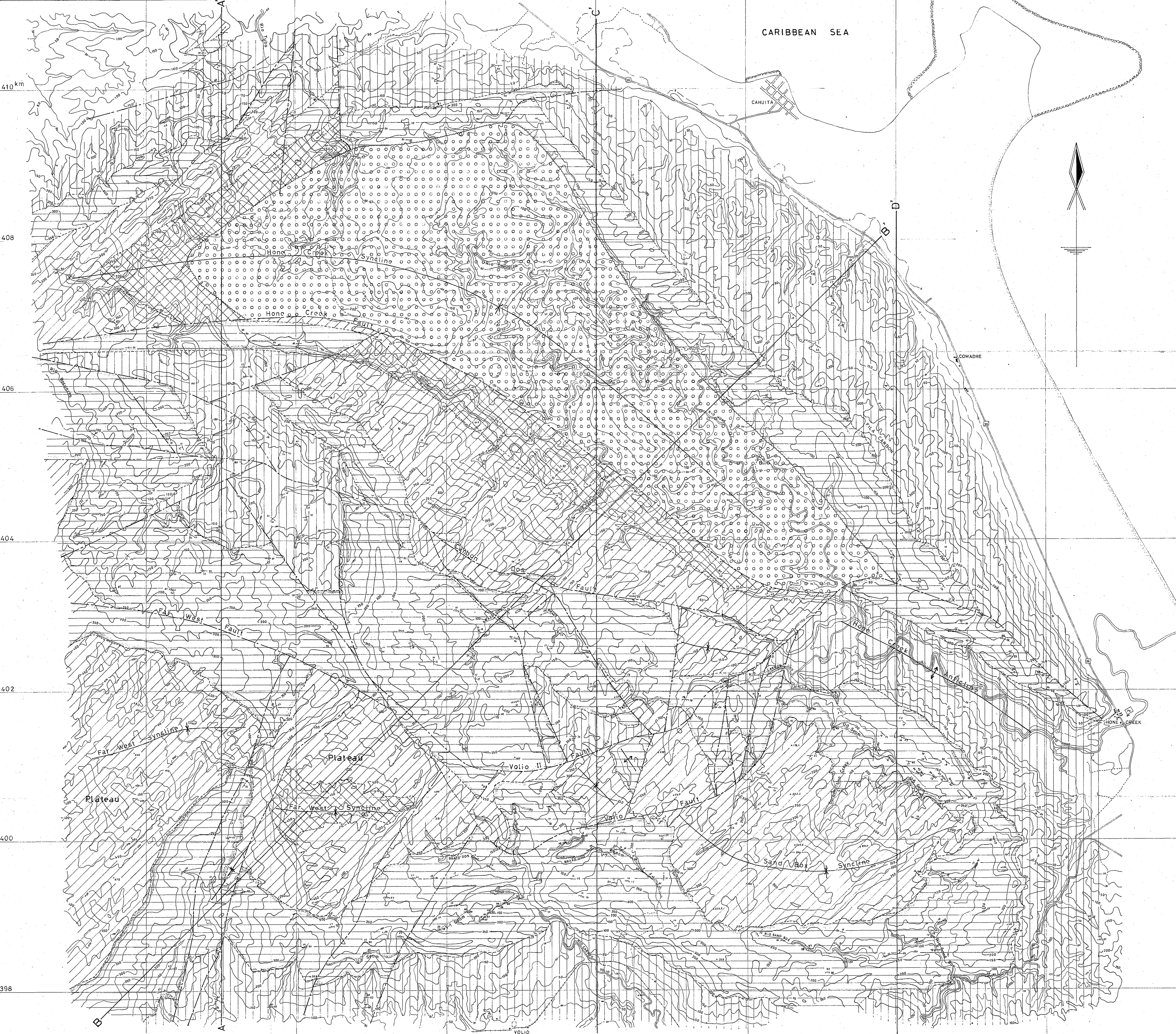




Figure 2 Geological Map of Baja Talamanca Coal Field

Scale 1: 20,000



LEGEND

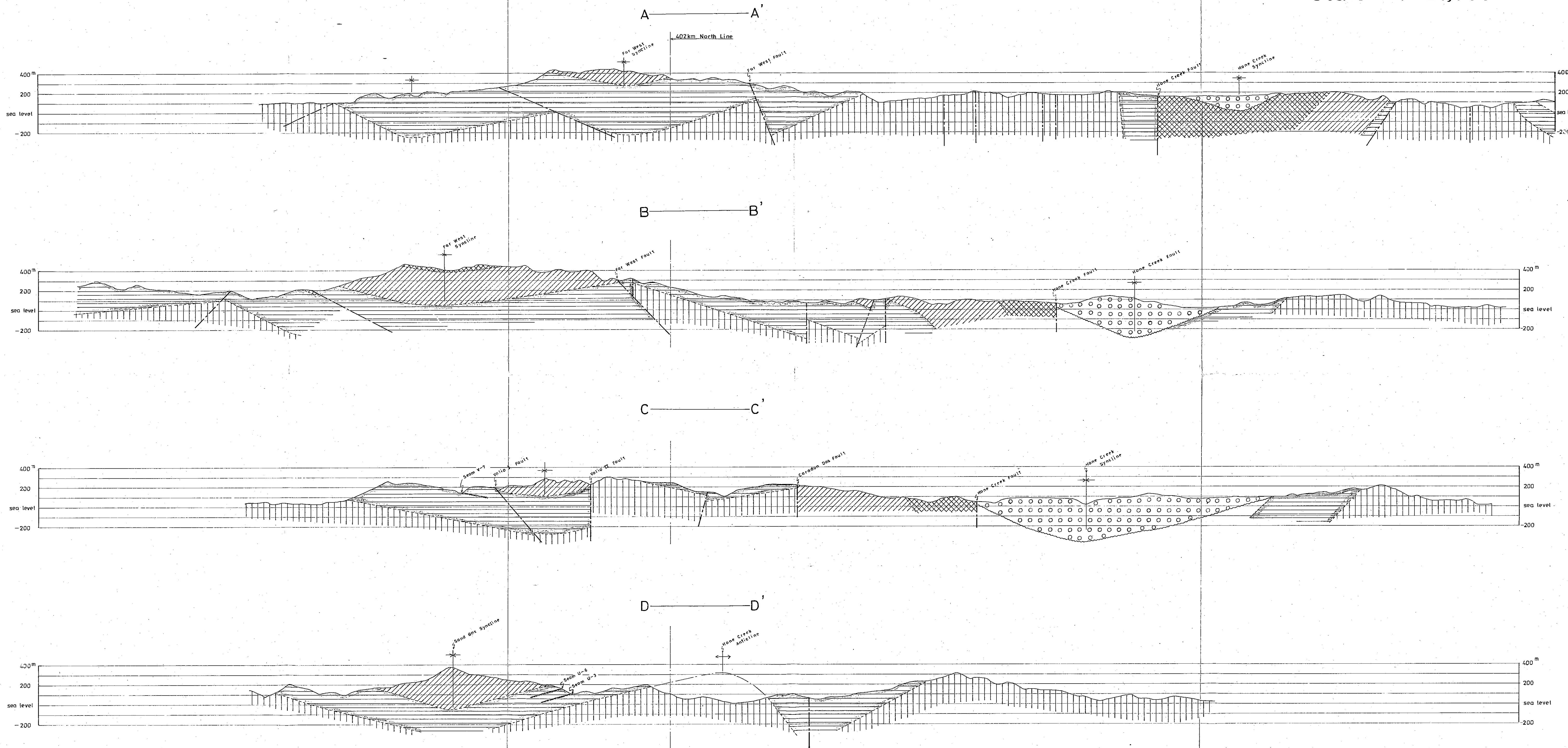
- |  |                            |  |                    |
|--|----------------------------|--|--------------------|
|  | Suretka Formation          |  | Fault              |
|  | Upper Coarse Facies Member |  | Syncline           |
|  | Middle Fine Facies Member  |  | Anticline          |
|  | Lower Coal bearing Member  |  | Main Coal Seam     |
|  | Uscari Formation           |  | Geological Section |

Baja Talamanca Coal Development Project	
Geological Map of Baja Talamanca Coal Field	
Scale 1: 20,000	
Japan International Cooperation Agency (JICA)	
Date: Feb., 1983	Fig. 2

502 km 504 506 508 510 512

Figure 3 Geological Sections of Baja Talamanca Coal Field

Scale 1:20,000



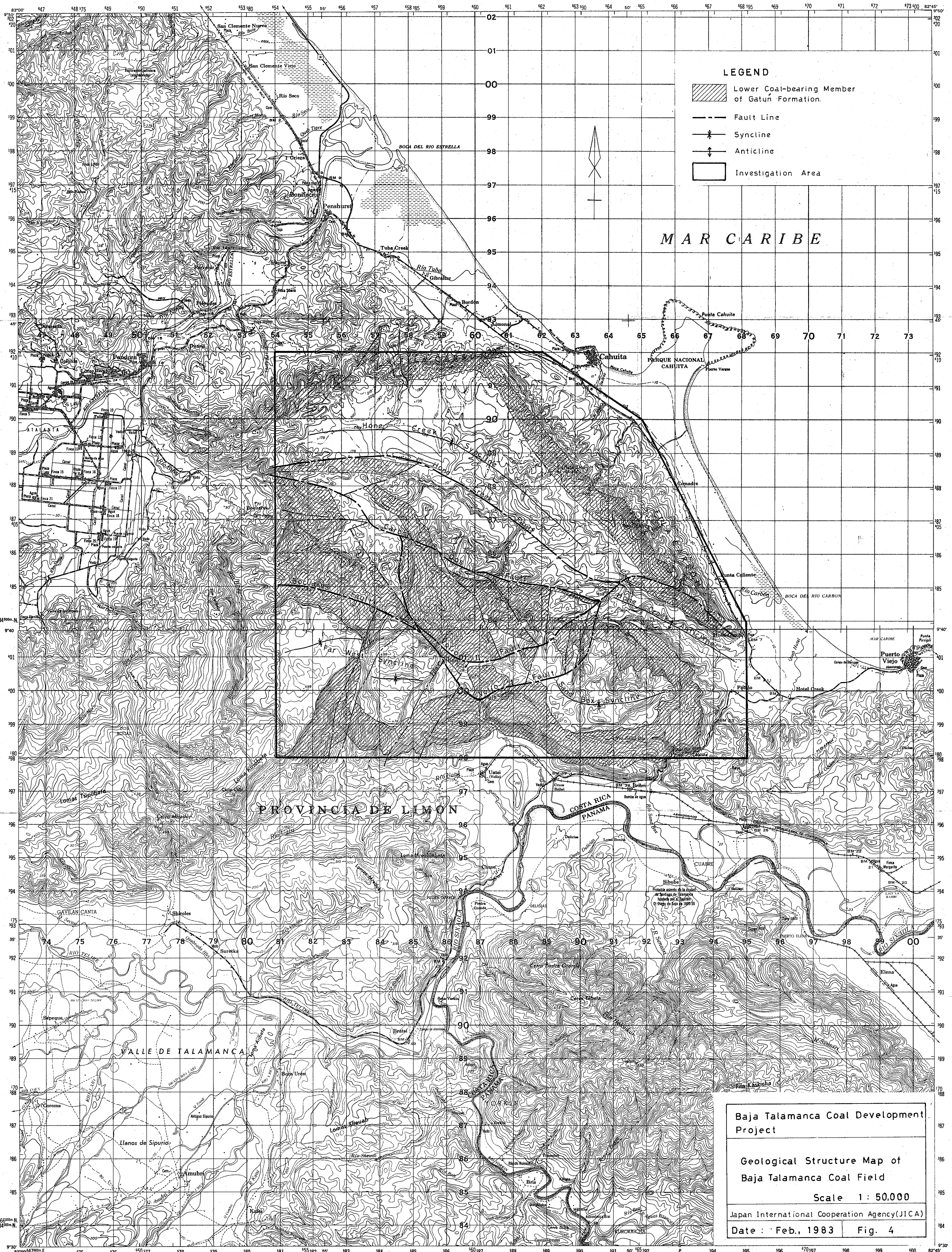
LEGEND

- |  |   |  |                |
|--|---|--|----------------|
|  | Suretka Formation   |  | Fault          |
|  | Upper Coarse Facies Member<br>Middle Fine Facies Member<br>Lower Coal bearing Member<br>} Gatún Formation |  | Syncline       |
|  |   |  | Anticline      |
|  |   |  | Main Coal Seam |
|  | Uscari Formation  |  |                |

Baja Talamanca Coal Development Project	
Geological Sections of Baja Talamanca Coal Field	
Scale 1:20,000	
Japan International Cooperation Agency(JICA)	
Date: Feb., 1983	Fig. 3

Figure 4 Geological Structure Map of Baja Talamanca Coal Field

Scale 1 : 50,000



Baja Talamanca Coal Development Project

Geological Structure Map of Baja Talamanca Coal Field

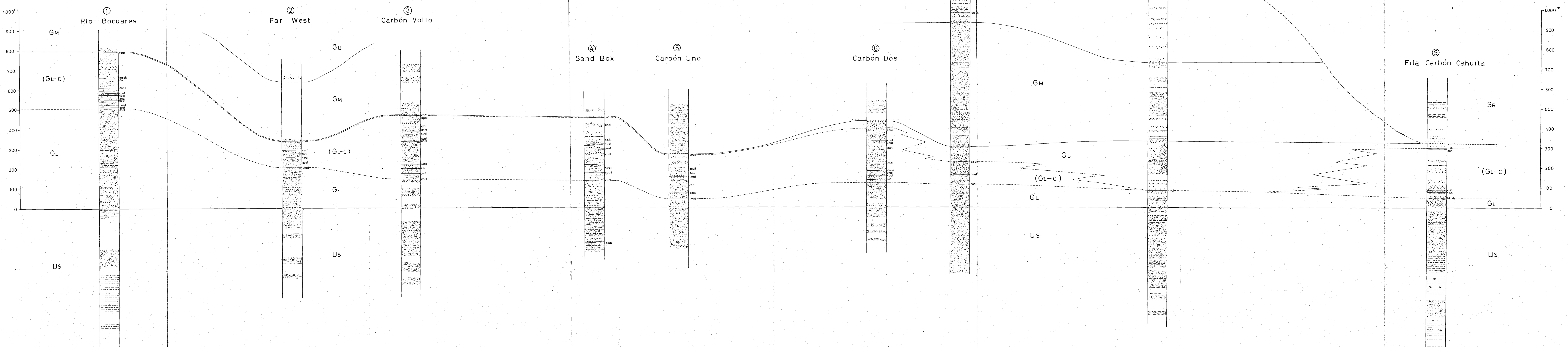
Scale 1 : 50,000

Japan International Cooperation Agency (JICA)

