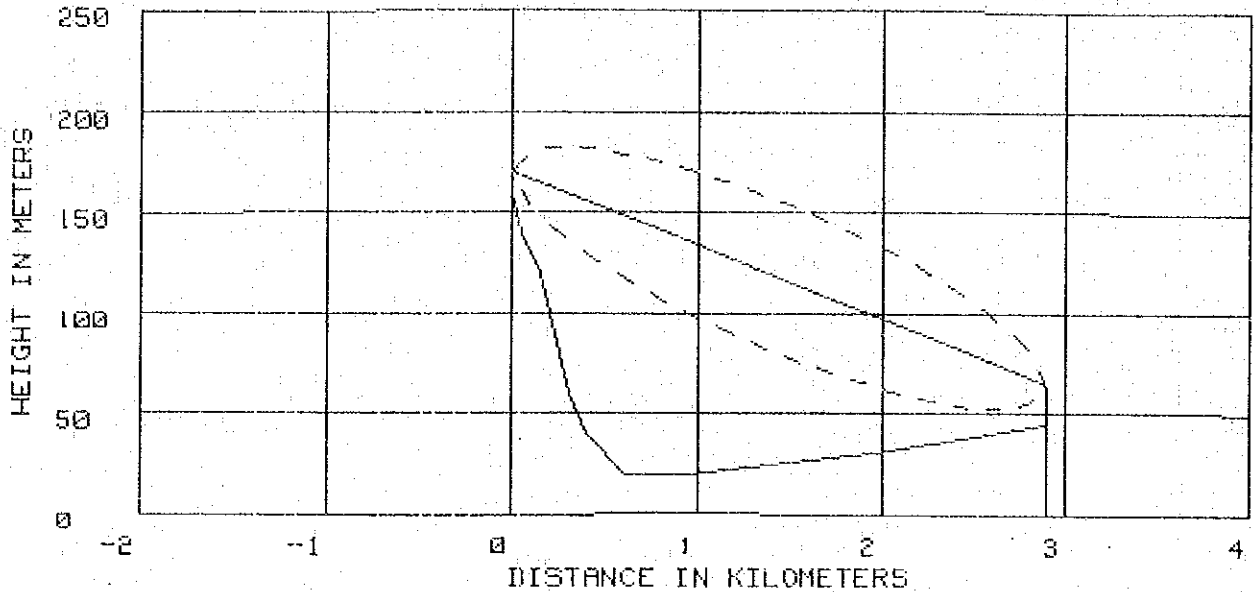


ANNEX

PATH PROFILE MAPS FOR RADIO SYSTEM

PATH PROFILE (4/3 RADIUS)



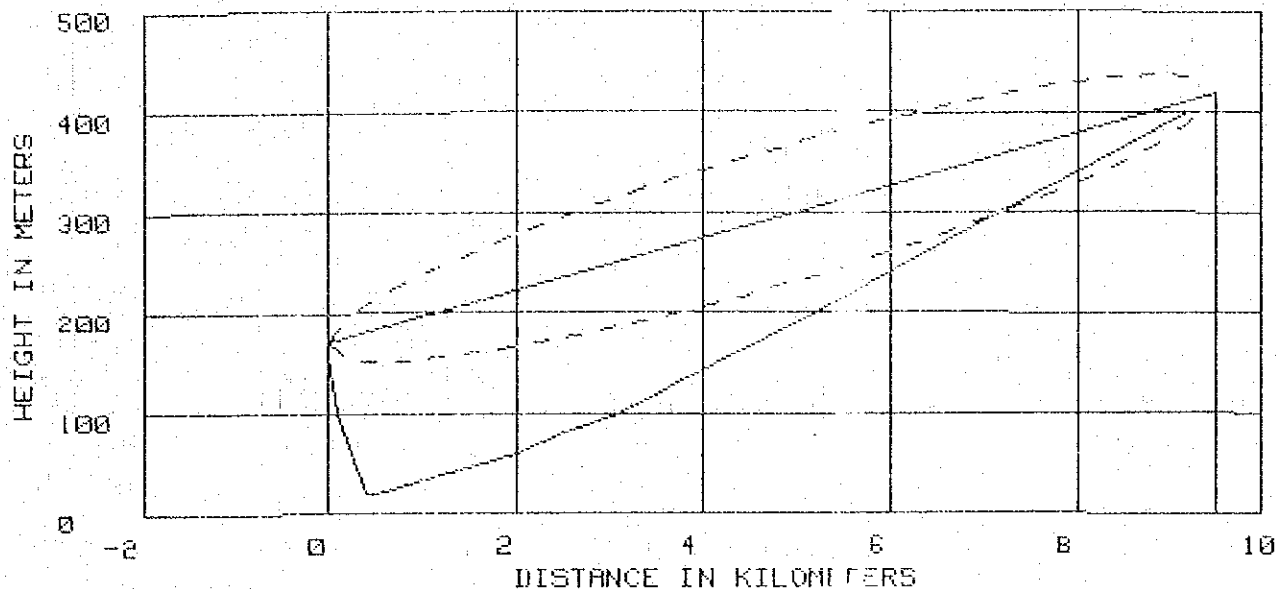
DISTANCE : 2.9 km

SITE 1 : LEGASPI (160)	SITE 2 : CULIAT
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 45.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =   1.33                               #
#
#   F       =   150 MHz : (λ = 2000 mm)           #
#
#   Hg1    =   160.0 m       Hg2    =   45.0 m     #
#   Ha1    =   10.0 m       Ha2    =   20.0 m     #
#
#   D1     =   2.6 km       D2     =   0.3 km     Hm =   55.0 m #
#   U      =   0.90        Ld     =   0.0 dB     #
#
#   Lfs    =   85.2 dB       Lfs + Ld = 85.2 dB   #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



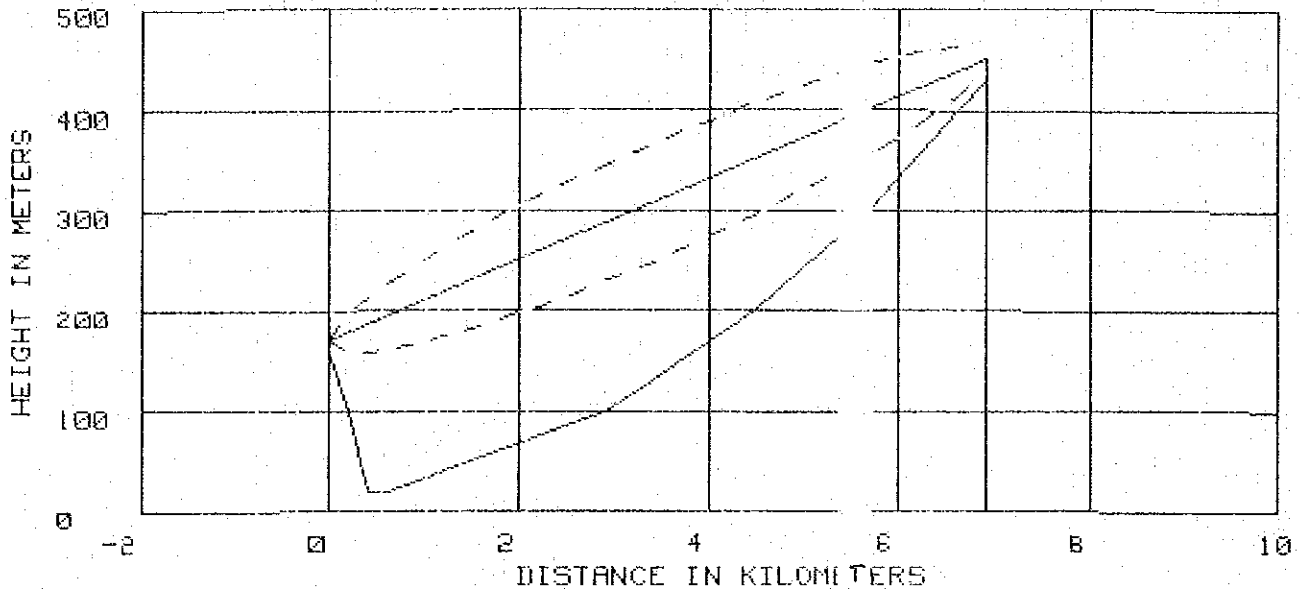
DISTANCE : 9.5 km

SITE 1 : LEGASPI(160m)	SITE 2 : QUIRANGAY(R)
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 400.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####:#####:#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K   =   1.33                                     #
#
#   F   =   150 MHz : (λ = 2000 mm)                 #
#
#   Hg1 = 160.0 m   Hg2 = 400.0 m                   #
#   Ha1 = 10.0 m    Ha2 = 20.0 m                   #
#
#   D1  = 9.2 km    D2  = 0.3 km   Hm = 415.0 m    #
#   U   = -0.13     Ld  = 7.6 dB
#
#   Lfs = 95.5 dB   Lfs + Ld = 103.1 dB
#
#####:#####:#####
    
```

PATH PROFILE (4/3 RADIUS)

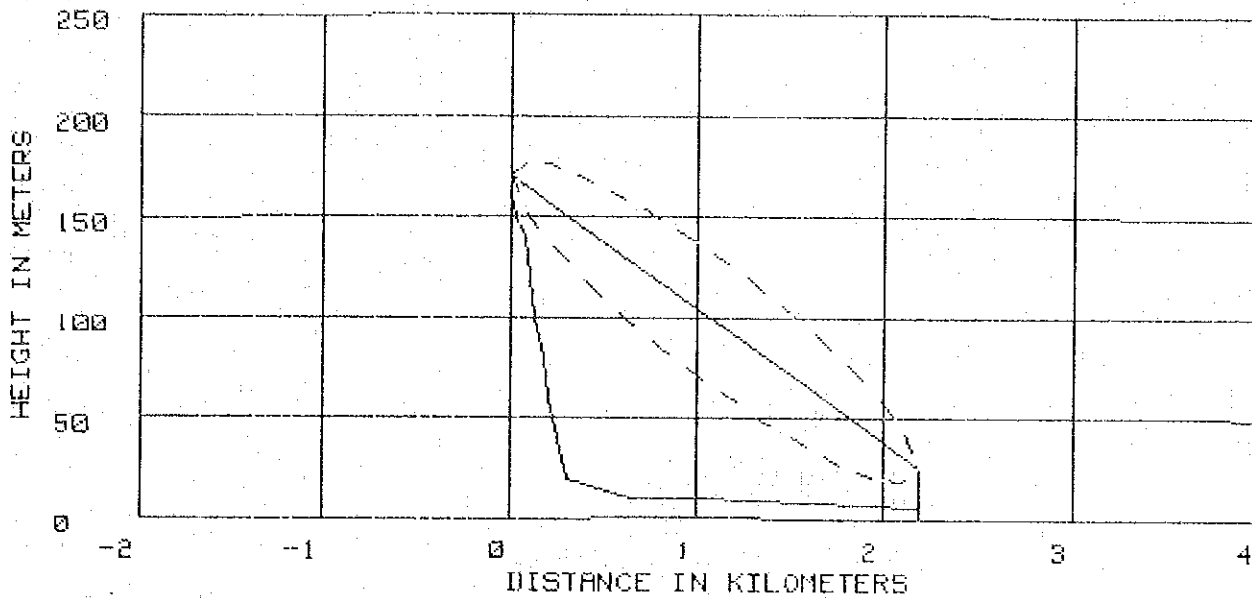


DISTANCE : 6.9 km

SITE 1 : LEGASPI (160m)	SITE 2 : MABINIT
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 430.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```
#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#   K       =       1.33
#
#   F       =       150 MHz ; (λ = 2000 mm)
#
#   Hg1    =   160.0 m      Hg2    =   430.0 m
#   Ha1    =   10.0 m      Ha2    =   20.0 m
#
#   D1     =   6.6 km      D2     =   0.3 km      Hm = 415.0 m
#   U      =   0.95       Ld      =   0.0 dB
#
#   Lfs    =   92.8 dB     Lfs + Ld = 92.8 dB
#
#####
```

PATH PROFILE (4/3 RADIUS)



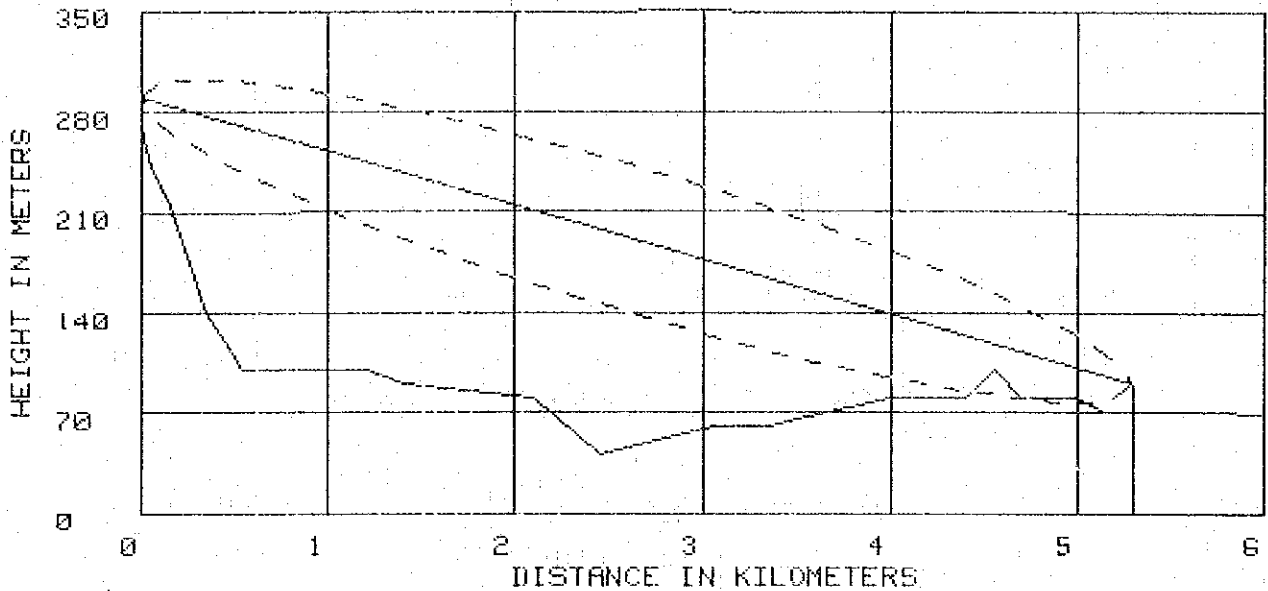
DISTANCE : 2.2 km

SITE 1 : LEGASPI (160)	SITE 2 : YAWA BRIDGE
GROUND ELEVATION: 150.0 m	GROUND ELEVATION: 5.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =    1.33                               #
#
#   F       =    150 MHz : (λ = 2000 mm)           #
#
#   Hg1    =    160.0 m      Hg2    =    5.0 m      #
#   Ha1    =    10.0 m      Ha2    =    20.0 m      #
#
#   D1     =    0.0 km      D2     =    2.2 km      Hm = 165.0 m #
#   U      =    0.58       Ld      =    0.0 dB      #
#
#   Lfs    =    82.8 dB      Lfs + Ld = 82.8 dB      #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 5.3 km

SITE 1 : LIGAO (270)

SITE 2 : GUINOBATAN (NL)

GROUND ELEVATION: 270.0 m

GROUND ELEVATION: 70.0 m

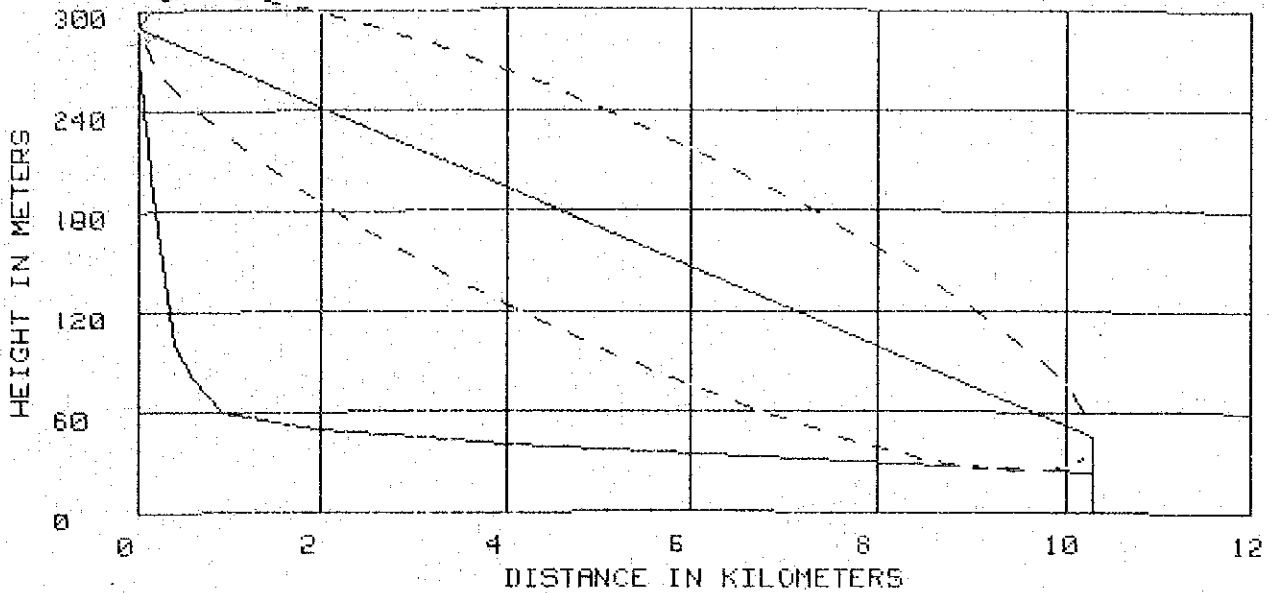
ANTENNA HEIGHT: 20.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K      =    1.33
#
#   F      =    150 MHz ; (λ = 2000 mm)
#
#   Hg1    =    270.0 m      Hg2    =    70.0 m
#   Ha1    =    20.0 m      Ha2    =    20.0 m
#
#   D1     =    4.6 km      D2     =    0.8 km      Hm = 115.0 m
#   U      =    0.09       Ld     =    5.0 dB
#
#   Lfs    =    90.5 dB     Lfs + Ld = 95.4 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



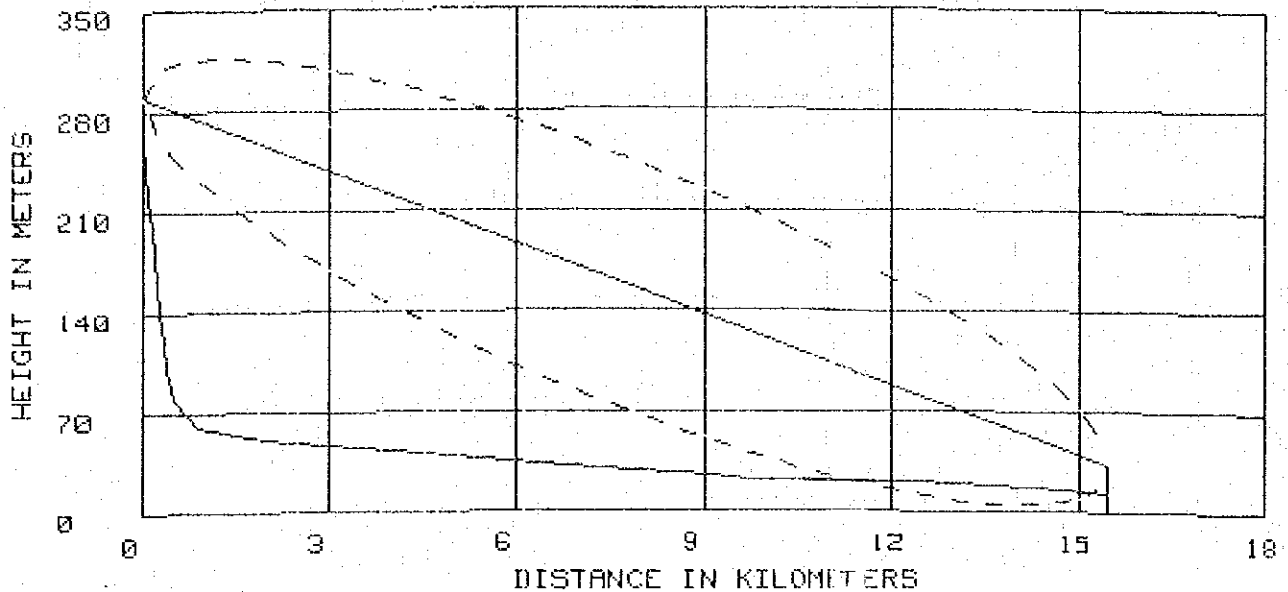
DISTANCE : 10.3 km

SITE 1 : LIGA0 (270)	SITE 2 : ORS (WL)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 25.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K       =   1.33
#
#   F       =   150 MHz : (λ = 2000 mm)
#
#   Hg1    =   270.0 m   Hg2    =   25.0 m
#   Ha1    =   20.0 m   Ha2    =   20.0 m
#
#   D1     =   7.8 km   D2     =   2.6 km   Hm    =   45.0 m
#   U      =   0.96    Ld     =   0.0 dB
#
#   Lfs    =   96.2 dB   Lfs + Ld = 96.2 dB
#
#####
    
```


PATH PROFILE (4/3 RADIUS)



DISTANCE : 15.5 km

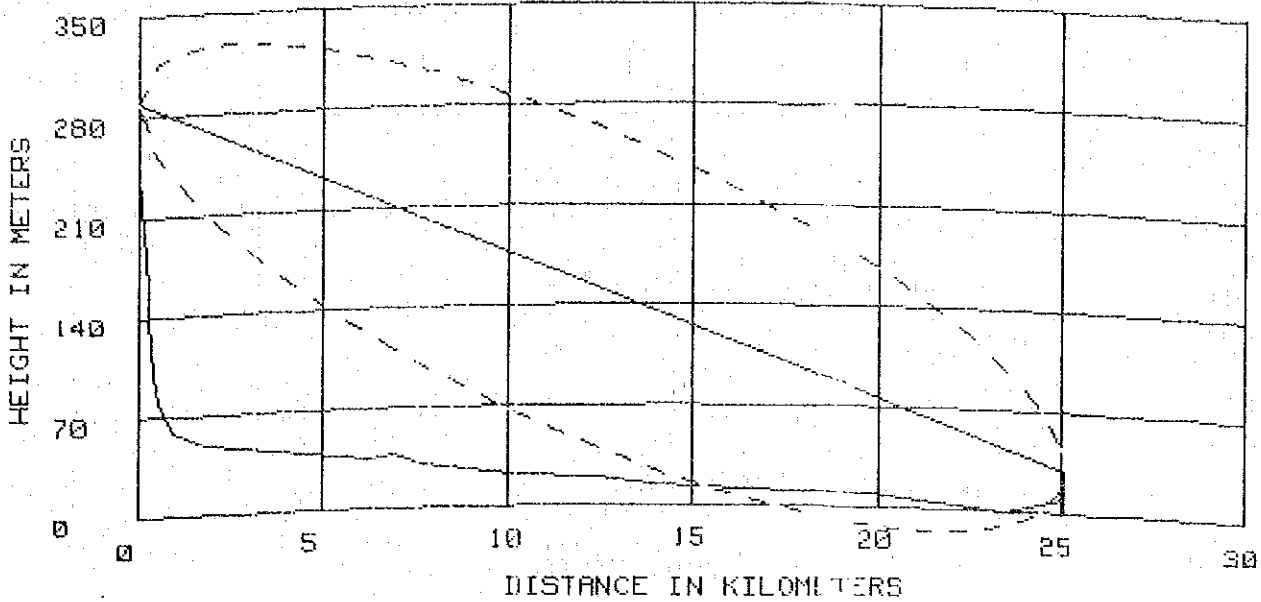
SITE 1 : LIGAO (270)	SITE 2 : LIBON(RF)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 13.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#   K       =   1.33
#
#   F       =   150 MHz : (lambda = 2000 mm)
#
#   Hg1    =   270.0 m      Hg2    =   13.0 m
#   Ha1    =   20.0 m      Ha2    =   20.0 m
#
#   D1     =   14.8 km     D2     =   0.7 km   Hm    =   29.6 m
#   U      =   0.39       Ld     =   1.4 dB
#
#   Lfs    =   99.8 dB     Lfs + Ld = 101.2 dB
#
#####

```

PATH PROFILE (4/3 RADIUS)



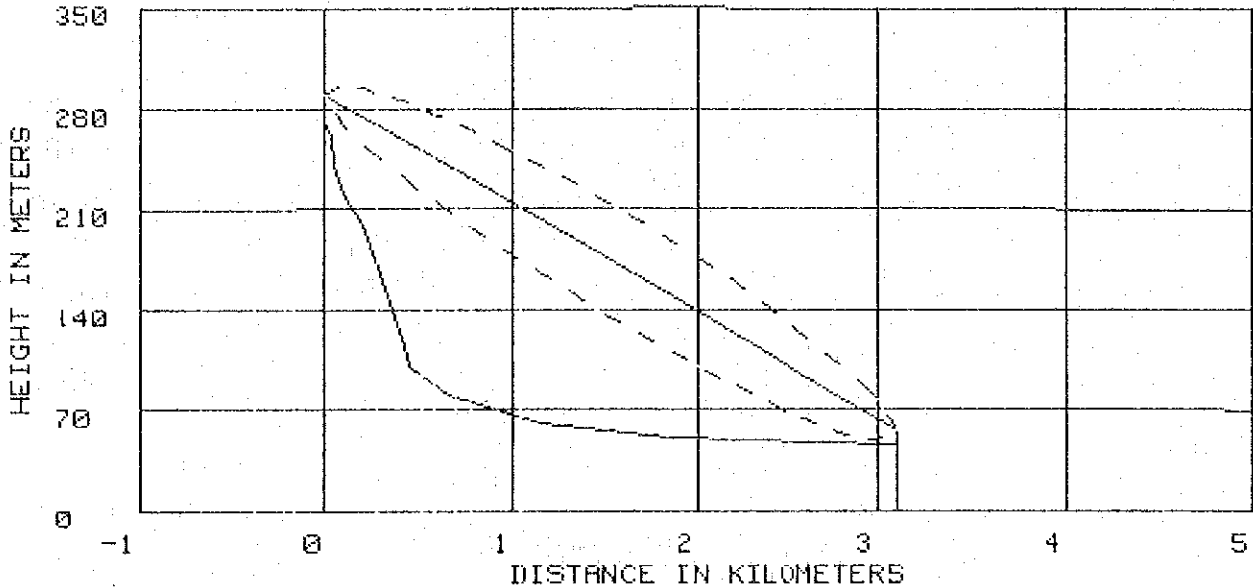
DISTANCE : 25.1 km

SITE 1 : LIGAO (270)	SITE 2 : BATO
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 10.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE  OSS                                     #
#                                     #
#      K      =      1.33                                                     #
#                                     #
#      F      =      150 MHz : (λ = 2000 mm)                                  #
#                                     #
#      Hg1 = 270.0 m      Hg2 = 10.0 m                                       #
#      Ha1 = 20.0 m      Ha2 = 20.0 m                                       #
#                                     #
#      D1 = 23.5 km      D2 = 1.6 km      Hm = 15.0 m                       #
#      U  = 0.54         Ld = 0.0 dB                                         #
#                                     #
#      Lfs = 104.0 dB      Lfs + Ld = 104.0 dB                               #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



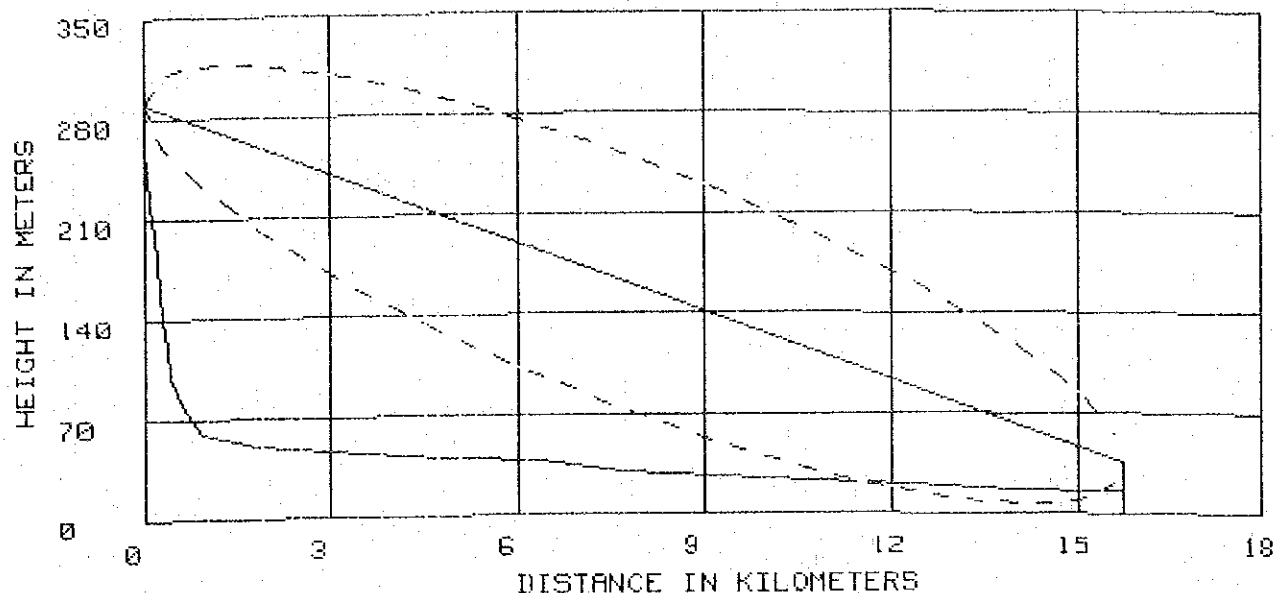
DISTANCE : 3.1 km

SITE 1 : LIGAO (270)	SITE 2 : LIGAO (RF)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 45.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 10.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K   =   1.33                                     #
#
#   F   =   150 MHz : (λ = 2000 mm)                 #
#
#   Hg1 = 270.0 m      Hg2 = 45.0 m                 #
#   Ha1 = 20.0 m      Ha2 = 10.0 m                 #
#
#   D1  = 1.9 km      D2  = 1.3 km      Hm = 65.0 m #
#   U   = 2.19        Ld  = 0.0 dB                 #
#
#   Lfs = 85.0 dB     Lfs + Ld = 85.8 dB           #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 15.8 km

