

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

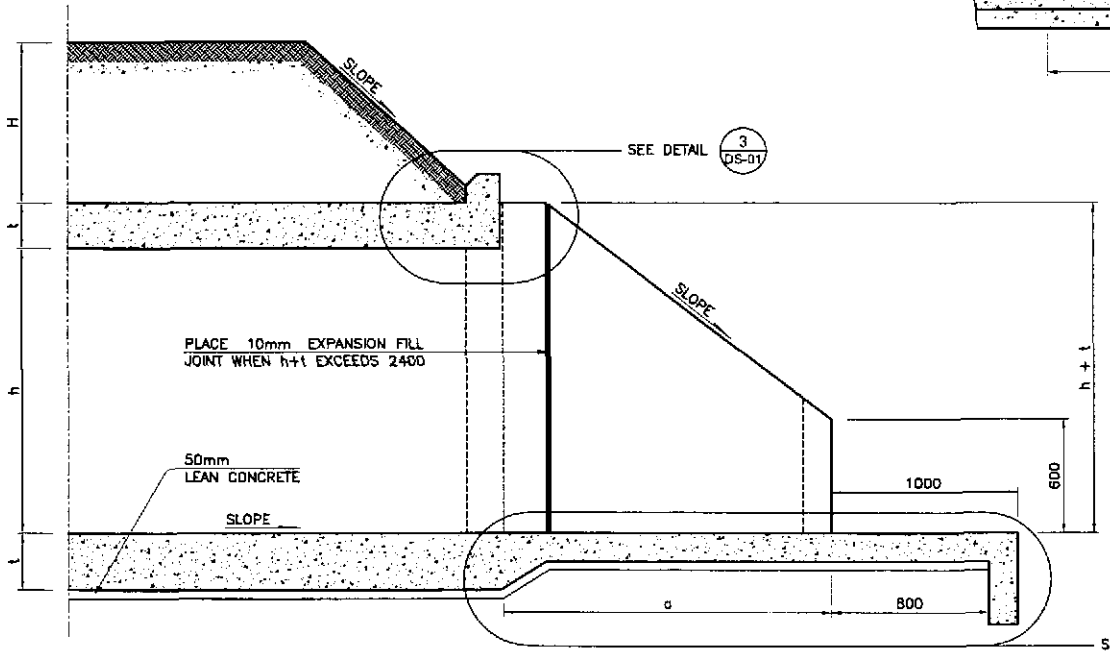
LEGEND:

- 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 — $x t_2 + 0.5 t_1 W_c$
- h — HEIGHT OF CULVERT OPENING
- t — THICKNESS OF CULVERT WALL OR SLAB
- ϕ — SLOPE OF EMBANKMENT
- CC — ANGLE OF SKEW

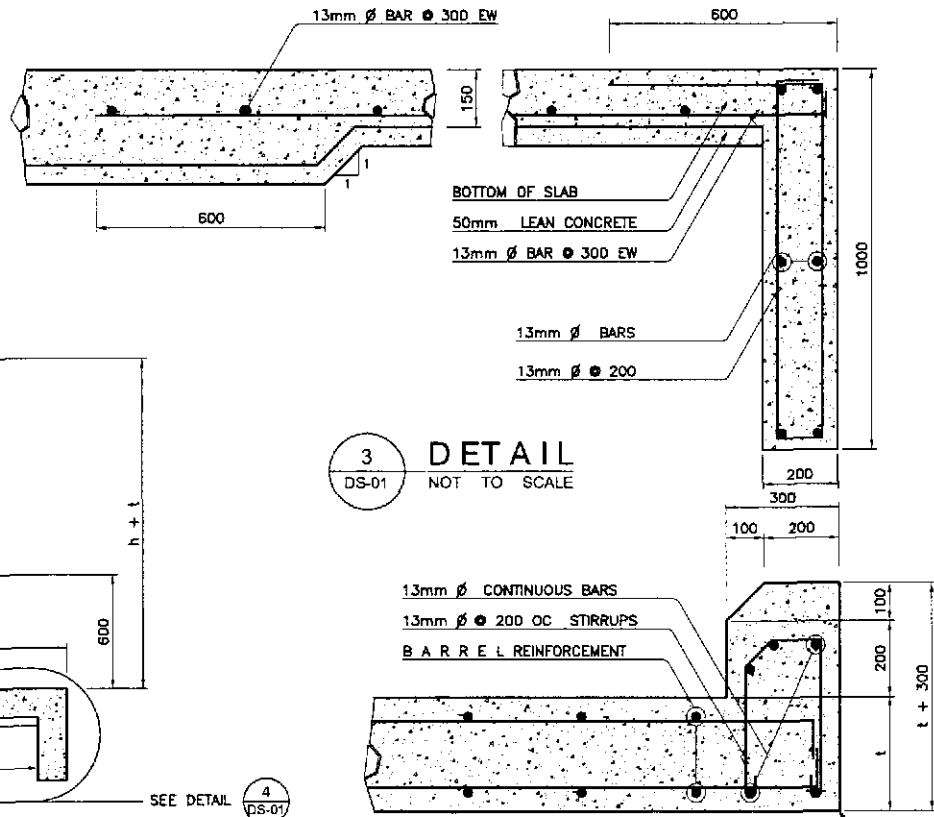
HORIZONTAL SKEW ANGLE CC	L (mm)
90°	$W + 2t \tan \phi [(H+t) - (B+200)]$
60°	$1.1547 (W + 2t \tan \phi [(H+t) - (B+200)])$
45°	$1.4142 (W + 2t \tan \phi [(H+t) - (B+200)])$

NOTES:

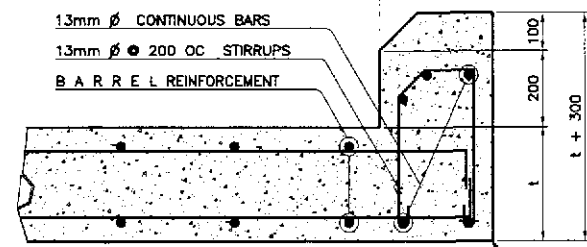
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. MINIMUM CONCRETE COVER SHALL BE 40 CLEAR. WHEN HEIGHT OF FILL H=0 INCREASE COVER BY 30.



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

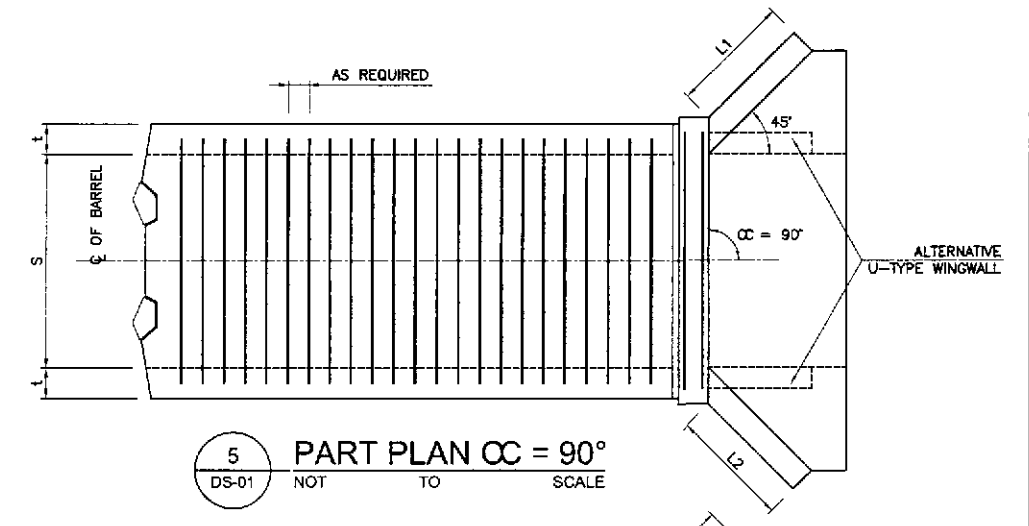


3 DETAIL
DS-01 NOT TO SCALE

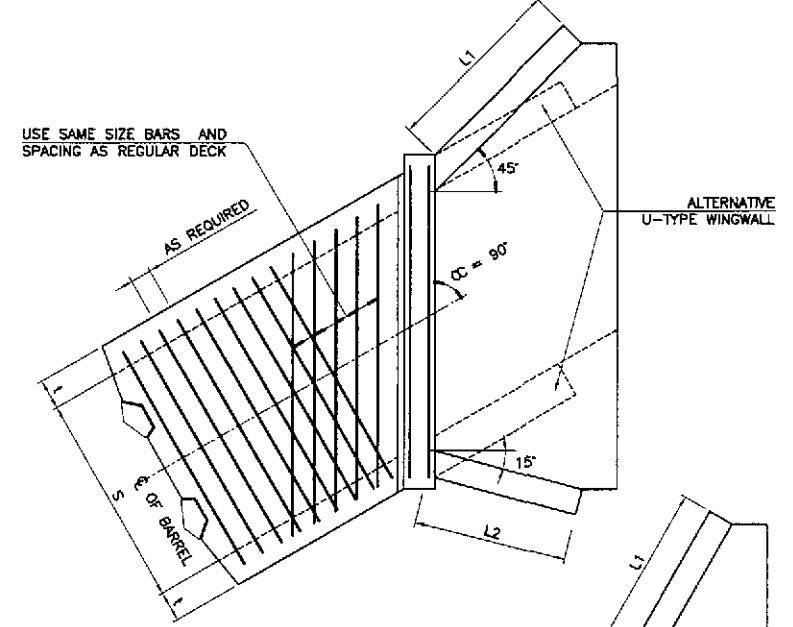


4 DETAIL
DS-01 NOT TO SCALE

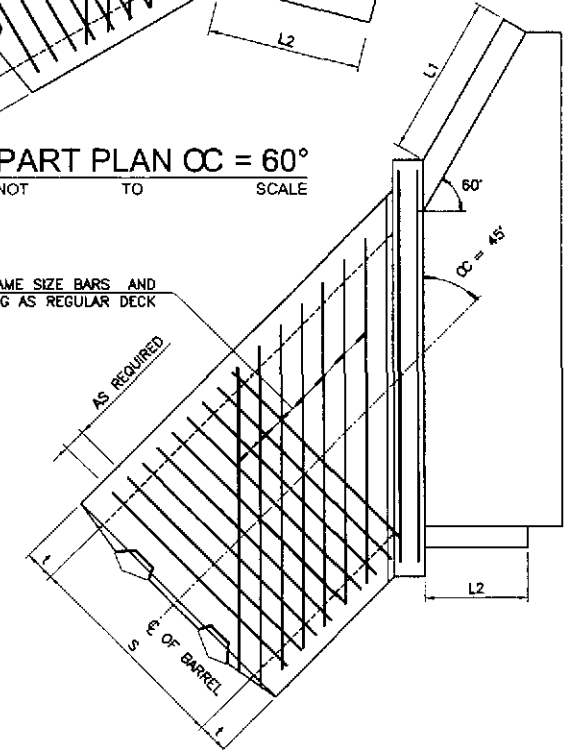
ROUND TO APPROXIMATE 150mm RADIUS (FOR INLET PORTION ONLY)



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



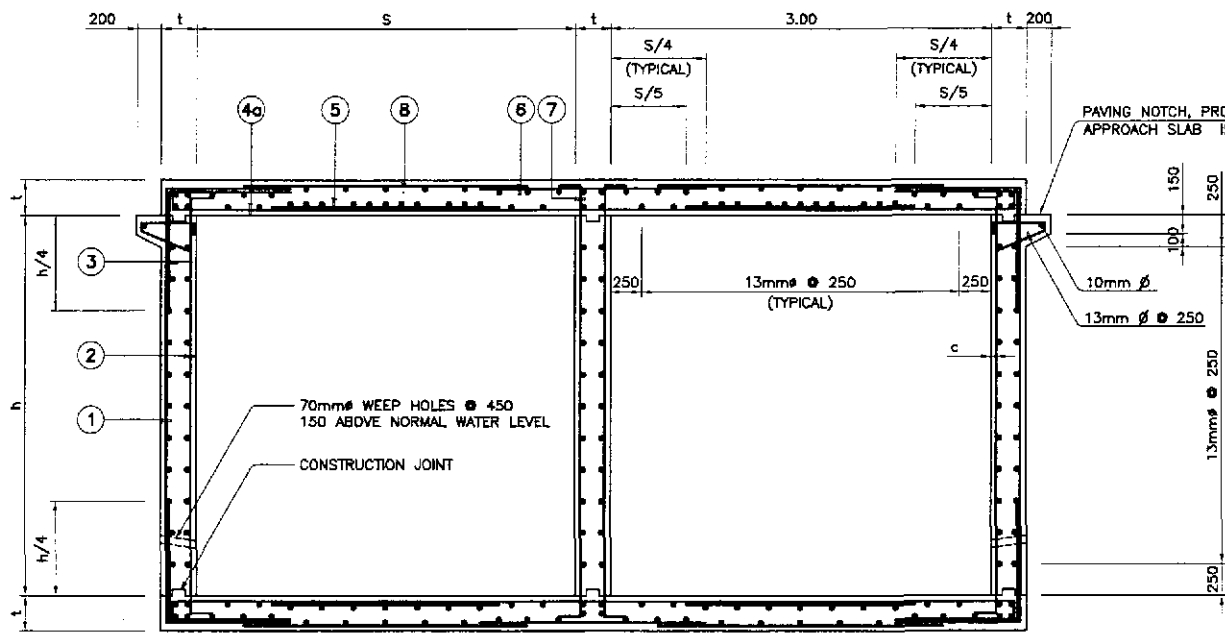
6 PART PLAN CC = 60°
DS-01 NOT TO SCALE



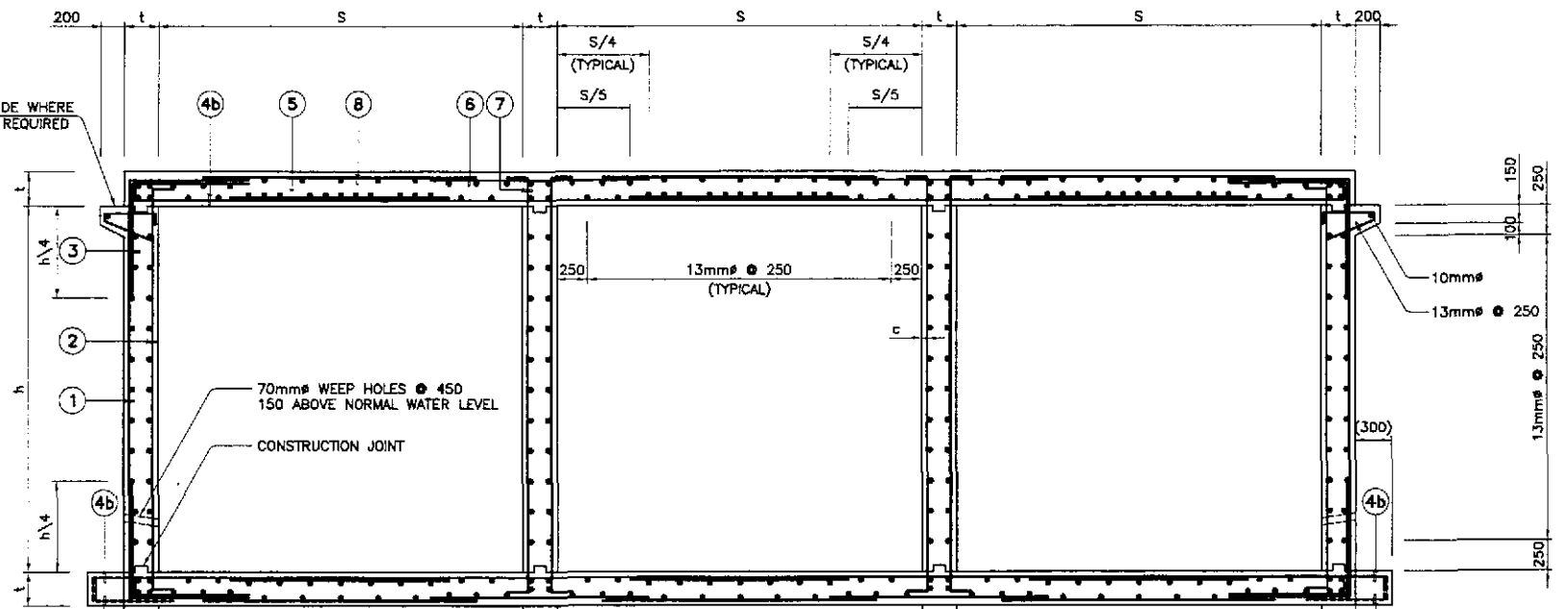
7 PART PLAN CC = 45°
DS-01 NOT TO SCALE

STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC)

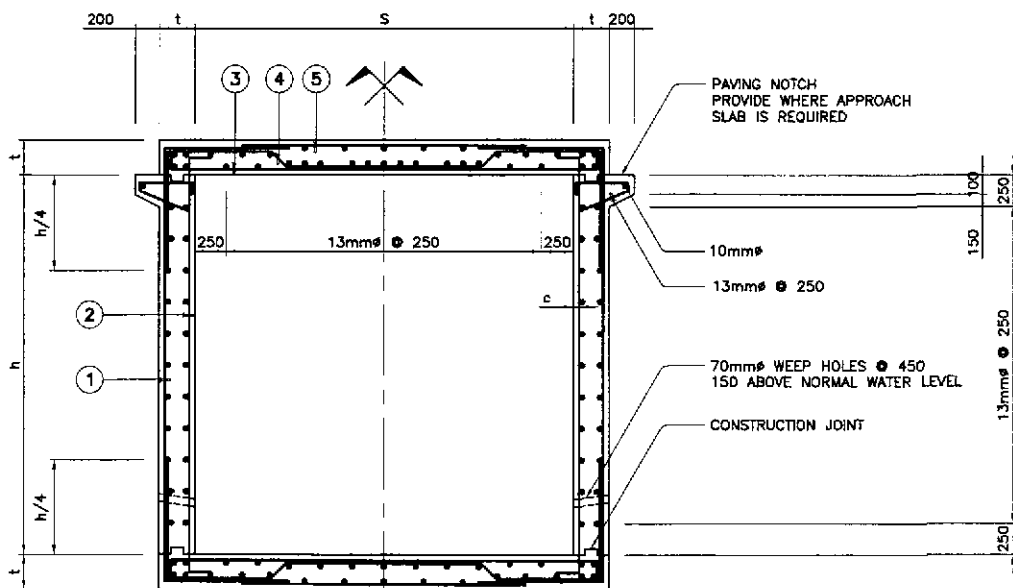
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	<p>PROJECT AND LOCATION :</p> <p>THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)</p> <p>PLARIDEL BYPASS - CONTRACT PACKAGE II</p>	<p>SCALE :</p> <p>1:100</p> <p>FULL SIZE A1</p>	<p>SHEET CONTENTS :</p> <p>STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC)</p>	<p>SHEET NO. :</p> <p>DS-01</p>					
	CHECKED	9/20/02	[Signature]						Submitted By:	Reviewed By:	Recommended By:	Approved By:	
	SUBMITTED	9/23/02	[Signature]						DANILO C. TRAJANO	JOSEFINA M. ALAGAR	GILBERTO S. REYES	MANUEL M. BONDAN	SIMEON A. DATUMANONG
									Project Director	Chief, Highways Division	OC, Director IV	Undersecretary	Secretary



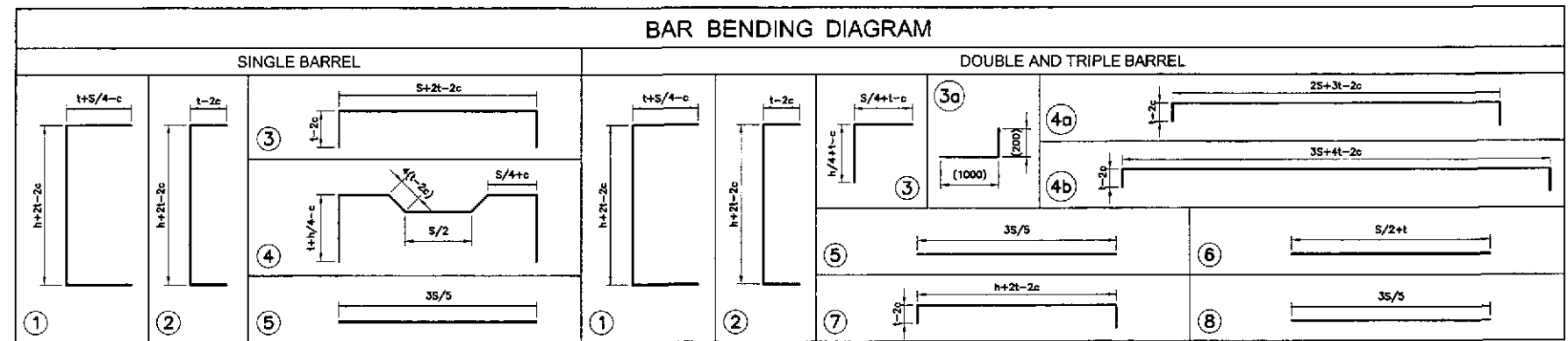
2 DOUBLE BARREL SECTION
DS-02 SCALE 1:30



3 TRIPLE BARREL SECTION
DS-02 SCALE 1:30



1 SINGLE BARREL SECTION
DS-02 SCALE 1:30



SPAN S	HEIGHT h	t	SINGLE BARREL BOX CULVERT										DOUBLE AND TRIPLE BARREL BOX CULVERT																
			BAR 1	BAR 2	BAR 3	BAR 4	BAR 5	BAR 1	BAR 2	BAR 3	BAR 4	BAR 5	BAR 6	BAR 7	BAR 8														
			φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	SPACING	φ	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	20	200	13	300	13	300
	1250	180	13	300	13	300	13	300	13	300	13	300	180	13	300	16	300	13	300	13	300	13	300	20	200	13	300	13	300
	1500	180	13	300	13	280	13	300	13	300	13	300	180	13	300	16	280	13	300	13	300	13	300	20	200	13	300	13	300
	1800	180	13	300	13	260	13	300	13	300	13	300	180	13	300	16	260	13	300	13	300	13	300	20	200	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	20	200	13	300	13	280
	1250	180	16	240	16	300	16	240	16	240	13	300	200	16	300	16	300	16	300	16	300	16	300	20	200	13	300	13	280
	1500	180	16	240	16	280	16	240	16	240	13	300	200	16	300	16	280	16	300	16	300	16	300	20	200	13	300	13	280
	1800	180	16	240	16	280	16	240	16	240	13	300	200	16	300	16	280	16	300	16	300	16	300	20	200	13	300	13	280
1800	1250	200	16	280	16	300	16	280	16	280	13	280	250	16	300	16	300	16	300	16	300	16	300	20	190	13	300	13	220
	1500	200	16	280	16	300	16	280	16	280	13	280	250	16	300	16	280	16	300	16	300	16	300	20	190	13	300	13	220
	1800	200	16	280	16	280	16	280	16	280	13	280	250	16	300	16	280	16	300	16	300	16	300	20	190	13	300	13	220
	2100	200	16	280	16	280	16	280	16	280	13	280	250	16	300	16	280	16	300	16	300	16	300	20	190	13	300	13	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	20	120	13	300	13	200
	2100	220	16	220	16	280	16	220	16	220	13	240	300	16	300	16	280	16	300	16	300	16	300	20	120	13	300	13	200
	2400	220	16	220	16	200	16	220	16	220	13	240	300	16	300	16	280	16	300	16	300	16	300	20	120	13	300	13	200
	2750	220	16	200	16	180	16	200	16	200	13	240	300	16	300	16	280	16	300	16	300	16	300	20	120	13	300	13	200
3000	2100	280	16	280	16	280	16	280	16	280	13	200	300	20	300	16	280	20	300	20	300	20	300	25	170	13	300	13	200
	2400	280	16	280	16	280	16	280	16	280	13	200	300	20	300	16	280	20	300	20	300	20	300	25	170	13	300	13	200
	2750	280	16	200	16	240	16	220	16	200	13	200	300	20	300	16	200	20	300	20	300	20	300	25	170	16	300	13	200
	3000	280	16	200	16	220	16	200	16	200	13	200	300	20	300	16	200	20	300	20	300	20	300	25	170	16	300	13	200
4000	2500											300	20	300	16	200	20	300	20	300	20	300	25	170	16	300	13	200	

NOTE:

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

LEGEND:

c = CONCRETE CLEAR COVER (50mm)
○ = ADDITIONAL REBARS IF FILL IS LESS THAN 600mm

STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC) BARRELS

	DESIGNED	DATE	SIGNATURE		PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	9/20/02	[Signature]		THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	1:30	STANDARD DETAILS OF RCBC BARRELS	DS-02
	SUBMITTED	9/23/02	[Signature]		PLARIDEL BYPASS - CONTRACT PACKAGE II	FULL SIZE A1		

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	130.98	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	298.20	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	239.60	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	721.60	9.72	1015.40
4000	2500	-	-	7.59	825.18	-	-

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	
2.60	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	8.14	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	
3.82	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	
3.80	2.80	4.67	-	-	17.01	671	-	-	

GENERAL NOTES :

SPECIFICATION :

AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES, 18th EDITION 1996.

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 :

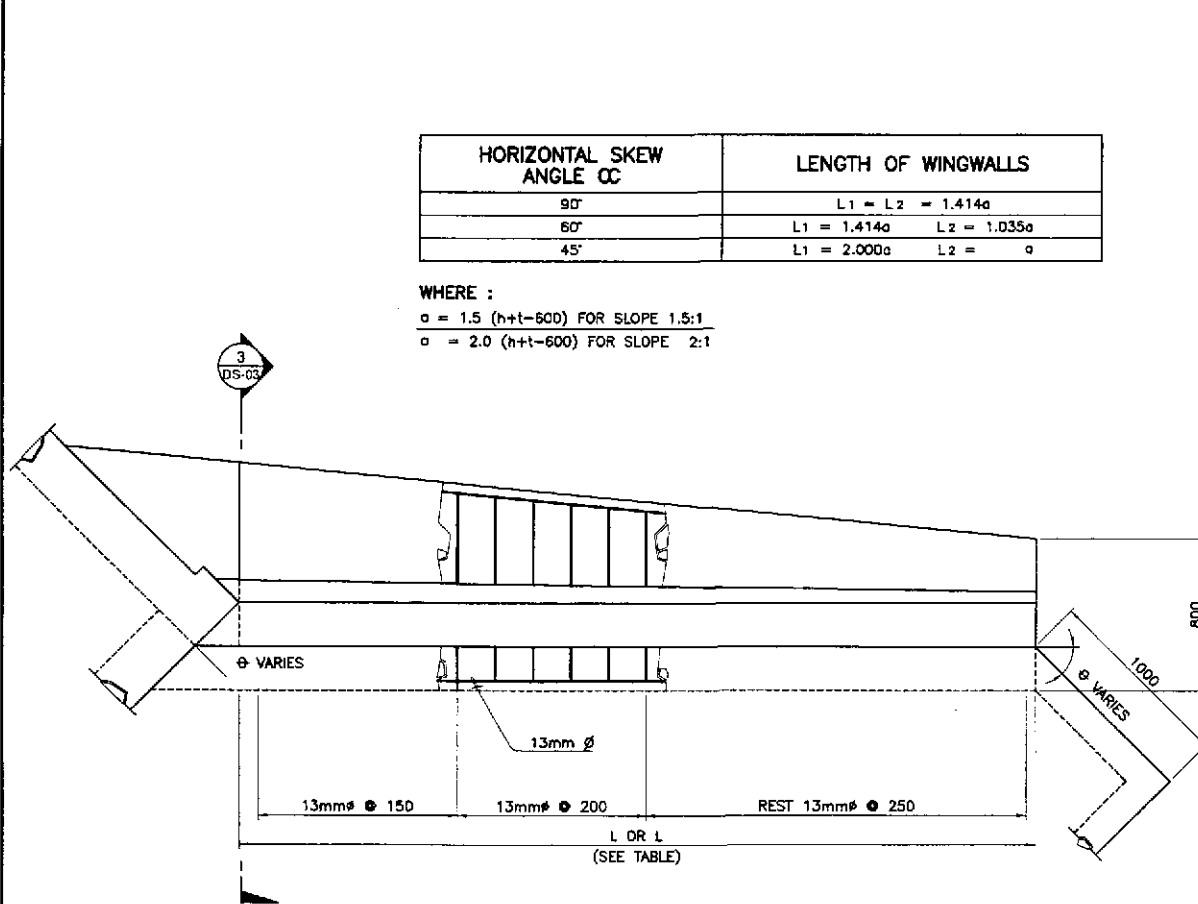
MAXIMUM HEIGHT OF FILL IS 3000mm ABOVE TOP SLAB, FOR HEIGHT OF FILL GREATER THAN 3000mm SPECIAL DESIGN OF BOX CULVERT SHOULD BE DONE.

