Table 4-15 Estimated Noise Performance for UHF Radio System

Station P Lalande — Station Q Malu'u

Path Type	: M't Diffraction	Transmission Capacity	: 24 channels
Radio Frequency	: 400 MHz	Receiver Bandwidth	: 1.4 MHz
Modulation System:	FDM	Test Tone Deviation	: 35 KHz r.m.s./ch
Noise Figure	: 6 dB	Figure of System Merit:	150 dB

		- P -	- Q -
1. Latitude		S 8.20.34	S 8.20.35
2. Longitude		E 160. 33. 43	E 160. 37. 58
3. Tower Type		Guyed	Guyed
4. Antenna Type (Size or No. of Elements)		G.P 2mø	G.P 2mø
5. Feeder Type		AF-50-7	AF-50-7
6. Feeder Length in meter		35	25
7. Feeder Loss/m in dB		0.04	0.04
8. Azimuth from True North		1.4	1.0
Path Loss:			
9. Radio Path Length	km		7.8
10. Free-space Propagation Loss	dB		102.3
11. Additional Propagation Loss (50%)	dB		31.5
12. Total Propagation Loss (50%)	dB		133.8
13. Antenna Gain at P	dB		15.5
14. Antenna gain at Q	dB		15.5
15. Duplexer Circuit Loss	dB		3.5
16. Feeder Loss at P	dB		1.4
17. Feeder Loss at Q	dB		1.0
18. Net Loss (50%)	dB		108.7
Median Noise (50%):			
19. Signal/Fade Dependent Noise (Thermal)	dB		61.1
20. Fade Dependent Noise (Thermal)	pWOp		776.3
21. Fade Independent Noise (Thermal+Intermodulation)	pWOp		500
22. Interference Noise	pWOp		0
23. Radio Link Noise, Total	pWOp		1,276.3
24. Carrier Multiplex Noise	pWOp		430
25. Signal/Noise, Total	dB		57.7
Short Period Noise (99.9%):			
26. Fading Depth	dB		5
27. Signal/Fade Dependent Noise (Thermal)	dB		56.1
28. Fade Dependent Noise (Thermal)	pWOp		2,454.7
29. Radio Link Noise, Total	pWOp		2,954.7
30. Signal/Noise, Total	dB		54.7
Fading Margin:			
31. Transmitter Output Power	dBm		40
32. Receiver Input Level (50%)	dBm		-68.7
33. Threshold Level	dBm		-97
34. Margin to Threshold	dB		28.3

Note: 1) Carrier Multiplex Noise, Nmux
Nmux=(Nsg (0 pWOp) + Ng (140 pWOp) + Nch (75 pWOp)) x 2 = 430 pWOp

2) Interference Noise
Amount of the interference noise includs the amount of feeder echo and propagation distortion noises.

LIST OF ILLUSTRATIONS

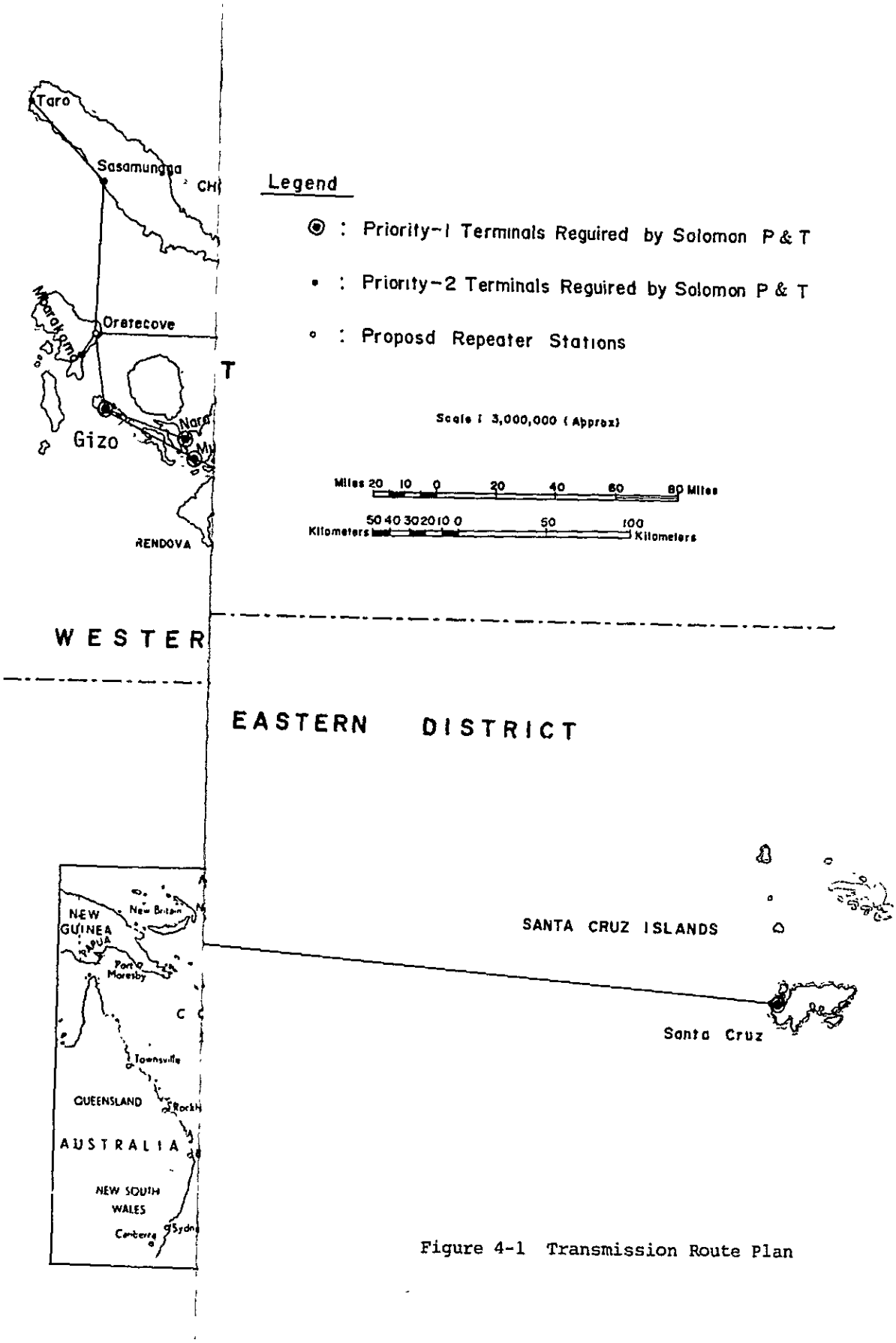


Figure 4-1 Transmission Route Plan

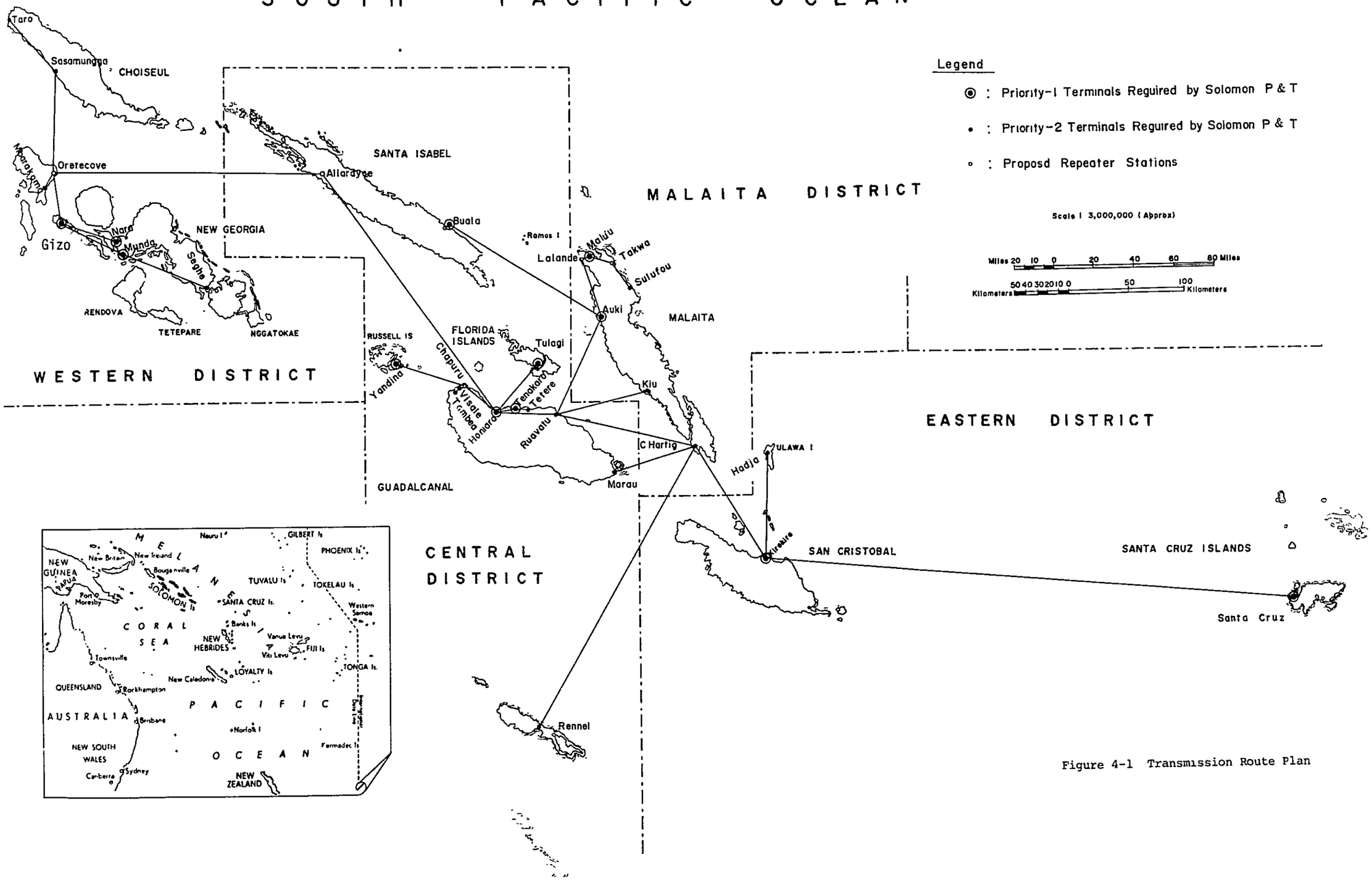


Figure 4-1 Transmission Route Plan

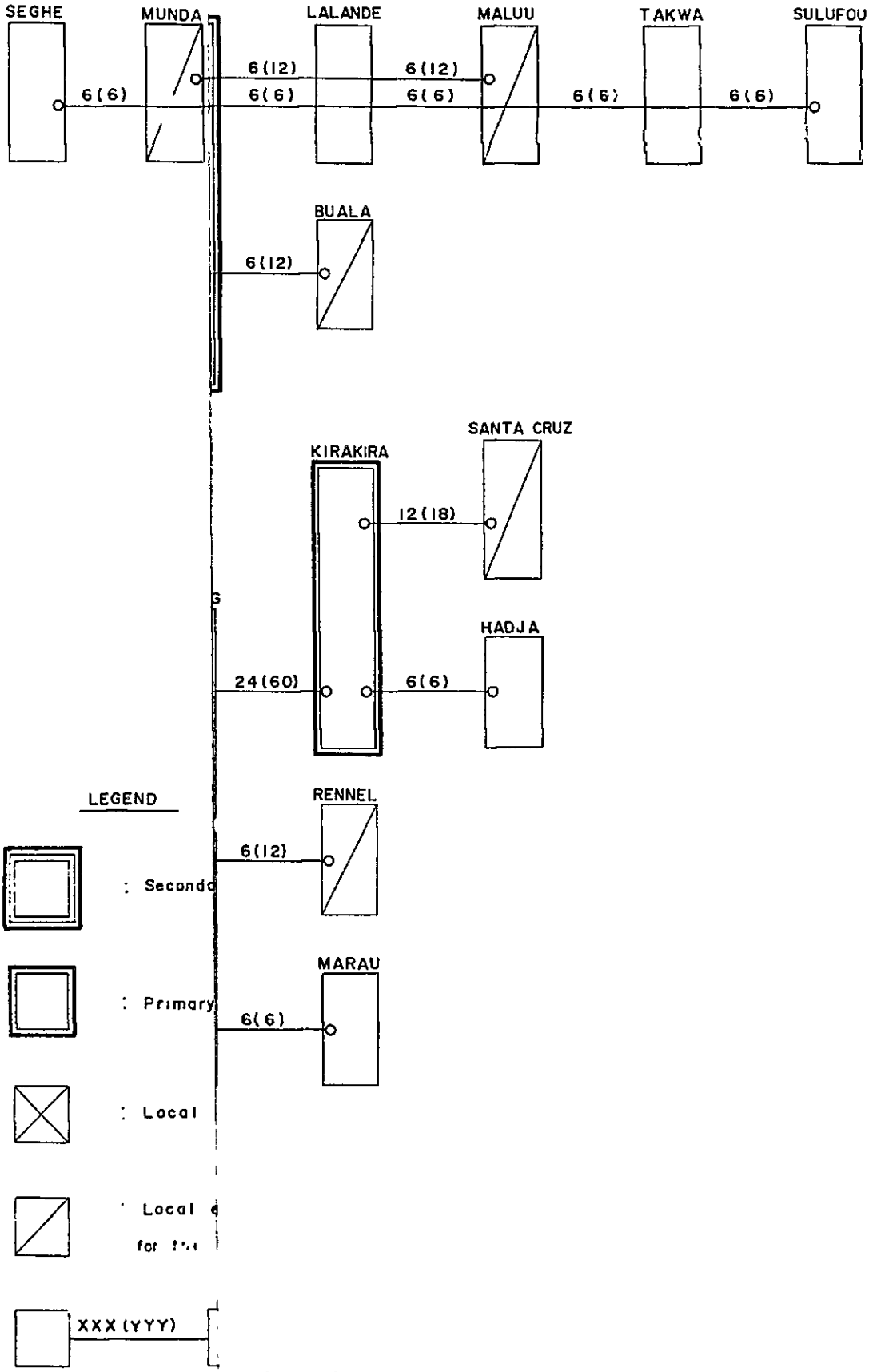


Figure 4-2 Channelling Plan for The Initial and The Ultimate Stages(1986 and 2006)

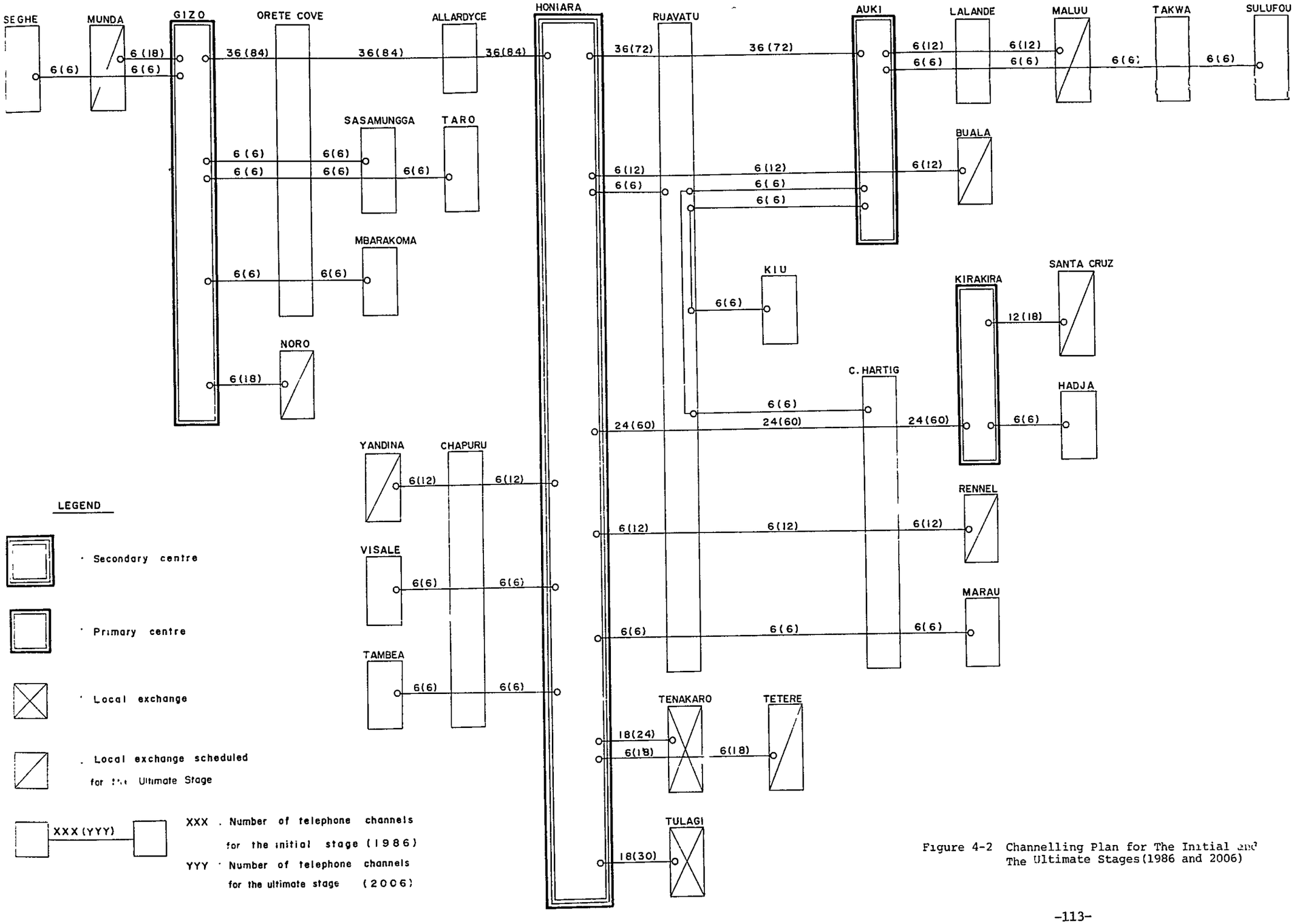


Figure 4-2 Channelling Plan for The Initial and The Ultimate Stages(1986 and 2006)

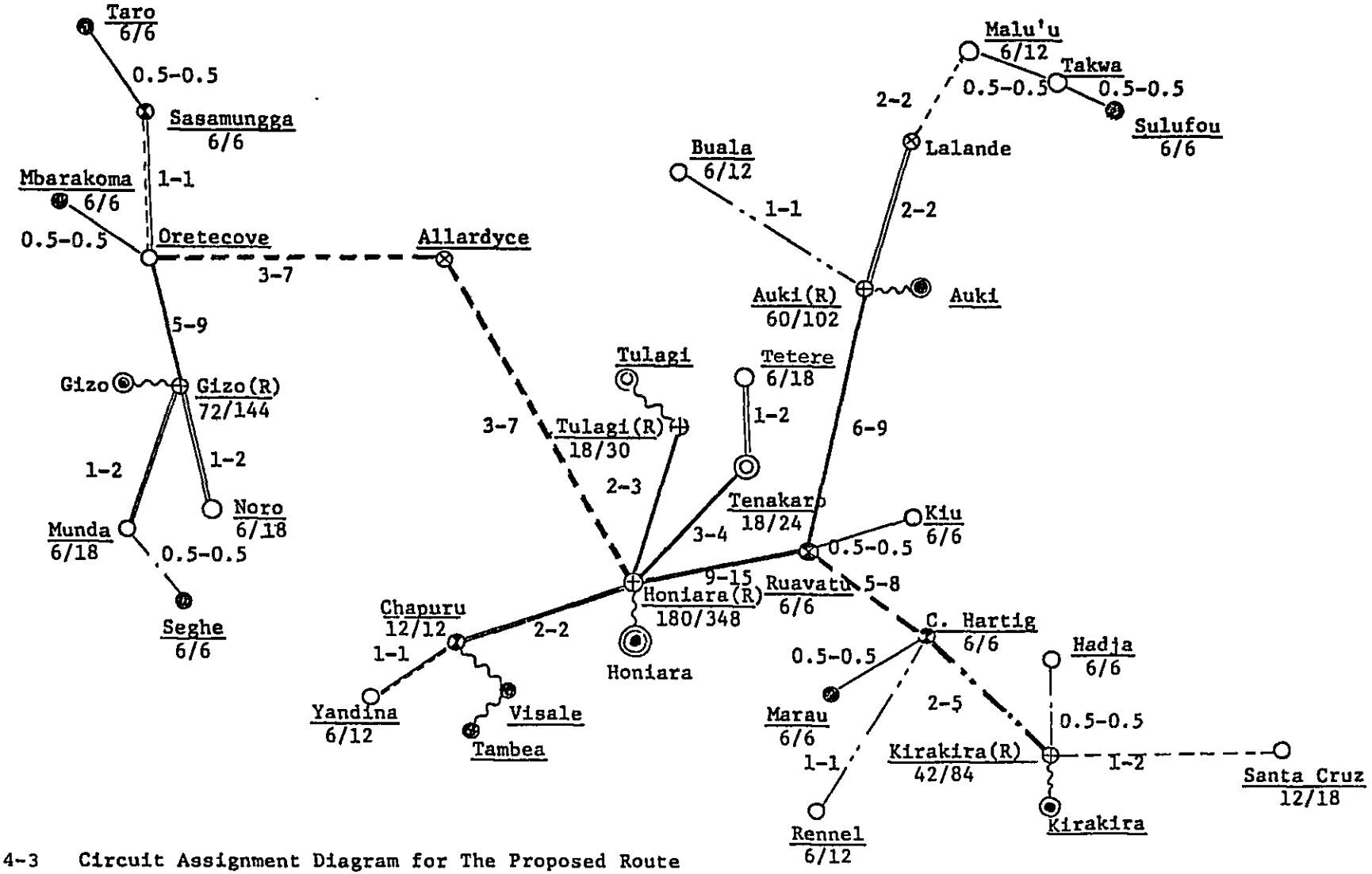


Figure 4-3 Circuit Assignment Diagram for The Proposed Route

Legend for Figure 4-3 :

	Initial Stage	Ultimate Stage
◎	Zone Centre	Secondary Zone Centres
◉	Local Exchanges	Primary Zone Centres
◎	Local Exchanges	Local Exchanges
○	Terminals for Rural Subs.	Terminals for Local Exchanges
●	Terminals for Rural Subs.	Terminals for Rural Subs.
⊗	Radio Repeaters	Radio Repeaters
⊕	Radio Terminals	Radio Terminals
⊗	Radio Repeaters with Drop & Insertion Functions	Radio Repeaters with Drop & Insertion Functions

——— UHF 120ch LOS System

- - - - UHF Trans-horizone 120ch System

—·—·— UHF Trans-horizone 60ch System

═══ UHF 24ch LOS System

– – – – UHF Trans-horizone 24ch System

═ ═ ═ UHF 12ch LOS System

—·—·— UHF Trans-horizone 12ch System

——— UHF 6ch LOS System

— - — UHF Trans-horizon 6ch System

~~~ Cable Lines

X/Y
- Number of Circuits Required for The Ultimate Stage, 2006
- Number of Circuits Required for The Initial Stage, 1986

X-Y
- Number of Groups Required for The Ultimate Stage, 2006
- Number of Groups Required for The Initial Stage, 1986
~~~

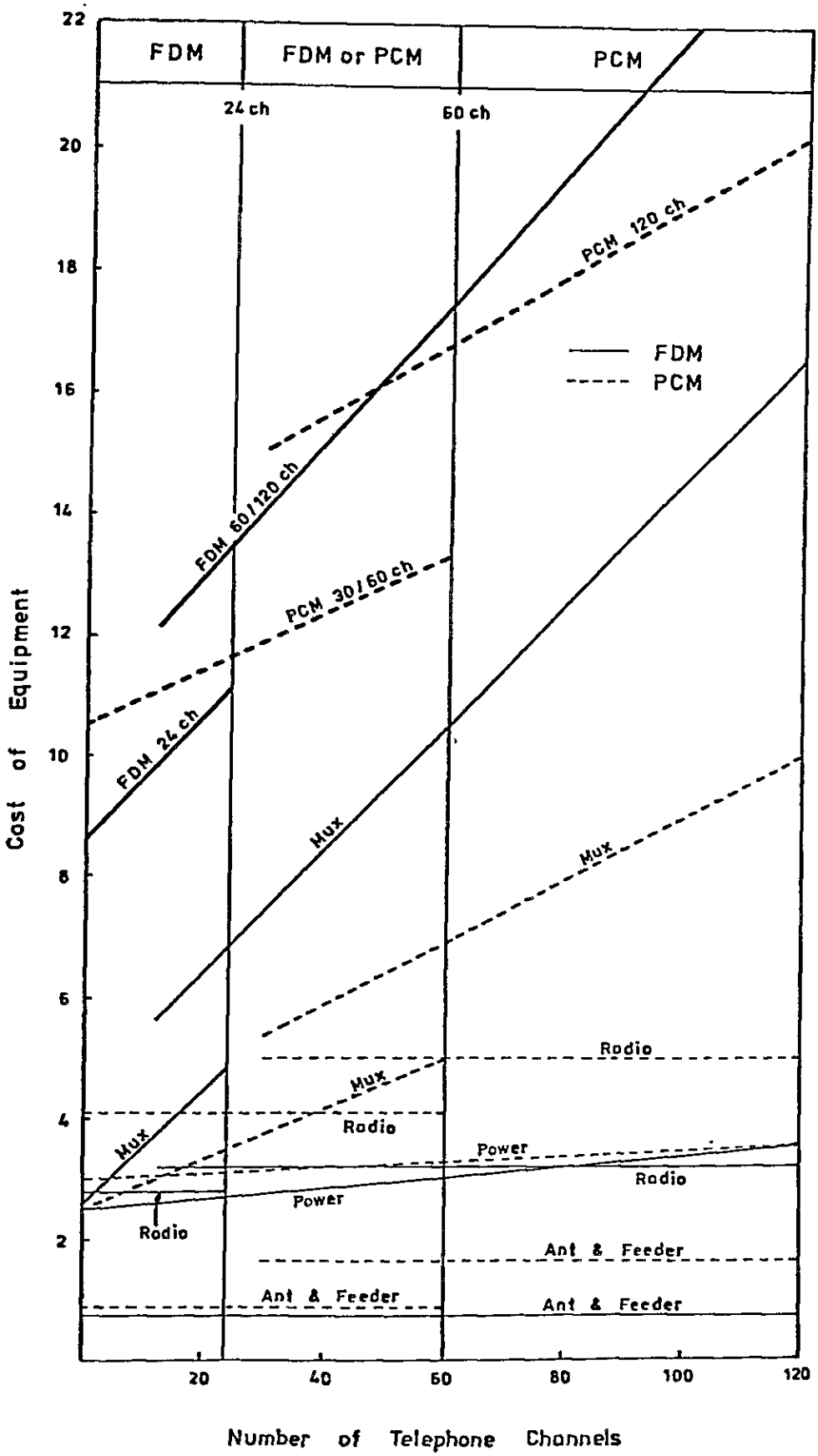


Figure 4-4 Cost Comparison between FDM and PCM Systems in 900 MHz Band

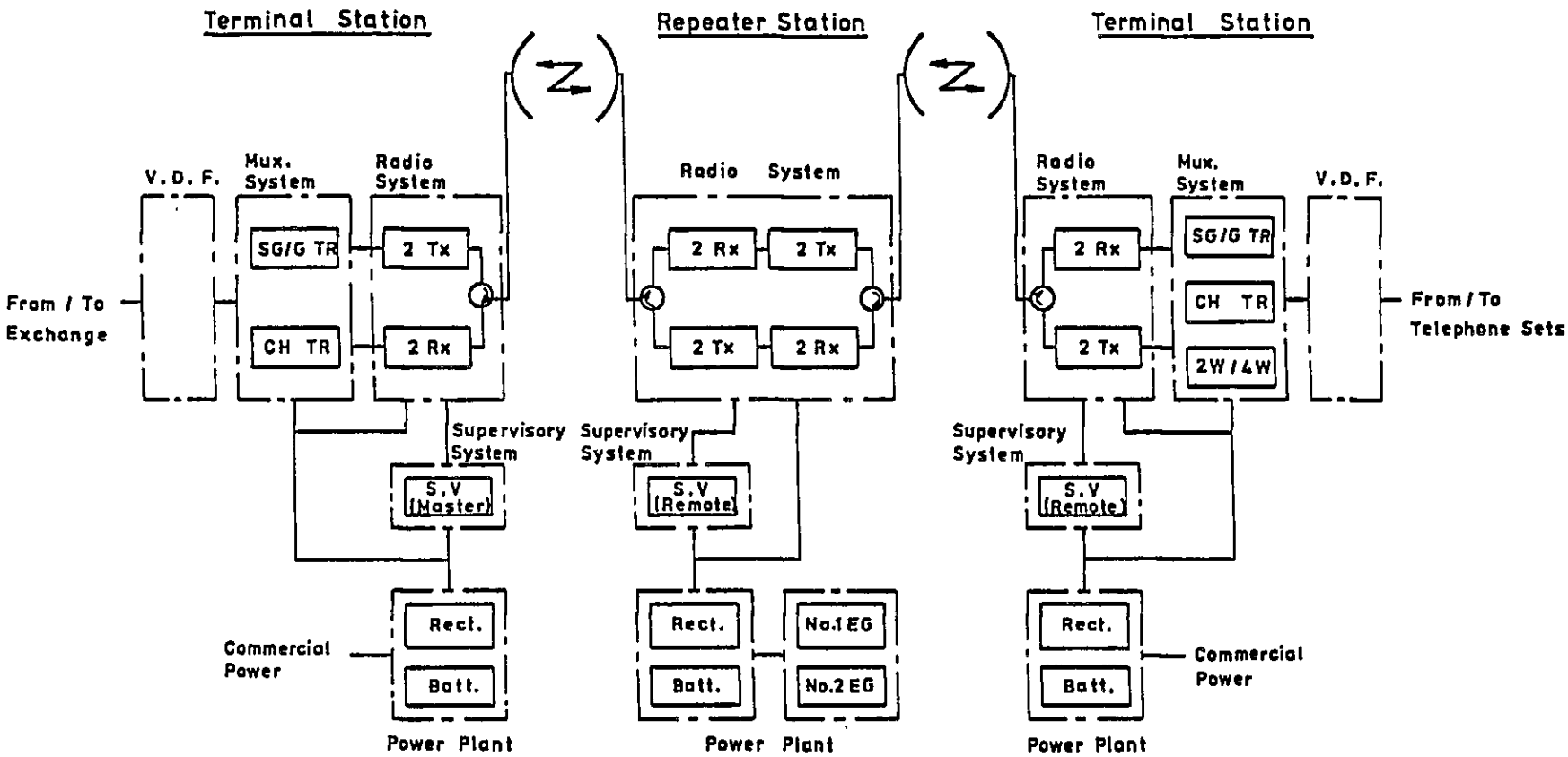
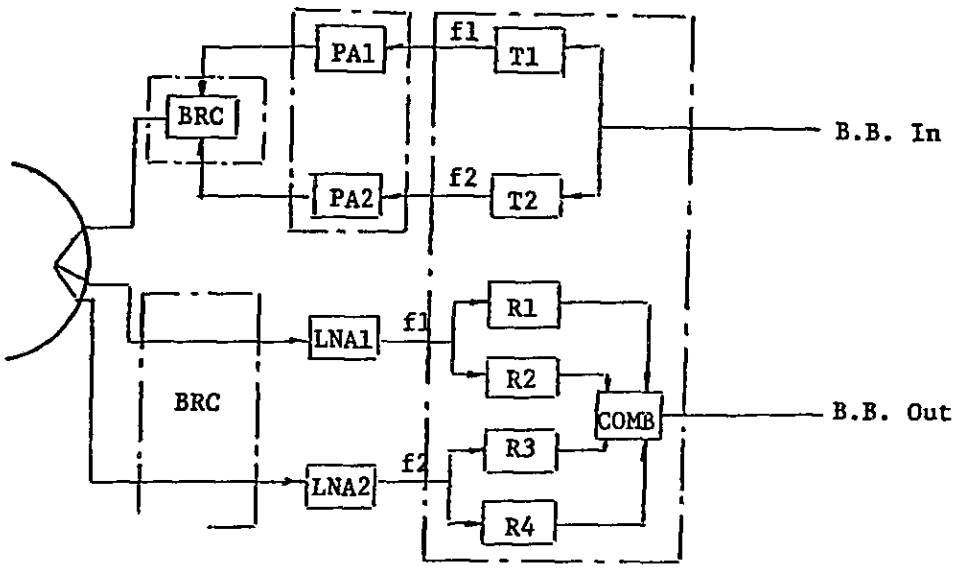
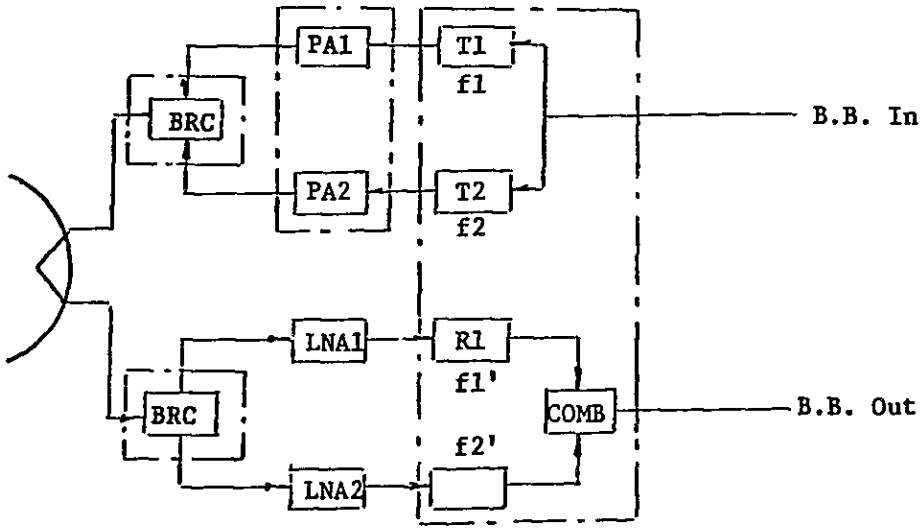


