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[illegible] TELECOMMUNICATIONS
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JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF THE PHILIPPINES

FEASIBILITY REPORT ON THE TELECOMMUNICATIONS NETWORK PROJECT IN THE NORTHERN PART OF LUZON

〔VOLUME Ⅱ〕

DECEMBER, 1978

JAPAN INTERNATIONAL COOPERATION AGENCY

Preface

This brochure presents necessary information on site location in executing the telecommunications network project for the Northern Part of Luzon.

In order to smoothly advance this project, it is essential before everything that the buildings of telephone offices and radio stations and related access roads will be constructed as required and, for this purpose, procurement of necessary sites is essential. The survey team believes that this brochure will make an effective reference for site location and procurement.

1st Ed., December 1968

118° 119° 120° 121° 122° 123°

INTERNATIONAL TREATY LIMITS

Shō-kōtō sho (569)

Amianan I (719)
North I (881)
Mabudis I (754)
Siayan I
Ithayan 914
Ibayat I
759
Diago I (1683)

BATANES

BASCO 3306
Mahatao
Ivana 487
Sabtang
Ibahos I (297)
Uyugan 153
Sabtang I

Stewart Bank

Santiago I
Ducoy
Bolinao
Ilogmalino
Zaragoza
CAPE BOLINAO
Tondul

LUZON STRAIT

(538) (339) Balintang I

Barugan Cove
BABUYAN I 2228 3569
San Dionisio 1308
Ponuitan I
Tumulod Pt Banua Batang Pt
Dibay Dilam
Colonapan Pt 732 1780 CALAYAN I
1330
Macaro 625 Piddan Pt
Nagaidel Pt Calayan Pine Pt
BABUYAN ISLANDS
DALUPIRI I
Pangol Pt Visite
903 Banoa 420
Irao I (80)
Didicas Rocks (270)
Minabul
Nagpalitingan Pt 2742
CAMIGUIN I 1620 Tangyda 970 Cuanayan Bay
Magsasarut Pt Cadagatan
Pinon I (110) 2260 Gaulous Pt
(20) Guinapao Rocks (316) (215)
Magab I
Barit I 425 Kiking Pt
Villa Vicenta Barogan
Magallan Sorongan
FUGA ISLAND

BABUYAN CHANNEL

Mayraira Pt
Babuloquen Pt
Centinela Pt
Gaddang Pasalec Bay
Bungui Bay
Negra Pt Pagudpud
Cape Bojeador
Dilavo 694
Paddaogan
Sanchez-Mira
Bidduang
Pamplona
Abulog
Ballesteros
Cabuttal
Linao
Aparri
Dos Hermanos Is
Cape Engaño
Escucho I (60)
PALAUI ISLANDS
Escarpada Pt
Puerto Pt
San Vincente
1000
Palawig
Santa. Ana
Ati I
Aracat Mt Topos
Pananapon Pt
Bawa 3780
Mt Cagua (Volcano) 3263 2018
Mt Cagagongan
Maloncon I
Nanandatan Pt
Naglocsaden Pt
Mt Lagil 3267
Bolos Pt
2505 2763
Cabutunan Pt
Batulinao Pt
Paranan
Intal
Ninauan Pt
Valley Head
Valley Cove
Baguio Pt
Dicalocan Bay
Gay I
Estagno Pt (225)
Fort Espe
Aborede Pt
Palanan Bay
Palanan Pt
Spires I
Disumangir I
Digollorin Pt
Digollorin Bay
Diviuire Pt
Pananapon Pt
Mt Cetacea (Dome Shape)
5535
3833 Thumb Peak 3770
6188
5422 Mt Cresta 3902 (225)
5530 Stairstrike 1338
Mt Molmol 4070
Peak
3931
1599 Puerta 3976 Palanan
Culculcucan
3717 The Knobs 3816 (173)
4521
1240
1890
2749
4597 4787 1909
Mt Dos
Dinapiqui Pt
Tariglig Pt
1540
Dijohan Pt
Rilaza
Esperanza

Capital of the Republic of the Philippines
Chartered City
City Capital of Province
Capital of Province
Regional Capital
Municipality or Municipal District
Barangay
Provincial Boundary
City boundary
Regional Boundary
International Treaty Limits
Railroads, 3'6" Gauge: with station
Railroads, Less than 3'6' Gauge
Railroad, Electric

REGION I

REGION II

1st Ed., December 1968

NORTHERN PART OF LUZON
THE PHILIPPINES

Scale 1:1,500,000

10 5 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 Kilometers

LEGEND

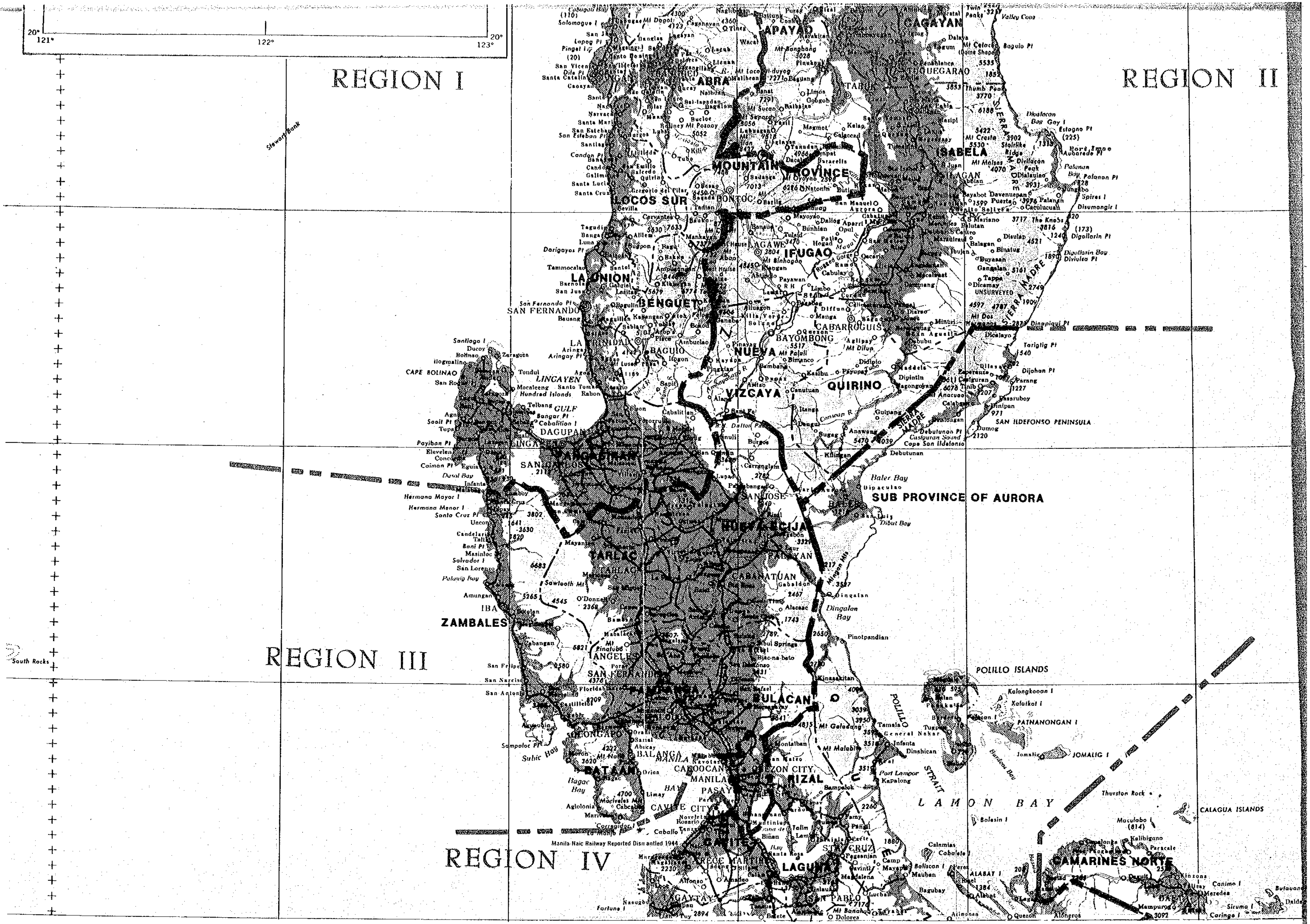
- Capital of the Republic of the Philippines
- Chartered City
- City Capital of Province
- Capital of Province
- Regional Capital
- Municipality or Municipal District
- Barangay
- Provincial Boundary
- City boundary
- Regional Boundary
- International Treaty Limits
- Railroads, 3'6" Gauge: with station
- Railroads, Less than 3'6" Gauge
- Railroad, Electric
- Main Road
- Secondary Road
- Track or Trail
- Road under Construction, 1941
- Ferry
- Telephone and Telegraph Line
- Power Transmission Line
- Marsh
- Mud or Tidal Flat
- Height (in feet) 743
- Mine
- Rock Awash
- Limiting Danger Line
- Principal Navigation Light

HEIGHTS IN FEET

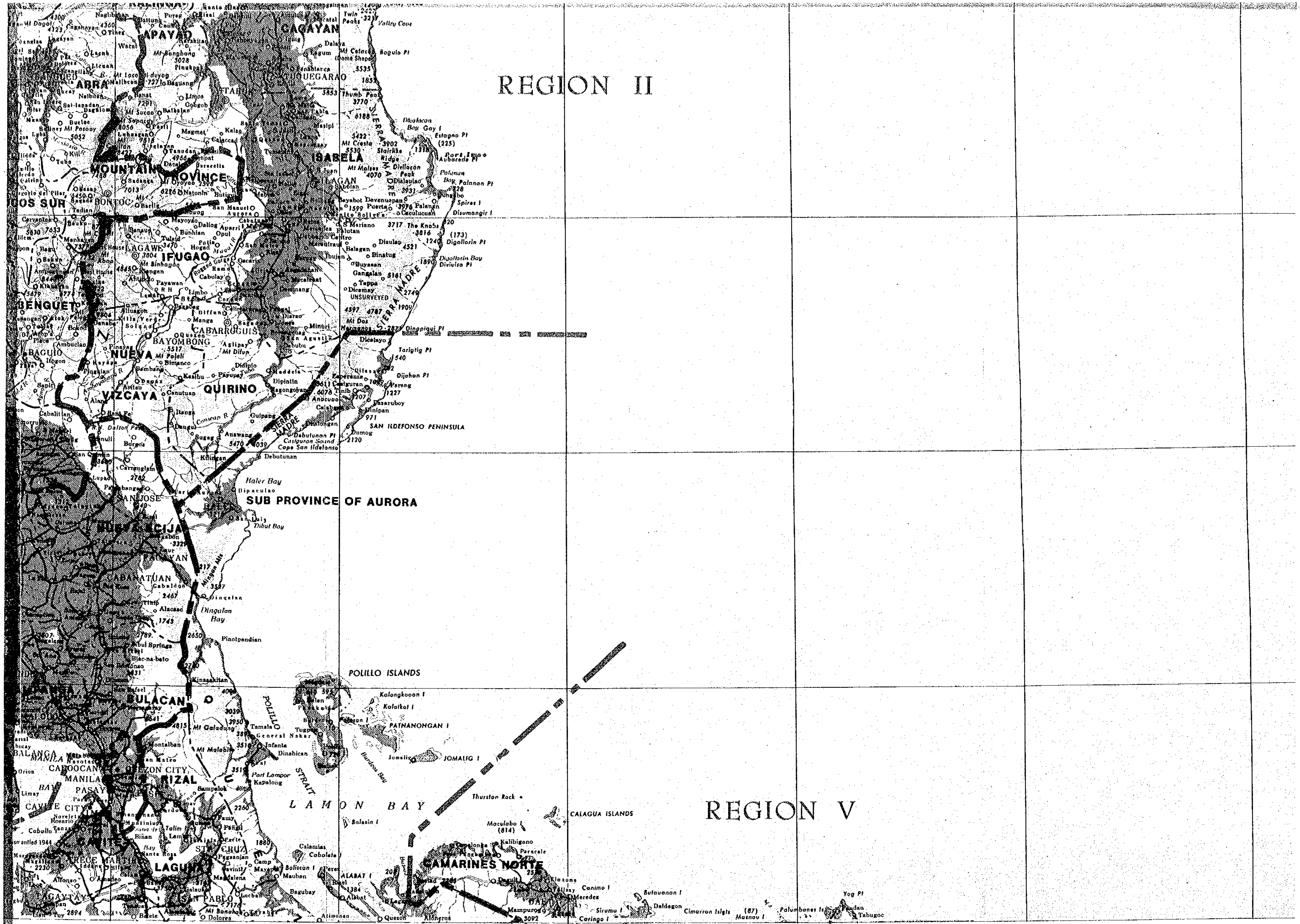
ALTITUDE TINTS

Feet	Meters
13,000	3963
10,000	3048
8000	2438
6500	1981
5000	1524
3500	1067
1500	457
500	152
Sea level	0

REGION II



REGION I
REGION II
REGION III
REGION IV
APAYAO
CAGAYAN
ABRA
MOUNTAIN PROVINCE
ILOCOS SUR
BONTOC
IFUGAO
ISABELA
LA UNION
BENGUET
BAGUIO
NUEVA VIZCAYA
QUIRINO
BAYOMBONG
SAN FERNANDO
LINGAYEN GULF
DAGUPAN
PANGASINAN
SUB PROVINCE OF AURORA
NUEVA ECIJA
TARLAC
CABANATUAN
ZAMBALES
IBA
ANGELES
SAN FERNANDO
PAMPANGA
BULACAN
BATAAN
BALANGA
OLONGAPO
CALOOCAN
QUEZON CITY
MANILA
PASAY
RIZAL
CAVITE CITY
CAVITE
LAGUNA
SANTA CRUZ
POLILLO ISLANDS
POLILLO STRAIT
LAMON BAY
CAMARINES NORTE
CALAGUA ISLANDS
SIERRA MADRE
SAN ILDEFONSO PENINSULA
Baler Bay
Dingalan Bay
Manila Bay
Subic Bay
CAPE BOLINAO
South Rocks
Stewart Bank
Manila-Naic Railway Reported Dismantled 1944



REGION II
REGION V
CAGAYAN
APAYAO
ABRA
MOUNTAIN PROVINCE
ISABELA
IFUGAO
BENGUET
NUEVA VIZCAYA
QUIRINO
SIERRA MADRE
SUB PROVINCE OF AURORA
NUEVA ECIJA
BULACAN
RIZAL
LAGUNA
CAVITE
CAMARINES NORTE
TUGUEGARAO
BONTOC
BAGUIO
LAGAWE
BAYOMBONG
CABARROGUIS
SAN JOSE
CABANATUAN
QUEZON CITY
MANILA
CALOOCAN
PASAY
CAVITE CITY
TRECE MARTIRES
TAGAYTAY
SAN PABLO
STA CRUZ
Baler Bay
Dingalan Bay
Dibut Bay
Casiguran Sound
SAN ILDEFONSO PENINSULA
POLILLO ISLANDS
POLILLO STRAIT
PATNANONGAN I
JOMALIG I
LAMON BAY
ALABAT I
CALAGUA ISLANDS
Thurston Rock

VOLUME II

CONTENTS

XVII ANNEX

[I]-1 Primary Center, Microwave Terminal Station

(1) Laoag

° Plan

At present, telephone service over Laoag City is managed by the Provincial Government. The local exchange office managed by the Provincial Government is located nearly at the center of the city. BUTEL's radio repeater station is located on a hill about 3km apart from the local exchange in straight line distance. The Laoag BUTEL Radio Repeater Station will function as:

- ° Toll exchange
- ° Microwave system terminal station
- ° Primary center for radio and cable spur routes

Accordingly, the following types of equipment will be accommodated at Laoag BUTEL.

Toll exchange
Microwave equipment
UHF/VHF equipment
Carrier equipment
Equipment for various cables and others

These items of equipment will be installed in the primary center/ radio terminal station building to be constructed newly in the place of the present radio repeater station.

° Proposed Building Site

The present radio repeater station will be pulled down and, instead, a new station building will be constructed to accommodate:

Toll exchange
Various radio equipment
Carrier equipment and power plant.

Since this site is somehow narrow, an upper portion of about 5m in width will be cut to obtain a new site of 50m x 70m for the building.

