

**BASIC DESIGN STUDY
ON
THE PROJECT FOR FLOOD DISASTER MITIGATION
IN CAMIGUIN ISLAND
IN THE REPUBLIC OF THE PHILIPPINES**

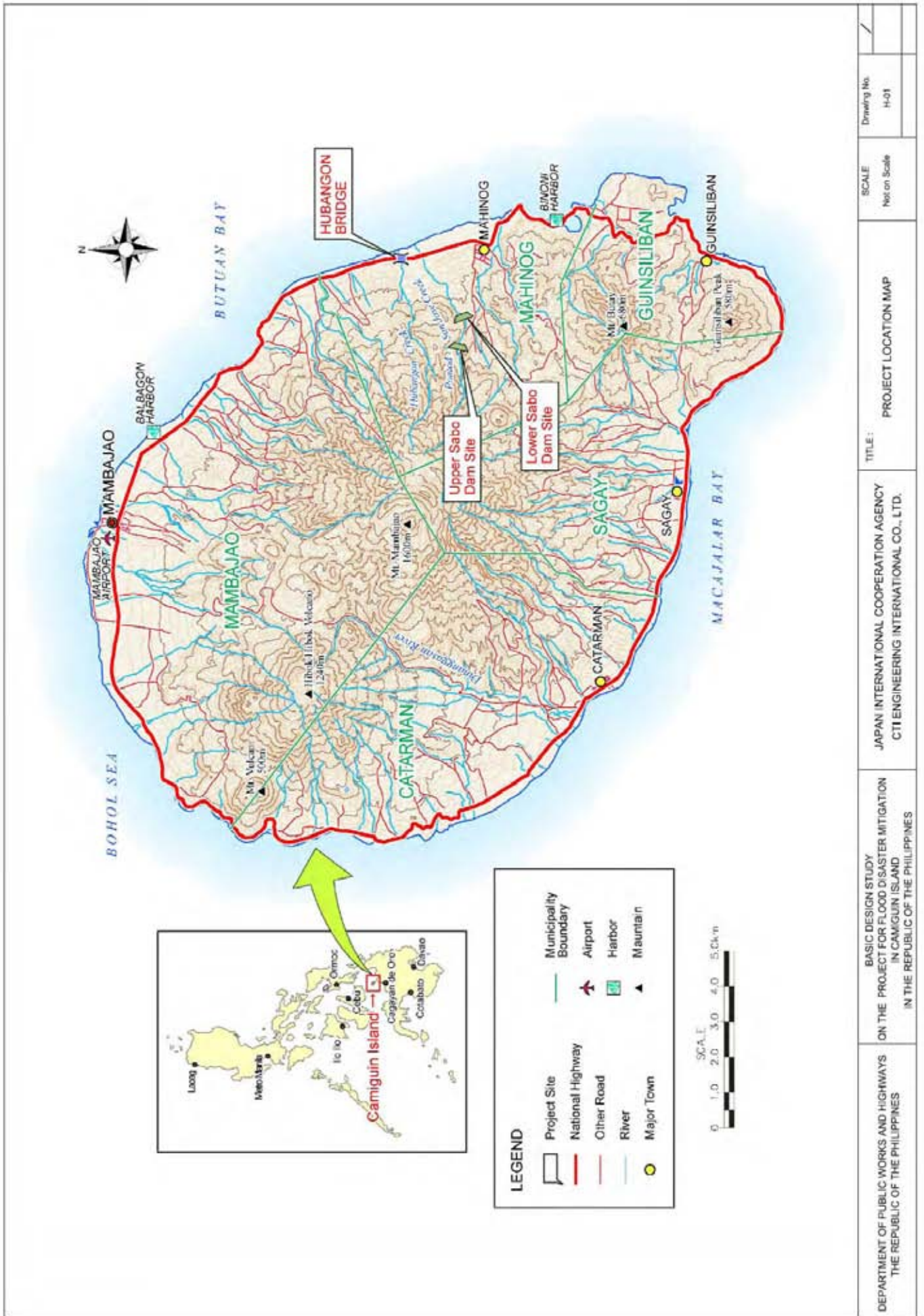
**DRAWINGS
(HUBANGON BRIDGE)**

February 2009

**JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING INTERNATIONAL CO., LTD.**

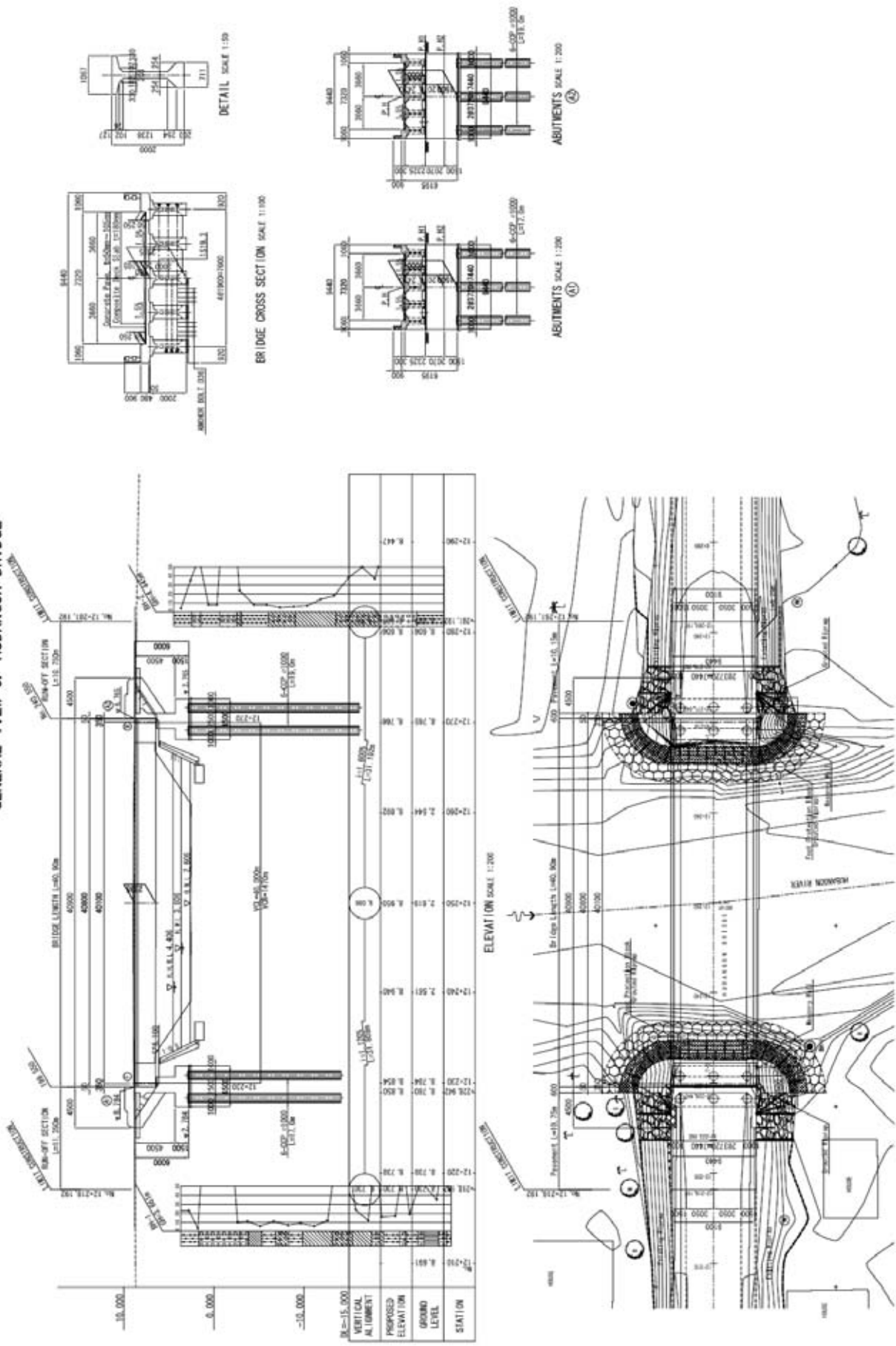
LIST OF DRAWINGS

No.	Drawing Title	Scale	No.	Drawing Title	Scale
H-01	Project Location Map	-			
H-02	General View of Hubangon Bridge	1/200,1/100,1/50			
H-03	Structure Drawing of Superstructure	1/100,1/50,1/30			
H-04	Prestressing Tendon for Main Girder	1/30,1/20,1/10			
H-05	Details of Expansion Joint and Drainage	1/200,1/40,1/20,1/10,1/5			
H-06	Structural Drawing of A1 Abutment	1/100,1/50,1/20,1/2			
H-07	Structural Drawing of A2 Abutment	1/100,1/50,1/20,1/2			
H-08	Plan and Profile	H=1/200,V=1/100			
H-09	Cross Section	1/100			
H-10	Typical Section & Detail of Structures	1/50,1/30,1/10			
H-11	Detail of Concrete Pavement	1/100,1/10			



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMIGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	TITLE:	PROJECT LOCATION MAP	SCALE	Next on Scale	Drawing No.	H-01

