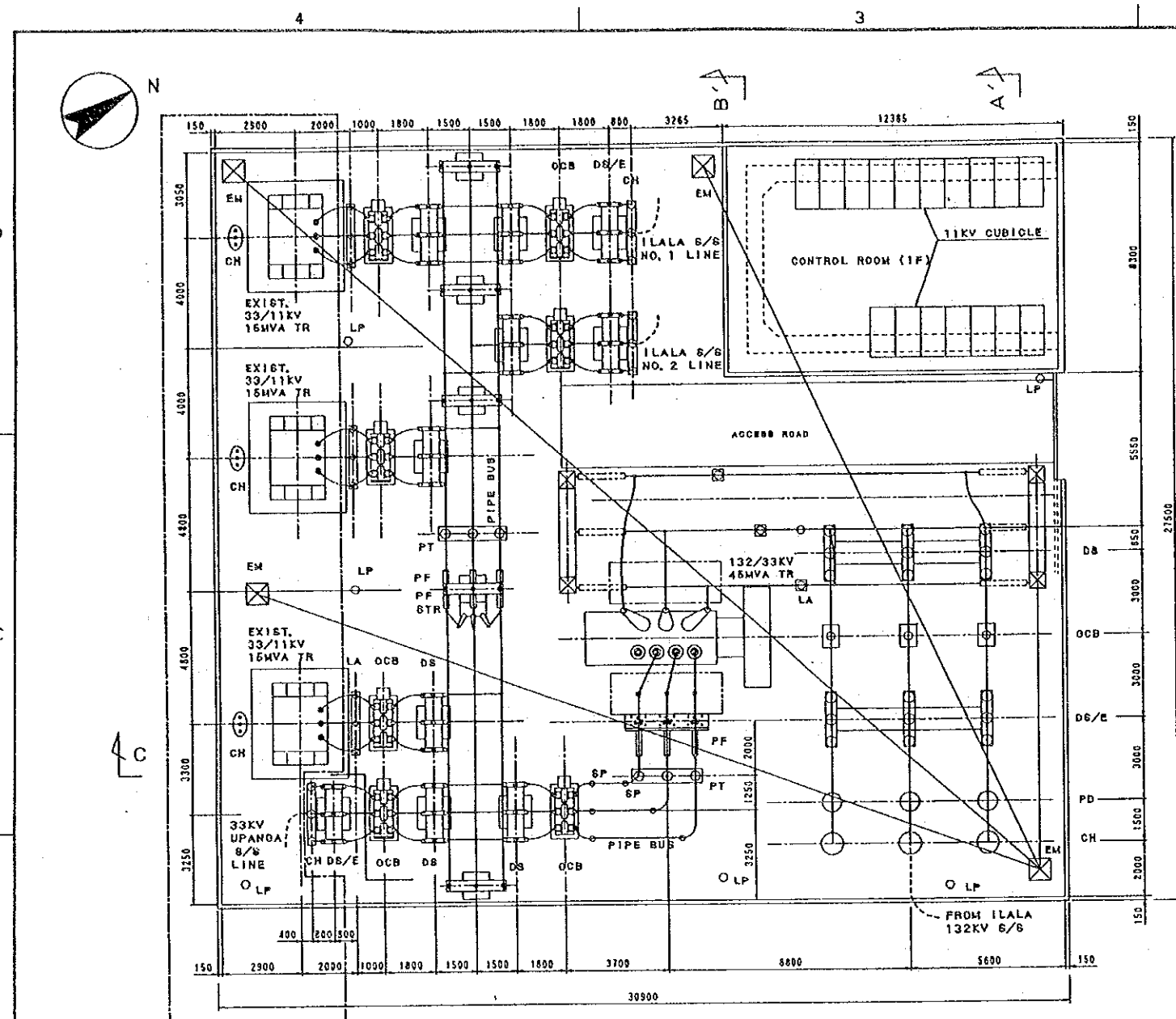
THE UNITED REPUBLIC OF TANZANIA	
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
LAYOUT OF MIKOCHENI SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
		REVISION	

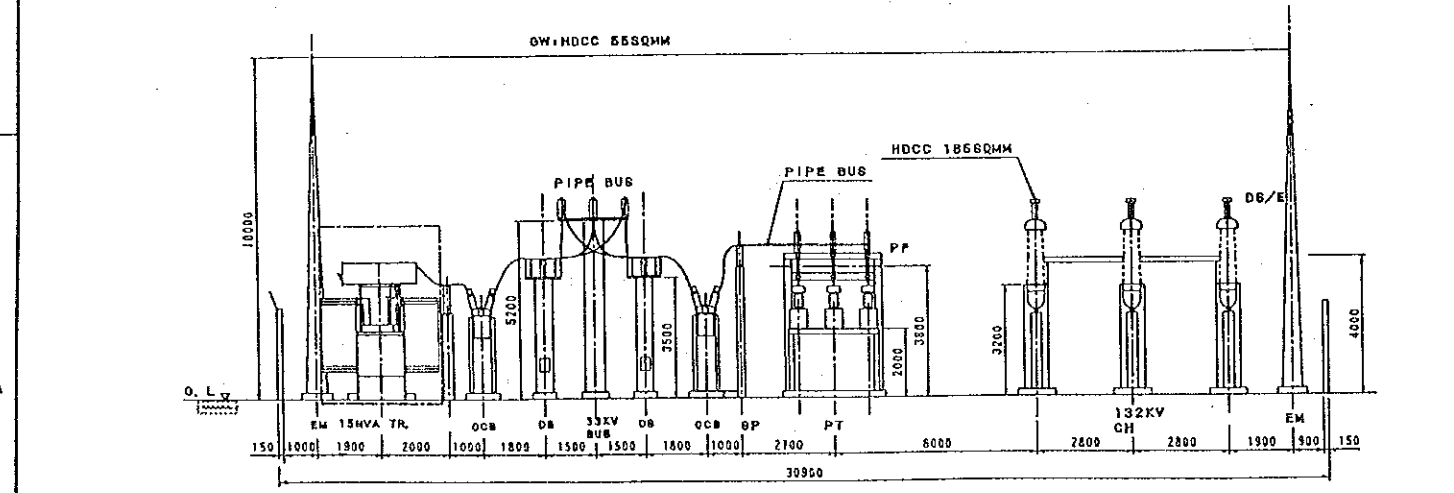


THE UNITED REPUBLIC OF TANZANIA			
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION			
SINGLE LINE DIAGRAM OF CITY CENTER SUBSTATION			
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN		
D.R.:	SUBMITTED:		
T.A.:	RECOMMENDED:		
C.K.:	APPROVED:		
REVISION			
LOCATION	DATE	DESCRIPTION	BY

Fig. 5.4 - 39 - 1



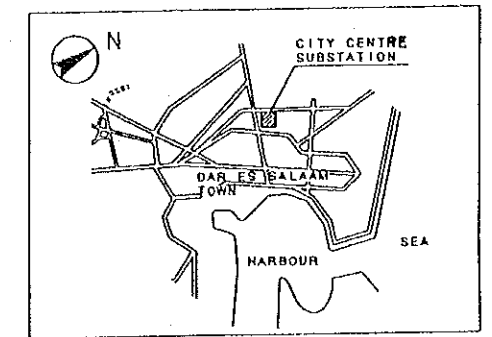
PLAN



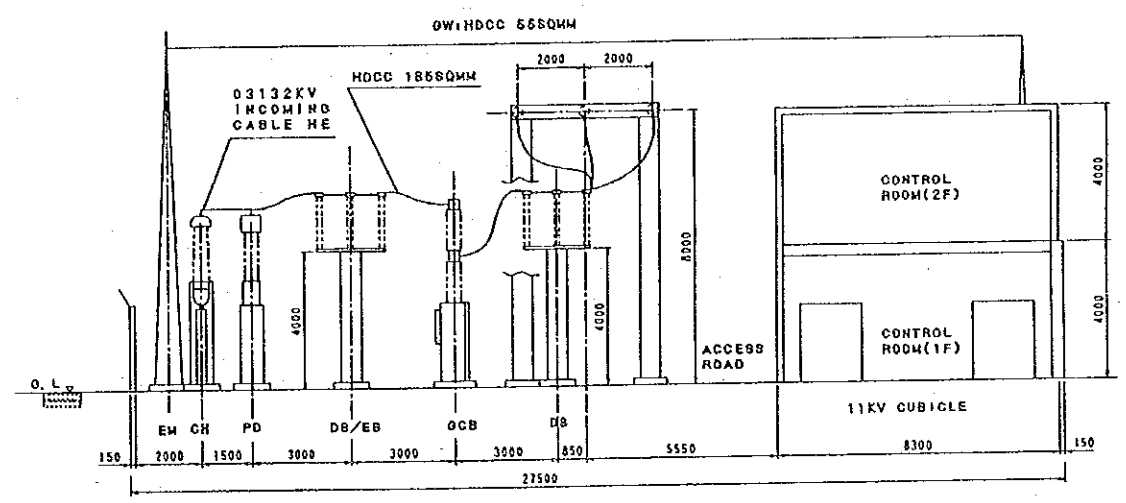
SECTION C-C'

- LEGEND:**
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
 - DB : DISCONNECTING SWITCH
 - CB : CIRCUIT BREAKER
 - LA : LIGHTNING ARRESTER
 - PT : POTENTIAL TRANSFORMER
 - LP : LIGHTNING POLE
 - PF : POWER FUSE
 - S. TR : STATION TRANSFORMER
 - EM : EARTH MAST
 - CH : CABLE HEAD

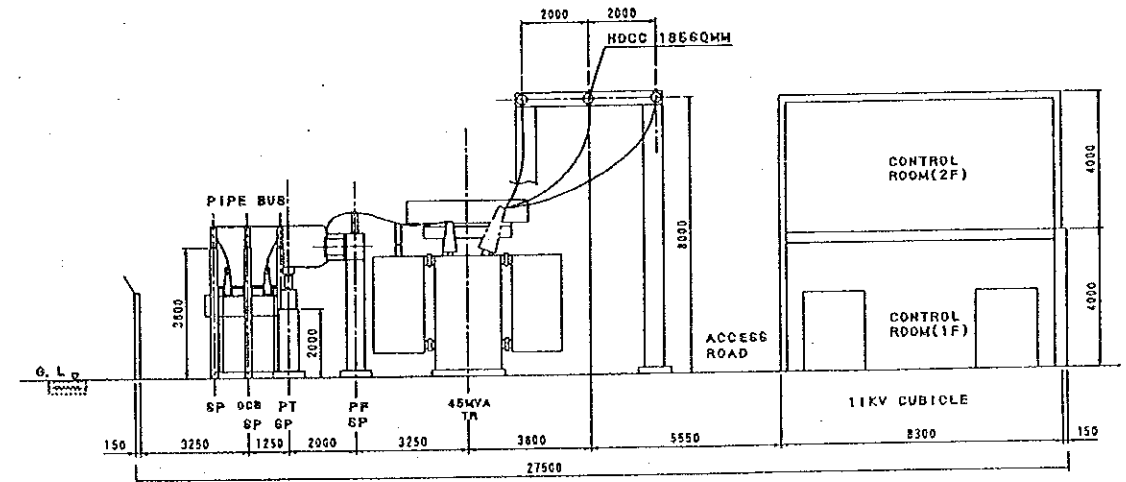
NOTE:
1. [] : EXPANSION AREA



LOCATION MAP (NONE SCALE)



