REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

REGIONAL OFFICE No. IV-A

BATANGAS 2ND DISTRICT ENGINEERING OFFICE

KUMINTANG ILAYA, BATANGAS CITY

C.Y. 2025 PROJECT

DETAILED ENGINEERING DESIGN PLAN FOR

OPENING AND CONCRETING OF BRGY. ESTRELLA TO BRGY. LAUREL FMR, BRGY. ESTRELLA AND BRGY. LAUREL, MABINI, BATANGAS

BRGY. ESTRELLA AND BRGY. LAUREL MABINI, BATANGAS
STA. 0+000 - STA. 0+280.00

LENGTH = 280.00 l.m.

START	END
LAT: 13.72686	LAT: 13.72576
LONG: 120.90456	LONG: 120.90331

SUBMITTED:

GEMMA L. OLAN
CHIEF, PLANNING AND DESIGN SECTION
DATE:

RECOMMENDED:

ARIEL V. ARMEDILLA
ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:

SONIA D. PAGLICAUAN
DISTRICT ENGINEER
DATE:

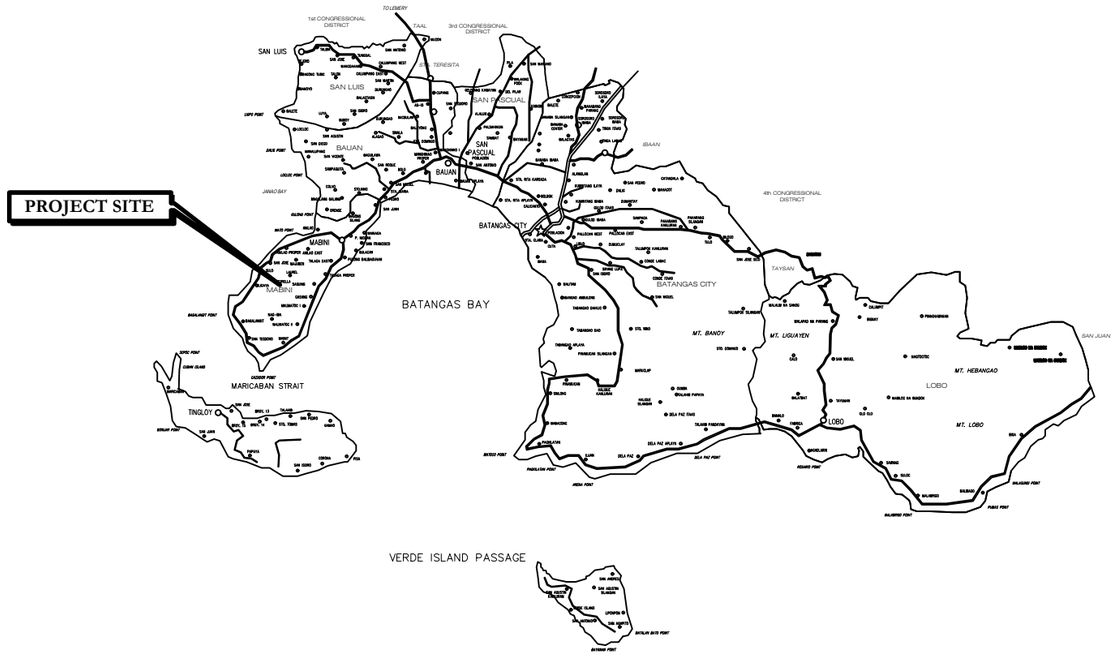
INDEX OF DRAWINGS

A. GENERAL

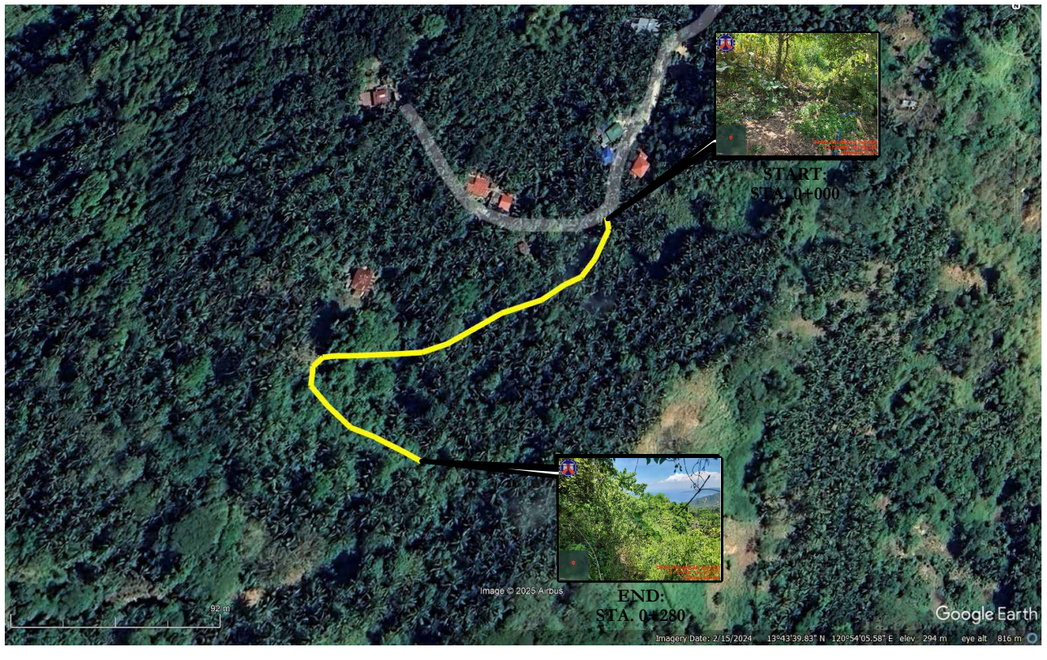
B. ROAD

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. IV-A
BATANGAS 2ND DISTRICT
ENGINEERING OFFICE
KUMINTANG ILAYA, BATANGAS CITY

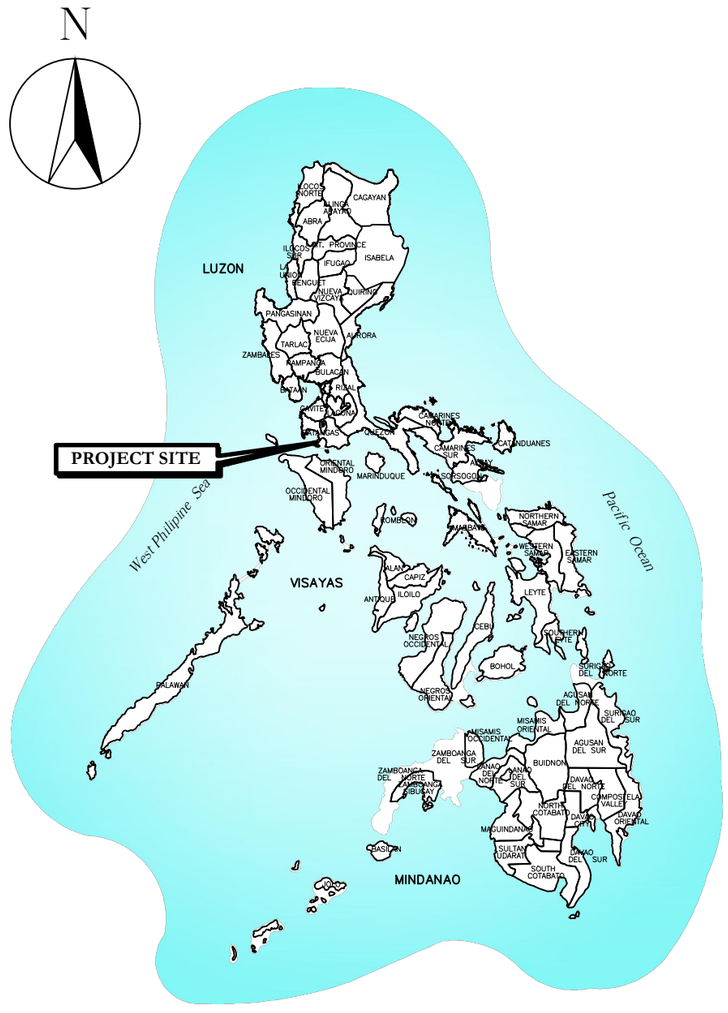
PROJECT NAME AND LOCATION:	SHEET CONTENT:	DRAFTED:	REVIEWED :	SUBMITTED :	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas	INDEX OF DRAWINGS	**MARK LEE M. DALANGIN** ENGINEER II PREPARED: **JUNEIL RAY M. CHAVEZ** ENGINEER II	**BRYAN EDWARD R. ANDAL** ENGINEER II DATE:	**GEMMA L. OLAN** CHIEF PLANNING AND DESIGN SECTION DATE:	**ARIEL V. ARMEDILLA** ASSISTANT DISTRICT ENGINEER DATE:	**SONIA D. PAGLICAUAN** DISTRICT ENGINEER DATE:	G 1 6	2 23



LOCATION MAP



VICINITY MAP



KEY MAP

REPUBLIC OF THE PHILIPPINES **DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS** REGIONAL OFFICE No. IV-A BATANGAS 2ND DISTRICT ENGINEERING OFFICE KUMINTANG ILAYA, BATANGAS CITY	PROJECT NAME AND LOCATION: Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas	SHEET CONTENT: LOCATION MAP VICINITY MAP AND KEY MAP	DRAFTED: **MARK LEE M. DALANGIN** ENGINEER II PREPARED: **JUNEIL RAY M. CHAVEZ** ENGINEER II	REVIEWED : **BRYAN EDWARD R. ANDAL** ENGINEER II DATE:	SUBMITTED : **GEMMA L. OLAN** CHIEF PLANNING AND DESIGN SECTION DATE:	RECOMMENDED: **ARIEL V. ARMEDILLA** ASSISTANT DISTRICT ENGINEER DATE:	APPROVED: **SONIA D. PAGLICAUAN** DISTRICT ENGINEER DATE:	SET NO. G 2 / 6	SHEET NO. 3 23

GENERAL NOTES

1.0 GENERAL

1.1 IN THE INTERPRETATION OF DRAWINGS INDICATED DIMENSION SHALL GOVERN ALL DIMENSION, DISTANCE AND SIZES SHALL NOT BE SCALED FOR CONSTRUCTION PURPOSES.

