1:44 PM 4/8/25 25HF00095

REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

CEBU 2ND DISTRICT ENGINEERING OFFICE

POBLACION DALAGUETE, CEBU, REGION VII

C.Y. 2025 PROJECT

DETAILED ENGINEERING DESIGN PLAN FOR

CONCRETING OF BRGY. SALUG TO BRGY. MANLAPAY FMR, BRGY. MANLAPAY, DALAGUETE, CEBU

STA 000 + 000.00 - STA 000 + 458.00

ARGAO, CEBU

NET LENGTH = 458.00 M.

SUBMITTED:

LENARD A. PANUGALINOG
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

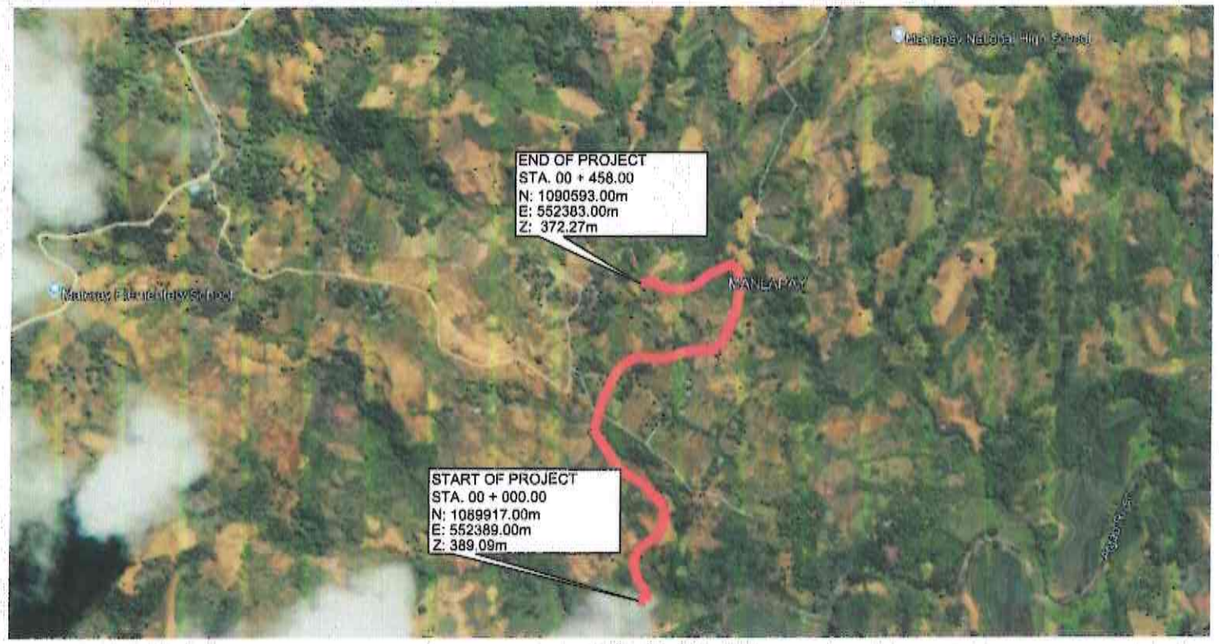
ROSALIND R. VASQUEZ
OIC-ASSISTANT DISTRICT ENGINEER

DATE:

SUBMITTED:

SUSAN L. ORNOPIA-AROA
OIC-DISTRICT ENGINEER

DATE:

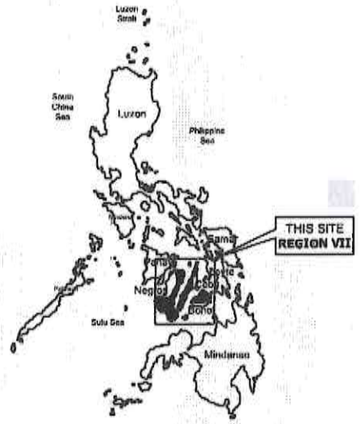


1 / A-2 / 2 VICINITY MAP
SCALE: NTS

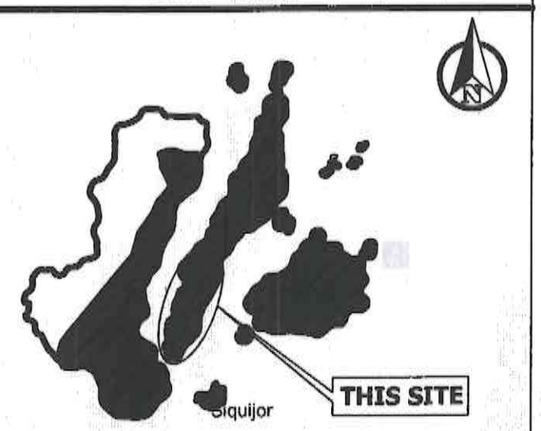
INDEX OF SHEETS		
SET	SHEET NO.	SHEET CONTENTS
A	1	COVER SHEET
	2	LOCATION PLAN, PROJECT LENGTH DATA, INDEX OF SHEET, KEY MAP, LOCATION MAP AND VICINITY MAP
	3	SUMMARY OF QUANTITIES
B	4-5	GENERAL NOTES (SPECIFICATION, DESIGN CRITERIA, SYMBOLS, ABBREVIATIONS & LEGENDS)
	6-7	CONSTRUCTION METHODOLOGY
	8-9	TYPICAL ROAD SECTION DESIGN
	10-11	PORTLAND CEMENT CONCRETE PAVEMENT JOINT DETAILS
	12	GEOMETRIC DESIGN - HORIZONTAL AND VERTICAL CURVES DETAIL
	13-14	GEOMETRIC DESIGN - SUPERELEVATION
	15	PCCP MARKINGS DETAILS
	16	SLOPE PROTECTION - STONE MASONRY DETAILS
C	17	DPWH STANDARD PROJECT BILLBOARD
	18-19	FMR ROAD MARKER DETAILS
	20-21	TRAFFIC MANAGEMENT PLAN - ROAD WORK SITE TEMPORARY SIGNAGE
	22	TRAFFIC MANAGEMENT PLAN - PROPOSED TRAFFIC MANAGEMENT LAYOUT
	23-28	TRAFFIC MANAGEMENT PLAN - ROAD CONSTRUCTION TABLE
D	29	TOPOGRAPHIC PLAN
	30	PLAN AND PROFILE
	31-34	CROSS - SECTION

PROJECT LENGTH DATA

TYPE	STATION (LIMITS)	LENGTH
PCCP	STA. 0+000 TO STA. 0+458.00	458.00M
STONE MASONRY	STA. 0+100 TO STA. 0+115, STA. 0+130 TO STA. 0+145, STA. 0+155 TO STA. 0+190, STA. 0+190 TO STA. 0+210, STA. 0+210 TO STA. 0+225, STA. 0+235 TO STA. 0+245, STA. 0+255 TO STA. 0+270, STA. 0+270 TO STA. 0+290, STA. 0+410 TO STA. 0+430	165.00M
NET LENGTH (PCCP)		458.00M
NET LENGTH (STONE MASONRY)		165.00M
PAVEMENT WIDTH		6.10M
SHOULDER WIDTH		0.50M (each side)
PAVEMENT THICKNESS		230MM
ROAD SECTION ID		LOCAL ROADS

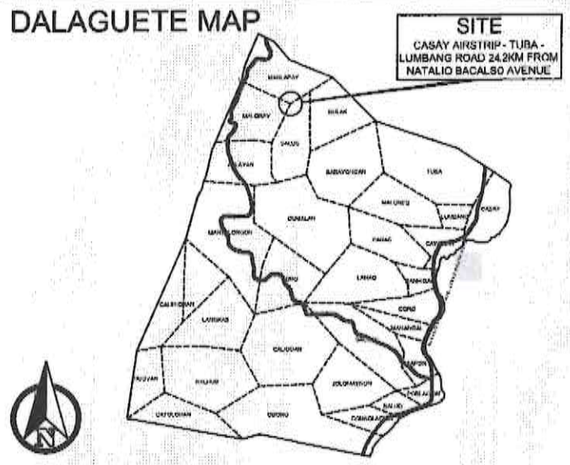


KEY MAP



REGION VII MAP

LOCATION MAP



VICINITY MAP

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII

CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:

SHEET CONTENTS:
INDEX OF DRAWINGS
PROJECT INFORMATION SHEET
LOCATION PLAN
KEY MAP, LOCATION MAP, VICINITY MAP

DRAFTED: JERAHFELLE D. SAYSON, ENGINEER I
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II

REVIEWED: TEDDIE B. YAP, ENGINEER II, DATE :

SUBMITTED: LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :

RECOMMENDED: ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :

APPROVED: SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :

SET NO: A 02|03

SHEET NO.: 02 / 34

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	REMARKS
A.1.1 (8)	Provision of Field Office for the Engineer (Rental Basis)	2.76	month	
A.1.1 (16)	Operation and Maintenance of Field Office for the Engineer	2.76	month	
B.4 (10)	Miscellaneous survey and staking	1.00	L.S.	
B.5	Project Billboard/Signboard	3.00	each	
B.7 (2)	Occupational Safety and Health Program	1.00	L.S.	
B.8 (1)	Traffic Management	2.76	month	
B.9	Mobilization/Demobilization	1.00	L.S.	
B.16	Recognition Plate/Project Marker	2.00	each	
102(2)	Surplus Common Excavation	3,739.75	cu.m.	
103(1)a	Structure Excavation, Common Soil	447.00	cu.m.	
104(1)a	Embankment from roadway/structure excavation, Common Soil	386.87	cu.m.	
105(1)a	Subgrade Preparation, Common Material	3,251.80	sq.m.	
200(1)	Aggregate Subbase Course	650.40	cu.m.	
311(1)c1	Portland Cement Concrete Pavement (Unreinforced), 0.23m thk., 14 days	3,251.80	sq.m.	
506(1)	Stone Masonry	892.60	cu.m.	
612(1)	Reflectorized Thermoplastic Pavement Markings White	114.50	sq.m.	

PLEASE BE NOTED THAT THE QUANTITIES ARE SUBJECT TO INCREASE OR DECREASE AS PER ACTUAL ACCOMPLISHMENT

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:
R.C. TELFORD
CONSTRUCTION OF BRGY. SALING TO BRGY. MANLAPAY PUR, BRGY. MAIB APAY, DALAGUETE, CEBU
NET LENGTH = 458.00 M

SHEET CONTENTS:
SUMMARY OF QUANTITIES

DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
JERAHFELLE D. SAYSON ENGINEER I					A 03 03	03 34
PREPARED: KEVIN JOSHUA A. TAMANAHA ENGINEER II	TEDDIE B. YAP ENGINEER II DATE :	LENARD A. PANUGALINOG CHIEF, PLANNING AND DESIGN DATE :	ROSALIND R. VASQUEZ OIC-ASSISTANT DISTRICT ENGINEER DATE :	SUSAN L. ORNOPIA-AROA OIC-DISTRICT ENGINEER DATE :		

GENERAL NOTES

CARRIAGE-WAY (ROADS, DRAINAGE AND STRUCTURES)

CERTIFICATION

This is to certify that the Detailed Engineering Surveys and Designs for the project ***CONCRETING OF BRGY. SALUG TO BRGY. MANLAPAY FMR, BRGY. MANLAPAY, DALAGUETE, CEBU*** *with Project ID No. _____ had been conducted in accordance with the DPWH Standards and Specifications, 2013 edition.*

This Certification is being issued for all legal intents and purposes.
Given this _____ day of _____, year _____.

LENARD A. PANUGALINOG
Chief, Planning and Design Section

1. **DESIGN SPECIFICATIONS**
ALL WORKS SHALL COMPLY WITH THE DPWH DESIGN GUIDELINES, CRITERIA & STANDARDS (DGCS) OF 2015 VOLUME 4 - HIGHWAY DESIGN AND SPECIAL PROVISIONS / SUPPLEMENTAL SPECIFICATIONS SPECIFICALLY PREPARED FOR THE PROJECT.

2. **PROJECT CONTROLS & REFERENCES**
a.) HORIZONTAL CONTROL FOR THE PROJECT WITH CORRESPONDING TECHNICAL DESCRIPTIONS ARE AS SHOWN ON THE PLANS VERTICAL CONTROLS FOR THE PROJECT WITH CORRESPONDING ELEVATIONS AND DESCRIPTION ARE AS SHOWN ON THE PLANS.
b.) ROAD ENG'G SURVEY WAS UNDERTAKEN ON JANUARY 2025.
c.) GEOTECHNICAL INVESTIGATIONS AND REPORTS WAS UNDERTAKEN BY QAS OF THE DPWH CEBU 2ND DISTRICT ENGINEERING OFFICE.

3. **SURVEY DATA**
FIELD DATA OF THIS PROJECT IS BASED ON ACTUAL SURVEY CONDUCTED BY THE SURVEY TEAM OF THE DPWH CEBU 2ND DISTRICT ENGINEERING OFFICE.

4. **SOIL TESTING**
THE ACTUAL CBR SHALL BE VERIFIED AND VALIDATED PRIOR TO CONSTRUCTION BY UNDERTAKING AUGER HOLE/TEST PITTING IN ACCORDANCE WITH THE DESIGN GUIDELINES, CRITERIA AND STANDARDS.

7. **DIMENSIONS**
DIMENSIONS ARE EXPRESSED IN MILLIMETER WHILE DISTANCES AND ELEVATIONS ARE IN TERMS OF METER, UNLESS OTHERWISE SPECIFIED.

8. **STATIONING**
a.) THE ROAD STATIONS & ELEMENTS OF CURVES ARE RELATIVE TO THE ULTIMATE CENTERLINE OF THE ROAD.
b.) EQUATION OF STATIONS WHEN USED (BACK STATION/ AHEAD STATION) ARE PROVIDED AT THE BEGINNING OR END OF THE CURVE AND/OR AT FULL STATION.
c.) THE STATION AT THE BEGINNING OF THE PROJECT WAS ESTABLISHED AND RECKONED FROM THE EXISTING KILOMETER POST & HAS INO RELATION WITH INTERSECTING ROAD.
d.) STATIONING ARE RECKONED FROM THE KILOMETER POST ALONG NATALIO BACALSO AVENUE ROAD.

9. **STANDARD DRAWINGS :**
THE NECESSARY DRAWINGS CONTAINED IN THE DPWH STANDARD DRAWINGS FOR ROADS AND BRIDGES SHALL BE UTILIZED FOR THE PROJECT UNLESS OTHERWISE A MORE DETAILED DRAWING IS SPECIFIED AND / OR PROVIDED AND APPROVED.

10. **STAKE OUT SURVEY & PLAN**
PRIOR TO THE COMMENCEMENT OF THE ACTUAL CONSTRUCTION, AN AS-STAKED SURVEY SHALL BE CONDUCTED BY THE WINNING BIDDER IN COORDINATION WITH THE IMPLEMENTING OFFICE CONCERNED WHEREIN THE RESULTING PLAN AS-STAKED PLAN SHALL BE APPROVED BY THE PROPER AUTHORITIES. BEFORE THE START OF ACTUAL CONSTRUCTION, THE AS-STAKED PLAN SHOULD BE SUBMITTED TO THE DISTRICT OFFICE IN ORDER THAT IMMEDIATE STEPS MAY BE UNDERTAKEN TO CORRECT OR ADJUST WHATEVER APPRECIABLE DEVIATION THERE MAY BE FROM THE ORIGINAL PLAN.

11. **RIGHT OF WAY**
ROAD CLASSIFICATION SHALL DICTATES THE RIGHT OF WAY LIMITS.