Date : Feb., 1983 Fig. 4

Figure 5 Correlated Stratigraphic Columnar Sections Over the Whole Area

Scale Vertical 1: 5,000  
Horizontal 1: 30,000

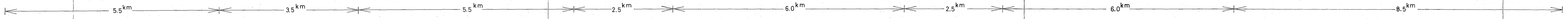


**LEGEND**

SR Suretka Formation  
 ~~~~~ unconformity  
 GU Upper Coarse Facies Member  
 GM Middle Fine Facies Member  
 GL Lower Coal-bearing Member (Coal-bearing Zone)  
 Us Uscari Formation

**Gatún Formation**

coal seam  
 black shale & coaly shale  
 shale  
 sandy shale  
 fine sandstone  
 medium to coarse sandstone  
 conglomerate  
 tuff  
 shell fossil  
 calcareous marl



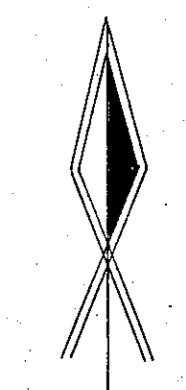
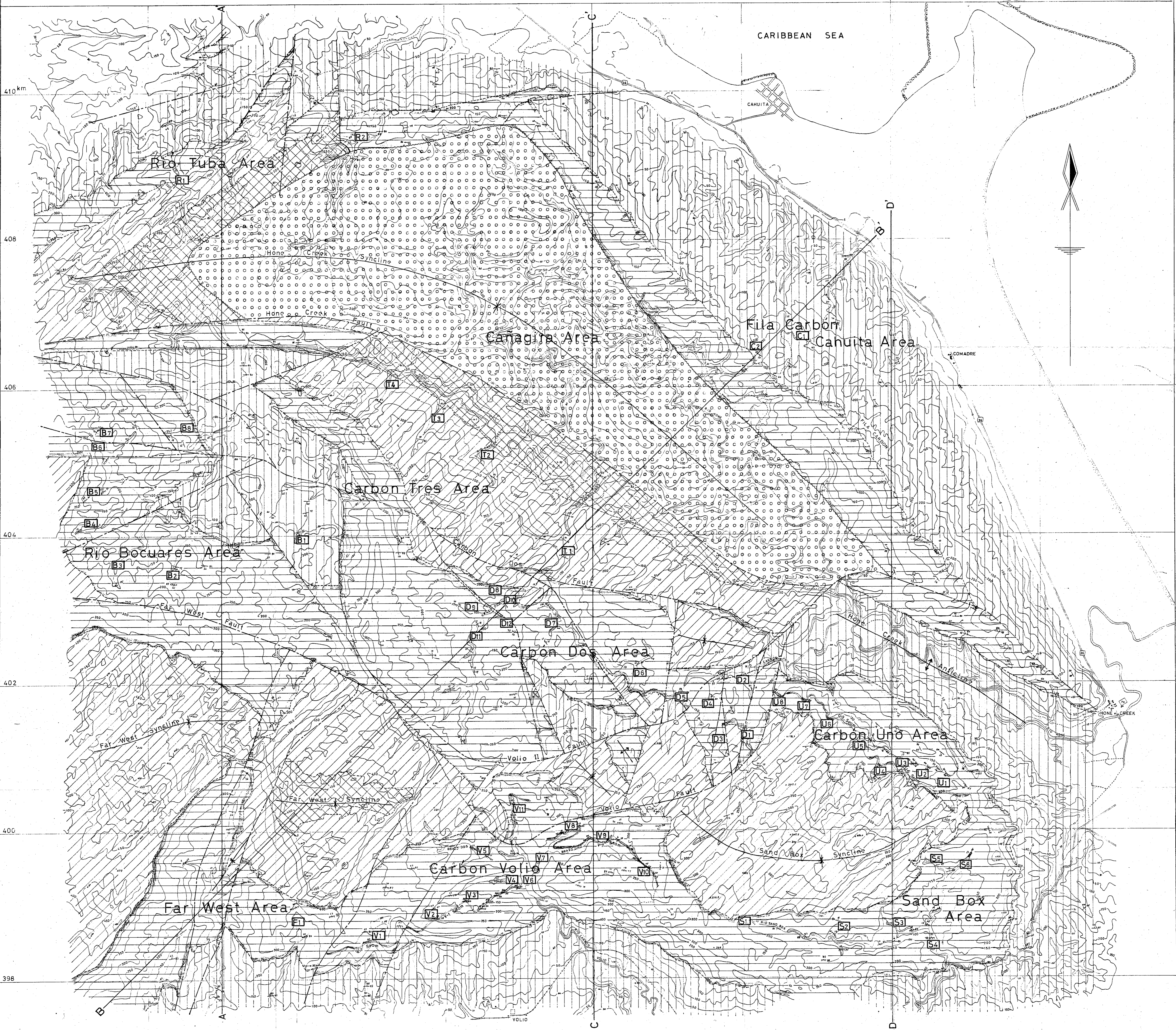
Baja Talamanca  
 Coal Development Project  
 Correlated Stratigraphic Columnar Sections Over the Whole Area

Scale V. 1: 5,000  
 H. 1: 30,000

Japan International Cooperation Agency (JICA)  
 Date: Feb., 1983 Fig. 5

Figure 6-0 Locality Map of Stratigraphic Columnar Sections

Scale 1: 20,000



LEGEND

- |  |                            |  |                      |
|--|----------------------------|--|----------------------|
|  | Suretka Formation          |  | Fault                |
|  | Upper Coarse Facies Member |  | Syncline             |
|  | Middle Fine Facies Member  |  | Anticline            |
|  | Lower Coal bearing Member  |  | Main Coal Seam       |
|  | Uscari Formation           |  | A Geological Section |
|  |                            |  | Section Number       |

Baja Talamanca  
Coal Development Project

Locality Map of Stratigraphic  
Columnar Sections

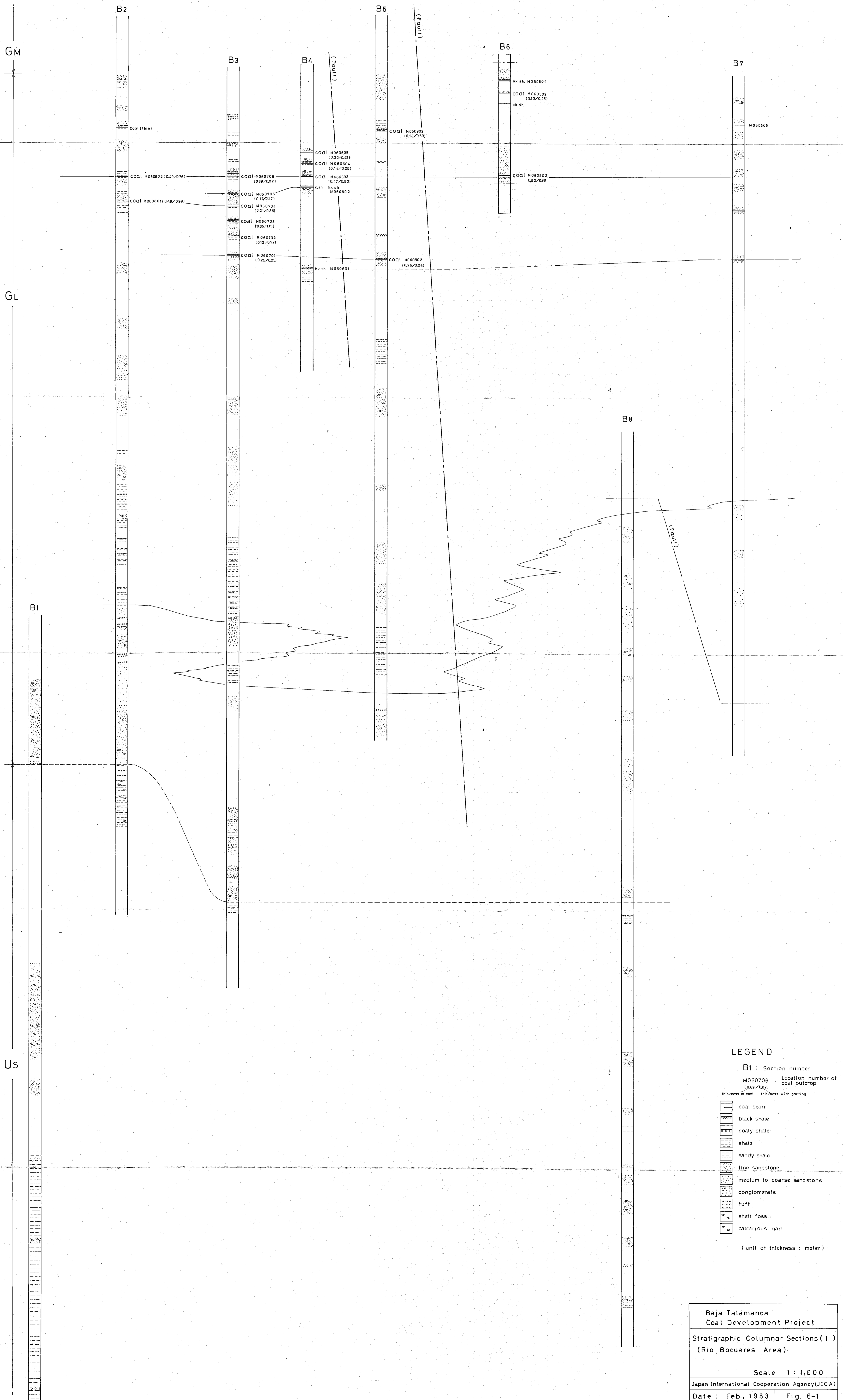
Scale 1: 20,000

Japan International Cooperation Agency (JICA)

Date: Feb, 1983 Fig. 6-0

Figure 6-1 Stratigraphic Columnar Sections (1)  
(Rio Bocuares Area)

Scale 1 : 1,000



**LEGEND**

B1 : Section number  
 M060706 : Location number of coal outcrop  
 (0.69/0.82)

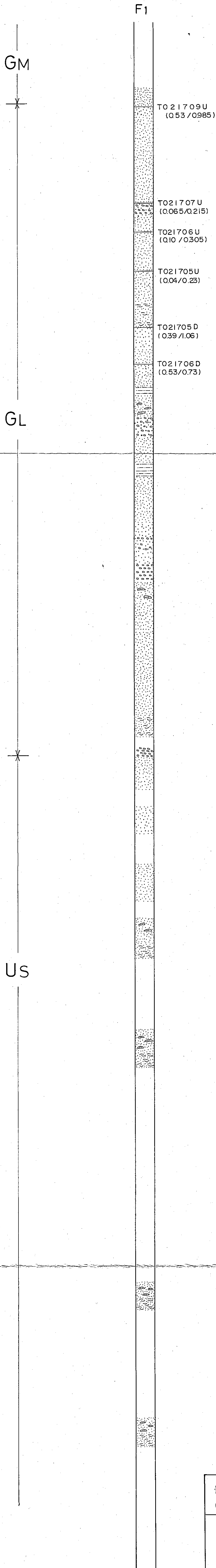
Thickness of coal    thickness with parting

- coal seam
- black shale
- coaly shale
- shale
- sandy shale
- fine sandstone
- medium to coarse sandstone
- conglomerate
- tuff
- shell fossil
- calcareous marl

(unit of thickness : meter)

Figure 6-2  
 Stratigraphic Columnar Section (2)  
 (Far West Area)

Scale 1:1,000












LEGEND

F1 : Section number

T021709U : Location number of coal outcrop

thickness of coal    thickness with parting

-  coal seam
-  shale
-  sandy shale
-  fine sandstone
-  medium to coarse sandstone
-  conglomerate
-  tuff
-  shell fossil
-  calcareous marl

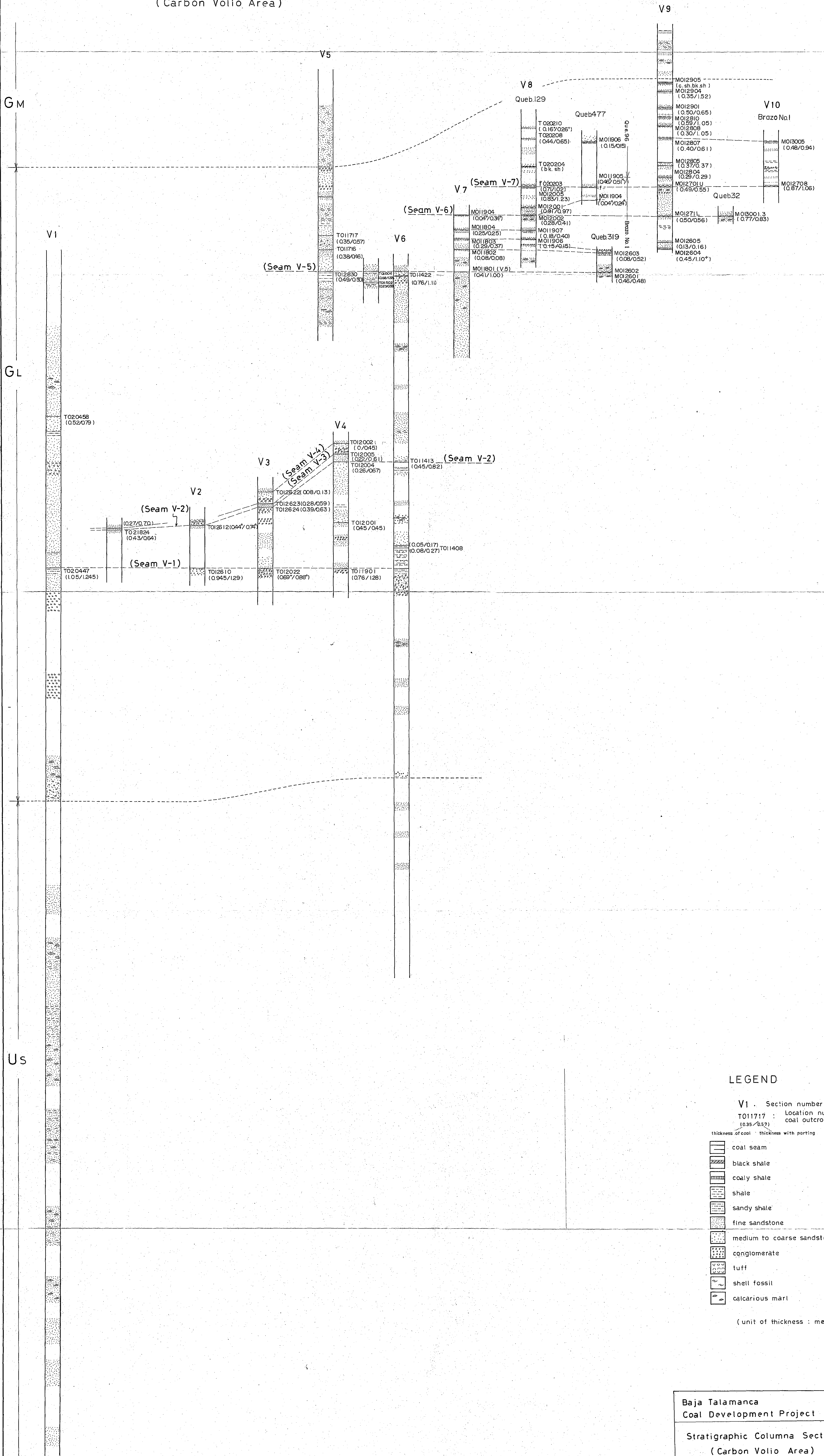
(unit of thickness : meter)

|                                                      |          |
|------------------------------------------------------|----------|
| Baja Talamanca<br>Coal Development Project           |          |
| Stratigraphic Columnar Section(2)<br>(Far West Area) |          |
| Scale 1:1,000                                        |          |
| Japan International Cooperation Agency(JICA)         |          |
| Date : Feb., 1983                                    | Fig. 6-2 |



Figure 6-3a Stratigraphic Columnar Sections (3a)  
(Carbón Volio Area)

Scale 1:1,000

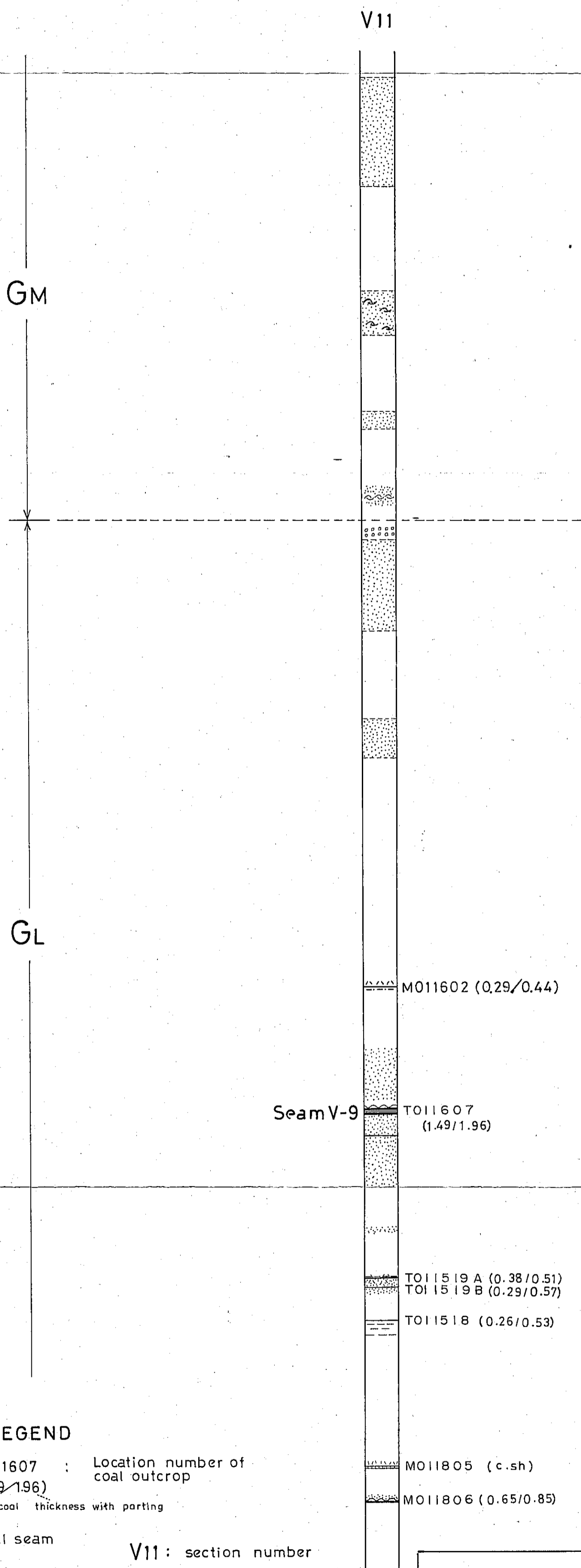


LEGEND

- V1 . Section number