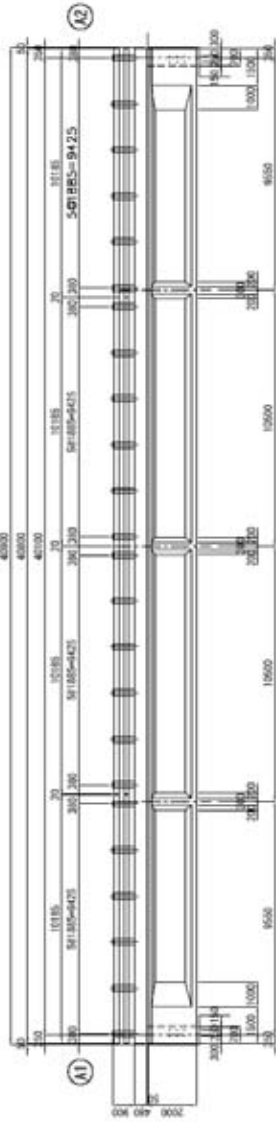
GENERAL VIEW OF HUBANGON BRIDGE



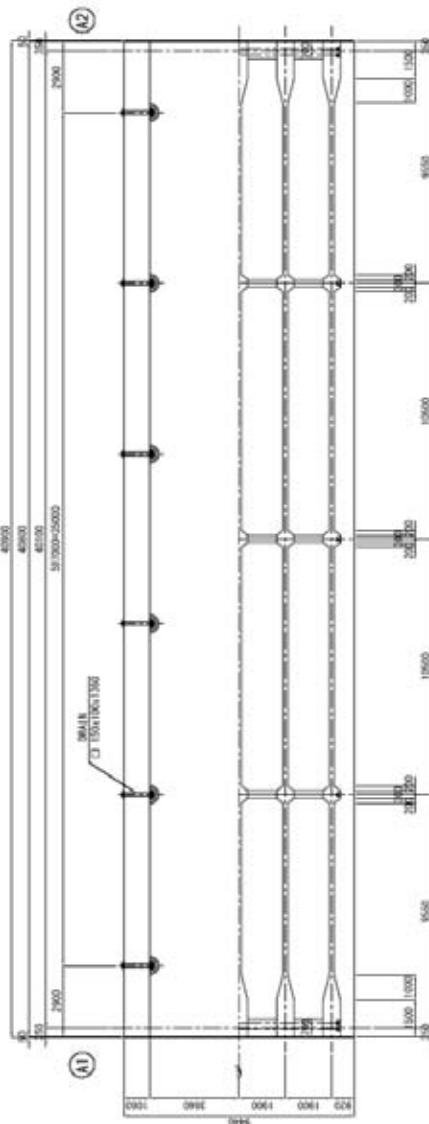
DEPARTMENT OF AGRARIAN REFORM THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE BRIDGE CONSTRUCTION PROJECT FOR EXPANDED AGRARIAN REFORM COMMUNITIES DEVELOPMENT	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	TITLE :	SCALE	Drawing No.
			GENERAL VIEW OF HUBANGON BRIDGE	S=1:200	H-02

STRUCTURE DRAWING OF SUPERSTRUCTURE

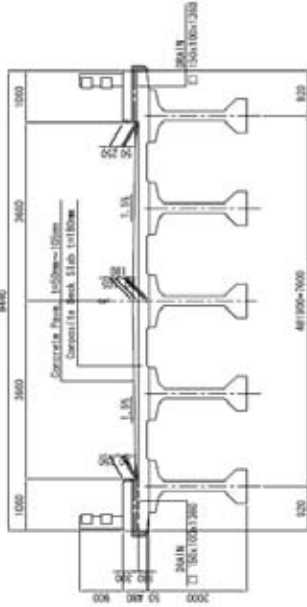
ELEVATION SCALE 1:30



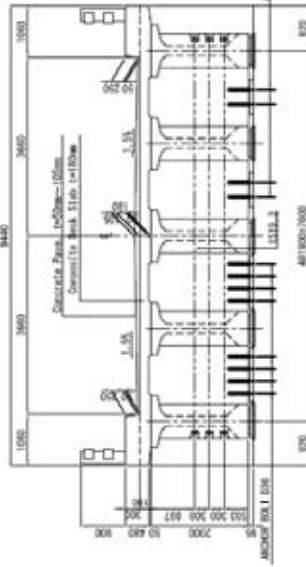
PLAN SCALE 1:100



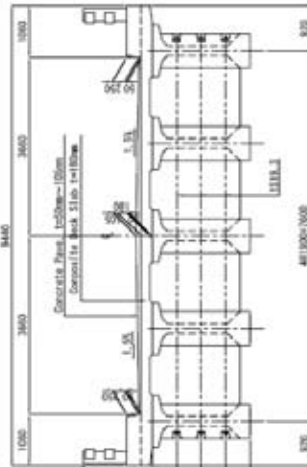
BRIDGE CROSS SECTION SCALE 1:30
STANDARD



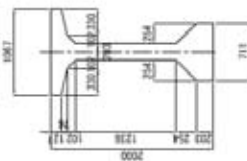
END A1 A2



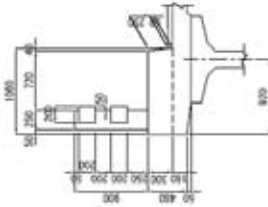
MIDDLE



PC GIRDER TYPE VI SCALE 1:30
(Modified)

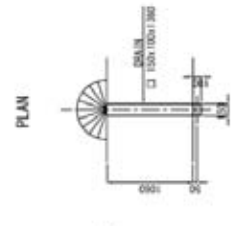


DETAIL SCALE 1:30



SECTION

DRAINAGE SCALE 1:30



PLAN

DEPARTMENT OF AGRARIAN REFORM
THE REPUBLIC OF THE PHILIPPINES

BASIC DESIGN STUDY
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FOR EXPANDED AGRARIAN REFORM
COMMUNITIES DEVELOPMENT

JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING INTERNATIONAL CO., LTD.

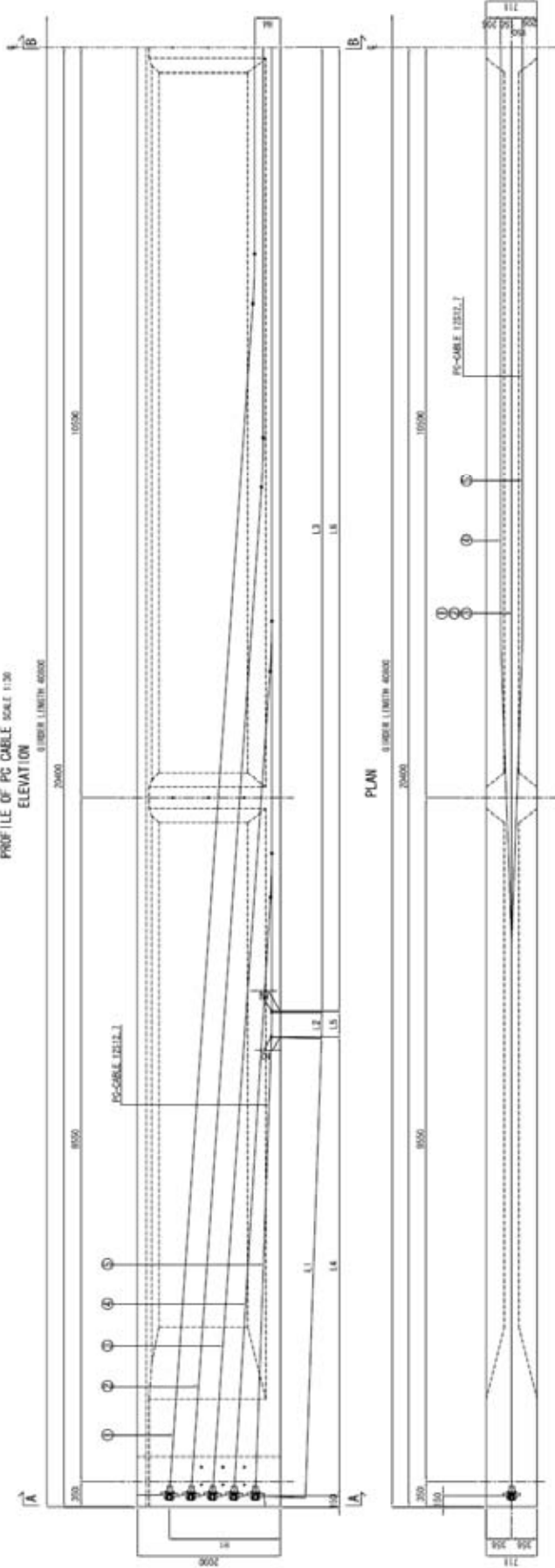
TITLE : HUBANGON BRIDGE
STRUCTURE DRAWING
OF SUPERSTRUCTURE

SCALE
S=1:100

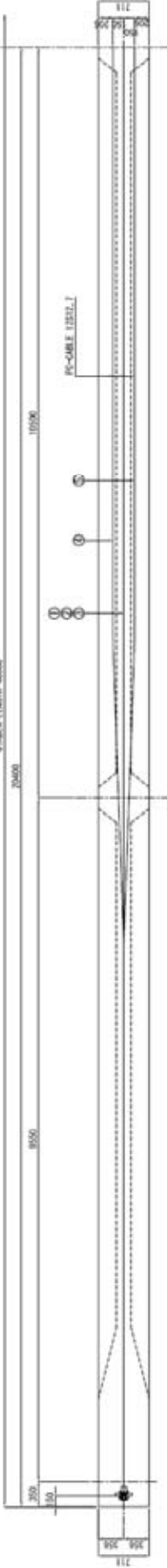
Drawing No.
H-03

PRESTRESSING TENDON FOR MAIN GIRDER

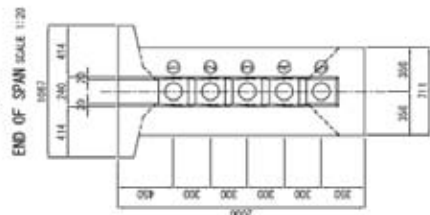
PROFILE OF PC CABLE SCALE 1:100
ELEVATION
GIRDER LENGTH 42000