SECTION A-A'



SECTION B-B'

Fig. 5.4-39-2

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**LAYOUT OF
CITY CENTRE SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

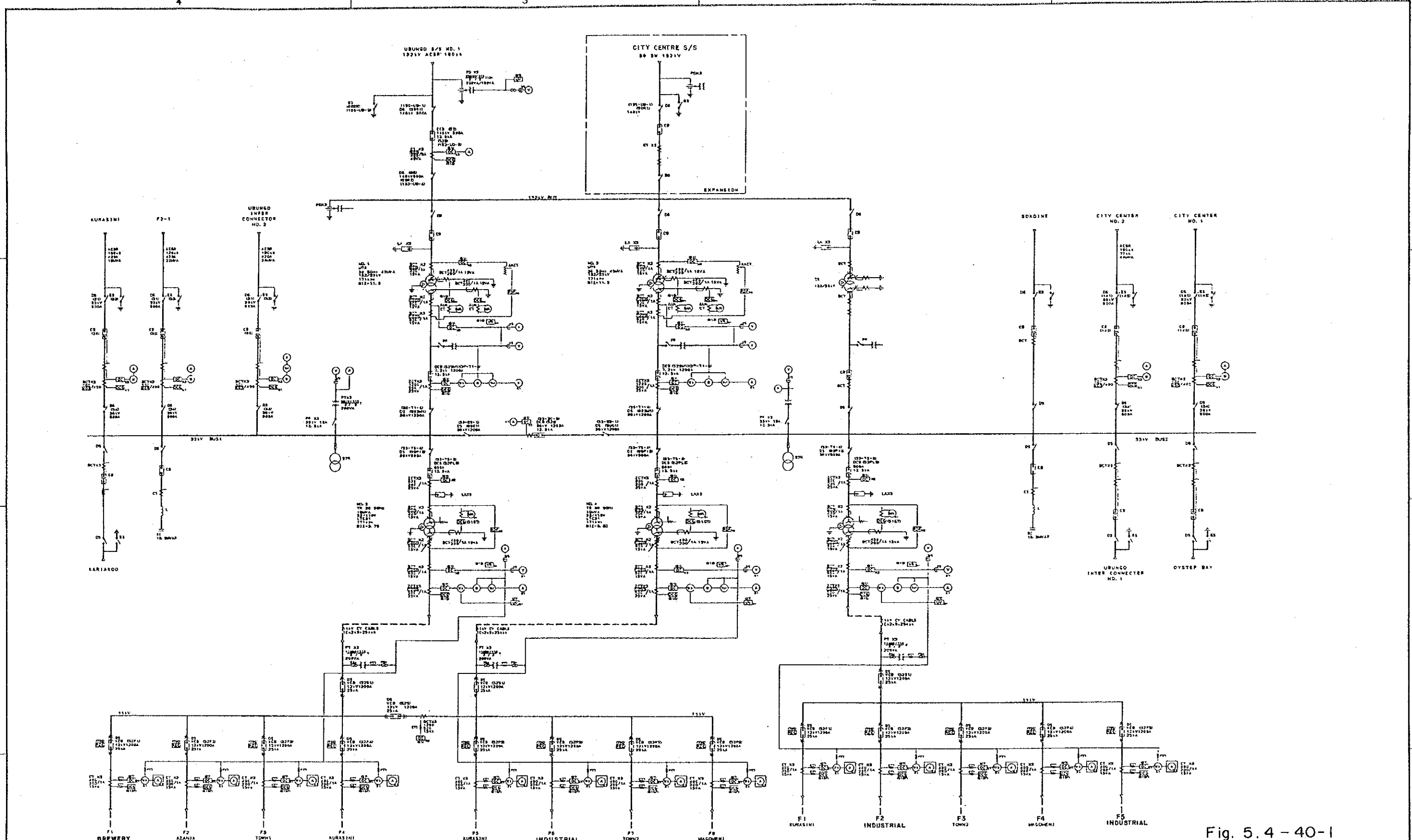
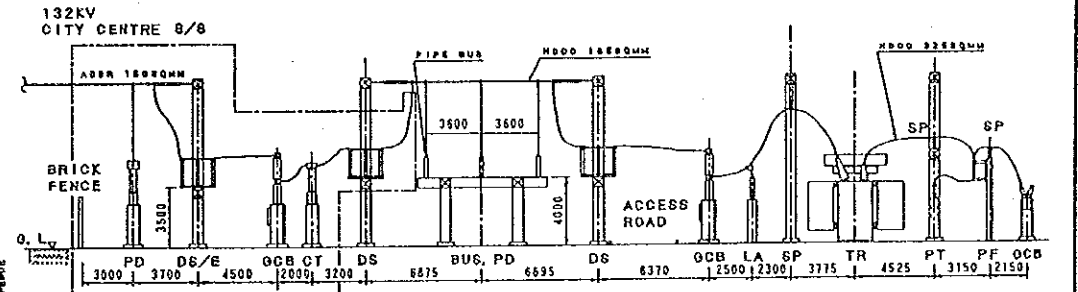
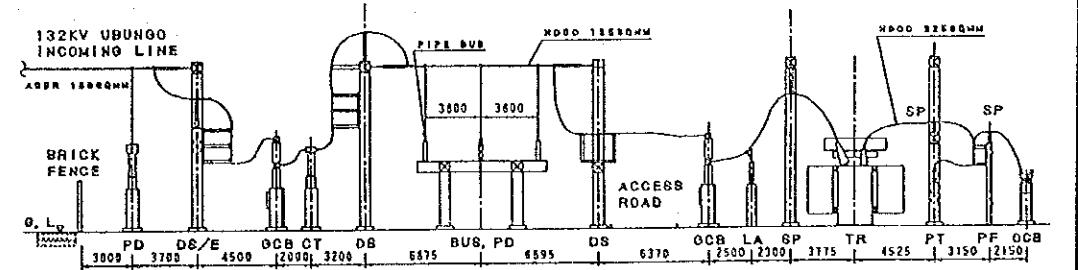
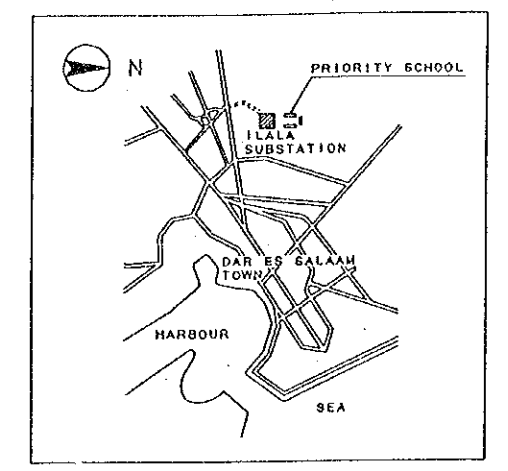
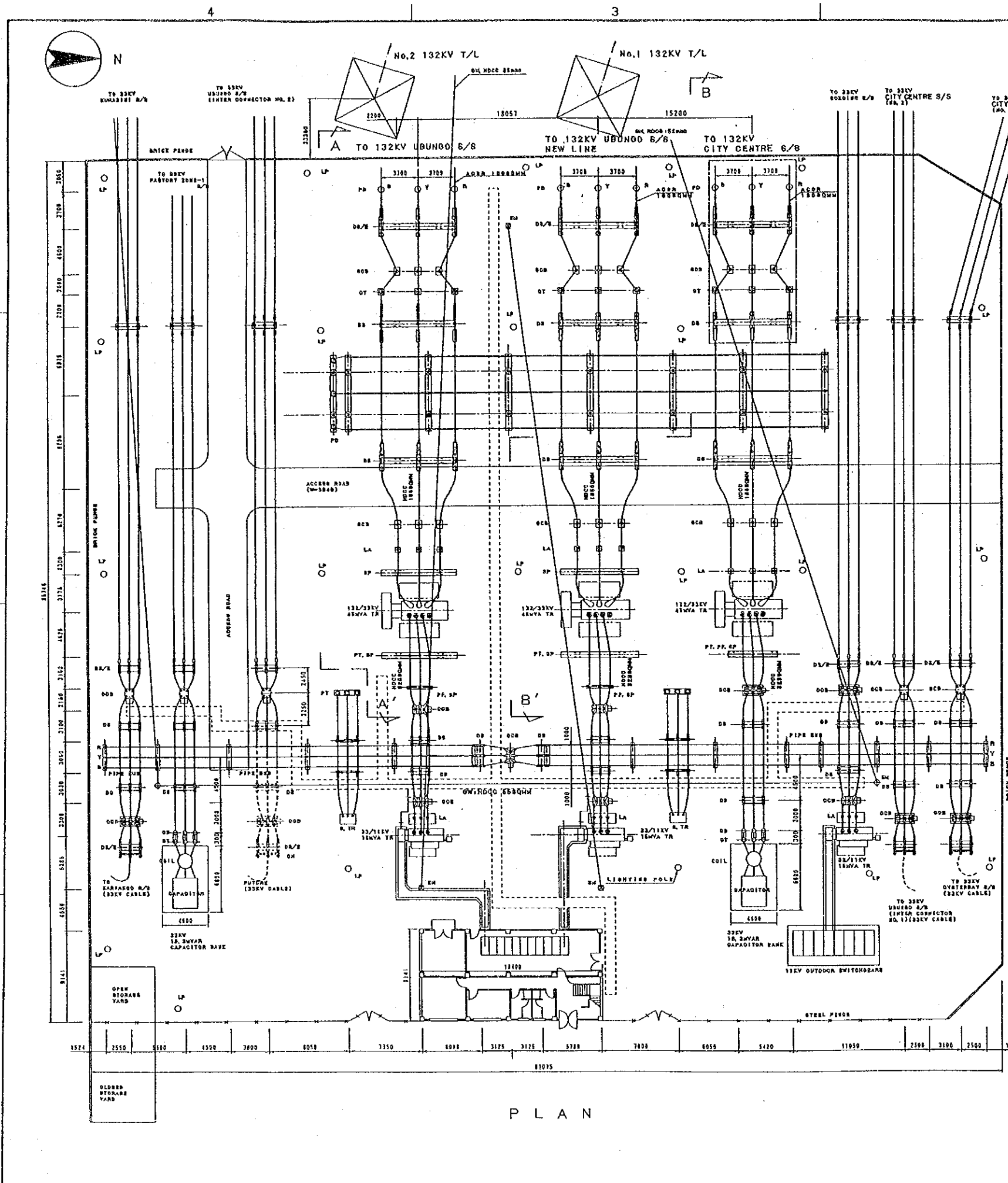