1.2 UNLESS OTHERWISE INDICATED, ALL DIMENSIONS AND MEMBER SIZES ARE IN ALL MILLIMETERS.

2.0 SPECIFICATION

2.1 DESIGN SPECIFICATION

2.1.1 ALL WORKS SHALL COMPLY WITH THE TECHNICAL STANDARD FOR PLANNING AND DESIGN, VOLUME 1, FLOOD CONTROL DPWH STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND AIRPORTS 2013.

3.0 DESIGN CRITERIA

3.1 DESIGN DATA / REFERENCES

3.1.1 THE DESIGN DATA ADOPTED IN THIS PROJECT WAS MAINLY ESTABLISHED WITH REFERENCE TO AASHTO'S POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS AND DESIGN GUIDELINES, CRITERIA AND STANDARDS (DGCS VOL 4), DPWH.

3.2 SLOPES

3.2.1 THE SIDE SLOPE SHOULD BE GENTLER ON THE RIVERSIDE OF THE EMBANKMENT THAN 1V:1.5H PROTECTED BY PROVIDING A TOTAL COVER OF 300mm THICK OF STONE MASONRY.

3.2.2 ON THE LANDWARD SIDE, STEEPER SLOPE CAN BE ACHIEVED WITH CRIBWALL OR STONE MASONRY WHERE SPACED MAY BE RESTRICTED.

4.0 HORIZONTAL CONTROL

4.1 THE AZIMUTH USED IN THIS PROJECT WAS BASED ON THE EXISTING BENCHMARK. THE EXISTING BENCHMARK (BM1) WAS LOCATED AT STA. 11+362.70 AND HAS COORDINATES OF N = 1,507,837.140, E = 493,501.716

5.0 VERTICAL CONTROL

5.1 THE DATUM USED IN THIS PROJECT WAS REFERED FROM BM1 (N = 1507837.140, E = 493,501.716), WITH ELEVATION OF 22.446m.

6.0 CONSTRUCTION REQUIREMENT

6.1 SETTING OUT

6.1.1 THE SETTING OUT AND THE ELEVATION OF DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE START OF ANY CONSTRUCTION WORK.

6.2 EXCAVATION

6.2.1 ALL EXCAVATION WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND IN CONFORMITY WITH THE LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER.

6.3 EMBANKMENT

6.3.1 EARTH EMBANKMENT SHALL BE IN ACCORDANCE WITH THE SPECIFICATION AND IN CONFORMITY WITH THE LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER.

6.3.2 PRIOR TO CONSTRUCTION OF EMBANKMENT, ALL NECESSARY CLEARING AND GRUBBING IN THAT AREA SHALL HAVE BEEN PERFORM.

6.3.3 THE SURFACE OF THE EXISTING GROUND SHALL BE COMPACTED TO A DEPTH OF 150mm AND TO THE SPECIFIED REQUIREMENTS. EMBANKMENT SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 200mm LOOSE MEASUREMENT AND SHALL BE COMPACTED AS SPECIFIED BEFORE THE NEXT LAYER IS PLACED.

6.4 STONE MASONRY

6.4.1 WHEN THE MASONRY IS TO BE PLACED ON A PREPARED FOUNDATION BED, THE BED SHALL BE FIRM AND NORMAL TO, OR IN STEPS NORMAL TO THE FACE OF THE WALL AND SHALL HAVE BEEN APPROVED BY THE ENGINEER BEFORE ANY STONE IS PLACED.

6.4.2 CARE SHALL BE TAKEN TO PREVENT THE BUNCHING OF SMALL STONES OR STONES OF THE SAME SIZE LARGE STONES SHALL BE USED IN THE CORNER.

6.4.3 ALL STONES SHALL BE CLEAN THOROUGHLY AND WETTED IMMEDIATELY BEFORE BEING SET, AND THE BED WHICH IS TO RECEIVE THEM SHALL BE CLEANED AND MOISTENED BEFORE THE MORTAR IS SPREAD. THEY SHALL BE LAID WITH THEIR LONGEST FACES HORIZONTAL ON FULL BEDS OF MORTAR, AND THE JOINTS SHALL BE FLUSHED WITH MORTAR.

6.4.4 THE EXPOSED FACES OF INDIVIDUAL STONES SHALL BE PARALLEL TO THE FACES OF THE WALLS IN WHICH THE STONES ARE SET.

6.4.5 THE STONES SHALL BE SO HANDLED AS NOT TO JAR OR DISPLACED THE STONES ALREADY SETS. SUITABLE EQUIPMENT SHALL BE PROVIDED FOR SETTING STONES LARGER THAN THOSE THAT CAN BE HANDLED BY TWO MEN. THE ROLLING OR TURNING OF STONES ON THE WALL WHERE NOT BE PERMITTED. IF A STONE IS LOOSENED AFTER THE MORTAR HAS TAKEN INITIAL SET, IT SHALL BE REMOVED, THE MORTAR CLEANED OFF, AND THE STONE RELAID WITH FRESH MORTAR.

6.4 STRUCTURAL CONCRETE

6.4.1 PORTLAND CEMENT

6.4.1.1 IT SHALL CONFORM TO ALL THE REQUIREMENTS OF SUBSECTION 311.2.1.

6.4.2 FINE AGGREGATES

6.4.2.1 IT SHALL CONFORM TO ALL THE REQUIREMENTS OF SUBSECTION 311.2.2.

6.4.3 COARSE AGGREGATES

6.4.3.1 IT SHALL CONFORM ALL THE REQUIREMENTS OF SUBSECTION 311.2.3 EXCEPT THAT GRADATION SHALL CONFORM TO TABLE 405.1.

Table 405.1 – Grading Requirements for Coarse Aggregate

Sieve Designation		Mass Percent Passing				
Standard Mm	Alternate US Standard	Class A	Class B	Class C	Class P	Class Seal
63	2-1/2"		100			
50	2"	100	95 – 100			100
37.5	1-1/2"	95 – 100	-			95 – 100
25	1"	-	35 – 70			-
19.0	¾"	35 – 70	-	100	100	25 – 60
12.5	½"	-	10 – 30	90 – 100	95 – 100	-
9.5	3/8"	10 – 30	-	40 – 70	-	0 – 10*
4.75	No.4	0 - 5	0 – 5	0 – 15*	20 – 55	
					0 – 10*	

6.4 REINFORCING STEEL

6.4.1 CONSTRUCTION REQUIREMENT

6.4.1.2 BEFORE MATERIALS ARE ORDERED, ALL ORDER LISTS AND BENDING DIAGRAMS SHALL BE FURNISHED BY THE CONTRACTOR, FOR APPROVAL OF THE ENGINEER. THE APPROVAL OF ORDER LISTS AND BENDING DIAGRAMS BY THE ENGINEER SHALL IN NO WAY RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR THE CORRECTNESS OF SUCH LISTS AND DIAGRAMS. ANY EXPENSE INCIDENT TO THE REVISIONS OF MATERIALS FURNISHED I ACCORDANCE WITH SUCH LISTS AND DIAGRAMS TO MAKE THEM COMPLY WITH THE PLANS SHALL BE BORNE BY THE CONTRACTOR.

6.4.1.2 STEEL REINFORCEMENT SHALL BE STORED ABOVE THE SURFACE OF THE GROUND UPON PLATFORMS, SKIDS, OR OTHER SUPPORTS AND SHALL BE PROTECTED AS FAR AS PRACTICABLE FROM MECHANICAL INJURY AND SURFACE DETERIORATION CAUSED BY EXPOSURE TO CONDITIONS PRODUCING RUST. WHEN PLACED IN THE WORK, REINFORCEMENT SHALL BE FREE FROM DIRT, DETRIMENTAL RUST, LOOSE SCALE, PAINT, GREASE, OIL, OR OTHER FOREIGN MATERIALS. REINFORCEMENT SHALL BE FREE FROM INJURIOUS DEFECTS SUCH AS CRACKS AND LAMINATIONS. RUST, SURFACE SEAMS, SURFACE IRREGULARITIES OR MILL SCALE WILL NOT BE CAUSE FOR REJECTION, PROVIDED THE MINIMUM DIMENSIONS, CROSS SECTIONAL AREA AND TENSILE PROPERTIES OF A HAND WIRE BRUSHED SPECIMEN MEETS THE PHYSICAL REQUIREMENTS FOR THE SIZE AND GRADE OF STEEL SPECIFIED.

6.4.1.3 ALL REINFORCING BARS REQUIRING BENDING SHALL BE COLD-BENT TO THE SHAPES SHOWN ON THE PLANS OR REQUIRED BY THE ENGINEER. BARS SHALL BE BENT AROUND A CIRCULAR PIN HAVING THE FOLLOWING DIAMETERS (D) IN RELATION TO THE DIAMETER OF THE BAR (D):

Nominal diameter, d, mm	Pin diameter (D)
10 to 20	6d
25 to 28	8d
32 and greater	10d

BENDS AND HOOKS IN STIRRUPS OR TIES MAY BE BENT TO THE DIAMETER OF THE PRINCIPAL BAR ENCLOSED THEREIN.

6.4.1.4 ALL REINFORCEMENT SHALL BE FURNISHED IN THE FULL LENGTHS INDICATED ON THE PLANS. SPLICING OF BARS, EXCEPT WHERE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. SPLICES SHALL BE STAGGERED AS FAR AS POSSIBLE AND WITH A MINIMUM SEPARATION OF NOT LESS THAN 40 BAR DIAMETERS. NOT MORE THAN ONE-THIRD OF THE BARS MAY BE SPLICED IN THE SAME CROSS-SECTION, EXCEPT WHERE SHOWN ON THE PLANS.

UNLESS OTHERWISE SHOWN ON THE PLANS, BARS SHALL BE LAPPED A MINIMUM DISTANCE OF:

Splice Type	Grade 40 min. lap	Grade 60 min. lap	But not less than
Tension	24 bar dia	36 bar dia	300 mm
Compression	20 bar dia	24 bar dia	300 mm

IN LAPPED SPLICES, THE BARS SHALL BE PLACED IN CONTACT AND WIRED TOGETHER. LAPPED SPLICES WILL NOT BE PERMITTED AT LOCATIONS WHERE THE CONCRETE SECTION IS INSUFFICIENT TO PROVIDE MINIMUM CLEAR DISTANCE OF ONE AND ONE-THIRD THE MAXIMUM SIZE OF COARSE AGGREGATE BETWEEN THE SPLICE AND THE NEAREST ADJACENT BAR. WELDING OF REINFORCING STEEL SHALL BE DONE ONLY IF DETAILED ON THE PLANS OR IF AUTHORIZED BY THE ENGINEER IN WRITING. SPIRAL REINFORCEMENT SHALL BE SPLICED BY LAPPING AT LEAST ONE AND A HALF TURNS OR BY BUTT WELDING UNLESS OTHERWISE SHOWN ON THE PLANS.