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

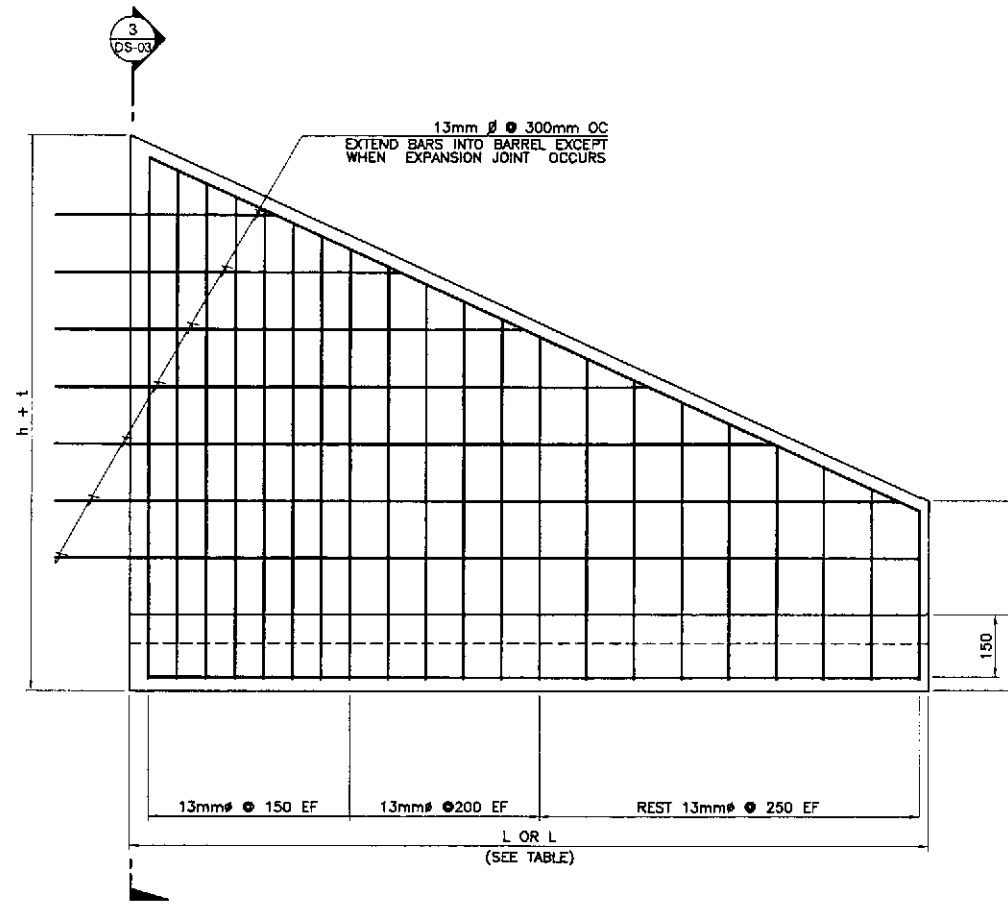
WHERE :

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

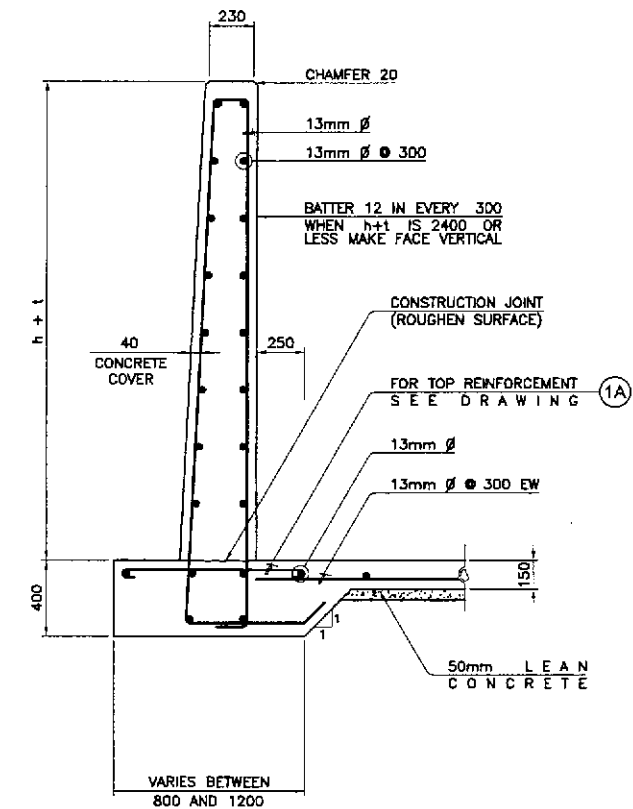
$a = 2.0 (h+t-600)$ FOR SLOPE 2:1



1 WINGWALL PLAN
SCALE 1:40



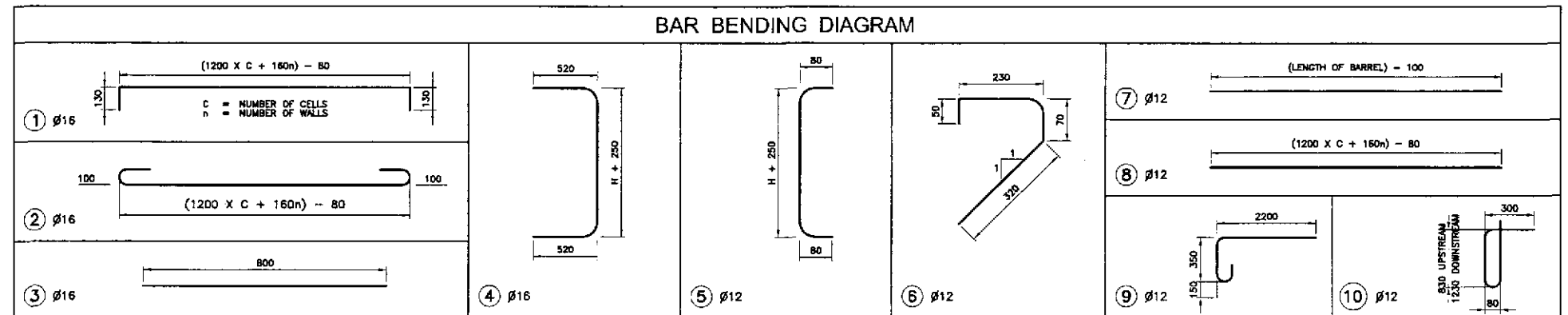
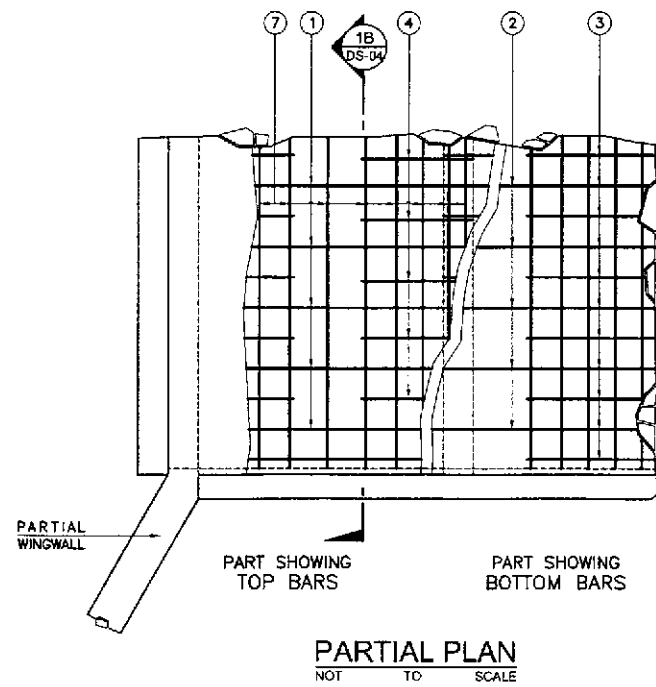
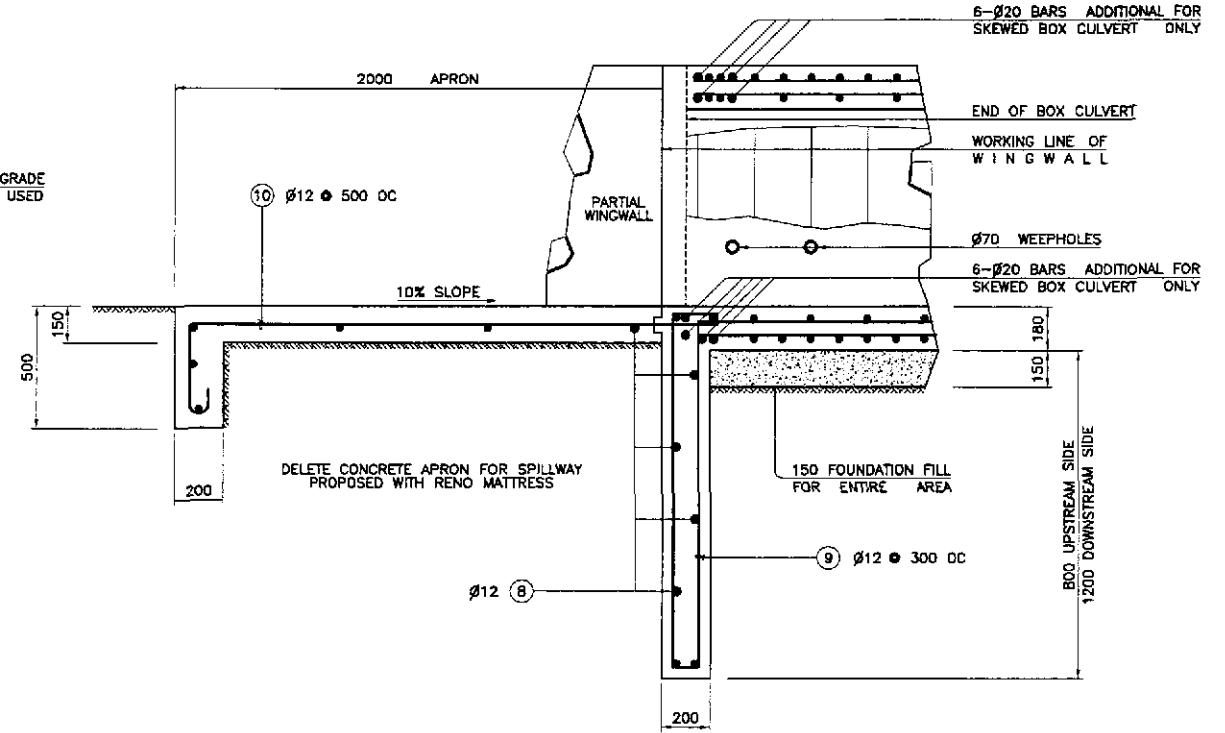
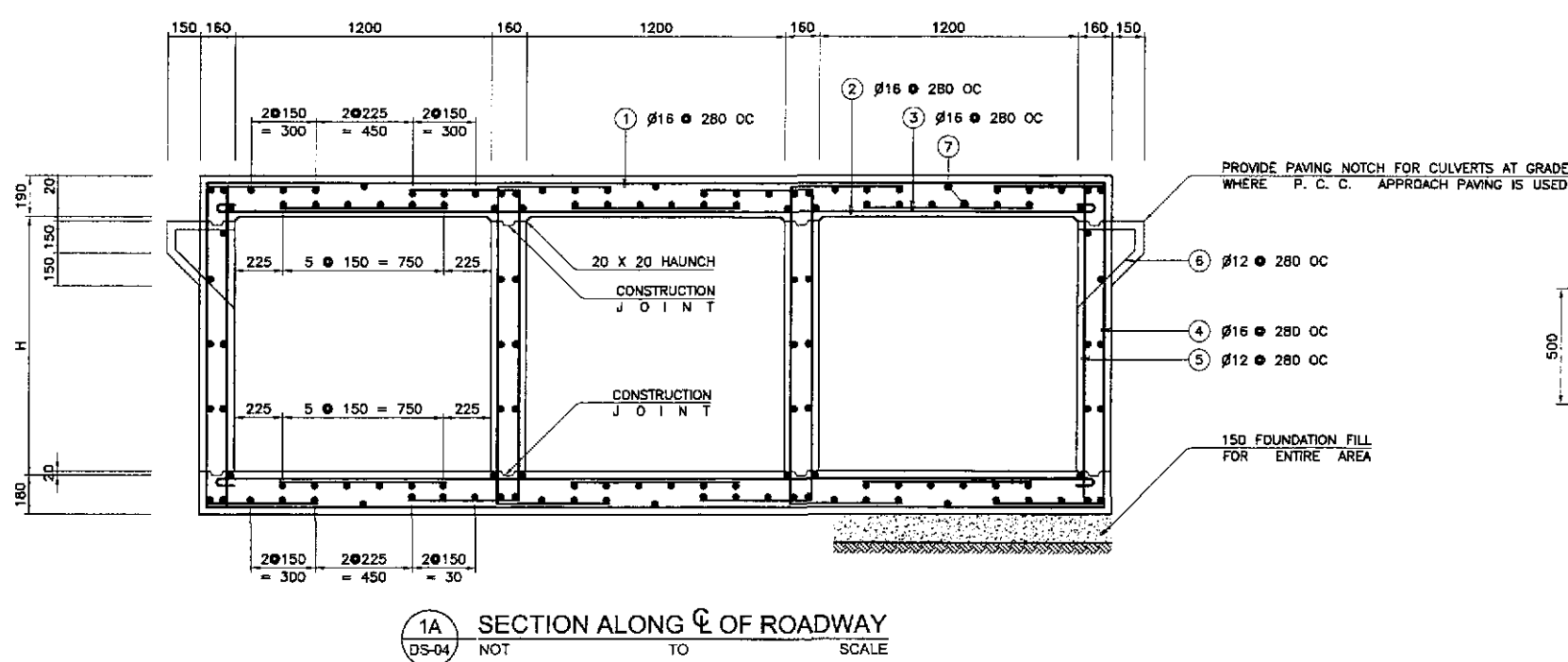
2 WINGWALL ELEVATION
SCALE 1:40



3 SECTION
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) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : 1:40 FULL SIZE A1	SHEET CONTENTS : STANDARD DETAILS OF RCBC WINGWALLS	SHEET NO. : DS-03
	CHECKED	9/20/02	[Signature]		Submitted By:	BUREAU OF DESIGN	OFFICE OF THE SECRETARY				
	SUBMITTED	9/23/02	[Signature]		DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV				



ESTIMATE OF QUANTITIES (PER LINEAR METER OF LENGTH)

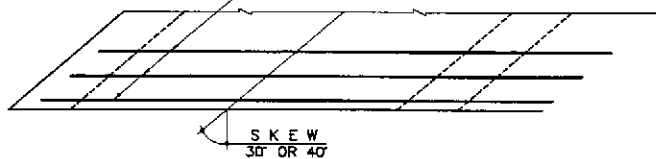
SINGLE BARREL					DOUBLE BARREL				TRIPLE BARREL			
HEIGHT OF CELL "H" (METER)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION FILL (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION FILL (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	FOUNDATION FILL (m ³)
1.20	0.95	132.59	0.67	0.27	1.64	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

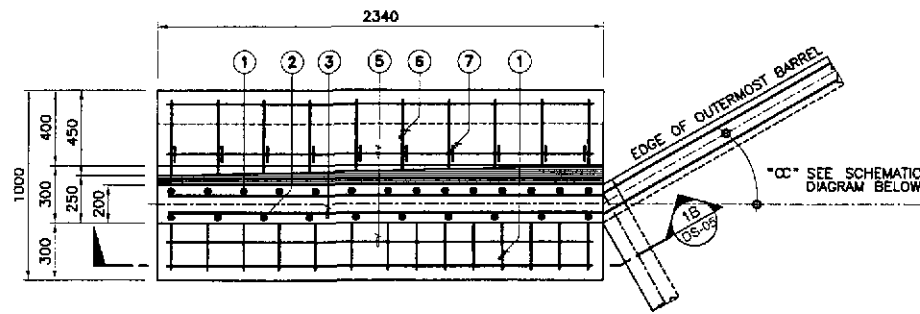
20 BARS ADDITIONAL FOR SKEWED BOX CULVERTS ONLY.
 (3 TOP BARS & 3 BOTTOM BARS FOR TOP & BOTTOM SLABS)



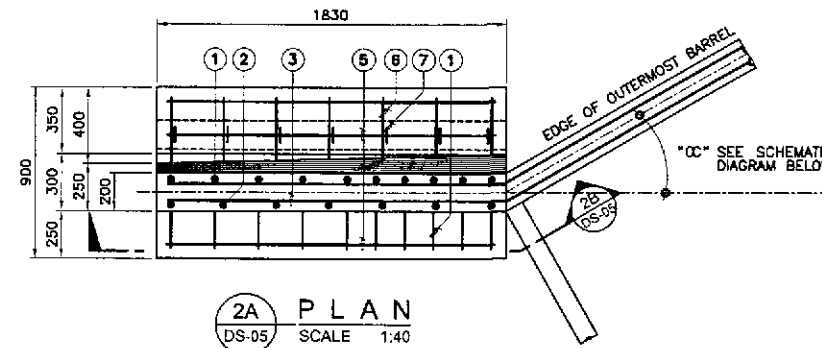
NOTE:
 ALL OTHER REINFORCING BARS SHALL BE PERPENDICULAR OR PARALLEL, AS THE CASE MAYBE, TO BOX AXIS.

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

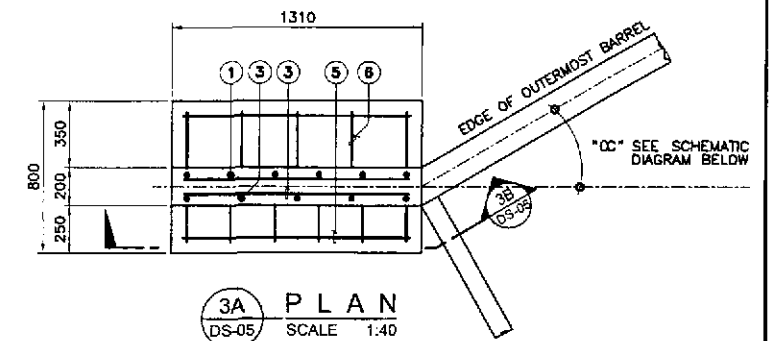
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : NOT TO SCALE FULL SIZE A1	SHEET CONTENTS : STANDARD LOW DEPTH TYPE BOX CULVERT (1 of 2)	SHEET NO. : DS-04					
	CHECKED	9/20/02	[Signature]						BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO Project Director	OFFICE OF THE SECRETARY Recommended By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV	Recommended By: MANUEL M. BONDAN Undersecretary	Approved By: SIMON A. DATUMANONG Secretary
	SUBMITTED	9/23/02	[Signature]						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. BONDAN Undersecretary	Approved By: SIMON A. DATUMANONG Secretary



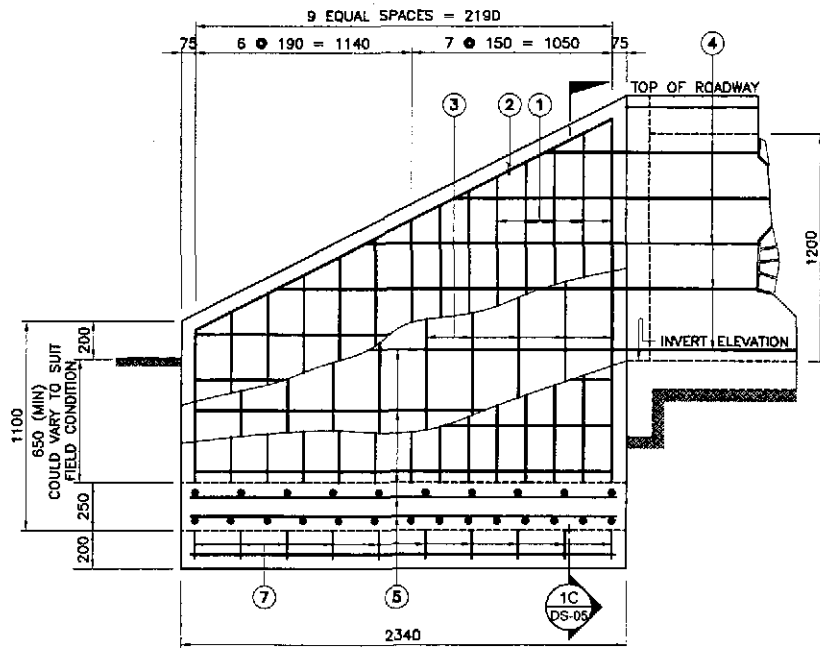
1A PLAN
DS-05 SCALE 1:40



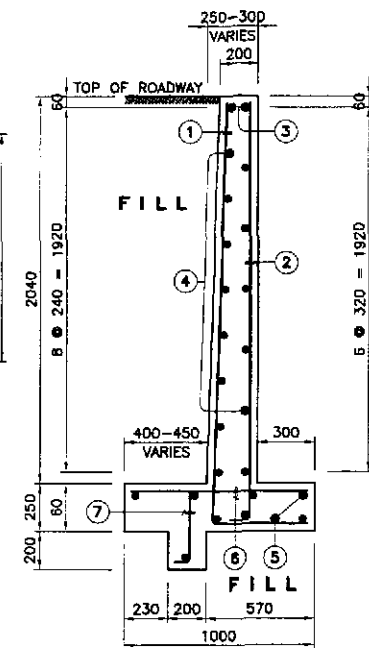
2A PLAN
DS-05 SCALE 1:40



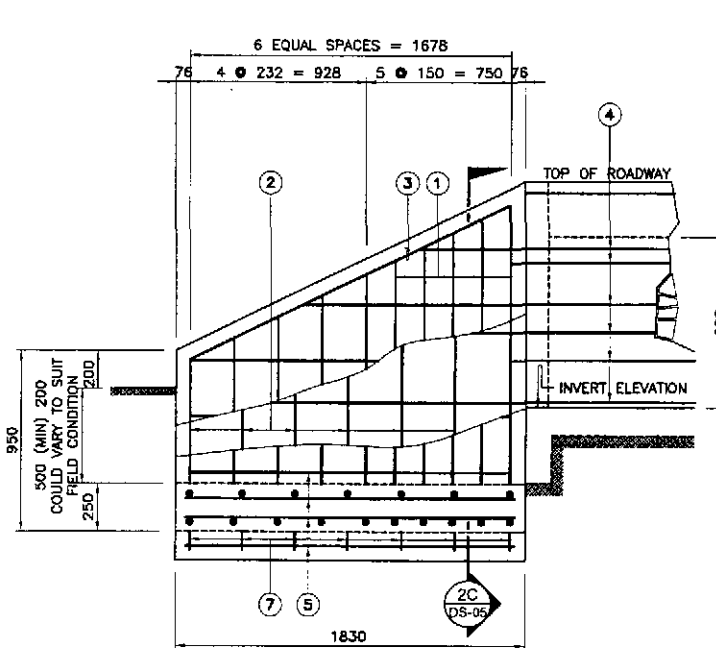
3A PLAN
DS-05 SCALE 1:40



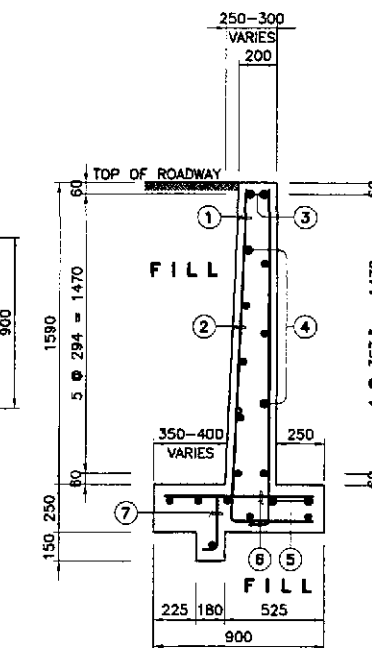
1A ELEVATION
DS-05 SCALE 1:40



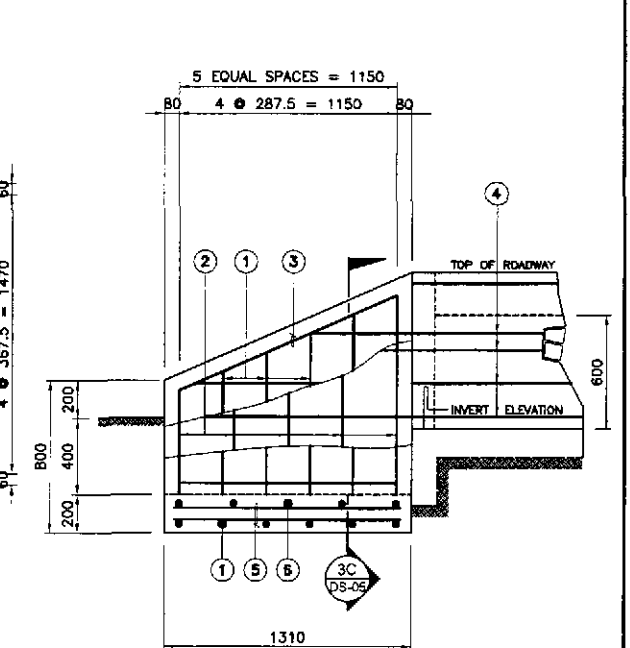
1C SECTION
DS-05 SCALE 1:40



2B ELEVATION
DS-05 SCALE 1:40



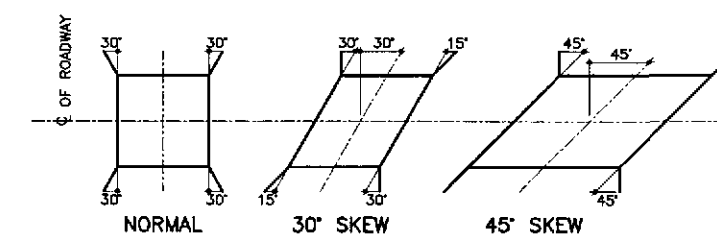
2C SECTION
DS-05 SCALE 1:40



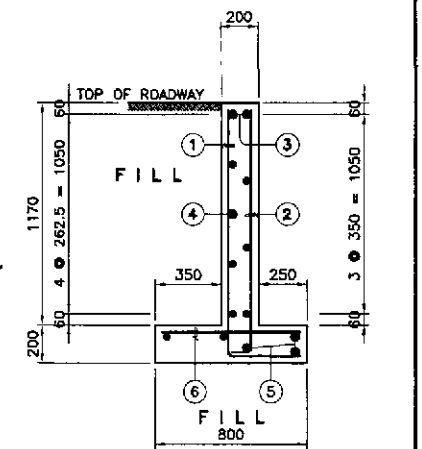
3B ELEVATION
DS-05 SCALE 1:40

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#	⑦ 10-12mm#	④ 6-12mm#	⑤ 10-12mm#	⑥ 7-12mm#	⑦ 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

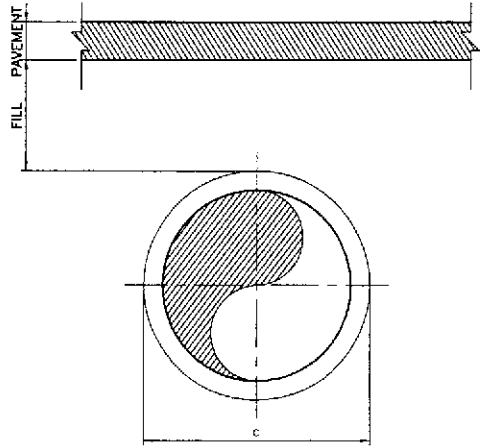


3C SECTION
DS-05 SCALE 1:40

LOW DEPTH TYPE BOX CULVERT

	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES	PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	9/20/02			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	STANDARD LOW DEPTH TYPE BOX CULVERT (2 of 2)	DS-05
	SUBMITTED	9/23/02			Submitted By: PUHL - PMO	PLARIDEL BYPASS - CONTRACT PACKAGE II	FULL SIZE A1		
					Reviewed By: JOSEFINA M. ALADAR, Chief, Highways Division	BUREAU OF DESIGN	Office of the Secretary		

DESIGN REQUIREMENT OF REINFORCED CONCRETE PIPE CULVERT

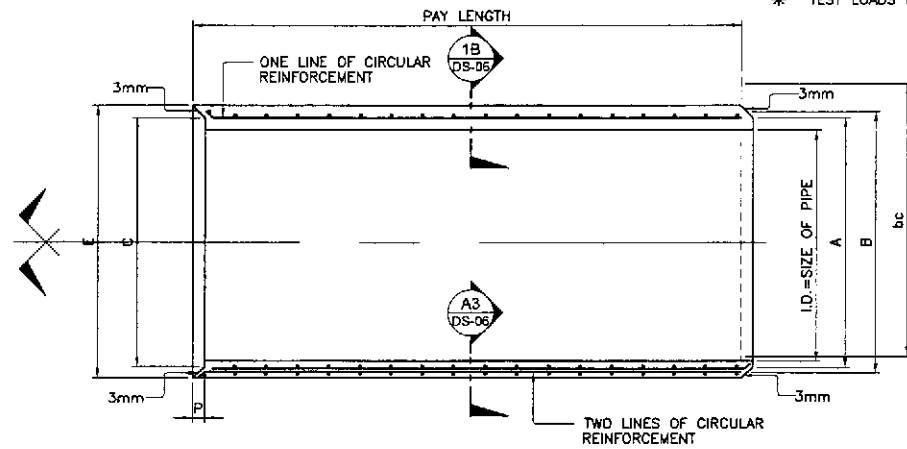


STANDARD STRENGTH PIPES:
FILL 1/2 E.D. FOR FLEXIBLE PAVEMENT OR MIN. OF 0.60 m
0.30 m FOR RIGID PAVEMENT
EXTRA STRENGTH PIPES:
FILL: 0.30 m FOR RIGID AND FLEXIBLE PAVEMENTS

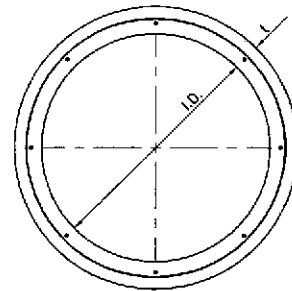
MINIMUM PIPE COVERING

		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				
SIZE OF PIPE (mm)	WALL THICKNESS (mm)	TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		STRENGTH TEST REQUIREMENTS kg/m OF PIPE		TONGUE (mm)		GROOVE (mm)		DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE		STRENGTH TEST REQUIREMENTS kg/m OF PIPE			
		A	B	C	E		CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	A	B	C	E		CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025m CRACK LOAD	ULTIMATE LOAD	A	B	C	E		CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025m CRACK LOAD	LOAD ULTIMATE		
300	57	344	363	351	370	44	1 LINE 1.48		51	495	514	502	521	44	1 LINE 1.69		3.355	5.218										
380	57	344	363	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										
610	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	1187	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	10.958	114	1168	1187	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

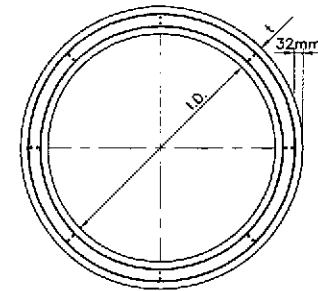
⊙ THE DISTANCE FROM CENTERLINE OF THE REINFORCEMENT TO THE NEAREST SURFACE OF THE CONCRETE HAS BEEN ASSUMED AS 32mm FOR PIPES WITH A SHELL THICKNESS OF 64mm OR MORE.
* TEST LOADS FOR SAND-BEARING TEST SHALL BE ONE AND ONE - HALF TIMES THOSE SPECIFIED IN THIS TABLE FOR THE THREE - EDGE BEARING TEST.



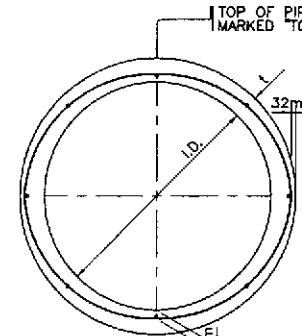
1A LONGITUDINAL SECTION
DS-06 NOT TO SCALE



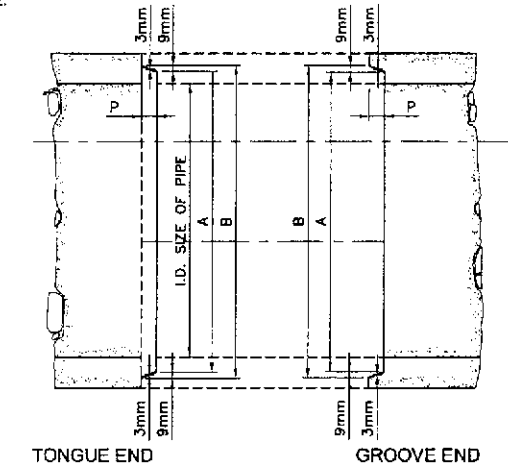
1B SECTION
DS-06



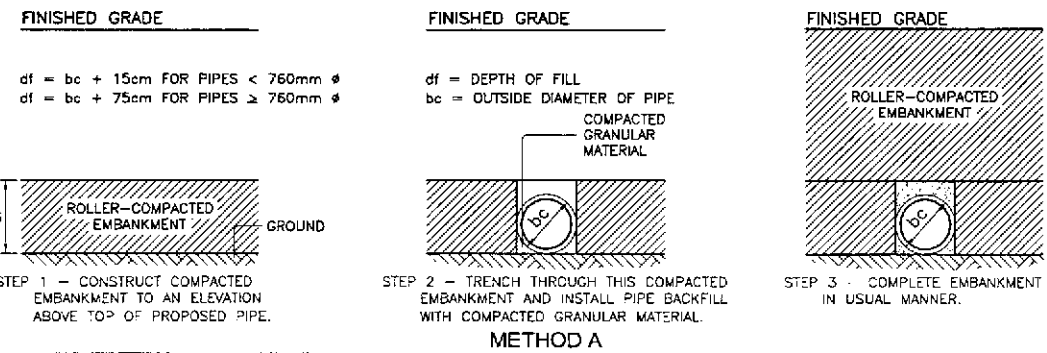
1C SECTION
DS-06



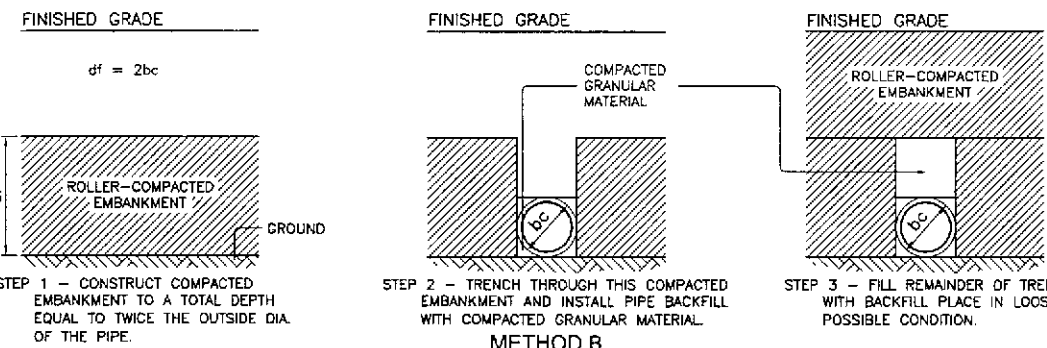
1D SECTION
DS-06



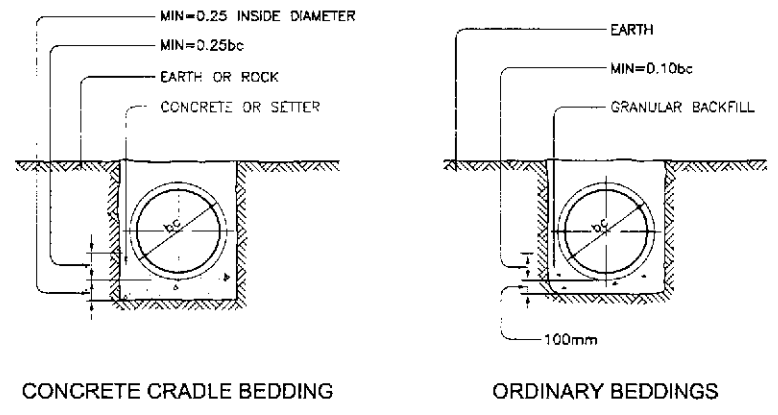
1E SECTION
DS-06



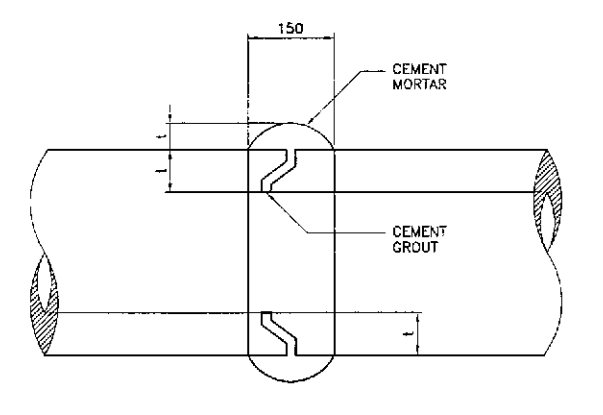
2 METHODS OF PIPE INSTALLATION
DS-06 NOT TO SCALE