Fig. 5.4 - 40-1

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
SINGLE LINE DIAGRAM OF ILALA SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



- LEGEND:**
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
 - CB : CIRCUIT BREAKER
 - LA : LIGHTNING ARRESTER
 - LP : LIGHTING POLE
 - PF : POWER FUSE
 - S.T.R. : STATION TRANSFORMER
 - EM : EARTH MAST
 - PD : POTENTIAL DEVICE
 - DS : DISCONNECTING SWITCH
 - CT : CURRENT TRANSFORMER
 - PT : POTENTIAL TRANSFORMER

NOTE:

1. [] : EXPANSION AREA

Fig. 5.4 - 40-2

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**LAYOUT OF
ILALA SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.M.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

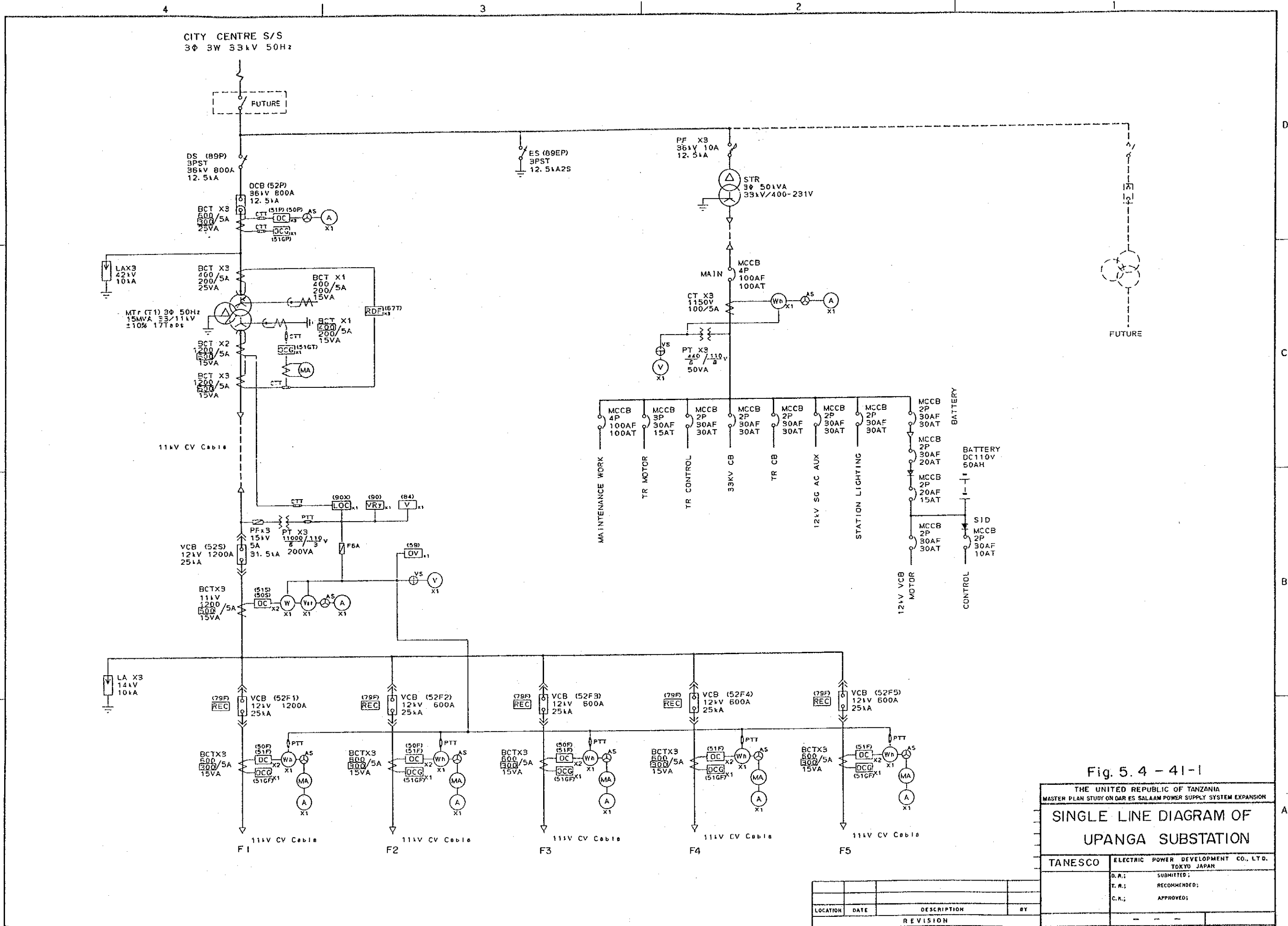


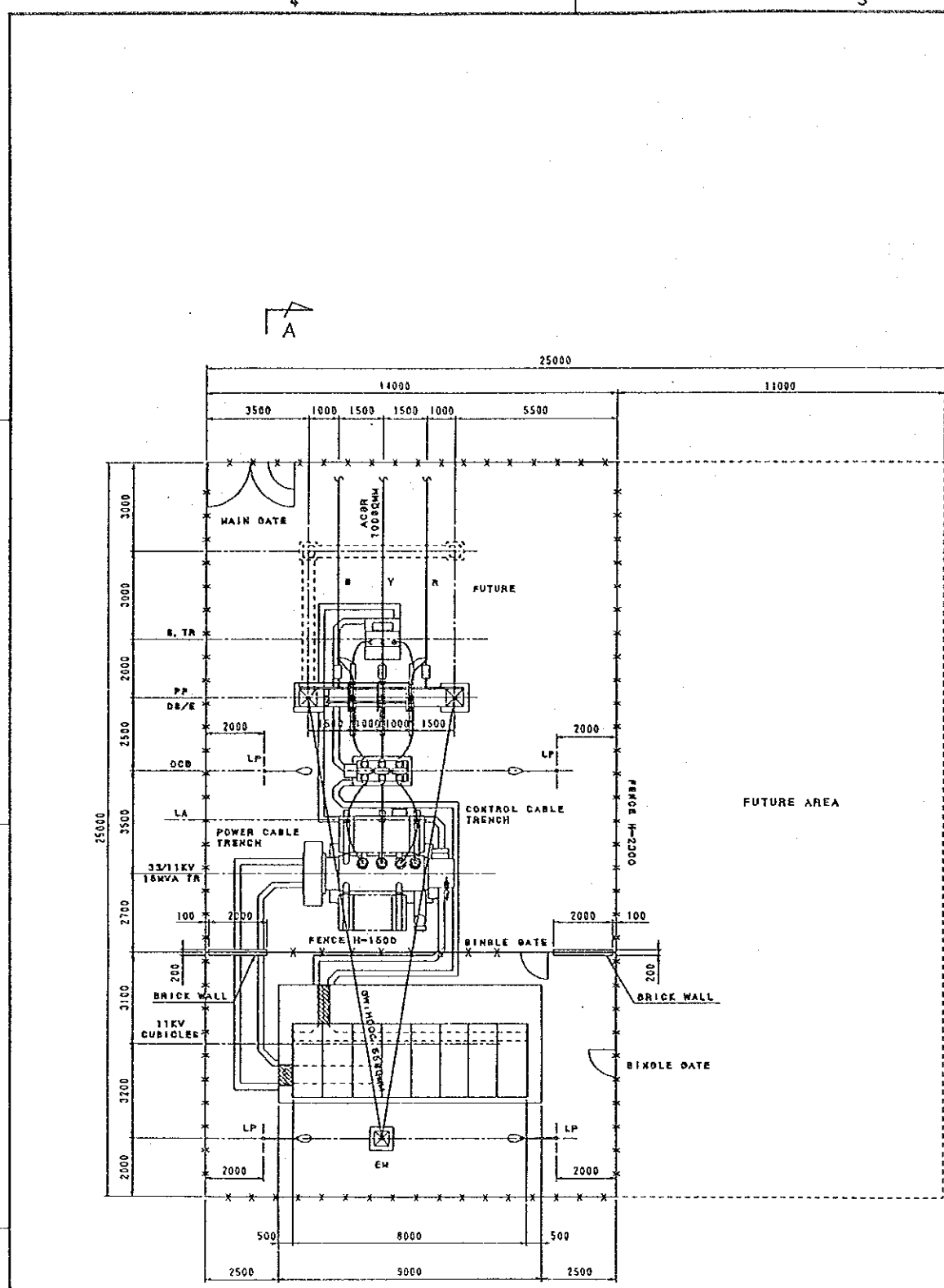
Fig. 5.4 - 41-1

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

SINGLE LINE DIAGRAM OF UPANGA SUBSTATION

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



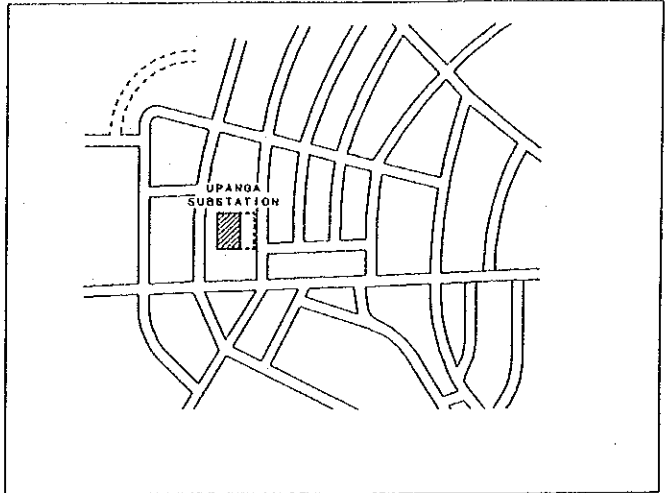
P L A N

LEGEND:

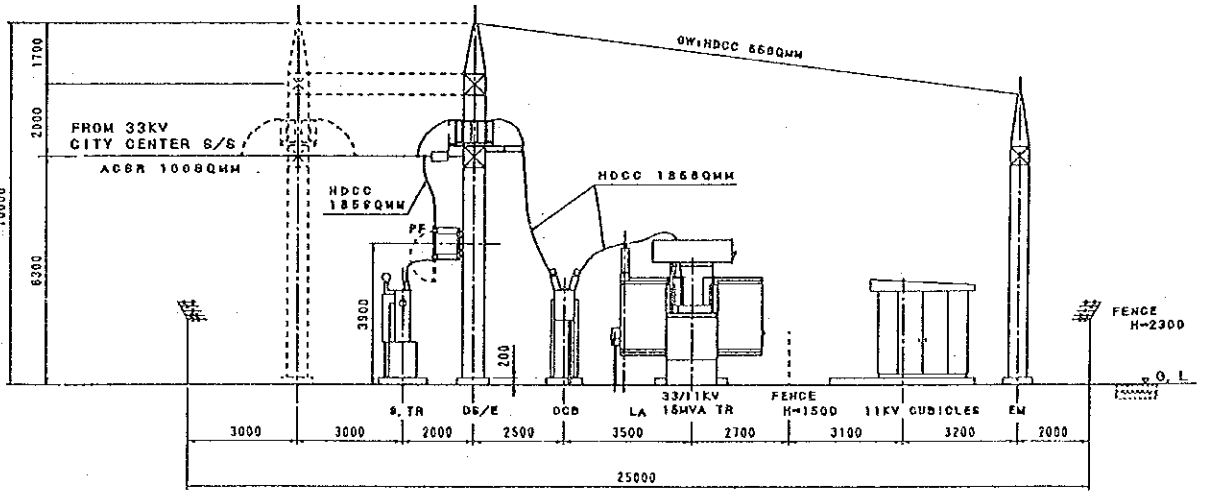
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST

