

DRAINAGE

SCHEDULE OF SIDE DITCH

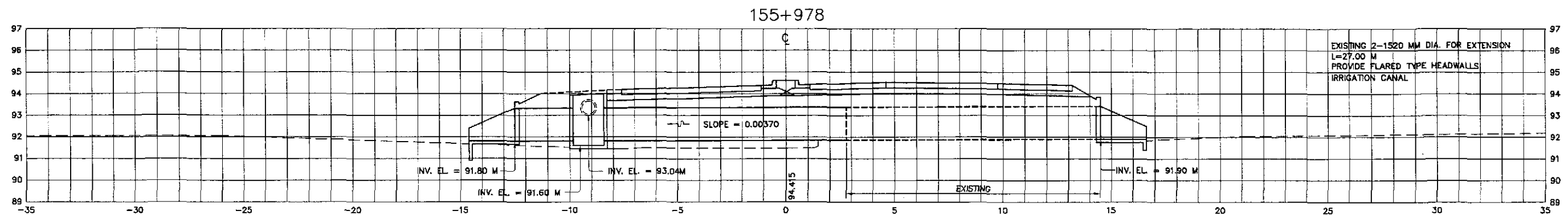
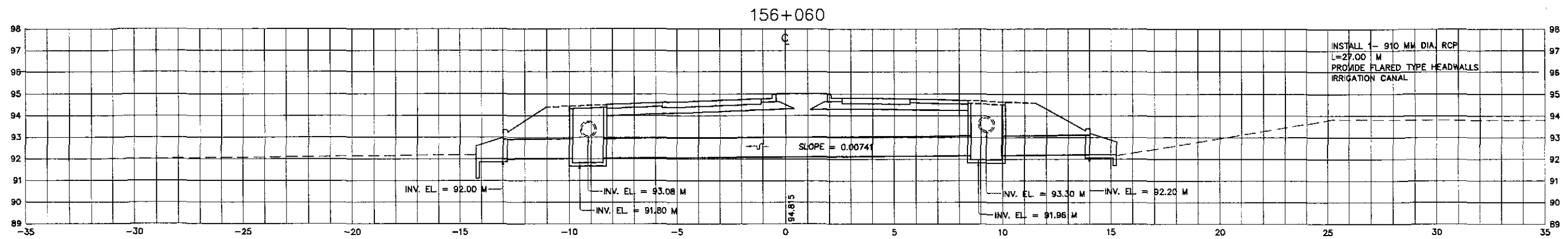
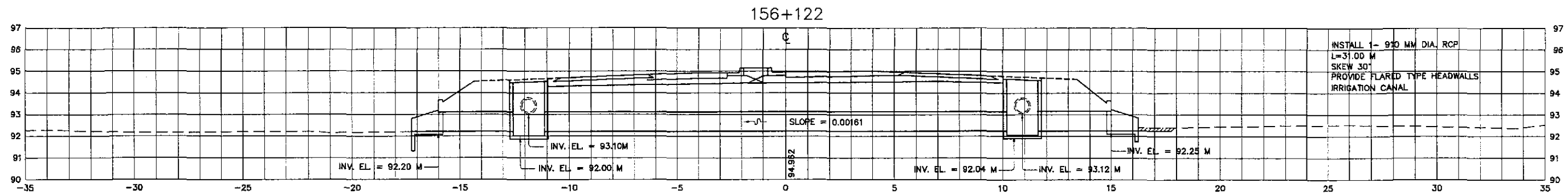
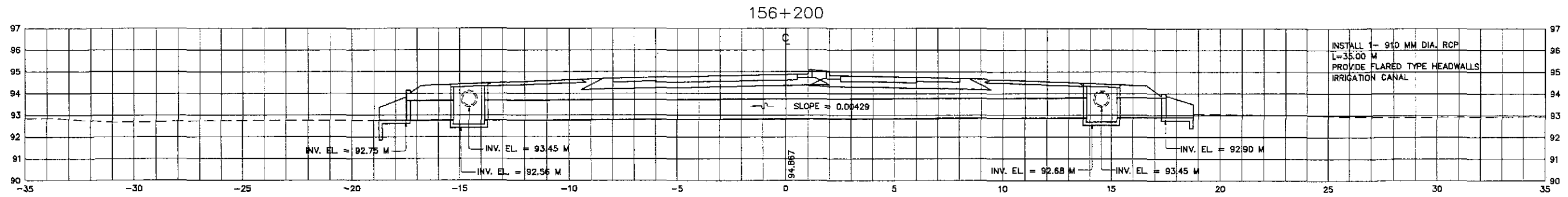
QUANTITIES FOR RCBC

STATION		LENGTH (m)	TYPE	LOCATION	REMARKS
FROM	TO				
MAIN BYPASS					
155+828.67	155+960	131.13	E - 4	RIGHTSIDE	UNLINED
155+940	155+978	38.00	C - 3	LEFTSIDE	LINED
156+200	156+314	114.00	E - 4	RIGHTSIDE	UNLINED
156+200	156+314	114.00	E - 3	LEFTSIDE	UNLINED
156+314	156+460	146.00	E - 4	RIGHTSIDE	UNLINED
156+314	156+460	146.00	E - 3	LEFTSIDE	UNLINED
156+500	156+560	60.00	E - 4	RIGHTSIDE	UNLINED
156+460	156+560	100.00	E - 3	LEFTSIDE	UNLINED
156+560	156+634	74.00	E - 4	RIGHTSIDE	UNLINED
156+560	156+634	74.00	E - 3	LEFTSIDE	UNLINED
156+634	156+700	66.00	E - 4	RIGHTSIDE	UNLINED
156+634	156+700	66.00	E - 3	LEFTSIDE	UNLINED
156+730	156+842	112.00	E - 4	RIGHTSIDE	UNLINED
156+730	156+842	112.00	E - 3	LEFTSIDE	UNLINED
156+842	157+060	218.00	C - 2	RIGHTSIDE	LINED
156+842	157+060	218.00	C - 1	LEFTSIDE	LINED
157+074	157+210	136.00	E - 4	RIGHTSIDE	UNLINED
157+074	157+210	136.00	E - 3	LEFTSIDE	UNLINED
157+210	157+300	90.00	E - 2	RIGHTSIDE	LINED
157+210	157+300	90.00	E - 1	LEFTSIDE	LINED
157+420	157+450	30.00	C - 2	RIGHTSIDE	LINED
157+500	157+716	216.00	C - 2	RIGHTSIDE	LINED
157+716	157+830	114.00	E - 2	RIGHTSIDE	LINED
157+850	158+072	222.00	C - 2	RIGHTSIDE	LINED
158+072	158+220	148.00	E - 2	RIGHTSIDE	LINED
158+020	158+220	200.00	E - 1	LEFTSIDE	LINED
158+220	158+350	130.00	E - 4	RIGHTSIDE	UNLINED
158+220	158+350	130.00	E - 3	LEFTSIDE	UNLINED
158+350	158+660	310.00	C - 2	LEFTSIDE	LINED
158+400	158+660	260.00	C - 1	RIGHTSIDE	LINED
158+660	158+720	60.00	E - 1	RIGHTSIDE	LINED
158+660	158+720	60.00	E - 2	LEFTSIDE	LINED
158+720	158+955	235.00	E - 3	RIGHTSIDE	UNLINED
158+720	158+955	235.00	E - 4	LEFTSIDE	UNLINED
158+955	159+060	105.00	E - 1	RIGHTSIDE	LINED
158+955	159+060	105.00	E - 2	LEFTSIDE	LINED
159+110	159+210	100.00	E - 1	RIGHTSIDE	LINED
159+110	159+210	100.00	E - 4	LEFTSIDE	UNLINED
159+210	159+380	170.00	E - 1	RIGHTSIDE	LINED
159+210	159+380	170.00	E - 2	LEFTSIDE	LINED
159+380	159+460	80.00	E - 3	RIGHTSIDE	UNLINED
159+380	159+460	80.00	E - 4	LEFTSIDE	UNLINED
159+460	159+560	100.00	E - 3	RIGHTSIDE	UNLINED
159+460	159+560	100.00	E - 4	LEFTSIDE	UNLINED
159+560	159+780	220.00	C - 2	RIGHTSIDE	LINED
159+560	159+780	220.00	C - 1	LEFTSIDE	LINED
159+845	160+060	215.00	E - 1	RIGHTSIDE	LINED
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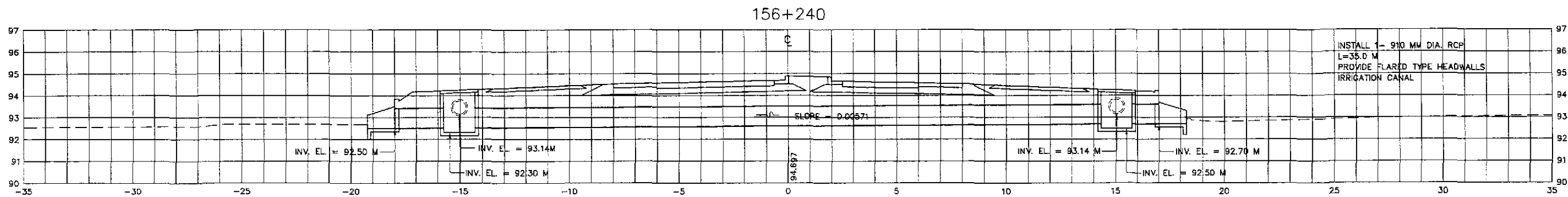
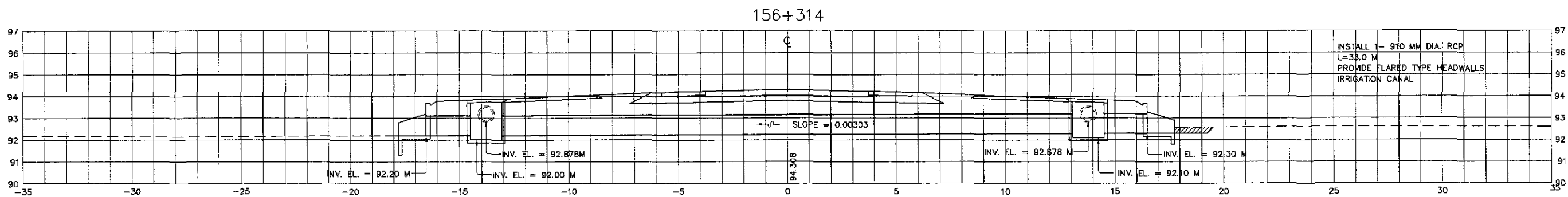
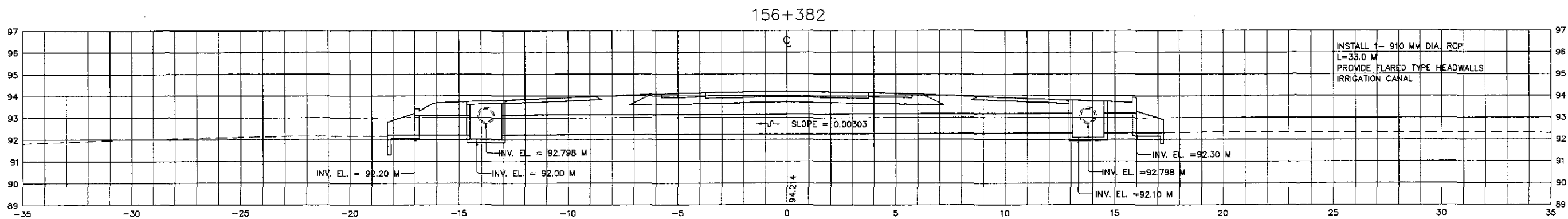
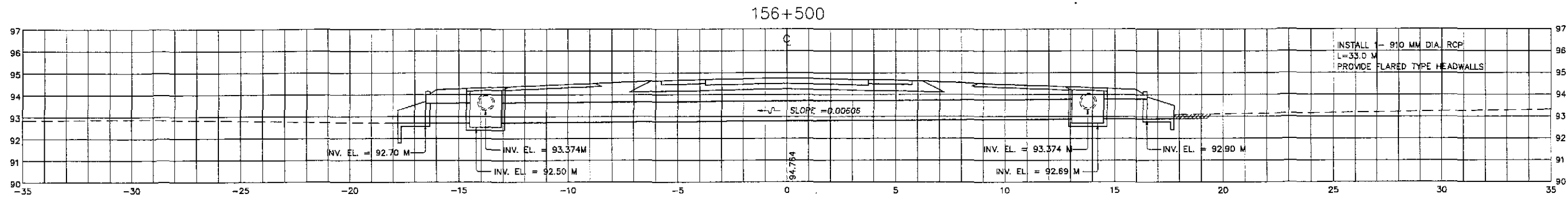
STATION		LENGTH (m)	TYPE	LOCATION	REMARKS
FROM	TO				
160+060	160+130	70.00	E - 3	RIGHTSIDE	UNLINED
160+060	160+130	70.00	E - 4	LEFTSIDE	UNLINED
160+130	160+300	170.00	E - 3	RIGHTSIDE	UNLINED
160+130	160+340	210.00	E - 4	LEFTSIDE	UNLINED
160+340	160+925	585.00	E - 1	RIGHTSIDE	LINED
160+340	160+855	515.00	E - 2	LEFTSIDE	LINED
160+855	160+925	70.00	E - 4	LEFTSIDE	UNLINED
160+975	161+044	69.00	E - 3	RIGHTSIDE	UNLINED
160+975	161+044	69.00	E - 4	LEFTSIDE	UNLINED
161+044	161+110	66.00	E - 1	RIGHTSIDE	LINED
161+044	161+110	66.00	E - 2	LEFTSIDE	LINED
161+120	161+210	90.00	E - 3	RIGHTSIDE	UNLINED
161+120	161+210	90.00	E - 2	LEFTSIDE	LINED
161+210	161+300	90.00	E - 3	RIGHTSIDE	UNLINED
161+300	161+360	60.00	C - 5	RIGHTSIDE	LINED
161+520	161+695	175.00	C - 2	LEFTSIDE	LINED
161+695	161+740	45.00	E - 2	LEFTSIDE	LINED
161+800	162+200	400.00	E - 2	LEFTSIDE	LINED
161+800	162+135	335.00	E - 1	RIGHTSIDE	LINED
162+280	162+440	160.00	C - 2	RIGHTSIDE	LINED
162+315	162+440	85.00	C - 3	LEFTSIDE	LINED
162+451	162+537	86.00	E - 3	RIGHTSIDE	UNLINED
162+451	162+537	86.00	E - 1	LEFTSIDE	LINED
162+537	162+760	223.00	E - 1	RIGHTSIDE	LINED
162+537	162+760	223.00	E - 2	LEFTSIDE	LINED
162+880	163+000	120.00	E - 3	RIGHTSIDE	UNLINED
162+880	163+000	120.00	E - 4	LEFTSIDE	UNLINED
163+000	163+300	300.00	E - 3	RIGHTSIDE	UNLINED
163+000	163+300	300.00	E - 4	LEFTSIDE	UNLINED
163+300	163+371	71.00	E - 4	LEFTSIDE	UNLINED
163+371	163+520	149.00	E - 4	LEFTSIDE	UNLINED
163+560	163+655	95.00	E - 4	LEFTSIDE	UNLINED
163+655	163+740	85.00	E - 4	LEFTSIDE	UNLINED
ACCESS ROAD					
ROAD INTERSECTION A-3					
1+020.00	1+026.00	6.00	E - 4	RIGHTSIDE	UNLINED
1+020.00	1+026.00	6.00	C - 5	RIGHTSIDE	UNLINED
ROAD INTERSECTION A-6					
0+950.00	0+966.33	16.33	E - 4	LEFTSIDE	UNLINED
0+950.00	0+966.33	16.33	E - 4	LEFTSIDE	UNLINED
ROAD INTERSECTION A-7					
0+188.23	0+200.00	11.77	E - 2	LEFTSIDE	LINED
0+188.23	0+200.00	11.77	E - 2	LEFTSIDE	LINED
0+245.00	0+260.00	15.00	E - 1	RIGHTSIDE	LINED
ROAD INTERSECTION A-9					
0+024.00	0+050.00	26.00	E - 3	RIGHTSIDE	UNLINED
ROAD INTERSECTION A-9a					
0+975.67	0+984.00	8.33	E - 4	LEFTSIDE	UNLINED

STATION	SIZE (m)	ITEM 103 (1) STRUCTURAL EXCAVATION (m ³)	ITEM 103 (3)a FOUNDATION FILL (m ³)		ITEM 404 (1) REINFORCING BAR (GRADE 40) (kg)		ITEM 405 (1)a STRUCTURAL CONCRETE CLASS "A" (m ³)		ITEM 405 (6) LEAN CONCRETE (m ³)	
		WW	RCBC	WW	RCBC	WW	RCBC	WW	RCBC	WW
157+060	3-3.00 x 2.75	542.51	33.46	13.00	29,356.00	2,260.00	308.98	6.96	16.73	6.50
157+210	1-1.80 x 1.50	120.99	4.44	2.47	7,396.30	560.00	54.76	10.06	4.44	1.24
157+320	1-3.00 x 2.10	186.10	12.35	4.84	10,588.41	1,120.00	108.73	20.16	6.17	2.42
161+455	1-3.00 x 2.10	274.55	18.22	4.84	15,620.22	1,120.00	160.40	20.16	9.11	2.42
157+400	1-3.00 x 2.40	229.45	13.61	5.84	12,145.14	1,360.00	126.25	24.60	6.80	2.92
159+150	1-1.20 x 0.60	25.82	8.94	0.30	4,038.53	62.86	24.83	3.94	4.47	0.26
159+630	2-3.00 x 3.00	440.20	36.21	11.27	25,616.80	2,240.00	242.82	40.66	12.25	5.63
160+000	1-2.40 x 2.40	182.34	10.38	5.36	10,867.86	1,260.00	79.93	22.84	5.19	2.68
161+518	1-2.40 x 2.10	220.98	11.55	4.42	11,107.25	1,020.00	83.55	18.56	5.78	2.21
TOTAL		2,222.94	149.15	52.35	126,763.51	11,002.86	1,190.24	167.94	70.94	26.29

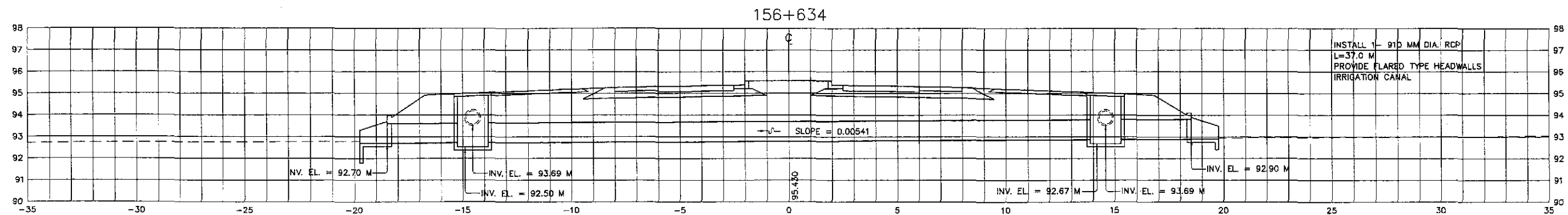
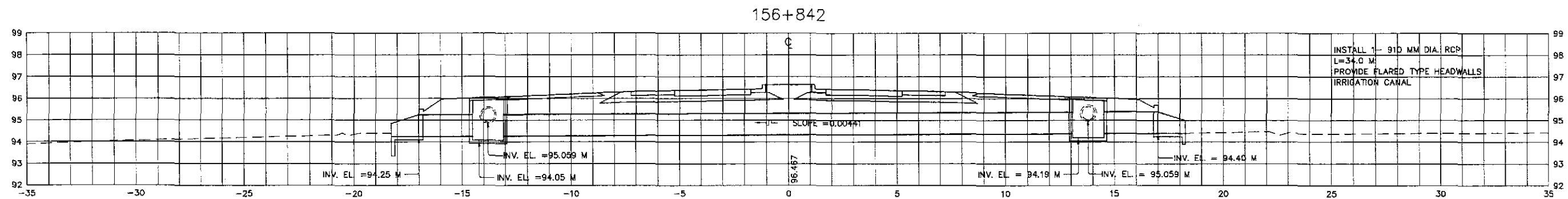
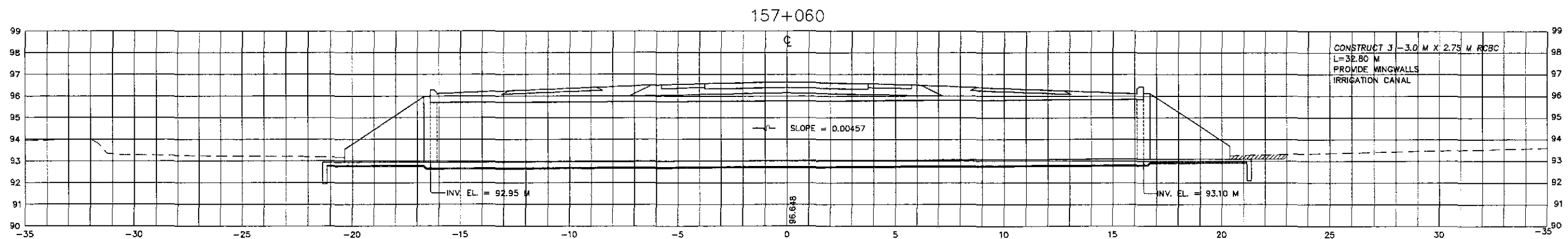
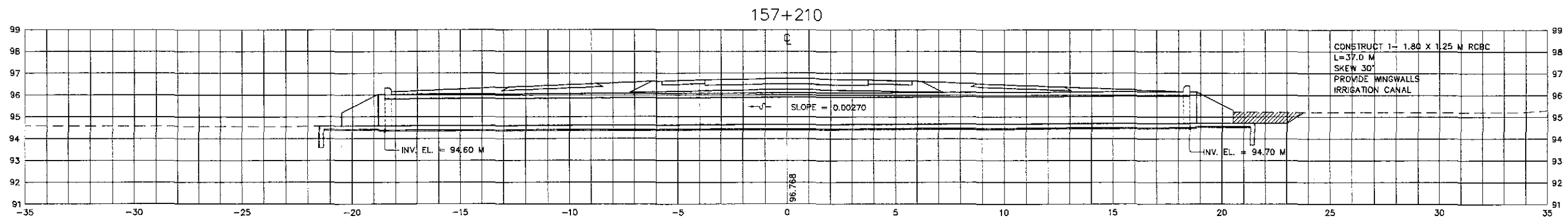
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KAI KATAHIRA & ENGINEERS INTERNATIONAL YEO YACHIYO ENGINEERING CO., LTD.	DESIGNED	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN	PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :								
	CHECKED	9/2/02			PUHL - PMO 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: (See cover sheet for Signature) MANUEL M. BONOAN Undersecretary	Approved By: (See cover sheet for Signature/Approval) SIMEON A. DATUMANONG Secretary	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Piaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	FULL SIZE A1	SCHEDULE OF SIDE DITCH AND QUANTITIES FOR RCBC	DG-02			
	SUBMITTED	9/10/02												PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Piaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS		FULL SIZE A1