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



3 TYPICAL BEDDING FOR CONDUITS
DS-06 NOT TO SCALE



4 DETAIL OF PIPE COLLAR
DS-06 NOT TO SCALE

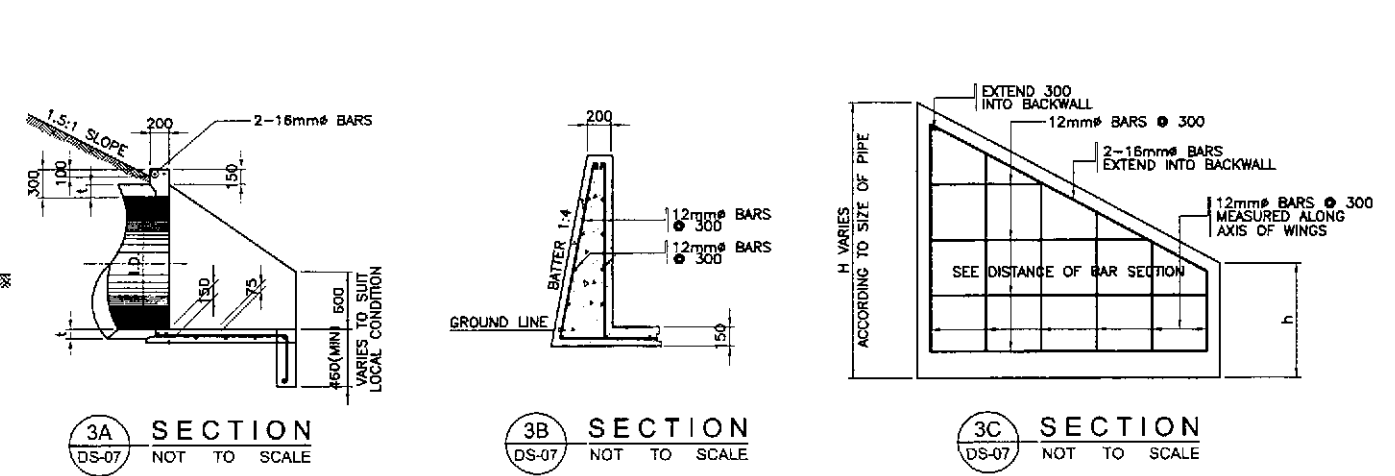
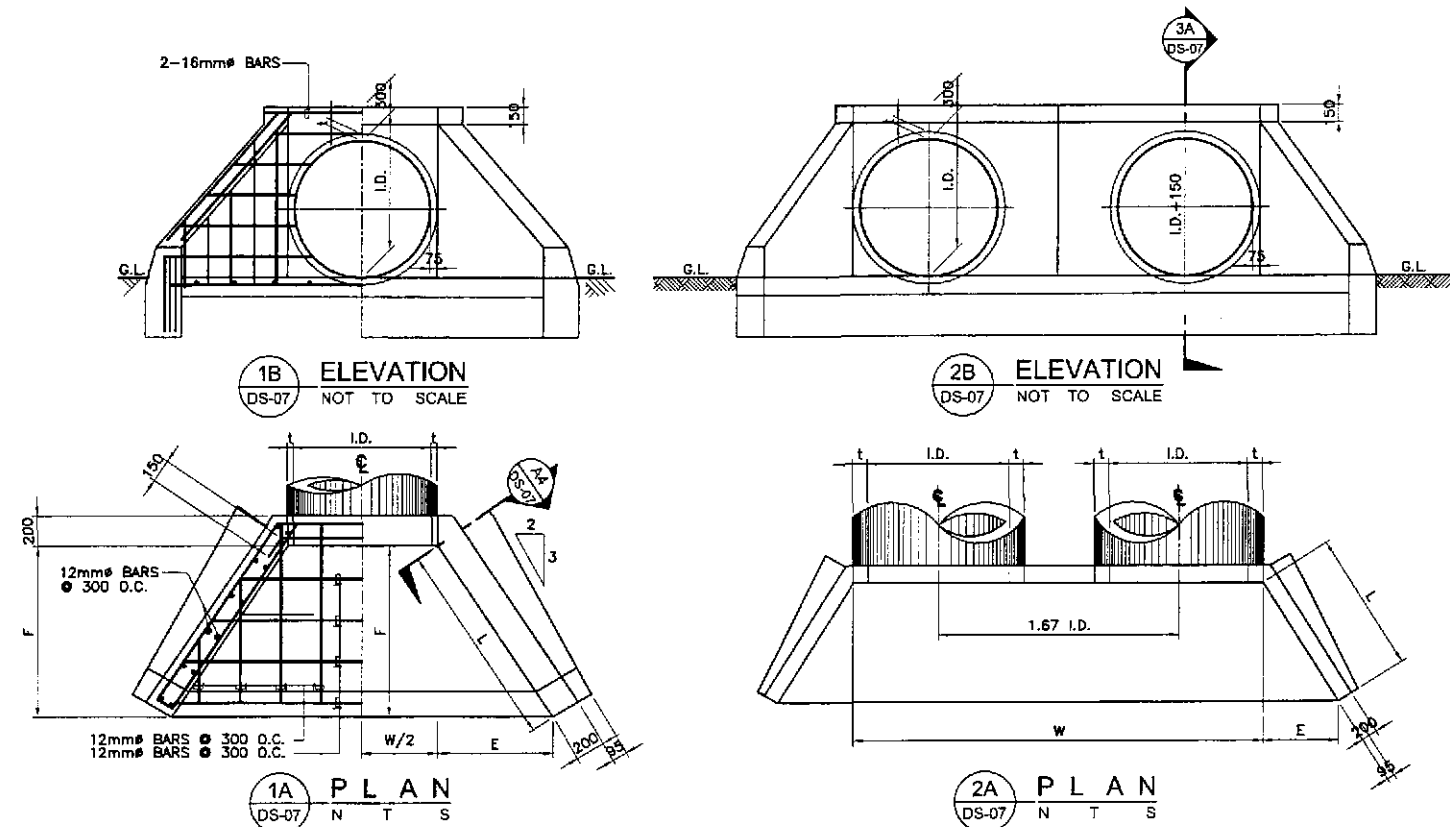


TABLE A (ONE FLARED TYPE HEADWALL 1.5:1)

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	W (mm)	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

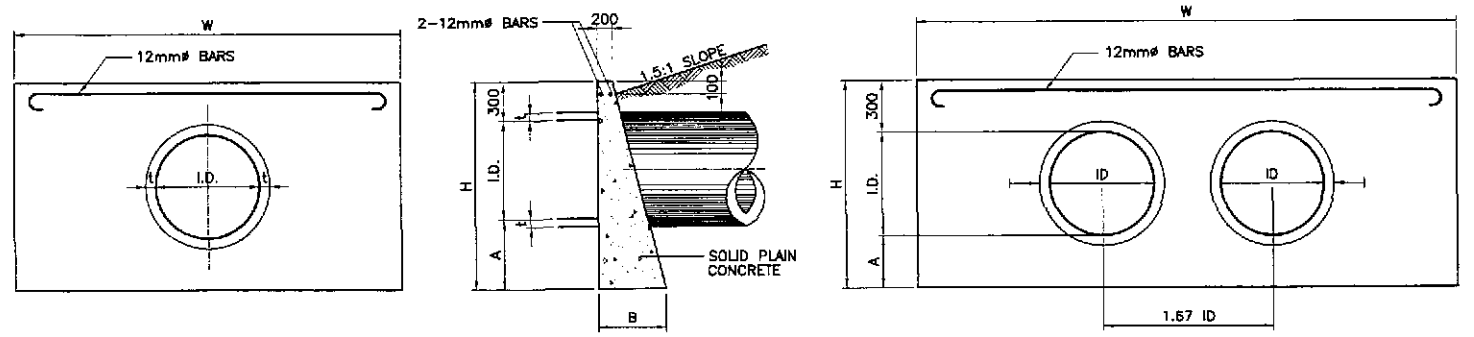
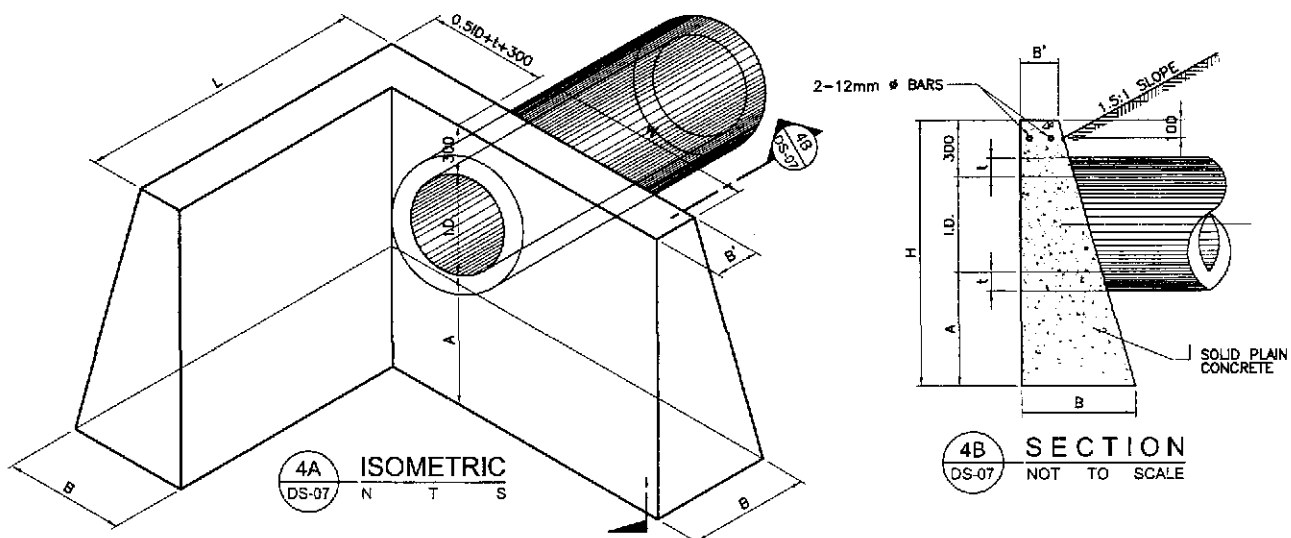
1 FLARED TYPE HEADWALL (SINGLE PIPE) SCALE AS SHOWN
2 FLARED TYPE HEADWALL (DOUBLE PIPE) SCALE AS SHOWN

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)

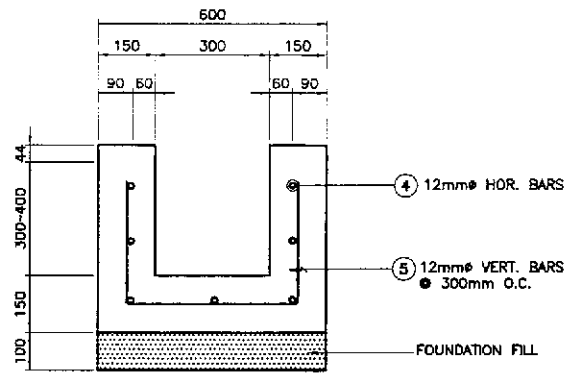
DIAMETER & THICKNESS (mm)		DIMENSIONS (mm)				SINGLE PIPE			DOUBLE PIPE				TRIPLE PIPE			
INTERNAL DIAMETER (I.D.)	MIN. THK. SHELL (t)	A	B	H	W (mm)	AREA OF WATERWAY m ²	CONCRETE m ³	REINF. STEEL kg.	W (mm)	AREA OF WATERWAY m ²	CONCRETE m ³	REINF. STEEL kg.	W (mm)	AREA OF WATERWAY m ²	CONCRETE m ³	REINF. STEEL kg.
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 SCALE AS SHOWN
5 STRAIGHT TYPE HEADWALL SCALE AS SHOWN

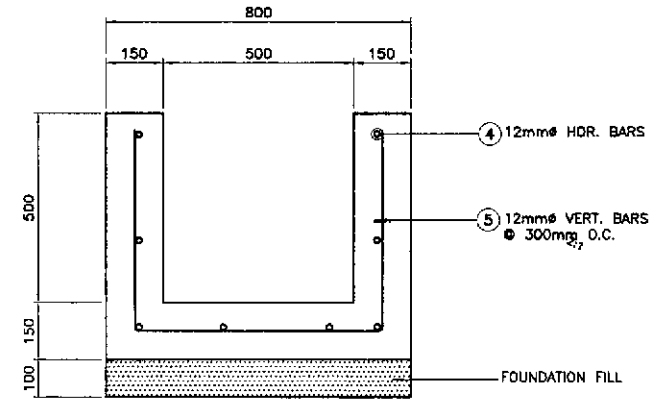
STANDARD REINFORCED CONCRETE HEADWALL FOR RCPC

	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES				PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : NOT TO SCALE FULL SIZE A1	SHEET CONTENTS : STANDARD REINFORCED CONCRETE HEADWALL FOR RCPC	SHEET NO. : DS-07
	CHECKED	7/20/02	[Signature]		DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS							
	SUBMITTED	9/26/02	[Signature]		BUREAU OF DESIGN							
					OFFICE OF THE SECRETARY							
				Submitted By:	Reviewed By:	Recommended By:	Approved By:					
				DANILO C. TRAJANO	JOSEFINA M. ALAGAR	GILBERTO S. REYES	MANUEL M. BONDAN					
				Project Director	Chief, Highways Division	OC, Director IV	Undersecretary					
							SIMEON A. DATUMANONG					
							Secretary					



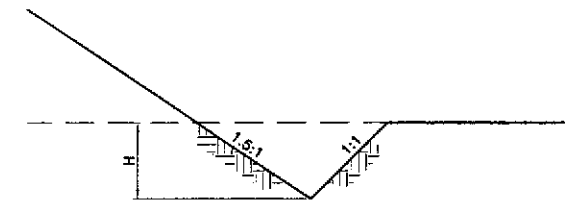
REINFORCED CONCRETE DITCH

1 TYPE BU
DS-08 SCALE: 1:10

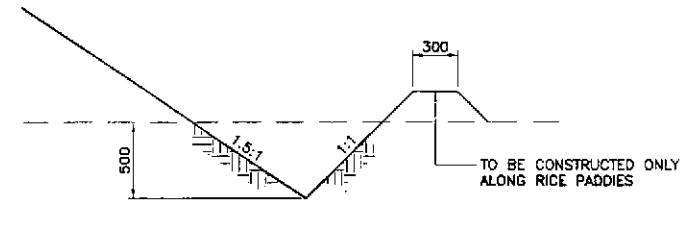


REINFORCED CONCRETE DITCH

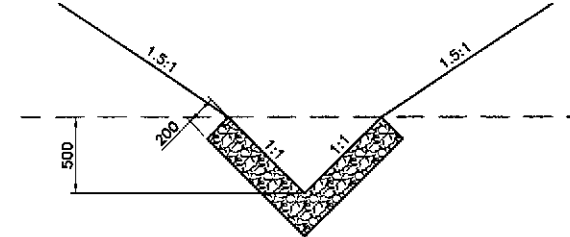
2 TYPE U
DS-08 SCALE: 1:10



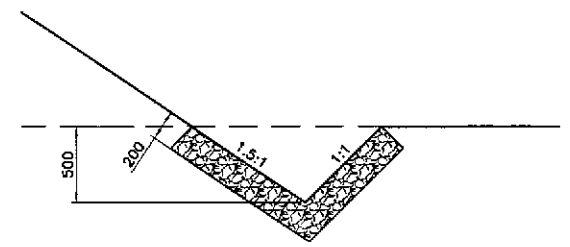
V-SHAPED UNLINED DITCH
TYPE E-4



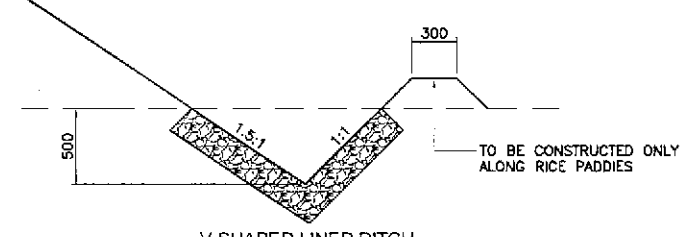
V-SHAPED UNLINED DITCH
TYPE E-3



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

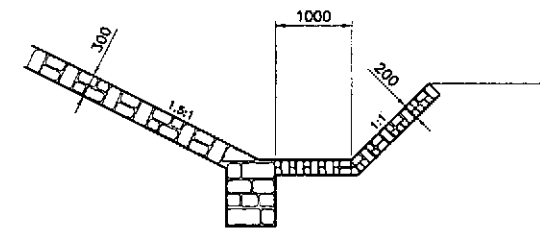


V-SHAPED LINED DITCH
TYPE E-2

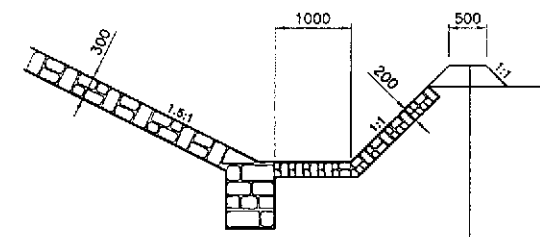


V-SHAPED LINED DITCH
TYPE E-1

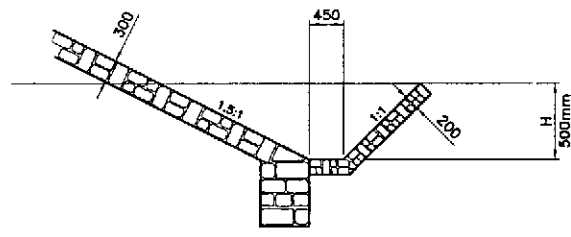
3 TYPE E
DS-08 SCALE: 1:25



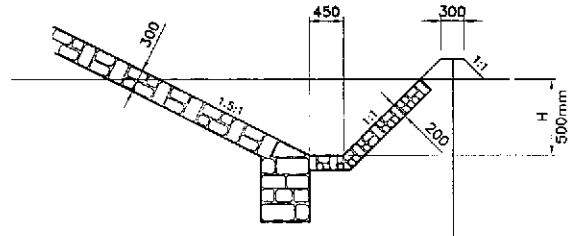
TYPE C-4



TYPE C-3

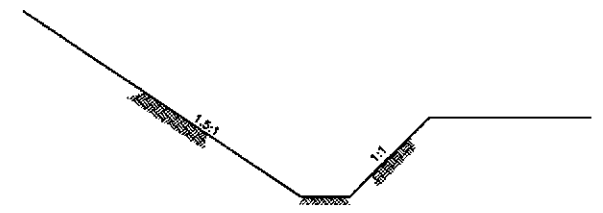


TYPE C-2

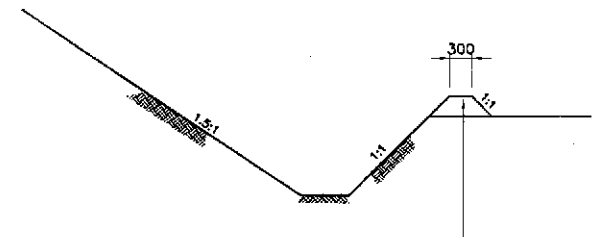


TYPE C-1

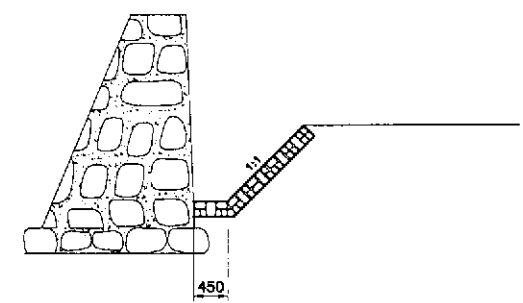
4 TYPE C
DS-08 NOT TO SCALE



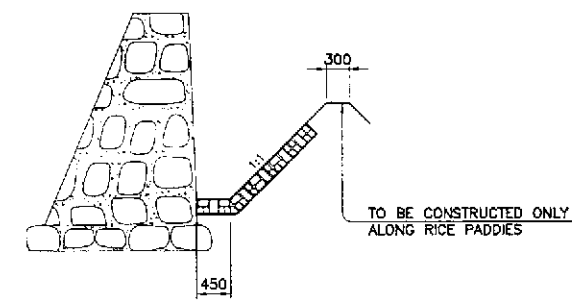
TYPE C-8



TYPE C-7



TYPE C-6



TYPE C-5

STANDARD DRAINAGE DITCHES

	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</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) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : NOT TO SCALE FULL SIZE A1	SHEET CONTENTS : STANDARD DRAINAGE DITCHES	SHEET NO. : DS-08	
	CHECKED	9/24/02	<i>[Signature]</i>						Submitted By:
	SUBMITTED	9/23/02	<i>[Signature]</i>						Reviewed By:
									Recommended By:
			DANILLO C. TRILIANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES O.C. Director IV	MANUEL M. BONGAN Undersecretary	SIMEON A. DATUMANONG Secretary		

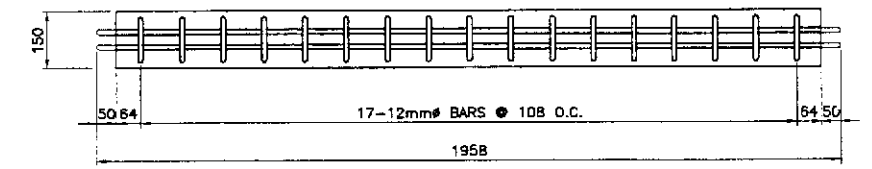
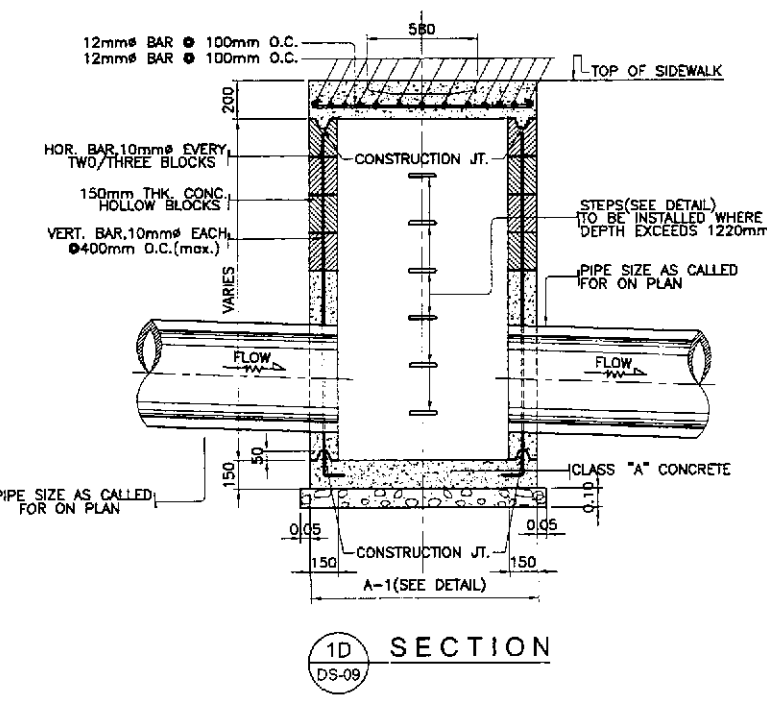
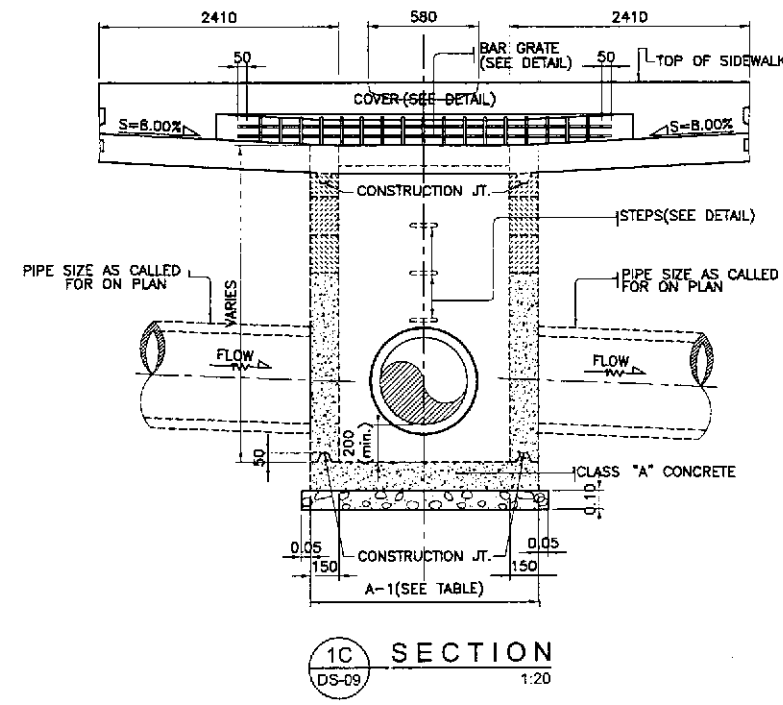
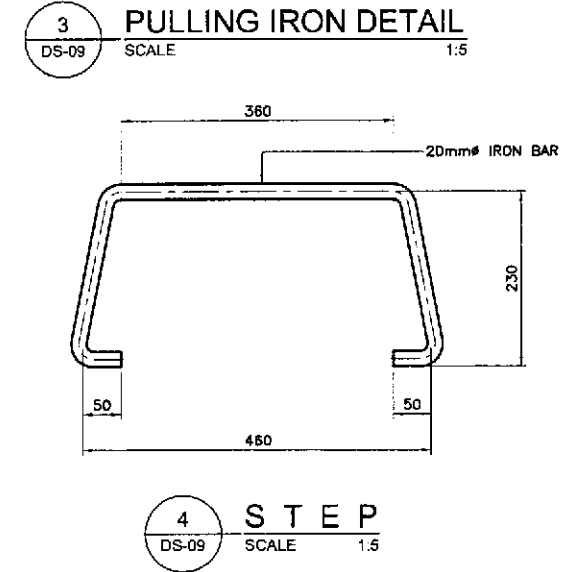
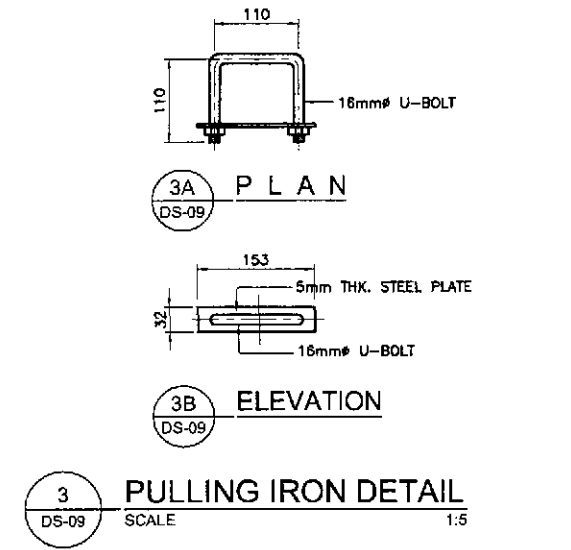
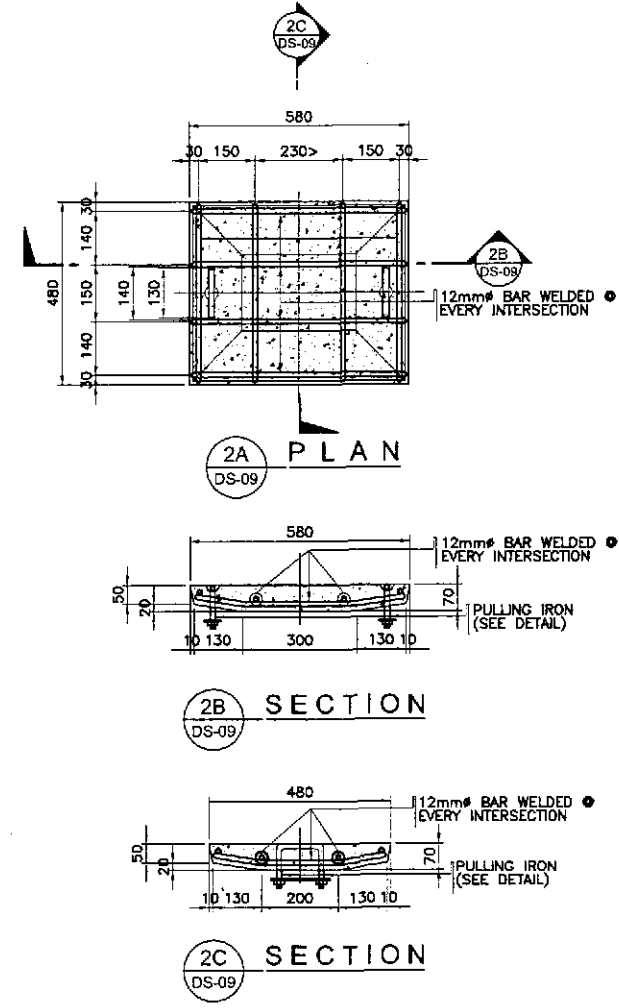
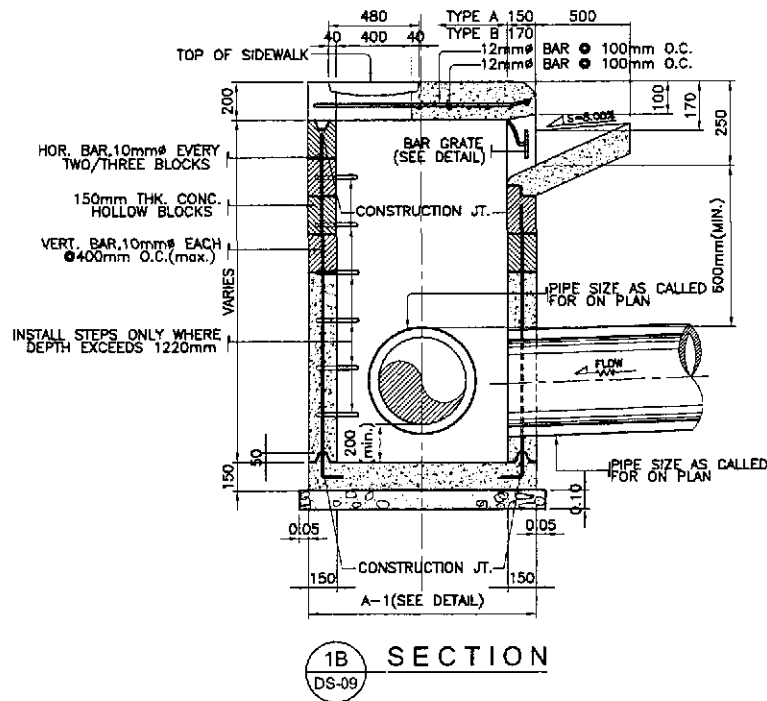
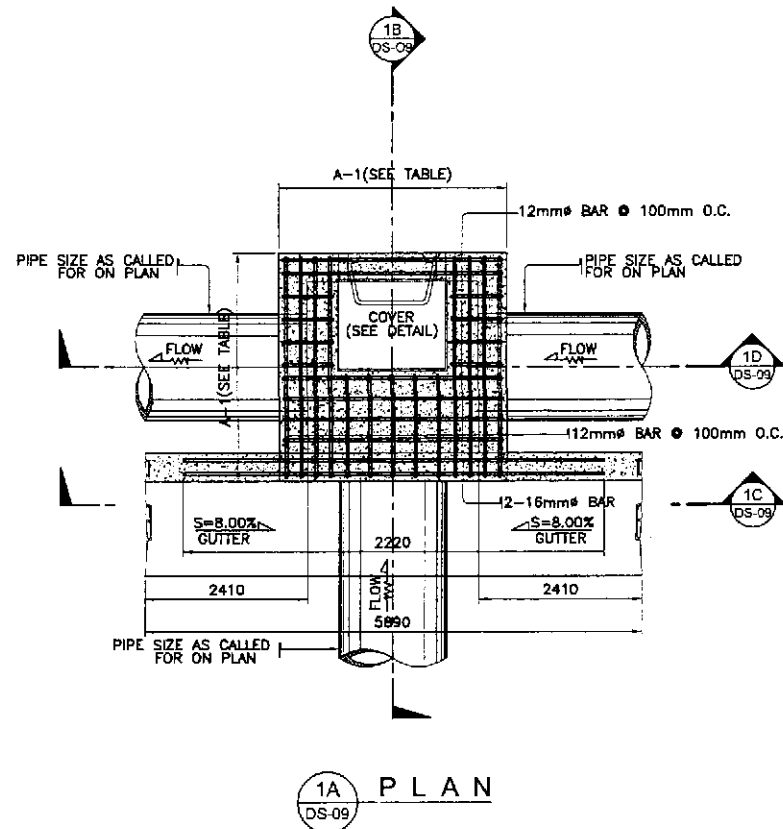


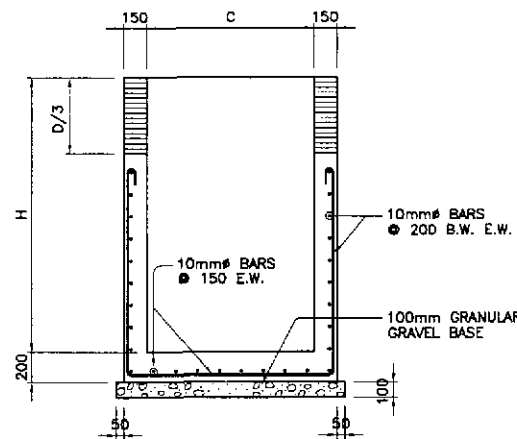
TABLE OF DIMENSION		
TYPE OF CIM	SIZE OF PIPE (mm)	A-1
T-1	300	1.12 M.
T-2	460	1.19 M.
T-3	610	1.37 M.
T-4	760	1.54 M.
T-5	910	1.73 M.
T-6	1070	1.90 M.
T-7	1220	2.08 M.
T-8	1520	2.43 M.

- 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 ADBE 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.