SITE 1 : LIGAO (270)

SITE 2 : POLANGUI (WL)

GROUND ELEVATION: 270.0 m

GROUND ELEVATION: 16.0 m

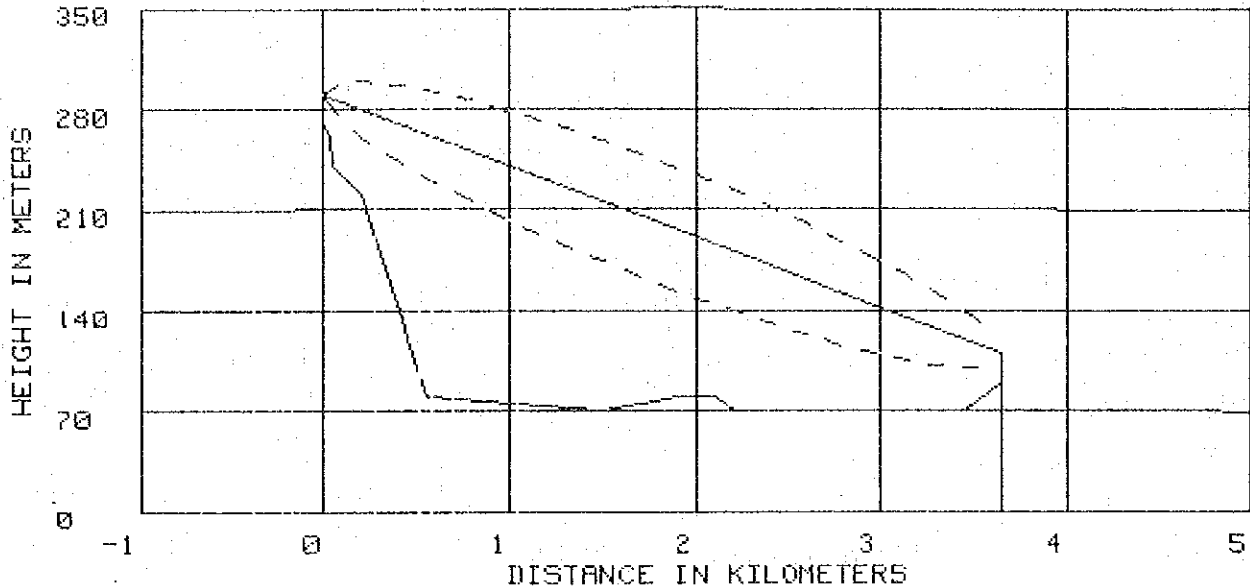
ANTENNA HEIGHT: 20.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K       =    1.33
#
#   F       =    150 MHz : (λ = 2000 mm)
#
#   Hg1    =    270.0 m      Hg2    =    16.0 m
#   Ha1    =    20.0 m      Ha2    =    20.0 m
#
#   D1     =    15.5 km     D2     =    0.3 km   Hm    =    31.0 m
#   U      =    0.40       Ld     =    1.4 dB
#
#   Lfs    =    99.9 dB     Lfs + Ld = 101.3 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



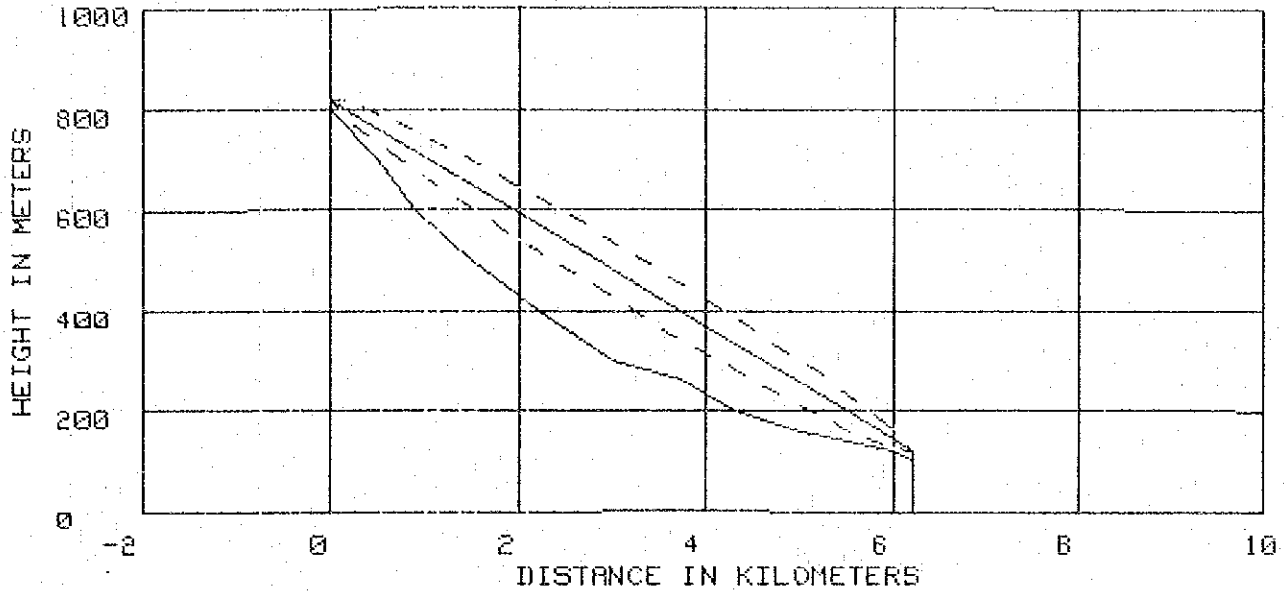
DISTANCE : 3.7 km

SITE 1 : LIGAO (270)	SITE 2 : NASISI (RF&WL)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 90.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =   1.33                               #
#
#   F       =   150 MHz : (λ = 2000 mm)            #
#
#   Hg1     =   270.0 m      Hg2 = 90.0 m          #
#   Ha1     =   20.0 m      Ha2 = 20.0 m          #
#
#   D1      =   3.5 km      D2 = 0.2 km      Hm = 85.0 m #
#   U       =   1.79       Ld = 0.0 dB          #
#
#   Lfs     =   87.2 dB      Lfs + Ld = 87.2 dB    #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



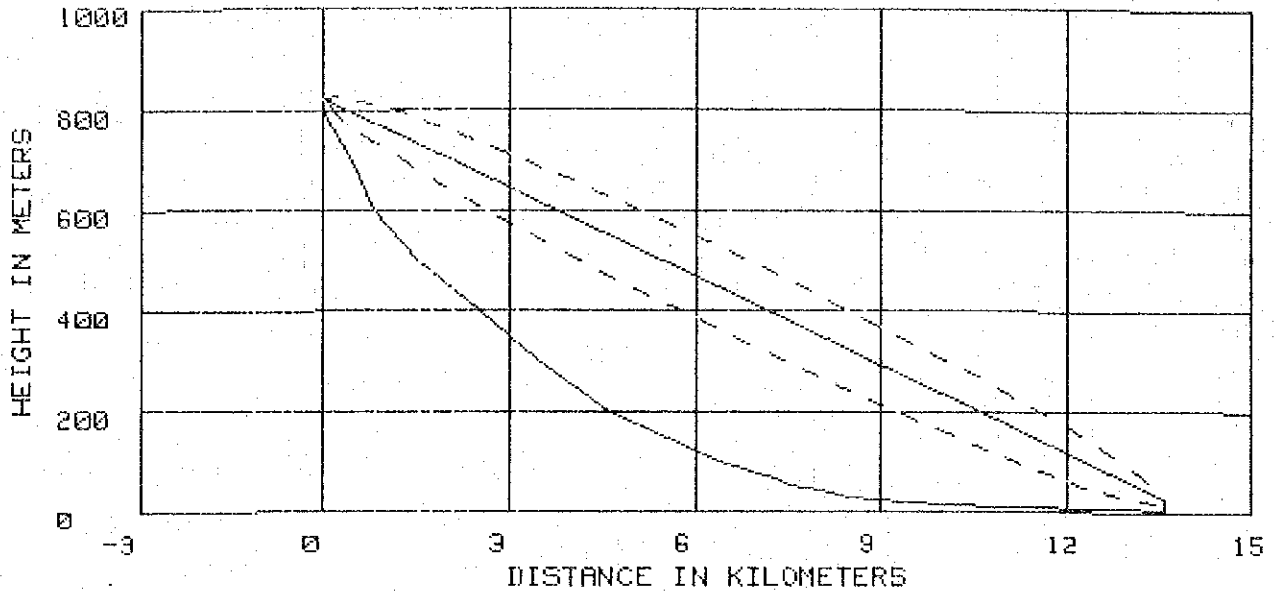
DISTANCE : 6.2 km

SITE 1 : M.REST HOUSE	SITE 2 : BANTRYAN
GROUND ELEVATION: 800.0 m	GROUND ELEVATION: 100.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =       1.33                               #
#
#   F       =       150 MHz ; (λ = 2000 mm)          #
#
#   Hg1     =       800.0 m       Hg2     =       100.0 m #
#   Ha1     =       20.0 m       Ha2     =       20.0 m #
#
#   D1      =       6.0 km       D2      =       0.2 km   Hm = 135.0 m #
#   U       =       0.38        Ld      =       1.6 dB   #
#
#   Lfs     =       91.8 dB       Lfs + Ld = 93.4 dB   #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



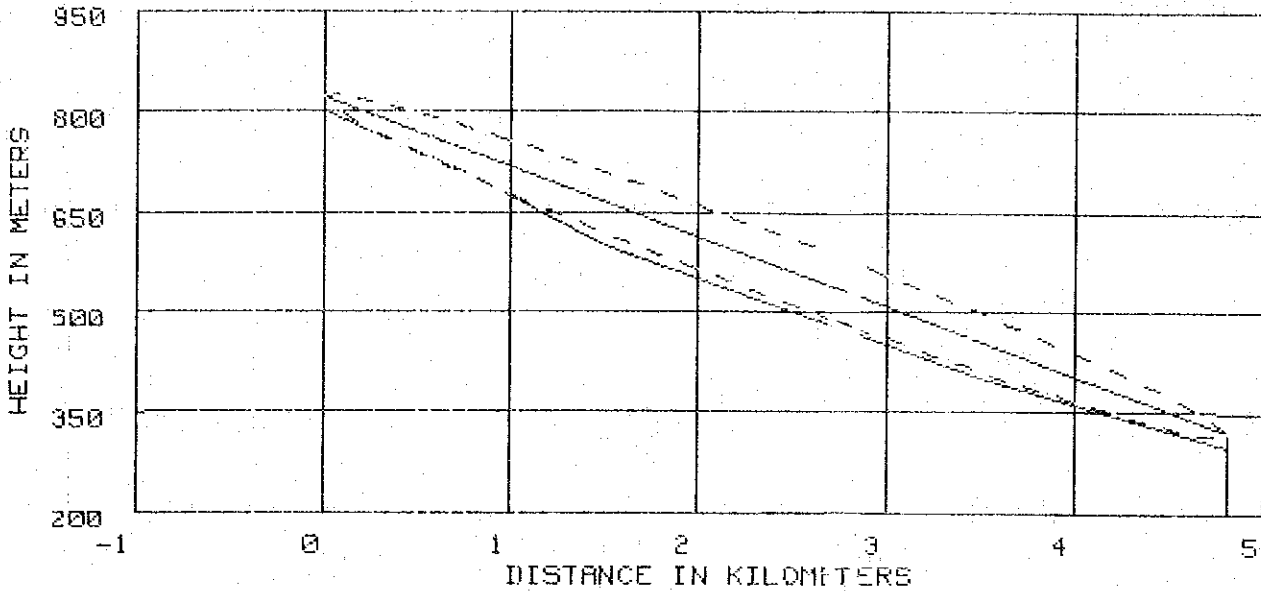
DISTANCE : 13.6 km

SITE 1 : M.REST HOUSE	SITE 2 : BALZA BRIDGE
GROUND ELEVATION: 800.0 m	GROUND ELEVATION: 5.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS           #
#                                     #
#   K   =   1.33                                     #
#                                     #
#   F   =   150 MHz : (λ = 2000 mm)                 #
#                                     #
#   Hg1 = 800.0 m   Hg2 = 5.0 m                     #
#   Ha1 = 20.0 m   Ha2 = 20.0 m                     #
#                                     #
#   D1  = 12.9 km   D2  = 0.7 km   Hm = 23.0 m      #
#   U   = 1.16     Ld  = 0.0 dB                      #
#                                     #
#   Lfs = 98.7 dB   Lfs + Ld = 98.7 dB              #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



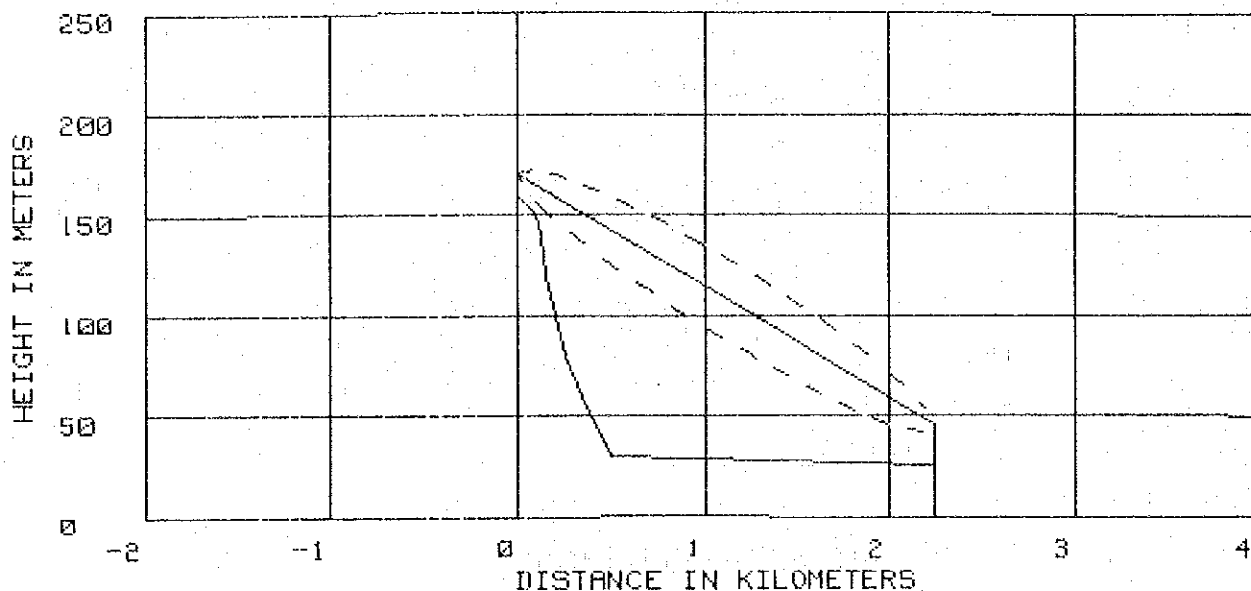
DISTANCE : 4.8 km

SITE 1 : M. REST HOUSE	SITE 2 : TABACO(300m)
GROUND ELEVATION: 800.0 m	GROUND ELEVATION: 300.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#   K       =   1.33
#
#   F       =   150 MHz : (λ = 2000 mm)
#
#   Hg1    =   800.0 m      Hg2    =   300.0 m
#   Ha1    =   20.0 m      Ha2    =   20.0 m
#
#   D1     =   0.8 km      D2     =   4.0 km      Hm = 715.0 m
#   U      =   0.59       Ld     =   0.0 dB
#
#   Lfs    =   89.6 dB     Lfs + Ld = 89.6 dB
#
#####
    
```


PATH PROFILE (4/3 RADIUS)



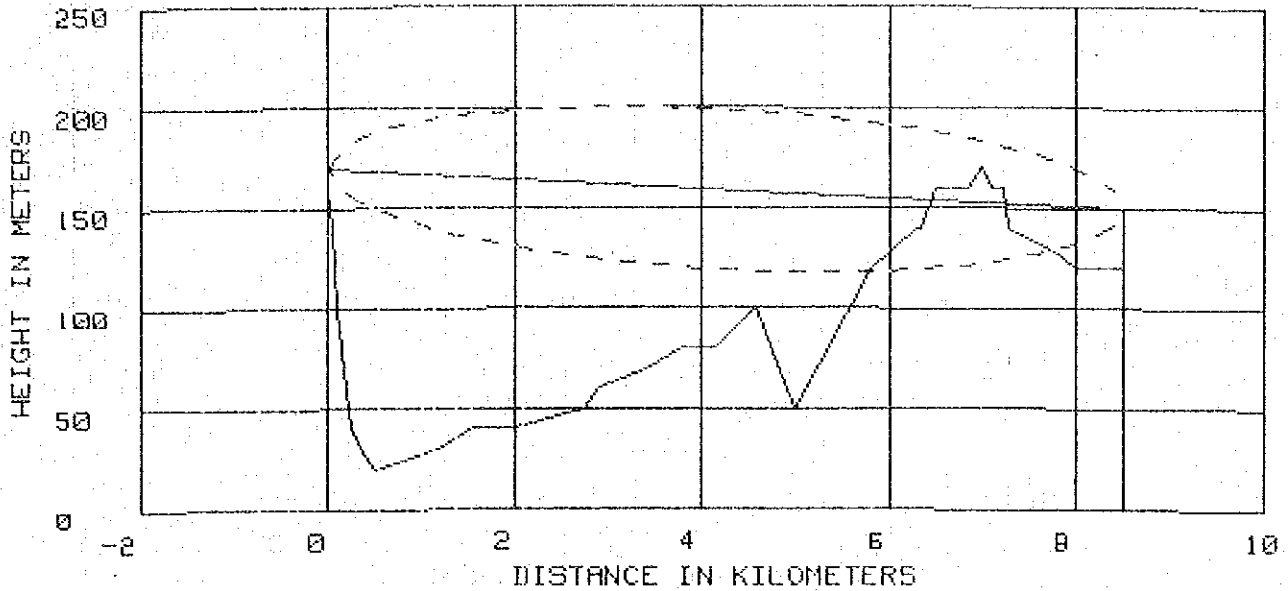
DISTANCE : 2.3 km

SITE 1 : LEGASPI (160)	SITE 2 : DARAGA
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 25.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS           #
#                                     #
#   K   =   1.33                                     #
#                                     #
#   F   =   400 MHz : (λ = 750 mm)                 #
#                                     #
#   Hg1 = 160.0 m   Hg2 = 25.0 m                   #
#   Ha1 = 10.0 m   Ha2 = 20.0 m                   #
#                                     #
#   D1  = 0.1 km   D2  = 2.2 km   Hm = 165.0 m    #
#   U   = -0.07   Ld  = 6.8 dB                    #
#                                     #
#   Lfs = 91.5 dB   Lfs + Ld = 98.4 dB            #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



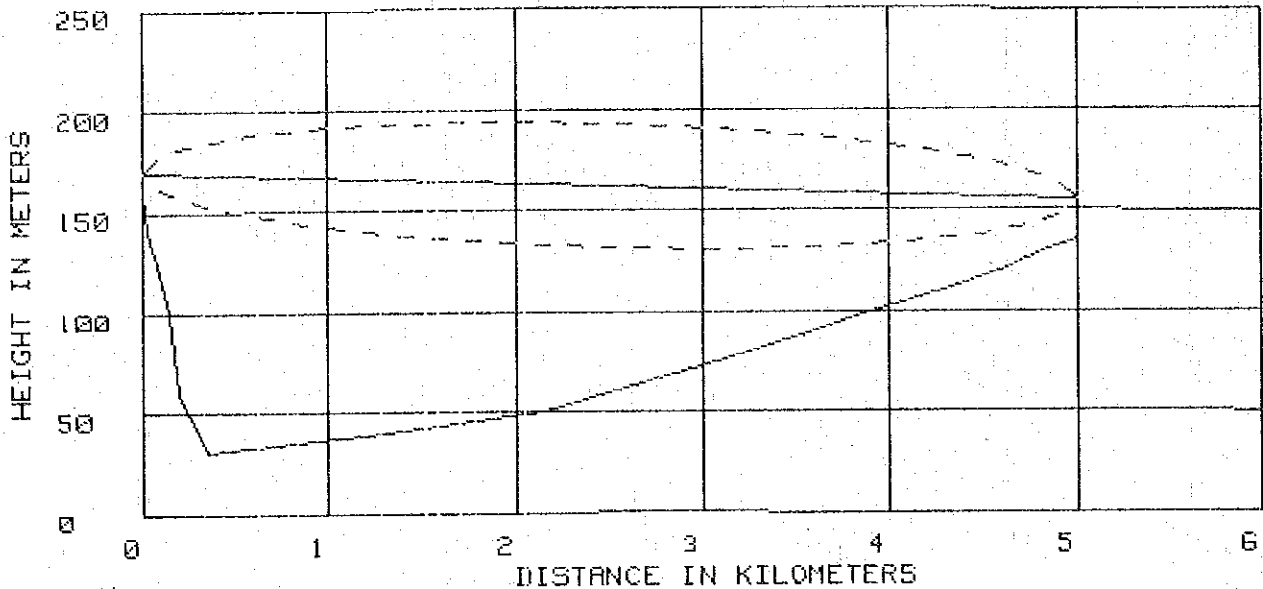
DISTANCE : 8.5 km

SITE 1 : LEGASPI (160)	SITE 2 : CARMALIG
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 120.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 30.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =       1.33                             #
#
#   F       =       400 MHz : (λ = 750 mm)          #
#
#   Hg1    = 160.0 m      Hg2    = 120.0 m          #
#   Ha1    = 10.0 m      Ha2    = 30.0 m           #
#
#   D1     = 7.0 km      D2     = 1.5 km      Hm = 185.0 m
#   U      = -1.05      Ld     = 16.7 dB
#
#   Lfs    = 103.1 dB      Lfs + Ld = 119.8 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 5.0 km

SITE 1 : LEGASPI (160)

SITE 2 : MALABOG

GROUND ELEVATION: 160.0 m

GROUND ELEVATION: 135.0 m

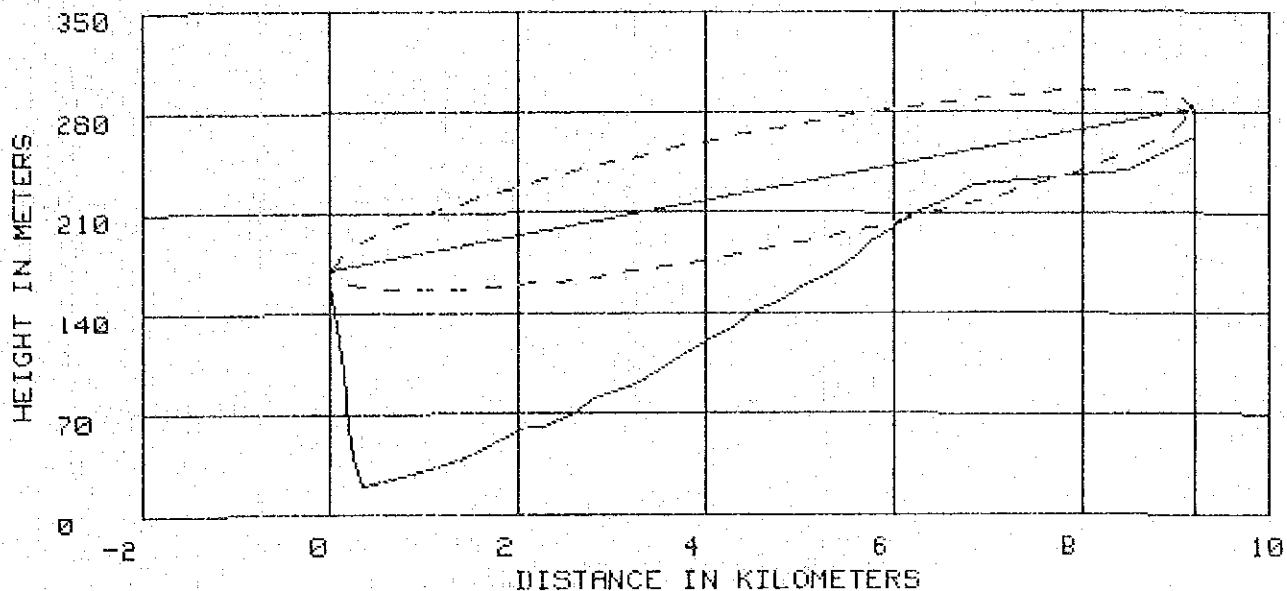
ANTENNA HEIGHT: 10.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K       =   1.33
#
#   F       =   400 MHz : (λ = 750 mm)
#
#   Hg1     =   160.0 m       Hg2     =   135.0 m
#   Ha1     =   10.0 m       Ha2     =   20.0 m
#
#   D1      =   4.9 km       D2      =   0.2 km   Hm = 145.0 m
#   U       =   1.00        Ld      =   0.0 dB
#
#
#   Lfs     =   98.5 dB      Lfs + Ld = 98.5 dB
#
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



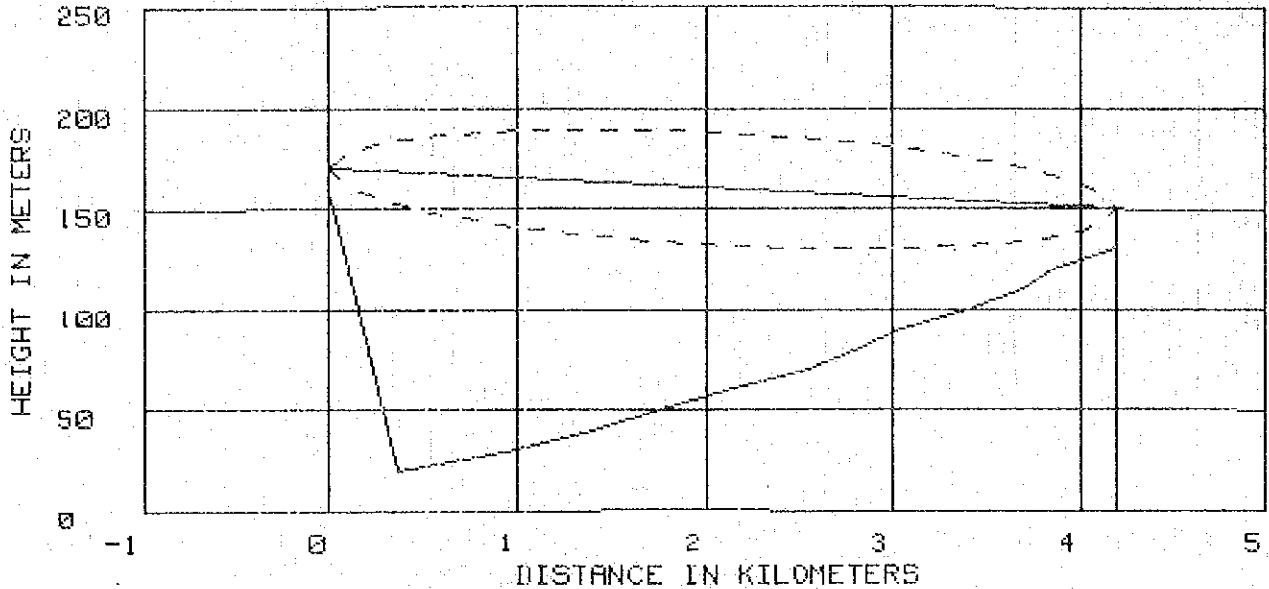
DISTANCE : 9.2 km

SITE 1 : LEGASPI (160)	SITE 2 : QUIRANGAY
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 263.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K   =   1.33                                     #
#
#   F   =   400 MHz : (λ = 750 mm)                 #
#
#   Hg1 = 160.0 m   Hg2 = 263.0 m                 #
#   Ha1 = 10.0 m   Ha2 = 20.0 m                   #
#
#   D1  = 6.9 km   D2  = 2.4 km   Hm = 245.0 m    #
#   U   = 0.23    Ld  = 3.3 dB                    #
#
#   Lfs = 103.8 dB   Lfs + Ld = 107.1 dB          #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



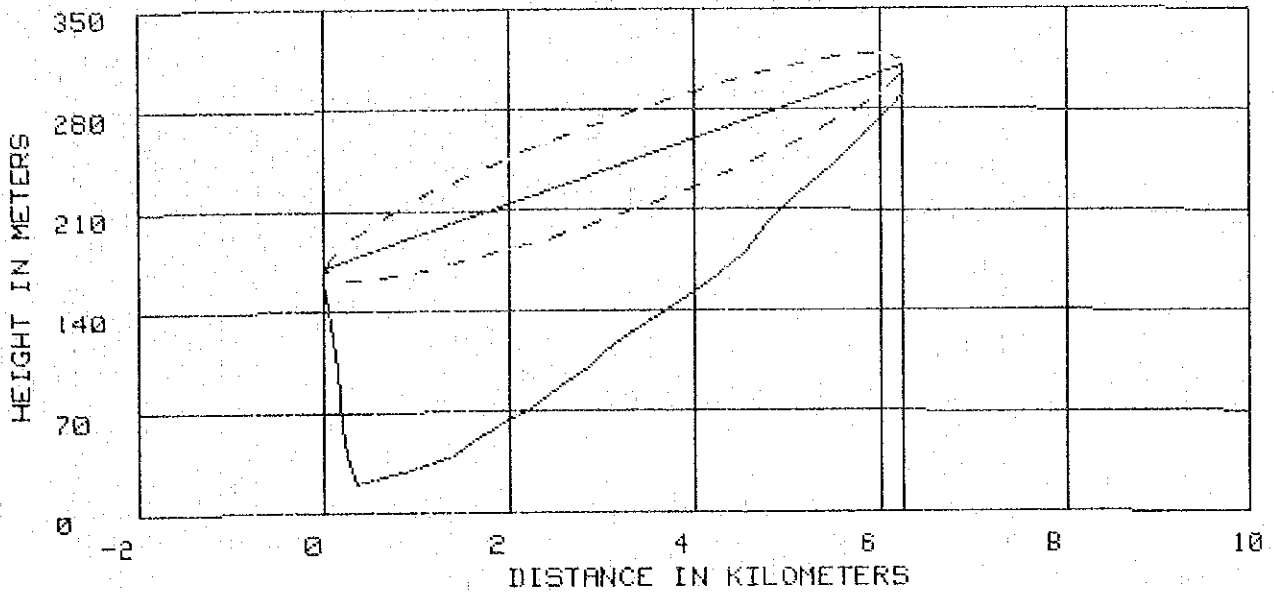
DISTANCE : 4.2 km

SITE 1 : LEGASPI (160)	SITE 2 : BUDIARO
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 130.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS           #
#                                     #
#   K   =   1.33                                     #
#                                     #
#   F   =   400 MHz : (λ = 750 mm)                 #
#                                     #
#   Hg1 = 160.0 m   Hg2 = 130.0 m                 #
#   Ha1 = 10.0 m   Ha2 = 20.0 m                   #
#                                     #
#   D1  = 3.9 km   D2  = 0.4 km   Hm = 135.0 m    #
#   U   = 1.07    Ld  = 0.0 dB                    #
#                                     #
#   Lfs = 97.0 dB   Lfs + Ld = 97.0 dB            #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



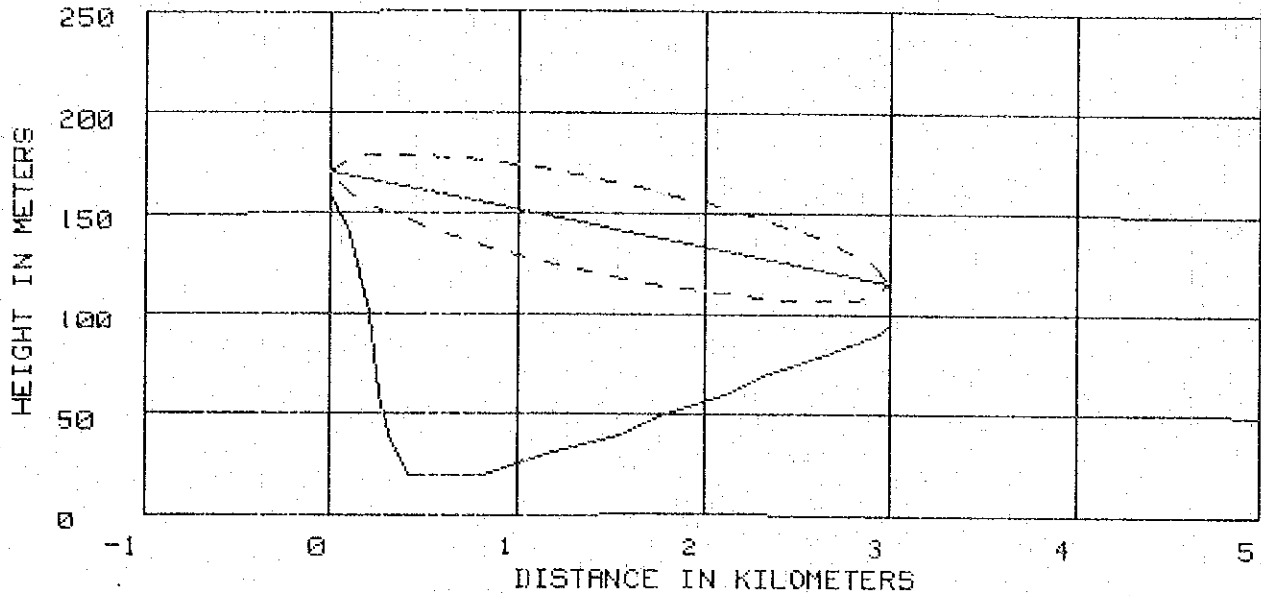
DISTANCE : 6.3 km

SITE 1 : LEGASPI (160)	SITE 2 : MI-ISI
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 290.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K       =   1.33
#
#   F       =   400 MHz : (λ = 750 mm)
#
#   Hg1    =   160.0 m      Hg2    =   290.0 m
#   Ha1    =   10.0 m      Ha2    =   20.0 m
#
#   D1     =   6.1 km      D2     =   0.2 km      Hm = 295.0 m
#   U      =   1.11       Ld     =   0.0 dB
#
#   Lfs    = 100.4 dB      Lfs + Ld = 100.4 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



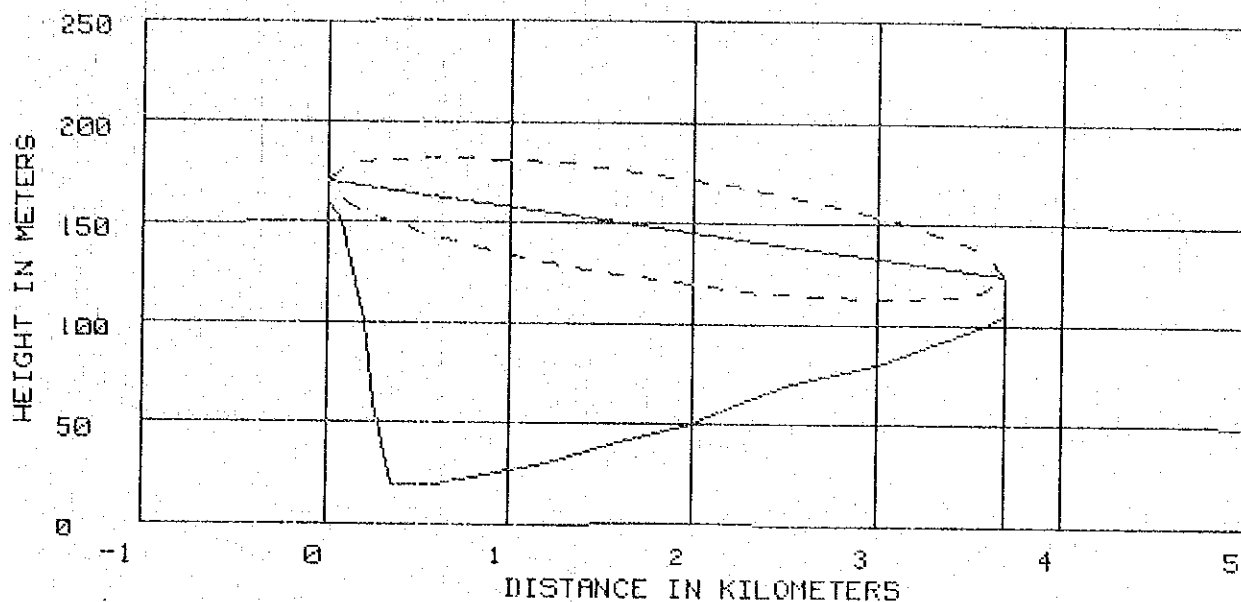
DISTANCE : 3.0 km

SITE 1 : LEGASPI (160)	SITE 2 : BONGA
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 95.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =      1.33                               #
#
#   F       =      400 MHz : (λ = 750 mm)           #
#
#   Hg1     =      160.0 m       Hg2     =      95.0 m   #
#   Ha1     =      10.0 m       Ha2     =      20.0 m   #
#
#   D1      =      3.0 km       D2      =      0.1 km   Hm = 105.0 m #
#   U       =      1.80        Ld       =      0.0 dB   #
#
#   Lfs     =      94.0 dB       Lfs + Ld = 94.0 dB   #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 3.7 km

SITE 1 : LEGASPI (160)

SITE 2 : MATANAG

GROUND ELEVATION: 160.0 m

GROUND ELEVATION: 105.0 m

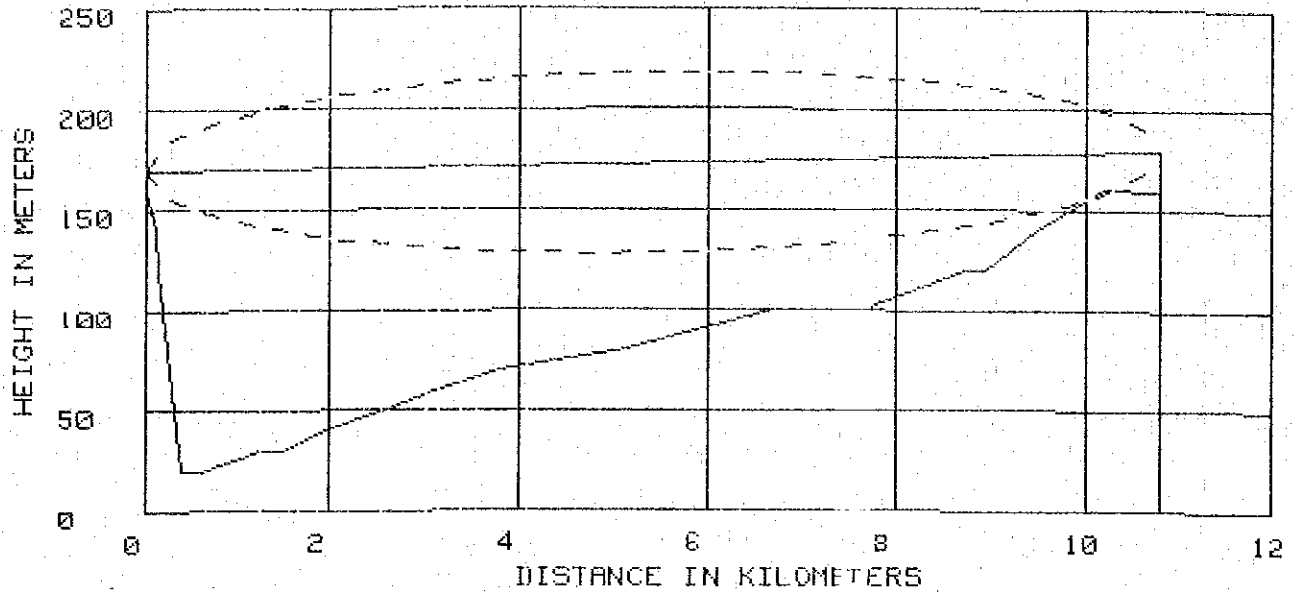
ANTENNA HEIGHT: 10.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K       =    1.33
#
#   F       =    400 MHz : (λ = 750 mm)
#
#   Hg1    =    160.0 m      Hg2    =    105.0 m
#   Ha1    =    10.0 m      Ha2    =    20.0 m
#
#   D1     =    0.1 km      D2     =    3.6 km      Hm = 165.0 m
#   U      =    0.58       Ld     =    0.0 dB
#
#   Lfs    =    95.9 dB      Lfs + Ld = 95.9 dB
#
#####
    
```