Dimentional Information

Necessary building area:	$700m^2$
Antenna tower height:	100m (Selfsupporting)
Necessary site area:	$2100m^2$

(2) Vigan

◦ Plan

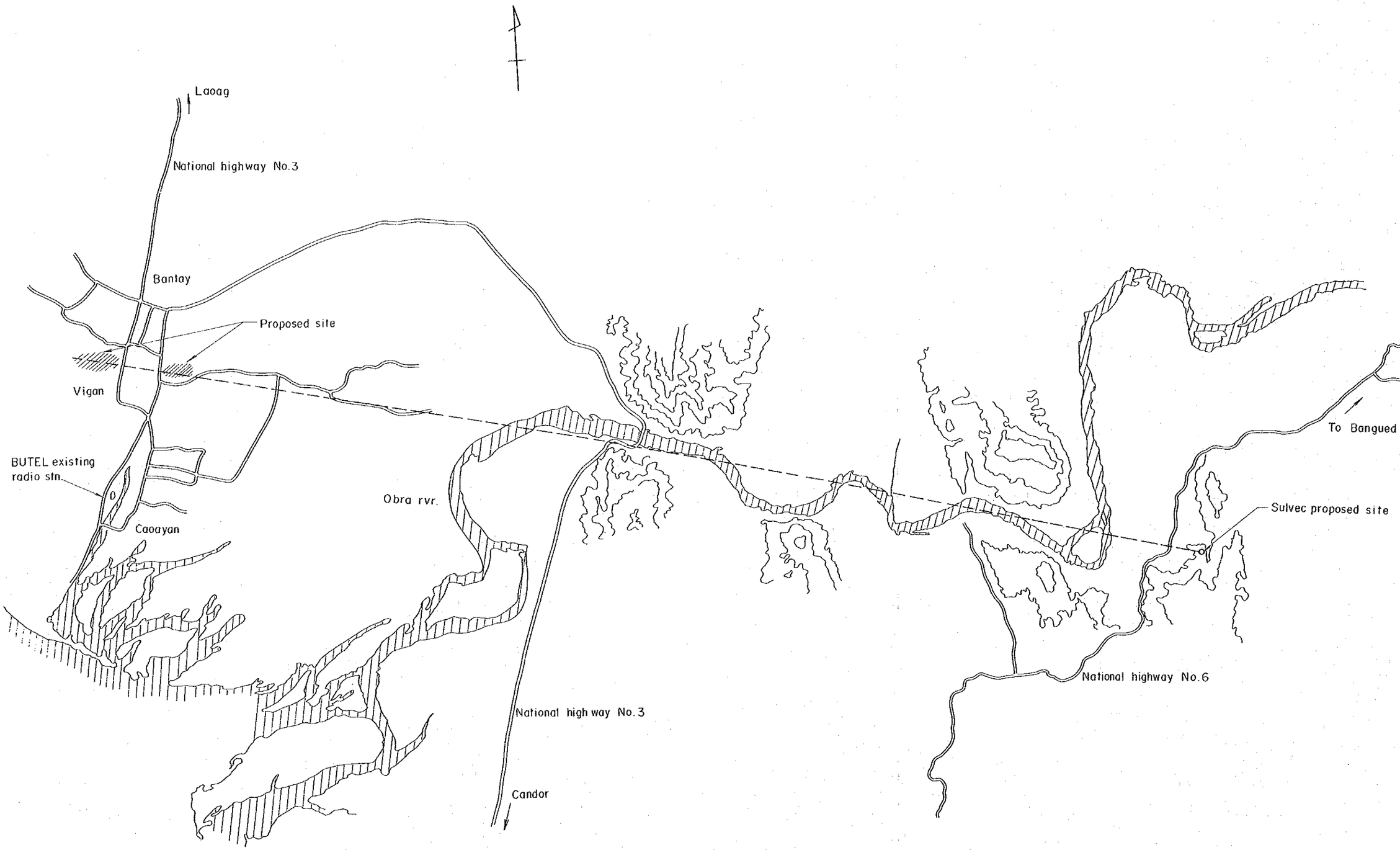
In Vigan having BUTEL-operated telephone network, the local exchange office is located nearly at the center of the town and the radio repeater station is situated on a hill opposite to Caoayan about 4km to the south of Vigan.
Here, toll exchange will be installed and the microwave system will require a video terminal station, so that the scale of the station/office will become comparatively large.
Meanwhile, the existing local exchange office provides no large margin in space and it is recommended to install the toll exchange at the place where the radio equipment is to be installed.
Meanwhile, the existing radio repeater station is located so that a good propagation course without obstraction can be secured in each of the directions to Sinait, Bigbiga, and Santa but the propagation course to the succeeding Sulvec Repeater Station in the Bangued route will be obstructed.
Accordingly, in order to secure a good propagation course to Sulvec, it is necessary to provide a propagation course accurately along River Abra. For this purpose, the Vigan video terminal station of microwave should be located somewhere on the extension line of the Sulvec→River Abra line.
The site thus selected is located about 600m from the existing local exchange office as stated later.
By accommodating the local exchange and radio equipment here, connection to the existing telephone office will be made by cable.

◦ Proposed Building Site

In order to secure the propagation course to Bangued, it is necessary to locate the Vigan Video Terminal Station at a proper position on the extension line of the Sulvec→River Abra line.

◦ Dimensional Information

Necessary building area: $700m^2$
Antenna tower height: 70m (Selfsupporting)
Necessary site area: $2100m^2$


Laoag
National highway No.3
Bantay
Proposed site
Vigan
BUTEL existing
radio stn.
Caoayan
Obra rvr.
National high way No.3
Candor
To Bangued
Sulvec proposed site
National highway No.6

(3) Baguio

° Plan

Local exchange and radio and carrier equipment will be accommodated in the building to be constructed newly.
The service at the window will still be continued at the present place. Acceptance of telegram and telephone will be made continuously at the existing message center.

° Proposed Building Site

The site behind the existing Director Office (approximately 17,000m^2) is recommended as the main plan and the site on Quezon Hill (approximately 3,000m^2 owned by the Government) as the alternative plan.
The cable distance to the existing message center or PILTEL office is approximately 1km in the case of the main plan and approximately 2km in the case of the alternative plan. Other conditions are all identical in the two plans except that the site of the main plan is nearer to the center of the city.
The survey team recommends the main plan.

° Dimensional Information

Necessary building area: 980m^2
Antenna tower height: 25m

The steel tower will be erected on the station building for the purposes of environmental preservation and beauty.

Necessary site area: 3000 ∿ 5000m^2

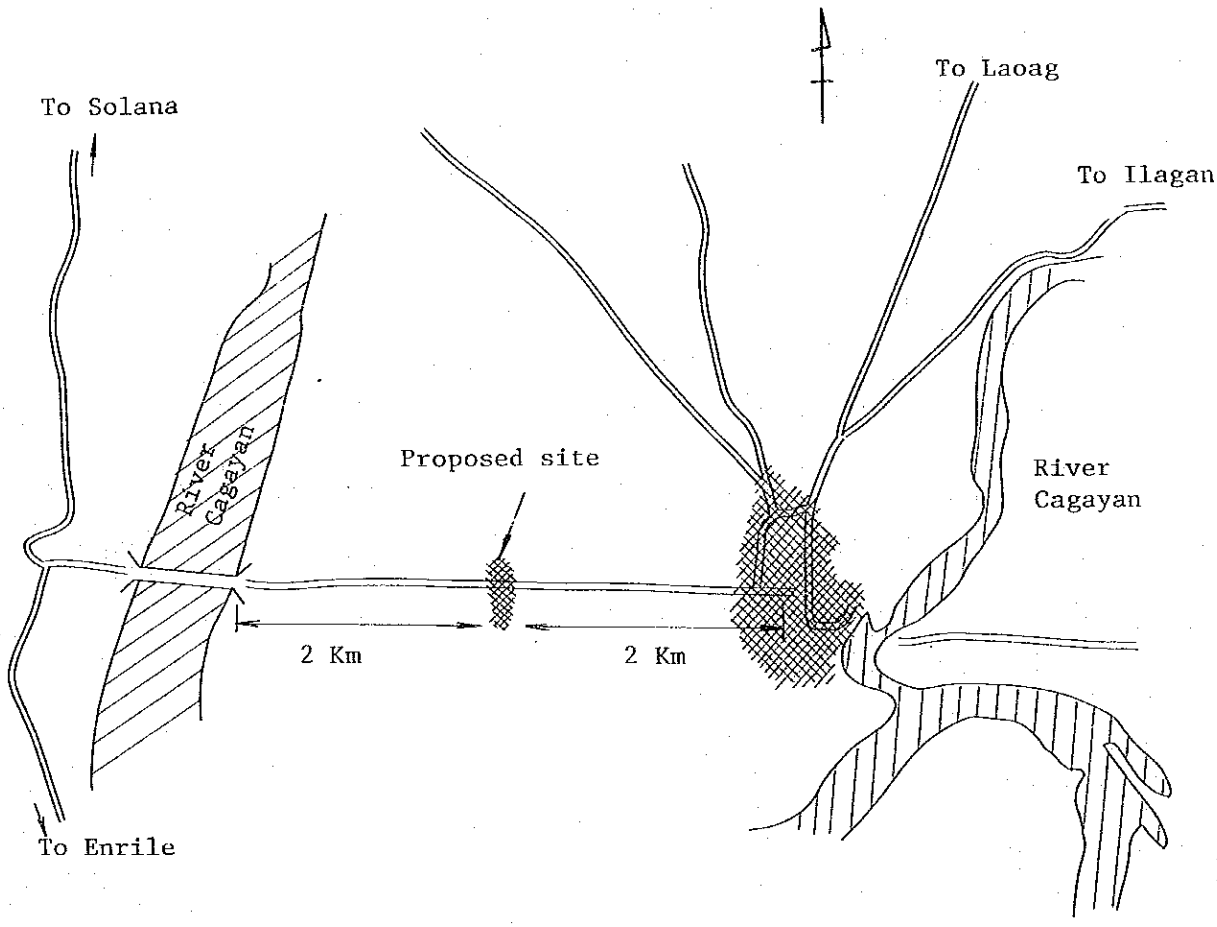
(4) Tuguegarao

° Plan

This station/office is expected to be the video terminal station in Region 2 of the microwave system and will be an important station to have the function of exchange for toll calls and telex in the area. A new station building will be constructed in Toguegarao to accommodate all microwave equipment, VHF/UHF equipment, carrier equipment, toll exchange and telex exchange.

Proposed Building Site

The proposed building site is located about 2km from the center of the town along National Road No.2 to Solana.



◦ Dimensional Information

Necessary building area: 980m^2

Antenna tower height: 115m (Selfsupporting)

Necessary site area: 3200m^2

It may be allowed that the site may be relocated to the south or north but should not be deviated to the east or west in consideration of propagation to Ilagan.

(5) Ilagan

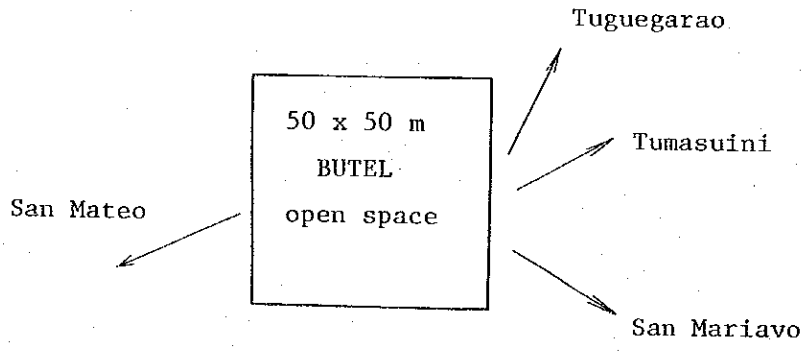
◦ Plan

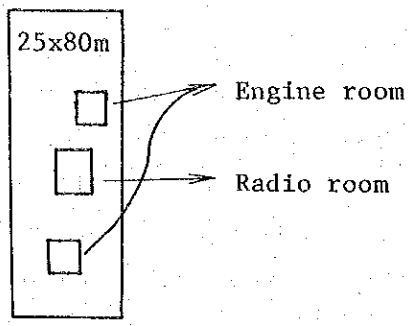
This station/office is expected to be a video terminal station of the Baguio Tuguegarao microwave link and will also be furnished with toll exchange. Accordingly, a relay line by UHF or cable will be formed from Ilagan to its neighboring towns. Local-telephone service is executed by a private operator. In this project, the following items of equipment will be accommodated in a station building to be constructed newly in the site of the present VHF repeater station.

Microwave equipment
Toll exchange
Carrier equipment
Spur route radio equipment
Power plant

◦ Proposed Building Site

Since the propagation courses to Tuguegarao and San Mateo are over plains, the site in Ilagan is expected to be as much high as possible. In this sense, the existing BUTEL repeater station is suitably located.
The site condition is as follows.





A sufficient space can be secured by adding the site being used and the site of about 2500m^2 on the north side.

° Dimensional Information

Necessary building area:	700m^2
Antenna tower height:	75m (Selfsupporting)
Necessary site area:	2100m^2

(6) Bayombong

° Plan

This station/office is expected to be a video terminal station in the Baguio ∿ Tuguegarao microwave route.
Because of the restriction in propagation, the existing radio repeater station will be employed. For the local and toll exchanges, the existing exchange office will be used by expansion.
In consideration of these circumstances, it is recommended to construct a building at the site of the present radio repeater station and install all radio equipment in the building.
Meanwhile, the existing telephone office will be somehow expanded so as to accommodate the toll exchange.

° Proposed Building Site

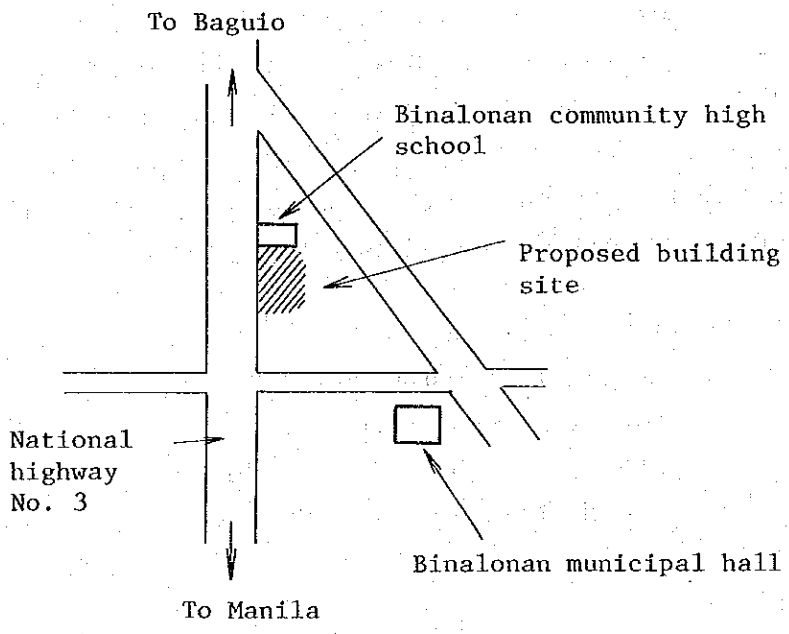
A station building of about $320m^2$ and a selfsupporting antenna tower of about 35m will be constructed in place of the present radio repeater station so as to accommodate radio equipment.
The existing telephone office will be expanded by $100m^2$ to accommodate the toll exchange.

(7) Binalonan

∘ Plan

A new building will be constructed on the south of the Binalonan Community Highschool along the national highway so as to accommodate toll exchange (to be implemented in Phase II), local exchange, and radio and carrier equipment.

∘ Proposed Building Site



°Dimensional Information

Necessary building area:	800m^2
Antenna tower height:	55m (Selfsupporting)
Necessary site area:	2400m^2

[I]-2 Microwave Repeater

(8) Sinait

° Plan

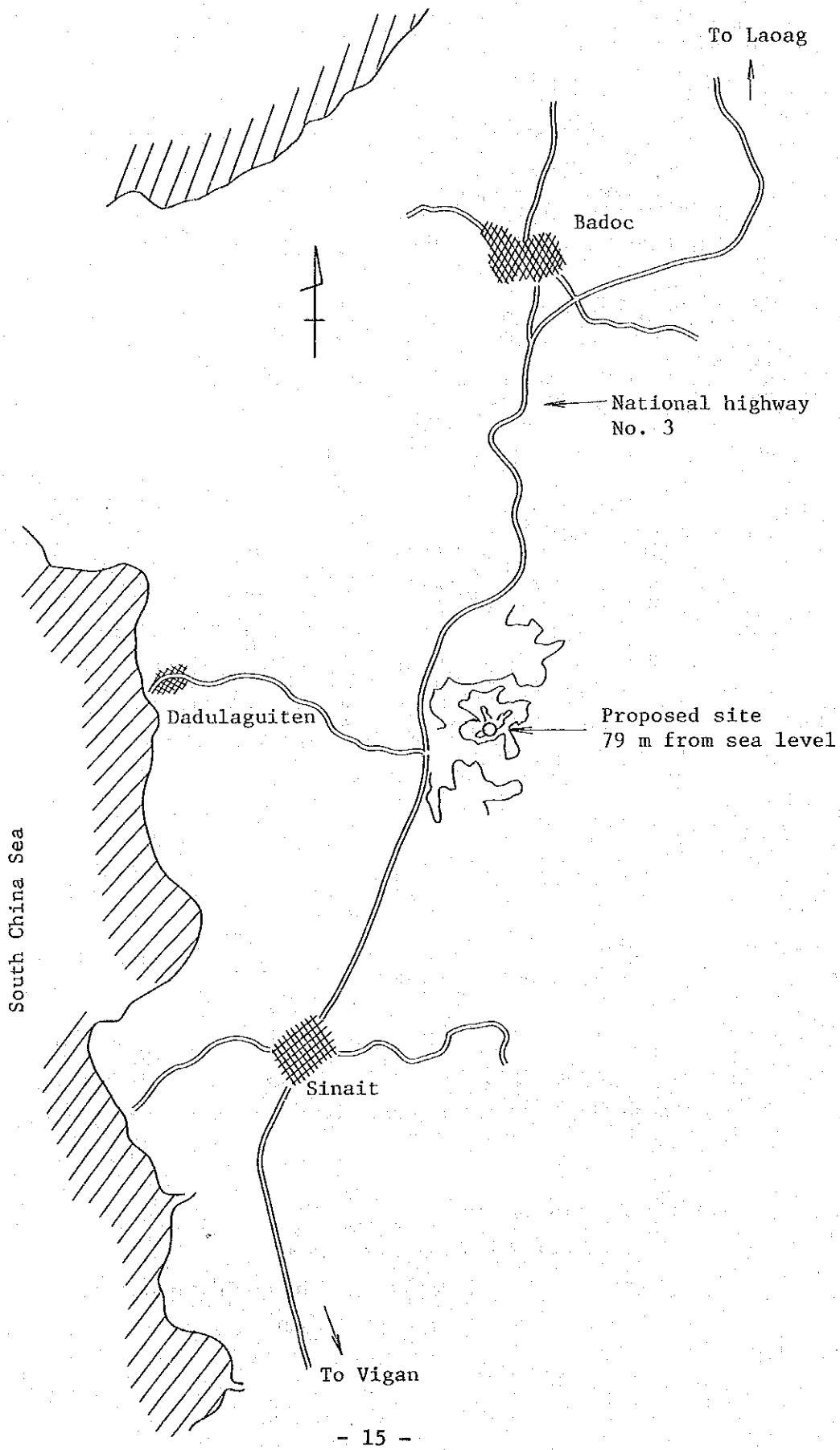
This station/office is a repeater station in the Vigan ∿ Laoag microwave route and has the function of branching by leaking to the IPTS at Currimas and Cabugao.

° Proposed Building Site

There is a crossroads (to Dadulaquiten) at a location 39.2km from Vigan to Laoag on National Highway No.3 and 2.9km from Sinait on the national highway. The proposed building site is located on the northeast of this crossroads. The proposed site is partially covered with a bamboo wood, and a site of 30m x 30m can be secured by cutting soil of 2m in width.

