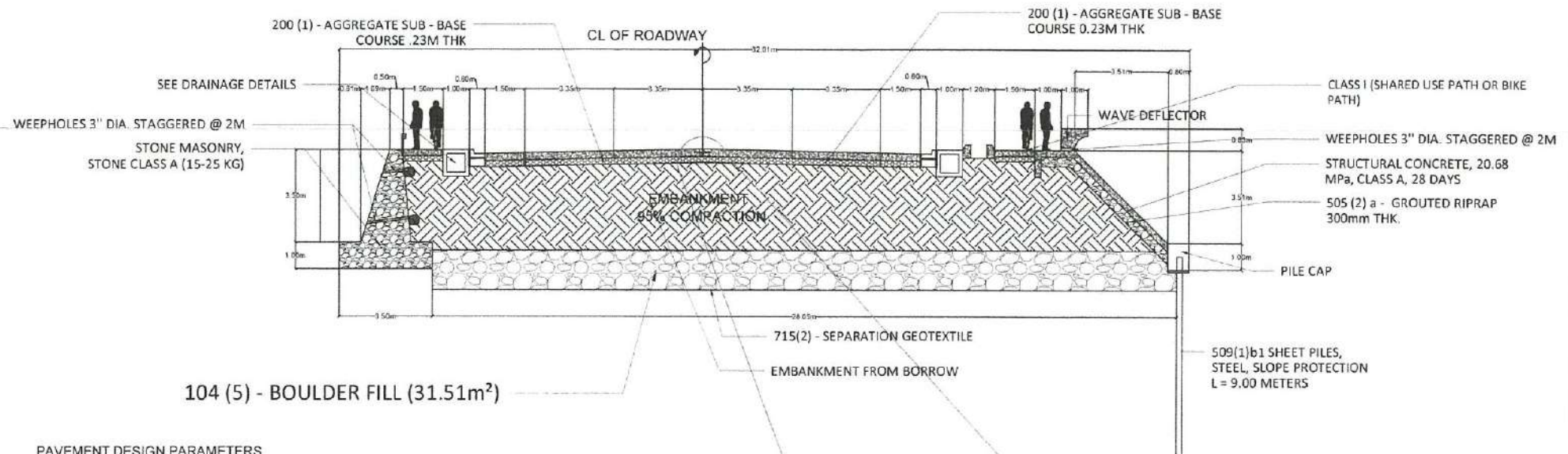




PAVEMENT DESIGN PARAMETERS

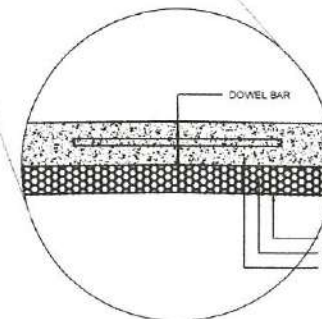
ITEM	DESIGN REQUIREMENTS
1. PERFORMANCE PERIOD FOR PCCP	20 years
2. DESIGN TRAFFIC, ESAL	7.277×10^6
3. DESIGN RELIABILITY, R	85 %
4. STANDARD DEVIATION, S_o	0.35
5. DESIGN SERVICEABILITY LOSS, ΔPSI	2.50
6. PCCP MODULUS OF RUPTURE, S_c	464.45 psi
7. PCCP MODULUS OF ELASTICITY, E_c	3.360×10^6
8. SUBGRADE DESIGN CBR	5.31
9. EFFECTIVE ROADBED RESILIENT MODULUS, MR	7,066.00
10. SUBBASE ELASTIC MODULUS, ESB	15,000 psi
11. SUBBASE THICKNESS	8" (200 mm)
12. EFFECTIVE MODULUS AT SUBGRADE REACTION, K (pci)	175.00
13. DRAINAGE COEFFICIENT, Cd	1.00
14. LOAD TRANSFER COEFFICIENT, J	3.90
15. LOSS OF SUPPORT, Ls	1.00
16. K (corrected)	100.00

SCHEDULE FOR SHOULDER

+ e% $\leq$ 5%	= -3%
+ e% $\geq$ 5%	= -2%
+ e% $\geq$ 6%	= -1%
+ e% $\geq$ 7%	= -0%
+ e% $\geq$ 8%	= +1%

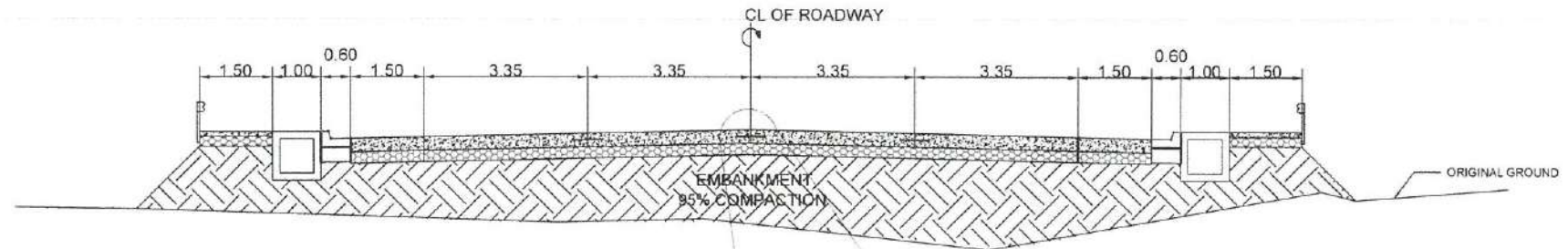
CUT/FILL SLOPE SCHEDULE

NATURE OF MATERIAL	CUT SLOPE	FILL SLOPE
COMMON EARTH	1:1 - $\frac{1}{2}$:1	2:1
RIPPABLE ROCK	$\frac{1}{2}$:1 - $\frac{1}{4}$:1	-
HARD ROCK	$\frac{1}{4}$:1 - $\frac{1}{8}$:1	-



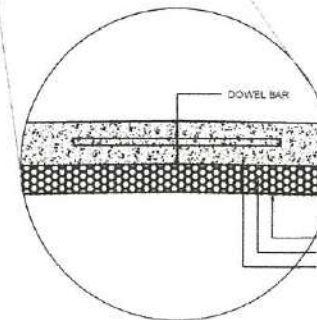
TYPICAL ROADWAY SECTION SHOWING REVITMENT
SCALE: NTS

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. VIII SARAS PAUL, LAYTE	PROJECT NAME AND LOCATION SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, Poblacion, ARTECHE, EASTERN SAMAR EASTERN SAMAR LD	SHEET CONTENTS TYPICAL ROADWAY SECTIONS	PREPARED JAN CHARLES S. HECHANOVA ENGINEER	REVIEWED FELIX R. ACUS CHIEF HIGHWAY DESIGN DIVISION	RECOMMENDED AGNES M. BARONDA CHIEF PLANNING AND DESIGN DIVISION	APPROVED MA. MARGARITA A. JUNIA, D.M. ASSISTANT REGIONAL DIRECTOR EDGAR B. TABACON, CESO IV REGIONAL DIRECTOR	SHEET NO. 15	SHEET NO. 42
	DATE: 15/24							



PAVEMENT DESIGN PARAMETERS

ITEM	DESIGN REQUIREMENTS
1. PERFORMANCE PERIOD FOR PCCP	20 years
2. DESIGN TRAFFIC: ESAL	7,277 x 10 ⁶
3. DESIGN RELIABILITY: R	85%
4. STANDARD DEVIATION: S _o	0.35
5. DESIGN SERVICEABILITY LOSS: ΔPSI	2.50
6. PCCP MODULUS OF RUPTURE: S _c	464.45 psi
7. PCCP MODULUS OF ELASTICITY: E _c	3,360 x 10 ⁶
8. SUBGRADE DESIGN CBR	5.31
9. EFFECTIVE ROADBED RESILIENT MODULUS: MR	7,965.00
10. SUBBASE ELASTIC MODULUS: E _{SB}	15,000 psi
11. SUBBASE THICKNESS	8" (200 mm)
12. EFFECTIVE MODULUS AT SUBGRADE REACTION: K (pci)	175.00
13. DRAINAGE COEFFICIENT: C _d	1.00
14. LOAD TRANSFER COEFFICIENT: J	3.90
15. LOSS OF SUPPORT: L _s	1.00
16. K (corrected)	100.00



