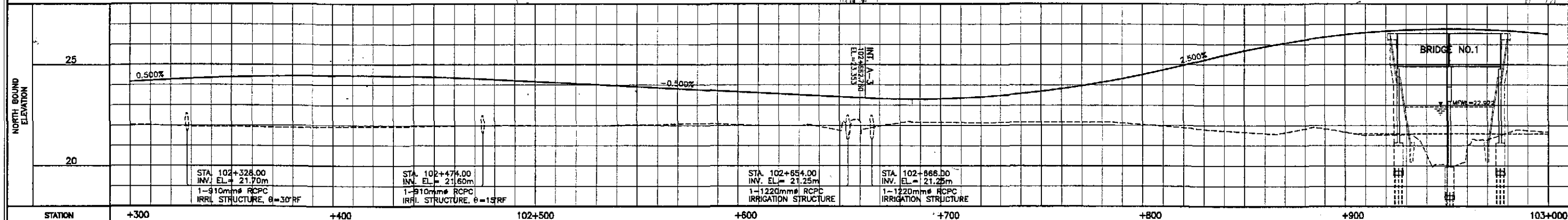
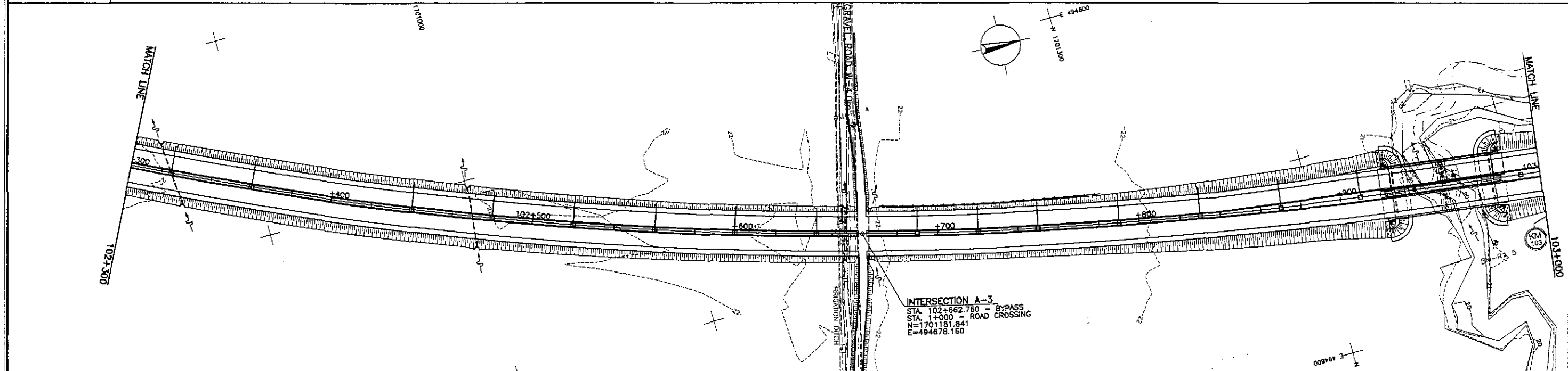
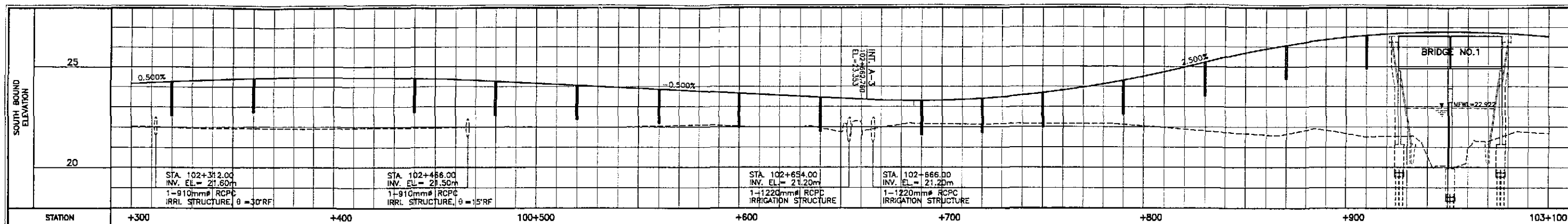


STATION	+600	+700	+800	+900	102+000	+100	+200	+300
FINISHED GRADE	24.047	23.998	23.916	23.816	23.716	23.616	23.516	23.416
TOP LEVEL OF CIM (MC)		20.113	21.647	23.998	23.916	23.816	23.716	23.616
INVERT LEVEL OF CROSS PIPE (MC)		20.113	21.647	23.998	23.916	23.816	23.716	23.616
TOP LEVEL OF CIM (FR)		20.053	21.119	23.175	23.283	23.390	23.497	23.604
INVERT LEVEL OF CROSS PIPE (FR)		20.053	21.119	23.175	23.283	23.390	23.497	23.604
INVERT LEVEL OF LONGITUDINAL PIPE (SB)								
INVERT LEVEL OF LONGITUDINAL PIPE (NB)								

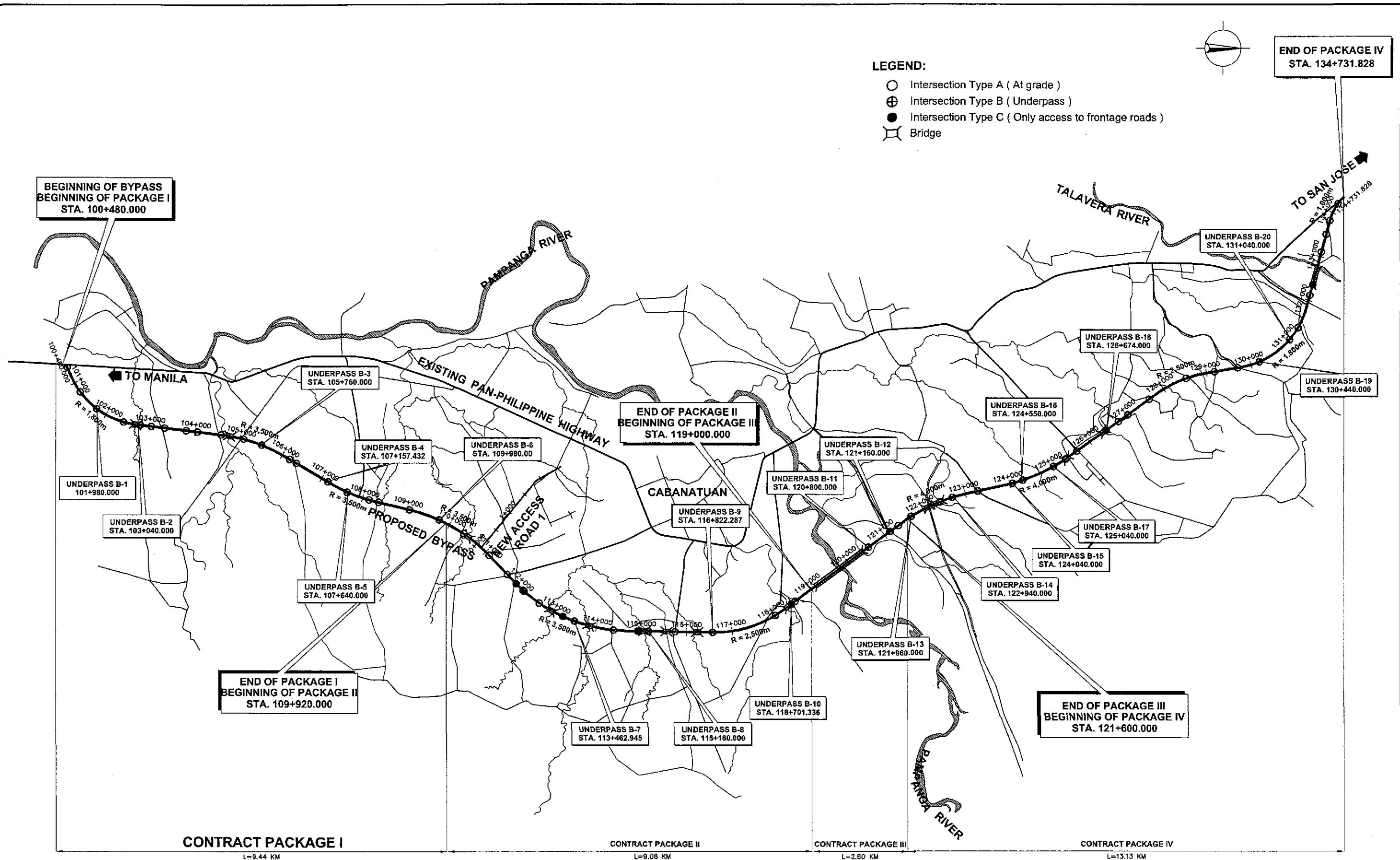
<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY <b>KATAHIRA &amp; ENGINEERS</b> <b>YEC</b> YACHIYO ENGINEERING CO., LTD.		DATE: 10/6/02 DESIGNED: [Signature] CHECKED: 10/10/02 [Signature] SUBMITTED: 10/16/02 [Signature]	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO Reviewed By: JOSEFINA M. ALAGAR Recommended By: GILBERTO S. REYES Office of the Secretary: MANUEL M. BONGAN 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 I	SCALE : HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1	SHEET CONTENTS : SURFACE DRAINAGE PLAN AND PROFILE ALONG BYPASS (ULTIMATE STAGE) STA. 101+600 - STA. 102+300	SHEET NO. : DP-03
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STATION	+300	+400	102+500	+600	+700	+800	+900	103+000
FINISHED GRADE	24.266	24.353	24.416	24.453	24.466	24.453	24.416	24.353
TOP LEVEL OF CIM (MC)	20.629	22.163	22.104	22.126	22.125	22.277	22.176	22.176
INVERT LEVEL OF CROSS PIPE (MC)								
TOP LEVEL OF CIM (FR)								
INVERT LEVEL OF CROSS PIPE (FR)	20.569	20.510	20.532	20.584	20.569	20.628	20.618	20.531
INVERT LEVEL OF LONGITUDINAL PIPE (SB)								
INVERT LEVEL OF LONGITUDINAL PIPE (NB)								








<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY <b>KATAHIRA &amp; ENGINEERS</b> INTERNATIONAL		<b>YEO</b> YACHIYO ENGINEERING CO., LTD.		DATE: 10/5/02 SIGNATURE: [Signature] DESIGNED: [Signature]		DATE: 10/5/02 SIGNATURE: [Signature] CHECKED: [Signature]		DATE: 10/16/02 SIGNATURE: [Signature] SUBMITTED: [Signature]		PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) <b>CABANATUAN BYPASS - CONTRACT PACKAGE I</b>		SCALE: HORIZONTAL 1:1000 VERTICAL 1:100 FULL SIZE A1		SHEET CONTENTS: <b>SURFACE DRAINAGE PLAN AND PROFILE</b> ALONG BYPASS (ULTIMATE STAGE) STA. 102+300 - STA. 103+000		SHEET NO.: <b>DP-04</b>	
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# **UNDERPASS CROSSING ( BOX CULVERT )**



**A**  
UP-01  
SCALE 1:40,000

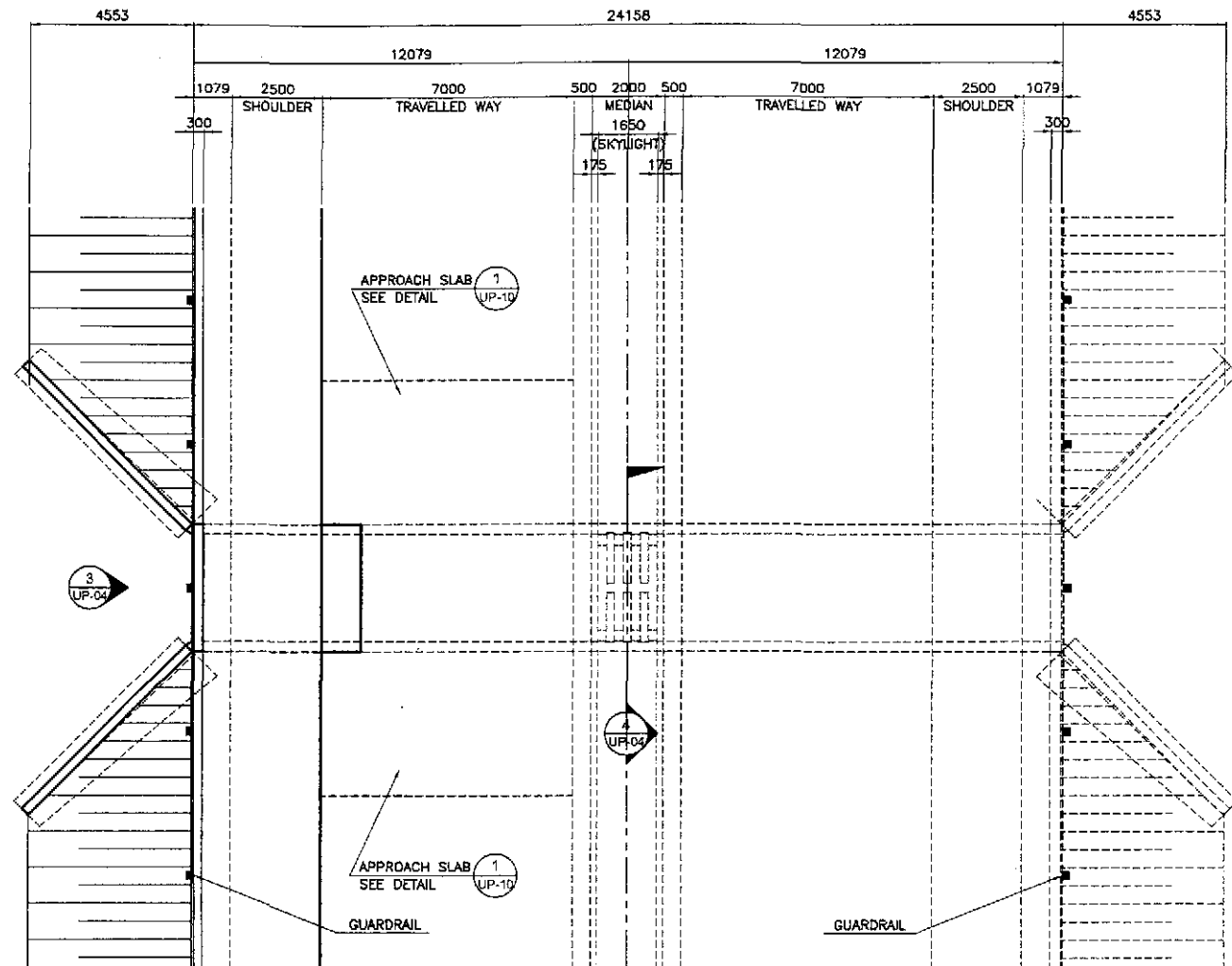
**SITE DEVELOPMENT PLAN - UNDERPASSES ALONG BYPASS**

