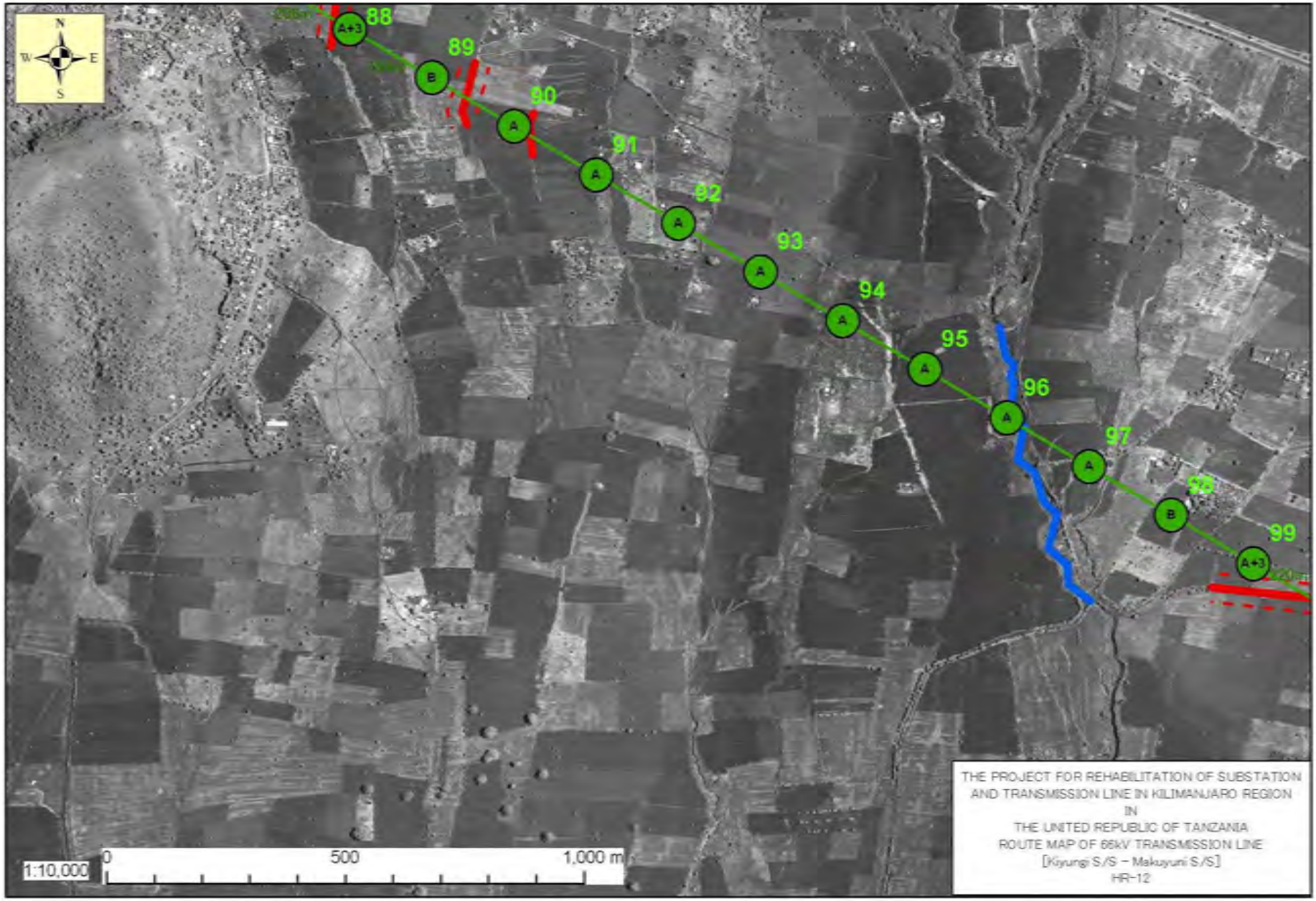
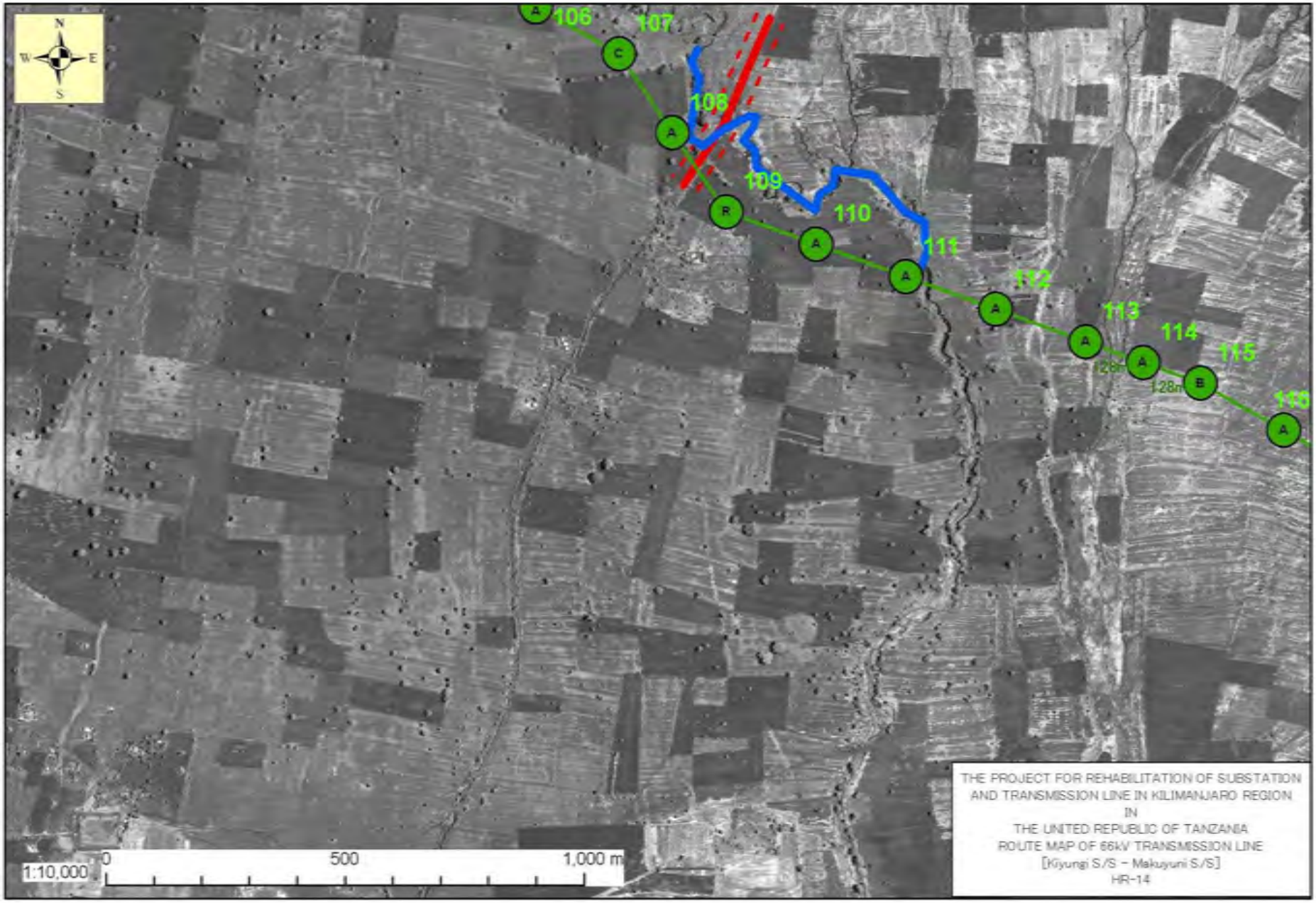
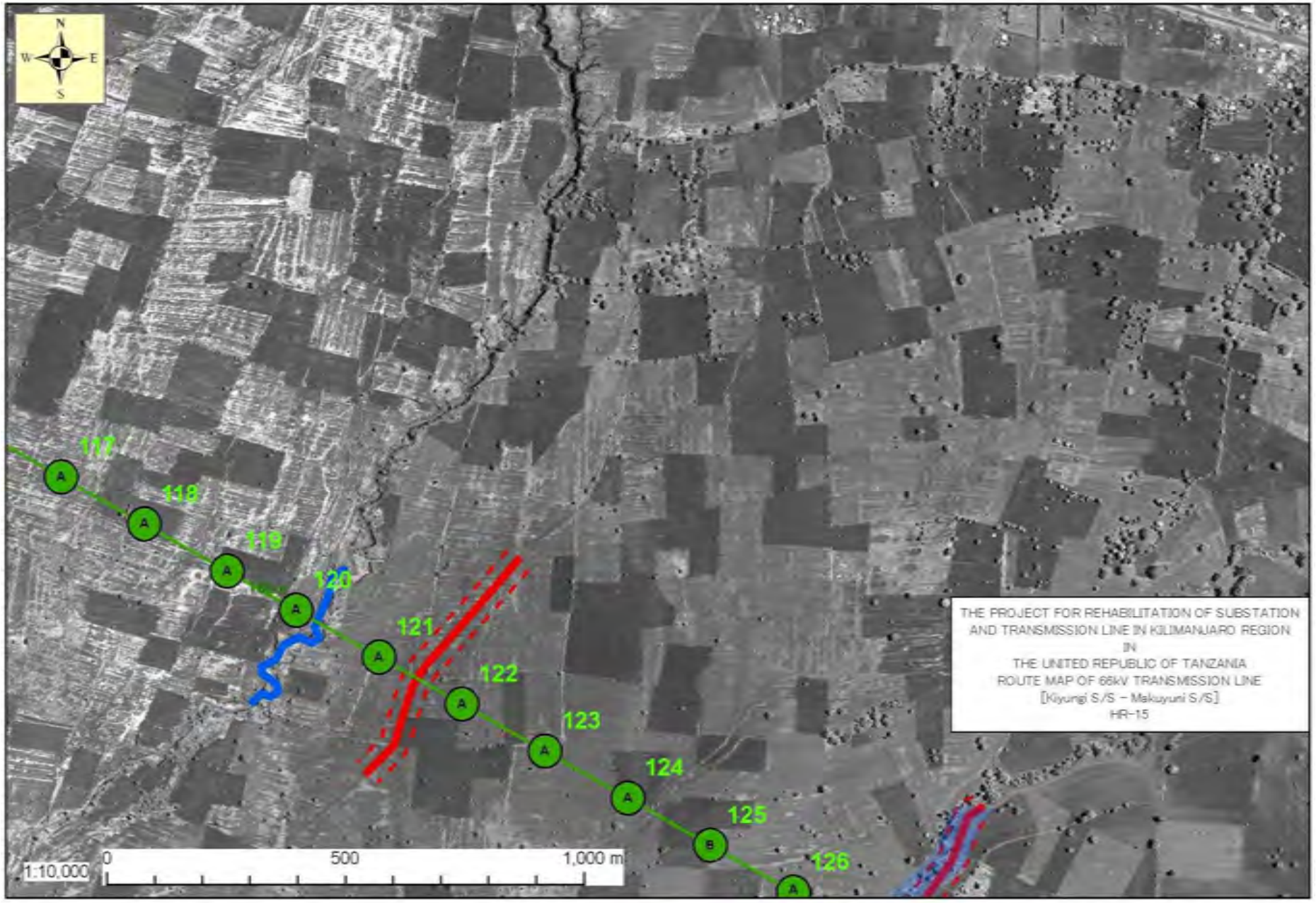
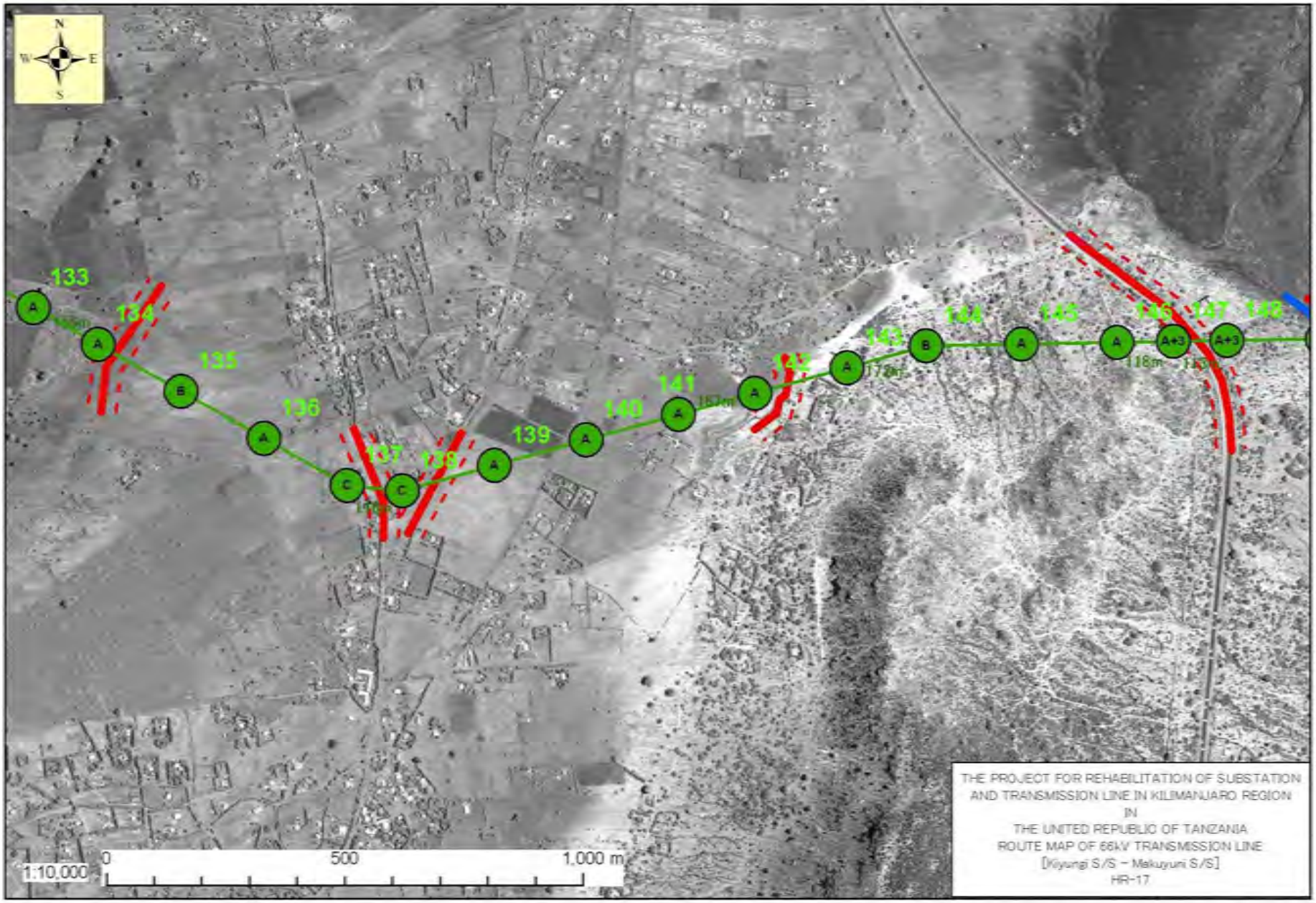
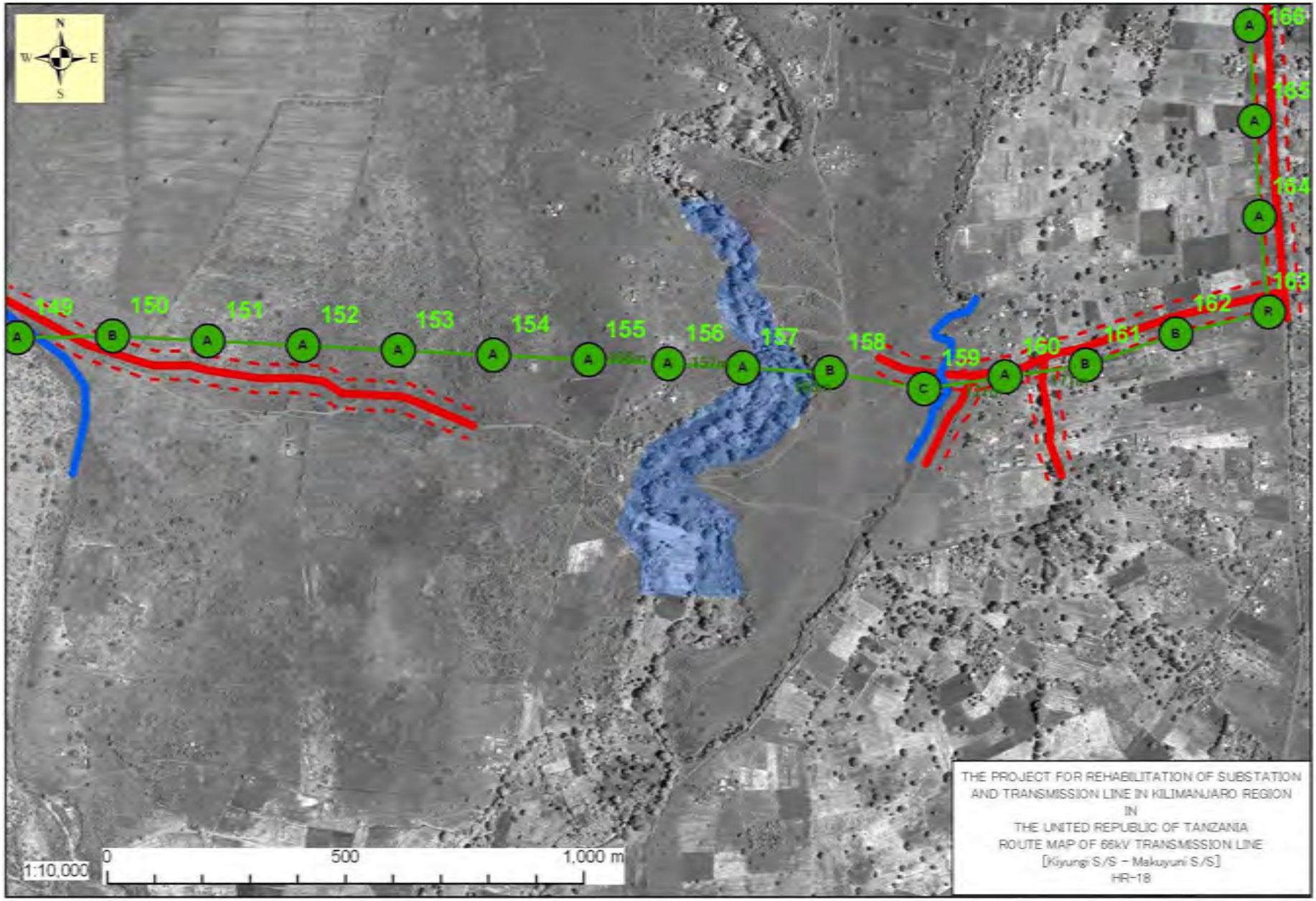


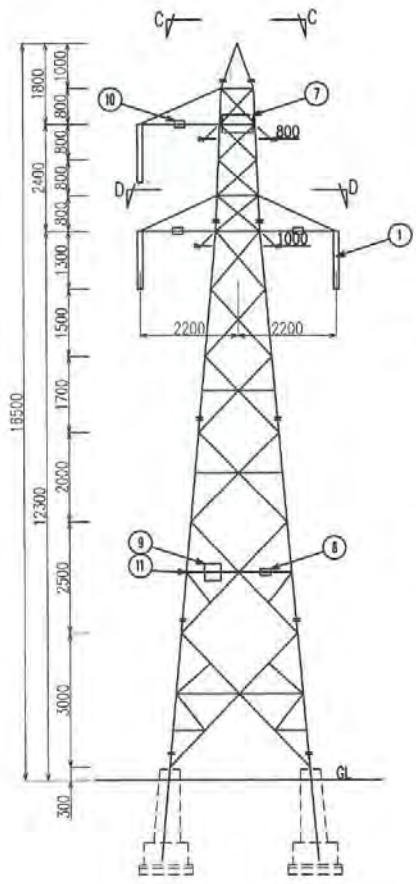






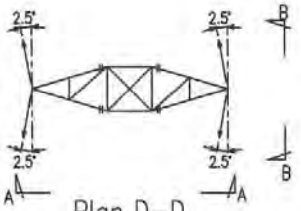


A TYPE

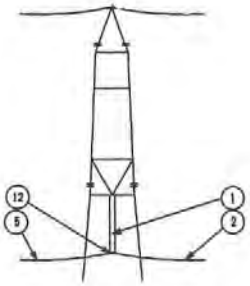


View A-A

Plan C-C



Plan D-D



View B-B

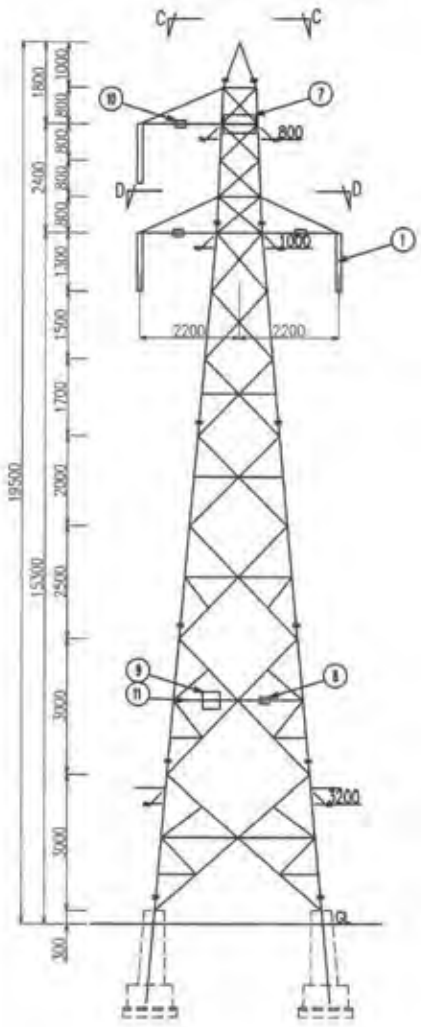
No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	懸垂碍子連セット Suspension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	対空番号札 Aero Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	危険防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇降防止装置 Anti-Climbing Guard	1 set
12	H-2-4-3	Armorロッド Armor Rods	3 set (3 phase)

General Design Condition

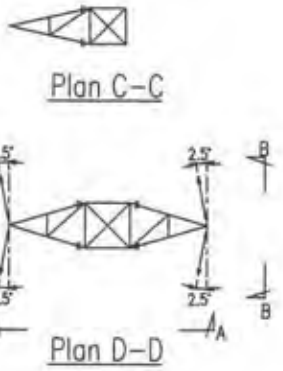
Voltage	66 kV	Vertical angle	Σtanα = ±0.1
Circuit	1 cct	Wind load	460 Pa
Assumptive Span	200~250m	Wind load for Conductor	160 Pa
Horizontal angle	5°or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726 kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13 mm		
Tension	20000 N		

SCALE	1:150
TITLE	Type of Steel Tower[A] 懸垂型 水平角度5度以下
DRG.NO.	HT-01

A TYPE+3000

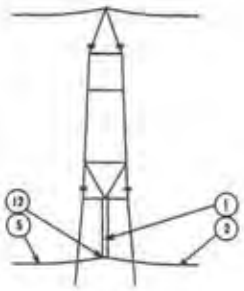


View A-A



Plan C-C

Plan D-D



View B-B

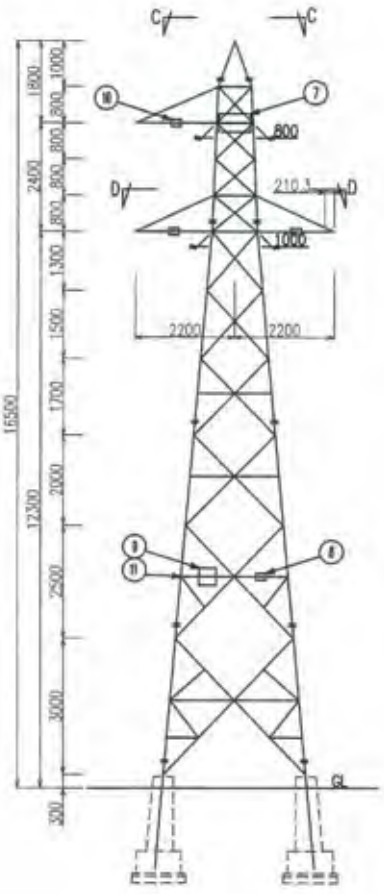
No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	懸垂碍子連セット Suspension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	対空番号札 Aero Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	危険防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇降防止装置 Anti-Climbing Guard	1 set
12	H-2-4-3	Armorロッド Armor Rods	3 set (3 phase)

General Design Condition

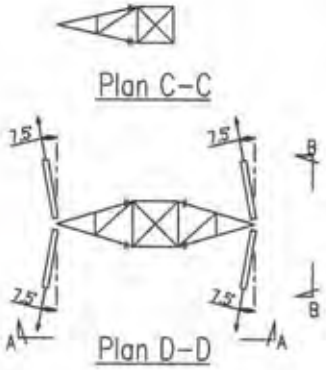
Voltage	66kV	Vertical angle	Σtanα = ±0.1
Circuit	1 cct	Wind load	460 Pa
Assumptive Span	200~250m	Wind load for Conductor	160 Pa
Horizontal angle	5°or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13mm		
Tension	20000 N		

SCALE	1:150	
TITLE	Type of Steel Tower[A+3m] 懸垂型 水平角度5度以下	DRG.NO. HT-02

B TYPE

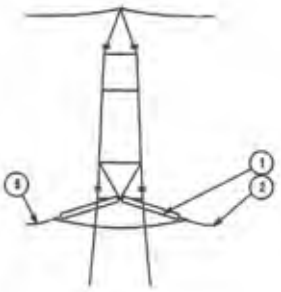


View A-A



Plan C-C

Plan D-D



View B-B

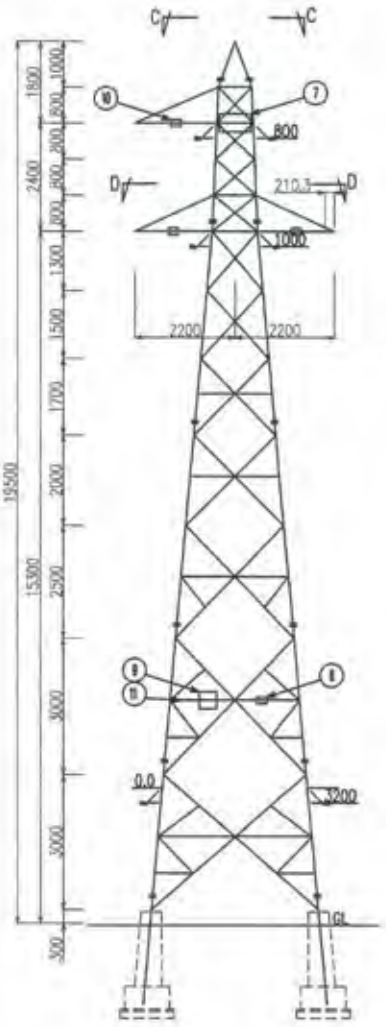
No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	懸垂碍子連セット Tension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	対空番号札 Aera Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	危険防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇降防止装置 Anti-Climbing Guard	1 set

