



Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Bonifacio Drive, Port Area Manila



OFF. IS DPWH
12.10.2024

DEC 03 2024

DEPARTMENT ORDER)

**SUBJECT: Standard Plans for Reinforced
Concrete Box Culvert (RCBC) Cross-
Drains**

NO. 228)
Series of 2024)
fny 12/10/2024

In line with the mandate of the Department to update and improve standards for the effective implementation of appropriate drainage systems for roadway projects, the standard plans for reinforced concrete box culverts are hereby issued for the implementation of all concerned. These plans incorporate suitable section thickness, steel reinforcement, and corresponding quantity estimates to accommodate the current load requirements of the design vehicle (HL-93) and ensure the structural integrity and safety of the RCBC structures.

The standard plans incorporate the latest design methodologies and specifications based on the DPWH Design Guidelines, Criteria, and Standard (DGCS), incorporating critical loading mechanisms on vehicular actions, earth pressure, and pertinent modifiers/factors to reflect actual site conditions. The plans include standard drawings for three (3) barrel types of RCBCs (single, double, and triple), with the corresponding reinforcing bar details and quantity estimates, align with the Load and Resistance Factor Design (LRFD) criteria adaptable to local conditions. The standard design and drawings are for RCBCs that cross the roadway or are oriented at an angle over the structure, rotated about its minor axis.

The issuance of said standard plans aims to ensure safety, cost effectiveness, and consistency in the design of RCBC structures for new road infrastructure projects. It shall also serve as a guide/reference for all District Engineering and Regional Offices, and Project Management Office Clusters in the preparation of RCBC-related designs and plans.

For your compliance.


MANUEL M. BONOAN
Secretary

Department of Public Works and Highways
Office of the Secretary



WIN4R01746

5.1 BSR/MGM/AGC

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Tel. Nos.: 5304-3000 / (02) 165-02

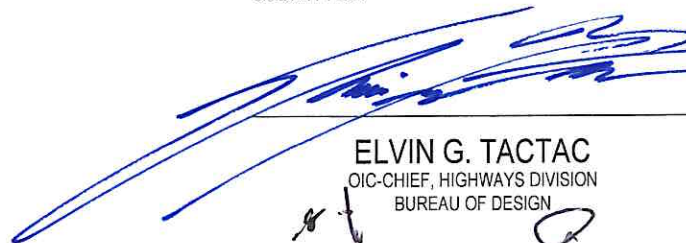




DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
BONIFACIO DRIVE, PORT AREA, MANILA

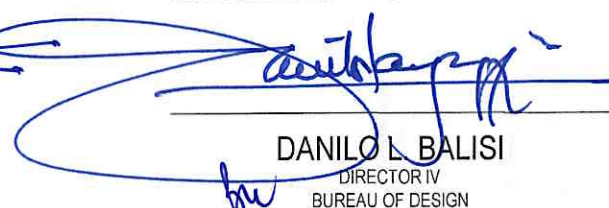
**STANDARD DRAWINGS FOR REINFORCED CONCRETE
BOX CULVERT (RCBC)**

SUBMITTED:


ELVIN G. TACTAC
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BUREAU OF DESIGN

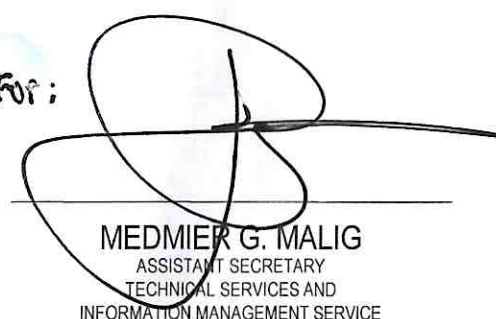
DATE: **OCT 30 2024**

RECOMMENDING APPROVAL:


DANILO L. BALISI
DIRECTOR IV
BUREAU OF DESIGN

DATE:

For:


MEDMIER G. MALIG
ASSISTANT SECRETARY
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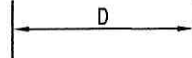

DATE:


APPROVED:


ADOR G. CANLAS, CESO IV
UNDERSECRETARY
TECHNICAL SERVICES AND
INFORMATION MANAGEMENT SERVICE

DATE:

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SYMBOLS AND ABBREVIATIONS			
	LINE OF SYMMETRY AND SIMILARITY	kN	KILONEWTON
	LIMITS OF DIMENSION	kPa	KILOPASCAL
	REINFORCEMENT TYPE	MPa	MEGAPASCAL
SB	SINGLE BARREL	m	METER
DB	DOUBLE BARREL	s	SPAN
TB	TRIPLE BARREL	h	HEIGHT
RCBC	REINFORCED CONCRETE BOX CULVERT	t	THICKNESS
		c	CONCRETE COVER
		CL	CENTERLINE

 <div>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF DESIGN HIGHWAYS DIVISION BONIFACIO DRIVE PORT AREA, MANILA</div>	SHEET TITLE:	SHEET CONTENT:	PREPARED: <div>MARK BRIANNE O. MAGPAYO ENGINEER II</div>	<div>PETER JAMES T. ESQUIBIL ENGINEER III</div>	SUBMITTED:	RECOMMENDING APPROVAL:	APPROVED:	SET NO.	SHEET NO.	
	STANDARD REINFORCED CONCRETE BOX CULVERT (RCBC)	INDEX OF DRAWINGS SYMBOLS & ABBREVIATIONS	DRAWN: <div>MARLON B. TURINGAN DRAFTSMAN I</div>	REVIEWED: <div>EDWIN K. ZURRY OIC CHIEF, DRAINAGE & FLOOD PROTECTION SECTION</div>	<div>ELVIN G. TACTAC OFFICER-IN-CHARGE, HIGHWAYS DIVISION BUREAU OF DESIGN</div>	<div>DANILO L. BALISI DIRECTOR IV, BUREAU OF DESIGN</div>	<div>MEDMIER G. MALIG ASSISTANT SECRETARY TECHNICAL SERVICES AND INFORMATION MANAGEMENT SERVICE</div>	<div>ADOR G. CANLAS, CESO IV UNDERSECRETARY TECHNICAL SERVICES AND INFORMATION MANAGEMENT SERVICE</div>	<div>HD</div> <div>BOD</div>	<div>C</div> <div>18</div>
					DATE: OCT 30 2024	DATE:	DATE:	DATE:		

GENERAL NOTES

GENERAL

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. IN STATING CULVERT SIZE, SPECIFY WIDTH FIRST FOLLOWED BY HEIGHT (W x H).
3. THE BOX CULVERT SHALL BE CONSTRUCTED ON A LAYER OF LEAN CONCRETE WITH 50mm MINIMUM THICKNESS.
4. WHEN HEIGHT OF FILL $H=0$, THE TOP SURFACE OF THE UPPER SLAB SHALL FOLLOW THE GRADE OF THE FINISHED ROADWAY. PLACE 25mm EXPANSION JOINTS PRE-MOULDED FILLER IN BETWEEN THE CARRIAGEWAY PAVEMENT AND THE TOP SLAB OF BOX CULVERT.
5. THE DESIGNER MUST CONDUCT SCOUR, SETTLEMENT, HYDROLOGIC, AND HYDRAULIC DESIGN ANALYSIS AND/OR OTHER PERTINENT GEOTECHNICAL INVESTIGATION TO ENSURE THE STABILITY AND ADEQUACY OF THE BOX CULVERT, AND TO DETERMINE THE APPROPRIATE INLET & OUTLET STRUCTURES.