PATH PROFILE (4/3 RADIUS)



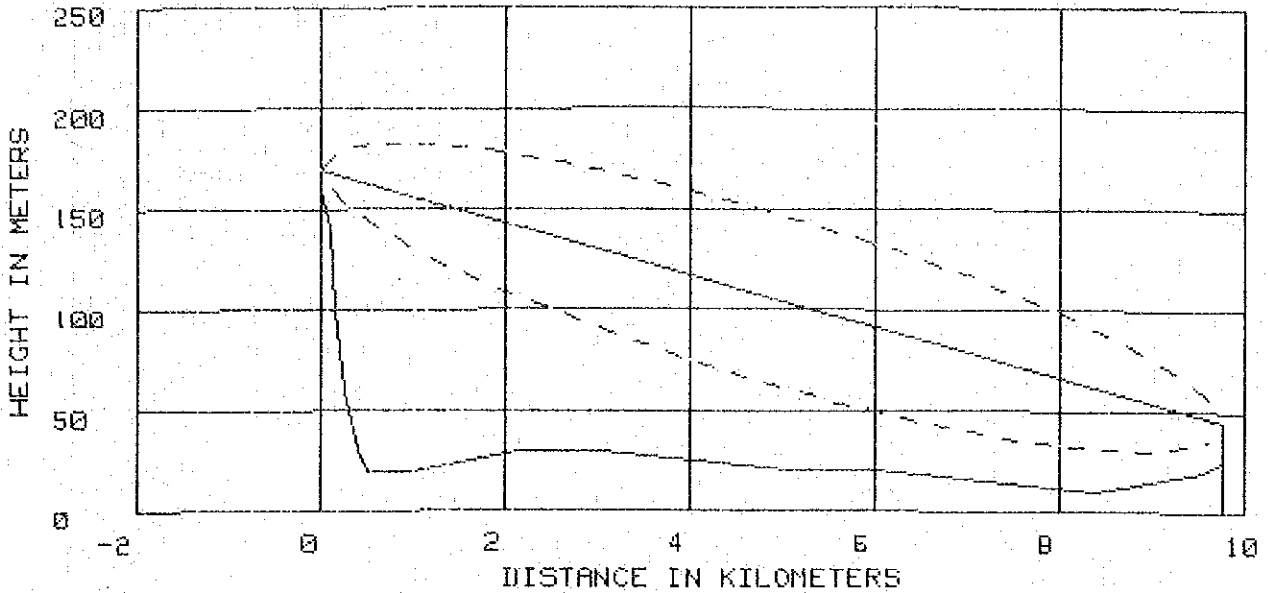
DISTANCE : 10.8 km

SITE 1 : LEGASPI (160)	SITE 2 : MISERICORDIA
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 160.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =       1.33                               #
#
#   F       =       400 MHz : (λ = 750 mm)           #
#
#   Hg1     =       160.0 m       Hg2     =       160.0 m   #
#   Ha1     =       10.0 m       Ha2     =       20.0 m   #
#
#   D1      =       10.2 km       D2      =       0.6 km   Hm = 175.0 m #
#   U       =       0.20         Ld      =       3.6 dB   #
#
#   Lfs     =       105.2 dB       Lfs + Ld = 108.8 dB   #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



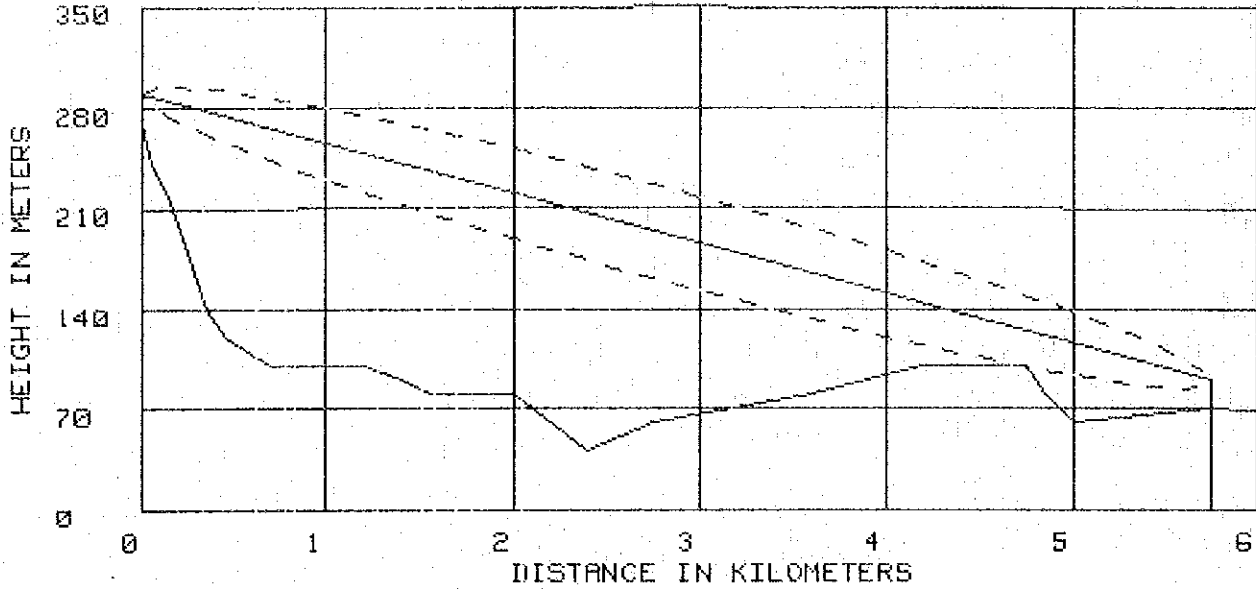
DISTANCE : 9.8 km

SITE 1 : LEGASPI (180)	SITE 2 : STO. DOMINGO
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 24.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =      1.33                               #
#
#   F       =      400 MHz : (λ = 750 mm)           #
#
#   Hg1     =      160.0 m      Hg2 = 24.0 m        #
#   Ha1     =      10.0 m      Ha2 = 20.0 m        #
#
#   D1      =      0.1 km      D2  = 9.7 km      Hm = 165.0 m #
#   U       =      0.71       Ld  = 0.0 dB         #
#
#   Lfs     =      104.3 dB      Lfs + Ld = 104.3 dB #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



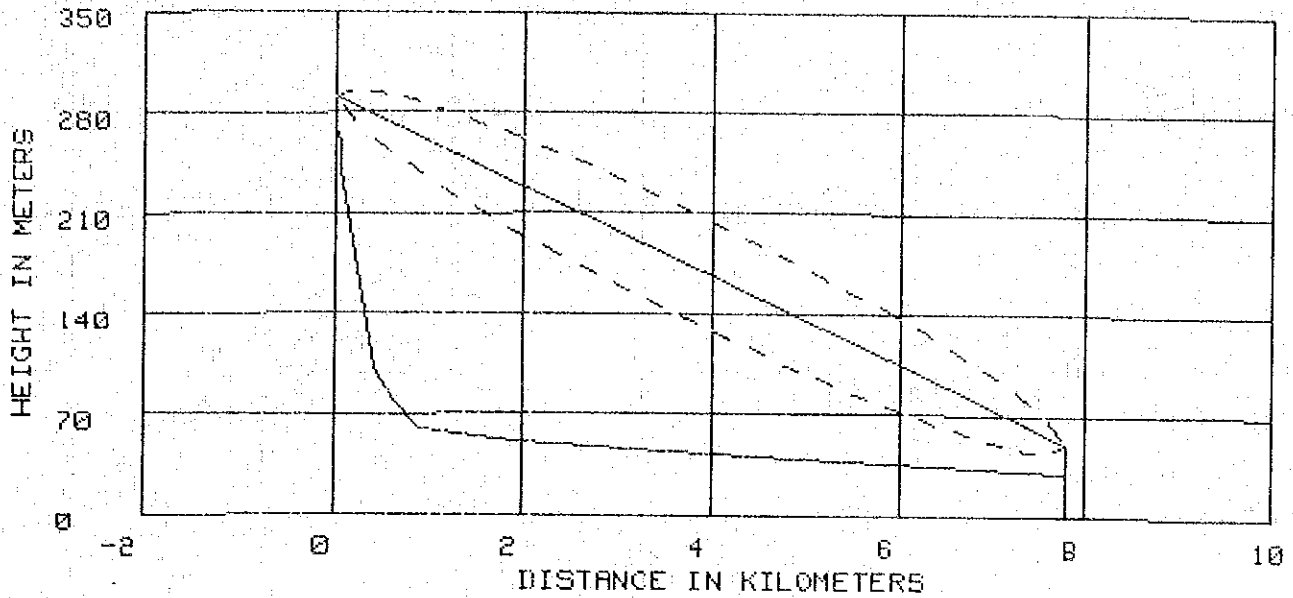
DISTANCE : 5.8 km

SITE 1 : LIGAO (270)	SITE 2 : GUINOBATAN (AL)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 70.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =       1.33                           #
#
#   F       =       400 MHz : (λ = 750 mm)         #
#
#   Hg1    =       270.0 m       Hg2    =       70.0 m   #
#   Ha1    =       20.0 m       Ha2    =       20.0 m   #
#
#   D1     =       4.8 km       D2     =       1.0 km   Hm = 115.0 m #
#   U      =       0.38        Ld      =       1.6 dB   #
#
#   Lfs    =       99.7 dB       Lfs + Ld = 101.2 dB   #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



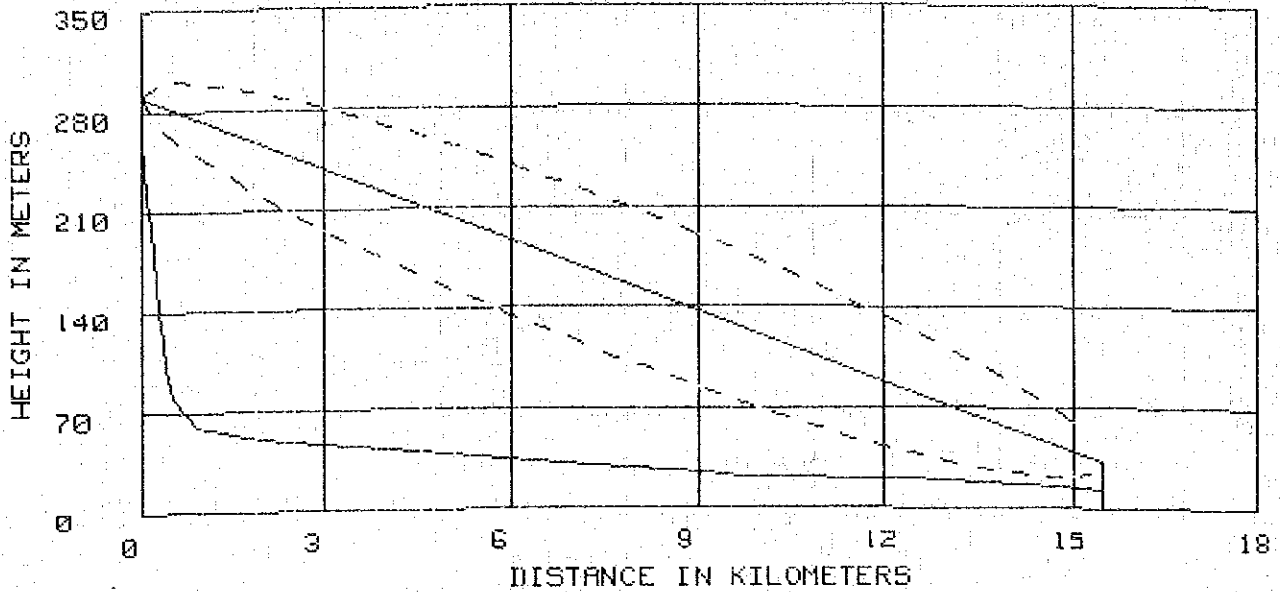
DISTANCE : 7.8 km

SITE 1 : LIGAO (270)	SITE 2 : OAS (ALARM)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 30.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =      1.33                               #
#
#   F       =      400 MHz : (λ = 750 mm)           #
#
#   Hg1     =      270.0 m      Hg2     =      30.0 m   #
#   Ha1     =      20.0 m      Ha2     =      20.0 m   #
#
#   D1      =      4.5 km      D2      =      3.4 km   Hm =      55.0 m #
#   U       =      2.57      Ld      =      0.0 dB     #
#
#   Lfs     =      102.3 dB      Lfs + Ld = 102.3 dB  #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



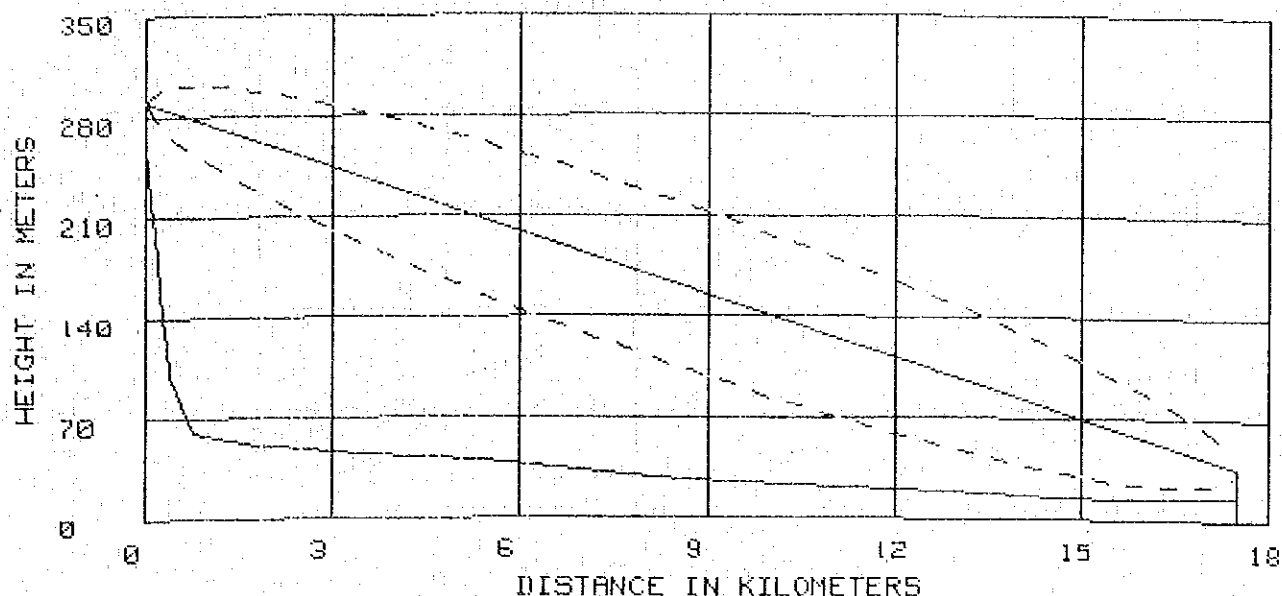
DISTANCE : 15.5 km

SITE 1 : LIGAO (270)	SITE 2 : LIBON (ALARM)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 13.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS           #
#                                     #
#   K   =   1.33                                     #
#                                     #
#   F   =   400 MHz : (λ = 750 mm)                 #
#                                     #
#   Hg1 = 270.0 m   Hg2 = 13.0 m                   #
#   Ha1 = 20.0 m   Ha2 = 20.0 m                   #
#                                     #
#   D1  = 14.8 km   D2  = 0.7 km   Hm = 29.6 m     #
#   U   = 0.64     Ld  = 0.0 dB                    #
#                                     #
#   Lfs = 108.3 dB   Lfs + Ld = 108.3 dB          #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE IN KILOMETERS

DISTANCE : 17.5 km

SITE 1 : LIGAO (270)