Figure 4-5 Typical Terrestrial Radio System Configuration



1) Quadruple Diversity System
(Dual Frequency Plus Angular Diversity)



2) Dual Diversity System
(Dual Frequency Diversity)

Figure 4-6 Typical Diversity Systems

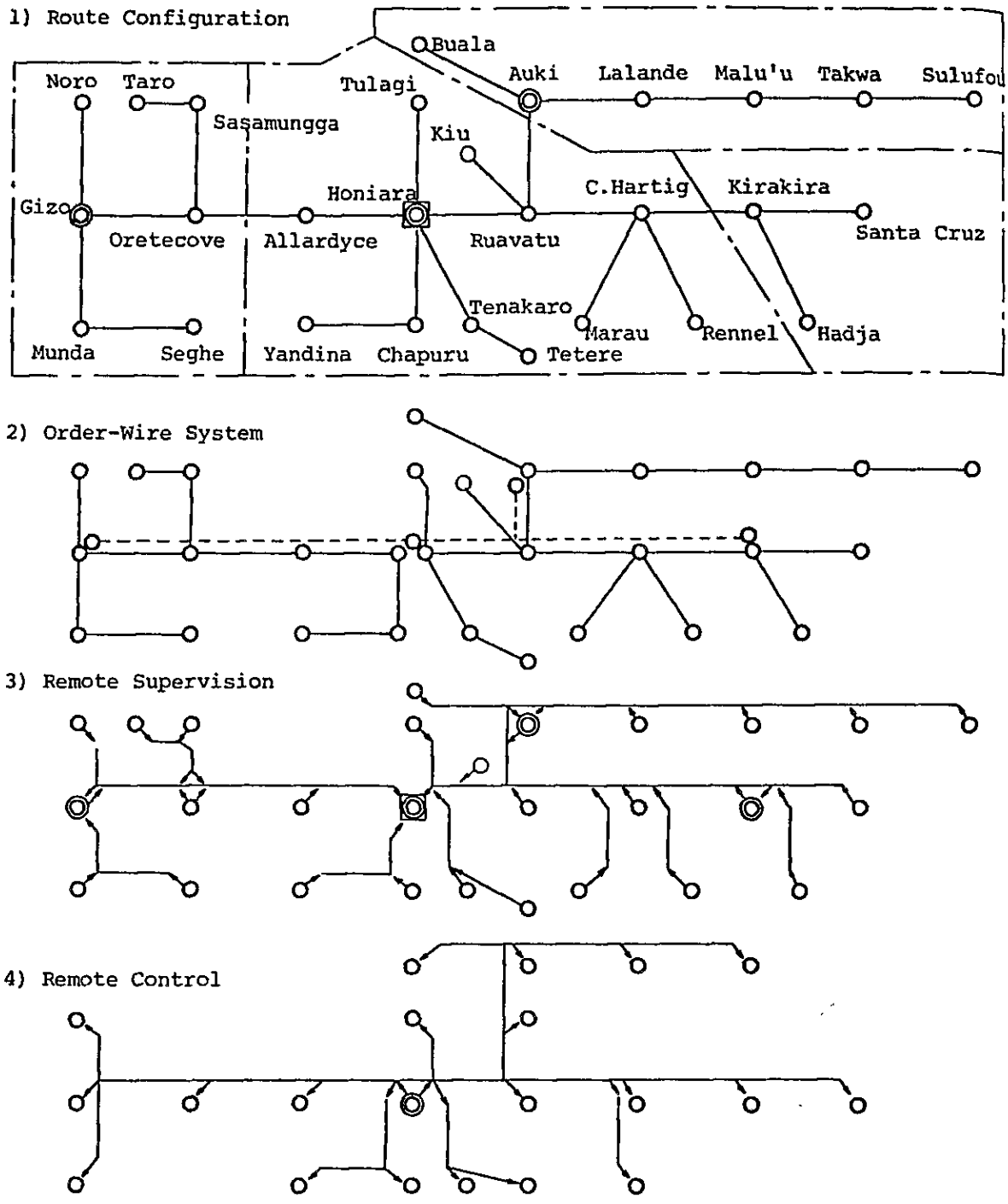
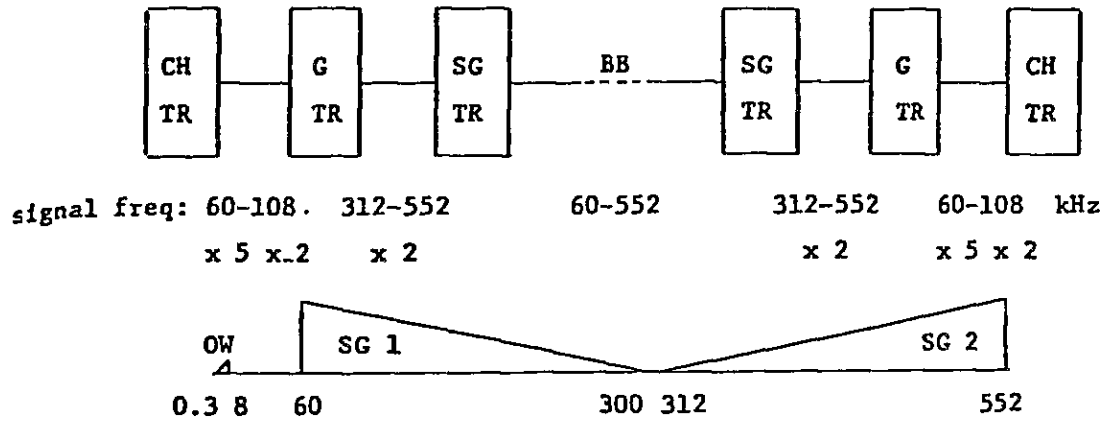
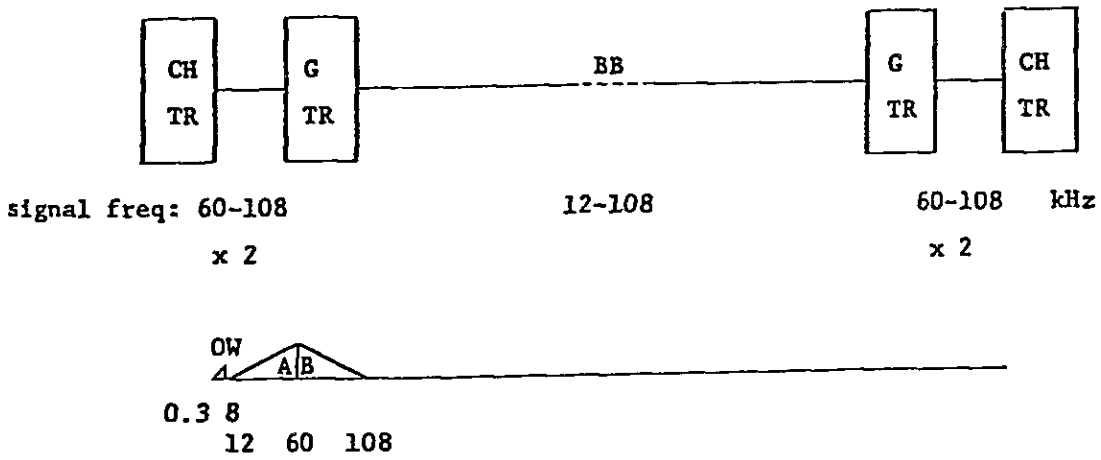


Figure 4-7 Remote Supervisory and Control System



(1) 120ch System



(2) 24ch System

Figure 4-8 Multiplex System Configuration and Baseband Frequency Arrangement

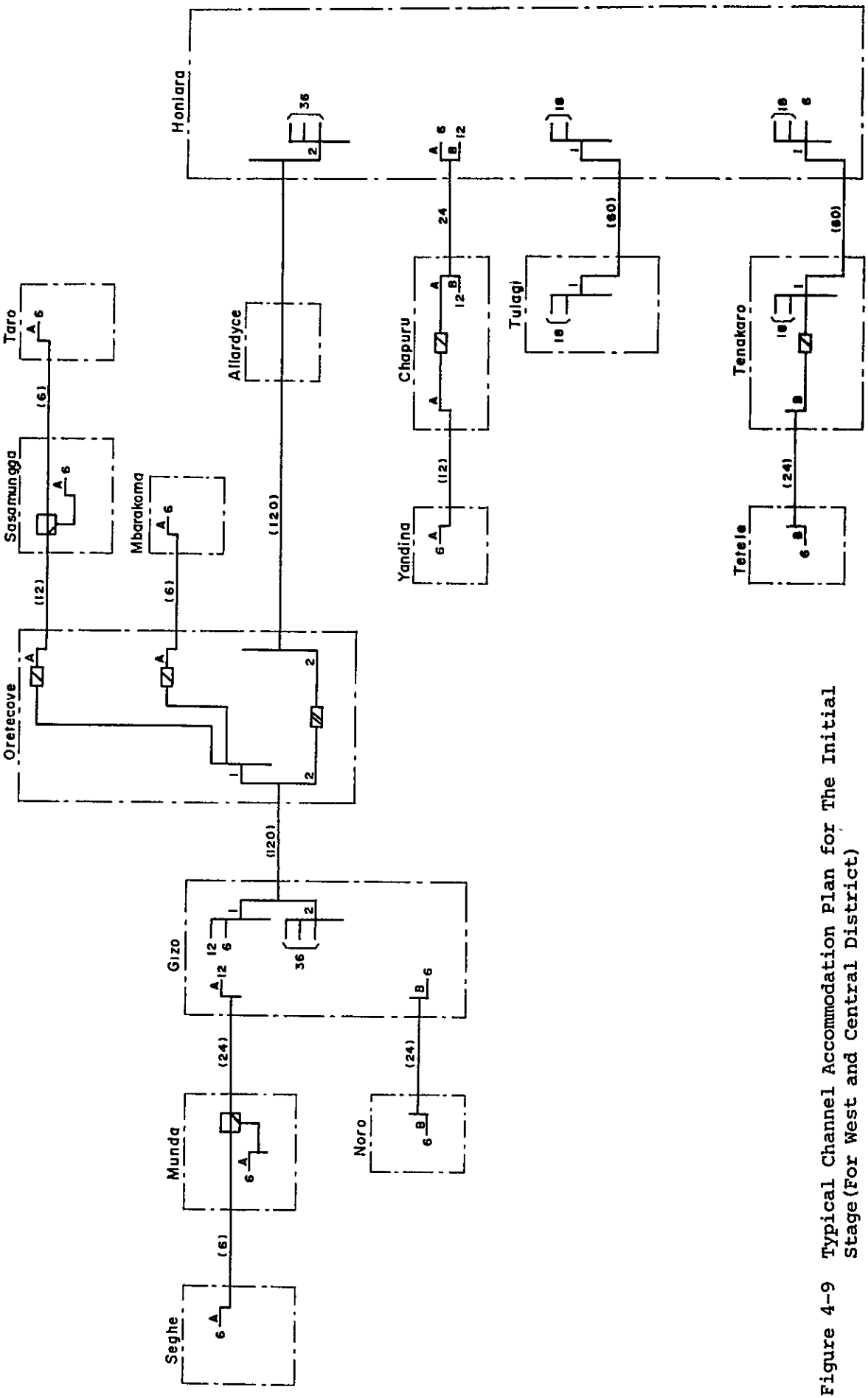


Figure 4-9 Typical Channel Accommodation Plan for The Initial Stage(For West and Central District)

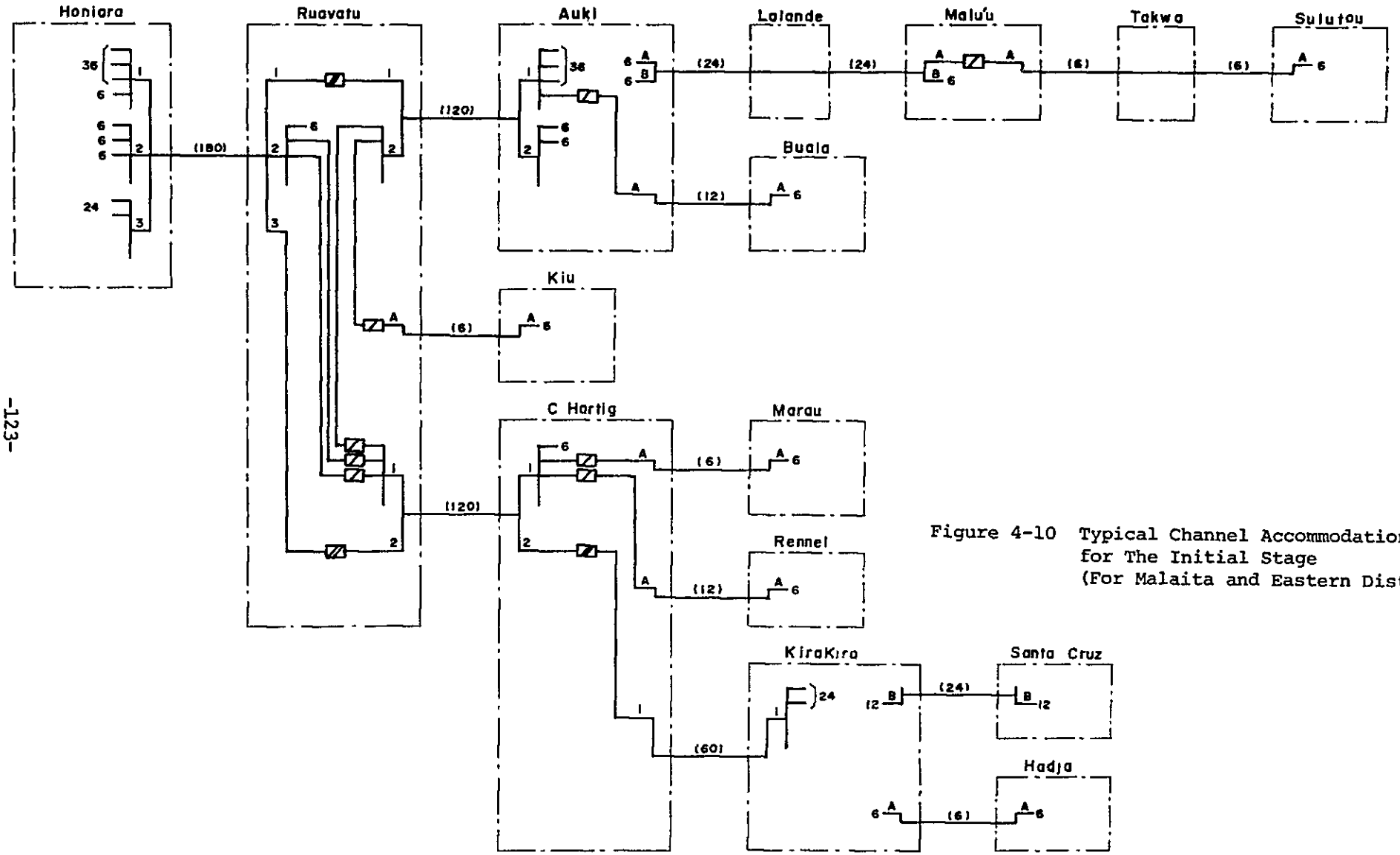


Figure 4-10 Typical Channel Accommodation Plan for The Initial Stage (For Malaita and Eastern District)

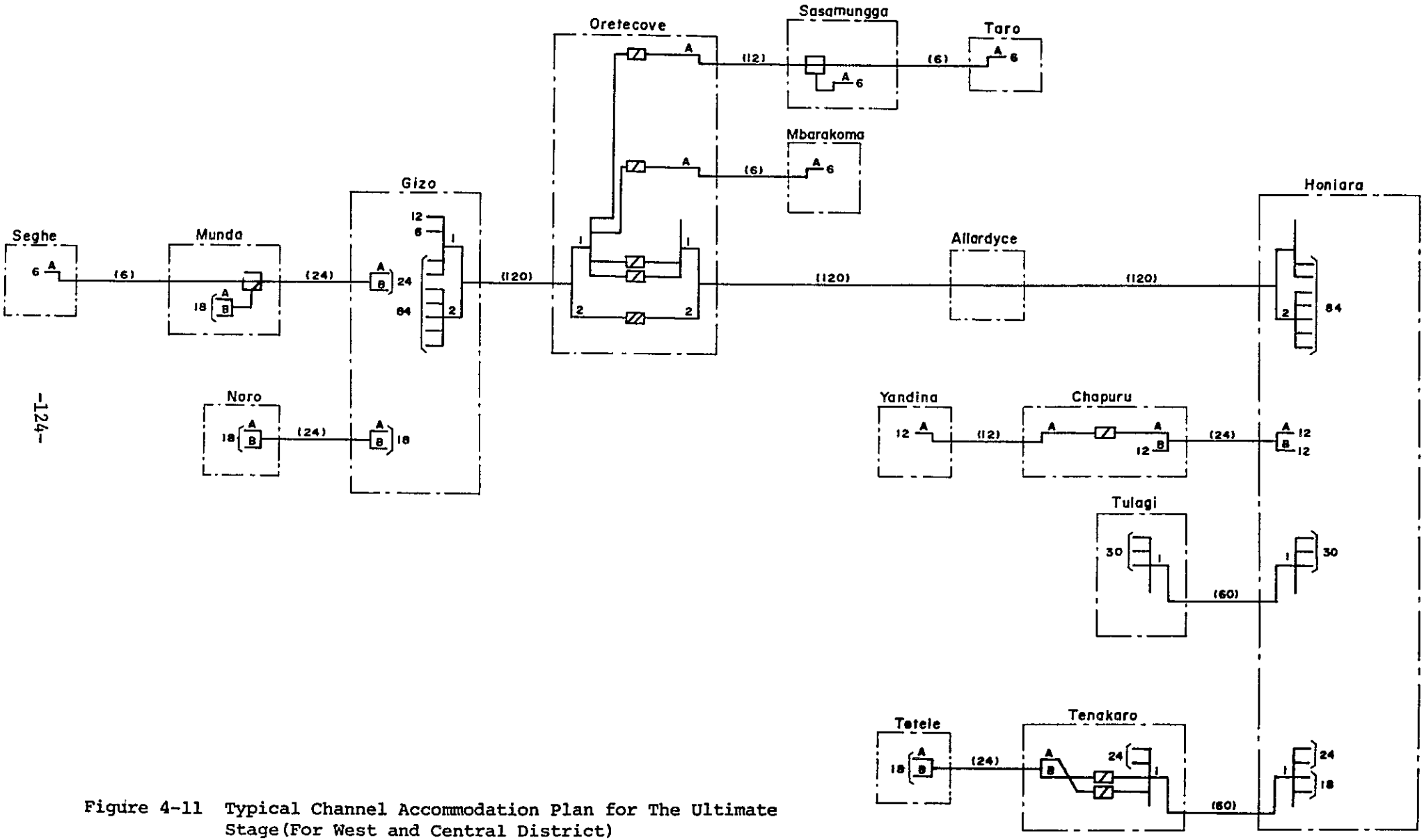


Figure 4-11 Typical Channel Accommodation Plan for The Ultimate Stage(For West and Central District)

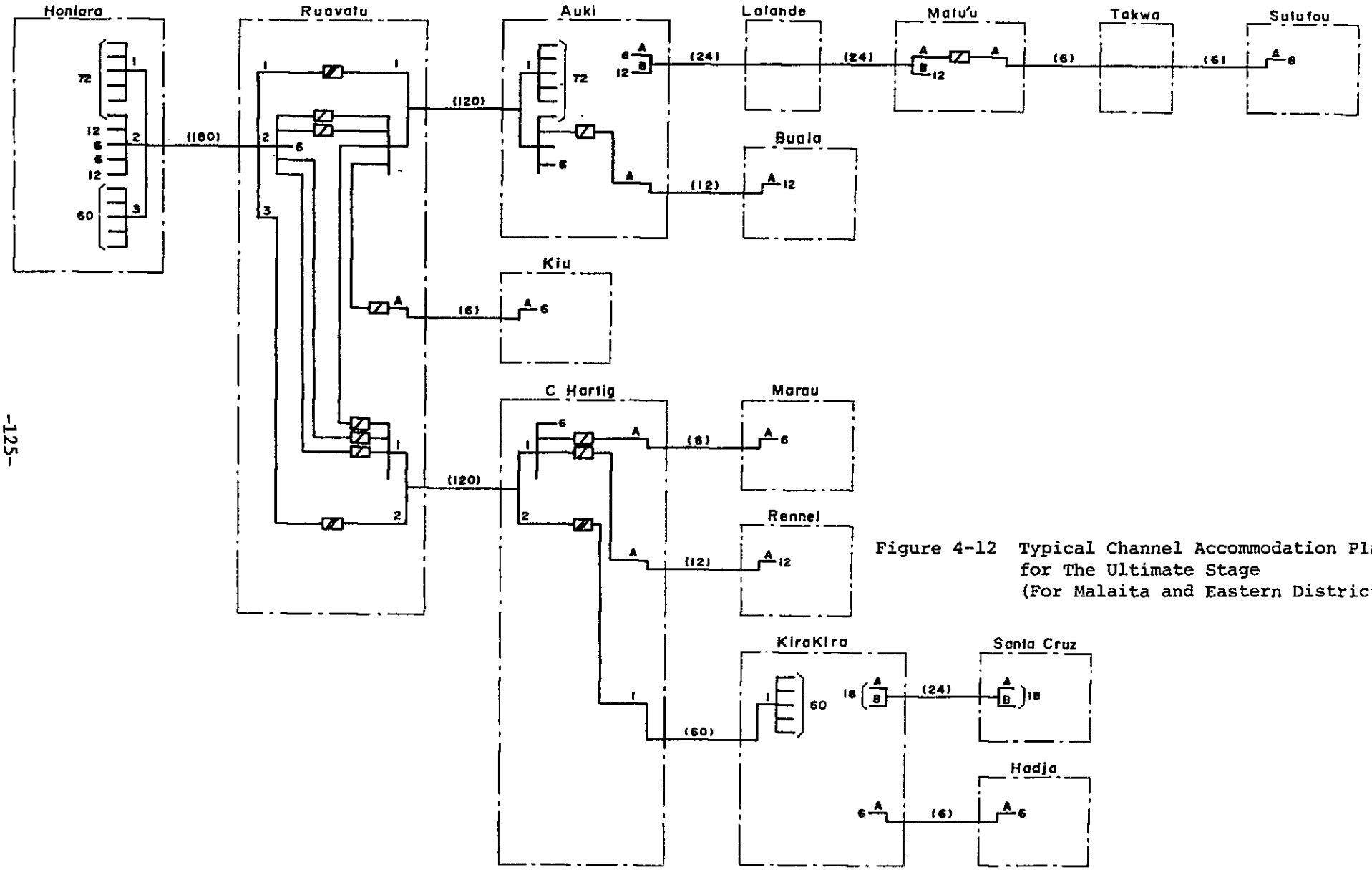


Figure 4-12 Typical Channel Accommodation Plan for The Ultimate Stage (For Malaita and Eastern District)

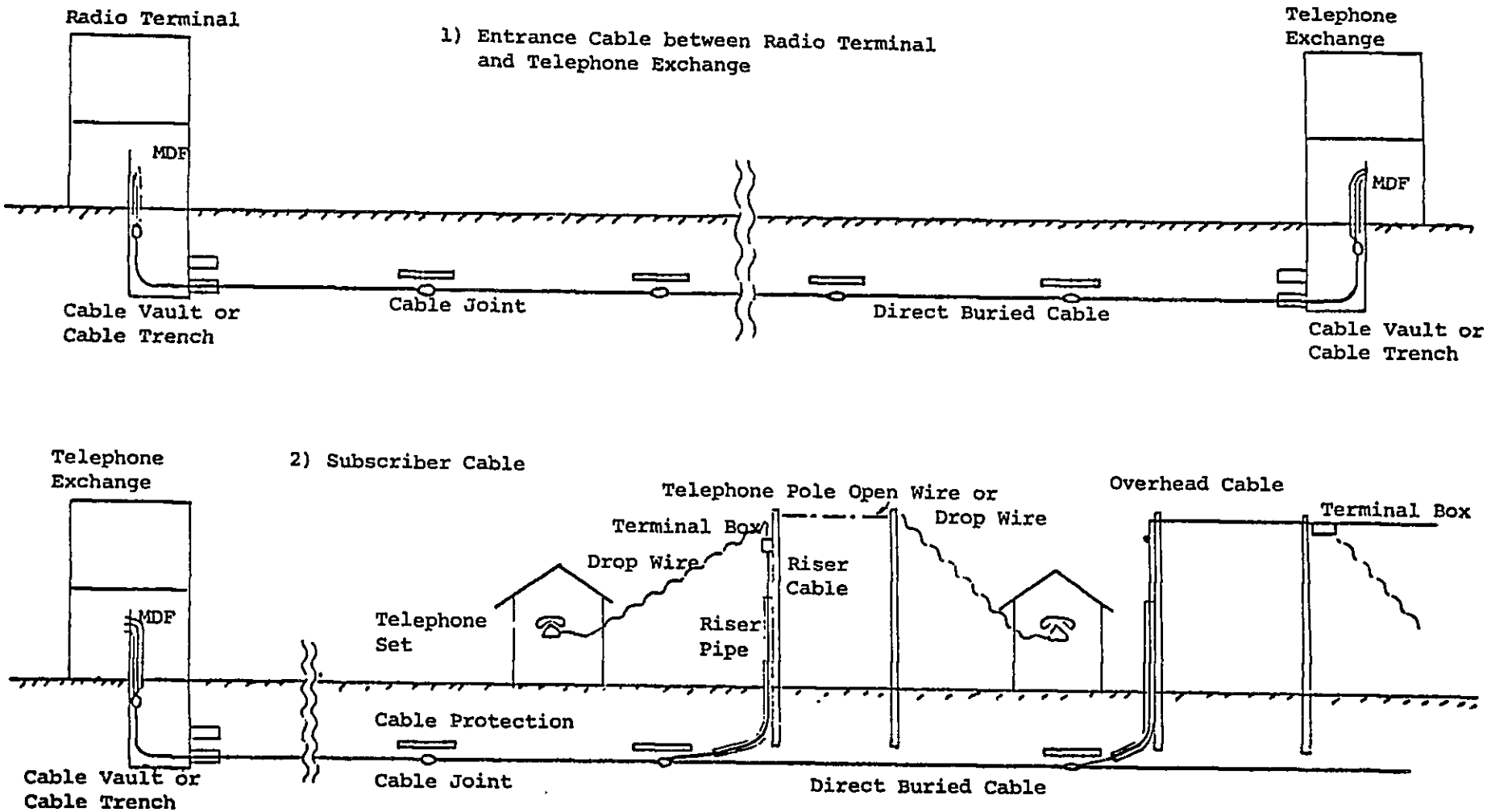


Figure 4-13 Typical Layout for Cable System

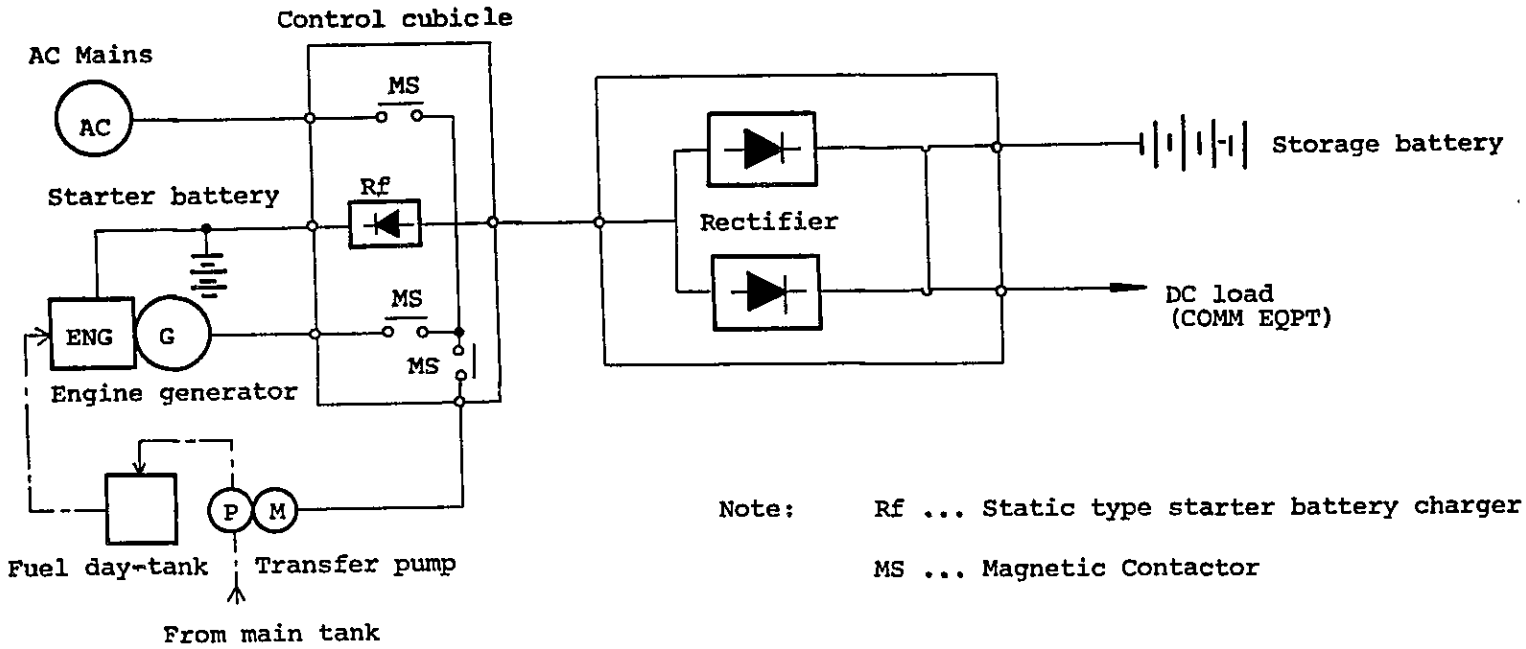


Figure 4-14 Power Supply System using Standby Engine Generator on Full-Floating Basis at AC Mains Station