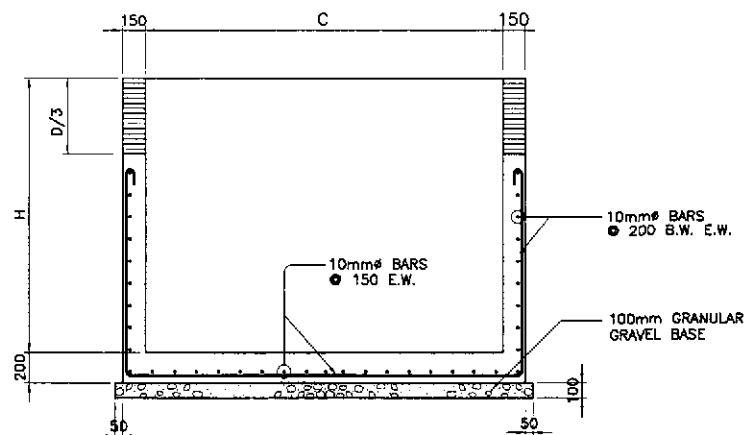
1 CURB INLET MANHOLE
DS-09 SCALE 1:20

DETAILS OF COMBINATION CURB INLET MANHOLE

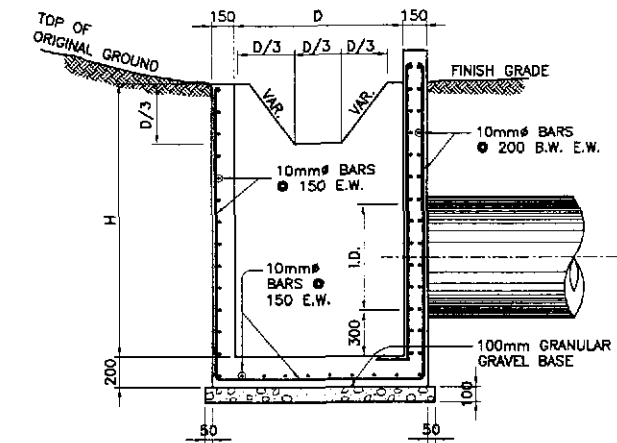
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	CHECKED	7/20/02	[Signature]		Submitted By:	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	STANDARD COMBINATION CURB INLET MANHOLE	DS-09
	SUBMITTED	9/23/02	[Signature]		Reviewed By:	PLARIDEL BYPASS - CONTRACT PACKAGE II	FULL SIZE A1		
<p>P.H.L. - PMD</p> <p>BUREAU OF DESIGN</p> <p>OFFICE OF THE SECRETARY</p>				<p>Recommended By:</p> <p>MANUEL M. BONDAN Undersecretary</p>					
<p>DANILO C. TRAJANO Project Director</p>				<p>JOSEFINA M. ALAGAR Chief, Highways Division</p>					
<p>GILBERTO S. REYES OIC, Director IV</p>				<p>SIMEON A. DATUMANONG Secretary</p>					



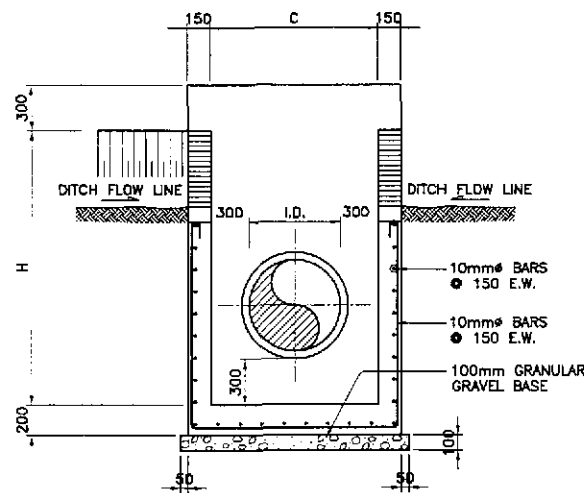
1C SECTION
DS-11



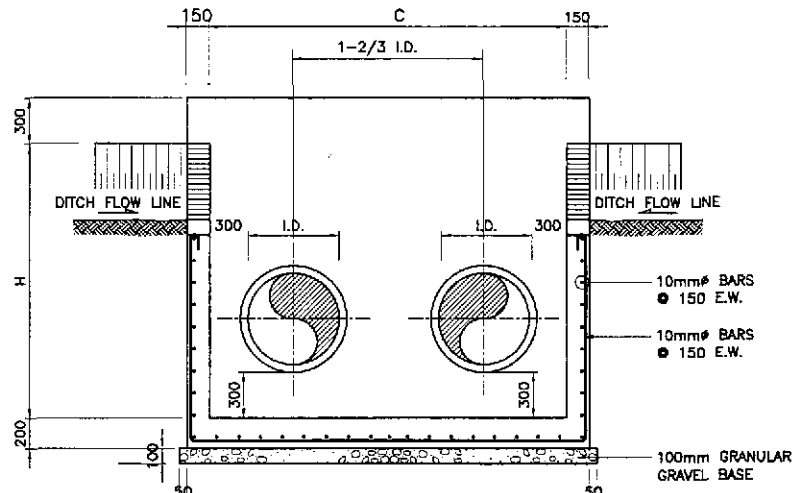
2C SECTION
DS-11



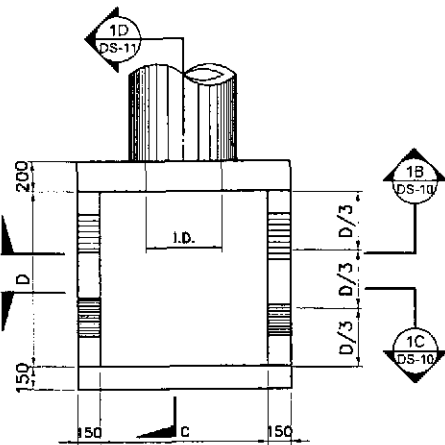
1C SECTION
DS-11



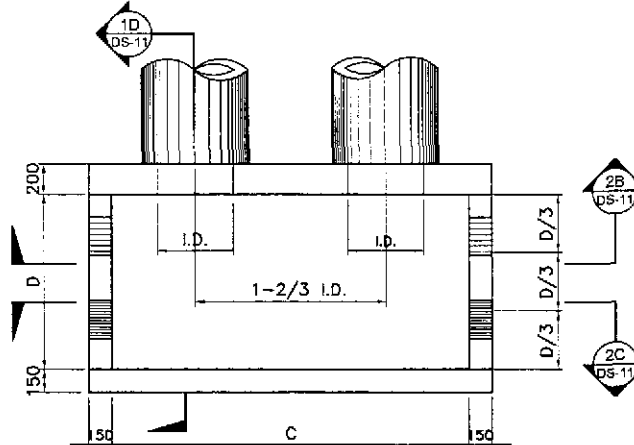
1B SECTION
DS-11



2B SECTION
DS-11



1A PLAN
DS-11



2A PLAN
DS-11

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

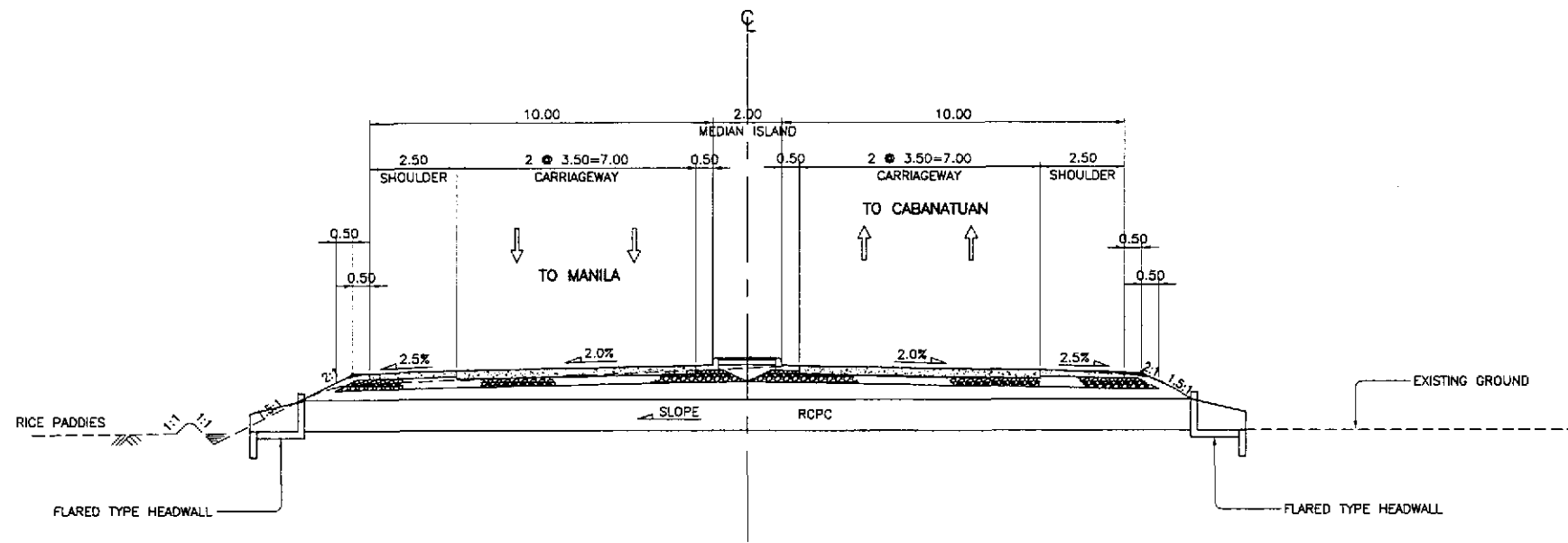
2 CONCRETE CATCH BASIN (DOUBLE PIPE)
SCALE 1:25
DS-11

REINFORCED CONCRETE CATCH BASIN DIMENSION FOR RCPC

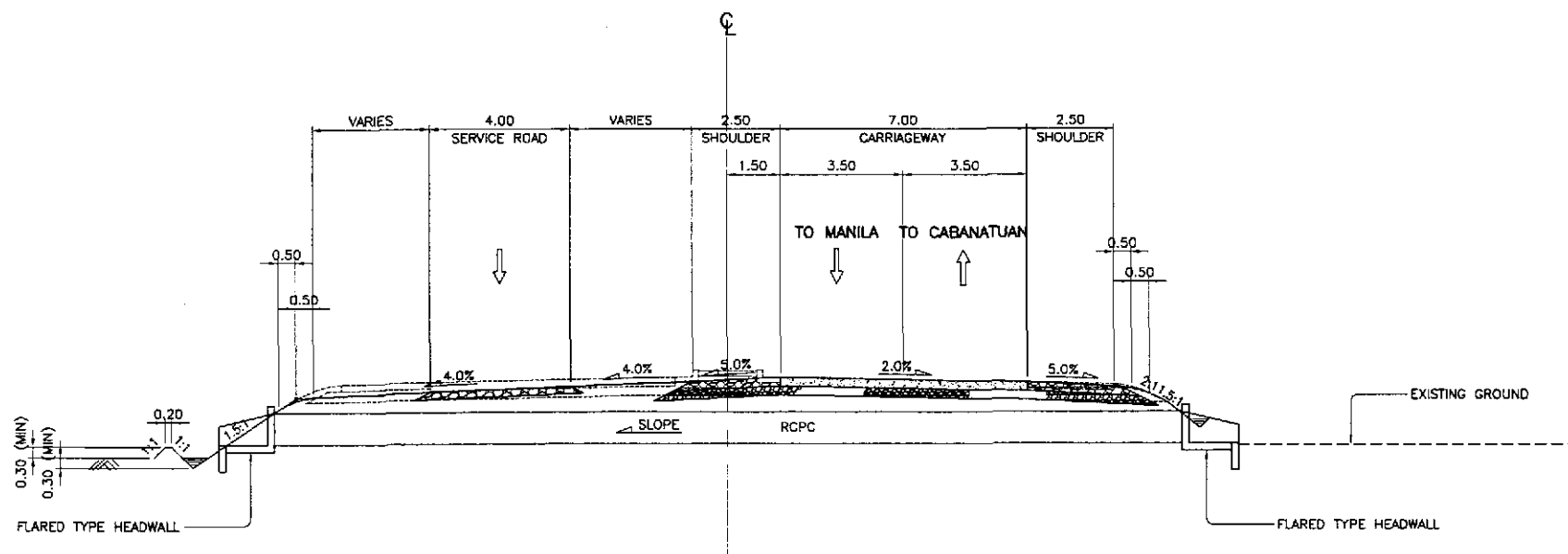
PIPE DIAMETER (mm)		610	910	1070	1220	1520
COMMON TO ALL NUMBER OF BARRELS	H	1.910	2.210	2.370	2.520	2.820
	D	1.200	1.500	1.650	1.800	2.100
SINGLE	C	1.210	1.510	1.670	1.820	2.120
DOUBLE	C	2.230	3.030	3.460	3.860	4.660
TRIPLE	C	3.250	4.550	5.240	5.890	7.120

DETAILS OF REINFORCED CONCRETE CATCH BASIN FOR RCPC

	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/18/02	[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) PLARIDEL BYPASS - CONTRACT PACKAGE II	1:25 FULL SIZE A1	STANDARD REINFORCED CONCRETE CATCH BASIN FOR RCPC	DS-11
	CHECKED	9/20/02	[Signature]	OFFICE OF THE SECRETARY						
	SUBMITTED	9/23/02	[Signature]	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. BONDAN, Undersecretary Approved By: SIMEON A. DATUMANONG, Secretary						
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. BONDAN, Undersecretary Approved By: SIMEON A. DATUMANONG, Secretary										

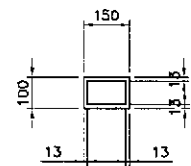


2
DS-12 SCALE 1:100
TYPICAL DRAINAGE SECTION (ULTIMATE STAGE)

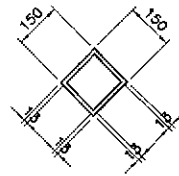


1
DS-12 SCALE 1:100
TYPICAL DRAINAGE SECTION (INITIAL STAGE)

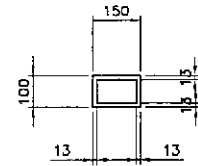
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION :			SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	7/20/02	<i>[Signature]</i>		THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)			NOT TO SCALE	TYPICAL DRAINAGE SECTIONS (INITIAL and ULTIMATE STAGE)	DS-12
	SUBMITTED	9/23/02	<i>[Signature]</i>		PLARIDEL BYPASS - CONTRACT PACKAGE II			FULL SIZE A1		
					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. BONDAN Undersecretary	Approved By: SIMEON A. DATUMANONG Secretary



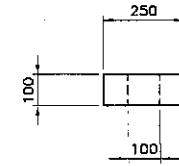
PLAN (POST)



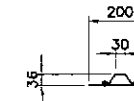
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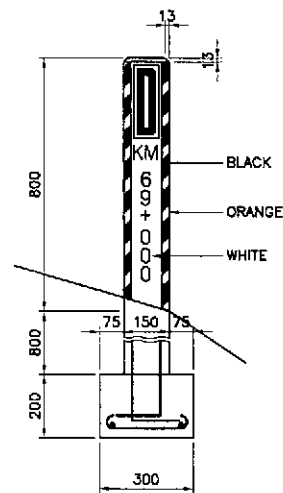
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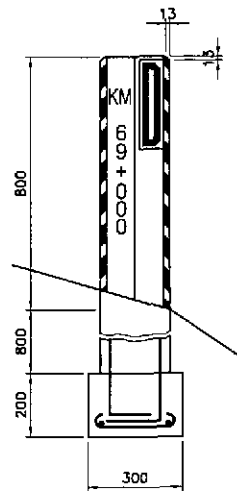
PLAN (POST)



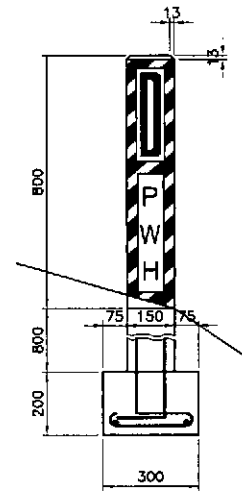
PLAN (POST)



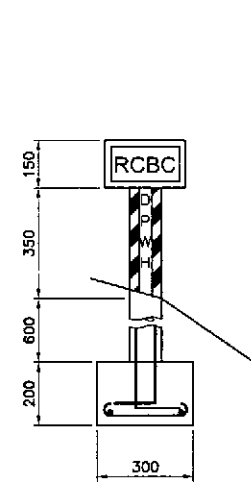
ELEVATION
CONCRETE MARKER
TYPE I-a



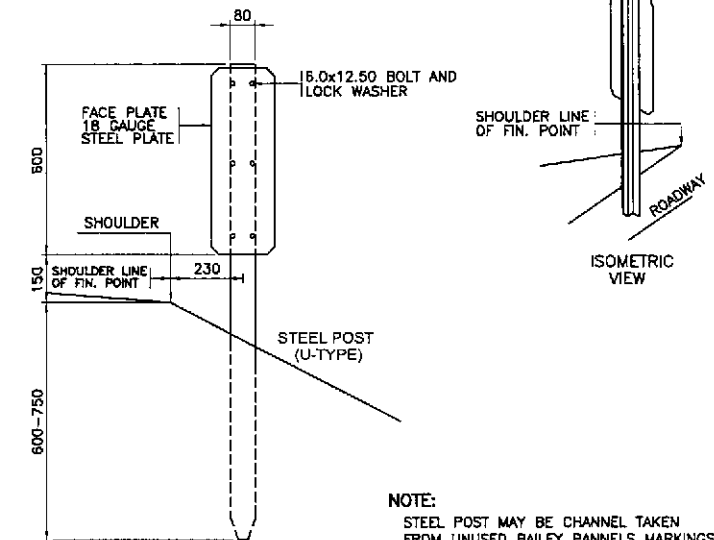
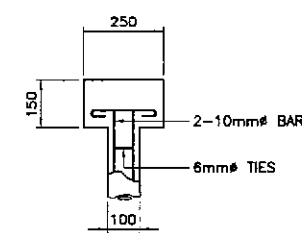
ELEVATION
CONCRETE MARKER
TYPE I-b



ELEVATION
CONCRETE MARKER
TYPE I-c

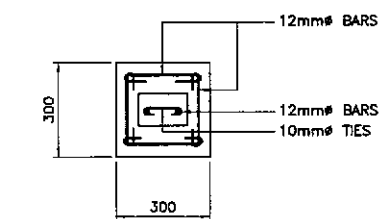


ELEVATION
CONCRETE MARKER
TYPE I-d

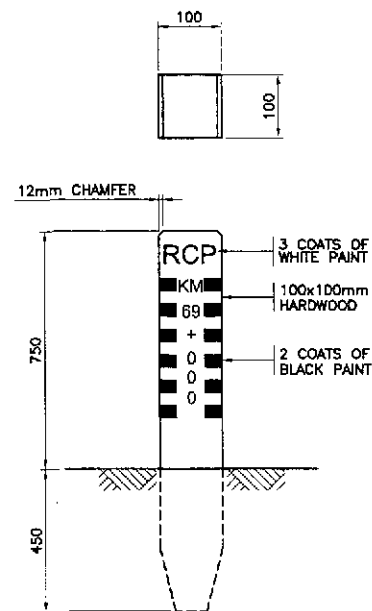


ELEVATION
STEEL MARKER
TYPE II

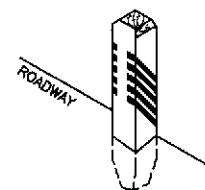
NOTE:
STEEL POST MAY BE CHANNEL TAKEN FROM UNUSED BAILEY PANELS MARKINGS AND PAINTINGS SAME AS FOR TYPE I AND TYPE II AS SHOWN.



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

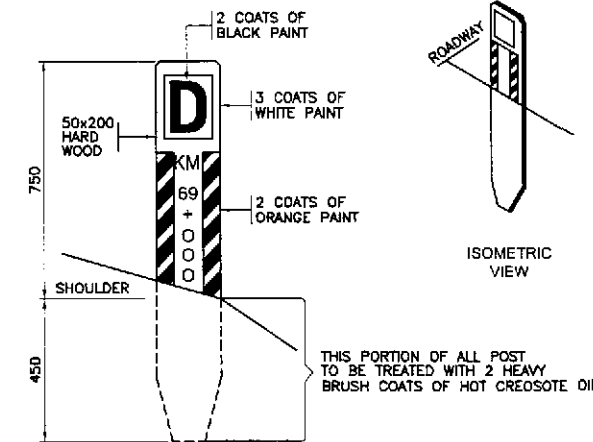


ELEVATION
WOODEN MARKER
TYPE II-a

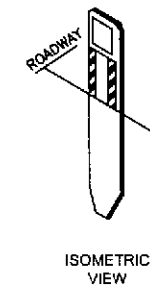


NOTE:
FACING ROADWAY STAKED AT CENTER LINE OF DRAINAGE 254mm AWAY FROM SHOULDER LINE OF FINAL POINT.

ISOMETRIC VIEW



ELEVATION
WOODEN MARKER
TYPE II-b



ISOMETRIC VIEW

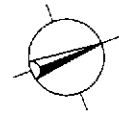
GENERAL NOTES

- 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 GLOSSED 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

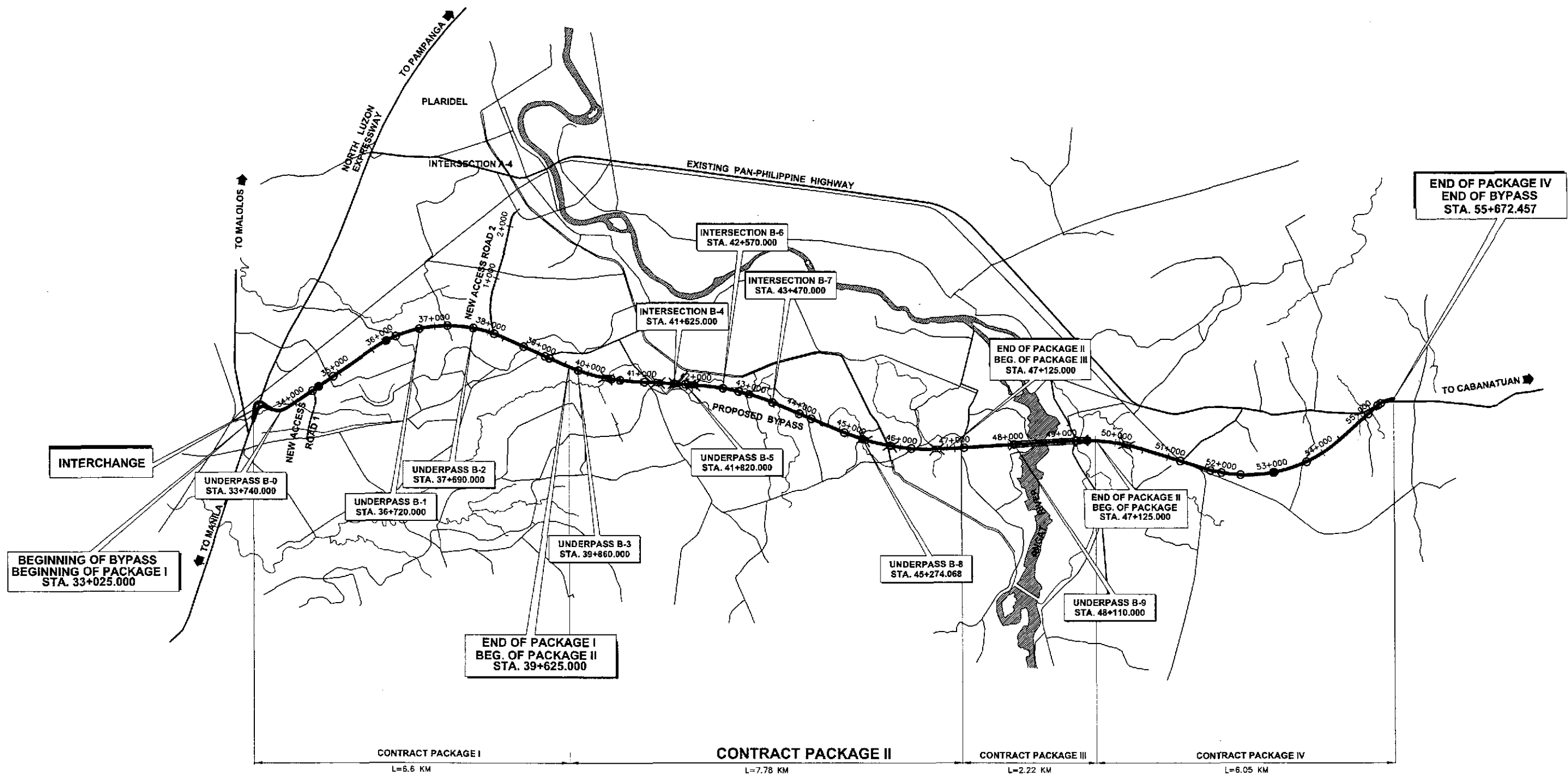
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION :			SCALE :	SHEET CONTENTS :	SHEET NO. :	
	CHECKED	9/20/02	[Signature]		BUREAU OF DESIGN	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)			NOT TO SCALE	STANDARD MAINTENANCE MARKERS	DS-13
	SUBMITTED	9/23/02	[Signature]		OFFICE OF THE SECRETARY	PLARIDEL BYPASS - CONTRACT PACKAGE II			FULL SIZE A1		
Submitted By: DANILLO C. TRAJANO, Project Director Reviewed By: JOSEFINA M. ALAGAR, Chief, Highways Division Recommended By: GILBERTO S. REYES, OC, Director IV Recommended By: MANUEL M. BONDAN, Undersecretary Approved By: SIMEON A. DATUMANONG, Secretary											

UNDERPASS CROSSING (BOX CULVERT)



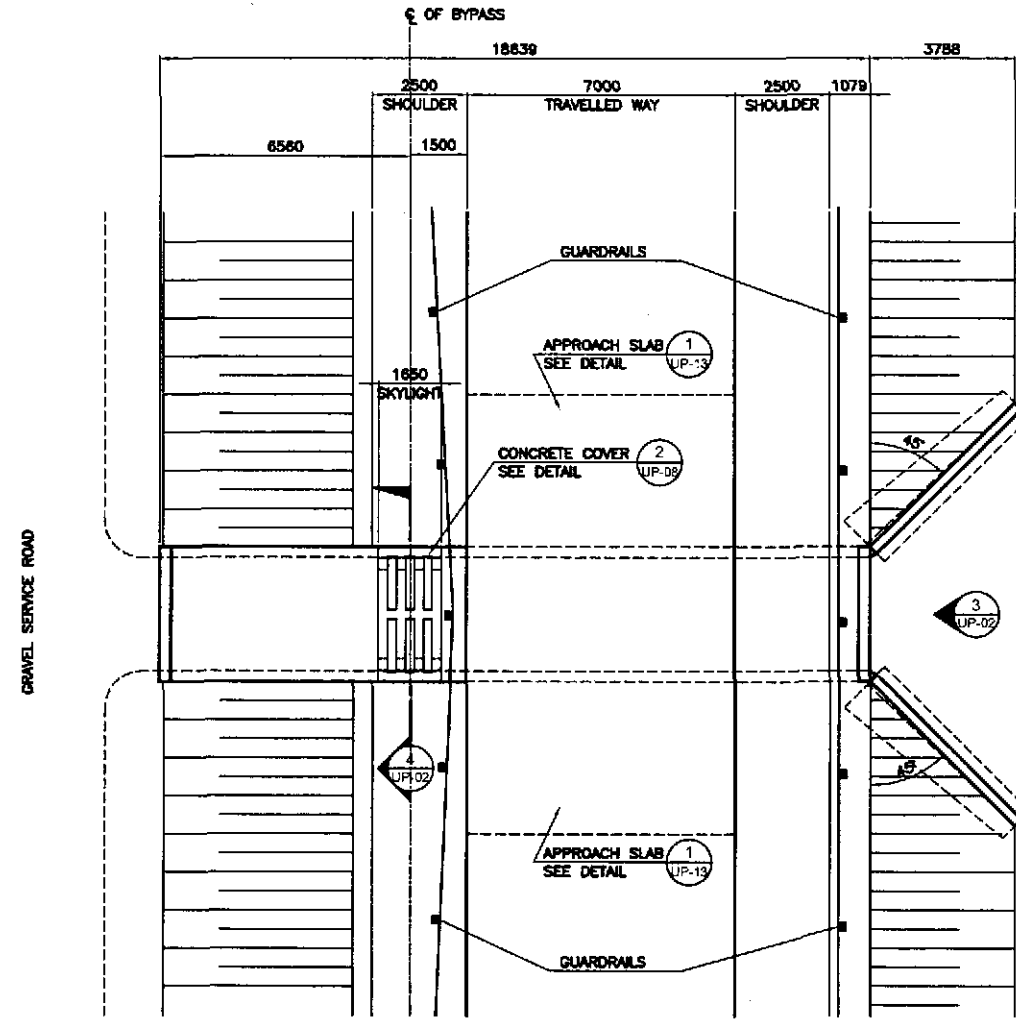
LEGEND:

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

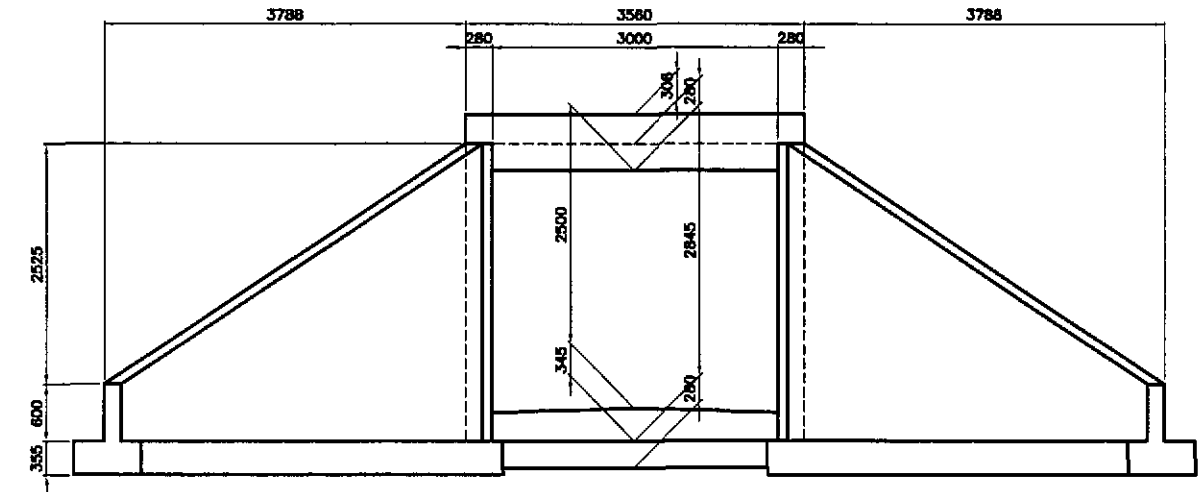


A SITE DEVELOPMENT PLAN - UNDERPASSES ALONG BYPASS
 UP-01 SCALE 1:40,000

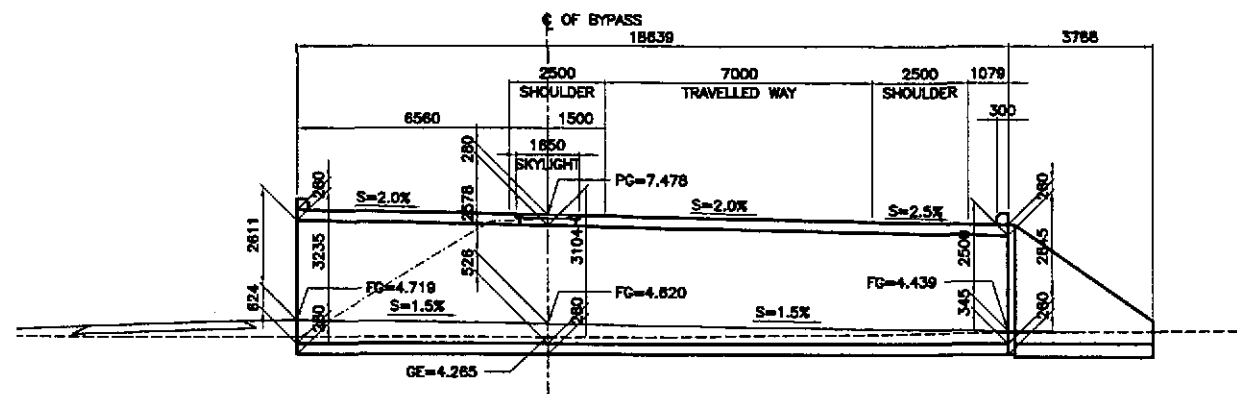
	DESIGNED	9/18/02			REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE :	SHEET CONTENTS : SITE DEVELOPMENT PLAN UNDERPASSES ALONG BYPASS	SHEET NO. : UP-01	
	CHECKED	9/20/02			Submitted By:	Reviewed By:	Recommended By:		Approved By:			1:40,000
	SUBMITTED	9/23/02			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