NOTE:

- 1. ----- FUTURE EXPANSION



LOCATION MAP (NONE SCALE)



SECTION A-A'

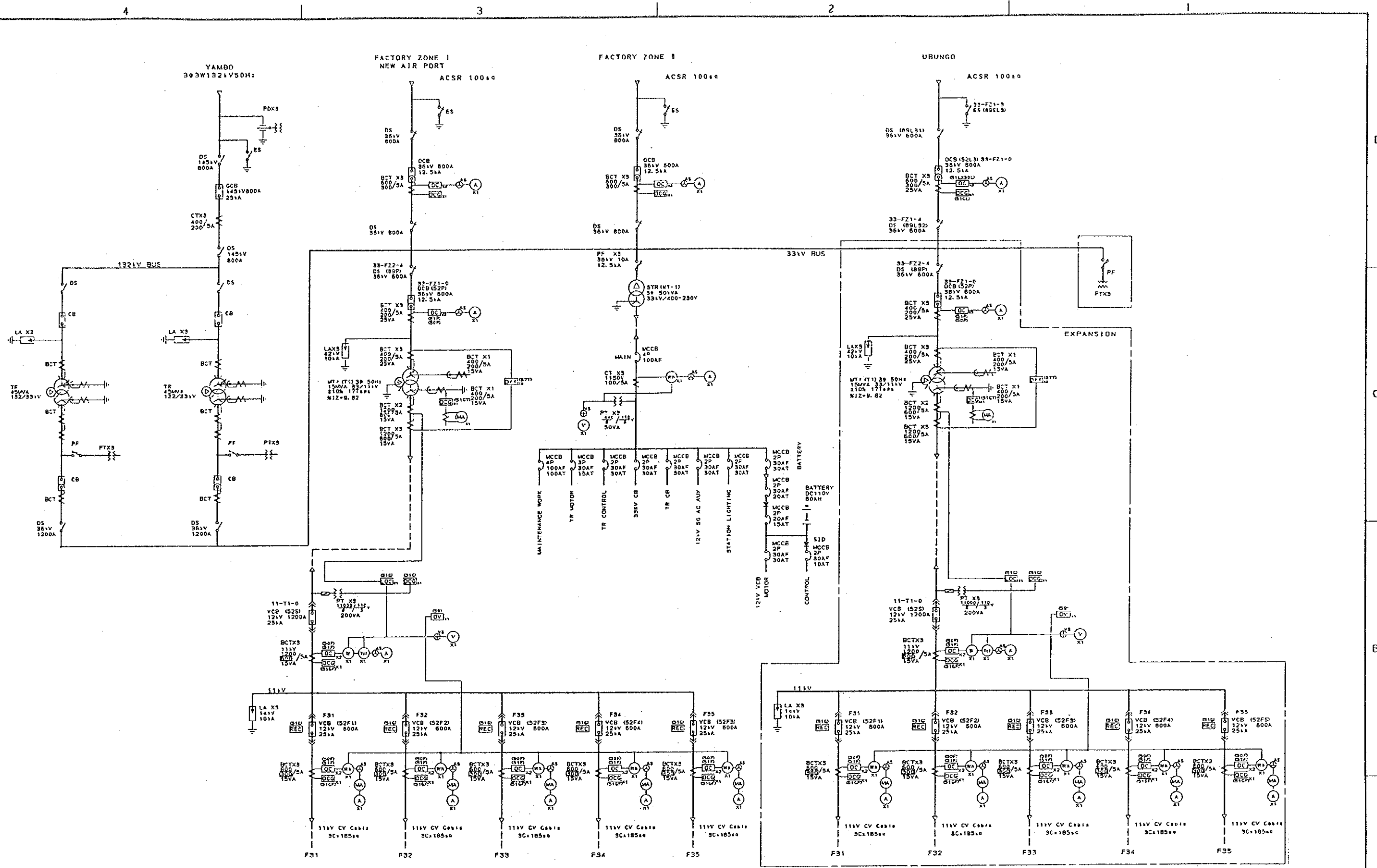
Fig. 5.4-41-2

THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

LAYOUT OF
UPANGA SUBSTATION

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.A.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



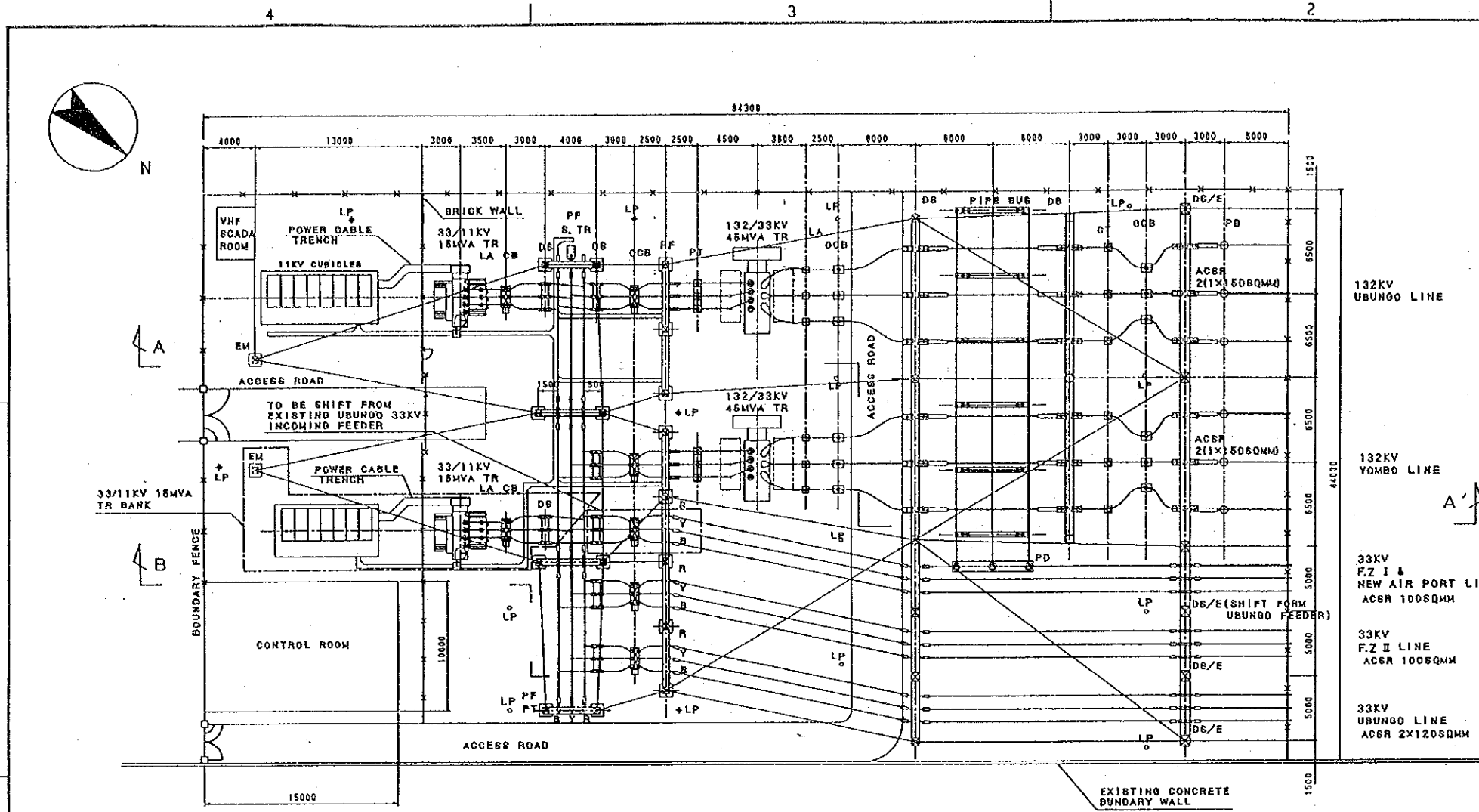
THE UNITED REPUBLIC OF TANZANIA
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

SINGLE LINE DIAGRAM OF FACTORY ZONE III SUBSTATION

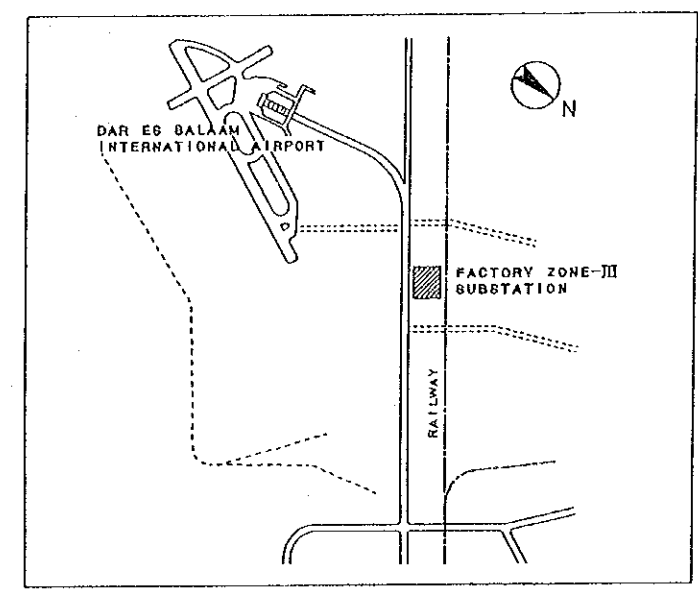
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