6.5 FACILITIES FOR THE ENGINEER

6.5.1 OFFICES AND LABORATORIES FOR THE ENGINEER

6.5.1.1 THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FIELD OFFICES AND TESTING LABORATORIES, INCLUDING ALL THE NECESSARY ELECTRICITY, WATER, DRAINAGE AND TELEPHONE SERVICES FOR THE USE OF THE ENGINEER AND HIS STAFF. THE OFFICES AND LABORATORIES SHALL HAVE AT LEAST THE FLOOR AREA PRESCRIBED ON THE PLANS AND SHALL CONTAIN THE EQUIPMENT, SUPPLIES AND FURNISHINGS SPECIFIED IN THE CONTRACT. TESTING EQUIPMENT SUPPLIED IN ACCORDANCE WITH THE SPECIAL PROVISIONS SHALL BE LOCATED IN TESTING LABORATORIES AS REQUIRED BY THE ENGINEER. ALL OFFICES AND LABORATORIES SHALL BE READY FOR OCCUPANCY AND USE BY THE ENGINEER WITHIN TWO (2) MONTHS OF THE COMMENCEMENT OF THE WORKS. THEIR LOCATION AND FINAL PLAN SHALL REQUIRE THE APPROVAL OF THE ENGINEER PRIOR TO THE START OF CONSTRUCTION. IT IS THE INTENT OF THIS SPECIFICATION TO LOCATE THE FIELD OFFICES AND LABORATORIES IN GOVERNMENT OWNED LOTS SO THAT THE USE BY THE GOVERNMENT OF THESE FACILITIES CAN BE MAXIMIZED EVEN AFTER THE COMPLETION OF THE PROJECT. HOWEVER, IF NO GOVERNMENT LOT IS AVAILABLE, AND THESE STRUCTURES ARE TO BE ERECTED ON PRIVATE PROPERTY, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE THE NECESSARY ARRANGEMENTS WITH THE LANDOWNER(S) REGARDING THE USE OF THE LOT FOR THE ENGINEER'S OFFICE AND LABORATORIES AND TO REMOVE AND/OR TRANSFER, IF SO REQUIRED UNDER THE CONTRACT, THE IMPROVEMENTS THEREON, INCLUDING ALL APPURTENANCES UPON COMPLETION OF THE WORKS.

6.5.1.2 ALL FACILITIES PROVIDED BY THE CONTRACTOR SHALL BE NEAR THE JOB SITE, WHERE NECESSARY AND SHALL CONFORM TO THE BEST STANDARD FOR THE REQUIRED TYPES. ON COMPLETION OF THE CONTRACT, THE FACILITIES PROVIDED BY THE CONTRACTOR INCLUDING UTILITIES AND COMMUNICATION FACILITIES SHALL REVERT TO THE GOVERNMENT INCLUDING OFFICE EQUIPMENT, APPARATUS, PIECES OF FURNITURE, LABORATORY EQUIPMENT, ETC, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

7.0 PHOTOGRAPHS

7.1.1 THE CONTRACTOR SHALL PROVIDE RECORD PHOTOGRAPHS TAKEN AS, WHEN AND WHERE DIRECTED BY THE ENGINEER AT INTERVALS OF NOT MORE THAN ONE MONTH. THE PHOTOGRAPHS SHALL BE SUFFICIENT IN NUMBER AND LOCATION TO RECORD THE EXACT PROGRESS OF THE WORKS. THE CONTRACTOR SHALL PROVIDE ONE PROOF PRINT OF EACH PHOTOGRAPH TAKEN, AND THE NEGATIVE AND TEN COPIES, NOT LESS THAN 254 MM X 203 MM AND PRINTED ON GLOSSY PAPER, OF ANY OF THE PHOTOGRAPHS BY THE ENGINEER. THE PHOTOGRAPHS RETAINED BY THE ENGINEER WILL BECOME THE PROPERTY OF THE GOVERNMENT AND THE CONTRACTOR SHALL SUPPLY APPROVED ALBUMS TO ACCOMMODATE THEM. TWO COPIES ARE TO BE SIGNED BY THE CONTRACTOR, ONE OF WHICH WILL BE SIGNED BY THE ENGINEER AND RETURNED TO THE CONTRACTOR.

LEGEND :

SYMBOL	LEGEND	SYMBOL	LEGEND
	GATE VALVE	TP	TIMBER TELEPHONE POST
	STREET LIGHT POST	CP	CONCRETE TELEPHONE POST
	TREE		MANILA WATER SEWERAGE SYSTEM
CP	CONCRETE ELECTRIC POST		PLAN KILOMETER FULL STATION
	MAN HOLE		TRAVERSE
	DEEP WELL		NORTH SIGN
	GATE	0+00.00	STATION
	TRANSCO		LENGTH OF VERTICAL CURVE
	BENCH MARK		RIVER / SEA / CREEK
	CURB INLET		EXISTING BRIDGE
	SIGN POST		CONTOUR-MAJOR
	PLOT		CONTOUR-MINOR

ABBREVIATIONS :

ACP	ASPHALT CONCRETE PAVEMENT	M	METER
AZM.	AZIMUTH	Max	MAXIMUM
BLDG	BUILDING	MH	MANHOLE
BM	BENCH MARK	mm	MILLIMETER
BOQ	BILL OF QUANTITIES	Mo	MIDDLE ORDINATE
BR	BRIDGE	MUN	MUNICIPAL
BRDY	BOUNDARY	MWSS	MANILA WATER SEWERAGE SYSTEM
BRGY	BARANGAY	NB	NORTH BOUND
BVCE	BEGIN OF VERTICAL CURVE ELEV.	O.C.	ON CENTER
BVCS	BEGIN OF VERTICAL CURVE STATION	OIE	OUTLET INVERT ELEVATION
BW	BOTHWAYS	PC	POINT OF CURVATURE
CEP	CONCRETE ELECTRIC POST	PCCP	PORTLAND CONCRETE CEMENT PAVEMENT
CIM	CURB INLET MANHOLE	PI	POINT OF INTERSECTION
CL	CENTERLINE	PT	POINT OF TANGENCY
cm	CENTIMETER	PVI	POINT OF VERTICAL INTERSECTION
CS	CURB TO SPIRAL	PVC	POINT OF VERTICAL CURVE
CTP	CONCRETE TELEPHONE POST	PVT	POINT OF VERTICAL TANGENCY
CU	CULVERT	R	RADIUS
D	DEGREE OF CURVE	RC	REINFORCED CONCRETE
DIST.	DISTANCE	RCBC	REINFORCED CONCRETE BOX CULVERT
DLI - 01	DRAINAGE MANHOLE MEMBER	RCPC	REINFORCED CONCRETE PIPE CULVERT
DPWH	DEPARTMENT OF PUBLIC WORKS AND HIGHWAY	RD	ROAD
E	EXTERNAL DISTANCE/EASTING	/RROW	ROAD RIGTH - OF - WAY
e	SUPERELEVATION	RT	RIGHT
EB	EAST BOUND	S	NORMAL CROSSFALL
ELEV.	ELEVATION	SB	SOUTH BOUND
EXTG.	EXISTING	SHLDR	SHOULDER
g	GRADIENT	STA	STATION
GV	GATE VALVE	STD	STANDARD
HOR	HORIZONTAL	STP	STEEL TELEPHONE POST
I	INTERSECTION ANGLE	SW	SOUTH WEST
I I E	INLET INVERT ELEVATION	T	TANGENT
INT'L	INTERNATIONAL	TBM	TEMPORARY BENCH MARK
KMS	KILOMETERS	VC	VERTICAL CURVE
L	LEFT/LENGTH	VERT. V	VERTICAL
Lc	LENGTH OF HORIZONTAL CURVE	W	WIDENING
Lm	LINEAR METER	WB	WEST BOUND
LP	STEEL LIGHT POST	WW	WINGWALL
LT	LEFT	Ø	DIAMETER
LVC	LENGTH OF VERTICAL CURVE	N C	NORMAL CROWN

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SHEET CONTENT:
GENERAL NOTES
LEGEND AND ABBREVIATION

DRAFTED:
MARK LEE M. DALANGIN
ENGINEER II

PREPARED:
JUNEIL RAY M. CHAVEZ
ENGINEER II

REVIEWED :
BRYAN EDWARD R. ANDAL
ENGINEER II
DATE:

SUBMITTED :
GEMMA L. OLAN
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DATE:

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SONIA D. PAGLICAUAN
DISTRICT ENGINEER
DATE:

SET NO. G 3 6

SHEET NO. 4 23

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QTY	REMARKS
PART A	**FACILITIES FOR THE ENGINEER**			
A.1.1 (8)	Provision of Field Office for the Engineer (Rental Basis)	Month	3.80	
A.1.4 (1)	Provision of Progress Photographs	Month	3.80	
PART B	**OTHER GENERAL REQUIREMENTS**			
B.5	Project Billboard / Signboard	Each	2.00	"1 each" corresponds to a set of DPWH and COA Billboard
B.7 (2)	Occupational Safety and Health Program	Lump Sum	1.00	
B.8 (1)	Traffic Management	Month	3.80	
B.9	Mobilization / Demobilization	Lump Sum	1.00	
B.16	Recognition Plate/Project Marker	Each	2.00	
PART C	**EARTHWORK**			
100 (1)	Clearing and Grubbing	Hectare	0.28	
100 (3) a1	Individual Removal of Trees, 150 - 300 mm dia., Small	Each	6.00	
102 (2)	Surplus common excavation	cu.m.	11,367.10	
105 (1) a	Subgrade Preparation, Common Material	sq.m.	2,184.00	
PART D	**SUBBASE AND BASE COURSE**			
200 (1)	Aggregate Subbase Course	cu.m.	596.40	
PART E	**SURFACE COURSES**			
311 (1) b1	Portland Cement Concrete Pavement (Unreinforced), 0.20 m thick, 14 days	sq.m	1,400.00	
PART G	**DRAINAGE AND SLOPE PROTECTION STRUCTURES**			
506 (1)	Stone Masonry	cu.m.	87.21	

NOTE:

1. THE STAKE-OUT SURVEY BETWEEN CONTRACTOR AND THE GOVERNMENT SHALL BE CONSIDERED AS THE FINAL PLAN.
2. THE ITEM OF WORK IDENTIFIED WITH THE CORRESPONDING COMPUTED QUANTITIES IN THE APPROVED JOINT AS-STAKE SURVEY PLANS WILL BE THE BASIS OF PAYMENT.