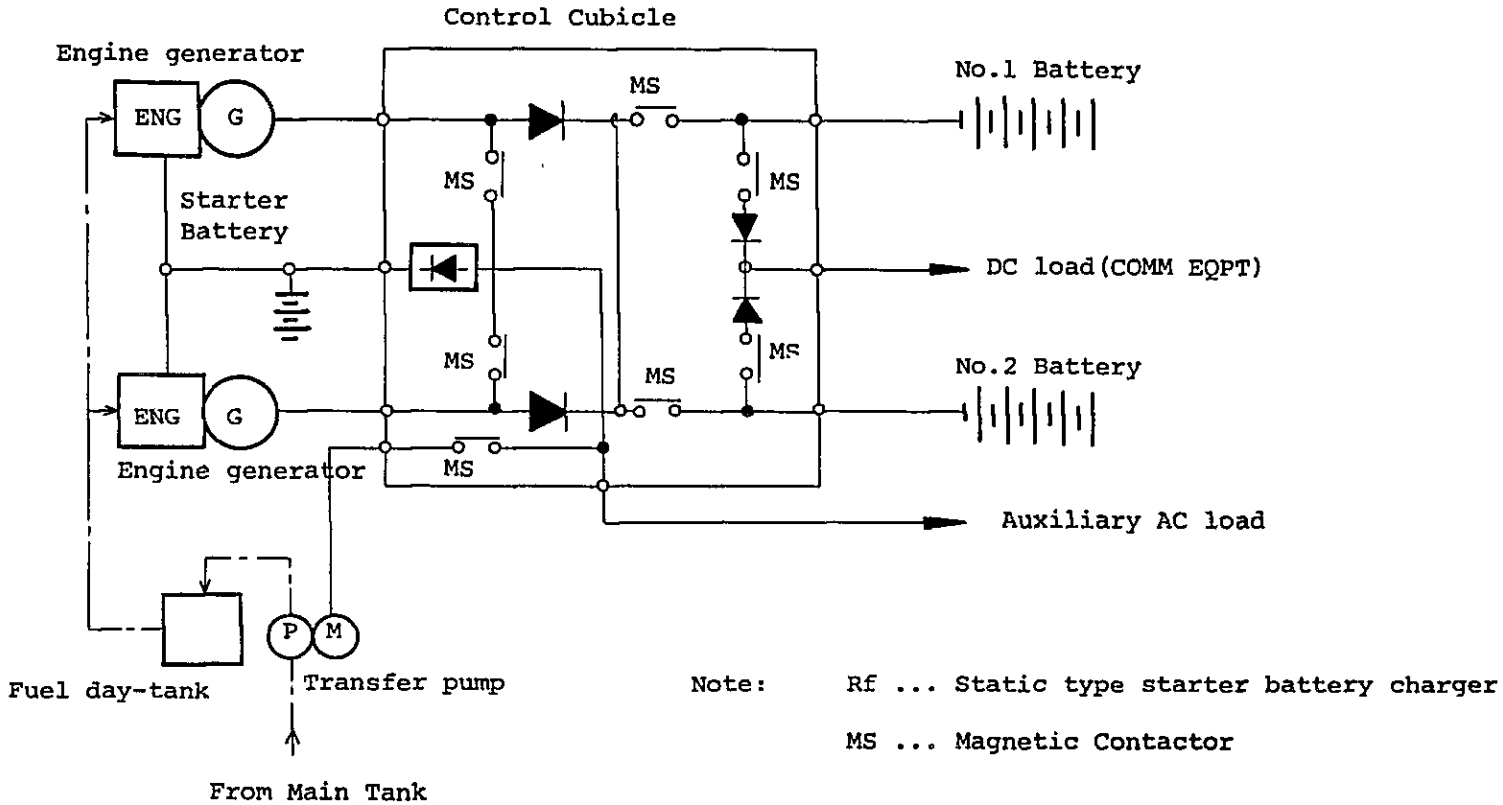


Figure 4-15 Power Supply System using Dual Prime Engine Generator on Charge-Discharge

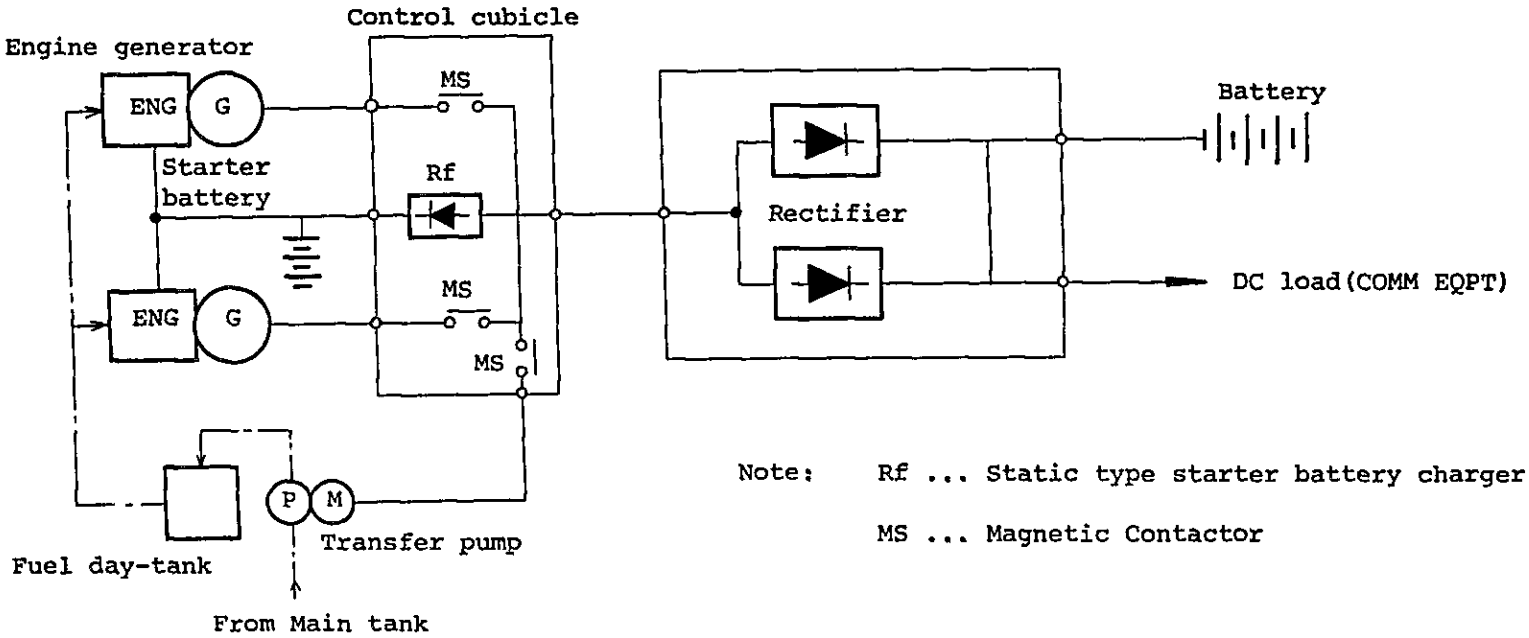


Figure 4-16 Power Supply System using Dual Prime Engine Generator on Full-Floating Basis

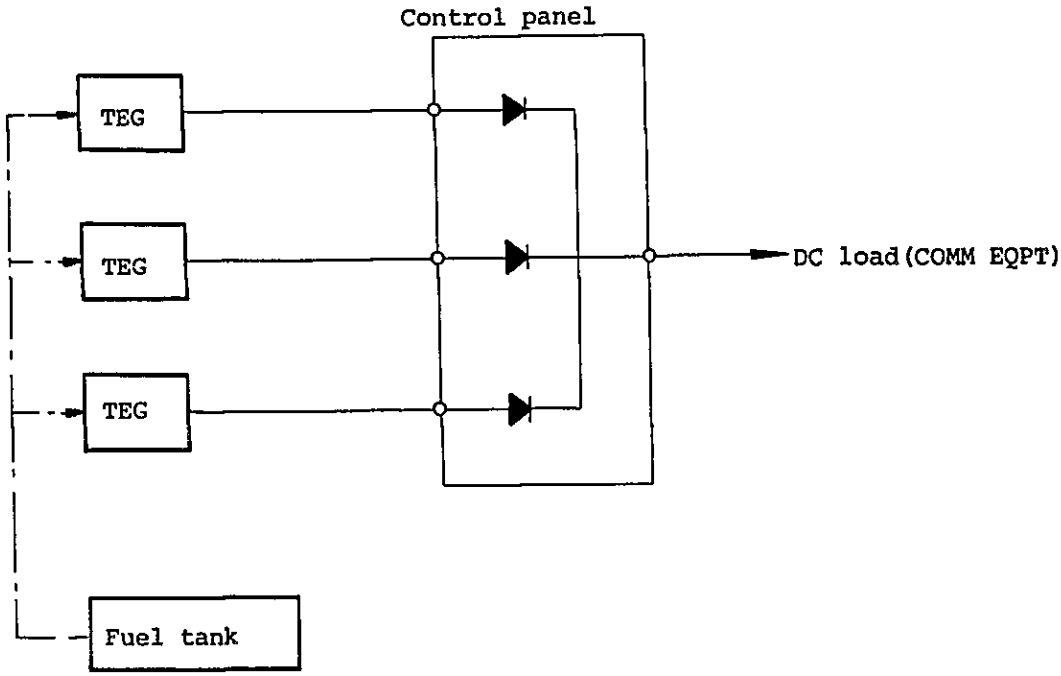


Figure 4-17 Power Supply System using Thermoelectric Generator

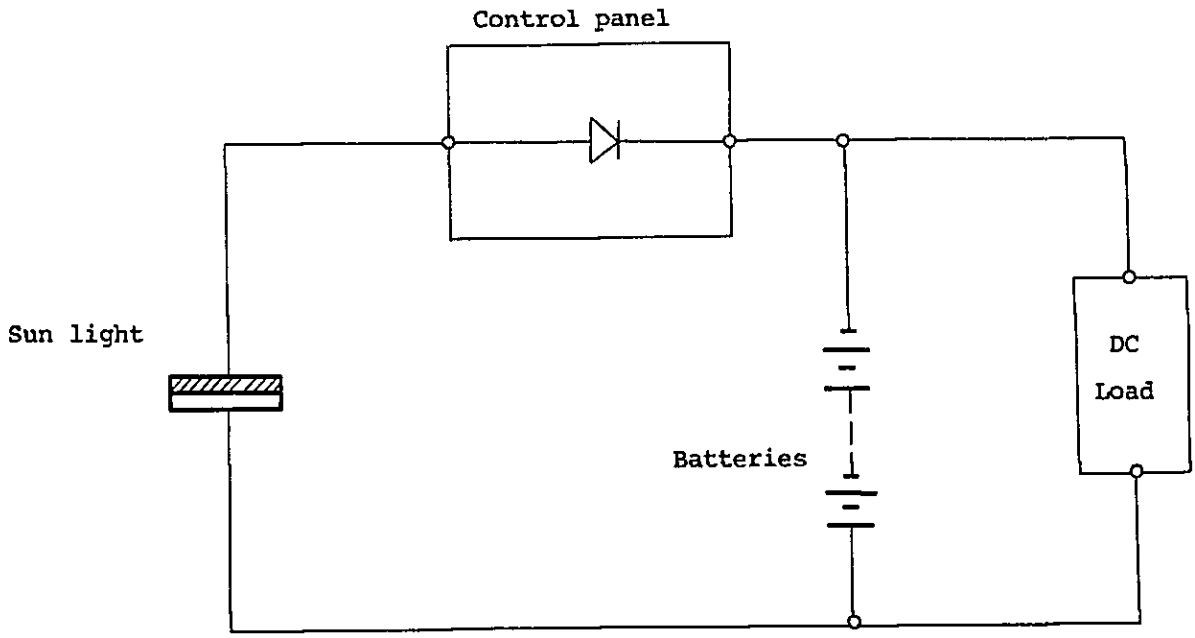


Figure 4-18 Power Supply System using Solar Cells

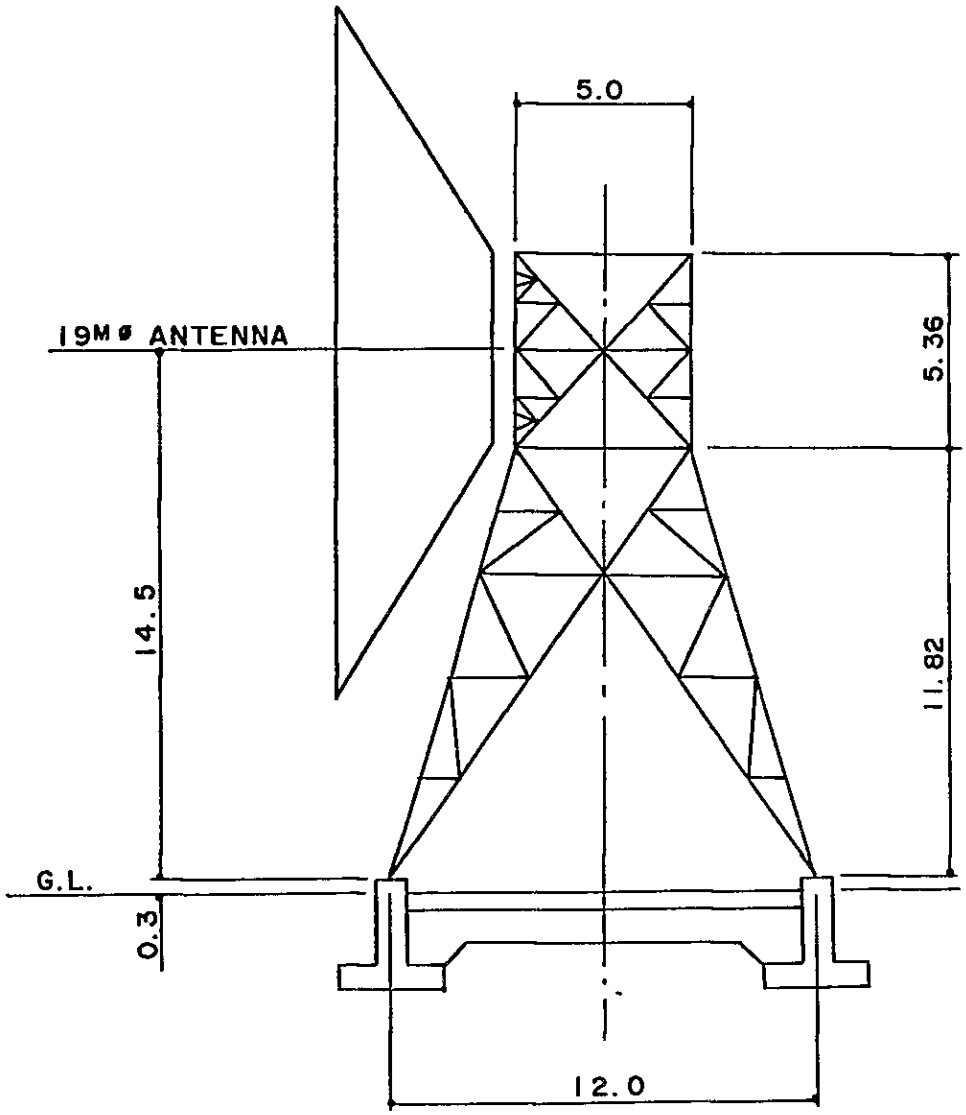


Figure 4-19 Typical Layout for Self Supporting Structure

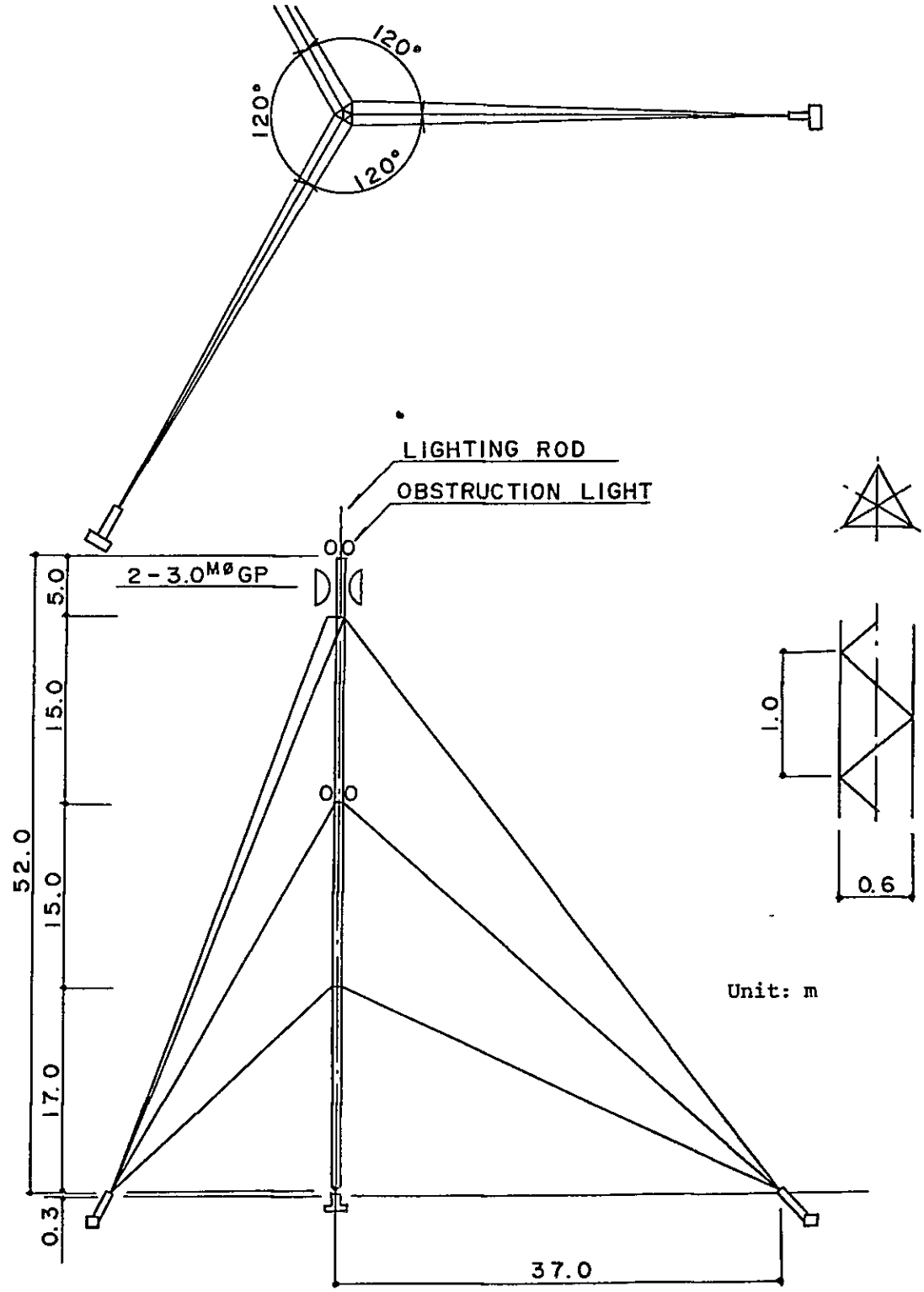


Figure 4-20 Typical Layout for Guyed Mast

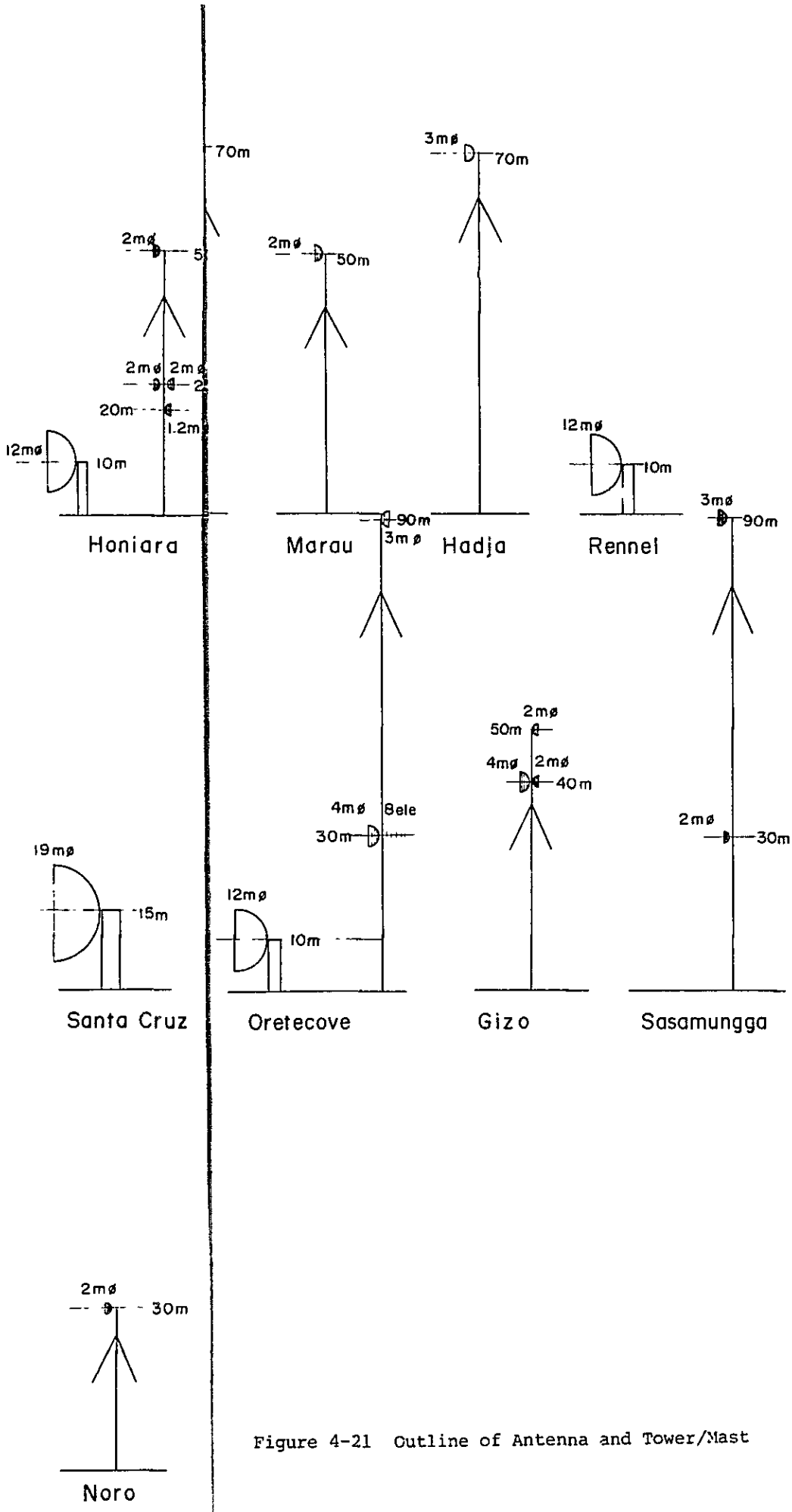


Figure 4-21 Outline of Antenna and Tower/Mast

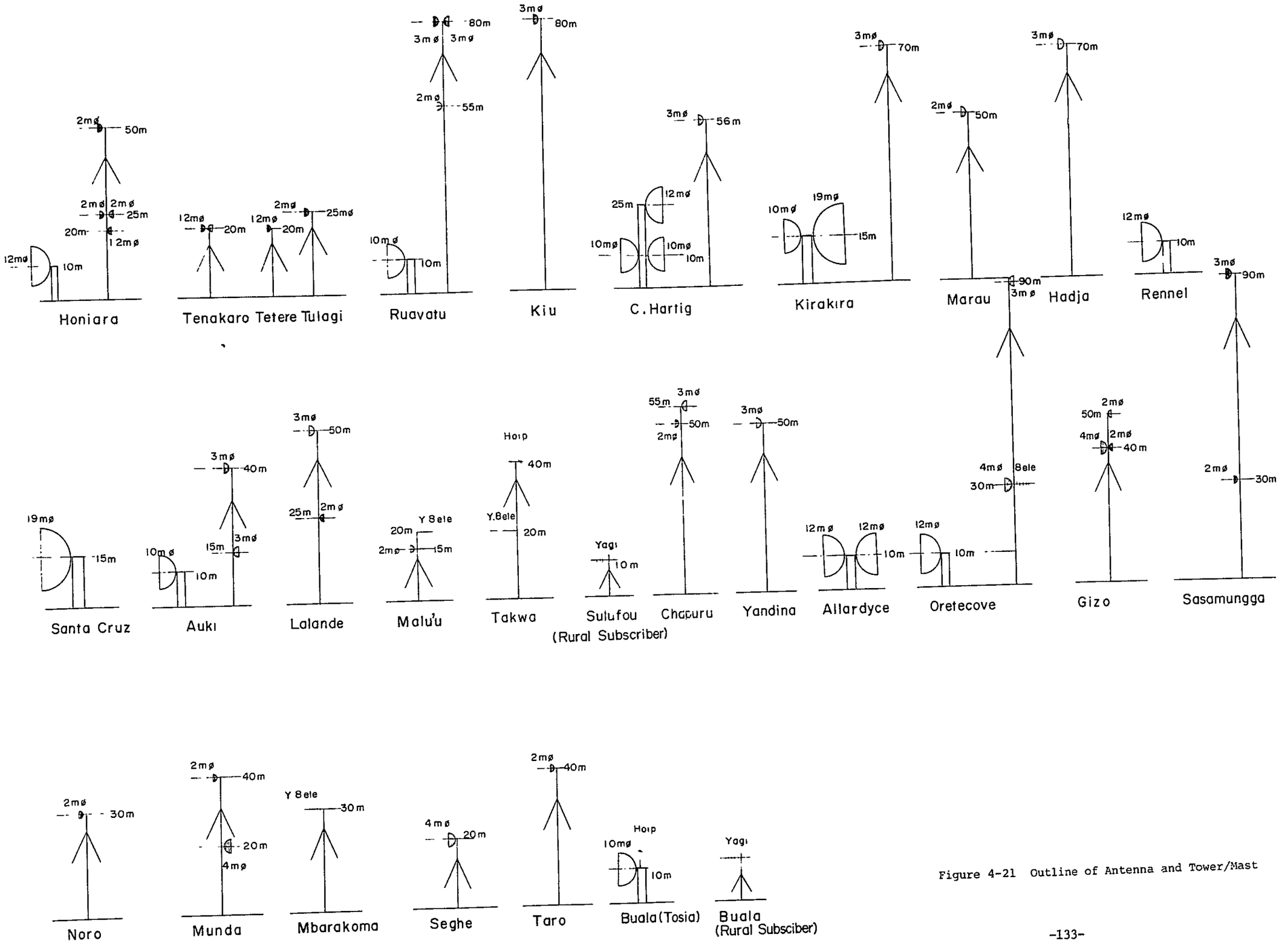


Figure 4-21 Outline of Antenna and Tower/Mast

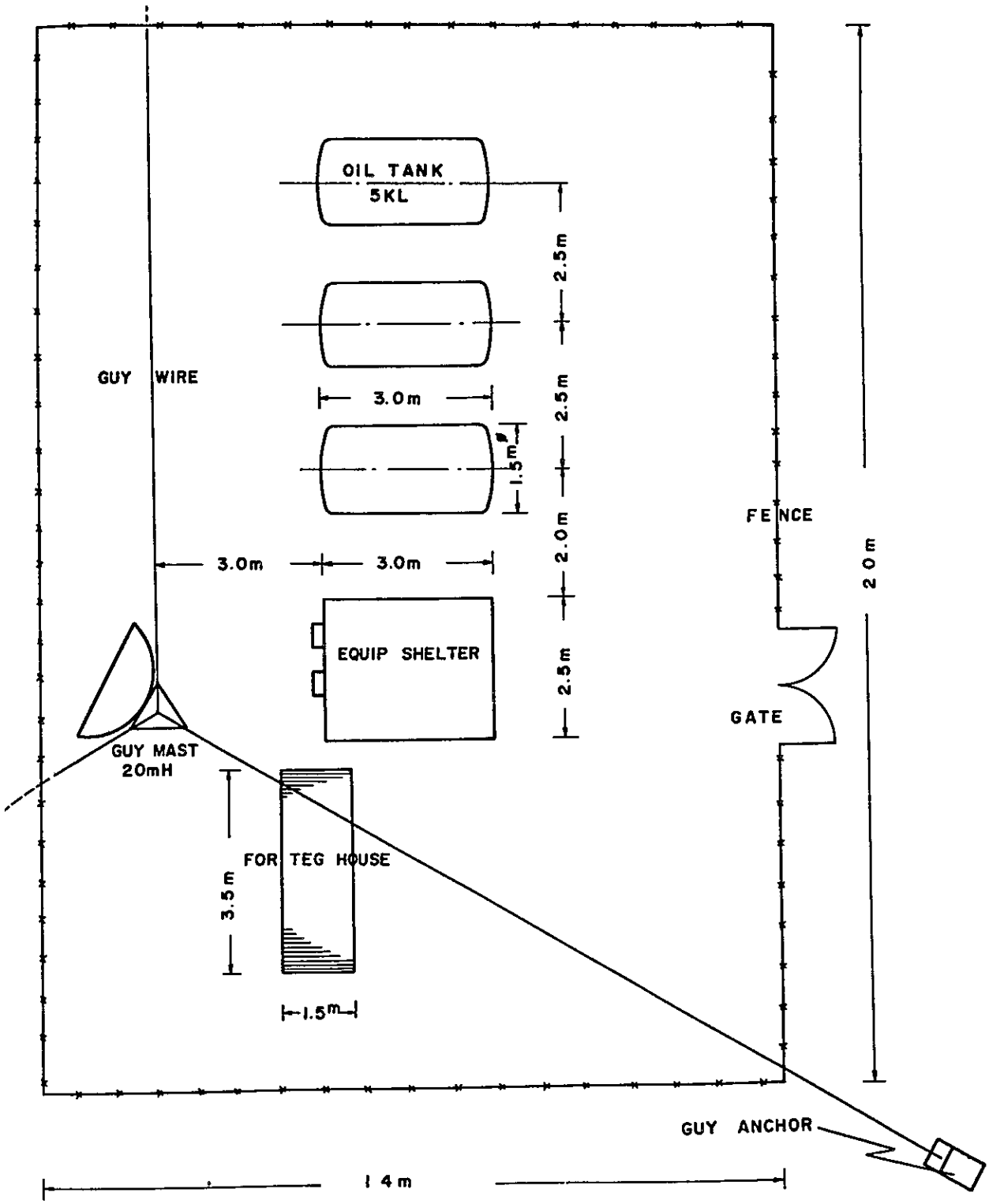


Figure 4-22 Typical Site Layout for UHF Repeater (1/2)