SCHEDULE FOR SHOULDER

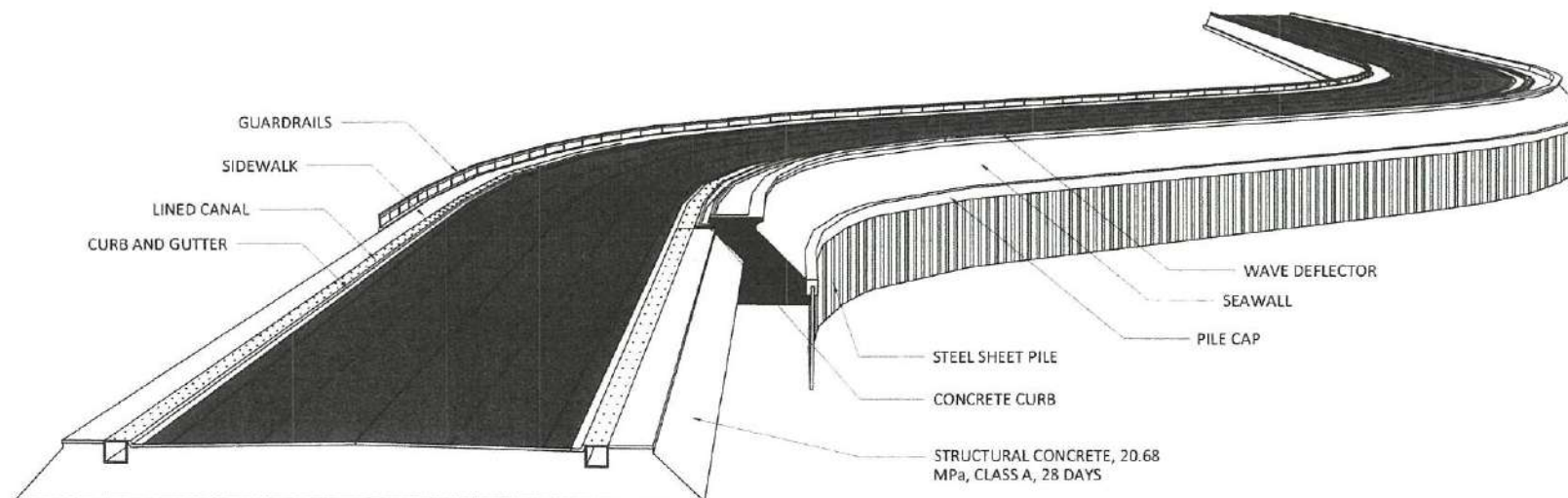
+ e%	≤	5%	=	-3%
+ e%	≥	5%	=	-2%
+ e%	≥	6%	=	-1%
+ e%	≥	7%	=	-0%
+ e%	≥	8%	=	+1%

CUT/FILL SLOPE SCHEDULE

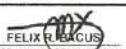
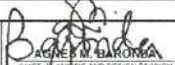
NATURE OF MATERIAL	CUT SLOPE	FILL SLOPE
COMMON EARTH	1:1 - 1/2:1	2:1
RIPPLE ROCK	1/2:1 - 1/4:1	-
HARD ROCK	1/4:1 - 1/8:1	-

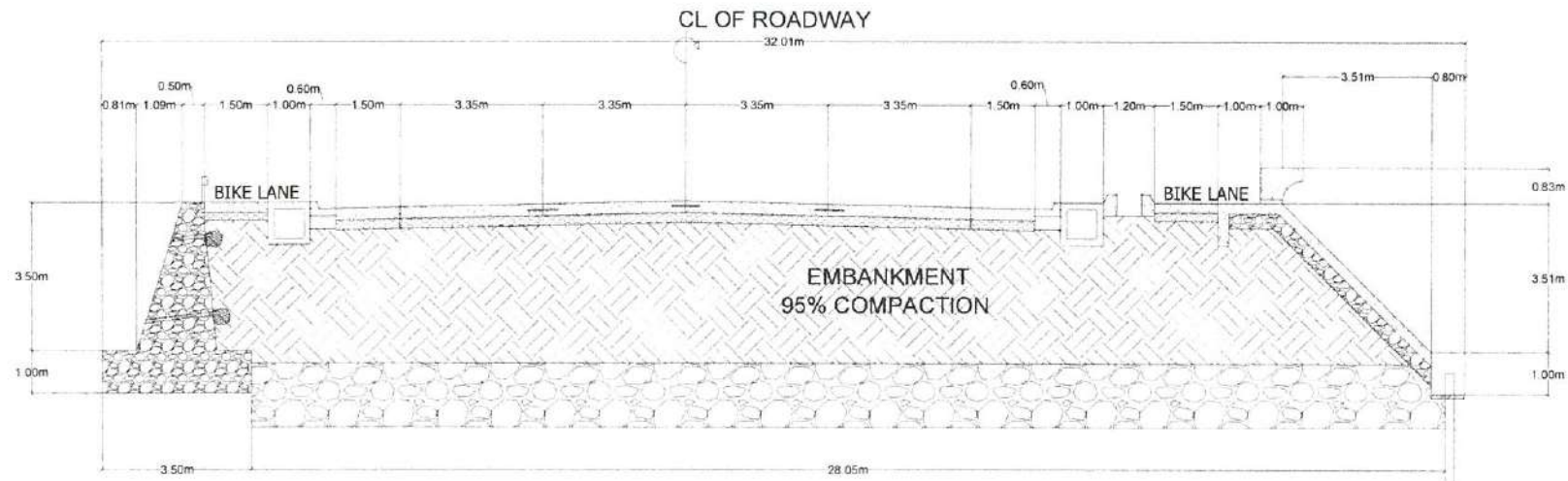
TYPICAL ROADWAY SECTION
SCALE: NTS

 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. VIII BARAS PAID, LEYTE	PROJECT NAME AND LOCATION SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR EASTERN SAMAR LD	SHEET CONTENTS TYPICAL ROADWAY SECTIONS	PREPARED JAKE M. REYES S. MECANOVA ENGINEER I (ROR)	REVIEWED FELIX R. BACUS CHIEF HIGHWAY DESIGN SECTION	RECOMMENDED AGNES M. BARONDA CHIEF PLANNING AND DESIGN DIVISION	APPROVED MA. MARGARITA O. LUNA, D.M. ASSISTANT REGIONAL DIRECTOR	SET NO. A	SHEET NO. 16 42
	DATE: 10/21/2021							

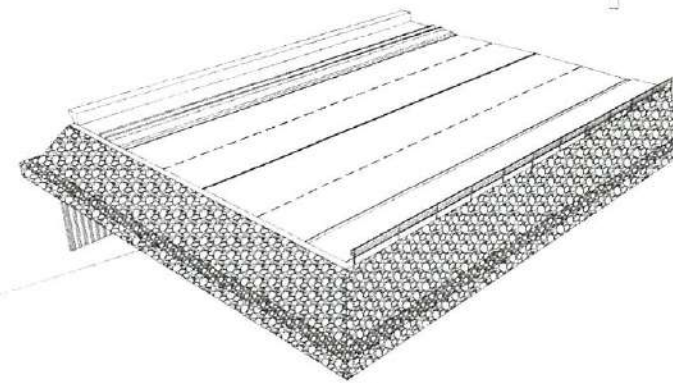
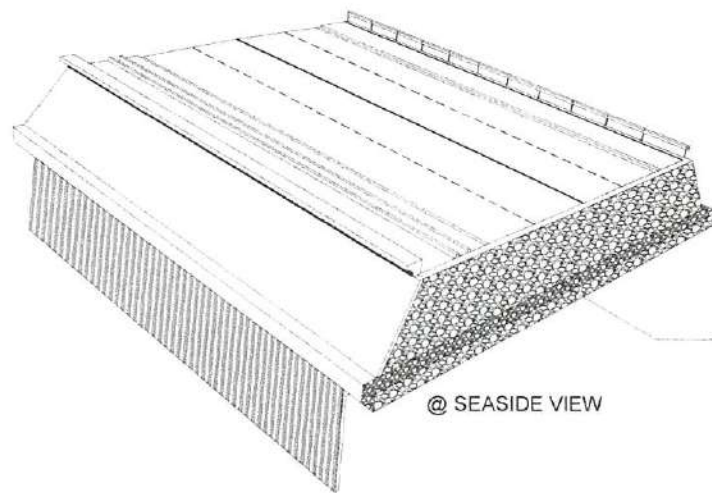


