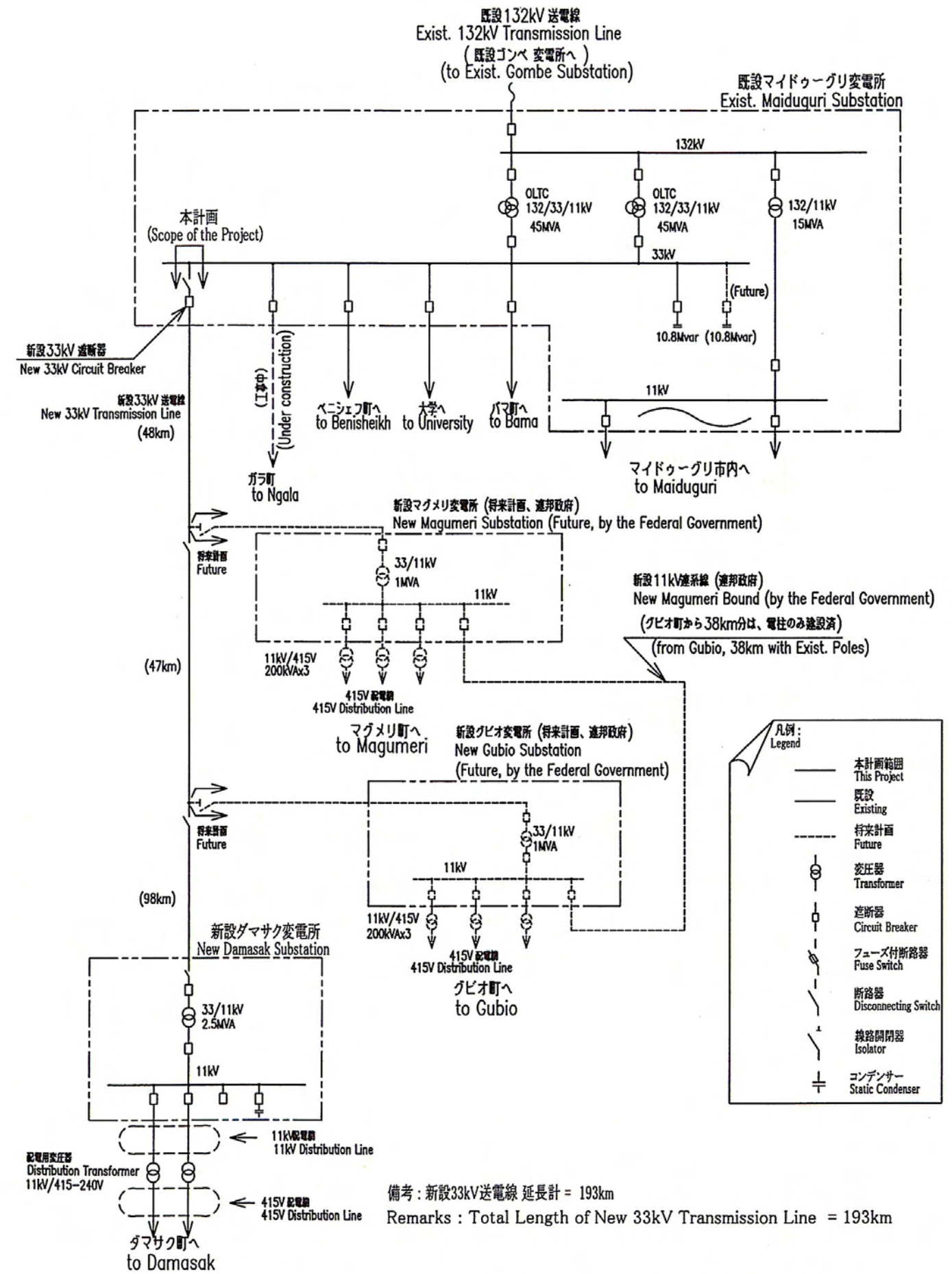
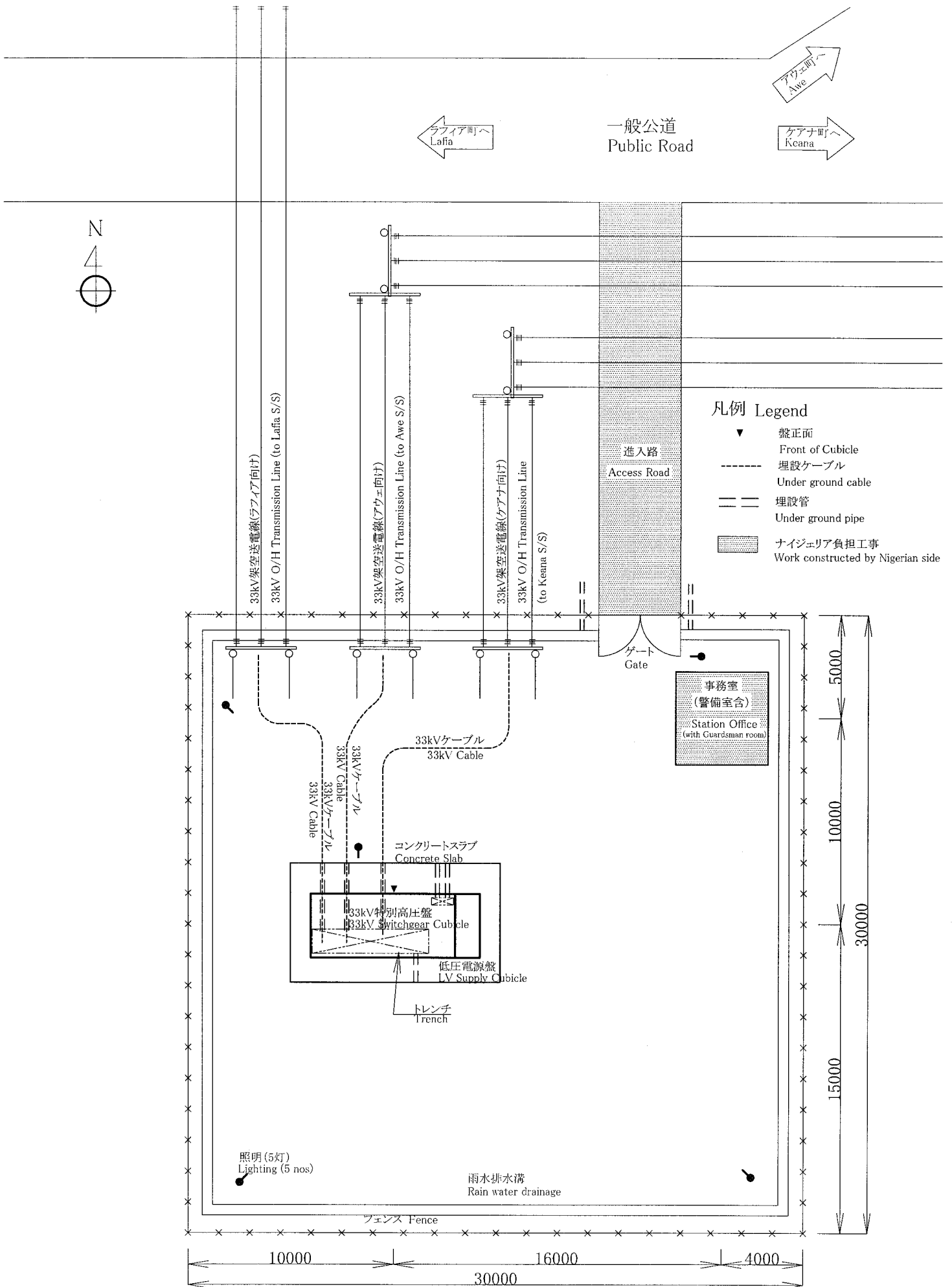


既設送電線と本計画33kV送電線ルート
Transmission Line Route



DWG. No. BDS-E01: 33kV送電線系統・ルート [ボルノ州 ダマサク町]
33kV Transmission Line Plan
[Damasak Town in Borno State]



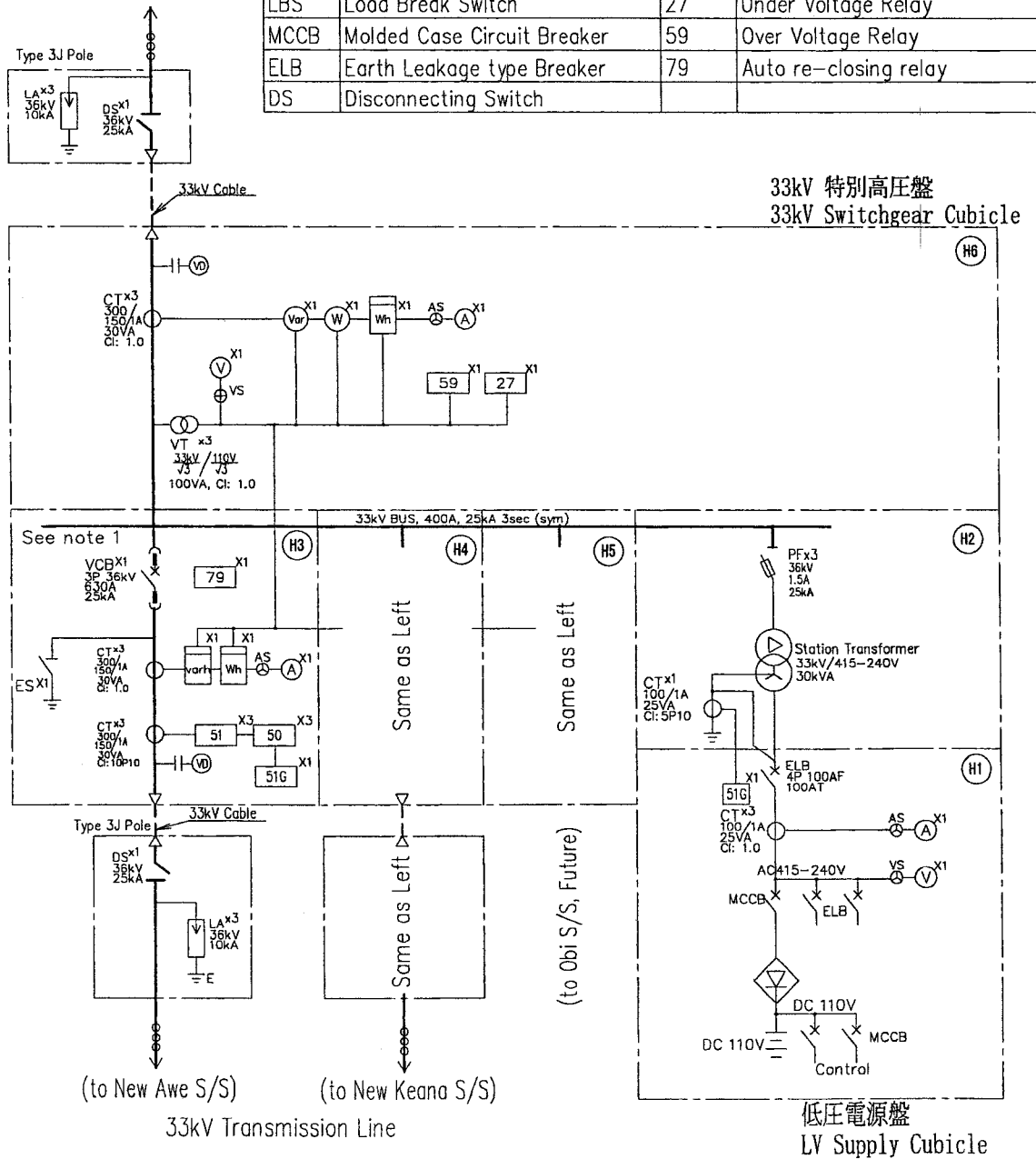
Scale: 1/250

DWG. No. NAS-G11: 機器配置図 (新設オビ開閉所)

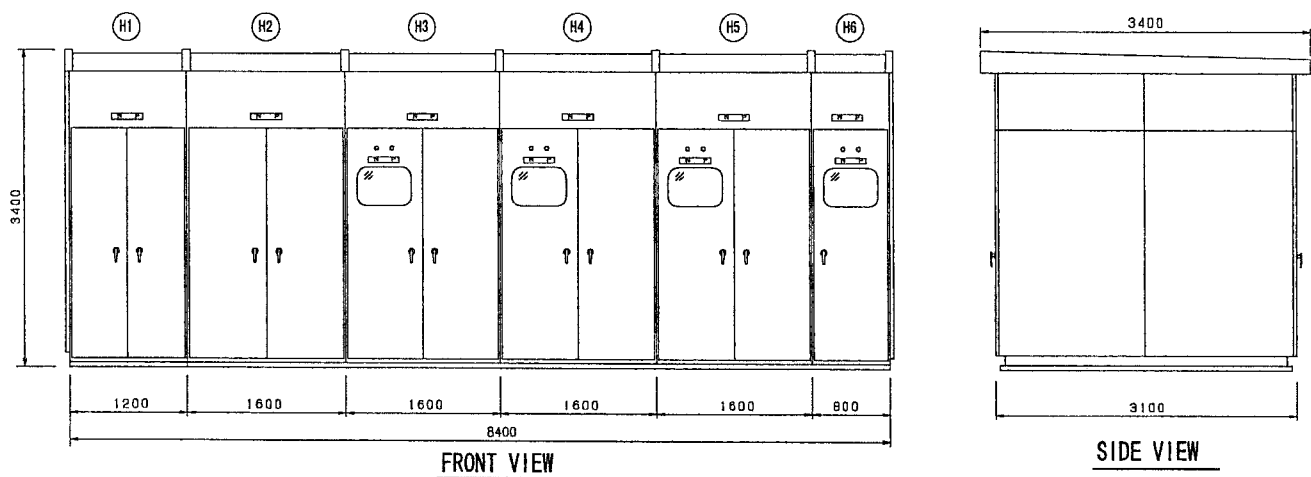
33kV 送電線 (ラフィア変電所より)
33kV Transmission Line (from Lafia S/S)