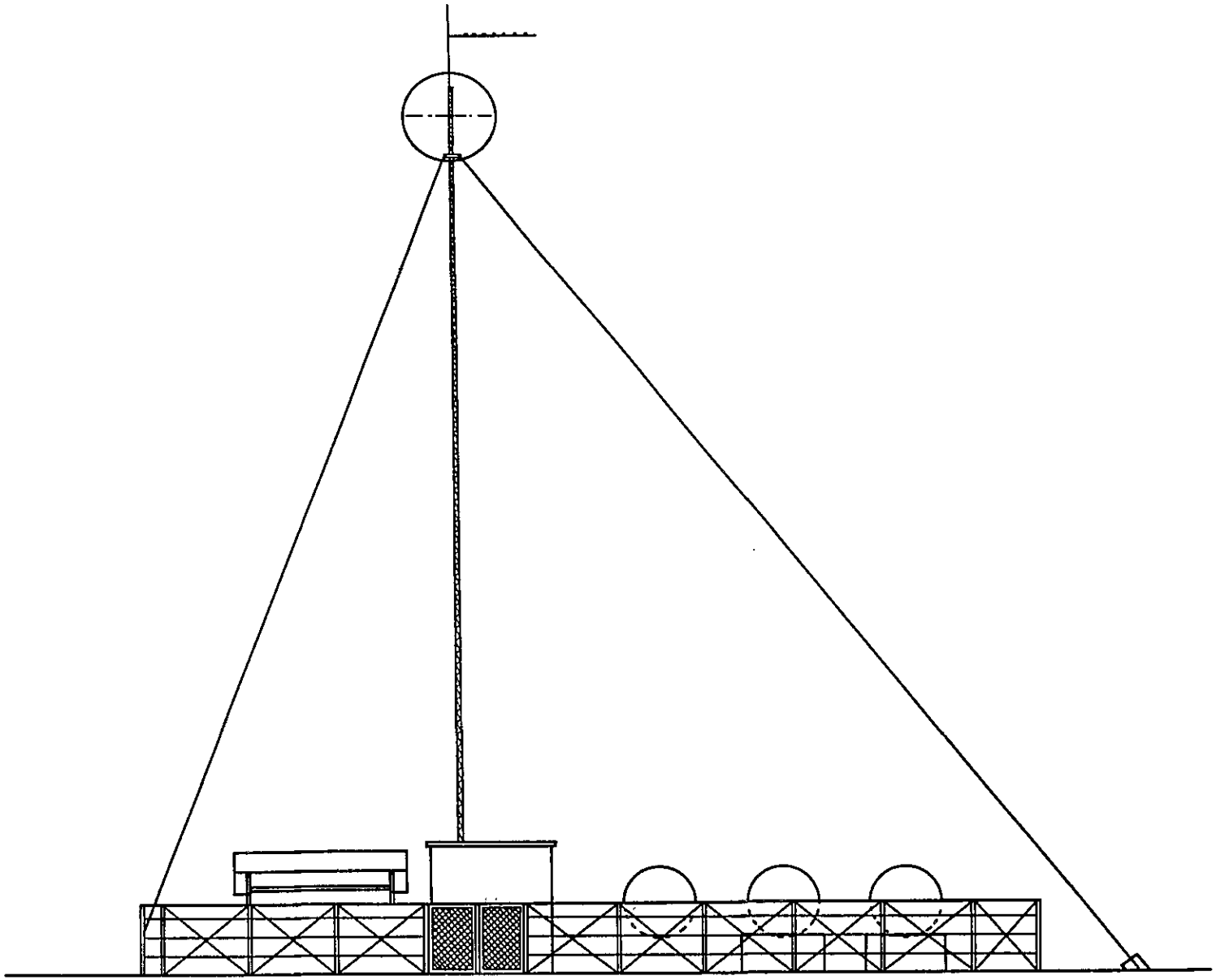


Figure 4-22 Typical Site Layout for UHF Repeater(2/2)

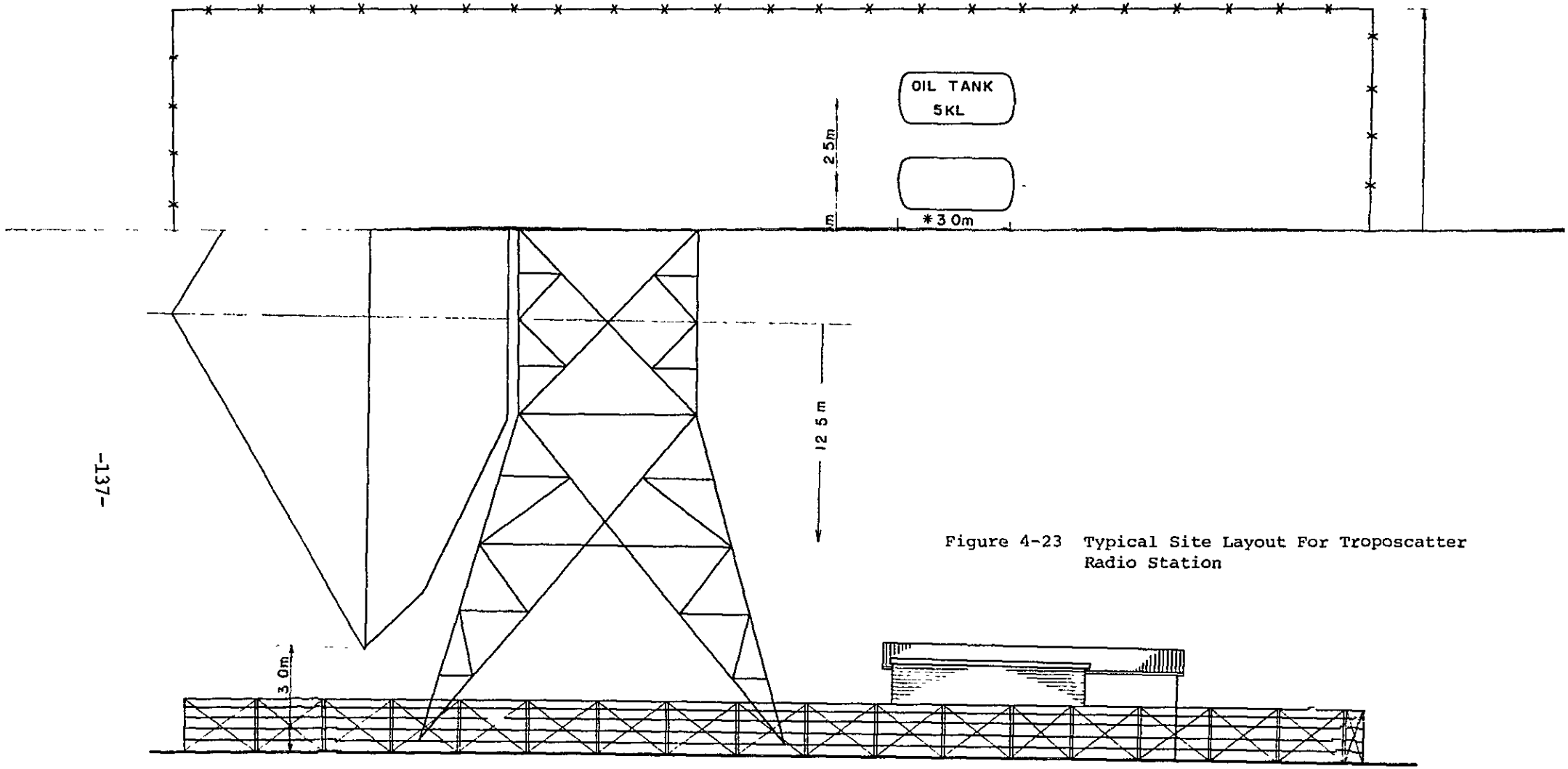
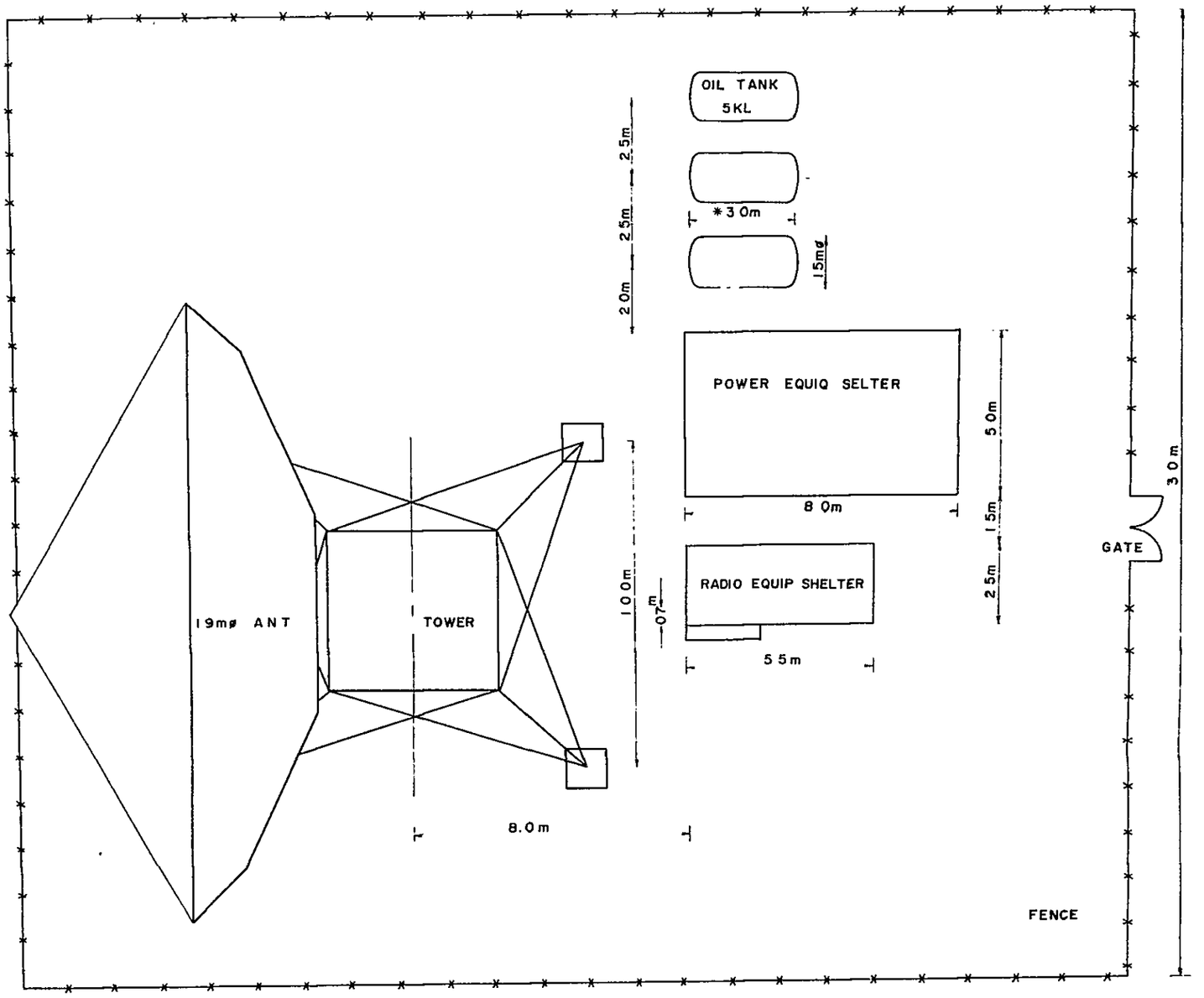


Figure 4-23 Typical Site Layout For Troposcatter Radio Station



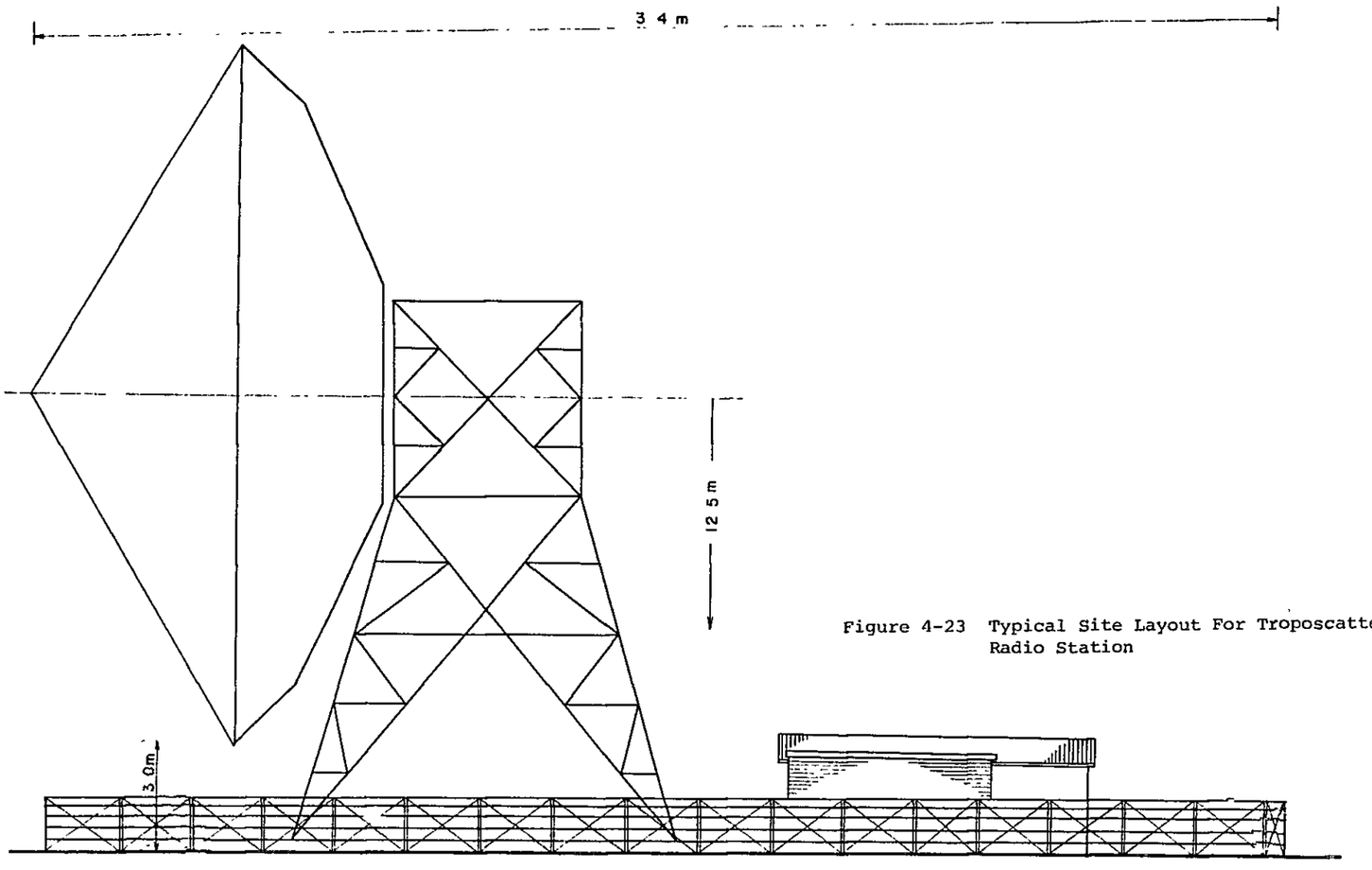


Figure 4-23 Typical Site Layout For Troposcatter Radio Station

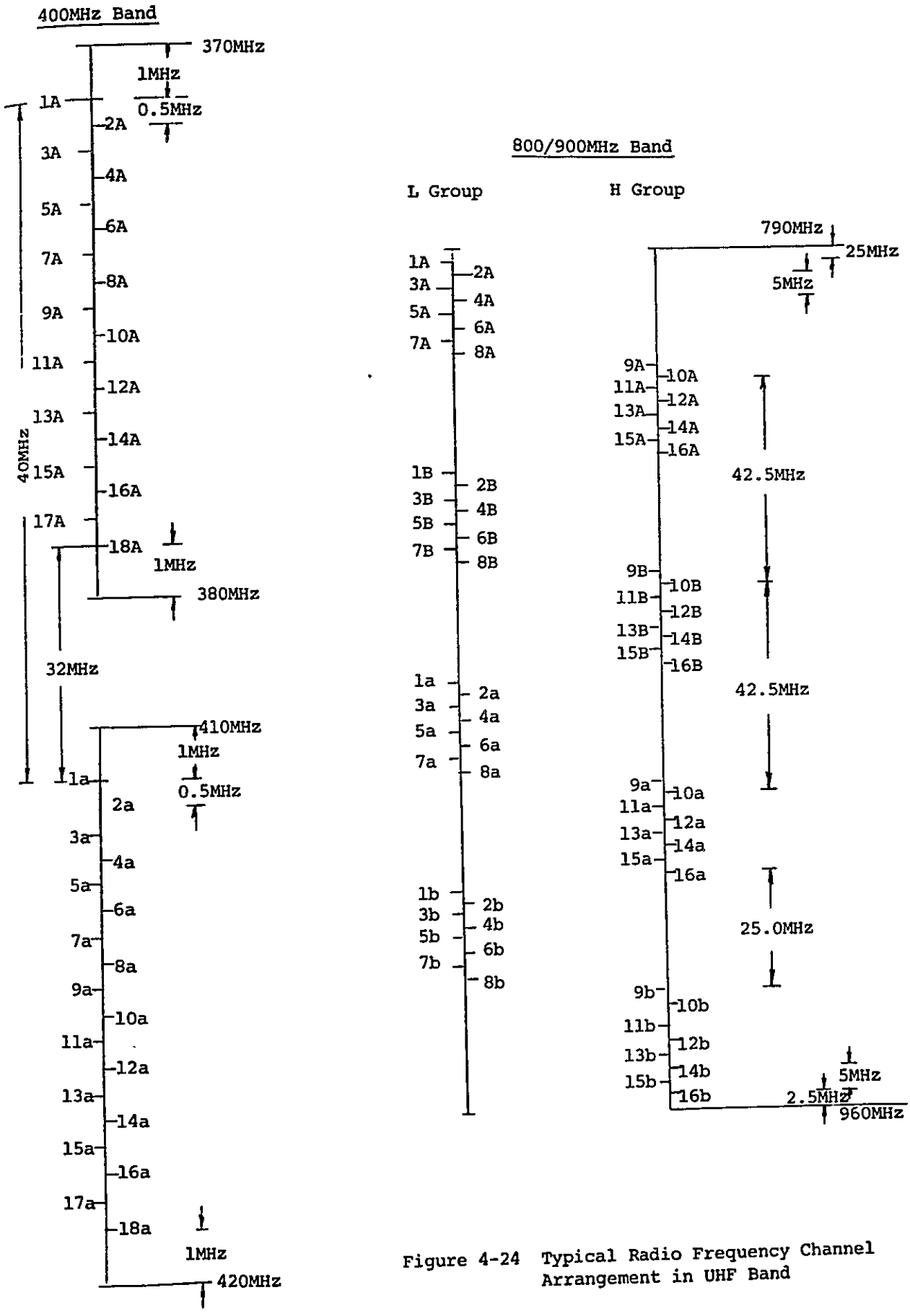
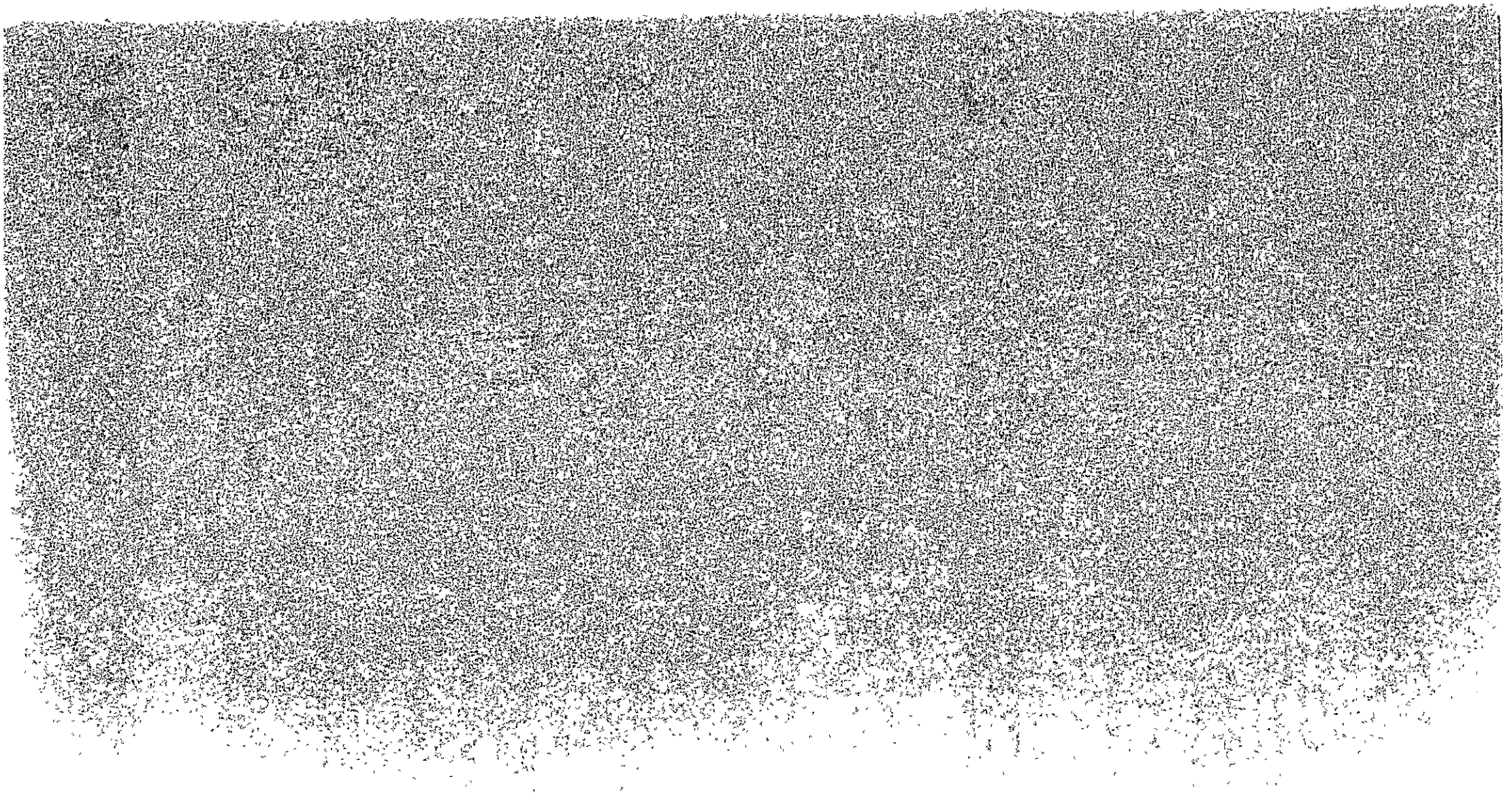


Figure 4-24 Typical Radio Frequency Channel Arrangement in UHF Band

ANNEX 4-1

QUTLINE OF SITE INFORMATION



ANNEX 4-1 Outline of Site Information

1. Honiara

   (1) Longitude: E159°56'55"
   (2) Latitude: S 9°25'58"
   (3) Elevation: 70 m
   (4) Type of Location: Proposed site for new VHF station
   (5) Land Space: 30 m x 30 m available
   (6) Soil: Dark brown soil mixed with corals
   (7) Power: Commercial power available
   (8) Road: Access road exists
   (9) Other: Available for new VHF Station

2. Tenakaro

   (1) Longitude: E160°06'17"
   (2) Latitude: S 9°25'41"
   (3) Elevation: 10 m
   (4) Type of Location: Site for Tenakaro Switching Station
   (5) Lnad Space: 40 m x 35 m
   (6) Soil: Ordinary soil
   (7) Power: Commercial power available
   (8) Road: Accessible from Honiara by large-sized car
   (9) Other: Palm woods, approx. 20 m high, spread in the direction of Honiara.

3. Tetere

   (1) Longitude: E160°12'38"
   (2) Latitude: S 9°26'46"
   (3) Elevation: 5 m
   (4) Type of Location: Idle land in front of Police Station
   (5) Land Space: 20 m x 20 m
   (6) Soil: Ordinary soil (somewhat mixed with sand)
   (7) Power: Commercial power available
   (8) Road: Accessible from Honiara by Large-sized car
   (9) Other: Government owned land

4. Tulagi

   (1) Longitude: E160°09'05"

(2) Latitude: S 9°05'57"

(3) Elevation: 30 m

(4) Type of Location: Site near the existing VHF station

(5) Land Space: 14 m x 42 m available

(6) Soil: Ordinary soil

(7) Power: Commercial power available

(8) Road: Approx. 200 m access road must be newly built

(9) Other: Water supply available. Harbor facilities usable.

5. Ruaratu

(1) Longitude: E160°23'18"

(2) Latitude: S 9°25'51"

(3) Elevation: 2 m

(4) Type of Location: Partly in the church compound and partly in the nearby plantation

(5) Land Space: 50 m x 50 m (felling of palm trees necessary)

(6) Soil: Ordinary soil mixed with sand

(7) Power: Commercial power not available

(8) Road: Accessible from Honiara by large-sized car. (Two rivers without bridges on the way)

(9) Other: Approx. 20 m high palm woods spread in the direction of Honiara.

6. Kiu

(1) Longitude: E161°01'47"

(2) Latitude: S 9°17'10"

(3) Elevation: 2 m

(4) Type of Location: Near a primary school. (Field survey necessary at the time of detailed system design.)

(5) Land Space: 20 m x 20 m

(6) Soil: Ordinary soil mixed with sand

(7) Power: Commercial power not available

(8) Road: No road. Transportation by ship. LST mooring at pier possible.

(9) Other: In the direction of Ruavatu, more than 80 m high tower is necessary.

7. C. Hortig

(1) Longitude: E161°26'37"

(2) Latitude: S 9°39'24"

(3) Elevation: 40 m

(4) Type of Location: Partly in Rokera Mission compound and partly in nearby private land

(5) Land Space: 50 m x 50 m (felling of trees necessary)

(6) Soil: Ordinary soil

(7) Power: Commercial power not available

(8) Road: Road extends from airport and pier.

(9) Other: In the neighborhood of proposed site, the woods prevent visibility. Hence the need for field survey at the time of detailed system design. If obstacle exists in the direction of Kirakira also, the change of site is necessary.

8. Marau

(1) Longitude: E160°49'25"

(2) Latitude: S 9°50'33"

(3) Elevation: 20 m

(4) Type of Location: Hill near the airfield

(5) Land Space: 18 m x 28 m available

(6) Soil: Brown soil

(7) Power: Commercial power not available

(8) Road: Road extends from airfield to near the site. Extention to the site must be newly built.

(9) Other: Water supply not available

9. Rennel

(1) Longitude: E160°16'45"

(2) Latitude: S 11°39'19"

(3) Elevation: 60 m

(4) Type of Location: Hill near Lavangga. (Ground levelling/land formation and felling of trees are necessary.)

(5) Land Space: 50 m x 50 m available

(6) Soil: Ordinary soil

(7) Power: Commercial power not available

(8) Road: Road extends from airfield to near the site, but access road must be newly built.

(9) Other: Obstacle exists in the direction of Kirakira. Because of disadvantage to propagation, another field survey is necessary at the time of detailed system design.

10. Kirakira

(1) Longitude: E161°55'26"
(2) Latitude: S 10°26'24"
(3) Elevation: 10 m
(4) Type of Location: Palm woods near Baura
(5) Land Space: 50 m x 50 m (Felling of palm trees necessary)
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Roads extend from airfield to Towani
(9) Other: At the time of detailed system design, consideration is necessary so that there will be no obstacle in the direction of Santa Cruz.

11. Hadja

(1) Longitude: E161°57'14"
(2) Latitude: S 9°47'06"
(3) Elevation: 2 m
(4) Type of Location: Near the sanatorium
(5) Land Space: 10 m x 10 m (Felling of palm trees necessary)
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Road availability not known
(9) Other: Almost completely destroyed by the cyclone of 1978.

12. Santa Cruz

(1) Longitude: E165°47'32"
(2) Latitude: S 10°43'13"
(3) Elevation: 40 m
(4) Type of Location: Near the Government structure
(5) Land Space: 50m x 50m
(6) Soil: Ordinary soil of good quality
(7) Power: Commercial power not available
(8) Road: Accessible from airfield and pier.
(9) Other: Harbor facilities exist. For large caliber antenna, height must be somewhat increased, depending upon the condition in the foreground. Re-survey is necessary at the time of detailed design.

13. Auki

(1) Longitude: E160°42'21"
(2) Latitude: S 8°45'15"
(3) Elevation: 177 m
(4) Type of Location: Private land near Bench Mark MA-Y2
(5) Land Space: 50 m x 50 m available
(6) Soil: Clayey soil
(7) Power: Commercial power available
(8) Road: 30 m - 100 m access road must be newly built.
(9) Other: Harbor facilities exist. There is a lodge available for staying.

14. Buala

(1) Longitude: E159°36'31"
(2) Latitude: S 8°07'57"
(3) Elevation: 10 m
(4) Type of Location: Near the pasture in the Tosia Island Mission compound
(5) Land Space: 50 m x 50 m
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Approx. 50 m access road must be newly built.
(9) Other: Pier exists but requires pair to some extent.

15. Lalande

(1) Lonitude: E160°33'43"
(2) Latitude: S 8°20'24"
(3) Elevation: 2 m
(4) Type of Location: Near Lalande seashore
(5) Land Space: 20 m x 20 m (Felling of palm trees necessary)
(6) Soil: Ordinary soil mixed with sand
(7) Power: Commercial power not available
(8) Road: Access road from Auki exists.
(9) Other: Water supply not available. However, the nearby stream is usable as water source.

16. Malu'u

(1) Longitude: E160°37'58"
(2) Latitude: S 8°20'35"

(3) Elevation: 30 m

(4) Type of Location: Church compound beyond the government owned land

(5) Land Space: 20 m x 20 m

(6) Soil: Ordinary soil

(7) Power: Commercial power not available

(8) Road: Accessible from Auki

(9) Other: Rest-house exists in the government owned land. It is available for lodging.

17. Takwa

(1) Longitude: E160°46'26"

(2) Latitude: S 8°21'53"

(3) Elevation: 20 m

(4) Type of Location: In the church compound

(5) Land Space: 10 m x 10 m

(6) Soil: Ordinary soil

(7) Power: Commercial power not available

(8) Road: Access road from Auki exists.

(9) Other: Water supply not available

18. Sulufou

(1) Longitude: E160°50'53"

(2) Latitude: S 8°27'13"

(3) Elevation: 5 m

(4) Type of Location: In the church compound

(5) Land Space: (No antenna construction site. In case of remote subscriber system, antenna is to be constructed at the roof-top of the church building).

(6) Soil: Not known

(7) Power: Commercial power not available

(8) Road: Road extends from Auki to Malaita main island before the artificial island.

(9) Other: Water supply not available.

19. Chapuru

(1) Longitude: E159°43'09"

(2) Latitude: S 9°15'04"

(3) Elevation: 5 m

(4) Type of Location: Near seashore in the neighborhood of Chapuru

(5) Land Space: 20 m x 20 m
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Accessible from Honiara by large-sized car
(9) Other: Proposed site is a private land.

20. Yandina

(1) Longitude: E159°13'11"
(2) Latitude: S 9°04'11"
(3) Elevation: 5 m
(4) Type of Location: In the Post Office compound
(5) Land Space: 20 m x 30 m
(6) Soil: Brown sandy silt
(7) Power: Commercial power not available
(8) Road: Accessible from airfield
(9) Other: Existing building at the site is not fit to utilize.

21. Allardyce

(1) Lonitude: E158°39'43"
(2) Latitude: S 7°46'05"
(3) Elevation: 40 m
(4) Type of Location: On the way from port to mountain
(5) Land Space: 50 m x 50 m
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Access road exists from port to near the proposed site.
(9) Other: Detailed field survey is necessary at the time of detailed system design.

22. Oretecove

(1) Longitude: E156°47'21"
(2) Latitude: S 7°44'59"
(3) Elevation: 2 m
(4) Type of Location: Palm trees grow beside the Oretecove road.
(5) Land Space: 50 m x 50 m (Felling of trees necessary)
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Road exists from Mbarakoma Airfield.
(9) Other: Proposed site is a private land. Water supply not available.

23. Sasamungga

(1) Longitude: E156°45'45"
(2) Latitude: S 7°02'12"
(3) Elevation: 5 m
(4) Type of Location: On the roadside of Sasamungga
(5) Land Space: 10 m x 10 m
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Roads exist on the island. Information about harbor facilities not available.
(9) Other: Proposed site is the government owned land.

24. Taro

(1) Longitude: E156°23'52"
(2) Latitude: S 6°42'22"
(3) Elevation: 5 m
(4) Type of Location: Wild land lying between airfield and government owned structure.
(5) Land Space: 20 m x 20 m
(6) Soil: Ordinary soil
(7) Power: Commercial power not available
(8) Road: Road exists between airfield and government owned structure.
(9) Other: Proposed site is the government owned land. Harbor facilities exist.

25. Mbarakoma

(1) Longitude: E156°42'44"
(2) Latitude: S 7°55'24"
(3) Elevation: 35 m
(4) Type of Location: Hill near the mission school
(5) Land Space: 20 m x 20 m
(6) Soil: Brown ordinary soil
(7) Power: Commercial power not available
(8) Road: Road extends from airfield to near the proposed site. Approx. 150 m extension must be newly built.
(9) Other: Proposed site is in the church compound.

26. Gizo

(1) Longitude: E156°50'29"
(2) Latitude: S 8°06'14"
(3) Elevation: 70 m
(4) Type of Location: P&T owned mountain-top land
(5) Land Space: 20 m x 20 m (including the existing building)
(6) Soil: Red clay
(7) Power: Commercial power available
(8) Road: Access road exists.
(9) Other: Harbor facilities exists. Pier allows mooring of large ships.