12. **ROAD CONNECTIONS & PRIVATE ENTRANCES:**
a.) APPROACHES & ROAD CONNECTIONS SHALL BE CONSTRUCTED BY THE CONTRACTOR AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEERS IN THE SUCH MANNER TO ENSURE SMOOTH CONNECTIONS &RIDING QUALITY.
b.) DESIGN OF THE ROAD WAS BASED ON THE FINAL HIGHWAY LOCATION SURVEY.
c.) WIDENING ON CURVES SHALL BE DETERMINED BY THE ENGINEERS IN-CHARGE TO SUIT EXISTING FIELD CONDITION.

13. **TREE PLANTING :**
FOR TREE PLANTING PLEASE REFER TO DEPARTMENT ORDER (D.O.) No. 73 SERIES 2014.

14. **REMOVAL OF EXISTING STRUCTURES AND OBSTRUCTION**
a.) ALL WORKS SHALL COMPLY WITH ITEM 101 OF THE STANDARD SPECIFICATION FOR HIGHWAYS, BRIDGES AND AIRPORTS EDITION.
b.) RESPECTED OWNERS WILL BE GIVEN PRIORITY TO TAKE ACTION IN THE REMOVAL OF THEIR HOUSES, FENCES, ELECTRICAL POLES AND OTHER UTILITIES.
c.) PORTIONS OF EXISTING UTILITIES SUCH AS POWER LINES,WATER MAINLINES, TELEPHONE TRUNK LINES, ETC. THAT MAY OBSTRUCT THE CONSTRUCTION OF THIS PROJECT, SHALL BE RELOCATED BY THE ENTITY OR OWNERS CONCERNED. EXTREME PRECAUTION SHALL BE EXERCISED BY THE CONTRACTOR NOT TO DAMAGE ANY PORTION OF THE EXISTING PUBLIC UTILITIES DURING CONSTRUCTION. ANY DAMAGE THEREOF SHALL BE ON THE ACCOUNT OF THE CONTRACTOR.
d.) IN PORTIONS WHERE THERE ARE EXISTING DETERIORATED ASPHALT OVERLAY, THIS SHALL BE SCARIFIED TOTALLY BEFORE PLACING THE REQUIRED OVERLAY TO ENSURE PROPER BOND. THIS WORK SHALL BE CONSIDERED SUBSIDIARY WORK PERTAINING TO CONTRACT PAY ITEMS.
e.) ANY REMOVAL OF MISCELLANEOUS STRUCTURES THAT MAY BE REQUIRED SHALL BE CONSIDERED SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEM. NO DIRECT PAYMENT SHALL BE MADE FOR THIS WORK EXCEPT WORK PERTAINING TO OTHER CONTRACT ITEM. NO DIRECT PAYMENT SHALL BE MADE FOR THIS WORK EXCEPT FOR SPECIFIC ITEMS EXPLICITLY IDENTIFIED FOR PAYMENT IN BID SCHEDULE.
f.) THE REMOVAL OF HOUSES, FENCES, ELECTRICAL POLES AND OTHER PUBLIC UTILITIES WILL NOT BE THE RESPONSIBILITY OF THE CONTRACTOR, THESE SHALL BE REMOVED BY THE RESPECTIVE OWNERS OR BY THE DPWH PRIOR TO THE CONSTRUCTION. PORTIONS OF EXISTING UTILITIES SUCH AS POWER LINES, WATER MAINS, TELEPHONE TRUNK LINES, ETC. THAT MAY OBSTRUCT THE CONSTRUCTION OF THIS PROJECT, SHALL BE RELOCATED BY THE ENTITY OR OWNERS CONCERNED. EXTREME PRECAUTION SHALL BE EXERCISED BY THE CONTRACTOR NOT TO DAMAGE ANY PORTION OF THE EXISTING PUBLIC UTILITIES DURING CONSTRUCTION. ANY DAMAGE THEREOF SHALL BE ON THE ACCOUNT OF THE CONTRACTOR

15. **HORIZONTAL ALIGNMENT & GRADES**
a.) THE HORIZONTAL ALIGNMENT SHOWN IN THESE DRAWINGS FOLLOWS THE LONGITUDINAL JOINT OF PCCP. PAVEMENT (WHICH IS DEFINED AS THE EXISTING CENTERLINE) WITH MINOR DEVIATION DUE TO MAINLY SOME CONSTRUCTION ERRORS DURING ORIGINAL CONSTRUCTION STAGE. MINOR ADJUSTMENT OF THE HORIZONTAL ALIGNMENT MAY BE MADE AS DIRECTED BY THE ENGINEER TO SUIT TO THE EXISTING CENTERLINE, PARTICULARLY FOR THE A.C OVERLAY SECTIONS.
b.) HORIZONTAL TRANSITIONS FOR ROADWAY TAPERING/ WIDENING SHALL BE APPLIED AS SHOWN ON THE PLANS.

16. **EXCAVATION**
WHEN SOIL AT LOWER PORTION OF THE SLOPE IS REQUIRED TO BE REMOVED, EXCAVATION SHOULD BE DONE AT THE HEAD PORTION FIRST PROGRESSING TOWARDS THE BOTTOM IN ORDER TO MAINTAIN THE STABILITY OF LANDSLIDE AND SLOPE FAILURE AREA.

17. **UNSUITABLE MATERIALS**
a.) UNSUITABLE MATERIALS BELOW THE SUB GRADE SHALL BE EXCAVATED TO A REQUIRED DEPTH & WIDTH AS INDICATED IN THE PLANS OR AS DIRECTED BY THE ENGINEERS, BASED ON THE LABORATORY TEST RESULT BE REPLACED WITH APPROVED MATERIALS.

18. **THICKNESS & WIDTH DETERMINATION**
THE THICKNESS & WIDTH OF THE PORTLAND CEMENT CONCRETE PAVEMENT (PCCP) , AND SUBBASE COURSE ARE RECKONED FROM A DESIGN ANALYSIS IN CONFIRMITY WITH THE PROVISIONS OF DEPARTMENT ORDER NO. 22 SERIES OF 2011.

19. **CALCULATIONS OF WORK**
REFER TO A SEPARATE QUANTITY CALCULATION SHEETS FOR THE DETAILED COMPUTATIONS OF QUANTITIES OF THE ITEMS OF WORK OUTLINED FOR THIS PROJECT.

20. **CONCRETE**
a.) UNLESS OTHERWISE INDICATED ON PLANS, THE CONCRETE CLASS AND STRENGTH SHALL BE IN ACCORDANCE WITH THE HIGHWAYS and BRIDGES SPECIFICATIONS.

CLASS	28 DAYS CYLINDER STRENGTH		MAX SIZE OF COARSE AGGREGATES mm (in)
	MPa	Psi	
A	20.7	3000	38 (1-1/2)
B	16.50	2400.00	50 (2)
C	20.70	3000.00	12.7 (1/2)
P	37.70	5000.00	19 (3/4)
LEAN	9.90	1400.00	

21. **REINFORCING STEEL BARS :**
a.) REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615), GRADE 40 FOR BARS 16mm AND SMALLER (40 000psi) fy=275.80 Mpa, AND FOR BARS GREATER THAN 16mm Ø GRADE 60 (60,000psi) Fy = 414 Mpa

BAR BENDING, SPLICING AND PLACING

(i) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL OF SHOP DRAWINGS INDICATING THE BENDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS. THE CONTRACTOR SHALL CALCULATE THE EXACT CUTTING LENGTH OF STEEL BARS USING WELL KNOWN FORMULA (SUCH AS BS 8666 : 2005 FOR INSTANCE)

(ii) BARS SHALL BE BENT COLD. BARS PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT UNLESS PERMITTED BY THE ENGINEER.

(iii) UNLESS APPROVED BY THE ENGINEER. NO SPLICES SHALL BE PERMITTED ON BEAMS AND GIRDERS WHERE CRITICAL BENDING MOMENT OCCURS. STAGGER SPLICES BETWEEN ADJACENT BARS AT A MINIMUM DISTANCE OF 40-BAR DIAMETER.

22. **STONE / RUBBLE MASONRY**
STONE FOR RUBBLE / STONE MASONRY SHALL BE OF APPROVED QUALITY, DURABLE AND FREE FROM DIRT, OIL OR ANY INJURIES OR DEFECTS WHICH CAN AFFECT THE PROPER ADHESION OF THE CONCRETE. IT SHALL HAVE A THICKNESS OF NOT LESS THAN 150mm. AND A LENGTH OF NOT MORE THAN 300mm. STONES SHALL BEDDED IN CLASS 'B' CONCRETE.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
[illegible] CONCRETING OF BRGY. SALUG TO BRGY. MANLAPAY FMR, BRGY. MANLAPAY, DALAGUETE, CEBU [illegible]	GENERAL NOTES 1	JERAHFELLE D. SAYSON, ENGINEER I PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II	TEDDIE B. YAP, ENGINEER II, DATE :	LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :	ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :	SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :	B 01 13	04 34

GENERAL NOTES

CARRIAGE-WAY (ROADS, DRAINAGE AND STRUCTURES)

23. GROUTED RIP RAP

EACH BOULDER SHALL BE HAND LAID WITH THE LONGEST AXIS PERPENDICULAR TO THE SLOPE AND IN CLOSE CONTACT WITH THE ADJOINING BOULDERS SHALL BE COMPLETELY FILLED WITH 1:3 MORTAR. THE OUTSIDE SURFACE OF THE BOULDERS SHALL BE LEFT EXPOSED AND THE SURFACE OF THE MORTAR SHALL BE SWEPT WITH STIFF BROOM.

24. SIDE DITCHES

a.) ALL DITCHES SHALL COMPLY WITH THE REQUIRED STANDARDS.

b.) INVERT ELEVATIONS & EXACT DIMENSIONS OF SIDE DITCHES MAYBE ADJUSTED IN THE FIELD AS DIRECTED BY ENGINEER.

c.) IN SOME CASES, IN ORDER TO SATISFY , DITCH CHANNEL INVERT ELEVATIONS OF DRAINAGE SLOPE REQUIREMENT, SIDE SLOPES OF DITCHES MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.

25. DRAINAGE STRUCTURES:

a.) EXACT LOCATIONS, SLOPES, OUTFALLS & INVERT ELEVATIONS OF DRAINAGE STRUCTURES SHALL BE CHECKED IN THE FIELD BY THE ENGINEER, MINOR ADJUSTMENTS MAY BE MADE WITH THE APPROVAL OF THE ENGINEER TO SUIT FIELD CONDITIONS.

b.) ANY REVISIONS, REMOVAL AND/ OR RELAYING DRAINAGE STRUCTURES AS DIRECTED BY THE ENGINEERS TO SUIT EXISTING FIELD CONDITIONS SHALL BE CONSIDERED AS SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEMS. NO DIRECT PAYMENT SHALL BE MADE FOR THIS WORK UNLESS OTHERWISE SPECIFICALLY IDENTIFIED FOR PAYMENT IN THE SCHEDULE.

c.) EXISTING DRAINAGE STRUCTURES OR PART THEREOF REMOVED BY THE CONTRACTOR THAT ARE STILL SERVICEABLE SHALL BE TURNED OVER TO THE GOVERNMENT & SHALL BE DEPOSITED AT A PLACE WITHIN THE PROJECT SITE DESIGNATED WITHOUT ANY EXTRA COMPENSATION. EXTREME PRECAUTION SHALL BE EXERCISED BY THE CONTRACTOR NOT TO DAMAGE THESE MATERIALS DURING THE REMOVAL & HANDLING.

26. ROAD SIGNS AND PAVEMENT MARKINGS

a.) ROAD SIGNS SHALL CONFORM WITH THE HIGHWAY SAFETY DESIGN STANDARD PART 2, ROAD SIGNS AND PAVEMENT MARKINGS MANUAL OF THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS, SERIES OF 2012.
b.) REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS TO BE USED IN THE PROJECT SHALL BE IN ACCORDANCE WITH THE DPWH - DEPARTMENT ORDER NO. 202, SERIES OF 1992 BEARING THE SUBJECT "USE OF REFLECTORIZED THERMOLPASTIC PAVEMENT MARKINGS."

27. MISCELLANEOUS STRUCTURES :

a.) LOCATION AND LENGTH OF SLOPE PROTECTIONS, GUARDRAIL, STONE MASONRY, RETAINING WALL AND OTHER STRUCTURES MAY BE ADJUSTED BY THE CONTRACTOR TO SUIT ACTUAL FIELD CONDITIONS WITH THE APPROVAL OF THE ENGINEER.
b.) CONSTRUCTION OF SIDE SLOPE SHALL FOLLOW THE STEPS OF EMBANKMENT CONSTRUCTION METHOD TO AVOID SLIDING OF FILL MATERIALS.
c.) SLOPE STAKED SHALL DEPEND ON THE STABILITY OF MATERIALS.
d.) PROVISIONS OF BATAS PAMBANSA BILANG 344 (AN ACT TO ENHANCE THE MOBILITY OF DISABLED PERSONS BY REQUIRING CERTAIN BUILDINGS, INSTITUTIONS, ESTABLISHMENTS AND PUBLIC UTILITIES TO INSTALL FACILITIES AND OTHER DEVICE).

28. PROJECT TRANSITION

a.) PROPER CONNECTION SHALL BE PROVIDED AT THE END OF THE PROJECT, WHEN NECESSARY, TO ENSURE A SAFE TRANSITION BETWEEN THE NEW AND OLD / EXISTING PAVEMENT.
b.)TRANSITION LENGTH OF AT LEAST 15.00m. FROM THE 6.70m. OF PCCP PAVEMENT TO THE 7.30m. WIDTH OF BRIDGE PAVEMENT SHALL BE PROVIDED BEFORE and AFTER APPROACHES OF EVERY BRIDGE STRUCTURES FOR PROPER CONNECTIONS.

LEGEND:

TOPOGRAPHY			
	BENCH MARK		WOODEN/ BAMBOO FENCE
	PIPE CULVERT		IRRIGATION CANAL
	BOX CULVERT		FORESET
	BRIDGES		BAMBOO
	RIPRAP		COCONUT
	DIRECTION OF FLOW		GEMELINA
	CEMETERY		ACACIA
	CONTOURS		TREE
	ROCK	CB	CONTROL BOX
	GUARD RAIL	EM	ELECTRIC METER
	LIGHT POST	WM	WATER METER
	FIRE HYDRANT	W	WELL
H	STRUCTURE BUILDING		FLAGPOLE
KM	KILOMTER POST		RICE FIELD
	RAIL TRACK		PROVINCIAL BOUNDERIES
SCHOOL	SCHOOL BUILDING		CREEK OR RIVER
	WOODEN HOUSE		MAXIMUM FLOOD LEVEL
	CONCRETE HOUSE		CUT SLOPE
	CHURCH OR CHAPEL		EMBANKMENT
	UTILITY POST		EXISTING ROADS
PLAN			
	ROAD CENTERLINE		ROAD RIGHT OF WAY
	POINT OF TANGENCY		GUARD RAIL L/R
	ROAD SIGNS		SIDE DITCH
	POINT OF INTERSECTION		NEW RCCP INSTALLED
	HIGH EMBANKMENT		STONE MASONRY
	PIPE CULVERTS		BRIDGES
	BOX CULVERTS	L:-4.40% R:4.40%	SUPER-ELEVATION CROWN
PROFILE			
	PIPE CULVERTS		LENGTH OF VERTICAL CURVE
	BOX CULVERTS		POINT OF VERTICAL INTERSECTION
	BRIDGES		SIDE DITCH L/R

ABBREVIATIONS:

AZI	= AZIMUTH	W	= WIDENING OF CURVE
BM	= BENCHMARK	OFL	= ORDINARY FLOOD LEVEL
DIST.	= DISTANCE	OWL	= ORDINARY WATER LEVEL
ELEV.	= ELEVATION	I	= INTERSECTION LEVEL
e	= SUPERELEVATION, %	PC	= POINT OF CURVATURE
ef	= MAXIMUM SUPERELEVATION	PT	= POINT OF TANGENCY
PI	= POINT OF INTERSECTION	POT	= POINT OF TANGENT
KM	= KILOMETER	RP	= REFERENCE POINT
D	= DEGREE OF CURVE	ARROW	= ROAD RIGHT OF WAY
E	= EXTERNAL DISTANCE	TBM	= TEMPORARY BENCH MARK
R	= RADIUS	SHLDR	= SHOULDER
T	= TANGENT	V	= DESIGN SPEED
LVC	= LENGTH OF VERTICAL CURVE	VPI	= VERTICAL POINT OF INTERSECTION
Lc	= LENGTH OF CIRCULAR CURVE	VPC	= VERTICAL POINT OF CURVATURE
Lo	= LENGTH OF TRANSITION	VPT	= VERTICAL POINT OF TANGENCY
DHWL	= DESIGN HIGH WATER LEVEL	RCBC	= REINF. CONC. BOX CULVERT
PCC	= POINT OF COMPOUND CURVE	RCPC	= REINF. CONC. PIPE CULVERT
CL	= CENTER LINE	PRC	= POINT OF REVERSE CURVE

NOTE:
FOR " Da " ASSUMED ARC = 100m
FOR " Dc " ASSUMED CHORD = 100m
ASSUMED " I " IS SUBTENDED BY A 20m ARC
NO HORIZONTAL CURVE IS REQUIRED WHERE THE CENTRAL ANGLE IS LESS THAN ONE (1) DEGREE ALGEBRAIC DIFFERENCE IS 0.50% OR LESS.