General Design Condition

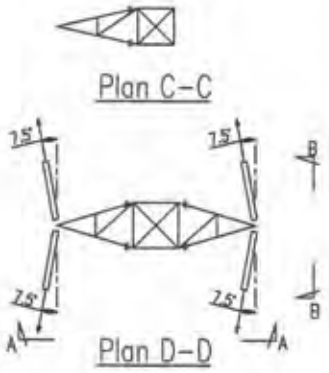
Voltage	66 kV	Vertical angle	Σtanα = ±0.1
Circuit	1 cct	Wind load	460 Pa
Assumptive Span	200~250m	Wind load for Conductor	160 Pa
Horizontal angle	15°or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726 kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13 mm		
Tension	20000 N		

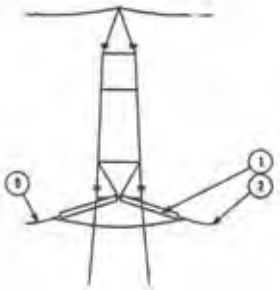
SCALE	1:150
TITLE	Type of Steel Tower[B] 耐張型 水平角度15度以下
DRG.NO.	HT-03

B TYPE+3000



View A-A





View B-B

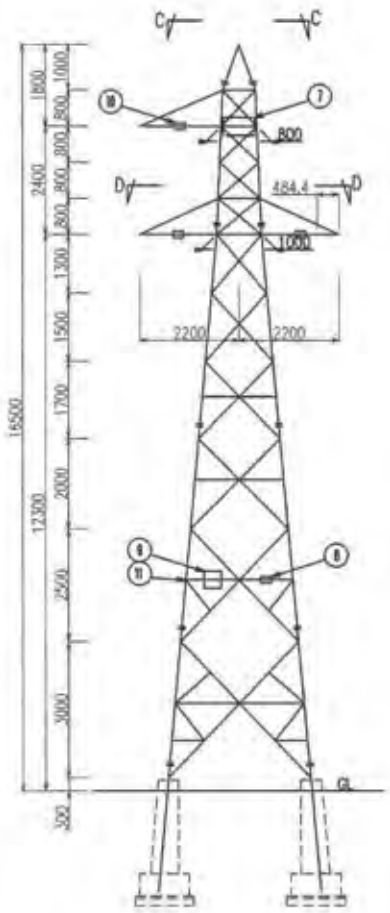
No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	懸垂碍子連セット Tension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	対空番号札 Aero Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	感電防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇柱防止装置 Anti-Climbing Guard	1 set

General Design Condition

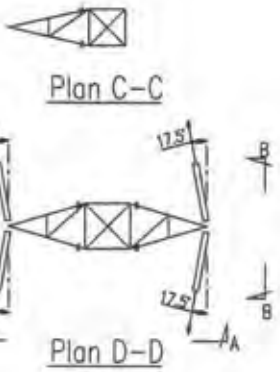
Voltage	66kV	Vertical angle	Tanα = ±0.1
Circuit	1 cct	Wind load	480 Pa
Assumptive Span	200~250m	Wind load for Conductor	160 Pa
Horizontal angle	15°or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726 kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13mm		
Tension	20000 N		

SCALE	1:150
TITLE	Type of Steel Tower[B+3m] 耐張型 水平角度15度以下
DRG.NO.	HT-04

C TYPE

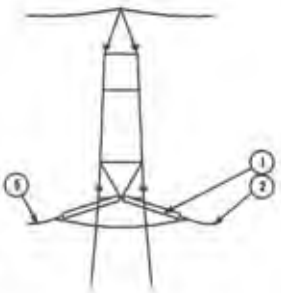


View A-A



Plan C-C

Plan D-D



View B-B

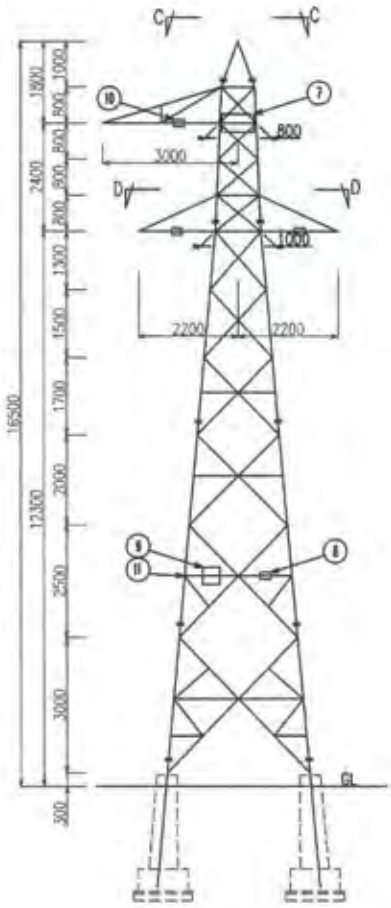
No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	耐張碍子連セット Tension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	対空標示札 Aero Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	危険防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇降防止装置 Anti-Climbing Guard	1 set

General Design Condition

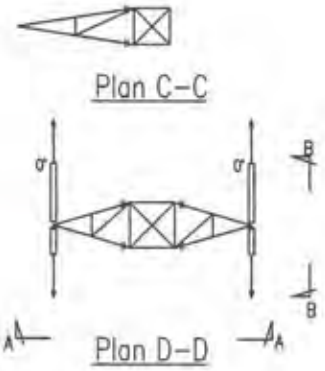
Voltage	66kV	Vertical angle	Tanα = ±0.1
Circuit	1 cct	Wind load	460 Pa
Assumptive Span	200~250m	Wind load for Conductor	160 Pa
Horizontal angle	35° or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13mm		
Tension	20000 N		

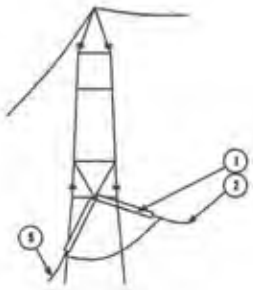
SCALE	1:150
TITLE	Type of Steel Tower[C] 耐張型 水平角度35度以下
DRG.NO.	HT-05

D TYPE



View A-A





View B-B

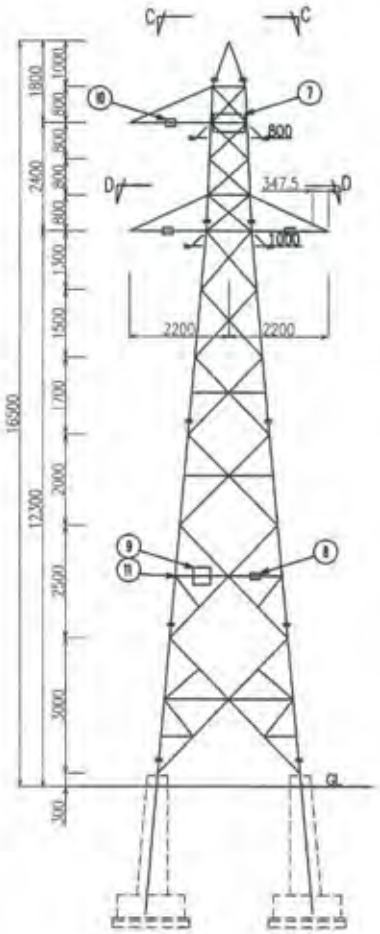
No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	懸垂碍子連セット Tension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
			1 set
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	対空番号札 Aero Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	危険防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇降防止装置 Anti-Climbing Guard	1 set

General Design Condition

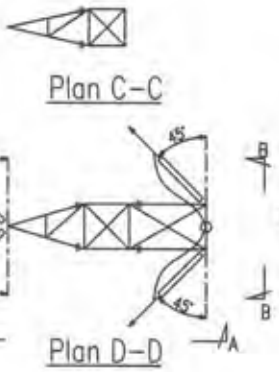
Voltage	66 kV	Vertical angle	Σtanθ= ±0.1
Circuit	1 cct	Wind load	460 Pa
Assumptive Span	200~250m	Wind load for Conductor	160 Pa
Horizontal angle	5°or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726 kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13 mm		
Tension	20000 N		

SCALE	1:150
TITLE	Type of Steel Tower[D] 耐張型 引留
DRG.NO.	HT-06

R TYPE

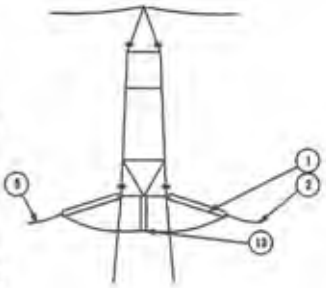


View A-A



Plan C-C

Plan D-D



View B-B

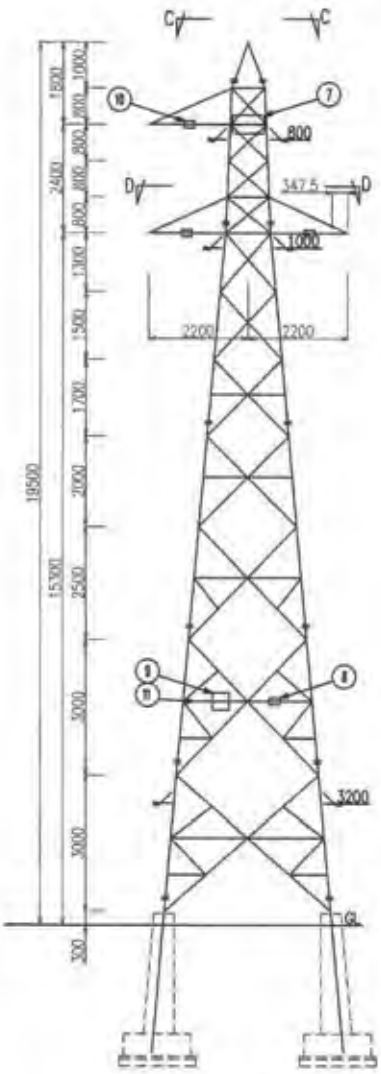
No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	懸垂碍子連セット Tension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	対空番号札 Aero Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	危険防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇降防止装置 Anti-Climbing Guard	1 set
13	H-2-3	ジャンパ用支持碍子セット Support Insulator for Jumper Conductor	1 set

General Design Condition

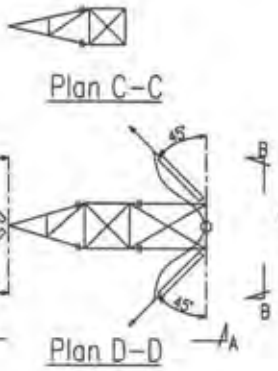
Voltage	66 kV	Vertical angle	Tone= ±0.1
Circuit	1 cct	Wind load	460 Pa
Assumptive Span	200~250 m	Wind load for Conductor	160 Pa
Horizontal angle	90°or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726 kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13 mm		
Tension	20000 N		

SCALE	1:150	
TITLE Type of Steel Tower[R] 耐張型 水平角度90度以下		DRG.NO. HT-07

R TYPE+3000

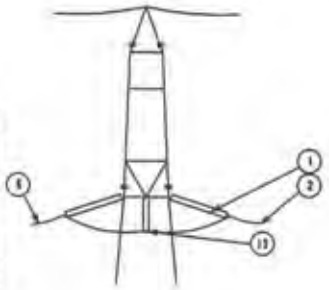


View A-A



Plan C-C

Plan D-D



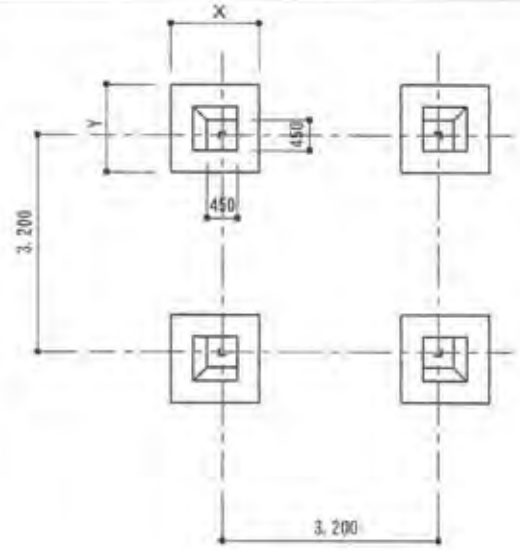
View B-B

No.	EQUIPMENT	DESCRIPTION	Q'TY
1	H-2-1	懸垂碍子連セット Tension Insulator set	3 set (3 phase)
2	H-2-4-1	ダンパクランプアルミ電線用 Damper Clamp for Aluminum Conductor	6 set (3 phase)
5	H-3-1	鋼心アルミ電線 ACSR 150mm2 (Wolf)	1 lot
7	H-4-1	航空標示札 Aero Plate	1 set
8	H-4-2	番号札 Number Plate	1 set
9	H-4-3	危険防止札 Danger Plate	1 set
10	H-4-4	相表示札 Phase Plate	3 set (3 phase)
11	H-4-5	昇降防止装置 Anti-Climbing Guard	1 set
13	H-2-3	ジャンパ用支持碍子セット Support Insulator for Jumper Conductor	1 set

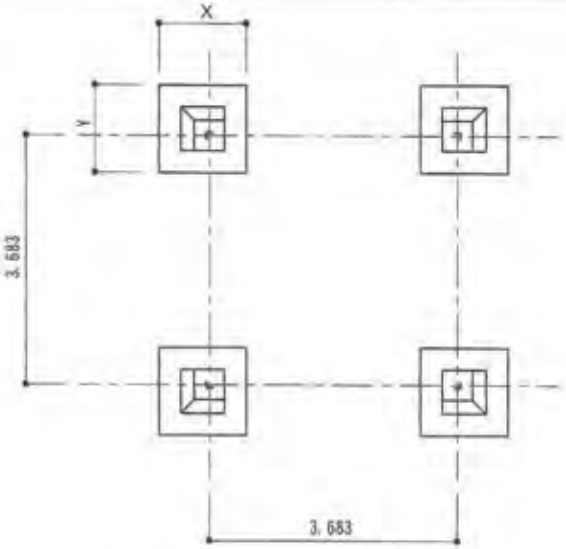
General Design Condition

Voltage	66kV	Vertical angle	Δtanα = ±0.1
Circuit	1 cct	Wind load	460 Pa
Assumptive Span	200~250m	Wind load for Conductor	160 Pa
Horizontal angle	90°or less		
Insulator			
Type	Ball Socket 250		
Number	6pcs/set		
Proof stress	100 kg/support		
Wind load	80 N/support		
Conductor		Reference	
Type	ACSR150	Seismic load	0.1G
Weight	0.726 kg/m	Horizontal seismic coefficient	0.1G
Diameter	18.13 mm		
Tension	20000 N		

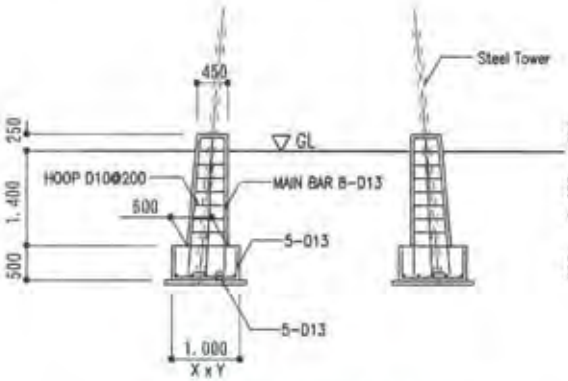
SCALE	1:150
TITLE	Type of Steel Tower[R+3m] 耐張型 水平角度90度以下
DRG.NO.	HT-08



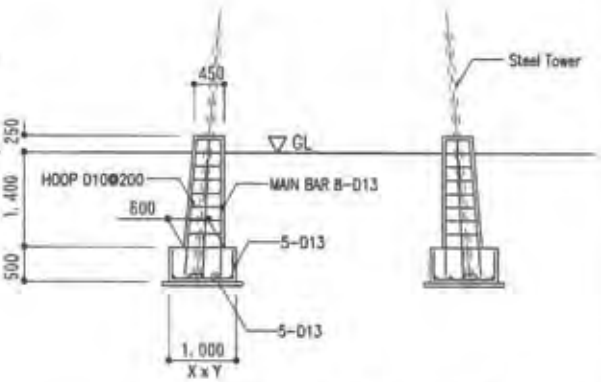
FOUNDATION PLAN
TYPE "A" "B"



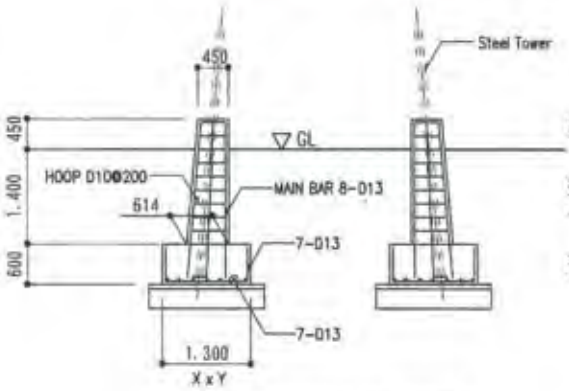
FOUNDATION PLAN
TYPE "A+3" "B+3"



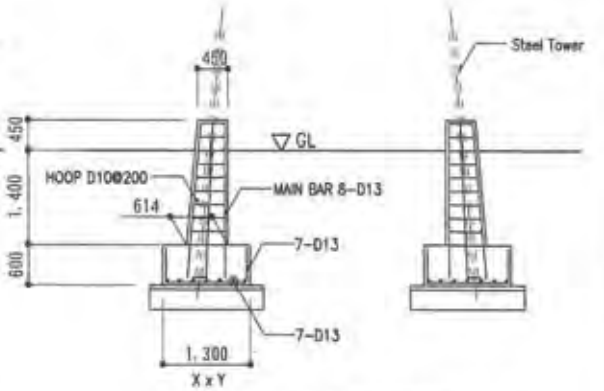
FOUNDATION SECTION
for Good Ground TYPE "A" "B"



FOUNDATION SECTION
for Good Ground TYPE "A+3" "B+3"

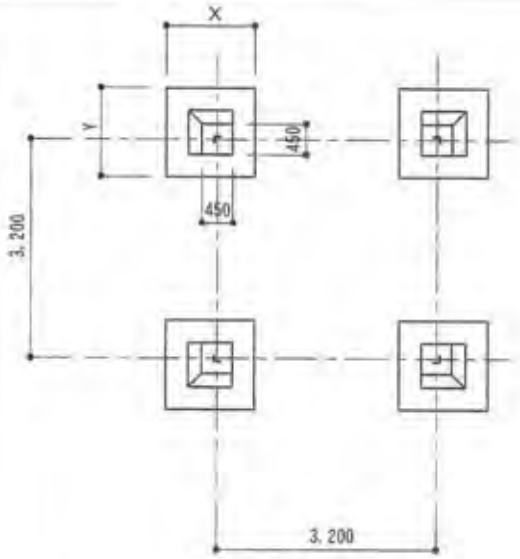


FOUNDATION SECTION
for Soft Ground TYPE "A" "B"

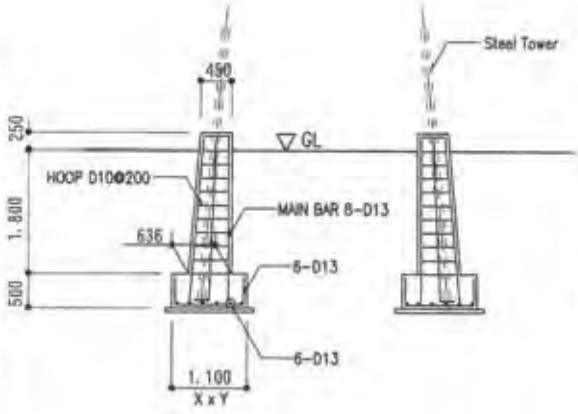


FOUNDATION SECTION
for Soft Ground TYPE "A+3" "B+3"

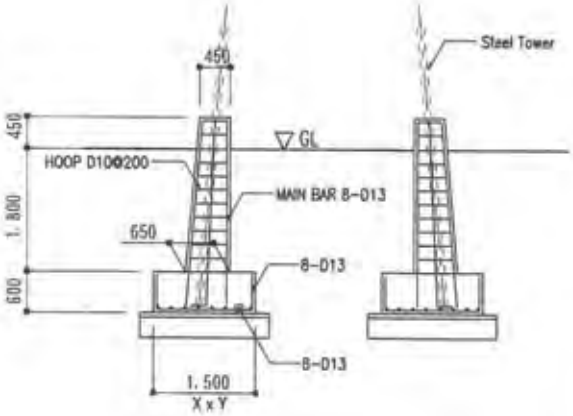
SCALE	1:100	
TITLE	Foundation Plan and Section [A] [A+3] [B] [B+3] 一般地盤 軟弱地盤	DRG.NO. HF-01



FOUNDATION PLAN
TYPE "C" "D"

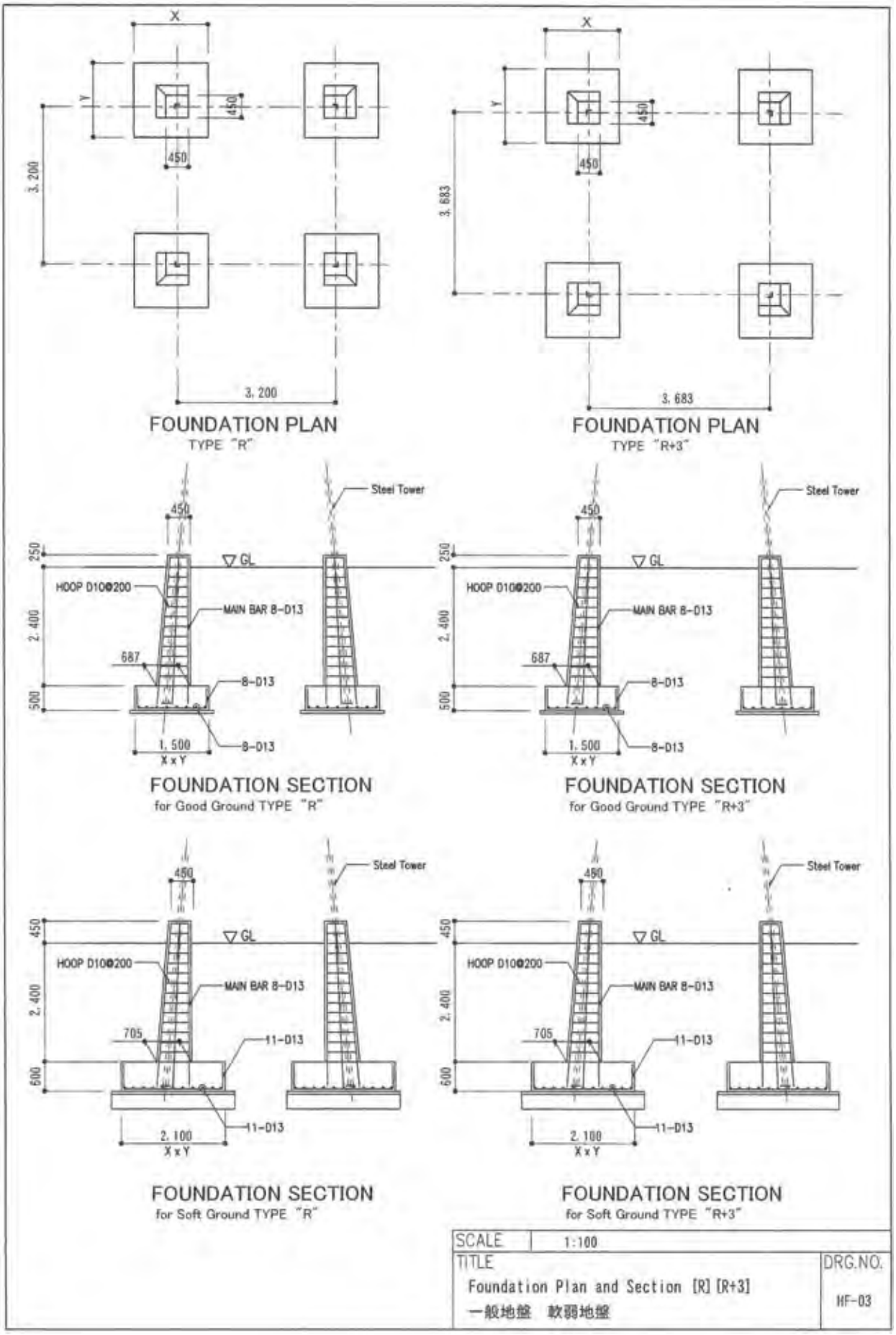


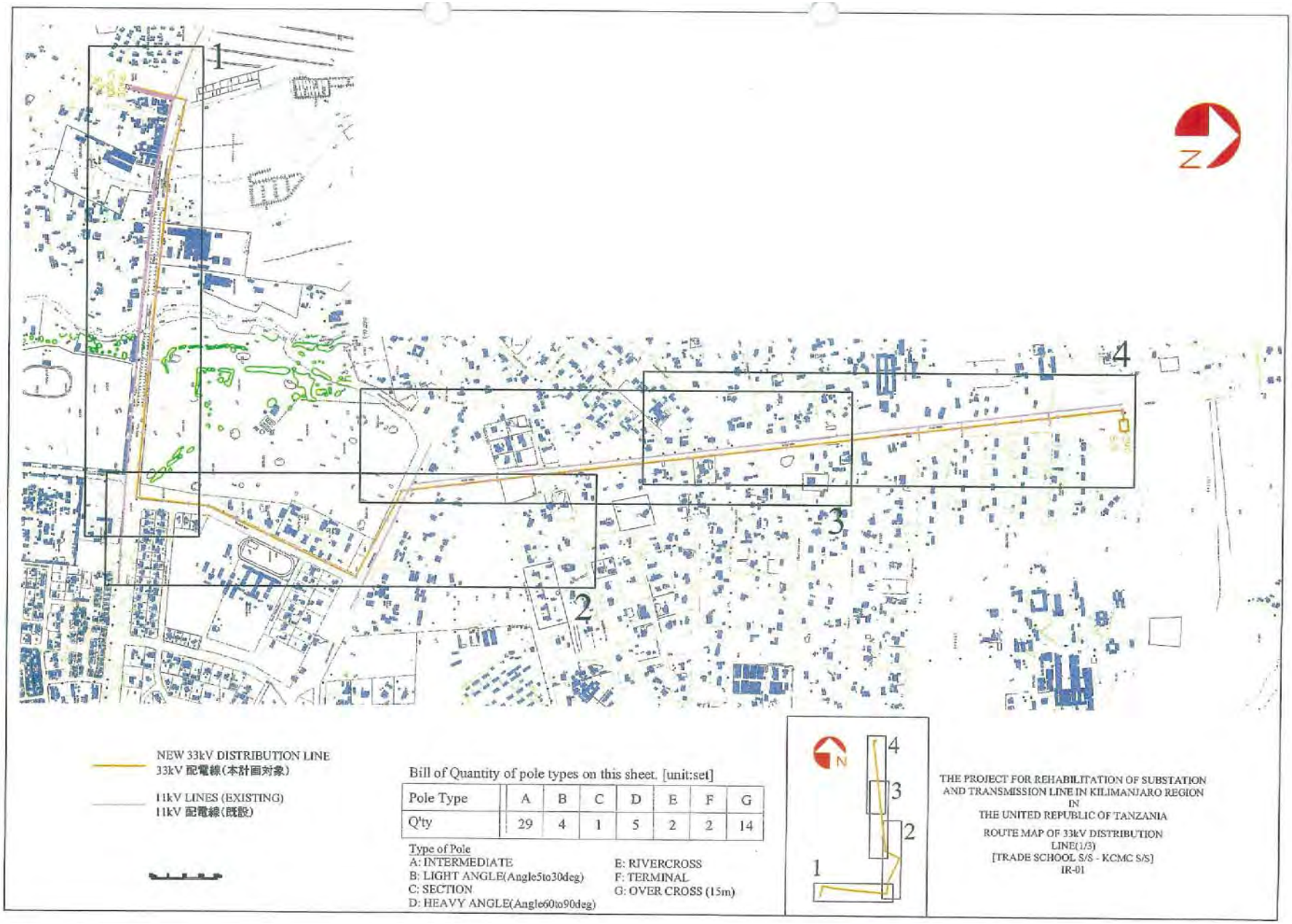
FOUNDATION SECTION
for Good Ground TYPE "C" "D"

