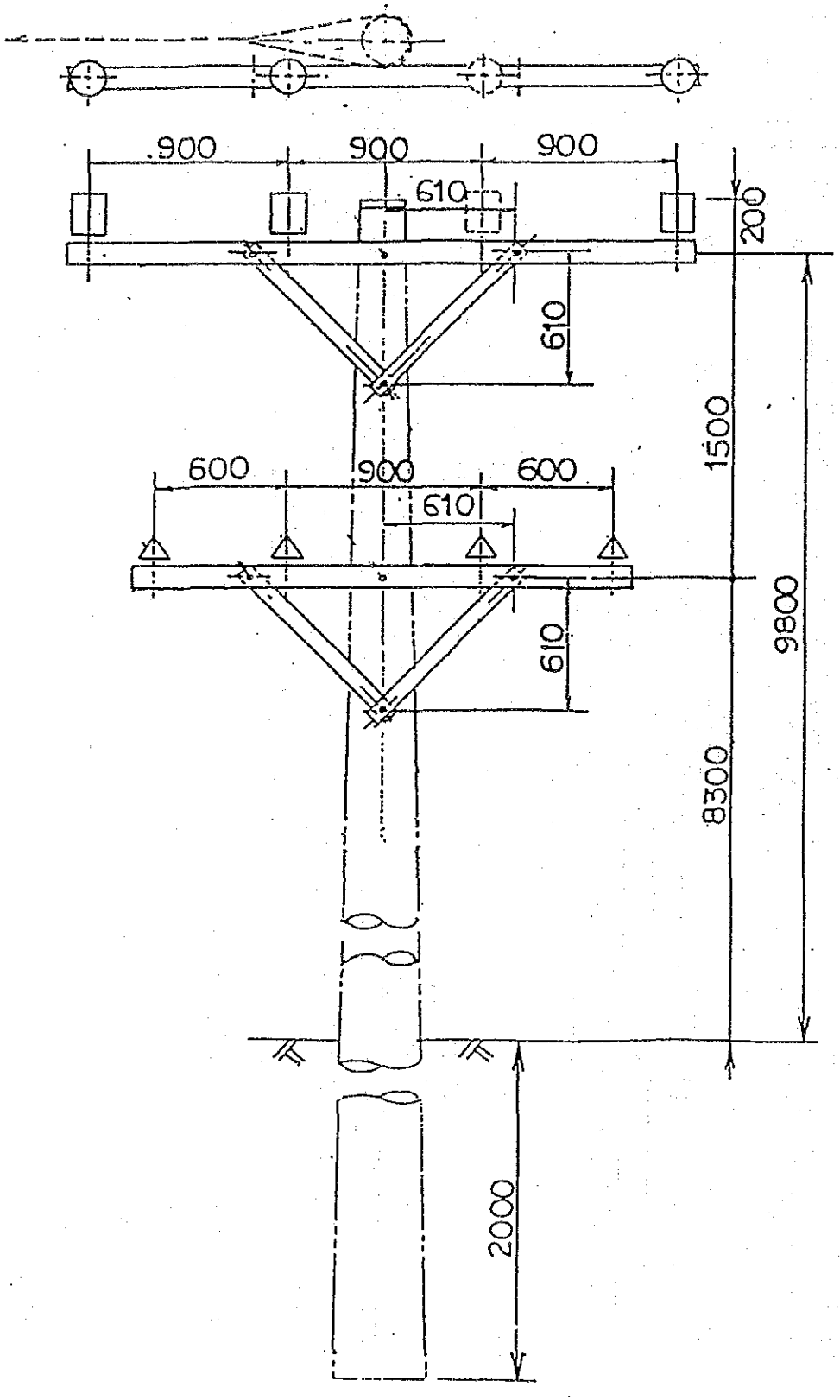
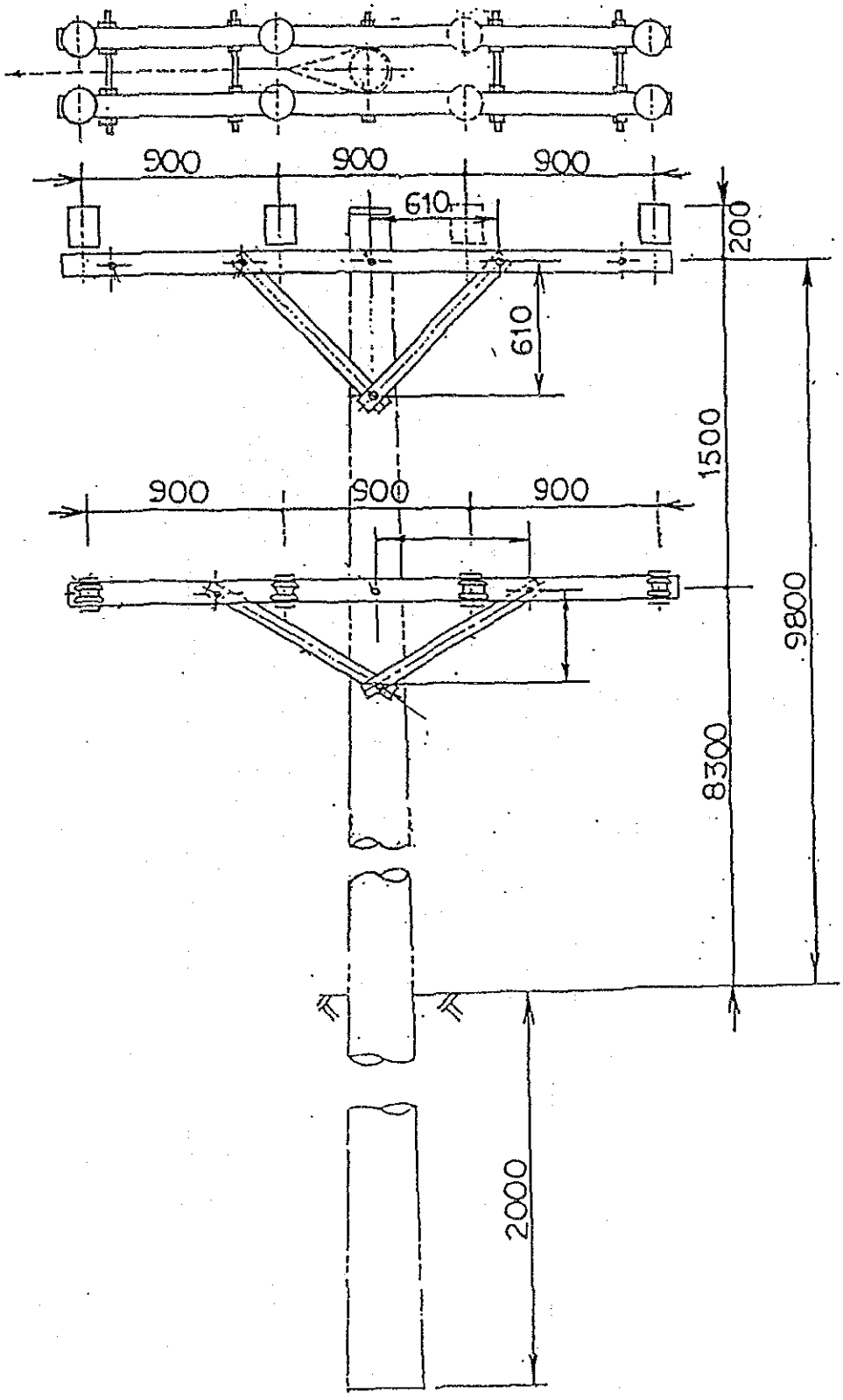
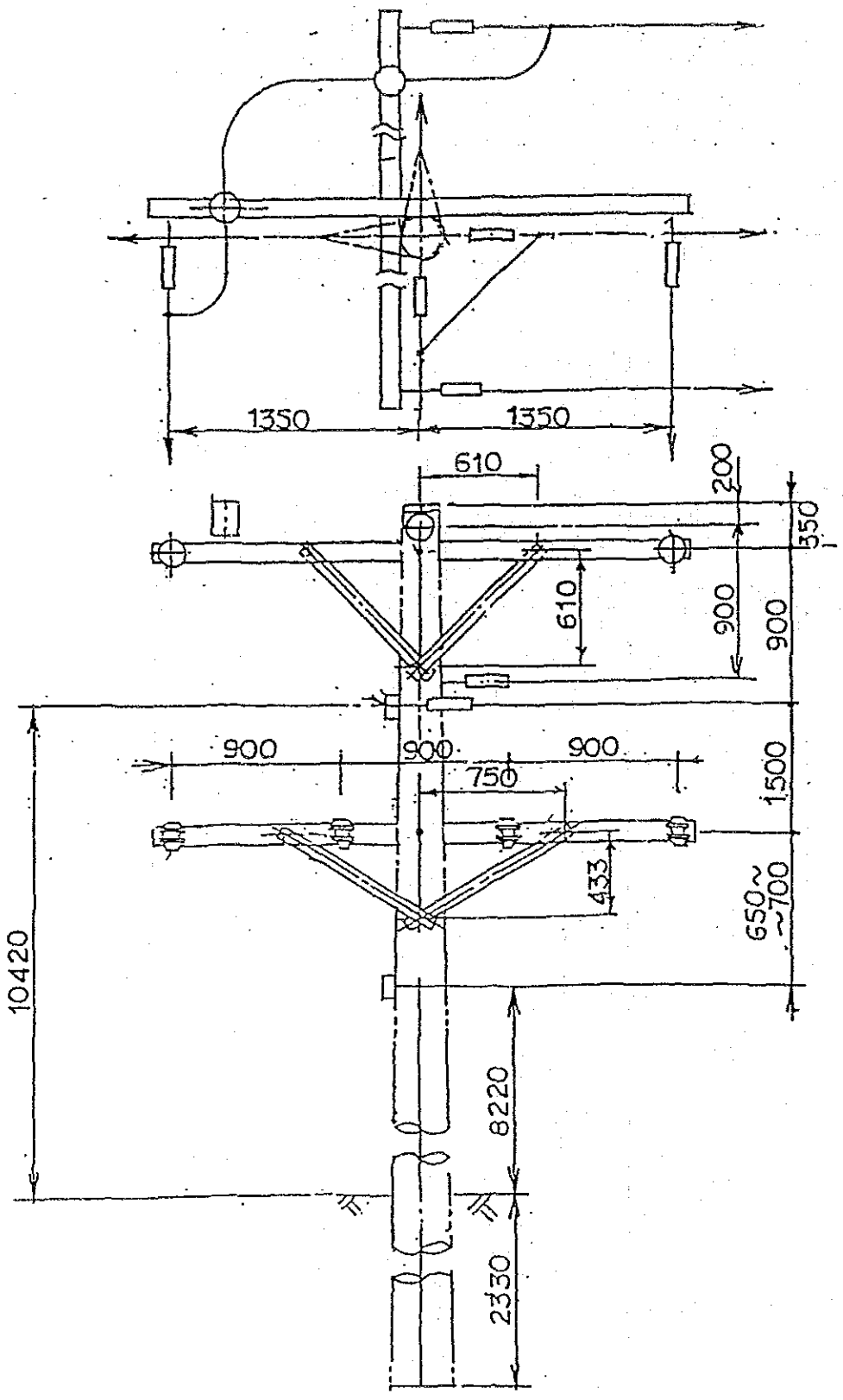
1. STRAIGHT LINE POLES



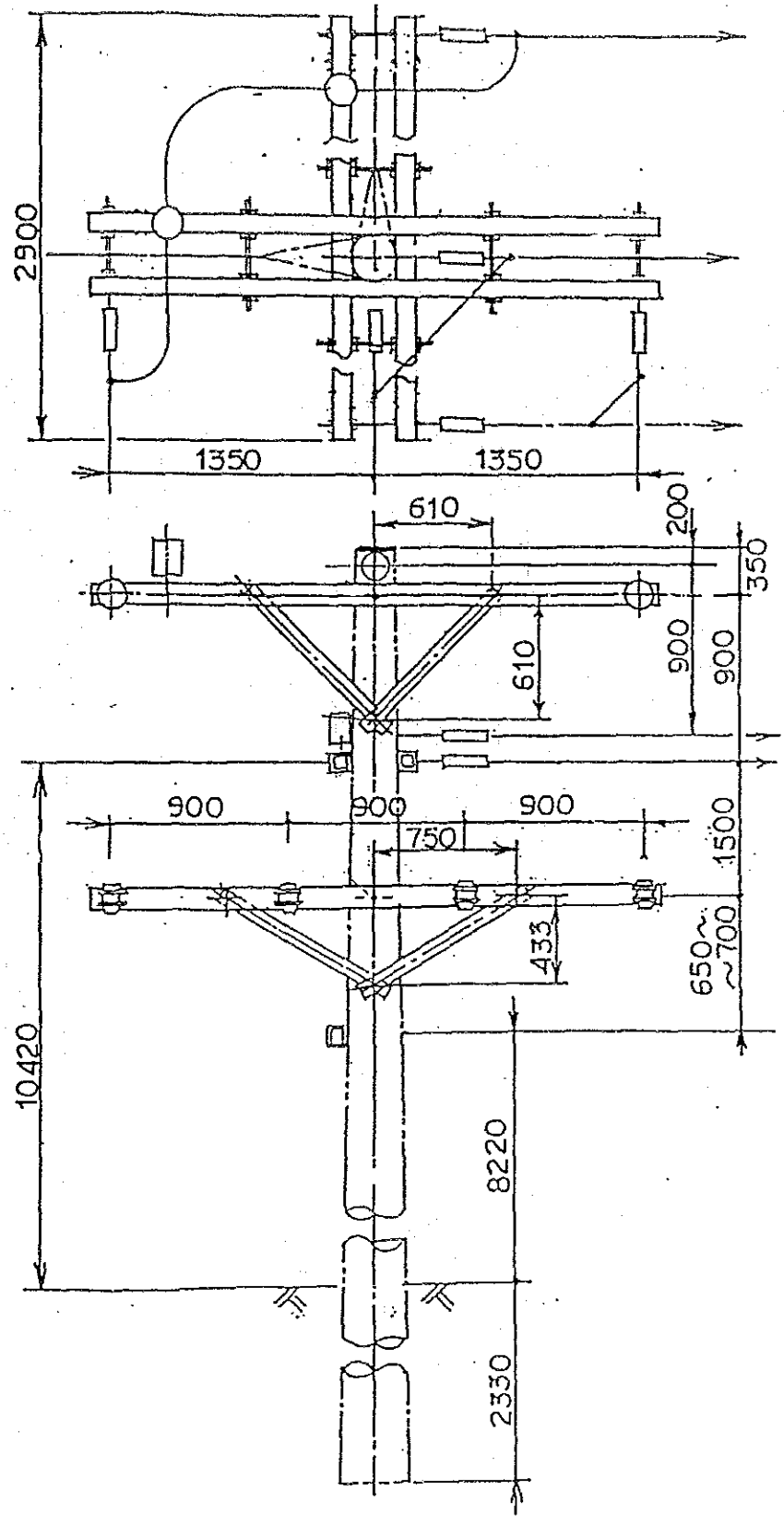
2. LIGHT ANGLE POLE (DOUBLE PIN)



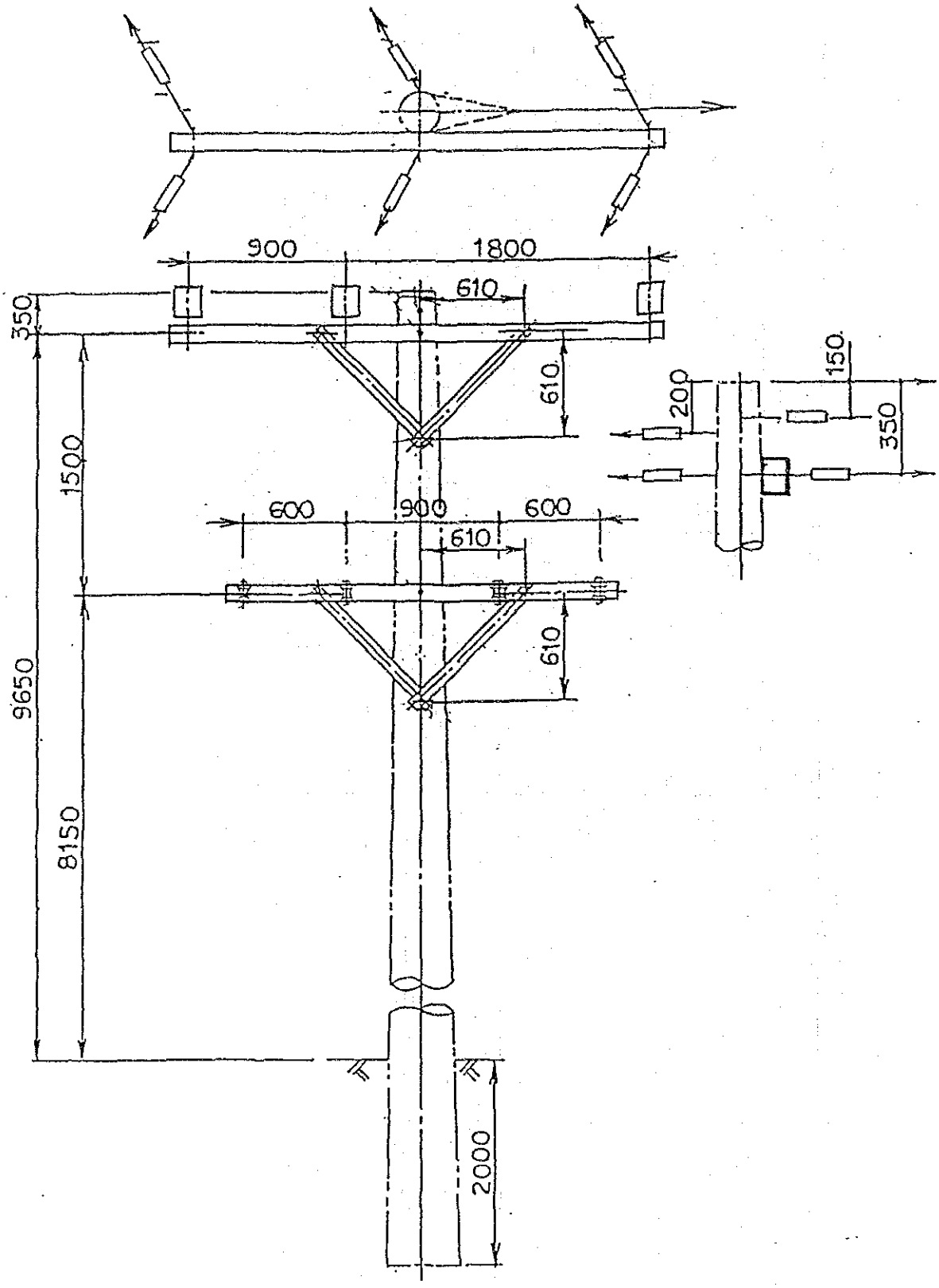
3. ANGLE LINE POLE (SINGLE ARM)



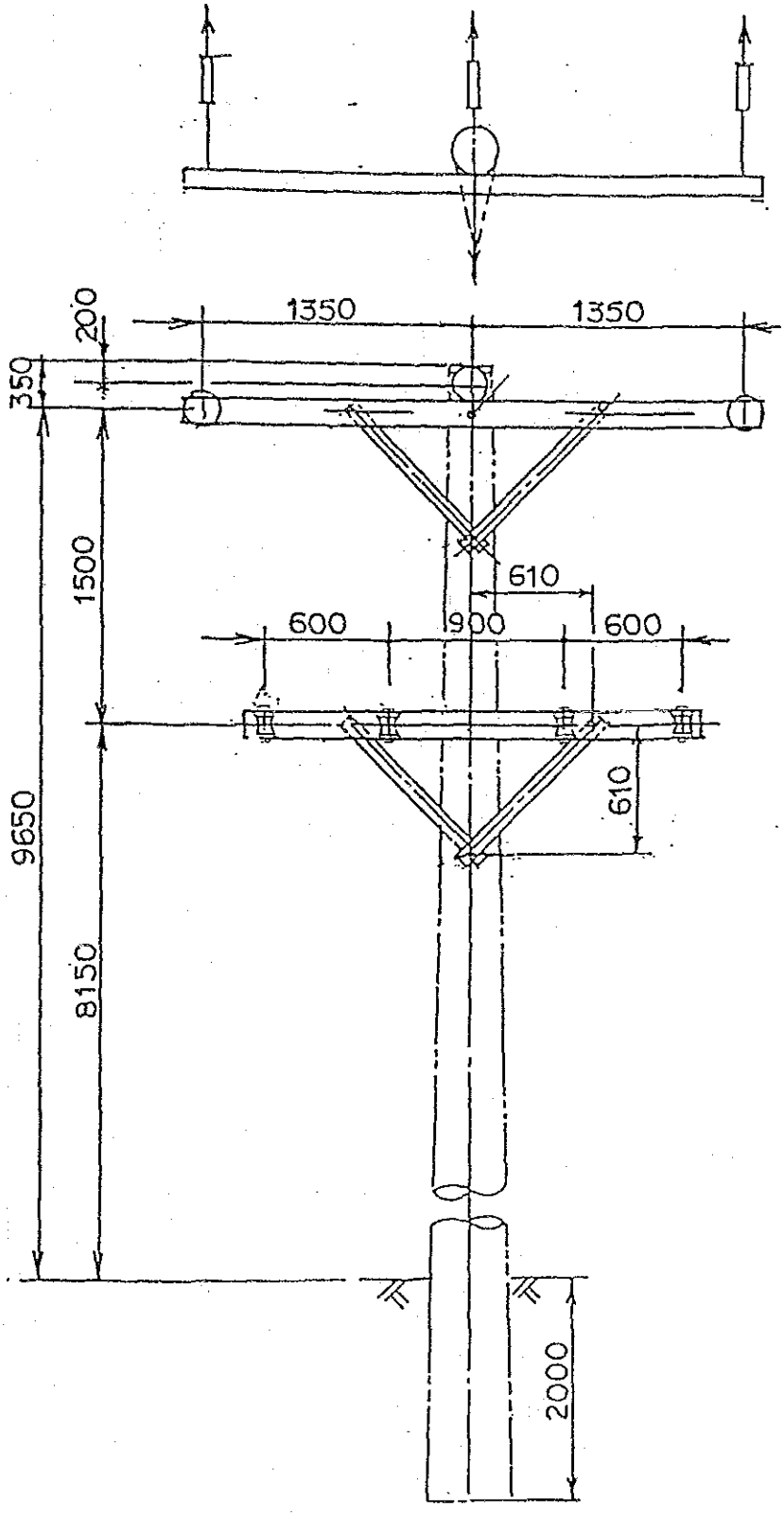
4. ANGLE LINE POLE (DOUBLE ARM)



