

LOCATION MAP (NONE SCALE)

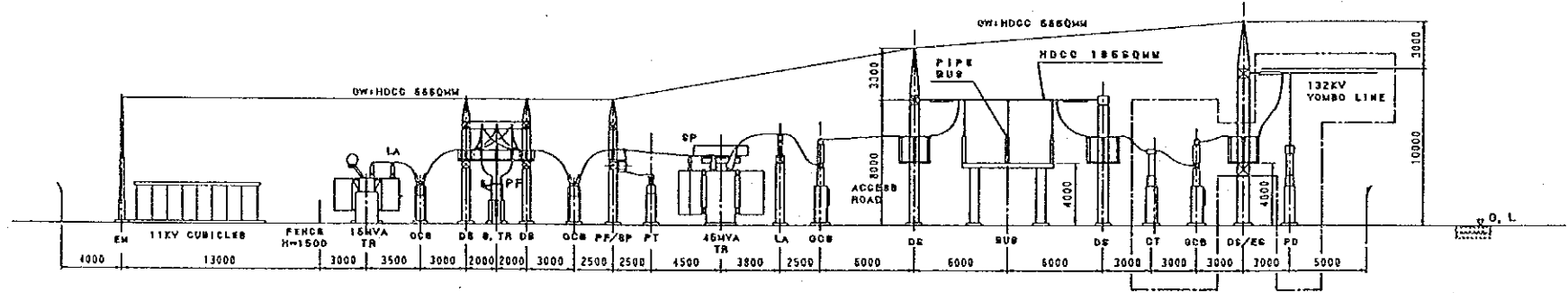
PLAN

LEGEND:

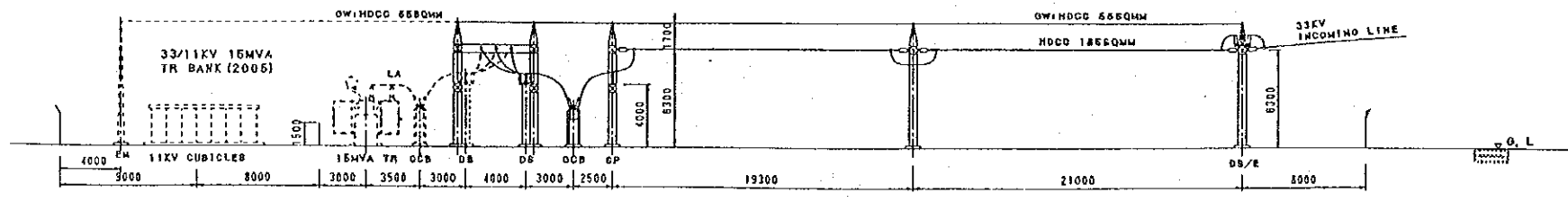
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST
- PD : POTENTIAL DEVICE
- DS : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER
- PT : POTENTIAL TRANSFORMER

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	
<b>LAYOUT OF FACTORY ZONE III SUBSTATION</b>	
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

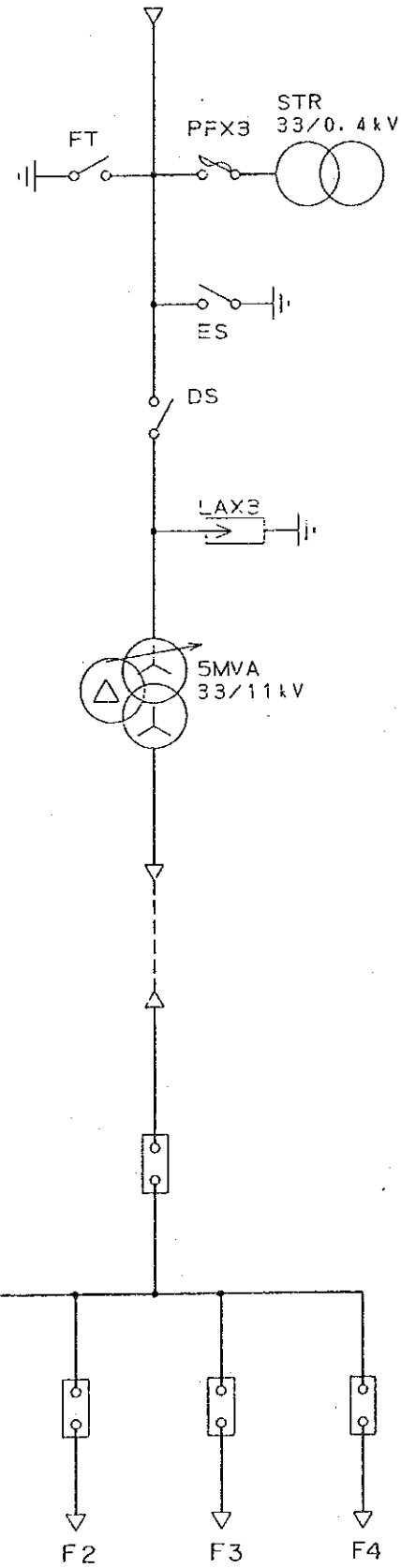


Fig. 5.4-29-1

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

LOCATION	DATE	DESCRIPTION	BY
REVISION			

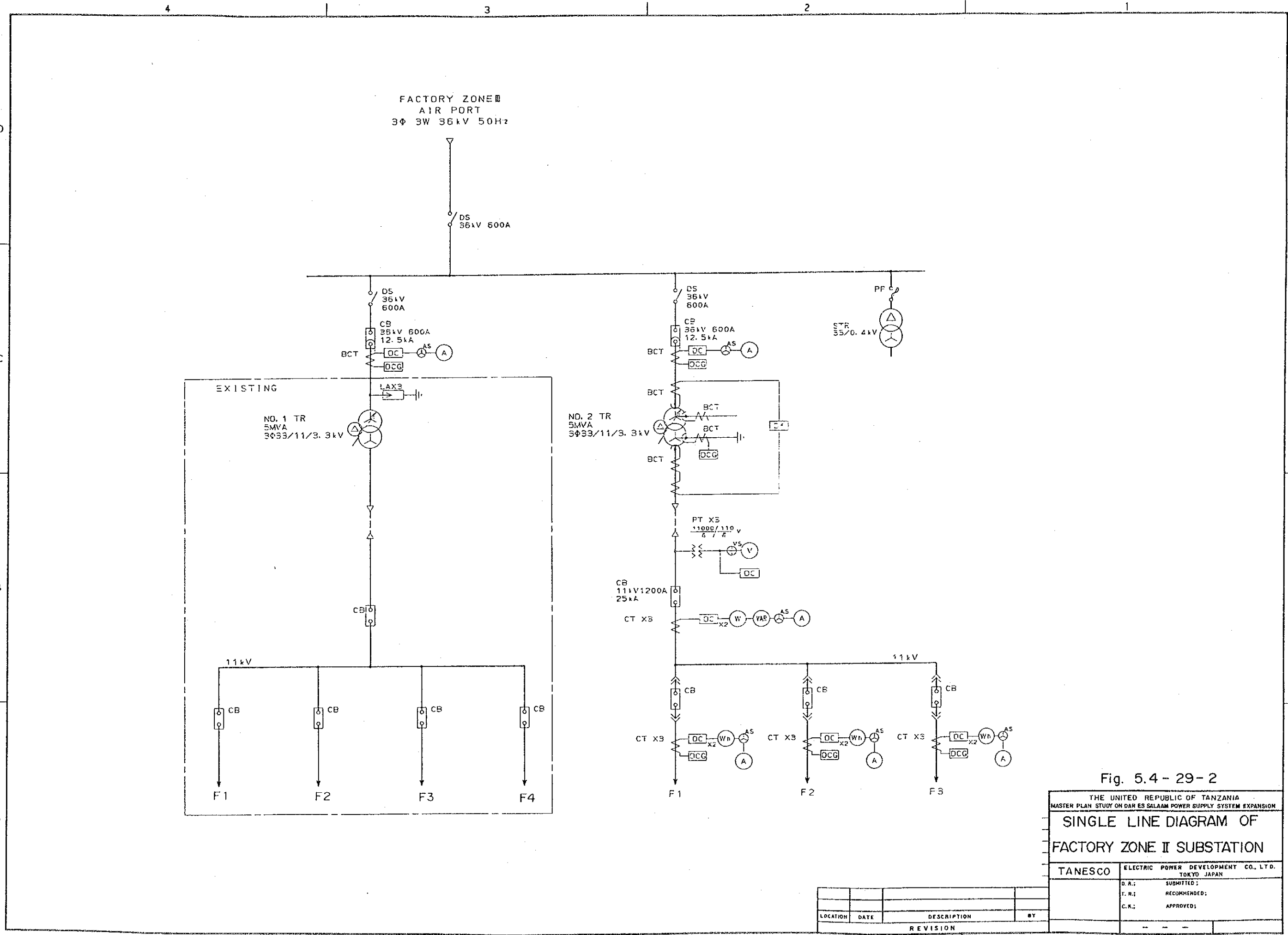
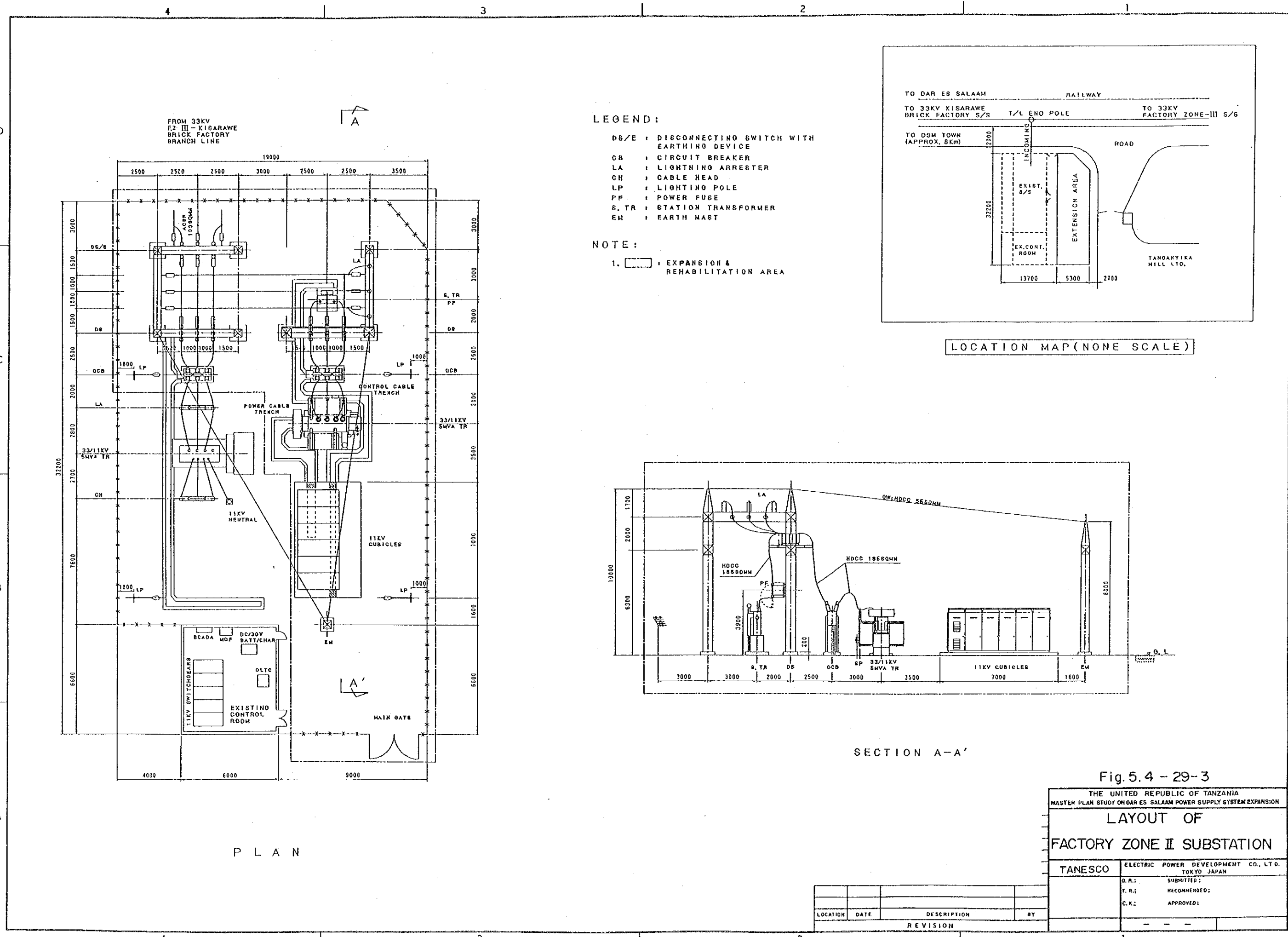


Fig. 5.4 - 29 - 2

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

LOCATION	DATE	DESCRIPTION	BY
REVISION			



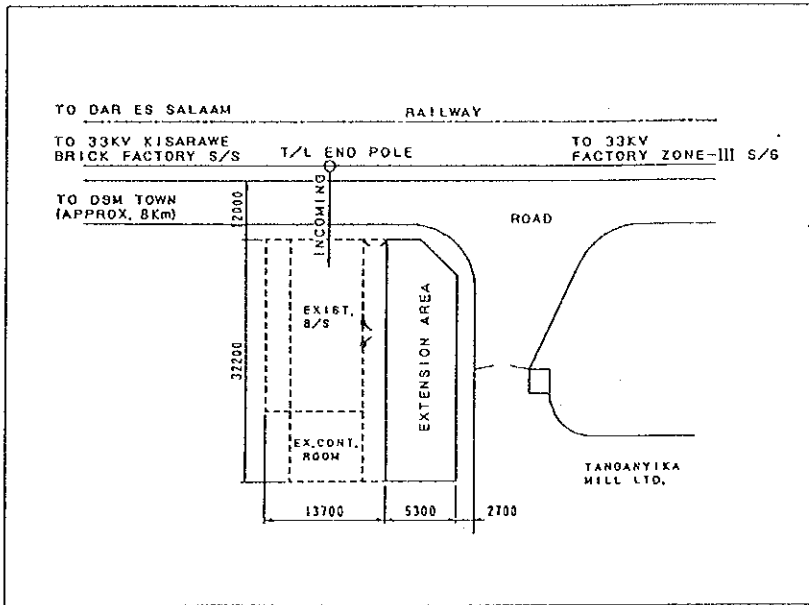
FROM 33KV  
FZ III - KISARAWA  
BRICK FACTORY  
BRANCH LINE

**LEGEND:**

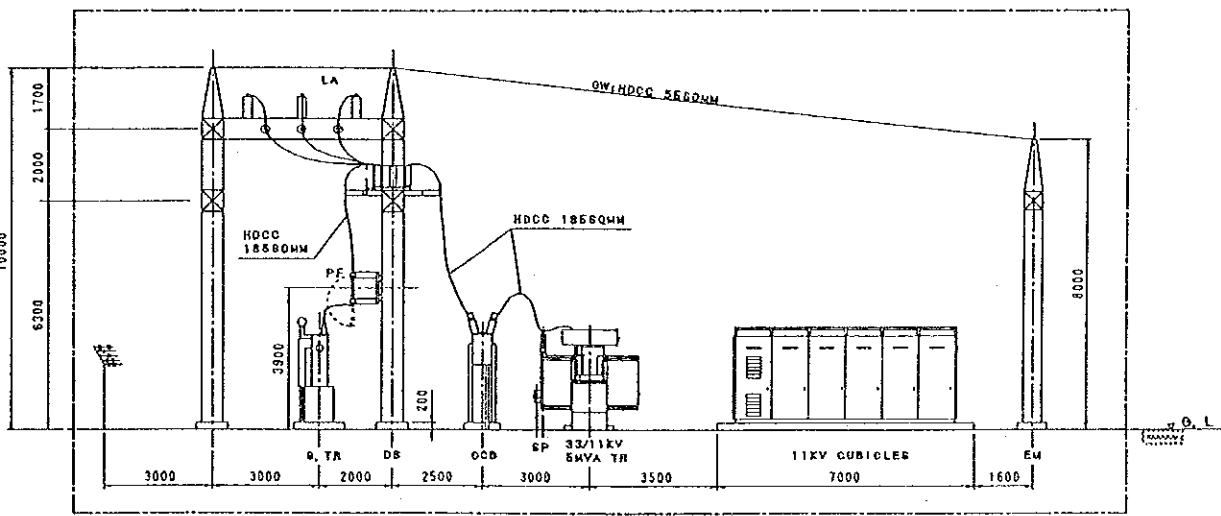
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- CH : CABLE HEAD
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST

**NOTE:**

- 1. [Symbol] : 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	
<b>LAYOUT OF FACTORY ZONE II SUBSTATION</b>	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D.R.:	SUBMITTED:
F.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

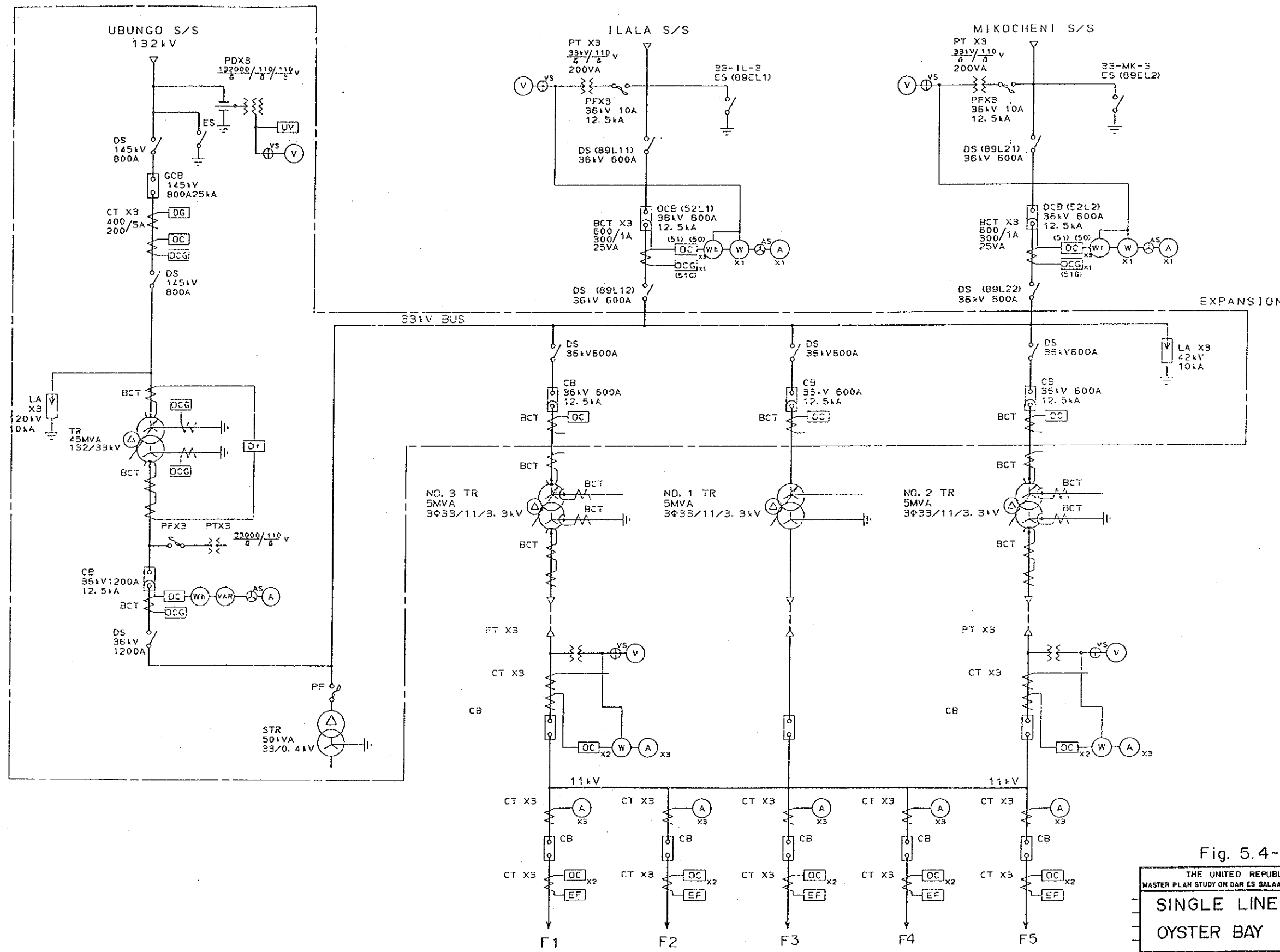
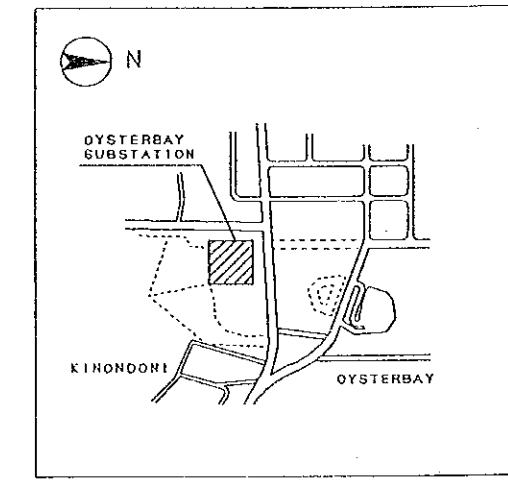
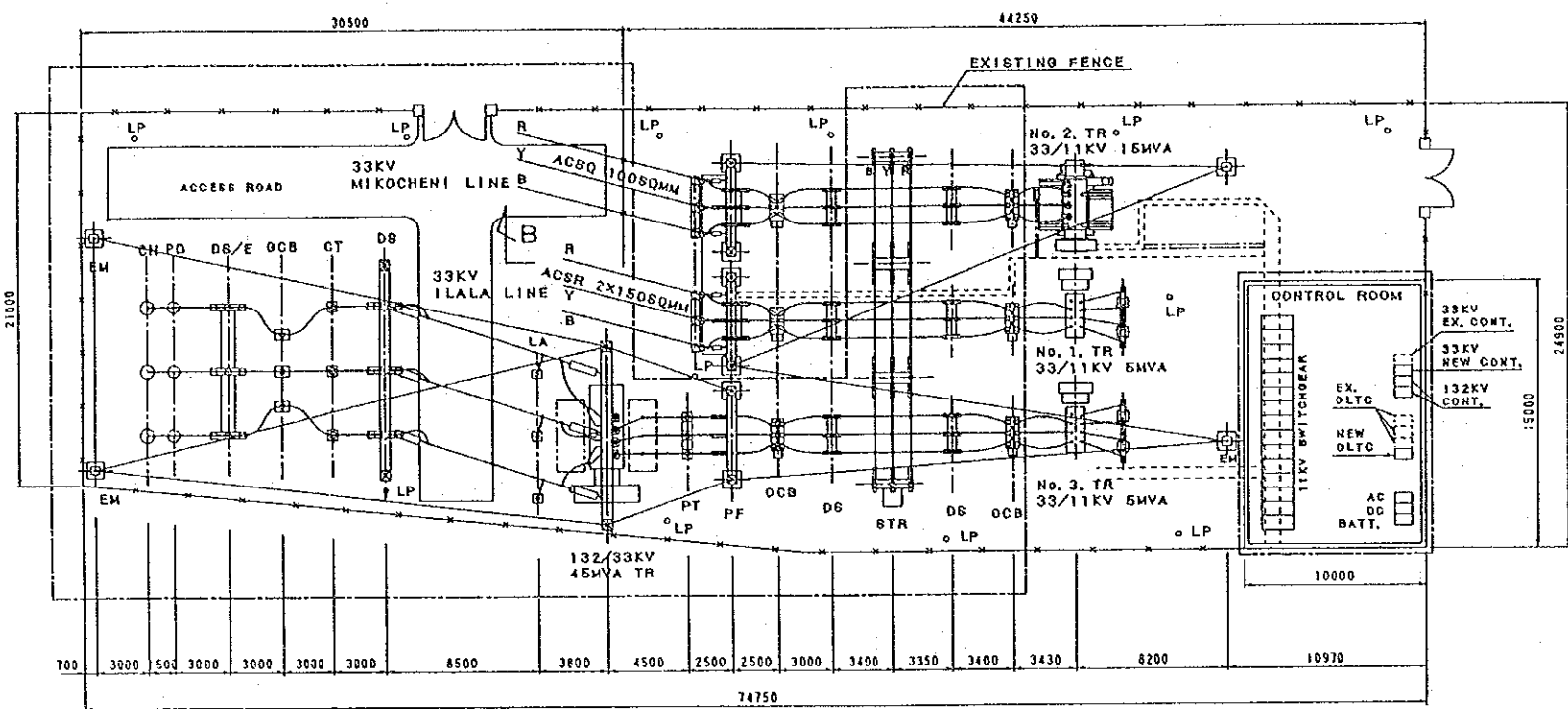
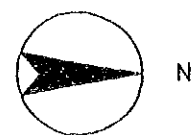


