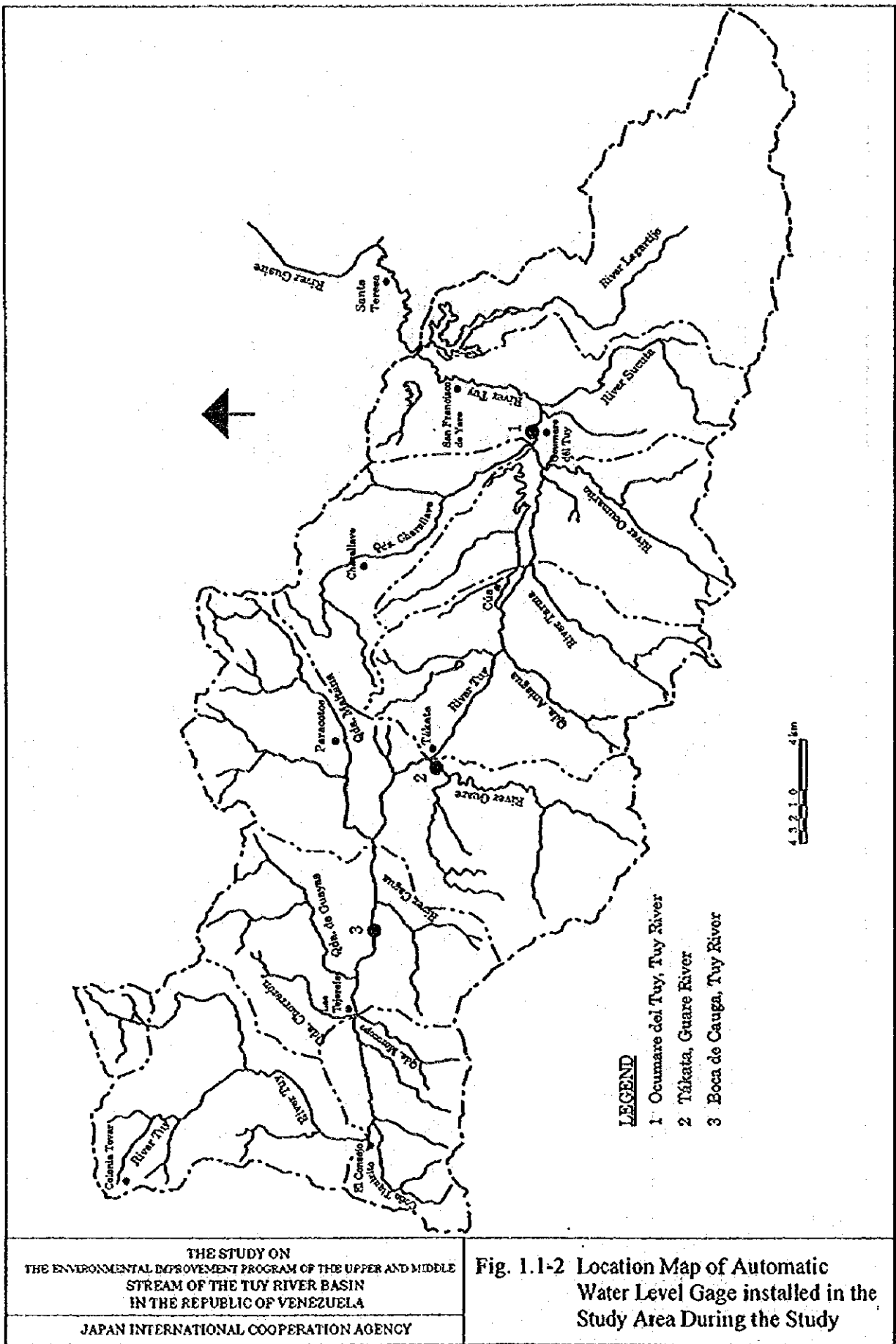


**SECTOR F**

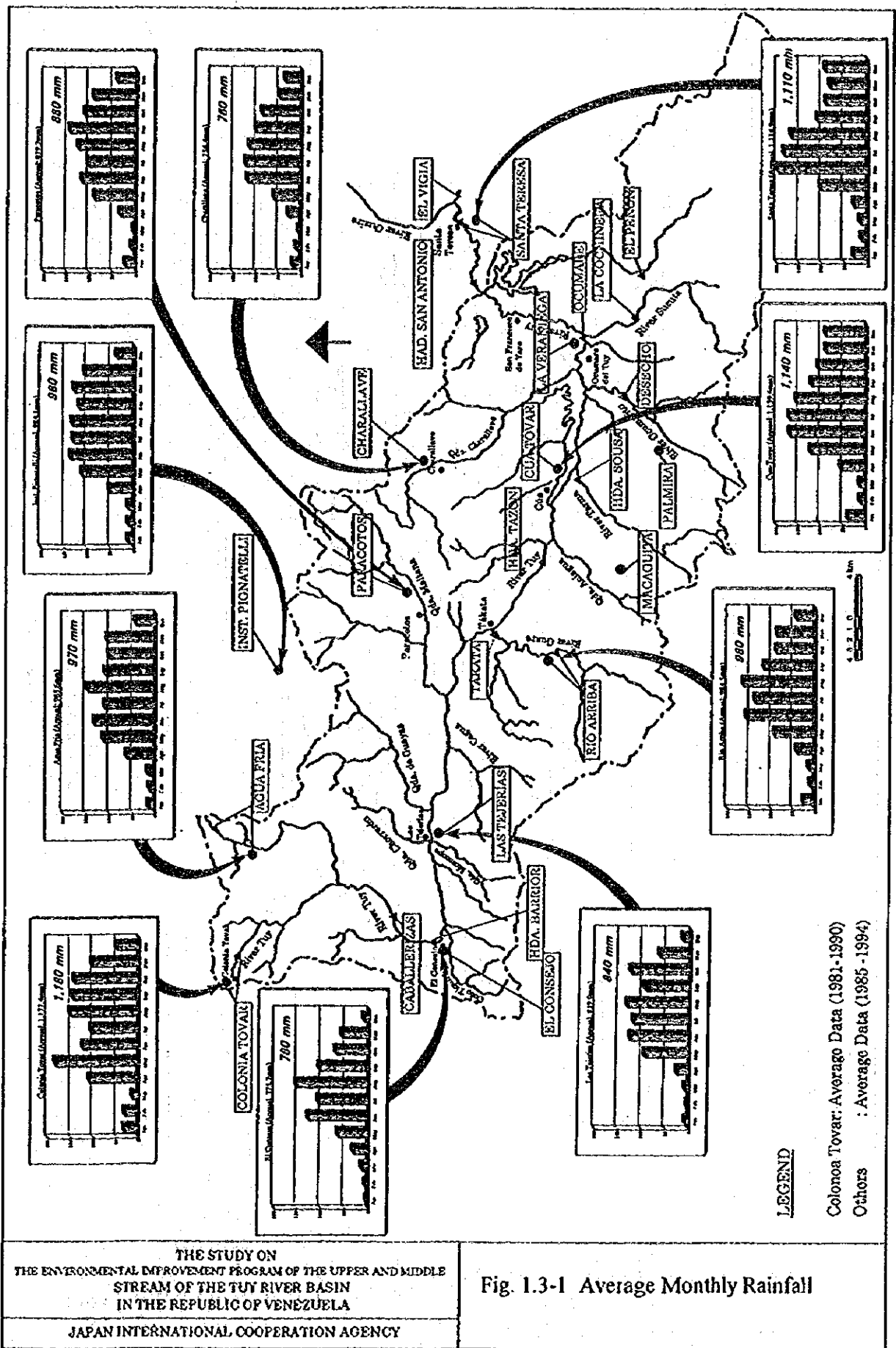
**FIGURES**

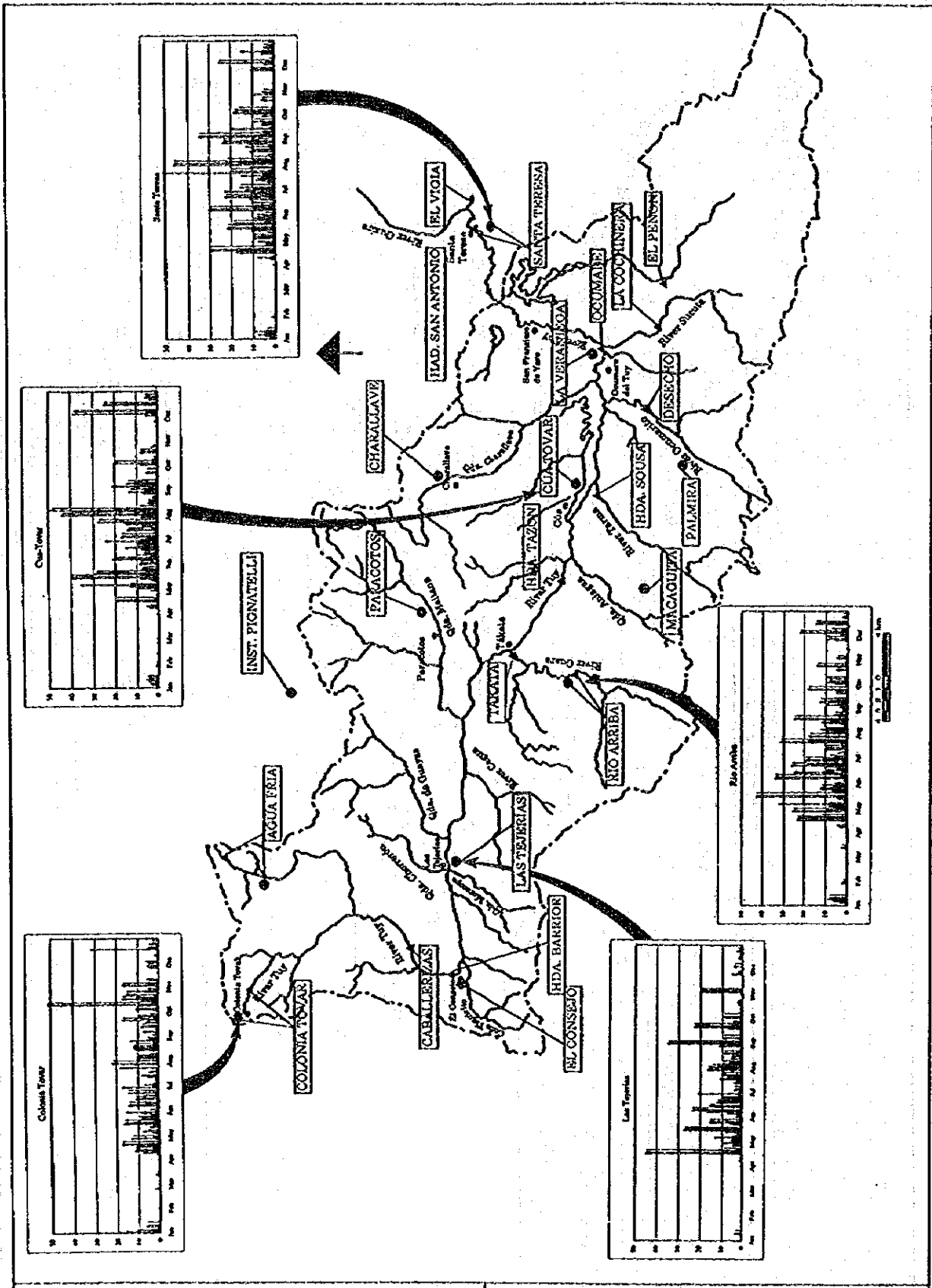








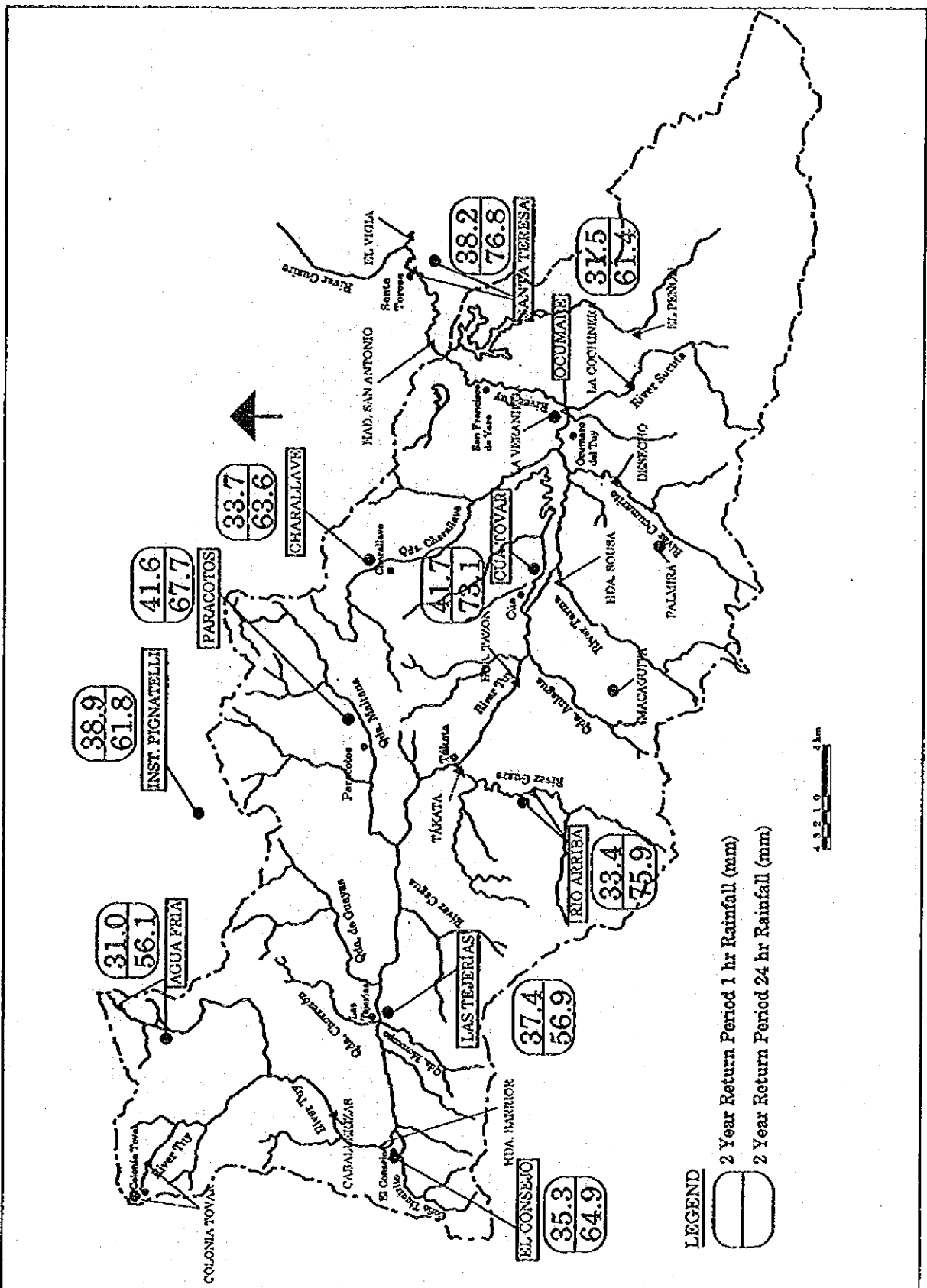




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Fig. 13-2 Daily Rainfall Distribution

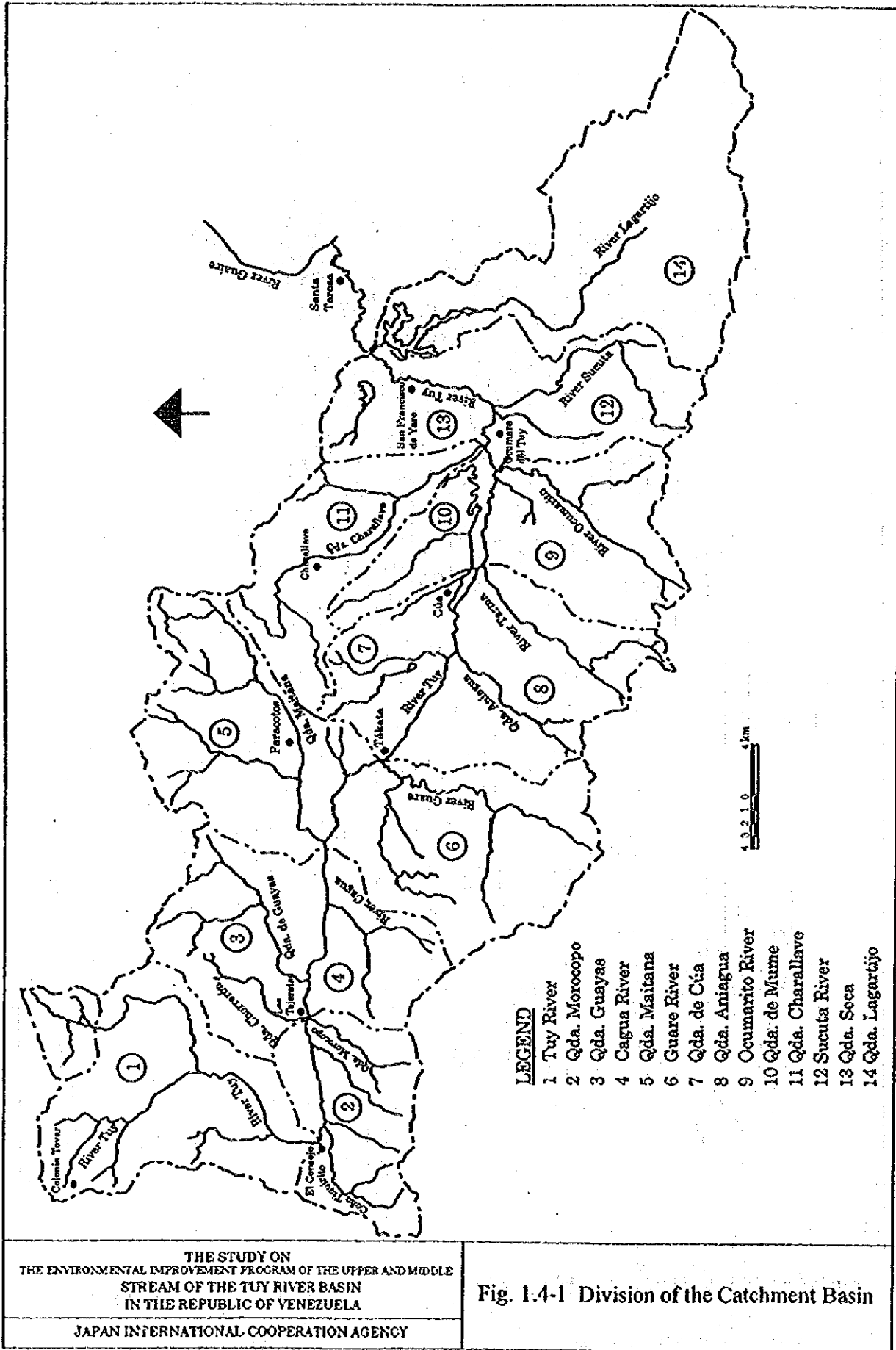


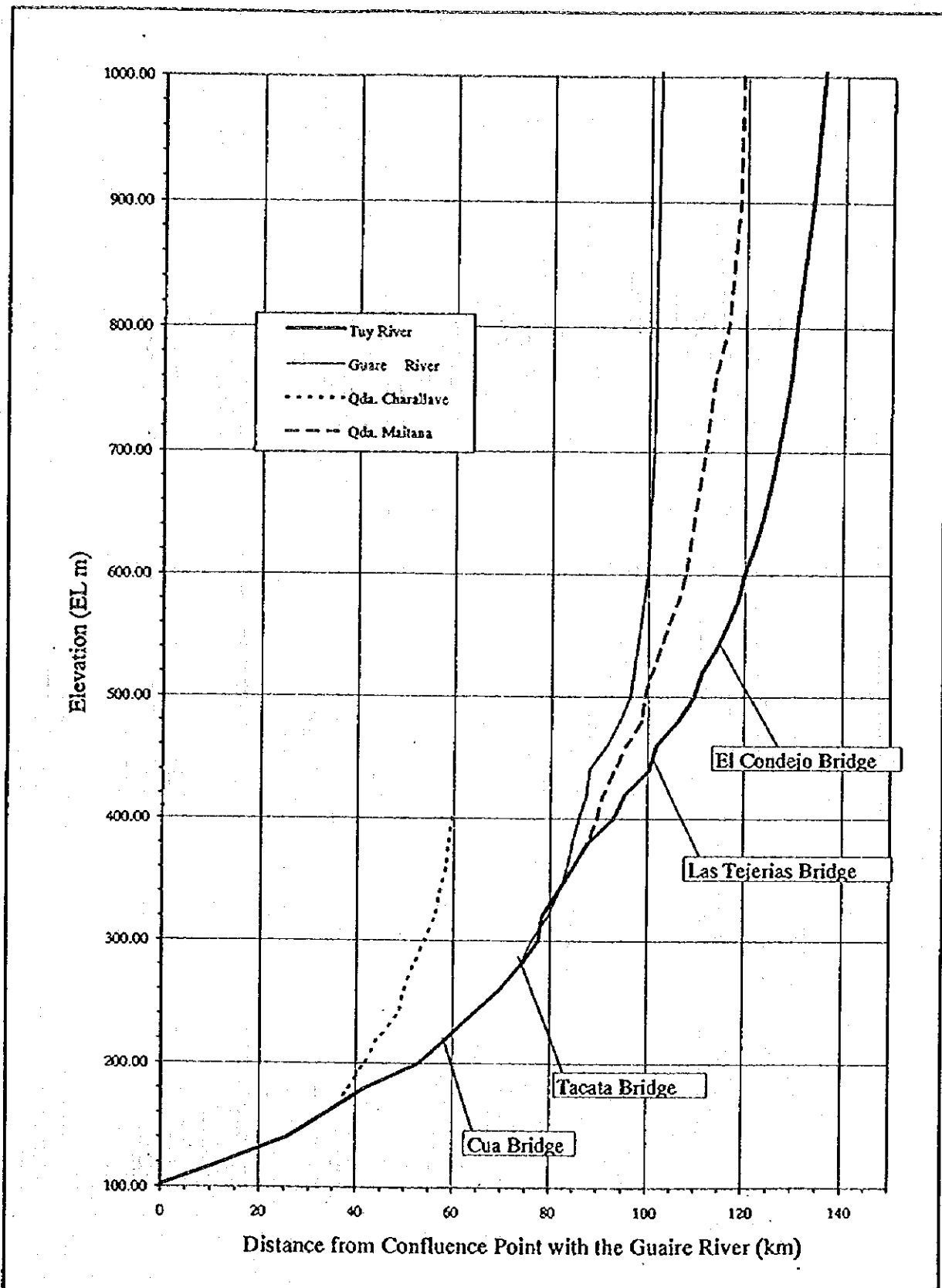
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Fig. 1.3-3 Probable 1 hr and 24 hr Rainfall