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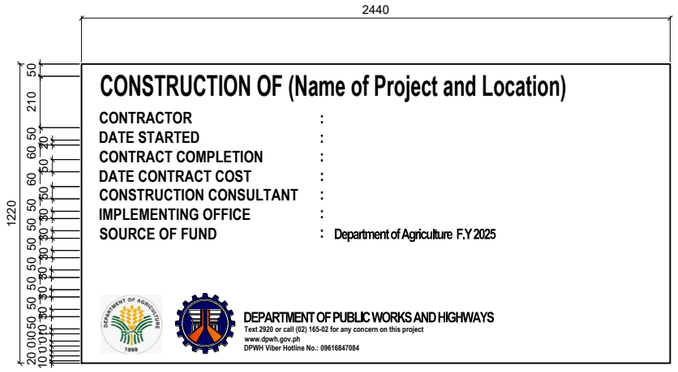
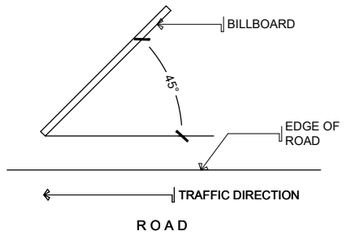
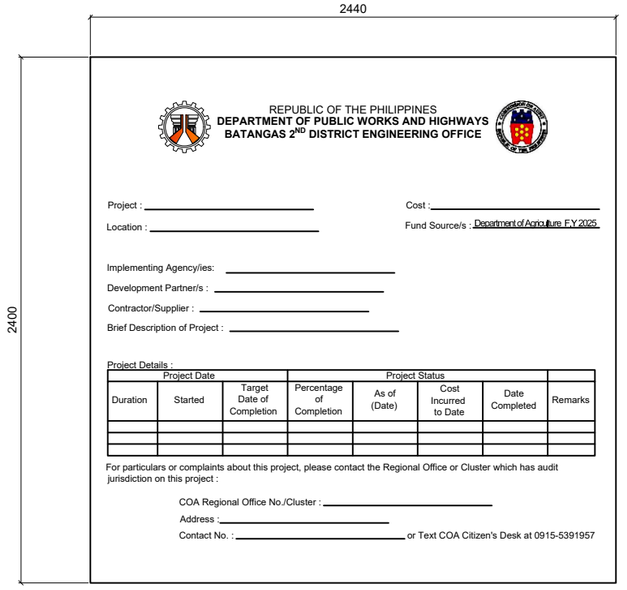


DPWH STANDARD PROJECT BILLBOARD



ORIENTATION



COA STANDARD PROJECT BILLBOARD

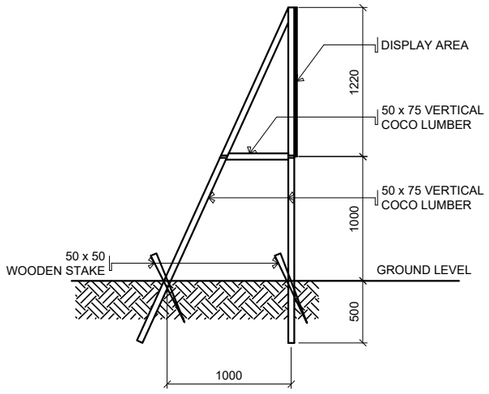
SPECIFICATION :

TARPAULIN, WHITE, 8 ft x 8 ft
RESOLUTION : 70 DPI
FONT : HELVETICA
FONT SIZE : MAIN INFORMATION - 3"
FONT COLOR : BLACK

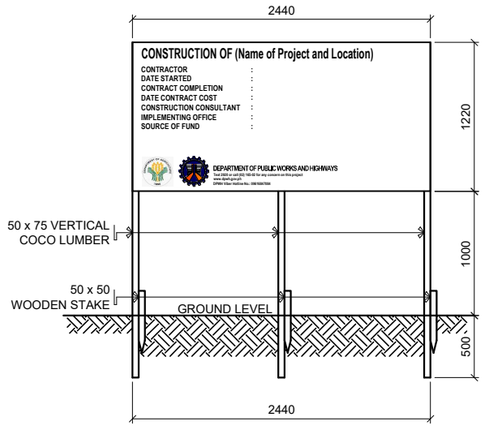
NOTES:

AS PER DEPARTMENT ORDER NO. 021 SERIES OF 2017

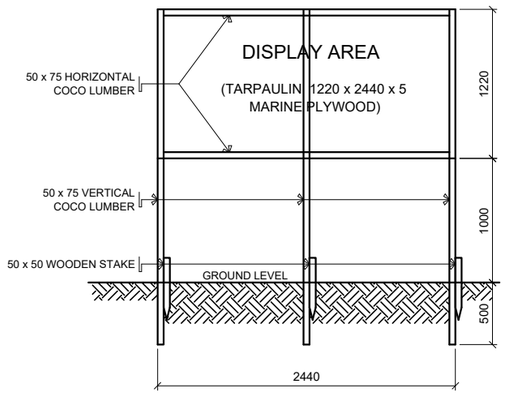
1. THE NEW BILLBOARD DESIGN LAYOUT AND DIMENSION (SEE DRAWING) SHALL BE INSTALLED ON A STANDARD BILLBOARD MEASURING 1220mm. x 2440mm. USING 12mm. (1/2 inch) THICK MARINE PLYWOOD OR TARPAULIN POSTED ON 5mm. (3/16 inch) MARINE PLYWOOD.
2. FOR EACH BUILDING PROJECT, THE BILLBOARD SHALL BE INSTALLED IN FRONT OF THE PROJECT SITE.
3. FOR EACH ROAD/BRIDGE/FLOOD CONTROL PROJECT, TWO BILLBOARDS SHALL BE INSTALLED, I.E., ONE AT THE BEGINNING AND ONE AT THE END OF THE PROJECT.
4. FOR ROAD PROJECTS WITH LENGTH OF 10 KILOMETERS OR MORE, BILLBOARD(S) SHALL ALSO BE INSTALLED AT EVERY 5 KILOMETERS INTERVAL.
5. NAME(S) AND/OR PICTURE(S) OF ANY PERSONAGES SHOULD NOT APPEAR IN THE BILLBOARD.
6. NO POLITICAL BILLBOARDS SHALL BE ALLOWED TO BE INSTALLED 100 METERS BEFORE AND 100 METERS AFTER ALL DPWH PROJECTS AND IN BETWEEN THE PROJECT LIMITS OR WITHIN THE ROAD RIGHT-OF-WAY.
7. DPWH CONTRACTORS SHALL NOT BE ALLOWED TO PLACE NAMES OF POLITICIANS ON THEIR EQUIPMENT OR CARRY POLITICAL BILLBOARD ON THEIR EQUIPMENT.



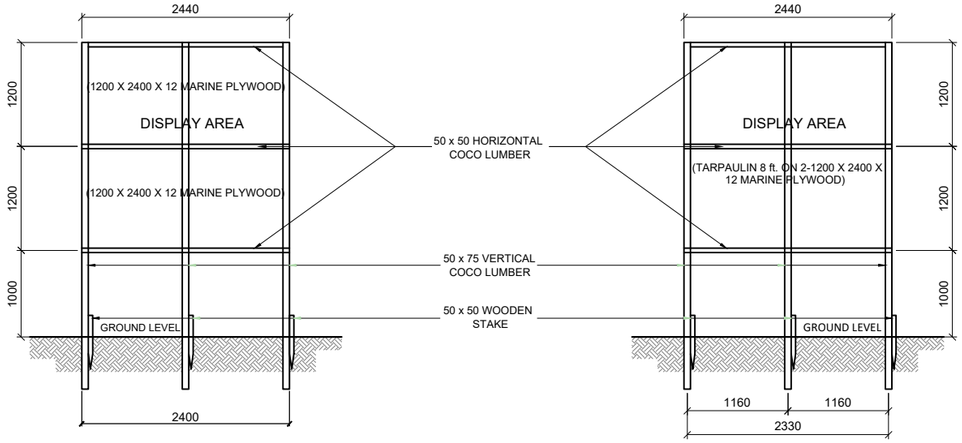
TYPICAL FRAME ELEVATION

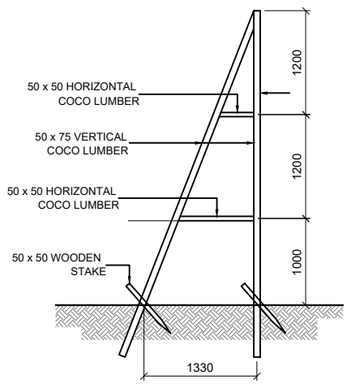


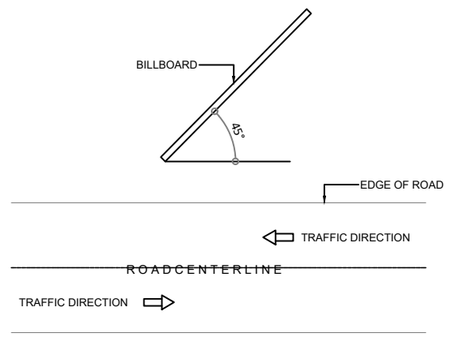
FRONT ELEVATION



REAR ELEVATION

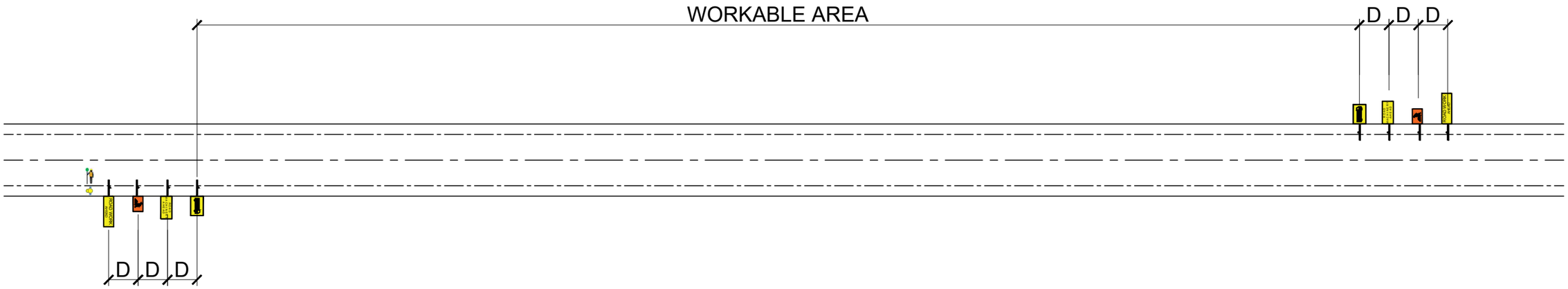




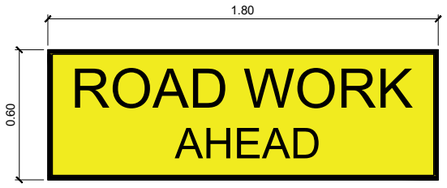


REPUBLIC OF THE PHILIPPINES **DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS** REGIONAL OFFICE No. IV-A BATANGAS 2ND DISTRICT ENGINEERING OFFICE KUMINTANG ILAYA, BATANGAS CITY	PROJECT NAME AND LOCATION: Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas	SHEET CONTENT: STANDARD PROJECT BILLBOARD	DRAFTED: **MARK LEE M. DALANGIN** ENGINEER II PREPARED: **JUNEIL RAY M. CHAVEZ** ENGINEER II	REVIEWED : **BRYAN EDWARD R. ANDAL** ENGINEER II DATE:	SUBMITTED : **GEMMA L. OLAN** CHIEF PLANNING AND DESIGN SECTION DATE:	RECOMMENDED: **ARIEL V. ARMEDILLA** ASSISTANT DISTRICT ENGINEER DATE:	APPROVED: **SONIA D. PAGLICAUAN** DISTRICT ENGINEER DATE:	SET NO. G 5 6	SHEET NO. 6 23