<div> JAPAN INTERNATIONAL COOPERATION AGENCY</div> <div> KATAHIRA &amp; ENGINEERS INTERNATIONAL YACHIYO ENGINEERING CO., LTD.</div>			<div>DATE: 10/16/02</div> <div>SIGNATURE: </div>		<div> REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</div> <div><div>PUBL - PMO</div><div>BUREAU OF DESIGN</div><div>OFFICE OF THE SECRETARY</div></div>			<div>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 I</div>		<div>SCALE : 1:40,000 FULL SIZE A1</div>	<div>SHEET CONTENTS : SITE DEVELOPMENT PLAN UNDERPASSES ALONG BYPASS</div>	<div>SHEET NO. : UP-01</div>					
<div>DESIGNED: 10/16/02 </div>			<div>Submitted By: DANILO C. TRAJANO Project Director</div>			<div>Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division</div>			<div>Recommended By: GILBERTO S. REYES OIC, Director IV</div>			<div>Recommended By: MANUEL M. BONGAN Undersecretary</div>			<div>Approved By:  (See cover sheet for Signature/Approval) SIMON A. DATUMANONG Secretary</div>		

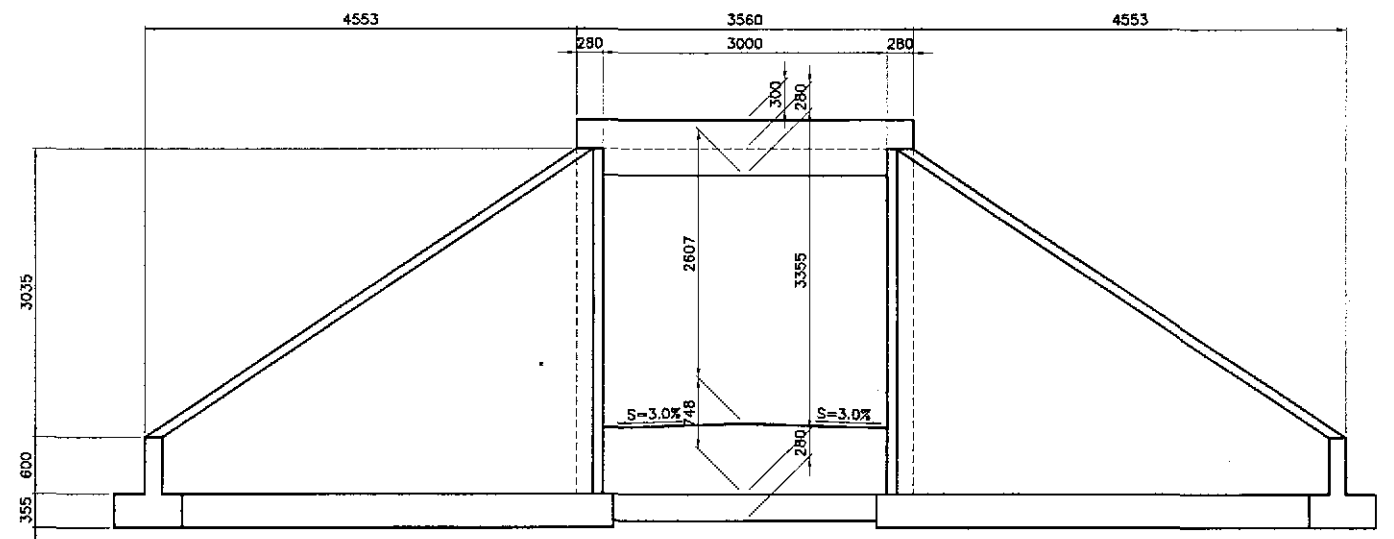




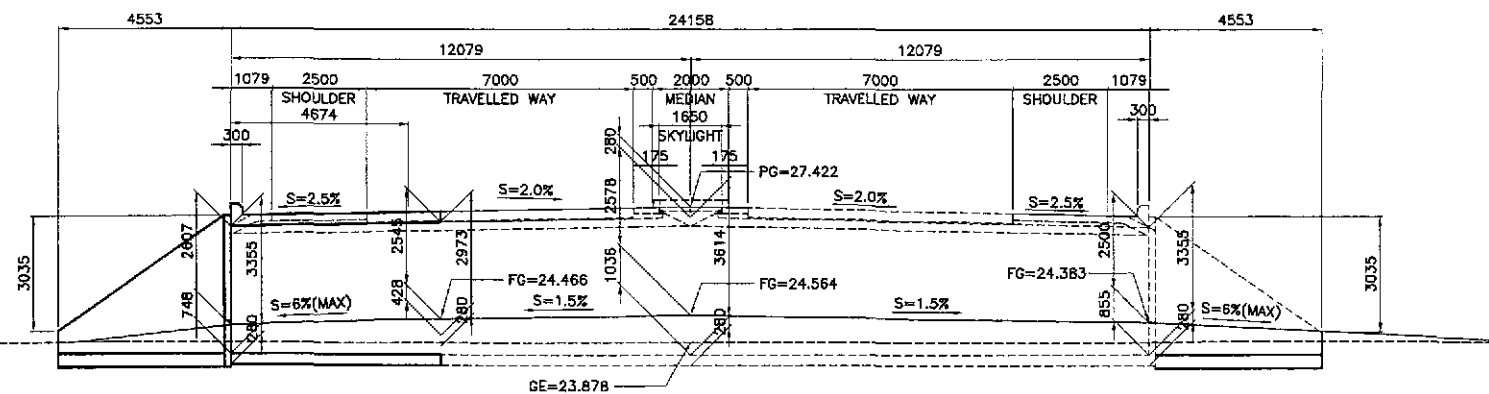




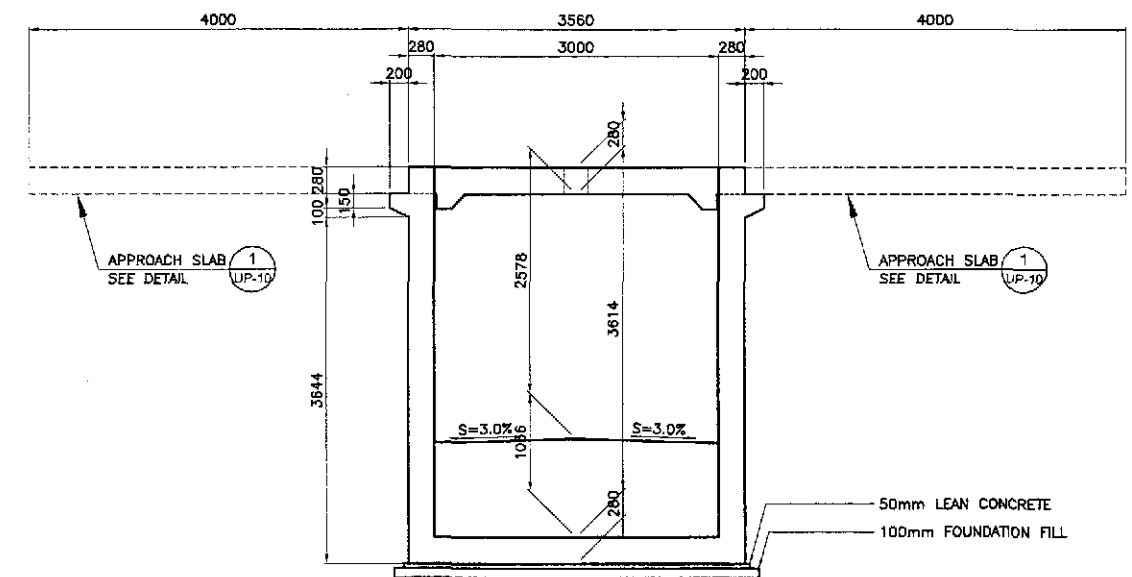
1 GENERAL PLAN  
UP-04 SCALE 1:100



3 ELEVATION  
UP-04 SCALE 1:40

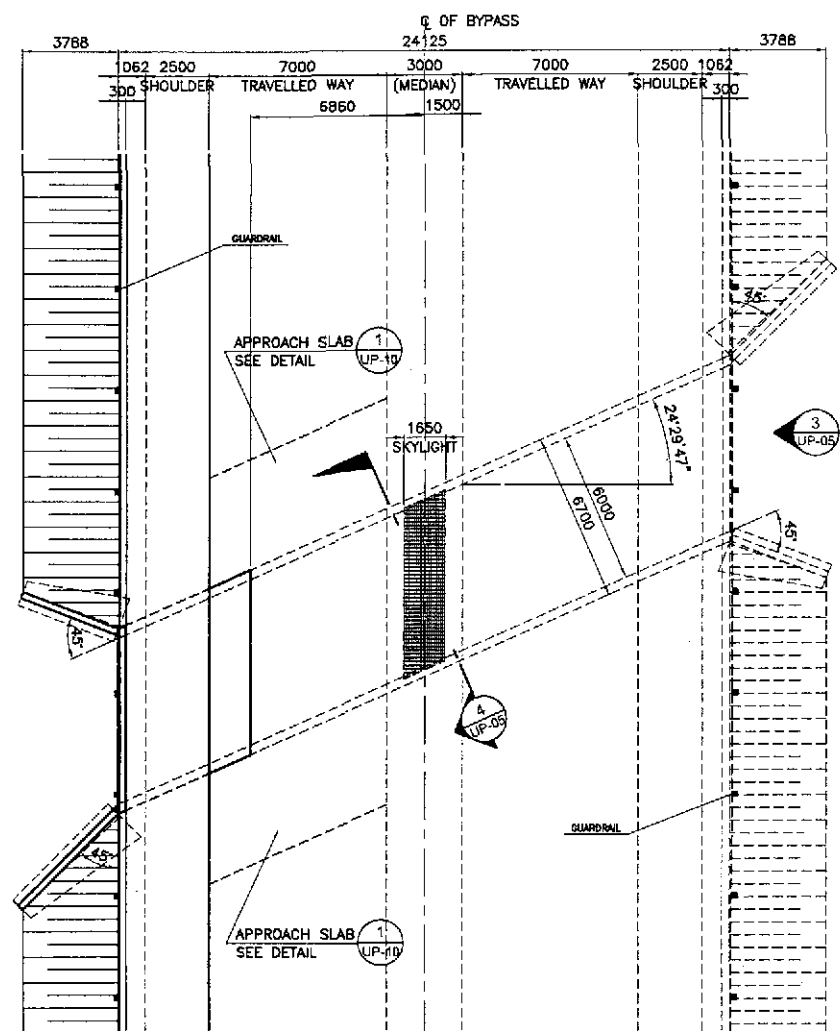


2 GENERAL ELEVATION  
UP-04 SCALE 1:100

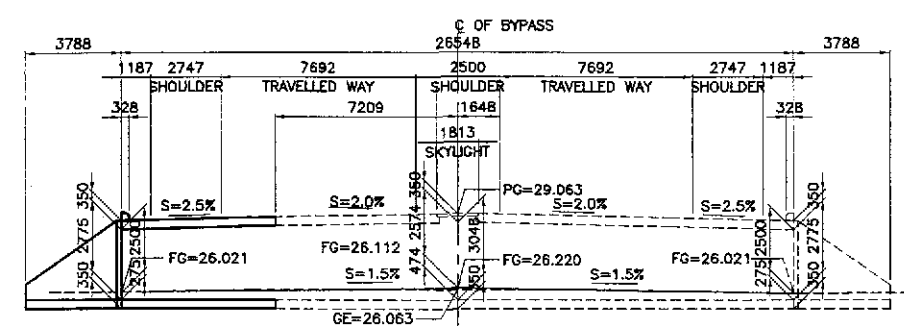


4 SECTION  
UP-04 SCALE 1:40

<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL YEO YACHIYO ENGINEERING CO., LTD.		DATE: 10/5/02 DESIGNED: [Signature] CHECKED: 10/8/02 SUBMITTED: 10/16/02	SIGNATURE: [Signature] TEAM LEADER: M. RICH PROJECT DIRECTOR: DANILLO C. TRAJANO CHIEF, HIGHWAYS DIVISION: JOSEFINA M. ALAGAR OIC, DIRECTOR IV: GILBERTO S. REYES UNDERSECRETARY: MANUEL M. BONOAN SECRETARY: SIMEDON A. DATUMANONG	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE 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 I	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (ULTIMATE STAGE) B-3 (STA. 105+760.00)	SHEET NO. : UP-04
