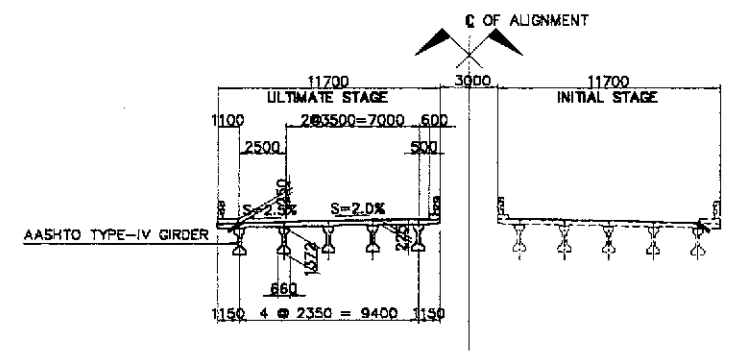
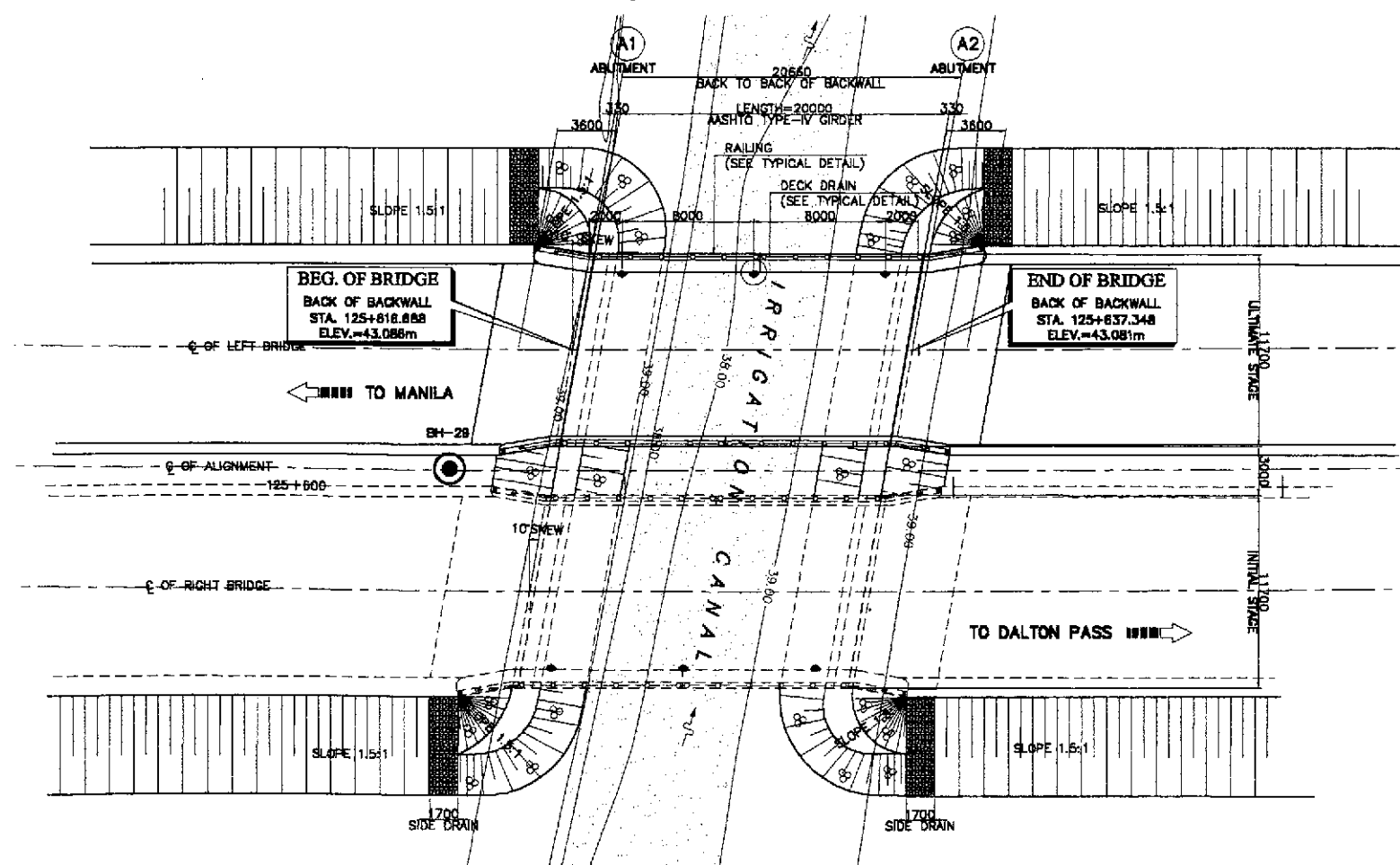


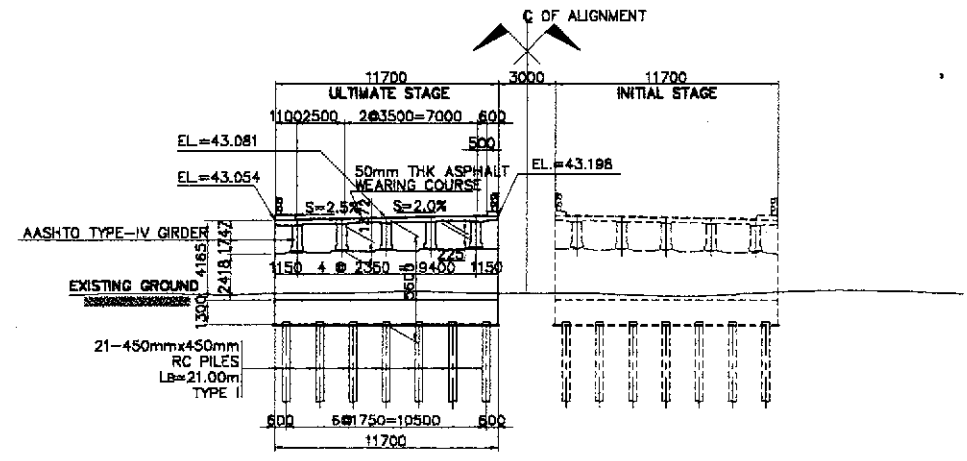
1 GENERAL ELEVATION
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DESIGN DATA	
IRRIGATION CANAL	-

NOTE :
PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM EMBEDMENT LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A PLARIDEL BRIDGE NO.13 (STA. 125+616.688)
SCALE AS SHOWN

PERFECTO L. ZAPLAN JR.
OIC Chief, Hydraulics Division, BOD

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS
INTERNATIONAL

YEO YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

BUREAU OF DESIGN

OFFICE OF THE SECRETARY

Submitted By: DANILLO C. TRAJANO (Project Director)

Reviewed By: ADRIANO M. DOROY (Chief, Bridge Division)

Recommended By: GILBERTO S. REYES (Director IV (OIC))

Recommended By: MANUEL M. BONDAN (Undersecretary)

Approved By: SIMEON A. DATUMANONG (Secretary)

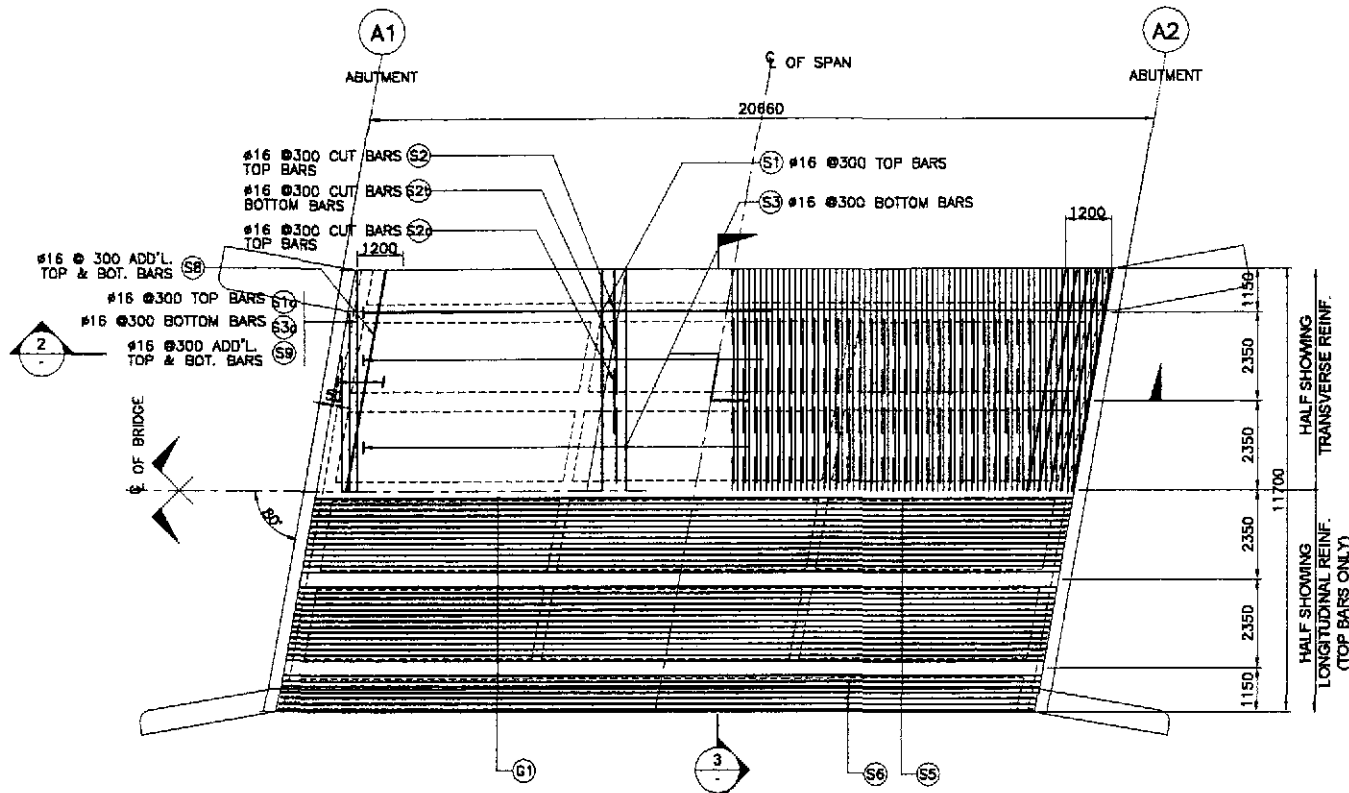
PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(Plaridel, Cabanatuan and San Jose Bypasses)

CABANATUAN BYPASS - CONTRACT PACKAGE IV

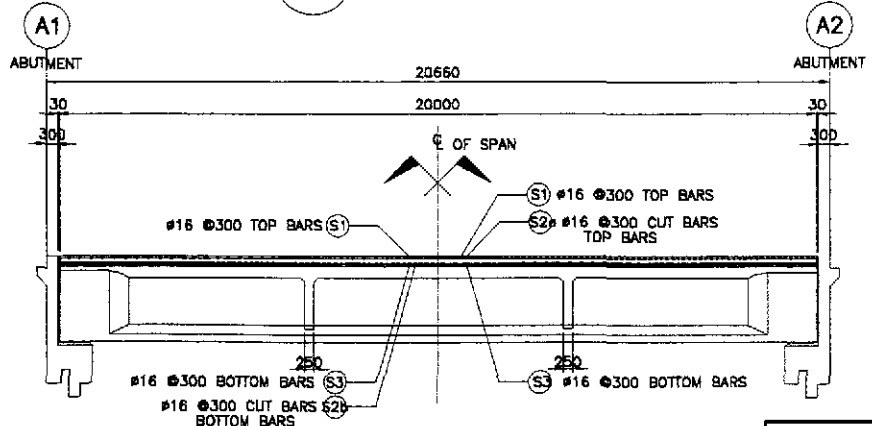
SCALE :
1:200
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 13
GENERAL PLAN, ELEVATION
AND SECTIONS
(ULTIMATE STAGE)

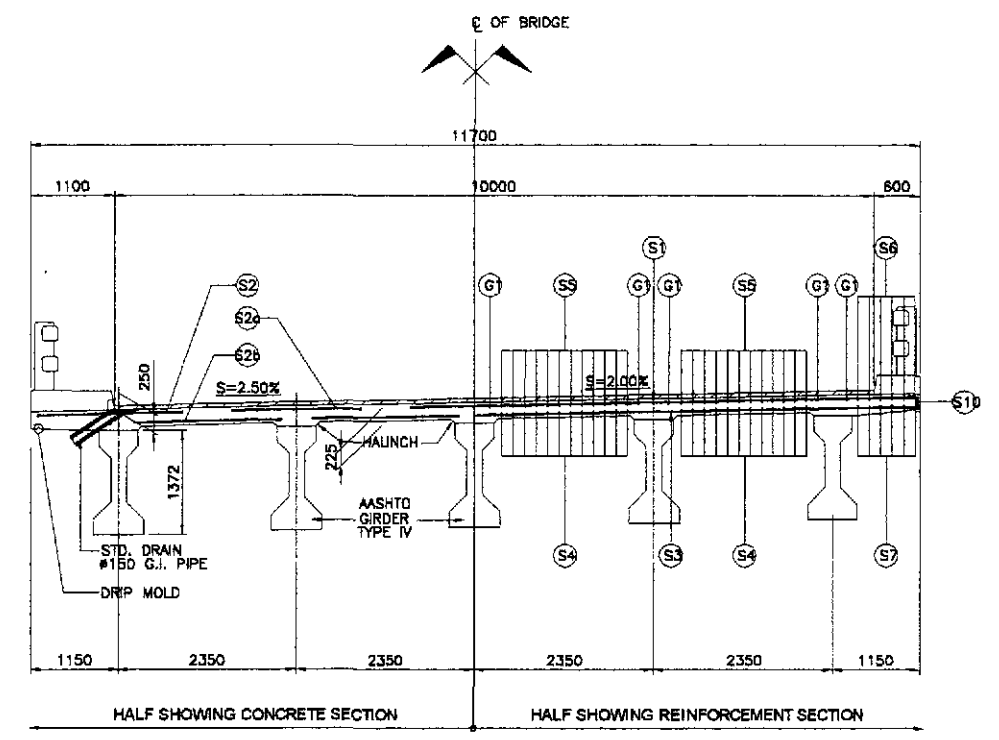
SHEET NO. :
B13-01



1 FRAMING PLAN
SCALE 1:100

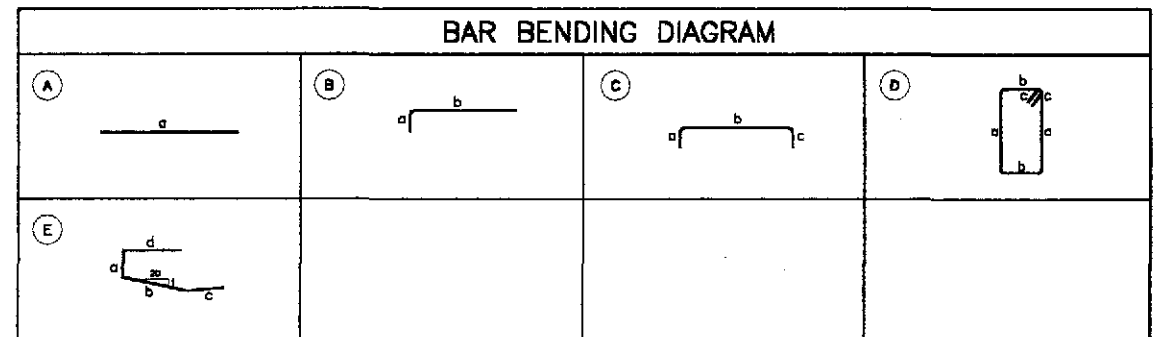


2 LONGITUDINAL SECTION
SCALE 1:100



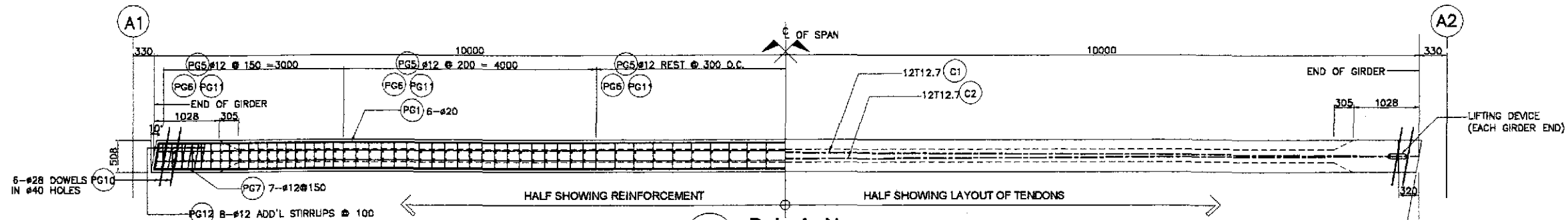
3 TYPICAL CROSS-SECTION
SCALE 1:50

ESTIMATED QUANTITIES OF SUPERSTRUCTURE			
ITEM NO.	DESCRIPTION	UNIT	TOTAL
404(1)a	REINFORCING STEEL GRADE 40	kg.	16748
	DECK SLAB	9131	
	DIAPHRAGM	362	
	GIRDER	4015	
	SIDEWALK, RAILING, & POST	1872	
	APPROACH SLAB	1368	
404(1)b	REINFORCING STEEL GRADE 60	kg.	10462
	DECK SLAB	0	
	DIAPHRAGM	1124	
	GIRDER	4645	
	SIDEWALK, RAILING, & POST	443	
	APPROACH SLAB	4250	
405(1)	STRUCTURAL CONCRETE	cu. m.	168.42
	DECK SLAB	55.44	
	DIAPHRAGM	11.18	
	GIRDER	53.19	
	SIDEWALK, RAILING, & POST	13.39	
	APPROACH SLAB	35.22	

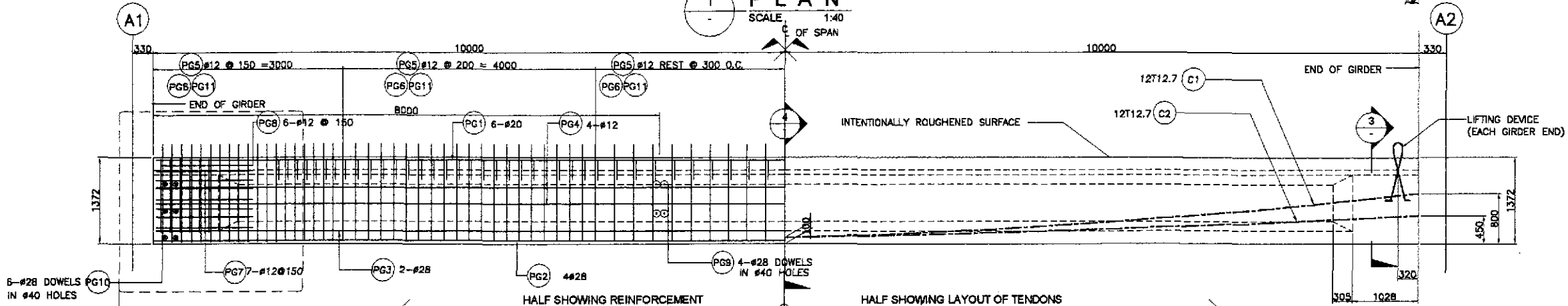


SCHEDULE OF REINFORCEMENT															
LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT				LENGTH EACH BAR (mm)	TOTAL LENGTH (m)	UNIT WT. (kg/m)	WEIGHT IN (kg)	REBAR RATIO (kg/m ³)
							a	b	c	d					
DECK SLAB	55.44	G1	16	10	AS SHOWN	(A)	19900	-	-	-	19900	199.00	1.579	315	164.70
		S1	16	61	300	(C)	145	11600	145	-	11890	725.29	1.579	1146	
		S1a	16	14	300	(C)	145	6590	145	-	6880	96.32	1.579	153	
		S2	16	122	300	(B)	145	2000	-	-	2145	261.69	1.579	414	
		S2a	16	183	300	(A)	1700	-	-	-	1700	311.10	1.579	492	
		S2b	16	244	300	(A)	1850	-	-	-	1850	475.80	1.579	752	
		S3	16	61	300	(A)	11600	-	-	-	11600	707.60	1.579	1118	
		S3a	16	14	300	(A)	6590	-	-	-	6590	92.26	1.579	146	
		S4	16	48	150	(A)	19900	-	-	-	19900	955.20	1.579	1509	
		S5	16	48	150	(A)	19900	-	-	-	19900	955.20	1.579	1509	
		S6	16	12	AS SHOWN	(A)	19900	-	-	-	19900	238.80	1.579	378	
		S7	16	12	AS SHOWN	(A)	19900	-	-	-	19900	238.80	1.579	378	
		S8	16	20	AS SHOWN	(E)	11780	-	-	-	11780	235.60	1.579	373	
		S9	16	28	AS SHOWN	(A)	6590	-	-	-	6590	184.52	1.579	292	
S10	12	90	450	(E)	145	900	600	300	1945	175.05	0.886	156			
TOTAL	55.44													GRADE 40 TOTAL = 9,131 kg.	

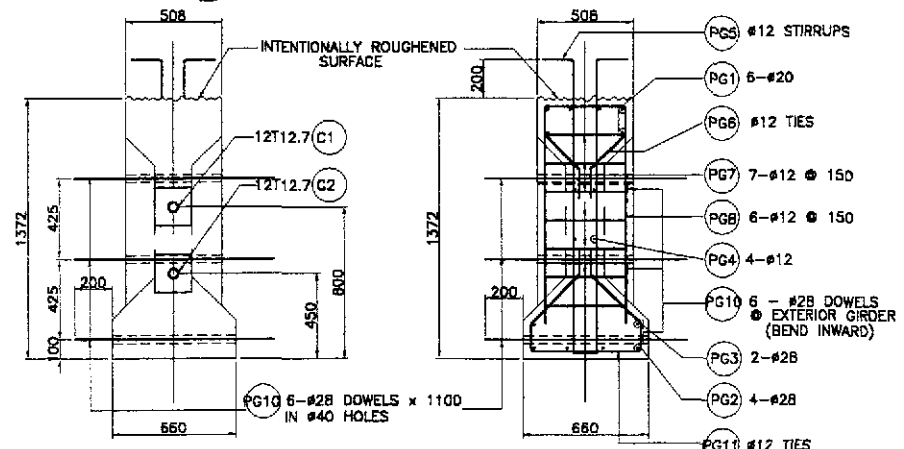
	DESIGNED	10/17/02	SIGNATURE			REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/19/02	Submitted By:			Reviewed By:	Recommended By:	Approved By:	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 13 DECK FRAMING PLAN AND SECTIONS (ULTIMATE STAGE)	B13-02	
	SUBMITTED	10/21/02	Project Director	DANILO C. TRAJANO		Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	MANUEL M. BONDAN Undersecretary	SIMEON A. DATUMANDANG Secretary	FULL SIZE A1			



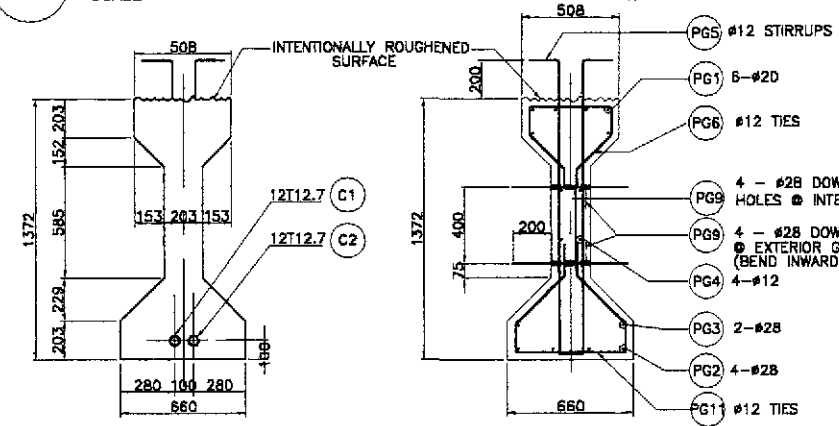
1 PLAN
SCALE 1:40



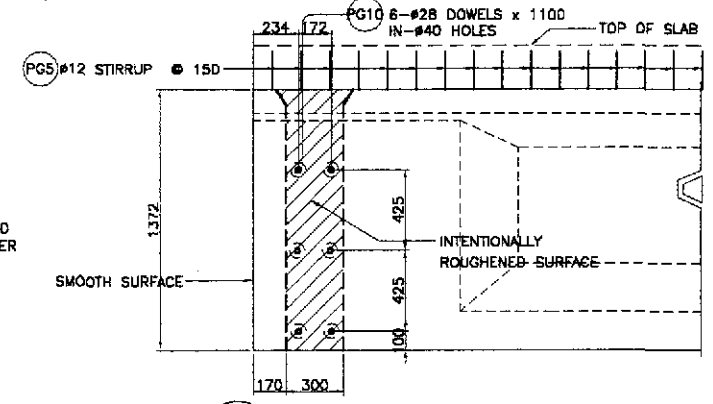
2 PRESTRESSED GIRDER ELEVATION
SCALE 1:40



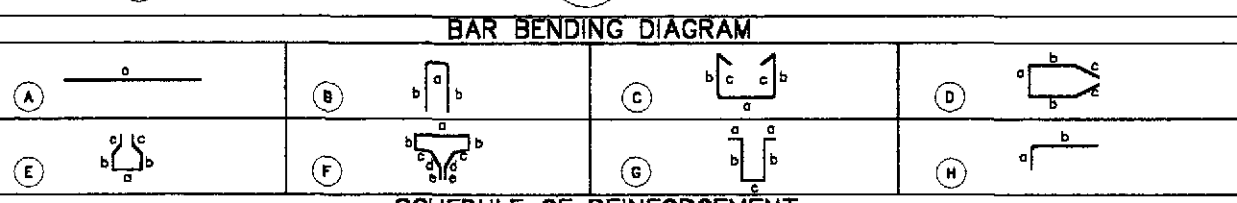
3 SECTION AT END
SCALE 1:20



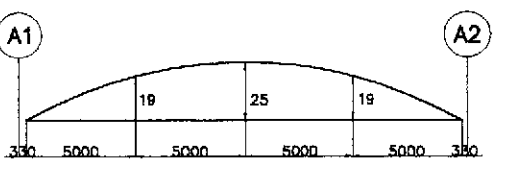
4 SECTION AT MIDSPAN
SCALE 1:20



5 DOWELS @ END BLOCK
SCALE 1:20



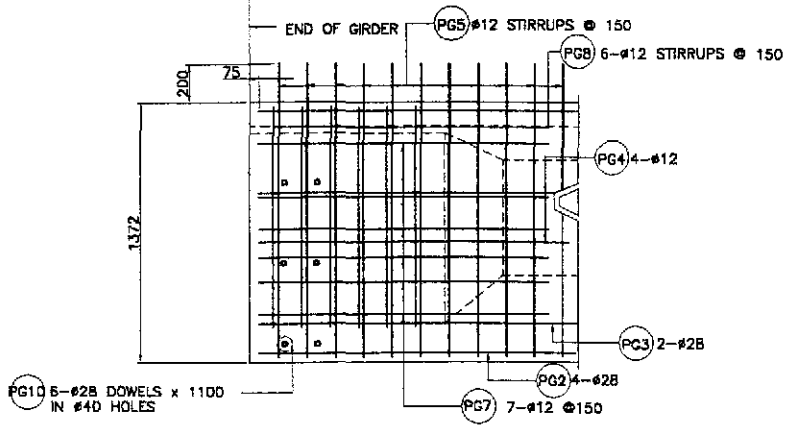
BAR BENDING DIAGRAM



7 CAMBER DIAGRAM
NOT TO SCALE

NOTES:
1.) SEE GENERAL NOTES, -2, FOR GIRDER DESIGN GUIDE.
2.) JACKING FORCE PER GIRDER, PJ = 3304 kN.
3.) JACKING WILL BE DONE AT BOTH ENDS.
4.) FINAL PRESTRESSING FORCE @ MIDSPAN, F_{net} = 2709 kN.