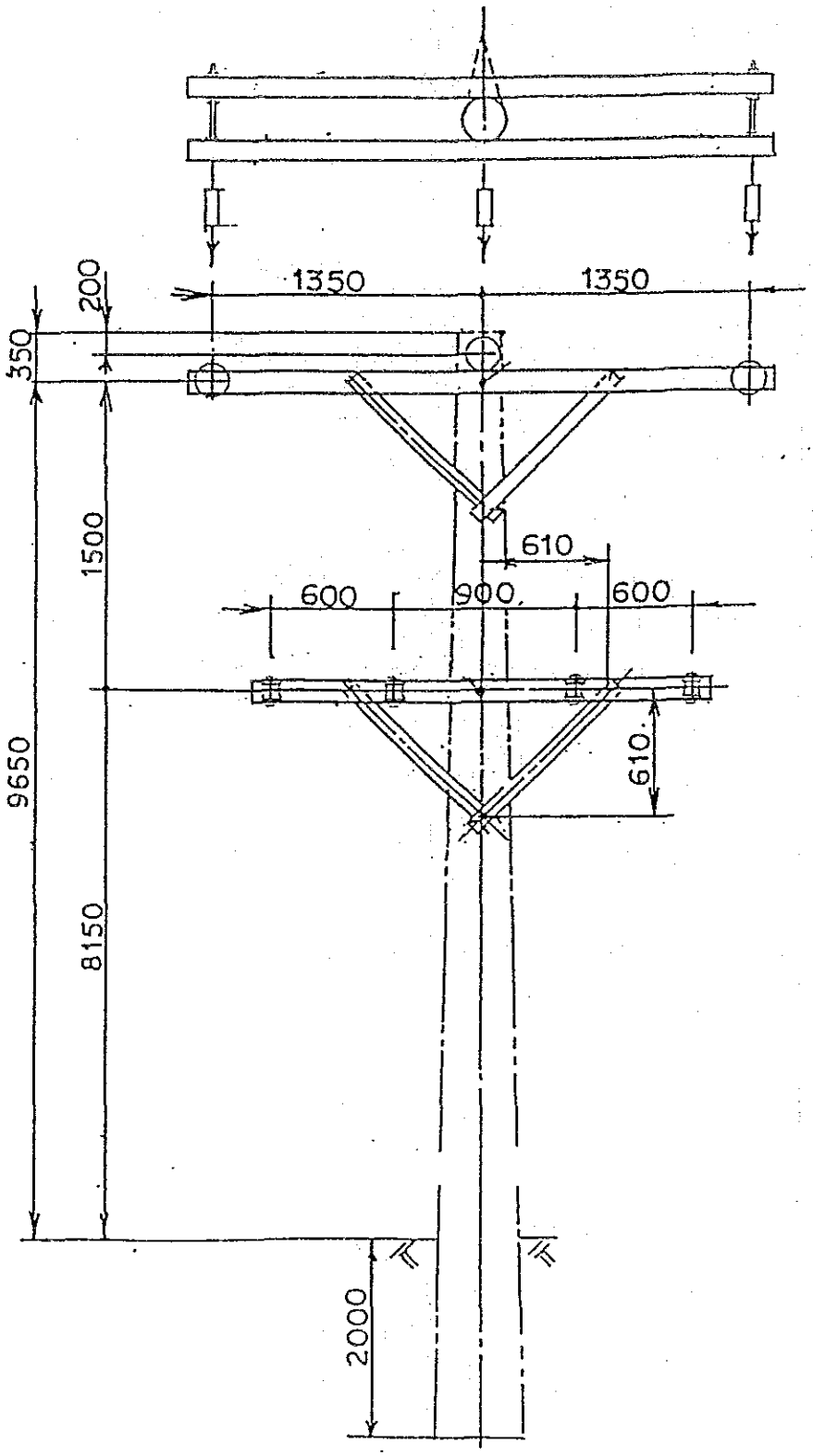
5. ANGLE LINE POLES STRAIN (SINGLE ARM)



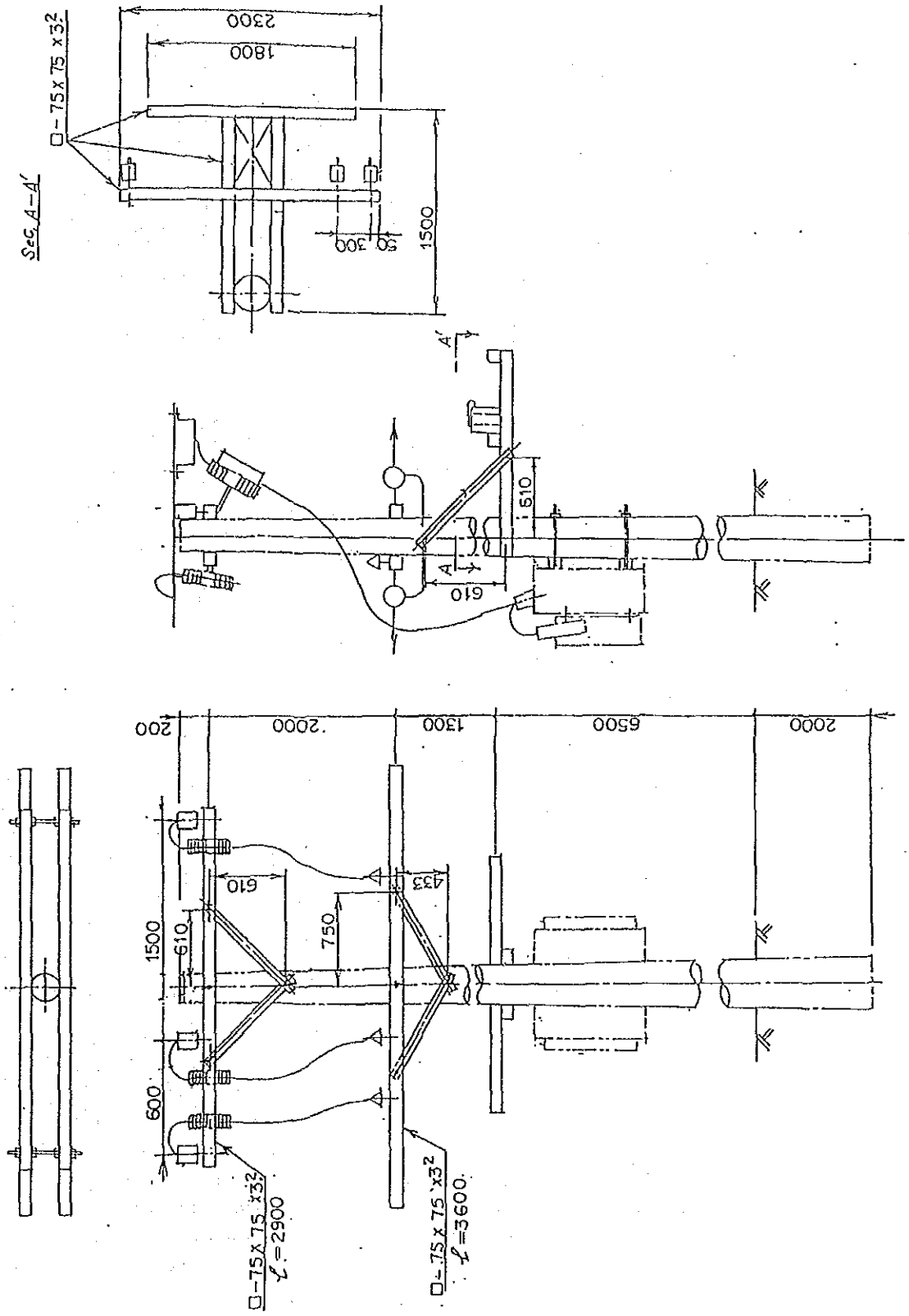
6. TERMINAL POLE (SINGLE ARM)



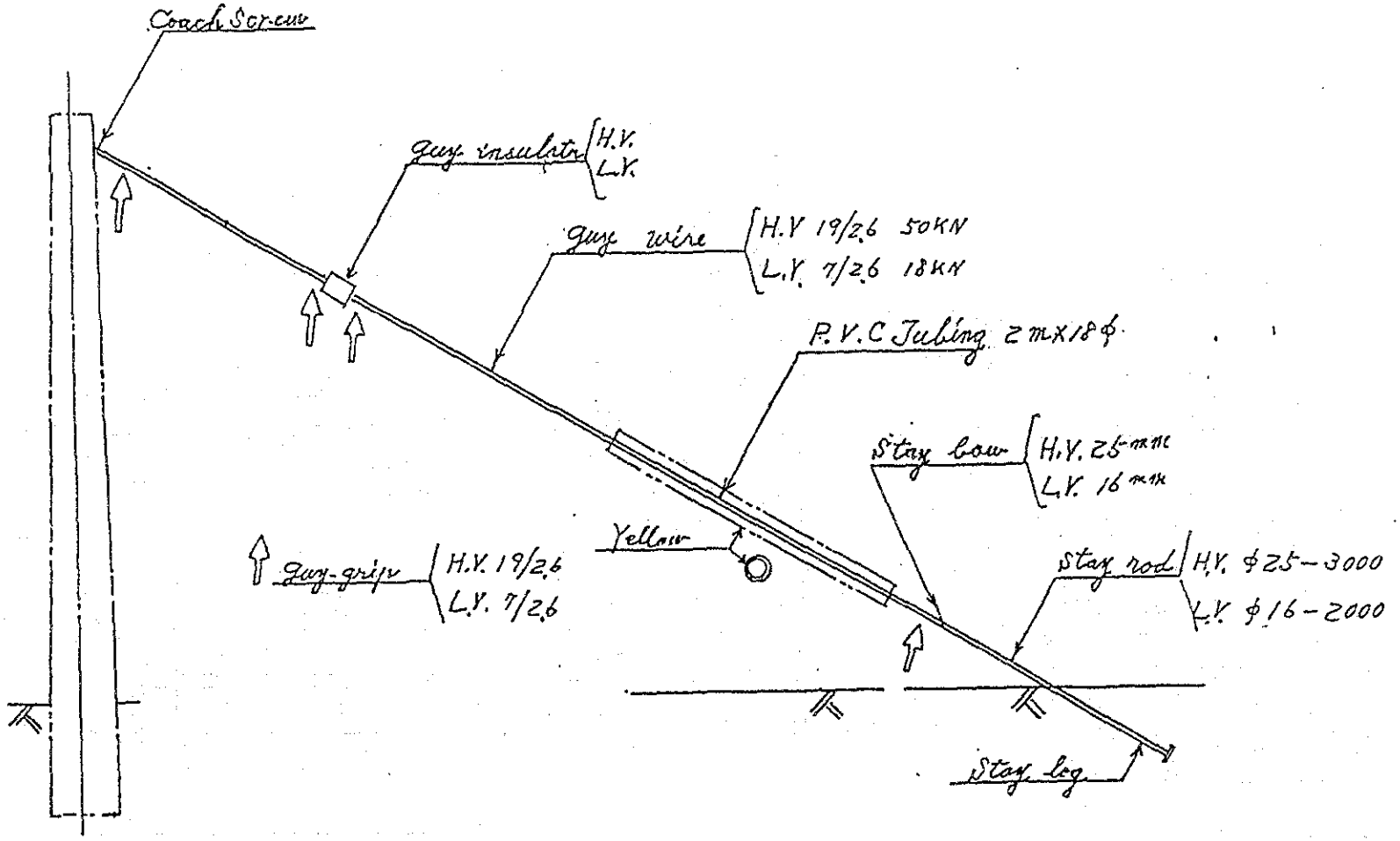
7. TERMINAL POLE (DOUBLE ARM)



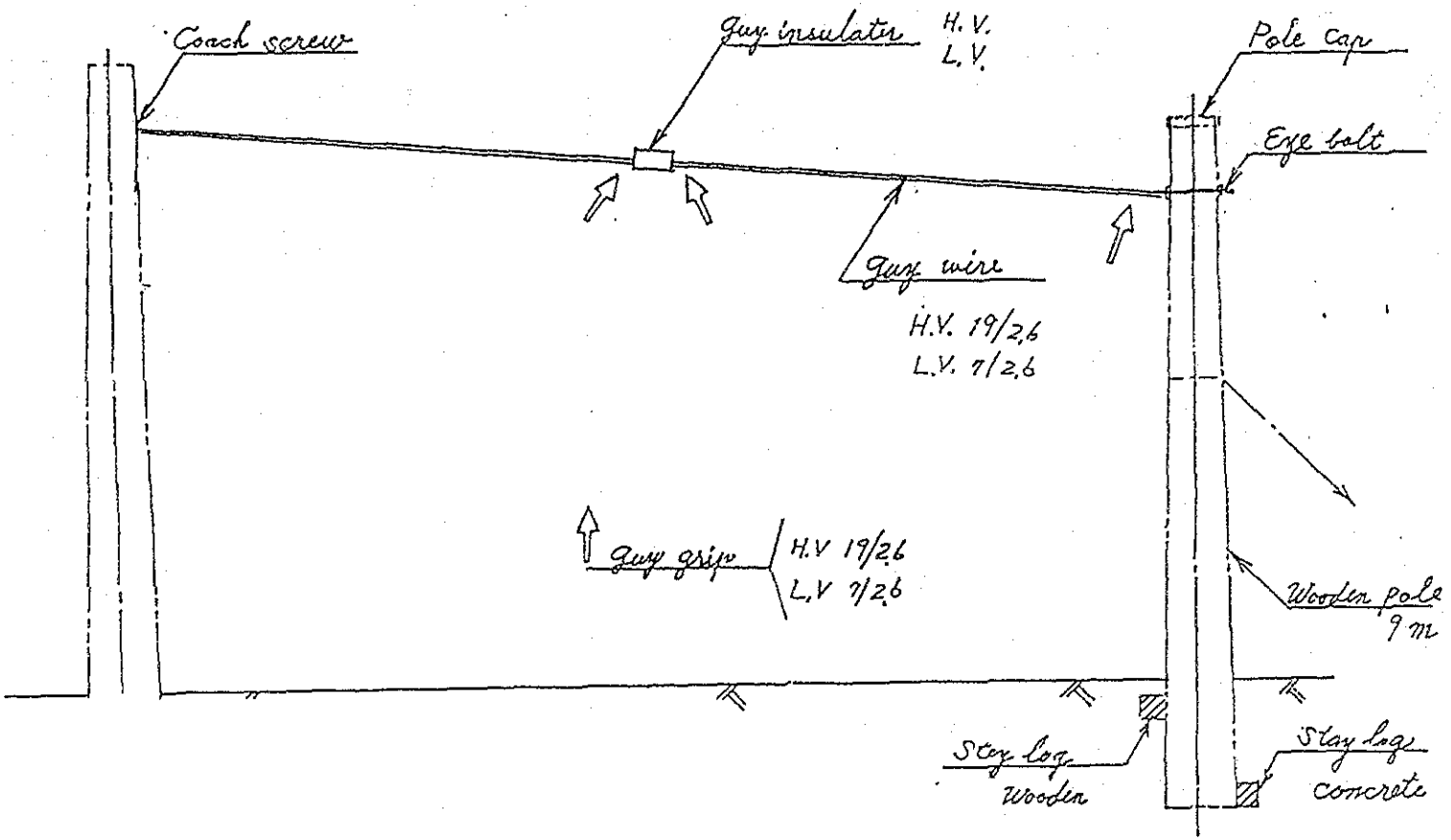
8. TRANSFORMER POLE



9. STAY ASSEMBLY



10. FLYING STAY ASSEMBLY



ELECTRIC POWER CORPORATION

COMMENTS ON "FIELD SURVEY REPORT ON
RURAL ELECTRIFICATION PROJECT IN WESTERN SAMOA"

1. Item 1(b) - Page 1:

It was anticipated that the reticulation of the Island of Savaii would be carried simultaneously with that of Upolu Island. The priorities allocated indicate that Savaii will be last to be reticulated.

It was expected there would be separate priorities - 1 to 4 allocated to Savaii replacing priorities 9 to 11 in the report.

2. Item 2 - Page 2:

Under the item "Construction Equipment (Drilling Machine)", it makes no mention of a crane truck for erection of poles. Is it intended that a crane will be sent out to perform the erection? *It will be needed.*

3. Item 2 - Page 2:

No mention is made of stay wire, stay wire bows, and anchoring equipment.

4. Item 4 - Page 3:

"To construct all distribution lines" should read: To "erect" all distribution lines.

5. Item 4 - Page 3:

To provide all erection forces for the construction works is too sweeping in the light of "Field Works" in Item 3. Suggest rewording to:

> "To provide the erection gang of labourers and linemen (with the exception of additional foremen under Item 3 above).

6. Item 5(b) - Page 4:

Average everyday temperature of conductor. Allow $30^{o}C$.

7. Item 5(b) - Page 4:

Maximum Temperature of Conductor (for maximum sag). Allow for $50^{o}C$.

.../2

8. Safety Factors: Item 5b - Page 4:

Wooden Poles:	4 (or preferably purchase poles with a strength rating (eg, 4, 6 or 8 kN) set by the Standard Specification AS 2209)
Concrete Poles) Steel Poles)	2 based on actual test results to establish crippling load
Steel Structures:	2 (if based on actual crippling load tests)
	4 (if based on design calculations only) and the design includes long members with compressive loads. These safety factors based on yield point

9. Item 5(b) - Page 4:

Ground Clearances - Please use the following clearances:

(a) 66 kV and 22 kV (EHV) 6.7m at any place

(b) 400/230 Volts Distribution lines 5.5m across or along roads, and any other place used by vehicles

(c) 400/230V Service Lines (last span to house):

- 5.5m across any part of a road
- 3.5m across any private property where vehicles will be used
- 2.7m at point of connection

10. Item 5(b) - Page 4:

The formula for spacing is confusing:

S = 0.0076m/kV + 0.37(S)½ where
S = dip in m

Suggest the formula be rewritten.

Spacing S = 0.0076m/kV + 0.37(d)½ where
S = Spacing in metres
d = dip or sag in metres

11. Item 5(c) - Page 5:

Colour preferred for insulators and bushings is Munsell grey, sometimes also known as "Sky glaze".

12. Item 5(d) - Page 6:

Suggest reword:

"Three phase transformers will be installed at villages where demand exceeds the largest size single phase transformer (25 kVA).

13. Item 5(h) - Page 7:

It is not necessary to have the 22kV outdoor switch yard completed before the commencement of the 22kV line from Tanugamanono to Siumu. It will be possible to connect the Siumu line to one of the 22kV lines at the gate of Tanugamanono - (preferably the West Coast Feeder) by a short 22kV cable link.

Otherwise it is accepted that the Japanese Aid does not include the outdoor switching yard.

14. Item 6(b) - Page 7:

It is suggested this be reworded more in line with the spirit of Items 3 and 4 as follows:

> EPC Organization for the Project:
>
> EPC will arrange a competent engineer to implement the project and a public relations officer to negotiate land use for the proper implementation of the project before commencement of construction in Samoa.
>
> EPC will, provide the erection work force so that the work can be implemented promptly, in accordance with the following tentative implementation schedule and in accordance with clauses 3 and 4 of this report".

It is considered that the original wording is too broad, and is, as a result, in conflict with the wording of the other clauses relating to staffing the project.

In all other respects the report is considered adequate.

Regarding the skeleton diagram for Poles etc.

Please refer 66kV line - Pages 1 and 2:

It is considered 2.000m bolt hole spacing for the 66kV arm to 22kV arm is excessive.

In view of a gain in height of about 400mm due to the difference in height of the 66kV post (about 600mm height) to that of a 22kV pin insulator (about 250mm) there is no reason why the spacing should not be 1.5m.

This will also make the 66kV wires within reach for a man standing on the 22kV arm.

The distances between arms above the LV arm is so great as to need "step bolts" for a worker to climb within reach of the wires - suggest these be shown at about 300 to 350mm spacing.

Eric J Hussey
GENERAL MANAGER

8 November 1989

COMMENTS ON FIELD SURVEY REPORT ON RURAL ELECTRIFICATION PROJECT IN WESTERN SAMOA

1. SCOPE OF PROJECT

(a) Upolu Island

This looks all right in that priority is given to the Tanugamanono - Siumu major link which by the time of the construction in 1990 will be very much needed to reinforce the voltage as the 22kV distribution around Leulumoega through Lefaga to Safata and Falealili, from the Control Station in Apia will have covered about 50 miles (80km).

The priority rating 1 to 5 for areas covered is all right too. I have swapped Aleisa Road - Saleimoa to rating 8 with Satuimalufilufi - Satapuala to 10 and Lepale - Fasitoo-uta to 9.

(b) Savaii Island

This part of the Project may be done simultaneously with Upolu at an independent priority rating from that of Upolu with the preferred ratings as followed:

Tufutafoe	- Falealupotai	- 6
Tafuauta	- Tafuatai	- 7
Puapua	- Samalaeulu	- 11
Sasina	- Matavai	- 12

2. Equipment and materials stated under this clause should include light trucks, heavy trucks of 6 tons type, compressure complete hammer dynamites (if required in place of a Koken-Down-the-hole drill type).

The vehicle and equipment essentials are given on a separate sheet attached. Crossarms if wooden and line construction hardware should also where required be standard to ones (or equivalent) used currently by EPC.

It is worth noting also that the 6.6kV/22kV step up transformer to be installed at Puapua will be temporary until conversion of the existing Salelologa - Puapua 6.6kV to 22kV at a later stage.

3. Home Works and Field Works are all right except that shipment of materials takes about three (3) months from placement of order to be supplied if procured from New Zealand or Australia.

4. Please note that materials are duty free into Apia. At present status the engineers in Charge is Toluono assisted by A. Tiotio.

5. (a) The pole design is the same as in our Construction manual submitted to you.

(b) Design Concept adopted is as in our construction manual submitted, based on the Australian Code of Practice for Overhead Line Construction by the Electricity Supply Association of Australia No. C (b) 1, 1974. All other design factors are all right except we use following safety factors for poles:

Wooden Poles	x 4
Concrete Poles	x 2
Steel Poles	x 2

Ground Clearance for LV (415/240 volts) is 5.5m.

(c) LINE MATERIALS

AAC FLY is hard drawn 7/3.4mm stranded conductors.

AAC WASP is also hard drawn 7/4.39mm stranded conductors.

Colour of Insulators and Bushings: Light Grey

(d) Distribution transformers sizes in the rural sector are determined mainly by the size of villages in population.

(f) Wood poles preferred for standardisation and local construction gangs experience with handling.

(g) A sawmill on this link have asked for a 100kVA substation with probable extension to 200kVA in two years.

(h) This clause is agreeable as it is.

(i) Provisional Pole Arrangement is ok except for the 14m poles where we have allowed 1.8m spacing between 66kV and 22kV although 1.5m space may be entertained for ease of maintenance.

6. Transformer erecting is still in progress between Lefaga and Siumu but had it not been for vehicle and machine break downs (old ones as no new ones assigned to this project) the whole section Leulumoega to Siumu would have finished by now.

T.F. Toluono.

T.F. Toluono
DEPUTY GENERAL MANAGER-ENGINEERING

LINE TOOLS AND MACHINERY FOR THE RURAL ELECTRIFICATION PROJECT UNDER JAPANESE AID

Cable Hoist or Puller (3-4 Tons)	36
Compression Tools 12 Tons	10
Wire Grip 1659-40 Klien for 7/3.4 PVC	36
Wire Grip 1628-58 Klien for 19/2.6 steel guy	12
Cable Cutter for Hull	12
Ring Anger Bits 22mm	24
Ring Anger Bits 20mm	24
Ring Anger Bits 18 mm	24
Digging Crawbars 2m	24
Digging spades with 2m galv. handles	30
Digging shovels with 2m galv. handles	30

Heavy Trucks 6 Ton Flat Deck or Dyna	3
Hiab Cranes 7 Ton with Pole Trailers	3
Air Compressor (complete with hammers) (Rig Crawler type)	2
Toyota Landcruiser S.W.B.	1

APPENDIX 1-3D

MINUTES OF MEETING
BETWEEN
THE GOVERNMENT OF WESTERN SAMOA
AND
SUPPLEMENTARY SURVEY TEAM

MINUTES OF MEETING
ON THE BASIC DESIGN STUDY
ON
RURAL ELECTRIFICATION PROJECT
IN
WESTERN SAMOA

Based on the results of Basic Design Study, the Japan International Cooperation Agency (JICA) decided to conduct a supplementary Basic Design Study on the project for Rural Electrification in Western Samoa (hereinafter referred to as "the Project").

JICA sent to Western Samoa a study team, which is headed by Mr Shinichi Suzuki, Resident Representatives, JICA Western Samoa office from 9 October to 23 October 1991.

The team had a series of discussion with the officials concerned of the Government of Western Samoa headed by the Hon Leafa Vitale and conducted a field survey at the Project areas.

As a result of the survey, discussion and study, both parties agreed to recommend to their respective Governments that the results of the survey, discussion and study attached herewith should be examined towards the realization of the Project.

17 October 1991

Shinichi Suzuki

Mr Shinichi Suzuki
LEADER
SUPPLEMENTARY BASIC DESIGN STUDY TEAM
JICA

Hon Leafa Vitale
MINISTER FOR
ELECTRIC POWER CORPORATION AND
PUBLIC WORKS DEPARTMENT

ATTACHMENT

1. The objective of the project is to improve the living standards of people who live in rural areas, by means of Rural Electrification.

2. The site of the Project is both islands, UPOLU and SAVAII.

3. The request of the Government of Western Samoa made on the Project for Japanese Grant Aid is as follows:

   (1) Provision of materials for the construction of 66kV transmission line, from Lotofaga to Tanugamanono, 22kV trunk line and low voltage line, (excluding service line for house connection) networks on UPOLU and SAVAII Islands: Cables, poles, transformers and others. (Priority of line route are indicated on the site map).

   (2) Provision of construction machinery and vehicles: Drilling Machine, pick-up truck and others.

   (3) Consultant Services for Detail Design and Construction Supervision.

4. Electric Power Corporation is responsible for the administration of the Project.

5. The Government of Western Samoa has understood Japanese Grant Aid System explained by the Team which includes a principle for the use of Japanese Consultancy Firm and General Contractors for the detail design, construction supervision and supply of materials.

6. The Government of Western Samoa will undertake items listed in Annex I when the Government of Japan decides to extend Grant Aid for the said Project.

7. The following sections of the lines are undertaken by Afulilo Hydro Project and excluded in the Japanese Grant Aid:

   (a) 22kV line from Taelefaga Power Station (Afulilo Power Station) to the existing Lalomauga Power Station (4.2 km).