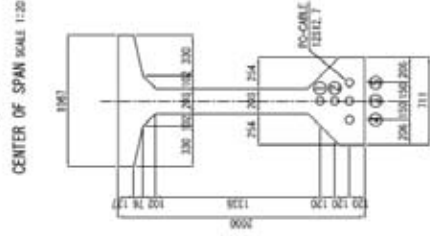
PLAN
GIRDER LENGTH 42000



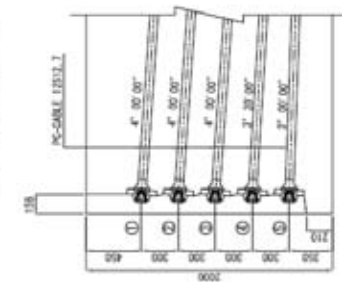
A - A
END OF SPAN SCALE 1:20



B - B
CENTER OF SPAN SCALE 1:20



END OF GIRDER SCALE 1:20



DETAIL SCALE 1:10

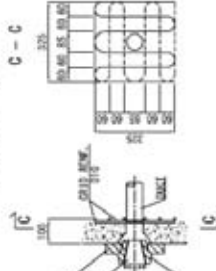
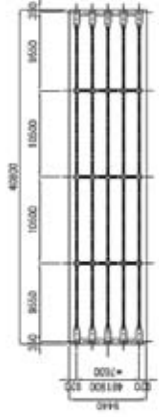


TABLE OF P. C. CABLE

CABLE NO.	AMBRIDGE	LENGTH OF CABLE (MM)								TOTAL LENGTH OF CABLE (MM)		
		L1	L2	L3	L4	L5	L6	L7	L8	PC CABLE LENGTH (MM)	STEEL WIRE LENGTH (MM)	
①	4' 00' 00"	1550	284	380	16710	598	2883	16559	598	2883	10,000	40583
②	4' 00' 00"	1250	284	340	14120	598	3457	14085	598	3457	10,000	40570
③	4' 00' 00"	850	144	120	11548	598	2021	11321	598	2021	10,000	40537
④	3' 30' 00"	650	120	120	8376	511	11279	8260	511	11279	10,000	40532
⑤	3' 00' 00"	350	120	120	6416	349	13489	6417	349	13489	10,000	40508

CABLE NO.	MARKING	MARKING FROM BRIDGE END
①	12-12.7	1540
②	12-12.7	1540
③	12-12.7	1540
④	12-12.7	1540
⑤	12-12.7	1540

MARKING DIAGRAM SCALE 1:100



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JAPAN INTERNATIONAL COOPERATION AGENCY
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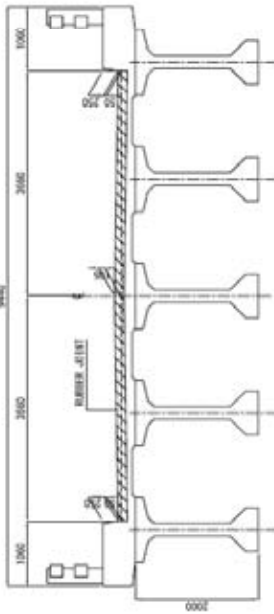
TITLE: HUBANGON BRIDGE
PRESTRESSING TENDON FOR MAIN GIRDER

SCALE
AS SHOWN

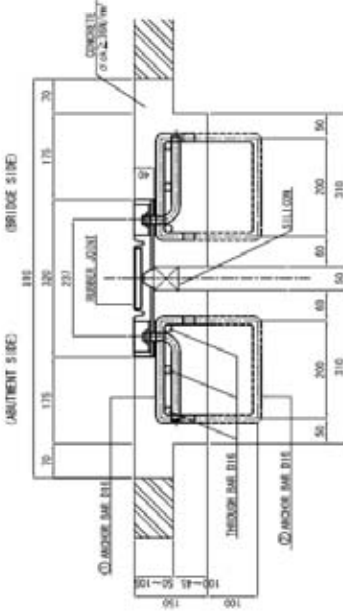
Drawing No.
H-04

DETAILS OF EXPANSION JOINT AND DRAINAGE

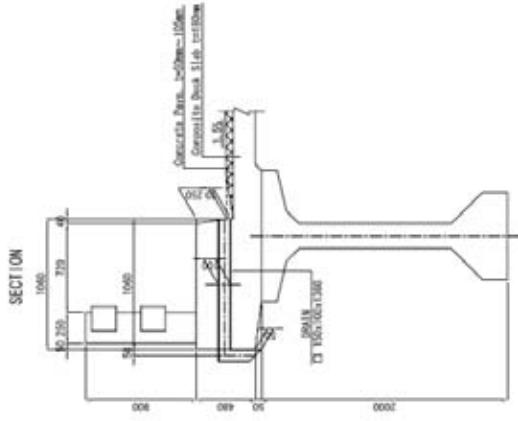
SECTION SCALE 1:40



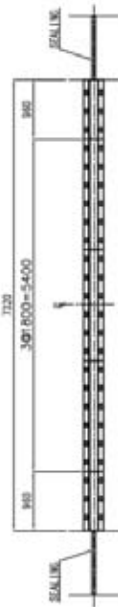
CROSS SECTION SCALE 1:5
RUBBER JOINT FOR ROADWAY



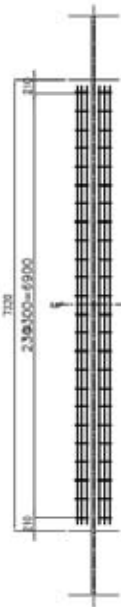
CROSS SECTION SCALE 1:20



PLAN SCALE 1:40
RUBBER JOINT



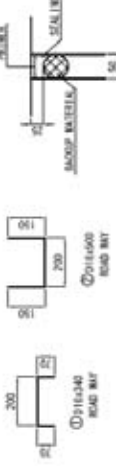
PLAN SCALE 1:40
ANCHOR BAR



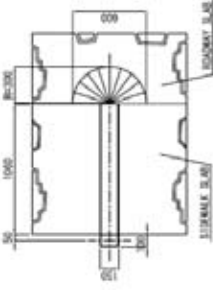
ANCHOR BAR UNDER CONCRETE SCALE 1:10



ANCHOR BAR SCALE 1:5



PLAN



MARKING DIAGRAM SCALE 1:200



MATERIAL OF EXPANSION JOINT

MATERIAL	QUALITY	QUANTITY		REMARKS
		①	② TOTAL	
RUBBER JOINT FOR ROADWAY	S5400 COMPOSITE RUBBER SBS/JS S20295	7.32 m	7.32 m	14.64 m
SEALING	SILICON	1.8 liter	1.8 liter	3.6 liter

ANCHOR BAR

SIZE	QUANTITY		WEIGHT		REMARKS
	①	② TOTAL	EACH	TOTAL	
① 316x340	48	96	0.537 kg	51.55 kg	ROADWAY
② 316x500	48	96	0.769 kg	75.74 kg	ROADWAY
TOTAL				127.29 kg	