STRUCTURE COMPONENT	BAR MARK	SIZE (mm)	QTY.	SPACING	BAR SHAPE	DIMENSION (mm)					LENGTH PER BAR (mm)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	TOTAL WEIGHT (kg)	CONC. VOLUME (cu.m)	REBAR RATIO (kg/cu.m)	REMARKS
						a	b	c	d	e							
GIRDER	PG1	20	6	AS SHOWN	(A)	19920	-	-	-	-	19920	119.52	2.466	295			QUANTITIES ARE FOR ONE (1) GIRDER ONLY
	PG2	28	4	AS SHOWN	(A)	19920	-	-	-	-	19920	79.68	4.833	386			
	PG3	28	2	AS SHOWN	(A)	19920	-	-	-	-	19920	39.84	4.833	193			
	PG4	12	4	AS SHOWN	(A)	19920	-	-	-	-	19920	79.68	0.888	71			
	PG5	12	100	150	(C)	100	1540	103	-	-	3383	338.30	0.888	301			
	PG6	12	100	150	(E)	430	160	150	260	-	1570	157.00	0.888	140			
	PG7	12	14	150	(D)	430	1000	550	-	-	3530	49.42	0.888	44	10.64	162.80	
	PG8	12	12	150	(C)	430	1230	150	-	-	3190	38.28	0.888	34			
	PG9	28	8	AS SHOWN	(A)	603	-	-	-	-	603	4.82	4.833	24			
	PG10	28	6	AS SHOWN	(A)	1060	-	-	-	-	1060	6.36	4.833	31			
	PG11	12	100	150	(E)	580	160	150	360	-	1920	192.00	0.888	171			
	PG12	12	16	100	(B)	430	1230	-	-	-	2890	46.24	0.888	42			
													GRADE 40 TOTAL = 803 kgs.				
													GRADE 60 TOTAL = 929 kgs.				

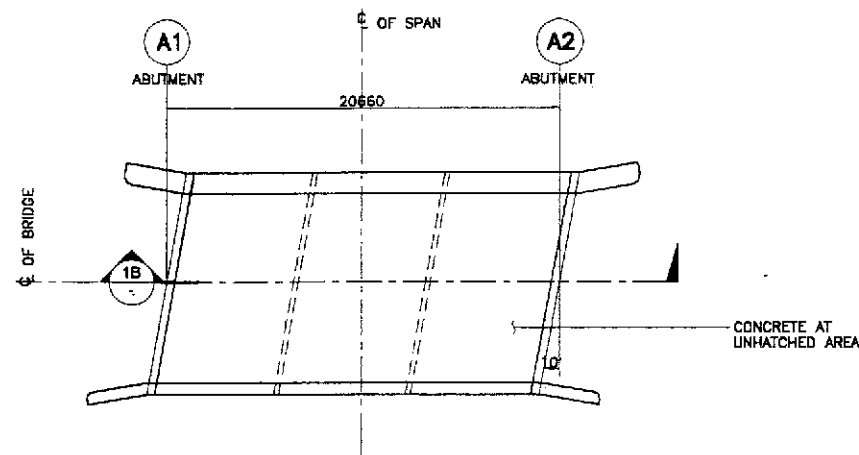


6 END BLOCK REINF. DETAIL
SCALE 1:20

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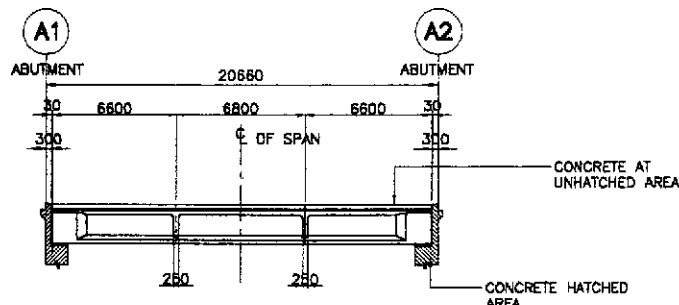
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
OFFICE OF THE SECRETARY
Submitted By: DANILLO C. TRAJANO, Project Director
Reviewed By: ADRIANO M. DORDY, Chief, Bridge Division
Recommended By: GILBERTO S. REYES, Director IV (CIC)
Approved By: MANUEL M. BONGAN, Undersecretary
SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
SCALE: AS SHOWN
SHEET CONTENTS: BRIDGE NO. 13 AASHTO TYPE IV GIRDER (ULTIMATE STAGE)
SHEET NO.: B13-03



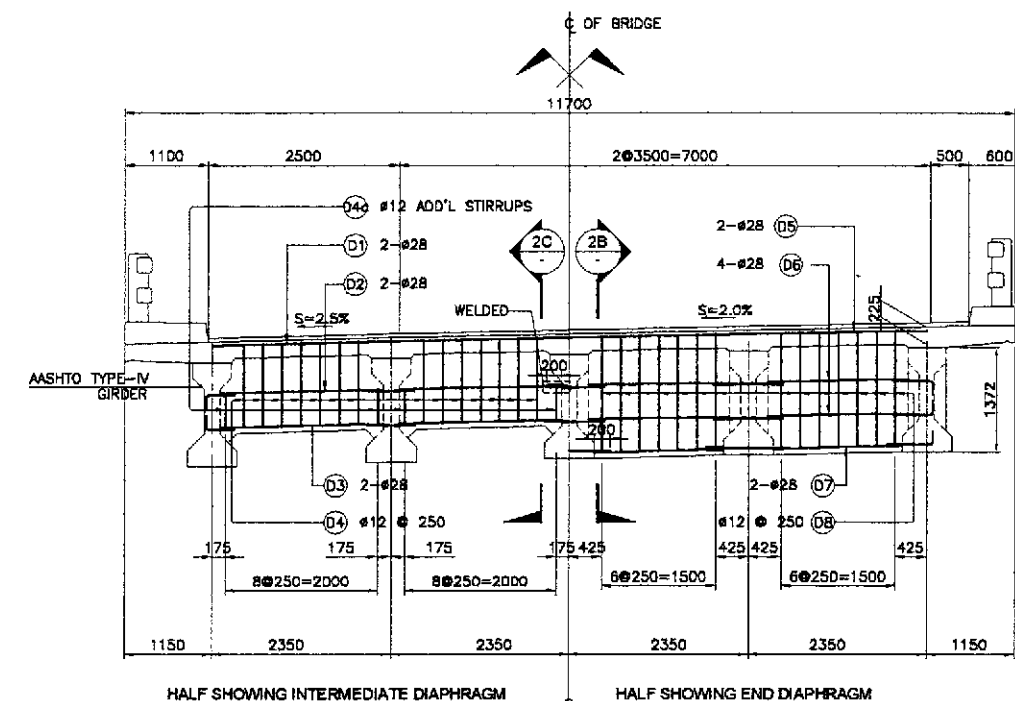
1A PLAN
SCALE 1:200

- NOTES:
- CONCRETE AT HATCHED AREAS SHALL BE PLACED AT LEAST TWENTY ONE (21) DAYS AHEAD OF CONCRETE AT UNHATCHED AREAS.
 - SEE GIRDER DETAILS FOR SPACING OF #28 DOWELS.

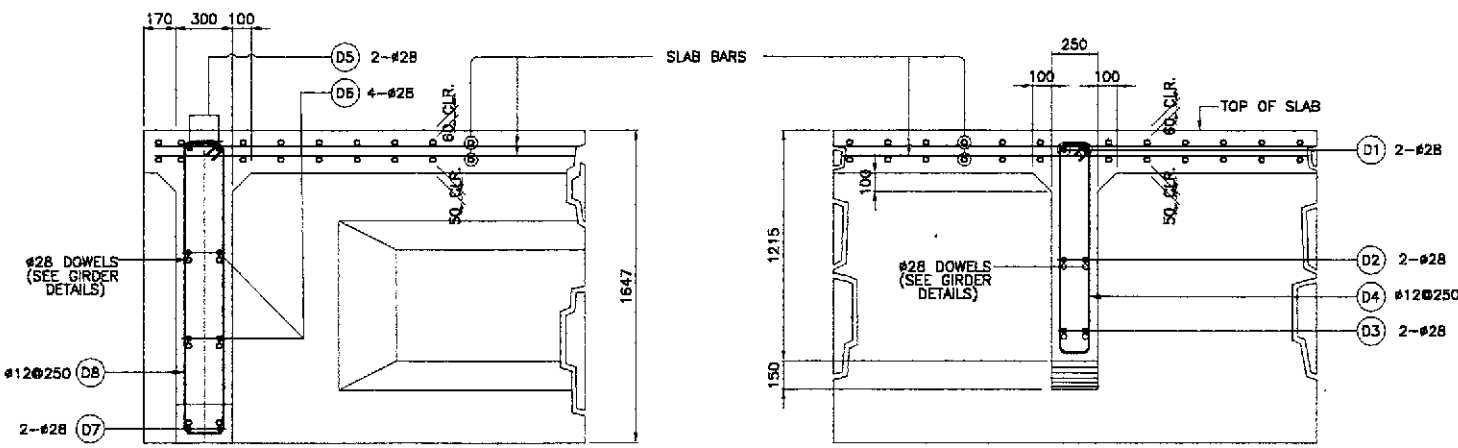


1B LONGITUDINAL SECTION
SCALE 1:200

1 CONCRETE POURING SEQUENCE
SCALE 1:200



2A ELEVATION
SCALE 1:50



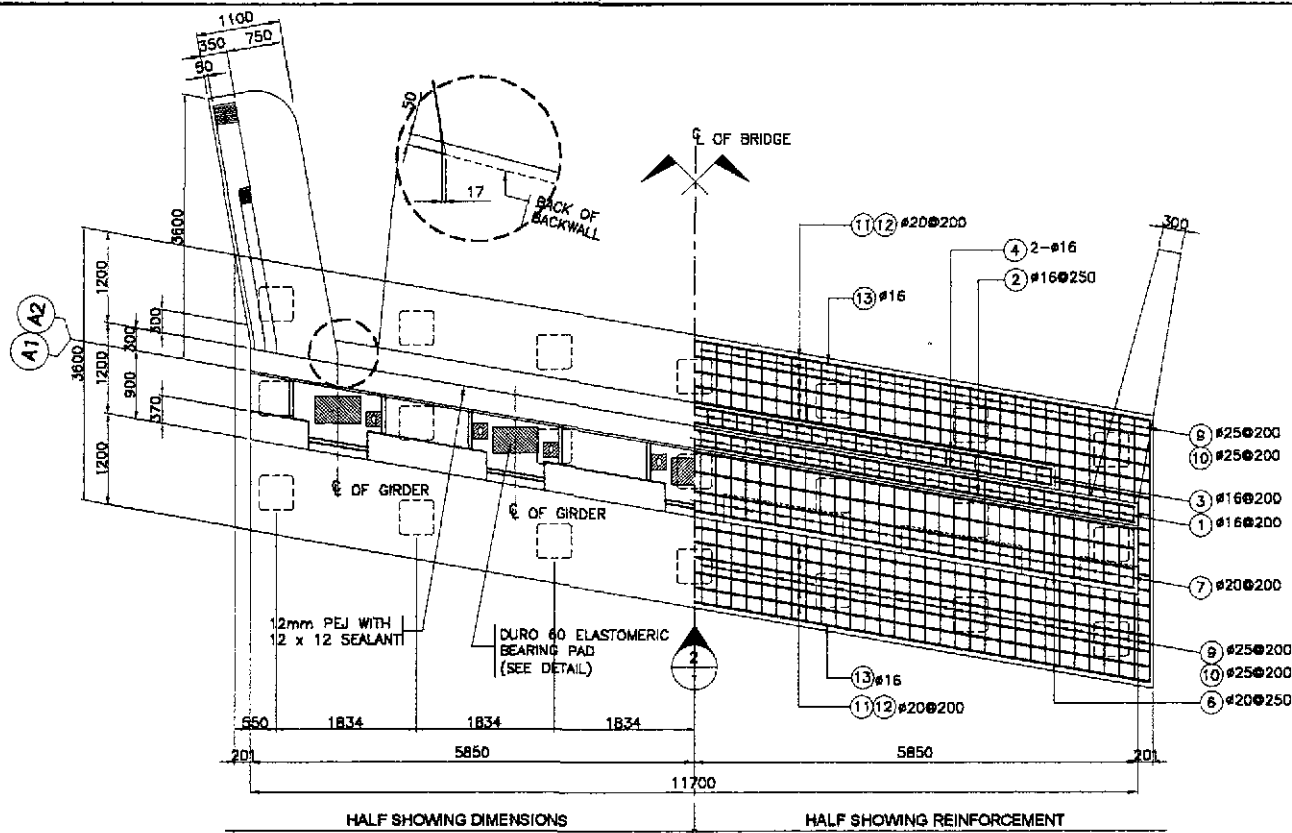
2B SECTION
SCALE 1:20

2C SECTION
SCALE 1:20

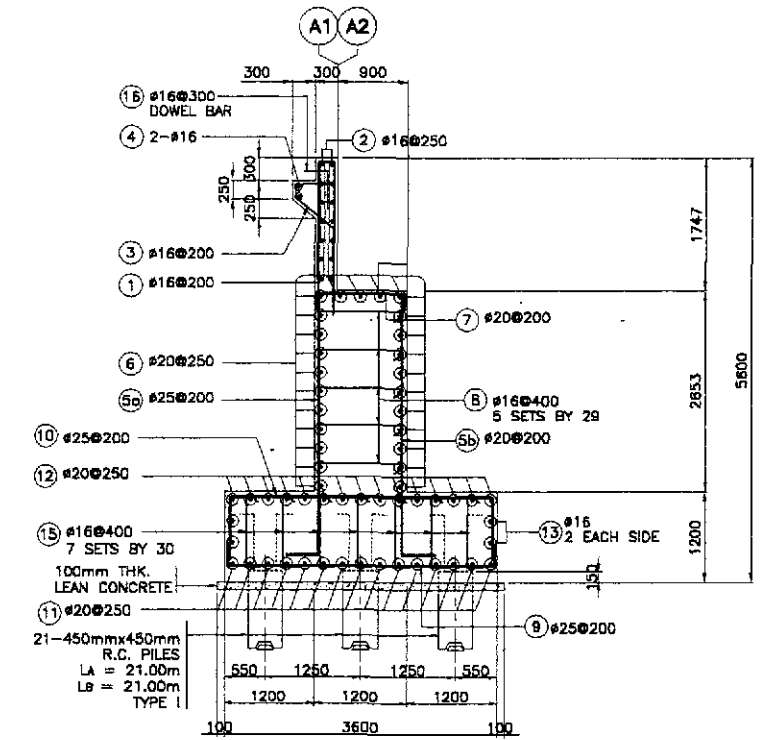
2 DETAIL OF END & INTERMEDIATE DIAPHRAGM
SCALE AS SHOWN

BAR BENDING DIAGRAM																
A							B									
SCHEDULE OF REINFORCEMENT																
STRUCTURE COMPONENT	LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT				LENGTH PER BAR (m)	TOTAL LENGTH (m)	UNIT WT. (kg/m)	TOTAL WEIGHT IN (kg)	REBAR RATIO (kg/m ³)
DIAPHRAGM	INTERMEDIATE DIAPHRAGM	4.90	D1	28	6	AS SHOWN	A	9400				9400	37.60	4.833	182	140.34
			D2	28	16	AS SHOWN	A	2145				2145	34.32	4.833	166	
			D3	28	16	AS SHOWN	A	2145				2145	34.32	4.833	166	
			D4	12	56	250	B	150	1200	150		3000	168.00	0.888	150	
	END DIAPHRAGM	6.29	D5	28	4	AS SHOWN	A	9400				9400	37.60	4.833	182	
			D6	28	32	AS SHOWN	A	1840				1840	58.88	4.833	285	
			D7	28	16	AS SHOWN	A	1840				1840	29.44	4.833	143	
D8	12	56	250	B	200	1550	150		3800	212.80	0.888	189				
TOTAL	11.18															
GRADE 60 TOTAL = 1,124 kgs.																
GRADE 40 TOTAL = 362 kgs.																

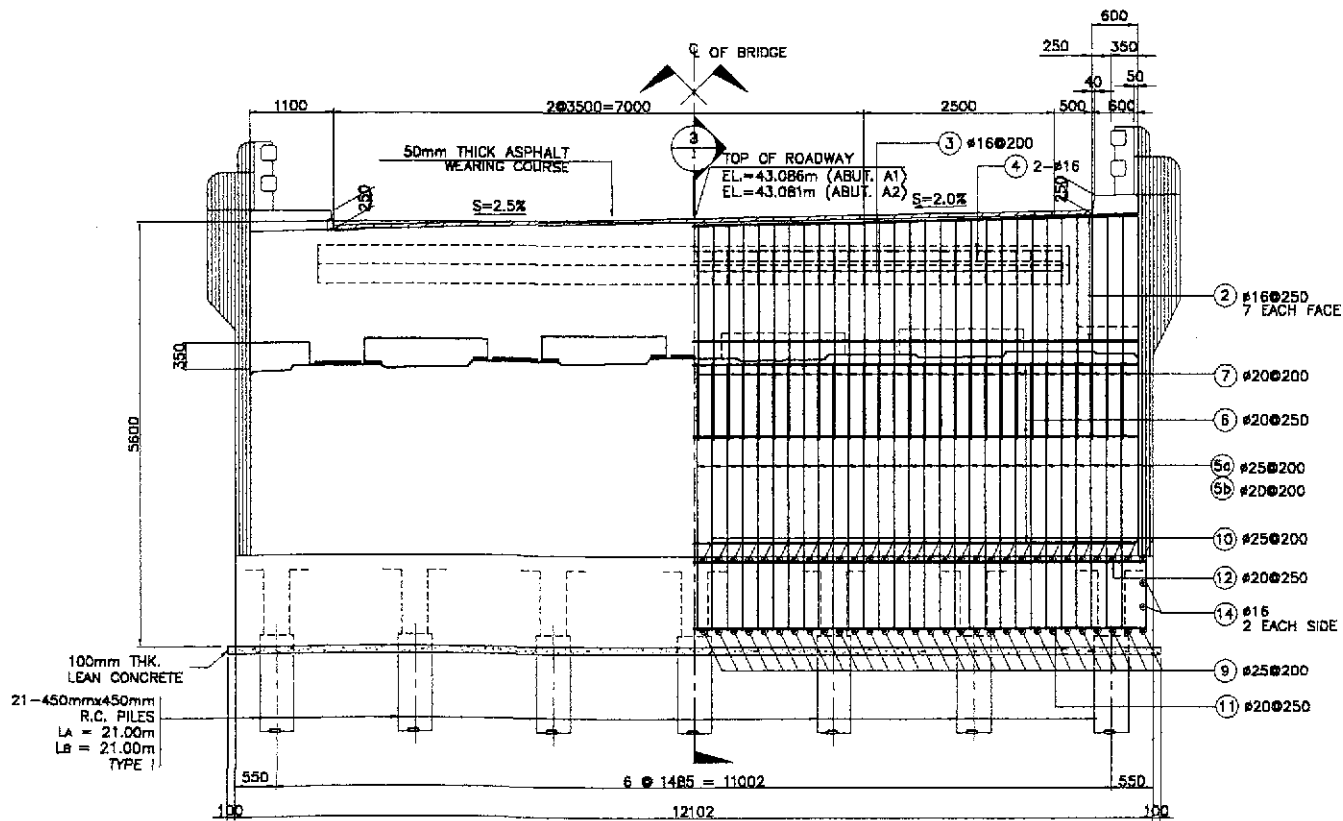
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE IV	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BRIDGE NO.13 CONCRETE POURING SEQUENCE AND DIAPHRAGM DETAILS (ULTIMATE STAGE)	SHEET NO. : B13-04	
	CHECKED	10/19/02	<i>[Signature]</i>		BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO Project Director	OFFICE OF THE SECRETARY Reviewed By: ADRIANO M. DOROY Chief, Bridges Division	Recommended By: GILBERTO S. REYES Director N (OIC)	Approved By: MANUEL M. BONDAN Undersecretary					Approved By: SIMEON A. DATUMANONG Secretary
	SUBMITTED	10/21/02	<i>[Signature]</i>		Submitted By: DANILLO C. TRAJANO Project Director	Reviewed By: ADRIANO M. DOROY Chief, Bridges Division	Recommended By: GILBERTO S. REYES Director N (OIC)	Approved By: MANUEL M. BONDAN Undersecretary					Approved By: SIMEON A. DATUMANONG Secretary