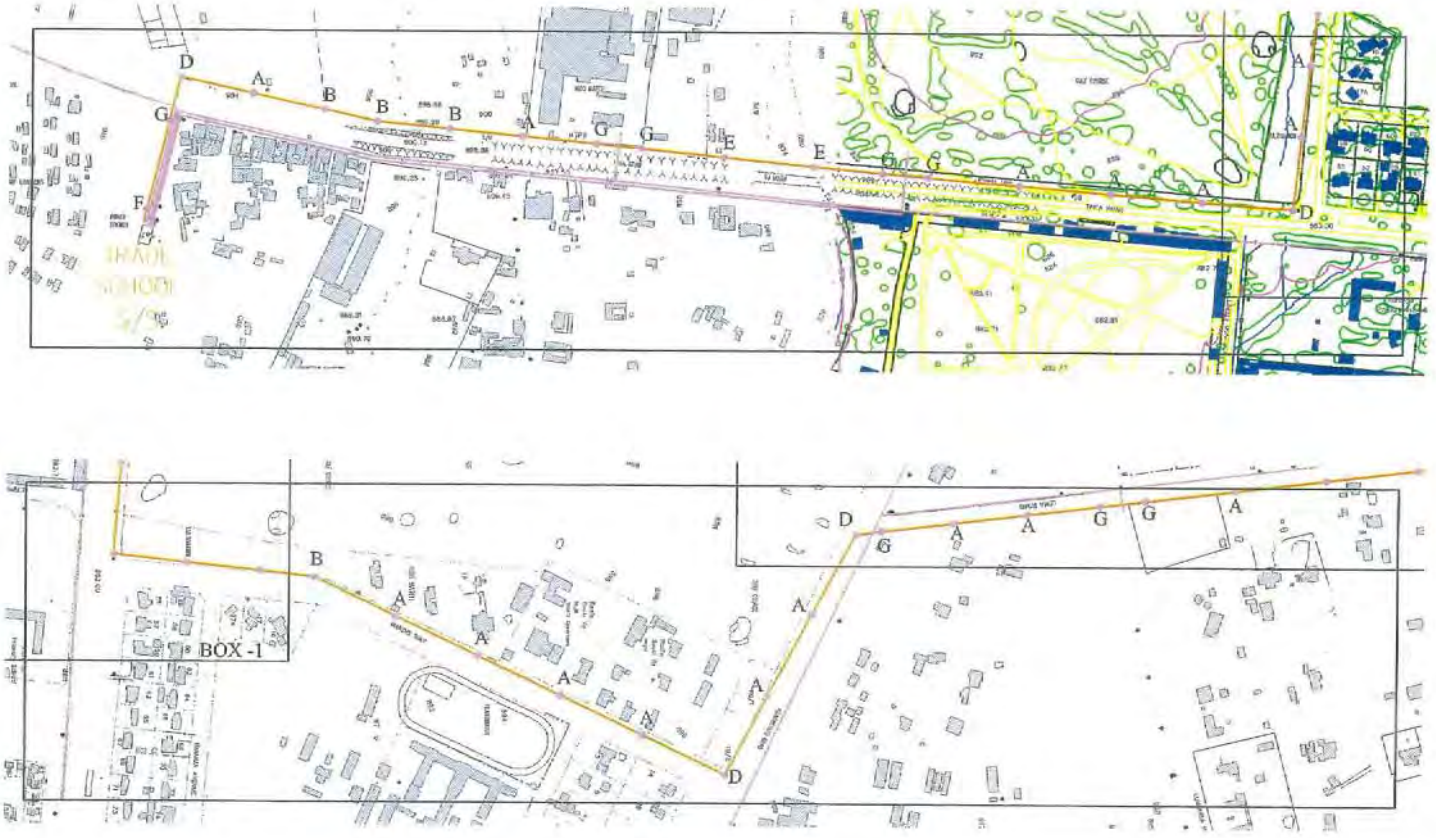


FOUNDATION SECTION
for Soft Ground TYPE "C" "D"

SCALE	1:100
TITLE	Foundation Plan and Section [C] [D] 一般地盤 軟弱地盤
DRG.NO.	HF-02


X
Y
450
3,200
3,200
FOUNDATION PLAN
TYPE "R"
3,683
3,683
FOUNDATION PLAN
TYPE "R+3"
Steel Tower
GL
HOOP D10@200
MAIN BAR 8-D13
687
8-D13
1,500
X x Y
FOUNDATION SECTION
for Good Ground TYPE "R"
FOUNDATION SECTION
for Good Ground TYPE "R+3"
705
11-D13
2,100
FOUNDATION SECTION
for Soft Ground TYPE "R"
FOUNDATION SECTION
for Soft Ground TYPE "R+3"
SCALE
1:100
TITLE
Foundation Plan and Section [R] [R+3]
一般地盤 軟弱地盤
DRG.NO.
NF-03


1
2
3
4
N
NEW 33kV DISTRIBUTION LINE
33kV 配電線(本計画対象)
11kV LINES (EXISTING)
11kV 配電線(既設)
Bill of Quantity of pole types on this sheet. [unit:set]
Pole Type | A | B | C | D | E | F | G
Q'ty | 29 | 4 | 1 | 5 | 2 | 2 | 14
Type of Pole
A: INTERMEDIATE
B: LIGHT ANGLE(Angle5to30deg)
C: SECTION
D: HEAVY ANGLE(Angle60to90deg)
E: RIVERCROSS
F: TERMINAL
G: OVER CROSS (15m)
THE PROJECT FOR REHABILITATION OF SUBSTATION AND TRANSMISSION LINE IN KILIMANJARO REGION IN THE UNITED REPUBLIC OF TANZANIA
ROUTE MAP OF 33kV DISTRIBUTION LINE(1/3)
[TRADE SCHOOL S/S - KCMC S/S]
IR-01



NEW 33kV DISTRIBUTION LINE
33kV 配電線(本計画対象)

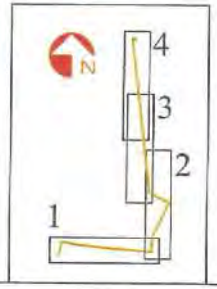
11kV LINES (EXISTING)
11kV 配電線(既設)

50m 0 50 100 150m

Bill of Quantity of pole types on this sheet. [unit:set]

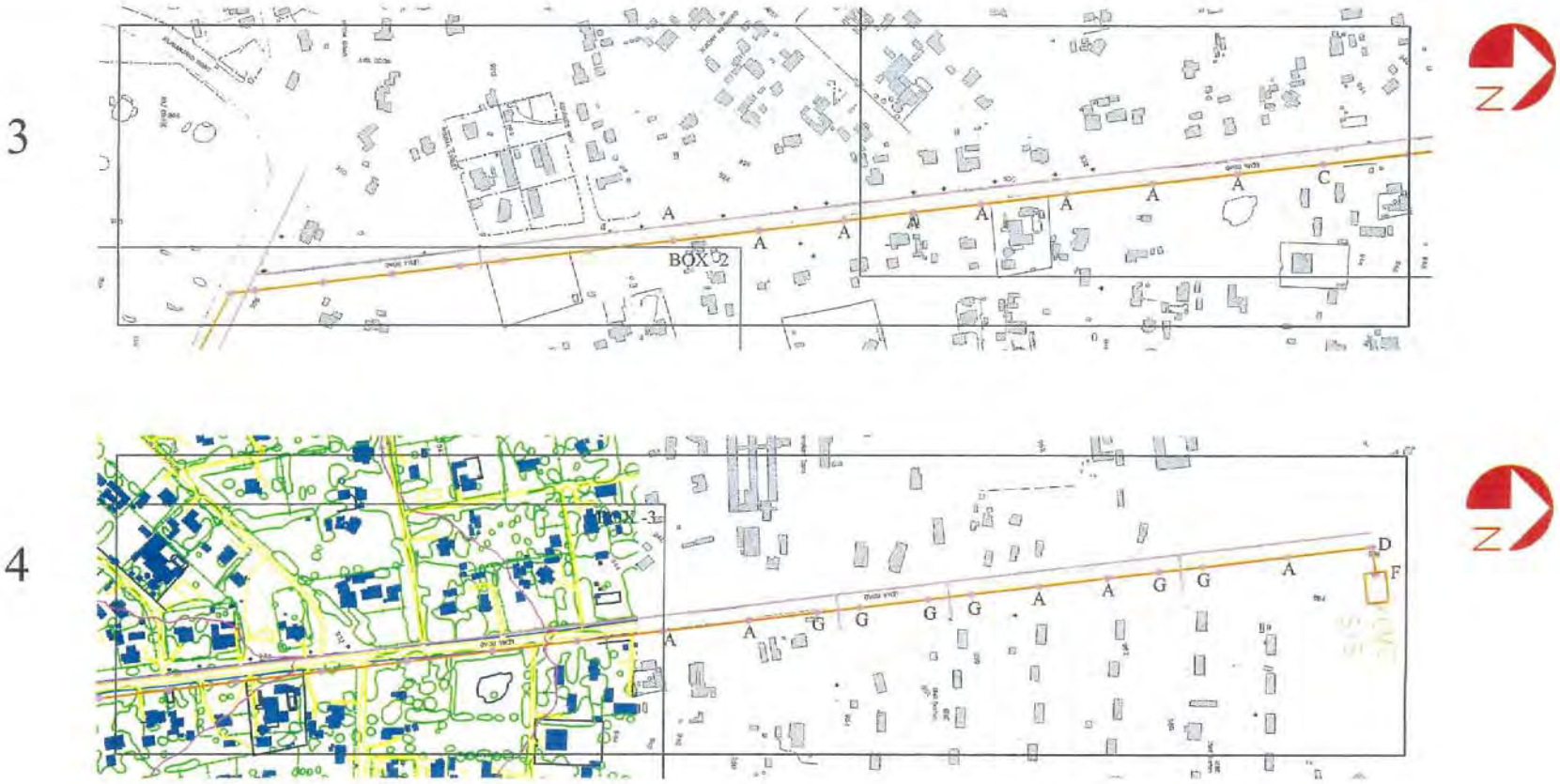
Pole Type	A	B	C	D	E	F	G
Q'ty	16	4	--	4	2	1	8

Type of Pole
A: INTERMEDIATE
B: LIGHT ANGLE(Angle5to30deg)
C: SECTION
D: HEAVY ANGLE(Angle60to90deg)
E: RIVERCROSS
F: TERMINAL
G: OVER CROSS (15m)



THE PROJECT FOR REHABILITATION OF SUBSTATION AND TRANSMISSION LINE IN KILIMANJARO REGION IN THE UNITED REPUBLIC OF TANZANIA

ROUTE MAP OF 33kV DISTRIBUTION LINE(2/3)
[TRADE SCHOOL S/S - KCMC S/S]
IR-02



NEW 33kV DISTRIBUTION LINE
33kV 配電線(本計画対象)

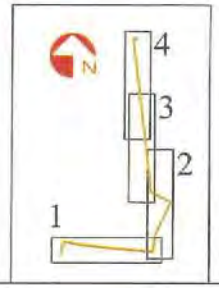
11kV LINES (EXISTING)
11kV 配電線(既設)

50m 0 50 100 150m

Bill of Quantity of pole types on this sheet. [unit:set]

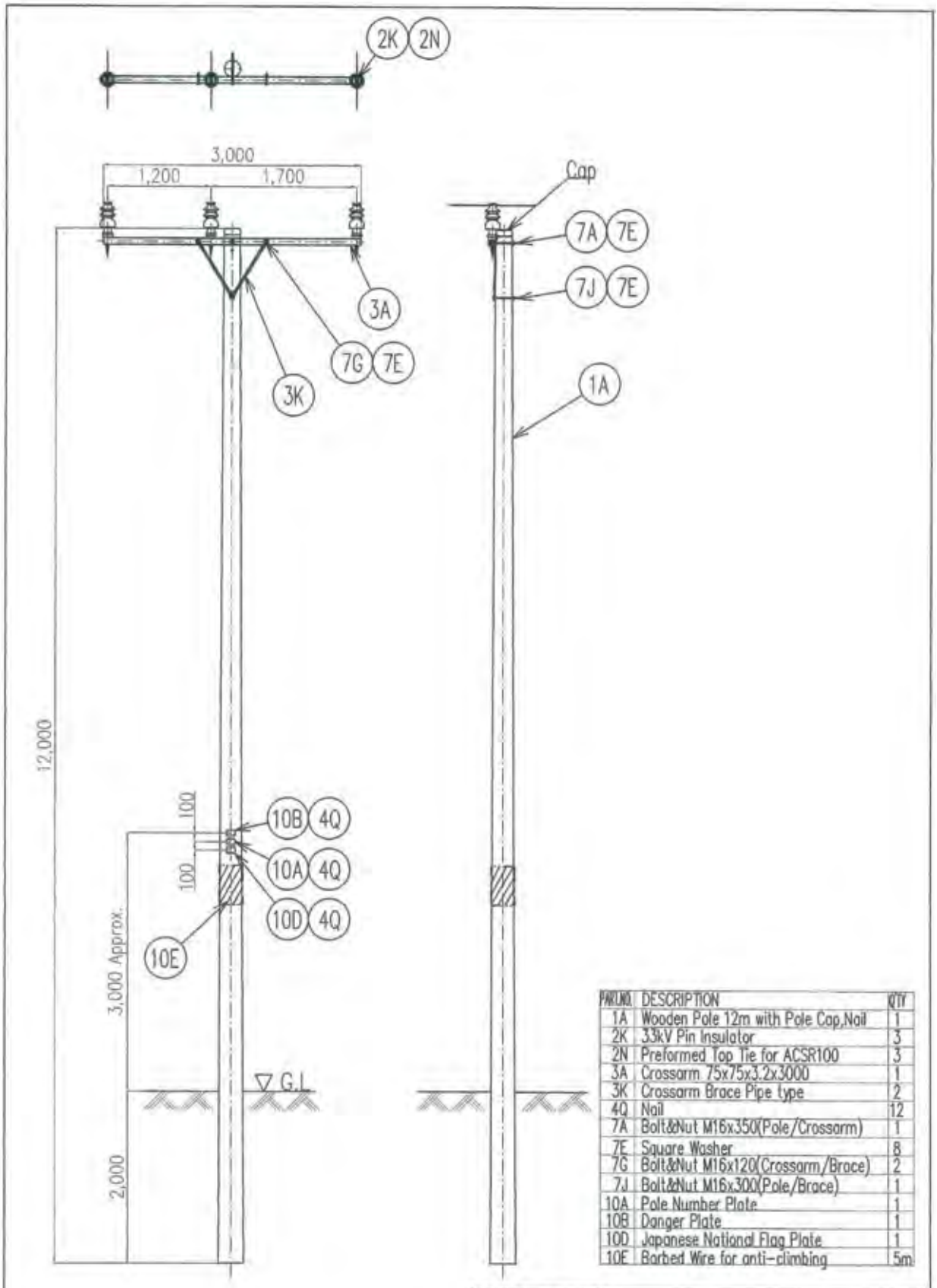
Pole Type	A	B	C	D	E	F	G
Q'ty	13	--	1	1	--	1	6

Type of Pole
A: INTERMEDIATE
B: LIGHT ANGLE(Angle5to30deg)
C: SECTION
D: HEAVY ANGLE(Angle60to90deg)
E: RIVERCROSS
F: TERMINAL
G: OVER CROSS (15m)



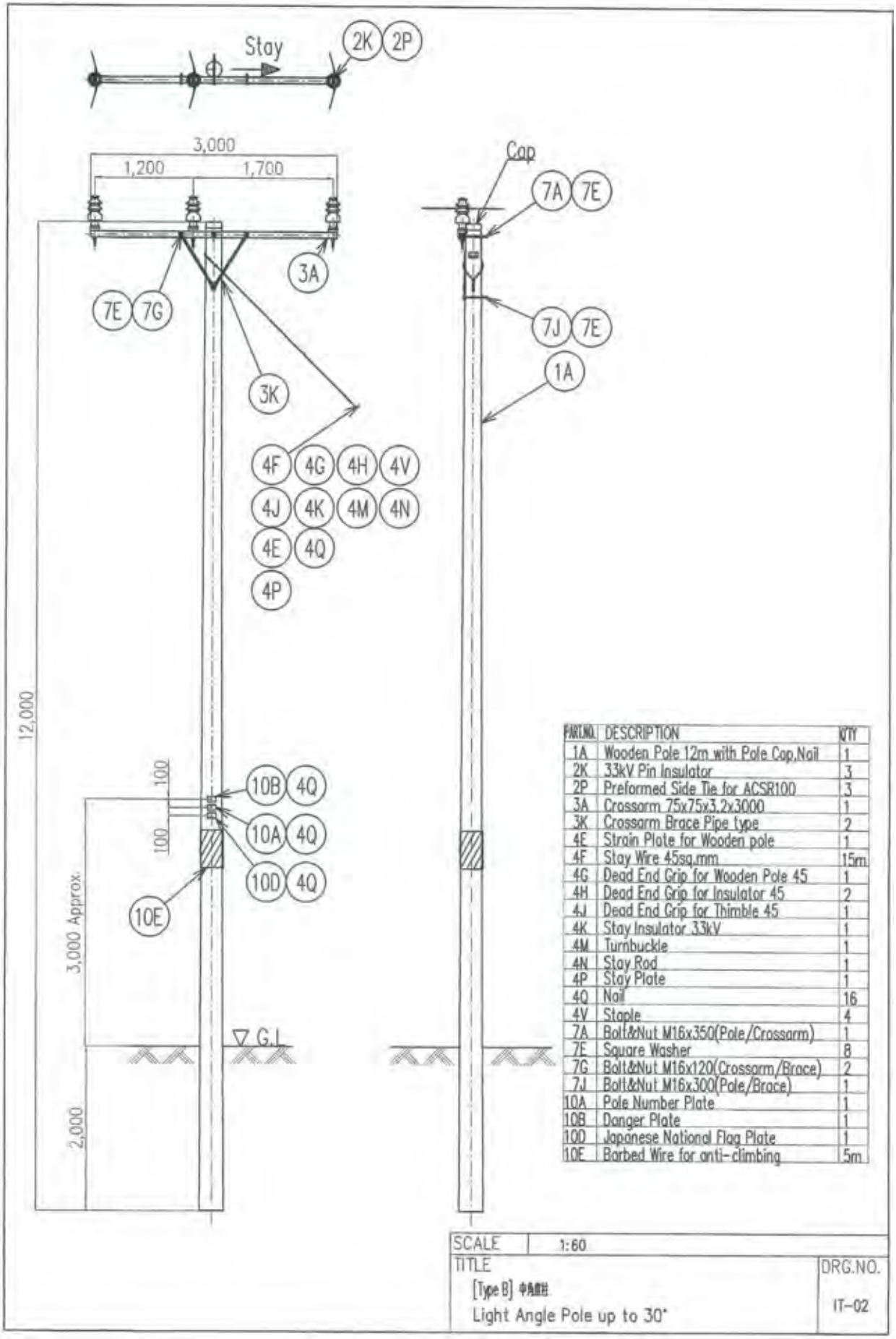
THE PROJECT FOR REHABILITATION OF SUBSTATION AND TRANSMISSION LINE IN KILIMANJARO REGION
IN
THE UNITED REPUBLIC OF TANZANIA

ROUTE MAP OF 33kV DISTRIBUTION LINE(3/3)
[TRADE SCHOOL S/S - KCMC S/S]
1R-03



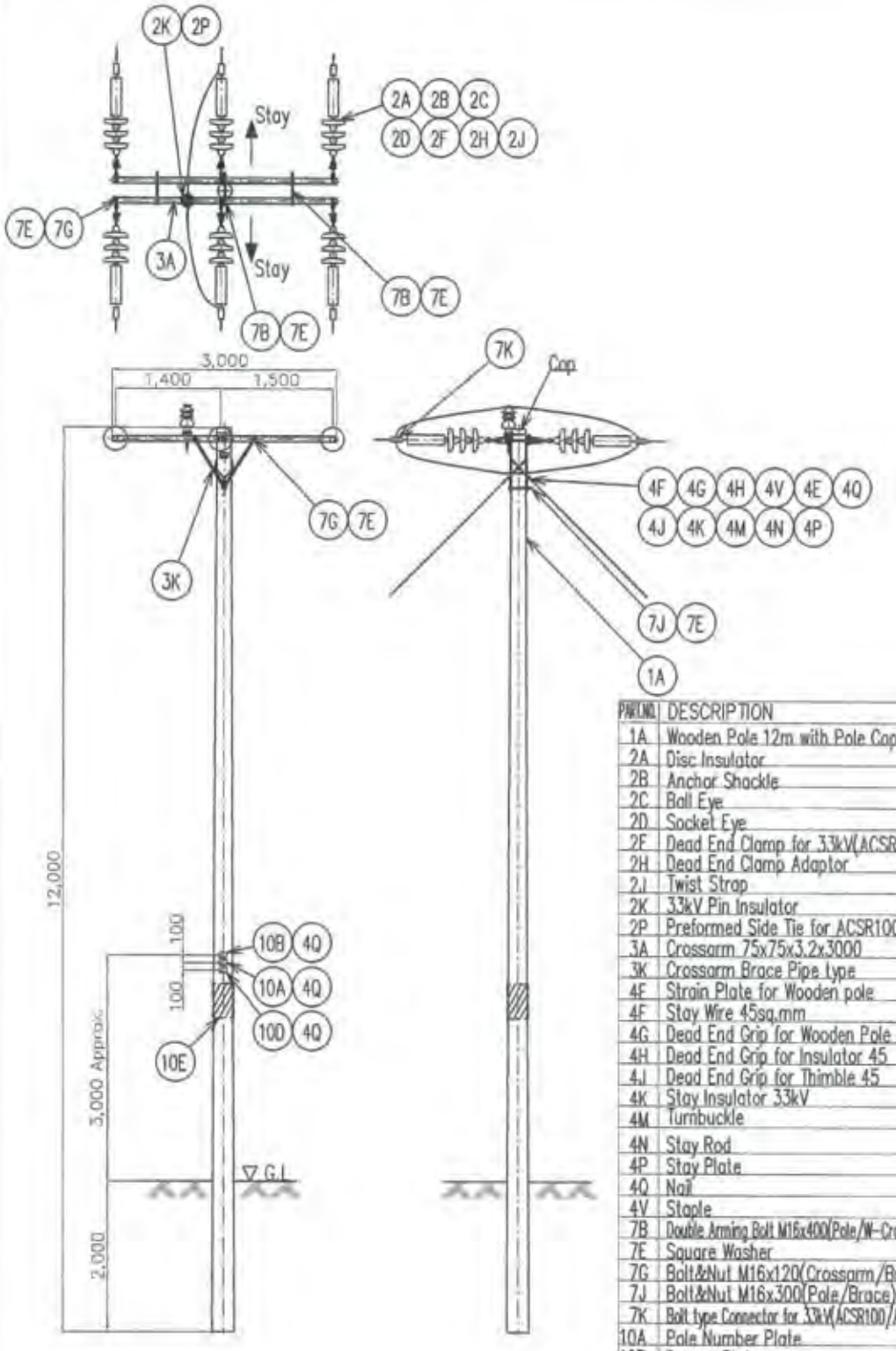
PART NO.	DESCRIPTION	QTY
1A	Wooden Pole 12m with Pole Cap,Nail	1
2K	33kV Pin Insulator	3
2N	Preformed Top Tie for ACSR100	3
3A	Crossarm 75x75x3.2x3000	1
3K	Crossarm Brace Pipe type	2
4Q	Nail	12
7A	Bolt&Nut M16x350(Pole/Crossarm)	1
7E	Square Washer	8
7G	Bolt&Nut M16x120(Crossarm/Brace)	2
7J	Bolt&Nut M16x300(Pole/Brace)	1
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	5m