Fig. 5.4 - 42 - 1

LOCATION	DATE	DESCRIPTION	BY
REVISION			



PLAN



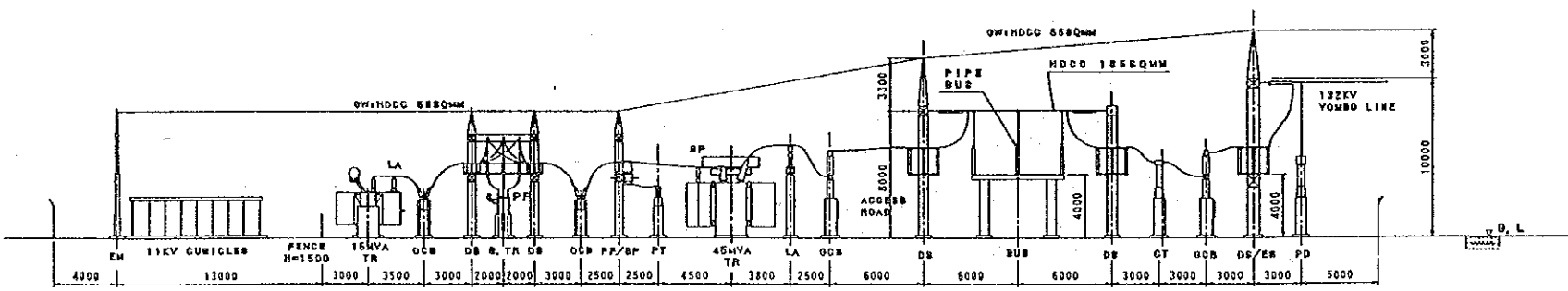
LOCATION MAP (NONE SCALE)

LEGEND:

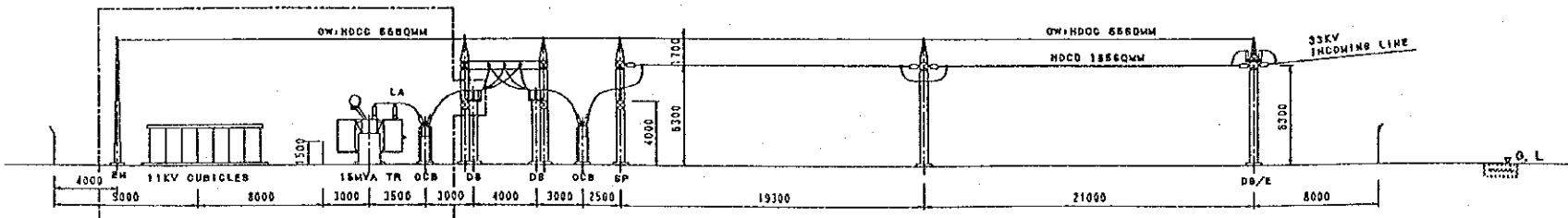
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- LP : LIGHTNING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST
- PD : POTENTIAL DEVICE
- DS : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER
- PT : POTENTIAL TRANSFORMER

NOTE:

1. [Symbol] EXPANSION AND REHABILITATION AREA



SECTION A-A'



SECTION B-B'

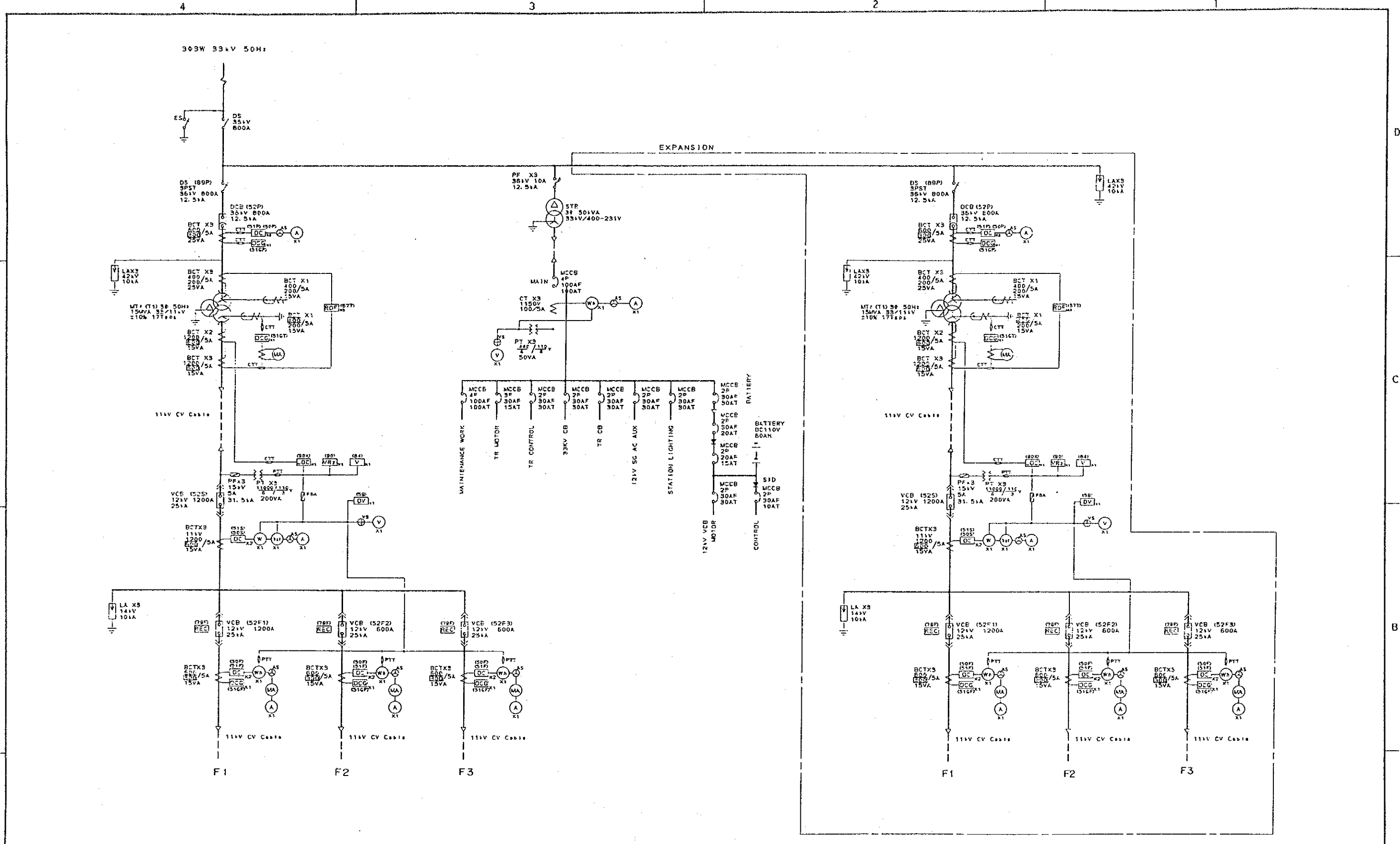
Fig. 5.4-42-2

THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**LAYOUT OF
 FACTORY ZONE III SUBSTATION**

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D. R.:	SUBMITTED:
E. R.:	RECOMMENDED:
C. K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



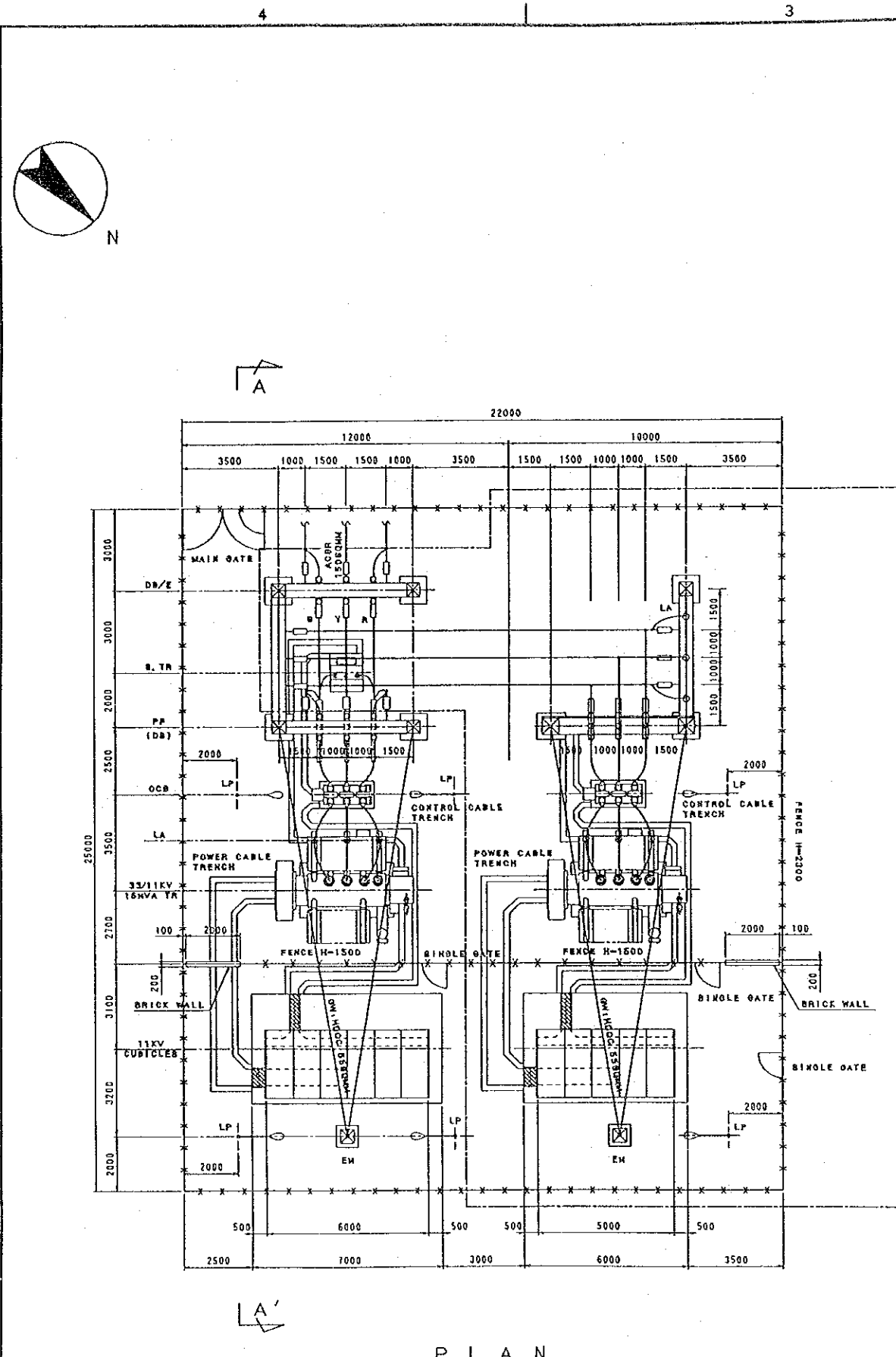
THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

SINGLE LINE DIAGRAM OF MSASANI SUBSTATION

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.K.:	APPROVED:

Fig. 5.4-43-1

LOCATION	DATE	DESCRIPTION	BY
REVISION			

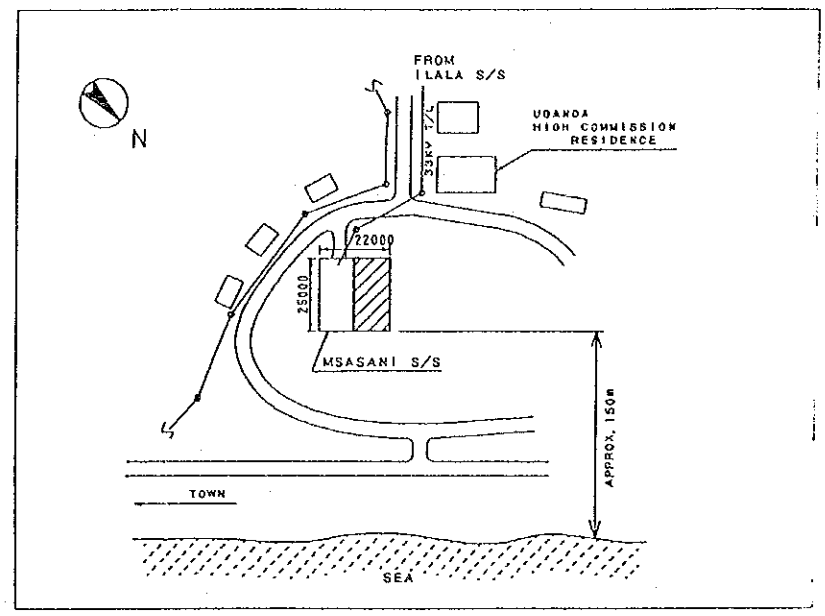


P L A N

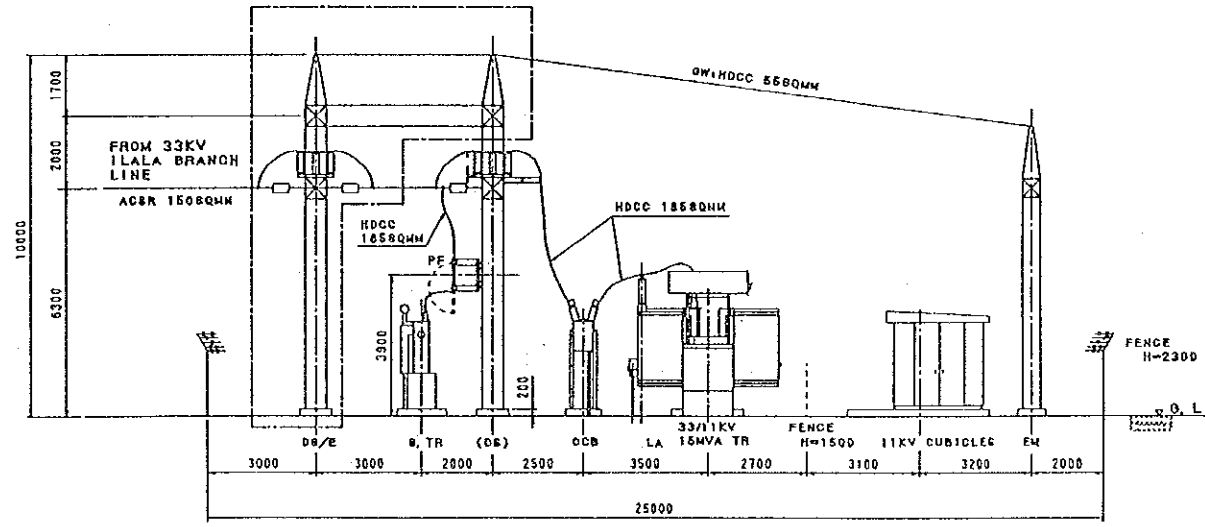
- LEGEND:**
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
 - CB : CIRCUIT BREAKER
 - LA : LIGHTNING ARRESTER
 - TR : 16MVA MAIN TRANSFORMER
 - LP : LIGHTING POLE
 - PF : POWER FUSE
 - S. TR : STATION TRANSFORMER
 - EM : EARTH MAT

NOTE:

1. [] : EXPANSION AREA



LOCATION MAP (NONE SCALE)



SECTION A-A'

Fig. 5.4 - 43-2

THE UNITED REPUBLIC OF TANZANIA	
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
LAYOUT OF MSASANI SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO. LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

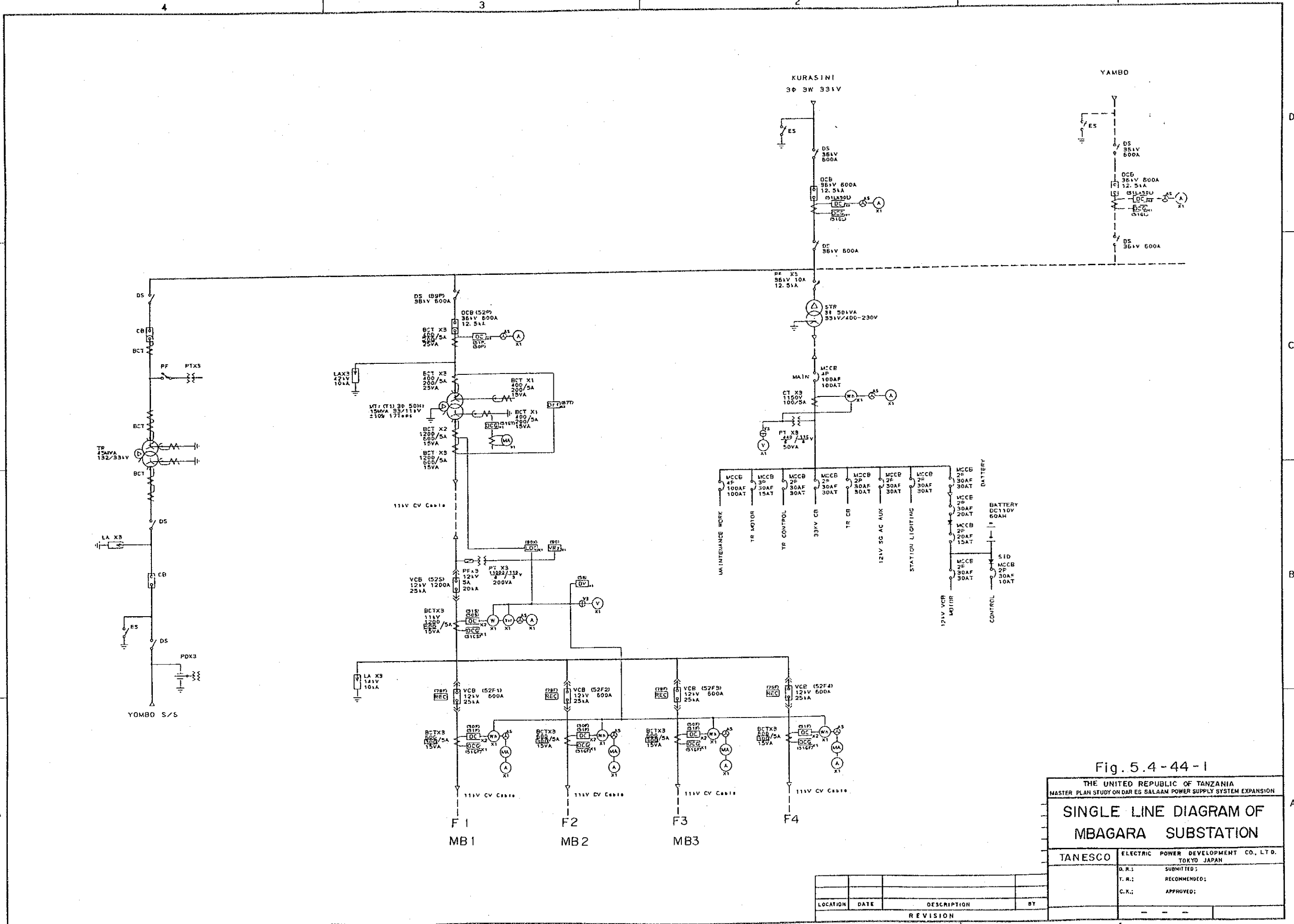
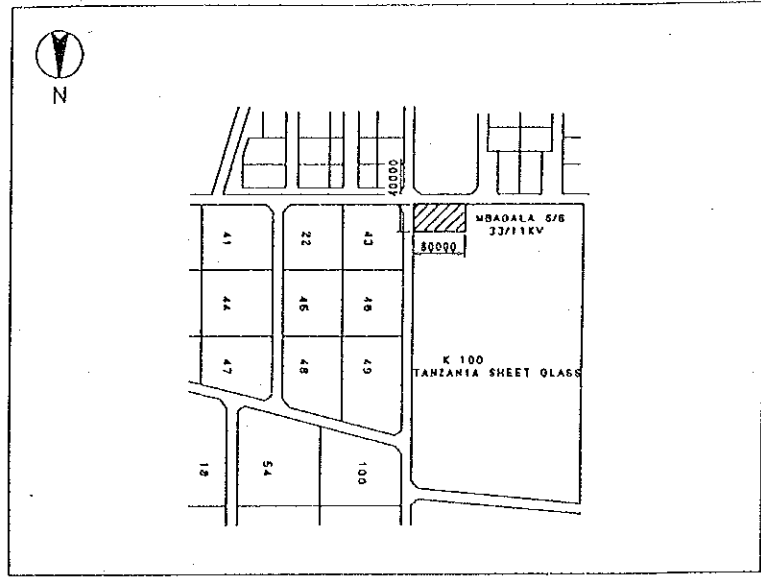
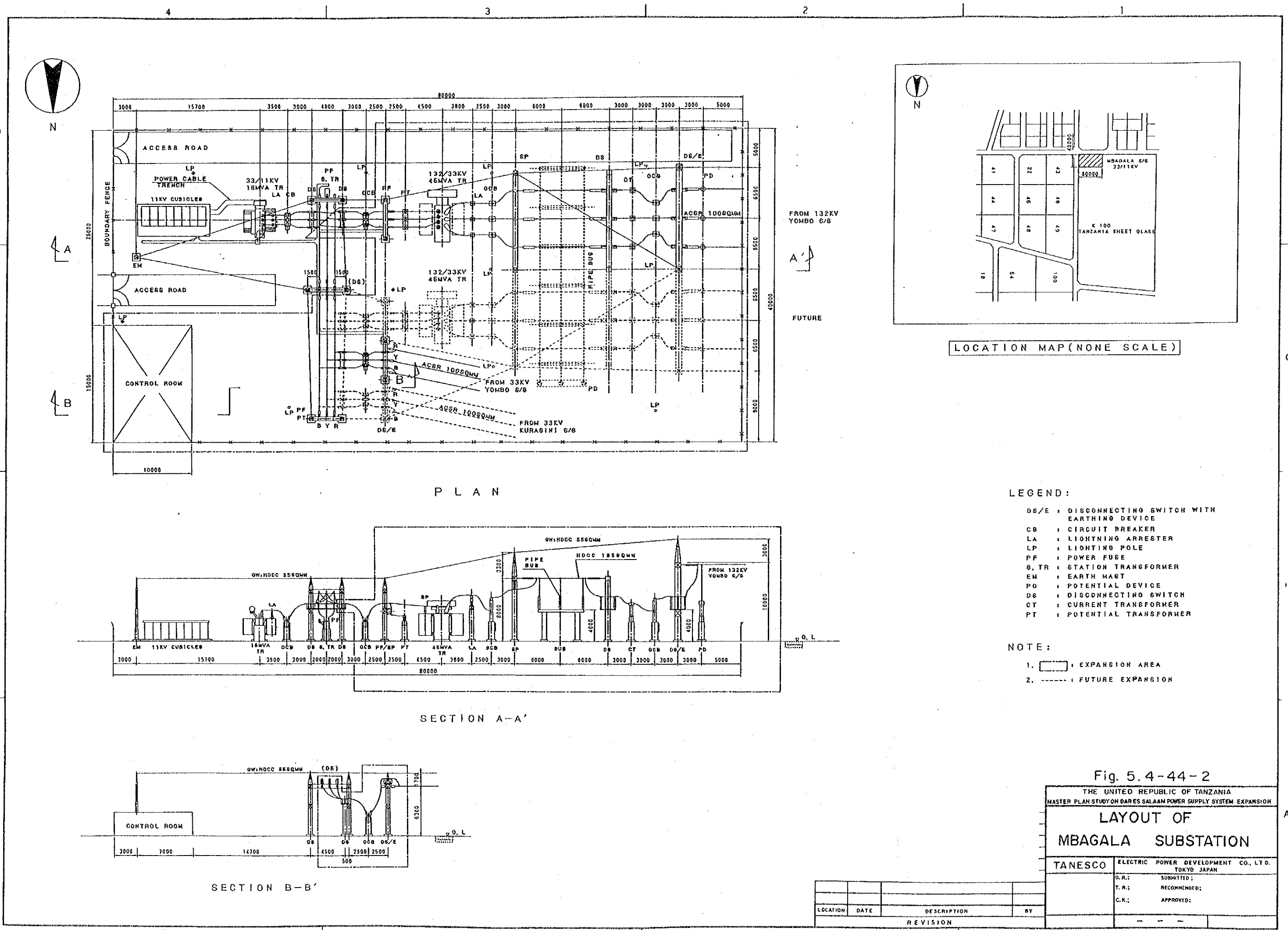
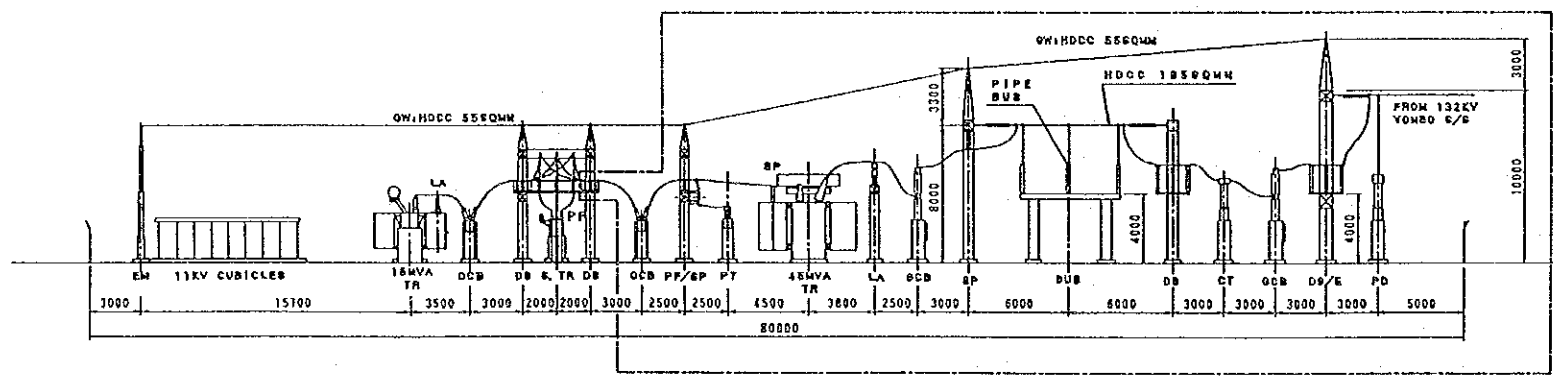