SITE 2 : SAN AGUSTIN

GROUND ELEVATION: 270.0 m

GROUND ELEVATION: 16.0 m

ANTENNA HEIGHT: 20.0 m

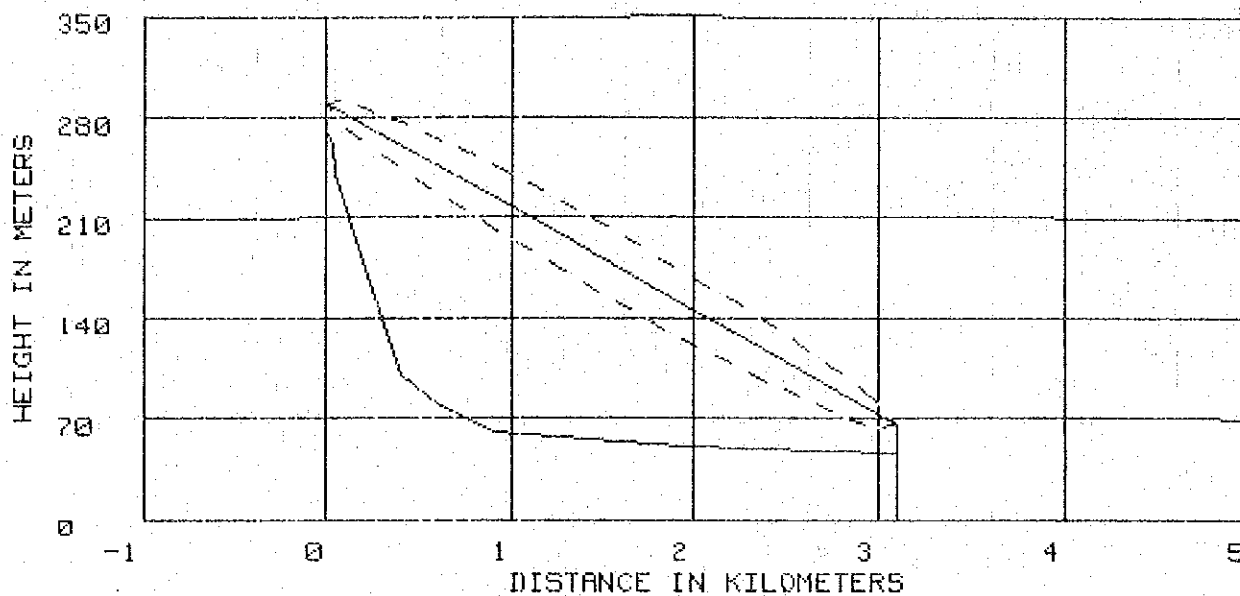
ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =      1.33                               #
#
#   F       =      400 MHz : (λ = 750 mm)           #
#
#   Hg1    =      270.0 m      Hg2    =      16.0 m   #
#   Ha1    =      20.0 m      Ha2    =      20.0 m   #
#
#   D1     =      17.0 km      D2     =      0.5 km   Hm =      30.4 m #
#   U      =      0.65        Ld      =      0.0 dB  #
#
#   Lfs    =      109.4 dB      Lfs + Ld = 109.4 dB #
#
#####

```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 3.1 km

SITE 1 : LIGAO (270)

SITE 2 : LIGAO (ALARM)

GROUND ELEVATION: 270.0 m

GROUND ELEVATION: 45.0 m

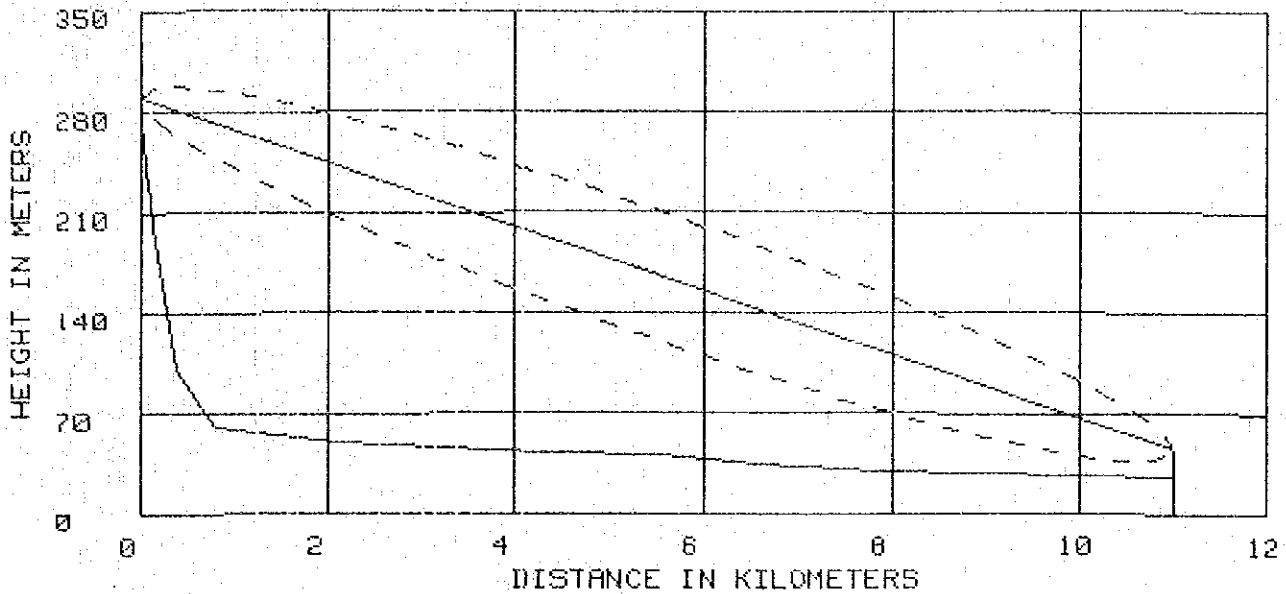
ANTENNA HEIGHT: 20.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K   =   1.33
#
#   F   =   400 MHz : (λ = 750 mm)
#
#   Hg1 = 270.0 m   Hg2 = 45.0 m
#   Ha1 = 20.0 m   Ha2 = 20.0 m
#
#   D1  = 2.0 km   D2  = 1.2 km   Hm = 65.0 m
#   U   = 3.58     Ld  = 0.0 dB
#
#
#   Lfs = 94.3 dB   Lfs + Ld = 94.3 dB
#
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 11.0 km

SITE 1 : LIGAO (270)

SITE 2 : POLANGUI(ALARM)

GROUND ELEVATION: 270.0 m

GROUND ELEVATION: 25.0 m

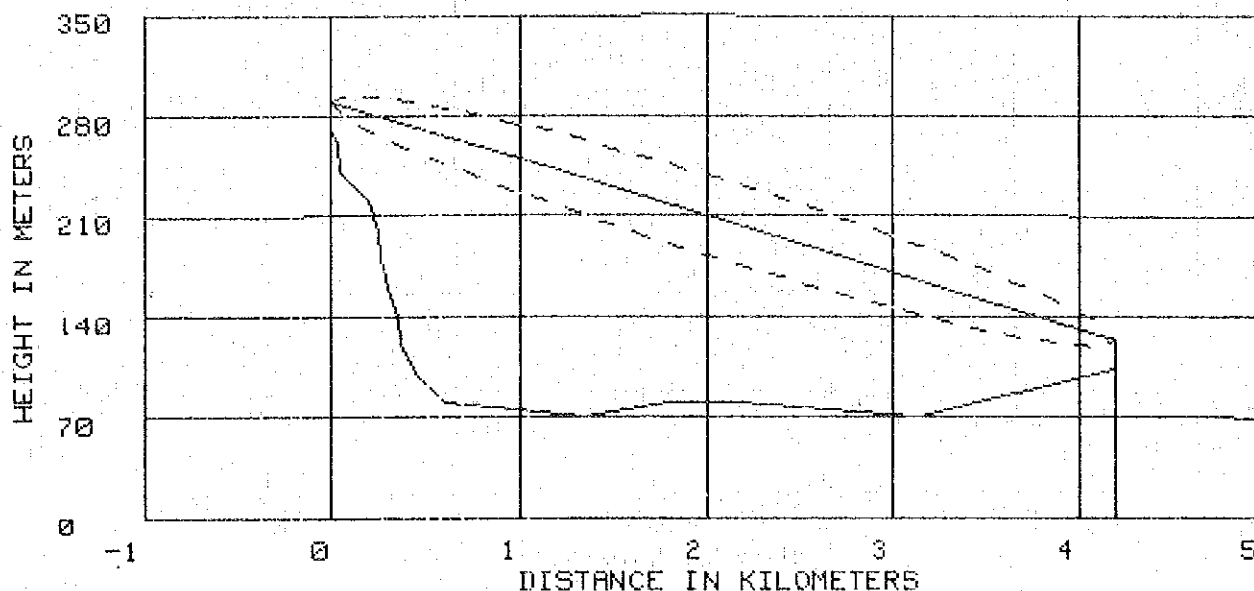
ANTENNA HEIGHT: 20.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS           #
#                                     #
#   K      =      1.33                                     #
#                                     #
#   F      =      400 MHz : (λ = 750 mm)               #
#                                     #
#   Hg1    =      270.0 m      Hg2    =      25.0 m      #
#   Ha1    =      20.0 m      Ha2    =      20.0 m      #
#                                     #
#   D1     =      10.0 km      D2     =      1.0 km      Hm =      41.1 m      #
#   U      =      0.98        Ld     =      0.0 dB      #
#                                     #
#   Lfs    =      105.3 dB      Lfs + Ld = 105.3 dB      #
#                                     #
#####
    
```


PATH PROFILE (4/3 RADIUS)



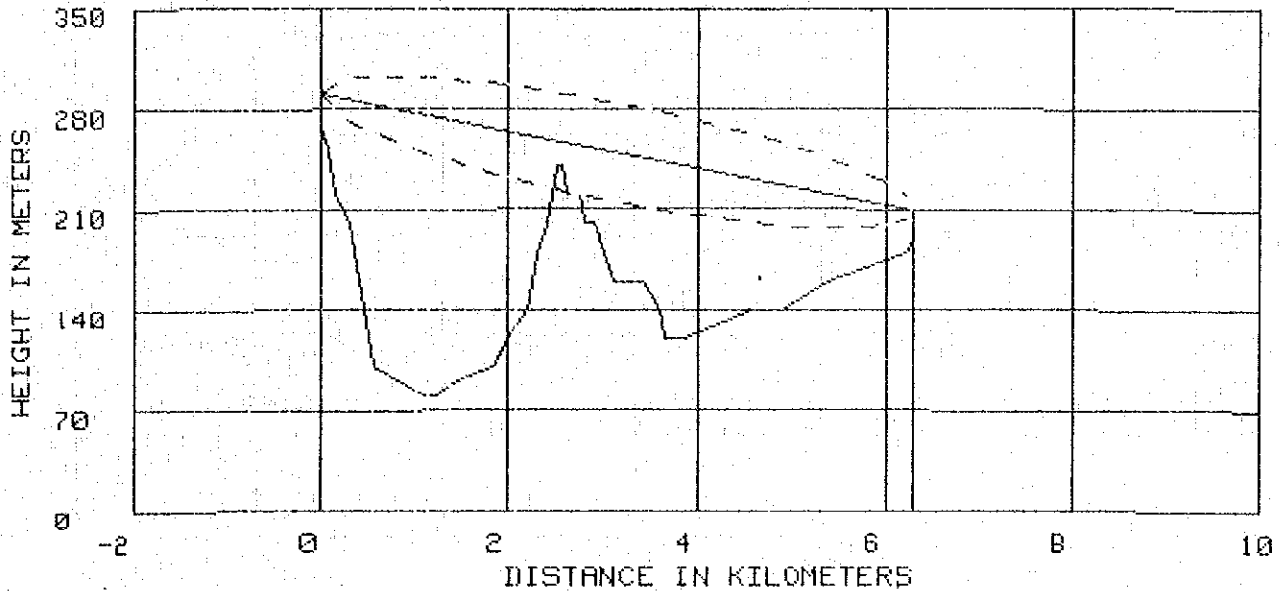
DISTANCE : 4.2 km

SITE 1 : LIGAO (270)	SITE 2 : NASISI (ALARM)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 103.6 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K   =   1.33                                     #
#
#   F   =   400 MHz : (λ = 750 mm)                  #
#
#   Hg1 = 270.0 m      Hg2 = 103.6 m                #
#   Ha1 = 20.0 m       Ha2 = 20.0 m                 #
#
#   D1  = 3.2 km      D2  = 1.1 km      Hm = 85.0 m  #
#   U   = 3.29        Ld  = 0.0 dB                  #
#
#   Lfs = 97.0 dB     Lfs + Ld = 97.0 dB            #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 6.3 km

SITE 1 : LIGAO (270)

SITE 2 : MASARAWAG

GROUND ELEVATION: 270.0 m

GROUND ELEVATION: 190.0 m

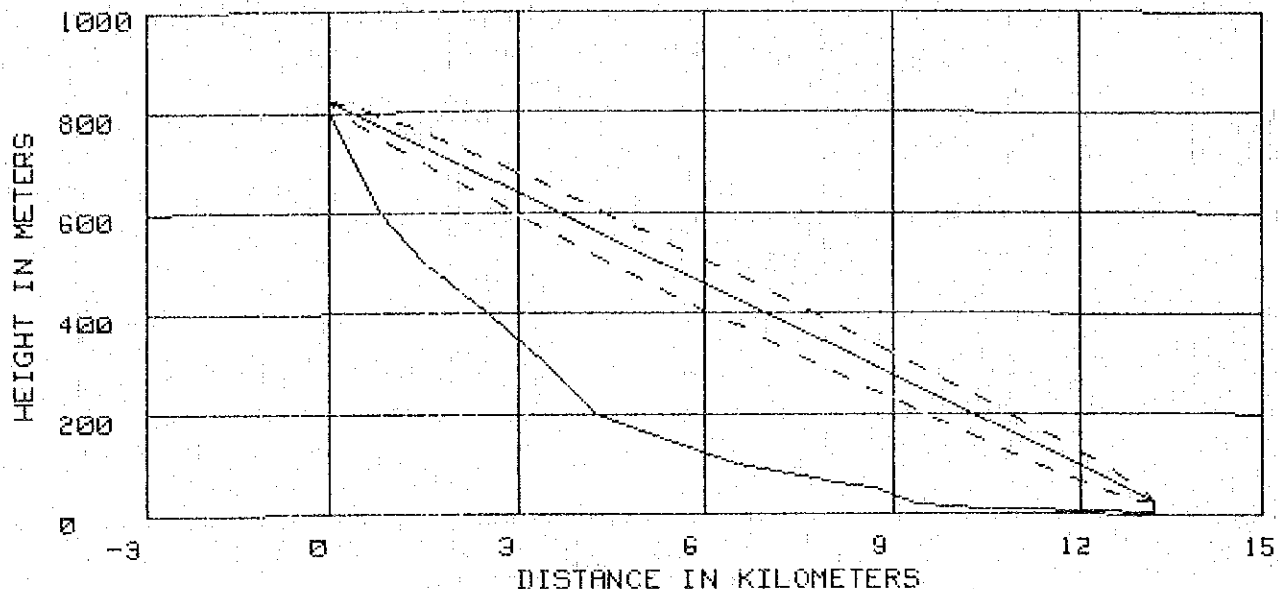
ANTENNA HEIGHT: 20.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K   =   1.33
#
#   F   =   400 MHz : (λ = 750 mm)
#
#   Hg1 = 270.0 m   Hg2 = 190.0 m
#   Ha1 = 20.0 m   Ha2 = 20.0 m
#
#   D1  = 2.6 km   D2  = 3.8 km   Hm = 255.0 m
#   U   = 0.06    Ld  = 5.3 dB
#
#   Lfs = 100.5 dB   Lfs + Ld = 105.8 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



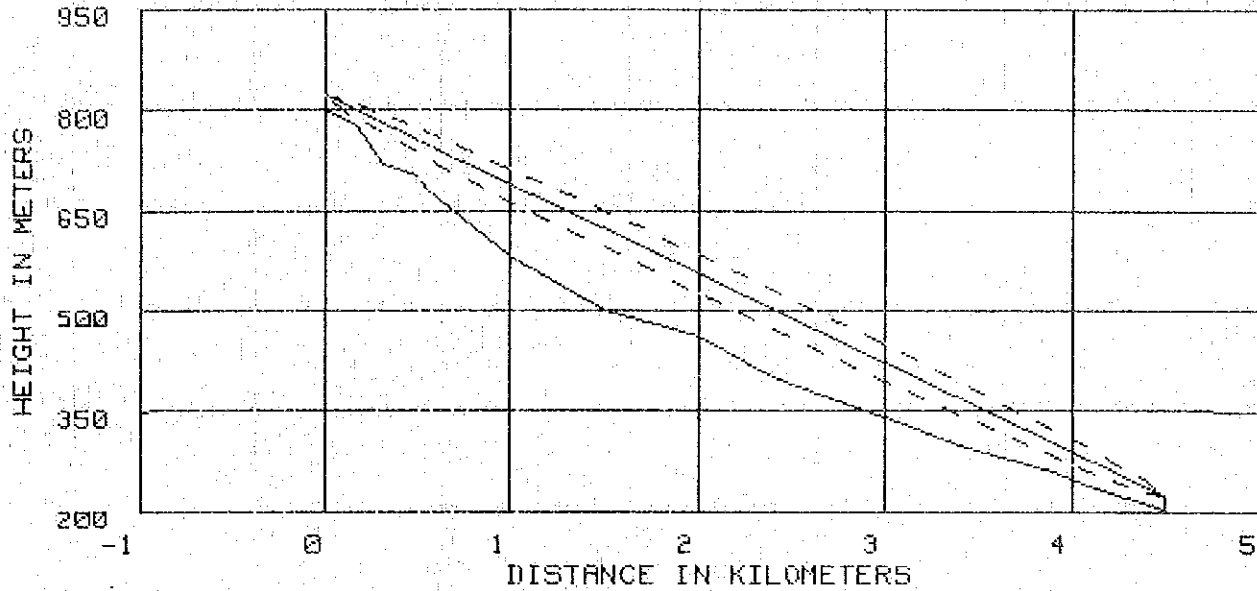
DISTANCE : 13.2 km

SITE 1 : M.REST HOUSE	SITE 2 : MALINAO
GROUND ELEVATION: 800.0 m	GROUND ELEVATION: 5.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#
#   K   =   1.33                                     #
#
#   F   =   400 MHz : (λ = 750 mm)                 #
#
#   Hg1 = 800.0 m      Hg2 = 5.0 m                 #
#   Ha1 = 20.0 m      Ha2 = 20.0 m                 #
#
#   D1  = 12.2 km     D2  = 1.0 km     Hm = 21.8 m  #
#   U   = 2.38        Ld  = 0.0 dB
#
#
#   Lfs = 106.9 dB     Lfs + Ld = 106.9 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 4.5 km

SITE 1 : M.REST HOUSE

SITE 2 : 050N

GROUND ELEVATION: 800.0 m

GROUND ELEVATION: 204.0 m

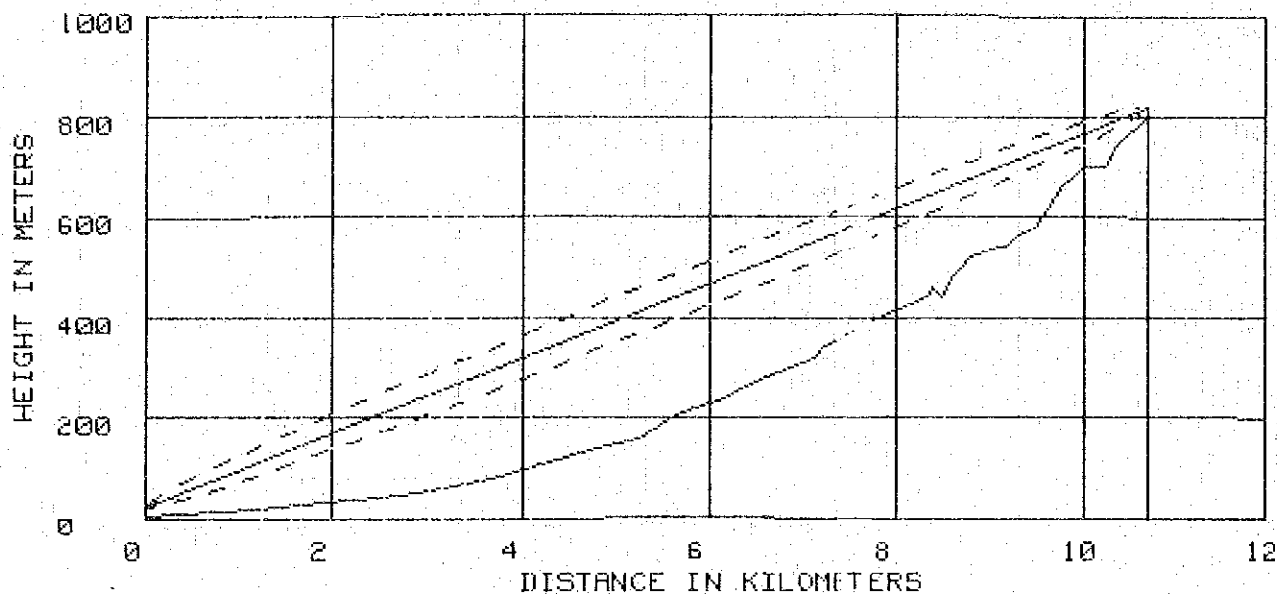
ANTENNA HEIGHT: 20.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#   K       =   1.33
#
#   F       =   400 MHz : (λ = 750 mm)
#
#   Hg1    =   800.0 m      Hg2    =   204.0 m
#   Ha1    =   20.0 m      Ha2    =   20.0 m
#
#   D1     =   0.2 km      D2     =   4.4 km      Hm = 795.0 m
#   U      =   0.49       Ld     =   0.0 dB
#
#   Lfs    =   97.6 dB     Lfs + Ld = 97.6 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 10.7 km

SITE 1 : TABACO

SITE 2 : M.REST HOUSE

GROUND ELEVATION: 5.0 m

GROUND ELEVATION: 800.0 m

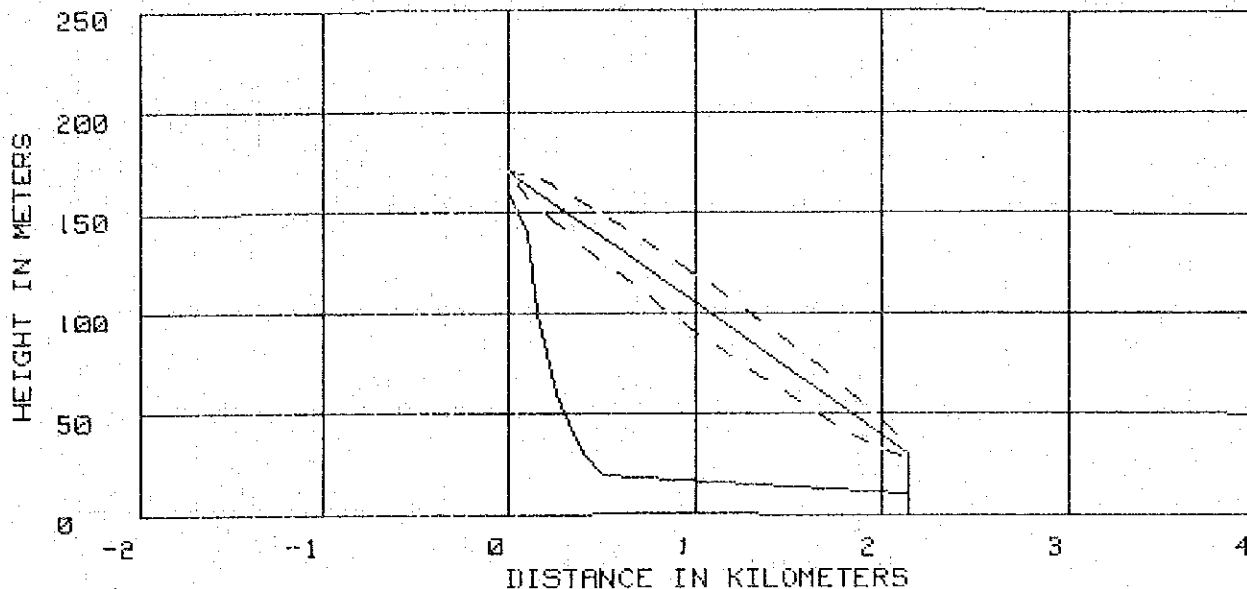
ANTENNA HEIGHT: 20.0 m

ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS.           #
#                                     #
#   K   =   1.33                                     #
#                                     #
#   F   =   400 MHz : (λ = 750 mm)                 #
#                                     #
#   Hg1 =   5.0 m           Hg2 = 800.0 m           #
#   Ha1 =  20.0 m           Ha2 =  20.0 m           #
#                                     #
#   D1  =  10.6 km         D2  =   0.1 m           Hm = 795.0 m #
#   U   =   2.03          Ld  =   0.0 dB           #
#                                     #
#   Lfs = 105.1 dB         Lfs + Ld = 105.1 dB       #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



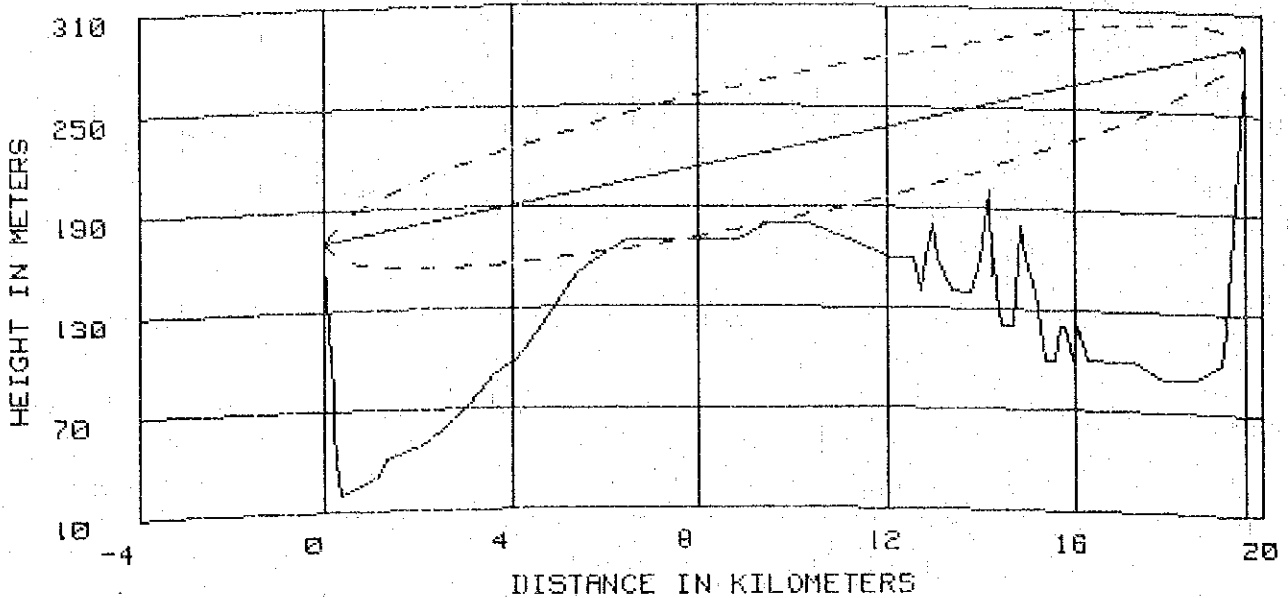
DISTANCE : 2.2 km

SITE 1 : LEGASPI (160)	SITE 2 : OCD OFFICE
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 10.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#
#   K   =   1.33
#
#   F   =   800 MHz : (λ = 375 mm)
#
#   Hg1 = 160.0 m   Hg2 = 10.0 m
#   Ha1 = 10.0 m   Ha2 = 20.0 m
#
#   D1  = 0.1 km   D2  = 2.1 km   Hm = 165.0 m
#   U   = 0.41     Ld  = 1.3 dB
#
#
#   Lfs = 97.2 dB   Lfs + Ld = 98.5 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



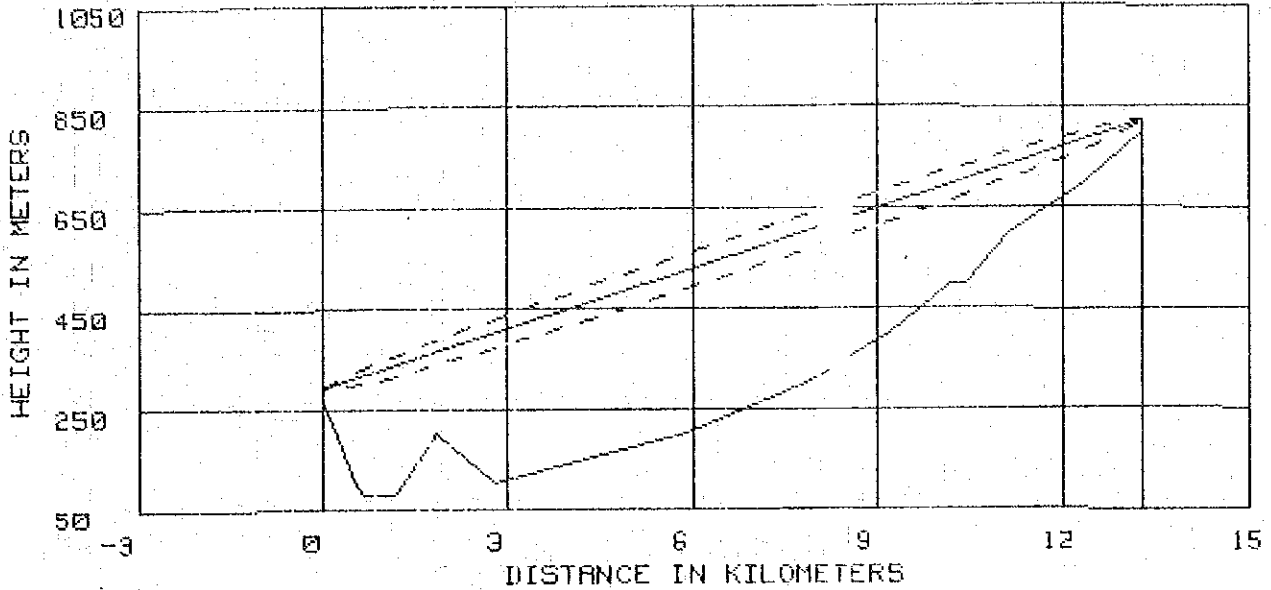
DISTANCE : 19.6 km

SITE 1 : LEGASPI (160)	SITE 2 : LIGAO (270)
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 270.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS           #
#                                     #
#   K       =       1.33                                     #
#                                     #
#   F       =       800 MHz : (λ = 375 mm)               #
#                                     #
#   Hg1     =       160.0 m       Hg2     =       270.0 m   #
#   Ha1     =       10.0 m        Ha2     =       20.0 m   #
#                                     #
#   D1      =       6.5 km        D2      =       13.2 km   #
#   U       =       0.48          Ld      =       0.0 dB    #
#                                     #
#   Lfs     =       116.4 dB       Lfs + Ld = 116.4 dB    #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 13.3 km

SITE 1 : LIGAO (270m)