  - T01177 : Location number of coal outcrop  
(0.35/0.57)
  - thickness of coal : thickness with parting
  - coal seam
  - black shale
  - coaly shale
  - shale
  - sandy shale
  - fine sandstone
  - medium to coarse sandstone
  - conglomerate
  - tuff
  - shell fossil
  - calcareous marl
- (unit of thickness : meter)









Figure 6-3b  
 Stratigraphic Columnar Section (3b)  
 (Northern Part of Carbón Volio Area)

Scale 1:1,000



LEGEND

T011607 : Location number of coal outcrop  
 (1.49/1.96)  
 thickness of coal    thickness with parting

-  coal seam
-  shale
-  sandstone
-  conglomerate
-  coaly shale
-  tuff
-  shell fossil
-  irregular boundary

V11 : section number

(unit of thickness : meter)

|                                                                                  |           |
|----------------------------------------------------------------------------------|-----------|
| Baja Talamanca<br>Coal Development Project                                       |           |
| Stratigraphic Columnar Section (3b )<br>(Northern Part of Carbón<br>Volio Area ) |           |
| Scale 1:1,000                                                                    |           |
| Japan International Cooperation Agency(JICA)                                     |           |
| Date : Feb., 1983                                                                | Fig. 6-3b |

Figure 6-4 Stratigraphic Columnar Sections (4)  
(Sand Box Area)

Scale 1 : 1,000

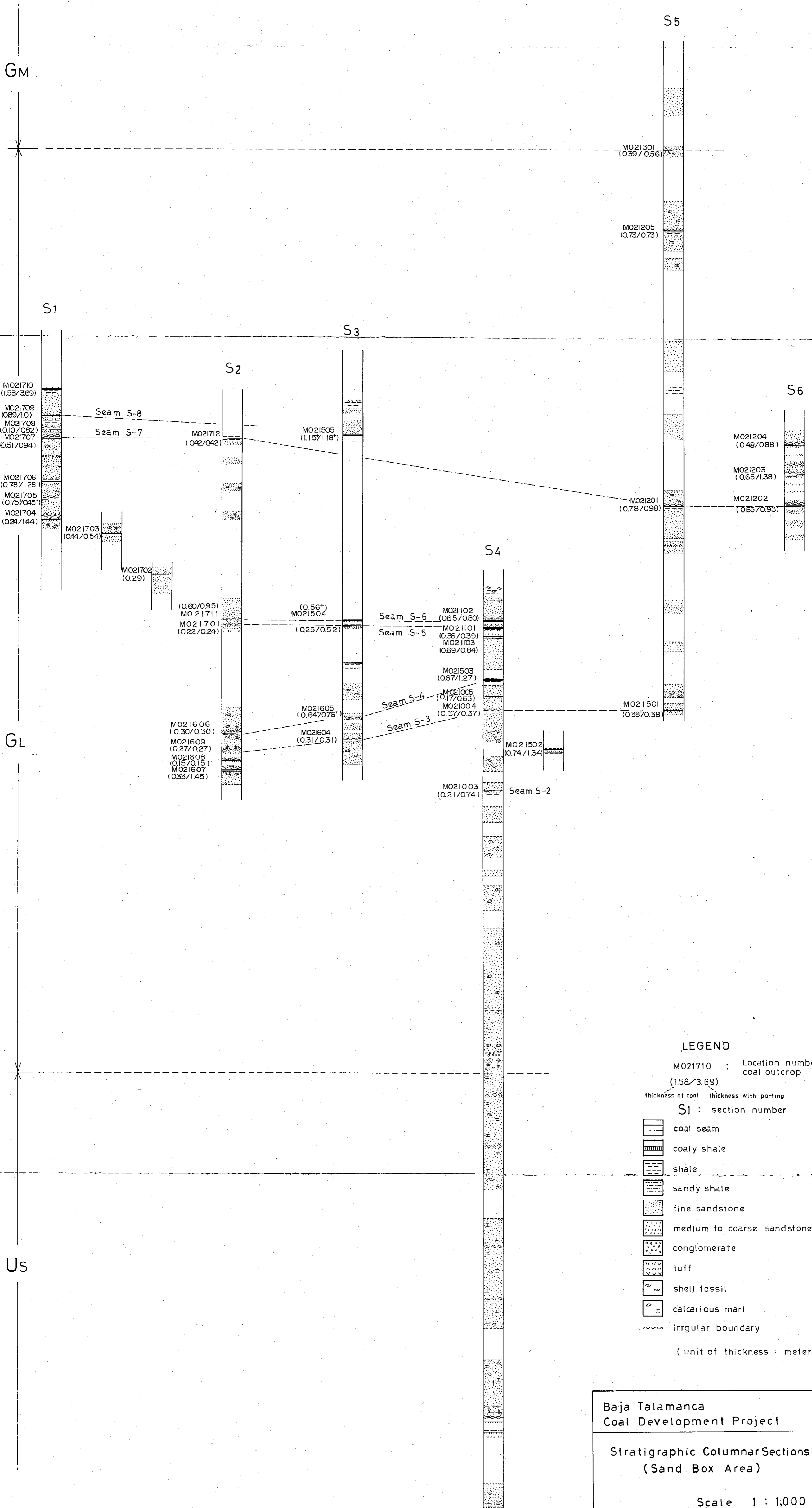
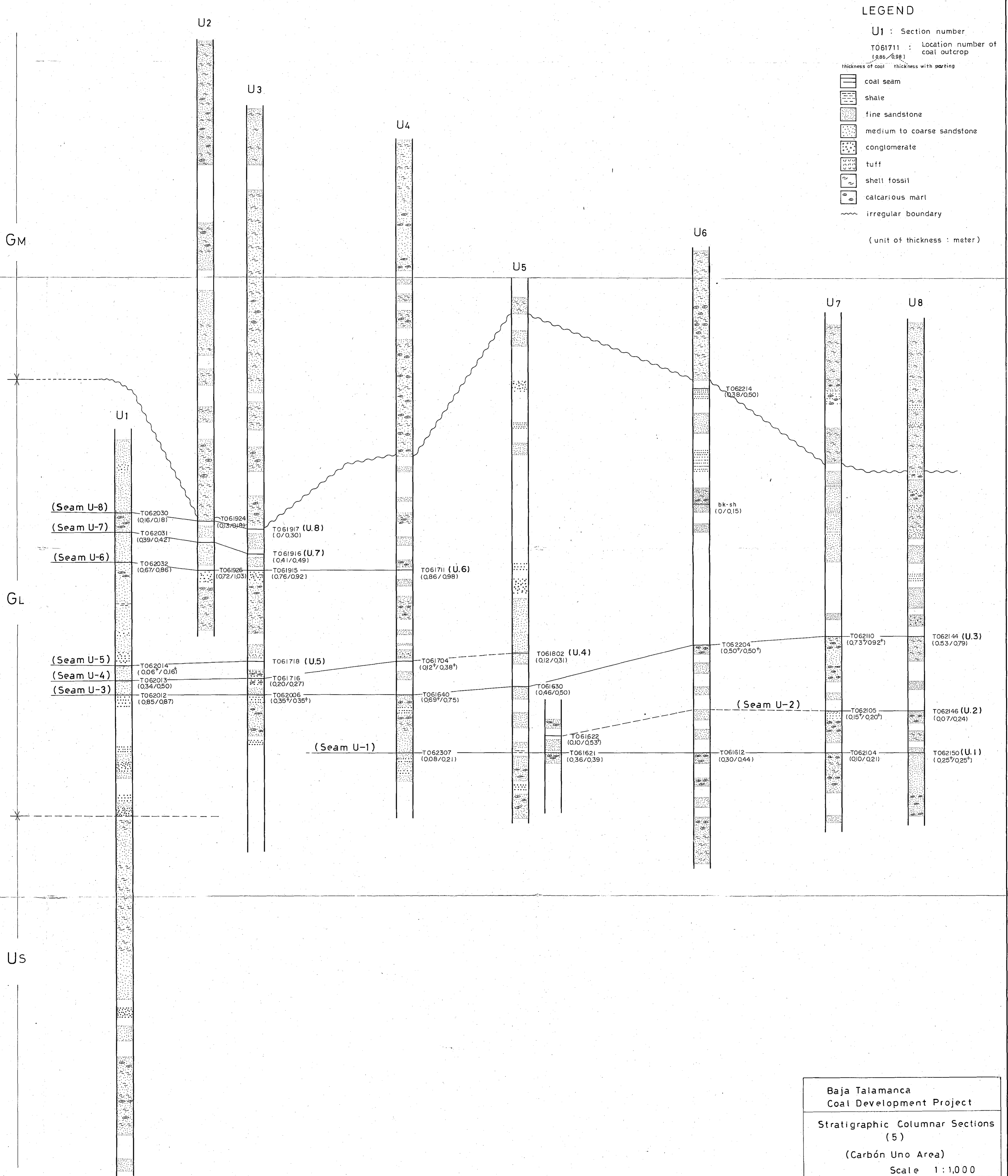


Figure 6-5

Stratigraphic Columnar Sections (5)  
(Carbón Uno Area)

Scale 1 : 1,000



Baja Talamanca  
Coal Development Project

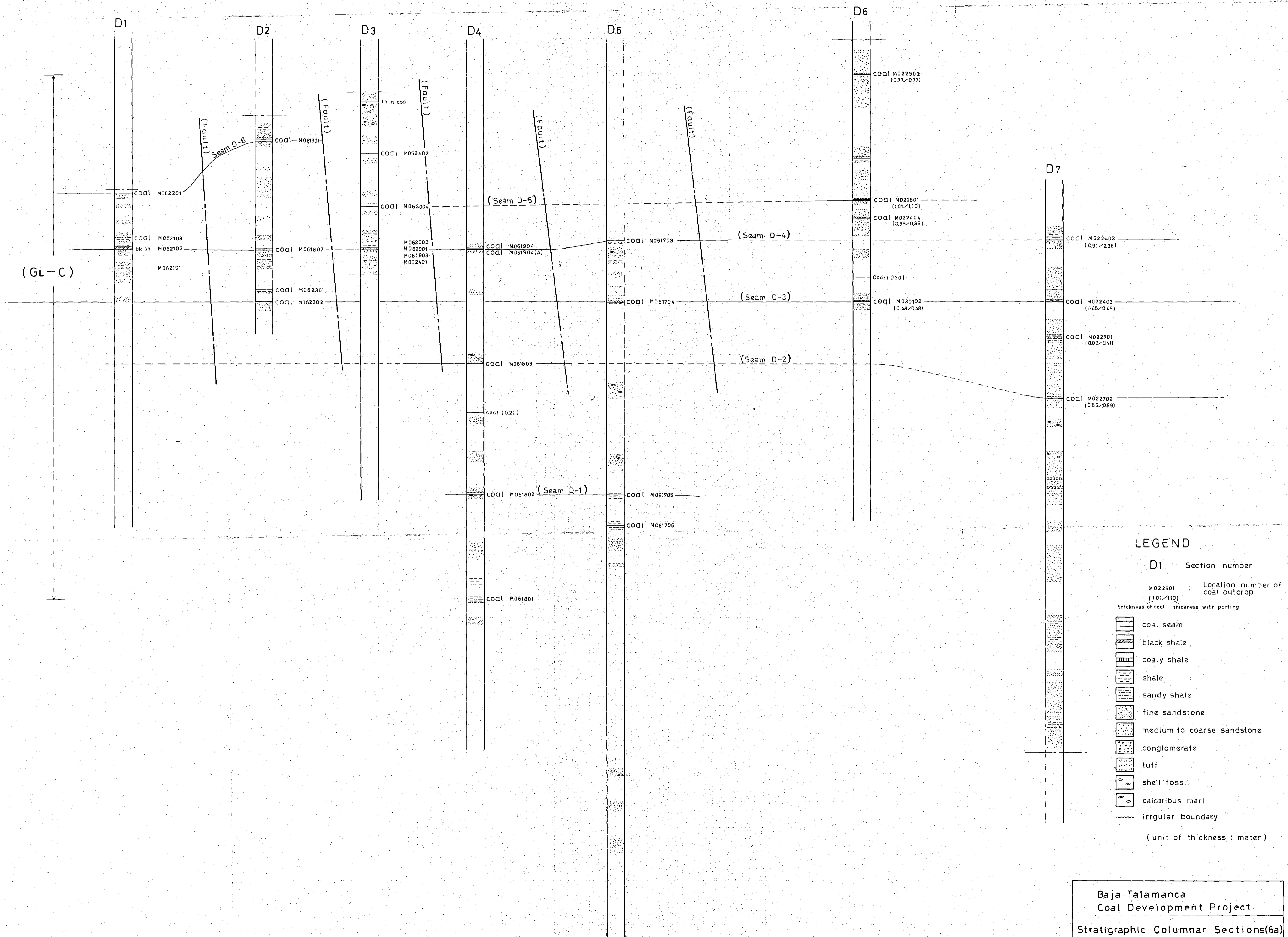
Stratigraphic Columnar Sections  
(5)  
(Carbón Uno Area)  
Scale 1 : 1,000

Japan International Cooperation Agency (JICA)

Date : Feb., 1983 | Fig. 6-5

Figure 6-6a Stratigraphic Columnar Sections(6a)  
(Eastern Part of Carbón Dos Area)

Scale 1 : 1.000



LEGEND

- D1 : Section number
- M022501 : Location number of coal outcrop  
(1.01/1.10)
- thickness of coal    thickness with parting
- coal seam
  - black shale
  - coaly shale
  - shale
  - sandy shale
  - fine sandstone
  - medium to coarse sandstone
  - conglomerate
  - tuff
  - shell fossil
  - calcareous marl
  - irregular boundary
- (unit of thickness : meter)

Baja Talamasca  
Coal Development Project

Stratigraphic Columnar Sections(6a)  
(Eastern Part of Carbon Dos Area)

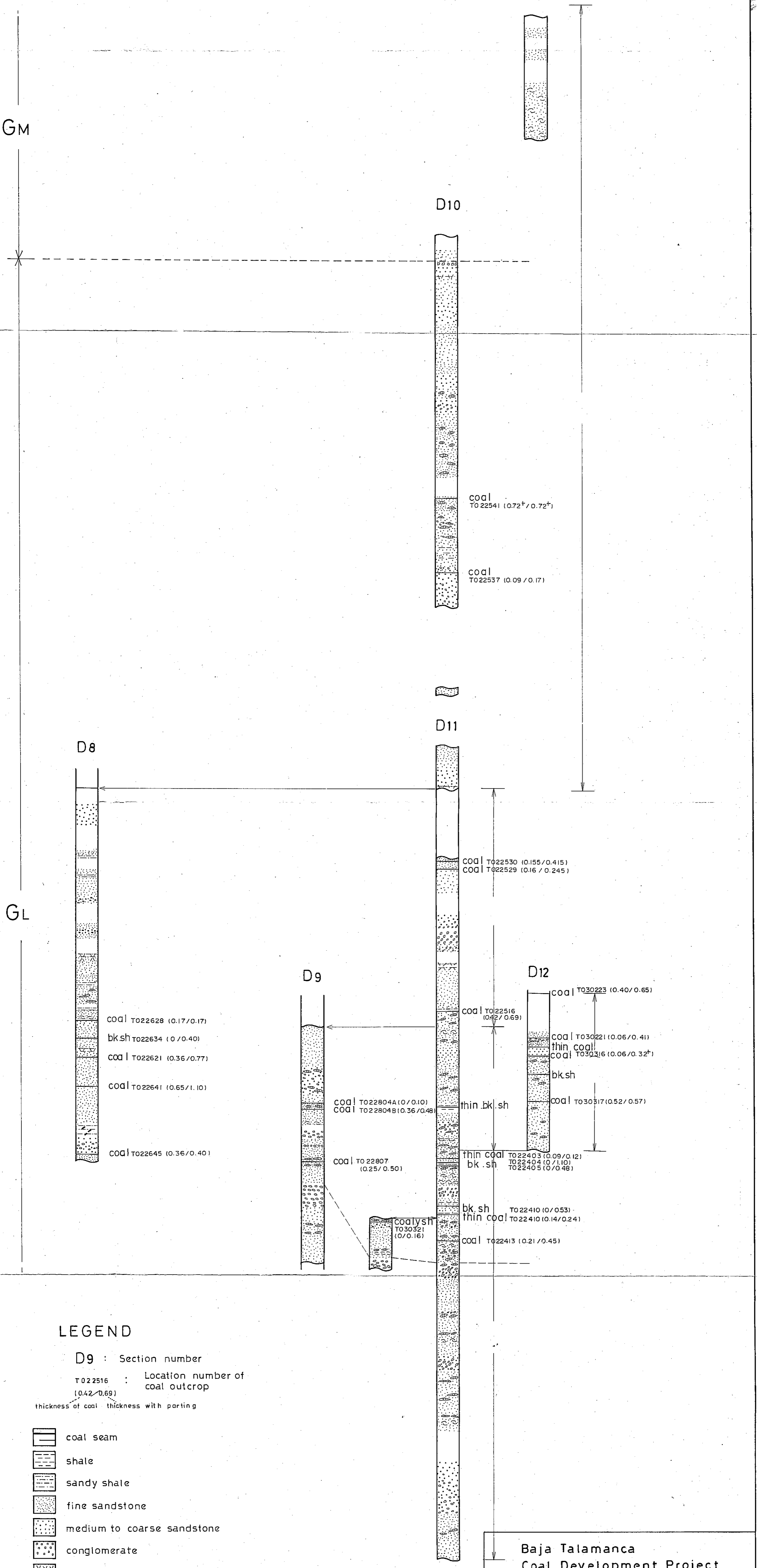
Scale 1 : 1.000

Japan International Cooperation Agency(JICA)

Date : Feb., 1983    Fig. 6-6a










Figure 6-6b  
Stratigraphic Columnar Sections(6b)  
(Carbon Dos Area)

Scale 1 : 1,000



LEGEND

D9 : Section number  
T022516 : Location number of coal outcrop  
(0.42/0.69)  
thickness of coal thickness with parting

-  coal seam
-  shale
-  sandy shale
-  fine sandstone
-  medium to coarse sandstone
-  conglomerate
-  tuff
-  shell fossil
-  calcareous marl

(unit of thickness : meter)

Baja Talamanca  
Coal Development Project

Stratigraphic Columnar Sections(6b)  
(Carbón Dos Area)

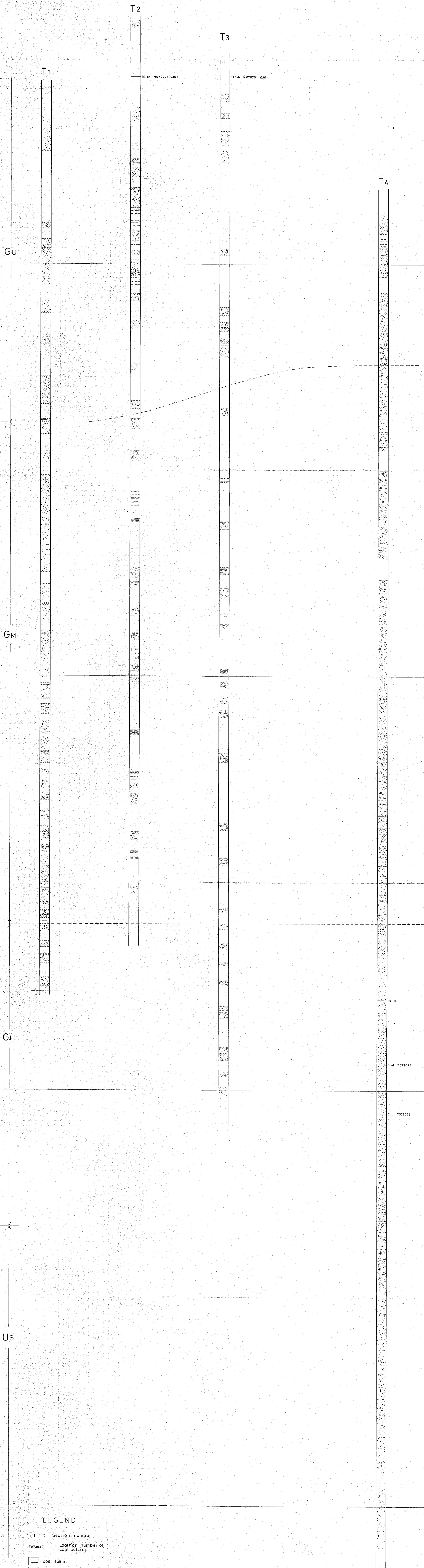
Scale 1 : 1,000

Japan International Cooperation Agency(JICA)










