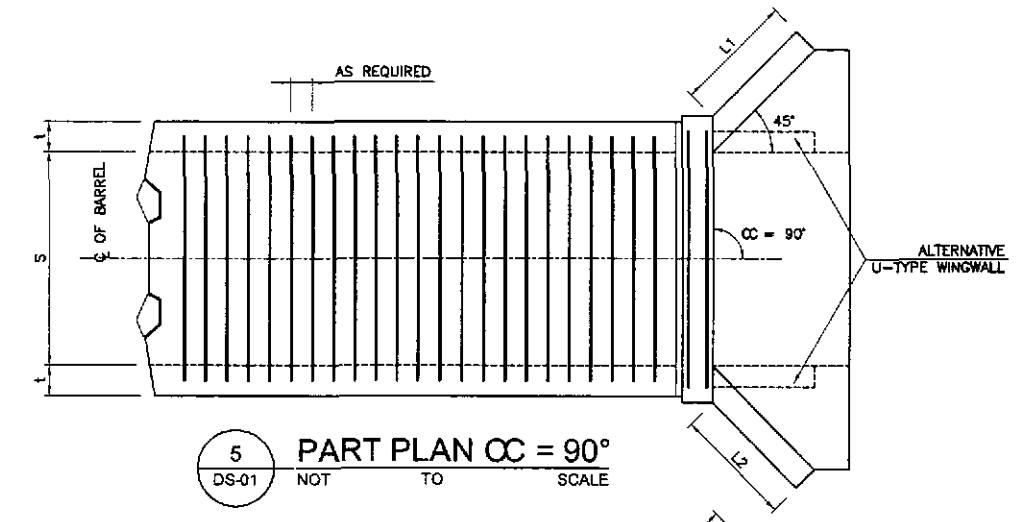


1 TYPICAL ROAD CROSS-SECTION 1
DS-01 NOT TO SCALE

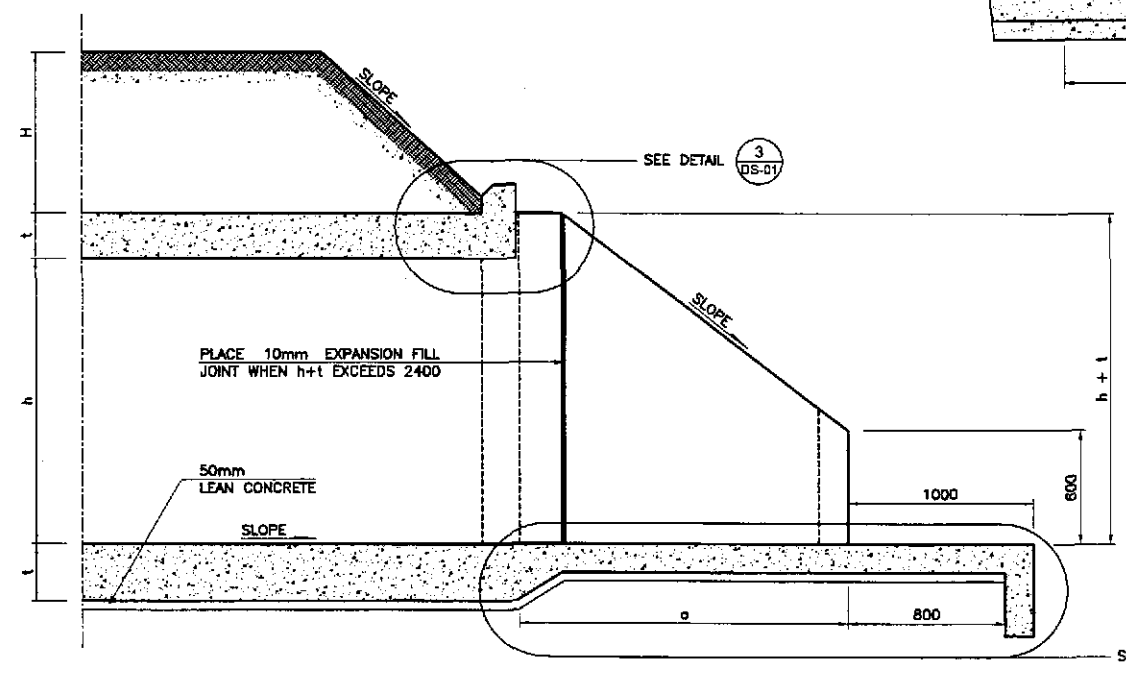
- LEGEND:
- W — WIDTH OF ROADWAY FORMATION
 - X — WIDTH OF SHOULDER
 - Wc — WIDTH OF CARRIAGEWAY
 - H — COVER ABOVE THE CULVERT
 - L — TOTAL LENGTH OF BARREL
 - t1 — SLOPE OF CARRIAGEWAY
 - t2 — SLOPE OF SHOULDER
 - Z — $[(H+t) - (B+200)] \tan \phi$
 - B — $xt_2 + 0.5t_1 Wc$
 - h — HEIGHT OF CULVERT OPENING
 - t — THICKNESS OF CULVERT WALL OR SLAB
 - ϕ — SLOPE OF EMBANKMENT
 - CC — ANGLE OF SKEW

HORIZONTAL SKEW ANGLE CC	L (mm)
90°	$W + 2t \tan \phi [(H+t) - (B+200)]$
60°	$1.1547 (W + 2t \tan \phi [(H+t) - (B+200)])$
45°	$1.4142 (W + 2t \tan \phi [(H+t) - (B+200)])$

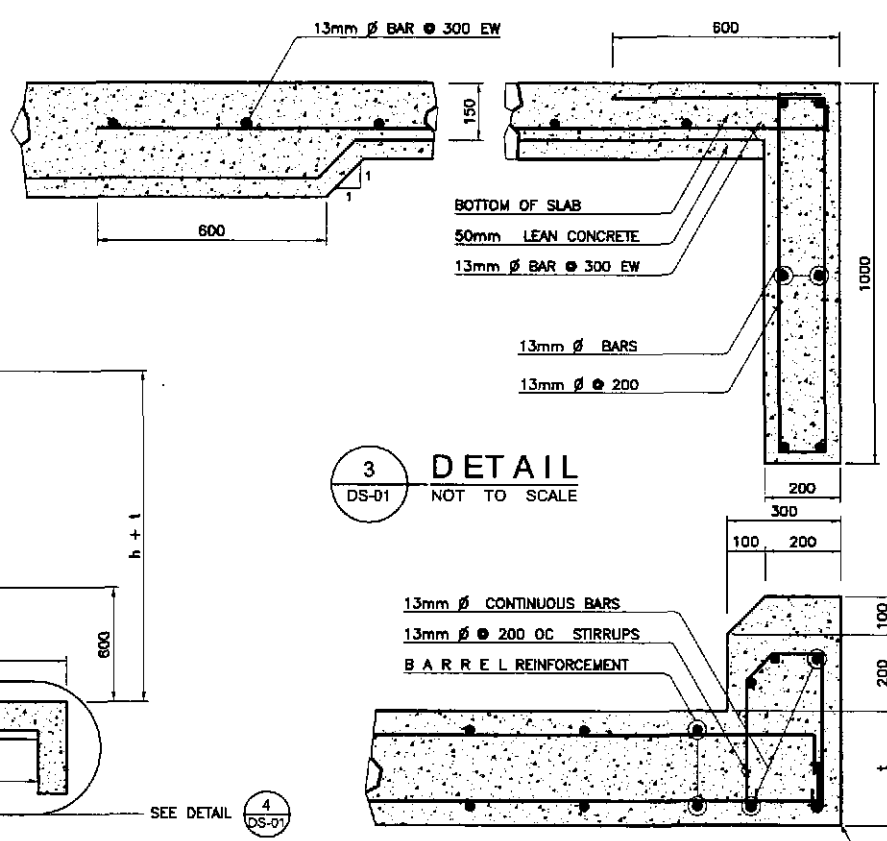
- NOTES:
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - MINIMUM CONCRETE COVER SHALL BE 40 CLEAR. WHEN HEIGHT OF FILL H=0 INCREASE COVER BY 30.



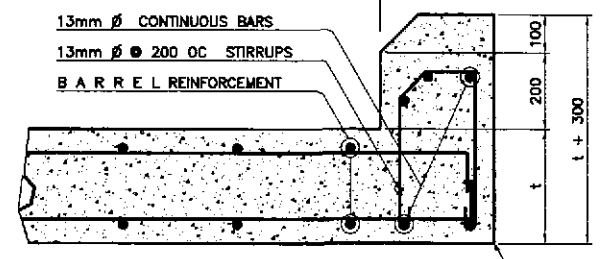
5 PART PLAN CC = 90°
DS-01 NOT TO SCALE



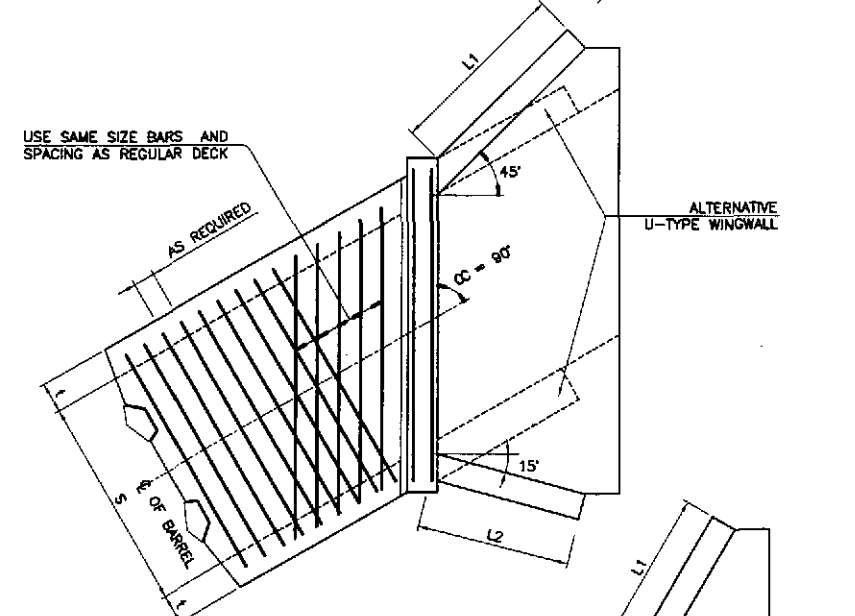
2 PART SECTION ALONG C OF CULVERT
DS-01 NOT TO SCALE



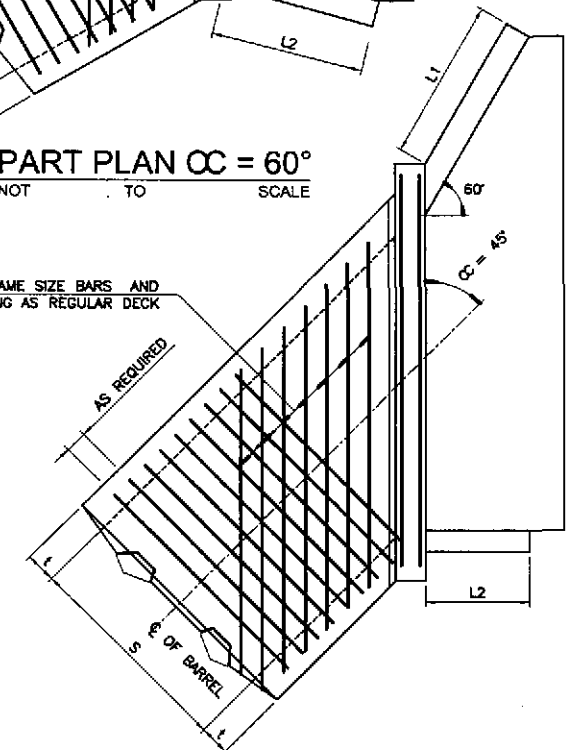
3 DETAIL
DS-01 NOT TO SCALE



4 DETAIL
DS-01 NOT TO SCALE



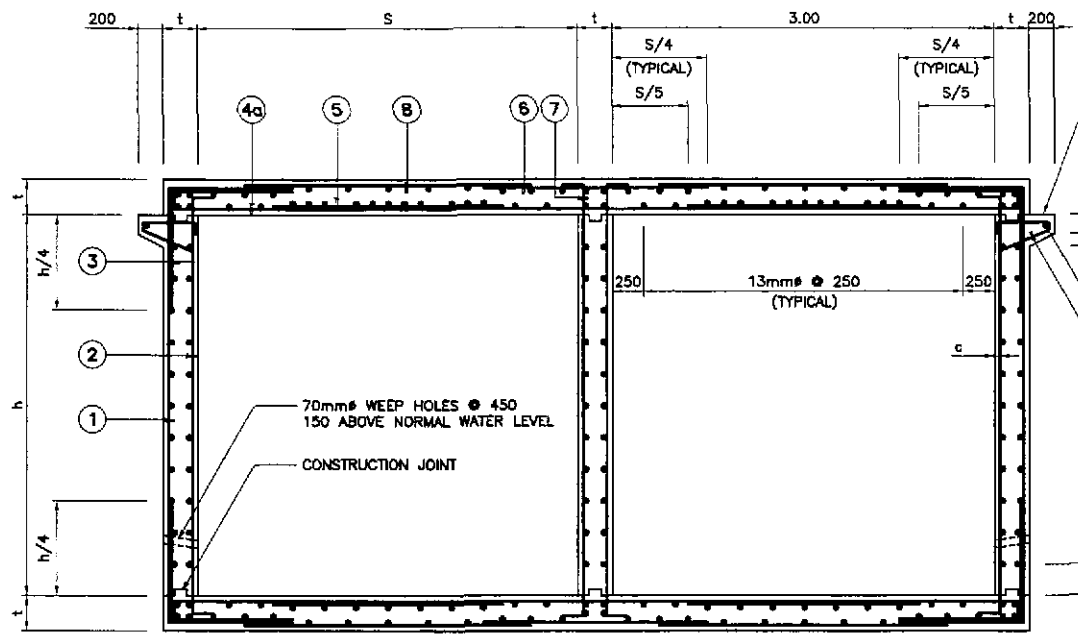
6 PART PLAN CC = 60°
DS-01 NOT TO SCALE



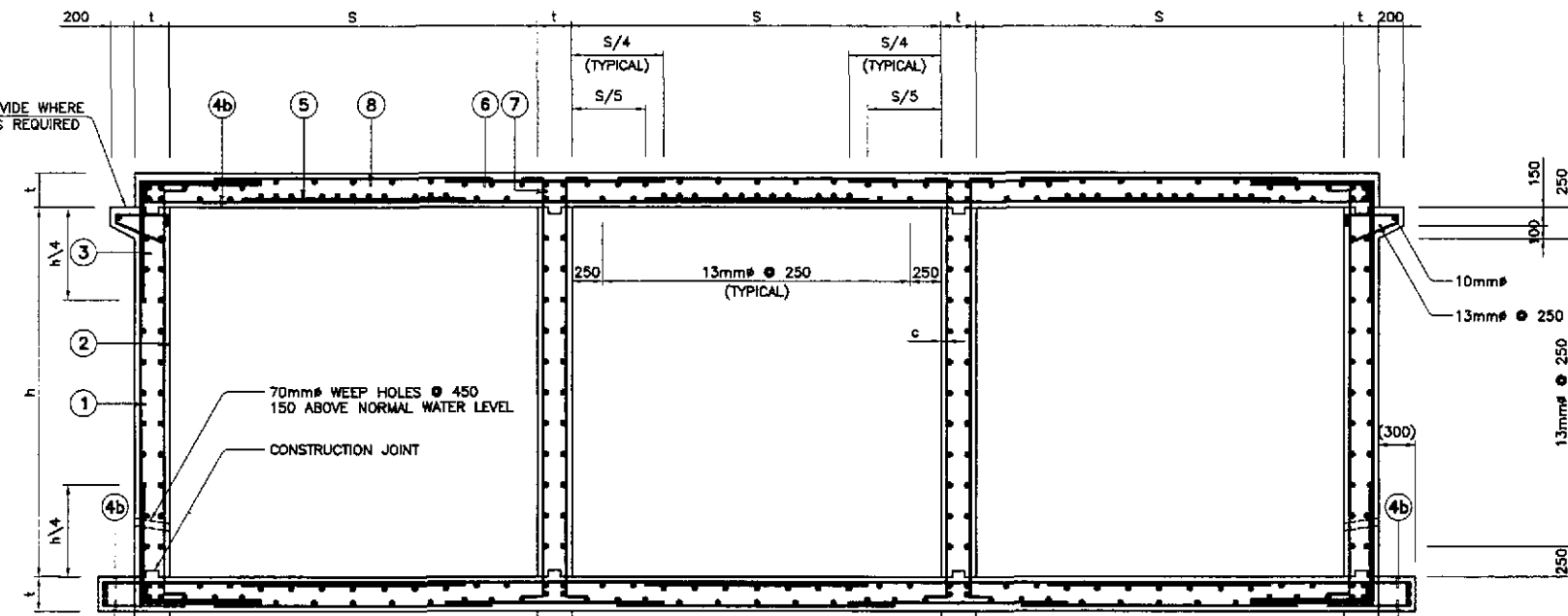
7 PART PLAN CC = 45°
DS-01 NOT TO SCALE

STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC)

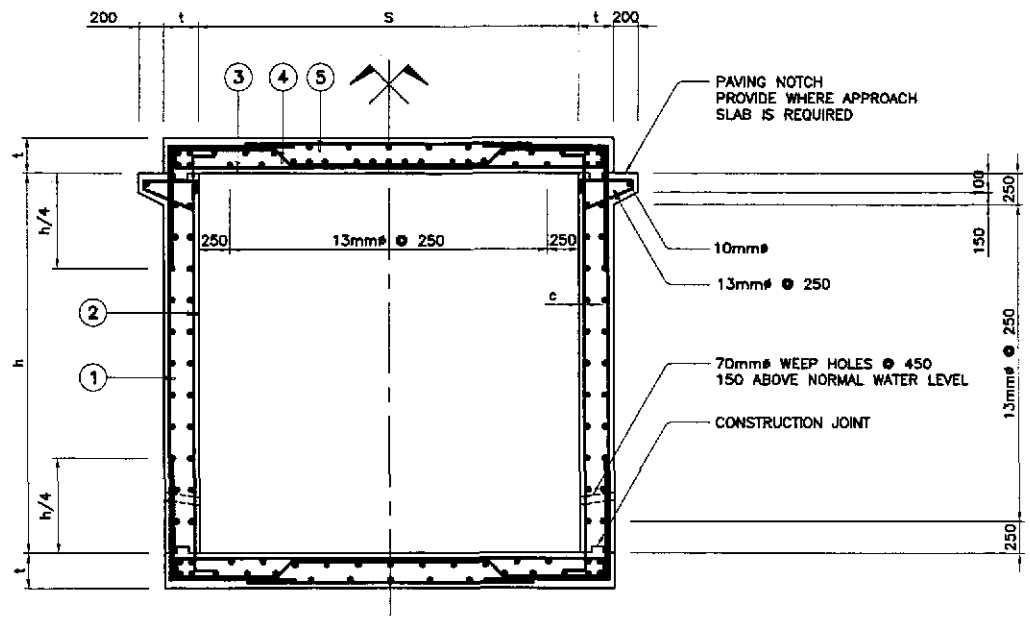
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC)	SHEET NO. : DS-01
	CHECKED				BUREAU OF DESIGN						
	SUBMITTED				Submitted By: DANIEL C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV				



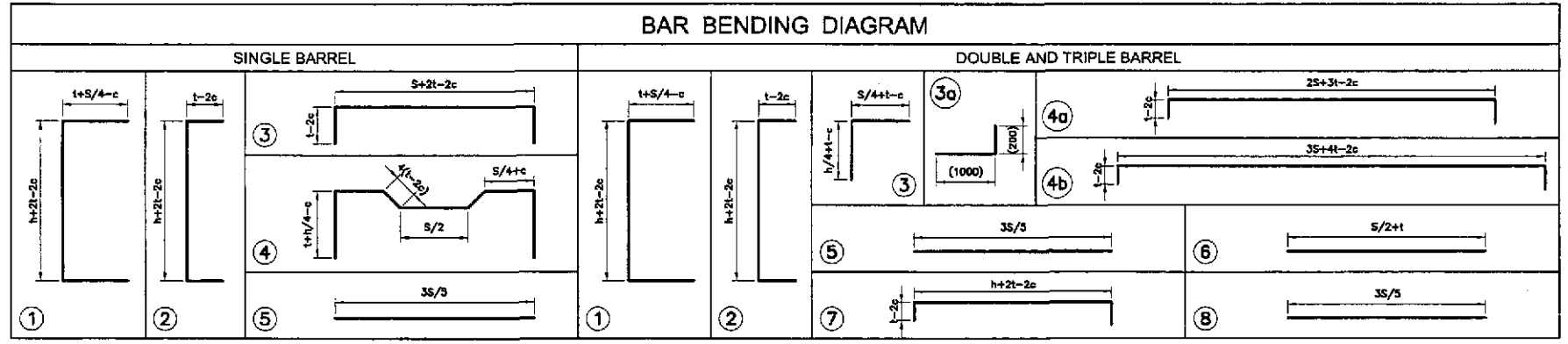
2 DOUBLE BARREL SECTION
 DS-02 SCALE 1:30



3 TRIPLE BARREL SECTION
 DS-02 SCALE 1:30



1 SINGLE BARREL SECTION
 DS-02 SCALE 1:30



CLEAR SPAN S	HEIGHT h	SINGLE BARREL BOX CULVERT										DOUBLE AND TRIPLE BARREL BOX CULVERT													
		t	BAR 1	BAR 2	BAR 3	BAR 4	BAR 5	t	BAR 1	BAR 2	BAR 3	BAR 4	BAR 5	BAR 6	BAR 7	BAR 8									
		Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING
1250	1000	180	13 300	13 300	13 300	13 300	13 300	180	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300
	1250	180	13 300	13 300	13 300	13 300	180	13 300	16 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300
	1500	180	13 300	13 280	13 300	13 300	180	13 300	16 280	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300
	1800	180	13 300	13 260	13 300	13 300	180	13 300	16 260	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300	13 300
1500	1000	180	16 240	16 300	16 240	16 240	13 300	200	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 280
	1250	180	16 240	16 300	16 240	16 240	13 300	200	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 280	
	1500	180	16 240	16 280	16 240	16 240	13 300	200	16 300	16 280	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 280	
	1800	180	16 240	16 280	16 240	16 240	13 300	200	16 300	16 260	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 280	
1800	1250	200	16 260	16 300	16 260	16 260	13 280	250	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 220
	1500	200	16 260	16 300	16 260	16 260	13 280	250	16 300	16 280	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 220
	1800	200	16 260	16 280	16 260	16 260	13 280	250	16 300	16 260	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 220
	2100	200	16 260	16 260	16 260	16 260	13 280	250	16 300	16 260	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 220
2400	1800	220	16 220	16 280	16 220	16 220	13 240	300	16 300	16 280	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 200
	2100	220	16 220	16 260	16 220	16 220	13 240	300	16 300	16 260	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 200
	2400	220	16 220	16 200	16 220	16 220	13 240	300	16 300	16 240	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 200
	2750	220	16 200	16 180	16 200	16 200	13 240	300	16 300	16 200	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 300	16 200
3000	2100	280	16 260	16 260	16 260	16 260	13 200	300	20 300	16 280	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 200
	2400	280	16 260	16 260	16 260	16 260	13 200	300	20 300	16 280	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 200
	2750	280	16 200	16 240	16 220	16 200	13 200	300	20 300	16 200	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 200
	3000	280	16 200	16 220	16 200	16 200	13 200	300	20 300	16 200	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 300	20 200

NOTE:
 FOR WALL THICKNESS LESS THAN 240, STAGGER HORIZONTAL REINFORCEMENT AS SHOWN.

LEGEND:
 c = CONCRETE CLEAR COVER (50mm)
 — o — ADDITIONAL REBARS IF FILL IS LESS THAN 600mm

STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC) BARRELS

	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 (Piaridel, Cabanatuan and San Jose Bypasses)	SCALE : 1:30 FULL SIZE A1	SHEET CONTENTS : STANDARD DETAILS OF RCBC BARRELS	SHEET NO. : DS-02
	CHECKED				BUREAU OF DESIGN							
	SUBMITTED				OFFICE OF THE SECRETARY							
					Submitted By:	Reviewed By:	Recommended By:	Approved By:				
					DANILO C. TRAJANO Project Director	JOSEFINA M. ALADAR Dir. Highways Division	GILBERTO S. REYES Dir. Director IV	MANUEL M. BONDAN Undersecretary	SIMEON A. DATUMANONG Secretary			

QUANTITIES FOR STANDARD BOX CULVERTS							
CLEAR		QUANTITY PER METER OF BARREL					
SPAN S	HEIGHT h	SINGLE		DOUBLE		TRIPLE	
		CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)
1250	1000	0.94	113.32	1.63	209.22	2.33	296.18
	1250	1.03	121.63	1.77	216.22	2.51	312.39
	1500	1.12	130.96	1.90	232.07	2.69	330.39
	1800	1.23	141.71	2.07	249.50	2.91	352.09
1500	1000	1.03	165.90	2.04	253.90	2.92	354.80
	1250	1.12	177.10	2.19	256.00	3.12	370.20
	1500	1.21	189.60	2.34	279.60	3.32	387.10
	1800	1.32	202.50	2.52	296.20	3.56	407.10
1800	1250	1.38	189.20	3.11	312.30	4.45	437.00
	1500	1.48	199.90	3.30	326.10	4.70	454.00
	1800	1.60	214.80	3.53	342.80	5.00	475.20
	2100	1.72	239.80	3.75	357.50	5.30	494.40
2400	1800	2.04	272.70	5.04	431.80	7.20	619.10
	2100	2.17	288.50	5.31	447.30	7.56	637.10
	2400	2.31	314.10	5.58	461.80	7.92	656.40
	2750	2.46	356.70	5.90	478.60	8.34	677.70
3000	2100	3.17	308.70	6.03	635.70	8.64	899.70
	2400	3.34	321.30	6.30	652.00	9.00	919.60
	2750	3.53	374.40	6.62	705.60	9.42	895.00
	3000	3.67	413.50	6.84	721.80	9.72	1015.40

QUANTITIES FOR STANDARD WINGWALLS								
CLEAR		QUANTITY PER WINGWALL AND APRON SLAB						
m (meter)	h+t (meter)	L (meter)	SINGLE		DOUBLE		TRIPLE	
			CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)	CONCRETE (m ³)	REINFORCEMENT (kg)
1.37	1.18	1.23	2.41	150	2.94	180	3.48	220
1.75	1.43	1.76	3.48	220	4.08	265	4.72	300
2.12	1.68	2.29	4.66	300	5.36	350	6.06	395
2.57	1.98	2.93	6.22	405	7.01	450	7.80	500
1.37	1.18	1.23	2.50	140	3.26	180	3.88	220
1.75	1.43	1.76	3.69	210	4.42	250	5.16	290
2.12	1.68	2.29	4.78	270	5.73	320	6.56	360
2.57	1.98	2.93	6.35	350	7.42	410	8.37	460
1.78	1.45	1.80	3.81	210	4.98	280	5.90	330
2.15	1.70	2.33	5.03	280	6.33	350	7.36	400
2.80	2.00	2.97	6.48	360	8.09	450	9.26	510
3.05	2.30	3.61	8.37	460	10.00	550	11.31	620
2.63	2.02	3.01	7.08	390	9.14	500	10.71	590
3.08	2.32	3.65	9.28	510	11.61	640	13.37	740
3.53	2.62	4.28	11.42	630	13.98	770	15.92	880
4.06	2.97	5.03	14.17	780	17.90	990	19.15	1050
3.17	2.38	3.78	10.08	560	12.38	680	14.53	800
3.62	2.68	4.41	12.30	680	14.83	820	17.19	940
4.15	3.03	5.15	15.15	840	17.94	990	20.57	1130
4.52	3.28	5.68	17.34	960	20.33	1120	23.15	1270

GENERAL NOTES :

SPECIFICATION :

AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES, 16th EDITION 1995.

DESIGN LOAD :

LIVE LOAD MS-18 (HS 20-44)

CONCRETE :

ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH IN 28 DAYS OF $f'_c = 20.7 \text{ MPa}$ (3000psi). ALL EXPOSED CORNERS TO BE CHAMFERED 20 MINIMUM. NO CONSTRUCTION JOINT ARE TO BE MADE EXCEPT WHERE SHOWN. WHEN BOTTOM SLAB IS SUBJECT TO ABRASION ADD 25mm TO BOTTOM SLAB TO INCREASE COVERAGE ON STEEL.

STEEL REINFORCEMENT :

ALL REINFORCING STEEL TO BE INTERMEDIATE (GRADE 40) ASTM A-615 WITH DEFORMATIONS CONFORMING TO ASTM A-305.

GENERAL :

IN STATING CULVERT SIZE, GIVE SPAN BY HEIGHT (SPAN FIRST) WHEN HEIGHT OF FILL, H=0 THE TOP OF SURFACE OF THE UPPER SLAB SHALL FOLLOW THE CROWN OF THE FINISHED ROADWAY. THE BOX CULVERT SHALL BE CONSTRUCTED ON A LAYER OF LEAN CONCRETE 50mm MINIMUM THICKNESS.

LIVE LOAD DISTRIBUTION REINFORCEMENT :

WHEN THERE IS LESS THAN 600mm OF FILL ABOVE TOP SLAB OF CULVERT ADDITIONAL REINFORCEMENT TRANSVERSE TO THE MAIN REINFORCEMENT IS ADDED TO THE BOTTOM OF THE TOP SLAB IN ACCORDANCE WITH AASHTO 1.3.2.E.

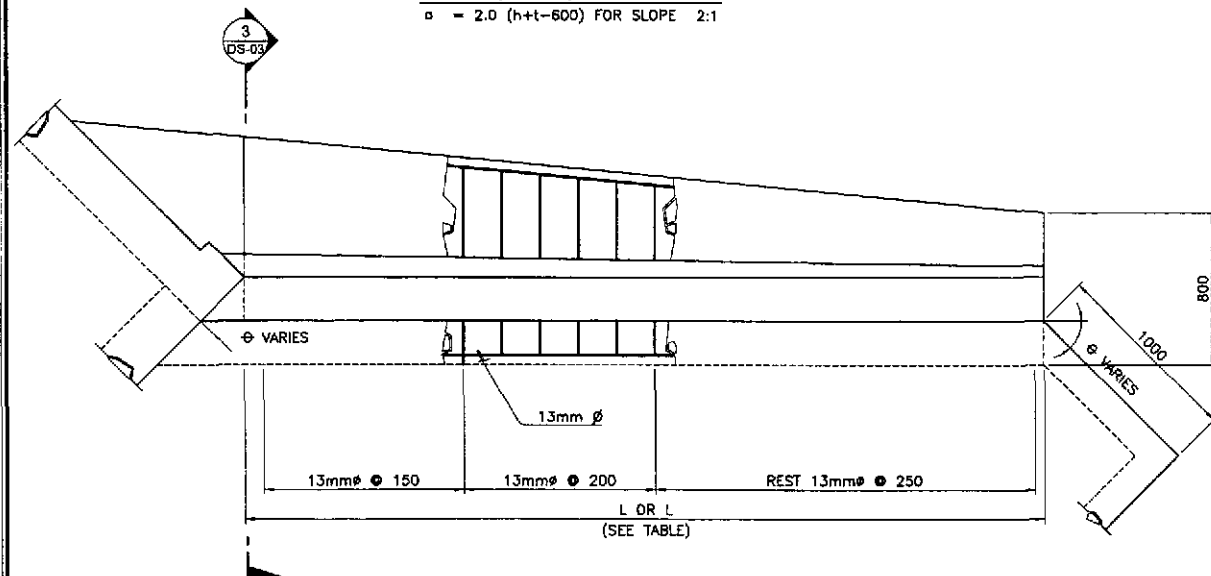
HEIGHT OF FILL :

MAXIMUM HEIGHT OF FILL IS 3000mm ABOVE TOP SLAB, FOR HEIGHT OF FILL GREATER THAN 3000mm SPECIAL DESIGN OF BOX CULVERT SHOULD BE DONE.

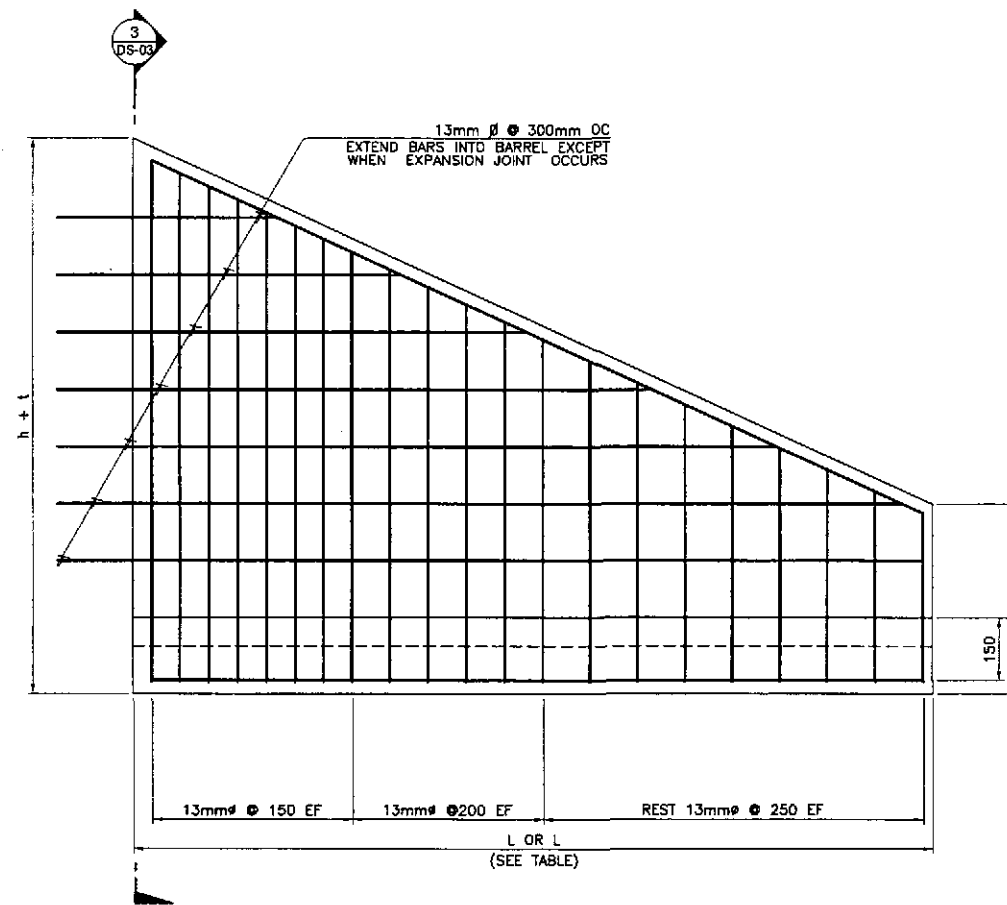
HORIZONTAL SKEW ANGLE CC	LENGTH OF WINGWALLS
90°	$L_1 = L_2 = 1.414a$
60°	$L_1 = 1.414a$ $L_2 = 1.035a$
45°	$L_1 = 2.000a$ $L_2 = a$

WHERE :

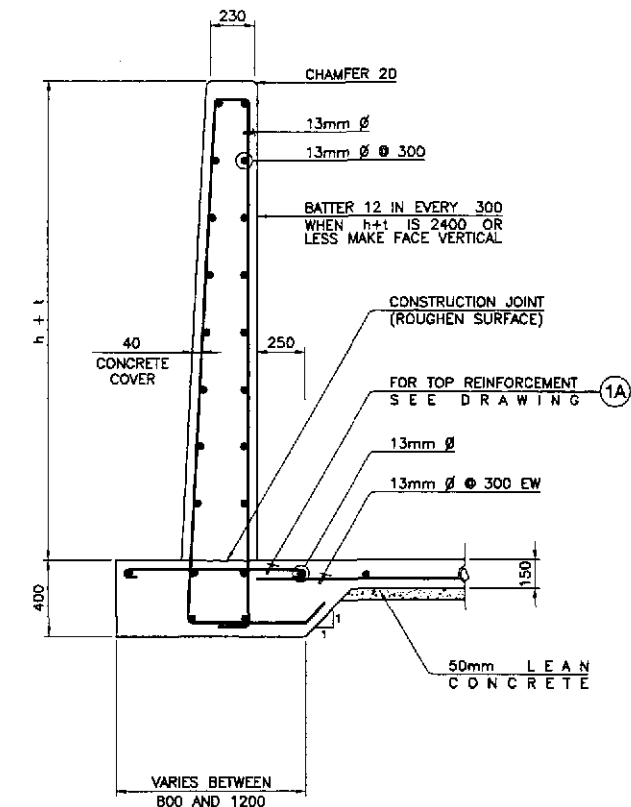
$a = 1.5 (h+t-600)$ FOR SLOPE 1.5:1
 $a = 2.0 (h+t-600)$ FOR SLOPE 2:1



1 WINGWALL PLAN
 DS-03 SCALE 1:40



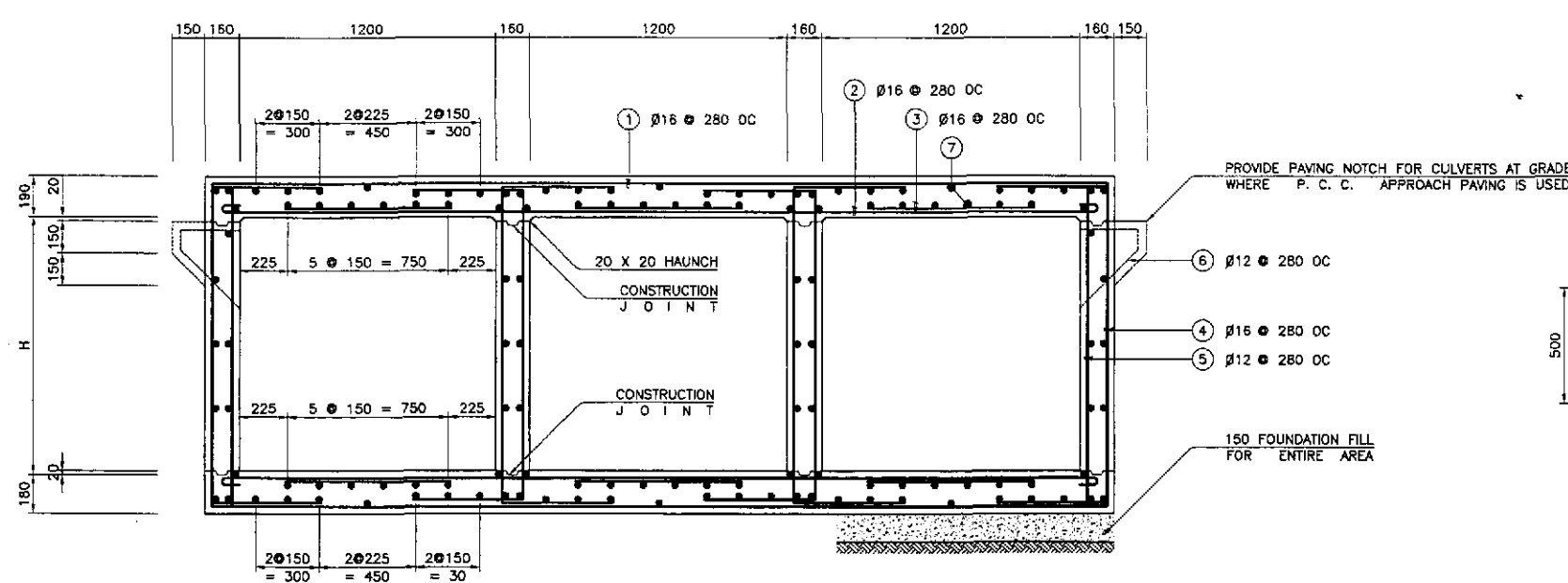
2 WINGWALL ELEVATION
 DS-03 SCALE 1:40



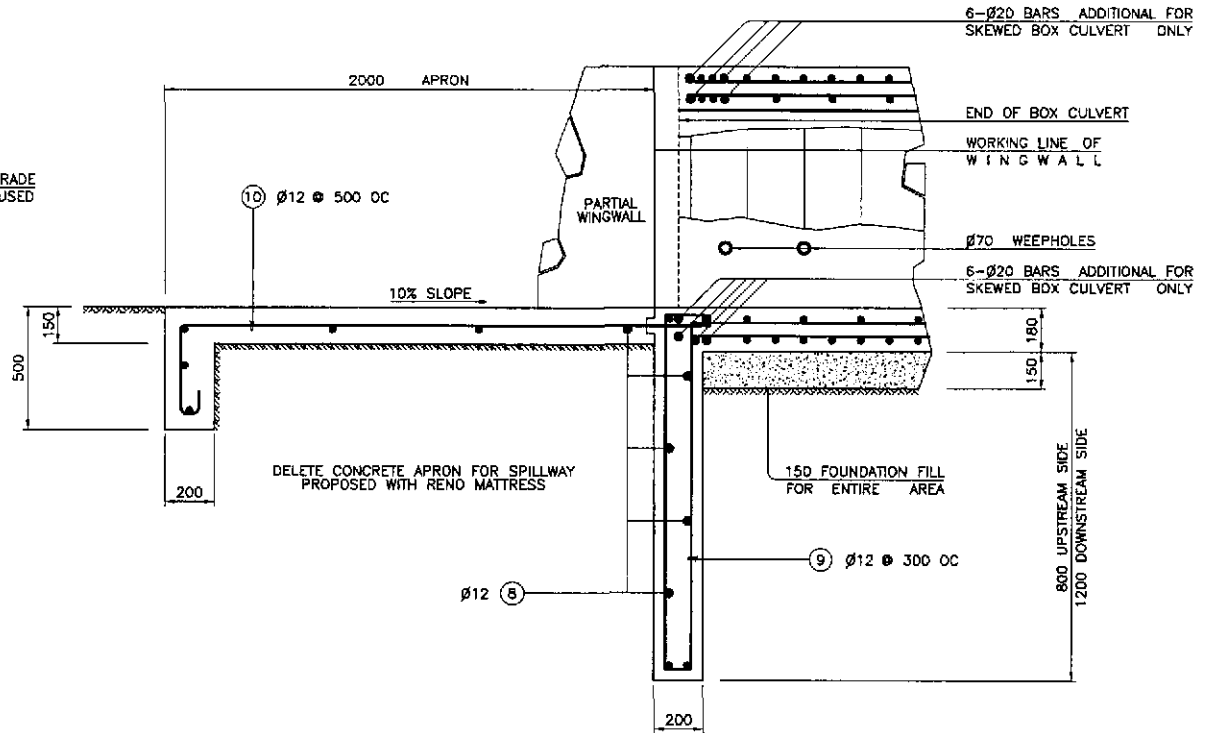
3 SECTION
 DS-03 SCALE 1:40

RCBC WINGWALL DETAILS

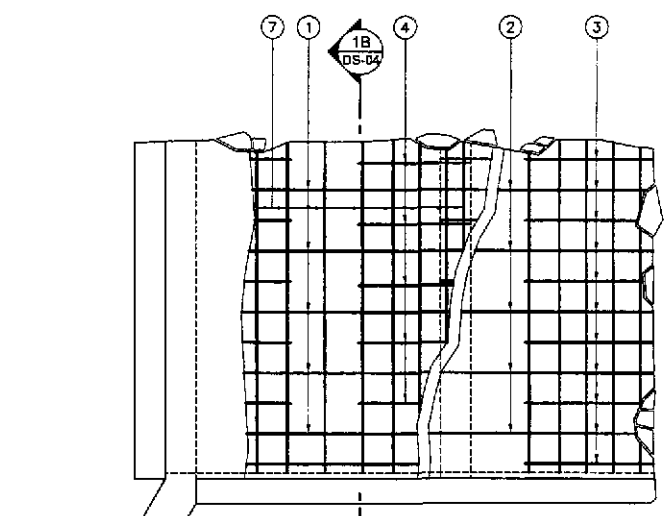
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE : 1:40 FULL SIZE A1	SHEET CONTENTS : STANDARD DETAILS OF RCBC WINGWALLS	SHEET NO. : DS-03
	CHECKED	10/25/02	[Signature]		FUHL - PMO BUREAU OF DESIGN OFFICE OF THE SECRETARY Recommended By: [Signature] Approved By: [Signature]	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV				
SUBMITTED 10/14/02			TEAM LEADER DANILLO C. TRAJANO Project Director								



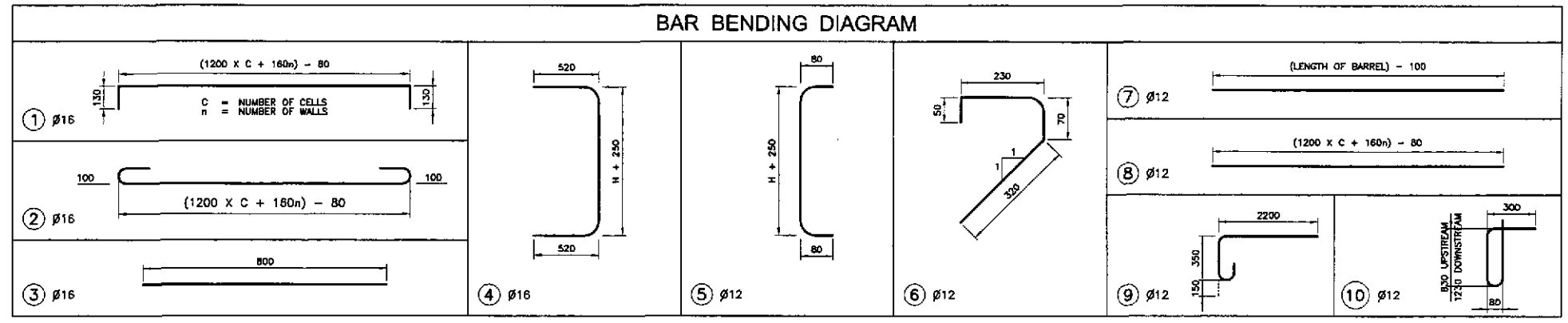
1A SECTION ALONG C OF ROADWAY
DS-04 NOT TO SCALE



1B PARTIAL SECTION A
DS-04 NOT TO SCALE



PARTIAL PLAN
NOT TO SCALE



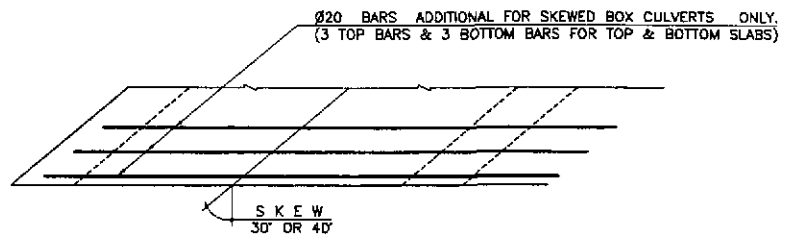
ESTIMATE OF QUANTITIES (PER LINEAR METER OF LENGTH)

HEIGHT OF CELL "H" (METER)	SINGLE BARREL				DOUBLE BARREL				TRIPLE BARREL			
	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION FILL (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION FILL (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION FILL (m ³)
1.20	0.95	132.59	0.67	0.27	1.84	217.00	1.12	0.48	2.34	299.62	1.56	0.68
0.90	0.85	127.30	0.67	0.27	1.50	209.08	1.12	0.48	2.14	289.04	1.56	0.68
0.60	0.75	122.01	0.67	0.27	1.35	201.15	1.12	0.48	1.95	278.48	1.56	0.68

ADDITIONAL WEIGHT OF REINFORCEMENT PER END OF BOX CULVERT
 30° SKEW = 98.5 kgs. 30° SKEW = 46.5 kgs.
 45° SKEW = 120.5 kgs. 45° SKEW = 57.0 kgs.