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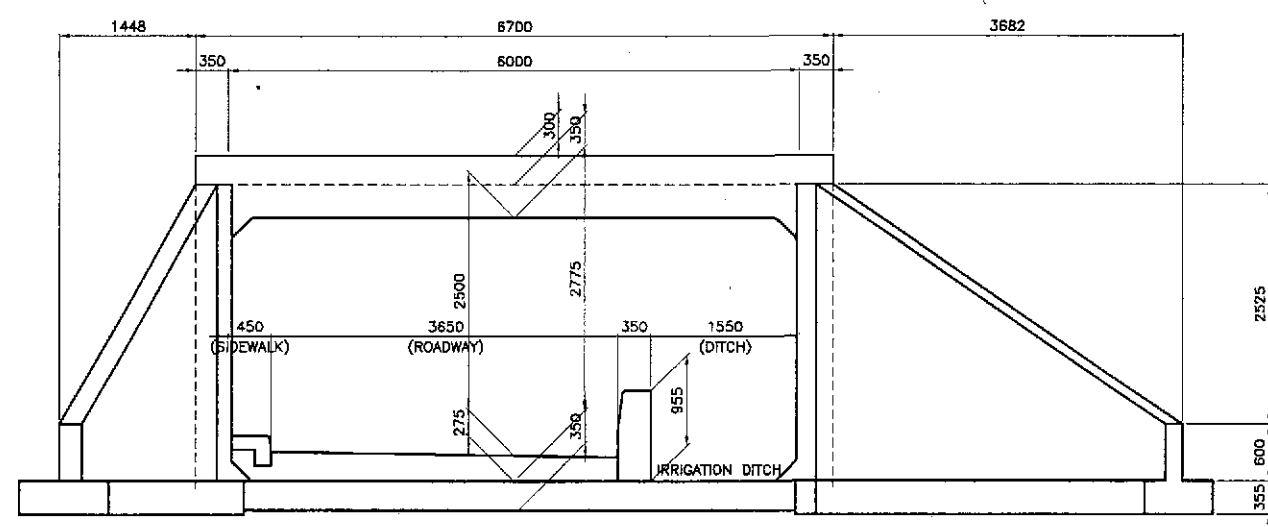


1 GENERAL PLAN  
UP-05 SCALE 1:150

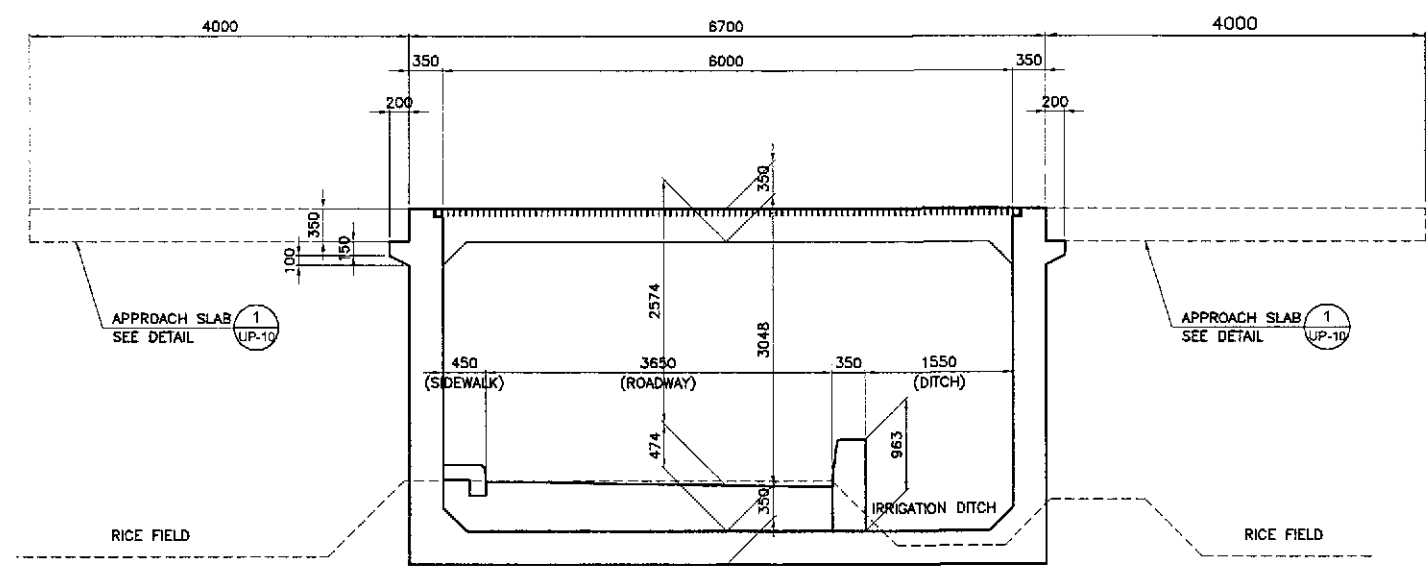


NOTE:  
THE HORIZONTAL DIMENSIONS INDICATED IN THIS ELEVATION ARE SKEWED LENGTH








2 GENERAL ELEVATION  
UP-05 SCALE 1:150

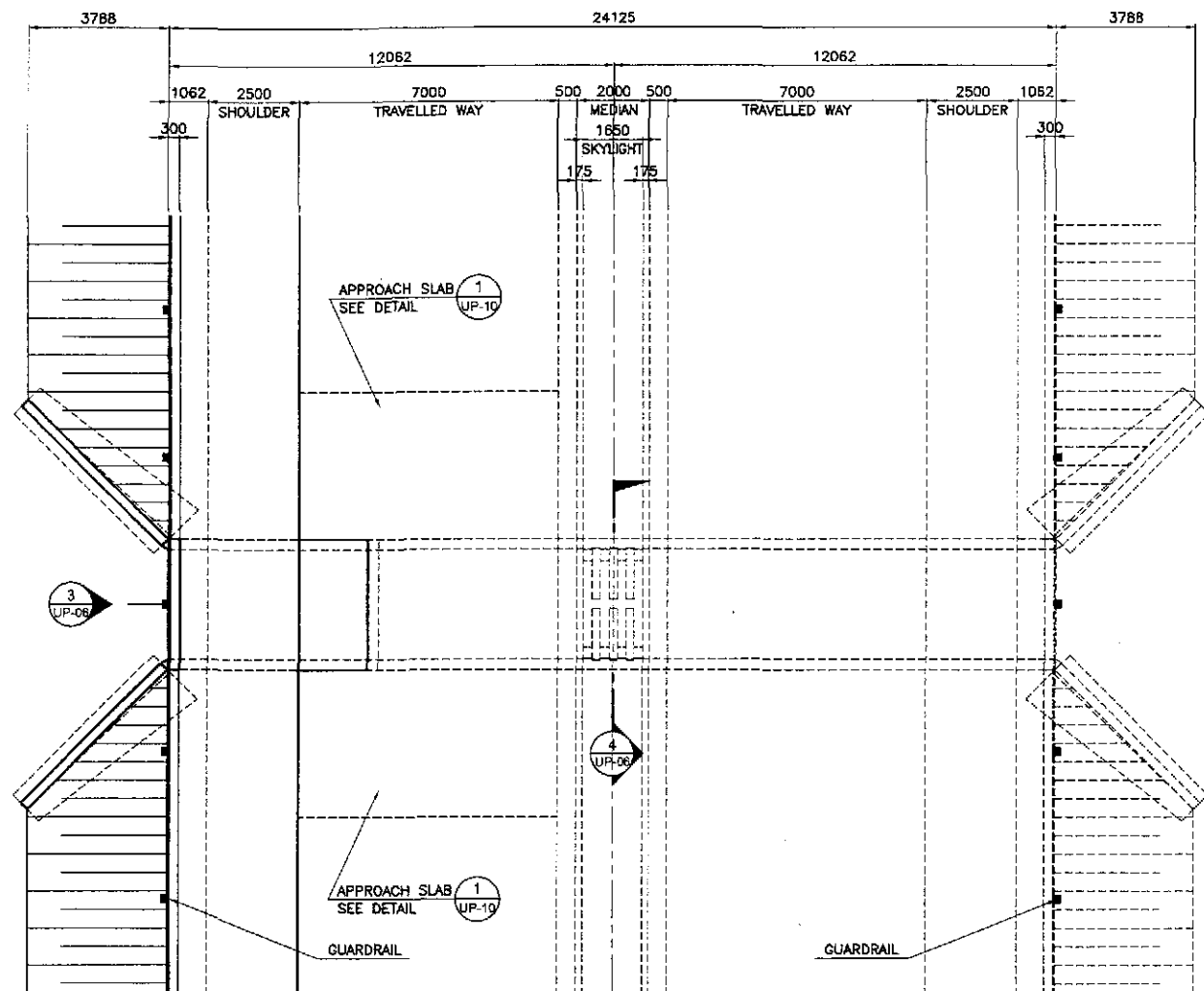


4 SECTION  
UP-05 SCALE 1:40

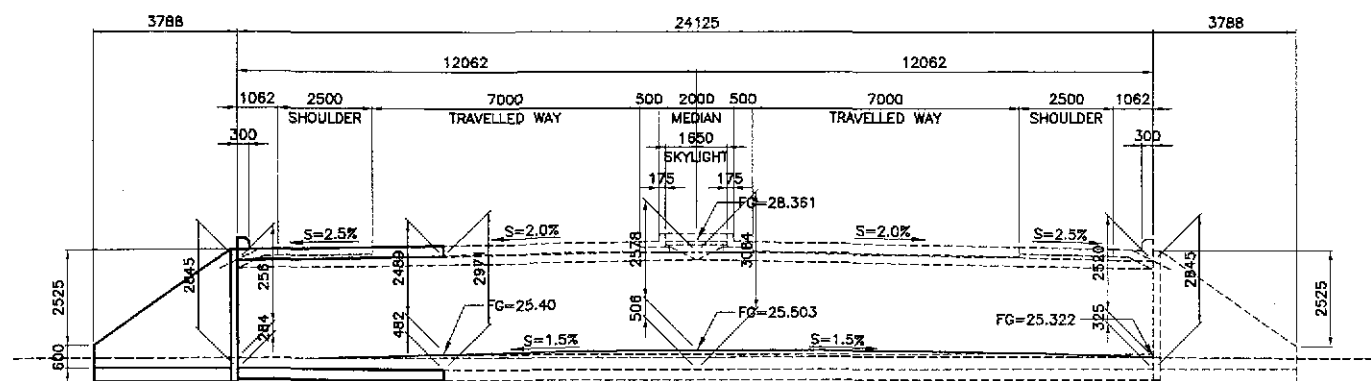


4 SECTION  
UP-05 SCALE 1:40

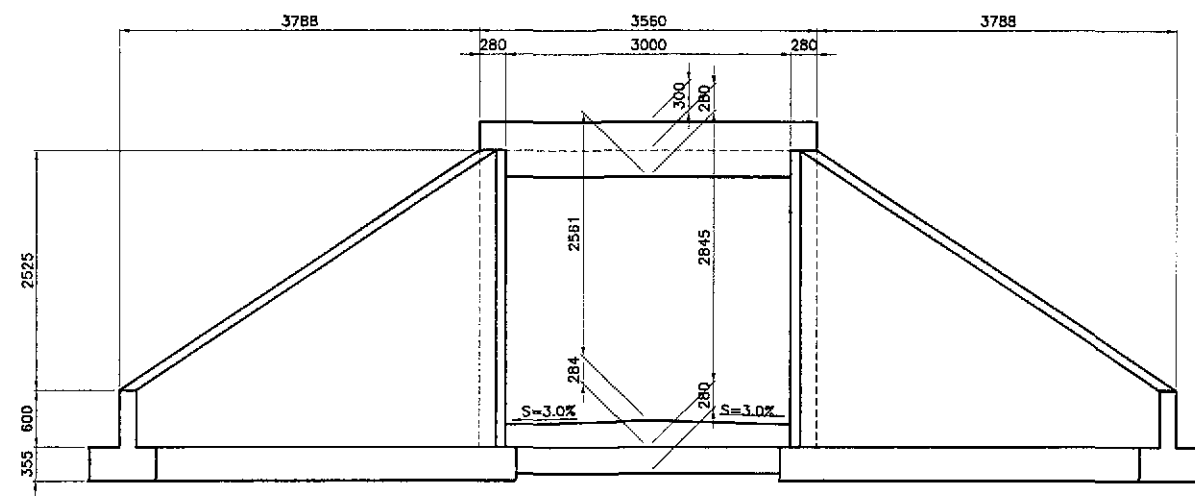
 JAPAN INTERNATIONAL COOPERATION AGENCY		 KATAHIRA & ENGINEERS INTERNATIONAL		 YACHIYO ENGINEERING CO., LTD.		<div>DATE 10/5/02</div> <div>SIGNATURE </div> <div>DESIGNED EHA</div> <div>CHECKED 10/15/02</div> <div>SUBMITTED 10/16/02</div> <div><div>SIGNATURE </div><div>RAKIM</div><div>SIGNATURE </div><div>M. KUCHI TEAM LEADER</div></div>	<div> REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</div> <div><div>BUREAU OF DESIGN</div><div>OFFICE OF THE SECRETARY</div></div> <div><div>Submitted By:</div><div>Reviewed By:</div><div>Recommended By:</div></div> <div><div>DANILO C. TRAJANO Project Director</div><div>JOSEFINA M. ALAGAR Chief, Highways Division</div><div>GILBERTO S. REYES O.C., Director IV</div></div> <div><div>(See cover sheet for Signature/Approve)</div><div>(See cover sheet for Signature/Approve)</div></div> <div><div>MANUEL M. BONGAON Undersecretary</div><div>SIMEON A. DATUMANDONG Secretary</div></div>	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 I	SCALE :  AS SHOWN  FULL SIZE A1	SHEET CONTENTS :  BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (ULTIMATE STAGE) B-4 (STA. 107+157.432)	SHEET NO. :  UP-05
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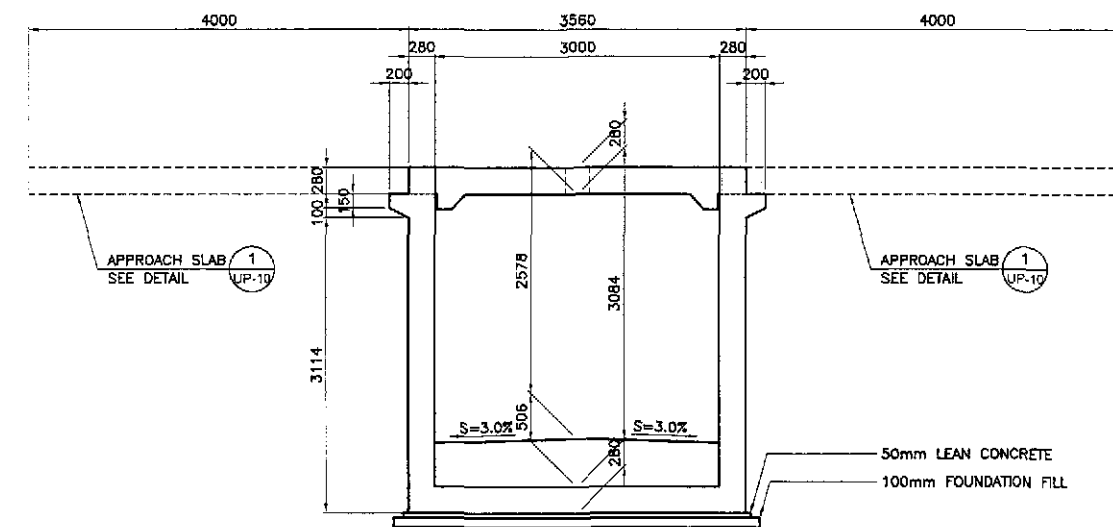
1 GENERAL PLAN  
UP-06 SCALE 1:100