A. APPLICABILITY OF STANDARD DRAWING

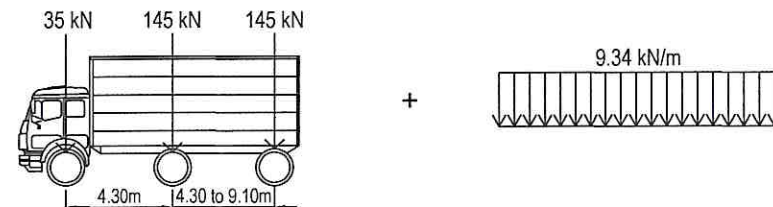
THE STANDARD DRAWING IS APPLICABLE FOR REINFORCED CONCRETE BOX CULVERT STRUCTURES WITH FILL HEIGHTS BETWEEN 0.0m TO 3.0m

HEIGHT OF FILL	REFERENCE DRAWING
0.0m TO 3.0m	STANDARD DRAWING
ABOVE 3.0m	STANDARD DRAWING NOT APPLICABLE. SPECIAL DESIGN SHALL BE PREPARED

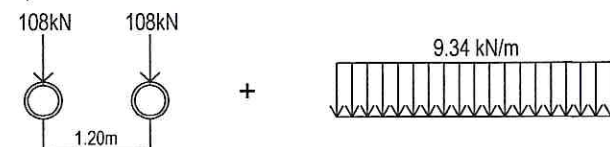
B. DESIGN CRITERIA

1. DESIGN STANDARDS AND MANUALS
 - a. DPWH DESIGN GUIDELINES, CRITERIA & STANDARDS (DGCS), 2015 EDITION, VOLUME 4 - HIGHWAY DESIGN
 - b. DPWH DESIGN GUIDELINES, CRITERIA, & STANDARDS (DGCS), 2015 EDITION, VOLUME 5 - BRIDGE DESIGN
 - c. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9th EDITION
 - d. DPWH STANDARD SPECIFICATIONS FOR HIGHWAY, BRIDGES, AND AIRPORTS, VOLUME II
2. LOADINGS
 - a. DEAD LOAD: WEIGHT OF STRUCTURE, CONCRETE PAVEMENT, AND FUTURE BITUMINOUS WEARING COURSE
 - b. LIVE LOAD: DESIGNED USING HL-93 VEHICULAR LOADING. AXLE LOADS OF THE DESIGN VEHICLE ARE ORIENTED PARALLEL TO THE SPAN OF THE RCBC STRUCTURE TO MAXIMIZE THE FORCE EFFECT UNDER CONSIDERATION

(b.1) HL-93 DESIGN TRUCK AND DESIGN LANE LOAD



(b.2) HL-93 DESIGN TANDEM AND DESIGN LANE LOAD



(b.3) MULTIPLE PRESENCE FACTOR: APPLY CORRESPONDING FACTORS BASED ON THE PROBABILITY OF FULLY LOADED LANES OCCURRING SIMULTANEOUSLY

NUMBER OF LOADED LANES	MULTIPLE PRESENCE FACTOR
1	1.20
2	1.00
3	0.85
>3	0.85

(b.4) DYNAMIC LOAD ALLOWANCE: APPLICABLE FOR HL-93 TRUCK/TANDEM LIVE LOAD ONLY. THE FACTOR TO BE APPLIED TO STATIC LOAD SHALL BE $(1 + IM/100)$, WHERE IM IS AS SPECIFIED IN THE TABLE BELOW:

COMPONENT	DECK JOINTS ALL LIMITS STATES	ALL OTHER COMPONENTS	
		FATIGUE & FRACTURE LIMIT STATES	ALL OTHER LIMIT STATES
IM	75%	15%	15%

c. LIVE LOAD SURCHARGE: HORIZONTAL PRESSURE ON OUTER SIDE WALLS IS DETERMINED USING EQUIVALENT ABUTMENT HEIGHT BASED ON SOIL EMBEDMENT.

ABUTMENT HEIGHT	heq
1.5	1.2
3	0.9
>6	0.6

d. LATERAL EARTH PRESSURE: HORIZONTAL LOAD APPLIED BY SOIL AGAINST THE BOX CULVERT.

C. CONSTRUCTION REQUIREMENTS

ALL MATERIALS CONSTRUCTION METHODS AND PROCEDURES SHALL COMPLY WITH THE DPWH STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, AND AIRPORTS 2013 EDITION. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

D. MATERIALS

1. STEEL REINFORCEMENT
 - a. ALL REINFORCING STEEL 16mm \emptyset & LARGER SHALL BE GRADE 60 ($f_y=415\text{MPa}$) WHILE 12mm \emptyset REINFORCING STEEL BAR SHALL BE GRADE 40 ($f_y=275\text{MPa}$), WITH DEFORMATION CONFORMING TO ASTM A-305-49.
2. CONCRETE
 - a. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF $f_c=27.6\text{ MPa}$ (4000 psi) IN 28 DAYS, EXCEPT FOR LEAN CONCRETE OF $f_c=16.5\text{ MPa}$ (2400 psi).
 - b. MINIMUM CONCRETE COVER FOR REINFORCING BARS SHALL BE 75mm FOR CONCRETE CAST AGAINST AND EXPOSED TO EARTH.
 - c. ALL EXPOSED CORNERS TO BE CHAMFERED 0.019m.
 - d. NO CONSTRUCTION JOINTS ARE TO BE MADE EXCEPT WHERE SHOWN.
 - e. WHEN BOTTOM SLAB IS SUBJECT TO ABRASION DUE TO SEDIMENT-LADEN WATER FLOW, ADD 25mm OF SLAB THICKNESS TO INCREASE COVERING ON STEEL REINFORCEMENT.
3. EARTH FILL AND FOUNDATION
 - a. UNIT WEIGHT OF SOIL: 19-20 kN/m³
 - b. RCBC IS DESIGNED USING AN ASSUMED ALLOWABLE SOIL BEARING CAPACITY OF 96 kPa (2000 psi). THE CONTRACTOR MUST CONDUCT GEOTECHNICAL INVESTIGATION TO VERIFY ACTUAL SOIL CONDITIONS AND CONFIRM THE BEARING CAPACITY OF SOIL.
 - c. IN CASES WHERE THE ACTUAL SOIL CONDITION IS SUCH THAT THE MINIMUM ALLOWABLE SOIL PRESSURE OF 96 kPa (2000 psi) CAN NOT BE ATTAINED, THE CONTRACTOR MUST PROVIDE SUITABLE SOLUTIONS OR METHODS TO IMPROVE SOIL BEARING CAPACITY OR ALTERNATIVE FOUNDATION DESIGN.



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
HIGHWAYS DIVISION
BONIFACIO DRIVE PORT AREA, MANILA

SHEET TITLE:

STANDARD REINFORCED CONCRETE BOX CULVERT
(RCBC)

SHEET CONTENT:

GENERAL NOTES

PREPARED:

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ENGINEER II

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ENGINEER III

SUBMITTED:

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BUREAU OF DESIGN

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OIC CHIEF, DAMAGE & SCOUR PROTECTION SECTION

RECOMMENDING APPROVAL:

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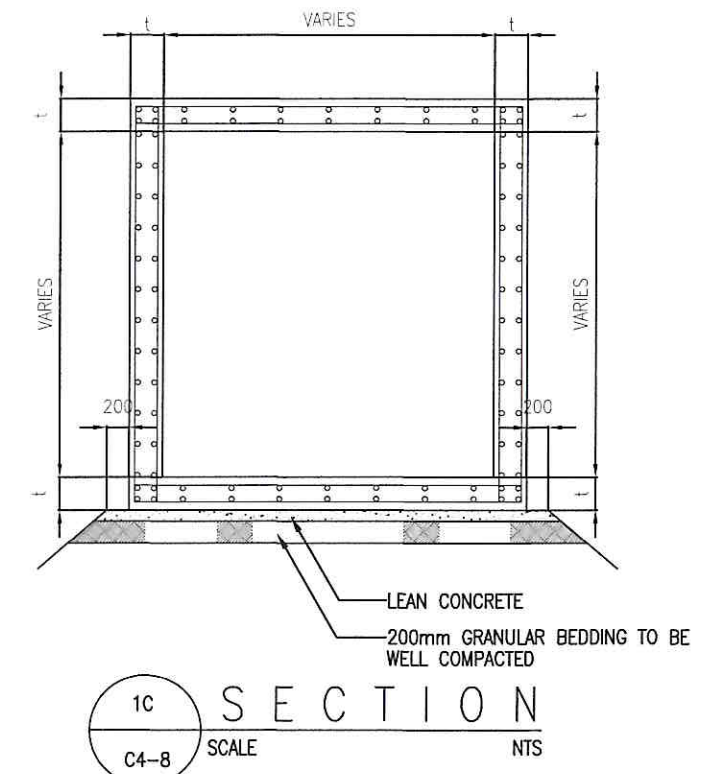
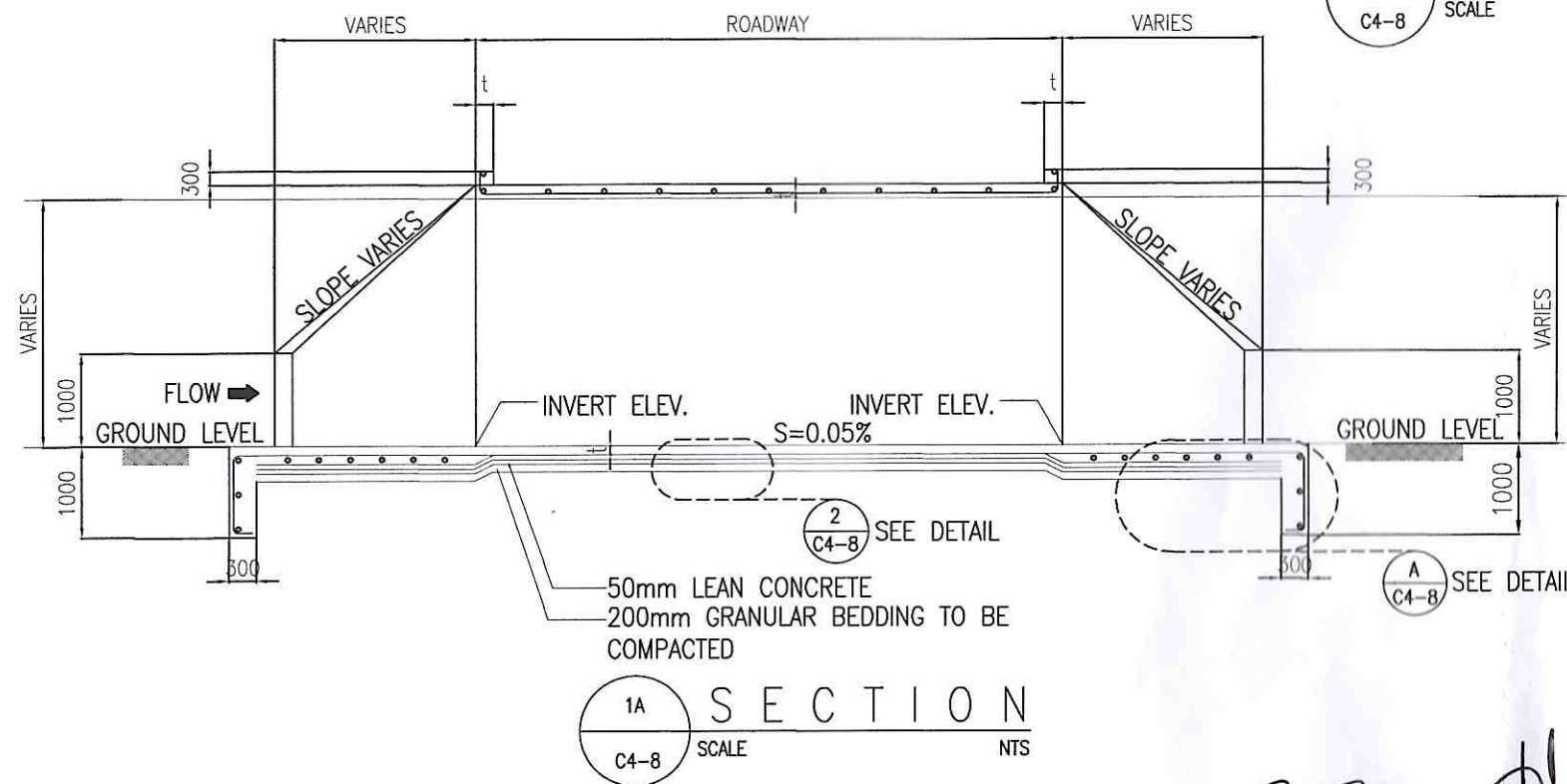
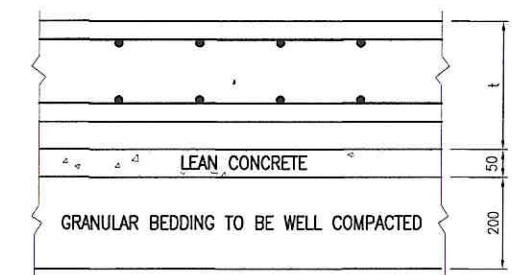
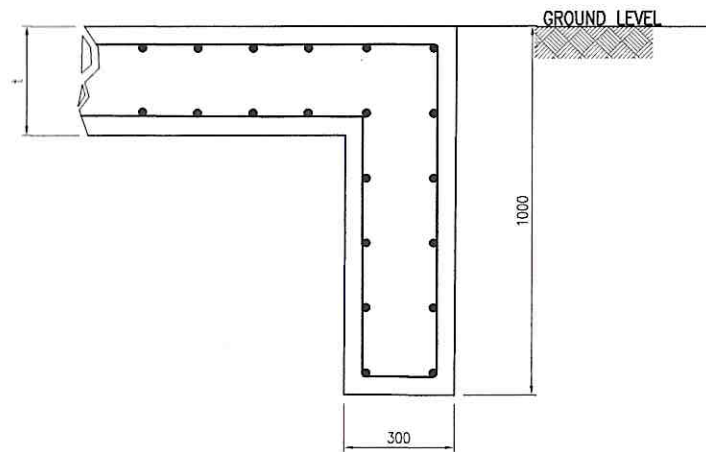
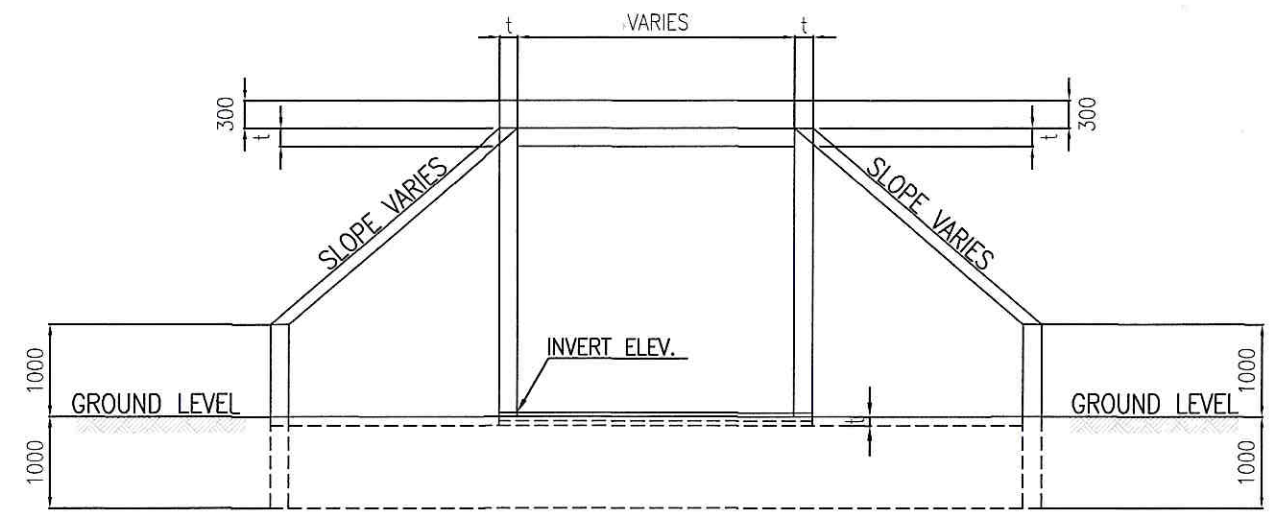
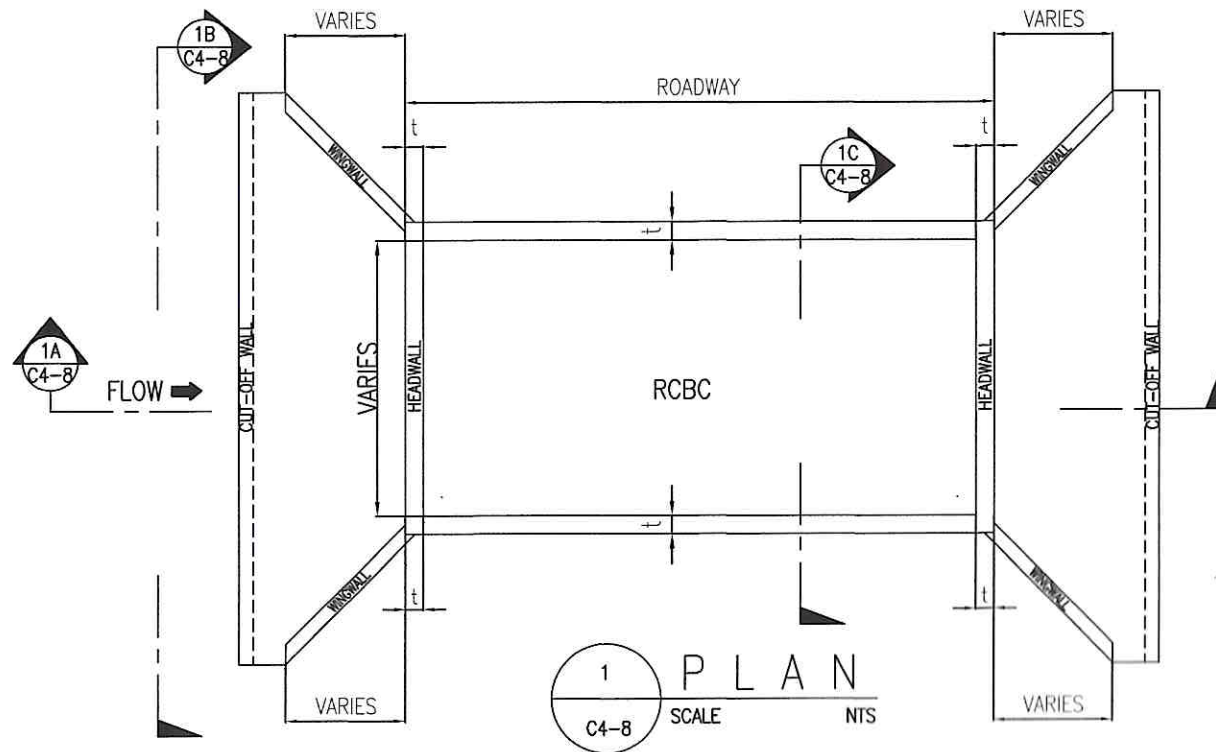
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SHEET NO.