TRAFFIC MANAGEMENT PLAN

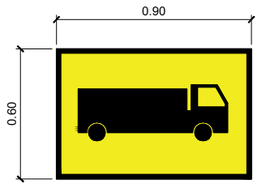


TEMPORARY ROADWORK SIGNS



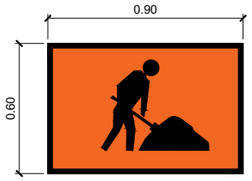
ROADWORK AHEAD

T1-1	1800 X 600	Line 1 – Black 200 DM Line 2 – Black 160 DM	Yellow Reflectorized



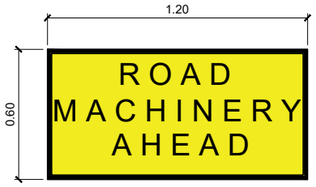
TRUCK ENTERING (SYMBOLIC)

T2-25	900 X 600	Symbol Black	Yellow Reflectorized



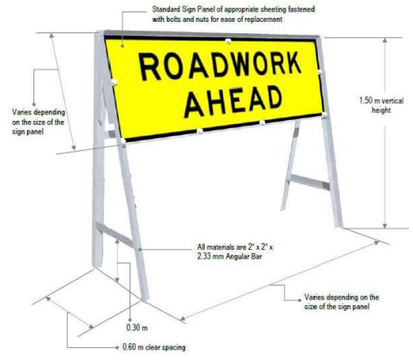
WORKMEN AHEAD (SYMBOLIC)

T1-5	900 X 600	Black Line 1 – White 120 DM	Fluorescent for day use (Short Term) Reflectorized for night use (Long Term)



ROAD MACHINERY AHEAD

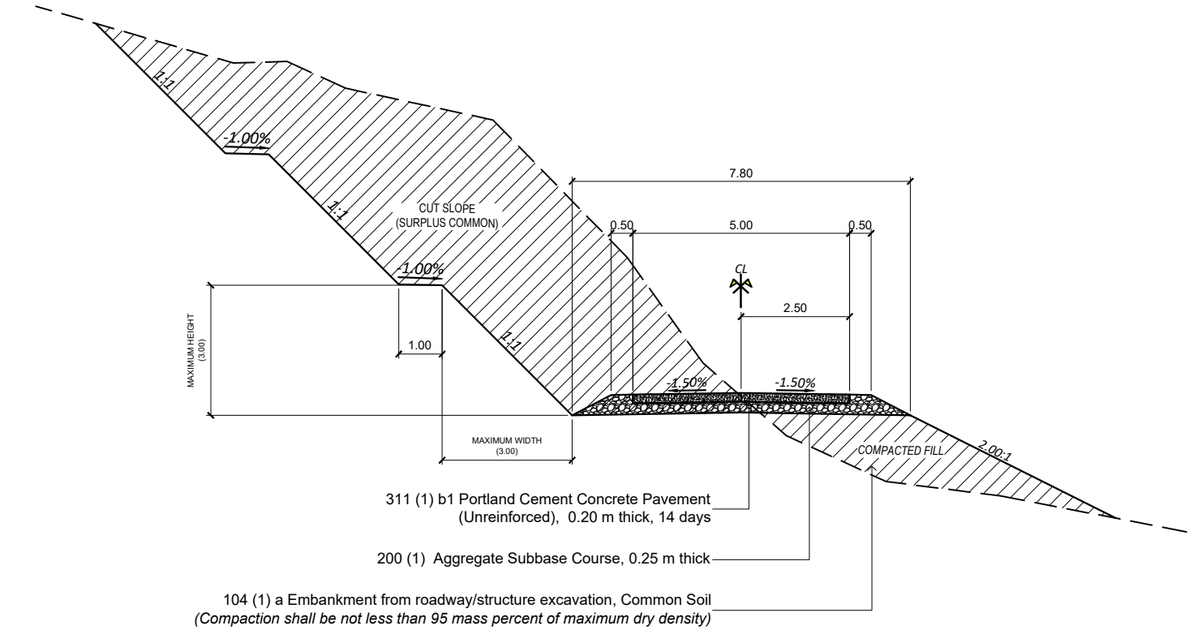
T1-3	1200 X 600	Line 1 – Black 100 EM Line 2 – Black 120 DM Line 3 – Black 100 EM	Yellow Reflectorized



NOTE: DIMENSION "D" A distance expressed in meters equal to the approach speed of traffic in kilometers per hour

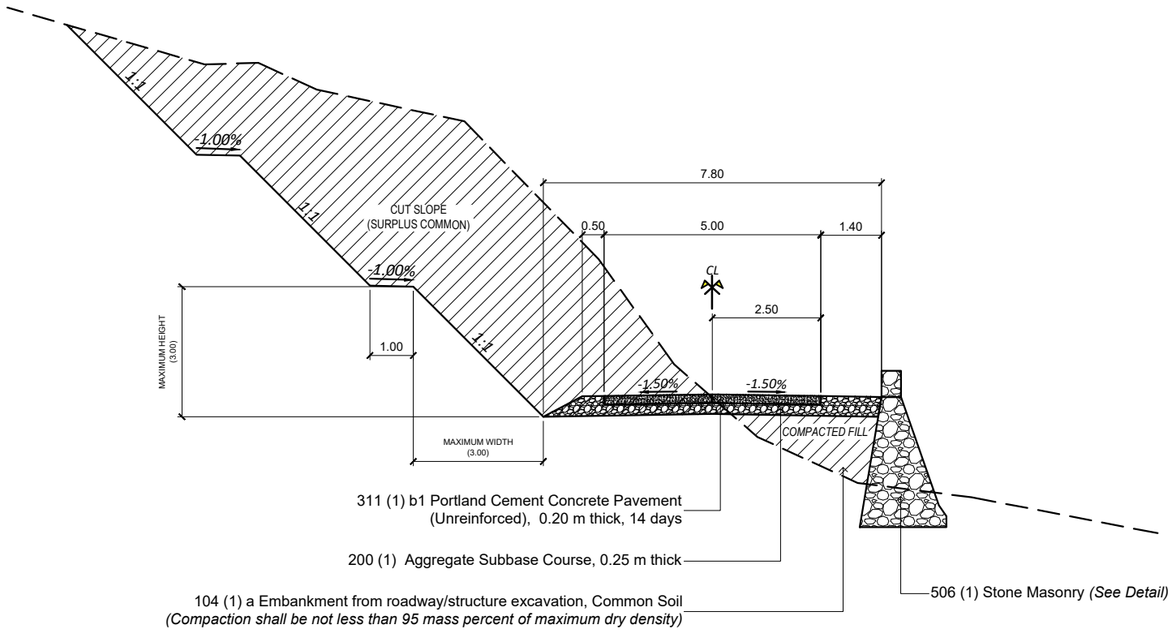
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. IV-A
BATANGAS 2ND DISTRICT
ENGINEERING OFFICE
KUMINTANG ILAYA, BATANGAS CITY

PROJECT NAME AND LOCATION:	SHEET CONTENT:	DRAFTED:	REVIEWED :	SUBMITTED :	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas	TRAFFIC MANAGEMENT PLAN TEMPORARY ROADWORK SIGNS	**MARK LEE M. DALANGIN** ENGINEER II PREPARED: **JUNEIL RAY M. CHAVEZ** ENGINEER II	**BRYAN EDWARD R. ANDAL** ENGINEER II DATE:	**GEMMA L. OLAN** CHIEF PLANNING AND DESIGN SECTION DATE:	**ARIEL V. ARMEDILLA** ASSISTANT DISTRICT ENGINEER DATE:	**SONIA D. PAGLICAUAN** DISTRICT ENGINEER DATE:	G 6 6	7 23



TYPICAL CROSS SECTION OF PROPOSED ROAD OPENING WITH SURPLUS COMMON EXCAVATION

SCALE 1:100



TYPICAL CROSS SECTION OF PROPOSED ROAD OPENING WITH SLOPE PROTECTION

SCALE 1:100

ITEM 102 - EXCAVATION

This item shall consist of roadway and drainage and borrow excavation and the disposal of material in accordance with this specification and in conformity with the lines, grades and dimensions shown on the plans or established by the engineer.

ROADWAY EXCAVATION

Roadway excavation will include excavation and grading for roadways, parking areas, intersections, approaches, slope rounding, benching, waterways and ditches; removal of unsuitable material from the roadbed and beneath embankment areas; and excavating selected material found in the roadway as ordered by the Engineer for specific use in the improvement. Roadway excavation will be classified as "unclassified excavation", "rock excavation", "common excavation", or "muck excavation" as indicated in the Bill of Quantities and hereinafter described.

(1) Unclassified Excavation. Unclassified excavation shall consist of the excavation and disposal of all materials regardless of its nature, not classified and included in the Bill of Quantities under other pay items.

(2) Rock Excavation. Rock excavation shall consist of igneous, sedimentary and metamorphic rock which cannot be excavated without blasting or the use of rippers, and all boulders or other detached stones each having a volume of 1 cubic meter or more as determined by physical measurements or visually by the Engineer.