SCALE	1:60	
TITLE	[Type A] 単柱形 Intermediate Pole Line Angle 0°	DRG.NO. IT-01



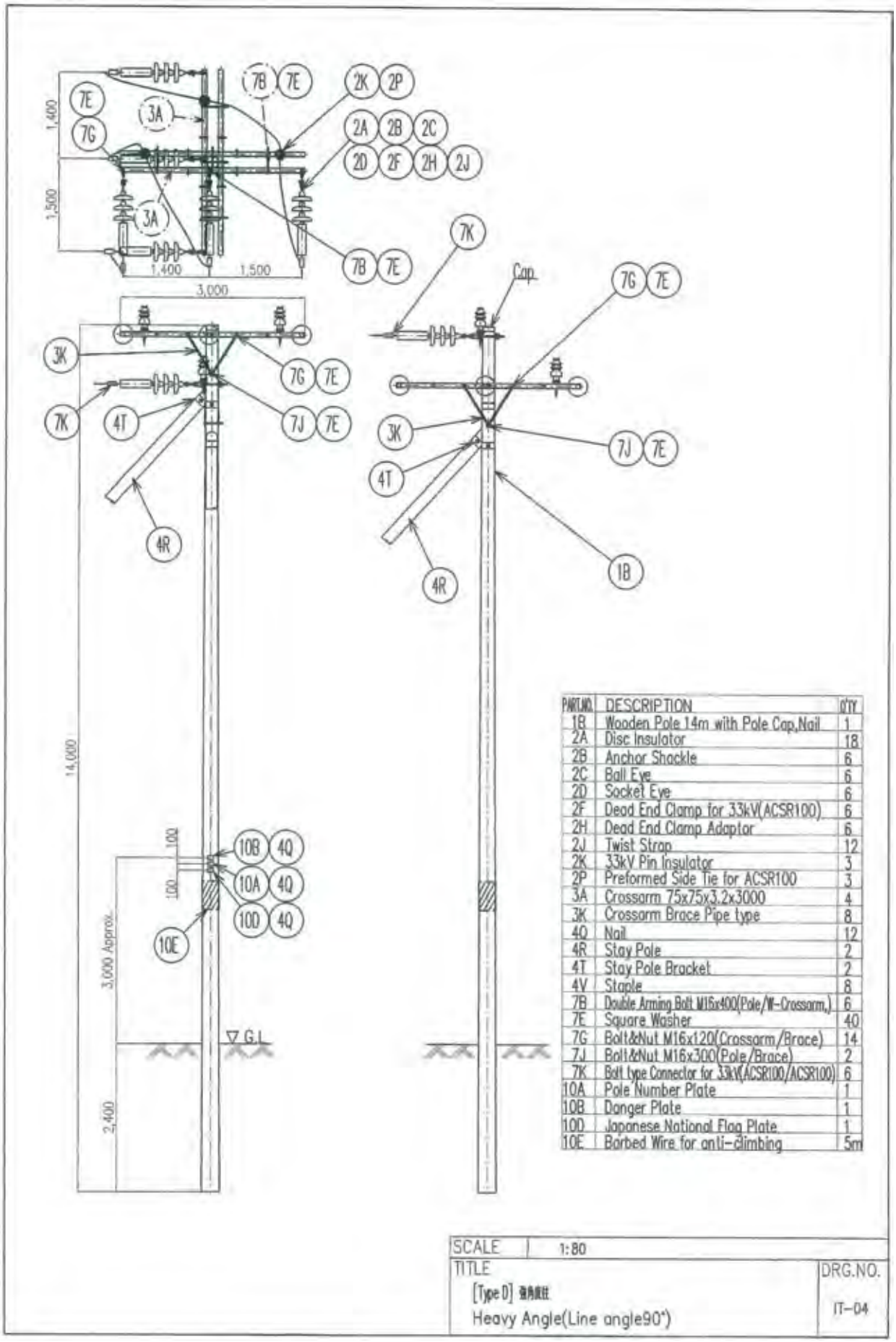
PART NO.	DESCRIPTION	QTY
1A	Wooden Pole 12m with Pole Cap,Nail	1
2K	33kV Pin Insulator	3
2P	Preformed Side Tie for ACSR100	3
3A	Crossarm 75x75x3.2x3000	1
3K	Crossarm Brace Pipe type	2
4E	Strain Plate for Wooden pole	1
4F	Stay Wire 45sq.mm	15m
4G	Dead End Grip for Wooden Pole 45	1
4H	Dead End Grip for Insulator 45	2
4J	Dead End Grip for Thimble 45	1
4K	Stay Insulator 33kV	1
4M	Turnbuckle	1
4N	Stay Rod	1
4P	Stay Plate	1
4Q	Nail	16
4V	Staple	4
7A	Bolt&Nut M16x350(Pole/Crossarm)	1
7E	Square Washer	8
7G	Bolt&Nut M16x120(Crossarm/Brace)	2
7J	Bolt&Nut M16x300(Pole/Brace)	1
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	5m

SCALE	1:60	
TITLE	[Type B] 中角柱 Light Angle Pole up to 30°	DRG.NO. IT-02



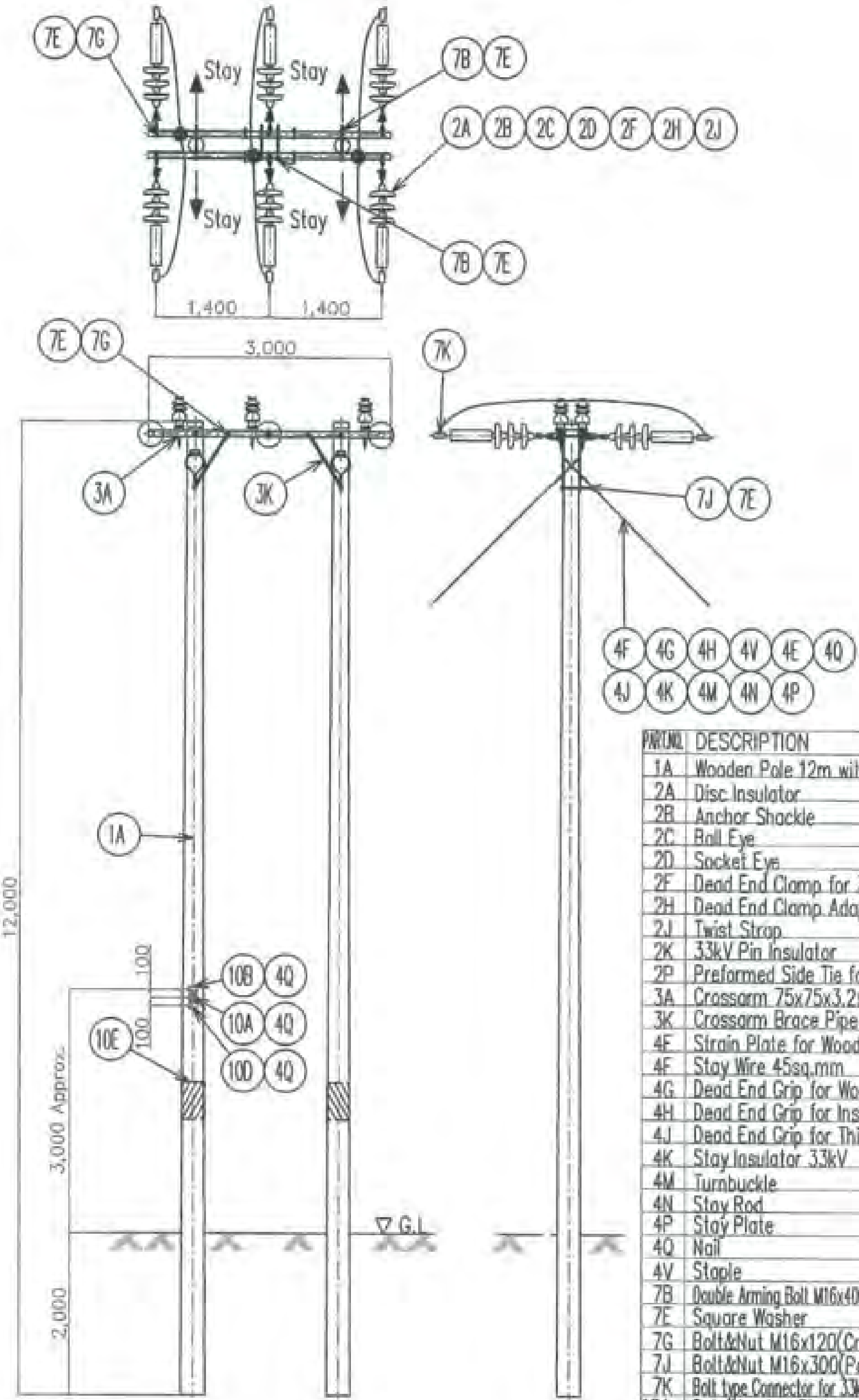
PART NO.	DESCRIPTION	QTY
1A	Wooden Pole 12m with Pole Cap,Nail	1
2A	Disc Insulator	18
2B	Anchor Shackle	6
2C	Ball Eye	6
2D	Socket Eye	6
2F	Dead End Clamp for 33kV(ACSR100)	6
2H	Dead End Clamp Adaptor	6
2J	Twist Strap	12
2K	33kV Pin Insulator	1
2P	Preformed Side Tie for ACSR100	1
3A	Crossarm 75x75x3.2x3000	2
3K	Crossarm Brace Pipe type	4
4E	Strain Plate for Wooden pole	2
4F	Stay Wire 45sq.mm	30m
4G	Dead End Grip for Wooden Pole 45	2
4H	Dead End Grip for Insulator 45	4
4J	Dead End Grip for Thimble 45	2
4K	Stay Insulator 33kV	2
4M	Turnbuckle	2
4N	Stay Rod	2
4P	Stay Plate	2
4Q	Nail	20
4V	Staple	8
7B	Double Arming Bolt M16x400(Pole/W-Crossarm)	3
7E	Square Washer	20
7G	Bolt&Nut M16x120(Crossarm/Brace)	10
7J	Bolt&Nut M16x300(Pole/Brace)	1
7K	Bolt type Connector for 33kV(ACSR100/ACSR100)	6
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	5m

SCALE	1:80	
TITLE	[Type C] 耐張柱 Section pole	DRG.NO. IT-03



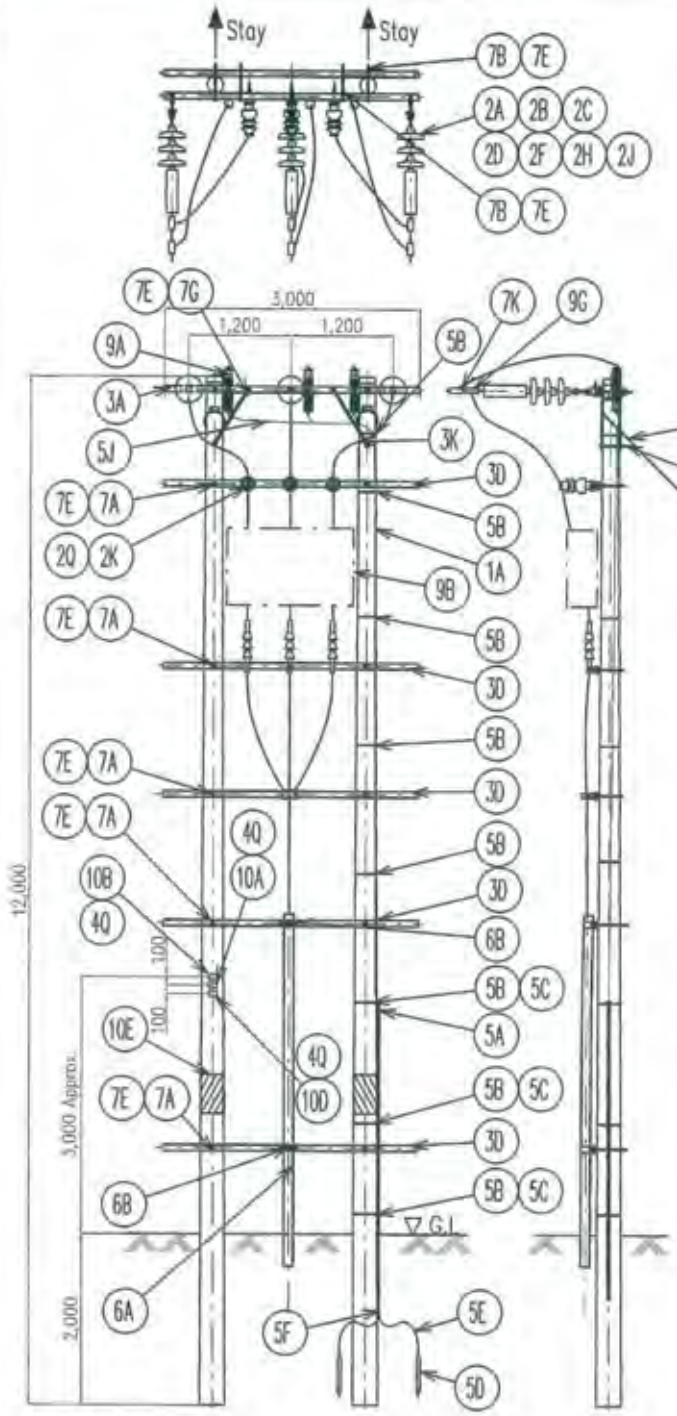
PART NO.	DESCRIPTION	Q'TY
1B	Wooden Pole 14m with Pole Cap,Nail	1
2A	Disc Insulator	18
2B	Anchor Shackle	6
2C	Ball Eye	6
2D	Socket Eye	6
2F	Dead End Clamp for 33kV(ACSR100)	6
2H	Dead End Clamp Adaptor	6
2J	Twist Strap	12
2K	33kV Pin Insulator	3
2P	Preformed Side Tie for ACSR100	3
3A	Crossarm 75x75x3.2x3000	4
3K	Crossarm Brace Pipe type	8
4Q	Nail	12
4R	Stay Pole	2
4T	Stay Pole Bracket	2
4V	Staple	8
7B	Double Arming Bolt M16x400(Pole/W-Crossarm,)	6
7E	Square Washer	40
7G	Bolt&Nut M16x120(Crossarm/Brace)	14
7J	Bolt&Nut M16x300(Pole/Brace)	2
7K	Bolt type Connector for 33kV(ACSR100/ACSR100)	6
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	5m

SCALE	1:80
TITLE	[Type D] 強角鉄柱 Heavy Angle(Line angle90°)
DRG.NO.	IT-04



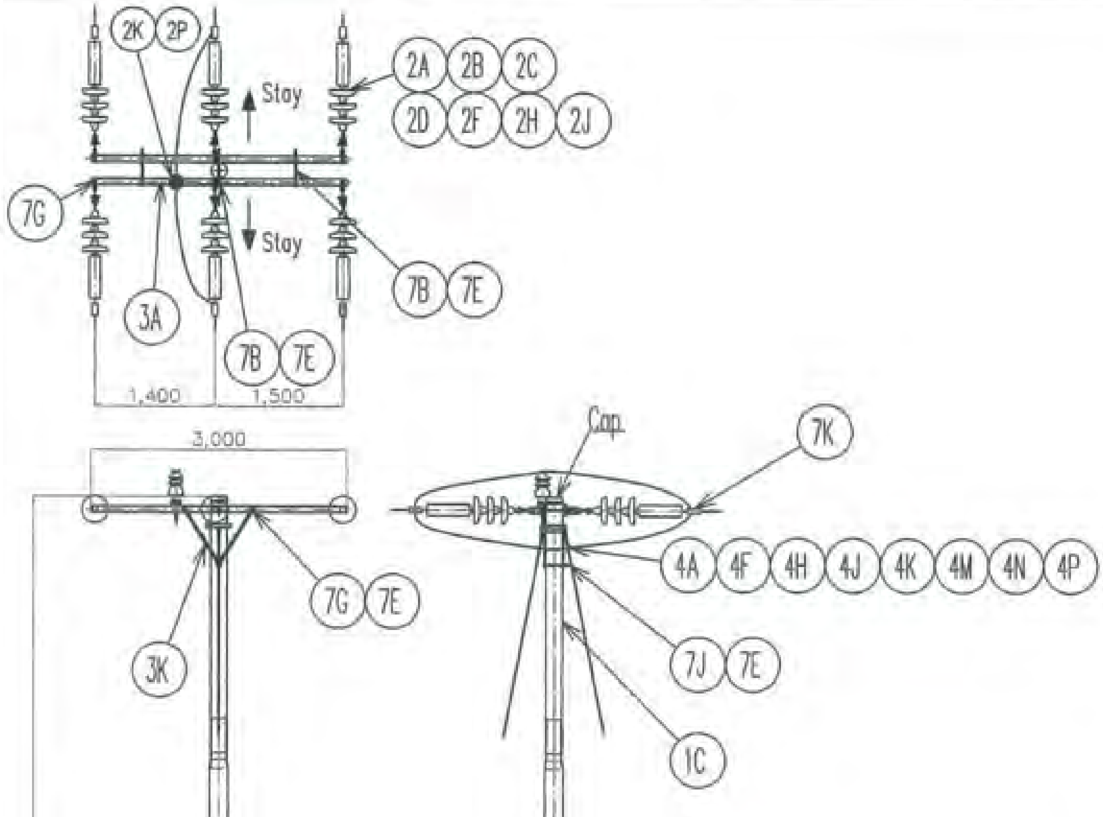
PART.NO.	DESCRIPTION	Q'TY
1A	Wooden Pole 12m with Pole Cap,Nail	2
2A	Disc Insulator	18
2B	Anchor Shackle	6
2C	Ball Eye	6
2D	Socket Eye	6
2F	Dead End Clamp for 33kV(ACSR100)	6
2H	Dead End Clamp Adaptor	6
2J	Twist Strap	12
2K	33kV Pin Insulator	3
2P	Preformed Side Tie for ACSR100	3
3A	Crossarm 75x75x3.2x3000	2
3K	Crossarm Brace Pipe type	4
4E	Strain Plate for Wooden pole	4
4F	Stay Wire 45sq.mm	60m
4G	Dead End Grip for Wooden Pole 45	4
4H	Dead End Grip for Insulator 45	8
4J	Dead End Grip for Thimble 45	4
4K	Stay Insulator 33kV	4
4M	Turnbuckle	4
4N	Stay Rod	4
4P	Stay Plate	4
4Q	Nail	28
4V	Staple	16
7B	Double Arming Bolt M16x400(Pole/W-Crossarm,)	4
7E	Square Washer	24
7G	Bolt&Nut M16x120(Crossarm/Brace)	10
7J	Bolt&Nut M16x300(Pole/Brace)	2
7K	Bolt type Connector for 33kV(ACSR100/ACSR100)	6
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	10m

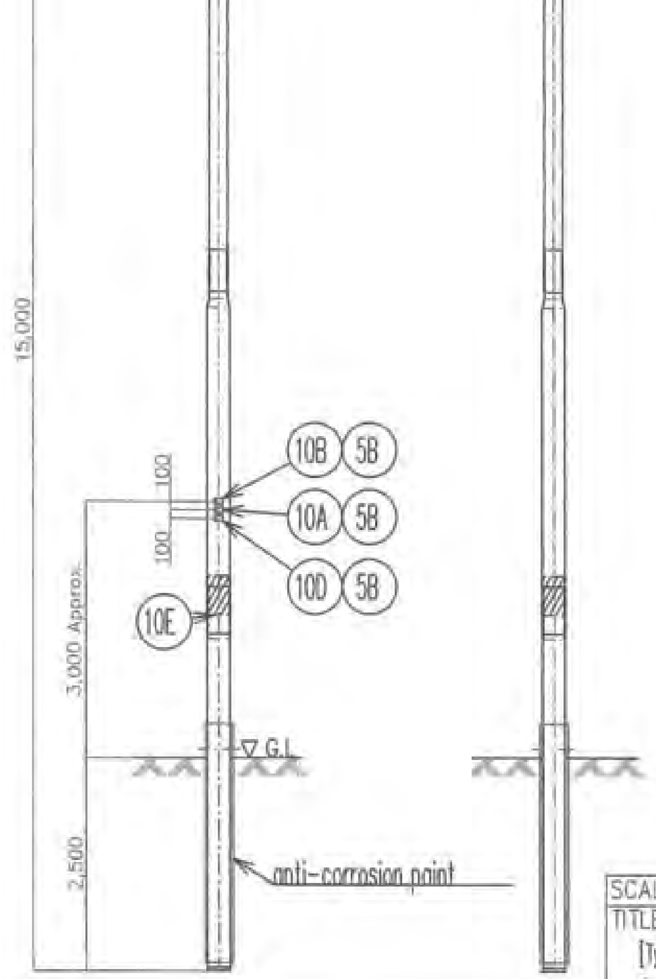
SCALE	1:80	
TITLE [Type E] Rivercross pole		DRG.NO. IT-05



MARK	DESCRIPTION	QTY
1A	Wooden Pole 12m with Pole Cap,Nail	2
2A	Disc Insulator	9
2B	Anchor Shackle	3
2C	Ball Eye	3
2D	Socket Eye	3
2F	Dead End Clamp for 33kV(ACSR100)	3
2H	Dead End Clamp Adaptor	3
2J	Twist Strap	6
2K	33kV Pin Insulator	3
2Q	Aluminum Bind Wire 4.0mm	9m
3A	Crossarm 75x75x3.2x3000	2
3D	Crossarm 75x75x3.2x3000 for Terminal	5
3K	Crossarm Brace Pipe type	4
4E	Strain Plate for Wooden pole	2
4F	Stay Wire 45sq.mm	30m
4G	Dead End Grip for Wooden Pole 45	2
4H	Dead End Grip for Insulator 45	4
4J	Dead End Grip for Thimble 45	2
4K	Stay Insulator 33kV	2
4M	Turnbuckle	2
4N	Stay Rod	2
4P	Stay Plate	2
4Q	Nail	20
4V	Staple	8
5A	PVC Protection Pipe L=4.0m	1
5B	Stainless Band L=1200mm	8
5C	Ring Saddle for Sus Band	3
5D	Ground Rod 14x1500	2
5E	Lead Wire Terminal	2
5F	Compression Connector (38-22)	1
5J	Grounding Wire (IV38sq.mm)	20m
6A	Protection Pipe for Cable (PVC150)	4m
6B	Pipe Saddle	2
7A	Bolt&Nut M16x350(Pole/Crossarm)	10
7B	Double Arming Bolt M16x400(Pole/W-Crossarm.)	4
7E	Square Washer	40
7G	Bolt&Nut M16x120(Crossarm/Brace)	7
7J	Bolt&Nut M16x300(Pole/Brace)	2
7K	Bolt type Connector for 33kV(ACSR100/ACSR100)	3
9A	33kV Lightning Arrester	3
9B	33kV Line Switch	1
9G	Bolt type Connector (ACSR100 / Cu 38)	3
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	10m

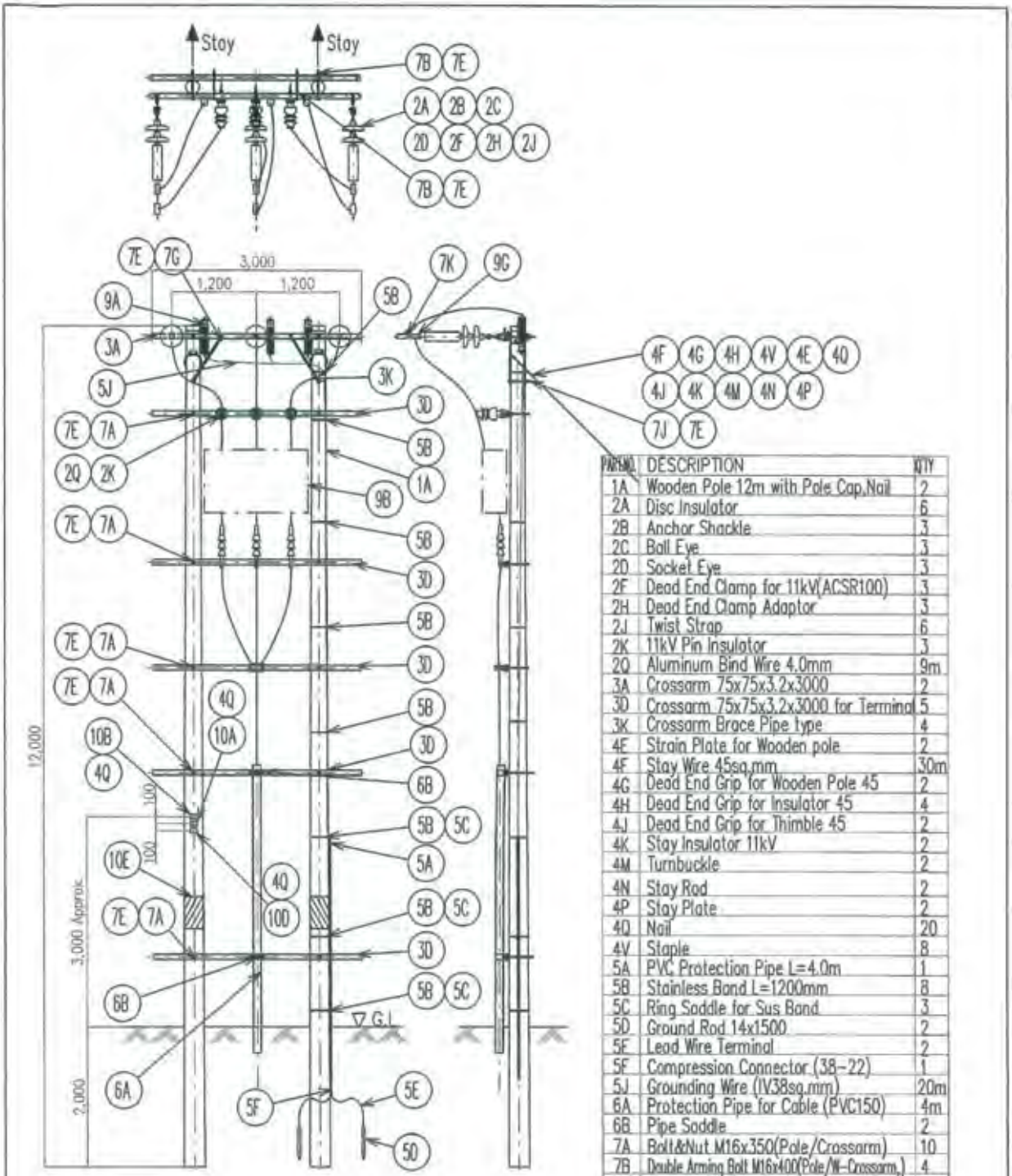
SCALE	1:80
TITLE	[Type F] 引留柱 Terminal pole
DRG.NO.	IT-06





PART NO.	DESCRIPTION	QTY
1C	Steel Pole 15m with Pole Cap	1
2A	Disc Insulator	18
2B	Anchor Shackle	6
2C	Ball Eye	6
2D	Socket Eye	6
2F	Dead End Clamp for 33kV(ACSR100)	6
2H	Dead End Clamp Adaptor	6
2J	Twist Strap	12
2K	33kV Pin Insulator	1
2P	Preformed Side Tie for ACSR100	1
3A	Crossarm 75x75x3.2x3000	2
3K	Crossarm Brace Pipe type	4
4A	Stay Band for 33kV steel pole	2
4F	Stay Wire 45sq.mm	40m
4H	Dead End Grip for Insulator 45	4
4J	Dead End Grip for Thimble 45	4
4K	Stay Insulator 33kV	2
4M	Turnbuckle	2
4N	Stay Rod	2
4P	Stay Plate	2
5B	Stainless Band L=1200mm	3
7B	Double Arming Bolt M16x400(Pole/W-Crossarm,)	3
7E	Square Washer	20
7G	Bolt&Nut M16x120(Crossarm/Brace)	10
7J	Bolt&Nut M16x300(Pole/Brace)	1
7K	Bolt type Connector for 33kV(ACSR100/ACSR100)	6
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	5m

SCALE	1:80	
TITLE [Type G] [illegible] Overcross pole		DRG.NO. IT-07



PART NO.	DESCRIPTION	QTY
1A	Wooden Pole 12m with Pole Cap,Nail	2
2A	Disc Insulator	6
2B	Anchor Shackle	3
2C	Ball Eye	3
2D	Socket Eye	3
2F	Dead End Clamp for 11kV(ACSR100)	3
2H	Dead End Clamp Adaptor	3
2J	Twist Strap	6
2K	11kV Pin Insulator	3
2Q	Aluminum Bind Wire 4.0mm	9m
3A	Crossarm 75x75x3.2x3000	2
3D	Crossarm 75x75x3.2x3000 for Terminal	5
3K	Crossarm Brace Pipe type	4
4E	Strain Plate for Wooden pole	2
4F	Stay Wire 45sq.mm	30m
4G	Dead End Grip for Wooden Pole 45	2
4H	Dead End Grip for Insulator 45	4
4J	Dead End Grip for Thimble 45	2
4K	Stay Insulator 11kV	2
4M	Turnbuckle	2
4N	Stay Rod	2
4P	Stay Plate	2
4Q	Nail	20
4V	Staple	8
5A	PVC Protection Pipe L=4.0m	1
5B	Stainless Band L=1200mm	8
5C	Ring Saddle for Sus Band	3
5D	Ground Rod 14x1500	2
5E	Lead Wire Terminal	2
5F	Compression Connector (38-22)	1
5J	Grounding Wire (IV38sq.mm)	20m
6A	Protection Pipe for Cable (PVC150)	4m
6B	Pipe Saddle	2
7A	Bolt&Nut M16x350(Pole/Crossarm)	10
7B	Double Arming Bolt M16x400(Pole/W-Crossarm)	4
7E	Square Washer	40
7G	Bolt&Nut M16x120(Crossarm/Brace)	7
7J	Bolt&Nut M16x300(Pole/Brace)	2
7K	Bolt type Connector for 33kV(ACSR100/ACSR100)	3
9A	11kV Lightning Arrester	3
9B	11kV Line Switch	1
9G	Bolt type Connector (ACSR100 / Cu 38)	3
10A	Pole Number Plate	1
10B	Danger Plate	1
10D	Japanese National Flag Plate	1
10E	Barbed Wire for anti-climbing	10m

SCALE	1:80
TITLE	[Type f] 引留柱 Terminal pole (11kV)
DRG.NO.	IT-08

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The Project shall be implemented based on the Government of Japan's Grant Aid scheme. According to this, the Project shall receive approval by the Government of Japan, the Exchange of Notes (E/N) shall be signed by the two countries' governments, and the Grant Agreement (G/A) shall be concluded by JICA (Japan International Cooperation Agency) and the Government of Tanzania before the Project progresses to the implementation stage. The following paragraphs describe the basic items and points requiring particular consideration in the event where the Project is implemented.