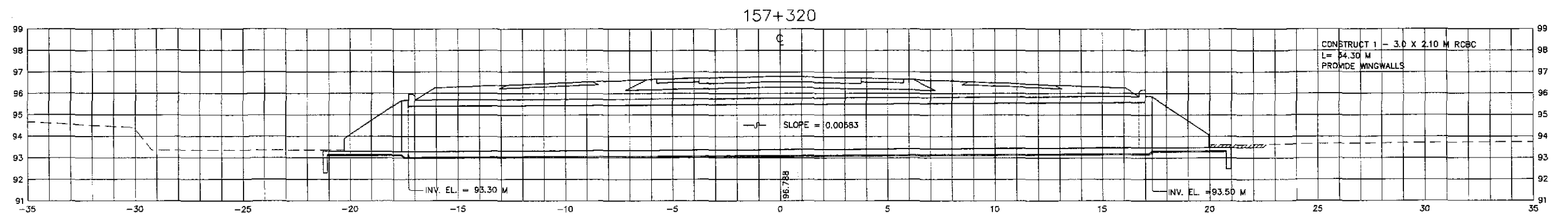
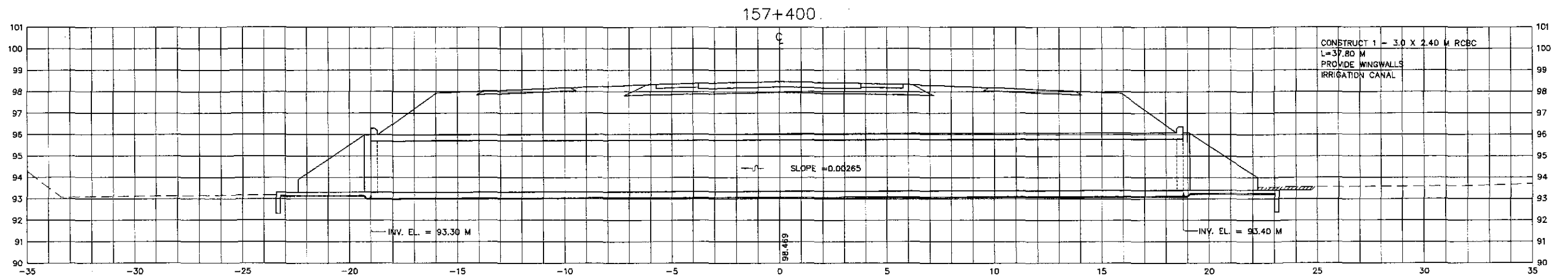
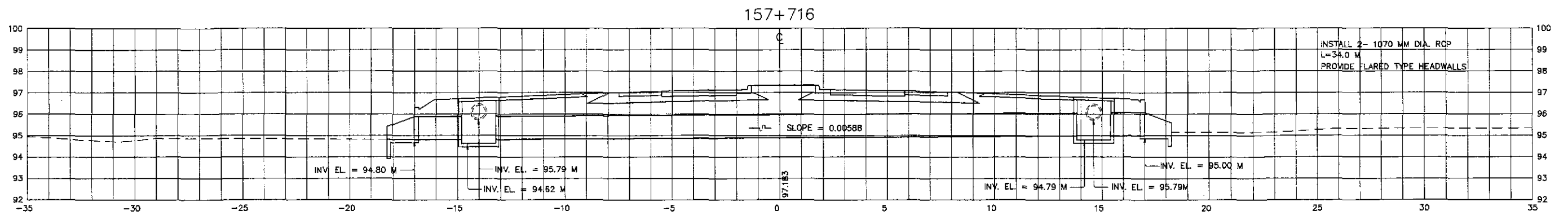
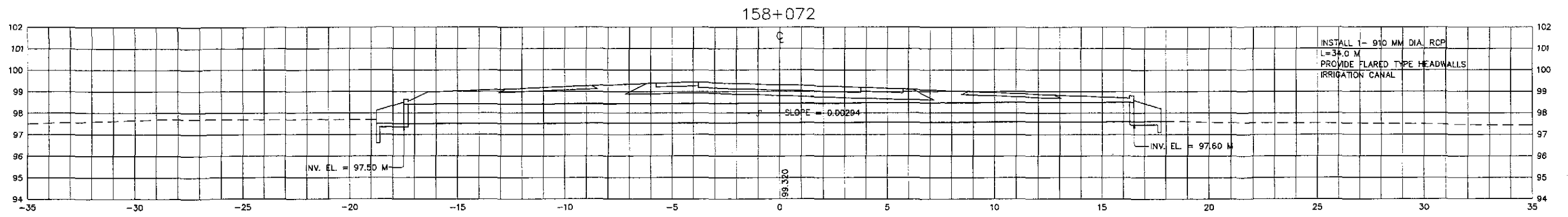
	DATE: 9/2/02 DESIGNED: F. STA. MARIA CHECKED: 9/4/02 SUBMITTED: 9/6/02	SIGNATURE: <i>[Signature]</i> TEAM LEADER	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN OFFICE OF THE SECRETARY	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 155+978 - STA. 156+200	SHEET NO. : DC-01
	Submitted By: DANILDO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV	Recommended By: MANUEL M. BONDAN Undersecretary	Approved By: SIMEON A. DATUMANONG Secretary		
	JICA JAPAN INTERNATIONAL COOPERATION AGENCY						



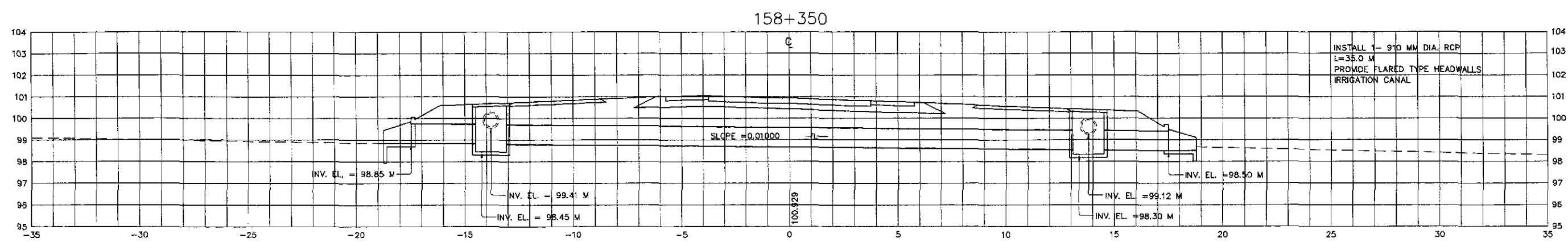
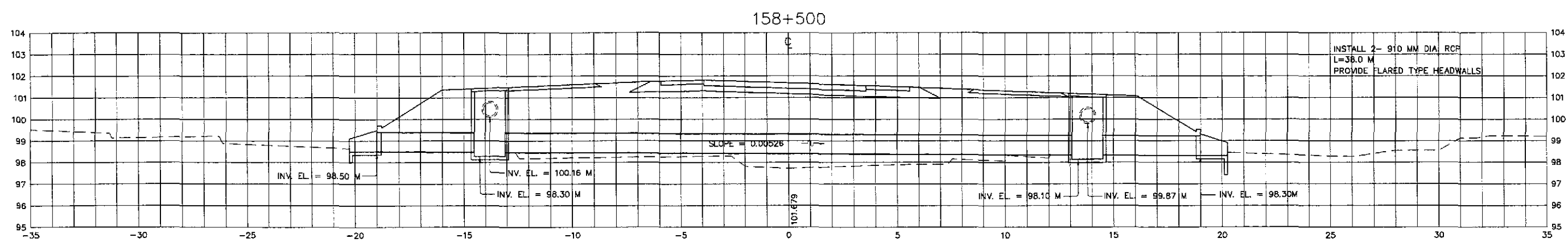
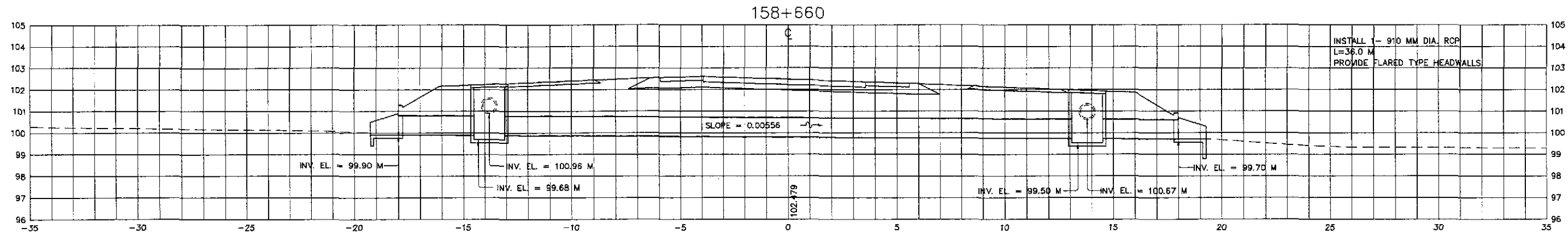
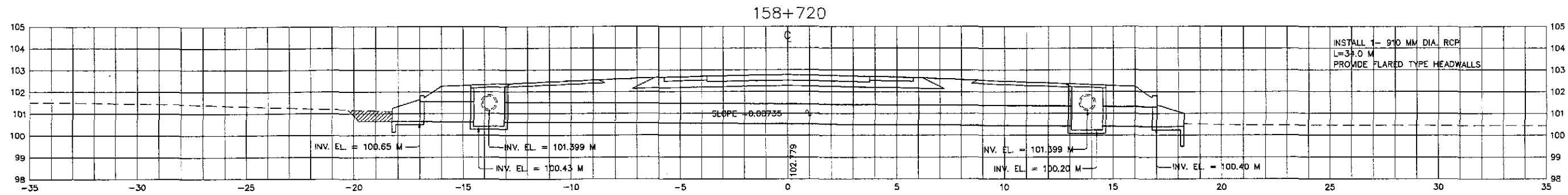
		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 156+240 - STA. 156+500	SHEET NO. : DC-02	
	DESIGNED <i>7/2/02</i> CHECKED <i>9/4/02</i> SUBMITTED <i>9/6/02</i>	DATE SIGNATURE <i>[Signature]</i> Submitted By:	BUREAU OF DESIGN OFFICE OF THE SECRETARY Recommended By:	OFFICE OF THE SECRETARY Approved By:			
	PJHL - PMO Submitted By:	Reviewed By:	Recommended By:	Approved By:			
	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary	SIMONE A. DATUMANGONG Secretary		

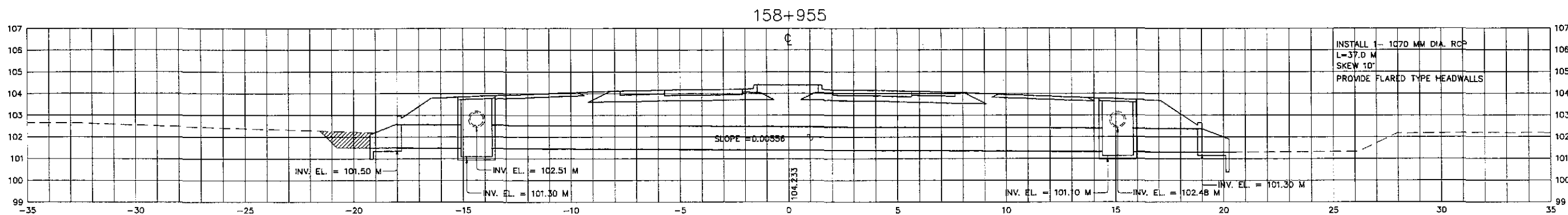
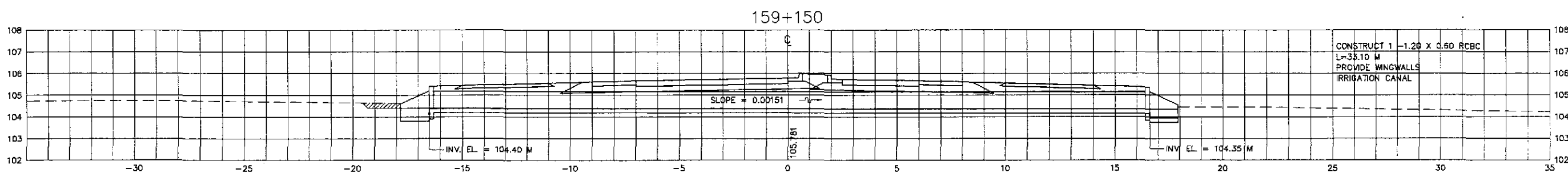
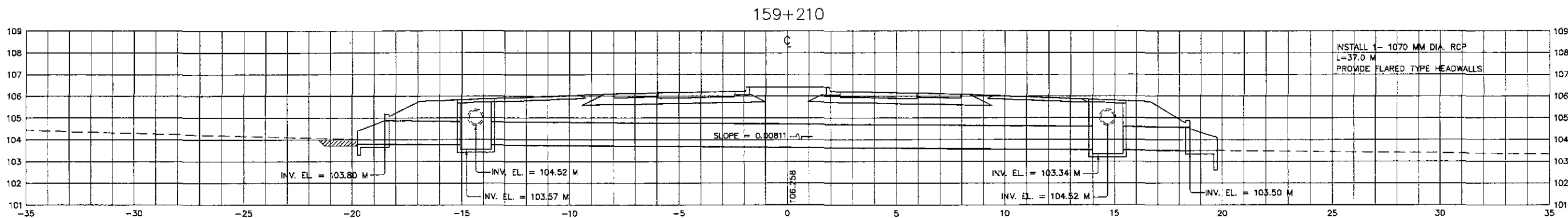
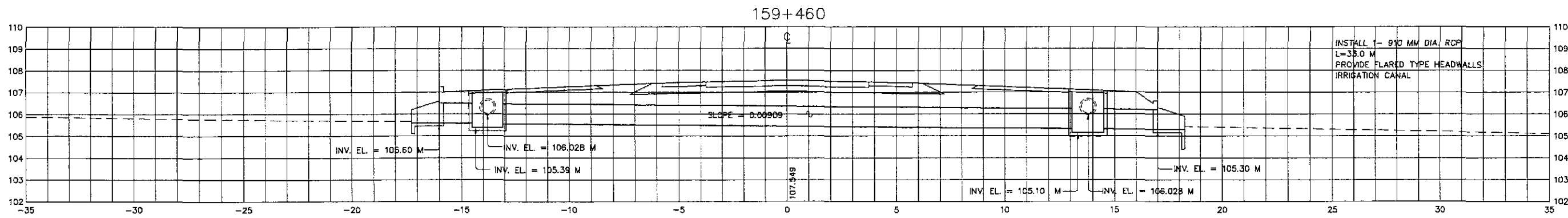


	DATE	SIGNATURE				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :		
	DESIGNED	9/2/02	[Signature]	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	1:100 FULL SIZE A1	DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 156+634 - STA. 157+210	DC-03	
	CHECKED	9/4/02	[Signature]	RUHL - PMO Submitted By:	BUREAU OF DESIGN Reviewed By:	OFFICE OF THE SECRETARY Recommended By:					
	SUBMITTED	9/6/02	[Signature]	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES DIC, Director IV					MANUEL M. BONDAN Undersecretary

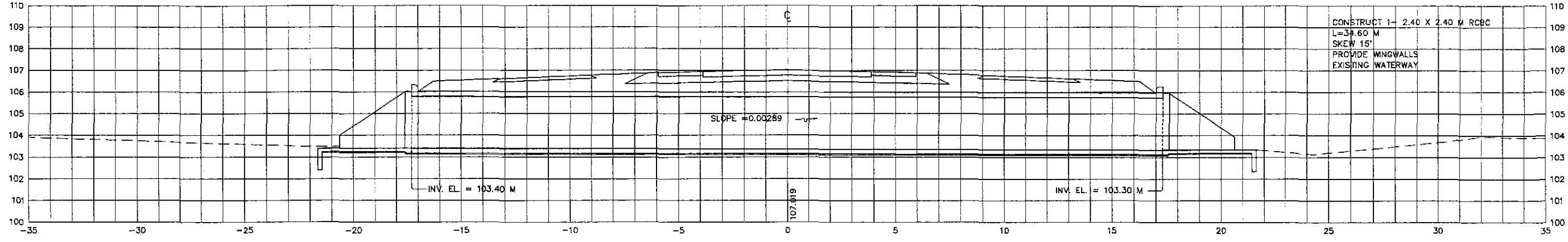


	DATE: 9/2/02 DESIGNED: [Signature] CHECKED: 9/4/02 [Signature] SUBMITTED: 9/6/02 [Signature]	SIGNATURE: [Signature] P.J.H.L. - PMO Submitted By: DANILO C. TRAJANO Project Director	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	BUREAU OF DESIGN Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	OFFICE OF THE SECRETARY Recommended By: GILBERTO S. REYES OIC, Director IV	Approved By: MANUEL M. BONDAN Undersecretary	Approved By: SIMEON A. DATUMANONG Secretary	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 157+320 - STA. 158+072	SHEET NO. : DC-04
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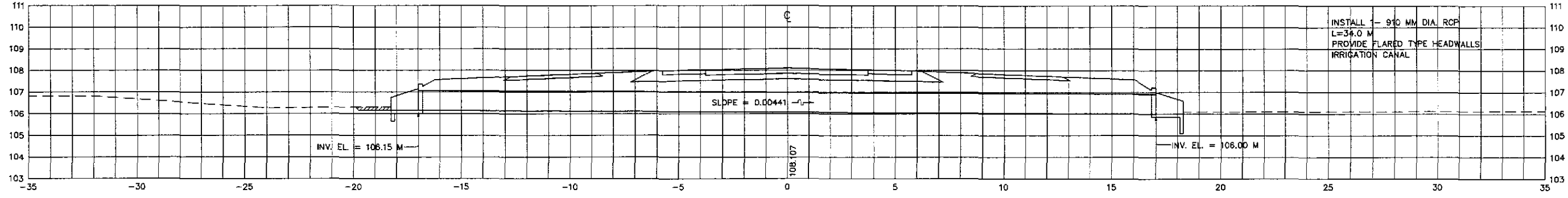




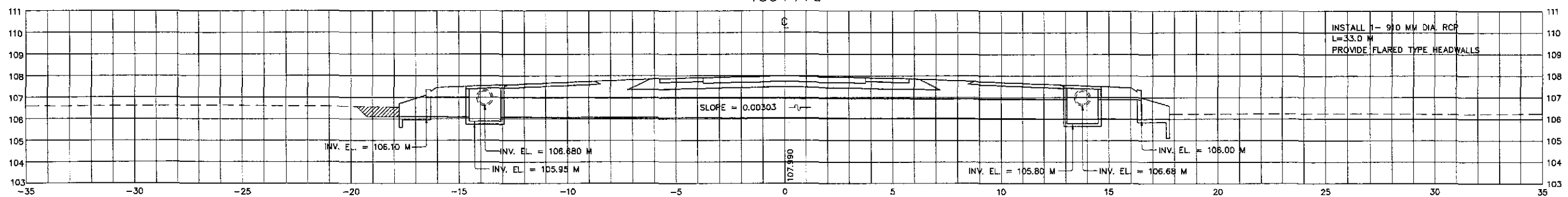
160+000



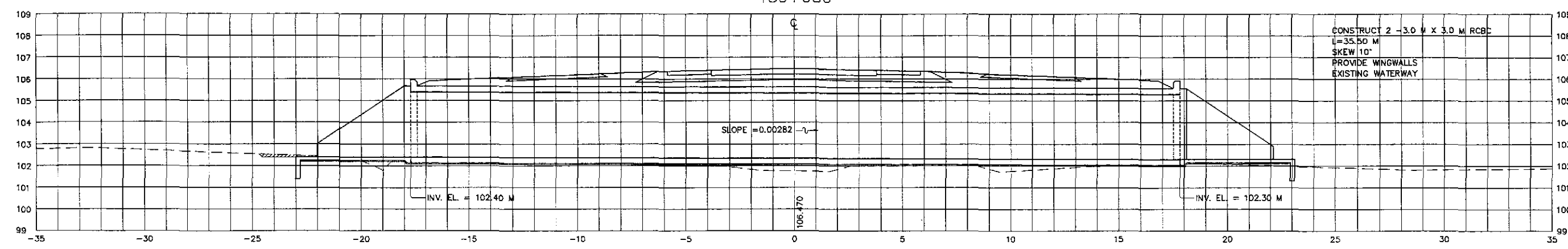
159+845



159+770



159+630



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JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS INTERNATIONAL

YEO YACHIYO ENGINEERING CO., LTD.

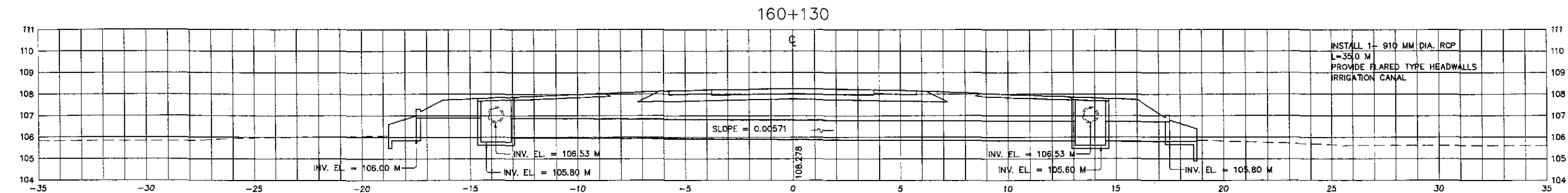
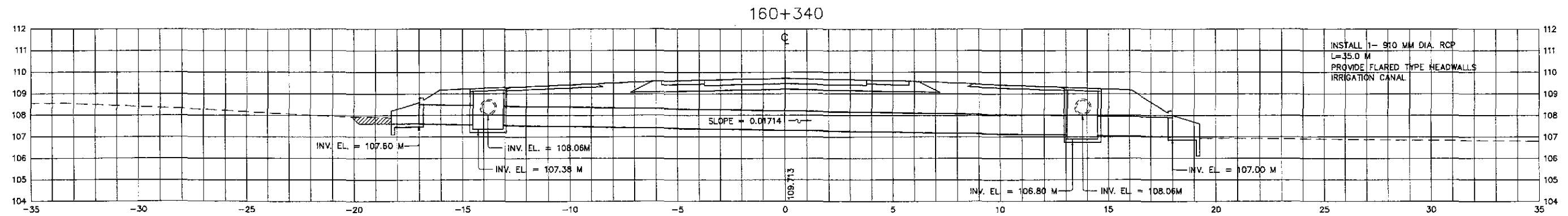
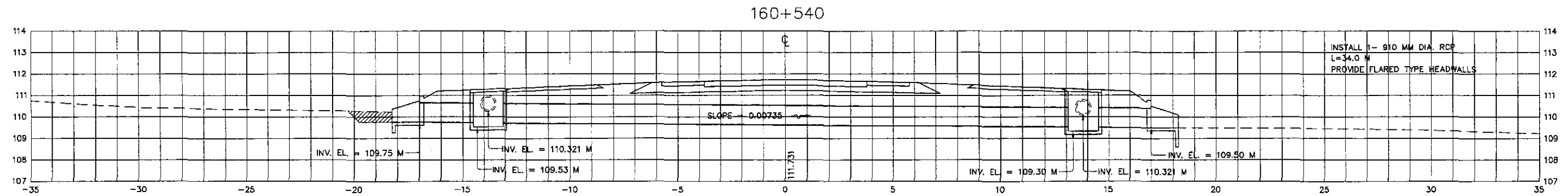
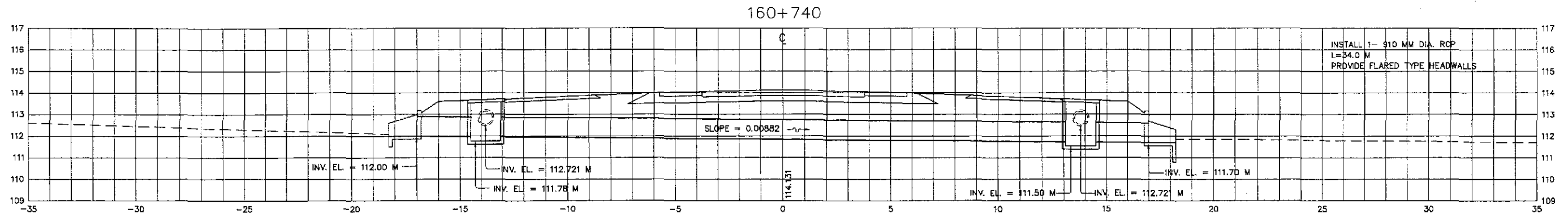
DESIGNED	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			
CHECKED	DATE	SIGNATURE	BUREAU OF DESIGN			
SUBMITTED	DATE	SIGNATURE	OFFICE OF THE SECRETARY			
			Submitted By:	Reviewed By:	Recommended By:	Approved By:
			DANILO C. TRAJANO Project Director	JOSEFINA M. ALACAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN 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)
SAN JOSE BYPASS