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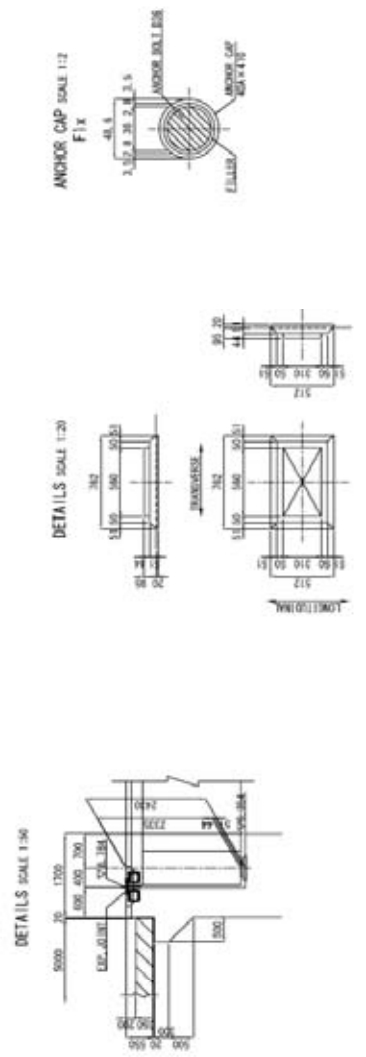
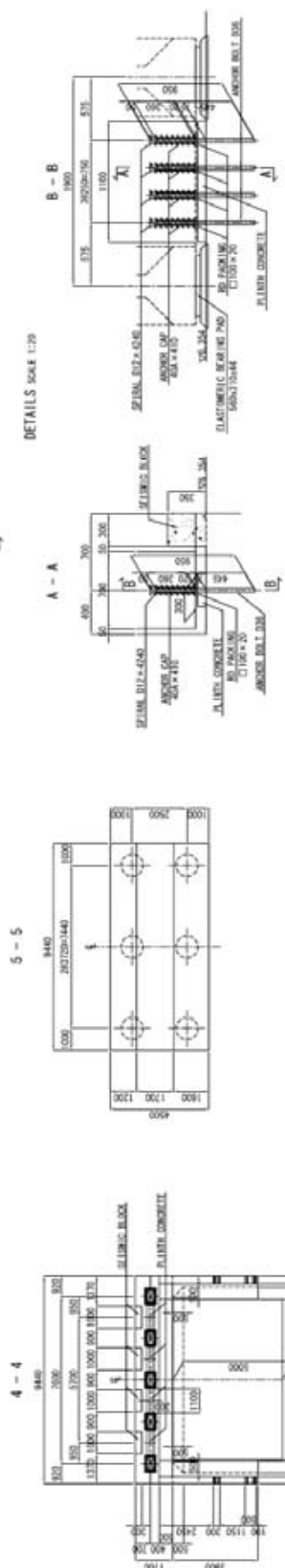
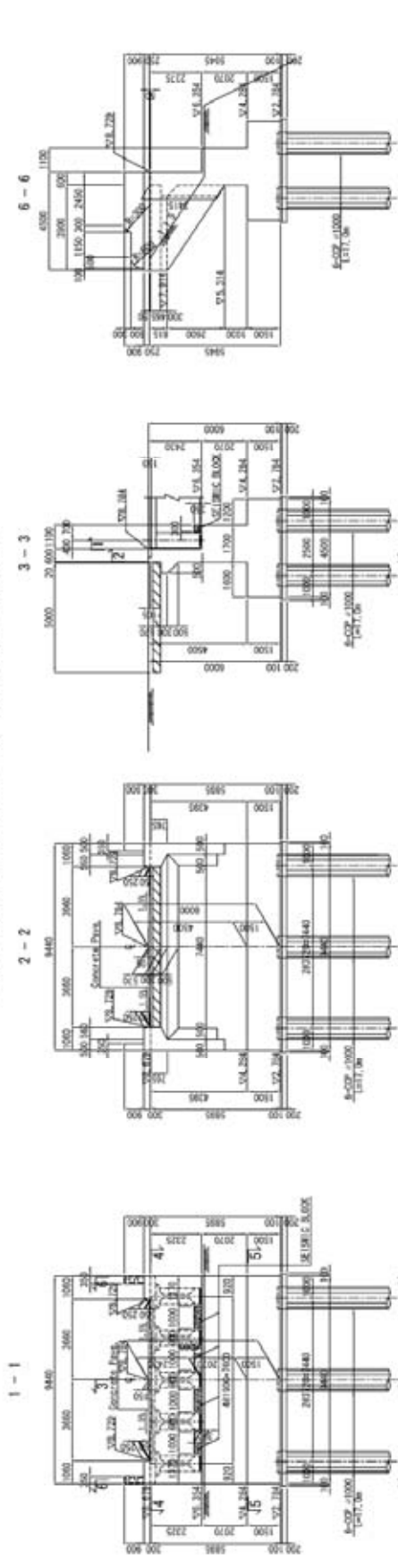
JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING INTERNATIONAL CO., LTD.

TITLE: HUBANGON BRIDGE
DETAILS OF EXPANSION JOINT AND DRAINAGE

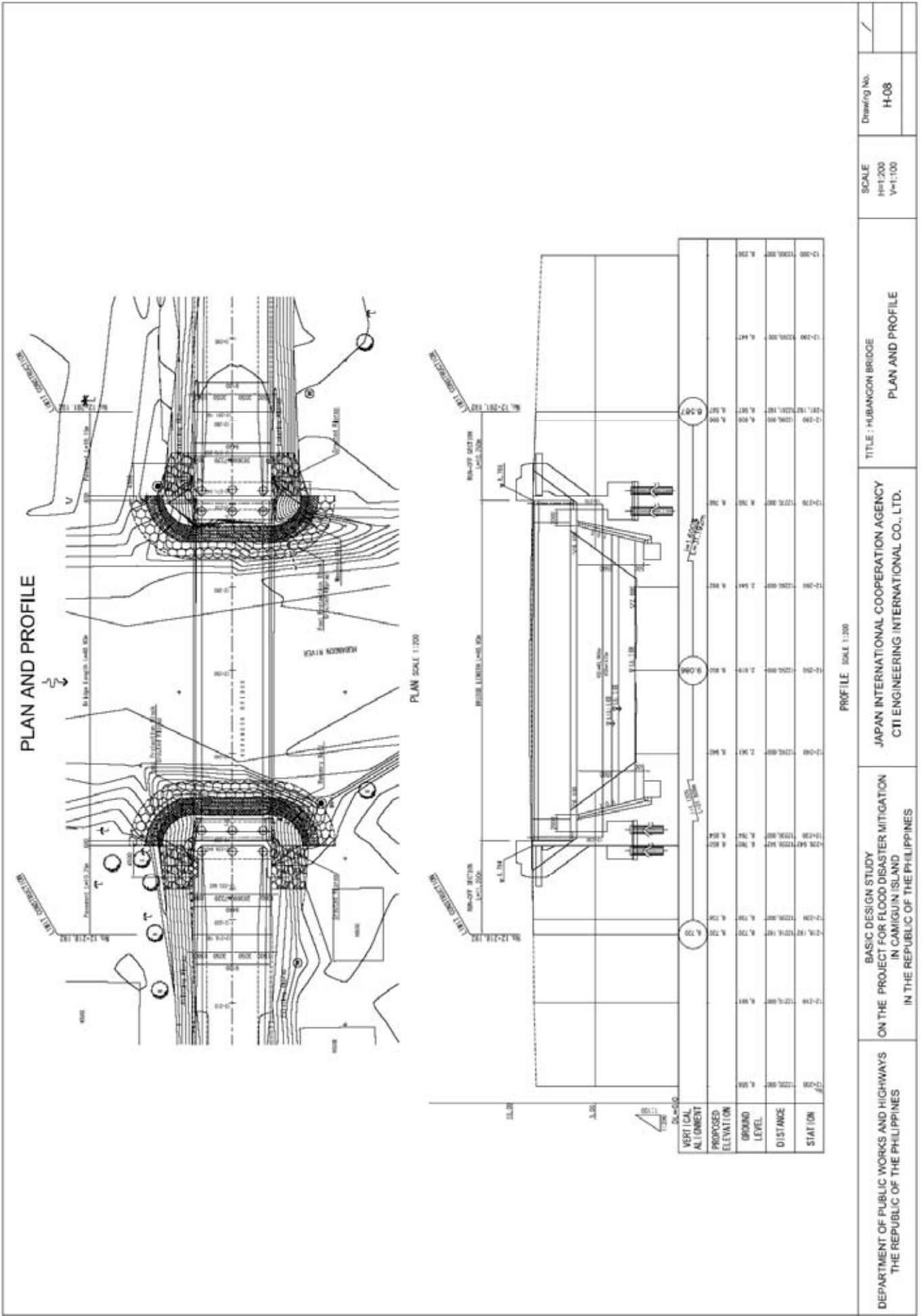
SCALE
S=1:5

Drawing No.
H-05

STRUCTURAL DRAWING OF A1 ABUTMENT SCALE 1:100

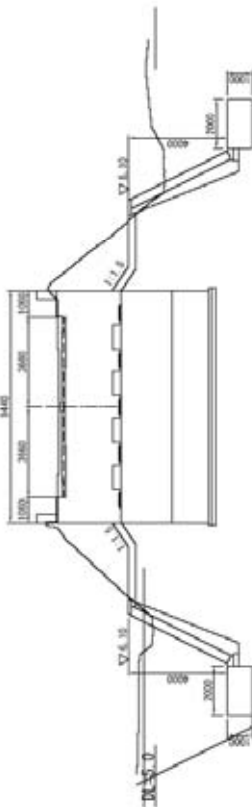


<p>DEPARTMENT OF AGRARIAN REFORM THE REPUBLIC OF THE PHILIPPINES</p>	<p>BASIC DESIGN STUDY ON THE BRIDGE CONSTRUCTION PROJECT FOR EXPANDED AGRARIAN REFORM COMMUNITIES DEVELOPMENT</p>	<p>JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.</p>	<p>TITLE : HUBANGON BRIDGE STRUCTURAL DRAWING OF A1 ABUTMENT</p>	<p>SCALE S=1:100</p>	<p>Drawing No. H-06</p>
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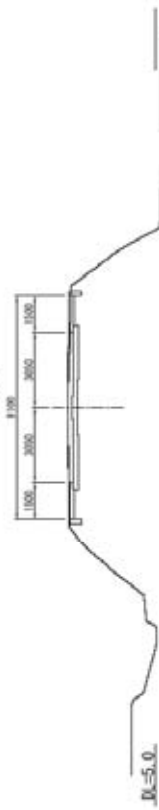


CROSS SECTION S=1:100

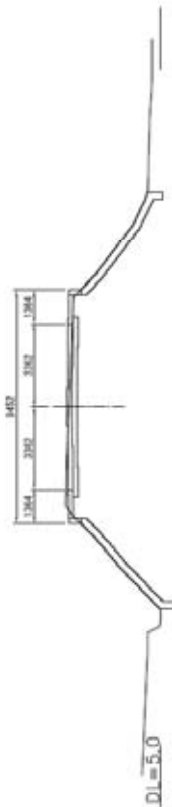
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 FINL. 731