Fig. 5.4-30-1

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.A.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



LOCATION MAP (NONE SCALE)

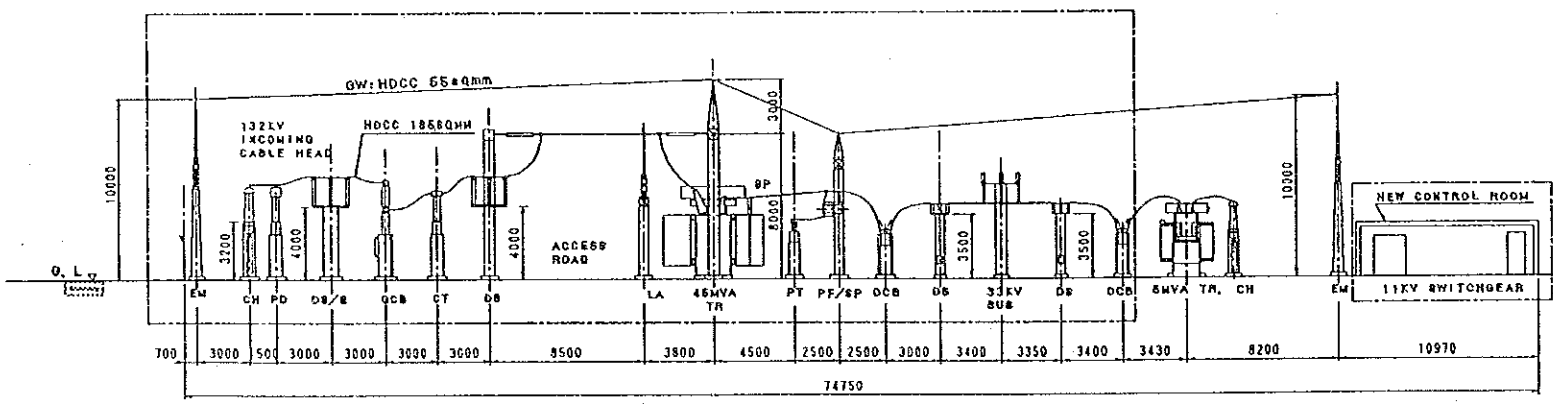
PLAN

LEGEND:

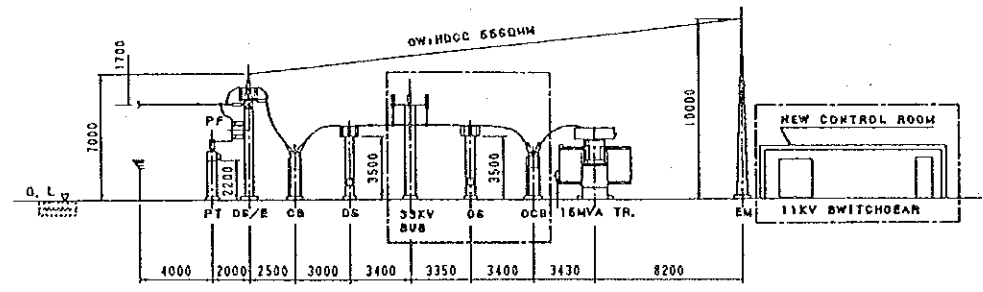
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DS : DISCONNECTING SWTCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- PT : POTENTIAL TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- CT : CURRENT TRANSFORMER
- PD : POTENTIAL DEVICE
- EM : EARTH MAST
- CH : CABLE HEAD

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;
R.R.:	RECOMMENDED;
C.A.:	APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			

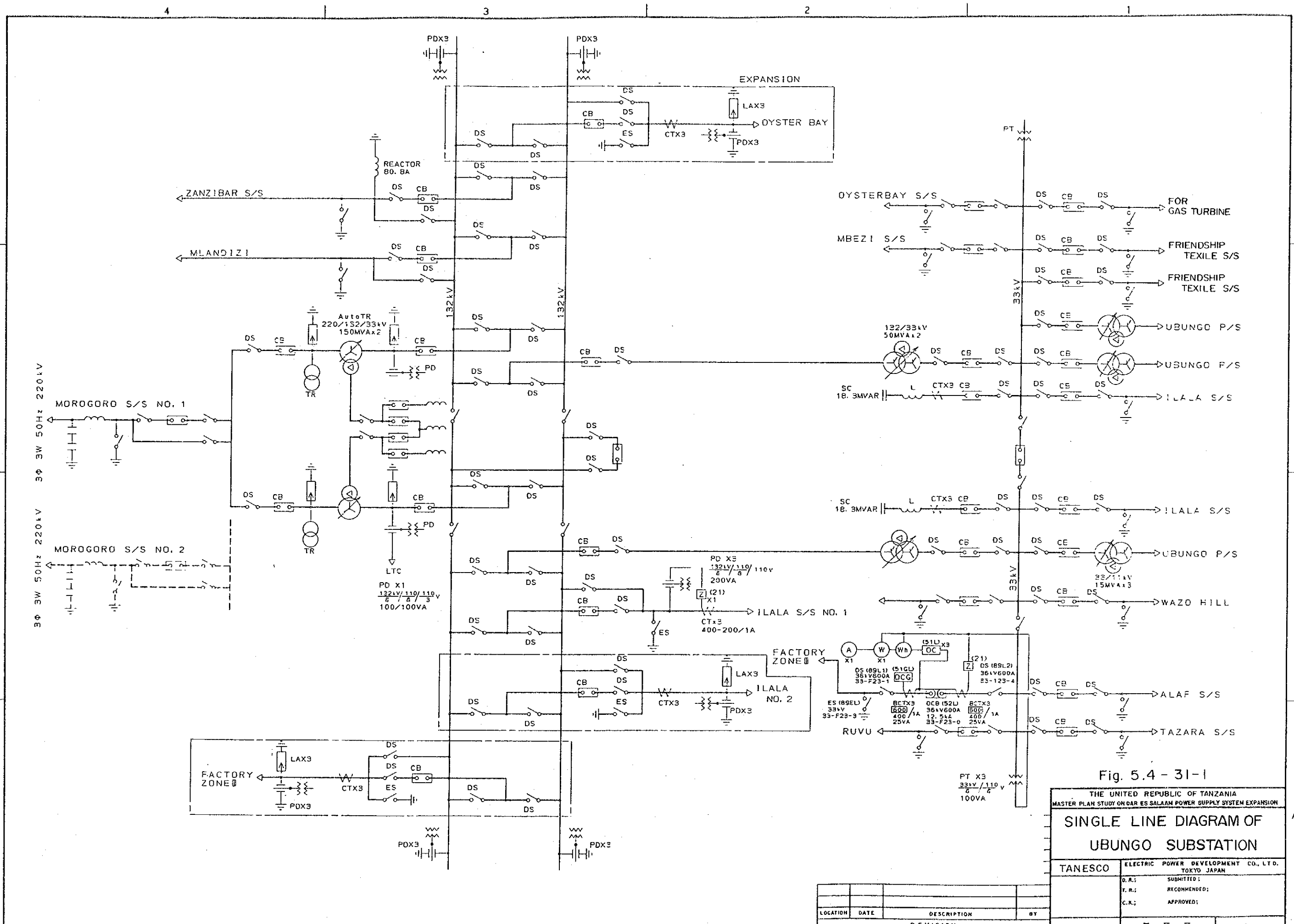


Fig. 5.4 - 31-1

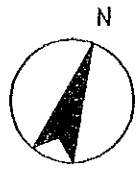
THE UNITED REPUBLIC OF TANZANIA  
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

**SINGLE LINE DIAGRAM OF  
 UBUNGO SUBSTATION**

TANESCO      ELECTRIC POWER DEVELOPMENT CO., LTD.  
 TOKYO JAPAN

D.R.: SUBMITTED:  
 E.R.: RECOMMENDED:  
 C.R.: APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

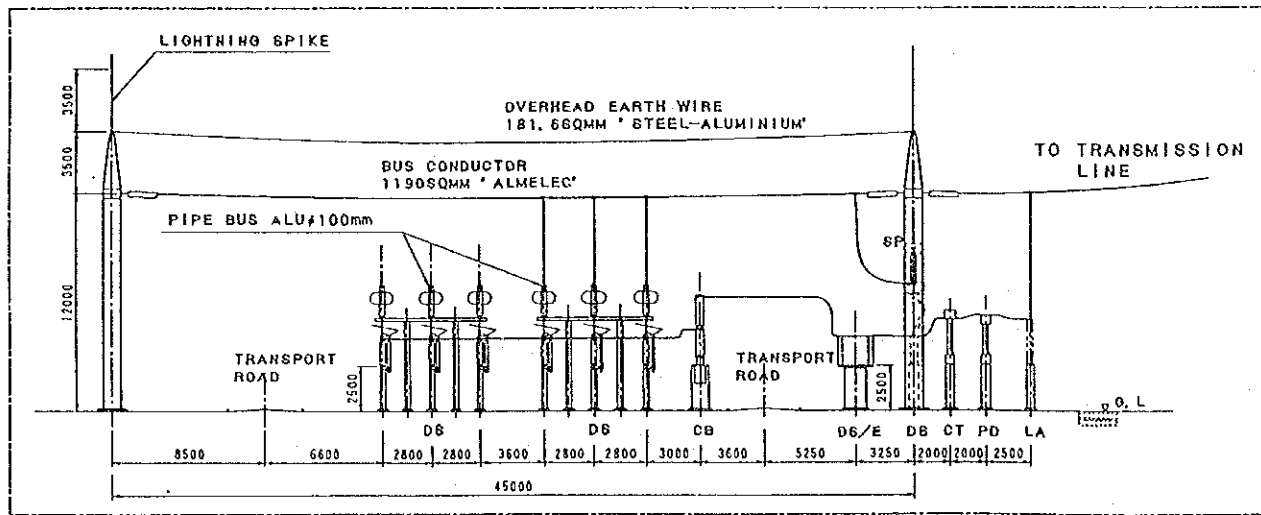


**LEGEND:**

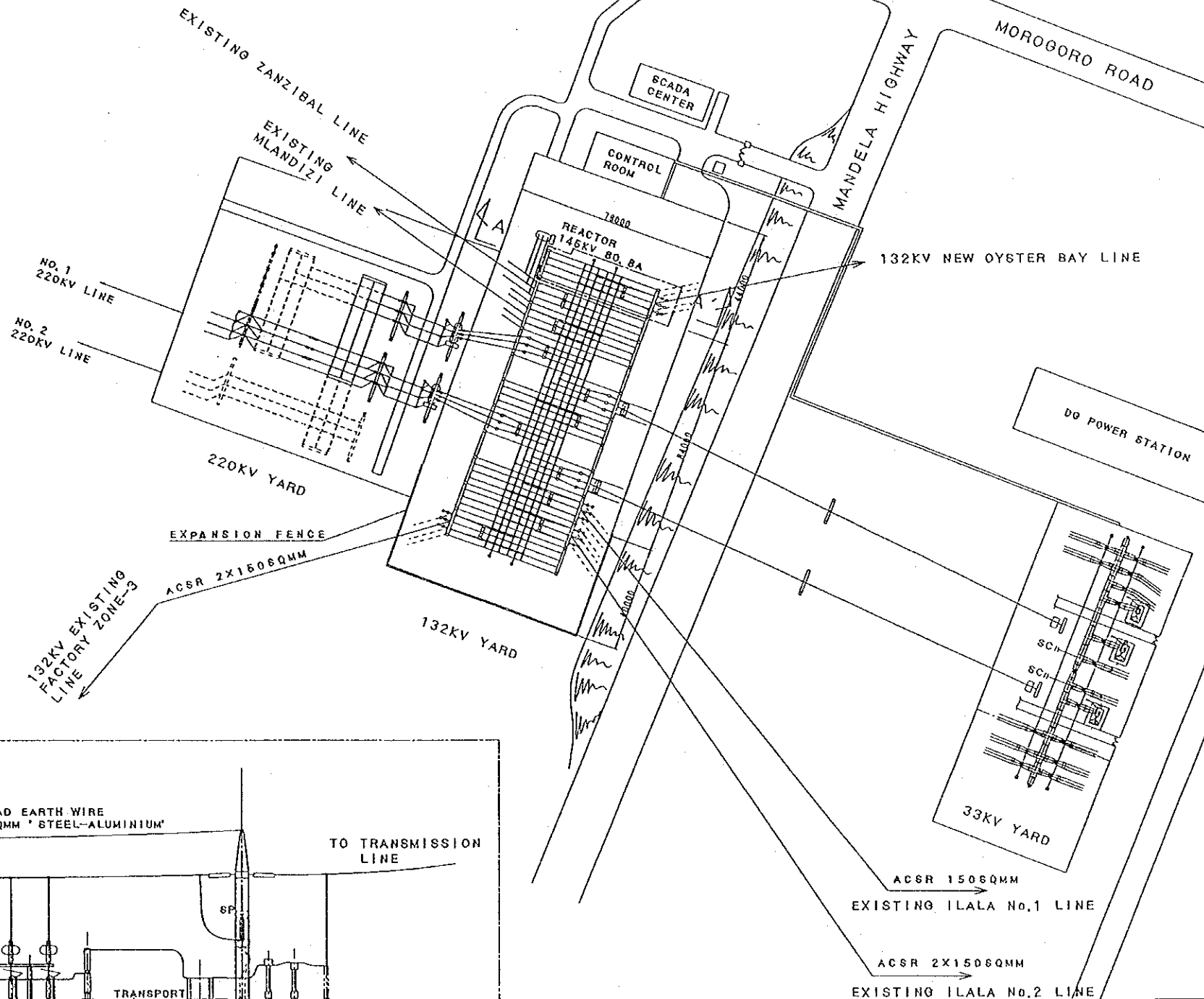
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- PD : POTENTIAL DEVICE
- DS : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER

**NOTE:**

1.  132KV FEEDER EXPANSION AREA



SECTION A-A' (S=1/200)



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			
<b>LAYOUT OF UBUNGO SUBSTATION</b>			
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN		
D.R.:	SUBMITTED:		
T.R.:	RECOMMENDED:		
C.K.:	APPROVED:		

LOCATION	DATE	DESCRIPTION	BY
REVISION			



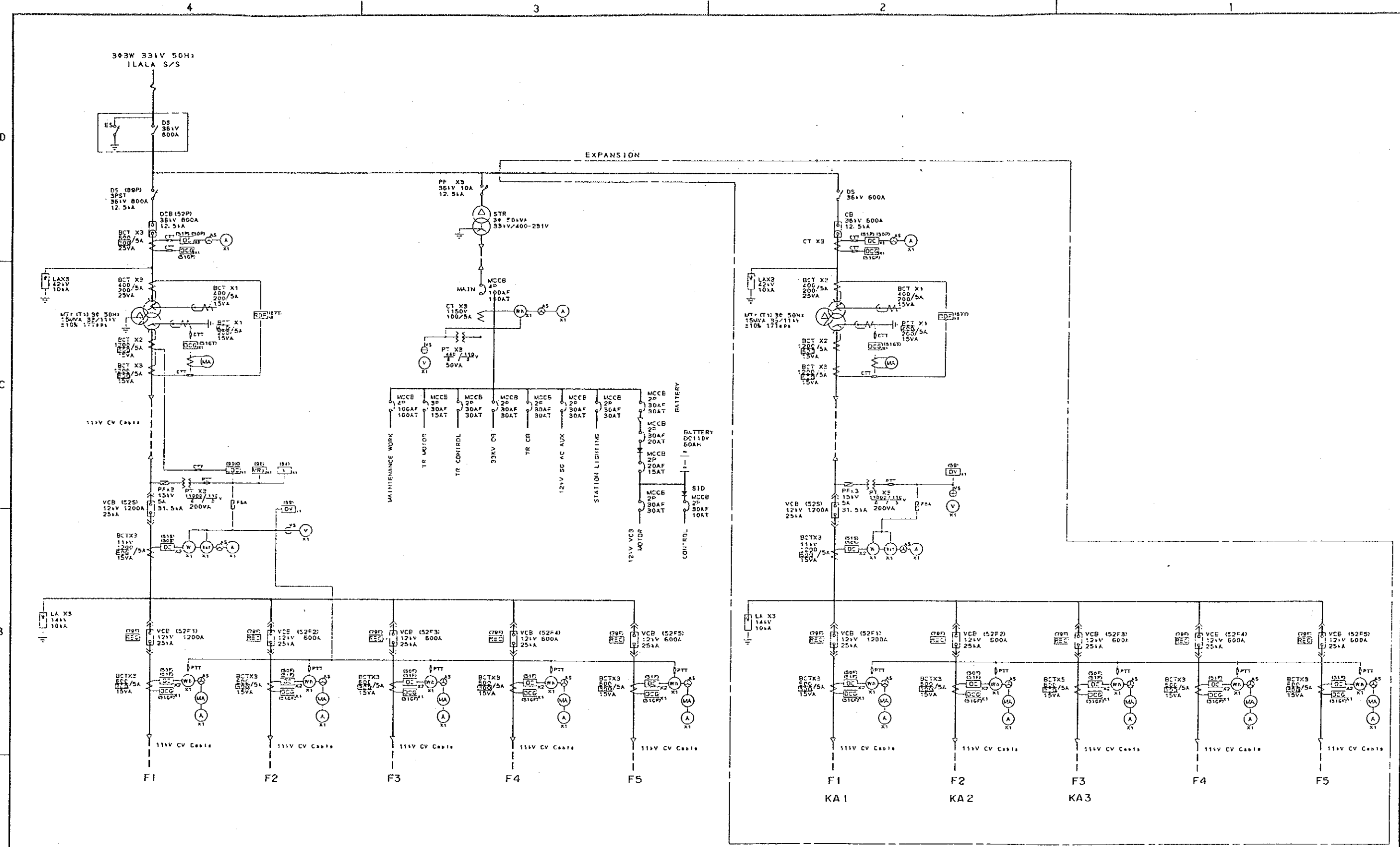
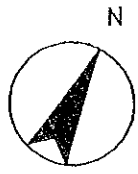


Fig.5.4-32-1

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

LOCATION	DATE	DESCRIPTION	BY

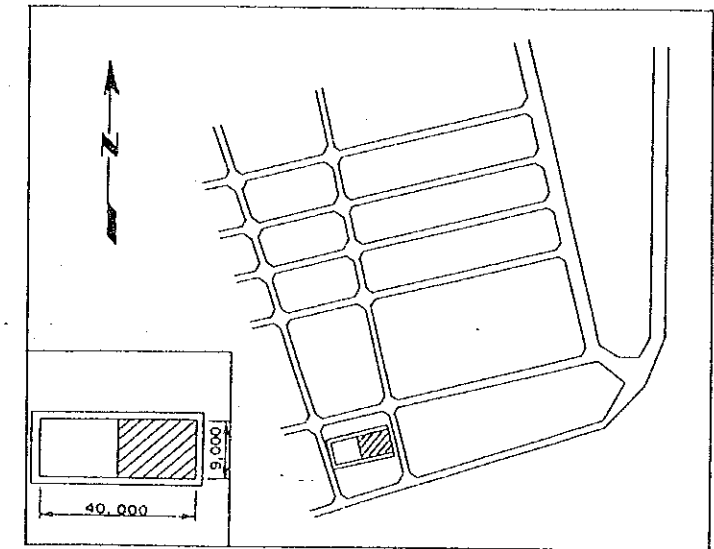


LEGEND :

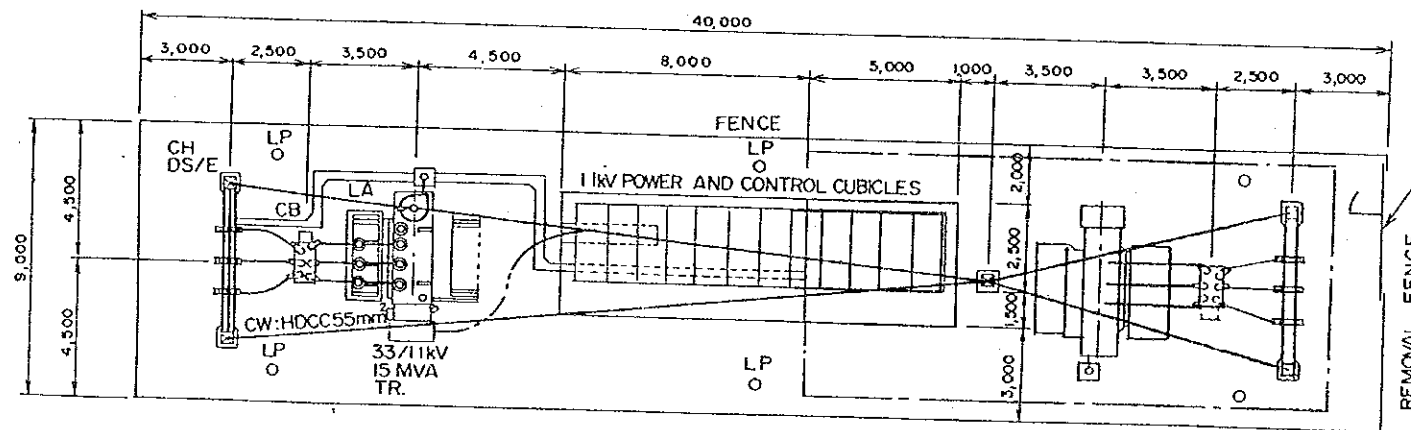
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S.TR : STATION TRANSFORMER
- EM : EARTH MAST

NOTE :

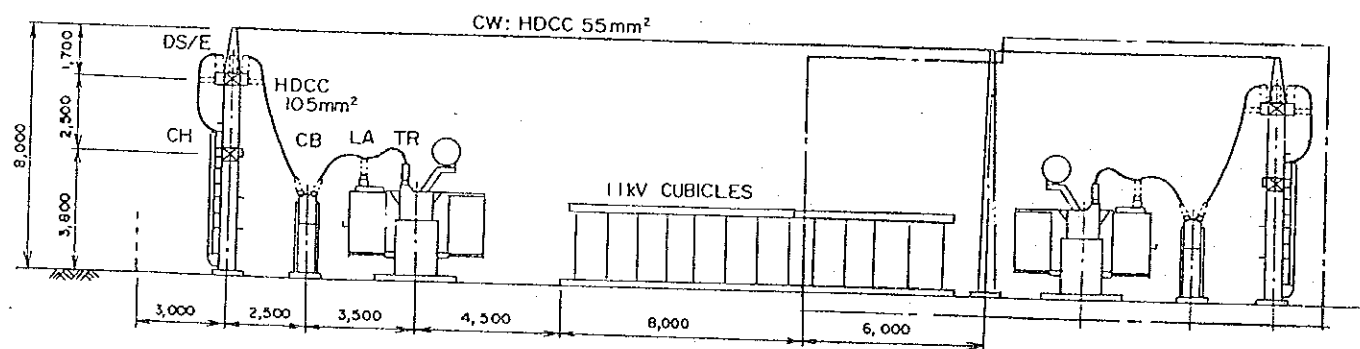
--- EXPANSION



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:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