APRON AND END TOE FOR BOTH ENDS

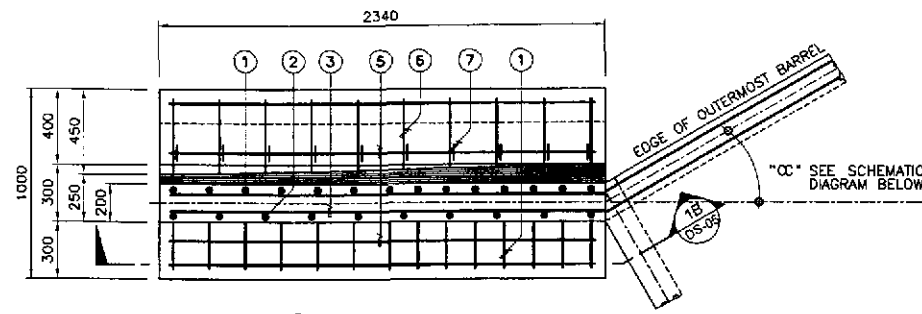
COMMON TO ALL HEIGHT OF CELL	SINGLE BARREL			DOUBLE BARREL			TRIPLE BARREL		
	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)
	1.73	57.94	3.64	3.28	111.34	6.08	4.83	164.70	8.53



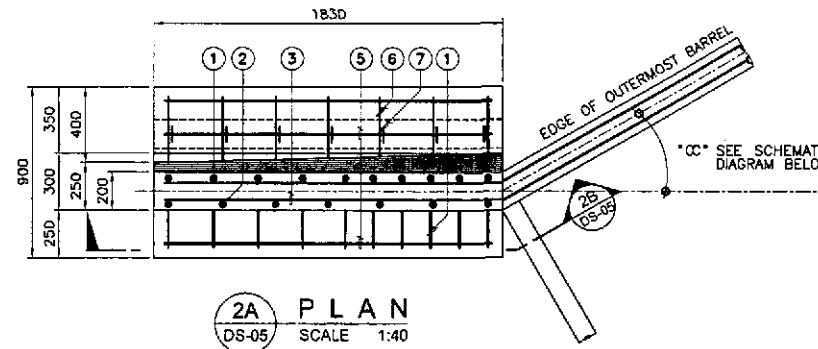
NOTE:
ALL OTHER REINFORCING BARS SHALL BE PERPENDICULAR OR PARALLEL, AS THE CASE MAYBE, TO BOX AXIS.

1 LOW DEPTH TYPE BOX CULVERT
DS-04 NOT TO SCALE

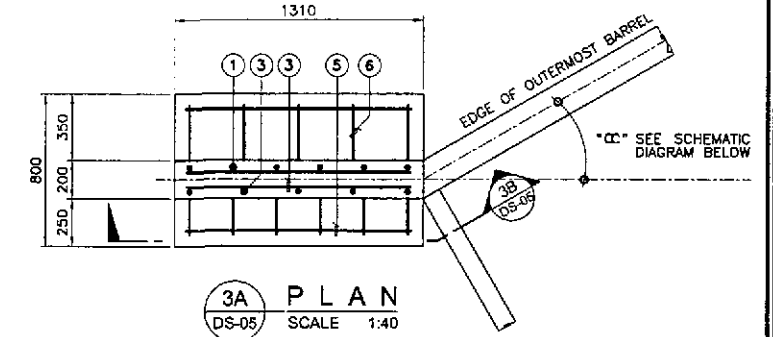
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :		SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/15/02	H. HAKI		BUREAU OF DESIGN			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		NOT TO SCALE	STANDARD LOW DEPTH TYPE BOX CULVERT (1 of 2)	DS-04
	SUBMITTED	10/14/02	EL. RUIH		Submitted By:	Reviewed By:	Recommended By:	Approved By:	CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1		



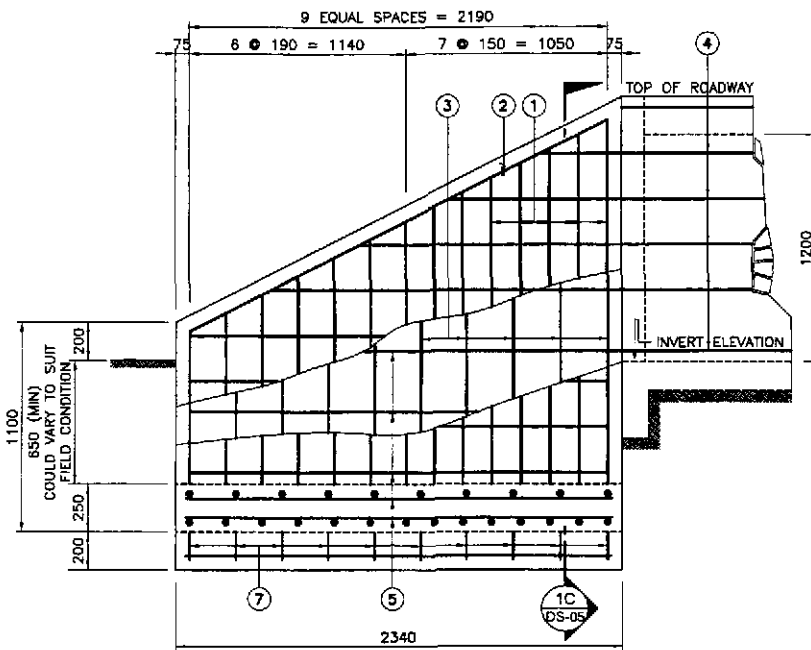
1A PLAN
DS-05 SCALE 1:40



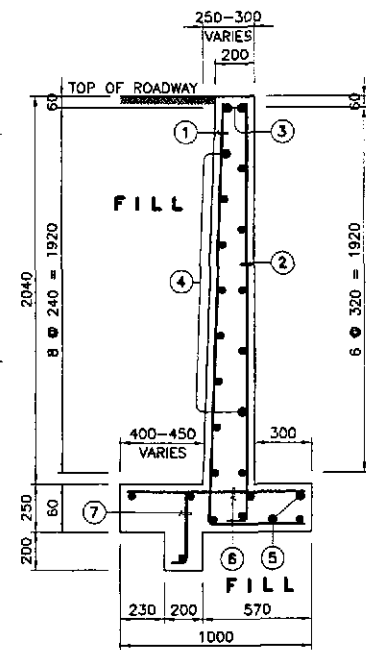
2A PLAN
DS-05 SCALE 1:40



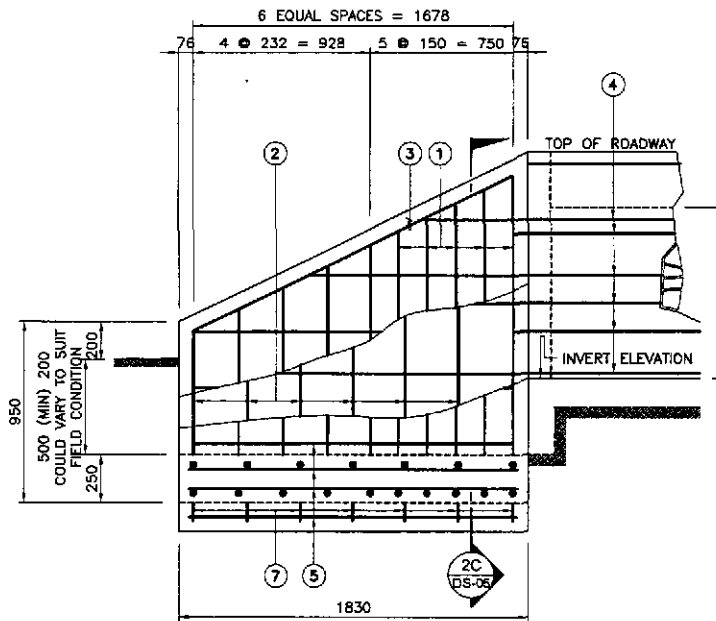
3A PLAN
DS-05 SCALE 1:40



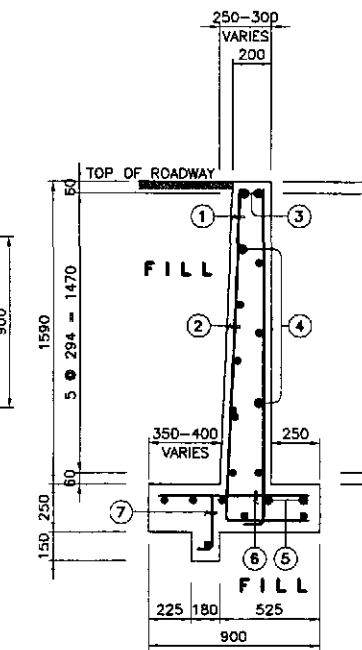
1A ELEVATION
DS-05 SCALE 1:40



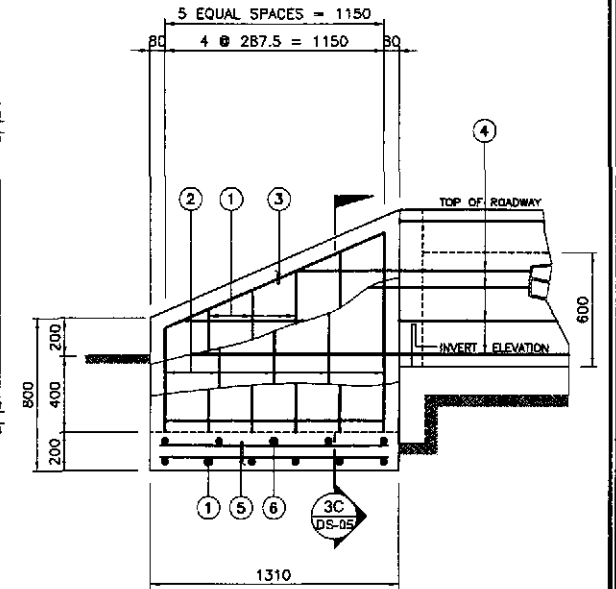
1C SECTION
DS-05 SCALE 1:40



2B ELEVATION
DS-05 SCALE 1:40



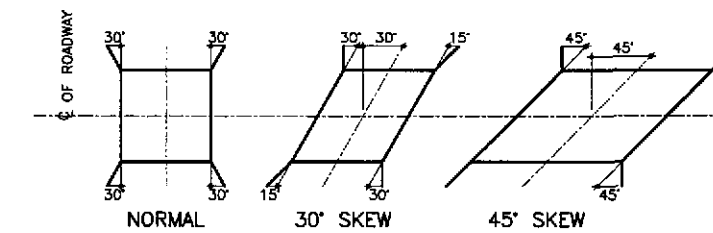
2C SECTION
DS-05 SCALE 1:40



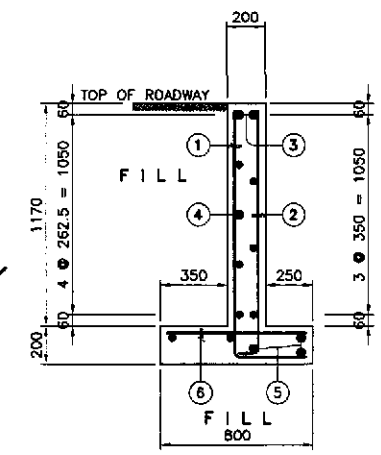
3B ELEVATION
DS-05 SCALE 1:40

BAR BENDING DIAGRAM H=1200			BAR BENDING DIAGRAM H=900			BAR BENDING DIAGRAM H=600		
① 14-12mm#	② 10-12mm#	③ 2-12mm#	① 10-12mm#	② 7-12mm#	③ 2-12mm#	① 6-12mm#	② 5-12mm#	③ 2-12mm#
④ 9-12mm#	⑤ 9-12mm#	⑥ 10-12mm#	④ 6-12mm#	⑤ 10-12mm#	⑥ 7-12mm#	④ 5-12mm#	⑤ 7-12mm#	⑥ 5-12mm#

HEIGHT (m)	CONCRETE CLASS "A" (m ³)	REINFORCEMENT (kg)	EXCAVATION (m ³)	FOUNDATION FILL (m ³)
1.20	2.96	102.89	5.78	0.30
0.90	1.90	57.68	3.53	0.22
0.60	0.88	31.43	1.97	0.15



4 SCHEMATIC DIAGRAM SHOWING FLARE OF WINGWALL
DS-05 NOT TO SCALE

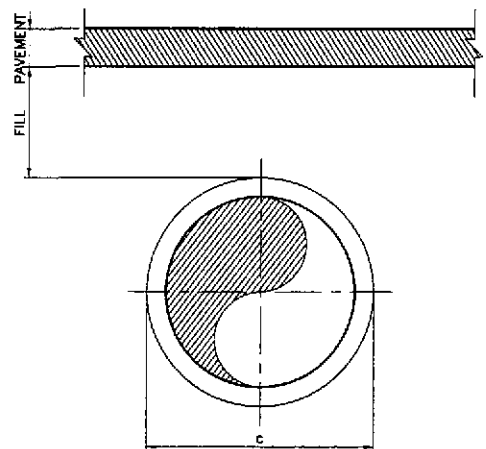


3C SECTION
DS-05 SCALE 1:40

LOW DEPTH TYPE BOX CULVERT

	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	12/15/02	<i>[Signature]</i>		BUREAU OF DESIGN	OFFICE OF THE SECRETARY	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	STANDARD LOW DEPTH TYPE BOX CULVERT (2 of 2)	DS-05	
SUBMITTED	12/16/02	<i>[Signature]</i>	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES DC, Director IV	MANUEL M. BONGAN Undersecretary	SIMEON A. DATUMANONG Secretary	FULL SIZE A1			

DESIGN REQUIREMENT OF REINFORCED CONCRETE PIPE CULVERT

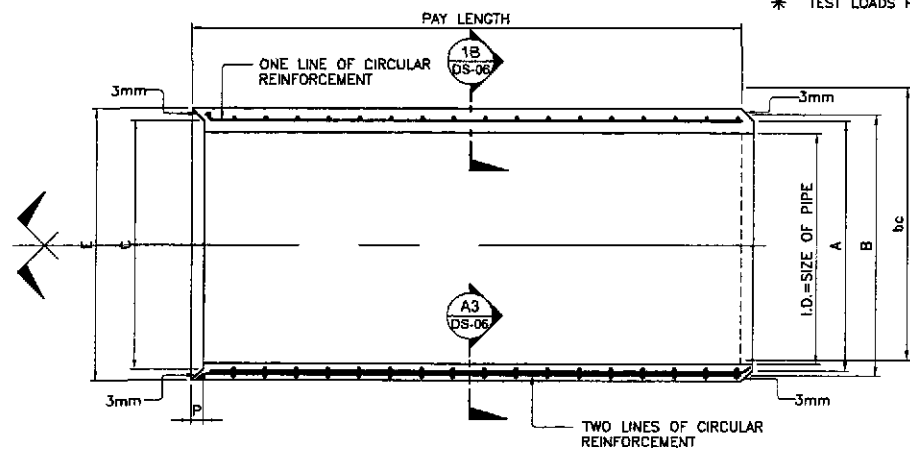


STANDARD STRENGTH PIPES:
 FILL 1/2 E.D. FOR FLEXIBLE PAVEMENT OR MIN. OF 0.60 m
 0.30 m FOR RIGID PAVEMENT
 EXTRA STRENGTH PIPES:
 FILL: 0.30 m FOR RIGID AND FLEXIBLE PAVEMENTS

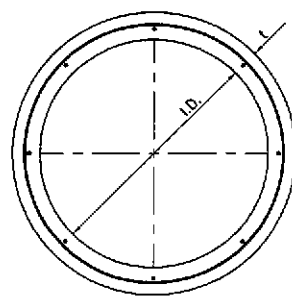
MINIMUM PIPE COVERING

SIZE OF PIPE (mm)		STANDARD STRENGTH REINFORCED CONCRETE PIPE CULVERTS														EXTRA STRENGTH REINFORCED CONCRETE PIPE CULVERTS												
		CONCRETE 247 kg/cm ² (3,500 lb/in ²)							CONCRETE 317 kg/cm ² (4,500 lb/in ²)							STRENGTH TEST REQUIREMENTS kg/m OF PIPE				CONCRETE 317 kg/cm ² (4,500 lb/in ²)				STRENGTH TEST REQUIREMENTS kg/m OF PIPE				
		WALL THICKNESS (mm)	TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		WALL THICKNESS (mm)	TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		THREE-EDGE-BEARING METHOD *		WALL THICKNESS (mm)	TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		THREE-EDGE-BEARING METHOD
I.D.	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025m CRACK LOAD	ULTIMATE LOAD	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025m CRACK LOAD	LOAD ULTIMATE
300	57	344	383	351	370	44	1 LINE 1.48		51	495	514	502	521	44	1 LINE 1.69		3.355	5.218	—	—	—	—	—	—				
380	57	344	383	351	370	44	1 LINE 1.90		51	495	514	502	521	44	1 LINE 2.33		3.914	6.060	—	—	—	—	—	—				
460	64	508	527	514	534	44	1 LINE 2.54	1 LINE 2.12	51	495	514	502	521	44	1 LINE 2.96		4.473	6.709	—	—	—	—	—	—				
510	76	673	692	680	699	44	1 LINE 3.60	1 LINE 2.75	64	660	680	667	686	44	1 LINE 4.23	1 LINE 3.60	4.473	7.454	76	673	692	680	699	44	1 LINE 5.50	1 LINE 4.23	5.964	8.945
760	89	858	857	845	864	51	1 LINE 4.66	1 LINE 3.60	76	825	845	832	851	51	1 LINE 5.92	1 LINE 4.44	5.032	8.573	89	838	857	845	864	51	1 LINE 6.56	1 LINE 5.08	7.454	11.182
910	102	1003	1022	1010	1029	64	2 LINES EACH 3.81	1 LINE 3.81	86	988	1007	994	1013	64	2 LINES EACH 4.66	1 LINE 4.66	6.038	9.840	102	1003	1022	1010	1029	64	2 LINES EACH 5.92	1 LINE 5.92	8.945	13.418
1070	114	1168	1167	1175	1194	64	2 LINES EACH 4.44	1 LINE 4.44	95	1150	1165	1156	1175	64	2 LINES EACH 5.29	1 LINE 5.29	7.045	10.956	114	1168	1167	1175	1194	64	2 LINES EACH 6.98	1 LINE 6.98	10.436	15.655
1220	127	1334	1353	1340	1359	64	2 LINES EACH 5.29	1 LINE 5.29	108	1315	1334	1321	1340	64	2 LINES EACH 6.56	1 LINE 6.56	8.051	11.927	127	1334	1353	1340	1359	64	2 LINES EACH 8.04	1 LINE 8.04	11.927	17.891
1520	152	1664	1683	1670	1690	64	2 LINES EACH 6.98	1 LINE 6.98	127	1639	1658	1645	1664	64	2 LINES EACH 8.68	1 LINE 8.68	8.945	14.909	152	1664	1683	1670	1690	64	2 LINES EACH 10.58	1 LINE 10.58	13.418	22.364

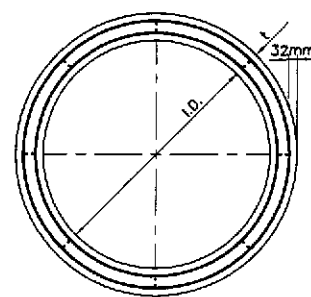
* THE DISTANCE FROM CENTERLINE OF THE REINFORCEMENT TO THE NEAREST SURFACE OF THE CONCRETE HAS BEEN ASSUMED AS 32mm FOR PIPES WITH A SHELL THICKNESS OF 84mm OR MORE.
 * TEST LOADS FOR SAND-BEARING TEST SHALL BE ONE AND ONE - HALF TIMES THOSE SPECIFIED IN THIS TABLE FOR THE THREE - EDGE BEARING TEST.



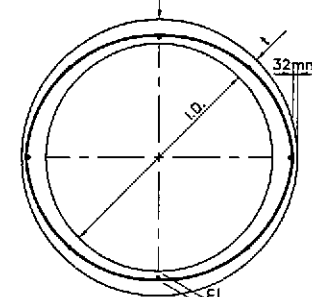
1A LONGITUDINAL SECTION
 DS-06 NOT TO SCALE



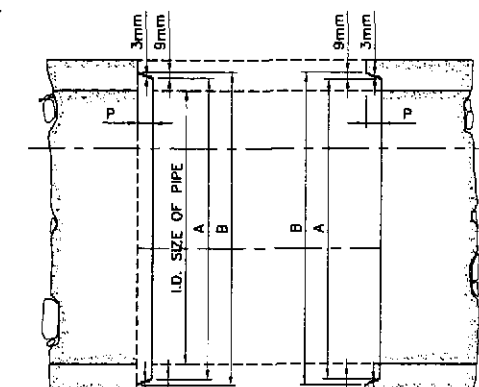
1B SECTION
 DS-06



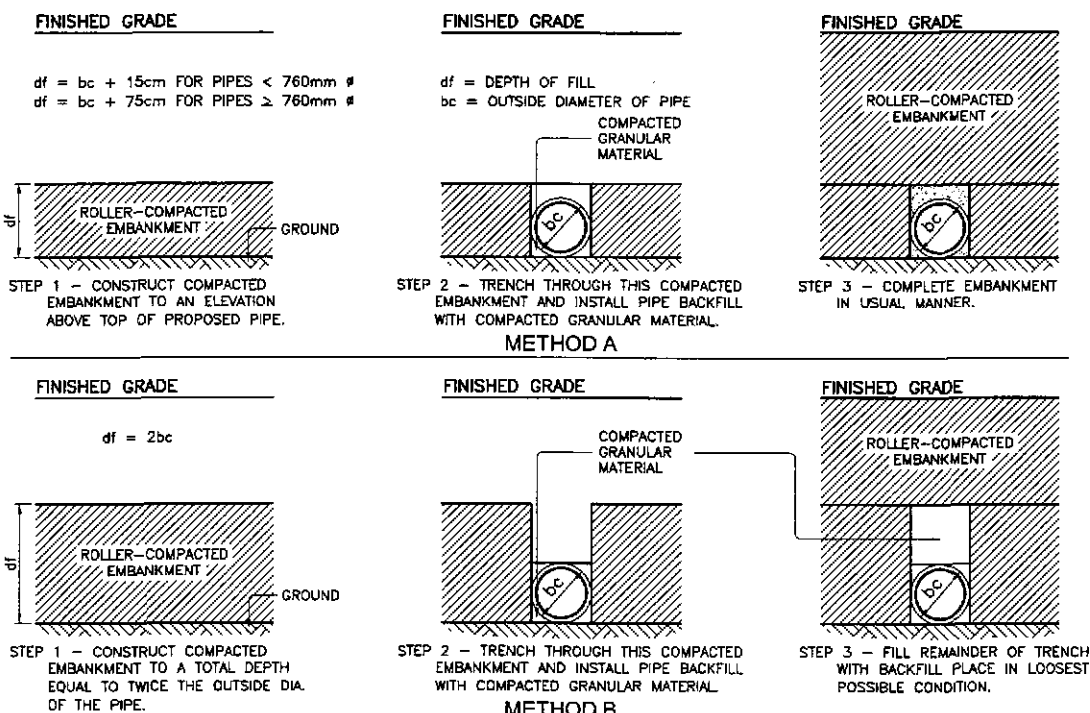
1C SECTION
 DS-06



1D SECTION
 DS-06

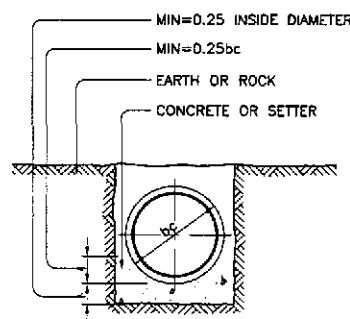


1E SECTION
 DS-06

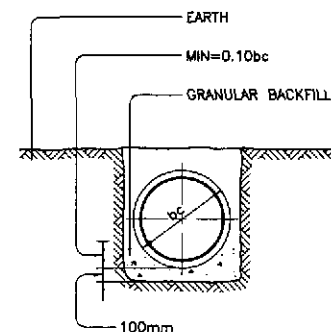


2 METHODS OF PIPE INSTALLATION
 DS-06 NOT TO SCALE

1 STANDARD REINFORCED CONCRETE PIPE CULVERTS
 DS-06 SCALE AS SHOWN

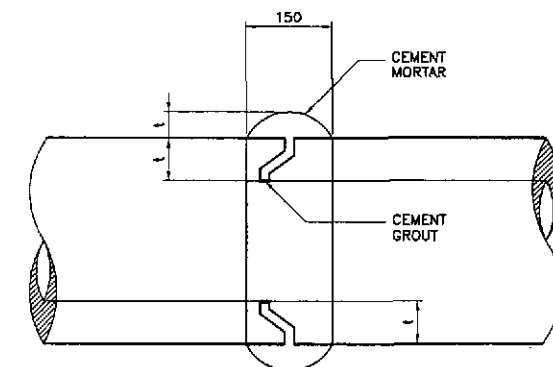


CONCRETE CRADLE BEDDING



ORDINARY BEDDINGS

3 TYPICAL BEDDING FOR CONDUITS
 DS-06 NOT TO SCALE



4 DETAIL OF PIPE COLLAR
 DS-06 NOT TO SCALE

 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	SHEET CONTENTS : STANDARD RCPC, METHOD OF PIPE INSTALLATION AND TYPICAL BEDDING FOR CONDUITS	SHEET NO. : DS-06
DESIGNED : 9/27/02 [Signature]	CHECKED : 10/10/02 [Signature]	SUBMITTED : 10/10/02 [Signature]	DATE : 10/10/02	SIGNATURE : [Signature]	PJHL - PMO Submitted By:	BUREAU OF DESIGN Reviewed By:	OFFICE OF THE SECRETARY Recommended By:	Approved By:	CABANATUAN BYPASS - CONTRACT PACKAGE I	
			DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES SIC, Director IV	MANUEL M. BONDAN Undersecretary	SIMEDON A. DATUMANONG Secretary			

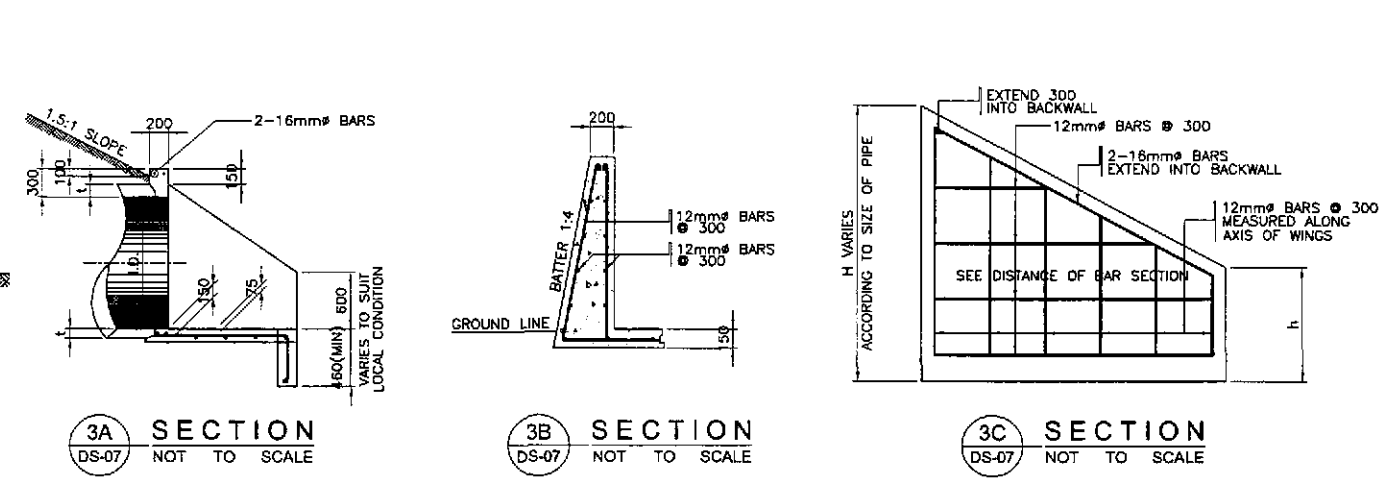
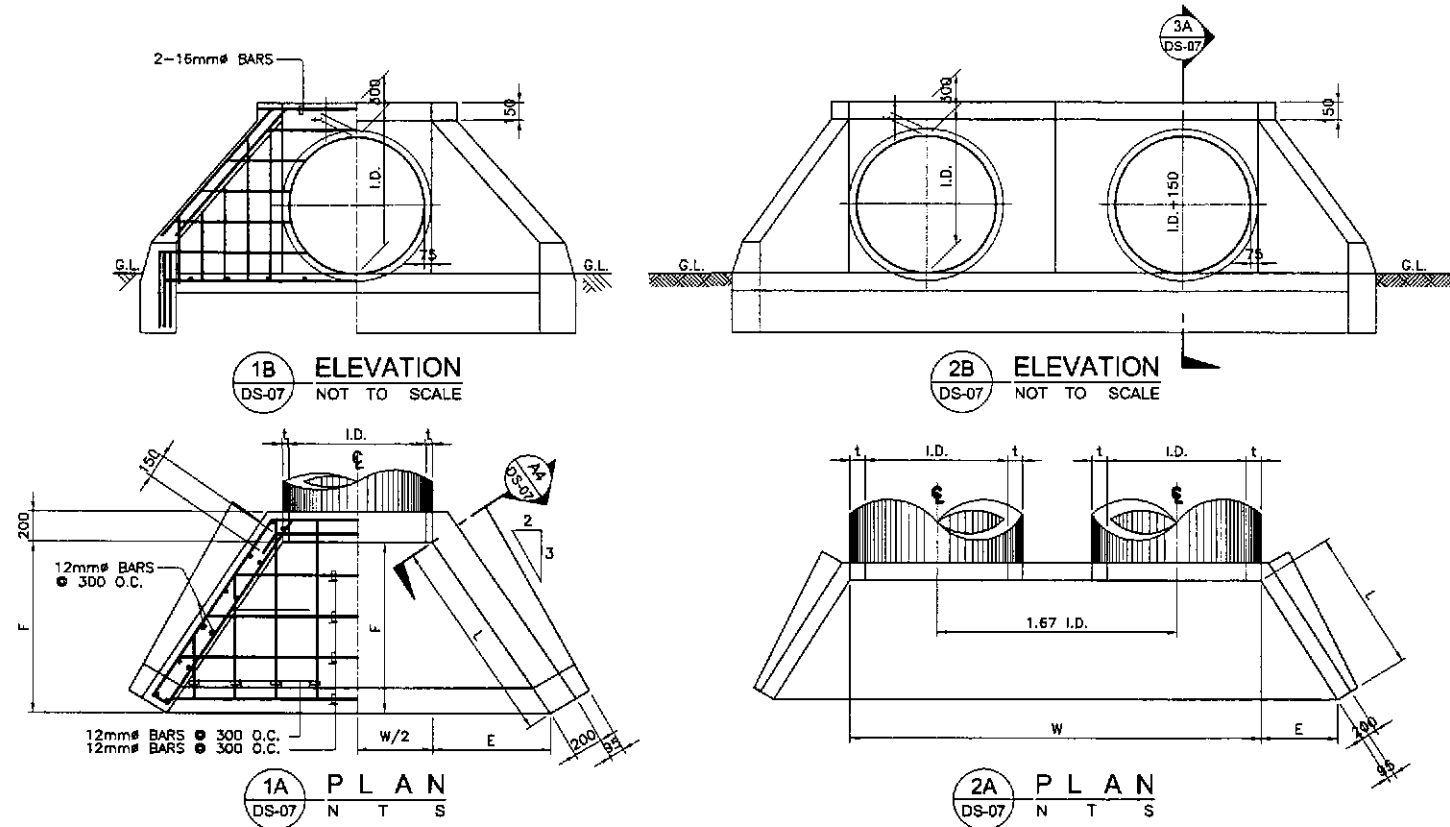


TABLE A (ONE FLARED TYPE HEADWALL 1.5:1)

DIAMETER & THICKNESS (mm)		DIMENSIONS (mm)				SINGLE PIPE			DOUBLE PIPE			TRIPLE PIPE					
INTERNAL DIAMETER (I.D.)	MIN. THICKNESS SHELL (t)	L	E	F	h	AREA OF WATERWAY m ²	EST. OF QUANTITIES		AREA OF WATERWAY m ²	W (mm)	EST. OF QUANTITIES		AREA OF WATERWAY m ²	W (mm)	EST. OF QUANTITIES		
							CONC. m ³	REINF. STEEL kg.			CONC. m ³	REINF. STEEL kg.			CONC. m ³	REINF. STEEL kg.	
460	51	710	390	590	0	0.17	610	0.57	25.65	0.32	1380	0.83	37.35	0.51	2150	1.27	57.15
610	64	960	530	800	0	0.29	760	0.82	36.46	0.58	1780	1.16	48.39	0.87	2800	1.75	78.75
910	86	1510	840	1260	600	0.65	1070	1.55	68.92	1.30	2590	2.22	92.61	1.95	4100	3.36	150.98
1070	95	1770	980	1470	600	0.90	1230	2.38	107.10	1.80	3020	3.05	137.25	2.70	4800	3.96	178.20
1220	108	2040	1130	1690	600	1.17	1370	2.66	110.27	2.34	3400	3.71	154.77	3.51	5360	5.36	241.34
1520	127	2540	1410	2110	600	1.81	1680	3.93	174.74	3.63	4229	5.47	228.18	5.43	6760	6.76	304.20

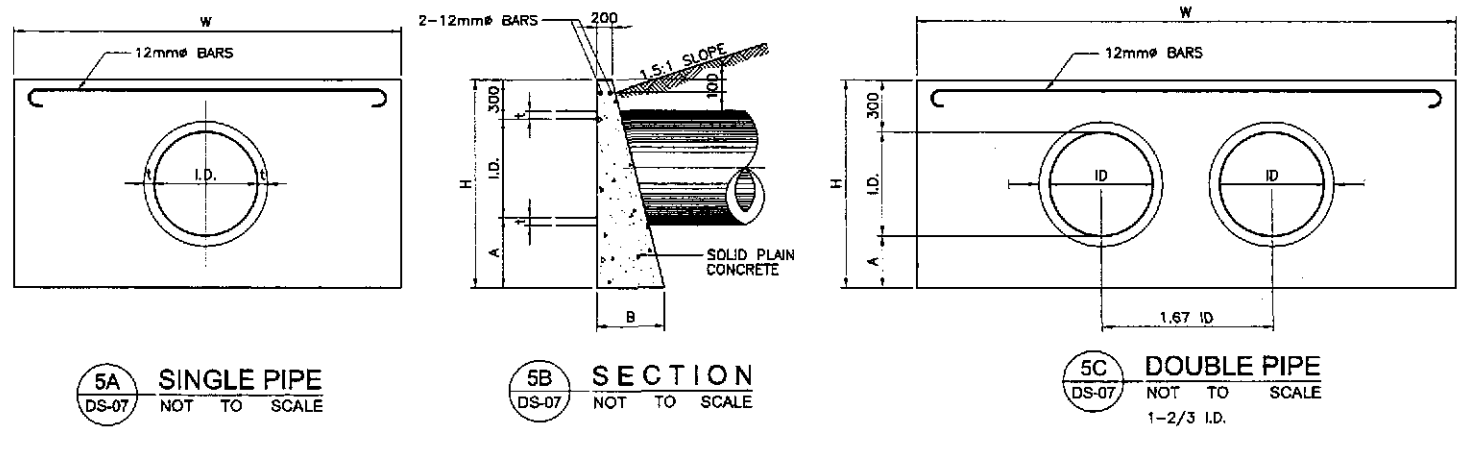
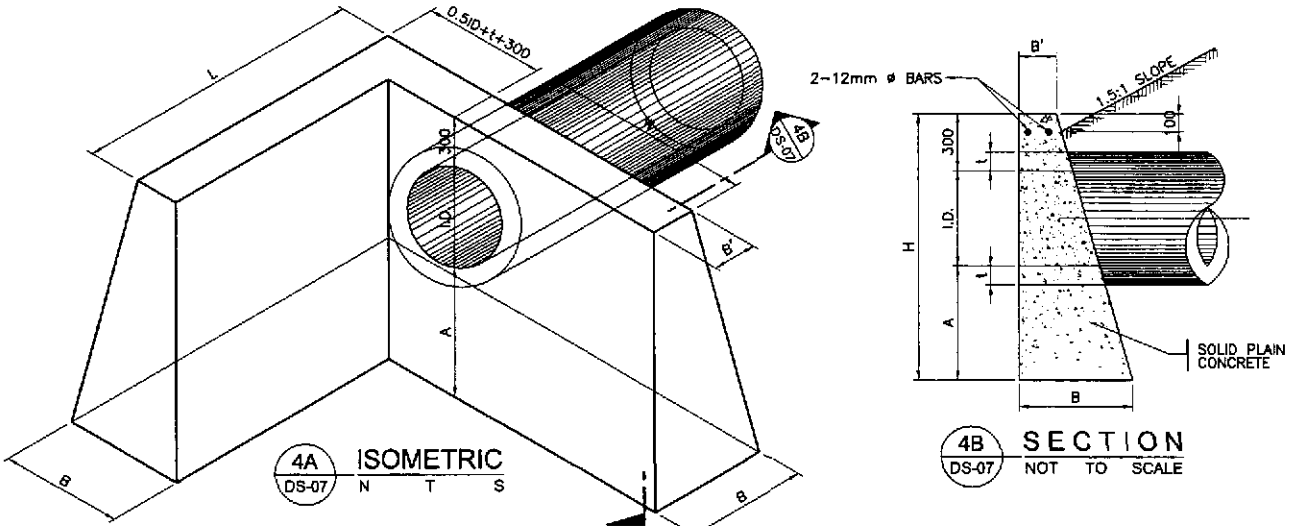
1 FLARED TYPE HEADWALL (SINGLE PIPE) SCALE AS SHOWN
 2 FLARED TYPE HEADWALL (DOUBLE PIPE) SCALE AS SHOWN

TABLE C (ONE L-TYPE HEADWALL)

DIA. & THICKNESS (mm)		DIMENSIONS (mm)						SINGLE PIPE	
INTERNAL DIAMETER (I.D.)	MIN. THK. SHELL (t)	A	B	B'	H	W	L	CONCRETE m ³	REINF. STEEL kg.
610	64	410	430	200	1320	1220	1220	1.06	8
910	86	610	610	200	1820	1820	1820	2.76	11
1070	95	710	780	300	2080	1970	VARIES	-	-
1220	108	810	870	300	2330	2120	VARIES	-	-
1520	127	1010	980	300	3030	2420	VARIES	-	-

TABLE C (ONE STRAIGHT TYPE HEADWALL)

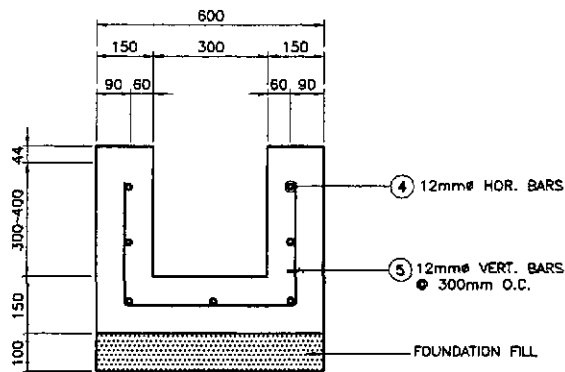
DIAMETER & THICKNESS (mm)		DIMENSIONS (mm)				SINGLE PIPE			DOUBLE PIPE			TRIPLE PIPE				
INTERNAL DIAMETER (I.D.)	MIN. THK. SHELL (t)	A	B	H	W (mm)	AREA OF WATERWAY m ²	CONCRETE		W (mm)	AREA OF WATERWAY m ²	CONCRETE		W (mm)	AREA OF WATERWAY m ²	CONCRETE	
							m ³	REINF. STEEL kg.			m ³	REINF. STEEL kg.			m ³	REINF. STEEL kg.
460	51	310	350	1070	1500	0.15	0.46	3.48	2600	0.33	0.63	4.90	3400	0.45	0.80	5.97
610	64	410	430	1320	2400	0.29	0.87	4.55	3500	0.58	1.20	6.50	4600	0.87	1.51	8.45
910	86	610	600	1820	3800	0.65	2.28	6.68	5200	1.30	3.16	9.52	6800	1.95	3.85	12.36
1070	95	710	780	2080	4300	0.90	3.84	7.57	6050	1.80	5.09	10.67	7900	2.70	6.43	13.96
1220	108	810	870	2330	4800	1.17	4.43	8.81	6900	2.34	6.70	12.54	9000	3.51	7.97	16.14
1520	127	1010	980	2830	6000	1.81	8.80	10.94	8600	3.63	11.93	15.56	11200	5.43	15.05	19.82



4 L-TYPE HEADWALL NOT AS SHOWN
 5 STRAIGHT TYPE HEADWALL NOT AS SHOWN

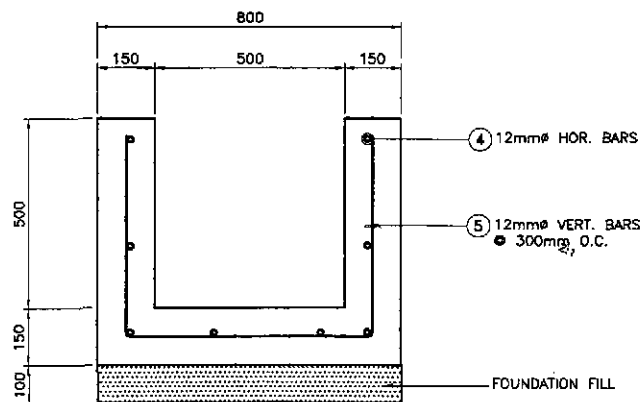
STANDARD REINFORCED CONCRETE HEADWALL FOR RCPC

	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/15/02	HAKIM		BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	NOT TO SCALE	STANDARD REINFORCED CONCRETE HEADWALL FOR RCPC	DS-07
	SUBMITTED	10/16/02	TEAM LEADER		Submitted By: DANILO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES DIC, Director IV	Recommended By: MANUEL M. BONDAN Undersecretary	Approved By: SIMEON A. DATUMANONG Secretary	CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1	



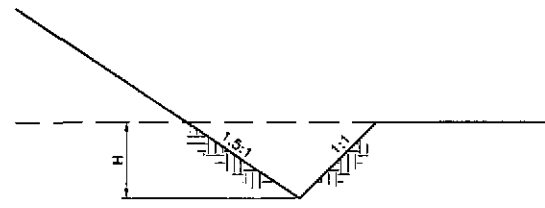
REINFORCED CONCRETE DITCH

1 TYPE BU
D-08 SCALE: 1:10

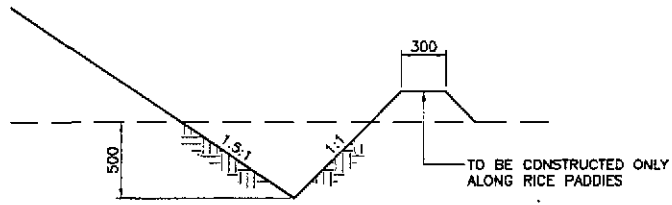


REINFORCED CONCRETE DITCH

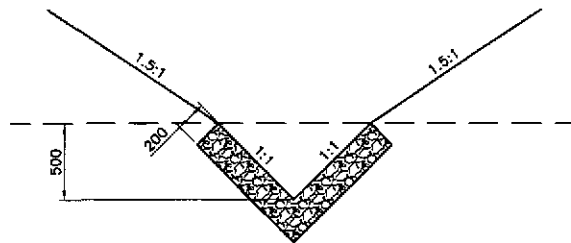
2 TYPE U
D-08 SCALE: 1:10



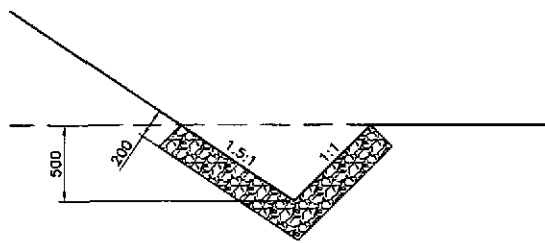
V-SHAPED UNLINED DITCH
TYPE E-4



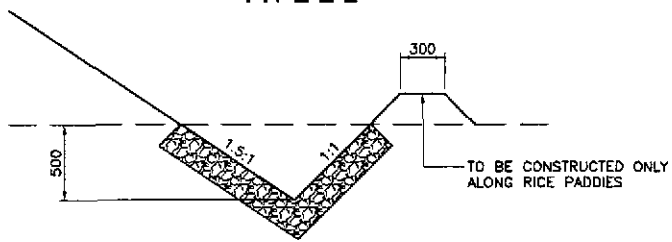
V-SHAPED UNLINED DITCH
TYPE E-3



V-SHAPED LINED DITCH
(OUTER SEPARATOR DITCH)
TYPE E-2a

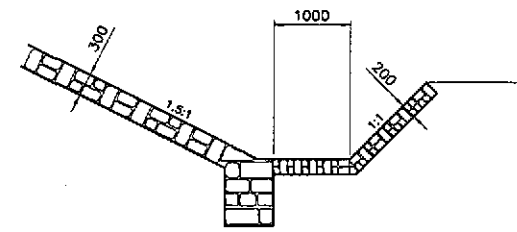


V-SHAPED LINED DITCH
TYPE E-2

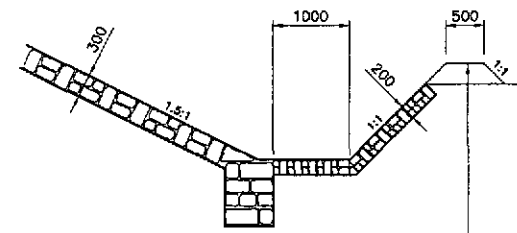


V-SHAPED LINED DITCH
TYPE E-1

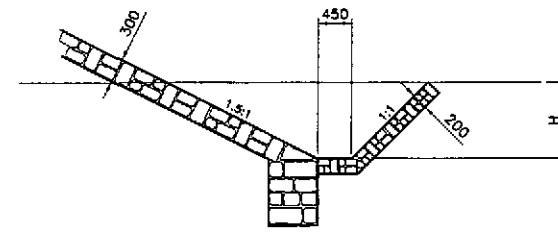
3 TYPE E
D-08 SCALE: 1:25



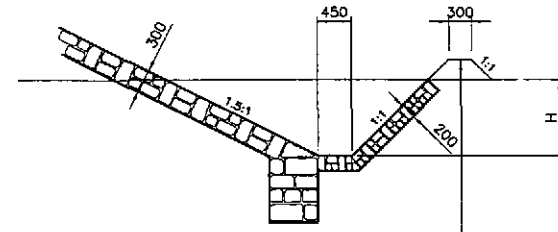
TYPE C-4



TYPE C-3

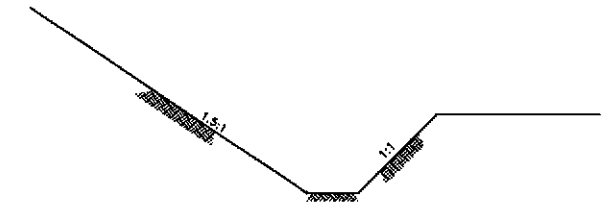


TYPE C-2

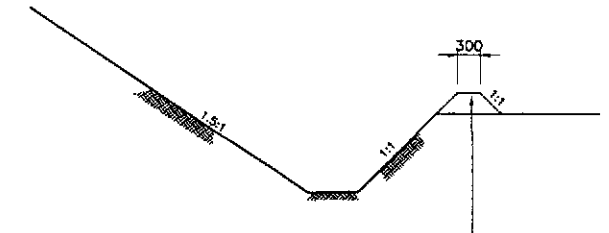


TYPE C-1

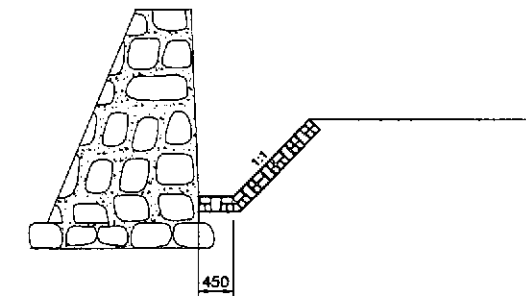
4 TYPE C
D-08 NOT TO SCALE



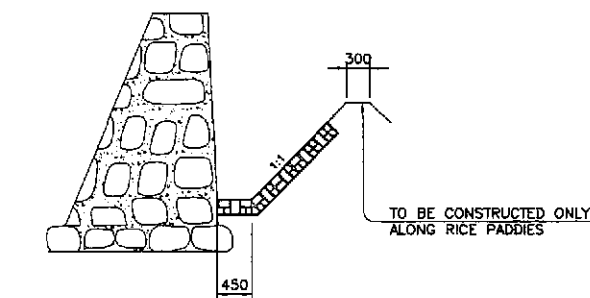
TYPE C-8



TYPE C-7



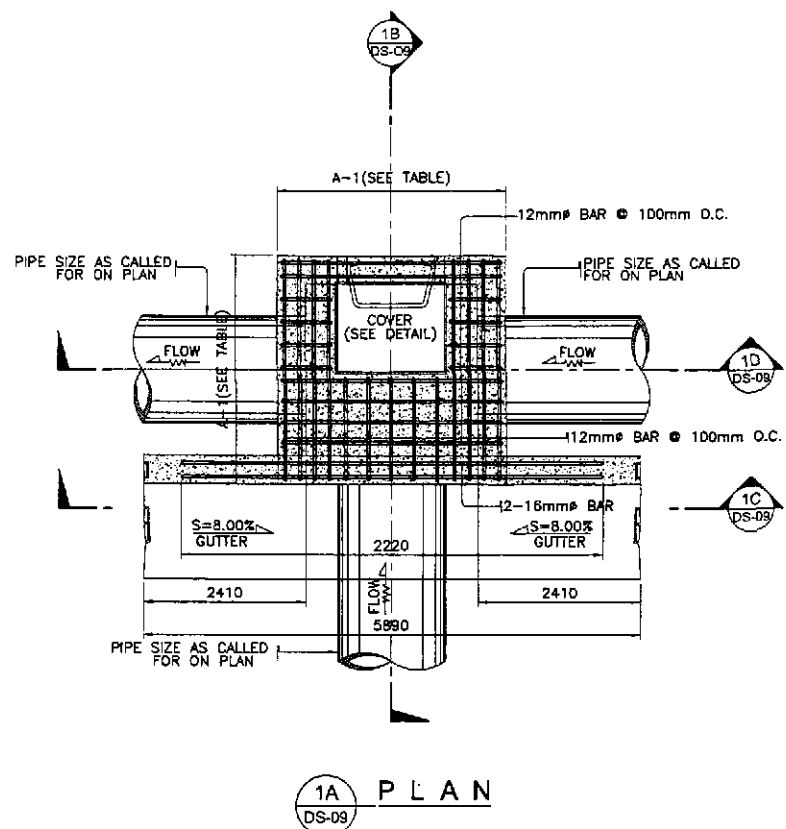
TYPE C-6



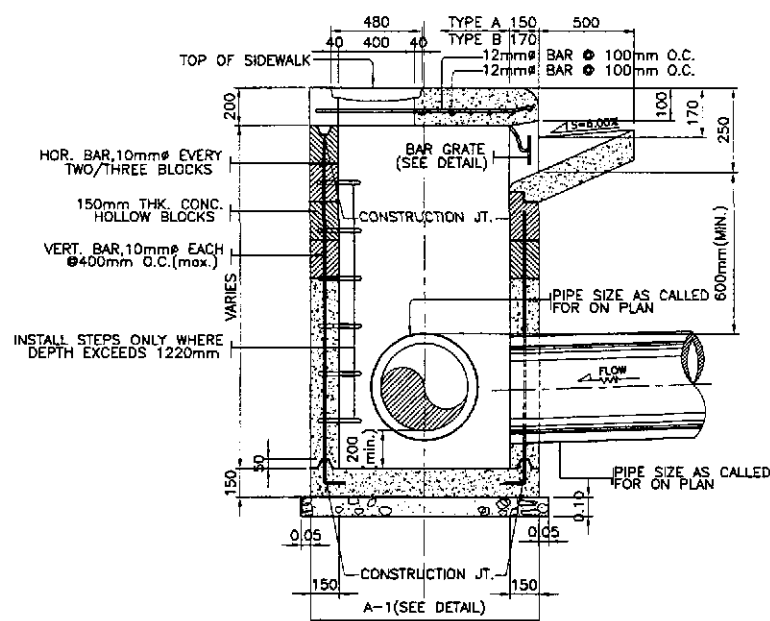
TYPE C-5

STANDARD DRAINAGE DITCHES

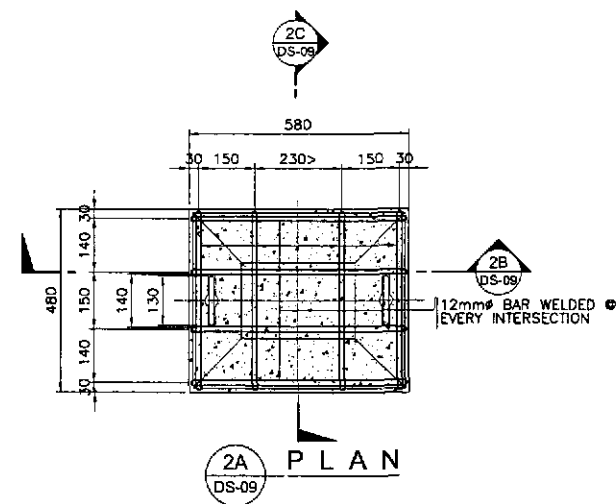
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS		PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	CHECKED	10/15/02	H. HAKIM		Submitted By:	BUREAU OF DESIGN	OFFICE OF THE SECRETARY	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	NOT TO SCALE	STANDARD DRAINAGE DITCHES	DS-08
	SUBMITTED	10/16/02	M. KUCHI		Reviewed By:	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONOAN Undersecretary		
							CABANATUAN BYPASS - CONTRACT PACKAGE I				