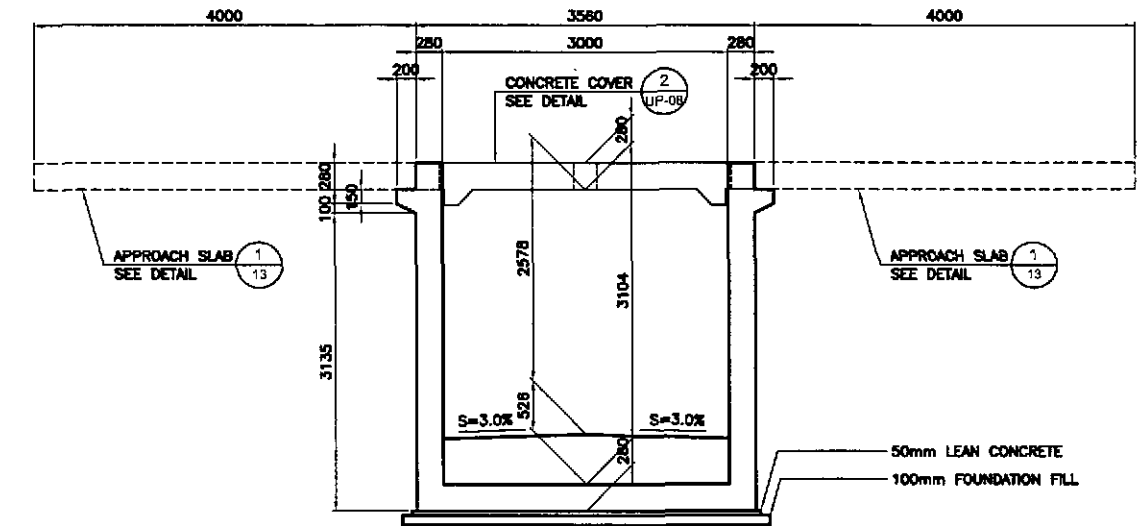
1 GENERAL PLAN
UP-02 SCALE 1:100



3 ELEVATION
UP-02 SCALE 1:40

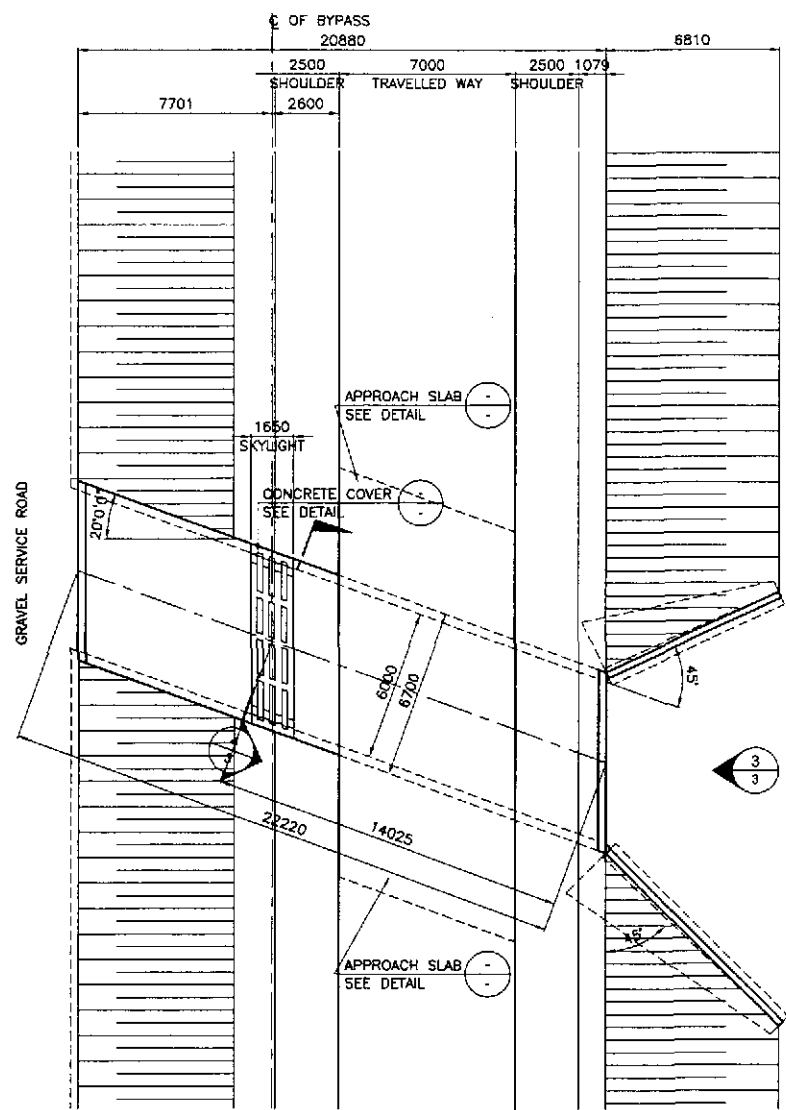


2 GENERAL ELEVATION
UP-02 SCALE 1:100

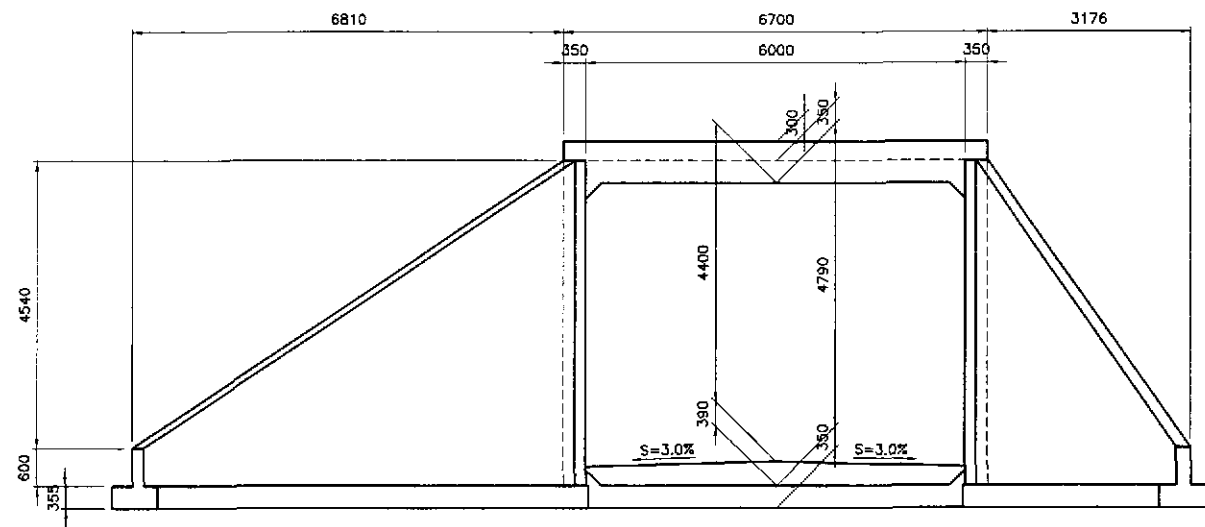


4 SECTION
UP-02 SCALE 1:40

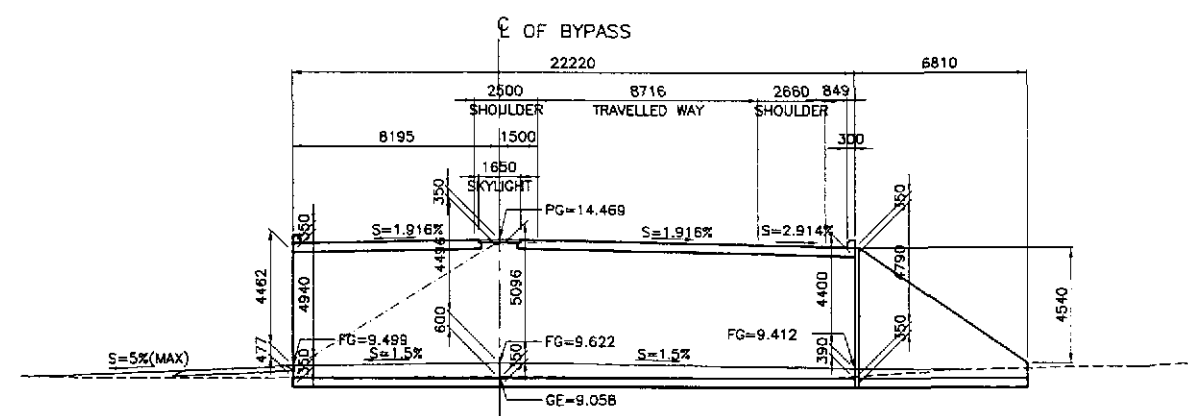
	DESIGNED	9/18/02		PROJECT AND LOCATION :		SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	9/22/02		THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		AS SHOWN	BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (INITIAL STAGE) B-3 (STA. 39+860.00)	UP-02
SUBMITTED	9/23/02	PLARIDEL BYPASS - CONTRACT PACKAGE II		FULL SIZE A1				



1 GENERAL PLAN
SCALE 1:150

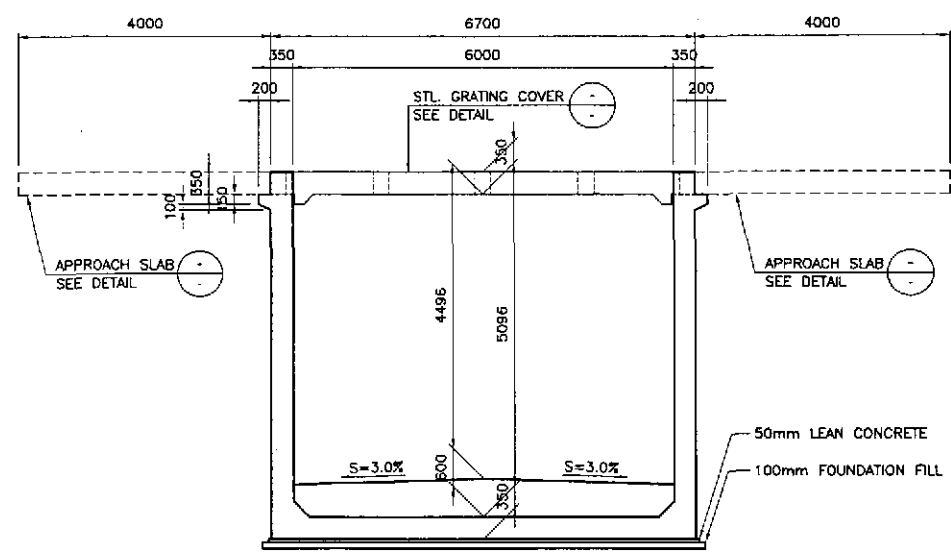


3 ELEVATION
SCALE 1:60



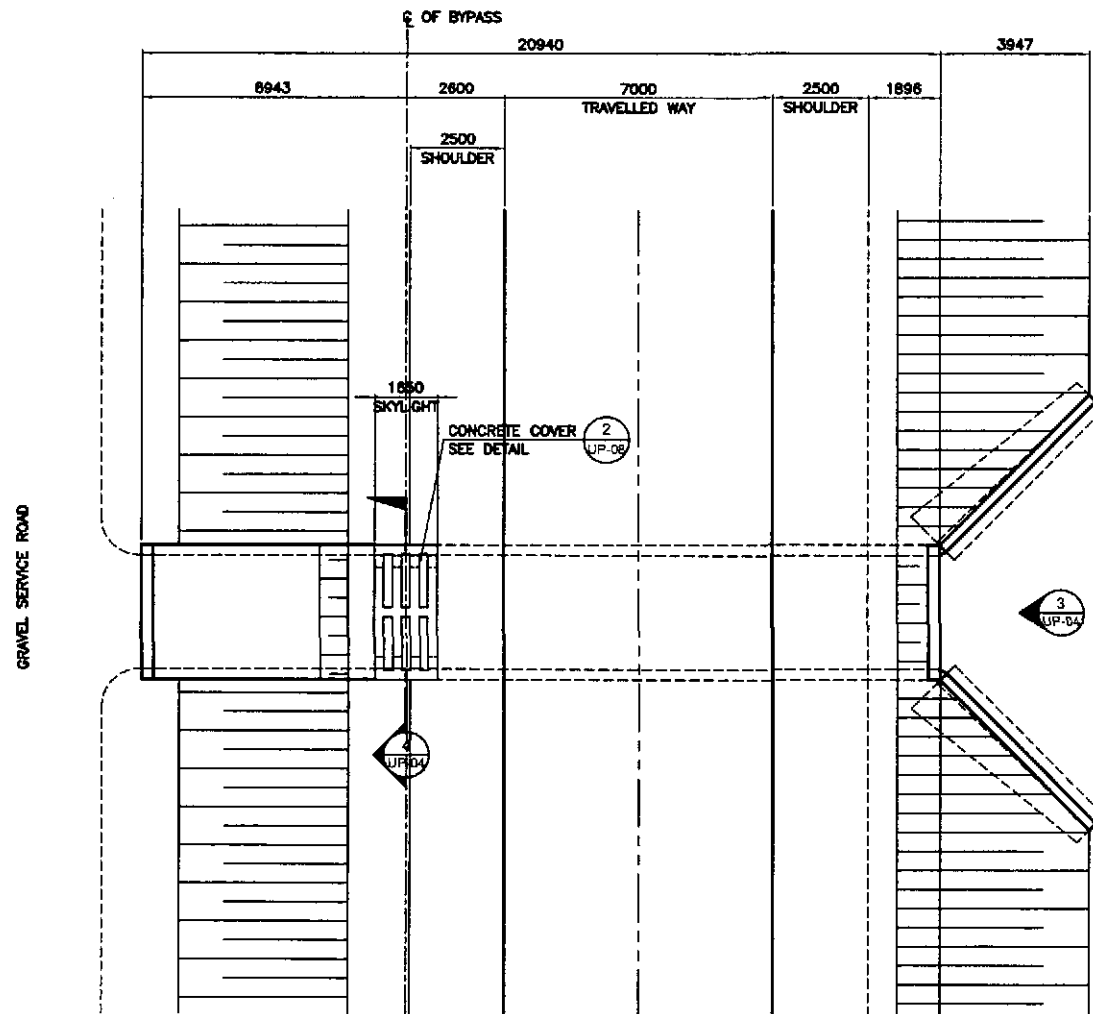
NOTE:
THE HORIZONTAL DIMENSIONS INDICATED IN THIS ELEVATION ARE SKEWED LENGTH

2 GENERAL ELEVATION
SCALE 1:150

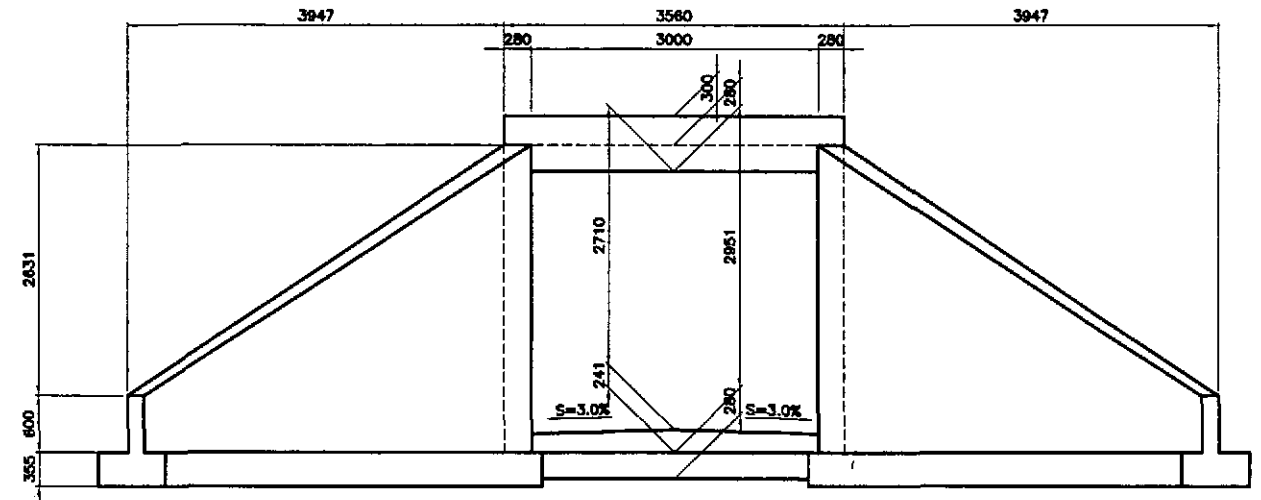


4 SECTION
SCALE 1:60

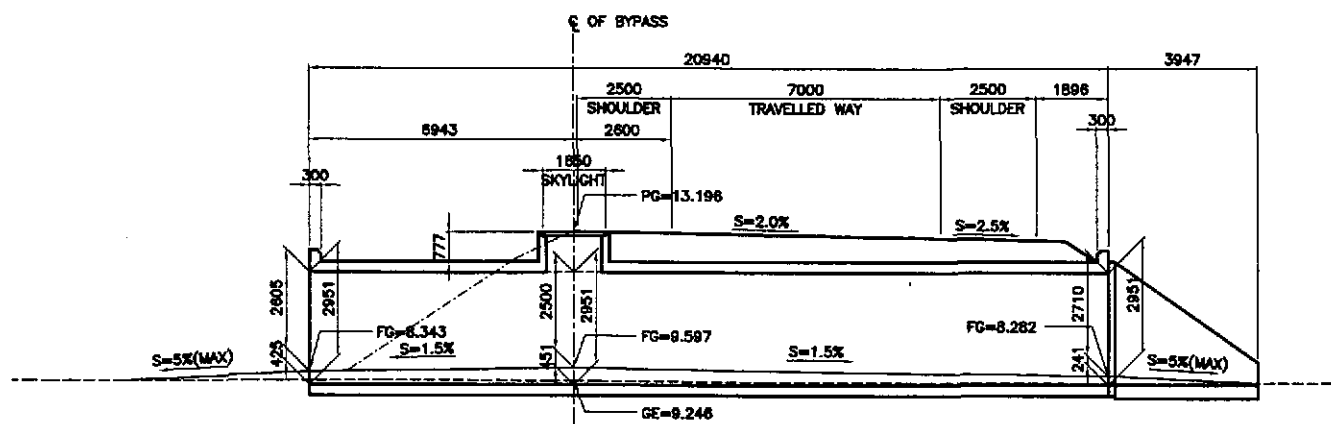
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS					PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : FULL SIZE A1	SHEET CONTENTS : BOX CULVERT GEN. PLAN, ELEVATION & SECTION B4- (STA: 41+625.00) (INITIAL STAGE)	SHEET NO. : UP-03
	CHECKED	7/10/02	[Signature]		BUREAU OF DESIGN								
	SUBMITTED	7/27/02	[Signature]		Submitted By:	Reviewed By:	Recommended By:	Recommended By:	Approved By:				
					DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES DIC, Director IV	MANUEL M. BONDAN Undersecretary	SIMEON A. DATUMANONG Secretary				



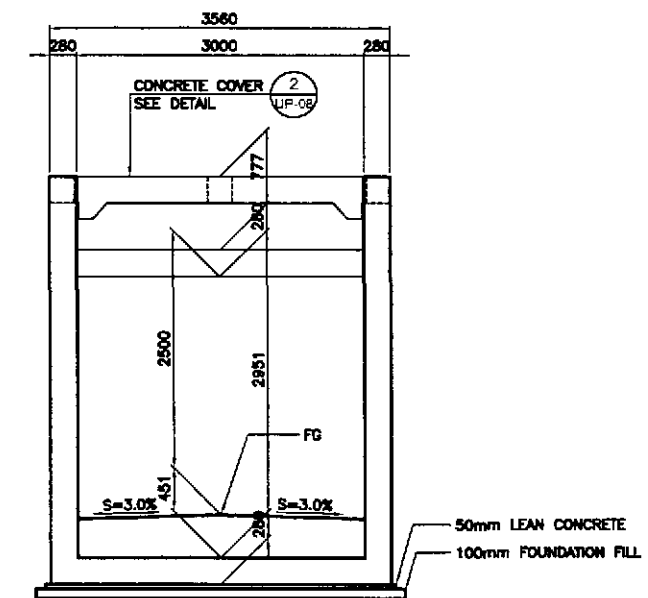
1 GENERAL PLAN
UP-04 SCALE 1:100



3 ELEVATION
UP-04 SCALE 1:40

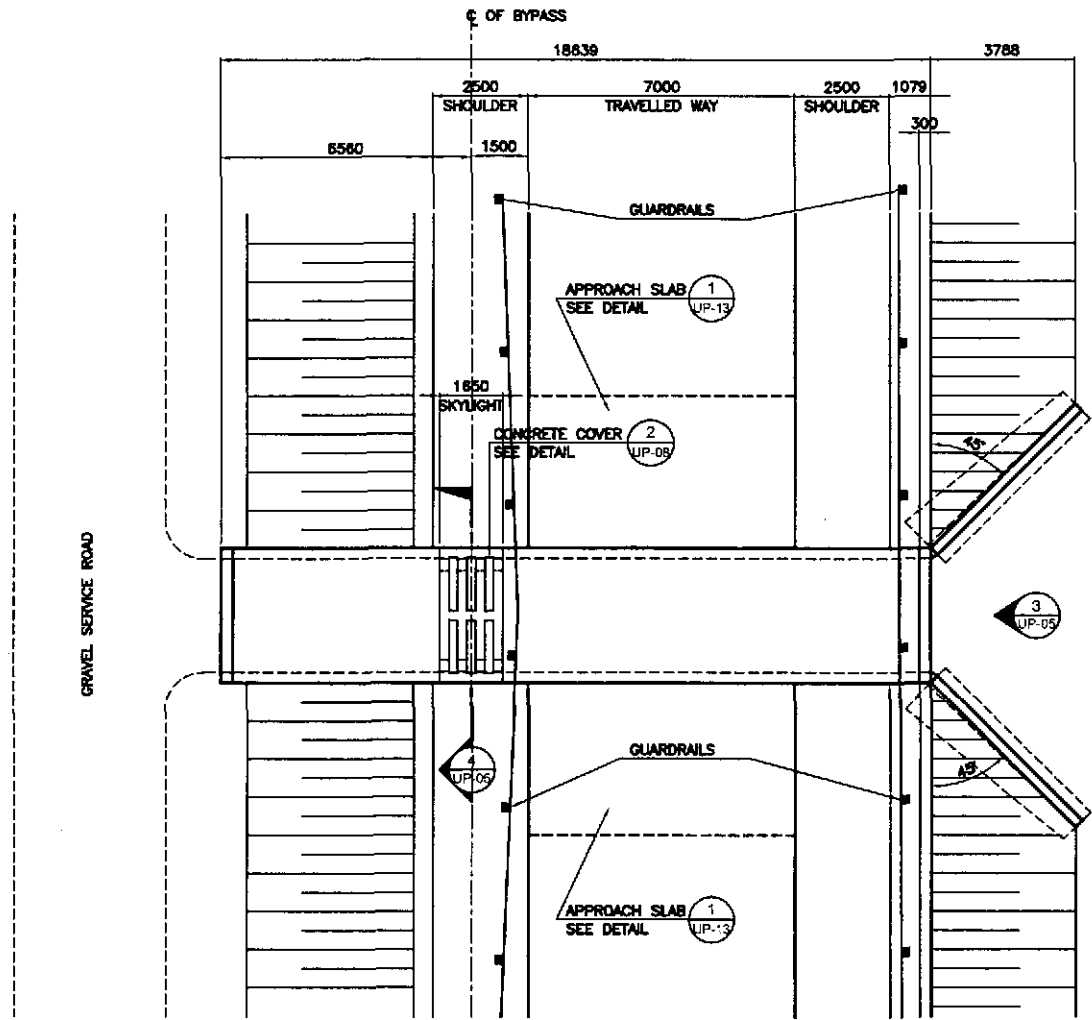


2 GENERAL ELEVATION
UP-04 SCALE 1:100

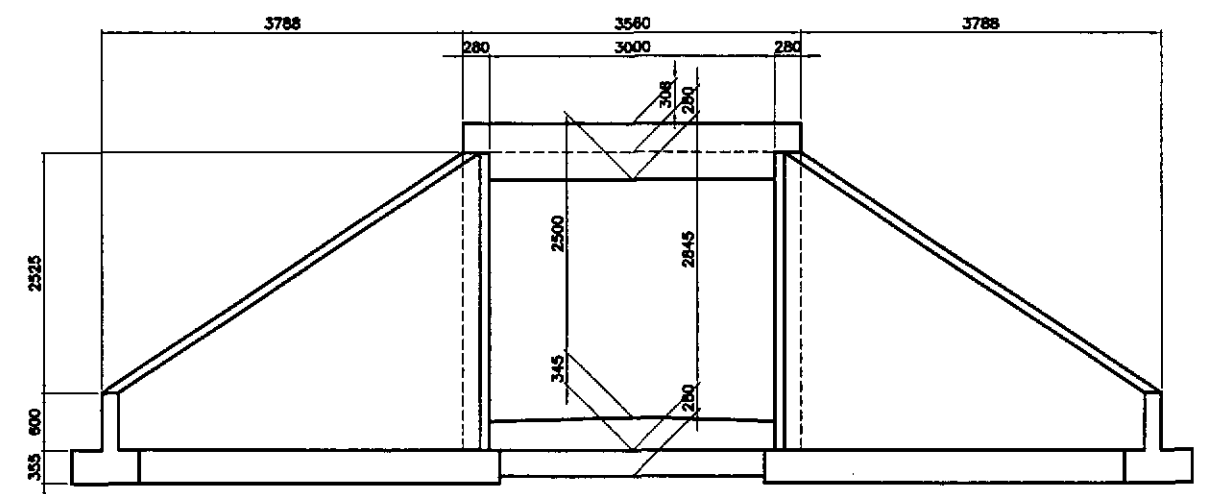


4 SECTION
UP-04 SCALE 1:40

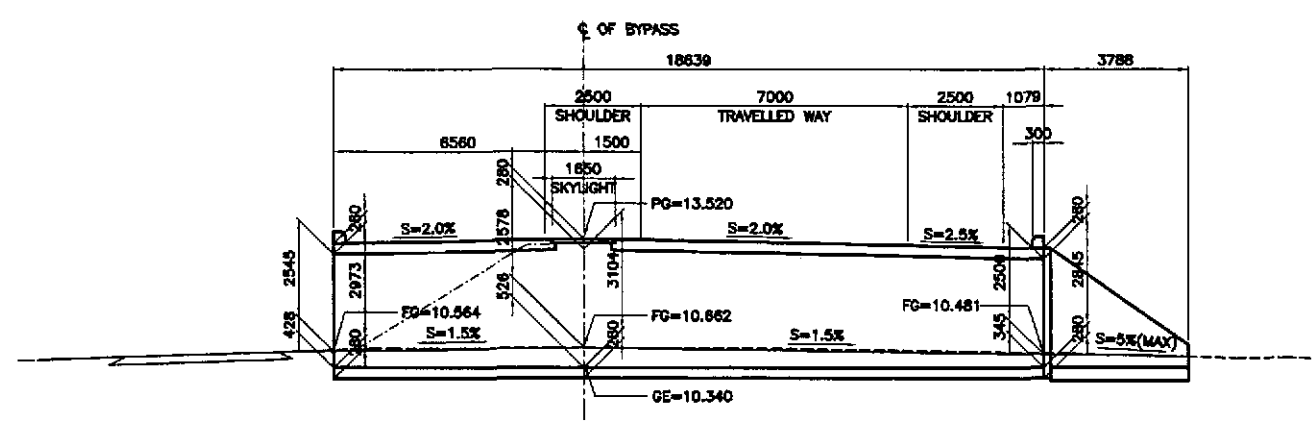
	DESIGNED	9/18/02		<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION :			SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	9/20/02			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)			AS SHOWN	BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (INITIAL STAGE) B-5 (STA. 41+820.00)	UP-04
	SUBMITTED	9/23/02			PLARIDEL BYPASS - CONTRACT PACKAGE II			FULL SIZE A1		
<p>FUNL - PMO</p> <p>Submitted By: DANILO C. TRAJANO Project Director</p> <p>Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division</p> <p>Recommended By: GILBERTO S. REYES C.C. Director IV</p> <p>Office of the Secretary</p> <p>Recommended By: MANUEL M. BONDAN Undersecretary</p> <p>Approved By: SMEON A. DATUMANONG Secretary</p>				<p>PROJECT AND LOCATION :</p> <p>THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)</p> <p>PLARIDEL BYPASS - CONTRACT PACKAGE II</p>			SCALE :	SHEET CONTENTS :	SHEET NO. :	



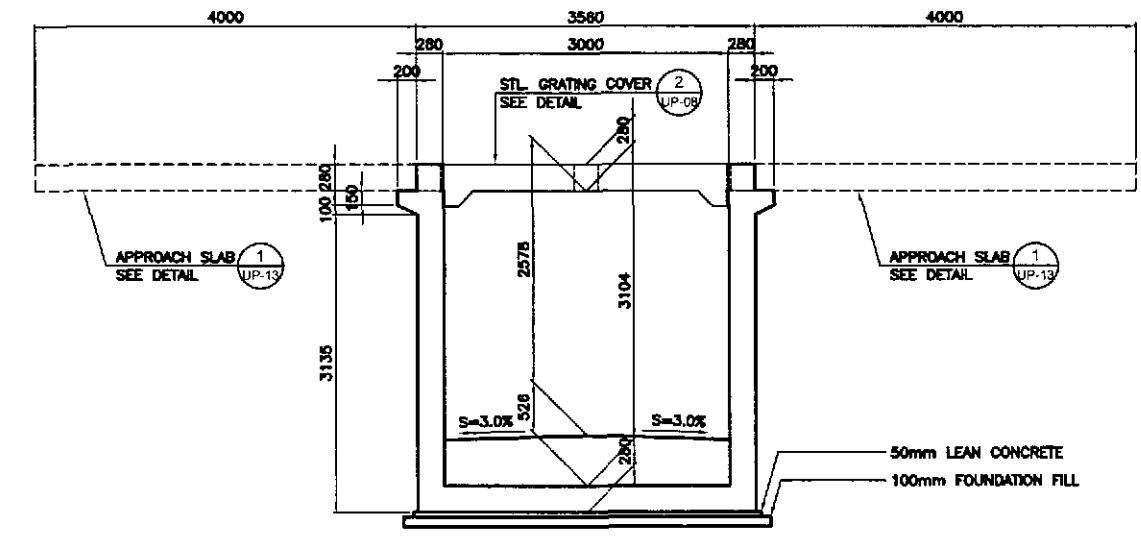
1 GENERAL PLAN
UP-05 SCALE 1:100



3 ELEVATION
UP-05 SCALE 1:40

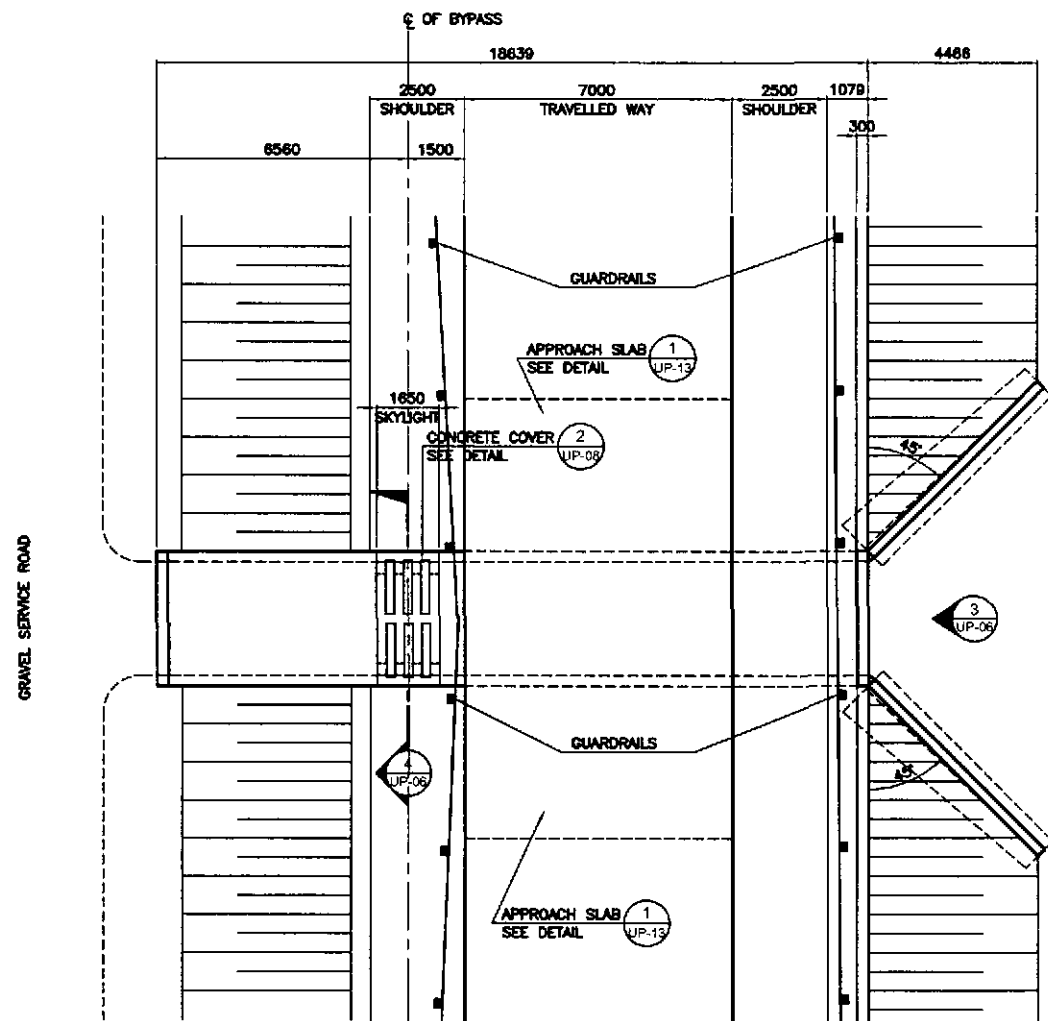


2 GENERAL ELEVATION
UP-05 SCALE 1:100

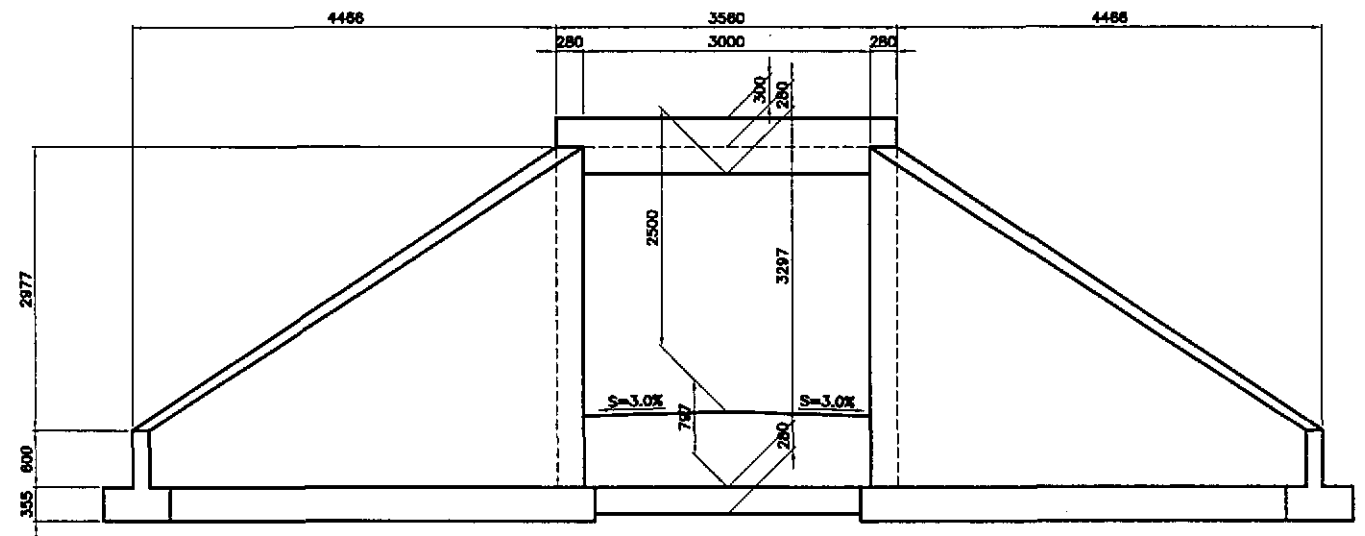


4 SECTION
UP-05 SCALE 1:40

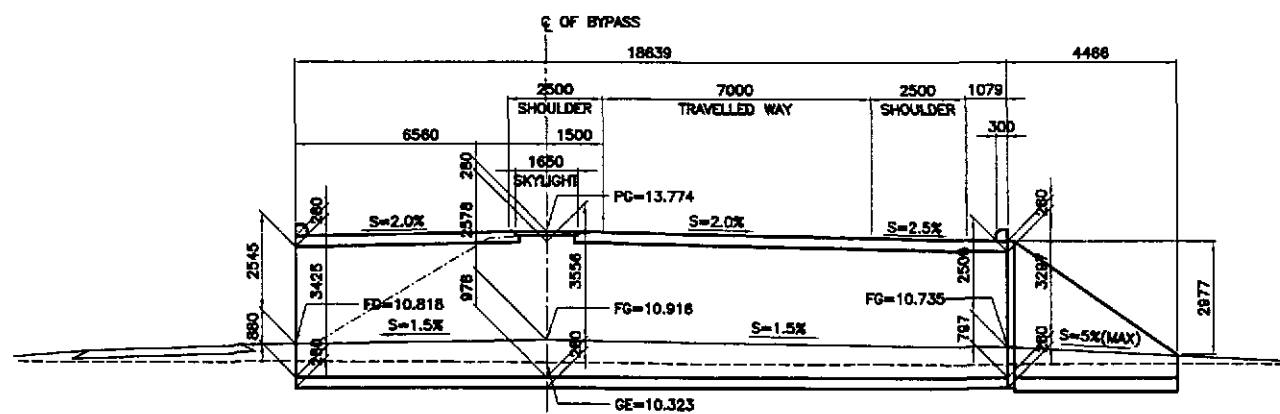
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (INITIAL STAGE) B-6 (STA. 42+555.00)	SHEET NO. : UP-05
	CHECKED	9/20/02	[Signature]		BUREAU OF DESIGN						
SUBMITTED	9/23/02	[Signature]	P.W.H. - P.W.O. Submitted By: DANIL C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES O.C. Director IV	Recommended By: MANUEL M. BONDAN Undersecretary	Approved By: SIMON A. DATUMANONG Secretary				