Fig. 5.4-44-1
 THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION
SINGLE LINE DIAGRAM OF MBAGARA SUBSTATION
 TANESCO | ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
 D.R.: SUBMITTED;
 T.R.: RECOMMENDED;
 C.K.: APPROVED;
 LOCATION | DATE | DESCRIPTION | BY
 REVISION

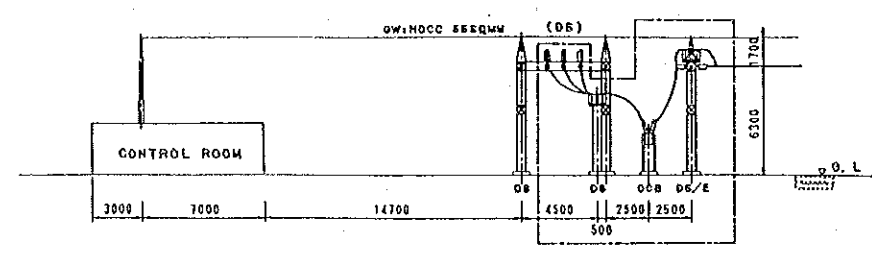


LOCATION MAP (NONE SCALE)

P L A N



SECTION A-A'



SECTION B-B'

LEGEND:

- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST
- PD : POTENTIAL DEVICE
- DS : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER
- PT : POTENTIAL TRANSFORMER

NOTE:

1. [Dashed Box] : EXPANSION AREA
2. [Dotted Line] : FUTURE EXPANSION

Fig. 5.4-44-2

THE UNITED REPUBLIC OF TANZANIA	
MASTER PLAN STUDY ON DARES SALAAM POWER SUPPLY SYSTEM EXPANSION	
LAYOUT OF MBAGALA SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

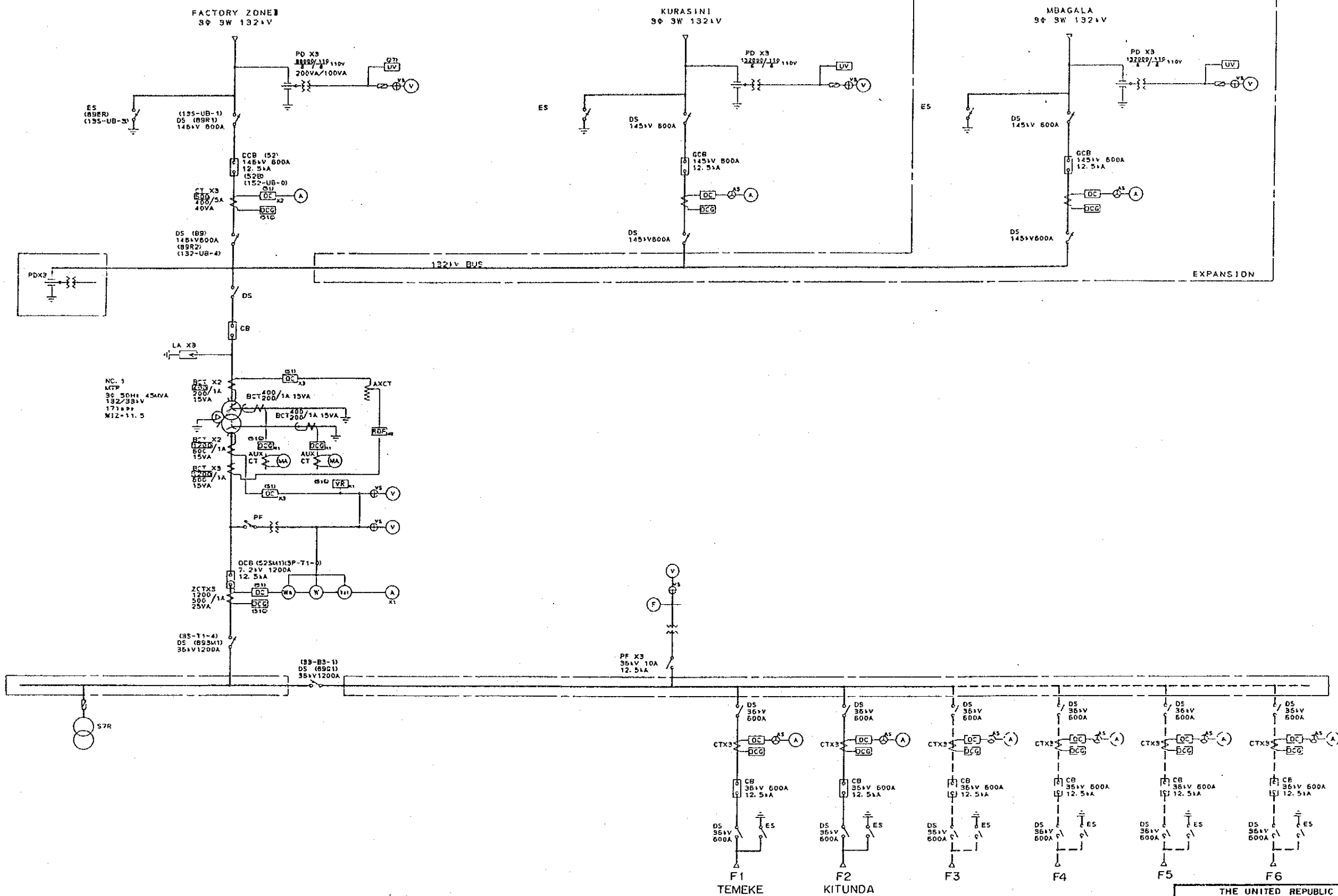
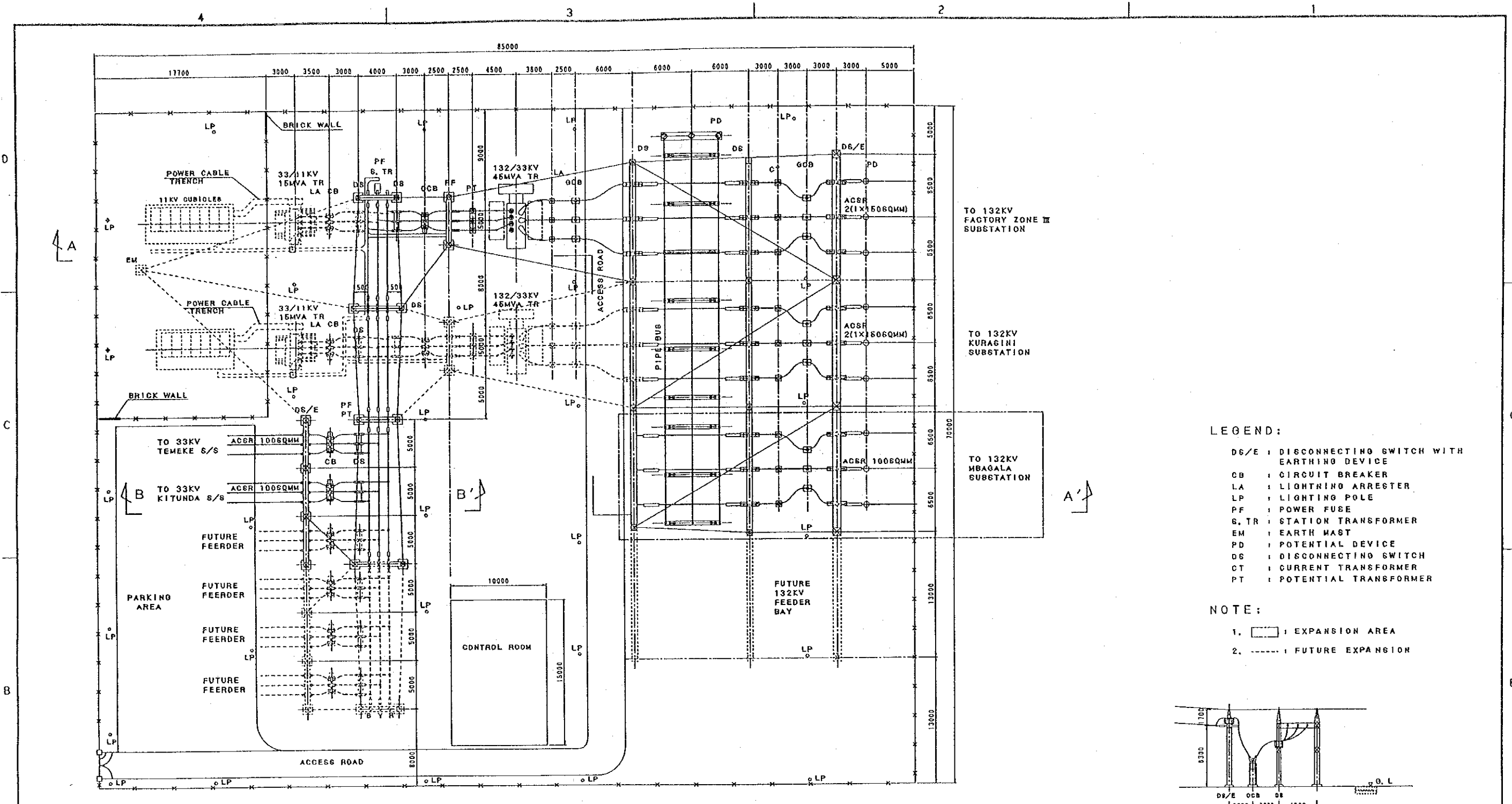