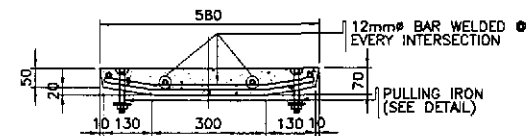
1A PLAN
DS-09



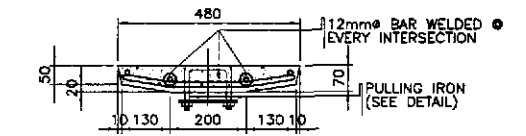
1B SECTION
DS-09



2A PLAN
DS-09

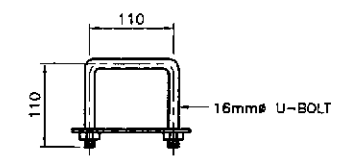


2B SECTION
DS-09

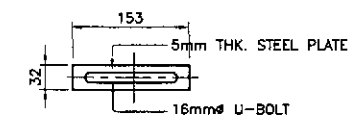


2C SECTION
DS-09

2 CONCRETE COVER DETAIL
DS-09 SCALE 1:10

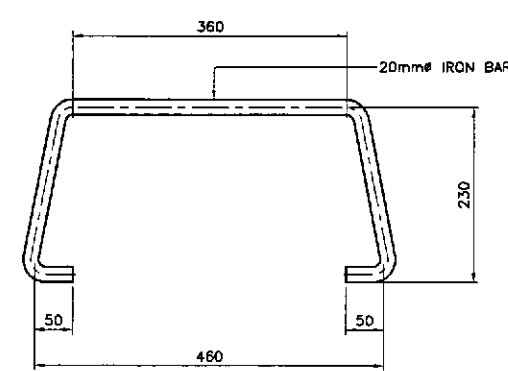


3A PLAN
DS-09

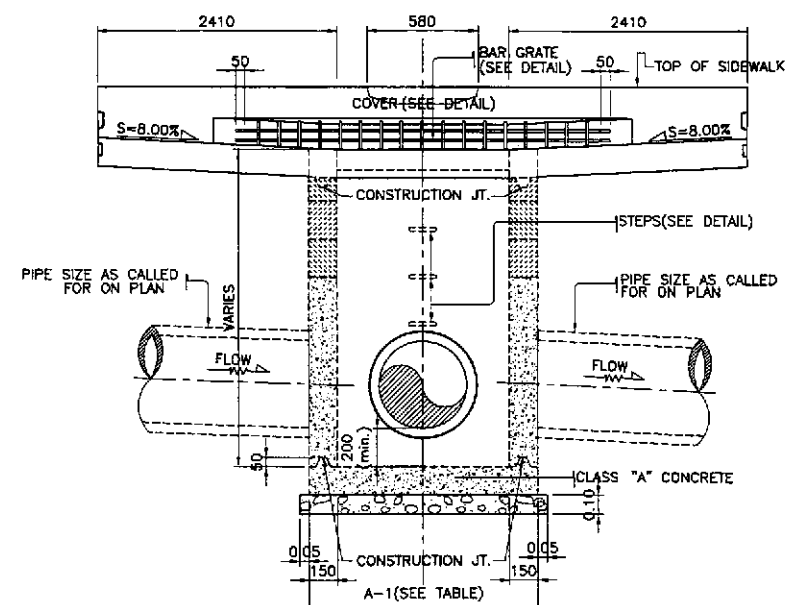


3B ELEVATION
DS-09

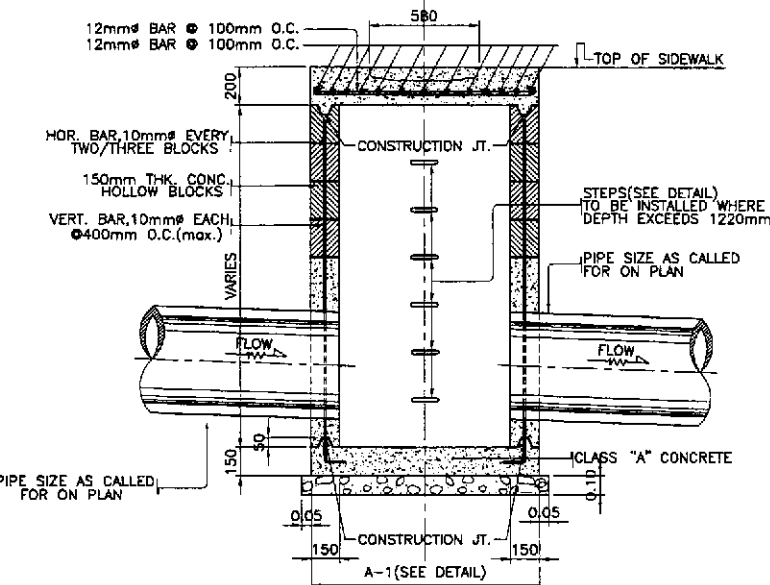
3 PULLING IRON DETAIL
DS-09 SCALE 1:5



4 STEP
DS-09 SCALE 1:5

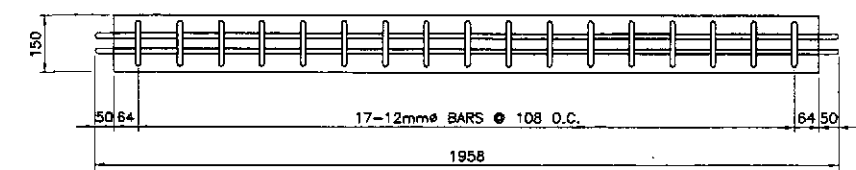


1C SECTION
DS-09 SCALE 1:20



1D SECTION
DS-09

1 CURB INLET MANHOLE
DS-09 SCALE 1:20



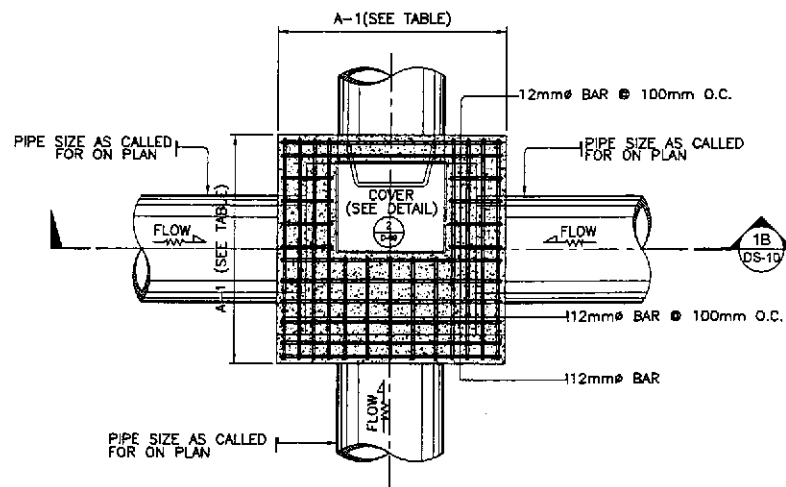
5 DETAIL OF BAR GRATE FOR OPENING OF CURB INLET
DS-09 SCALE 1:20

TABLE OF DIMENSION		
TYPE OF CIM	SIZE OF PIPE (mm)	A-1
T-1	300	1.12 M.
T-2	460	1.19 M.
T-3	610	1.37 M.
T-4	760	1.54 M.
T-5	910	1.73 M.
T-6	1070	1.90 M.
T-7	1220	2.08 M.
T-8	1520	2.43 M.

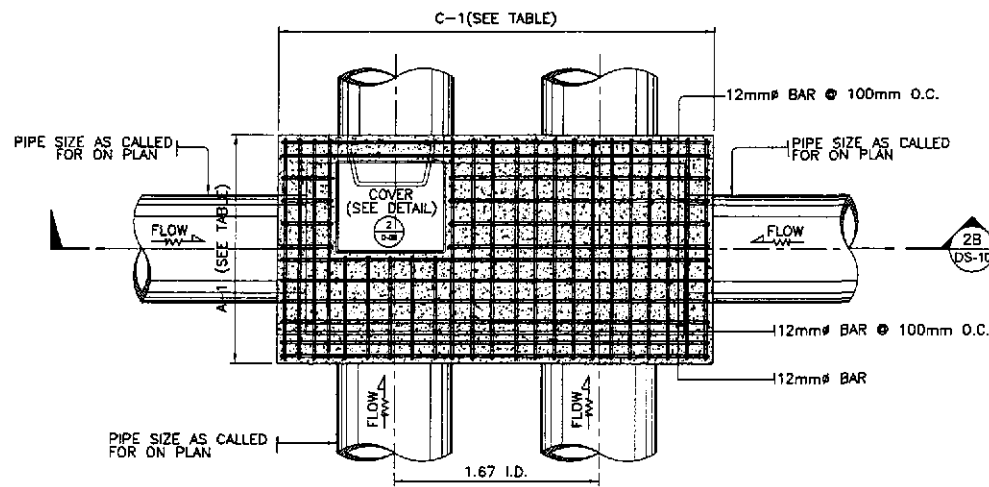
- NOTES:
- ALL CONCRETE SHALL BE CLASS "A". EXPOSED EDGES SHALL BE FINISHED WITH SUITABLE EDGER.
 - PULLING IRON, STEPS AND BAR GRATE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE.
 - CONSTRUCTION JOINTS SHALL CONFORM WITH THE GROOVES OF CONCRETE HOLLOW BLOCKS.
 - CONCRETE HOLLOW BLOCKS OR DRESSED ADOBE BLOCKS SHALL HAVE AN AVERAGE COMPRESSIVE STRENGTH OF 6.865MPa.
 - IN CONCRETE HOLLOW BLOCKS STRUCTURE, ALL HOLES SHALL BE FILLED WITH CEMENT MORTAR.
 - WHERE CONCRETE HOLLOW BLOCKS STRUCTURES ATTAIN A HEIGHT OF 1.20 METER, IT SHALL BE REINFORCED STEEL BARS SPACE AT NOT MORE THAN 0.60 M. O.C. BOTHWAYS.
 - INSTALL STEPS ONLY WHERE DEPTH EXCEEDS 1.22 METERS.

DETAILS OF COMBINATION CURB INLET MANHOLE

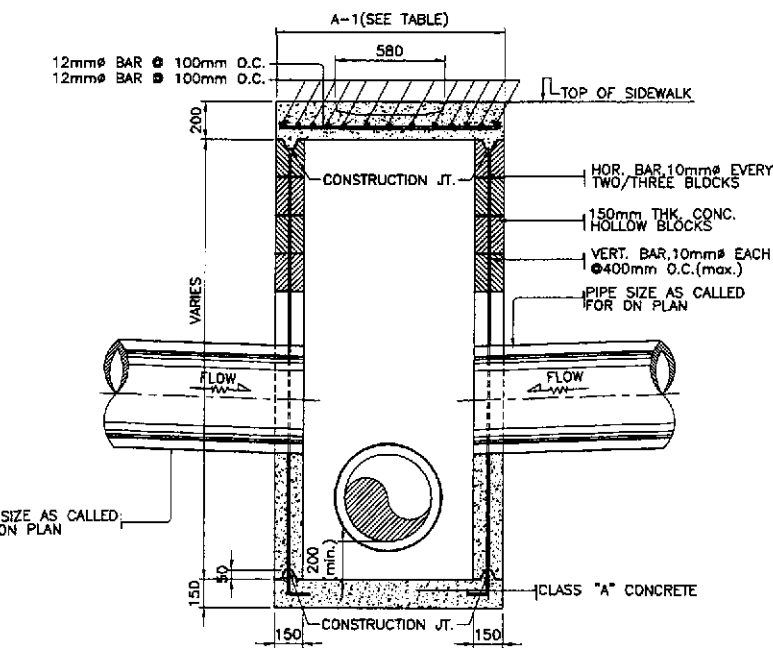
	DESIGNED: <i>[Signature]</i> CHECKED: <i>[Signature]</i> SUBMITTED: <i>[Signature]</i>	DATE: 7/27/02 SIGNATURE: <i>[Signature]</i> H. HAKIM TEAM LEADER		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE SECRETARY	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : STANDARD COMBINATION CURB INLET MANHOLE	SHEET NO. : DS-09
	Submitted By: DANILLO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALACAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV	Recommended By: MANUEL M. BONDAN Undersecretary	Approved By: SIMEON A. DATUMANONG Secretary			



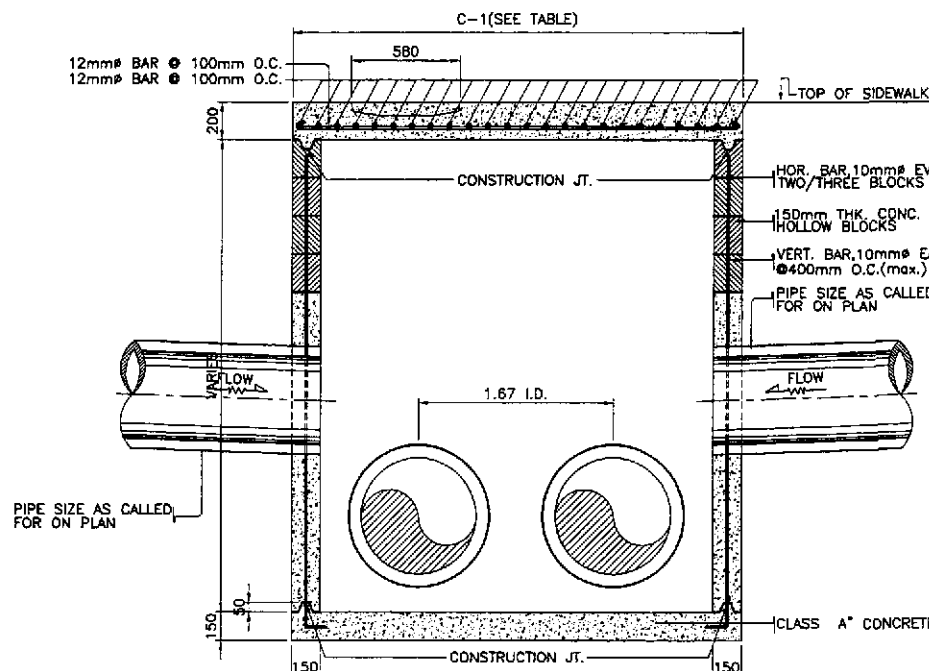
1A PLAN BOX-TYPE MANHOLE (SINGLE PIPE)
DS-10



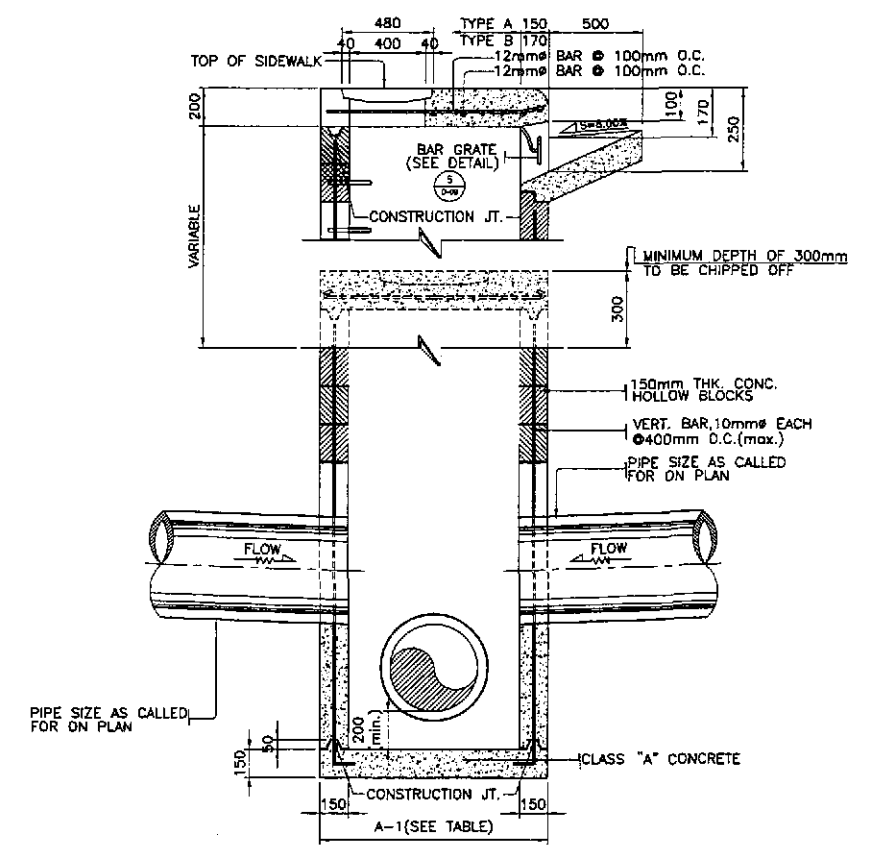
2A PLAN BOX-TYPE MANHOLE (DOUBLE PIPE)
DS-10



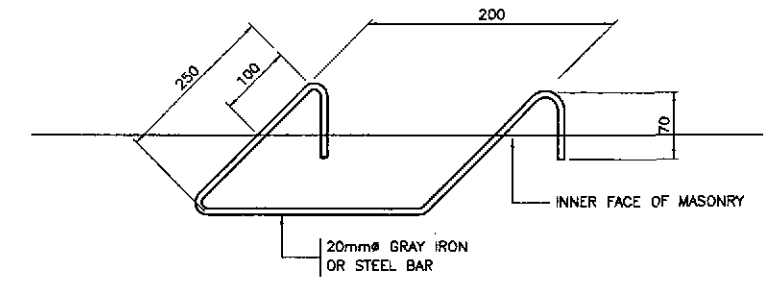
1B SECTION
DS-10



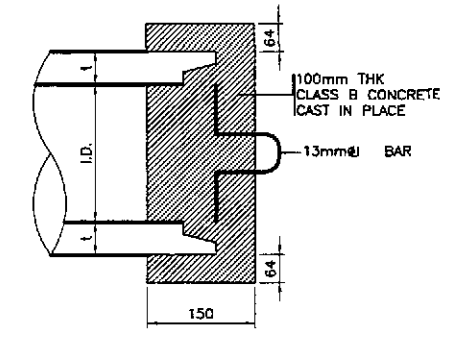
2B SECTION
DS-10



3 BOX-TYPE CONVERTED TO CURB INLET MANHOLE
DS-10



4 STD. STEP OR RUNG
DS-10



5 CONCRETE BLOCK PLUG @ SUBSURFACE PIPE
DS-10

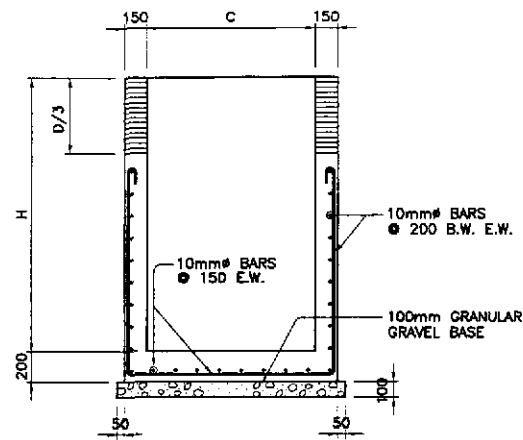
- NOTES:
- ALL CONCRETE SHALL BE CLASS "A". EXPOSED EDGES SHALL BE FINISHED WITH SUITABLE EDGER.
 - PULLING IRON, STEPS AND BAR GRATE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE.
 - CONSTRUCTION JOINTS SHALL CONFORM WITH THE GROOVES OF CONCRETE HOLLOW BLOCKS.
 - CONCRETE HOLLOW BLOCKS OR DRESSED ADOBE BLOCKS SHALL HAVE AN AVERAGE COMPRESSIVE STRENGTH OF 5.865MPa.
 - IN CONCRETE HOLLOW BLOCKS STRUCTURE, ALL HOLES SHALL BE FILLED WITH CEMENT MORTAR.
 - WHERE CONCRETE HOLLOW BLOCKS STRUCTURES ATTAIN A HEIGHT OF 1.20 METER, IT SHALL BE REINFORCED STEEL BARS SPACE AT NOT MORE THAN 0.60 M. O.C. BOTHWAYS.
 - INSTALL STEPS ONLY WHERE DEPTH EXCEEDS 1.22 METERS.
 - 150 mm BOTTOM SLAB THICKNESS FOR HEIGHT OF 1000 TO 4000mm. AND 200mm. FOR 5000 TO 8000mm IN HEIGHT.
 - FROM THE HEIGHT OF 3000 TO 8000mm. THE FIRST 2000mm, FROM THE TOP IS CHB WITH DETAILS FOR 2000mm HEIGHT.
 - REINFORCEMENT FOR BOTTOM SLAB ARE ALL 10mm# @ 400 B.W.
 - VERTICAL BARS ARE CUT AT HALF POINT FOR EVERY OTHER BAR AT SOLID WALL.
 - INSIDE SURFACES AND OUTSIDE SURFACES OF ALL MASONRY SHALL HAVE A PLASTER COAT 1/2" THICK.
 - BOX TYPE MANHOLE SHALL NOT BE CONSTRUCTED WITHIN THE RIDING SURFACE.

(H) HEIGHT mm.	(T) THICKNESS OF WALL (mm)	VERTICAL BARS			HORIZONTAL BARS
		INSIDE EDGE	CENTER	OUTSIDE EDGE	
1000	150mm CHB	-	10mm# @ 200	-	10mm# @ 400
2000	150mm CHB	-	12mm# @ 200	-	10mm# @ 400
3000	180mm CONC.	20mm# @ 300	-	32mm# @ 300	10mm# @ 400
4000	230mm CONC.	20mm# @ 250	-	32mm# @ 250	10mm# @ 400
5000	280mm CONC.	20mm# @ 225	-	32mm# @ 225	10mm# @ 400
6000	330mm CONC.	20mm# @ 200	-	32mm# @ 200	10mm# @ 400
7000	380mm CONC.	20mm# @ 175	-	32mm# @ 175	10mm# @ 400
8000	410mm CONC.	20mm# @ 150	-	32mm# @ 150	10mm# @ 400

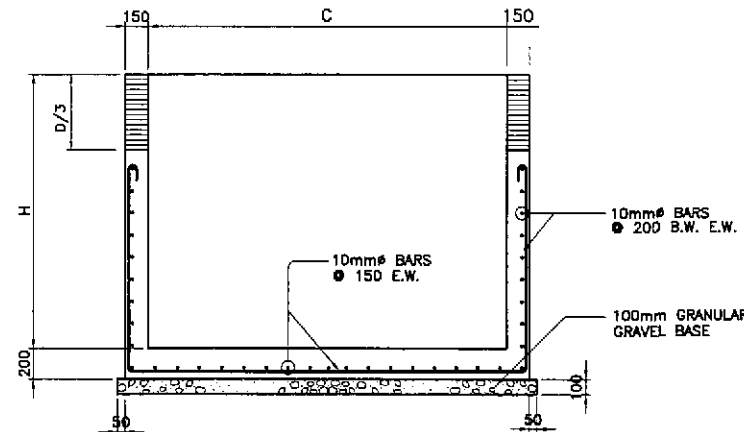
TYPE OF CIM	SIZE OF PIPE (mm)	TABLE OF DIMENSION	
		A-1 (m)	C-1 (m)
T-1	300	1.12	1.92
T-2	460	1.19	2.26
T-3	610	1.37	2.69
T-4	760	1.54	3.11
T-5	910	1.73	3.55
T-6	1070	1.90	3.98
T-7	1220	2.08	4.42
T-8	1520	2.43	5.27

SPECIAL JUNCTION BOX MANHOLE

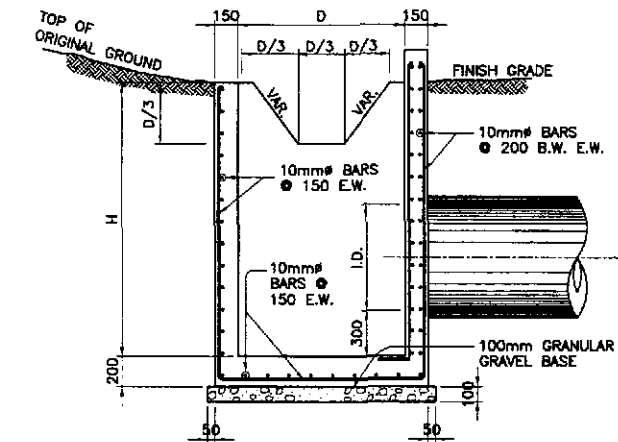
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES	PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/15/02	F. SHAWA		DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	SPECIAL JUNCTION BOX MANHOLE	DS-10
	SUBMITTED	10/16/02	M. GOSPE		PUHL - PWO Submitted By: DANILLO C. TRAJANO Project Director Recommended By: JOSEFINA M. ALAGAR Chief, Highways Division Recommended By: GILBERTO S. REYES OIC, Director IV Recommended By: MANUEL M. BONOAN 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) CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1		



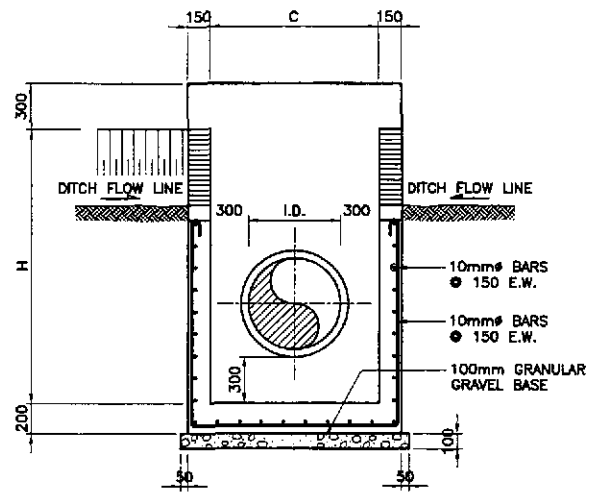
1C SECTION
DS-11



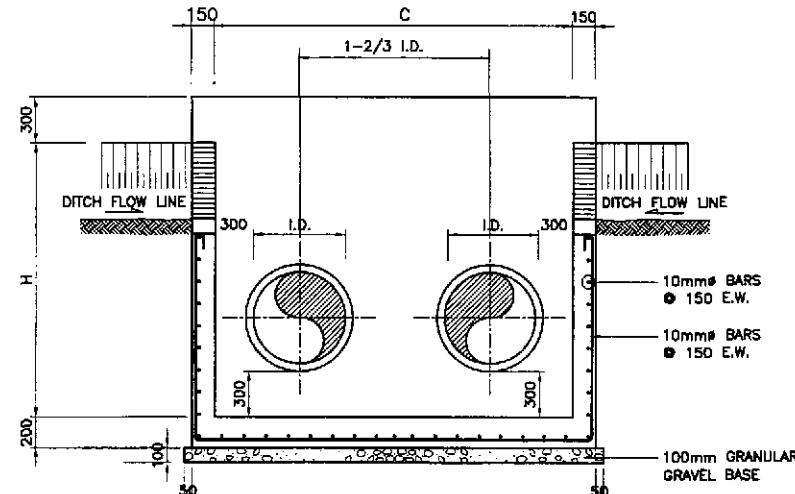
2C SECTION
DS-11



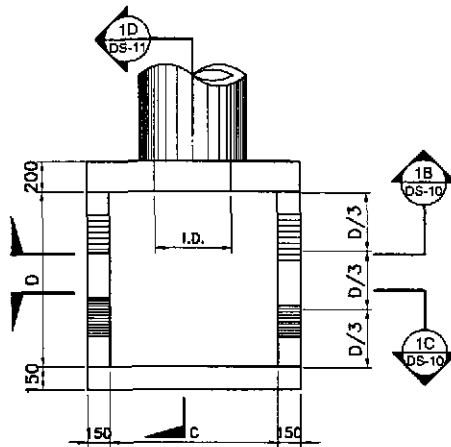
1C SECTION
DS-11



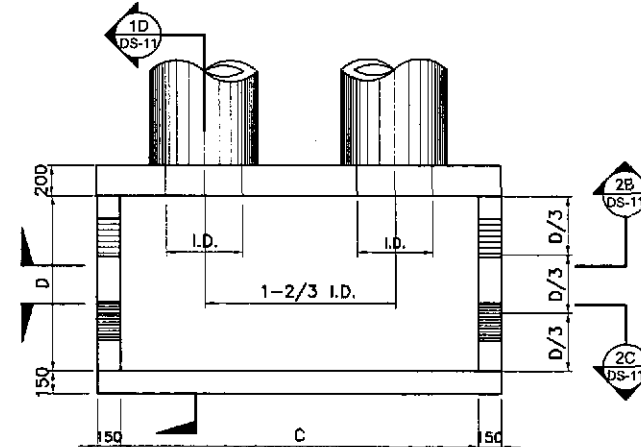
1B SECTION
DS-11



2B SECTION
DS-11



1A PLAN
DS-11



2A PLAN
DS-11

REINFORCED CONCRETE CATCH BASIN DIMENSION FOR RCPC

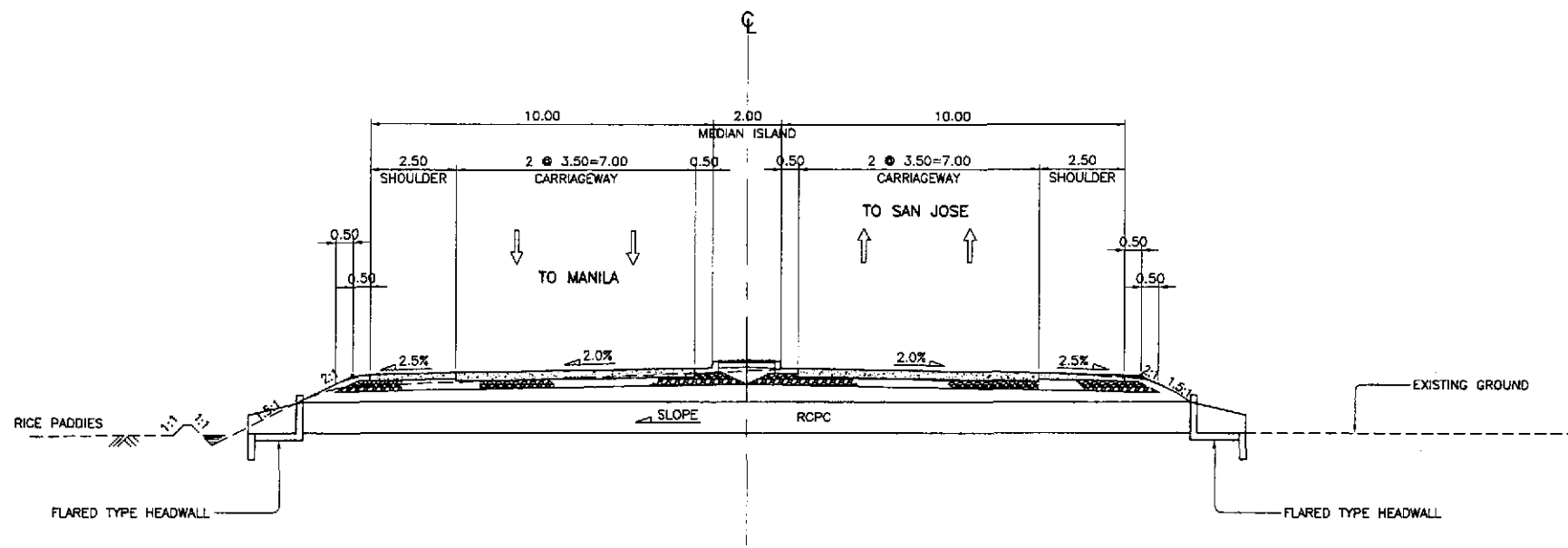
PIPE DIAMETER (mm)		610	910	1070	1220	1520
COMMON TO ALL NUMBER OF BARRELS	H	1.910	2.210	2.370	2.520	2.820
	D	1.200	1.500	1.650	1.800	2.100
SINGLE	C	1.210	1.510	1.670	1.820	2.120
DOUBLE	C	2.230	3.030	3.460	3.860	4.660
TRIPLE	C	3.250	4.550	5.240	5.890	7.120

1 CONCRETE CATCH BASIN (SINGLE PIPE)
DS-11 SCALE 1:25

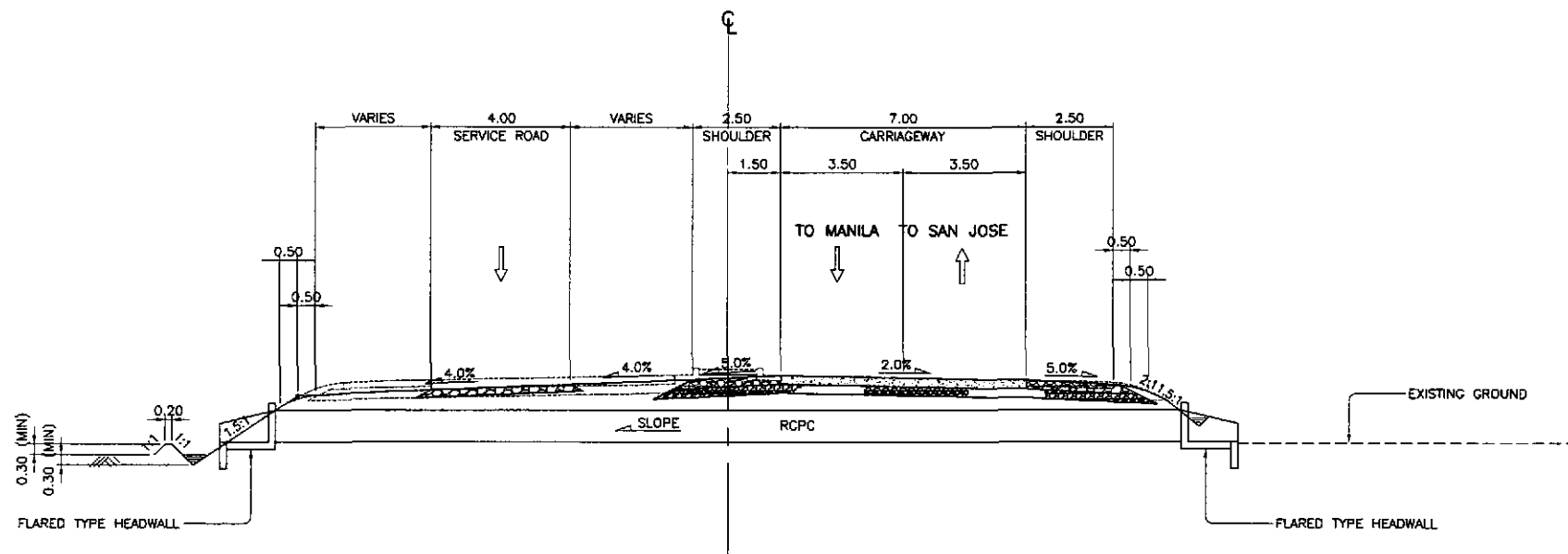
2 CONCRETE CATCH BASIN (DOUBLE PIPE)
DS-11 SCALE 1:25

DETAILS OF REINFORCED CONCRETE CATCH BASIN FOR RCPC

	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 I	SCALE : 1:25 FULL SIZE A1	SHEET CONTENTS : STANDARD REINFORCED CONCRETE CATCH BASIN FOR RCPC	SHEET NO. : DS-11
	CHECKED				FUHL - PMO Submitted By:	BUREAU OF DESIGN Reviewed By:	OFFICE OF THE SECRETARY Recommended By:				
	SUBMITTED				DANILLO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highway Division	GILBERTO S. REYES Dir., Director IV				

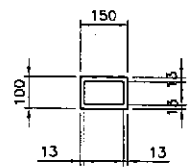


2
DS-12 SCALE 1:100
TYPICAL DRAINAGE SECTION (ULTIMATE STAGE)

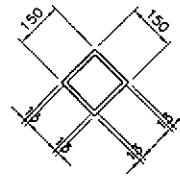


1
DS-12 SCALE 1:100
TYPICAL DRAINAGE SECTION (INITIAL STAGE)

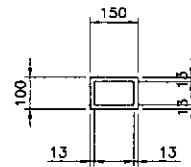
	DESIGNED	9/27/02	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/15/02	SIGNATURE	BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO, Project Director			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	NOT TO SCALE	TYPICAL DRAINAGE SECTIONS (INITIAL and ULTIMATE STAGE)	DS-12
	SUBMITTED	10/16/02	SIGNATURE	OFFICE OF THE SECRETARY Recommended By: JOSEFINA M. ALAGAR, Chief, Highways Division			CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1		
			SIGNATURE	Recommended By: GILBERTO S. REYES, OIC, Director IV						
		SIGNATURE	Recommended By: MANUEL M. BONDAN, Undersecretary							



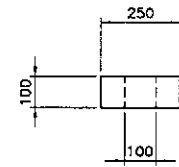
PLAN (POST)



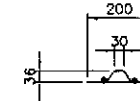
PLAN (POST)



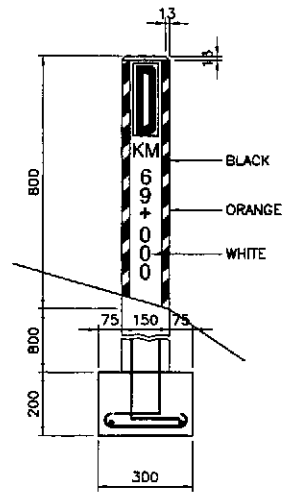
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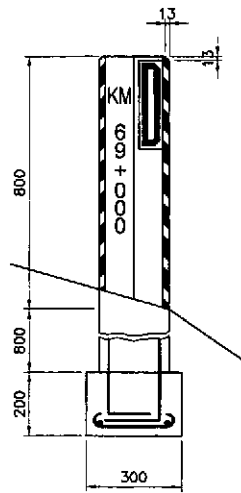
PLAN (POST)



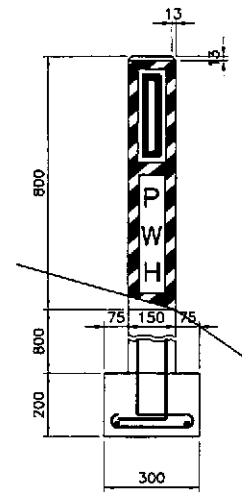
PLAN (POST)



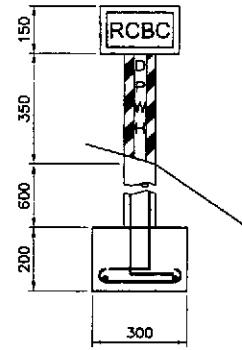
ELEVATION
CONCRETE MARKER
TYPE I-a



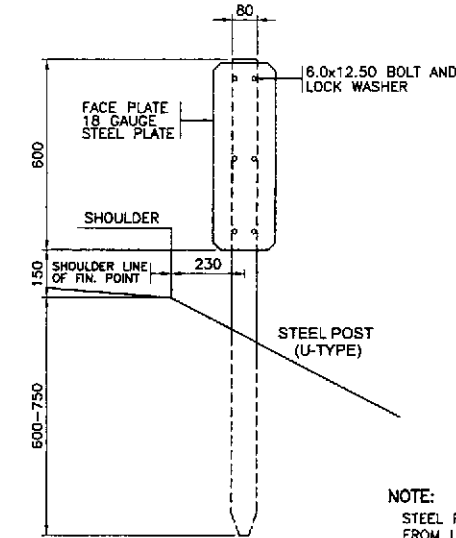
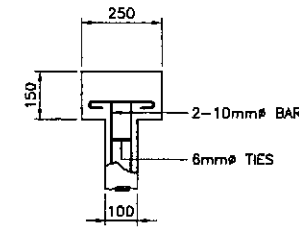
ELEVATION
CONCRETE MARKER
TYPE I-b



ELEVATION
CONCRETE MARKER
TYPE I-c

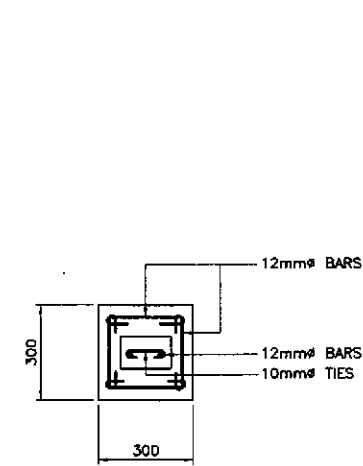
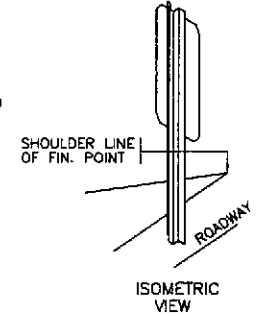


ELEVATION
CONCRETE MARKER
TYPE I-d

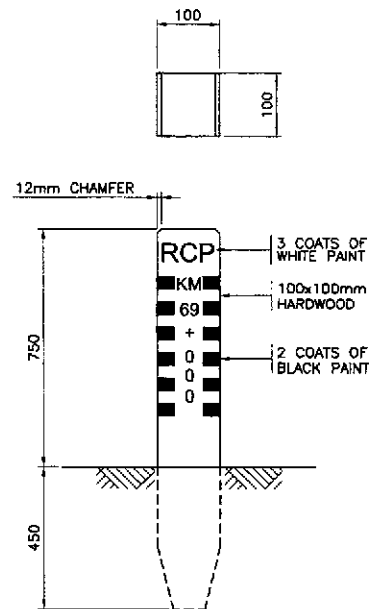


ELEVATION
STEEL MARKER
TYPE II

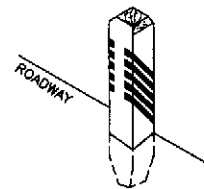
NOTE:
STEEL POST MAY BE CHANNEL TAKEN FROM UNUSED BAILEY PANNELS MARKINGS AND PAINTINGS SAME AS FOR TYPE I AND TYPE II AS SHOWN.



TYPICAL FOOTING DETAIL
CONCRETE MARKER
(TYPE I-a,b,c,d)

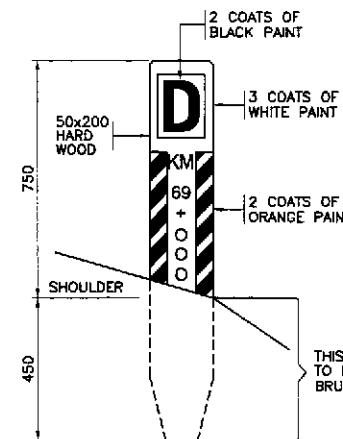


ELEVATION
WOODEN MARKER
TYPE III-a

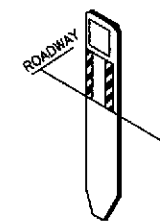


NOTE:
FACING ROADWAY STAKED AT CENTER LINE OF DRAINAGE 254mm AWAY FROM SHOULDER LINE OF FINAL POINT.