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OCT 30 2024



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
HIGHWAYS DIVISION
BONIFACIO DRIVE PORT AREA, MANILA

SHEET TITLE:

STANDARD REINFORCED CONCRETE BOX CULVERT (RCBC)

SHEET CONTENT:

STANDARD DETAILS OF REINFORCED CONCRETE BOX CULVERT (2 OF 2)

PREPARED: MARK BRIMMINE O. MAGPAYO
ENGINEER II

DRAWN:

REVIEWED:

PETER JAMUS T. EQUIBIL
ENGINEER II

DRAWN:

REVIEWED:

SUBMITTED:

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BUREAU OF DESIGN

DATE: OCT 30 2024

RECOMMENDING APPROVAL:

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DIRECTOR IV, BUREAU OF DESIGN

DATE:

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ASSISTANT SECRETARY
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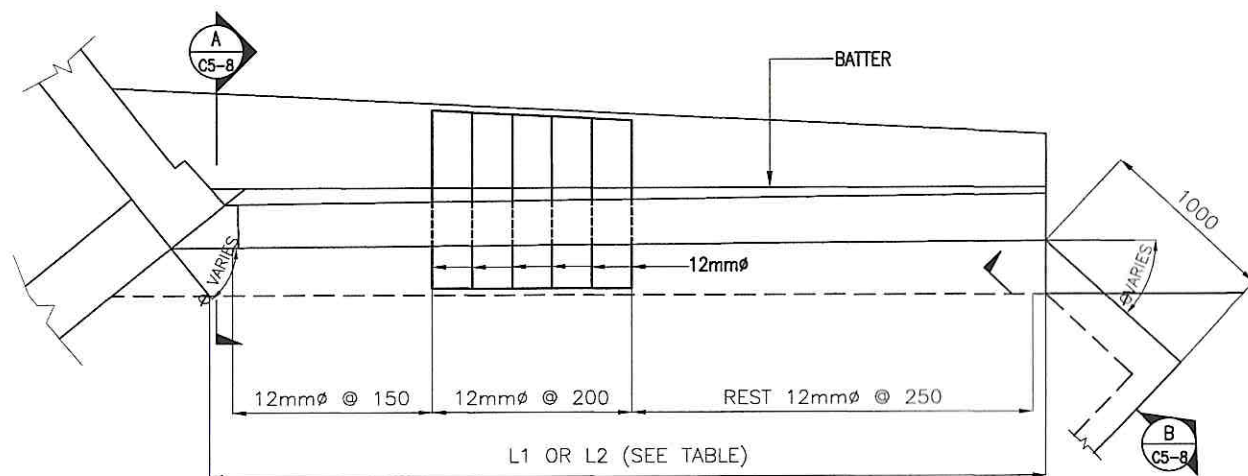
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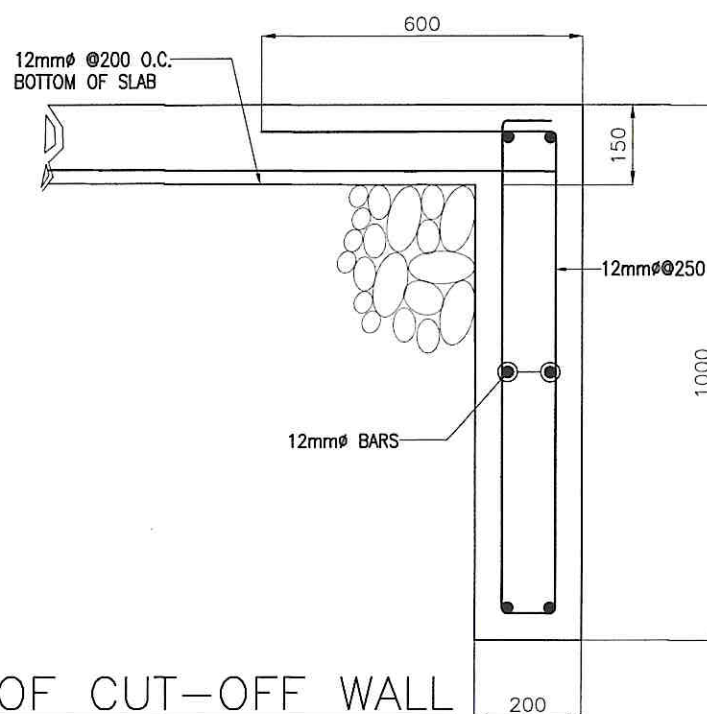
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SHEET NO.

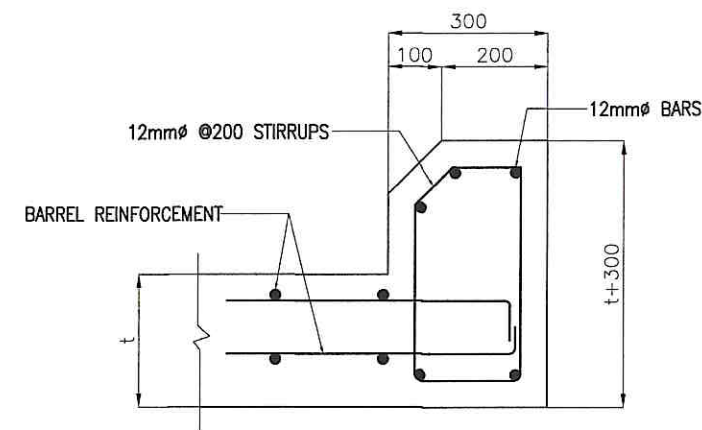
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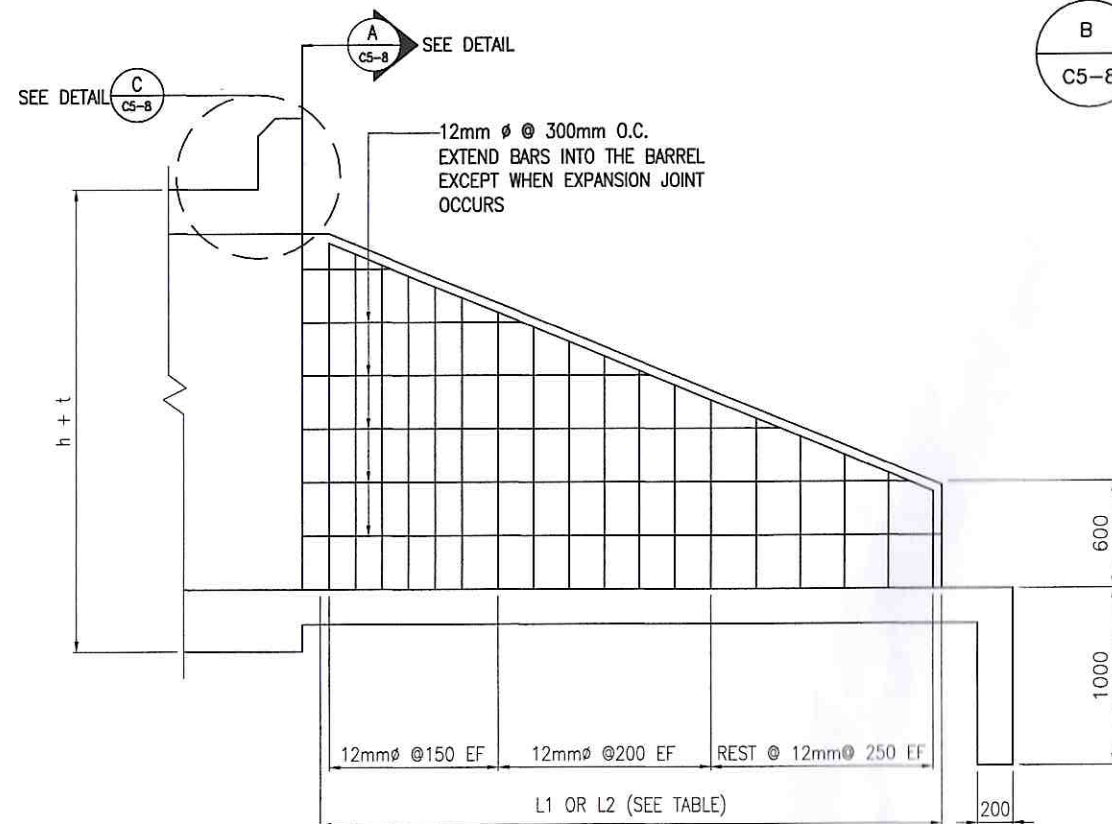
1 WINGWALL PLAN
C5-8 SCALE NTS