Abbreviations

CT	Current transformer	W	Watt Meter with P max
VCB	Vacuum circuit breaker	Var	Var Meter with Q max
LA	Lightning arrester with counter	Wh	Watt-hour Meter
ES	Earthing switch	varh	Var-hour Meter
VT	Voltage transformer	50	Over current relay (Instantaneous)
A	Ammeter	51G	Over current ground relay
V	Volt meter	51	Over current relay
LBS	Load Break Switch	27	Under Voltage Relay
MCCB	Molded Case Circuit Breaker	59	Over Voltage Relay
ELB	Earth Leakage type Breaker	79	Auto re-closing relay
DS	Disconnecting Switch		



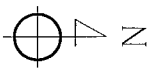
DWG. No. NAS-E11 : 単線結線図 (新設オビ開閉所)



33kV Switchgear Cubicle

No.	Name of Cubicle
(H1)	Low Voltage Supply Cubicle
(H2)	33kV Switchgear Cubicle - Station Transformer -
(H3)	33kV Switchgear Cubicle - Outgoing Feeder (1) -
(H4)	33kV Switchgear Cubicle - Outgoing Feeder (2) -
(H5)	33kV Switchgear Cubicle - Outgoing Feeder (3) -
(H6)	33kV Switchgear Cubicle - Incoming Feeder -

DWG. No. NAS-E12 : 屋外特別高圧盤概略外形図 (新設オビ開閉所)
 Arrangement of Outdoor Switchgear Cubicles
 (New Obi Switching Station)



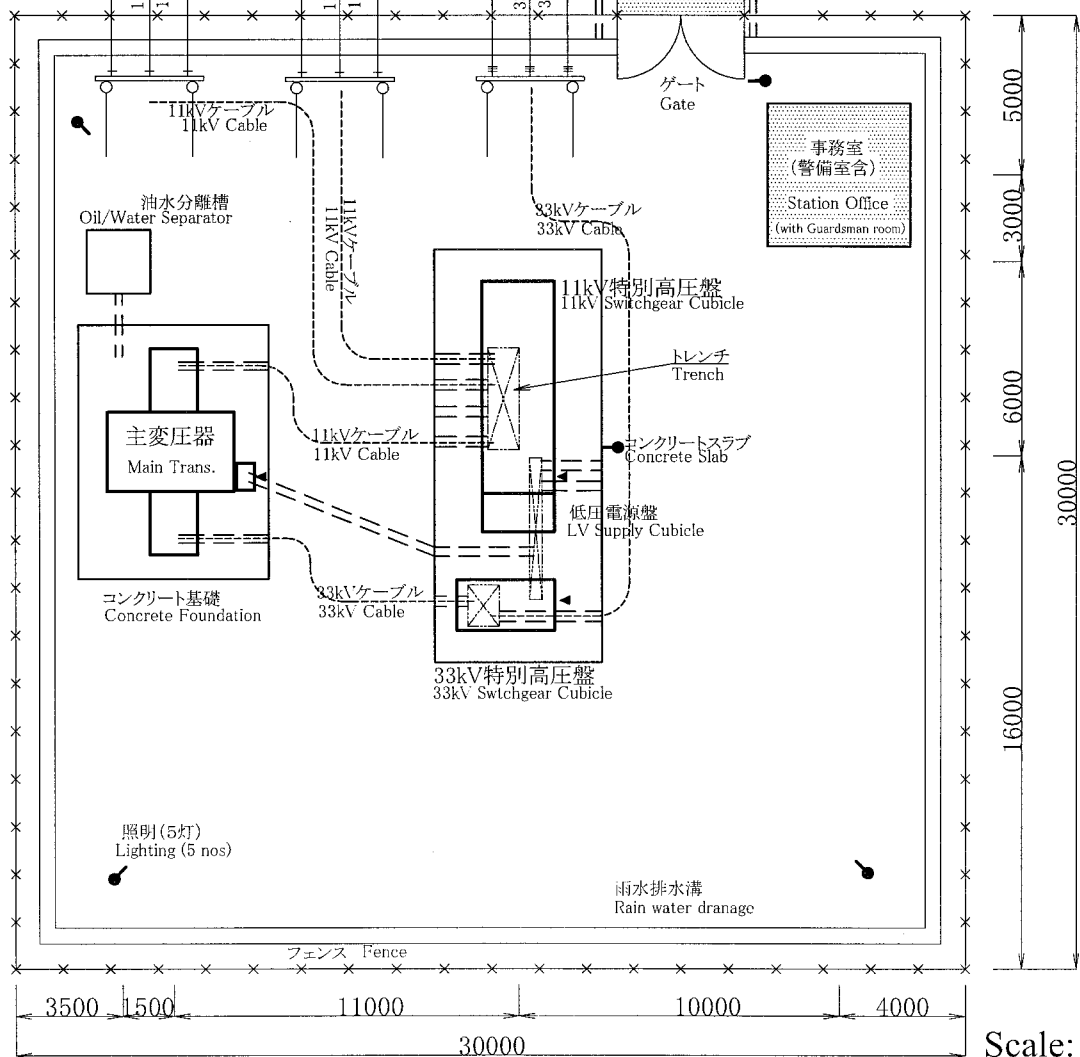
アウェ町へ
To Awe Town
←

一般公道
Public Road

オビ町へ
To Obi Town
→

凡例 Legend

- ▼ 盤正面
Front of Cubicle
- 埋設ケーブル
Underground Cable
- == 埋設管
Underground Pipe
- ▨ ナイジェリア負担工事
Work constructed by Nigerian side



DWG. No. NAS-G21 : 機器配置図 (新設アウェ変電所)
82 Equipment Layout (New Awe Substation)

Scale: 1/250

33kV Transmission Line
(from New Obi Switching Station)

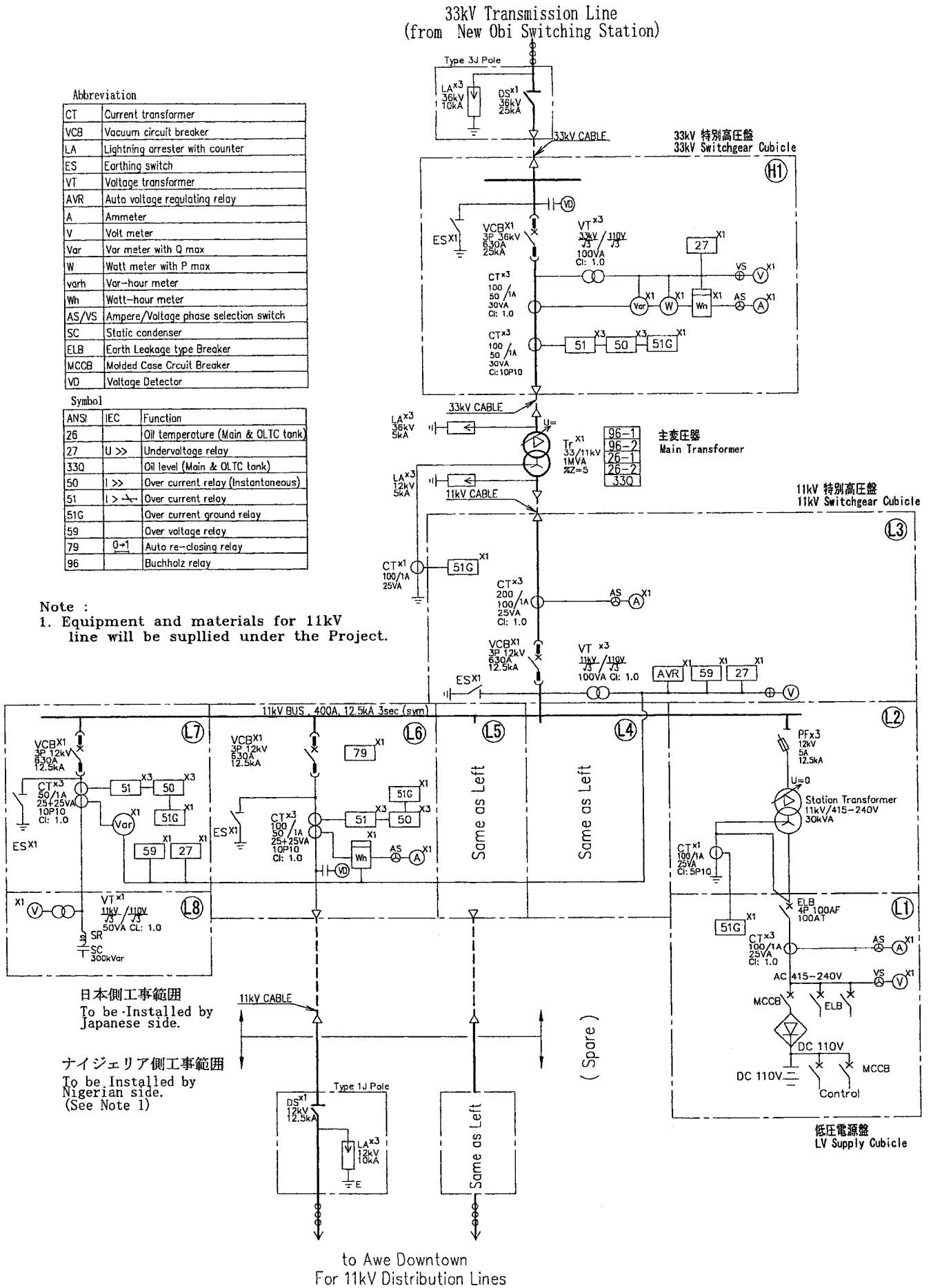
Abbreviation

CT	Current transformer
VCB	Vacuum circuit breaker
LA	Lightning arrester with counter
ES	Earthing switch
VT	Voltage transformer
AVR	Auto voltage regulating relay
A	Ammeter
V	Volt meter
Var	Var meter with Q max
W	Watt meter with P max
varh	Var-hour meter
Wh	Watt-hour meter
AS/VS	Ampere/Voltage phase selection switch
SC	Static condenser
ELB	Earth Leakage type Breaker
MCCB	Molded Case Circuit Breaker
VD	Voltage Detector

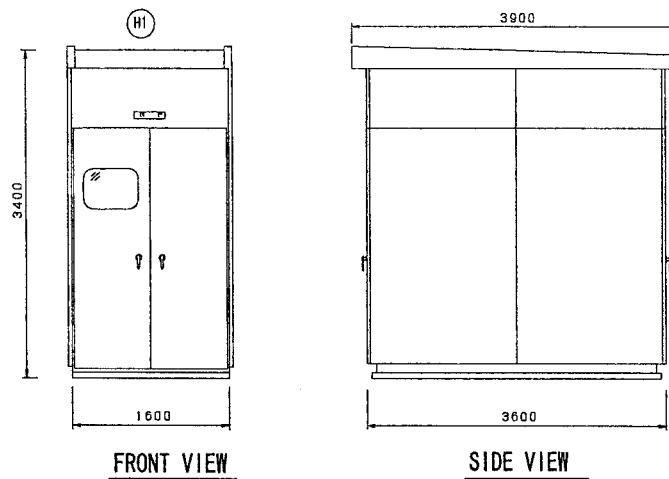
Symbol

ANSI	IEC	Function
26		Oil temperature (Main & OLTC tank)
27	U >>	Undervoltage relay
33Q		Oil level (Main & OLTC tank)
50	I >>	Over current relay (Instantaneous)
51	I > ->	Over current relay
51G		Over current ground relay
59		Over voltage relay
79	0+1	Auto re-closing relay
96		Buchholz relay

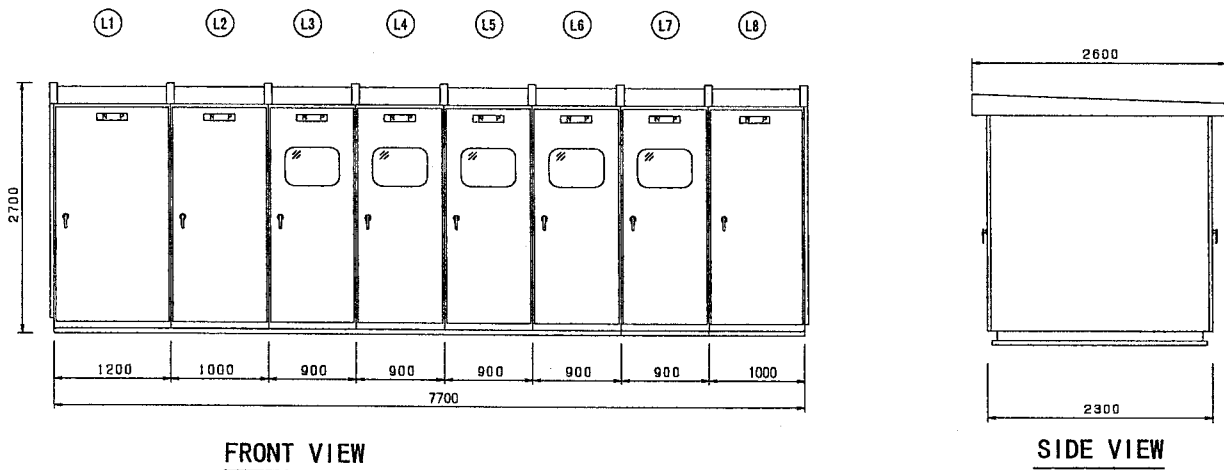
Note :
1. Equipment and materials for 11kV line will be supplied under the Project.