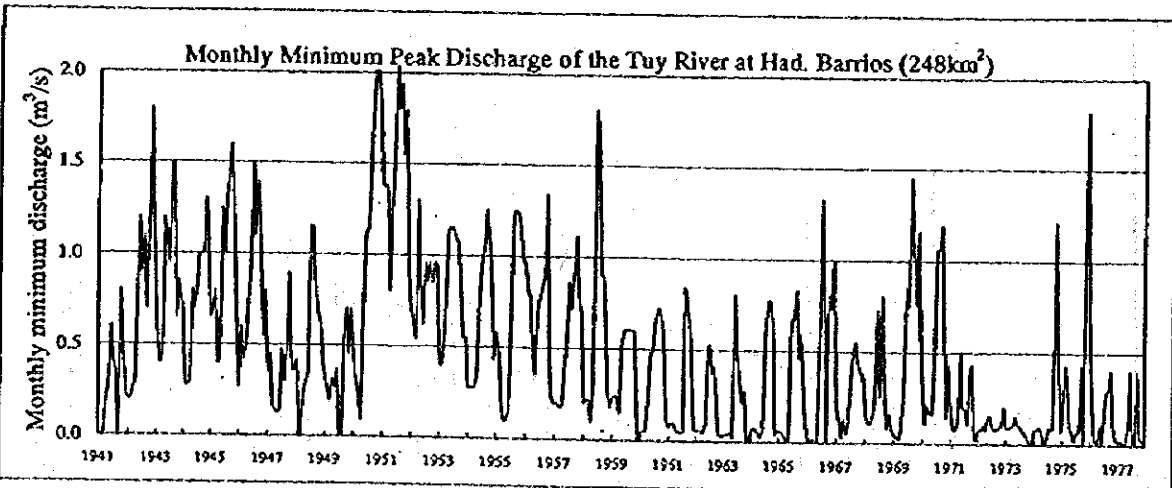
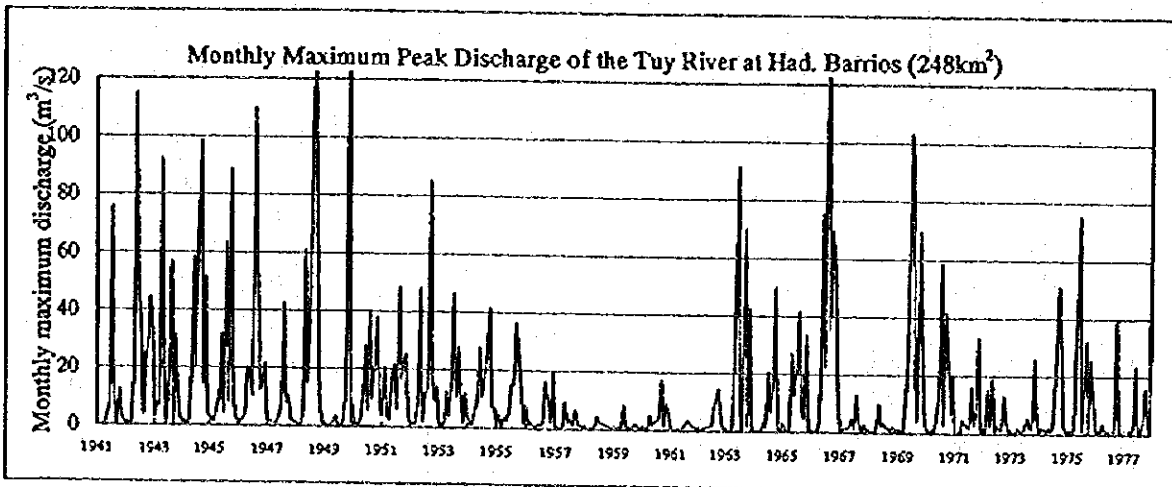
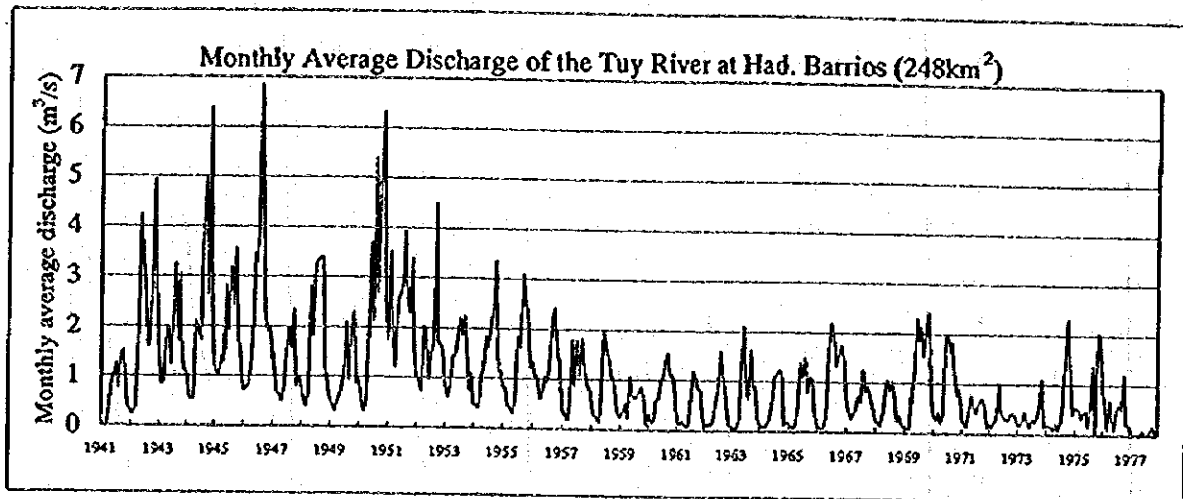






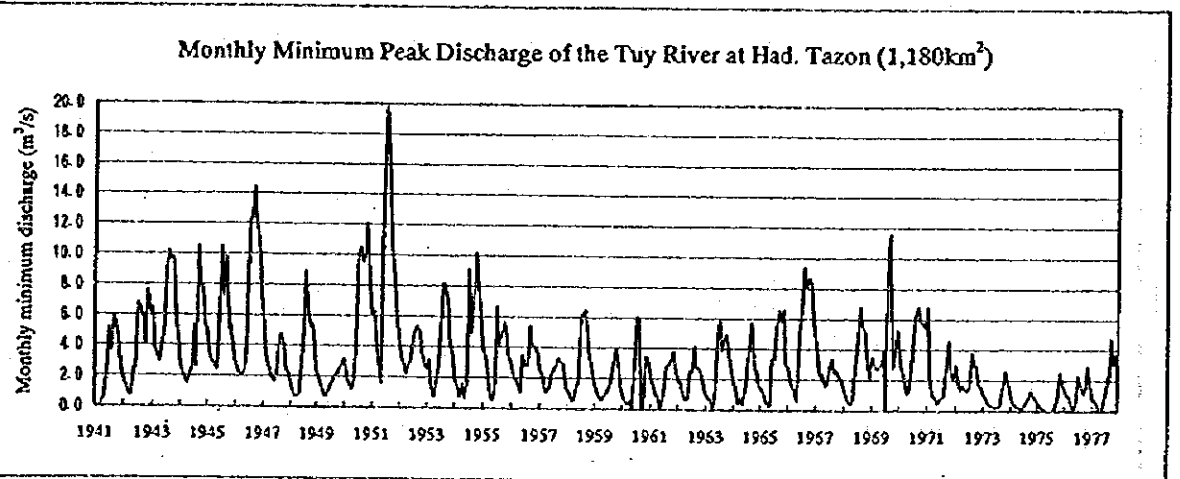
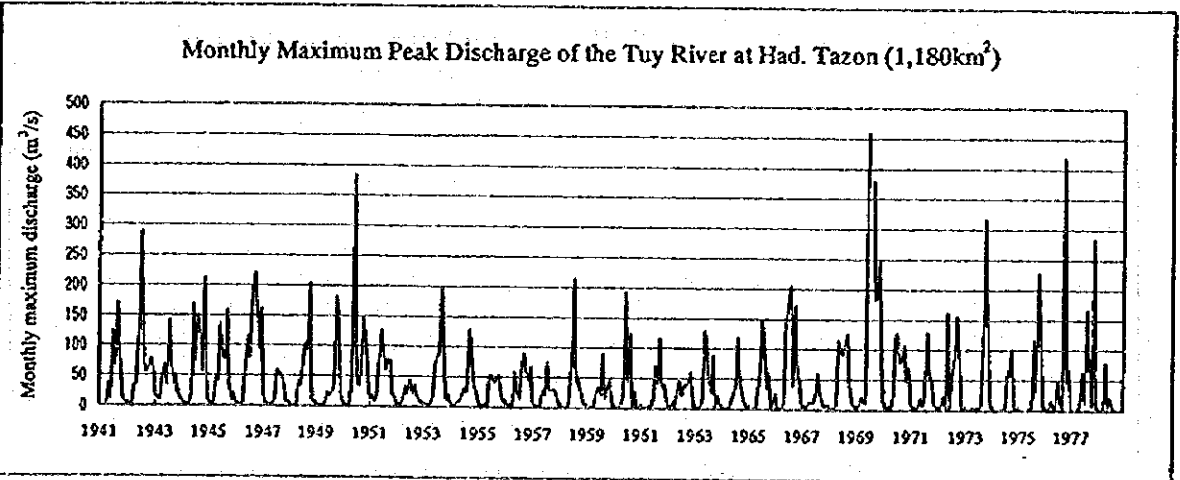
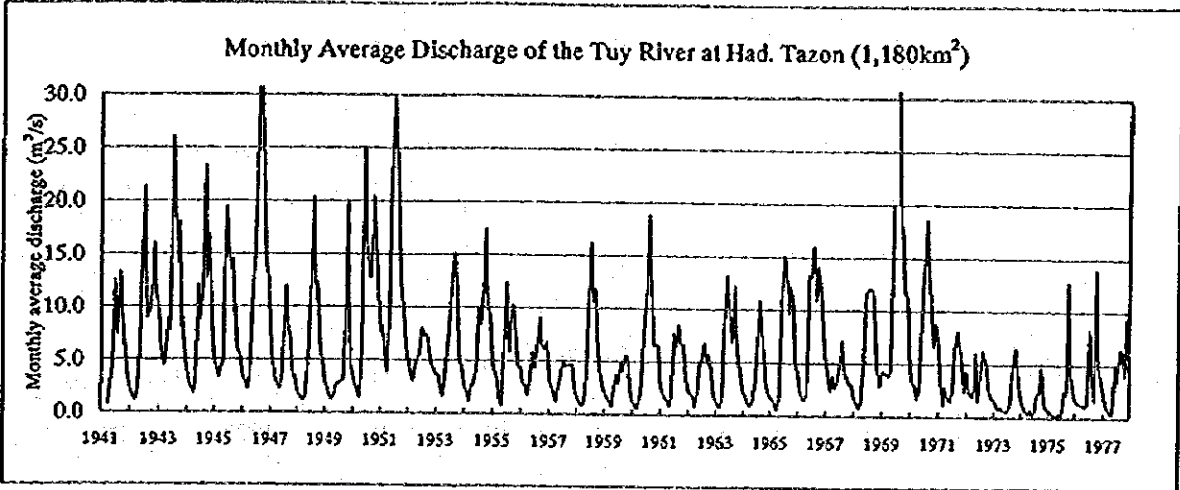
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Fig. 1.4-2 Longitudinal Profile of the Tuy River and Tributaries



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Fig. 1.5-1 Monthly Discharge of the Tuy  
 (1/2) River

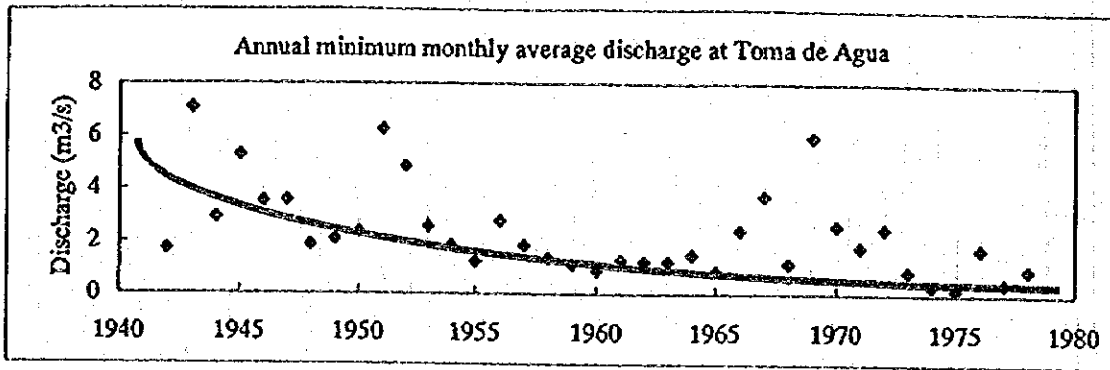


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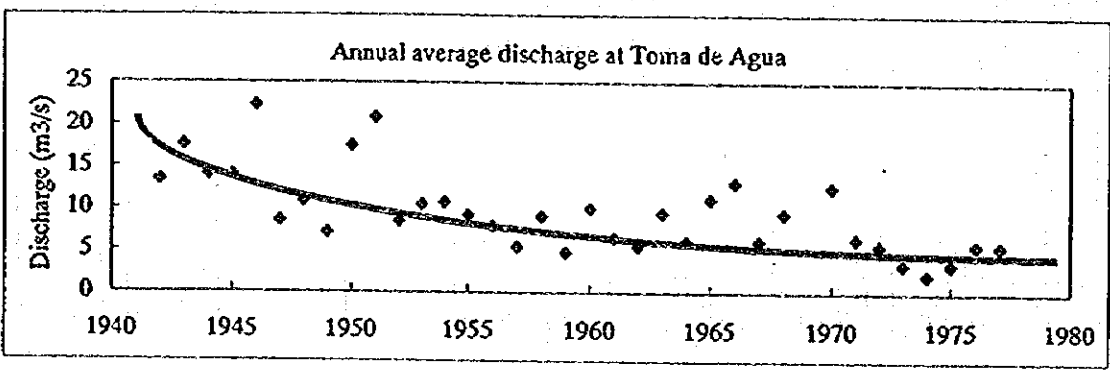
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**Fig. 1.5-1 Monthly Discharge of the Tuy River (2/2)**



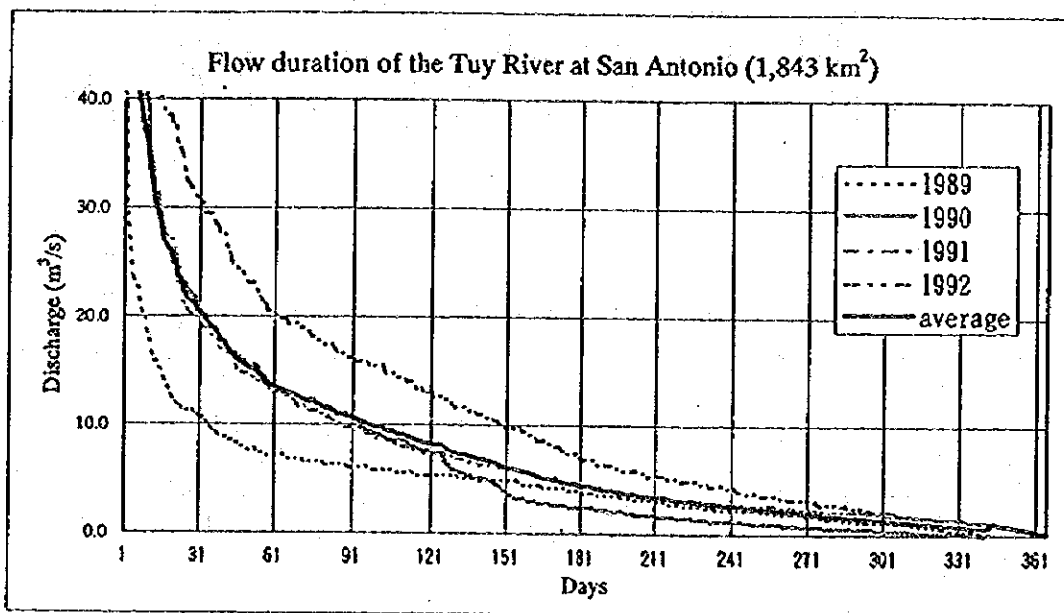
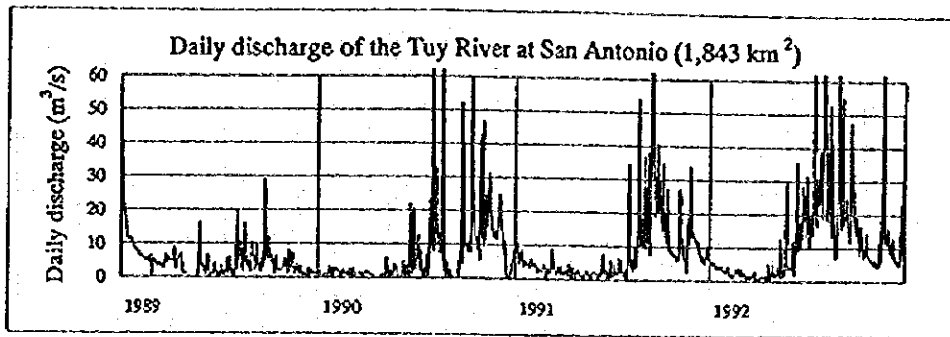
Note: Data is for Toma de Agua (1,856 km<sup>2</sup>) calculated on data at Hda. Tazon (1,180 km<sup>2</sup>)



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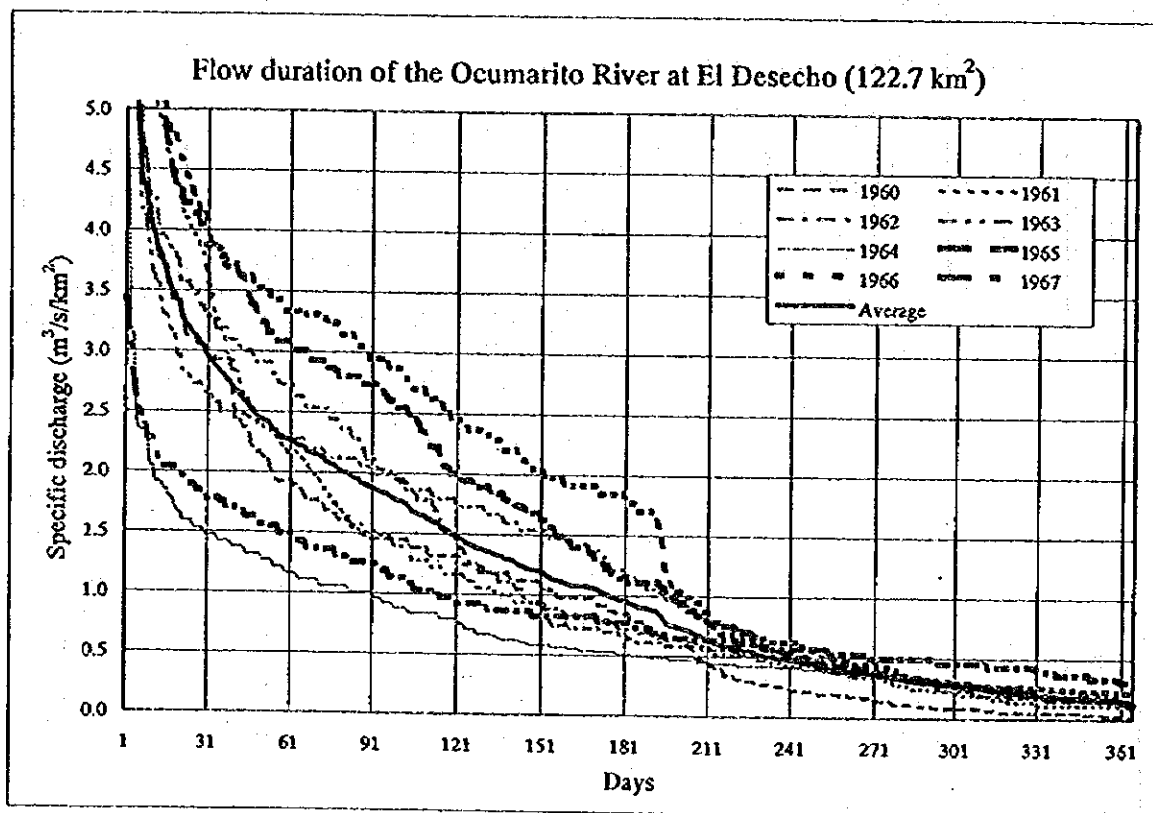
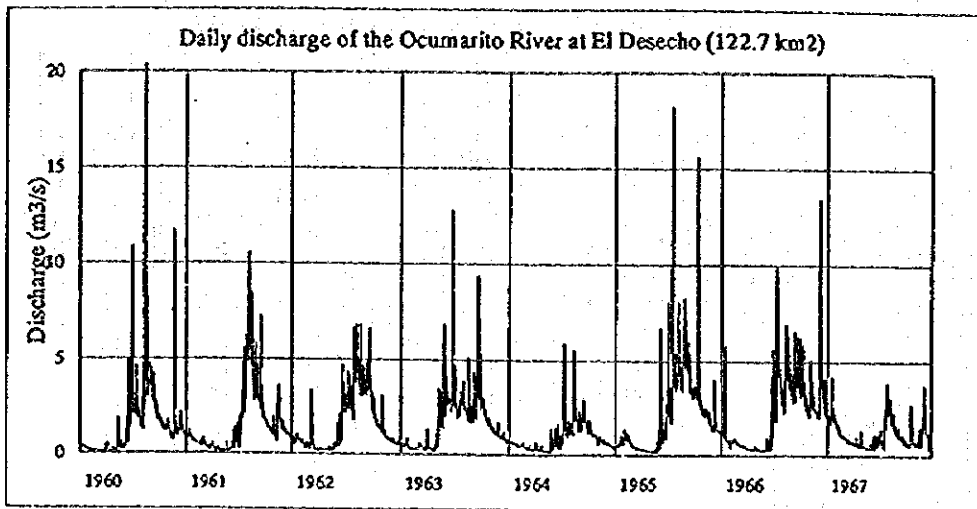
Fig. 1.5-2 Annual Minimum Monthly and Annual Average Discharge at Toma de Agua