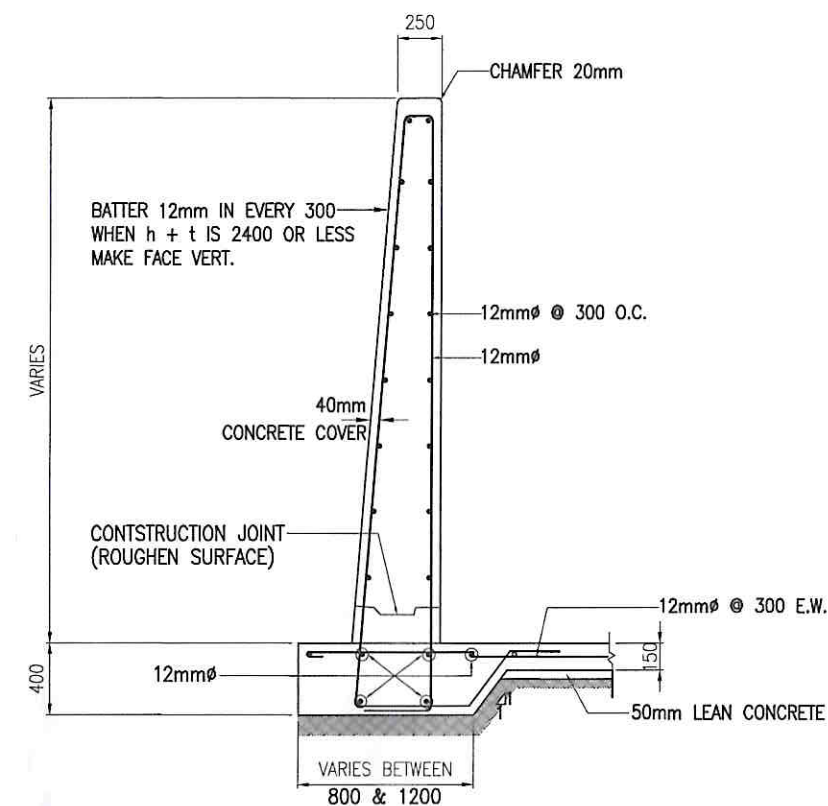
B DETAILS OF CUT-OFF WALL
C5-8 SCALE NTS



C DETAIL
C5-8 NOT TO SCALE



2 WINGWALL ELEVATION
C5-8 SCALE NTS



A SECTION
C5-8 SCALE NTS

HORIZONTAL SKEW ANGLE, α	LENGTH OF WINGWALLS
90	$L_1 = L_2 = 1.414a$
60	$L_1 = 1.414a$ $L_2 = 1.035a$
45	$L_1 = 2.0a$ $L_2 = a$

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



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 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
 BUREAU OF DESIGN
 HIGHWAYS DIVISION
 BONIFACIO DRIVE PORT AREA, MANILA

SHEET TITLE:
 STANDARD REINFORCED CONCRETE BOX CULVERT (RCBC)

SHEET CONTENT:
 RCBC WINGWALL DETAILS

PREPARED: MARK BRIANNE MAGPAYO
 ENGINEER II
 DRAWN: MARLOMBE TORINGAN
 DRAFTSMAN I
 REVIEWED: JEROME E. ARAN
 OIC CHIEF, DESIGN & CONSTRUCTION SECTION

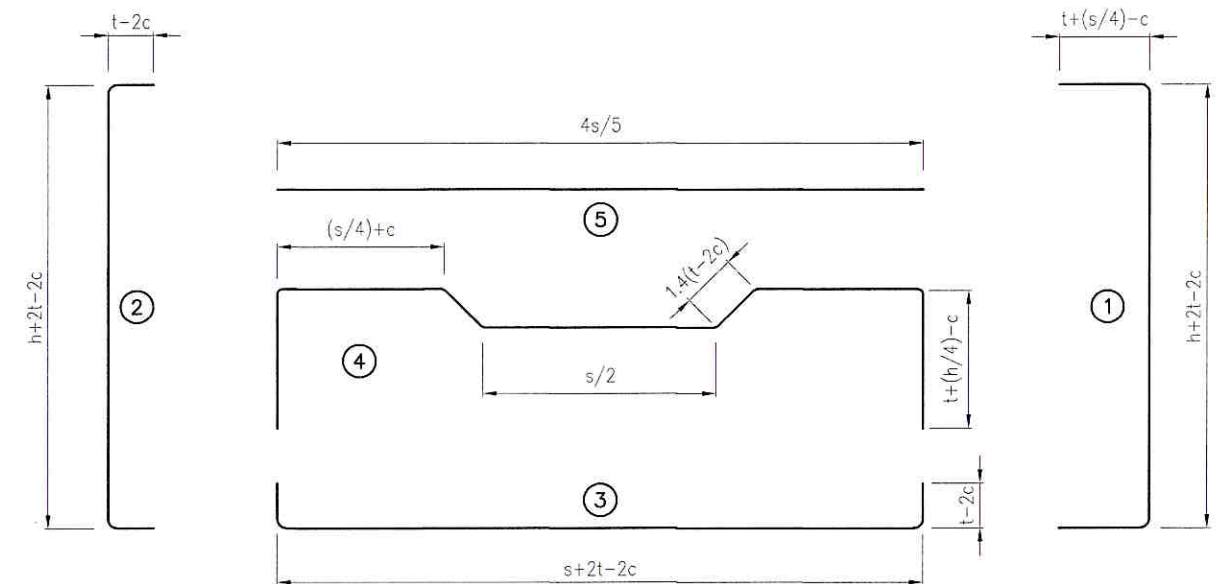
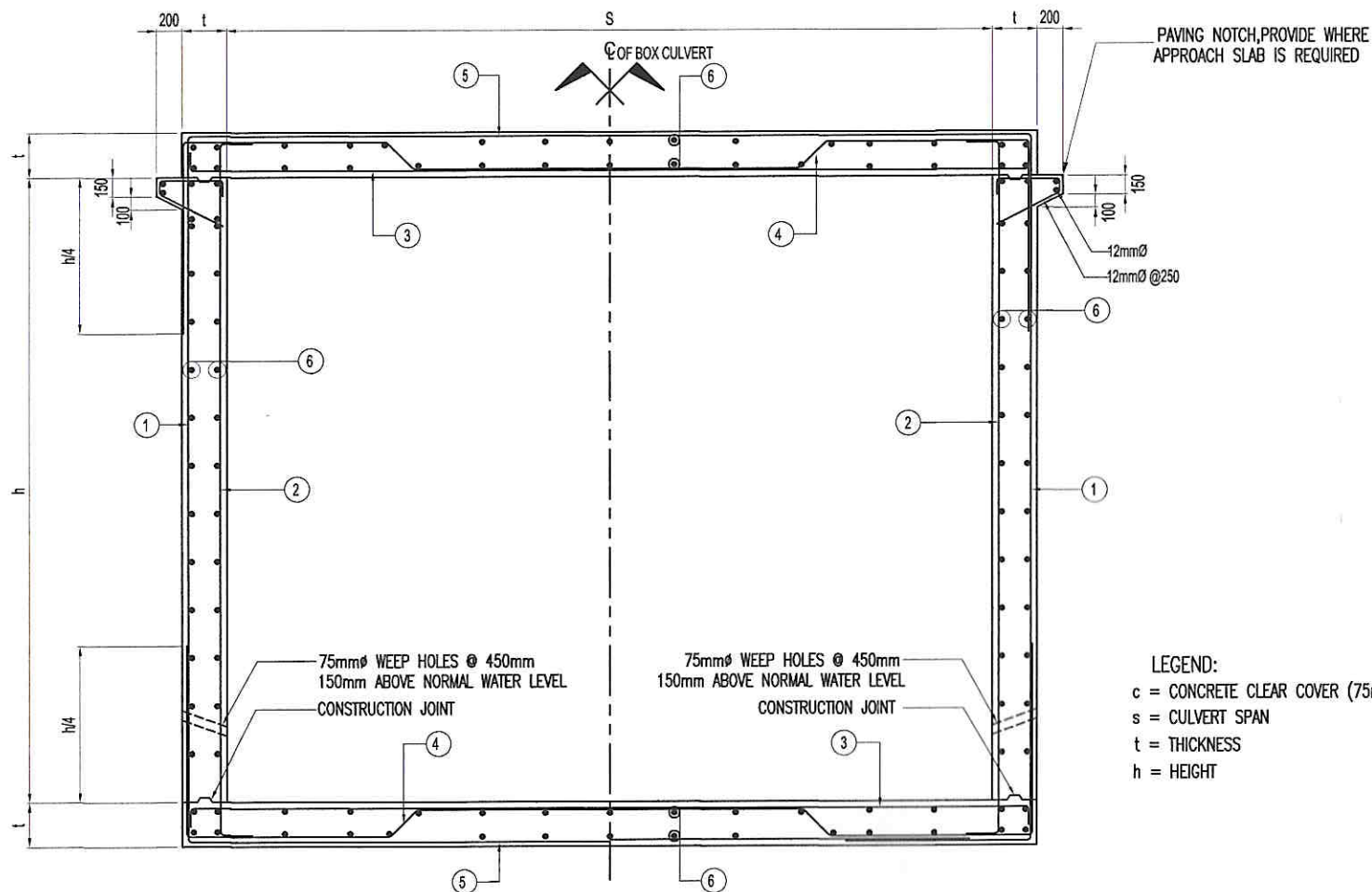
PETER JAMES V. ESQUIBIL
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 OFFICER-IN-CHARGE, HIGHWAYS DIVISION
 BUREAU OF DESIGN
 DATE: OCT 30 2024