DWG. No. NAS-E21 : 単線結線図 (新設アウエ変電所)
Single Line Diagram (New Awe substation)



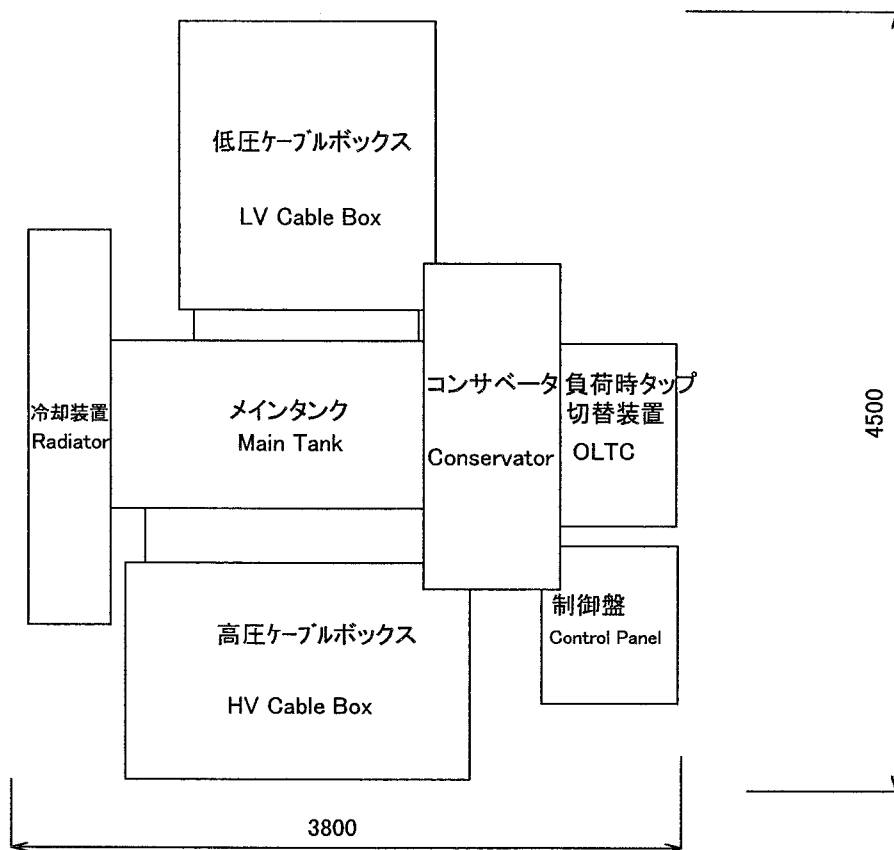
33kV Switchgear Cubicle



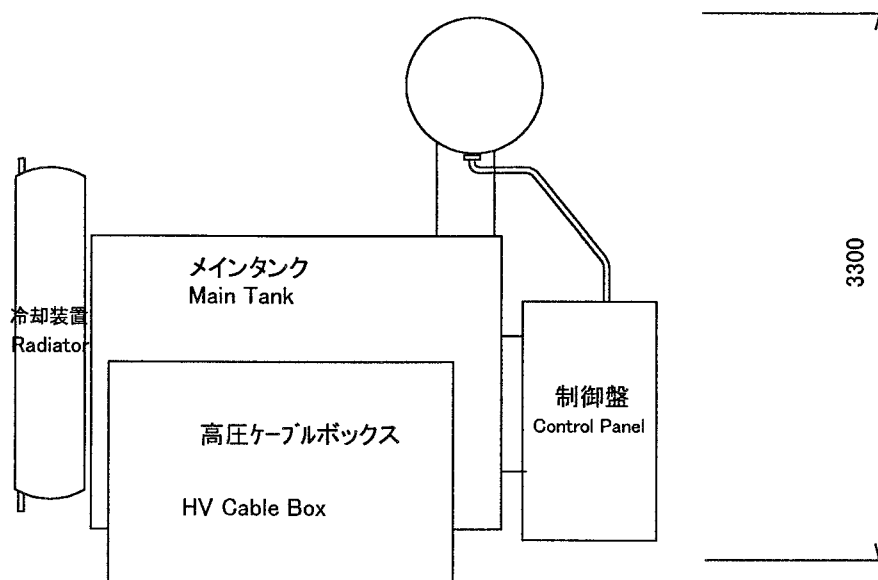
11kV Switchgear and LV Supply Cubicles

No.	Name of Cubicles
(H1)	33kV Switchgear Cubicle - Incoming Feeder -
(L1)	Low Voltage Supply Cubicle
(L2)	11kV Switchgear Cubicle - Station Transformer -
(L3)	11kV Switchgear Cubicle - Incoming Feeder -
(L4)	11kV Switchgear Cubicle - Outgoing Feeder (1) -
(L5)	11kV Switchgear Cubicle - Outgoing Feeder (2) -
(L6)	11kV Switchgear Cubicle - Outgoing Feeder (3) -
(L7)	11kV Switchgear Cubicle - Condenser Feeder -
(L8)	11kV Cubicle - Static Condenser -

DWG. No. NAS-E22 : 屋外特別高圧盤概略外形図 (新設アウエ変電所)
 Arrangement of Outdoor Switchgears Cubicles
 (New Awe Substation)

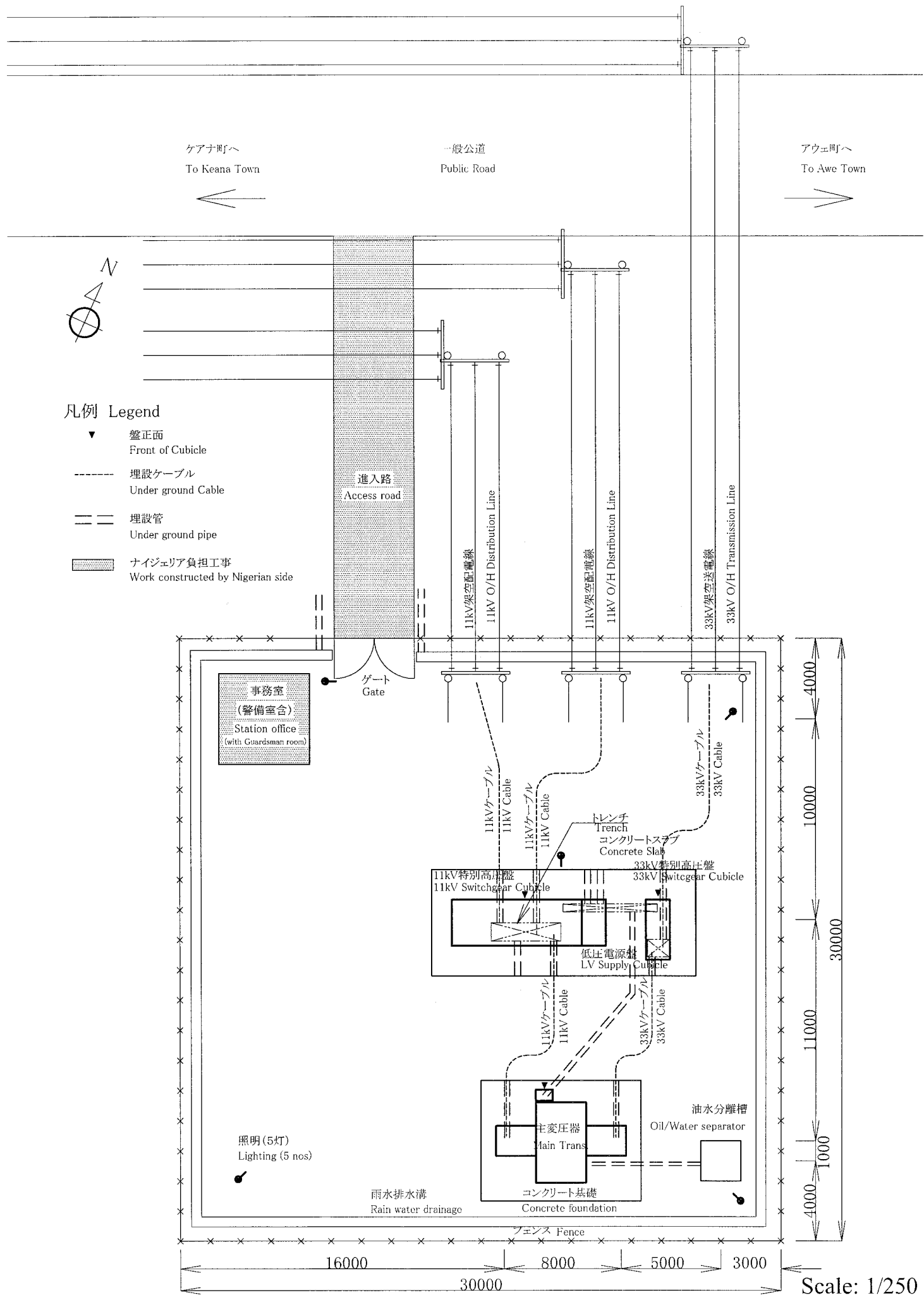


平面図 (Plan)



側面図 (Section)

DWG. No. NAS-E23 : 33/11kV主変圧器概略外形図 (新設アウエ変電所)
 33/11kV Outline of Main Transformer (New Awe Substation)



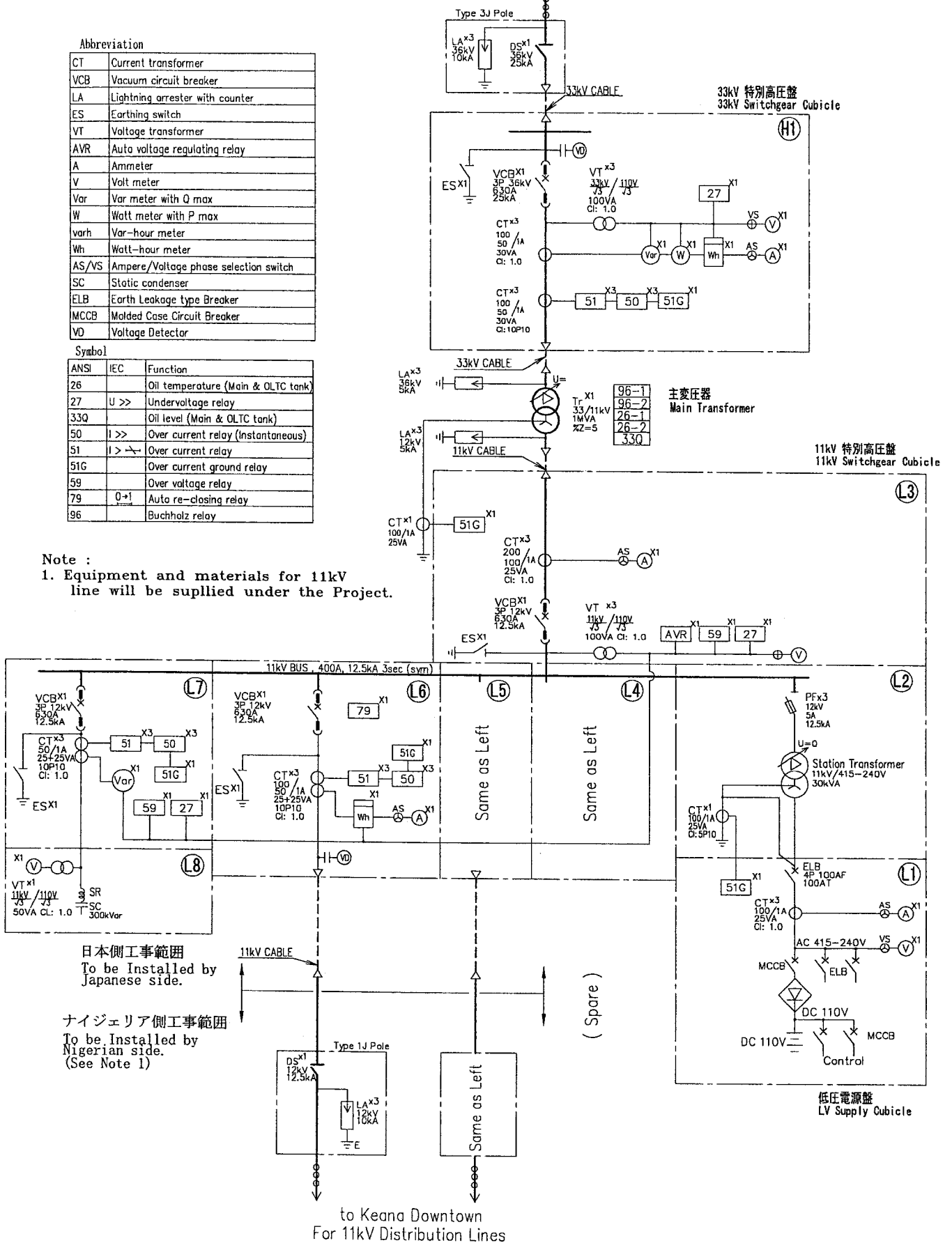
DWG. No. NAS-G31 : 機器配置図 (新設ケアナ変電所)

33kV Transmission Line
(from New Obi Switching Station)