SITE 2 : MAYON RESTHOUSE

GROUND ELEVATION: 270.0 m

GROUND ELEVATION: 800.0 m

ANTENNA HEIGHT: 20.0 m

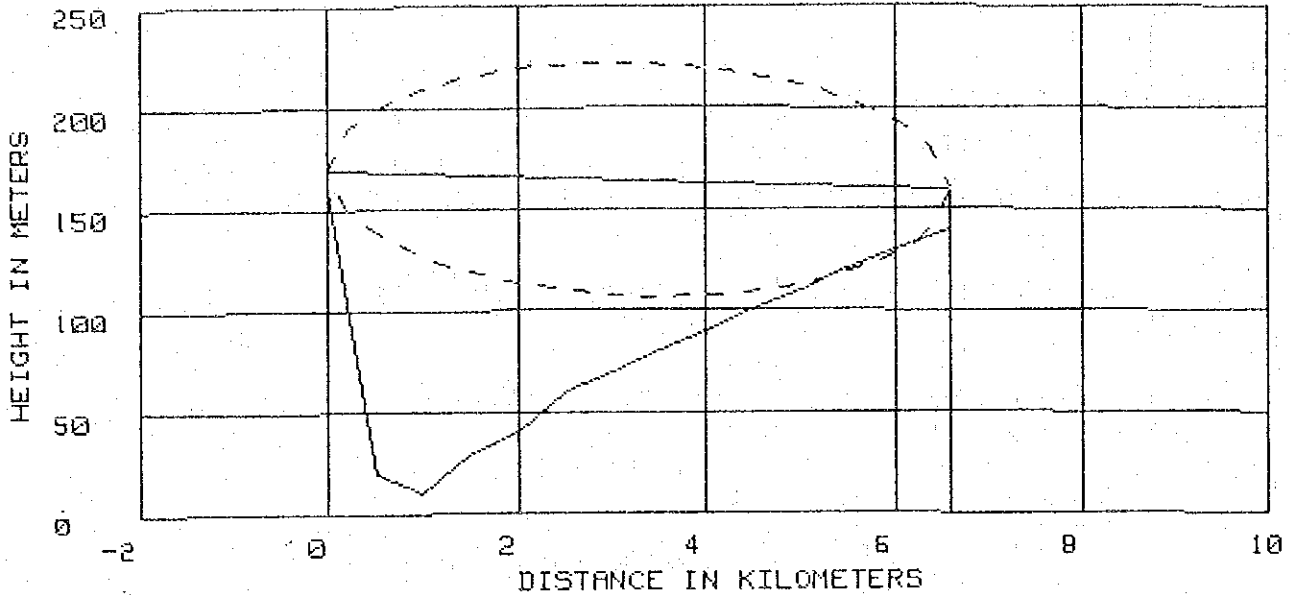
ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS
#
#   K       =   1.33
#
#   F       =   800 MHz : (λ = 375 mm)
#
#   Hg1    =   270.0 m       Hg2    =   800.0 m
#   Ha1    =   20.0 m       Ha2    =   20.0 m
#
#   D1     =   12.4 km      D2     =   1.0 km      Hm = 715.0 m
#   U      =   3.65        Ld     =   0.0 dB
#
#   Lfs    = 113.0 dB      Lfs + Ld = 113.0 dB
#
#####

```


PATH PROFILE (4/3 RADIUS)



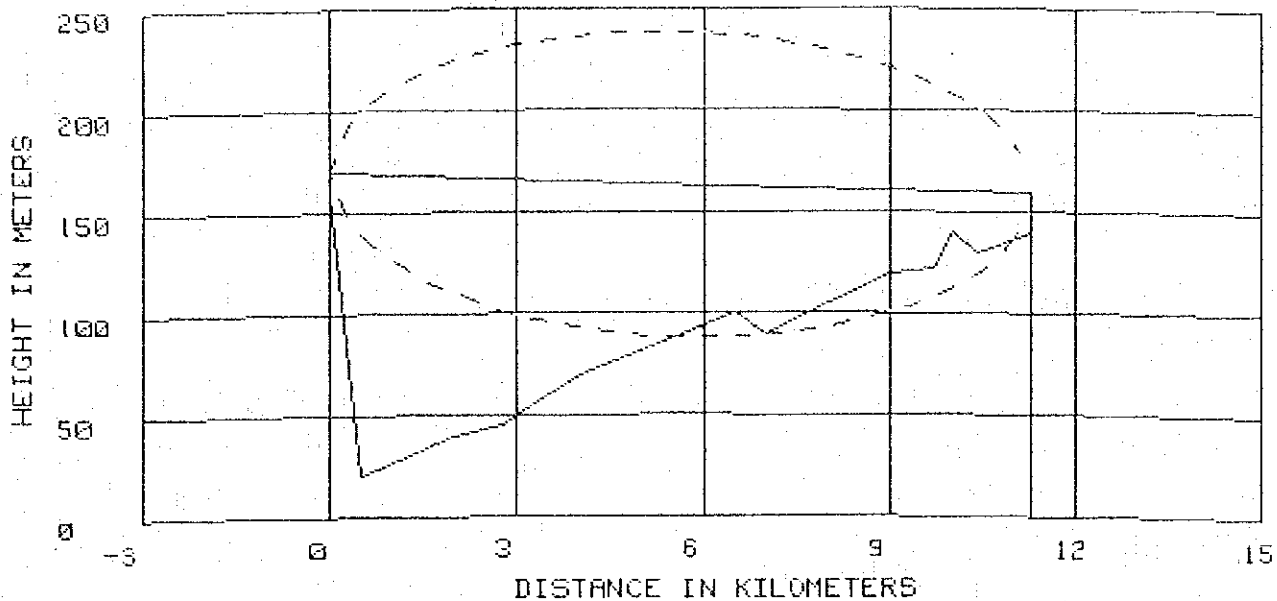
DISTANCE : 6.6 km

SITE 1 : LEGASPI(R/S)	SITE 2 : LEGASPI GALF(R)
GROUND ELEVATION: 160.0 m	GROUND ELEVATION: 140.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =   1.33                               #
#
#   F       =   150 MHz : (λ = 2000 mm)           #
#
#   Hg1     =   160.0 m       Hg2 = 140.0 m       #
#   Ha1     =   10.0 m       Ha2 = 20.0 m       #
#
#   D1      =   6.0 km       D2 = 0.6 km       Hm = 130.0 m #
#   U       =   0.93        Ld = 0.0 dB           #
#
#   Lfs     =   92.4 dB       Lfs + Ld = 92.4 dB   #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



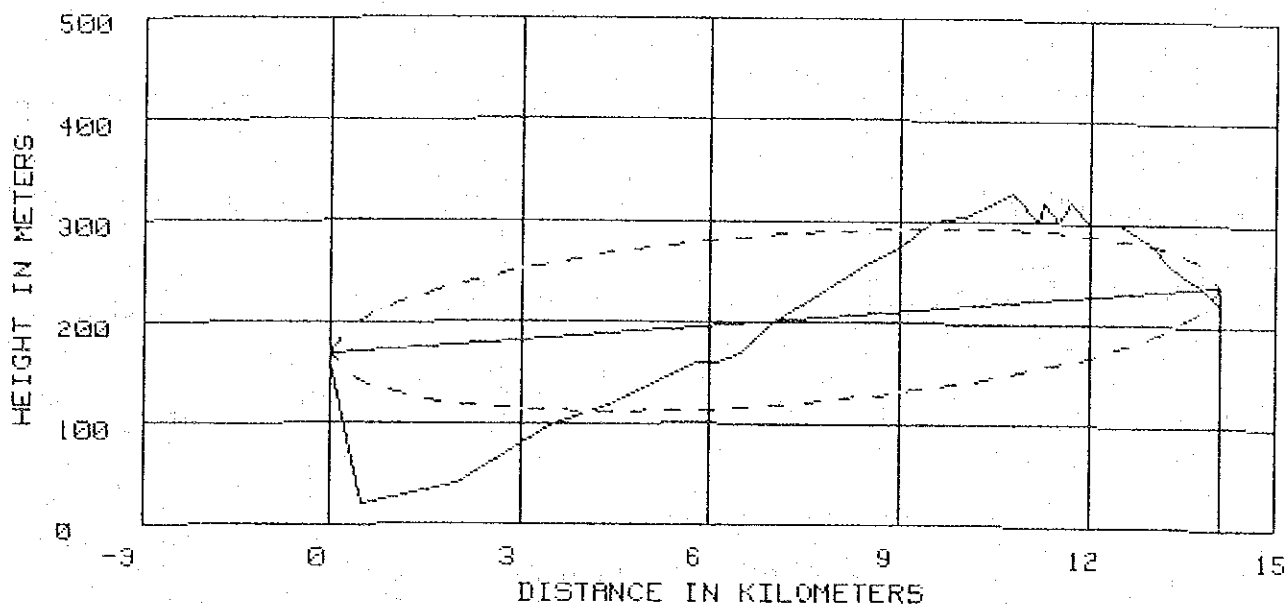
DISTANCE : 11.3 km

SITE 1 : LEGASPI(R/S)	SITE 2 : MICERCORDIA(R)
GROUND ELEVATION: 150.0 m	GROUND ELEVATION: 140.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#
#   K       =      1.33                               #
#
#   F       =      150 MHz : (λ = 2000 mm)           #
#
#   Hg1    =      150.0 m      Hg2 = 140.0 m         #
#   Ha1    =      10.0 m      Ha2 = 20.0 m         #
#
#   D1     =      10.0 km      D2  = 1.3 km   Hm = 140.0 m #
#   U      =      0.42        Ld   = 1.1 dB
#
#
#   Lfs    =      97.0 dB      Lfs + Ld = 98.2 dB
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



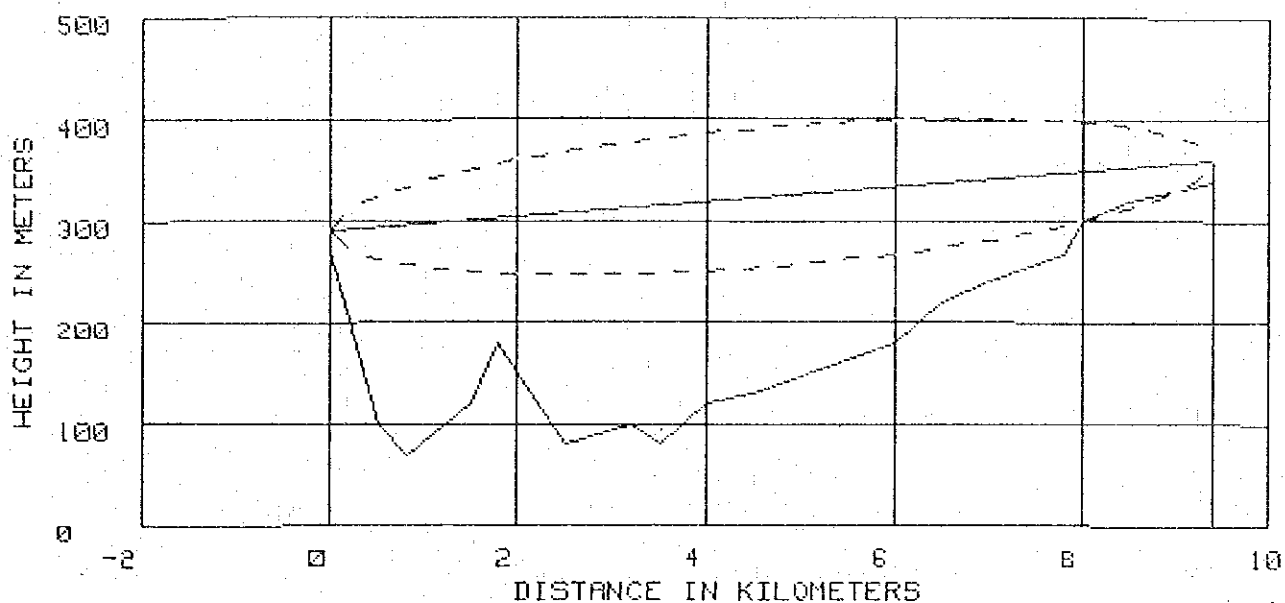
DISTANCE : 14.1 km

SITE 1 : LEGASPI(R/S)	SITE 2 : SAN ROQUE(R)
GROUND ELEVATION: 180.0 m	GROUND ELEVATION: 220.0 m
ANTENNA HEIGHT: 10.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K   =   1.33                                     #
#
#   F   =   150 MHz : (λ = 2000 mm)                 #
#
#   Hg1 = 180.0 m   Hg2 = 220.0 m                   #
#   Ha1 = 10.0 m   Ha2 = 20.0 m                     #
#
#   D1  = 10.8 km   D2  = 3.3 km   Hm = 330.0 m     #
#   U   = -1.53    Ld  = 19.7 dB                    #
#
#   Lfs = 99.0 dB   Lfs + Ld = 118.7 dB             #
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



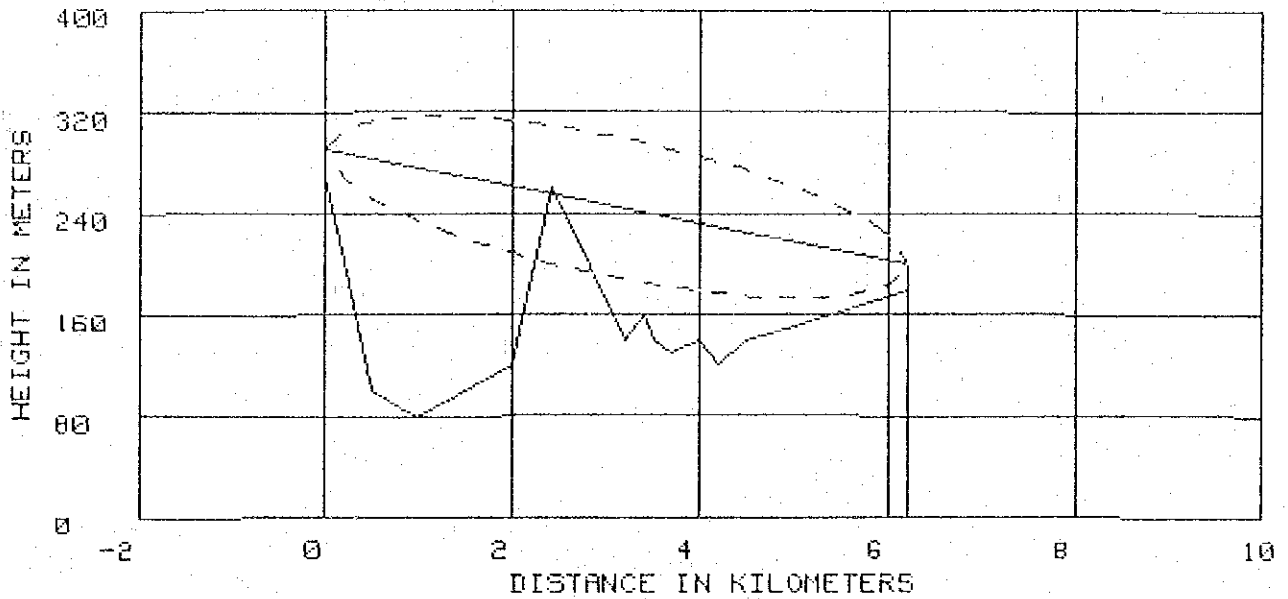
DISTANCE : 9.4 km

SITE 1 : LIGAO(R/S)	SITE 2 : BALAIGARG(R)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 340.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#                                     #
#           PATH CLEARANCE AND RIDGE LOSS           #
#                                     #
#   K       =       1.33                                     #
#                                     #
#   F       =       150 MHz : (λ = 2000 mm)               #
#                                     #
#   Hg1    = 270.0 m      Hg2    = 340.0 m               #
#   Ha1    = 20.0 m      Ha2    = 20.0 m               #
#                                     #
#   D1     = 8.5 km      D2     = 0.9 km      Hm = 320.0 m #
#   U      = 0.81       Ld     = 0.0 dB                #
#                                     #
#   Lfs    = 95.4 dB      Lfs + Ld = 95.4 dB           #
#                                     #
#####
    
```

PATH PROFILE (4/3 RADIUS)



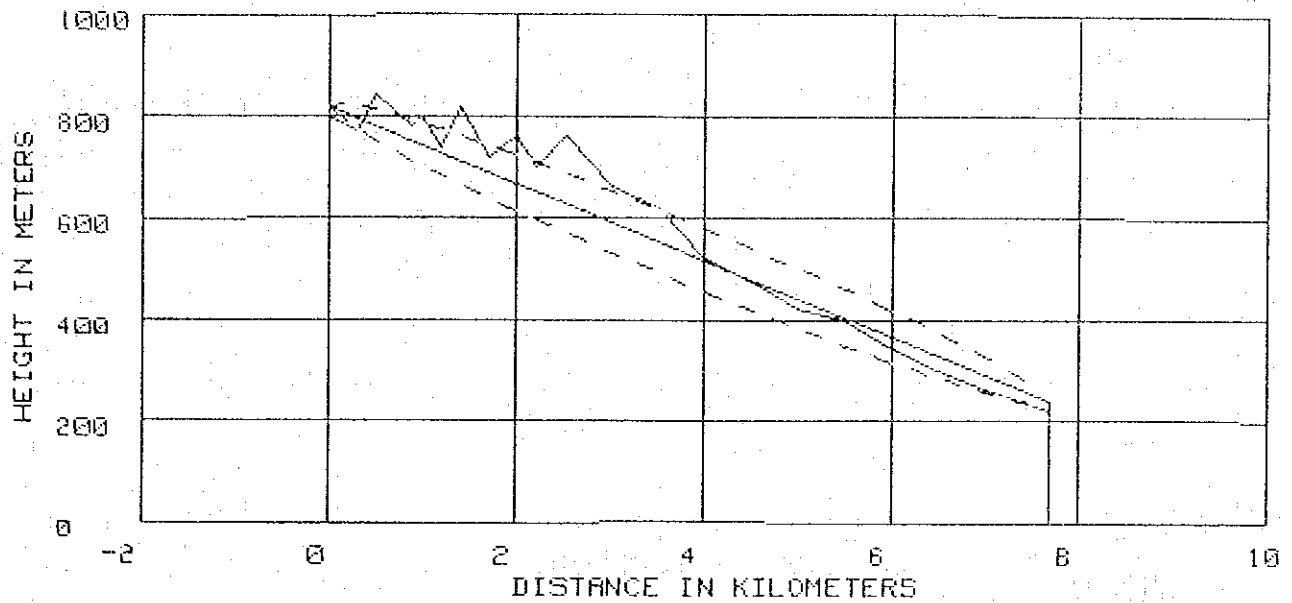
DISTANCE : 6.2 km

SITE 1 : LIGAO(R/S)	SITE 2 : MASURANAG(R)
GROUND ELEVATION: 270.0 m	GROUND ELEVATION: 180.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =      1.33                             #
#
#   F       =      150 MHz : (λ = 2000 mm)          #
#
#   Hg1     =      270.0 m      Hg2 = 180.0 m      #
#   Ha1     =      20.0 m      Ha2 = 20.0 m      #
#
#   D1      =      2.4 km      D2 = 3.8 km      Hm = 260.0 m #
#   U       =      -1.0       Ld = 7.2 dB        #
#
#
#   Lfs     =      91.8 dB      Lfs + Ld = 99.1 dB #
#
#
#####
    
```

PATH PROFILE (4/3 RADIUS)



DISTANCE : 7.7 km

SITE 1 : MAYON R. HOUSE	SITE 2 : SAN ROQUE(R)
GROUND ELEVATION: 800.0 m	GROUND ELEVATION: 220.0 m
ANTENNA HEIGHT: 20.0 m	ANTENNA HEIGHT: 20.0 m

```

#####
#
#           PATH CLEARANCE AND RIDGE LOSS           #
#
#   K       =    1.33                               #
#
#   F       =    150 MHz : (λ = 2000 mm)           #
#
#   Hg1     =    800.0 m      Hg2 = 220.0 m        #
#   Ha1     =    20.0 m      Ha2 = 20.0 m        #
#
#   D1      =    2.5 km      D2  = 5.2 km      Hm = 760.0 m #
#   U       =    -2.22      Ld  = 22.9 dB
#
#   Lfs     =    93.7 dB      Lfs + Ld = 116.6 dB
#
#####
    