PERSPECTIVE VIEW
SCALE NTS

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. VIII BAYAN, PALO, CEBU	PROJECT NAME AND LOCATION SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR EASTERN SAMAR LG	SHEET COMMENTS PERSPECTIVE VIEW	PREPARED  JAKES CHARLES S. HECHANOVA ENGINEER I (1988)	REVIEWED  FELIX R. BACUS CHIEF, HIGHWAY DESIGN SECTION DATE	 AGNES M. BARONA CHIEF PLANNING AND DESIGN DIVISION DATE	RECOMMENDED  MA. MARGARITA C. JUNIA, D.M. ASSISTANT REGIONAL DIRECTOR DATE	APPROVED  EDGAR B. BACON, SESO I REGIONAL DIRECTOR DATE	SHEET NO. A	SHEET NO. 18
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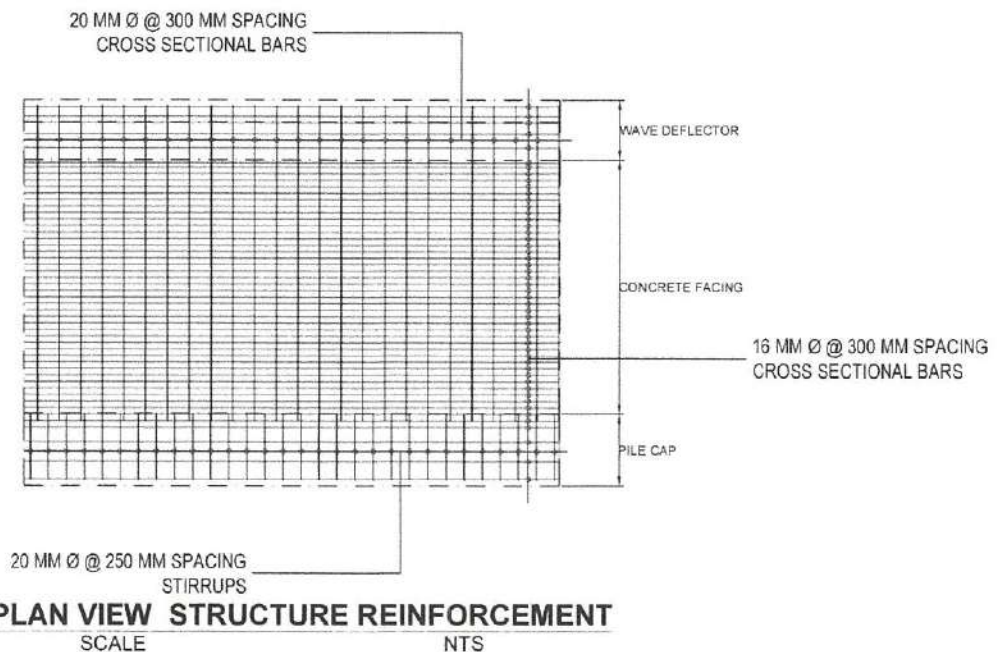
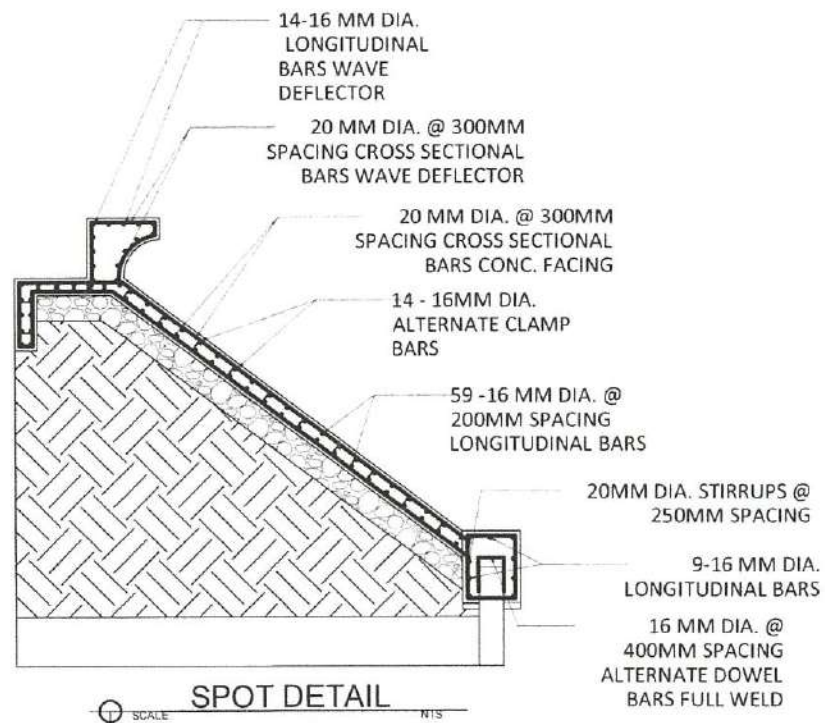
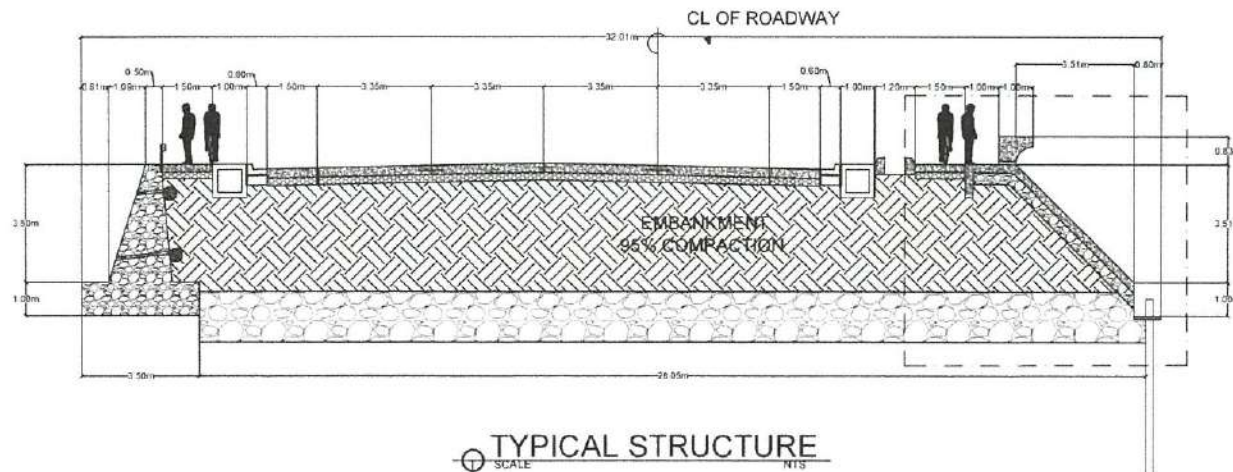


TYPICAL STRUCTURE DIMENSION
SCALE: NTS

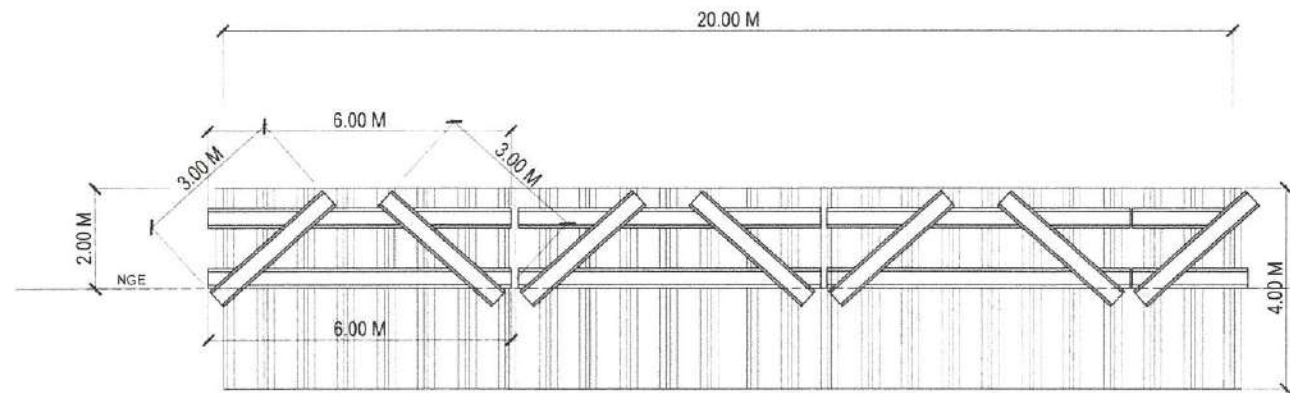


ISOMETRIC VIEW @END OF CLOSURE
SCALE: NTS

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. VIII BARAS PALO LEYTE EASTERN SAMAR LD	PROJECT NAME AND LOCATION SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR	SHEET CONTENTS TYPICAL STRUCTURE DIMENSION	PREPARED JAKE CHARLES S. HECHANOVA ENGINEER (R.D.M.)	REVIEWED FELIX R. BACUS CHIEF HIGHWAY DESIGN DIVISION DATE	RECOMMENDED AGNES H. BARONDA CHIEF PLANNER AND DESIGN DIVISION DATE	APPROVED MA. MARGARITA C. LUNA, D.M. ASSISTANT REGIONAL DIRECTOR DATE	APPROVED EDGAR B. TABARON, DESO IV REGIONAL DIRECTOR DATE	SHEET NO. 19 SHEET NO. 42
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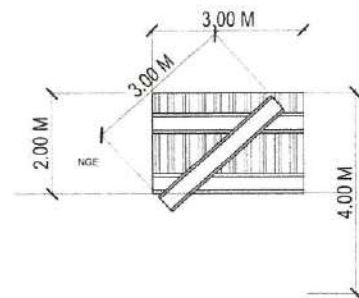