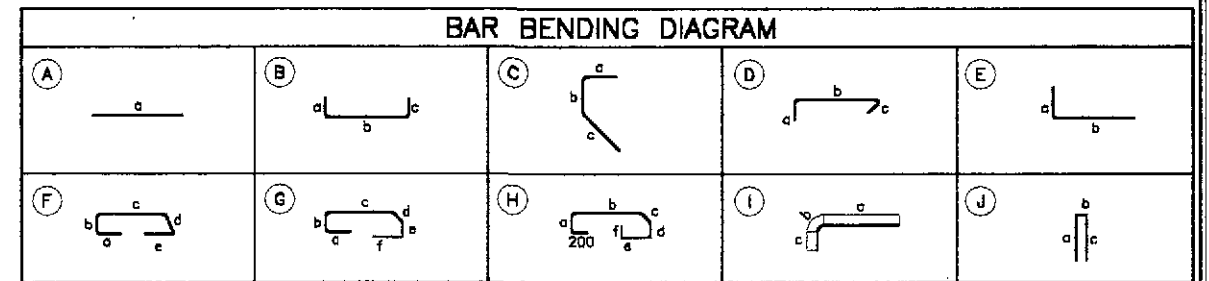
1 PLAN
SCALE 1:50



3 SECTION
SCALE 1:50

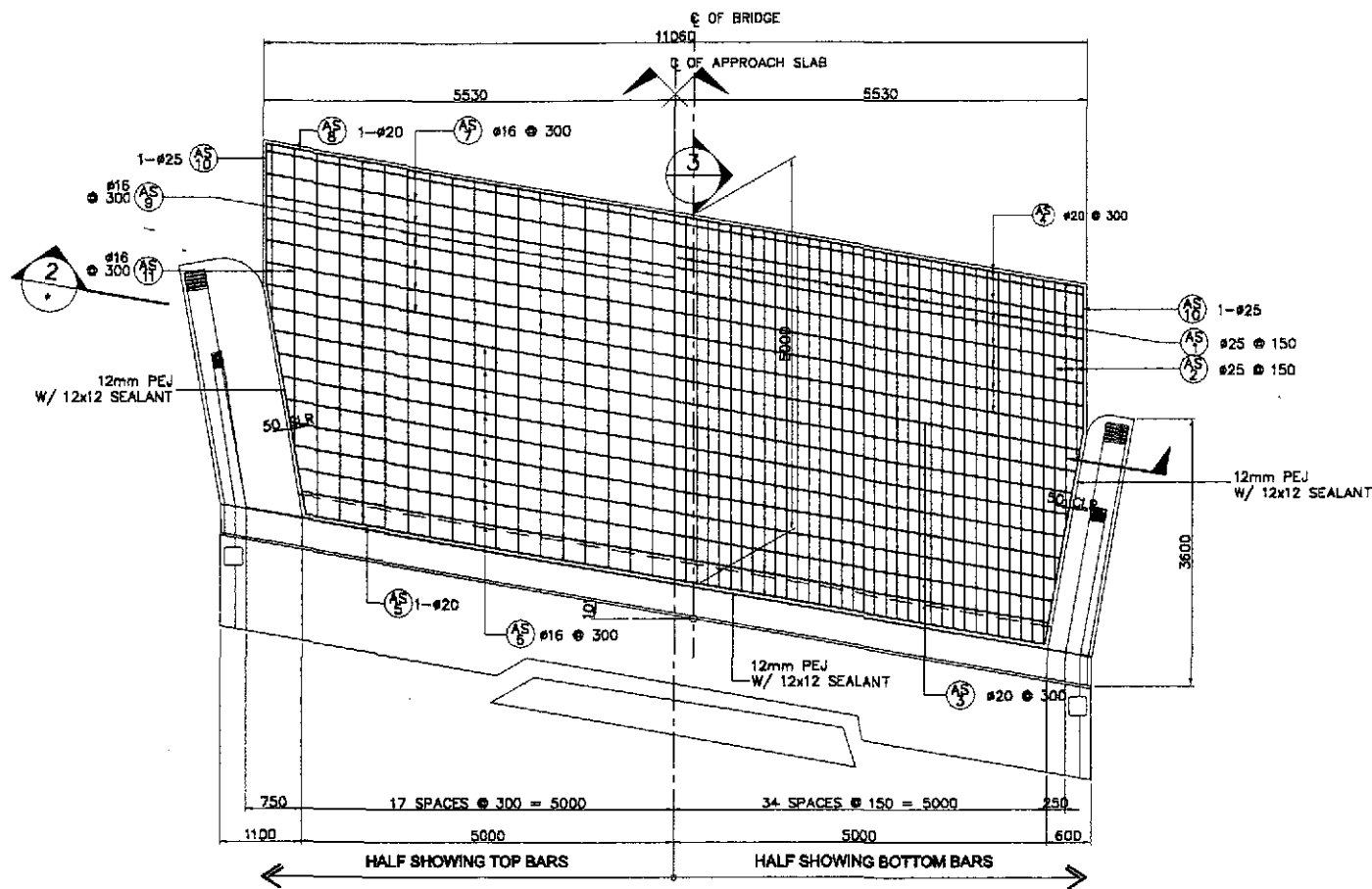


2 ELEVATION
SCALE 1:50

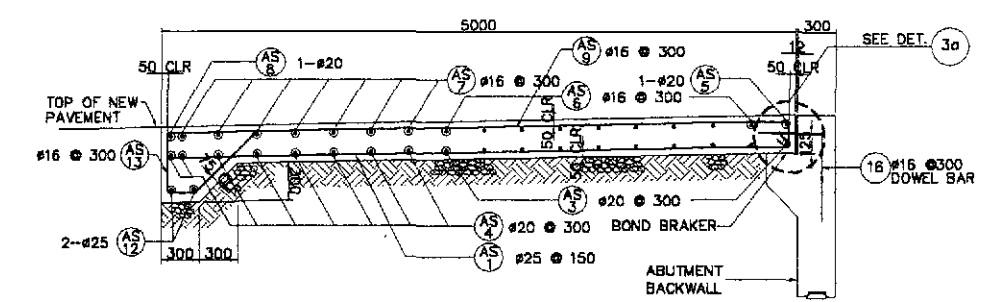


SCHEDULE OF REINFORCEMENT PER ABUTMENT																	
LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT					EA. BAR LENGTH (mm)	TOTAL LENGTH (m)	UNIT WT. (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/m ³)	
							a	b	c	d	e						f
BACKWALL	7.26	1	16	59	200	B	2000	200	2000	-	-	-	4200	247.80	1.579	392	111.07
		2	16	14	250	A	11800	-	-	-	-	-	11800	165.20	1.579	261	
		3	16	51	200	C	800	150	750	-	-	-	1500	78.50	1.579	121	
		4	16	2	AS SHOWN	A	10050	-	-	-	-	-	10050	20.18	1.579	32	
MAINWALL	37.25	5a	25	59	200	E	400	3600	-	-	-	4000	236.00	3.854	910	75.71	
		5b	20	59	200	E	400	3600	-	-	-	4000	236.00	2.466	582		
		6	20	25	250	A	11800	-	-	-	-	-	11800	295.00	2.466		724
		7	20	59	200	B	250	1100	250	-	-	-	1800	94.40	2.466		233
FOOTING	52.28	8	16	145	400	D	250	1100	250	-	-	1600	232.00	1.579	367	74.67	
		9	25	61	200	B	700	3450	700	-	-	-	4850	295.85	3.854		1141
		10	25	61	200	B	700	3450	700	-	-	-	4850	295.85	3.854		1141
		11	20	15	250	B	700	12200	700	-	-	-	13600	204.00	2.466		504
		12	20	15	250	B	700	12200	700	-	-	-	13600	204.00	2.466		504
		13	16	4	AS SHOWN	A	12200	-	-	-	-	-	12200	48.80	1.579		78
DOWEL		14	16	4	AS SHOWN	A	3450	-	-	-	-	3450	13.80	1.579	22		
		15	16	210	400	D	250	1050	250	-	-	-	1550	325.50	1.579		514
TOTAL	98.79																GRADE 40 TOTAL = 1,849 kgs. GRADE 60 TOTAL = 5,743 kgs.

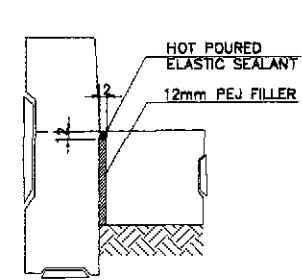
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE IV	SCALE : 1:50 FULL SIZE A1	SHEET CONTENTS : BRIDGE NO. 13 ABUTMENT A1 & A2 MAINWALL REINFORCEMENT DETAILS (ULTIMATE STAGE)	SHEET NO. : B13-05
	CHECKED	10/17/02	A.P. GONZALES		Submitted By:	Reviewed By:	Recommended By:	Approved By:				
	SUBMITTED	10/21/02	M. KUBAYASHI		DANILO C. TRAJANO Project Director	ADRIANO M. DOROS Chief, Bridge Division	GILBERTO S. REYES Director IV (OIC)	MANUEL M. BONGAN Undersecretary				



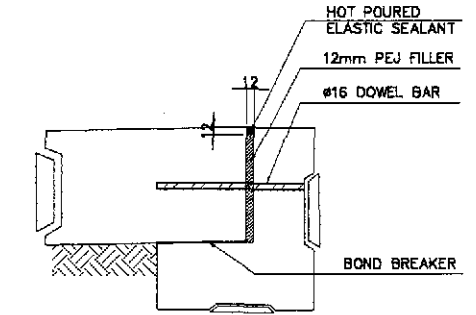
1 PLAN
SCALE 1:50



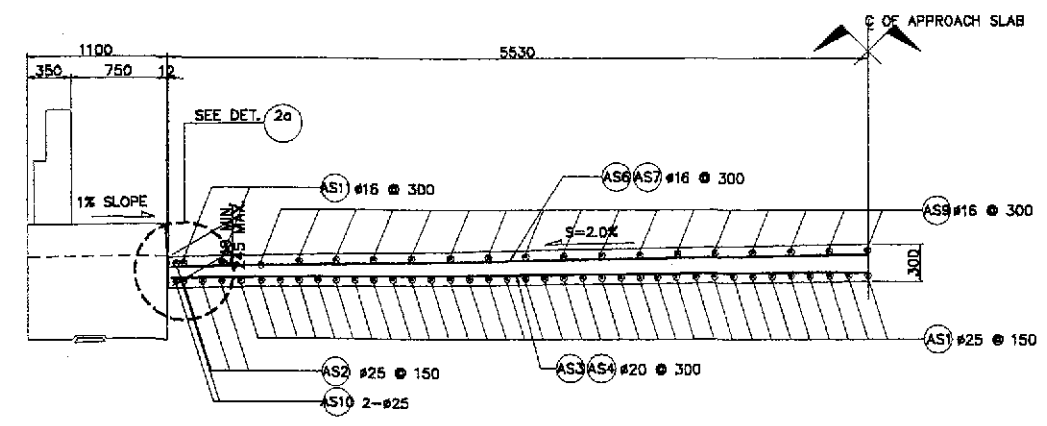
3 SECTION
SCALE 1:30



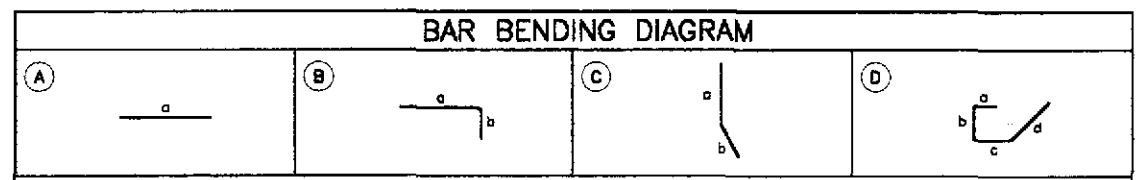
2a DETAIL
SCALE 1:10



3a DETAIL
SCALE 1:10

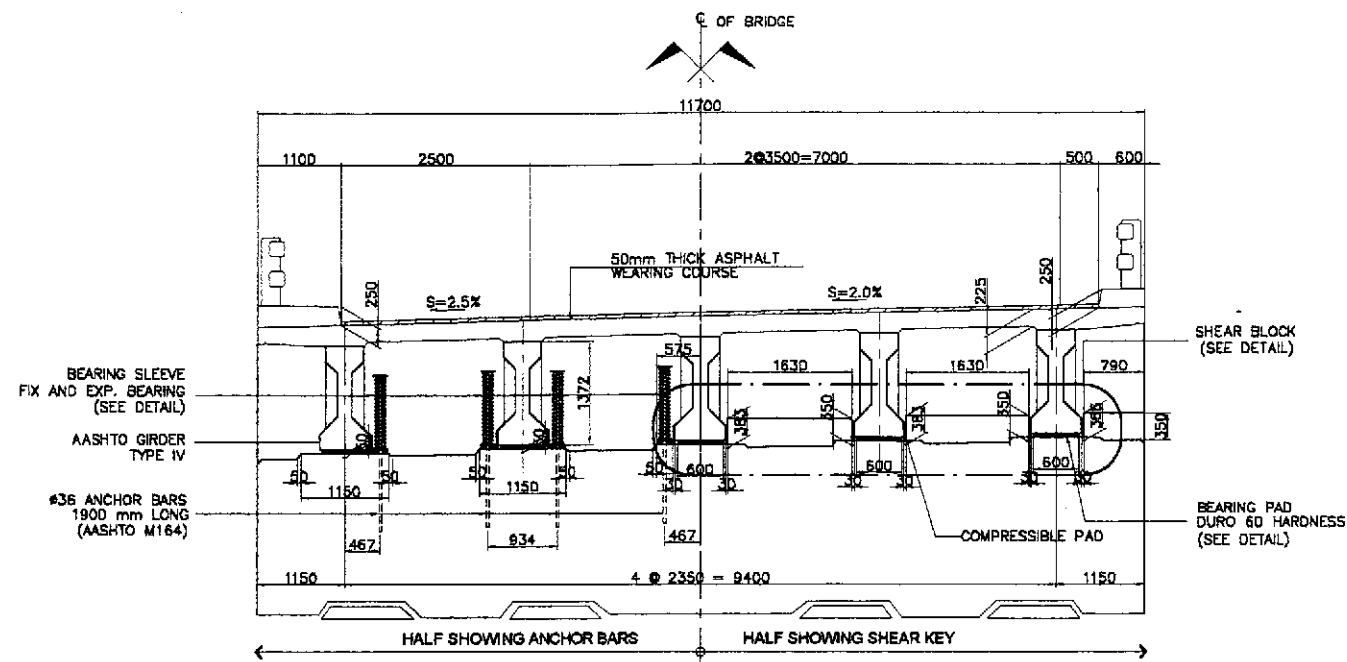


2 SECTION
SCALE 1:30

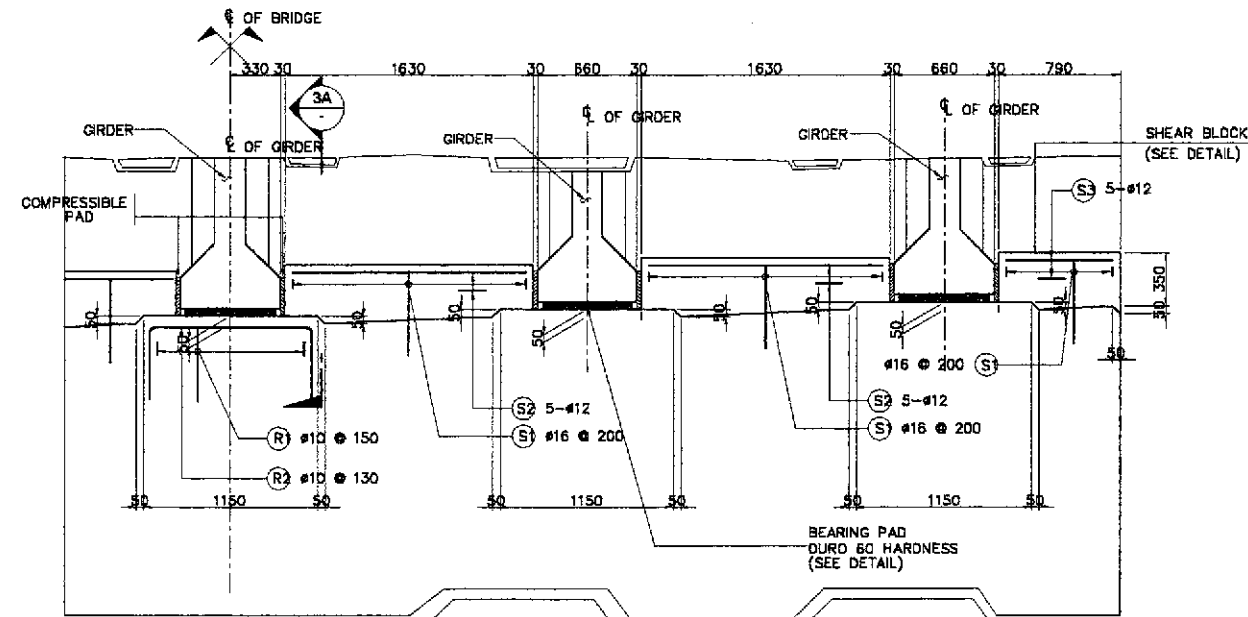


SCHEDULE OF REINFORCEMENT PER APPROACH SLAB																
LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT					LENGTH EA. BAR (mm)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/cu.m)
							a	b	c	d	e					
APPROACH SLAB	17.61	AS1	25	68	150	(B)	4900	200	-	-	-	5100	346.80	3.854	1337	159.55
		AS2	25	6	150	(B)	3250	200	-	-	-	3450	20.70	3.854	80	
		AS3	20	10	300	(A)	10700	-	-	-	-	10700	107.00	2.466	264	
		AS4	20	8	300	(A)	11300	-	-	-	-	11300	90.40	2.466	223	
		AS5	20	1	AS SHOWN	(A)	10150	-	-	-	-	10150	10.15	2.466	25	
		AS6	16	9	300	(A)	10800	-	-	-	-	10800	97.20	1.579	154	
		AS7	16	7	300	(A)	11800	-	-	-	-	11800	78.10	1.579	125	
		AS8	20	1	AS SHOWN	(A)	11300	-	-	-	-	11300	11.30	2.466	28	
		AS9	16	34	300	(B)	4900	200	-	-	-	5100	173.40	1.579	274	
		AS10	25	4	AS SHOWN	(C)	2000	3100	-	-	-	5100	20.40	3.854	79	
		AS11	16	4	300	(B)	3150	200	-	-	-	3350	13.40	1.579	22	
		AS12	25	2	AS SHOWN	(A)	11300	-	-	-	-	11300	22.60	3.854	88	
		AS13	16	38	300	(D)	400	500	200	700	-	1800	68.40	1.579	109	
		TOTAL	17.61													

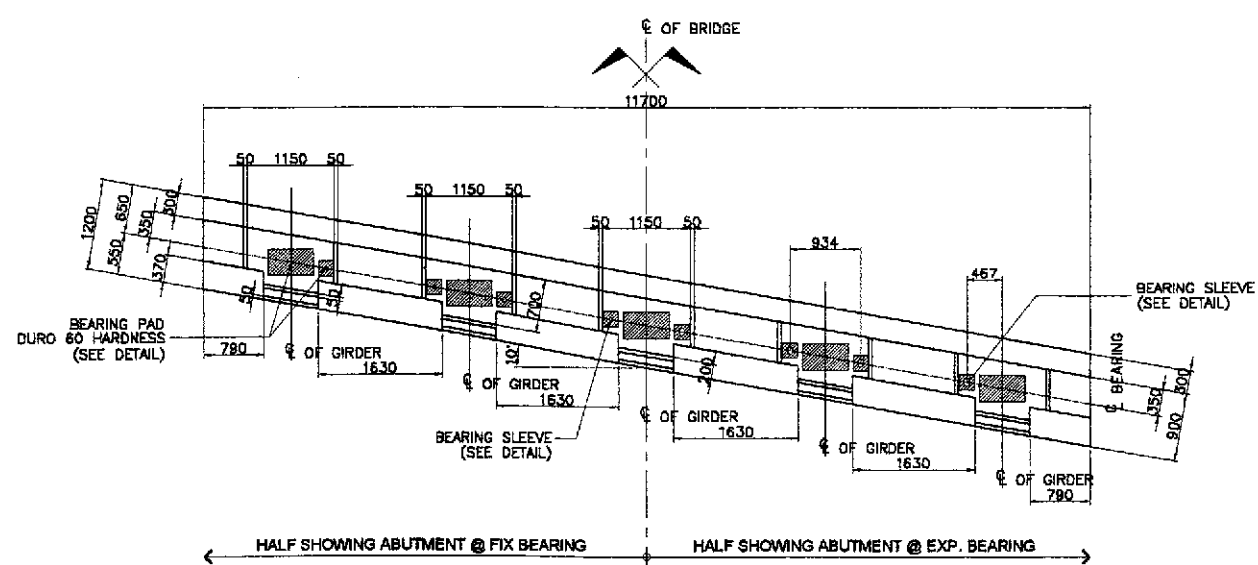
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/17/02	<i>[Signature]</i>		BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 13 APPROACH SLAB PLAN, SECTIONS & DETAIL (ULTIMATE STAGE)	B13-07
	SUBMITTED	10/19/02	<i>[Signature]</i>		OFFICE OF THE SECRETARY				CABANATUAN BYPASS - CONTRACT PACKAGE IV	FULL SIZE A1		
		10/21/02	<i>[Signature]</i>									
			Submitted By: DANILLO C. TRAJANO, Project Director Reviewed By: ADRIANO M. DOROY, Chief, Bridges Division Recommended By: GILBERTO S. REYES, Director IV (OIC) Recommended By: MANUEL M. BONDAN, Undersecretary Approved By: SIMON A. DATUMANONG, Secretary									



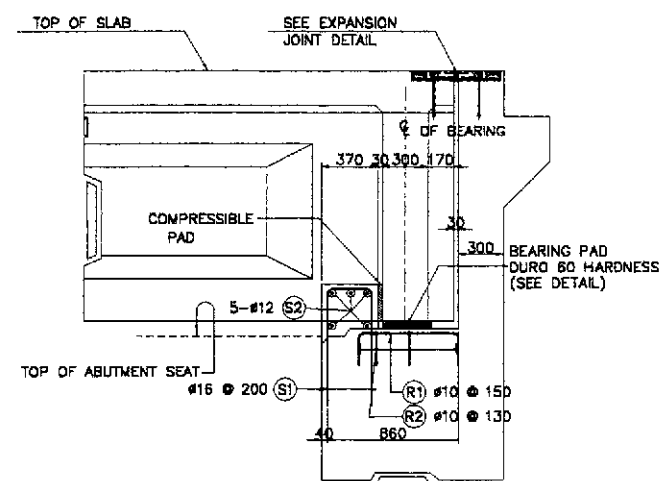
1 SECTION AT ABUTMENT SEAT
SCALE 1:50



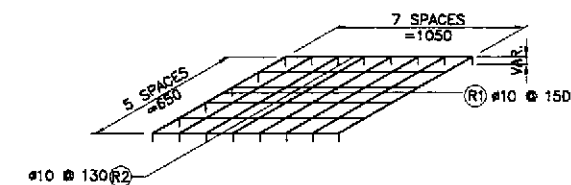
3 SHEAR BLOCK DETAIL
SCALE 1:25



2 PLAN AT ABUTMENT SEAT
SCALE 1:50



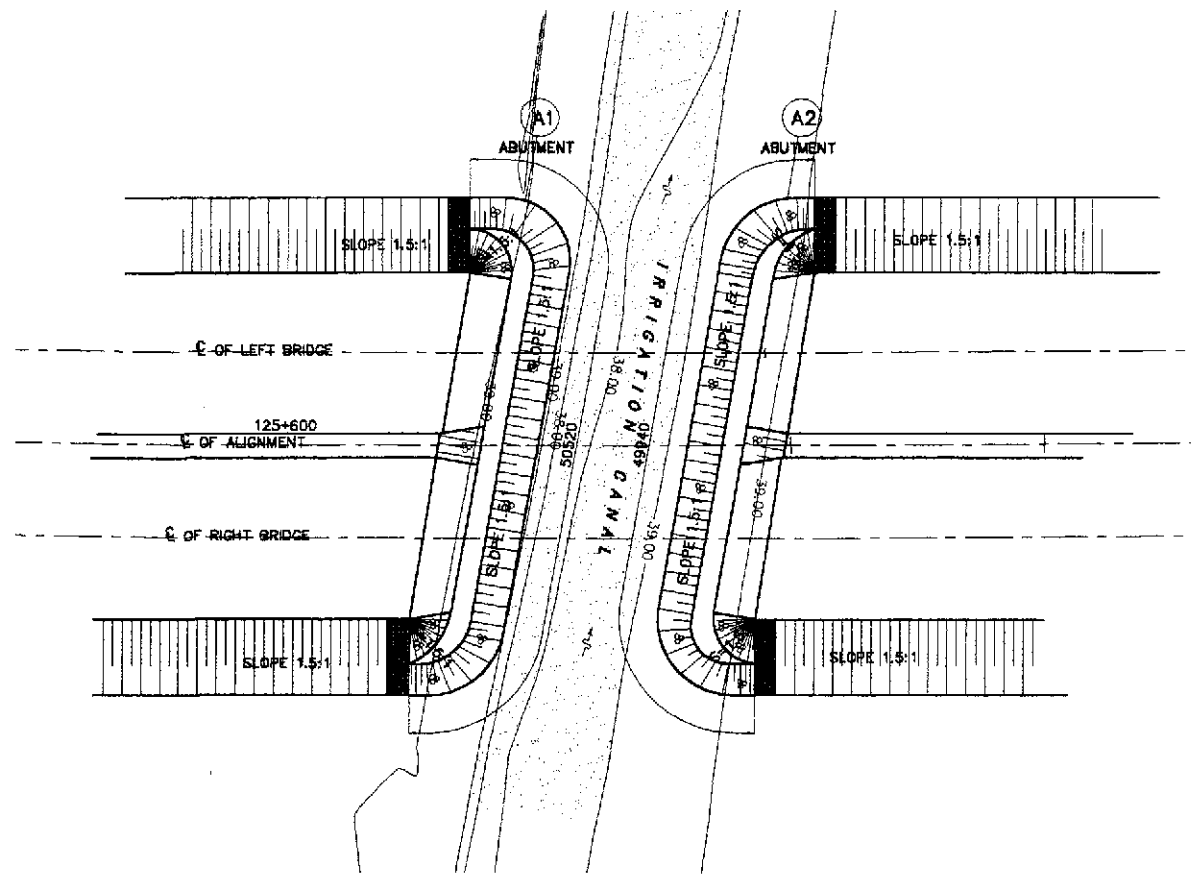
3A SECTION
SCALE 1:25



4 RISER REINFORCEMENT
NOT TO SCALE

BAR BENDING DIAGRAM																
A							B									
a							b									
SCHEDULE OF REINFORCEMENT																
LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSION (mm) OUT TO OUT					LENGTH EACH BAR (m)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/m ³)
							a	b	c	d	e					
SHEAR KEY & RISER	1.55	S1	16	46	200	(B)	560	290	580			1410	6486	1.579	103	147.28
		S2	12	20	AS SHOWN	(A)	1575					1575	31.50	0.888	28	
		S3	12	10	AS SHOWN	(A)	720					720	7.20	0.888	7	
		R1	10	40	150	(B)	500	660	500			1560	66.40	0.616	41	
		R2	10	30	130	(B)	500	1070	500			2070	62.10	0.616	39	
TOTAL	1.55															GRADE 40 TOTAL = 218 kgs.

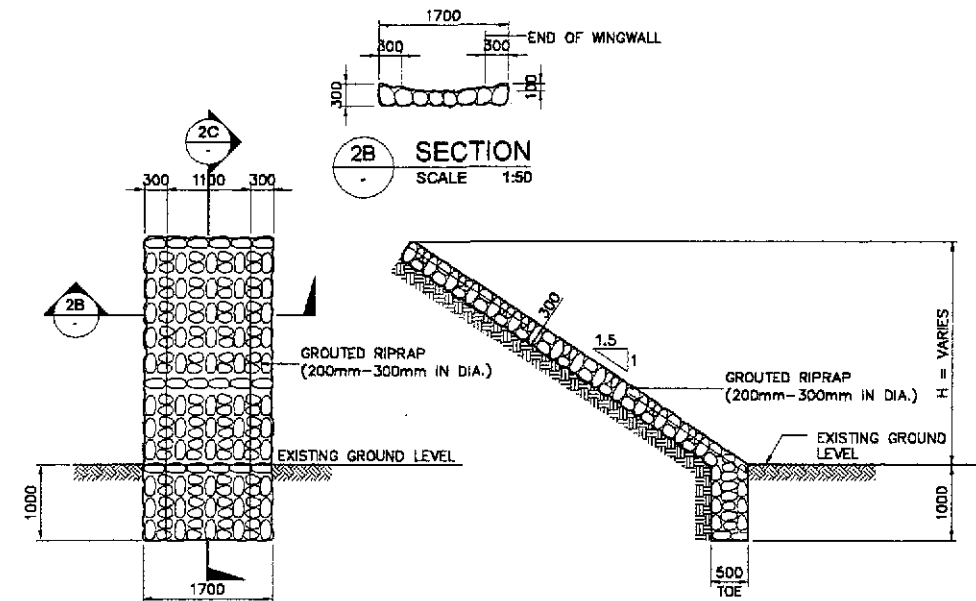
THE REINFORCEMENT SHOWN ON THIS TABLE IS FOR REFERENCE ONLY. THE CONTRACTOR SHOULD CHECK AND VERIFY ALL DIMENSIONS, SIZES AND QUANTITIES OF REINFORCEMENT.