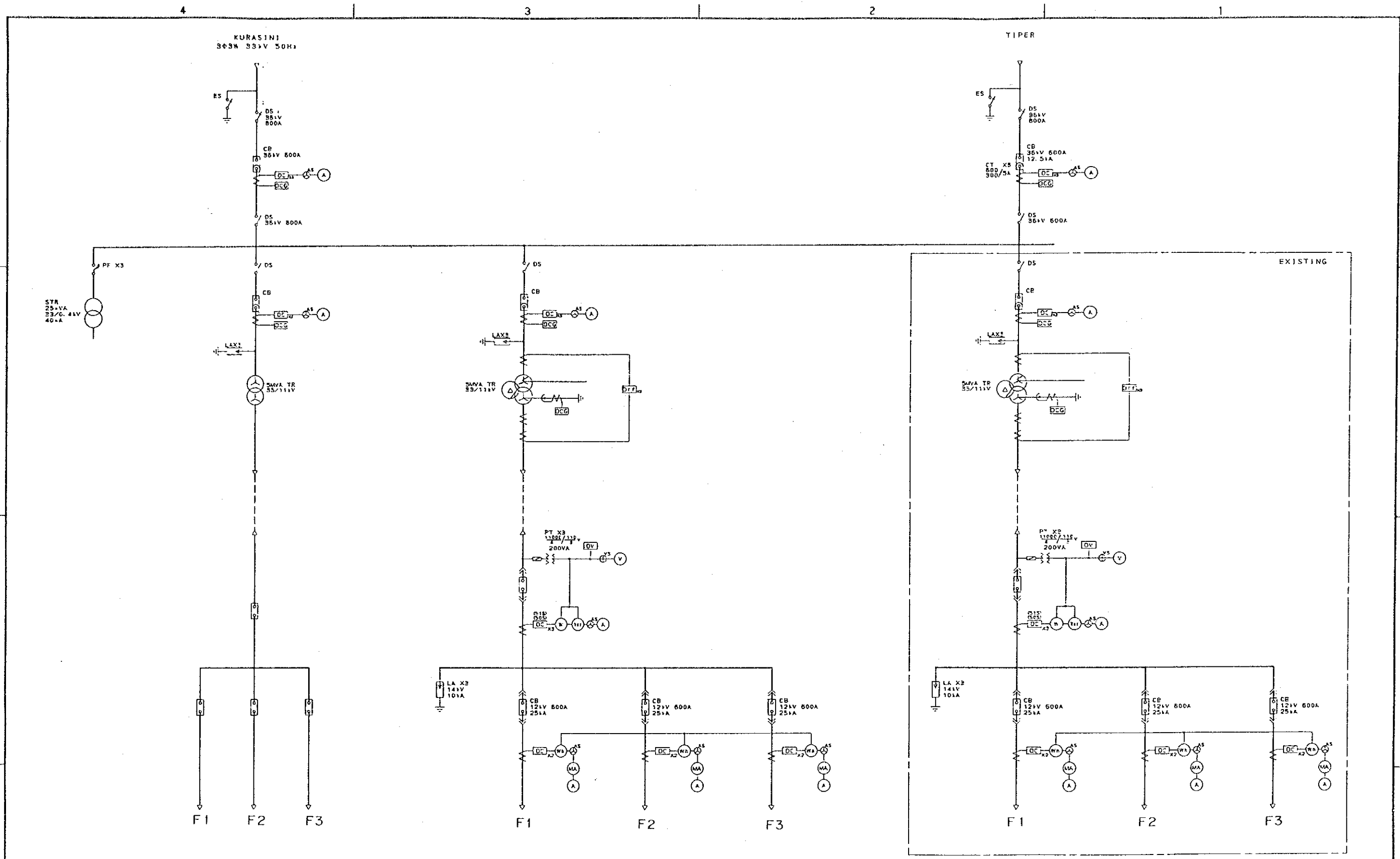


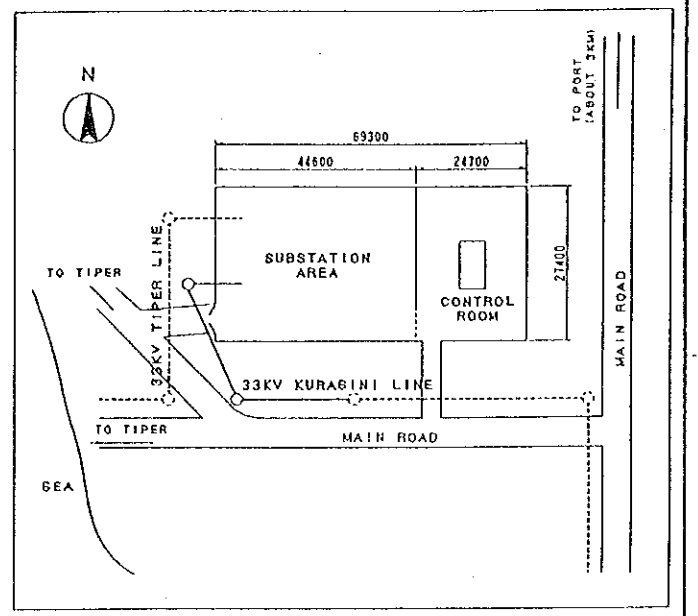
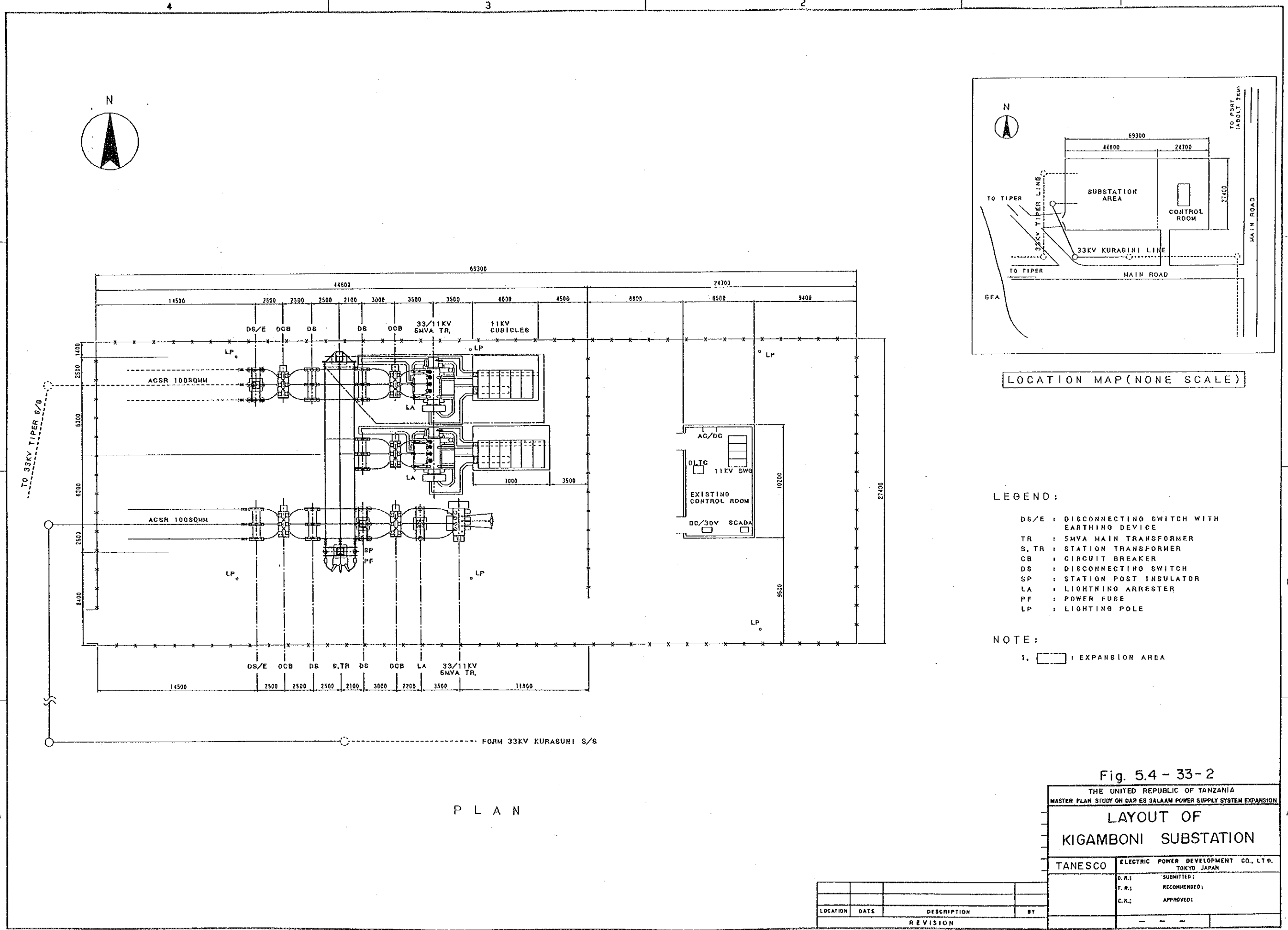
Fig. 5.4 - 33 - 1

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 KIGAMBONI SUBSTATION

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



LOCATION MAP (NONE SCALE)

- LEGEND :**
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
  - TR : 6MVA 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	
<b>LAYOUT OF KIGAMBONI SUBSTATION</b>	
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN
D. R.:	SUBMITTED;
T. R.:	RECOMMENDED;
C. R.:	APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			

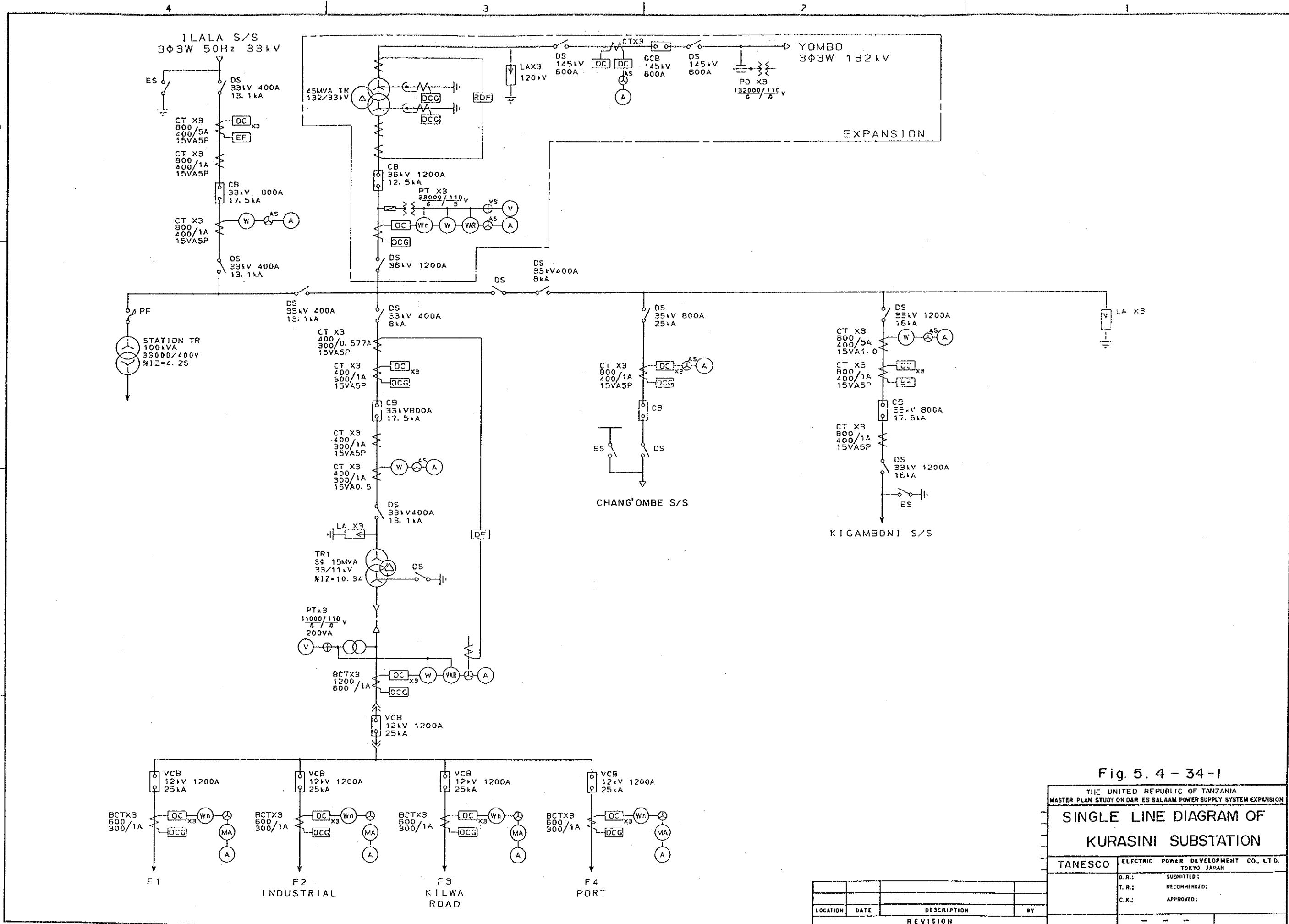


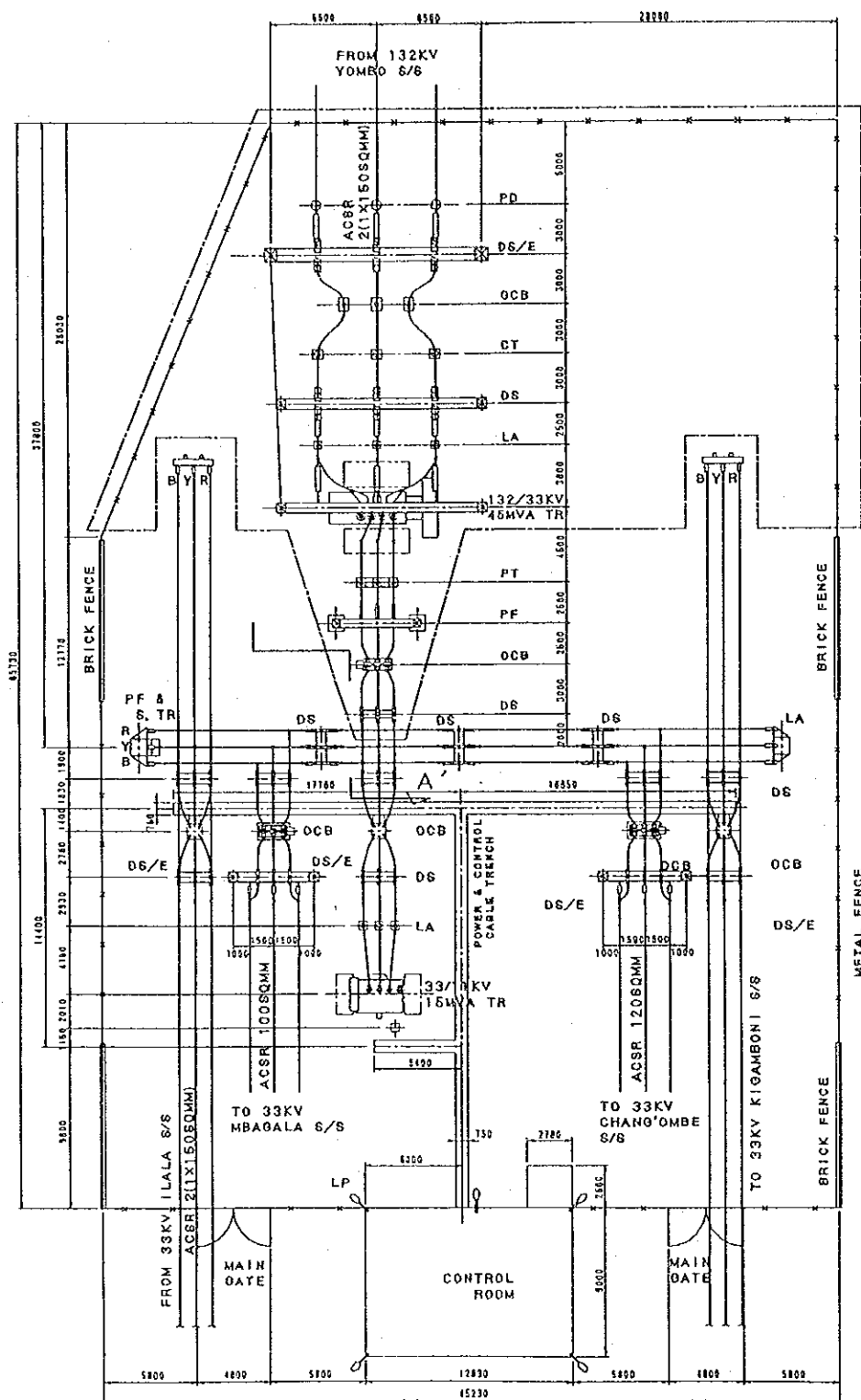
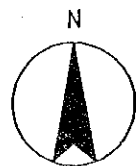
Fig. 5.4 - 34-1

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:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



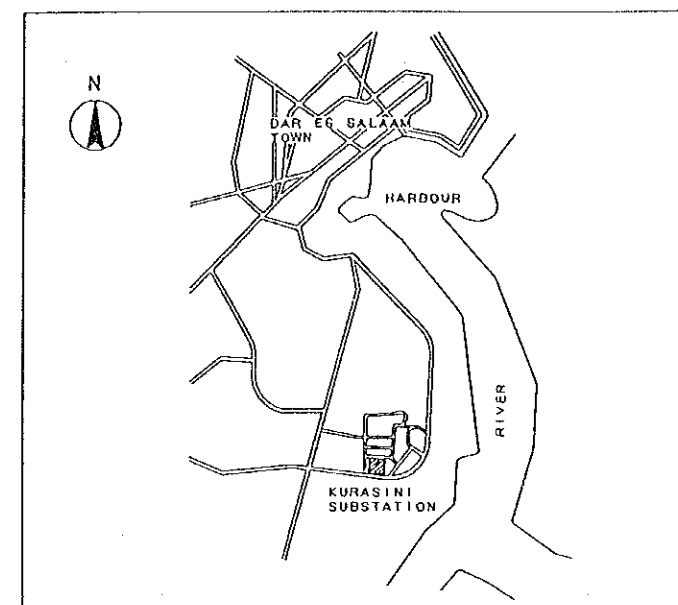
P L A N

LEGEND :

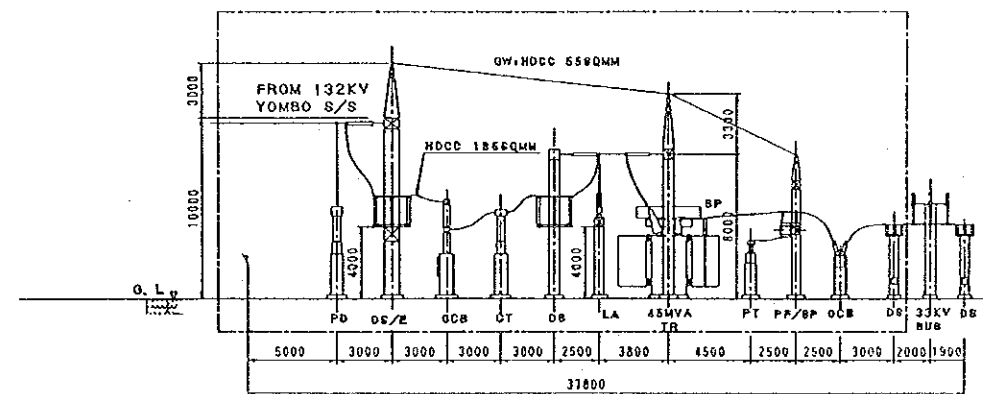
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DS : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S, TR : STATION TRANSFORMER

NOTE :

- 1. [ ] : EXPANSION AREA



LOCATION MAP (NONE SCALE)



SECTION A-A'

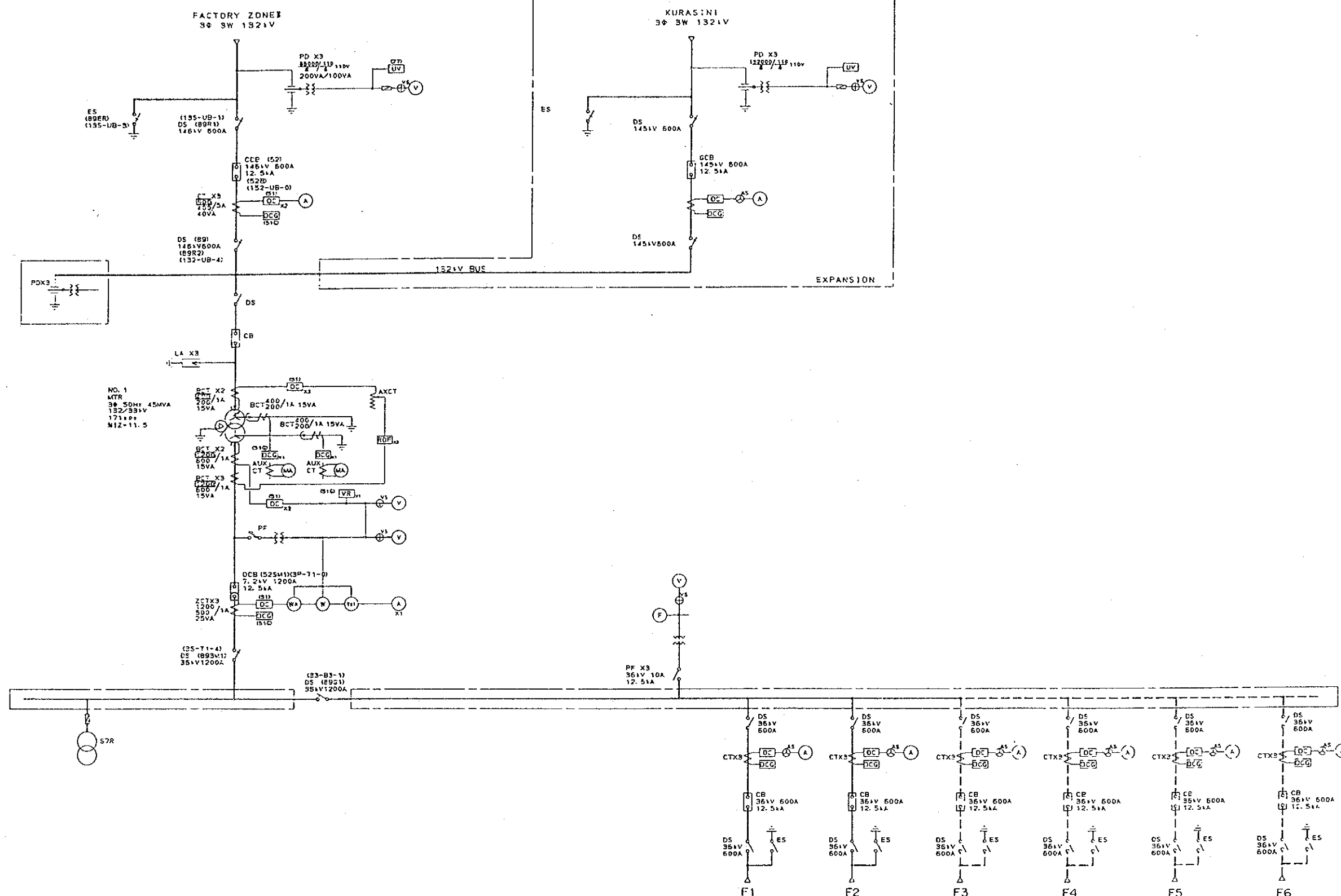
Fig. 5.4 - 34-2

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:
T. R.:	RECOMMENDED:
C. R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

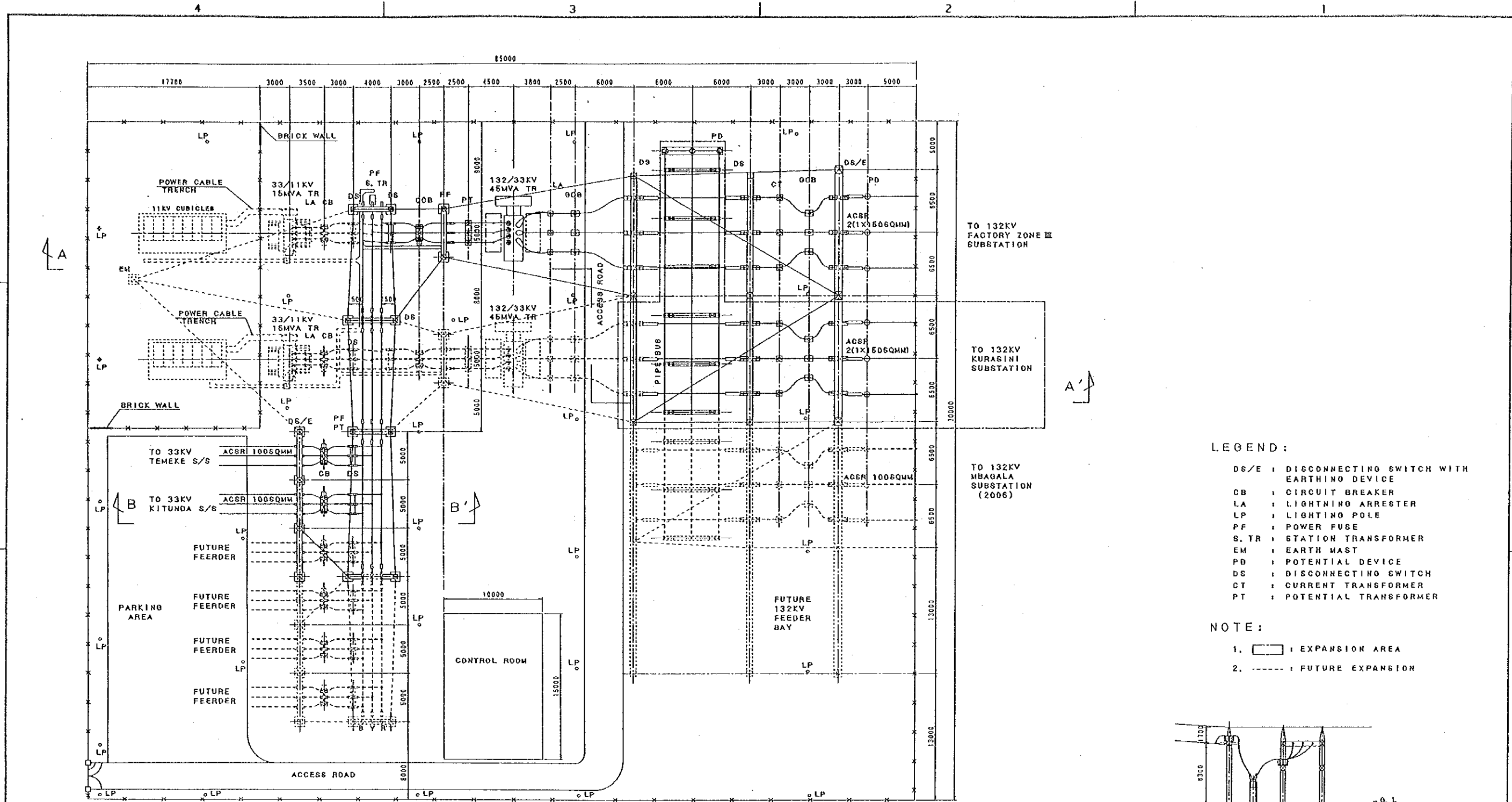


THE UNITED REPUBLIC OF TANZANIA  
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION  
**SINGLE LINE DIAGRAM OF  
 YOMBO SUBSTATION**