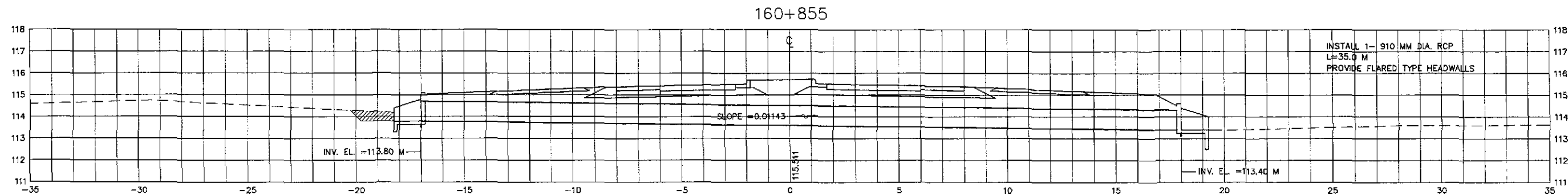
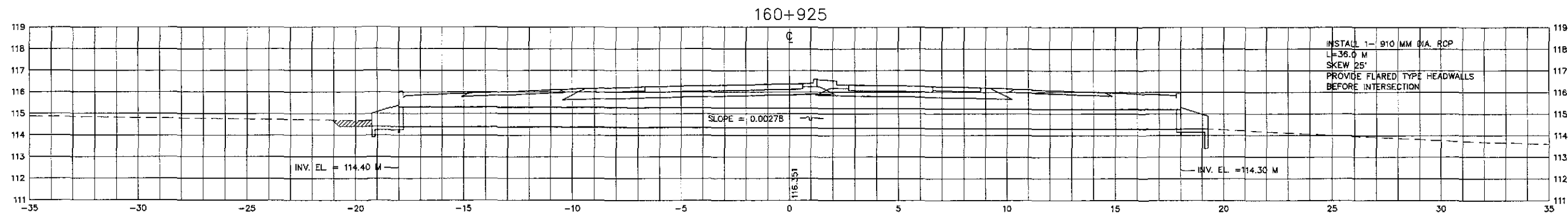
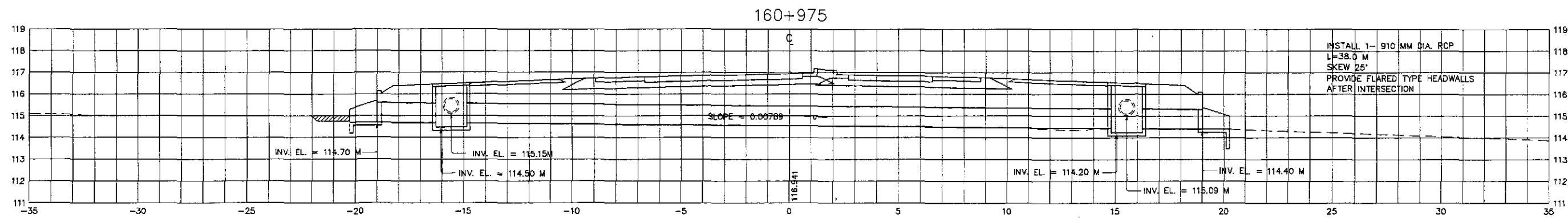
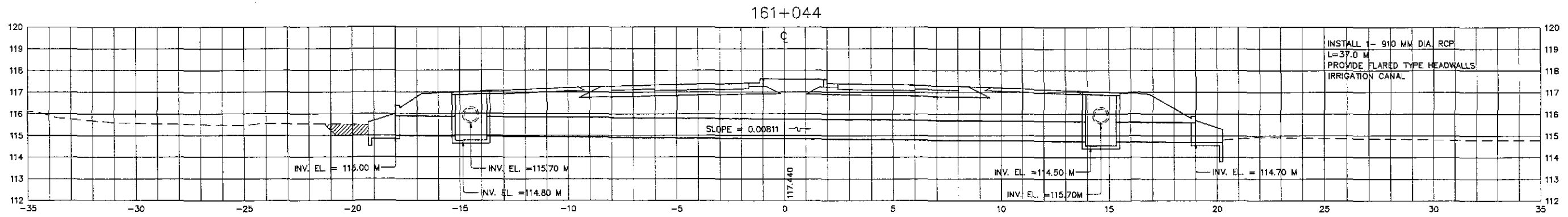
SCALE :
1:100
FULL SIZE A1

SHEET CONTENTS :
**DRAINAGE CROSS-SECTION
ALONG BYPASS (INITIAL STAGE)
STA. 159+630 - STA. 160+000**

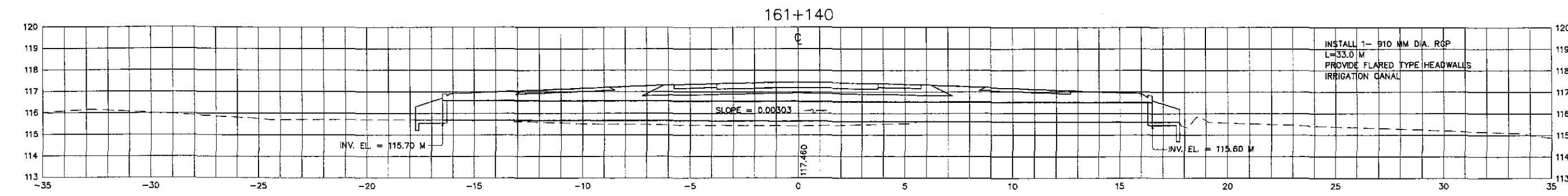
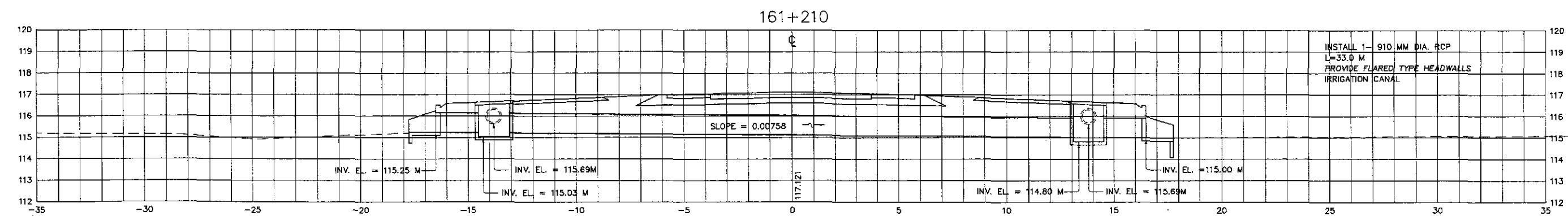
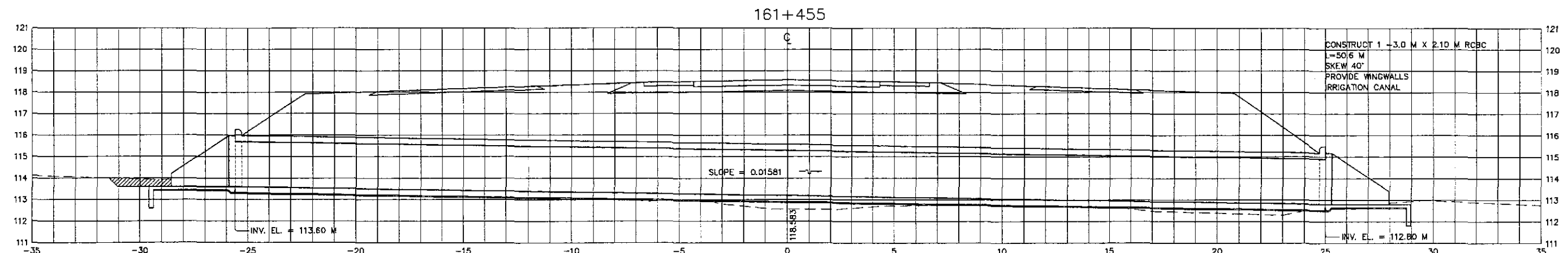
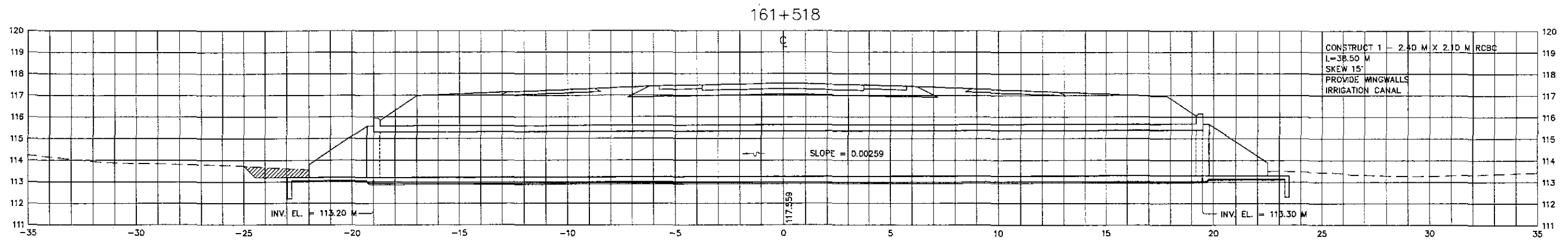
SHEET NO. :
DC-07

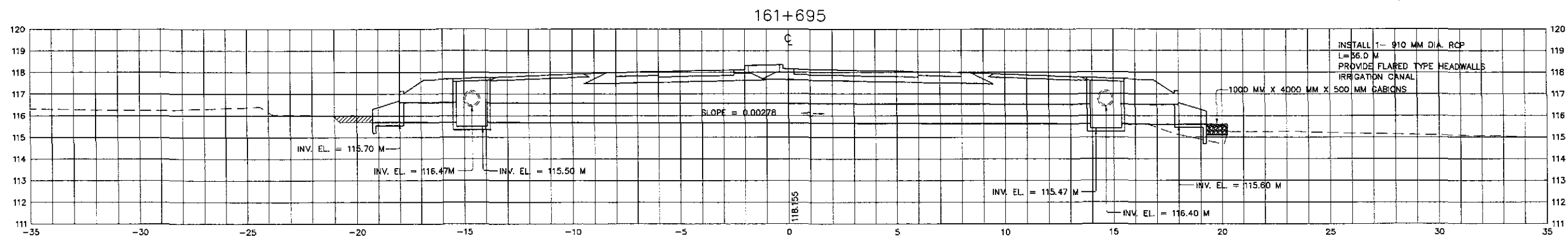
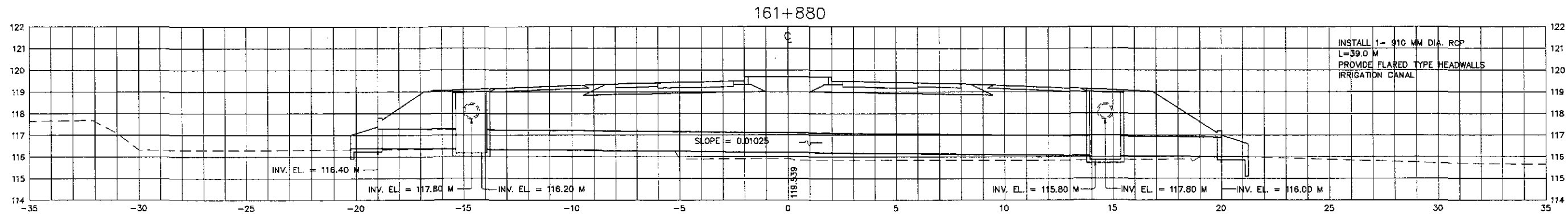
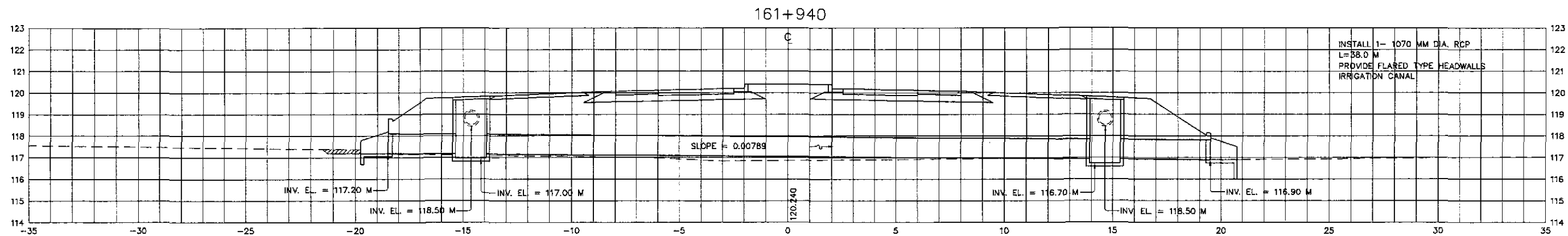
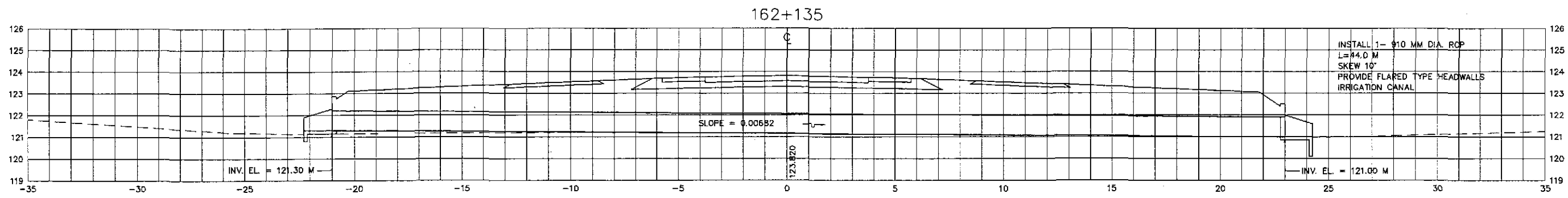


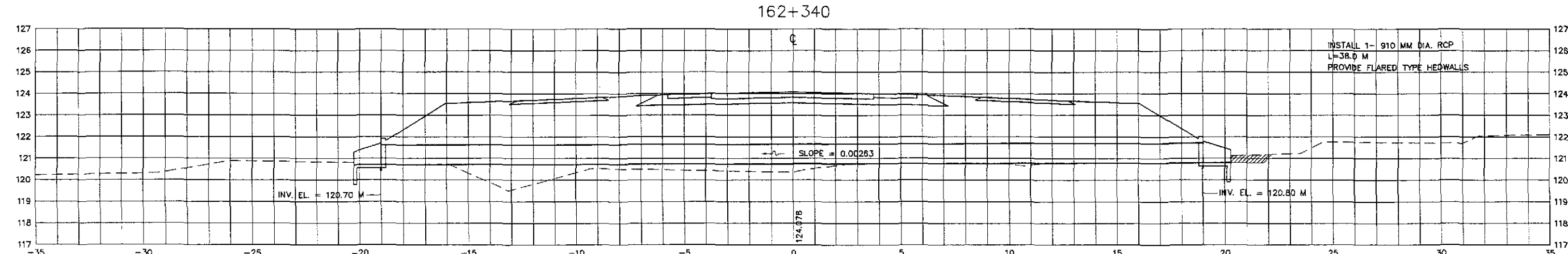
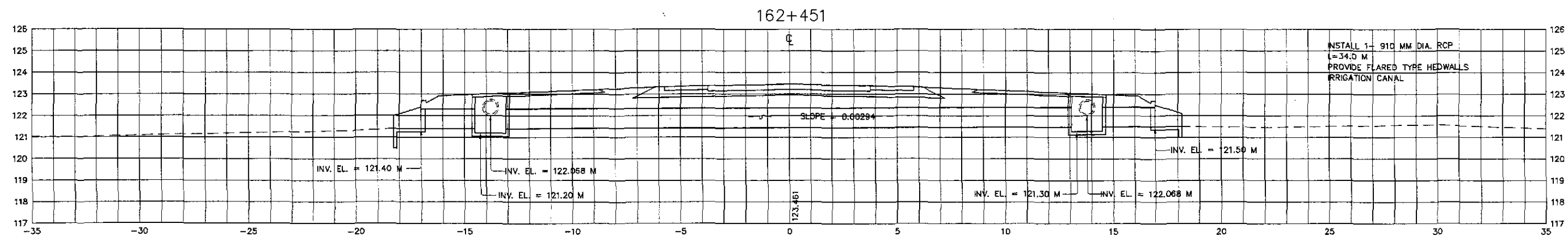
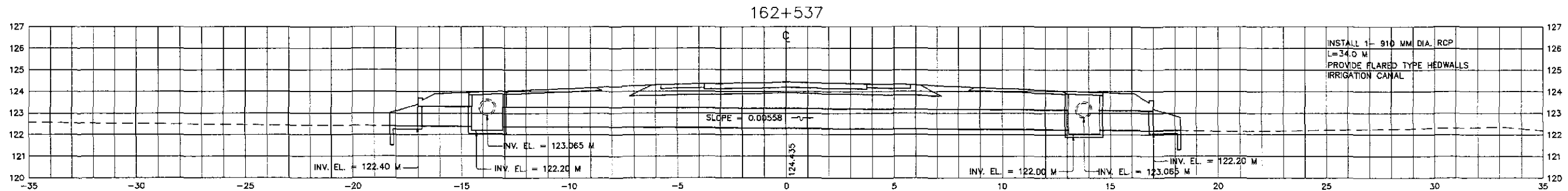
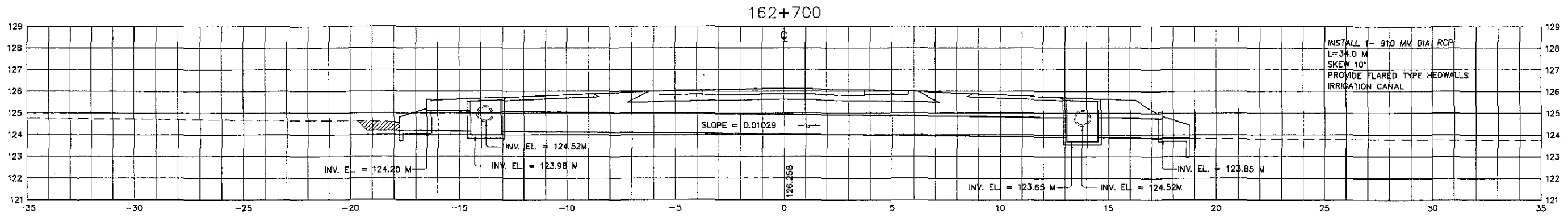
		PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Pilaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 160+130 - STA. 160+740	SHEET NO. : DC-08
	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS		BUREAU OF DESIGN OFFICE OF THE SECRETARY		
	DESIGNED <i>9/2/02</i> <i>[Signature]</i> CHECKED <i>9/4/02</i> <i>[Signature]</i> SUBMITTED <i>9/6/02</i> <i>[Signature]</i>	DATE SIGNATURE Submitted By: <i>[Signature]</i> DANILLO C. TRAJANO Project Director	Reviewed By: <i>[Signature]</i> JOSEFINA M. ALACAR Chief, Highway Division	Recommended By: <i>[Signature]</i> GILBERTO S. REYES DIC, Director IV	Recommended By: <i>[Signature]</i> MANUEL M. BONDAN Undersecretary



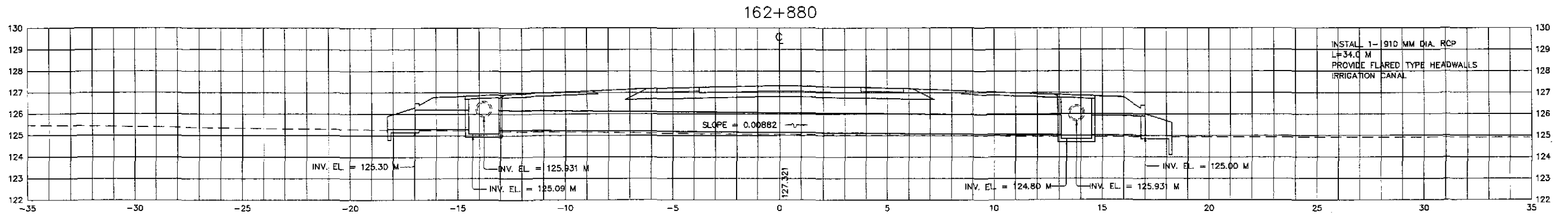
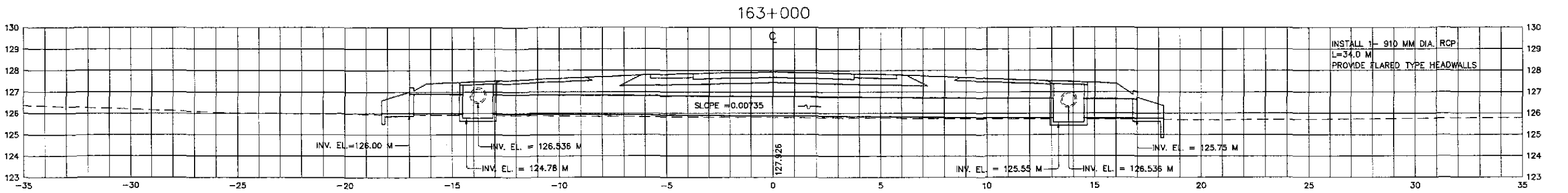
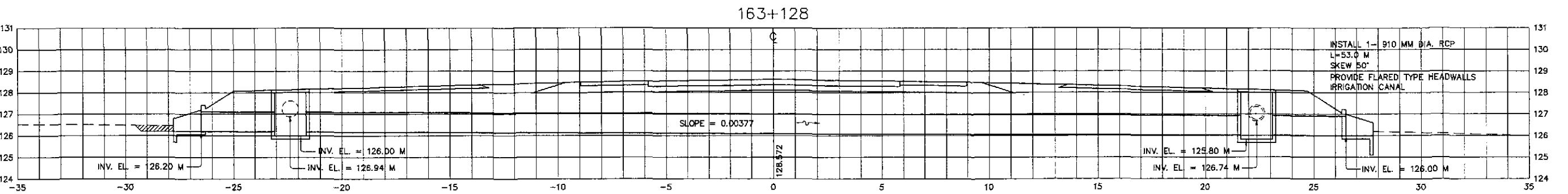
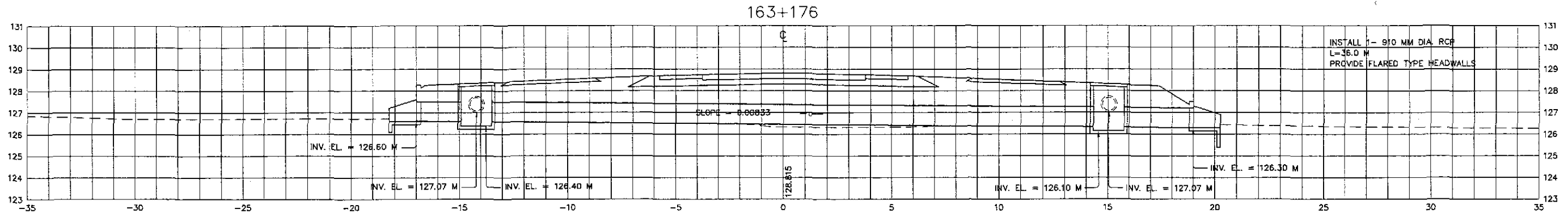
	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES			PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :				
	DESIGNED	9/2/02	F. STA. MARIA	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS						1:100	DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 160+855 - STA. 161+044	DC-09	
	CHECKED	9/4/02	A. HAZEN	BUREAU OF DESIGN									
	SUBMITTED	9/6/02	Mr. Richard	OFFICE OF THE SECRETARY									
Submitted By:		Reviewed By:		Recommended By:		Approved By:							
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					
						THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS		FULL SIZE A1					




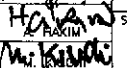





	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 162+340 - STA. 162+700	SHEET NO. : DC-12	
	DESIGNED	9/2/02	[Signature]	P.U.H.L. - PMO	BUREAU OF DESIGN					OFFICE OF THE SECRETARY
	CHECKED	9/4/02	[Signature]	Submitted By:	Reviewed By:					Recommended By:
	SUBMITTED	9/6/02	[Signature]	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division					GILBERTO S. REYES DIC, Director IV
					Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)				
					MANUEL M. BONGJAN Undersecretary	SIMEON A. DATUMANONG Secretary				