 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. VIII BARAS, PAUL LEVE	PROJECT NAME AND LOCATION BPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR EASTERN SAMAR LO	SHEET CONTENTS TYPICAL STRUCTURE SPOT DETAIL PLAN VIEW STRUCTURE REINFORCEMENT	PREPARED JACK CHARLES S. HECHANOVA ENGINEER II/BS	REVIEWED FELIX R. BACOS CHIEF, HIGHWAY DESIGN SECTION DATE	RECOMMENDED AGNES M. BARONDA SUPER PLANNING AND DESIGN DIVISION DATE	RECOMMENDED MA. MARGARITA C. ABINIA, D.M. ASSISTANT REGIONAL DIRECTOR DATE	APPROVED EDGAR B. TABACON, CESO III REGIONAL DIRECTOR	SHEET NO. A 20 24 42
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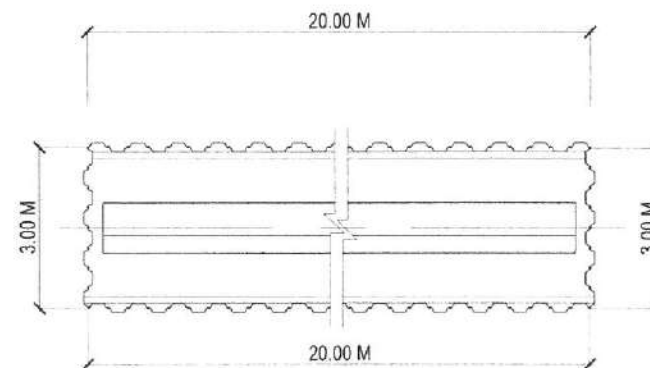
LONGITUDINAL SECTION

SCALE 1:75



CROSS SECTION

SCALE 1:75



PLAN

SCALE 1:75

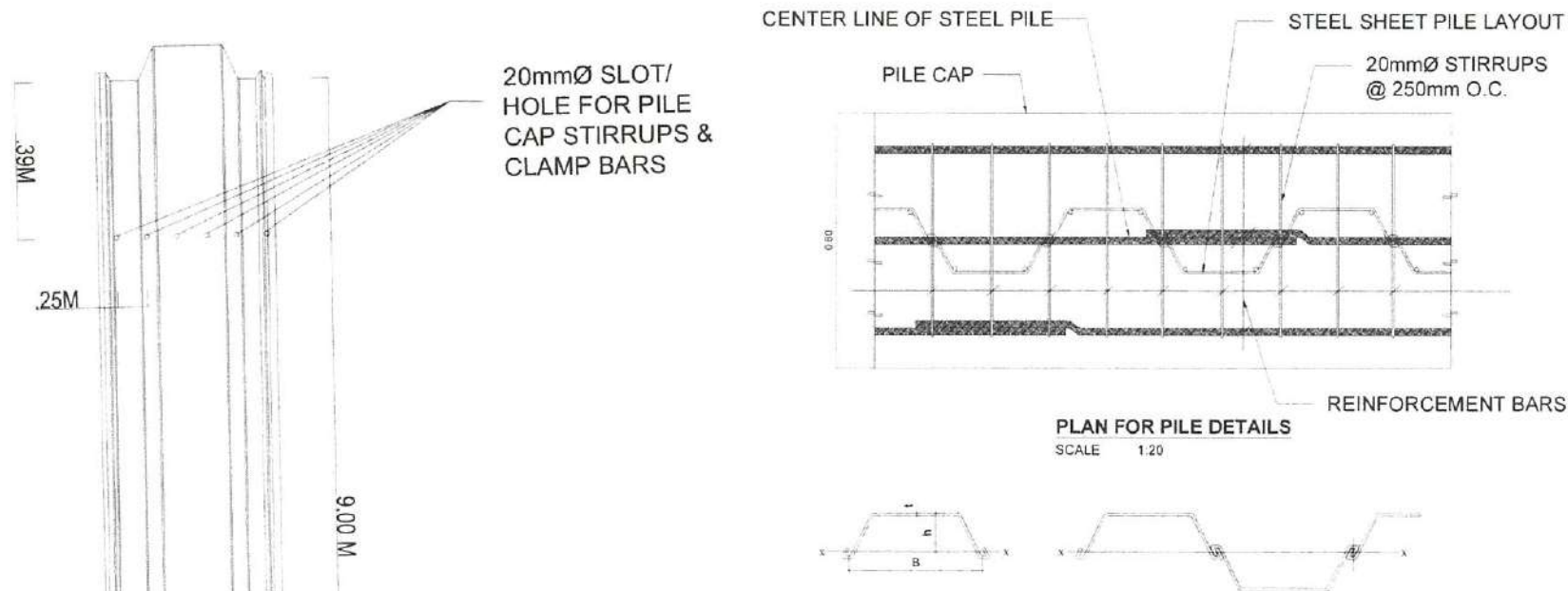
QUANTITY FOR 20.00m SHORING/COFFERDAMING

DESCRIPTION	UNIT	QTY
STEEL SHEET PILE, 48 kg./m, W=400mm, L=9.00m	kg.	22.656
LATERAL CROSS BRACINGS		

SHORING/COFFERDAMING LAYOUT AND SECTION DETAILS

SCALE AS SHOWN

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. VIII BANGALAY, CEBU	PROJECT NAME AND LOCATION	SHEET CONTENTS	PREPARED	REVIEWED	RECOMMENDED	APPROVED	SET NO.	SHEET NO.
	SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR EASTERN SAMAR LO	SHORING/COFFERDAMING LAYOUT AND SECTION DETAILS	JAKE CHARLES S. NECHANOVA ENGINEER (E.O.B.)	FELIX S. JAMES CHIEF HIGHWAY DESIGN SECTION DATE	AGNES M. BARONDA CHIEF PLANNING AND DESIGN DIVISION DATE	MA. MARGARITA A. JUNIA, D.M. ASSISTANT REGIONAL DIRECTOR DATE	ROGAR P. TABACON, C.E.O. III REGIONAL DIRECTOR DATE	A 21 24



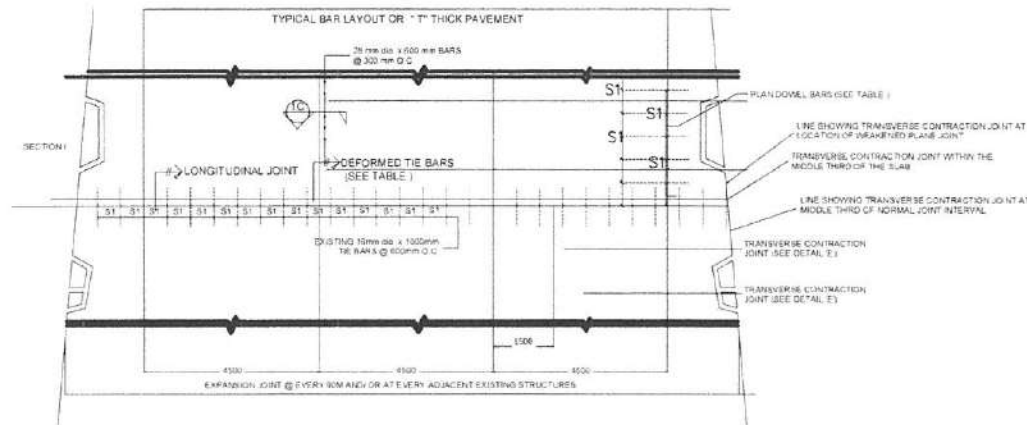
	DIMENSIONS			PER PILE				PER LINEAR METER OF WALL			
	Width B	Height h	Thickness t	Sectional Area A	Weight W	Moment of Inertia Ix	Section Modulus Zx	Sectional Area A	Weight W	Moment of Inertia Ix	Section Modulus Zx
	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ³	cm ² /m	kg/m ³	cm ⁴ /m	cm ³ /m
SKSP I	400	85	8.0	45.21	35.5	598	88	113.0	88	4,500	529
SKSP II	400	100	10.5	61.18	48	1,240	152	153.0	120	8,710	874
SKSP IIa	400	120	9.2	55.01	43.2	1,460	160	137.5	108	10,600	880
SKSP III	400	125	13.0	70.42	60.0	2,220	223	191.0	150	16,800	1,340

- A. STEEL SHEET PILE
 $F_y = 251 \text{ MPa}$
 STEEL SHEET PILE SHALL BE OF TYPE, WEIGHT, AND SECTION MODULUS INDICATED ON THE TABLE ABOVE AND SHALL CONFORM TO THE REQUIREMENTS OF STEEL SHEET PILE

NOTE:
 SECTION TYPE USED: SKSP II

STEEL SHEET PILE U-TYPE DETAILS

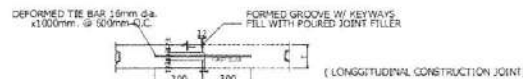
 REGIONAL OFFICE NO. VIII BARANG PULO, DAVAO	PROJECT NAME AND LOCATION SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR	SHEET CONTENTS PLAN FOR PILE DETAILS STEEL SHEET PILE U-TYPE DETAILS	PREPARED JAKE MARLB S. HECHANOYA ENGINEER (1381)	REVIEWED FELIX R. BACUS CHIEF ENGINEER AND DESIGN DIVISION	RECOMMENDED MA. MARGALITA C. ANIA, D.M. ASSISTANT REGIONAL DIRECTOR	APPROVED EDGAR B. TABACON, CESO IV REGIONAL DIRECTOR	SET NO. A	SHEET NO. 22
	EASTERN SAMAR LD	DATE	DATE	DATE	DATE	DATE	22 24	42



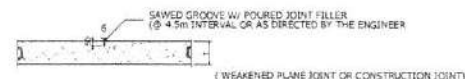
TYPICAL PLAN OF A FOUR-LANE UNDOVELED PAVEMENT

NOTE:

TRANSVERSE CONTRACTION (CONTACT) JOINT SHALL BE PROVIDED AT 1/4 OF ANY RUN WHERE LAYING OF CONCRETE HAS BEEN STOPPED FOR THIRTY (30) MINUTES LONGER.
ALL TRANSVERSE CONTRACTION JOINT SHOULD BE BUTT JOINTS WITH DOWELS.
SPACING (S1 AND S2) VARIES DEPENDING ON THE DISTANCE OF PAVEMENT TO CLOSE FREE EDGE.