Date : Feb., 1983 Fig. 6-6b

Figure 6-7  
Stratigraphic Columnar Sections(7)  
(Carbón Tres Area)

Scale 1:1,000



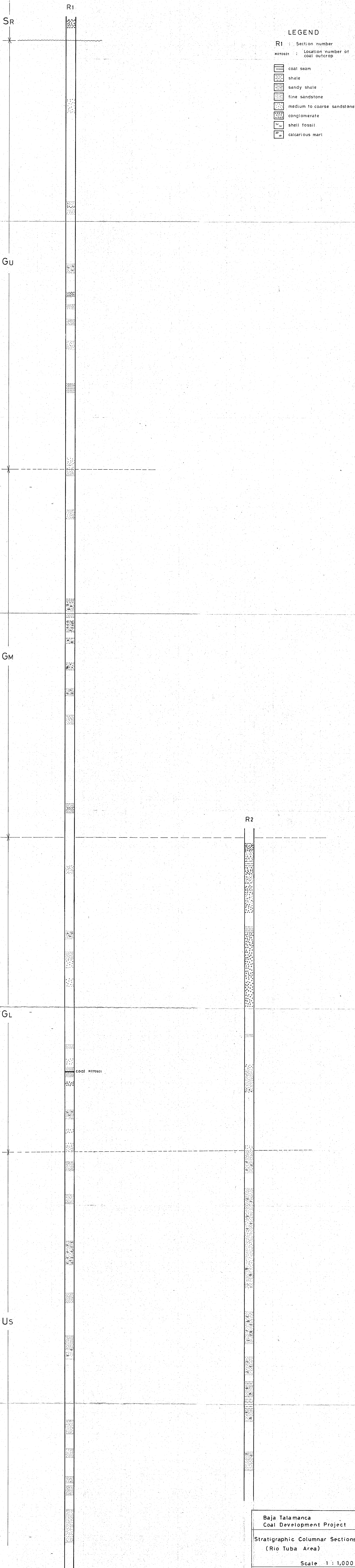
LEGEND

- T1 : Section number  
T072024 : Location number of coal outcrop
-  coal seam
  -  black shale
  -  shale
  -  sandy shale
  -  fine sandstone
  -  medium to coarse sandstone
  -  conglomerate
  -  tuff
  -  shell fossil
  -  calcareous marl
- (unit of thickness : meter)

|                                                          |          |
|----------------------------------------------------------|----------|
| Baja Talamanca<br>Coal Development Project               |          |
| Stratigraphic Columnar Sections(7)<br>(Carbón Tres Area) |          |
| Scale 1:1,000                                            |          |
| Japan International Cooperation Agency(JICA)             |          |
| Date : Feb., 1983                                        | Fig. 6-7 |

Figure 6-8 Stratigraphic Columnar Sections(8)  
(Rio Tuba Area)

Scale 1 : 1,000



LEGEND

- R1 : Section number
- M070601 : Location number of coal outcrop
- coal seam
- shale
- sandy shale
- fine sandstone
- medium to coarse sandstone
- conglomerate
- shell fossil
- calcareous marl

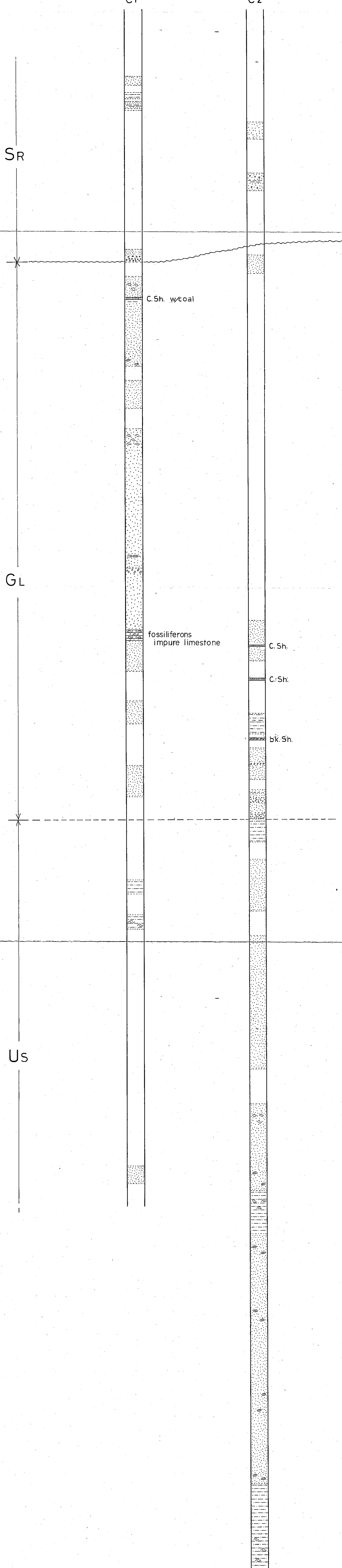


Figure 6-9

Stratigraphic Columnar Sections(9)

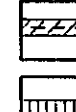

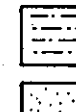


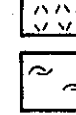
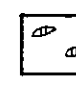


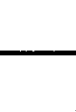
(Fila Carbón Cahuita Area)

Scale 1 : 1,000



LEGEND

C1 : Section number

-  black shale
-  coaly shale
-  shale
-  sandy shale
-  fine sandstone
-  medium to coarse sandstone
-  conglomerate
-  tuff
-  shell fossil
-  calcareous marl

|                                                                  |          |
|------------------------------------------------------------------|----------|
| Baja Talamanca<br>Coal Development Project                       |          |
| Stratigraphic Columnar Sections(9)<br>(Fila Carbón Cahuita Area) |          |
| Scale 1 : 1,000                                                  |          |
| Japan International Cooperation Agency(JICA)                     |          |
| Date : Feb., 1983                                                | Fig. 6-9 |

Figure 7-1 Correlation of Coal Seams (1)  
(Rio Bocuaires Area)

Scale 1 : 20

LEGEND

M060903 : Location number of coal outcrop

- |  |               |  |                                  |
|--|---------------|--|----------------------------------|
|  | coal          |  | sandy shale                      |
|  | dull coal     |  | fine sandstone                   |
|  | 2nd coal      |  | medium to coarse sandstone       |
|  | striated coal |  | tuff                             |
|  | coaly shale   |  | coal striation & coal patch      |
|  | black shale   |  | slikside                         |
|  | shale         |  | calcareous nodule & shell fossil |
|  |               |  | irregular boundary               |
- (unit of thickness : meter)

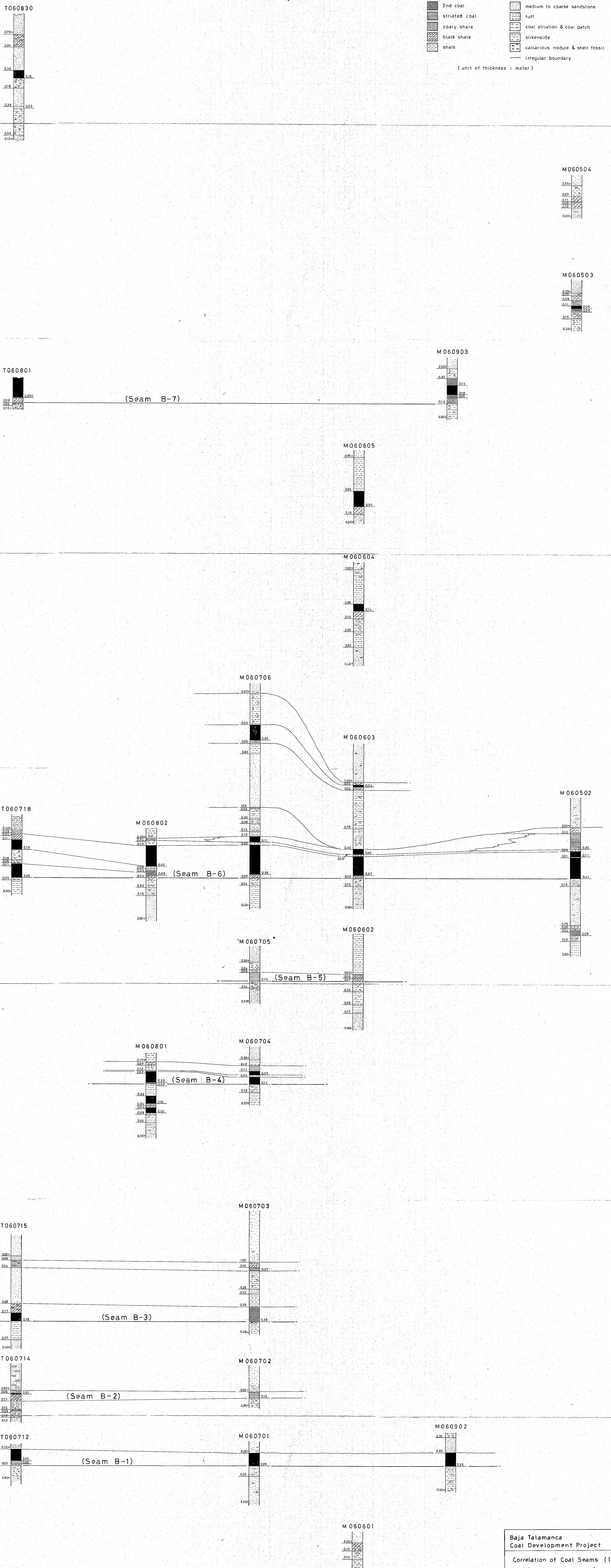


Figure 7-3a Correlation of Coal Seams (3a)  
(Northern Part of Carbón Volio Area)

Scale 1 : 20