2 GENERAL ELEVATION  
UP-06 SCALE 1:100

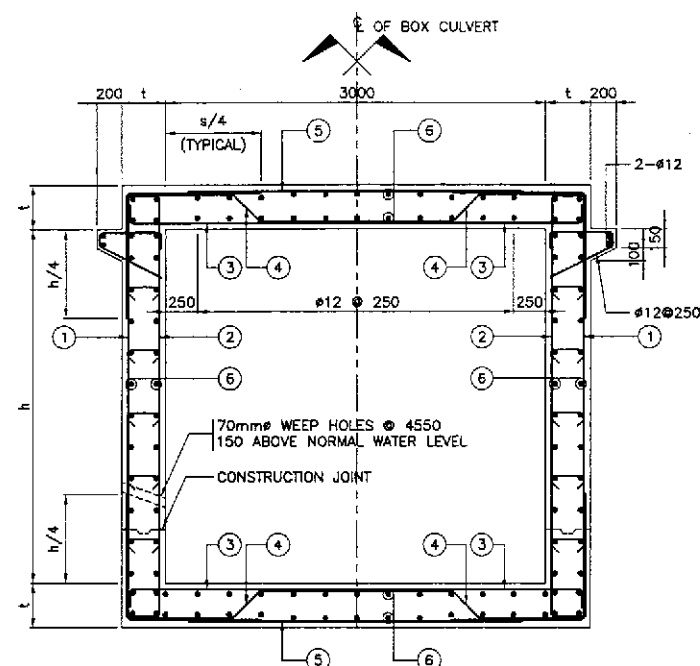


3 ELEVATION  
UP-06 SCALE 1:40

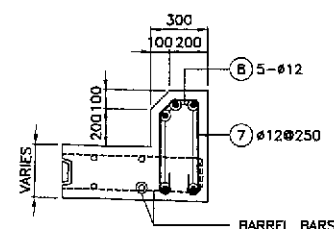


4 SECTION  
UP-06 SCALE 1:40

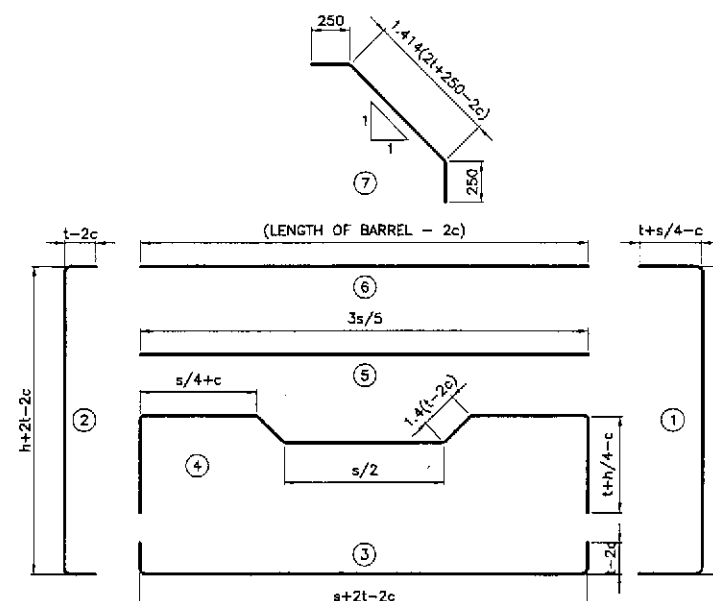
<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY <b>KATAHIRA &amp; ENGINEERS</b> INTERNATIONAL <b>yeo</b> YACHIYO ENGINEERING CO., LTD.		DATE: 10/15/02 DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: 10/16/02	SIGNATURE: [Signature] TEAM LEADER	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE SECRETARY	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 I	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (ULTIMATE STAGE) B-5 (STA. 107+640.00)	SHEET NO. : UP-06
		SUBMITTED BY: [Signature] DANILLO C. TRAJANO Project Director	REVIEWED BY: [Signature] JOSEFINA M. ALAGAR Chief, Highways Division	RECOMMENDED BY: [Signature] GILBERTO S. REYES OIC, Director IV	APPROVED BY: [Signature] MANUEL M. BONOAN Undersecretary	APPROVED BY: [Signature] SIMEON A. DATUMANONG Secretary		



1 SECTION - SINGLE BARREL  
UP-07 NOT TO SCALE



2 PARAPET DETAIL  
UP-07 SCALE 1:20



3 BAR BENDING DIAGRAM - SINGLE BARREL  
UP-07 NOT TO SCALE

# DESIGN NOTES :

## SPECIFICATIONS:

DESIGN: BRIDGE DESIGN SPECIFICATION (1992 AASHTO SPECIFICATIONS)

## LOAD FACTORS:

$$1.3 (D + 1.67 LL + 1.00 E)$$

$$1.3 (D + 1.67 LL + 0.50 E)$$

## WHERE:

D - DEAD LOAD  
E - EARTH LOAD  
L - LIVE LOAD  
I - IMPACT

CAPACITY REDUCTION FACTOR IS INCLUDED.

## LOADING:

LIVE LOAD: HS20-44 TRUCK  
APPLY IMPACT ONLY TO THE ROOF SLAB.

EARTH COVER (mm)	IMPACT (%)
Up to 300	30
301 to 600	20
601 to 900	10
Over 900	0

NO SURCHARGE ON WALL DUE TO LIVE LOAD.

## EARTH LOAD:

EARTH PRESSURE FOR CONDITIONS:  
18.8 kPa/m VERTICAL  
9.4 kPa/m HORIZONTAL

## UNIT STRESSES:

$$f'_c = 28 \text{ MPa}$$

$$f_y = 276 \text{ MPa}$$

## DISTRIBUTION "d" BARS:

UP TO AND INCLUDING 3.0M COVER EXPRESSED AS A PERCENT  
OF MAIN POSITIVE REINFORCEMENT REQUIRED:  
 $\frac{55}{5}$ , MAX. 50%

OVER 3.0 COVER  
#12 @ 450 mm MAXIMUM.

## SHEAR:

$$\text{ULTIMATE SHEAR, } v = 0.16 \sqrt{f'_c} \text{ MPa}$$

## EXCLUSIONS:

COMPRESSIVE REINFORCEMENT AND NEGATIVE-MOMENT  
REDUCTION (FOR CONTINUITY) DO NOT APPLY.  
AXIAL LOADING ON MEMBERS HAS NOT BEEN CONSIDERED.

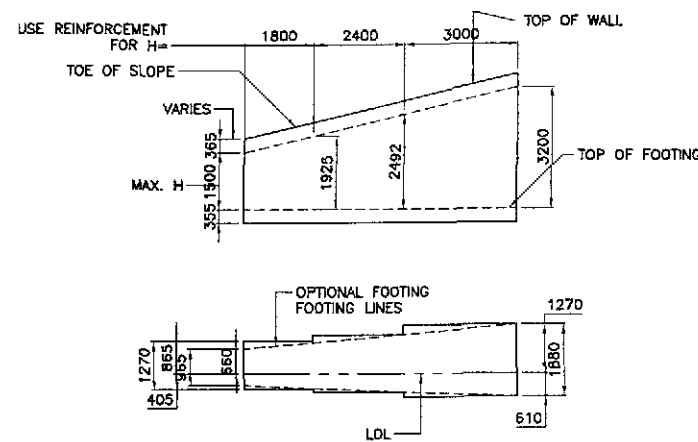
BAR SCHEDULE SINGLE BARREL BOX CULVERT																		
NAME	S	h	t	BAR 1		BAR 2		BAR 3		BAR 4		BAR 5		BAR 6		BAR 7		REMARKS
	SPAN	HEIGHT	THICKNESS	#	SPACING	#	SPACING	#	SPACING	#	SPACING	#	SPACING	#	SPACING	#	SPACING	
B-1	3000	3500	280	16	200	16	180	16	200	16	200	12	200	12	250	—	—	FLUSHED TO ROADWAY
B-2	3000	3500	280	16	200	16	180	16	200	16	200	12	200	12	250	—	—	ON FILL
B-3	3000	3600	280	16	200	16	180	16	200	16	200	12	200	12	250	—	—	FLUSHED TO ROADWAY
B-4	6000	3000	280	20	200	20	220	20	200	20	200	12	200	12	250	—	—	FLUSHED TO ROADWAY (SKEW 24.5°)
B-5	3000	3100	280	16	200	16	180	16	200	16	200	12	200	12	250	—	—	FLUSHED TO ROADWAY

SCHEDULE OF REINFORCEMENTS (B1 - STA. 101+980.00)															
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	VOLUME OF CONC. (m <sup>3</sup> )
BARREL L=5.829m.	1	16	62	200	(A)	980	3877	980	-	-	-	5837	361.91	1.579	572
	2	16	66	180	(A)	180	3877	180	-	-	-	4237	279.66	1.579	442
	3	16	62	200	(B)	180	3460	180	-	-	-	3820	236.84	1.579	374
	4	16	60	200	(C)	1084	800	255	1500	-	-	5778	346.66	1.579	548
	5	12	62	200	(D)	2000	-	-	-	-	-	2000	124	0.888	111
	6	12	128	250	(D)	5828	-	-	-	-	-	5828	745.98	0.888	663
	7	12	30	250	(E)	114	380	71	150	480	114	1309	39.26	0.888	35
	8	12	10	AS DWG	(D)	3460	-	-	-	-	-	3460	34.6	0.888	31
	9	12	58	250	(H)	430	70	608	-	-	-	1108	64.27	0.888	58
	10	12	4	AS DWG	(D)	6900	-	-	-	-	-	6900	27.6	0.888	25
WINOWALLS (H+)=3.097m.	W1	12	4	AS DWG	(D)	600	7734	-	-	-	-	8334	33.33	0.888	30
	W2	12	24	300	(D)	3743	-	-	-	-	-	3743	89.84	0.888	80
	W3a	25	28	200	(I)	1208	3411	150	-	-	-	4769	133.53	3.854	516
	W3b	16	16	250	(I)	748	2379	150	-	-	-	3277	52.43	1.579	83
	W3c	12	8	350	(I)	698	1345	150	-	-	-	2194	17.55	0.888	16
	W4	12	44	300	(I)	203	2379	150	-	-	-	2732	120.19	0.888	107
	W5a	25	12	400	(D)	1800	-	-	-	-	-	1800	21.6	3.854	84
	W5b	16	16	250	(D)	1219	-	-	-	-	-	1219	19.5	1.579	31
	W5c	12	8	350	(D)	817	-	-	-	-	-	817	6.54	0.888	6
	W6	12	14	AS DWG	(D)	6685	-	-	-	-	-	6685	93.59	0.888	84
GRAND TOTAL = 3895 KG														40.3	