DESIGN PARAMETERS - RIGID PAVEMENT		
1	CUMULATIVE EQUIVALENT STD. AXLE LOAD, CESAL (W18)	1.3900E+07
2	DESIGN LIFE, years	20
3	ASSUMED TRAFFIC GROWTH RATE, TGR	2.43
4	REPRESENTATIVE CBR	9.03
5	RESILIENT MODULUS, MR	13,540
6	RELIABILITY, R	80%
7	ZR	-0.8410
8	OVERALL STANDARD DEVIATION, So	0.40
9	INITIAL SERVICEABILITY INDEX, Pi	4.50
10	TERMINAL SERVICEABILITY INDEX, Pt	2.00
11	PRESENT SERVICEABILITY INDEX, ΔPsi	2.5000
12	PCCP MODULUS OF ELASITICITY, E'o (3500psi AT 28 DAYS)	3.3700E+06
13	PCCP MODULUS OF RUPTURE, S'c (mean - 650psi AT 14 DAYS)	9801.0000
14	DRAINAGE COEFFICIENT, Cd	1.0000
15	LOAD TRANSFER COEFFICIENT, J	3.2000
16	LOSS OF SUPPORT, Ls	1
17	EFFECTVIE MODULUS OF SUBGRADE REACTION, k	190
18	REQUIRED PCCP THICKNESS,mm	230
19	REQUIRED SUBBASE THICKNESS,mm	200

PLEASE BE NOTED THAT THE QUANTITIES ARE SUBJECT TO INCREASE OR DECREASE AS PER ACTUAL ACCOMPLISHMENT

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:
S.Y. 2021 TO 2022
CONCRETING OF BRGY. BALUD TO BRGY. MANALAPAY FOR, BRGY. MANALAPAY, DALAGUETE, CEBU
NET LENGTH = 4.5+00 M

SHEET CONTENTS: GENERAL NOTES 2

DRAFTED: JERAHFELLE D. SAYSON, ENGINEER I
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II
REVIEWED: TEDDIE B. YAP, ENGINEER II, DATE :
SUBMITTED: LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :
RECOMMENDED: ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :
APPROVED: SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :

SET NO. B 02|13
SHEET NO. 05 34

CONSTRUCTION METHODOLOGY

CARRIAGE-WAY (ROADS, DRAINAGE AND STRUCTURES)

IMMEDIATELY AFTER ALL MATERIALS TO BE USED IN THE PROJECT HAVE PASSED THE MINIMUM TESTING REQUIREMENTS BASED ON THE STANDARD SPECIFICATIONS FOR DPWH, THE MANNER OF OPERATION IN THIS PARTICULAR PROJECT SHALL HAVE THE FOLLOWING SEQUENCE:

1. MOBILIZATION SHALL CONSIST OF MOBILIZATION OF EQUIPMENT AND MANPOWER, MATERIALS AND OTHER ITEMS THAT SHALL BE OF USE IN THE IMPLEMENTATION OF THE PROJECT. ALL CEMENT MATERIALS SHALL BE STORED IMMEDIATELY UPON DELIVERY AT SITE, INA WEATHER PROOF BUILDING WHICH WILL PROTECT THE CEMENT FROM DAMPNESS. THE FLOOR SHALL BE RAISED FROM THE GROUND BY 4 INCHES. ALL SIGNAGES AND PROJECT BILLBOARDS SHALL BE PLACED AT DESIGNATED LOCATIONS APPROVED BY THE PROJECT ENGINEER. DEMOBILIZATION FOLLOWS ONLY AFTER THE PROJECT WAS FINALLY ACCEPTED AND THE SURROUNDINGS ARE PROPERLY CLEANED

2. FACILITIES FOR ENGINEERS SHALL CONSISTS OF OFFICES AND LABORATORIES FOR PROJECT ENGINEERS. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FIELD OFFICES AND TESTING LABORATORIES, INCLUDING THE NECESSARY ELECTRICITY, WATER DRAINAGE AND TELEPHONE SERVICES FOR THE USE OF THE ENGINEER AND HIS STAFF. THEIR LOCATION AND FINAL PLAN SHALL REQUIRE THE APPROVAL OF THE PROJECT ENGINEER PRIOR TO THE START OF CONSTRUCTION. IT IS INTENT THAT THE LOCATION SITE SHOULD BE IN GOVERNMENT OWNED LOT SO THAT THE USE OF THE GOVERNMENT TO THESE FACILITIES CAN BE MAXIMIZED.

   OTHER GENERAL REQUIREMENTS SHALL BE PROVIDED BY THE CONTRACTOR AND SHALL MAINTAIN SUCH OFFICES, STORES, WORKSHOPS LATRINES AND MESSING ACCOMMODATIONS AS ARE NECESSARY. THESE SHOULD BE LOCATED IN THE CONTRACTORS COMPOUND, DISTINCT AND SEPARATE FROM ENGINEER'S COMPOUND. THE DIMENSIONS AND LAYOUT OF THE BUILDINGS AND PLACES SHALL BE SUBJECT TO THE APPROVAL OF THE PROJECT ENGINEER. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN THROUGHOUT THE DURATION OF THE CONTRACT.

3. REMOVAL OF STRUCTURES AND OBSTRUCTION FOLLOWS. THIS ITEM SHALL CONSIST OF THE REMOVAL OF WHOLLY OR IN PART AND SATISFACTORY DISPOSAL OF ALL FENCES, STRUCTURES, OLD PAVEMENTS, ABANDONED PIPE LINES AND ANY OBSTRUCTIONS TO BE REMOVED AND DISPOSED UNDER THIS ITEM.

   THE CONTRACTOR SHALL PERFORM THE WORK DESCRIBED ABOVE, WITHIN AND ADJACENT TO THE ROADWAY, ON GOVERNMENT LAND OR EASEMENT, AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. ALL DESIGNATED SALVABLE MATERIAL SHALL BE REMOVED, WITHOUT UNNECESSARY DAMAGE, IN SECTIONS OR PIECES WHICH MAY BE READILY TRANSPORTED, AND SHALL BE STORED BY THE CONTRACTOR AT SPECIFIED PLACES ON THE PROJECT OR AS OTHERWISE SHOWN IN THE SPECIAL PROVISIONS. PERISHABLE MATERIAL SHALL BE HANDLED AS DESIGNATED IN SUBSECTION 100.2.2 NONPERISHABLE MATERIAL MAY BE DISPOSED OFF OUTSIDE THE LIMITS OF VIEW FROM THE PROJECT WITH WRITTEN PERMISSION OF THE PROPERTY OWNER ON WHOSE PROPERTY THE MATERIAL IS PLACED. COPIES OF ALL AGREEMENTS WITH PROPERTY OWNERS ARE TO BE FURNISHED TO THE ENGINEER. BASEMENTS OR CAVITIES LEFT BY THE STRUCTURE REMOVAL SHALL BE FILLED WITH ACCEPTABLE MATERIAL TO THE LEVEL OF THE SURROUNDING GROUND AND, IF WITHIN THE PRISM OF CONSTRUCTION, SHALL BE COMPACTED TO THE REQUIRED DENSITY.

   ALL CONCRETE PAVEMENT, BASE COURSE, SIDEWALKS, CURBS, GUTTERS, ETC., DESIGNATED FOR REMOVAL, SHALL BE:

   i. BROKEN INTO PIECES AND USED FOR RIP-RAP ON THE PROJECT, OR BROKEN INTO PIECES. THE SIZE OF WHICH SHALL NOT EXCEED 300MM IN ANY DIMENSION AND STOCKPILED AT DESIGNATED LOCATIONS ON THE PROJECT FOR USE BY THE GOVERNMENT, OR OTHERWISE DEMOLISHED AND DISPOSED OFF AS DIRECTED BY THE ENGINEER. WHEN SPECIFIED BALLAST, GRAVEL,

   ii. BITUMINOUS MATERIALS OR OTHER SURFACING OR PAVEMENT MATERIALS SHALL BE REMOVED AND STOCKPILED AS

   iii. REQUIRED IN SUBSECTION 101.2.1, OTHERWISE SUCH MATERIALS SHALL BE DISPOSED OFF AS DIRECTED. THERE WILL BE NO SEPARATE PAYMENT FOR EXCAVATING FOR THE REMOVAL OF STRUCTURES AND OBSTRUCTIONS, OR FOR BACKFILLING AND COMPACTING THE REMAINING CAVITY.

4. ROADWAY EXCAVATION SHALL CONSIST OF ROADWAY, DRAINAGE AND BORROW EXCAVATION IS IN ACCORDANCE WITH THIS SPECIFICATIONS AND IN CONFORMITY WITH THE LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE PROJECT ENGINEER. ALL EXCAVATED MATERIALS SHALL BE STOCKPILED FOR FURTHER USE FOR EMBANKMENT. ANY EXCAVATED MATERIALS IN EXCESS FOR EMBANKMENT SHALL BE PROPERLY DISPOSED AT THE LOCATION APPROVED BY THE PROJECT ENGINEER.

5. CONSTRUCTION ROADWAY EXCAVATION SHALL BE IN ACCORDANCE WITH SPECIFICATIONS AND IN CONFORMITY WITH THE LINES GRADES AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE PROJECT ENGINEER. ROADWAY EXCAVATION OF SHALL BE DISPOSED PROPERLY AT THE LOCATION APPROVED BY THE PROJECT ENGINEER.

6. CONSTRUCTION OF EMBANKMENT FROM ROADWAY EXCAVATION SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND IN CONFORMITY WITH THE LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS. EARTH MATERIAL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 200 MM, LOOSE MEASUREMENT AND SHALL BE COMPACTED AS SPECIFIED BEFORE THE SECOND LAYER IS PLACED.

   HOWEVER, THICKER LAYER MAY BE PLACED IF VIBRATORY LAYER WITH HIGH COMPACTION IS USED PROVIDED THAT DENSITY REQUIREMENT IS ATTAINED CONDUCTED AND APPROVED BY THE PROJECT ENGINEER.

   WATERING IS COMPULSORY DURING COMPACTION TO ATTAIN ITS MAXIMUM DENSITY.

7. STRUCTURE EXCAVATION SHALL CONSISTS OF THE NECESSARY EXCAVATION WORK FOR FOUNDATION, CULVERTS, UNDER DRAINS, AND OTHER STRUCTURES. THE BACKFILLING OF COMPLETED STRUCTURES AND THE DISPOSAL OF EXCAVATED SURPLUS MATERIALS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND IN REASONABLY CLOSE CONFORMITY WITH THE PLANS OR AS ESTABLISHED BY THE PROJECT ENGINEER.

   TRENCHES OR FOUNDATION PITS FOR STRUCTURES OR STRUCTURE FOOTINGS SHALL BE EXCAVATED TO THE LINES AND GRADES OR ELEVATIONS SHOWN ON THE PLANS OR AS STAKED BY THE PROJECT ENGINEER. THEY SHALL BE OF SUFFICIENT SIZE TO PERMIT THE PLACING OF STRUCTURES OF THE FULL WIDTH AND LENGTH SHOWN ON THE PLAN.

8. PREPARATION OF THE SUBGRADE FOR THE SUPPORT OF OVERLYING STRUCTURAL LAYERS. IT SHALL EXTEND TO FULL WIDTH OF THE ROADWAY. UNLESS AUTHORIZED BY THE ENGINEER, SUBGRADE PREPARATION SHALL NOT BE DONE UNLESS THE CONTRACTOR IS ABLE TO START IMMEDIATELY THE CONSTRUCTION OF THE PAVEMENT STRUCTURE.

9. CONSTRUCTION OF LEAN CONCRETE SHALL CONSIST OF THE BEDDING SHALL CONFORM TO ONE OF THE CLASSES SPECIFIED. WHEN NO BEDDING CLASS IS SPECIFIED, THE REQUIREMENTS FOR CLASS C, BEDDING SHALL BE APPLIED AS SPECIFIED IN DPWH STANDARD SPECIFICATIONS OR AS ESTABLISHED BY THE PROJECT ENGINEER.

10. REINFORCING STEEL, GRADE 40 SHALL CONSIST OF FURNISHING, BENDING, FABRICATING AND PLACING OF STEEL REINFORCEMENT OF TYPE, SIZE, SHAPES AND GRADES REQUIRED IN ACCORDANCE WITH THE SPECIFICATIONS AND IN CONFORMITY WITH THE REQUIREMENTS SHOWN ON THE PLANS INTENDED FOR BOX CULVERTS, CATCH BASINS AND GUARDRAILS.

11. CONSTRUCTION OF STRUCTURAL CONCRETE CLASS "A" SHALL CONSIST OF FURNISHING, PLACING AND FINISHING CONCRETE FOR BOX CULVERT AND CATCH BASIN INCLUDING THE NECESSARY FORMWORKS IN CONFORMITY WITH LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS.
    CONCRETE SHALL HAVE THE CONSISTENCY SUCH THAT IT WILL BE WORKABLE IN THE REQUIRED POSITION, SUCH THAT IT WILL FLOW AROUND REINFORCING STEEL .

12. FOR PIPE CULVERT AND DRAINAGE EXCAVATION THE WIDTH OF THE PIPE TRENCH OF THE BOX CULVERT SHALL BE SUFFICIENT TO PERMIT SATISFACTORY JOINTING OF PIPES AND THOROUGH TAMPERING OF THE BEDDING MATERIAL UNDER AND AROUND THE PIPE.

13. PIPE CULVERTS FOR 910 MM. DIA. AND 1220 MM. DIA. SHALL CONSIST OF CONSTRUCTION OF CULVERTS AND STORM DRAINS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND IN CONFORMITY WITH THE LINES AND GRADES SHOWN ON THE PLANS OR AS ESTABLISHED BY THE PROJECT ENGINEER.
    PORTLAND CEMENT AND SAND SHALL CONFORM TO THE REQUIREMENTS OF ITEM 405 STRUCTURAL CONCRETE.

    JOINT MORTAR FOR CONCRETE PIPES SHALL CONSIST OF 1 PART BY VOLUME OF CEMENT AND 2 PARTS OF APPROVED SAND WITH WATER AS NECESSARY TO OBTAIN THE REQUIRED CONSISTENCY.

    PRIOR TO BACKFILLING THE WORK SHALL BE INSPECTED BY THE PROJECT ENGINEER FOR HIS APPROVAL.