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

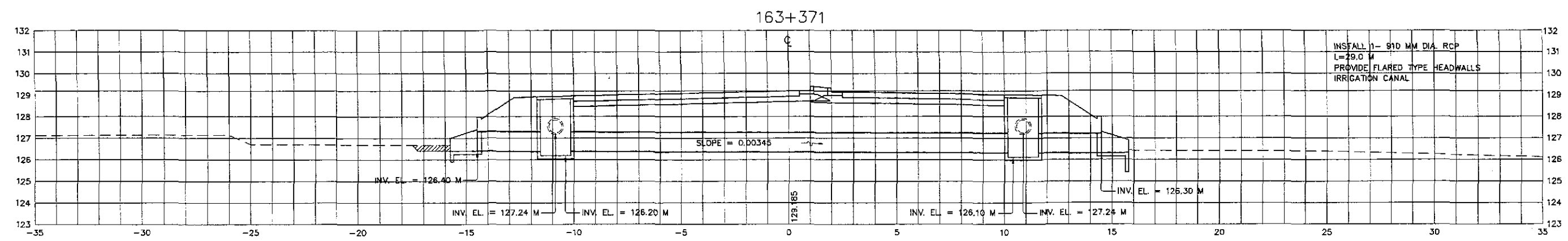
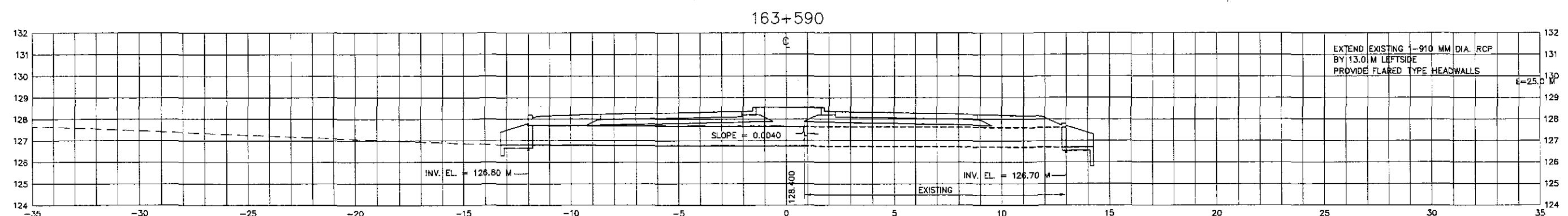
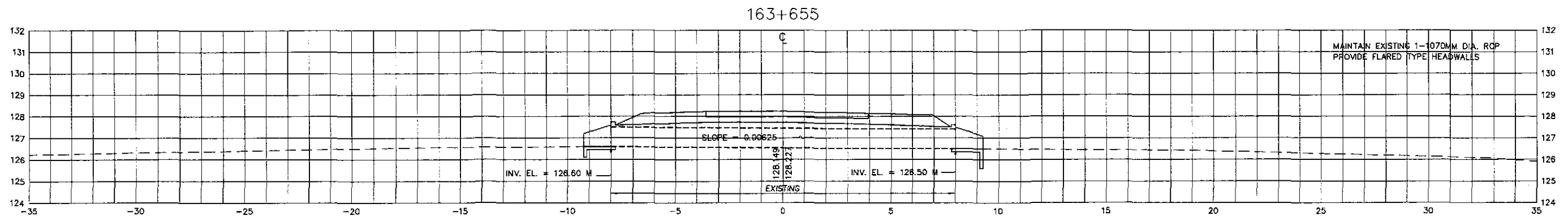
DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				
DESIGNED: 9/2/02		BUREAU OF DESIGN		OFFICE OF THE SECRETARY		
CHECKED: 9/4/02		Submitted By:	Reviewed By:	Recommended By:	Recommended By:	Approved By:
SUBMITTED: 9/6/02		DANILO C. TRAJANO Project Director	JOSEFINA M. ALACAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary	SIMEON A. DATUMANGONG Secretary

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

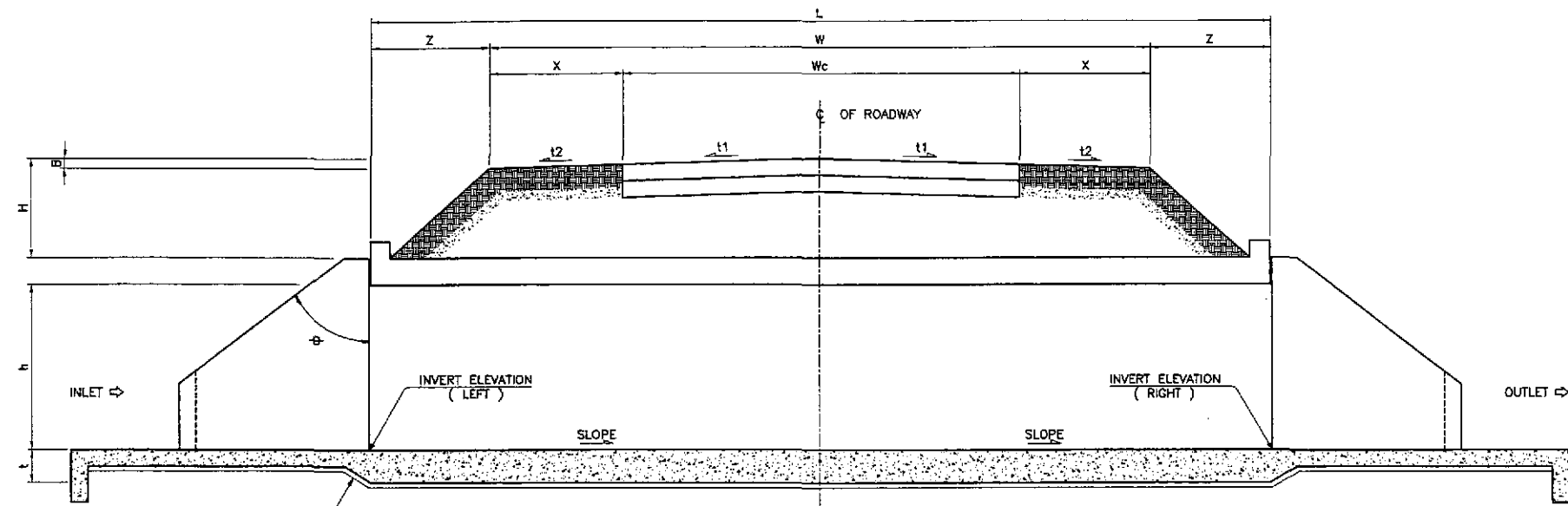
SCALE :
 1:100
 FULL SIZE A1

SHEET CONTENTS :
DRAINAGE CROSS-SECTION
 ALONG BYPASS (INITIAL STAGE)
 STA. 162+880 - STA. 163+176

SHEET NO. :
DC-13



		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) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 163+371 - STA. 163+655	SHEET NO. : DC-14	
	DESIGNED <i>9/2/02</i> <i>[Signature]</i> CHECKED <i>9/4/02</i> <i>[Signature]</i> SUBMITTED <i>9/6/02</i> <i>[Signature]</i>	DATE SIGNATURE Submitted By: <i>[Signature]</i> Reviewed By: <i>[Signature]</i> Recommended By: <i>[Signature]</i> Recommended By: <i>[Signature]</i> Approved By: <i>[Signature]</i>	BUREAU OF DESIGN OFFICE OF THE SECRETARY	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : DRAINAGE CROSS-SECTION ALONG BYPASS (INITIAL STAGE) STA. 163+371 - STA. 163+655	SHEET NO. : DC-14
	PJHL - PMO DANILLO C. TRAJANO Project Director	JOSEFINA M. ALACAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary	SIMON A. DATUMANONG Secretary		



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

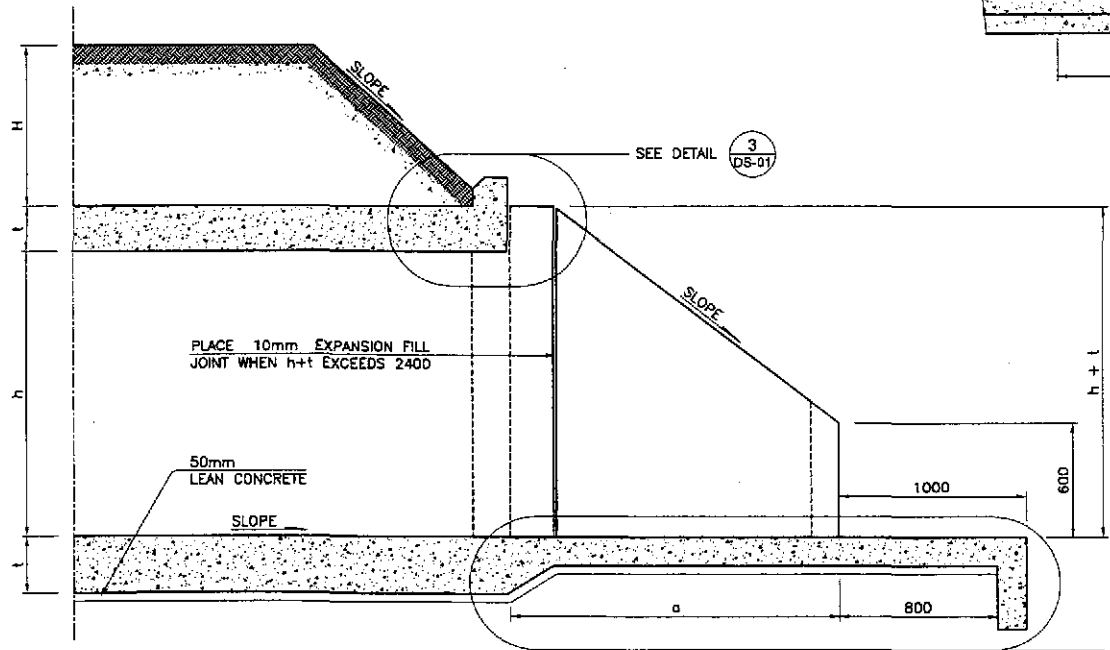
LEGEND:

- W — WIDTH OF ROADWAY FORMATION
- X — WIDTH OF SHOULDER
- Wc — WIDTH OF CARRIAGEWAY
- H — COVER ABOVE THE CULVERT
- L — TOTAL LENGTH OF BARREL
- t1 — SLOPE OF CARRIAGEWAY
- t2 — SLOPE OF SHOULDER
- Z — $[(H+t) - (B+200)] \tan \phi$
- B — $x t_2 + 0.5 t_1 W_c$
- h — HEIGHT OF CULVERT OPENING
- t — THICKNESS OF CULVERT WALL OR SLAB
- ϕ — SLOPE OF EMBANKMENT
- CC — ANGLE OF SKEW

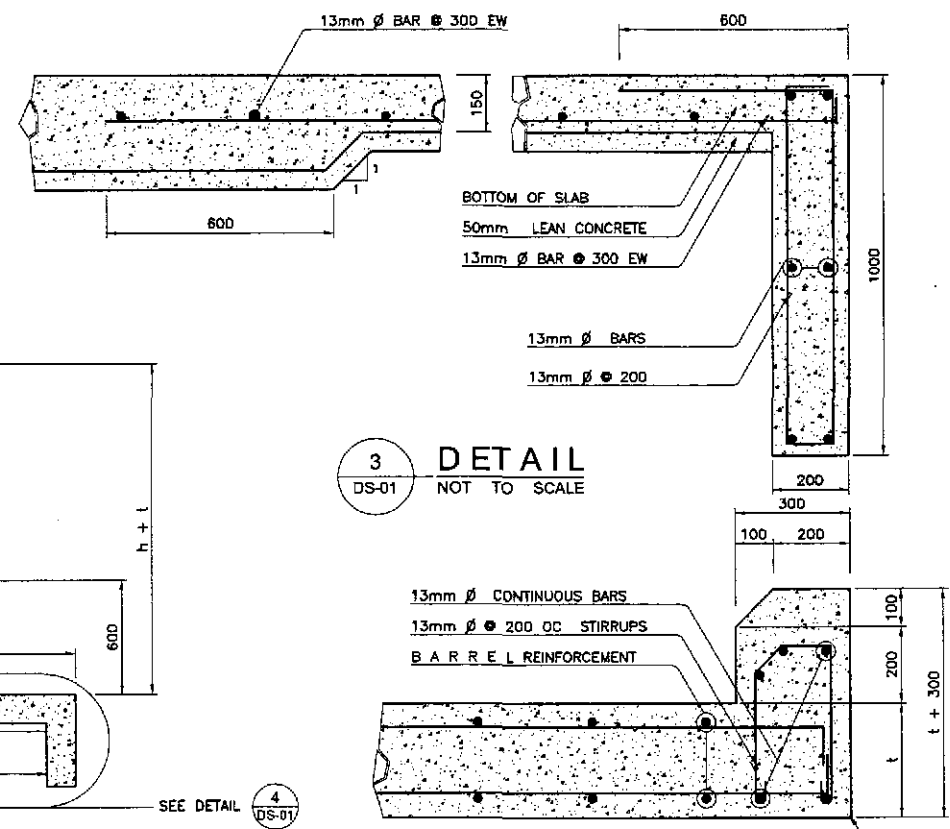
HORIZONTAL SKEW ANGLE CC	L (mm)
90°	$W + 2t \tan \phi [(H+t) - (B+200)]$
60°	$1.1547 (W + 2t \tan \phi [(H+t) - (B+200)])$
45°	$1.4142 (W + 2t \tan \phi [(H+t) - (B+200)])$

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.



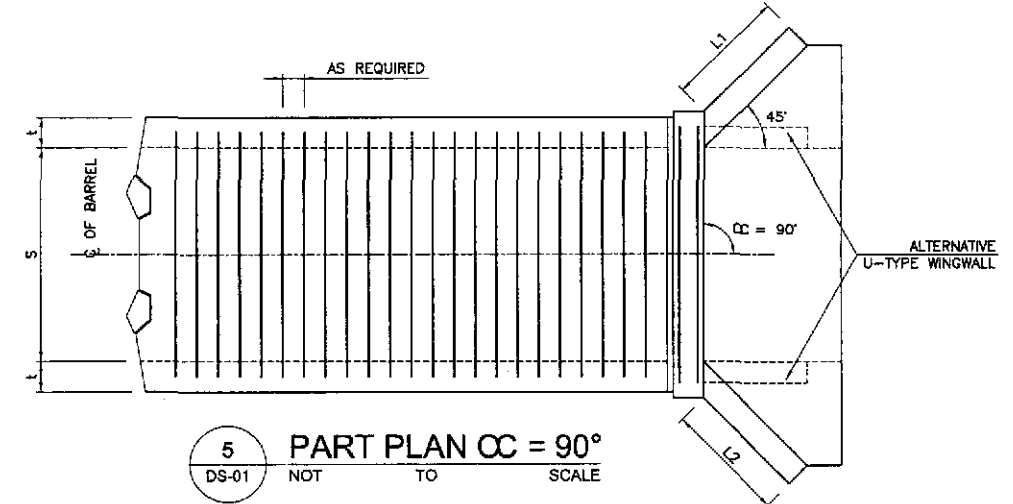
2 PART SECTION ALONG C OF CULVERT
DS-01 NOT TO SCALE



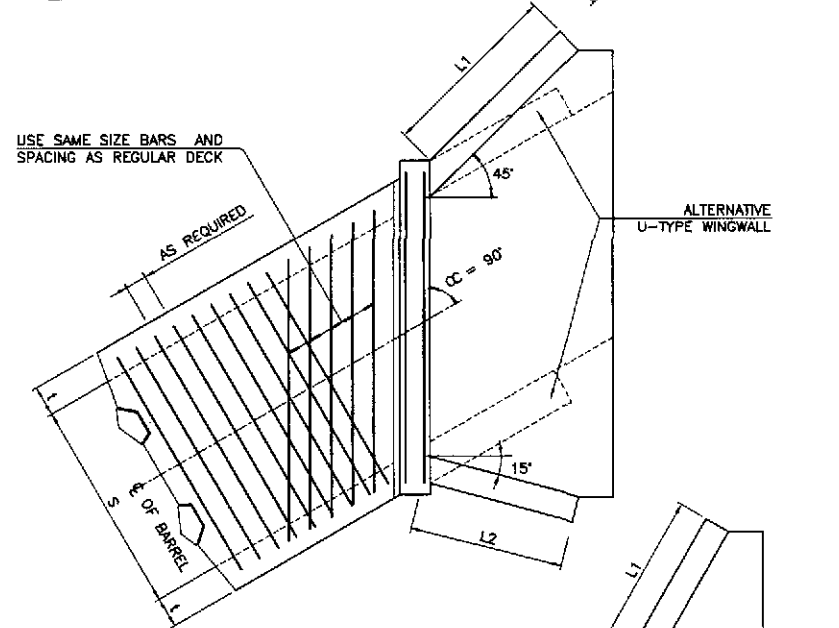
3 DETAIL
DS-01 NOT TO SCALE

4 DETAIL
DS-01 NOT TO SCALE

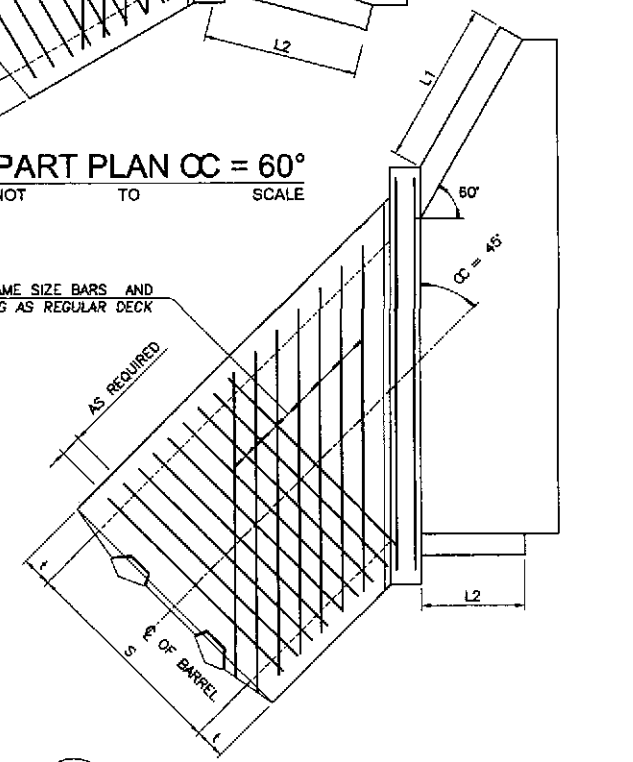
ROUND TO APPROXIMATE 150mm RADIUS (FOR INLET PORTION ONLY)



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



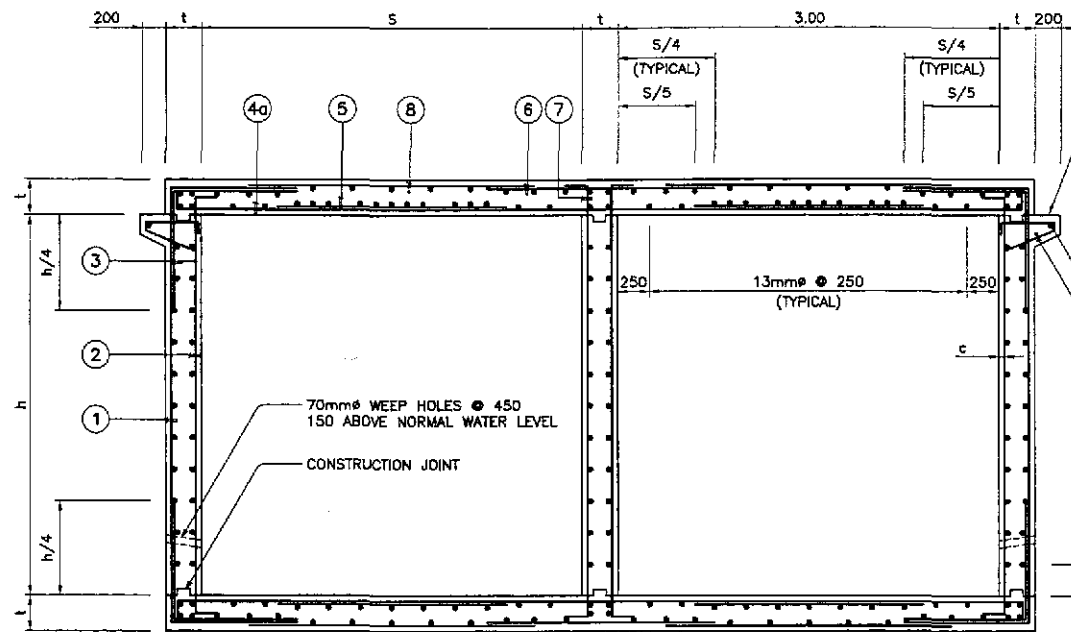
6 PART PLAN CC = 60°
DS-01 NOT TO SCALE



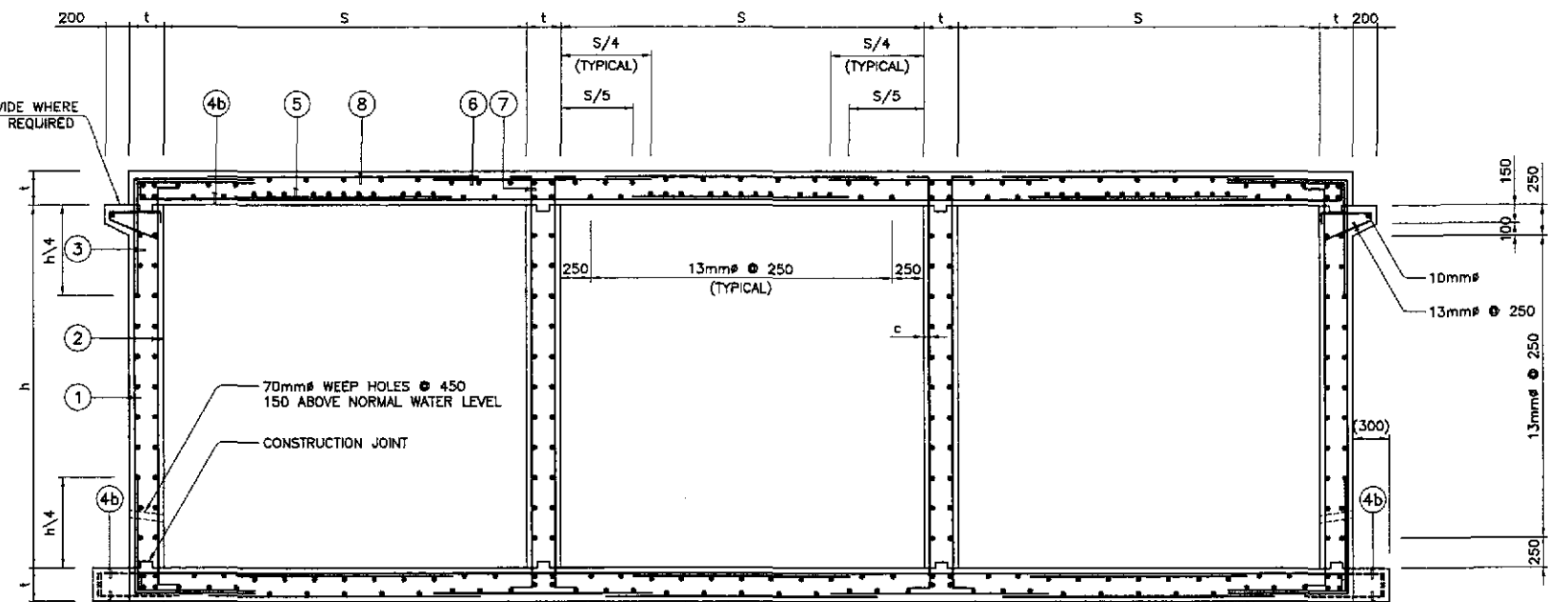
7 PART PLAN CC = 45°
DS-01 NOT TO SCALE

STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC)

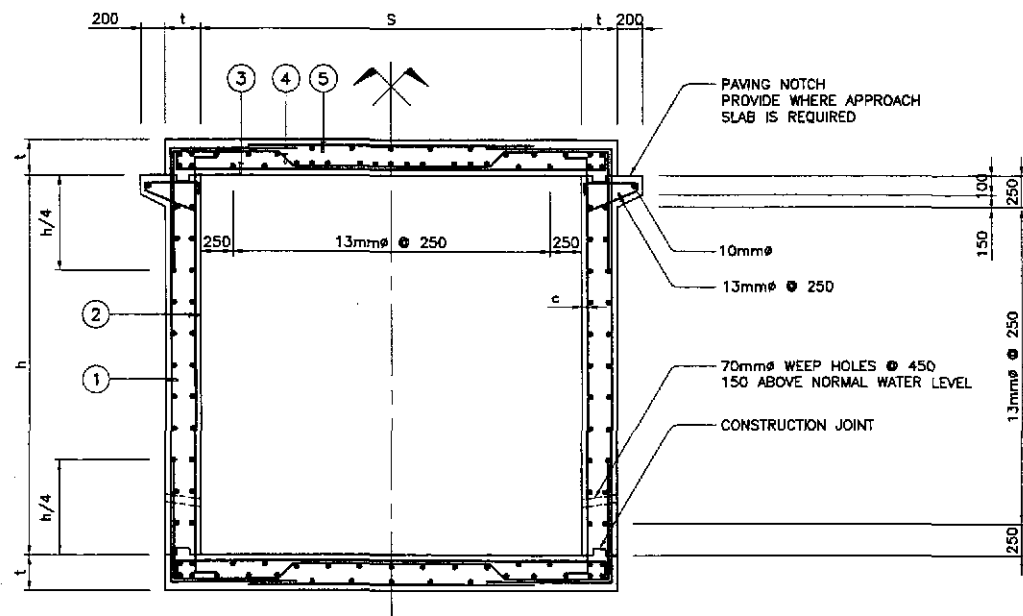
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION: THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE: 1:100 FULL SIZE A1	SHEET CONTENTS: STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (RCBC)	SHEET NO. : DS-01
	CHECKED	9/2/02	[Signature]		Submitted By:	BUREAU OF DESIGN	OFFICE OF THE SECRETARY				
	SUBMITTED	9/10/02	[Signature]		DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OC, Director IV				