   (b) Upgrading of the existing 22kV to 33kV between Lalomauga and Letogo (28.7 km), new double line section 33/22kV between Letogo and Tanugamanono Power Station (4.2km).

   (c) 22kV double transmission line from Taelefaga Power Station to Afulilo Dam, one system insulated as 66kV but operated in 22kV (2.9km), the other system 22kV for Intake supply and later continuation on the Richardson Road.

   New Transmission line from Afulilo Dam to Lotofaga (Sapo'e Road) insulated as 66kV but operated in 22kV.

   New distribution line 22kV from Sapo'e Road to Lotofaga (3.6km).

   (d) 22kV distribution line from Taelefaga Power Station around the Fagaloa bay: 2.1km to Salimu and 5.0km to Samamea.

8. The following materials, equipment and erection tools (hereinafter referred to as the Plant) for the Project will be provided under the Japanese Grant Aid.

- Distribution line poles
- Conductors
- Insulators
- Distribution transformers
- Switches
- Construction equipment and tools
- Miscellaneous materials and equipment

9. The Consultant will provide the following services for the implementation of the Project:

- Detailed design of the distribution system
- Preparation of the tender document for procurement of the Plant
- Technical assistances for erection works
- Administration services for the implementation of the Project
- Other assistances

10. Transmission lines and distribution lines to be undertaken by Japanese Grant Aid will be selected from the following taking into account of priority marked on the attached maps:

(a) 66kV transmission line from Lotofaga to Tanugamanono via Siumu.

(b) 22kV line from Tanugamanono to Siumu.

(c) 22kV line from Afulilo dam to Samusu.

(d) 22kV line from Sauniatu to Saluafata.

(e) 22kV lines at Alofi area.

(f) 22kV lines between Aleisa Road and North Coast Road.

(g) 22kV line from Puapua to Samalaeulu.

(h) 22kV line from Sasina to Matavai.

(i) 22kV line from Falealupo to Arata.

(j) 22kV line from Tafua-uta to Tafua-tai.

(k) Saleaula to Patamea.

(l) Saleapaga - Lalomanu.

UNDERTAKINGS BY THE GOVERNMENT OF WESTERN SAMOA

1. To secure and clear the lands for the construction.

2. To secure the temporary yard to store the material provided under Grant Aid.

3. To secure all local costs for the works: Labour cost, fuel for machines and vehicles, administration and others, not covered by Grant Aid.

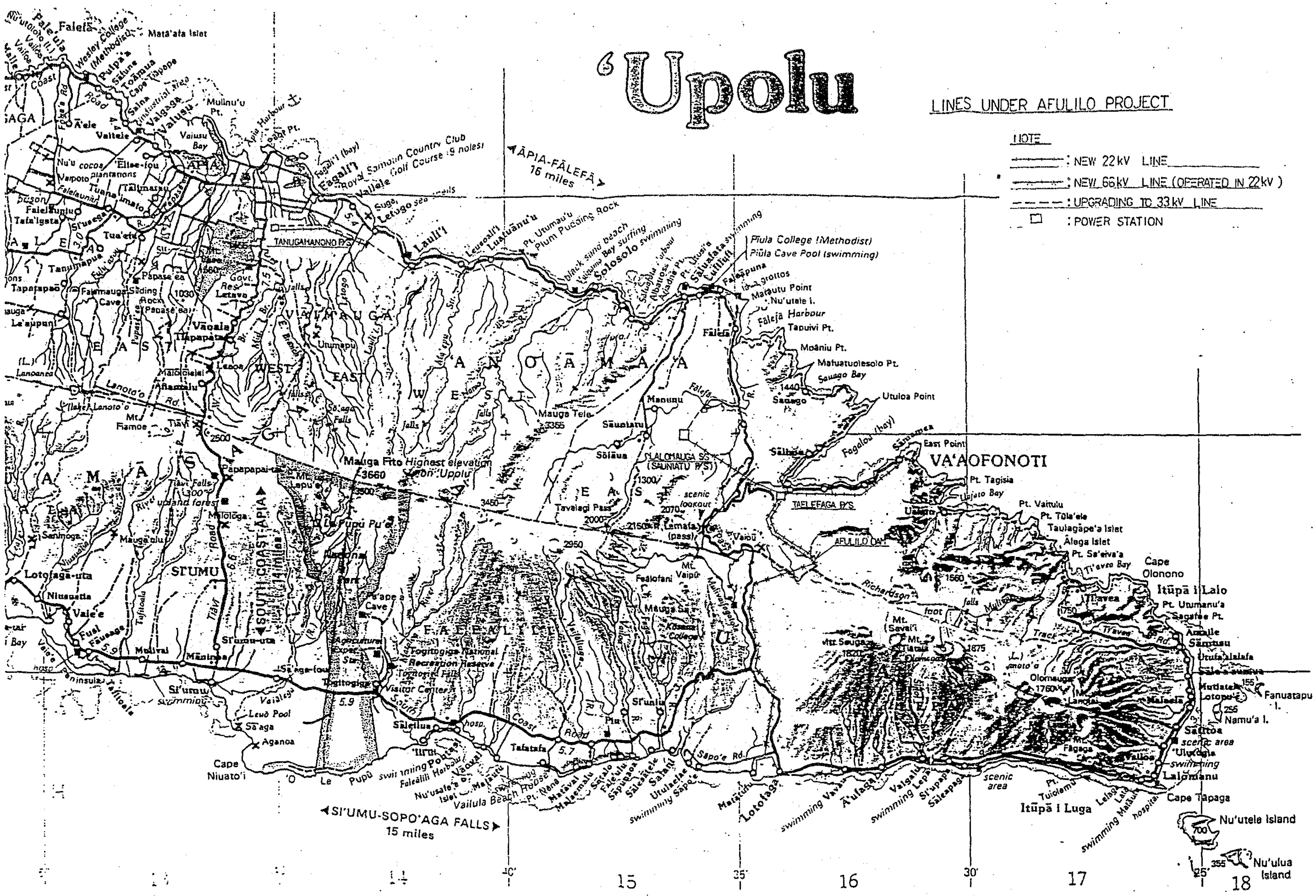
4. To ensure prompt unloading of material provided under Grant Aid.

5. To provide customs duties for materials.

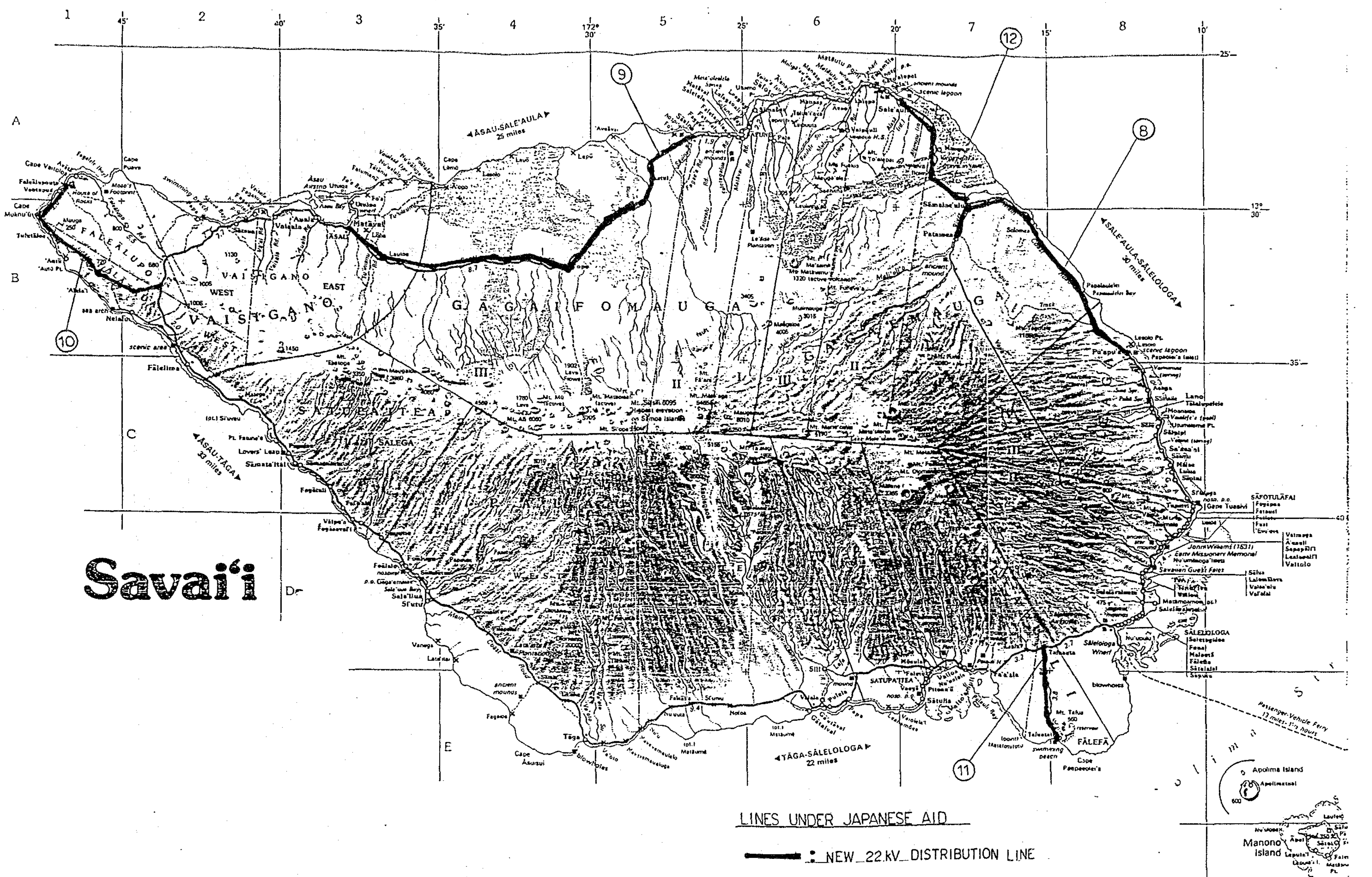
6. To grant exemption to Japanese nationals who will serve under the Project from local tax and other fiscal levies.

7. To bear the expense for banking services.

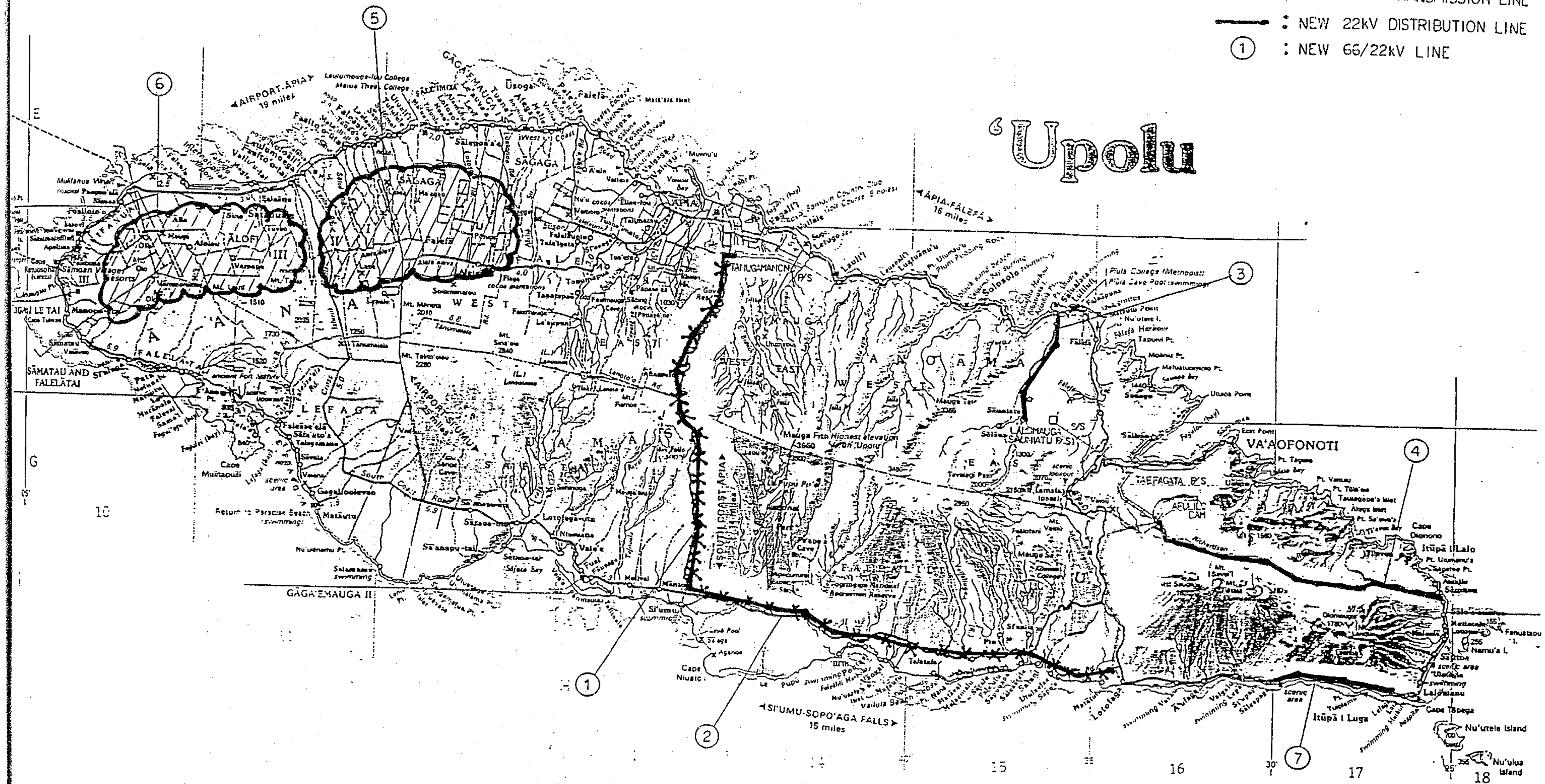
8. Others in accordance with principle of Japan's Grant Aid Program.



'Upolu
LINES UNDER AFULILO PROJECT
NOTE
: NEW 22kV LINE
: NEW 66kV LINE (OPERATED IN 22kV)
: UPGRADING TO 33kV LINE
: POWER STATION
TANUGAMANONO P/S
LALOMAUGA SS (SAUNIATU P/S)
TAELEFAGA P/S
AFULILO DAM
VA'AOFONOTI
SI'UMU
'ĀPIA-FĀLEFĀ 16 miles
SI'UMU-SOPO'AGA FALLS 15 miles



Savai'i
LINES UNDER JAPANESE AID
: NEW 22 kV DISTRIBUTION LINE
ĀSAU-SALE'AULA 25 miles
SALE'AULA-SĀLELOLOGA 30 miles
ĀSAU-TĀGA 33 miles
TĀGA-SĀLELOLOGA 22 miles
GAGAIFOMAUGA
FALEĀLUPO
VAISIGANO
SATUPA'ITEA
Manono Island
Apolima Island
Passenger-Vehicle Ferry



LINES UNDER JAPANESE AID
NOTE
: NEW 66kV TRANSMISSION LINE
: NEW 22kV DISTRIBUTION LINE
① : NEW 66/22kV LINE
'Upolu
TAFAGAMANCN P/S
LALOMAUGA (SAUNIATU P/S)
TAEFAGATA P/S
VA'AOFONOTI
AIRPORT-ĀPIA 19 miles
ĀPIA-FALEFĀ 16 miles
SI'UMU-SOPO'AGA FALLS 15 miles

APPENDIX 2

GENARATED FACILITY

Source:EPC

Description	Rated (kW)	Output (kW)	Location	Erected	Note
Upolu Island					
Diesel Generators					
Tanugamanono NO.4	1,670	0	Tanugamanono	1966	Shortage spare parts
Tanugamanono NO.5	1,670	1,336	Tanugamanono	1966	
Tanugamanono NO.6	1,456	1,165	Tanugamanono	1973	
Tanugamanono NO.7	1,800	0	Tanugamanono	1979	Shortage spare parts
Tanugamanono NO.8	1,800	1,440	Tanugamanono	1979	
Tanugamanono NO.9	2,250	1,800	Tanugamanono	1984	
Tanugamanono NO.10	1,000	0	Tanugamanono	1986	Shortage spare parts
Tanugamanono NO.11	1,000	0	Tanugamanono	1986	Shortage spare parts
Tanugamanono (Lease)	1,125	720	Tanugamanono	1990	
Tanugamanono (Lease)	1,500	960	Tanugamanono	1990	
Tanugamanono (Lease)	1,375	880	Tanugamanono	1990	
Satitoa	160	128			
Total	16,806	8,429			Reduced putput:10,536 kW
Hydro Generator					
Fuluasol No.2	370	0	Fuluasol	1985	No water
Alaoa	1,000	800	Alaoa	1982	
Faleole Fee	1,600	0	Faleole Fee	1982	Danaged by cyclone in 1990
Samasoni	950	1,520	Samasoni	1982	Rated 950 kW 2units
Lalomauga	1,750	1,408	Lalomauga	1985	Rated 750 kW 2units
Total	5,670	3,728			
Total Upolu Island	22,476	12,157			
Savaii Island					
Salelologa					
Salelologa No.1	100	0	Salelologa	1978	Shortage spare parts
Salelologa No.2	300	0	Salelologa	1978	Shortage spare parts
Salelologa No.3	412	0	Salelologa	1978	Shortage spare parts
Salelologa No.4	480	0	Salelologa	1985	Shortage spare parts
Salelologa No.5	60	0	Salelologa	1982	Shortage spare parts
Salelologa No.6	60	48	Salelologa	1982	
Salelologa No.7	150	120	Salelologa	1986	
Salelologa (Lease)	560	448			
Vaipouli No.1	200	160			
Vaipouli No.2	136	109			
Total EPC Savaii	2,458	885			Reduced output:1,106 kW
Asau					
Asau Steam (Private	1,500	500	Asau	1894	Purchased 500 kW by EPC
Total Savaii	3,958	1,385			

DISTRIBUTION FACILITY

Source:EPC

Description	1981 (km)	1982 (km)	1983 (km)	1984 (km)	1985 (km)	1986 (km)	1987 (km)
Upolu System							
Overhead line							
6.6 kV line	69	99	74	73	73	73	73
22 kV line	97	115	151	158	174	177	182
LV line	217	320	335	350	370	396	419
Total	383	534	560	581	617	646	674
Underground line							
6.6 kV line	1.45	1.45	1.45	1.5	1.5	1.5	1.5
22 kV line	0.85	3	3	3	3.08	3.33	3.33
Total	2.30	4.45	4.45	4.50	4.58	4.83	4.83
Upolu system total							
6.6 kV line	70	100	75	75	75	75	75
22 kV line	98	118	154	161	177	180	185
LV line	217	320	335	350	370	396	419
Total	385	538	564	586	622	651	679
Savaii System							
Salelologa System							
6.6 kV line	23	23	23	23	23	23	23
22 kV line					13	21	21
LV line	30	45	45	53	63	72	72
Total	23	23	23	23	36	44	44
Asau System							
2.2 kV line		10	15				
22 kV line				28	40	44	72
LV line		12	27	27	32	40	78.4
Total	0	22	42	55	72	84	150
Savaii system total							
22 kV line	0	10	15	0	0	0	0
6.6 kV line	23	23	23	23	23	23	23
22 kV line	0	0	0	28	53	65	93
LV line	30	57	72	80	95	112	150
Total Savaii Island	53	90	110	131	171	200	266

LOAD FACTOR IN UPOLU ISLAND

Source:EPC

TANUGAMANONO West Coast Feeder (Domestic demand dated Feb. 20, '89)													
Time	0:00	2:00	4:00	6:00	8:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00	
Load	75	730	780	1,050	1,200	1,220	1,230	1,220	1,100	1,460	1,760	1,300	
Energy	150	1,460	1,560	2,100	2,400	2,440	2,460	2,440	2,200	2,920	3,520	2,600	26,250
Peak load	1,900												
Peak energy													45,600
Load factor													0.6

TANUGAMANONO Paitele Feeder (Commercial demand dated Mar. 3,'89)													
Time	0:00	2:00	4:00	6:00	8:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00	
Load	890.0	800.0	840.0	1150.0	2050.0	2040.0	240.0	2150.0	1750.0	1350.0	1300.0	1000.0	
Energy	1780.0	1600.0	1680.0	2300.0	4100.0	4080.0	480.0	4300.0	3500.0	2700.0	2600.0	2000.0	31120.0
Peak load	2150.0												
Peak energy													51600.0
Load factor													0.6

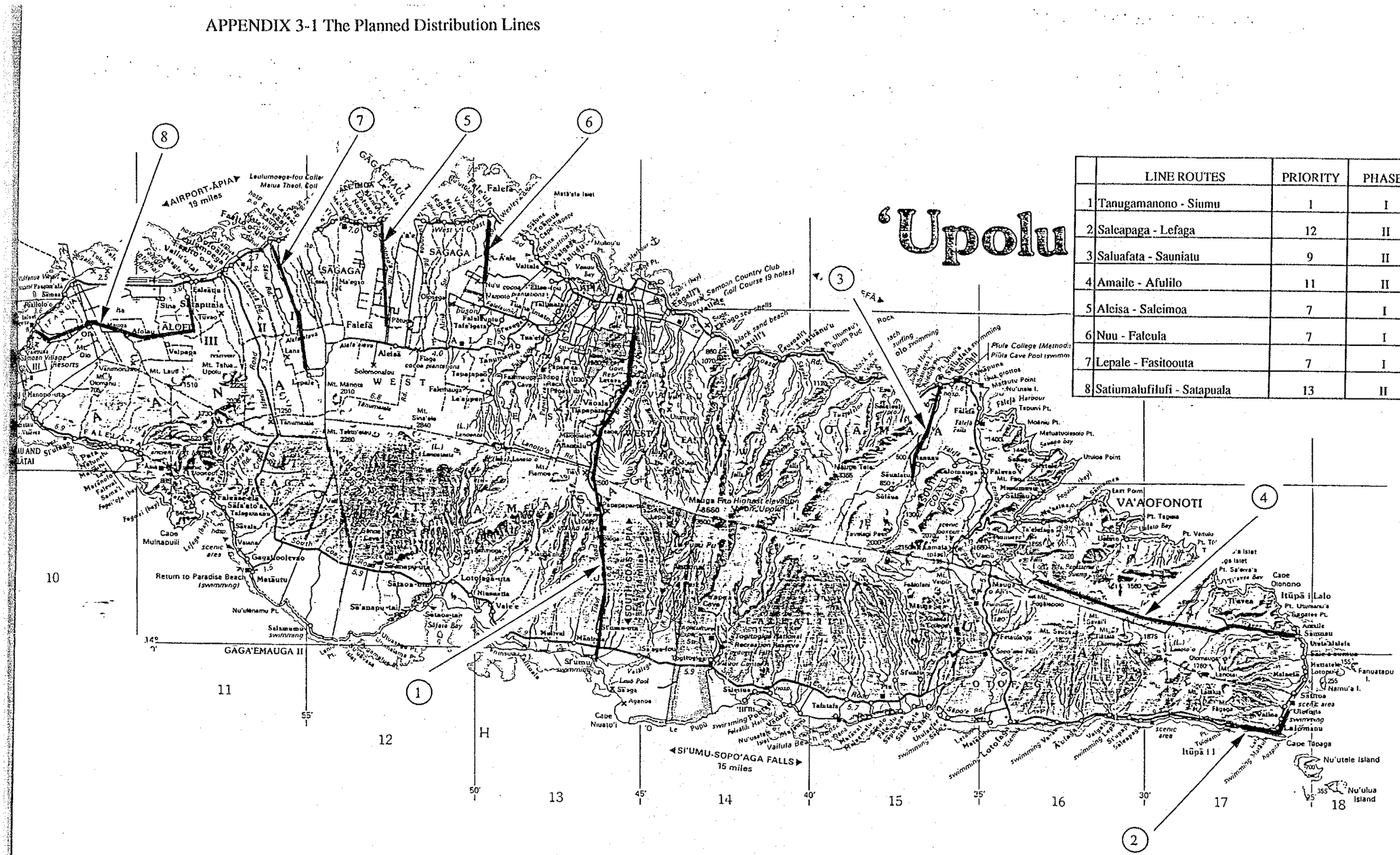
TANUGAMANONO Hospital Feeder (Commercial demand, dated Feb. 28,'89)													
Time	0:00	2:00	4:00	6:00	8:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00	
Load	550.0	540.0	540.0	630.0	930.0	1000.0	950.0	990.0	850.0	850.0	800.0	650.0	
Energy	1100.0	1080.0	1080.0	1260.0	1860.0	2000.0	1900.0	1980.0	1700.0	1700.0	1600.0	1300.0	18560.0
Peak load	1100.0												
Peak energy													26400.0
Load factor													0.7