(1) Implementing Agency

The supervising government agency on the Tanzanian side shall be the Ministry of Energy and Minerals (MEM). The responsible department for the Project in the MEM shall be the Department of Energy and Petroleum, while TANESCO (the implementing agency) shall be responsible for the operation and maintenance of facilities after they go into service. It will be necessary for the MEM Department of Energy and Petroleum and TANESCO to liaise and communicate closely with the Japanese consultant and contractor and to appoint staff in charge of the Project in order to smoothly advance the Project.

The appointed Project staff member in TANESCO will need to fully explain and secure understanding for the contents of the Project to related MEM and TANESCO personnel and residents of the target areas with a view to eliciting cooperation for Project implementation.

(2) Consultant

In order to implement the equipment and materials procurement and installation works, the Japanese Consultant shall conclude a Design Supervision Contract with TANESCO and conduct the implementation design and execution supervision work for the Project. Moreover, the Consultant shall prepare the tender documents and act for TANESCO in conducting the tender work.

(3) Contractor

In accordance with the framework of Japan's Grant Aid scheme, the Japanese contractor that has been selected by the Tanzanian side in general open tender shall implement the equipment and materials procurement and installation works of the Project.

Following completion of the Project, since it will be necessary to continue supplying spare parts and conducting post-installation service to resolve breakdowns and so on, it will be necessary to conduct thorough liaison and coordination after the handover of equipment and materials.

(4) Need for Dispatch of Engineers

Since the Project will entail construction of substations involving civil engineering, building and transforming equipment installation works at multiple sites, construction of approximately 5 km of distribution line and 34 km of transmission line, and interconnection with existing transforming equipment, it will be necessary to coordinate the different components. Moreover, since the bulk of works will be implemented simultaneously, it will be essential to understand the Grant Aid scheme of the Government of Japan and dispatch a site chief from Japan to conduct consistent management and guidance on schedule, quality, progress and safety throughout the works.

2-2-4-2 Implementation Conditions

(1) Construction Conditions and Technology Transfer in Tanzania

As was described in section 2-1-4, there are numerous general construction companies and electrical works firms in Tanzania, meaning that it is possible to locally procure laborers, transportation vehicles and construction equipment and order the general workers for conducting the substation civil engineering and building works and transmission and distribution line construction works to local contractors. However, since the project will be implemented under the Government of Japan's Grant Aid scheme and will be simultaneously advanced at multiple sites, it will be necessary to coordinate and generally manage each works component. Accordingly, it will be essential to dispatch Japanese engineers to ensure schedule control, quality control and safety control.

Furthermore, since the transforming equipment installation works and transmission line construction works entail a high degree of difficulty and will need to be certainly implemented with the minimum required equipment and materials, and since highly skilled engineers shall be needed to conduct adjustment and testing during and after equipment installation, it will be hard to find local personnel with these skills. Accordingly, when implementing the installation work, it is desirable that the Japanese contractor procures local laborers and works equipment and dispatches engineers from Japan or a third country. Moreover, the Japanese engineers shall conduct technology transfer in the shape of OJT for the Tanzanian engineers during the installation period.

(2) Minimization of Black Out Period

In order to minimize black out period during the construction works of renewal and expansion of the existing substations, electricity distribution diverting a substation under work will be considered. In the case of upgrading YMCA substation, 33 kV cables which will be used to bypass the substation is procured under the Project to minimize shut down period of the substation because a distribution path to divert YMCA substation is difficult to form.

(3) Utilization of Local Equipment and Materials

The wooden poles for use in distribution line works and aggregate, cement and reinforcing bars, etc. required for the civil engineering and building works in the Project can be procured in Tanzania, and there have been numerous examples of such local procurement in the past. Accordingly, when compiling the procurement plan, locally procurable equipment shall be utilized as far as possible with a view to nurturing local industries. However, since equipment and materials for the scale of substations and transmission and distribution facilities required in the Project are imported in Tanzania, i.e. locally produced equipment and materials are not available, these items shall be procured from Japan or third countries.

(4) Safety Measures

Tanzania has relatively few problems in terms of law and order compared to other countries in Africa, however, because the Project target area is one of the most popular tourist destinations in Tanzania, there is risk of pickpockets, baggage thieves and fraudsters targeting tourists in addition to general theft and burglary. It shall thus be necessary to display ample care for preventing theft of equipment and securing the safety of works personnel. It shall also be indispensible for the Tanzanian side to take the necessary safety measures. Also, the Japanese side will need to take thorough safety measures around the accommodation facilities, site offices and equipment and materials stores, secure means of communication, confirm methods of response to emergency situations, and establish a liaison setup.

(5) Tax Exemptions

In order to receive exemptions of Tanzanian taxes (including value added tax) on the Project equipment and materials, the contractor will need to request TANESCO to implement the required procedure. In response, TANESCO, working through MEM, shall request the Ministry of Finance to issue a letter of tax exemption to the tax authorities (copies shall also be issued to MEM and the contractor at the same time). When the Project equipment and materials arrive at the port or airport in Tanzania, the contractor shall attach the said copy of the tax exemption letter to the shipping documents and present them to the customs office in order to obtain tax exemption. Ample care will be required to ensure that progress of the Project is not impacted by any delays in the tax exemption measures.

2-2-4-3 Scope of Works

Concerning the scope of works on both sides, the Japanese side shall implement the necessary procurement of equipment and materials, installation works, tests and adjustments and civil engineering works for the upgrading, expansion and construction of substations and construction of 66kV transmission line and 33kV distribution line. The Tanzanian side shall be responsible for leveling land on the works sites and connecting the upgraded and newly constructed substations to

existing distribution lines. Table 2-2-4-3.1 shows the detailed scope of works on the Japanese and Tanzanian sides.

Table 2-2-4-3.1 Scope of Works on the Japanese and Tanzanian Sides

Item	Equipment and Materials Procurement		Installation Works		Remarks
	Japan	Tanzania	Japan	Tanzania	
1. General construction works					
(1) Provision of equipment and materials storage areas		○		○	To be completed by the start of works by the Japanese side
(2) Securing of safety for site personnel during works	○	○ (Note)	○	○ (Note)	(Note) The Tanzanian side shall take the necessary safety measures during works by the Japanese side.
(3) Response and compensation to consumers, etc. when planned power outages occur during works		○		○	
(4) Communication to consumers of the power outage plan during works		○		○	(As needed)
(5) Road traffic controls		○		○	(As needed)
(6) Provision of treatment sites for handling residual earth and miscellaneous wastewater from works		○		○	(As needed)
2. Upgrading and expansion works at existing S/S					
【Upgrading of existing S/S】(YMCA/Lawate)					
(1) Ground leveling and improvement (including removal of obstructions) on the site		○		○	To be completed by the start of works by the Japanese side
(2) Access road (main road and sub-road)		○		○	(As needed)
(3) Drainage facilities on the site and access road		○		○	(As needed)
(4) Fence and gates	○		○		
(5) Substation civil engineering and building works (including outdoor lights)	○		○		
(6) Transforming equipment works	○		○		
(7) Earthing works	○		○		
(8) Connection of existing 33kV and 11kV distribution lines and upgraded transforming equipment		○		○	
【Expansion of existing S/S】Trade School/Kiyungi)					
(1) Ground leveling and improvement (including removal of obstructions) on the site		○		○	To be completed by the start of works by the Japanese side
(2) Access road (main road and sub-road)		○		○	(As needed)
(3) Drainage facilities on the site and access road		○		○	(As needed)
(4) Fence and gates	○		○		
(5) Substation civil engineering and building works	○		○		
(6) Transforming equipment works	○		○		

Item	Equipment and Materials Procurement		Installation Works		Remarks
	Japan	Tanzania	Japan	Tanzania	
(7) Earthing works	○	○ (Note)	○	○ (Note)	(Note) Overhead grounding wire expansion works to be implemented on the Tanzanian side
(8) Connection of existing 33kV and 11kV distribution lines and upgraded transforming equipment		○		○	
3. Construction of new S/S (Makuyuni/KCMC)					
(1) Ground leveling and improvement (including removal of obstructions) on the site		○		○	To be completed by the start of works by the Japanese side
(2) Access road (main road and sub-road)		○		○	(As needed)
(3) Drainage facilities on the site and access road	○	○	○	○	(As needed) The Japanese side shall conduct work inside the S/S, and the Tanzanian side shall conduct work outside.
(4) Fence and gates	○		○		
(5) Substation civil engineering and building works (including outdoor lights, plumbing and fire extinguishers)	○		○		
(6) Transforming equipment works	○		○		
(7) Station power supply	○		○		
(8) Earthing equipment (including overhead optical grounding wire)	○		○		
(9) Connection of existing 33kV distribution line and transforming equipment after construction		○		○	
4. 66kV transmission line and 33kV distribution line construction works					
(1) Access road (road and sub-road needed for the 66kV transmission line works)		○		○	
(2) Tree cutting and relocation/removal of obstructions, etc. (objects on the 66kV transmission line and 33kV distribution line routes)		○		○	
(3) Road traffic controls		○		○	(As needed)
(4) Civil engineering and steel tower construction works for transmission line construction	○		○		
(5) Transmission line and distribution line construction works	○		○		
(6) Earthing equipment	○		○		
(7) Overhead optical grounding wire (OPGW) and accessories		○		○	
5. Others					
(1) Spare parts and maintenance tools (including test materials)	○			○ (Storage)	Maintenance tools may be used during installation works by the Japanese side)

Item	Equipment and Materials Procurement		Installation Works		Remarks
	Japan	Tanzania	Japan	Tanzania	
(2) Tools for installing transformers		○	○		Oil tank, oil purifier, oil insulation tester, etc. The Tanzanian side shall transport tools to sites.
(3) Handover test			○		
(4) OJT			○ (Guidance)		

(Note): Circles (◯) indicate responsible work areas.

2-2-4-4 Consultant Supervision

Based on the Government of Japan's Grant Aid scheme, the Consultant shall organize a consistent project team to smoothly conduct the implementation design and Consultant supervision work according to the principles of the basic design. Since the Project sites are dispersed over the target area and entail substation construction works, transmission line works, distribution line works and interconnections with existing distribution facilities, and it will be necessary to advance supervision based on coordination with TANESCO on site, the Consultant shall permanently assign at least one engineer during the Consultant supervision stage in order to conduct general schedule control, quality control, performance control and safety control. Furthermore, an expert in Japan shall attend the installation, trial operation, adjustment and handover tests, etc. of equipment in order to supervise these work components by the local contractor. Moreover, where necessary, the expert shall attend plant inspections and pre-shipping inspections of equipment and materials manufactured in Japan with a view to ensuring that no troubles occur following delivery of materials and equipment to Tanzania.

(1) Basic Concept of Consultant Supervision

The basic concept of supervision by the Consultant shall be as follows: to supervise the works progress to ensure they finish within the designated period, and to supervise and instruct the contractor to ensure that the quality, performance and delivery times specified in the contract are secured and that the site works are executed safely.

The important points to consider in Consultant supervision are described below.

1) Schedule Control

The contractor shall compare progress with the implementation schedule decided in the contract every month or every week in order to adhere to the delivery deadline given in the contract. In cases where delays are predicted, the contractor shall warn the subcontractors, demand the submission and implementation of a plan of countermeasures and offer guidance to ensure that the works and delivery of equipment and materials are completed within the contract period. The comparison of the planned schedule and actual progress shall be carried out according to the

following items.

① Confirmation of works performance (manufacture of equipment and materials in plant and performance of civil engineering and building works on site)

② Confirmation of equipment and materials delivery (switching equipment, transmission and distribution equipment and materials, and civil engineering and building works equipment and materials)

③ Confirmation of temporary installation works and construction machinery preparations

④ Confirmation of yield and actual numbers of engineers, skilled workers and laborers, etc.

2) Quality and Performance Control

Supervision shall be carried out based on the following items to determine whether the manufactured, delivered and installed equipment and materials and constructed facilities satisfy the required quality and performance stated in the contract documents. In cases where doubts arise over quality and performance, the Consultant shall immediately demand that the contractor make amendments, revisions or corrections.

① Checking of shop drawings and specifications of equipment and materials

② Attendance of plant inspections of equipment and materials and checking of plant inspection results

③ Checking of packing, transportation and on-site temporary storage methods

④ Checking of shop drawings and installation guidelines of equipment and materials

⑤ Checking of trial operation, adjustment, test and inspection guidelines of equipment and materials

⑥ Supervision of equipment and materials site installation works and attendance of trial operations, adjustments, tests and inspections

⑦ Checking of equipment installation work drawings and shop drawings with site performance

3) Safety Control

Discussions shall be held and cooperation sought with responsible officers of the contractor and safety control shall be exercised during the construction period in order to prevent industrial accidents and accidents affecting third parties. Important points to consider in safety control on the site are as follows:

① Establishment of safety control regulations and appointment of manager

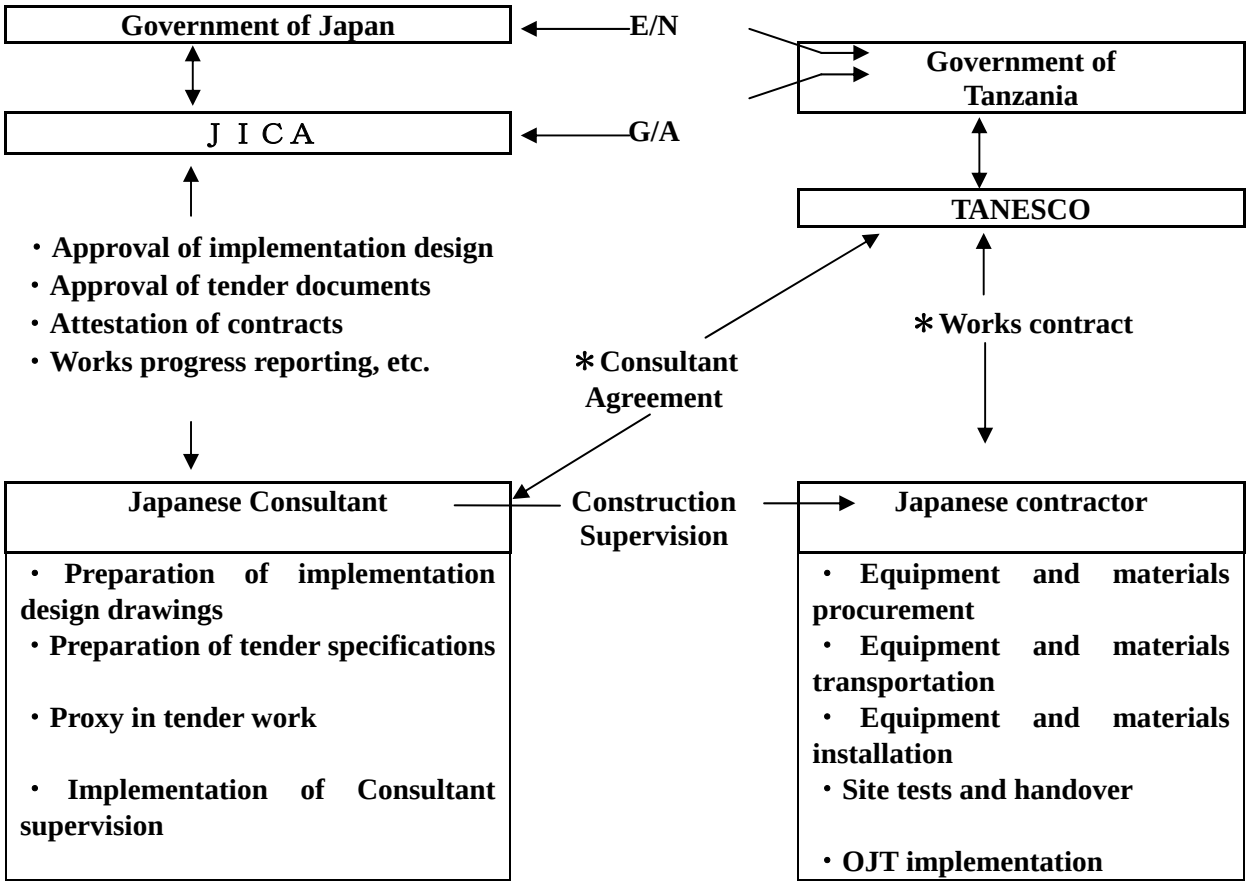
② Prevention of accidents through implementation of periodic inspections of construction machinery

③ Planning of the works vehicles and construction machinery operating routes and thorough enforcement of safe driving

④ Encouragement of laborers to utilize welfare measures and vacations

(2) Overall Relationships concerning Project Implementation

Figure 2-2-4-4.1 shows the mutual relationships between Project parties including the Consultant supervision.



＊Note: The Consultant Agreement and Works Contract require attestation by the Government of Japan.

Figure 2-2-4-4-.1 Project Implementation Relationships

(3) Works Supervisor

The contractor shall procure and supply the equipment and materials for the substation upgrading, expansion and construction works and the 66kV transmission line and 33kV distribution line works, and implement the civil engineering and building works. Moreover, in order to implement these works, the contractor shall employ a subcontractor(s) in Tanzania. Therefore, since the contractor will need to thoroughly ensure that the subcontractor(s) complies with the works schedule, quality, performance and safety measures prescribed in the contract, it shall dispatch an engineer who has experience of similar projects in overseas countries to provide guidance and advice on the sites.

Based on the scale and contents of transforming equipment and transmission/distribution line works in the Project, it is desirable that the contractor(s) assign the engineers and technicians indicated in Table 2-2-4-4.2 to the works sites.

Table 2-2-4-4.2 Engineer Dispatch by the Contractor(s)

Dispatched Engineer	Number	Work Contents	Dispatch Period
Site procurement control staff member (site manager)	1	Management of works overall, liaison and coordination with related agencies and acquisition of approval, OJT implementation, equipment and materials procurement management, customs clearance procedures, labor management, accounting	Entire works period
Site procurement control staff member (building)	1	Equipment and materials procurement management, labor management and safety control regarding the building works	Building works period
Inspector 1 (transmission and distribution facilities)	1	Confirmation of and checking against equipment (general) shop drawings, pre-shipping inspection	Drawings approval period
Inspector 2 (substation facilities)	1	Confirmation of and checking against equipment (general) shop drawings, pre-shipping inspection, equipment (general) on-site inspection	Equipment test and pre-shipping inspection period
Inspector 3 (building)	1	Confirmation of and checking against building shop drawings	Drawings approval period
Procurement control assistant 1 (locally recruited)	1	Manager's assistant: Equipment and materials in general Adjustment of equipment (general) installation test and coordination with local subcontractors On-site inspections, OJT assistance	Entire works period
Procurement control assistant 2 (locally recruited)	1	Manager's assistant: Civil engineering and building On-site inspections, OJT assistance	Civil engineering and building works period
Procurement control assistant 3 (locally recruited)	1	All clerical affairs including accounting work	Entire works period
Procurement control assistant 4 (locally recruited)	1	Miscellaneous tasks	Entire works period

2-2-4-5 Quality Control Plan

The Consultant's construction supervisor shall carry out supervision and checking based on the following items to ensure that the contractor secures the quality of Project equipment and materials and the execution and installation performance stipulated in the contract documents (technical specifications and implementation design drawings, etc.). In cases where doubts arise over quality and performance, the construction supervisor shall immediately demand that the contractor make amendments, revisions or corrections.

① Checking of shop drawings and specifications of equipment and materials

② Attendance of plant inspections of equipment and materials and checking of plant inspection results

③ Checking of packing, transportation and on-site temporary storage methods

④ Checking of shop drawings and installation guidelines of equipment and materials

⑤ Checking of trial operation, adjustment, test and inspection guidelines of equipment and materials

⑥ Supervision of site installation works of equipment and materials and attendance of trial operations, adjustments, tests and inspections

⑦ Checking of facilities shop drawings against work performance on site

2-2-4-6 Procurement Plan

The transforming equipment, transmission and distribution facilities and parts of the electrical fittings to be procured and installed in the Project are not manufactured in Tanzania on the scale required. For this reason, equipment and materials for projects in Tanzania are procured from European countries and Japan depending on the source of funding. Although some European transforming equipment makers have agents and manufacturing plants (transformers, switchgear, etc.) in Tanzania, not many makers have the necessary post-installation setups to deal with breakdowns and repairs or provide spare parts for high voltage transformers. Meanwhile, TANESCO, which will be responsible for operating and maintaining equipment and materials following completion of the Project, has experience of handling Japanese products procured in past grant aid projects, and its post-installation service is reliable. Accordingly, when selecting the suppliers of transforming equipment in the Project, it will be necessary to take local conditions, ease of operation and maintenance by local engineers, and existence of the post-installation setup for procuring spare parts and responding to breakdowns, etc. into account.

However, concerning 132kV equipment, although this is a standard voltage class in Europe, it corresponds to 154kV equipment in Japan and, due to differences in insulation, it is forecast that Japanese circuit breakers, line switches and other switchgear shall be less competitive in terms of prices. Accordingly, procurement of 132kV equipment shall be opened to products from Japan and DAC countries with a view to securing competition. Moreover, concerning the 66kV transmission steel towers, Tanzania has procured products from South Africa, India and China in the past, however, because products from India and China especially have poor quality, officials in Tanzania are hoping to procure steel towers made in Japan. Moreover, because the transmission steel towers procured in the project will entail difficult design with a view to enabling TANESCO to procure and install OPGW (optical grounding wire) in future, it is desirable to procure products made by a Japanese corporation.

In consideration of the above points, the suppliers of equipment and materials in the Project shall be as follows.

(1) Locally procured equipment and materials

Works equipment and materials: Wooden poles (for 33kV distribution line), cement, sand, concrete blocks, aggregate, reinforcing bars, timber, gasoline, diesel oil, works vehicles, cranes, trailers and other temporary installation equipment

(2) Equipment and materials procured in Japan

1) Transforming equipment and materials

132/66kV, 66/33kV, 33/11kV transformers, 33/11kV switchgear cubicles, etc.

2) Transmission and distribution line equipment and materials

66kV transmission steel towers, transmission and distribution line equipment and materials, etc. (steel poles, conductors, insulators, cross arms, earthing equipment)

(3) Equipment and Materials procured in Japan and Third Countries (DAC Countries)

132kV and 66kV switchgear

Concerning equipment and materials procured in Japan, products shall be packed in a manner that can fully withstand long-term sea transportation, port landing, inland transportation to the Project sites and storage.

2-2-4-7 Soft Component (Technical Assistance) Plan

Before the works are finished, guidance shall be carried out on the initial equipment controls and operation and maintenance methods. Such guidance shall basically be carried out by instructors from the manufacturer or works contractor via site OJT according to the operation and maintenance manual.

In order to advance the plan of guidance smoothly, TANESCO will need to hold close communications and discussions with the Consultant and contractor and appoint a full-time engineer to take part in the OJT. The appointed engineer will need to convey technology to other employees who cannot participate in the Project and cooperate in enhancing the maintenance capability of TANESCO.

Moreover, since high level engineers will be required in order to operate transforming equipment and conduct adjustment and testing, etc. of 66kV transmission lines following installation, it will be difficult to recruit such personnel other than laborers locally. Accordingly, it will be necessary to dispatch engineers from Japan in order to conduct quality control, technical guidance and schedule control.