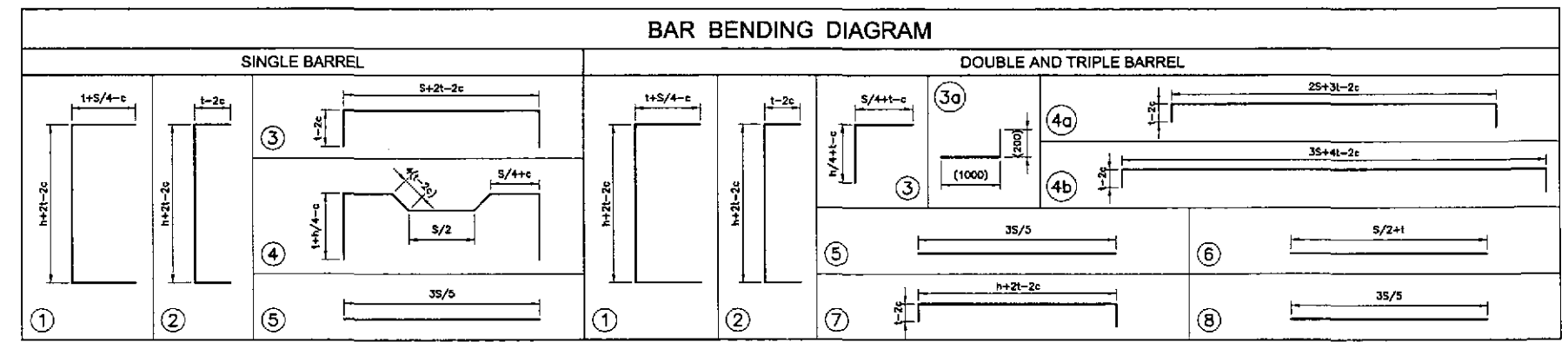
2 DOUBLE BARREL SECTION
DS-02 SCALE 1:30



3 TRIPLE BARREL SECTION
DS-02 SCALE 1:30



1 SINGLE BARREL SECTION
DS-02 SCALE 1:30



CLEAR SPAN S	HEIGHT h	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	φ	SPACING	
1250	1000	180	13	300	13	300	13	300	13	300	13	300	180	13	300	13	300	13	300	13	300	20	200	13	300	13	300	13	300
	1250	180	13	300	13	300	13	300	13	300	13	300	180	13	300	16	280	13	300	13	300	20	200	13	300	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	20	200	13	300	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	20	200	13	300	13	300	13	300
1500	1000	180	16	240	16	240	16	240	16	240	13	300	200	16	300	16	300	16	300	16	300	20	200	13	300	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	20	200	13	300	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	20	200	13	300	13	300	13	280
	1800	180	16	240	16	280	16	240	16	240	13	300	200	16	300	16	260	16	300	16	300	20	200	13	300	13	300	13	280
1800	1250	200	16	280	16	300	16	260	16	260	13	280	250	16	300	16	300	16	300	16	300	20	190	13	300	13	300	13	220
	1500	200	16	280	16	300	16	260	16	260	13	280	250	16	300	16	280	16	300	16	300	20	190	13	300	13	300	13	220
	1800	200	16	260	16	280	16	260	16	260	13	280	250	16	300	16	280	16	300	16	300	20	190	13	300	13	300	13	220
	2100	200	16	260	16	260	16	260	16	260	13	280	250	16	300	16	260	16	300	16	300	20	190	13	300	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	20	120	13	300	13	300	13	200
	2100	220	16	220	16	260	16	220	16	220	13	240	300	16	300	16	280	16	300	16	300	20	120	13	300	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	20	120	13	300	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	20	120	13	300	13	300	13	200
3000	2100	280	16	260	16	260	16	260	16	260	13	200	300	20	300	16	280	20	300	20	300	25	170	13	300	13	300	13	200
	2400	280	16	260	16	260	16	260	16	260	13	200	300	20	300	16	280	20	300	20	300	25	170	13	300	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	25	170	16	300	13	300	13	200
	3000	280	16	200	16	220	16	200	16	200	13	200	300	20	300	16	200	20	300	20	300	25	170	16	300	13	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

	DATE	SIGNATURE					PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	DESIGNED	9/2/02	[Signature]	DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Pilarid, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	1:30	STANDARD DETAILS OF RCBC BARRELS	DS-02
	CHECKED	9/4/02	[Signature]	Submitted By:	Reviewed By:	Recommended By:	Approved By:				
	SUBMITTED	9/6/02	[Signature]	DANILO C. TRAJANO Project Director	JOSEFINA M. ALAGAR Chief, Highways Division	GILBERTO S. REYES OIC, Director IV	MANUEL M. BONDAN Undersecretary				
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	296.20	3.56	407.10
1800	1250	1.38	189.20	3.11	312.30	4.45	437.00
	1500	1.48	199.90	3.30	326.10	4.70	454.00
	1800	1.60	214.80	3.53	342.80	5.00	475.20
	2100	1.72	239.60	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

QUANTITIES FOR STANDARD WINGWALLS									
m (meter)	h+t (meter)	L (meter)	QUANTITY PER WINGWALL AND APRON SLAB						
			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	3.89	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	3.81	8.37	460	10.00	550	11.31	620	
2.63	2.02	3.01	7.08	390	9.14	500	10.71	590	
3.08	2.32	3.65	9.28	510	11.61	640	13.37	740	
3.53	2.62	4.28	11.42	630	13.98	770	15.92	880	
4.06	2.97	5.03	14.17	780	17.90	990	19.15	1050	
3.17	2.38	3.78	10.08	560	12.38	680	14.53	800	
3.62	2.68	4.41	12.30	680	14.83	820	17.19	940	
4.15	3.03	5.15	15.15	840	17.94	990	20.57	1130	
4.52	3.28	5.68	17.34	960	20.33	1120	23.15	1270	

GENERAL NOTES :

SPECIFICATION :

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

DESIGN LOAD :

LIVE LOAD MS-1B (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 :

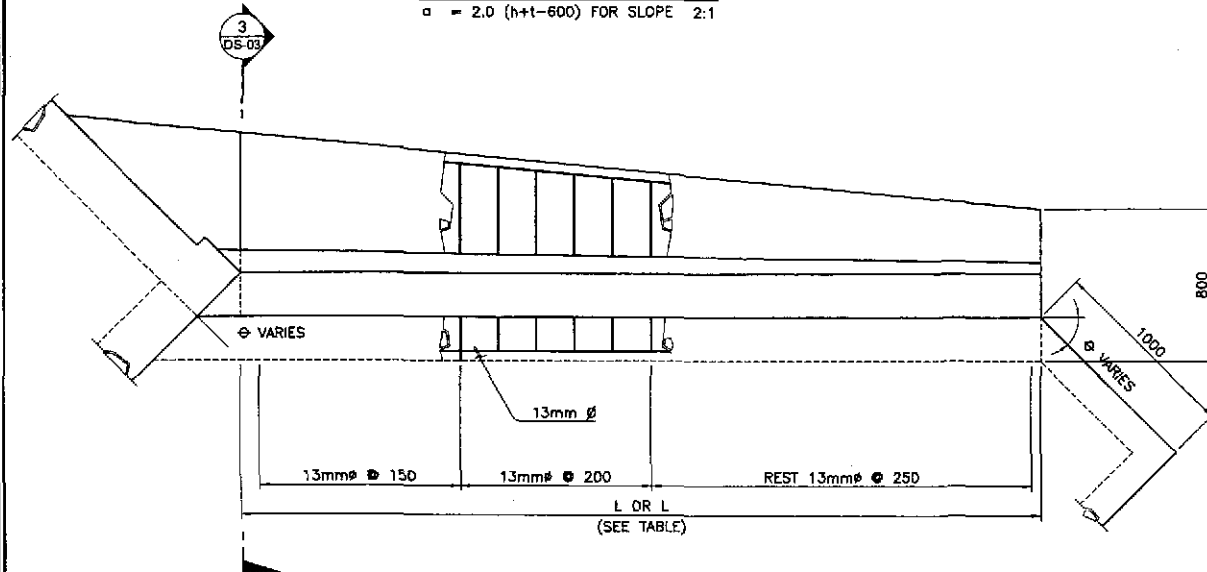
MAXIMUM HEIGHT OF FILL IS 3000mm ABOVE TOP SLAB, FOR HEIGHT OF FILL GREATER THAN 3000mm SPECIAL DESIGN OF BOX CULVERT SHOULD BE DONE.

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

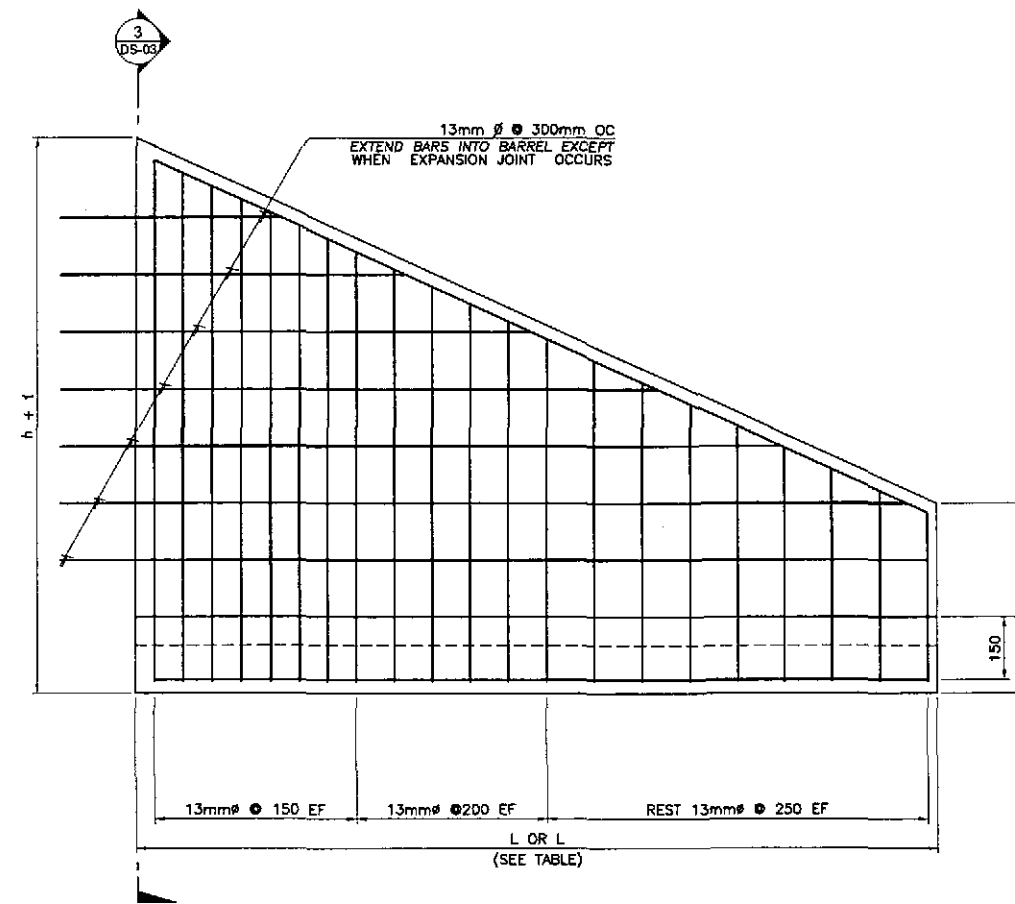
WHERE :

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

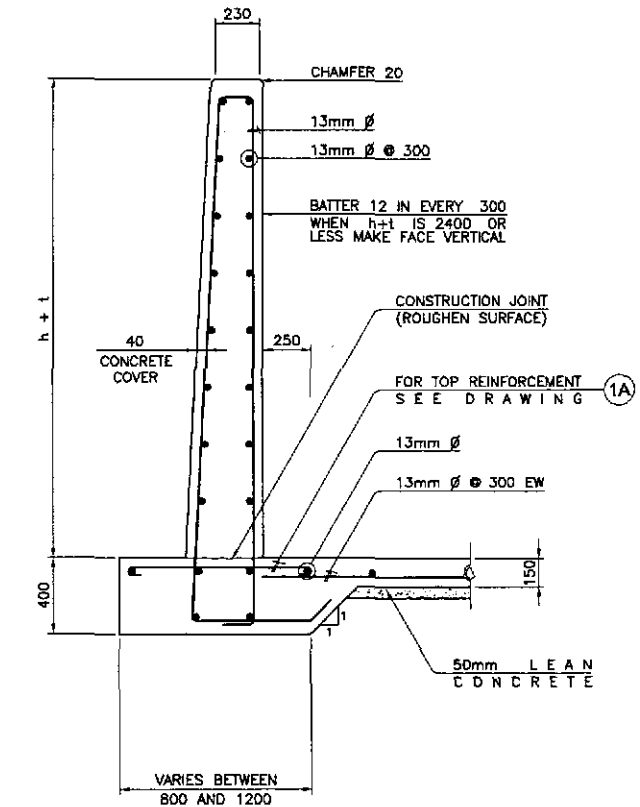
$a = 2.0 (h+t-600)$ FOR SLOPE 2:1



1 WINGWALL PLAN
SCALE 1:40



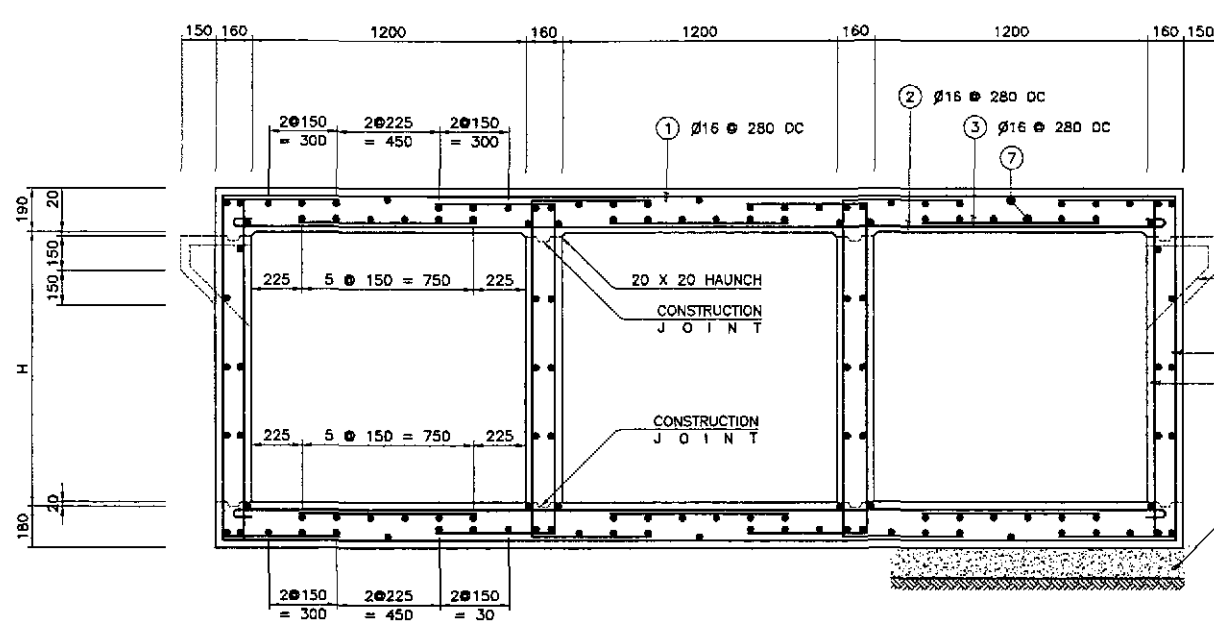
2 WINGWALL ELEVATION
SCALE 1:40



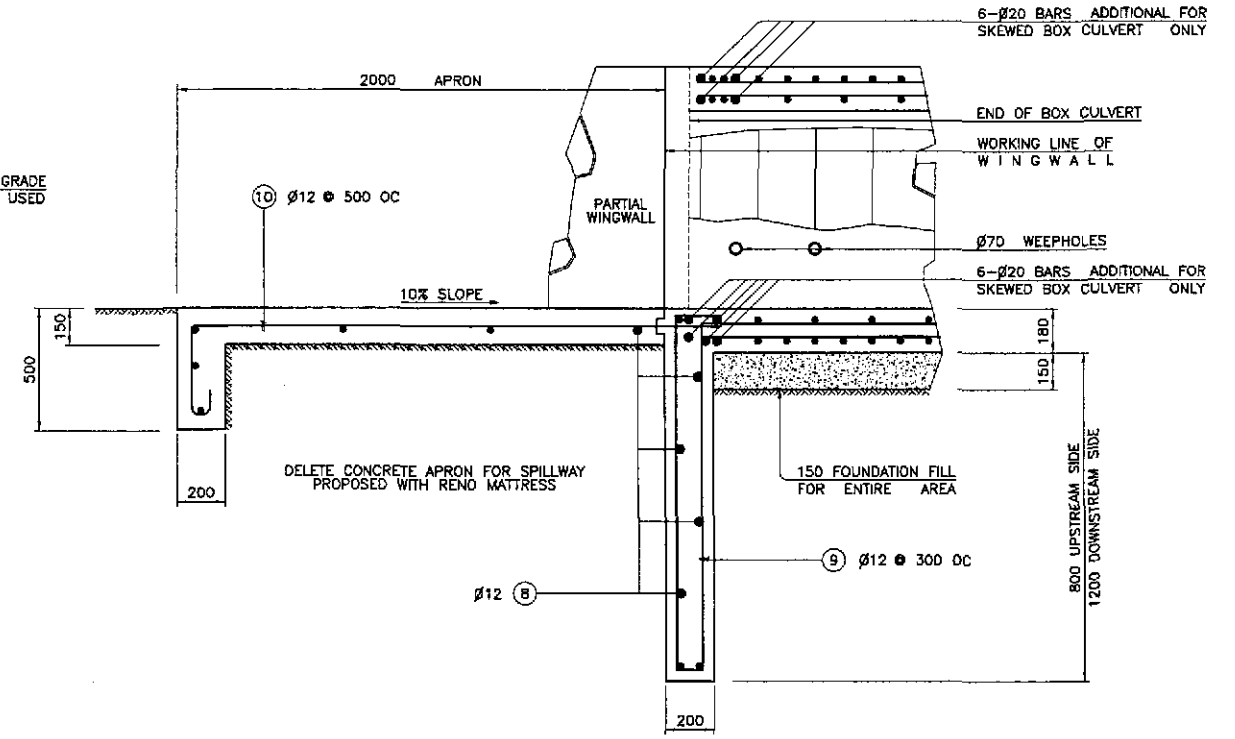
3 SECTION
SCALE 1:40

RCBC WINGWALL DETAILS

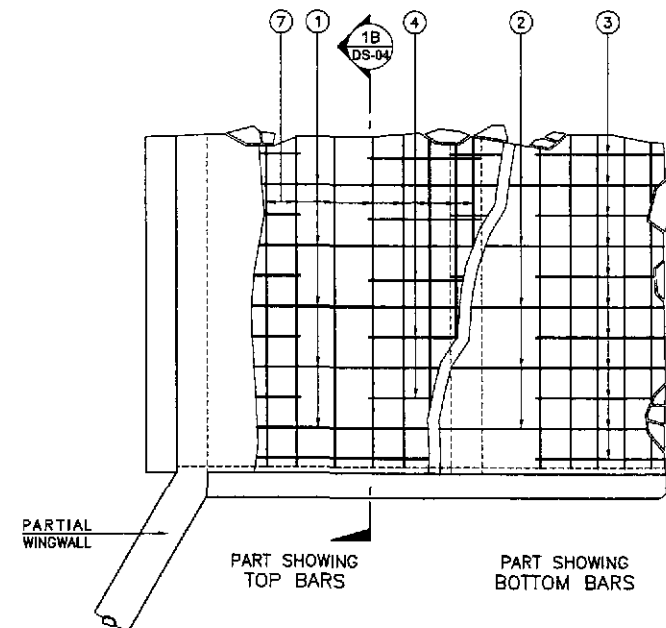
		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Paridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:40 FULL SIZE A1	SHEET CONTENTS : STANDARD DETAILS OF RCBC WINGWALLS	SHEET NO. : DS-03
	DESIGNED: 9/2/02 CHECKED: 9/4/02 SUBMITTED: 9/6/02	DATE: 9/2/02 SIGNATURE: [Signature] SUBMITTED BY: [Signature] REVIEWED BY: [Signature] PROJECT DIRECTOR: DANILLO C. TRAJANO	BUREAU OF DESIGN OFFICE OF THE SECRETARY RECOMMENDED BY: [Signature] APPROVED BY: [Signature] CHIEF, HIGHWAYS DIVISION: JOSEFINA M. ALACAR OIC, DIRECTOR IV: GILBERTO S. REYES UNDERSECRETARY: MANUEL M. BONGOHAN SECRETARY: SIMEON A. DATUMANONG	SCALE : 1:40 FULL SIZE A1	SHEET CONTENTS : STANDARD DETAILS OF RCBC WINGWALLS	SHEET NO. : DS-03



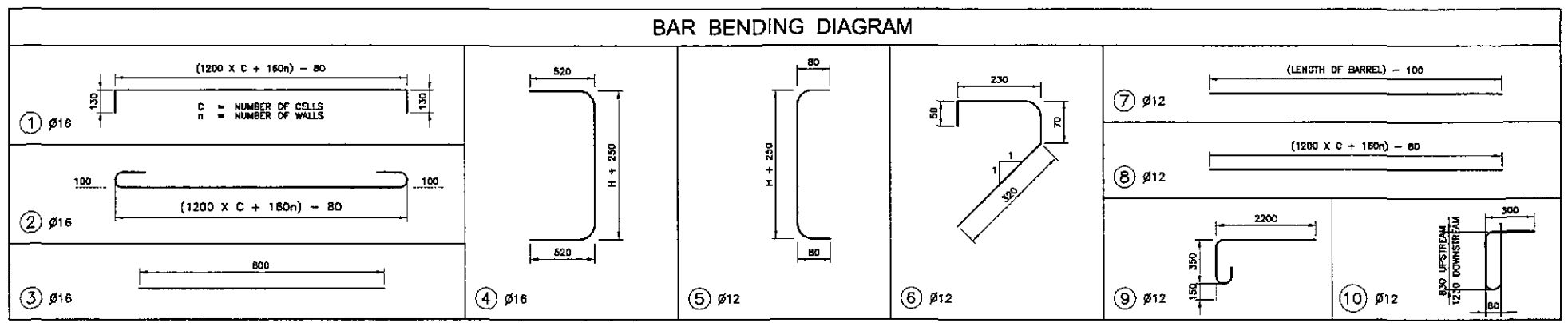
1A SECTION ALONG C OF ROADWAY
DS-04 NOT TO SCALE



1B PARTIAL SECTION A
DS-04 NOT TO SCALE



PARTIAL PLAN
NOT TO SCALE



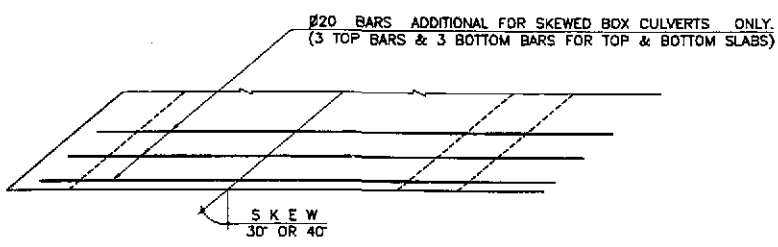
ESTIMATE OF QUANTITIES (PER LINEAR METER OF LENGTH)

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

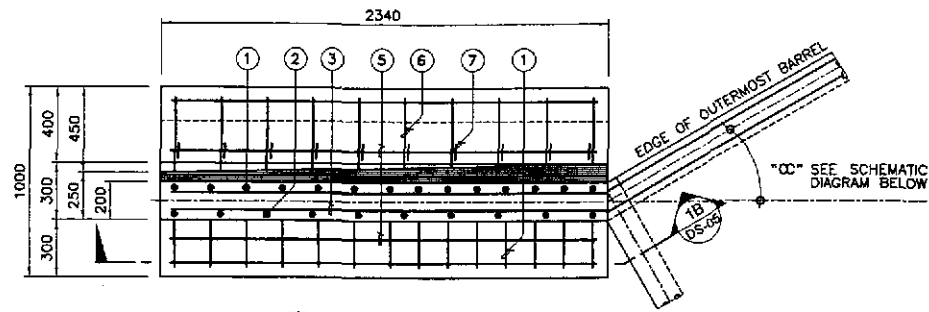
COMMON TO ALL HEIGHT OF CELL	SINGLE BARREL			DOUBLE BARREL			TRIPLE BARREL		
	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)	CONCRETE CLASS "A" (m ³)	REINFORCING STEEL (kg)	EXCAVATION (m ³)
	1.73	57.94	3.64	3.28	111.34	6.08	4.83	184.70	8.53



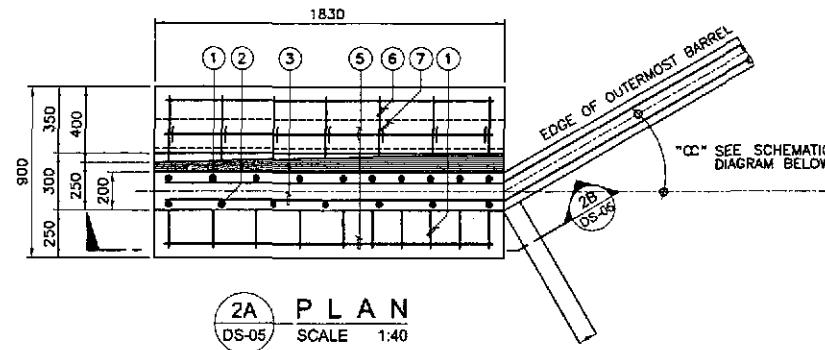
NOTE:
 ALL OTHER REINFORCING BARS SHALL BE PERPENDICULAR OR PARALLEL, AS THE CASE MAYBE, TO BOX AXIS.