ISOMETRIC VIEW



ELEVATION
WOODEN MARKER
TYPE III-b



ISOMETRIC VIEW

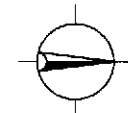
GENERAL NOTES

- CONCRETE:**
ALL CONCRETE TO BE CLASS "A" AND EXPOSED TOP TO BE CHAMFERED 13.0mm. ALL CONCRETE SHALL POURED IN THE DRY.
- REINFORCING STEEL:**
UNLESS OTHERWISE SHOWN ALL BAR SPACINGS ARE TO THE CENTER OF BARS AND THE MINIMUM COVERING OF BARS MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY BARS SHALL BE 50.0mm.
- MARKINGS:**
ALL RECESSED LETTERS SHALL BE CAST INTO CONCRETE AND ALL NUMBERS SHALL BE PAINTED AS SHOWN USING LETTER AND NUMBER FORM.
- PAINTINGS:**
ALL CONCRETE POSTS, TWO COATS OF WHITE PAINT. ALL RECESSED LETTERS ONE (1) COAT OF BLACK PAINT AND ALL BACKGROUND STRIPE SHALL BE ONE (1) COAT OF BLACK/ORANGE GLOSS PAINT. ALL STRUCTURAL PLATES TWO COATS WHITE SHARP PAINT.
- LOCATION:**
DRAINAGE CULVERT MARKER TO BE SET AT SHOULDER LINE AND AT CENTER LINE OF CULVERT FACING TRAFFIC/ROADWAY AS SHOWN AND AS STAKED BY ENGINEERS.
- DIMENSION:**
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

A STANDARD MAINTENANCE MARKERS
DS-13 NOT TO SCALE

	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/27/02	[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)	NOT TO SCALE	STANDARD MAINTENANCE MARKERS	DS-13
	CHECKED	10/16/02	[Signature]	Submitted By:	Reviewed By:	Recommended By:				
SUBMITTED	11/14/02	[Signature]	DANILDO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary				
CABANATUAN BYPASS - CONTRACT PACKAGE I						FULL SIZE A1				

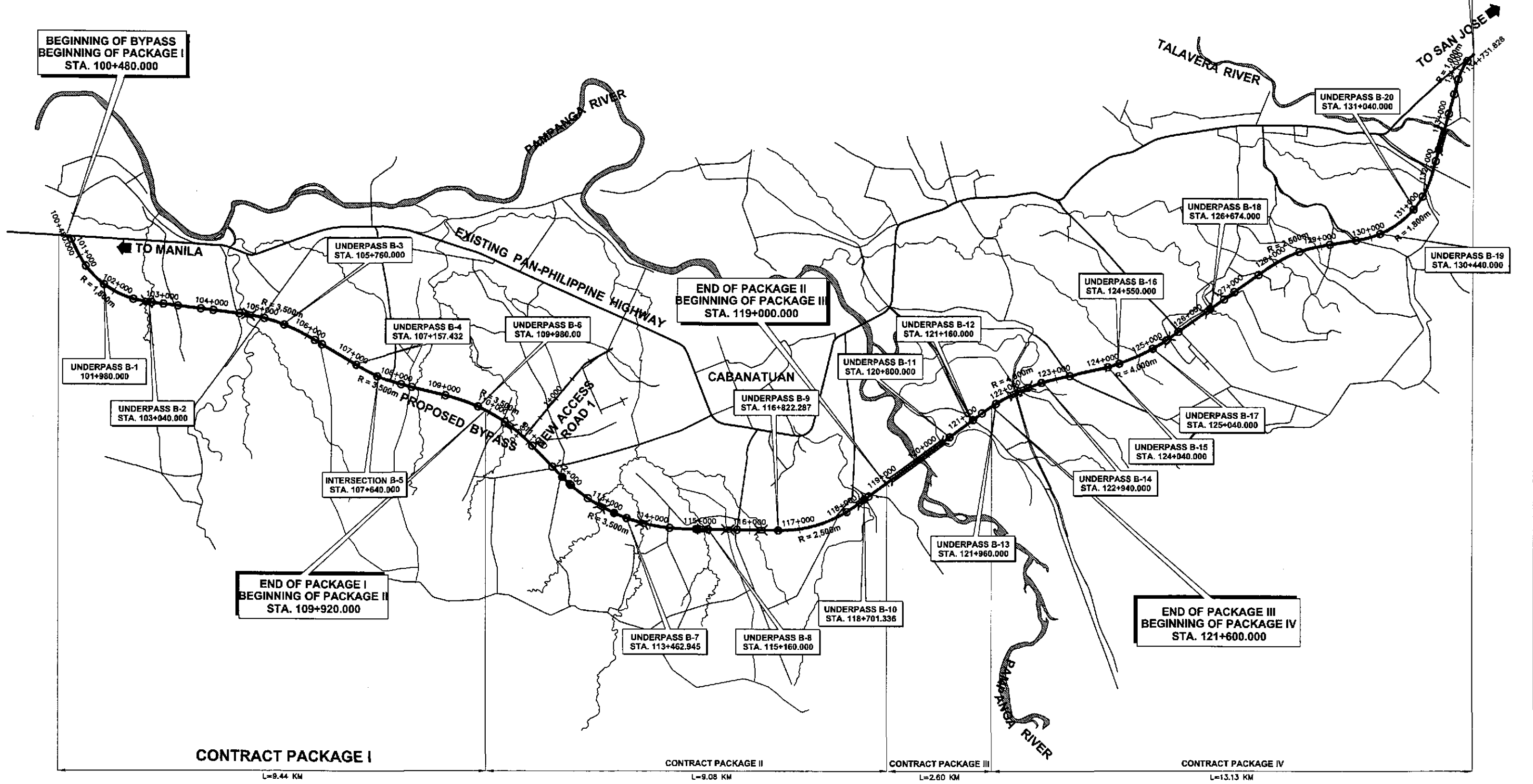
UNDERPASS CROSSING (BOX CULVERT)



LEGEND:

- Intersection Type A (At grade)
- ⊕ Intersection Type B (Underpass)
- Intersection Type C (Only access to frontage roads)
- ⌈ Bridge

END OF PACKAGE IV
STA. 134+731.828



CONTRACT PACKAGE I

L=9.44 KM

CONTRACT PACKAGE II

L=9.08 KM

CONTRACT PACKAGE III

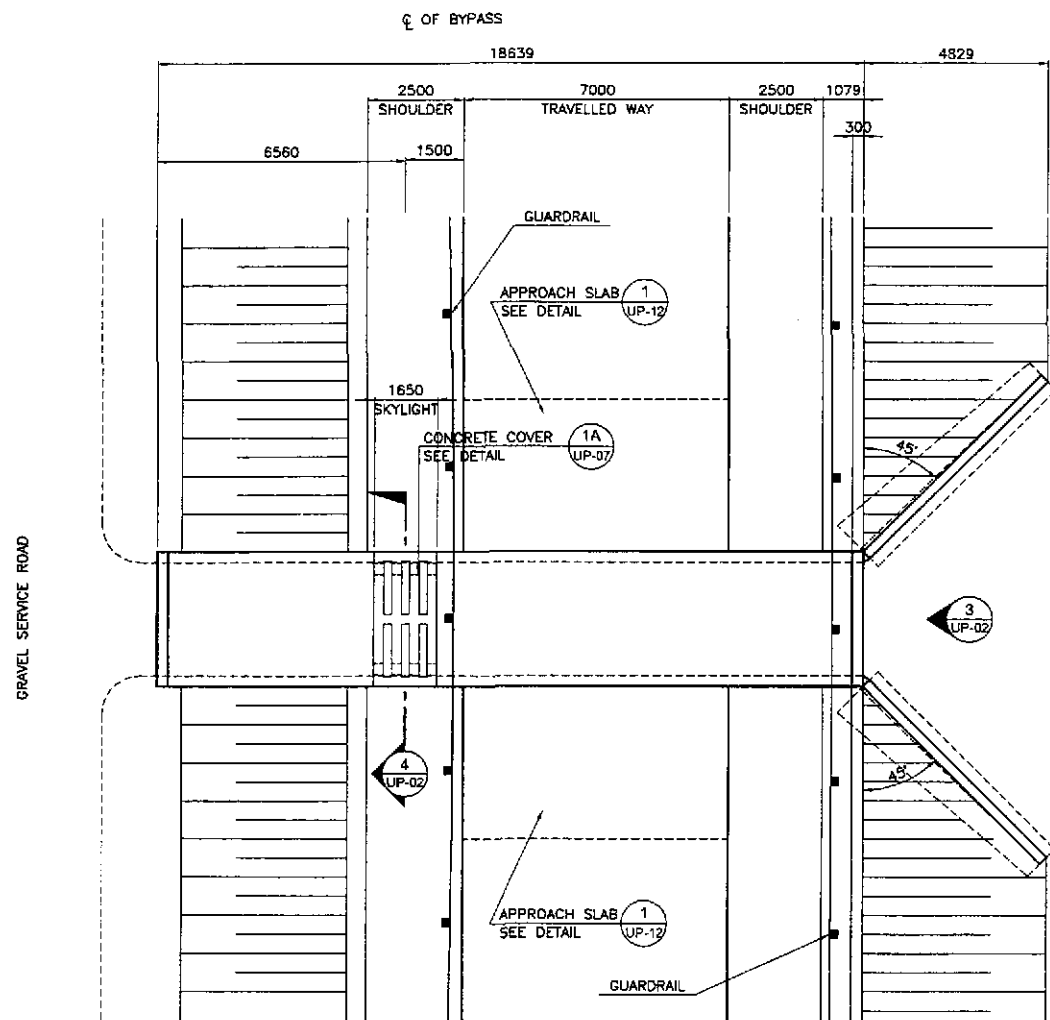
L=2.60 KM

CONTRACT PACKAGE IV

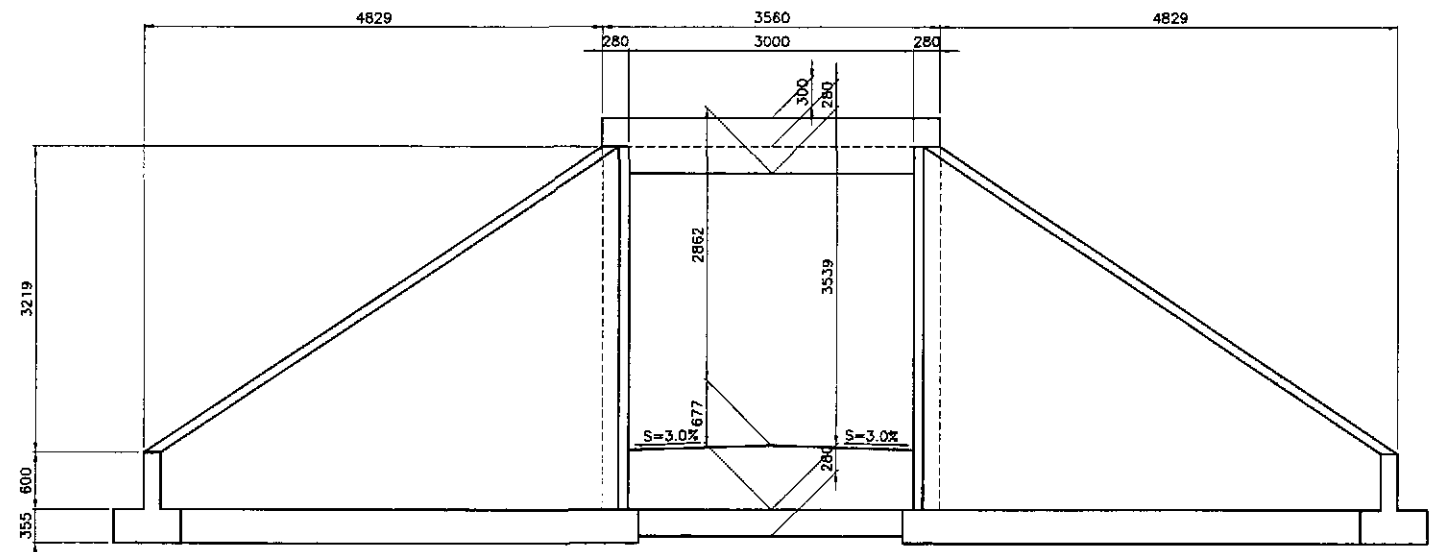
L=13.13 KM

A SITE DEVELOPMENT PLAN - UNDERPASSES ALONG BYPASS
UP-01 SCALE 1:40,000

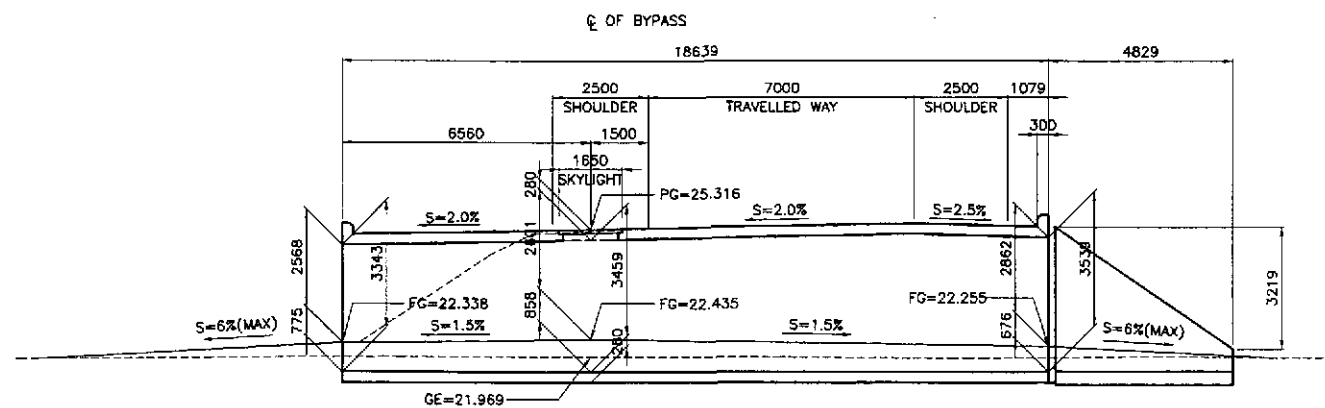
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL YEO YACHIYO ENGINEERING CO., LTD.	DESIGNED	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE SECRETARY	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	CHECKED	10/15/02	<i>[Signature]</i>			Submitted By:			1:40,000
	SUBMITTED	10/18/02	<i>[Signature]</i>			DANILLO C. TRAJANO Project Director JOSEFINA M. ALAGAR Chief, Highways Division GILBERTO S. REYES OIC, Director IV MANUEL M. BONDAN Undersecretary SIMEON A. DATUMANONG Secretary			FULL SIZE A1
						SITE DEVELOPMENT PLAN UNDERPASSES ALONG BYPASS		UP-01	



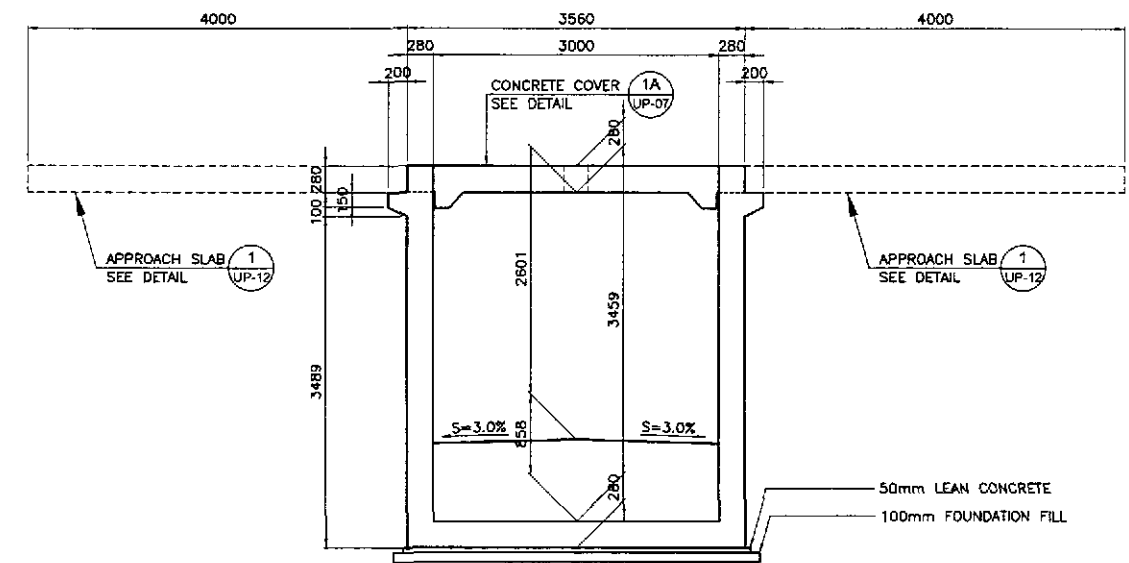
1 GENERAL PLAN
UP-02 SCALE 1:100



3 ELEVATION
UP-02 SCALE 1:40

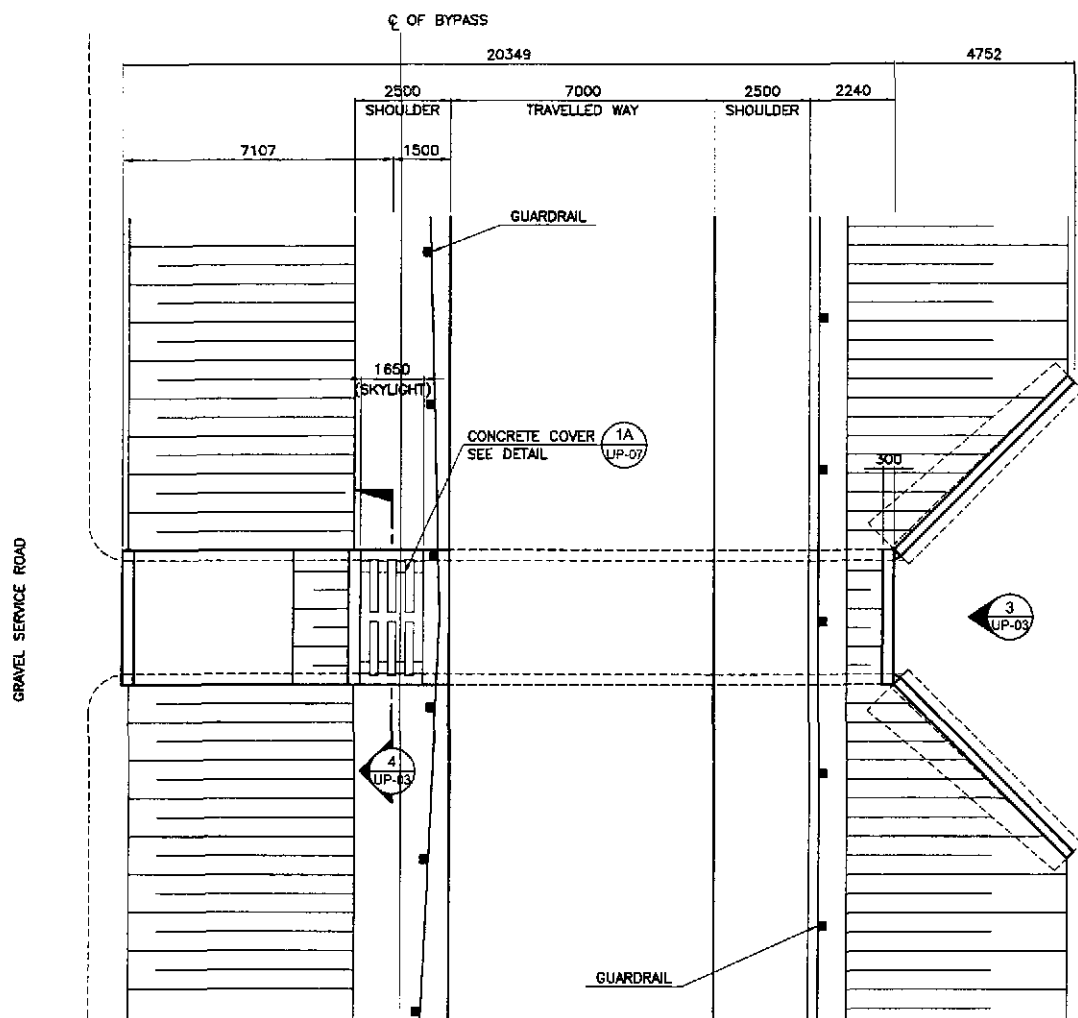


2 GENERAL ELEVATION
UP-02 SCALE 1:100

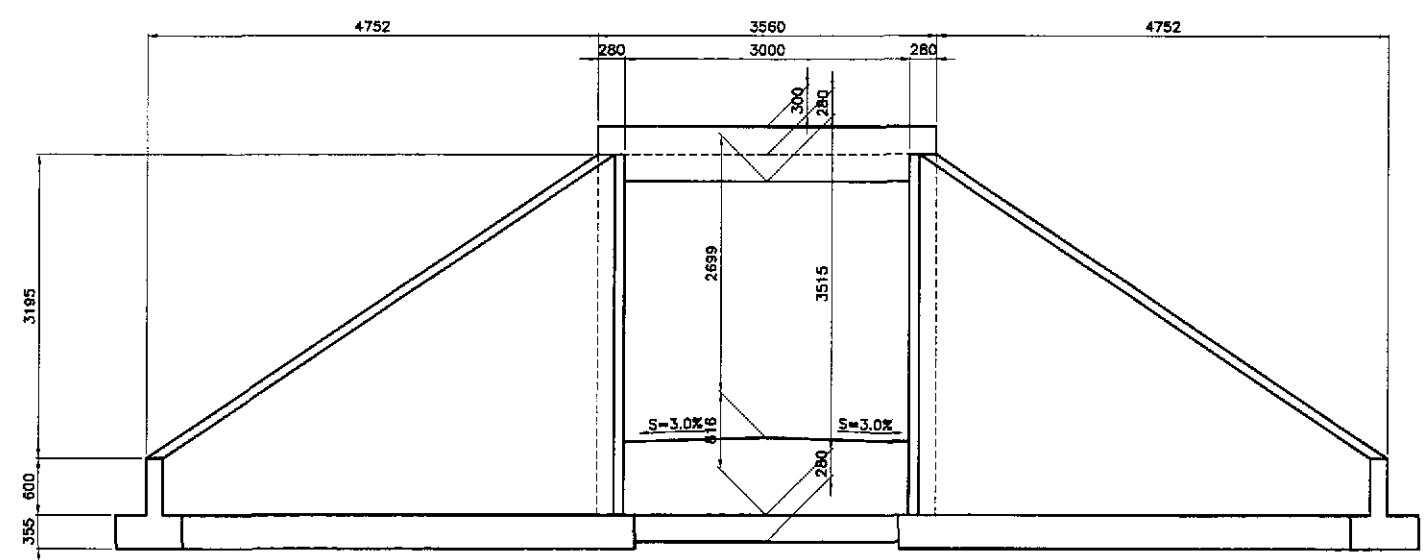


4 SECTION
UP-02 SCALE 1:40

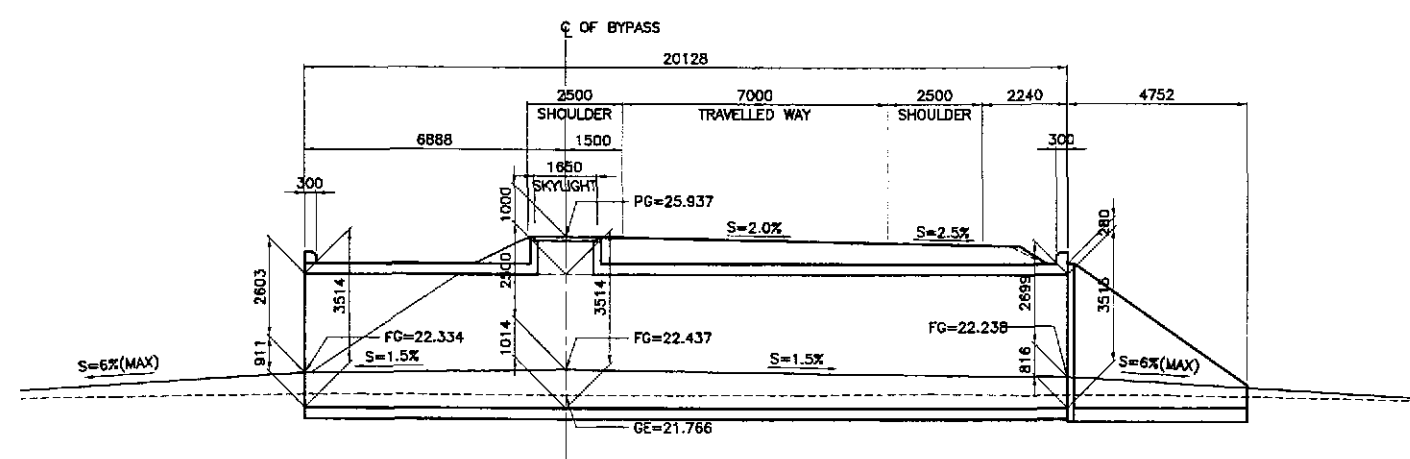
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION :		SCALE :	SHEET CONTENTS :	SHEET NO. :	
	CHECKED	10/15/02	<i>[Signature]</i>		PJHL - PMO BUREAU OF DESIGN	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		AS SHOWN	BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (INITIAL STAGE) B-1 (STA. 101+980.00)	UP-02
	SUBMITTED	10/16/02	<i>[Signature]</i>		Submitted By: DANILDO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV	Recommended By: MANUEL M. BONDAN Undersecretary		



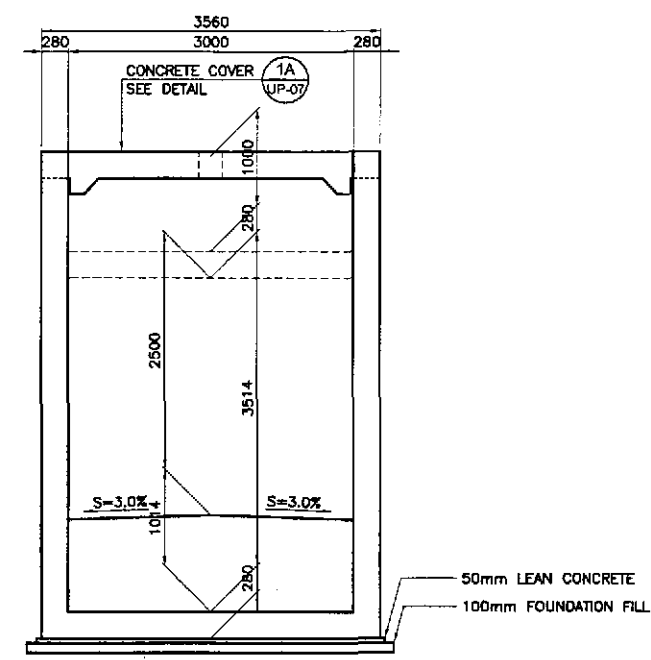
1 GENERAL PLAN
UP-03 SCALE 1:100



3 ELEVATION
UP-03 SCALE 1:40



2 GENERAL ELEVATION
UP-03 SCALE 1:100



4 SECTION
UP-03 SCALE 1:40

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JAPAN INTERNATIONAL COOPERATION AGENCY
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YEO YACHIYO ENGINEERING CO., LTD.

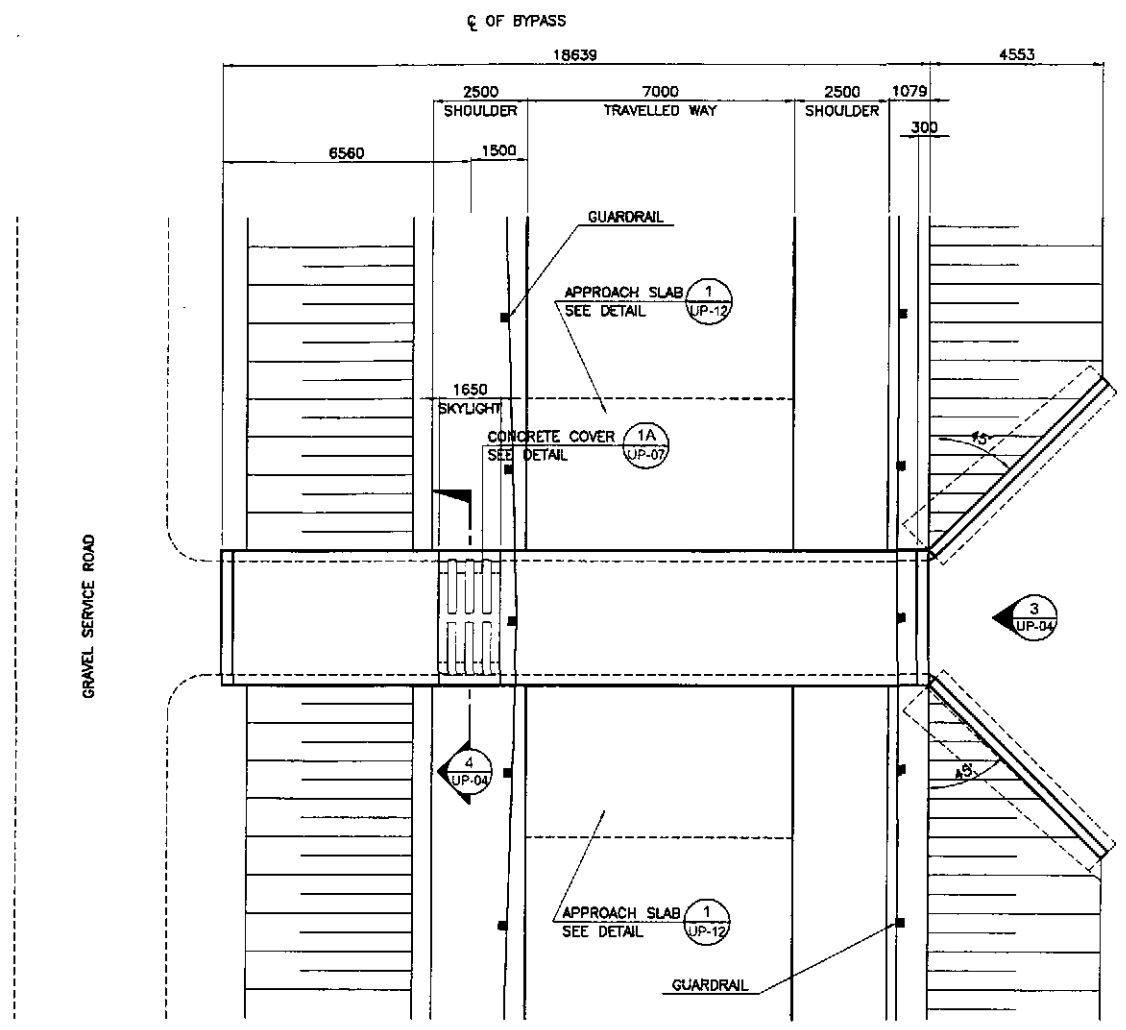
DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			
DESIGNED: 9/27/02	[Signature]	PUHL - PMD	BUREAU OF DESIGN			
CHECKED: 10/15/02	[Signature]	Submitted By:	Reviewed By:	Recommended By:	Recommended By:	Approved By:
SUBMITTED: 11/16/02	[Signature]	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	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
(Pilaridel, Cabanatuan and San Jose Bypasses)
CABANATUAN BYPASS - CONTRACT PACKAGE I

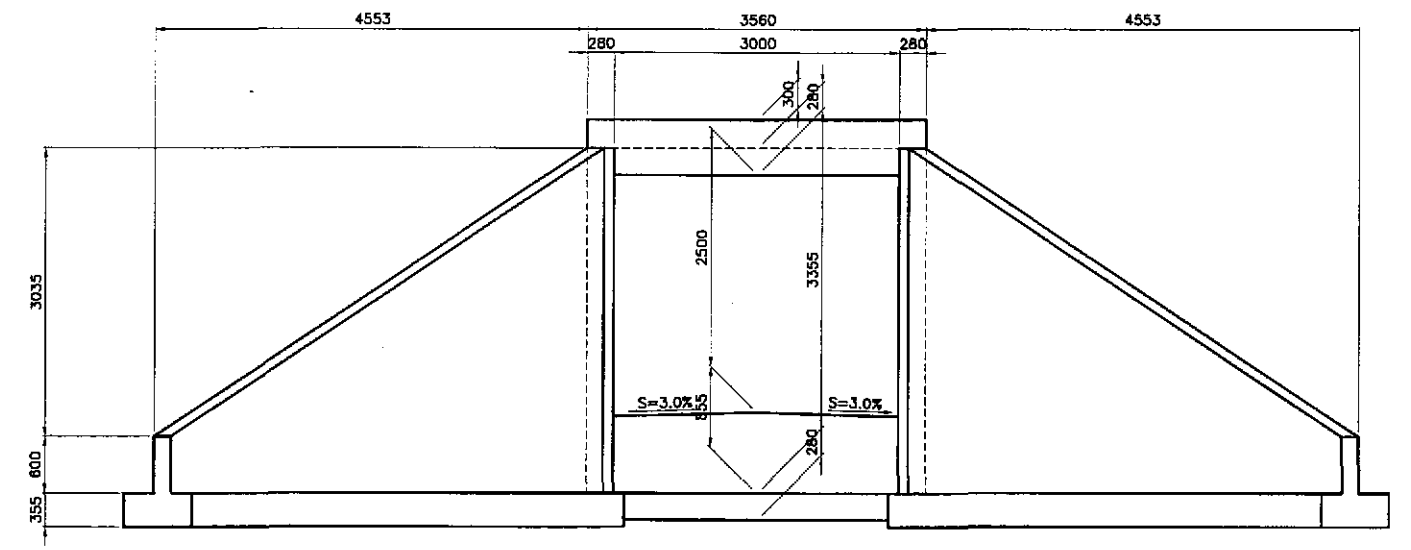
SCALE :
FULL SIZE A1

SHEET CONTENTS :
BOX CULVERT
(INITIAL STAGE)
GENERAL PLAN, ELEVATION & SECTION
B-2 (STA. 103+040.00)

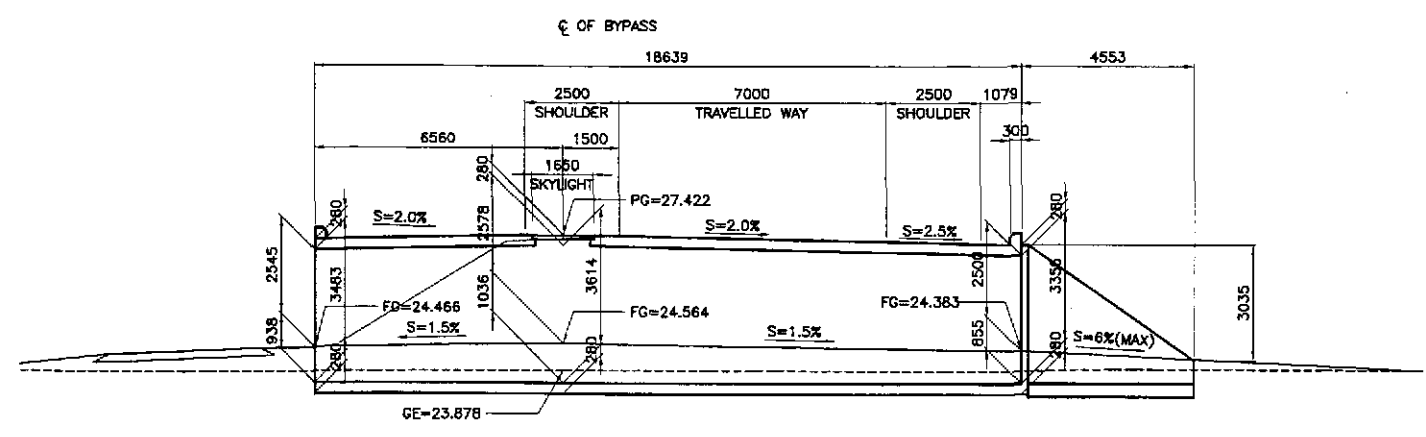
SHEET NO. :
UP-03



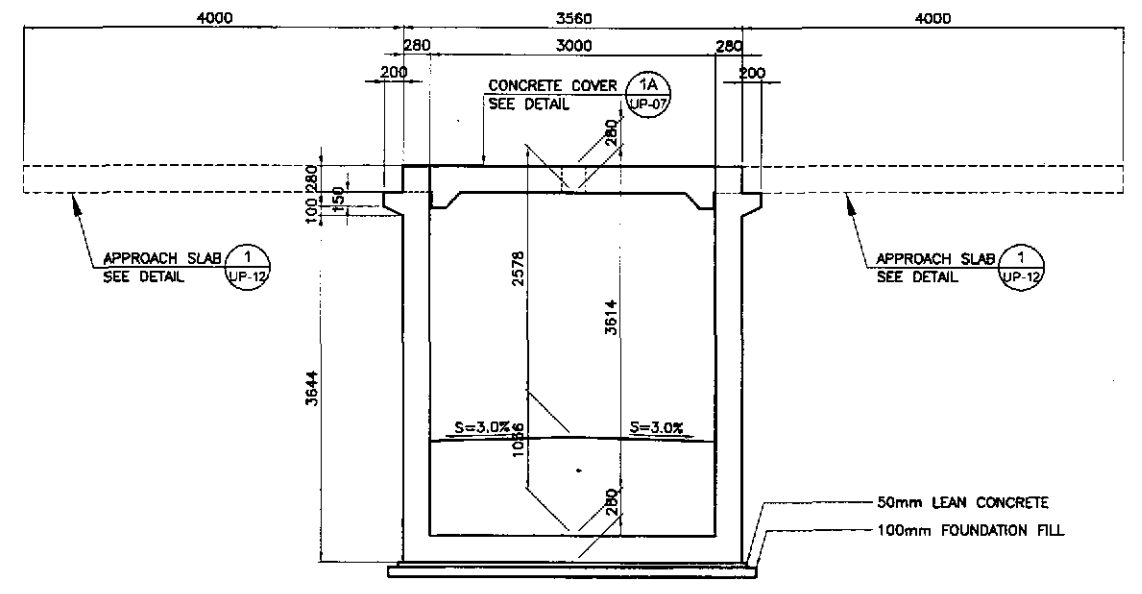
1 GENERAL PLAN
UP-04 SCALE 1:100



3 ELEVATION
UP-04 SCALE 1:40

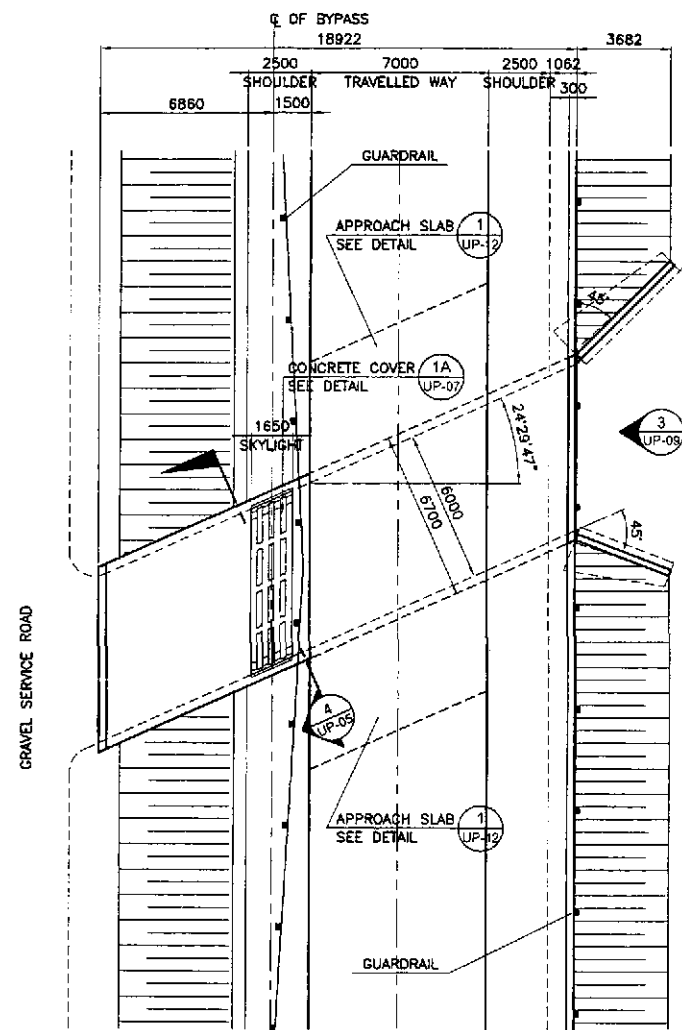


2 GENERAL ELEVATION
UP-04 SCALE 1:100

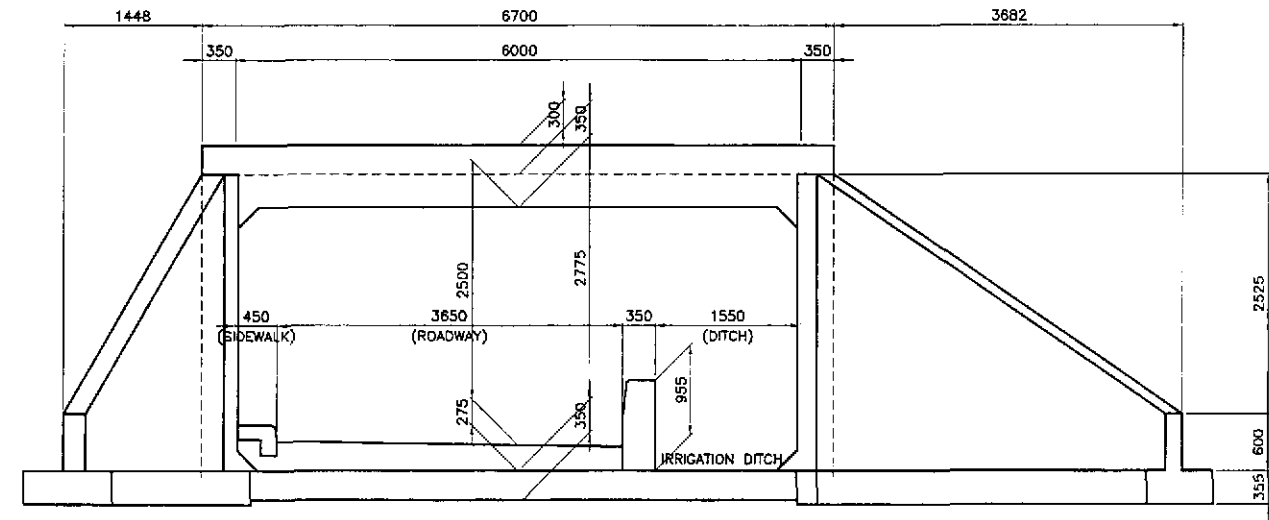


4 SECTION
UP-04 SCALE 1:40

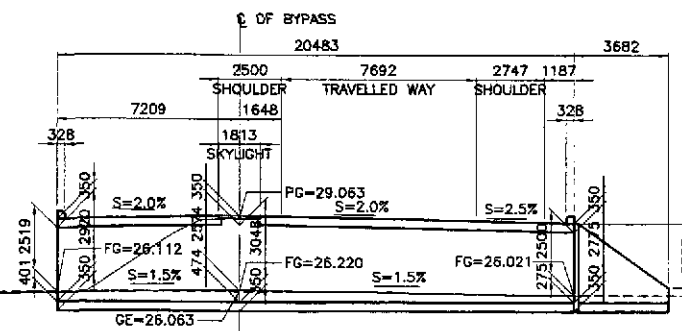
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	CHECKED	10/15/02	<i>[Signature]</i>		Submitted By:	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		BOX CULVERT (INITIAL STAGE) GENERAL PLAN, ELEVATION & SECTION B-3 (STA. 105+760.00)	UP-04
	SUBMITTED	10/16/02	<i>[Signature]</i>		BUREAU OF DESIGN DANLO C. TRAJANO Project Director	OFFICE OF THE SECRETARY Recommended By: JOSEFINA M. ALAGAR Chief, Highways Division GILBERTO S. REYES OIC, Director IV MANUEL M. BONGCAN Undersecretary SIMEON A. DATUMANONG Secretary	CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1	