1A PLAN
SCALE 1:300

GENERAL NOTES:

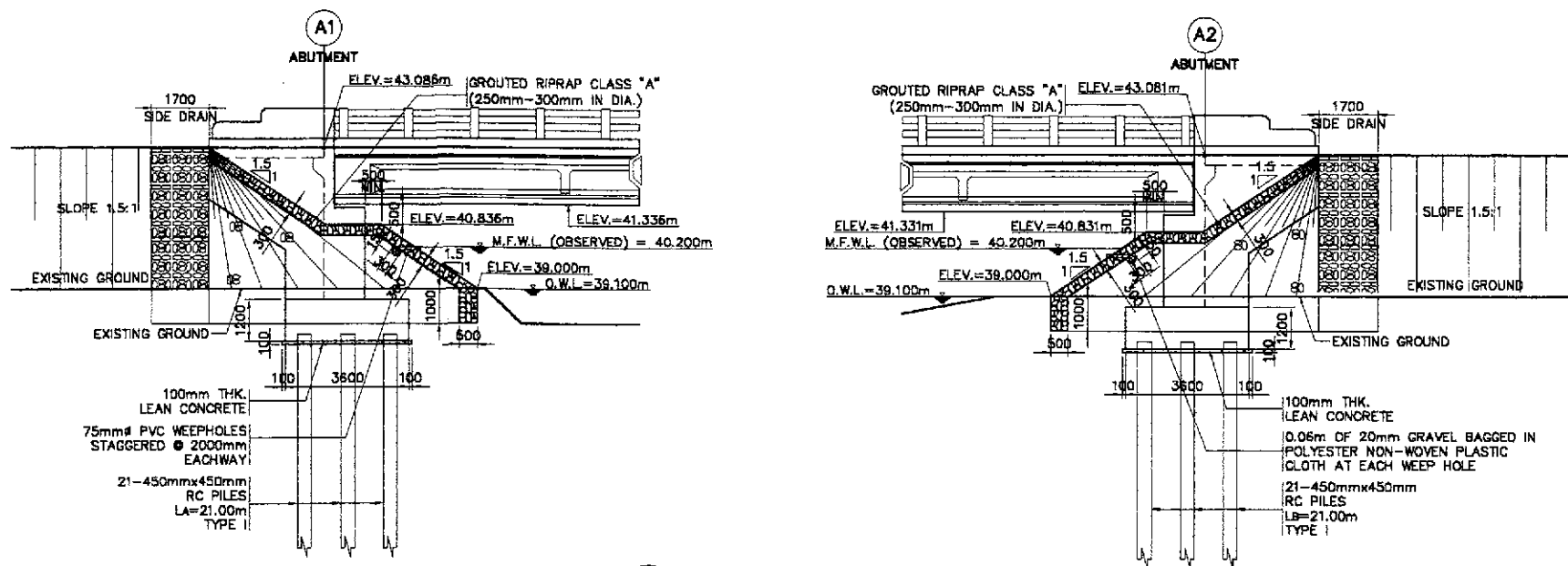
1. GROUTED RIPRAP (250mm-300mm DIA.) SHALL BE USED FOR THE FACING AND SHALL BE CAREFULLY HANDLAID WITH THE LONGEST DIMENSIONS PERPENDICULAR TO THE SLOPE AND FIRMLY BEDDED INTO THE SLOPE AND ADJACENT TO THE ADJOINING BOULDERS SPACED BETWEEN THE BOULDERS. THE SPACE BETWEEN THE BOULDERS SHALL BE COMPLETELY FILLED WITH MORTAR. THE OUTSIDE SURFACE OF THE BOULDERS SHALL BE LEFT EXPOSED AND THE SURFACE OF THE MORTAR SHALL BE SWEEPED WITH A STIFF BRUSH.
2. GEOTEXTILE
THE FOLLOWING SPECIFICATIONS ARE REQUIRED:
 1. POLYESTER OR POLYPROPYLENE - 100%
 2. MECHANICALLY BONDED/HEAT BONDED
 3. NON-WOVEN
 4. EFFECTIVE OPENING SIZE - 110 MICRONS (MAX.)
 5. THICKNESS UNDER PRESSURE - 0.80mm (MIN.)
 6. WEIGHT - 200g/sq. m. (MIN.)
 7. CBR PUNCTURE STRENGTH - 400N (MIN.)
 8. MULTI-DIRECTIONAL TENSILE STRENGTH - 13KN/m
3. GRAVEL FILTER SHALL BE COARSE AGGREGATES MATERIALS WHICH SATISFY THE REQUIREMENTS FOR ITEM 405, STRUCTURAL CONCRETE, GRADING B OF TABLE 405.1 AS REVISED.
4. NO CONCRETING UNDER WATER SHALL BE PERMITTED.
5. PROVIDE 1.0 m BERM WHEN HEIGHT (H) IS > 4.0 m.



2A ELEVATION
SCALE 1:50

2C SECTION
SCALE 1:50

2 TYPICAL SIDE DRAIN DETAIL
SCALE AS SHOWN



1B ELEVATION
SCALE 1:100

1 ABUTMENT SLOPE PROTECTION
SCALE AS SHOWN

VELOCITY (m/sec)	ROCK SIZE (mm)	
	VERY TURBULENT FLOW	SMOOTH FLOW
1.00	40	-
1.50	135	-
2.00	170	-
2.50	255	137
3.00	370	197
3.50	515	270
4.00	690	350
4.50	825	425
5.00	>900	590

LOCATION	SIZES	PER ABUTMENT QUANTITY	
		ABUT. A1	ABUT. A2
SIDE DRAIN	200mm-300mm IN DIA.	10.28 cu. m.	10.77 cu. m.
GROUTED RIPRAP	250mm-300mm IN DIA.	53.88 cu. m.	53.88 cu. m.

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YEO YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

BUREAU OF DESIGN
OFFICE OF THE SECRETARY

DESIGNED: P. GONZALES
CHECKED: [Signature]
SUBMITTED: [Signature]

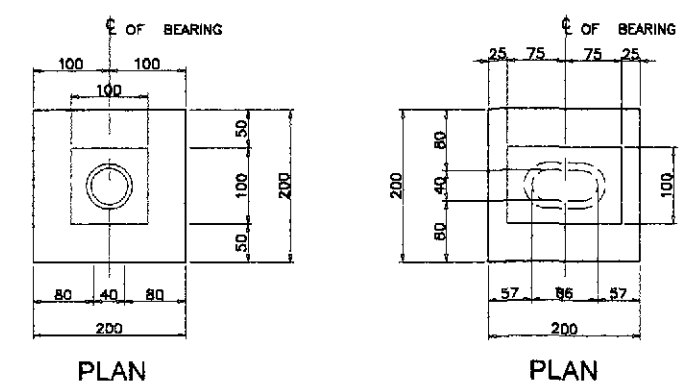
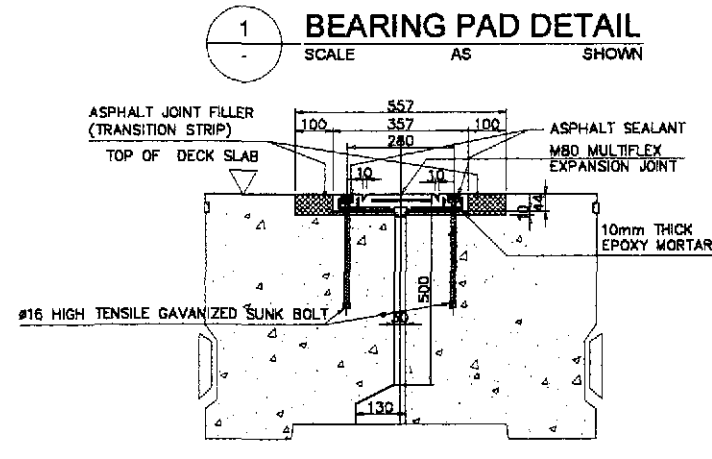
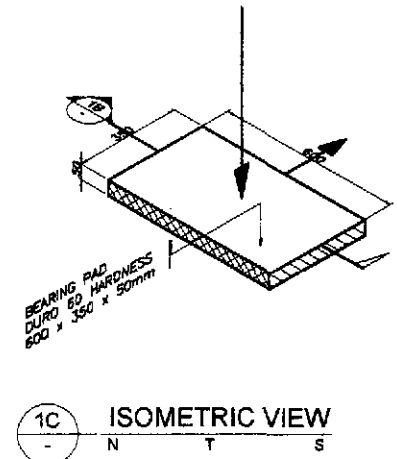
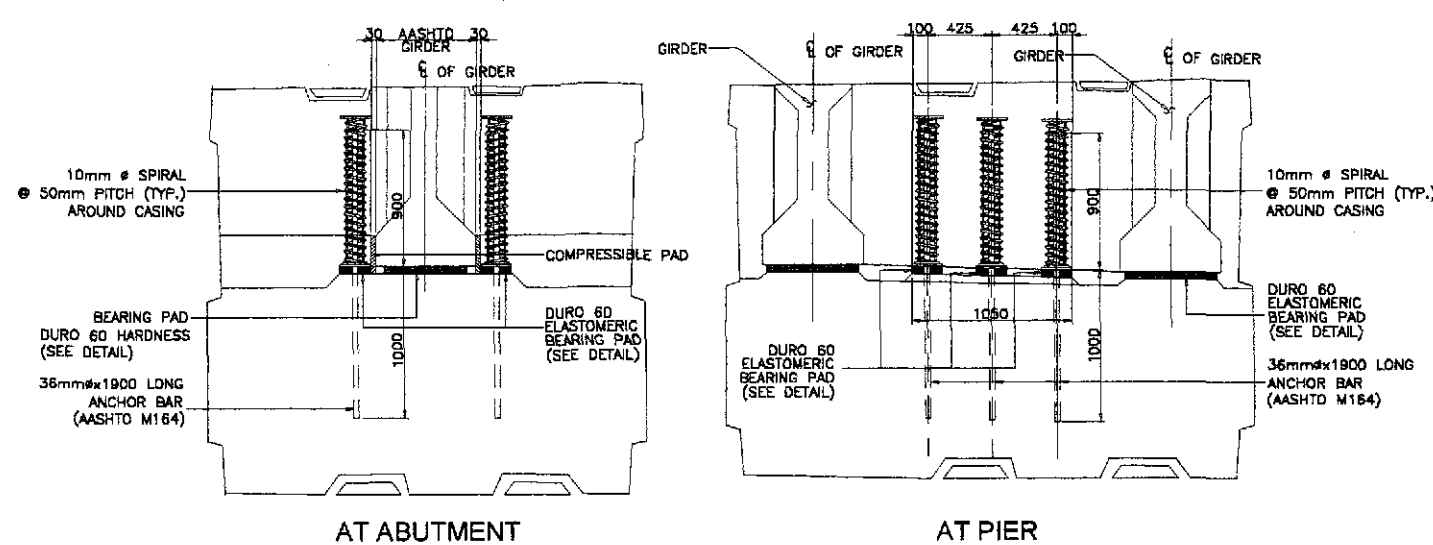
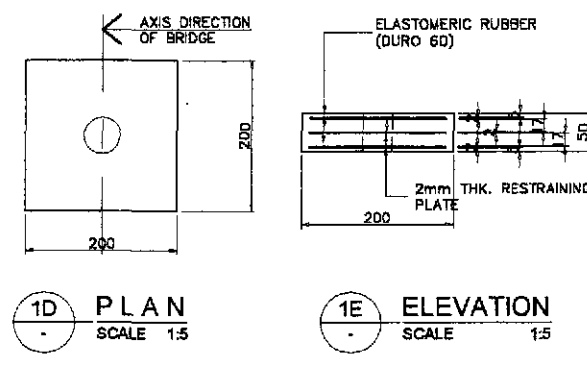
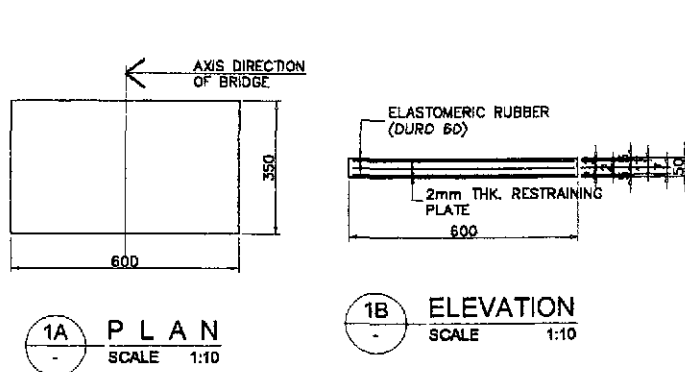
Submitted By: DANILLO C. TRAJANO
Reviewed By: PERFECTO L. ZAPLAN JR.
Recommended By: GILBERTO S. REYES
Recommended By: MANUEL M. BONDAN
Approved By: SIMEON A. DATUMANONG

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(Plaridel, Cabanatuan and San Jose Bypasses)
CABANATUAN BYPASS - CONTRACT PACKAGE IV

SCALE :
AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 13
ABUTMENT PROTECTION
AND SIDE DRAIN DETAILS
(ULTIMATE STAGE)

SHEET NO. :
B13-09



A.) QUALITY TESTING OF RUBBER COMPOUND

PROPERTIES	SPECIFICATION
HARDNESS (SHORE A)	50 ± 5
TENSILE STRENGTH (MPa)	13 MIN
ELONGATION AT BREAK (%)	400 MIN
COMPRESSION SET (AFTER 22h at 70°C)	20% MAX
OZONE RESISTANCE (AFTER 72h at 40°C, 20% STRAIN 10D pphm)	NO CRACK
OIL RESISTANCE IN ASTM NO. 3 OIL (168h at 25°C VOLUME CHANGE)	15% MAX

B.) DIMENSION CHECK ON METAL PLATES

DIMENSION	SPECIFICATION
LENGTH	± 1
WIDTH	0 TO -1.5 MIN
THICKNESS	±0.5 MIN

C.) QUALITY CHECK

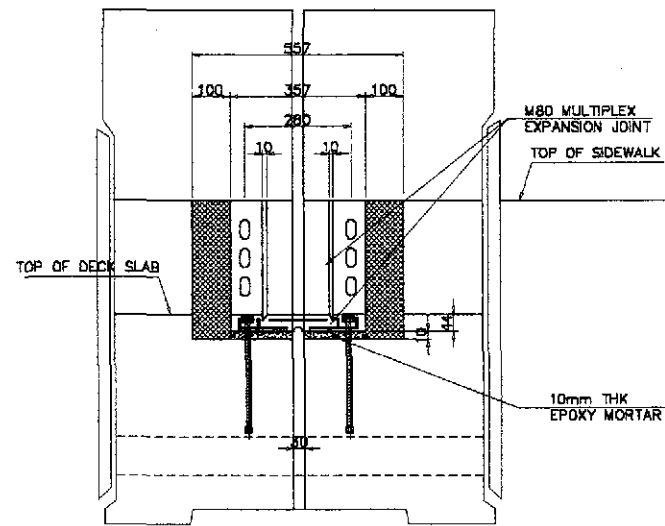
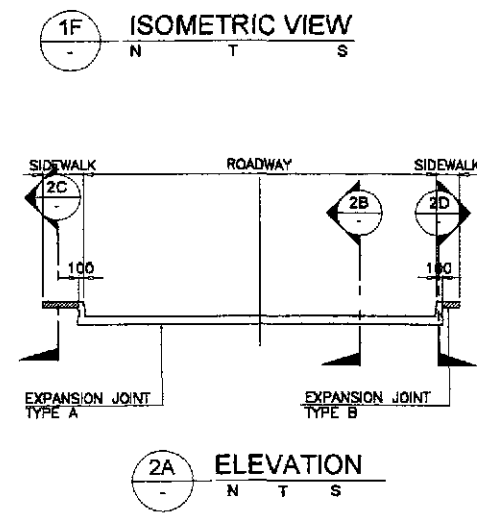
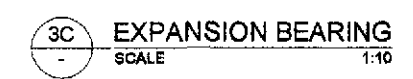
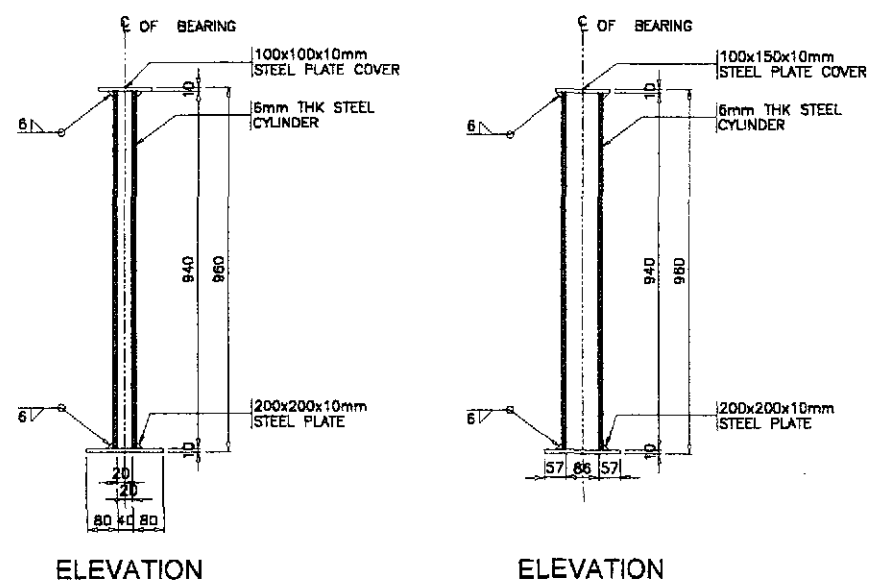
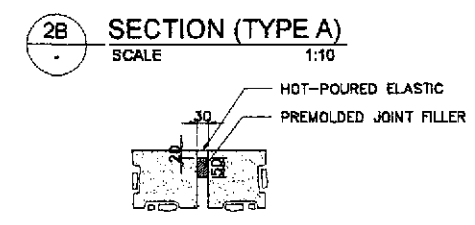
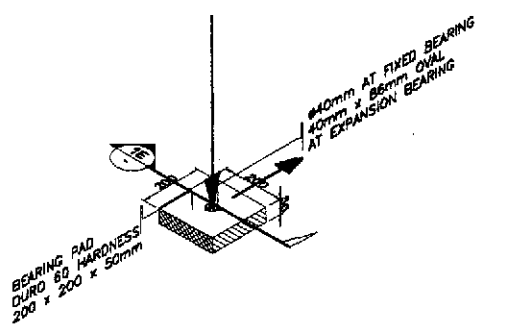
PROPERTY	SPECIFICATION
DIMENSION	ACCORDING TO PRODUCT DRAWING
SURFACE APPEARANCE	NO VISIBLE CRACK
RUBBER COVER HARDNESS (SHORE A)	50 ± 5

INSTALLATION MATERIALS

- EPOXY BEDDING
- EPOXY NOSING
- BOLT/NUTS
- SEALANT

LOCATION	EXPANSION JOINT TYPE	MOVEMENT (mm)	LENGTH (m)
BRIDGE 11	MULTIFLEX 80	30	26
BRIDGE 12	MULTIFLEX 80	30	26
BRIDGE 13	MULTIFLEX 80	30	26

LOCATION	ELASTOMERIC BEARING PAD SIZE	QUANTITY
BRIDGE 11	800x350x50	10 PCS.
	200x200x50	16 PCS.
BRIDGE 12	600x350x50	30 PCS.
	200x200x50	52 PCS.
BRIDGE 13	600x350x50	10 PCS.
	200x200x50	16 PCS.



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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
CABANATUAN BYPASS - CONTRACT PACKAGE IV

SCALE: AS SHOWN / FULL SIZE A1

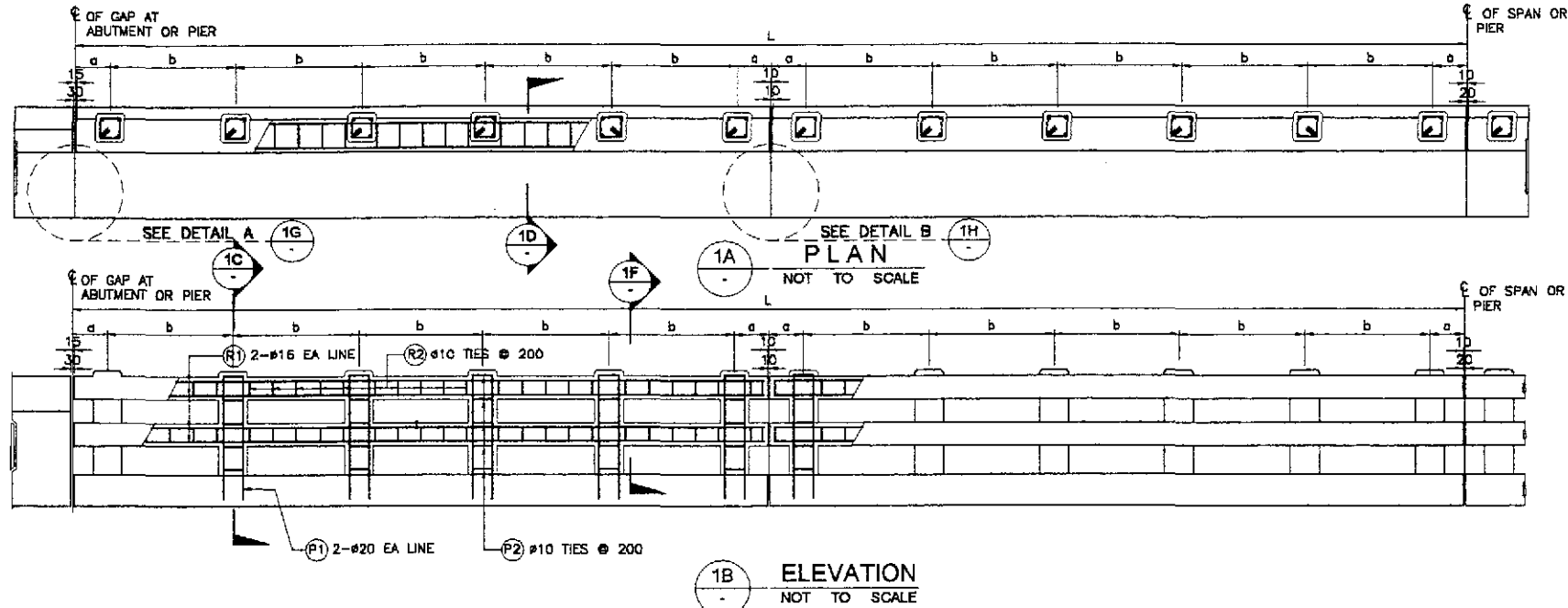
SHEET CONTENTS: BRIDGE NO. 11, 12, & 13 TYP. BEARING PAD, EXPANSION JOINT, BEARING SLEEVE & ANCHOR BAR DET. (ULTIMATE STAGE)

SHEET NO.: BS-01

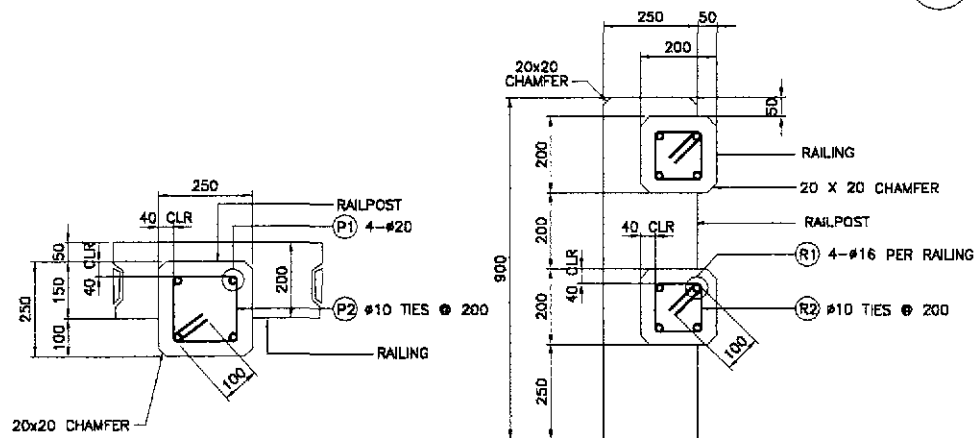
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			10/19/02	[Signature]
			10/21/02	[Signature]

DESIGNED	CHECKED	SUBMITTED	DATE	SIGNATURE
			10/17/02	[Signature]
			10/19/02	[Signature]
			10/21/02	[Signature]