DETAIL 'A' NOT TO SCALE



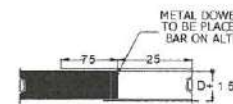
DETAIL 'B' NOT TO SCALE



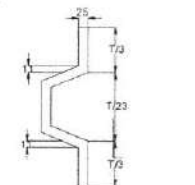
DETAIL 'C' NOT TO SCALE

SLAB THICKNESS (mm)	12mm Ø	16mm Ø
230	600	750
240	600	750
250	600	750
260	600	750
270	600	750
280	600	750
290	600	750
300	600	750
310	600	750
320	600	750
330	600	750
340	600	750

Based on AASHTO Guide for the Design of Pavement Structures 1993



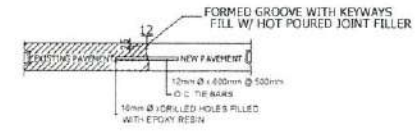
SECTION 1L METAL DOWEL CAP DETAIL NOT TO SCALE



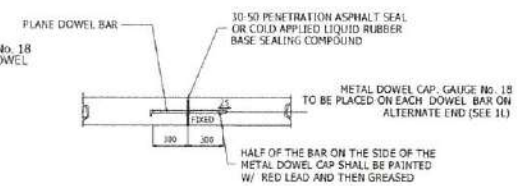
SECTION 1E METAL SIDE FORM (KEYED JOINT) DETAIL OF SIDE FORM NOT TO SCALE

SLAB THICKNESS (mm)	DIAMETER (mm)	SPACING, S2 (mm)
230	25	300
240	30	300
250	32	300
260	32	300
270	34	300
280	36	300

NOTE: DIAMETER AND SPACING OF PLAIN DOWEL BARS MAYBE MODIFIED AS LONG AS THE EQUIVALENT STEEL AREAS IS SUSTAINED.



SECTION 1I CONTRACTION JOINT TO BE USED FOR FLARING EXISTING CONCRETE PAVEMENT NOT TO SCALE



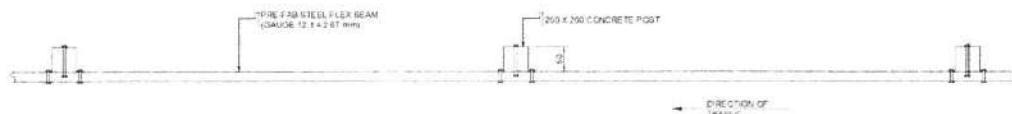
SECTION 1K EXPANSION JOINT NOT TO SCALE

GENERAL NOTES:

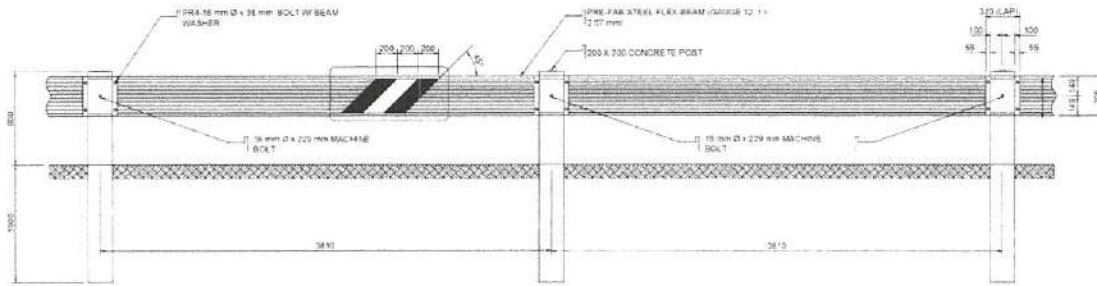
- MATERIALS AND WORKMANSHIP SHALL CONFORM WITH THE DPWH STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND AIRPORTS 2013 AND SPECIALS PROVISIONS.
- CONTRACTION (CONTACT) JOINTS ARE FORMED WHEN CONCRETE ON ONE SIDE OF THE JOINT IS POURED AHEAD AND ALLOWED TO SET BEFORE POURING ON THE OTHER SIDE.
- AT CONTRACTION JOINTS (LONGITUDINAL OR TRANSVERSE) CARE SHOULD BE TAKEN THAT NO CONCRETE FROM THE LAST SLAB PLACED OVERHANGS ANY PORTION OF THE FIRST SLAB.
- THE BARS SHOULD BE DEFORMED STEEL BARS. ALL THE DOWEL BARS BE SMOOTH ROUND STEEL BARS FREE FROM THE RUST AND OTHER THE DEFECTS WHICH MIGHT RESTRICT THEIR MOVEMENT.
- TYPE OF WEAKENED PLANE JOINT TO BE USED SHALL BE AS SPECIFIED IN THE PLANS AND ONLY ONE TYPE SHALL BE USED FOR THE WHOLE PROJECT.
- MATERIAL FOR THE METAL SIDE FORM SHALL BE BRAND NEW SHEET METAL GAUGE NO. 18 OF BLOCK IRON FREE FROM THE RUST AND KINKS.
- AT LEAST SIX (6) SUCCESSIVE DOWELED BUTT JOINTS AT NORMAL JOINT SPACING SHALL BE PROVIDED BEFORE OR AFTER IN EXPANSION JOINT.
- THE GROOVE OR TRACK ABOVE JOINTS (LONGITUDINAL OR TRANSVERSE) SHALL BE SEALED WITH 30-50 PENETRATION ASPHALT SEAL OR COLD APPLIED LIQUID RUBBER COMPOUND AFTER THE CONCRETE HAD BEEN CURED AND BEFORE OPENING THE PAVEMENT TO TRAFFIC. ASPHALT SEAL SHOULD BE POURED IN SUCH MANNER THAT SPILLING SHALL BE PREVENTED/ELIMINATED. THIS PROVIDE A SMOOTH RIDING SURFACE.
- ALL TRANSVERSE JOINTS, EXCEPT CONTRACTION JOINT, BE CONTINUOUS FROM THE EDGE TO EDGE.
- ALL LONGITUDINAL JOINTS SHALL MEET AT INTERSECTIONS WITH NO GAPS OR OFFSETS.
- ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED.
- AVOID STORAGE OF FORM WORKS ALONG CURVES.
- CONTRACT EXPANSION JOINT AT EVERY 90 METERS AND/OR AT EVERY ADJACENT EXISTING STRUCTURES.

1 STANDARD PORTLAND CEMENT CONCRETE PAVEMENT JOINTS

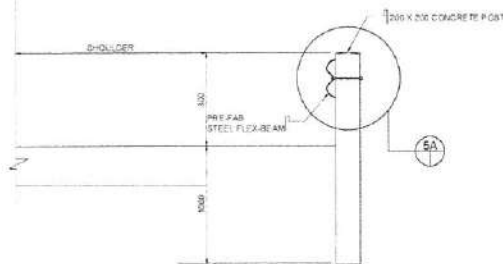
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. VIII BANGAL, PALO, LEYTE	PROJECT NAME AND LOCATION SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR	SHEET CONTENTS STANDARD PORTLAND CEMENT CONCRETE PAVEMENT JOINTS	PREPARED JAKE CHARLES S. HECHANOVA (11/26/23) (P. 0000)	REVIEWED FELIX R. ERASUS CHIEF, HIGHWAY DESIGN DIVISION DATE	DESIGNED AGNES M. BARONDA CHIEF, PLANNING AND DESIGN DIVISION DATE	RECOMMENDED MA. MARGARET D. SOLA, D.M. ASSISTANT REGIONAL DIRECTOR DATE	APPROVED EDGAR D. TABACON, CESOW REGIONAL DIRECTOR DATE	SET NO. A	SHEET NO. 23
	EASTERN SAMAR LD		23 24		42		23 24		42