TANUGAMANONO Alaoa Feeder (Domestic demand, Dated Mar. 2,'89													
Time	0:00	2:00	4:00	6:00	8:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00	
Load	90.0	87.0	87.0	102.0	100.0	90.0	98.0	98.0	100.0	120.0	155.0	120.0	
Energy	180.0	174.0	174.0	204.0	200.0	180.0	196.0	196.0	200.0	240.0	310.0	240.0	2494.0
Peak load	164.0												
Peak energy													3936.0
Load factor													0.6

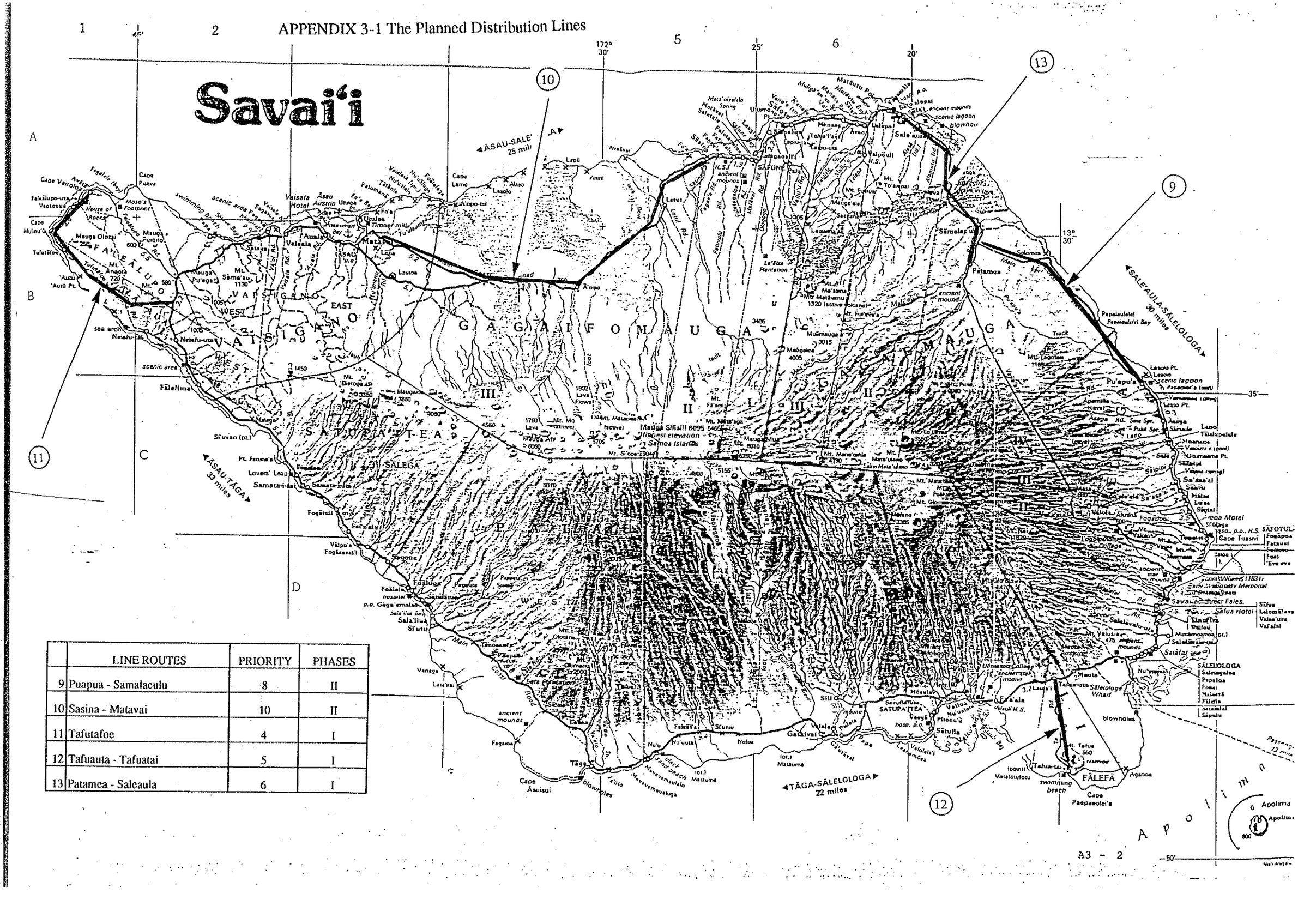
TANUGAMANONO Lotopa Feeder (Domestic demand, dated Mar. 8,'8													
Time	0:00	2:00	4:00	6:00	8:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00	
Load	90.0	65.0	63.0	105.0	98.0	97.0	100.0	110.0	140.0	180.0	130.0	90.0	
Energy	180.0	130.0	126.0	210.0	196.0	194.0	200.0	220.0	280.0	360.0	260.0	180.0	2536.0
Peak load	206.0												
Peak energy													4944.0
Load factor													0.5

APPENDIX 3

APPENDIX 3-1 The Planned Distribution Lines

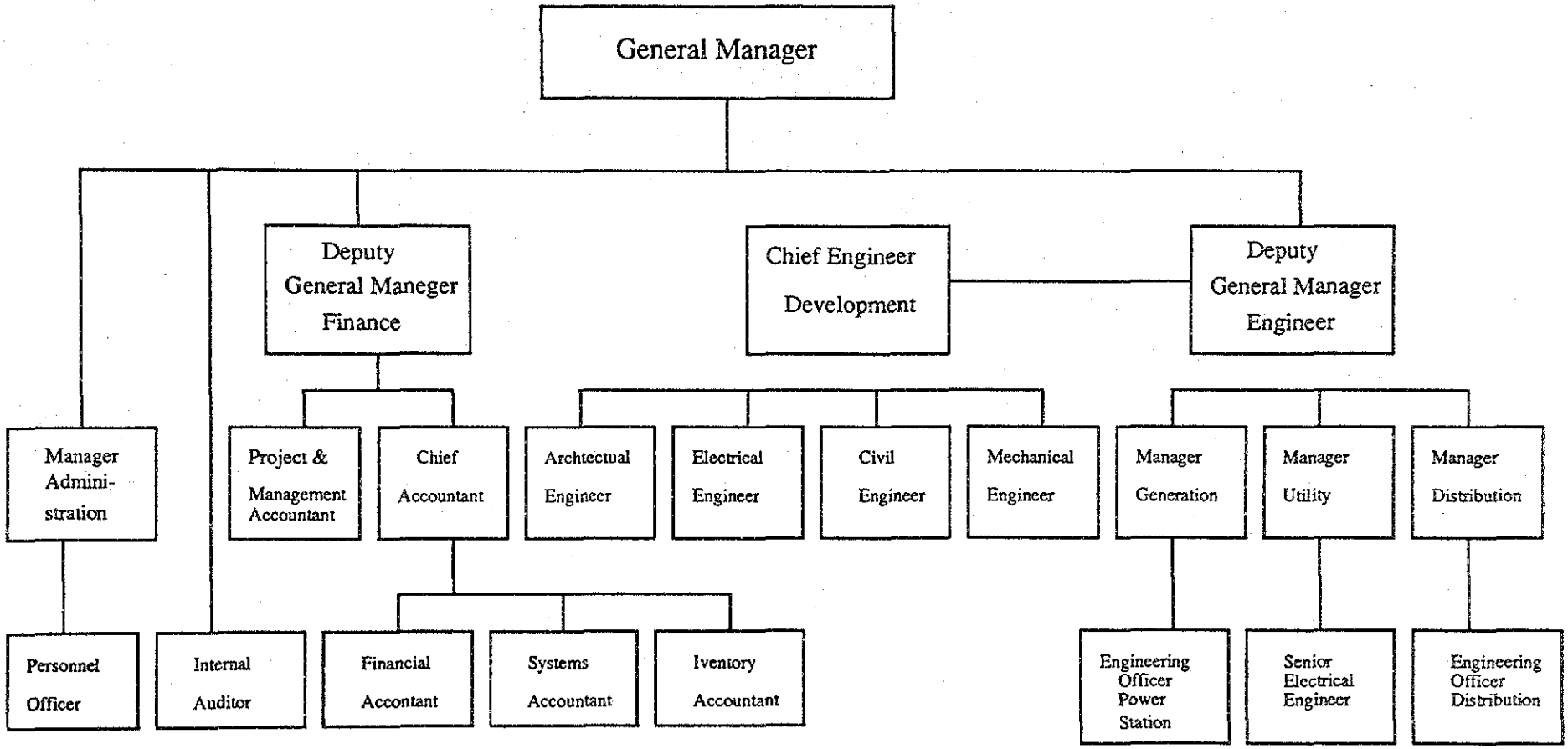


	LINE ROUTES	PRIORITY	PHASES
1	Tanugamanono - Siumu	1	I
2	Saleapaga - Lefaga	12	II
3	Saluafata - Sauniatu	9	II
4	Amaile - Afulilo	11	II
5	Aleisa - Saleimoa	7	I
6	Nuu - Faleula	7	I
7	Lepale - Fasitoouta	7	I
8	Satiumalufilufi - Satapuala	13	II



	LINE ROUTES	PRIORITY	PHASES
9	Puapua - Samalaeulu	8	II
10	Sasina - Matavai	10	II
11	Tafutafoe	4	I
12	Tafuauta - Tafuatai	5	I
13	Patamea - Salcaula	6	I

ELECTRIC POWER CORPORATION
ORGANIZATION CHART



APPENDIX 4

METEOROLOGICAL DATA IN APIA

MAX. TEMPERATURE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Spt	Oct	Nov	Dec
1941	31.9	31.8	31.3	31.7	31.1	31.6	29.8	30.8	31.0	30.8	32.4	32.4
1942	32.8	32.7	31.6	30.9	31.8	31.1	29.9	30.1	30.9	30.2	30.4	30.5
1943	30.8	30.9	31.2	31.2	30.3	30.2	30.1	30.1	30.2	30.9	32.1	31.0
1944	32.3	30.5	31.0	31.7	30.8	30.3	30.7	30.2	30.3	30.1	30.5	31.2
1945	31.2	31.0	31.0	32.0	30.7	30.9	29.9	30.1	30.0	31.0	31.2	31.2
1946	31.7	31.4	32.1	32.2	32.1	31.2	31.0	30.7	31.5	31.8	31.9	31.9
1947	31.9	32.7	32.8	32.6	32.4	31.6	31.6	31.5	31.4	31.4	31.4	31.1
1948	33.8	31.6	32.2	31.8	32.0	31.8	30.8	30.8	30.7	31.9	31.7	31.1
1949	31.6	31.9	32.2	31.8	31.6	30.9	31.6	30.4	31.3	30.8	31.8	31.0
1950	31.9	31.1	31.6	31.8	31.6	30.3	29.9	30.3	31.1	31.4	31.4	31.3
1951	31.0	31.9	31.3	32.3	31.6	31.1	30.8	31.2	30.9	30.7	31.6	32.2
1952	33.3	32.3	32.3	31.4	31.7	31.3	30.6	30.6	31.0	31.3	31.5	32.4
1953	31.8	32.1	32.8	32.2	32.7	31.2	30.4	30.6	31.6	31.7	32.3	32.2
1954	31.6	32.4	30.7	31.2	31.6	30.9	31.1	31.2	30.6	31.1	31.2	31.1
1955	31.3	31.2	31.0	31.6	31.1	30.6	30.3	29.8	29.9	30.2	31.1	30.4
1956	31.1	30.1	31.0	31.8	31.1	30.8	29.9	30.3	30.6	31.0	31.4	31.7
1957	31.1	31.7	31.8	31.4	31.7	31.2	30.2	31.6	30.8	31.1	31.7	31.1
1958	32.2	32.1	32.8	32.3	32.0	30.7	31.6	31.3	30.7	31.3	31.7	32.2
1959	32.0	32.7	31.8	31.9	32.0	31.8	31.3	30.6	31.4	31.1	31.6	31.6
1960	31.7	31.8	31.7	30.4	32.2	30.9	30.2	30.7	30.8	31.3	31.6	31.3
1961	31.6	31.6	31.8	31.7	31.2	30.4	30.3	30.3	30.5	30.4	30.7	31.2
1962	31.1	31.7	31.9	31.7	31.0	31.1	30.6	30.0	30.5	30.0	31.1	31.4
1963	31.1	31.7	31.2	31.4	31.9	31.6	30.6	31.1	31.1	31.6	31.4	31.7
1964	32.2	32.8	32.2	31.9	30.9	30.7	30.1	30.2	30.5	30.7	30.6	30.3
1965	32.1	30.9	32.3	31.2	31.2	30.5	30.7	30.6	30.8	30.7	31.7	31.9
1966	31.9	31.7	32.8	31.6	31.3	31.0	30.4	30.6	30.4	31.2	31.7	31.5
1967	31.1	31.1	31.6	30.6	30.7	31.0	30.7	29.6	30.6	30.6	30.8	31.2
1968	32.8	31.6	31.9	31.0	30.6	30.7	29.6	30.1	30.0	31.1	31.5	31.7
1969	32.3	32.3	31.7	31.3	30.8	31.6	30.6	30.6	30.6	31.7	31.9	31.7
1970	32.4	32.2	31.6	31.7	32.2	30.8	30.7	30.7	31.2	30.6	30.8	30.6
1971	31.4	31.7	30.5	30.7	30.6	30.7	30.3	29.8	29.9	30.3	32.0	31.5
1972	30.8	31.3	31.5	31.3	31.6	31.1	30.4	30.2	30.2	31.3	31.2	31.2
1973	31.4	31.6	32.0	31.6	31.9	31.2	30.6	30.0	30.8	30.3	30.4	30.5
1974	32.0	31.0	30.6	31.0	30.5	30.1	30.5	30.1	30.4	30.6	30.7	30.7
1975	33.4	30.8	31.3	30.8	30.9	30.1	30.5	30.1	30.4	30.6	30.7	30.7
1976	30.2	31.0	31.7	31.2	30.8	30.9	30.1	31.2	30.4	31.5	31.6	31.4
1977	31.3	31.8	31.9	32.2	31.9	31.3	30.6	30.2	30.6	31.4	31.6	32.4
1978	30.9	33.4	32.1	31.8	31.9	31.0	31.2	31.5	31.4	31.6	31.5	32.0
1979	32.0	32.0	31.8	32.0	32.3	31.9	31.2	32.1	31.4	32.0	31.4	32.2
1980	32.0	32.1	32.0	33.2	31.1	31.6	30.9	30.8	31.0	31.2	32.6	32.8
1981	32.2	32.8	32.1	-	-	-	31.3	31.0	31.3	31.2	32.0	32.0
1982	31.6	31.4	32.8	32.6	32.6	32.2	31.4	30.9	31.8	32.8	31.5	32.4
1983	32.5	33.6	33.0	32.8	32.4	32.1	31.3	30.4	31.2	32.0	32.2	32.4
1984	31.6	32.0	32.3	32.1	32.1	31.9	30.6	30.6	31.0	32.4	32.0	31.5
1985	33.0	31.5	32.9	32.5	32.0	31.5	30.7	31.2	-	-	-	-
Max.	33.8	33.6	33.0	33.2	32.7	32.2	31.6	32.1	31.8	32.8	32.6	32.8

Recorded Max. Temp.: 33.8 Jan. 1948

Source : EPC

METEOLOLOGICAL DATA IN APIA

MIN. TEMPERATURE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Spt	Oct	Nov	Dec
1941	21.6	23.1	22.0	22.9	22.0	21.5	20.1	21.6	21.7	19.8	22.2	21.6
1942	22.8	23.9	23.8	21.6	21.8	21.7	20.1	22.0	20.2	21.6	21.2	21.8
1943	22.7	23.0	22.6	23.9	22.7	20.9	20.9	20.0	21.3	21.9	22.5	22.9
1944	22.5	22.7	23.0	22.0	22.0	22.8	20.1	21.0	22.6	20.1	22.2	21.8
1945	21.5	22.9	22.5	22.9	21.8	21.8	22.8	20.0	21.8	22.8	21.8	23.0
1946	22.9	22.8	22.8	22.2	22.6	21.7	19.7	20.8	20.9	20.8	22.9	20.7
1947	22.4	22.9	21.9	22.7	20.8	21.8	21.3	19.5	21.0	20.1	22.6	22.1
1948	21.7	22.9	22.3	22.4	22.7	20.8	19.7	19.7	20.6	21.9	21.3	21.7
1949	21.6	22.7	22.0	22.2	21.7	20.0	18.8	20.6	22.0	20.7	21.9	22.7
1950	22.2	21.9	21.9	21.8	21.7	20.9	20.5	20.8	19.7	20.9	21.3	21.4
1951	22.9	21.9	22.8	23.8	21.1	21.6	17.9	19.4	19.7	19.8	21.1	20.8
1952	22.7	22.6	22.2	20.7	20.6	20.8	20.9	20.0	19.7	20.6	21.7	22.7
1953	22.0	22.6	23.8	22.3	21.1	20.7	19.9	19.8	18.7	21.7	21.9	20.6
1954	21.7	22.3	21.6	21.1	21.1	21.8	19.0	21.6	21.1	21.7	21.6	22.0
1955	21.7	21.7	21.1	21.3	21.5	21.7	21.6	20.3	20.1	21.6	21.0	21.6
1956	20.6	21.6	21.7	21.9	21.0	19.5	19.9	20.6	19.8	20.5	20.8	21.4
1957	21.7	21.8	21.6	22.6	20.5	19.6	19.7	18.7	20.0	20.0	20.7	20.8
1958	21.7	21.8	22.7	23.4	21.6	20.9	17.7	18.9	19.6	20.3	21.9	21.5
1959	21.9	22.9	22.6	22.9	21.9	20.6	19.6	21.0	19.9	22.2	21.9	22.9
1960	21.9	22.6	22.8	23.6	22.1	20.9	19.9	20.7	19.6	20.6	21.5	22.8
1961	22.2	22.1	21.7	21.9	22.7	20.3	19.7	20.8	21.7	20.7	22.7	21.7
1962	22.2	23.6	22.8	22.2	22.0	19.6	20.6	20.6	21.7	20.6	21.7	21.7
1963	21.9	22.8	22.2	21.6	21.7	19.9	20.6	21.9	20.8	21.8	21.2	21.7
1964	21.1	22.8	22.7	22.1	20.4	20.3	19.6	19.4	20.9	21.3	20.6	21.7
1965	21.7	19.4	21.6	22.3	21.8	19.7	18.6	20.0	21.6	21.9	20.1	21.0
1966	22.9	21.6	22.2	21.1	22.3	21.6	20.8	18.6	19.9	21.7	21.7	19.9
1967	20.6	21.2	21.9	21.7	21.1	20.5	20.0	18.3	21.1	20.6	20.8	20.8
1968	21.9	22.3	22.7	19.5	21.0	20.7	21.6	19.4	19.4	21.7	20.8	21.7
1969	22.3	22.8	22.5	22.8	21.0	20.9	20.0	20.8	19.8	22.1	22.8	21.7
1970	21.7	21.1	22.7	22.1	21.5	22.8	19.6	20.4	18.1	21.2	21.6	21.5
1971	21.1	22.0	22.4	22.0	21.6	20.4	19.7	19.6	19.2	21.6	20.8	22.2
1972	21.9	21.9	21.6	22.4	20.8	21.6	20.2	20.3	21.9	20.5	21.6	23.0
1973	21.0	22.6	23.6	22.8	22.1	20.8	20.5	20.4	20.2	20.9	21.4	22.1
1974	22.1	21.1	21.6	21.3	19.6	19.6	19.1	21.4	20.0	20.4	19.3	21.6
1975	21.4	21.6	22.5	22.4	21.1	20.3	20.4	20.3	20.6	21.0	21.4	22.0
1976	20.4	21.5	22.0	22.5	21.6	20.9	20.2	19.8	18.7	21.4	21.8	20.7
1977	20.2	22.4	21.2	21.1	19.5	18.9	19.3	18.9	19.1	21.6	21.7	21.3
1978	22.6	21.4	21.5	22.2	21.6	20.7	19.2	20.7	19.2	21.5	19.2	22.0
1979	21.9	21.9	22.4	21.4	21.2	22.1	24.0	18.1	20.5	21.2	21.5	20.9
1980	21.5	23.2	22.7	21.5	20.5	19.1	21.2	21.9	21.9	21.9	18.5	19.0
1981	19.6	18.1	19.5	-	-	-	17.5	14.7	17.5	20.5	20.1	20.5
1982	23.0	21.4	22.4	23.0	22.0	20.9	20.2	20.4	20.4	20.1	21.4	21.0
1983	21.7	23.5	22.6	20.8	21.7	20.2	20.1	18.5	21.0	22.0	21.1	22.6
1984	20.9	22.5	23.1	22.7	20.8	20.3	19.0	20.4	20.5	20.3	21.8	22.4
1985	21.9	22.9	22.3	21.9	22.1	21.5	20.5	21.3	-	-	-	-
Min.	19.6	18.1	19.5	19.5	19.5	18.9	17.5	14.7	17.5	19.8	18.5	19.0

Recorded Min. Temp. : 14.7 Aug. 1981

Source : EPC

METEOROLOGICAL DATA IN APIA

GAST WIND VELOCITY (Knots)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Spt	Oct	Nov	Dec
1941	25	39	55	35	33	30	34	30	35	38	50	33
1942	30	38	36	39	28	43	44	41	41	38	29	33
1943	32	26	41	31	28	20	35	36	38	36	28	33
1944	42	33	35	32	32	29	36	38	42	37	28	29
1945	34	36	40	38	29	37	31	32	41	41	33	30
1946	33	38	26	26	29	38	31	39	32	33	30	46
1947	36	26	36	42	36	36	42	39	45	38	27	36
1948	42	42	42	36	35	41	41	36	37	39	32	49
1949	25	39	41	29	44	38	37	41	39	37	37	37
1950	44	41	38	35	32	43	28	34	35	34	31	44
1951	30	41	32	29	30	36	33	29	38	42	36	29
1952	38	37	36	34	34	43	35	31	43	47	27	39
1953	29	35	29	36	38	33	45	29	29	37	42	25
1954	36	42	39	36	43	34	44	37	41	44	35	34
1955	32	46	33	32	39	35	35	45	51	41	35	42
1956	39	38	33	35	30	39	39	33	37	34	29	34
1957	34	65	31	33	28	42	35	34	30	34	34	47
1958	44	31	44	29	48	33	32	36	32	37	33	27
1959	37	42	37	32	33	33	37	32	38	41	34	39
1960	52	34	39	34	36	38	39	35	34	32	33	38
1961	34	43	53	32	35	45	34	29	41	43	31	28
1962	41	37	38	29	43	35	29	47	42	35	31	46
1963	31	34	42	39	31	39	29	34	31	31	33	33
1964	37	34	40	44	33	39	33	37	37	39	33	28
1965	33	33	31	35	36	44	41	33	36	36	28	30
1966	82	35	33	36	34	43	32	33	41	30	33	35
1967	52	37	35	38	35	36	41	52	36	38	36	42
1968	40	78	34	42	28	37	39	28	32	40	31	31
1969	43	43	39	35	39	28	34	32	33	32	34	36
1970	51	47	41	33	32	38	39	36	35	34	28	30
1971	32	28	38	41	34	44	31	33	39	38	35	41
1972	40	32	30	36	29	36	32	38	38	37	36	51
1973	47	37	30	36	36	38	33	36	34	39	38	33
1974	41	37	45	34	42	41	37	28	39	34	35	44
1975	52	36	38	38	34	38	43	37	38	33	38	40
1976	36	42	39	-	-	-	-	-	28	34	30	40
1977	42	32	34	41	33	37	37	31	40	-	-	43
1978	41	30	35	23	35	31	34	30	37	35	38	43
1979	42	35	32	40	30	39	36	32	35	40	34	37
1980	33	44	42	32	27	41	32	36	36	35	26	32
1981	37	46	45	-	-	-	-	32	33	45	35	30
1982	-	49	-	25	38	33	31	-	29	28	38	22
1983	23	-	28	32	32	43	36	34	36	30	26	35
1984	29	36	33	31	33	38	34	38	31	33	28	38
1985	32	29	35	35	43	33	36	32	-	-	-	-
Max.	82	78	55	44	48	45	45	52	51	47	50	51
m/sec	42	40	28	23	25	23	23	27	26	24	26	26

Recorded Max. Gast Wind Velocity:82Knots(42m/sec)