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

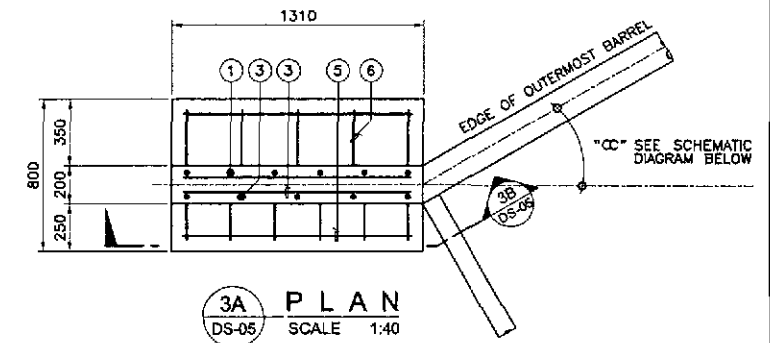
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :			
	CHECKED	9/2/02	[Signature]		BUREAU OF DESIGN				THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)				NOT TO SCALE	STANDARD LOW DEPTH TYPE BOX CULVERT (1 of 2)	DS-04
	SUBMITTED	9/16/02	[Signature]		OFFICE OF THE SECRETARY				SAN JOSE BYPASS						
Submitted By:		Reviewed By:		Recommended By:		Approved By:									
DANILDO C. TRAJANO Project Director		JOSEFINA M. ALAGAR Chief, Highways Division		GILBERTO S. REYES Dir. Director IV		MANUEL M. BONGUAN Undersecretary		SIMEON A. DATUMANONG Secretary							



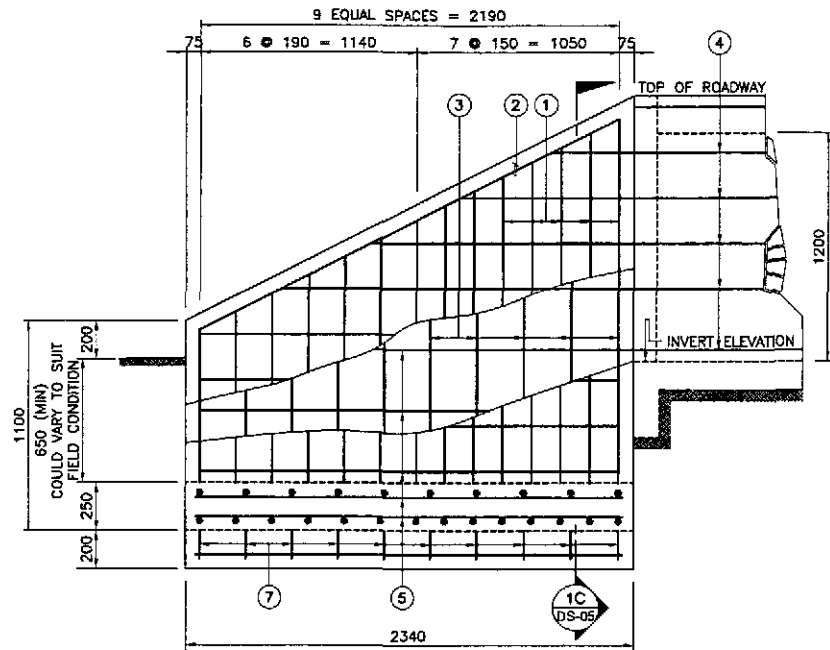
1A PLAN
DS-05 SCALE 1:40



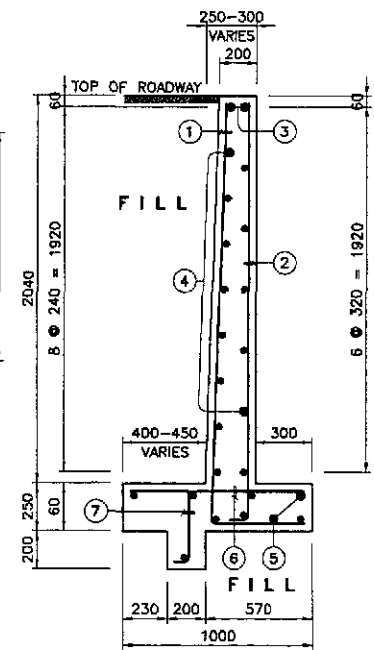
2A PLAN
DS-05 SCALE 1:40



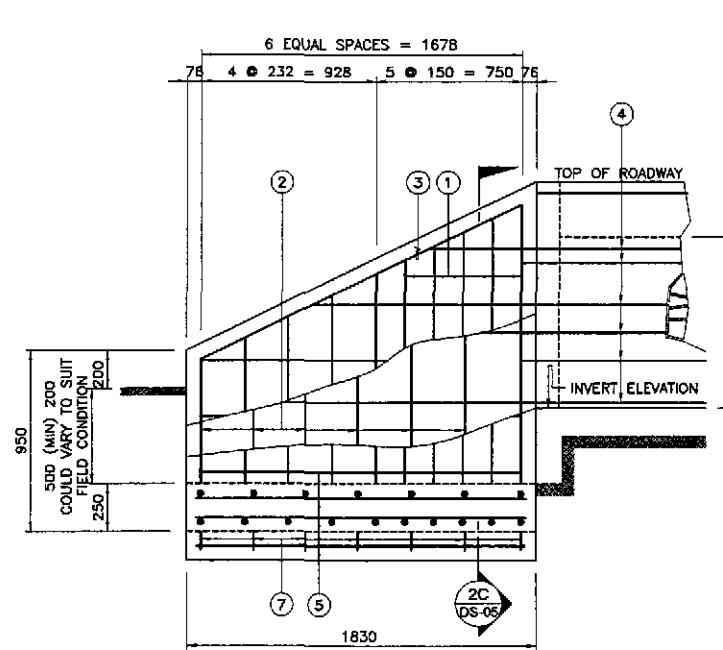
3A PLAN
DS-05 SCALE 1:40



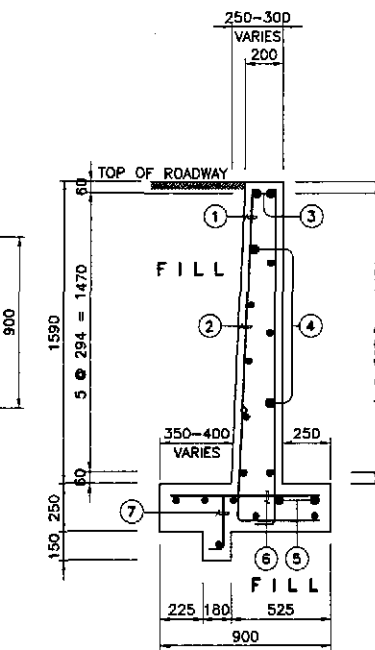
1A ELEVATION
DS-05 SCALE 1:40



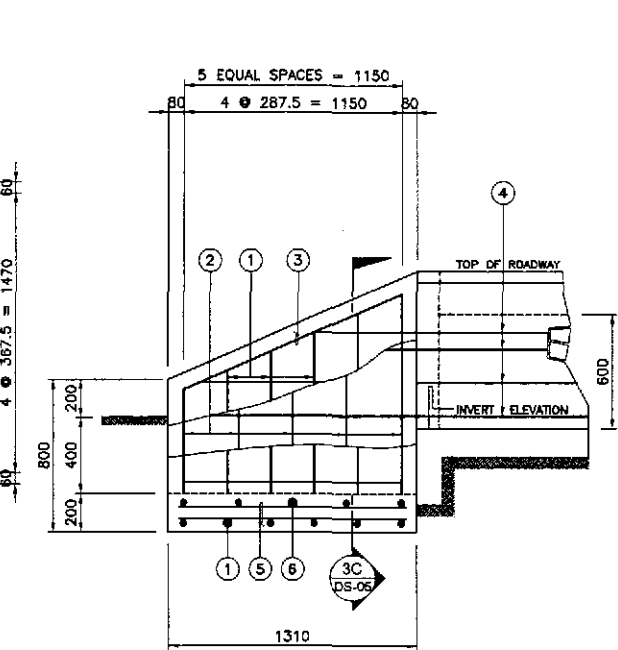
1C SECTION
DS-05 SCALE 1:40



2B ELEVATION
DS-05 SCALE 1:40



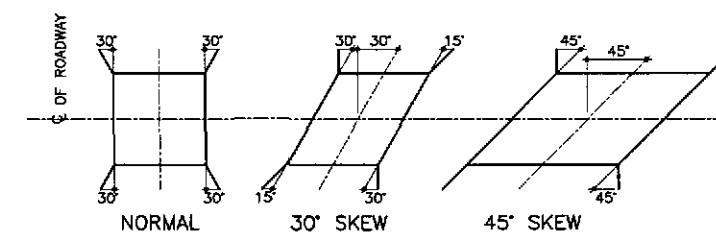
2C SECTION
DS-05 SCALE 1:40



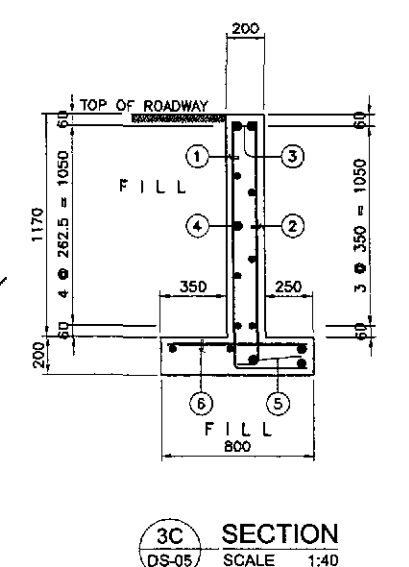
3B ELEVATION
DS-05 SCALE 1:40

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

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

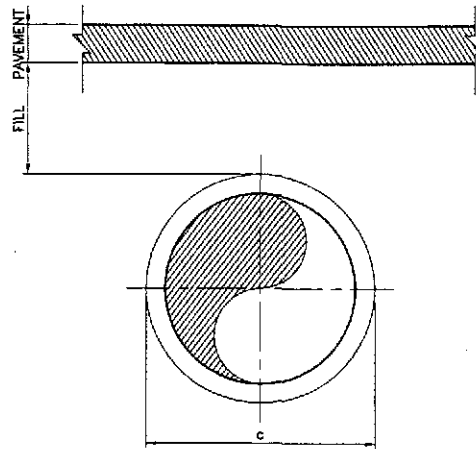


3C SECTION
DS-05 SCALE 1:40

LOW DEPTH TYPE BOX CULVERT

	DESIGNED	DATE	SIGNATURE	<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) SAN JOSE BYPASS	SCALE :	SHEET CONTENTS :	SHEET NO. :	
	CHECKED	9/4/02	<i>[Signature]</i>			BUREAU OF DESIGN Submitted By: DANILLO C. TRAJANO Project Director	AS SHOWN	STANDARD LOW DEPTH TYPE BOX CULVERT (2 of 2)	DS-05
	SUBMITTED	9/10/02	<i>[Signature]</i>			OFFICE OF THE SECRETARY Recommended By: GILBERTO S. REYES Chief, Highways Division Approved By: MANUEL M. BONDAN Undersecretary SIMEON A. DATUMANONG Secretary	FULL SIZE A1		

DESIGN REQUIREMENT OF REINFORCED CONCRETE PIPE CULVERT

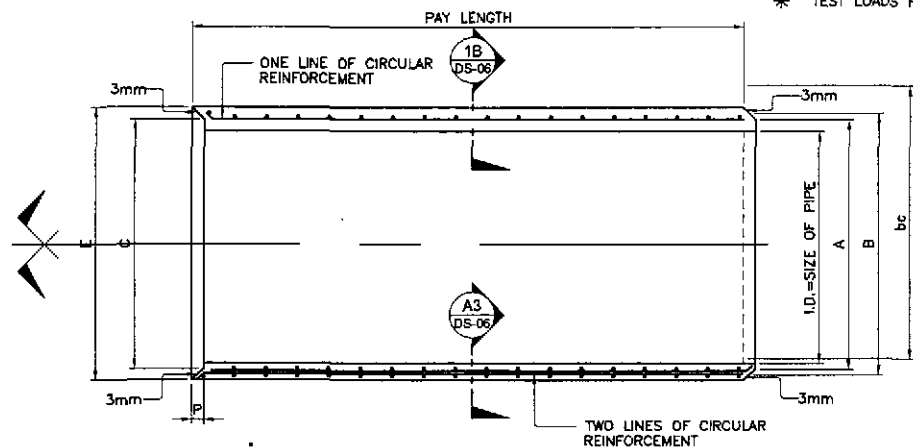


STANDARD STRENGTH PIPES:
FILL 1/2 E.D. FOR FLEXIBLE PAVEMENT OR MIN. OF 0.60 m
0.30 m FOR RIGID PAVEMENT
EXTRA STRENGTH PIPES:
FILL: 0.30 m FOR RIGID AND FLEXIBLE PAVEMENTS

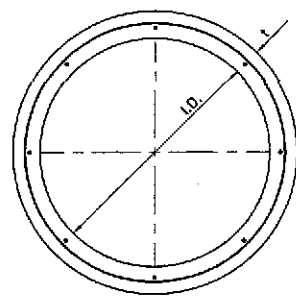
MINIMUM PIPE COVERING

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	WALL THICKNESS (mm)	TONGUE (mm)	GROOVE (mm)	DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE	THREE-EDGE-BEARING METHOD *	0.00025m CRACK LOAD	ULTIMATE LOAD	WALL THICKNESS (mm)	TONGUE (mm)	GROOVE (mm)	DEPTH (mm)	MINIMUM REINFORCEMENT cm ² /m OF PIPE	THREE-EDGE-BEARING METHOD										
i.d.	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025m CRACK LOAD	ULTIMATE LOAD	t	A	B	C	E	P	CIRCULAR REINFORCEMENT	ELLIPTICAL REINFORCEMENT	0.00025m CRACK LOAD	LOAD ULTIMATE	
300	57	344	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 4.68	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.

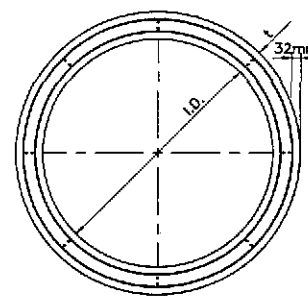


1A LONGITUDINAL SECTION
NOT TO SCALE



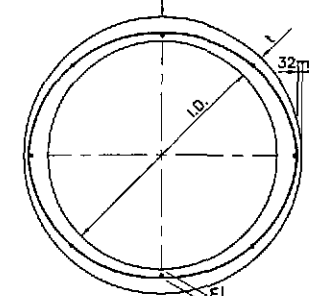
ONE LINE OF CIRCULAR REINFORCEMENT

1B SECTION
NOT TO SCALE

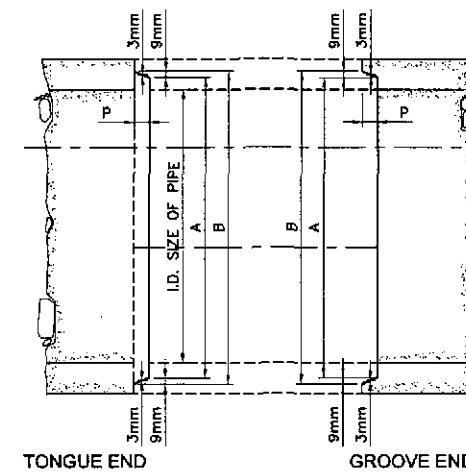


TWO LINES OF CIRCULAR REINFORCEMENT

1C SECTION
NOT TO SCALE

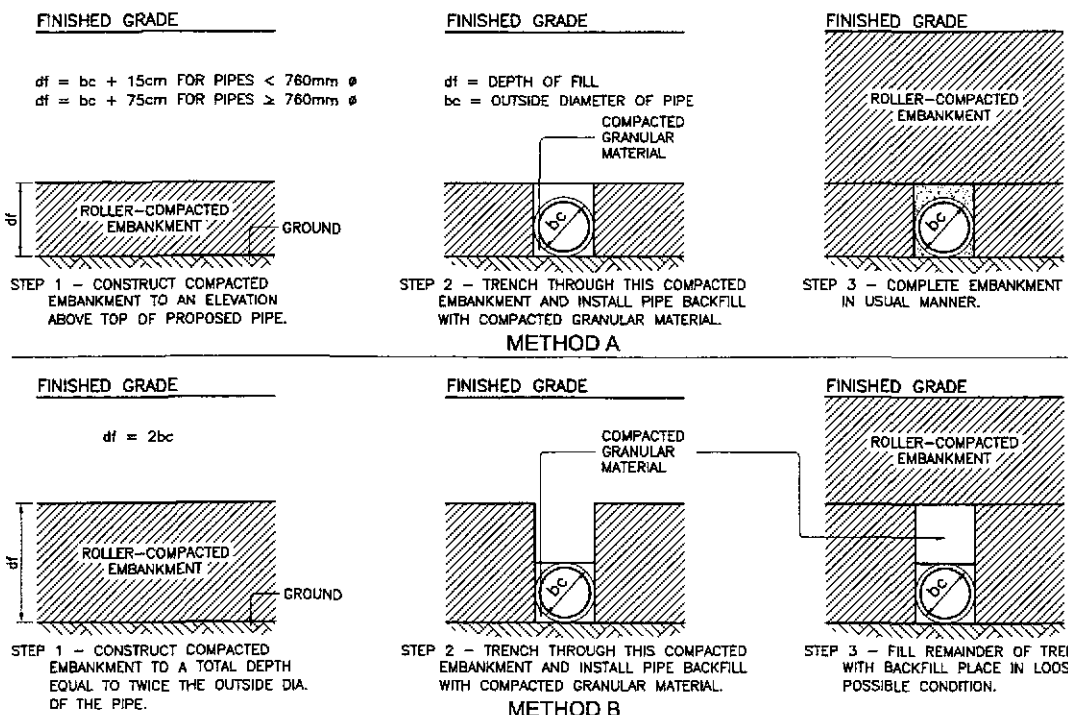


ONE LINE OF ELLIPTICAL REINFORCEMENT

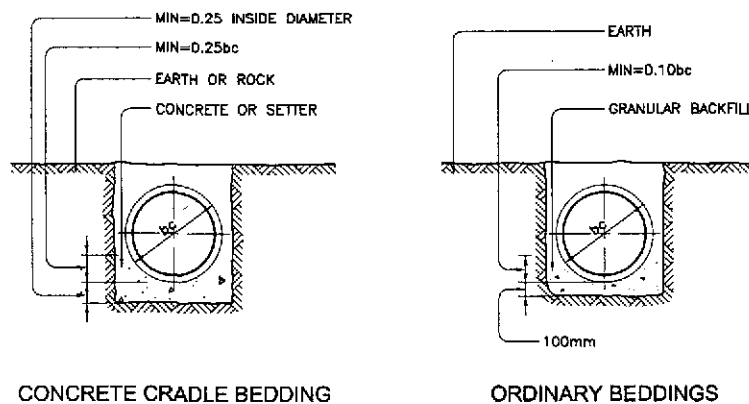


1D SECTION
NOT TO SCALE

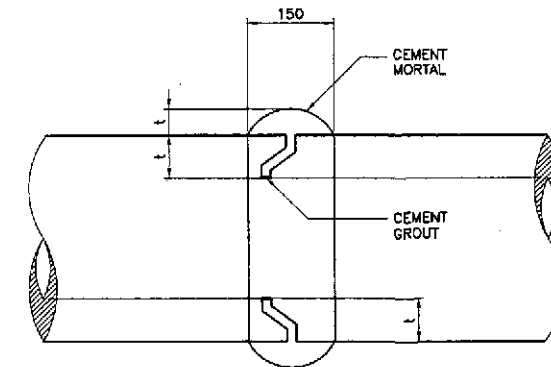
1 STANDARD REINFORCED CONCRETE PIPE CULVERTS
SCALE AS SHOWN



2 METHODS OF PIPE INSTALLATION
NOT TO SCALE



3 TYPICAL BEDDING FOR CONDUITS
NOT TO SCALE



4 DETAIL OF PIPE COLLAR
NOT TO SCALE

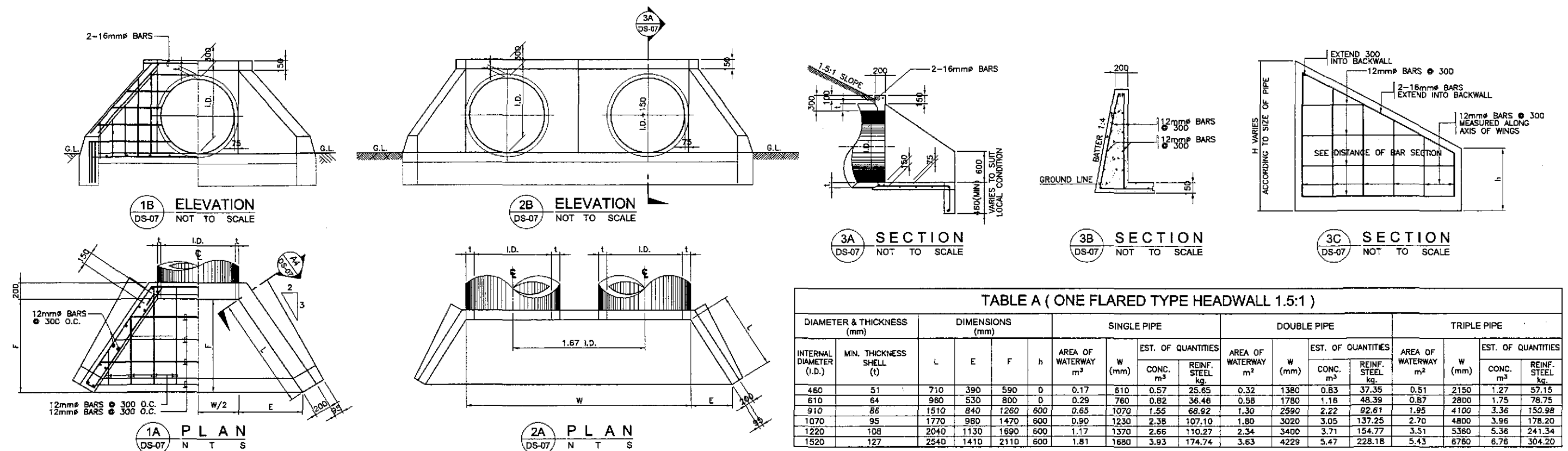


TABLE A (ONE FLARED TYPE HEADWALL 1.5:1)