CONSTRUCTION METHODOLOGY

CARRIAGE-WAY (ROADS, DRAINAGE AND STRUCTURES)

14. CONSTRUCTION OF REINFORCED CONCRETE HEADWALLS FOR CULVERTS SHALL BE IN CONFORMITY WITH THE LINES, GRADES, SECTIONS AND DIMENSIONS SHOWN ON THE PLANS OR AS ORDERED IN WRITING BY THE PROJECT ENGINEER.

    CEMENT, FINE AGGREGATES AND WATER SHALL CONFORM TO THE RESPECTIVE REQUIREMENTS FOR THOSE MATERIALS AS SPECIFIED UNDER ITEM 405.

15. CONSTRUCTION OF AGGREGATE SUBBASE COURSE SHALL CONSIST OF FURNISHING, PLACING AND COMPACTING AN AGGREGATE SUBBASE COURSE ON PREPARED SUBGRADE IN ACCORDANCE WITH THE SPECIFICATION AND THE LINES, GRADES AND CROSS SECTIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE PROJECT ENGINEER.

THE AGGREGATE SUBBASE MATERIALS SHALL BE PLACED AT A UNIFORM MIXTURE ON A PREPARED SUBGRADE IN A QUANTITY WHICH WILL PROVIDE THE REQUIRED COMPACTED THICKNESS. WHEN MORE THAN ONE LAYER IS REQUIRED, EACH LAYER SHALL BE SHAPED AND COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED.

WHERE THE REQUIRED THICKNESS IS 200MM. THE MATERIALS SHALL BE SPREAD IN TWO LAYERS OF APPROXIMATELY TWO EQUAL THICKNESS.

THE MOISTURE CONTENT OF SUBBASE MATERIAL SHALL, IF NECESSARY, BE ADJUSTED PRIOR TO COMPACTION BY WATERING WITH APPROVED SPRINKLERS MOUNTED ON TRUCKS OR BY DRYING OUT, AS REQUIRED IN ORDER TO ATTAIN THE REQUIRED COMPACTION UNTIL A FIELD DENSITY OF AT LEAST 100 PERCENT OF THE MAXIMUM DRY DENSITY.

ROLLING SHALL PROGRESS GRADUALLY FROM THE SIDES TO THE CENTER, PARALLEL TO THE CENTERLINE OF THE ROAD AND SHALL CONTINUE UNTIL THE WHOLE SURFACE HAS BEEN ROLLED.

HAULING EQUIPMENT

TRUCKS USED FOR HAULING BITUMINOUS MIXTURES SHALL HAVE TIGHT, CLEAN, SMOOTH METAL BEDS WHICH HAVE BEEN THINLY COATED WITH APPROVED MATERIAL TO PREVENT THE MIXTURE FROM ADHERING TO THE BEDS. EACH TRUCK SHALL HAVE A COVER OF CANVASS OR OTHER SUITABLE MATERIAL OF SUCH SIZE AS TO PROTECT THE MIXTURE FROM THE WEATHER. WHEN NECESSARY, SUCH THAT THE MIXTURE WILL BE DELIVERED ON THE ROAD AT THE SPECIFIED TEMPERATURE, TRUCK BODY SHALL BE INSULATED AND COVERS SHALL BE SECURELY FASTENED. TRUCK BEDS SHALL BE DRAINED PRIOR TO LOADING.

SPREADING AND FINISHING

THE MIXTURE SHALL BE SPREAD AND STRUCK OFF TO THE GRADE AND ELEVATION ESTABLISHED. BITUMINOUS PAVERS SHALL BE USED TO DISTRIBUTE THE MIXTURE EITHER OVER THE ENTIRE WIDTH OR OVER SUCH PARTIAL WIDTH AS MAY BE THE LONGITUDINAL JOINT IN ONE LAYER SHALL OFFSET THAT IN THE LAYER IMMEDIATELY BELOW APPROXIMATELY 15CM; HOWEVER, THE JOINT IN THE TOP LAYER SHALL BE AT THE CENTER LINE OF THE PAVEMENT IF THE ROADWAY COMPRISES TWO (2) LANES, OR AT LANE LINES IF THE ROADWAY IS MORE THAN TWO (2) LANES, ----- OTHERWISE DIRECTED.

ON AREAS WHERE IRREGULARITIES OR UNAVOIDABLE OBSTACLE MAKE THE USE OF MECHANICAL SPREADING AND FINISHING EQUIPMENT IMPRACTICABLE, THE MIXTURE MAY BE PLACED AND FINISHED BY HAND TOOLS.

THE MIXTURE SHALL BE PLACED AT TEMPERATURE NOT LESS THAN 170°C AS MEASURED IN THE TRUCK JUST PRIOR TO DUMPING INTO THE SPREADER.

WHEN TAR IS USED, THE MIXER SHALL BE PLACED AT BETWEEN 66°C AND 107°C.

WHEN PRODUCTION OF THE MIXTURE CAN BE MAINTAINED AND WHEN PRACTICAL, PAVERS SHALL BE USED IN ECHELON TO PLACE THE WEARING COURSE IN ADJACENT LANES.

JOINTS

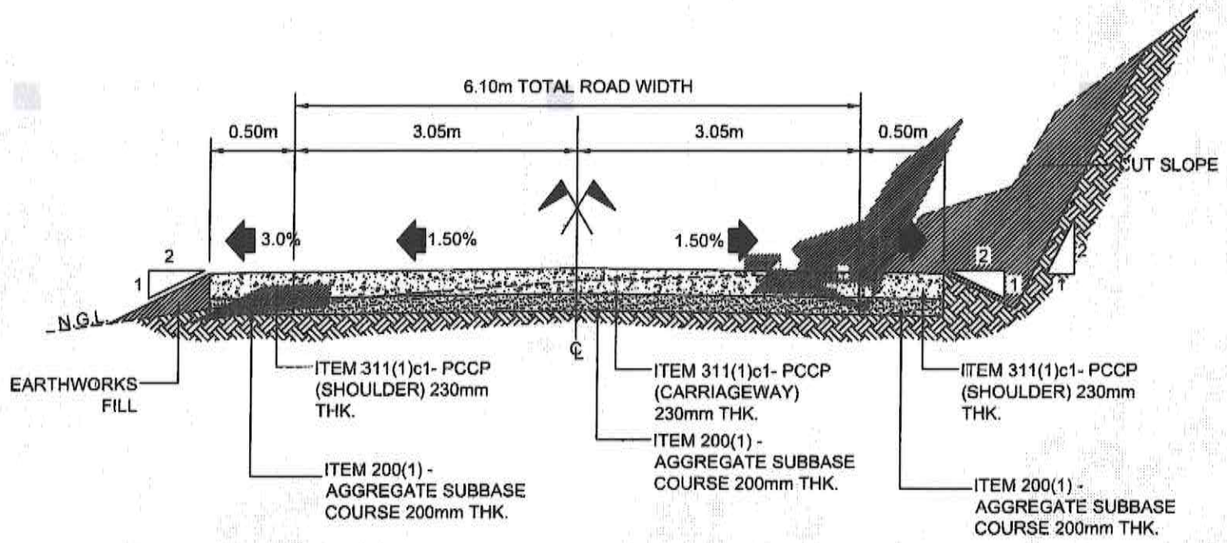
PLACING OF THE BITUMINOUS PAVING SHALL BE CONTINUOUS AS POSSIBLE. ROLLERS SHALL NOT PASS OVER THE UNPROTECTED END OF A FRESHLY LAID MIXTURE UNLESS AUTHORIZED BY THE ENGINEER. TRANSVERSE JOINTS SHALL BE FORMED BY CUTTING BACK ON THE PREVIOUS RUN TO EXPOSE THE FULL DEPTH OF THE COURSE. WHEN DIRECTED BY THE ENGINEER, A BRUSH COAT OF BITUMINOUS MATERIAL SHALL BE USED ON CONTACT SURFACE OF TRANSVERSE JOINTS BEFORE ADDITIONAL MIXTURE IS PLACED AGAINST THE PREVIOUSLY ROLLED MATERIAL.

QUALITY ASSURANCE AND QUALITY CONTROL

SUBSTANDARD MATERIALS WILL RESULT IN SUB STANDARD WORK. THE RESPONSIBILITY FOR TESTING AND ACCEPTING LIES FULLY WITH THE CONTRACTOR, AND IT IS THE RESPONSIBILITY OF THE MATERIALS ENGINEER TO OVERSEE ALL TESTING AND TO ENSURE THAT THE TESTS COMPLY WITH THE SPECIFICATIONS AND PROCEDURES.

FINAL INSPECTION

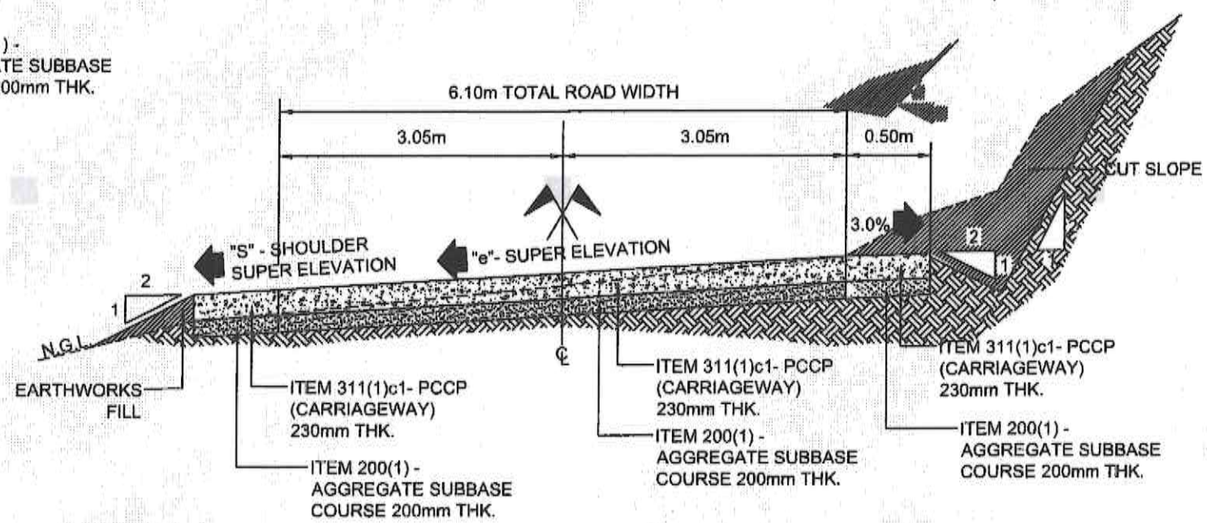
FINAL INSPECTION OF THE COMPLETED PROJECT MAY BE REQUESTED BY THE CONTRACTOR UPON THE APPROVAL OF THE PROJECT ENGINEER.



1 B-5 08

NORMAL ROAD SECTION

SCALE: 1:20



2 B-5 08

SUPER-ELEVATED ROAD SECTION

SCALE: 1:20

VALUE OF SLOPE RATIOS OF CUT & FILL

HEIGHT OF SLOPE, m	APPROXIMATE SLOPE RATIO			
	NATURE OF MATERIAL	CUT SLOPE RATIO	FILL SLOPE RATIO	REMARKS
0.0 to 1.0	EARTH	4:1	4:1	EARTH
1.1 to 2.0	EARTH	2:1	2:1	EARTH
1.1 to 2.0	SOFT ROCK, CORAL, SHALE, CEMENTED GRADE	VARIES FROM 1 to 1:1	2:1	CUT SLOPE STAKE WILL DEPEND UPON STABILITY OF MATERIAL
1.1 to 2.0	HARD ROCK	NATURAL BREAK DESIGN SLOPE 0.5:1	2:1	NATURAL BREAK SLOPE RESULTING AFTER BLASTING AND SEALING OF LOOSE MATERIAL DESIGN PURPOSES, NORMAL SLOPE IN HARD ROCK WILL BE 0.5:1
OVER 2.0	EARTH	VARIES FROM 0.5:1 to 1:1	1.5:1	EARTH
OVER 2.0	SOFT ROCK, CORAL, SHALE, CEMENTED GRADE	VARIES FROM 0.5:1 to 1:1	1.5:1	CUT SLOPE STAKE WILL DEPEND UPON STABILITY OF MATERIAL
OVER 2.0	HARD ROCK	NATURAL BREAK DESIGN SLOPE 0.5:1	1.25:1	NATURAL BREAK SLOPE RESULTING AFTER BLASTING AND SEALING OF LOOSE MATERIAL DESIGN PURPOSES, NORMAL SLOPE IN HARD ROCK WILL BE 0.5:1

TABLE FOR SHOULDER SLOPE "S" (HIGH SHOULDERS)

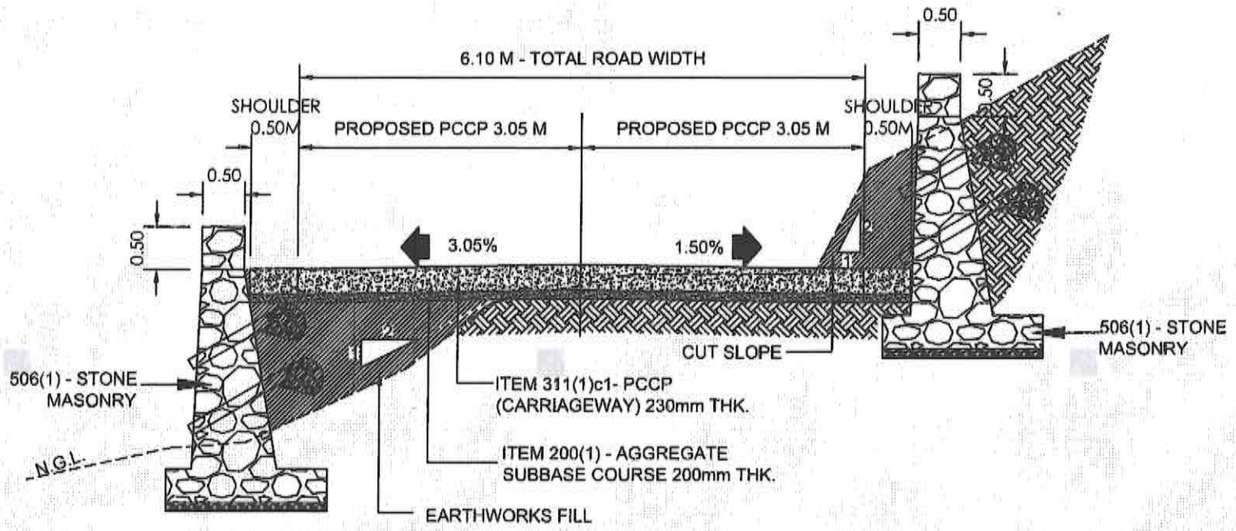
"e"	"S"
3.00	3.00
4.00	3.00
5.00	2.00
6.00	1.00
7.00	0.00
8.00	-1.00

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:

SHEET CONTENTS:
NORMAL ROAD SECTION
SUPER-ELEVATED ROAD SECTION
VALUE OF SLOPE RATIOS
NORMAL ROAD SECTION WITH RCPC

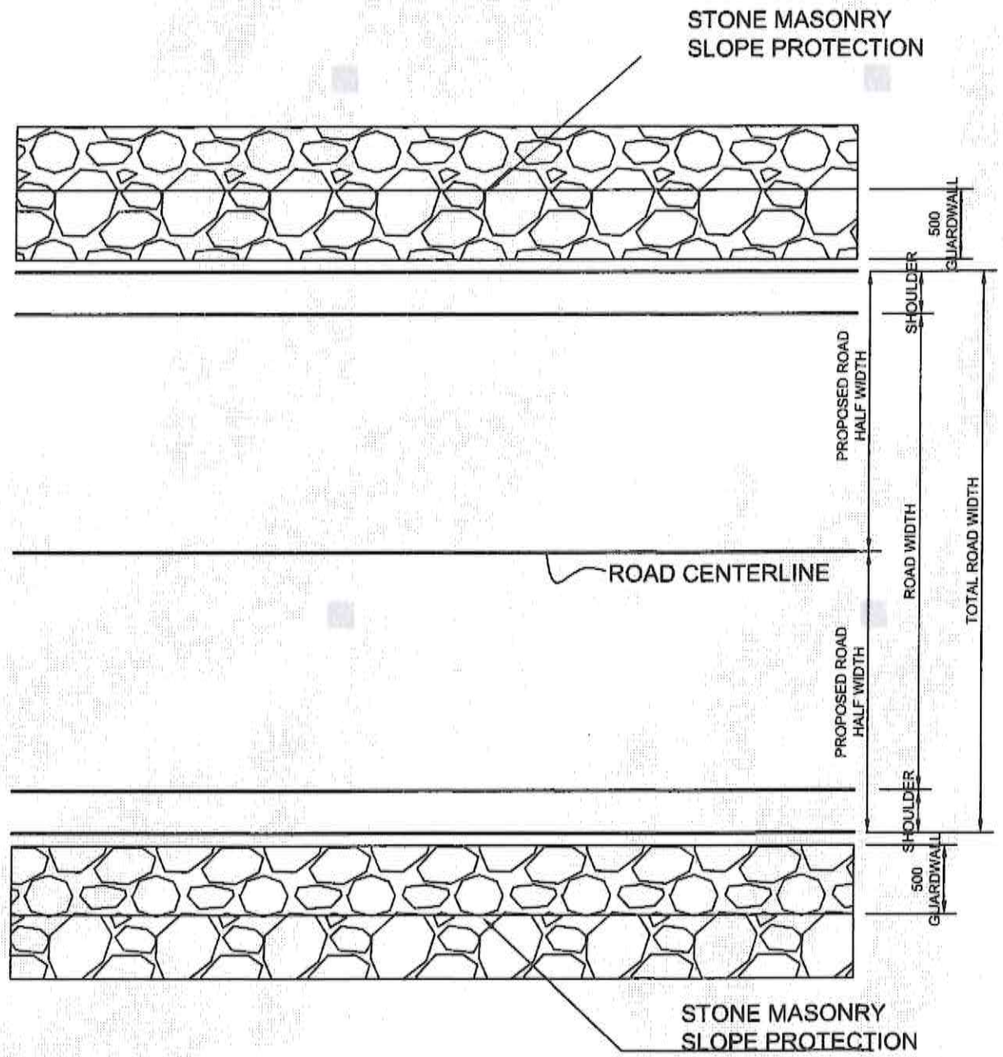
DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
JERAHFELLE D. SAYSON, ENGINEER I	TEDDIE B. YAP, ENGINEER II, DATE :	LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :	ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :	SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :	B 05 13	08 34
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II						



1 / B-6 09

TYPICAL ROAD SECTION WITH STONE MASONRY

NTS



2 / B-06 09

PROPOSED STONE MASONRY PLAN

SCALE: NTS

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII

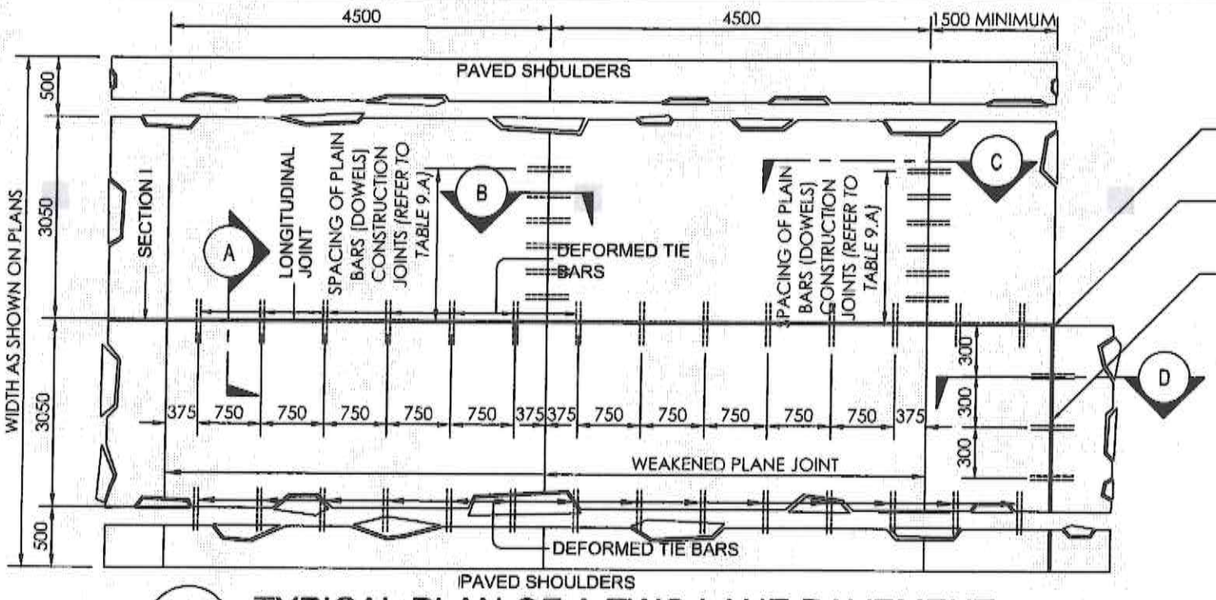
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
C.Y. 2021 PROJECT CONCRETING OF BRGY. AGUSTO BRGY. BANLAYAT PAID, BRGY. BANLAPAY, DALAGUETE, CEBU NET LENGTH = 484.00 M	TYPICAL ROAD SECTION WITH STONE MASONRY PROPOSED STONE MASONRY PLAN	JERAHFELLE D. SAYSON ENGINEER I PREPARED: KEVIN JOSHUA A. TAMANAHA ENGINEER II	TEDDIE B. YAP ENGINEER II DATE :	LENARD A. PANUGALINOG CHIEF, PLANNING AND DESIGN DATE :	ROSALIND R. VASQUEZ OIC-ASSISTANT DISTRICT ENGINEER DATE :	SUSAN L. ORNOPIA-AROA OIC-DISTRICT ENGINEER DATE :	B 06 13	09 34

NOTES

STANDARD PORTLAND CEMENT CONCRETE PAVEMENT DETAIL

1. MATERIALS AND WORKMANSHIP SHALL CONFORM WITH THE "DPWH STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND AIRPORTS, 2013".
2. CONSTRUCTION (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. NO CONSTRUCTION JOINT SHALL BE PLACED WITHIN 1.50M FROM THE WEAKENED PLANE JOINT.
3. AT CONSTRUCTION JOINTS (LONGITUDINAL OR TRANSVERSE) CARE SHOULD BE TAKEN THAT NO CONCRETE FROM THE LAST SLAB PLACED OVERHANGS.ANY PORTION OF THE FIRST SLAB.
4. TIE BARS SHOULD BE DEFORMED STEEL BARS, ALL DOWEL BARS SHALL BE SMOOTH ROUND STEEL BAR FREE FROM RUST AND OTHER DEFECTS WHICH MIGHT RESTRICT THEIR MOVEMENT.
5. 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.
6. MATERIAL FOR THE METAL SIDE FORM SHALL BE BRAND NEW SHEET METAL GAUGE NO. 18 OF BLACK IRON FREE FROM RUST AND LINKS.
7. AT LEAST SIX (6) SUCCESSIVE DOWEL BUTT JOINTS AT NORMAL JOINT SPACING SHALL BE PROVIDED BEFORE OR AFTER AN EXPANSION JOINT.
8. THE GROOVE OR CRACK 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 PAVEMENT TO TRAFFIC. ASPHALT SEAL SHALL BE POURED IN SUCH MANNER THAT SPILLING SHALL BE PREVENTED/ELIMINATED,THUS PROVIDE A SMOOTH RIDING SURFACE.
9. ALL TRANSVERSE JOINTS, EXCEPT CONSTRUCTION JOINT, SHALL BE CONTINUOUS FROM EDGE TO EDGE.
10. ALL LONGITUDINAL JOINTS SHALL MEET AT INTERSECTIONS WITH NO GAPS OR OFFSET.
11. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
12. AVOID STOPPAGE OF FORM WORKS ALONG CURVES.
13. CONSTRUCTION EXPANSION JOINT AT EVERY 60 METERS ANCHOR AT EVERY ADJACENT EXISTING STRUCTURES.



LANE SHOWING TRANSVERSE CONSTRUCTION JOINT AT LOCATION OF WEAKENED PLANE JOINT

TRANSVERSE CONSTRUCTION JOINT WITHIN THE MIDDLE THIRD OF THE SLAB

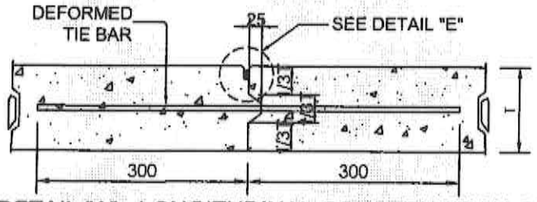
LANE SHOWING TRANSVERSE CONSTRUCTION JOINT AT MIDDLE THIRD OF NORMAL JOINT INTERVAL

NOTE:

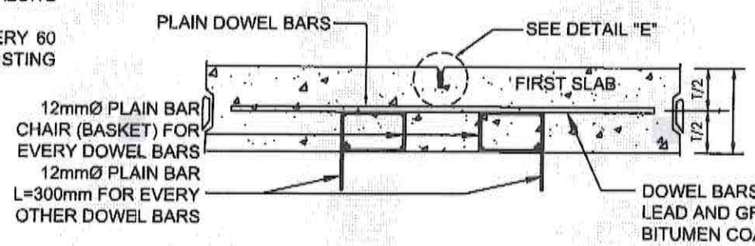
TRANSVERSE CONSTRUCTION (CONTACT) JOINT SHALL BE PROVIDED AT THE END OF ANY RUN WHERE LAYING OF CONCRETE HAS BEEN STOPPED FOR THIRTY (30) MINUTES OR LONGER.

TRANSVERSE CONSTRUCTION JOINTS WHICH OCCUR AT LOCATION OF WEAKENED PLANE JOINT SHOULD BE BUTT JOINTS WITH DOWELS. IF JOINT OCCURS IN THE MIDDLE THIRD OF THE WEAKENED JOINT INTERVAL (1500-3000mm) IT SHOULD BE KEYED JOINTS WITH TIE BARS.

1 / B-7 10 — **TYPICAL PLAN OF A TWO LANE PAVEMENT**
SCALE: NTS



2 / B-7 10 — **DETAIL "A" - LONGITUDINAL CONSTRUCTION OR CONTRACTION JOINT - ONE LANE CONSTRUCTION**
SCALE: NTS



3 / B-7 10 — **DETAIL "B" - CONTRACTION JOINT (WITH STEEL BASKET FOR SETTING DOWELS)**
SCALE: NTS

4 / B-7 10 — **DETAIL "C" -DOWELED EXPANSION JOINT**
SCALE: NTS

TABLE 9.A - PLAIN DOWEL BARS

T	a	b	DOWELS AT CONTRACT JOINTS	TIE BARS LONGITUDINAL JOINT
150.00	375 TO 600	600.00	25mmØ, L = 600mm, @ 300mm	16mmØ, L = 600mm, @750mm
200.00	375 TO 600	600.00	28mmØ, L = 600mm, @ 300mm	
230.00	375 TO 600	600.00	32mmØ, L = 600mm, @ 300mm	
280.00	375 TO 600	600.00	36mmØ, L = 600mm, @ 300mm	
			32mmØ, L = 600mm, @ 250mm	
			28mmØ, L = 600mm, @ 190mm	
			25mmØ, L = 600mm, @ 150mm	
300.00	375 TO 600	600.00	36mmØ, L = 600mm, @ 274mm	
			32mmØ, L = 600mm, @ 210mm	
			28mmØ, L = 600mm, @ 160mm	
			25mmØ, L = 600mm, @ 130mm	

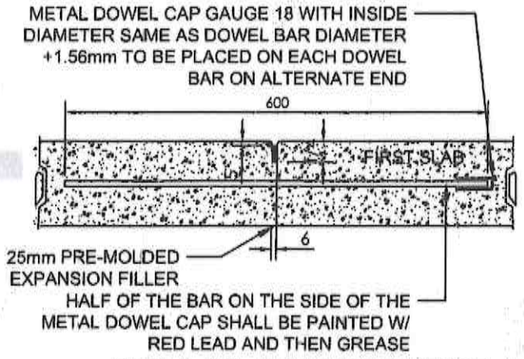
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:

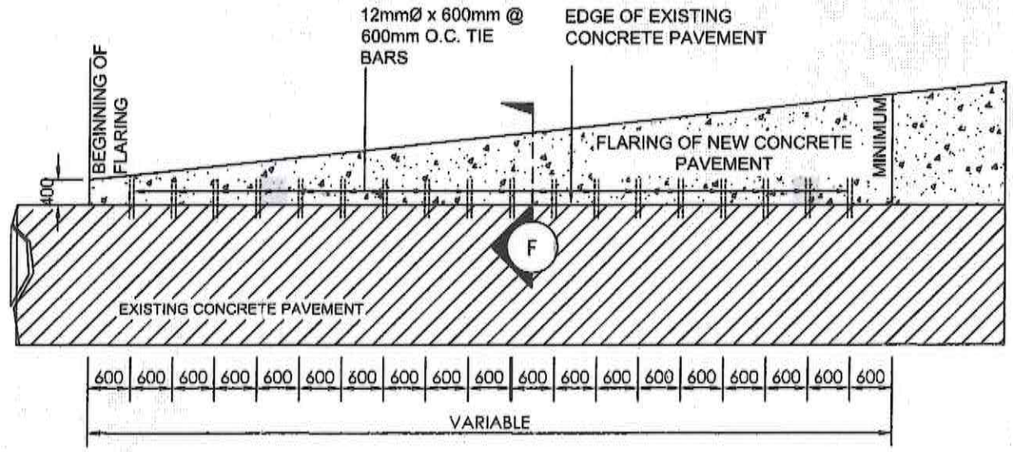
SHEET CONTENTS: STANDARD PORTLAND CEMENT CONCRETE PAVEMENT DETAIL 1

DRAFTED: JERAHFELLE D. SAYSON, ENGINEER I
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II

REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
TEDDIE B. YAP, ENGINEER II, DATE :	LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :	ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :	SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :	B 07 13	10 34

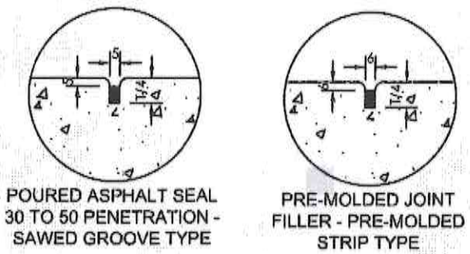


1 / B-8 11 DETAIL "D" - BUTT TRANSVERSE CONSTRUCTION OR CONTACT JOINTS
SCALE: NTS

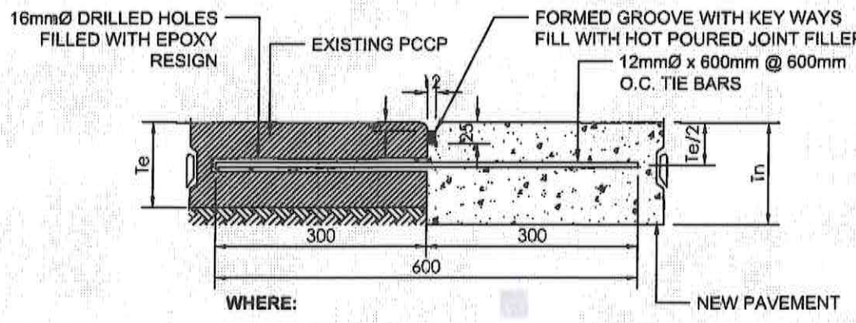


NOTE:
THE EXISTING CONCRETE PAVEMENT BE CHIPPED OFF PERPENDICULARLY TO EXISTING BASE ABOUT 300mm WIDE DISTANCE WHERE THE FLARE IS 1000mm AND NECESSARY DOWEL BARS BE PROVIDED TO CONNECT THE NEW PAVEMENT WITH THE EXISTING PAVEMENT.