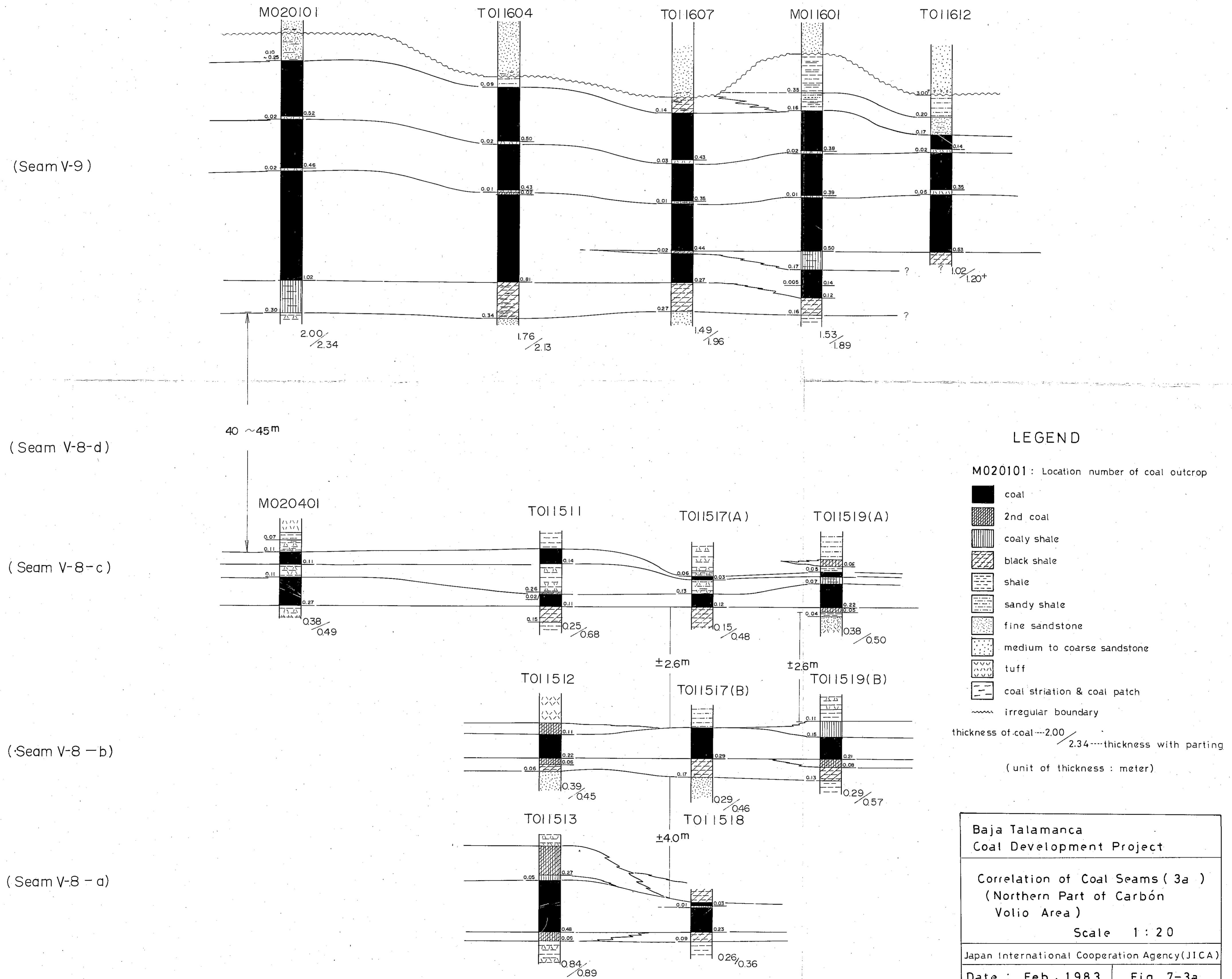














Figure 7-3b Correlation of Coal Seams (3b)  
(Eastern Part of Carbón Volio Area)

Scale 1 : 20

LEGEND

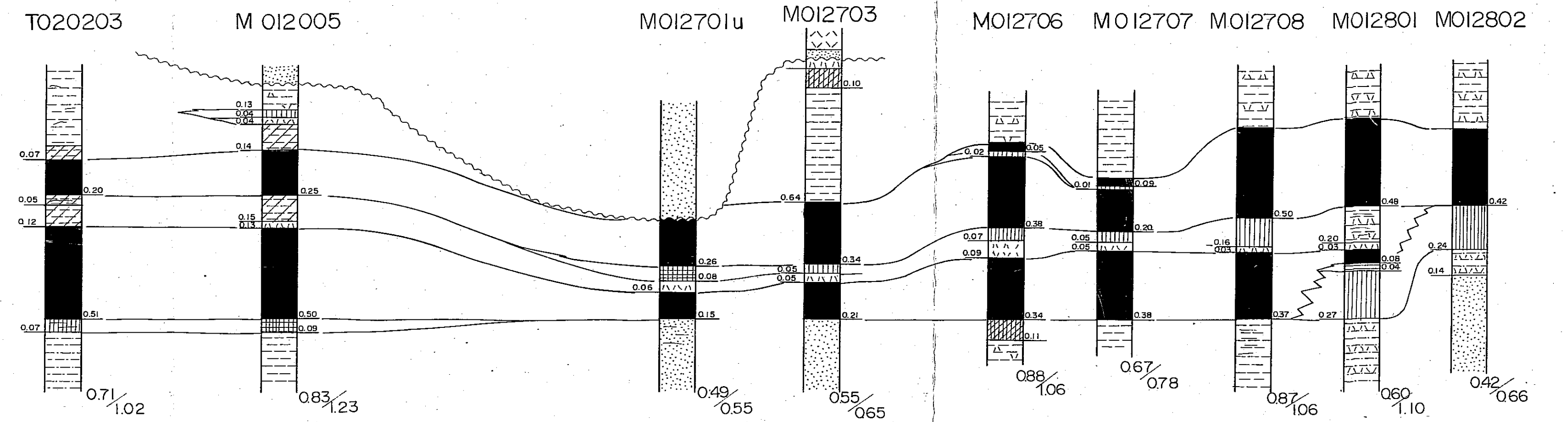
T020203 : Location number of coal outcrop

thickness of coal---0.71---thickness with parting  
/1.02---thickness with parting

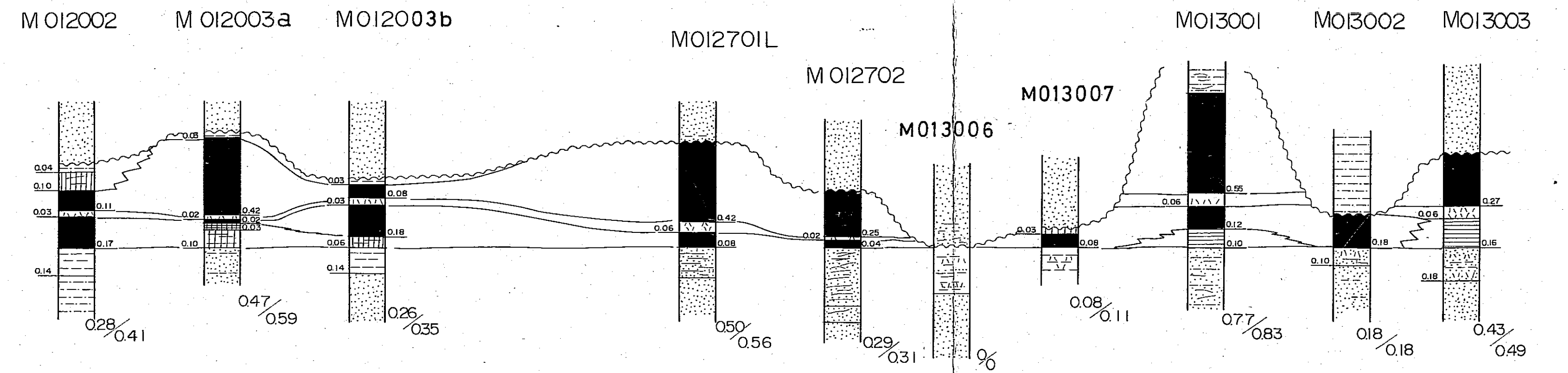
- |                                                                                   |               |                                                                                   |                             |
|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|-----------------------------|
|  | coal          |  | shale                       |
|  | dull coal     |  | sandy shale                 |
|  | 2nd coal      |  | sandstone                   |
|  | striated coal |  | tuff                        |
|  | coaly shale   |  | coal striation & coal patch |
|  | black shale   |  | irregular boundary          |

(unit of thickness : meter)

(Seam V-7)

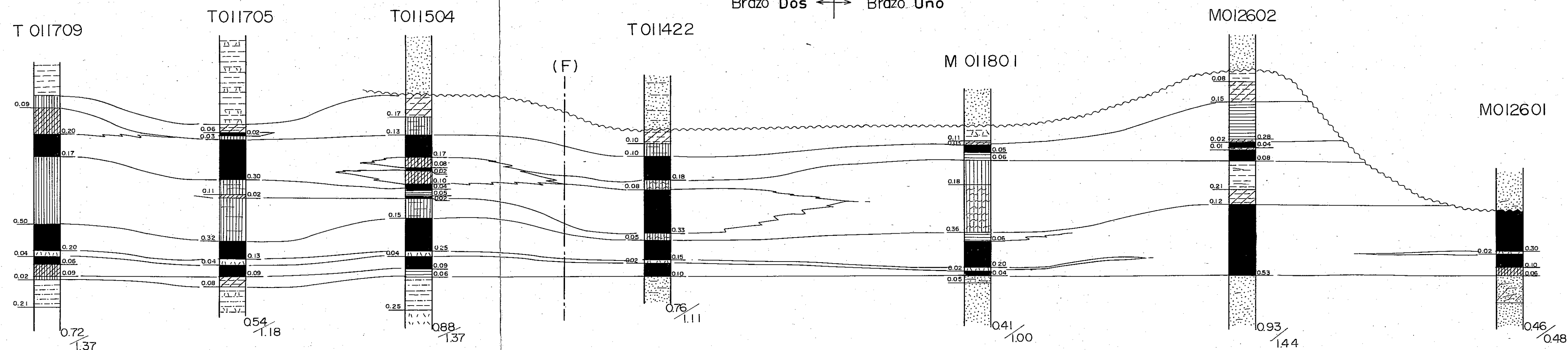


(Seam V-6)



Brazo Dos ← Brazo Uno

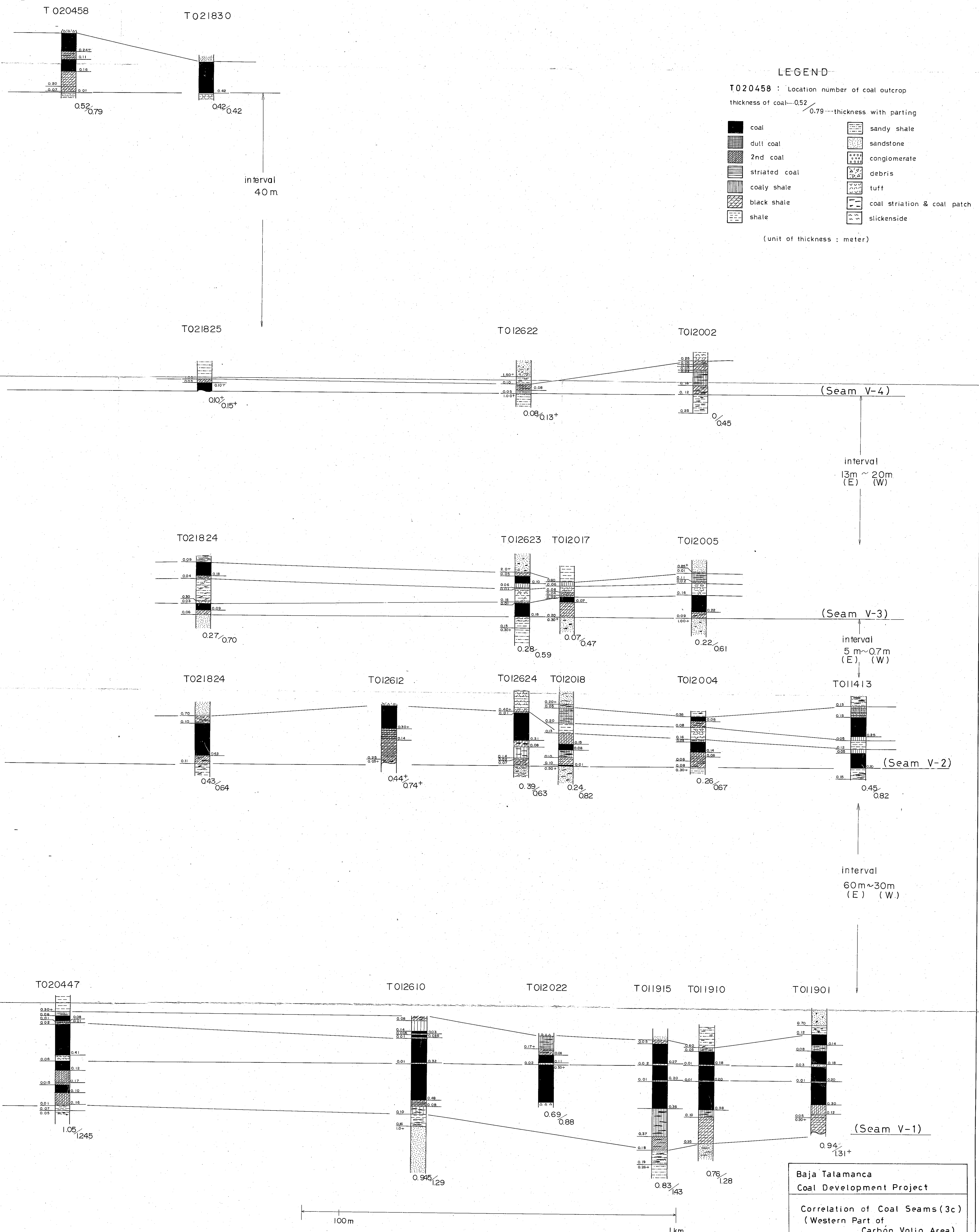
(Seam V-5)



|                                                                          |           |
|--------------------------------------------------------------------------|-----------|
| Baja Talamanca<br>Coal Development Project                               |           |
| Correlation of Coal Seams (3b)<br>(Eastern Part of Carbón<br>Volio Area) |           |
| Scale 1 : 20                                                             |           |
| Japan International Cooperation Agency(JICA)                             |           |
| Date : Feb., 1983                                                        | Fig. 7-3b |

Figure 7-3c Correlation of Coal Seams (3c)  
(Western Part of Carbón Volio Area)

Scale 1 : 20



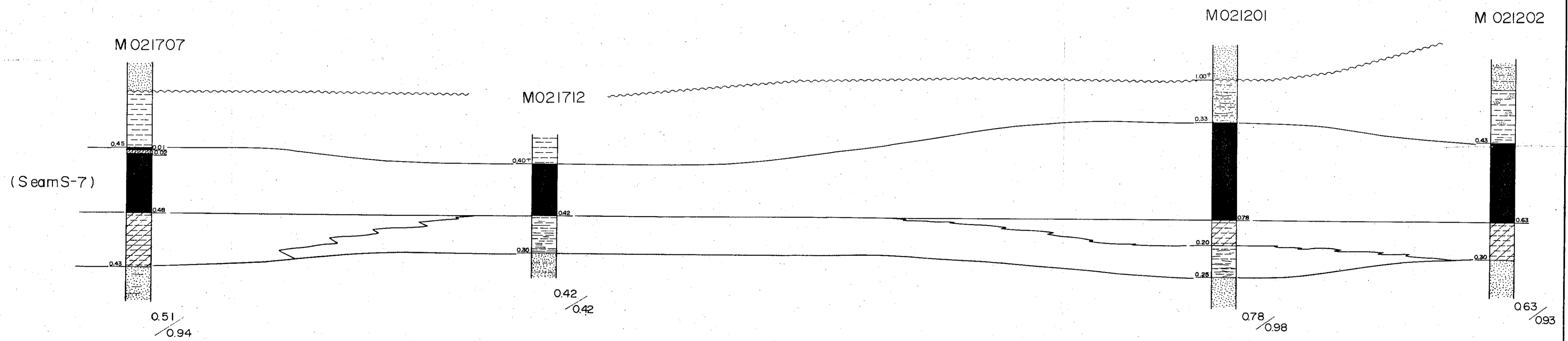
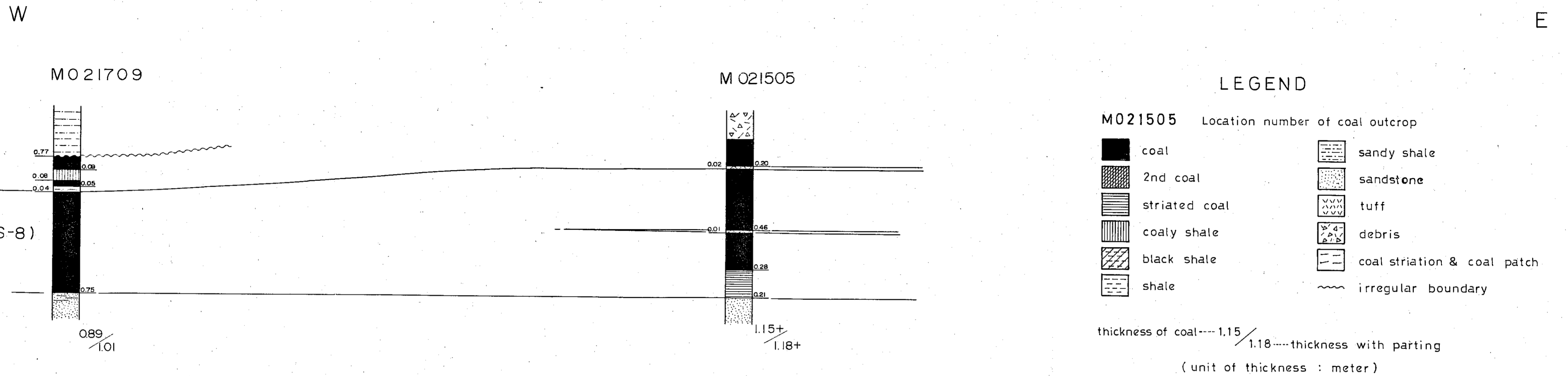
LEGEND

- T020458 : Location number of coal outcrop  
 thickness of coal--0.52 / 0.79---thickness with parting
- |  |               |  |                             |
|--|---------------|--|-----------------------------|
|  | coal          |  | sandy shale                 |
|  | dull coal     |  | sandstone                   |
|  | 2nd coal      |  | conglomerate                |
|  | striated coal |  | debris                      |
|  | coaly shale   |  | tuff                        |
|  | black shale   |  | coal striation & coal patch |
|  | shale         |  | slickenside                 |
- (unit of thickness : meter)

Baja Talamanca  
 Coal Development Project  
 Correlation of Coal Seams(3c)  
 (Western Part of  
 Carbón Volio Area)  
 Scale 1 : 20  
 Japan International Cooperation Agency(JICA)  
 Date : Feb., 1983 Fig. 7-3c

Figure 7-4a Correlation of Coal Seams (4a)  
(Sand Box Area)

Scale 1 : 20



Baja Talamanca Coal Development Project

Correlation of Coal Seams(4a)  
(Sand Box Area)

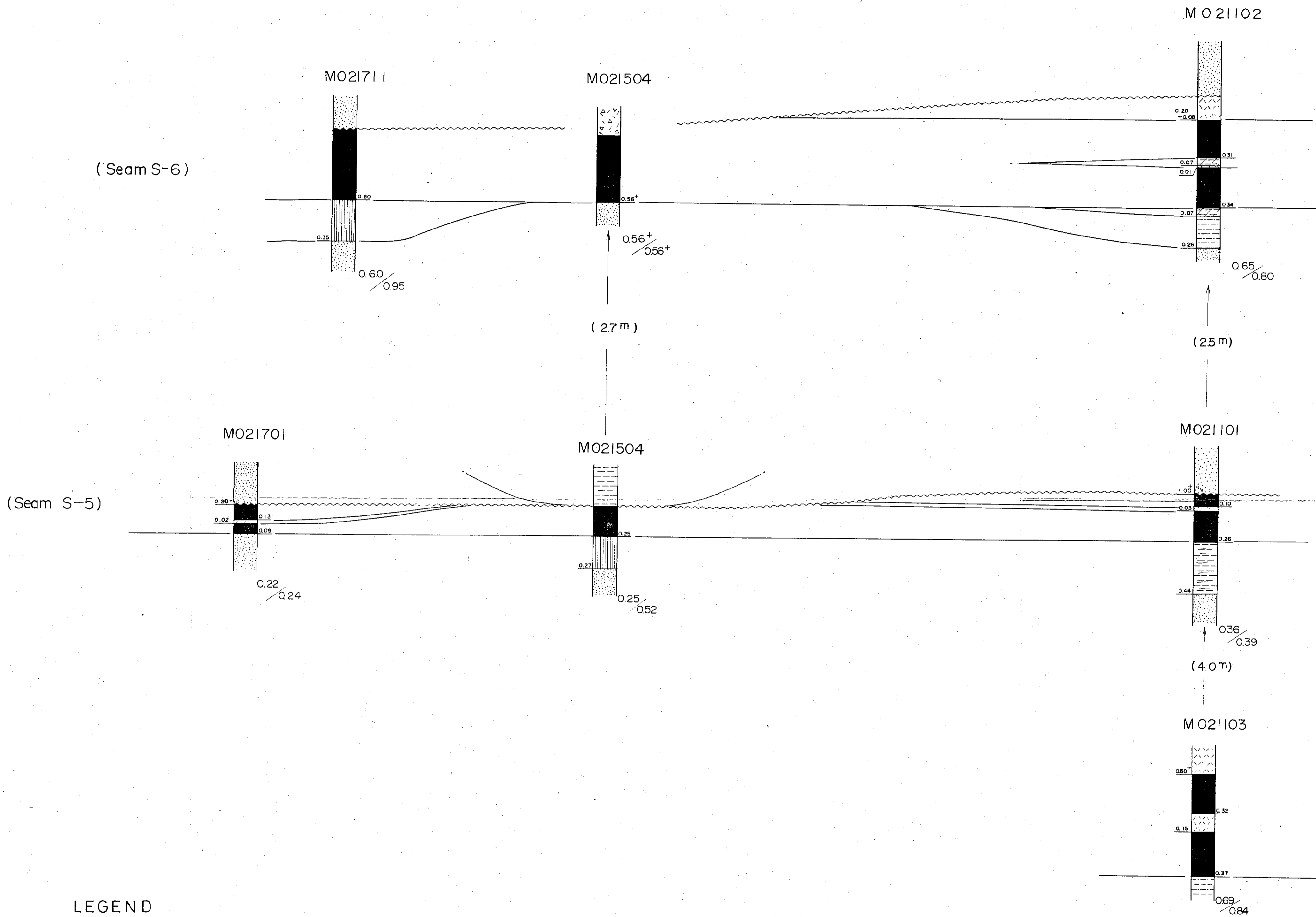
Scale 1 : 20

Japan International Cooperation Agency(JICA)

Date : Feb., 1983 Fig. 7-4a

Figure 7-4b Correlation of Coal Seams (4b)  
(Sand Box Area)

Scale 1 : 20



LEGEND

M021711 : Location number of coal outcrop  