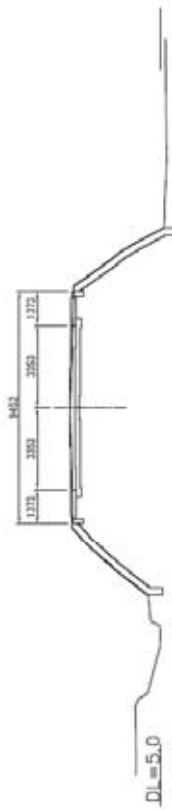
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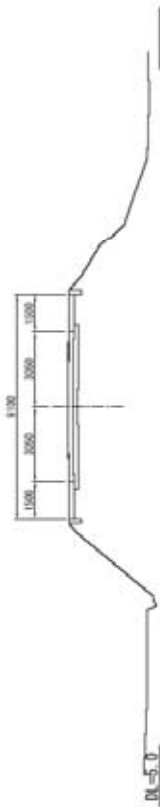
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 FINL. 731



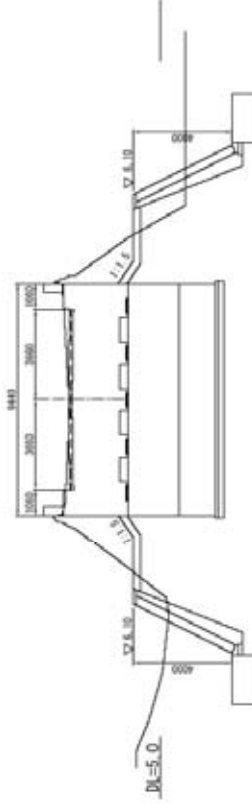
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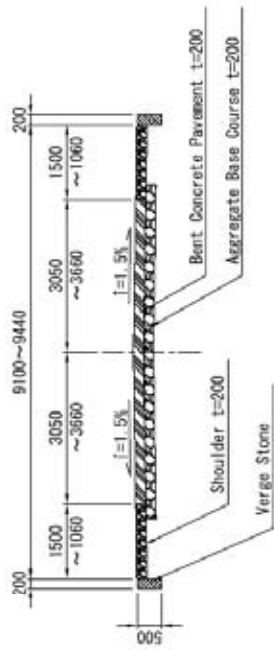


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 FINL. 720

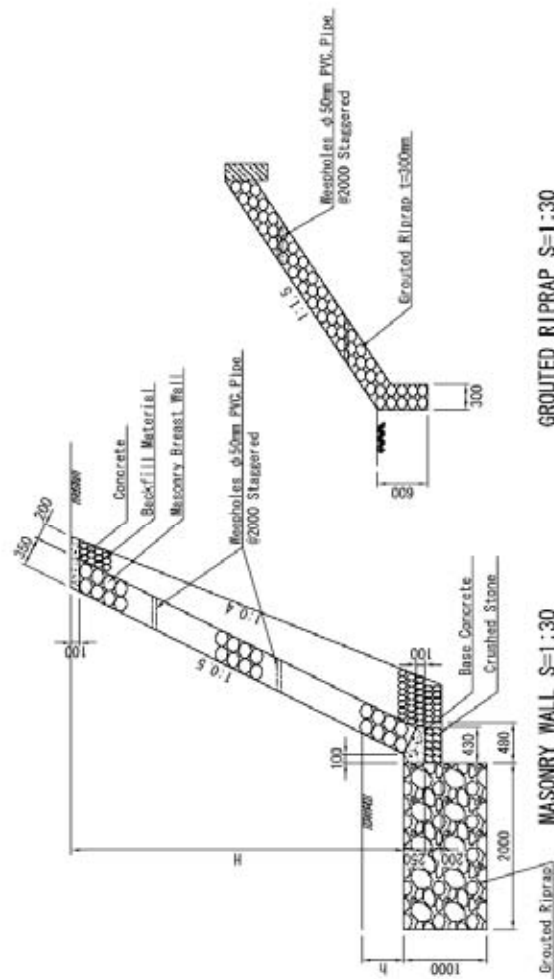


DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMIGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	TITLE : HUBANGON BRIDGE CROSS SECTION	SCALE S=1:100	Drawing No. H-09
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TYPICAL SECTION & DETAIL OF STRUCTURES

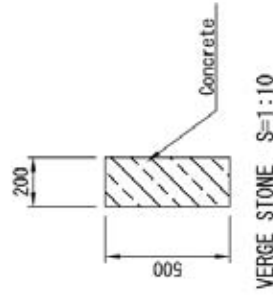


TYPICAL CROSS SECTION S=1:50



MASONRY WALL S=1:30

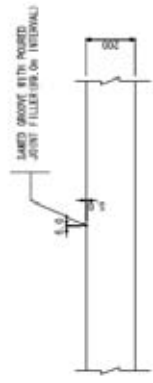
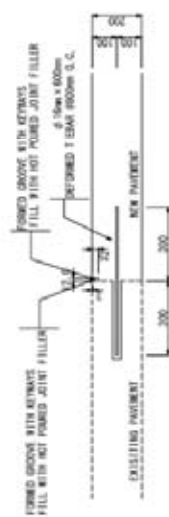
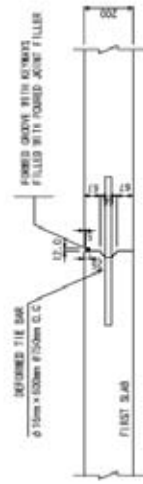
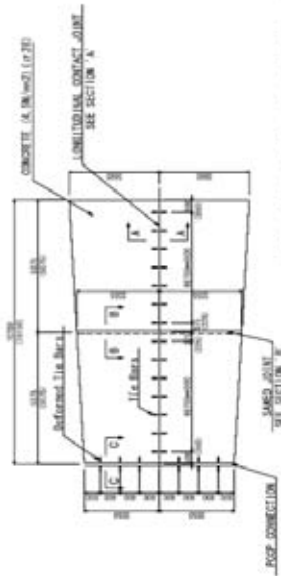
GROUTED RIPRAP S=1:30



VERGE STONE S=1:10

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMAGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	TITLE : HUBANGON BRIDGE TYPICAL SECTION & DETAIL OF STRUCTURES	SCALE	Drawing No.
				As Shown	H-10

DETAIL OF CONCRETE PAVEMENT



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMIGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	TITLE : HUBANGON BRIDGE DETAIL OF CONCRETE PAVEMENT	SCALE	Drawing No.
				AS SHOWN	H-11

Department of Public Works and Highways
The Republic of the Philippines

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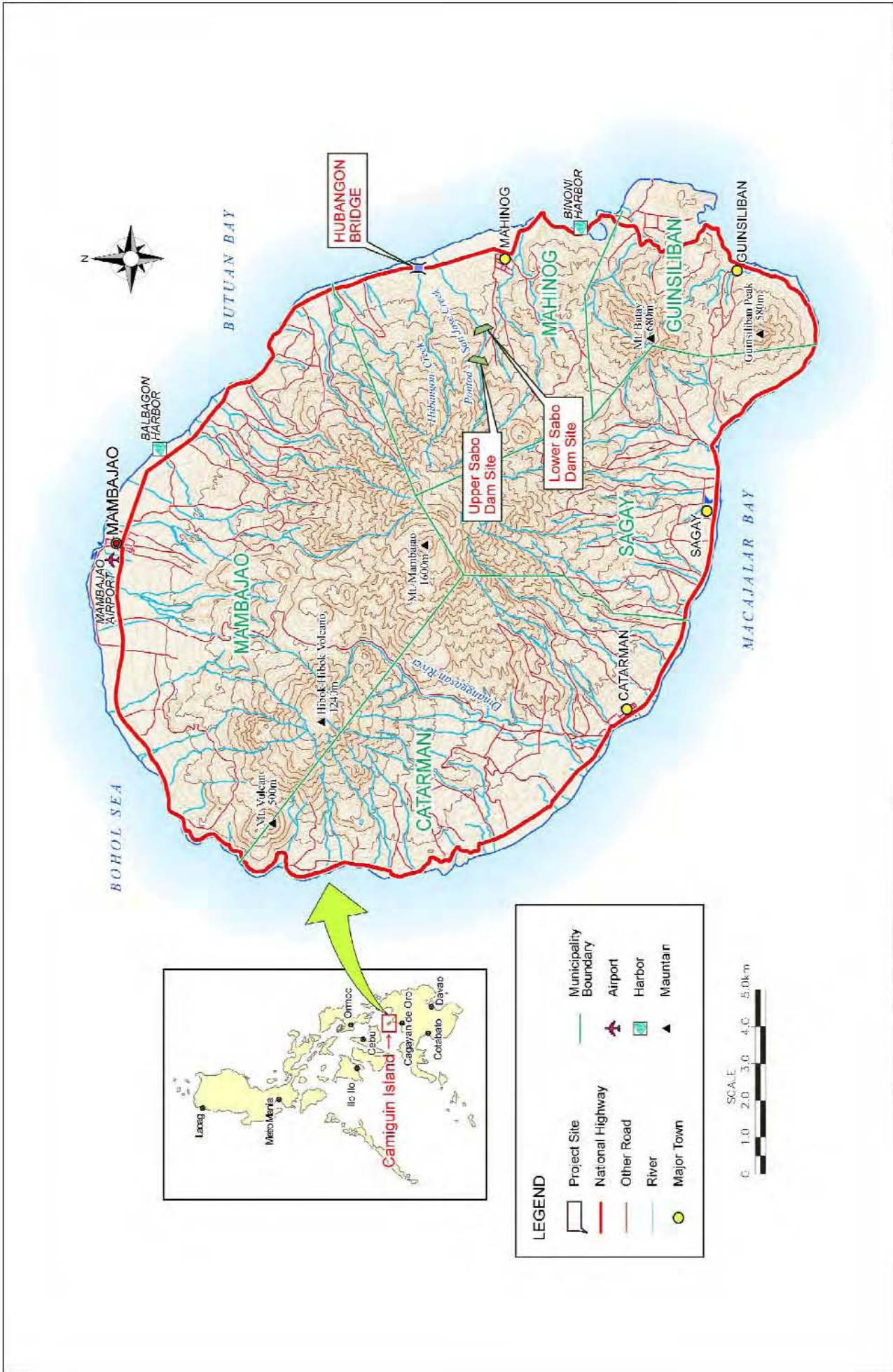
**DRAWINGS
(SABO DAM)**