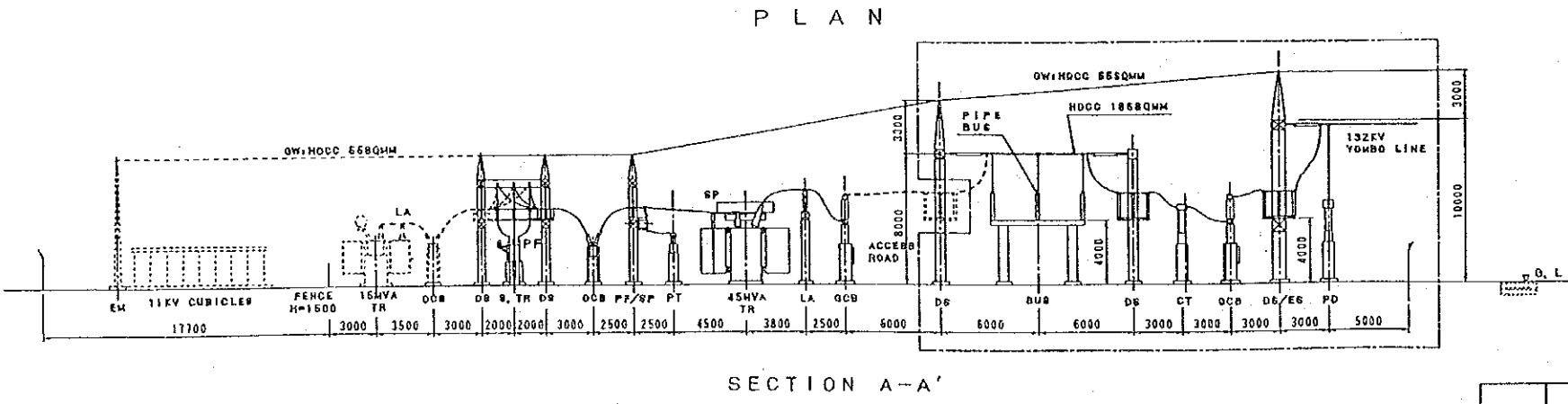
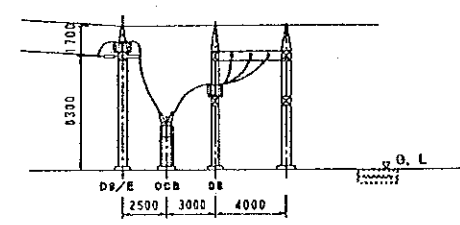
Fig. 5.4 - 45 - 1

THE UNITED REPUBLIC OF TANZANIA MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION	
SINGLE LINE DIAGRAM OF YOMBO SUBSTATION	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.A.:	APPROVED:
REVISION	
LOCATION	DATE
DESCRIPTION	BY



- LEGEND:**
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
 - CB : CIRCUIT BREAKER
 - LA : LIGHTNING ARRESTER
 - LP : LIGHTNING POLE
 - PF : POWER FUSE
 - S. TR : STATION TRANSFORMER
 - EM : EARTH MAST
 - PD : POTENTIAL DEVICE
 - DS : DISCONNECTING SWITCH
 - CT : CURRENT TRANSFORMER
 - PT : POTENTIAL TRANSFORMER

- NOTE:**
1. [Solid Line] : EXPANSION AREA
 2. [Dashed Line] : FUTURE EXPANSION



SECTION B-B'

PLAN

SECTION A-A'

Fig. 5.4-45-2
 THE UNITED REPUBLIC OF TANZANIA
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION
**LAYOUT OF
 YOMBO SUBSTATION**

LOCATION	DATE	DESCRIPTION	BY
REVISION			

TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

C. その他関係資料

C その他関係資料

頁

1. 変電所建設予定地及び送電線鉄塔
の基礎地盤・地耐力測定の結果 C-1

C. その他関係資料

1. 変電所建設予定地及び送電線鉄塔の基礎地盤・地耐力測定の結果

今回の調査では、短期計画の5ヶ年間に建設を予定される Tandale, Chang'ombe, Kunduchi, Kariakoo, Mbagala, Tabata の6ヶ所の新設変電所予定地と Ubungo - Ilala, Ubungo - FZ III の送電線2路線の鉄塔基礎(1路線につき2地点)の地耐力の測定を実施した。

地耐力の測定には、日本より持参したポータブル・コーンペネトロメーター(portable cone penetrometer)と、Central Material Laboratory から借用したハンドオーガー(hand Auger)を用いて、1地点につき3つの深度(地表下2.0m、2.5m、3.0m)の地耐力を測定した。

まずハンドオーガーを用いて地表下2.0mまでボーリングを行い、コーンペネトロメーターを衝撃を加えないように、且つ傾かないよう注意しながら垂直下向きに力を加え、静かに先端コーンを試験土中に貫入させて、プルービング・リングのダイヤルゲージの読みを記録した。次にコーンペネトロメーターを引抜き、ハンドオーガーでボーリングを行い、2.5m、3.0mの深さで同様の試験を行なった。

測定試験を実施したほとんどの地点で、全体重をかけて押し込もうとしても、地盤が締っていて先端コーンの貫入は不可能となってしまった。その時のダイヤルゲージの読み取りは、ほぼ150~180であった。

[許容地耐力の求め方]

まず、ダイヤルゲージの読み取り数値にダイヤルゲージの特性係数(0.422)を乗じて、貫入力Q(kg)を求め、次式により許容地耐力(qa)を算出する。

$$qa = \alpha \cdot \frac{Q}{A}$$

ここに qa : 換算許容地耐力(kg/cm²), (安全率3とした場合の値)

Q : 貫入力(kg) (コーンの最小貫入抵抗)

A : コーンの最大断面積(今回は6.45cm²を使用)

α : 許容地耐力換算係数(0.15~0.20) (今回は0.17を採用)

Tandale では、地表下 1.0m程までボーリングしたところで、堅固な地盤に当たり、ハンドオーガーによる掘削が不可能となったので、それ以下の深さでの測定試験は中止した。

変電所建設予定地では、基礎地盤の地耐力に関しては全く問題はない。

送電線では、Ubungo - Ilala 線のNo.2 鉄塔付近で 2.5~4.0 ton/m²の極めて軟弱な粘土地盤に遭遇した。鉄塔建設に当たっては、再度詳細な試験と適切な基礎地盤の改良方法の検討が必要である。

他の 3ヶ所の地盤は変電所建設予定地と同様、全く問題はない。

求めた地耐力 (kg/cm²) に10を乗じてton/m²の単位に換算したものを、次表 Table C-1 に示す。

Table C-1 Result of Bearing Capacity Test
for proposed site of Substations
and Transmission lines

Substations

Depth Site	2.0 m	2.5 m	3.0 m	Remarks
Tandale	20.0 ton/m ² < (1.0 m)	-	-	Good condition
Chang'ombe	12.0 ton/m ² <	15.6 ton/m ² <	15.6 ton/m ² <	Good condition
Kunduchi	14.5 ton/m ² <	15.6 ton/m ² <	16.7 ton/m ² <	G.W.L. -0.75 m Good condition
Kariakoo	17.2 ton/m ² <	17.2 ton/m ² <	17.2 ton/m ² <	Good condition
Mbagala	17.2 ton/m ² <	17.2 ton/m ² <	17.2 ton/m ² <	Good condition
Tabata	15.6 ton/m ² <	16.7 ton/m ² <	16.7 ton/m ² <	G.W.L. -0.90 m Good condition

Transmission Lines

Depth Line	2.0 m	2.5 m	3.0 m	Remarks
Ubungo-Ilala No.2	2.5-4.0ton/m ²	2.5-4.0ton/m ²	2.5-4.0ton/m ²	Should be considered special countermeasure for the founda- tion
No.7-8	16.7 ton/m ² <	16.7 ton/m ² <	16.7 ton/m ² <	Good condition
Ubango-FZ III WP 32	16.7 ton/m ² <	17.8 ton/m ² <	17.8 ton/m ² <	G.W.L. -0.70 m Good condition
WP 39-40	17.2 ton/m ² <	17.2 ton/m ² <	17.2 ton/m ² <	Good condition

JICA