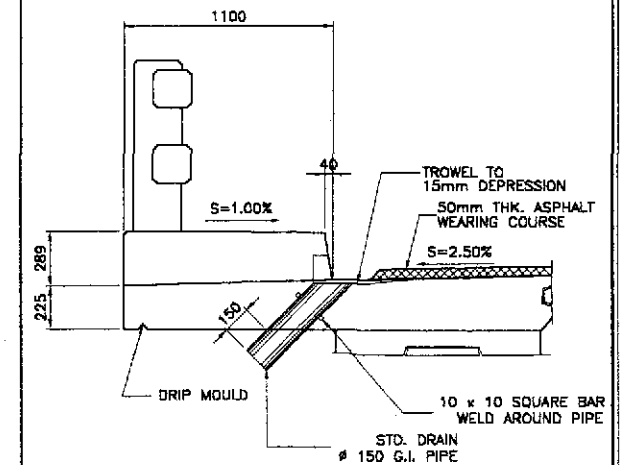
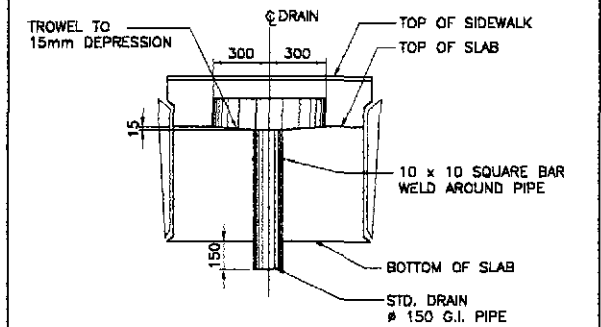
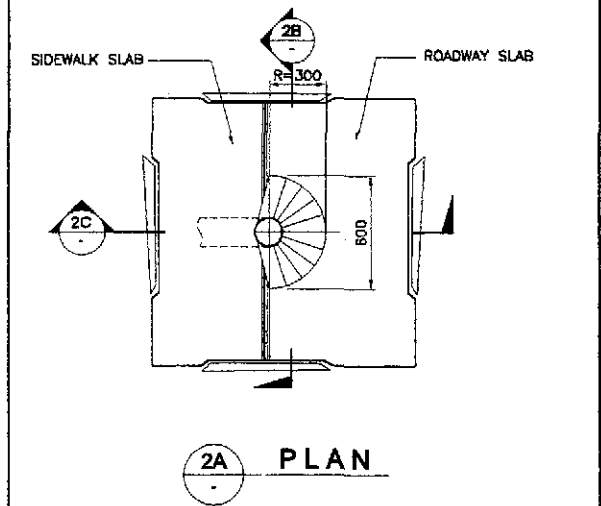
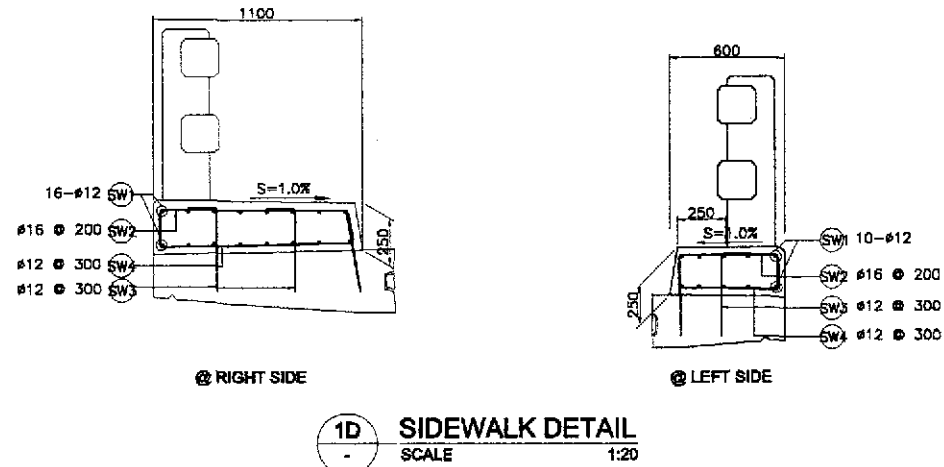
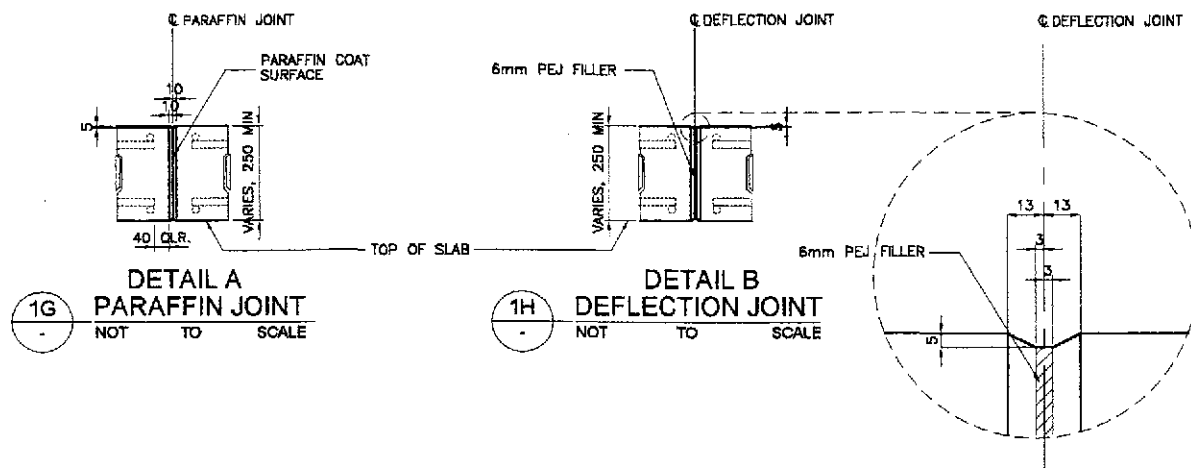
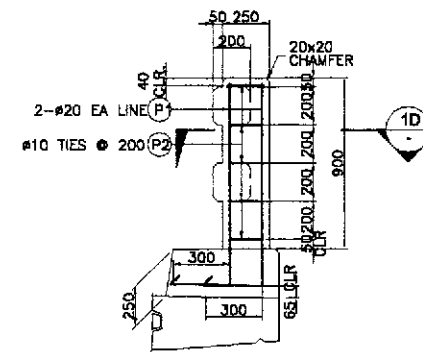
DESIGNED	CHECKED	SUBMITTED	DATE	SIGNATURE
			10/17/02	[Signature]
			10/19/02	[Signature]
			10/21/02	[Signature]



NOTE :
SIDEWALK SHALL BE PLACED AFTER THE SHORING UNDER THE SUPERSTRUCTURE HAS BEEN RELEASED SUFFICIENTLY TO PERMIT THE SPANS TO ATTAIN FULL DEAD LOAD DEFLECTION.



NOTE :
FOR LOCATION OF JOINTS SEE GENERAL PLAN OF BRIDGE.



1 TYPICAL RAILING AND SIDEWALK DETAILS SCALE AS SHOWN

2 TYPICAL DRAIN DETAILS SCALE 1:20

	DESIGNED	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Paridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE IV	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BRIDGE 11, 12 & 13 TYPICAL SIDEWALK, RAILING AND DRAIN DETAILS (ULTIMATE STAGE)	SHEET NO. : BS-02		
	CHECKED	10/19/02	<i>[Signature]</i>	PUHL - PMO Submitted By:	BUREAU OF DESIGN Reviewed By:	OFFICE OF THE SECRETARY Recommended By:						
	SUBMITTED	10/21/02	<i>[Signature]</i>	DANLO C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridges Division	GILBERTO S. REYES Director IV (D/C)					Recommended By: (See cover sheet for Signature/Approve) MANUEL M. BONDAN Undersecretary	Approved By: (See cover sheet for Signature/Approve) SIMEON A. DATUMANONG Secretary
				TEAM LEADER								

BAR BENDING DIAGRAM																	
A		B		C		D		E									
SCHEDULE OF REINFORCEMENT (POST, RAILING AND SIDEWALK)																	
BRIDGE NO.	LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT					LENGTH EA. BAR (mm)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/m)
								a	b	c	d	e					
BRIDGE 11	POST	2.70	(P1)	20	182	AS SHOWN	(B)	1045	450	-	-	-	1495	287.04	2.466	708	310.74
			(P2)	10	240	200	(C)	170	170	100	-	-	880	211.20	0.616	131	
	RAILING	5.60	(R1)	16	16	AS SHOWN	(A)	35000	-	-	-	-	35000	560.00	1.579	885	206.07
			(R2)	10	640	200	(C)	120	125 (ave.)	100	-	-	680	435.20	0.616	269	
	SIDEWALK	14.88	(SW1)	12	26	AS SHOWN	(A)	35000	-	-	-	-	35000	910.00	0.888	809	132.24
			(SW2)	16	176	200	(D)	170	980	400	-	-	1550	272.80	1.579	431	
			(SW2a)	16	176	200	(D)	170	480	400	-	-	1050	184.80	1.579	282	
			(SW3)	12	353	300	(B)	400	250	-	-	-	650	229.45	0.888	204	
			(SW4)	12	118	300	(E)	170	1020	170	-	-	1360	160.48	0.888	143	
			(SW4a)	12	118	300	(E)	170	520	170	-	-	860	101.48	0.888	91	
TOTAL	23.18	GRADE 40 GRAND TOTAL = 3,255 kgs. GRADE 80 GRAND TOTAL = 708 kgs.															

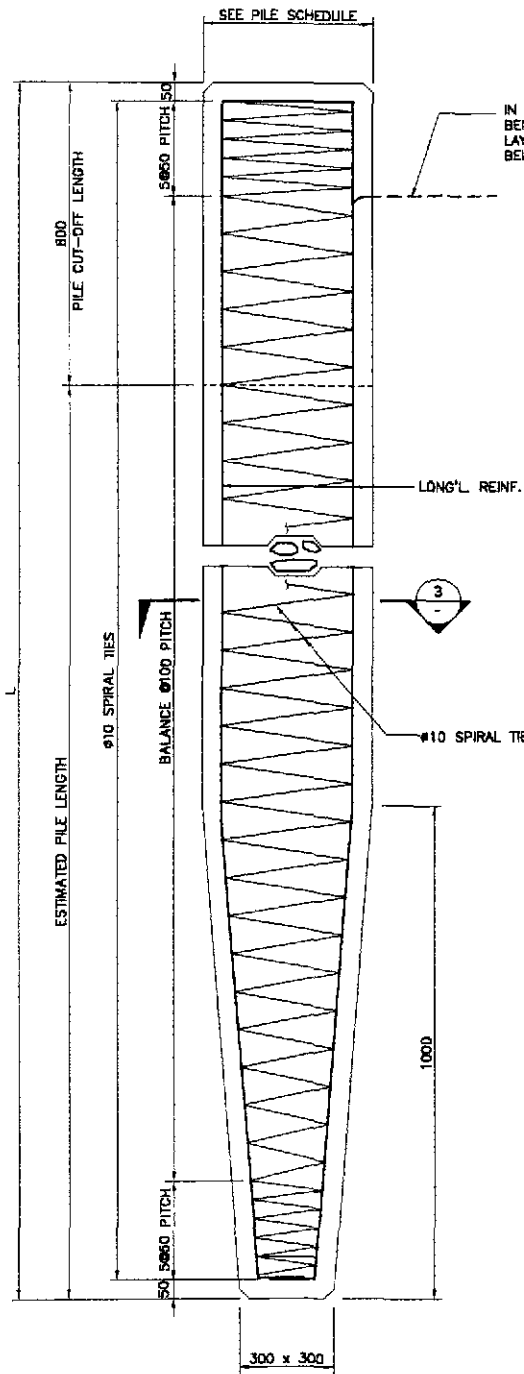
BAR BENDING DIAGRAM																	
A		B		C		D		E									
SCHEDULE OF REINFORCEMENT (POST, RAILING AND SIDEWALK)																	
BRIDGE NO.	LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT					LENGTH EA. BAR (mm)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/m)
								a	b	c	d	e					
BRIDGE 12	POST	8.10	(P1)	20	576	AS SHOWN	(B)	1045	450	-	-	-	1495	861.12	2.466	2124	310.52
			(P2)	10	720	200	(C)	170	170	100	-	-	880	633.60	0.616	391	
	RAILING	16.00	(R1)	16	16	AS SHOWN	(A)	101800	-	-	-	-	101800	1628.80	1.579	2572	210.31
			(R2)	10	1892	200	(C)	120	120	100	-	-	680	1286.56	0.616	793	
	SIDEWALK	43.27	(SW1)	12	26	AS SHOWN	(A)	101800	-	-	-	-	101800	2646.80	0.888	2351	131.88
			(SW2)	16	510	200	(D)	170	980	400	-	-	1550	790.50	1.579	1249	
			(SW2a)	16	510	200	(D)	170	480	400	-	-	1050	535.50	1.579	846	
			(SW3)	12	1020	300	(B)	400	250	-	-	-	650	653.10	0.888	589	
			(SW4)	12	340	300	(E)	170	1020	170	-	-	1360	452.40	0.888	411	
			(SW4a)	12	340	300	(E)	170	520	170	-	-	860	292.40	0.888	260	
TOTAL	67.37	GRADE 40 GRAND TOTAL = 8,482 kgs. GRADE 80 GRAND TOTAL = 2,124 kgs.															

BAR BENDING DIAGRAM																	
A		B		C		D		E									
SCHEDULE OF REINFORCEMENT (POST, RAILING AND SIDEWALK)																	
BRIDGE NO.	LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT					LENGTH EA. BAR (mm)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/m)
								a	b	c	d	e					
BRIDGE 13	POST	1.69	(P1)	20	120	AS SHOWN	(B)	1045	450	-	-	-	1495	178.40	2.466	443	311.11
			(P2)	10	150	200	(C)	170	170	100	-	-	880	132.00	0.616	82	
	RAILING	3.20	(R1)	16	16	AS SHOWN	(A)	20000	-	-	-	-	20000	320.00	1.579	506	205.94
			(R2)	10	364	200	(C)	120	120	100	-	-	680	247.52	0.616	153	
	SIDEWALK	8.50	(SW1)	12	26	AS SHOWN	(A)	20000	-	-	-	-	20000	520.00	0.888	462	133.06
			(SW2)	16	101	200	(D)	170	980	400	-	-	1550	156.55	1.579	248	
			(SW2a)	16	101	200	(D)	170	480	400	-	-	1050	106.05	1.579	168	
			(SW3)	12	203	300	(B)	400	250	-	-	-	650	131.95	0.888	118	
			(SW4)	12	68	300	(E)	170	1020	170	-	-	1360	92.48	0.888	83	
			(SW4a)	12	68	300	(E)	170	520	170	-	-	860	58.48	0.888	52	
TOTAL	13.38	GRADE 40 GRAND TOTAL = 1,872 kgs. GRADE 80 GRAND TOTAL = 443 kgs.															

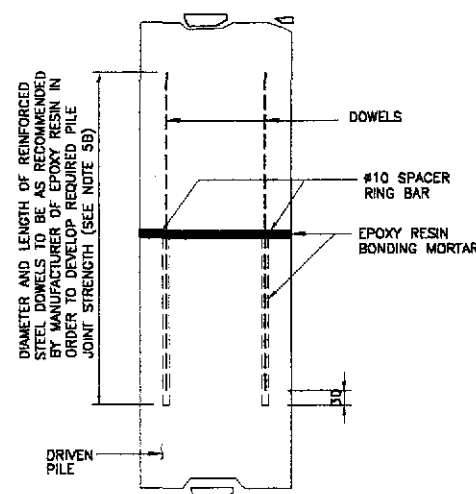
RAILING FOR BRIDGES

BRIDGE NO.	SPAN LENGTH (m)	NO. OF EXP. JT. INSIDE SPAN	NO. OF POST W/IN EXP. JT.	NO. OF RAIL POST PER SPAN	L (mm)	a (mm)	b (mm)
BR. 11	35.00	3	6	48	17515	250	1652
BR. 12	25.00	2	6	36	12665	250	1589
	25.00	2	6	36	25300	250	1587
BR. 13	20.00	2	5	30	10015	250	1545

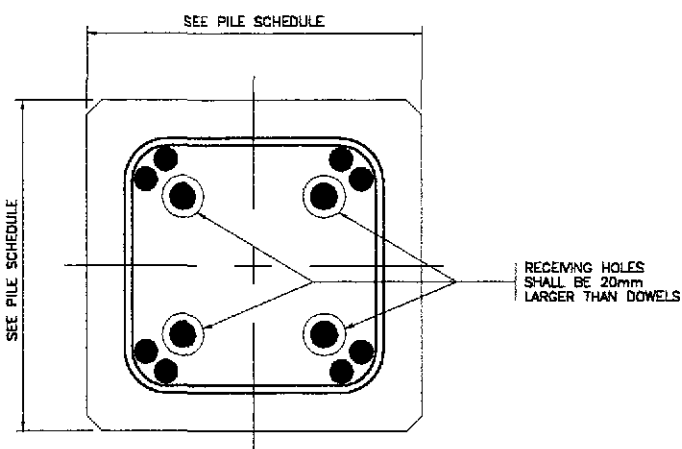
	DESIGNED	10/17/02	E. N. SALLAN		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/19/02	[Signature]		BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE 11, 12 & 13 SCHEDULE OF REINFORCEMENT (POST, RAILING AND SIDEWALK) (ULTIMATE STAGE)	BS-02a
	SUBMITTED	10/21/02	[Signature]		OFFICE OF THE SECRETARY				CABANATUAN BYPASS - CONTRACT PACKAGE IV	FULL SIZE A1		
	Submitted By: DANILO C. TRAJANO Project Director				Reviewed By: ADRIANO M. DOROY Chief, Bridges Division		Recommended By: GILBERTO S. REYES Director IV (OIC)				Approved By: MANUEL M. BONDAN Undersecretary	



1 PILE ELEVATION
NOT TO SCALE

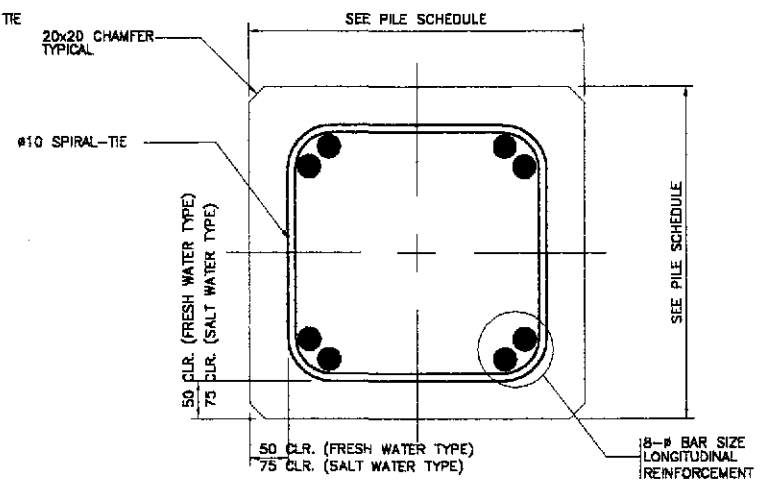


2A ELEVATION
N T S

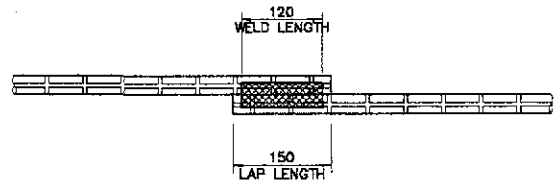


2B SECTION
N T S

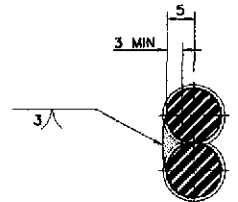
2 PILE SPLICE DETAIL
NOT TO SCALE



3 SECTION
NOT TO SCALE

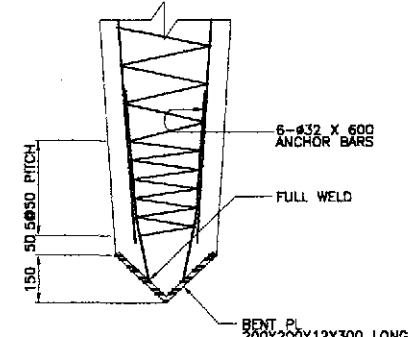


5A ELEVATION
N T S



5B SECTION
N T S

5 WELDED SPIRAL TIE SPLICE DETAIL
NOT TO SCALE



4 PILE TIP FOR HARD DRIVING
NOT TO SCALE

PILE SCHEDULE				
TYPE	SIZE (mm)	LONGITUDINAL REINF.		ALLOWABLE BEARING CAPACITY (kN)
		QTY.	BAR SIZE	
I	450 x 450	8	28	680
II	450 x 450	6	32	680
III	400 x 400	6	28	480

NOTES

- CONCRETE :
CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF CLASS AA CONCRETE WITH 28 MPa CYLINDER STRENGTH AND 19.0mm MAXIMUM AGGREGATE SIZE.
- REINFORCEMENT :
A. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASSHTO M31 (ASTM A615) GRADE 40 AND 60.
B. SPLICES OF ADJACENT LONGITUDINAL STEEL SHALL BE STAGGERED 100 BAR DIAMETERS APART. LENGTH OF SPLICES SHALL BE 1000mm FOR #25 AND 1300mm FOR #28 AND 1700mm FOR #32.
C. SPIRAL-TIES SHALL BE WELDED AT SPLICES.
- DRIVING :
A. PILE HEADS SHALL BE PROTECTED FROM DIRECT IMPACT OF THE HAMMER BY CUSHION BLOCKS CONSISTING OF SEVERAL BLOCKS OF WOOD OR OF OTHER APPROVED MATERIALS.
B. PILES SHALL BE DRIVEN TO A DEPTH THAT WILL PRODUCE THE REQUIRED ALLOWABLE BEARING CAPACITY.
- PILE FOUNDATION DESIGN:
A. IN PILE-BENT PIERS, PILE LENGTHS SHALL BE DETERMINED BY THE ENGINEER/CONSULTANT BASED ON THE ALLOWABLE PILE BEARING CAPACITY SPECIFIED BELOW.
B. IN COLUMN-BENT PIERS, THE NUMBER, LOCATION AND LENGTH OF PILES SHALL BE DETERMINED BY THE ENGINEER/CONSULTANT BASED ON THE LOADING INFORMATION GIVEN IN THE PIER DETAILS.
- PILE SPLICE :
A. PILES MAY BE SPLICED ONLY IF STRICTLY NECESSARY AND APPROVED BY THE ENGINEER/CONSULTANT. PILE SPLICES SHALL BE LOCATED AT LEAST 10m BELOW THE EXISTING GROUND LEVEL.
B. PILE SPLICE SHALL DEVELOP 100% AXIAL, AND 50% BENDING OF THE CAPACITY OF THE PILE SECTION WHERE THE SPLICE IS LOCATED.
- ALLOWABLE PILE BEARING CAPACITY : (SEE PILE SCHEDULE)
- MINIMUM HAMMER ENERGY RATING = 55 kN-m
- BASIS FOR COMPUTING ALLOWABLE PILE BEARING CAPACITY:

$$P_{all} = \left(\frac{167 e_h E_h}{S + 2.54} \right) \left(\frac{W_r + 0.16 W_p}{W_r + W_p} \right)$$

WHERE:

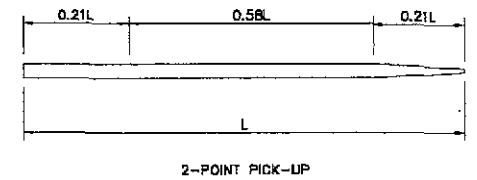
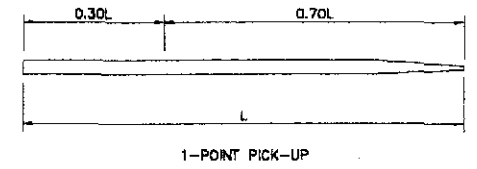
- P_{all} = ALLOWABLE PILE BEARING CAPACITY (kN)
- e_h = HAMMER EFFICIENCY
- E_h = HAMMER ENERGY RATING (kN-m)
- W_r = WEIGHT OF RAM (kN)
- W_p = WEIGHT OF PILE AND OTHER DRIVEN WEIGHTS (kN)
- S = AVERAGE PENETRATION PER BLOW FOR THE LAST 150mm OF DRIVING (mm)

9. TEST PILES

TEST PILES SHALL BE DRIVEN WITH THE SAME HAMMER USED FOR DRIVING REGULAR PILES AND MAY BE PART OF FOUNDATION IF APPROVED BY THE ENGINEER/CONSULTANT.

10. PICK-UP POINTS :

PICK-UP POINTS SHALL BE MARKED ON ALL PILES AND ALL LIFTING SHALL BE DONE AT THESE POINTS.



THE USE OF SPECIAL EMBEDDED OR ATTACHED LIFTING DEVICES SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER/CONSULTANT.