(3) Common Excavation. Common excavations shall consist of all excavation not included in the Bill of Quantities under "rock excavation" or other pay items.

(4) Muck Excavation. Muck excavation shall consist of the removal and disposal of deposits of saturated or unsaturated mixtures of soils and organic matter not suitable for foundation material regardless of moisture content.

ITEM 104 - EMBANKMENT

This Item shall consist of the construction of embankment in accordance with this Specification and in conformity with the lines, grades and dimensions shown on the Plans or established by the Engineer.

Embankments shall be constructed of suitable materials, in consonance with the following definitions:

1. Suitable Material – Material which is acceptable in accordance with the Contract and which can be compacted in the manner specified in this Item. It can be common material or rock.
Selected Borrow, for topping – soil of such gradation that all particles will pass a sieve with 75 mm (3 inches) square openings and not more than 15 mass percent will pass the 0.075 mm (No. 200) sieve, as determined by AASHTO T 11. The material shall have a plasticity index of not more than 6 as determined by ASSHTO T 90 and a liquid limit of not more than 30 as determined by AASHTO T 89.

2. Unsuitable Material – Material other than suitable materials such as:

(a) Materials containing detrimental quantities of organic materials, such as grass, roots and sewerage.
(b) Organic soils such as peat and muck.
(c) Soils with liquid limit exceeding 80 and/or plasticity index exceeding 55.
(d) Soils with a natural water content exceeding 100%.
(e) Soils with very low natural density, 800 kg/m3 or lower.
(f) Soils that cannot be properly compacted as determined by the Engineer.

ITEM 105 - SUBGRADE PREPARATION

This Item shall consist of the 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.

ITEM 200 - AGGREGATE SUB BASE COURSE

This Item shall consist of furnishing, placing and compacting an aggregate subbase course on a prepared subgrade in accordance with this Specification and the lines, grades and cross-sections shown on the Plans, or as directed by the Engineer.
Aggregate for subbase shall consist of hard, durable particles or fragments of crushed stone, crushed slag, or crushed or natural gravel and filler of natural or crushed sand or other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable subbase.

ITEM 311 - PORTLAND CEMENT CONCRETE PAVEMENT

This Item shall consist of pavement of Portland Cement Concrete, with or without reinforcement, constructed on the prepared base in accordance with this Specification and in conformity with lines, grades, thickness and typical cross-section shown on the Plans.

ITEM 102 (2) - SURPLUS COMMON EXCAVATION (CUT AREA)

STATION	AREA
STA 0+000.00	0.01
STA 0+020.00	_
STA 0+040.00	_
STA 0+060.00	_
STA 0+080.00	_
STA 0+100.00	_
STA 0+120.00	_
STA 0+140.00	_
STA 0+160.00	_
STA 0+180.00	_
STA 0+200.00	_
STA 0+220.00	_
STA 0+240.00	_
STA 0+260.00	_
STA 0+280.00	_

STATION	AREA
STA 0+000.00	5.12
STA 0+020.00	6.11
STA 0+040.00	4.49
STA 0+060.00	16.54
STA 0+080.00	33.02
STA 0+100.00	33.66
STA 0+120.00	56.14
STA 0+140.00	47.15
STA 0+160.00	28.12
STA 0+180.00	35.91
STA 0+200.00	66.69
STA 0+220.00	49.83
STA 0+240.00	31.02
STA 0+260.00	93.26
STA 0+280.00	127.70

ITEM 105 (1) a - SUBGRADE PREPARATION, COMMON MATERIAL

STATION		LENGTH	WIDTH
STA 0+000.00	STA 0+280.00	280.00	7.80

ITEM 200 (1) - AGGREGATE SUBBASE COURSE

STATION		LENGTH	AREA
STA 0+000.00	STA 0+280.00	280.00	2.13

ITEM 311 (1) b1 - PORTLAND CEMENT CONCRETE PAVEMENT (UNREINFORCED), 0.20 M THICK, 14 DAYS

STATION		LENGTH	WIDTH
STA 0+000.00	STA 0+280.00	280.00	5.00

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
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KUMINTANG ILAYA, BATANGAS CITY

PROJECT NAME AND LOCATION: Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas

SHEET CONTENT: TYPICAL ROAD SECTION

DRAFTED: MARK LEE M. DALANGIN, ENGINEER II
PREPARED: JUNEIL RAY M. CHAVEZ, ENGINEER II

REVIEWED: BRYAN EDWARD R. ANDAL, ENGINEER II, DATE:

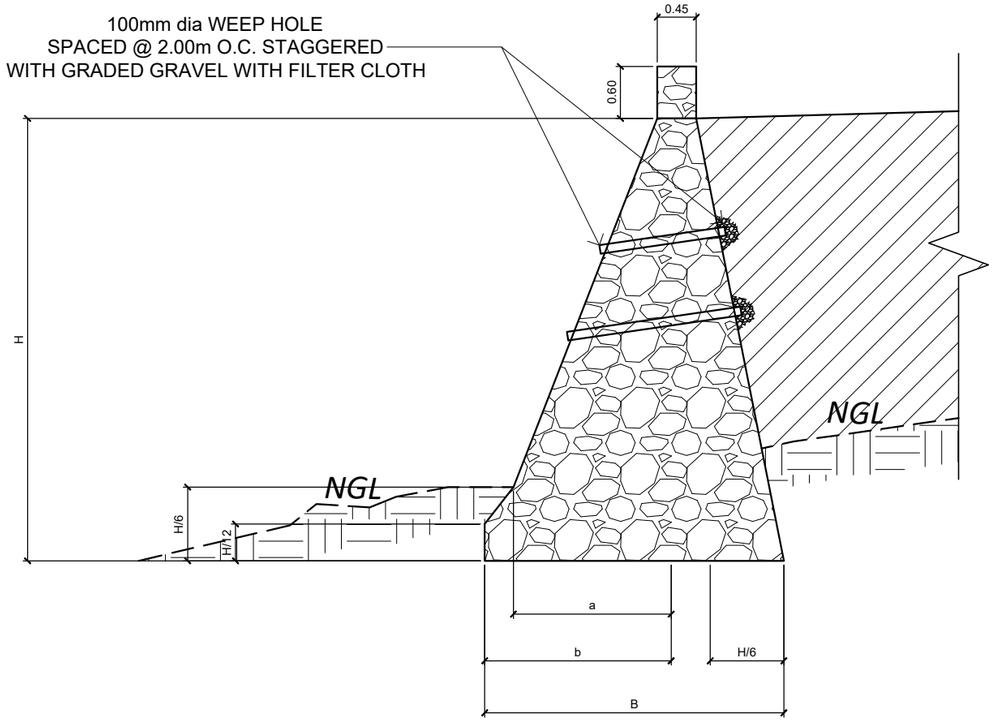
SUBMITTED: GEMMA L. OLAN, CHIEF, PLANNING AND DESIGN SECTION, DATE:

RECOMMENDED: ARIEL V. ARMEDILLA, ASSISTANT DISTRICT ENGINEER, DATE:

APPROVED: SONIA D. PAGLICAUAN, DISTRICT ENGINEER, DATE:

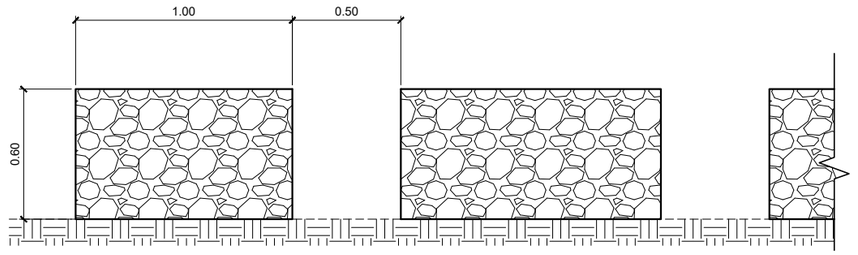
SET NO. R 1 16

SHEET NO. 8 23



DETAIL OF STONE MASONRY

SCALE 1:50



DETAIL OF GUARDWALL BLOCK

SCALE 1:20

ITEM 506 (1) - STONE MASONRY

STATION		LENGTH	AREA
STA 0+005.00	STA 0+025.00	20.00	3.85

STATION		LENGTH	AREA	NO. OF PAR
STA 0+005.00	STA 0+025.00	20.00	0.73	14.00

DIMENSION FOR STONE MASONRY WALL (TYPE I–A AND TYPE I–B)

TYPE	FORE BATTER SLOPE	WALL	DIMENSION (mm)				STONE MASONRY
		H (mm)	a (mm)	b (mm)	B=b+450+H/6 (mm)	H/6 (mm)	(m^3)
I–A	1:10.0	900	75	90	720	150	0.53
	1:6.25	1500	206	250	1000	250	1.09
	1:4.62	1800	325	390	1200	300	1.49
	1:4.00	2100	442	530	1400	350	1.95
	1:3.57	2400	558	670	1600	400	2.37
	1:3.33	2700	675	810	1800	450	3.05
	1:2.86	3000	875	1050	2100	500	3.85

ITEM 506 - STONE MASONRY

This Item shall consist of stone masonry in minor structures, in headwalls for culverts, in retaining walls at the toes of slopes, and at other places called for on the Plans, constructed on the prepared foundation bed, in accordance with this Specification and in conformity with the lines, grades, sections, and dimensions shown on the Plans or as ordered in writing by the Engineer.

STONE

The stone shall be clean, hard, and durable and shall be subject to the Engineer's approval. Adobe stone shall not be used unless otherwise specified.

Sizes and Shapes – Unless other sizes are shown on the Plans, stones have a thickness of not less than 150 mm, and widths of not less than one and one-half times their respective thickness, and lengths of not less than one and one half times their respective widths. Each stone shall be of good shape and be free of depressions and projections that might weaken or prevent it from being properly bedded.

Dressing – The stone shall be dressed to remove any thin or weak portions. Face stones shall be dressed to provide bed and joint lines that do not vary more than 20 mm from the true lines and to ensure the meeting of bed and joint lines without the rounding of corners of the stones in excess of 30 mm in radius. Bed surfaces of the face stones shall be approximately normal to the face of the stones for about 80 mm and from this point may depart from a normal plane not to exceed 50 mm in 300 mm.

Finish for Exposed Faces – Face stones shall be pitched to the line along the beds and joints. The maximum projection of rock faces beyond the pitch lines shall not be more than 50 mm.