1 GENERAL PLAN
UP-05 SCALE 1:150

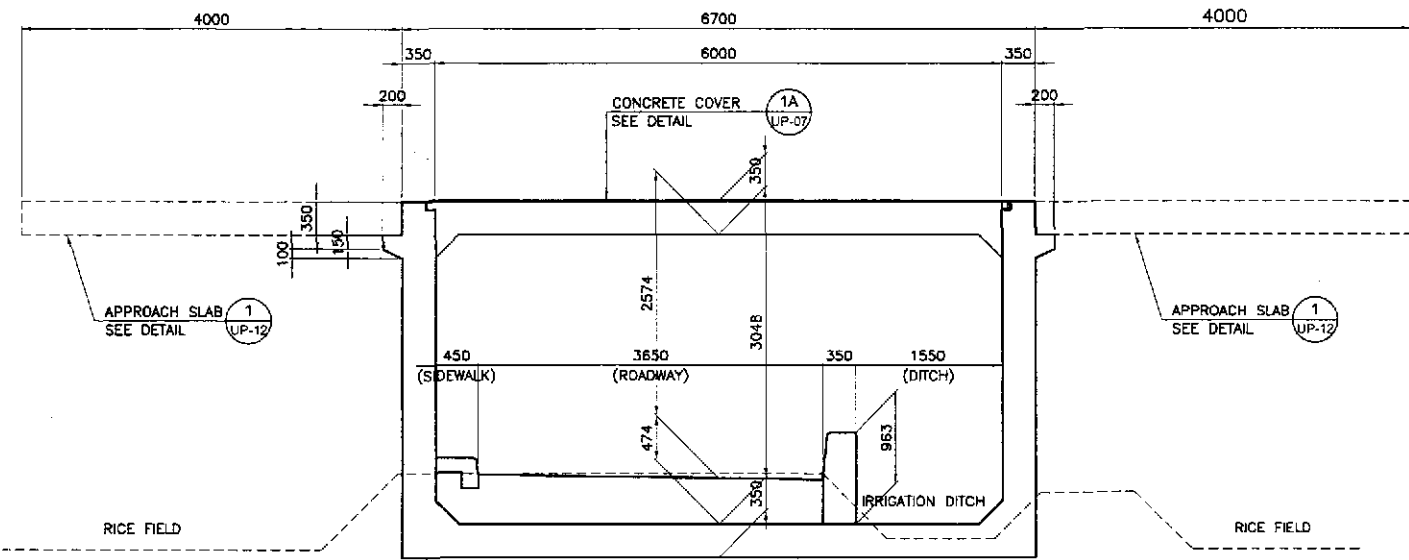


3 SECTION
UP-05 SCALE 1:40



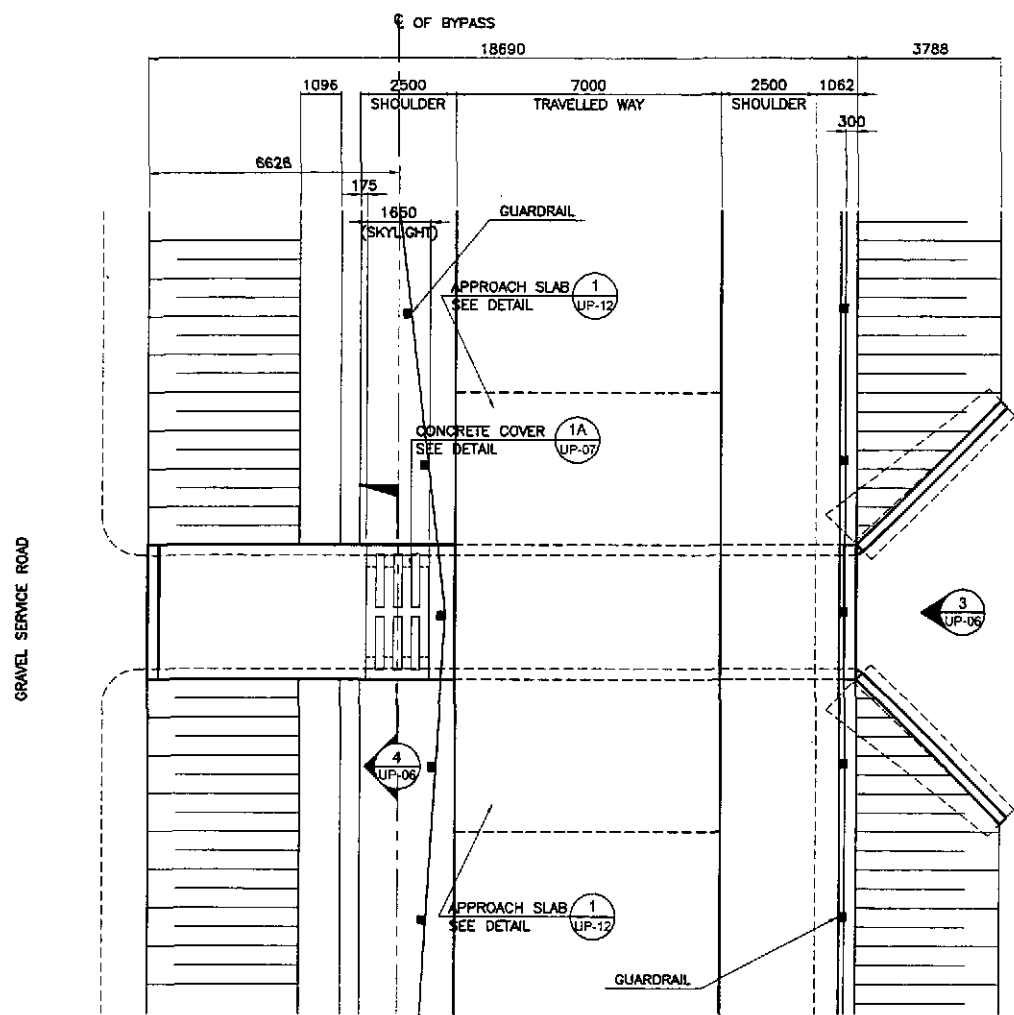
NOTE:
THE HORIZONTAL DIMENSIONS INDICATED IN THIS ELEVATION ARE SKEWED LENGTH

2 GENERAL ELEVATION
UP-05 SCALE 1:150

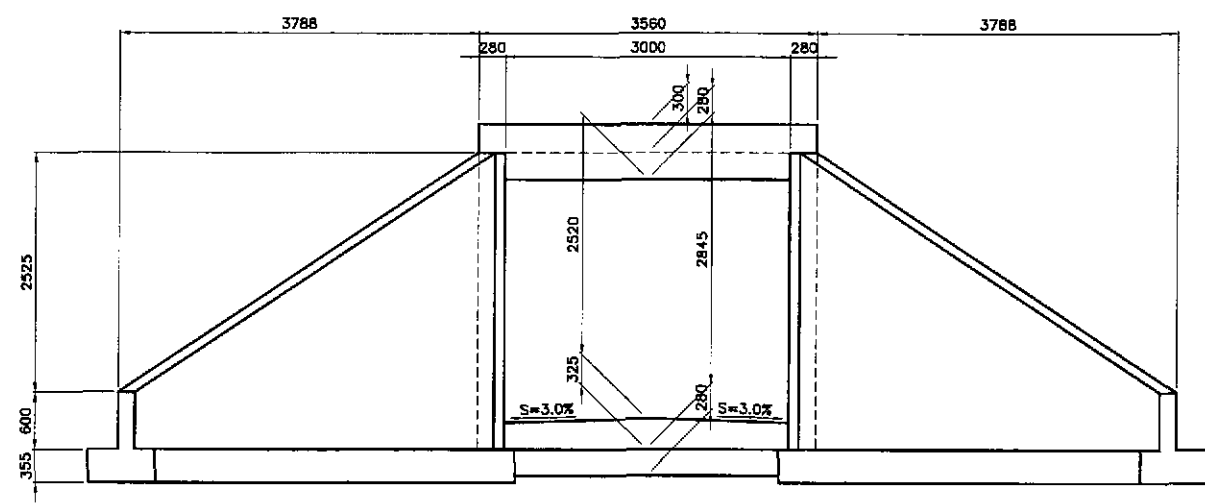


4 SECTION
UP-05 SCALE 1:40

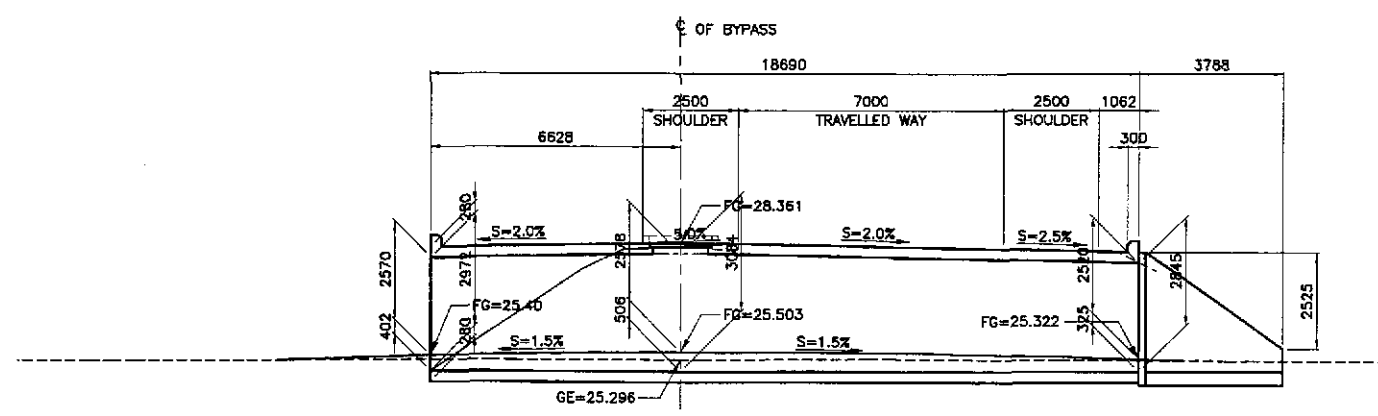
	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/27/02	PJHL - PMO	BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (INITIAL STAGE) B-4 (STA. 107+157.432)	UP-05
	CHECKED	10/15/02	Submitted By:	Reviewed By:	Recommended By:	Approved By:	CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1			
	SUBMITTED	10/14/02	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary			SIMEON A. DATUMANONG Secretary		



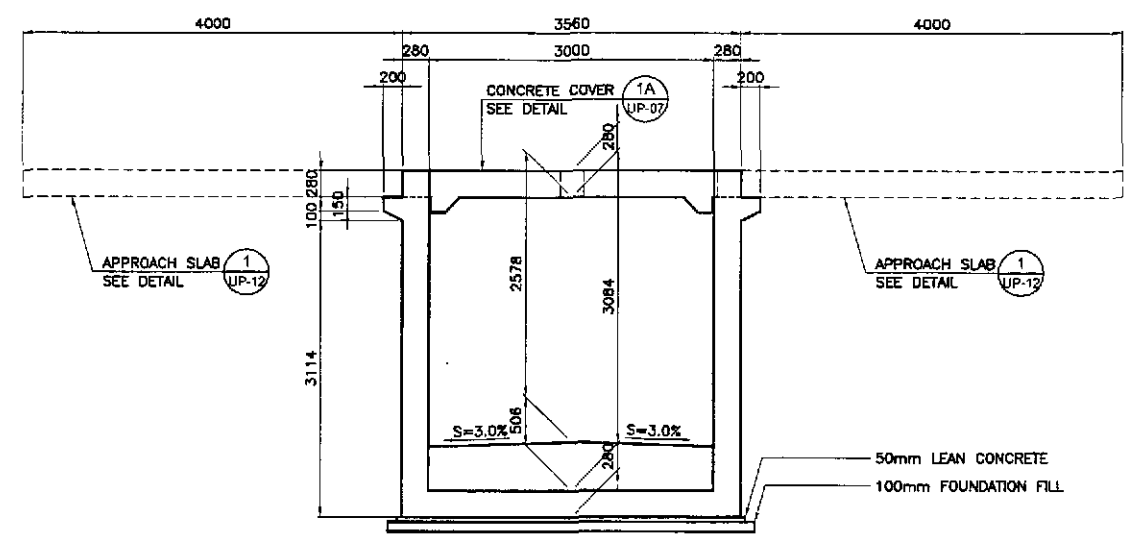
1 GENERAL PLAN
UP-06 SCALE 1:100



3 ELEVATION
UP-06 SCALE 1:40

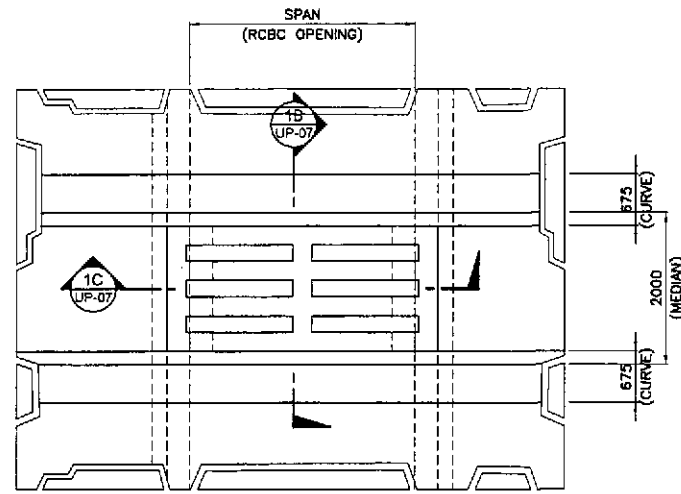


2 GENERAL ELEVATION
UP-06 SCALE 1:100

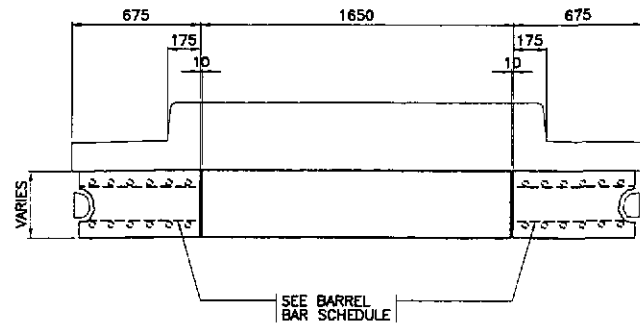


4 SECTION
UP-06 SCALE 1:40

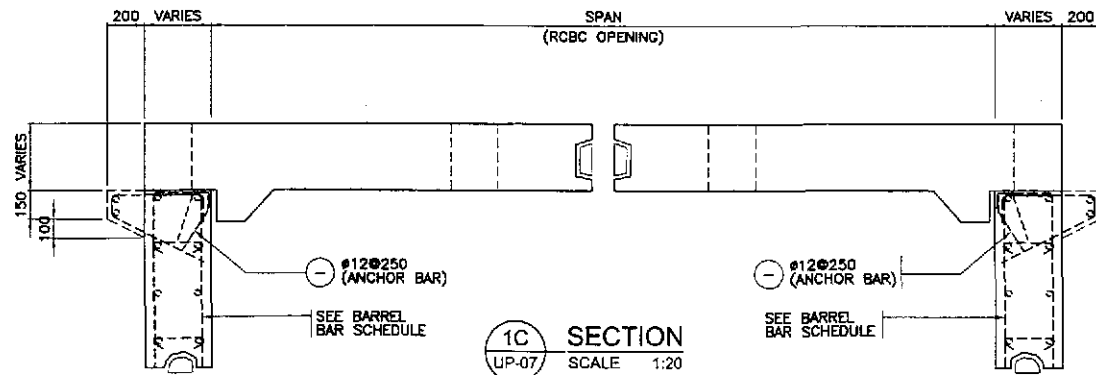
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE : FULL SIZE A1	SHEET CONTENTS : BOX CULVERT (INITIAL STAGE) GENERAL PLAN, ELEVATION & SECTION B-5 (STA. 107+640.00)	SHEET NO. : UP-06	
	CHECKED	10/15/02	[Signature]		Submitted By:	Reviewed By:	Recommended By:					Approved By:
	SUBMITTED	10/14/02	[Signature]		DANLO C. TRAJANO Project Director	JOSEFINA N. ALACAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV					MANUEL M. BONGAN Undersecretary



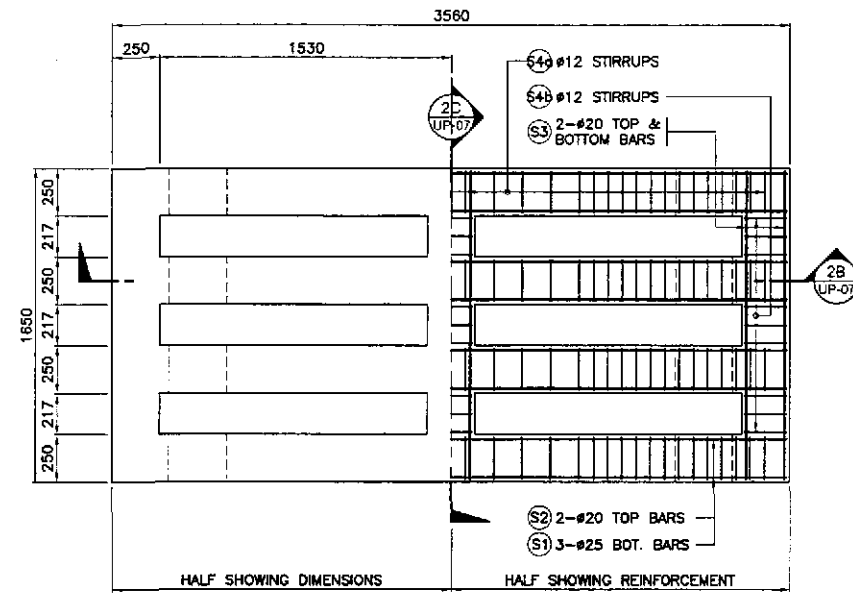
1A PARTIAL PLAN
UP-07 SCALE 1:50



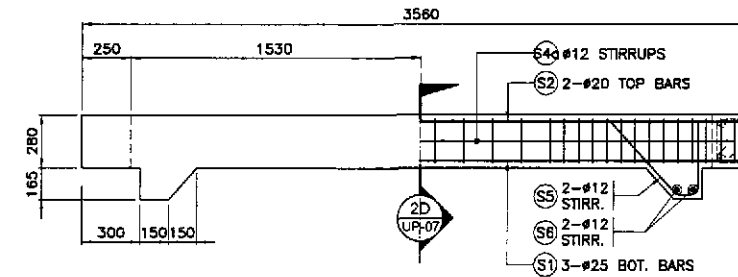
1B SECTION
UP-07 SCALE 1:20



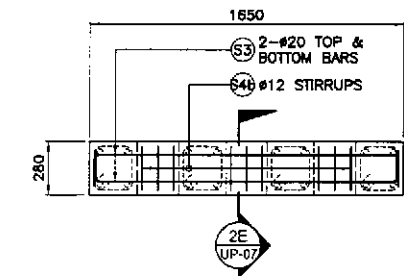
1 PARTIAL BOX SUPPORT DETAILS
UP-07 SCALE AS SHOWN



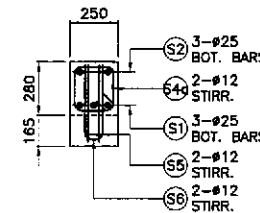
2A PLAN DETAIL
UP-07 SCALE 1:20



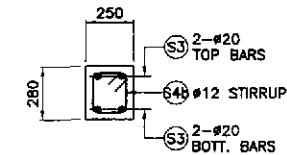
2B SECTION
UP-07 SCALE 1:20



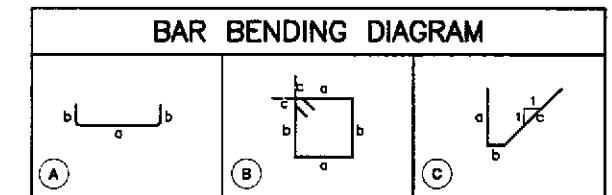
2C SECTION
UP-07 SCALE 1:20



2D SECTION
UP-07 SCALE 1:20



2E SECTION
UP-07 SCALE 1:20



2 CONCRETE COVER DETAILS (3.0 M.)
UP-07 SCALE AS SHOWN

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 ³)
						a	b	c	d	e					
3.0 M SPAN	S1	25	12	AS DWG	(A)	3510	206	-	-	-	3922	47.06	3.854	182	1.2
	S2	20	8	AS DWG	(A)	3510	206	-	-	-	3922	31.38	2.466	78	
	S3	20	12	AS DWG	(A)	1600	206	-	-	-	2012	24.14	2.466	60	
	S4c	12	144	AS DWG	(B)	200	206	115	-	-	1042	150.05	0.888	134	
	S4b	12	27	AS DWG	(B)	200	206	115	-	-	1042	28.13	0.888	25	
	S5	12	16	AS DWG	(C)	395	125	560	-	-	1080	17.28	0.888	16	
S6	12	16	AS DWG	(A)	100	385	-	-	-	870	13.92	0.888	13		
GRAND TOTAL =												508 KG	1.2		

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KATAHIRA & ENGINEERS INTERNATIONAL
YEO YACHIYO ENGINEERING CO., LTD.

DESIGNED: [Signature]
CHECKED: [Signature]
SUBMITTED: [Signature]

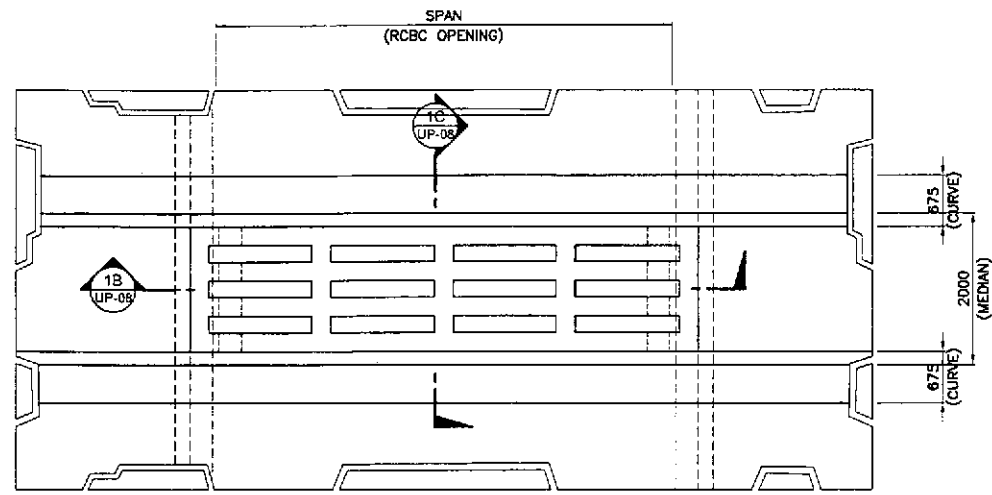
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
OFFICE OF THE SECRETARY
Submitted By: DANILLO C. TRAJANO, Project Director
Reviewed By: JOSEFINA M. ALAGAR, Chief, Highways Division
Recommended By: GILBERTO S. REYES, OIC, Director IV
Recommended By: MANUEL M. BONDIAN, 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
(Planidel, Cabanatuan and San Jose Bypasses)
CABANATUAN BYPASS - CONTRACT PACKAGE I

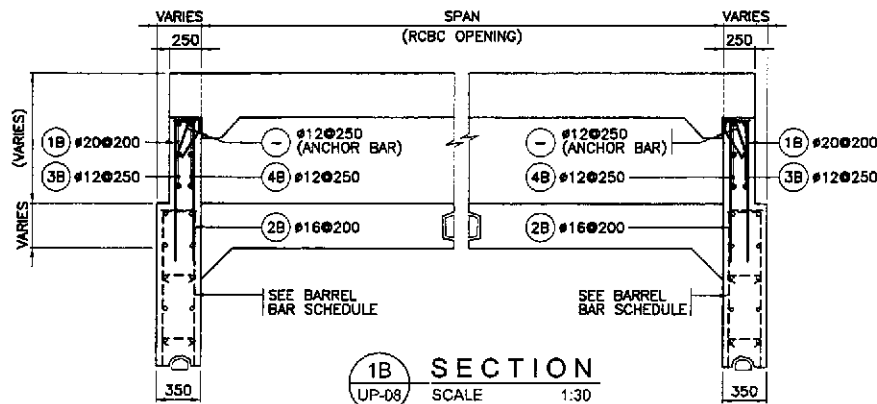
SCALE :
FULL SIZE A1

SHEET CONTENTS :
BOX CULVERT
(INITIAL STAGE)
CONCRETE COVER DETAILS (3.0 M.) WITH
BOX SUPPORT (RCBC OPENING)

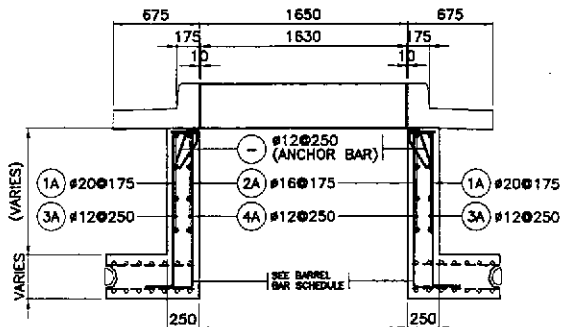
SHEET NO. :
UP-07



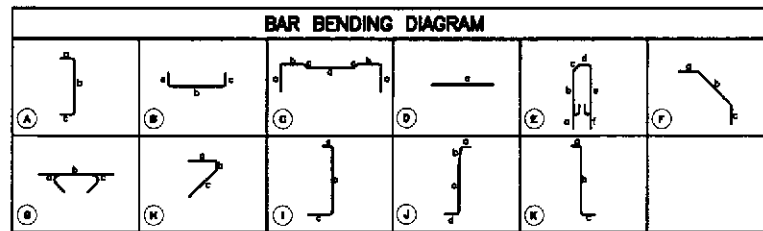
1A PARTIAL PLAN
UP-08 SCALE 1:50



1B SECTION
UP-08 SCALE 1:30

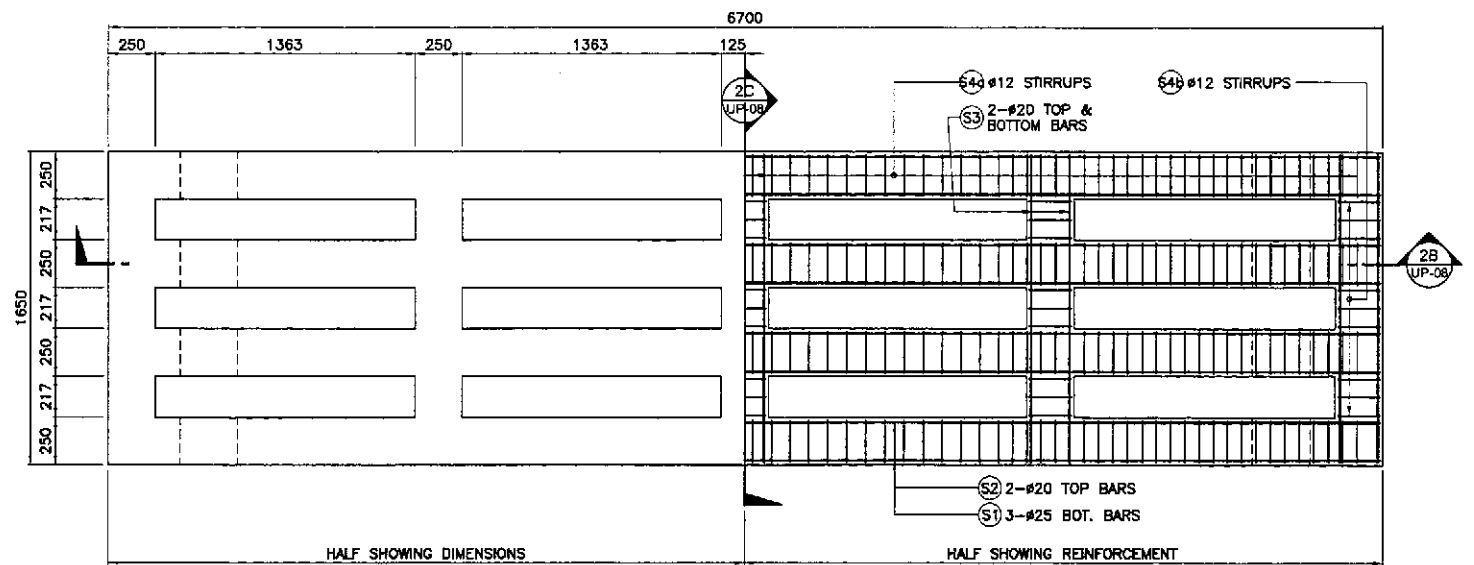


1C SECTION
UP-08 SCALE 1:30

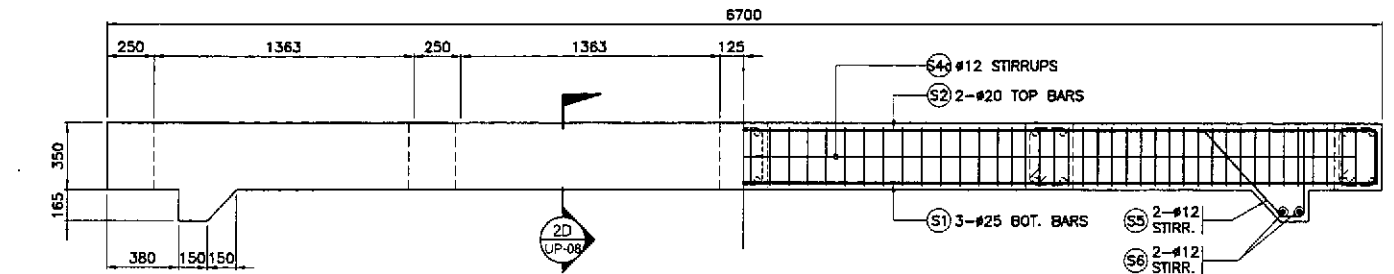


1 PARTIAL BOX SUPPORT DETAILS
UP-08 SCALE AS SHOWN

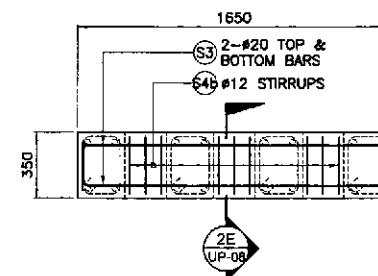
SCHEDULE OF REINFORCEMENTS																
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m ³)
						a	b	c	d	e	f					
BOX SUPPORT	1a	20	44	200	(L)	305	1180	-	-	-	-	1485	65.34	2.466	162	1.45
	1b	20	16	200	(D)	1180	-	-	-	-	-	1180	18.88	2.466	47	
	2a	16	44	200	(L)	254	1180	-	-	-	-	1434	63.1	1.579	100	
	2b	16	16	200	(D)	1180	-	-	-	-	-	1180	18.88	1.579	30	
	3a	12	10	250	(B)	203	3400	203	-	-	-	3808	36.06	0.888	34	
	3b	12	10	250	(B)	150	3400	150	-	-	-	3700	37	0.888	53	
	4a	12	10	250	(B)	203	1860	203	-	-	-	2266	22.66	0.888	21	
	4b	12	10	250	(B)	150	1860	150	-	-	-	2160	21.6	0.888	20	
	5	12	66	500	(C)	114	150	114	-	-	-	378	24.95	0.888	23	
	GRAND TOTAL =												470 KG	1.5		



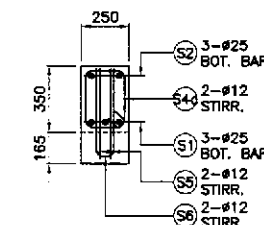
2A PLAN
UP-08 SCALE 1:20



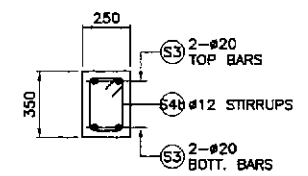
2B SECTION
UP-08 SCALE 1:50



2C SECTION
UP-08 SCALE 1:20



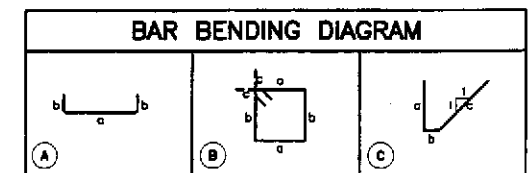
2D SECTION
UP-08 SCALE 1:20



2E SECTION
UP-08 SCALE 1:20

2 CONCRETE COVER DETAILS (6.0 M.)
UP-08 SCALE AS SHOWN

SCHEDULE OF REINFORCEMENTS																
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 ³)
						a	b	c	d	e	f					
6.0 M SPAN	S1	32	B	AS DWG	(A)	6650	276	-	-	-	-	7202	57.62	6.313	384	2.7
	S2	20	B	AS DWG	(A)	6650	276	-	-	-	-	7202	57.62	2.468	143	
	S3	20	20	AS DWG	(A)	1600	276	-	-	-	-	2152	43.04	2.468	107	
	S4a	12	312	AS DWG	(B)	200	276	115	-	-	-	1182	368.78	0.888	328	
	S4b	12	45	AS DWG	(B)	200	276	115	-	-	-	1182	53.19	0.888	48	
	S5	12	16	AS DWG	(C)	465	125	660	-	-	-	1250	20	0.888	18	
S6	12	16	AS DWG	(A)	100	465	-	-	-	-	1030	16.48	0.888	15		
GRAND TOTAL =												1023 KG	2.7			



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JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS
YEC YACHIYO ENGINEERING CO., LTD.

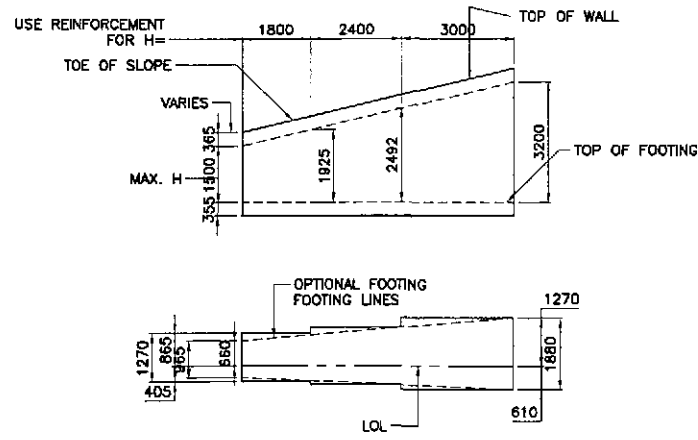
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
OFFICE OF THE SECRETARY
DESIGNED: 9/20/02
CHECKED: 10/15/02
SUBMITTED: 10/16/02
DATE: 10/16/02
SIGNATURE: [Signatures]
Submitted By: DANILLO C. TRAJANO, Project Director
Reviewed By: JOSEFINA M. ALAGAR, Chief, Highways Division
Recommended By: GILBERTO S. REYES, OIC, Director IV
Recommended By: MANUEL M. BONDAN, Undersecretary
Approved By: SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
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ALONG THE PAN-PHILIPPINE HIGHWAY
(Paridel, Cabanatuan and San Jose Bypasses)
CABANATUAN BYPASS - CONTRACT PACKAGE I

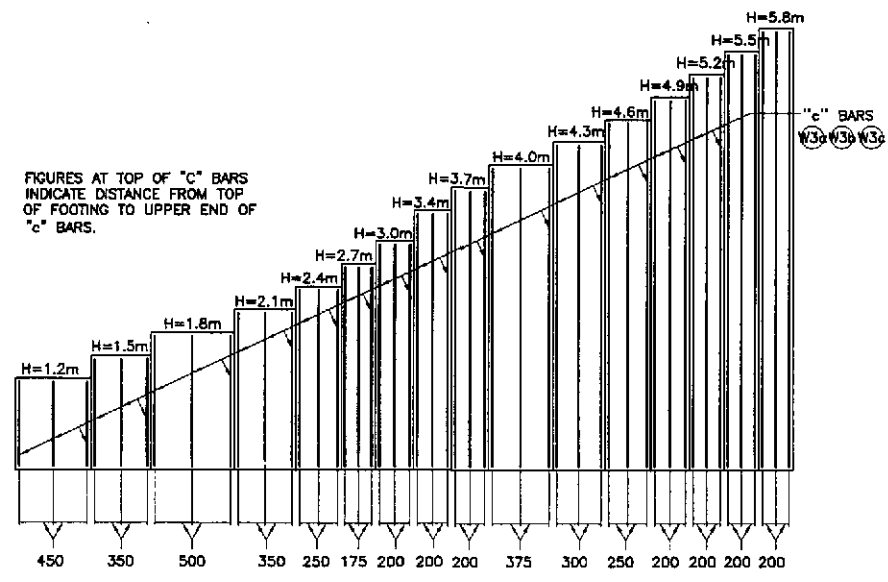
SCALE :
FULL SIZE A1

SHEET CONTENTS :
BOX CULVERT
(INITIAL STAGE)
CONCRETE COVER DETAILS (6.0 M.) WITH
BOX SUPPORT (RCBC OPENING)

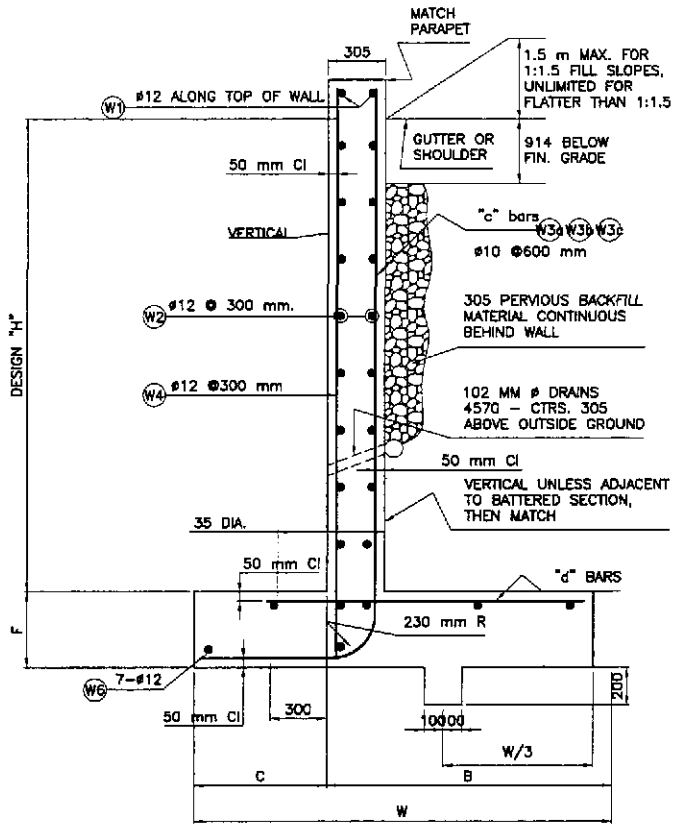
SHEET NO. :
UP-08



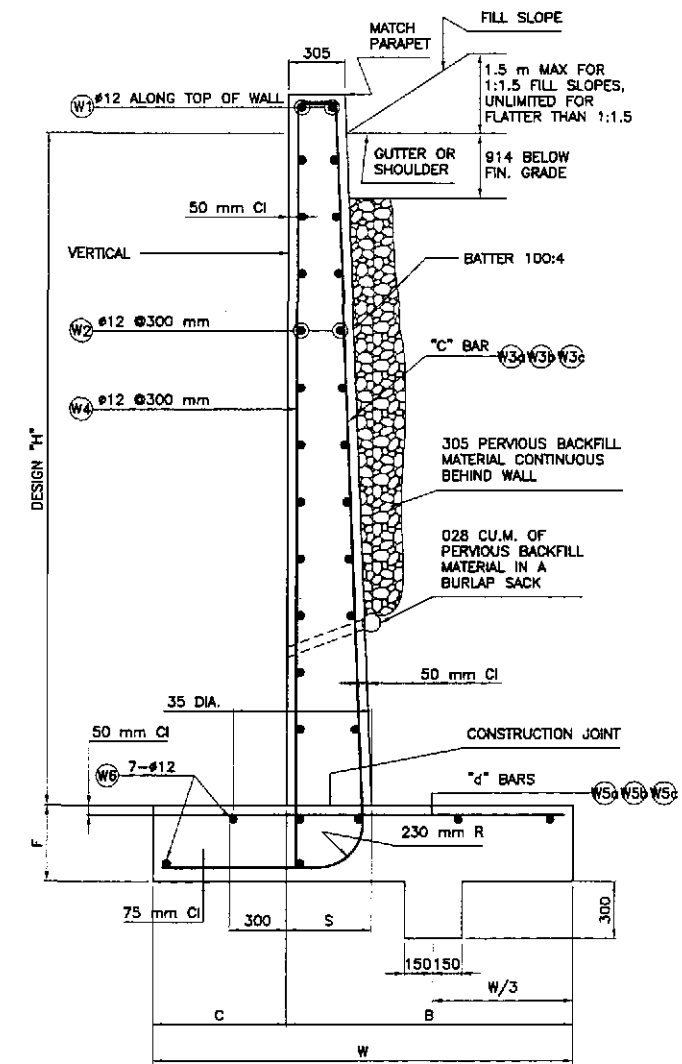
1 TYPICAL LAYOUT EXAMPLE
SCALE 1:100



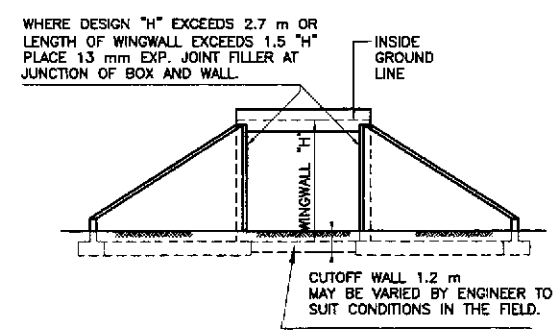
2 TYPICAL SECTION
H=1.2 m THRU 3.7 m
SCALE 1:20



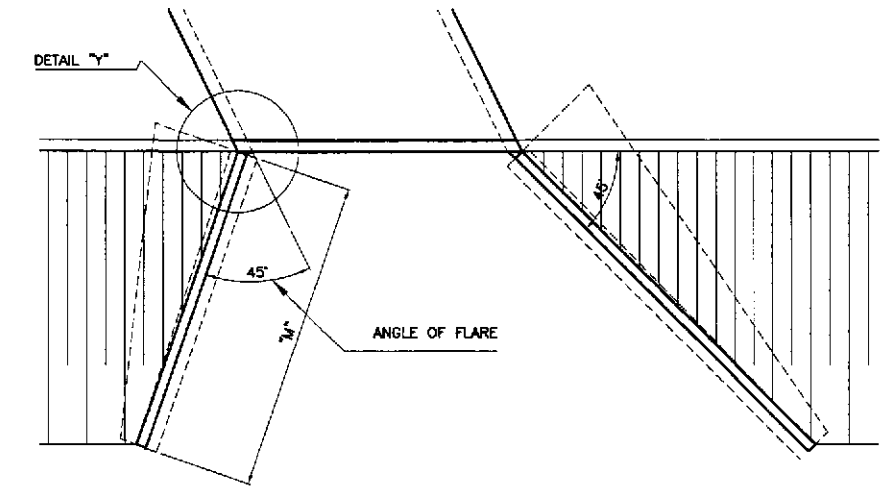
3 TYPICAL SECTION
H=4.0 m THRU 4.9 m
SCALE 1:20



4 PLAN
SCALE 1:100



5 END ELEVATION
SCALE 1:100

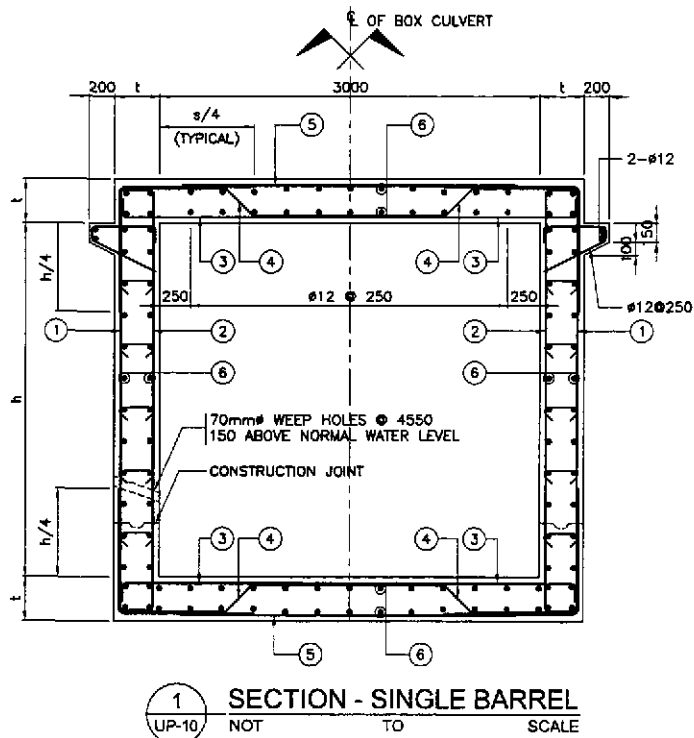


6 PLAN
SCALE 1:100

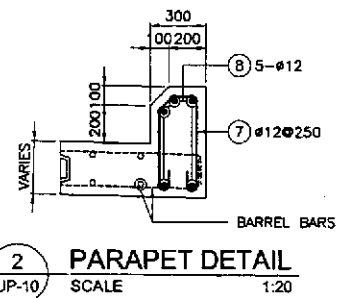
REINFORCED CONCRETE WINGWALLS																
H	1200	1500	1800	2100	2400	2700	3000	3400	3700	4000	4300	4600	4900	5200	5500	5800
W	965	1120	1270	1420	1575	1730	1880	2030	2185	2335	2490	2640	2795	2945	3050	3150
C	305	355	405	455	510	560	610	660	710	760	815	865	915	965	1015	1065
B	660	765	865	965	1065	1170	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	1:26	1:27
S	305	305	305	305	305	305	305	305	305	465	475	480	500	500	500	500
"c" Bars	12@450	12@350	12@275	16@350	16@250	16@175	20@200	25@200	25@200	32@375	32@300	32@250	32@200	32@175	32@200	32@200
"d" Bars	12@450	12@350	12@275	16@350	16@250	20@350	25@400	25@400	25@400	25@375	25@300	25@250	25@200	25@175	28@200	28@200

NOTES
 UNIT STRESSES: $f_c = 165 \text{ MPa}$, $f_s = 9 \text{ MPa}$, $n = 10$
 MAXIMUM TOE PRESSURE = 180 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 "G" 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 B3-8

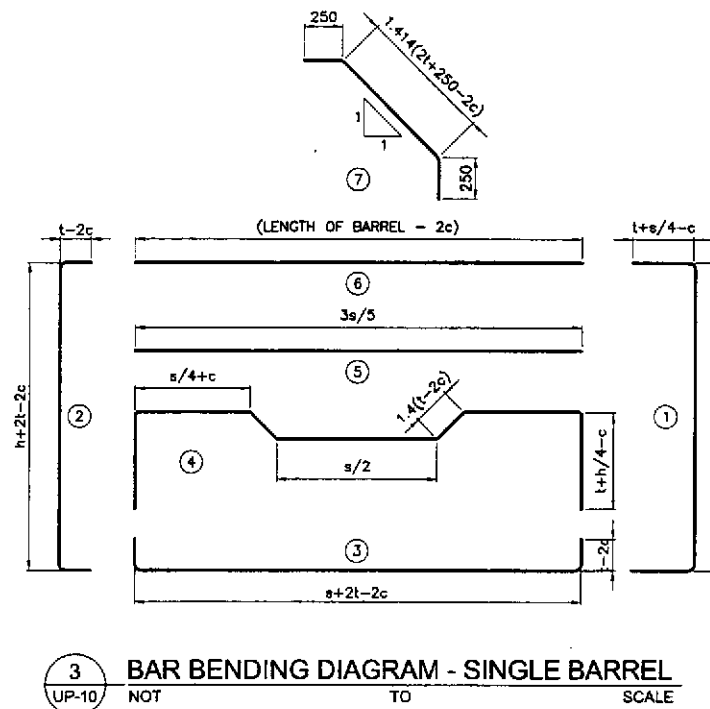
	DESIGNED: 7/27/02 CHECKED: 8/15/02 SUBMITTED: 10/14/02	SIGNATURE: [Signature] TEAM LEADER	PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE: FULL SIZE A1	SHEET CONTENTS: BOX CULVERT (INITIAL STAGE) WINGWALL DETAIL	SHEET NO.: UP-09
	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 I	SCALE: FULL SIZE A1	SHEET CONTENTS: BOX CULVERT (INITIAL STAGE) WINGWALL DETAIL	SHEET NO.: UP-09
	BUREAU OF DESIGN OFFICE OF THE SECRETARY Submitted By: DANILLO C. TRAJANO, Project Director Reviewed By: JOSEFINA M. ALAGAR, Chief, Highways Division Recommended By: GILBERTO S. REYES, OIC, Director IV Approved By: MANUEL M. BONCAN, 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) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE: FULL SIZE A1	SHEET CONTENTS: BOX CULVERT (INITIAL STAGE) WINGWALL DETAIL	SHEET NO.: UP-09



1 SECTION - SINGLE BARREL
UP-10 NOT TO SCALE



2 PARAPET DETAIL
UP-10 SCALE 1:20



3 BAR BENDING DIAGRAM - SINGLE BARREL
UP-10 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:
 $\frac{SS}{\sqrt{S}}$, MAX. 50%

OVER 3.0 COVER
#12 @ 450 mm MAXIMUM.

SHEAR:
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.