```

TABLES

TABLE-I.1 EMPLOYED PERSONS BY MAJOR
INDUSTRY GROUP (1976)

<u>Major Industry Group</u>	<u>Persons</u> <u>(In thousand)</u>	<u>Proportional</u> <u>Extent</u> <u>(%)</u>
Agricultural Sector ^{/1}	<u>8,126</u>	<u>52.7</u>
Industrial Sector	<u>2,317</u>	<u>15.0</u>
- Mining, and quarrying	56	0.4
- Construction	491	3.2
- Manufacturing	1,680	10.8
- Electricity, gas and water	46	0.3
- Industry not reported	44	0.3
Service Sector	<u>4,984</u>	<u>32.3</u>
- Commerce	1,864	12.1
- Transport, storage and communication	550	3.6
- Government, community, business and recreation services	1,501	9.7
- Domestic services	793	5.1
- Personal services other than domestic	276	1.8
Total	15,427	100.0

/1: Include forestry, hunting and fishing.

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-1.2 GROSS NATIONAL PRODUCT
(AT CURRENT PRICES)

Industry	GDP		Annual Growth Rate (%)
	1975 (P10 ⁹)	1980 (P10 ⁹)	
1. Agriculture, Fishery and Forestry	<u>33.0</u>	<u>62.5</u>	<u>13.6</u>
2. Industrial Sector	<u>38.7</u>	<u>100.8</u>	<u>21.1</u>
a. Mining and quarrying	2.0	7.5	30.3
b. Manufacturing	28.5	70.0	19.7
c. Construction	7.1	20.0	23.0
d. Electricity, gas and water	1.1	3.3	24.6
3. Service Sector	<u>42.9</u>	<u>104.9</u>	<u>19.6</u>
a. Transport, communication and storage	4.8	16.7	28.3
b. Commerce	25.3	61.9	19.6
c. Services	12.8	26.3	15.5
GROSS DOMESTIC PRODUCT (at market prices)	<u>114.6</u>	<u>268.2</u>	<u>18.5</u>
- Net factor income from the rest of the world	(0.3)	1.6	
GROSS NATIONAL PRODUCT (at market prices)	<u>114.3</u>	<u>269.8</u>	<u>18.7</u>

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-I.3 GROSS NATIONAL PRODUCT
(AT CONSTANT 1972 PRICES)

Industry	GDP		Annual Growth Rate (%)
	1975 (P10 ⁹)	1980 (P10 ⁹)	
1. Agriculture, Fishery and Forestry	<u>18.2</u>	<u>23.6</u>	<u>5.3</u>
2. Industrial Sector	<u>22.7</u>	<u>33.4</u>	<u>8.0</u>
a. Mining and quarrying	1.5	2.4	9.9
b. Manufacturing	16.5	23.3	7.1
c. Construction	4.1	6.7	10.3
d. Electricity, gas and water	0.6	1.0	10.7
3. Services Sector	<u>27.5</u>	<u>35.0</u>	<u>4.9</u>
a. Transport, communication and storage	3.3	4.9	8.2
b. Commerce	15.1	18.9	4.6
c. Services	9.1	11.2	4.2
GROSS DOMESTIC PRODUCT (at market price)	<u>68.4</u>	<u>91.9</u>	<u>6.1</u>
- Net factor income from the rest of the world	0.1	1.0	
GROSS NATIONAL PRODUCT (at market prices)	<u>68.5</u>	<u>92.9</u>	<u>6.3</u>

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-I.4 PHILIPPINE EXPORTS BY MAJOR COMMODITY GROUPS

(Unit: F.O.B. value in million U.S. dollars)

<u>Major Commodity Group</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Agricultural Products	1,530	1,826	1,749	2,124	2,255
- Coconut products	540	761	908	1,024	811
- Sugar and sugar products	456	535	216	240	515
- Fruits and vegetables ^{/1}	142	157	177	214	367
- Abaca and products	27	29	25	38	31
- Tabaco and products	29	29	30	33	30
- Textiles	28	21	31	39	33
- Forest products	308	294	362	536	468
Mineral Products	<u>371</u>	<u>501</u>	<u>554</u>	<u>831</u>	<u>1,031</u>
Mineral Fuel and Lubricants	<u>34</u>	<u>37</u>	<u>30</u>	<u>42</u>	<u>38</u>
Chemicals	<u>26</u>	<u>51</u>	<u>59</u>	<u>112</u>	<u>89</u>
Miscellaneous Manufactures and Others	<u>589</u>	<u>722</u>	<u>1,011</u>	<u>1,463</u>	<u>2,338</u>
Re-exports	<u>24</u>	<u>14</u>	<u>22</u>	<u>29</u>	<u>37</u>
Total	2,574	3,151	3,425	4,601	5,788

/1: Include pineapple products, bananas, others

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-I.5 PHILIPPINE IMPORTS BY MAJOR
COMMODITY GROUPS

(Unit: F.O.B. value in
million U.S. dollars)

<u>Item</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
<u>Consumer Goods</u>	<u>545</u>	<u>636</u>	<u>817</u>	<u>1,067</u>	<u>1,426</u>
- Meat and meat preparation	9	12	13	17	12
- Daily products	54	70	60	96	113
- Fish and fish preparation	30	22	24	20	27
- Cereal and cereal preparation	160	122	121	144	214
- Fruits and vegetables	5	7	8	10	11
- Others	287	403	591	780	1,049
<u>Capital Goods</u>	<u>1,126</u>	<u>1,077</u>	<u>1,401</u>	<u>1,785</u>	<u>1,986</u>
- Machinery and parts	626	589	738	935	1,015
- Electrical machinery apparatus & appliance	187	138	203	229	312
- Transport equipment	276	295	389	544	533
- Professional scientific and control instruments	37	55	71	77	126
<u>Raw Materials</u>	<u>1,863</u>	<u>2,202</u>	<u>2,514</u>	<u>3,290</u>	<u>4,315</u>
- Feeding stuff for animals	30	47	48	42	81
- Textile fiber not manufac- tured with thread yarn	80	87	101	113	107
- Mineral fuels, lubricants and related matters	891	993	1,030	1,385	2,248
- Chemical elements and compound	142	160	203	249	267
- Dyeing, tanning and coloring matter	26	29	38	42	39
- Fertilizers, manufactured	1	11	47	91	139
- Others	693	87	1,047	1,368	1,434
<u>Total</u>	<u>3,534</u>	<u>3,915</u>	<u>4,732</u>	<u>6,142</u>	<u>7,727</u>

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-I.6 AGRICULTURAL PRODUCTION
BY KIND OF CROP

(Unit: 10³ tons)

Food Crops					
Year	Palay ^{/1}	Corn ^{/2}	Banana	Rootcrops ^{/3}	Others ^{/4}
1970	5,233	2,008	896	1,316	1,217
1971	5,343	2,005	1,035	1,221	1,170
1972	5,100	2,013	980	1,218	1,318
1973	4,415	1,831	1,013	1,221	1,410
1974	5,594	2,289	1,236	1,411	1,543
1975	5,660	2,568	1,686	1,807	1,828
1976	6,160	2,767	3,068	2,144	2,143
1977	6,456	2,843	2,447	2,774	2,337
1978	6,895	2,855	3,156	3,004	2,461
1979	7,198	3,167	4,179	3,569	2,723
1980	7,504	3,176	3,977	3,470	3,458

Commercial Crops					
Year	Coconut ^{/5}	Sugarcane ^{/6}	Abaca	Tobacco ^{/7}	Others ^{/8}
1970	1,726	2,595	122	61	27
1971	1,679	2,980	105	56	28
1972	1,813	2,554	110	56	29
1973	1,797	3,191	119	65	30
1974	1,800	3,450	126	63	35
1975	2,723	3,288	134	57	56
1976	3,415	3,577	139	59	67
1977	3,845	3,541	151	50	63
1978	4,195	3,282	130	57	61
1979	4,296	3,199	160	51	67
1980	4,570	3,121	172	39	80

- ^{/1}: Rough rice ^{/2}: Shelled
^{/3}: Includes camote, cassava, gabi, etc.
^{/4}: Includes fruits, vegetables, citrus, beans, etc.
^{/5}: Includes copra, desiccated coconut, home-made oil, etc.
^{/6}: Includes muscovado, panocha, molasses, etc.
^{/7}: Includes native tobacco and virginia tobacco.
^{/8}: Includes kapok, castor beans, cotton, rubber, etc.

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-I.7 RETAIL PRICE INDEX OF SELECTED
COMMODITIES IN METRO MANILA
(1972 = 100)

<u>Year</u>	<u>All Item</u>	<u>Food</u>	<u>Beverages</u>	<u>Tabacco</u>	<u>Wearing Apparel</u>
1970	76.2	67.0	84.7	86.3	73.9
1971	89.2	84.3	93.7	94.5	88.6
1972	100.0	100.0	100.0	100.0	100.0
1973	114.5	109.1	114.2	124.9	116.7
1974	160.0	155.3	148.8	160.0	168.6
1975	176.1	165.0	170.0	176.4	181.7
1976	191.0	174.5	184.7	192.3	186.0
1977	203.9	190.6	187.9	196.5	208.0
1978	216.3	206.2	199.3	212.6	223.5
1979	254.0	240.9	239.4	230.5	258.3
1980	304.7	275.4	301.6	277.7	312.8

<u>Year</u>	<u>Construction Materials</u>	<u>Fuel</u>	<u>Medicinal and Pharmaceutical Preparations</u>	<u>Office and School Supplies</u>	<u>Household Operation and Supplies</u>
1970	77.3	66.2	75.2	83.9	74.1
1971	90.9	84.5	85.6	93.2	88.4
1972	100.0	100.0	100.0	100.0	100.0
1973	128.1	109.3	101.5	117.6	111.2
1974	208.6	161.4	121.0	173.1	155.7
1975	213.3	186.5	139.2	166.0	175.8
1976	224.2	210.1	157.2	212.2	185.6
1977	251.2	217.7	263.9	231.3	200.4
1978	277.9	221.1	166.4	247.4	210.0
1979	341.6	278.3	187.2	286.3	252.4
1980	387.0	378.1	212.7	337.1	299.3

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-I.8 CONSUMER PRICE INDEX
IN THE PHILIPPINES
(ALL FAMILIES: 1972 = 100)

<u>Year</u>	<u>All Item</u>	<u>Food, Alcoholic Beverages and Tobacco</u>	<u>Clothing</u>	<u>Housing and Repair</u>
1973	116.5	115.6	115.9	127.2
1974	156.3	155.2	172.2	155.0
1975	166.9	163.4	186.5	162.7
1976	182.3	178.5	195.2	181.2
1977	200.4	195.6	215.5	205.2
1978	215.0	207.9	235.6	225.0
1979	250.5	239.2	275.6	262.7
1980	294.7	283.1	336.2	307.3

<u>Year</u>	<u>Fuel, Light and Water</u>	<u>Services</u>	<u>Miscellaneous</u>
1973	112.4	113.7	116.4
1974	153.7	144.6	170.3
1975	170.5	160.8	190.6
1976	189.2	175.4	210.3
1977	205.2	196.9	223.7
1978	230.5	214.1	238.4
1979	291.2	260.1	278.3
1980	383.4	325.6	326.2

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-I.9 GROSS NATIONAL PRODUCT
BY INDUSTRIAL ORIGIN,
1980 - 1983 and 1987

(Unit: P10⁹)

Item	Constant Level				
	Actual		Estimate	Projections	
	1980	1981	1982	1983	1987
A) Gross National Product	<u>92.6</u>	<u>96.1</u>	<u>100.0</u>	<u>105.2</u>	<u>136.7</u>
1) Agriculture, Fishery and Forestry	<u>23.7</u>	<u>24.6</u>	<u>25.5</u>	<u>26.6</u>	<u>32.3</u>
2) Industry	<u>33.5</u>	<u>35.1</u>	<u>36.6</u>	<u>38.6</u>	<u>52.8</u>
- Mining and quarrying	2.2	2.3	2.3	2.5	3.3
- Manufacturing	23.2	24.0	25.0	26.3	35.9
- Construction	7.1	7.8	8.1	8.6	11.8
- Electricity, gas and water	0.9	1.0	1.1	1.2	1.8
3) Services	<u>35.5</u>	<u>36.6</u>	<u>38.1</u>	<u>40.1</u>	<u>51.2</u>
- Transportation, communication and storage	4.8	5.0	5.3	5.7	7.5
- Commerce	19.3	19.7	20.4	21.4	27.5
- Other services	11.3	11.8	12.4	13.0	16.3
B) Gross Domestic Product	<u>92.7</u>	<u>96.2</u>	<u>100.2</u>	<u>105.3</u>	<u>136.3</u>

Source: Five-Year Philippine Development Plan, 1983 - 1987, NEDA

TABLE-I.10 AVERAGE ANNUAL REAL
GROWTH RATES OF GNP

(Unit: %)

Item	Actual 1980 - 81	Estimate 1981 - 82	Projections 1983 - 87
A) Gross National Product	<u>3.8</u>	<u>4.1</u>	<u>6.5</u>
1) Agriculture, Fishery and Forestry	<u>3.6</u>	<u>3.8</u>	<u>4.9</u>
2) Industry	<u>4.7</u>	<u>4.3</u>	<u>7.6</u>
- Mining and quarrying	1.7	3.0	6.8
- Manufacturing	3.4	4.2	7.6
- Construction	9.7	3.8	7.8
- Electricity, gas and water	7.8	13.1	9.7
3) Services	<u>3.0</u>	<u>4.3</u>	<u>6.1</u>
- Transportation, communication and storage	4.4	5.9	7.1
- Commerce	1.8	3.8	6.1
- Other services	4.3	4.6	5.7
B) Gross Domestic Product	<u>3.8</u>	<u>4.2</u>	<u>6.3</u>

Source: Five-Year Philippine Development Plan, 1983 - 1987, NEDA

TABLE-I.11 GROSS REGIONAL DOMESTIC
PRODUCT (1972 CONSTANT PRICES)

<u>Item</u>	<u>1975</u>		<u>1980</u>		<u>Average Growth Rate (%)</u>
	<u>Amount (₱10⁶)</u>	<u>Per Cent</u>	<u>Amount (₱10⁶)</u>	<u>Per Cent</u>	
Agriculture	1,385	54.2	1,660	52.0	3.7
Industry	464	18.2	627	19.6	6.2
Services	705	27.6	908	28.4	5.2
BICOL Region	2,554	100.0	3,195	100.0	4.6

Source: BICOL (Region V) Five-Year Development Plan, 1983 - 1987,
NEDA Regional Office, 1982

TABLE-I.12 TARGETED GRDP BY SECTOR
AND PERCENTAGE SHARE FOR
BICOL, 1983 - 1987
(1972 CONSTANT PRICES)

<u>Year</u>	<u>GRDP by Sector (₱10⁶)</u>			<u>Total</u>
	<u>Agriculture</u>	<u>Industry</u>	<u>Services</u>	
1983	2,008	694	1,127	3,829
1984	2,157	730	1,225	4,112
1985	2,316	768	1,332	4,416
1986	2,488	807	1,448	4,723
1987	2,671	894	1,574	5,094

<u>Year</u>	<u>Agriculture</u>	<u>Industry</u>	<u>Services</u>	<u>Annual Growth Rate (%)</u>
1983	52.5	18.1	29.4	-
1984	52.4	17.8	29.8	7.4
1985	52.4	17.4	30.2	7.4
1986	52.4	17.0	30.6	7.0
1987	52.4	16.7	30.9	7.9

<u>Annual Growth Rate (%)</u>	7.4	5.2	8.7	7.4
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Source: BICOL (Region V) Five-Year Development Plan, 1983 - 1987, NEDA Regional Office, 1982

TABLE-I.13 CONSUMER PRICE INDEX FOR
REGION V (BICOL REGION):
1972 TO 1980

<u>Year</u>	<u>All Items</u>	<u>Food, Alcoholic, Beverages and Tobacco</u>	<u>Clothing</u>	<u>Housing and Repair</u>
1972	100.0	100.0	100.0	100.0
1973	115.9	114.2	111.7	130.9
1974	163.4	163.8	167.6	181.3
1975	169.4	166.0	177.6	180.0
1976	186.1	182.4	192.1	203.6
1977	204.3	200.8	212.3	217.4
1978	222.9	213.9	245.2	234.6
1979	267.4	251.5	290.2	315.4
1980	310.5	284.0	351.4	369.3
Annual Growth Rate (%) (1975 - 1980)	12.9	11.3	14.6	15.5

<u>Year</u>	<u>Fuel, Light and Water</u>	<u>Services</u>	<u>Miscellaneous</u>
1972	100.0	100.0	100.0
1973	115.6	119.3	105.6
1974	155.8	151.1	151.7
1975	186.3	164.6	176.3
1976	208.6	169.7	200.7
1977	252.7	185.6	213.1
1978	339.8	210.1	231.1
1979	462.7	240.1	269.4
1980	576.6	301.3	319.0
Annual Growth Rate (%) (1975 - 1980)	25.4	12.9	12.6

Source: 1981 Philippine Statistical Yearbook, NEDA

TABLE-II.1 RECORDED ANNUAL MAXIMUM RAINFALL AT BACACAY

Duration year	1-day		3-day		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1971	Dec. 11	121.6	Dec. 10-12	311.6	Jan.-June
1972	June. 25	129.5	June. 24-26	152.8	
1973	Dec. 17	153.6	Dec. 17-19	234.4	
1974	June. 8	156.6	June. 7- 9	453.8	
1975	Apr. 23	127.4	Dec. 18-20	239.8	
1976	Jan. 9	127.0	May. 18-20	224.3	Dec.
1977	Nov. 4	99.4	Nov. 3- 5	189.5	Dec.
1978	Nov. 20	88.1	Dec. 23-25	134.1	
1979	Sept. 19	146.3	Sept. 17-19	171.5	
1980	Oct. 27	139.7	Mar. 23-25	192.1	

TABLE--II.2 RECORDED ANNUAL MAXIMUM RAINFALL AT GUINOBATAN

Duration year	1-day		3-day		Remarks (No record period)
	Occurrence data	Amount	Occurrence date	Amount	
1956	Dec. 9	194.3	Dec. 7- 9	282.4	
1957	Nov. 11	99.6	Aug. 8-10	164.1	
1958	Oct. 28	258.3	Oct. 27-29	485.1	
1959	Nov. 16	295.9	Nov. 14-16	363.0	
1960					No record
1961	July 4	122.9	July 3- 5	122.9	
1962	May 17	133.1	May 16-18	200.6	
1963	Aug. 13	135.4	Aug. 11-13	270.0	
1964	Dec. 13	126.5	Dec. 12-14	184.9	
1965	July 12	73.5	July 11-13	101.9	
1966	Dec. 18	172.7	Dec. 25-27	288.0	
1967	Sept. 2	179.9	Sept. 2- 4	222.8	
1968	Dec. 22	301.8	Dec. 21-23	335.8	May-Aug., Nov.
1969	Dec. 11	84.6	Dec. 9-11	195.7	Jan., June
1970	Feb. 5	112.2	Nov. 22-24	560.1	
1971	Dec. 28	146.9	Dec. 27-29	206.3	Feb.
1972	June 24	189.3	Jun. 23-25	200.7	
1973	Nov. 19	145.3	Nov. 19-21	281.8	
1974	Dec. 20	250.9	June. 8-10	400.5	Sept.
1975	Nov. 25	214.3	Nov. 24-26	456.7	
1976	Dec. 4	292.1	Dec. 3- 5	366.8	
1977	July 22	86.8	Nov. 2- 4	140.2	
1978	Oct. 6	84.3	Oct. 22-24	111.7	
1979	Apr. 18	160.1	Apr. 17-19	197.5	Aug.-Dec.
1980	Oct. 29	156.8	Oct. 27-29	162.8	
1981	July 1	299.8	June. 29- July 1	336.8	

TABLE-II.3 RECORDED ANNUAL MAXIMUM RAINFALL AT LEGAZPI

Duration year	1-day		3-day		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1956	Sept. 19	169.7	Apr. 7-9	251.4	
1957	Oct. 12	90.7	Nov. 10-12	149.2	
1958	Oct. 28	263.9	Oct. 28-30	449.1	
1959	Nov. 16	150.1	Nov. 14-16	270.7	
1960	June 25	294.1	Apr. 21-23	347.5	Jan.-Mar.
1961	Aug. 31	83.8	June 17-9	116.6	
1962	Apr. 17	189.7	May 16-18	207.5	
1963	Aug. 13	178.3	Aug. 12-14	313.5	
1964	Dec. 13	172.5	Apr. 27-29	220.2	
1965	July 12	174.0	July 11-13	217.0	
1966	Jan. 2	236.3	Jan. 2-4	319.3	
1967	Nov. 3	484.8	Nov. 1-3	578.0	
1968	Jan. 28	173.5	Jan. 27-29	264.8	
1969	Dec. 11	116.2	Dec. 9-11	244.3	
1970	Dec. 13	130.9	Nov. 22-24	235.9	
1971	Mar. 11	209.2	Mar. 10-12	337.4	
1972	June 24	236.6	June 22-24	268.9	
1973	Nov. 20	190.8	Dec. 12-14	319.5	
1974	June 9	247.6	June 8-10	421.7	
1975	Dec. 26	458.6	Dec. 24-26	744.9	
1976	May. 18	155.8	Jan. 1-3	274.5	
1977	Nov. 4	137.2	Nov. 2-4	173.5	Mar.-Apr.
1978	Oct. 26	171.5	Oct. 24-26	193.2	Jan.
1979	Sept. 18	161.2	Sept. 16-18	237.8	Oct.
1980	Oct. 28	235.0	Oct. 26-28	261.0	
1981	June 30	220.4	Jan. 26-28	334.2	

TABLE-II.4 RECORDED ANNUAL MAXIMUM RAINFALL AT MALAMA

Duration year	1-day		3-day		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1971	Apr. 3	85.9	Oct. 2-4	115.8	Jan.-June, Sept.
1972	June 24	69.4	Aug. 12-14	149.2	
1973	Dec. 18	101.2	Oct. 5-7	253.6	
1974	June 8	70.3	June 7-9	120.9	Apr., Dec.
1975					No record
1976	Nov. 29	55.4	Nov. 27-29	113.6	Jan.-July, Dec.
1977	July 17	92.0	July 16-18	129.6	Jan.
1978	Oct. 26	84.1	Sept. 25-27	162.8	
1979	Apr. 17	100.7	Apr. 16-18	217.8	June-Dec.
1980	May 24	70.5	Nov. 2-4	123.3	
1981	Jan. 27	90.6	Jan. 26-28	192.1	

TABLE-II.5 RECORDED ANNUAL MAXIMUM RAINFALL AT ALLANG

Duration year	1-day		3-day		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1975	Jan. 7	231.1	Jan. 5-7	424.1	Mar.
1976	Nov. 28	82.6	Nov. 27-29	191.8	Dec.
1977	July 22	204.3	July 1-3	310.8	
1978	Sept. 4	154.9	Sept. 4-6	307.1	
1979	Sept. 4	174.3	Aug. 14-16	360.8	
1980	Feb. 13	130.1	Feb. 11-13	235.3	Mar.-Dec.
1981	June 30	111.8	June 28-30	153.5	July-Dec.

TABLE-II.6 RECORDED ANNUAL MAXIMUM RAINFALL AT STO. DOMINGO

Duration year	1-day		3-day		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1956	Sept. 19	218.7	Apr. 7-9	340.9	
1957	Nov. 10	142.7	Nov. 10-12	235.4	
1958	Oct. 28	207.5	Oct. 27-29	339.3	
1959	Nov. 16	191.5	Nov. 14-16	364.2	
1960	Oct. 5	126.0	Oct. 4-6	285.7	
1961	June 19	80.0	Nov. 7-9	142.8	
1962	May 17	154.4	Nov. 5-7	198.6	
1963	Aug. 12	141.0	Aug. 12-14	287.3	
1964	Sept. 28	215.4	Sept. 28-30	223.5	
1965	July 12	129.8	Jan. 16-18	201.6	
1966	Nov. 19	254.0	Nov. 17-19	289.6	
1967	Nov. 3	362.7	Nov. 1-3	472.5	
1968	Jan. 28	145.3	Jan. 27-29	239.3	
1969	Dec. 11	159.5	Dec. 10-12	268.0	
1970	Oct. 12	163.6	Oct. 12-14	331.0	
1971	Jan. 28	141.2	Mar. 10-12	269.0	
1972	June 24	161.6	Jan. 28-30	222.1	
1973	Dec. 17	163.9	Dec. 17-19	311.2	
1974	June 9	210.9	June 8-10	308.7	Jan.
1975	Dec. 25	196.6	Dec. 23-25	390.8	
1976	Dec. 4	204.0	Dec. 3-5	309.8	
1977	Nov. 13	182.8	Nov. 2-4	270.7	
1978	Sept. 26	171.9	Dec. 23-25	195.4	Jan.
1979	Sept. 18	149.0	Sept. 16-18	241.0	
1980	Oct. 28	224.8	Oct. 27-29	241.4	
1981	June 30	203.0	Jan. 26-28	283.8	

TABLE-II.7 RECORDED ANNUAL MAXIMUM RAINFALL AT MALINAO

Duration year	1-day		3-day		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1972	Jan. 30	226.4	Jan. 29-31	341.4	
1973	Oct. 6	191.7	Dec. 16-18	271.4	Nov.
1974	Dec. 20	211.5	Dec. 14-16	248.3	
1975	Apr. 23	164.9	Dec. 18-20	485.5	
1976	Dec. 4	263.9	Dec. 29-31	385.4	
1977	Nov. 13	263.2	Nov. 11-13	277.3	Apr.
1978	Sept. 26	164.4	June 27-29	287.4	
1979	Sept. 18	94.8	Nov. 28-30	186.0	
1980	Dec. 22	116.0	Nov. 2-4	238.4	

TABLE-II.8 RECORDED ANNUAL MAXIMUM HOURLY RAINFALL AT LEGAZPI

Duration year	6-hours		12-hours		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1970	Oct. 13	77.0	Oct. 13	113.8	
1971	Dec. 29	139.4	Mar. 17-18	181.9	
1972	June 24	165.0	June 24-25	192.7	
1973	Nov. 20	90.2	Dec. 18	154.7	
1974	Nov. 12	163.6	Nov. 12	204.8	
1975	Dec. 25	250.5	Dec. 24-25	252.5	
1976	Dec. 4	119.9	Dec. 4	214.1	
1977	Dec. 1	111.2	Nov. 4	141.2	
1978	Oct. 6	149.2	Oct. 26	164.8	
1979	Sept. 18	96.0	Sept. 18	129.2	
1980	Oct. 28	172.2	Oct. 28	218.6	
1981	June 30	179.0	June 30	205.8	

Duration year	18-hours		24-hours		Remarks (No record period)
	Occurrence date	Amount	Occurrence date	Amount	
1970	Oct. 13	138.7	Feb. 5-6	161.6	
1971	Mar. 17-18	245.7	Mar. 17-18	276.7	
1972	June 24	208.9	June 24-25	236.6	
1973	Nov. 20-21	175.6	Nov. 20	198.1	
1974	Nov. 12	205.8	June 9-10	233.5	
1975	Dec. 24-25	258.3	Dec. 24-25	357.6	
1976	Dec. 4-5	248.9	Dec. 24-25	279.9	
1977	Nov. 4	160.3	Nov. 4	181.1	
1978	Oct. 26	168.4	Oct. 26	171.5	
1979	Sept. 18	160.6	Sept. 18	186.6	
1980	Oct. 28	228.8	Oct. 28	235.0	
1981	June 30	213.4	June 30	220.4	

TABLE-II.9 PROBABLE ANNUAL MAXIMUM 1-DAY RAINFALL

Station	Duration	Return Period (yr)								(Unit: mm)	
		1.01	2	5	10	20	50	100	200		500
Guinobatan	Master Plan	35	157	231	279	326	386	431	476	536	580
	Review	36	161	236	286	333	394	440	486	547	593
Legaspi	Master Plan	86	174	259	327	403	519	620	734	910	1,063
	Review	81	176	261	328	401	510	602	706	861	995
Allang	Master Plan	42	163	235	283	329	389	433	478	536	580
	Review	44	149	212	253	293	344	383	421	472	510
Sto. Domingo	Master Plan	111	163	212	250	291	350	399	453	532	598
	Review	106	166	216	252	289	342	385	430	496	550
Malinao	Master Plan	84	188	250	291	330	381	419	458	508	546
	Review	67	177	243	286	328	382	422	463	516	556
*Quinali (A) River Basin	Master Plan	21	139	209	256	300	358	402	445	502	545
	Review	26	134	199	242	283	336	376	416	469	508

Note; * basin average rainfall with a drainage area of 523 km².

TABLE-II.10 PROBABLE ANNUAL MAXIMUM 3-DAY RAINFALL

Station	Duration	Return Period (yr)									(Unit: mm)
		1.01	2	5	10	20	50	100	200	500	
Guinobatan	Master Plan	37	249	377	461	542	647	726	805	908	986
	Review	39	247	371	454	532	635	711	787	888	964
Legaspi	Master Plan	133	257	377	474	583	748	893	1,056	1,307	1,527
	Review	126	256	376	472	578	737	874	1,029	1,263	1,466
Allang	Master Plan	127	310	419	492	561	651	718	785	873	940
	Review	80	272	386	462	535	629	699	770	862	932
Sto. Domingo	Master Plan	147	270	344	395	439	500	545	591	650	695
	Review	151	269	339	386	431	489	532	576	633	676
Malinao	Master Plan	118	299	407	479	548	637	704	770	858	924
	Review	118	291	394	462	528	612	676	739	823	886

TABLE-II.11 PROBABLE ANNUAL MAXIMUM RAINFALL AT BEGAZPI

Duration	Return Period (yr)	1.01	2	5	10	20	50	100
6	I (mm/h)	6.0	21.2	30.2	36.2	42.0	49.3	55.0
	Review	7.8	22.7	31.5	37.3	43.0	50.3	55.8
	R (mm)	36	127	181	217	252	296	330
	Review	47	136	189	224	258	302	335
12	I (mm/h)	7.5	13.9	17.8	20.3	22.8	25.8	28.3
	Review	8.3	14.6	18.4	20.9	23.3	26.4	28.8
	R (mm)	90	167	213	244	273	310	339
	Review	99	175	221	251	280	317	345
18	I (mm/h)	6.1	10.4	13.1	14.8	16.4	18.6	20.2
	Review	6.8	10.8	13.3	14.9	16.4	18.4	20.0
	R (mm)	110	188	235	266	296	334	363
	Review	122	195	239	268	296	332	360
24	I (mm/h)	5.0	8.6	11.8	13.9	16.0	18.6	20.5
	Review	4.9	9.2	11.8	13.5	15.1	17.2	18.8
	R (mm)	120	207	284	334	383	446	493
	Review	117	220	282	323	362	413	451

Note; Record period analyzed is from 1970 to 1979 in "Master Plan" and from 1970 to 1981 in "Re-Study".
 "I" means rainfall intensity and "R" means rainfall amount.

TABLE-II.12 ANNUAL MAXIMUM BASIN AVERAGE 1-DAY RAINFALL
OF THE QUINALI (A) RIVER BASIN INCLUDING
THE TALISAY RIVER

Year	Occurrence date	Name of Station					Basin Average
		Guinobatan	Malama	Allang	Polangui	Bato	
1972	July 24	189.3 (0.55)	69.4 (0.36)	-	-	198.9 (0.09)	147.0
1973	Oct. 14	137.2 (0.55)	50.6 (0.36)	-	-	159.8 (0.09)	108.1
1974	June 9	250.9 (0.55)	70.3 (0.36)	-	-	135.2 (0.09)	175.5
1975	Nov. 25	214.3 (0.55)	*136.5 (0.36)	-	-	*149.6 (0.09)	180.5
1976	Dec. 4	292.1 (0.55)	*186.1 (0.36)	-	-	*203.9 (0.09)	264.4
1977	July 22	86.8 (0.40)	61.3	204.3 (0.32)	19.0 (0.28)	84.3	105.4
1978	Oct. 26	22.8 (0.40)	84.1	114.3 (0.32)	106.6 (0.28)	-	75.5
1979	Apr. 18	160.1 (0.40)	36.9	103.9 (0.32)	58.0 (0.28)	-	113.5
1980	Oct. 28	156.8 (0.40)	5.0 (0.32)	-	64.6 (0.28)	-	82.4
1981	July 1	299.8 (0.40)	18.5	111.8 (0.32)	41.3 (0.28)	-	167.3

Note; (1) The drainage area of the subject basin is 523 km²
(2) The parenthesized figures are Thissen's weights.
(3) The asterisked figures were estimated by simple regression analysis.

TABLE- II.13 REPRESENTATIVE RAINFALL STATIONS

Base point No. concerned to basin	Representative station	Remarks
A-1 - A-48, A-58 - A-59	Guinobatan	Quinali (A) River basin
A-19 - A-57	Allang	Talisay River basin
Y-1 - Y-14	Legaspi	Yawa River basin
O-1 - O-9	Sto. Domingo	Northeast - Southeast torrents' basins
O-10 - O-15, B-1 - B-21	Malinao	Part of northeast - southeast torrents' basins Quinali (B) River basin

Note; A means the Quinali (A) River
 Y means the Yawa River
 O means the northeast - southeast torrents
 B means the Quinali (B) River

TABLE-II.14

PROBABLE FLOOD PEAK RUNOFF CALCULATED BY RATIONAL FORMULA

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-1	Quirangay River	9.3	110-2400	9.75	0.2349-0.235	46.	0.70	1	73.8	15.2	27.
								2	203.4	37.3	67.
								5	299.2	67.4	122.
								10	361.4	92.0	166.
								20	422.3	118.2	214.
								50	500.0	153.3	277.
A-2	Tributary	5.6	110-510	5.38	0.0743-0.074	26.	0.70	1	75.4	16.5	18.
								2	207.6	40.1	44.
								5	305.5	73.6	80.
								10	368.9	101.7	111.
								20	431.1	131.9	144.
								50	510.4	172.9	188.
A-3	Iraya River	14.9	110-2400	9.75	0.2349-0.235	46.	0.70	1	72.2	14.8	43.
								2	198.9	36.5	106.
								5	292.6	65.9	191.
								10	353.4	90.0	261.
								20	413.0	115.5	335.
								50	489.0	149.9	434.
A-4	Tagaytay River	26.7	100-2400	15.00	0.0019-0.235	88.	0.70	1	69.9	12.9	67.
								2	192.5	32.1	166.
								5	283.3	56.4	293.