February 2009

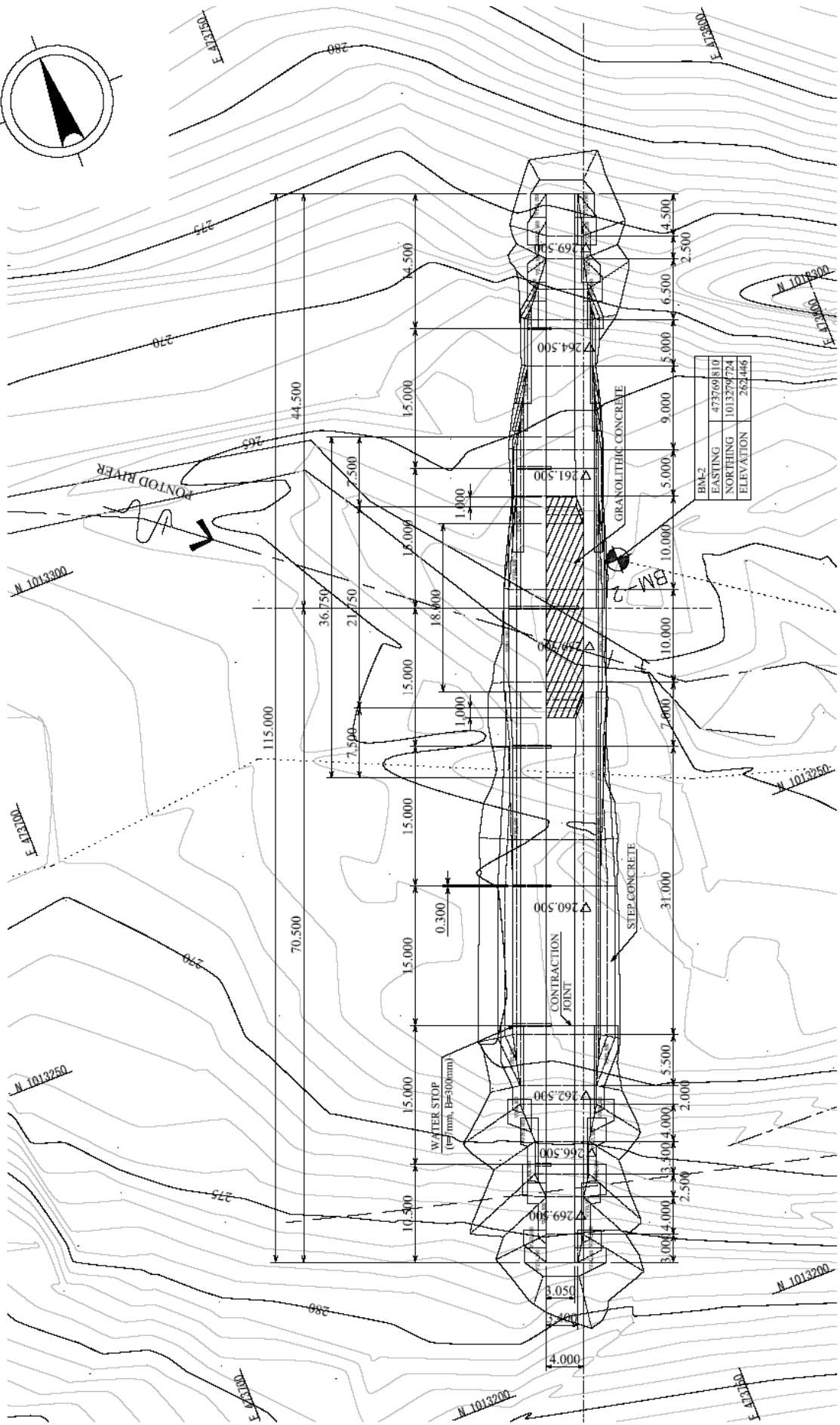
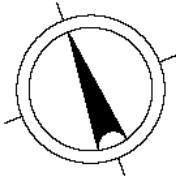
**JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING INTERNATIONAL CO., LTD.**

LIST OF DRAWINGS

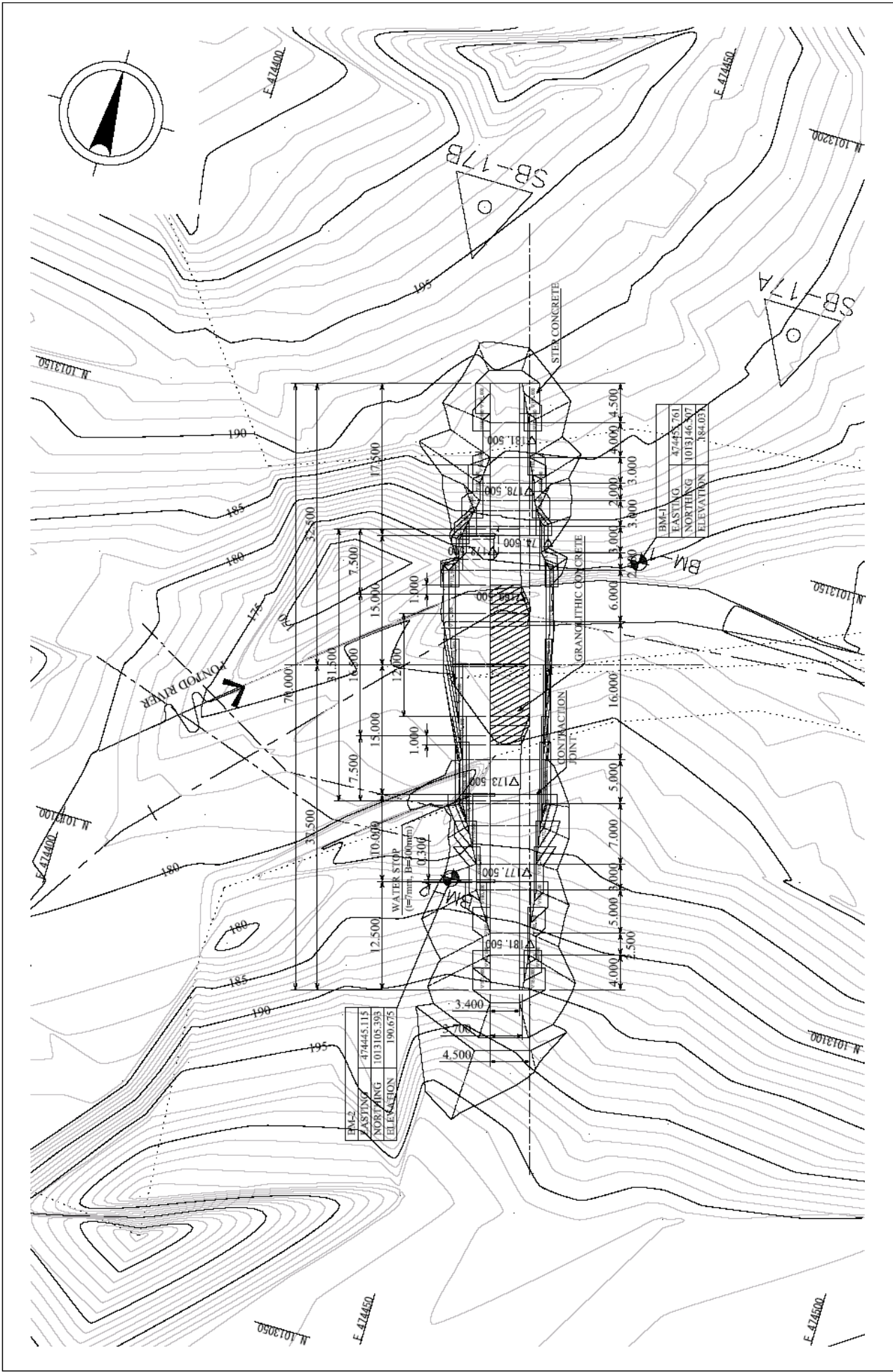
No.	Drawing Title	Scale	No.	Drawing Title	Scale
S-01	Project Location Map	-			
S-02	Plan of Upper Sabo Dam	1/200			
S-03	Plan of Lower Sabo Dam	1/200			
S-04	General Drawing of Upper Sabo Dam	1/200			
S-05	General Drawing of Lower Sabo Dam	1/200			
S-06	Plan and Profile of Access Road (Upper Sabo Dam)	H=1/1000, V=1/500			
S-07	Plan and Profile of Access Road (Lower Sabo Dam)	H=1/1000, V=1/500			
S-08	Typical Cross Section of Road Section	1/50			