	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES		PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE IV	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BRIDGE NO. 11 & 13 TYPICAL PRECAST CONCRETE PILE DETAILS (ULTIMATE STAGE)	SHEET NO. : BS-03
	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS									
	CHECKED	DATE	SIGNATURE		BUREAU OF DESIGN OFFICE OF THE SECRETARY					
	SUBMITTED	DATE	SIGNATURE		Recommended By: (See cover sheet for Signature/Approval) Approved By: (See cover sheet for Signature/Approval)					
Submitted By: DANIL C. TRAJANO Project Director			Reviewed By: ADRIANO M. DORON Chief, Bridge Division		Recommended By: GILBERTO S. REYES Director IV (CID)		Recommended By: MANUEL M. BONDAN Undersecretary		Approved By: SIMEON A. DATUMANONG Secretary	

**CABANATUAN BYPASS
(ULTIMATE STAGE)**

BRIDGE NO. 14

GENERAL

GENERAL NOTES FOR BRIDGES - 1

A. DESIGN CRITERIA

1. DESIGN SPECIFICATION

- A. DPWH DESIGN GUIDELINES CRITERIA AND STANDARDS FOR PUBLIC WORKS AND HIGHWAYS, VOL.II .
- B. NATIONAL STRUCTURAL CODE OF THE PHILIPPINES, VOL. II, 2nd ED. 1997
- C. THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 16TH EDITION, 1996.
- D. JAPAN ROAD ASSOCIATION SPECIFICATIONS FOR HIGHWAY BRIDGES

2. DESIGN METHODOLOGY

ALLOWABLE STRESS DESIGN (ASD) &
LOAD FACTOR DESIGN (ULTIMATE STRENGTH DESIGN)

3. LOADING

3.1 DEAD LOADS

WEIGHT

A. CONCRETE	24.50 kN/m ³
B. STEEL	77.00 kN/m ³
C. EARTH	19.00 kN/m ³
D. WEARING SURFACE (50mm THK.)	1.10 kN/m ²

3.2 LIVE LOADS

A. AASHTO MS18 (HS20) TRUCK AND EQUIVALENT LANE LOADING.

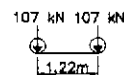
B. SIDEWALK LOAD

$$\text{SPAN} \leq 30.5\text{m} ; 4.07 \text{ kN/m}^2$$

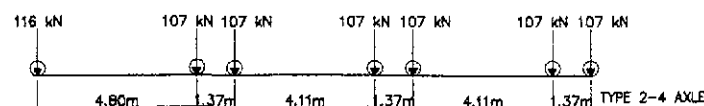
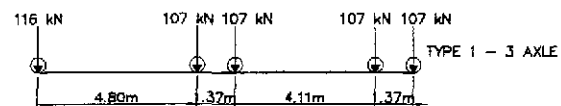
$$\text{SPAN} > 30.5\text{m} ; (1.437 + \frac{43.798}{L})(16.76 - W) \text{ kN/m}^2 < 2.874 \text{ kN/m}^2$$

L : LOADED LENGTH W : SIDEWALK WIDTH

C. ALTERNATE MILITARY LOADING.



D. PERMIT DESIGN LOAD (SPECIAL PERMIT REQUIRED BEFORE PASSING BRIDGE)



3.3 IMPACT

IN ACCORDANCE WITH DIVISION 1 OF AASHTO STANDARD SPECIFICATIONS, 1996.

3.4 SEISMIC LOAD

IN ACCORDANCE WITH DIVISION 1A OF THE 1996 AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES USING ACCELERATIONS COEFFICIENT OF 0.40 AND SEISMIC PERFORMANCE CATEGORY D.

3.5 HYDRAULIC DESIGN DATA

50-YEAR DESIGN DISCHARGE, $Q_{50} = 1,570 \text{ m}^3/\text{sec}$.
DESIGN FLOW VELOCITY, $V_{50} = 2.08 \text{ m/sec}$.
DESIGN FLOOD WATER LEVEL, DFWL = EL + 43.25 m
CATCHMENT AREA, CA = 463 km²

3.6 TEMPERATURE RANGES

ASSUMED BASE TEMPERATURE : +28C°
MINIMUM AMBIENT AIR TEMPERATURE : +18C°
MAXIMUM AMBIENT AIR TEMPERATURE : +38C°
TEMPERATURE DIFFERENCE BETWEEN TOP OF SLAB AND OTHER PARTS OF STRUCTURE : +10C°

3.7 CONSTRUCTION LOADS

CONSTRUCTION LOADS SHALL BE AS STIPULATED IN THE AASHTO GUIDE SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THESE LOADS ARE NOT EXCEEDED AND THAT THE MEMBER STRESSES ARE WITHIN ALLOWABLE DURING CONSTRUCTION.

3.8 OTHER LOADS

IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS, 1996.

3.9 LOAD COMBINATION (LOAD FACTOR DESIGN)

- A. GROUP I = 1.3 [1.0 D + 1.67(L+I)_n + 1.0 SF]
- B. GROUP II = 1.3 [1.0 D + 1.0(L+I)_p + 1.0 SF]
- C. GROUP VII = 1.3 [1.0 D + 1.0 SF + EQ]
- D. OTHER LOAD COMBINATIONS SHALL BE IN ACCORDANCE WITH AASHTO GUIDE SPECIFICATIONS.

B. MATERIALS

1. CONCRETE

UNLESS INDICATED OTHERWISE ON PLANS, THE CONCRETE CLASS AND STRENGTH SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER	CLASS	28 - DAY CYLINDER STRENGTH		MAX. SIZE OF COARSE AGGREGATE mm (in.)	REMARKS
		MPa	PSI		
CAST - IN PLACE GIRDERS, SLABS, DIAPHRAGMS, WINGWALLS, BACKWALLS, ABUTMENT COPINGS, COLUMNS, SLABS, SHEAR KEYS	AA2	28	4060	20	
FOOTINGS, PILE CAP, BORED PILES, APPROACH SLAB	AA1	28	4060	25	*SEE NOTE BELOW
THIN REINFORCED SECTIONS, PARAPET, RAILINGS & RAILPOST CURB AND SIDEWALK	C	21	3000	12	
PRESTRESSED CONCRETE MEMBERS : AASHTO GIRDERS	PP	35	5075	20	⊕ TRANSFER
		41	5946	20	⊕ SERVICE
STEEL SHEET PILE CAP	A	21	3000	38	
RUBBLE CONC./CONC. BLOCKS FOR SLOPE PROTECTION	B	16.5	2400	50	
LEAN CONCRETE	-	17	1450	38	

* NOTE :
THE CEMENT CONTENT OF THE DESIGN MIX SHALL BE ADJUSTED IN ACCORDANCE WITH THE AASHTO PROVISIONS WHEN CONCRETING UNDER WATER TO COMPENSATE FOR THE LOSS OF STRENGTH DUE TO WATER INFILTRATION.

2. REINFORCING STEEL

(a) REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615), GRADES 40 & 60 DEFORMED WITH MINIMUM YIELD STRENGTH AS DESCRIBED BELOW.

REBAR GRADE	YIELD STRENGTH fy (MPa)	SIZE (mm)
40	276 (40 ksi)	16mmφ & BELOW, UNLESS OTHERWISE NOTED
60	415 (60 ksi)	20mmφ & ABOVE

(b) REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.
(c) REINFORCING STEEL SHALL BE WELDABLE TYPE.
WELDING REINFORCING STEEL SHALL CONFORM TO ANSI/AWS D1.4.

3. PRESTRESSING STEEL

PRESTRESSING STEEL SHALL BE SEVEN-WIRE UNCOATED STRESS-RELIEVED STRANDS AND SHALL CONFORM TO AASHTO M203 (ASTM A416) WITH MINIMUM ULTIMATE STRENGTH OF $F_y = 1860 \text{ MPa}$ (270,000psi).

PC STRESS BARS SHALL BE HIGH TENSILE COLD WORKED STRESS BAR CONFORMING TO ASTM-A722/ISO 6934 (SBPR 930/1180) WITH NOMINAL TENSILE STRENGTH OF 1176 MPa.

4. STRUCTURAL STEEL, BOLTS AND WELDS

MATERIALS	YIELD STRENGTH fy (MPa)	REFERENCE SPECIFICATIONS
STRUCTURAL STEEL	250 (GRADE 36)	AASHTO M270, (ASTM A709)
HIGH STRENGTH BOLTS		AASHTO M253, ASTM A490M
WELDS		LATEST ANSI /AASHTO/AWS D1.5 BRIDGE WELDING CODE

5. ELASTOMERIC BEARING PADS

ELASTOMERIC BEARING PADS SHALL BE 100% VIRGIN CHLOROPRENE (NEOPRENE) PADS WITH DUROMETER HARDNESS 60 AND SHALL BE LAMINATED WITH NON-CORROSIVE MILD STEEL SHEETS (ASTM A570). ELASTOMERIC PADS SHALL CONFORM TO THE REQUIREMENTS AS PRESCRIBED IN DPWH D.O. NO. 25 SERIES OF 1997 "REVISED DPWH STANDARD SPECIFICATION FOR ELASTOMERIC BEARING PAD."

SPECIFICATIONS	
DURO HARDNESS, SHORE A (ASTM D-2240)	60 ± 5
TENSILE STRENGTH ASTM	D 412-175 Kg/cm ² (min)
ULTIMATE ELONGATION %	350 % (min)
MATERIAL	NEOPRENE

C. CONSTRUCTION

THESE NOTES ARE PROVIDED FOR QUICK REFERENCE ONLY AND SHALL BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS FOR THE PROJECT.

THE DESIGN OF BRIDGES IS BASED ON THE CONSTRUCTION SEQUENCE SHOWN IN THE DRAWINGS. ANY VARIATION FROM THE SEQUENCE MUST BE APPROVED BY THE ENGINEER.

CONSTRUCTION SHALL COMPLY WITH 1995 DPWH STANDARD SPECIFICATION FOR HIGHWAYS, BRIDGES AND AIRPORTS OR MODIFIED BY SPECIAL PROVISIONS.

1. DIMENSIONS

- 1.1 SECTION, DIMENSIONS AND DISTANCES SHALL NOT BE SCALED FOR CONSTRUCTION PURPOSES. THE INDICATED DIMENSION SHALL GOVERN UNLESS OTHERWISE SPECIFIED.
- 1.2 ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
- 1.3 ALL STATIONING ARE IN KILOMETER PLUS METER AND ELEVATION IN METER.

	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	10/17/02	F. P. DE JESUS	BUREAU OF DESIGN			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO.14 TALAVERA RIVER BRIDGE GENERAL NOTES - 1 OF 3 (ULTIMATE STAGE)	B14G-01
	CHECKED	10/19/02	J. C. SANTOS	Submitted By:	Reviewed By:	Recommended By:				
SUBMITTED	10/21/02	Mr. Ricardo	DANILO C. TRAJANO Project Director	ADRIANO M. DORCY Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	MANUEL M. BONGAN Undersecretary				

GENERAL NOTES FOR BRIDGES - 2

2. SETTING OUT

THE SETTING OUT AND THE ELEVATIONS OF THE DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE START OF ANY CONSTRUCTION WORK.

3. REINFORCED CONCRETE

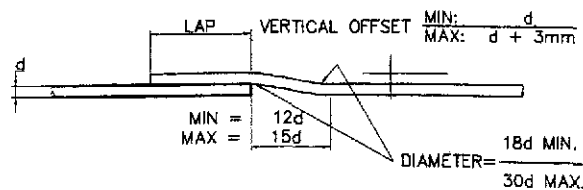
3.1 CAST IN PLACE CONCRETE SHALL BE CLASS "AA1" OR "AA2" EXCEPT RAILINGS WHICH SHALL BE CLASS "C". UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED EDGES SHALL BE CHAMFERED 25mm EXCEPT RAILINGS AND RE-ENTRANT ANGLES WHICH SHALL BE CHAMFERED AND FILLETED 13mm RESPECTIVELY.

3.2 CONCRETE MIX AND PLACING

- DESIGN OF CONCRETE MIX SHALL MEET THE DESIGN CONCRETE STRENGTH GIVEN UNDER ITEM 1 OF MATERIALS.
- CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE SPECIFICATION.
- FOR CONCRETE DEPOSITED AGAINST THE GROUND, LEAN CONCRETE WITH A MINIMUM THICKNESS OF 100mm SHALL BE LAID FIRST BEFORE INSTALLING THE REINFORCEMENT. THIS LEAN CONCRETE SHALL NOT BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF CONCRETE SECTION.
- THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL PLACING SEQUENCES FOR ALL CONCRETING WORK.

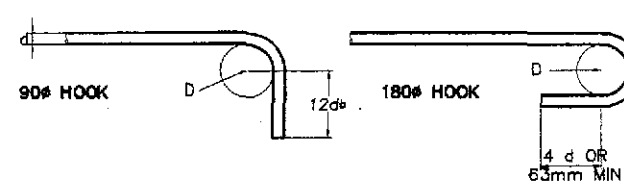
3.3 BAR BENDING, SPLICING AND PLACING

- THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER, FOR APPROVAL, SHOP DRAWINGS INDICATING THE BENDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS.
- BARS SHALL BE BENT COLD. BARS PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT UNLESS PERMITTED BY THE ENGINEER.
- BAR SPLICING NOT INDICATED ON DRAWINGS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
- WELDED SPLICES, IF APPROVED BY THE ENGINEER, SHALL DEVELOP IN TENSION AT LEAST 125% OF THE SPECIFIED YIELD STRENGTH OF THE BARS.
- NOT MORE THAN 50% OF THE BARS AT ANY ONE SECTION SHALL BE SPLICED.
- UNLESS OTHERWISE SHOWN ON DRAWINGS, THE CLEAR DISTANCE BETWEEN PARALLEL BARS IN A LAYER SHALL NOT BE LESS THAN 1.5 TIMES THE NOMINAL DIAMETER OF THE BAR NOR LESS THAN 1.5 TIMES THE MAXIMUM SIZE OF COARSE AGGREGATE. THE CLEAR DISTANCE BETWEEN LAYERS SHALL NOT BE LESS THAN 25mm NOR ONE BAR DIAMETER. THE BARS IN THE UPPER LAYER SHALL BE PLACED DIRECTLY ABOVE THOSE IN THE BOTTOM LAYER.
- CRANKED SPLICES



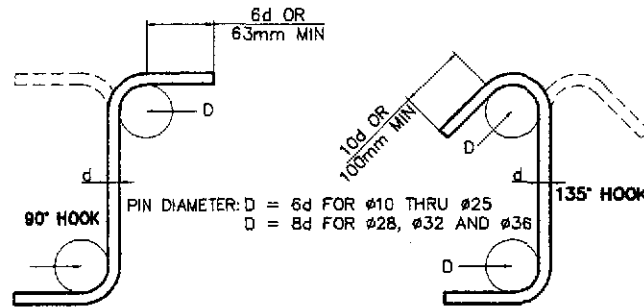
(B) HOOKS AND BENDS

DIMENSIONS OF 90-DEGREE AND 180-DEGREE HOOKS



PIN DIAMETER: D = 6d FOR #10 THRU #25
D = 8d FOR #28, #32 AND #36

DIMENSIONS FOR STIRRUPS AND TIE HOOKS



3.4 CONCRETE COVER TO REINFORCEMENT

UNLESS OTHERWISE NOTED, ALL BAR DIMENSIONS ARE REFERRED TO THE CENTER OF BARS AND THE MINIMUM COVERING MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY BAR SHALL BE 40mm. FOR SUBSTRUCTURE PERMANENTLY EXPOSED TO EARTH, COVERING SHALL BE 75mm.

3.5 CONSTRUCTION JOINT

- THE POSITION AND FORM OF ANY CONSTRUCTION JOINT SHALL BE AS SHOWN ON DRAWINGS OR AS AGREED WITH THE ENGINEER.
- THE INTERFACE BETWEEN THE FIRST AND SECOND POUR CONCRETE SHALL BE ROUGHENED WITH AN AMPLITUDE OF 6MM MINIMUM.

3.6 FALSEWORK

ALL FALSEWORK SHALL BE DESIGNED BY THE CONTRACTOR SUBJECT TO THE APPROVAL BY THE ENGINEER. FALSEWORKS SHOWN IN THE DRAWINGS SHALL SERVE AS REFERENCE ONLY.

3.7 FORMWORK

FORMWORKS SHALL BE CONSTRUCTED SUCH THAT IT WILL NOT YIELD UNDER THE LOAD AND SHALL BE SUCH AS TO AVOID THE FORMATION OF FINE. ALL CORNERS OF CONCRETE MEMBERS SHALL BE CHAMFERED TO 25mm UNLESS NOTED OTHERWISE ON DRAWINGS. STRIPPING OF FORMS AND SHORES SHALL BE AS DESIGNATED BY THE ENGINEER. THE FOLLOWING MAYBE USED AS A GUIDE.

	MIN. TIME
SHORING UNDER GIRDERS, BEAMS, FRAMES.	14 DAYS
DECK SLABS	14 DAYS
WALLS	7 DAYS
COLUMNS	7 DAYS
SIDES OF BEAMS AND ALL OTHER VERTICAL SURFACES	2 DAYS

3.8 PROTECTION AND CURING OF CONCRETE

CONCRETE SURFACES SHALL BE PROTECTED FROM HARMFUL EFFECTS OF SUN, WIND AND RUNNING WATER AND SHALL BE KEPT DAMP FOR AT LEAST 7 DAYS.

4. EMBANKMENT CONSTRUCTION SEQUENCE

APPROACH EMBANKMENT SHALL BE CONSTRUCTED PRIOR TO CONSTRUCTION OF ABUTMENT PILES.

5. REINFORCED CONCRETE CAST-IN-PLACE BORED PILES

5.1 THE REQUIRED ALLOWABLE BEARING CAPACITY FOR EACH PILE DIAMETER IS AS FOLLOWS:

PILE DIA.	NORMAL (KN)		ULTIMATE (KN)	
	COMPRESSION	TENSION	COMPRESSION	TENSION
Ø1000	3000	1200	9000	7200
Ø1500	6000	2100	18000	13000

5.2 BOTTOM OF BORED PILES SHALL BE EMBEDDED AT LEAST TWO TIMES PILE DIAMETER (2D) INTO HARD STRATA CAPABLE OF DEVELOPING ALLOWABLE BEARING CAPACITY AS SPECIFIED. IF THE ABOVE CONDITION IS NOT MET DURING CONSTRUCTION, THE PILE SHALL BE INCREASED AND THE DESIGNER/CONSULTANT SHALL BE NOTIFIED FOR CONFIRMATION. AN ON-SITE SUBSURFACE INVESTIGATION SHALL ALSO BE UNDERTAKEN DURING CONSTRUCTION FOR CONFIRMATION/VERIFICATION OF DATA USED IN THE DESIGN.

5.3 PILE LENGTHS SHOWN ARE ESTIMATED LENGTHS DURING DESIGN. DETERMINATION OF REQUIRED PILE LENGTHS SHALL BE DETERMINED BY THE CONTRACTOR BASED ON THE RESULTS OF FIELD INVESTIGATIONS CARRIED OUT BY THE CONTRACTOR. SEE THE SPECIAL PROVISIONS OF THE TECHNICAL SPECIFICATIONS.

5.4 ULTRASONIC INTEGRITY TESTING (AS PER SPECIFICATIONS) SHALL BE CONDUCTED FOR ALL PILES TO VERIFY/CHECK THE CONCRETE HOMOGENEITY AND TO LOCATE/EVALUATE ANY POSSIBLE IRREGULARITY IN THE COMPLETED BORED PILES AS DESCRIBED IN THE SPECIAL PROVISIONS.

5.5 STATIC LOAD TEST AND HIGH STRAIN DYNAMIC LOAD TEST SHALL BE CONDUCTED AS INDICATED IN THE SCHEDULE OF PILE LOAD TEST OF THE COMPLETED BORED PILES. THE RESULT SHALL BE SUBMITTED FOR EVALUATION AND REFERENCE.

6. ADDITIONAL SOIL INVESTIGATION

ADDITIONAL SUBSURFACE INVESTIGATION (BORE HOLES) SHALL BE CONDUCTED FOR EACH PIER AND ABUTMENT LOCATION TO CONFIRM/VERIFY THE DESIGN SOIL PROFILE AND CAPACITIES. IF THE RESULTS OF THE SOIL INVESTIGATION DIFFERS FROM THE SOIL DATA USED IN DESIGN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER/CONSULTANT TO MAKE THE NECESSARY ADJUSTMENTS IN THE FOUNDATION.

7. CAMBER

7.1 PRECAST PRESTRESSED CONCRETE GIRDERS SHALL BE CONSTRUCTED WITH CAMBER INDICATED IN THE DRAWINGS.

7.2 AFTER ERECTION IS COMPLETE, THE FLANGE ELEVATION OF THE GIRDERS SHALL BE SURVEYED. BASED ON THIS INFORMATION, THE CONTRACTOR SHALL DETERMINE THE HAUNCH HEIGHTS REQUIRED ALONG THE STRUCTURE IN ORDER THAT THE FINISHED GRADE SHOWN IN THE DRAWINGS WILL BE ACHIEVED, TAKING DUE ACCOUNT OF FURTHER DEFLECTIONS TO BE INCURRED WHEN THE DECK AND SIDEWALKS ARE ADDED AND THE ORDER IN ERECTION OF DECK PANEL IS TO TAKE PLACE.

7.3 THE CONTRACTOR SHOULD PREPARE & SUBMIT A GEOMETRY CONTROL REPORT TO THE ENGINEER INDICATING THE ASSUMPTIONS AND CALCULATION PROCEDURES THAT HAVE BEEN FOLLOWED IN DETERMINING HAUNCH HEIGHTS. THE CONTRACTOR SHOULD MONITOR AND UPDATE THIS REPORT AS NECESSARY AS ERECTION PROCEEDS.

	DESIGNED	10/17/02	F. P. DE JESUS		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	SCALE : AS SHOWN	SHEET CONTENTS : BRIDGE NO.14 TALAVERA RIVER BRIDGE GENERAL NOTES - 2 OF 3 (ULTIMATE STAGE)	SHEET NO. : B14G-02
	CHECKED	10/19/02	J. C. SANTOS		P.W.H. - PMO Submitted By: DANILO C. TRAJANO Project Director	BUREAU OF DESIGN Reviewed By: ADRIANO M. DORCY Chief, Bridge Division	OFFICE OF THE SECRETARY Recommended By: GILBERTO S. REYES Director IV (CIC)				

GENERAL NOTES FOR BRIDGES - 3

8. STRUCTURAL STEEL

THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS FOR ALL STRUCTURAL STEEL WORK. THESE SHOP DRAWINGS SHALL BE APPROVED BY THE ENGINEER BEFORE ANY FABRICATION COMMENCES.

9. SHORING

9.1 CAMBER FOR REINFORCED CONCRETE SUPERSTRUCTURES WERE DETERMINED BASED ON THE USE OF SHORINGS DURING CONSTRUCTION.

9.2 CAMBER FOR COMPOSITE SUPERSTRUCTURES WITH PRECAST PRESTRESSED GIRDERS WERE DETERMINED BASED ON UNSHORED CONDITIONS.

10. EXCAVATION

EXCAVATION FOR STRUCTURES SHALL BE TO THE NEAT LINES OF FOOTING OR AS SPECIFIED IN THE STANDARD SPECIFICATIONS.

11. WATER ELEVATION

WATER ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY ANY VARIATION FOUND DURING CONSTRUCTION SHALL NOT BE CONSIDERED AS A BASIS FOR EXTRA COMPENSATION.

12. DETOUR

THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN DETOUR BRIDGES, AND/OR ROADS DURING CONSTRUCTION TO ALLOW CONTINUOUS FLOW OF TRAFFIC. THEY SHALL BE CONSTRUCTED ON LOCATION AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. NO ADDITIONAL COST SHALL BE ALLOWED FOR ANY RELOCATION OF DETOUR.

13. PRESTRESSED CONCRETE

GIRDER DESIGN GUIDE

13.1 POST-TENSIONING ; THE PROPOSED TYPE OF TENDONS WHICH WILL BE USED IN THE POST-TENSIONED DESIGNS AND ALL NECESSARY ADDITIONAL DETAILS INCLUDING THOSE FOR END ANCHORAGES, METHODS TO BE EMPLOYED AND PROCEDURES TO BE FOLLOWED, SHALL BE AS APPROVED BY THE ENGINEER. PORTION OF THE TENDONS SHALL BE DRAPED LONGITUDINAL IN PARABOLIC PORTIONS. ALL TENDONS SHALL BE PLACED SO THAT THEIR CENTER OF GRAVITY WILL BE AT THE POSITION SHOWN ON PLANS. THE TOTAL POST-TENSION FORCE AFTER LOSSES REQUIRED AT MIDSPAN SHALL BE PROVIDED AS CALLED FOR IN THE VARIOUS DESIGNS. THE REQUIRED FORCES AFTER LOSSES SHALL BE OBTAINED BY APPLYING INITIAL TENSILE FORCES OF SUFFICIENT MAGNITUDE TO ALLOW FOR ALL SUBSEQUENT LOSSES, INCLUDING THOSE FOR ELASTIC SHORTENING, SHRINKAGE, CREEP, RELAXATION, FRICTION, AND EFFICIENCY OF END ANCHORAGES. AFTER SECURING THE END ANCHORAGES ALL TENDONS SHALL BE PRESSURE GROUTED IN THEIR CONDUITS IN ACCORDANCE WITH THE "SPECIFICATIONS".

13.2 CONCRETE FOR GIRDERS SHALL BE A MINIMUM STRENGTH OF 41 N/mm² (5,945 PSI) AT THE AGE OF 28 DAYS.

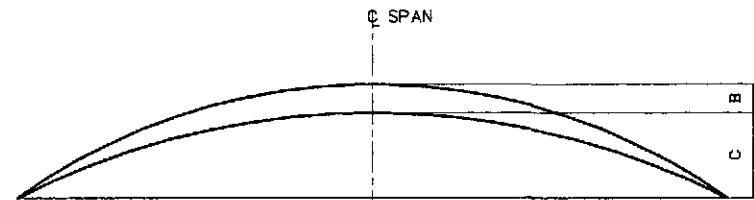
13.3 CONCRETE FOR CAST-IN-PLACE SLAB HAVE A MINIMUM STRENGTH OF 28 N/mm² (4,060 PSI) AT THE AGE OF 28 DAYS.

13.4 THE CONTRACTOR MAY PROPOSE ANY ALTERNATIVE TENDON SIZE AND LAYOUT WHICH SHALL MEET THE APPROVAL OF THE ENGINEER.

13.5 THE REQUIRED STRENGTH OF CONCRETE AT TIME OF TENSIONING SHALL BE 35 MPa (5,075 PSI). A GRID CONSISTING OF #12 BARS AT 100 CENTERS IN BOTH DIRECTIONS SHALL BE PLACED NEAR EACH ANCHORAGE OF THE POST-TENSIONING SYSTEM.

13.6 HANDLING PRESTRESSED CONCRETE BEAMS : THE BEAMS SHALL BE MAINTAINED IN AN UPRIGHT POSITION AND SHALL BE LIFTED BY SUITABLE DEVICES PROVIDED AT THE ENDS OF THE BEAMS. ATTENTION IS DIRECTED TO THE INCREASED DIFFICULTY OF LIFTING BEAMS WITHOUT END BLOCKS. THE CONTRACTOR'S PROPOSED LIFTING DETAILS SHOULD BE GIVEN CAREFUL CONSIDERATION BEFORE BEING SUBMITTED ON SHOP DRAWING FOR APPROVAL. THE USE OF HOLES FOR LIFTING PURPOSES WILL NOT BE PERMITTED.