° Dimensional Information

Necessary building area: $90m^2$
Antenna tower height: 55m
Necessary site area: $400m^2$
The distance of roads to be repaired: 180m

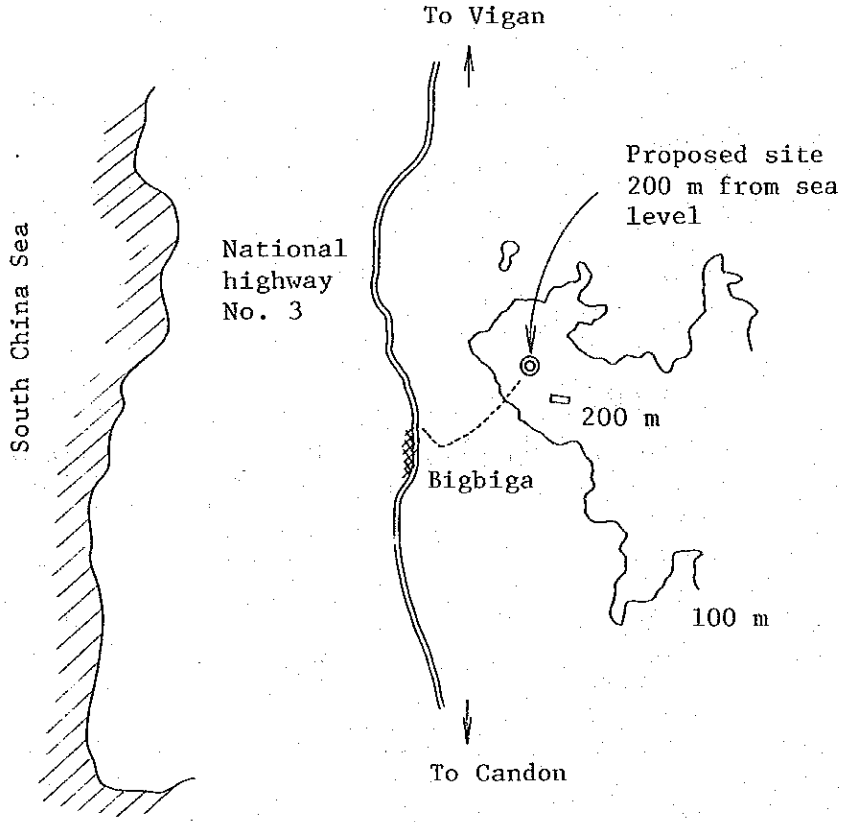

To Laoag
Badoc
National highway
No. 3
Dadulaguiten
Proposed site
79 m from sea level
South China Sea
Sinait
To Vigan

(9) Bigbiga

° Plan

This station/office is exptected to be a repeater station in the Baguio∿Vigan microwave route. Some telephone lines are branched by the leaking method for connection to Narvacan and Candon by VHF/UHF.

° Proposed Building Site



The proposed building site is on a hill located 14.5km to the north from Candon on National Highway No.3 and on the east of Bigbiga village.

° Dimensional Information

Necessary building area: 90m^2

Antenna tower height: 20m (Selfsupporting)

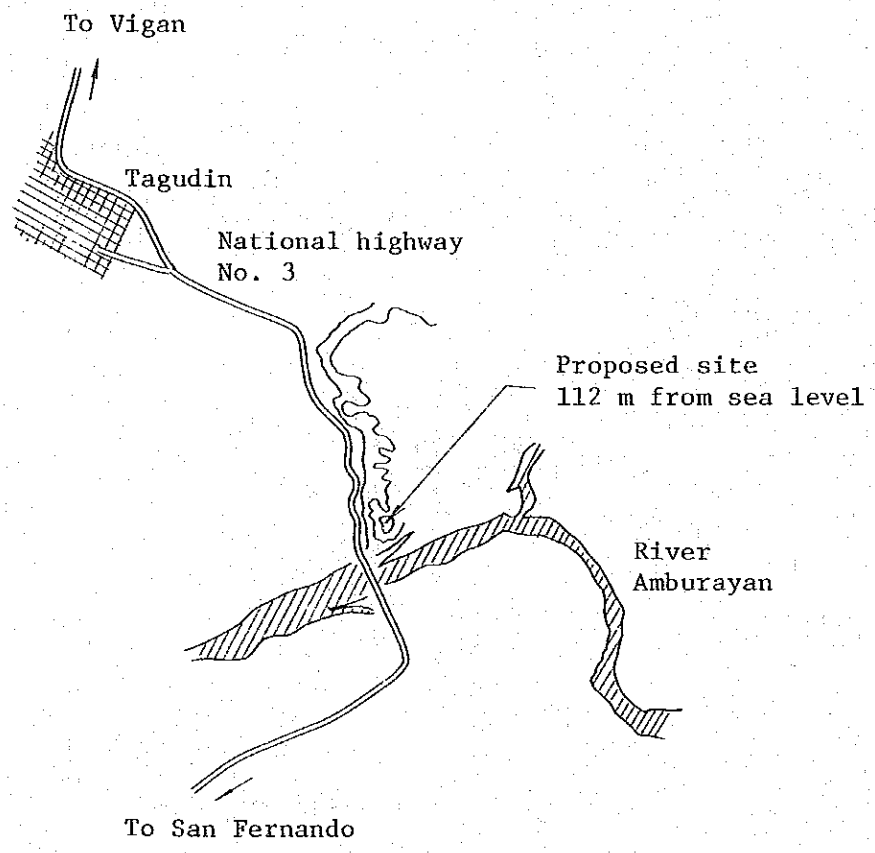
Necessary site area: 400m^2

(10) Tagudin (Radio repeater station)

° Plan

This station/office is expected to be a radio repeater station of the Baguio ∿ Vigan microwave route. Telephone lines will be branched to Tagudin by cable.

° Proposed Building Site



The proposed site is on a hill located about 3.2km from Tagudin to San Fernando on National Highway No.3 and on the north of the bridge over River Amburayan.

° Dimensional Information

Necessary building area:	$90m^2$
Antenna tower height:	20m (Selfsupporting)
Necessary site area:	$400m^2$

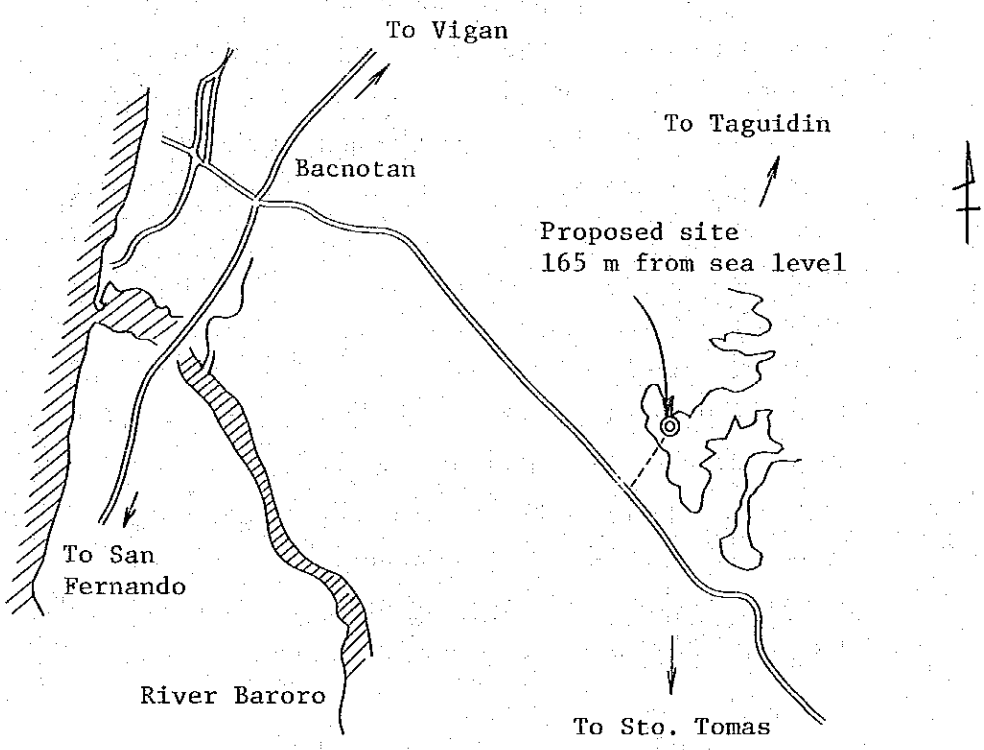
(11) Guinguinabang

° Plan

This station/office is expected to a radio repeater station of the Baguio ∿ Vigan microwave route. This station/office will be a simple repeater station with no branching.

° Proposed Building Site

Proposed building site can be reached by going 14.6km to the north on National Highway No.3 from San Fernando, then turning to the right at Bacnotan, and still going 3.5km to find a hill on the left. The proposed building site is located on this hill.



° Dimensional Information

Necessary building area: 90m^2

Antenna tower height: 20m (Selfsupporting)

Necessary site area: 400m^2

(12) Sto.Tomas

° Plan

This station/office will be a simple repeater station of microwave without branching but the Laoag, Tuguegarao, and Bontoc routes will pass through it, so that it is considerably large repeater station in scale.

° Proposed Building Site

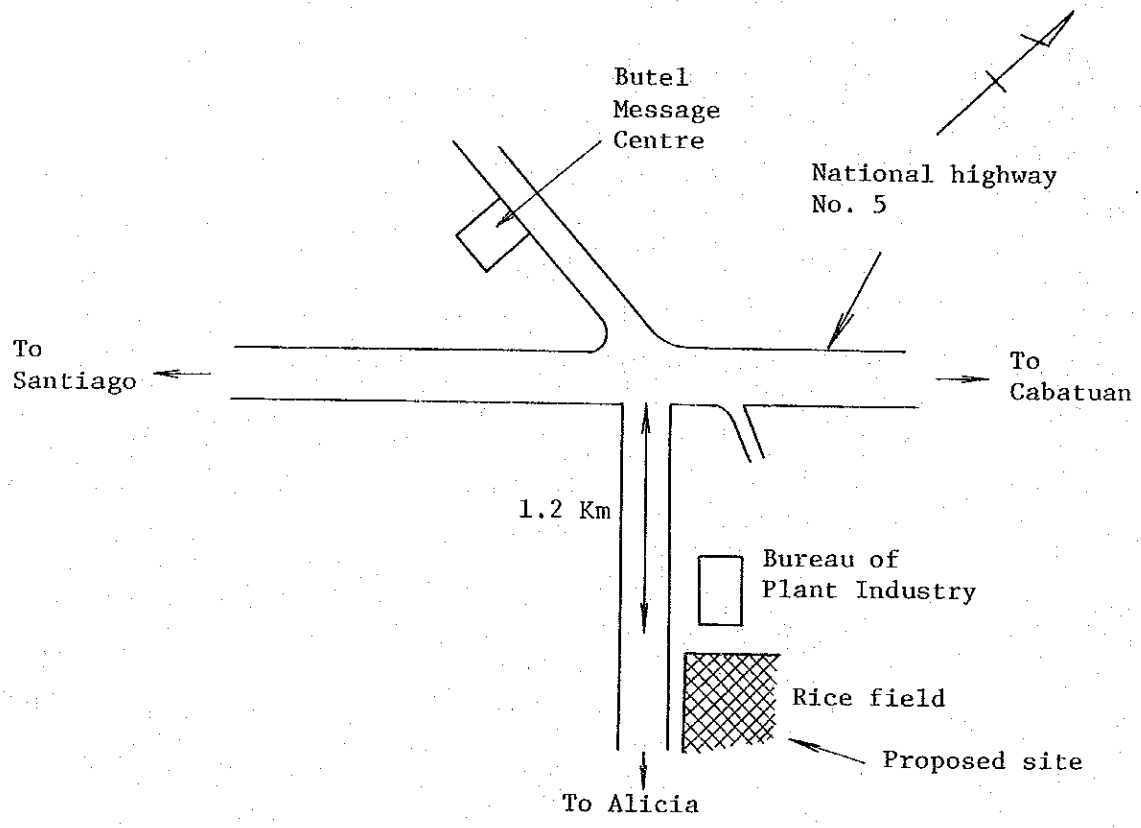
The existing repeater station site will be used. However, the site area is rather small. (Perhaps as small as about $200m^2$.) Station with a floor area of $200 \sim 220m^2$ will be required —— about $60m^2$ for the equipment room, about $60m^2$ for the office room, about $60m^2$ for the power room, and about $30m^2$ for others.
Accordingly, the present power plant and the equipment building will be pulled down and the ground levels on which these buildings are constructed will be added together.
That is, the ground level of the equipment building is higher than that of the power plant, so that the soil of the higher ground level will be cut down for leveling and a station building of about $120m^2$ (2 storied) will be constructed to accommodate radio equipment and the office room.
The unused building which was used as VHF station building will be repaired for use as the power plant.
An steel tower will be erected on the roof of the station building accommodating the radio equipment.
However, care should be exercised not to disturb the propagation course of PLDT's route to San Fernando.

(13) San Mateo

◦ Plan

This station/office will be a radio repeater station of the Bayombong ∿ Ilagan microwave route, where a lot of telephone lines will be branched by the leaking method so as to form spur routes to neighboring towns. At the same time, the San Mateo Station itself will be a local exchange office, so that radio and carrier equipment and local exchange will be installed at this station/office. In order to secure the propagation course to Diadi from this radio repeater station, it is necessary to locate the radio repeater station in the suburbs. Accordingly, it is suitable as a building plan to construct the radio repeater station in the suburbs and the local telephone office at a center in the town.

◦ Proposed Building Site



The local exchange office and the radio repeater station will be located next to the Bureau of Plant Industry which can be reached by going 1.2km along the provincial road toward Alicia from National Highway No.5.

° Dimensional Inforamtion

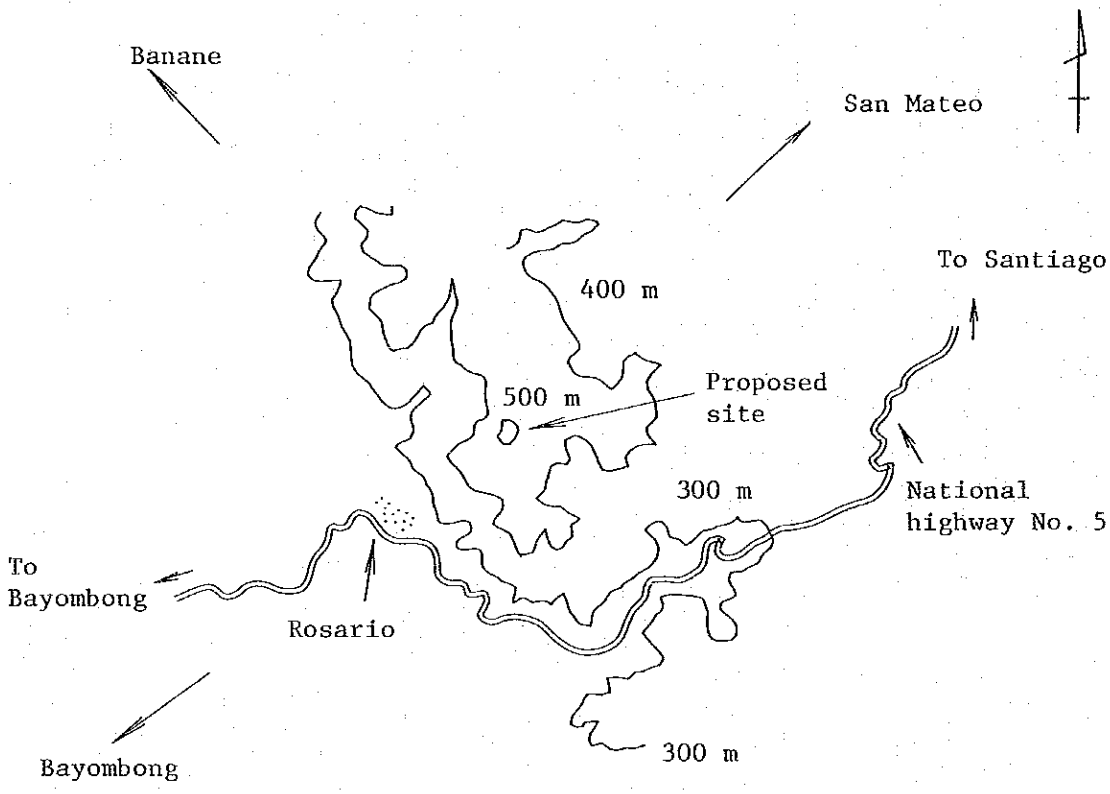
Necessary building area:	$400m^2$
Antenna tower height:	50m (Selfsupporting)
Necessary site area:	$1200m^2$

(14) Diadi

° Plan

This station/office will be a radio repeater station of the Bayombong ∿ Ilagan microwave route and, at the same time, will work as a branch station for branching telephone lines to Kiangan and Banaue.

° Proposed Building Site



The proposed site is located at the top of a hill which can be reached by going 34km on National Highway No.5 from Santiago and passing Rosario Village. The top of this hill is a plain and has a space of 30m x 70m.

The proposed site is privately owned.

(According to inhibitants, the site belongs to the Mayor of N. Vizcaya Quezon City.)

At present no commercial power is available.

° Dimensional Information

Necessary building area: $90m^2$

Antenna tower height: 20m

Necessary site area: $400m^2$

Distance of roads to be constructed newly: about 2km

(15) Dalton Pass

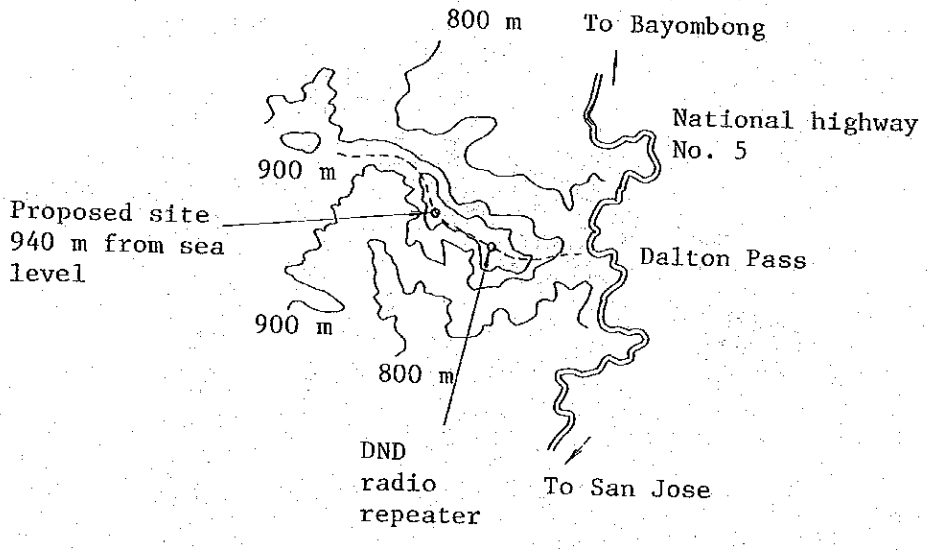
° Plan

This station/office will be a radio repeater station of the Binalonan ∿ Bayombong microwave route.