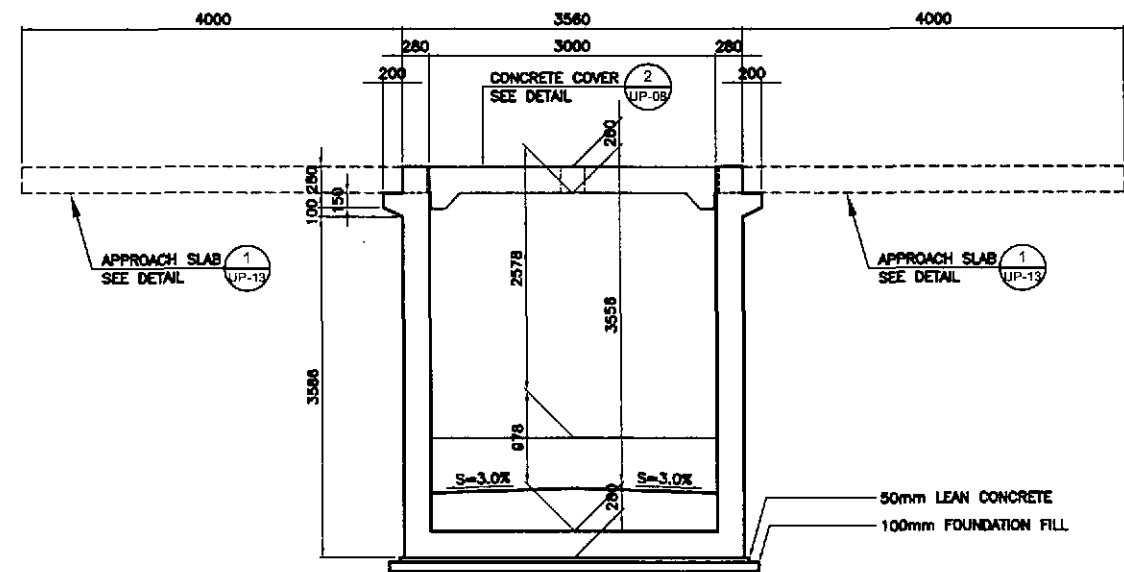
1 GENERAL PLAN
UP-06 SCALE 1:100



3 ELEVATION
UP-06 SCALE 1:40

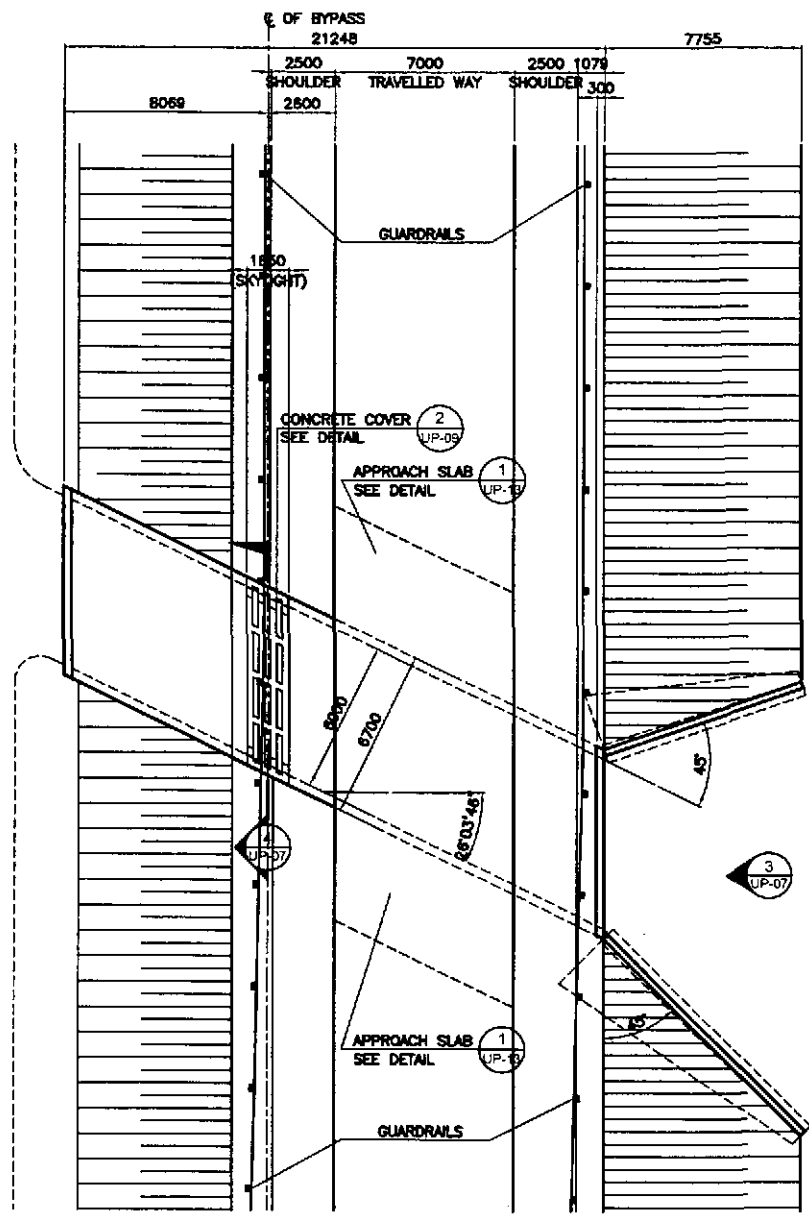


2 GENERAL ELEVATION
UP-06 SCALE 1:100

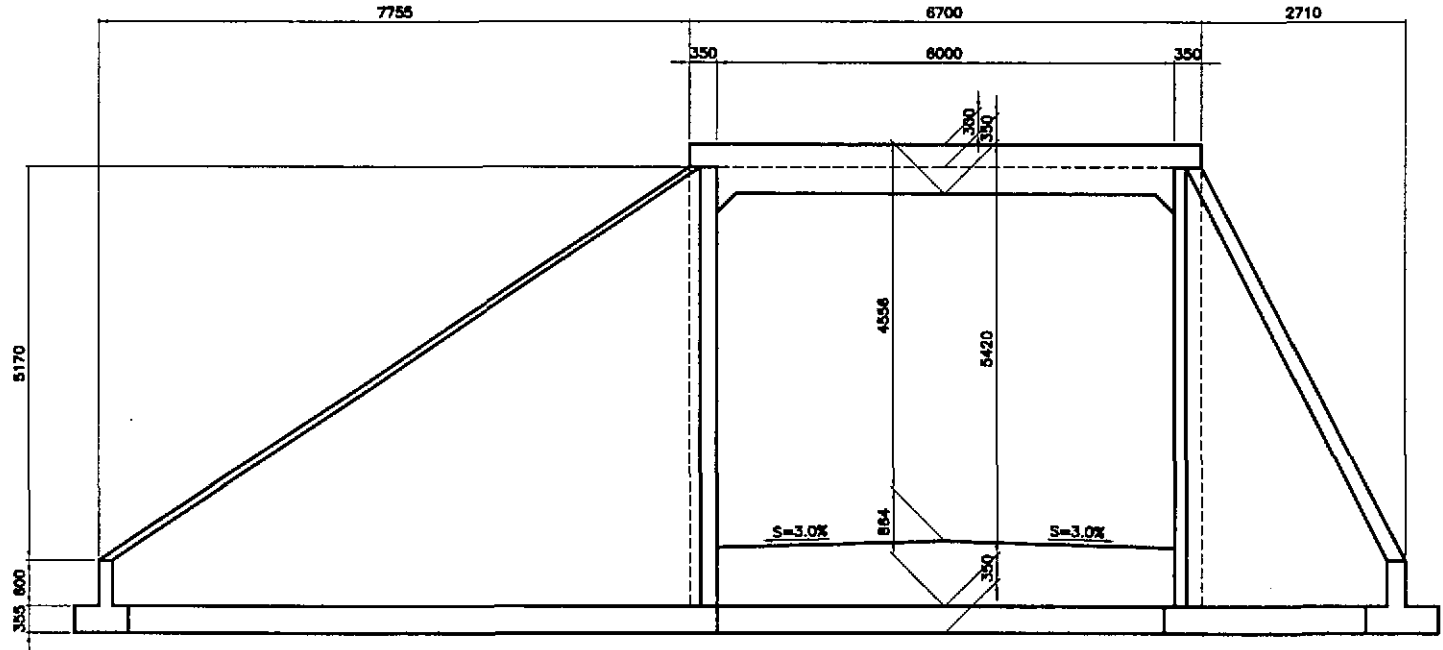


4 SECTION
UP-06 SCALE 1:40

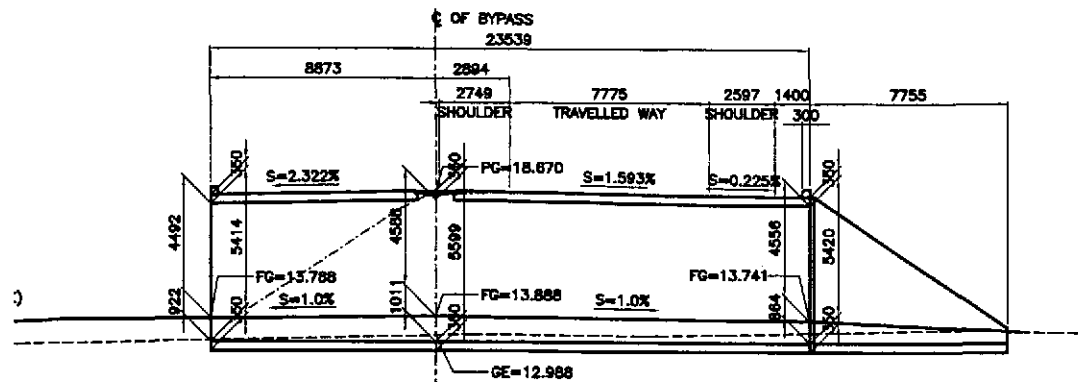
	DESIGNED	DATE	DATE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BOX CULVERT GENERAL PLAN, ELEVATION & SECTION (INITIAL STAGE) B-7 (STA. 43+440.00)	SHEET NO. : UP-06
	CHECKED	DATE	DATE		Submitted By:	Reviewed By:	Recommended By:				
	SUBMITTED	DATE	DATE	DANIL C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highway Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONGAN Undersecretary	SIMEON A. DATUMANONG Secretary			



1 GENERAL PLAN
UP-07 SCALE 1:150

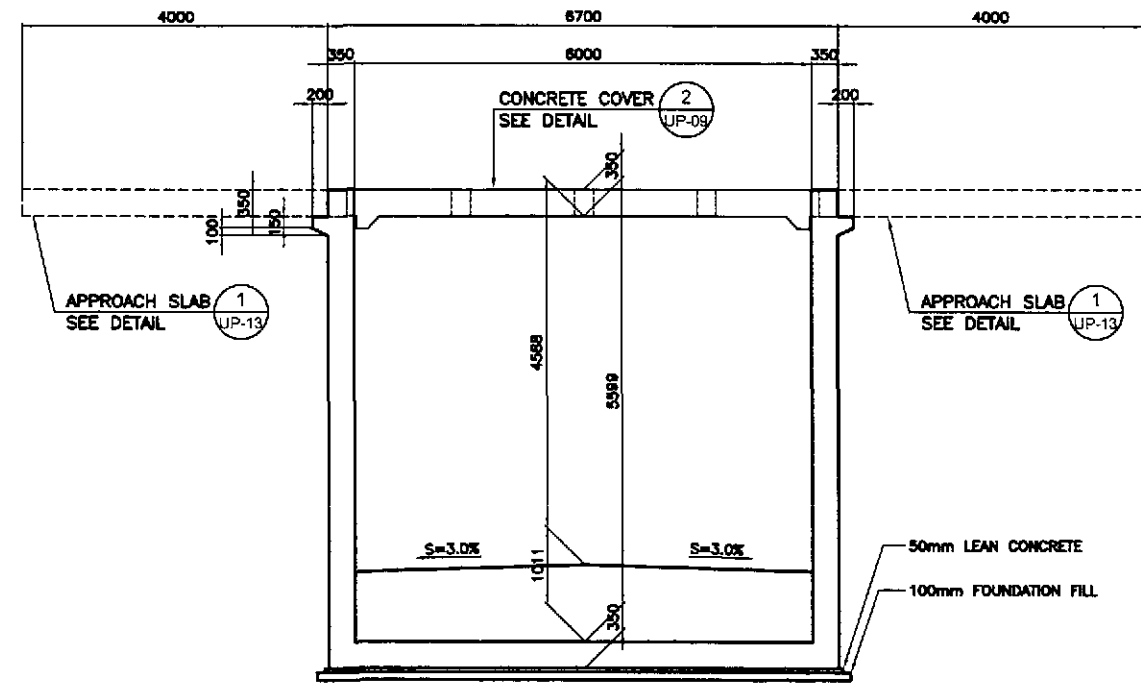


3 ELEVATION
UP-07 SCALE 1:50



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

2 GENERAL ELEVATION
UP-07 SCALE 1:150



4 SECTION
UP-07 SCALE 1:50

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

DESIGNED	DATE	SIGNATURE
9/18/02		
CHECKED	9/20/02	
SUBMITTED	9/23/02	

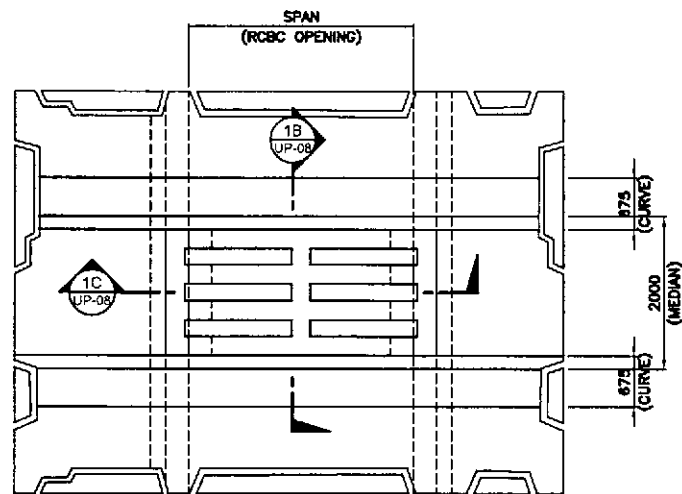
BUREAU OF DESIGN		OFFICE OF THE SECRETARY		
Submitted By:	Reviewed By:	Recommended By:	Approved By:	Approved By:
DANILO C. TRINIDAD Project Director	JOSEFINA M. ALADAR Chief, Highways Division	GILBERTO S. REYES OC, Director IV	MANUEL M. BONOAN Undersecretary	SIMEON A. DATUMANONG Secretary

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

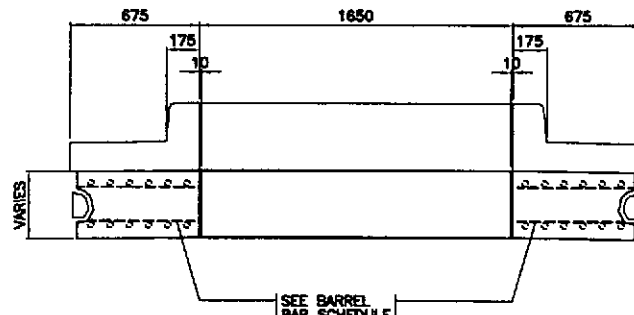
SCALE :
AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BOX CULVERT
GENERAL PLAN, ELEVATION & SECTION
(INITIAL STAGE)
B-8 (STA. 45+276.072)

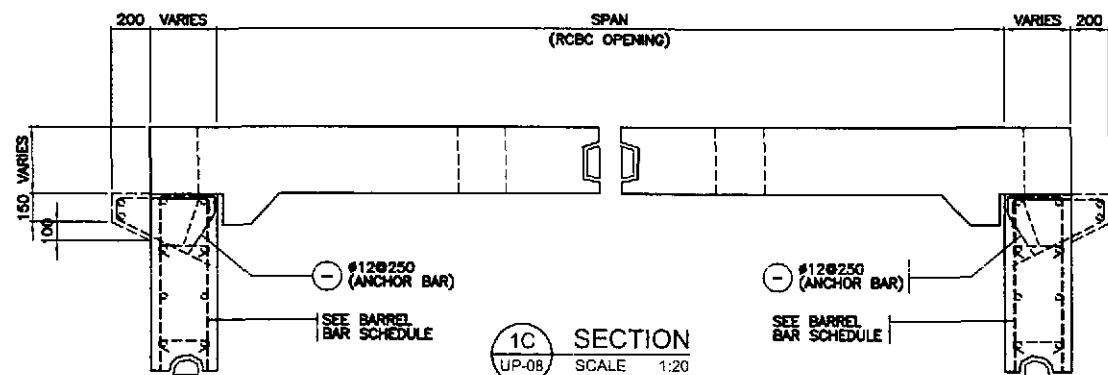
SHEET NO. :
UP-07



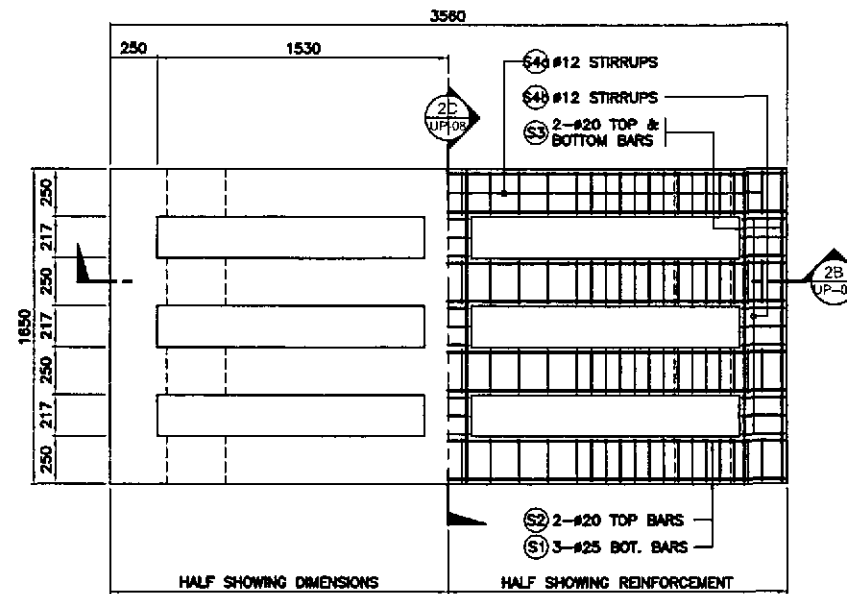
1A PARTIAL PLAN
UP-08 SCALE 1:50



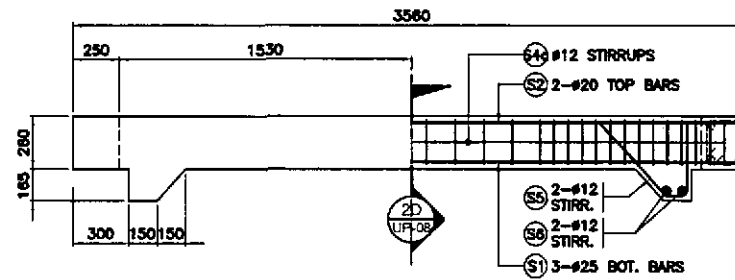
1B SECTION
UP-08 SCALE 1:20



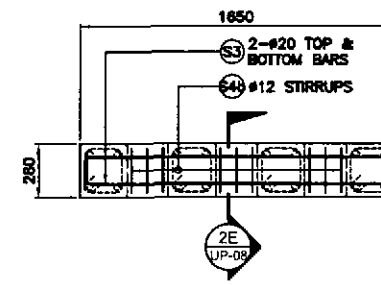
1 PARTIAL BOX SUPPORT DETAILS
UP-08 SCALE AS SHOWN



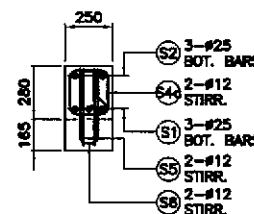
2A PLAN DETAIL
UP-08 SCALE 1:20



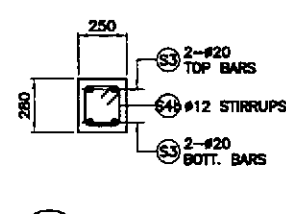
2B SECTION
UP-08 SCALE 1:20



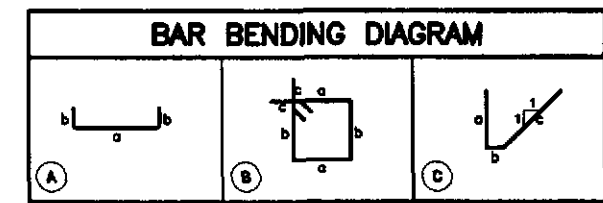
2C SECTION
UP-08 SCALE 1:20



2D SECTION
UP-08 SCALE 1:20



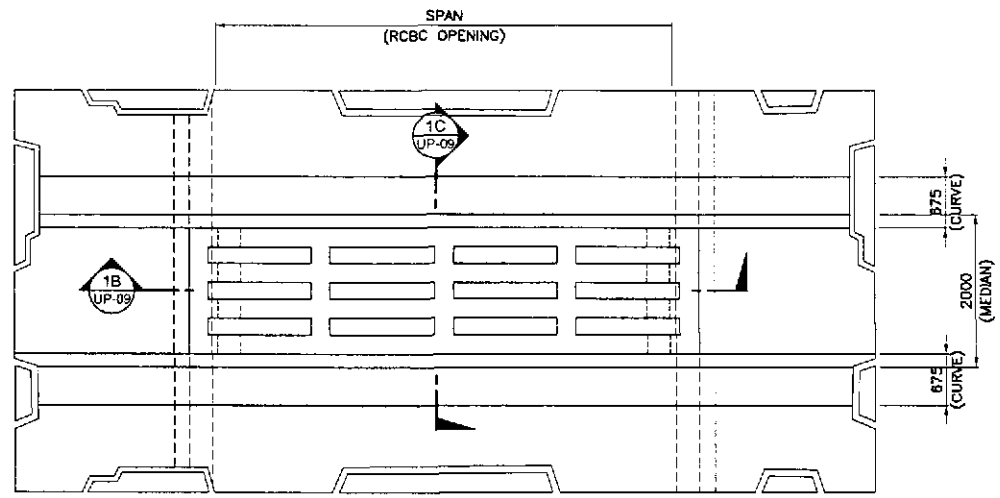
2E SECTION
UP-08 SCALE 1:20



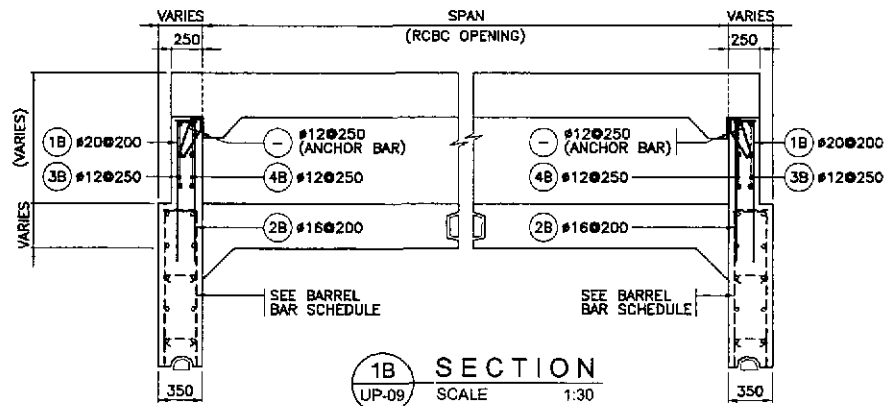
2 CONCRETE COVER DETAILS (3.0 M.)
UP-08 SCALE AS SHOWN

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	f					
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	80	
	S4a	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	18	AS DWG	(C)	395	125	580	-	-	-	1080	17.28	0.888	18	
	S6	12	18	AS DWG	(A)	100	385	-	-	-	-	870	13.92	0.888	13	
GRAND TOTAL =													508 KG	1.2		

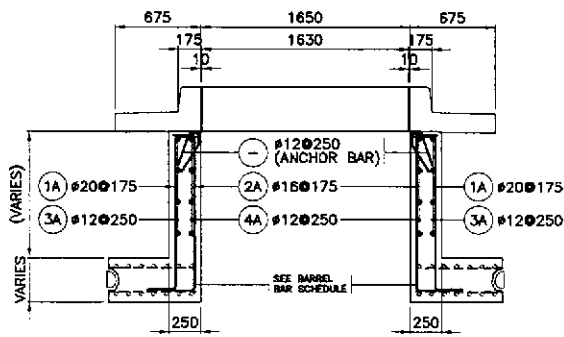
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE II	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : BOX CULVERT CONCRETE COVER DETAILS (3.0 M.) WITH BOX SUPPORT (RCBC OPENING) (INITIAL STAGE)	SHEET NO. : UP-08
	CHECKED	DATE	SIGNATURE		BUREAU OF DESIGN Submitted By: DANILO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chair, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV				



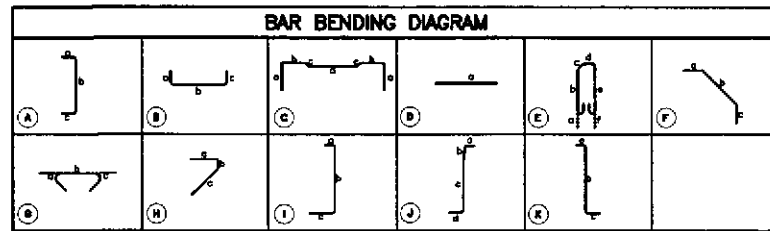
1A PARTIAL PLAN
UP-09 SCALE 1:50



1B SECTION
UP-09 SCALE 1:30

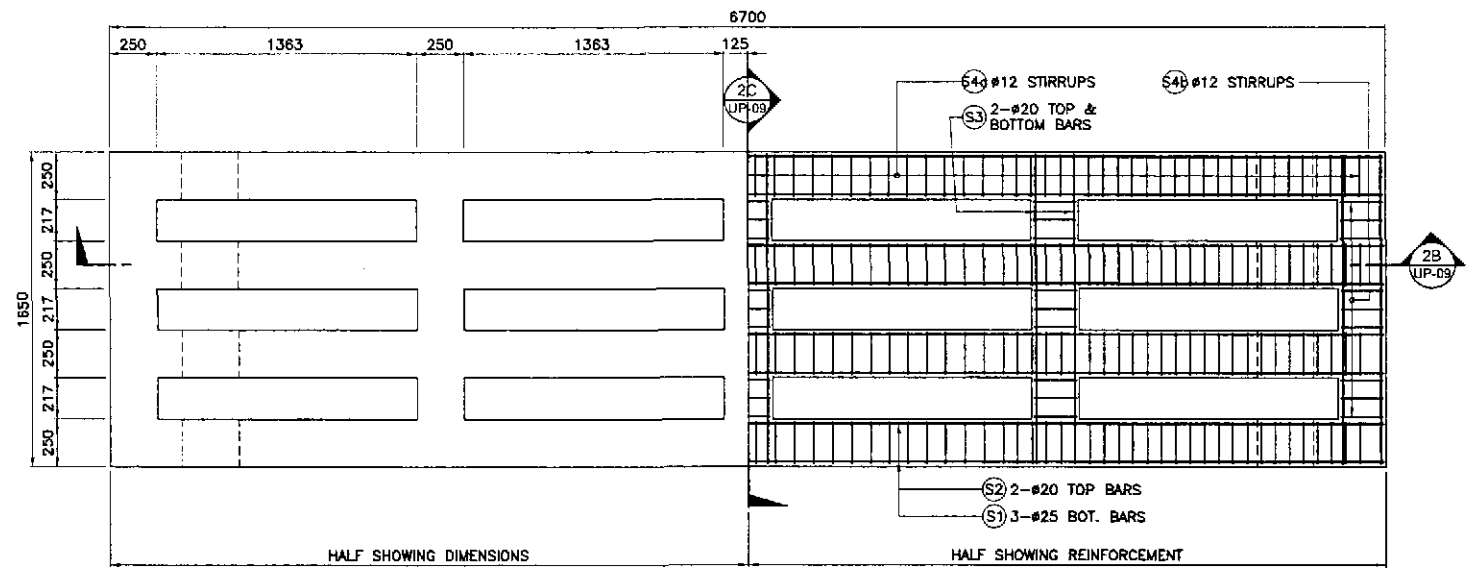


1C SECTION
UP-09 SCALE 1:30

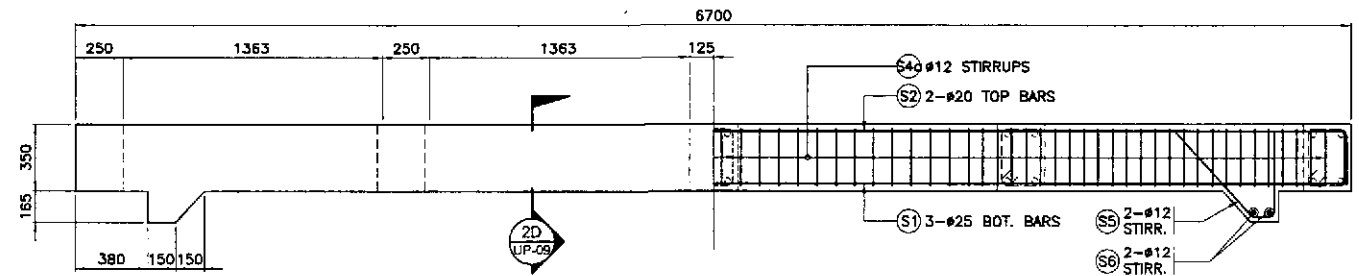


1 PARTIAL BOX SUPPORT DETAILS
UP-09 SCALE AS SHOWN

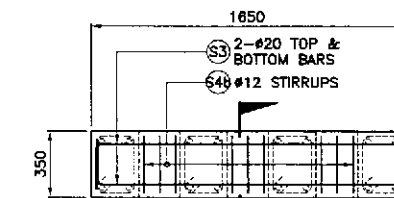
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA. BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m ³)
						a	b	c	d	e	f					
BOX SUPPORT	1a	20	44	200	(L)	305	1330	-	-	-	-	1835	71.94	2.466	178	2.85
	1b	20	16	200	(D)	1330	-	-	-	-	-	1330	21.28	2.466	53	
	2a	16	44	200	(L)	254	1330	-	-	-	-	1584	69.7	1.579	111	
	2b	18	18	200	(D)	1330	-	-	-	-	-	1330	21.28	1.579	34	
	3a	12	12	250	(B)	203	3400	203	-	-	-	3806	45.87	0.888	41	
	3b	12	12	250	(B)	150	3400	150	-	-	-	3700	44.4	0.888	40	
	4a	12	12	250	(B)	203	1860	203	-	-	-	2266	27.19	0.888	25	
	4b	12	12	250	(B)	150	1860	150	-	-	-	2160	25.92	0.888	24	
	5	12	68	500	(C)	114	150	114	-	-	-	378	24.95	0.888	23	
	GRAND TOTAL =													529 KG	2.85	