2-2-4-8 Implementation Schedule

The Project implementation schedule was compiled as shown in Figure 2-2-4-8.1 based on the scheme of the Government of Japan's Grant Aid.

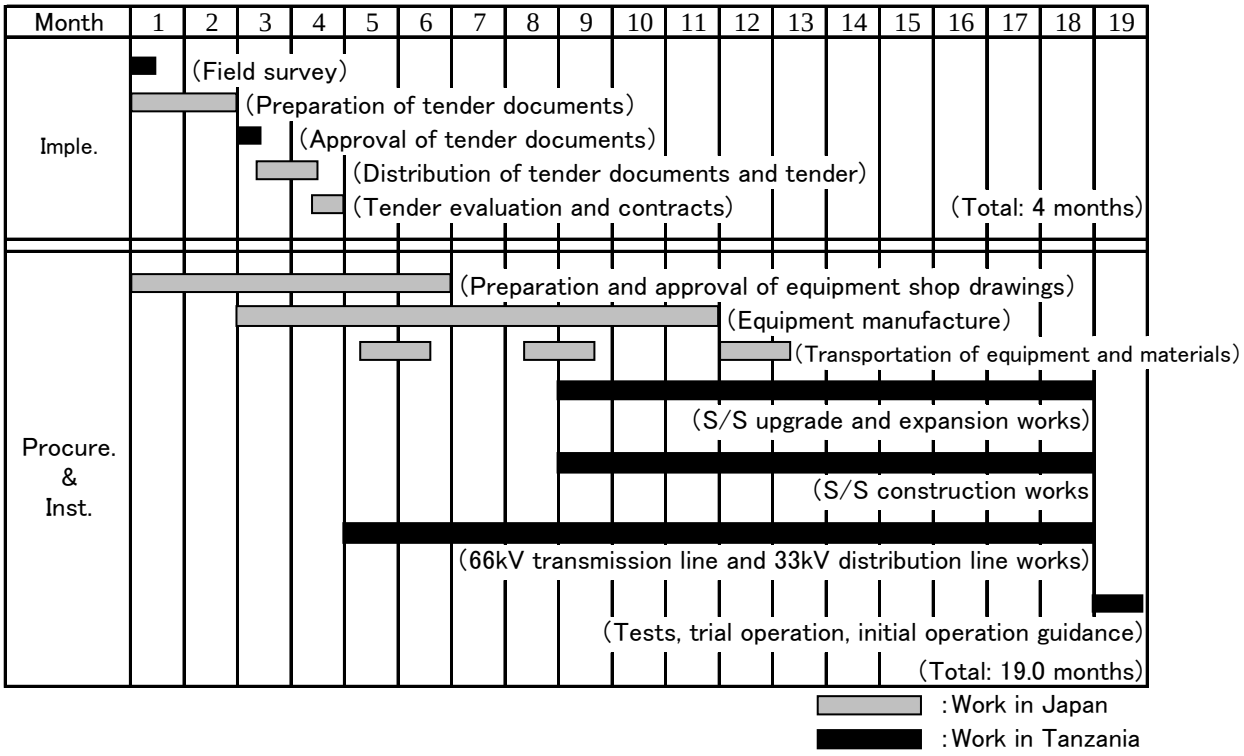


Figure 2-2-4-8.1 Project Implementation Schedule

2-3 Obligations of recipient country

When it comes to implementing the Project, in addition to the scope of works on the Tanzanian side indicated in 2-4-3 Scope of Works, Procurement and Construction, items to be implemented or borne by the Tanzanian side are as follows.

Common Items

(1) To provide information and data necessary for the Project.

(2) To secure tax exemption and customs clearance and the speedy unloading of products for the Project at the port of unloading in Tanzania.

(3) To exempt taxes and tariffs and provide conveniences regarding products and services required for the Project and Japanese nationals dispatched therein.

(4) To exempt business taxes regarding products and services required for the Project, Japanese corporations and Japanese individuals including the exemption of registration fee for Japanese Consultant and Contactor to engage in construction works in Tanzania.

(5) To pay commission fees to the Japanese bank in relation to opening of a bank account for the Project

(6) To bear all items not covered under Japan's Grant Aid when implementing the Project

(7) To appoint specialist engineers for the transfer of operation and maintenance technology and to attend equipment and materials quality inspections on site

(8) To properly and effectively use and maintain the equipment and materials procured under Japan's Grant Aid

(9) To implement environmental monitoring

Preparatory works

(10) To construct access roads for construction of the 66kV transmission line

(11) To upgrade the access roads to Makuyuni substation, Kiyungi substation and Trade School substation

(12) To level land on the substation upgrading and construction sites

(13) To cut trees and clear obstructions on the routes of the 66kV transmission line and 33kV distribution line

(14) To provide works offices, equipment and materials storage areas and temporary installation sites free of charge

Works to be borne by the Tanzanian side

(15) To construct the 33kV distribution line leading from Makuyuni substation

(16) To connect upgraded and constructed substations and the existing 33kV and 11kV distribution network

(17) To procure and install SCADA and telecommunications equipment

(18) To procure and install 66kV transmission line optical grounding wire (OPGW) and accessories

2-4 Project Operation Plan

2-4-1 Basic Concept

In order to improve the reliability of power supply to consumers in the Project target area and conduct stable operation of the supply utility, it is essential to conduct the appropriate operation and maintenance (O&M) of transmission and distribution facilities and maintain the peripheral environment. Accordingly, it is desirable to implement appropriate preventive maintenance and regular maintenance geared to reducing breakdown rates in facilities and enhancing reliability, safety and efficiency.

Figure 2-4-1.1 shows the basic thinking regarding the maintenance of transmission and distribution facilities. According to this, it will be necessary to primarily conduct preventive maintenance on the equipment and facilities to be installed and constructed in the Project.

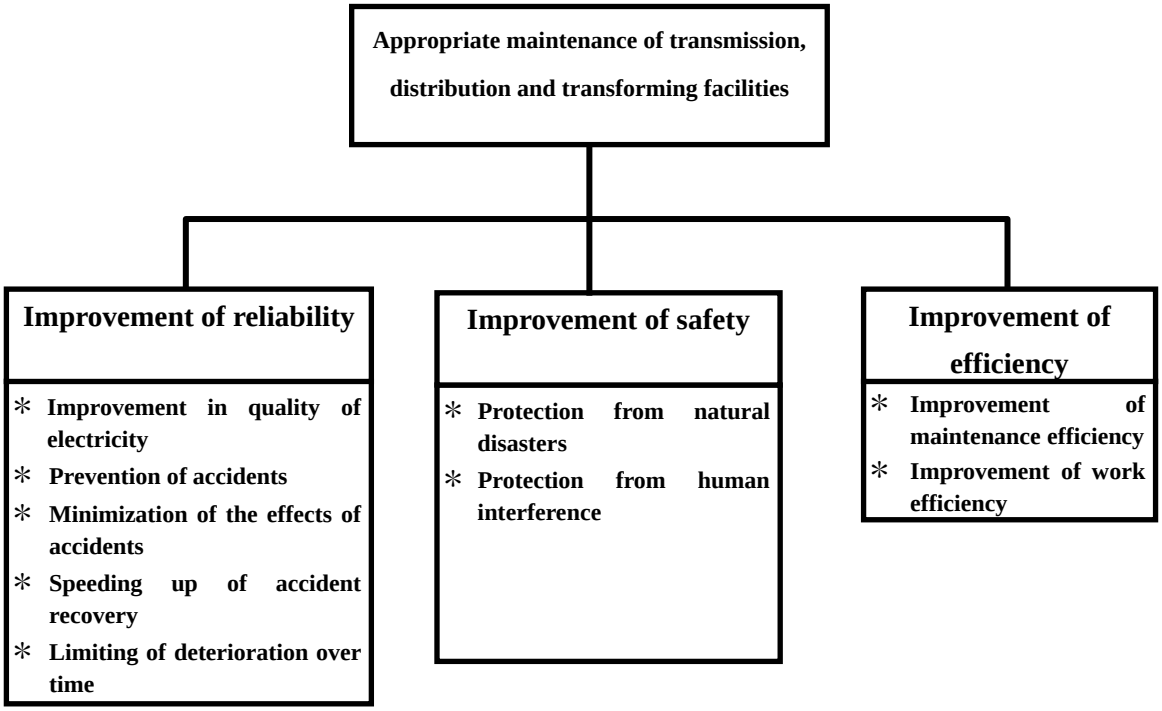


Figure 2-4-1.1 Basic Thinking on Maintenance of Transmission, Distribution and Transforming Facilities

In the Project, it is planned for the engineers dispatched by the Japanese contractor to implement OJT on operation and maintenance of transmission, distribution and transforming facilities during the installation works and testing and adjustment period. At the same time, through providing the necessary spare parts, test equipment, maintenance tools and operation and maintenance manuals from the Japanese side and making proposals about the operation and maintenance setup after commissioning, it will be possible to ensure the full effectiveness of the OJT.

2-4-2 Operation and Maintenance Setup

Since TANESCO, which will be responsible for operation and maintenance following the Project, is planning an implementation setup operated by the following offices under the supervision of its Kilimanjaro branch, the necessary organization and personnel setup for conducting appropriate operation of the power utility can be anticipated.

- Kiyungi substation

- Makuyuni substation

- 66kV transmission line (Kiyungi substation ~ Makuyuni substation) and 33kV distribution line (Trade School substation ~ KCMC substation): TANESCO Kilimanjaro branch

2-4-3 Periodic Inspection Items

(1) Periodic Inspection of Transforming equipment

Table 2-4-3.1 shows the standard periodic inspection items for transforming equipment to be procured and installed in the Project.

As is shown in the table, equipment inspections are classified into the following three types: ① patrol inspections in which abnormal heating or noises, etc. are inspected for everyday based on the five senses; ② ordinary inspections in which inspections are conducted on live sections that cannot be inspected in routine patrols, for example, torque of equipment bolts, surface dirt on insulated objects, etc. and ③ detailed inspections on functions of interlocking mechanisms between instruments and for maintaining precision of measuring instruments.

Ordinary inspections are normally conducted once every one or two years, while detailed inspections are conducted around once every four years. Moreover, it is desirable to replace parts such as fuses, meters and relays, etc. fitted inside switchgear cubicles when they are found to have deteriorated performance, deteriorated insulation performance, worn contacts or altered characteristics in ordinary inspections and detailed inspection.

Table 2-4-3.1 Periodic Inspection Items in Standard Equipment

Inspection Item	Inspection Contents (Method)	Patrol Inspection	Ordinary Inspection	Detailed Inspection
Equipment exterior	Display conditions of switching indicators, switching display lamps	○	○	
	Abnormal noise and odor	○	○	
	Heating discoloration of terminals	○	○	
	Cracking, damage and staining of bushing and porcelain tubes	○	○	
	Rust on installation booths and frames, etc.	○	○	
	Abnormal temperature (thermometer)	○	○	
	Bushing terminals torque (mechanical check)	○	○	
Operating device and control panel	Display conditions on measuring instruments	○	○	○
	Indications on operation counters		○	○
	Condensation, rust and dirt inside operating boxes and panels		○	○
	Lubrication and cleaning conditions		○	○
	Wiring terminals torque	○	○	○
	Confirmation of switching display status		○	○
	Air and oil leaks		○	○
	Pressure check before and after operation (air pressure, etc.)		○	○
	Operation check of operation meters		○	○
	Rust, deformation and damage of springs (repair)	○	○	○
	Abnormality of pins at tightening parts		○	○
	Inspection (repair) of auxiliary switches and relays		○	○
	Inspection of DC control power source	○		
Measurement and testing	Measurement of insulation resistance		○	○
	Measurement of contact resistance			○
	Heater disconnections		○	○
	Operation test of relays		○	○

(2) Periodic Inspection of Transmission Lines

① Damage or uneven sag of line, etc.

② Damage of insulators

③ Contact between power line and trees, etc.

④ Scratches on steel poles (steel towers), loose bolts and leaning

⑤ Damage of steel poles

(3) Periodic Inspection of Distribution Lines

Maintenance of distribution lines is the most important service to consumers and entails discovering breakdown, damage and breakage areas through routine patrol inspections and implementing immediate recovery work when breakdowns occur. Moreover, when there is risk of earthing faults, etc. being caused by contact of lines with trees and so on, it is necessary to take preventive measures such as cutting trees, etc. The major inspection items in routine patrols

are as follows.

① Cutting of power line

② Damage to insulators

③ Contact between power line and trees, etc.

④ Damage to electric poles

⑤ Leaning of electric poles

⑥ Status check of switches

2-4-4 Spare Parts Purchase Plan

In the Project, it is planned to procure a minimum one year supply of necessary spare parts (consumable parts and replacement parts). It will be necessary for the Tanzanian side to budget for the purchase of additional spare parts for up to a year ahead.

Moreover, since replacement parts are sometimes needed to cope with emergencies arising from degradation and accidents, etc., it will be necessary for the Tanzanian side to purchase parts upon investigating what is needed in the above-mentioned periodic inspections.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Costs to be borne by the Tanzanian side

US$ 2.36 million (approximately 218 million yen)

The contents and costs to be borne by the Tanzanian side are as follows:

① Provision of temporary road for construction of the 66kV transmission line: US$1.00 million (approximately 92 million yen)

② Construction of 33kV distribution line (from Makuyuni S/S): US$ 1.33 million (approximately 123 million yen)

③ Bank commission for banking arrangement: US$ 27 thousand (approximately 2.5 million yen)

(2) Estimation criteria

① Estimation point: : July 2010

② Exchange rate : 1 US$＝92.35 yen (TTS mean value from January to June 2010)
1 Euro＝122.72 (TTS mean value from January to June 2010)

2-5-2 Operation and Maintenance Cost

The Kilimanjaro branch of TANESCO conducts maintenance on existing substations and transmission and distribution lines in the region and it shall be responsible for operating and maintaining the upgraded and newly constructed substations and newly installed transmission and distribution lines in the Project.

Out of the substations to be newly constructed in the Project, only Makuyuni substation shall be a manned facility, having 10 operating personnel, however, since it is planned to assign these personnel from other departments in TANESCO, it will not be necessary to recruit new staff. As for the other substations to be upgraded and constructed and the transmission and distribution lines to be installed, the existing staff at the TANESCO branch shall be responsible.

Moreover, in order to soundly operate the substations to be upgraded and constructed in the Project, it will be necessary to always keep the spare parts (consumable parts and replacement parts) shown in Table 2-2-21 on hand and for the said TANESCO branch to budget for necessary parts (approximately 32 million Tsh/year). Since the branch's budget for repair and maintenance in 2010 was 671 million Tsh, it should be possible for the branch to afford the cost of maintaining the substations upgraded and constructed in the Project.

2-6 Other Relevant Issues

The following issues need to be considered as important points that may directly impact the smooth implementation of the Project.

(1) In the event where connections between substations and existing 33 kV and 11 kV distribution systems (works to be implemented by the Tanzanian side) are delayed, since this could impact the realization of Project effects, it will be necessary to implement these works without delay in unison with progress of works on the Japanese side.

(2) Since any delays in the provision of compensation and acquisition of consent from residents who will be affected by construction of the 66kV and 33kV distribution lines could exert an impact on the construction schedule for transmission and distribution lines, it will be necessary for the Tanzanian side to pay close attention to the progress of works.

(3) Regarding Kiyungi S/S and Trade School S/S, which are to be expanded in the Project, since there are also plans by other donors to expand and upgrade transforming equipment, it will be necessary for the Tanzanian side to coordinate the equipment layout plan and installation schedule so that work goes smoothly on both sides.

CHAPTER 3 PROJECT EVALUATION

3. Project Evaluation

3-1 Recommendations

3-1-1 Prerequisites for Project Implementation

The prerequisites for Project implementation are acquisition of land for substation works, compensation for occupation of land by transmission lines and acquisition of the necessary environmental permits, however, the Tanzanian side is taking the necessary procedures and there are no major concerns.

3-1-2 Prerequisites and External Conditions for Attaining the Overall Project Plan

In order to realize and sustain the Project effects, the Tanzanian side will need to tackle the following issues.

(1) It will be necessary to appropriately implement routine maintenance to ensure that the transmission and distribution lines and transforming facilities procured and installed by the Japanese side in the Project are utilized to the full.

(2) It will be necessary to assign personnel to the new Makuyuni substation and to plan and implement training to ensure that operation of the facility is smoothly commenced.

(3) It will be necessary to construct the 33 kV distribution line from the new Makuyuni substation to the distribution substation and switching station and to make connections to consumer households by the end of the works on the Japanese side.

(4) It will be necessary to implement the procurement and installation of optical fiber complex overhead lines and SCADA for use in 66 kV transmission lines, scheduled for implementation under the Tanzanian side's budget, in unison with the Japanese side's works and without delay.

(5) It will be necessary to conduct management and adjustment to ensure that the project for improvement of the transmission and distribution line network in Kilimanjaro Region, which is planned for implementation under the support of other donors, is implemented without any delays.

3-2 Project Evaluation

3-2-1 Relevance

As is described below, the Project is deemed to be highly relevant as an aid undertaking since it will contribute to the realization of development plans and energy policy in Tanzania and impart benefits for the general public including impoverished people in Tanzania.

(1) Benefiting population

Project implementation will lead to the supply of stable, good quality electricity to approximately 1.57 million residents in Kilimanjaro Region. The number of power consumers in the target area is approximately 49,200, comprising 33,000 ordinary households, 11,000 commercial facilities, 4,800 public facilities and 400 industrial facilities.

(2) Urgency

The frequently occurring power interruptions in Kilimanjaro Region are causing problems such as deterioration of the living environment for residents, worsening of public services and lowering of local industrial productivity. Therefore, there is an urgent need to remedy this situation through implementing the Project.

(3) Contribution to the stable operation of public welfare facilities

Kilimanjaro Region is currently experiencing frequent power interruptions and reduced power supply quality (voltage drop) due to the deterioration and lack of capacity of transmission and distribution facilities. This unstable power supply is adversely affecting the operation of public facilities such as hospitals and schools: for example, in hospitals, power interruptions cause treatment to be suspended while voltage drop prevents medical instruments from operating. Through implementing the Project and thereby enabling stable electricity to be supplied to KCMC Hospital, which is the largest hospital in the north of Tanzania, and other public welfare facilities such as the tuberculosis hospital and schools, the Project will contribute to the stable operation of these facilities.

(4) Operation and maintenance capacity

The Kilimanjaro branch of TANESCO routinely implements operation and maintenance of 132 kV and 66 kV transmission lines, 132/66/33 kV core substations, 33/11 kV distribution substations and 33/11 kV distribution lines, so it has ample experience for operating and maintaining such transformation, transmission and distribution facilities. Therefore, the 66 kV transmission and transformation equipment and 33 kV distribution equipment to be procured in the Project can be comfortably operated and maintained by TANESCO with its current technical capacity, and there will be no major problems in terms of Project implementation. Furthermore, JICA is implementing the Capacity Building Project for Efficient Transmission and Distribution Networks over five years since 2009, and since this also targets engineers from regional branches, it is anticipated that this will produce a synergistic effect with the Project.

(5) Contribution to national development plans

In the National Strategy for Growth and Reduction of Poverty (NSGRP, or MKUKUTA in Swahili) that was formulated in July 2005, the following three core strategies were adopted in order to achieve growth and poverty reduction: Strategy 1: Economic growth and reduction of poverty in terms of income; Strategy 2: Improvement in living quality and social welfare, and Strategy 3: Governance and accountability. As separate measures under Strategy 1, in the energy sector, “Supply of reliable and cheap energy to consumers” is given as the objective.

In the National Energy Policy that was compiled in February 2003, the following goal was raised for the energy sector: “To build the foundation for supplying safe, reliable, efficient, competitive and environmentally friendly energy to all sectors by sustainable methods.”

In the Project, construction and upgrading of transmission, distribution and transformer facilities in Kilimanjaro Region will be conducted with a view to stabilizing power supply and

improving the quality of electricity. Accordingly, the Project will contribute to the realization of development plans and energy policy in Tanzania.

(6) Environmental and social impacts

Project implementation will entail the payment of compensation for land acquired for substations and land occupied under transmission lines. TANESCO implemented an environmental impact assessment study based on the Environmental Management Law (Law No. 20, 2004) and, via consultations with the stakeholders, explained the Project contents and compensation policy and schedule to the residents who will be affected. Regarding calculation of the compensation amount, market prices are applied based on the Land Law (Law No. 4, 1999) and Village Land Law (Law No. 5, 1999), while compensation for lost profits and inconvenience satisfies the OP 4.12 standard prescribed by the World Bank, and basic consent has been obtained from all affected residents. Accordingly, compensation procedures are being smoothly conducted under the initiative of the government assessor belonging to the Moshi District Land Office and are scheduled to be completed by the end of April 2011.

In the natural environmental field, none of the Project sites (substations and transmission lines) are situated in or around national parks or other protected areas. Moreover, as they are also located away from the tourist spots around Mt. Kilimanjaro, they will not damage the landscape at all. Also, it has been confirmed that no rare flora and fauna exist around the Project sites.

In consideration of the above points, the Project will impart no major impacts in terms of natural and social environment.

(7) Japan's Grant Aid scheme

Since the Project has been planned with reasonable contents and schedule compliant with the framework of the Grant Aid scheme, for example, the main source of Project equipment will be Japan and the Project will finish within the E/N limit, it can be implemented without any great difficulty.

3-2-2 Effectiveness

The following effects can be anticipated from Project implementation.

① Quantitative effects

Indicator	Current value (2010)	Planned value (2013)
Restricted supply time (hours/month)	159	32
Time of power interruptions due to failures (hours/month)	272	190
Voltage drop	11kV system (KCMC Hospital): 18% drop (11→9 kV) 0.4 kV system (Lombo): 16% drop (0.4→0.338 kV)	11kV system (KCMC Hospital): No drop (11→11 kV) 0.4 kV system (Lombo):5% drop (0.4→0.380 kV)

② Qualitative effects

Current conditions and problems	Project measures (Project works)	Project effects and degree of improvement
1. In Kilimanjaro Region, there are frequent power interruptions caused by the deterioration and overload of transmission and distribution facilities, and these adversely impact development of local industries.	Upgrade and construct substations and construct transmission and distribution lines.	The provision of stable power supply will vitalize local industries such as the illumination culture of flowers and plants, timber processing, manufacture of potable water and coffee processing.
2. In Kilimanjaro Region, there are frequent power interruptions caused by the deterioration and overload of transmission and distribution facilities, and these adversely impact stable operation or medical care agencies.	Upgrade and construct substations and construct transmission and distribution lines.	Through enabling stable power supply to KCMC Hospital and the tuberculosis hospital, the Project will contribute to the stable operation of medical agencies and improvement of medical services.
3. In Kilimanjaro Region, there are frequent power interruptions caused by the deterioration and overload of transmission and distribution facilities, and these adversely impact the living environment of local residents.	Upgrade and construct substations and construct transmission and distribution lines.	Through enabling stable power supply, the Project will improve the living environment of local residents.

The beneficial effects imparted by each of the Project components are as indicated in the following table.

③ Qualitative effects (by each component)

No	Component	Current Problems and Anticipated Effects
1	YMCA S/S upgrading	Since the substation was already overloaded in 2007 and is having to conduct rotating power interruptions, there is an urgent and high need for upgrading. Since YMCA substation is located in the center of Moshi, beneficial effects in the shape of economic vitalization and improvement of the living environment can be anticipated if stable power supply can be provided to the various commercial, industrial and public facilities and ordinary households in the area. • Forecast number of beneficiaries at Moshi University: Employees 350, students 3,000
2	Lawate S/S upgrading	Since the substation was already overloaded in 2006 and is having to conduct rotating power interruptions, there is an urgent and high need for upgrading. Since Lawate substation supplies electricity to the tuberculosis hospital and facilities supplying water to the west of Kilimanjaro Region, beneficial effects can be anticipated in terms of the stable operation of public facilities. • Forecast number of beneficiaries at the tuberculosis hospital: Inpatients 180, outpatients 1,600/month (80/day)

No	Component	Current Problems and Anticipated Effects
3	• KCMC S/S construction • Trade School SS circuit breaker installation • 33kV distribution line installation (Trade School-KCMC)	Currently power is distributed from YMCA substation at 11 kV, however, voltage drop is extreme. The greatest beneficiary of KCMC substation construction will be KCMC Hospital, where frequent power interruptions and voltage drop interrupt treatment and hamper the operation of instruments and the instable power supply is hindering medical care services. Moreover, since the hospital generator has to be operated frequently due to the power outages and voltage drop, the resulting fuel costs are putting pressure on the hospital business. Through constructing KCMC substation and distributing 33 kV power, voltage drop will be improved and stable power supply to the hospital and medical university can be anticipated. Since KCMC Hospital is the largest hospital in the north of Tanzania and it receives government subsidies in order to receive impoverished people, the beneficial effect in terms of the stable hospital operation will be large. • Forecast number of beneficiaries at KCMC Hospital: Inpatients 500, outpatients 123,000/year (out of the outpatients, 105,000 are resident in Kilimanjaro Region. • Forecast number of beneficiaries at KCMC Medical University: Employees 150, students 900
4	• Makuyuni S/S construction • 66kV transmission line installation (Kiyungi-Makuyuni) • Kiyungi S/S transformer installation	Power from Kiyungi substation is supplied to Himo Town in the east of Moshi and to Marangu and Rombo in the northeast, however, the distribution feeder for these areas only accounts for roughly half of the load from the substation, so a single 33 kV line distributes power over more than 50 km. Accordingly, accidents are prone to frequently occur, and when accidents do occur, power is interrupted along the entire line, a long time is needed to find the accident point and the voltage drop is large. Numerous timber processing plants are located in Rombo district at the end of the 33 kV line, and their productivity is greatly hampered by the frequent power interruptions. Some of these timber processing plants were established with the objective of promoting the employment of women and jobless people Construction of Makuyuni substation, which can receive 66 kV of power, close to the demand area will improve the voltage drop situation and boost supply reliability.

④ Concrete example of beneficial effects on KCMC Hospital arising from construction of KCMC Substation

1) Outline of KCMC Hospital

KCMC Hospital is the largest general hospital in the north of Tanzania and is one of four referral hospitals in Tanzania. Accordingly, patients visit the hospital not only from Kilimanjaro Region but also all areas of Tanzania and neighboring countries. However, residents of Kilimanjaro Region account for 82% of inpatients and 86% of outpatients at the hospital. In 2009, the hospital has an aggregate total of approximately 22,000 inpatients and 123,000 outpatients, and it conducted 3,111 childbirths.