Fig. 5.4-35-1

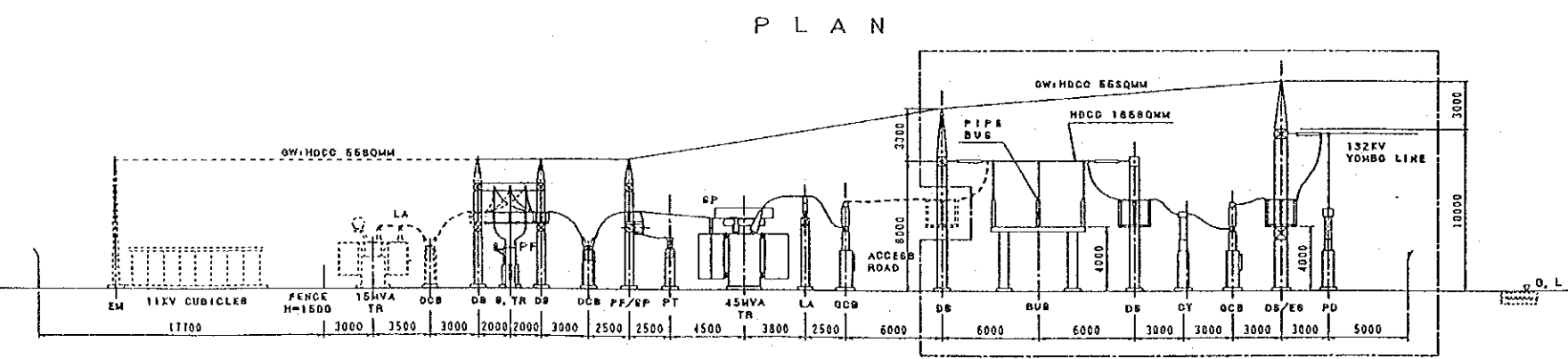
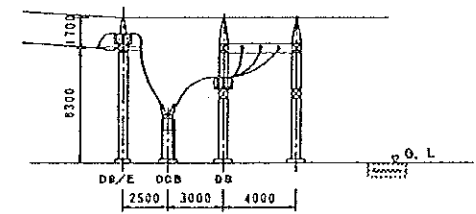
LOCATION	DATE	DESCRIPTION	BY
REVISION			

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



- 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



**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:
T. R.:	RECOMMENDED:
C. R.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



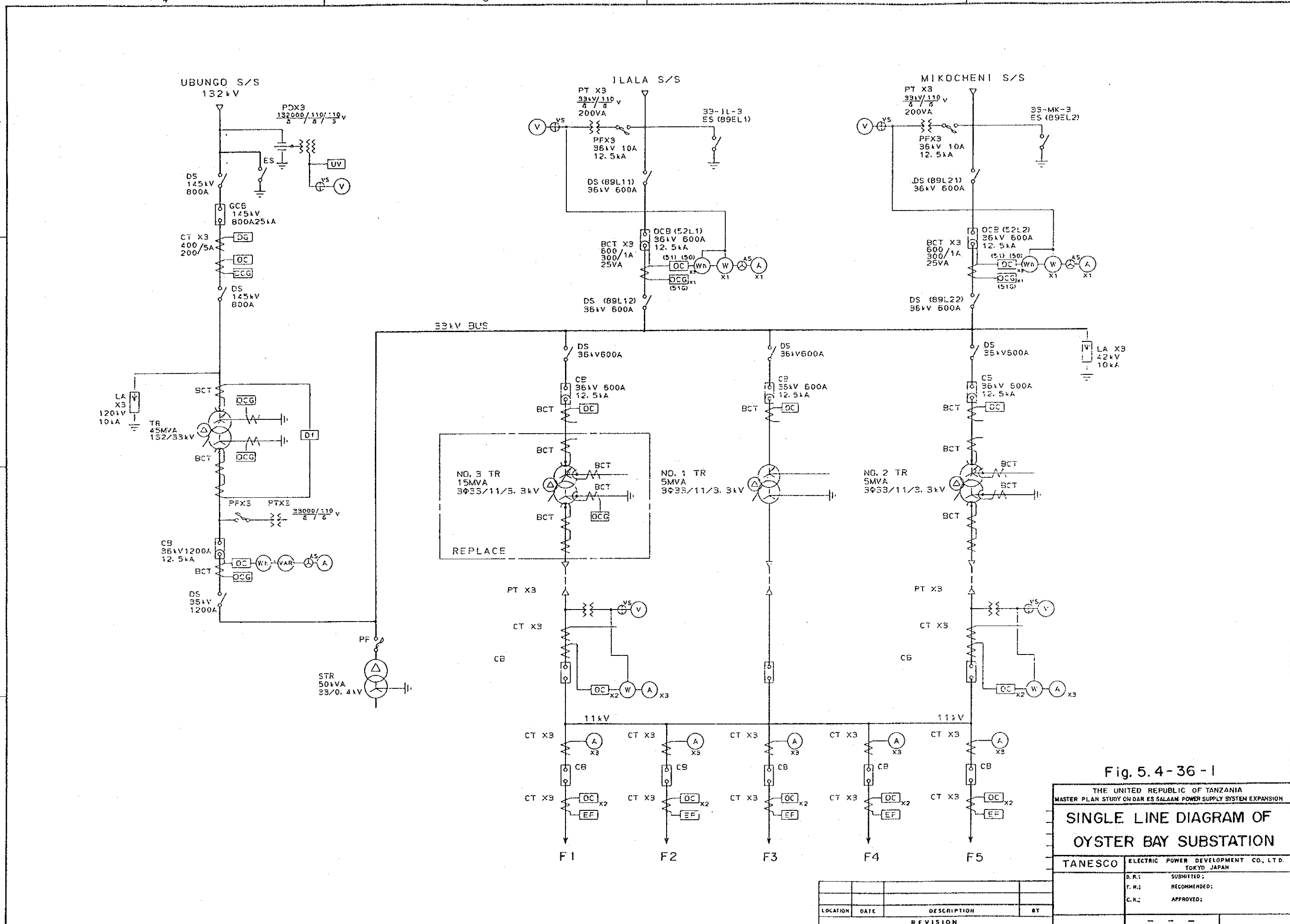


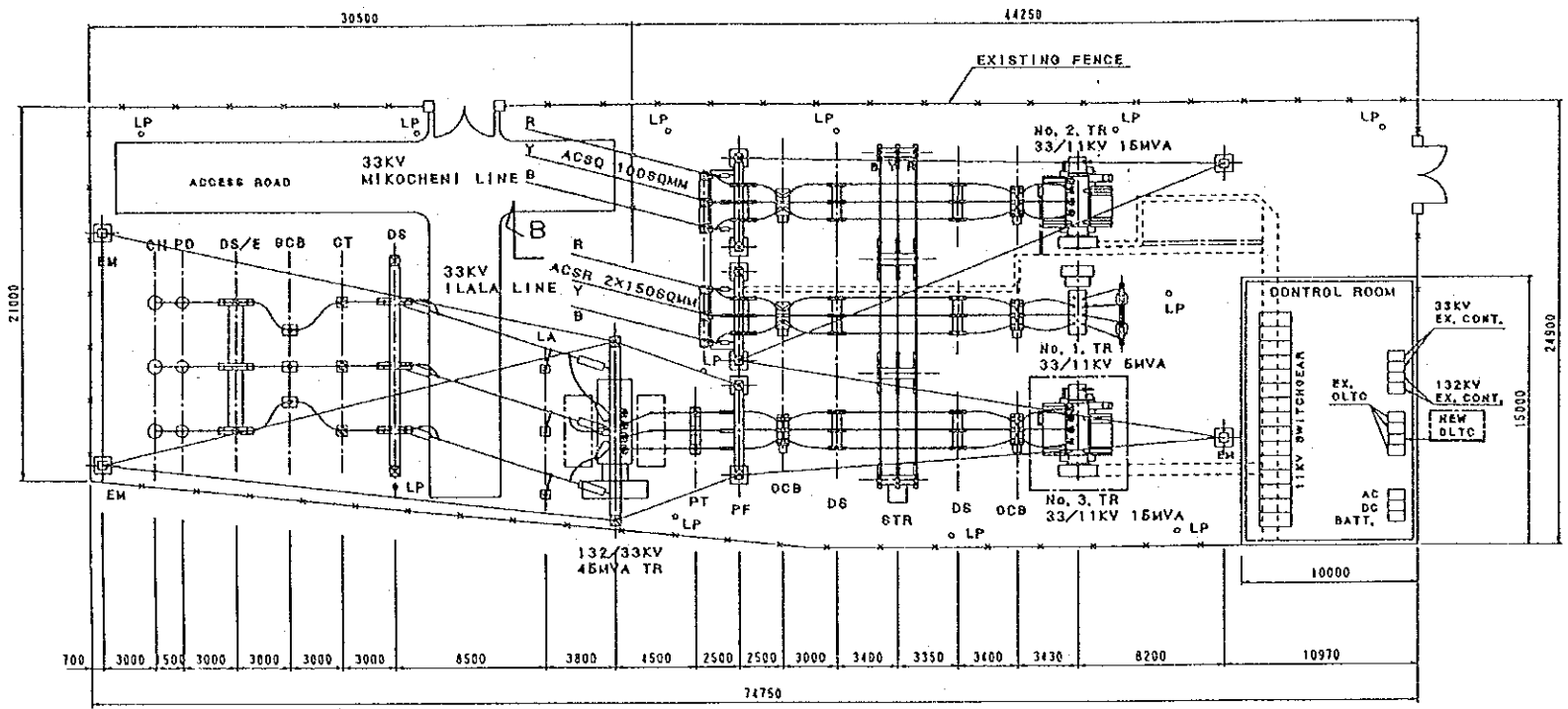
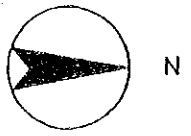
Fig. 5.4-36-1

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

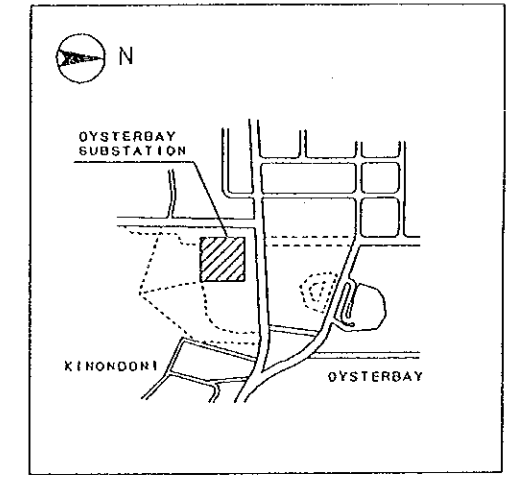
**SINGLE LINE DIAGRAM OF OYSTER BAY SUBSTATION**

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

LOCATION	DATE	DESCRIPTION	BY
REVISION			



PLAN



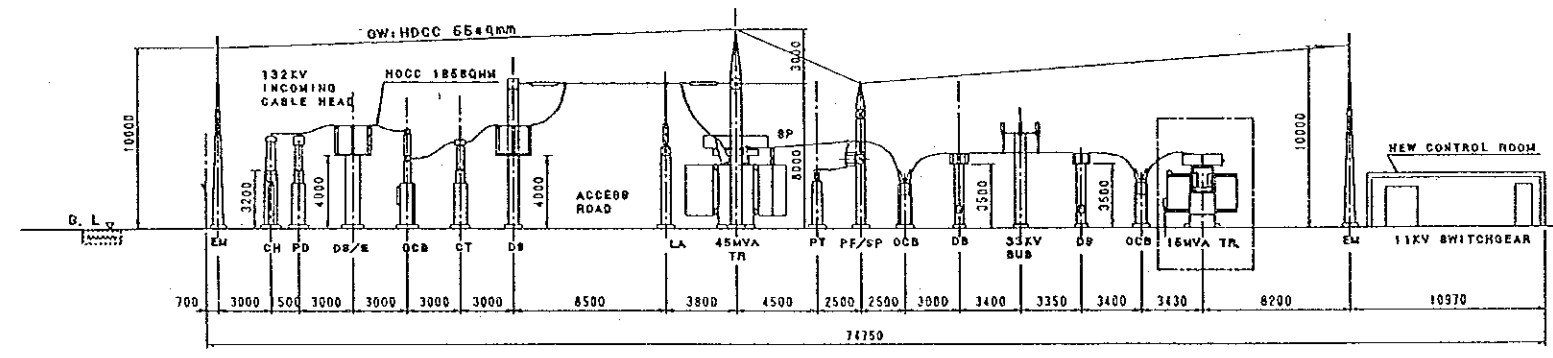
LOCATION MAP (NONE SCALE)

LEGEND:

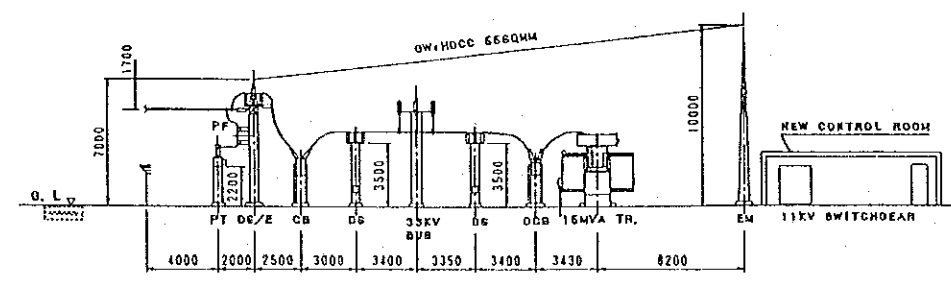
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DS : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- PT : POTENTIAL TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- CT : CURRENT TRANSFORMER
- PD : POTENTIAL DEVICE
- EM : EARTH MAST
- CH : CABLE HEAD

NOTE:

- 1. [ ] : EXPANSION AREA



SECTION A-A'



SECTION B-B'

Fig. 5.4 - 36-2

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

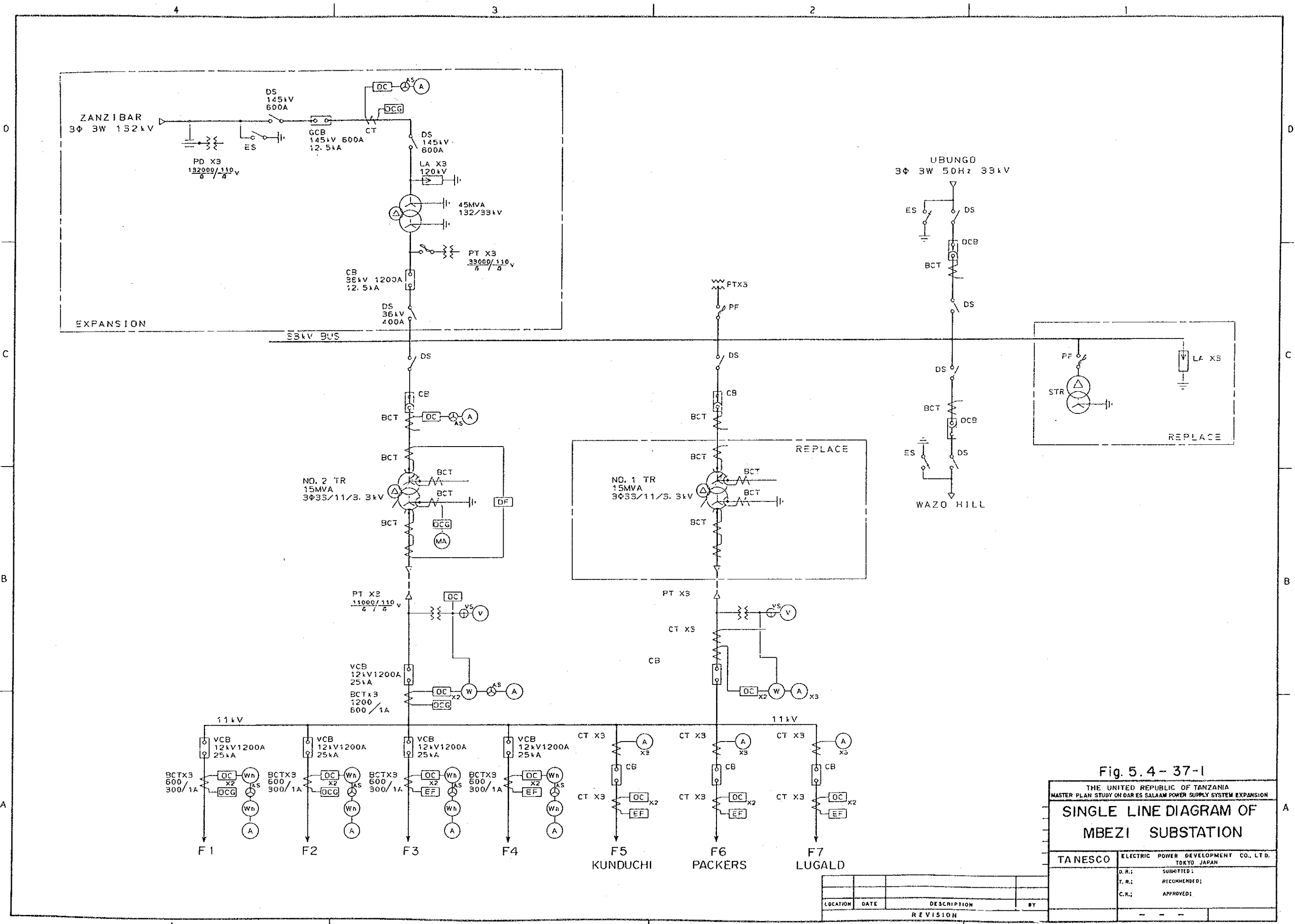
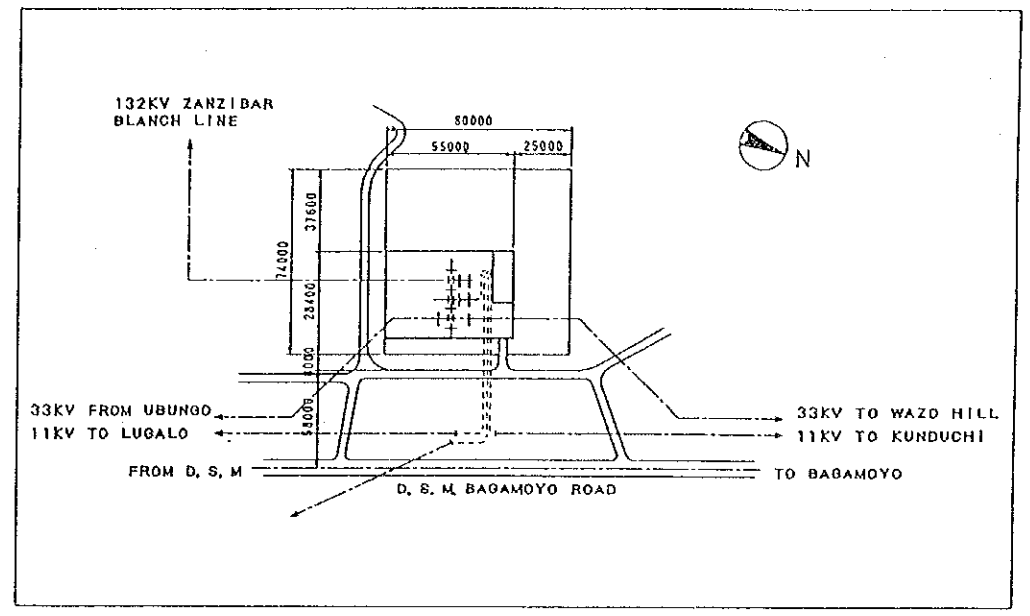
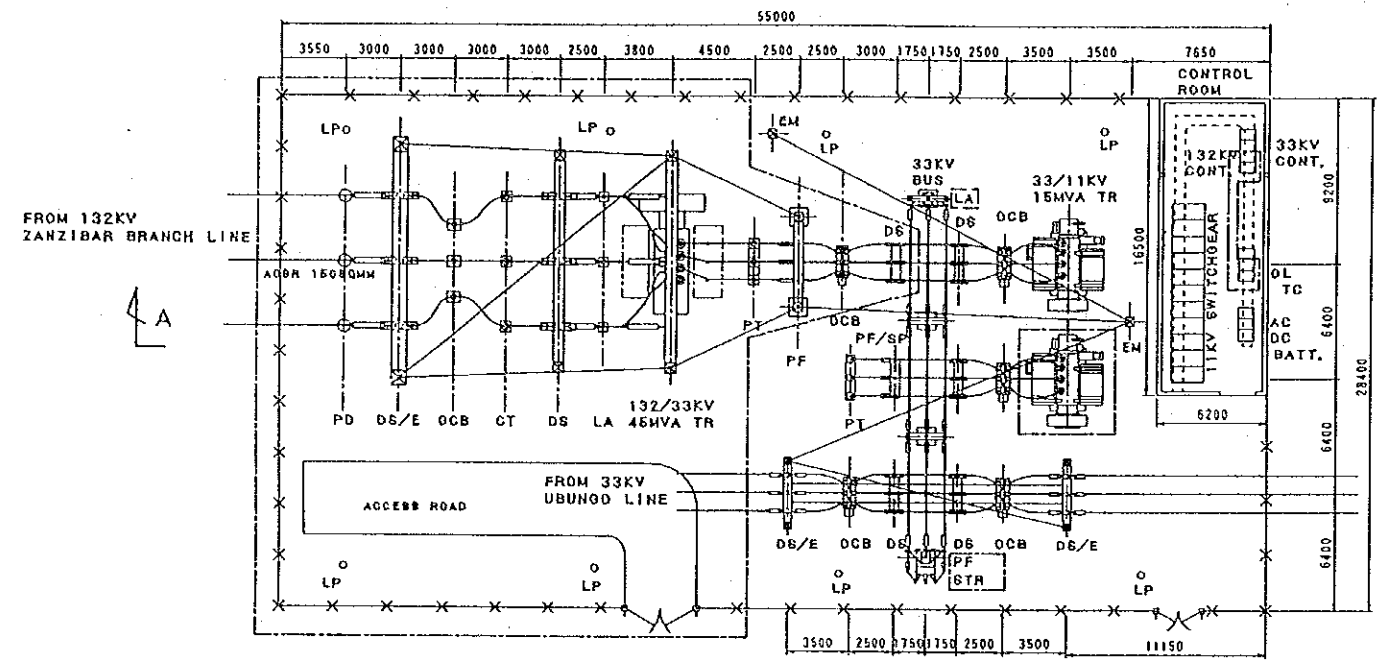



Fig. 5.4-37-1

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;
T.R.;	RECOMMENDED;
C.R.;	APPROVED;

LOCATION	DATE	DESCRIPTION	BY
		REVISION	



- 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 MAGT
  - DS : DISCONNECTING SWITCH
  - PD : POTENTIAL DEVICE
  - CT : CURRENT TRANSFORMER
  - PT : POTENTIAL TRANSFORMER

NOTE:

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

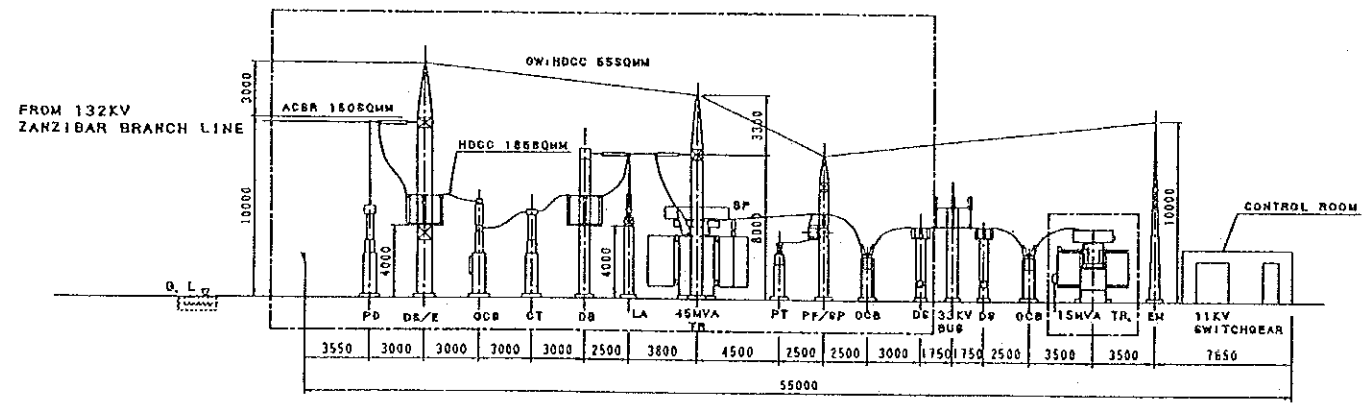


Fig. 5.4 - 37-2

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:
G.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

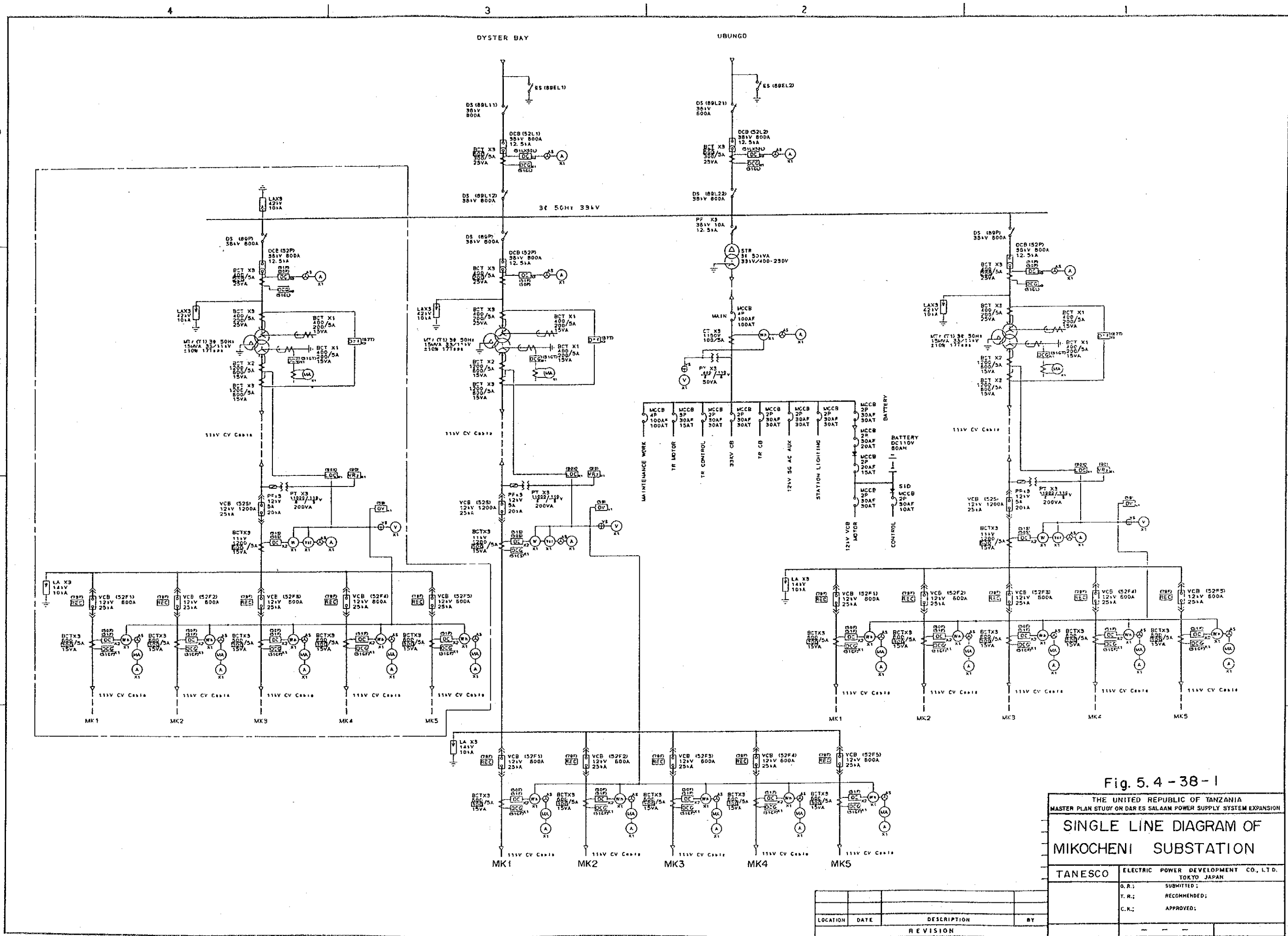
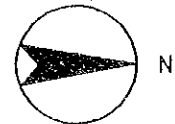


Fig. 5.4 - 38 - 1

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

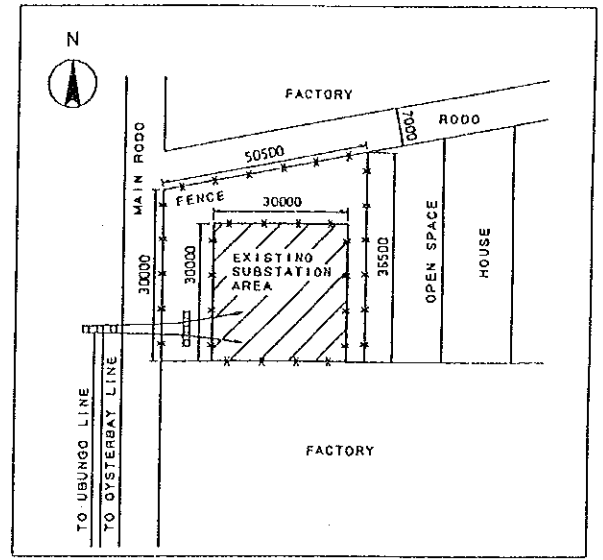


**LEGEND:**

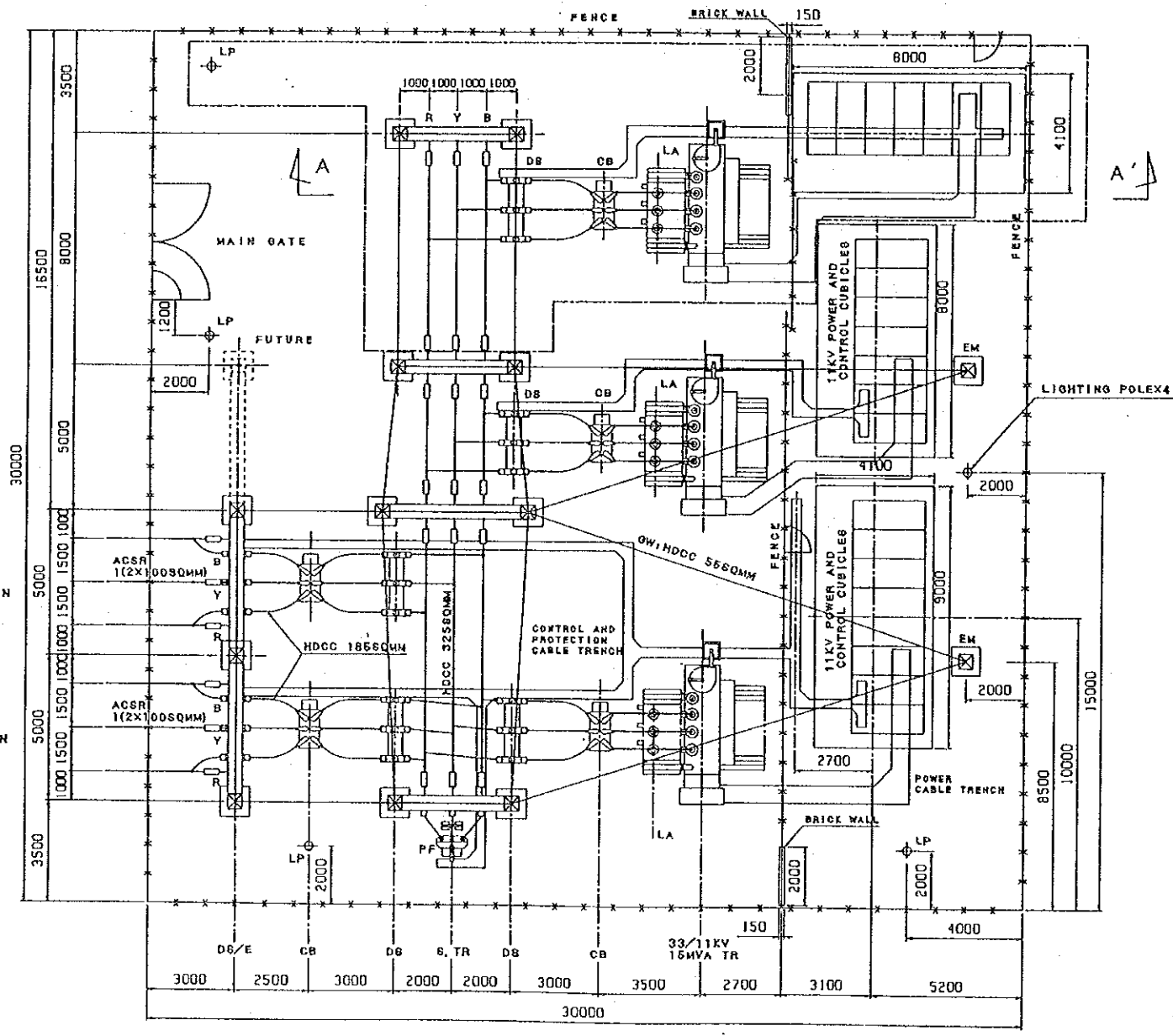
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DB : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST

**NOTE:**

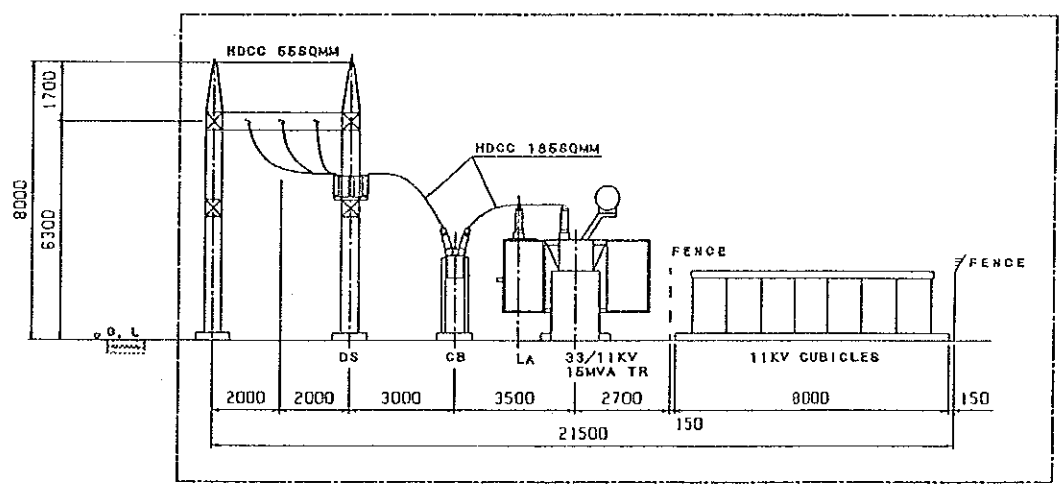
1. [Symbol] : EXPANSION TRANSFORMER FEEDER
2. [Symbol] : FUTURE EXPANSION



LOCATION MAP (NONE SCALE)



P L A N



A-A' SECTION

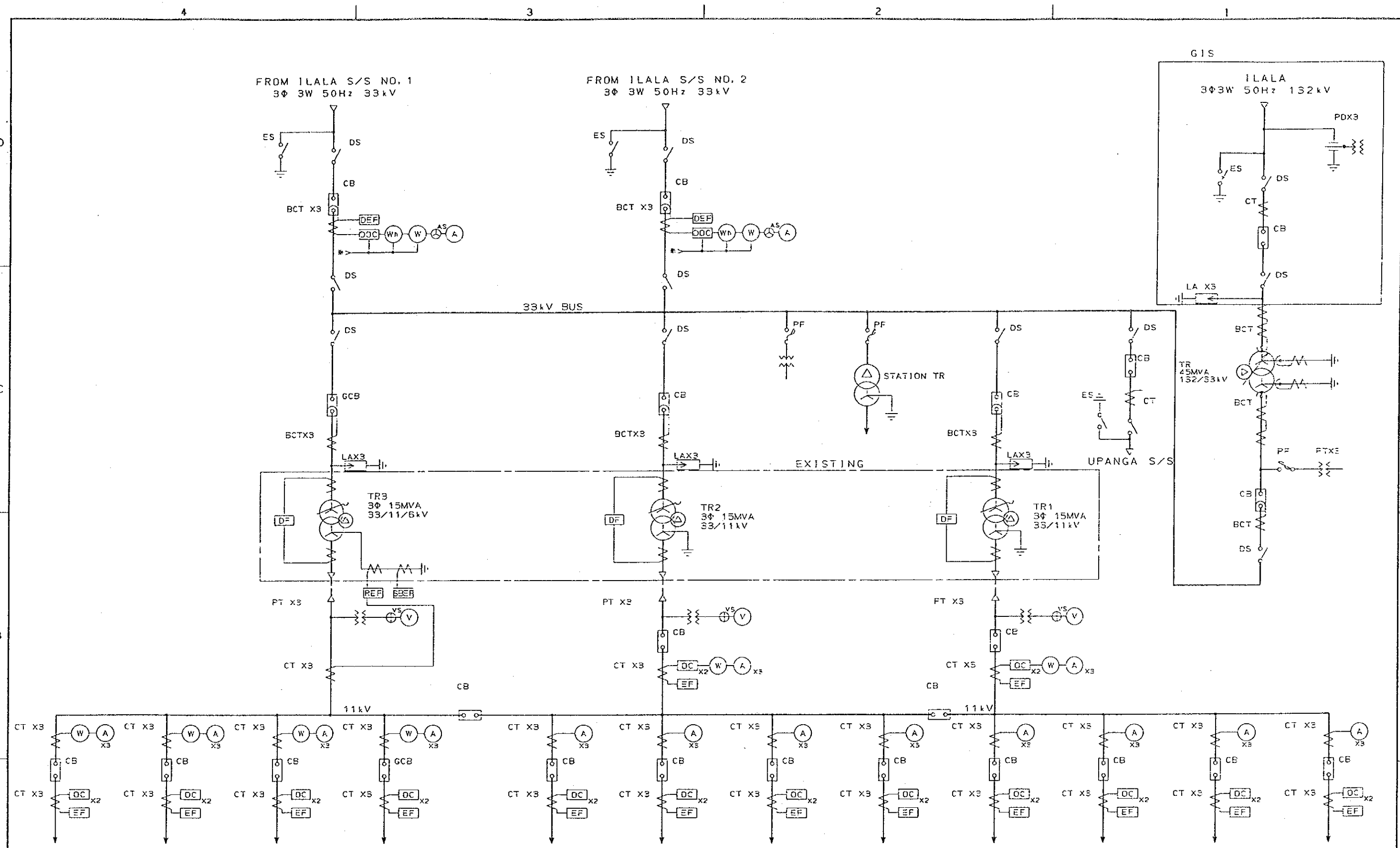
Fig. 5.4 - 38 - 2

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:
F.R.:	RECOMMENDED:
C.A.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			



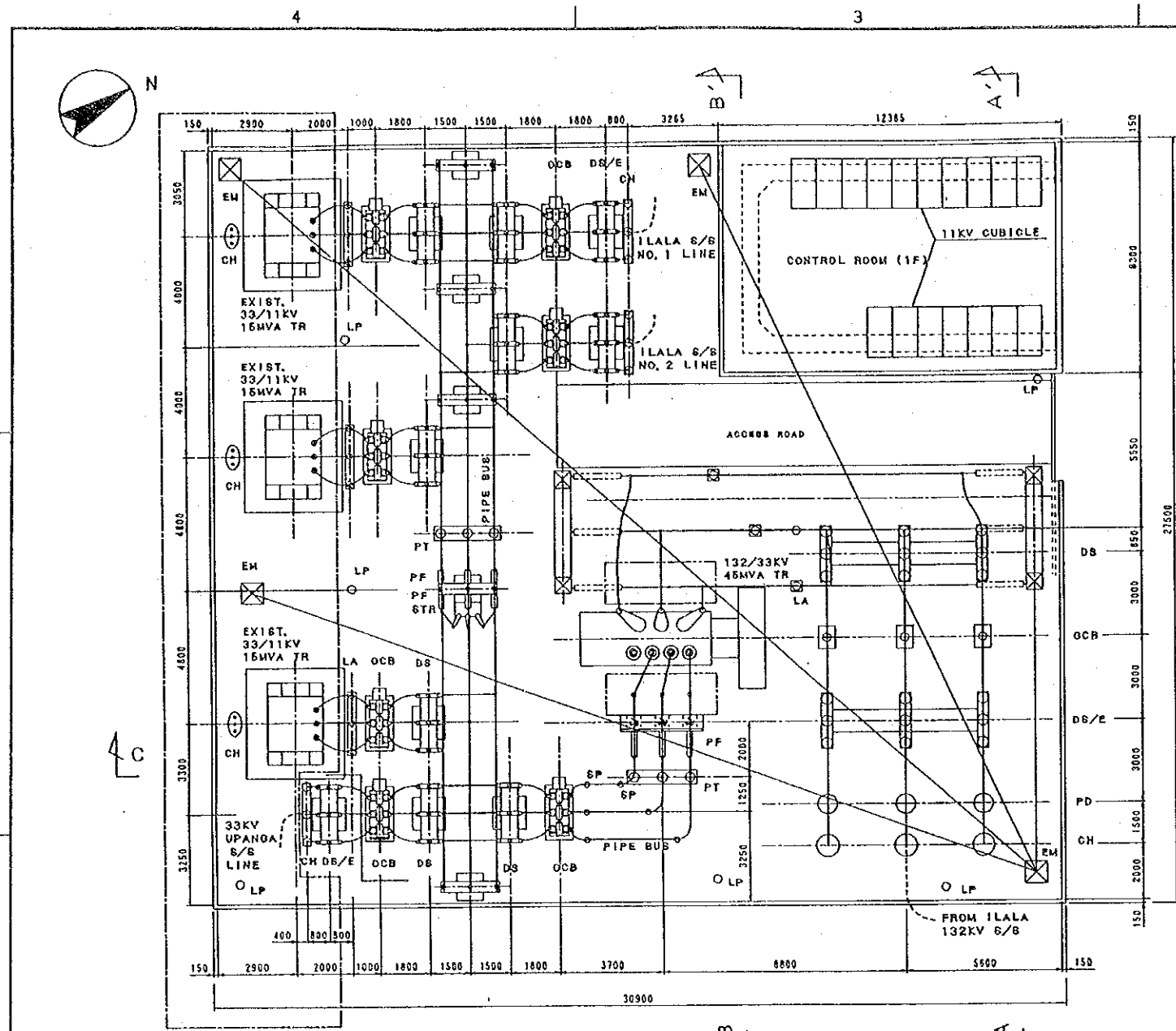
THE UNITED REPUBLIC OF TANZANIA  
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

### SINGLE LINE DIAGRAM OF CITY CENTER SUBSTATION

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

Fig. 5.4-39-1

LOCATION	DATE	DESCRIPTION	BY
REVISION			



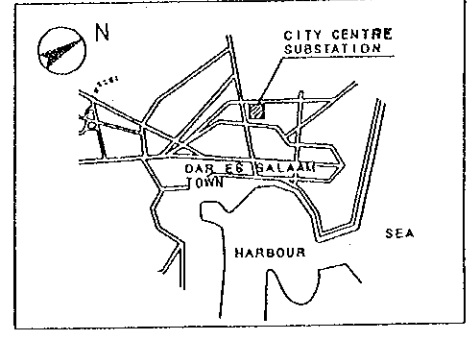
PLAN

LEGEND:

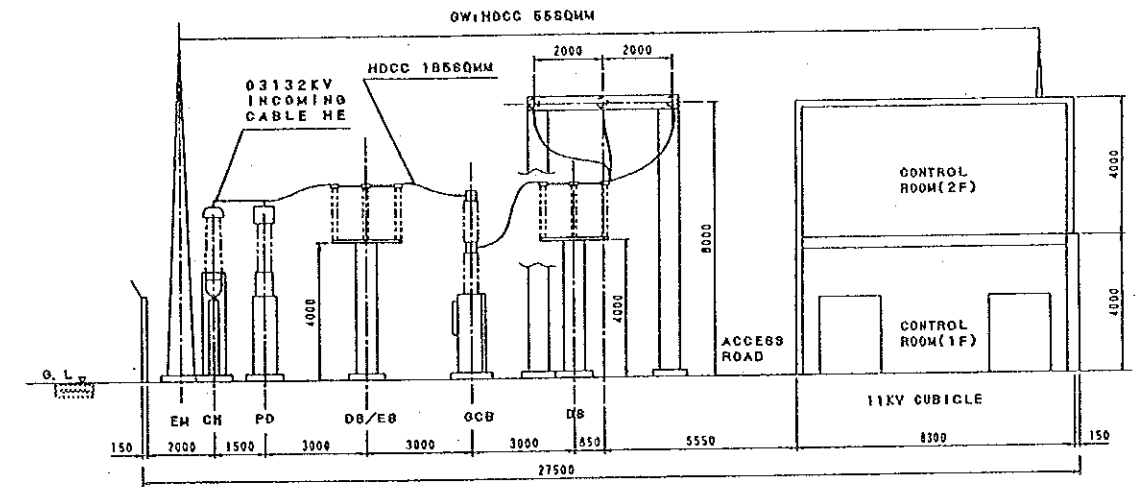
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- DS : DISCONNECTING SWITCH
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- PT : POTENTIAL TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST
- CH : CABLE HEAD

NOTE:

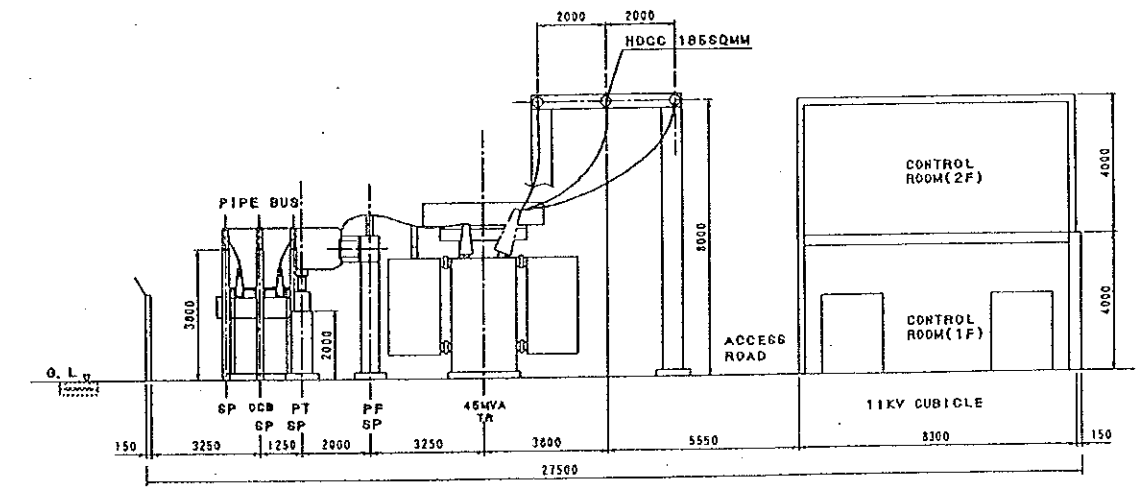
- 1. [ ] : EXPANSION AREA



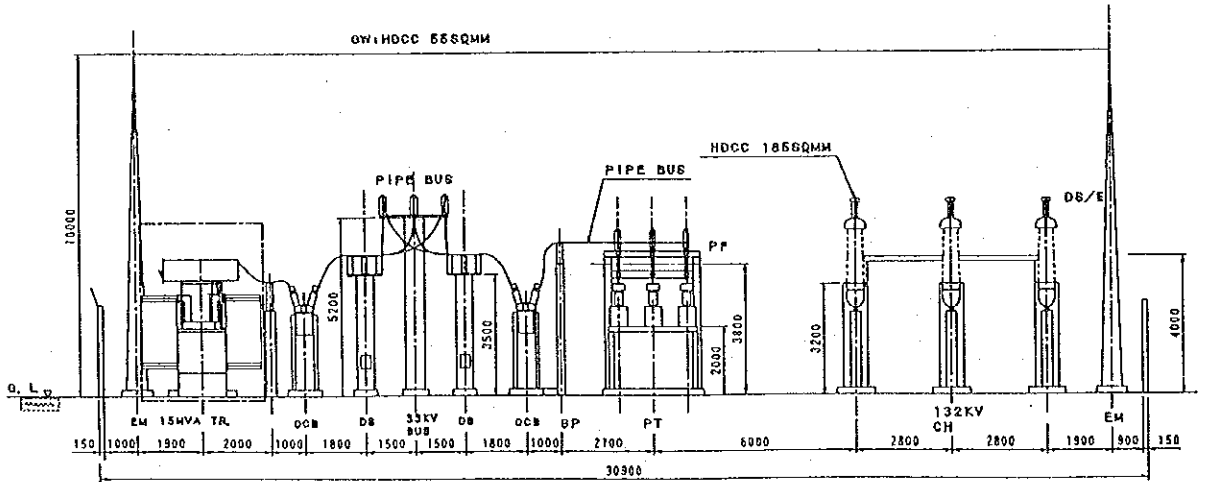
LOCATION MAP (NONE SCALE)