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SET NO. HD
 BOD
 SHEET NO. C
 5 8



SPAN s	HEIGHT h	t	BAR 1		BAR 2		BAR 3		BAR 4		BAR 5		BAR 6	
			ϕ	SPACING	ϕ	SPACING	ϕ	SPACING	ϕ	SPACING	ϕ	SPACING	ϕ	SPACING
1250	1000	300	16	250	16	250	16	250	16	250	16	250	12	200
	1250	300	16	250	16	250	16	250	16	250	16	250	12	200
	1500	300	16	250	16	250	16	250	16	250	16	250	12	200
	1800	300	16	250	16	250	16	250	16	250	16	250	12	200
1500	1000	300	16	250	16	250	16	250	16	250	16	250	12	200
	1250	300	16	250	16	250	16	250	16	250	16	250	12	200
	1500	300	16	250	16	250	16	250	16	250	16	250	12	200
	1800	300	16	250	16	250	16	250	16	250	16	250	12	200
1800	1250	300	16	250	16	250	16	250	16	250	16	250	12	200
	1500	300	16	250	16	250	16	250	16	250	16	250	12	200
	1800	300	16	250	16	250	16	250	16	250	16	250	12	200
	2100	300	16	250	16	250	16	250	16	250	16	250	12	200
2400	1800	300	16	200	16	200	16	200	16	200	16	200	12	200
	2100	300	16	200	16	200	16	200	16	200	16	200	12	200
	2400	300	16	200	16	200	16	200	16	200	16	200	12	200
	2750	300	16	200	16	200	16	200	16	200	16	200	12	200
3000	2100	300	16	150	16	150	16	150	16	150	16	150	12	200
	2400	300	16	150	16	150	16	150	16	150	16	150	12	200
	2750	300	16	150	16	150	16	150	16	150	16	150	12	200
	3000	300	16	150	16	150	16	150	16	150	16	150	12	200

3 BAR SCHEDULE - SINGLE BARREL

SCALE 1:100M.



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HIGHWAYS DIVISION
BONIFACIO DRIVE PORT AREA, MANILA

SHEET TITLE:
STANDARD REINFORCED CONCRETE BOX CULVERT
(SINGLE BARREL DETAILS)

SHEET CONTENT:
SECTION SINGLE BARREL
BAR BENDING DIAGRAM - SINGLE BARREL
BAR SCHEDULE (SINGLE BARREL)

PREPARED: MARK BRIANNE O. MAGPAYO
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ENGINEER III

DRAWN: MARLON B. TURINGAN
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REVIEWED: EDWIN T. DURAN
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SUBMITTED: ELVIN G. TACTAC
OFFICER-IN-CHARGE, HIGHWAYS DIVISION
BUREAU OF DESIGN

DATE: OCT 30 2024

RECOMMENDING APPROVAL:
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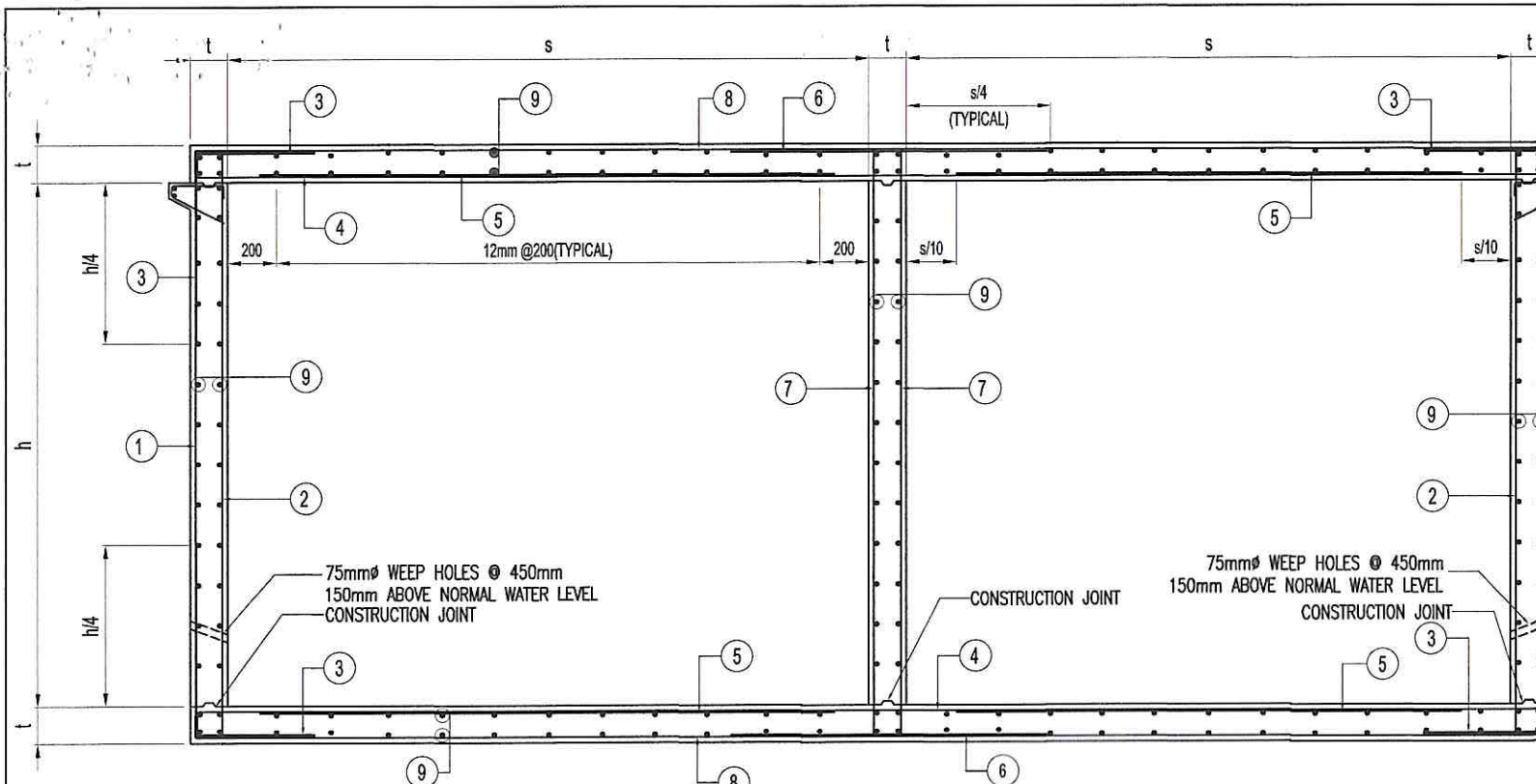
MEDMIER G. MALIG
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TECHNICAL SERVICES AND INFORMATION
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APPROVED: (SEE COVER SHEET)