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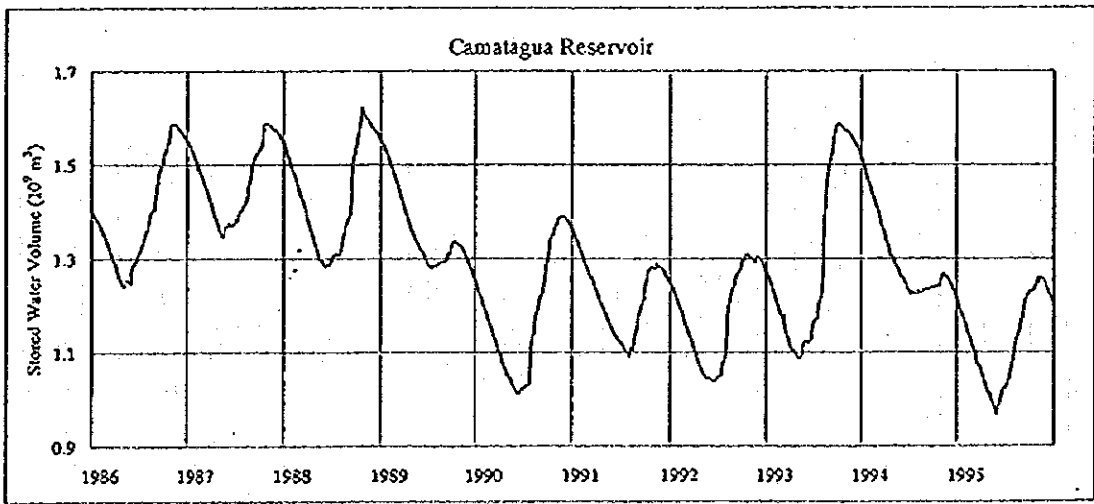
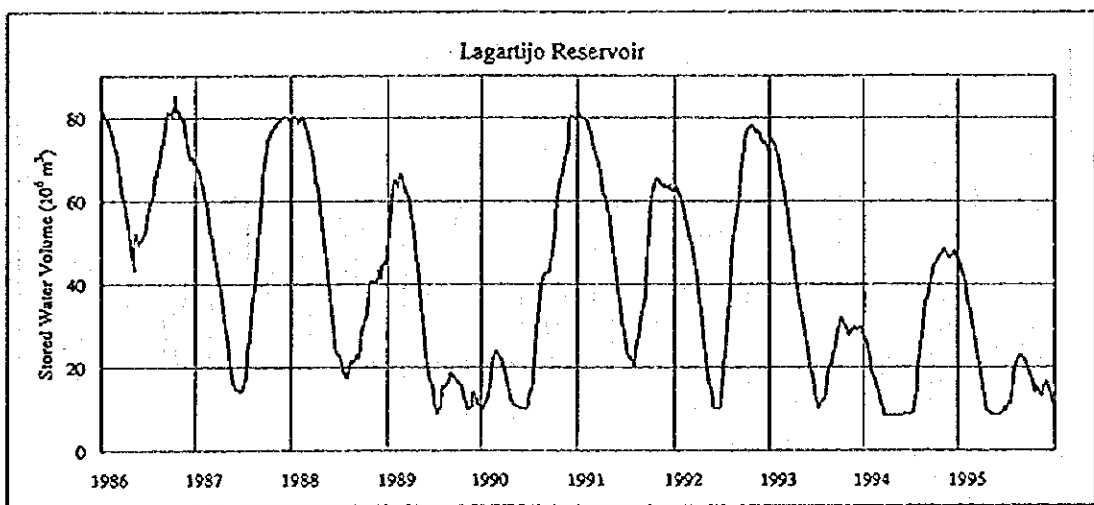
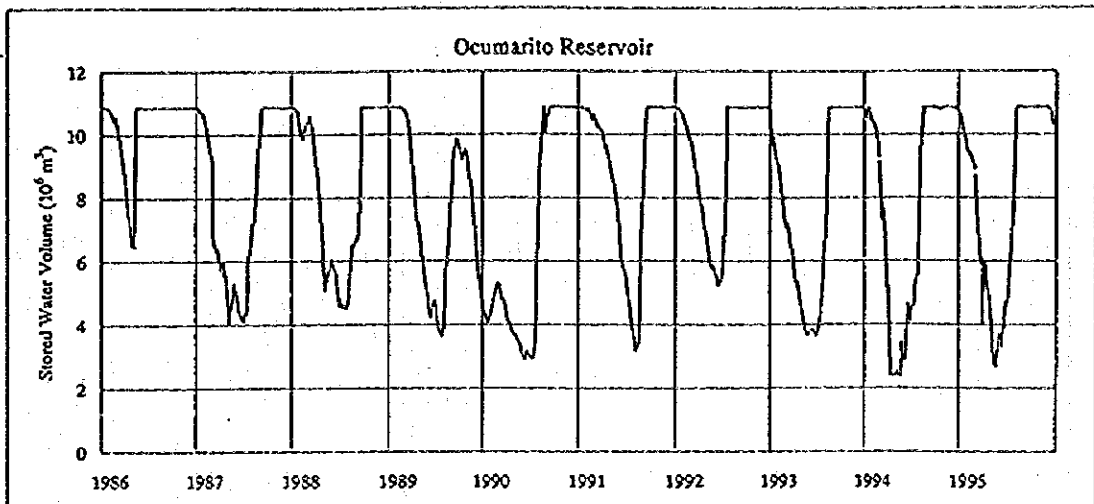
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Fig. 1.5-3 Discharge of the Tuy River at San Antonio



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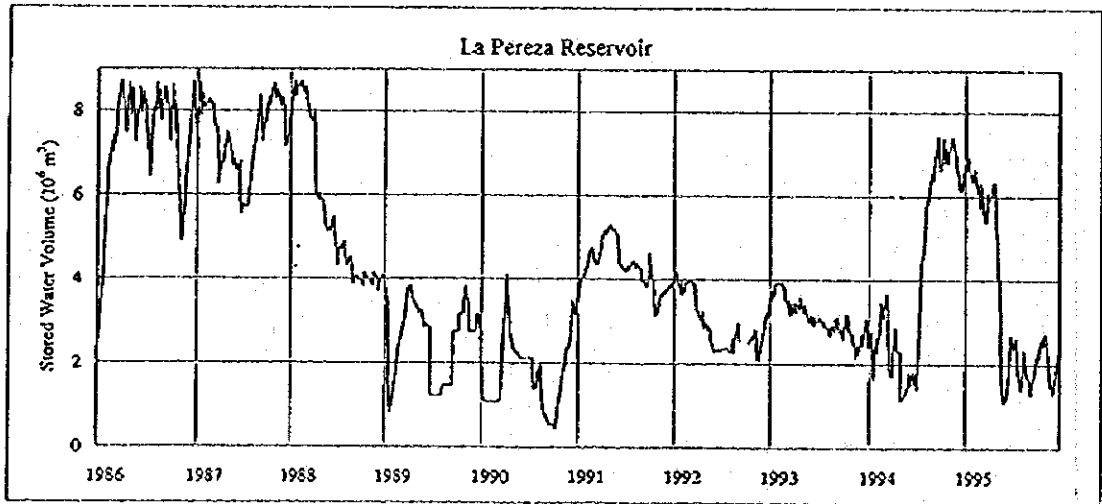
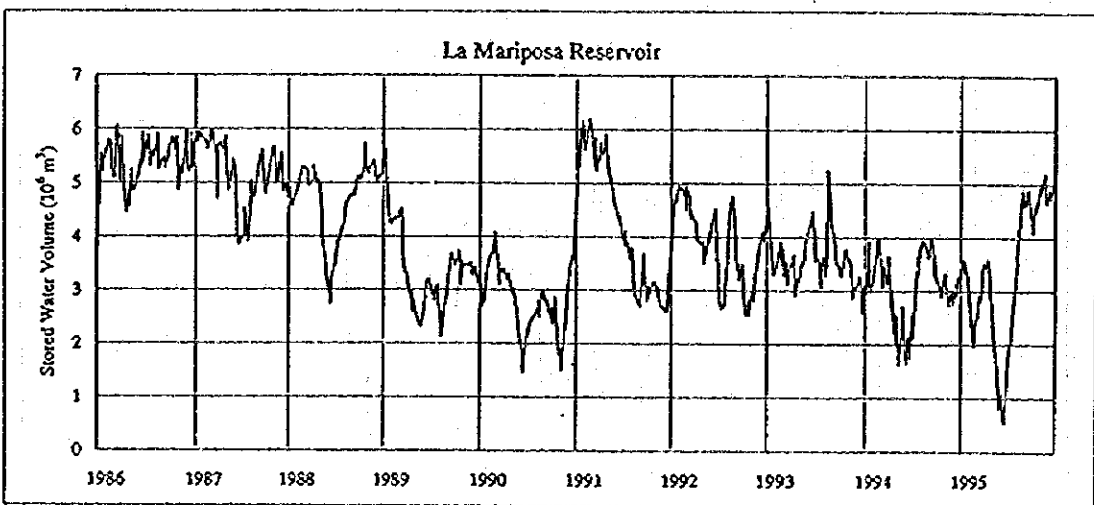
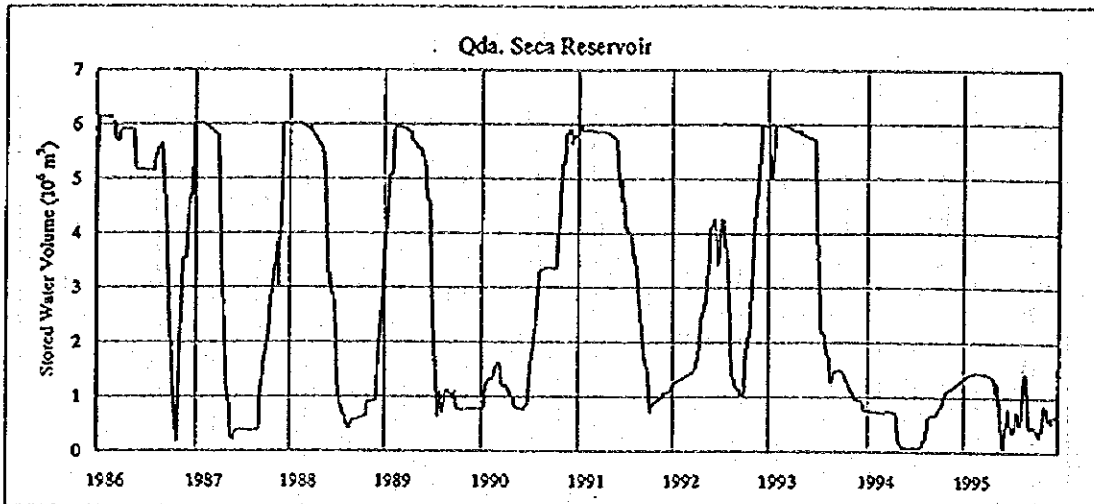
Fig. 1.5-4 Discharge of the Ocumarito River at El Desecho



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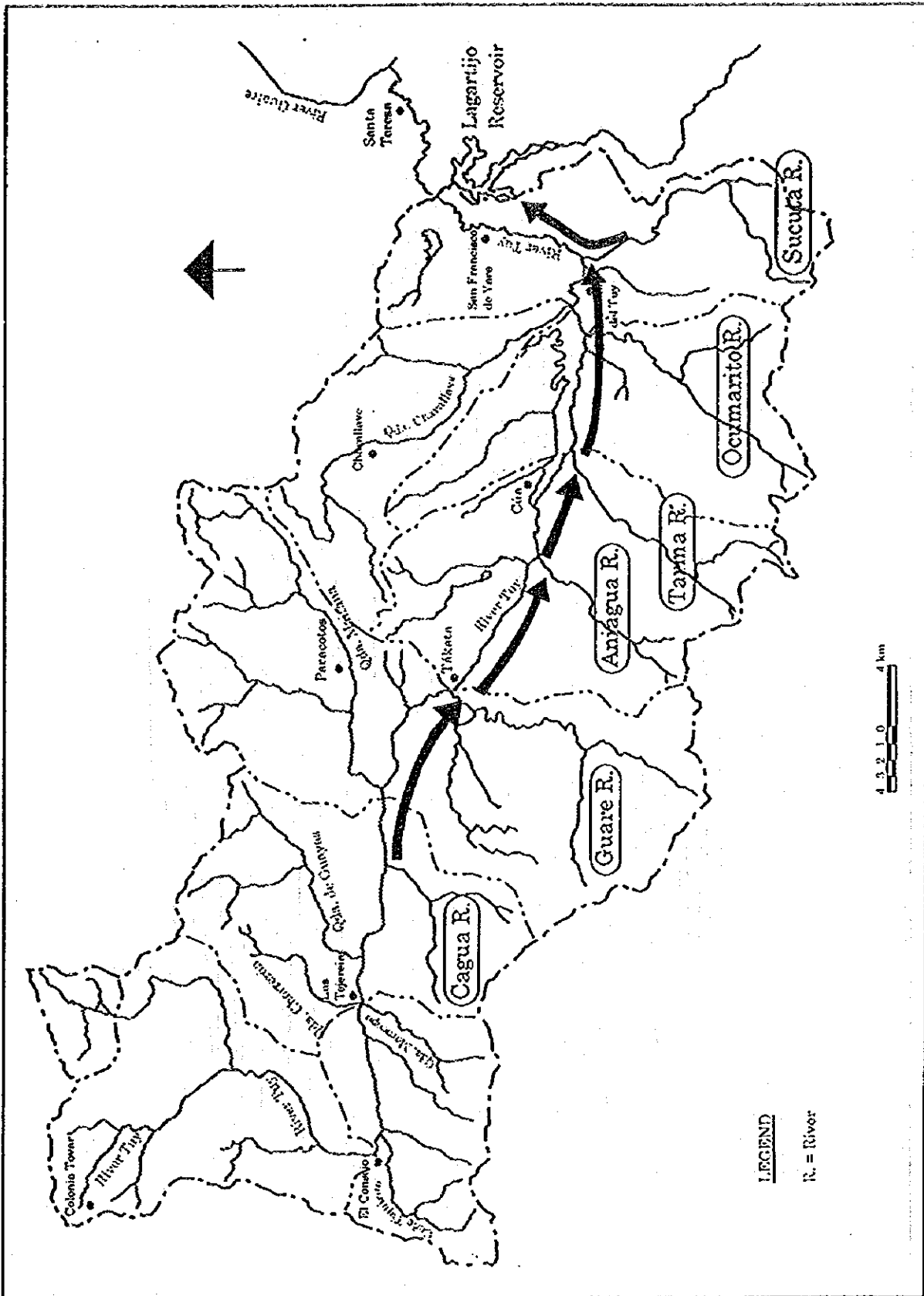
Fig. 2.1-1 Historical Daily Operation  
 (1/2) Record of Related Reservoirs





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Fig. 2.1-1 Historical Daily Operation  
 (2/2) Record of Related Reservoirs

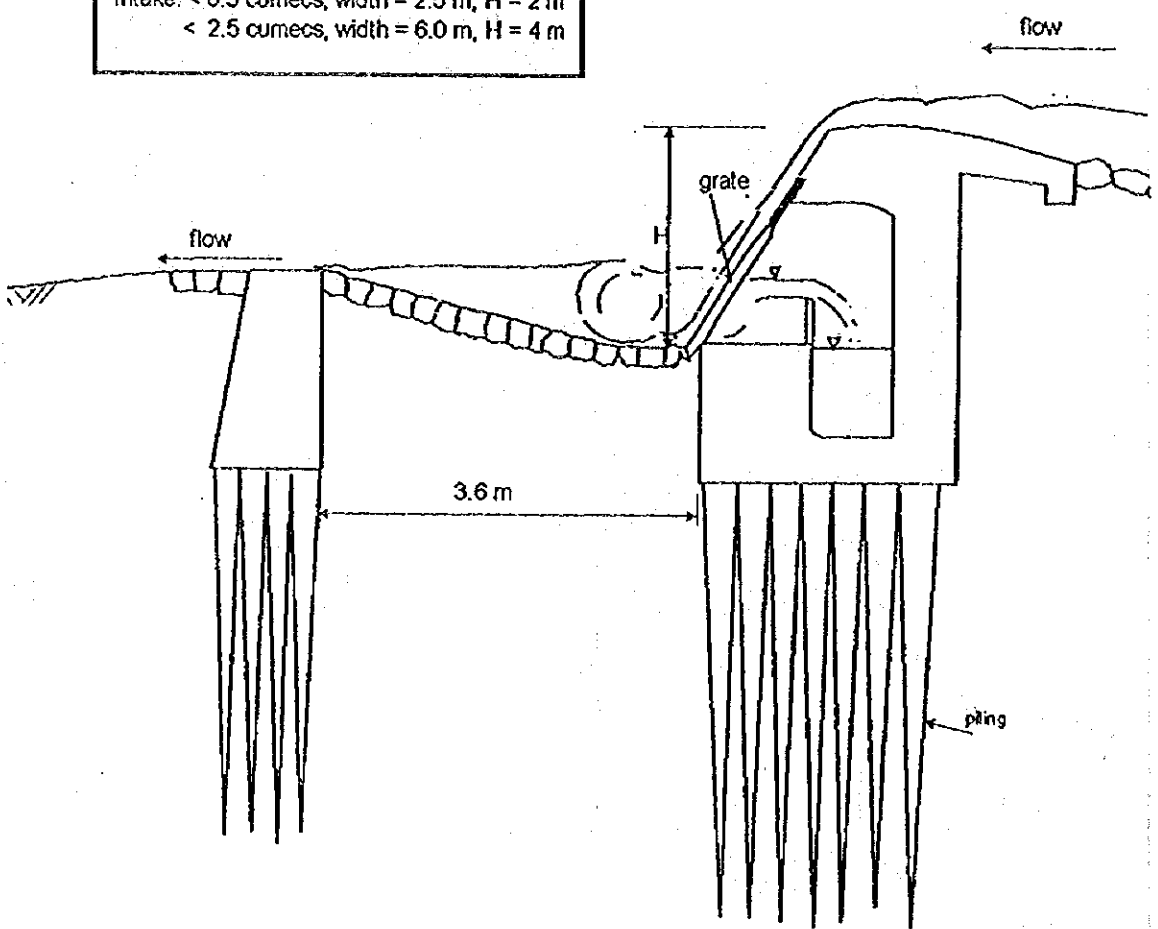


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 STREAM OF THE TUY RIVER BASIN  
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Fig. 3.3-1 Layout of Torrent Diversion

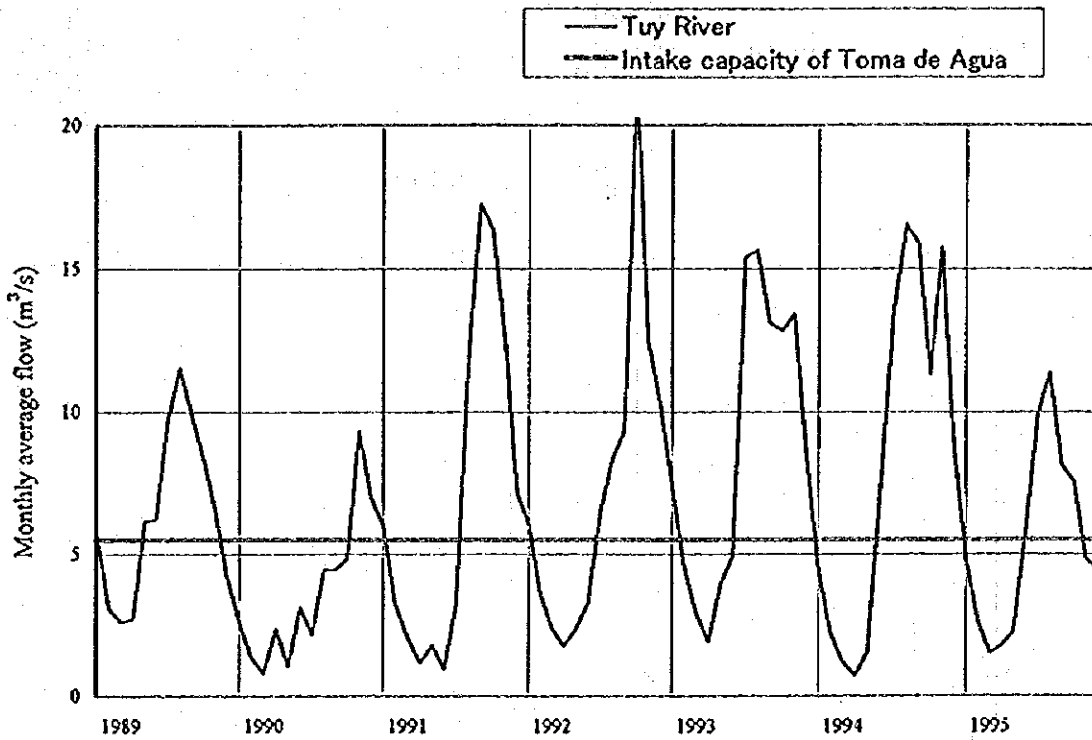
Intake: < 0.5 cumecs, width = 2.5 m, H = 2 m  
 < 2.5 cumecs, width = 6.0 m, H = 4 m



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Fig. 3.3-2 General Structure of Torrent Intake

Relation between Monthly average flow of the Tuy River and Intake at Toma de Agua



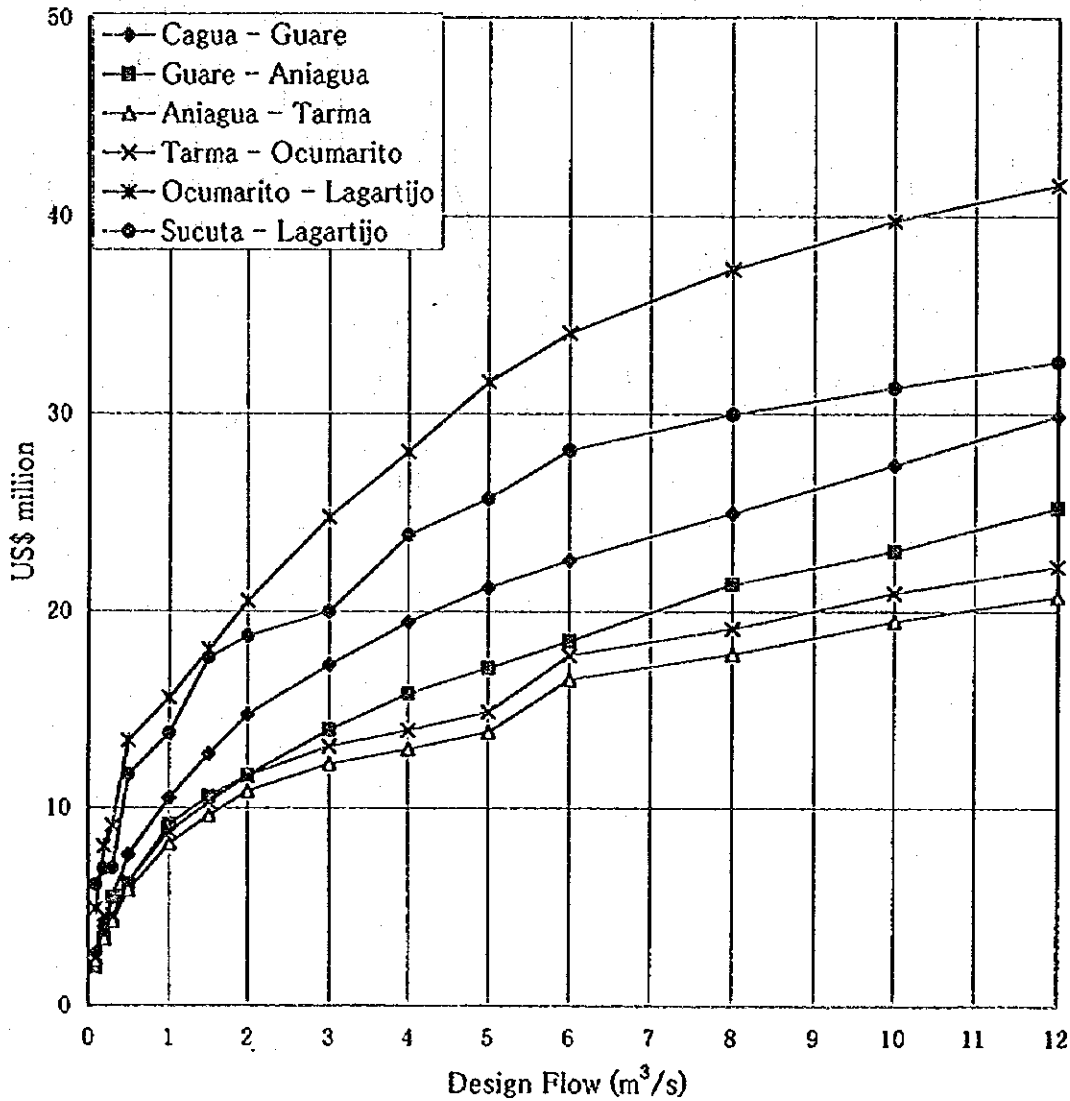
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Fig. 3.3-3 Relation between Monthly Average Flow of the Tuy River and Intake at Toma de Agua

Table

River	Length (km)	Discharge (m <sup>3</sup> /s)													
		0.1	0.2	0.3	0.5	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
Cagua - Guare	17.0	2.66	3.99	5.47	7.64	10.50	12.75	14.75	17.28	19.47	21.23	22.60	25.00	27.40	29.88
Guare - Aniagua	12.1	1.94	3.36	5.48	6.20	9.16	10.59	11.64	13.99	15.82	17.12	18.49	21.40	23.05	25.23
Aniagua - Tarma	9.3	2.25	3.36	4.27	5.85	8.21	9.62	10.85	12.25	13.01	13.87	16.54	17.82	19.49	20.75
Tarma - Ocumarito	10.0	2.42	4.58	4.59	6.27	8.81	10.32	11.63	13.14	13.96	14.88	17.76	19.13	20.93	22.28
Ocumarito - Lagartijo	18.0	4.92	8.06	9.11	13.42	15.60	18.07	20.53	24.78	28.08	31.62	34.09	37.33	39.77	41.56
Tarma - Lagartijo	28.0	7.34	12.64	13.70	19.69	24.41	28.38	32.16	37.92	42.04	46.50	51.85	56.46	60.70	63.84
Sucuta - Lagartijo	13.5	6.14	6.93	6.95	11.71	13.80	17.64	18.74	19.99	23.87	25.73	28.16	29.99	31.33	32.64