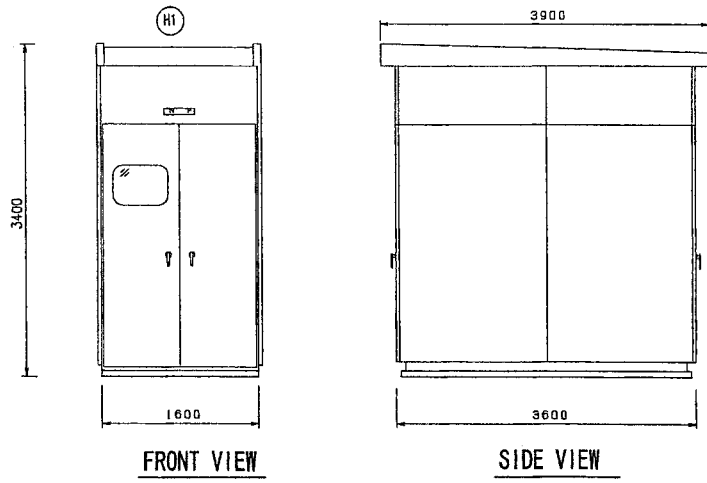
Abbreviation	
CT	Current transformer
VCB	Vacuum circuit breaker
LA	Lightning arrester with counter
ES	Earthing switch
VT	Voltage transformer
AVR	Auto voltage regulating relay
A	Ammeter
V	Volt meter
Var	Var meter with Q max
W	Watt meter with P max
varh	Var-hour meter
Wh	Watt-hour meter
AS/VS	Ampere/Voltage phase selection switch
SC	Static condenser
ELB	Earth Leakage type Breaker
MCCB	Molded Case Circuit Breaker
VD	Voltage Detector

Symbol		
ANSI	IEC	Function
26		Oil temperature (Main & OLTC tank)
27	U >>	Undervoltage relay
33Q		Oil level (Main & OLTC tank)
50	I >>	Over current relay (Instantaneous)
51	I > →	Over current relay
51G		Over current ground relay
59		Over voltage relay
79	0+1	Auto re-closing relay
96		Buchholz relay

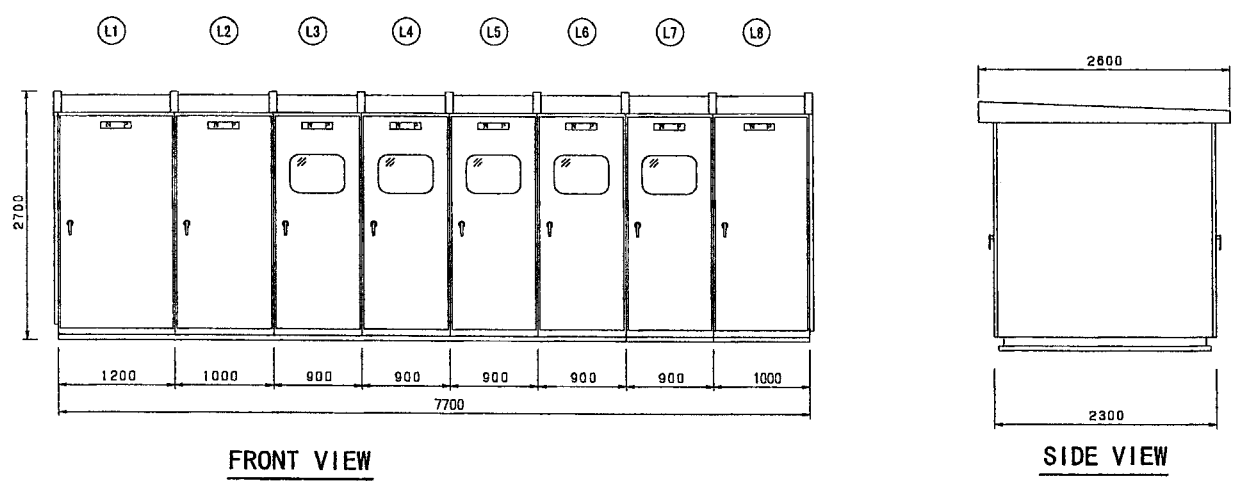
Note :
1. Equipment and materials for 11kV line will be supplied under the Project.



DWG. No. NAS-E31 : 単線結線図 (新設ケアナ変電所)
Single Line Diagram (New Keana Substation)



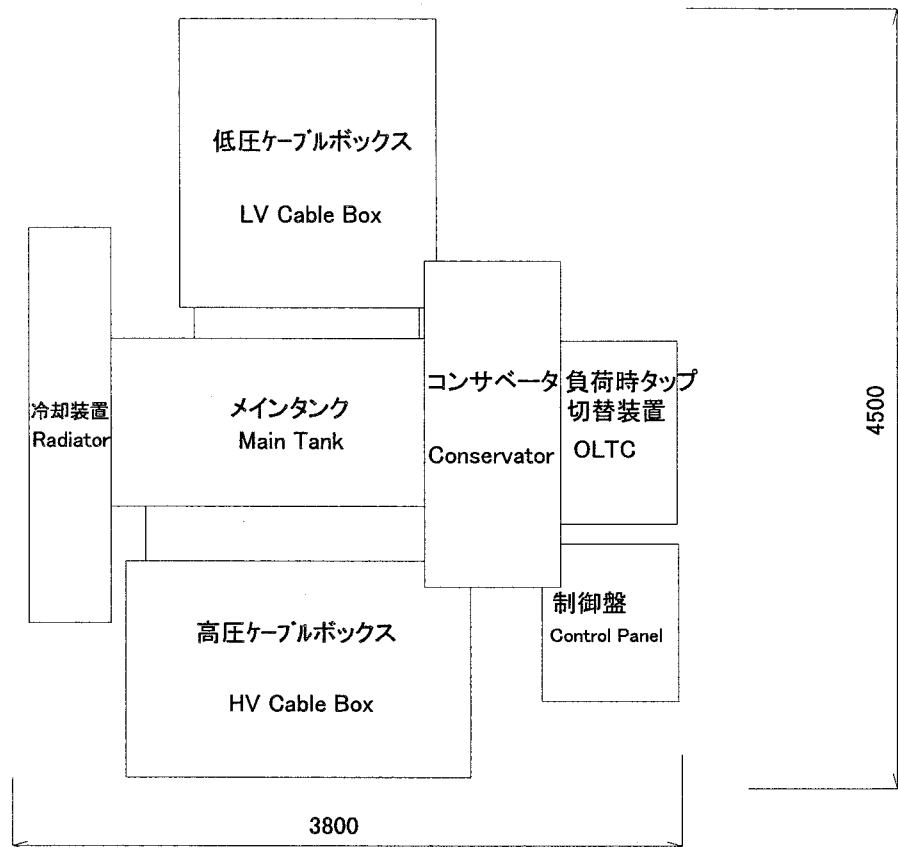
33kV Switchgear Cubicle



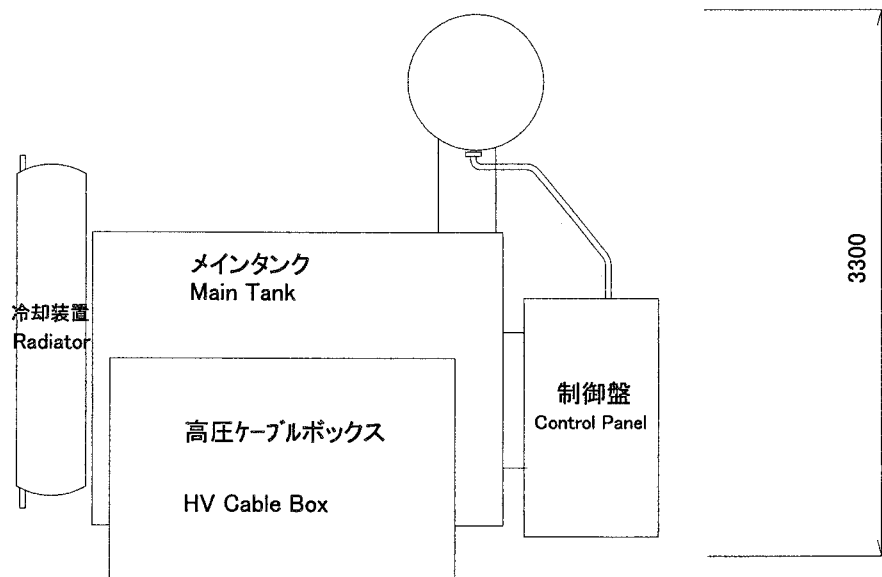
11kV Switchgear and LV Supply Cubicle

No.	Name of Cubicle
(H1)	33kV Switchgear Cubicle - Incoming Feeder -
(L1)	Low Voltage Supply Cubicle
(L2)	11kV Switchgear Cubicle - Station Transformer -
(L3)	11kV Switchgear Cubicle - Incoming Feeder -
(L4)	11kV Switchgear Cubicle - Outgoing Feeder (1) -
(L5)	11kV Switchgear Cubicle - Outgoing Feeder (2) -
(L6)	11kV Switchgear Cubicle - Outgoing Feeder (3) -
(L7)	11kV Switchgear Cubicle - Condenser Feeder -
(L8)	11kV Cubicle - Static Condenser -

DWG. No. NAS-E32 : 屋外特別高圧盤概略外形図 (新設ケアナ変電所)
 Arrangement of Outdoor Switchgears Cubicles
 (New Keana Substation)

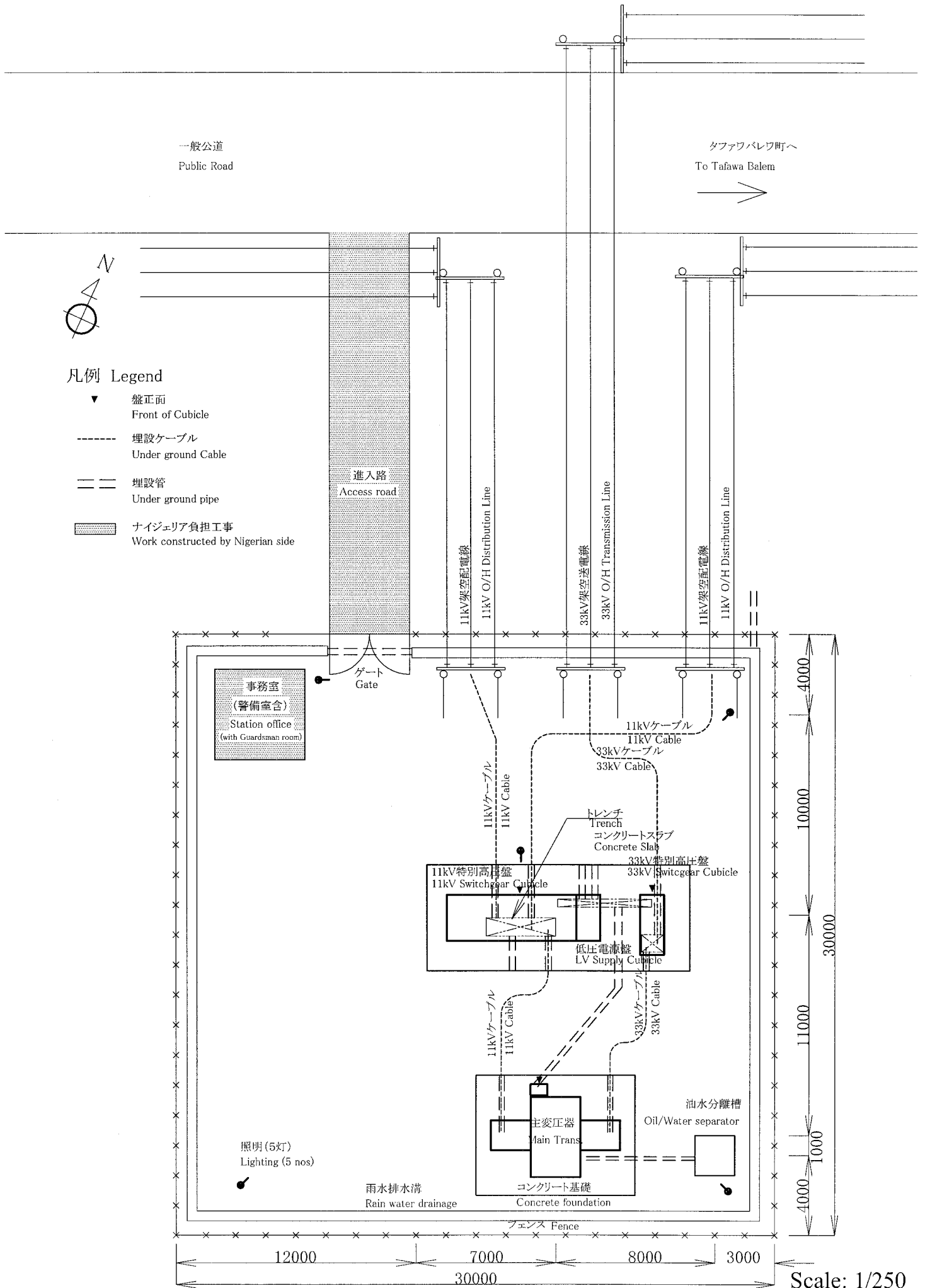


平面図 (Plan)



側面図 (Section)

DWG. No. NAS-E33 : 33/11kV主変圧器概略外形図 (新設ケアナ変電所)
33/11kV Outline of Main Transformer
(New Keana Substation)



DWG. No. BBS-G11 : 機器配置図 (新設ボゴロ変電所)

33kV Transmission Line
(from Exist. Bauchi Substation)