MORTAR

The mortar for the masonry shall be composed of one part of Portland Cement and two parts of fine aggregate by volume and sufficient water to make the mortar of such consistency that it can be handled easily and spread with a trowel. Mortar shall be mixed only in those quantities required for immediate use. Unless an approved mortar mixing machine is used, the fine aggregate and cement shall be mixed dry in a tight box until the mixture assumes a uniform color, after which, water shall be added as the mixing continues until the mortar attains the proper consistency. Mortar that is not used within 90 minutes after the water has been added shall be discarded. Retempering of mortar will not be permitted.

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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
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KUMINTANG ILAYA, BATANGAS CITY

PROJECT NAME AND LOCATION: Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas

SHEET CONTENT: DETAIL OF STONE MASONRY

DRAFTED: **MARK LEE M. DALANGIN**, ENGINEER II

PREPARED: **JUNEIL RAY M. CHAVEZ**, ENGINEER II

REVIEWED : **BRYAN EDWARD R. ANDAL**, ENGINEER II, DATE:

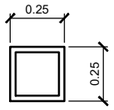
SUBMITTED : **GEMMA L. OLAN**, CHIEF PLANNING AND DESIGN SECTION, DATE:

RECOMMENDED: **ARIEL V. ARMEDILLA**, ASSISTANT DISTRICT ENGINEER, DATE:

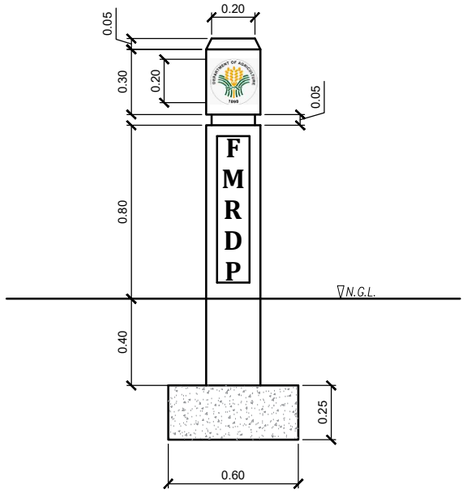
APPROVED: **SONIA D. PAGLICAUAN**, DISTRICT ENGINEER, DATE:

SET NO. R 2 16

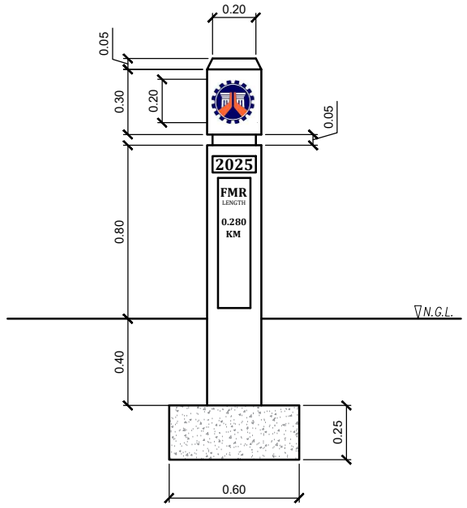
SHEET NO. 9 23



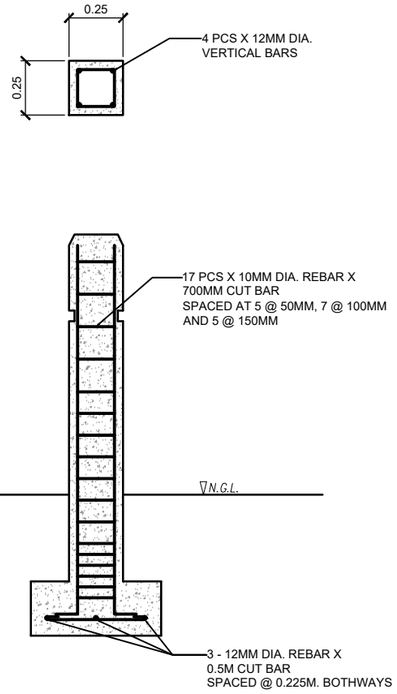
TOP VIEW



FRONT VIEW



REAR VIEW



SECTION VIEW

FARM-TO-MARKET-ROAD MARKER

SCALE 1:20 MTS.

REPUBLIC OF THE PHILIPPINES
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REGIONAL OFFICE No. IV-A
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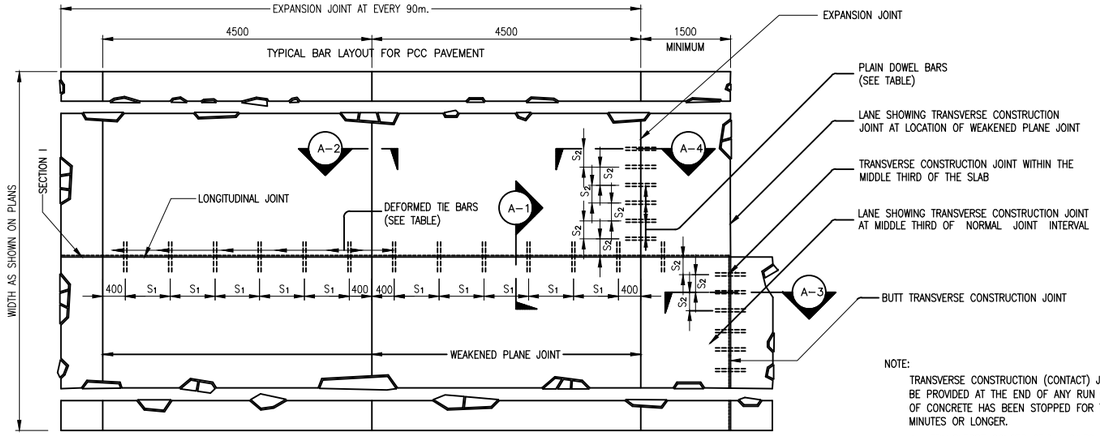
PROJECT NAME AND LOCATION:	SHEET CONTENT:	DRAFTED:	REVIEWED :	SUBMITTED :	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas	PROJECT MARKER	**MARK LEE M. DALANGIN** ENGINEER II PREPARED: **JUNEIL RAY M. CHAVEZ** ENGINEER II	**BRYAN EDWARD R. ANDAL** ENGINEER II DATE:	**GEMMA L. OLAN** CHIEF PLANNING AND DESIGN SECTION DATE:	**ARIEL V. ARMEDILLA** ASSISTANT DISTRICT ENGINEER DATE:	**SONIA D. PAGLICAUAN** DISTRICT ENGINEER DATE:	R 3 / 16	10 / 23



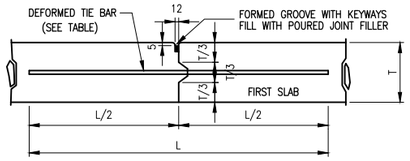
A / 5 TYPICAL PLAN OF A TWO – LANE UNDOWELED PAVEMENT
SCALE 1:50

NOTE:

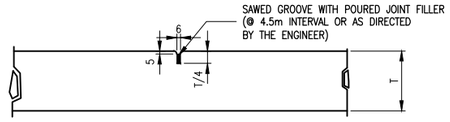
TRANSVERSE CONSTRUCTION (CONTACT) JOINT SHALL BE PROVIDED AT THE END OF ANY RUN WHERE LAYING OF CONCRETE HAS BEEN STOPPED FOR THIRTY (30) MINUTES OR LONGER.

ALL TRANSVERSE CONSTRUCTION JOINTS SHOULD BE BUTT JOINTS WITH DOWELS.

SPACING, (S_1 AND S_2) VARIES DEPENDING ON THE DISTANCE OF PAVEMENT TO CLOSEST FREE EDGE.



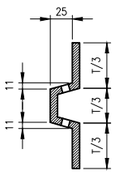
A-1 / 5 DETAIL'A' (LONGITUDINAL CONSTRUCTION JOINT)
SCALE 1:10



A-2 / 5 DETAIL'B' (WEAKENED PLANE JOINT OR CONSTRUCTION JOINT)
SCALE 1:10

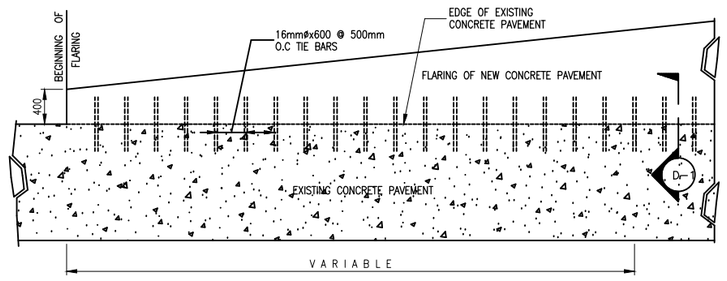
TABLE FOR SPACING OF TIE BARS		
SLAB THICKNESS (mm)	TIE BAR SIZE X LENGTH(L), mm	TIE BAR SPACING mm(S_1)
130	12mm x 600	760
150	12mm x 600	760
180	12mm x 600	760
200	12mm x 600	760
230	16mm x 760	900
250	16mm x 760	900
280	16mm x 760	900
310	16mm x 760	900

BASED ON DESIGN GUIDELINES, CRITERIA AND STANDARDS 2015, VOLUME 4/ AMERICAN CONCRETE INSTITUTE.