NAME	BAR SCHEDULE SINGLE BARREL BOX CULVERT											REMARKS						
	S	h	t	BAR 1		BAR 2		BAR 3		BAR 4			BAR 5		BAR 6		BAR 7	
SPAN	HEIGHT	THICKNESS	#	SPACING	#	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° RF)
B-5	3000	3100	280	16	200	16	180	16	200	16	200	12	200	12	250	-	-	FLUSHED TO ROADWAY

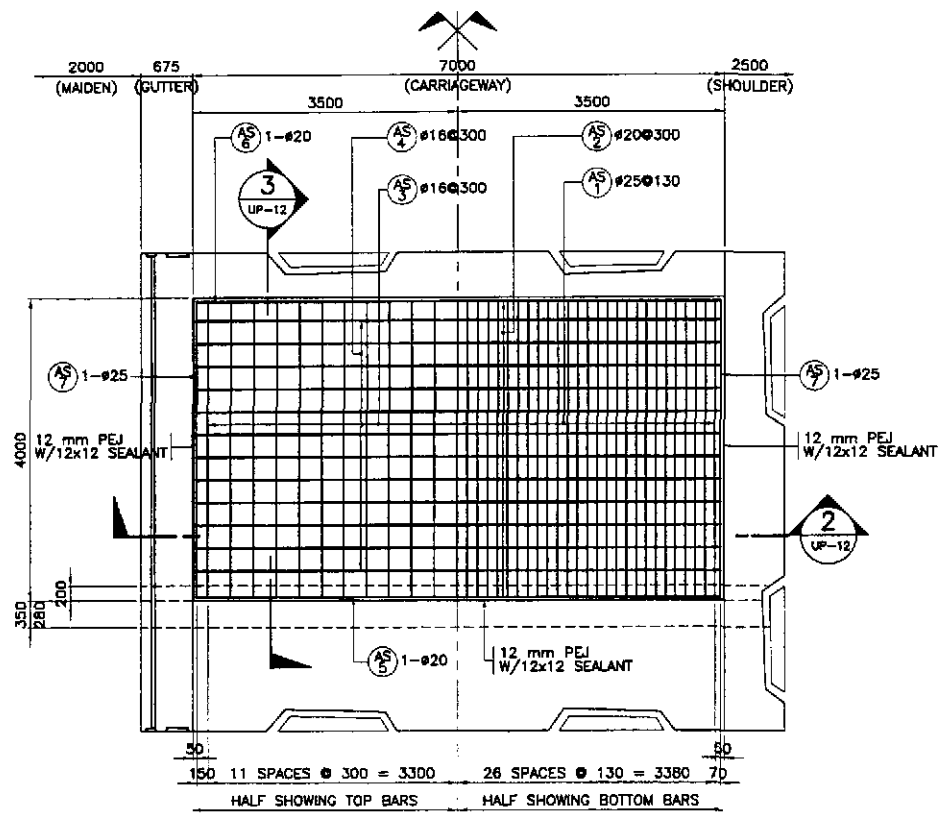
	DATE	SIGNATURE		PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	<i>[Signature]</i>		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BOX CULVERT SPECIAL RCBC BARREL DETAILS (INITIAL STAGE)	UP-10
	CHECKED	<i>[Signature]</i>		BUREAU OF DESIGN	CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1		
	SUBMITTED	<i>[Signature]</i>		OFFICE OF THE SECRETARY				
			Submitted By: DANILLO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV	Recommended By: MANUEL M. BONDAN Undersecretary	Approved By: SIMEON A. DATUMANONG Secretary	

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)	WEIGHT IN (KG)	VOLUME OF CONC. (m³)
						a	b	c	d	e	f					
BARREL L=20.74m	1	18	210	200	(A)	980	3877	980	-	-	-	5837	1225.82	1.579	1936	82.89
	2	16	232	180	(A)	180	3877	180	-	-	-	4237	983.04	1.579	1553	
	3	16	210	200	(B)	180	3460	180	-	-	-	3820	802.2	1.579	1267	
	4	16	208	200	(C)	1084	800	255	1500	-	-	5778	1201.77	1.579	1898	
	5	12	210	200	(D)	2000	-	-	-	-	-	2000	420	0.888	373	
	6	12	128	250	(D)	20694	-	-	-	-	-	20694	2648.83	0.888	2353	
	7	12	30	250	(E)	114	380	71	150	480	114	1309	39.26	0.888	35	
	8	12	10	AS DWG	(D)	3480	-	-	-	-	-	3480	34.8	0.888	31	
	9	12	58	250	(H)	430	70	608	-	-	-	1108	64.27	0.888	58	
	10	12	4	AS DWG	(D)	8900	-	-	-	-	-	8900	27.6	0.888	25	
WINDWALLS (H+)=3.897m	W1	12	4	AS DWG	(D)	800	8567	-	-	-	-	9187	36.67	0.888	33	20.87
	W2	12	24	300	(D)	4133	-	-	-	-	-	4133	99.68	0.888	89	
	W3a	25	30	200	(I)	1208	3282	150	-	-	-	4840	139.2	3.854	537	
	W3b	16	26	175	(I)	748	2121	150	-	-	-	3019	78.48	1.579	124	
	W3c	12	12	275	(I)	898	1217	150	-	-	-	2085	24.78	0.888	23	
	W4	12	48	300	(I)	203	2379	150	-	-	-	2732	131.12	0.888	117	
	W5a	25	14	400	(D)	1892	-	-	-	-	-	1892	26.49	3.854	103	
	W5b	20	12	350	(D)	1235	-	-	-	-	-	1455	17.46	2.466	44	
	W5c	12	12	275	(D)	813	-	-	-	-	-	813	10.96	0.888	10	
	W6	12	14	AS DWG	(D)	7379	-	-	-	-	-	7379	103.3	0.888	92	
GRAND TOTAL = 10701 KG														103.8		

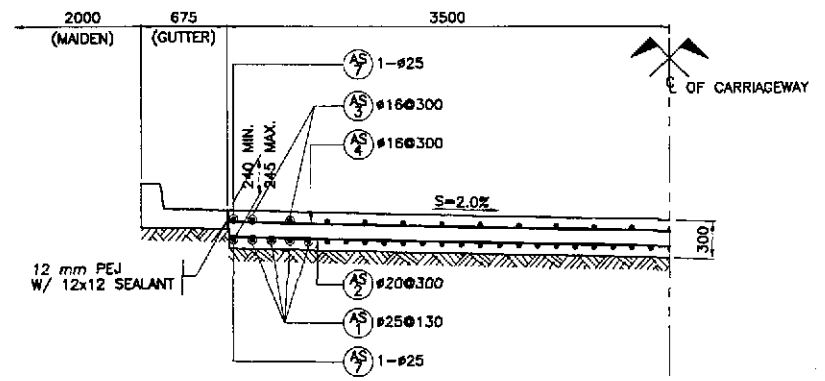
SCHEDULE OF REINFORCEMENTS (B2 - STA. 103+040.00)																
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m³)
						a	b	c	d	e	f					
BARREL L=20.346m	1	18	208	200	(A)	980	3975	980	-	-	-	5935	1222.61	1.579	1931	83.71
	2	16	226	180	(A)	180	3975	180	-	-	-	4335	979.71	1.579	1947	
	3	16	206	200	(B)	180	3460	180	-	-	-	3820	786.92	1.579	1243	
	4	16	204	200	(C)	1109	800	255	1500	-	-	5827	1188.63	1.579	1877	
	5	12	206	200	(D)	2000	-	-	-	-	-	2000	412	0.888	368	
	6	12	128	250	(D)	20249	-	-	-	-	-	20249	2591.87	0.888	2302	
	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)	8900	-	-	-	-	-	8900	27.6	0.888	25	
WINDWALLS (H+)=3.76m	W1	12	4	AS DWG	(D)	800	8506	-	-	-	-	9106	36.42	0.888	33	20.80
	W2	12	26	300	(D)	4123	-	-	-	-	-	4123	107.2	0.888	98	
	W3a	25	30	200	(I)	1212	3339	150	-	-	-	4721	141.64	3.854	546	
	W3b	16	26	175	(I)	752	2161	150	-	-	-	3063	79.64	1.579	126	
	W3c	12	12	275	(I)	702	1229	150	-	-	-	2081	24.98	0.888	23	
	W4	12	48	300	(I)	203	2428	150	-	-	-	2780	133.46	0.888	119	
	W5a	25	14	400	(D)	1893	-	-	-	-	-	1893	26.5	3.854	103	
	W5b	20	12	350	(D)	1456	-	-	-	-	-	1456	17.47	2.466	44	
	W5c	12	12	275	(D)	813	-	-	-	-	-	813	10.96	0.888	10	
	W6	12	14	AS DWG	(D)	7328	-	-	-	-	-	7328	102.59	0.888	92	
GRAND TOTAL = 10524 KG														104.51		

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)	WEIGHT IN (KG)	VOLUME OF CONC. (m³)
						a	b	c	d	e	f					
BARREL L=18.630m	1	16	188	200	(A)	980	3944	980	-	-	-	5904	1110.03	1.579	1753	75.14
	2	16	208	180	(A)	180	3944	180	-	-	-	4304	895.34	1.579	1414	
	3	16	188	200	(B)	180	3460	180	-	-	-	3820	718.16	1.579	1134	
	4	16	188	200	(C)	1101	800	255	1500	-	-	5811	1060.91	1.579	1707	
	5	12	188	200	(D)	2000	-	-	-	-	-	2000	376	0.888	334	
	6	12	128	250	(D)	18539	-	-	-	-	-	18539	2372.99	0.888	2108	
	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)	8900	-	-	-	-	-	8900	27.6	0.888	25	
WINDWALLS (H+)=3.76m	W1	12	4	AS DWG	(D)	800	8098	-	-	-	-	8698	34.79	0.888	31	19.50
	W2	12	26	300	(D)	3923	-	-	-	-	-	3923	101.99	0.888	91	
	W3a	25	28	200	(I)	1211	3335	150	-	-	-	4896	131.49	3.854	507	
	W3b	16	24	175	(I)	751	2149	150	-	-	-	3050	73.19	1.579	118	
	W3c	12	8	350	(I)	701	1229	150	-	-	-	2077	16.61	0.888	15	
	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)	1450	-	-	-	-	-	1460	17.52	2.466	44	
	W5c	12	8	350	(D)	816	-	-	-	-	-	816	6.52	0.888	6	
	W6	12	14	AS DWG	(D)	8988	-	-	-	-	-	8988	97.83	0.888	87	
GRAND TOTAL = 9897 KG														94.64		

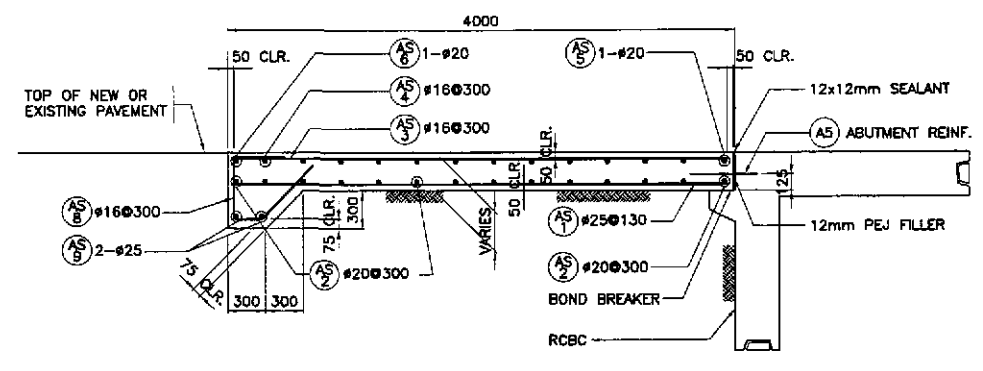
SCHEDULE OF REINFORCEMENTS (B4 - STA. 107+157.432)																
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m³)
						a	b	c	d	e	f					
BARREL L=20.74m	1	20	210	200	(A)	1800	3512	1800	-	-	-	7112	1493.42	2.466	3683	149.36
	2	20	208	200	(A)	250	3512	250	-	-	-	4012	834.39	2.466	2058	
	3	20	210	200	(A)	250	6800	250	-	-	-	7100	1491	2.466	3677	
	4	20	208	200	(B)	1028	1550	354	3000	-	-	8863	1843.47	2.466	4546	
	5	12	210	200	(C)	4000	-	-	-	-	-	4000	840	0.888	748	
	6	12	188	250	(C)	20694	-	-	-	-	-	20694	3476.54	0.888	3088	
	7	16	380	200	(D)	560	1202	560	-	-	-	2322	882.32	1.579	1394	
	8	12	60	250	(E)	114	450	71	150	550	114	1449	86.92	0.888	78	
	9	12	10	AS DWG	(D)	8590	-	-	-	-	-	8590	85.9	0.888	59	
	10	12	58	250	(H)	500	70	707	-	-	-	1277	74.07	0.888	66	
	11	12	4	AS DWG	(D)	8900	-	-	-	-	-	8900	27.6	0.888	25	
DITCH WALL	12	20	96	200	(J)	209	371	1147	317	-	-	2044	196.22	2.466	484	8.47
	13	16	96	200	(K)	209	1527	317	-	-	-	2053	197.09	1.579	312	
	14	12	10	AS DWG	(D)	18822	-	-	-	-	-	18822	188.22	0.888	168	
WINDWALL (H+)=3.26m L=5.806m	15	12	189	400	(C)	114	274	114	-	-	-	502	94.88	0.888	85	7.33
	W1	12	2	AS DWG	(D)	800	8788	-	-	-	-	7398	14.8	0.888	14	
	W2	12	11	300	(D)	3396	-	-	-	-	-	3396	37.35	0.888	34	
	W3a	20	12	200	(I)	830	2927	150	-	-	-	3917	47	2.466	116	
	W3b	16	7	250	(I)	730	1839	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	8	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	
WINDWALL (H+)=3.26m L=4.44m	W6	12	7	AS DWG	(D)	5906	-	-	-	-	-	5906	41.34	0.888	37	5.88
	W1	12	2	AS DWG	(D)	800	5221	-	-	-	-	5821	11.64	0.888	11	
	W2	12	11	300	(D)	2564	-	-	-	-	-	2564	28.53	0.888	26	
	W3a	20	9	200	(I)	830	3048	150	-	-	-	4028	36.25	2.466	80	
	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	8.14	1.579	10	
	W5c	12	2	350	(D)	822	-	-	-	-	-	822	1.6			



1 PLAN
UP-12 SCALE 1:50



2 SECTION
UP-12 SCALE 1:30



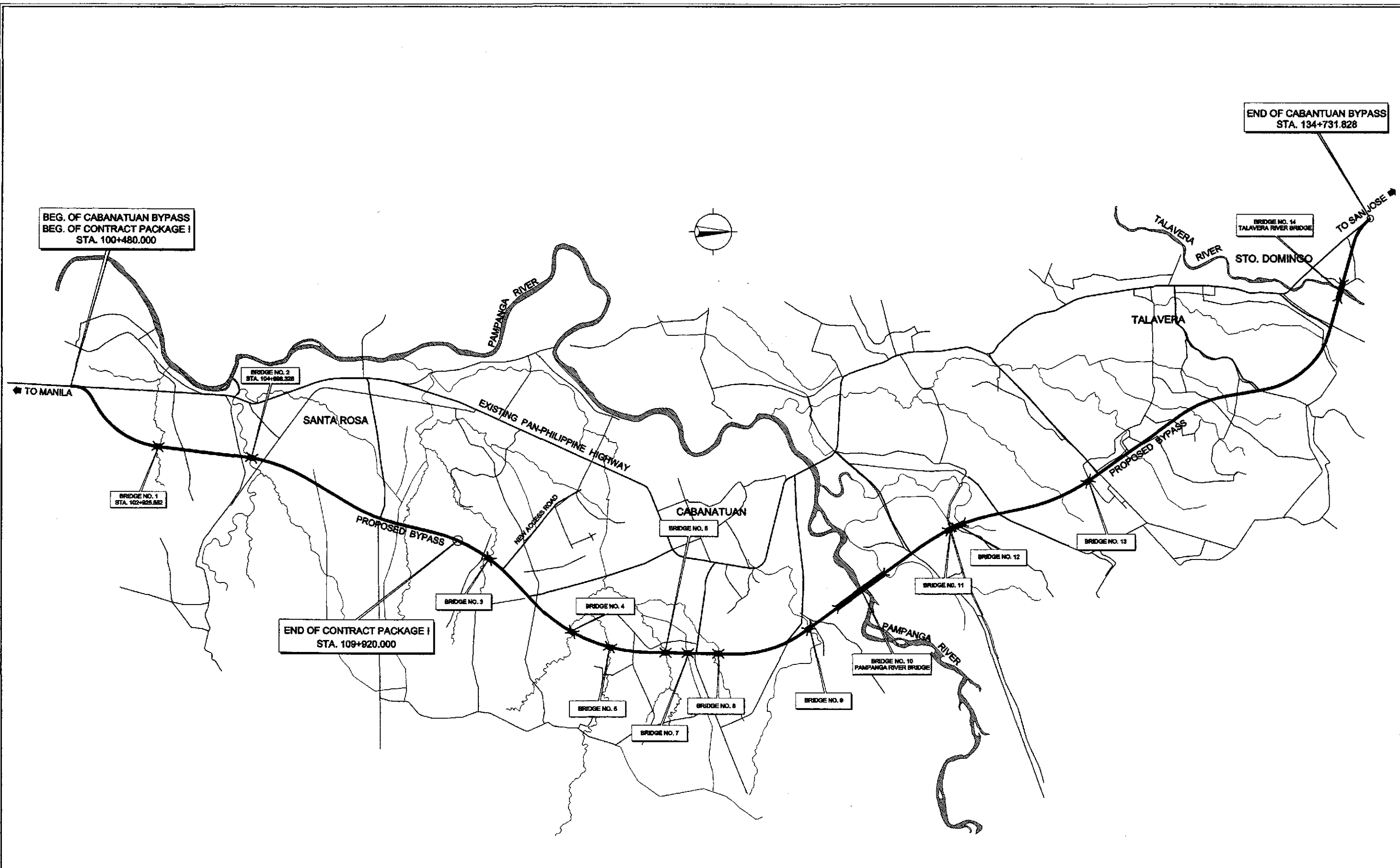
3 SECTION
UP-12 SCALE 1:30

REINFORCEMENT SCHEDULE & ESTIMATED QUANTITIES FOR TWO LANES APPROACH SLABS

BENDING DIAGRAM (DIMENSIONS ARE OUT TO OUT OF REBARS)	REINFORCEMENT										CONCRETE VOLUME (m ³)	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 A	AS 1-#20	25	69	130	(B)	3900	150	-	4050	226.80	3.853	874	1. QUANTITIES ARE FOR ONE (1) APPROACH SLAB	
	AS 1-#25	20	14	300	(A)	7900	-	-	7900	55.30	2.466	136		
	AS #16@300	16	25	300	(B)	3900	150	-	4050	101.25	1.578	160		
a B	AS #16@300	16	12	300	(A)	7900	-	-	7900	47.40	1.578	75		
	AS 1-#25	20	1	AS SHOWN	(A)	7200	-	-	7200	7.20	2.466	18		
a C	AS 1-#25	20	1	AS SHOWN	(A)	7900	-	-	4050	53.20	1.578	84		
	AS #16@300	25	4	AS SHOWN	(A)	1965	1965	-	3930	15.72	3.853	61		
	AS #16@300	16	27	300	(C)	415 MIN. 475 MAX.	250	650	1745	47.11	1.578	74		
	AS 1-#25	25	2	AS SHOWN	(A)	7900	-	-	7900	15.80	3.853	61		
GRAND TOTAL = 1543											9.58			

	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/15/02	<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)	FULL SIZE A1	BOX CULVERT (INITIAL STAGE) APPROACH SLAB DETAIL	UP-12
	SUBMITTED	10/14/02	<i>[Signature]</i>		OFFICE OF THE SECRETARY				CABANATUAN BYPASS - CONTRACT PACKAGE I			
					Submitted By:	Reviewed By:	Recommended By:	Recommended By:	Approved By:			
			<i>[Signature]</i>	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONGAON Undersecretary	SIMEON A. DATUMANONG Secretary				

BRIDGES



A CABANATUAN BYPASS BRIDGE LOCATION MAP
NOT TO SCALE

	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 I	SCALE :	SHEET CONTENTS : BRIDGE LOCATION MAP (INITIAL STAGE)	SHEET NO. : BG-01	
	CHECKED	10/15/02	<i>[Signature]</i>		BUREAU OF DESIGN				AS SHOWN			
	SUBMITTED	10/16/02	<i>[Signature]</i>		Submitted By:	Reviewed By:	Recommended By:		Approved By:			FULL SIZE A1
					DANILO C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridge Division	GILBERTO S. REYES Director IV (DC)		MANUEL M. BONGAN Undersecretary			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

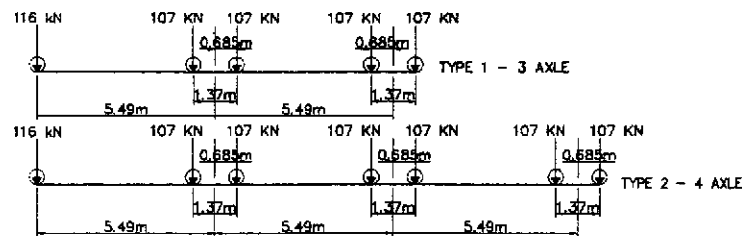
	WEIGHT
A. CONCRETE	24.00 kN/m ³
B. STEEL	77.00 kN/m ³
C. EARTH	19.00 kN/m ³
D. WEARING SURFACE	1.10 kN/m ²

3.2 LIVE LOADS

- A. AASHTO HS20 (MS18) TRUCK AND EQUIVALENT LANE LOADING.
- B. SIDEWALK LOAD 4.07 kN/m² 107 kN 107 kN
- 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 VI = 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	5075	20 (3/4)	⊗ TRANSFER
		41	5946	20 (3/4)	⊗ 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 (16mmφ AND SMALLER)
F_y = 276 MPa (40,000 psi)
- GRADE 60 (20mmφ AND LARGER)
F_y = 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 F_y = 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 ² (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

- 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.

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
 - (1) DESIGN OF CONCRETE MIX SHALL MEET THE DESIGN CONCRETE STRENGTH GIVEN UNDER ITEM 1 OF MATERIALS.
 - (2) CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE SPECIFICATION.

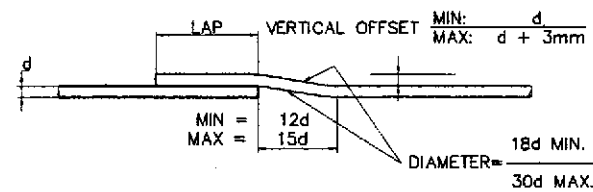
- (3) FOR CONCRETE DEPOSITED AGAINST THE GROUND, LEAN CONCRETE WITH A MINIMUM THICKNESS OF 200mm SHALL LAID FIRST BEFORE INSTALLING THE REINFORCEMENT. THIS LEAN CONCRETE SHALL NOT BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF CONCRETE SECTION.

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

c. BAR BENDING, SPLICING AND PLACING

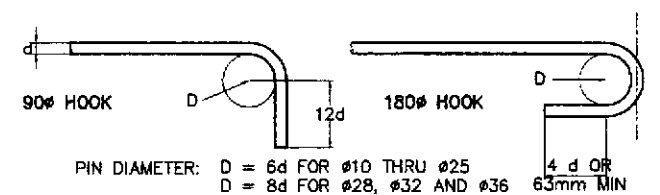
- (1) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER/CONSULTANT FOR APPROVAL OF SHOP DRAWINGS INDICATING THE BENDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS.
- (2) BARS SHALL BE BEND COLD. BARS PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT UNLESS PERMITTED BY THE ENGINEER/CONSULTANT.
- (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

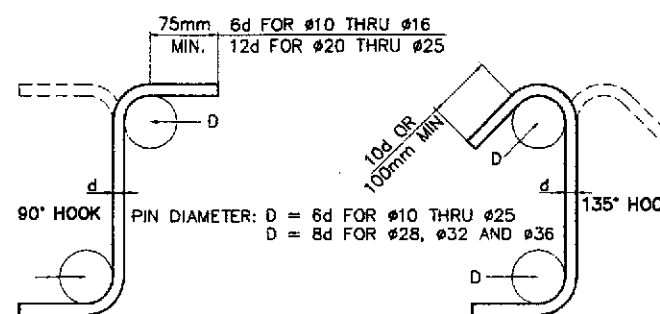


(8) HOOKS AND BENDS

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

- (1) THE POSITION AND FORM OF ANY CONSTRUCTION JOINT SHALL BE AS SHOWN ON DRAWINGS OR AS AGREED WITH THE ENGINEER/CONSULTANT.
- (2) 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.

	DATE: 9/27/02 DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: 10/11/02	SIGNATURE: [Signature] S. SALLAN Project Director	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN Reviewed By: [Signature] Recommended By: [Signature] DANLO C. TRAJANO Project Director	OFFICE OF THE SECRETARY Recommended By: [Signature] Approved By: [Signature] MANUEL M. BONDAN Undersecretary SINEON A. DATUMANGONG 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 : GENERAL NOTES FOR BRIDGES (SHEET 1 OF 2) (INITIAL STAGE)	SHEET NO. : BG-02
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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

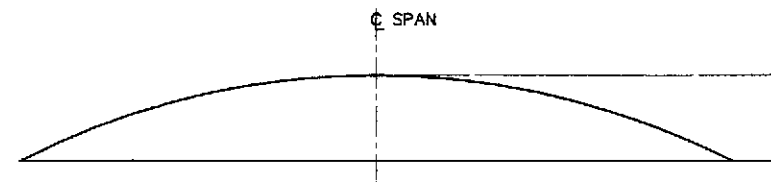
GIRDER DESIGN GUIDE

- 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/mm² (6,000 PSI) AT THE AGE OF 28 DAYS.
- c.) CONCRETE FOR CAST-IN-PLACE SLAB HAVE A MINIMUM STRENGTH 21 N/mm² (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




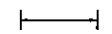




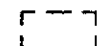

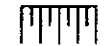

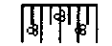
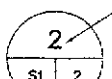


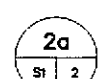
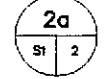
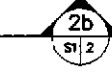
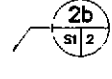









- a.) ALL ELEVATIONS, STATIONING AND DIMENSIONS SHALL BE VERIFIED PRIOR TO CONSTRUCTION.
- b.) ALL QUANTITIES SHALL BE VERIFIED DURING CONSTRUCTION.



DEAD LOAD CAMBER DIAGRAM





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

SYMBOLS

 LINE OF SYMMETRY OR SIMILARITY  NORTH ARROW  INDICATION OF ELEVATION  LIMITS OF DIMENSION  SECTION IN WATER  SECTION IN EARTH  SECTION IN STRUCTURAL STEEL  SECTION IN CONCRETE  SECTION IN EXISTING CONCRETE STRUCTURE  BITUMINOUS WEARING SURFACE ON BRIDGES  PLAN VIEW AND ELEVATION OF CUT & FILL SLOPES  PLAN VIEW OF RUBBLE CONC. ON SLOPE  PLAN VIEW OF GROUTED RIPRAP ON SLOPE	 IDENTIFICATION SYMBOL  TITLE TARGET  SET No.  SHEET No.  SUB-TITLE TARGET  SECTION TARGET  DETAIL REF TARGET  BUNDLED BARS  ROUND  SQUARE  AT  AND  CENTERLINE  PLATE  ANGLE SHAPE  CENTER TO CENTER
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ABBREVIATIONS

ABT	ABOUT	kPa	KILOPASCAL
ABUT	ABUTMENT	m	METER
BEG	BEGINNING	mm	MILLIMETER
BET	BETWEEN	MAX	MAXIMUM
BOTT	BOTTOM	MAX. FLOOD	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	STR	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

 JAPAN INTERNATIONAL COOPERATION AGENCY  KATAHIRA & ENGINEERS INTERNATIONAL  YACHIYO ENGINEERING CO., LTD.	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 I	SCALE :	SHEET CONTENTS :	SHEET NO. :		
	DESIGNED	9/21/02			[Signature]	BUREAU OF DESIGN	AS SHOWN	GENERAL NOTES FOR BRIDGES (SHEET 2 OF 2) (INITIAL STAGE)	BG-03
	CHECKED	10/15/02			[Signature]	OFFICE OF THE SECRETARY	FULL SIZE A1		
SUBMITTED	10/18/02	[Signature]	Submitted By: DANLO C. TRAJANO, Project Director Reviewed By: ADRIANO M. DOROY, Chief, Bridge Division Recommended By: GILBERTO S. REYES, Director IV (GIC) Approved By: MANUEL M. BONDAN, Undersecretary Approved By: SIMEON A. DATLIMANONG, Secretary						

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

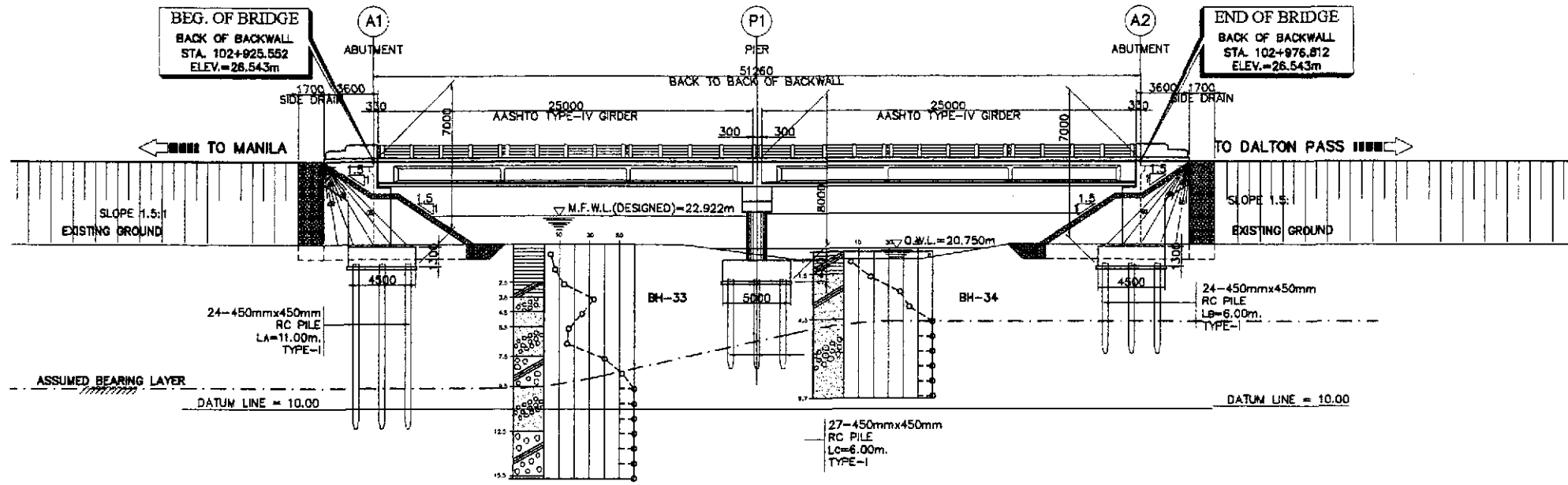
SUMMARY OF QUANTITIES							
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		PIER	SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "			
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	100.00	100.00			200.00
103(2)c	Bridge Excavation, Common, Below O.W.L.	cu.m.			128.00		128.00
104(3)	Embankment from Borrow Pit	cu.m.	378.00	378.00			756.00
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 x 450 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 60	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		20.00
407(2)a	Expansion Joint, (± 40mm Movement)	l.m.	10.00	10.00			20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	2.00	2.00			4.00
407(4)	Metal Drain (150 mmø G.I. Drain Pipe)	l.m.				5.00	5.00
504(1)	Grouted Riprap, Class "A"	cu.m.	111.00	109.00			220.00
508(1)	Hand Laid Rock	cu.m.	61.00	60.00			121.00

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

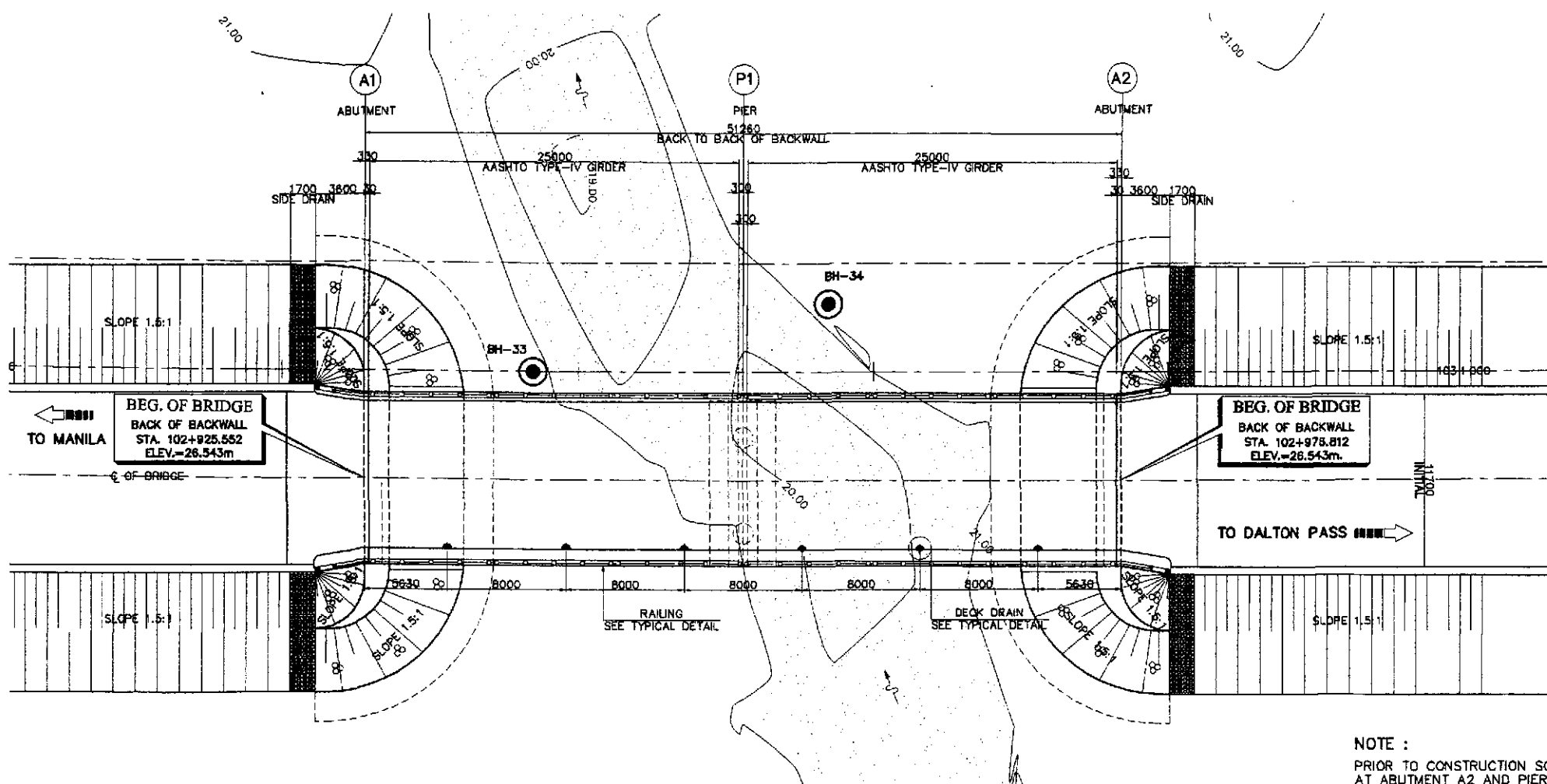
SUMMARY OF QUANTITIES								
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		PIER		SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "	" P1 "	" P2 "		
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	103.00	131.00				234.00
103(2)c	Bridge Excavation, Common, Below O.W.L.	cu.m.			250.00	218.00		468.00
104(3)	Embankment from Borrow Pit	cu.m.	313.00	297.00				610.00
104(4)	Embankment for Bridge Approach	cu.m.	272.00	261.00				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 x 450 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	127.00
404(1)	Reinforcing Steel, Grade 40	kg	3,666.00	3,666.00	2,805.00	2,805.00	31,321.00	43,701.00
404(2)	Reinforcing Steel, Grade 60	kg	8,691.00	8,691.00	17,461.00	17,461.00	7,106.00	59,410.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	142.00	142.00	152.00	152.00		588.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.					213.00	213.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00			27.00	35.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	26.00	26.00	7.00	7.00		66.00
406(1)a	Prestressed Concrete Girder Type IV L=20.00m	each					10.00	10.00
406(1)b	Prestressed Concrete Girder Type IV L=22.00m	each					5.00	5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00	10.00	10.00		30.00
407(2)a	Expansion Joint, (± 40mm Movement)	l.m.	10.00	10.00				20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	2.00	2.00				4.00
407(4)	Metal Drain (150 mmø G.I. Drain Pipe)	l.m.					6.00	6.00
504(1)	Grouted Riprap, Class "A"	cu.m.	25.00	25.00				50.00
510(1)	Rubble Concrete Slope Protection	cu.m.	54.00	54.00				108.00
507(2)b	Steel Sheet Pile (85x400x8mm), Furnished and Driven	l.m.	409.00	410.00				819.00
509(1)	Gabions	cu.m.			176.00	176.00		352.00

NOTE: ALL QUANTITIES SHALL BE VERIFIED DURING CONSTRUCTION

	DESIGNED	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	10/15/02	<i>[Signature]</i>	BUREAU OF DESIGN Submitted By: DANILO C. TRAJANO Reviewed By: ADRIANO M. DORDY Recommended By: GILBERTO S. REYES (See cover sheet for Signature/Approval)				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	N. T. S.	BRIDGE NO. 1 & 2 SUMMARY OF QUANTITIES (INITIAL STAGE)	BG-04
	SUBMITTED	10/16/02	<i>[Signature]</i>	OFFICE OF THE SECRETARY Approved By: SIMEON A. DATUMANONG (See cover sheet for Signature/Approval)							

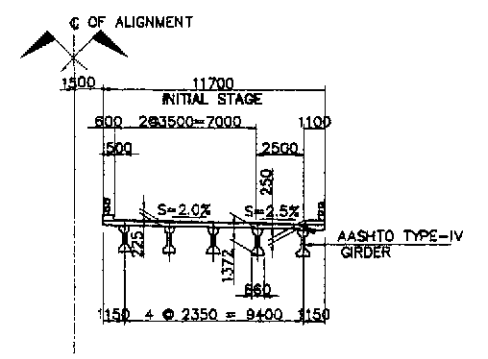


1 GENERAL ELEVATION
SCALE 1:200

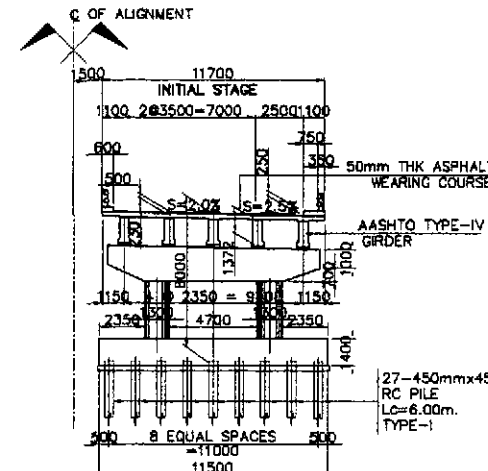


2 GENERAL PLAN
SCALE 1:200

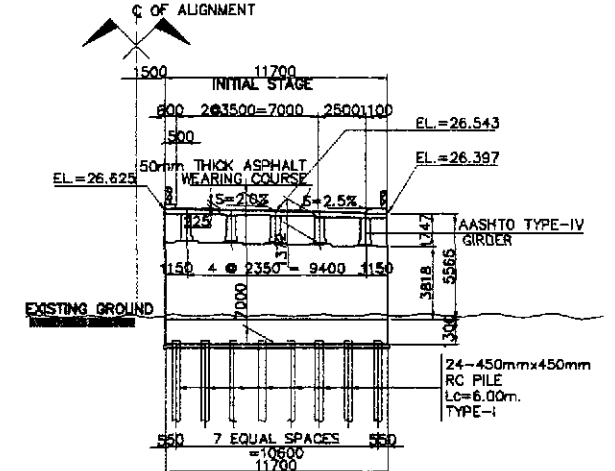
A CABANATUAN BRIDGE NO.1 (STA. 102+925.552)
SCALE AS SHOWN



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P1
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

NOTE :
PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 AND PIER P1 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.

HYDRAULIC DESIGN DATA	
VELOCITY @ 50 YEARS, V_{50}	1.578 m/sec
DISCHARGE @ 50 YEARS, Q_{50}	92.700 cu.m/sec
CATCHMENT AREA, CA	26.130 sq. km

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

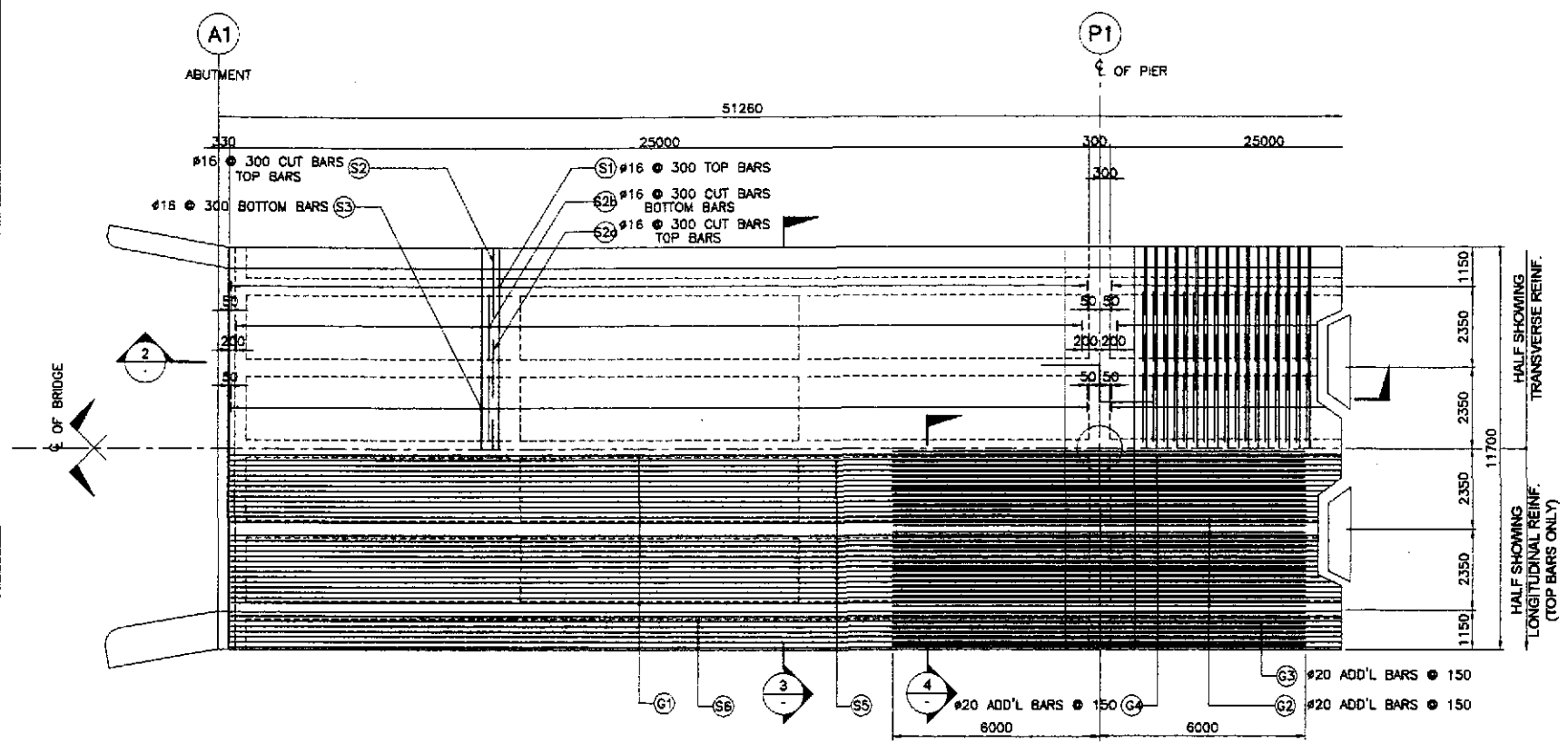
DESIGNED	10/15/02	SIGNATURE	<i>[Signature]</i>
CHECKED	10/15/02	SIGNATURE	<i>[Signature]</i>
SUBMITTED	10/14/02	SIGNATURE	<i>[Signature]</i>

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	
Submitted By: DANILO C. TRAJANO Project Director	Reviewed By: ADRIANO M. DOROY Chief, Bridges Division
Recommended By: GILBERTO S. REYES Director IV (GC)	Approved By: MANUEL M. BORDAN Undersecretary
Approved By: SIMEON A. DATUMANONG Secretary	

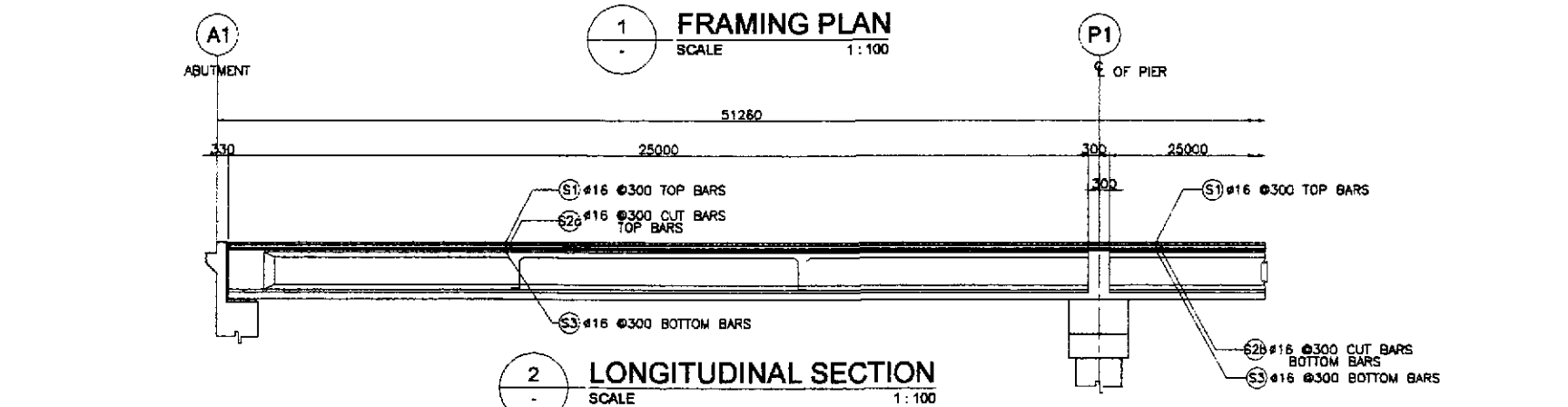
PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Florida, Cabanatuan and San Jose Bypasses)	SCALE : 1:200 FULL SIZE A1	SHEET CONTENTS : BRIDGE NO. 1 GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)	SHEET NO. : B1-01
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JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

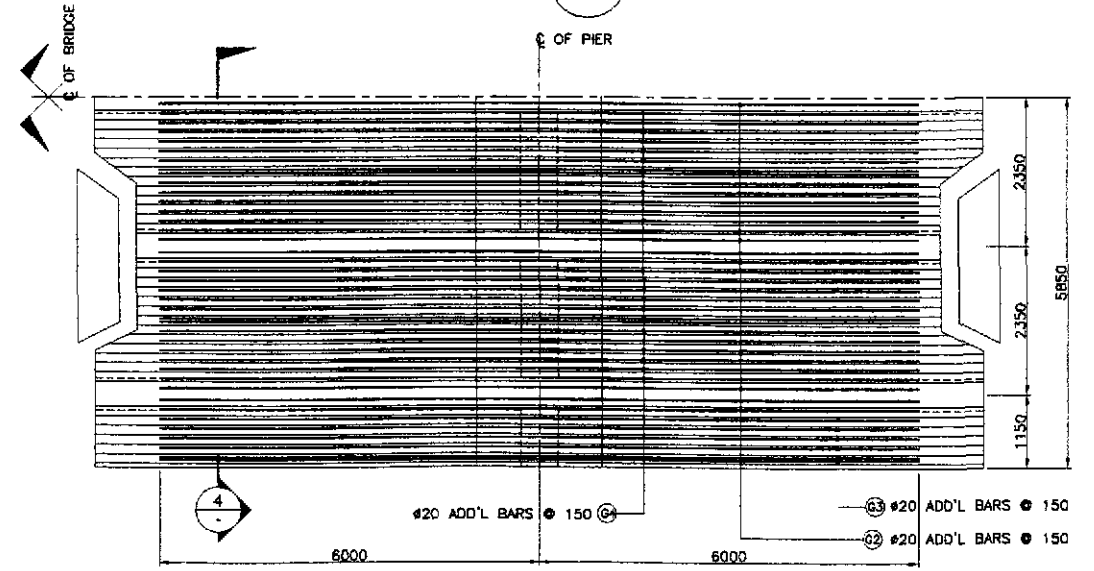
KATAHIRA & ENGINEERS
YEO YACHYO ENGINEERING CO., LTD.