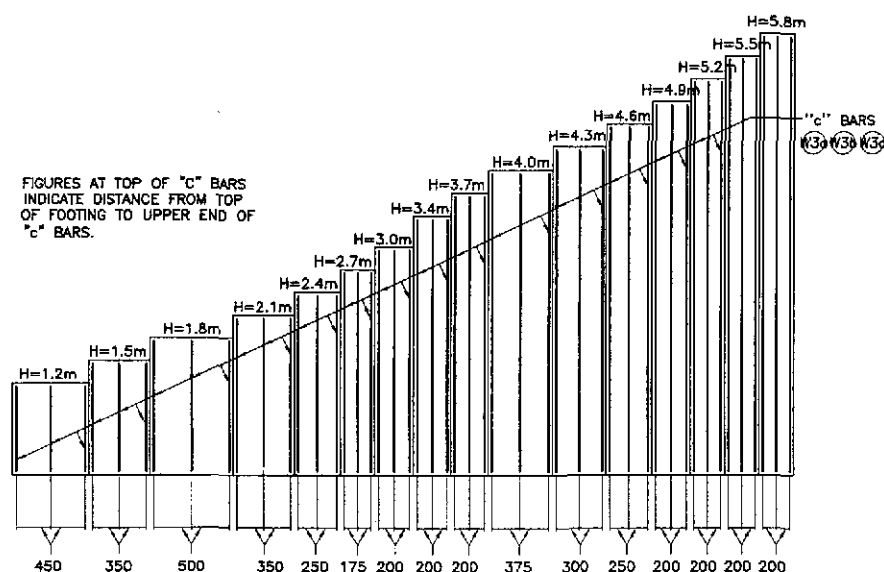
SCHEDULE OF REINFORCEMENTS (B2 - STA. 103+040.00)															
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	VOLUME OF CONC. (m <sup>3</sup> )
BARREL L=5.871m.	1	16	70	200	(A)	980	3975	980	-	-	-	5935	415.45	1.579	656
	2	16	76	180	(A)	180	3975	180	-	-	-	4335	329.46	1.579	521
	3	16	70	200	(B)	180	3460	180	-	-	-	3820	267.4	1.579	423
	4	16	68	200	(C)	1109	800	255	1500	-	-	5627	396.21	1.579	626
	5	12	70	200	(D)	2000	-	-	-	-	-	2000	140	0.888	125
	6	12	128	250	(D)	6771	-	-	-	-	-	6771	866.68	0.888	770
	7	12	30	250	(E)	114	380	71	150	480	114	1309	39.26	0.888	35
	8	12	10	AS DWG	(D)	3460	-	-	-	-	-	3460	34.6	0.888	31
	9	12	58	250	(H)	430	70	608	-	-	-	1108	64.27	0.888	58
	10	12	4	AS DWG	(D)	6900	-	-	-	-	-	6900	27.6	0.888	25
WINOWALLS (H+)=3.795m.	W1	12	4	AS DWG	(D)	600	8506	-	-	-	-	9106	36.42	0.888	33
	W2	12	26	300	(D)	4123	-	-	-	-	-	4123	107.2	0.888	96
	W3a	25	30	200	(I)	1212	3492	150	-	-	-	4854	145.64	3.854	582
	W3b	16	26	175	(I)	752	2428	150	-	-	-	3330	86.57	1.579	137
	W3c	12	12	275	(I)	702	1362	150	-	-	-	2214	26.57	0.888	24
	W4	12	48	300	(I)	203	2428	150	-	-	-	2780	133.46	0.888	119
	W5a	25	14	400	(D)	1883	-	-	-	-	-	1893	26.5	3.854	103
	W5b	20	12	350	(D)	1456	-	-	-	-	-	1456	17.47	2.466	44
	W5c	12	12	275	(D)	913	-	-	-	-	-	913	10.96	0.888	10
	W6	12	14	AS DWG	(D)	7328	-	-	-	-	-	7328	102.59	0.888	92
GRAND TOTAL = 4407 KG														49.5	

SCHEDULE OF REINFORCEMENTS (B3 - STA. 105+740.00)															
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	VOLUME OF CONC. (m <sup>3</sup> )
BARREL L=5.819m.	1	16	60	200	(A)	980	3944	980	-	-	-	5804	354.27	1.579	560
	2	16	64	180	(A)	180	3944	180	-	-	-	4304	275.49	1.579	435
	3	16	60	200	(B)	180	3460	180	-	-	-	3820	229.2	1.579	362
	4	16	58	200	(C)	1101	800	255	1500	-	-	5611	337.06	1.579	533
	5	12	60	200	(D)	2000	-	-	-	-	-	2000	120	0.888	107
	6	12	128	250	(D)	5719	-	-	-	-	-	5719	732.03	0.888	651
	7	12	30	250	(E)	114	380	71	150	480	114	1309	39.26	0.888	35
	8	12	10	AS DWG	(D)	3460	-	-	-	-	-	3460	34.6	0.888	31
	9	12	58	250	(H)	430	70	608	-	-	-	1108	64.27	0.888	58
	10	12	4	AS DWG	(D)	6900	-	-	-	-	-	6900	27.6	0.888	25
WINOWALLS (H+)=3.785m.	W1	12	4	AS DWG	(D)	600	8098	-	-	-	-	8698	34.79	0.888	31
	W2	12	26	300	(D)	3923	-	-	-	-	-	3923	101.99	0.888	91
	W3a	25	28	200	(I)	1211	3457	150	-	-	-	4828	135.19	3.854	522
	W3b	16	24	175	(I)	751	2412	150	-	-	-	3313	79.52	1.579	126
	W3c	12	8	350	(I)	701	1357	150	-	-	-	2208	17.67	0.888	16
	W4	12	46	300	(I)	203	2412	150	-	-	-	2765	127.2	0.888	113
	W5a	25	12	400	(D)	1900	-	-	-	-	-	1900	22.8	3.854	88
	W5b	20	12	350	(D)	1460	-	-	-	-	-	1460	17.52	2.466	44
	W5c	12	8	350	(D)	816	-	-	-	-	-	816	6.52	0.888	6
	W6	12	14	AS DWG	(D)	6988	-	-	-	-	-	6988	97.83	0.888	87
GRAND TOTAL = 3921 KG														41.83	

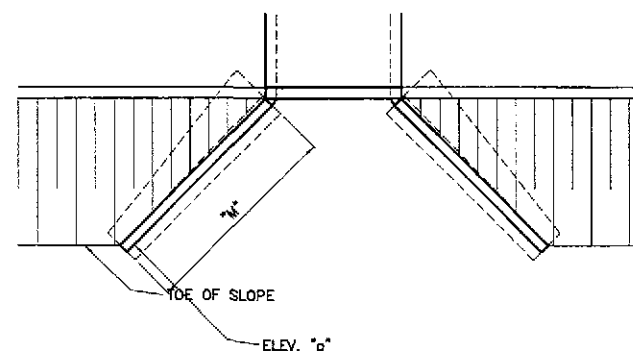
SCHEDULE OF REINFORCEMENTS (B4 — STA. 107+157.432)																
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m <sup>3</sup> )
						a	b	c	d	e	f					
BARREL L=6.038m.	1	20	62	200	(A)	1800	3512	1800	—	—	—	7112	440.91	2.466	1088	44.88
	2	20	60	200	(A)	250	3512	250	—	—	—	4012	240.69	2.466	594	
	3	20	62	200	(A)	250	6600	250	—	—	—	7100	440.2	2.466	1086	
	4	20	60	200	(B)	1028	1550	354	3000	—	—	8863	531.77	2.466	1312	
	5	12	62	200	(C)	4000	—	—	—	—	—	4000	248	0.888	221	
	6	12	168	250	(C)	5838	—	—	—	—	—	5838	997.53	0.888	886	
	7	16	112	200	(D)	560	1202	560	—	—	—	2322	260.05	1.579	411	
	8	12	60	250	(E)	114	450	71	150	550	114	1449	86.92	0.888	78	
	9	12	10	AS DWG	(D)	6580	—	—	—	—	—	6590	65.9	0.888	59	
	10	12	58	250	(H)	500	70	707	—	—	—	1277	74.07	0.888	66	
	11	12	4	AS DWG	(D)	6900	—	—	—	—	—	6900	27.6	0.888	25	
DITCH WALL	12	20	29	200	(J)	209	371	1147	317	—	—	2044	59.28	2.466	147	2.46
	13	16	29	200	(K)	209	1527	317	—	—	—	2053	59.54	1.579	95	
	14	12	10	AS DWG	(D)	5403	—	—	—	—	—	5403	54.03	0.888	48	
	15	12	57	400	(C)	114	274	114	—	—	—	502	28.61	0.888	26	
	WINOWALL (H+)=3.252m L=5.056m.	W1	12	2	AS DWG	(D)	600	6798	—	—	—	—	7398	14.8	0.888	
W2		12	11	300	(D)	3386	—	—	—	—	—	3396	37.35	0.888	34	
W3a		20	12	200	(I)	830	2237	150	—	—	—	3917	47	2.466	116	
W3b		16	7	250	(I)	730	1939	150	—	—	—	2819	19.73	1.579	32	
W3c		12	3	350	(I)	680	1163	150	—	—	—	1993	5.98	0.888	6	
W4		12	20	300	(I)	203	2161	150	—	—	—	2514	50.28	0.888	45	
W5a		25	6	400	(D)	1715	—	—	—	—	—	1715	10.29	3.854	40	
W5b		16	7	250	(D)	1229	—	—	—	—	—	1229	8.6	1.579	14	
W5c		12	3	350	(D)	822	—	—	—	—	—	822	2.47	0.888	3	
WINOWALL (H+)=3.252m L=4.349m.	W6	12	7	AS DWG	(D)	5906	—	—	—	—	—	5906	41.34	0.888	37	5.87
	W1	12	2	AS DWG	(D)	600	5227	—	—	—	—	5827	11.65	0.888	11	
	W2	12	11	300	(D)	2567	—	—	—	—	—	2597	28.56	0.888	26	
	W3a	20	9	200	(I)	830	3048	150	—	—	—	4028	36.25	2.466	90	
	W3b	16	5	250	(I)	730	2161	150	—	—	—	3041	15.2	1.579	25	
	W3c	12	2	350	(I)	680	1274	150	—	—	—	2104	4.21	0.888	4	
	W4	12	15	300	(I)	203	2161	150	—	—	—	2514	37.71	0.888	34	
W5a	25	5	400	(D)	1715	—	—	—	—	—	1715	8.58	3.854	34		
W5b	16	5	250	(D)	1229	—	—	—	—	—	1229	6.14	1.579	10		
W5c	12	2	350	(D)	822	—	—	—	—	—	822	1.64	0.888	2		
W6	12	7	AS DWG	(D)	4599	—	—	—	—	—	4599	32.19	0.888	29		
GRAND TOTAL =													6748 KG	80.34		



1 TYPICAL LAYOUT EXAMPLE  
UP-09 SCALE 1:100



2 TYPICAL SECTION  
H=1.2 m THRU 3.7 m  
UP-09 SCALE 1:20



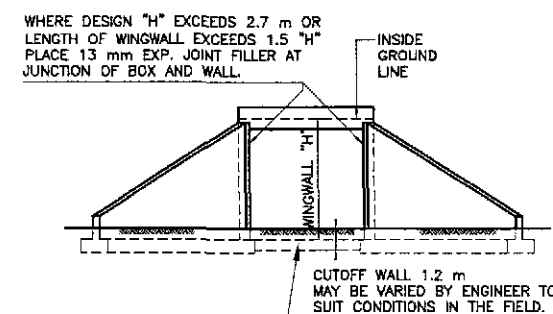
3 TYPICAL SECTION  
H=4.0 m THRU 4.9 m  
UP-09 SCALE 1:20

REINFORCED CONCRETE WINGWALLS																
H	1200	1500	1800	2100	2400	2700	3000	3400	3700	4000	4300	4600	4900	5200	5500	5800
W	965	1120	1270	1420	1575	1730	1880	2030	2185	2335	2490	2640	2795	2945	3050	3150
C	305	355	405	455	510	560	610	660	710	760	815	865	915	965	1015	1065
B	660	765	865	965	1065	1170	1270	1370	1475	1575	1675	1775	1880	1980	2035	2085
F	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355
Batter	None	None	None	None	None	None	None	None	None	1:25	1:25	1:25	1:25	1:25	1:25	1:27
S	305	305	305	305	305	305	305	305	305	465	475	490	500	500	500	500
"c" Bars	12Ø450	12Ø350	12Ø275	16Ø350	16Ø250	16Ø175	20Ø200	25Ø200	25Ø200	32Ø375	32Ø300	32Ø250	32Ø200	32Ø175	32Ø200	32Ø200
"d" Bars	12Ø450	12Ø350	12Ø275	16Ø350	16Ø250	20Ø350	25Ø400	25Ø400	25Ø400	25Ø375	25Ø300	25Ø250	25Ø200	25Ø175	28Ø200	28Ø200