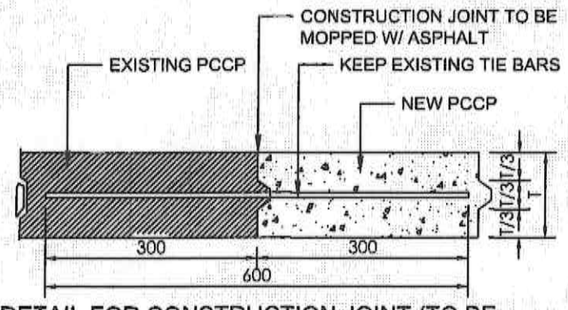
4 / B-8 11 PLAN FOR FLARING OF EXITING PAVEMENT
SCALE: NTS



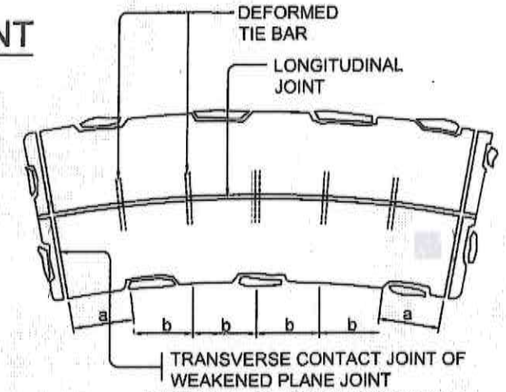
2 / B-8 11 DETAIL "E" - WEAKENED PLANE GROOVE
SCALE: NTS



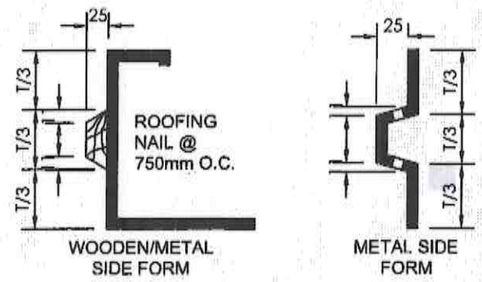
3 / B-8 11 DETAIL "F" - CONSTRUCTION JOINT FOR FLARING EXISTING PCCP
SCALE: NTS



5 / B-8 11 DETAIL FOR CONSTRUCTION JOINT (TO BE USED FOR WIDENING OF EXISTING PCCP)
SCALE: NTS



6 / B-8 11 DETAILS OF BAR SPACING ALONG CURVED LANES
SCALE: NTS



7 / B-8 11 DETAILS OF SIDE FORMS
SCALE: NTS

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:
[illegible]

SHEET CONTENTS:
STANDARD PORTLAND CEMENT CONCRETE PAVEMENT DETAIL 2

DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
JERAHFELLE D. SAYSON, ENGINEER I	TEDDIE B. YAP, ENGINEER II, DATE :	LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :	ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :	SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :	B 08 13	11 34
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II						

NOTES

GEOMETRIC DESIGN - HORIZONTAL AND VERTICAL CURVES

1. NO HORIZONTAL CURVE IS REQUIRED WHERE THE INTERSECTION ANGLE IS LESS THAN ONE DEGREE (1° 0' 0")
2. PARAMETER " A " SHALL BE GREATER OR EQUAL THAN THE THIRD OF THE RADIUS OF THE CONNECTED CIRCULAR CURVE.
3. WHEN REQUIRED UNSYMMETRICAL SPIRAL OR COMPOUND CURVE MAY BE ADOPTED. CIRCULAR CURVE.

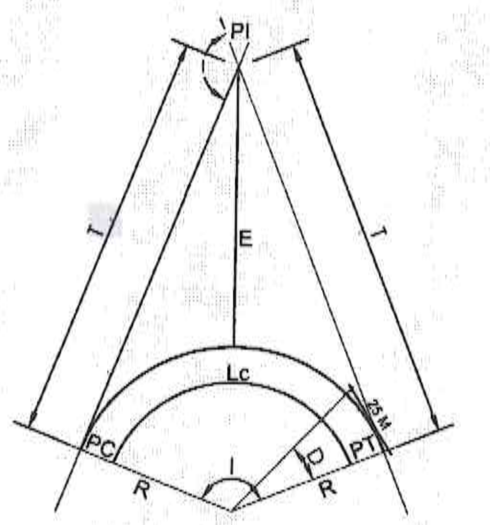
ABBREVIATION:

HORIZONTAL CURVE (CIRCULAR)

- PI = POINT OF INTERSECTION
- I = INTERSECTION ANGLE
- T = TOTAL TANGENT DISTANCE
- Lc = LENGTH OF CIRCULAR CURVE
- E = TOTAL EXTERNAL DISTANCE
- D = DEGREE OF CURVE (ARC DEFINITION)
- PC = POINT OF CURVATURE
- PT = POINT OF TANGENCY

HORIZONTAL CURVE WITH TRANSITION (CLOTHOID)

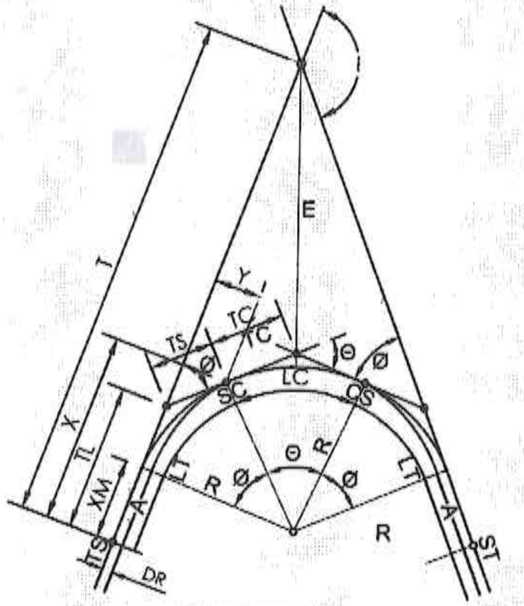
- A = CLOTHOID PARAMETER
- R = RADIUS OF CIRCULAR CURVE
- LT = LENGTH OF TRASITION
- X = ABSCISSA OF THE TRANSITION END
- Y = ORDINATE OF THE TRASITION END
- DR = OFFSET OF THE CIRCULAR CURVE
- XM = SHIFT OF THE POINT OF TANGENCY
- TL = LONG TANGENT OF THE TRASITION
- TS = SHORT TANGENT OF THE TRANSITION
- I = DEFLECTION ANGLE
- Ø = ANGLE OF THE CLOTHOID AT R
- Θ = ANGLE AT THE CENTER OF THE CIRCULAR CURVE
- T1, T2, T, = TANGENT LENGTH OF THE CURVE
- E = EXTERNAL DISTANCE BETWEEN MIDDLE OR CURVE AND PI
- LC = LENGTH OF CIRCULAR CURVE
- L = TOTAL LENGTH
- TS = TANGENT TO SPIRAL
- ST = SPIRAL TO TANGENT
- CS = CIRCULAR TO SPIRAL
- SC = SPIRAL TO CIRCULAR
- W = WIDENING



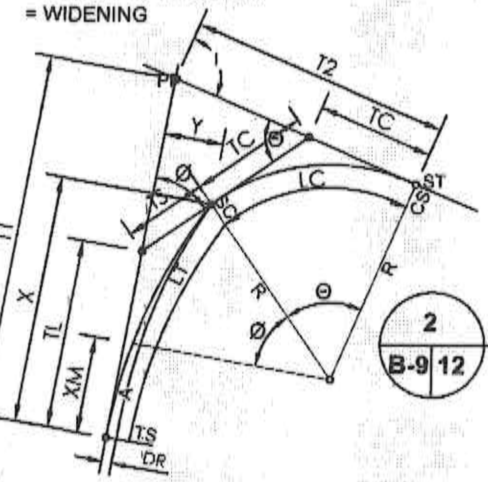
1 | B-9 | 12

HORIZONTAL CURVE (CIRCULAR)

SCALE: NTS



(SYMMETRICAL FORM)

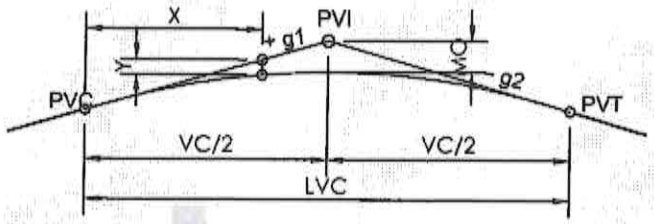


(UNSYMMETRICAL FORM)

2 | B-9 | 12

HORIZONTAL CURVE WITH TRANSITION (CURVE)

SCALE: NTS



SYMMETRICAL VERTICAL CURVE

NOTE:
NO VERTICAL CURVES IS REQUIRED WHEN THE ALGEBRAIC DIFFERENCE IN GRADE IS LESS THAN 0.50%.

WHERE:

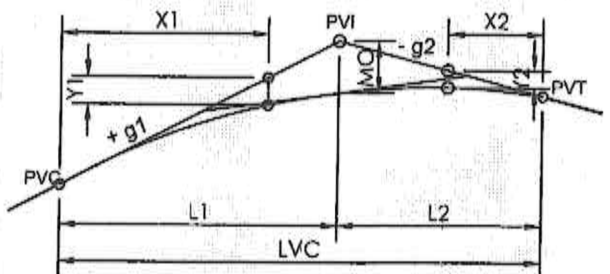
- PVI = POINT OF VERTICAL INTERSECTION
- PVC = POINT OF VERTICAL CURVE
- PVT = POINT OF VERTICAL TANGENT
- LVC = LENGTH OF VERTICAL CURVE
- g1 , g2 = GRADIENT IN PERCENT
- MO = MIDDLE ORDINATE
- X, X1 , X2 = DISTANCE FROM TANGENT TO ANY POINT OF CURVE
- Y, Y1 , Y2 = VERTICAL OFFSET WITH RESPECT TO DISTANCE X
- A = ALGEBRAIC DIFFERENCE BETWEEN GRADIENT, %
- K = RATE OF VERTICAL CURVATURE, m

FORMULA/S FOR SYMMETRICAL VERTICAL CURVE:

$MO = \frac{ALVC}{800}$ PI

$Y = \frac{X^2 (MO)}{(LVC/2)^2}$

LVC = KA



UNSYMMETRICAL VERTICAL CURVE

FORMULA/S FOR UNSYMMETRICAL VERTICAL CURVE:

$MO = \frac{(LVC1)(LVC2)(A)}{200LVC}$

$Y1 = \frac{MO(X1)^2}{(LVC1)^2}$

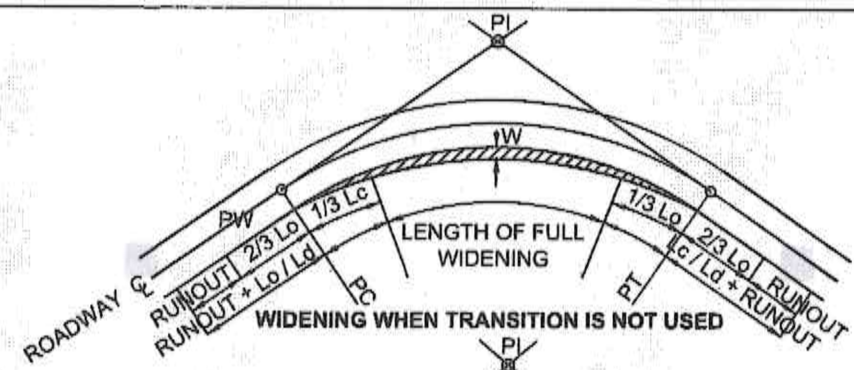
$Y2 = \frac{MO(X2)^2}{(LVC2)^2}$

LVC = KA

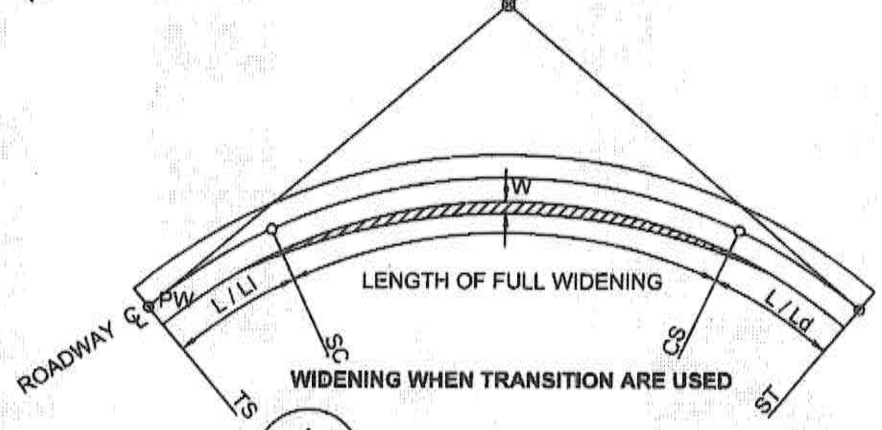
3 | B-9 | 12

VERTICAL PARABOLIC CURVE

SCALE: NTS



WIDENING WHEN TRANSITION IS NOT USED



WIDENING WHEN TRANSITION ARE USED

4 | B-9 | 12

WIDENING ON CURVE

SCALE: NTS

LEGEND:

- W = WIDENING WIDTH
- Lo = LENGTH OF SUPER ELEVATION RUN-OFF
- Lw = LENGTH OF FULL WIDENING WIDTH
- Ln = LENGTH FROM THE BEGINNING OF RUN-OFF WITH A WIDENING OF Wn
- Wn = WIDENING OF LENGTH Ln

FORMULA:

$Wn = \frac{WLn}{Lc}$

WIDENING (W) OF TWO LANES PAVEMENT ON CURVES BASE ON SINGLE - UNIT TRUCK - SU - VEHICLE TYPE

R	DESIGN SPEED (kph)							
	30	40	50	60	70	80	90	100
30	1.50							
40	1.50							
50	1.50	1.50						
60	1.50	1.50						
70	1.35	1.50						
80	1.20	1.35	1.50					
90	1.05	1.20	1.35					
100	1.05	1.20	1.20					
125	0.90	1.05	1.05	1.20				
150	0.90	0.90	1.05	1.05	1.20			
175	0.75	0.90	0.90	1.05	1.05			
200	0.75	0.75	0.90	0.90	1.05			
225	0.75	0.75	0.90	0.90	0.90	1.05		
250	0.60	0.75	0.75	0.90	0.90	1.05		
275	0.60	0.75	0.75	0.90	0.90	0.90		
300	0.60	0.60	0.75	0.75	0.90	0.90	1.05	
350	0.60	0.60	0.75	0.75	0.75	0.75	0.90	
400	0.60	0.60	0.60	0.75	0.75	0.75	0.90	0.90
450		0.60	0.60	0.75	0.75	0.75	0.90	0.90
500			0.60	0.60	0.75	0.75	0.75	0.75
600			0.60	0.60	0.60	0.75	0.75	0.75
700				0.60	0.60	0.60	0.75	0.75
800					0.60	0.60	0.75	0.75
900					0.60	0.60	0.60	0.75
1000						0.60	0.60	0.60
1500						0.60	0.60	0.60
2000								

NOTES

GEOMETRIC DESIGN - SUPER ELEVATION

1. IN MOUNTAINOUS SECTIONS AND AT BRIDGE APPROACHES THE DESIGN SPEED OF 30 Km/h AND THE MAXIMUM SUPER-ELEVATION OF 4% INSTEAD OF 8% WILL BE ADOPTED WHEN NECESSARY.
2. THE SLOPE OF SHOULDER SHALL ALWAYS FALL IN THE DIRECTION OF THE OUTSIDE EDGE OF THE TRAVELED WAY.
3. WHEN THE SUPER-ELEVATION IS LARGER THAN 4% THEN THE SLOPE OF THE LOWER SHOULDER SHALL BE THE SAME AS FOR THE TRAVELED WAY.
4. WHEN THE SUPER-ELEVATION IS LESS THAN 6%, THEN THE HIGHER SHOULDER SHALL HAVE A SLOPE OF 4%.
5. IF THE SUPER-ELEVATION VARIES FROM 6% TO 8% THEN THE SUPER-ELEVATION OF THE SLOPE OR THE HIGH SHOULDER WILL VARY FROM 4% TO 1 ½ % to 1% e, THE ALGEBRAIC SUM OF THE SLOPES OF THE TRAVELED WAY AND THE SHOULDER SHOULD ALWAYS BE EQUAL TO 10%
6. FOR EFFECTIVE DRAINAGE , ΔS SHOULD BE LESS THAN 0.30 % BETWEEN e + 2.0 % AND - 2.0 %.
7. WHERE ΔS < 0.30 % , A SPECIAL METHOD OF SUPER-ELEVATION TRANSITION HAS TO BE USED AS INDICATED.