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MANAGEMENT SERVICE

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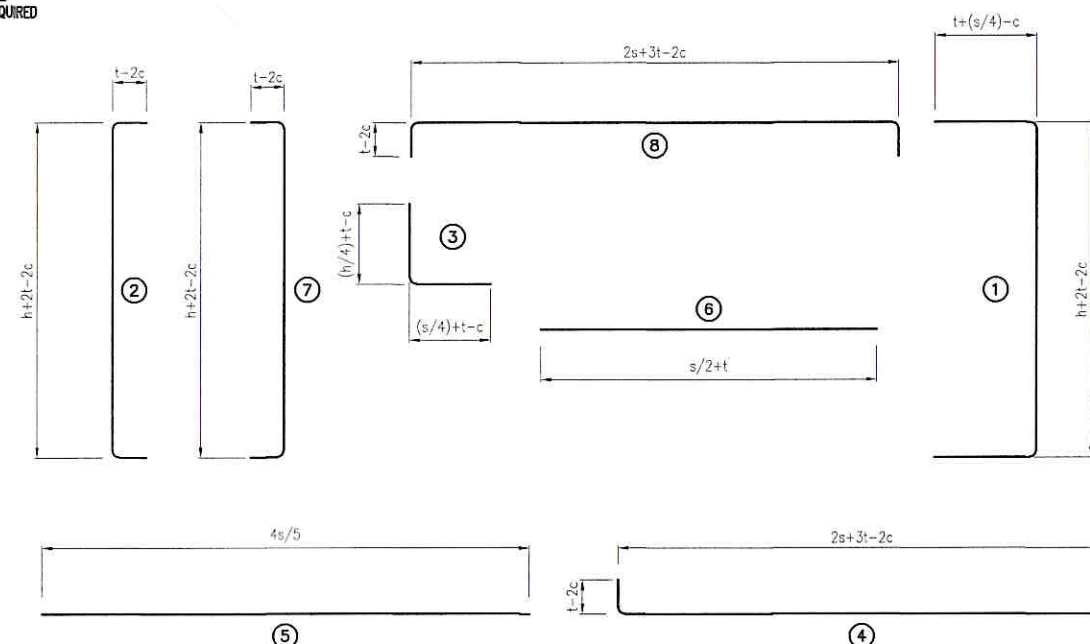
SHEET NO. C
6 8



LEGEND:
 c = CONCRETE CLEAR COVER (75mm)
 s = CULVERT SPAN
 t = THICKNESS
 h = HEIGHT

1 SECTION - DOUBLE BARREL
 SCALE 1:50M.
 C7-8

PAVING NOTCH, PROVIDE
 APPROACH SLAB IS REQUIRED



2 BAR BENDING DIAGRAM - DOUBLE BARREL
 SCALE 1:40M.
 C7-8

SPAN	HEIGHT h	t	BAR 1		BAR 2		BAR 3		BAR 4		BAR 5		BAR 6		BAR 7		BAR 8		BAR 9	
			Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING
1250	1000	300	16	250	16	250	16	250	16	250	16	250	16	250	16	200	16	250	12	200
	1250	300	16	250	16	250	16	250	16	250	16	250	16	250	16	200	16	250	12	200
	1500	300	16	250	16	250	16	250	16	250	16	250	16	250	16	200	16	250	12	200
	1800	300	16	250	16	250	16	250	16	250	16	250	16	250	16	200	16	250	12	200
1500	1000	300	16	200	16	200	16	200	16	200	16	200	16	200	16	200	16	200	12	200
	1250	300	16	200	16	200	16	200	16	200	16	200	16	200	16	200	16	200	12	200
	1500	300	16	200	16	200	16	200	16	200	16	200	16	200	16	200	16	200	12	200
	1800	300	16	200	16	200	16	200	16	200	16	200	16	200	16	200	16	200	12	200
1800	1250	300	16	200	16	200	16	150	16	150	16	150	16	150	16	200	16	150	12	200
	1500	300	16	200	16	200	16	150	16	150	16	150	16	150	16	200	16	150	12	200
	1800	300	16	200	16	200	16	150	16	150	16	150	16	150	16	200	16	150	12	200
	2100	300	16	200	16	200	16	150	16	150	16	150	16	150	16	200	16	150	12	200
2400	1800	300	16	200	16	200	20	200	20	200	20	200	20	200	16	200	20	200	12	200
	2100	300	16	200	16	200	20	200	20	200	20	200	20	200	16	200	20	200	12	200
	2400	300	16	200	16	200	20	200	20	200	20	200	20	200	16	200	20	200	12	200
	2750	300	16	200	16	200	20	200	20	200	20	200	20	200	16	200	20	200	12	200
3000	2100	300	25	300	25	300	25	150	25	150	25	150	25	150	16	200	25	150	12	200
	2400	300	25	300	25	300	25	150	25	150	25	150	25	150	16	200	25	150	12	200
	2750	300	25	300	25	300	25	150	25	150	25	150	25	150	16	200	25	150	12	200
	3000	300	25	300	25	300	25	150	25	150	25	150	25	150	16	200	25	150	12	200

3 BAR SCHEDULE - DOUBLE & TRIPLE BARREL
 SCALE 1:100M.
 C7-8



REPUBLIC OF THE PHILIPPINES
 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
 BUREAU OF DESIGN
 HIGHWAYS DIVISION
 BONIFACIO DRIVE PORT AREA, MANILA

SHEET TITLE:
 STANDARD REINFORCED CONCRETE BOX CULVERT
 (DOUBLE BARREL DETAILS)

SHEET CONTENT:
 SECTION DOUBLE BARREL
 BAR BENDING DIAGRAM - DOUBLE BARREL
 BAR SCHEDULE (DOUBLE & TRIPLE BARREL)

PREPARED: MARK BRIANNE O. MAGPAYO
 ENGINEER II

PETER JAMES T. ESQUIBIL
 ENGINEER III

SUBMITTED: ELVIN G. TACTAC
 OFFICER-IN-CHARGE, HIGHWAYS DIVISION
 BUREAU OF DESIGN

RECOMMENDING APPROVAL: (SEE COVER SHEET)
 (SEE COVER SHEET)

APPROVED: (SEE COVER SHEET)
 (SEE COVER SHEET)

ADOR G. CANLAS, CESO IV
 UNDERSECRETARY
 TECHNICAL SERVICES AND INFORMATION
 MANAGEMENT SERVICE

SET NO. SHEET NO.

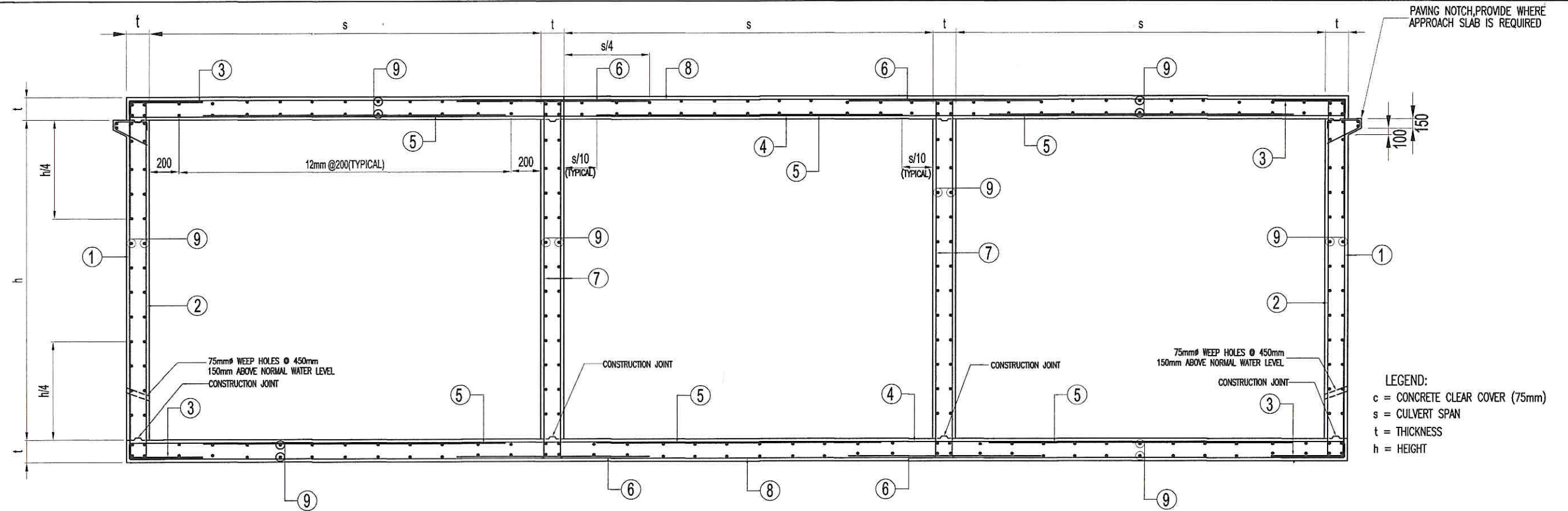
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DATE: OCT 30 2024