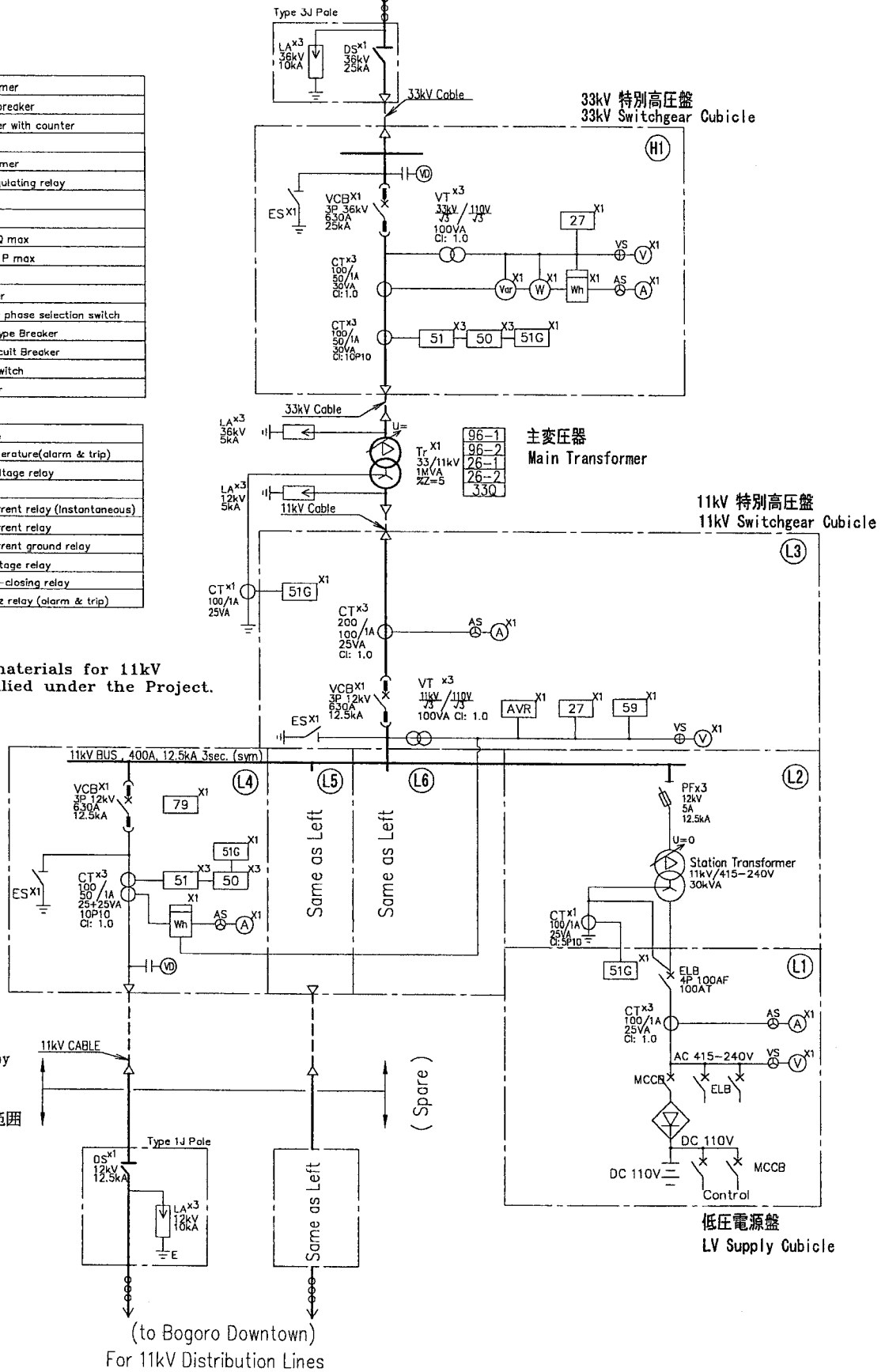
Abbreviation	
CT	Current transformer
VCB	Vacuum circuit breaker
LA	Lightning arrester with counter
ES	Earthing switch
VT	Voltage transformer
AVR	Auto voltage regulating relay
A	Ammeter
V	Volt meter
Var	Var meter with Q max
W	Watt meter with P max
varh	Var-hour meter
Wh	Watt-hour meter
AS/VS	Ampere/Voltage phase selection switch
ELB	Earth Leakage type Breaker
MCCB	Molded Case Circuit Breaker
DS	Disconnecting Switch
VD	Voltage Detector

Symbol		
ANSI	IEC	Function
26		Oil temperature(alarm & trip)
27	U >>	Undervoltage relay
33Q		Oil level
50	I >>	Over current relay (Instantaneous)
51	I > ↘	Over current relay
51G		Over current ground relay
59		Over voltage relay
79	0→1	Auto re-closing relay
96		Buchholz relay (alarm & trip)

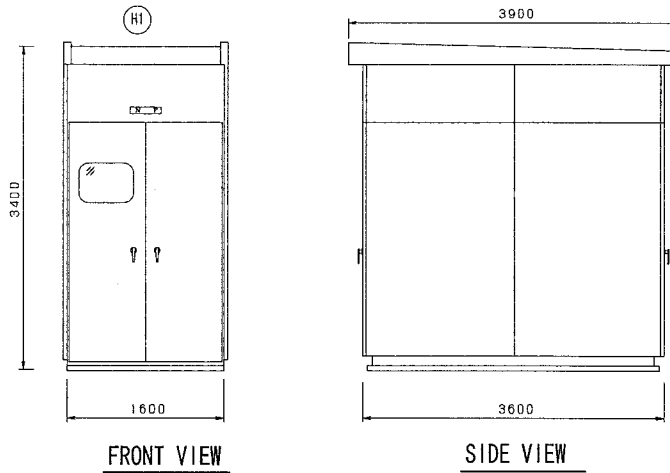
Note :
1. Equipment and materials for 11kV line will be supplied under the Project.

日本側工事範囲
To be Installed by Japanese side.

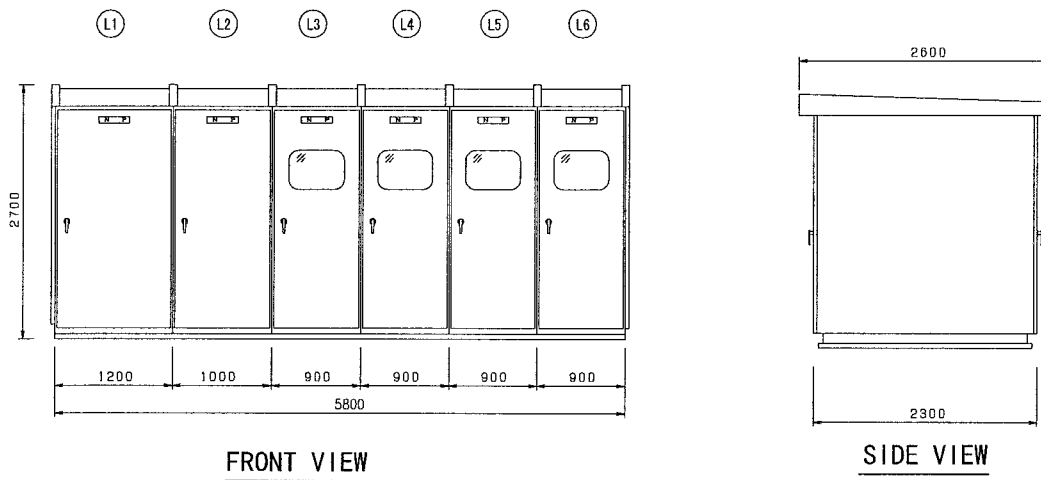
ナイジェリア側工事範囲
To be Installed by Nigerian side.
(See Note 1)



DWG. No. BBS-E11 : 単線結線図 (新設ボゴロ変電所)
Single Line Diagram (New Bogoro Substation)

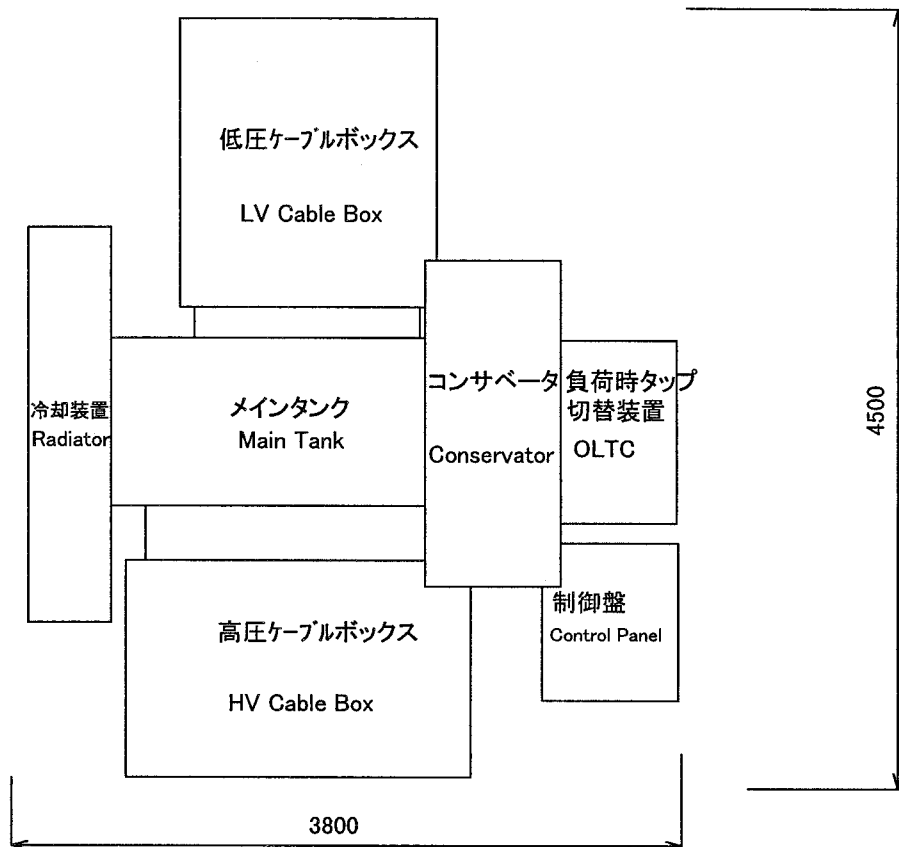


33kV Switchgear Cubicle

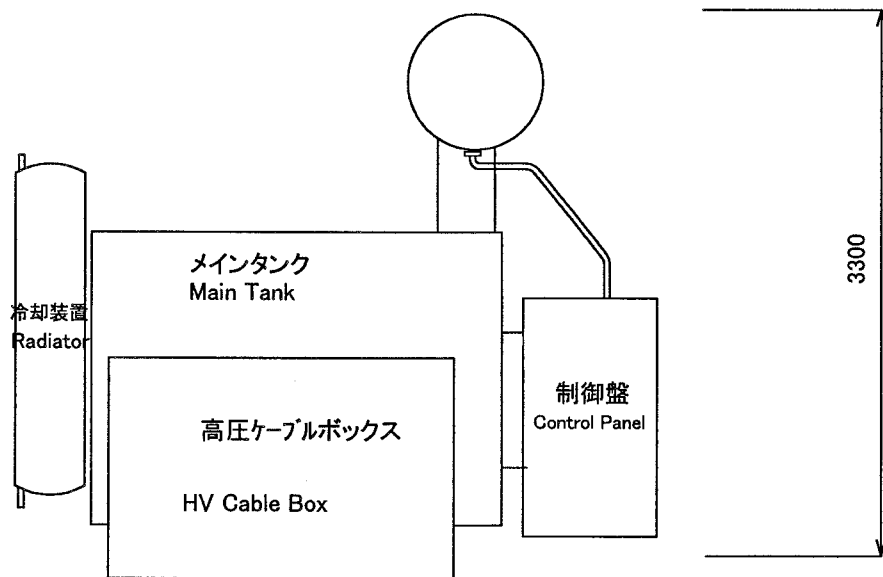


11kV Switchgear and LV Supply Cubicle

No.	Name of Cubicle
(H1)	33kV Switchgear Cubicle - Incoming Feeder -
(L1)	Low Voltage Supply Cubicle
(L2)	11kV Switchgear Cubicle - Station Transformer -
(L3)	11kV Switchgear Cubicle - Incoming Feeder -
(L4)	11kV Switchgear Cubicle - Outgoing Feeder (1) -
(L5)	11kV Switchgear Cubicle - Outgoing Feeder (2) -
(L6)	11kV Switchgear Cubicle - Outgoing Feeder (3) -



平面図 (Plan)



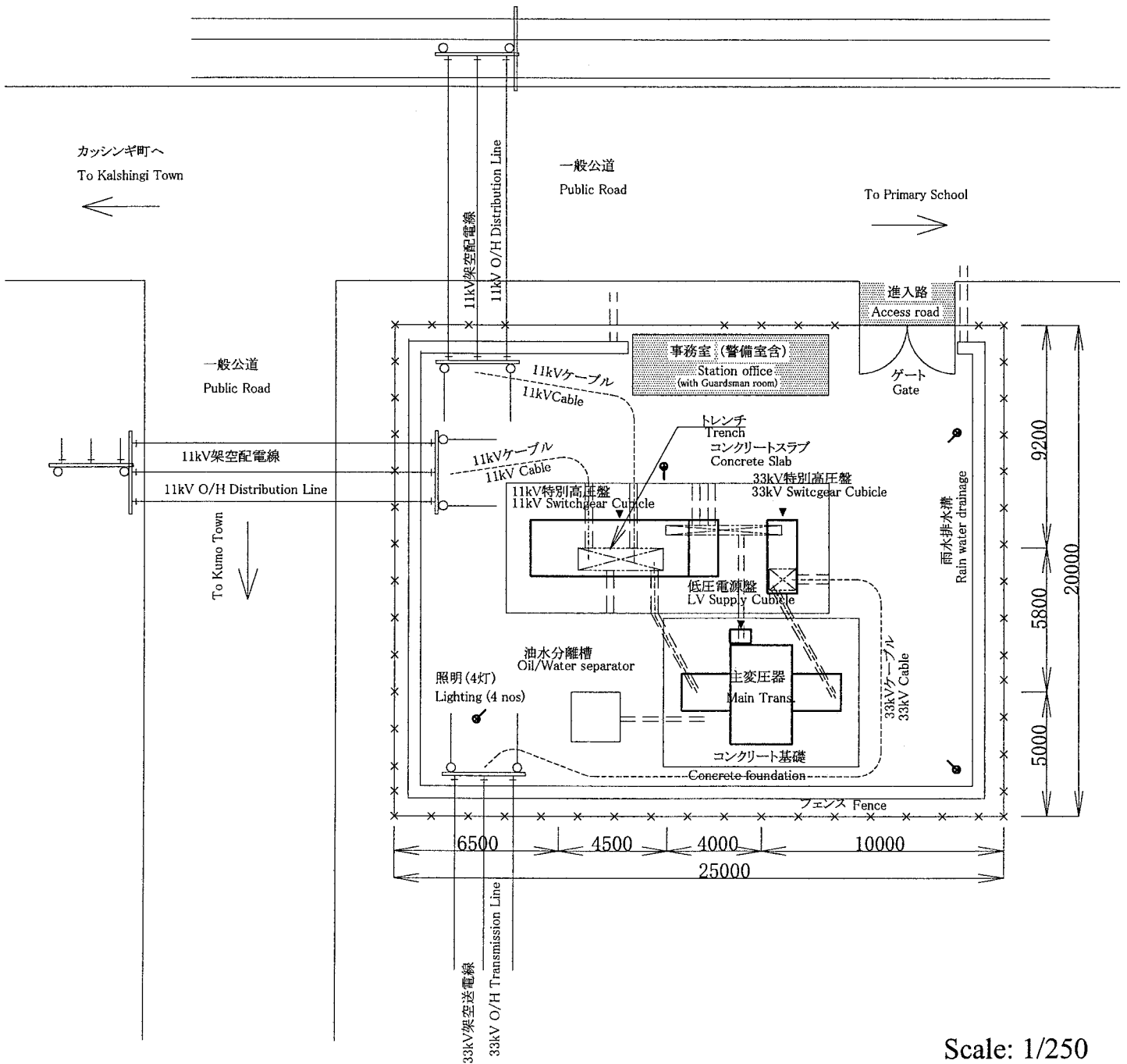
側面図 (Section)