Table 3-2-2.1 Breakdown of Patients at KCMC Hospital by Area (2009 actual figures)

Regions		In-patients	Out-patients		
			New	Return attendance	Total
Tanzania main land	Kilimanjaro	17,957	16,773	88,605	105,378
	Arusha	1,663	2,928	5,075	8,003
	Tanga	598	981	1,601	2,582
	Manyara	542	886	1,242	2,128
	Singida	208	374	518	892
	Dodoma	155	273	472	745
	Dar es salaam	154	380	362	742
	Iringa	24	72	42	114
	Mbeya	29	76	74	150
	Kigoma	23	21	57	78
	Lindi	3	3	2	5
	Mara	50	115	259	374
	Morogoro	68	153	201	354
	Mtwara	2	10	10	20
	Mwanza	38	122	125	247
	Pwani	7	12	47	59
	Rukwa	10	39	42	81
	Shinyanga	54	99	132	231
	Ruvuma	2	10	9	19
	Tabora	87	123	186	309
	Z. Magharibi	17	23	36	59
Zanizbar	Zanzibar	20	20	35	55
	Pemba	2	4	0	4
Foreign	Kenya	106	188	79	267
	Uganda	2	3	2	5
	Burundi	1	2	0	2
Total		**21,822**	23,690	99,213	**122,903**

Source: KCMC Hospital annual report 2009

Table 3-2-2.2 Ratio of Patients by Medical Department at KCMC Hospital

Medical Departments	Percentage of patients
1 Casualty	15.6%
2 Dermatology	12.6%
3 Internal Medicine	11.4%
4 Gynecology/Obstetrics	11.0%
5 Orthopedic	7.7%
Others	41.6%
Total	100.0%

Source: KCMC Hospital annual report 2009

Looking at the number of patients by medical department, casualty accounts for the most at around 16%, followed in order by dermatology and internal medicine,

For patients who are too impoverished to pay treatment costs, KCMC Hospital grants exemptions or extensions on payments, and 818 patients received such support in 2009.

2) Current problems arising from power supply

Problems arising from the current unstable power supply are as follows:

- Power interruptions cause the measurement data of medical instruments (CT scanners, etc.) to be lost.
- Voltage fluctuations cause damage to medical instruments.
- Voltage drop causes medical instruments to cease operating.
- The emergency generator is operated during power interruptions, however, high fuel costs put pressure on the hospital business.
- Since the emergency generator does not have sufficient capacity to fill the power demand of the entire hospital, treatment activities have to be suspended in a number of departments during power cuts.

3) Effects of Project implementation

Through overcoming the above problems through implementing the Project, the following effects can be expected and this will contribute to improvement in the medical care services at KCMC Hospital.

- Loss of measurement data in medical instruments due to power interruptions will be prevented.
- Damage of medical instruments due to voltage fluctuations will be prevented.
- Malfunctioning of medical instruments caused by voltage drop will be resolved.
- Operating time of emergency generators will be reduced, thereby enabling fuel costs to be cut.
- Suspensions to medical treatment services due to power interruptions will be resolved.

Furthermore, because the above improvements can be anticipated at KCMC Hospital, which handles more than 3,000 childbirths per year, contribution will be made to achieving the Millennium Development Goals 4 (Reduction of infant mortality rate) and 5 (Improvement in health of pregnant women).

Appendices

Appendix 1 Member List of the Study Team

Appendices

1. Member List of the Study Team

(1) First Field Survey

Name	Work Assignment	Position
Mr. Mitsuhiro Maehara	Leader	Director Electric Power and Energy Division Natural Resource and Energy Group Industrial Development Department, JICA
Mr. Tetsuya Takimoto	Planning Management	Deputy Director Electric Power and Energy Division Natural Resource and Energy Group Industrial Development Department, JICA
Mr. Kyoji Fujii	Chief Consultant / Power Development Planning/ Substation Facilities Planning	Yachiyo Engineering Co., Ltd.
Mr. Masayuki Tamai	Transmission and Distribution System Planning	Yachiyo Engineering Co., Ltd.
Mr. Sigeki Takashima	Environmental and Social Considerations	Yachiyo Engineering Co., Ltd.
Mr. Daisuke Akatsuka	Coordinator	Yachiyo Engineering Co., Ltd.

(2) Second Field Survey

Name	Work Assignment	Position
Mr. Tetsuya Takimoto	Leader	Deputy Director Electric Power and Energy Division Natural Resource and Energy Group Industrial Development Department, JICA
Mr. Kyoji Fujii	Chief Consultant / Power Development Planning/ Substation Facilities Planning	Yachiyo Engineering Co., Ltd.
Mr. Masayuki Tamai	Transmission and Distribution System Planning	Yachiyo Engineering Co., Ltd.
Mr. Susumu Imai	Civil Structure / Facility Planning / Natural Condition Survey	Yachiyo Engineering Co., Ltd.
Mr. Sigeki Takashima	Environmental and Social Considerations	Yachiyo Engineering Co., Ltd.
Mr. Makoto Abe	Construction and Procurement Planning / Cost Estimation	Yachiyo Engineering Co., Ltd.
Mr. Daisuke Akatsuka	Coordinator	Yachiyo Engineering Co., Ltd.

(3) Third Field Survey (Explanation on Draft Final Report)

Name	Work Assignment	Position
Mr. Toshihisa Hasegawa	Leader	Senior Representative JICA Tanzania Office
Mr. Tetsuya Takimoto	Leader	Deputy Director Electric Power and Energy Division Natural Resource and Energy Group Industrial Development Department, JICA
Mr. Kyoji Fujii	Chief Consultant / Power Development Planning/ Substation Facilities Planning	Yachiyo Engineering Co., Ltd.
Mr. Sigeki Takashima	Environmental and Social Considerations	Yachiyo Engineering Co., Ltd.
Mr. Daisuke Akatsuka	Coordinator	Yachiyo Engineering Co., Ltd.

Appendix 2 Study Schedule

Tentative 1st Field Survey Schedule for Preparatory Survey on the Project for
Rehabilitation of Substation and Transmission Line in Kilimanjaro Region in the Republic of Tanzania

As of 1 Apr. 10

No.	Date	A day of the week	Contents of Survey						Stay at
			JICA		Consultant				
					Team 1		Team 2		
			Maehara	Takimoto	Fujii	Akatsuka	Tamai	Takashima	
1	13-Apr	Tue		①Trip 〔Narita → Dubai〕					Dubai (Takimoto)
2	14-Apr	Wed		①Trip 〔Dubai 10:50→ Dar es Salaam 15:20 by EK725〕			①Trip 〔Narita 11:00 → Bangkok 15:35 by JL717〕		Dar es Salaam (Takimoto) Bangkok (Tamai, Takashima)
3	15-Apr	Thu		①Meeting on Technical Assistance			①Trip 〔Bangkok 02:40 → Dubai 05:45 by EK419〕 ②Trip 〔Dubai 10:50 → Dar es Salaam 15:20 by EK725〕		Dar es Salaam (Takimoto, Tamai, Takashima)
4	16-Apr	Fri		①Courtesy call and Explanation of Inception Report to JICA Tanzania Office, Ministry of Energy and Mine, TANESCO			①Courtesy call and Explanation of Inception Report to JICA Tanzania Office, Ministry of Energy and Mine, TANESCO		Dar es Salaam (Takimoto, Tamai, Takashima)
5	17-Apr	Sat	①Trip 〔Narita → Dubai〕	①Trip 〔Dar es Salaam 07:20 → Kilimanjaro 08:40 by PW420〕	①Trip 〔Narita 11:00 → Bangkok 15:35 by JL717〕		①Trip 〔Dar es Salaam 16:45→ Kilimanjaro 18:05 by PW432〕 ②Sorting of the collecting data and Internal meeting		Kilimanjaro (Takimoto, Tamai, Takashima) Dubai (Maehara) Bangkok (Tamai, Takashima)
6	18-Apr	Sun	①Trip 〔Dubai → Dar es Salaam → Kilimanjaro〕	①Sorting of the collecting data and Internal meeting	①Trip 〔Bangkok 02:40 → Dubai 05:45 by EK419〕 ②Trip 〔Dubai 10:50 → Dar es Salaam 15:20 by EK725〕 ③Trip 〔Dar es Salaam18:30→ Kilimanjaro19:50 by PW725〕		①Sorting of the collecting data and Internal meeting		Kilimanjaro
7	19-Apr	Mon	①Courtesy call and Explanation of Inception Report to TANESCO Kilimanjaro Office, ②Confirmation of Requested Contents, ③Site Survey (Lawati S/S →Machame S/S →YMCA S/S)						Kilimanjaro
8	20-Apr	Tue	①Site Survey (KCMC S/S →Gomberi S/S →Kiyungi S/S → Route of 66kV Transmission Line →Makunyuni S/S → Same S/S)						Kilimanjaro
9	21-Apr	Wed	①Trip 〔Kilimanjaro 10:30→Dar es Salaam 12:35 by PW420〕 ②Discussion on Minutes of Discussion (M/D) with Ministry of Energy and Mine and TANESCO			①Current Situation Survey for Facilities in Substations (Lawati S/S, Machame S/S, YMCA S/S) ②Collecting Data	①Current Situation Survey for Facilities in Substations (Lawati S/S, Machame S/S, YMCA S/S)	①Environmental and Social Consideration on Route of Transmission Line (Current Situation Survey for Natural Environment and Social Environment)	Kilimanjaro (Tamai, Takashima, Akatsuka) Dar es Salaam（Maehara, Takimoto, Fujii)
10	22-Apr	Thu	①Discussion on Minutes of Discussion (M/D) with Ministry of Energy and Mine and TANESCO			①Current Situation Survey for Facilities in Substations (Kiyungi S/S, Same S/S) ②Collecting Data	①Current Situation Survey for Facilities in Substations (Kiyungi S/S, Same S/S)	①Environmental and Social Consideration on Route of Transmission Line (Ascertain Presence of Relocation of Inhabitant and Current Situation Survey for Land Expropriation)	Kilimanjaro (Tamai, Takashima, Akatsuka) Dar es Salaam（Maehara, Takimoto, Fujii)
11	23-Apr	Fri	①Signing on Minutes of Discussion (M/D) with Ministry of Energy and Mine and TANESCO ②Report to JICA Tanzania Office and Embassy of Japan			①Current Situation Survey for Transmission Line (existing 66/33/11kV) ②Collecting Data	①Current Situation Survey for Transmission Line (existing 66/33/11kV)	①Environmental and Social Consideration on Land Required for Substation (Current Situation Survey for Natural Environment and Social Environment and Land Expropriation)	Kilimanjaro (Tamai, Takashima, Akatsuka) Dar es Salaam（Maehara, Takimoto, Fujii)
12	24-Apr	Sat	①Trip 〔Dar es Salaam 16:50 → Dubai 23:20 by EK726〕		①Trip 〔Dar es Salaam 07:20 → Kilimanjaro 08:40 by PW420〕	①Preparation of Field Report			Kilimanjaro Dubai (Maehara, Takimoto)
13	25-Apr	Sun	①Trip 〔Dubai → Narita〕		①Preparation of Field Report				Kilimanjaro
14	26-Apr	Mon			①Current Situation Survey for Power Load and Power Demand Forecast ②Preparation of Field Report	①Collecting Data ②Preparation of Field Report	①Technical Evaluation for Requested Contents ②Preparation of Field Report	①Supporting of Formulation of Resettlement Action Plan ②Preparation of Field Report	Kilimanjaro
15	27-Apr	Tue			①Current Situation Survey for Power Load and Power Demand Forecast ②Preparation of Field Report	①Collecting Data ②Preparation of Field Report	①Technical Evaluation for Requested Contents ②Preparation of Field Report	①Supporting of Formulation of Resettlement Action Plan ②Preparation of Field Report	Kilimanjaro
16	28-Apr	Wed			①Technical Discussion with TANESCO Kilimanjaro Office, ②Preparation of Field Report	①Technical Discussion with TANESCO Kilimanjaro Office, ②Collecting Data ③Preparation of Field Report	①Technical Discussion with TANESCO Kilimanjaro Office, ②Preparation of Field Report	①Technical Discussion with TANESCO Kilimanjaro Office, ②Preparation of Field Report	Kilimanjaro
17	29-Apr	Thu			①Submission, Explanation and Discussion on Field Report (TANESCO Kilimanjaro Office) , ②Modification of Field Report				Kilimanjaro
18	30-Apr	Fri			①Discussion and Signing on Field Report (TANESCO Kilimanjaro Office)				Kilimanjaro
19	1-May	Sat			①Sorting of the co lecting data and Internal meeting ②Trip (Kilimanjaro 10:30→Dar es Salaam 12:35 by PW420)				Dar es Salaam
20	2-May	Sun			①Sorting of the collecting data and Internal meeting		①Sorting of the collecting data and Internal meeting Trip 〔Dar es Salaam 16:50 → Dubai 23:20 by EK726〕		Dar es Salaam Dubai (Tamai, Takashima)
21	3-May	Mon			①Survey for Other Doner'sAssistance: EDCF, World Bank		①Trip 〔Dubai 03:15 → Bangkok 12:25 by EK384〕 ②Trip {Bangkok 23:00 → Narita 07:10 1 by JL718}		Dar es Salaam
22	4-May	Tue			①Report to JICA Tanzania Office, Ministry of Energy and Mine, TANESCO)		①Arrive at Narita (07:10)		Dar es Salaam
23	5-May	Wed			①Trip 〔Dar es Salaam 16:50 → Dubai 23:20 by EK726〕				Dubai
24	6-May	Thu			①Trip 〔Dubai 03:15 → Bangkok 12:25 by EK384〕 ②Trip {Bangkok 23:00 → Narita 07:10 1 by JL718}				on board
25	7-May	Fri			①Arrive at Narita (07:10)				

〔Remarks〕
JICA Japan International Cooperation Agency
TANESCO Tanzania Electric Supply Company
PW Precis on Air
S/S Substation

Tentative 2nd Field Survey Schedule for Preparatory Survey on the Project for Rehabilitation of Substation and Transmission Line in Kilimanjaro Region in the Republic of Tanzania

As of 2 Jun. '10

No.	Date	Day of the week	Contents of Survey						Stay at
			JICA	Consultant					
				Team 1	Team 2			Team 3	
			Takimoto	Fujii	Imai	Akatsuka	Takashima	Tamai / Abe	
1	6-Jun	Sun		①Trip〔Narita 20:50 → Doha 05:15+1 by QR803〕				①Trip〔Narita 20:50 → Doha 05:15+1 by QR803〕	on Flight
2	7-Jun	Mon		①Trip {Doha 7:45→ Dar es Salaam 13:25 by QR544}				①Trip {Doha 7:45→ Dar es Salaam 13:25 by QR544} ③Trip〔Dar es Salaam 18:00→ Kilimanjaro 19:20 by PW725〕	Dar es Salaam〔Fujii, Imai, Akatsuka, Takashima〕 Kilimanjaro〔Tamai, Abe〕
3	8-Jun	Tue		①Courtesy call and Explanation of Analysis in Japan to 9:00 JICA Tanzania Office 11:00 TANESCO	①Meeting with Sub-Contractor for Geological and Topographic Survey	same as on the left	①Confirm the Progress of Environmental Impact Assessment Procedure	①Courtesy call and Explanation of Analysis in Japan to TANESCO Kilimanjaro Office	Dar es Salaam〔Fujii, Imai, Akatsuka, Takashima〕 Kilimanjaro〔Tamai, Abe〕
4	9-Jun	Wed		①Confirmation of Schedule of TEDAP Project and Contents of Design (TANESCO and TEDAP Consultant) ②Contract Negotiation with Local Contructor	①Contract Negotiation with Sub-Contructor for Geological and Topographic Survey	same as on the left	①Survey for Environmental Laws	①Site Survey at Kiyungi S/S (1)	Dar es Salaam〔Fujii, Imai, Akatsuka, Takashima〕 Kilimanjaro〔Tamai, Abe〕
5	10-Jun	Thu		①Survey for Power Development Planning and Transmission Line Expansion Planning in Whole of Country ②Survey for Cost of Transmission and Distribution Project by Other Donors	①Survey for Ability of Local Contractor ②Collection of Estimation of Materials, Equipment, Labors	same as on the left	①Survey for Railway Expansion Planning and Building Restrictions in Kilimanjaro Region	①Site Survey at Kiyungi S/S (2)	Dar es Salaam〔Fujii, Imai, Akatsuka, Takashima〕 Kilimanjaro〔Tamai, Abe〕
6	11-Jun	Fri		①Survey for Organization, Personnel, Financial Standing of TANESCO	①Market Survey〔Materials, Installation〕 ②Canclution of a Contract with Local Contructor for Geological and Topographic Survey	same as on the left	①Survey for Basis of Conservation Area of Widening of Road ②Collecting Information of Land Registration in Project Site for New Construction of S/S and Transmission Line	①Detail Site Survey for Route of 66 kV Transmission Line (1) (Kiyungi S/S, Paddy Field)	Dar es Salaam〔Fujii, Imai, Akatsuka, Takashima〕 Kilimanjaro〔Tamai, Abe〕
7	12-Jun	Sat	Trip〔Narita → Dubai〕	①Internal Meeting	①Internal Meeting ②Trip〔Dar es Salaam 16：45→ Kilimanjaro 18：05 by PW432〕			①Detail Site Survey for Route of 66 kV Transmission Line (2) (Makuyuni S/S)	Dar es Salaam〔Fujii〕 Kilimanjaro〔Tamai, Abe, Imai, Akatsuka, Takashima〕
8	13-Jun	Sun	①Trip〔Dubai 10:50 → Dar es Salaam 15:20 by EK725〕 ②Internal Meeting	①Sorting of the Collecting Data ②Internal Meeting	①Sorting of the Collecting Data and Internal Meeting				Dar es Salaam〔Takimoto, Fujii〕 Kilimanjaro〔Tamai, Abe, Imai, Akatsuka, Takashima〕
9	14-Jun	Mon	Courtesy call and Explanation of Analysis in Japan to 10:00 JICA Tanzania Office 11:00 Ministry of Energy and Minerals 14:00 TANESCO		①Witness of Sub-Contract Works and Sight Survey〔Lawati S/S, Machame S/S, YMCA S/S〕	①Additional Survey for to Study Outcome & Effect of the Project (Interview to Main Consumer of TANESCO)	①Environmental and Social Consideration Survey for Proposed Updating Substation (Lawati S/S, Machame S/S, YMCA S/S)	①Sight Survey for Proposed Updating Substation (Lawati S/S, Machame S/S, YMCA S/S)	Dar es Salaam〔Takimoto, Fujii〕 Kilimanjaro〔Tamai, Abe, Imai, Akatsuka, Takashima〕
10	15-Jun	Tue	14:00 Discussion on Minutes of Discussion (M/D)〔Ministry of Energy and Minerals, TANESCO〕		①Witness of Sub-Contract Works and Sight Survey〔KCMC S/S〕 ②Survey for Ability of Local Contractor	①Additional Survey for to Study Outcome & Effect of the Project (Interview to Main Consumer of TANESCO) ②Survey for Ability of Local Contractor	①Environmental and Social Consideration Survey (Trade School S/S, KCMC S/S)	①Sight Survey (Trade School S/S) ②Sight Survey(KCMC S/S)	Dar es Salaam〔Takimoto, Fujii〕 Kilimanjaro〔Tamai, Abe, Imai, Akatsuka, Takashima〕
11	16-Jun	Wed	①9:00 Signing on Minutes of Discussion (M/D)〔Ministry of Energy and Minerals, TANESCO〕 ②Report to JICA Tanzania Office and Embassy of Japan		①Witness of Sub-Contract Works and Sight Survey〔Makuyuni S/S〕 ②Survey for Carry-in Route of Materials and Equipments ③Survey for Ability of Local Contractor	①Base Line Survey for Outcome Indicator of the Project	①Environmental and Social Consideration Survey (Makuyuni S/S)	①Sight Survey〔Makuyuni S/S and Carry-in Route〕	Dar es Salaam〔Takimoto, Fujii〕 Kilimanjaro〔Tamai, Abe, Imai, Akatsuka, Takashima〕
12	17-Jun	Thu	①Trip {Dar es Salaam 16:50 → Dubai 23:20 by EK726}	①Trip〔Dar es Salaam 16：00→ Kilimanjaro 17：20 by PW432〕 ②Courtesy call to TANESCO Kilimanjaro Office ③Internal Meeting	①Market Survey〔Materials, Installation〕 ②Survey for Ability of Local Contractor ③Internal Meeting	①Base Line Survey for Outcome Indicator of the Project ②Survey for Ability of Local Contractor ③Internal Meeting	①Environmental and Social Consideration Survey for Route of 33 kV Distribution Line (Trade School～KCMC S/S) ②Internal Meeting	①Survey for Route of 33 kV Distribution Line (Trade School～KCMC S/S) ②Internal Meeting	Kilimanjaro
13	18-Jun	Fri	①Trip〔Dubai → Narita〕	①Detail Site Survey for Route of 66 kV Transmission Line	①Witness of Sub-Contract Works and Sight Survey〔Route of 66 kV Transmission Line〕	①Detail Site Survey for Route of 66 kV Transmission Line	①Environmental and Social Consideration Survey for Route of 66 kV Transmission Line	①Detail Site Survey for Route of 66 kV Transmission Line (3) (Rocky Mountain)	Kilimanjaro
14	19-Jun	Sat		①Preparation of Field Report ②Additional Survey					Kilimanjaro
15	20-Jun	Sun		①Preparation of Field Report					Kilimanjaro
16	21-Jun	Mon		①Preparation of Field Report ②Additional Survey					Kilimanjaro
17	22-Jun	Tue		①Preparation of Field Report ②Additional Survey					Kilimanjaro
18	23-Jun	Wed		①Submission, Explanation and Discussion on Field Report〔TANESCO Kilimanjaro Office〕					Kilimanjaro
19	24-Jun	Thu		①Discussion on Field Report〔TANESCO Kilimanjaro Office〕					Kilimanjaro
20	25-Jun	Fri		①Discussion and Signing on Field Report〔TANESCO Kilimanjaro Office〕					Kilimanjaro
21	26-Jun	Sat		①Trip〔Kilimanajro 10:30→ Dar es Salaam 12:35 by PW420〕					Dar es Salaam
22	27-Jun	Sun		①Sorting of the Collecting Data and Internal Meeting					Dar es Salaam
23	28-Jun	Mon		①Discussion on Field Report〔TANESCO〕					Dar es Salaam
24	29-Jun	Tue		①Discussion on Field Report〔TANESCO〕					Dar es Salaam
25	30-Jun	Wed		①Discussion and Signing on Field Report〔TANESCO〕					Dar es Salaam
26	1-Jul	Thu		Courtesy call to JICA Tanzania Office, TANESCO					Dar es Salaam
27	2-Jul	Fri		①Trip〔Dar es Salaam 14:25 → Doha 20:00 by QR545}					on Flight
28	3-Jul	Sat		①Trip {Doha 01:05 → Narita 19:30 by QR802}					

〔Remarks〕
JICA Japan International Cooperation Agency
TANESCO Tanzania Electric Supply Company
S/S：Substation

Tentative Field Survey (Explanation of Draft Outline Design Report) Schedule for
Preparatory Survey on the Project for Rehabilitation of Substation and Transmission Line in Kilimanjaro Region in the Republic of Tanzania

As of Nov.4 2010

No.	Date	A day of the week	Contents of Survey				Stay at
			JICA	Consultant			
			Mr. Takimoto	Mr. Fujii	Mr. Takashima	Mr. Akatsuka	
1	20-Nov	Sat		①Trip 〔Narita 20:50 → Doha 05:10+1 by QR803〕			on Flight
2	21-Nov	Sun		①Trip {Doha 7:20→ Dar es Salaam 13:15 by QR544}			Dar es Salaam
3	22-Nov	Mon		①Courtesy call to JICA Tanzania Office, EOJ, Ministry of Energy and Minerals, TANESCO ②Preparation for Explanation of Draft Basic Design Report	①same as left, ②Environmental and Social Consideration Survey		Dar es Salaam
4	23-Nov	Tue	①Trip 〔Narita 20:50 → Doha 05:10+1 by QR803〕	①Explanation of Draft Basic Design Report (Ministry of Energy and Minerals, TANESCO) ②Additional Survey	①same as left ②Environmental and Social Consideration Survey ③Trip 〔Dar es Salaam 18:00→ Kilimanjaro 19:20 by PW434〕		Dar es Salaam (Fujii) Kilimanjaro (Takashima, Akatsuka) on Flight(Takimoto)
5	24-Nov	Wed	①Trip {Doha 7:20→ Dar es Salaam 13:15 by QR544} ②Preparation for Discussion on Minutes of Discussion (M/D) ③Meeting on Technical Cooperation Project	①Explanation of Draft Basic Design Report (Ministry of Energy and Minerals, TANESCO) ②Additional Survey	①Explanation of Draft Basic Design Report (TANESCO Kilimanjaro Office) ②Environmental and Social Consideration Survey ③Additional Survey		Dar es Salaam (Takimoto, Fujii) Kilimanjaro (Takashima, Akatsuka)
6	25-Nov	Thu	①Discussion on Minutes of Discussion (M/D) (Ministry of Energy and Minerals, TANESCO) ②Additional Survey		①Explanation of Draft Basic Design Report (TANESCO Kilimanjaro Office) ②Environmental and Social Consideration Survey ③Additional Survey		Dar es Salaam (Takimoto, Fujii) Kilimanjaro (Takashima, Akatsuka)
7	26-Nov	Fri	①Discussion on Minutes of Discussion (M/D) (Ministry of Energy and Minerals, TANESCO) ②Additional Survey	①Discussion on Minutes of Discussion (M/D) (Ministry of Energy and Minerals, TANESCO) ②Trip 〔Dar es Salaam 18:00→ Kilimanjaro 19:20 by PW434〕 ③Internal Meeting	①Explanation of Draft Basic Design Report (TANESCO Kilimanjaro Office) ②Environmental and Social Consideration Survey ③Additional Survey ④Internal Meeting		Dar es Salaam (Takimoto) Kilimanjaro (Fujii, Takashima, Akatsuka)
8	27-Nov	Sat	①Trip {Dar es Salaam 9:20→ Zanzibar 9:50 by PW730} ②Follow up for Zanzibar Project	①Additional Survey			Zanzibar (Takimoto) Kilimanjaro (Fujii, Takashima, Akatsuka)
9	28-Nov	Sun	①Follow up for Zanzibar Project ②Trip {Zanzibar 17:00→ Dar es Salaam 17:30 by PW431} ③Internal Meeting	①Additional Survey ②Trip 〔Kilimanajro 10:30→ Dar es Salaam 12:35 by PW420〕 ③Internal Meeting			Dar es Salaam
10	29-Nov	Mon	①Discussion and Signing on Minutes of Discussion (M/D) (Ministry of Energy and Minerals, TANESCO)		①same as left, ②Environmental and Social Consideration Survey		Dar es Salaam
11	30-Nov	Tue	①Report to JICA Tanzania Office, EOJ ②Trip 〔Dar es Salaam 14:25 → Doha 20:00 by QR545〕				on Flight
12	1-Dec	Wed	①Trip {Doha 01:10 → Narita 19:05 by QR802}				