DATE:

DATE:

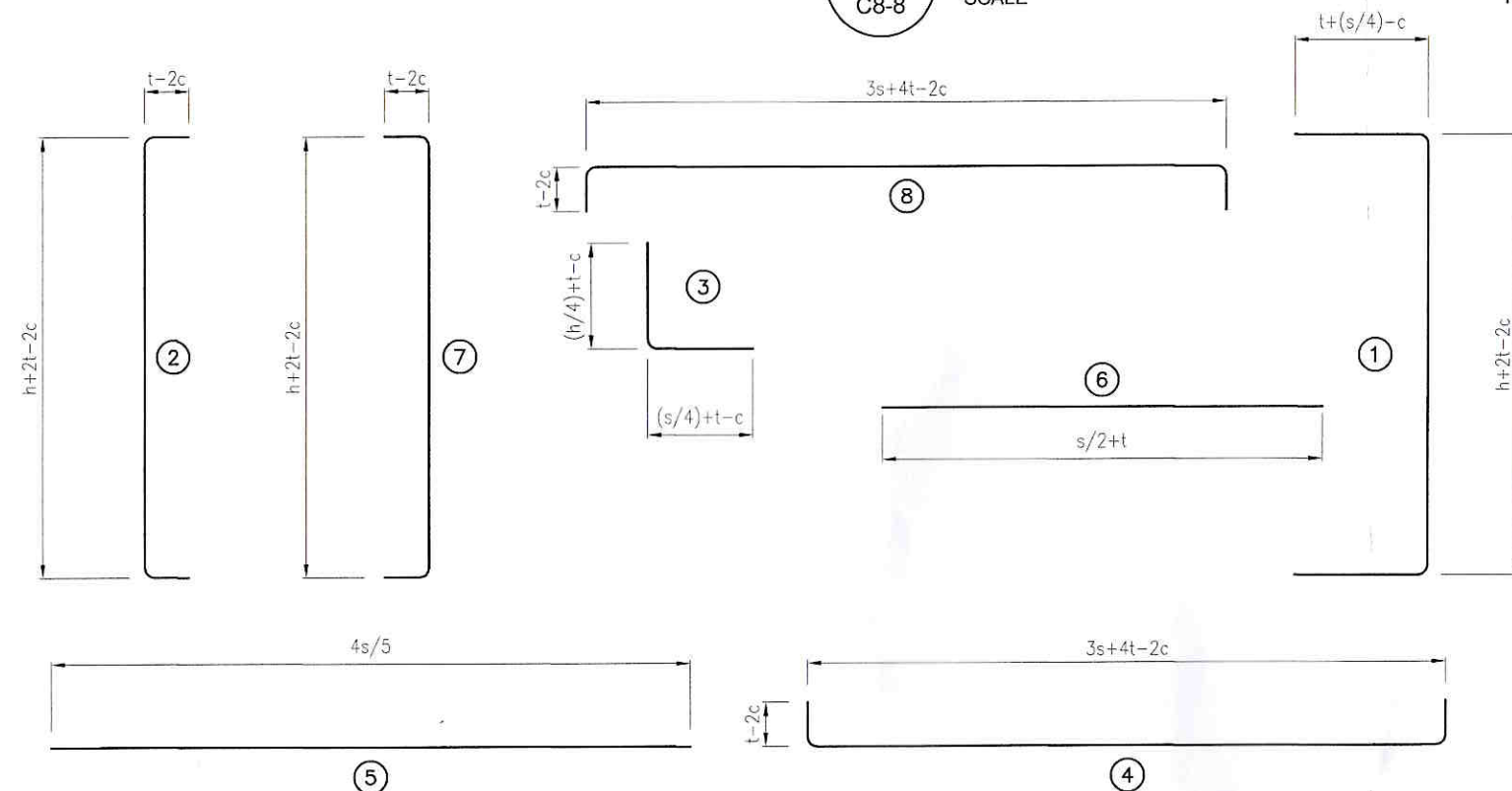
DATE:



1 SECTION - TRIPLE BARREL
C8-8 SCALE 1:50M.

QUANTITIES FOR STANDARD BOX CULVERTS

SPAN s	CLEAR HEIGHT h	QTY. PER METER OF BARREL (SINGLE)		QTY. PER METER OF BARREL (DOUBLE)		QTY. PER METER OF BARREL (TRIPLE)	
		CONC. (cu.m)	REINF. (kg)	CONC. (cu.m)	REINF. (kg)	CONC. (cu.m)	REINF. (kg)
1250	1000	1.71	176.54	2.94	320.73	4.17	445.52
	1250	1.86	191.53	3.17	352.54	4.47	487.94
	1500	2.01	202.97	3.39	381.69	4.77	526.81
	1800	2.19	215.99	3.66	418.27	5.13	575.58
1500	1000	1.86	190.50	3.24	407.36	4.62	568.14
	1250	2.01	205.50	3.47	441.15	4.92	612.53
	1500	2.16	216.94	3.69	472.27	5.22	653.37
	1800	2.34	229.96	3.96	511.22	5.58	704.51
1800	1250	2.19	225.10	3.83	585.18	5.46	822.46
	1500	2.34	236.54	4.05	617.09	5.76	822.46
	1800	2.52	249.56	4.32	656.98	6.12	864.09
	2100	2.70	266.13	4.59	711.26	6.48	987.44
2400	1800	2.88	335.20	5.04	821.98	7.20	1158.22
	2100	3.06	369.53	5.31	876.64	7.56	1229.87
	2400	3.24	354.14	5.58	924.91	7.92	1293.00
	2750	3.45	390.44	5.90	997.48	8.34	1388.31
3000	2100	3.42	513.26	6.03	1471.58	8.64	2545.39
	2400	3.60	533.38	6.30	1527.25	9.00	2621.91
	2750	3.81	559.81	6.62	1608.44	9.42	2732.86
	3000	3.96	577.17	6.84	1664.15	9.72	2809.06



2 BAR BENDING DIAGRAM - TRIPLE BARREL
C8-8 SCALE 1:30M.



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
HIGHWAYS DIVISION
BONIFACIO DRIVE PORT AREA, MANILA

SHEET TITLE:
STANDARD REINFORCED CONCRETE BOX CULVERT
(TRIPLE BARREL DETAILS)

SHEET CONTENT:
SECTION TRIPLE BARREL
BAR BENDING DIAGRAM - TRIPLE BARREL
QUANTITIES

PREPARED: MARK BRIANNE O. MAGPAYO
ENGINEER II

PETER JAMES L. ESQUIBIL
ENGINEER III

SUBMITTED:

ELVIN G. TACTAC
OFFICER-IN-CHARGE, HIGHWAYS DIVISION
BUREAU OF DESIGN

RECOMMENDING APPROVAL:

DANILO L. BALISI
DIRECTOR IV, BUREAU OF DESIGN

(SEE COVER SHEET)
MEDMIER G. MALIG
ASSISTANT SECRETARY
TECHNICAL SERVICES AND INFORMATION
MANAGEMENT SERVICE

APPROVED:

(SEE COVER SHEET)
ADOR G. CANLAS, CESO IV
UNDERSECRETARY
TECHNICAL SERVICES AND INFORMATION
MANAGEMENT SERVICE

SET NO.

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BOD

SHEET NO.

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