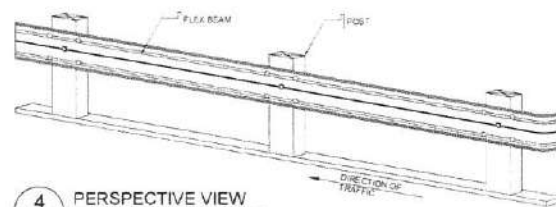
1 PLAN
SCALE NTS



2 ELEVATION
SCALE NTS



3 SECTION
SCALE NTS



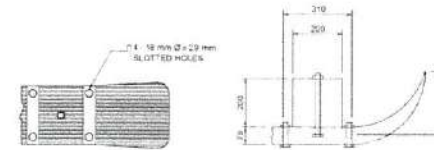
4 PERSPECTIVE VIEW
SCALE NTS

GENERAL NOTES:

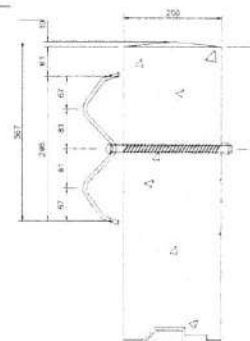
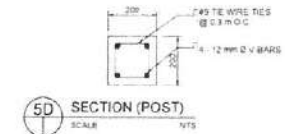
1. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES REVISION 2004.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. CONCRETE POST SHALL CONFORM WITH THE REQUIREMENTS OF CLASS 'C' CONCRETE AND REINFORCING STEEL.
4. GAUGE OF FLEX-BEAM GUARDRAIL SHALL BE AS INDICATED IN PLAN AND SPECIFICATIONS.
5. ALL NUTS SHALL BE WELDED TO THE BOLTS AFTER TIGHTENING.
6. ALL LAPS OF GUARDRAIL SHALL BE IN THE DIRECTION OF TRAFFIC FLOW.
7. PROVIDE ALTERNATING BLACK AND YELLOW BAND STRIPE REFLECTORIZED TO APPLIED ON FRONT FACE OF FLEX-BEAM FOR ADDITIONAL SAFETY AND MATERIAL PROTECTION AGAINST RUST.

TYPE	TYPE WIDTH (mm)	DEPTH OF CORR (mm)	CROSS SECTIONAL AREA (sq. mm)	WT PER LIN (kg)	WT OF 11.2 X 47 BOLTS FOR 1 SECTION (kg)	WT OF 11.2 X 47 BOLTS FOR 1 SECTION (kg)	WT PER LIN (kg)
STANDARD (GAUGE 12)	330	75.00	13.00	10.27	43.85	150	11.91
HEAVY DUTY (GAUGE 10)	330	75.00	15.50	11.27	50.00	150	14.56

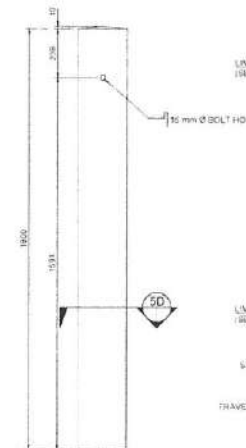
1 - 10 x 254 mm POST BOLT Ø 16 x 32 mm SPICE BOLT 16 mm WASHERS MULTIPLE BY LENGTH AND ADD 18.4 x kg (FOR 2 END WINGS AND BOLTS) TO OBTAIN TOTAL WEIGHT OF FLEX BEAM INSTALLED ON 3.81 m OF CENTER



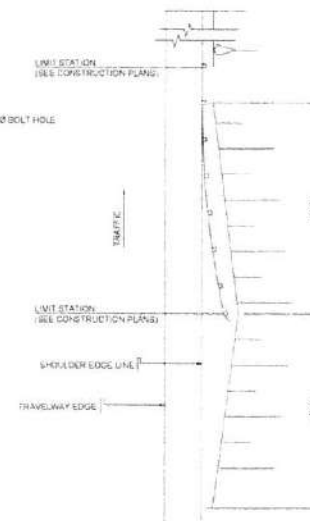
5B FLEX-BEAM END DETAIL
SCALE NTS



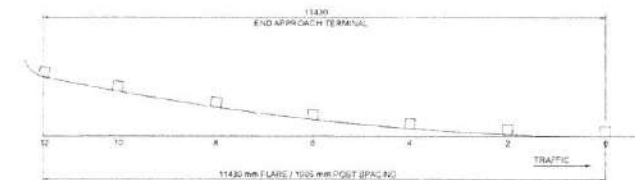
5A DETAIL
SCALE NTS



5C ELEVATION (POST)
SCALE NTS



5 FLEX-BEAM DETAIL
SCALE NTS



6 GUARDRAIL SET-OUT STANDARD
INSTALLATION FOR END TERMINAL
SCALE NTS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. VIII
BARANGAL, LEYTE

PROJECT NAME AND LOCATION
SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR
EASTERN SAMAR LG

SHEET CONTENTS
DETAIL FOR FLEX-BEAM

PREPARED
JAKE S. SANCHEZ, H. HERNANDEZ
PROJECT ENGINEER

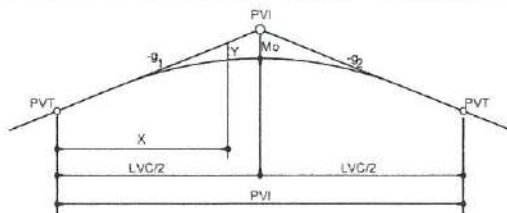
REVIEWED
FELIX R. JACOS
CHIEF HIGHWAY DESIGN DIVISION

RECOMMENDED
AGNES M. BARONDA
CHIEF PLANNING AND DESIGN DIVISION

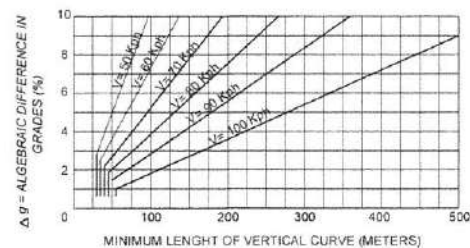
APPROVED
MA. MAMARITA C. UNIA, D.M.
ASSISTANT REGIONAL DIRECTOR

APPROVED
EDGAR B. TACURON, DESO IV
REGIONAL DIRECTOR

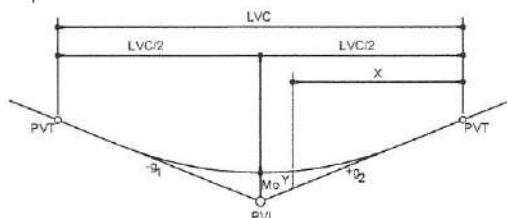
SET NO.
A
SHEET NO.
24
42



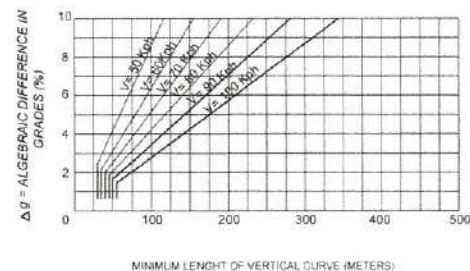
SYMMETRICAL VERTICAL PARABOLIC CURVES (CREST)



DESIGN CONTROL FOR VERTICAL CURVES (CREST)



SYMMETRICAL VERTICAL PARABOLIC CURVES (SAG)



DESIGN CONTROL FOR VERTICAL CURVES (SAG)

IN ANY VERTICAL PARABOLIC CURVE :

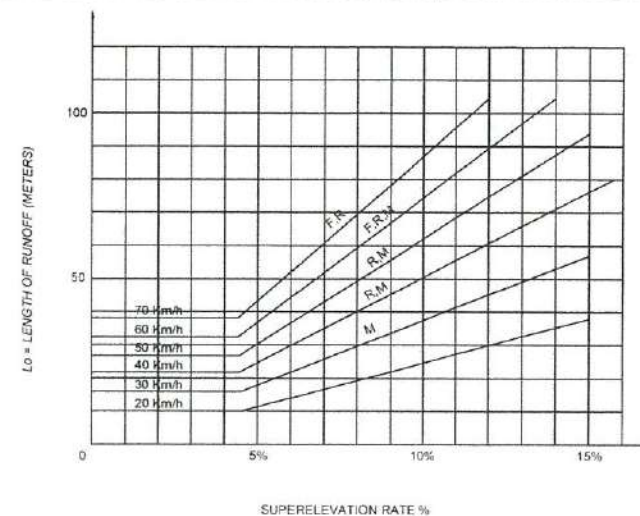
- $M_o = \frac{(g_1 - g_2) (LVC)}{800}$
- $M_o = \frac{1}{2} \left[\left(\frac{ELEV\ PVC + ELEV\ PVT}{2} \right) - ELEV\ PVI \right]$
- $Y = 4M_o$