27. Noro

(1) Longitude: E157°11'55"
(2) Latitude: S 8°12'52"
(3) Elevation: 17 m
(4) Type of Location: Part of hired land of Solomon-Taiyo Company
(5) Land Space: 30 m x 30 m
(6) Soil: Light yellow soil mixed with corals
(7) Power: Although commercial power is not available, power from Solomon-Taiyo Company can be expected.
(8) Road: Road from Munda scheduled to be completed shortly.
(9) Other: Harbor facilities exist.

28. Munda

(1) Longitude: E157°16'09"
(2) Latitude: S 8°19'00"
(3) Elevation: 80 m
(4) Type of Location: Hill behind airfield runway
(5) Land Space: 6 m x 22 m
(6) Soil: Light yellow ordinary soil
(7) Power: Commercial power available
(8) Road: Access road from airfield exists.
(9) Other: Harbor facilities exist. Mooring of LST possible. Water supply available.

29. Seghe

(1) Longitude: E157 52'35"

(2) Latitude: S 8°34'04"

(3) Elevation: 4 m

(4) Type of Location: In the church compound near airfield.

(5) Land Space: 20 m x 20 m

(6) Soil: Reddish brown clayey soil

(7) Power: Commercial power not available

(8) Road: Accessible from airfield

(9) Other: Proposed site is the church owned land.

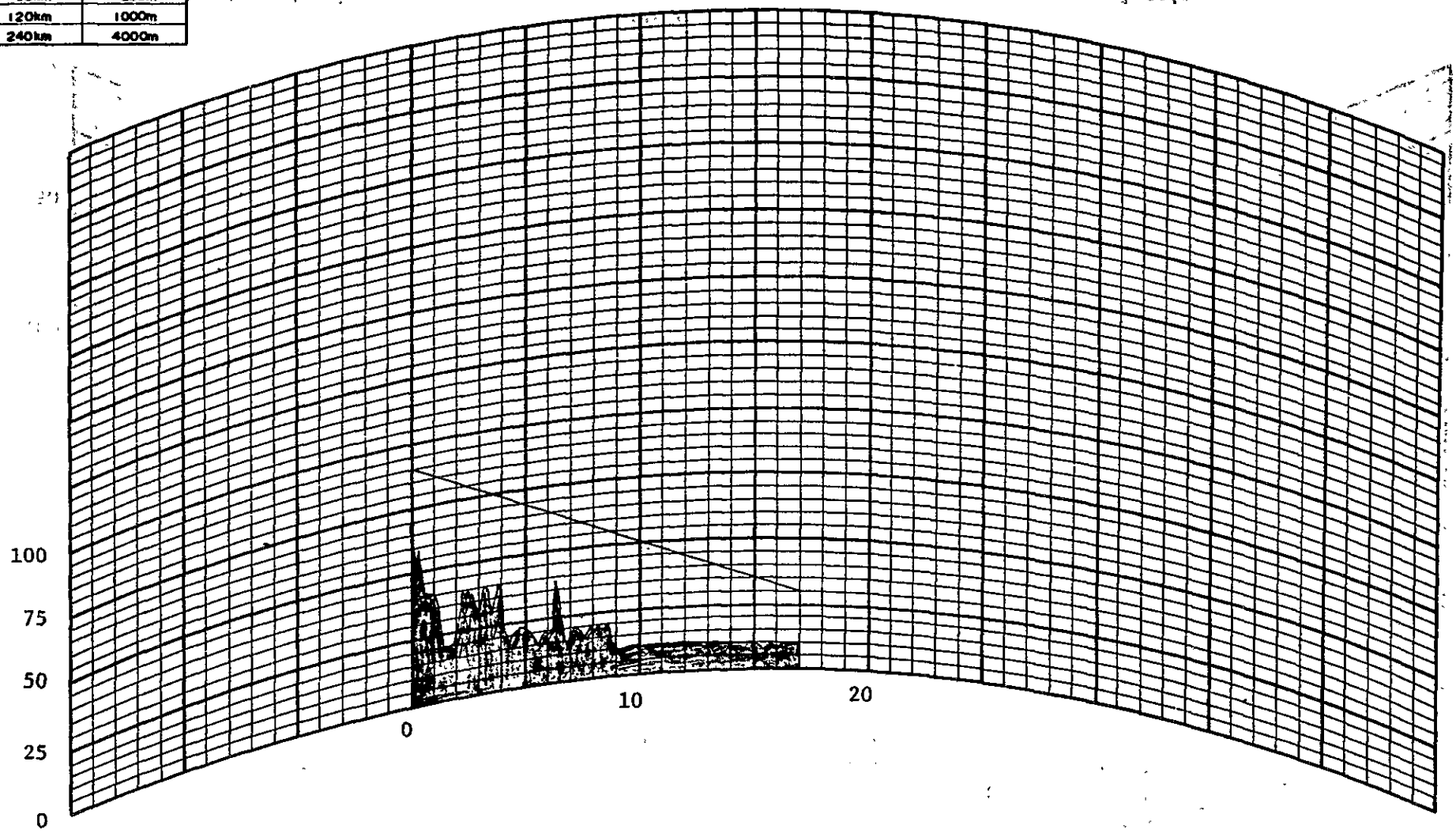
ANNEX 4-2

PROPAGATION PATH PROFILE

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 1

SITE: Honiara
GROUND ELEVATION: 70 m
ANTENNA HEIGHT: 20 m

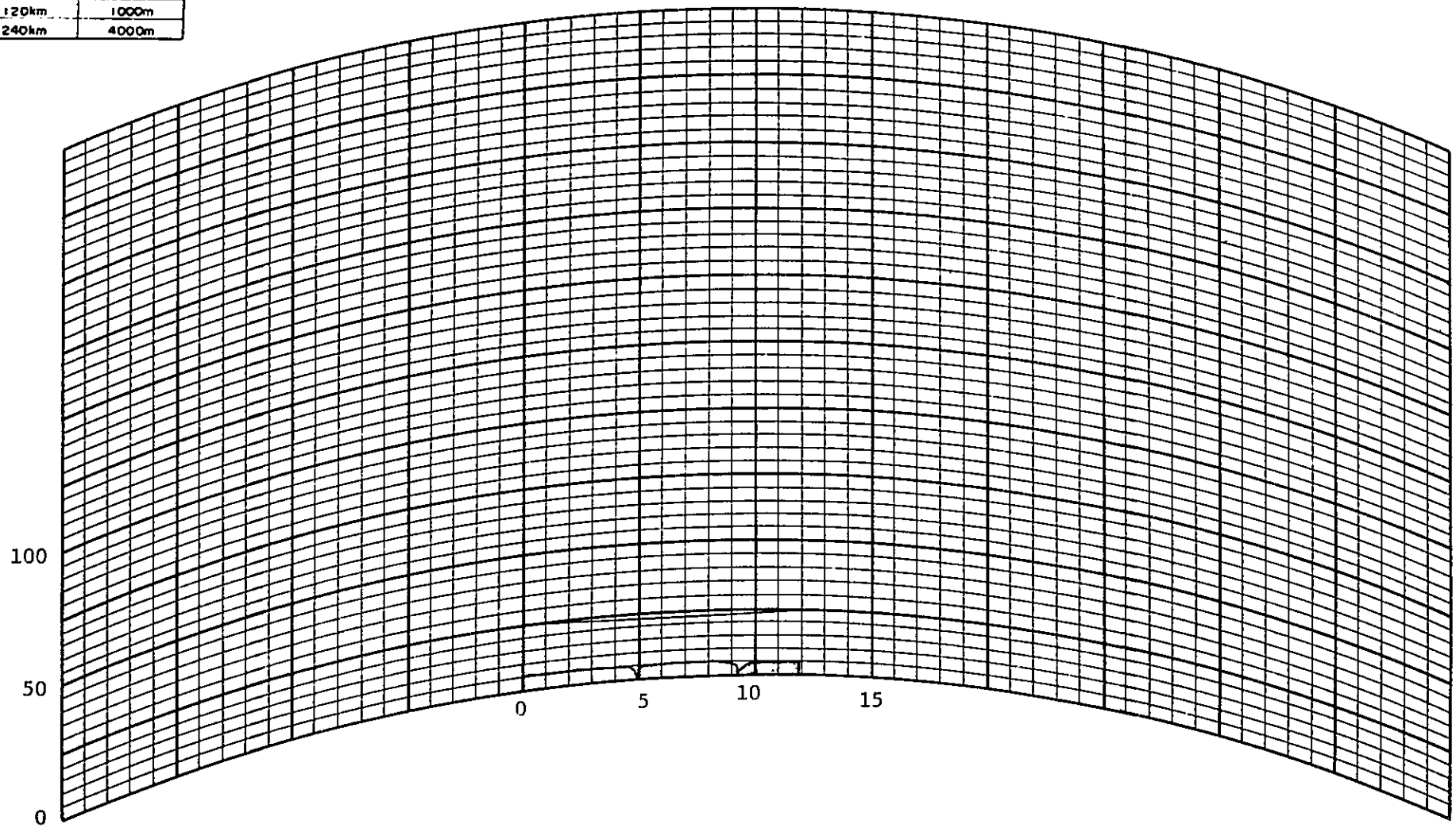
DISTANCE: 17.1 km

SITE: Tenakaro
GROUND ELEVATION: 10 m
ANTENNA HEIGHT: 20 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 2

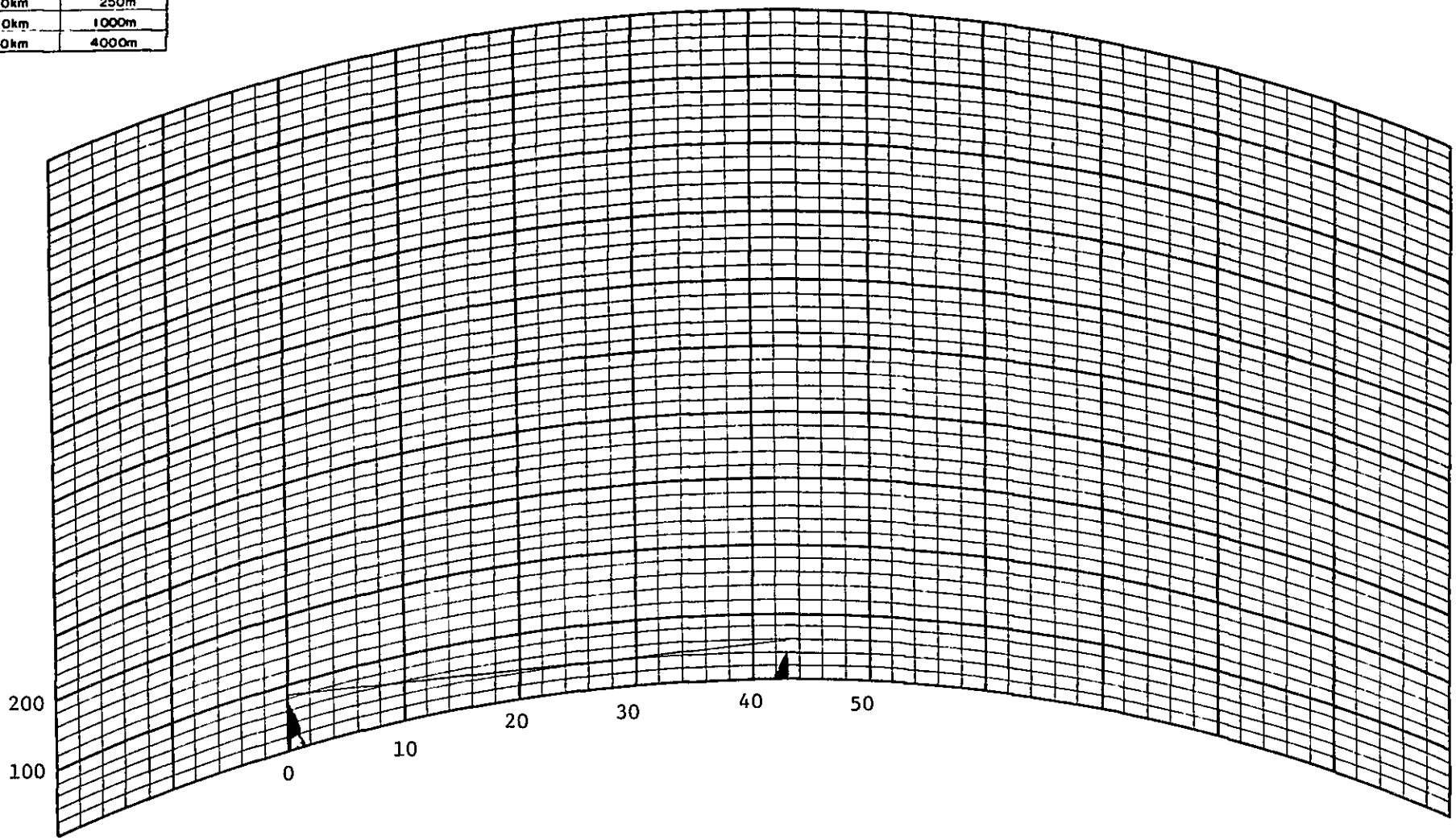
SITE Tenakaro
GROUND ELEVATION 5 m
ANTENNA HEIGHT 20 m

DISTANCE 11.8 km

SITE Tetele
GROUND ELEVATION 5 m
ANTENNA HEIGHT 20 m

PATH PROFILE (4/3 RADIUS)

	FULL SCALE	
	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m



No. 3

SITE Honiara
GROUND ELEVATION 70 m
ANTENNA HEIGHT 15 m

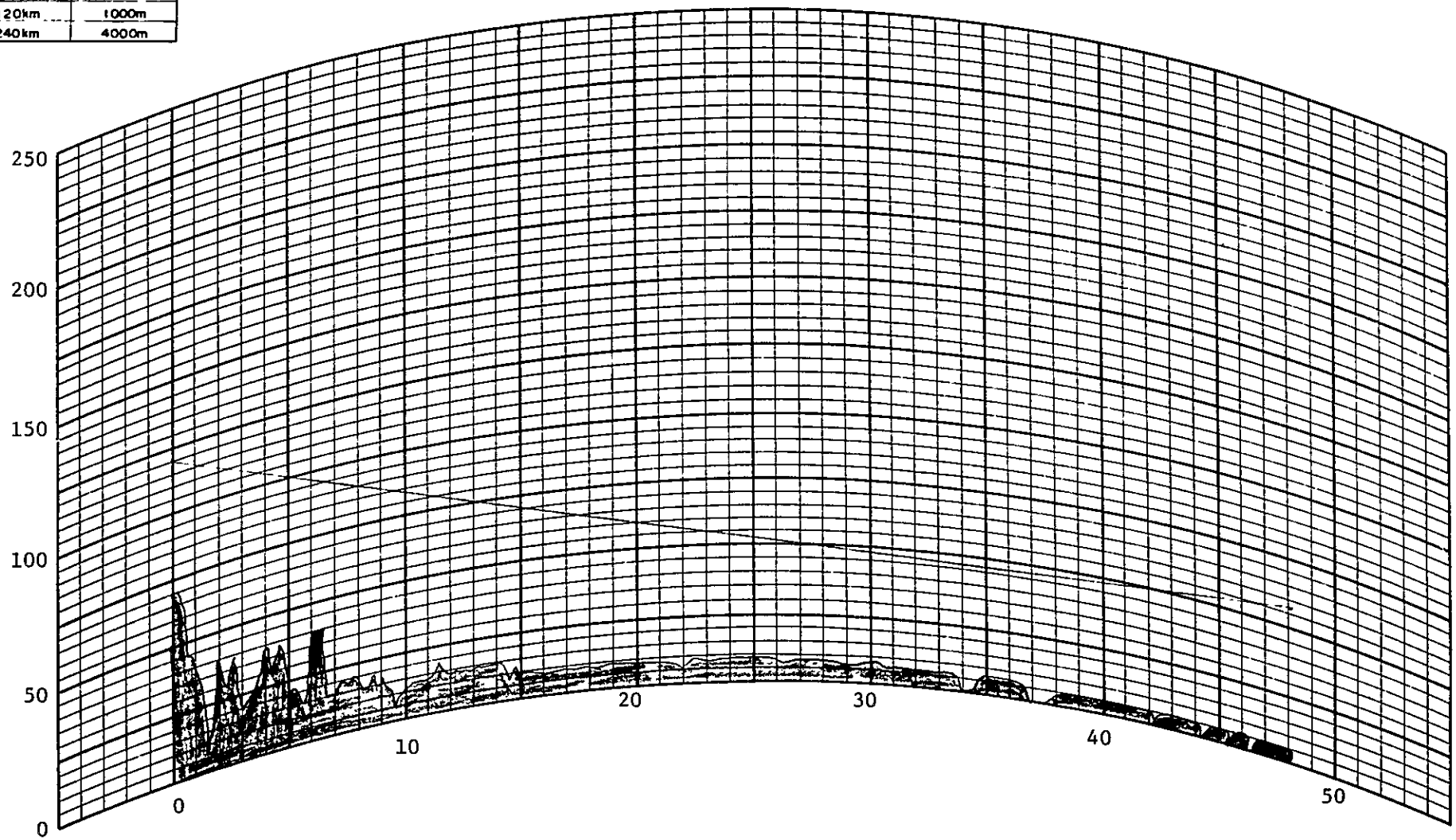
DISTANCE 43.1 km

SITE Tulagi
GROUND ELEVATION 40 m
ANTENNA HEIGHT 15 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 4

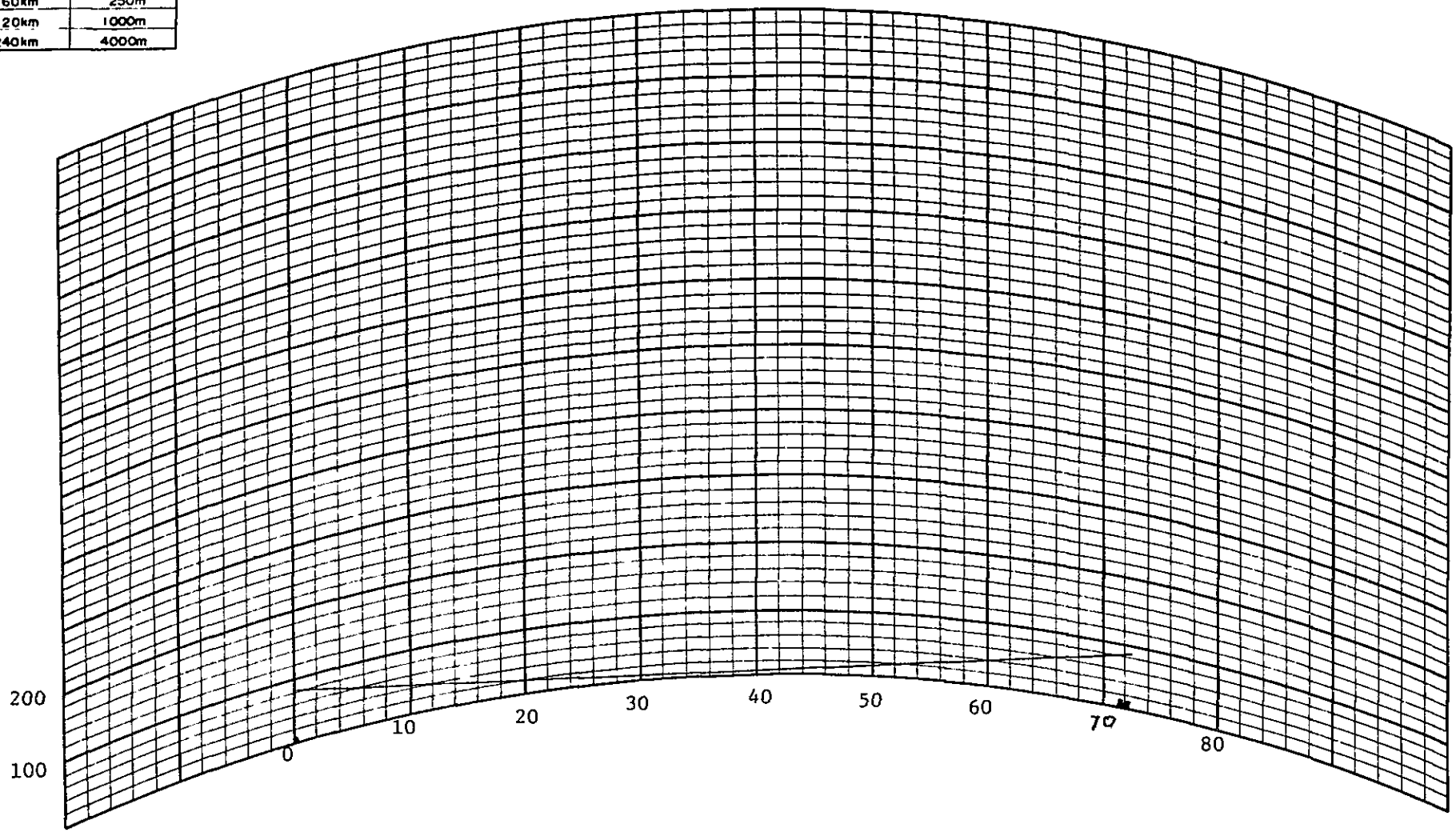
SITE Honiara
GROUND ELEVATION 70 m
ANTENNA HEIGHT 50 m

DISTANCE 48.2 km

SITE Ruavatu
GROUND ELEVATION 2 m
ANTENNA HEIGHT 55 m

PATH PROFILE (4/3 RADIUS)

	FULL SCALE	
	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m



No. 5

SITE Ruavatu
GROUND ELEVATION 2 m
ANTENNA HEIGHT 80 m

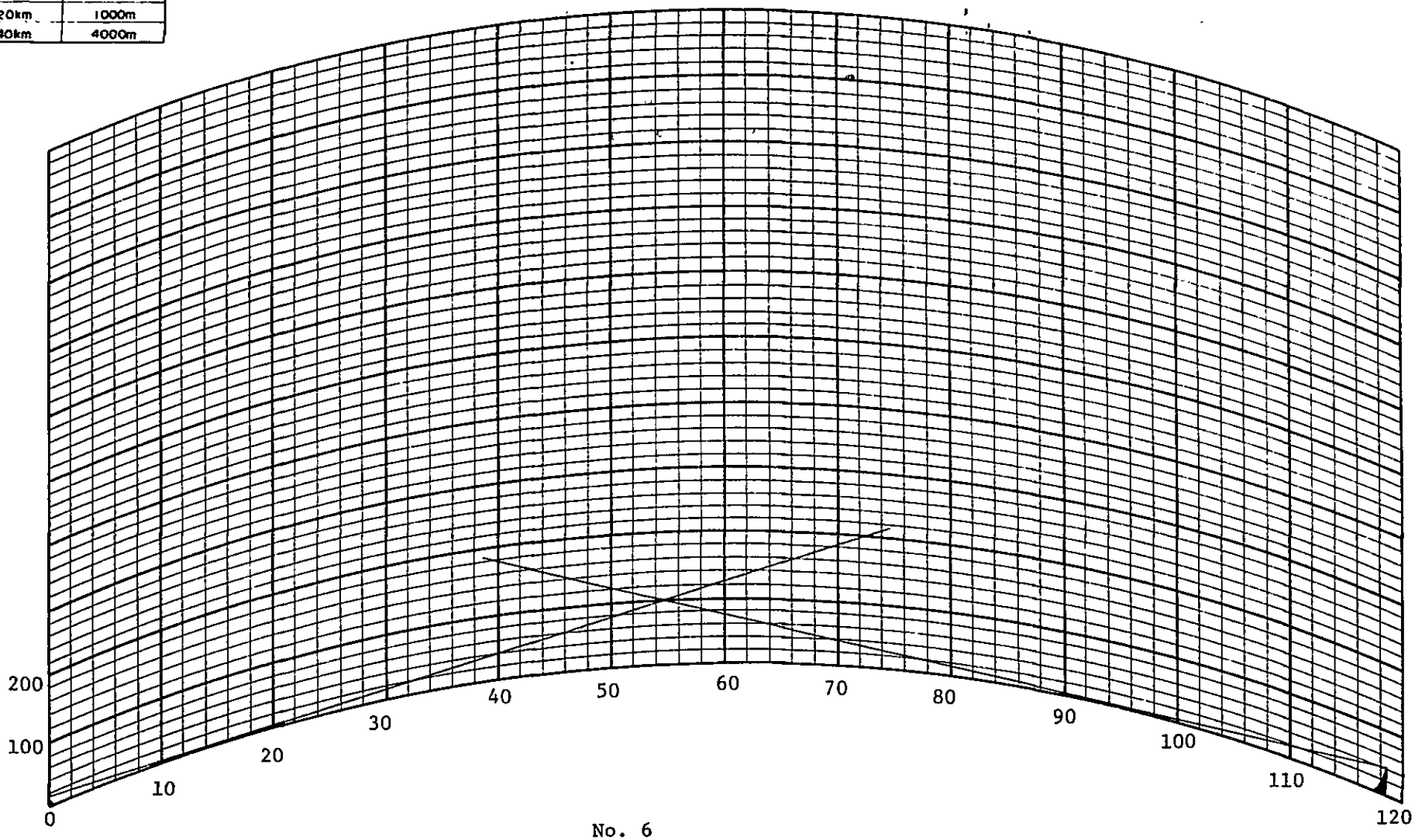
DISTANCE: 72.2 km

SITE Kiu
GROUND ELEVATION 2 m
ANTENNA HEIGHT 80 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 6

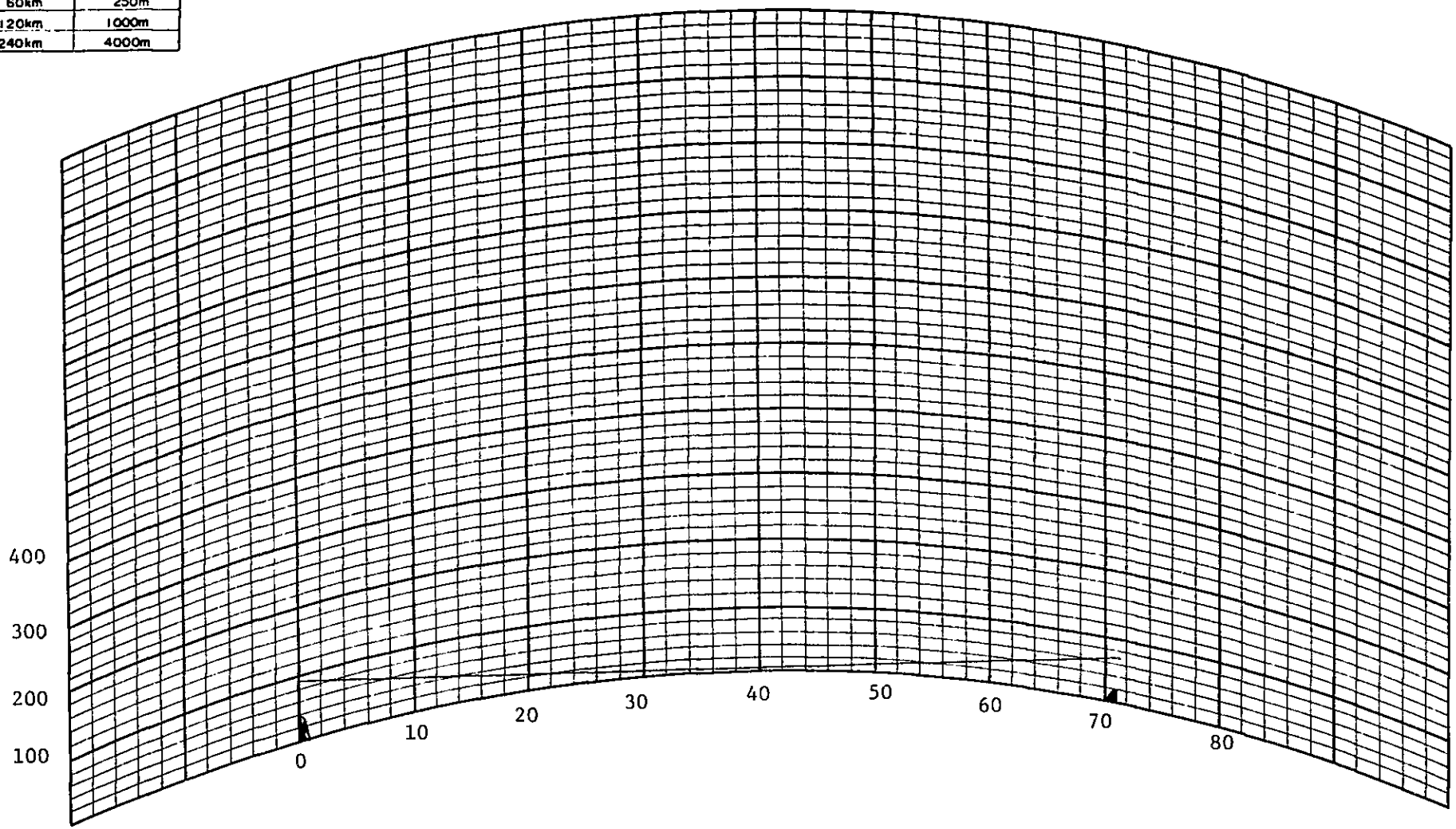
SITE Ruavatu
GROUND ELEVATION 2 m
ANTENNA HEIGHT 10 m

DISTANCE 118.4 km

SITE C. Hartig
GROUND ELEVATION 40 m
ANTENNA HEIGHT 10 m

PATH PROFILE (4/3 RADIUS)

FULL SCALE	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m



No. 7

SITE C. Hartig
GROUND ELEVATION 40 m
ANTENNA HEIGHT 50 m

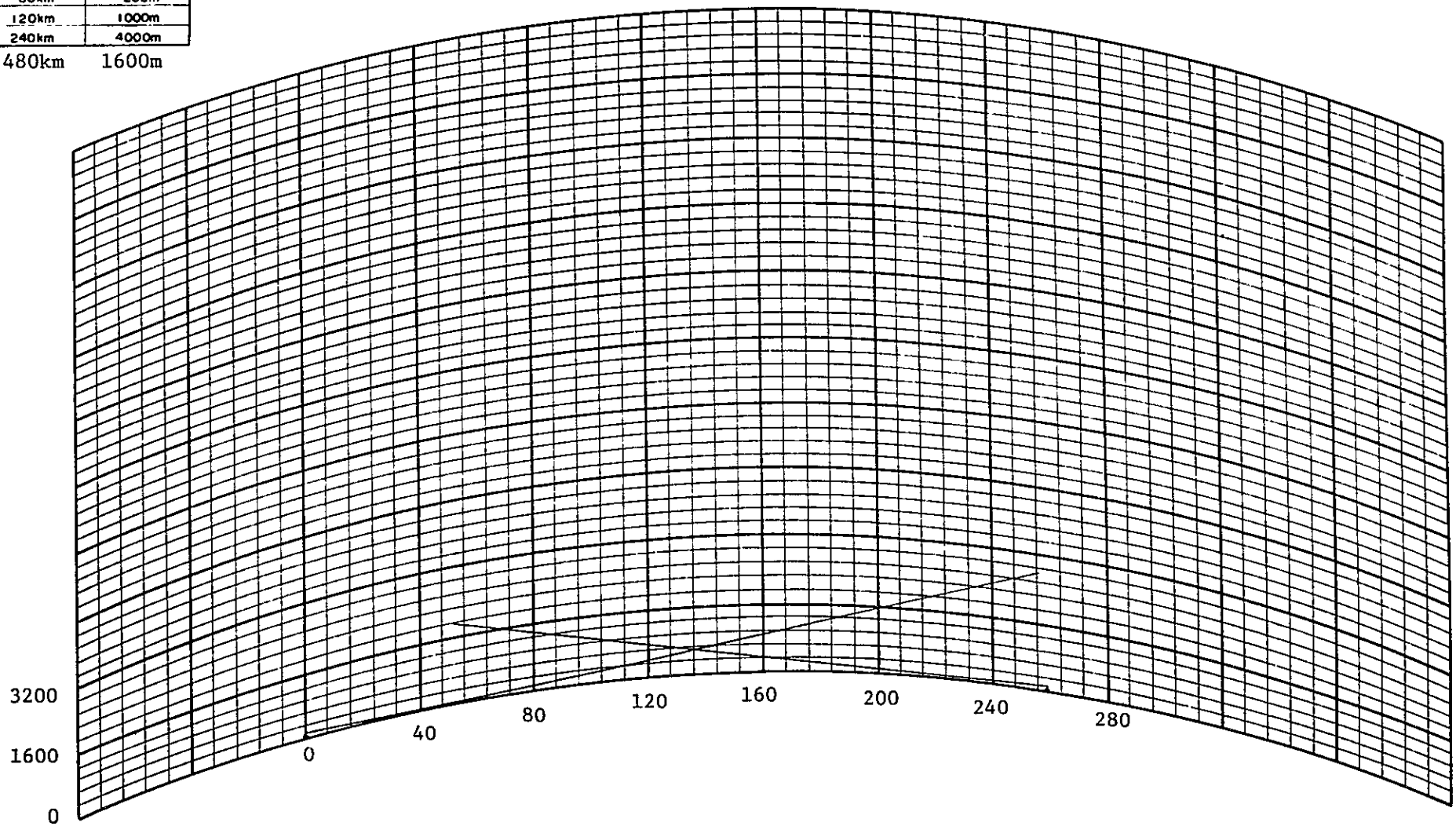
DISTANCE 71.0 km

SITE Marau
GROUND ELEVATION 20 m
ANTENNA HEIGHT 50 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
	120km	1000m
	240km	4000m
*	480km	1600m