VALUE OF ΔS								
DESIGN SPEED (kph)	30	40	50	60	70	80	90	100
MAXIMUM ΔS	0.75	0.70	0.65	0.60	0.55	0.50	0.45	0.40

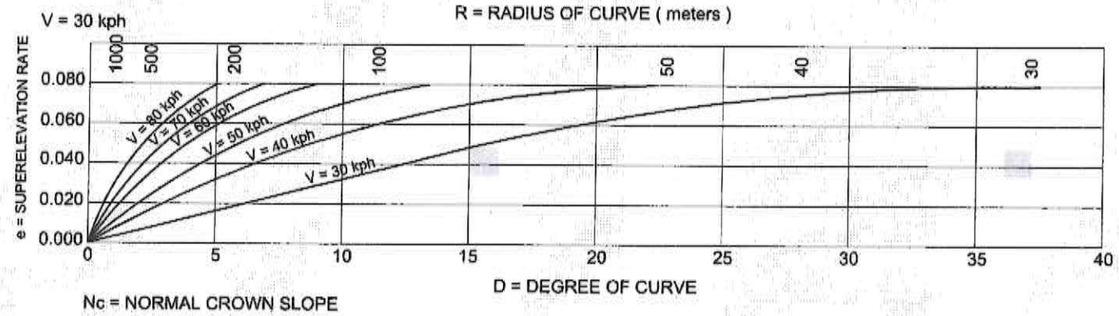
8. ROUNDING OFF IS ONLY NECESSARY IF ΔS 0.60 % RADII FOR ROUNDING

V	50 kph	80 kph	80 kph
R	500 m.	1000 m.	2000 m.

9. A " BROKEN RACK " SHOULD BE A VOIDED IF THIS IS IMPOSSIBLE , SUPER-ELEVATION TRANSITION MUST BE ATTAINED USING CASE 4 , IF LENGTH OF STRAIGHT IS - (40 + 20e),. WHERE THE THE LENGTH OF THE STRAIGHT IS (40 + 20e) , NORMAL SUPER-ELEVATION TRANSITION CASE 1 SHOULD BE USED
10. WHERE REQUIRED SUPER-ELEVATION RUNOFF LENGTH CANNOT BE ACCOMMODATED, REQUIRED RUNOFF SHALL BE DISTRIBUTED WITHIN THE CURVE.
11. SUPER-ELEVATION DIMENSIONS SHOWN IN THE PLAN AND SHEET PROFILE ARE BASED ON VARYING LANE WIDTH DUE TO WIDENING.
12. SUPER-ELEVATION RATE CAN BE TAKEN FROM SUPER-ELEVATION CHART.
13. SUPER-ELEVATION IS ATTAINED BY RESOLVING THE PAVEMENT ABOUT THE ROAD CENTERLINE.

LEGEND:

NC = NORMAL CROWN
ΔS = SLOPE OF EDGE OF PAVEMENT, %
R = RADIUS OF CIRCULAR CURVE
V = DESIGN SPEED

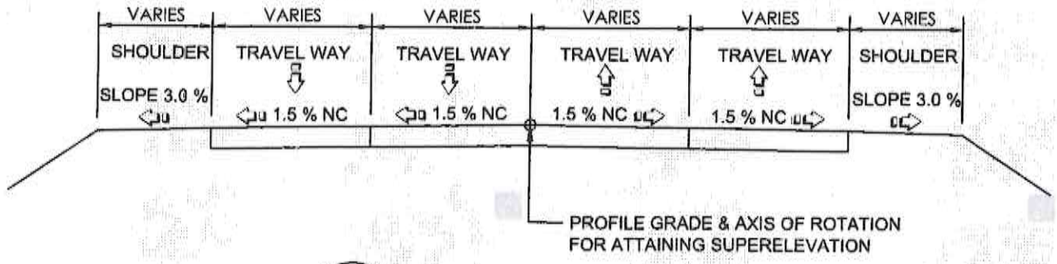


Nc = NORMAL CROWN SLOPE
Rc = REMOVE ADVERSE CROWN , SUPERELEVATE

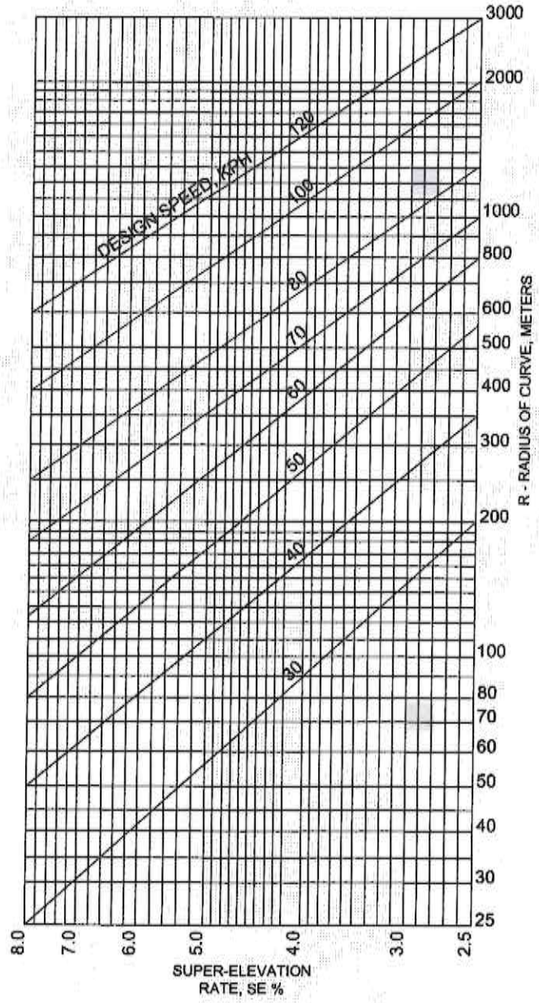
$R = \frac{1145.916}{D}$

e max = 0.10

1 / B-10 13 DESIGN SUPERELEVATION RATES
SCALE: NTS



2 / B-10 13 ROADWAY CROWN SECTION
SCALE: NTS



3 / B-10 13 SUPERELEVATION CHART
SCALE: NTS

SUPER-ELEVATION TABLE		
DESIGN SPEED, kph	L1, m	S, %
40	8.00	0.66
50	10.00	0.65
60	12.00	0.60
70	14.00	0.55
80	16.00	0.50
90	18.00	0.47
100	20.00	0.43
110	22.00	0.40
120	28.00	0.38

LANES ROTATED FACTOR	
LANES	bw
1.00	1.00
2.00	0.75
3.00	0.67

DESIGN SPEED, kph	LANES ROTATED FACTOR		
	1	2	3
20-70	0.80	0.90	0.90
70-130	0.70	0.80	0.85

FORMULA/S:

$Tro = \frac{Sro\ Nc}{ed}$

$Sro = \frac{w(ed)\ n1(bw)}{S}$

$L1 = \frac{WNc}{S}$

$Le = L1 + Sro + Tro$

WHERE:

L1 = LENGTH OF ROUNDING
Le = LENGTH OF SUPER-ELEVATION DEVELOPMENT
w = WIDTH OF LANE
n1 = NUMBER OF LANES ROTATED
e = SUPER-ELEVATION
NC = NORMAL CROWN SLOPE
S = RELATIVE SLOPE BETWEEN EDGE AND CENTERLINE
Tro = TANGENT RUNOUT
Sro = SUPER ELEVATION RUNOFF LENGTH
PSro = PORTION OF Sro PRIOR TO CIRCULAR CURVE
bw = LANE ROTATION FACTOR
ed = DESIGN SUPER-EVEVATION

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

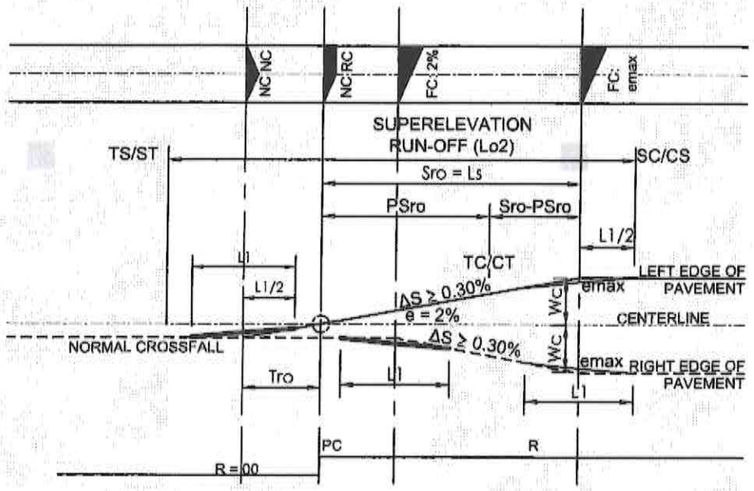
PROJECT NAME AND LOCATION:

SHEET CONTENTS: GEOMETRIC DESIGN - SUPER - ELEVATION 1

DRAFTED: JERAHFELLE D. SAYSON, ENGINEER I
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II

REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:
TEDDIE B. YAP	LENARD A. PANUGALINOG	ROSALIND R. VASQUEZ	SUSAN L. ORNOPIA-AROA
ENGINEER II	CHIEF, PLANNING AND DESIGN	OIC-ASSISTANT DISTRICT ENGINEER	OIC-DISTRICT ENGINEER
DATE :	DATE :	DATE :	DATE :

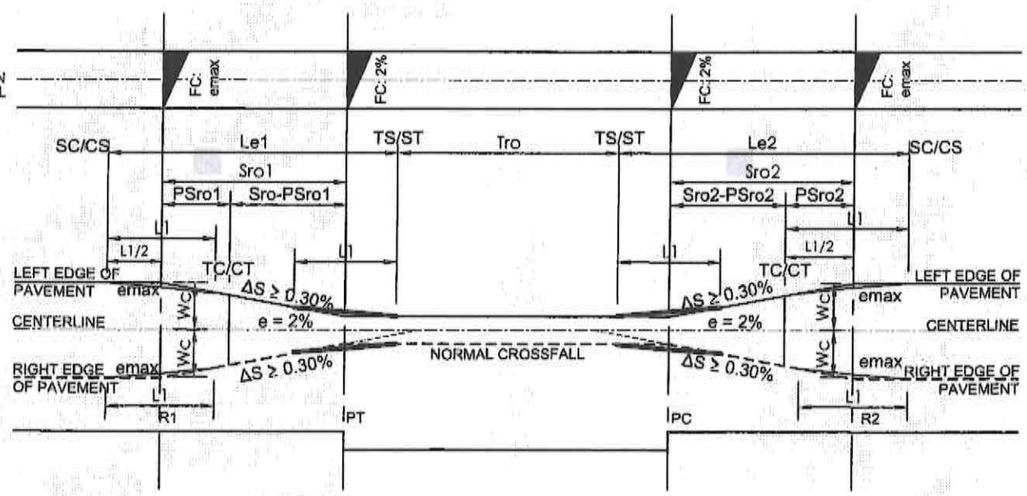
SET NO: B 10 13
SHEET NO: 13 34



1
B-11 | 14

TRANSITION: STRAIGHT - CIRCULAR CURVE CASE 1
SCALE: NTS

LEFT - SIDE
AXIS OF ROTATION PROFILE CONTROL
RIGHT - SIDE

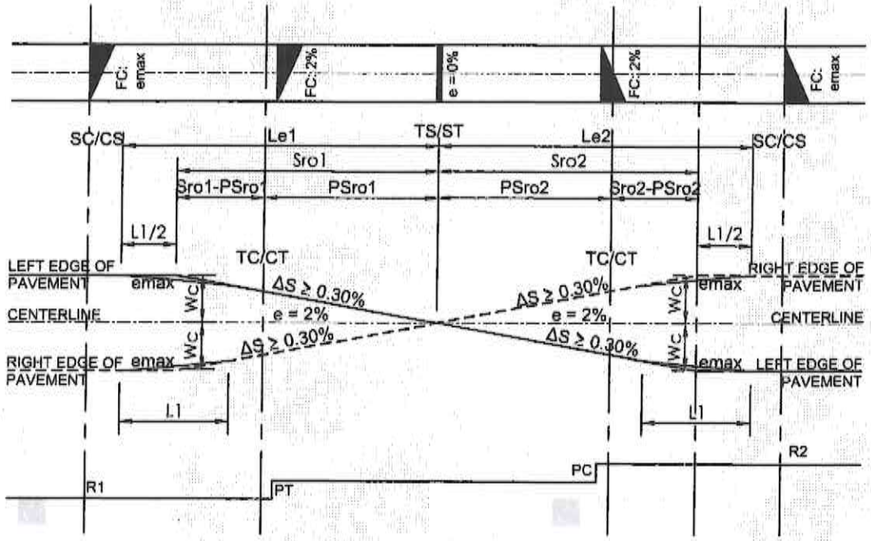


LEGEND :

NC = NORMAL CROWN
RC = REVERSE CROWN
FC = FULL CROWN
e = SUPER-ELEVATION, %
emax = MAXIMUM SUPER ELEVATION, %
L1 = LENGTH OF ROUNDING
Le = LENGTH OF SUPER ELEVATION DEVELOPMENT
Ls = LENGTH OF CLOTHOID (SPIRAL)(PER ASSHTO 2001)
PSro = PORTION OF Sro PRIOR TO CIRCULAR CURVE
Sro = SUPER-ELEVATION RUNOFF LENGTH
Tro = TANGENT RUNOUT
PT = POINT OF TANGENCY
PC = POINT OF CURVATURE
Wc = WIDENING WIDTH