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	0.63	37.35	0.51	2150	1.27	57.15
610	64	980	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	6780	6.76	304.20

1 FLARED TYPE HEADWALL (SINGLE PIPE) (DS-07) SCALE AS SHOWN

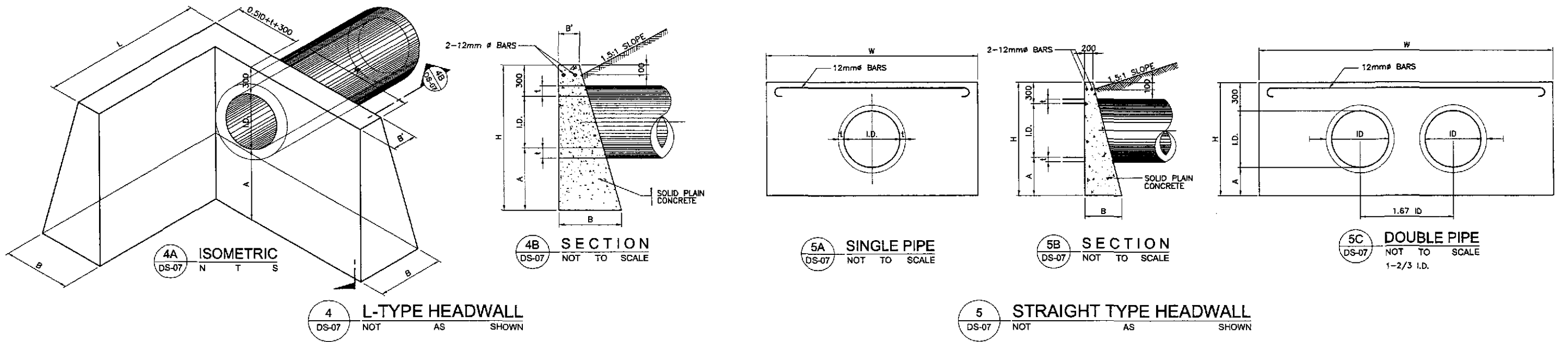
2 FLARED TYPE HEADWALL (DOUBLE PIPE) (DS-07) SCALE AS SHOWN

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 (DS-07) NOT AS SHOWN

5 STRAIGHT TYPE HEADWALL (DS-07) NOT 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) SAN JOSE BYPASS	SCALE : NOT TO SCALE FULL SIZE A1	SHEET CONTENTS : STANDARD REINFORCED CONCRETE HEADWALL FOR RCPC	SHEET NO. : DS-07
	CHECKED	7/2/02	[Signature]		DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS							
	SUBMITTED	7/6/02	[Signature]		Submitted By: P.J.H. - PMO	Reviewed By: DANILLO C. TRAJANO, Project Director	Recommended By: JOSEFINA M. ALAGAR, Chief, Highways Division	GILBERTO S. REYES, OIC, Director IV				

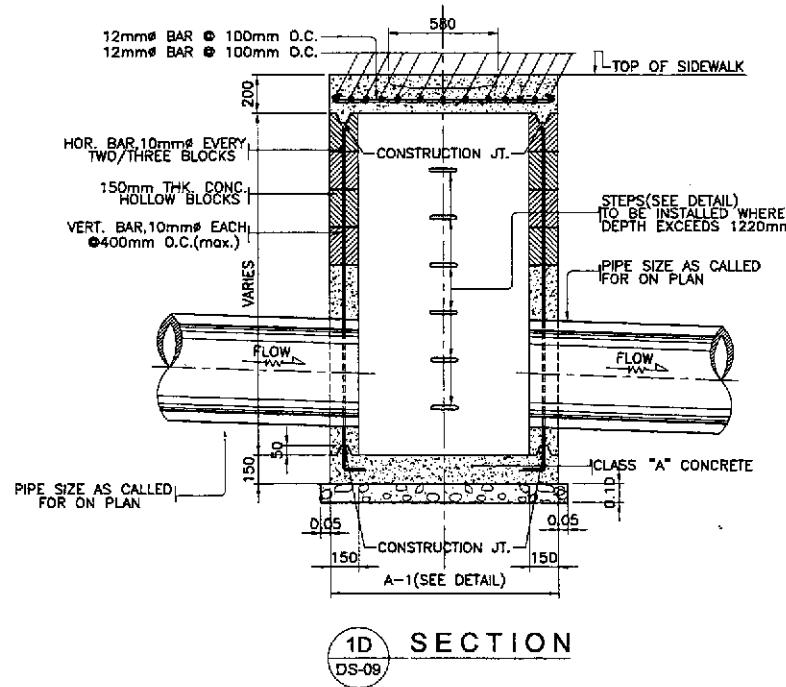
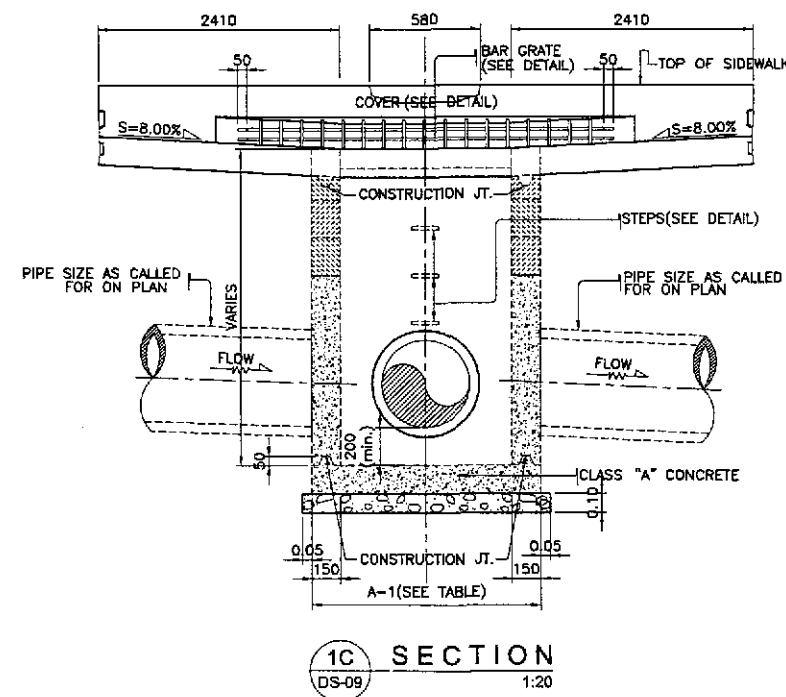
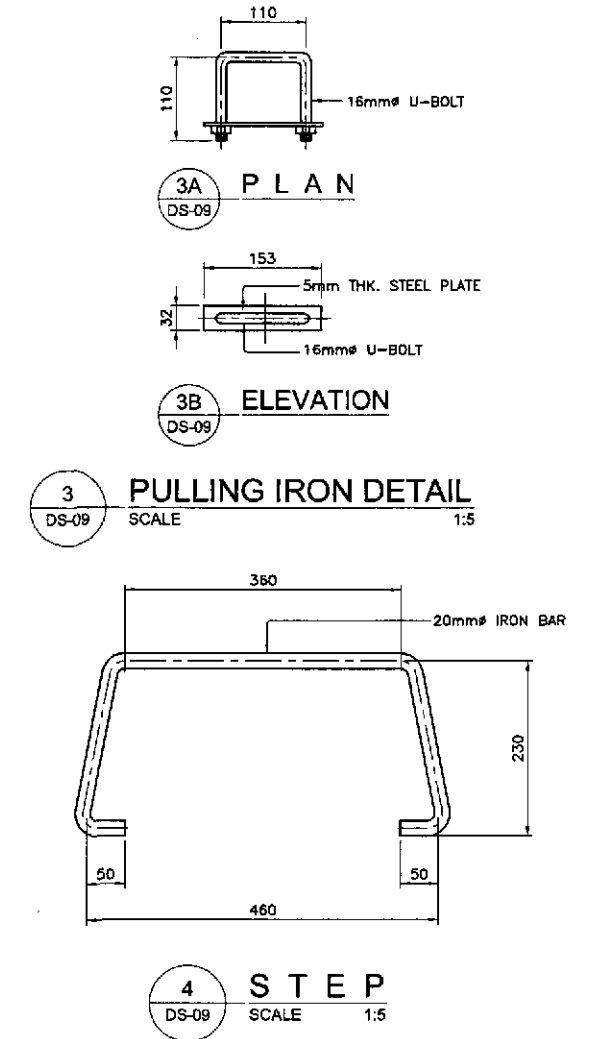
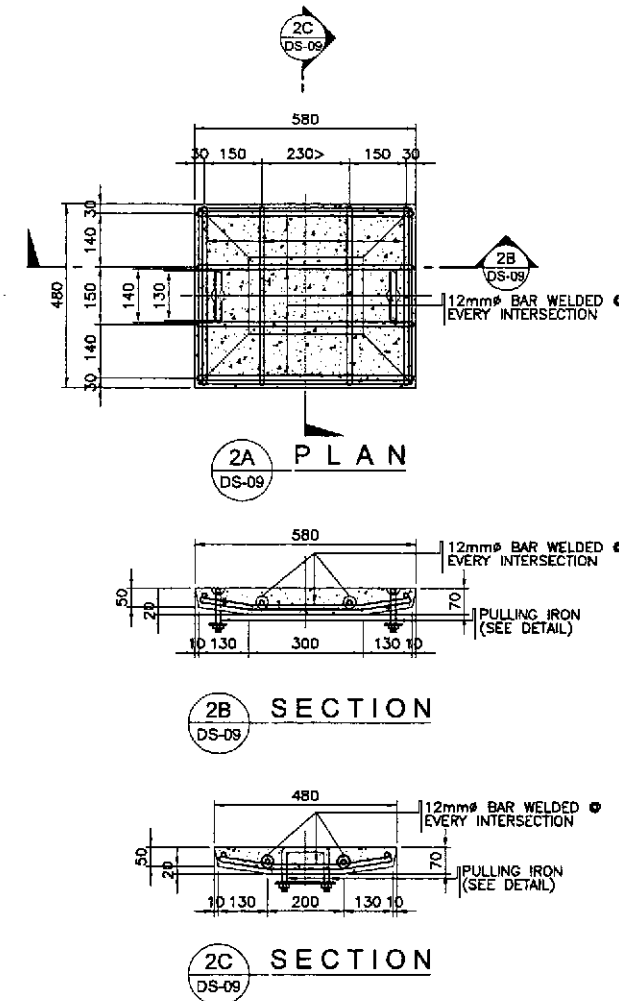
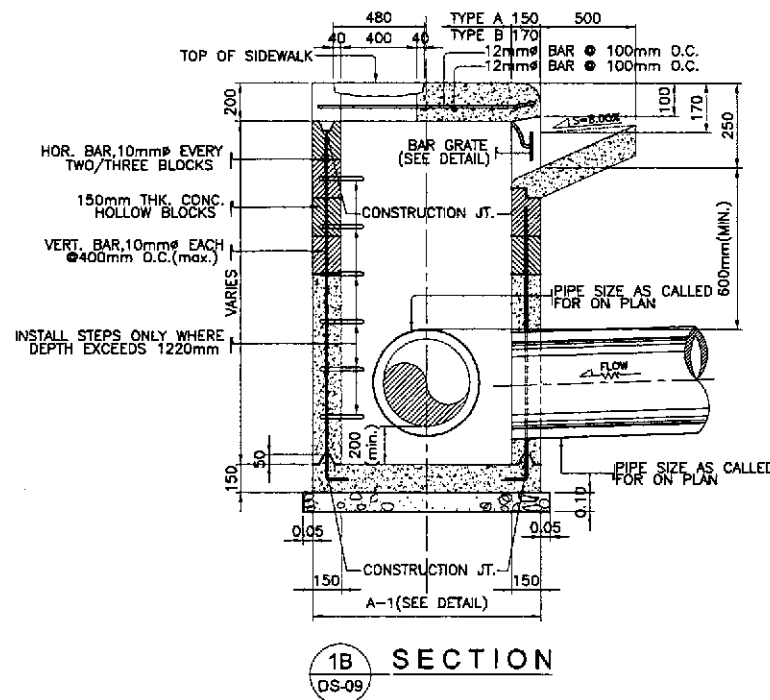
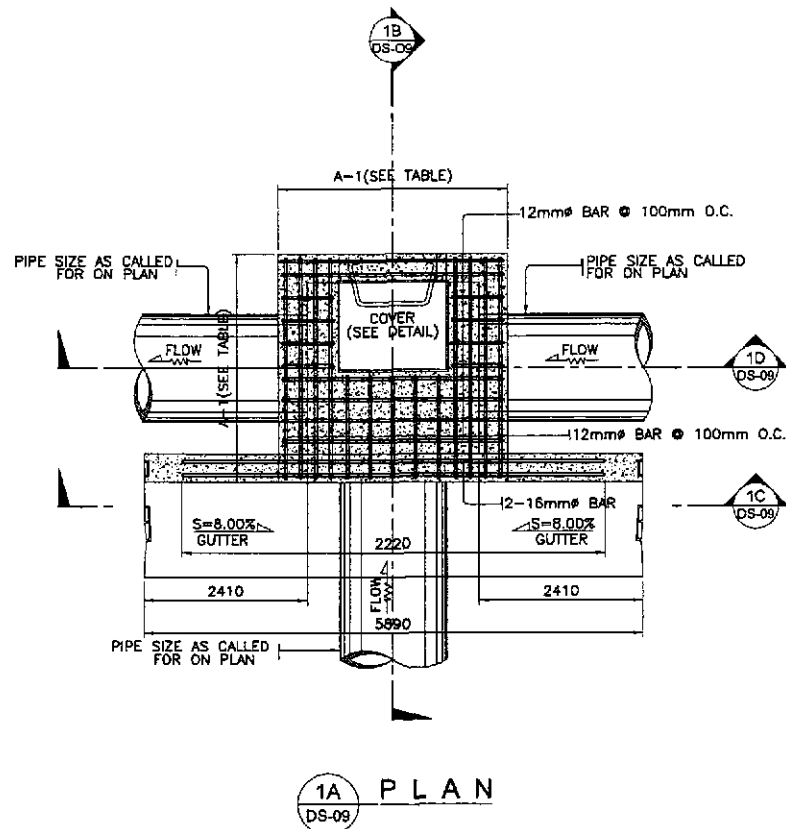


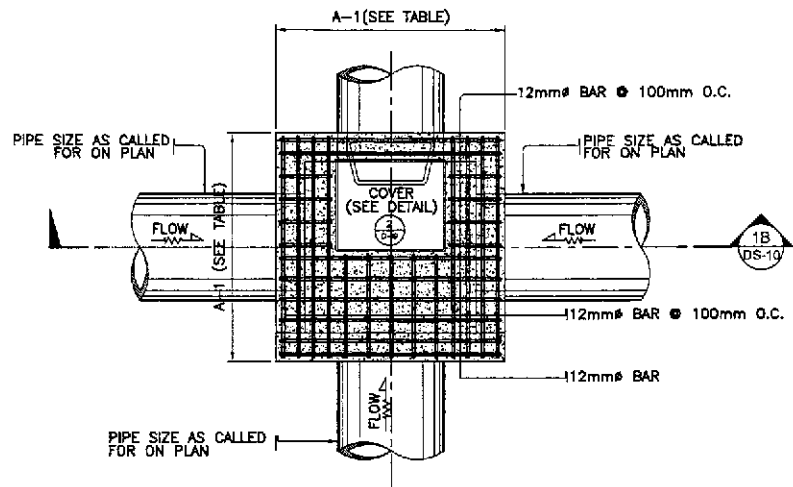
TABLE OF DIMENSION		
TYPE OF CIM	SIZE OF PIPE (mm)	A-1
T-1	300	1.12 M.
T-2	460	1.19 M.
T-3	610	1.37 M.
T-4	760	1.54 M.
T-5	910	1.73 M.
T-6	1070	1.90 M.
T-7	1220	2.08 M.
T-8	1520	2.43 M.

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

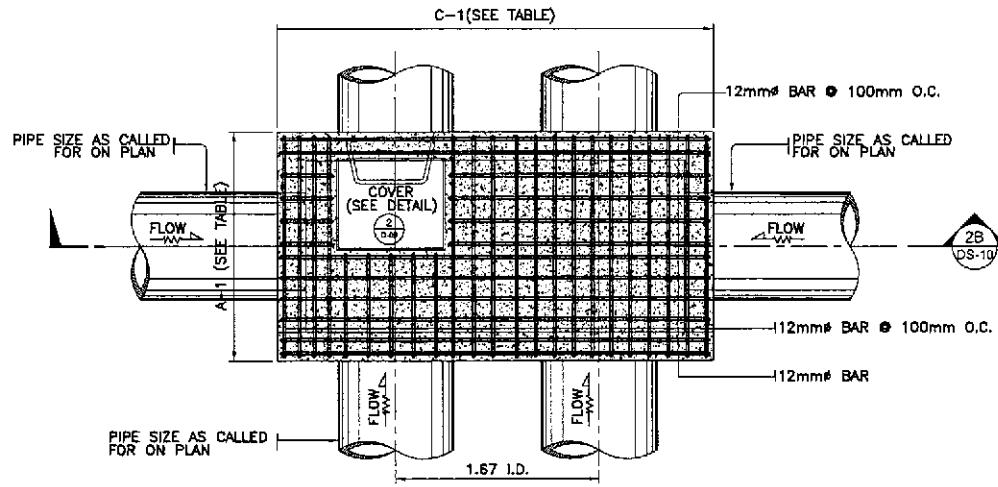
1 CURB INLET MANHOLE
DS-09 SCALE 1:20

DETAILS OF COMBINATION CURB INLET MANHOLE

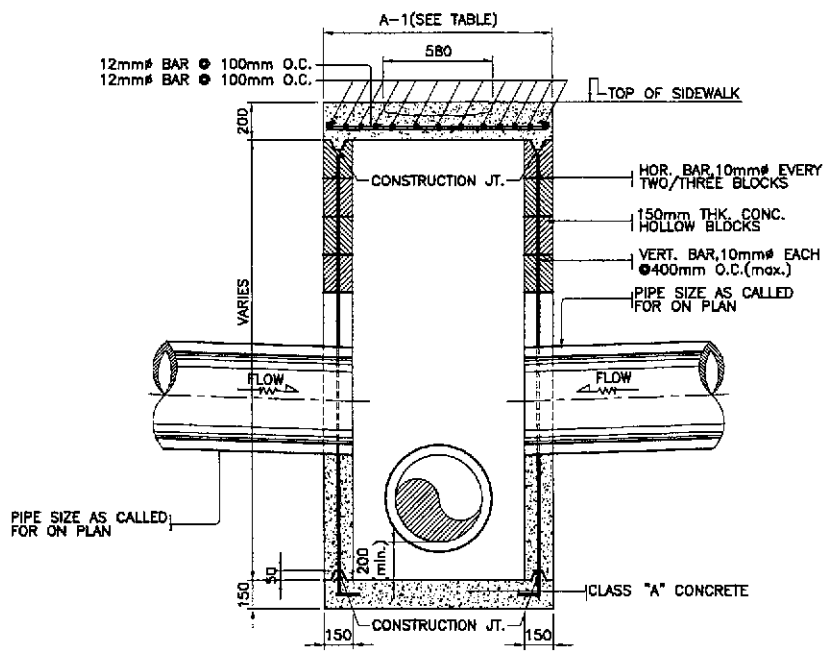
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : AS SHOWN FULL SIZE A1	SHEET CONTENTS : STANDARD COMBINATION CURB INLET MANHOLE	SHEET NO. : DS-09
	CHECKED	9/1/02	[Signature]		Submitted By:	Reviewed By:	Recommended By:				
	SUBMITTED	9/4/02	[Signature]		DANILO C. TRAJANO Project Director	JOSEFINA M. ALADAR Chief, Highways Division	GILBERTO S. REYES Dir. Director IV	MANUEL M. BONDAN Underscretary	SIMEON A. DATUMANDANG Secretary		



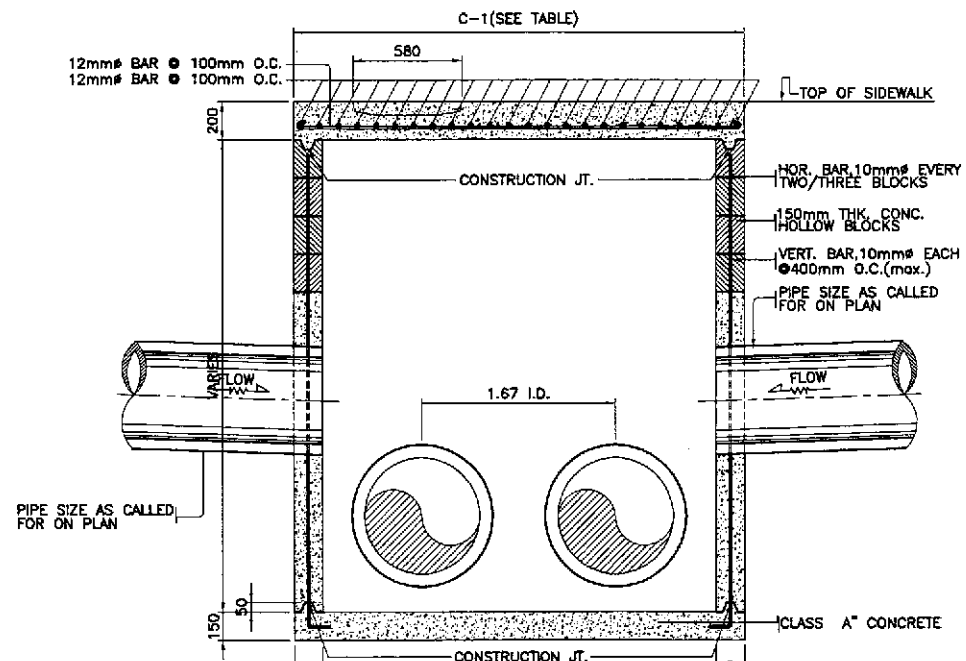
1A PLAN BOX-TYPE MANHOLE (SINGLE PIPE)
DS-10



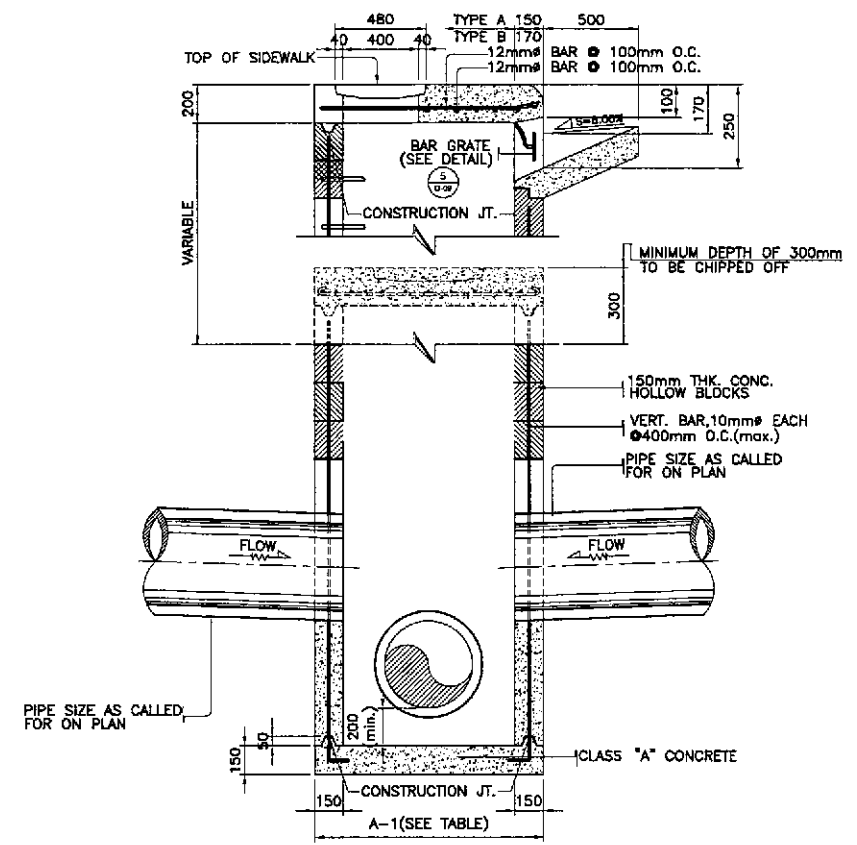
2A PLAN BOX-TYPE MANHOLE (DOUBLE PIPE)
DS-10