Source : EPC

Knot=1853M/h= 0.5147 m/sec

METEOROLOGICAL DATA IN APIA

DAYS WITH THUNDER

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Spt	Oct	Nov	Dec	Total
1941	5	5	5	3	2	1	0	1	1	3	2	6	34
1942	7	9	20	10	4	2	1	3	5	4	6	9	80
1943	4	7	6	5	9	0	1	0	2	3	17	13	67
1944	6	5	6	5	4	2	0	1	1	1	0	3	34
1945	5	0	2	2	3	4	1	8	1	4	7	3	40
1946	7	2	13	7	6	1	0	0	0	7	19	14	76
1947	13	10	14	12	8	9	5	2	8	6	8	11	106
1948	7	6	10	9	9	2	1	1	1	6	5	11	68
1949	10	11	3	9	14	3	4	3	5	14	6	9	91
1950	8	13	2	10	14	5	4	2	1	11	15	12	97
1951	6	12	3	15	11	8	0	0	0	8	9	11	83
1952	1	15	9	6	5	3	0	3	2	8	4	12	68
1953	7	7	8	16	7	2	2	0	0	6	5	4	64
1954	8	8	3	11	9	9	2	4	3	17	14	7	95
1955	10	9	4	3	3	2	0	5	3	14	19	19	91
1956	9	5	9	7	1	5	0	0	0	4	3	8	51
1957	5	2	7	9	5	3	3	0	0	0	4	3	41
1958	2	4	13	9	3	0	1	1	3	2	3	4	45
1959	2	2	8	8	8	1	2	3	3	6	6	6	55
1960	1	3	2	6	5	1	0	0	3	3	7	11	42
1961	11	12	5	5	2	6	0	1	1	7	8	7	65
1962	8	3	9	13	11	6	2	8	0	8	6	7	81
1963	10	13	11	12	5	2	3	0	1	6	4	4	71
1964	6	6	9	15	8	13	1	2	5	5	4	6	80
1965	4	4	5	10	10	5	2	0	0	5	3	7	55
1966	8	4	10	9	12	6	3	5	4	5	13	13	92
1967	8	11	9	7	3	4	5	2	1	5	11	5	71
1968	6	8	9	8	10	1	2	1	0	8	4	10	67
1969	6	8	16	6	5	1	4	2	3	11	10	13	85
1970	14	4	7	2	5	4	1	3	3	6	13	3	65
1971	9	7	4	7	7	2	0	0	2	3	12	8	61
1972	5	10	11	11	1	1	1	0	0	6	3	3	52
1973	5	3	5	10	5	3	2	7	6	8	6	5	65
1974	5	3	9	5	10	3	0	0	3	7	7	7	59
1975	4	11	14	6	13	2	6	2	0	5	2	4	69
1976	1	6	7	7	5	2	0	0	0	3	10	8	49
1977	11	7	6	6	4	2	2	0	0	0	4	5	47
1978	12	8	2	3	1	3	3	1	1	2	1	5	42
1979	3	10	4	6	3	0	0	0	4	1	2	3	36
1980	6	5	5	3	3	5	0	0	0	5	0	0	32
1981	11	0	0	-	-	-	1	2	2	0	11	9	36
1982	2	4	3	6	2	0	0	0	1	3	0	2	23
1983	1	0	3	1	0	0	0	0	0	5	3	5	18
1984	4	1	2	3	3	5	0	0	1	0	2	8	29
1985	3	1	3	10	3	1	2	2	-	-	-	-	25

Maximum Thunder Days/year: 106 in 1947

Souce : EPC

Mean Thunder Days/year: 60

WIND PRESSURE IN WESTERN SAMOA

Wind pressures on conductor and support

Calculation Formula for Wind Pressure specified in JEC Standard JEC-127

$P = C \times p \times a \times b \times K1 \times k2$

where C:Wind Coeficient

For conductor	1.2	Re=0.013 x 46/1.46 x 10^-5=40,959<Re=400,000
For pole	0.75	Re=0.4 x 67/1.46 x10^-5=1,260,274>Re=400,000

C is selected as below;

In case Reynolds Factor (Re=d x V/u) is more than 400,000 then C=1.2, if less C=0.75

Re=d x V/u V:Wind velicity (m/s),
u:Viscosity of air 1.46 x 10^-5(sq.m/s)
d: Diameter

p: Basic wind pressure p=(1/2) x d x V^2

d: Air Dencity (kg*s/m^4) 0.115

V: Gust Wind Velocity (m/s) 46

The wind velocity complyed with the existing wind presure 500 Pa for conductors is calculated at 29 m/sec according to the formula mentioned above, while the recorded maximum gust velocity was 42 m/sec (82 knot in 1966). Ratio of the maximum gust and the calculated above (29 m/sec) is 1.448.
Referring to the above result, wind velocity considering cyclone like Val is recommended to be 46 m/sec (Gust velocity of Val 67 m/sec/1.448)
If safety factor is 4.0 with wind velocity 46 m/sec, the factor will be reduced to 1.8 with the velocity 67 m/sec, and poles are expected to withstand such heavey gust wind.

a:	Coefficient due to height	1
b:	Coefficient due to material f	1
K1:	Coefficient of structure	0.9
K2:	Coefficient of shielding	0.9

P: Conductor	1.2 x (1/2) x 0.115 x 46 x 46 x 1 x 1 x 0.9 x 0.9	118 kg/sq.m
Support	0.75 x (1/2) x 0.115 x 46 x 46 x 1 x 1 x 0.9 x 0.9	643 kg/sq.m

ENERGY GENERATED AND CONSUMED

Years	Unit	1981	1982	1983	1984	1985	1986	1987	1988
UPOLU SYSTEM									
Generated	(GWH)	29.790	30.279	31.104	32.952	34.764	35.950	38.254	41.284
Consumed	(GWH)	24.455	24.478	25.426	27.595	27.712	30.037	32.078	35.144
Auxiliaries	(GWH)	0.336	0.269	0.243	0.253	0.620	0.721	0.642	0.642
Losses	(GWH)	4.999	5.532	5.435	5.104	5.432	5.191	5.534	5.499
Losses	% on gen	16.8	18.3	17.5	15.5	15.6	14.4	14.5	13.3
SAVAII SYSTEM									
Salelologa System									
Generated	(GWH)	0.801	0.898	0.883	0.853	1.017	1.308	1.460	1.401
Consumed	(GWH)	0.748	0.717	0.679	0.660	0.818	1.108	1.144	1.371
Auxiliaries	(GWH)	0.009	0.010	0.010	0.018	0.014	0.019	0.044	0.068
Losses	(GWH)	0.043	0.171	0.194	0.175	0.185	0.181	0.271	-0.038
Losses	% on gen	5.5	19.1	22.0	20.5	18.2	13.8	18.6	-2.7
Asau System									
Generated	(GWH)	0	0	0	0	0	0.557	0.512	0.712
Consumed	(GWH)	0	0	0	0	0	0.342	0.411	0.576
Auxiliaries	(GWH)	0	0	0	0	0	0.000	0.000	0.000
Losses	(GWH)	0	0	0	0	0	0.214	0.101	0.141
Losses	% on gen	0	0	0	0	0	38.4	19.7	19.7
TOTAL ALL SYSTEM									
Generated	(GWH)	30.591	31.177	31.987	33.805	35.781	37.815	40.226	43.463
Consumed	(GWH)	25.203	25.195	26.105	28.255	28.53	31.487	33.633	37.091
Auxiliaries	(GWH)	0.345	0.279	0.253	0.271	0.634	0.74	0.686	0.710
Losses	(GWH)	5.042	5.703	5.629	5.279	5.617	5.586	5.906	5.602
Losses	% on gen	16.48	18.29	17.60	15.62	15.70	14.77	14.70	12.89

Note;

1 Commencing 1984 figures for Energy Consumed have been reconciled for the period 1, Jan. to 31, Dec. Energy consumed may therefore differ from energy sold figures shown in Table X. Period to 1984 system loss figures may vary due to the intervals between readings of consumers revenu meters.

2 Energy generated by the Asau plant of Samoa Forest Product Ltd. for Public Supply is not yet separated.

Source : EPC

ENERGY SOLD BY CONSUMER CATEGORIES

Years	Unit	1981	1982	1983	1984	1985	1986	1987	1988
UPOLU SYSTEM									
Domestic	(GWH)	9,259	6,514	7,051	7,340	7,404	8,291	8,912	9,986
Industrial	(GWH)	1,626	2,921	3,376	3,887	3,727	3,650	3,798	4,037
Commercial	(GWH)	5,399	11,782	10,098	12,278	12,289	12,688	13,455	15,015
Hotel	(GWH)	1,723	1,554	1,395	1,675	1,684	1,701	1,707	1,788
Regigious	(GWH)	-	574	1,006	1,545	2,032	2,188	2,298	2,416
Schools	(GWH)	-	948	1,279	1,313	1,298	1,290	1,398	1,627
Street Lights	(GWH)	176	185	222	228	263	250	281	261
Sub-total		18,183	24,478	24,427	28,266	28,697	30,058	31,849	35,130
Ratio			34.6	-0.2	15.7	1.5	4.7	6.0	10.3
SAVAII SYSTEM									
Salelologa System									
Domestic	(GWH)	284	292	253	288	367	489	595	743
Industrial	(GWH)	0	0	0	0	0	0	0	0
Commercial	(GWH)	214	382	367	349	389	484	512	513
Hotel	(GWH)	10	8	12	12	10	7	11	9
Regigious	(GWH)	0	12	22	23	27	38	42	64
Schools	(GWH)	0	8	10	8	11	17	24	25
Street Lights	(GWH)	13	14	15	15	15	15	12	14
Sub-total		521	716	679	695	819	1,050	1,196	1,368
Ratio			37.4	-5.2	2.4	17.8	28.2	13.9	14.4
Asau System									
Domestic	(GWH)	0	31	41	41	91	121	168	289
Industrial	(GWH)	0	0	1	0	0	0	0	0
Commercial	(GWH)	0	16	90	88	135	154	160	194
Hotel	(GWH)	0	1	0	13	31	25	51	45
Regigious	(GWH)	0	3	2	3	9	7	11	20
Schools	(GWH)	0	0	0	0	0	0	1	0
Street Lights	(GWH)	0	0	0	0	0	0	0	0
Sub-total		0	51	134	145	266	307	391	548
Ratio				163.5	7.9	83.4	15.4	27.3	40.3
TOTAL ALL SYSTEM									
Domestic	(GWH)	9,543	6,836	7,346	7,668	7,862	8,901	9,735	11,018
Industrial	(GWH)	1,626	2,921	3,377	3,887	3,727	3,645	3,798	4,037
Commercial	(GWH)	5,613	12,180	11,555	12,715	12,813	13,324	14,126	15,721
Hotel	(GWH)	1,733	1,563	1,407	1,700	1,725	1,733	1,769	1,842
Regigious	(GWH)	0	590	1,030	1,571	2,068	2,234	2,350	2,500
Schools	(GWH)	0	957	1,289	1,320	1,309	1,307	1,422	1,652
Street Lights	(GWH)	188	199	237	243	292	265	293	275
Total		18,703	25,246	26,241	29,104	29,796	31,409	33,493	37,045
Ratio			35.0	3.9	10.9	2.4	5.4	6.6	10.6

Note:

1 Energy sold means read from consumer revenue metersfor the period of Jan.1 to Dec.31. This may vary from consumption figures shownin Tables VI and VII.

2 Consumption on street lighting is an estimate basing on the number of lights,rating of the lights and hours of operation.

3 Consumers connected to the Public Supply from Asau mill of SFP have been included from 1982.

NUMBERS OF CONSUMERS BY CATEGORIES

Year	Unit	1,981	1982	1983	1984	1985	1986	1987	1988
UPOLU SYSTEM									
Domestic	(Nos)	6,319	6,243	6,508	6,869	7,061	7,506	7,708	7,870
Industrial	(Nos)	88	79	82	67	64	68	58	56
Commercial	(Nos)	719	718	761	673	655	707	674	632
Hotels	(Nos)	4	4	5	11	11	12	11	10
Government Dept.		202	0	0	0	0	0	0	0
Religious Bodies	(Nos)	0	207	230	227	233	233	233	232
Schools	(Nos)	0	109	116	93	88	93	96	98
Total	(Nos)	7,332	7,360	7,702	7,940	8,112	8,619	8,780	8,898
SAVAII SYSTEM									
Salelologa System									
Domestic	(Nos)	702	684	661	688	978	1,154	1,282	1,419
Industrial	(Nos)	0	0	0	0	0	0	0	0
Commercial	(Nos)	25	41	40	45	52	57	62	67
Hotels	(Nos)	1	1	1	2	2	2	2	2
Government Dept.		17	0	0	0	0	0	0	0
Religious Bodies	(Nos)	0	25	28	31	41	53	64	66
Schools	(Nos)	0	2	2	4	5	8	10	10
Total	(Nos)	745	753	732	770	1,078	1,274	1,420	1,564
Asau System									
Domestic	(Nos)	0	55	93	135	224	286	494	738
Industrial	(Nos)	0	0	1	0	0	0	0	0
Commercial	(Nos)	0	2	16	17	24	36	28	31
Hotels	(Nos)	0	1	1	2	2	2	2	2
Government Dept.		0	0	0	0	0	0	0	0
Religious Bodies	(Nos)	0	1	5	7	11	13	21	31
Schools	(Nos)	0	0	0	0	0	1	1	3
Total	(Nos)	0	59	116	161	261	338	546	805
TOTAL ALL SYSTEM									
Domestic	(Nos)	7,021	6,982	7,262	7,692	8,263	8,946	9,484	10,027
Industrial	(Nos)	88	79	83	67	64	68	58	56
Commercial	(Nos)	744	761	817	735	731	800	764	730
Hotels	(Nos)	5	6	7	15	15	16	15	14
Government Dept.		219	0	0	0	0	0	0	0
Religious Bodies	(Nos)	0	233	263	265	285	299	318	329
Schools	(Nos)	0	111	118	97	93	102	107	111
Total	(Nos)	8,077	8,172	8,550	8,871	9,451	10,231	10,746	11,267

Notes:

1 A consumer is defined as a metering point. Some organisations have more than one metering point. Some apparent reduction in the number of consumers may
2 appear as a result of converting consumers to a single point.
In 1982, Government Department were re-classified according to the nature of their function and new categories were introduced for Religious and Charitable
3 Bodies and for Schools.
Consumers connected to the Public Supply from the Asau mill of Samoa Forest
4 Product Ltd have been included from 1982.
In 1984, Guest Houses were re-classified from domestic to Hoteles.

APPENDIX 4-9 Power Demand Forecast on Upolu Island

Feb. 1992

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Domestic Demand																									
Population	[Based on Census in 1986]					112,478	113,603	114,739	115,886	117,045	118,216	119,398	120,592	121,798	123,016	124,246	125,488	126,743	128,010	129,291	130,583	131,889	133,208	134,540	135,886
Electrification Ratio in %						75	75	75	*75*	*75*	*75*	*75*	*88.8*	*92*	*93*	*93*	*94*	*94*	*95*	*95*	*95*	*95*	*95*	*95*	*95*
Population in electrified Areas						84,359	85,202	86,054	86,915	87,784	88,662	89,548	107,085	112,054	114,404	115,548	117,959	119,138	121,610	122,826	124,054	125,295	126,548	127,813	129,091
Numbers of Consumer	6,319	6,243	6,508	6,869	7,061	7,506	7,708	7,870	7,901	7,980	8,060	8,141	9,735	10,187	10,400	10,504	10,724	10,831	11,055	11,166	11,278	11,390	11,504	11,619	11,736
Number of Family per Consumer						11	11	11	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*
Power Consumption (MWh)	9,259	6,514	7,051	7,340	7,404	8,291	8,912	9,986	10,114	7,650	8,113	8,604	11,317	13,027	13,965	14,810	15,875	16,835	18,044	19,135	20,293	21,521	22,823	24,204	25,668
Power Demand per Consumer (kWh)	1,465	1,043	1,083	1,069	1,049	1,105	1,156	1,269	1,280	959	1,007	1,057	1,163	1,279	1,343	1,410	1,480	1,554	1,632	1,714	1,799	1,889	1,984	2,083	2,187
Increment per Consumer	-	0.712	1.038	0.986	0.981	1.053	1.047	1.097	1.009	0.749	1.050	1.050	1.100	1.100	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Annual Increment Ratio		0.704	1.092	1.041	1.009	1.120	1.075	1.121	1.013	0.756	1.061	1.061	1.315	1.151	1.072	1.061	1.072	1.061	1.072	1.061	1.061	1.061	1.061	1.061	1.061
Industrial Demand																									
Power Consumption (MWh)	1,626	2,921	3,376	3,887	3,727	3,650	3,798	4,037	4,037	4,502	4,801	5,121	5,462	5,825	6,213	6,627	7,068	7,538	8,040	8,575	9,146	9,755	10,404	11,096	11,835
Numbers of Consumer	88	79	82	67	64	68	58	56	56	56	57	57	58	58	59	59	60	61	61	62	62	63	64	64	65
Annual Increment per Consumer	-	0.898	1.038	0.817	0.955	1.063	0.853	0.966	*1.000*	*1.000*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*
Consumed Energy per Consumer (kWh)	18,477	36,975	41,171	58,015	58,234	53,676	65,483	72,089	76,126	80,389	84,891	89,645	94,665	99,966	105,565	111,476	117,719	124,311	131,273	138,624	146,387	154,584	163,241	172,383	182,036
Annual Increment Ratio per Consumer	-	2.001	1.113	1.409	1.004	0.922	1.220	1.101	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*	*1.056*
Commercial Demand																									
Power Consumption (MWh)	5,399	11,782	10,098	12,278	12,289	12,688	13,455	15,015	15,526	16,053	16,599	17,164	17,747	18,351	18,974	19,620	20,287	20,976	21,690	22,427	23,190	23,978	24,793	25,636	26,508
Numbers of Consumer	713	718	761	673	655	707	707	707	707	707	707	707	707	707	707	707	707	707	707	707	707	707	707	707	707
Annual Increment Ratio per Consumer	-	1.007	1.060	0.884	0.973	1.079	1.000	1.000	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Consumed Energy per Consumer (kWh)	7,572	16,409	13,269	18,244	18,762	17,946	19,031	21,238	21,960	22,706	23,478	24,277	25,102	25,955	26,838	27,750	28,694	29,670	30,678	31,721	32,800	33,915	35,068	36,261	37,493
Annual Increment Ratio per Consumer	-	2.167	0.809	1.375	1.028	0.957	1.060	1.116	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*
Hotel Demand																									
Power Consumption (MWh)	1,723	1,554	1,395	1,675	1,684	1,701	1,707	1,788	1,824	1,860	1,897	1,935	1,974	2,014	2,054	2,095	2,137	2,180	2,223	2,268	2,313	2,359	2,406	2,455	2,504
Numbers of Consumer	4	4	5	11	11	12	11	10	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*10*
Consumed Energy per Consumer (kWh)	430,750	388,500	279,000	152,273	153,091	141,750	155,182	178,800	182,376	186,024	189,744	193,539	197,410	201,358	205,385	209,493	213,683	217,956	222,315	226,762	231,297	235,923	240,641	245,454	250,363
Annual Increment Ratio per Consumer	-	0.902	0.718	0.546	1.005	0.926	1.095	1.152	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*
Regional Demand																									
Power Consumption (MWh)		574	1006	1545	2032	2188	2,298	2,416	2,699	3,015	3,368	3,762	4,202	4,694	5,244	5,857	6,543	7,309	8,165	9,120	10,188	11,381	12,713	14,201	15,863
Numbers of Consumer	-	207	230	227	233	233	235	238	240	242	245	247	250	252	255	257	260	263	265	268	271	273	276	279	281
Annual Increment Ratio per Consumer	-	-	1.111	0.987	1.026	1.000	1.010	1.010	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*
Consumed Energy per Consumer (kWh)	-	2,773	4,374	6,806	8,721	9,391	9,765	10,165	11,242	12,434	13,752	15,210	16,822	18,605	20,577	22,758	25,171	27,839	30,790	34,053	37,663	41,655	46,071	50,954	56,355
Annual Increment Ratio per Consumer	-	-	1.577	1.556	1.281	1.077	1.040	1.041	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*	*1.106*
School Demand																									
Power Consumption (MWh)		948	1,279	1,313	1,298	1,290	1,398	1,627	1,691	1,813	1,914	2,021	2,133	2,252	2,378	2,510	2,650	2,797	2,953	3,117	3,291	3,474	3,668	3,872	4,088
Numbers of Consumer	-	109	116	93	88	98	99	100	102	104	106	108	110	112	114	116	118	121	123	125	128	130	133	135	138
Annual Increment Ratio per Consumer	-	-	1.064	0.802	0.946	1.114	1.010	1.010	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*	*1.019*
Consumed Energy per Consumer (kWh)	-	8,697	11,026	14,118	14,750	13,163	14,124	16,275	16,861	17,468	18,097	18,748	19,423	20,122	20,847	21,597	22,375	23,180	24,015	24,879	25,775	26,703	27,664	28,660	29,692
Annual Increment Ratio per Consumer	-	-	1.268	1.280	1.045	0.892	1.073	1.152	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*	*1.036*
Street Lighting																									
Power Consumption (MWh)	176	185	222	228	263	250	281	261	270	279	289	298	308	319	330	341	353	365	377	390	403	417	431	446	461
Annual Increse	-	1.051	1.200	1.027	1.154	0.951	1.124	0.929	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*	*1.034*
Total Power Consumption (MWh)	18,183	24,478	24,427	28,266	28,697	30,058	31,849	35,130	36,161	35,172	36,981	38,905	43,145	46,482	49,157	51,860	54,911	58,000	61,491	65,033	68,824	72,884	77,238	81,909	86,926
System Loss (MWh)	4,999	5,532	5,435	5,104	5,432	5,191	5,534	5,499	*5,750*	*5,557*	*5,806*	*6,069*	*6,687*	*7,158*	*7,521*	*7,883*	*8,292*	*8,700*	*9,162*	*9,625*	*10,117*	*10,714*	*11,354*	*12,041*	*12,778*
Loss Factor (%)	27.49	22.60	22.25	18.06	18.93	17.27	17.38	15.65	*15.90*	*15.80*	*15.70*	*15.60*	*15.50*	*15.40*	*15.30*	*15.20*	*15.10*	*15.00*	*14.90*	*14.80*	*14.70*	*14.70*	*14.70*	*14.70*	*14.70*
Total System Demand (MWh)	23,182	30,010	29,862	33,370	34,129	35,249	37,383	40,629	41,910	40,730	42,787	44,974	49,832	53,640	56,679	59,742	63,203	66,700	70,653	74,658	78,941	83,598	88,592	93,950	99,704
Load Factor	0.55	0.55	0.56	0.56	0.56	0.57	0.57	0.57	0.57	0.58	0.58	0.58	0.58	0.58	0.59	0.59	0.59	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.60
Peak Power (kW)	4,812	6,229	6,087	6,802	6,957	7,059	7,487	8,137	8,393	8,016	8,421	8,852	9,808	10,557	10,966	11,559	12,229	12,905	13,670	14,204	15,019	15,905	16,855	17,875	18,970
Annual Increment Ratio	-	1.295	0.995	1.117	1.023	1.033	1.061	1.087	1.032	0.972	1.051	1.051	1.108	1.076	1.057	1.054	1.058	1.055	1.059	1.057	1.057	1.059	1.060	1.060	1.061

Consumed energy from 1981 to 1988, demand thereafter has been forecasted.