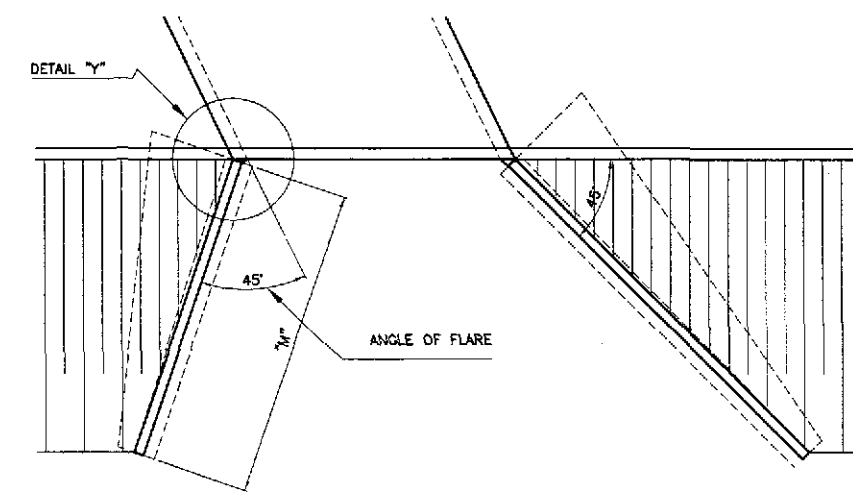
#### NOTES

UNIT STRESSES:  $f_c = 165 \text{ MPa}$ ,  $f_s = 9 \text{ MPa}$ ,  $n=10$   
 MAXIMUM TOE PRESSURE = 150 kPa  
 ELEVATIONS, LENGTH AND ANGLE OF FLARE OF WINGS MAY BE VARIED BY THE ENGINEER TO SUIT CONDITIONS ENCOUNTERED IN THE FIELD. WALLS DESIGNED FOR 600 mm LEVELLOAD SURCHARGE, 1 : 1.5 SLOPING SURCHARGE NOT TO EXCEED 1.5 m IN ELEVATION PLUS 600 mm LEVELLOAD SURCHARGE, OR UNLIMITED 1:2 SURCHARGE DIMENSIONS "H", "L", "M", "N", ELEVATION "a" AND "ANGLE OF FLARES" (AS APPLY) ARE SHOWN ON THE PLANS  
 WALL HEIGHT MAY BE EXCEEDED BY 150 mm BEFORE GOING TO NEXT GREATER "H".  
 ELIMINATE CUTOFF WALL IF ADJACENT CHANNEL IS PAVED AND SKEW IS 20° MAXIMUM  
 FOR WALL OFFSET VALUES, SEE STANDARD PLAN 83-B

4 PLAN  
UP-09 SCALE 1:100

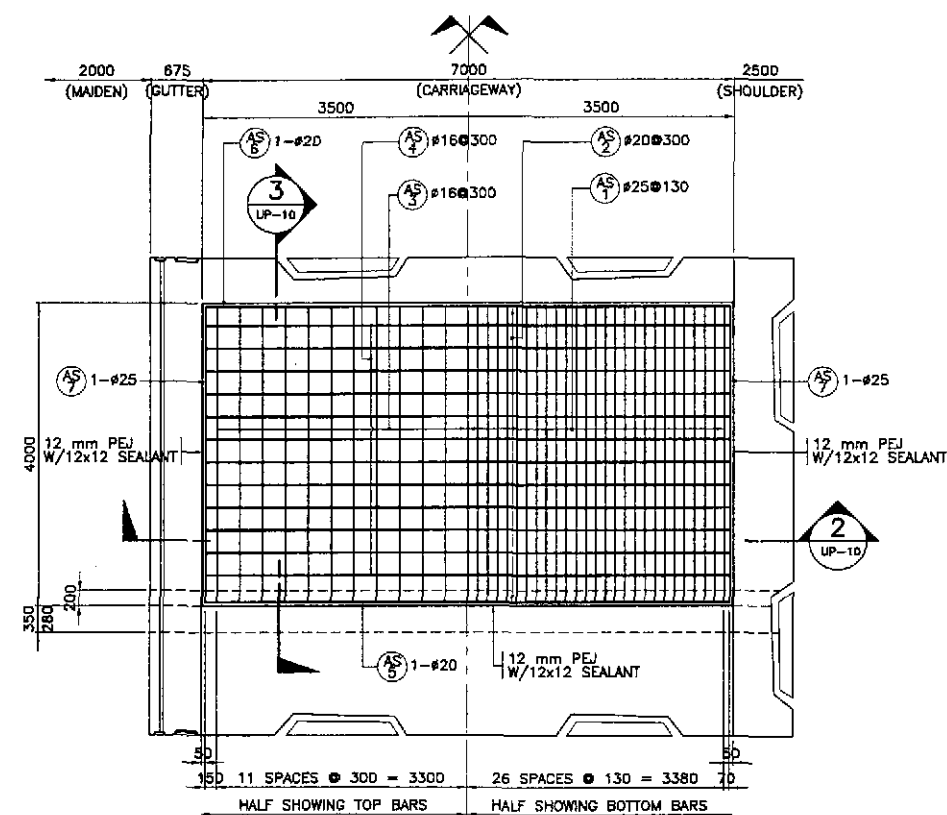


5 END ELEVATION  
UP-09 SCALE 1:100

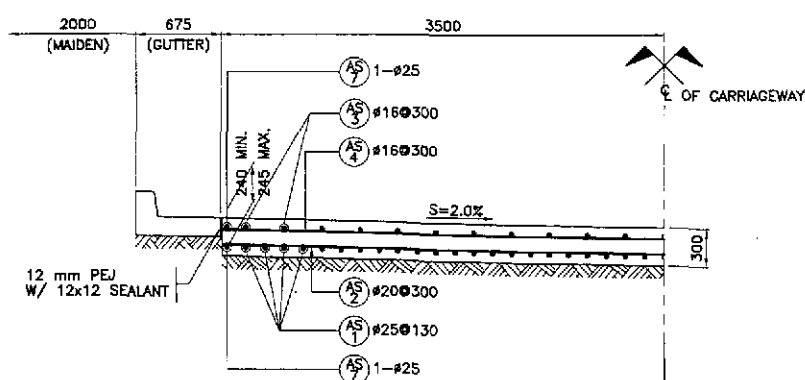


6 PLAN  
UP-09 SCALE 1:100

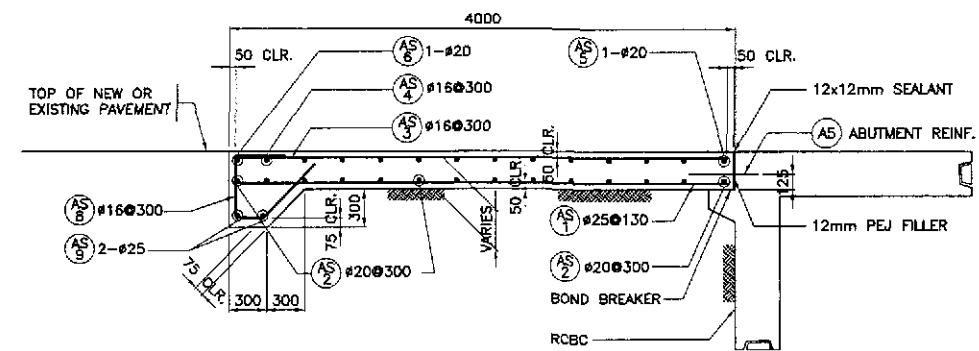
<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY <b>K&amp;E</b> KATAHIRA & ENGINEERS INTERNATIONAL <b>yeo</b> YACHIYO ENGINEERING CO., LTD.		DESIGNED: 10/5/02 CHECKED: 10/15/02 SUBMITTED: 10/16/02	SIGNATURE: [Signature] TEAM LEADER	PUHL - PMO Submitted By: DANILLO C. TRAJANO Project Director	BUREAU OF DESIGN Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	OFFICE OF THE SECRETARY Recommended By: GILBERTO S. REYES O.C. Director IV	Approved By: MANUEL M. BONGAON Undersecretary	Approved By: SIMON 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) <b>CABANATUAN BYPASS - CONTRACT PACKAGE I</b>	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : <b>BOX CULVERT          WINGWALL DETAIL          (ULTIMATE STAGE)</b>	SHEET NO. : <b>UP-09</b>
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1 PLAN  
UP-10 SCALE 1:50

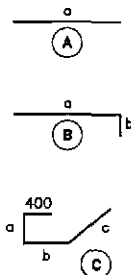


2 SECTION  
UP-10 SCALE 1:30



3 SECTION  
UP-10 SCALE 1:30

### REINFORCEMENT SCHEDULE & ESTIMATED QUANTITIES FOR TWO LANES APPROACH SLABS

BENDING DIAGRAM  (DIMENSIONS ARE OUT TO OUT OF REBARS)	REINFORCEMENT											CONCRETE VOLUME (m³)	REMARKS	
	MARK	SIZE (mm)	QUANTITY	SPACING (mm)	SHAPE	BAR DIMENSIONS (mm)			LENGTH PER BAR (mm)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)			TOTAL WEIGHT (kg)
						a	b	c						
	AS 1	25	69	130	B	3900	150	—	4050	226.80	3.853	874	9.58	1. QUANTITIES ARE FOR ONE (1) APPROACH SLAB
	AS 2	20	14	300	A	7900	—	—	7900	55.30	2.466	136		
	AS 3	16	25	300	B	3900	150	—	4050	101.25	1.578	160		
	AS 4	16	12	300	A	7900	—	—	7900	47.40	1.578	75		
	AS 5	20	1	AS SHOWN	A	7200	—	—	7200	7.20	2.466	18		
	AS 6	20	1	AS SHOWN	A	7900	—	—	4050	53.20	1.578	84		
	AS 7	25	4	AS SHOWN	A	1965	1965	—	3930	15.72	3.853	61		
	AS 8	16	27	300	C	415 MIN. 475 MAX.	250	650	1745	47.11	1.578	74		
	AS 9	25	2	AS SHOWN	A	7900	—	—	7900	15.80	3.853	61		
GRAND TOTAL = 1543												9.58		



JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS  
INTERNATIONAL

YEO YACHIYO ENGINEERING  
CO., LTD.

DESIGNED	DATE	SIGNATURE
CHECKED	10/15/02	
SUBMITTED	10/16/02	

PUHL - PMO  
Submitted By:  
DANILO C. TRAJANO  
Project Director



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

BUREAU OF DESIGN  
Reviewed By:  
JOSEFINA M. ALAGAR  
Chief, Highways Division

Recommended By:  
GILBERTO S. REYES  
OIC, Director IV

Office of the Secretary  
Recommended By:  
MANUEL M. BONGAN  
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 I

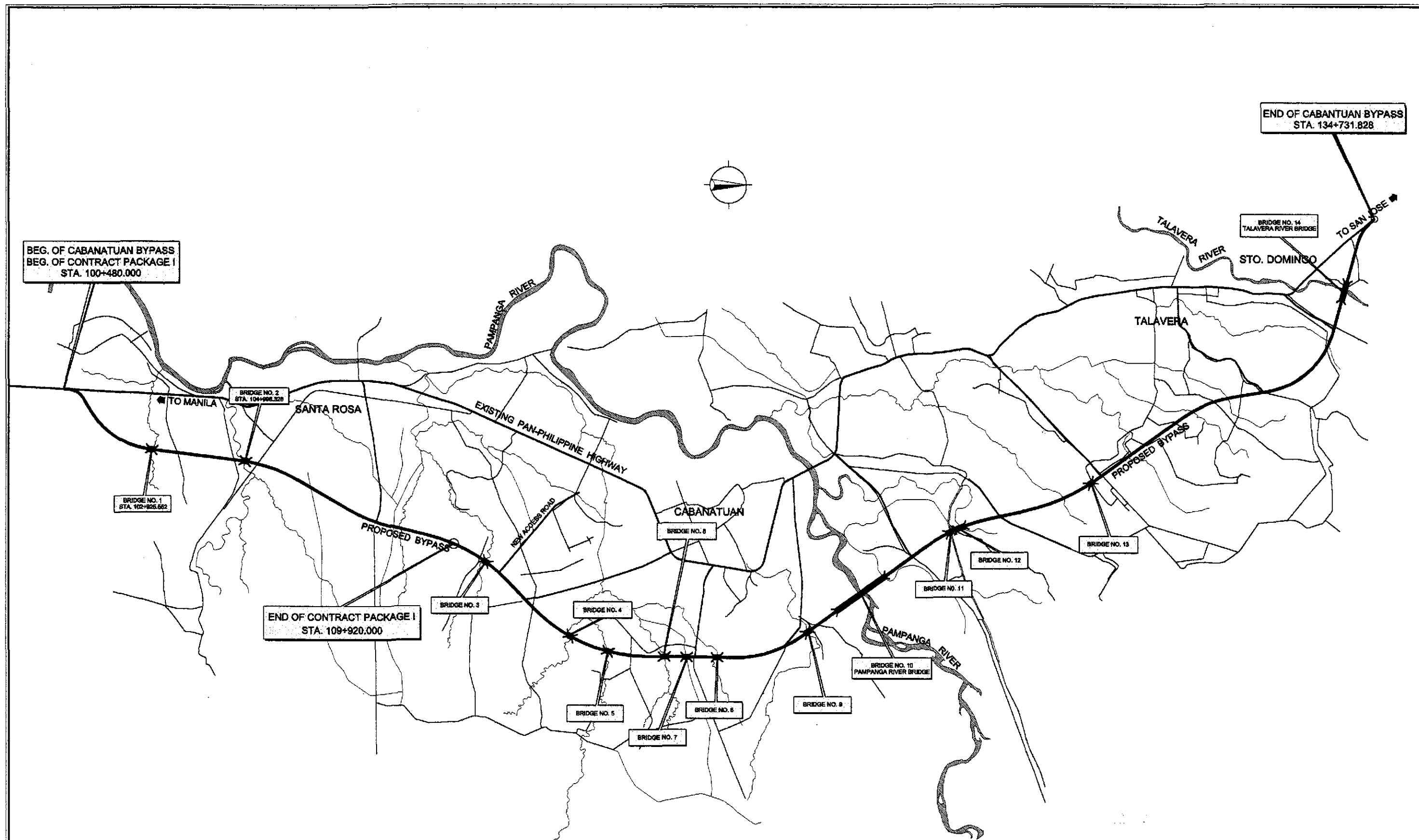
SCALE :  
AS SHOWN  
FULL SIZE A1

SHEET CONTENTS :  
BOX CULVERT  
APPROACH SLAB DETAIL  
(ULTIMATE STAGE)

SHEET NO. :  
UP-10

# **BRIDGES**





A  
NOT TO SCALE  
CABANATUAN BYPASS BRIDGE LOCATION MAP

<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY			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 FULL SIZE A1	SHEET CONTENTS : BRIDGE LOCATION MAP (ULTIMATE STAGE)	SHEET NO. : BG-01
DESIGNED 10/15/01 E. ANSALAN	CHECKED 10/15/01 M. K. K.	SUBMITTED 10/15/01 M. K. K.	P.H. - PMG Submitted By: DANILLO C. TRAJANO Project Director	Reviewed By: ADRIANO M. DORCOY Chief, Bridges Division	Recommended By: GILBERTO S. REYES Director IV (DIC)	Recommended By: (See cover sheet for Signature/Approval) MANUEL M. BONGAN Undersecretary	Approved By: (See cover sheet for Signature/Approval) SIMEON A. DATUMANONG Secretary		

# GENERAL NOTES FOR BRIDGES

## (SHEET 1 OF 2)

### A. DESIGN CRITERIA

#### 1. DESIGN SPECIFICATION

(a) THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 16TH EDITION, 1996.