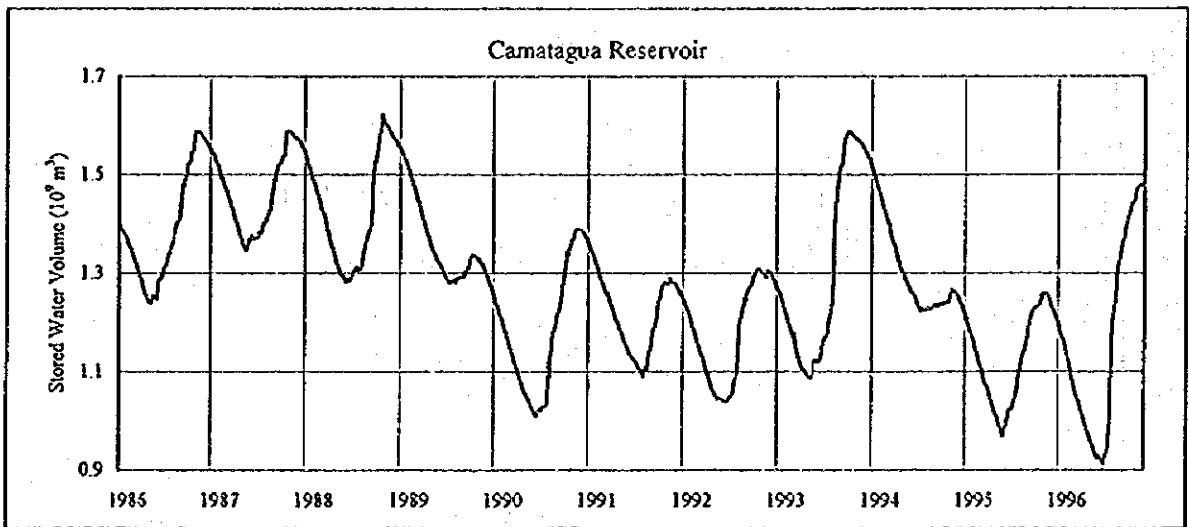
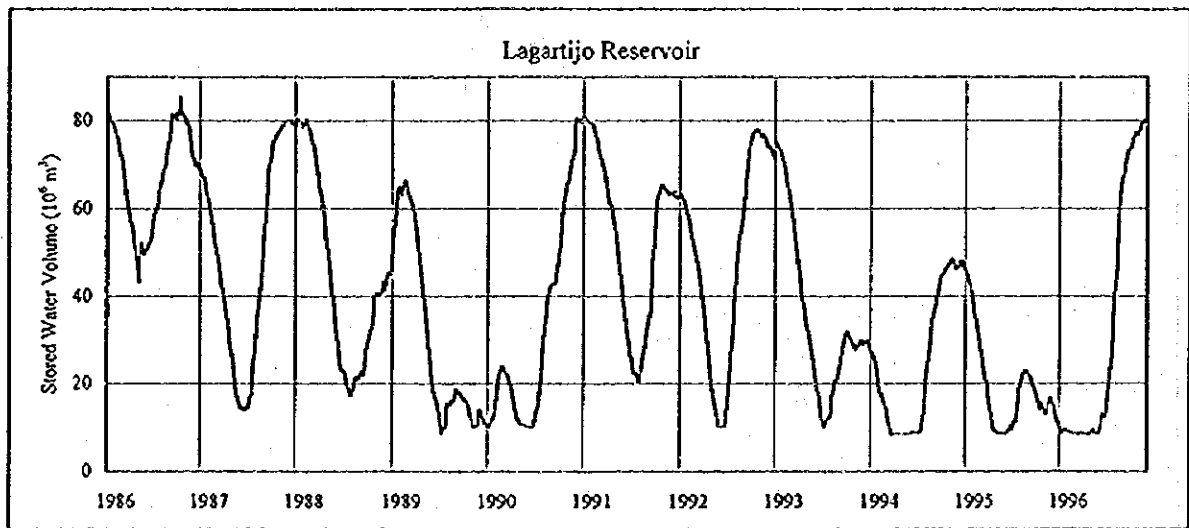
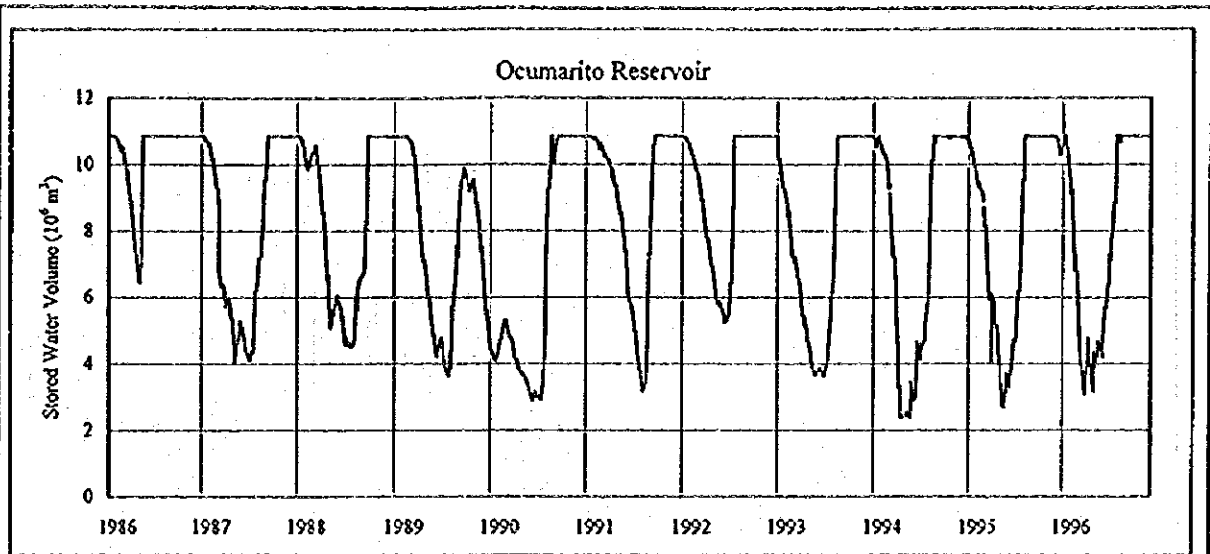
Initial Construction Cost



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Fig. 3.3-4 Cost Curve for Torrent Diversion

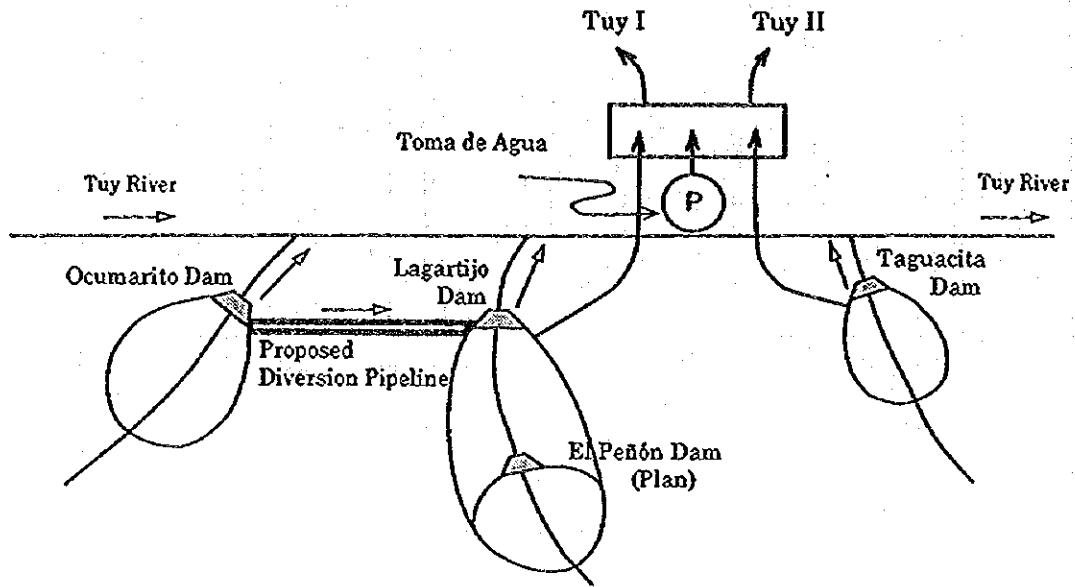


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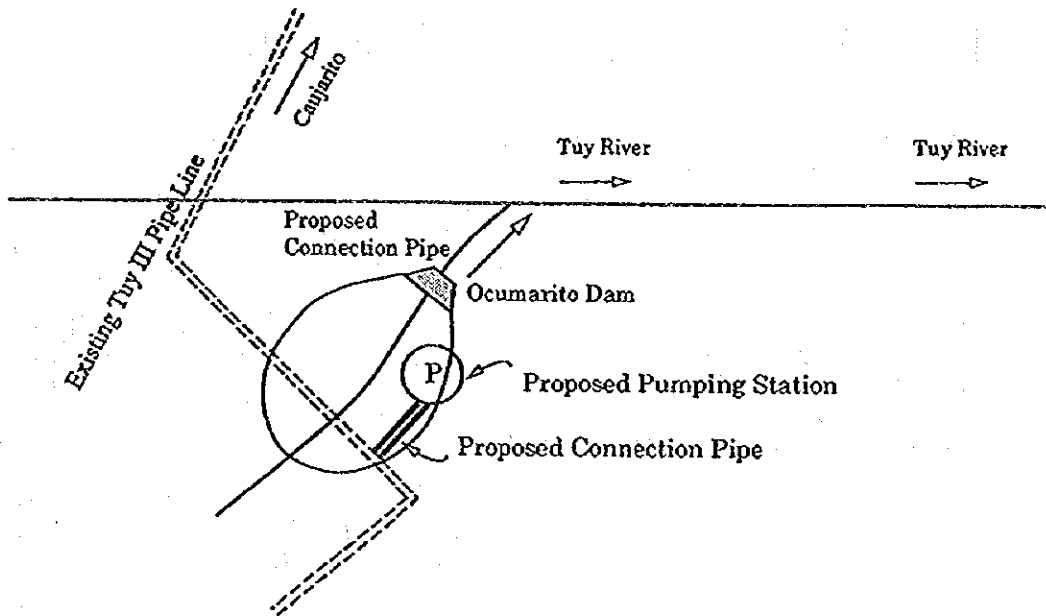
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Fig. 4.3-1 Historical Daily Operation Record of Related Reservoirs

Ocumarito - Lagartijo Diversion Plan



Pumping Plan to Tuy III Pipeline

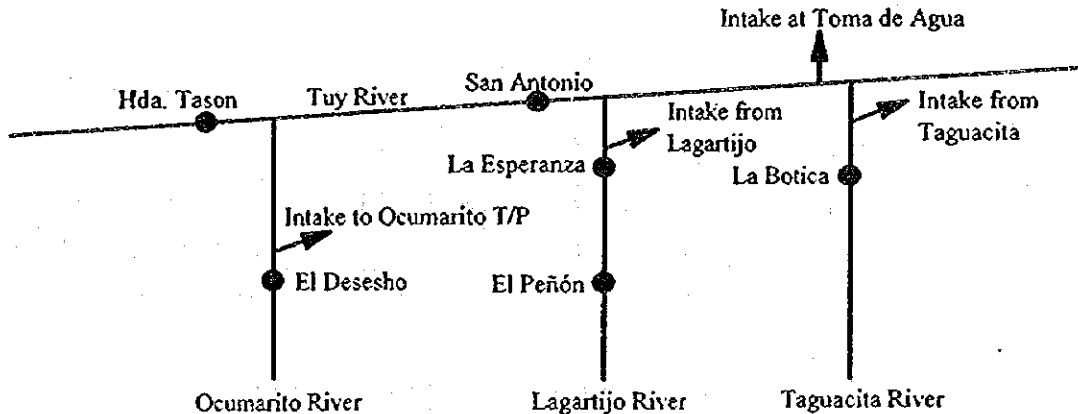


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Fig. 4.3-2 General Concept for Utilization Plan of the Ocumarito River

Data Item	Year 19##																												
	39	...	59	60	61	62	63	64	65	66	67	...	76	77	78	...	85	86	87	88	89	90	91	92	93	94	95	96	
River flow (Simulated monthly)																													
Ocumarito, El Desecho																													
Lagartijo, La Esperanza																													
Lagartijo, El Peñón																													
Taguacita, La Botica																													
Tuy, Had. Tazon																													
Tuy, San Antonio																													
River flow (Observed daily)																													
Ocumarito, El Desecho																													
Reservoir water volume (Observed daily)																													
Ocumarito																													
Lagartijo																													
Camatagua																													
Intake by Hidrocapital (Observed monthly)																													
from Lagartijo																													
from Taguacita																													
at Toma de Agua																													
to Ocumarito T/P																													

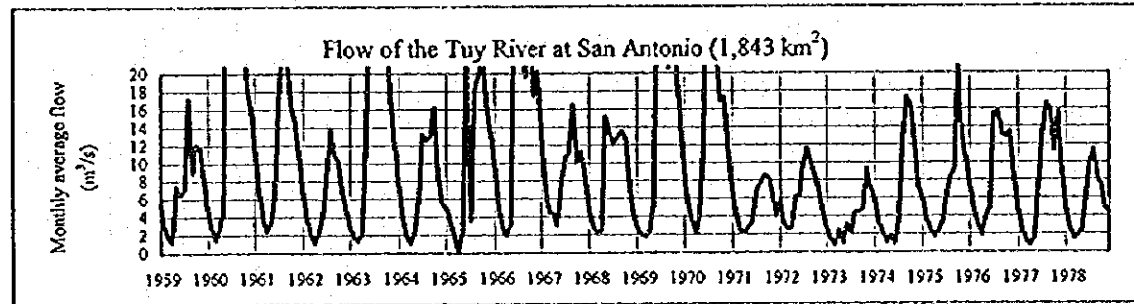
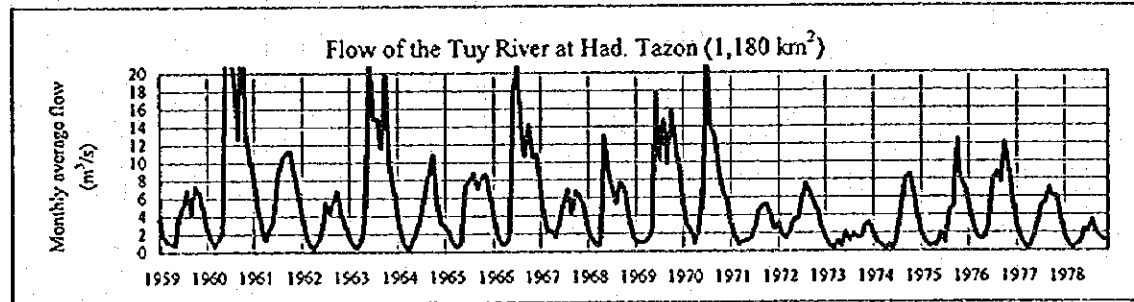
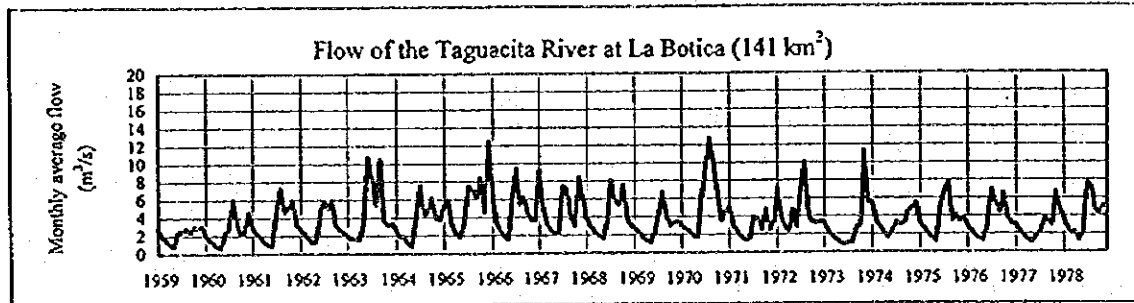
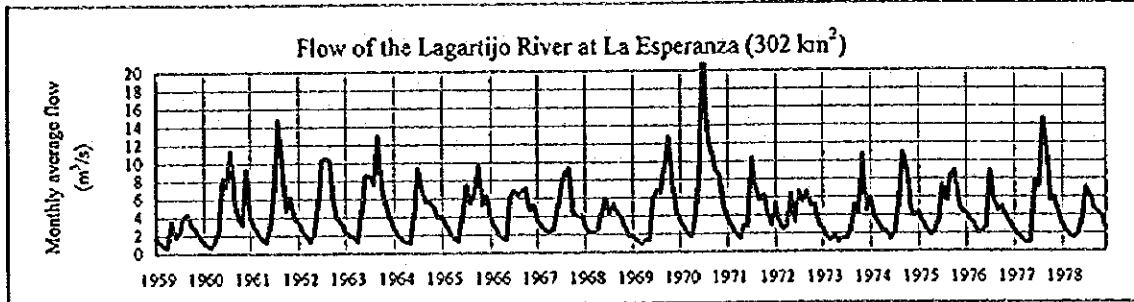
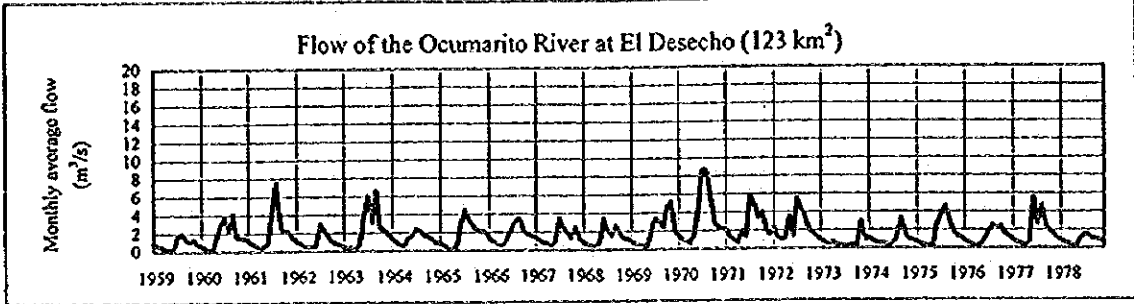


T/P: Treatment Plant

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Fig. 4.3-3 Availability of Hydrological and Hydraulic Data



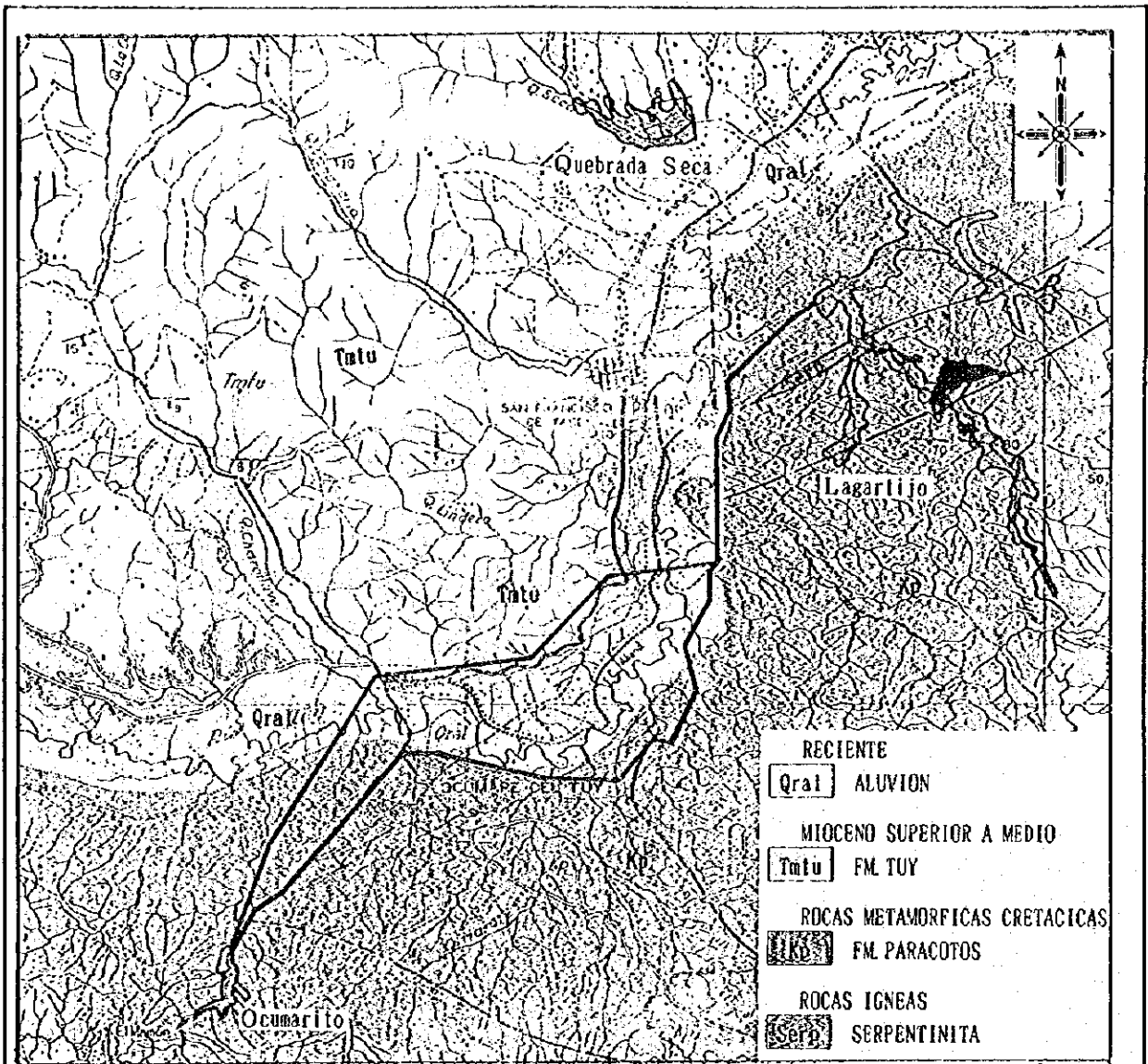


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**Fig. 4.3-4 Simulated Monthly Flow Hydrograph of Related Rivers**