APPENDIX 4-10 Power Demand Forecast on Savaii Island

Feb. 1992

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Domestic Demand																									
Population	[Based on Census in 1986]					44,930	45,379	45,833	46,291	46,754	47,222	47,694	48,171	48,653	49,139	49,631	50,127	50,628	51,135	51,646	52,162	52,684	53,211	53,743	54,280
Electrification Ratio in %						70	70	70	*70*	*70*	*70*	*70*	*78.9*	*90*	*91*	*91*	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*
Population in electrified Areas						31,451	31,766	32,083	32,404	32,728	33,055	33,386	38,007	43,787	44,717	45,164	46,117	46,578	47,044	47,514	47,989	48,469	48,954	49,443	49,938
Numbers of Consumer	702	739	754	823	1,202	1,440	1,776	2,157	1,800	1,818	1,836	1,855	2,111	2,433	2,484	2,509	2,562	2,588	2,614	2,640	2,666	2,693	2,720	2,747	2,774
Number of Family per Consumer						22	18	18	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*
Power Consumption (MWh)	284	323	294	329	458	610	763	832	860	427	453	480	618	805	863	915	981	1,040	1,103	1,170	1,241	1,316	1,395	1,480	1,569
Power Demand per Consumer (kWh)	405	437	390	400	381	424	430	386	478	235	247	259	293	331	347	365	383	402	422	443	465	489	513	539	566
Increment per Consumer	-	1.080	0.892	1.025	0.953	1.112	1.014	0.898	1.238	0.492	1.050	1.050	1.130	1.130	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Annual Increment Ratio		1.137	0.910	1.119	1.392	1.332	1.251	1.090	1.033	0.497	1.061	1.061	1.286	1.302	1.072	1.061	1.072	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061
Industrial Demand																									
Power Consumption (MWh)	0	0	0	0	0	0	0	0	0	0	26	32	40	50	61	76	94	116	143	177	219	270	334	413	510
Numbers of Consumer	0	0	0	0	0	0	0	0	0	0	2	2	3	3	4	5	6	7	9	10	12	15	18	21	26
Annual Increment per Consumer	-	-	-	-	-	-	-	-	-	-	-	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*	*1.200*
Consumed Energy per Consumer (kWh)	-	-	-	-	-	-	-	-	-	-	13,140	13,534	13,940	14,358	14,789	15,233	15,690	16,161	16,645	17,145	17,659	18,189	18,734	19,297	19,875
Annual Increment Ratio per Consumer	-	-	-	-	-	-	-	-	-	-	-	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*
Commercial Demand																									
Power Consumption (MWh)	214	398	457	437	524	638	672	707	735	765	796	828	861	896	932	970	1,009	1,050	1,092	1,136	1,182	1,229	1,279	1,330	1,384
Numbers of Consumer	25	43	56	62	76	93	90	98	99	100	101	102	103	104	105	106	107	108	109	110	112	113	114	115	116
Annual Increment Ratio per Consumer	-	1.720	1.302	1.107	1.226	1.224	0.968	1.089	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*
Consumed Energy per Consumer (kWh)	-	9,256	8,161	7,048	6,895	6,860	7,467	7,214	7,431	7,654	7,883	8,120	8,363	8,614	8,873	9,139	9,413	9,695	9,986	10,286	10,594	10,912	11,240	11,577	11,924
Annual Increment Ratio per Consumer	-	-	0.882	0.864	0.978	0.995	1.088	0.966	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*
Hotel Demand																									
Power Consumption (MWh)	-	9	13	25	41	32	62	54	55	145	166	172	179	186	211	220	229	238	247	279	290	301	313	326	339
Numbers of Consumer	-	2	2	4	4	4	4	4	*10*	*10*	*11*	*11*	*11*	*11*	*12*	*12*	*12*	*12*	*12*	*13*	*13*	*13*	*13*	*13*	*13*
Consumed Energy per Consumer (kWh)	-	4,536	6,271	6,218	10,284	8,048	15,451	13,385	13,921	14,477	15,057	15,659	16,285	16,937	17,614	18,319	19,051	19,813	20,606	21,430	22,287	23,179	24,106	25,070	26,073
Annual Increment Ratio per Consumer	-	-	1.382	0.992	1.654	0.783	1.920	0.866	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*	*1.040*
Regional Demand																									
Power Consumption (MWh)		16	24	111	36	36	52	84	93	103	115	128	142	158	175	195	216	240	267	296	329	366	407	452	502
Numbers of Consumer	-	26	33	38	52	66	85	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	113	114	115
	-	-	1.269	1.152	1.368	1.269	1.288	1.141	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*
Consumed Energy per Consumer (kWh)	-	604	731	2,910	686	539	614	864	951	1,046	1,150	1,265	1,392	1,531	1,684	1,853	2,038	2,242	2,466	2,712	2,984	3,282	3,610	3,971	4,368
Annual Increment Ratio per Consumer	-	-	1.212	3.979	0.236	0.786	1.138	1.408	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*	*1.100*
School Demand																									
Power Consumption (MWh)		8	10	8	11	17	24	25	26	27	29	30	31	32	33	35	36	38	39	41	42	44	46	48	50
Numbers of Consumer	-	109	116	93	88	98	99	100	101	102	103	104	105	106	107	108	109	110	112	113	114	115	116	117	118
Annual Increment Ratio per Consumer	-	-	1.064	0.802	0.946	1.114	1.010	1.010	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*	*1.020*
Consumed Energy per Consumer (kWh)	-	77	84	84	122	168	244	254	261	269	277	285	294	303	312	321	331	341	351	362	372	384	395	407	419
Annual Increment Ratio per Consumer	-	-	1.088	0.999	1.453	1.384	1.450	1.038	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*	*1.030*
Street Lighting																									
Power Consumption (MWh)	-	14	15	15	15	15	12	14	12	12	13	13	14	14	15	15	16	16	17	17	18	19	19	20	21
Annual Increse	-	-	1.051	0.967	0.993	1.025	0.796	1.195	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*	*1.035*
Total Power Consumption (MWh)	-	769	813	924	1,084	1,347	1,585	1,716	1,781	1,480	1,597	1,684	1,885	2,141	2,291	2,425	2,580	2,737	2,908	3,116	3,321	3,545	3,793	4,068	4,375
System Loss (MWh)	-	171	194	175	185	395	372	400	*410*	*296*	*319*	*320*	*349*	*385*	*401*	*412*	*439*	*452*	*480*	*499*	*531*	*567*	*607*	*651*	*700*
Loss Factor (%)	-	22.25	23.87	18.94	17.06	29.32	23.47	23.31	*23.00*	*20.00*	*20.00*	*19.00*	*18.50*	*18.00*	*17.50*	*17.00*	*17.00*	*16.50*	*16.50*	*16.00*	*16.00*	*16.00*	*16.00*	*16.00*	16.00
Total System Demand (MWh)	-	940	1,007	1,099	1,269	1,742	1,957	2,116	2,191	1,776	1,917	2,004	2,234	2,526	2,692	2,837	3,019	3,189	3,388	3,615	3,852	4,113	4,400	4,719	5,075
Load Factor	-	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.45	0.46	0.46	0.46	0.46	0.46	0.46
Peak Power (kW)	-	306	328	358	414	568	638	690	714	548	576	587	638	703	732	753	783	809	860	897	956	1,021	1,092	1,171	1,259
Annual Increment Ratio	-	-	1.071	1.092	1.155	1.373	1.123	1.081	1.035	0.811	1.079	1.045	1.115	1.131	1.066	1.054	1.064	1.056	1.062	1.087	1.066	1.068	1.070	1.072	1.075

Consumed energy from 1981 to 1988, demand thereafter has been forecasted.

Appendix 4-11 Demand Forecast for Lines in Upolu

Distribution Lines	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
No.1 Line												
Tanugamanono-Siumu	Tanugamanono	654	782	71	2,083	148,135	0.40	42	50	0	2	0
	Papauta	504	603	55	2,083	114,159	0.40	33	50	0	2	0
	Pr. School		0	1	28,660	28,660	0.30	11	15	1	0	0
	Vailima	790	945	86	2,083	178,940	0.40	51	25	0	2	0
	Avele	371	444	40	2,083	84,034	0.40	24	25	0	1	0
	Church		0	1	50,954	50,954	0.60	10	15	1	0	0
	Letava	264	316	29	2,083	59,798	0.40	17	25	0	1	0
	Vaoala	503	602	55	2,083	113,933	0.40	33	50	0	0	1
	Tiapapata	112	134	12	2,083	25,369	0.40	7	15	1	0	0
	Afiamalu East	74	89	8	2,083	16,762	0.40	5	15	1	0	0
	Trans/Station		0	1	172,383	172,383	0.60	33	50	0	0	1
	Afiamalu West	40	48	4	2,083	9,060	0.40	3	15	1	0	0
	Branch line									0	0	0
	FM Trans/Station		0	1	2,083	2,083	0.40	0.59	15	1	0	0
	Maninoa	320	383	35	2,083	72,482	0.40	21	25	0	1	0
	Siumu	561	671	61	2,083	127,070	0.40	36	50	0	0	1
	Shops		0	8	36,261	290,088	0.40	83	25	0	1	0
	Schools		0	2	28,660	57,320	0.60	11	15	1	0	0
	Churches		0	6	50,954	305,724	0.60	58	25	0	1	0
	Siumu-Uta	590	706	64	2,083	133,639	0.40	38	50	0	0	1
	Saaga	407	487	44	2,083	92,188	0.40	26	50	0	0	1
	Hotel		0	2	245,454	490,908	0.60	93	25	0	1	0
	Sub-Total	5,190	6,208	584		2,082,782	0.45	528		7	12	5

Distribution Lines	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load(kW)	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
No.2 Line												
Saleapaga - Lefaga	Satitea	481	575	52	2,083	108,950	0.40	31	50	0	0	1
	Malaela	123	147	13	2,083	27,860	0.40	8	15	1	0	0
	Lepue	258	309	28	2,083	58,439	0.40	17	25	0	1	0
	Mutiatele	252	301	27	2,083	57,080	0.40	16	25	0	1	0
	Lalomanu	748	895	81	2,083	169,427	0.40	48	50	0	0	1
	Vailoa	376	450	41	2,083	85,167	0.40	24	25	0	1	0
	Ulutogia	201	240	22	2,083	45,528	0.40	13	15	1	0	0
	Shops		0	5	36,261	181,305	0.50	41	50	0	0	1
	Schools		0	3	28,660	85,980	0.60	16	25	0	1	0
	Church		0	6	50,954	305,724	0.60	58	25	0	2	0
	Sub-Total	2,439	2,917	279		1,125,459	0.45	286		2	6	3

Distribution Lines	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
No.3 Line												
Saluafata - Sauniatu	Sauano	221	264	24	2,083	50,058	0.40	14	15	1	0	0
	Falevao	423	506	46	2,083	95,812	0.40	27	50	0	0	1
	Manunu	177	212	19	2,083	40,092	0.40	11	15	1	0	0
	Sauniatu	133	159	14	2,083	30,125	0.40	9	15	1	0	0
	Shops		0	4	36,261	145,044	0.50	33	50	0	0	1
	Schools		0	2	28,660	57,320	0.60	11	15	1	0	0
	Church		0	2	50,954	101,908	0.60	19	25	0	1	0
	Sub-Total	954	1,141	112		520,360	0.45	132		4	1	2

Distribution Lines	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
No.4 Line												
Amaile - Aflilo	Amaile - Aflilo	150	179	16	2,083	33,976	0.40	10	15	1	0	0
	Shops		0	1	36,261	36,261	0.40	10	15	1	0	0
	Schools		0	1	28,660	28,660	0.40	8	15	1	0	0
	Church		0	1	50,954	50,954	0.40	15	15	1	0	0
	Sub-Total	150	179	19		149,851	0.40	43		4	0	0

Distribution Lines	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
No.5 Line												
Aleisa - Saleimoa	Salepeua'e	208	249	23	2,083	47,113	0.40	13	15	1	0	0
	Nonoa	143	171	16	2,083	32,390	0.40	9	15	1	0	0
	Sub-Total	351	420	38		79,504	0.40	23		2	0	0

Distribution Lines	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
No.6 Line												
Nuu - Faleula	Acle	326	390	35	2,083	73,841	0.40	21	25	0	1	0
	Nuu	257	307	28	2,083	58,212	0.40	17	25	0	1	0
	Church		0	1	50,954	50,954	0.60	10	15	1	0	0
	Sub-Total	583	697	64		183,007	0.45	46		1	2	0

Appendix 4-12 Demand Forecast for Lines in Savaii

Districts	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
Line No.9												
Puapia - Samalaeulu	Lane	695	831	46	539	24,893	0.20	14	15	1	0	0
	Asaga	243	291	16	539	8,704	0.20	5	15	1	0	0
	Puapua	519	621	34	539	18,590	0.20	11	15	1	0	0
	Pataimea	605	724	40	539	21,670	0.20	12	15	1	0	0
	Samalaeulu	828	990	55	539	29,657	0.20	17	15	1	0	0
	Mauga	157	188	10	539	5,623	0.20	3	15	1	0	0
	Shops	0	0	2	11,577	23,154	0.40	7	15	1	0	0
	Schools	0	0	2	407	814	0.20	0	15	1	0	0
	Churches	0	0	3	3,971	11,913	0.40	3	15	1	0	0
	Sub-Total	3,047	3,645	209		145,018	0.35	47		9	0	0

Districts	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
Line No.10												
Sasina - Matavai	Fagaee	248	297	16	539	8,883	0.20	5	15	1	0	0
	Sasina	614	734	41	539	21,992	0.20	13	15	1	0	0
	Letui	273	327	18	539	9,778	0.20	6	15	1	0	0
	Aopo	389	465	26	539	13,933	0.20	8	15	1	0	0
	Shops	0	0	6	11,577	69,462	0.20	40	15	1	1	0
	Schools	0	0	4	407	1,628	0.20	1	15	1	0	0
	Churches	0	0	4	3,971	15,884	0.20	9	15	1	0	0
	Sub-Total	1,524	1,823	115		141,561	0.20	81		7	1	0

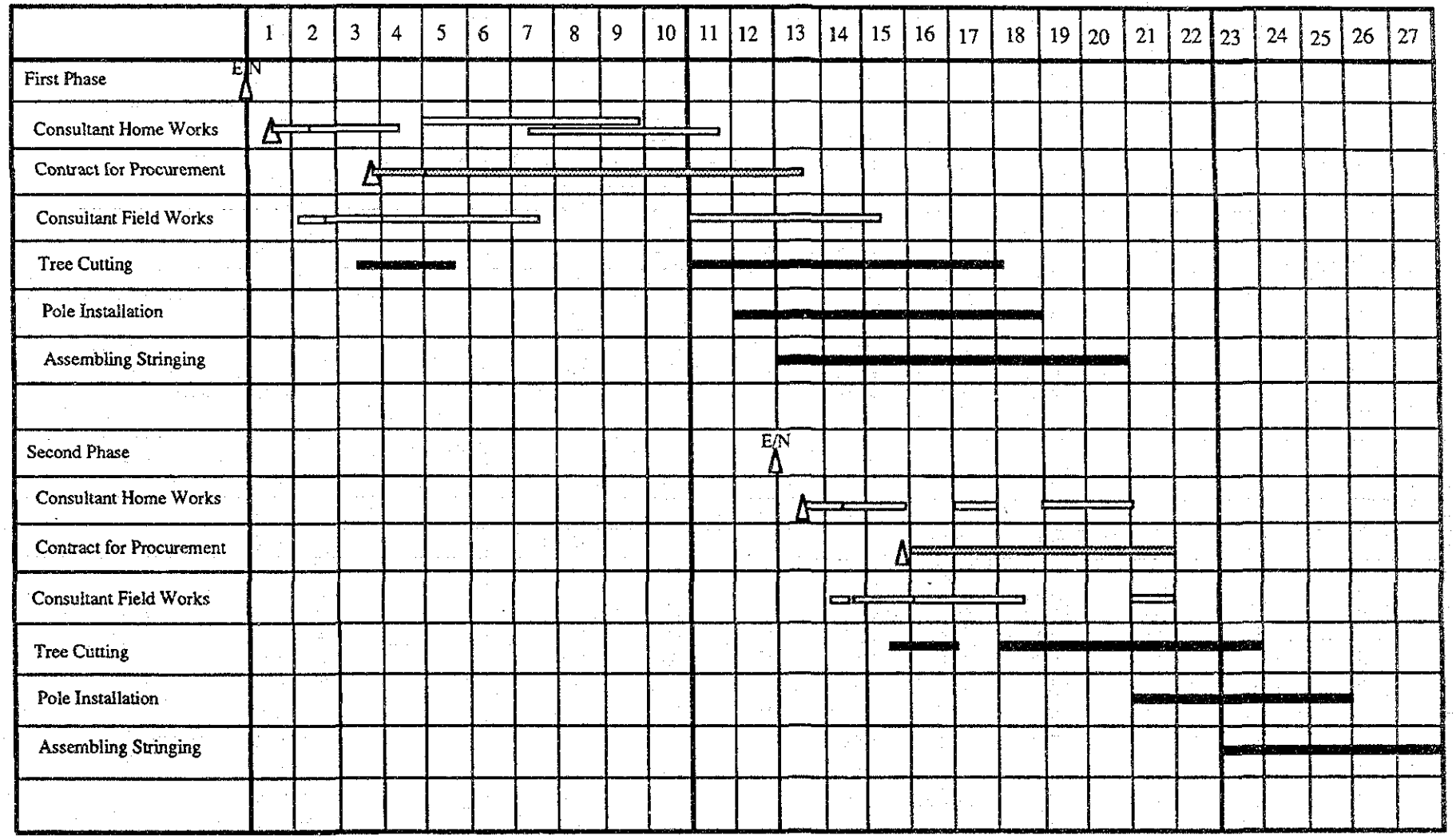
Districts	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
Line No.11												
Taftafoe	Falealupo-Uta	718	859	48	539	25,717	0.20	15	15	1	0	0
	Vaetupua	386	462	26	539	13,826	0.20	8	15	1	0	0
	Avata	170	203	11	539	6,089	0.20	3	15	1	0	0
	Tufutafoe	354	423	24	539	12,680	0.20	7	15	1	0	0
	Neiafu-Tai	506	605	34	539	18,124	0.20	10	15	1	0	0
	Neiafu-Uta	603	721	40	539	21,598	0.20	12	15	1	0	0
	Falelima	555	664	37	539	19,879	0.20	11	15	1	0	0
	Shops	0	0	2	11,577	23,154	0.20	13	15	1	0	0
	Schools	0	0	3	407	1,221	0.20	1	15	1	0	0
	Churches	0	0	4	3,971	15,884	0.20	9	15	1	0	0
	Sub-Total	3,292	3,938	228		158,172	0.30	60		10	0	0

Districts	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
Line No.12												
Tafuautaa - Tafuatai	Tafua-Tai	357	427	24	539	12,787	0.20	7	15	1	0	0
	Tafua-Uta	185	221	12	539	6,626	0.20	4	15	1	0	0
	Shops	0	0	1	11,577	11,577	0.20	7	15	1	0	0
	Schools	0	0	1	407	407	0.20	0	15	1	0	0
	Churches	0	0	1	3,971		0.20	0	15	1	0	0
	Sub-Total	542	648	39		31,397	0.20	18		5	0	0

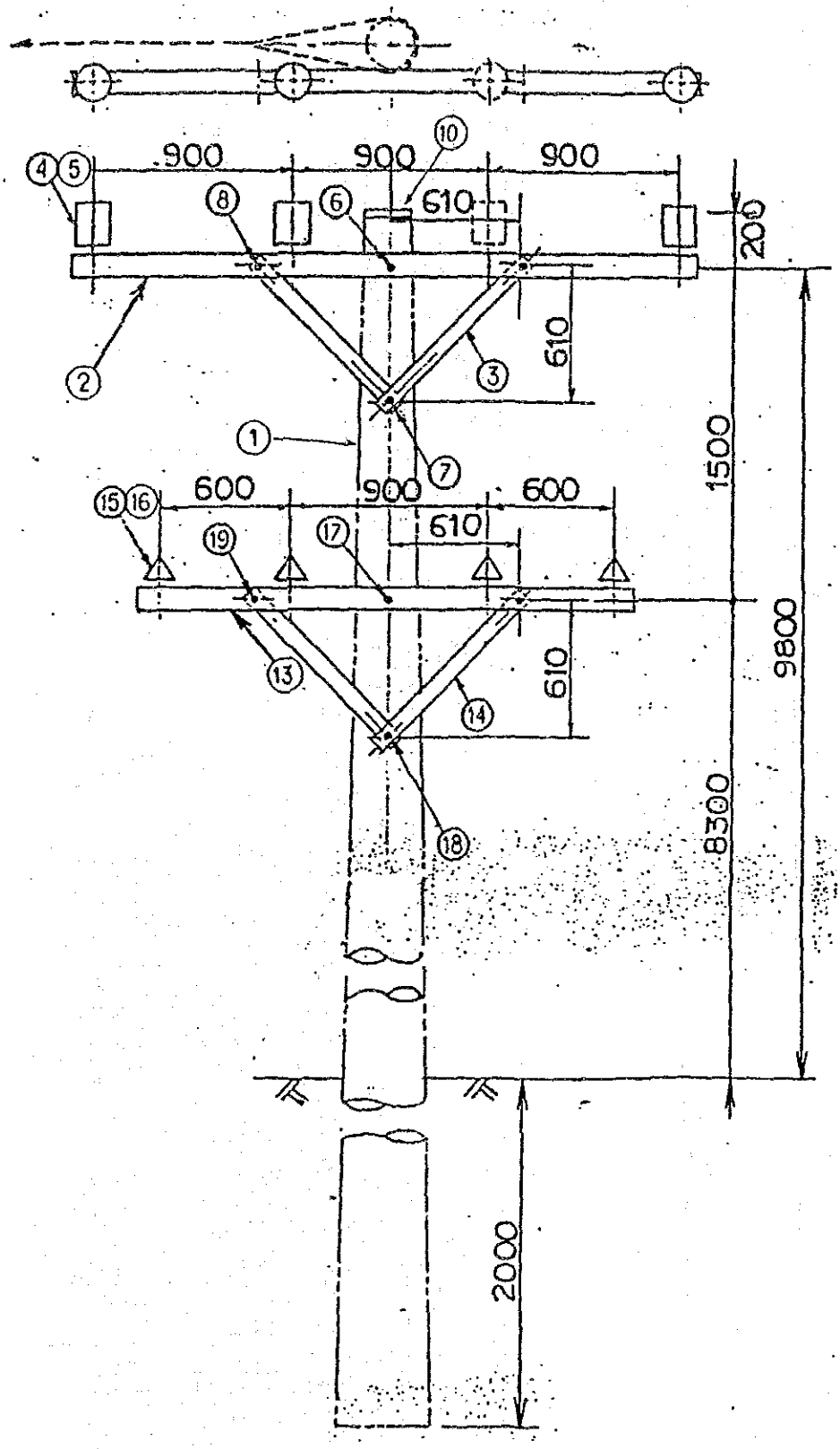
Districts	Villages or Big Consumers	Population in 1986	Population in 2004	Nos. of Consumer	Unit/MWh in 2004	Total MWh	Load Factor	Peak Load	Tr. Capa (kVA)	15 kVA	25 kVA	50 kVA
Line No.13												
Patamea - Saleaula	Patamea	605	724	40	539	21,670	0.20	12	15	1	0	0
	Samalaeulu	828	990	55	539	29,657	0.20	17	15	1	0	0
	Mauga	157	188	10	539	5,623	0.20	3	15	1	0	0
	Saleaula	634	758	42	539	22,709	0.20	13	15	1	0	0
	Shops	0	0	4	11,577	46,308	0.20	26	15	1	0	0
	Schools	0	0	3	407	1,221	0.20	1	15	1	0	0
	Churches	0	0	3	3,971	11,913	0.20	7	15	1	0	0
	Sub-Total	2,224	2,660	158		139,101	0.20	79	105	7	0	0