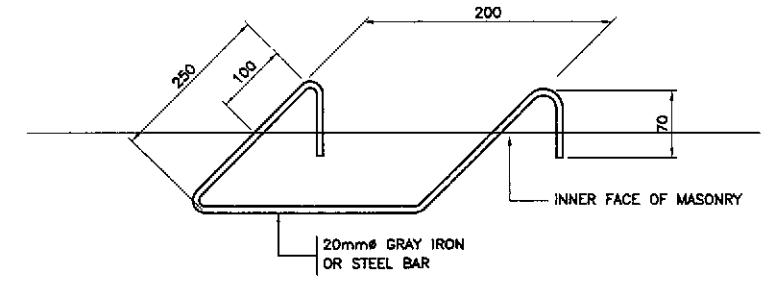
1B SECTION
DS-10



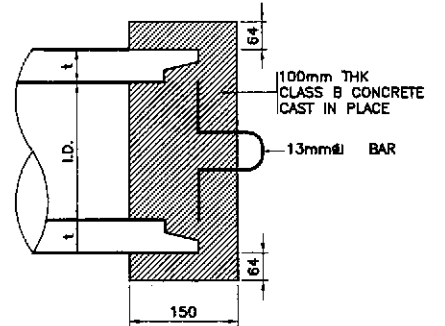
2B SECTION
DS-10



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



4 STD. STEP OR RUNG
DS-10



5 CONCRETE BLOCK PLUG @ SUBSURFACE PIPE
DS-10

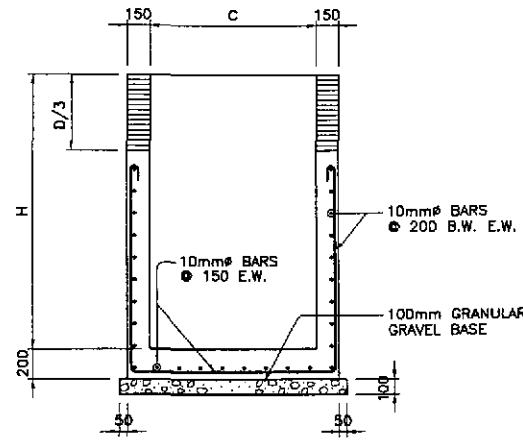
- NOTES:
- ALL CONCRETE SHALL BE CLASS "A". EXPOSED EDGES SHALL BE FINISHED WITH SUITABLE EDGER.
 - PULLING IRON STEPS AND BAR GRATE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE.
 - CONSTRUCTION JOINTS SHALL CONFORM WITH THE GROOVES OF CONCRETE HOLLOW BLOCKS.
 - CONCRETE HOLLOW BLOCKS OR DRESSED ADOBE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

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

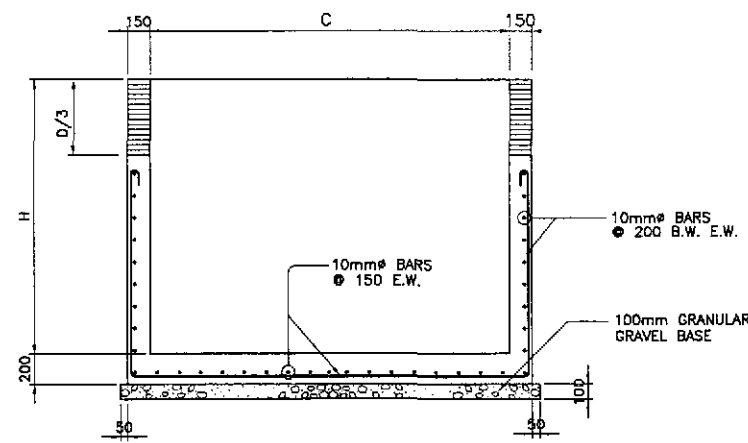
TYPE OF CIM	SIZE OF PIPE (mm)	TABLE OF DIMENSION	
		A-1 (m)	C-1 (m)
T-1	300	1.12	1.92
T-2	460	1.19	2.26
T-3	610	1.37	2.69
T-4	760	1.54	3.11
T-5	910	1.73	3.55
T-6	1070	1.90	3.98
T-7	1220	2.08	4.42
T-8	1520	2.43	5.27

SPECIAL JUNCTION BOX MANHOLE

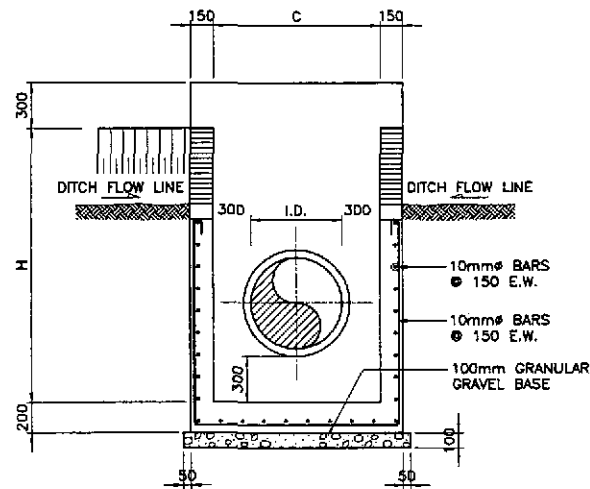
	DESIGNED	DATE	SIGNATURE	<p>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS</p>	PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE :	SHEET CONTENTS : SPECIAL JUNCTION BOX MANHOLE	SHEET NO. : DS-10	
	CHECKED	9/4/02	[Signature]			P.H.L. - PMO Submitted By: DANILDO C. TRAJANO Project Director			AS SHOWN FULL SIZE A1
	SUBMITTED	9/6/02	[Signature]			BUREAU OF DESIGN Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division			OFFICE OF THE SECRETARY Recommended By: GILBERTO S. REYES OIC, Director IV Approved By: MANUEL M. BONOAN Undersecretary SIMEON A. DATUMANONG Secretary



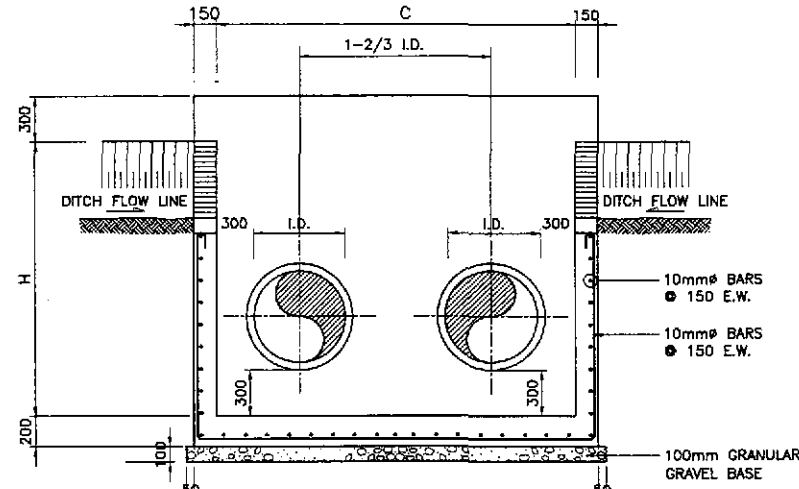
1C SECTION
DS-11



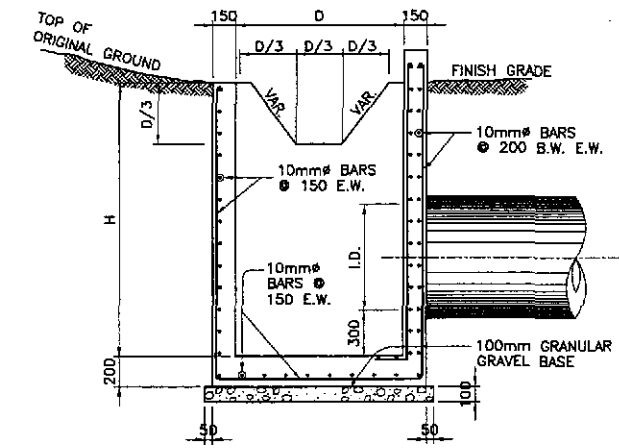
2C SECTION
DS-11



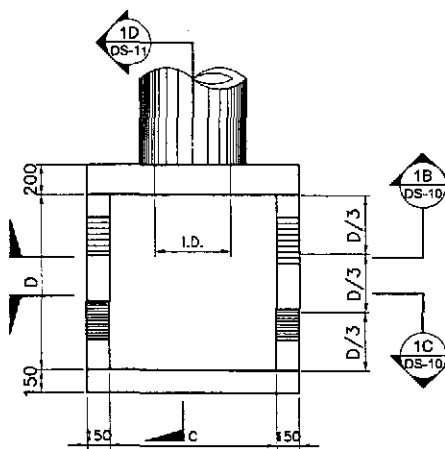
1B SECTION
DS-11



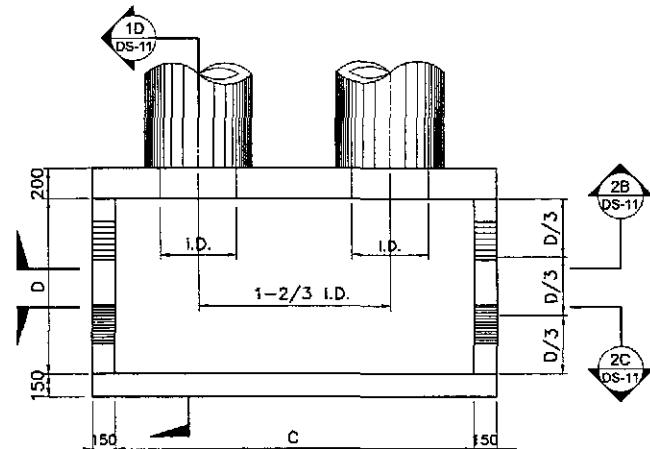
2B SECTION
DS-11



1C SECTION
DS-11



1A PLAN
DS-11



2A PLAN
DS-11

REINFORCED CONCRETE CATCH BASIN DIMENSION FOR RCPC

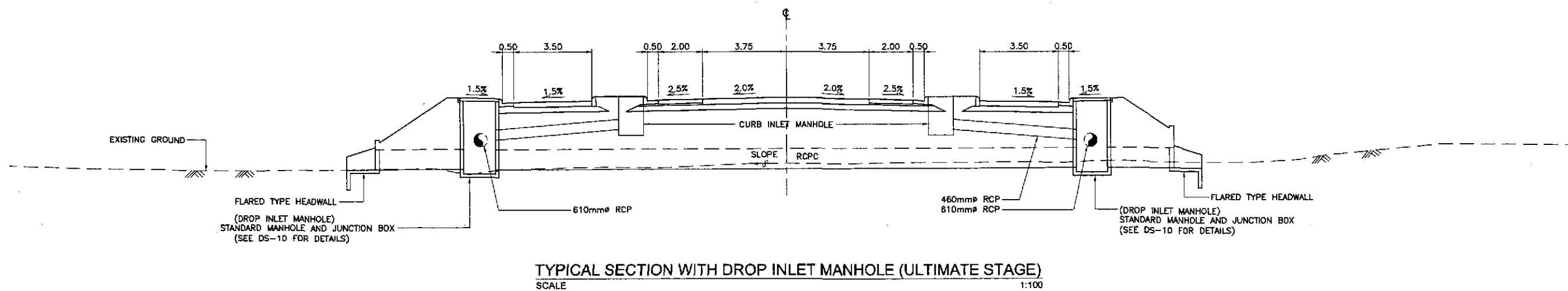
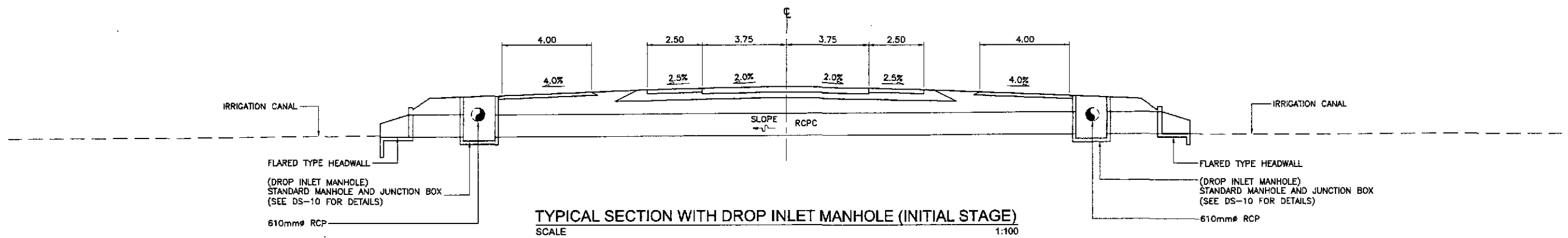
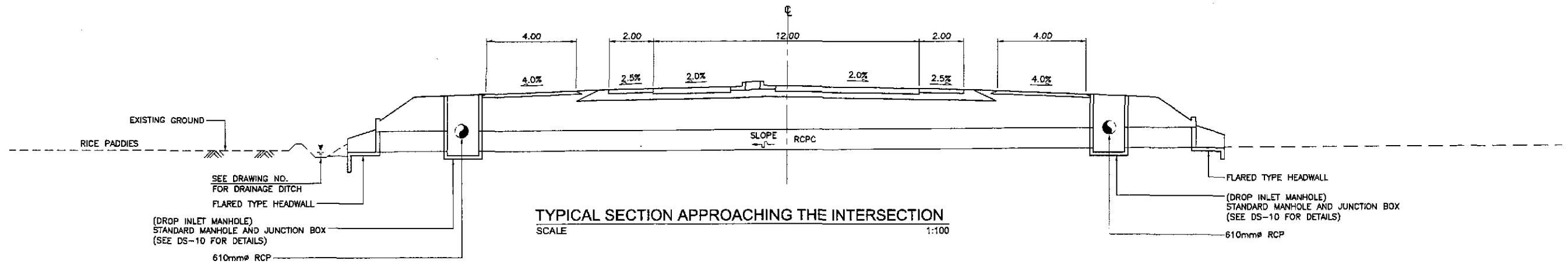
PIPE DIAMETER (mm)	610	910	1070	1220	1520	
COMMON TO ALL NUMBER OF BARRELS	H	1.910	2.210	2.370	2.520	2.820
	D	1.200	1.500	1.650	1.800	2.100
SINGLE	C	1.210	1.510	1.670	1.820	2.120
DOUBLE	C	2.230	3.030	3.460	3.860	4.660
TRIPLE	C	3.250	4.550	5.240	5.890	7.120

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

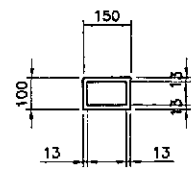
2 CONCRETE CATCH BASIN (DOUBLE PIPE)
DS-11 SCALE 1:25

DETAILS OF REINFORCED CONCRETE CATCH BASIN FOR RCPC

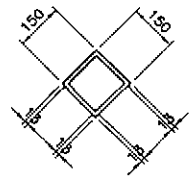
	DESIGNED	DATE	SIGNATURE*		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	SCALE : 1:25	SHEET CONTENTS : STANDARD REINFORCED CONCRETE CATCH BASIN FOR RCPC	SHEET NO. : DS-11
	CHECKED	9/2/02	[Signature]		BUREAU OF DESIGN						
	SUBMITTED	9/6/02	[Signature]		Submitted By: DANILO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV				



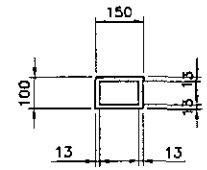
	DESIGNED	DATE	SIGNATURE		REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			PROJECT AND LOCATION : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : 1:100 FULL SIZE A1	SHEET CONTENTS : TYPICAL DRAINAGE CROSS-SECTIONS (INITIAL & ULTIMATE STAGE)	SHEET NO. : DS-12
	CHECKED	9/2/02	[Signature]		BUREAU OF DESIGN	OFFICE OF THE SECRETARY					
	SUBMITTED	9/16/02	[Signature]		Submitted By: DANILLO C. TRAJANO Project Director	Reviewed By: JOSEFINA M. ALAGAR Chief, Highways Division	Recommended By: GILBERTO S. REYES OIC, Director IV				



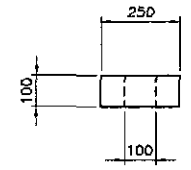
PLAN (POST)



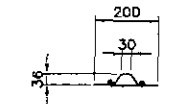
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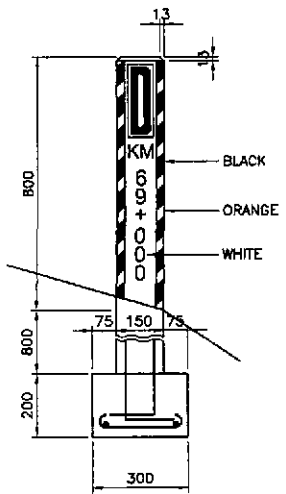
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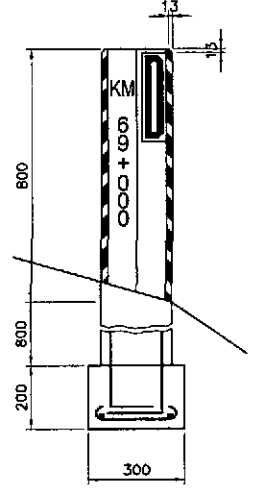
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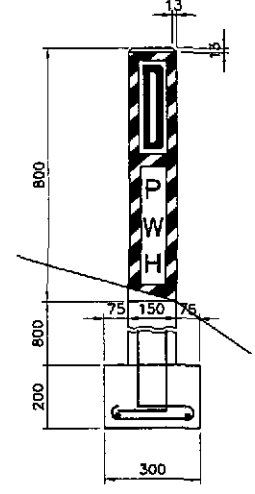
PLAN (POST)



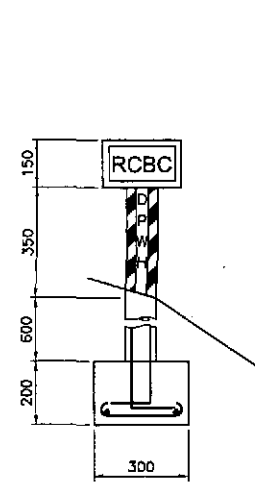
ELEVATION
CONCRETE MARKER
TYPE I-a



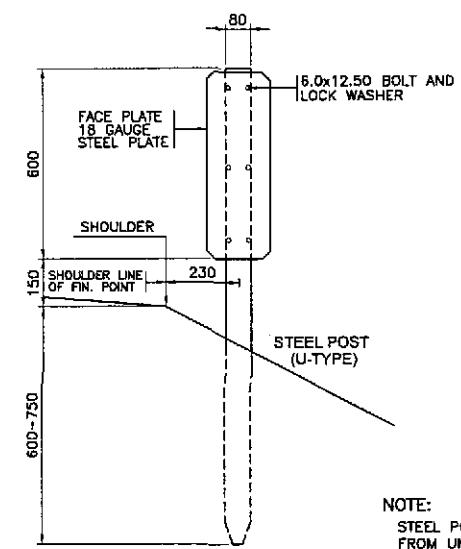
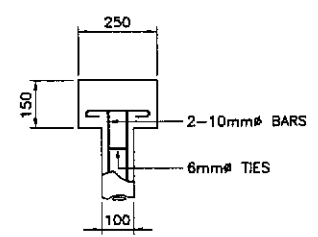
ELEVATION
CONCRETE MARKER
TYPE I-b



ELEVATION
CONCRETE MARKER
TYPE I-c

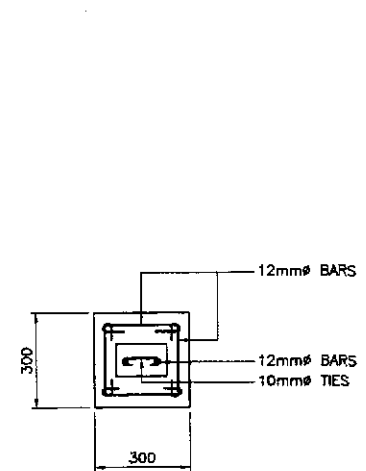
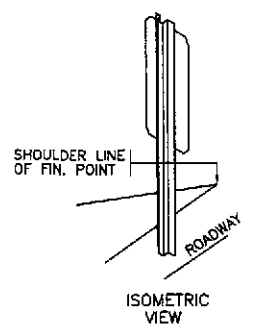


ELEVATION
CONCRETE MARKER
TYPE I-d

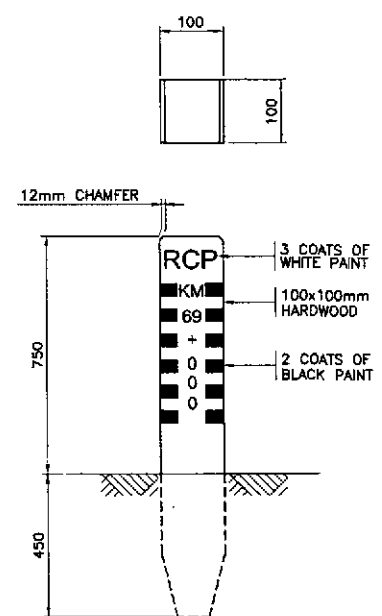


ELEVATION
STEEL MARKER
TYPE II

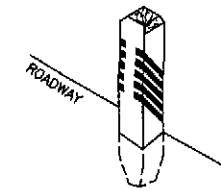
NOTE:
STEEL POST MAY BE CHANNEL TAKEN FROM UNUSED BAILEY PANNELS MARKINGS AND PAINTINGS SAME AS FOR TYPE I AND TYPE II AS SHOWN.



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

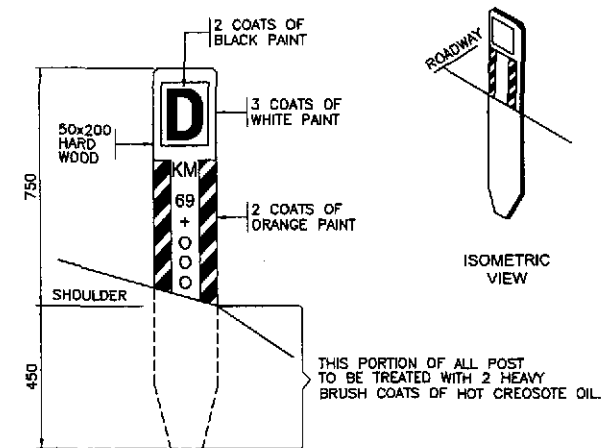


ELEVATION
WOODEN MARKER
TYPE III-a

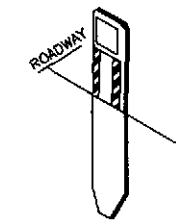


NOTE:
FACING ROADWAY STAKED AT CENTER LINE OF DRAINAGE 254mm AWAY FROM SHOULDER LINE OF FINAL POINT.

ISOMETRIC VIEW



ELEVATION
WOODEN MARKER
TYPE III-b



ISOMETRIC VIEW

GENERAL NOTES

- CONCRETE:**
ALL CONCRETE TO BE CLASS "A" AND EXPOSED TOP TO BE CHAMFERED 13.0mm. ALL CONCRETE SHALL POURED IN THE DRY.
- REINFORCING STEEL:**
UNLESS OTHERWISE SHOWN ALL BAR SPACINGS ARE TO THE CENTER OF BARS AND THE MINIMUM COVERING OF BARS MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY BARS SHALL BE 50.0mm.
- MARKINGS:**
ALL RECESSED LETTERS SHALL BE CAST INTO CONCRETE AND ALL NUMBERS SHALL BE PAINTED AS SHOWN USING LETTER AND NUMBER FORM.
- PAINTINGS:**
ALL CONCRETE POSTS, TWO COATS OF WHITE PAINT. ALL RECESSED LETTERS ONE (1) COAT OF BLACK PAINT AND ALL BACKGROUND STRIPE SHALL BE ONE (1) COAT OF BLACK/ORANGE 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 : THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) SAN JOSE BYPASS	SCALE : NOT TO SCALE FULL SIZE A1	SHEET CONTENTS : STANDARD MAINTENANCE MARKERS	SHEET NO. : DS-13	
	CHECKED	DATE	SIGNATURE						BUREAU OF DESIGN 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
	SUBMITTED	DATE	SIGNATURE						