LEGEND

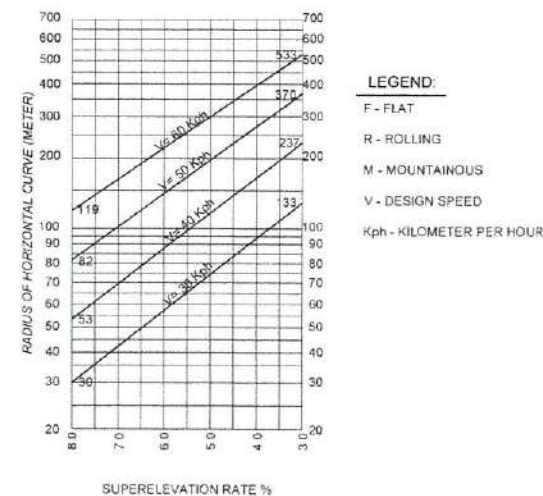
- PVI - POINT OF VERTICAL INTERSECTION
PVC - POINT OF VERTICAL CURVATURE
PVT - POINT OF VERTICAL TANGENCY
LVC - LENGTH OF VERTICAL CURVES - METER
Mo - MIDDLE ORDINATE
g1 g2 - GRADE RATES PERCENT
X - DISTANCE FROM PVC OR PVT TO ANY POINT ON CURVE - METERS
Y - VERTICAL OFFSET AT DISTANCE X - METERS

NOTES:

- GRADES ASCENDING FORWARD ARE POSITIVE, GRADES DESCENDING FORWARD ARE NEGATIVE
- NO VERTICAL CURVE IS REQUIRED WHEN THE ALGEBRAIC DIFFERENCE IN GRADE IS 0.5% OR LESS

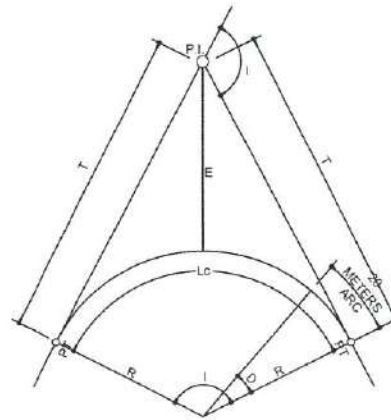


SUPERELEVATION RUNOFF CHART



DESIGN SUPERELEVATION RATES

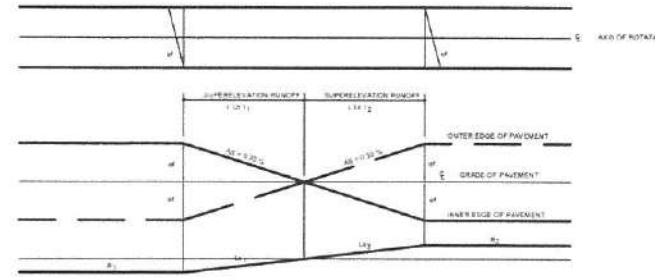
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO VIII BAGUIO, PANGASINAN	PROJECT NAME AND LOCATION SIPAG - COASTAL ROADS AUGMENT RESILIENCY OF COASTAL COMMUNITIES - CONSTRUCTION OF COASTAL ROAD, BARANGAY GARDEN, POBLACION, ARTECHE, EASTERN SAMAR	SHEET CONTENTS GEOMETRIC DESIGN STANDARD FOR VERTICAL (PARABOLIC CURVE) AND SUPERELEVATION CHART	DESIGNED JAKE CHARLES S. HICHANOVA ENGINEER (1380)	REVIEWED FELIX R. BACUS CHIEF, TECHNICAL DIVISION DATE	APPROVED AGNES M. BARONDA CHIEF, PLANNING AND DESIGN DIVISION DATE	RECOMMENDED MA. MARGARITA E. JUNIA, D.M. ASSISTANT REGIONAL DIRECTOR DATE	APPROVED EDGAR B. TAPACON, CESO IV REGIONAL DIRECTOR DATE	SHEET NO. A 25 SHEET NO. 42
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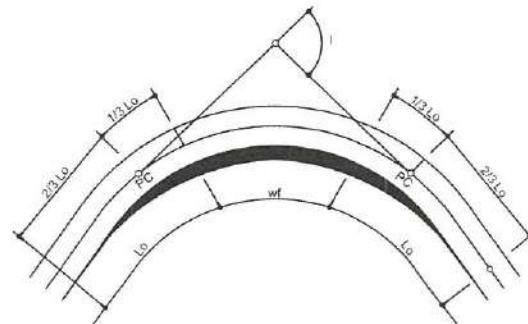
HORIZONTAL CURVE (CIRCULAR)

LEGEND

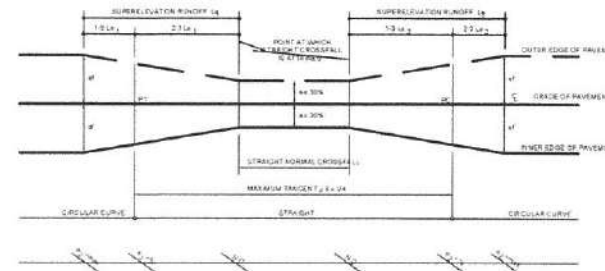
- wf - FULL WIDENING
- PI - POINT OF INTERSECTION
- I - INTERSECTION ANGLE (CENTRAL ANGLE)
- T - TANGENT DISTANCE
- R - HORIZONTAL RADIUS
- Lc - LENGTH OF CIRCULAR CURVE
- E - EXTERNAL DISTANCE
- D - DEGREE OF CURVE (ARC DEFINITION)
- PC - POINT OF CURVATURE
- PT - POINT OF TANGENCY
- L - LENGTH OF SUPERELEVATION RUNOFF
- La - LENGTH OF SUPERELEVATION RUNOFF
- wf - FULL SUPERELEVATION
- X - LENGTH BETWEEN SUPERELEVATION 0% & 4% N.C.
- ΔS - SLOPE OF EDGE OF PAVEMENT IN % RELATIVE TO
- Vd - DESIGN SPEED
- N.C. - NORMAL CROSSFALL



CASE 2
TRANSITION: CIRCULAR CURVE - REVERSED CIRCULAR



METHOD OF WIDENING



CASE 3
TRANSITION: CIRCULAR CURVE - STRAIGHT - CIRCULAR CURVE

NOTES:

- FOR EFFECTIVE DRAINAGE Δ S HAS TO BE > 0.30%
- WHERE Δ S < 0.30% A SPECIAL METHOD OF SUPERELEVATION TRANSITION HAS TO BE ADOPTED AS INDICATED IN THE DOTTED LINE
- ROUNDING OFF ONLY NECESSARY IF Δ S > 0.50%

Vd	≤50 Km/h	80 Km/h	≥80Km/h
R	500 m	1,000 m	2,000 m

- of CAN BE TAKEN FROM CHART OF SUPERELEVATION RATE
- SUPERELEVATION CAN BE ATTAINED BY REVOLVING THE PAVEMENT ABOUT THE CENTERLINE PROFILE
- THE SLOPE OF THE SIDEWALK SHALL ALWAYS FALL TOWARDS THE TRAVELED WAY. THE SLOPE OF THE SHOULDER SHALL ALWAYS FALL IN THE DIRECTION OF THE OUTSIDE EDGE OF TRAVELED WAY
- WHEN SUPERELEVATION IS LARGER THAN 4% THEN THE SLOPE OF LOWER SHOULDER SHALL BE THE SAME FOR THE TRAVELED WAY
- WHEN THE SUPERELEVATION IS LESS THAN 8%, THE HIGHER SHOULDER SHALL HAVE A SLOPE OF 4% OR 5% FOR PAVED AND UNPAVED SHOULDER RESPECTIVELY
- IF THE SUPERELEVATION VARIES FROM 6% TO 8% (BEING THE MAXIMUM PERMITTED IN GEOMETRIC STANDARD FOR THE SECONDARY ROAD) THEN THE SLOPE OF THE HIGHER SHOULDER VARY FROM 4% TO 2% THE ALGEBRAIC SUM OF THE SLOPES OF TRAVELED WAY AND THE SHOULDER WHEN SUPERELEVATED SHALL ALWAYS BE EQUAL TO 10%
- USE CASE 3 WHEN MINIMUM TANGENT BETWEEN CURVES IS GRATER THAN $\frac{2}{3} (L_o + L_o)$
- NO HORIZONTAL CURVE IS REQUIRED WHEN THE INTERSECTION I (CENTRAL ANGLE) IS LESS THAN ONE DEGREE (1°)

RADIUS (m)	DESIGN SPEED (km/h)							COMMENTS
	40	50	60	70	80	100	120	
50	1.75							THE VALUES GIVEN IN THE TABLE ARE VALID FOR CARRIAGEWAY WIDTH OF 8.1 METERS FOR 7.00 METERS THE GIVEN VALUES ARE TO BE REDUCED BY 0.75 m AND 0.25 m RESPECTIVELY WHERE A SHOULDER (CANT) NUMBER OF SPECIALLY LARGE VEHICLES IS ENCOUNTERED EXTRA WIDENING MAY HAVE TO BE CONSIDERED VALUES LESSER THAN 0.5 MAY BE DISREGARDED THE WIDENING IS ATTAINED LINEARLY OVER THE WHOLE SUPERELEVATION RUN OFF AND APPLIED ON THE INSIDE OF THE CURVE
60	1.50	1.50						
80	1.50	1.50						
100	1.50	1.50						
125	1.25	1.25	1.25					
150	1.00	1.25	1.25					
160	1.00	1.25	1.25	1.25				
200	0.75	0.75	1.00	1.00	1.25			
250	0.75	0.75	1.00	1.00	1.00			
300	0.75	0.75	1.00	1.00	1.00			
400	0.50	0.75	0.75	0.75	1.00	1.00		
500	0.50	0.50	0.75	0.75	1.00	1.00		
600	0.50	0.50	0.75	0.75	1.00	1.00		
800		0.50	0.50	0.75	0.75	1.00		
1200				0.50	0.75	0.75		
1200	N.C. WIDENING				0.50	0.75	0.75	
1400					0.75	0.75		