Scale: 1/100,000

Legend

Source: Geologia de Superficie, Mapa D-8, Creole Petroleum Corporation

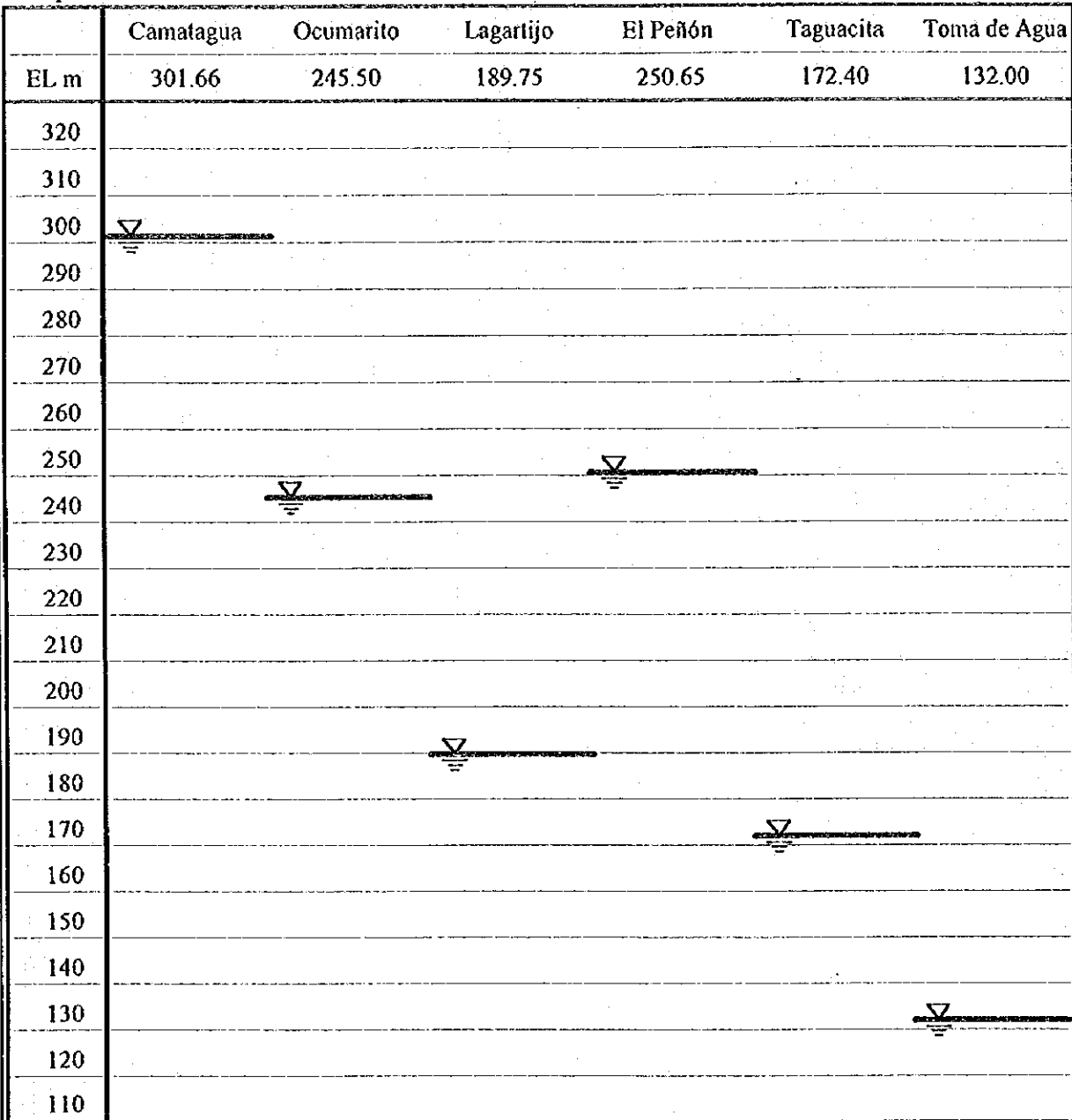
—— Possible diversion route

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Fig. 4.3-5 Geological Map for Ocumarito-Lagartijo Area

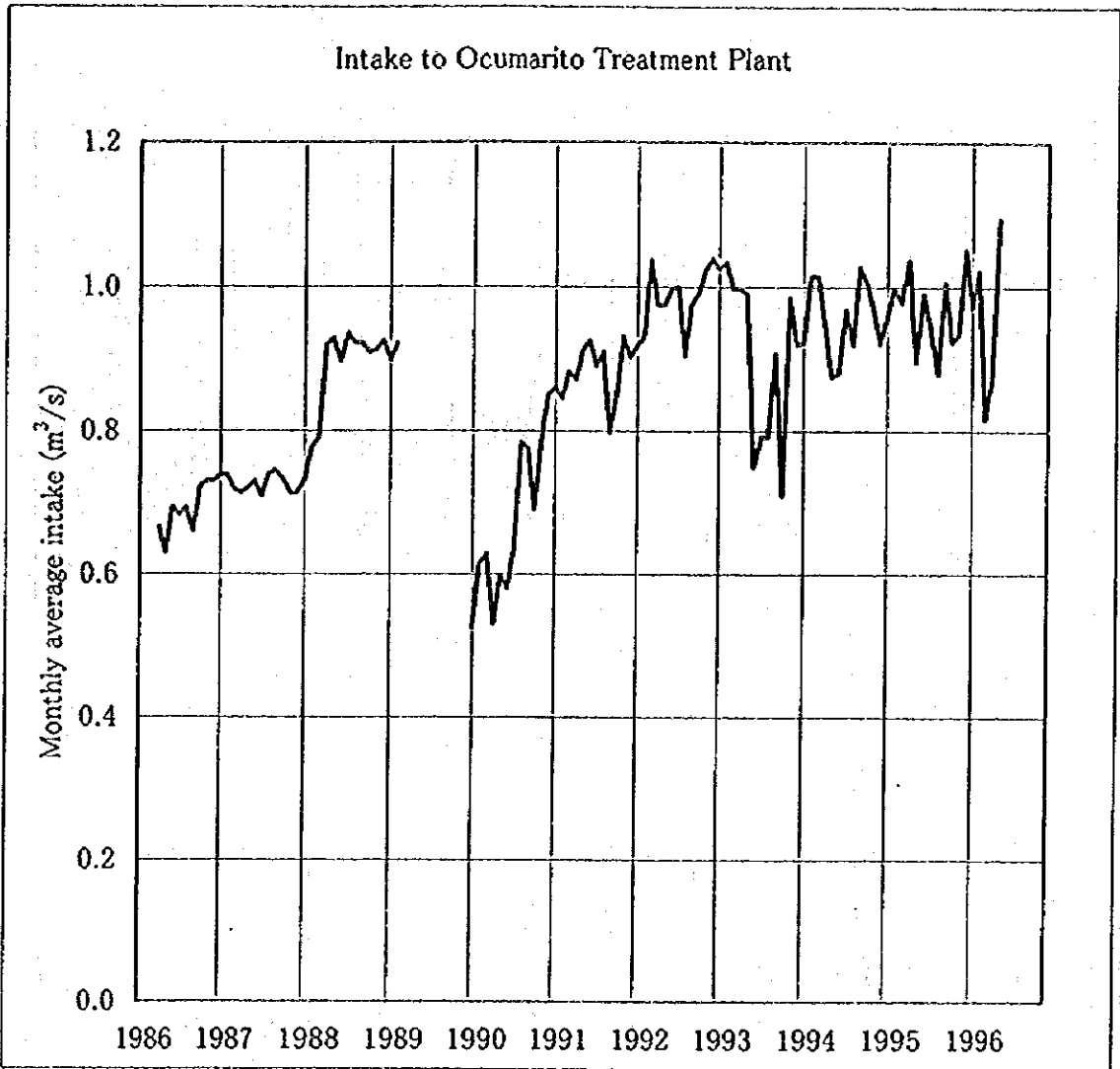
Comparison of Normal Water Level



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Fig. 4.3-6 Comparison of Normal Water Levels of Existing Reservoirs

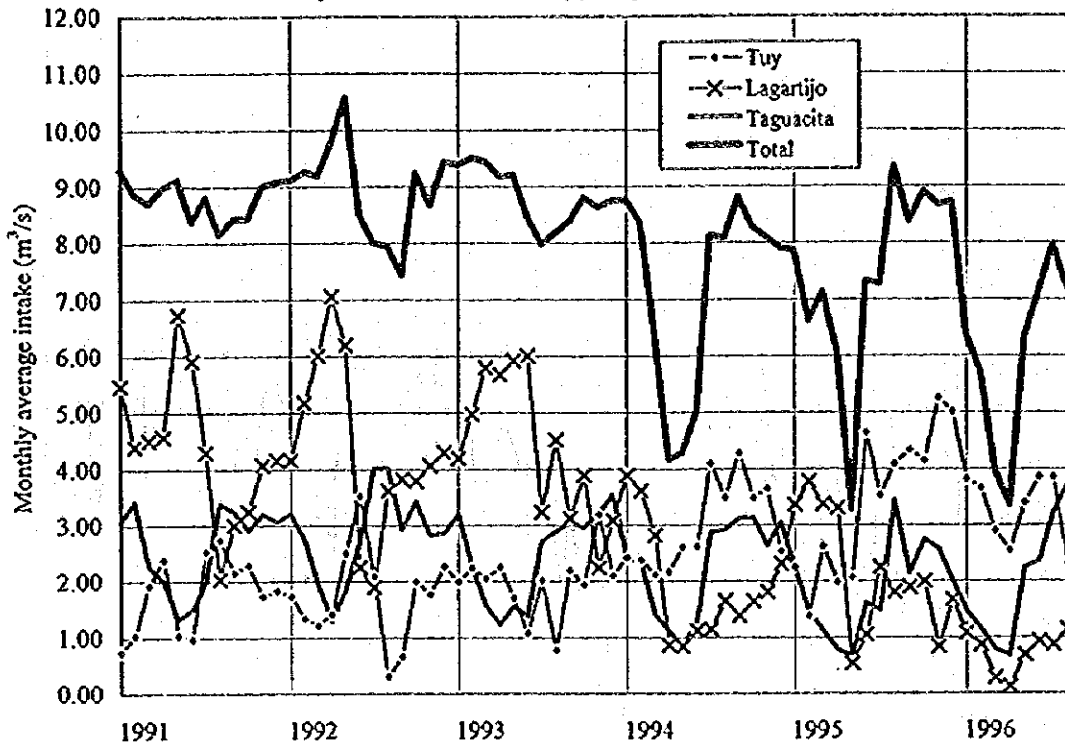


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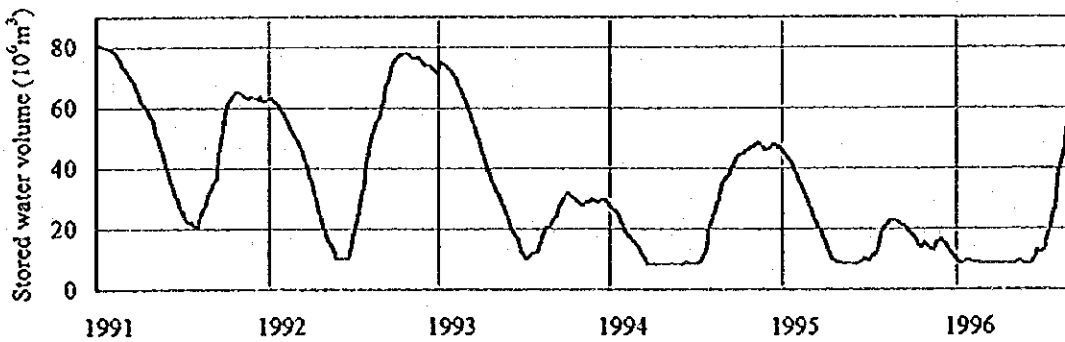
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Fig. 4.3-7 Historical Monthly Intake to Ocumarito Treatment Plant

Hydrocapital intake from Tuy, Lagartijo and Taguacita



Operation record of Lagartijo Reservoir

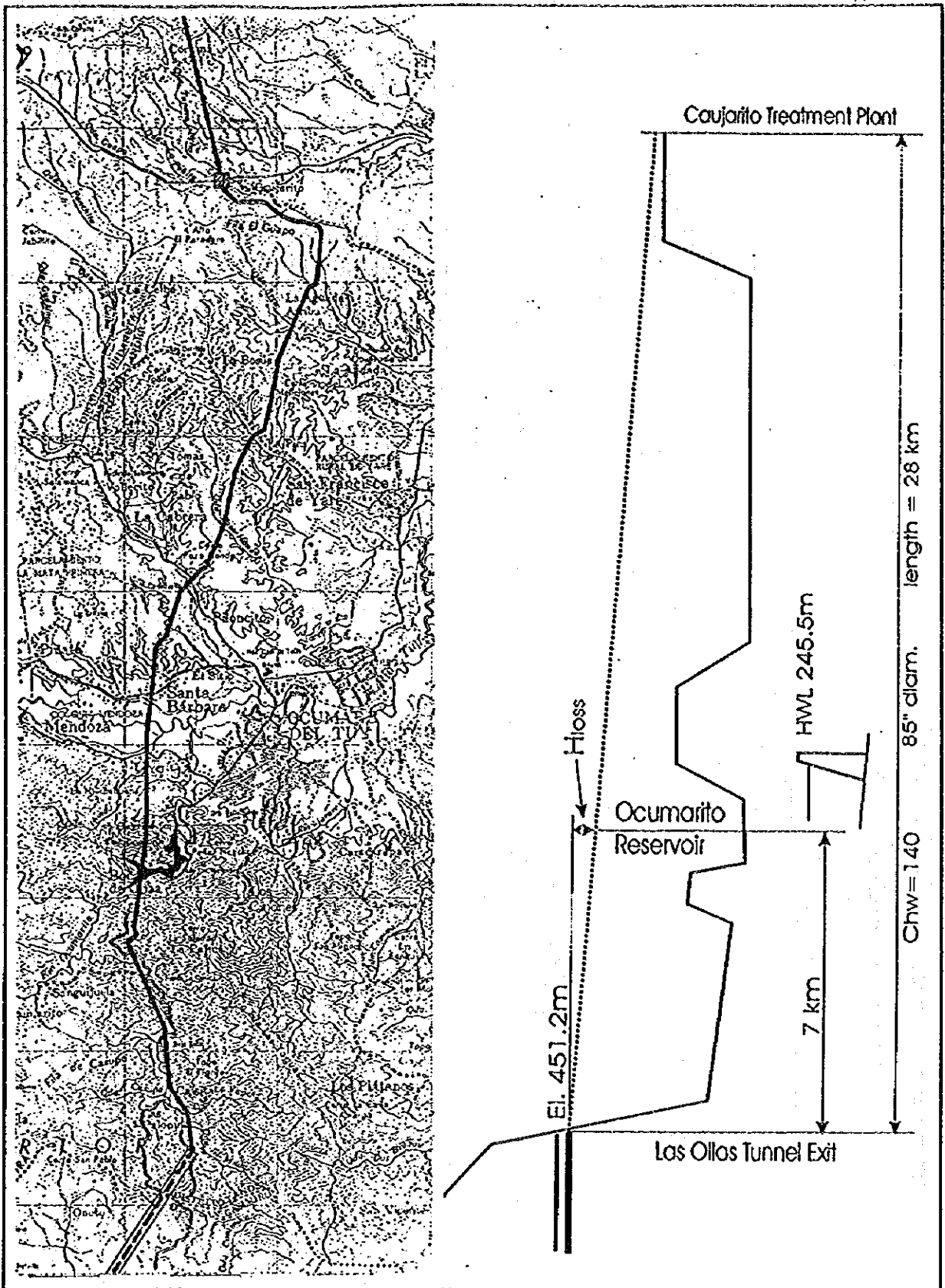


Intake	1991-95 average intake (m <sup>3</sup> /s)
Tuy	2.39
Lagartijo	3.44
Taguacita	2.40
Total	8.24

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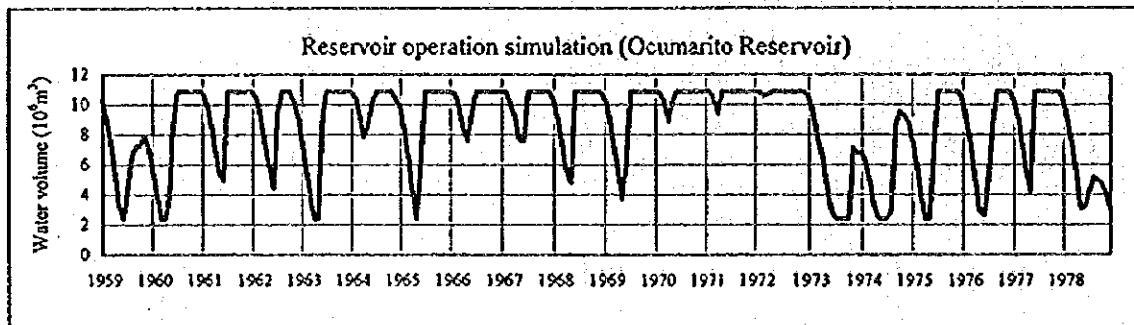
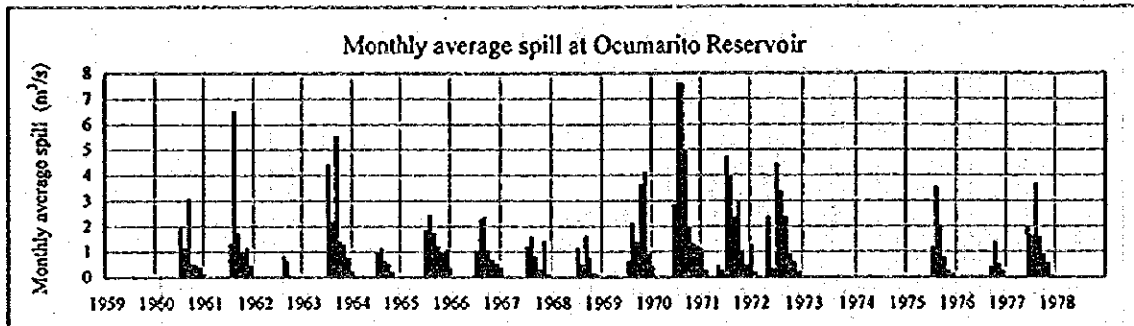
Fig. 4.3-8 Historical Monthly Intake from Tuy, Lagartijo and Taguacita



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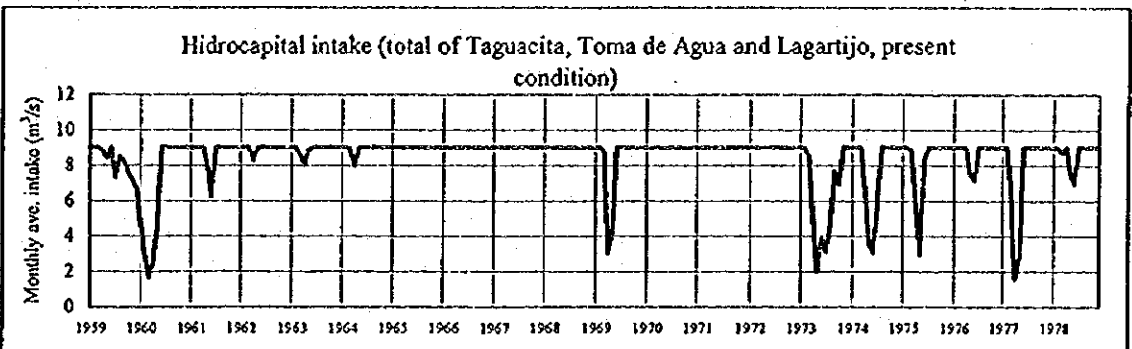
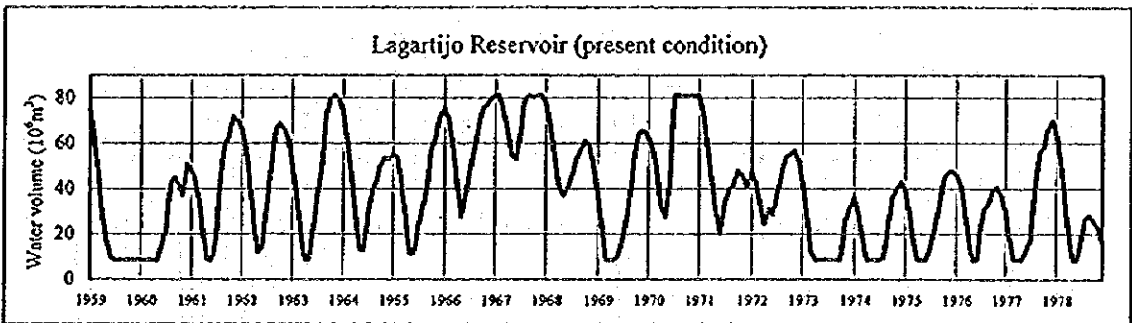
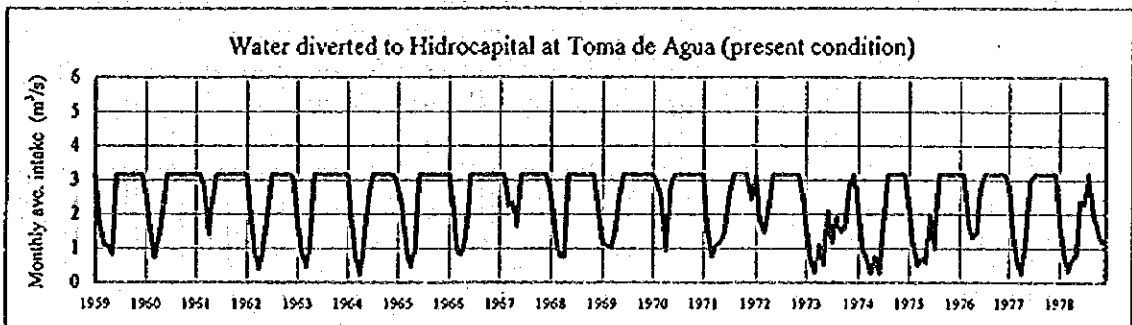
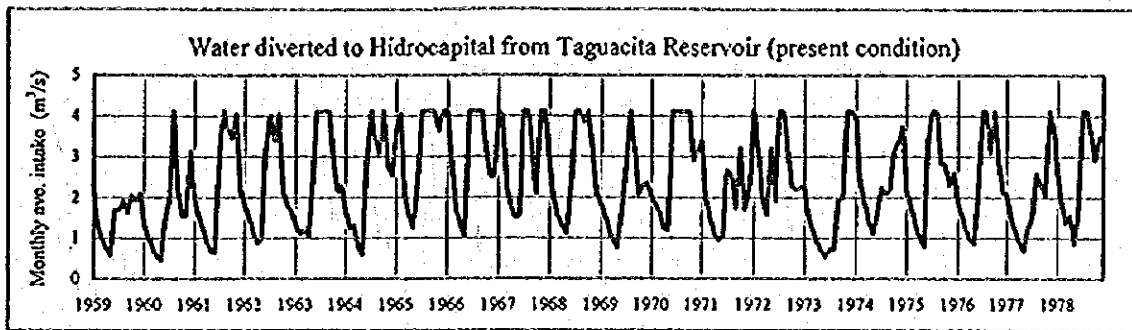
Fig. 4.3-9 Plan and Piezometric Profile of Tuy III Pipeline



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Fig. 4.3-10 Simulation of Ocumarito Reservoir