In Phase II, branching will be made by VHF to Sta.Fe.

° Proposed Building Site

The proposed building site can be reached by going on National Highway No.5 from Dalton Pass and about 600m from DND UHF repeater station. The site is 940m from the sea level.



° Dimentional Information

Necessary building area: 90m^2

Antenna tower height: 50m

Necessary site area: 400m^2

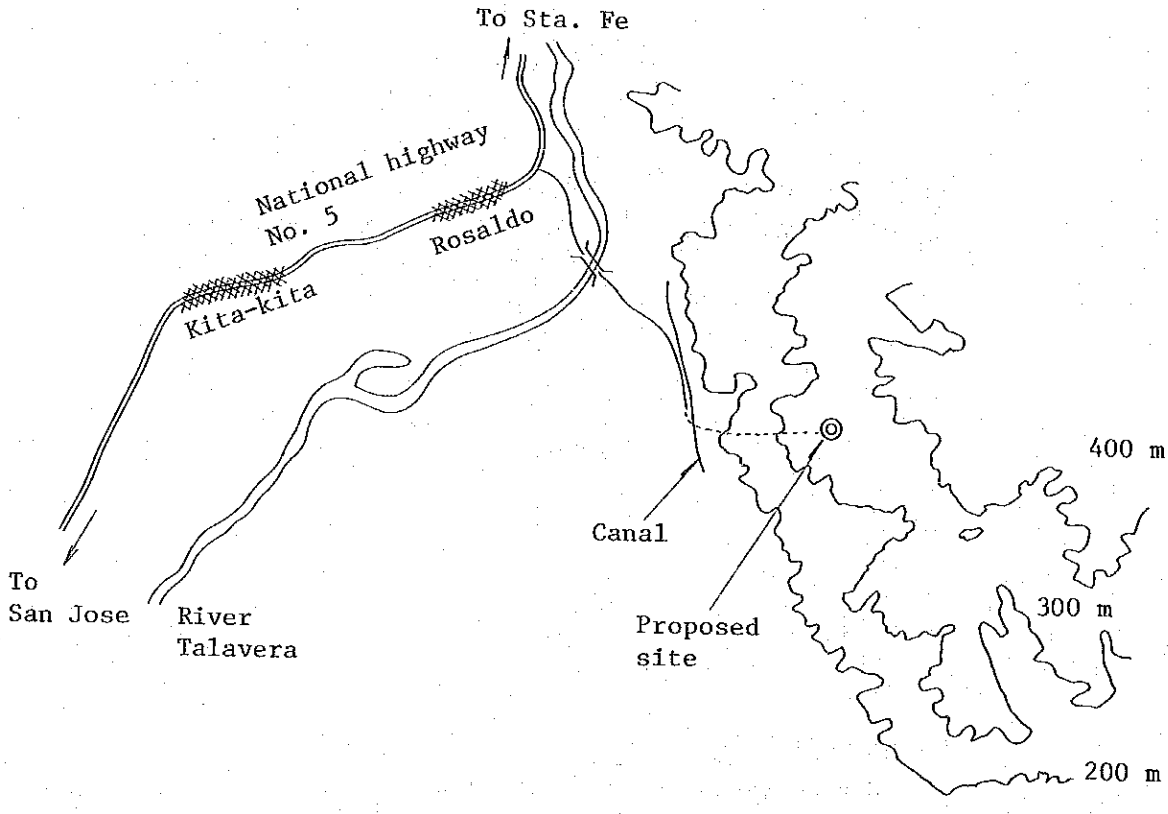
(16) Kita Kita

° Plan

This station/office will be a repeater station of the Binalonan ∿ Bayombong microwave route. This station/office is a simple repeater station without branching to spur route.

° Proposed Building Site

The proposed site can be reached by going 6.9km to the northeast on National Highway No.5 from San Jose, turning to the right at Rosaldo village, crossing River Talavera, crossing a small canal, and still going on through a path on either side of the canal, as shown below.



° Dimensional Information

Necessary building area:	90m2
Antenna tower height:	30m (Selfsupporting)
Necessary site area:	400m2

(17) Balungao R.S.

◦ Plan

This station/office will be a radio repeater station for the Binalonan ∿ Bayombong and Binalonan ∿ Manila microwave routes. The site used at present as a radio repeater station of the Baguio ∿ Manila (7GHz) route will be used as the site for the new radio repeater station by pulling down the existing repeater station.

◦ Proposed Building Site

By removing the present power plant and radio room, a building of 120m^2 (or about 280m^2 if attended) will be constructed newly and a selfsupporting steel tower of 20m in height will be erected.

◦ Necessary site area: about 400m^2 (or 1000m^2 in the case of attended station)

[I]-3 Local Exchange, IPTS and U/VHF Radio Terminal Station

(18) Pasquin

◦ Plan

This station/office will be an IPTS to be connected from Laoag VHF system.

Since the expected steel tower height is comparatively small (25m), radio equipment and switchboard will be accommodated in a room of the municipal building and a power plant of about $30m^2$ will be constructed in the site.

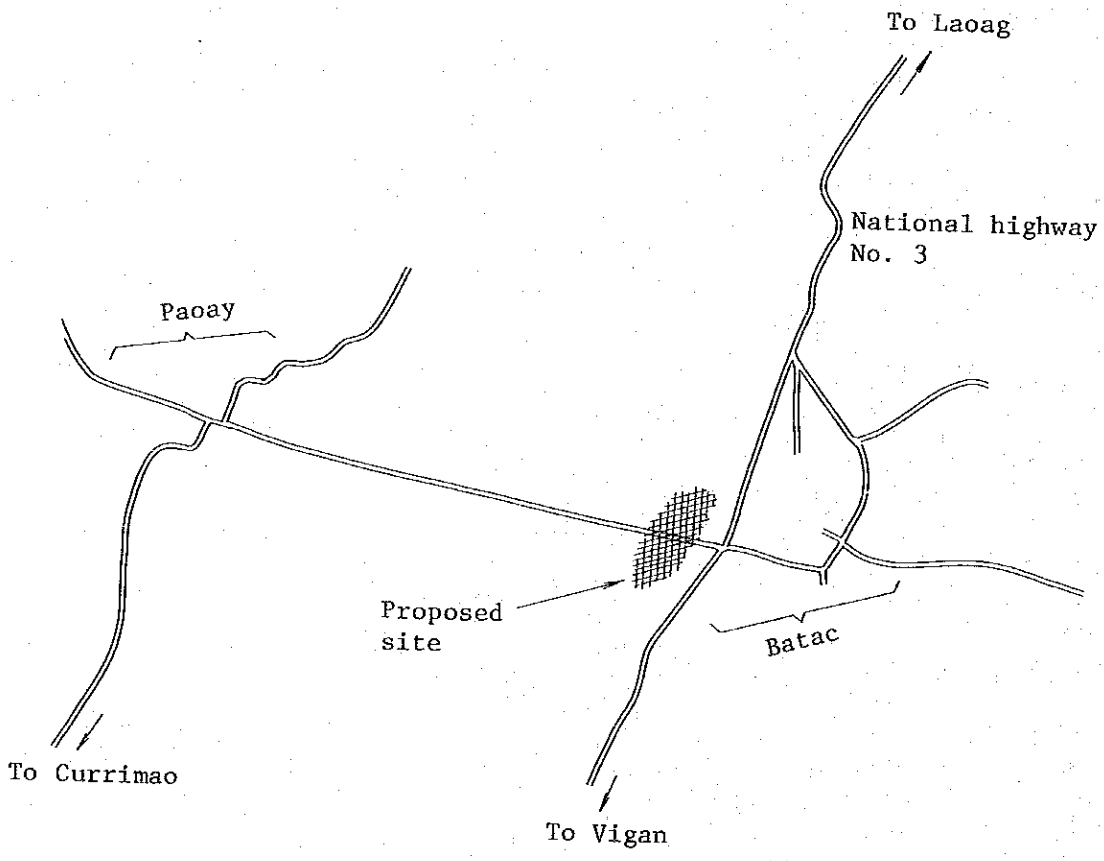
It is to be noted that this IPTS may be ranked up to a local exchange office in 1993 or so and it is also recommendable to procure a site of about $1600m^2$ if possible and start service as an IPTS there.

(19) Batac

° Plan

This station/office will be a local exchange office to be connected from Laoag by UHF system and will be connected to Paoay by cable.

Although the steel tower height of this station/office is about 35m, there is no serious problem in the propagation course to Laoag. In consideration of also cable laying to Paoay, a new building will be constructed near the crossroads of National Highway No.3 and the road to Paoay so as to accommodate radio and carrier equipment and local exchange.



° Dimensional Information

Necessary building area: $350m^2$

Antenna tower height: 35m (Guyed-wire type)

Necessary site area: $875m^2$

This area will include the foundation for guy wires for the steel tower.

(20) Piddig

° Plan

This station/office will be an IPTS to be connected to Dingras by a VHF link. The radio equipment and switching board will be accommodated in the municipal building and the power plant and steel tower will be constructed in the site of the municipal building.

° Proposed Building Site

The power plant will be constructed in the open space behind the municipal building.

° Dimensional Information

Necessary building area:	$30m^2$
Antenna tower height:	20m (Guyed-wire type)
Necessary site area:	$400m^2$
	(Including foundation for guy wires)

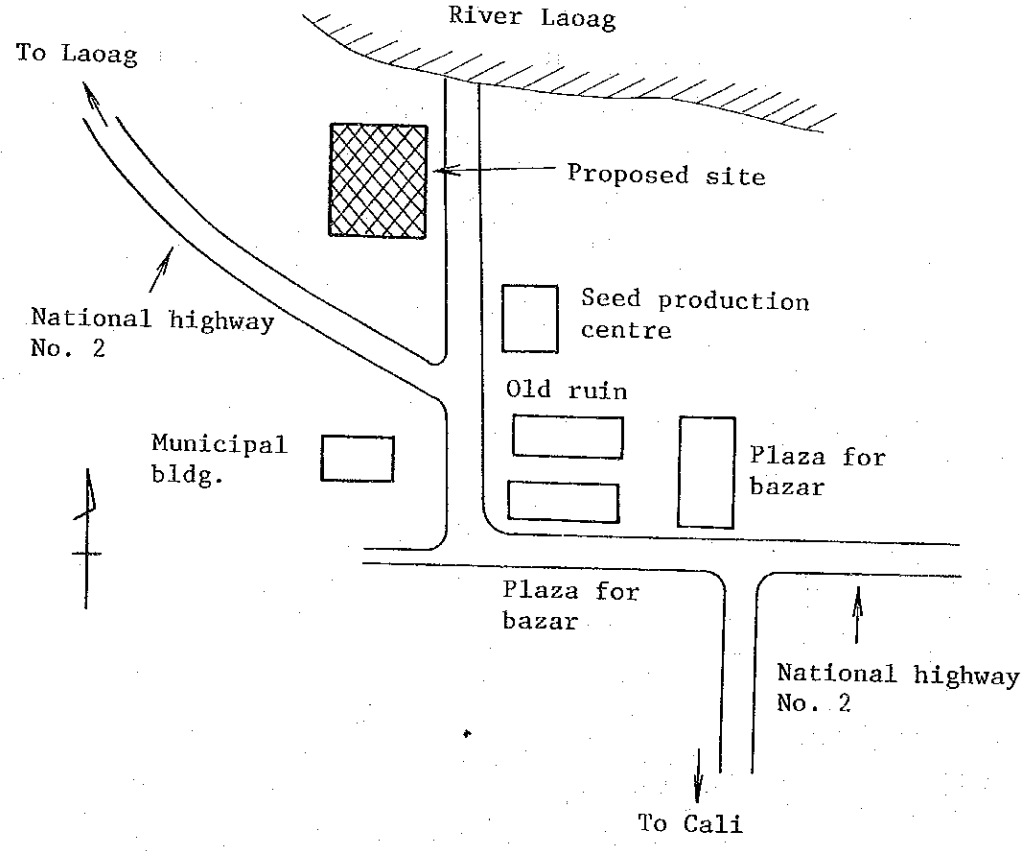
Since this IPTS will be ranked up to a local exchange office in 1993 or so, it is suitable to consider a site for future expansion of the building for the accommodation of local exchange.

(21) Dingras

° Plan

This station/office will be a local exchange office to be connected from Laoag by UHF. In Phase I, IPTS circuits from Dingrass to Piddig and Espiritu will be constructed by VHF. In Phase II, telephone circuits will be expanded to Solsona, Marcos, and Nuevaera. Accordingly, this station/office will not only be a simple local exchange office connected by radio but become in future a considerably large tandem central office. The town is considerably large and there is almost no open space in the center of the town where the municipal building stands but site procurement at locations somehow apart from the center of the town may not be so difficult and it will be advantageous to accommodate radio and carrier equipment and local exchange within the same building.

° Proposed Building Site

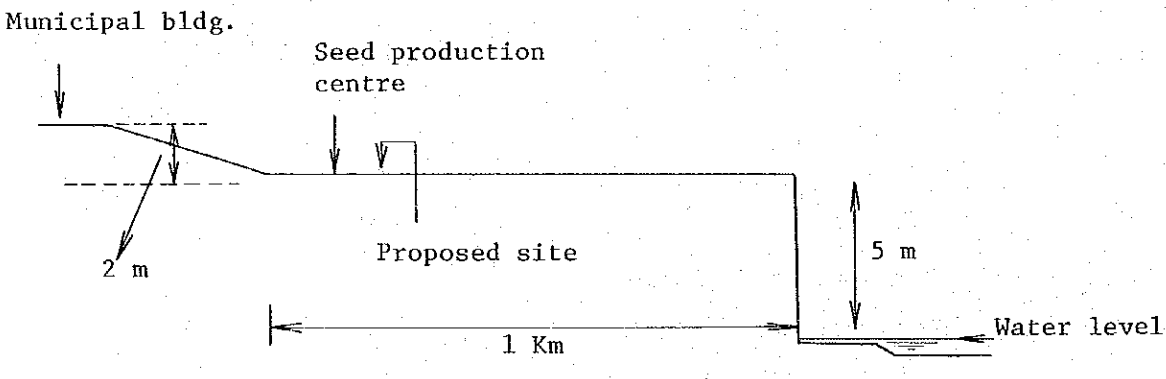


By going straight to the north along the street in front of the municipal building, we face River Laoag where the street finishes.

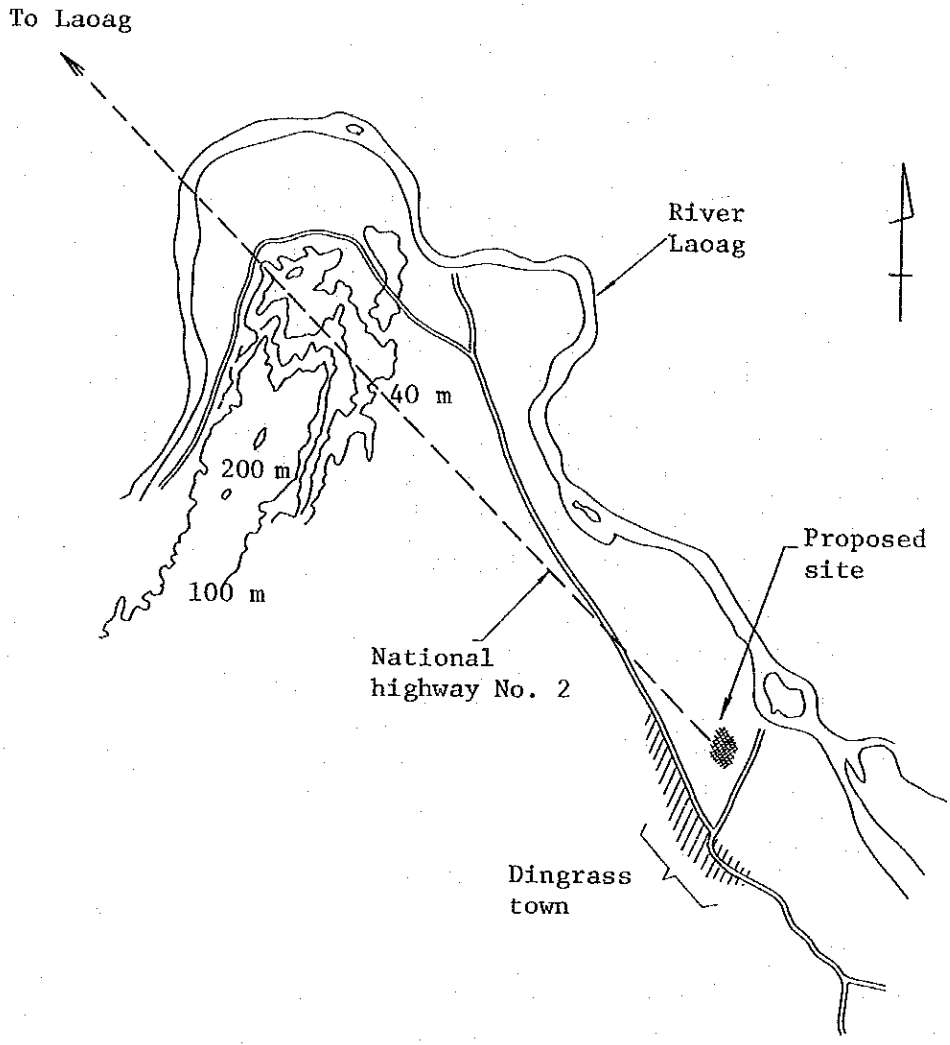
There is the Seed Production Center at about 1km before River Laoag. The land owned by a private person and located on the opposite side of the Seed Production Center may be a good site for this station/office.