SECTION A-A'



SECTION B-B'



SECTION C-C'

Fig. 5.4-39-2

THE UNITED REPUBLIC OF TANZANIA			
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION			
<b>LAYOUT OF CITY CENTRE SUBSTATION</b>			
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN		
D.R.:	SUBMITTED:		
F.R.:	RECOMMENDED:		
C.K.:	APPROVED:		
LOCATION	DATE	DESCRIPTION	BY
REVISION			



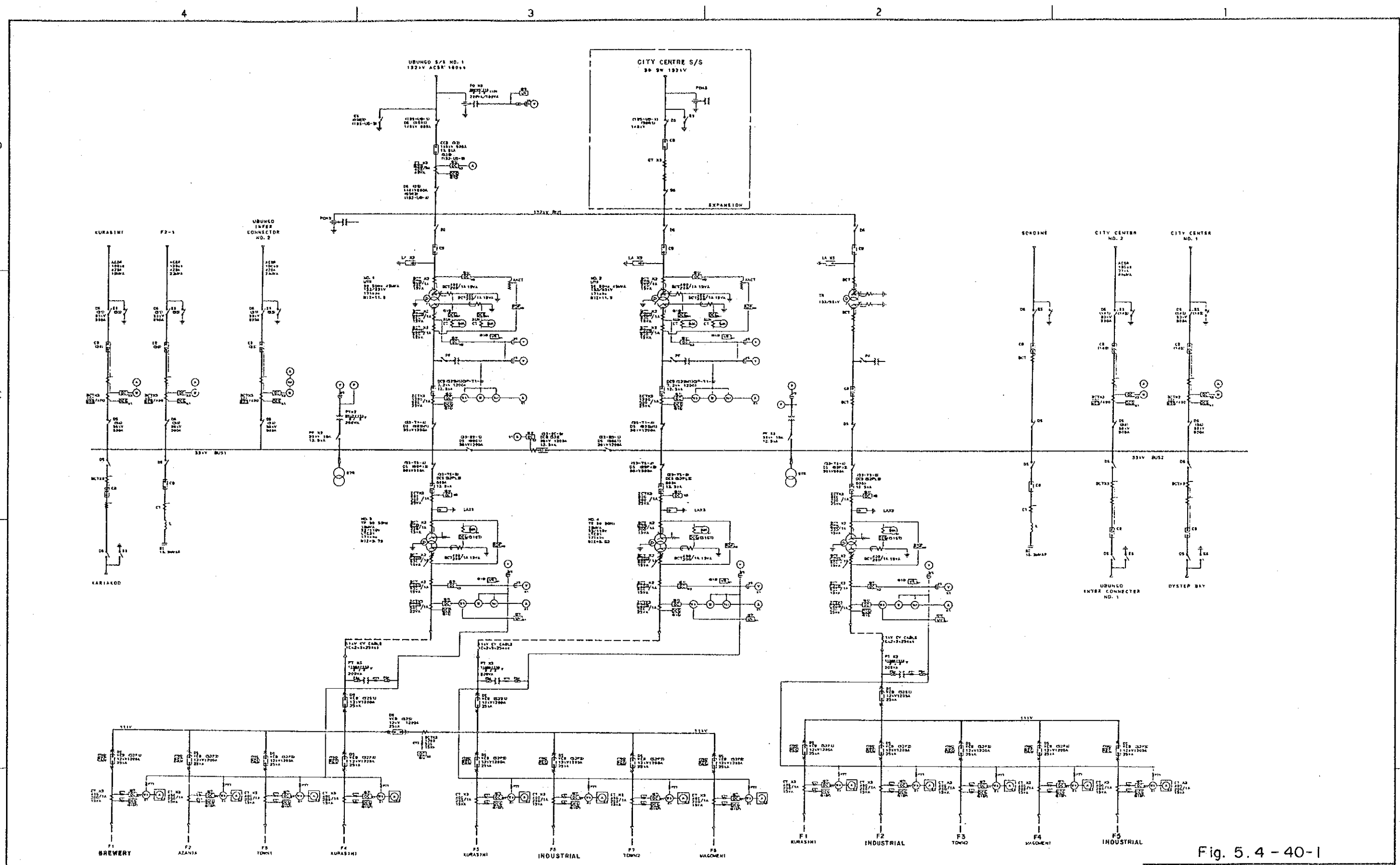
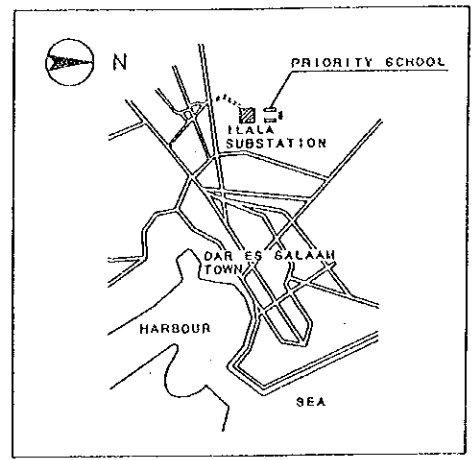
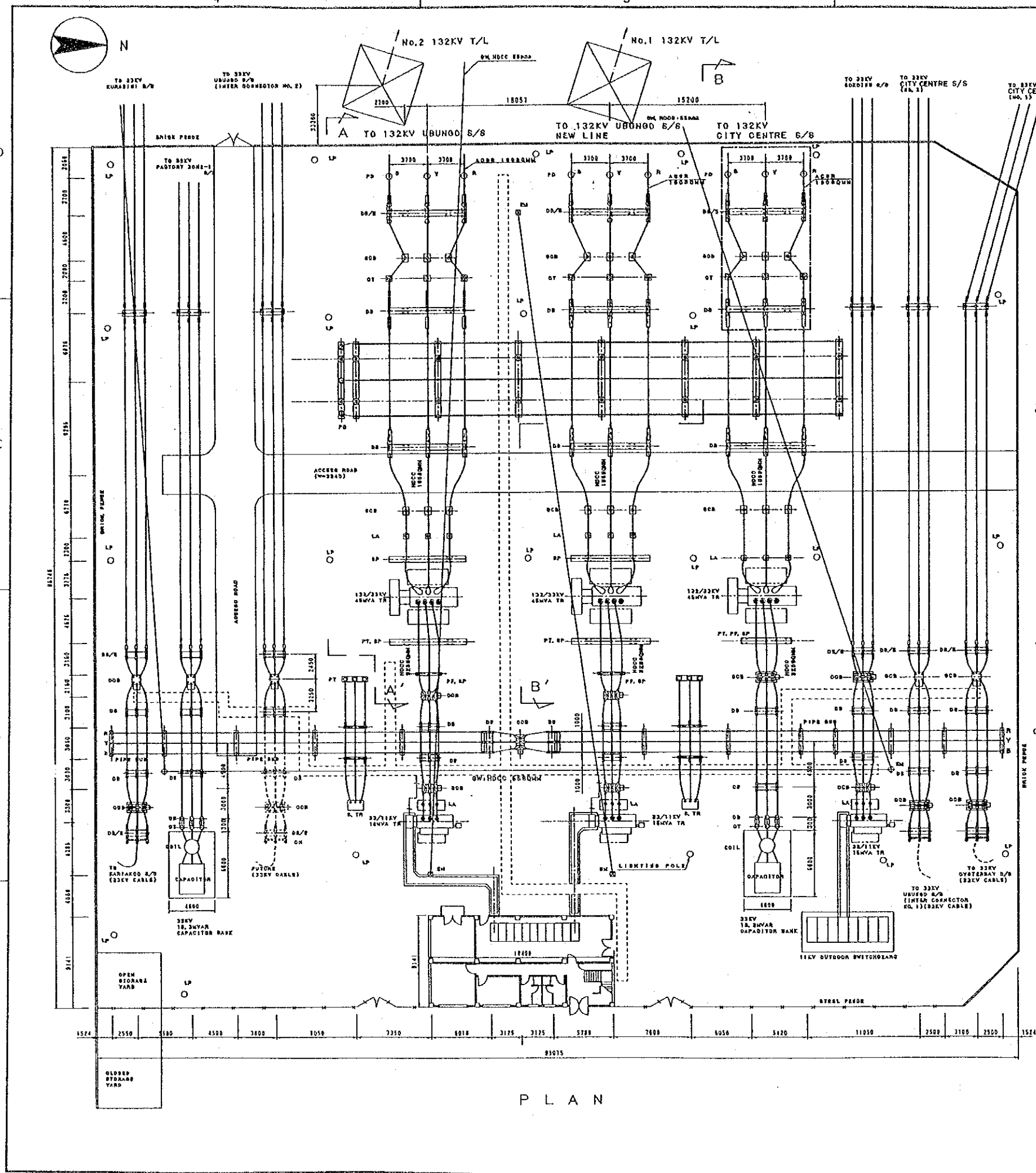



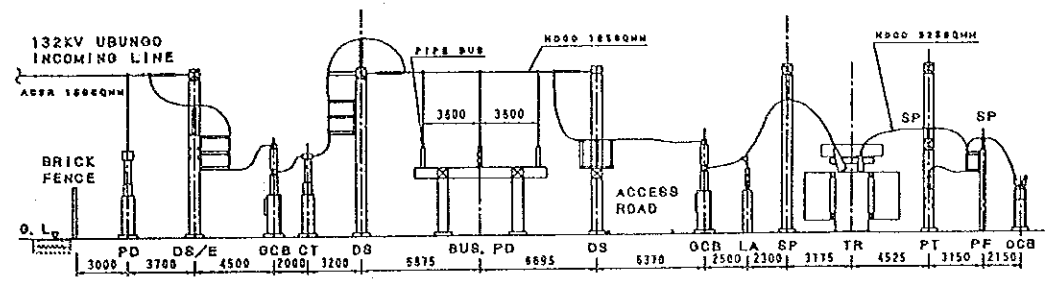
Fig. 5.4-40-1

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

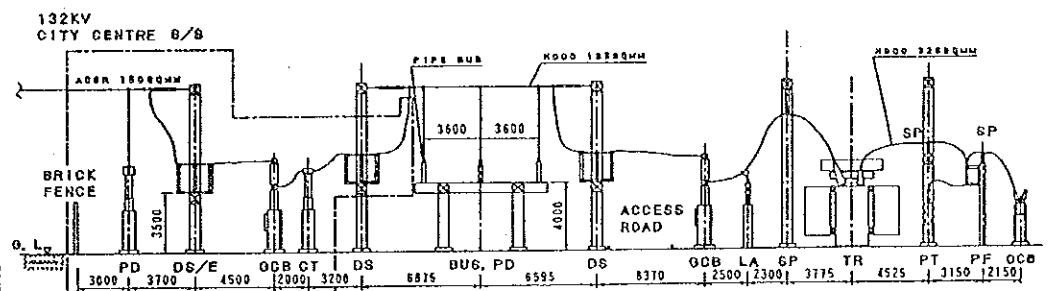
LOCATION	DATE	DESCRIPTION	BY
REVISION			



LOCATION MAP (NONE SCALE)



SECTION A-A'



SECTION B-B'

- 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. [ ] : 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**

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

LOCATION	DATE	DESCRIPTION	BY
REVISION			

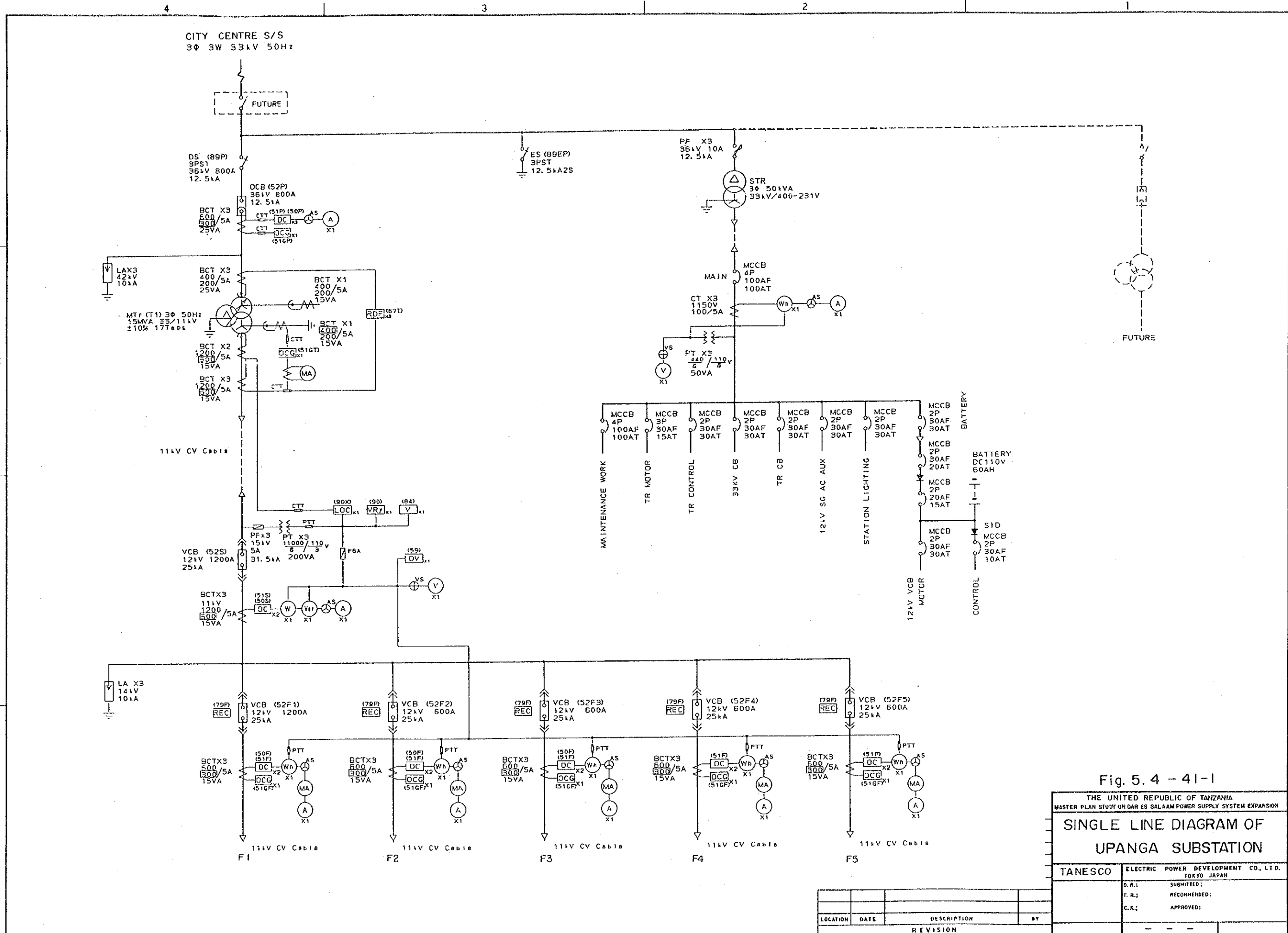
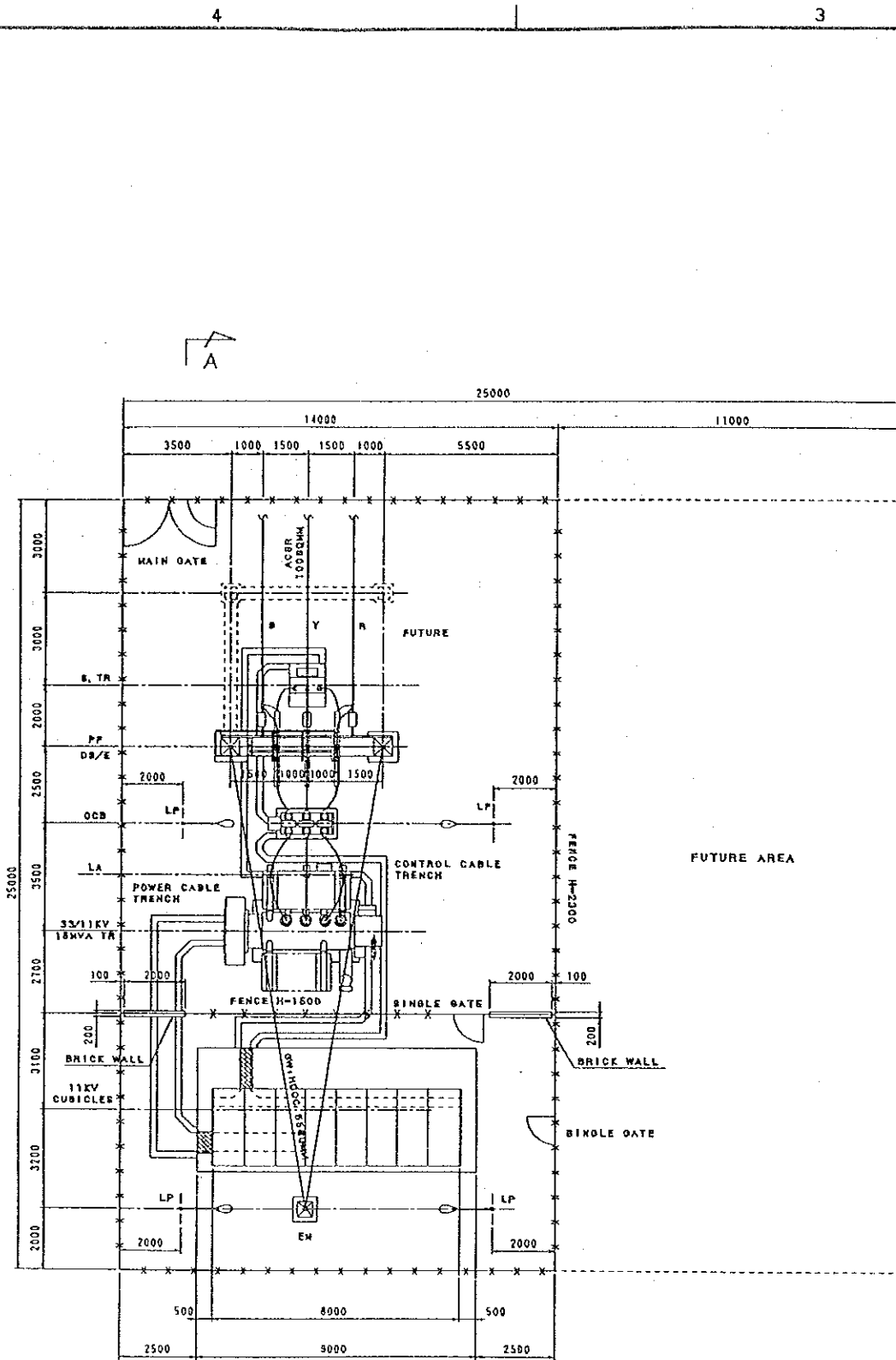


Fig. 5.4 - 41-1

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



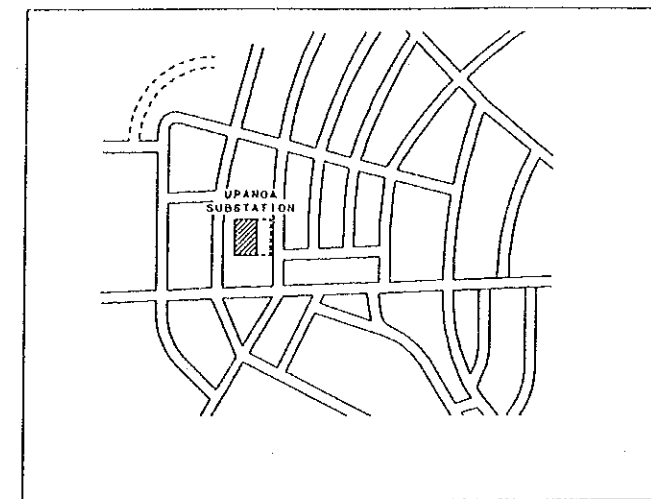
P L A N

LEGEND:

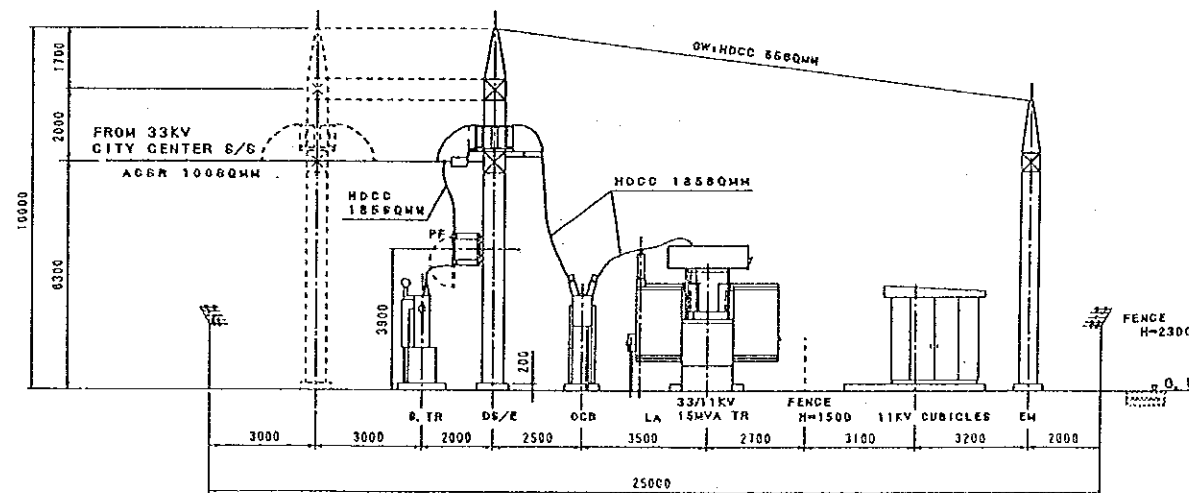
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- TR : 15MVA MAIN TRANSFORMER
- LP : LIGHTING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST

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.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY
REVISION			