2
B-11 | 14

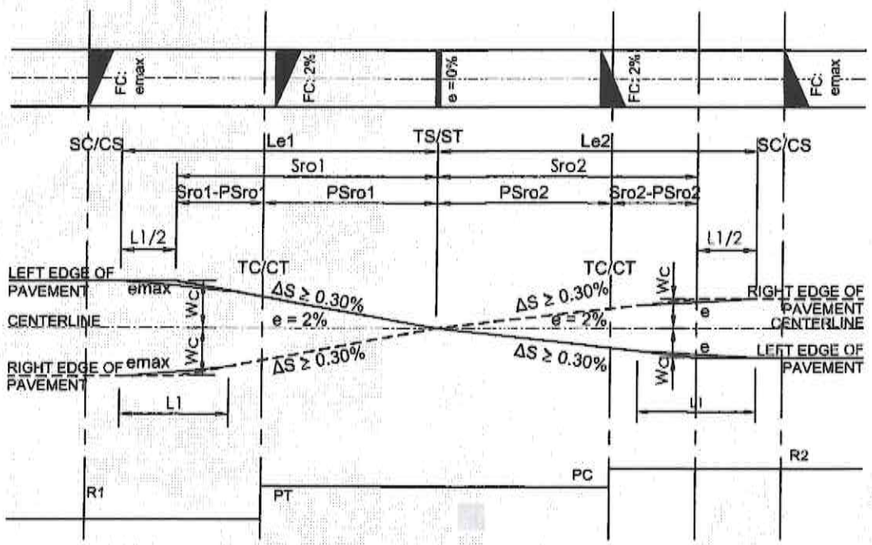
TRANSITION: CIRCULAR CURVE - STRAIGHT - CIRCULAR CURVE CASE 2
SCALE: NTS



LEFT - SIDE
AXIS OF ROTATION PROFILE CONTROL
RIGHT - SIDE

3
B-11 | 14

TRANSITION: CIRCULAR CURVE - MINIMUM STRAIGHT - CIRCULAR CURVE CASE 3
SCALE: NTS



4
B-11 | 14

TRANSITION: CIRCULAR CURVE - - CIRCULAR CURVE CASE 4
SCALE: NTS

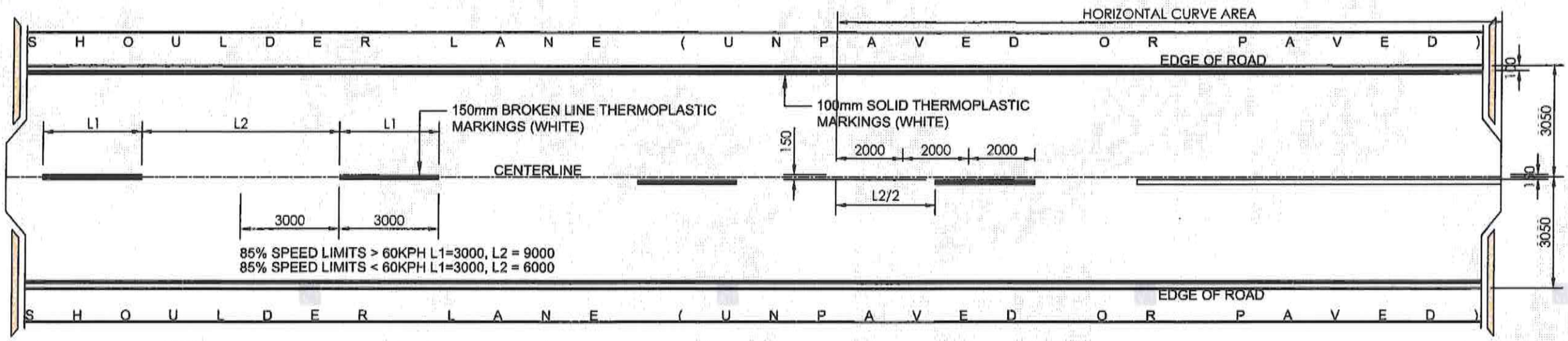
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:
DETAILED ENGINEERING DESIGN PLAN FOR CONCRETING OF BRGY. SAN GO TO BRGY. MANLAPAT FOR, BRGY. MANLAPAT, DALAGUETE, CEBU

SHEET CONTENTS:
GEOMETRIC DESIGN - SUPER - ELEVATION 2

DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
JERAHFELLE D. SAYSON ENGINEER I	TEDDIE B. YAP ENGINEER II DATE :	LENARD A. PANUGALINOG CHIEF, PLANNING AND DESIGN DATE :	ROSALIND R. VASQUEZ OIC-ASSISTANT DISTRICT ENGINEER DATE :	SUSAN L. ORNOPIA-AROA OIC-DISTRICT ENGINEER DATE :	B 11 | 13	14 34

PREPARED:
KEVIN JOSHUA A. TAMANAHA
ENGINEER II



1 / B-12 | 15

TWO LANES PAVEMENT MARKINGS
SCALE: NTS

DESIGN SPEED, kph	MINIMUM PASSING SIGHT DISTANCE, m
30.00	200.00
40.00	285.00
50.00	345.00
60.00	407.00
70.00	482.00
80.00	541.00
90.00	605.00
100.00	670.00
110.00	728.00
120.00	792.00

SCHEDULE OF PAVEMENT MARKINGS (WHITE)

LENGTH, m	NO. OF UNITS	TYPE/ DESCRIPTION	STA. BEGINNING	STA. END	TOTAL LENGTH
458.00	2.00	SOLID	STA. 0+000	STA. 0+458.00	916.00
458.00	1.00	BROKEN	STA. 0+000	STA. 0+458.00	458.00

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:

SHEET CONTENTS: PCCP MARKINGS DETAILS

DRAFTED: JERAHFELLE D. SAYSON, ENGINEER I
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II

REVIEWED: TEDDIE B. YAP, ENGINEER II, DATE :

SUBMITTED: LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :

RECOMMENDED: ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :

APPROVED: SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :

SHEETNO. B 12 | 13

SHEET NO. 15 / 34

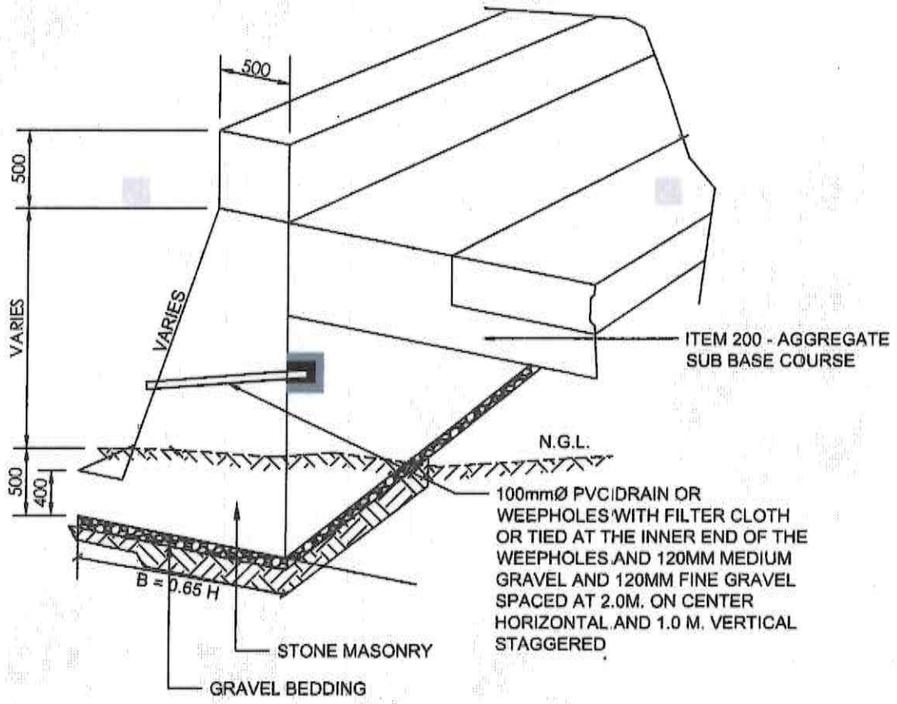
NOTES

SLOPE PROTECTION - STONE MASONRY

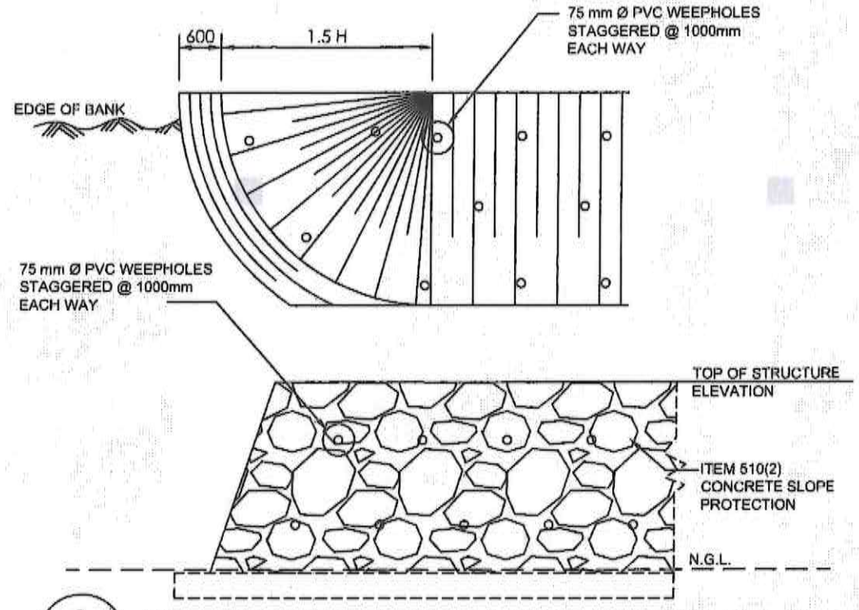
1. PRIOR TO CONSTRUCTION, CONDUCT SOIL INVESTIGATION IN ACCORDANCE WITH THE STANDARD TESTING REQUIREMENT ALONG THE ALIGNMENT OF STONE MASONRY WALL TO VERIFY THE REQUIRED DESIGN SOIL BEARING CAPACITY OF THE FOUNDATION BED.
2. STONE MASONRY STRUCTURE TO BE USED IF DIFFERENCE IN ELEVATION BETWEEN TOP AND BOTTOM NGL IS BETWEEN 2.5 METERS ONLY, ABOVE 2.5METERS SPECIAL DESIGN OF SLOPE PROTECTION MUST BE USED.
3. THE COST OF FINE MEDIUM GRAVEL, WEEPHOLES, (BURLAP CLOTH) USED FOR THE WEEPHOLES SHALL BE CONSIDERED SUBSIDIARY TO COMPLETION OF PAY ITEM WHERE IT IS USED.
4. ALL WEEPHOLES SHALL HAVE A SLOPE OF 0.5%.
5. DESIGN CRITERIA OF STONE MASONRY

γ MASONRY	-	23.55kN/m³
γ SOIL	-	15.70kN/m³
Ø	-	35.70° ANGLE OF INTERVAL REPOSE
Qa	-	196kPa (TO BE VERIFIED DURING CONSTRUCTION)
μ	-	0.50 ASSUMED COEFFICIENT OF FRICTION
Qs	-	22.52 kPa
FSo	-	2.00
FS	-	1.50

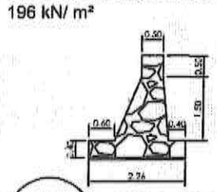
ALLOWABLE SOIL BEARING CAPACITY = 196 kN/ m²



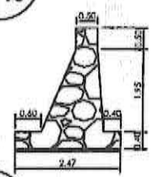
1 B-13 16 STONE MASONRY ISOMETRIC VIEW
SCALE: NTS



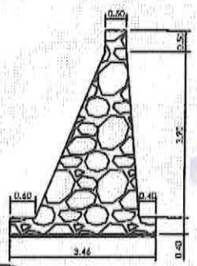
2 B-13 16 END PROTECTION DETAILS (PLAN & ELEVATION)
SCALE: NTS



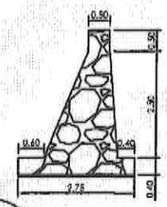
5 B-13 16 SM-1 DETAIL
SCALE: NTS



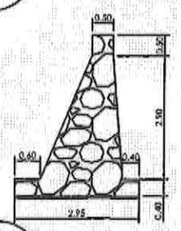
6 B-13 16 SM-2 DETAIL
SCALE: NTS



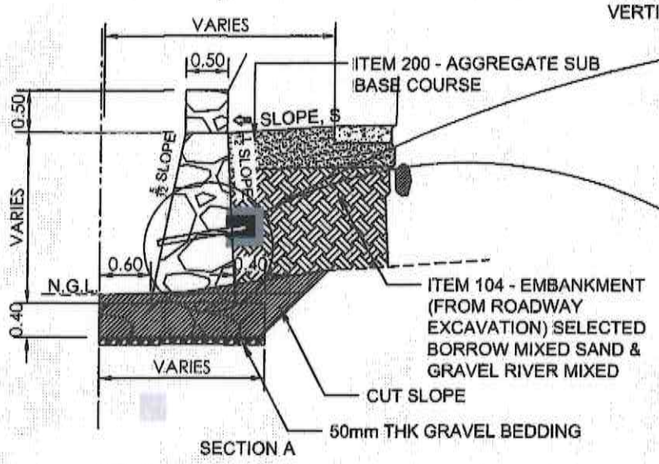
7 B-13 16 SM-3 DETAIL
SCALE: NTS



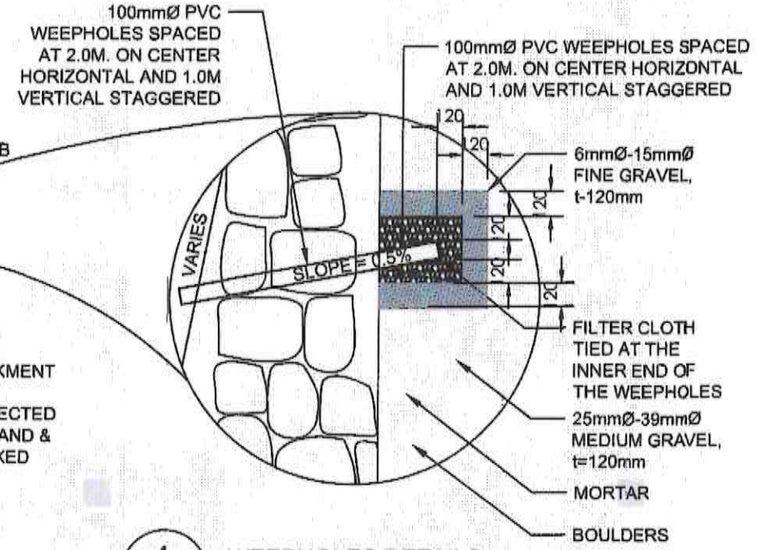
8 B-13 16 SM-4 DETAIL
SCALE: NTS



9 B-13 16 SM-5 DETAIL
SCALE: NTS



3 B-13 16 STONE MASONRY (SM) DETAIL
SCALE: NTS



4 B-13 16 WEEPHOLES DETAILS
SCALE: NTS

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. VII
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU

PROJECT NAME AND LOCATION:
C.Y. 2021 PROJECT
CONCRETING OF BRGY. SALUG TO BRGY. SAMLAPAY FWD, BRGY. MANLAPAY, DALAGUETE, CEBU
NET LENGTH = 474.00 M

SHEET CONTENTS:
SLOPE PROTECTION - STONE MASONRY DETAILS

DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
JERAHFELLE D. SAYSON, ENGINEER I	TEDDIE B. YAP, ENGINEER II, DATE :	LENARD A. PANUGALINOG, CHIEF, PLANNING AND DESIGN, DATE :	ROSALIND R. VASQUEZ, OIC-ASSISTANT DISTRICT ENGINEER, DATE :	SUSAN L. ORNOPIA-AROA, OIC-DISTRICT ENGINEER, DATE :	B 13 13	16 34
PREPARED: KEVIN JOSHUA A. TAMANAHA, ENGINEER II						