Transformers in Savai	10,629	12,714	749		615,249	0.30	234		38	1	0

Appendix 4-13 IMPLEMENTATION SCHEDULE FOR RURAL ELECTRIFICATION PROJECT



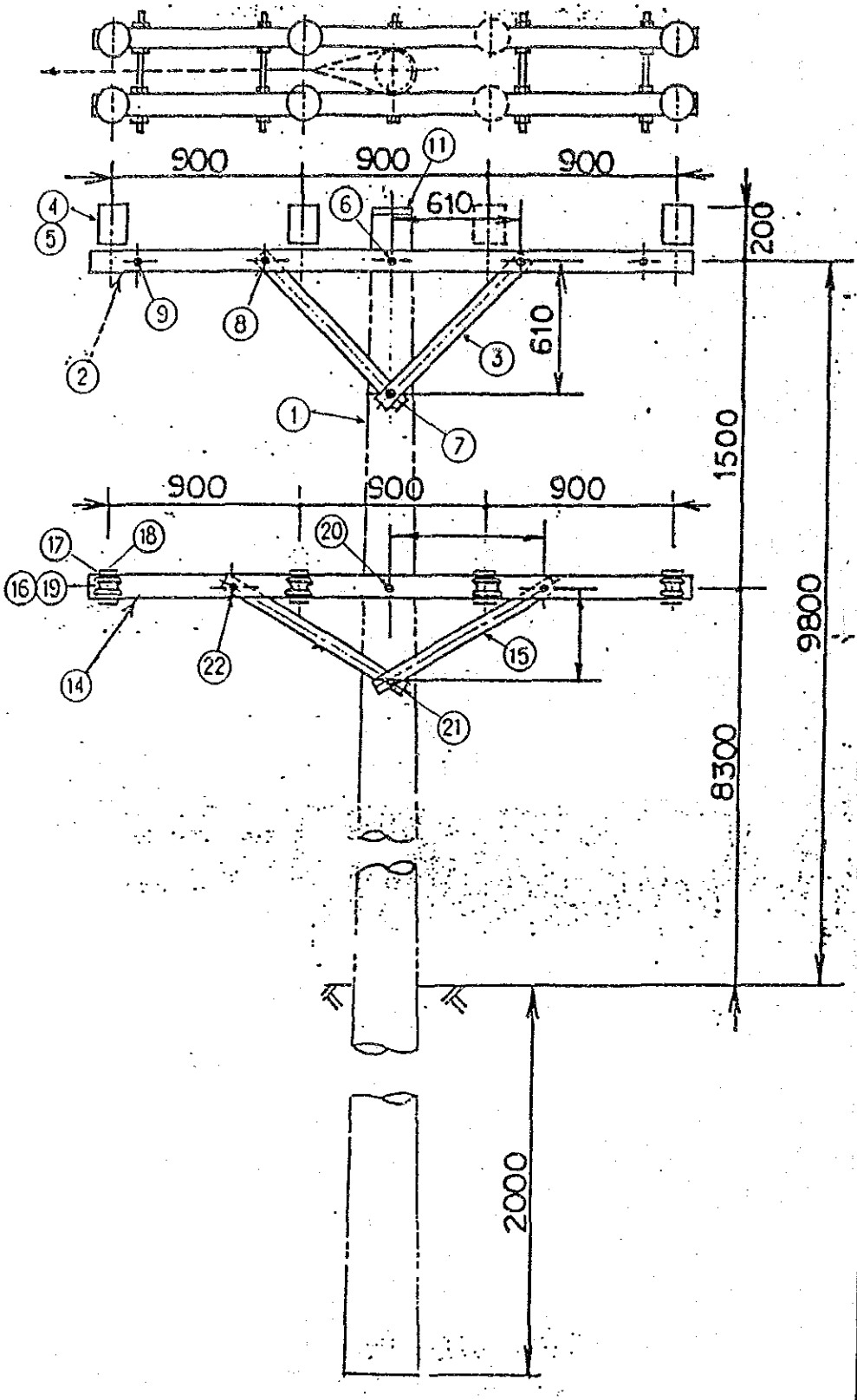
1. STRAIGHT LINE POLES



1. STRAIGHT LINE POLES

	DESCRIPTION	SPEC.	Q'TY
	(FOR 22KV LINE)		
1	POLES	12M	1
2	STEEL CROSSARM	75x75x3.2x2900	1
3	ARM BRACE	863x40x6	2
4	22KV PIN INSULATORS		3
5	22KV INSULATOR PIN		3
6	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x340	1
7	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x280	1
8	BOLT FOR ARM/BRACE	M16x120	2
9	COACH SCREW	12x100	2
10	ALUMI POLE CAP		1
11	STEP BOLT	16x260	2
12	PREFORMED TOP TIE		3
	(FOR L.V.LINE)		
13	STEEL CROSSARM	75x75x3.2x2300	1
14	ARM BRACE	863x40x6	2
15	L/V PIN INSULATOR		4
16	L/V INSULATOR PIN		4
17	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x360	1
18	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x300	1
19	BOLT FOR ARM/BRACE	M16x120	2
20	AL. BIND WIRE	3.2mm INSULATED	12M
* 21	POLES	9M	1

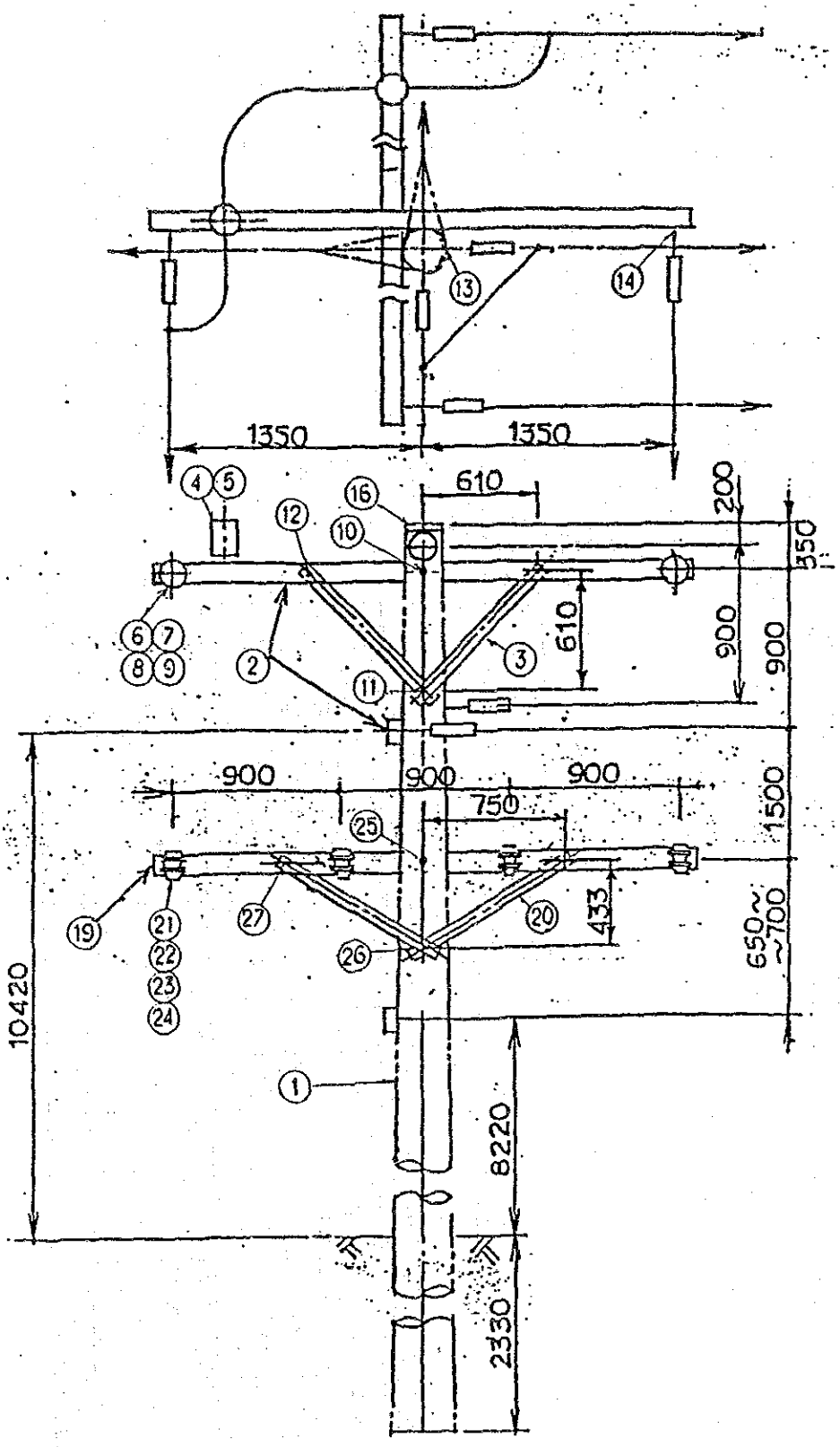
2. LIGHT ANGLE POLE (DOUBLE PIN)



2. LIGHT ANGLE POLE (DOUBLE PIN)

	DESCRIPTION	SPEC.	Q'TY
	[FOR 22KV LINE]		
1	POLES	12M	1
2	STEEL CROSSARM	75x75x3.2x2900	2
3	ARM BRACE	863x40x6	4
4	22KV PIN INSULATORS		6
5	22KV INSULATOR PIN		6
6	BOLT FOR ARM/POLE	M16x420	1
7	BOLT FOR BRACE/POLE	M16x300	1
8	BOLT FOR ARM/BRACE	M16x120	4
9	DOUBLE ARMING BOLT WITH 4-NUT, 4-SQ. WASHER	M16x440	2
10	COACH SCREW	12x100	2
11	ALUMI POLE CAP		1
12	STEP BOLT	16x260	2
13	PREFORMED TOP TIE	FOR DOUBLE PIN	3
	[FOR L.V.LINE]		
14	STEEL CROSSARM	75x75x3.2x2900	1
15	ARM BRACE	863x40x6	2
16	SHACKLE INSULATOR		8
17	SHACKLE STRAP	PAIR	8
18	SHACKLE STRAP BOLT	M16x150	4
19	SHACKLE BOLT	M16x120	8
20	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x360	1
21	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x300	1
22	BOLT FOR ARM/BRACE	M16x120	2
23	AL. BIND WIRE	3.2mm INSULATED	24M
24	POLES	9M	1

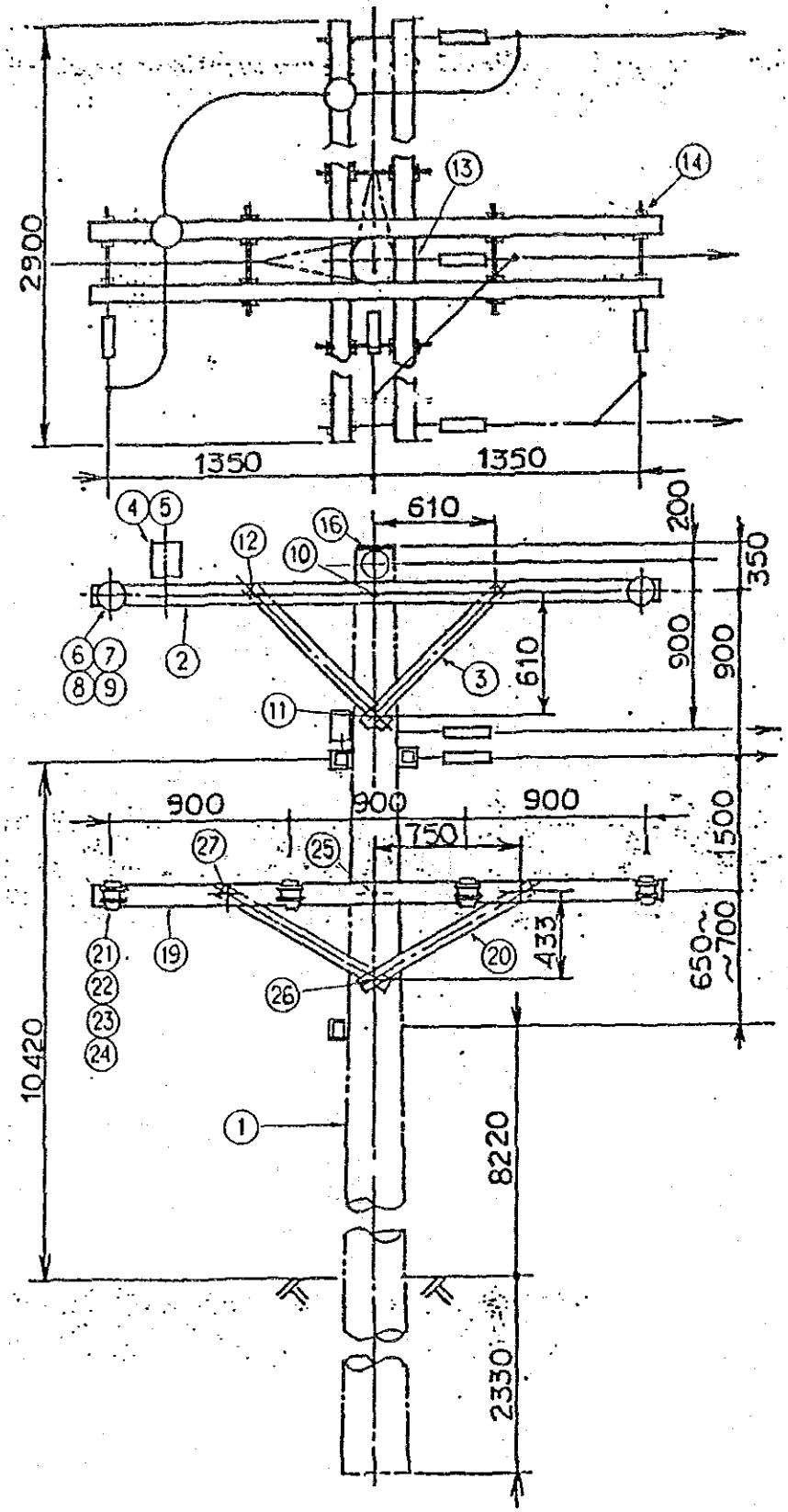
3. ANGLE LINE POLE (SINGLE ARM)



3. ANGLE LINE POLE (SINGLE ARM)

	DESCRIPTION	SPEC.	Q'TY
	(FOR 22KV LINE)		
1	POLES	14M	1
2	STEEL CROSSARM	75x75x3.2x2900	2
3	ARM BRACE	863x40x6	4
4	22KV PIN INSULATORS		2
5	22KV INSULATOR PIN		2
6	22KV DISC INSULATOR		12
7	BALL HOOK		6
8	SOCKET THIMBLE		6
9	PREFORMED DEADEND GRIP		6
10	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x340	2
11	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x280	2
12	BOLT FOR ARM/BRACE	M16x120	4
13	EYE BOLT WITH 1-CURVED WASHER	M20x300	2
14	EYE BOLT WITH 1-SQUARE WASHER	M20x120	4
15	COACH SCREW	12x100	2
16	ALUMI POLE CAP		1
17	STEP BOLT	16x260	2
18	PREFORMED TOP TIE		2
	(FOR L.V.LINE)		
19	STEEL CROSSARM	75x75x3.2x2900	2
20	ARM BRACE	863x40x6	4
21	SHACKLE INSULATOR		8
22	SHACKLE STRAP	PAIR	8
23	SHACKLE STRAP BOLT	M16x150	8
24	SHACKLE BOLT	M16x120	8
25	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x360	2
26	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x300	2
27	BOLT FOR ARM/BRACE	M16x120	4
28	AL. BIND WIRE	3.2mm INSULATED	24M
29	POLES	9M	1

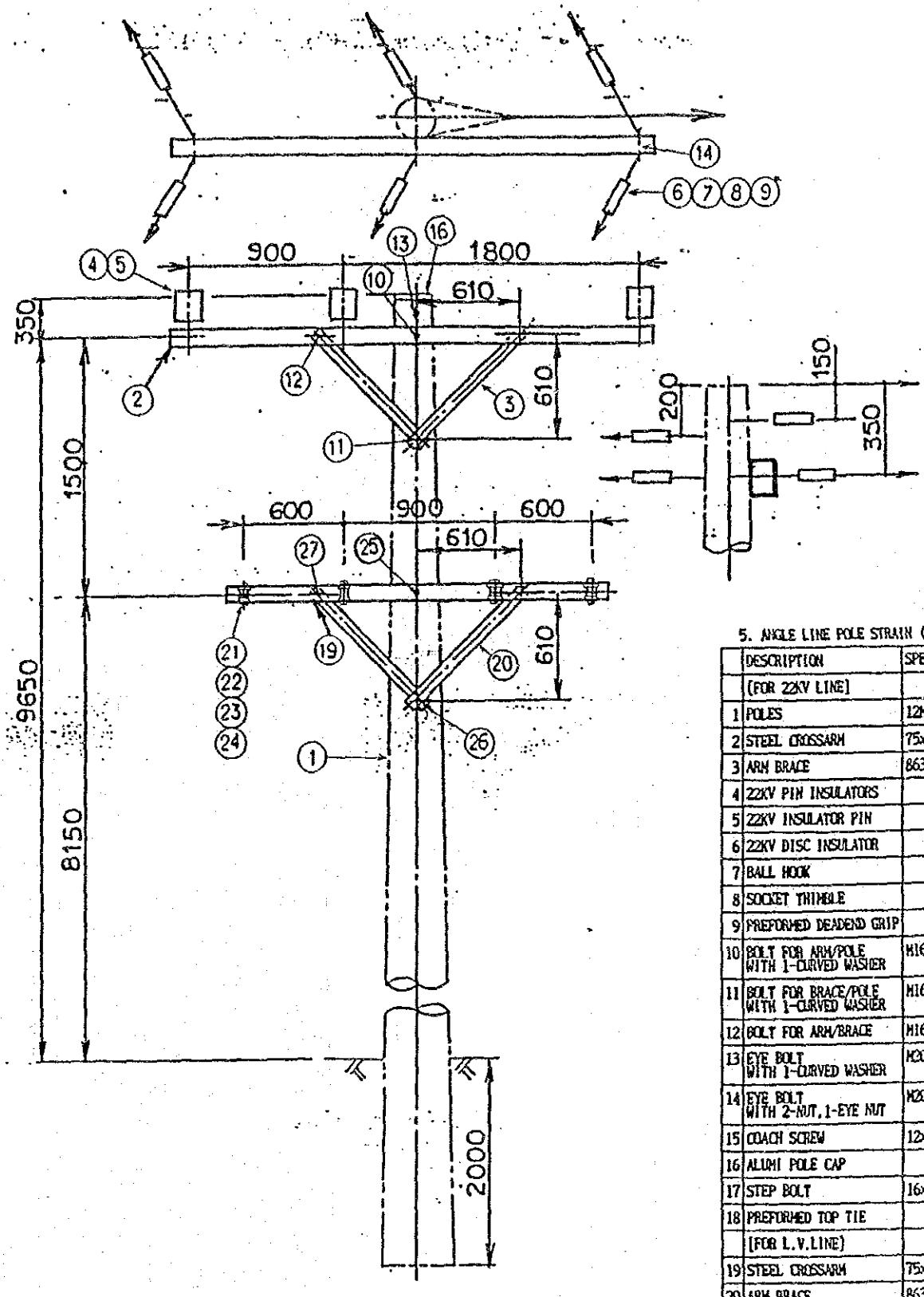
4. ANGLE LINE POLE (DOUBLE ARM)



4. ANGLE LINE POLE (DOUBLE ARM)

	DESCRIPTION	SPEC.	Q'TY
	(FOR 22KV LINE)		
1	POLES	14M	1
2	STEEL CROSSARM	75x75x3.2x2900	4
3	ARM BRACE	863x40x6	8
4	22KV PIN INSULATORS		2
5	22KV INSULATOR PIN		2
6	22KV DISC INSULATOR		12
7	BALL HOOK		6
8	SOCKET THIMBLE		6
9	PREFORMED DEADEND GRIP		6
10	BOLT FOR ARM/POLE	M16x420	2
11	BOLT FOR BRACE/POLE	M16x300	2
12	BOLT FOR ARM/BRACE	M16x120	8
13	EYE BOLT WITH 1-CURVED WASHER	M20x300	2
14	DOUBLE ARMING EYE BOLT WITH 4-NUT, 4-SQ. WASHER	M20x440	4
15	COACH SCREW	12x100	4
16	ALUM POLE CAP		1
17	STEP BOLT	16x260	4
18	PREFORMED TOP TIE		2
	(FOR L.V.LINE)		
19	STEEL CROSSARM	75x75x3.2x2900	2
20	ARM BRACE	863x40x6	4
21	SHACKLE INSULATOR		8
22	SHACKLE STRAP	PAIR	8
23	SHACKLE STRAP BOLT	M16x150	8
24	SHACKLE BOLT	M16x120	8
25	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x360	2
26	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x300	2
27	BOLT FOR ARM/BRACE	M16x120	4
28	AL. BIND WIRE	3.2mm INSULATED	24M
29	POLES	9M	1

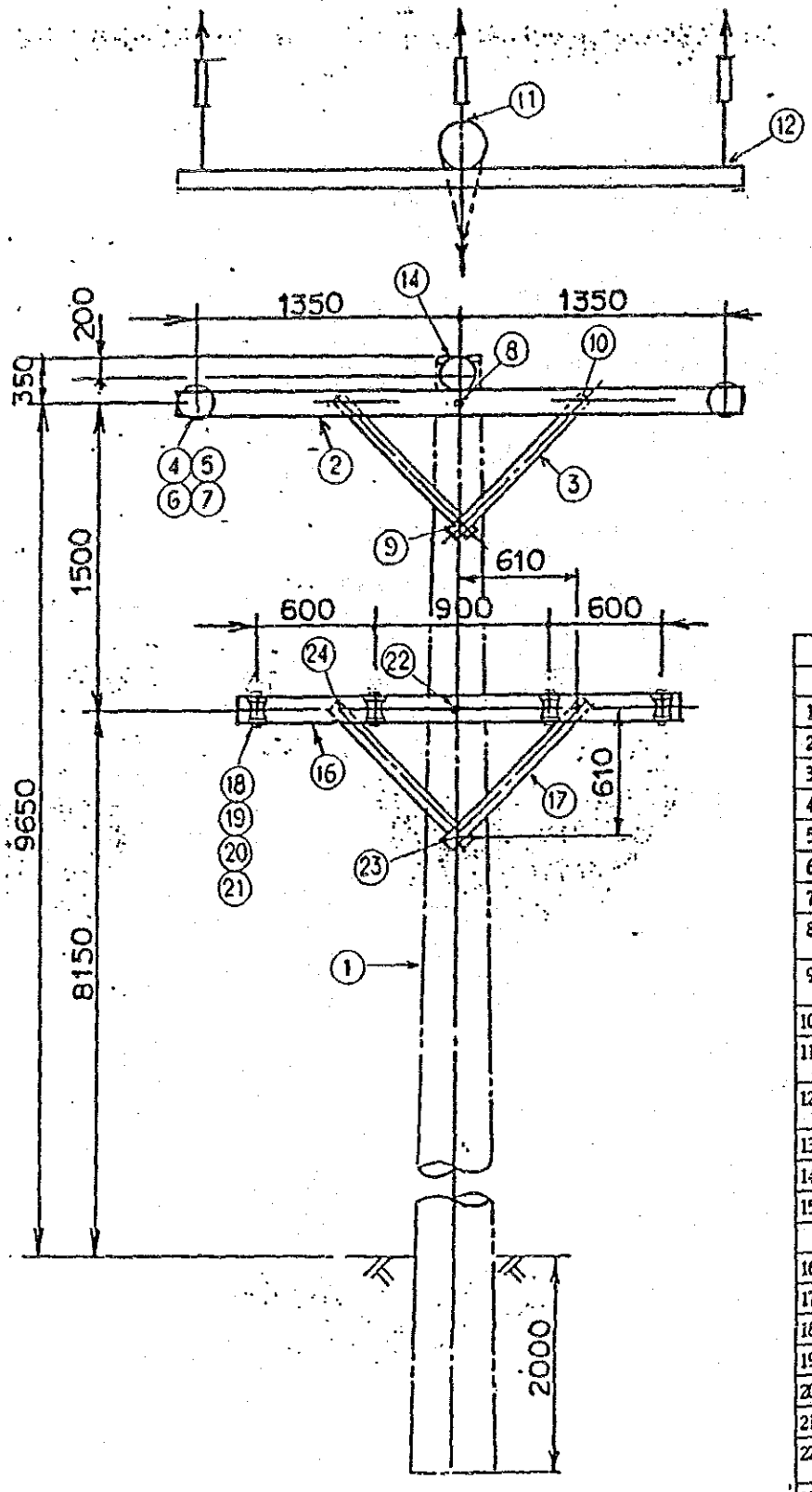
5. ANGLE LINE POLES STRAIN (SINGLE ARM)



5. ANGLE LINE POLE STRAIN (SINGLE ARM)

	DESCRIPTION	SPEC.	Q'TY
	(FOR 22KV LINE)		
1	POLES	12M	1
2	STEEL CROSSARM	75x75x3.2x2900	1
3	ARM BRACE	863x40x6	2
4	22KV PIN INSULATORS		3
5	22KV INSULATOR PIN		3
6	22KV DISC INSULATOR		12
7	BALL HOOK		6
8	SOCKET THIMBLE		6
9	PREFORMED DEADEND GRIP		6
10	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x340	1
11	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x280	1
12	BOLT FOR ARM/BRACE	M16x120	2
13	EYE BOLT WITH 1-CURVED WASHER	M20x300	2
14	EYE BOLT WITH 2-NUT, 1-EYE NUT	M20x140	2
15	COACH SCREW	12x100	2
16	ALUMI POLE CAP		1
17	STEP BOLT	16x260	2
18	PREFORMED TOP TIE		3
	(FOR L.V.LINE)		
19	STEEL CROSSARM	75x75x3.2x2300	1
20	ARM BRACE	863x40x6	2
21	SHACKLE INSULATOR		8
22	SHACKLE STRAP	PAIR	8
23	SHACKLE STRAP BOLT	M16x150	4
24	SHACKLE BOLT	M16x120	8
25	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x360	1
26	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x300	1
27	BOLT FOR ARM/BRACE	M16x120	2
28	AL. BIND WIRE	3.2mm INSULATED	24M
* 29	POLES	9M	1