DWG. No. BBS-E13 : 33/11kV主変圧器概略外形図 (新設ボゴロ変電所)
 33/11kV Outline of Main Transformer
 (New Bogoro Substation)



凡例 Legend

- ▼ 盤正面
Front of Cubicle
- 埋設ケーブル
Under ground Cable
- == 埋設管
Under ground pipe
- ▨ ナイジェリア負担工事
Work constructed by Nigerian side



Scale: 1/250

DWG. No. GKS-G11 : 機器配置図 (新設カッシング変電所)

94 Equipment Layout (New Kalshingi Substation)

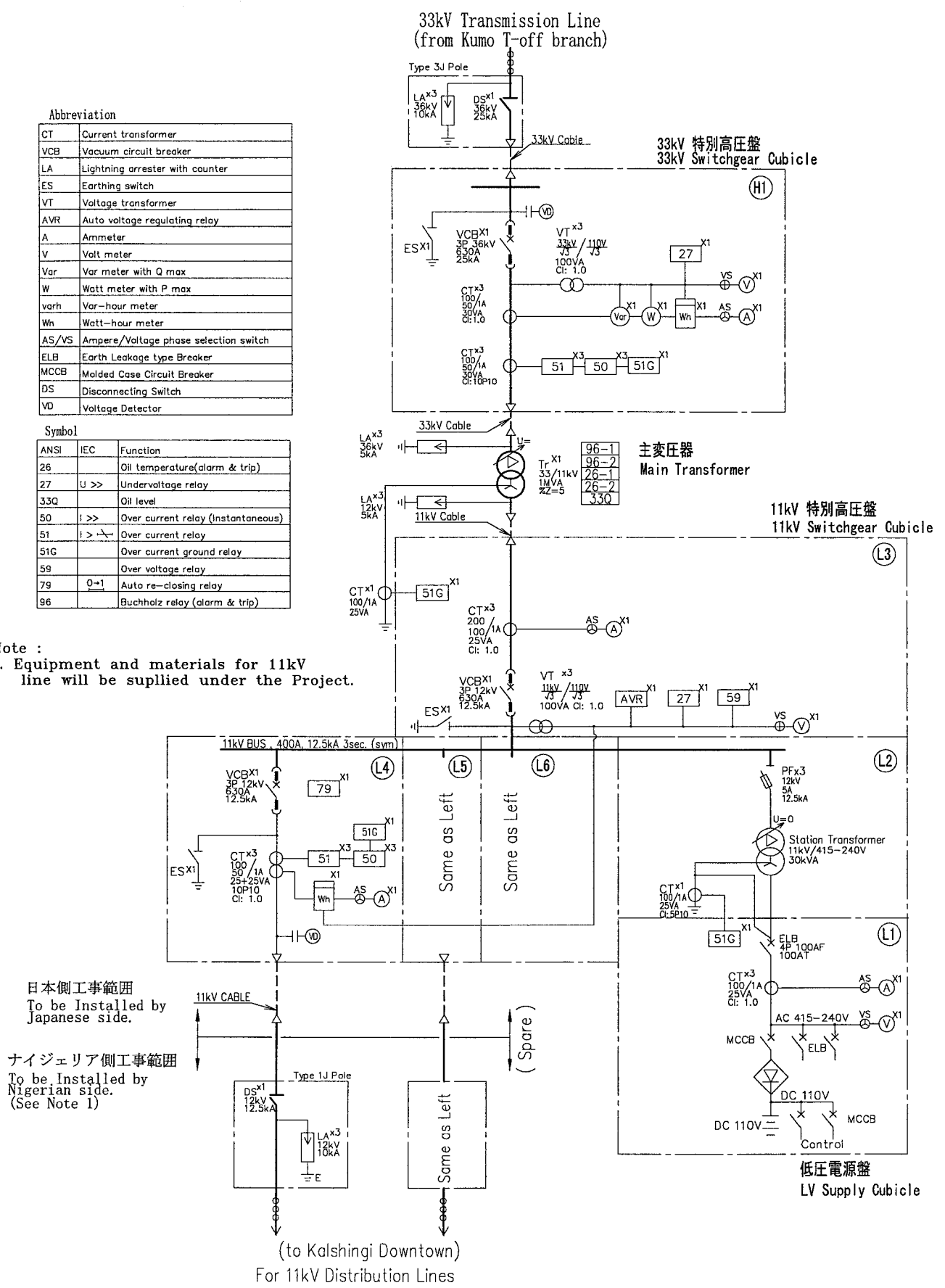
Abbreviation

CT	Current transformer
VCB	Vacuum circuit breaker
LA	Lightning arrester with counter
ES	Earthing switch
VT	Voltage transformer
AVR	Auto voltage regulating relay
A	Ammeter
V	Volt meter
Var	Var meter with Q max
W	Watt meter with P max
varh	Var-hour meter
Wh	Watt-hour meter
AS/VS	Ampere/Voltage phase selection switch
ELB	Earth Leakage type Breaker
MCCB	Molded Case Circuit Breaker
DS	Disconnecting Switch
VD	Voltage Detector

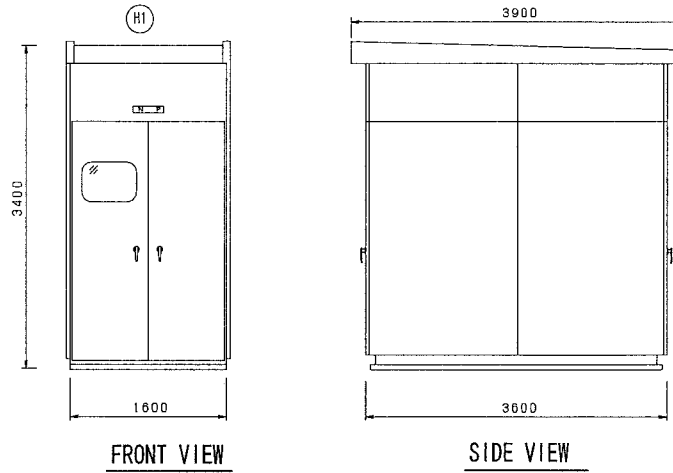
Symbol

ANSI	IEC	Function
26		Oil temperature(alarm & trip)
27	U >>	Undervoltage relay
33Q		Oil level
50	I >>	Over current relay (instantaneous)
51	I > ->	Over current relay
51G		Over current ground relay
59		Over voltage relay
79	0-1	Auto re-closing relay
96		Buchholz relay (alarm & trip)

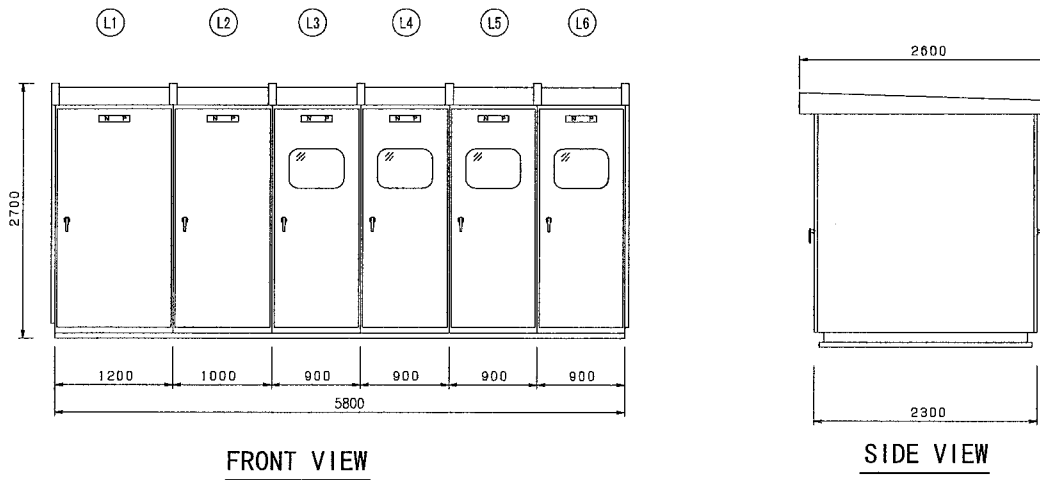
Note :
1. Equipment and materials for 11kV line will be supplied under the Project.



DWG. No. GKS-E11 : 単線結線図 (新設カッシング変電所)



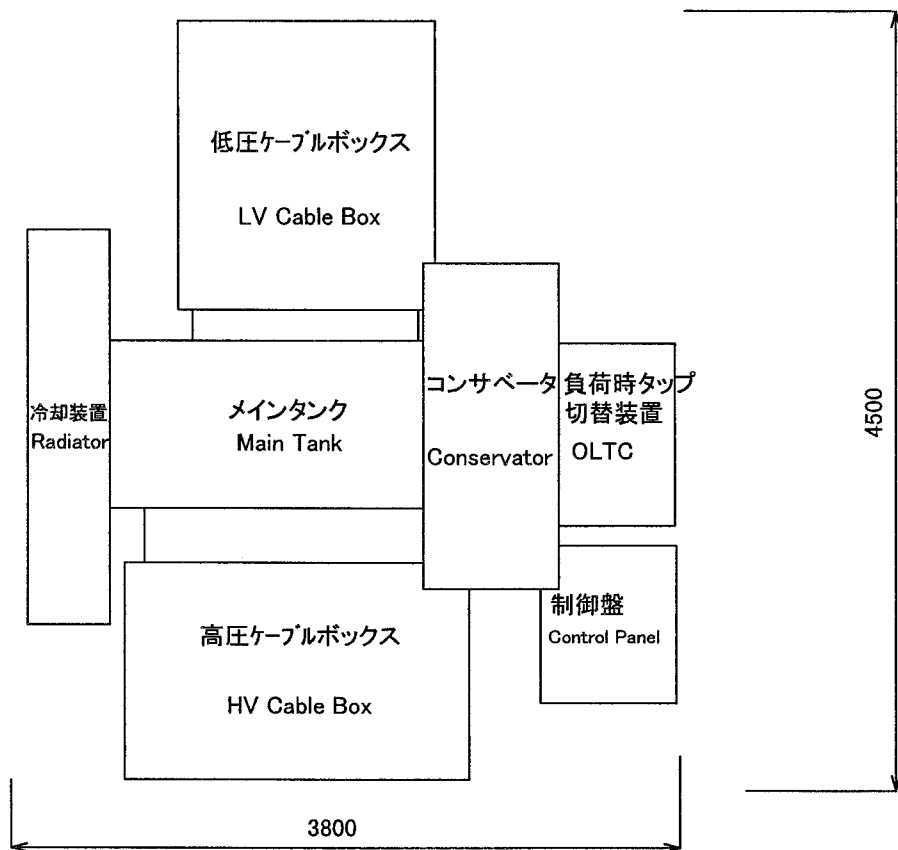
33kV Switchgear Cubicle



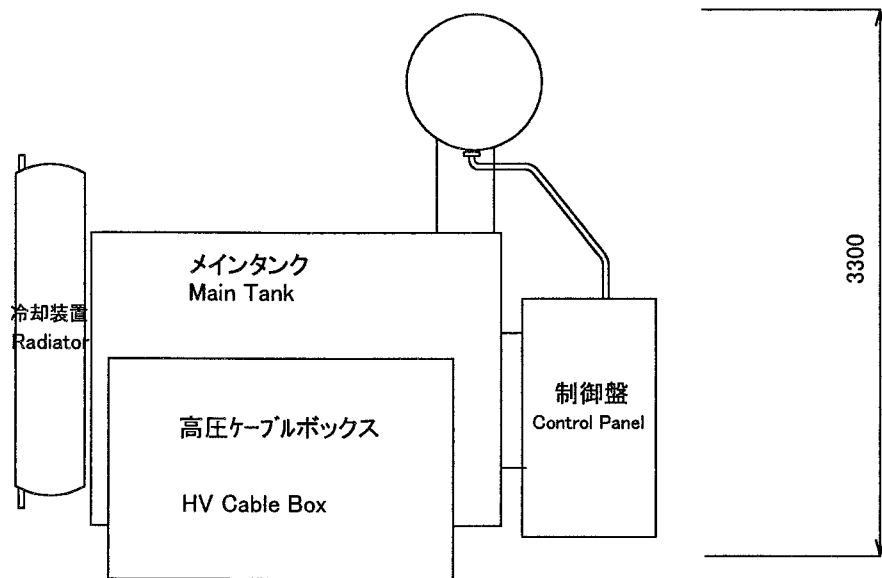
11kV Switchgear and LV Supply Cubicle

No.	Name of Cubicle
(H1)	33kV Switchgear Cubicle - Incoming Feeder -
(L1)	Low Voltage Supply Cubicle
(L2)	11kV Switchgear Cubicle - Station Transformer -
(L3)	11kV Switchgear Cubicle - Incoming Feeder -
(L4)	11kV Switchgear Cubicle - Outgoing Feeder (1) -
(L5)	11kV Switchgear Cubicle - Outgoing Feeder (2) -
(L6)	11kV Switchgear Cubicle - Outgoing Feeder (3) -