thickness of coal---0.60 / 0.95---thickness with parting

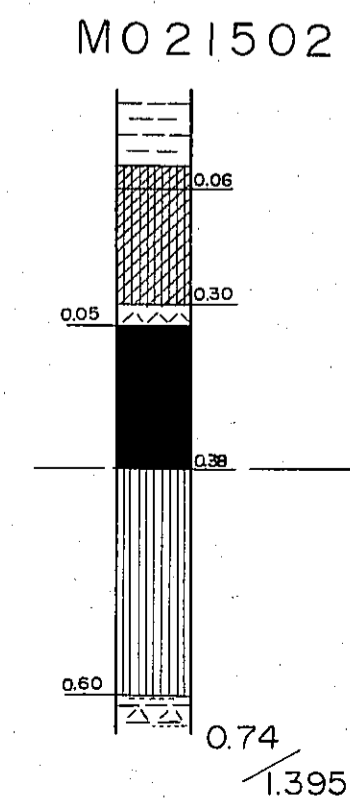
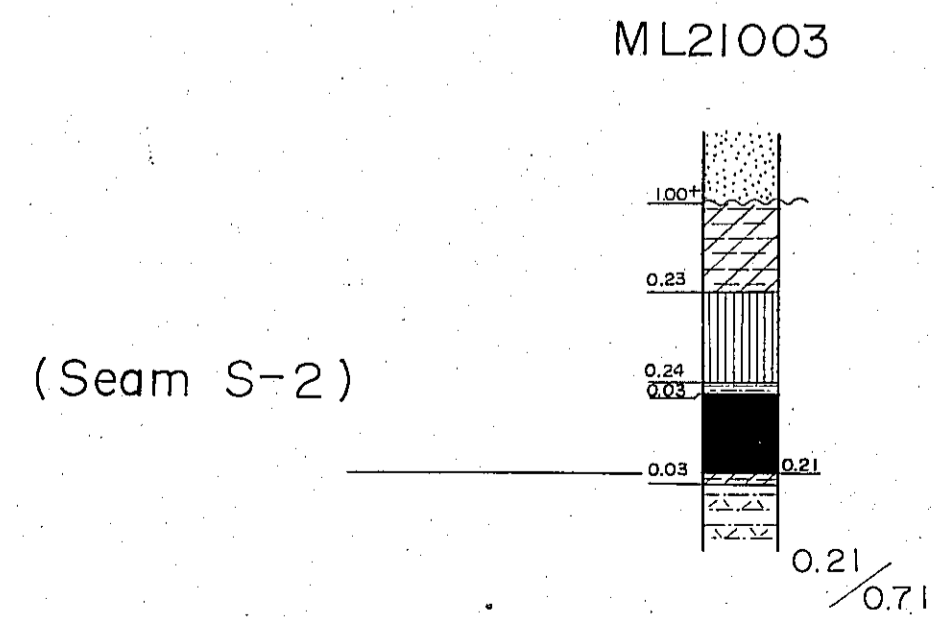
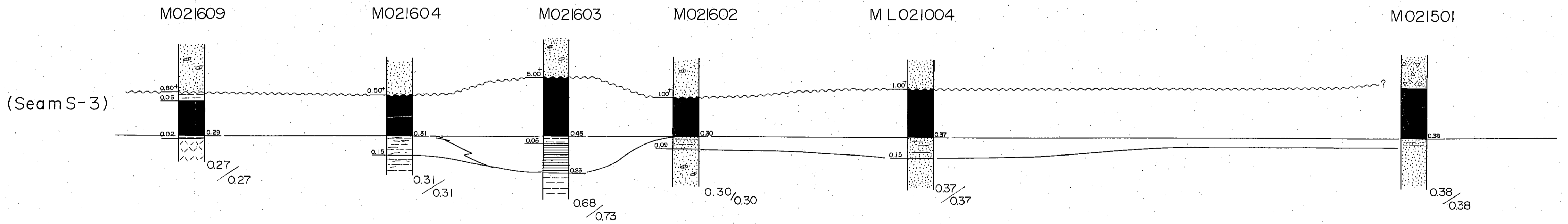
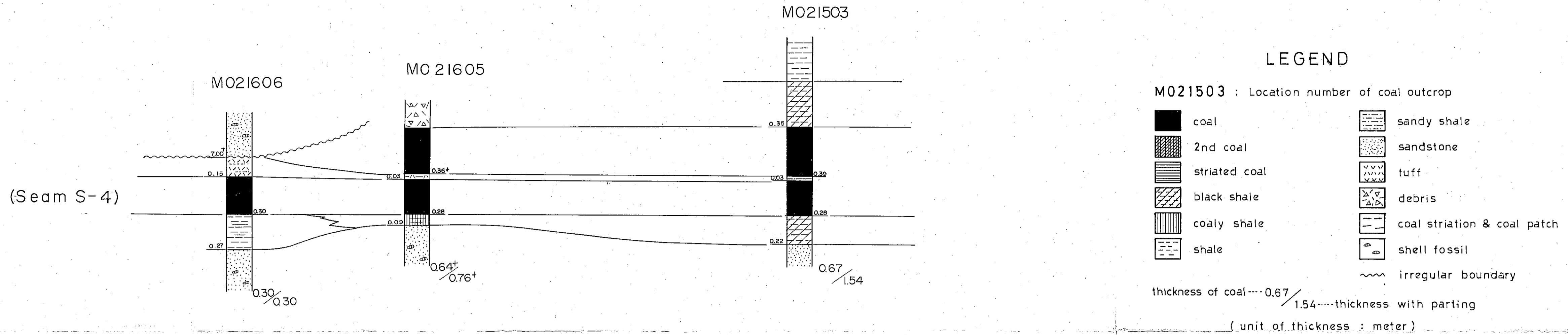
- coal
- black shale
- shale
- sandy shale
- sandstone
- tuff
- debris
- coal striation & coal patch
- irregular boundary

(unit of thickness : meter)

|                                                  |           |
|--------------------------------------------------|-----------|
| Baja Talamanca<br>Coal Development Project       |           |
| Correlation of Coal Seams(4b)<br>(Sand Box Area) |           |
| Scale 1 : 20                                     |           |
| Japan International Cooperation Agency(JICA)     |           |
| Date : Feb., 1983                                | Fig. 7-4b |

Figure 7-4c Correlation of Coal Seams (4c)  
(Sand Box Area)

Scale 1 : 20



|                                                       |           |
|-------------------------------------------------------|-----------|
| Baja Talamanca<br>Coal Development Project            |           |
| Correlation of Coal Seams ( 4c )<br>( Sand Box Area ) |           |
| Scale 1 : 20                                          |           |
| Japan International Cooperation Agency(JICA)          |           |
| Date : Feb., 1983                                     | Fig. 7-4c |



Figure 7-5 Correlation of Coal Seams (5)  
(Carbón Uno Area)

Scale 1 : 20

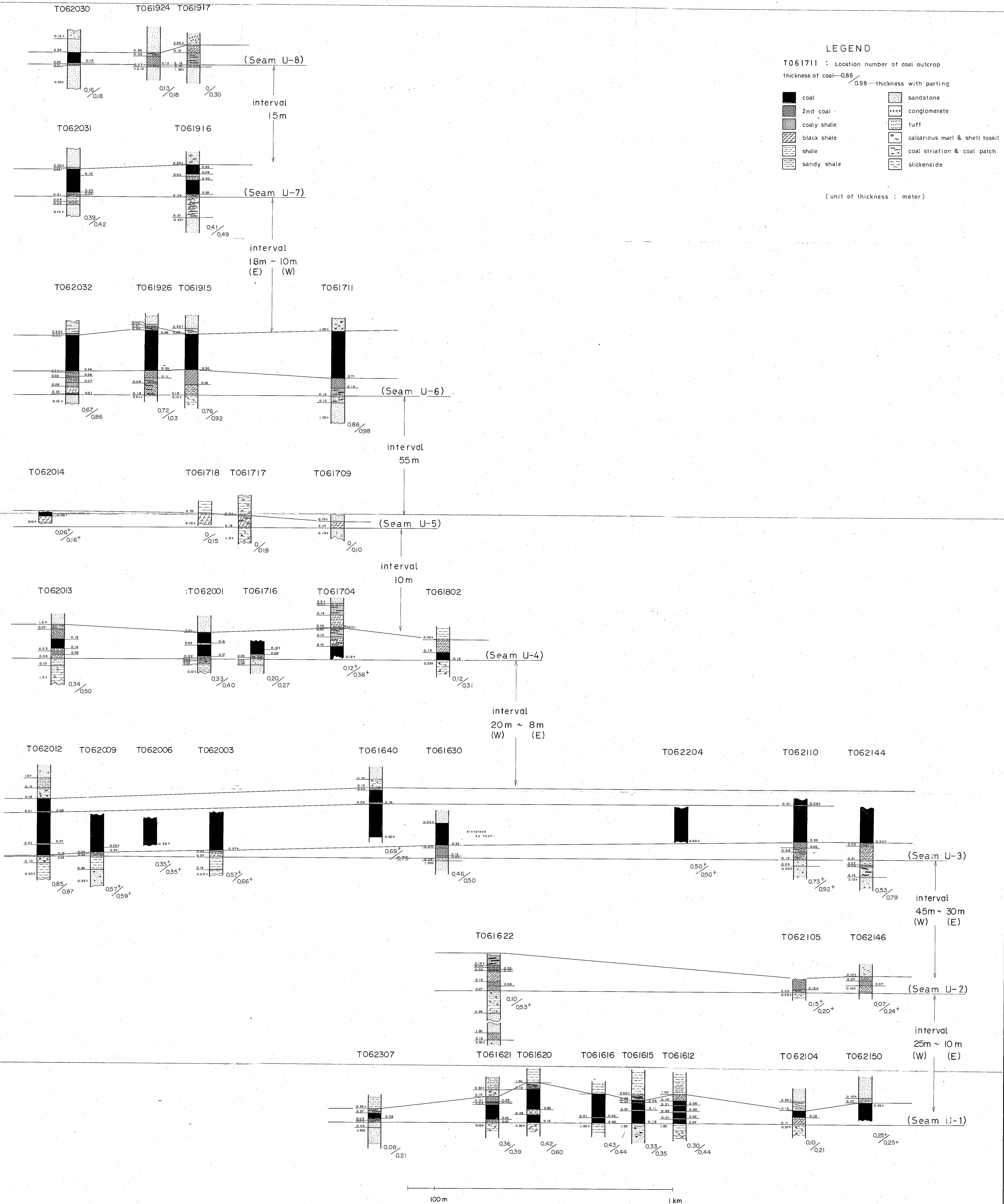
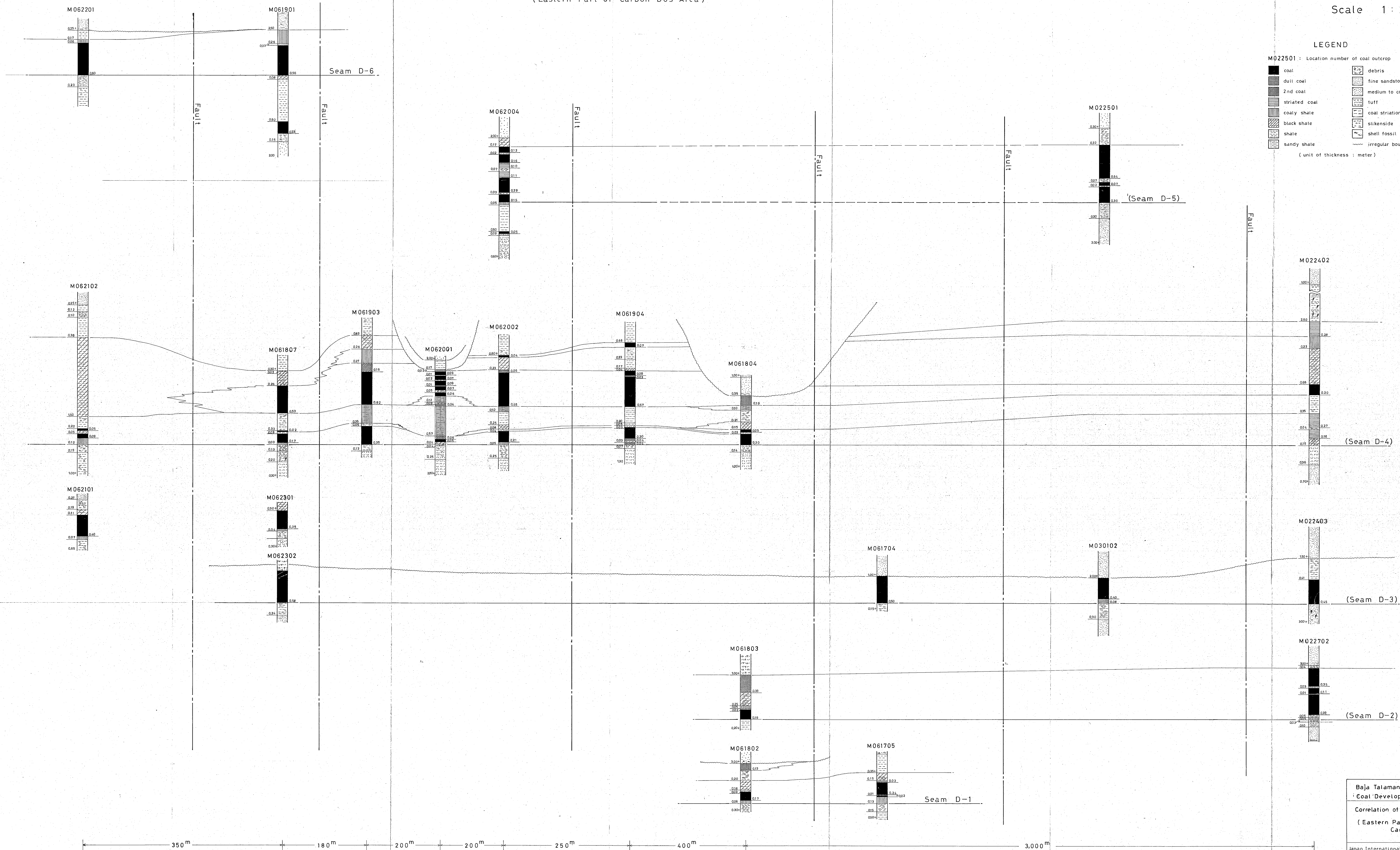


Figure 7-6 Correlation of Coal Seams (6)  
(Eastern Part of Carbón Dos Area)

Scale 1 : 20



**LEGEND**

M022501 : Location number of coal outcrop

|  |               |  |                             |
|--|---------------|--|-----------------------------|
|  | coal          |  | debris                      |
|  | dull coal     |  | fine sandstone              |
|  | 2nd coal      |  | medium to coarse sandstone  |
|  | striated coal |  | tuff                        |
|  | coaly shale   |  | coal striation & coal patch |
|  | black shale   |  | slickenside                 |
|  | shale         |  | shell fossil                |
|  | sandy shale   |  | irregular boundary          |

(unit of thickness : meter)

Figure 8 Isometric Projection Map at 150 m a.s.l. of Main coal Seams in Sand Box Area

Scale 1 : 5,000



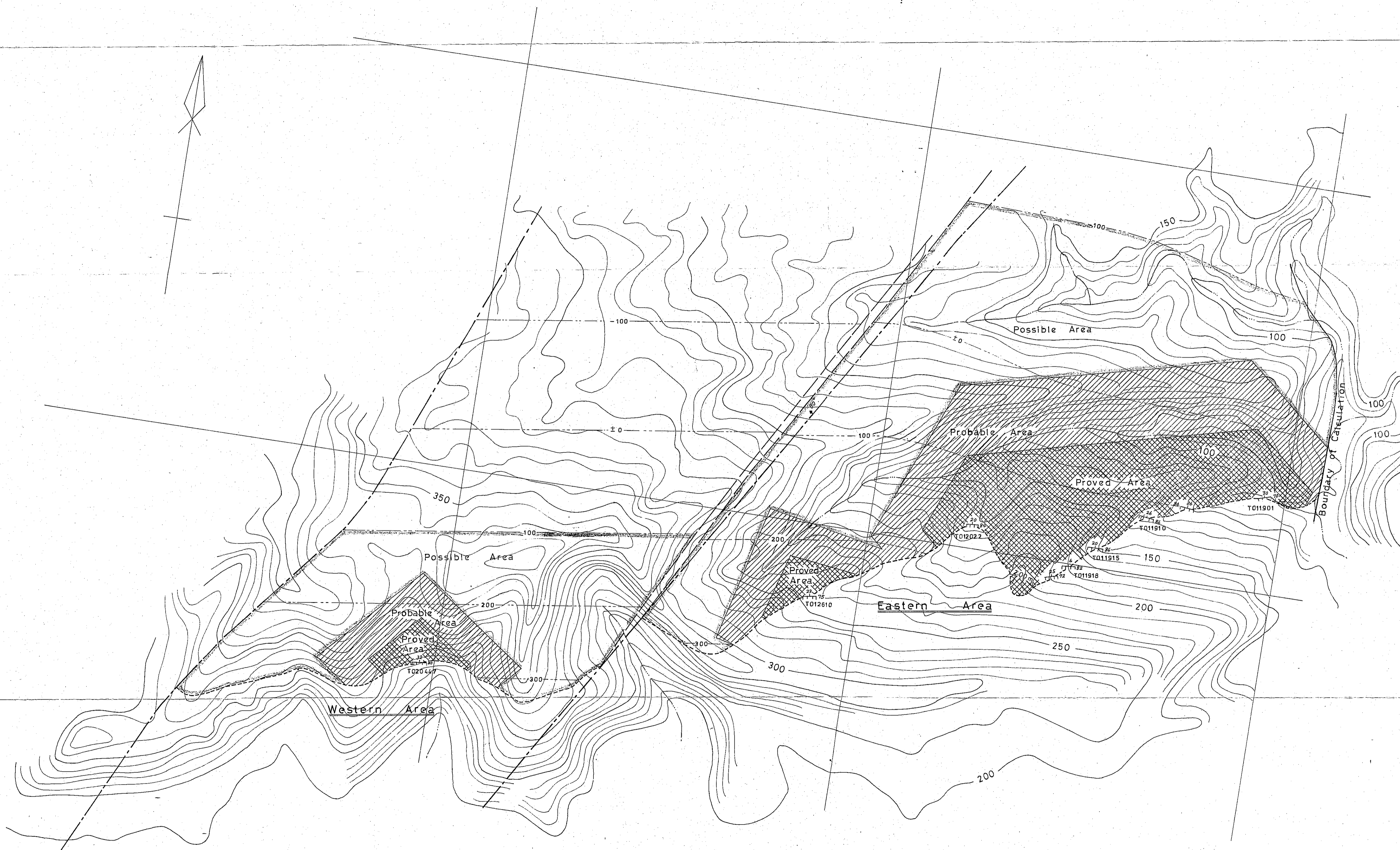
LEGEND

- Projected coal seam outcrop & outcrop number
- Projected seam contour line at 150 m a.s.l.
- 150 m a.s.l. contour line  
(It seems to be nearly the between eroded and subsurface portion)



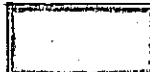
|                                                               |        |
|---------------------------------------------------------------|--------|
| Baja Talamanca<br>Coal Development Project                    |        |
| Isometric Projection Map<br>(EL.150m) of Rio Sand Box<br>Area |        |
| Scale 1 : 5,000                                               |        |
| Japan International Cooperation Agency(JICA)                  |        |
| Date : Feb., 1983                                             | Fig. 8 |