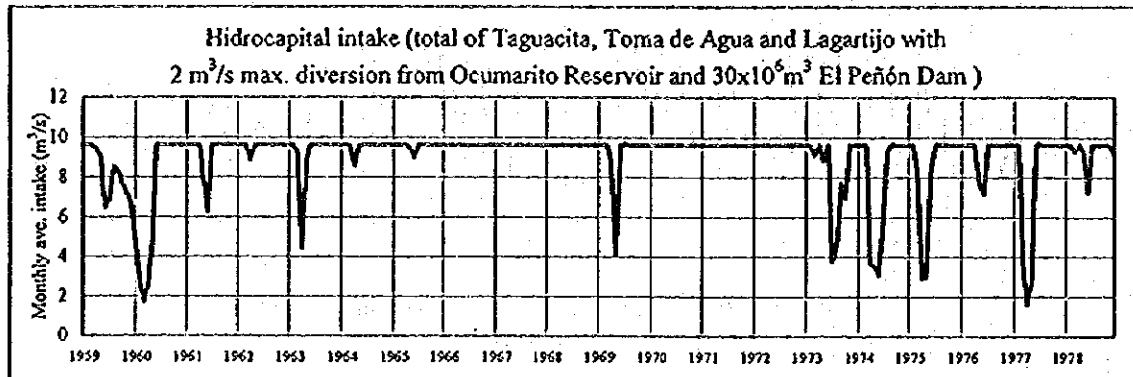
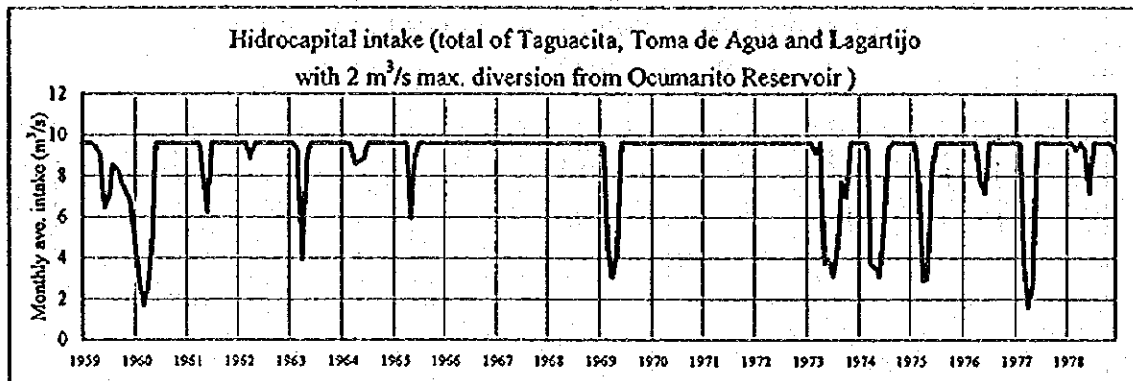
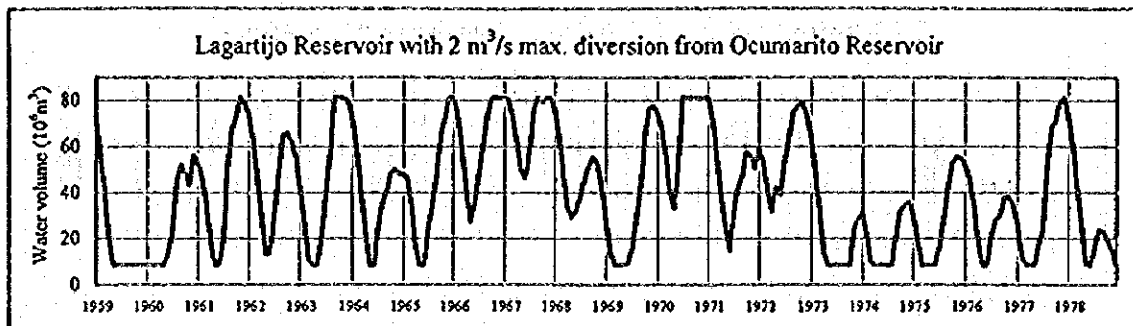


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Fig. 4.3-11 Simulation of Taguacita Reservoir, Toma de Agua and Lagartijo Reservoir



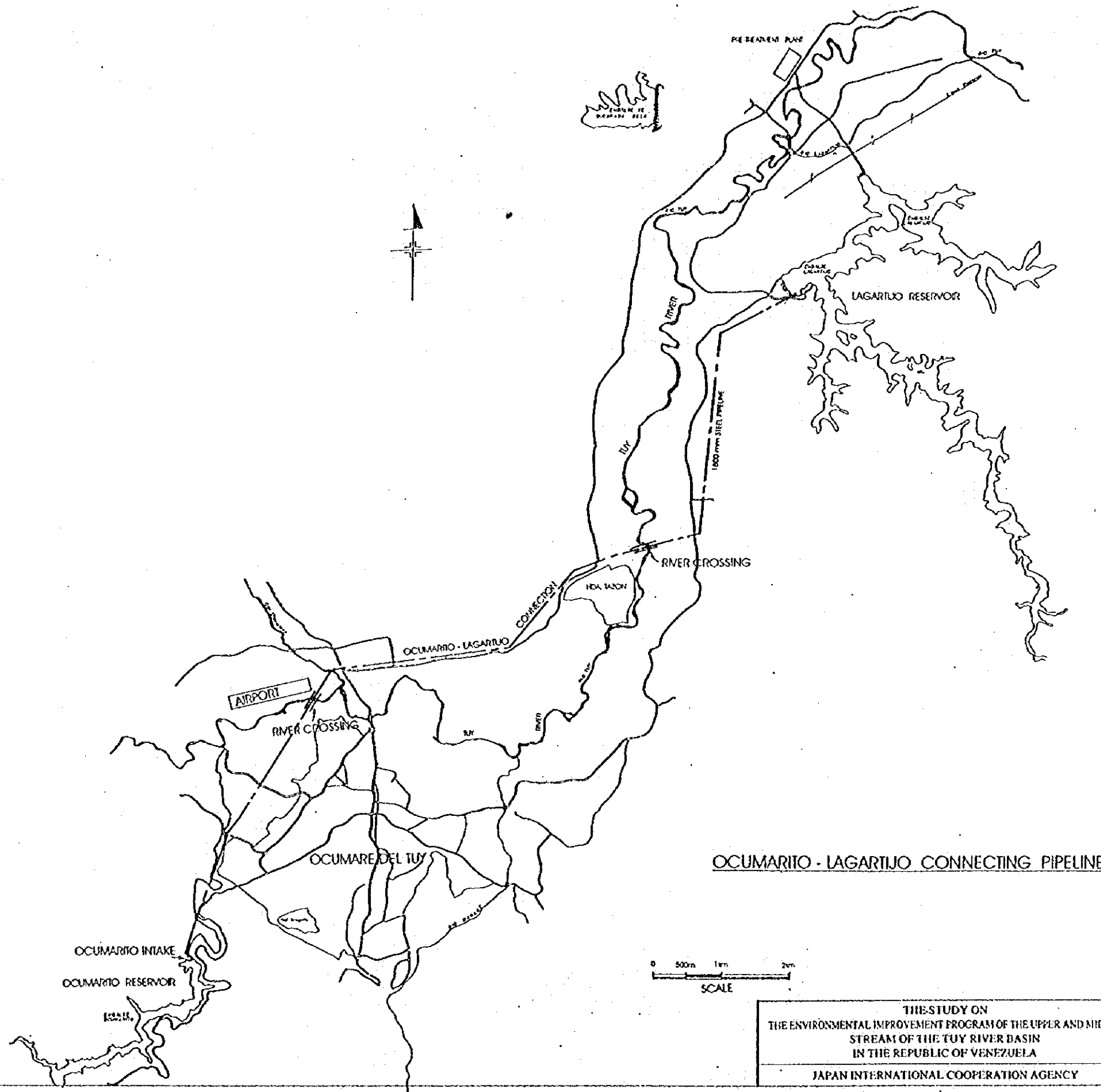


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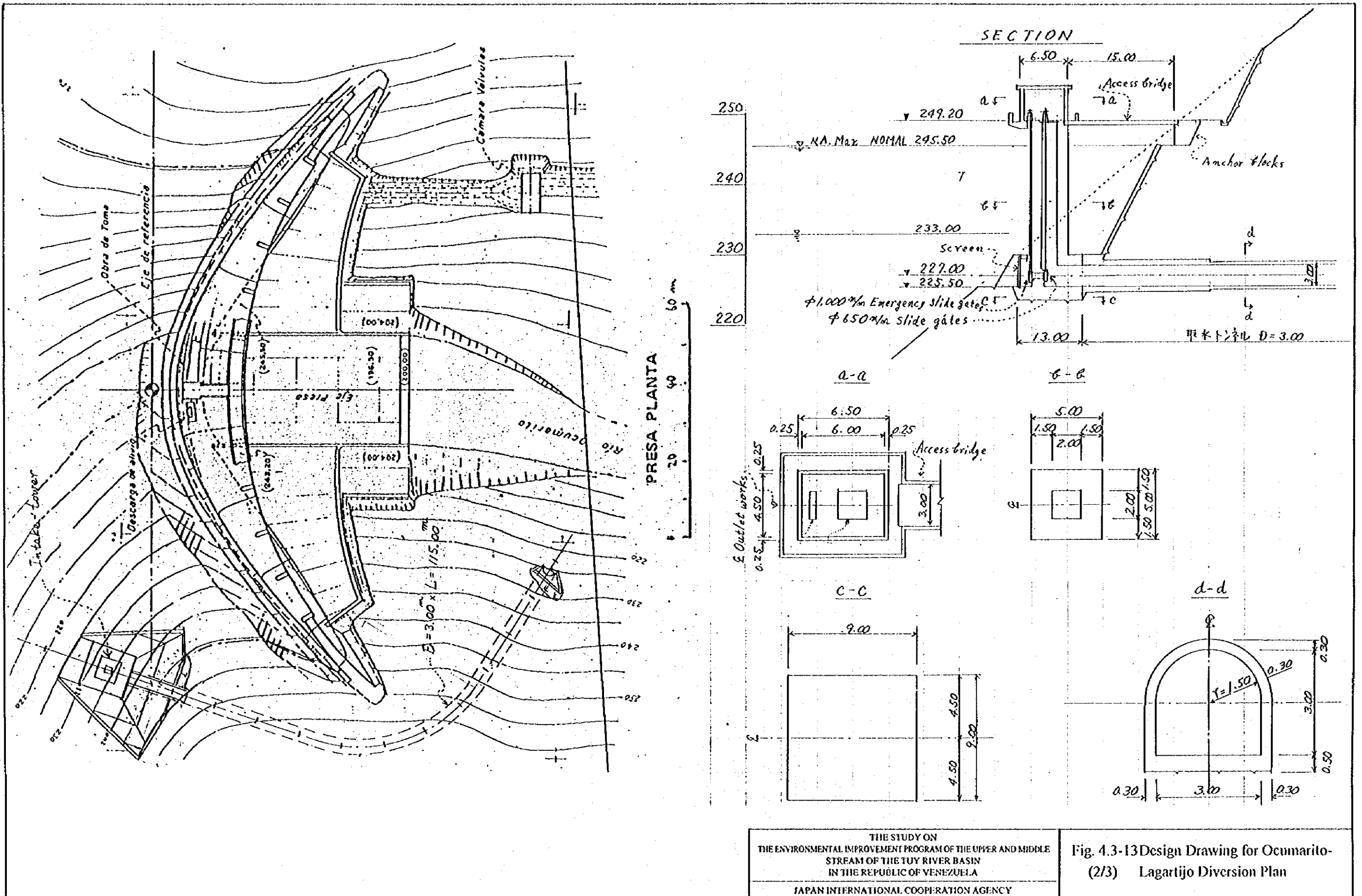
Fig. 4.3-12 Simulation of Ocumarito-  
Lagartijo Diversion and El  
Peñón Reservoir

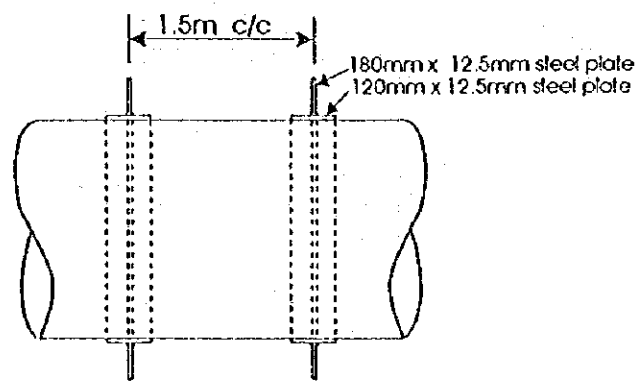




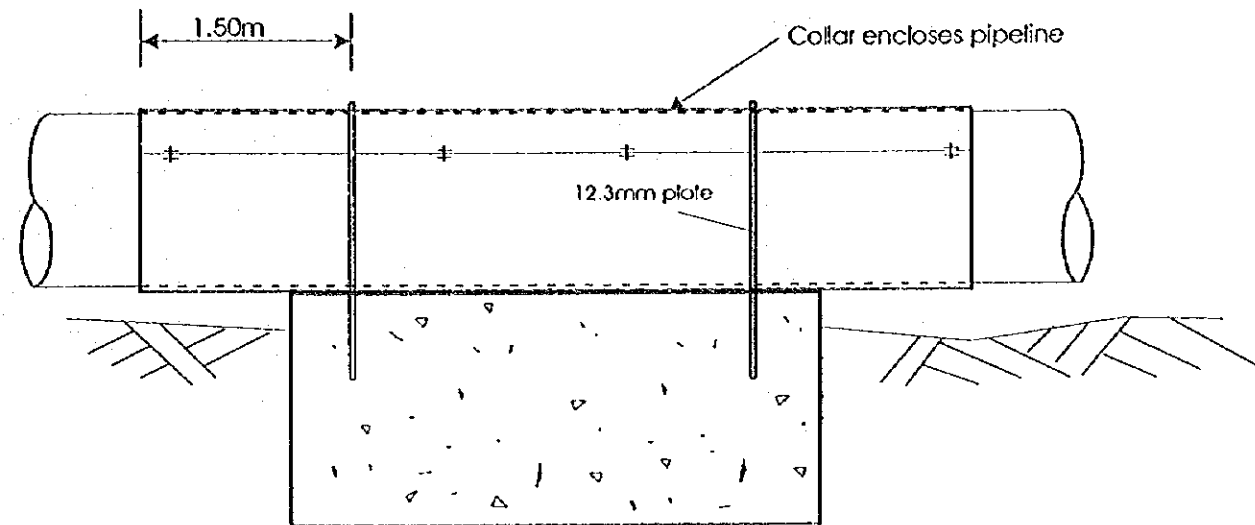
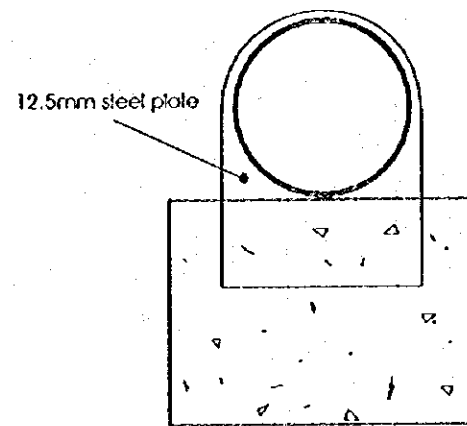
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Fig. 4.3-13 Design Drawing for Ocumarito-  
 (1/3) Lagartijo Diversion Plan

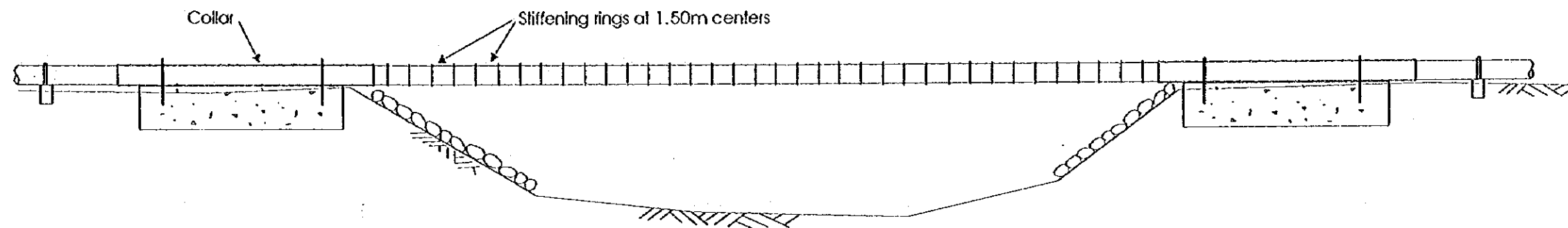




Stiffening Ring Detail



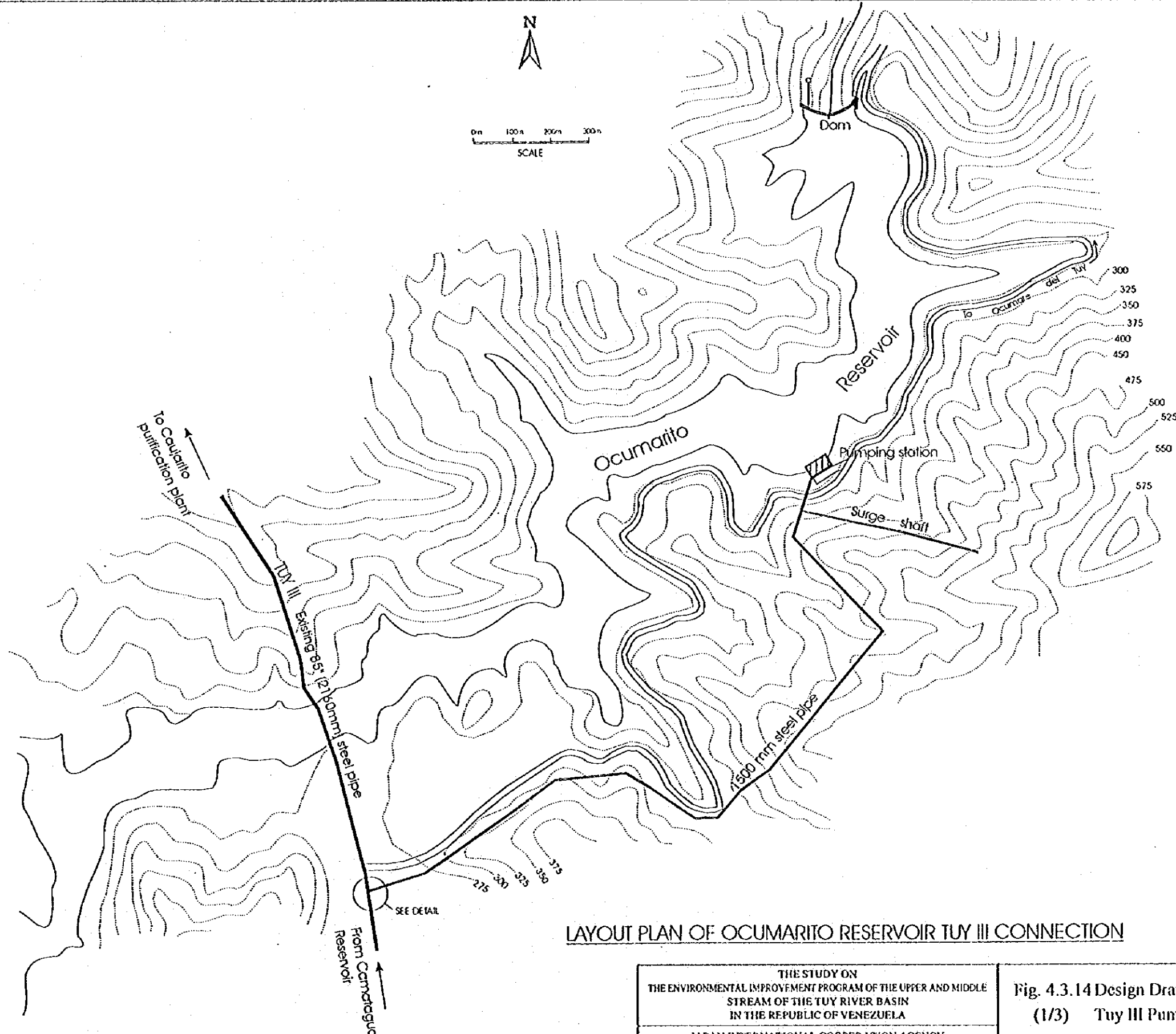
Collar Detail



Steel Pipe River Crossing

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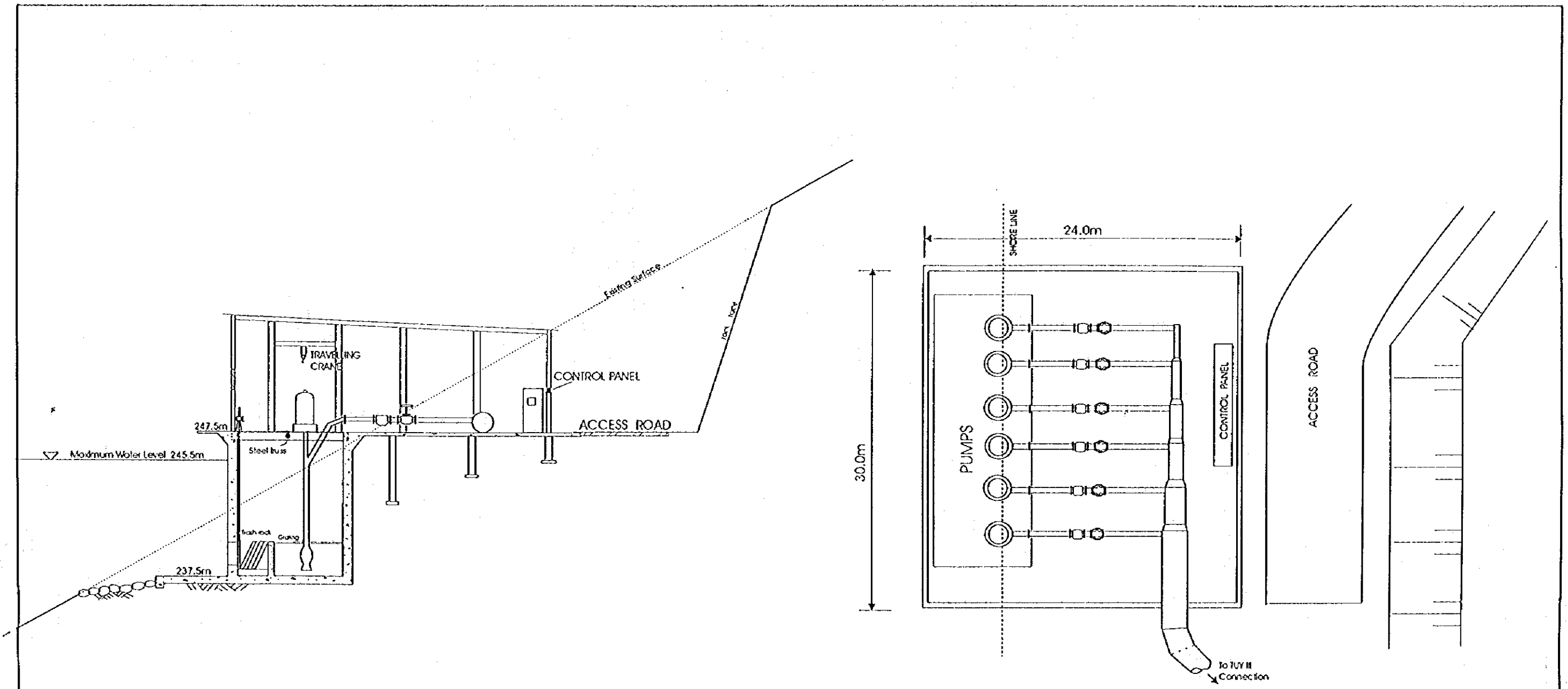
Fig. 4.3-13 Design Drawing for Ocumarito-  
 (3/3) Lagartijo Diversion Plan