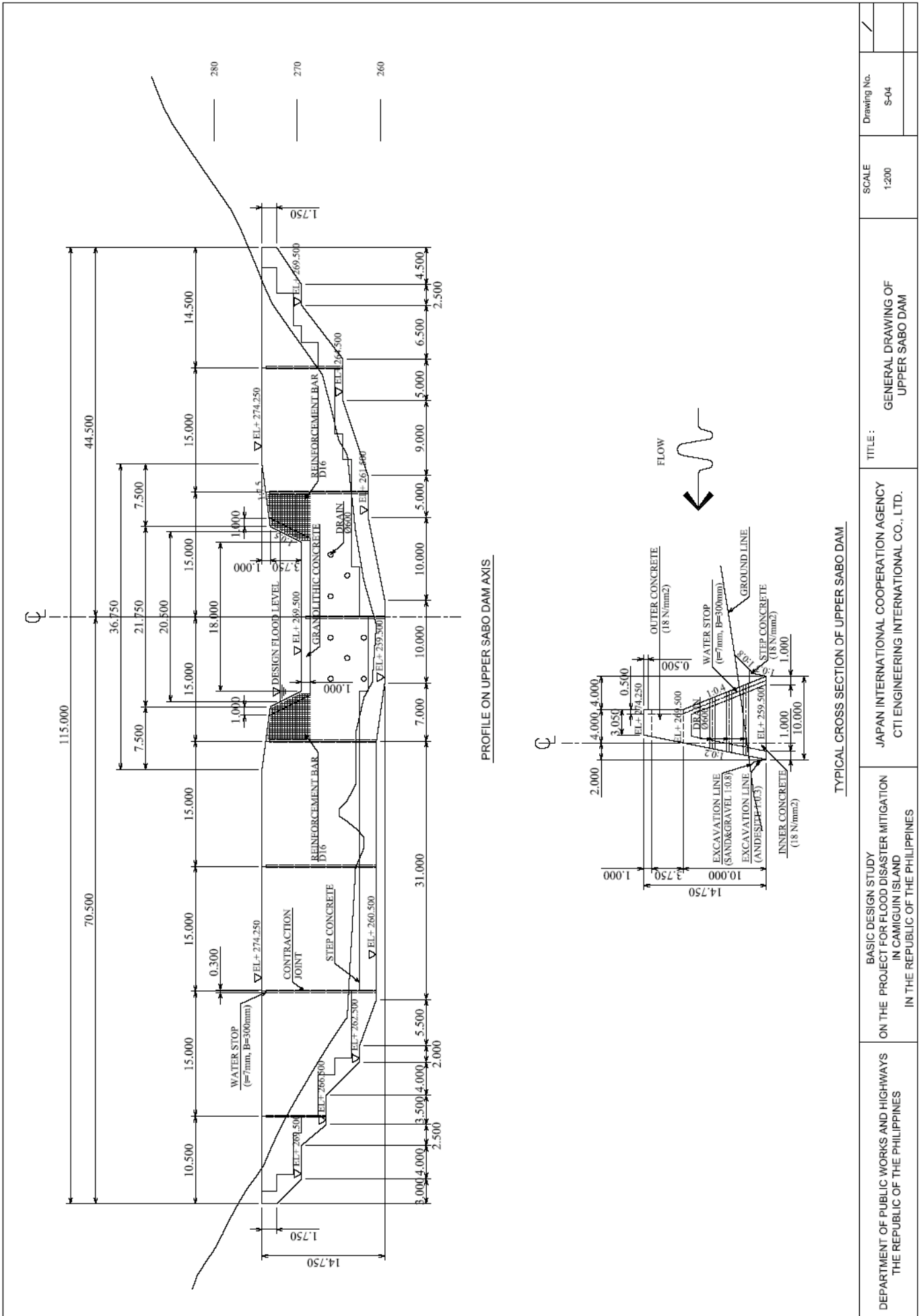
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMIGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	TITLE: PROJECT LOCATION MAP	SCALE	Drawing No.
				Not on Scale	S-01

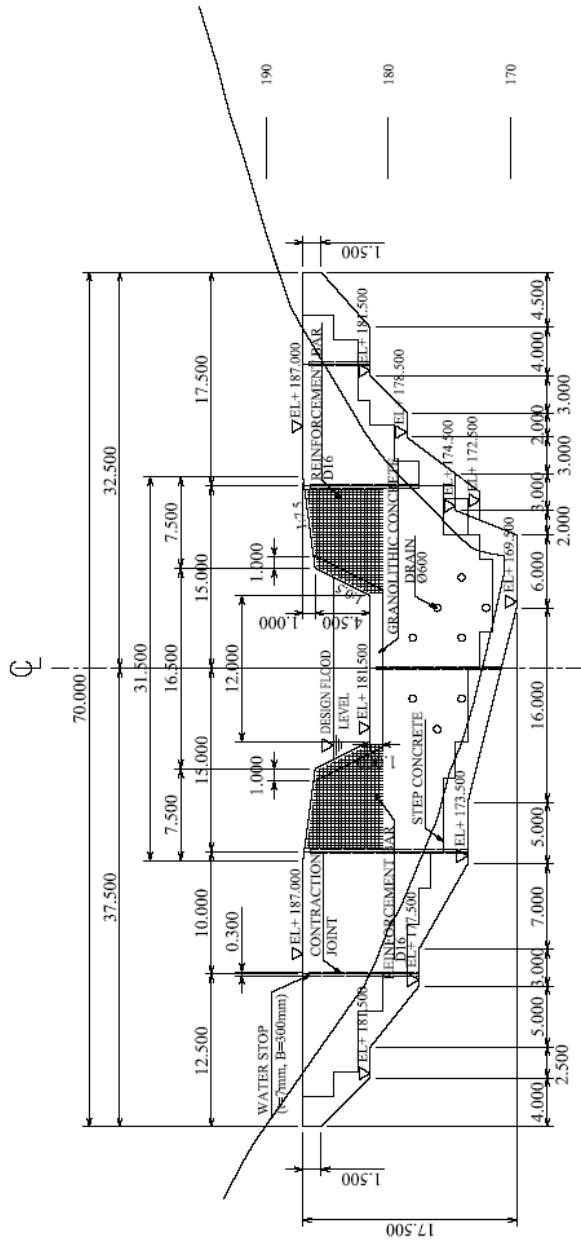


Drawing No. 9-02	SCALE 1:200	TITLE: PLAN OF UPPER SABO DAM	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMIGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES
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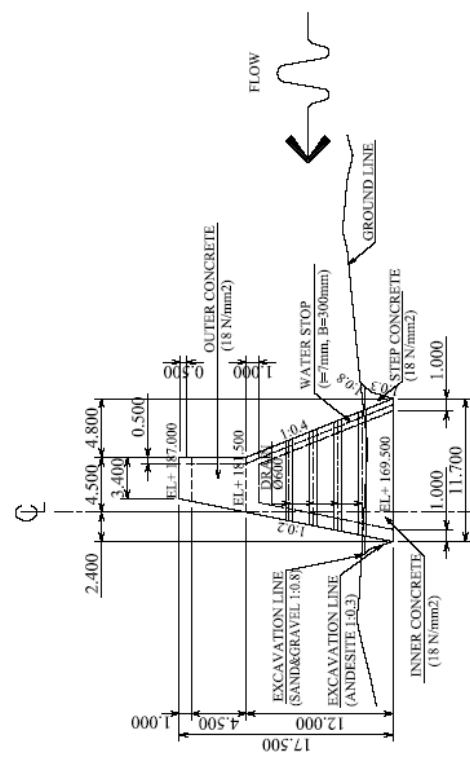