Figure 9-1 Reserve Calculation Map (1)  
(Seam V-1)

Scale 1 : 5,000



LEGEND

- T011915  
----- Coal Outcrop
- Fault Line
- Truncated Line by Fault
- 100 Seam Contour Line in Meters
-  Proved Area
-  Probable Area
-  Possible Area

Baja Talamanca  
Coal Development Project

Reserve Calculation Map (1)  
(Seam V-1)

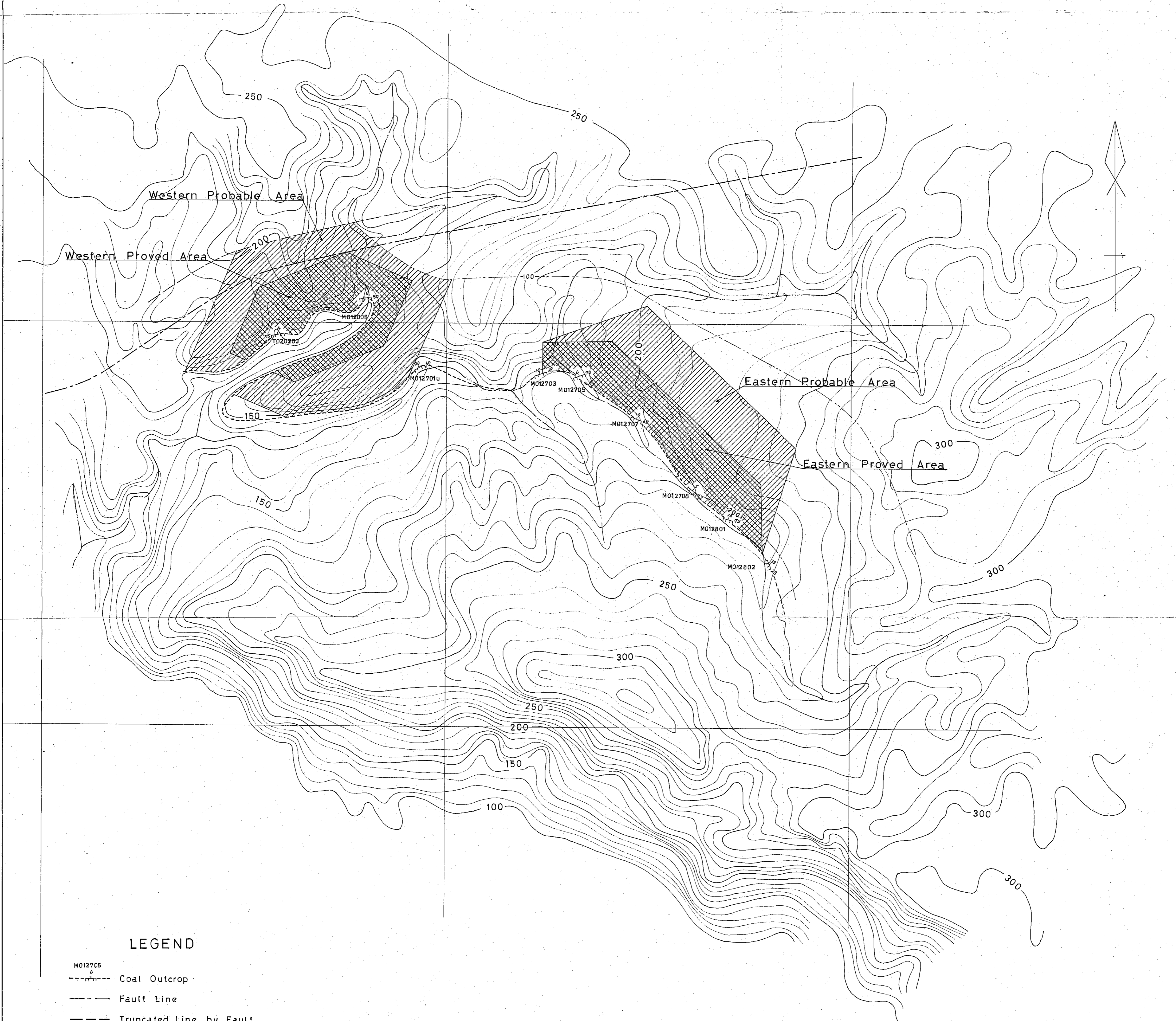
Scale 1 : 5,000

Japan International Cooperation Agency (JICA)


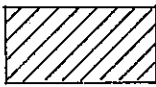
Date : Feb., 1983 Fig. 9-1

Figure 9-2 Reserve Calculation Map (2)  
(Seam V-7)

Scale 1 : 5,000



LEGEND

- M012705  
--- Coal Outcrop
- Fault Line
- - - - - Truncated Line by Fault
- 100- Seam Contour Line in Meters
-  Proved Area
-  Probable Area

|                                               |          |
|-----------------------------------------------|----------|
| Baja Talamanca<br>Coal Development Project    |          |
| Reserve Calculation Map (2)<br>(Seam V-7)     |          |
| Scale 1 : 5,000                               |          |
| Japan International Cooperation Agency (JICA) |          |
| Date : Feb., 1983                             | Fig. 9-2 |

Figure 9-3 Reserve Calculation Map (3)  
(Seam V-9)

Scale 1 : 5,000



LEGEND

- T011601  
Coal Outcrop
- Fault Line
- Truncated Line by Fault
- 100- Seam Contour Line in Meters
- ↑ Anticlinal Axis
- ▨ Proved Area

|                                               |          |
|-----------------------------------------------|----------|
| Baja Talamanca<br>Coal Development Project    |          |
| Reserve Calculation Map (3)<br>(Seam V-9)     |          |
| Scale 1 : 5,000                               |          |
| Japan International Cooperation Agency (JICA) |          |
| Date : Feb., 1983                             | Fig. 9-3 |

Figure 9-4 Reserve Calculation Map (4)  
(Seam U-3)

Scale 1 : 5,000



LEGEND

- T062204
- Coal Outcrop
- Fault Line
- Truncated Line by Fault
- 100- Seam Contour Line in Meters
- ▨ Proved Area
- ▧ Probable Area
- Possible Area

|                                               |          |
|-----------------------------------------------|----------|
| Baja Talamanca<br>Coal Development Project    |          |
| Reserve Calculation Map (4)<br>(Seam U-3)     |          |
| Scale 1 : 5,000                               |          |
| Japan International Cooperation Agency (JICA) |          |
| Date : Feb., 1983                             | Fig. 9-4 |

Figure 9-5 Reserve Calculation Map (5)  
(Seam U-6)

Scale 1 : 5,000



LEGEND

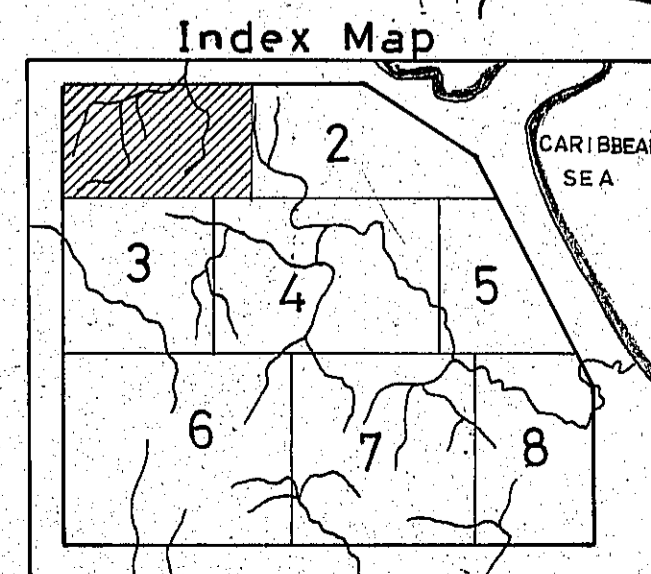
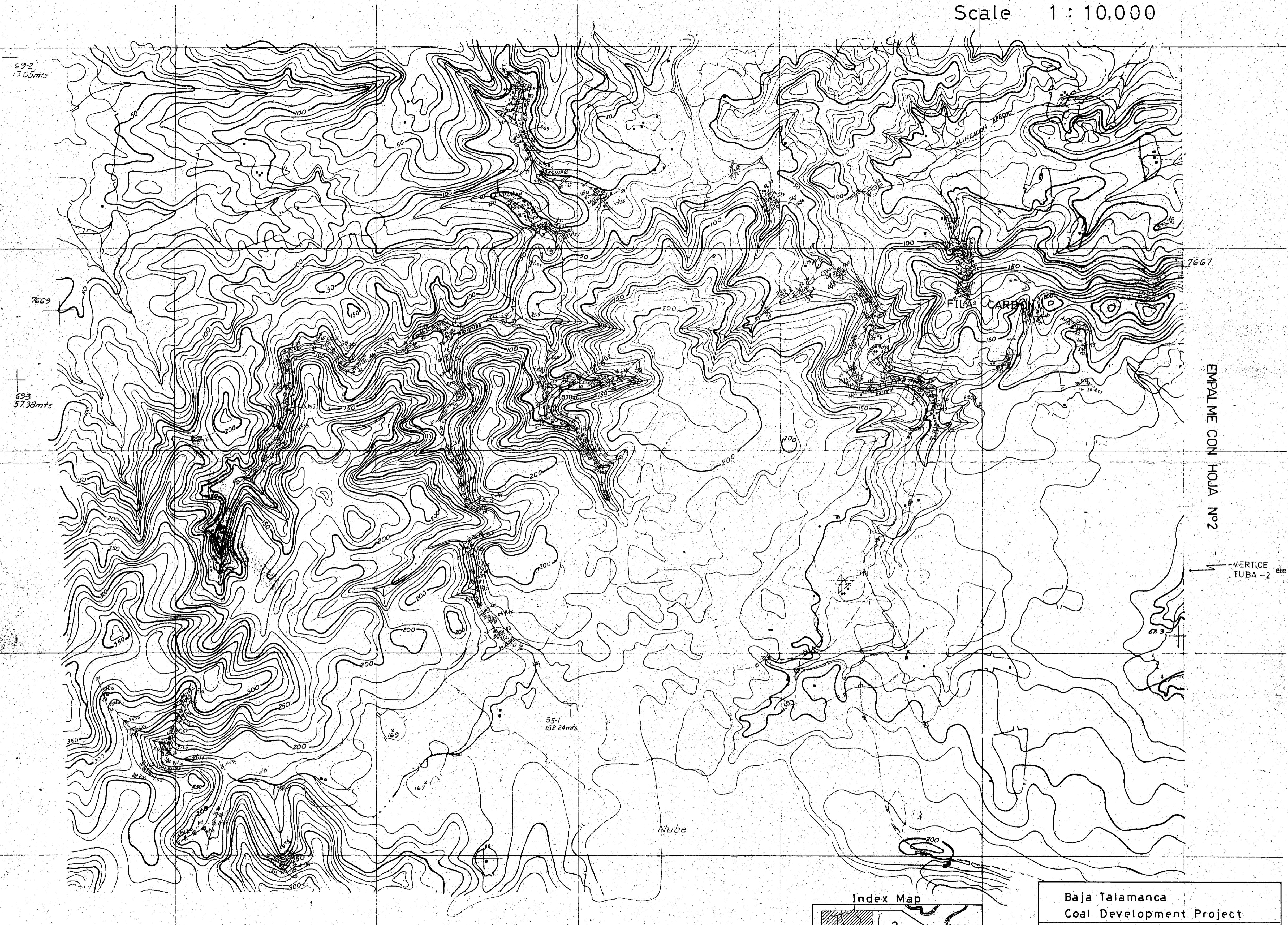
- 1061915  
Coal Outcrop
- Fault Line
- Truncated Line by Fault
- 100- Seam Contour Line in Meters
- ▨ Proved Area
- ▧ Probable Area
- Possible Area

|                                               |          |
|-----------------------------------------------|----------|
| Baja Talamanca<br>Coal Development Project    |          |
| Reserve Calculation Map (5)<br>(Seam U-6)     |          |
| Scale 1 : 5,000                               |          |
| Japan International Cooperation Agency (JICA) |          |
| Date : Feb., 1983                             | Fig. 9-5 |



Figure 10-1 Route Map (1) Showing Locality of Measured Coal Seam