								10	342.2	75.6	392.
								20	399.8	95.5	496.
								50	473.4	121.9	633.
A-5	Tributary	16.4	100-160	6.90	0.0087-0.009	38.	0.70	1	71.8	15.1	48.
								2	197.9	37.0	118.
								5	291.2	67.3	215.
								10	351.7	92.3	294.
								20	410.9	118.9	379.
								50	486.5	154.9	494.
A-6	Tagaytay River	43.1	100-2400	15.00	0.0019-0.235	88.	0.70	1	67.8	12.5	104.
								2	186.7	31.1	261.
								5	274.6	54.6	458.
								10	331.7	73.3	614.
								20	387.6	92.6	776.
								50	458.9	118.2	991.
100	512.4	140.2	1175.								

Note; MMSL: meters above mean sea level
min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-7	Tagaytay River	44.0	95-2400	16.73	0.0029-0.235	102.	0.70	1	67.7	12.0	103.
								2	186.4	30.1	258.
								5	274.2	52.5	450.
								10	331.2	70.1	600.
								20	387.0	88.2	755.
								50	458.2	112.1	959.
								100	511.7	132.5	1134.
A-8	Tumpa River	5.7	95-525	7.75	0.0555-0.055	37.	0.70	1	75.3	15.9	18.
								2	207.5	39.0	43.
								5	305.3	70.9	79.
								10	368.7	97.3	108.
								20	430.8	125.4	139.
								50	510.1	163.5	181.
								100	569.6	197.4	219.
A-9	Tagaytay River	49.7	95-2400	16.73	0.0029-0.235	102.	0.70	1	67.1	11.9	115.
								2	184.8	29.9	289.
								5	271.9	52.1	503.
								10	328.3	69.5	672.
								20	383.7	87.5	845.
								50	454.3	111.2	1074.
								100	507.2	131.3	1269.
A-10	Cabilogan River	52.1	94-2400	17.61	0.0020-0.235	109.	0.70	1	66.8	11.7	118.
								2	184.1	29.3	297.
								5	270.9	51.0	516.
								10	327.2	67.8	687.
								20	382.3	85.2	863.
								50	452.7	108.0	1094.
								100	505.5	127.4	1291.
A-11	Maninila River	4.9	94-2400	10.65	0.2165-0.217	51.	0.70	1	75.7	15.4	15.
								2	208.6	37.9	36.
								5	307.0	68.2	65.
								10	370.8	93.0	89.
								20	433.2	119.1	114.
								50	513.0	154.2	147.
								100	572.8	185.2	176.
A-12	Cabilogan River	57.0	94-2400	17.61	0.0020-0.235	109.	0.70	1	66.4	11.6	129.
								2	182.9	29.1	323.
								5	269.1	50.6	561.
								10	323.0	67.4	747.
								20	379.8	84.6	938.
								50	449.7	107.3	1189.
								100	502.1	126.6	1403.

Note; MMSL: meters above mean sea level
min.: minutes

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Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-13	Cabilogan River	58.1	80-2400	19.31	0.0082-0.235	118.	0.70	1	66.3	11.3	128.
								2	182.6	28.5	322.
								5	268.7	49.3	557.
								10	324.5	65.4	739.
								20	379.2	82.0	926.
								50	449.0	103.7	1171.
A-14	Trapicia River	4.9	80-823	8.80	0.0844-0.084	42.	0.70	1	75.7	15.8	15.
								2	208.6	38.7	37.
								5	307.0	70.1	67.
								10	370.8	96.0	91.
								20	433.2	123.5	118.
								50	513.0	160.6	153.
A-15	Cabilogan River	63.0	80-2400	19.31	0.0082-0.235	118.	0.70	1	65.9	11.3	138.
								2	181.5	28.3	347.
								5	267.0	49.0	600.
								10	322.5	65.0	796.
								20	376.9	81.5	998.
								50	446.2	103.0	1262.
A-16	Cabilogan River	73.4	68-2400	21.34	0.0070-0.235	130.	0.70	1	65.1	10.8	155.
								2	179.3	27.3	390.
								5	263.8	47.0	671.
								10	318.6	62.2	887.
								20	372.3	77.7	1109.
								50	440.8	98.0	1398.
A-17	Masarawag River	10.5	68-2400	12.23	0.1907-0.191	58.	0.70	1	73.4	14.6	30.
								2	202.3	36.1	74.
								5	297.6	64.6	132.
								10	359.4	87.7	179.
								20	420.0	112.1	229.
								50	497.3	114.6	295.
A-18	San Francisco R.	83.9	68-2400	21.34	0.0070-0.235	130.	0.70	1	64.4	10.7	175.
								2	177.3	27.0	441.
								5	260.9	46.5	759.
								10	315.1	61.5	1003.
								20	368.1	76.8	1253.
								50	435.9	96.9	1581.
100	486.7	113.7	1856.								

Note; MMSL: meters above mean sea level
min.: minutes

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Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-19	San Francisco R.	91.4	60-2400	24.79	0.0023-0.235	157.	0.70	1	63.9	10.0	178.
								2	176.0	25.4	452.
								5	258.9	43.2	768.
								10	312.8	56.7	1007.
								20	365.4	70.4	1251.
								50	432.7	88.2	1567.
100	483.1	103.0	1830.								
A-20	Cabilogan River	128.8	38-2400	34.79	0.0022-0.235	236.	0.70	1	61.9	8.3	208.
								2	170.5	21.4	535.
								5	250.9	35.3	884.
								10	303.0	45.5	1139.
								20	354.1	55.7	1395.
								50	419.2	68.9	1725.
100	468.1	79.5	1992.								
A-21	Bubusan Creek	18.9	60-1070	13.75	0.0188-0.135	68.	0.70	1	71.3	13.8	51.
								2	196.4	34.3	126.
								5	289.0	61.0	224.
								10	349.0	82.5	303.
								20	407.8	105.0	386.
								50	482.9	134.9	496.
100	539.2	161.1	592.								
A-22	Nabonton Creek	8.3	60-2400	13.45	0.1740-0.174	64.	0.70	1	74.2	14.5	23.
								2	204.4	36.0	58.
								5	300.7	64.1	104.
								10	363.2	86.9	140.
								20	424.3	110.7	179.
								50	502.4	142.6	230.
100	561.0	170.3	275.								
A-23	Ogsong River	27.2	60-1070	13.75	0.0188-0.135	68.	0.70	1	69.8	13.5	72.
								2	192.3	33.6	177.
								5	283.0	59.7	316.
								10	341.8	80.7	427.
								20	399.4	102.8	544.
								50	472.9	132.2	699.
100	528.0	157.7	834.								
A-24	Ogsong River	38.1	38-1070	21.35	0.0029-0.135	128.	0.70	1	68.3	11.4	85.
								2	188.2	28.8	213.
								5	277.0	49.6	367.
								10	334.5	65.6	486.
								20	390.9	82.0	607.
								50	462.8	103.4	766.
100	516.7	121.4	900.								

Note; MMSL: meters above mean sea level

min.: minutes

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Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-25	Nasisi River	11.0	190-2400	9.25	0.2389-0.239	44.	0.70	1	73.3	15.2	32.
								2	201.8	37.2	80.
								5	296.9	67.4	144.
								10	358.7	92.1	197.
								20	419.1	118.4	253.
								50	496.2	153.8	329.
100	554.0	185.1	396.								
A-26	Nasisi River	7.7	190-1328	4.95	0.2299-0.230	24.	0.70	1	74.4	16.4	24.
								2	205.0	39.8	60.
								5	301.6	73.2	110.
								10	364.3	101.3	152.
								20	425.7	131.4	197.
								50	504.0	172.5	258.
100	562.8	209.7	314.								
A-27	Nasisi River	18.7	190-2400	9.25	0.2389-0.239	44.	0.70	1	71.3	14.8	54.
								2	196.5	36.3	132.
								5	289.1	65.6	239.
								10	349.2	89.7	326.
								20	408.1	115.3	419.
								50	483.2	149.7	544.
100	539.5	180.3	656.								
A-28	Nasisi River	26.7	100-2400	12.25	0.1878-0.188	58.	0.70	1	69.9	13.9	72.
								2	192.5	34.3	178.
								5	283.3	61.5	319.
								10	342.2	83.5	433.
								20	399.8	106.7	554.
								50	473.4	137.6	715.
100	528.6	164.8	856.								
A-29	Buga River	7.7	100-2400	11.13	0.2066-0.207	53.	0.70	1	74.4	15.0	22.
								2	205.0	37.0	55.
								5	301.6	66.5	100.
								10	364.3	90.6	136.
								20	425.7	116.0	174.
								50	504.0	150.0	225.
100	562.8	180.0	269.								
A-30	Nasisi River	34.4	100-2400	12.25	0.1878-0.188	58.	0.70	1	68.8	13.7	92.
								2	189.5	33.8	226.
								5	278.8	60.5	405.
								10	336.8	82.2	550.
								20	393.5	105.0	702.
								50	465.9	135.5	906.
100	520.3	162.2	1085.								

Note; MMSL: meters above mean sea level

min.: minutes

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Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-31	Nasisi River	35.7	80-2400	13.33	0.1740-0.174	63.	0.70	1	68.6	13.5	93.
								2	189.1	33.3	231.
								5	278.2	59.4	413.
								10	336.0	80.5	559.
								20	392.6	102.7	713.
								50	464.8	132.2	918.
100	519.0	158.0	1097.								
A-32	Nasisi River	39.2	40-2400	19.91	0.0046-0.151	109.	0.70	1	68.2	11.9	91.
								2	187.9	29.9	228.
								5	276.4	52.0	396.
								10	333.9	69.2	528.
								20	390.1	86.9	663.
								50	461.9	110.3	840.
100	515.8	130.1	991.								
A-33	Nasisi River	6.6	40- 82	6.00	0.0033-0.011	38.	0.70	1	74.9	15.8	20.
								2	206.3	38.6	50.
								5	303.5	70.2	90.
								10	366.6	96.3	124.
								20	428.4	124.1	159.
								50	507.2	161.6	207.
100	566.3	195.1	250.								
A-34	Nasisi River	84.2	38-2400	20.91	0.0041-0.151	117.	0.70	1	64.3	11.0	181.
								2	177.2	27.8	455.
								5	260.8	48.1	787.
								10	315.0	63.8	1044.
								20	368.0	80.0	1309.
								50	435.8	101.2	1656.
100	486.6	119.1	1950.								
A-35	Quinali(A) River	213.0	38-2400	34.79	0.0022-0.235	236.	0.70	1	58.7	7.9	326.
								2	161.8	20.3	840.
								5	238.0	33.5	1387.
								10	287.5	43.2	1788.
								20	335.9	52.8	2189.
								50	397.8	65.3	2706.
100	444.1	75.5	3126.								
A-36	Quinali(A) River	216.1	20-2400	45.04	0.0020-0.235	318.	0.70	1	58.6	6.8	287.
								2	161.5	17.8	749.
								5	237.7	28.8	1211.
								10	287.0	36.6	1540.
								20	335.4	44.4	1867.
								50	397.1	54.4	2286.
100	443.4	62.4	2621.								

Note; MMSL: meters above mean sea level

min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-37	Salog River	30.3	22-1328	17.90	0.0042-0.301	129.	0.70	1	69.4	11.6	68.
								2	191.1	29.2	172.
								5	281.1	50.2	296.
								10	339.5	66.4	391.
								20	396.7	83.0	489.
								50	469.7	104.6	616.
100	524.5	122.9	724.								
A-38	Magkaslu River	17.3	22- 367	16.50	0.0035-0.037	104.	0.70	1	71.6	12.7	43.
								2	197.3	31.7	107.
								5	290.4	55.3	186.
								10	350.7	73.7	248.
								20	409.8	92.8	312.
								50	485.2	117.8	396.
100	541.7	139.1	468.								
A-39	Salog River	47.6	22-1328	17.90	0.0042-0.301	129.	0.70	1	67.3	11.2	104.
								2	185.3	28.3	262.
								5	272.7	48.7	451.
								10	329.4	64.4	596.
								20	384.9	80.5	745.
								50	455.7	101.5	939.
100	508.8	119.2	1103.								
A-40	Magkaslu River	13.9	40-1328	7.50	0.0045-0.241	43.	0.70	1	72.5	15.1	41.
								2	199.6	37.0	100.
								5	293.6	66.9	181.
								10	354.7	91.6	247.
								20	414.4	117.8	318.
								50	490.7	153.0	414.
100	547.9	184.3	498.								
A-41	Tributary	11.2	40- 800	5.10	0.1490-0.149	24.	0.70	1	73.2	16.1	35.
								2	201.7	39.1	85.
								5	296.7	71.8	156.
								10	358.4	99.3	216.
								20	418.7	128.9	281.
								50	495.8	169.0	368.
100	553.6	205.4	447.								
A-42	Tributary	25.1	40-1328	7.50	0.0045-0.241	43.	0.70	1	70.2	14.6	71.
								2	193.3	35.8	175.
								5	284.4	64.8	316.
								10	343.4	88.7	433.
								20	401.3	114.0	557.
								50	475.2	148.2	723.
100	530.6	178.5	871.								

Note; MMSL: meters above mean sea level
min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-43	Polangui River	79.1	20-1328	19.40	0.0039-0.301	141.	0.70	1	64.7	10.5	162.
								2	178.2	26.6	409.
								5	262.2	45.5	699.
								10	316.6	59.9	921.
								20	370.0	74.6	1148.
								50	438.1	93.9	1444.
								100	489.1	110.0	1691.
A-44	Quinali(A) River	295.2	20-2400	45.04	0.0020-0.235	318.	0.70	1	56.5	6.6	378.
								2	155.7	17.2	986.
								5	229.0	27.8	1594.
								10	276.6	35.3	2027.
								20	323.2	42.8	2458.
								50	382.7	52.4	3010.
								100	427.3	60.1	3450.
A-45	Quinali(A) River	297.3	15-2400	50.44	0.0018-0.235	360.	0.70	1	56.5	6.2	356.
								2	155.5	16.1	934.
								5	228.8	25.9	1495.
								10	276.4	32.7	1391.
								20	322.9	39.5	2283.
								50	382.4	48.2	2785.
								100	426.9	55.1	3183.
A-46	Sugtad Creek	28.0	15- 213	9.90	0.0026-0.045	66.	0.70	1	69.7	13.6	74.
								2	192.0	33.7	183.
								5	282.5	60.0	327.
								10	341.2	81.2	442.
								20	398.7	103.4	563.
								50	472.0	133.1	725.
								100	527.1	158.9	865.
A-47	Quinali(A) River	325.3	15-2400	50.44	0.0018-0.235	360.	0.70	1	55.8	6.1	385.
								2	153.8	16.0	1010.
								5	226.2	25.6	1617.
								10	273.3	32.3	2045.
								20	319.3	39.0	2470.
								50	378.0	47.6	3013.
								100	422.1	54.4	3443.
A-48	Quinali(A) River	330.6	8-2400	54.97	0.0018-0.235	396.	0.70	1	55.7	5.8	370.
								2	153.4	15.2	976.
								5	225.8	24.1	1552.
								10	272.7	30.4	1955.
								20	318.6	36.6	2555.
								50	377.3	44.5	2863.
								100	421.2	50.8	3264.

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min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-49	Talisay River	96.5	50- 507	24.70	0.0026-0.074	179.	0.70	1	87.0	13.0	244.
								2	195.2	27.1	508.
								5	282.3	44.8	841.
								10	340.3	58.4	1095.
								20	394.9	71.7	1345.
								50	466.3	89.2	1673.
A-50	Talisay River	132.0	30- 507	37.20	0.0021-0.074	278.	0.70	1	84.5	10.5	270.
								2	189.6	22.2	571.
								5	274.1	35.7	915.
								10	330.5	45.5	1168.
								20	383.6	55.1	1414.
								50	452.9	67.5	1734.
A-51	Talisay River	19.5	20- 400	8.65	0.0042-0.092	56.	0.70	1	97.4	19.5	74.
								2	218.5	39.2	148.
								5	316.0	69.0	262.
								10	380.9	93.6	355.
								20	442.1	118.9	451.
								50	522.0	153.1	581.
A-52	Talisay River	151.5	30- 507	37.20	0.0021-0.074	278.	0.70	1	83.4	10.4	305.
								2	187.0	21.9	646.
								5	270.4	35.2	1036.
								10	326.0	44.9	1323.
								20	378.3	54.3	1600.
								50	446.7	66.6	1963.
A-53	Talisay River	163.8	19- 507	42.28	0.0021-0.074	318.	0.70	1	82.7	9.6	306.
								2	185.5	20.5	652.
								5	268.2	32.5	1035.
								10	323.4	41.2	1314.
								20	375.3	49.7	1582.
								50	443.2	60.7	1932.
A-54	Talisay River	174.8	11- 507	47.06	0.0020-0.074	356.	0.70	1	82.1	9.0	306.
								2	184.3	19.3	654.
								5	266.4	30.3	1031.
								10	321.2	38.3	1302.
								20	372.8	46.0	1562.
								50	440.2	55.9	1901.
								100	490.7	63.8	2170.

Note; MMSL: meters above mean sea level
min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
A-55	San Miguel River	3.8	11- 22	6.75	0.0016-0.002	54.	0.70	1	104.6	21.1	16.
								2	234.6	42.3	31.
								5	339.2	74.7	55.
								10	408.9	101.5	75.
								20	474.6	129.0	95.
								50	560.5	166.4	123.
100	624.8	199.3	147.								
A-56	Talisay River	178.6	11- 507	47.06	0.0020-0.074	356.	0.70	1	81.9	9.0	312.
								2	183.9	19.2	667.
								5	265.8	30.3	1051.
								10	320.4	38.2	1327.
								20	371.9	45.8	1592.
								50	439.2	55.8	1938.
100	489.4	63.7	2212.								
A-57	Talisay River	192.4	8- 507	50.16	0.0020-0.074	381.	0.70	1	81.3	8.6	322.
								2	182.4	18.4	689.
								5	263.7	28.9	1080.
								10	317.9	36.4	1360.
								20	368.9	43.5	1629.
								50	435.6	52.9	1979.
100	485.7	60.3	2255.								
A-58	Quinali(A) River	523.0	8-2400	54.97	0.0018-0.235	396.	0.70	1	52.3	5.4	550.
								2	144.1	14.2	1449.
								5	211.9	22.7	2304.
								10	256.0	28.5	2903.
								20	299.1	34.4	3495.
								50	354.2	41.8	4252.
100	395.5	47.7	4848.								
A-59	Quinali(A) River	524.2	7-2400	56.52	0.0017-0.235	409.	0.70	1	52.3	5.3	542.
								2	144.0	14.0	1429.
								5	211.9	22.2	2267.
								10	255.9	28.0	2852.
								20	299.0	33.7	3430.
								50	354.0	40.9	4170.
100	395.3	46.6	4751.								
Y- 1	Anuling River	9.4	85-2400	10.23	0.2263-0.226	49.	0.70	1	111.3	22.7	42.
								2	225.3	41.1	75.
								5	335.3	75.0	137.
								10	423.4	106.9	195.
								20	521.7	144.6	264.
								50	671.9	203.8	373.
100	802.7	262.1	479.								

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min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
Y- 2	Right tributary	4.8	85- 340	5.13	0.0497-0.050	24.	0.70	1	114.4	25.1	23.
								2	231.4	44.9	42.
								5	344.5	83.4	78.
								10	434.9	120.5	112.
								20	536.0	164.8	154.
								50	690.2	235.2	220.
Y- 3	Yawa River	14.2	85-2400	10.23	0.2263-0.226	49.	0.70	1	109.2	22.3	62.
								2	220.9	40.3	111.
								5	328.9	73.5	203.
								10	415.2	104.9	290.
								20	511.7	141.9	392.
								50	659.0	199.9	552.
Y- 4	Left Tributary	4.0	68-2400	10.08	0.2313-0.231	48.	0.70	1	115.1	23.6	18.
								2	232.9	42.6	33.
								5	346.7	77.7	60.
								10	437.7	110.8	86.
								20	539.4	150.0	117.
								50	694.7	211.4	164.
Y- 5	Yawa River	19.0	40-2400	11.68	0.2021-0.202	56.	0.70	1	107.6	21.6	80.
								2	217.6	39.1	144.
								5	323.9	70.9	262.
								10	409.0	100.7	372.
								20	504.0	135.9	502.
								50	649.1	191.0	705.
Y- 6	Right Tributary	19.0	40- 126	8.05	0.0107-0.011	38.	0.70	1	107.6	22.6	84.
								2	217.6	40.7	150.
								5	323.9	74.9	277.
								10	409.0	107.3	397.
								20	504.0	145.9	539.
								50	649.1	206.6	763.
Y- 7	Yawa River	38.0	40-2400	11.68	0.2021-0.202	56.	0.70	1	103.1	20.7	153.
								2	208.7	37.4	277.
								5	310.6	68.0	502.
								10	392.1	96.6	714.
								20	483.3	130.3	963.
								50	622.4	183.1	1353.
100	743.5	234.8	1735.								

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- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
Y- 8	Yawa River	40.0	20-2400	12.98	0.1834-0.183	62.	0.70	1	102.8	20.2	157.
								2	207.9	36.8	286.
								5	309.5	66.5	517.
								10	390.8	94.2	733.
								20	481.6	126.8	986.
								50	620.2	177.6	1382.
Y- 9	Budiao River	7.5	20-2400	11.78	0.2020-0.202	56.	0.70	1	112.4	22.5	33.
								2	227.5	40.8	59.
								5	338.6	74.0	108.
								10	427.5	105.1	153.
								20	526.8	141.8	207.
								50	678.4	199.2	290.
Y-10	Yawa River	47.5	20-2400	12.98	0.1834-0.183	62.	0.70	1	101.5	20.0	185.
								2	205.4	36.3	336.
								5	305.8	65.7	607.
								10	386.1	93.1	360.
								20	475.8	125.2	1157.
								50	612.8	175.5	1621.
Y-11	Yawa River	58.5	10-2400	15.53	0.0039-0.183	82.	0.70	1	100.0	18.7	212.
								2	202.3	34.1	388.
								5	301.1	60.9	693.
								10	380.2	85.6	974.
								20	468.5	114.4	1301.
								50	603.4	159.1	1310.
Y-12	Pawa-Burabod R.	7.6	10-2400	11.55	0.2069-0.207	55.	0.70	1	112.4	22.6	33.
								2	227.3	40.9	60.
								5	338.4	74.2	110.
								10	427.2	105.5	156.
								20	526.5	142.3	210.
								50	678.1	200.0	296.
Y-13	Yawa River	66.1	10-2400	15.53	0.039-0.183	82.	0.70	1	99.0	18.5	238.
								2	200.4	33.8	435.
								5	298.3	60.4	776.
								10	376.6	84.8	1090.
								20	464.1	113.3	1456.
								50	597.7	157.6	2026.
100	714.0	200.3	2575.								

Note; MMSL: meters above mean sea level
min.: minutes

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Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
Y-14	Yawa River	74.4	4-2400	17.28	0.0030-0.181	96.	0.70	1	98.1	17.7	256.
								2	198.5	32.5	470.
								5	295.4	57.5	832.
								10	373.0	80.4	1163.
								20	459.7	106.9	1547.
								50	592.0	148.0	2142.
								100	707.2	187.4	2711.
0- 1	Buyuan(A) River	5.3	0-1300	9.38	0.1386-0.139	45.	0.70	1	147.1	30.4	31.
								2	216.0	39.8	41.
								5	280.9	63.6	66.
								10	331.3	84.9	88.
								20	385.6	108.7	112.
								50	463.8	143.3	148.
								100	528.7	176.1	182.
0- 2	Buyuan(B) River	3.7	0-1700	9.25	0.1838-0.184	44.	0.70	1	149.0	30.8	22.
								2	218.7	40.4	29.
								5	284.5	64.5	46.
								10	335.5	86.2	62.
								20	390.5	110.3	79.
								50	469.7	145.6	105.
								100	535.5	178.9	129.
0- 3	Unknown	3.2	0-2400	10.25	0.2341-0.234	49.	0.70	1	149.7	30.6	19.
								2	219.8	40.1	25.
								5	285.9	63.9	40.
								10	337.1	85.1	53.
								20	392.4	108.7	68.
								50	471.9	143.1	89.
								100	538.0	175.6	109.
0- 4	Matanag River	5.6	0-2400	10.13	0.2369-0.237	48.	0.70	1	146.8	30.0	33.
								2	215.5	39.4	43.
								5	280.3	62.8	68.
								10	330.6	83.6	91.
								20	384.8	106.9	116.
								50	462.8	140.7	153.
								100	527.6	172.7	188.
0- 5	Basud River	14.0	0-2400	11.00	0.2182-0.218	52.	0.70	1	141.0	28.5	78.
								2	207.1	37.5	102.
								5	269.4	59.5	162.
								10	317.7	79.2	216.
								20	369.8	101.0	275.
								50	444.7	132.7	361.
								100	507.0	162.6	443.

Note; MMSL: meters above mean sea level
min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
0- 6	Bacacay River	23.3	10-1500	14.38	0.0043-0.141	76.	0.70	1	137.2	26.1	118.
								2	201.5	34.5	156.
								5	262.1	54.0	245.
								10	309.1	71.0	322.
								20	359.8	89.8	407.
								50	432.7	117.0	530.
0- 7	Bulawan River	5.7	220-2400	7.25	0.3007-0.301	35.	0.70	1	146.7	31.2	35.
								2	215.4	40.7	45.
								5	280.2	65.5	73.
								10	330.4	88.0	98.
								20	384.6	113.1	125.
								50	462.5	149.9	166.
0- 8	Bulawan River	7.3	220-2400	9.00	0.2422-0.242	43.	0.70	1	145.3	30.2	43.
								2	213.3	39.5	56.
								5	277.4	63.2	90.
								10	327.2	84.4	120.
								20	380.8	108.1	153.
								50	458.0	142.7	203.
0- 9	Bulawan River	15.4	90-2400	11.48	0.2012-0.201	55.	0.70	1	140.4	28.2	84.
								2	206.1	37.1	111.
								5	268.1	58.8	176.
								10	316.1	78.1	234.
								20	368.0	99.6	298.
								50	442.6	130.8	392.
0-10	Tiagao River	5.7	0- 493	4.25	0.0059-0.189	22.	0.70	1	130.8	28.9	32.
								2	248.4	48.5	54.
								5	330.4	80.7	59.
								10	384.6	107.7	119.
								20	436.1	135.9	151.
								50	503.5	174.1	193.
0-11	Tiagao River	7.7	0-2400	10.05	0.0100-0.264	48.	0.70	1	129.3	26.5	40.
								2	245.5	44.9	67.
								5	326.4	73.2	110.
								10	380.0	96.3	144.
								20	430.9	119.9	179.
								50	497.5	151.5	227.
								100	547.1	179.4	269.

Note; MMSL: meters above mean sea level

min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
0-12	Tiagao River	13.4	0-2400	10.05	0.0100-0.264	48.	0.70	1	126.1	25.8	67.
								2	239.4	43.8	114.
								5	318.4	71.4	186.
								10	370.6	93.9	245.
								20	420.2	116.9	305.
								50	485.2	147.8	385.
0-13	Tagas River	8.3	0-2400	13.64	0.1760-0.176	65.	0.70	1	128.9	25.2	41.
								2	244.7	43.0	69.
								5	325.4	69.2	112.
								10	378.8	90.3	146.
								20	429.6	111.7	180.
								50	495.9	140.2	226.
0-14	Bonbon River	6.6	0- 880	11.78	0.0102-0.088	56.	0.70	1	130.1	26.0	33.
								2	247.0	44.3	57.
								5	328.5	71.8	92.
								10	382.4	94.0	121.
								20	433.6	116.7	150.
								50	500.6	147.0	189.
0-15	Sawang River	9.9	20-2400	13.25	0.1796-0.180	63.	0.70	1	127.9	25.1	48.
								2	242.8	42.8	82.
								5	322.9	69.1	133.
								10	375.9	90.2	174.
								20	426.3	111.6	215.
								50	492.1	140.2	270.
B- 1	Antic(B) River	8.1	240-1140	7.13	0.1262-0.126	34.	0.70	1	129.0	27.5	43.
								2	245.0	46.4	73.
								5	325.8	76.4	120.
								10	379.2	101.2	159.
								20	430.0	126.8	200.
								50	496.4	161.4	254.
B- 2	Buang River	4.5	240-2400	8.25	0.2618-0.262	39.	0.70	1	132.0	27.7	24.
								2	250.6	46.8	41.
								5	333.3	76.8	67.
								10	387.9	101.4	89.
								20	439.9	126.8	111.
								50	507.9	160.9	141.
								100	558.5	191.2	167.

Note; MMSL: meters above mean sea level

min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
B- 3	Quinali(B) River	12.6	240-2400	8.25	0.2618-0.262	39.	0.70	1	126.4	26.5	65.
								2	240.1	44.8	110.
								5	319.3	73.6	180.
								10	371.7	97.2	238.
								20	421.5	121.5	298.
								50	486.6	154.2	378.
B- 4	Quinali(B) River	19.2	180-2400	9.13	0.2432-0.243	43.	0.70	1	123.7	25.7	96.
								2	235.0	43.4	162.
								5	312.5	71.0	265.
								10	363.7	93.6	350.
								20	412.5	116.8	436.
								50	476.2	148.0	552.
B- 5	Quinali(B) River	30.8	100-2400	12.80	0.0308-0.262	61.	0.70	1	120.4	23.8	142.
								2	228.5	40.5	243.
								5	303.9	65.4	392.
								10	353.8	85.5	512.
								20	401.2	105.9	634.
								50	463.2	133.2	797.
B- 6	Tabigyan River	4.7	90-1180	7.75	0.1406-0.141	37.	0.70	1	131.8	27.8	25.
								2	250.2	47.0	43.
								5	332.7	77.2	71.
								10	387.3	102.2	93.
								20	439.2	127.9	117.
								50	507.1	162.5	149.
B- 7	Left Tributary	44.7	90-1548	15.90	0.0917-0.092	76.	0.70	1	117.4	22.3	194.
								2	222.9	38.2	332.
								5	296.5	61.1	531.
								10	345.1	79.4	690.
								20	391.3	97.8	850.
								50	451.8	122.2	1062.
B- 8	Quinali(B) River	80.2	90-1548	15.90	0.0917-0.092	76.	0.70	1	112.2	21.3	332.
								2	213.1	36.5	569.
								5	283.4	58.4	911.
								10	329.9	75.9	1183.
								20	374.1	93.4	1457.
								50	431.9	116.8	1821.
100	475.0	136.9	2135.								

Note; MMSL: meters above mean sea level
min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
B- 9	Quinali(B) River	84.1	75-1548	17.70	0.0083-0.092	86.	0.70	1	111.8	20.7	338.