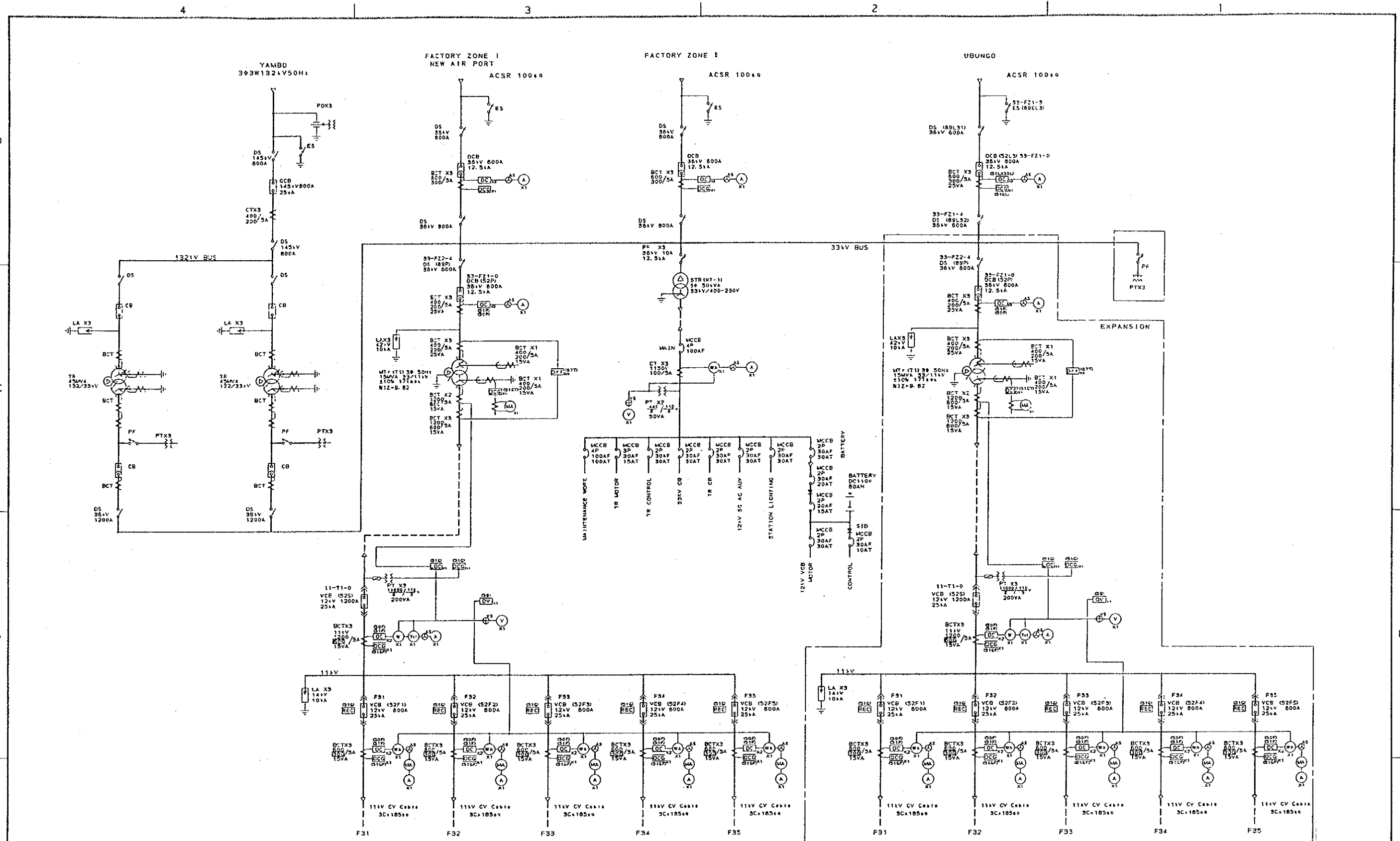
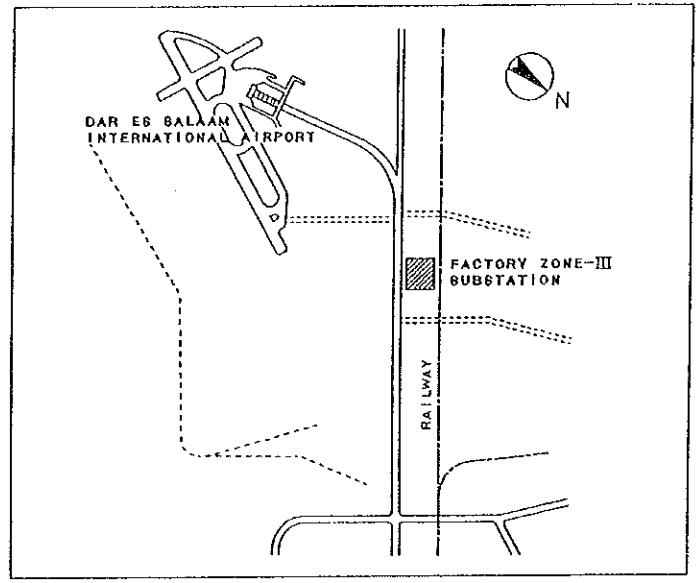
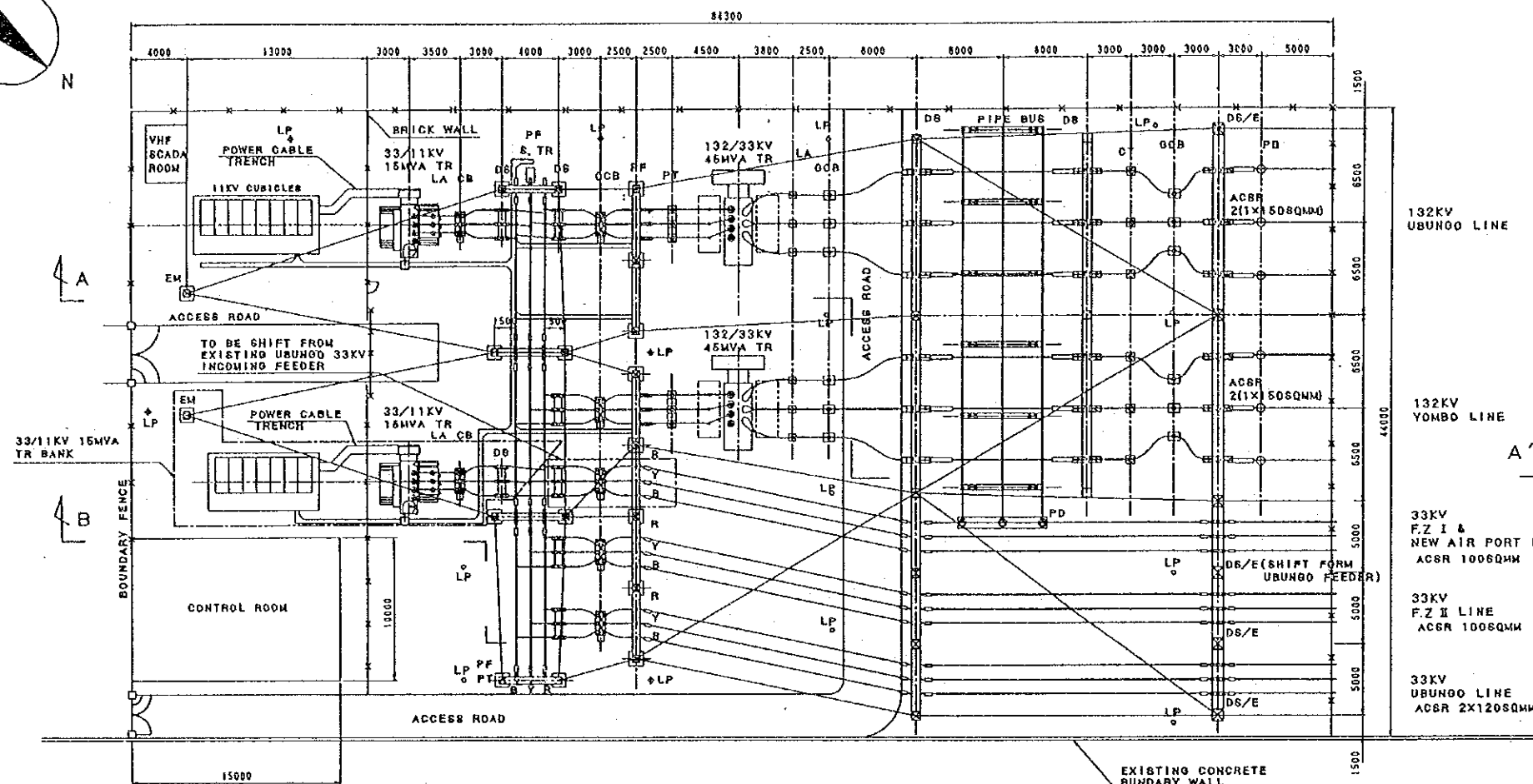


Fig. 5.4 - 42 - 1

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.A.:	APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			



LOCATION MAP (NONE SCALE)

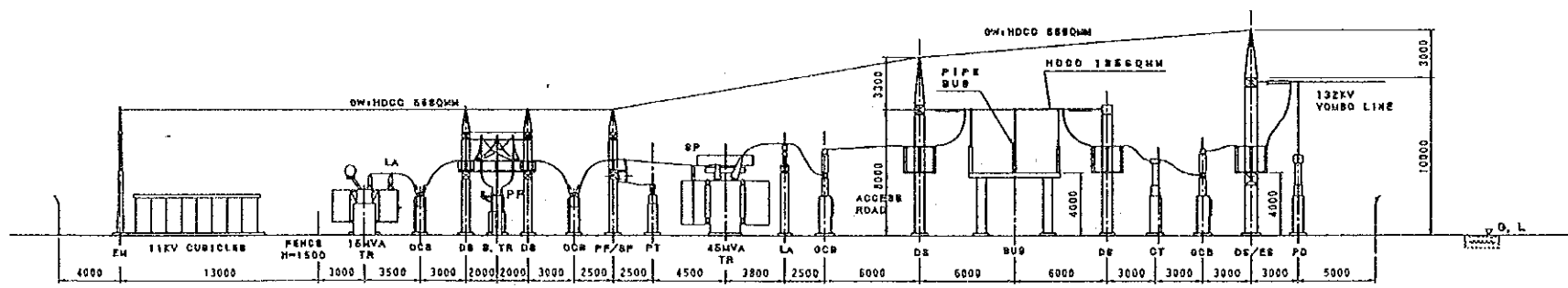
PLAN

LEGEND:

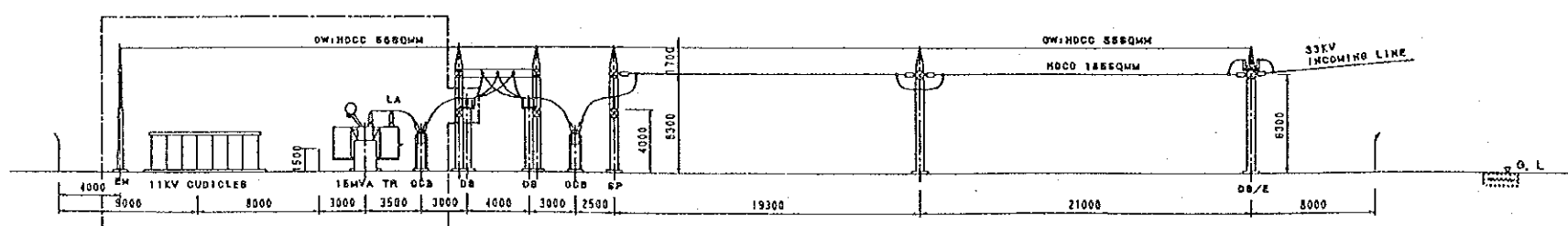
- DB/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- LP : LIGHTNING POLE
- PF : POWER FUSE
- S. TR : STATION TRANSFORMER
- EM : EARTH MAST
- PD : POTENTIAL DEVICE
- DS : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER
- PT : POTENTIAL TRANSFORMER

NOTE:

1. [Symbol] : EXPANSION AND REHABILITATION AREA



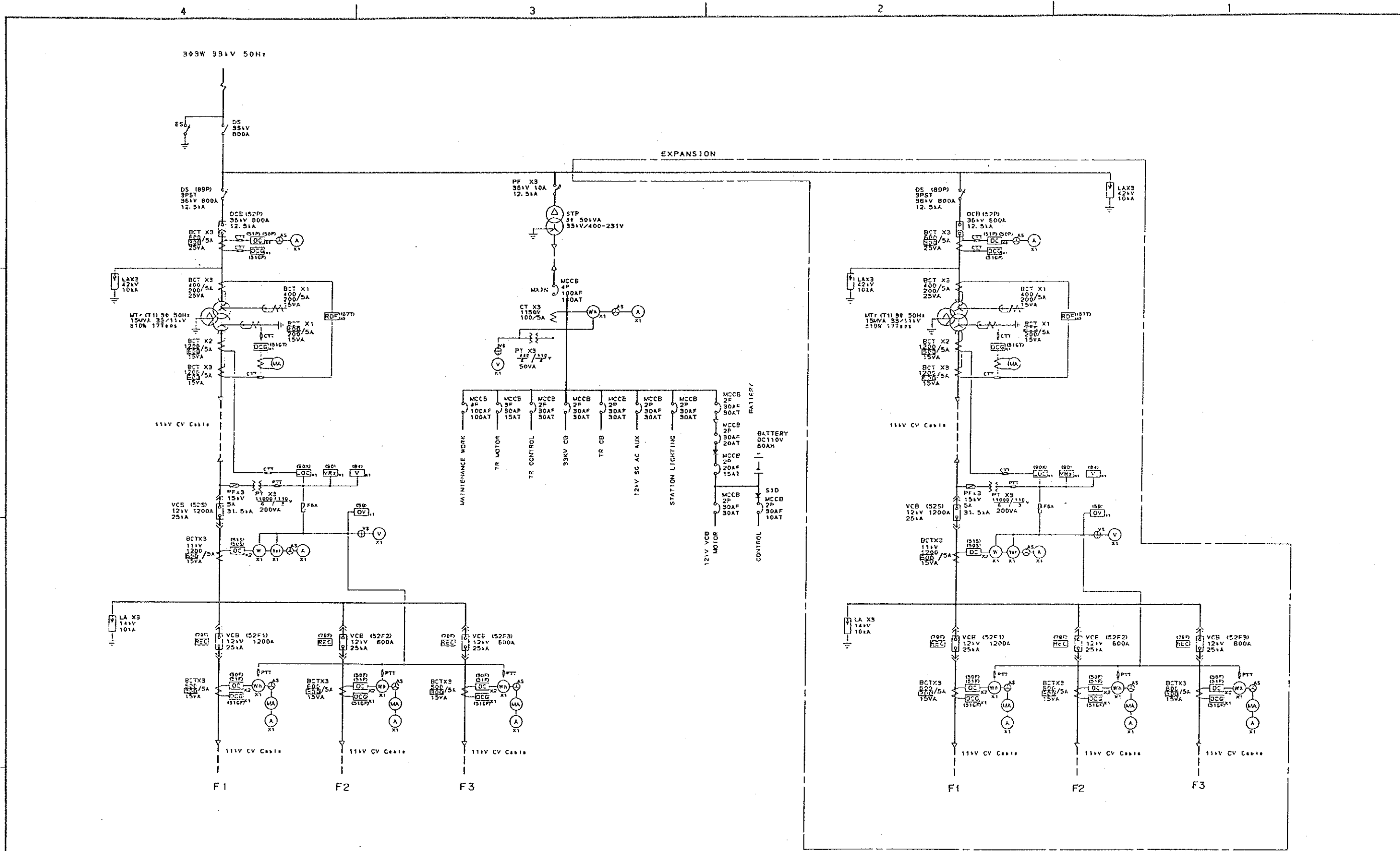
SECTION A-A'



SECTION B-B'

Fig. 5.4-42-2

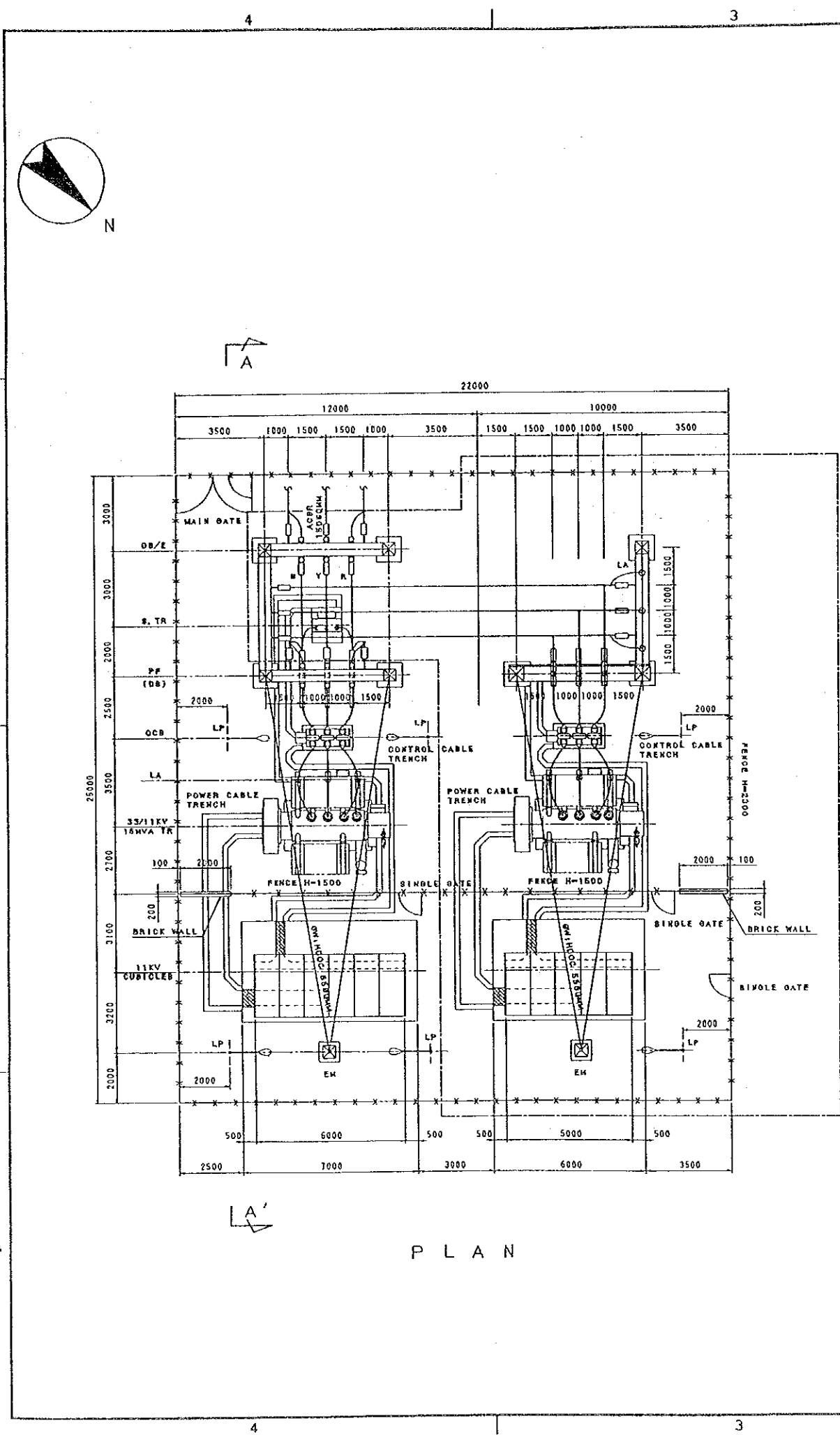
THE UNITED REPUBLIC OF TANZANIA			
MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION			
<b>LAYOUT OF FACTORY ZONE III SUBSTATION</b>			
TANESCO	ELECTRIC POWER DEVELOPMENT CO., LTD. TOKYO JAPAN		
D.R.:	SUBMITTED:		
T.R.:	RECOMMENDED:		
C.X.:	APPROVED:		
LOCATION	DATE	DESCRIPTION	BY
REVISION			



THE UNITED REPUBLIC OF TANZANIA  
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION  
**SINGLE LINE DIAGRAM OF  
 MSASANI SUBSTATION**

Fig. 5.4-43-1

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
- 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. [ ] : EXPANSION AREA

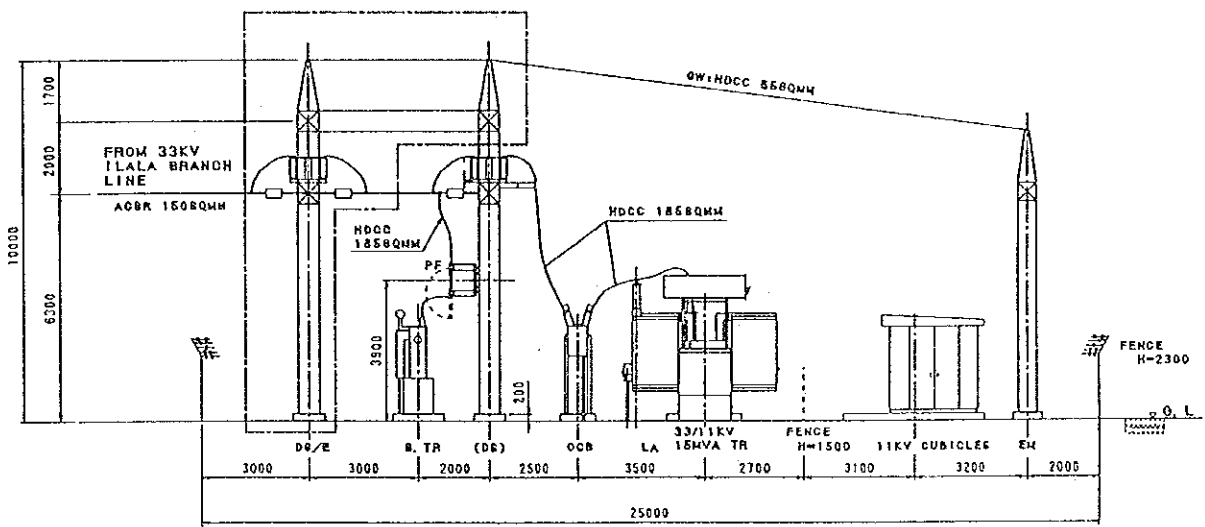
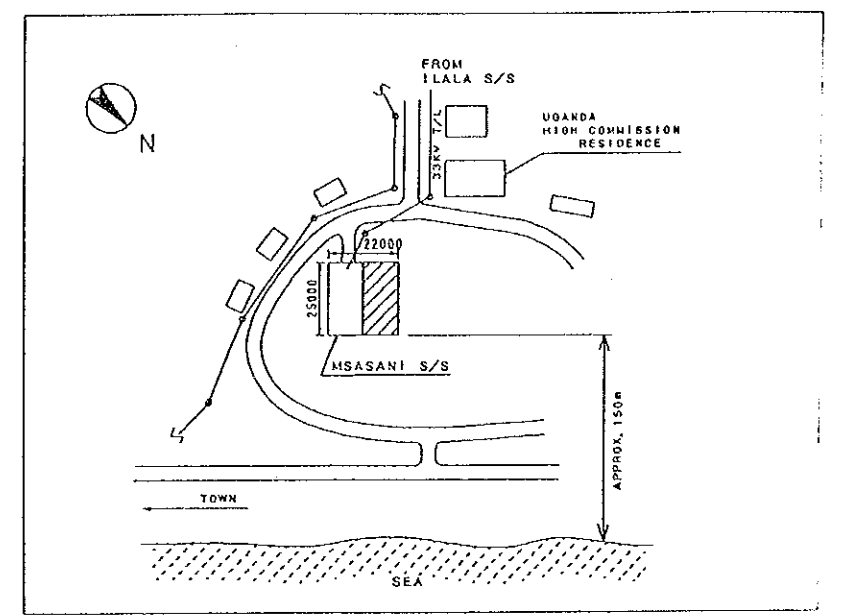