1 FRAMING PLAN
SCALE 1:100

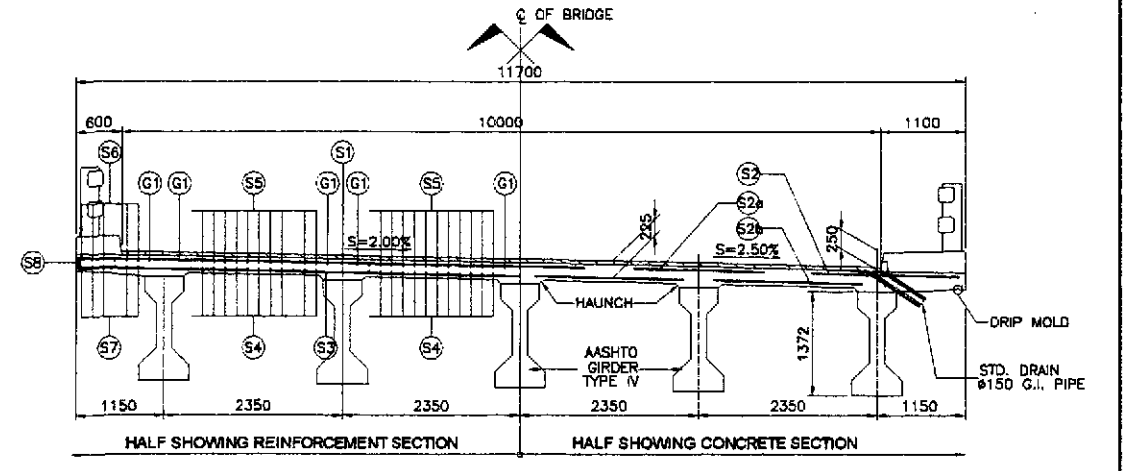


2 LONGITUDINAL SECTION
SCALE 1:100

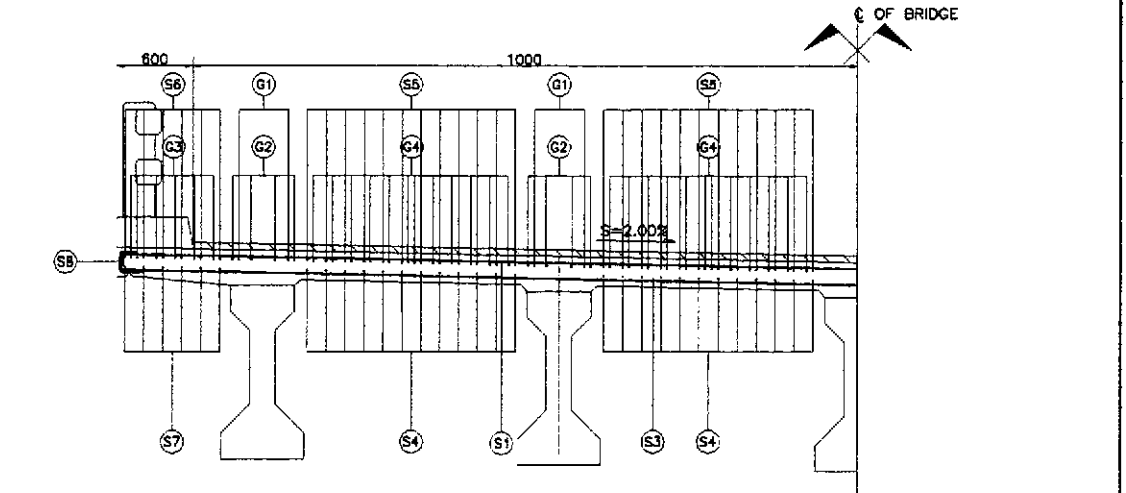


5 REINF. OVER PIER
SCALE 1:80

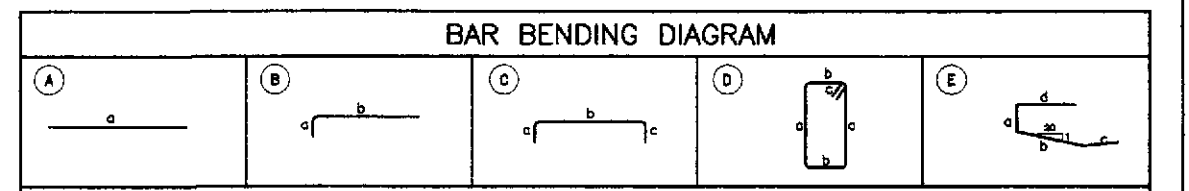
ESTIMATED QUANTITIES OF SUPERSTRUCTURE			
ITEM NO.	DESCRIPTION	UNIT	TOTAL
404(1)a	REINFORCING STEEL GRADE 40	kgs.	36932
	DECK SLAB	21495	
	DIAPHRAGM	684	
	GIRDER	8760	
	SIDEWALK, RAILING, & POST	4677	
	APPROACH SLAB	1316	
404(1)b	REINFORCING STEEL GRADE 60	kgs.	21257
	DECK SLAB	2148	
	DIAPHRAGM	2266	
	GIRDER	1170	
	SIDEWALK, RAILING, & POST	885	
	APPROACH SLAB	4188	
405(1)	STRUCTURAL CONCRETE	cu. m.	364.55
	DECK SLAB	140.18	
	DIAPHRAGM	24.53	
	GIRDER	131.82	
	SIDEWALK, RAILING, & POST	32.88	
	APPROACH SLAB	35.143	



3 TYPICAL CROSS-SECTION
SCALE 1:50



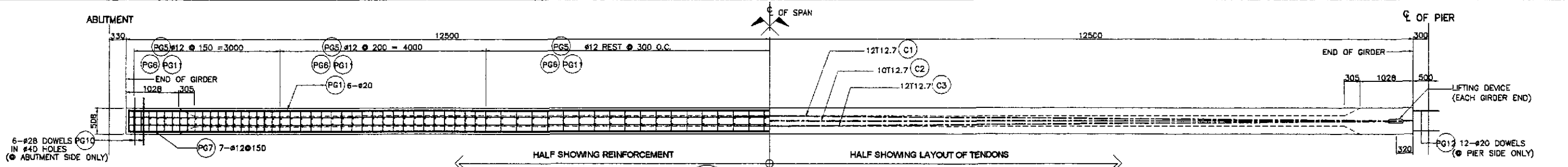
4 SECTION @ SUPPORT
SCALE 1:30



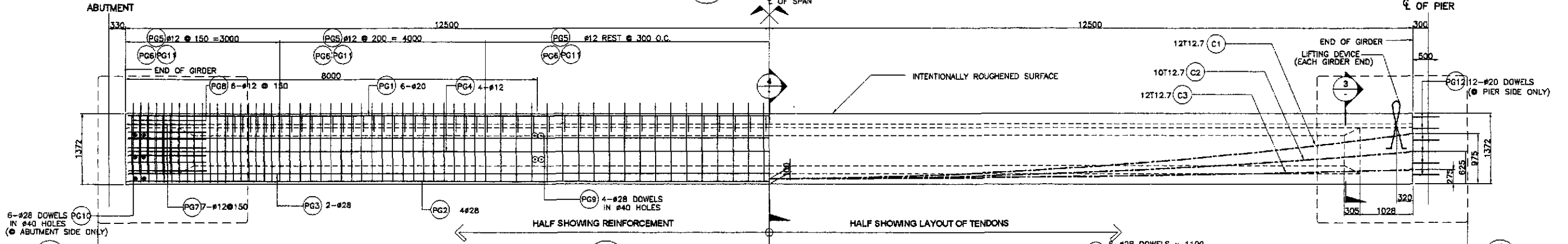
SCHEDULE OF REINFORCEMENT															
LOCATION	CONCRETE VOLUME (m³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) CUT TO CUT				LENGTH EACH BAR (mm)	TOTAL LENGTH (m)	UNIT WT. (kg/m)	WEIGHT IN (kg)	REBAR RATIO (kg/m³)
							a	b	c	d					
DECK SLAB	140.18	G1	16	10	AS SHOWN	(A)	50500	-	-	-	50500	505.00	1.579	798	168.58
		G2	20	20	150	(A)	12000	-	-	-	12000	240.00	2.466	592	
		G3	20	6	150	(A)	12000	-	-	-	12000	72.00	2.466	178	
		G3a	20	6	150	(A)	9000	-	-	-	9000	54.00	2.466	134	
		G4	20	24	150	(A)	12000	-	-	-	12000	288.00	2.466	711	
		G4a	20	24	150	(A)	9000	-	-	-	9000	216.00	2.466	533	
		S1	16	168	300	(C)	145	11600	145	-	11890	1997.52	1.579	3155	
		S2	16	332	300	(B)	145	2000	-	-	2145	712.14	1.579	1125	
		S2a	16	498	300	(A)	1700	-	-	-	1700	846.60	1.579	1337	
		S2b	16	664	300	(A)	1950	-	-	-	1950	1294.80	1.579	2045	
		S3	16	168	300	(A)	11600	-	-	-	11600	1948.80	1.579	3078	
		S4	16	48	150	(A)	50500	-	-	-	50500	2424.00	1.579	3828	
		S5	16	48	150	(A)	50500	-	-	-	50500	2424.00	1.579	3828	
		S6	16	12	AS SHOWN	(A)	50500	-	-	-	50500	606.00	1.579	957	
		S7	16	12	AS SHOWN	(A)	50500	-	-	-	50500	606.00	1.579	957	
		S8	12	224	450	(E)	145	900	600	300	1945	435.68	0.888	387	
TOTAL	140.18														

GRADE 40 TOTAL = 21,495 kgs.
GRADE 60 TOTAL = 2,148 kgs.

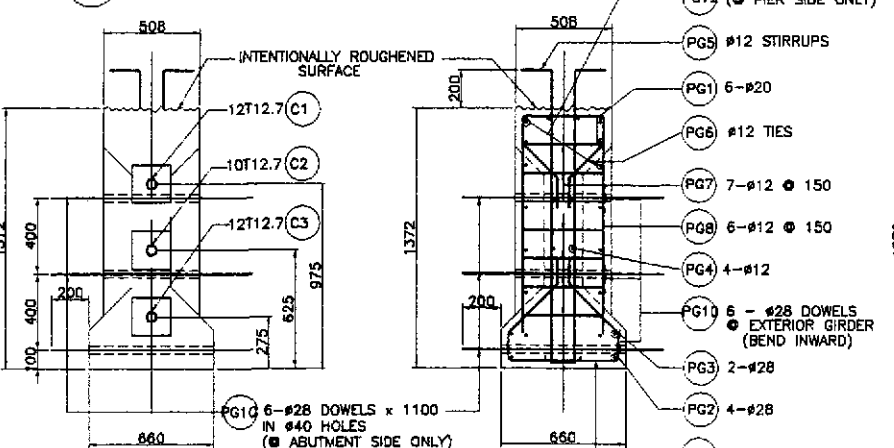
	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/27/02	SALLAN	BUREAU OF DESIGN			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Paridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 1 DECK FRAMING PLAN AND SECTIONS (INITIAL STAGE)	B1-02
	CHECKED	10/15/02	SALLAN	Submitted By:	Reviewed By:	Recommended By:	FULL SIZE A1			
SUBMITTED	10/14/02	SALLAN	DANILO C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridges Division	GILBERTO S. REYES Director IV (GC)	CABANATUAN BYPASS - CONTRACT PACKAGE I				



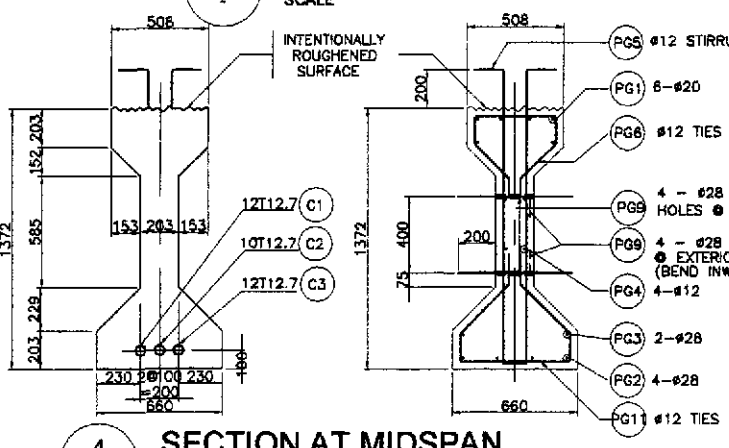
1 PLAN
SCALE 1:40



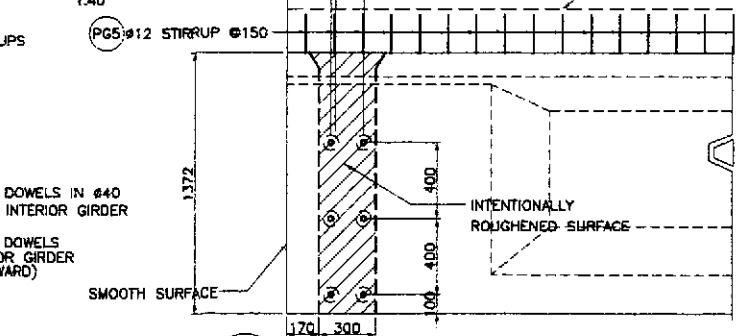
2 PRESTRESSED GIRDER ELEVATION
SCALE 1:40



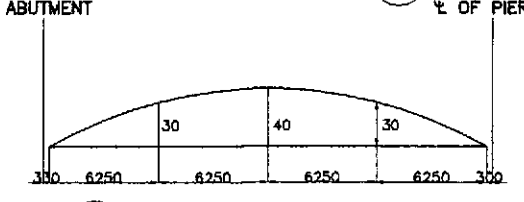
3 SECTION AT END
SCALE 1:20



4 SECTION AT MIDSPAN
SCALE 1:20

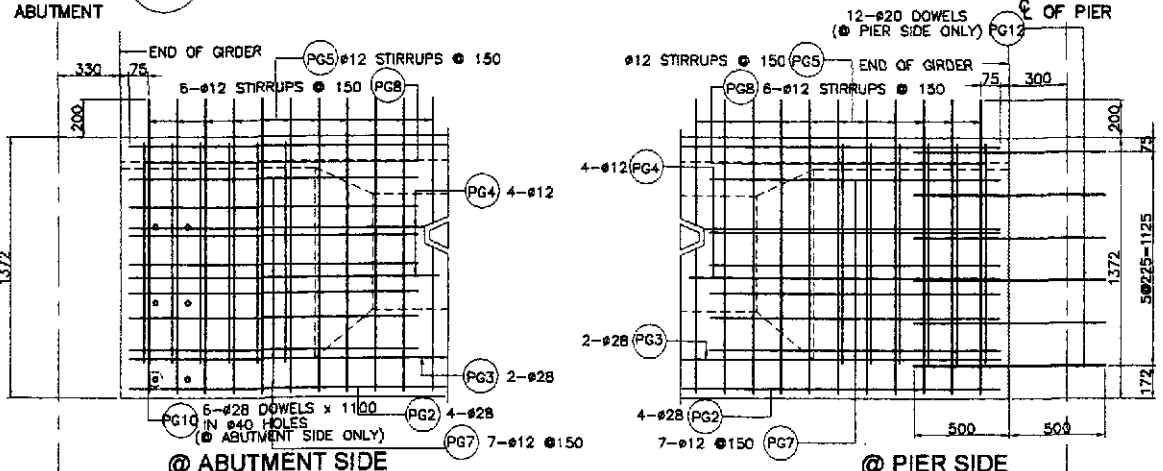


5 DOWELS @ END BLOCK
SCALE 1:20

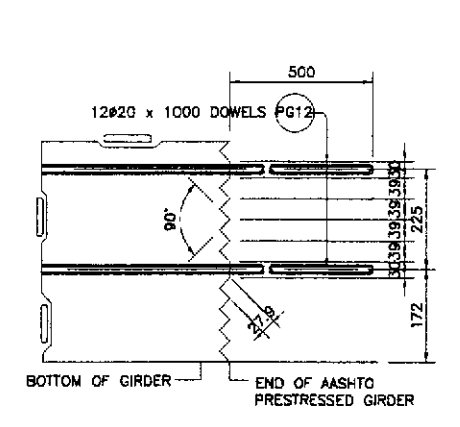


6 CAMBER DIAGRAM
NOT TO SCALE

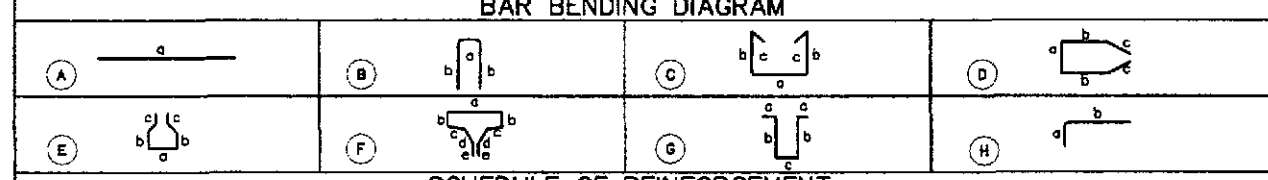
NOTES:
1.) SEE GENERAL NOTES, -2, FOR GIRDER DESIGN GUIDE.
2.) JACKING FORCE PER GIRDER, $P_j = 4681 \text{ KN}$.
3.) JACKING WILL BE DONE AT BOTH ENDS.
4.) FINAL PRESTRESSING FORCE @ MIDSPAN, $F_{ier} = 4,186 \text{ KN}$.



7 END BLOCK REINF. DETAIL
SCALE 1:20



8 TOOTH DETAIL
SCALE N.T.S.

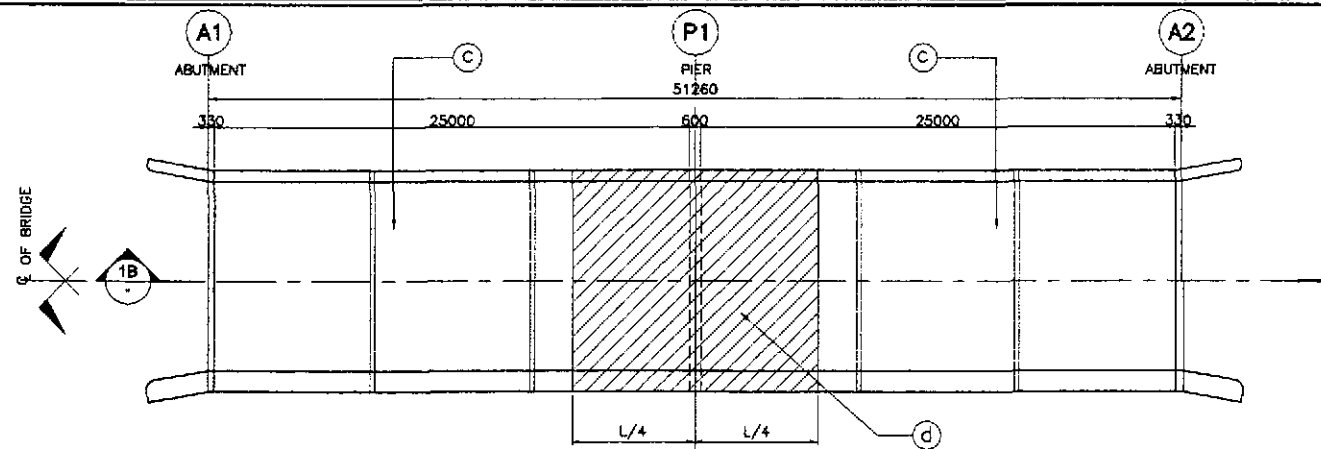


BAR BENDING DIAGRAM

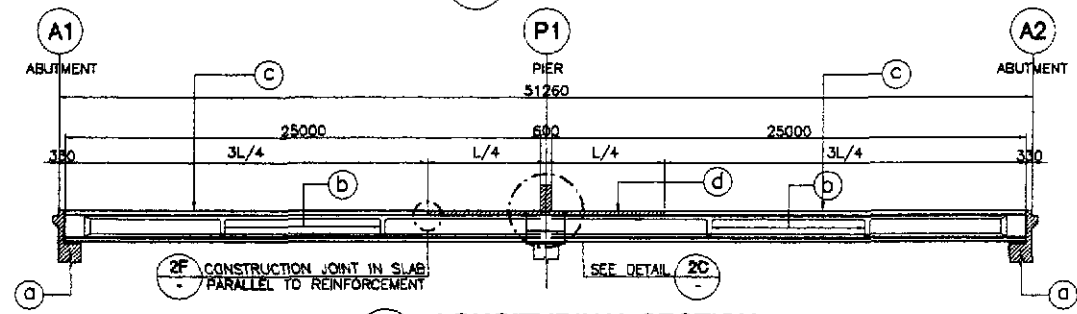
STRUCTURE COMPONENT	BAR MARK	BAR SIZE (mm)	QTY.	SPACING	BAR SHAPE	DIMENSION (mm)				LENGTH PER BAR (mm)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	TOTAL WEIGHT (kg)	CONC. VOLUME (cu.m)	REBAR VOLUME (cu.m)	REMARKS
						a	b	c	d							
GIRDER	PG1	20	6	AS SHOWN	(A)	24920	-	-	-	-	24920	149.52	2.466	369		QUANTITIES ARE FOR ONE (1) GIRDER ONLY
	PG2	28	4	AS SHOWN	(A)	24920	-	-	-	-	24920	99.68	4.833	482		
	PG3	28	2	AS SHOWN	(A)	24920	-	-	-	-	24920	49.84	4.833	241		
	PG4	12	4	AS SHOWN	(A)	24920	-	-	-	-	24920	99.68	0.888	88		
	PG5	12	116	150	(G)	100	1540	103	-	-	3383	392.43	0.888	349		
	PG6	12	116	150	(E)	430	160	150	260	-	1570	182.12	0.888	162		
	PG7	12	14	150	(D)	430	1000	550	-	-	3530	49.42	0.888	44		
	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	116	150	(E)	580	160	150	380	-	1920	222.72	0.888	198		
	PG12	20	12	AS SHOWN	(A)	1000	-	-	-	-	1000	12.00	2.466	30		

GRADE 40 TOTAL = 876 kgs.
GRADE 60 TOTAL = 1,177 kgs.

	DATE: 10/10/2010 DESIGNED: [Signature] CHECKED: [Signature] SUBMITTED: 10/10/2010	SIGNATURE: [Signature] E.M. SALLAN PROJECT LEADER	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 (Pardie, Cabanatuan and San Jose Bypasses) CABANATUAN BYPASS - CONTRACT PACKAGE I	SCALE: AS SHOWN FULL SIZE A1	SHEET CONTENTS: BRIDGE NO. 1 AASHTO TYPE-IV GIRDER (INITIAL STAGE)	SHEET NO.: B1-03
	BUREAU OF DESIGN OFFICE OF THE SECRETARY Submitted By: DANLO C. TRILANO (Project Director) Reviewed By: ADRIANO M. DOROY (Chief, Bridges Division) Recommended By: GILBERTO S. REYES (Director IV (C)) Approved By: MANUEL M. BONGAN (Undersecretary) and SIMEON A. DATUMANONG (Secretary)			PROJECT NO.: BRIDGE NO. 1 SHEET NO.: B1-03			
	JICA JAPAN INTERNATIONAL COOPERATION AGENCY			PROJECT NO.: BRIDGE NO. 1 SHEET NO.: B1-03			
	KATAHIRA & ENGINEERS YEO YACHYO ENGINEERING CO., LTD.			PROJECT NO.: BRIDGE NO. 1 SHEET NO.: B1-03			

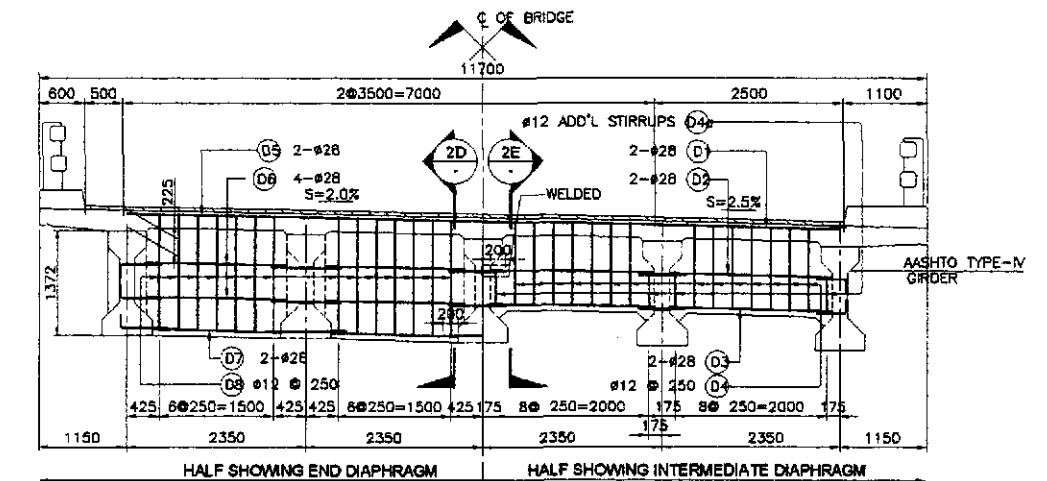


1A PLAN
SCALE 1:200

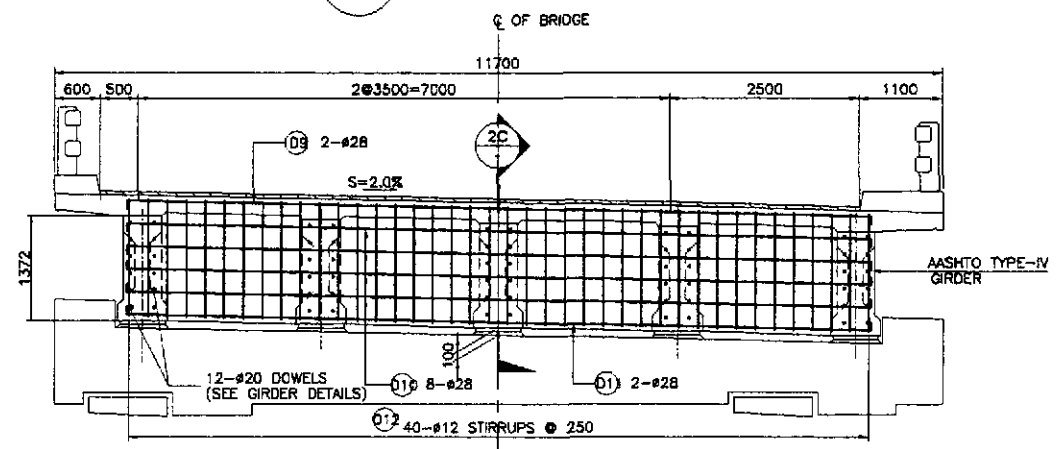


1B LONGITUDINAL SECTION
SCALE 1:200

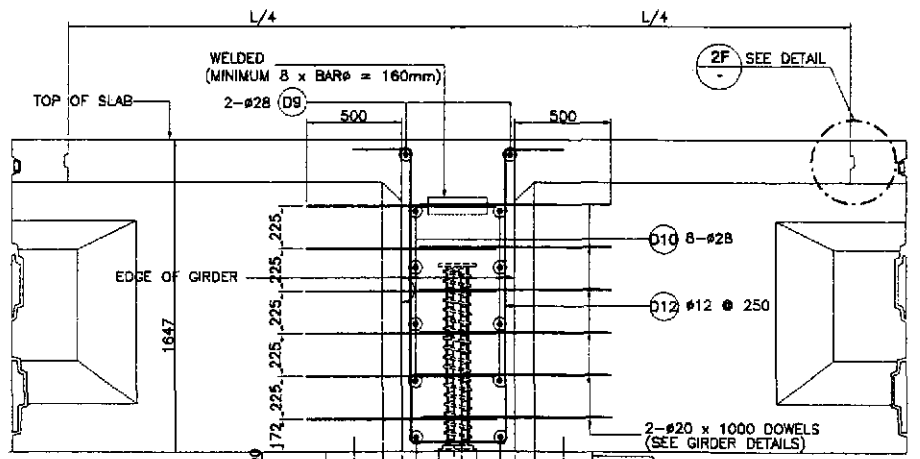
1 CONC. POURING SEQUENCE
SCALE 1:200



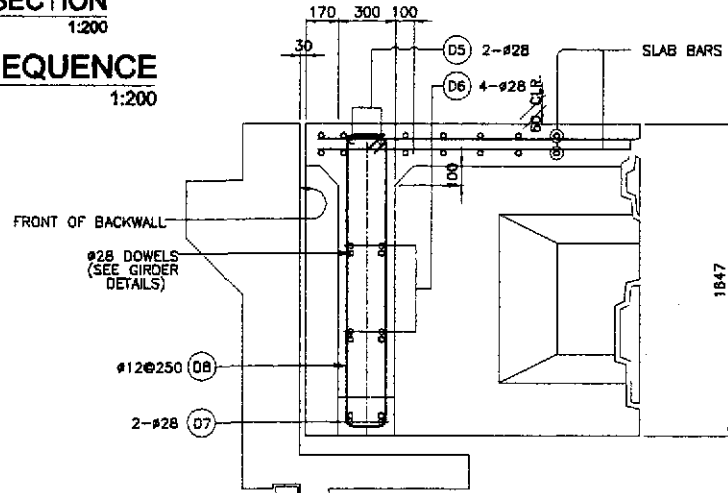
2A ELEVATION
SCALE 1:50



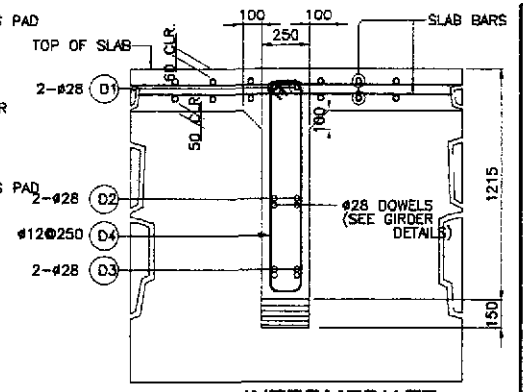
2B ELEVATION SHOWING DIAPHRAGM REINFORCEMENT @ PIER
SCALE 1:50



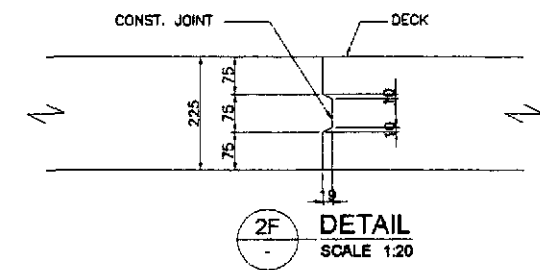
2C DIAPHRAGM @ PIER
SCALE 1:20



2D END DIAPHRAGM @ ABUTMENT
SCALE 1:20

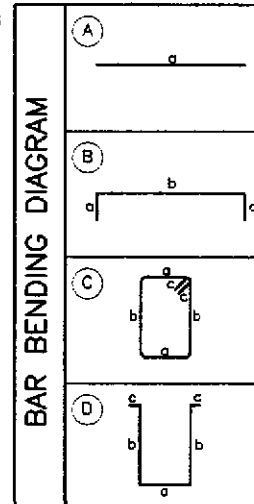


2E INTERMEDIATE DIAPHRAGM
SCALE 1:20



2F DETAIL
SCALE 1:20

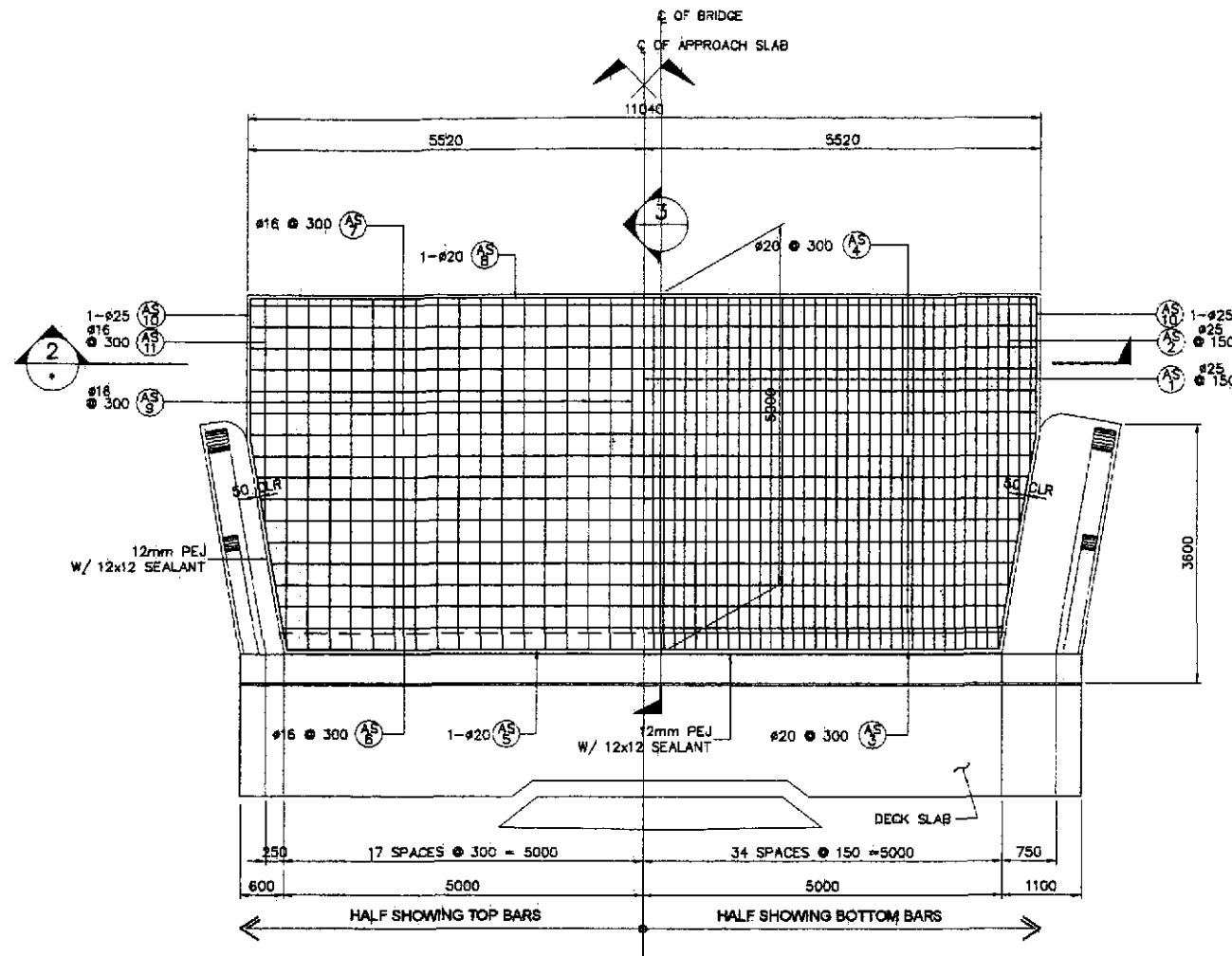
- NOTES:**
1. CONCRETE AT (A) AREAS SHALL BE PLACED AT LEAST 21 DAYS AHEAD OF CONCRETE AT (B) AREAS.
 2. CONCRETE AT (B) AREAS SHALL BE PLACED AT LEAST ONE DAY AHEAD OF CONCRETE AT (C) AREAS. POUR (C) AREAS LAST.
 3. REINFORCEMENT SHALL BE CONTINUOUS AT CONSTRUCTION JOINTS.
 4. SEE GIRDER DETAILS FOR SPACING OF #28 DOWELS.



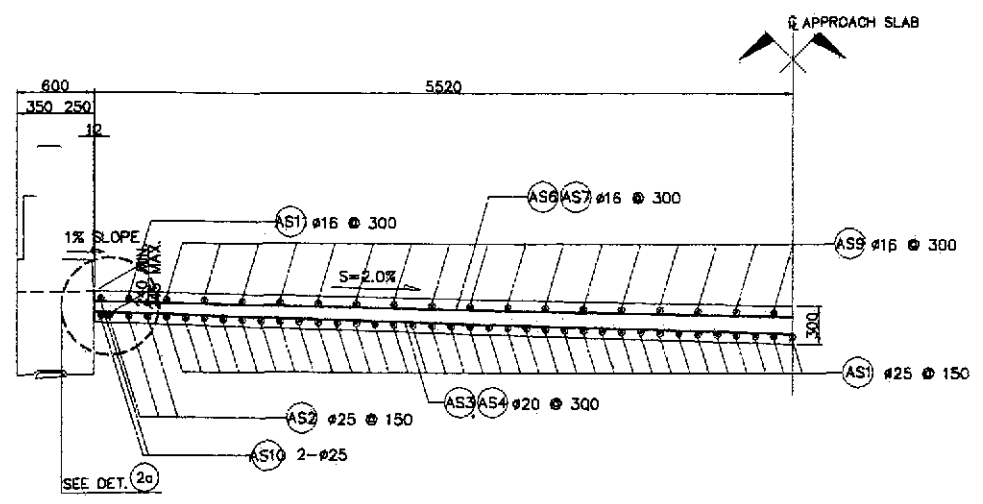
STRUCTURE COMPONENT	LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT				LENGTH PER BAR (mm)	TOTAL LENGTH (m)	UNIT WT. (kg/m)	TOTAL WEIGHT IN (kg)	REBAR RATIO (kg/m ³)
								a	b	c	d					
DIAPHRAGM	INTERMEDIATE DIAPHRAGM	9.79	D1	28	8	AS SHOWN	A	9400				9400	75.20	4.833	364	140.24
			D2	28	32	AS SHOWN	A	2145				2145	68.64	4.833	332	
			D3	28	32	AS SHOWN	A	2145				2145	68.64	4.833	332	
			D4	12	112	250	C	150	1200	150	3000	336.00	0.888	299		
DIAPHRAGM	END DIAPHRAGM	6.29	D5	28	4	AS SHOWN	A	9400				9400	37.60	4.833	182	127.10
			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	C	200	1550	150	3800	212.80	0.888	189		
DIAPHRAGM	AT PIER	8.45	D9	28	2	AS SHOWN	B	500	9810	500	10810	21.62	4.833	105	92.03	
			D10	28	8	AS SHOWN	B	500	9810	500	10810	88.48	4.833	418		
			D11	28	2	AS SHOWN	B	500	9810	500	10810	21.62	4.833	105		
			D12	12	40	250	D	500	1550	300	4200	168.00	0.888	150		
TOTAL		24.53														

GRADE 60 TOTAL = 2266 kgs.
GRADE 40 TOTAL = 684 kgs.

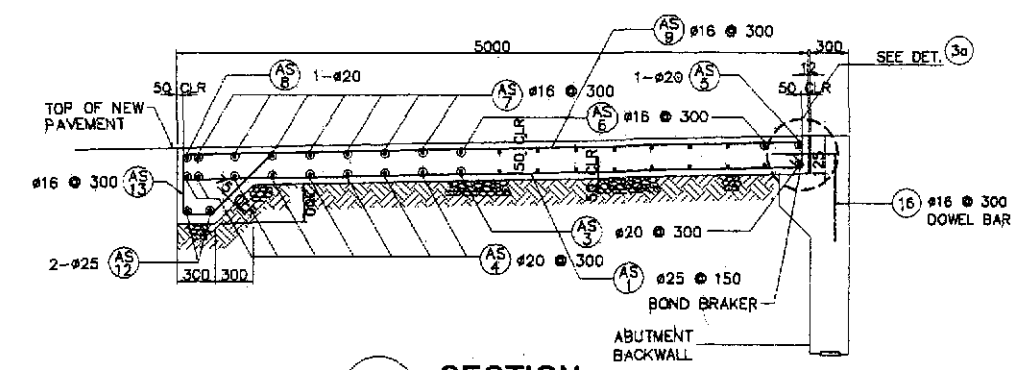
				<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>				<p>PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)</p>		<p>SCALE : AS SHOWN</p>		<p>SHEET CONTENTS : BRIDGE NO. 1 CONCRETE POURING SEQUENCE AND DIAPHRAGM DETAILS (INITIAL STAGE)</p>		<p>SHEET NO. : B1-04</p>			
DESIGNED	9/21/02	SIGNATURE	[Signature]	PROJECT DIRECTOR	REVIEWED BY	ADRIANO M. DOROS	CHIEF, BRIDGES DIVISION	RECOMMENDED BY	GILBERTO S. REYES	DIRECTOR IV (OIC)	APPROVED BY	MANUEL M. BONDAN	UNDERSECRETARY	<p>CABANATUAN BYPASS - CONTRACT PACKAGE I</p>		<p>FULL SIZE A1</p>	



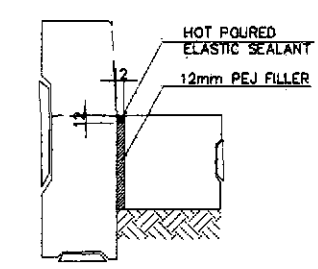
1 PLAN
SCALE 1:50



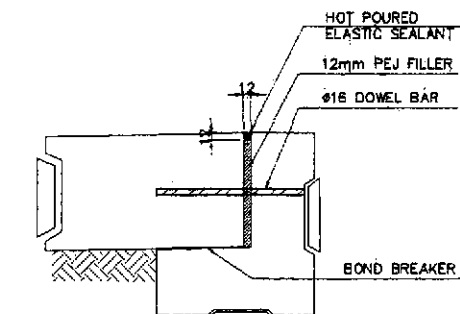
2 SECTION
SCALE 1:30



3 SECTION
SCALE 1:30



2a DETAIL
SCALE 1:10



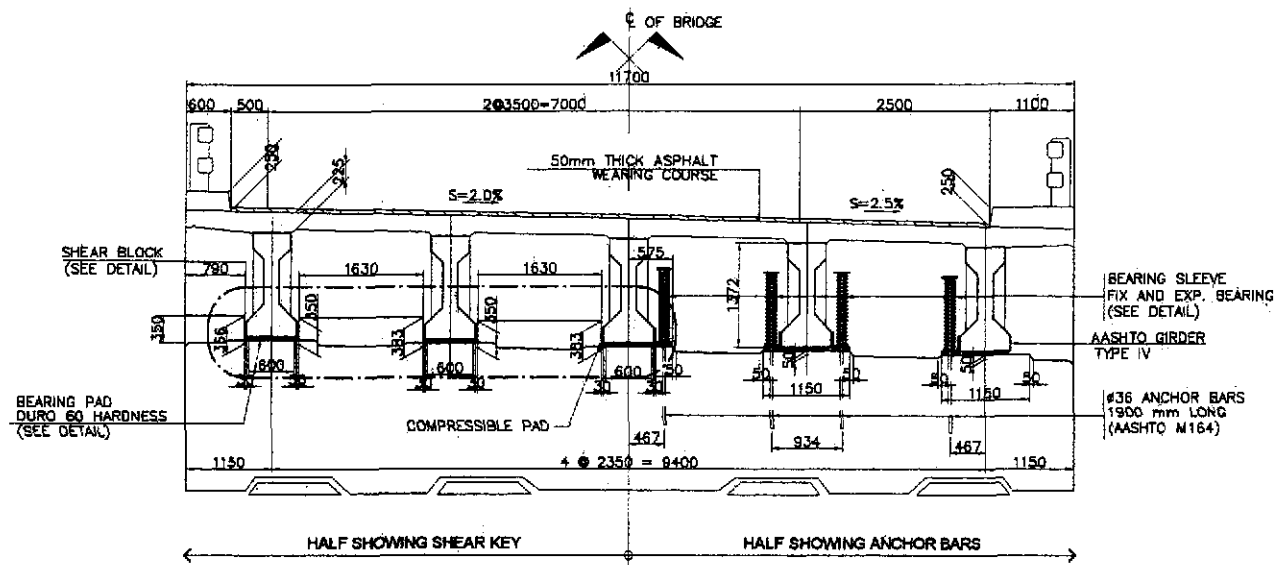
3a DETAIL
SCALE 1:10

BAR BENDING DIAGRAM																	
A		B		C		D											
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)	
APPROACH SLAB	17.57	AS1	25	68	150	(B)	4900	200	-	-	-	-	5100	346.80	3.854	1337	156.66
		AS2	25	6	150	(B)	3200	200	-	-	-	-	3400	20.40	3.854	79	
		AS3	20	10	300	(A)	9980	-	-	-	-	-	9980	99.80	2.466	247	
		AS4	20	8	300	(A)	10940	-	-	-	-	-	10940	87.52	2.466	216	
		AS5	20	1	AS SHOWN	(A)	9900	-	-	-	-	-	9900	9.90	2.466	25	
		AS6	16	9	300	(A)	10040	-	-	-	-	-	10040	90.36	1.579	143	
		AS7	16	7	300	(A)	10940	-	-	-	-	-	10940	76.58	1.579	121	
		AS8	20	1	AS SHOWN	(A)	10940	-	-	-	-	-	10940	10.94	2.466	27	
		AS9	16	34	300	(B)	4900	200	-	-	-	-	5100	173.40	1.579	274	
		AS10	25	4	AS SHOWN	(C)	2000	3000	-	-	-	-	5000	20.00	3.854	78	
		AS11	16	2	300	(B)	3100	200	-	-	-	-	3300	6.60	1.579	11	
		AS12	25	2	AS SHOWN	(A)	10940	-	-	-	-	-	10940	21.88	3.854	85	
		AS13	16	38	300	(D)	400	500	200	700	-	-	1800	68.40	1.579	108	
TOTAL	17.57											GRADE 40 TOTAL = 858 kgs.		GRADE 60 TOTAL = 2,094 kgs.			

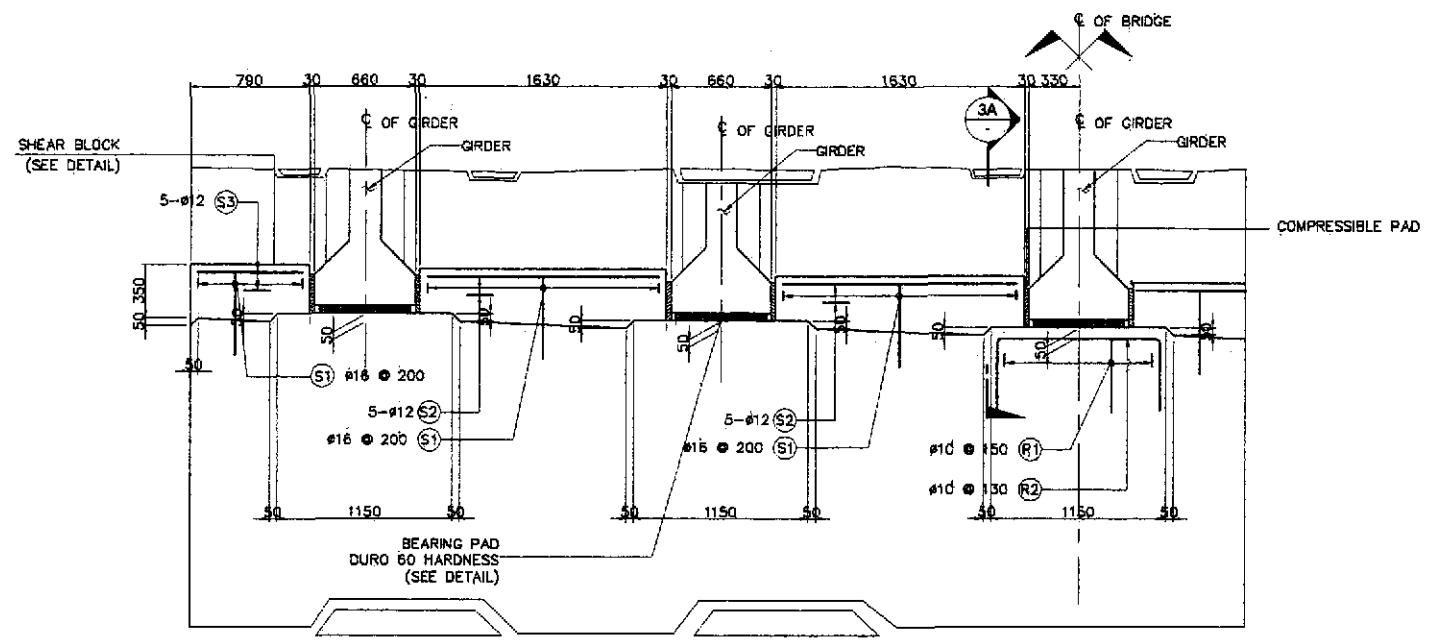
JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS
YEO YACHYO ENGINEERING CO., LTD.