A hill of 200m stands at about 5km in the direction to Laoag from Dingrass, so that when the station/office of Dingrass is located too southward, the propagation course may be obstructed by this hill of 200m.

The site on the opposite side of the Seed Production Center is located on the north side of Dingrass town and the propagation course from this site is not obstructed by the hill of 200m, so that this site is advantageous from the standpoint of radio wave propagation. However, this site is only about 1km from River Laoag and may be covered with water when River Laoag floods. The water level of River Laoag and the level of the proposed site are as follows when the survey team visited on March 31st, 1978.



Accordingly, a soil filling of about 2m or enclosure by a wall against flood will be necessary upon constructing the building.



° Dimensional Information

Necessary building area:	400m^2
Antenna tower height:	45m (Guyed wire type)
Necessary site area:	1300m^2

The proposed site area includes the foundation for guy wires. When the guy wire foundation is not procurable due to the environmental condition, the necessary site for the guy wire foundation may be rented.

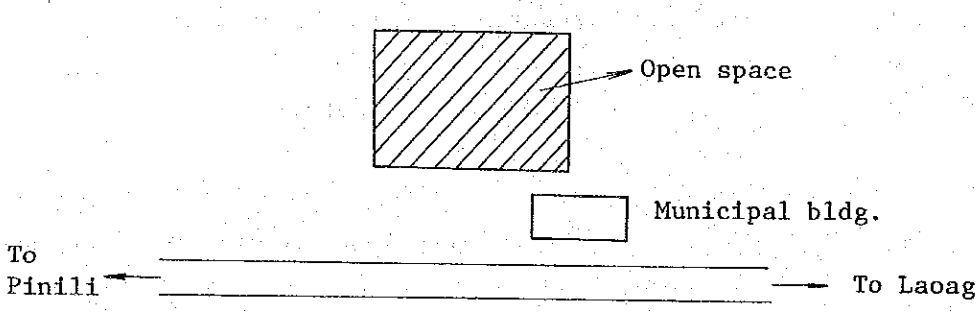
(22) Espiritu

◦ Plan

This station/office will be an IPTS to be connected from Dingras by VHF. Furthermore, this IPTS will be connected to more remote Nueva Era by cable. Since the municipal building has no ample space for the accommodation of radio equipment and power plant, a steel tower and a radio equipment and power facilities building will be constructed in a part of open space (owned by the Gonverment) measuring 100m x 100m and located behind (west) of the municipal building and connection to the switchboard installed at BUTEL Message Center in the municipal building will be made by a local cable.

◦ Proposed Building Site

There is an open space owned by the Government immediately behind the municipal building. This space is recommended for the site of this IPTS.



◦ Dimensional Information

Necessary building area

Radio equipment building + Power plant: $45m^2$

Antenna tower height: 35m (Guyed-wire type)

Necessary site area: $360m^2$

(Including steel tower guy wire foundation)

(23) Currimao

° Plan

This station/office will be an IPTS to be branched from the Sinait microwave repeater station. It is recommended, for securing propagation clearance to Sinait, that the radio equipment building should be located on a hill immediately behind the municipal building and accommodate the switchboard in the municipal building.

° Proposed Building Site

As already mentioned, the radio equipment building will be constructed on a hill located on the northwest of the municipal building. Although it is more advantageous for propagation to Sinait to locate the building as much to the west (toward the sea) as possible, the distance from the municipal building expected to accommodate the switchboard will then increase.

° Dimensional Information

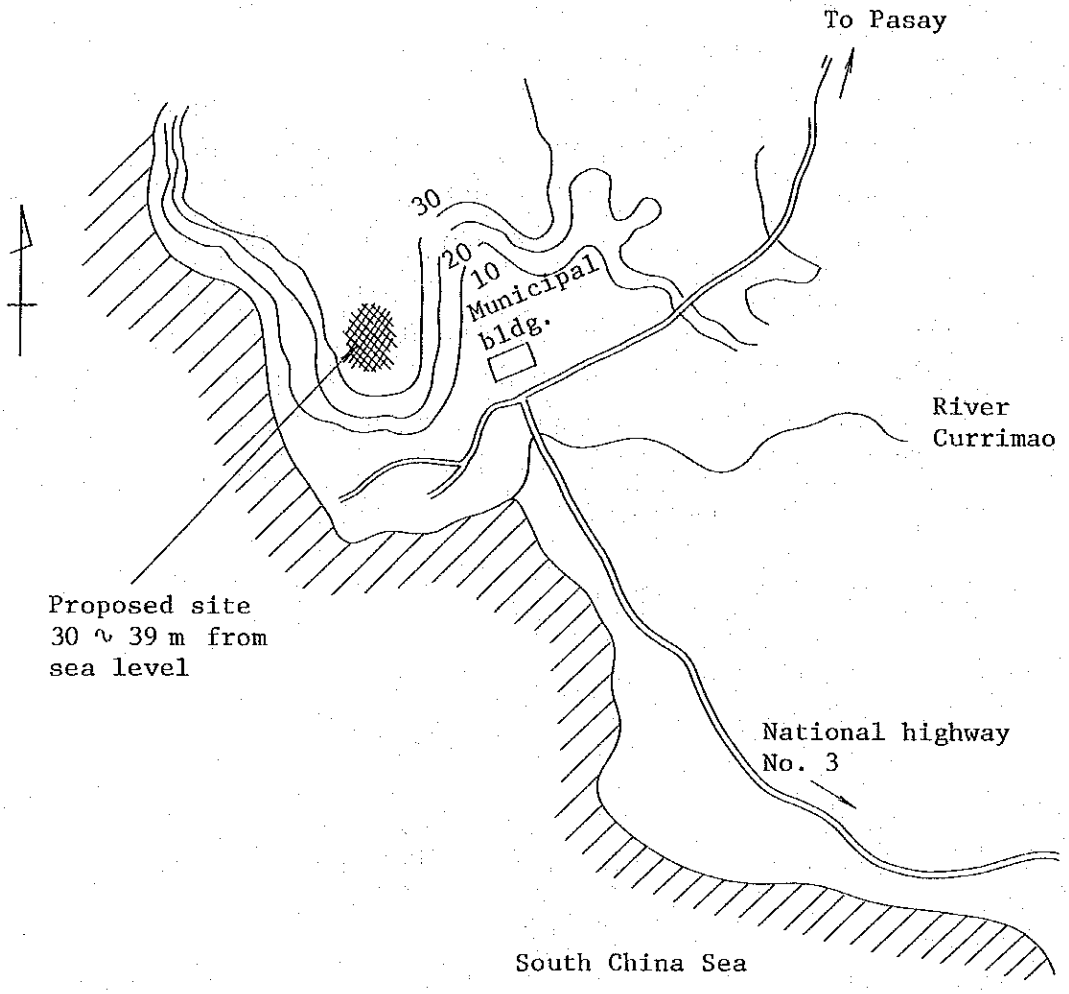
Necessary building area

Radio equipment building + Power plant: $45m^2$

Steel tower height: 20m (Guyed-wire type)

Necessary side area: $400m^2$

This IPTS may be ranked up to a local exchange office in 1983 or so. The building for accommodating the local excange then will be designed and constructed separately after the re-ranking.

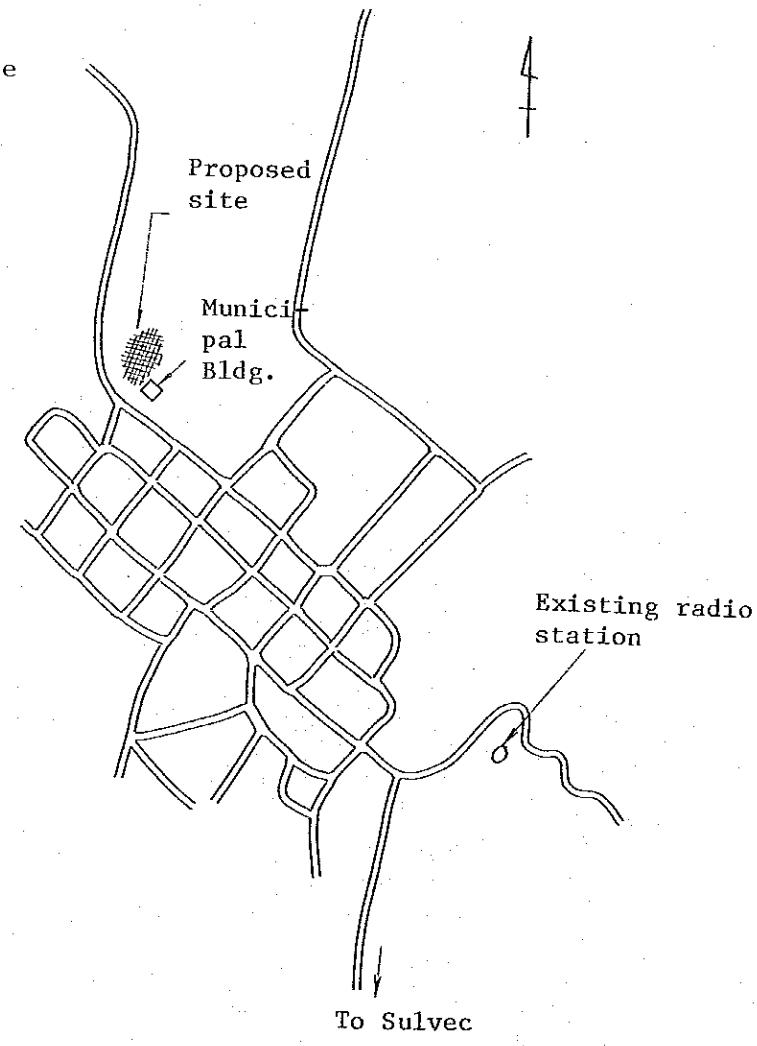

To Pasay
30
20
10
Municipal bldg.
River Currimao
Proposed site
30 ∿ 39 m from sea level
National highway No. 3
South China Sea

(24) Bangued

° Plan

At present, telephone switching in Bangued City is executed by BUTEL. Connection for long distance calls with Vigan is made directly by the VHF radio repeater station located on a hill about 1km southeast of the center of the town.
In this project, a 60-channel radio system using a 800MHz band is planned for connection with Vigan through Sulvec.
There is no parcicuraly large obstruction between Sulvec and Bangued and it is recommended to procure a site behind the municipal building for constructing a building to accommodate the radio and carrier equipment and the new exchange. According to BUTEL's plan, the existing exchange will be transferred to somewhere else in future.

° Proposed Building Site



A space at a corner of the athletic field located behind the municipal building will be used.

° Dimensional Information

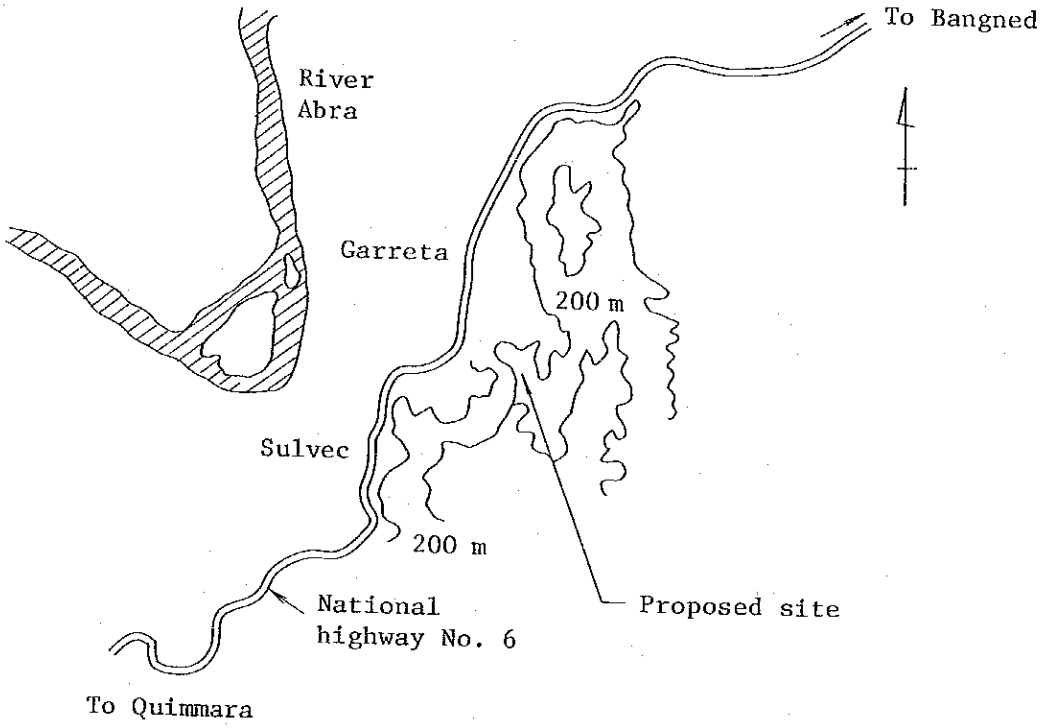
Necessary building area:	$400m^2$
Antenna tower height:	25m (Guyed-wire type)
Necessary site area:	$1400m^2$
	(Including guy wire foundation)

(25) Sulvec

° Plan

This station/office will be a radio repeater station of the Vigan ∿ Bangued UHF link. Since no commercial power may be available here, power will be generated by dual engine generator system.

° Proposed Building Site



At about 11km on National Highway No.6 from Quimmara there is Garreta village. The proposed site is located on the ridge about 1km south of Garreta village. The proposed site is rather narrow in width and a width of about 12m will be achievable by cutting the soil of about 2m.

◦ Dimensional Information

Necessary building site: $60m^2$

Radio equipment building + Engine generator hut for 2 engines

Antenna tower height: 25m (Guyed-wire type)

Necessary site area: $400m^2$

(Including guy wire foundation)

(26) Santa

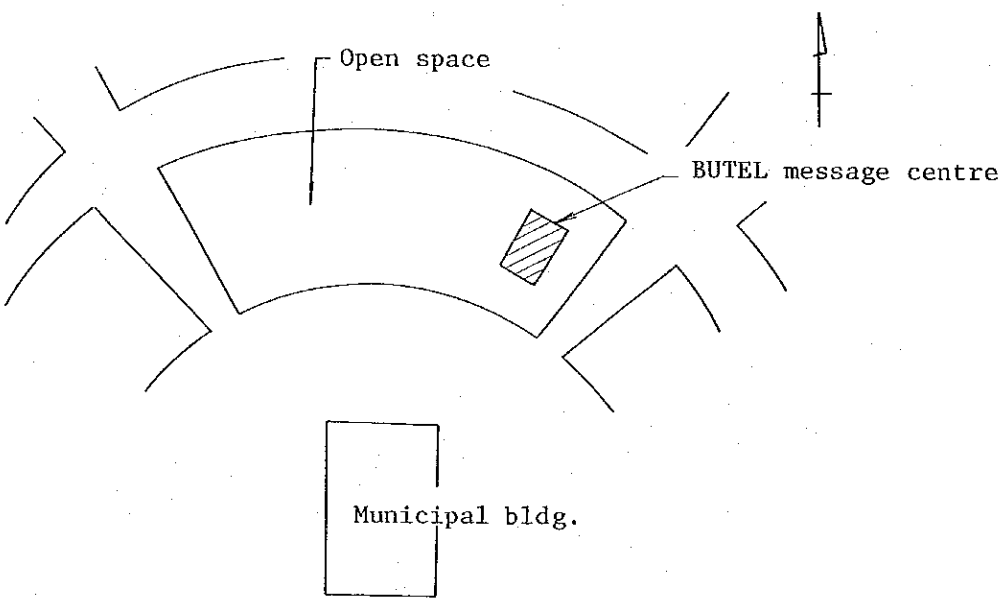
° Plan

This station/office will be an IPTS to be connected with Vigan by VHF. This IPTS will be of such type that accommodate radio equipment and switchboard at a place.

° Proposed Building Site

There is BUTEL's Message Center on the north of the municipal building, where the radio equipment and switchboard can be installed.

The steel tower and power plant will be constructed in the Government-owned site located on the west of the Message Center.



° Dimensional Information

Necessary building area

Space necessary for accommodating radio equipment and switchboard: $15m^2$

Power plant: $15m^2$

(This station may be ranked up to a local exchange office in 1993 or so and consideration for the site necessary for future expansion may be necessary.)

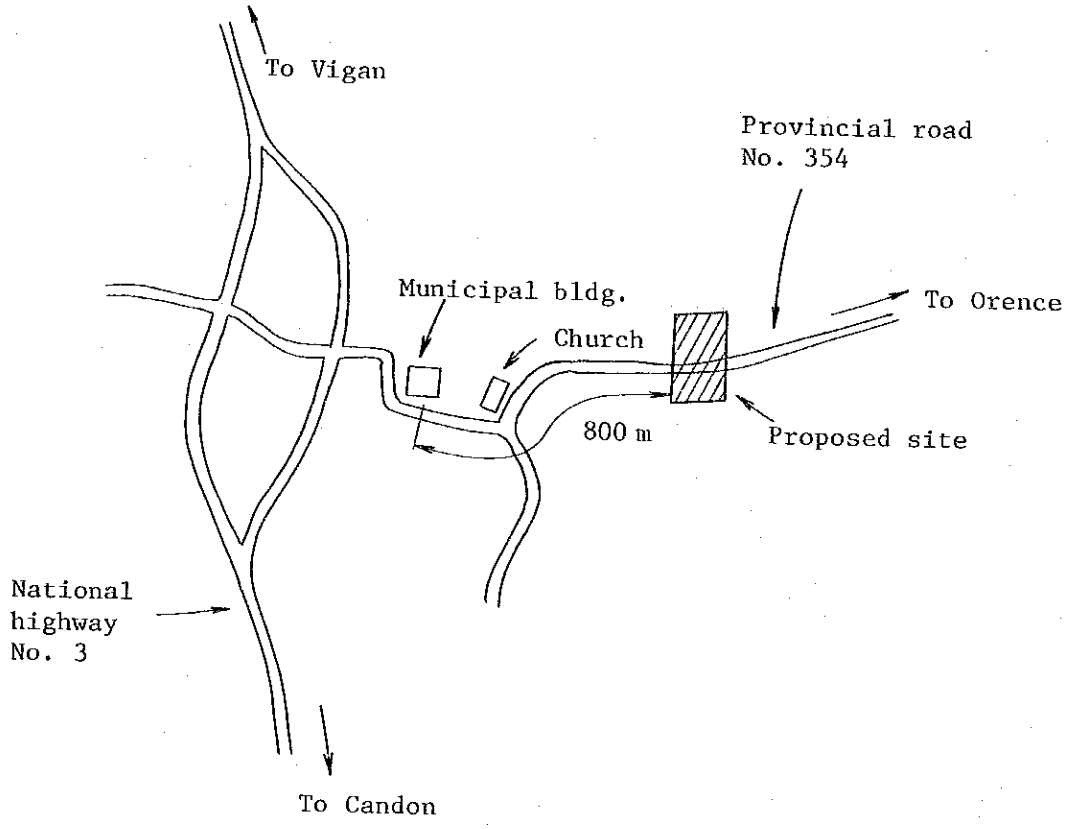
Antenna tower height:	20m (Guyed-wire type)
Necessary site area:	$400m^2$ (for power plant and steel tower)

(27) Narvacan

◦ Plan

This station/office will be a local exchange office branched from Bigbiga by UHF. This local exchange office is still connected to Sta. Maria by cable.