Fig. 5.4 - 43-2

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

LOCATION	DATE	DESCRIPTION	BY
REVISION			



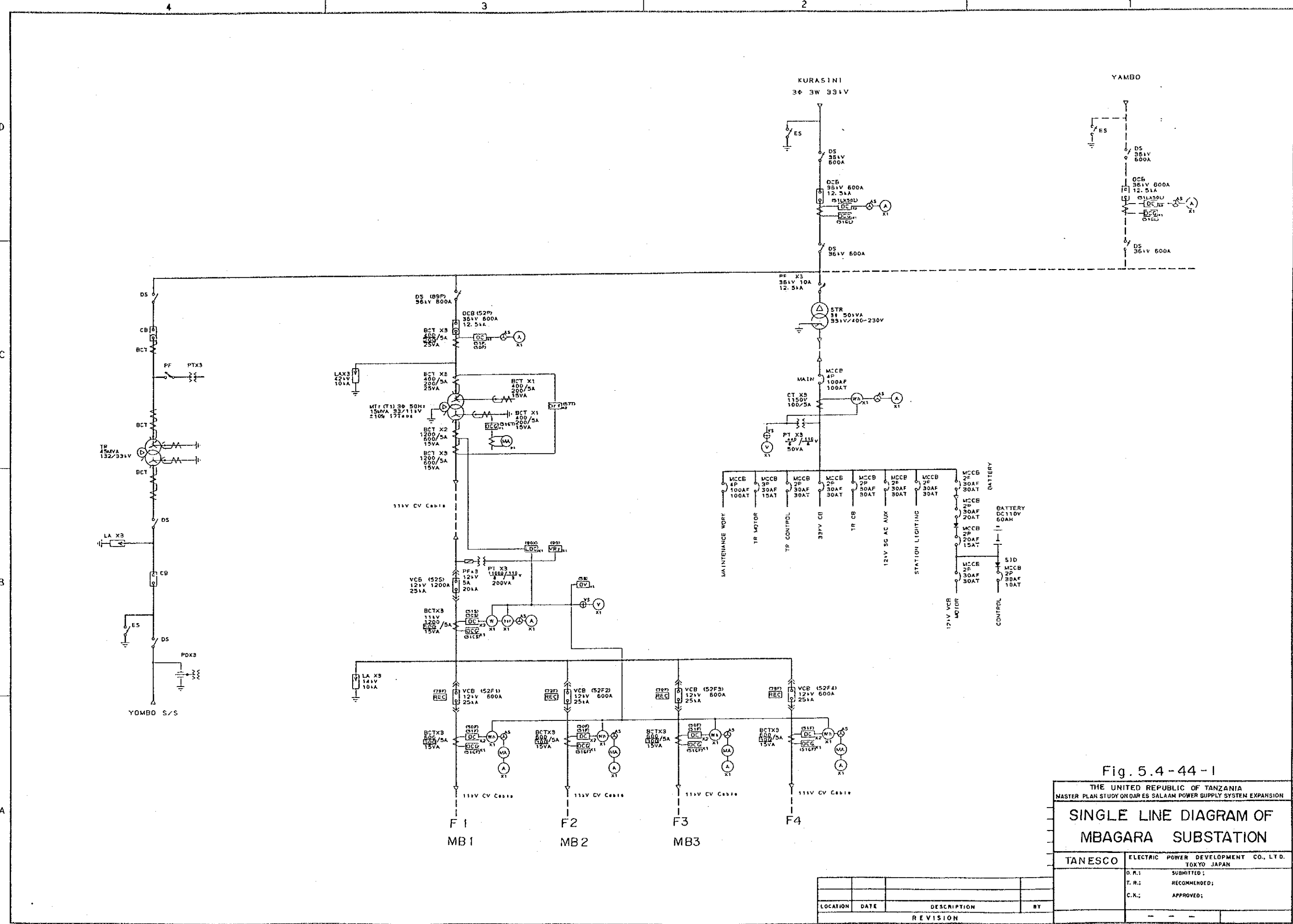


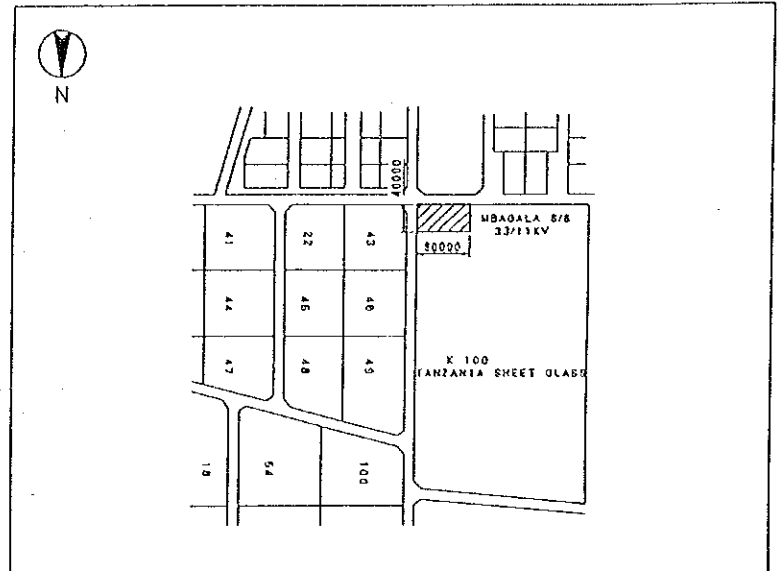
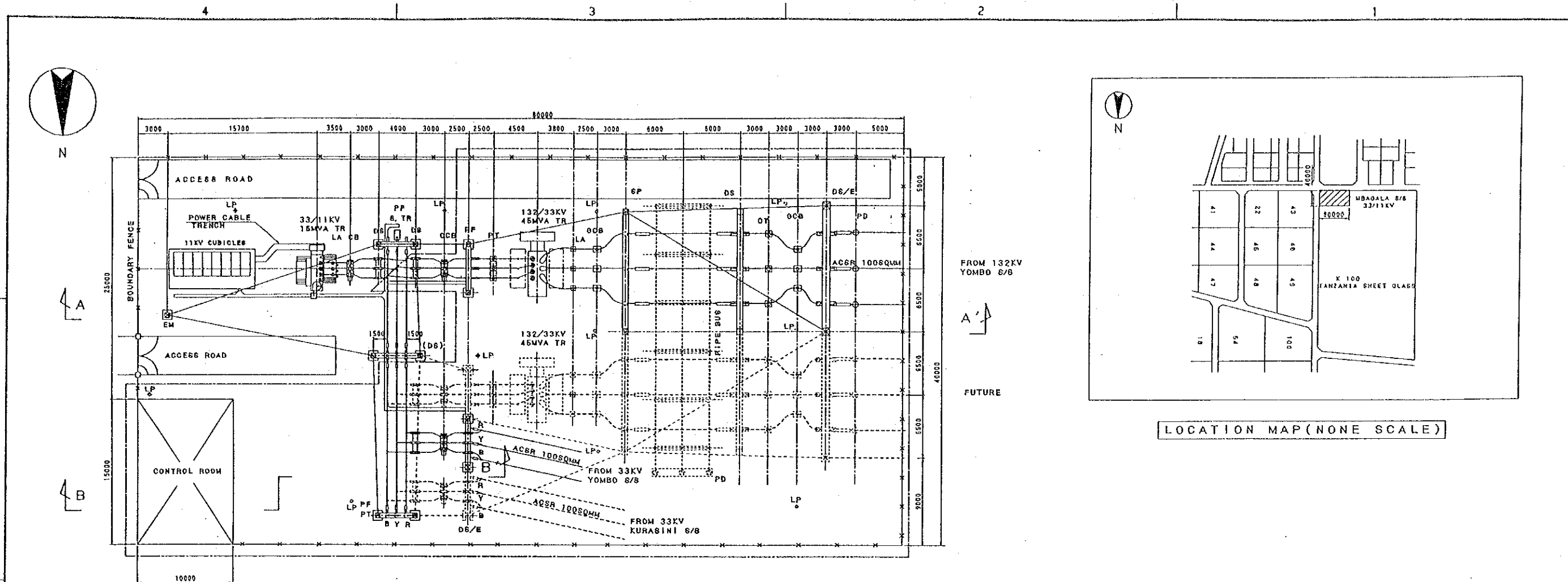
Fig. 5.4-44-1

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)

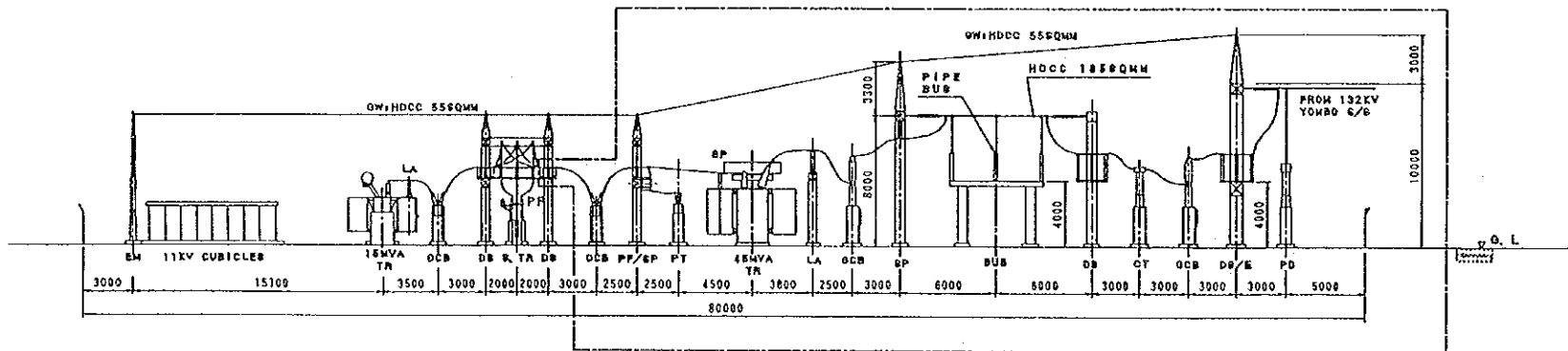
PLAN

LEGEND:

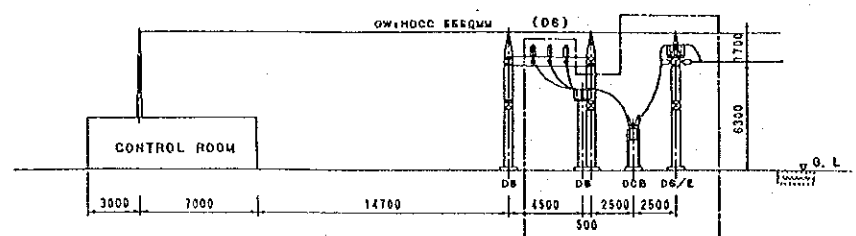
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
- CB : CIRCUIT BREAKER
- LA : LIGHTNING ARRESTER
- LP : LIGHTING POLE
- PF : POWER FUSE
- 6. TR : STATION TRANSFORMER
- EM : EARTH MAST
- PD : POTENTIAL DEVICE
- DS : DISCONNECTING SWITCH
- CT : CURRENT TRANSFORMER
- PT : POTENTIAL TRANSFORMER

NOTE:

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



SECTION A-A'



SECTION B-B'

Fig. 5.4-44-2

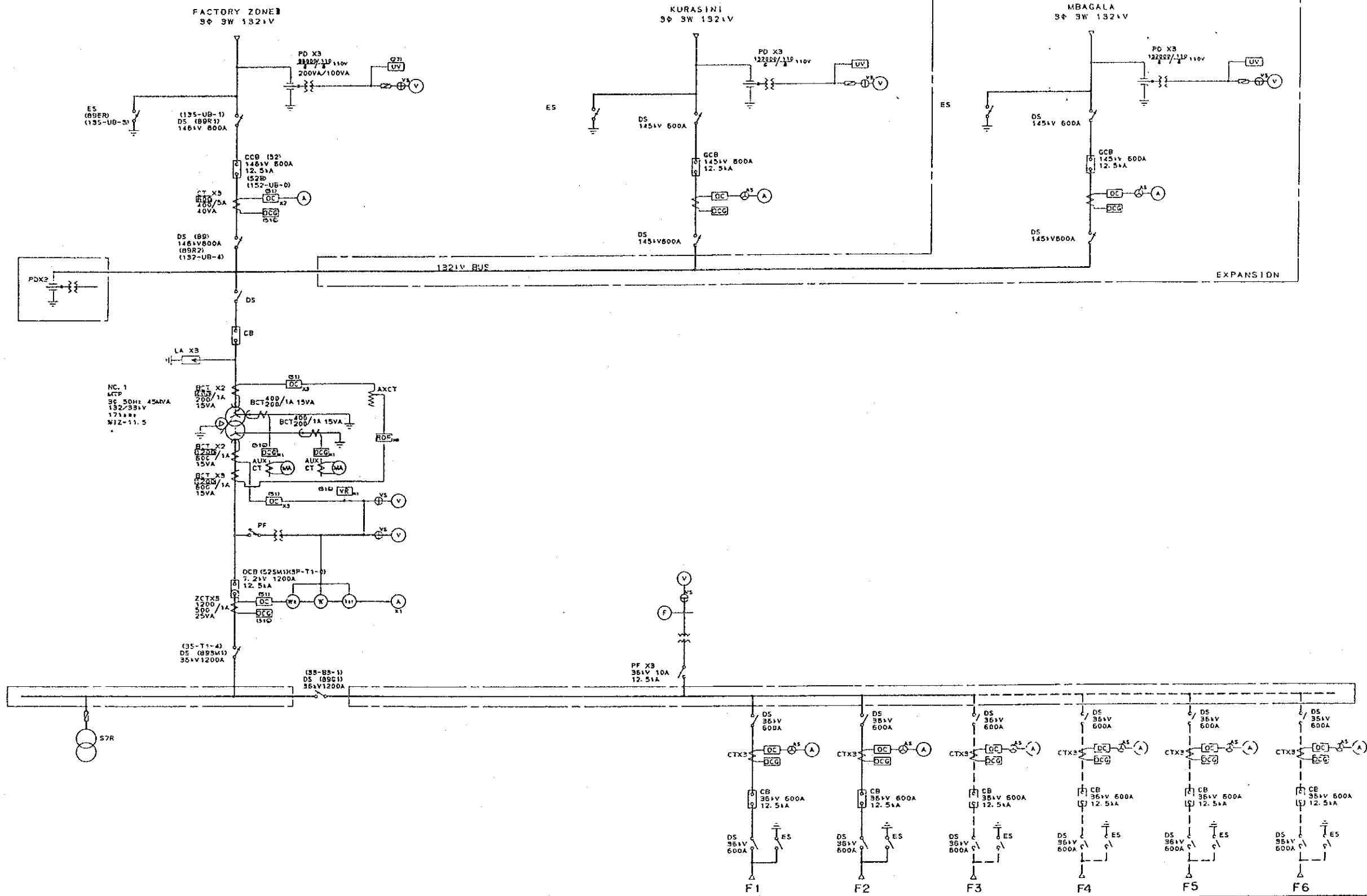
THE UNITED REPUBLIC OF TANZANIA

MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

LAYOUT OF MBAGALA SUBSTATION

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

LOCATION	DATE	DESCRIPTION	BY
REVISION			



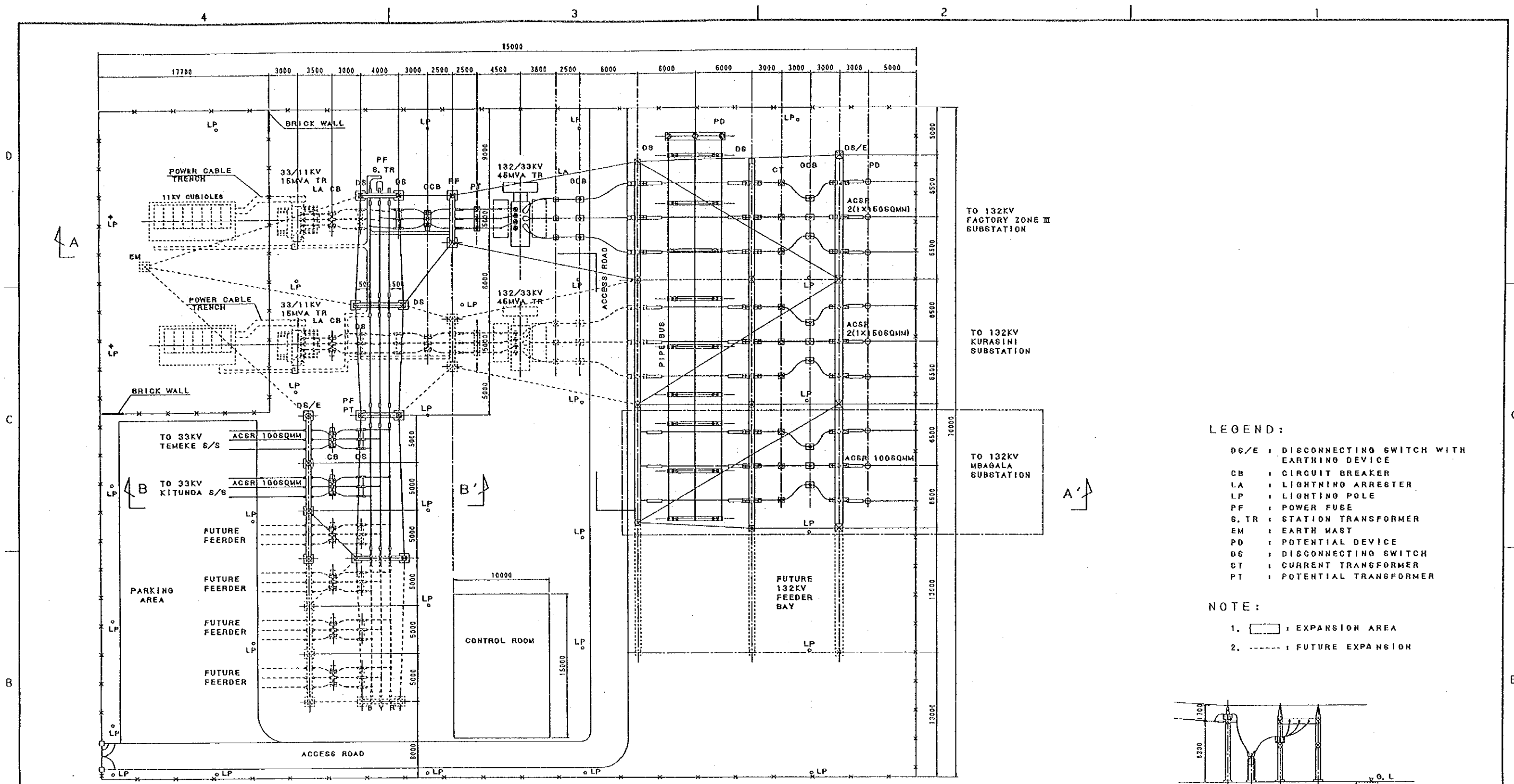
THE UNITED REPUBLIC OF TANZANIA  
 MASTER PLAN STUDY ON DAR ES SALAAM POWER SUPPLY SYSTEM EXPANSION

### SINGLE LINE DIAGRAM OF YOMBO SUBSTATION

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

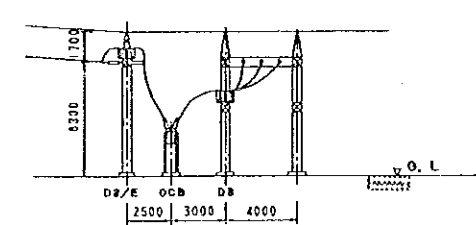
LOCATION	DATE	DESCRIPTION	BY
REVISION			

Fig. 5.4 - 45 - 1



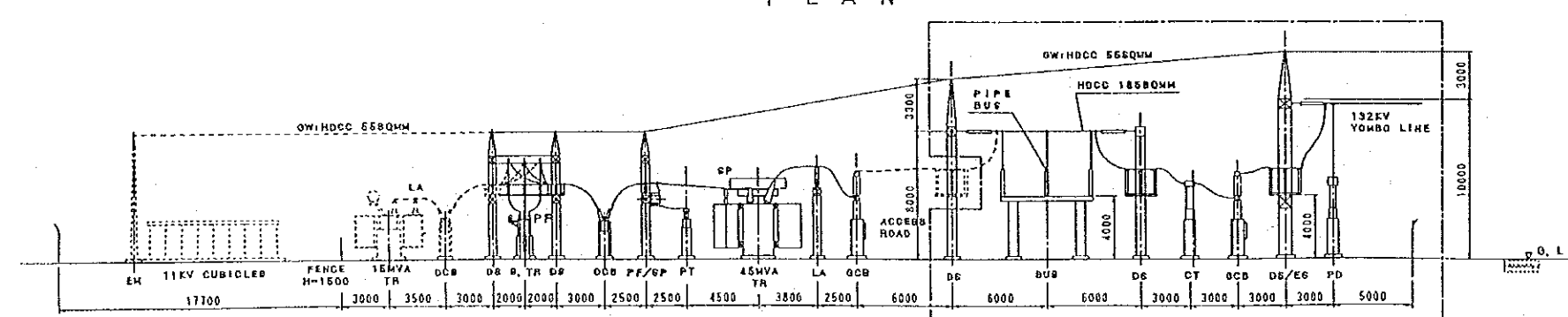
- LEGEND:**
- DS/E : DISCONNECTING SWITCH WITH EARTHING DEVICE
  - CB : CIRCUIT BREAKER
  - LA : LIGHTNING ARRESTER
  - LP : LIGHTNING POLE
  - PF : POWER FUSE
  - S. TR : STATION TRANSFORMER
  - EM : EARTH MAST
  - PD : POTENTIAL DEVICE
  - DS : DISCONNECTING SWITCH
  - CT : CURRENT TRANSFORMER
  -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

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



PLAN

SECTION B-B'



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**

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

LOCATION	DATE	DESCRIPTION	BY
REVISION			



**C. OTHER RELATED DOCUMENTS**



C. Other Related Documents

	Page
1. Results of the bearing capacity measurement of foundation soil at the proposed sites for the Substations and the Power Transmission Towers .....	C-1





### C. Other Materials

1. Result of the bearing capacity measurement of foundation soil at the proposed sites for the Substations and the Power Transmission Towers

Under the present study, the bearing capacity measurements were carried out at the proposed sites for six substations (Tandale, Chang'ombe, Kunduchi, Kariakoo, Mbagala and Tabata), and the steel towers' foundation of two power transmission lines (Ubungo - Ilala Line & Ubungo - FZ III line), under the short-term plan over a five-year period.

The bearing capacity measurements were carried out with the use of a portable cone penetrometer brought from Japan by the Survey Team for this purpose and a hand auger borrowed from the Central Material Laboratory. The bearing capacity was measured at three depths for each measurement point (2.0m, 2.5m, and 3.0m below the ground surface).

Boring was performed with the hand auger to a depth of 2.0m below the ground surface, and a downward force was applied in the perpendicular direction by taking care not to cause impact to the cone penetrometer and not to cause the penetrometer to slant.

The point head cone was gently caused to penetrate into the test soil and the reading value on the dial gauge of the proving ring was recorded. After this, the cone penetrometer was withdrawn and boring was performed with the hand auger to prepare the same way of penetration tests at the next depth stages of 2.5m and 3.0m, respectively.

Practically all of the soil locations in which the measurements were carried out proved to be a solid ground as it was not possible to cause the point head cone to penetrate even though the full weight was applied to drive it in. The readings on the dial gauge taken at that time were all in the 150-180 range.

#### [Allowable Bearing Capacity Calculation]

The allowable bearing capacity ( $q_a$ ) was calculated by the following equation after determining the penetration force (kg) that multiplying the dial gauge reading value by the dial gauge coefficient (0.422).



$$q_a = \alpha \cdot Q/A$$

q<sub>a</sub>: Converted allowable bearing capacity

(kg/cm<sup>2</sup>) (value with a safety factor of 3)

Q : Penetration force (kg)

(minimum penetration resistance of cone)

A : Maximum sectional area of cone (a value of 6.45 cm<sup>2</sup> was used)

α : Conversion factor for allowable bearing capacity

(0.15 - 0.20) (a value of 0.17 was used)

In Tandale, a boring test was performed to a depth of about 1.0m below the ground surface, when a solid ground was encountered. As it was not possible to drill further with the hand auger, the boring was discontinued at that depth and no further depth measurements at lower depths were made.

At the proposed sites for the construction of the substations, in terms of the bearing capacity of its foundation soil.

In the vicinity of the No. 2 tower for the Ubungo-Ilala transmission line, a very soft clay soil bed (2.5 - 4.0 ton/m<sup>2</sup>) was encountered. For the construction of the steel tower, it will therefore be necessary to conduct further detailed tests and consider special countermeasure for improving the foundation soil. At the other three proposed sites of the transmissions, there is no problem, similarly to the proposed sites of the substations.

The calculated bearing capacity (kg/cm<sup>2</sup>) is multiplied by 10 to convert the value to the ton/m<sup>2</sup> unit which is used as the unit for the values given in the following Table C-1.



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 <sup>2</sup> < (1.0 m)	-	-	Good condition
Chang'ombe	12.0 ton/m <sup>2</sup> <	15.6 ton/m <sup>2</sup> <	15.6 ton/m <sup>2</sup> <	Good condition
Kunduchi	14.5 ton/m <sup>2</sup> <	15.6 ton/m <sup>2</sup> <	16.7 ton/m <sup>2</sup> <	G.W.L. -0.75 m Good condition
Kariakoo	17.2 ton/m <sup>2</sup> <	17.2 ton/m <sup>2</sup> <	17.2 ton/m <sup>2</sup> <	Good condition
Mbagala	17.2 ton/m <sup>2</sup> <	17.2 ton/m <sup>2</sup> <	17.2 ton/m <sup>2</sup> <	Good condition
Tabata	15.6 ton/m <sup>2</sup> <	16.7 ton/m <sup>2</sup> <	16.7 ton/m <sup>2</sup> <	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 <sup>2</sup>	2.5-4.0ton/m <sup>2</sup>	2.5-4.0ton/m <sup>2</sup>	Should be considered special countermeasure for the founda- tion
No.7-8	16.7 ton/m <sup>2</sup> <	16.7 ton/m <sup>2</sup> <	16.7 ton/m <sup>2</sup> <	Good condition
Ubango-F2 III WP 32	16.7 ton/m <sup>2</sup> <	17.8 ton/m <sup>2</sup> <	17.8 ton/m <sup>2</sup> <	G.W.L. -0.70 m Good condition
WP 39-40	17.2 ton/m <sup>2</sup> <	17.2 ton/m <sup>2</sup> <	17.2 ton/m <sup>2</sup> <	Good condition

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