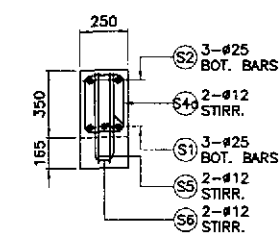
2A PLAN
UP-09 SCALE 1:20



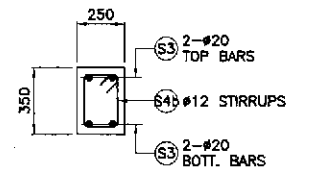
2B SECTION
UP-09 SCALE 1:50



2C SECTION
UP-09 SCALE 1:20



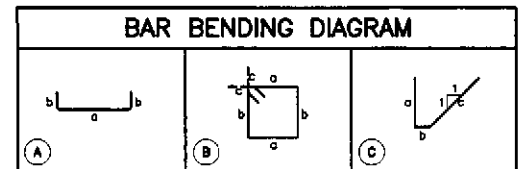
2D SECTION
UP-09 SCALE 1:20



2E SECTION
UP-09 SCALE 1:20

2 CONCRETE COVER DETAILS (6.0 M.)
UP-09 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	f					
6.0 M SPW	S1	32	8	AS DWG	(A)	6550	276	-	-	-	-	7202	57.82	8.313	364	2.7
	S2	20	8	AS DWG	(A)	6550	276	-	-	-	-	7202	57.82	2.466	143	
	S3	20	20	AS DWG	(A)	1600	276	-	-	-	-	2152	43.04	2.466	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	680	-	-	-	1250	20	0.888	18	
S6	12	15	AS DWG	(A)	100	485	-	-	-	-	1030	16.48	0.888	15		
GRAND TOTAL =													1023 KG	2.7		



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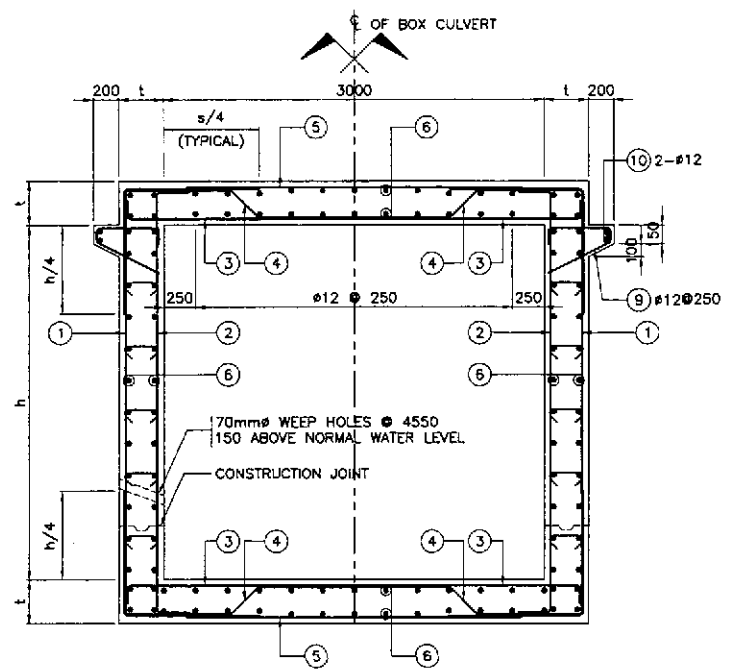
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
OFFICE OF THE SECRETARY
DESIGNED: 9/18/02
CHECKED: 9/20/02
SUBMITTED: 9/23/02
DATE: 9/23/02
SIGNATURES: [Signatures]
P.J.H. - PMD
Submitted By: DANILLO C. TRAJANO
Reviewed By: JOSEFINA M. ALAGAR
Recommended By: GILBERTO S. REYES
Approved By: MANUEL M. BONDAN
SIMEON A. DATUMANONG

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

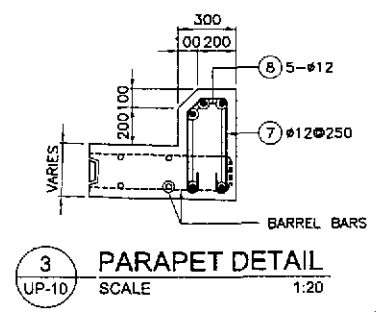
SCALE :
AS SHOWN
FULL SIZE A1

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

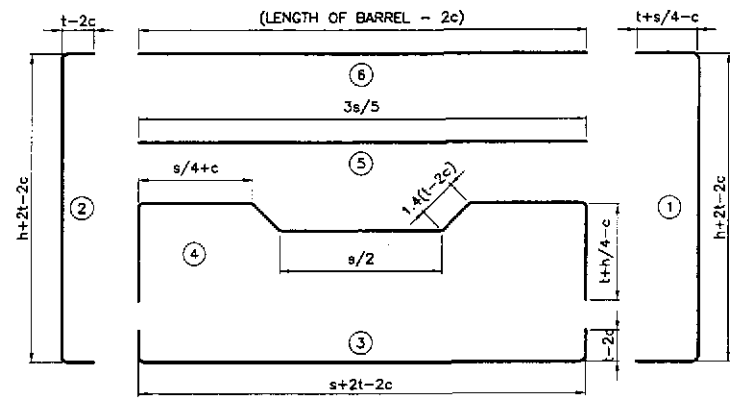
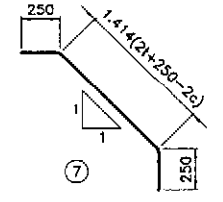
SHEET NO. :
UP-09



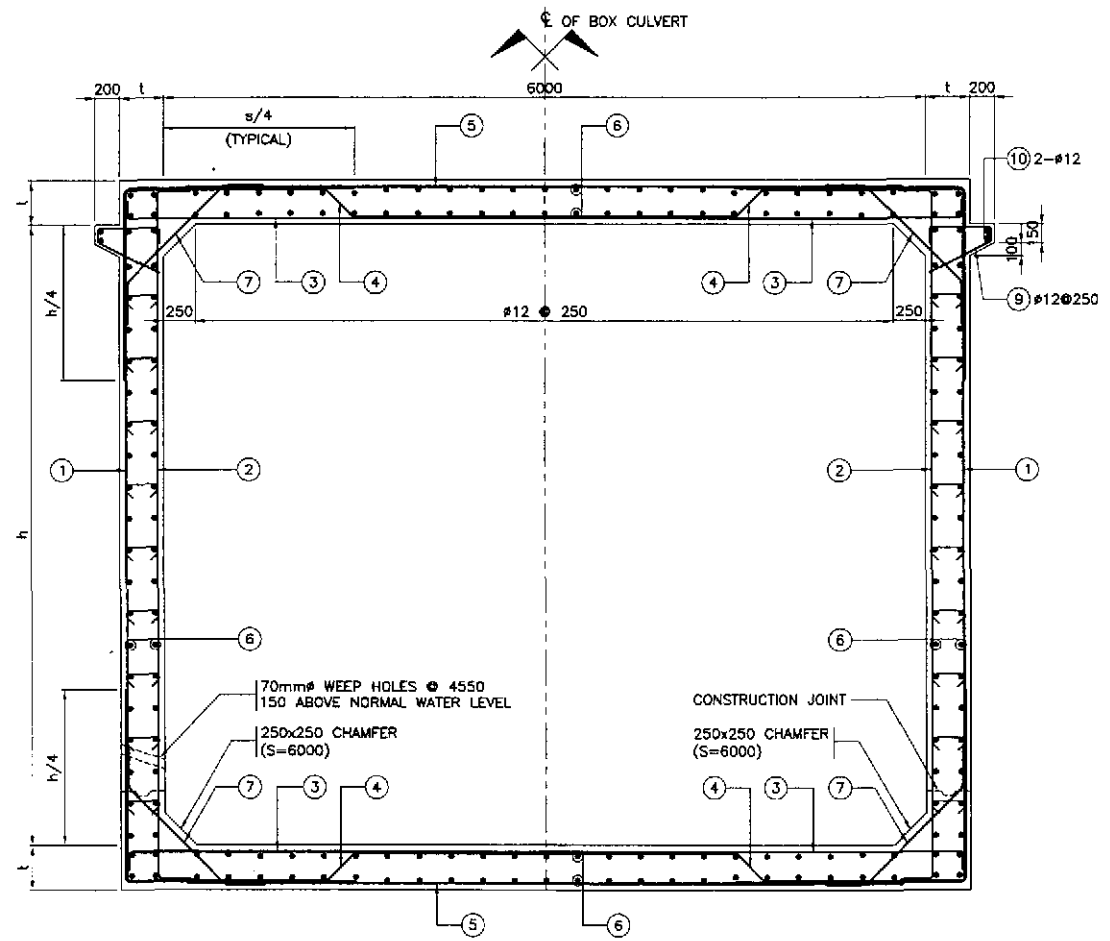
1 SECTION - SINGLE BARREL
UP-10 NOT TO SCALE



3 PARAPET DETAIL
UP-10 SCALE 1:20



4 BAR BENDING DIAGRAM - SINGLE BARREL
UP-10 NOT TO SCALE



2 SECTION - SINGLE BARREL
UP-10 NOT TO SCALE

DESIGN NOTES :

SPECIFICATIONS:
DESIGN: BRIDGE DESIGN SPECIFICATION (1992 AASHTO SPECIFICATIONS)

LOAD FACTORS:
1.5 D + 1.5 E + 2.5 (L + I)
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 MPa
f_y = 276 MPa

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

OVER 3.0 COVER
#12 @ 450 mm MAXIMUM.

SHEAR:
MAXIMUM ALLOWABLE SHEAR, $y = 0.291/\sqrt{f_c}$ 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						
B-3	3000	3200	280	16	200	16	180	16	200	12	200	12	250	-	-	FLUSHED TO ROADWAY
B-4	6000	5100	350	20	200	20	200	20	200	12	200	12	250	16	200	FLUSHED TO ROADWAY (SKEW 20°LF)
B-5	3000	3000	280	16	200	16	180	16	200	12	200	12	250	-	-	ON FILL
B-6	3000	3100	280	16	200	16	180	16	200	12	200	12	250	-	-	FLUSHED TO ROADWAY
B-7	3000	3600	280	16	200	16	180	16	200	12	200	12	250	-	-	FLUSHED TO ROADWAY
B-8	6000	5600	350	20	200	20	200	20	200	12	200	12	250	16	200	FLUSHED TO ROADWAY (SKEW 26°LF)

	DESIGNED	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED			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 BARREL DETAILS (INITIAL STAGE)	UP-10
	SUBMITTED			Submitted By:	Reviewed By:	Recommended By:	PLARIDEL BYPASS - CONTRACT PACKAGE II	FULL SIZE A1		
					DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV			

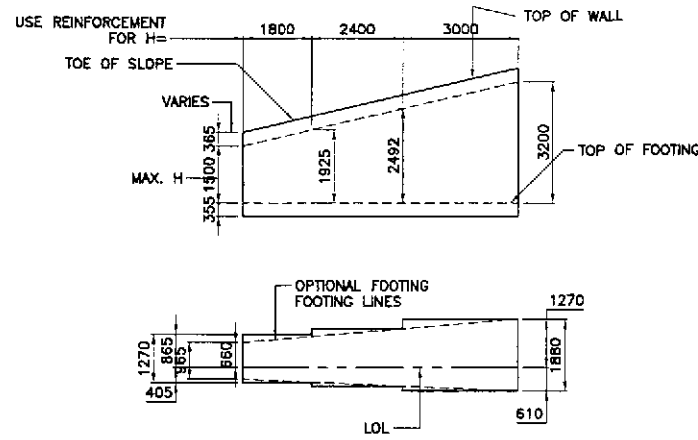
SCHEDULE OF REINFORCEMENTS (B3 - STA. 39+860.000)																
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m³)
						a	b	c	d	e	f					
BARREL L=18.630m	1	16	188	200	(A)	980	3520	980	-	-	-	5480	1030.15	1.579	1627	70.7
	2	16	208	180	(A)	180	3520	180	-	-	-	3880	806.94	1.579	1275	
	3	16	188	200	(B)	180	3460	180	-	-	-	3820	718.16	1.579	1134	
	4	16	188	200	(C)	995	800	255	1500	-	-	5589	1041.39	1.579	1645	
	5	12	188	200	(D)	2000	-	-	-	-	-	2000	376	0.888	334	
	6	12	120	250	(D)	18539	-	-	-	-	-	18539	2224.68	0.888	1976	
	7	12	30	250	(E)	114	380	71	150	480	114	1309	39.26	0.888	35	
	8	12	10	AS DWG	(D)	3460	-	-	-	-	-	3460	34.6	0.888	31	
	9	12	58	250	(H)	430	70	608	-	-	-	1108	64.27	0.888	58	
	10	12	4	AS DWG	(D)	6900	-	-	-	-	-	6900	27.6	0.888	25	
WINGWALLS (H)=3.330m	W1	12	4	AS DWG	(D)	600	6798	-	-	-	7398	29.59	0.888	27	14.84	
	W2	12	22	300	(D)	3396	-	-	-	-	3396	74.7	0.888	67		
	W3a	20	24	200	(I)	834	2889	150	-	-	3983	95.59	2.468	236		
	W3b	16	14	250	(I)	734	1971	150	-	-	2855	39.96	1.579	64		
	W3c	12	6	350	(I)	684	1772	150	-	-	2008	12.04	0.888	11		
	W4	12	40	300	(I)	203	2200	150	-	-	2553	102.11	0.888	91		
	W5a	25	10	400	(D)	1715	-	-	-	-	1715	17.15	3.854	67		
	W5b	16	14	250	(D)	1229	-	-	-	-	1229	17.2	1.579	28		
	W5c	12	6	350	(D)	822	-	-	-	-	822	4.93	0.888	5		
W6	12	14	AS DWG	(D)	5906	-	-	-	-	5906	82.69	0.888	74			
GRAND TOTAL =													8810 KG	85.54		

SCHEDULE OF REINFORCEMENTS (B4 - STA. 41+625.000)																
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=22.220m	1	20	238	200	(A)	1800	5543	1800	-	-	-	9143	2176.03	2.468	5367	195.66
	2	20	238	200	(A)	250	5543	250	-	-	-	6043	1426.15	2.468	3517	
	3	20	238	200	(A)	250	6600	250	-	-	-	7100	1669.8	2.468	4188	
	4	20	238	200	(B)	1538	1550	354	3000	-	-	9879	2331.35	2.468	5750	
	5	12	238	200	(C)	4000	-	-	-	-	-	4000	952	0.888	846	
	6	12	200	250	(C)	23548	-	-	-	-	-	23548	4709.21	0.888	4182	
	7	16	444	200	(D)	560	1202	560	-	-	-	2322	1030.92	1.579	1628	
	8	12	58	250	(E)	114	450	71	150	550	114	1449	84.03	0.888	75	
	9	12	10	AS DWG	(D)	6594	-	-	-	-	-	6594	65.94	0.888	59	
	10	12	58	250	(H)	500	70	707	-	-	-	1277	74.07	0.888	66	
	11	12	4	AS DWG	(D)	6900	-	-	-	-	-	6900	27.6	0.888	25	
WINGWALL (H)=3.331m	W1	12	2	AS DWG	(D)	600	11935	-	-	-	12535	25.07	0.888	23	20.18	
	W2	12	18	300	(D)	5530	-	-	-	-	5530	99.54	0.888	89		
	W3a	32	21	200	(I)	1762	4545	150	-	-	6457	135.6	6.313	857		
	W3b	25	16	200	(I)	1272	2785	150	-	-	4207	67.32	3.854	260		
	W3c	16	6	350	(I)	812	1417	150	-	-	2379	14.27	1.579	23		
	W4	12	34	300	(I)	203	3176	150	-	-	3530	120	0.888	107		
	W5a	25	20	200	(D)	2344	-	-	-	-	2344	48.89	3.854	181		
	W5b	16	8	400	(D)	1900	-	-	-	-	1900	15.2	3.854	58		
	W5c	16	6	350	(D)	1135	-	-	-	-	1135	6.81	1.579	11		
	W6	12	7	AS DWG	(D)	10181	-	-	-	-	10181	71.27	0.888	64		
	W1	12	2	AS DWG	(D)	600	9391	-	-	-	9991	19.98	0.888	18		13.95
	W2	12	18	300	(D)	4339	-	-	-	-	4339	78.1	0.888	70		
W3a	32	16	200	(I)	1762	4545	150	-	-	6457	103.32	6.313	853			
W3b	25	12	200	(I)	1272	2785	150	-	-	4207	50.49	3.854	195			
W3c	16	6	350	(I)	812	1417	150	-	-	2379	14.27	1.579	23			
W4	12	27	300	(I)	203	3176	150	-	-	3530	95.3	0.888	85			
W5a	25	15	200	(D)	2344	-	-	-	-	2344	35.17	3.854	136			
W5b	25	6	400	(D)	1900	-	-	-	-	1900	11.4	3.854	44			
W5c	16	5	350	(D)	1135	-	-	-	-	1135	5.68	1.579	9			
W6	12	7	AS DWG	(D)	8064	-	-	-	-	8064	55.45	0.888	51			
GRAND TOTAL =													20841 KG	231.8		

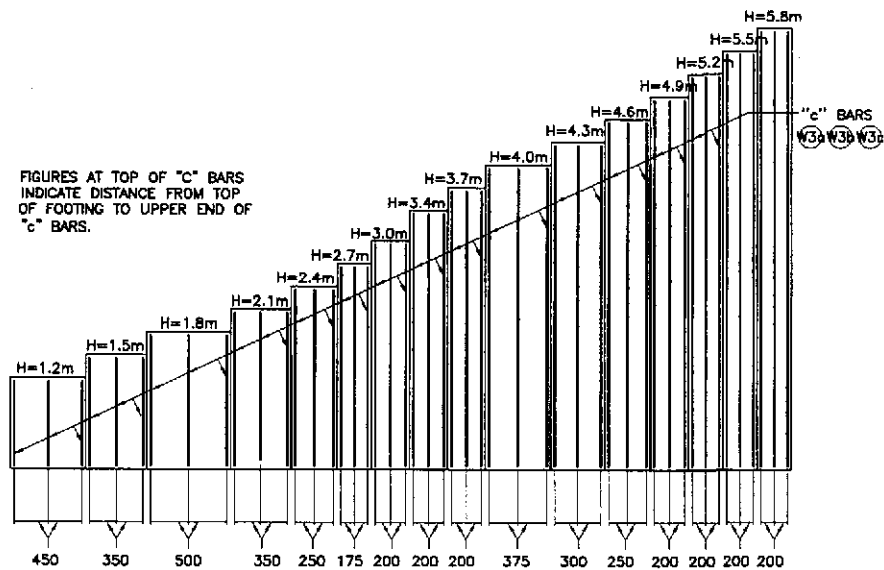
SCHEDULE OF REINFORCEMENTS (B5 - STA. 41+820.000)																
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m³)
						a	b	c	d	e	f					
BARREL L=20.940m	1	16	212	200	(A)	980	3411	980	-	-	-	5371	1136.65	1.579	1798	79.81
	2	16	232	180	(A)	180	3411	180	-	-	-	3771	874.87	1.579	1382	
	3	16	212	200	(B)	180	3460	180	-	-	-	3820	809.84	1.579	1278	
	4	16	210	200	(C)	968	800	255	1500	-	-	5545	1164.37	1.579	1839	
	5	12	212	200	(D)	2000	-	-	-	-	-	2000	424	0.888	377	
	6	12	120	250	(D)	20840	-	-	-	-	-	20840	2500.8	0.888	2221	
	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	
WINGWALLS (H)=3.331m	W1	12	4	AS DWG	(D)	600	7088	-	-	-	7688	30.67	0.888	28	15.36	
	W2	12	22	300	(D)	3535	-	-	-	-	3535	77.72	0.888	70		
	W3a	25	24	200	(I)	1189	2913	150	-	-	4252	102.05	3.854	394		
	W3b	16	14	250	(I)	729	1928	150	-	-	2805	39.27	1.579	63		
	W3c	12	8	350	(I)	679	1759	150	-	-	1988	15.9	0.888	15		
	W4	12	40	300	(I)	203	2146	150	-	-	2498	99.94	0.888	89		
	W5a	25	10	400	(D)	1811	-	-	-	-	1811	18.11	3.854	70		
	W5b	16	14	250	(D)	1226	-	-	-	-	1226	17.16	1.579	28		
	W5c	12	8	350	(D)	821	-	-	-	-	821	6.57	0.888	8		
W6	12	14	AS DWG	(D)	6131	-	-	-	-	6131	85.84	0.888	77			
GRAND TOTAL =													9802 KG	95.18		

SCHEDULE OF REINFORCEMENTS (B6 - STA. 42.550.000)																
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	3434	980	-	-	-	5394	1014.17	1.579	1602	69.81
	2	16	208	180	(A)	180	3434	180	-	-	-	3794	789.26	1.579	1247	
	3	16	188	200	(B)	180	3460	180	-	-	-	3820	718.16	1.579	1134	
	4	16	188	200	(C)	974	800	255	1500	-	-	5556	1033.48	1.579	1632	
	5	12	188	200	(D)	2000	-	-	-	-	-	2000	376	0.888	334	
	6	12	120	250	(D)	18539	-	-	-	-	-	18539	2224.68	0.888	1976	
	7	12	30	250	(E)	114	380	71	150	480	114	1309	39.26	0.888	35	
	8	12	10	AS DWG	(D)	3460	-	-	-	-	-	3460	34.6	0.888	31	
	9	12	58	250	(H)	430	70	608	-	-	-	1108	64.27	0.888	58	
	10	12	4	AS DWG	(D)	6900	-	-	-	-	-	6900	27.6	0.888	25	
WINGWALLS (H)=3.335m	W1	12	4	AS DWG	(D)	600	6798	-	-	-	7398	29.59	0.888	27	14.65	
	W2	12	22	300	(D)	3396	-	-	-	-	3396	74.7	0.888	67		
	W3a	20	24	200	(I)	830	2831	150	-	-	3911	83.88	2.468	232		
	W3b	16	14	250	(I)	730	1936	150	-	-	2816	39.42	1.579	63		
	W3c	12	6	350	(I)	680	1182	150	-	-	1992	11.95	0.888	11		
	W4	12	40	300	(I)	203	2157	150	-	-	2510	100.41	0.888	90		
	W5a	25	10	400	(D)	1715	-	-	-	-	1715	17.15	3.854	67		
	W5b	16	14	250	(D)	1229	-	-	-	-	1229	17.2	1.579	28		
	W5c	12	6	350	(D)	822	-	-	-	-	822	4.93	0.888	5		
W6	12	14	AS DWG	(D)	5906	-	-	-	-	5906	82.69	0.888	74			
GRAND TOTAL =													8738 KG	84.46		

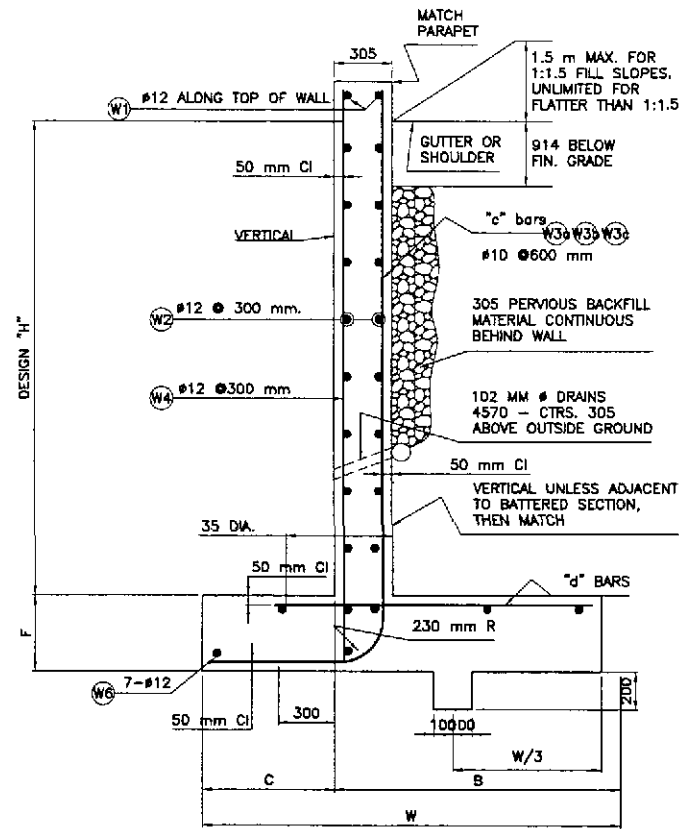
SCHEDULE OF REINFORCEMENTS (B7 - STA. 43+470.000)																
STRUCTURE COMMENT	BAR MARK	BAR SIZE	QTY.	SPACING	BAR SHAPE	DIMENSIONS (mm)						LENGTH EA BAR	TOTAL LENGTH	UNIT WT. (KG/M)	WEIGHT IN (KG)	VOLUME OF CONC. (m³)
						a	b	c	d	e	f					
BARREL L=18.630m	1	16	188	200	(A)	980	3886	980	-	-	-	5846	1099.14	1.579	1706	74.12
	2	16	208	180	(A)	180	3886	180	-	-	-	4246	883.27	1.579	1395	
	3	16	188	200	(B)	180	3460	180	-	-	-	3820	718.16	1.579	1134	
	4	16	188	200	(C)	1087	800	255	1500	-	-	5782	1075.52	1.579	1699	
	5	12														



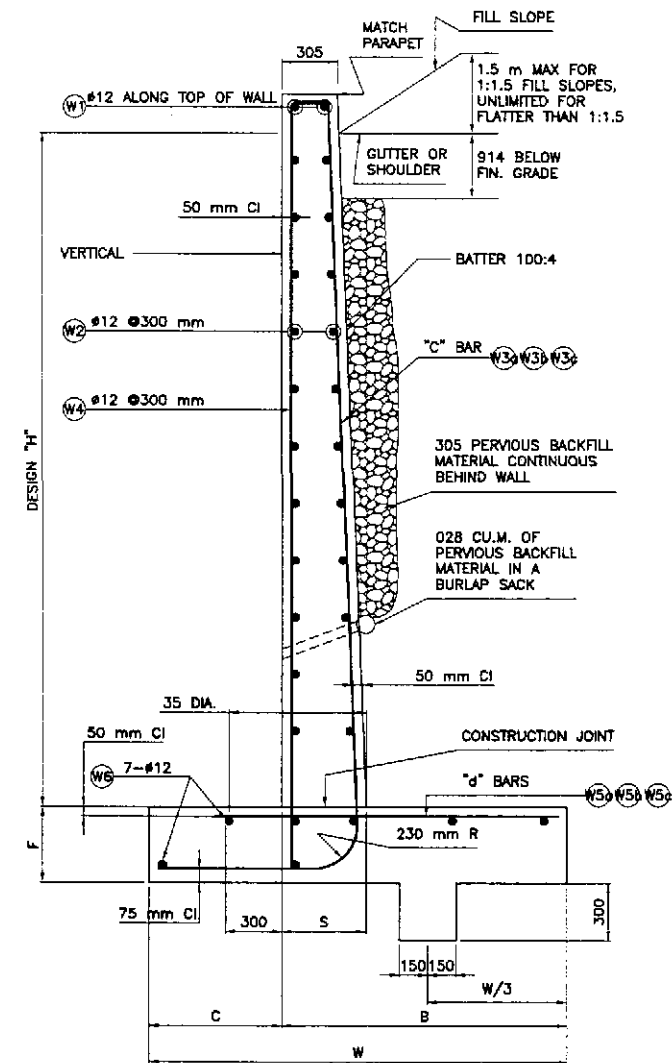
1 TYPICAL LAYOUT EXAMPLE
SCALE 1:100



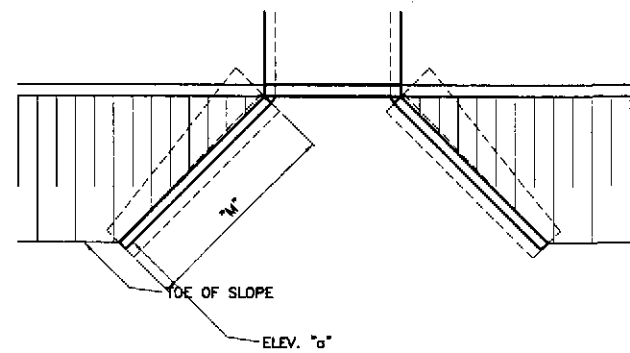
FIGURES AT TOP OF "c" BARS INDICATE DISTANCE FROM TOP OF FOOTING TO UPPER END OF "c" BARS.