LAYOUT PLAN OF OCUMARITO RESERVOIR TUY III CONNECTION

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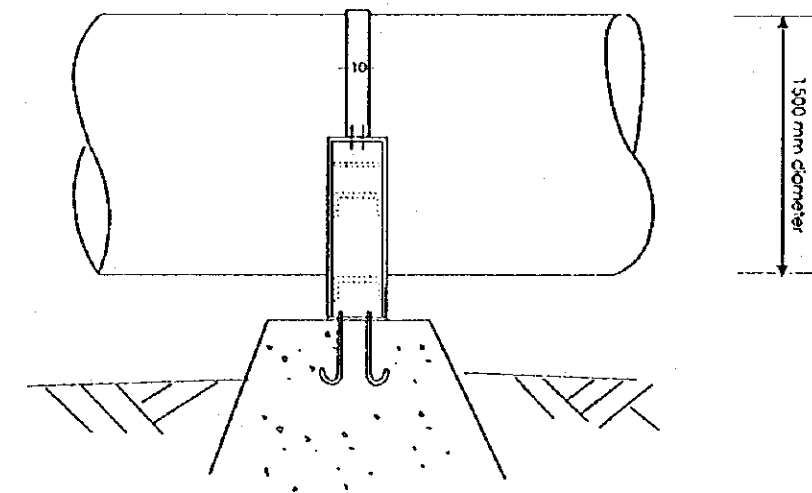
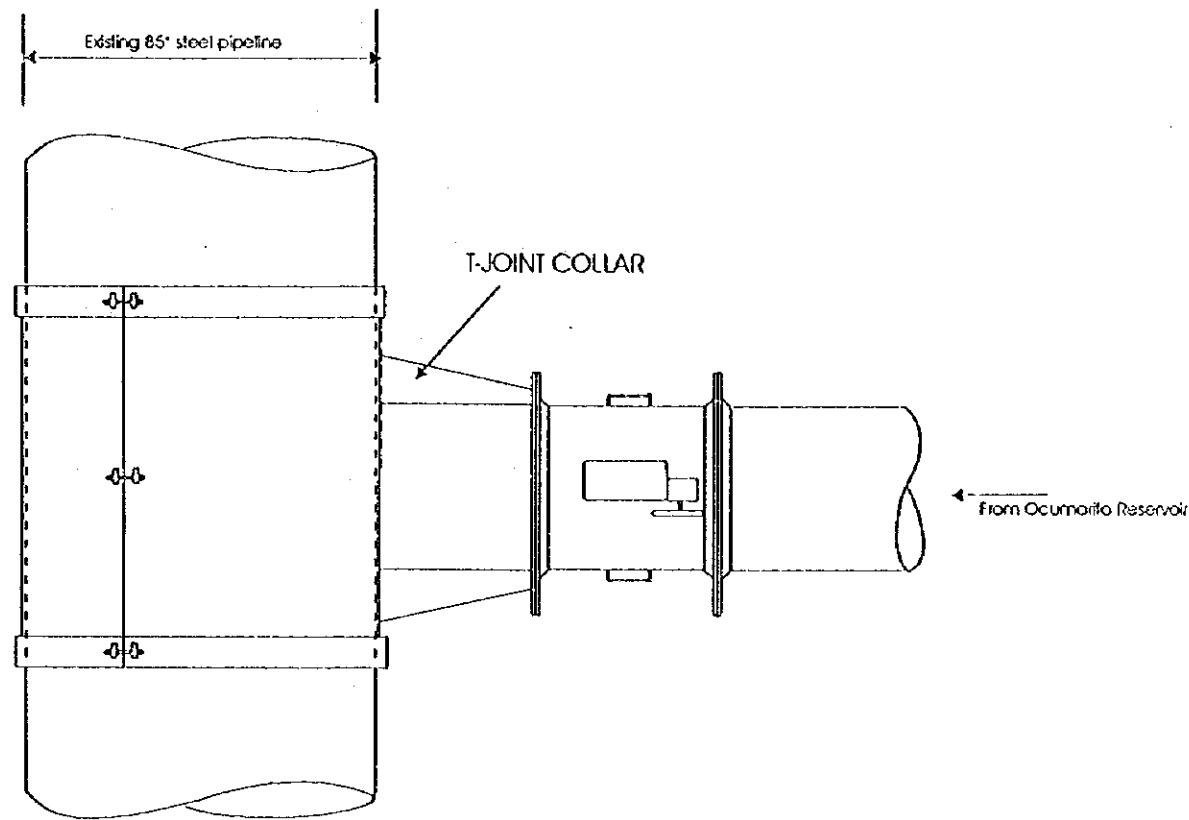
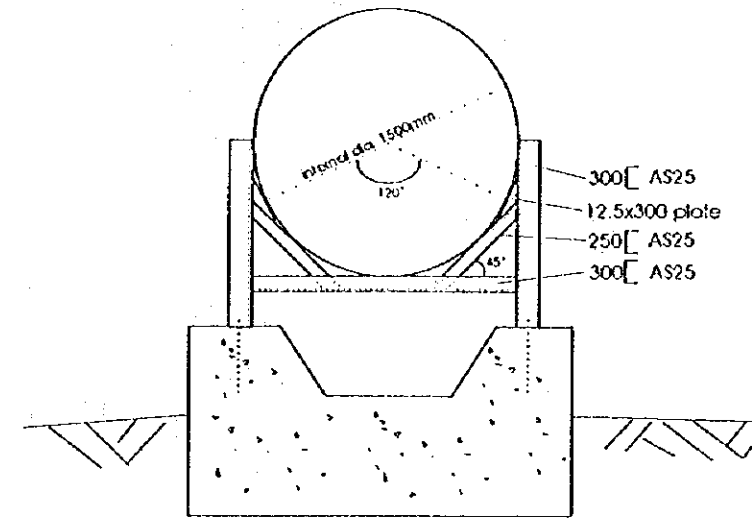
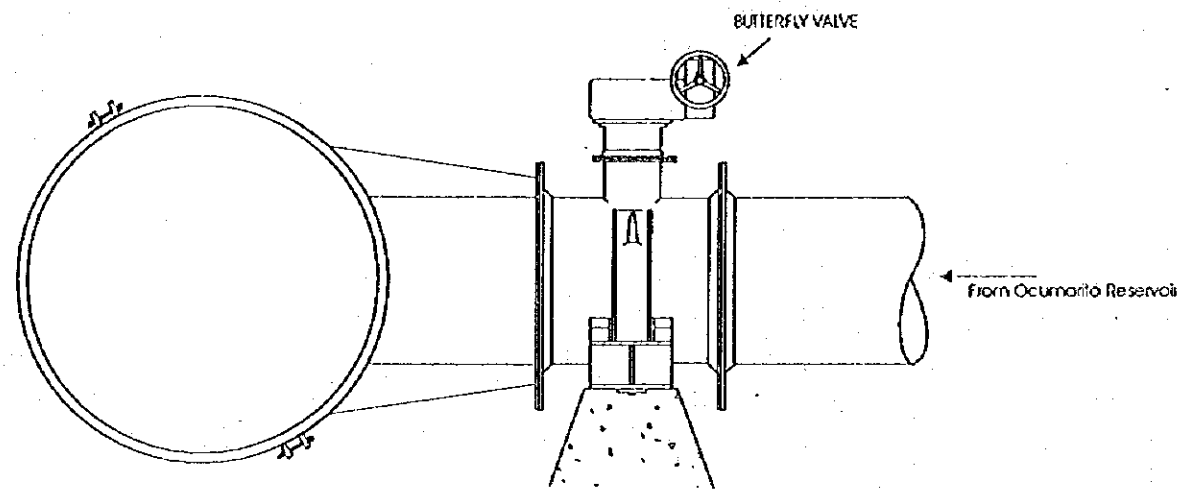
Fig. 4.3.14 Design Drawing for Ocumarito-  
 (1/3) Tuy III Pumping Plan



OCUMARITO RESERVOIR TUY III CONNECTION PUMPING STATION

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Fig. 4.3.14 Design Drawing for Ocumarito-  
 (2/3) Tuy III Pumping Plan



Pipe Support detail

Connection with Tuy III detail

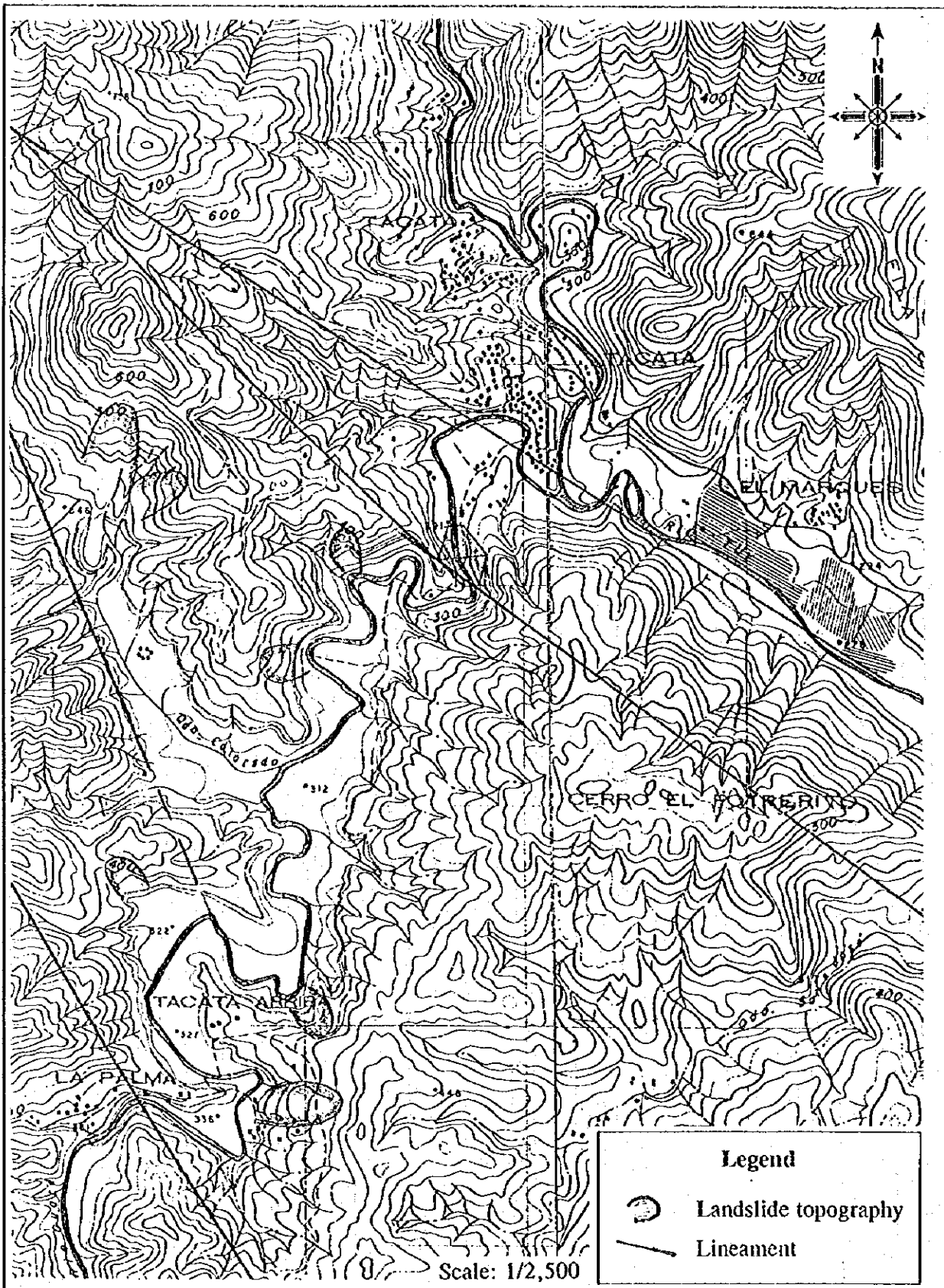
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Fig. 4.3.14 Design Drawing for Ocumarito-  
(3/3) Tuy III Pumping Plan





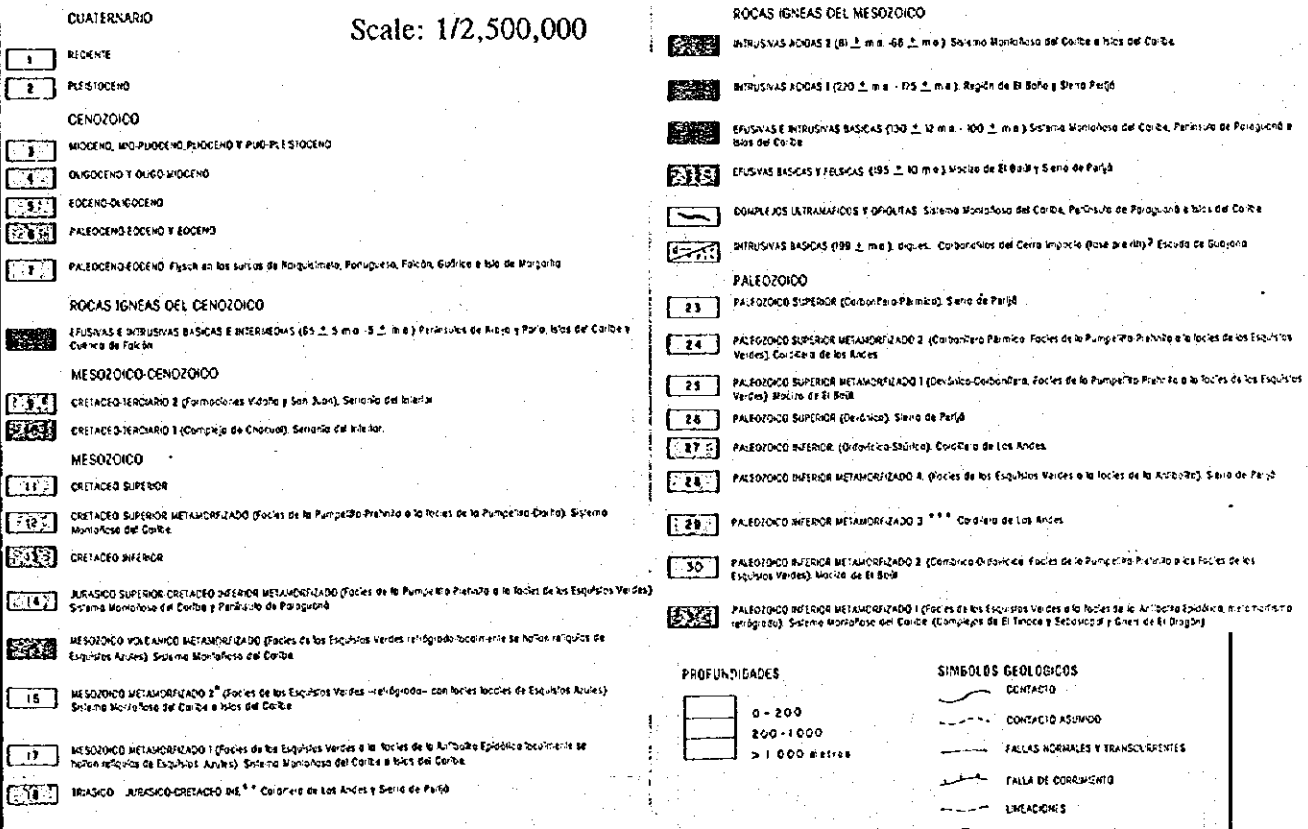
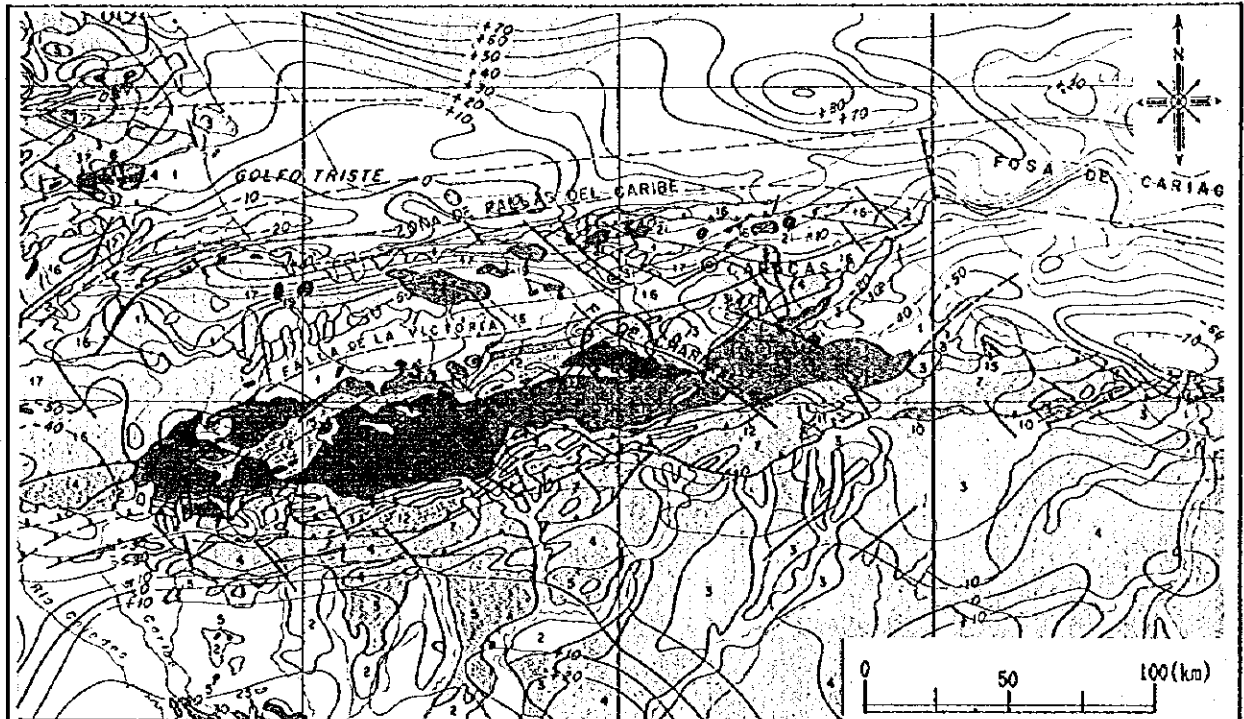




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Fig. 4.4-2 Topography of the Proposed Damsite Area



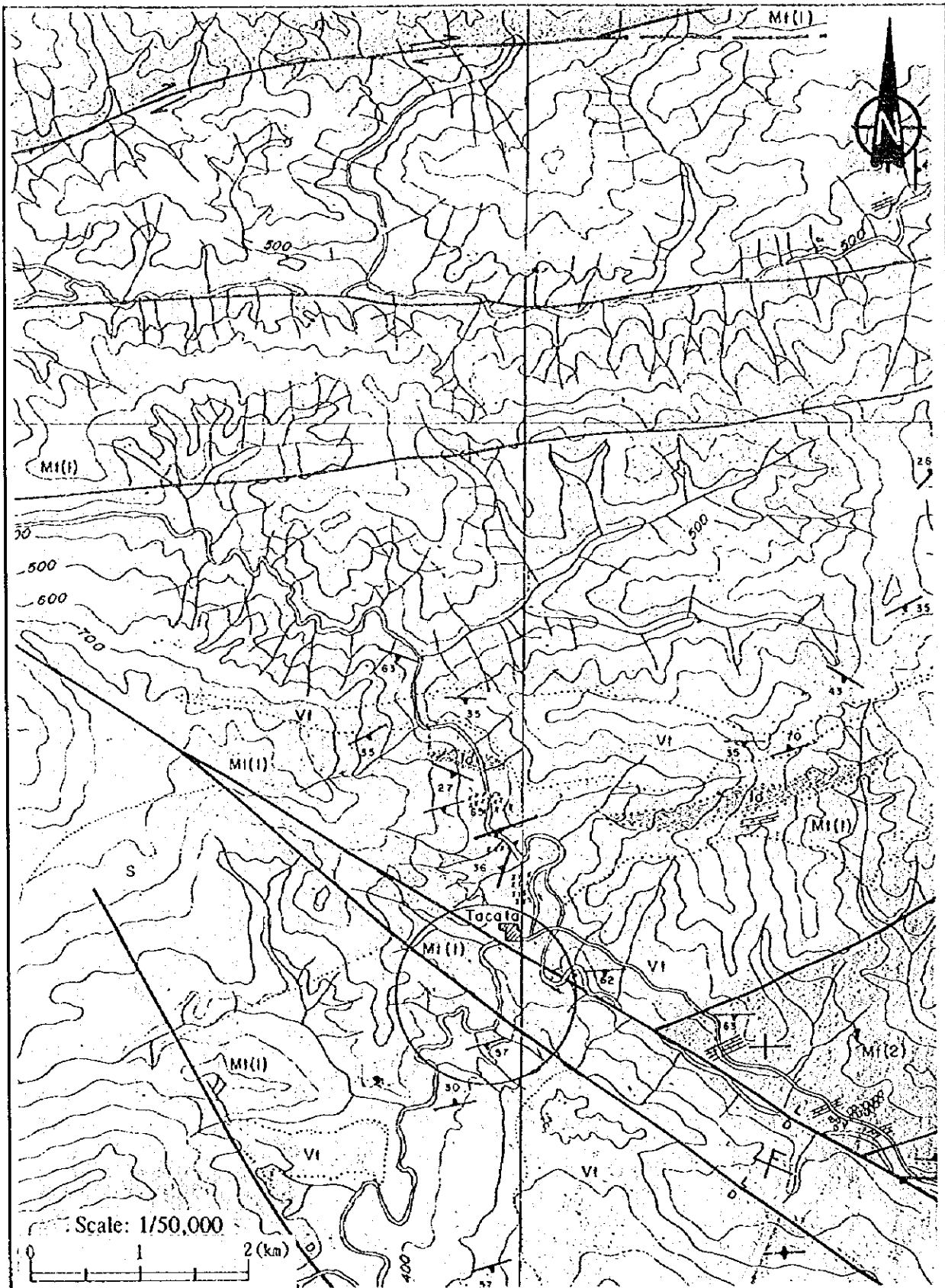
Source: "Mapa Geológico e Structural de Venezuela, Estados Unidos de Venezuela, Ministerio de Energía y Minas (1984)"

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Fig. 4.4-3 General Geology in Northern  
Venezuela





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Fig. 4.4-4 Geology in the Proposed  
 (1/2) Damsite Area

## ROCAS SEDIMENTARIAS









TERCIARIO - CUATENARIO TO CONGLOMERADOS Y ARCILLAS VERDES Y MARRONES

## ROCAS METAMORFICAS

- |                        |   |   |
|------------------------|---|---|
| GRUPO DE CARACAS       | <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="font-size: 8px; margin-right: 5px;">MI(1)</div> </div> | CALIZAS VERDES EN CAPAS DELGADAS<br>CONGLOMERADOS FIANITICOS GRAUVACA<br>TOBAS EPIDOTICAS-CALIZAS NEGRAS, GRANO MEDIO<br>Y FILITAS CLORITICAS |
| FORMACION PARACOTOS    | <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="font-size: 8px; margin-right: 5px;">MI(2)</div> </div> | ESQUITOS CALCAREOS CON LENTES DE CALIZAS<br>INCLUYE CALIZA DE LOS COLORADOS Y CONGLOMERADO DE CHARALLAVE                                      |
| FORMACION LAS MERCEDES | <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="font-size: 8px; margin-right: 5px;">MI(3)</div> </div> | LENTES DE CALIZAS GRIS OSCURO, MACIZA, RECRISTALIZADA   |
| FORMACION ANTIMANO     | <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="font-size: 8px; margin-right: 5px;">MI(4)</div> </div> | ESQUITOS SERICITICOS<br>CALIZAS CONGLOMERATICAS, SERICITICAS<br>ESQUITOS CONGLOMERATICOS, SERICITICOS   |
| FORMACION LAS BRISAS   | <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="font-size: 8px; margin-right: 5px;">MI(5)</div> </div> | GNEIS MICROCLINICO  |
| COMPLEJO DE SEBASTOPOL | <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="font-size: 8px; margin-right: 5px;">MI(8)</div> </div> | ORTOGNEIS GRANITICO   |

## ROCAS IGNEAS

- |                           |   |   |
|---------------------------|---|---|
| ROCAS VOLCANICAS DE TIARA | <div style="border: 1px solid black; width: 10px; height: 10px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 6px;">V</span> </div>  | GABRO Y BASALTO                             |
| ACIDAS                    | <div style="border: 1px solid black; width: 10px; height: 10px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 6px;">gr</span> </div> | GRANITO SODICO                              |
| BASICAS                   | <div style="border: 1px solid black; width: 10px; height: 10px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 6px;">B</span> </div>  | DIORITA HORNABLENDICA                       |
| ULTRABASICAS              | <div style="border: 1px solid black; width: 10px; height: 10px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 6px;">U</span> </div>  | SERPENTINITAS Y PERIDOTITAS SERPENTINIZADAS |
| BASICAS METAMORFIZADAS    | <div style="border: 1px solid black; width: 10px; height: 10px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 6px;">m</span> </div>  | ANFIBOLITAS EPIDOTICAS                      |