〔Remarks〕:
EOJ: Embassy of Japan
JICA: Japan International Cooperation Agency
TANESCO: Tanzania Electric Supply Company

Appendix 3 List of Parties Concerned in the Recipient Country

3. List of Parties Concerned in the Recipient Country

Name and Organization	Position
Ministry of Energy and Minerals (MEM)	
Mr. Bashir J. Mrindoko	Commissioner for Energy and Petroleum Affairs
Mr. Prosper Victus	Assistant Commissioner of Petroleum and gas
Mr. Juma Mkobya	Acting Assistant Commissioner of Electricity
Mr. Salum M. Inegeja	Energy Engineer
Mr. John F. Kitonga	Energy Engineer
Mr. Marwa R. Petro	Energy Engineer
Mr. Levina Kashushura	Eng. Trainee
Tanzania Electric Supply Company ltd (TANESCO)	
Mr. Wiliam G. Mhando	Managing Director
Mr. Felchesmi J. Mramba	Ag. General Manager (Marketing)
Ms. Sophia S. Mgonja	Senior Manager Distribution
Mr. Robert M. Semsella	Manager Electrification
Mr. Seleman Mgwira	Principal Engineer
Mr. Theodory F. Bayona	Principal Engineer – Distribution Planning
Mr. Emmanuel G. Manirabona	Senior Electrical Engineer (Projects)
Mr. Hamdun R. Mansur	Principal Environmental Engineer
Mr. Elisa Kirimbo	Mapping Engineer
Tanzania Electric Supply Company ltd (TANESCO) Kilimanjaro Office	
Mr. Zakayo G. Temu	Regional Manager
Mr. Stephan J. Mfundo	Principal Engineer / Regional Revenue Protection Engineer
Mr. Honest E. Moshy	Principal Engineer
Mr. Donasiano J. Shamba	Construction Engineer
Mr. Charles Mwandu	Design and Planning Engineer
Mr. Peter U. Masanja	Emergency and Maintenance Engineer
Mr. Jackson J. Mndeme	Electrical Technician
Mr. Rajab M. Haule	Electrical Technician
Mr. Amir Kilimo	Senior Technician
Mr. Oscar Muhanba	Surveyor of Tanga Office
Mr. James E. Chinula	District Manager of Hai Office
Mr. Hashim M. Munisi	Electrical Engineer of Hai Office

Mr. Raymond H. Tuppa	District Manager of Rombo Office
Mr. Gabriel Shoo	Accounts Supervisor of Tarakea Office
Mr. Rodrock Kiwea	Foreman of Tarakea Office
Mr. Festo Nhembo	System Supervisor of Same Substation

Tanzania National Road Agency (TANROADS - KILIMANJARO)

Eng. Japherson M. Nnko	Head of Planning Unit
Eng. Leonard M. E. Chimagu	Head of Engineering Unit

National Environmental Management Council (NEMC – Dar es Salaam)

Mr. Kamugenyi Lutenganya	Environmental Consultancy

Ministry of Infrastructure Development

Ms. Fauster M. Ngowi	Principal State Attorney (Head Legal Unit)
Mr. Sihaba S. Nkinga	Director for Policy and Planning
Mr. Aunyisa Boniface Meena	Senior Transport Economist

Ministry of Lands, Housing & Human Settlement (Dar es Salaam)

Dr. Selassie D. Mayunga	Assistant Director, Surveys & Mapping Division

International Union for Conservation of Nature (IUCN – Dar es Salaam)

Mr. Abdallah Said Shah	Head of Tanzania Office
Mr. Victor Kamagenge	Program Officer

Ministry of Natural Resources and Tourism

Mr. Julius M. Mkumbo	Senior Forest Officer of Forestry and Beekeeping Division
Mr. Msami Mshana	District Natural Resources Officer

Regional Commissioner Office

Mr. Hassan M. Bendeyeko	Assistant of Regional Administrative Secretary

Pangani Basin Water Office

Mr. Phillipo Patrick	Assistant of Regional Administrative Secretary

Moshi Municipal Council

Ms. Bernadette Kinabo	Municipal Director
Mr. Mr. Neville D. Msaki	Acting Municipal Engineer
Mr. Mwasumbi A. E	Town Planner

Moshi District Council

Ms. E. N. Mbarian	Acting District Director
Mr. Mseo P. Hro	Director of Human Resource
Eng. Joag S. LA. Luntrgnner	Director of Engineering

The World Bank Tanzania Office

Mr. Robert Schlotterer	Financial Analyst, Energy Team

Korea Eximbank

Ms. Hye-Kyung Lee	EDCF Tanzania Country Director

Tanzania Railways Limited

Mr. Surendra Singh Bisht	Addl Executive Director (Infrastructure)
Mr. S. Musakileo	Permanent Way Inspector

Others (Factories, Schools, Hospitals)

Mr. Jaffari Ally	Corporate Services Executive Manager of TPC Limited
Mr. David Calwell	Senior Electrical Engineer of TPC Limited
Mr. Nizam Codabux	AFEO of TPC Limited
Mr. Wilfred N. Swai	Head of Engineering of KCMC Hospital
Ms. Juliana R. Muro	Senior Admin Officer
Mr. Nsairo Nkiwi	Admin Officer of Wild Life College
Mr. Peris S. Ayo	Head of PMU of Wild Life College
Ms. Ngina Maitru	Housekeeper of Wild Life College
Mr. Mariin K. Magogwa	Health Secretary of Kibongoto National TB Hospital
Mr. Edward Kavishi	Electrician of Kibongoto National TB Hospital
Mr. Mandonde H. S.	Electrical Engineer of Dekker Bruins
Mr. Euzebio Mveyange	Electrical Engineer of Dekker Bruins
Mr. Onesmo Silaa	Manager of Kiliwood Products LTD

Mr. Samuel	Operator of Kiliwood Products LTD
Ms. Eupheia Masita	Manager of Woman's Saw Mill Company
Ms. Cesilia Mrema	Accountant of Woman's Saw Mill Company
Mr. Joseph Silialla	Electrical Foreman of Kilimanjaro Plantation LTD.
Mr. A. H. B. M. Nijenhuis M. Sc	Managing Director of Vasso Agroventures Ltd.

Embassy of Japan in Tanzania

Mr. Hiroshi Nakagawa	Ambassador
Mr. Yukinori Seki	Second Secretary

JICA Tanzania Office

Mr. Yukihide Katsuta	Chief Representative
Mr. Toshihisa Hasegawa	Senior Representative
Mr. Shin Maruo	Representative
Mr. Minako Yamamoto	Representative
Mr. Tomoko Tauchi	Programme Advisor, Infrastructure

JICA Experts (The Project for Capacity Development of Efficient Distribution and Transmission Systems)

Mr. Jiro Nagasaka	Chief Advisor
Mr. Hisao Odagiri	Coordinator

Appendix 4 Minutes of Discussions

Minutes of Discussions
on 1st Preparatory Survey on the Project for
Rehabilitation of Substation and Transmission Line in Kilimanjaro Region
in the United Republic of Tanzania

In response to the request from the Government of the United Republic of Tanzania (hereinafter referred to as "Tanzania"), the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with the Government of Japan, decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") on the Project for Rehabilitation of Substation and Transmission Line in Kilimanjaro Region (hereinafter referred to as "the Project").

JICA sent to Tanzania the 1st Preparatory Survey Team (hereinafter referred to as "the Team"), headed by Mr. Mitsuhiro MAEHARA, Director for Electric Power Division, Industrial Development Department for International Cooperation, JICA. The Team is scheduled to stay in the country from April 14 to May 5, 2010.

The Team held discussions with the officials of Tanzanian authorities concerned (hereinafter referred to as "Tanzania side"). In the course of the discussions, both sides have confirmed the main items described in the sheets attached hereto.

Dar es Salaam, April 23, 2010

Mitsuhiro Maehara
Leader
1st Preparatory Survey Team
Japan International Cooperation Agency

Bashir J. Mrindoko
Commissioner for Energy and Petroleum Affairs
Ministry of Energy and Minerals
The United Republic of Tanzania

Witnessed by :

Willian G.. Mhando
Acting Managing Director
Tanzania Electric Supply Company Ltd.
The United Republic of Tanzania

Ngosha Said Magonya
Commissioner for External Finance
Ministry of Finance and Economic Affairs
The United Republic of Tanzania

ATTACHMENT

1. Objective of the Project

The objective of the Project is to rehabilitate the substations and transmission/distribution network in Kilimanjaro Region.

2. Project Site

The Project sites are located in Kilimanjaro Region as shown in Annex-1.

3. Responsible and Implementing Organization

(1) The responsible ministry is Ministry of Energy and Minerals (MEM).
(2) The implementing Organization is Tanzania Electric Supply Company Ltd (TANESCO).
(3) The Organization Structure of MEM and TANESCO are shown in Annex-2 and Annex-3.

4. Items Requested by the Tanzania side

The Tanzania side requested to revise the component of Japan's Grant Aid Application which was submitted in July, 2008, and the Summary of the requests are described below. Also detailed contents of each request are described in Annex-4.

(1) Construction of 33/11kV substations (KCMC, Gomberi)
(2) Upgrading of existing 33/11kV substations (YMCA, Lawati, Machame)
(3) Construction of 66/33kV substation (Makuyuni)
(4) Installation of 66kV transmission line from Kiyungi to Makuyuni
(5) Installation of 33kV transmission lines from Trade School to Gomberi
(6) Installation of 33kV transmission lines from Makuyuni to existing lines
(7) Installation of switching bay at Mkuu Rombo
(8) Installation of 132/66kV transformer at Kiyungi substation
(9) Installation of 132kV incoming/outgoing bays at Same substation

JICA will assess the appropriateness of the request for Japan's Grant Aid.

5. Japan's Grant Aid Scheme

(1) The Tanzania side has understood Japan's Grant Aid Scheme explained by the Team as described in Annex-5.
(2) The Tanzania side will take the necessary measures, as described in Annex-6, for smooth implementation of the Project as prerequisites for the Japan's Grant Aid to be implemented.

6. Schedule of the 1st Preparatory Survey

The Team will continue the Survey in Tanzania until May 5, 2010. Based on the results of the Survey, JICA will send the 2nd Preparatory Survey Team.

7. Other Relevant Issues

(1) Status of the 1st Preparatory Survey

The Team explained that the purpose of the Survey is to collect necessary information and data

for evaluating the relevance, appropriateness and urgency of the Project, and identify the issues to be cleared for implementation of the Project.

(2) Coordination among relevant donors and agencies

The Team requested the Tanzania side to ensure coordination among relevant donors and agencies for smooth implementation of the Project.

(3) Environmental and Social Considerations

a) The Team requested the Tanzania side to ensure access to the site and undertake expropriation if necessary in order to secure the project site.

b) The Team requested the Tanzania side to conduct the required environmental works, and obtain approval on environmental clearance for implementation of the Project

c) The Tanzania side agreed to comply with the JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "JICA Guidelines") as well as Tanzanian laws and regulations, and requested to prepare Environmental Checklist and Monitoring Form which are designated by JICA Guidelines for an outline design.

d) The Tanzania side agreed to make necessary arrangements with governmental organizations concerned in order to secure funding for and execution of the above environmental matters in a schedule as required for smooth execution of the Project.

(4) Counterpart Personnel

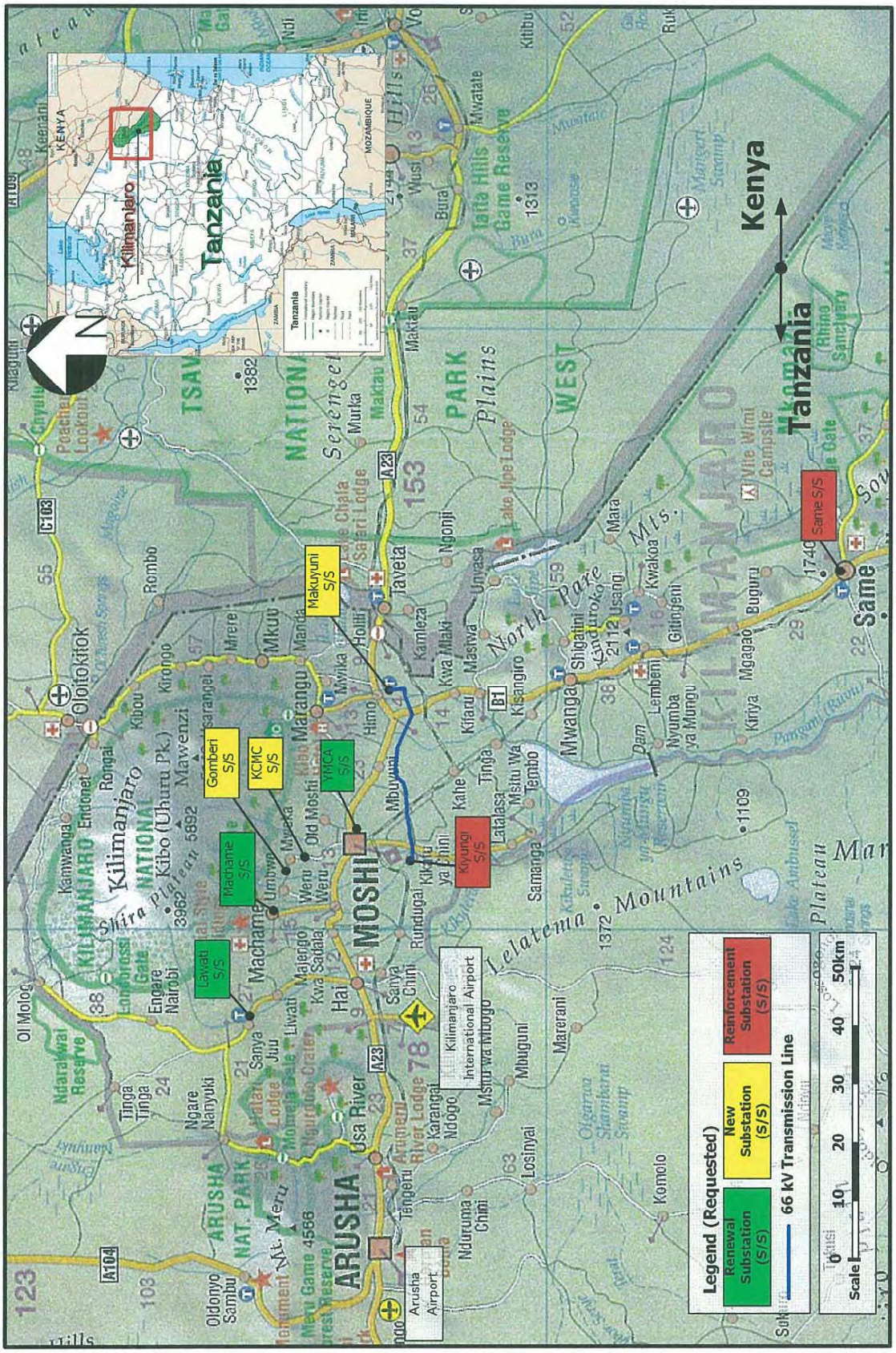
The Team requested the Tanzania side that necessary number of counterpart personnel shall be assigned to the Team and necessary arrangements with related organizations be made during the Survey in Tanzania.

The Team requested the Tanzania side that the answers to the questionnaire which the Team already submitted to the Tanzania side shall be given to the Team by April 30, 2010.

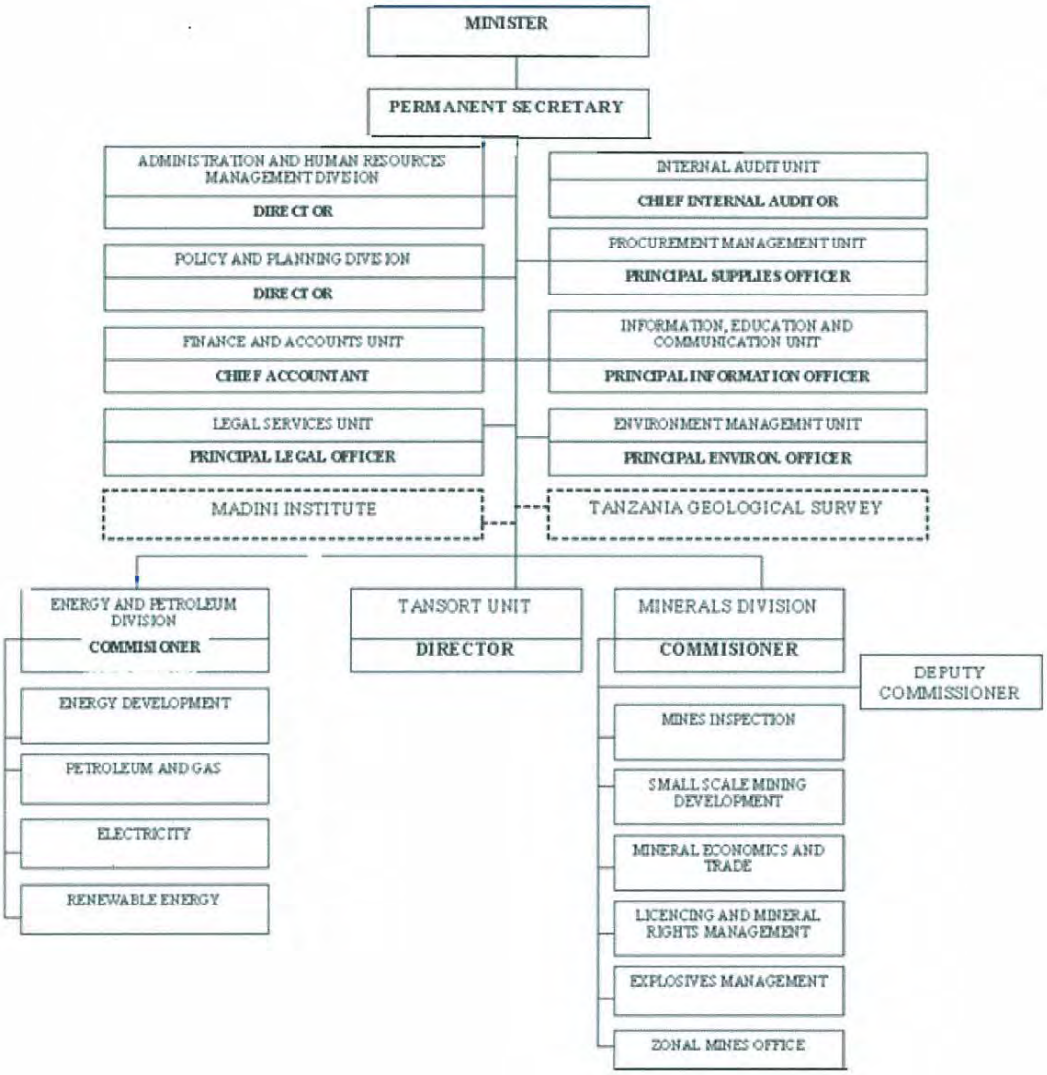
(End)

Annex-1 Project site
Annex-2 Organization Structure of Ministry of Energy and Minerals
Annex-3 Organization Structure of TANESCO (Head office and Kilimanjaro office)
Annex-4 Detailed contents of each request
Annex-5 Japan's Grant Aid Scheme
Annex-6 Major Undertakings to be taken by Each Government

Annex-1

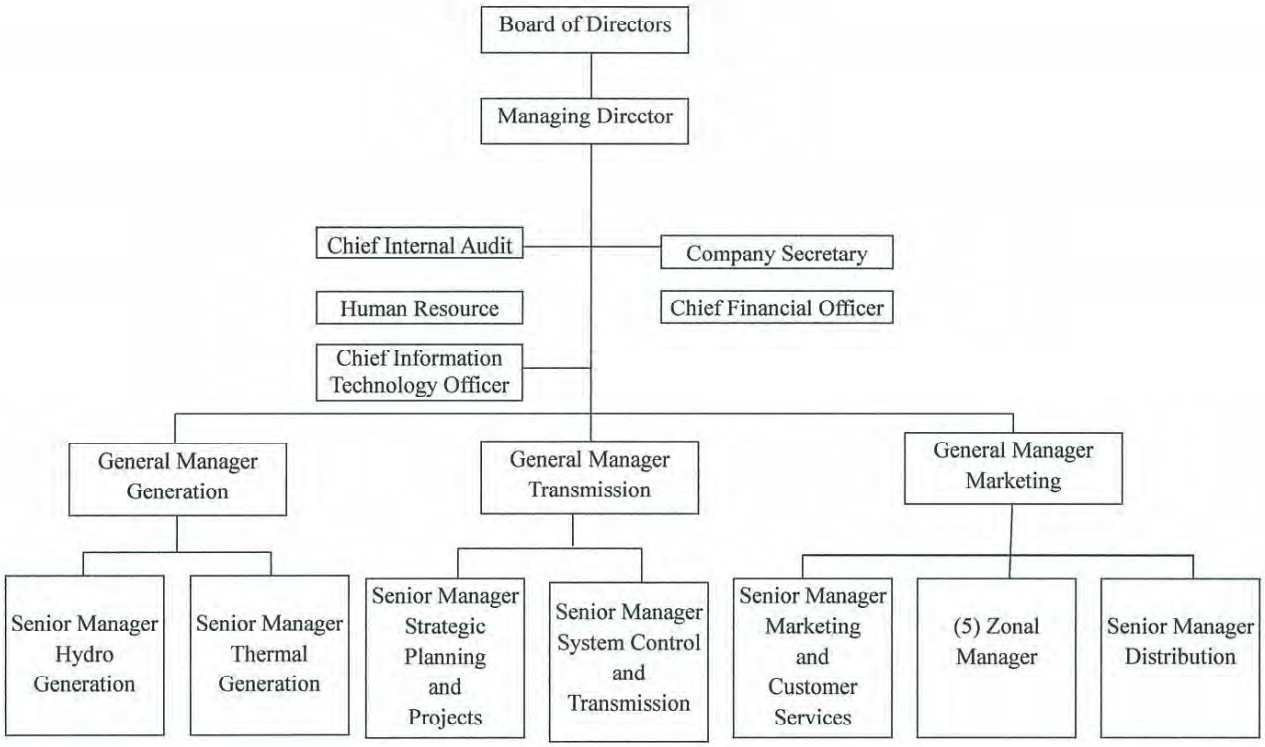

Proposed Project Sites
Kilimanjaro
Tanzania
Kenya
Legend (Requested)
Renewal Substation (S/S)
New Substation (S/S)
Reinforcement Substation (S/S)
66 kV Transmission Line
Scale
0 10 20 30 40 50km
Gomberi S/S
KCMC S/S
YMCA S/S
Machame S/S
Lawati S/S
Makuyuni S/S
Kiyungi S/S
Same S/S
MOSHI
ARUSHA
Same
Mwanga
Kilimanjaro International Airport
Arusha Airport
Lelatema Mountains
North Pare Mts.
Plateau

Annex-2

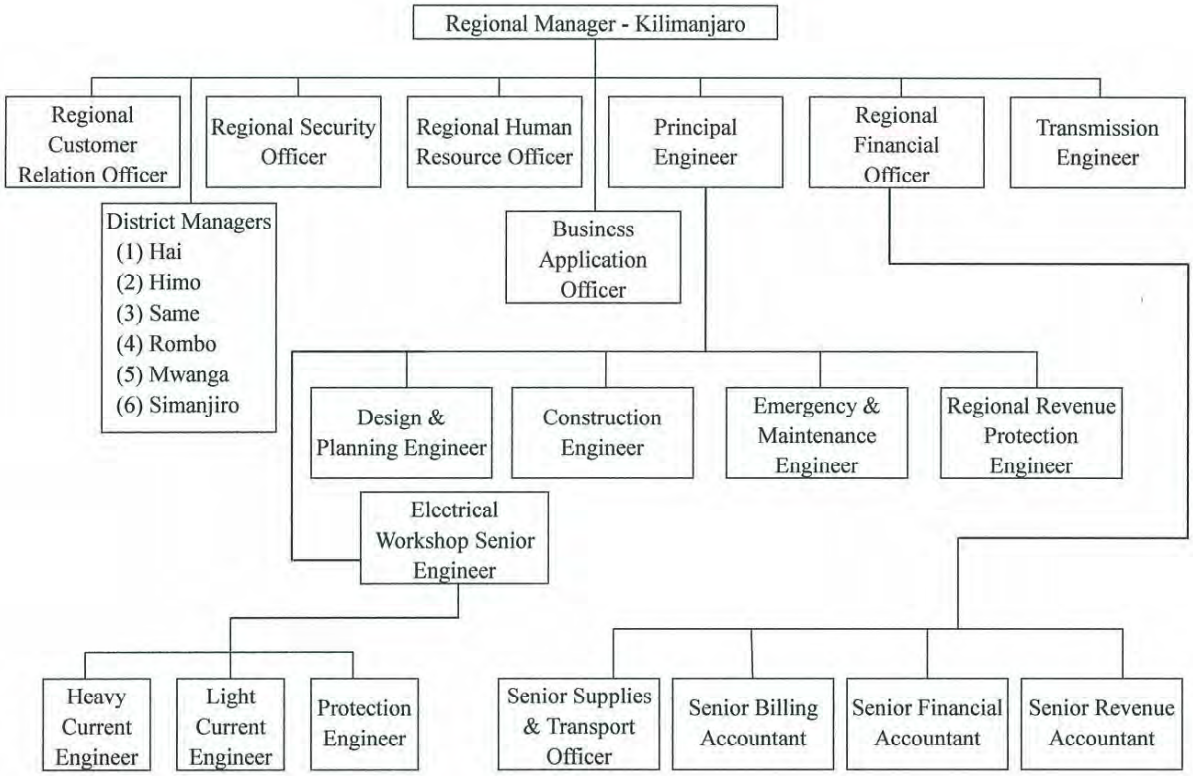


ORGANIZATION STRUCTURE OF MINISTRY OF ENERGY AND MINERALS

Annex-3



ORGANIZATION STRUCTURE OF TANESCO HEAD OFFICE



ORGANIZATION STRUCTURE OF TANESCO KILIMANJARO OFFICE