DWG. No. GKS-E12 : 屋外特別高圧盤概略外形図 (新設カッシング変電所)



平面図 (Plan)



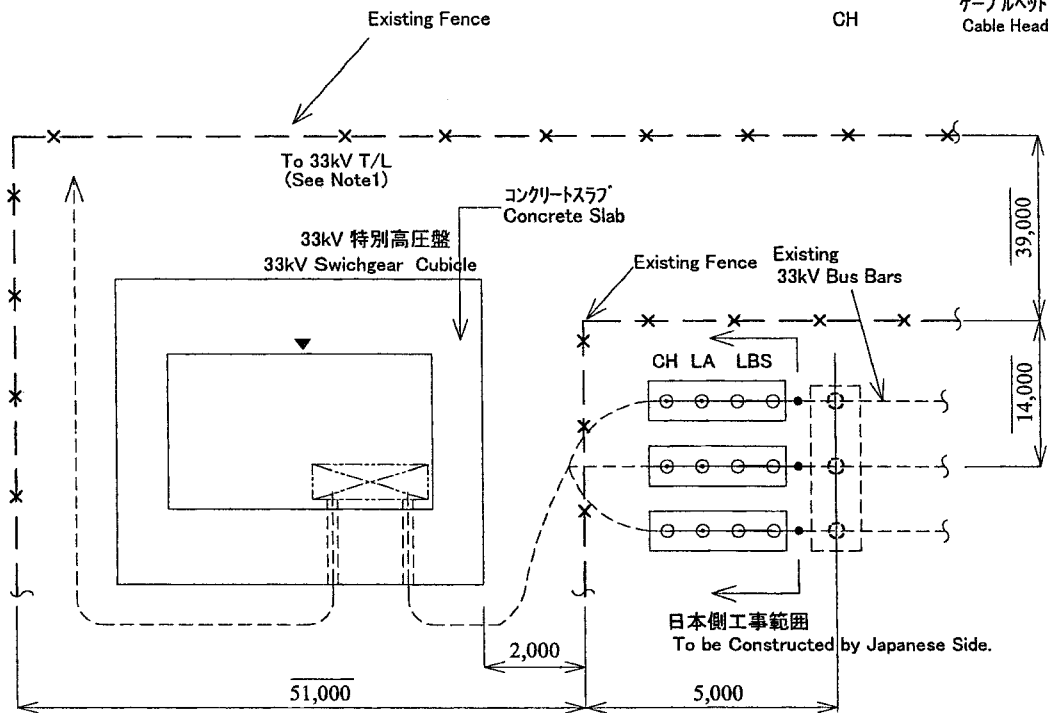
側面図 (Section)

DWG. No. GKS-E13 : 33/11kV主変圧器概略外形図(新設カッシング変電所)
 33/11kV Outline of Main Transformer
 (New Kalshingi Substation)



凡例
Legend

- ▼ 盤正面
Front of Cubicle
- 埋設ケーブル
Under Ground Cable
- LBS 断路器
Load Breaker Switch
- LA 避雷器
Lightning Arrester
- CH ケーブルヘッド
Cable Head



(Note)

1. 33kV cable length is approximately 700m.

Scale : 1/150

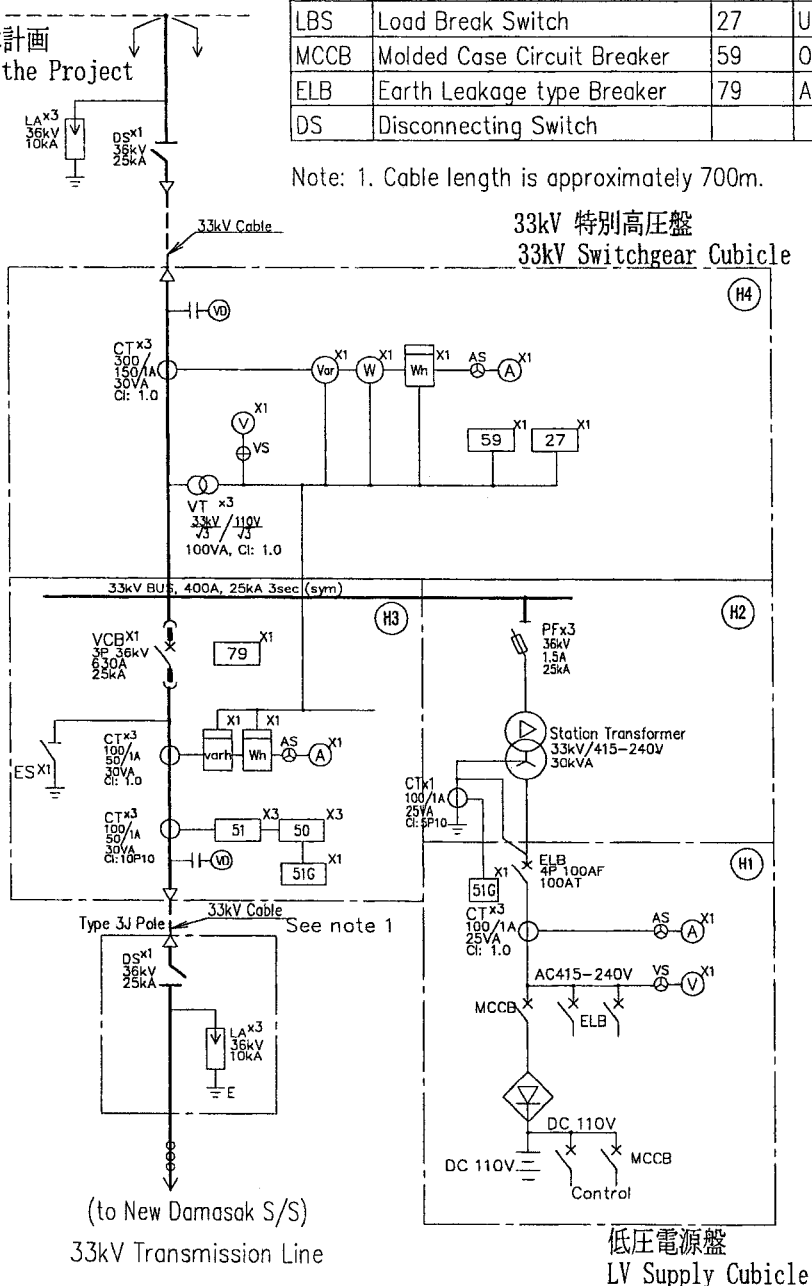
DWG. No. BDS-G11 : マイドゥーグリ変電所機器配置図
Equipment Layout [Maiduguri Substation]

Abbreviations

CT	Current transformer	W	Watt Meter with P max
VCB	Vacuum circuit breaker	Var	Var Meter with Q max
LA	Lightning arrester with counter	Wh	Watt-hour Meter
ES	Earthing switch	varh	Var-hour Meter
VT	Voltage transformer	50	Over current relay (Instantaneous)
A	Ammeter	51G	Over current ground relay
V	Volt meter	51	Over current relay
LBS	Load Break Switch	27	Under Voltage Relay
MCCB	Molded Case Circuit Breaker	59	Over Voltage Relay
ELB	Earth Leakage type Breaker	79	Auto re-closing relay
DS	Disconnecting Switch		

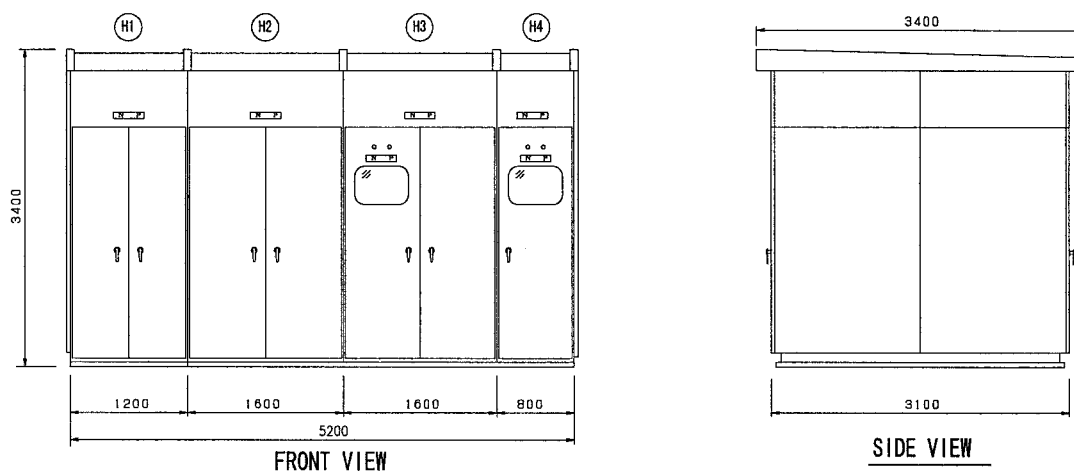
既設マイドゥーグリ変電所 (33kV母線)
Maiduguri Existing 33kV Bus Bar

本計画
Scope of the Project



Note: 1. Cable length is approximately 700m.

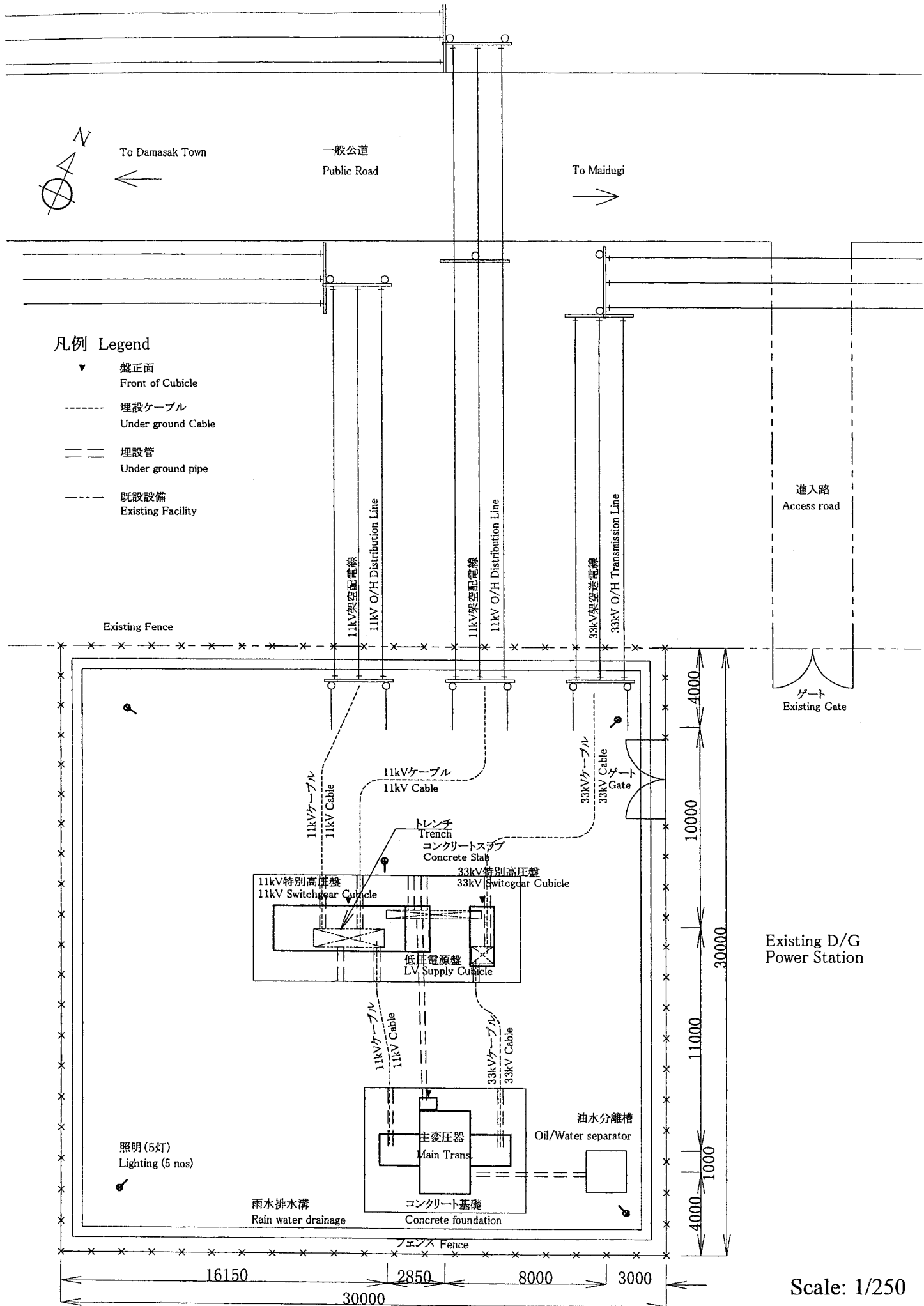
DWG. No. BDS-E11: 増設盤単線結線図 (既設マイドゥーグリ変電所)
Single Line Diagram of Expansion Switchgear
(Existing Maiduguri Substation)