◦ Proposed Building Site



In the case of Narvacan, there is no open space at all around the municipal building, so that the site (privately owned) located 800m from the municipal building along Road 354 may be suitable in consideration of propagation in the direction of Bigbiga.

◦ Dimensional Information

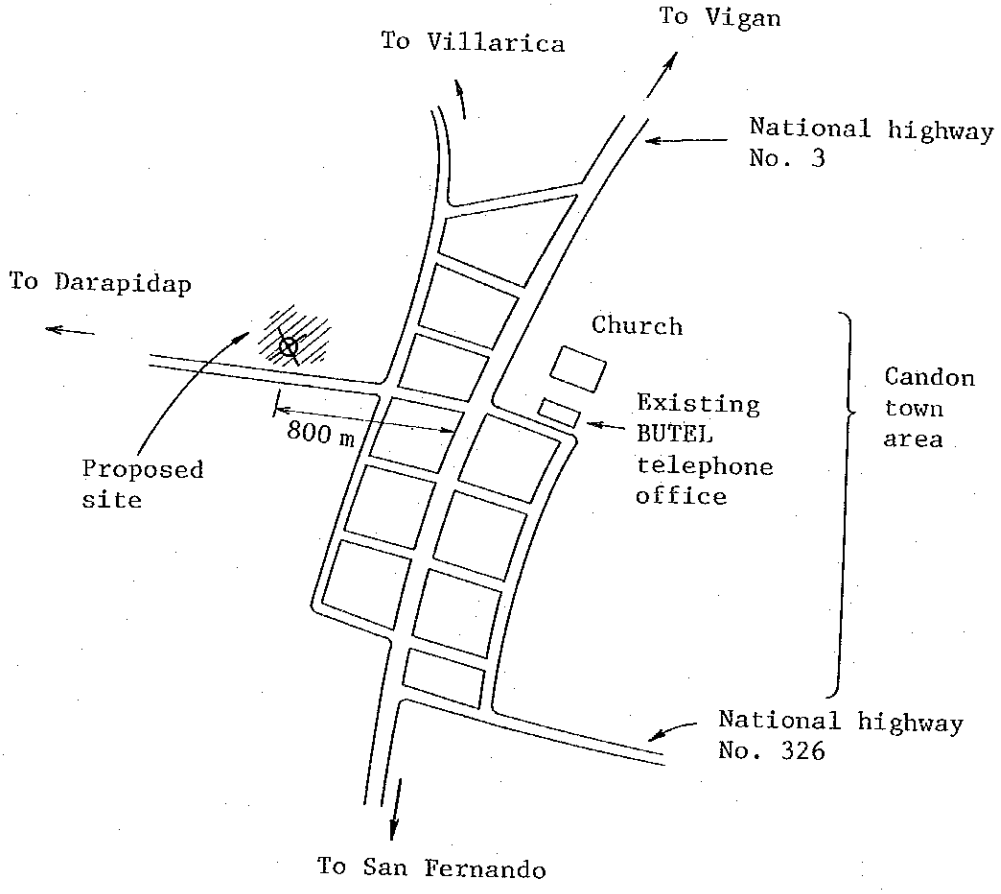
Necessary building area:	$350m^2$
Antenna tower height:	25m (Guyed-wire type)
Necessary site area:	$1200m^2$

(28) Candon R.S.

◦ Plan

The existing telephone office will be used as it is but the radio equipment can not be installed in the existing telephone office because of space and the problem in propagation to Bigbiga and should be installed somewhere else.

◦ Proposed Building Site



For the sake of course clearance in the direction of Bigbiga, the site located more than 600m westward (toward the sea) from the national highway should be procured. The radio repeater station to be constructed at this site and the existing Candon Telephone Office will be connected by cable.

- Dimensional Information

Necessary building area:	$90m^2$
Antenna tower height:	75m (Guyed-wire type)
Necessary site area:	$400m^2$

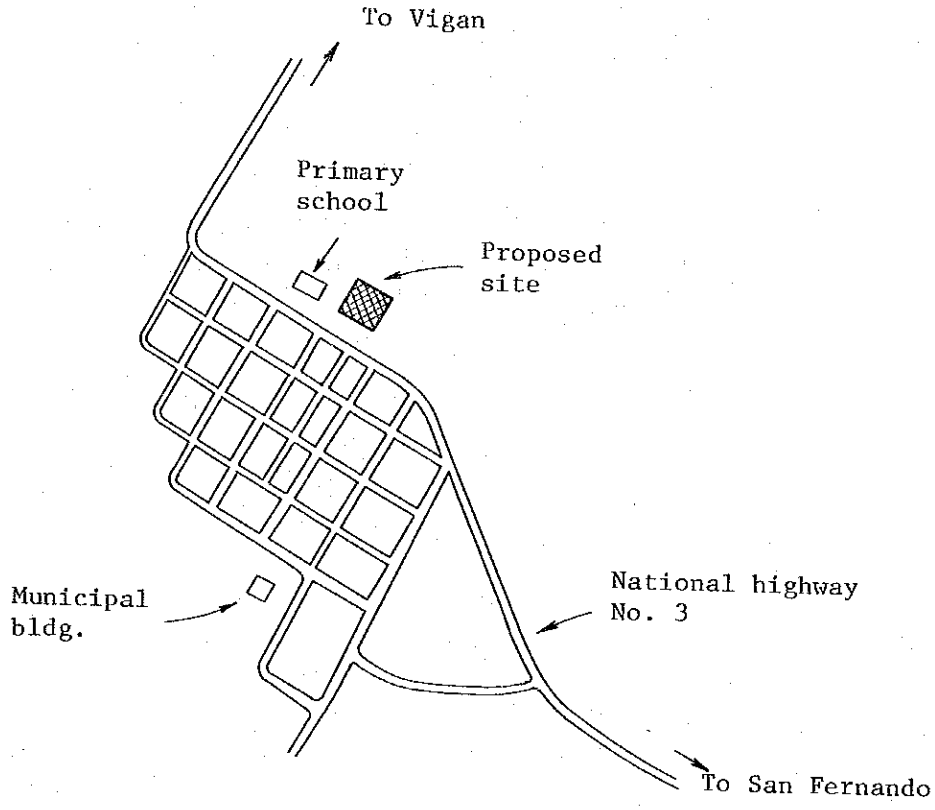
This area does not include the steel tower guy wire foundation. The site for the guy wire foundation should be leased or procured by some other means.

(29) Tagudin (Local exchange office)

° Plan

This office will be a local exchange office connected by cable through leaking branch from Tagudin radio repeater station located about 3.5km southwast from Tagudin town.

° Proposed Building Site



The open space (about 40m x 40m) located next to the elementary school along National Highway No.3 in Tagudin town is proposed for use as the site for the telephone office.

° Dimensional Information

Necessary building area: 320m^2

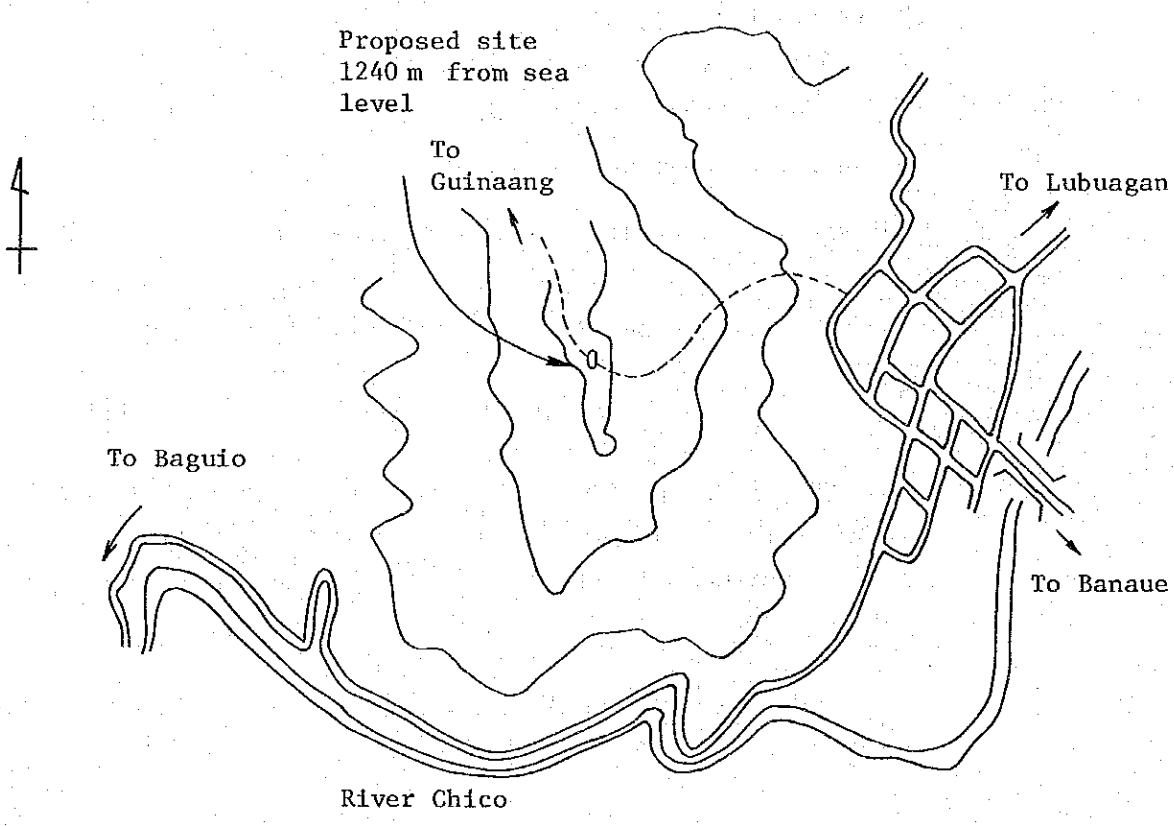
Necessary site area: 1000m^2

(30) Bontoc

◦ Plan

Bontoc will be connected with Baguio through Sto. Tomas, Mt. Mungueto, Mt. Data, and Sagada by a UHF link. This station/ office will be established as a local exchange office.

◦ Proposed Building Site



From the standpoint of securing the propagation course between Bontoc and Sagada, the radio repeater station will be constructed on a hill and the telephone office will be constructed in the town area.

The hill (1240m above the sea) behind the military camp in Bontoc Town is a suitable proposed site for the radio repeater station. The proposed radio repeater station will be connected to the telephone exchange office located at a suitable place in the town area by cable.

The present BUTEL Message Center site may be a little too narrow to construct the local exchange office.

° Dimensional Information

Necessary building area

$60m^2$ (Radio repeater station)

$320m^2$ (Local exchange office)

Antenna tower height: 45m (Guyed-wire type)

Necessary site area: $800m^2$ (for radio repeater station)

The site for the guy wire foundation will be leased.

$1200m^2$ (for local exchange office)

Upon selecting the site (for the radio repeater station), ample propagation test should be performed against Sagada, since clearance against Sagada is rather critical.

(31) Sagada

◦ Plan

This station/office will be estabilished as a simple repeater station of the Baguio ∿ Bontoc UHF link and in Phase II an IPTS will be opened here.

◦ Proposed Building Site

The provision of the propagation course in the direction of Bontoc is rather difficult and the radio repeater station will be located on a nearby hill so that when IPTS is opened in future, connection to the switchboard accommodated in the municipal building will be made by cable.

There are two proposed sites for the radio equipment building and power plant, which are disignated proposed sites "A" and "B."

By going about 400m on the road to Besao from the front of the municipal building in Sagada town, the hut of the town's reservoir is seen on a hill on the right.

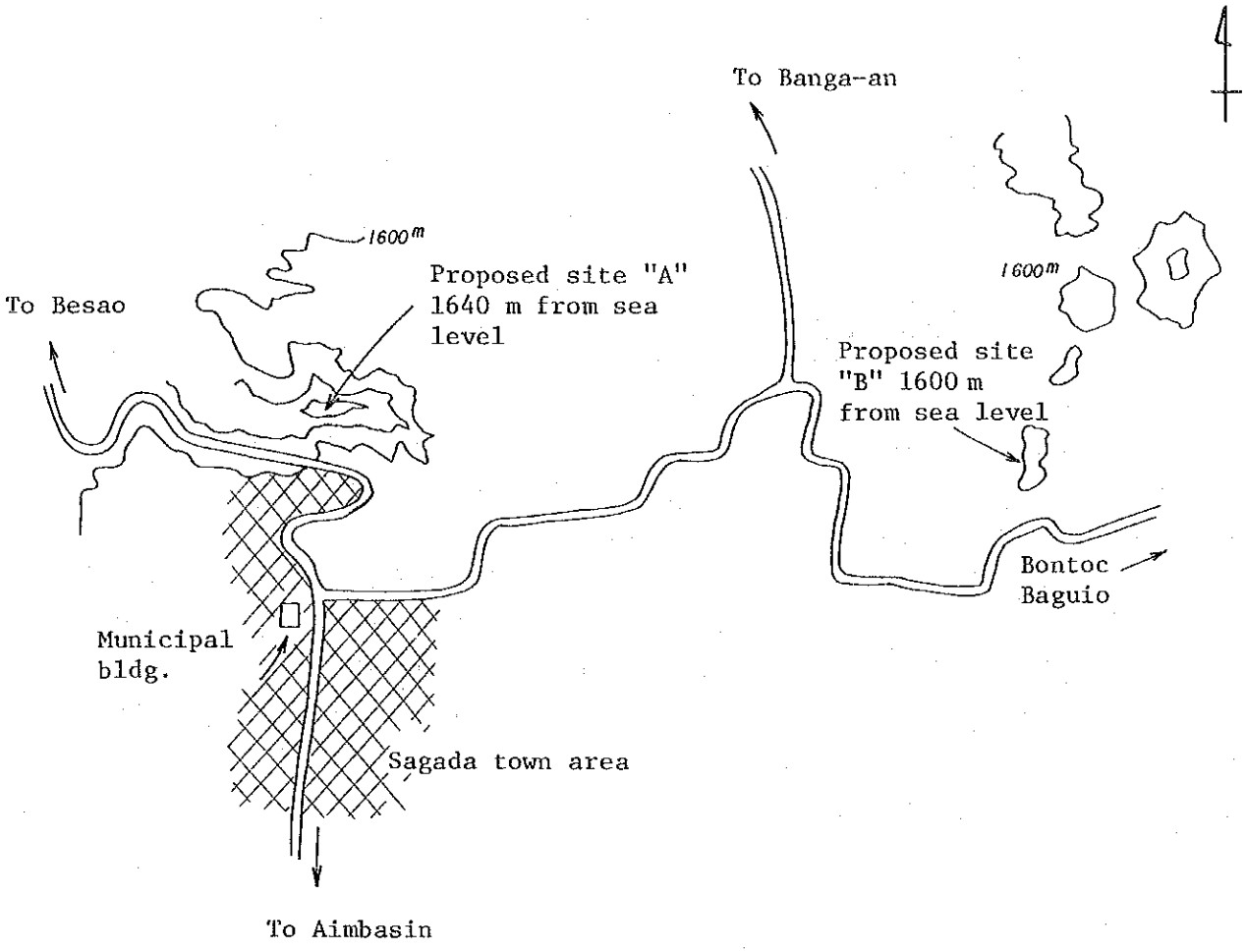
Proposed site "A" is located behind the reservoir hut.

This site is rather near the municipal building, providing an advantage when IPTS is opened in future.

The disadvantages of this site are as follows:

- The propagation course in the direction to Bontoc is rather difficult to acquire and careful propagation test should be performed.

- Since the ridge is rather narrow and a width of only 20m is available, a high steel tower can not be erected.



Proposed site "B"

By going from bontoc to the municipalting, a hill of 1600m can be seen on the north of the road at a location 2.5km from the municipal building. Proposed site "B" is located on this hill. This site provides comparatively flat portions and the propagation course in the direction of Bontoc can be achieved rather easily but distance to the municipal building is as long as about 3km.

Although it is difficult to determine which of the two proposed sites is more advantageous for the time being, proposed site "B" may somehow be more advantageous. Further examination should be made.

(32) Mt. Data

◦ Plan

This station/office will be established as a radio repeater station of the Baguio ∿ Bontoc UHF link. However when Mankayan station/office opens in Phase II, branching will be made at this repeater station so as to secure the radio link to Mankayan.

◦ Proposed Building Site

By going 15km along National Highway No.11 from Abatan to Bontoc, we can see Mt. Data Tourist Lodge operated by the Government. There is a small path from the rear garden of the lodge to the top of Mt. Data and it is possible to climb the mountain of 2346m from there. The top of the mountain is covered with considerable woods and should be cut down.