13.7 CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER THE CALCULATED ELONGATION OF THE PRESTRESSING TENDONS CORRESPONDING TO THE REQUIRED JACKING FORCES.



DEAD LOAD CAMBER DIAGRAM

A = INITIAL CAMBER - ESTIMATED PRESTRESS CAMBER LESS DEFLECTION DUE TO GIRDER DEAD LOAD

B = DEFLECTION DUE TO SLAB, DIAPHRAGM, SIDEWALKS, RAILING AND RAILPOST

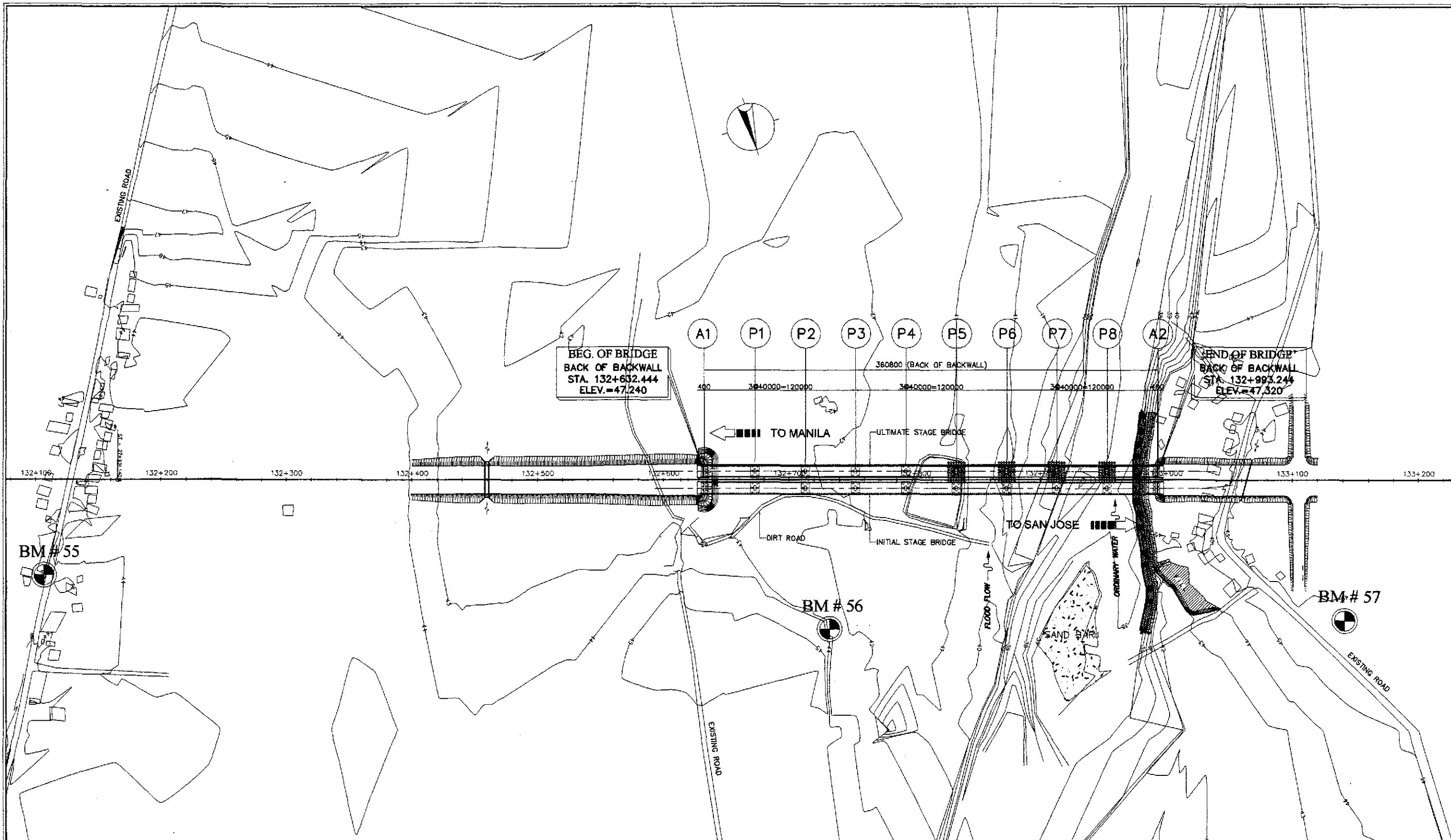
C = FINAL CAMBER

NOTE: A AND B ARE THEORETICAL VALUES AND MAY VARY WITH ACTUAL (AGE) CONCRETE STRENGTH, VARIOUS PRESTRESSING CONDITIONS, CREEP FACTOR, AND PRESTRESS LOSSES. CONTRACTOR SHALL SURVEY TOP OF GIRDERS TO OBTAIN ACTUAL VALUE OF A AND ADJUST PROFILE ACCORDINGLY.

13.8 PRECAST GIRDERS AND DECK PANELS SHALL MEET THE TOLERANCES SPECIFIED IN THE AASHTO GUIDE SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF SEGMENTAL CONCRETE BRIDGES.

13.9 TRANSVERSE DEFLECTION OF PRECAST GIRDERS SHALL NOT EXCEED 1/500TH OF THE GIRDER LENGTH. WHERE DEFLECTION EXCEED THIS VALUE, PROCEDURES FOR CORRECTION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW, IF CORRECTION BY APPROVED PROCEDURE IS NOT POSSIBLE, THE GIRDER SHALL BE REJECTED.

	DESIGNED	10/17/02	[Signature]	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/19/02	[Signature]	BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO, Project Director			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO.14 TALAVERA RIVER BRIDGE GENERAL NOTES - 3 OF 3	B14G-03
	SUBMITTED	10/21/02	[Signature]	OFFICE OF THE SECRETARY Recommended By: ADRIANO M. DORIOY, Chief, Bridges Division Recommended By: GILBERTO S. REYES, Director IV (CIC) Recommended By: MANUEL M. BONOAN, Undersecretary Approved By: SIMON A. DATUMANONG, Secretary			CABANATUAN BYPASS - CONTRACT PACKAGE IV	FULL SIZE A1	(ULTIMATE STAGE)	

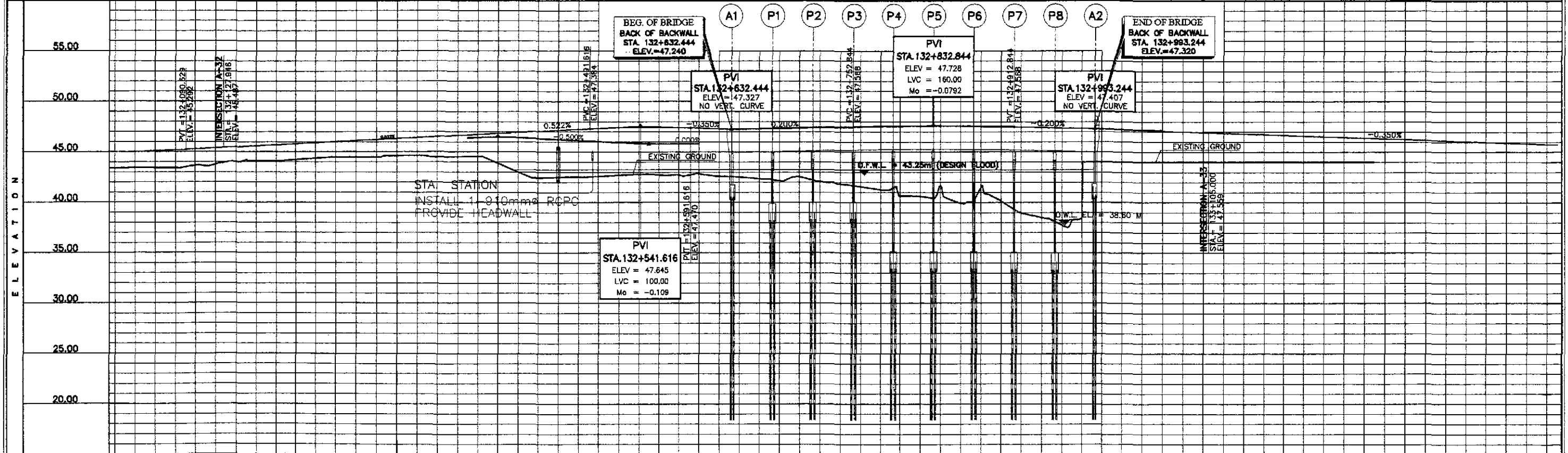
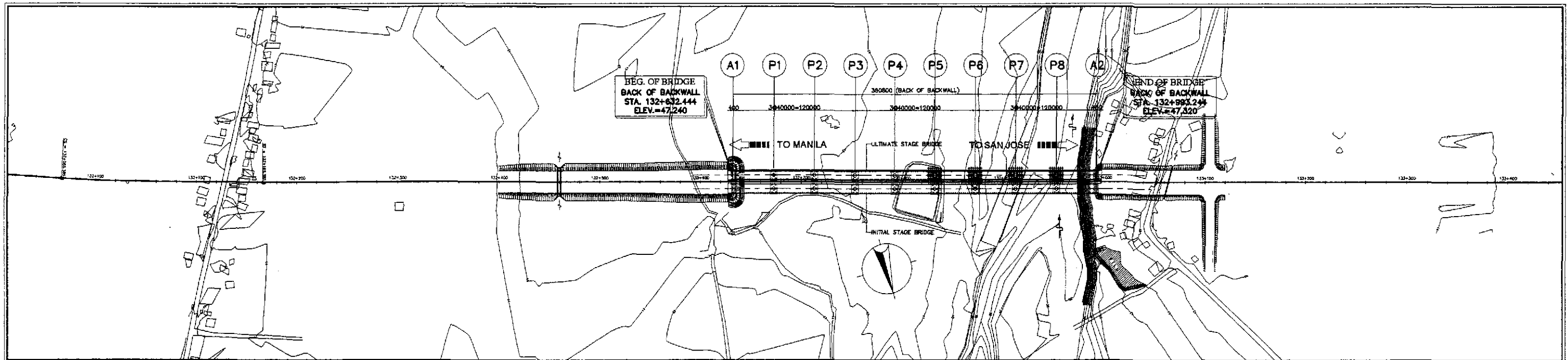


B.M. NO.	COORDINATES		DESCRIPTION
	NORTHING	EASTING	
55	1,727,251.355	492,153.048	IT IS LOCATED ON THE RIGHT SIDE OF THE ALIGNMENT NEAR THE CORNER OF CONC. WALL/FENCE. IT IS 3 M AWAY FROM THE CL OF AN EXISTING ROAD 5 M WIDE AT BRGY. CAMPOS, TALAVERA.
56	1,727,456.793	491,560.117	IT IS LOCATED ON THE LEFT SIDE OF THE ALIGNMENT 70 M AWAY UNDERNEATH A MANGO TREE IN BRGY. CAMPOS, TALAVERA.
57	1,727,557.278	491,163.464	IT IS LOCATED ON THE RIGHT SIDE OF THE ALIGN. PLACED ON THE TOE OF A RICEFIELD NEAR THE SIDE OF A ROAD UNDER A COCONUT TREE IN BRGY. LOMBOY, TALAVERA.

NOTE :
SEE HIGHWAY PLANS FOR
REFERENCE OF ALIGNMENT

A HORIZONTAL AND VERTICAL CONTROL MONUMENTS
SCALE 1:1500

	DESIGNED	10/17/02	 P. DE JESUS			REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE IV	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BRIDGE NO.14 TALAVERA RIVER BRIDGE HORIZONTAL AND VERTICAL CONTROL MONUMENTS (ULTIMATE STAGE)	SHEET NO. : B14G-04		
	CHECKED	10/19/02	 J. S. SANTIAGO			Submitted By: DANILLO C. TRAJANO Project Director	Reviewed By: ADRIANO M. DORCY Chief, Bridges Division	Recommended By: GILBERTO S. REYES Director IV (D/C)					Approved By: MANUEL M. BONDAN Undersecretary	Approved By: SIMON A. DATUMANONG Secretary
	SUBMITTED	10/21/02	 DANILLO C. TRAJANO TEAM LEADER											



STATION	+100	+200	+300	+400	132+500	+600	+700	+800	+900	133+000	+100	+200	+300	+400
FINISHED GRADE @ BYPASS ALIGNMENT						47.191	47.279							
FINISHED GRADE @ BRIDGE CENTERLINE						47.231	47.319							
FINISHED ELEV./STATION @ BRIDGE PIER CENTERLINE						632.444	632.444							
ORIGINAL GROUND ELEVATION						42.515	47.240	47.271	47.359	47.311	47.389	47.351	47.439	47.527
HORIZONTAL CURVATURE	A=600		132+165.384		R=∞									
VERTICAL CURVATURE			g=+0.506%		g=+0.506%		g=+0.200%		f=160 Mo = -0.080		g=-0.200% NO VERTICAL CURVE		g=-0.500%	
SUPERELEVATION	27+842.251													

	DESIGNED	10/17/02			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/19/02			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO.14 TALAVERA RIVER BRIDGE PLAN AND PROFILE	B14G-05
	SUBMITTED	10/21/02			CABANATUAN BYPASS - CONTRACT PACKAGE IV	FULL SIZE A1	(ULTIMATE STAGE)	

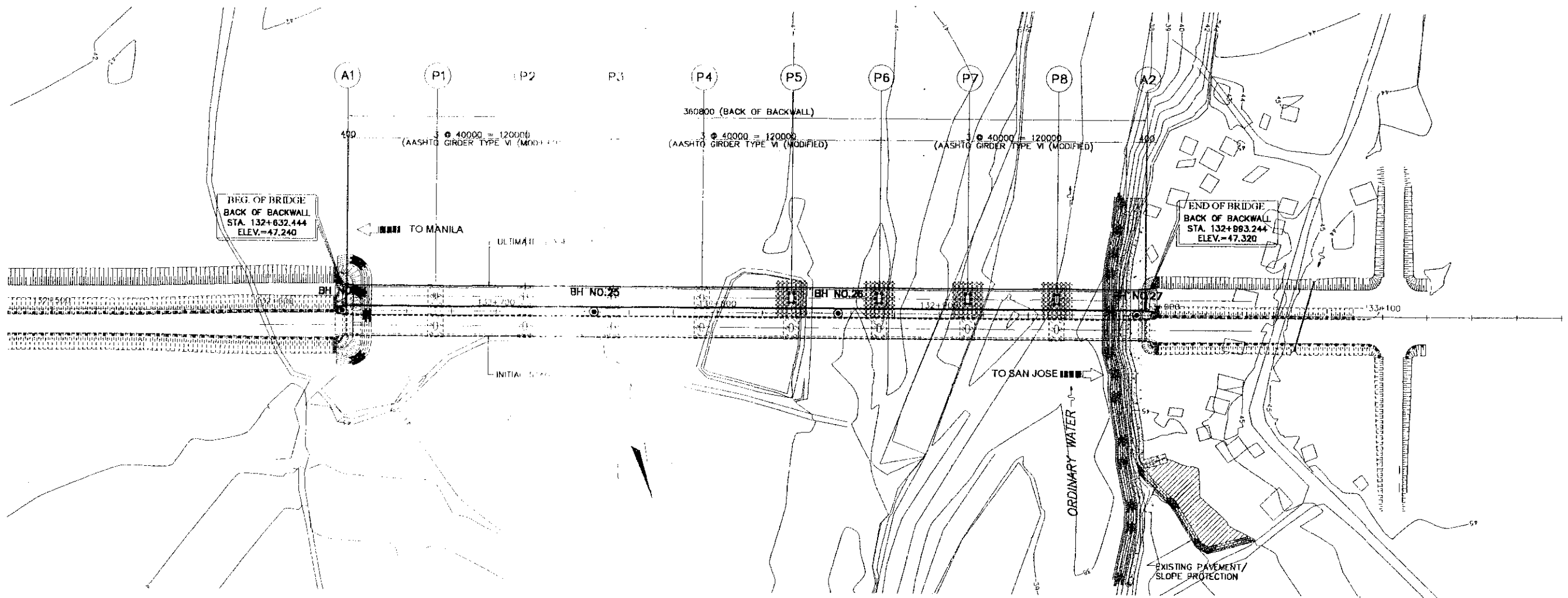
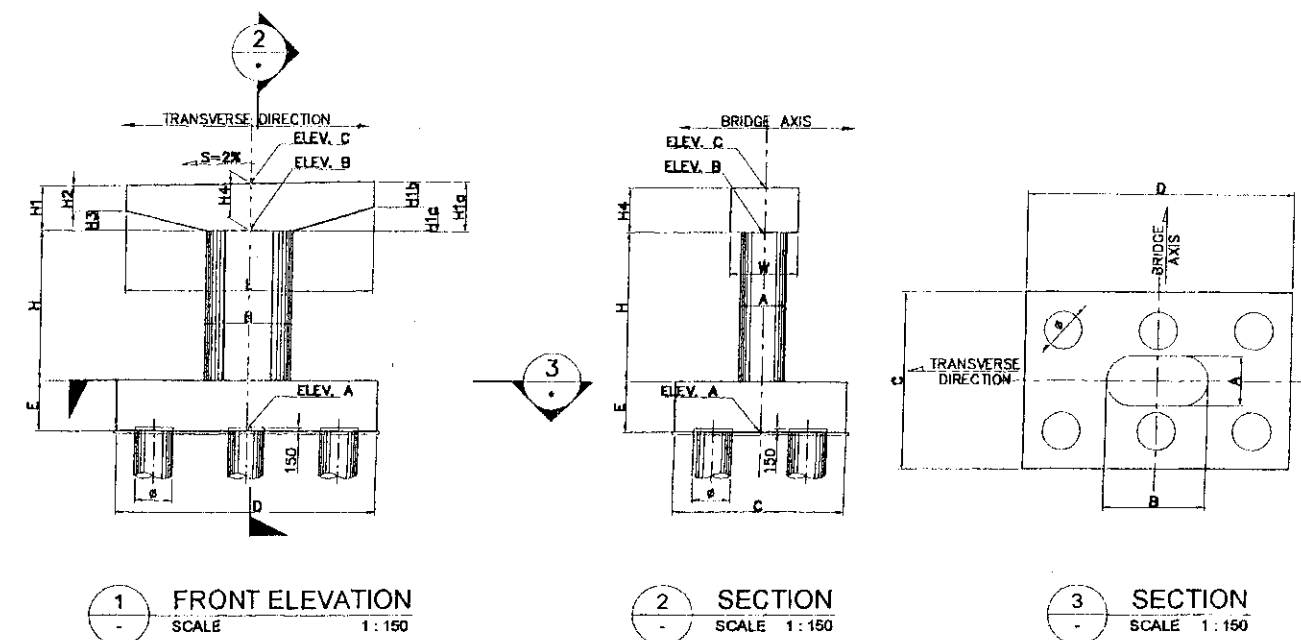
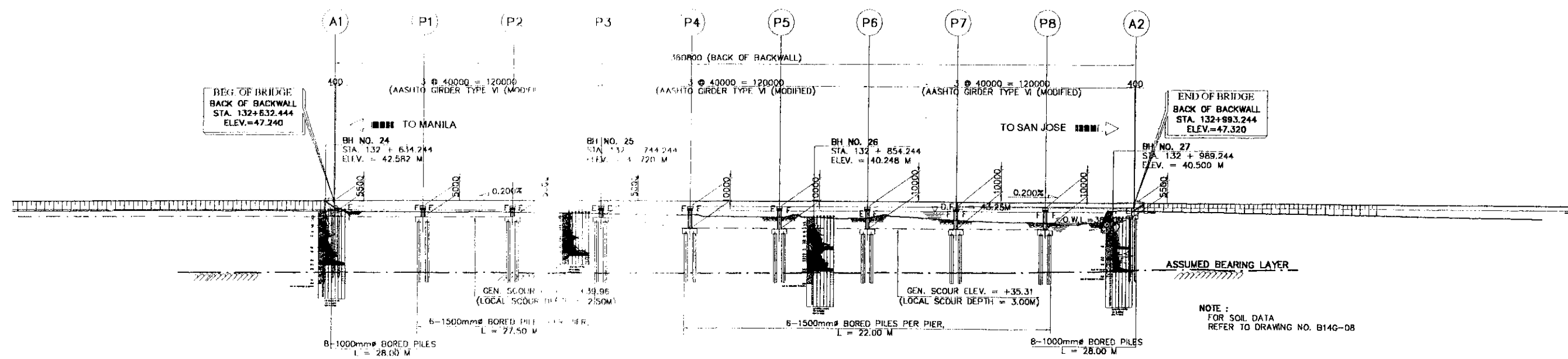


TABLE OF COORDINATES

PIER NO.	STATION	INITIAL STAGE				ULTIMATE STAGE			
		COLUMN		PILE CAP		COLUMN		PILE CAP	
		NORTHINGS	EASTINGS	NORTHINGS	EASTINGS	NORTHINGS	EASTINGS	NORTHINGS	EASTINGS
ABUT. 1	132 + 632.444	1727322.526	491627.227	1727322.526	491627.227	1727309.498	491623.689	1727309.498	491623.689
PIER 1	132 + 672.844	1727333.114	491586.239	1727333.114	491586.239	1727320.086	491584.701	1727320.086	491584.701
PIER 2	132 + 712.844	1727343.598	491549.637	1727343.598	491549.637	1727330.570	491546.099	1727330.570	491546.099
PIER 3	132 + 752.844	1727354.081	491511.036	1727354.081	491511.036	1727341.053	491507.497	1727341.053	491507.497
PIER 4	132 + 792.844	1727364.564	491472.434	1727364.564	491472.434	1727351.536	491468.896	1727351.536	491468.896
PIER 5	132 + 832.844	1727375.047	491433.832	1727375.047	491433.832	1727362.019	491430.294	1727362.019	491430.294
PIER 6	132 + 872.844	1727385.531	491395.230	1727385.531	491395.230	1727372.502	491391.692	1727372.502	491391.692
PIER 7	132 + 912.844	1727396.014	491356.628	1727396.014	491356.628	1727382.986	491353.090	1727382.986	491353.090
PIER 8	132 + 952.844	1727406.497	491318.026	1727406.497	491318.026	1727393.469	491314.488	1727393.469	491314.488
ABUT. 2	132 + 993.244	1727417.085	491279.038	1727417.085	491279.038	1727404.057	491275.500	1727404.057	491275.500

NOTE : * ABUTMENT COORDINATES ARE BASED ON COORDINATES OF BACK OF BACKWALL AT BRIDGE CENTERLINE.