PATH PROFILE (4/3 RADIUS)



No. 8

SITE C. Hartig
GROUND ELEVATION 40 m
ANTENNA HEIGHT 14.5 m

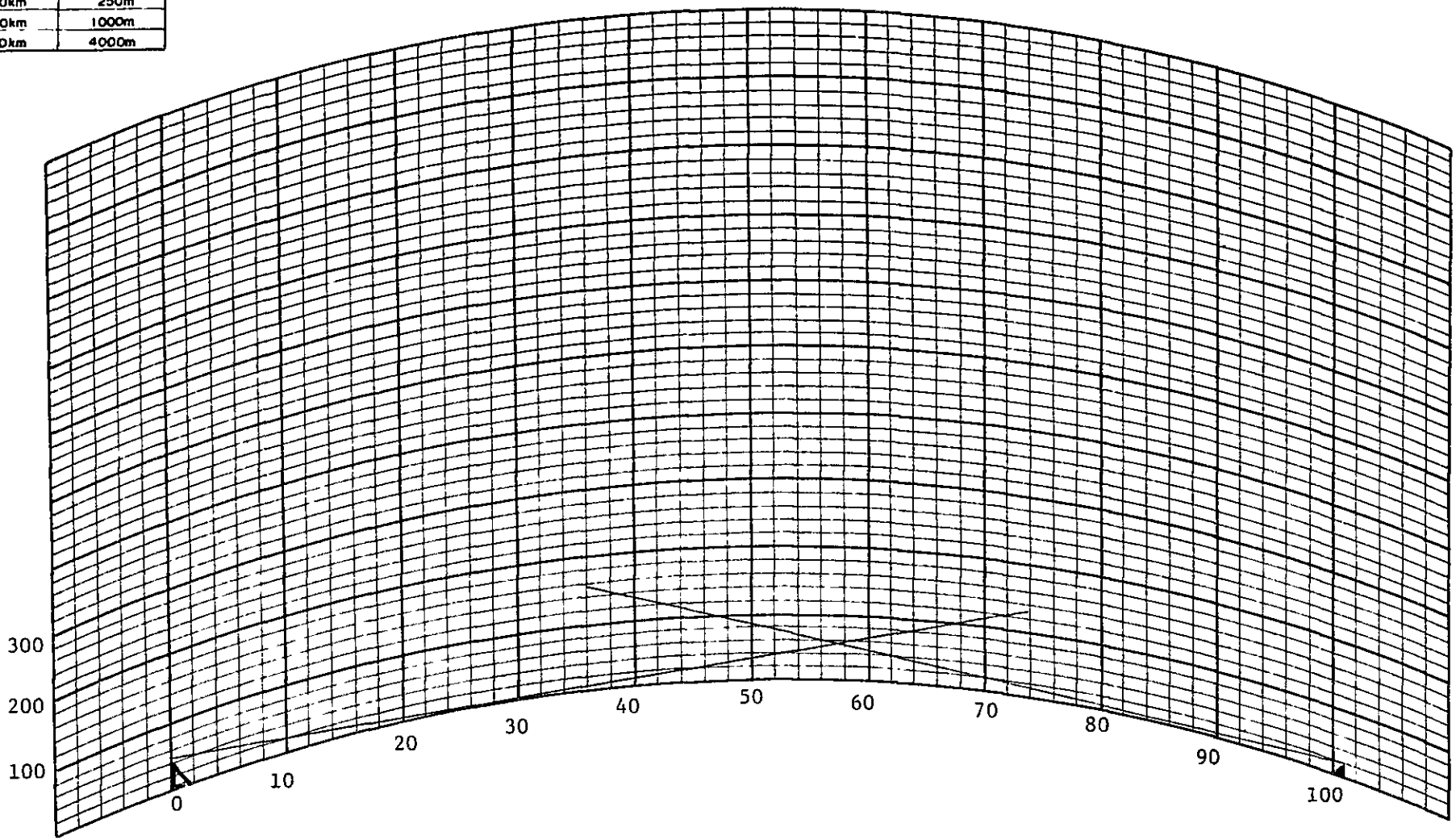
DISTANCE 254.9 km

SITE Rennel
GROUND ELEVATION 60 m
ANTENNA HEIGHT 14.5 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 9

SITE C. Hartig
GROUND ELEVATION 40 m
ANTENNA HEIGHT 10 m

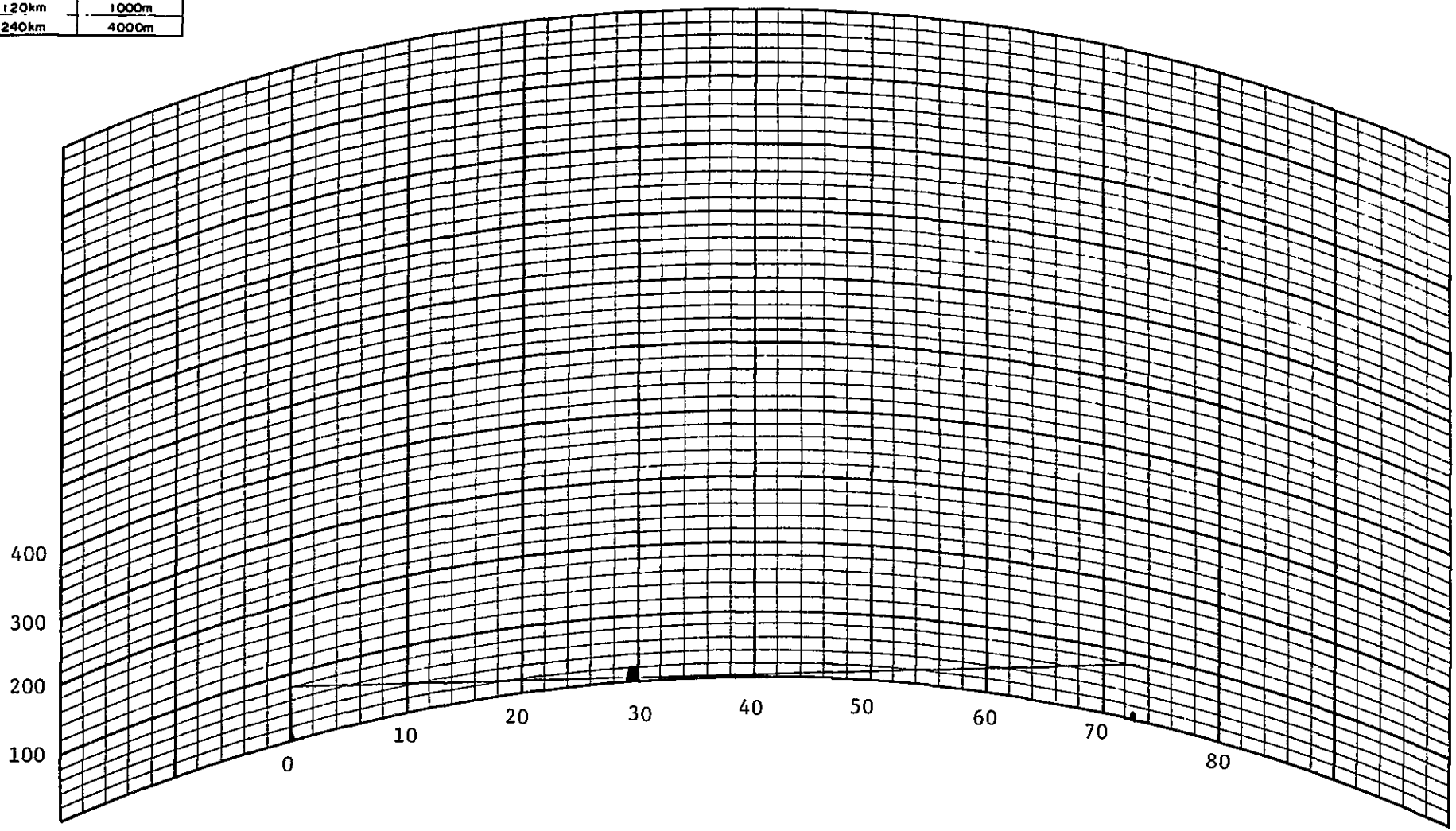
DISTANCE 101.3 km

SITE Kirakira
GROUND ELEVATION 10 m
ANTENNA HEIGHT 10 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 10

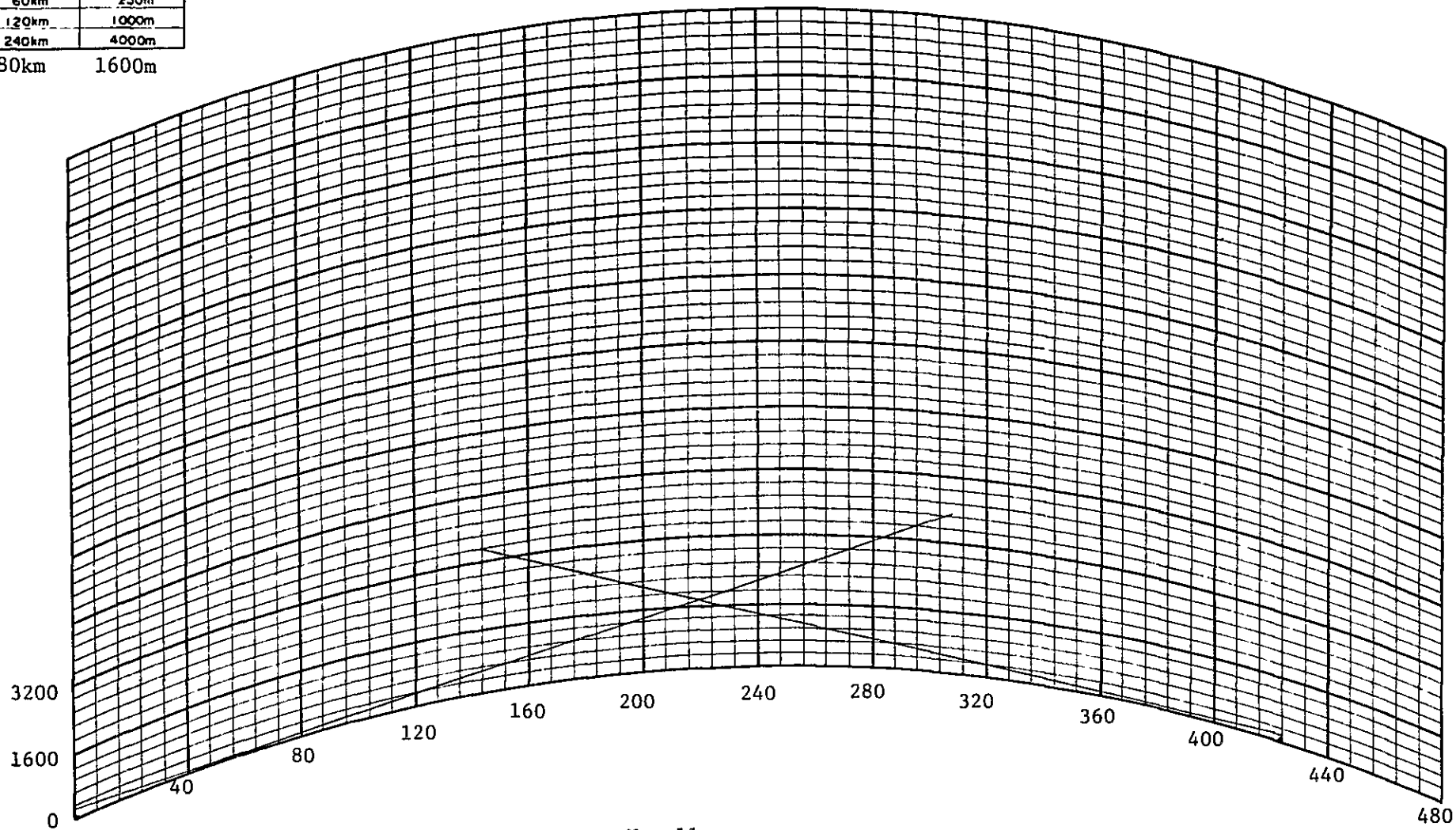
SITE Kirakira
GROUND ELEVATION 10 m
ANTENNA HEIGHT 70 m

DISTANCE 72.4 km

SITE Hadja
GROUND ELEVATION 10 m
ANTENNA HEIGHT 70 m

PATH PROFILE (4/3 RADIUS)

FULL SCALE	
DISTANCE	HEIGHT
60km	250m
120km	1000m
240km	4000m
* 480km	1600m



No. 11

SITE Kirakira
GROUND ELEVATION 10 m
ANTENNA HEIGHT 14.5 m

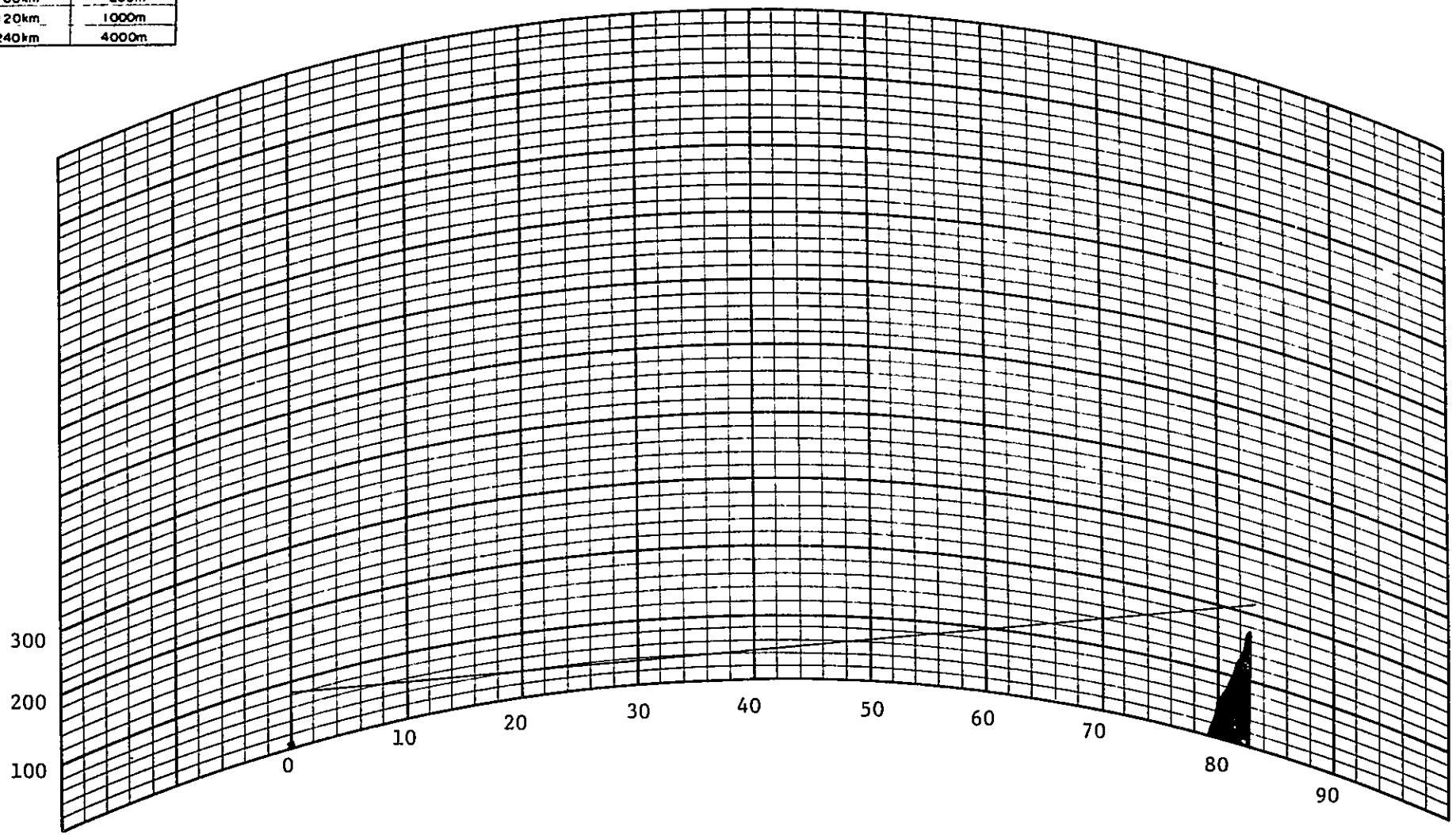
DISTANCE 424.0 km

SITE Santa Cruz
GROUND ELEVATION 40 m
ANTENNA HEIGHT 14.5 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 12

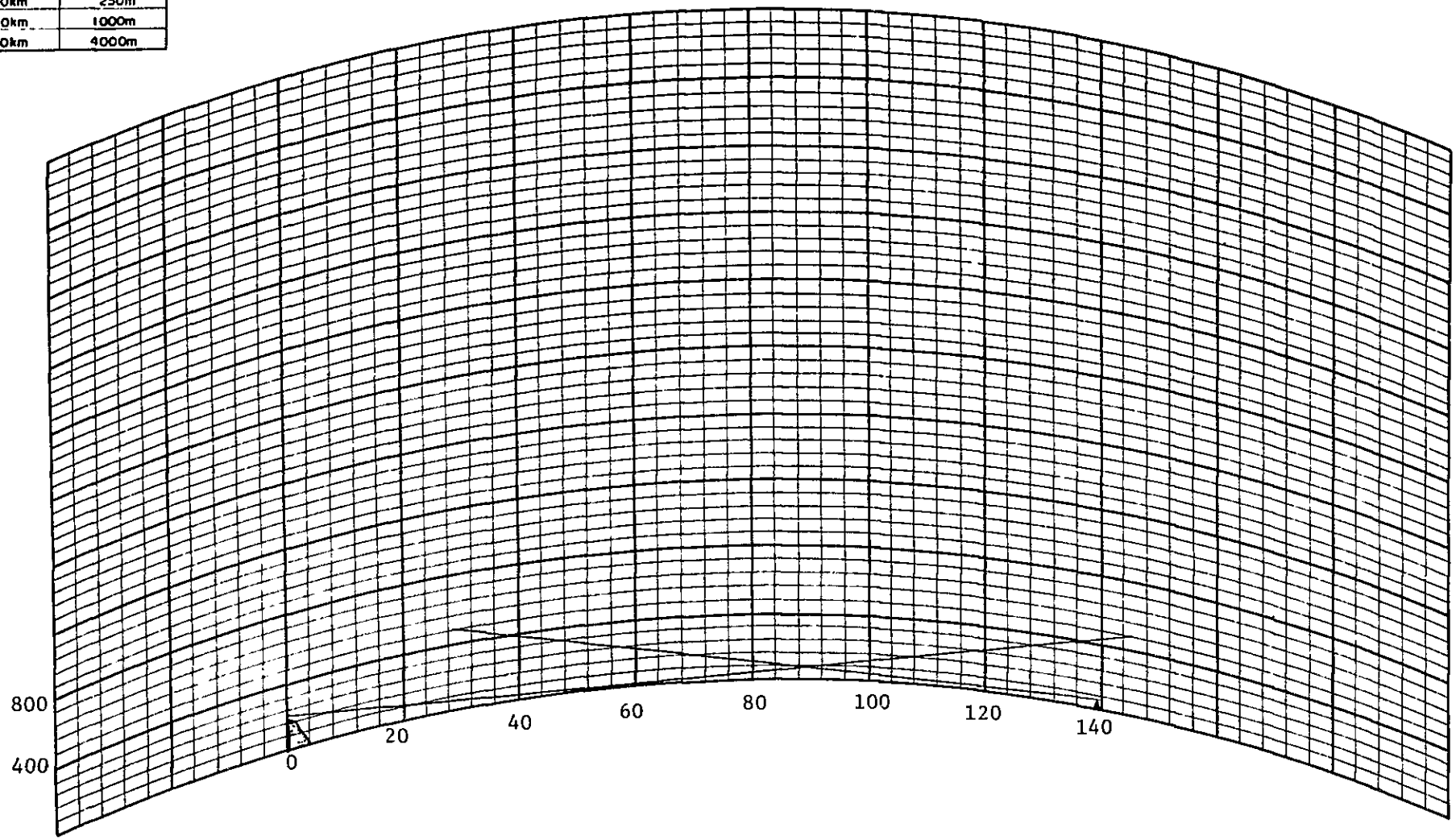
SITE Ruavatu
GROUND ELEVATION 2 m
ANTENNA HEIGHT 80 m

DISTANCE 82.5 km

SITE Auki
GROUND ELEVATION 177 m
ANTENNA HEIGHT 40 m

PATH PROFILE (4/3 RADIUS)

	FULL SCALE	
	DISTANCE	HEIGHT
	60km	250m
	120km	1000m
*	240km	4000m



No. 13

SITE Auki
GROUND ELEVATION 177 m
ANTENNA HEIGHT 11 m

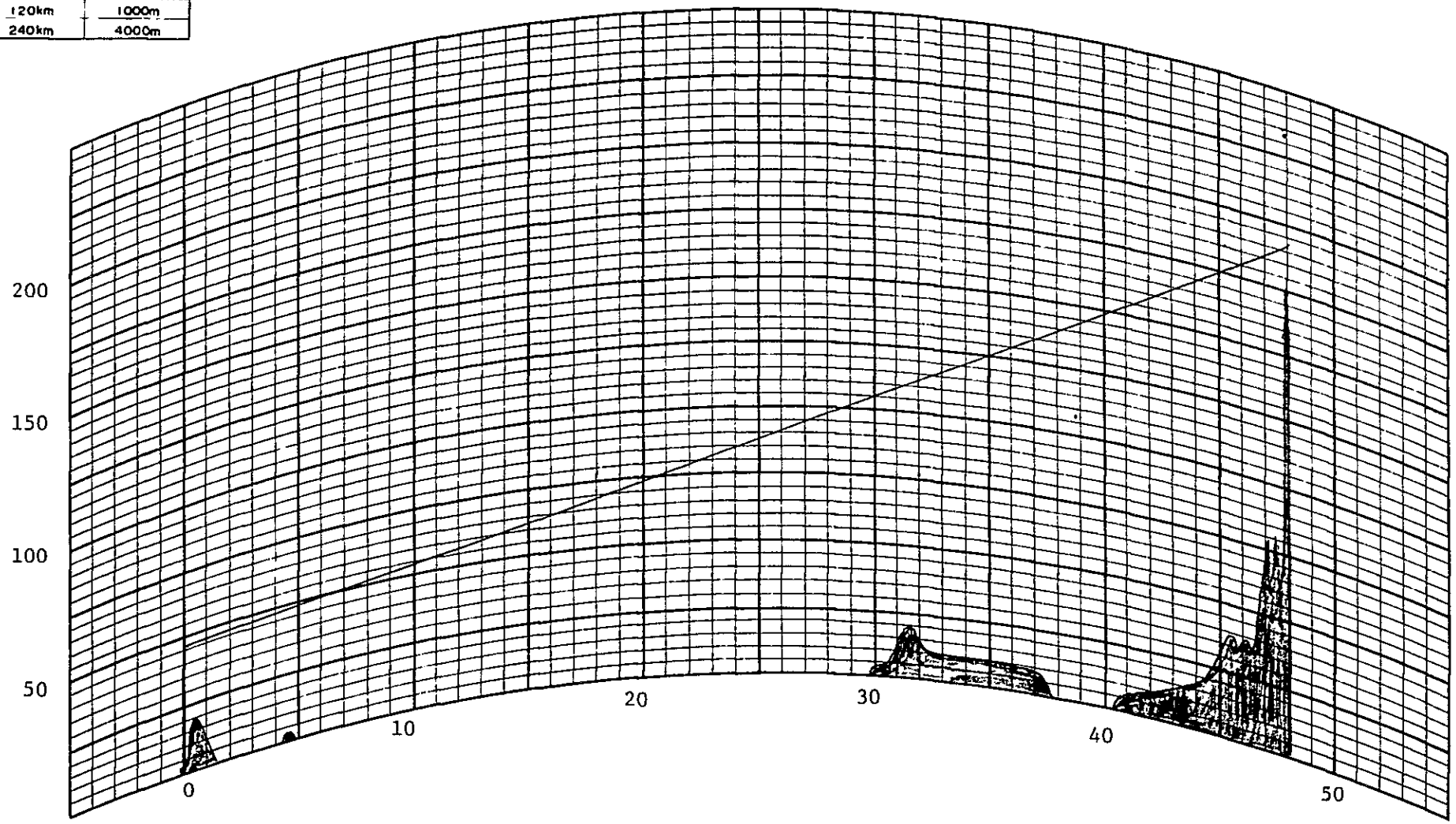
DISTANCE 138.9 km

SITE Buala
GROUND ELEVATION 10 m
ANTENNA HEIGHT 11 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 14

SITE Lalande
GROUND ELEVATION 2 m
ANTENNA HEIGHT 50 m

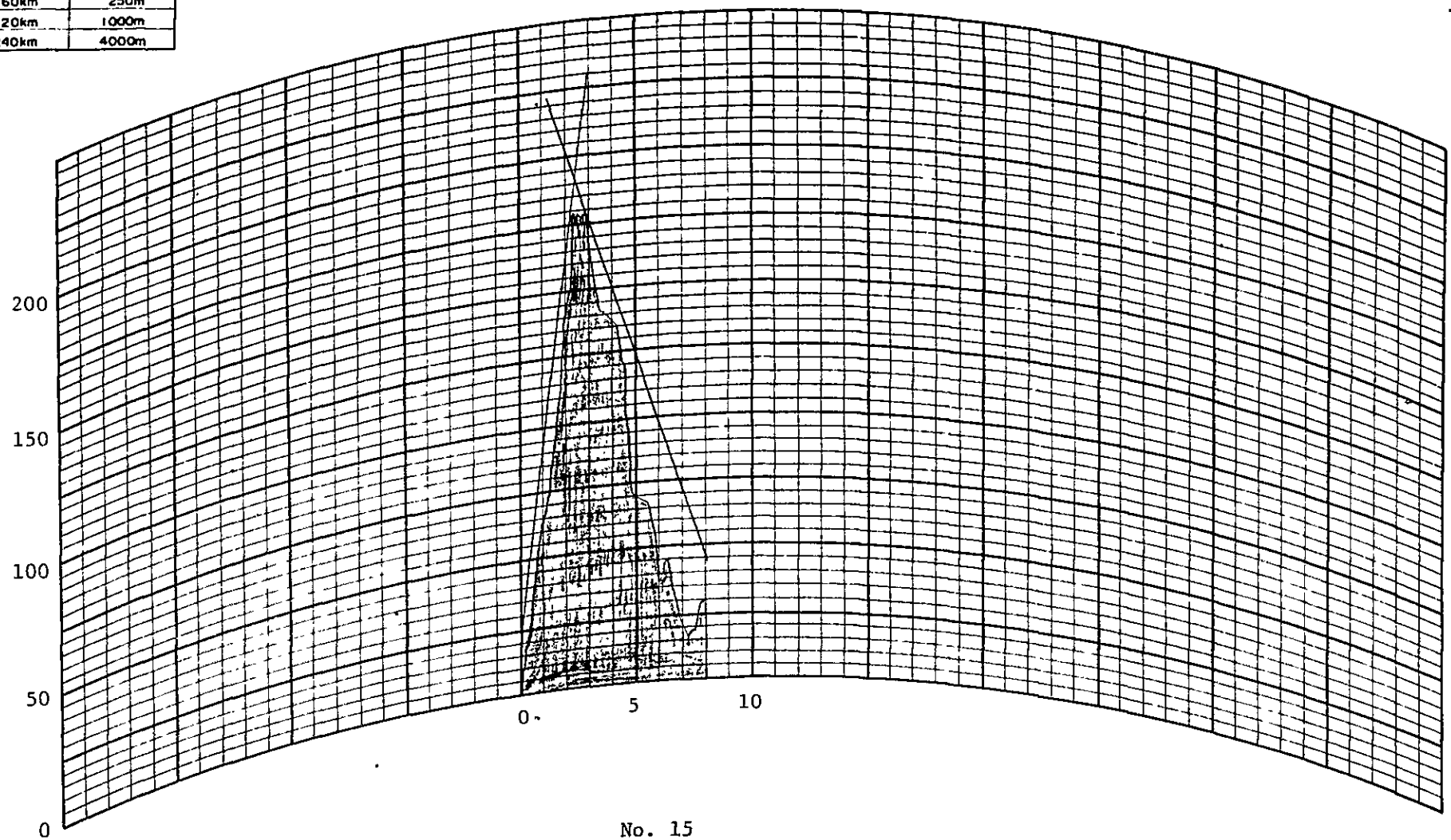
DISTANCE 48.1 km

SITE Auki
GROUND ELEVATION 177 m
ANTENNA HEIGHT 15 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 15

SITE Lalande
GROUND ELEVATION 2 m
ANTENNA HEIGHT 25 m

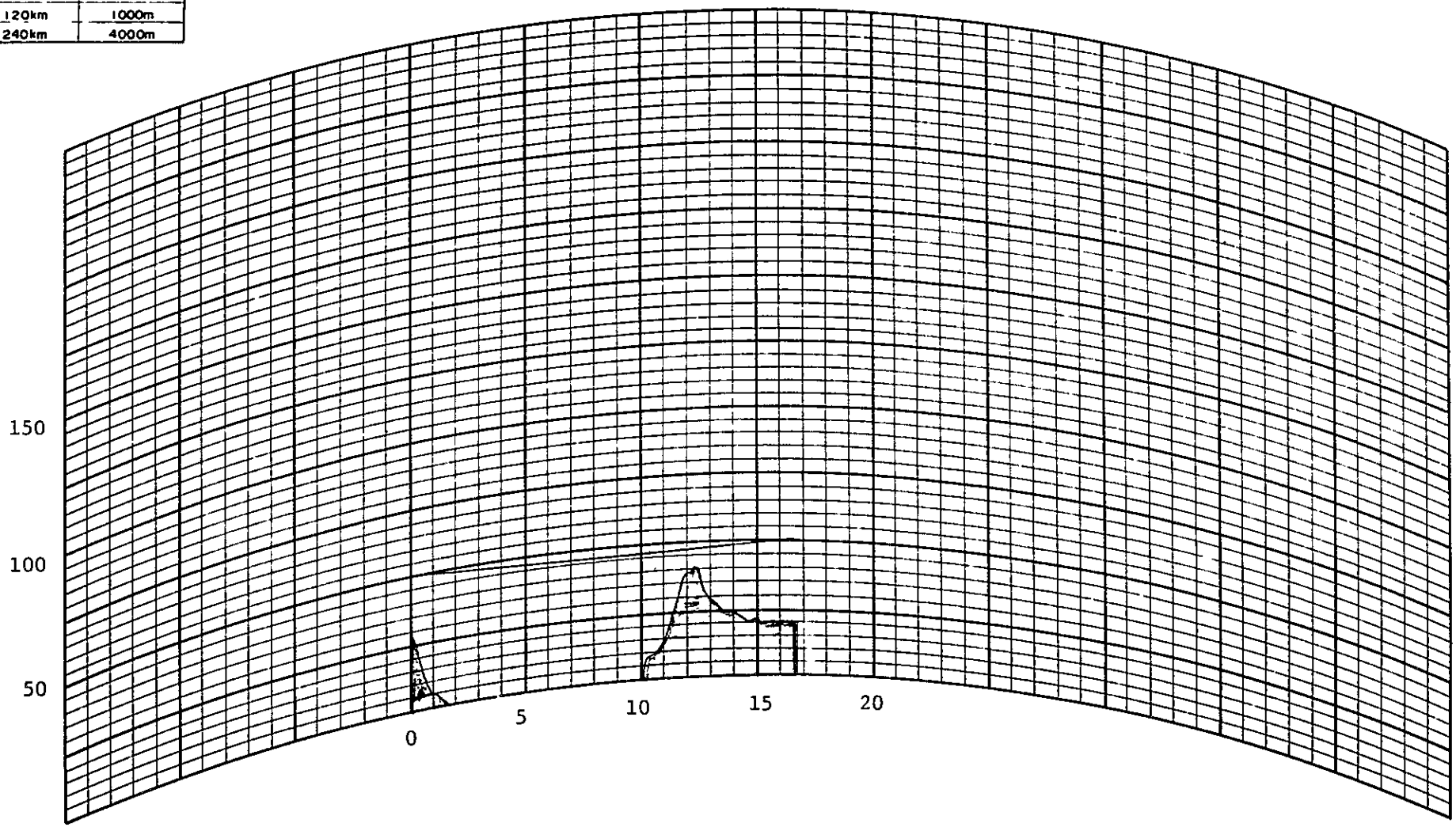
DISTANCE 7.8 km

SITE Malu'u
GROUND ELEVATION 30 m
ANTENNA HEIGHT 15 m

PATH PROFILE (4/3 RADIUS)