◦ Dimensional Information

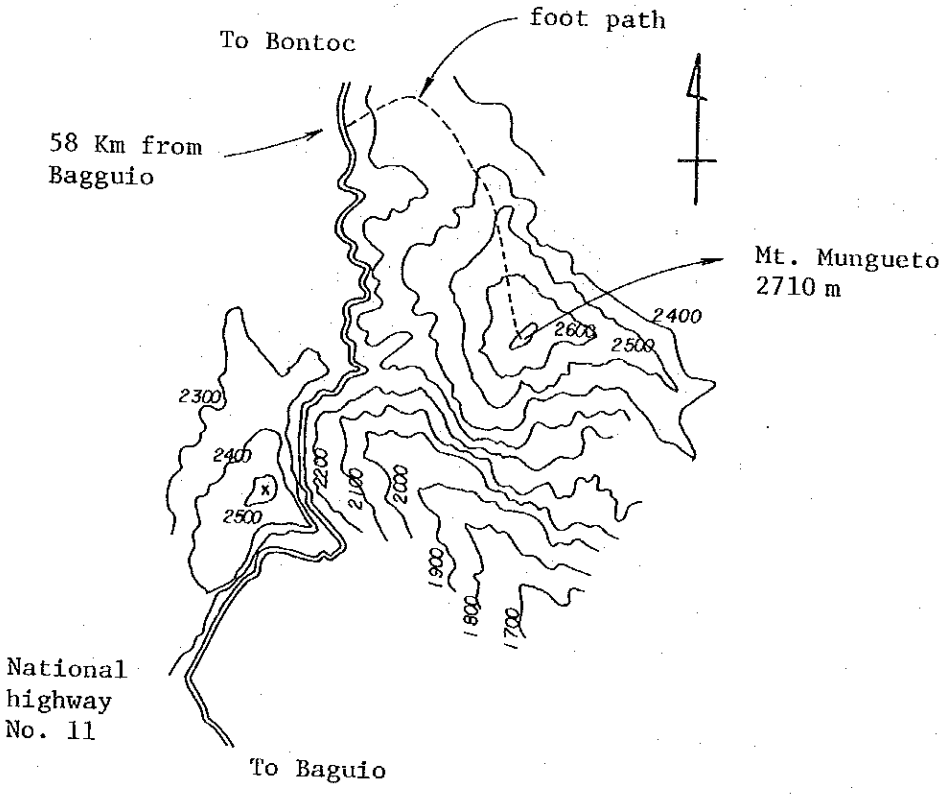
Necessary building area:	$60m^2$
Antenna tower height:	45m (Guyed-wire type)
Necessary site area:	$800m^2$
Road to be repaired:	2km

(33) Mt. Mungueto

◦ Plan

This station/office will be a repeater station of the Botoc route and is a typical unattended station on a mountain. In Phase II, branching to Bokod will be executed.
Since no commercial power is available there, a power plant for accommodating a dual engine system should be provided at the foot of the mountain and power to the top of the mountain will be fed by a power line.

◦ Proposed Building Site



There is a small path for climbing the mountain at a point 58km from Baguio.

◦ Dimensional Information

Necessary building area: $60m^2$

Antenna tower height: 30m (Guyed-wire type)

Necessary site area: $400m^2$

Expected length of road to be constructed: approx. 3km

(34) San Quintin

◦ Plan

This station/office is an IPTS connected from Binalonan by VHF. In Phase II, extension to Umingan will be acomplished from this IPTS.

◦ Proposed Building Site

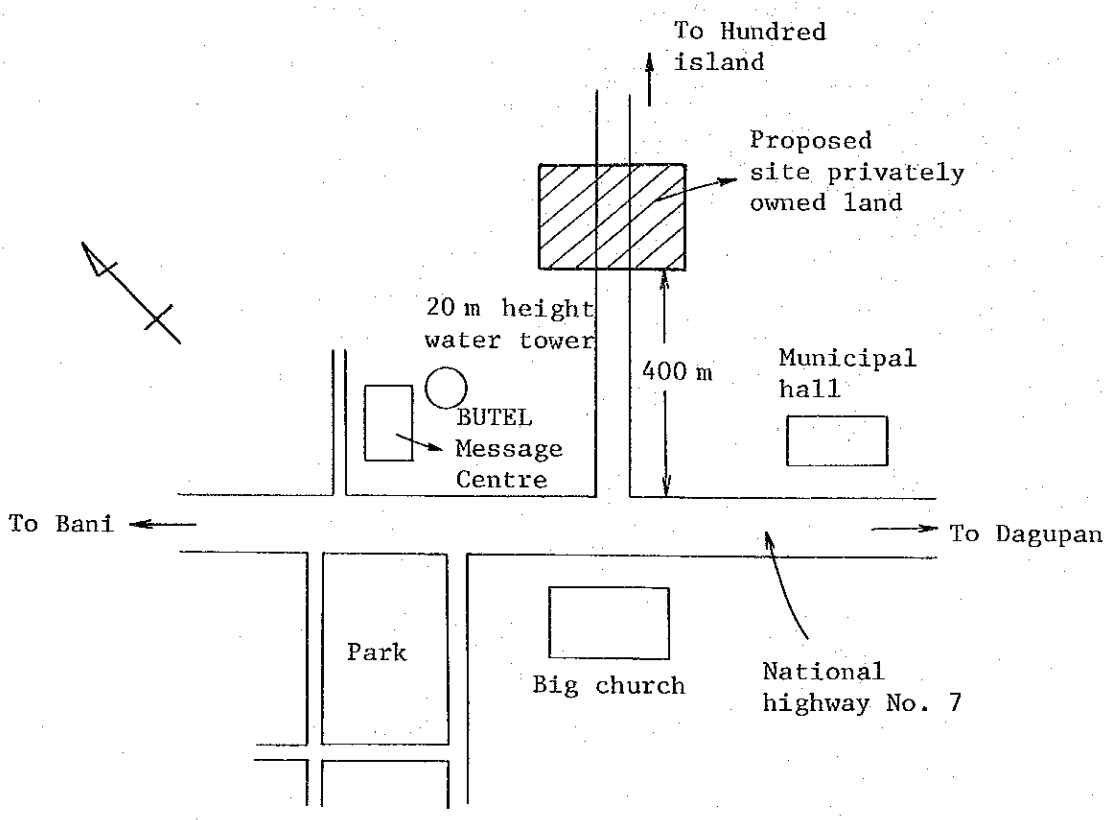
Since there is no particular problem on the propagation course to Binalonan, a 20m guyed-wire steel tower will be constructed in an open space in the municipal building site and the radio equipment and switchboard will be accommodated in the message center in the municipal building site.
The power plant house of $30m^2$ will be constructed near the municipal building.

(35) Alaminos

° Plan

This station/office will incorporate a comparatively large telephone office/attended radio repeater station. All facilities will be accommodated in a building.

° Proposed Building Site



It is proposed to procure a site of 1400m^2 from a privately-owned land about 400m from Alaminos town along National Highway No.7 to Hundred island.

° Dimensional Information

Necessary building area: 400m^2
Antenna tower height: 65m (Guyed-wire type)
Necessary site area: 2800m^2

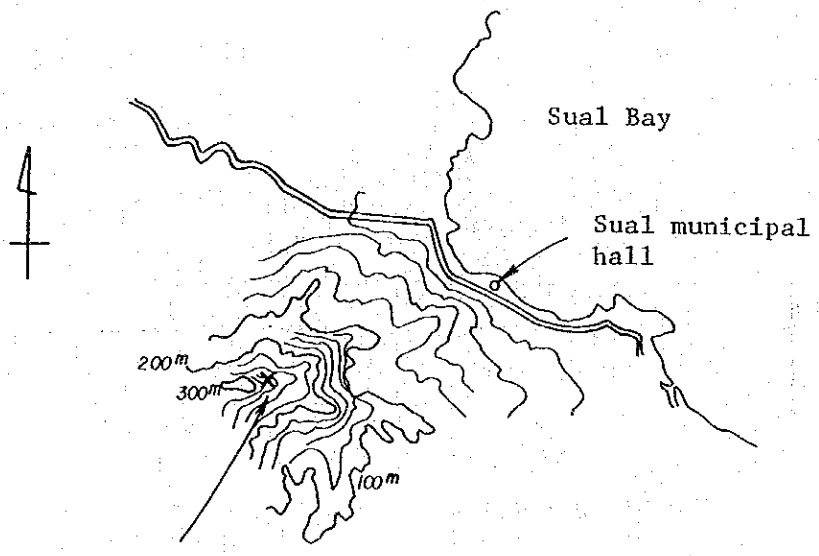
This area includes the site for the guy wire foundation, and if the site necessary for the guy wire foundation can be leased, the necessary site area can be reduced.

(36) Sual

◦ Plan

This station/office will be an unattended repeater station to be maintained by Dagupan or Alaminos station/office.
A road will be provided from Sual town to the site.

◦ Proposed Building Site



◦ Dimensional Information

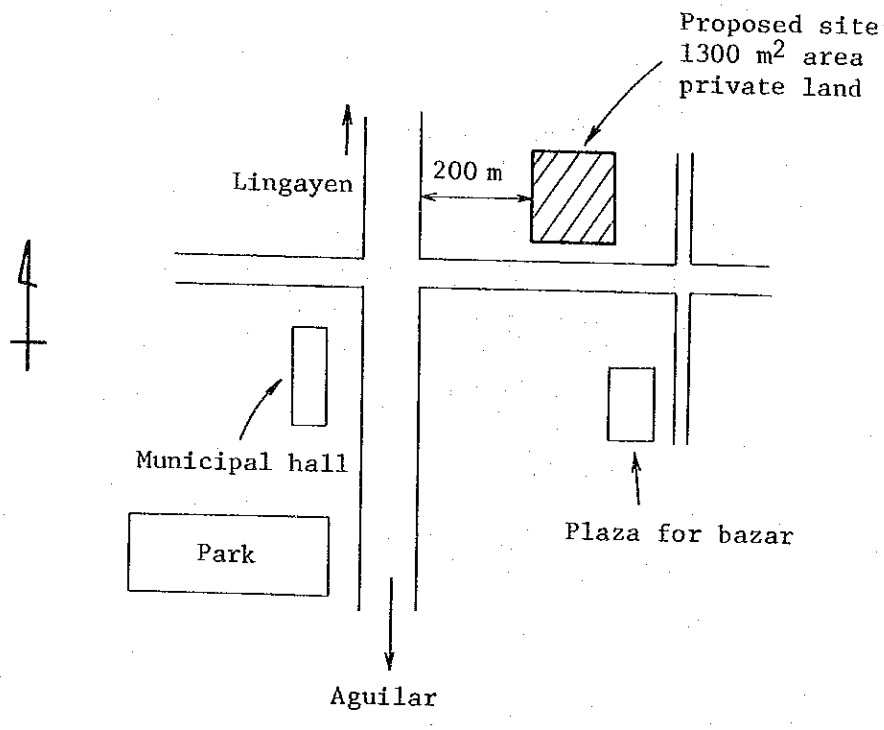
Necessary building area: $60m^2$
Antenna tower height: 25m (Guyed-wire type)
Necessary site area: $400m^2$
Length of road to be constructed newly: about 3.5km

(37) Bugallon

° Plan

In Phase I, this station/office will be used only as a radio repeater station of the Dagupan ∿ Alaminos link. In Phase II, local exchange will be installed to open a telephone office. Accordingly, the building should be provided in consideration of the unattended radio repeater station plus local exchange office.

° Proposed Building Site



° Dimensional Information

Necessary building area:	350m^2
Antenna tower height:	60m (Selfsupporting)
Necessary site area:	1300m^2

Site procurement may be difficult because of the privately-owned land. When the proposed site is not available, it is desirable to seek for eastern or northern land of the initially proposed site. Western or southern land will be inconvenient for propagation clearance in the direction of Sual.

(38) Dagupan

° Plan

This station/office will be a radio repeater station to be connected from Binalonan by a 2GHz UHF link. Telephone lines will be extended to the directions of Alaminos and San Fabian.

° Proposed Building Site

Dagupan will require a building area of about 400m^2 including the space for the existing facilities.
The present message center will be too narrow but the problem can be solved by constructing the building in 3∿4 stories.
Since public telephone boxes will be installed and window service will be opened in future, the present location will be suitable.

° Dimensional Information

Necessary building area:	400m^2
Antenna tower height:	50m (Selfsupporting)
Necessary site area:	An area of at least about 1200m^2 will be necessary if a steel tower of 25∿30m is erected on the roof of the building constructed to have 2∿3 floors on an area of 14m x 14m.

(39) Claveria

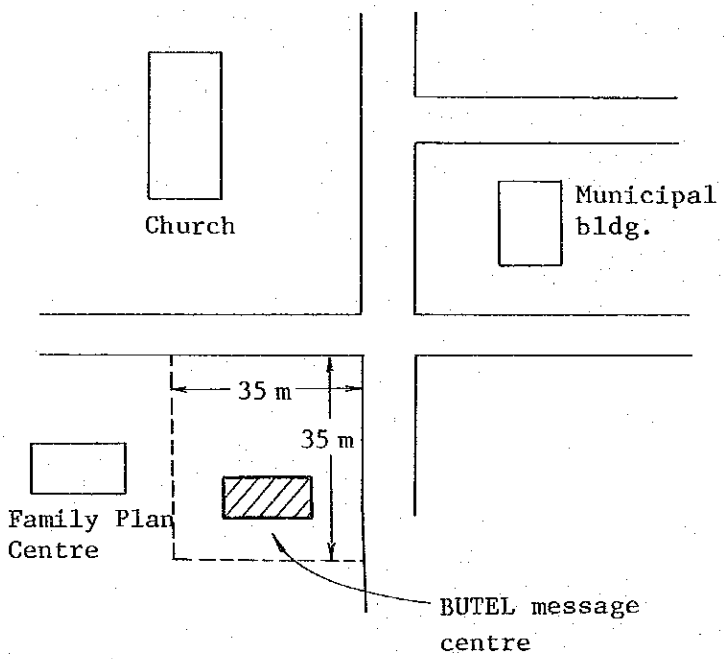
◦ Plan

This station/office will be an IPTS to be connected from Sanchez-Mira by cable.

BUTEL's message center is located just in front of the municipal building. A new building will be constructed in place of the message center so as to accommodate cable terminal facilities, carrier equipment, and switchboard.

Commercial power will be available by 1983 or so.

◦ Proposed Building Site



◦ Dimensional Information

Necessary building area: 90m^2

(No steel tower)

This area includes the necessary area for the power plant. Since this IPTS may be ranked up to a local exchange office in 1993 or so, due consideration should be given to future expansion upon constructing the building.

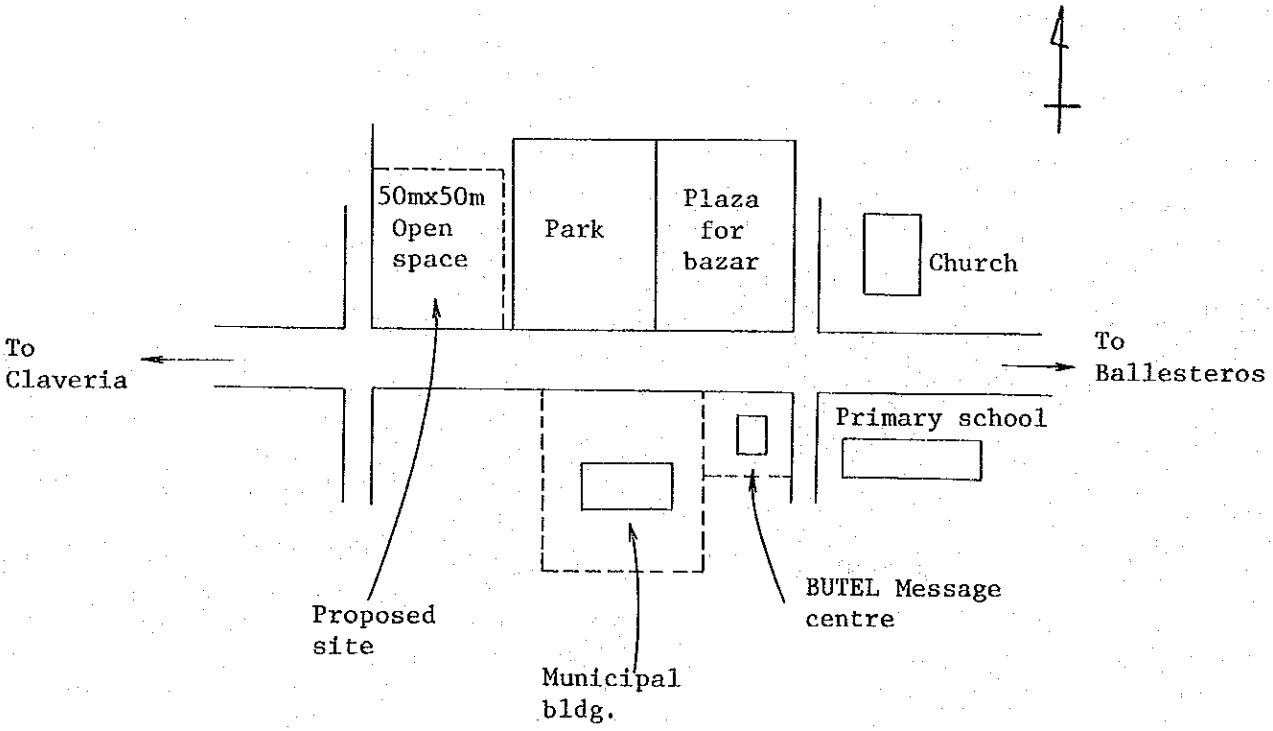
(40) Sanchez-Mira

° Plan

This station/office will be an IPTS to be connected from Ballesteros by UHF. Telephone lines will be extended from this IPTS to Claveria by cable.

° Proposed Building Site

The present BUTEL's message center has a site area of about 10m x 10m and is considerably narrow. Although this may be considered sufficient for the IPTS to start its service since the site is next to the municipal building, yet the site will be too small when the IPTS is ranked up to a local exchange office in 1993 or so as expected.
Accordingly, it is recommendable to change the initially proposed site with an open space shown in the figure and construct the IPTS building in this open space.



◦ Dimensional Information

Necessary building area: $30m^2$

Antenna tower height: 65m (Guyed-wire type)

Necessary site area: $2200m^2$

(Some part of the steel tower guy wire foundation is not included.)