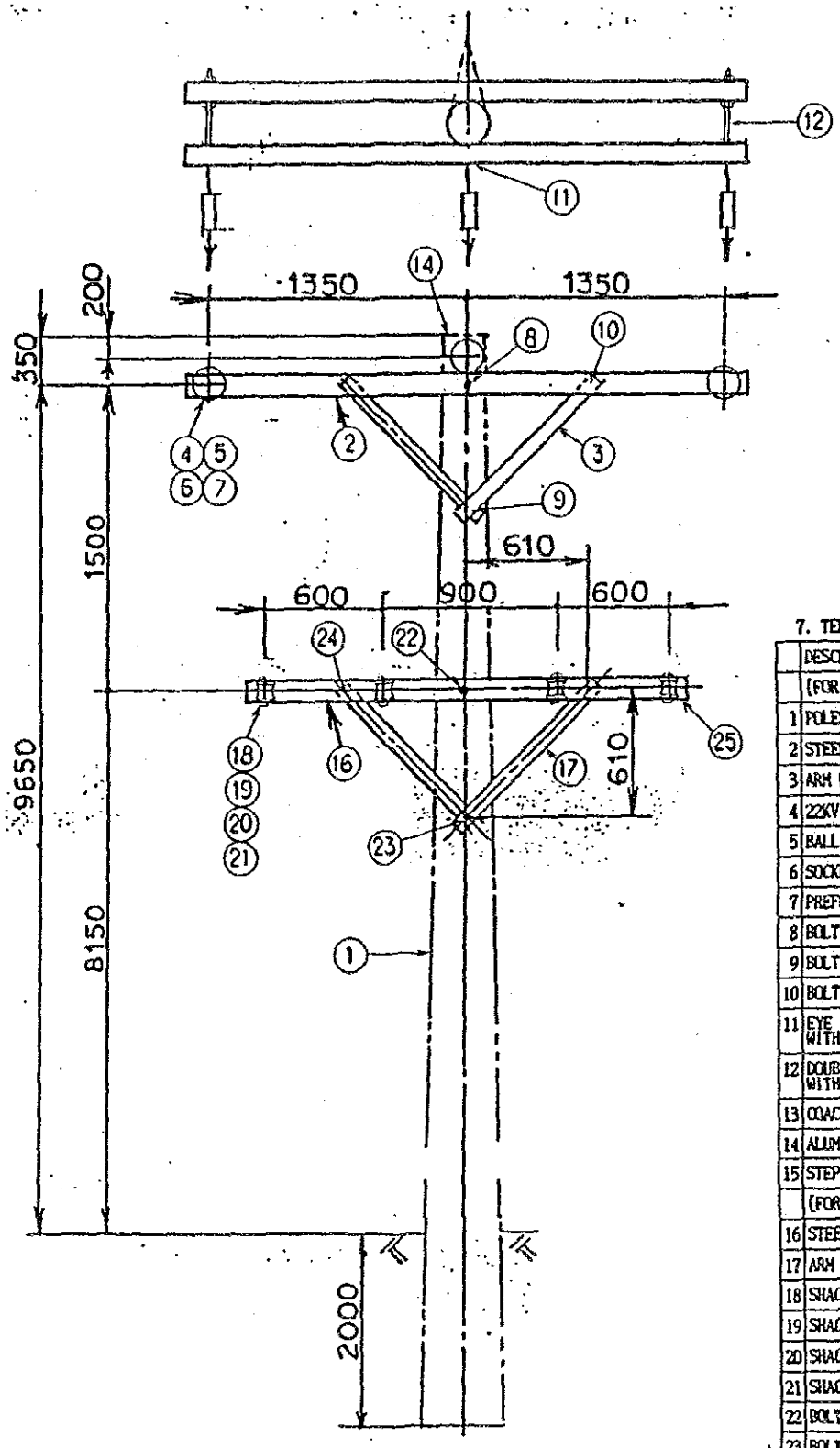
6. TERMINAL POLE (SINGLE ARM)



6. TERMINAL POLE (SINGLE ARM)

	DESCRIPTION	SPEC.	Q'TY
	(FOR 22KV LINE)		
1	POLES	12M	1
2	STEEL CROSSARM	75x75x3.2x2900	1
3	ARM BRACE	863x40x6	2
4	22KV DISC INSULATOR		6
5	BALL HOOK		3
6	SOCKET THIMBLE		3
7	PREFORMED DEADEND GRIP		3
8	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x340	1
9	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x280	1
10	BOLT FOR ARM/BRACE	M16x120	2
11	EYE BOLT WITH 1-CURVED WASHER	M20x300	1
12	EYE BOLT WITH 2-NUT, 1-SQ. WASHER	M20x140	2
13	COACH SCREW	12x100	2
14	ALUMI POLE CAP		1
15	STEP BOLT	16x260	2
	(FOR L.V.LINE)		
16	STEEL CROSSARM	75x75x3.2x2300	1
17	ARM BRACE	863x40x6	2
18	SHACKLE INSULATOR		4
19	SHACKLE STRAP	PAIR	4
20	SHACKLE STRAP BOLT	M16x150	4
21	SHACKLE BOLT	M16x120	4
22	BOLT FOR ARM/POLE WITH 1-CURVED WASHER	M16x360	1
23	BOLT FOR BRACE/POLE WITH 1-CURVED WASHER	M16x300	1
24	BOLT FOR ARM/BRACE	M16x120	2
25	AL. BIND WIRE	3.2mm INSULATED	12M
* 26	POLES	9M	1

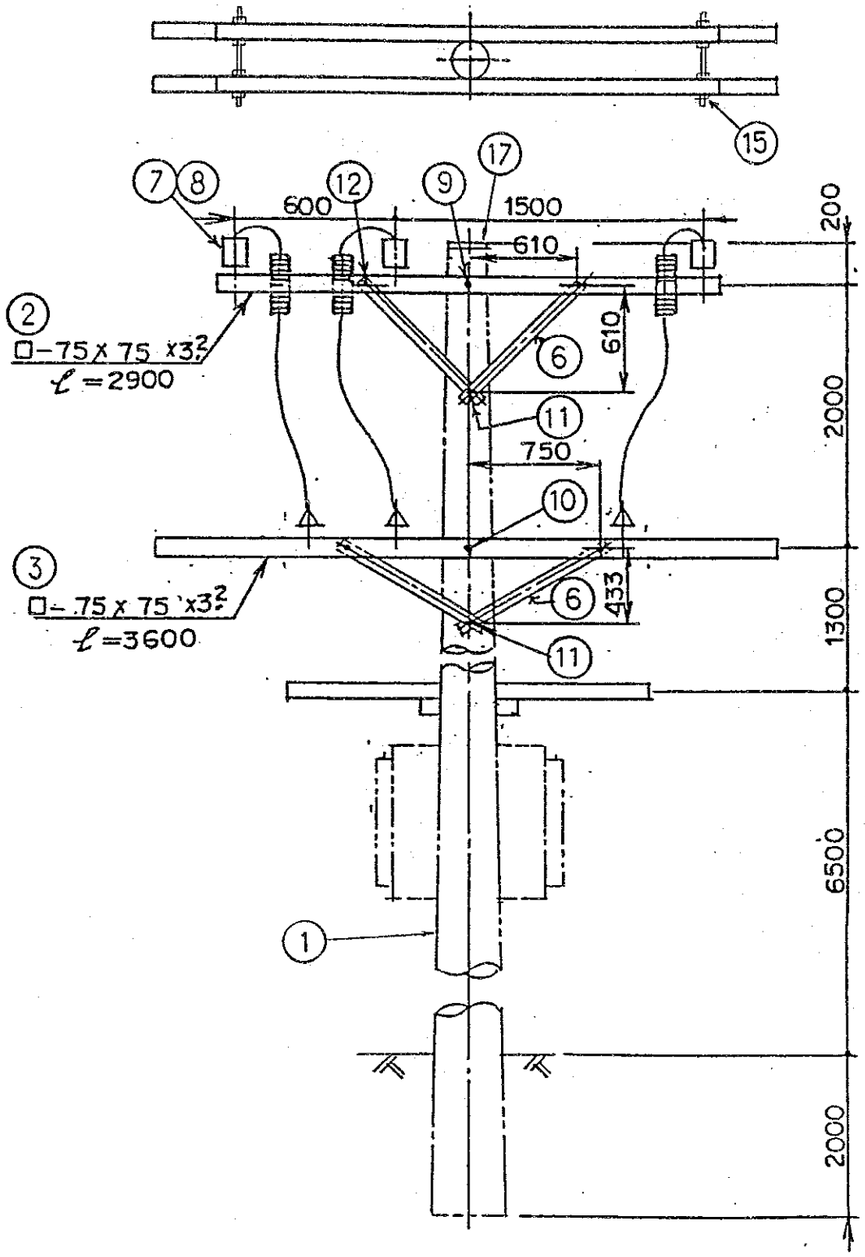
7. TERMINAL POLE (DOUBLE ARM)

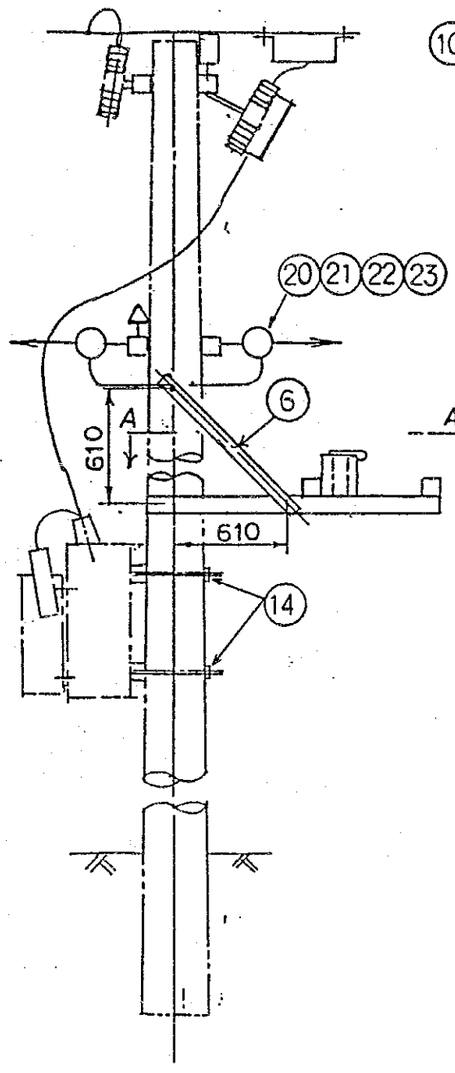


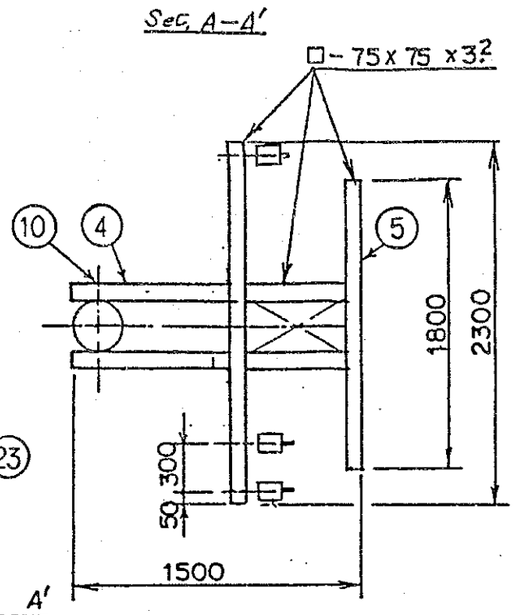
7. TERMINAL POLE (DOUBLE ARM)

	DESCRIPTION	SPEC.	Q'TY
	(FOR 22KV LINE)		
1	POLES	12M	1
2	STEEL CROSSARM	75x75x3.2x2900	2
3	ARM BRACE	863x40x6	4
4	22KV DISC INSULATOR		6
5	BALL HOOK		3
6	SOCKET THIMBLE		3
7	PREFORMED DEADEND GRIP		3
8	BOLT FOR ARM/POLE	M16x420	1
9	BOLT FOR BRACE/POLE	M16x300	1
10	BOLT FOR ARM/BRACE	M16x120	4
11	EYE BOLT WITH 1-CURVED WASHER	M20x300	1
12	DOUBLE ARMING EYE BOLT WITH 4-NUT, 4-SQ.WASHER	M20x440	2
13	COACH SCREW	12x100	2
14	ALUMI POLE CAP		1
15	STEP BOLT	16x260	2
	(FOR L.V.LINE)		
16	STEEL CROSSARM	75x75x3.2x2500	2
17	ARM BRACE	863x40x6	4
18	SHACKLE INSULATOR		4
19	SHACKLE STRAP	PAIR	4
20	SHACKLE STRAP BOLT	M16x150	4
21	SHACKLE BOLT	M16x120	4
22	BOLT FOR ARM/POLE	M16x440	1
23	BOLT FOR BRACE/POLE	M16x320	1
24	BOLT FOR ARM/BRACE	M16x120	4
25	DOUBLE ARMING BOLT WITH 4-NUT, 4-SQ.WASHER	M16x460	2
26	AL. BIND WIRE	3.2mm INSULATED	12M
27	POLES	9M	1

8. TRANSFORMER POLE



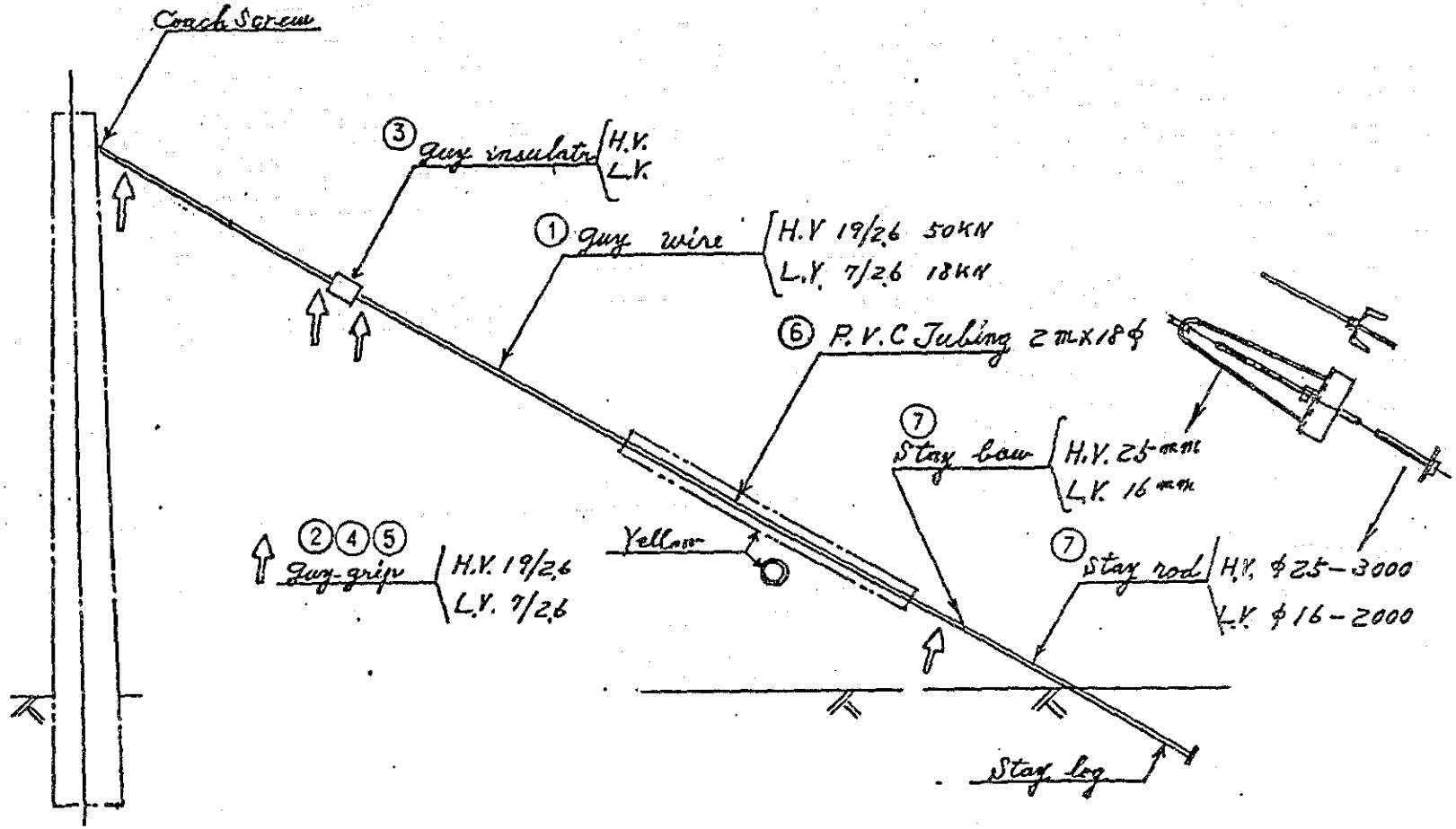




8. TRANSFORMER POLE

	DESCRIPTION	SPEC.	Q'TY
	(FOR 22KV LINE)		
1	POLES	12M	1
2	STEEL CROSSARM	75x75x3.2x2900	2
3	STEEL CROSSARM	75x75x3.2x3600	2
4	STEEL CROSSARM	75x75x3.2x1500	2
5	STEEL CROSSARM	75x75x3.2x1800	2
6	ARM BRACE	863x40x6	10
7	22KV PIN INSULATOR		6
8	22KV INSULATOR PIN		6
9	BOLT FOR ARM/POLE	M16x420	1
10	BOLT FOR ARM/POLE	M16x440	2
11	BOLT FOR BRACE/POLE	M16x320	3
12	BOLT FOR ARM/BRACE	M16x120	10
13	BOLT FOR ARM/ARM	M16x200	4
14	TRANSFORMER BRACKET WITH 2-THROUGH BOLT, 2-CURVED WASHER		1
15	DOUBLE ARMING BOLT WITH 4-NUT, 4-SQ. WASHER	M16x440	4
16	COACH SCREW	12x100	2
17	ALUMI POLE CAP		1
18	STEP BOLT	16x260	2
19	PREFORMED TOP TIE		3
	(FOR L.V.LINE)		
20	SHACKLE INSULATOR		8
21	SHACKLE STRAP	PAIR	8
22	SHACKLE STRAP BOLT	M16x150	8
23	SHACKLE BOLT	M16x120	8
24	AL. BIND WIRE	3.2mm INSULATED	24M
25	EARTHING WIRE COVER		2

9. STAY ASSEMBLY



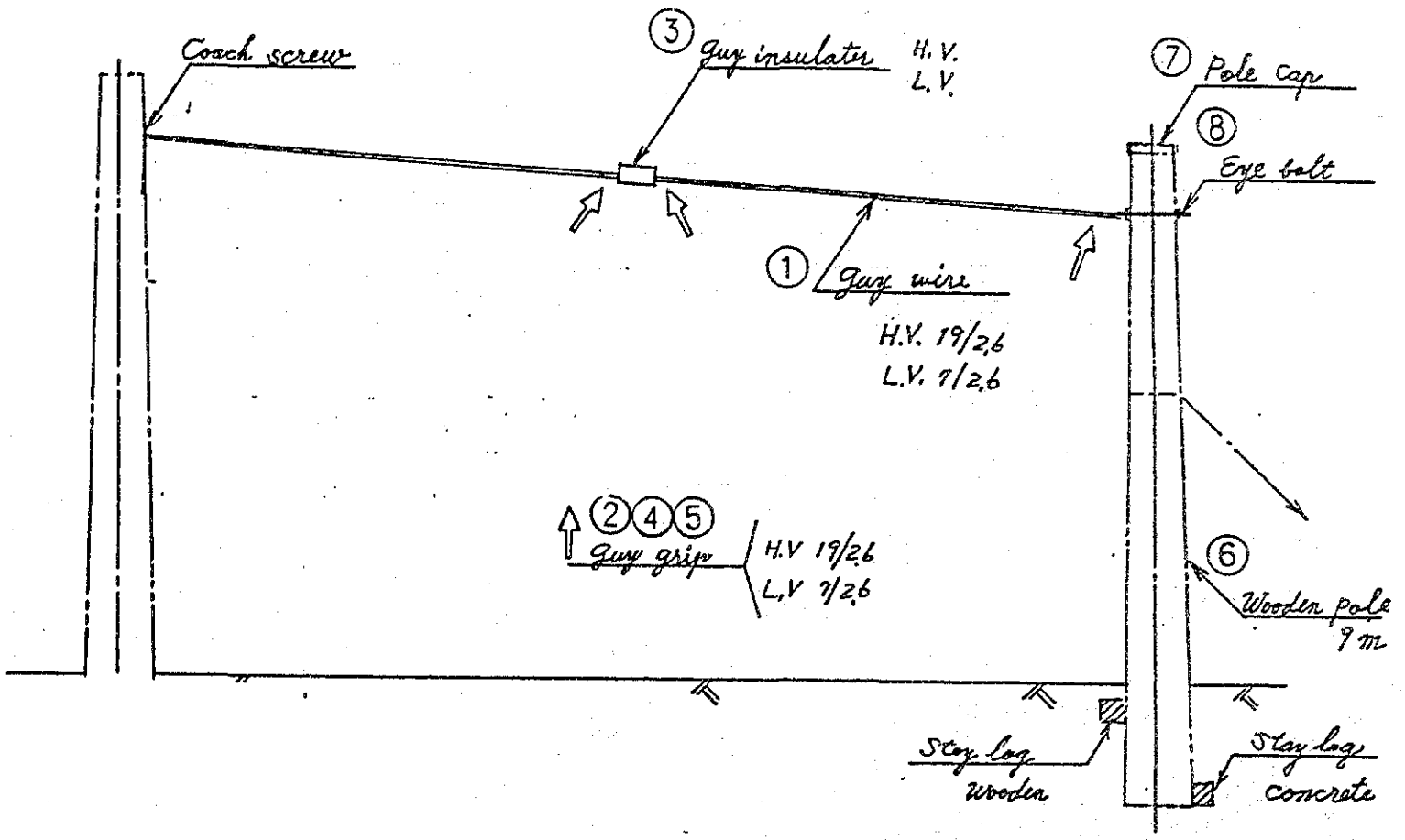
9-1. STAY ASSEMBLY(22KV)

	DESCRIPTION	SPEC.	Q'TY
	[FOR 22KV LINE]		
1	GUY WIRE	19/2.6	20M
2	GUY GRIP FOR WOOD POLE	FOR 19/2.6	1
3	GUY INSULATOR		1
4	GUY GRIP FOR INSULATOR	FOR 19/2.6	2
5	GUY GRIP FOR THIMBLE	FOR 19/2.6	1
6	PVC TUBE(YELLOW)	18x2500mm	1
7	STAY ROD,BOW TYPE	25x3000mm	1

9-2.STAY ASSEMBLY(L.V)

	DESCRIPTION	SPEC.	Q'TY
	[FOR L.V LINE]		
1	GUY WIRE	7/2.6	20M
2	GUY GRIP FOR WOOD POLE	FOR 7/2.6	1
3	GUY INSULATOR		1
4	GUY GRIP FOR INSULATOR	FOR 7/2.6	2
5	GUY GRIP FOR THIMBLE	FOR 7/2.6	1
6	PVC TUBE(YELLOW)	18x2500mm	1
7	STAY ROD,BOW TYPE	16x2200mm	1

0. FLYING STAY ASSEMBLY



10-1. FLYING STAY ASSEMBLY(22KV)

	DESCRIPTION	SPEC.	Q'TY
	[FOR 22KV LINE]		
1	GUY WIRE	19/2.6	20M
2	GUY GRIP FOR WOOD POLE	FOR 19/2.6	1
3	GUY INSULATOR		1
4	GUY GRIP FOR INSULATOR	FOR 19/2.6	2
5	GUY GRIP FOR THIMBLE	FOR 19/2.6	1
6	POLES	9M	1
7	ALUMI POLE CAP		1
8	EYE BOLT WITH 1-CURVED WASHER.1-OPEN THIMBLE	M20x300	1

10-2. FLYING STAY ASSEMBLY(L.V)

	DESCRIPTION	SPEC.	Q'TY
	[FOR L.V LINE]		
1	GUY WIRE	7/2.6	20M
2	GUY GRIP FOR WOOD POLE	FOR 7/2.6	1
3	GUY INSULATOR		1
4	GUY GRIP FOR INSULATOR	FOR 7/2.6	2
5	GUY GRIP FOR THIMBLE	FOR 7/2.6	1
6	POLES	9M	1
7	ALUMI POLE CAP		1
8	EYE BOLT WITH 1-CURVED WASHER.1-OPEN THIMBLE	M20x300	1