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m



No. 16

SITE Malu'u
GROUND ELEVATION 30 m
ANTENNA HEIGHT 20 m

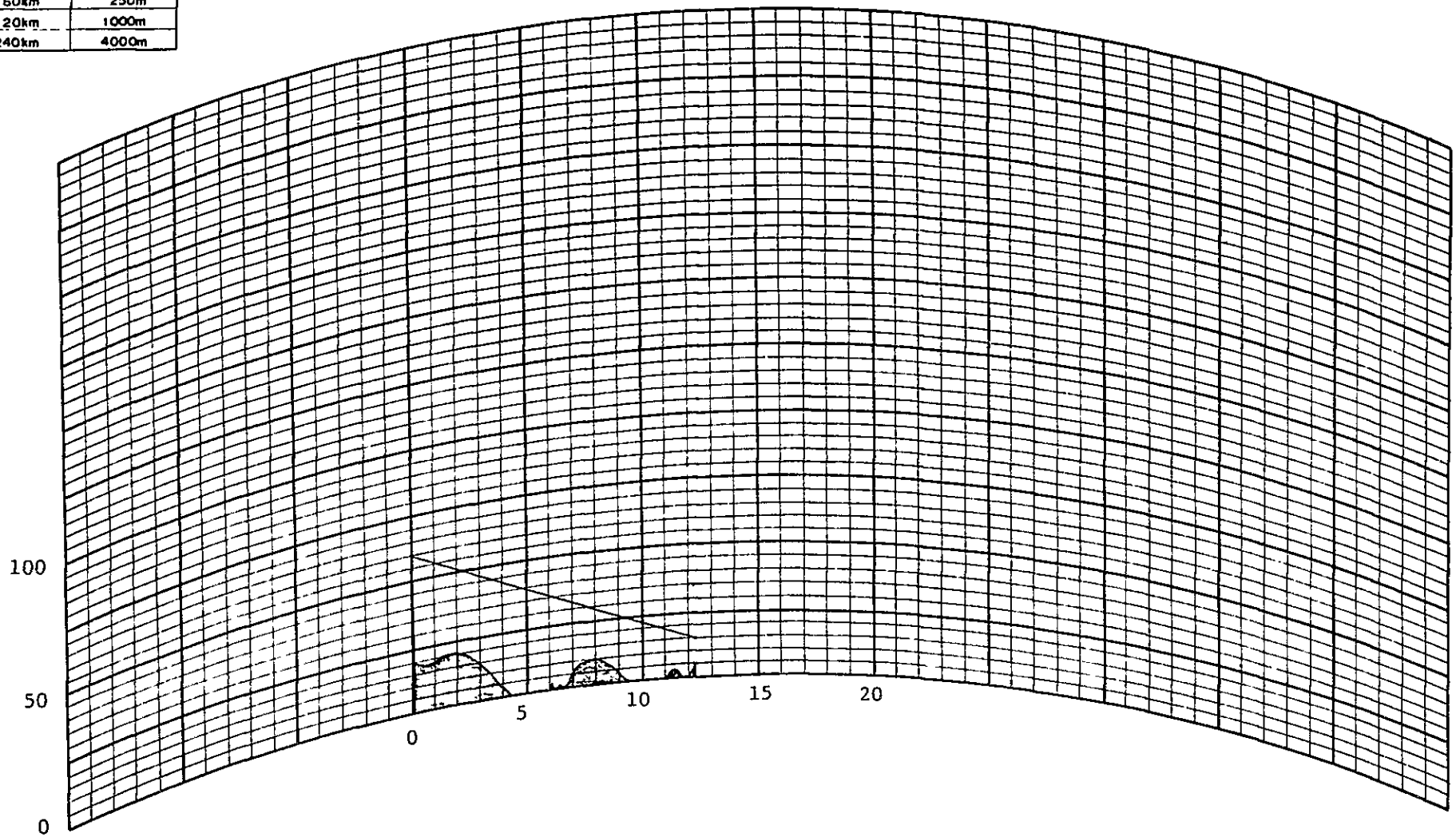
DISTANCE 15.7 km

SITE Takwa
GROUND ELEVATION 20 m
ANTENNA HEIGHT 30 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 17

SITE Takwa
GROUND ELEVATION 20 m
ANTENNA HEIGHT 40 m

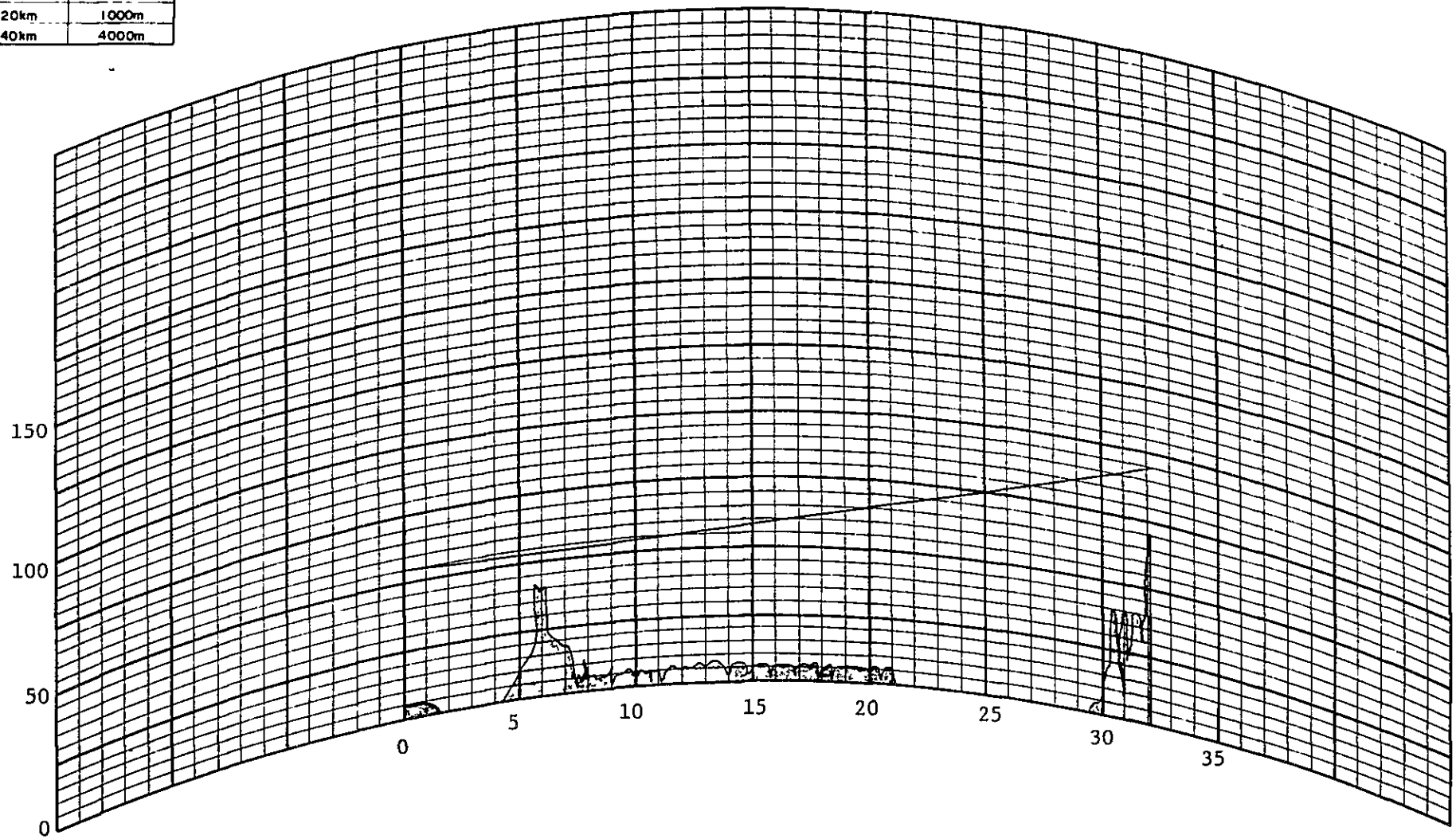
DISTANCE 12.2 km

SITE Sulufou
GROUND ELEVATION 5 m
ANTENNA HEIGHT 10 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 18

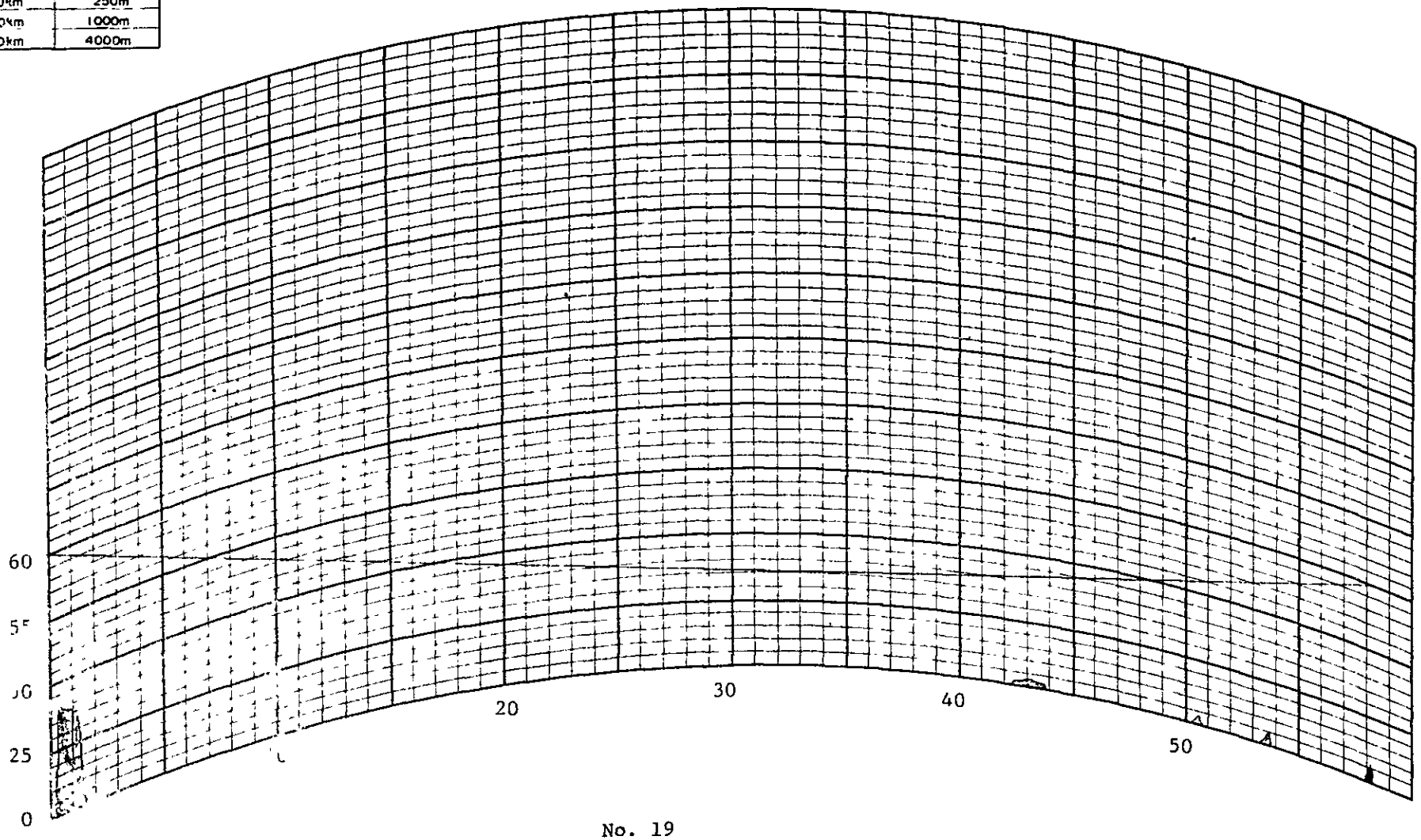
SITE Chapuru
GROUND ELEVATION 5 m
ANTENNA HEIGHT 50 m

DISTANCE 32.2 km

SITE Honiara
GROUND ELEVATION 70 m
ANTENNA HEIGHT 25 m

PATH PROFILE (4/3 RADIUS)

FULL SCALE	DISTANCE	HEIGHT
*	60km	250m
+	120km	1000m
	240km	4000m



No. 19

SITE Chapuru
GROUND ELEVATION 5 m
ANTENNA HEIGHT 55 m

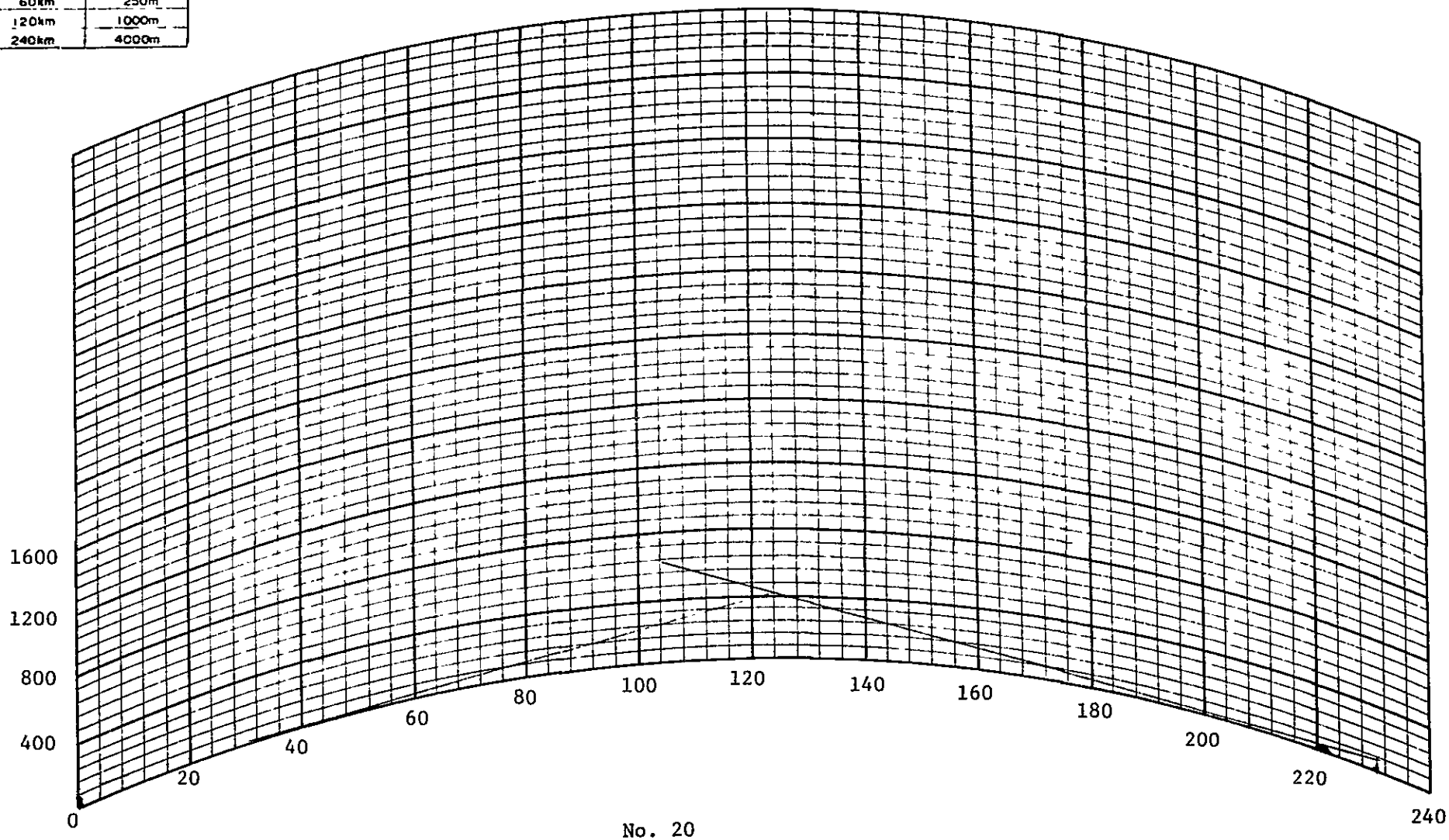
DISTANCE 58.4 km

SITE Yandina
GROUND ELEVATION 5 m
ANTENNA HEIGHT 50 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
	120km	1000m
*	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 20

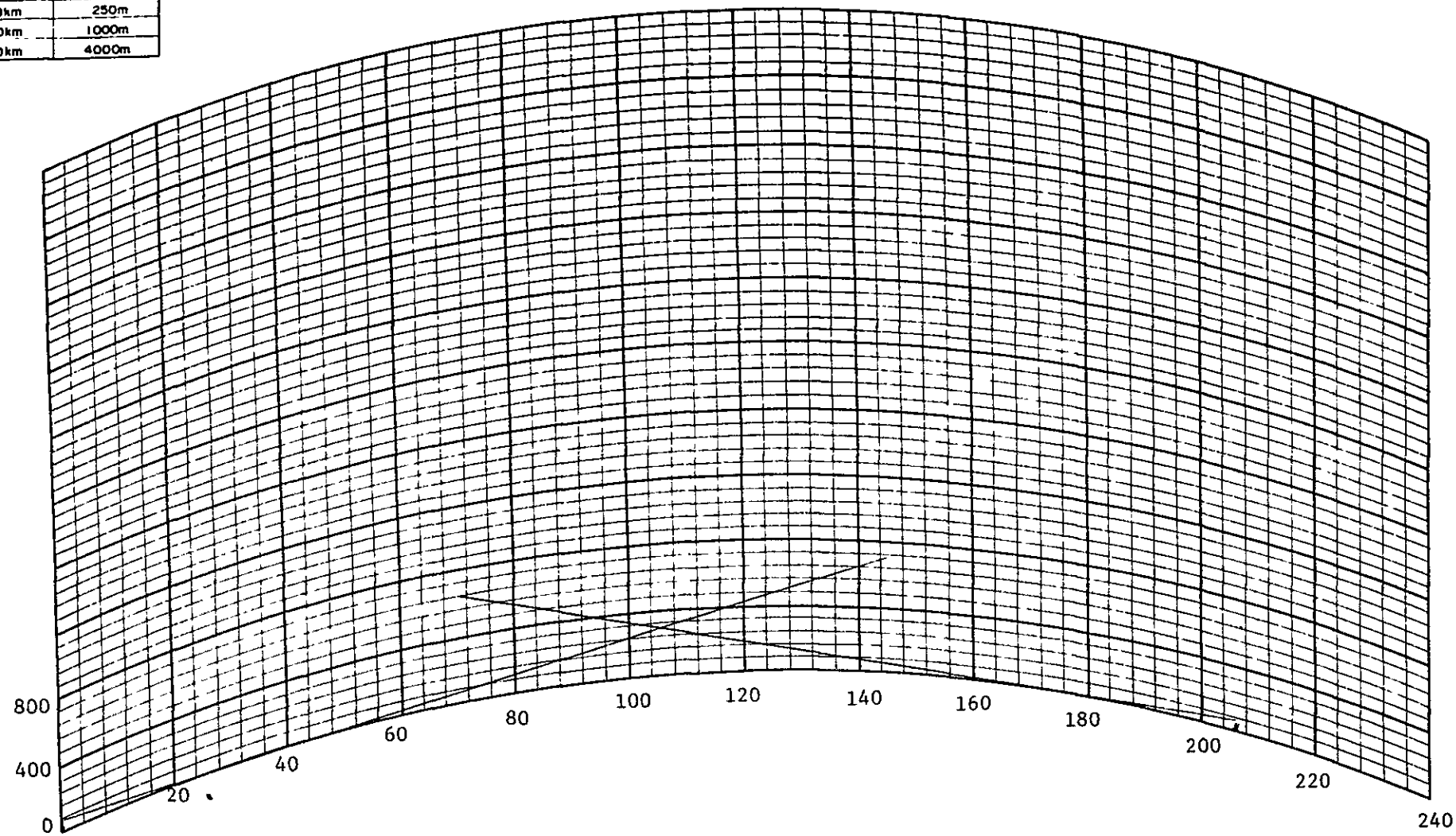
SITE Honiara
GROUND ELEVATION 70 m
ANTENNA HEIGHT 14.5 m

DISTANCE 232 km

SITE Allardyce
GROUND ELEVATION 40 m
ANTENNA HEIGHT 14.5 m

PATH PROFILE (4/3 RADIUS)

	FULL SCALE	
	DISTANCE	HEIGHT
	60km	250m
	120km	1000m
*	240km	4000m



No. 21

SITE Orete Cove
GROUND ELEVATION 2 m
ANTENNA HEIGHT 14.5 m

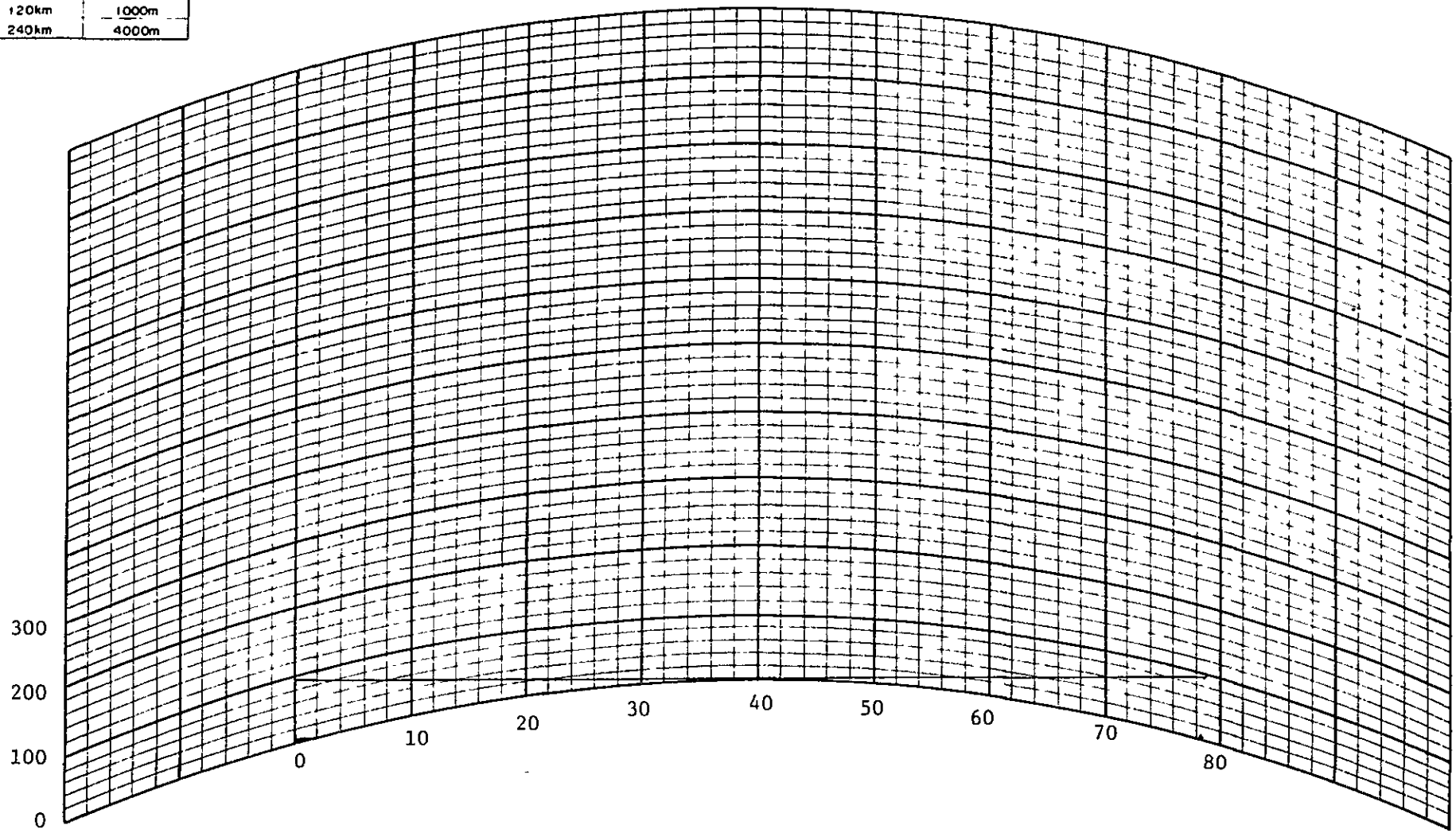
DISTANCE 206.3 km

SITE Allardayce
GROUND ELEVATION 40 m
ANTENNA HEIGHT 14.5 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 22

SITE Orete Cove
GROUND ELEVATION 5 m
ANTENNA HEIGHT 90 m

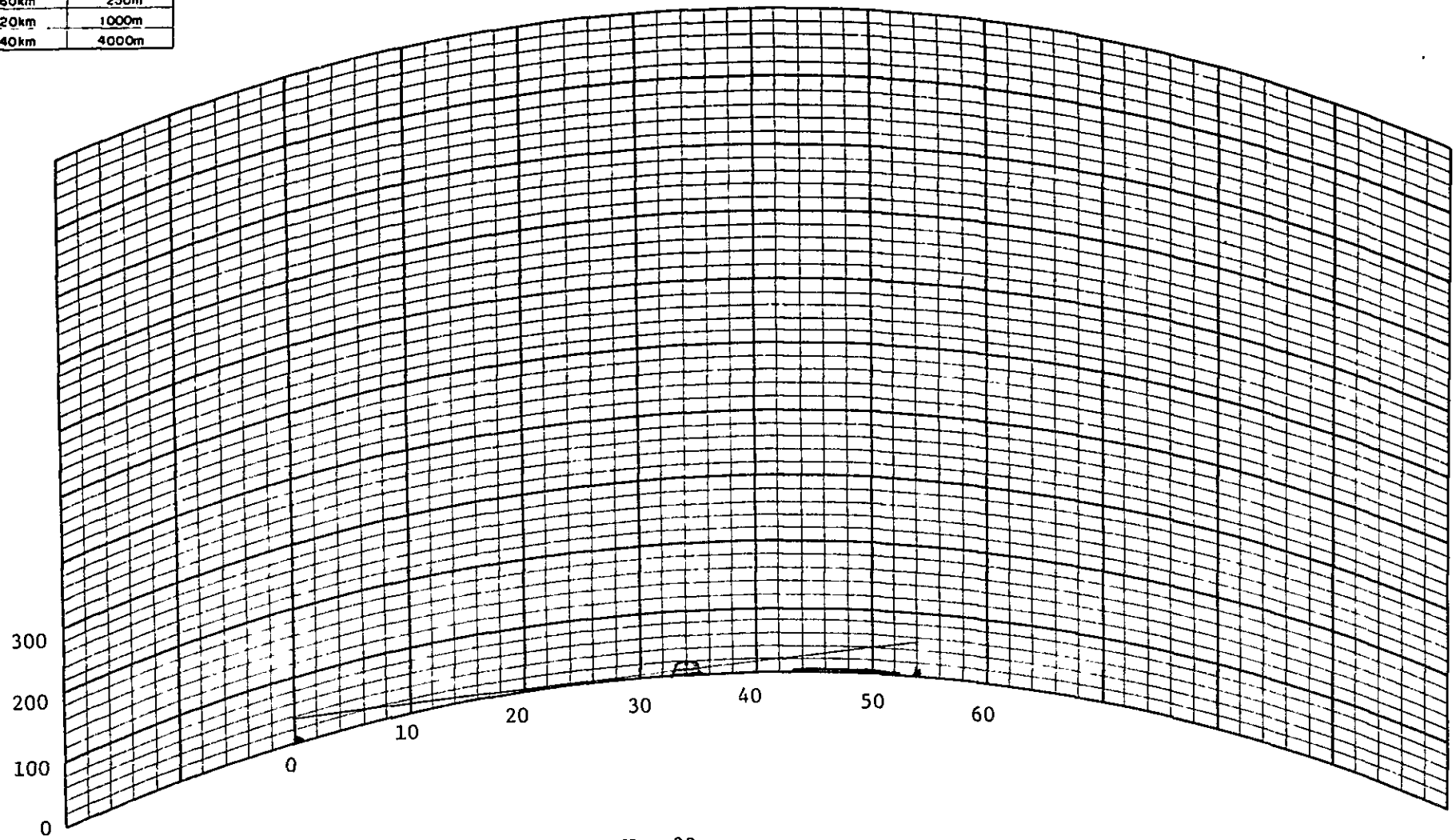
DISTANCE 78.8 km

SITE Sasamungga
GROUND ELEVATION 5 m
ANTENNA HEIGHT 90 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 23

SITE Sasamungga
GROUND ELEVATION 5 m
ANTENNA HEIGHT 30 m

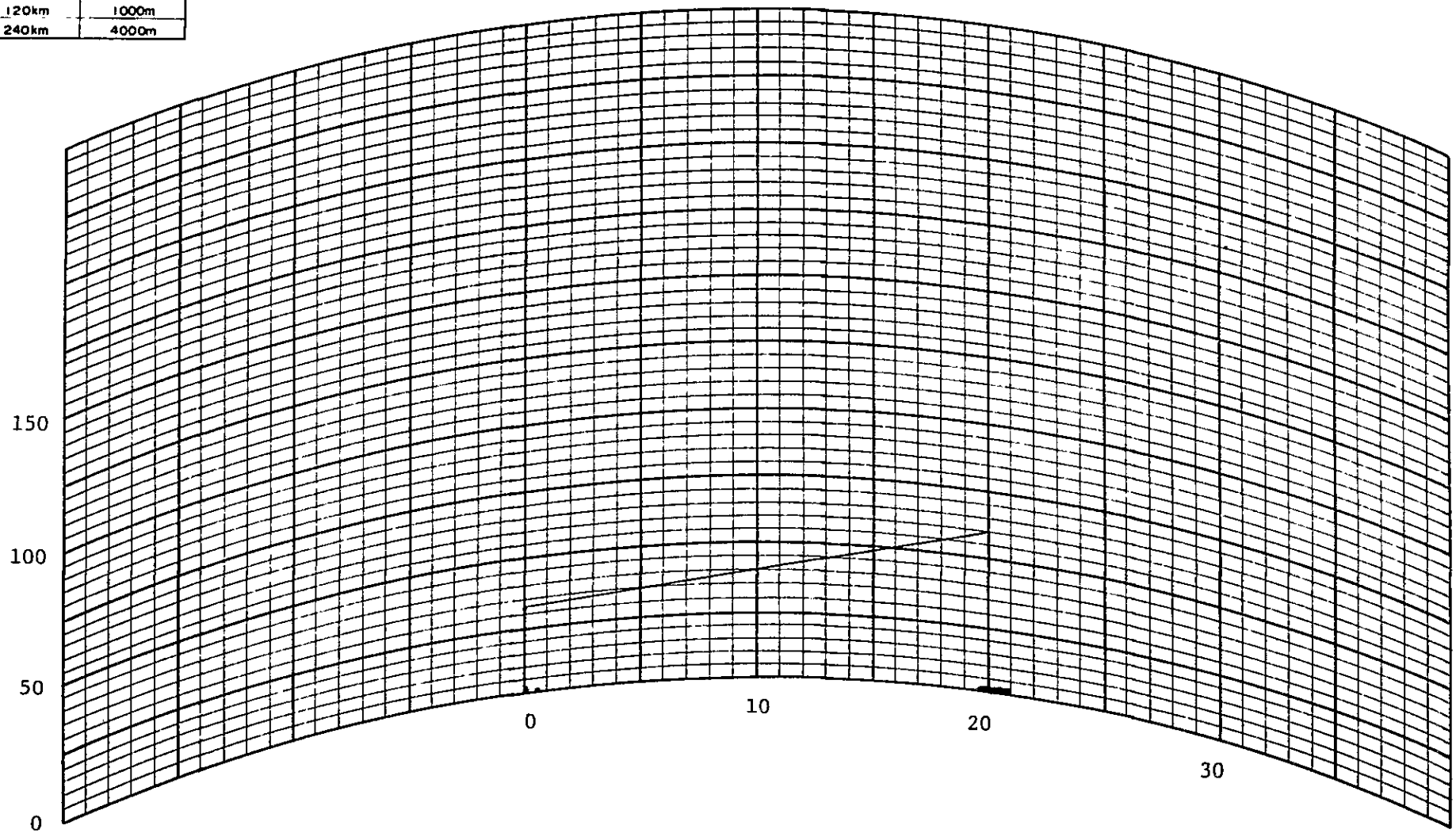
DISTANCE 54.4 km

SITE Taro
GROUND ELEVATION 5 m
ANTENNA HEIGHT 40 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 24