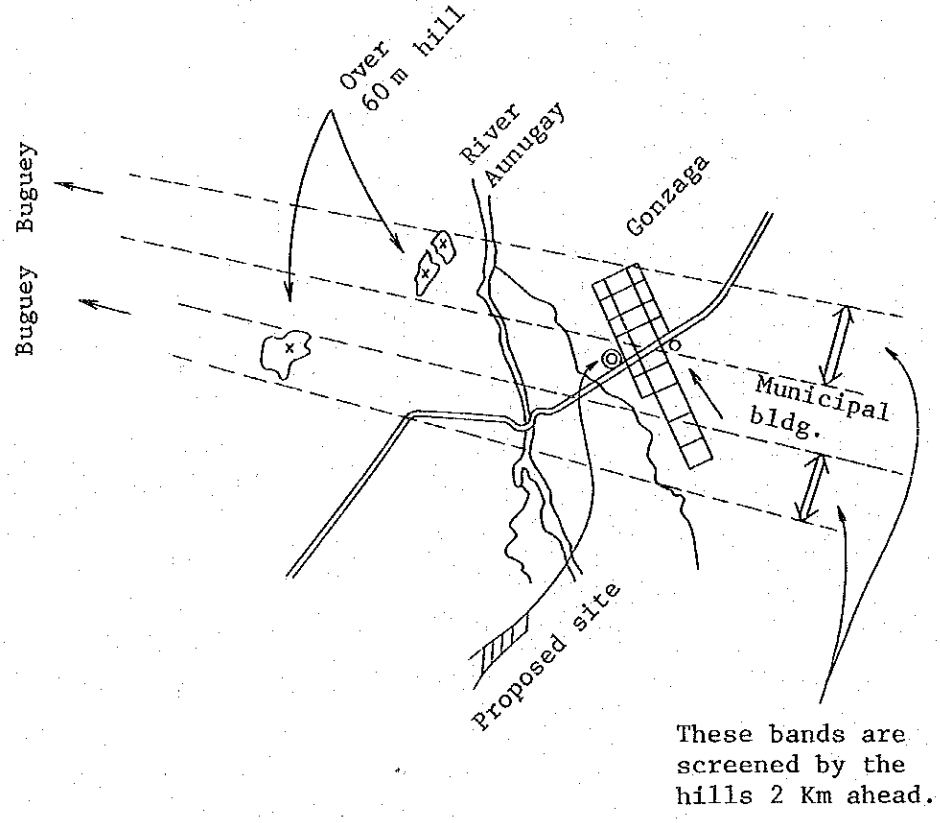
(41) Gonzaga

◦ Plan

This station/office is an IPTS to be connected from Appari via Buguey. This IPTS may be ranked up to a local exchange office in 1993 or so.

◦ Proposed Building Site

Since the propagation course will be established not to be obstructed by the 70∿75m hill located 2km from Gonzaga town, the location of the steel tower will be restricted as shown in the figure.
Accordingly, the steel tower and radio equipment will be located in Gonzaga town or so as shown in the figure and connection to the switchboard in the municipal building will be made by cable from here.



° Dimensional Information

Necessary building area: $45m^2$

(Radio equipment + Power plant)

Antenna tower height: 25m (Guyed-wire type)

Necessary site area: $400m^2$

(Including the steel tower guy wire foundation)

(42) Buguey

° Plan

In Phase I, this station/office will be used only as a radio repeater station of the Appari ∿ Gonzaga route. In Phase II, this station/office will initiate telephone service as an IPTS. In 1993 or so, the IPTS will be ranked up to a local exchange office, so that due consideration should be given to future expansion upon site selection and building construction.

° Proposed Building Site

Since the site incorporating the municipal building has an ample margin in space, it is recommendable to construct the steel tower and radio equipment building in the same site. Construction of a local exchange office in future as expected will be achievable within this site.

Dimensional Information

Necessary building area:	$30m^2$
Antenna tower height:	25m
Necessary site area:	$400m^2$

(43) Aparri

° Plan

This station/office is an important station/office for branching toll trunk lines from Tuguegarao to Bugaey and Gonzaga, Claveria, Sanchez Mira, Ballesteros, and Lal-Lo by cables and to Basco by HF.

Although no local exchange service is presented for the time being at this station/office, RETELCO has been assigned to present the telephone service.

Accordingly, this station is expected to function as a radio repeater station in this project also, so that a new building constructed in the place of the present radio repeater station.

° Proposed Building Site

A building about 320m^2 and a 45m high steel tower (self-supporting) will be constructed in the place of the present radio repeater station.

(44) Lal-lo

◦ Plan

This station/office is an IPTS to be connected from Aparri by VHF and may be ranked up to a local exchange office in 1993 or so.

◦ Proposed Building Site

There is an open space of 35m x 18m next to the municipal building. A steel tower and a radio equipment building will be constructed in this space and a switchboard will be installed in the municipal building.

◦ Dimensional Information

Necessary building area:	$30m^2$	(for radio equipment and power plant)
Antenna tower height:	35m	(Guyed-wire type)
Necessary site area:	$400m^2$	

(The site for the guy wire foundation will be leased.)

(45) Nassiping

° Plan

This station/office will be a repeater station of the transmission line to Aparri. In Phase II, telephone lines will still be extended to Lazam and Sto. Ninio by branching from this station.

° Proposed Building Site

By climbing National Highway No.5 from Nassiping village, then going about 2.4km on a jeepable road, we can see the top of a hill where the proposed site is located on the left hand. By leaving the car and wolking on foot about 300m, we arrive at a top of 158m from the sea. The top is a privately-owned pasture. By cutting soil of about 2m, a space of 90m x 30m will be obtained. The surrounding of this site is overrun with grass without wood.

° Dimensional Information

Necessary building area:	$90m^2$
Antenna tower height:	25m (Selfsupporting)
Necessary site area:	$400m^2$ (Not including expenses for procurement of roads to be constructed newly.)
Road to be constructed newly:	about 500m
Road to be repaired:	about 2.4km

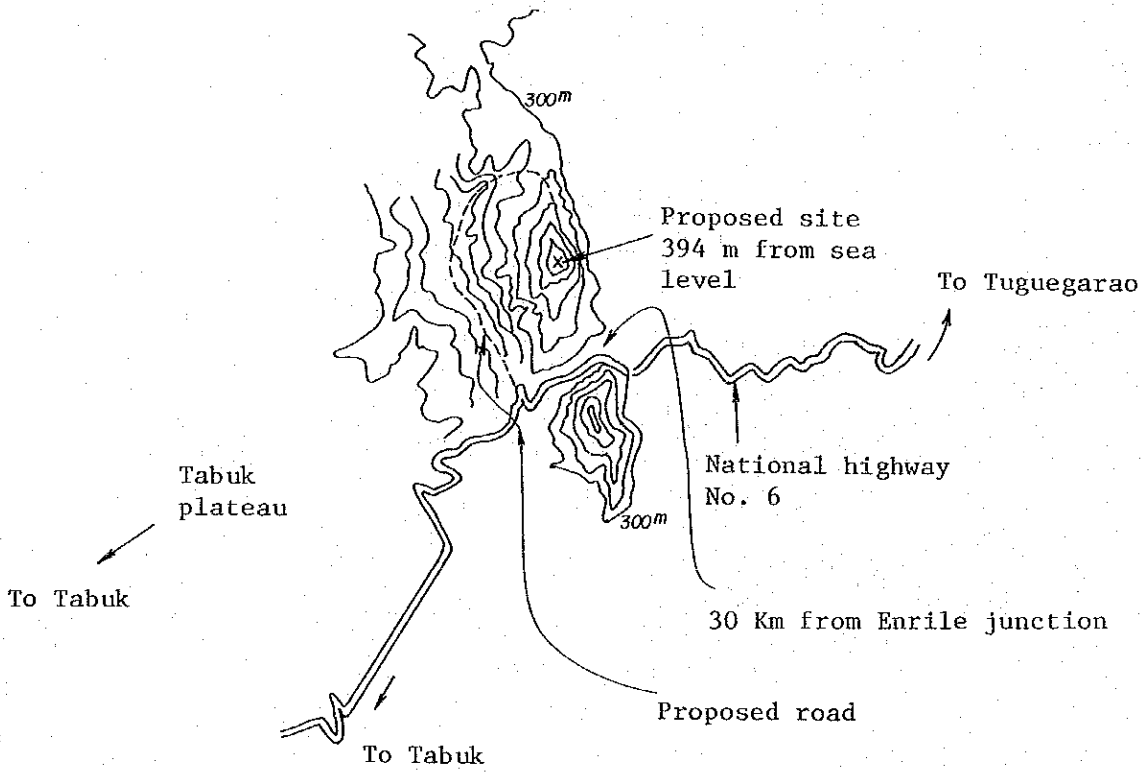
(46) Babalog

◦ Plan

This station/office will start as a repeater station of the Tuguegarao ∿Tuao IPTS route.
Since the routes expected to be constructed in Phase II to Lubuagan and Kabugao will still be branched from this station/office, so that it will play a considerably important role in future as a UHF repeater station.

◦ Proposed Building Site

By going 30km from Enrile to the Junction on National Highway No.6 from Tuguegarao, we reach the final ridge before entering into Tabuk Plateau, where Tabuk town can be seen very well. The proposed site is located on the hill on the north of the road.
Commercial power will not be available easily in future too and a dual engine generator system will be necessary.



Dimensional Information

Necessary building area: $90m^2$

Antenna tower height: 25m (Guyed-wire type)

Necessary site area: $400m^2$

(Including the steel tower guy wire foundation)

(47) Tuao

◦ Plan

This station/office will be an IPTS to be connected from Tuguegarao via Babalog by UHF. Although station/office may be ranked up to a local exchange office in future, telephone service will be presented at a room in the municipal building for the time being.

◦ Proposed Building Site

A 25m high steel tower will be constructed within the minucipal building site and the radio equipment and switchboard will be accommodated in a room of the message center in the municipal building.
A power plant of about $30m^2$ will be provided in the municipal building site.

(48) Tumauini

° Plan

This station/office will be a local exchange office to be connected from Ilagan by UHF.

° Proposed Building Site

Since site selection will not be restricted by the propagation requirement, the building site may be selected at a proper location as much near to the center of the town as possible.

° Dimensional Information

Necessary building area:	350m^2
Antenna tower height:	25m (Guyed-wire type)
Necessary site area:	1200m^2

(49) Santiago

◦ Plan

This station/office will be a large telephone office to work as a local exchange office to be connected to Ilagan via San Mateo and also play a role of a repeater station for the links extended to Cabarroguis, Diffum, Jones, Maddela, and San Augustin.

The present Santiago BUTEL Telephone Office accommodates local exchange facilities and some radio equipments but has no ample space, so that the radio and carrier equipment to be introduced by this project will be accommodated in the new building to be constructed at this site.

◦ Proposed Building Site

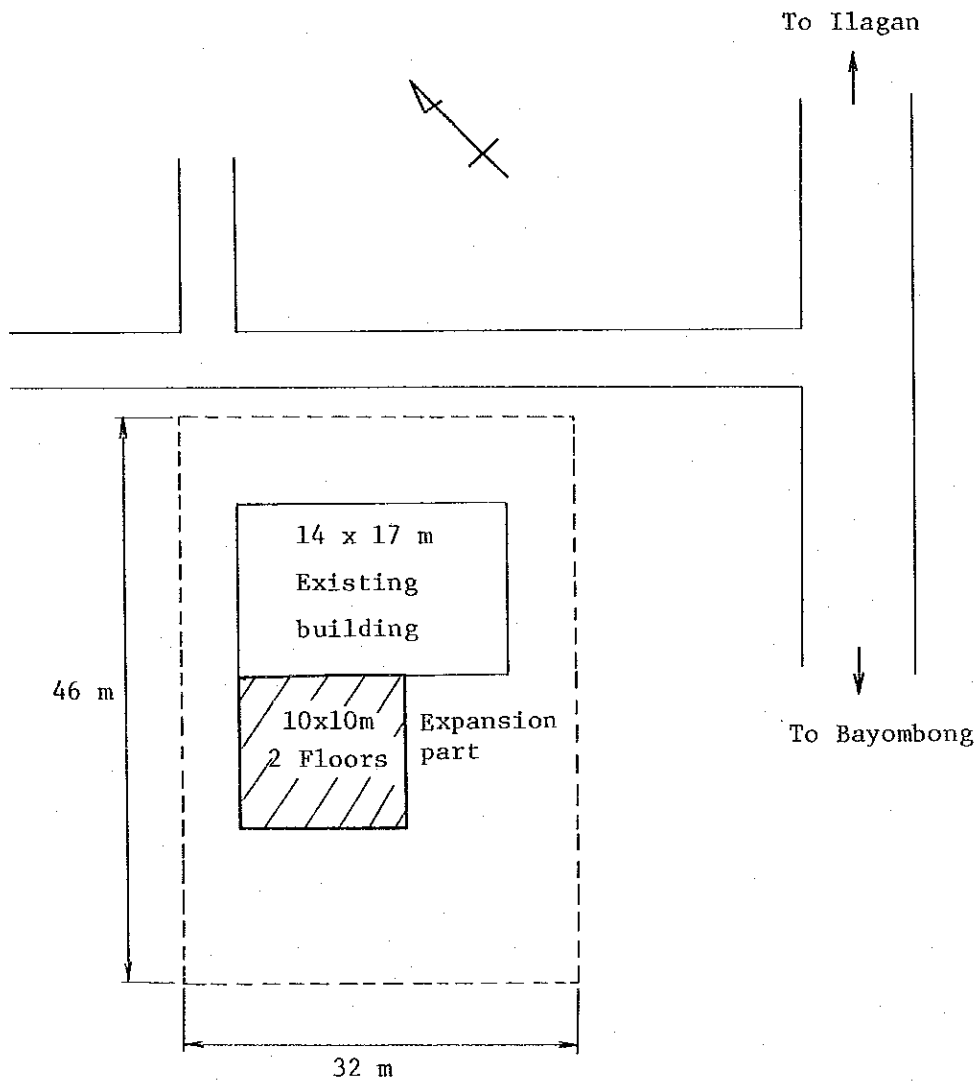
A building of about 200m will be constructed newly at a site behind the present Santiago Telephone Office and a self-supporting steel tower will be erected on the roof of the building.

° Dimensional Information

Necessary building area: 400m2 (including present floor space)

Antenna tower height: 55m (Selfsupporting)

The existing site will be utilized.



(50) Callang

◦ Plan

This station/office will be an IPTS to be connected from San Mateo. In Phase II, telephone lines will be extended from this IPTS to Mallig and Aurora.

◦ Proposed Building Site

The radio equipment and switching equipment will be accommodated in the BUTEL Message Center in the municipal building center. The power plant and 30m high steel tower will be constructed in the site of the municipal building. When telephone lines are extended to Mallig and Aurora, additional repeater equipment will be necessary. These repeater equipment will be installed in a space to be achieved by expanding in Phase II the power plant to be connected in Phase I.

◦ Dimensional Information

Necessary building area: $30m^2$ (for power facilities)
Antenna tower height: 35m (Guyed-wire type)

The site of the municipal building will be used.

(51) Alicia

° Plan

This station/office will be a local exchange office to be connected to Ilagan via San Mateo. In Phase II, telephone lines will be extended to Mayoyao and Angadanan from this local exchange office.

° Proposed Building Site

There is a land of about 850m^2 next to the plaza in front of the municipal building. However, this land is not conveniently shaped (10m x 85m) for use as the site for constructing the local exchange office. Since there is no particular problem in the radio propagation to San Mateo and Mayoyao, it is recommendable to seek for another land instead.

° Dimensional Information

Necessary building area:	350m^2
Antenna tower height:	35m (Guyed-wire type)
Necessary site area:	900m^2

(52) Cabarroquis

° Plan

This station/office will be a local exchange office to be connected to Ilagan via Santiago and San Mateo.

° Proposed Building Site

It is recommended to use the land just behind the provincial capital building as the site for the new local exchange office building through land leveling.
However, it is to be noted that the actual topographical conditions are much different from the existing 1/50,000 map and ample propagation test should be performed before determining the site.
The provincial capital building seems to be actually situated at lat. 16°31'34" N. and long. 121° 30'54" E.

° Dimensional Information

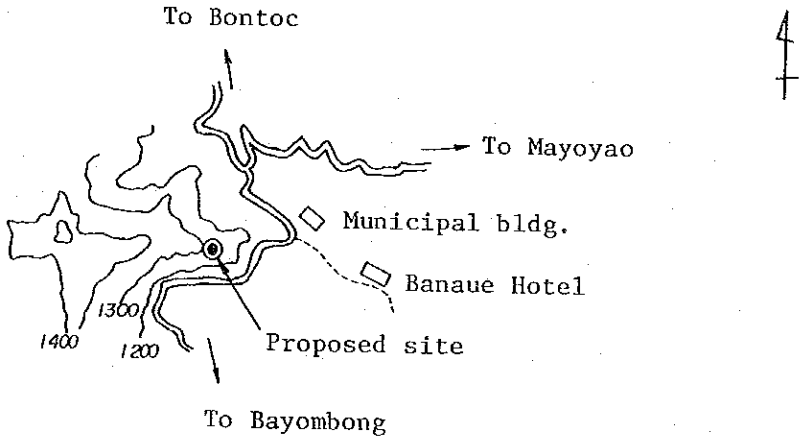
Necessary building area:	350m^2
Antenna tower height:	55m (Guyed-wire type)
Necessary site area:	1600m^2

(53) Banaue

◦ Plan

This station/office will be an IPTS to be connected to Bayombong via Diadi. In Phase II, telephone lines to Kiangan will be extended from here.

◦ Proposed Building Site



The proposed site is located at a point of 1260m from the sea level and can be reached by climbing up 400m along the path from the municipal building. At this site a 25m high steel tower and a building for accommodating the radio equipment and power plant will be constructed.
From here a cable will be layed into the BUTEL Message Center located next to the municipale building for connection to the switchboard.

° Dimensional Information

Necessary building area:	45m^2 (for radio equipment and power facilities)
Antenna tower height:	25m (Guyed-wire type)
Necessary site area:	400m^2

(54) Sarrat, Paoay, Cabuyao, San Fabian, Bambong, Enrile, Solana, Sto. Domingo, Sta. Maria, Mapandan and San Jacinto

These will be IPTS or local change offices which will not be furnished with any radio equipment.
Accordingly, it is recommendable to select their sites in the center of these towns where buildings of public organizations are concentrated, since there is no ristriction in radio propagation. In the case of IPTS, the switchboard will be accommodated in the municipal building and a power plant house of 10 ∿ 15m^2 will be constructed in the neighborhood.

∘ Proposed Building Site

Necessary building area:	320m^2	(for local exchange office)
	15m^2	(for power plant for IPTS)
Necessary site area:	1000m^2	(for local exchange office)
	50m^2	(for power plant for IPTS)