(b) NATIONAL STRUCTURAL CODE OF THE PHILIPPINES, VOLUME II-BRIDGES, 2ND EDITION, 1997.

#### 2. DESIGN METHODOLOGY

LOAD FACTOR DESIGN METHOD ( ULTIMATE STRENGTH DESIGN METHOD )

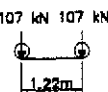
#### 3. LOADING

##### 3.1 DEAD LOADS

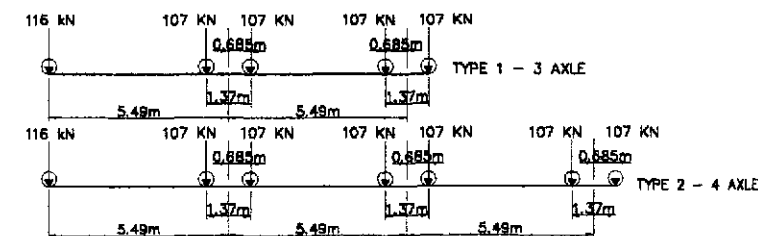
	WEIGHT
A. CONCRETE	24.00 kN/m <sup>3</sup>
B. STEEL	77.00 kN/m <sup>3</sup>
C. EARTH	19.00 kN/m <sup>3</sup>
D. WEARING SURFACE	1.10 kN/m <sup>2</sup>

##### 3.2 LIVE LOADS

A. AASHTO HS20 (MS18) TRUCK AND EQUIVALENT LANE LOADING.  
B. SIDEWALK LOAD 4.07 kN/m<sup>2</sup>  
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 OTHER LOADS

IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS, 1996.

##### 3.6 LOAD COMBINATION

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 ]

### B. MATERIALS

#### 1. CONCRETE

UNLESS OTHERWISE INDICATED 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, COPINGS, COLUMNS	A (MOD)	21	3045	20 (3/4)	
FOOTINGS	A	21	3045	38 (1-1/2)	
PRECAST R.C. PILES	AA	28	4060	20 (3/4)	
THIN REINFORCED SECTIONS RAILINGS AND RAILPOST	C	21	3045	12 (1/2)	
PRESTRESSED CONCRETE MEMBERS	P	35 41	5075 5946	20 (3/4) 20 (3/4)	• TRANSFER • SERVICE
LEAN CONCRETE	-	17	2465	50 (2)	

#### 2. REINFORCING STEEL

(a) REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615), GRADES 40 & 60 DEFORMED WITH MINIMUM YIELD STRENGTH.  
GRADE 40 ( 16mm# AND SMALLER )  
Fy = 276 MPa (40,000 psi)  
GRADE 60 ( 20mm# AND LARGER )  
Fy = 414 MPa (60,000 psi)

(b) REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

#### 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 Fy = 1860 MPa (270,000psi).

#### 4. STRUCTURAL STEEL, BOLTS AND WELDS

MATERIALS	UNIT WEIGHT
STEEL PLATES AND ROLLED SHAPES	AASHTO M183 (ASTM A36)
BOLTS	AASHTO M164 (ASTM A325)
WELDS	AWS D1.1 - 183, E70XX SERIES

#### 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. 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  
TENSILE STRENGTH ASTM D 412-175 Kg/cm<sup>2</sup> (min)  
ULTIMATE ELONGATION % 350 % (min)  
MATERIAL NEOPRENE

### C. CONSTRUCTION

ALL WORKS SHALL COMPLY WITH 1995 DPWH SPECIFICATION FOR ROADS AND BRIDGES OR MODIFIED BY SPECIAL PROVISIONS.

#### 1. DIMENSIONS

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

#### 2. SETTING OUT

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

#### 3. REINFORCED CONCRETE

a. ALL CAST IN PLACE CONCRETE SHALL BE CLASS "A" 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.

##### b. 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.

(3) FOR CONCRETE DEPOSITED AGAINST THE GROUND, LEAN CONCRETE WITH A MINIMUM THICKNESS OF 200mm SHALL LAID FIRST BEFORE INSTALLING THE REINFORCEMENT. THIS LEAN CONCRETE SHALL NOT BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF CONCRETE SECTION.

(4) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER/CONSULTANT FOR APPROVAL PLACING SEQUENCES FOR ALL CONCRETING WORK.

#### c. BAR BENDING, SPLICING AND PLACING

(1) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER/CONSULTANT FOR APPROVAL OF SHOP DRAWINGS INDICATING THE BENDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS.

(2) BARS SHALL BE BEND COLD. BARS PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT UNLESS PERMITTED BY THE ENGINEER/CONSULTANT.

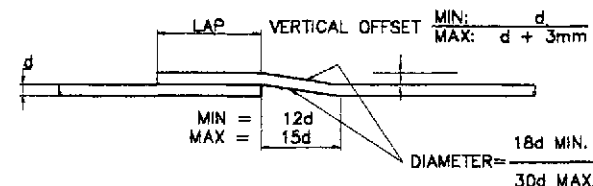
(3) BAR SPLICING NOT INDICATED ON DRAWINGS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

(4) WELDED SPLICES, IF APPROVED BY THE ENGINEER, SHALL DEVELOP IN TENSION AT LEAST 125% OF THE SPECIFIED YIELD STRENGTH OF THE BARS.

(5) NOT MORE THAN 50% OF THE BARS AT ANY ONE SECTION SHALL BE SPLICED.

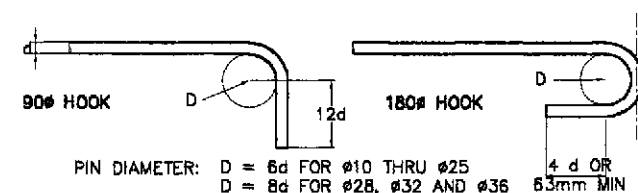
(6) UNLESS OTHERWISE SHOWN ON DRAWINGS, THE CLEAR DISTANCE BETWEEN PARALLEL BARS IN A LAYER SHALL NOT BE LESS THAN 1.5 TIMES THE NOMINAL DIAMETER OF THE BAR NOR LESS THAN 1.5 TIMES THE MAXIMUM SIZE OF COARSE AGGREGATE. THE CLEAR DISTANCE BETWEEN LAYERS SHALL NOT LESS THAN 25mm NOR ONE BAR DIAMETER. THE BARS IN THE UPPER LAYER SHALL BE PLACED DIRECTLY ABOVE THOSE IN THE BOTTOM LAYER.

##### (7) CRANKED SPLICES

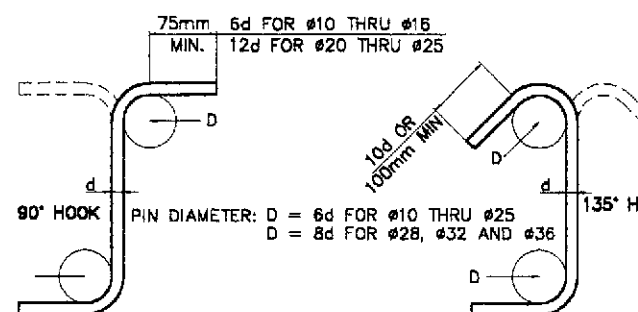


##### (8) HOOKS AND BENDS

DIMENSIONS OF 90-DEGREE AND 180-DEGREE HOOKS



DIMENSIONS FOR STIRRUPS AND TIE HOOKS



#### d. 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.

#### e. CONSTRUCTION JOINT

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

#### f. FALSEWORK

ALL FALSEWORK SHALL BE DESIGNED BY THE CONTRACTOR SUBJECT TO THE APPROVAL BY THE ENGINEER/CONSULTANT.

#### g. 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/CONSULTANT. 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

#### h. PROTECTION AND CURING OF CONCRETE

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

#### 6. EMBANKMENT CONSTRUCTION SEQUENCE

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

#### 7. (a) REINFORCED CONCRETE PILES/TEST PILES

ALL PILES SHALL BE 400mm x 400mm AND 450mm x 450mm PRECAST REINFORCED CONCRETE, FRESH OR SALT WATER TYPE, UNLESS OTHERWISE NOTED. ALL PRECAST R.C. PILES SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 50 TONNES (490 KN) AND 70 TONNES (680 KN), RESPECTIVELY EACH AND TO THE FULL AUTHORIZED PAY LENGTH AND IN ACCORDANCE WITH ITEM 400 (13) (PILE DRIVING) OF THE STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, VOL.II 1995. ACTUAL CASTING LENGTH SHALL BE DETERMINED FROM THE RESULT OF DRIVING TEST PILE. CUT-OFF SHALL BE AUTHORIZED ONLY UPON PRIOR APPROVAL OF THE ENGINEER/CONSULTANT. ALL PILES SHALL BE PROVIDED WITH METAL SHOES FOR HARD DRIVING. TEST PILE SHALL BE DRIVEN AS DIRECTED BY THE ENGINEER/CONSULTANT.

##### (b) STEEL H-PILES/SHEET PILES

THE MINIMUM QUANTITY REQUIREMENT FOR FOUNDATION PILING SHALL ONFORM TO THE SPECIFICATION FOR STRUCTURAL STEEL FOR BRIDGES, AASHTO M270 (ASTM A 709) GRADE 36 AND/OR JIS G 3101 SS400. FULL-LENGTH PILES SHALL BE USED WHERE PRACTICABLE. IF SPLICING IS PERMITTED, THE METHOD OF SPLICING SHALL BE AS SHOWN ON THE PLANS OR AS APPROVED BY THE ENGINEER/CONSULTANT.

<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY		<b>REPUBLIC OF THE PHILIPPINES</b> 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)		SCALE : AS SHOWN	SHEET CONTENTS : GENERAL NOTES FOR BRIDGES (SHEET 1 OF 2) (ULTIMATE STAGE)	SHEET NO. : BG-02
KATAHIRA & ENGINEERS YEO YACHYO ENGINEERING CO., LTD.		BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO Reviewed By: ADRIANO M. DORAY Recommended By: GILBERTO S. REYES Approved By: MANUEL M. BONOAN SIMEON A. DATUMANONG		OFFICE OF THE SECRETARY Approved By: (See cover sheet for Signature/Approval)		CABANATUAN BYPASS - CONTRACT PACKAGE I		
DESIGNED: 10/1/02 CHECKED: 10/15/02 SUBMITTED: 10/16/02		DATE: 10/1/02 SIGNATURE: [Signature] TEAM LEADER						

# GENERAL NOTES FOR BRIDGES (SHEET 2 OF 2)

## 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

- (a) CAMBER FOR REINFORCED CONCRETE SUPERSTRUCTURES WERE DETERMINED BASED ON THE USE OF SHORINGS DURING CONSTRUCTION.
- (b) 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 AND 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/CONSULTANT. NO ADDITIONAL COST SHALL BE ALLOWED FOR ANY RELOCATION OF DETOUR.

## 13. PRESTRESSED CONCRETE

### GIRDER DESIGN GUIDE

- a.) POST-TENSIONING ; THE PROPOSED TYPE OF TENDONS WHICH WILL BE USED IN THE POST-TENSIONED DESIGNS, ALL NECESSARY ADDITIONAL DETAILS INCLUDING THOSE FOR END ANCHORAGES, METHODS TO BE EMPLOYED AND PROCEDURES TO BE FOLLOWED, SHALL BE AS APPROVED BY THE ENGINEERS/CONSULTANT. A PORTION OF THE TENDONS SHALL BE DRAPED LONGITUDINAL IN PARABOLIC POSITIONS. 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 "SPECIFICATIONS".

- b.) CONCRETE FOR GIRDERS SHALL BE A MINIMUM STRENGTH OF 41 N/mm<sup>2</sup> (6,000 PSI) AT THE AGE OF 28 DAYS.

- c.) CONCRETE FOR CAST-IN-PLACE SLAB HAVE A MINIMUM STRENGTH 21 N/mm<sup>2</sup> (3,000 PSI) AT THE AGE OF 28 DAYS.

- d.) THE CONTRACTOR MAY PROPOSE ANY ALTERNATIVE TENDON SIZE AND LAYOUT AND SUBJECT SHALL MEET THE APPROVAL OF THE ENGINEER.