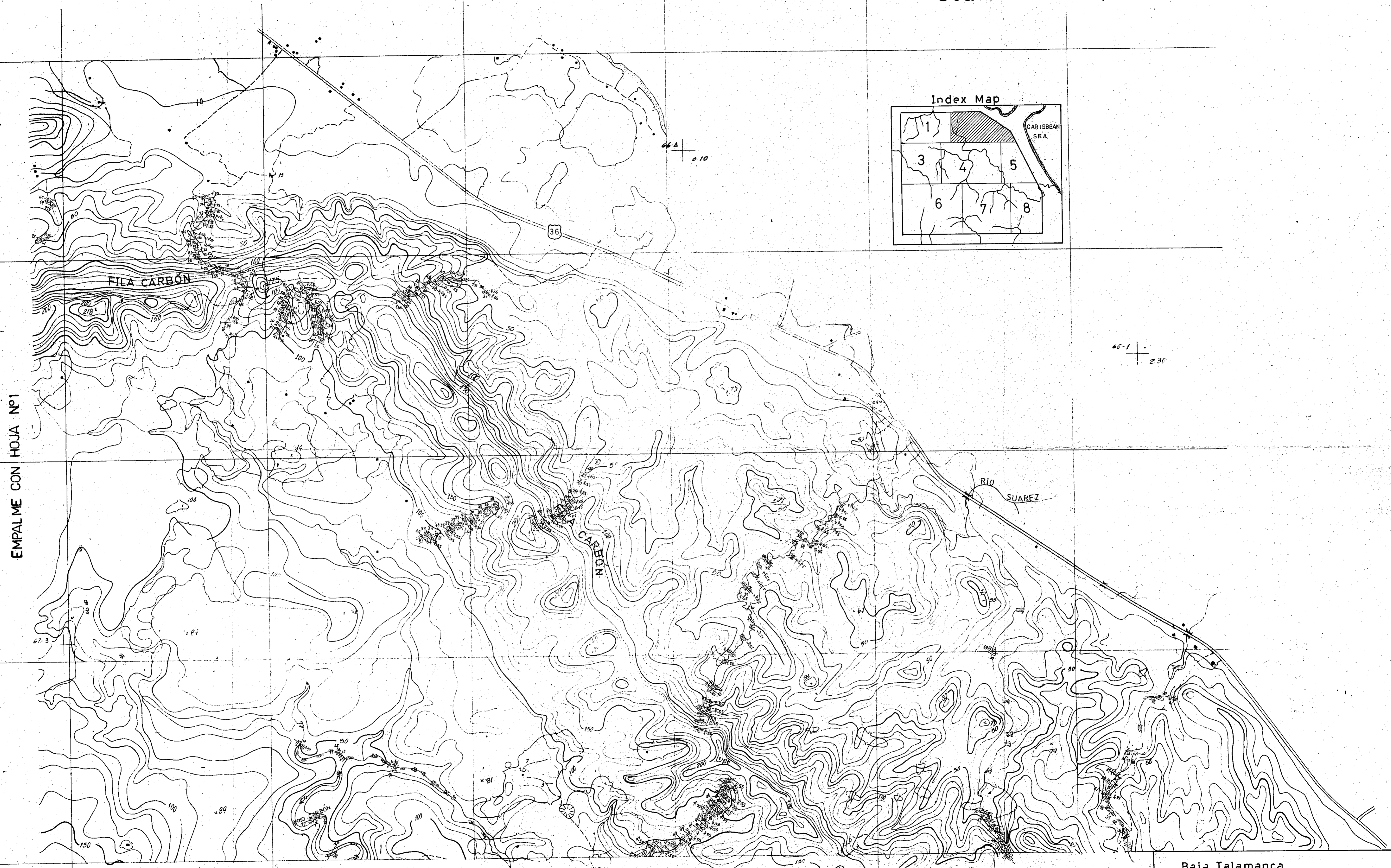
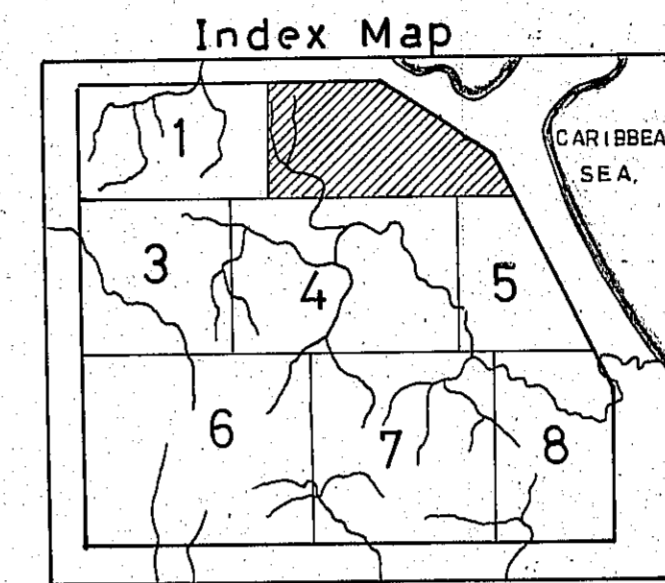
Scale 1 : 10,000



Baja Talamasca  
Coal Development Project  
Route Map (1)  
Showing Locality of  
Measured Coal Seam  
Scale 1:10,000  
Japan International Cooperation Agency (JICA)  
Date: Feb., 1983 | Fig. 10-1

Figure 10-2 Route Map (2)  
 Showing Locality of Measured Coal Seam

Scale 1 : 10,000



EMPALME CON HOJA Nº1

EMP. REV. CON HOJA Nº4

|                                                                              |           |
|------------------------------------------------------------------------------|-----------|
| Baja Talamasca<br>Coal Development Project                                   |           |
| Route Map (2)<br>Showing Locality of<br>Measured Coal Seam<br>Scale 1:10,000 |           |
| Japan International Cooperation Agency (JICA)                                |           |
| Date : Feb., 1983                                                            | Fig. 10-2 |

Figure 10-3 Route Map (3) Showing Locality of Measured Coal Seam

407000

Scale 1:10,000

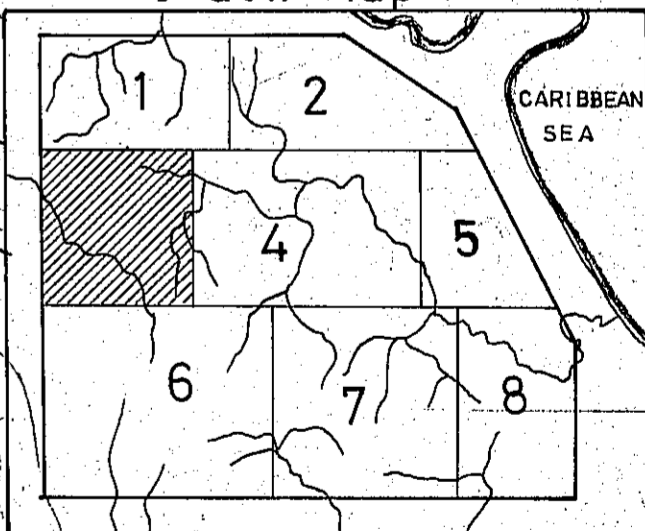
56.2

138.40

EMPALME CON HOJA N°4

405000

Index Map



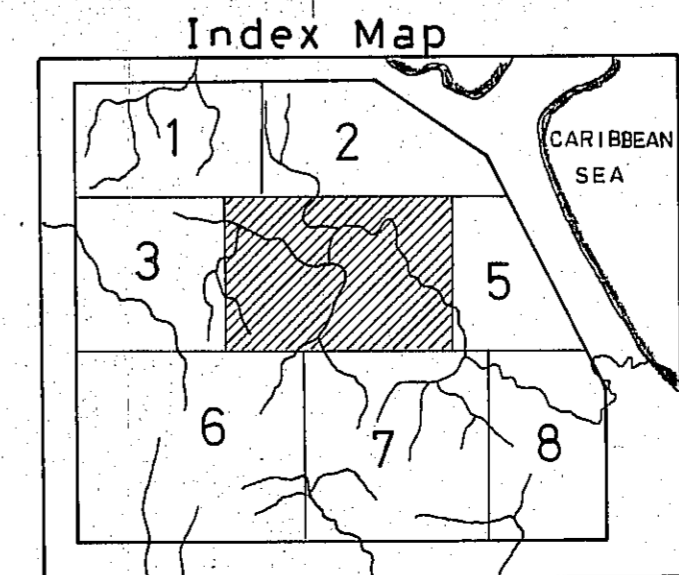
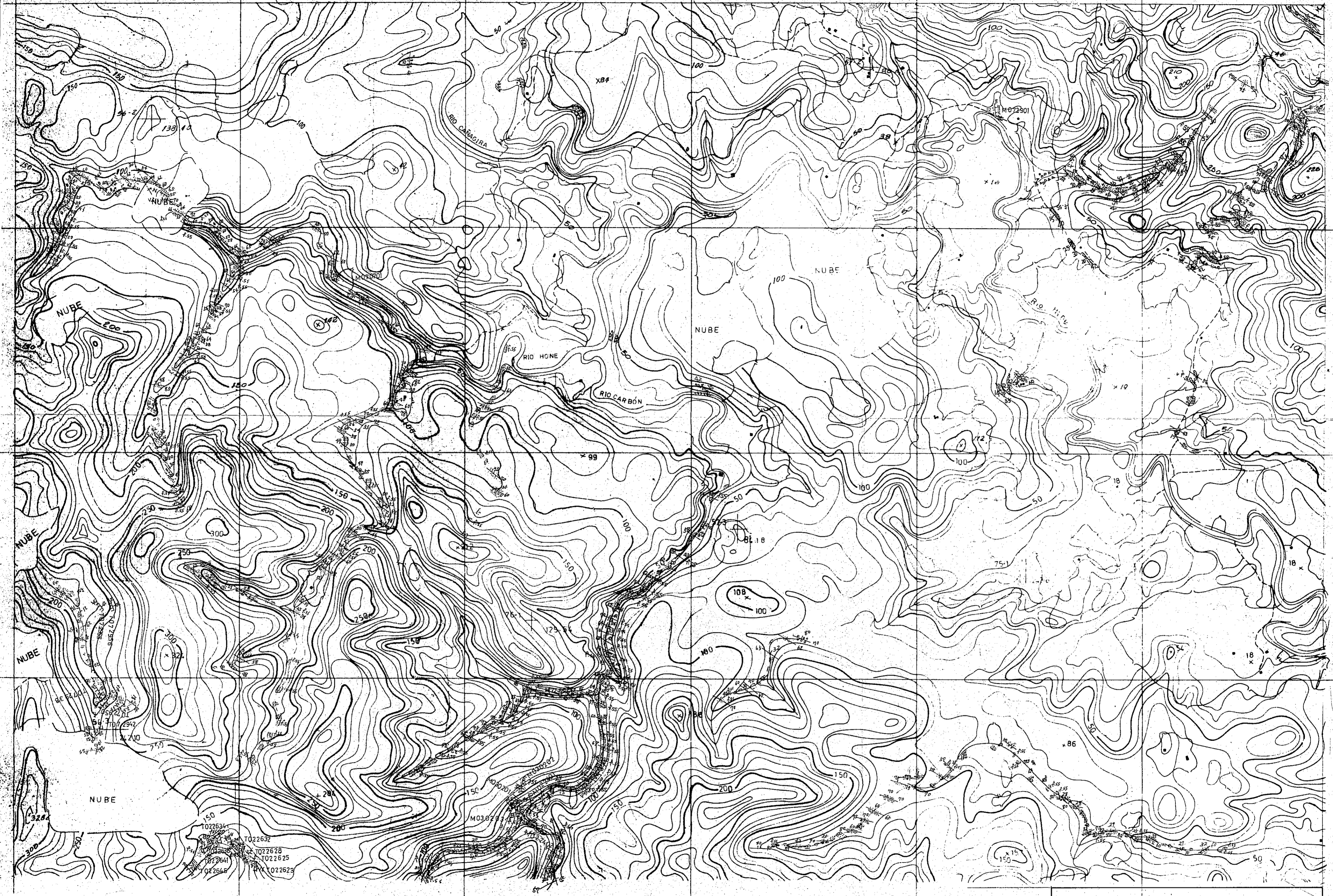
Baja Talamasca  
Coal Development project

Route Map(3)  
Showing Locality of  
Measured Coal Seam

Scale 1:10,000

Japan International Cooperation Agency(JICA)

Date: Feb., 1983 Fig. 10-3



**Baja Talamanca  
 Coal Development Project**

Route Map (4)  
 Showing Locality of  
 Measured Coal Seam  
 Scale 1 : 10,000

Japan International Cooperation Agency (JICA)

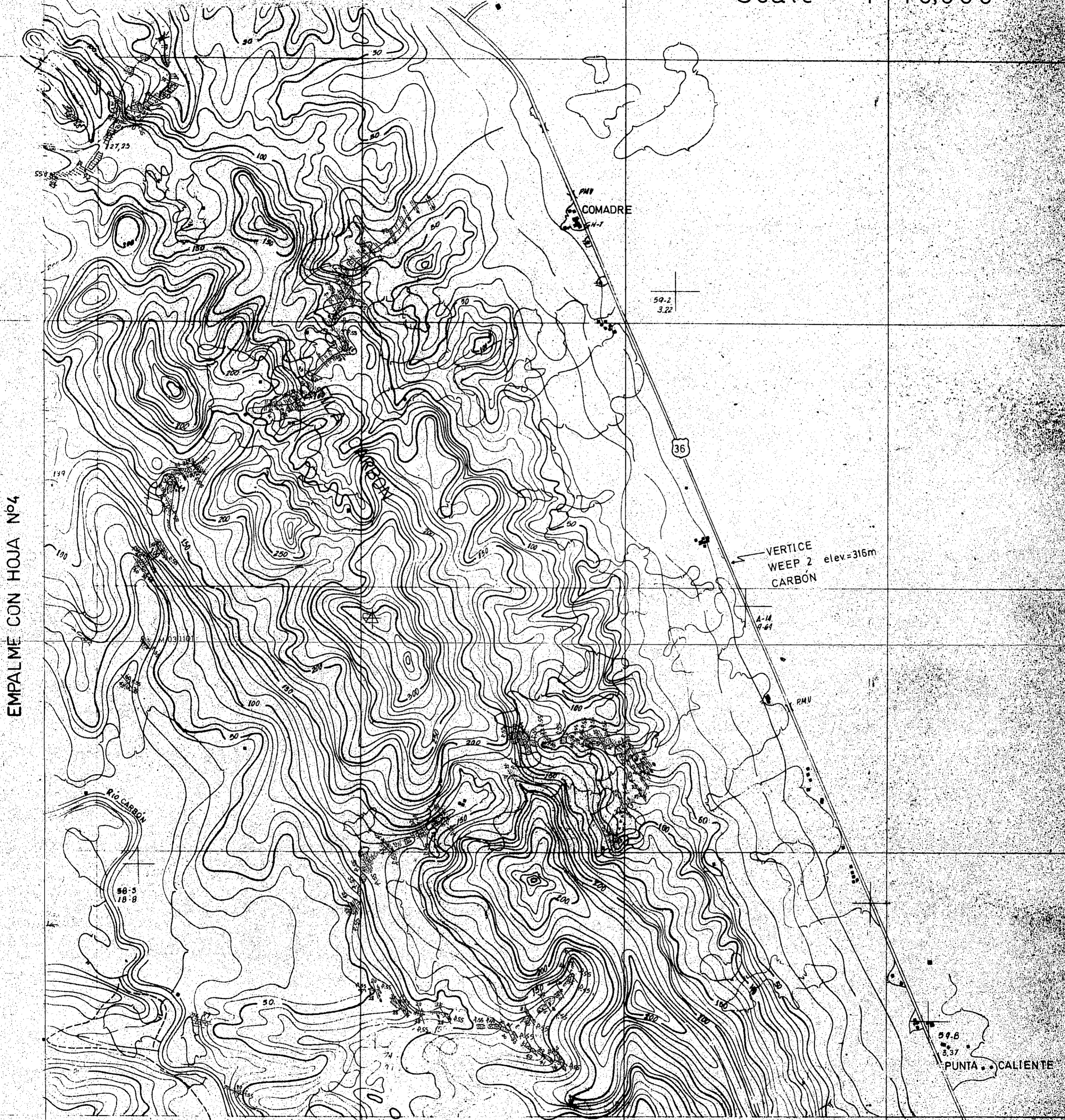
Date : Feb. 1983      Fig. 10-4

Figure 10-5 Route Map (5)

Showing Locality Measured Coal Seam

EMP. REV. CON HOJA N° 2

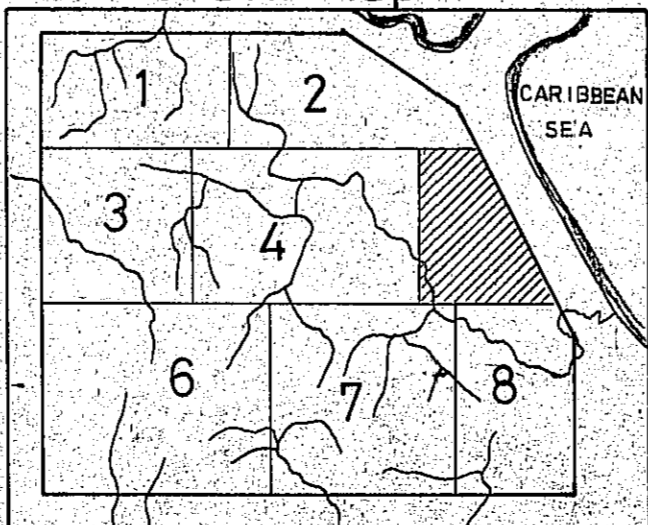
Scale 1:10,000



EMPALME CON HOJA N°4

EMP. REV. CON HOJA N°8

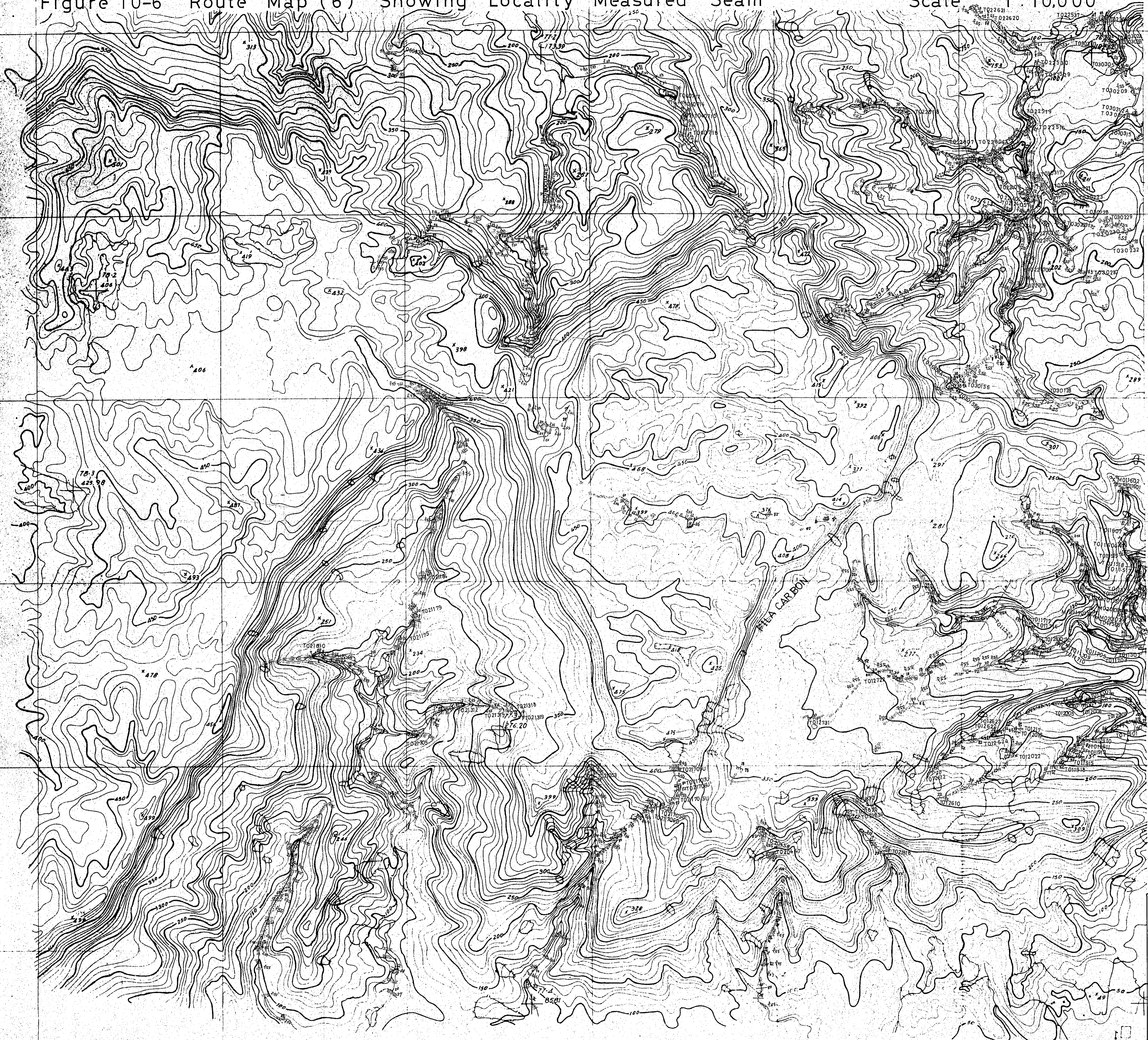
Index Map



|                                                            |          |
|------------------------------------------------------------|----------|
| Baja Talamasca<br>Coal Development Project                 |          |
| Route Map (5)<br>Showing Locality of<br>Measured Coal Seam |          |
| Scale 1:10,000                                             |          |
| Japan International Cooperation Agency (JICA)              |          |
| Date Feb., 1983                                            | Fig 10-5 |

Figure 10-6 Route Map (6) Showing Locality Measured Seam

Scale 1:10,000

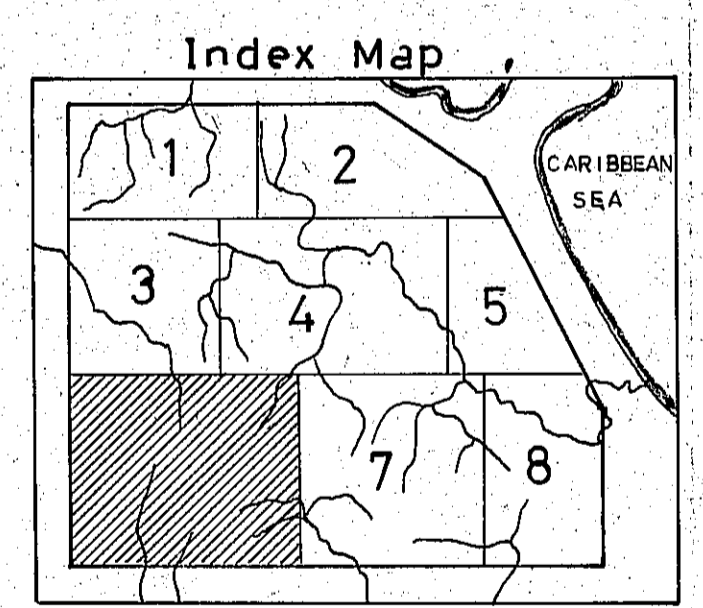


402000

EMPALME CON HOJA No 7

400000

76-3  
46.37



Baja Talamasca  
Coal Development Project

Route Map(6)  
Showing Locality of  
Measured Coal Seam

Scale 1:10,000

Japan International Cooperation Agency(JICA)

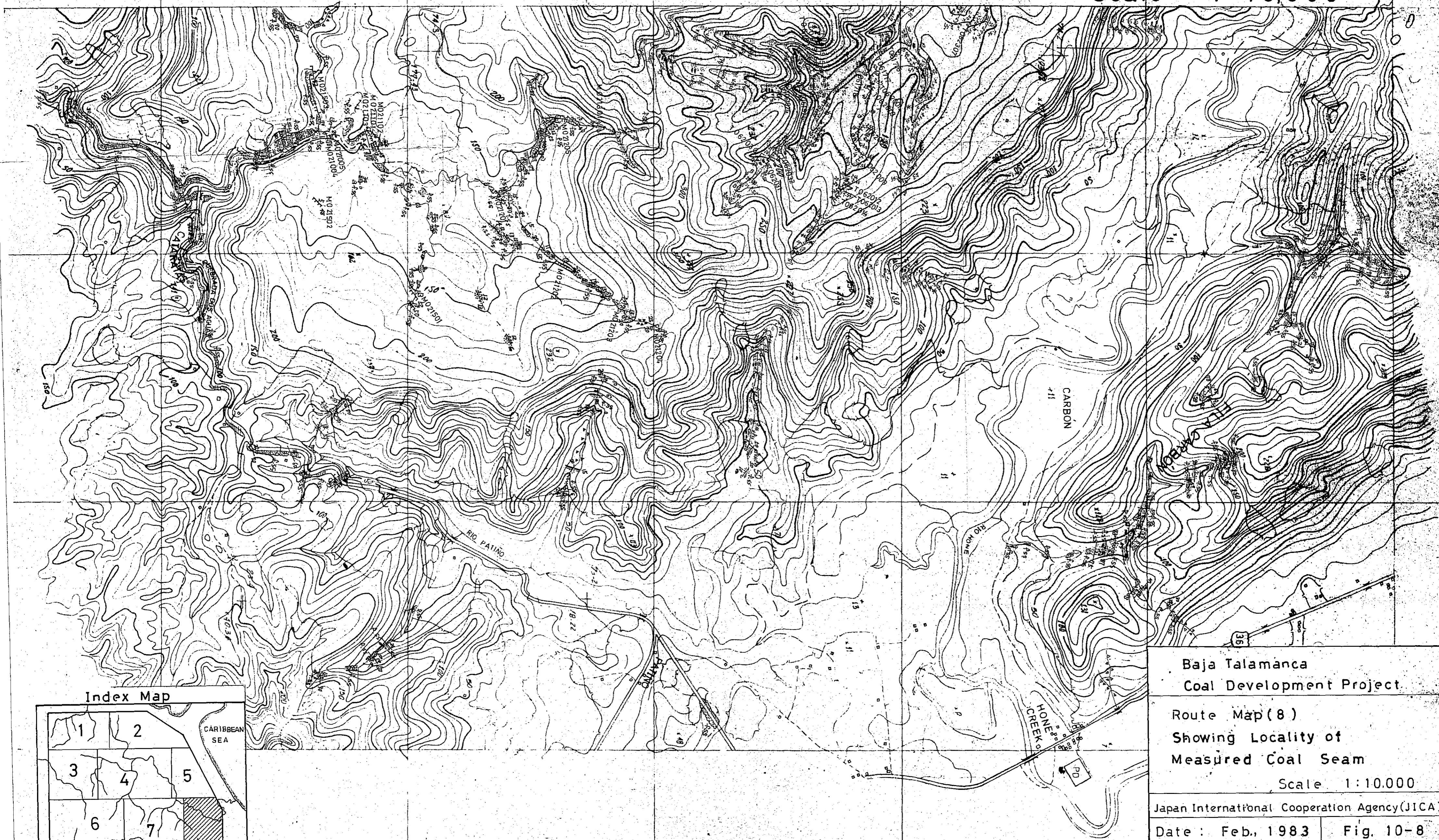
Date : Feb., 1983 Fig. 10-6



Figure 10-8 Route Map (8)  
 Showing Locality of Measured Coal Seam

EMP.REV. CON HOJA N°7

Scale 1:10,000



Baja Talamasca  
 Coal Development Project  
 Route Map (8)  
 Showing Locality of  
 Measured Coal Seam  
 Scale 1:10,000  
 Japan International Cooperation Agency (JICA)  
 Date: Feb., 1983 Fig. 10-8

EMP. REV. CON HOJA N°5