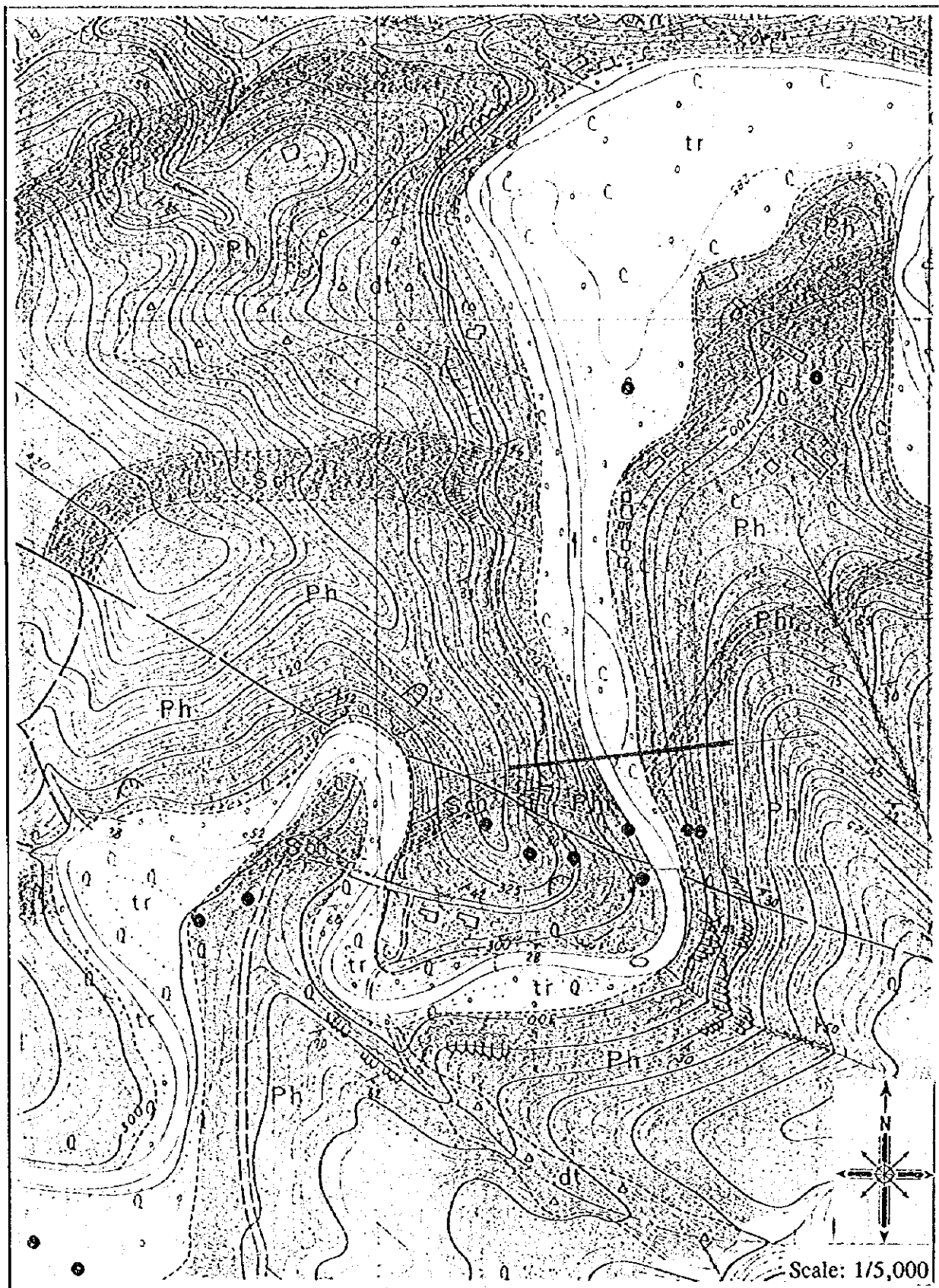
- |   |   |
|---|---|
|  | BUZAMIENTOS   |
|  | RUMBO Y BUZAMIENTO DE LA FOLIACION                      |
|  | FOLIACION VERTICAL                                      |
|  | EJE ANTICLINAL  |
|  | EJE SINCLINAL   |
|  | DIRECCION GENERAL DEL EJE DE AREAS FUERTEMENTE PLEGADAS |
|  | CONTACTOS GEOLOGICOS                                    |
|  | FALLAS  |

Source: "Mapa Geologico de la Region Los Tequis - Cita, Estados Unidos de Venezuela, Ministerio de Minas e Hidrocarburos (1951)"

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Fig. 4.4-4 Geology in the Proposed  
(2/2) Damsite Area

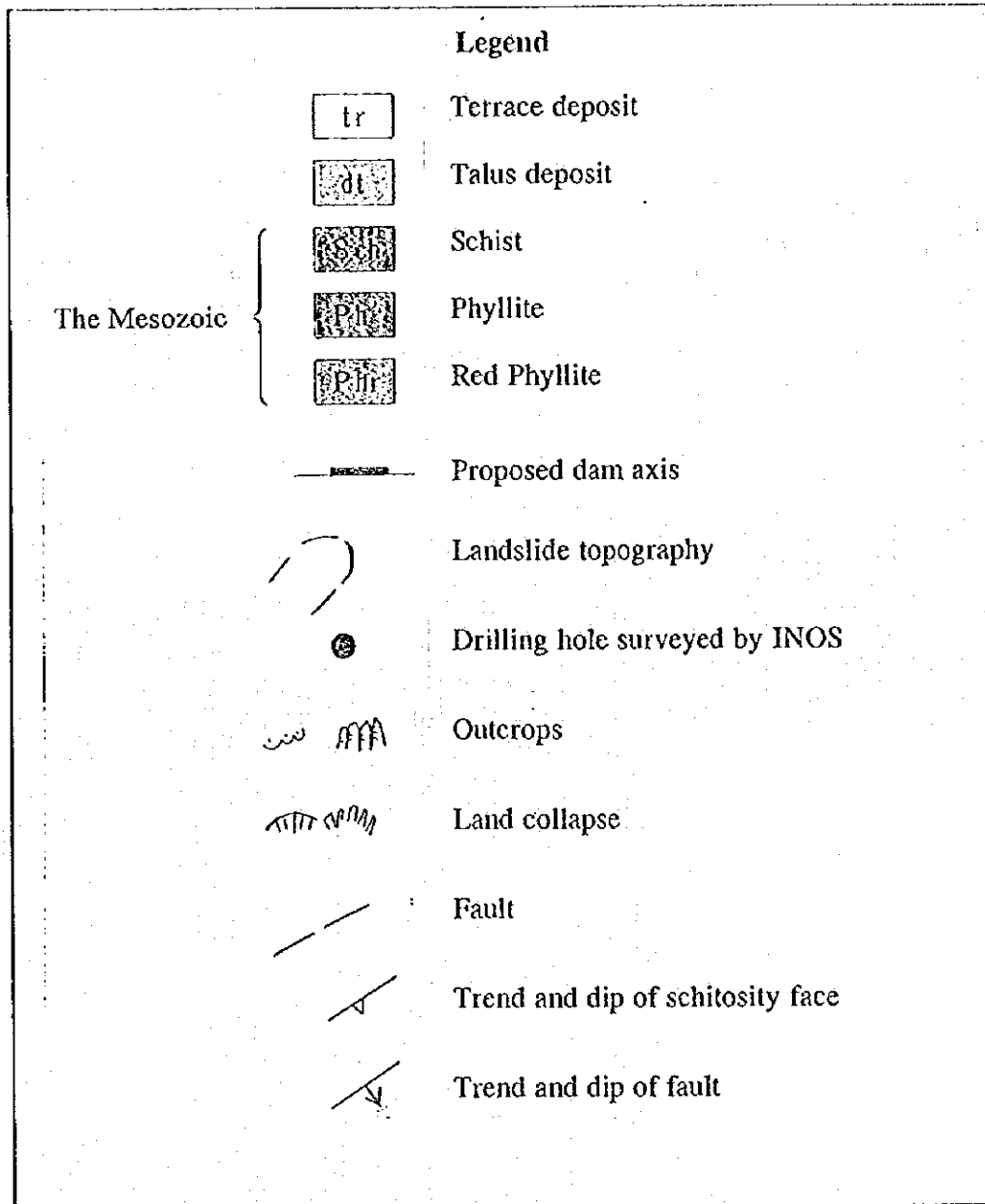


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Fig. 4.4-5 Geological Map of the Proposed  
 (1/2) Damsite



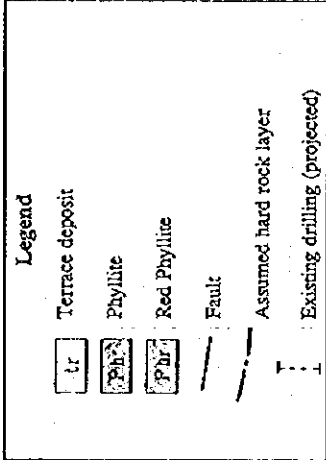
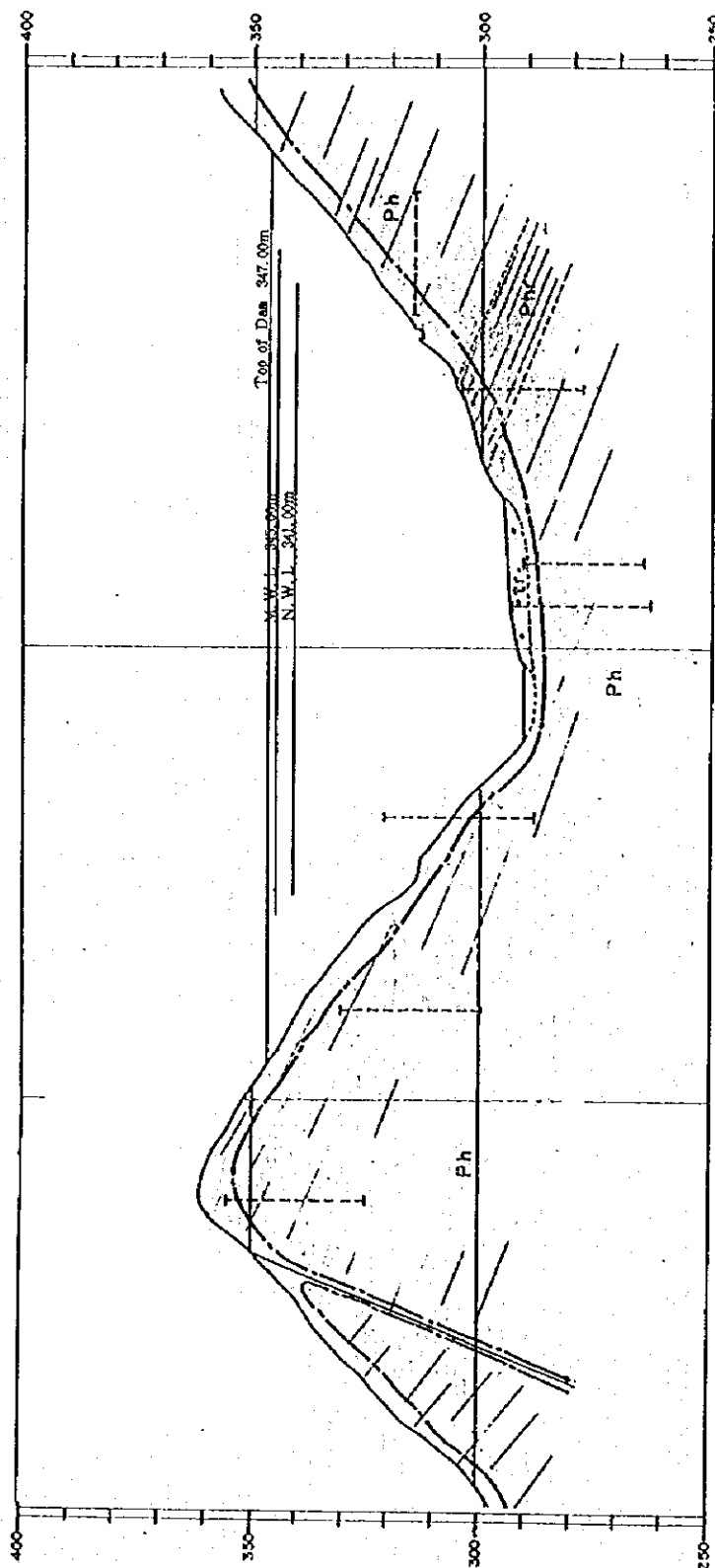


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Fig. 4.4-5 Geological Map of the Proposed  
 (2/2) Damsite

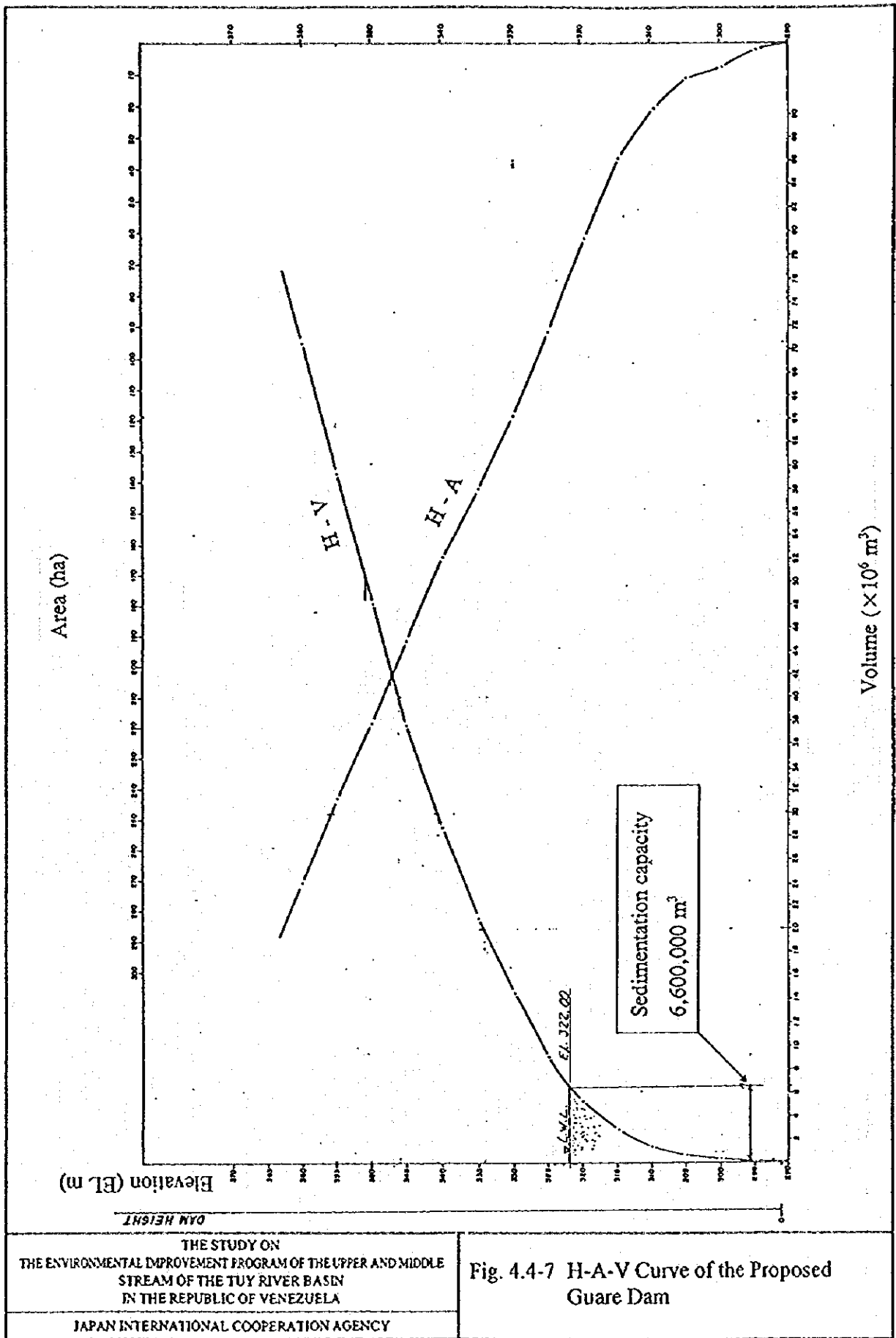


Scale: 1/5,000

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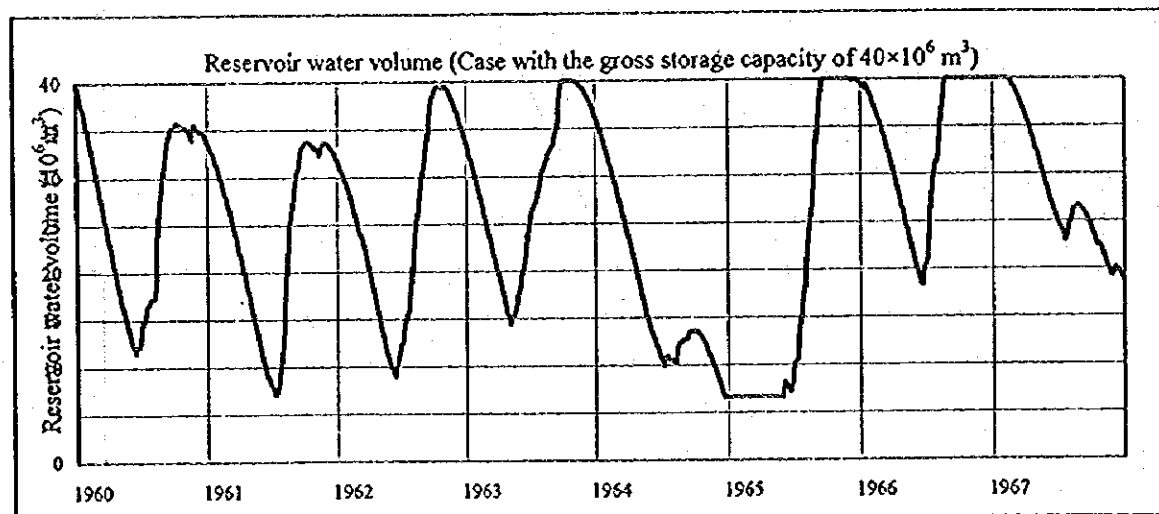
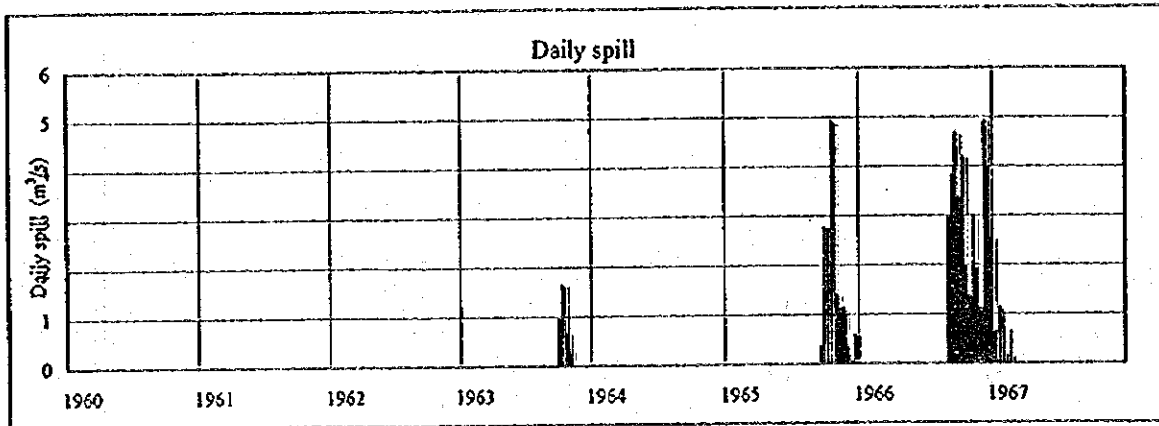
Fig. 4.4-6 Geological Cross Section of the Proposed Damsite



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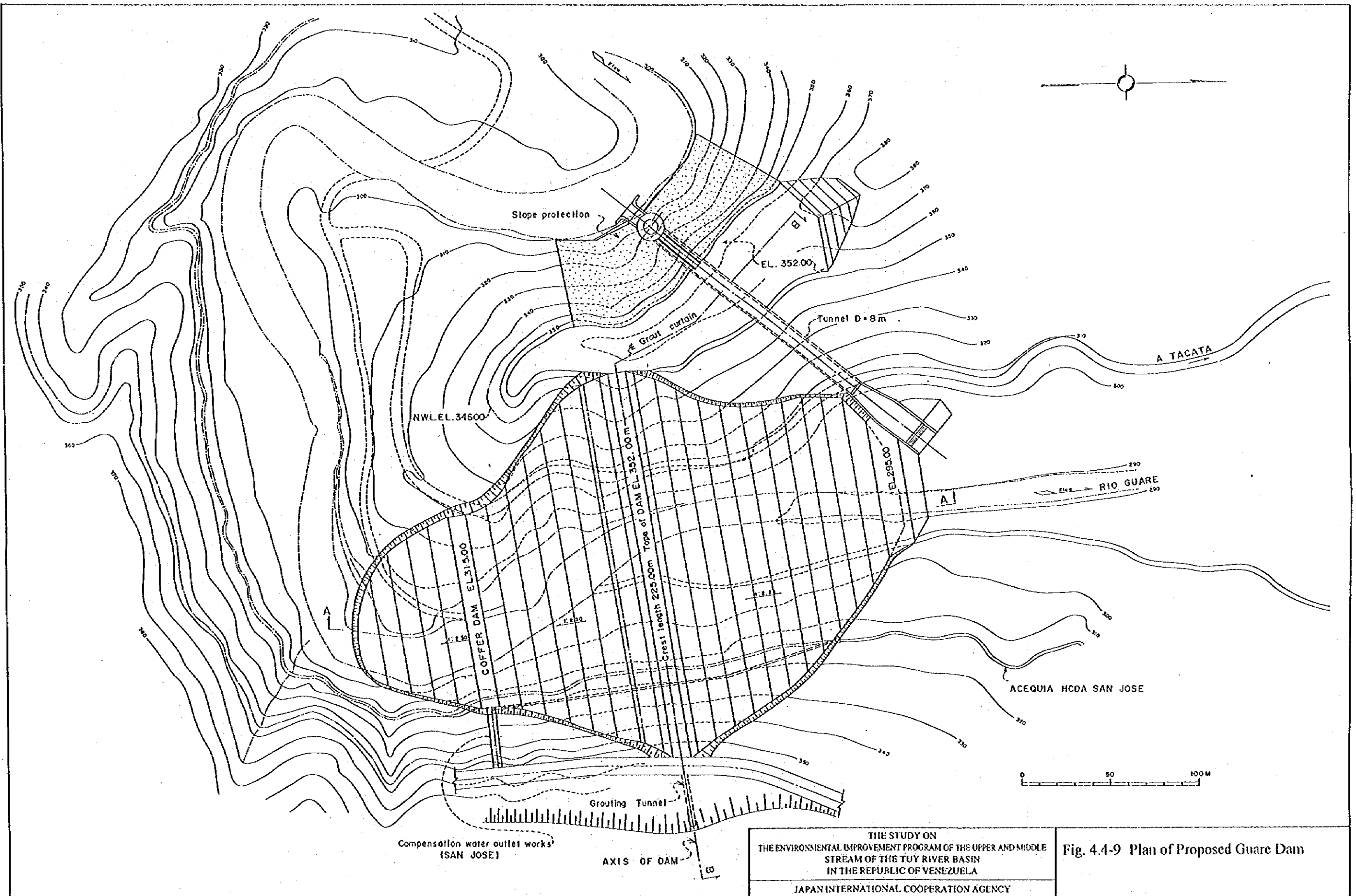
Fig. 4.4-7 H-A-V Curve of the Proposed Guare Dam



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Fig. 4.4-8 Simulation of Guare Reservoir





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Fig. 4.4-9 Plan of Proposed Guaré Dam