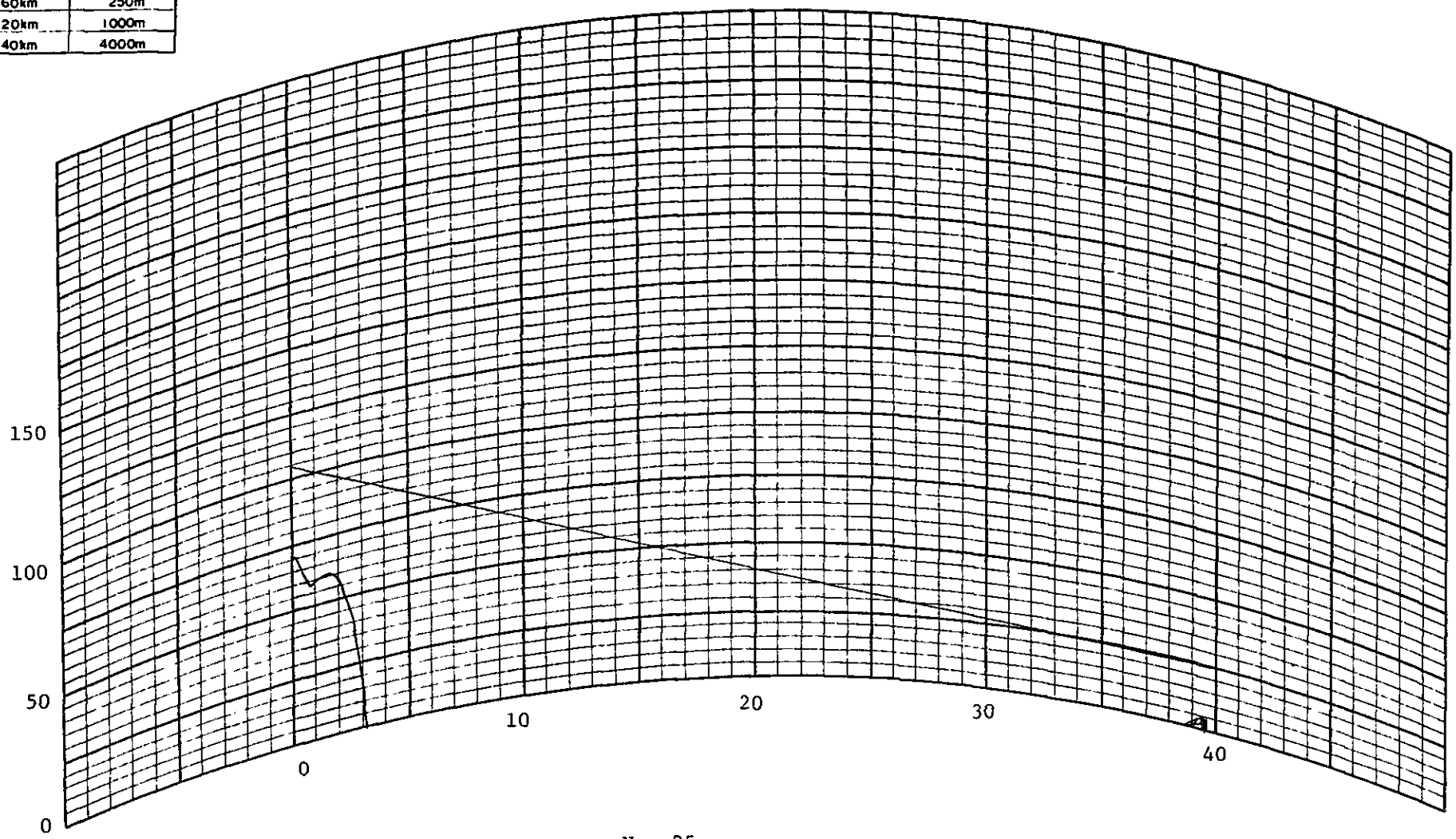
SITE Orete Cove
GROUND ELEVATION 2 m
ANTENNA HEIGHT 30 m

DISTANCE 21 km

SITE Mbarakoma
GROUND ELEVATION 35 m
ANTENNA HEIGHT 30 m

PATH PROFILE (4/3 RADIUS)

FULL SCALE	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m



No. 25

SITE Gizo
GROUND ELEVATION 70 m
ANTENNA HEIGHT 40 m

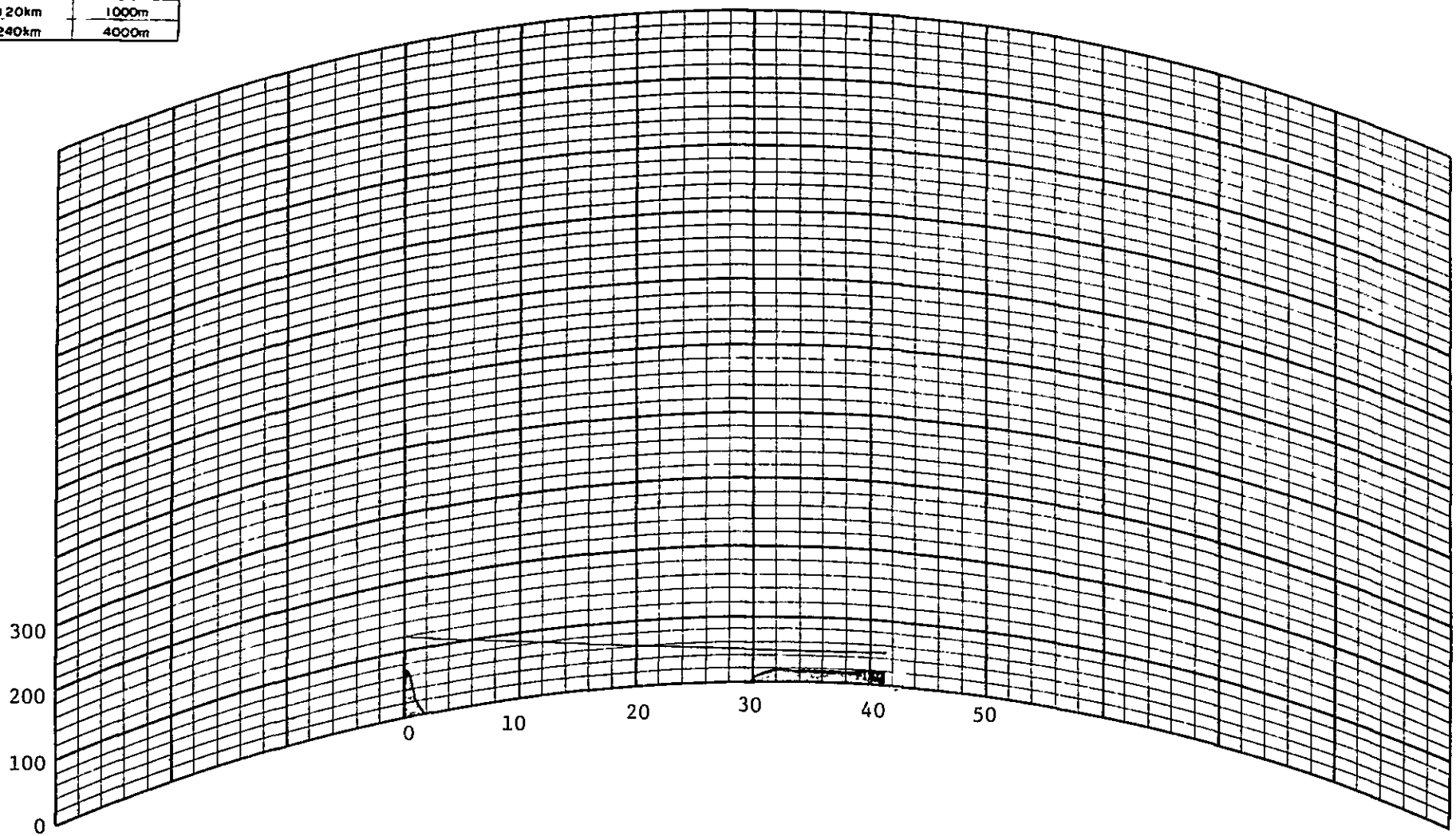
DISTANCE 39.2 km

SITE Orete Cove
GROUND ELEVATION 5 m
ANTENNA HEIGHT 20 m

FULL SCALE

	DISTANCE	HEIGHT
*	60km	250m
	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 26

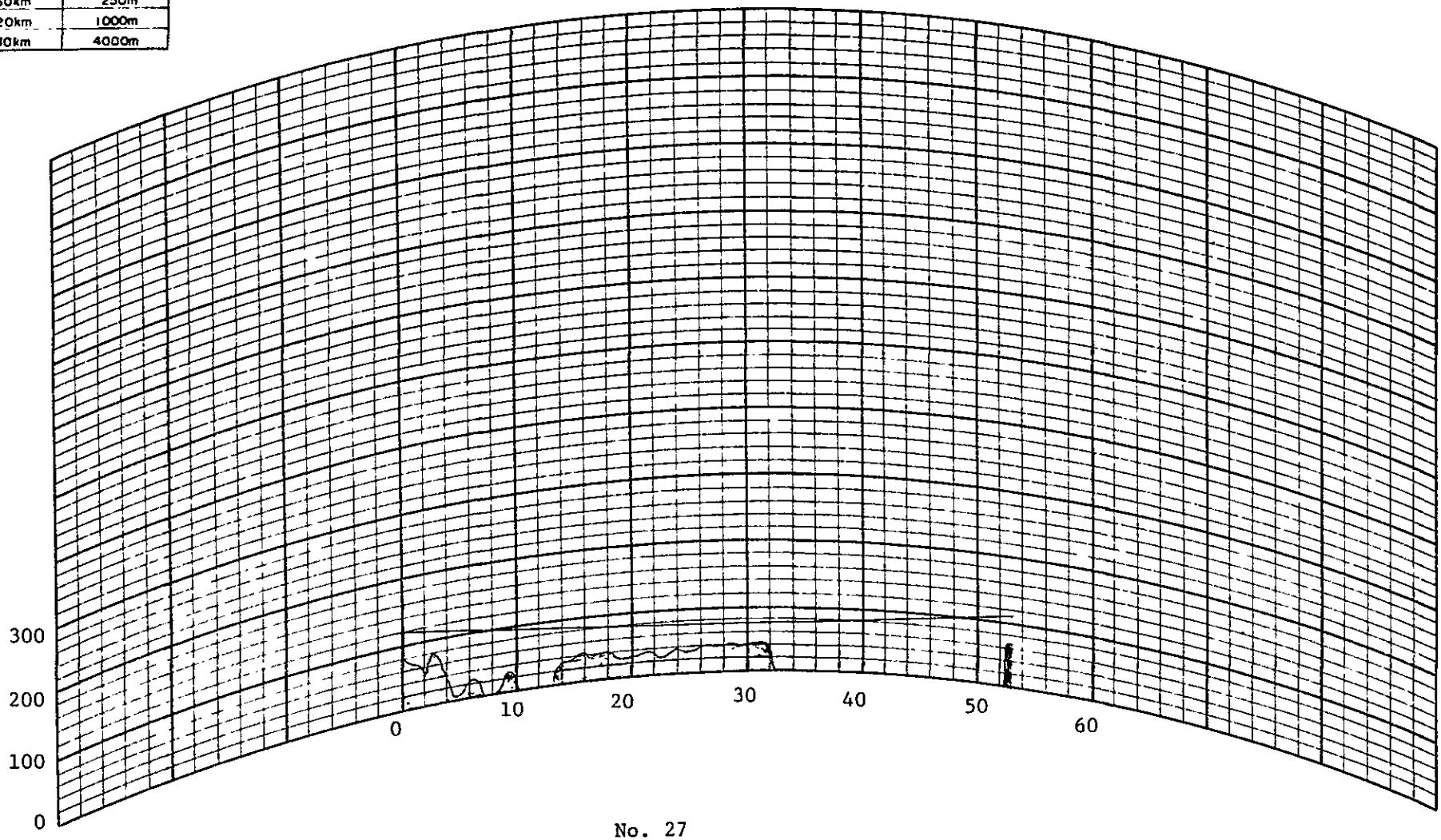
SITE Gizo
GROUND ELEVATION 70 m
ANTENNA HEIGHT 50 m

DISTANCE 41.3 km

SITE Noro
GROUND ELEVATION 17 m
ANTENNA HEIGHT 30 m

PATH PROFILE (4/3 RADIUS)

	FULL SCALE	
	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m



No. 27

SITE Munda
GROUND ELEVATION 80 m
ANTENNA HEIGHT 40 m

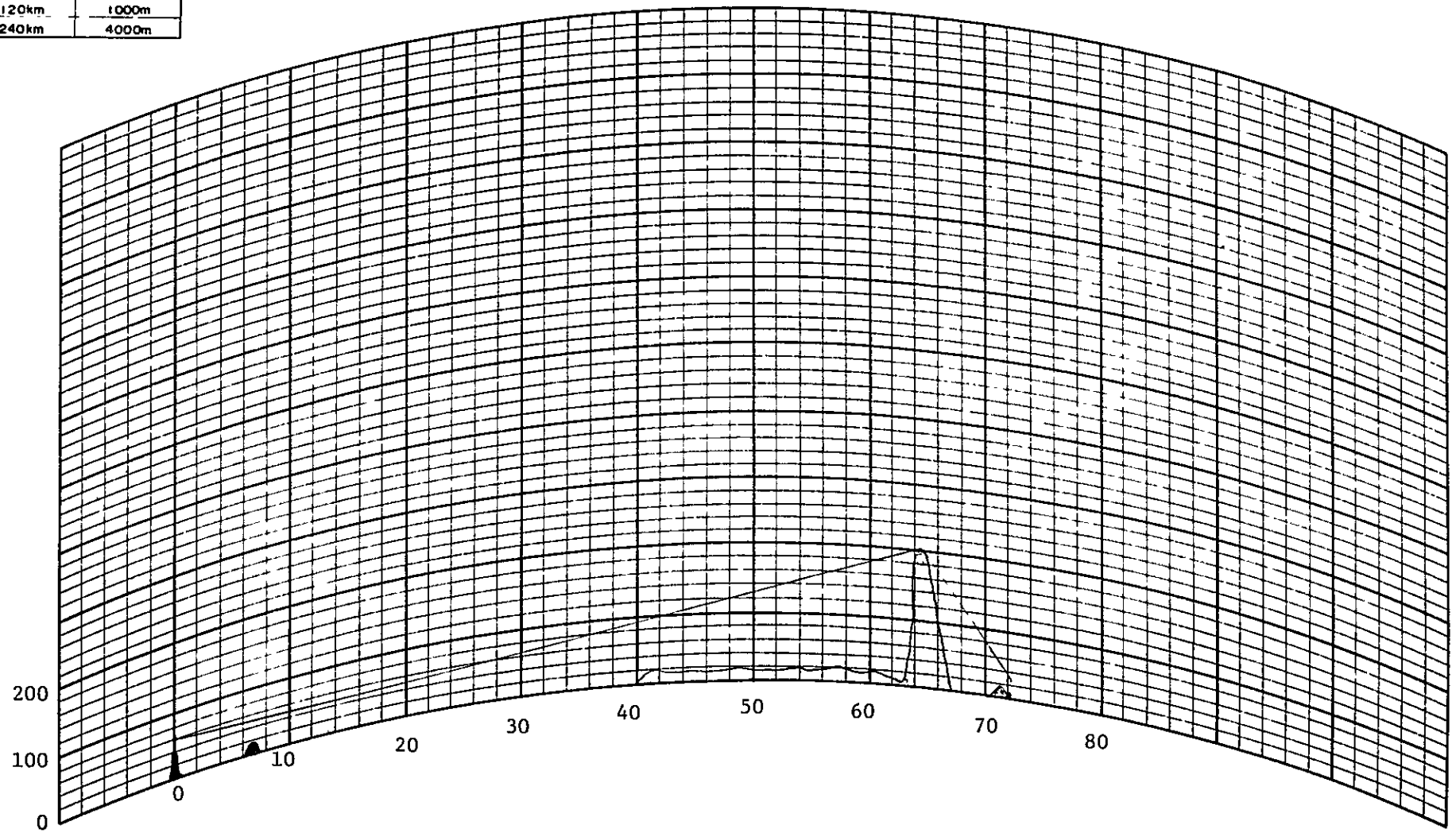
DISTANCE 52.8 km

SITE Gizo
GROUND ELEVATION 70 m
ANTENNA HEIGHT 40 m

FULL SCALE

	DISTANCE	HEIGHT
	60km	250m
*	120km	1000m
	240km	4000m

PATH PROFILE (4/3 RADIUS)



No. 28

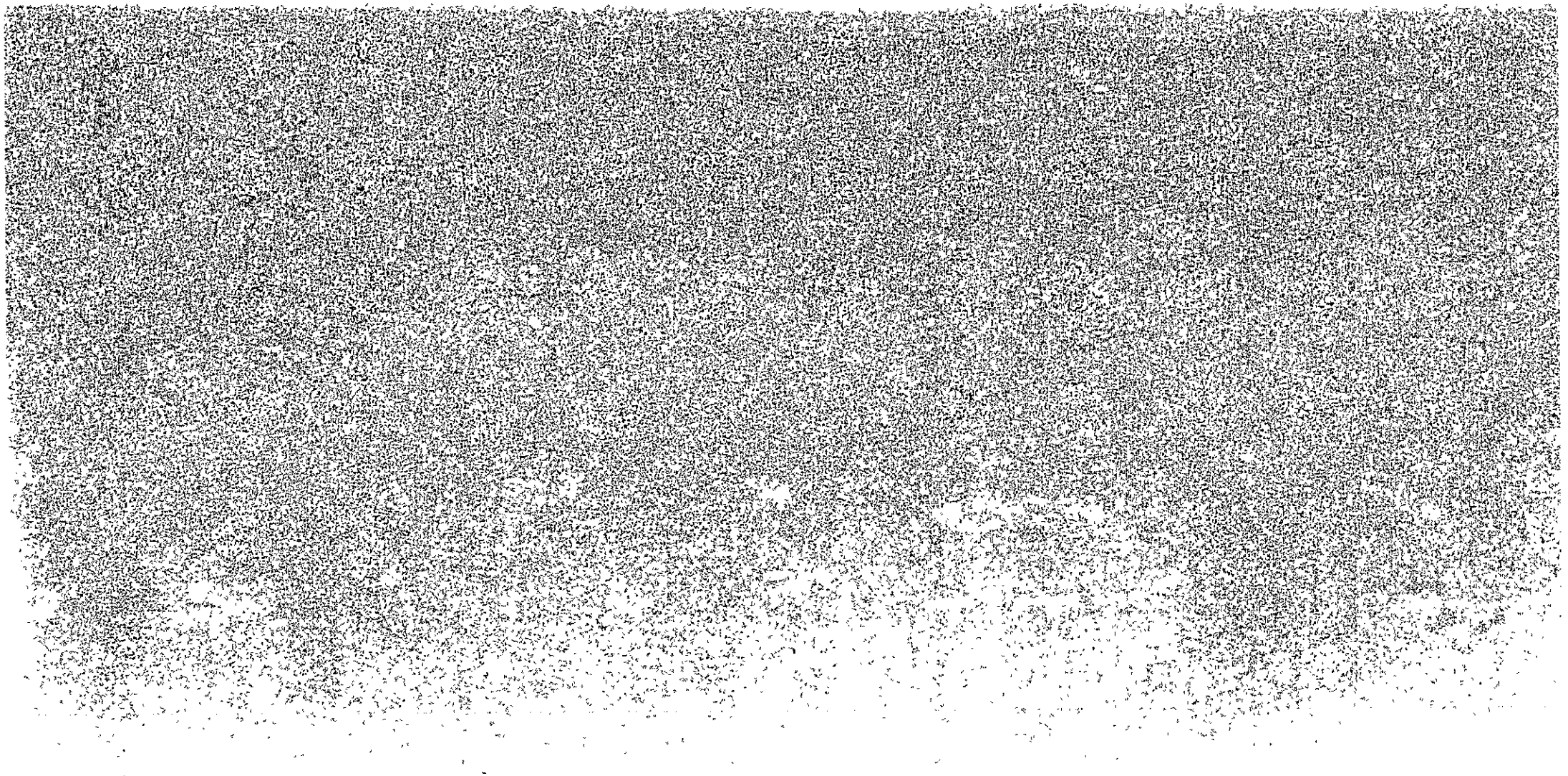
SITE Munda
GROUND ELEVATION 40 m
ANTENNA HEIGHT 20 m

DISTANCE 72.3 km

SITE Seghe
GROUND ELEVATION 4 m
ANTENNA HEIGHT 20 m

CHAPTER 5

MAINTENANCE AND OPERATION



Chapter 5 Maintenance and Operation

5-1 Maintenance and Operation Works

The purpose of maintenance and operation works is to maintain the completed telecommunication system in good operating conditions and provide good services at all times for users and at the same time keep up to date the record of maintenance work of the facilities and services to reflect them on the future maintenance plans and improvement of service quality.

The ideal service means minimization of service interruptions or the occurrence of faults. The approach to the ideal service requires a reliable design, manufacture and erection of equipment and systems on the one hand and effective measures for minimization of fault occurrence and providing good services in the maintenance and operation works on the other hand. Any measures relative to maintenance and operation works for trunk network must be determined by taking into consideration the performance and quality of the telecommunication system, policies for service grade, the number of available maintenance personnel and the demand of users.

The following measures should be considered as the basic and universal requirement for maintenance and operation of the system.

(1) Analysis of fault data to determine feeble parts of the system and replacement of such parts with reliable ones.

(2) Preventive maintenance including periodic tests and inspections to ensure the required performance.

(3) Training of operating personnel for improvement of work efficiency and quality to minimize the occurrence of troubles due to erroneous operations.

(4) Introduction of an emergency supervisory device to reduce time from the occurrence to the detection of a fault.

(5) For the reduction of time from the detection to reporting of a fault:

   a. Establishment of an improved standard route for smooth transmission of fault information.
   b. Provision for the necessary order-wire telephone.

(6) For reduction of time from reporting to detection of a fault:

   a. Provision for alarm circuits in the equipment and panel for easy detection of faults.

b. Establishment of standard procedures for handling faults and training of personnel.

c. Preparation of appropriate system and equipment diagrams.

(7) For reduction of time from the detection of a fault to the recovery of service:

a. Adoption of the spare panel replacement system.

b. Provision for such functions as automatic or manual changeover to standby system or standby equipment.

c. Establishment of maintenance patrol system for unattended stations.

d. Assignment of fully trained personnel and provision for stocking the necessary measuring instruments, appropriate spare panels and maintenance spare parts.

(8) Feedback of technical information relative to the equipment and the system from the maintenance field to the planning and construction fields and further to the equipment manufacturers as a clue for improvement of system performance.

In general, maintenance and operation works may be classified into the maintenance of facilities, maintenance of services and supporting maintenance, each of which may be broken down further as shown in Fig. 5-1.

5-2 Proposed Organization for Maintenance and Operation Works

In consideration of the maintenance requirement peculiar to Solomon Islands and the system functions proposed in Chapter 4, the following organization is recommended for maintenance and operation works for the trunk network.

Under the management of the Posts and Telecommunication Division, a master maintenance center will be located in Honiara and a maintenance center will be located in Gizo, Auki and Kirakira and necessary maintenance personnel will be assigned to each center.

Honiara master maintenance center will be equipped with a remote centralized supervisory and control function and with the assignment of personnel for 24 hours operation, will act as the center for operation, supervision and control of the entire system. Spare units and panels will be concentrated in this center for repair and maintenance of the system. Maintenance personnel will engage in maintenance work of their own station and maintenance patrol for unattended stations in the maintenance zone.

This master maintenance center will also be equipped with mobile generators and portable power units against the possible power failures or for overhaul of engines.

Maintenance centers in Gizo, Auki and Kirakira will be equipped with a remote centralized supervisory function for stations in their respective maintenance zones, with the maintenance personnel assigned during daytime for operation and supervision of facilities in their respective maintenance zones. The maintenance personnel in these maintenance centers will be engaged in maintenance of their own stations and maintenance patrol for unattended stations in their respective maintenance zones. These centers will also be equipped with portable power units against the possible power failures.

An exclusive order-wire tlephone will be provided between the master maintenance center and maintenance centers for smooth execution of maintenance and operation works. A common order-wire telephone will be provided between a maintenance center and unattended stations in the maintenance zone for communication during maintenance patrol.

A group of skilled engineers will be assigned to the Posts and Telecommunication Division to direct maintenance personnel of each maintenance center for solution of problems which are beyond the capability of maintenance personnel. These engineers will also be responsible for establishment of standard procedures and providing technical training for amintenance personnel of centers.

5-3 Proposed Personnel Plan and Training Program

For the efficient management of the above maintenance organization and smooth implementation of maintenance and operation works, it is essential to supplement the existing personnel with the additional personnel shown in Table 5-1 and provide necessary training for these personnel.

Since Solomon Islands have a limited number of engineers having experience in maintenance of wide-band multiplex system using radiowaves of VHF or over, it will be necessary to train engineers and technicians overseas or invite instructors from overseas to train personnel in the country. It will also be necessary to send personnel to manufacturers' plants for training on maintenance techniques which are unique for the equipment and system. It is desirable to start on-the-job training of maintenance personnel during the construction stage of the project.

In the event the skilled maintenance personnel cannot be secured in the country, it will be necessary to request the equipment manufacturer to send

a skilled maintenance specialist for a period of one year or for an appropriate period of time upon completion of the system or invite a skilled engineer from abroad for assignment as a maintenance specialist or as an instructor for training of maintenance personnel. The proposed training program based on the above considerations is shown in Table 5-2

5-4 Maintenance and Operating Cost

Accurate calculation of maintenance and operating cost is difficult unless the type of equipment to be used and the wage level of maintenance personnel are clearly defined. In this report, the maintenance (and operating) cost was estimated on the basis of NTT's experience in the maintenance of transmission systems with consideration given to the difference of wage levels between Solomon Islands and Japan.

It may be resonable, therefore, to estimate the annual maintenance and operating cost at about 3 percent of the initial cost.

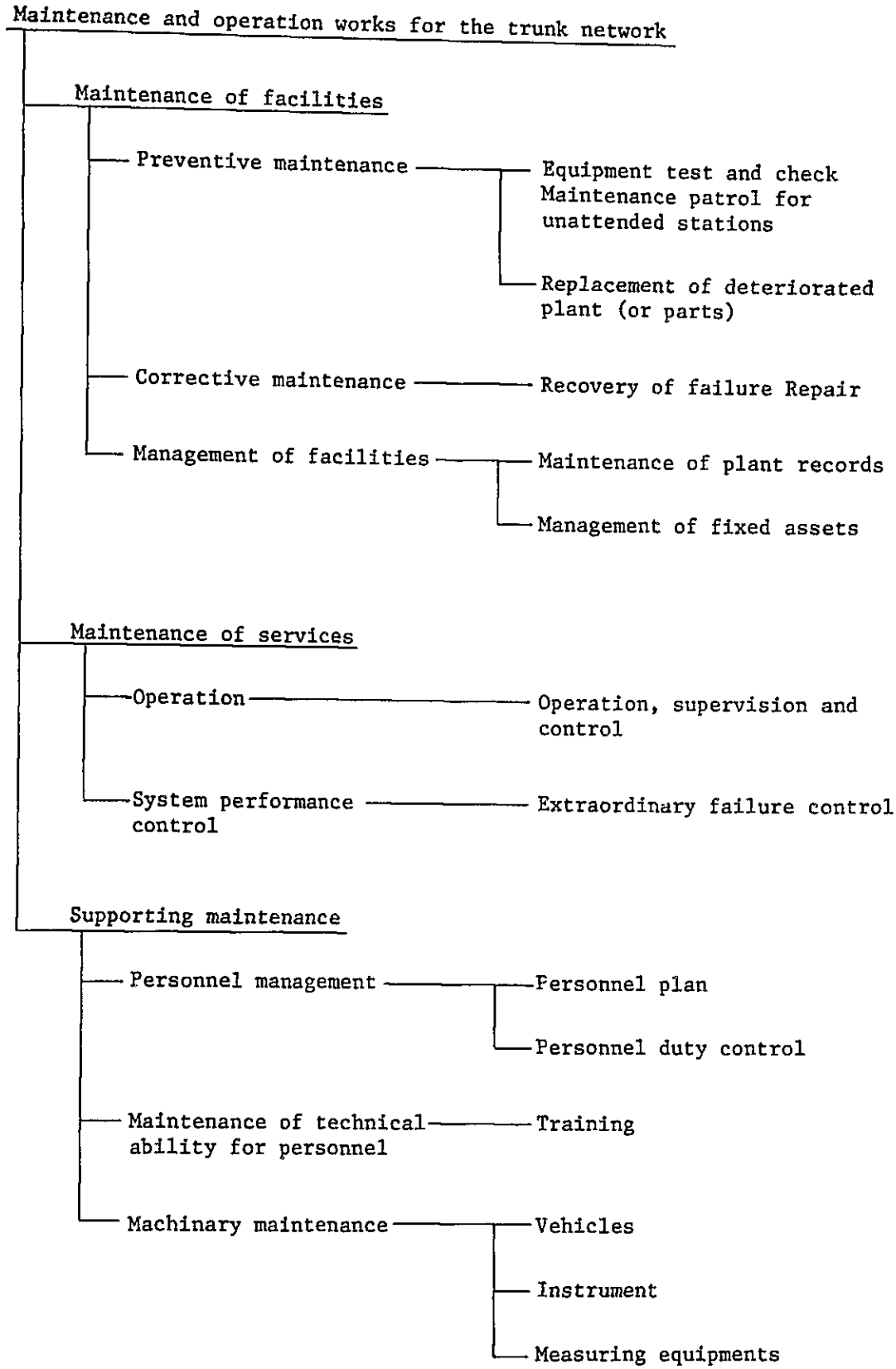


Figure 5-1 Outline of maintenance and operation works for the trunk network

Table 5-1 Proposed personnel plan

Clacification \ Number of personnel	Phase - 1	Phase - 2
Assistant Technical Officer	7	8
Technician (Level 4)	10	12
Technician (Level 3)	3	10
Total	20	30

Table 5-2 Proposed training program

	CLASIFICATION	NUMBER OF PERSON
Oversea Training	Engineer	1
	Senior Technical Officer	1
	Technical Officer	1
Factory Training	Assistant Technical Officer	8
On the Job Training	Technician	13