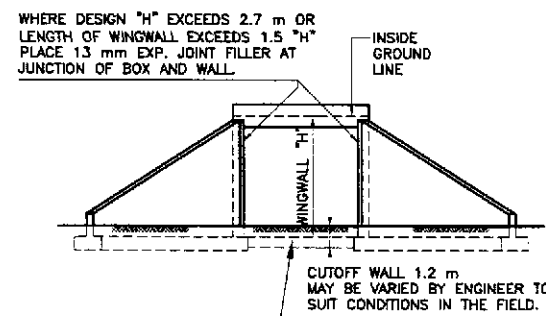
2 TYPICAL SECTION
H=1.2 m THRU 3.7 m
SCALE 1:20



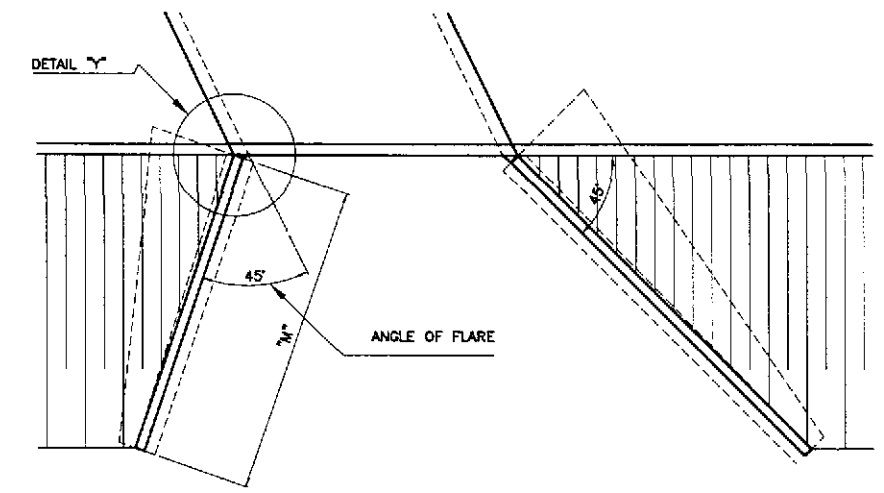
3 TYPICAL SECTION
H=4.0 m THRU 4.9 m
SCALE 1:20



4 PLAN
SCALE 1:100



5 END ELEVATION
SCALE 1:100



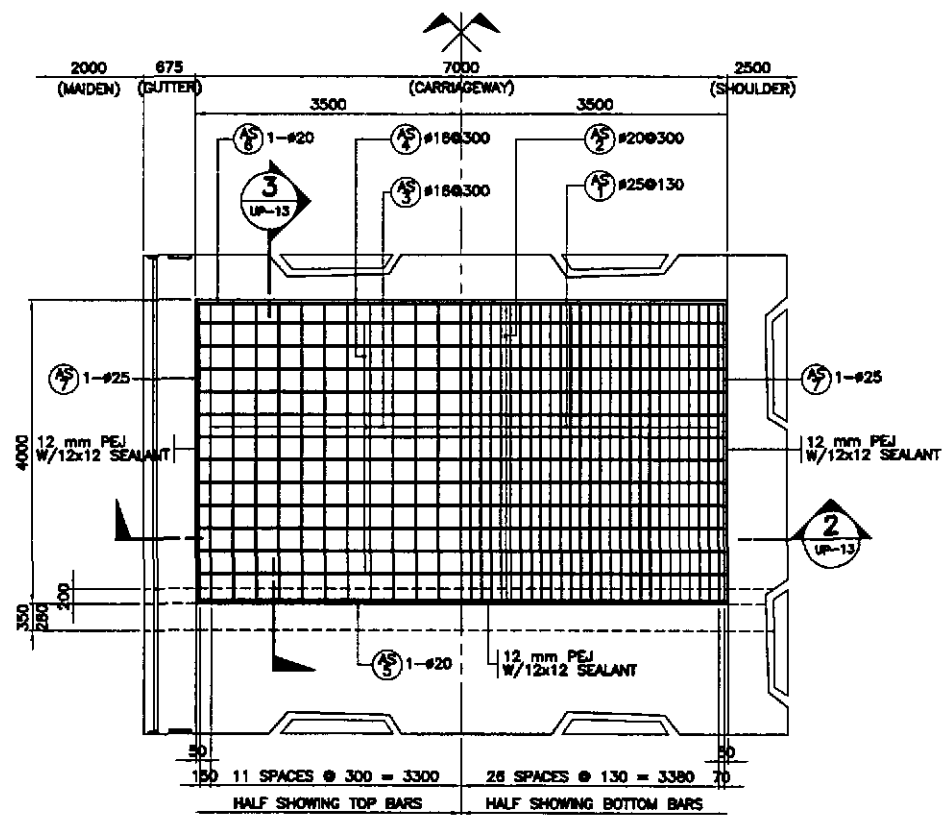
6 PLAN
SCALE 1:100

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	None	1:25	1:25	1:25	1:25	1:26	1:27
S	305	305	305	305	305	305	305	305	305	465	475	490	500	500	500	500
"c" Bars	12Ø450	12Ø350	12Ø275	16Ø350	16Ø250	16Ø175	20Ø200	25Ø200	25Ø200	32Ø375	32Ø300	32Ø250	32Ø200	32Ø175	32Ø200	32Ø200
"d" Bars	12Ø450	12Ø350	12Ø275	16Ø350	16Ø250	20Ø350	25Ø400	25Ø400	25Ø400	25Ø375	25Ø300	25Ø250	25Ø200	25Ø175	28Ø200	28Ø200

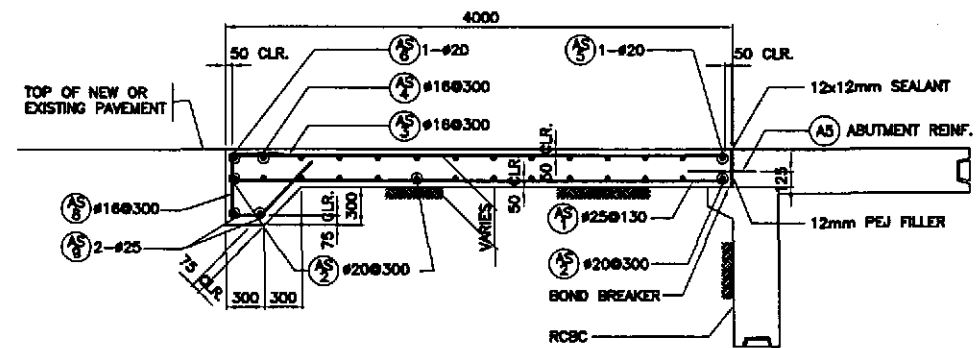
NOTES

UNIT STRESSES: $f_c = 165 \text{ MPa}$, $f_s = 9 \text{ MPa}$, $n = 10$
 MAXIMUM TOE PRESSURE = 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", "W", "N", ELEVATION "a" AND "ANGLE OF FLARES" (AS APPLY) ARE SHOWN ON THE PLANS
 WALL HEIGHT MAY BE EXCEEDED BY 150 mm BEFORE GOING TO NEXT GREATER "H".
 ELIMINATE CUTOFF WALL IF ADJACENT CHANNEL IS PAVED AND SKEW IS 20° MAXIMUM
 FOR WALL OFFSET VALUES, SEE STANDARD PLAN B3-B

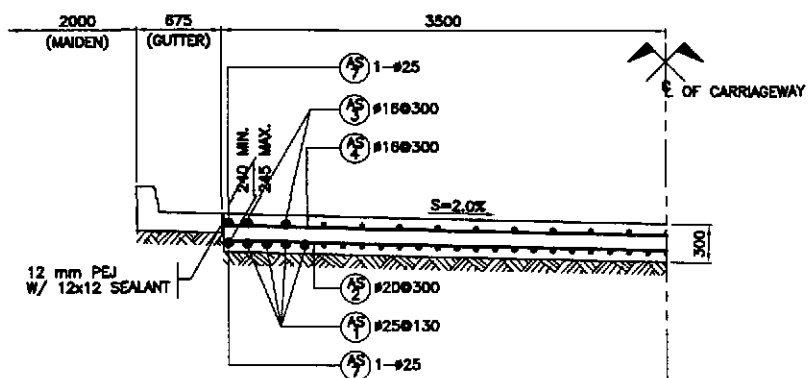
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :		SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	9/10/02	<i>[Signature]</i>		BUREAU OF DESIGN		OFFICE OF THE SECRETARY		THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		AS SHOWN	BOX CULVERT WINGWALL DETAIL (INITIAL STAGE)	UP-12
	SUBMITTED	9/23/02	<i>[Signature]</i>		Submitted By:	Reviewed By:	Recommended By:	Approved By:	PLARIDEL BYPASS - CONTRACT PACKAGE II		FULL SIZE A1		



1 PLAN
UP-13 SCALE 1:50



3 SECTION
UP-13 SCALE 1:30

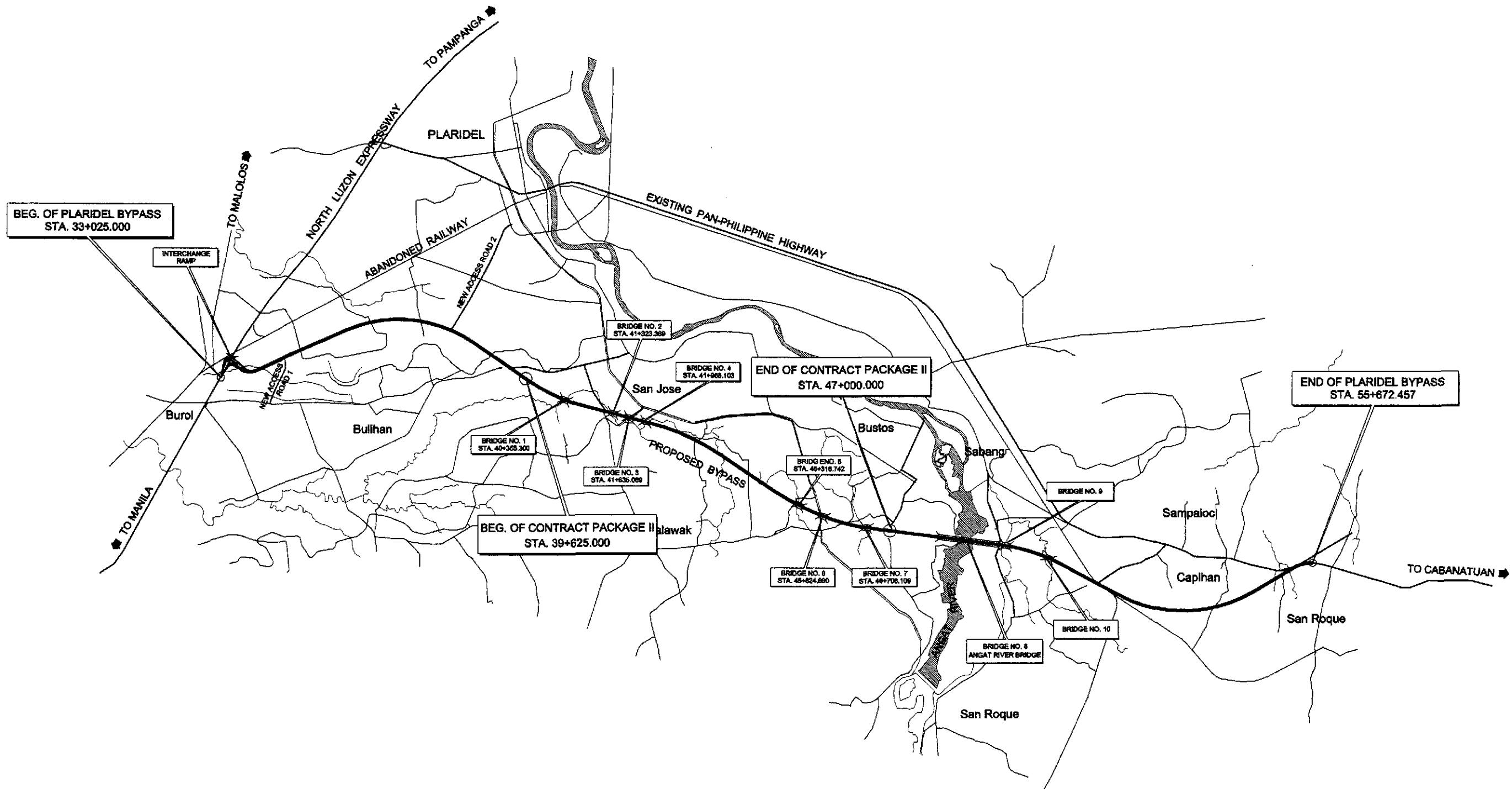


2 SECTION
UP-13 SCALE 1:30

REINFORCEMENT SCHEDULE & ESTIMATED QUANTITIES FOR TWO LANES APPROACH SLABS

BENDING DIAGRAM (DIMENSIONS ARE OUT TO OUT OF REINBAR)	REINFORCEMENT										CONCRETE VOLUME (m ³)	REMARKS	
	MARK	SIZE (mm)	QUANTITY	SPACING (mm)	SHAPE	BAR DIMENSIONS (mm)			LENGTH PER BAR (m)	TOTAL LENGTH (m)			UNIT WEIGHT (kg/m)
a	(A)	25	69	130	(B)	3900	150	-	4050	226.80	3.853	874	1. QUANTITIES ARE FOR ONE (1) APPROACH SLAB
	(A)	20	14	300	(A)	7900	-	-	7900	55.30	2.468	138	
b	(B)	16	25	300	(B)	3900	150	-	4050	101.25	1.578	160	
	(B)	16	12	300	(A)	7900	-	-	7900	47.40	1.578	75	
c	(C)	20	1	AS SHOWN	(A)	7200	-	-	7200	7.20	2.468	18	
	(C)	20	1	AS SHOWN	(A)	7900	-	-	4050	53.20	1.578	84	
d	(D)	25	4	AS SHOWN	(A)	1985	1985	-	3930	15.72	3.853	61	
	(D)	16	27	300	(C)	415 MIN. 475 MAX.	250	650	1745	47.11	1.578	74	
e	(E)	25	2	AS SHOWN	(A)	7900	-	-	7900	15.80	3.853	61	
	GRAND TOTAL = 1543											9.58	

BRIDGES



A
- NOT TO SCALE

 JAPAN INTERNATIONAL COOPERATION AGENCY		DATE	SIGNATURE	 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	PROJECT AND LOCATION :			SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/10/02	<i>[Signature]</i>		BUREAU OF DESIGN			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE LOCATION MAP	BG-01
	CHECKED	9/20/02	<i>[Signature]</i>		OFFICE OF THE SECRETARY						
SUBMITTED	9/23/02	<i>[Signature]</i>	Submitted By:	Reviewed By:	Recommended By:	Approved By:					
			M. PAULUS TEAM LEADER	DANILO C. TRAJANO Project Director	ADRIANO M. DORCY Chief, Bridges Division	GILBERTO S. REYES Director IV (CIC)	MANUEL M. BONGAN Undersecretary				

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

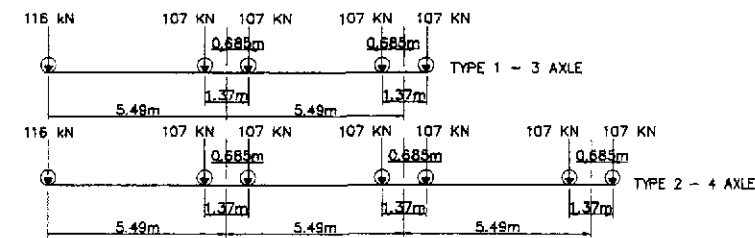
	WEIGHT
A. CONCRETE	24.00 kN/m ³
B. STEEL	77.00 kN/m ³
C. EARTH	19.00 kN/m ³
D. WEARING SURFACE	1.10 kN/m ²

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+1)n + 1.0 SF]
- B. GROUP II = 1.3 [1.0 D + 1.0(L+1)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)
Fy = 276 MPa (40,000 psi)
GRADE 60 (20mmφ AND LARGER)
Fy = 414 MPa (60,000 psi)
- (b) REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

3. PRESTRESSING STEEL

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

4. STRUCTURAL STEEL, BOLTS AND WELDS

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

5. ELASTOMERIC BEARING PADS

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

SPECIFICATIONS

DURO HARDNESS, SHORE A (ASTM D-2240)-----60
TENSILE STRENGTH ASTM D 412-175 Kg/cm² (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.

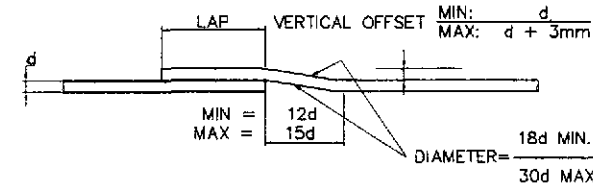
3. REINFORCED CONCRETE

- 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.

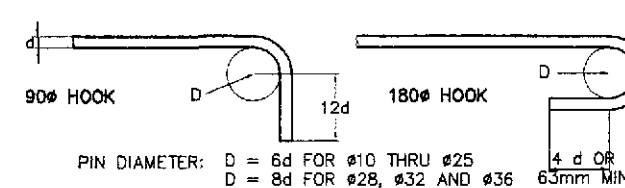
c. BAR BENDING, SPLICING AND PLACING

- (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

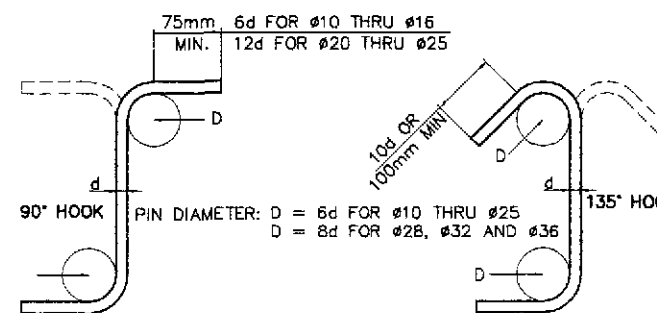


(8) HOOKS AND BENDS

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: 9/18/02 SIGNATURE: <i>[Signature]</i> DESIGNED: <i>[Signature]</i>	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 : GENERAL NOTES FOR BRIDGES (SHEET 1 OF 2) (INITIAL STAGE)	SHEET NO. : BG-02	
	CHECKED: 9/20/02 SIGNATURE: <i>[Signature]</i>	BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANG Project Director	OFFICE OF THE SECRETARY Recommended By: ADRIANO M. DOROY Chief, Bridge Division	Recommended By: GILBERTO S. REYES Director IV (CIC)	Approved By: MANUEL M. BONDAN Undersecretary	Approved By: SIMON A. BATULANONG Secretary	
	SUBMITTED: 9/23/02 SIGNATURE: <i>[Signature]</i> TEAM LEADER						

GENERAL NOTES FOR BRIDGES

(SHEET 2 OF 2)

8. STRUCTURAL STEEL

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

9. SHORING

- (a) CAMBER FOR REINFORCED CONCRETE SUPERSTRUCTURES WERE DETERMINED BASED ON THE USE OF SHORINGS DURING CONSTRUCTION.
- (b) CAMBER FOR COMPOSITE SUPERSTRUCTURES WITH PRECAST PRESTRESSED GIRDERS WERE DETERMINED BASED ON UNSHORED CONDITIONS.

10. EXCAVATION

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

11. WATER ELEVATION

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

12. DETOUR

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

13. PRESTRESSED CONCRETE

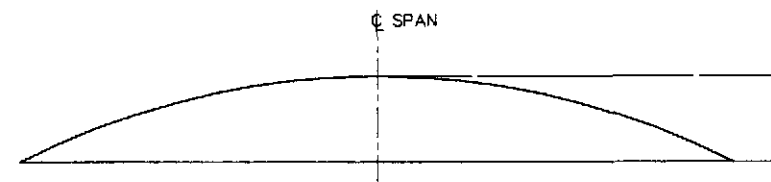
GIRDER DESIGN GUIDE

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

- b.) CONCRETE FOR GIRDERS SHALL BE A MINIMUM STRENGTH OF 41 N/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 ϕ 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














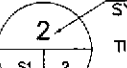
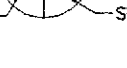
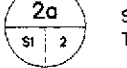

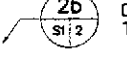
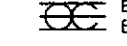








- a.) ALL ELEVATIONS, STATIONING AND DIMENSIONS SHALL BE VERIFIED PRIOR TO CONSTRUCTION.
- b.) ALL QUANTITIES SHALL BE VERIFIED DURING CONSTRUCTION.



DEAD LOAD CAMBER DIAGRAM



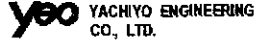
A = FABRICATION CAMBER - ESTIMATED PRESTRESS CAMBER LESS DEFLECTION DUE TO GIRDER DEAD LOAD

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  SUB-TITLE TARGET  SECTION TARGET  DETAIL REF TARGET  BUNDLED BARS  ROUND  SQUARE  AT  AND  CENTERLINE  PLATE  ANGLE SHAPE  C/C, C TO C CENTER TO CENTER
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ABBREVIATIONS

ABT ABUT BEG BET BOTT BR BRG CLR cm COL CONC CONST CTR DET DIAM DIAPH DWG EA EF ELEV ENGR EQ EW EXP EXT EXIST FF FTG GEN HOR HW INT INTERM JT L LG kg kN	ABOUT ABUTMENT BEGINNING BETWEEN BOTTOM BRIDGE BEARING CLEAR CENTIMETER COLUMN CONCRETE CONSTRUCTION CENTER DETAIL DIAMETER DIAPHRAGM DRAWING EACH EACH FACE ELEVATION ENGINEER EQUAL EACHWAY EXPANSION EXTERIOR EXISTING FAR FACE FOOTING GENERAL HORIZONTAL HIGH WATER INTERIOR INTERMEDIATE JOINT LENGTH LONG KILOGRAM KILONEWTON	kPa m mm MAX MFWL MIN MO MPa N NF No. O.C. PEJ PVC PVI QTY R RC RDWY REINF SDWK SL SP SPCD SPCS STD STR STA STRUCT SYMM THK TYP VAR VERT VOL W W/ &	KILOPASCAL METER MILLIMETER MAXIMUM MAX. FLOOD WATER LEVEL MINIMUM MIDDLE ORDINATE MEGAPASCAL NEWTON NEAR FACE NUMBER ON CENTER PREMOULDED EXPANSION JOINT POLYVINYL CHLORIDE POINT OF VERT. INTERSECTION QUANTITY RADIUS REINFORCED CONCRETE ROADWAY REINFORCEMENT SIDEWALK SLOPE SPIRAL SPACED SPACES STANDARD STIRRUP STATION STRUCTURE SYMMETRY THICK TYPICAL VARIABLE VERTICAL VOLUME WIDTH WITH AND
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 JAPAN INTERNATIONAL COOPERATION AGENCY	 KATAHIRA & ENGINEERS INTERNATIONAL	 YACHIYO ENGINEERING CO., LTD.	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : GENERAL NOTES FOR BRIDGES (SHEET 2 OF 2) (INITIAL STAGE)	SHEET NO. : BG-03
			BUREAU OF DESIGN				
			OFFICE OF THE SECRETARY				
DESIGNED 9/18/02 E. N. SALLAN	CHECKED 9/20/02 M. R. S. II	SUBMITTED 9/23/02 M. R. S. II	Submitted By: DANILO C. TRAJANO Project Director	Reviewed By: ADRIANO M. DOROY Chief, Bridge Division	Recommended By: GILBERTO S. REYES Director IV (D/C)	Approved By: (See cover sheet for Signature/Approval) MANUEL M. BONOAN Undersecretary	Approved By: (See cover sheet for Signature/Approval) SIMEON A. DATUMANONG Secretary

BRIDGE NAME : BRIDGE NO. 1 (INITIAL STAGE)
 BRIDGE LENGTH : 35.00 m
 SPECIFICATION : 1 - 35.00 m SPAN TYPE VI PSCG ON SEAT TYPE ABUTMENT

SUMMARY OF QUANTITIES						
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "		
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	114.00	114.00		228.00
104(3)	Embankment from Borrow Pit	cu.m.	340.00	334.00		674.00
104(4)	Embankment for Bridge Approach	cu.m.	261.00	261.00		522.00
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.	259.00	259.00		518.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	224.00	224.00		448.00
400(15)b	Test Piles (450 mm x 450 mm)	l.m.	11.25	11.25		22.50
400(19)b	Pile Shoes	each	29.00	29.00		58.00
401(1)a	Concrete Post and Railing	l.m.			70.00	70.00
404(1)	Reinforcing Steel, Grade 40	kg	3,991.00	3,991.00	16,912.00	24,894.00
404(2)	Reinforcing Steel, Grade 60	kg	8,409.00	8,409.00	1,702.00	18,520.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	147.00	147.00		294.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.			118.00	118.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	5.00	5.00	15.00	25.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	27.00	26.00		53.00
406(1)j	Prestressed Concrete Girder Type VI L=35.00m	each			5.00	5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00		10.00
407(2)a	Expansion Joint, (±40mm Movement)	l.m.	10.00	10.00		20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	2.00	2.00		4.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.			3.00	3.00
504(1)	Grouted Riprap, Class "A"	cu.m.	30.00	30.00		60.00
510(1)	Rubble Concrete	cu.m.	59.00	52.00		111.00
506(1)	Hand Laid Rock	cu.m.	59.00	57.00		116.00

BRIDGE NAME : BRIDGE NO. 3 (INITIAL STAGE)
 BRIDGE LENGTH : 30.00 m
 SPECIFICATION : 1 - 30.00 m SPAN TYPE IV-B PSCG ON SEAT TYPE ABUTMENT

SUMMARY OF QUANTITIES						
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "		
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	121.00	121.00		242.00
104(3)	Embankment from Borrow Pit	cu.m.	210.00	216.00		426.00
104(4)	Embankment for Bridge Approach	cu.m.	226.00	226.00		452.00
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.	60.00	60.00		120.00
400(4)b	RC Piles (450 mm x 450 mm) Furnished	l.m.	236.00	236.00		472.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	207.00	207.00		414.00
400(15)b	Test Piles (450 mm x 450 mm)	l.m.	12.25	12.25		24.50
400(19)b	Pile Shoes	each	24.00	24.00		48.00
401(1)a	Concrete Post and Railing	l.m.			60.00	60.00
404(1)	Reinforcing Steel, Grade 40	kg	3,626.00	3,626.00	15,774.00	23,026.00
404(2)	Reinforcing Steel, Grade 60	kg	7,960.00	7,960.00	1,451.00	17,371.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	136.00	136.00		272.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.			99.00	99.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00	13.00	21.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	7.00	7.00		14.00
406(1)e	Prestressed Concrete Girder Type IV-B L=30.00m	each			5.00	5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00		10.00
407(2)a	Expansion Joint, (±40mm Movement)	l.m.	10.00	10.00		20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	1.70	1.70		3.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.			3.00	3.00
504(1)	Grouted Riprap, Class "A"	cu.m.	78.00	98.00		174.00

BRIDGE NAME : BRIDGE NO. 2 (INITIAL STAGE)
 BRIDGE LENGTH : 33.50 m
 SPECIFICATION : 1 - 33.50 m SPAN TYPE V PSCG ON SEAT TYPE ABUTMENT

SUMMARY OF QUANTITIES						
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "		
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	138.00	138.00		276.00
104(3)	Embankment from Borrow Pit	cu.m.	370.00	362.00		732.00
104(4)	Embankment for Bridge Approach	cu.m.	284.00	284.00		568.00
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.	60.00	60.00		120.00
400(4)b	RC Piles (450 mm x 450 mm) Furnished	l.m.	298.00	229.00		527.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	261.00	203.00		464.00
400(15)b	Test Piles (450 mm x 450 mm)	l.m.	12.25	10.25		22.50
400(19)b	Pile Shoes	each	30.00	30.00		60.00
401(1)a	Concrete Post and Railing	l.m.			67.00	67.00
404(1)	Reinforcing Steel, Grade 40	kg	4,129.00	4,129.00	16,809.00	25,067.00
404(2)	Reinforcing Steel, Grade 60	kg	9,576.00	9,576.00	1,702.00	20,854.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	172.00	172.00		344.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.			111.00	111.00
405(3)a	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00	15.00	23.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	28.00	28.00		56.00
406(1)i	Prestressed Concrete Girder Type V L=33.50m	each			5.00	5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00		10.00
407(2)a	Expansion Joint, (±40mm Movement)	l.m.	10.00	10.00		20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	2.00	2.00		4.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.			3.00	3.00
504(1)	Grouted Riprap, Class "A"	cu.m.	28.00	28.00		56.00
510(1)	Rubble Concrete	cu.m.	67.00	65.00		132.00
506(1)	Hand Laid Rock	cu.m.	61.00	60.00		121.00

BRIDGE NAME : BRIDGE NO. 4 (INITIAL STAGE)
 BRIDGE LENGTH : 24.00 m
 SPECIFICATION : 1 - 24.00 m SPAN TYPE IV PSCG ON SEAT TYPE ABUTMENT

SUMMARY OF QUANTITIES						
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "		
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	119.00	90.00		209.00
104(3)	Embankment from Borrow Pit	cu.m.	378.00	236.00		614.00
104(4)	Embankment for Bridge Approach	cu.m.	296.00	243.00		539.00
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.	293.00	282.00		575.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	260.00	253.00		513.00
400(15)b	Test Piles (450 mm x 450 mm)	l.m.	13.25	14.25		27.50
400(19)b	Pile Shoes	each	27.00	24.00		51.00
401(1)a	Concrete Post and Railing	l.m.			48.00	48.00
404(1)	Reinforcing Steel, Grade 40	kg	3,726.00	3,366.00	12,506.00	19,598.00
404(2)	Reinforcing Steel, Grade 60	kg	10,067.00	7,491.00	1,194.00	18,752.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	165.00	125.00		290.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.			78.00	78.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00	11.00	19.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	28.00	24.00		52.00
406(1)c	Prestressed Concrete Girder Type IV L=24.00m	each			5.00	5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00		10.00
407(2)a	Expansion Joint, (±40mm Movement)	l.m.	10.00	10.00		20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	1.70	1.70		3.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.			3.00	3.00
504(1)	Grouted Riprap, Class "A"	cu.m.	23.00	23.00		46.00
510(1)	Rubble Concrete	cu.m.	72.00	48.00		120.00
506(1)	Hand Laid Rock	cu.m.	60.00	54.00		114.00
507(2)b	Steel Sheet Pile (85x400x8mm Thk.) Furnished and Driven	l.m.	436.00	388.00		826.00

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	9/12/02	<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)	N. T. S.	BRIDGE NO. 1, 2, 3 AND 4 SUMMARY OF QUANTITIES	BG-04
	SUBMITTED	9/13/02	<i>[Signature]</i>	Submitted By:	Reviewed By:	Recommended By:	Recommended By:	PLARIDEL BYPASS - CONTRACT PACKAGE II	FULL SIZE A1	(INITIAL STAGE)	

BRIDGE NAME : BRIDGE NO. 5 (INITIAL STAGE)
 BRIDGE LENGTH : 33.50 m
 SPECIFICATION : 1 - 33.50 m SPAN TYPE V PSCG ON SEAT TYPE ABUTMENT

BRIDGE NAME : BRIDGE NO. 6 (INITIAL STAGE)
 BRIDGE LENGTH : 40.00 m
 SPECIFICATION : 1 - 40.00 m SPAN TYPE VI PSCG ON SEAT TYPE ABUTMENT

SUMMARY OF QUANTITIES						
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "		
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	135.00	160.00		295.00
104(3)	Embankment from Borrow Pit	cu.m.	389.00	465.00		854.00
104(4)	Embankment for Bridge Approach	cu.m.	313.00	319.00		632.00
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.	60.00	60.00		120.00
400(4)b	RC Piles (450 mm x 450 mm) Furnished	l.m.	414.00	414.00		828.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	377.00	377.00		754.00
400(15)b	Test Piles (450 mm x450 mm)	l.m.	16.25	16.25		32.50
400(19)b	Pile Shoes	each	30.00	30.00		60.00
401(1)a	Concrete Post and Railing	l.m.			48.00	48.00
404(1)	Reinforcing Steel, Grade 40	kg	4,279.00	4,279.00	16,809	25,367.00
404(2)	Reinforcing Steel, Grade 60	kg	11,527.00	11,527.00	1,702.00	24,756.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	183.00	183.00		366.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.			75.00	75.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00	8.00	16.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	8.00	8.00		16.00
406(1)i	Prestressed Concrete Girder Type V L=33.50m	each			5.00	5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00		10.00
407(2)a	Expansion Joint, (± 40mm Movement)	l.m.	10.00	10.00		20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	1.70	1.70		3.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.			3.00	3.00
504(1)	Grouted Riprap, Class "A"	cu.m.	103.00	119.00		222.00
506(1)	Loose Boulder Apron (Hand Laid Rock)	cu.m.	60.00	63.00		123.00

SUMMARY OF QUANTITIES						
PAY ITEM NO.	DESCRIPTION	UNIT	ABUTMENT		SUPER-STRUCTURE	TOTAL
			" A1 "	" A2 "		
103(2)a	Bridge Excavation, Common, Above O.W.L.	cu.m.	192.00	121.00		313.00
104(3)	Embankment from Borrow Pit	cu.m.	173.00	248.00		421.00
104(4)	Embankment for Bridge Approach	cu.m.	220.00	226.00		446.00
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.	60.00	60.00		120.00
400(4)b	RC Piles (450 mm x 450 mm) Furnished	l.m.	371.00	344.00		715.00
400(13)b	RC Piles (450 mm x 450 mm) Driven	l.m.	338.00	312.00		650.00
400(15)b	Test Piles (450 mm x450 mm)	l.m.	16.25	15.25		31.50
400(19)b	Pile Shoes	each	27.00	27.00		54.00
401(1)a	Concrete Post and Railing	l.m.			80.00	80.00
404(1)	Reinforcing Steel, Grade 40	kg	3,719.00	3,719.00	19,807.00	27,245.00
404(2)	Reinforcing Steel, Grade 60	kg	7,837.00	7,837.00	1,702.00	17,376.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	137.00	137.00		274.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.			134.00	134.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	5.00	5.00	17.00	27.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	7.00	7.00		14.00
406(1)n	Prestressed Concrete Girder Type VI Modified L=40.00m	each			5.00	5.00
407(1)c	Elastomeric Bearing Pad (600x350x50, Duro 60)	each	5.00	5.00		10.00
407(2)a	Expansion Joint, (± 40mm Movement)	l.m.	10.00	10.00		20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	2.00	2.00		4.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.			4.00	4.00
504(1)	Grouted Riprap, Class "A"	cu.m.	68.00	77.00		145.00

BRIDGE NAME : BRIDGE NO. 7 (INITIAL STAGE)
 BRIDGE LENGTH : 45.00 m
 SPECIFICATION : 3 - 15.00 m SPAN RCDG ON SEAT TYPE ABUTMENT, 2 COLUMN BENT PIER ON PILES

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.	90.00	121.00				211.00
103(2)c	Bridge Excavation, Common, Below O.W.L.	cu.m.			93.00	87.00		180.00
104(3)	Embankment from Borrow Pit	cu.m.	465.00	717.00				1,182.00
104(4)	Embankment for Bridge Approach	cu.m.	243.00	278.00				521.00
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.	60.00	60.00				120.00
400(4)a	RC Piles (400 mm x 400 mm) Furnished	l.m.	282.00	319.00	192.00	192.00		985.00
400(13)a	RC Piles (400 mm x 400 mm) Driven	l.m.	253.00	286.00	170.00	170.00		879.00
400(15)a	Test Piles (400 mm x400 mm)	l.m.	14.25	14.25	13.25	13.25		55.00
400(19)a	Pile Shoes	each	24.00	27.00	18.00	18.00		87.00
401(1)a	Concrete Post and Railing	l.m.					90.00	90.00
404(1)	Reinforcing Steel, Grade 40	kg	2,858.00	3,136.00	2,686.00	2,686.00	20,231.00	31,597.00
404(2)	Reinforcing Steel, Grade 60	kg	7,323.00	8,340.00	9,329.00	9,329.00	23,891.00	58,212.00
405(1)b	Structural Concrete Class "A" (fc' = 21MPa)	cu.m.	127.00	151.00	76.00	76.00		430.00
405(1)d	Structural Concrete Class "A1" (fc' = 21MPa)	cu.m.					222.00	222.00
405(3)	Structural Concrete Class "C" (fc' = 21MPa)	cu.m.	4.00	4.00			20.00	28.00
405(6)	Structural Concrete Class "B" (Lean Concrete) fc' = 17MPa	cu.m.	6.00	7.00	4.00	4.00		21.00
407(1)a	Elastomeric Bearing Pad (400x300x50, Duro 60)	each	5.00	5.00				10.00
407(2)a	Expansion Joint, (± 40mm Movement)	l.m.	10.00	10.00				20.00
407(2)g	Expansion Joint, 30mm for Bridge Sidewalk	l.m.	2.00	2.00				4.00
407(4)	Metal Drain (150 mm Ø G.I. Drain Pipe)	l.m.					4.00	4.00
504(1)	Grouted Riprap, Class "A"	cu.m.	75.00	110.00				185.00
506(1)	Hand Laid Rock	cu.m.	51.00	61.00				112.00
SPL420(2)d	Realignment of River / Stream	L.S.						1.00

NOTE: ALL QUANTITIES SHALL BE VERIFIED DURING CONSTRUCTION

	DESIGNED	DATE	SIGNATURE		PROJECT AND LOCATION :		SCALE :	SHEET CONTENTS :	SHEET NO. :
	CHECKED	9/18/02	<i>[Signature]</i>		THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)		N. T. S.	BRIDGE NO. 5, 6 & 7 SUMMARY OF QUANTITIES	BG-05
	SUBMITTED	9/23/02	<i>[Signature]</i>		PLARIDEL BYPASS - CONTRACT PACKAGE II		FULL SIZE A1	(INITIAL STAGE)	
SUBMITTED BY: DANILO C. TRAJANO, Project Director REVIEWED BY: ADRIANO M. DOROY, Chief, Bridges Division RECOMMENDED BY: GILBERTO S. REYES, Director IV (OC) RECOMMENDED BY: MANUEL M. BONGAON, Undersecretary APPROVED BY: SIMEON A. DATUMANONG, Secretary									