33kV Switchgear Cubicle

No.	Name of Cubicle
(H1)	Low Voltage Supply Cubicle
(H2)	33kV Switchgear Cubicle - Station Transformer -
(H3)	33kV Switchgear Cubicle - Outgoing Feeder (1) -
(H4)	33kV Switchgear Cubicle - Incoming Feeder -

DWG. No. BDS-E12 : 屋外特別高圧盤概略外形図 (既設マイドゥーグリ変電所)
 Arrangement of Outdoor Switchgear Cubicles (Expansion)
 (Existing Maiguguri Substation)



DWG. No. BDS-G21 : 機器配置図 (新設ダマサク変電所)

101 Equipment Layout (New Damasak Substation)

33kV Transmission Line
(from Existing Maiduguri Substation)

Abbreviation

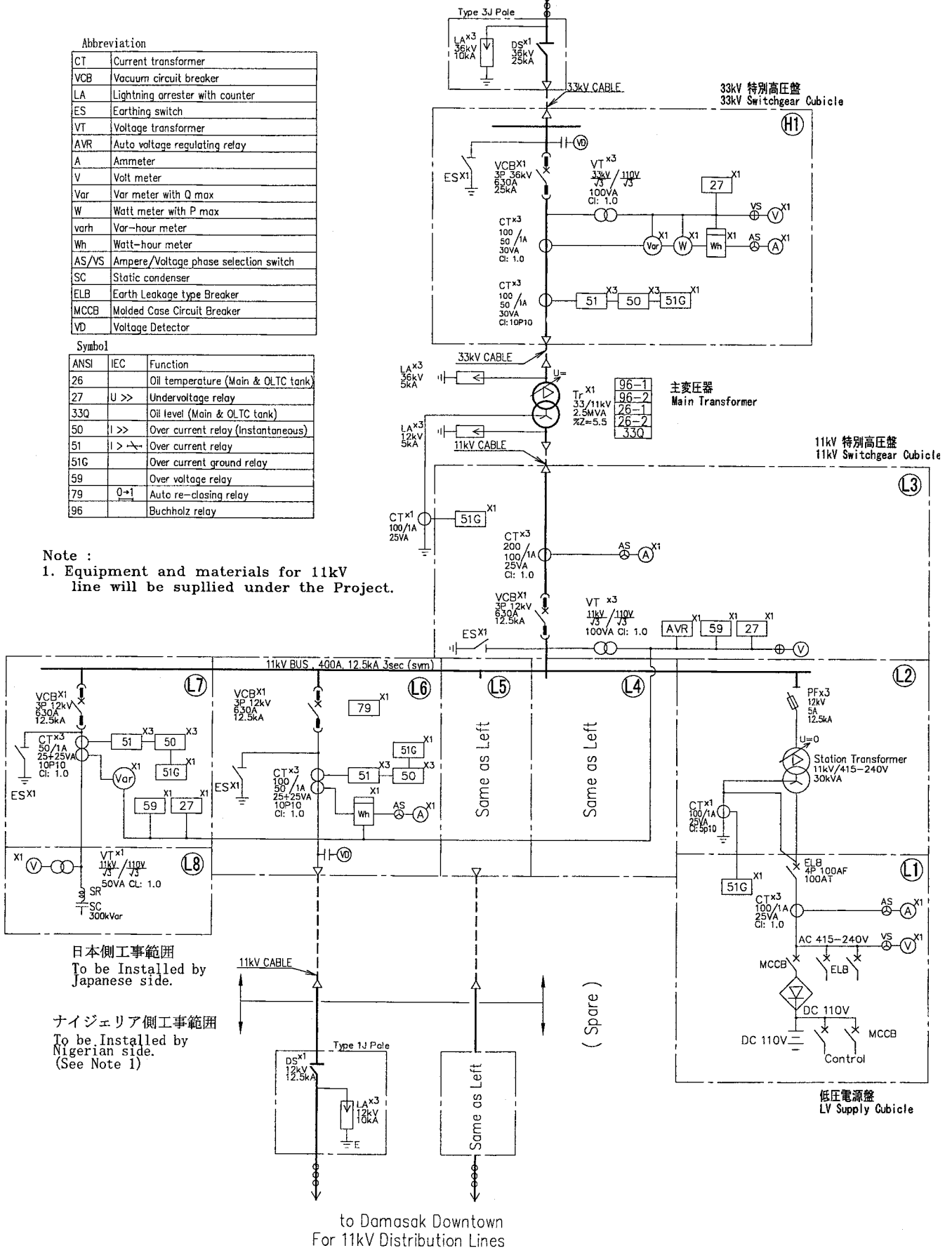
CT	Current transformer
VCB	Vacuum circuit breaker
LA	Lightning arrester with counter
ES	Earthing switch
VT	Voltage transformer
AVR	Auto voltage regulating relay
A	Ammeter
V	Volt meter
Var	Var meter with Q max
W	Watt meter with P max
varh	Var-hour meter
Wh	Watt-hour meter
AS/VS	Ampere/Voltage phase selection switch
SC	Static condenser
ELB	Earth Leakage type Breaker
MCCB	Molded Case Circuit Breaker
VD	Voltage Detector

Symbol

ANSI	IEC	Function
26		Oil temperature (Main & OLTC tank)
27	U >>	Undervoltage relay
33Q		Oil level (Main & OLTC tank)
50	I >>	Over current relay (instantaneous)
51	I > -	Over current relay
51G		Over current ground relay
59		Over voltage relay
79	0+1	Auto re-closing relay
96		Buchholz relay

Note :

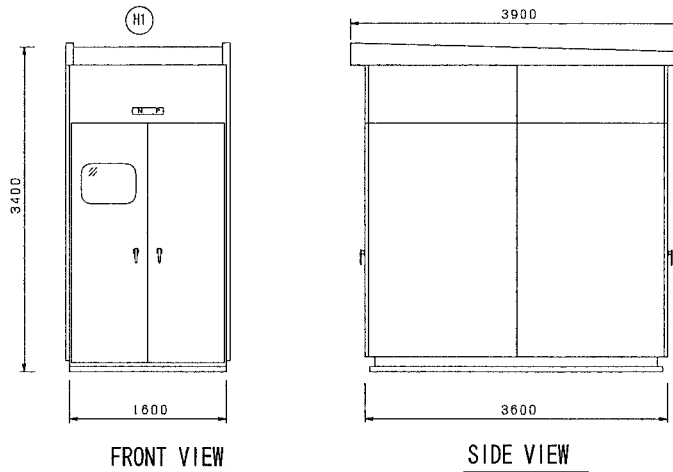
- Equipment and materials for 11kV line will be supplied under the Project.



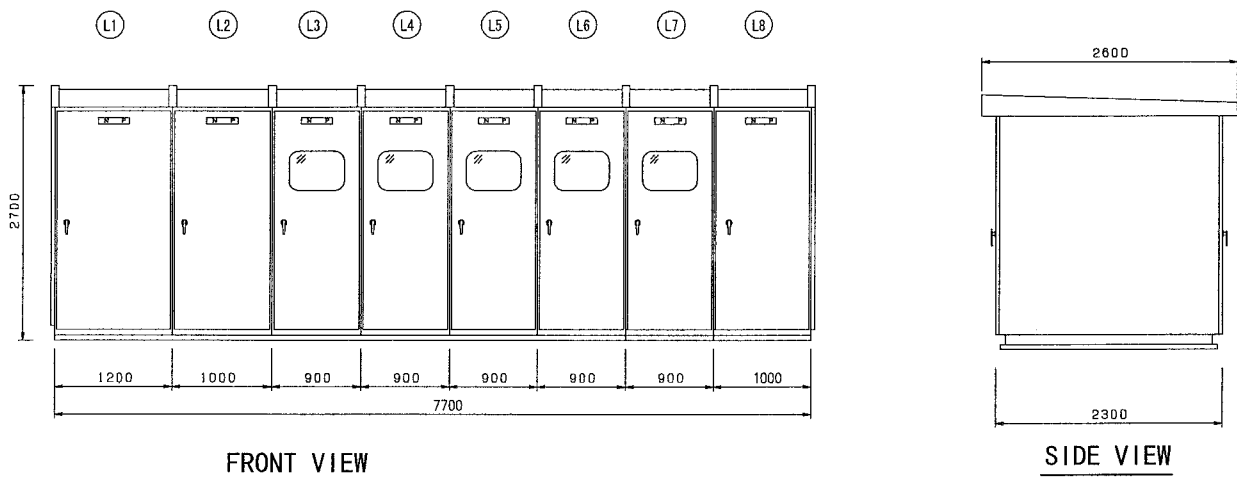
日本側工事範囲
To be Installed by
Japanese side.

ナイジェリア側工事範囲
To be Installed by
Nigerian side.
(See Note 1)

to Damasak Downtown
For 11kV Distribution Lines

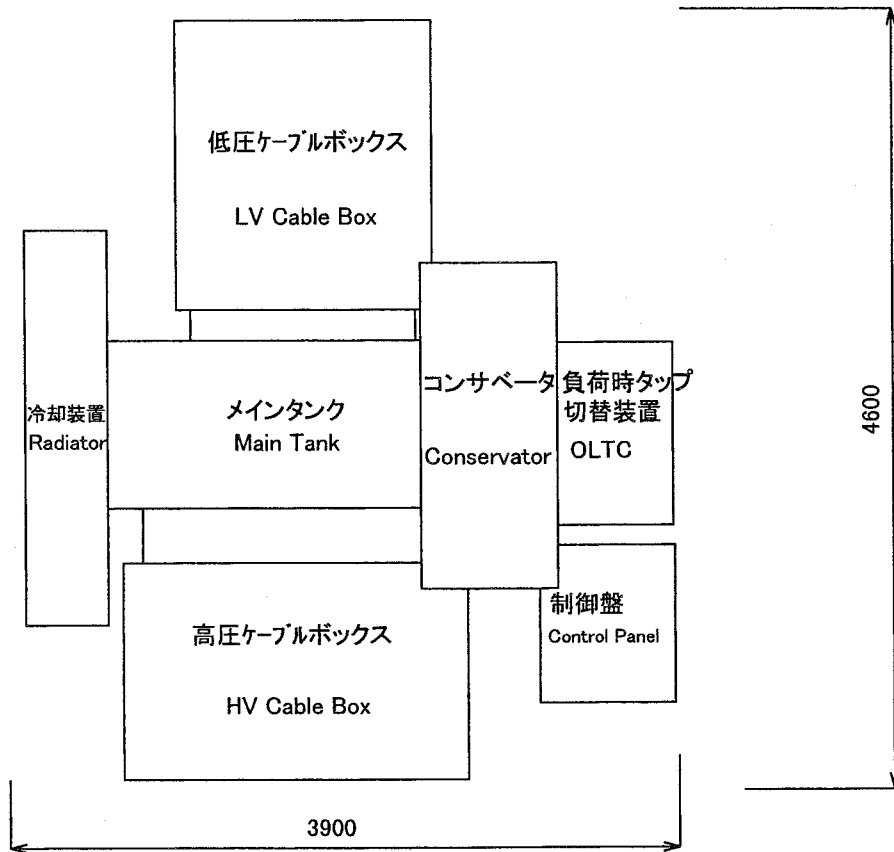


33kV Switchgear Cubicle

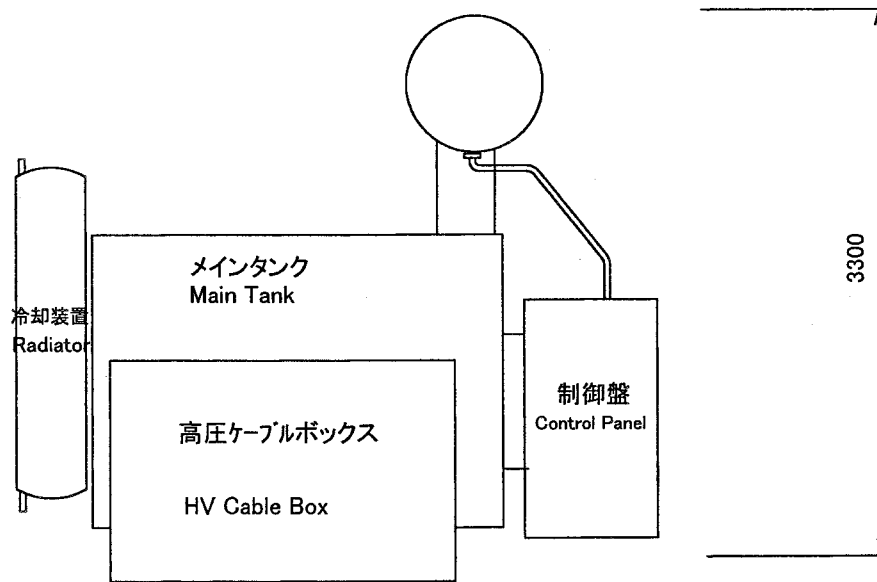


11kV Switchgear and LV Supply Cubicle

No.	Name of Cubicle
(H1)	33kV Switchgear Cubicle - Incoming Feeder -
(L1)	Low Voltage Supply Cubicle
(L2)	11kV Switchgear Cubicle - Station Transformer -
(L3)	11kV Switchgear Cubicle - Incoming Feeder -
(L4)	11kV Switchgear Cubicle - Outgoing Feeder (1) -
(L5)	11kV Switchgear Cubicle - Outgoing Feeder (2) -
(L6)	11kV Switchgear Cubicle - Outgoing Feeder (3) -
(L7)	11kV Switchgear Cubicle - Condenser Feeder -
(L8)	11kV Cubicle - Static Condenser -



平面図 (Plan)



側面図 (Section)