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

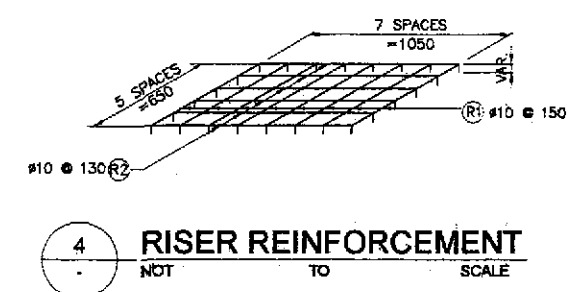
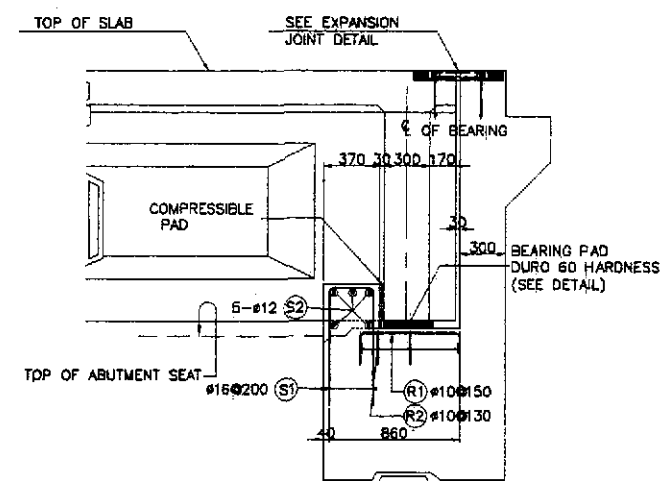
PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
SCALE: AS SHOWN
SHEET CONTENTS: BRIDGE NO. 1 & 2 APPROACH SLAB PLAN, SECTIONS AND DETAILS (INITIAL STAGE)
SHEET NO.: B1-07
CABANATUAN BYPASS - CONTRACT PACKAGE I
FULL SIZE A1



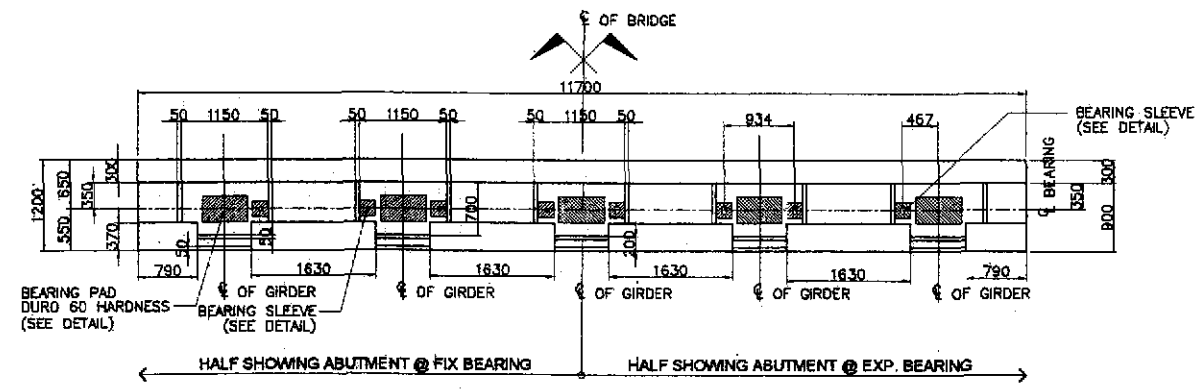
1 SECTION AT ABUTMENT SEAT
SCALE 1:50



3 SHEAR BLOCK DETAIL
SCALE 1:25



4 RISER REINFORCEMENT
NOT TO SCALE



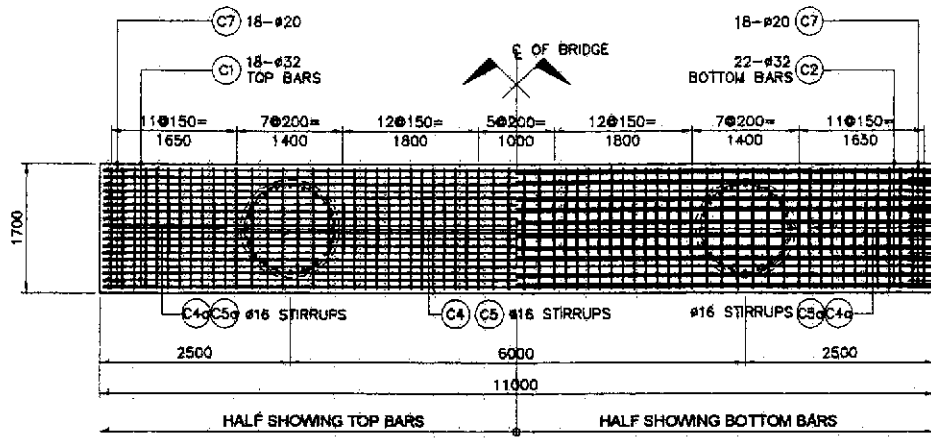
2 PLAN AT ABUTMENT SEAT
SCALE 1:50

3A SECTION
SCALE 1:25

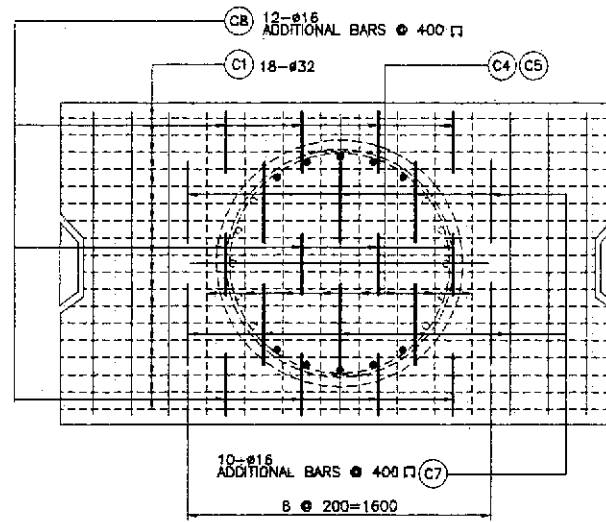
BAR BENDING DIAGRAM															
A							B								
a							b c								
SCHEDULE OF REINFORCEMENT															
LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSION (mm) OUT TO OUT				LENGTH EACH BAR (m)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/m ³)
							a	b	c	d	e				
SHEAR KEY & RISER	1.48	S1	16	46	200	(B)	560	290	560			1410	64.86	1.578	103
		S2	12	20	AS SHOWN	(A)	1550					1550	31.00	0.888	28
		S3	12	20	AS SHOWN	(A)	710					710	7.10	0.888	7
		R1	10	40	150	(B)	500	650	500			1650	66.00	0.616	41
		R2	10	30	130	(B)	500	1050	500			2050	61.50	0.616	38
TOTAL	1.48														GRADE 40 TOTAL = 217 kgs.

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

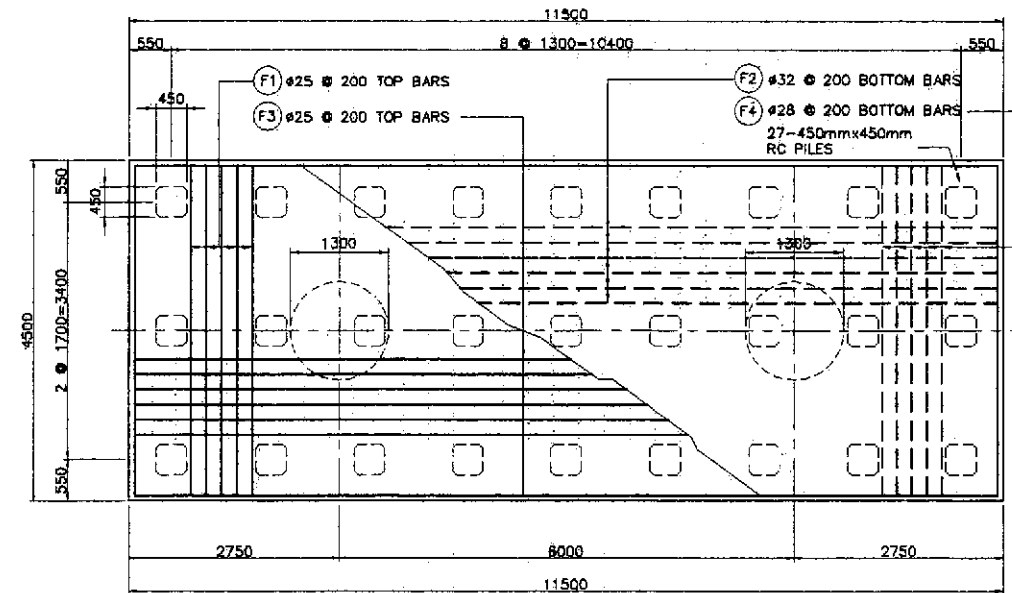
	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/27/02	[Signature]	BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 1 & 2 SHEAR KEY AND RISER DETAILS AT ABUTMENT (INITIAL STAGE)	B1-08
	CHECKED	10/15/02	[Signature]	OFFICE OF THE SECRETARY				FULL SIZE A1			
SUBMITTED	10/16/02	[Signature]	Submitted By:	Reviewed By:	Recommended By:	Approved By:					
			DANLO C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridges Division	GILBERTO S. REYES Director IV (OP)	MANUEL M. BONDAN Undersecretary	SNEON A. DATUMANONG Secretary				



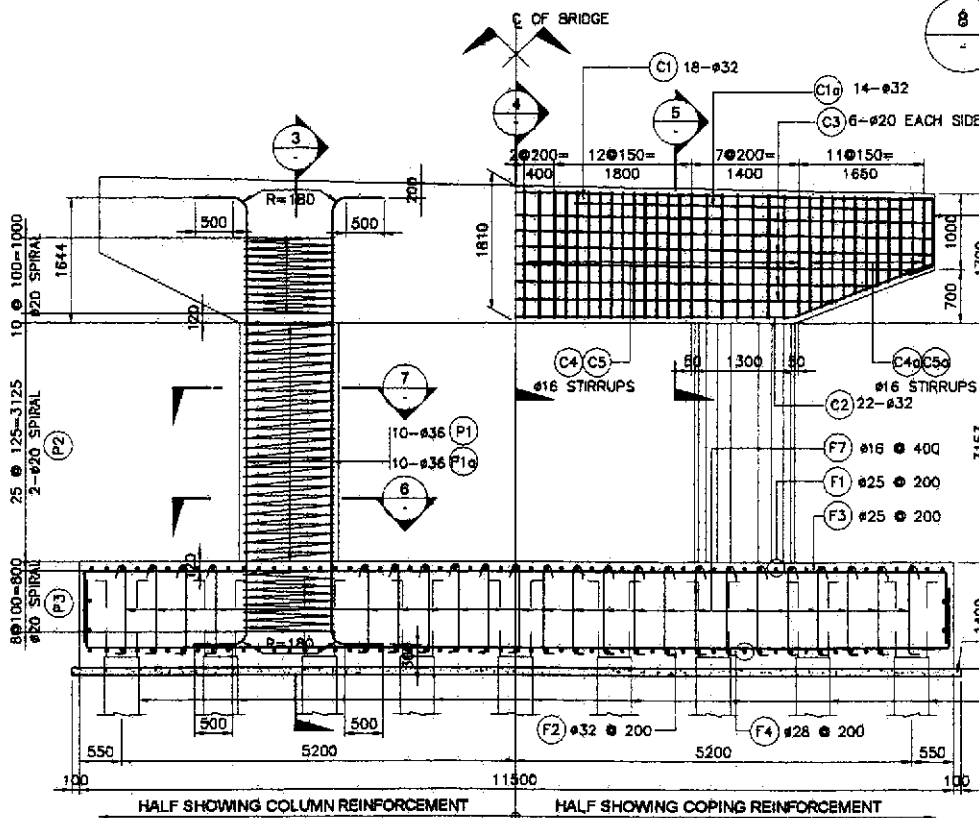
1 COPING PLAN
SCALE 1:50



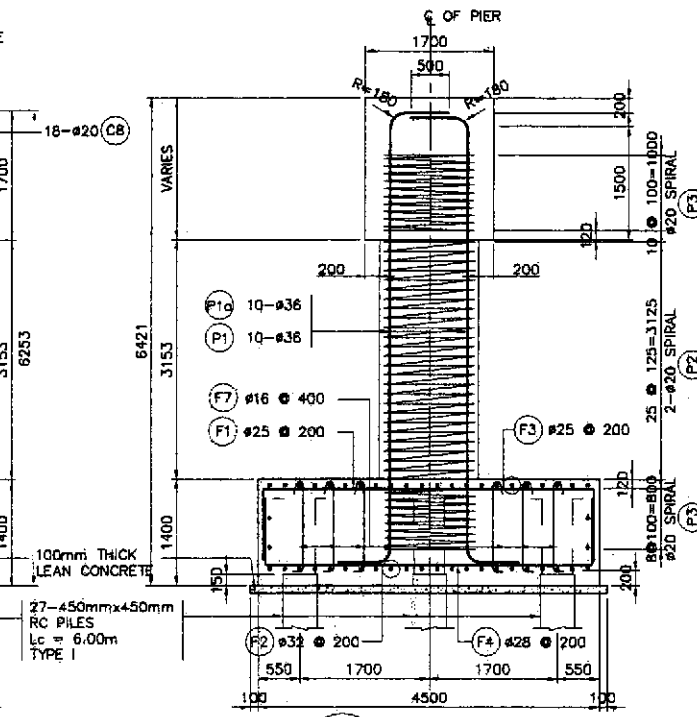
8 DETAIL OF ADDITIONAL REINFORCEMENT @ PIER
SCALE 1:20



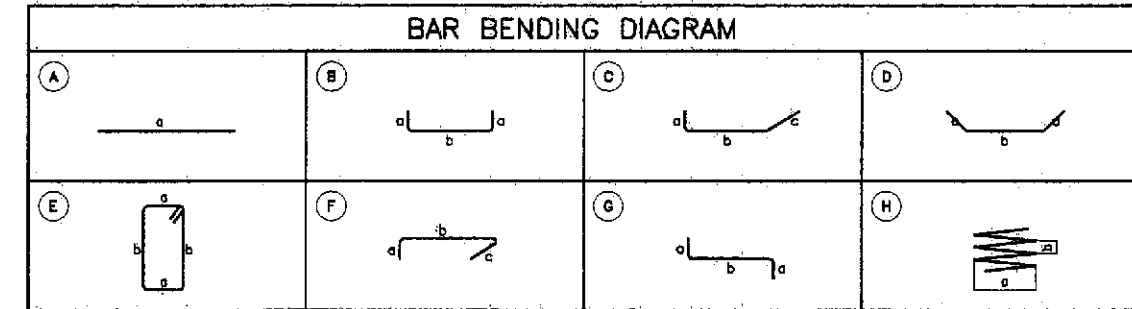
9 FOOTING PLAN
SCALE 1:50



2 ELEVATION
SCALE 1:50

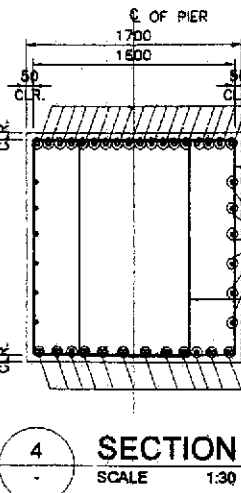


3 SECTION
SCALE 1:50

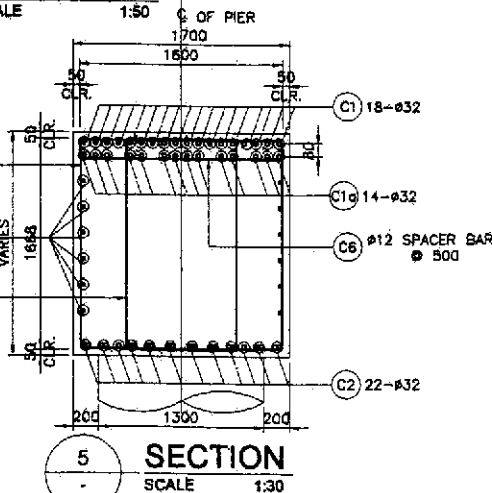


SCHEDULE OF REINFORCEMENT FOR ONE PIER

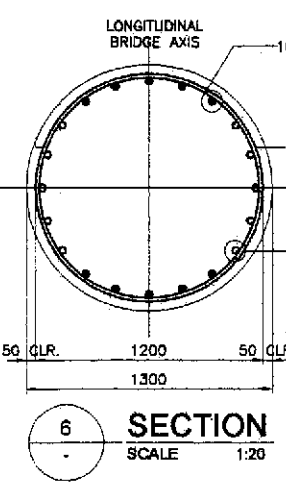
LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm) OUT TO OUT				LENGTH EACH BAR (mm)	TOTAL LENGTH (m)	UNIT WT. (kg/m)	TOTAL WEIGHT (kg)	REBAR RATIO (kg/m ³)
							a	b	c	d					
COPING	31.29	C1	32	18	AS SHOWN	(A)	10900	-	-	-	10900	196.20	6.313	1239	175.89
		C1a	32	28	AS SHOWN	(A)	4500	-	-	-	4500	126.00	6.313	796	
		C2	32	22	AS SHOWN	(D)	2000	7200	-	-	11200	246.40	6.313	1556	
		C3	20	6	AS SHOWN	(A)	10900	-	-	-	10900	65.40	2.466	162	
		C3a	20	6	AS SHOWN	(A)	9500	-	-	-	9500	57.00	2.466	141	
		C4	16	44	150	(E)	1600	1725	150	-	6950	305.80	1.579	483	
		C4a	16	104	150	(E)	1600	1425	150	-	6350	139.70	1.579	221	
		C5	16	44	150	(E)	900	1725	150	-	5550	244.20	1.579	386	
		C5a	16	22	150	(E)	900	1425	150	-	4950	108.90	1.579	172	
		C6	12	20	150	(B)	150	1600	-	-	1900	38.00	0.888	34	
COLUMN	8.37	C7	20	36	AS SHOWN	(C)	350	900	300	-	1600	57.60	2.466	143	415.60
		C8a	16	24	150	(B)	330	1700	-	-	2380	56.64	1.579	90	
		C8b	16	20	150	(B)	430	1700	-	-	2560	51.20	1.579	81	
		P1	36	20	AS SHOWN	(B)	600	5750	-	-	6950	139.00	7.991	1111	
		P1a	36	20	AS SHOWN	(B)	600	5750	-	-	6950	139.00	7.991	1111	
		P2	20	100	125	(H)	1200	125	-	-	3770	376.99	2.466	930	
		P3	20	36	100	(H)	1200	100	-	-	3770	135.72	2.466	335	
		F1	25	58	200	(B)	925	4350	925	-	6200	359.60	3.854	1386	
		F2	32	58	200	(B)	925	4350	925	-	6200	359.60	6.313	2271	
		FOOTING	72.45	F3	25	23	200	(B)	925	11350	925	-	13200	303.60	
F4	28			23	200	(B)	925	11350	925	-	13200	303.60	4.833	1468	
F5	16			4	AS SHOWN	(A)	11350	-	-	-	11350	45.40	1.579	72	
F6	16			4	AS SHOWN	(A)	4350	-	-	-	4350	17.40	1.579	28	
F7	16			280	400	(F)	200	1250	150	-	1630	448.00	1.579	708	
TOTAL	112.11											GRADE 40 TOTAL = 2,275 kgs.	GRADE 60 TOTAL = 13,820 kgs.		



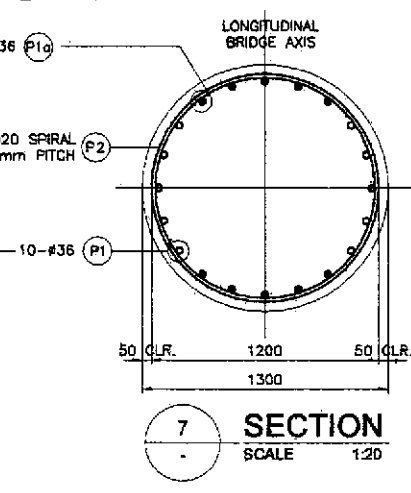
4 SECTION
SCALE 1:30



5 SECTION
SCALE 1:30

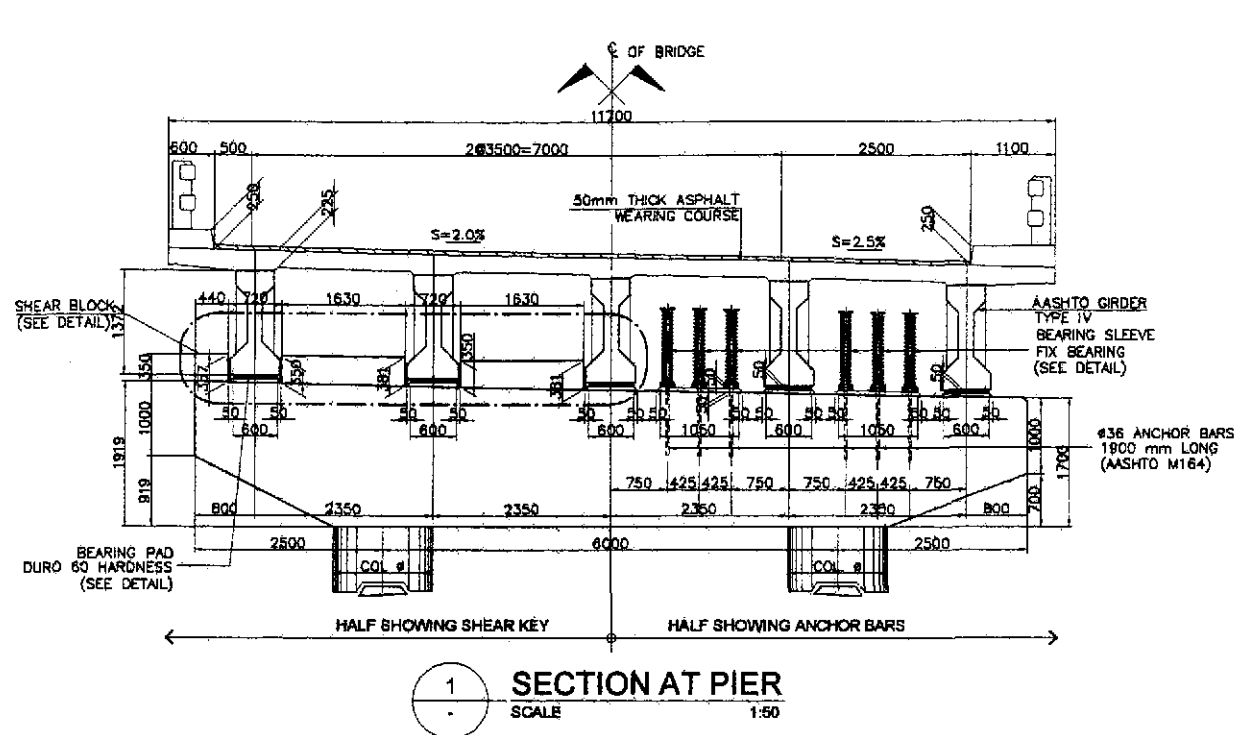


6 SECTION
SCALE 1:20

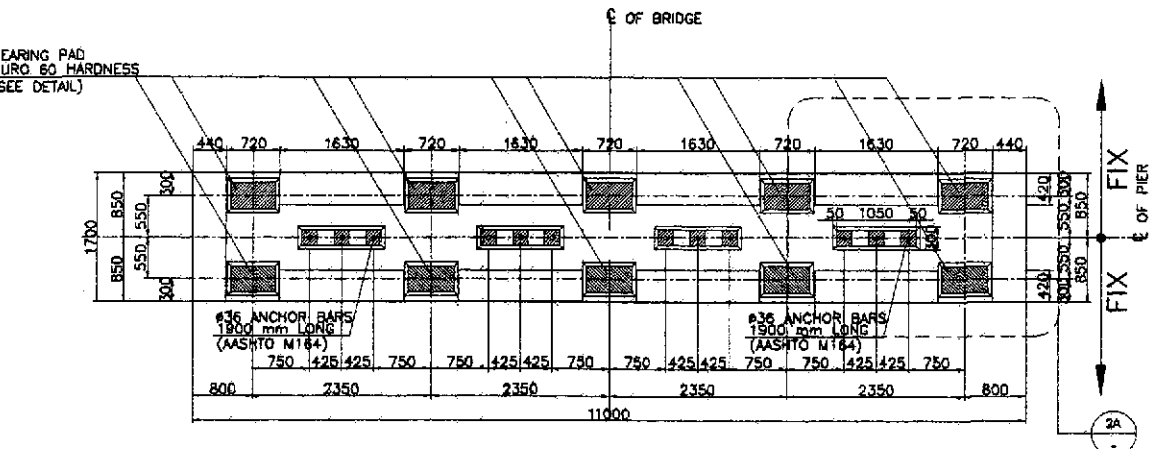


7 SECTION
SCALE 1:20

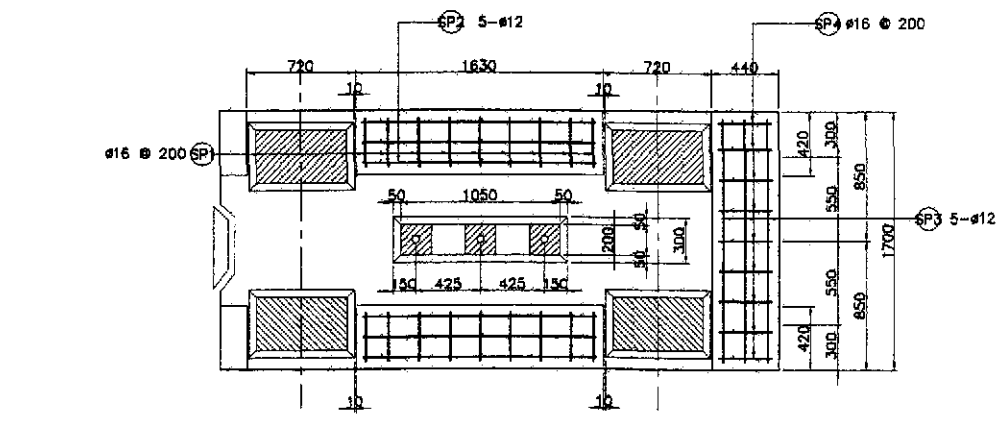
	DATE: 9/27/02	SIGNATURE: [Signature]	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE SECRETARY	PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	SCALE: AS SHOWN	SHEET CONTENTS: BRIDGE NO. 1 PIER P1 BAR ARRANGEMENT (INITIAL STAGE)	SHEET NO.: B1-09	
	DESIGNED: [Signature]	Submitted By: DANILLO C. TRAJANO, Project Director		Reviewed By: ADRIANO M. DOROY, Chief, Bridges Division	Recommended By: GILBERTO S. REYES, Director IV (PIC)	Approved By: MANUEL M. BONJON, Undersecretary	CABANATUAN BYPASS - CONTRACT PACKAGE I	FULL SIZE A1
	CHECKED: [Signature]	Submitted By: [Signature]		Reviewed By: [Signature]	Recommended By: [Signature]	Approved By: [Signature]		



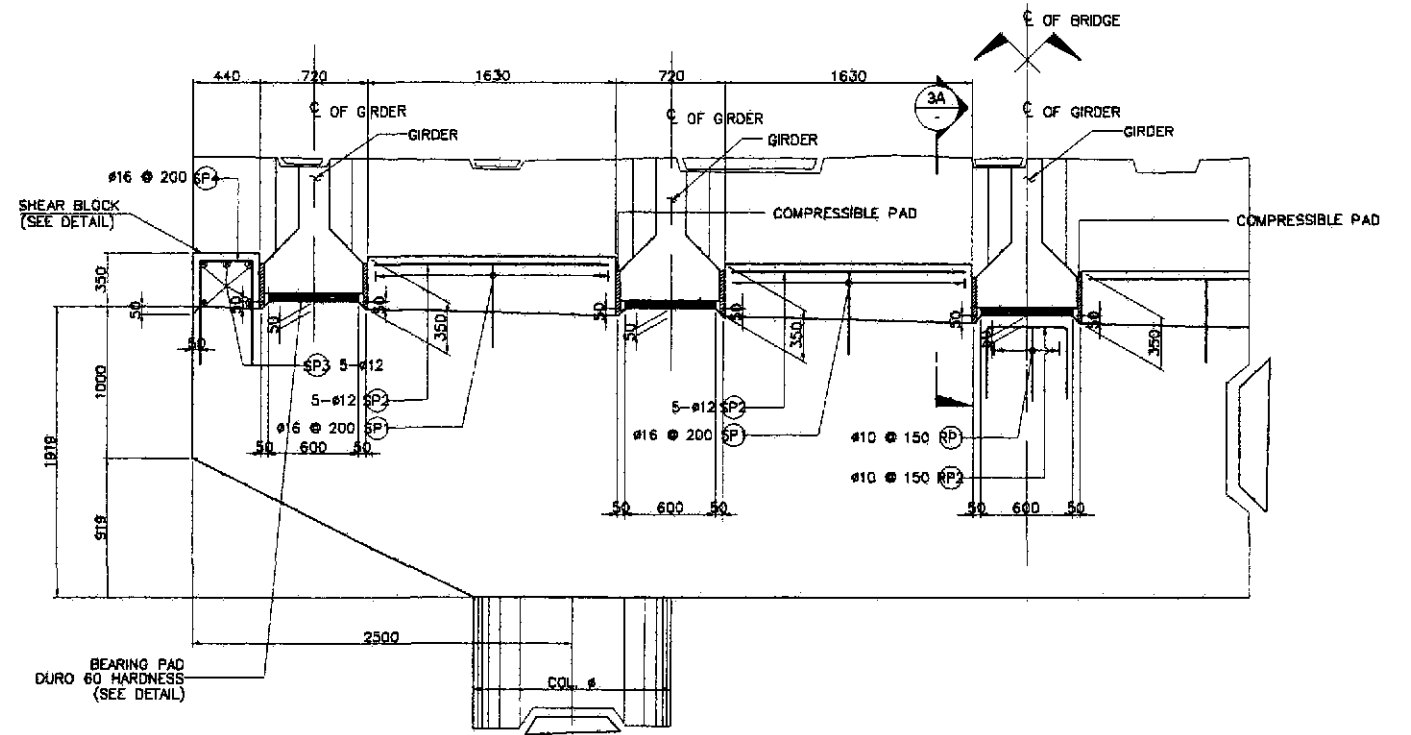
1 SECTION AT PIER
SCALE 1:50



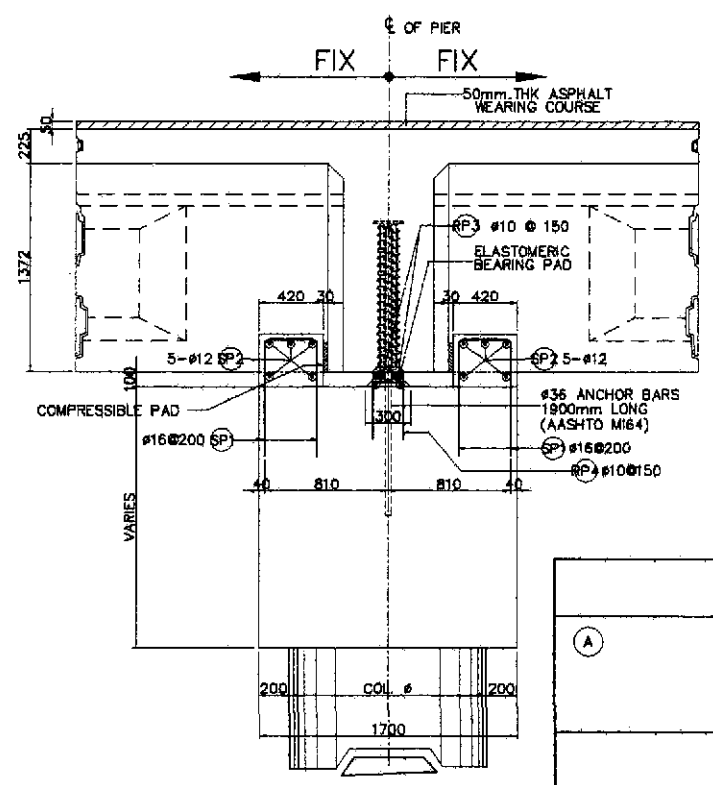
2 PLAN AT PIER
SCALE 1:50



2A DETAIL
SCALE 1:25

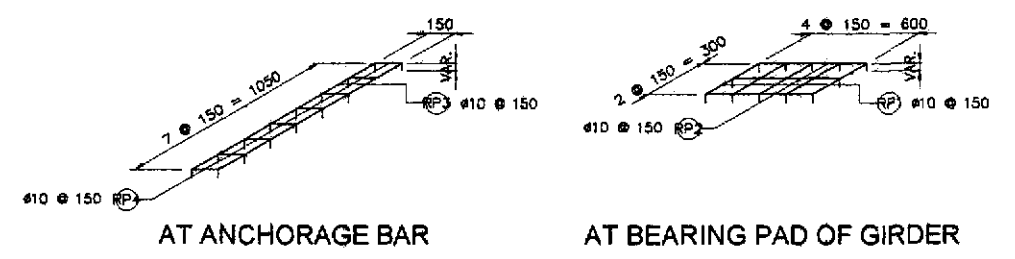


3 SHEAR BLOCK DETAIL AT PIER
SCALE 1:25



3A SECTION
SCALE 1:25

PIER SCHEDULE	
LOCATION	COL. # (mm)
BRIDGE 1	1300
BRIDGE 2	1400

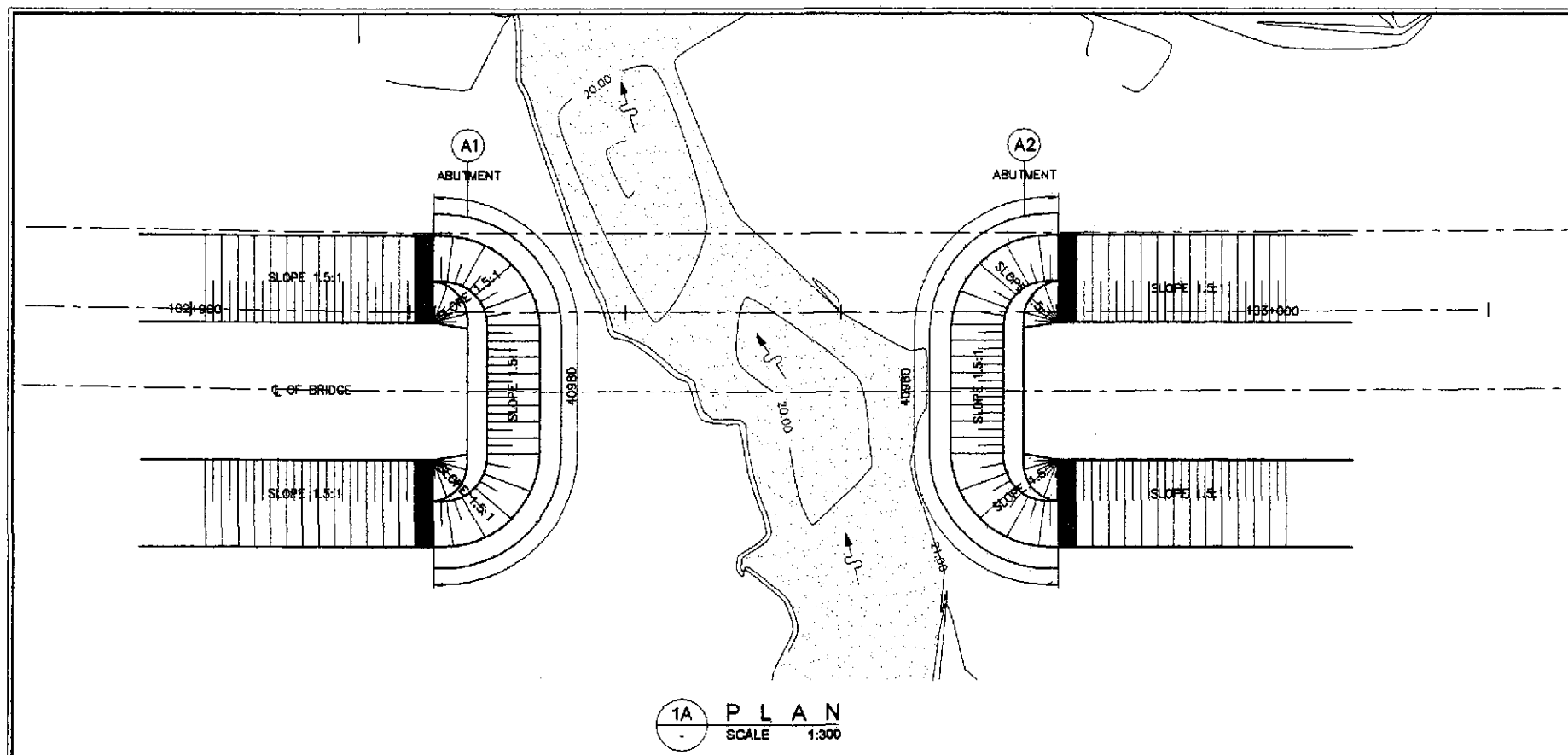


4 RISER REINFORCEMENT
NOT TO SCALE

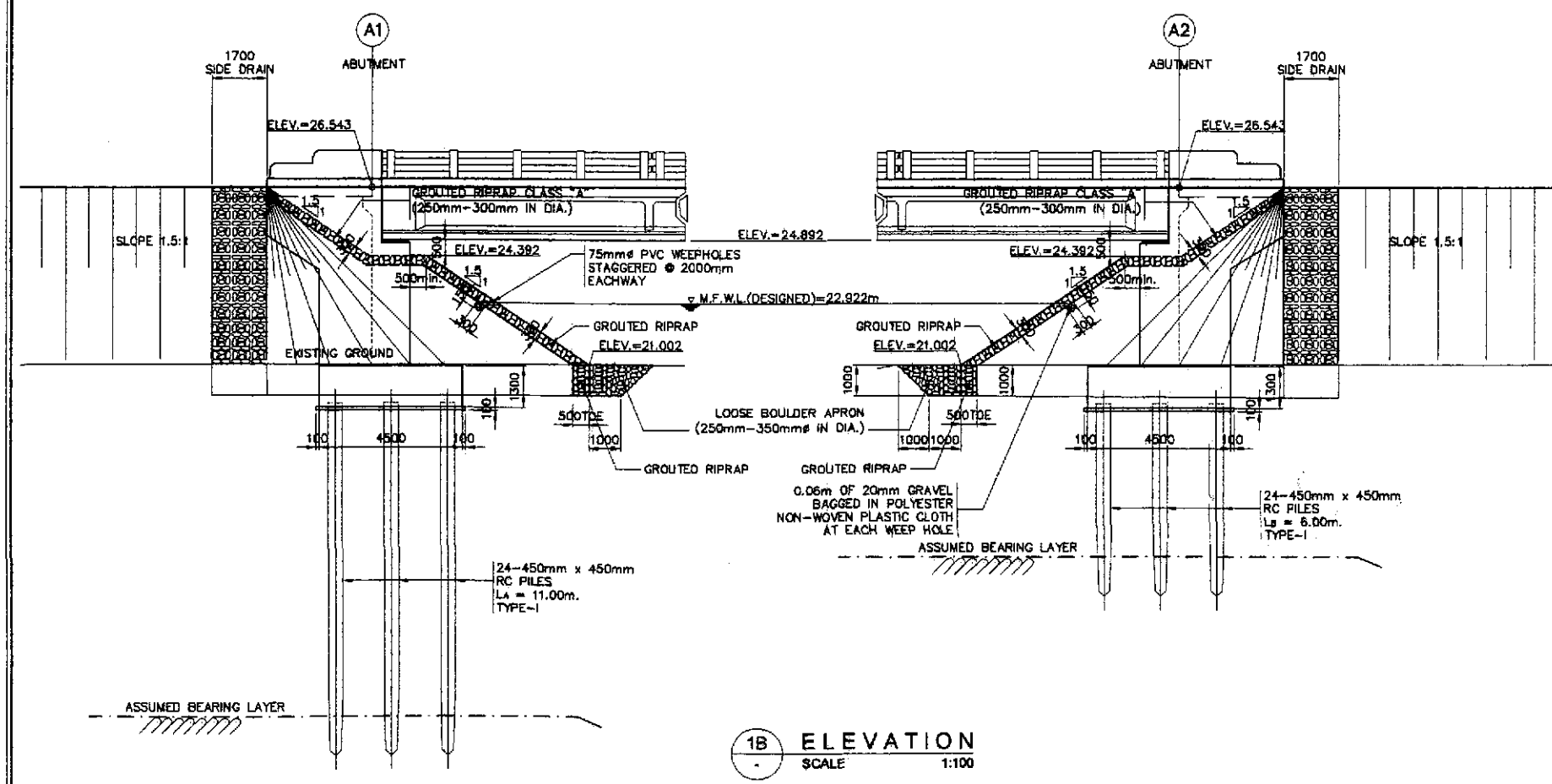
SCHEDULE OF REINFORCEMENT (FOR ONE PIER ONLY)																
LOCATION	CONCRETE VOLUME (m ³)	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSION (mm)					LENGTH EACH BAR (m)	TOTAL LENGTH (m)	UNIT WEIGHT (kg/m)	WEIGHT (kg)	REBAR RATIO (kg/m ³)
							a	b	c	d	e					
SHEAR KEY & RISER	2.65	SP1	16	72	200	(B)	560	340	560			1480	105.12	1.579	166	146.82
		SP2	12	40	AS SHOWN	(A)	1550					1550	62.00	0.888	56	
		SP3	12	10	AS SHOWN	(A)	1620					1620	16.20	0.888	15	
		SP4	16	18	200	(B)	560	360	560			1480	26.64	1.579	43	
		RP1	10	50	150	(B)	500	600	500			1600	80.00	0.616	50	
		RP2	10	30	150	(B)	500	300	500			1300	39.00	0.616	25	
		RP3	10	8	150	(B)	500	1050	500			2050	16.40	0.616	11	
		RP4	10	32	150	(B)	500	150	500			1150	36.80	0.616	23	
TOTAL	2.65														GRADE 40 TOTAL = 389 kgs.	

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

	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	DESIGNED	<i>[Signature]</i>	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			THE DETAILED DESIGN STUDY ON	AS SHOWN	BRIDGE NO. 1 & 2	B1-10
	CHECKED	<i>[Signature]</i>	BUREAU OF DESIGN			UPGRADING INTER-URBAN HIGHWAY SYSTEM	FULL SIZE A1	PIER SHEAR KEY AND RISER DETAILS AT PIER (INITIAL STAGE)	
	SUBMITTED	<i>[Signature]</i>	OFFICE OF THE SECRETARY			ALONG THE PAN-PHILIPPINE HIGHWAY			
Submitted By: DANILLO C. TRAJANO, Project Director			Reviewed By: ADRIANO M. DORAY, Chief, Bridges Division			(Plaridel, Cabaatuan and San Jose Bypasses)			
Submitted By: <i>[Signature]</i>			Recommended By: GILBERTO S. REYES, Director IV (OIC)			CABANATUAN BYPASS - CONTRACT PACKAGE I			
Submitted By: <i>[Signature]</i>			Recommended By: MANUEL M. BONDAN, Undersecretary						
Submitted By: <i>[Signature]</i>			Approved By: SIMEON A. DATUMANONG, Secretary						



1A PLAN SCALE 1:300

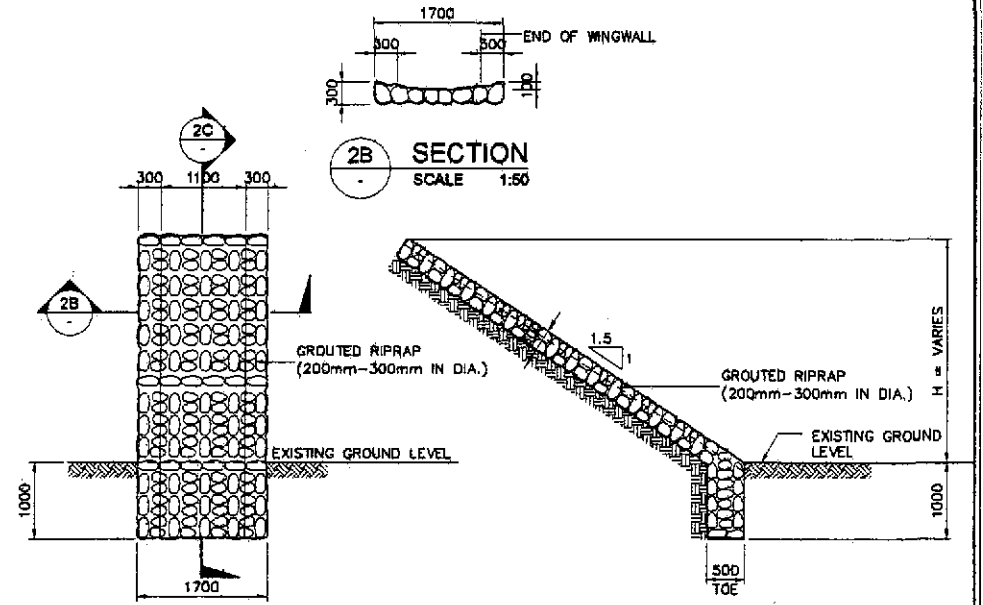


1B ELEVATION SCALE 1:100

1 ABUTMENT SLOPE PROTECTION SCALE AS SHOWN

GENERAL NOTES:

1. GROUDED 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. FOR THE LOOSE BOULDER APRON, BOULDERS 250-350mm ϕ SHALL BE HAND-LAID, CLOSE TOGETHER AND SHALL BE FIRMLY BEDDED. ALL VOIDS BETWEEN BOULDERS SHALL BE FILLED WITH TIGHTLY DRIVEN SPALLS.
3. 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
4. GRAVEL FILTER SHALL BE COARSE AGGREGATES MATERIALS WHICH SATISFY THE REQUIREMENTS FOR ITEM 405, STRUCTURAL CONCRETE, GRADING B OF TABLE 405.1 AS REVISED.
5. HAND-LAID ROCK SHALL BE MORE THAN 0.015cu.m. IN VOLUME AND SHALL CONSISTS OF HARD AND DURABLE STONES. ALL SHALL BE LAID FLAT AND SECURELY PLACED WITH LARGER STONES GENERALLY LOCATED IN THE LOWER PART OF THE STRUCTURE.
6. NO CONCRETING UNDER WATER SHALL BE PERMITTED.
7. PROVIDE 1.0m BERM WHEN HEIGHT (H) IS > 4.0m.



2A ELEVATION SCALE 1:50

2C SECTION SCALE 1:50

2 TYPICAL SIDE DRAIN DETAIL SCALE AS SHOWN

VELOCITY (m/sec)	ROCK SIZE (mm)	
	VERY TURBULENT FLOW (m/sec)	SMOOTH FLOW (m/sec)
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	QUANTITY	
		ABUT. A1	ABUT. A2
BOULDER APRON	250mm-350mm IN DIA.	60.43 cu. m.	58.96 cu. m.
SIDE DRAIN	200mm-300mm IN DIA.	11.50 cu. m.	11.50 cu. m.
GROUDED RIPRAP	250mm-300mm IN DIA.	99.39 cu. m.	97.30 cu. m.

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS
YUO YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

DESIGNED: 9/27/02 P. GONZALES
CHECKED: 10/15/02 [Signature]
SUBMITTED: 10/16/02 [Signature]

DATE: 10/16/02
SIGNATURE: [Signature]

PROJECT DIRECTOR: DANIL C. TRAJANO
CHIEF, HYDRAULICS DIVISION (OIC): PERFECTO L. ZAPLAN JR.

BUREAU OF DESIGN
RECOMMENDED BY: GILBERTO S. REYES, Director IV (OIC)

OFFICE OF THE SECRETARY
RECOMMENDED BY: MANUEL M. BONDUAN, 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 (Pardal, Cabanatuan and San Jose Bypasses)

SCALE: AS SHOWN

SHEET CONTENTS: BRIDGE NO. 1 ABUTMENT PROTECTION AND SIDE DRAIN DETAILS (INITIAL STAGE)

SHEET NO.: B1-11

CABANATUAN BYPASS - CONTRACT PACKAGE I