								2	212.3	35.5	531.
								5	282.3	56.5	925.
								10	328.6	73.1	1196.
								20	372.6	89.8	1468.
								50	430.2	111.8	1829.
B-10	Namotnga River	5.0	75-1960	9.25	0.2038-0.204	44.	0.70	1	131.5	27.2	26.
								2	249.7	46.1	45.
								5	332.0	75.3	73.
								10	386.4	99.3	97.
								20	438.2	123.8	120.
								50	506.0	156.8	152.
B-11	Quinali(B) River	89.1	75-1548	17.70	0.083-0.092	86.	0.70	1	111.2	20.6	357.
								2	211.2	35.4	613.
								5	280.9	56.3	975.
								10	326.9	72.8	1261.
								20	370.7	89.3	1548.
								50	428.0	111.3	1928.
B-12	Quinali(B) River	93.9	20-1548	22.20	0.0122-0.092	107.	0.70	1	110.7	19.4	355.
								2	210.2	33.6	613.
								5	279.6	52.8	964.
								10	325.4	67.8	1238.
								20	369.0	82.7	1510.
								50	426.1	102.3	1367.
B-13	Left Tributary	15.3	20-1548	11.50	0.1329-0.133	55.	0.70	1	125.2	25.2	75.
								2	237.8	42.8	127.
								5	316.3	69.4	206.
								10	368.1	91.0	271.
								20	417.5	112.9	336.
								50	482.0	142.3	423.
B-14	Quinali(B) River	109.2	20-1548	22.20	0.0122-0.092	107.	0.70	1	109.2	19.2	407.
								2	207.4	33.1	704.
								5	275.8	52.1	1106.
								10	321.0	66.9	1420.
								20	364.1	81.6	1732.
								50	420.3	100.9	2142.
								100	462.2	117.3	2490.

Note; MMSL: meters above mean sea level

min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
B-15	Quinali(B) River	123.1	8-1548	27.40	0.0023-0.092	148.	0.70	1	108.0	17.2	413.
								2	205.1	30.1	721.
								5	272.7	46.4	1112.
								10	317.4	58.8	1408.
								20	360.0	71.0	1700.
								50	415.6	87.0	2081.
								100	457.1	100.2	2398.
B-16	Left Tributary	8.8	8-1548	9.50	0.0048-0.218	53.	0.70	1	128.5	25.9	44.
								2	244.1	44.1	75.
								5	324.6	71.6	122.
								10	377.8	93.9	161.
								20	428.5	116.7	200.
								50	494.7	147.1	252.
								100	544.0	173.8	297.
B-17	Quinali(B) River	131.9	8-1548	27.40	0.0023-0.092	148.	0.70	1	107.3	17.1	439.
								2	203.7	29.9	768.
								5	270.9	46.1	1183.
								10	315.3	58.4	1499.
								20	357.6	70.6	1509.
								50	412.9	86.4	2215.
								100	454.0	99.5	2552.
B-18	Quinali(B) River	132.8	7-1548	28.84	0.007-0.092	160.	0.70	1	107.2	16.7	431.
								2	203.6	29.3	755.
								5	270.7	44.9	1159.
								10	315.1	56.7	1463.
								20	357.4	68.2	1762.
								50	412.6	83.4	2152.
								100	453.7	95.8	2474.
B-19	Tuliw Creek	18.3	7- 700	13.64	0.0031-0.092	80.	0.70	1	124.1	23.3	83.
								2	235.6	39.9	142.
								5	313.3	63.8	227.
								10	364.7	82.7	294.
								20	413.5	101.7	362.
								50	477.5	126.9	451.
								100	525.1	148.6	529.
B-20	Quinali(B) River	151.1	7-1548	28.84	0.0007-0.092	160.	0.70	1	105.8	16.5	484.
								2	201.0	28.9	848.
								5	267.3	44.3	1302.
								10	311.1	55.9	1644.
								20	352.8	67.4	1980.
								50	407.3	82.3	2418.
								100	447.9	94.6	2779.

Note; MMSL: meters above mean sea level
min.: minutes

- Cont'd

Site No.	Name of River	Drainage Area (km ²)	Elevation of Basin (MMSL)	River Course Length (km)	Average River Bed Slope	Flood Concentration Time (min.)	Runoff Coefficient	Rainfall Return Period (year)	Average Basin Rainfall (mm/day)	Average Rainfall Intensity (mm/hour)	Peak Rainfall Discharge (m ³ /sec)
B-21	Quinali(B) River	157.8	0-1548	31.14	0.0030-0.092	178.	0.70	1	105.4	15.8	485.
								2	200.1	27.8	852.
								5	266.1	42.3	1298.
								10	309.7	53.2	1632.
								20	351.2	63.8	1958.
								50	405.5	77.7	2383.
								100	446.0	89.0	2731.

Note; MMSL: meters above mean sea level

min.: minutes

TABLE-II.15 RECORDED ANNUAL MINIMUM MONTHLY RAINFALL

(1) LEGASPI

(2) GUINOBATAN

(3) MALINAO

Year	Month	Amount (mm)	Remarks (No record period)	Year	Month	Amount (mm)	Remarks (No record period)
1956	June	87.0		1956	Jan.	100.5	
1957	Feb.	98.8		1957	May	26.8	
1958	Apr.	75.2		1958	Apr.	21.1	
1959	June	72.7		1959	Apr.	35.1	
1960	July	193.0	JAN. - MAR.	1960	-	-	JAN. - DEC.
1961	Feb.	46.5		1961	Feb.	1.0	
1962	Apr.	91.8		1962	Apr.	39.8	
1963	Apr.	41.9		1963	Mar.	11.4	
1964	Mar.	96.6		1964	May	50.7	
1965	Apr.	158.4		1965	Mar.	22.6	
1966	Apr.	87.8		1966	Apr.	30.4	
1967	May	47.2		1967	May	46.6	
1968	May	19.4		1968	Apr.	10.4	MAY - AUG., NOV.
1969	Feb.	24.1		1969	Mar.	7.6	JAN. JUNE
1970	May	134.5		1970	May	43.6	
1971	Apr.	137.9		1971	Apr.	73.5	FEB.
1972	Apr.	95.8		1972	Apr.	22.5	
1973	Mar.	83.0		1973	Apr.	11.2	
1974	Apr.	65.6		1974	Mar.	39.0	SEPT.
1975	Mar.	122.0		1975	Mar.	8.2	
1976	Apr.	104.9		1976	Apr.	13.6	
1977	June	107.3		1977	Oct.	8.6	
1978	Feb.	92.8	JAN.	1978	Feb.	12.0	
1979	Mar.	73.1		1979	Mar.	11.4	
1980	May	63.7		1980	Apr.	8.9	
1981	Mar.	61.8		1981	Mar.	3.8	

TABLE-II.16 RECORDED ANNUAL MINIMUM MONTHLY MEAN RUNOFF

(1) San Francisco River,
Bobongsuran (131 km²)

(2) Cabilogan River,
Bobongsuran (164 km²)

(3) Irraya River,
Obaliw (217 km²)

Year	Mean Runoff	Remarks	Year	Mean Runoff	Remarks	Year	Mean Runoff	Remarks
	(No record period)	(No record period)		(No record period)	(No record period)		(No record period)	(No record period)
1956	4.5	JAN. - APR.22	1956	7.6	JAN. - APR.22	1960	3.5	
1957	3.3		1957	7.5		1961	7.4	
1958	1.5		1958	5.3		1962	3.8	
1959	0.9		1959	4.6		1963	3.7	
1960	4.1		1960	9.0		1964	3.8	
1961	3.9		1961	7.4		1965	2.6	
1962	3.7		1962	5.6		1966	3.5	
1963	2.5		1963	5.5		1967	-	JAN. - DEC.
1964	2.7		1964	5.6		1968	-	JAN. - DEC.
1965	3.3		1965	5.3		1969	-	JAN. - DEC.
1966	3.0		1966	7.2		1970	2.9	AUG. - SEPT.
1967	3.3		1967	5.9	NOV.-DEC.	1971	2.1	
1968	1.3		1968	2.3	JAN.-MAY, AUG.-OCT	1972	3.2	
1969	2.7		1969	2.5	OCT.-NOV.	1973	3.2	
1970	1.6	JAN.-MAR.,	1970	1.8	APR., MAY, JUL.,	1974	3.9	SEPT.
		JUNE-SEPT., DEC.			SEPT., NOV., OCT.	1975	3.1	NOV.
1971	1.5	AUG.	1971	3.0	JAN., JUNE, AUG.	1976	4.5	MAR.
1972	6.0	NOV.	1972	6.5	JUL., SEPT.,	1977	3.3	JAN.
1973	4.1	AUG. - DEC.			OCT., DEC.	1978	2.1	FEB. - MAR.
1974	4.3	JAN., JUNE	1973	5.9	JAN.	1979	3.2	SEPT.26-OCT.15, DEC.
1975	4.3	JAN., FEB., APR.,	1974	11.0	JAN.	1980	3.7	JAN., SEPT.18-OCT.11
		SEPT., OCT.	1975	3.1	JAN., FEB., APR.	1981	6.8	JUL.-AUG.,
1976	2.2	SEPT.	1976	2.8	SEPT.			NOV.21 - DEC.
1977	3.6		1977	3.3				
1978	4.0	JUL. - SEPT.	1978	4.1				
1979	1.7		1979	2.7				
1980	2.8		1980	5.2				
1981	3.9		1981	2.8	JULY, AUG.			

TABLE-II.17 RECORDED ANNUAL MINIMUM MONTHLY MEAN RUNOFF

(1) Ogsong River, Benantuan (11 km ²)		(2) Nasisi River, Nasisi (39 km ²)		(3) Talisay River, Allang (90 km ²)	
Year	Mean Runoff (No record period)	Year	Mean Runoff (No record period)	Year	Mean Runoff (No record period)
1954	1.12	1951	3.2	1964	0.18
1955	1.23	1952	0.8	1965	0.94
1956	0.82	1953	1.2	1966	0.16
1957	1.49	1954	0.8	1967	-
1958	-	1955	1.3	1968	0.01
1959	-	1956	1.0	1969	0.01
1960	0.45	1957	1.1	1970	0.05
1961	0.41	1958	1.3	1971	0.07
1962	0.21	1959	1.5	1972	-
1963	0.03	1960	0.9	1973	0.08
1964	0.06	1961	1.6	1974	0.24
1965	0.07	1962	1.6	1975	0.13
1966	0.05	1963	1.4	1976	0.02
1967	0.03	1964	1.3	1977	1.53
1968	0.05	1965	1.3	1978	-
1969	0.01	1966	1.2	1979	0.58
1970	0.05	1967	0.9	1980	0.61
1971	0.02	1968	1.2	1981	0.22
1972	0.02	1969	0.8		
1973	0.02	1970	0.6		
1974	0.18	1971	0.6		
1975	0.28	1972	0.7		
1976	0.25	1973	1.7		
1977	0.76	1974	1.7		
1978	0.40	1975	0.3		
1979	0.22	1976	1.0		
1980	0.24	1977	0.4		
1981	1.03	1978	1.7		
		1979	1.0		
		1980	1.7		
		1981	0.4		

(3) Talisay River,
Allang (90 km²)

(2) Nasisi River,
Nasisi (39 km²)

(1) Ogsong River,
Benantuan (11 km²)

TABLE-II.18 RECORDED ANNUAL MINIMUM MONTHLY MEAN RUNOFF

(1) Quinali River
Busac (232 km²)

Year	Mean Runoff	Remarks (No record period)
1954	4.4	
1955	5.2	JAN. - MAR.11
1956	5.2	
1957	5.5	
1958	4.3	
1959	2.8	
1960	3.4	
1961	2.5	
1962	3.3	
1963	3.4	
1964	2.7	
1965	1.8	
1966	5.0	
1967	3.4	
1968	4.8	
1969	1.8	
1970	3.0	MAY
1971	3.9	MAR. - DEC.
1972	-	JAN. - DEC.
1973	3.8	
1974	1.8	
1975	3.0	
1976	1.5	
1977	3.2	
1978	6.6	JULY-SEPT., NOV.-DEC.
1979	1.3	JUNE-JULY
1980	0.6	
1981	6.2	JAN., JULY, AUG., OCT. - DEC.

(2) San Agustin River,
San Agustin (262 km²)

Year	Mean Runoff	Remarks (No record period)
1960	5.6	
1961	9.9	
1962	4.7	
1963	-	JAN. - DEC.
1964	3.7	
1965	5.0	
1966	1.3	
1967	3.3	
1968	2.1	
1969	0.8	DEC.
1970	3.5	JAN., MAY, SEPT.
1971	2.7	FEB.
1972	5.1	
1973	0.9	
1974	2.6	
1975	3.7	
1976	2.5	
1977	1.5	
1978	6.2	
1979	6.3	
1980	2.6	
1981	2.5	

TABLE-II.19 MONTHLY MEAN RUNOFF

(Unit: m³/sec)

Station	Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
Bobongsuran, San Francisco River (131 km ²)		6.9	5.1	4.5	5.0	4.5	5.8	7.7	7.6	7.7	7.6	7.7	9.3	6.6
Bobongsuran, Cabilogan River (164 km ²)		12.3	8.2	7.3	8.1	8.6	10.3	13.2	14.3	13.3	14.4	15.4	17.2	11.9
Benauan, Ogsong River (11 km ²)		0.9	0.7	0.6	0.6	0.8	1.0	0.9	1.0	1.3	1.7	1.8	1.6	1.1
Nasisi, Nasisi River (39 km ²)		2.6	1.9	1.8	1.8	1.7	1.7	1.6	1.7	1.7	2.0	2.7	3.1	2.0
Obaliw, Irraya River (217 km ²)		6.0	6.0	5.5	4.9	5.3	6.7	8.8	8.0	9.2	9.3	11.0	15.7	7.5
Allang, Talisay River (90 km ²)		2.0	1.0	0.6	0.4	1.1	2.4	4.8	3.9	5.9	3.1	6.2	8.2	3.4
Busac, Quinali River (232 km ²)		6.0	5.8	5.5	5.8	5.3	6.3	8.1	8.1	8.3	8.9	8.8	8.4	7.1
San Agustin, San Agustin River (262 km ²)		8.1	8.7	6.7	5.2	5.8	6.0	6.7	7.3	9.7	8.3	9.1	11.5	7.6

TABLE-II.20 ESTIMATED ANNUAL SUSPENDED LOAD
UNDER PRESENT RIVER CONDITIONS

(Unit: m³)

Station Year	Busac, Quinali River (233 km ²)	Allang, Talisay River (90 km ²)	Remarks
1954	* 70,300		
1955	77,200		
1956	232,300		
1957	69,300		
1958	52,500		
1959	19,400		
1960	6,500		
1961	47,400		
1962	46,600		
1963	70,900		
1964	55,600	* 63,300	
1965	57,500	66,400	
1966	69,600	17,500	
1967	164,100	-	
1968	210,200	20,900	
1969	9,600	5,300	
1970	* 23,100	* 193,000	
1971	* 1,400	* 300	
1972	-	-	
1973	* 217,300	* 300	
1974	11,700	* 321,000	
1975	240,300	* 1,539,800	
1976	127,000	142,500	
1977	78,800	533,300	
1978	* 45,200	261,400	
1979	* 5,800	* 94,800	
1980	15,300	* 800	
1981	* 16,200	* 500	
<hr/>			
Average	86,400	131,000	(in the Master Plan)
<hr/>			
	83,100	149,600	(in the Review)

Note: These sediment loads were estimated based on daily runoff. Specific weight of deposit sediment load was assumed to be 1.2 tons/m³. The values with asterisk (*) include some interruptions in runoff observation.

TABLE-II.21 ESTIMATED ANNUAL BED LOAD
UNDER PRESENT RIVER CONDITIONS

				(Unit: m ³)
Station	Busac, Quinali River (233 km ²)	San Augstin, San Augstin River (262 km ²)	Bacolod Talisay River (164 km ²)	Remarks
Year				
1954	* 17,800			
1955	18,400			
1956	25,600			
1957	21,800			
1958	16,700			
1959	14,700			
1960	5,300	2,300		
1961	14,200	2,900		
1962	16,600	1,300		
1963	13,200	-		
1964	10,900	1,800	* 400	
1965	14,200	600	600	
1966	16,500	1,100	200	
1967	16,600	1,500	-	
1968	23,600	1,200	* 100	
1969	8,200	* 400	100	
1970	* 10,500	* 1,700	* 500	
1971	* 1,400	* 2,100	* 0	
1972	-	2,000	* 0	
1973	23,400	2,400	* 0	
1974	8,400	* 1,200	* 1,600	
1975	27,200	2,800	3,000	
1976	14,600	2,500	700	
1977	21,800	800	2,100	
1978	* 12,600	500	800	
1979	* 5,800	400	* 400	
1980	6,800	800	* 20	
1981	* 9,100	900	* 15	
Average	16,600	1,800	1,100	(in the Master Plan)
	16,100	1,500	1,100	(in the Review)

Note: These sediment loads were estimated based on daily runoff. The values with asterisk (*) include some interruptions in runoff observation.

TABLE-II.22

BASIN AVERAGE 1-DAY RAINFALL
AT THE OCCURRENCE OF TYPHOON

Name of Typhoon	Occurrence Date	Basin Average 1-day Rainfall (mm)	Return Period (yr)
Bebang	18 Apr. 1979	113.5	1.5
Etang	1 July 1979	2.7	1.0
Pepang	18 Sept. 1979	106.3	1.4
Yayang	5 Nov. 1979	31.6	1.0
Nitang	19 July 1980	11.1	1.0
Osang	25 July 1980	34.4	1.0
Yoning	28 Oct. 1980	82.4	1.1
Aring	4 Nov. 1980	46.8	1.0
Daling	1 July 1981	167.3	4.0
Yeyeng	20 Nov. 1981	86.8	1.1
Dinang	26 Dec. 1981	87.3	1.1

TABLE-IV.1 SEDIMENT RUN-OFF VOLUME
(50-yr Probable Flood)

Base Point No.	A (km ²)	I ₂₀₀	Rd (mm)	C	D (10 ³ m ³)	Ds (10 ³ m ³ /km ²)
Quilangay R. (Quinali (A) River Basin)						
No.1	4.4	0.080	515	7.0	230.0	52.3
No.2	3.2	0.080	521	7.0	124.5	38.9
No.3	8.9	0.064	501	4.0	325.7	36.6
No.4	10.0	0.051	500	4.0	260.1	26.0
Tumpa R. (Quinali (A) River Basin)						
No.1	1.2	0.100	535	4.0	16.5	13.7
No.2	2.8	0.066	523	4.0	37.4	13.3
No.3	3.4	0.053	520	4.0	35.1	10.3
No.4	3.5	0.048	519	4.0	30.4	8.7
No.5	1.2	0.043	534	4.0	3.0	2.5
No.6	5.7	0.036	510	4.0	43.8	7.7
Maninila R. (Quinali (A) River Basin)						
No.1	1.3	0.094	533	10.0	42.4	32.6
No.2	3.3	0.063	520	10.0	116.9	35.4
No.3	4.1	0.051	516	4.0	42.6	10.7
No.4	4.9	0.046	514	7.0	94.0	19.2
Masarawag R. (Quinali (A) River Basin)						
No.1	4.1	0.113	516	10.0	571.5	139.4
No.2	5.7	0.065	511	10.0	358.4	62.9
No.3	1.0	0.059	537	7.0	7.0	7.0
No.4	7.2	0.054	506	10.0	387.0	53.8
No.5	9.7	0.041	500	7.0	276.8	28.5
Ogsong R. (Quinali (A) River Basin)						
No.1	3.5	0.08	519	7.0	147.8	42.2
No.2	5.4	0.052	511	7.0	144.1	26.7
No.3	8.3	0.034	502	7.0	140.5	16.9
Nasisi R. (Quinali (A) River Basin)						
No.1	6.0	0.082	509	10.0	627.1	104.5
No.2	3.4	0.078	519	10.0	189.4	55.7
No.3	11.0	0.058	496	10.0	1,001.4	91.0
No.4	7.7	0.057	504	4.0	119.5	25.4
No.5	5.8	0.065	510	4.0	147.9	25.5
No.6	7.7	0.044	504	4.0	116.6	15.1
No.7	26.7	0.037	473	7.0	1,528.6	57.3
No.8	35.7	0.030	465	4.0	992.1	27.8

- to be continued -

TABLE-IV.1 SEDIMENT RUN-OFF VOLUME
(50-yr Probable Flood)

Base Point No.	A (km ²)	I ₂₀₀	Rd (mm)	C	D (10 ³ m ³)	Ds (10 ³ m ³ /km ²)
Buang R. (Quinali (B) River Basin)						
No.1	4.1	0.097	510	7.0	288.0	70.2
No.2	4.7	0.073	507	7.0	211.8	45.1
No.3	8.1	0.048	496	4.0	148.8	18.4
No.4	19.2	0.031	475	4.0	319.7	16.6
Anuling R. (Yawa River Basin)						
No.1	3.6	0.093	790	7.0	489.7	136.0
No.2	2.1	0.114	803	4.0	147.8	70.4
No.3	4.7	0.059	783	7.0	329.9	70.2
No.4	4.0	0.060	787	4.0	142.7	35.7
No.5	9.4	0.045	762	4.0	415.6	44.2
Budiuro R. (Yawa River Basin)						
No.1	2.2	0.110	802	10.0	376.7	171.2
No.2	3.2	0.070	793	7.0	220.8	69.0
No.3	7.5	0.042	769	4.0	234.6	31.3
Pawa-Burabod R. (Yawa River Basin)						
No.1	4.2	0.100	786	10.0	1,089.8	259.5
No.2	6.2	0.074	774	7.0	882.7	142.4
No.3	7.6	0.043	768	4.0	252.0	33.2

Note: A - drainage area
I₂₀₀ - average river bed slope from the point concerned up to the point 200 m higher in altitude
Rd - daily rainfall
C - coefficient
D - sediment run-off volume
Ds - specific sediment run-off volume

TABLE-IV.2 ESTIMATED BED LOAD AMOUNT
(Allowable Sediment Volume)

River Name	Item	Drainage area (km ²)	River bed slope	River bed width (m)	Mean diameter of river bed materials(m)	Bed load (10 ³ m ³)	River basin
Quirangay R.		10.0	0.033	15	0.015	82.6	Quinali(A)
Tumpa R.		5.7	0.0183	20	0.015	35.2	"
Maninila R.		5.7	0.025	15	0.022	36.7	"
Masarawag R.		9.7	0.022	20	0.010	77.6	"
Ogsong R.		8.3	0.015	30	0.071	32.7	"
Nasisi R.		35.7	0.018	40	0.020	270.9	"
Quinali(B) R.		19.2	0.029	30	0.071	143.7	Quinali(B)
Anuling R.		9.4	0.02	30	0.0296	85.8	Yawa
Budiao R.		7.5	0.02	15	0.0295	58.1	"
Pawa-Burabod R.		7.6	0.019	30	0.0295	69.5	"

TABLE-IV.3 EXCESS SEDIMENT VOLUME
(50-yr Probable Flood)

(unit: 10³m³)

River Name	River Basin	Sediment Run-off Volume	Allowable Sediment Volume	Excess Sediment Volume
Quirangay River	Quinali (A)	260.1	82.6	177.5
Tumpa River	"	43.7	35.2	8.5
Maninila River	"	94.0	36.7	57.3
Masaraga River	"	276.8	77.6	199.2
Ogsong River	"	140.5	32.7	107.8
Nasisi River	"	992.1	270.9	721.2
Quinali(B)River	Quinali (B)	319.7	143.7	176.0
Anuling River	Yawa	415.6	85.8	329.8
Budiao River	"	234.6	58.1	176.5
Pawa-Burabod R.	"	252.0	69.5	182.5

TABLE-V.1 INUNDATION CALCULATION FOR THE QUINALI (A)
RIVER BASIN INCLUDING THE TALISAY RIVER

(1) Return Period (yr)	(2) Basin Average Rainfall (mm)	(3) Quinali (A) Discharge (m ³ /sec)	(4) Inundation Area (km ²)	(5) Inundation Depth (m)	(6) Inundation Duration (days)
100 (100)	665 (665)	50 (760)	89 (74)	2.66 (0.71)	3 (1)
50	593	50	89	2.35	3
20	497	50	89	1.95	2 - 3
10	422	50	89	1.63	2 - 3
5	345	50	89	1.31	2 - 3
2	228	50	89	0.82	1 - 2
1.01	74	50	89	0.17	0

Notes: (1) (5) = $\left\{ (2) \times 10^{-3} \times 535 \times 10^6 \times 0.7 - (3) \times 86,400 \times 3 \right\}$
+ (89×10^6)

(2) Rainfall duration is 3 days.

(3) Figures in () are those in with-project condition and others are in without-project condition.

(4) In with-project condition, no inundation is caused by the probable flood with return period of less than 50-year.

TABLE-V.2 INUNDATION CALCULATION FOR THE QUINALI (B)
RIVER BASIN

(1) Return Period (yr)	(2) Basin Average Rainfall (mm)	(3) Quinali (A) Discharge (m ³ /sec)	(4) Inundation Area (km ²)	(5) Inundation Depth (m)	(6) Inundation Duration (days)
100 (100)	446 (446)	250 (465)	11.9 (11.9)	2.33 (0.77)	2 - 3 (1)
50	406	250	11.9	1.96	2 - 3
20	353	250	11.9	1.47	1 - 2
10	311	250	11.9	1.08	1 - 2
5	267	250	11.9	0.67	1
2	201	250	11.9	-	-
1.01	105	250	11.9	-	-

Notes: (1) (5) = $\left\{ (2) \times 10^{-3} \times 158 \times 10^6 \times 0.7 - (3) \times 86,400 \right\}$
+ (11.9×10^6)

(2) Hyphen (-) means no inundation.

(3) Rainfall duration is 1 day.

(4) Figures in () are those in with-project condition and others are in without-project condition.

(5) In with-project condition, no inundation is caused by the probable flood with return period of less than 50-year.

TABLE-V.3 FLOODING DEPTH OF AREA (A) IN
THE QUINALI (B) RIVER BASIN

(1)	(2)	(3)	(4)	(5)
Return Period	Peak Runoff (m ³ /sec)	Flooding Depth (Without Project) (m)	Flooding Depth (With Project) (m)	Flooding Duration (days)
100	2,490	1.90	1.25	1
50	2,142	1.75	-	-
20	1,732	1.55	-	-
10	1,420	1.40	-	-
5	1,106	1.20	-	-
2	704	0.90	-	-
1.01	407	0.75	-	-

Notes: (1) Slope of Ground Surface 1/170
(2) Roughness Coefficient 0.060
(3) Hyphen (-) means no flooding.

TABLE-V.4 FLOODING DEPTH OF AREA (B) IN
THE QUINALI (B) RIVER BASIN

(1)	(2)	(3)	(4)	(5)
Return Period (yr)	Peak Runoff (Sec. B-1) (m ³ /sec)	Peak Runoff (Sec. B-2) (m ³ /sec)	Flooding Depth (Sec. B-1) (m)	Flooding Depth (Sec. B-2) (m)
100 (100)	578 (578)	306 (306)	0.65 (0.65)	0.29 (0.29)
50	492	261	0.59	0.27
20	396	210	0.52	0.23
10	321	170	0.46	0.21
5	248	131	0.39	0.18
2	155	82	0.30	0.13
1.01	91	48	0.22	0.10

- Notes: (1) Slope of Ground Surface Sec. B-1 1/150
Sec. B-2 1/200
- (2) Roughness Coefficient 0.060
- (3) Figures in () are those in with-project condition and others are in without-project condition.
- (4) In with-project condition, no flooding is caused by the probable flood with return period of less than 50-year.

TABLE-V.5 FLOODING DEPTH IN THE YAWA RIVER BASIN

(1) Return Period (yr)	(2) Peak Runoff (m ³ /sec)	(3) Yawa R. Discharge (m ³ /sec)	(4) Flooding Depth (m)	(5) Flooding Duration (days)
100 (100)	2,711 (2,711)	550 (810)	2.54 (2.09)	1 (1)
50	2,142	550	2.13	1
20	1,547	550	1.66	1
10	1,163	550	1.28	1
5	832	550	0.86	1
2	470	470	-	-
1.01	256	256	-	-

- Notes:
- (1) Slope of Ground Surface 1/1,000
 - (2) Roughness Coefficient 0.060 - 0.100
 - (3) Hyphen (-) means no flooding.
 - (4) Figures in () are those in with-project condition and others are in without-project condition.
 - (5) In with-project condition, no flooding is caused by the probable flood with return period of less than 50-year.

TABLE-V.6 SEDIMENT BALANCE OF THE QUINALI (A) RIVER, MAIN COURSE

(Unit: m³/sec)

Section	50-yr Flood		10-yr Flood		1.01-yr Flood	
	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge
Sta.23+000	2,710	0.41	1,790	0.26	330	0.18
Sta.13+000	2,710	0.33	1,790	0.24	330	0.05
Sta.12+000	3,010	0.36	1,790	0.21	380	0.05
Sta. 8+000	3,010	0.23	2,030	0.15	380	0.03
Sta. 6+000	3,020	0.23	2,050	0.15	390	0.03
Sta. 4+000	3,020	0.13	2,050	0.12	390	0.01
Sta. 2+000	4,260	0.20	2,910	0.21	550	0.01

TABLE-V.7 SEDIMENT BALANCE OF THE NASISI RIVER

(Unit: m³/sec)

Section	50-yr Flood		10-yr Flood		1.01-yr Flood	
	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge
Sta. 7+000	920	1.57	560	0.66	100	0.04
Sta. 5+000	920	1.04	560	0.45	100	0.03
Sta. 3+000	920	0.81	560	0.35	100	0.03
Sta. 2+000	920	0.22	560	0.10	100	0.01
Sta. 0+000	1,660	0.07	1,050	0.23	190	0.02

TABLE-V.8 SEDIMENT BALANCE OF THE TALISAY RIVER

(Unit: m³/sec)

Section	50-yr Flood		10-yr Flood		1.01-yr Flood	
	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge
Sta. 7+000	1,970	0.28	1,330	0.23	310	0.02
Sta. 5+000	1,970	0.18	1,330	0.14	310	0.02
Sta. 3+000	1,970	0.19	1,330	0.14	310	0.02
Sta. 2+000	1,970	0.15	1,330	0.01	310	0.02
Sta. 0+000	1,980	0.10	1,360	0.01	330	0.01

TABLE-V.9 SEDIMENT BALANCE OF THE QUINALI (B) RIVER

(Unit: m³/sec)

Section	50-yr Flood		10-yr Flood		1.01-yr Flood	
	Water Discharge	Dediment Discharge	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge
Sta. 13+000	1,930	3.72	1,260	2.24	360	0.51
Sta. 11+000	1,930	4.54	1,260	2.81	360	0.59
Sta. 10+000	2,150	2.84	1,420	1.64	410	0.31
Sta. 7+000	2,150	0.43	1,420	0.20	410	0.03
Sta. 4+000	2,150	0.28	1,420	0.09	410	0.03
Sta. 3+000	2,220	0.22	1,500	0.10	440	0.01
Sta. 2+000	2,420	0.17	1,650	0.08	490	0.01
Sta. 1+000	2,420	0.06	1,650	0.02	490	0.01

TABLE-V.10 SEDIMENT BALANCE OF THE YAWA RIVER

(Unit: m³/sec)

Section	50-yr Flood		10-yr Flood		1.01-yr Flood	
	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge	Water Discharge	Sediment Discharge
Sta. 1+000	2,150	1.33	1,170	0.49	260	0.08
Sta. 0+000	2,150	0.15	1,170	0.06	260	0.01

TABLE-VI.1 IRRIGATION WATER RESOURCES IN THE PROJECT AREA

Irrigation System	Water resources
<u>Quinali (A) River Basin</u>	
Irrigation systems in lower and middle reach	Surface water of the Quinali (A) River and its tributaries.
Irrigation systems in upper reach	Spring water in the slope of Mayon Volcano.
<u>Quinali (B) River Basin</u>	
Irrigation system in middle reach	Spring water in the slope of Mayon Volcano.
Irrigation system in lower reach	Surface water of the Quinali (B) River and its tributaries.

TABLE-VI.2 RESULTS OF WATER QUALITY ANALYSIS

Item	<u>Quinali (A) River</u>		<u>Cabilogan River</u>
	South Quinali	Agos-Sta. Cruz	Cabilogan
Conductivity mmhos/cm	250	200	300
Alkalinity mg/l	138	142	177
Chloride mg/l	3	5	6
Hardness mg/l	134	116	166
Iron mg/l	0.8	0.8	0.13
pH	6.8	7.0	7.0
Total solids mg/l	230	190	250
Calcium mg/l	29	25	43
Manganese mg/l	Nil	Nil	Nil
Magnesium mg/l	15	13	15
Sulfate mg/l	25	Nil	30
Boron mg/l	Nil	Nil	Nil

TABLE-VI.3 POPULATION AND HOUSEHOLD
IN THE PROJECT AREA IN 1980

City / Municipality	Household	Family Size ^{/1}	Population	Composition of Farm Household ^{/2} (%)	Farm Household
	(1)	(2)	(1)x(2)		(1)x(3)
1) Legazpi City	6,030	5.77	34,800	34.4	2,070
2) Polangui	6,540	5.77	37,700	42.2	2,760
3) Oas	5,300	5.53	29,300	62.2	3,300
4) Libon	4,420	5.75	25,400	93.3	4,120
5) Daraga	7,330	5.66	41,500	69.0	5,060
6) Camalig	4,960	5.52	27,400	67.9	3,370
7) Guinobatan	4,950	5.52	27,300	59.9	2,960
8) Bacacay	4,050	5.71	23,100	53.3	2,160
9) Malinao	3,890	5.40	21,000	58.3	2,270
10) Tabaco	11,240	5.68	63,800	54.5	6,130
11) Malilipot	3,670	5.58	20,500	25.0	920
12) Ligao	7,900	5.97	47,200	37.0	2,920
13) Sto. Domingo	3,090	5.73	17,700	37.3	1,150
Total/Average	73,370	5.69	416,700	53.4	39,190

^{/1} : See Table

^{/2} : Results of farm economic survey by the survey team of the Master Plan

TABLE-VI.4 PRESENT LAND USE IN THE PROJECT AREA

Land Category	Area	Composition
1. Residential area	2,759 ha	4.0 %
2. School	97	0.1
3. Church	2	0.0
4. Reclaimed area	38	0.0
5. Airport	36	0.0
6. Golf course	65	0.1
7. Agricultural land	44,712	64.0
- Paddy field	(21,700)	(31.1)
- Upland	(1,879)	(2.7)
- Coconut field	(20,880)	(29.9)
- Abaca field	(131)	(0.2)
- Citrus field	(122)	(0.2)
8. Fish pond	15	0.0
9. Forest	10,182	14.6
10. Bush	1,697	2.4
11. Nipa field	268	0.4
12. Grass land	7,720	11.0
13. Bare land	1,845	2.6
14. Water surface	466	0.7
Total	69,902	(100.0)