TABLE OF DIMENSIONS FOR INITIAL STAGE

PIER NO.	COLUMN			PILE CAP			COPING						PILES								
	A (mm)	B (mm)	H (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H1 (mm)	H2 (mm)	H3 (mm)	H4 (mm)	H1c (mm)	H1b (mm)	H1a (mm)	ELEV. C (mm)	DIA. (mm)	LENGTH (mm)	NUMBER (pcs)		
ABUT. 1	-	-	-	5000	10750	1500	40.24	-	-	-	-	-	-	-	-	44.814	1000	28000	8		
PIER 1	1800	3500	3250	43.045	6750	10500	2000	37.795	9950	2700	1750	1000	750	1850	1949	1000	949	44.895	1500	27500	6
PIER 2	1800	3500	3250	43.125	6750	10500	2000	37.875	9950	2700	1750	1000	750	1850	1949	1000	949	44.975	1500	27500	6
PIER 3	1800	3500	3250	43.205	6750	10500	2000	37.955	9950	2700	1750	1000	750	1850	1949	1000	949	45.055	1500	27500	6
PIER 4	1800	3500	8250	43.265	6750	10500	2000	33.015	9950	2700	1750	1000	750	1850	1949	1000	949	45.115	1500	22000	6
PIER 5	1800	3500	8250	43.285	6750	10500	2000	33.035	9950	2700	1750	1000	750	1850	1949	1000	949	45.135	1500	22000	6
PIER 6	1800	3500	8250	43.265	6750	10500	2000	33.015	9950	2700	1750	1000	750	1850	1949	1000	949	45.115	1500	22000	6
PIER 7	1800	3500	8250	43.205	6750	10500	2000	32.955	9950	2700	1750	1000	750	1850	1949	1000	949	45.055	1500	22000	6
PIER 8	1800	3500	8250	43.125	6750	10500	2000	32.875	9950	2700	1750	1000	750	1850	1949	1000	949	44.975	1500	22000	6
ABUT. 2	-	-	-	-	5000	10750	1500	40.32	-	-	-	-	-	-	-	44.894	1000	28000	8		

HYDRAULIC DATA

50-YEAR DESIGN DISCHARGE, Q ₅₀	1,750 cu.m./sec
DESIGN FLOW VELOCITY, V ₅₀	2.08 m/sec
CATCHMENT AREA, CA	463.0 sq. km
DESIGN FLOOD WATER LEVEL	EL. = +43.25 m

PERFECTED BY: AP'LAN JR.
OIC Chief Engineer, Division Office

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INTERNATIONAL

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REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

BUREAU OF DESIGN

OFFICE OF THE SECRETARY

MANUEL M. BONGAON
Undersecretary

SIMEON A. CANTAMANGING
Secretary

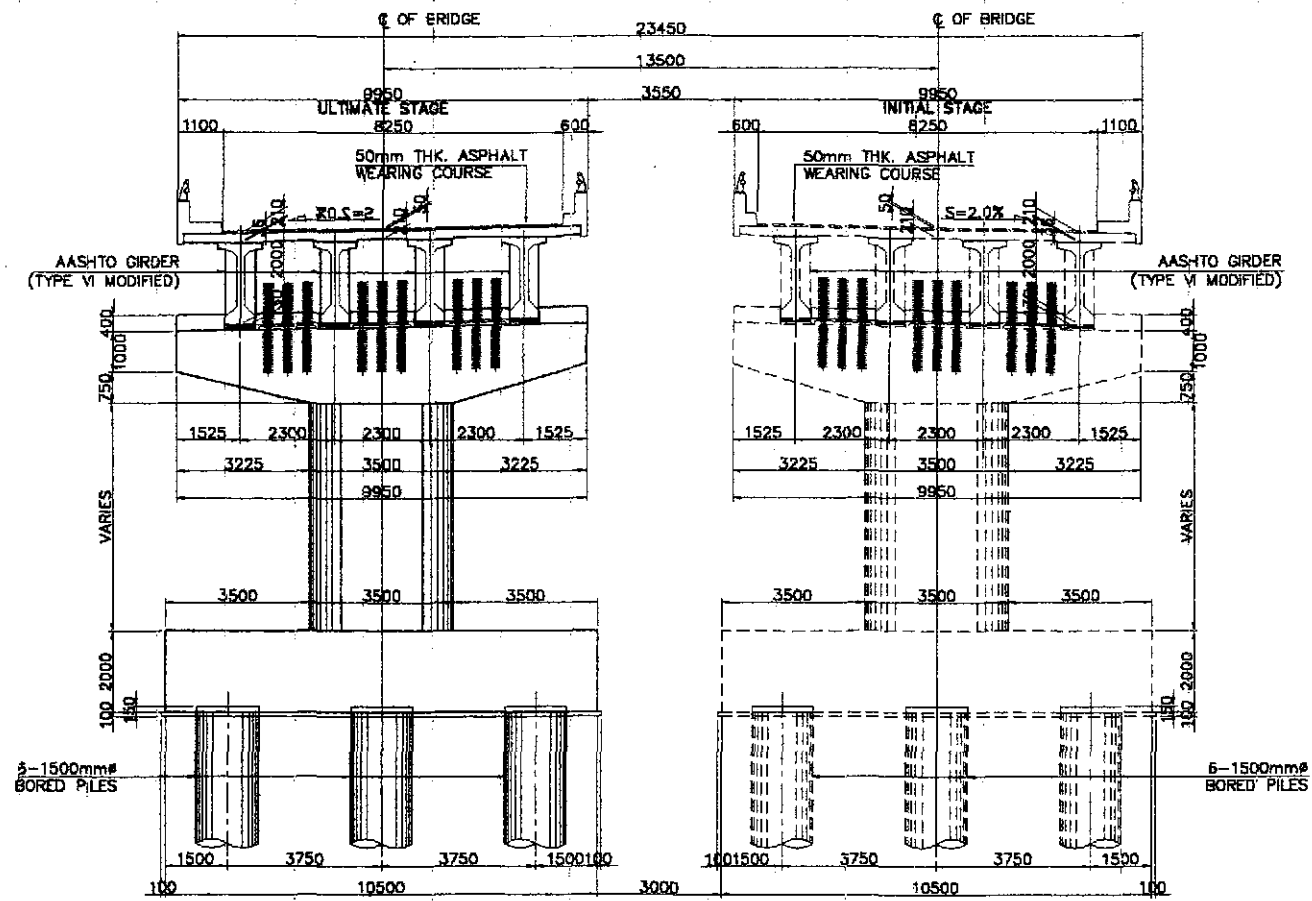
PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(Plaridel, Cabanatuan and San Jose Bypasses)

SCALE :
AS SHOWN

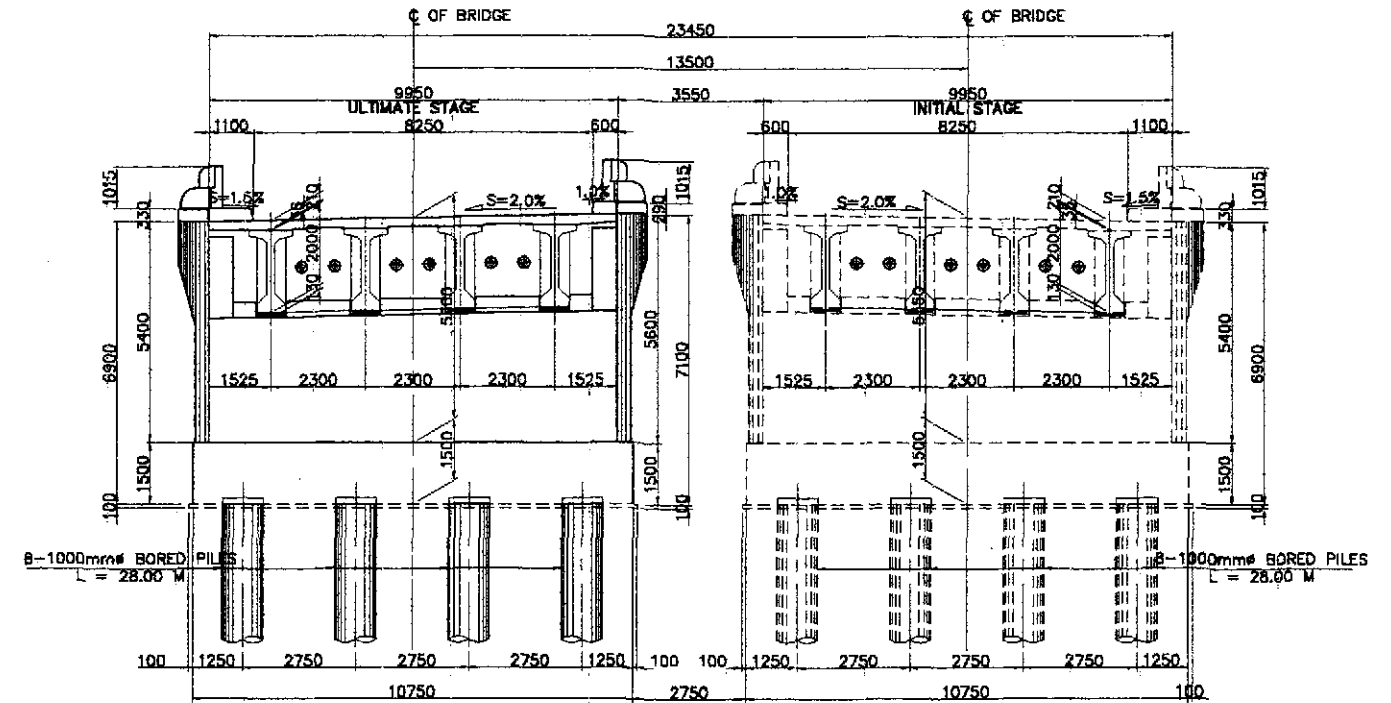
SHEET CONTENTS :
BRIDGE NO. 14 TALAVERA RIVER BRIDGE
GENERAL PLAN, ELEVATION
AND SECTIONS - 1 OF 2
(ULTIMATE STAGE)

SHEET NO. :
B14G-06

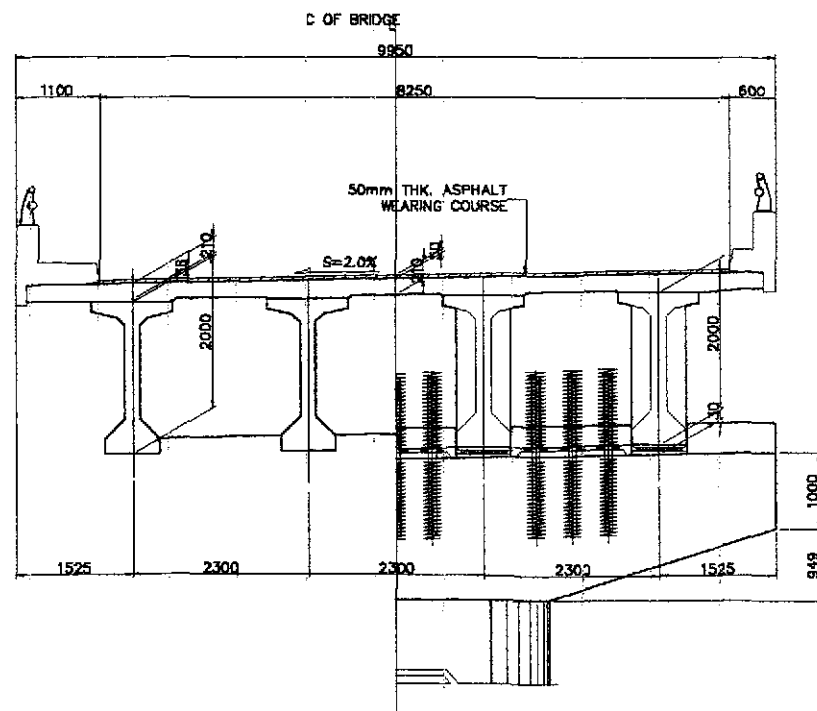
1 GENERAL PLAN, ELEVATION AND SECTIONS (TALAVERA RIVER BRIDGE CROSSING)
SCALE AS SHOWN



A SECTION @ PIER (FIX-FIX)
SCALE 1:100

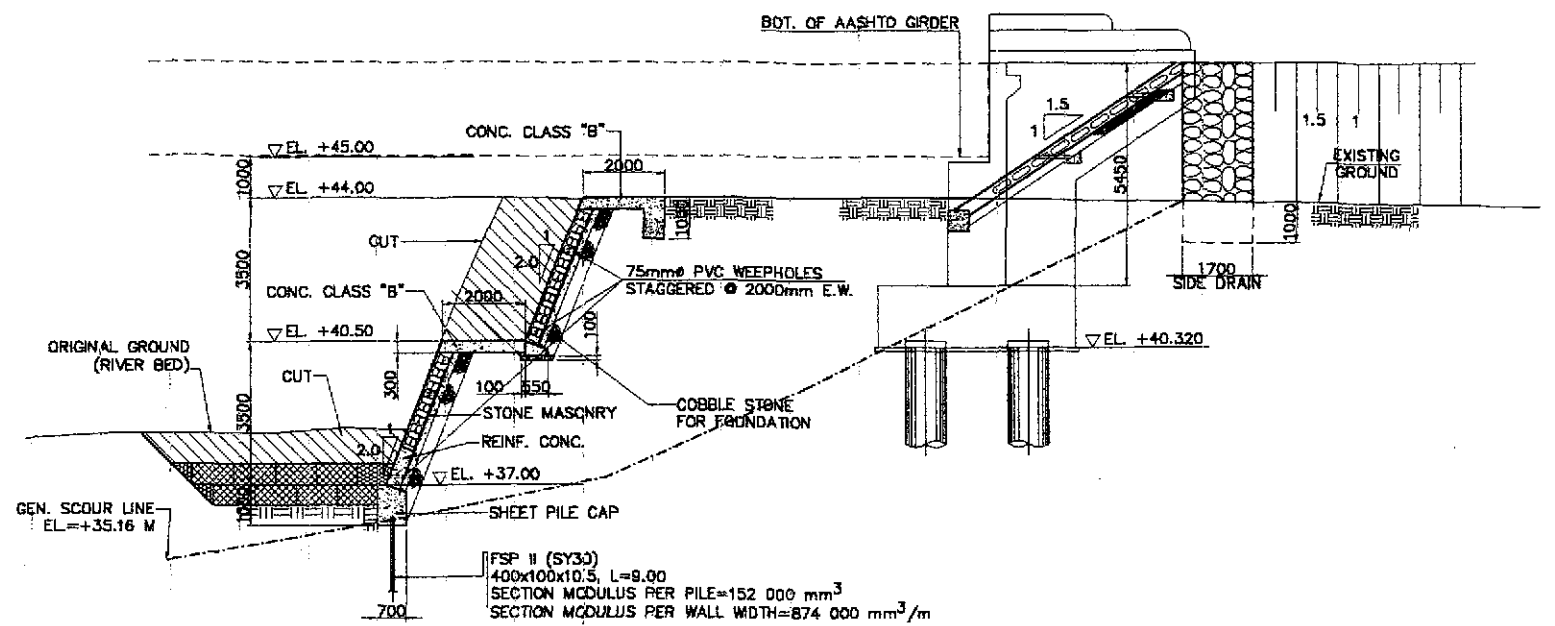


B SECTION @ ABUTMENT
SCALE 1:100



C SECTION @ SUPPORT
SCALE 1:50

D SECTION @ MID SPAN
SCALE 1:50



E ABUTMENT SLOPE PROTECTION DETAILS
SCALE 1:100

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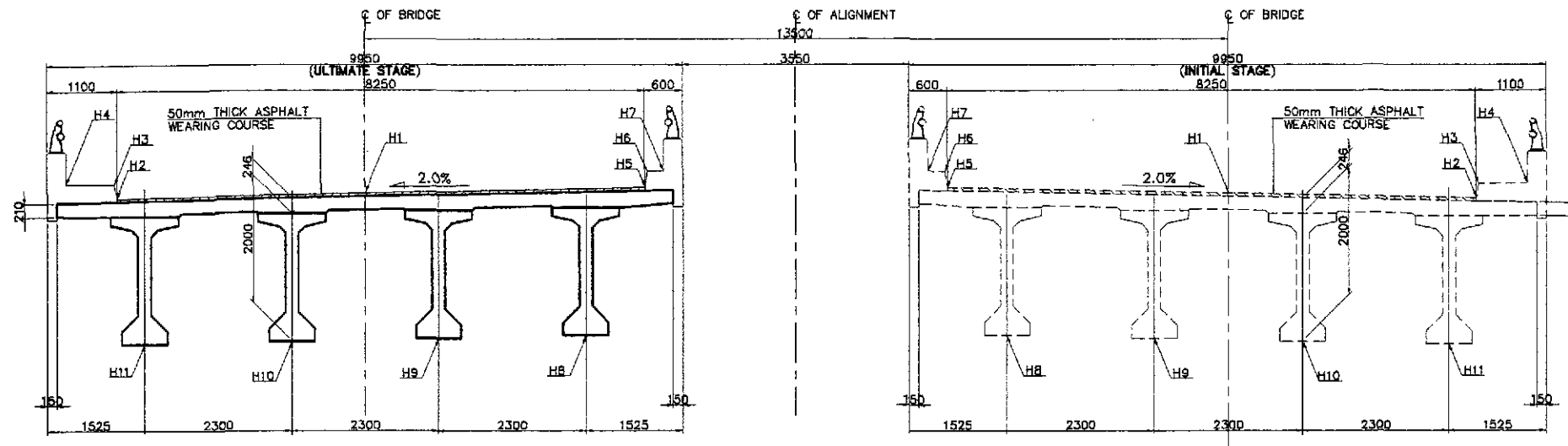
DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				
DESIGNED 10/17/02	F. P. DEL ROSARIO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY		
CHECKED 10/19/02	J. SANTOS	Submitted By:	Reviewed By:	Recommended By:	Approved By:	Approved By:
SUBMITTED 10/21/02	Max. Toledo TEAM LEADER	DANILG. C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridge Division	GILBERTO S. REYES Director IV (CIC)	MANUEL M. BONOAN Undersecretary	SIMEON A. DATUMANONG Secretary

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THE DETAILED DESIGN STUDY ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(Plaridel, Cabanatuan and San Jose Bypasses)
CABANATUAN BYPASS - CONTRACT PACKAGE IV

SCALE :
AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 14 TALAVERA RIVER BRIDGE
GENERAL PLAN, ELEVATION
AND SECTIONS - 2 OF 2
(ULTIMATE STAGE)

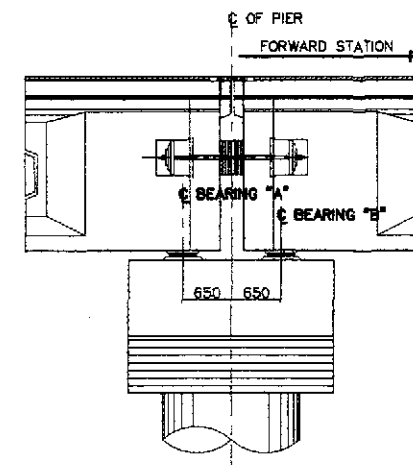
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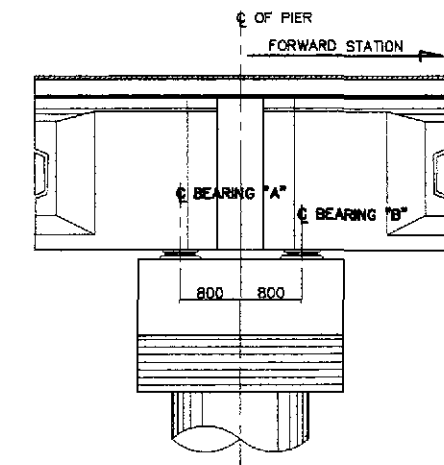
A TYPICAL BRIDGE SECTION
SCALE 1 : 50

STATION	H1	H2	H3	H4	H5	H6	H7
132+640.000	47.934	47.852	48.102	48.110	48.017	48.267	48.270
132+660.000	47.311	47.229	47.479	47.487	47.394	47.644	47.647
132+680.000	47.351	47.269	47.519	47.527	47.434	47.684	47.687
132+700.000	47.391	47.309	47.559	47.567	47.474	47.724	47.727
132+720.000	47.431	47.349	47.599	47.607	47.514	47.764	47.767
132+740.000	47.471	47.389	47.639	47.647	47.554	47.804	47.807
132+760.000	47.508	47.426	47.676	47.684	47.591	47.841	47.844
132+780.000	47.536	47.454	47.704	47.712	47.619	47.869	47.872
132+800.000	47.553	47.471	47.721	47.729	47.636	47.886	47.889
132+820.000	47.560	47.478	47.728	47.736	47.643	47.893	47.896
132+840.000	47.558	47.476	47.726	47.734	47.641	47.891	47.894
132+860.000	47.545	47.463	47.713	47.721	47.628	47.878	47.881
132+880.000	47.523	47.441	47.691	47.699	47.606	47.856	47.859
132+900.000	47.490	47.408	47.658	47.666	47.573	47.823	47.826
132+920.000	47.450	47.368	47.618	47.626	47.533	47.783	47.786
132+940.000	47.410	47.326	47.578	47.586	47.493	47.743	47.746
132+960.000	47.370	47.288	47.538	47.546	47.453	47.703	47.706
132+980.000	47.330	47.248	47.498	47.506	47.413	47.663	47.666

LOCATION	BEARING SIDE	STATION	H8	H9	H10	H11
ABUT. A1	B	132+633.494	45.015	44.970	44.924	44.878
PIER 1	A	132+672.044	45.082	45.047	45.001	44.955
	B	132+673.644	45.086	45.050	45.004	44.958
PIER 2	A	132+712.044	45.172	45.127	45.081	45.035
	B	132+713.644	45.176	45.130	45.084	45.038
PIER 3	A	132+752.199	45.253	45.207	45.161	45.115
	B	132+753.489	45.255	45.210	45.164	45.118
PIER 4	A	132+792.044	45.312	45.267	45.221	45.175
	B	132+793.644	45.316	45.270	45.224	45.178
PIER 5	A	132+832.044	45.334	45.288	45.242	45.196
	B	132+833.644	45.334	45.288	45.242	45.196
PIER 6	A	132+872.199	45.315	45.270	45.224	45.178
	B	132+873.489	45.313	45.267	45.221	45.175
PIER 7	A	132+912.044	45.256	45.210	45.164	45.118
	B	132+913.644	45.252	45.207	45.161	45.115
PIER 8	A	132+952.044	45.176	45.130	45.084	45.038
	B	132+953.644	45.172	45.127	45.081	45.035
ABUT. A2	A	132+992.194	45.085	45.050	45.004	44.958



1 AT EXPANSION
SCALE 1 : 50



2 AT FIXED
SCALE 1 : 50

	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	10/17/02	J. P. DE JESUS	BUREAU OF DESIGN			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Pilaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE IV	AS SHOWN	BRIDGE NO.14 TALAVERA RIVER BRIDGE TABLE OF ELEVATIONS (ULTIMATE STAGE)	B14G-09
	CHECKED	10/19/02	J. V. SANTOS	OFFICE OF THE SECRETARY						
SUBMITTED	10/21/02	M. B. BUSTOS	DANILLO C. TRAJANO - Project Director ADRIANO M. DORCY - Chief, Bridge Division GILBERTO S. REYES - Director IV (OIC) MANUEL M. BONDAN - Undersecretary SIMON A. DATUMANONG - Secretary							

SUMMARY OF QUANTITIES TALAVERA RIVER BRIDGE CROSSING (BRIDGE NO. 14)

ITEM NO.	DESCRIPTION	UNIT	QUANTITIES	REMARKS
PART F BRIDGE CONSTRUCTION				
I SUPERSTRUCTURE				
310(2)	Asphalt Mixture Wearing Course (t=50mm) incl. Tack Coat	m ²	2,970.00	
401(2)a	Steel Railing Type A for (Angat, Talavera and approach of Pampanga Bridge)	m	720.00	
SPL 401(3)c	Bridge Name Plate, 1000 x 600 for Talavera Bridge	ea.	2	
404(1)	Reinforcing Steel (Grade 40)	kg.	212,163.00	
404(2)	Reinforcing Steel (Grade 60)	kg.	91,653.00	
405(1)f	Structural Concrete Class AA2 (f _c =28 Mpa, max. aggregate 20mm) for Long Bridge Superstructures	m ³	978.69	
405(3)	Structural Concrete Class C (f _c =21 Mpa, max. aggregate 12mm) for Thin Reinforced Members	m ³	315.36	
406(1)j	Precast Prestressed Structural Concrete Member (AASHTO Girder Type VI Modified L=39.40m)	ea.	12	
406(1)m	Precast Prestressed Structural Concrete Member (AASHTO Girder Type VI Modified L=39.55m)	ea.	24	
407(1)e	Elastomeric Bearing Pad (600x400x50mm)	ea.	72	
407(2)b	Expansion Joint, Multiflex M100 (Elastomeric) ±50mm movement	m	40.80	
407(4)	G.I Drain Pipe Ø150mm for Bridge Drainage	m	154.98	
SPL 407(3)a	Restraining Bar Ø32mm x 1495mm	ea.	12	
SPL 407(3)b	Restraining Bar Ø32mm x 1900mm	ea.	12	
II SUBSTRUCTURE				
103(2)a	Bridge Excavation above OWL (Common Soil)	m ³	2,126.43	
103(2)c	Bridge Excavation below OWL (Common Soil)	m ³	2,507.46	
104(4)	Embankment from Borrow (Selected Granular Material) for Bridge	m ³	681.40	
200(1)	Aggregate Subbase Course	m ³	30.34	
400(15)a	Cast-in-place Concrete Bored Piles Ø 1000mm	m	448.00	
400(15)c	Cast-in-place Concrete Bored Piles Ø 1500mm	m	1155	
400(21)	Static Pile Load Test for Ø1500mm Bored Piles	ea.	2	
404(1)	Reinforcing Steel (Grade 40)	kg.	18,334.00	
404(2)	Reinforcing Steel (Grade 60)	kg.	489,578.00	
405(1)e	Structural Concrete Class AA1 (f _c =28 Mpa, max. aggregate 20mm) for Long Bridge Substructures	m ³	2,160.28	
405(6)	Lean Concrete (f _c =17 Mpa max. aggregate 38mm)	m ²	70.87	
SPL 311(2)	PCC Pavement (Reinforced) t=300mm Approach Slab	m ²	91.24	
SPL 400(23)a	High Strain Dynamic Pile Test for Ø1000mm Bored Piles	ea.	1	
SPL 400(24)	Pile Integrity Test for Bored Piles of Various Diameter	ea.	22	
SPL 900(3)	Provisional Sum for Geotechnical Investigation	l.s.	1	
III REVETMENT (RIVERBANK PROTECTION)				
101(7)	Removal of Existing Slope Protection	m ³	100.31	
101(8)	Removal of Existing Slope Protection (Hand-Laid Rock)	m ³	18.07	
101(9)	Removal of Existing Gabion	m ³	145.80	
103(1)	Structure Excavation	m ³	363.00	
104(3)	Embankment from borrow pit	m ³	382.65	
405(1)a	Structural Concrete Class A (f _c =21 Mpa, max. aggregate 38mm) for Heavily Reinf. Structures	m ³	30.51	
405(2)	Structural Concrete Class B (f _c =17 Mpa, max. aggregate 50mm) for Plain or Lightly Reinf. Structures	m ³	17.47	
SPL 407(5)c	Pier Protection Concrete Blocks for Talavera Bridge	m ²	898.00	
504(5)	Grouted Riprap Class A	m ³	7.03	
505(1)	Stone Masonry	m ³	40.51	
506(1)	Hand Laid Rock Apron (Loose Boulder Apron)	m ³	23.92	
507(2)b	Steel Sheet Piles (400mmx85mm), furnish & driven	m	756.00	
509(1)	Gabions, (2.0 x 1.0 x 0.50)	m ³	204.30	
510(1)	Rubble Concrete Slope Protection	m ³	101.22	
IV TEMPORARY WORKS				
SPL 420(4)c	Temporary Craneway for Talavera Bridge Construction	m	80.00	
SPL 420(5)c	Temporary Access Road (Causeway) for Talavera Bridge Construction	m	300.00	
SPL 420(6)d	Temporary Cofferdam for Pier Construction (Talavera Bridge)	ea.	3	
V ELECTRICAL WORKS				
SPL 620(4)c	Bridge Lighting Poles (Single Lamp)	ea.	12	
SPL 620(4)d	Street Lighting Service Pole with Panel	ea.	1	

	DESIGNED	19/11/02	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN	PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/19/02				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO.14 TALAVERA RIVER BRIDGE SUMMARY OF QUANTITIES	B14G-10
	SUBMITTED	10/21/02				CABANATUAN BYPASS - CONTRACT PACKAGE IV	FULL SIZE A1	(ULTIMATE STAGE)	