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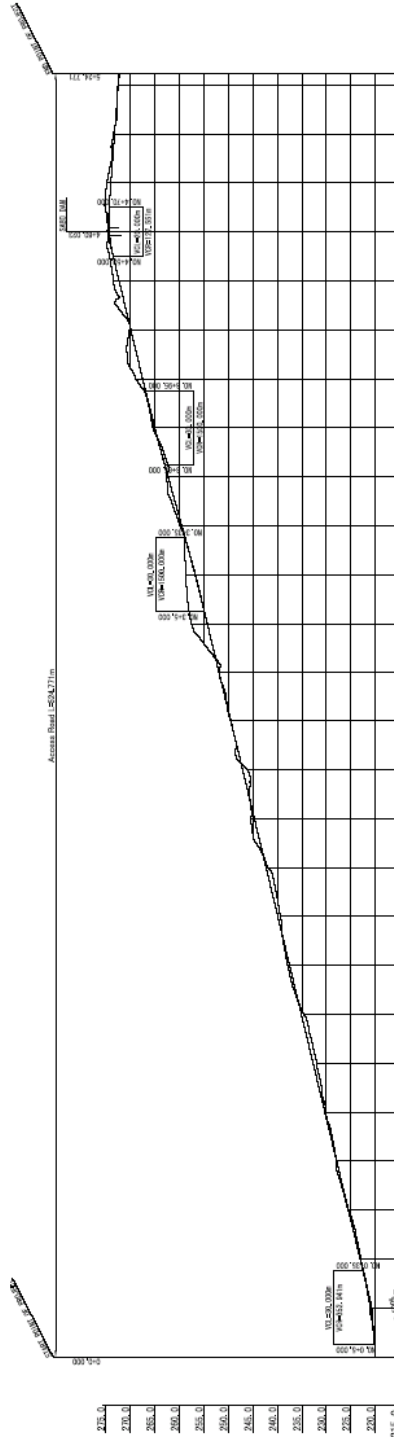
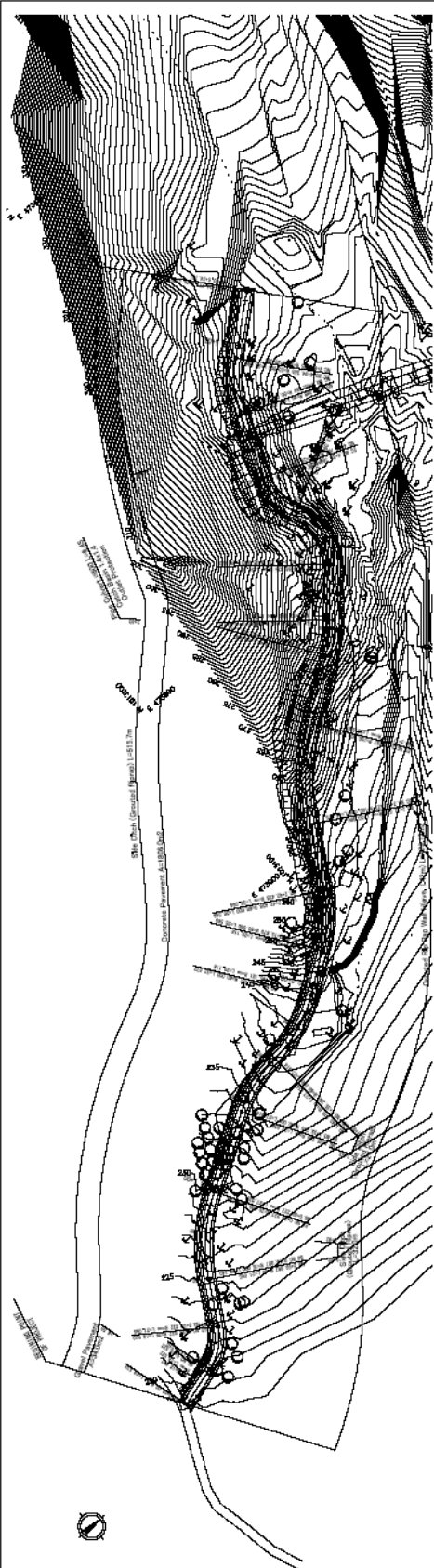


PROFILE ON LOWER SABO DAM AXIS



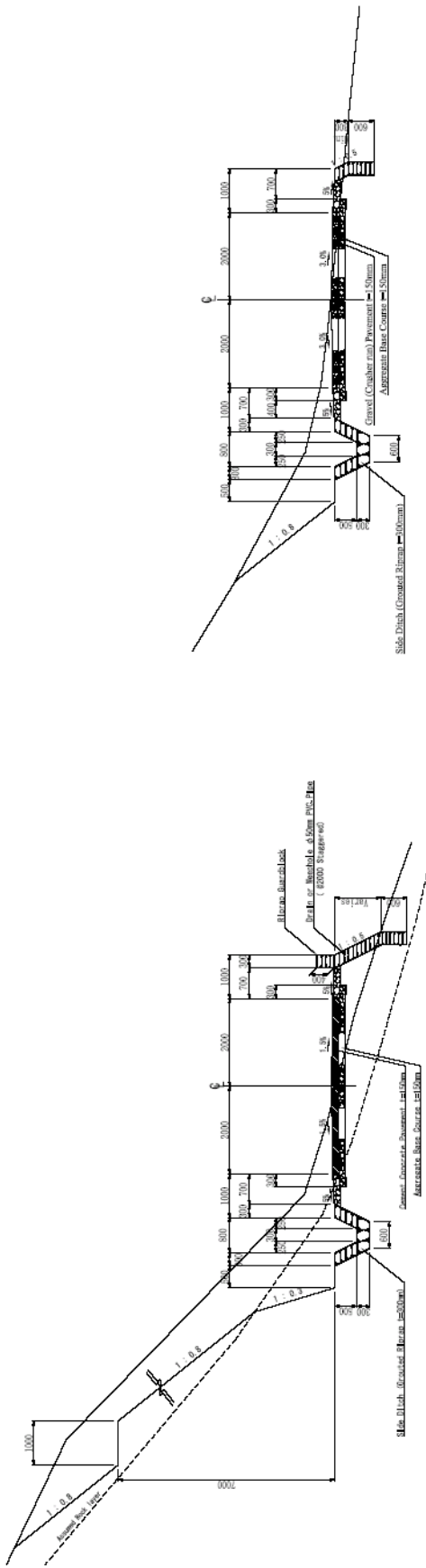
TYPICAL CROSS SECTION OF LOWER SABO DAM

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				Drawing No.	S-05



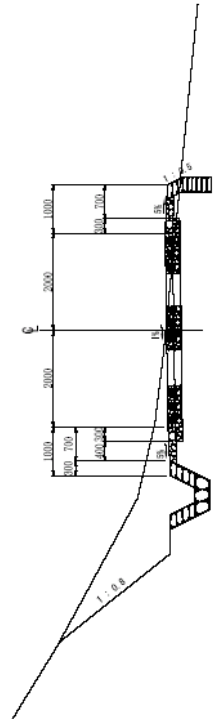
VERTICAL ALIGNMENT	FORMATION HEIGHT	GROUND HEIGHT	DISTANCE	STATION	HORIZONTAL CURVATURE	SUPER ELEVATION
0+00	232.223	232.223	0.000	0+00	0.000	0.000
0+10	232.223	232.223	10.000	0+10	0.000	0.000
0+20	232.223	232.223	20.000	0+20	0.000	0.000
0+30	232.223	232.223	30.000	0+30	0.000	0.000
0+40	232.223	232.223	40.000	0+40	0.000	0.000
0+50	232.223	232.223	50.000	0+50	0.000	0.000
0+60	232.223	232.223	60.000	0+60	0.000	0.000
0+70	232.223	232.223	70.000	0+70	0.000	0.000
0+80	232.223	232.223	80.000	0+80	0.000	0.000
0+90	232.223	232.223	90.000	0+90	0.000	0.000
0+100	232.223	232.223	100.000	0+100	0.000	0.000
0+110	232.223	232.223	110.000	0+110	0.000	0.000
0+120	232.223	232.223	120.000	0+120	0.000	0.000
0+130	232.223	232.223	130.000	0+130	0.000	0.000
0+140	232.223	232.223	140.000	0+140	0.000	0.000
0+150	232.223	232.223	150.000	0+150	0.000	0.000
0+160	232.223	232.223	160.000	0+160	0.000	0.000
0+170	232.223	232.223	170.000	0+170	0.000	0.000
0+180	232.223	232.223	180.000	0+180	0.000	0.000
0+190	232.223	232.223	190.000	0+190	0.000	0.000
0+200	232.223	232.223	200.000	0+200	0.000	0.000
0+210	232.223	232.223	210.000	0+210	0.000	0.000
0+220	232.223	232.223	220.000	0+220	0.000	0.000
0+230	232.223	232.223	230.000	0+230	0.000	0.000
0+240	232.223	232.223	240.000	0+240	0.000	0.000
0+250	232.223	232.223	250.000	0+250	0.000	0.000
0+260	232.223	232.223	260.000	0+260	0.000	0.000
0+270	232.223	232.223	270.000	0+270	0.000	0.000
0+280	232.223	232.223	280.000	0+280	0.000	0.000
0+290	232.223	232.223	290.000	0+290	0.000	0.000
0+300	232.223	232.223	300.000	0+300	0.000	0.000

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMIGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.
TITLE : UPSTREAM DAM PLAN AND PROFILE OF ACCESS ROAD		
	SCALE H=1:1000 V=1:500	Drawing No. S-06



Typical Cross Section (Longitudinal Gradient less than 7 %)

Typical Cross Section (Longitudinal Gradient 7 % or more)



Typical Cross Section (Superelevation Section)

- NOTES:
1. All dimensions are in millimeters unless otherwise indicated.
 2. Concrete pavement shall be provided where longitudinal gradient exceeds 7.0 percent.
 3. The bonding strength of concrete shall be 0.28 MPa.
 4. The minimum interval where the full height exceeds 2.0 meters, length of shoulder of P.V.C. shall be provided at greater than 2.0 meters staggered.
 5. Grade of shoulder of P.V.C. shall be provided at greater than 2.0 meters staggered.

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS THE REPUBLIC OF THE PHILIPPINES	BASIC DESIGN STUDY ON THE PROJECT FOR FLOOD DISASTER MITIGATION IN CAMIGUIN ISLAND IN THE REPUBLIC OF THE PHILIPPINES	JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING INTERNATIONAL CO., LTD.	TITLE:	SCALE:	Drawing No.
			TYPICAL CROSS SECTION OF ROAD SECTION	1:50	S-08