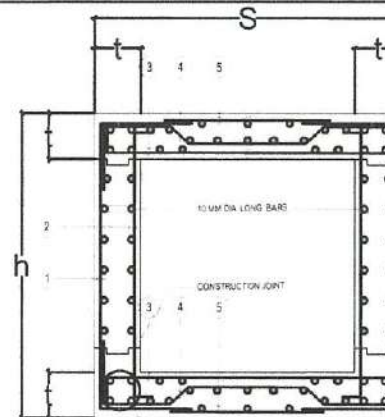
WIDENING OF CURVES



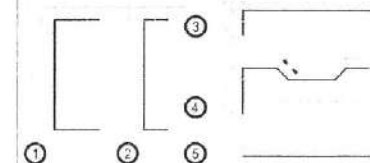
STATION LIMITS		TOTAL LENGTH	LOCATION
0+040.00	0+234.00	194.00	L/S



NOTE (STONE MASONRY)
PRIOR TO CONSTRUCTION CONDUCT SOIL BEARING INVESTIGATION IN ACCORDANCE WITH THE STANDARD TESTING REQUIREMENT ALONG THE ALIGNMENT OF STONE MASONRY WALL TO VERIFY THE REQUIRED DESIGN SOIL BEARING CAPACITY OF THE FOUNDATION BED.
ALLOWABLE SOIL BEARING CAPACITY (qa) = 186 kPa



BAR BENDING DIAGRAM
COVERED CANAL

HYDROLOGIC ANALYSIS AND HYDRAULIC PARAMETERS
COVERED CANAL

DESIGN STORM FREQUENCY	=	25 years
COEFFICIENT OF RUN-OFF, C	=	0.30
RAINFALL INTENSITY, I	=	85.526 mm/hr
CATCHMENT AREA, A	=	6.123 sq km
RUN-OFF DISCHARGE, Q_0	=	43.675 cu m/sec
HEIGHT, H	=	3.00 m
BASE, B	=	6.00 m
FREE BOARD	=	0.30 m
DEPTH, H_1	=	2.70 m
SLOPE, S	=	0.0100
ROUGHNESS COEFFICIENT, n	=	0.018
WETTED PERIMETER, P	=	11.40
HYDRAULIC RADIUS, R	=	1.42
VELOCITY, V	=	3.74 m/s (V_1)
DESIGN DISCHARGE, Q_0	=	60.59 cu m/sec
INLET CONTROL HW (R/CBC)	=	1.60
OUTLET VELOCITY HW (R/CBC)	=	0.70
OUTLET VELOCITY (R/CBC)	=	3.17 m/s (V_0)

NOTE:

LEGEND:

FOR WALL THICKNESS LESS THAN 2 M, STAGGER	2	=	CONCRETE CLEAR COVER (SEE
HORIZONTAL REINFORCEMENT AS SHOWN	3	=	CLEAR HEIGHT
	4	=	SPAN OR WIDTH OF CULVERT
	5	=	THICKNESS

DESIGN: A MAJOR STANDARD SPECIFICATION OF HIGHWAY BRIDGE CONSTRUCTION

DESIGN LIAISON
TYPE: LAMPING SYSTEMS, 1994

ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4,000 PSI. THERE SHALL BE SUFFICIENT STRENGTH TO BE GUARANTEED 21 DAYS AFTER CASTING. JOINTS ARE TO BE MADE EXACTLY WHERE SHOWN. WHEN EXISTING SLABS ARE TO BE ABRADED AND REPAIRED, THE NEW SLAB IS TO BE 4" THICK AND CONTAIN 4" DIA. BARS.

[illegible]

EXISTING CURB/STREET LINE WITH STREETSIDE WATERFALL: WHEN EXISTING WALLS ARE FOUND TO BE SURFACE OR THE UPPER SIDE SHALL FOLLOW THE CURB OR ENGRAVED HIGHWAY. IN SUCH CASES, WALLS CAN BE CONSTRUCTED IN A LAYER OF 1.5M CONCRETE OR STONE/MASTIC BACKFILL.

THE LOAD ESTIMATED ON REINFORCEMENT WHEN THERE IS LESS THAN 100 MM OF FILL ABOVE TOP SLAB OF CONCRETE. ADDITIONAL TRUCKS ARE NOT ALLOWED BECAUSE REINFORCEMENT IS ADDED TO THE BOTTOM OF THE SLAB IN ACCORDANCE WITH 1.3.2.E.

MAXIMUM HEIGHT OF FLAG IS GIVEN ABOVE TOP LAMB FOR HEIGHT OF FLAG. GREATER THAN ZERO INDICATES A FLAG OF POSITIVE HEIGHT. SMALLER THAN ZERO INDICATES A FLAG OF NEGATIVE HEIGHT.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED

ADDITIONAL NOTE

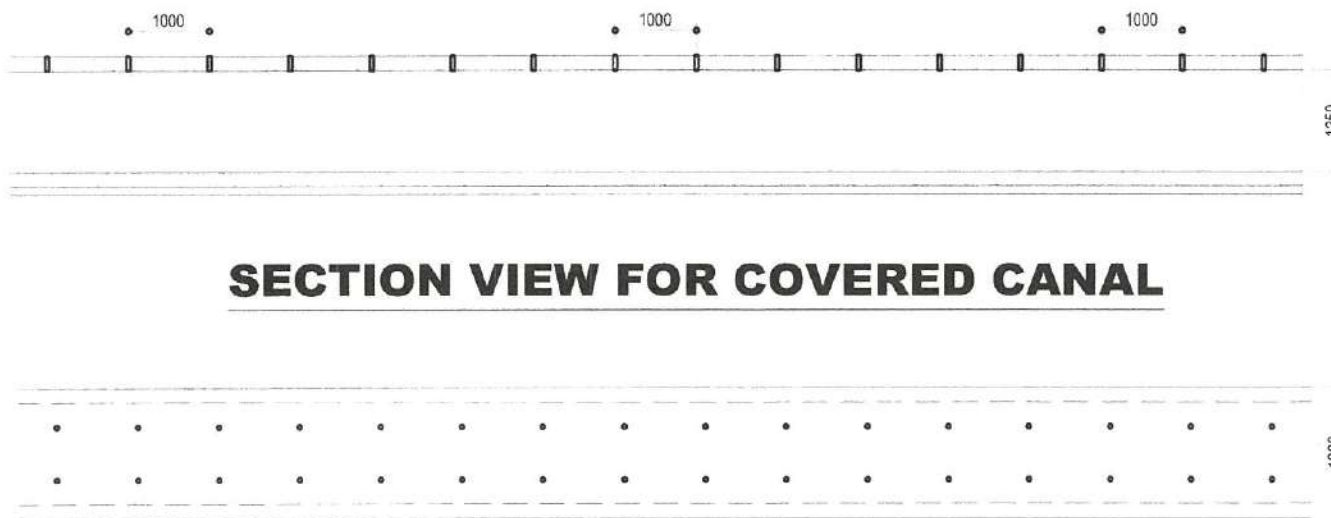
[illegible]

2. CLAMPING DECK COVER (1.5mm)
 2. FILL IN DECK SLAB CONCRETE AND INCREASE BY 5mm.

THE FOLLOWING ARE THE OFFICIAL ALTERNATE
SINGLE SAMPLE, 1ST 540
TWO SAMPLE, & THREE SAMPLE, 64 560, 580

4. THE CONTRACTOR SHALL BASE ON THE DETAILS & SUBMIT SHOP DRAWING FOR APPROVAL BY PROJECT ENGINEER.

SECTION VIEW FOR COVERED CANAL



TOP VIEW FOR COVERED CANAL

SCALE

NTS



REPUBLIC OF THE PHILIPPINES
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EASTERN SAMAR LD

DETAILS OF CONCRETE CURB &
CONCRETE LINED CANAL W/ COVER

PREPARED: 
JAKE CHARLES S. HECHANOV

REVIEWED: 
FELIX R. BACUS
CHIEF, ANTI-MONEY LAUNDERING SECTION

AGNES M. BARONDA
CHIEF, PLANNING AND DESIGN DIVISION

RECOMMENDED

MA. MARGARITA C. JULIA, D.A.
ASSISTANT TO THE CHIEF OF POLICE

APPROVED

~~EDGAR B. TABACON, CESO~~

SET NO	SHEET
A	20