- e.) THE REQUIRED STRENGTH OF CONCRETE AT TIME OF TENSIONING SHALL BE 35 MPa (5,000 PSI). A GRID CONSISTING OF #12 BARS AT 100 CENTERS IN BOTH DIRECTIONS SHALL BE PLACED NEAR EACH ANCHORAGE OF THE POST-TENSIONING SYSTEM.

- f.) 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 CONTRACTORS 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.

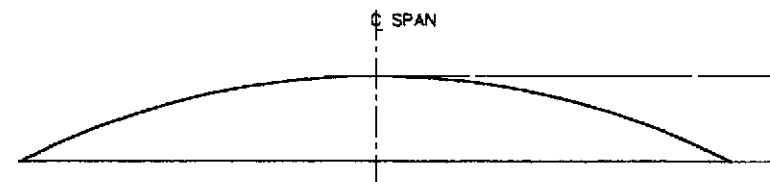
- g.) CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER THE CALCULATED ELONGATION OF THE PRESTRESSING TENDONS CORRESPONDING TO THE REQUIRED JACKING FORCES.

- h.) SHOP DRAWING SHALL SUBMIT FOR APPROVAL PRIOR TO FABRICATION.

## 14. DRAWINGS

- a.) ALL ELEVATIONS, STATIONING AND DIMENSIONS SHALL BE VERIFIED PRIOR TO CONSTRUCTION.

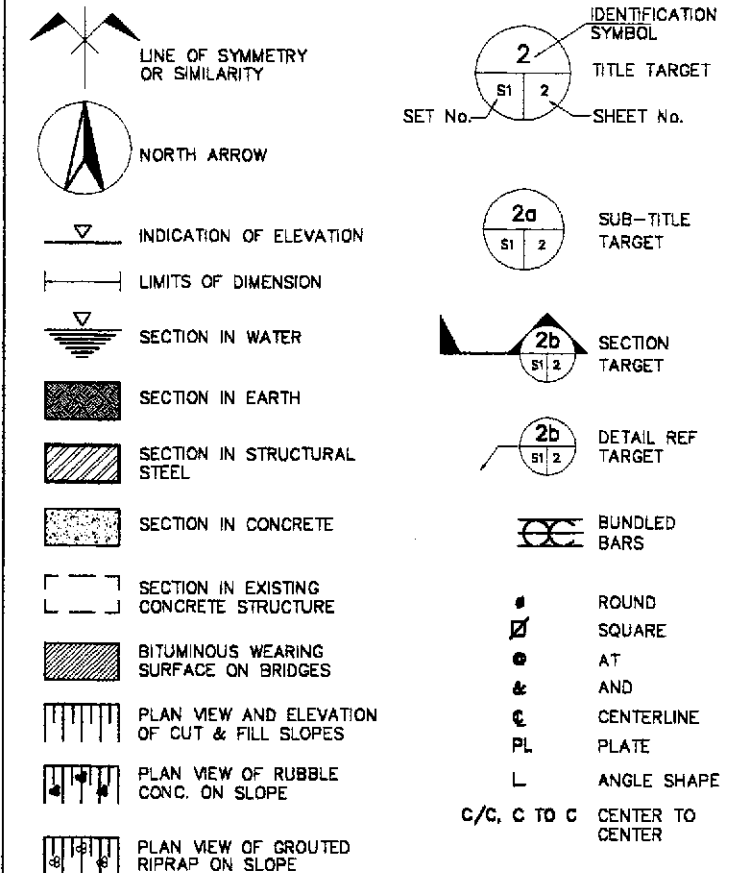
- b.) ALL QUANTITIES SHALL BE VERIFIED DURING CONSTRUCTION.



DEAD LOAD CAMBER DIAGRAM

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

## SYMBOLS



## ABBREVIATIONS

ABT	ABOUT	kPa	KILOPASCAL
ABUT	ABUTMENT	m	METER
BEG	BEGINNING	mm	MILLIMETER
BET	BETWEEN	MAX	MAXIMUM
BOTT	BOTTOM	MFWL	MAX. FLOOD WATER LEVEL
BR	BRIDGE	MIN	MINIMUM
BRG	BEARING	MO	MIDDLE ORDINATE
CLR	CLEAR	MPa	MEGAPASCAL
cm	CENTIMETER	N	NEWTON
COL	COLUMN	NF	NEAR FACE
CONC	CONCRETE	No.	NUMBER
CONST	CONSTRUCTION	O.C.	ON CENTER
CTR	CENTER	PEJ	PREMOULDED EXPANSION JOINT
DET	DETAIL	PVC	POLYVINYL CHLORIDE
DIAM	DIAMETER	PVI	POINT OF VERT. INTERSECTION
DIAPH	DIAPHRAGM	QTY	QUANTITY
DWG	DRAWING	R	RADIUS
EA	EACH	RC	REINFORCED CONCRETE
EF	EACH FACE	RDWY	ROADWAY
ELEV	ELEVATION	REINF	REINFORCEMENT
ENGR	ENGINEER	SDWK	SIDEWALK
EQ	EQUAL	SL	SLOPE
EW	EACHWAY	SP	SPIRAL
EXP	EXPANSION	SPCD	SPACED
EXT	EXTERIOR	SPCS	SPACES
EXIST	EXISTING	STD	STANDARD
FF	FAR FACE	STIR	STIRRUP
FTG	FOOTING	STA	STATION
GEN	GENERAL	STRUCT	STRUCTURE
HOR	HORIZONTAL	SYMM	SYMMETRY
HW	HIGH WATER	THK	THICK
INT	INTERIOR	TYP	TYPICAL
INTERM	INTERMEDIATE	VAR	VARIABLE
JT	JOINT	VERT	VERTICAL
L	LENGTH	VOL	VOLUME
LG	LONG	W	WIDTH
kg	KILOGRAM	W/	WITH
kN	KILONEWTON	&	AND

<b>JICA</b> JAPAN INTERNATIONAL COOPERATION AGENCY		<b>KATAHIRA &amp; ENGINEERS</b> YEO YACHIYO ENGINEERING CO., LTD.		<b>REPUBLIC OF THE PHILIPPINES</b> DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				<b>PROJECT AND LOCATION :</b> THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		<b>SCALE :</b> AS SHOWN	<b>SHEET CONTENTS :</b> GENERAL NOTES FOR BRIDGES (SHEET 2 OF 2) (ULTIMATE STAGE)	<b>SHEET NO. :</b> BG-03
DESIGNED	10/5/02	SIGNATURE	<i>[Signature]</i>	Submitted By:	Reviewed By:	Recommended By:	Approved By:	CABANATUAN BYPASS - CONTRACT PACKAGE I				
CHECKED	10/15/02	SIGNATURE	<i>[Signature]</i>	DANILLO C. TRAJANO Project Director	ADRIANO M. DORAY Chief, Bridges Division	GILBERTO S. REYES Director IV (OC)	MANUEL M. BONOAN Undersecretary					
SUBMITTED	10/16/02	SIGNATURE	<i>[Signature]</i>									



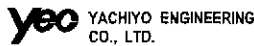
BRIDGE NAME : BRIDGE NO. 1 (ULTIMATE STAGE)  
BRIDGE LENGTH : 50.00 m  
SPECIFICATION : 2 - 25.00 m SPAN TYPE IV PSCG ON SEAT TYPE ABUTMENT

SUMMARY OF QUANTITIES							
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		PIER	SUPER- STRUCTURE	TOTAL
			" A1 "	" A2 "	" P1 "		
101(7)	Removal of Existing Slope Protection	cu.m.	41.00	41.00			82.00
101(8)	Removal of Existing Slope Protection (Hand Laid Rock)	cu.m.	22.00	22.00			44.00
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	115.00	115.00			230.00
103(2)c	Bridge Excavation, Common, Below O.W.L.	cu.m.			155.00		155.00
104(3)	Embankment from Borrow Pit	cu.m.	357.00	357.00			714.00
104(4)	Embankment for Bridge Approach	cu.m.	296.00	296.00			592.00
200(1)	Aggregate Subbase Course	cu.m.	15.00	15.00			30.00
311(2)	PCC Pavement (Reinforced) t=300mm, Including Dowel Bars (Approach Slab)	sq.m.	59.00	59.00			118.00
400(4)b	RC Piles (450 mm x 450 mm) Furnished	l.m.	282.00	167.00	189.00		638.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	253.00	138.00	156.00		547.00
400(15)b	Test Piles (450 mm x450 mm)	l.m.	14.25	9.25	9.25		32.75
400(19)b	Pile Shoes for 450 mm x 450 mm Piles	each	24.00	24.00	27.00		75.00
401(1)a	Concrete Post and Railing	l.m.				102.00	102.00
404(1)	Reinforcing Steel, Grade 40	kg	3,550.00	3,550.00	2,664.00	25,020.00	34,784.00
404(2)	Reinforcing Steel, Grade 50	kg	9,252.00	9,252.00	13,820.00	4,414.00	36,738.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	149.00	149.00	115.00		413.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.				165.00	165.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00		22.00	30.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	7.00	7.00	6.00		20.00
406(1)d	Prestressed Concrete Girder Type IV L=25.00m	each				10.00	10.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00			10.00
407(2)a	Expansion Joint, ( ± 40mm Movement)	l.m.	10.00	10.00			20.00
407(2)g	Expansion Joint, 30 mm for Bridge Sidewalk	l.m.	2.00	2.00			4.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.				5.00	5.00
504(1)	Grouted Riprap, Class "A"	cu.m.	83.00	81.00			164.00
506(1)	Hand Laid Rock	cu.m.	44.00	44.00			88.00

BRIDGE NAME : BRIDGE NO. 2 (ULTIMATE STAGE)  
BRIDGE LENGTH : 62.00 m  
SPECIFICATION : (20.00 - 22.00 - 20.00) SPAN TYPE IV PSCG ON SEAT TYPE ABUTMENT

SUMMARY OF QUANTITIES							
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		PIER		TOTAL
			" A1 "	" A2 "	" P1 "	" P2 "	
101(7)	Removal of Existing Slope Protection	cu.m.	35.00	35.00			71.00
101(9)	Removal of Existing Gabions	cu.m.			12.00	12.00	24.00
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	103.00	131.00			234.00
103(2)c	Bridge Excavation, Common, Below O.W.L.	cu.m.			202.00	226.00	428.00
104(3)	Embankment from Borrow Pit	cu.m.	335.00	273.00			608.00
104(4)	Embankment for Bridge Approach	cu.m.	284.00	249.00			533.00
200(1)	Aggregate Subbase Course	cu.m.	15.00	15.00			30.00
311(2)	PCC Pavement (Reinforced) t=300mm, Including Dowel Bars (Approach Slab)	sq.m.	59.00	59.00			118.00
400(4)b	RC Piles (450 mm x 450 mm) Furnished	l.m.	190.00	190.00	215.00	215.00	810.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	161.00	161.00	182.00	182.00	686.00
400(15)b	Test Piles (450 mm x450 mm)	l.m.	10.25	10.25	10.25	10.25	41.00
400(19)b	Pile Shoes for 450 mm x 450 mm Piles	each	24.00	24.00	27.00	27.00	102.00
401(1)a	Concrete Post and Railing	l.m.					127.00
404(1)	Reinforcing Steel, Grade 40	kg	3,688.00	3,583.00	2,805.00	2,805.00	44,152.00
404(2)	Reinforcing Steel, Grade 60	kg	8,839.00	8,654.00	17,539.00	17,539.00	59,677.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	143.00	140.00	140.00	153.00	576.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.					213.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00			35.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	21.00	20.00	7.00	7.00	55.00
406(1)a	Prestressed Concrete Girder Type IV L=20.00m	each					10.00
406(1)b	Prestressed Concrete Girder Type IV L=22.00m	each					5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00	10.00	10.00	30.00
407(2)c	Expansion Joint, ( ± 40mm Movement)	l.m.	10.00	10.00			20.00
407(2)g	Expansion Joint, 30 mm for Bridge Sidewalk	l.m.	2.00	2.00			4.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.					6.00
504(1)	Grouted Riprap, Class "A"	cu.m.	18.00	18.00			36.00
510(1)	Rubble Concrete Slope Protection	cu.m.	51.00	39.00			90.00
507(2)b	Steel Sheet Pile (85x400x8mm Thk.), Furnished and Driven	l.m.	314.00	297.00			611.00
509(1)	Gabions	cu.m.			73.00	73.00	146.00

NOTE: ALL QUANTITIES SHALL BE VERIFIED DURING CONSTRUCTION

 JAPAN INTERNATIONAL COOPERATION AGENCY		DESIGNED 10/3/02 K. KOBAYASHI K. KOBAYASHI K. KOBAYASHI	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 : N. T. S.	SHEET CONTENTS : BRIDGE NO. 1 & 2 SUMMARY OF QUANTITIES (ULTIMATE STAGE)		SHEET NO. : BG-04
 KATAHIRA & ENGINEERS INTERNATIONAL		CHECKED 10/15/02 K. KOBAYASHI K. KOBAYASHI	BUREAU OF DESIGN OFFICE OF THE SECRETARY				CABANATUAN BYPASS - CONTRACT PACKAGE I		FULL SIZE A1			
 YACHIYO ENGINEERING CO., LTD.		SUBMITTED 10/16/02 K. KOBAYASHI K. KOBAYASHI	SUBMITTED BY: DANILLO C. TRAJANO REVIEWED BY: ADRIANO M. DOROS RECOMMENDED BY: GILBERTO S. REYES RECOMMENDED BY: MANUEL M. BONGAN APPROVED BY: SIMEON A. DATUMANONG									
			PROJECT DIRECTOR CHIEF, BRIDGES DIVISION DIRECTOR IV (OIC) UNDERSECRETARY SECRETARY									