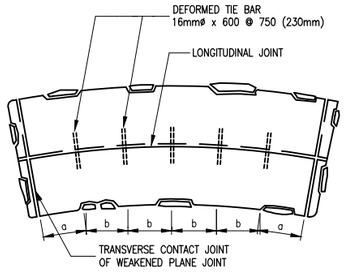


METAL SIDE FORM (KEYED JOINT)

B / 5 DETAIL OF SIDE FORMS
SCALE 1:10

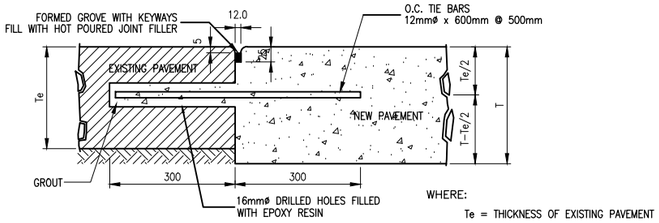


D / 5 PLAN OF EXISTING CONCRETE PAVEMENT
SCALE 1:10



T	a	b
280	150	600
230	375	750

C / 5 DETAIL OF BAR SPACING ALONG CURVES
SCALE NTS



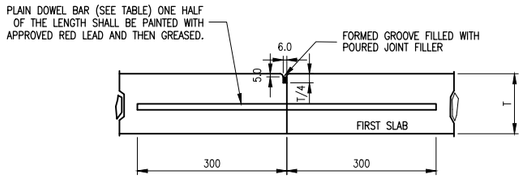
'SECTION'

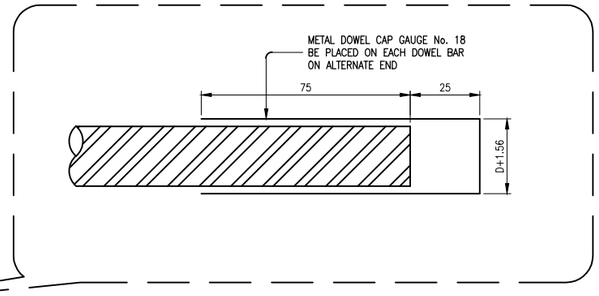
WHERE:
Te = THICKNESS OF EXISTING PAVEMENT
T = THICKNESS OF NEW PAVEMENT

D-1 / 5 CONSTRUCTION JOINT TO BE USED FOR FLARING EXISTING CONCRETE PAVEMENT
SCALE 1:10

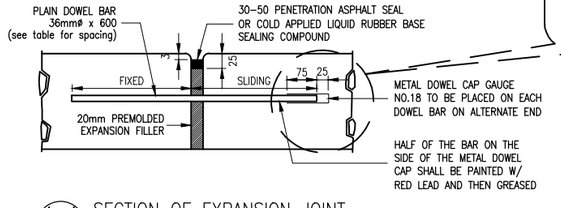
GENERAL NOTES:

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. EXPANSION JOINTS AT EVERY 90m SHALL BE PROVIDED WITH DOWELS.
5. 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.
6. 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.
7. MATERIAL FOR THE METAL SIDE FORM SHALL BE BRAND NEW SHEET METAL GAUGE NO. 18 OF BLACK IRON FREE FROM RUST AND LINKS.
8. AT LEAST SIX (6) SUCCESSIVE DOWELED BUTT JOINTS AT NORMAL JOINT SPACING SHALL BE PROVIDED BEFORE OR AFTER AN EXPANSION JOINT.
9. 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 SHOULD BE POURED IN SUCH MANNER THAT SPILLING SHALL PREVENTED/ELIMINATED THIS, PROVIDE A SMOOTH RIDING SURFACE.
10. ALL TRANSVERSE JOINTS, EXCEPT CONSTRUCTION JOINT, SHALL BE CONTINUOUS FROM EDGE TO EDGE.
11. ALL LONGITUDINAL JOINTS SHALL MEET AT INTERSECTIONS WITH NO GAPS OR OFFSET.
12. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
13. AVOID STOPPAGE OF FORMWORKS ALONG CURVES.





A-3 / 5 DETAIL'C' (BUTT TRANSVERSE CONSTRUCTION JOINT)
SCALE 1:10



A-4 / 5 SECTION OF EXPANSION JOINT
SCALE NTS

SPACING OF DOWEL BARS DIAMETER=36mm/LENGTH=600mm		SUBSTITUTE	
SLAB DEPTH, T (mm)	SPACING, S (mm)	SIZE OF DOWEL BAR (mm)	SPACING, S (mm)
280	300	32	250
		28	190
		25	150
290	295	32	230
		28	170
		25	140
300	274	32	210
		28	160
		25	130
310	255	32	200
		28	150
		25	120
320	238	32	190
		28	140
		25	110
330	223	32	180
		28	130
		25	110
340	209	32	170
		28	130
		25	100

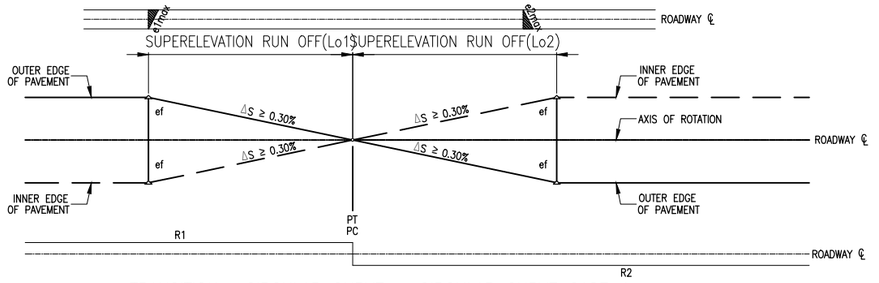
NOTE:

IN CASE THE REQUIRED DIAMETER OF 36mm IS NOT COMMERCIALLY AVAILABLE, SMALLER DOWEL BAR CAN BE USED WITH ADJUSTMENT IN BAR SPACING AS SHOWN IN THE TABLE ABOVE.

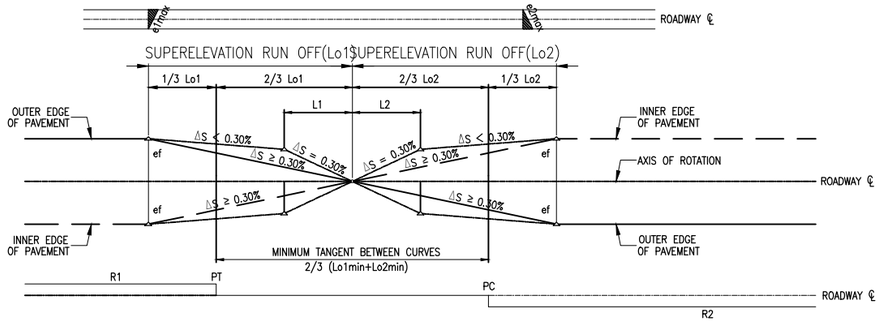
STD-H STANDARD PORTLAND CEMENT CONCRETE PAVEMENT DETAILS
SCALE AS SHOWN

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE No. IV-A
BATANGAS 2ND DISTRICT
ENGINEERING OFFICE
KUMINTANG ILAYA, BATANGAS CITY

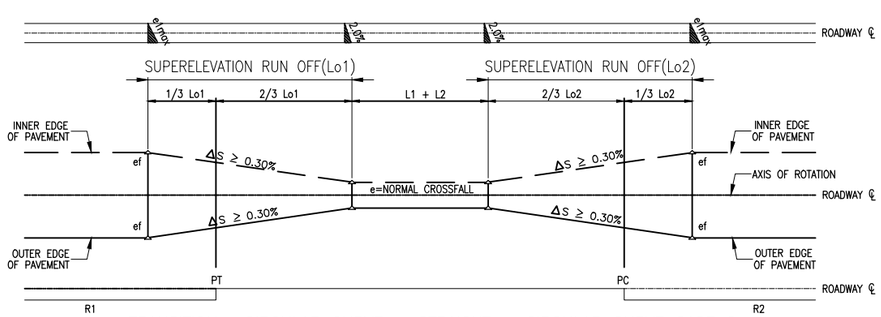
PROJECT NAME AND LOCATION:	SHEET CONTENT:	DRAFTED:	REVIEWED :	SUBMITTED :	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
Opening and Concreting of Brgy. Estrella to Brgy. Laurel FMR, Brgy. Estrella and Brgy. Laurel, Mabini, Batangas	STANDARD PORTLAND CEMENT CONCRETE PAVEMENT	**MARK LEE M. DALANGIN** ENGINEER II PREPARED: **JUNEIL RAY M. CHAVEZ** ENGINEER II	**BRYAN EDWARD R. ANDAL** ENGINEER II DATE:	**GEMMA L. OLAN** CHIEF PLANNING AND DESIGN SECTION DATE:	**ARIEL V. ARMEDILLA** ASSISTANT DISTRICT ENGINEER DATE:	**SONIA D. PAGLICAUAN** DISTRICT ENGINEER DATE:	R 4 16	11 23



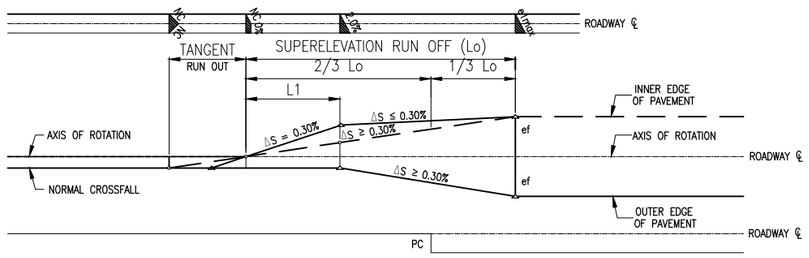
TRANSITION : CIRCULAR CURVE – CIRCULAR CURVE CASE 4



TRANSITION : CIRCULAR CURVE – MINIMUM STRAIGHT – CIRCULAR CURVE CASE 3



TRANSITION : CIRCULAR CURVE – STRAIGHT – CIRCULAR CURVE CASE 2



TRANSITION : STRAIGHT – CIRCULAR CURVE CASE 1

A 4 LONGITUDINAL SECTION
SCALE NTS

RATE OF SUPERELEVATION

AASHTO GEOMETRIC DESIGN OF HIGHWAYS AND STREETS

Design Speed e %	30kph 8% (max)	40kph 8% (max)	50kph 8% (max)	60kph 8% (max)	70kph 8% (max)
	RADIUS				
NC	443	784	1090	1490	1970
RC	322	571	791	1090	1450
2.2	288	512	711	976	1300
2.4	261	463	644	885	1190
2.6	237	421	587	808	1080
2.8	216	385	539	742	992
3.0	199	354	496	684	916
3.2	183	326	458	633	849
3.4	169	302	425	588	790
3.6	156	279	395	548	738
3.8	144	259	368	512	690
4.0	134	241	344	479	648
4.2	124	224	321	449	608
4.4	115	208	301	421	573
4.6	106	192	281	395	540
4.8	96	178	263	371	509
5.0	87	163	246	349	480
5.2	78	148	229	328	454
5.4	71	136	213	307	429
5.6	65	125	198	288	405
5.8	59	115	185	270	382
6.0	55	106	172	253	360
6.2	50	98	161	238	340
6.4	46	91	151	224	322
6.6	43	85	141	210	304
6.8	40	79	132	198	287
7.0	37	73	123	185	270
7.2	34	68	115	174	254
7.4	31	62	107	162	237
7.6	29	57	99	150	221
7.8	26	52	90	137	202
8.0	20	41	73	113	168

NOTES:
- e max = 8.0%
- NC = normal crown section
- RC = remove adverse crown

RELATIVE SLOPE OF PAVEMENT EDGE

DESIGN SPEED (KPH)	20	30	40	50	60	70	80	90	100
MAXIMUM ΔS (%)	0.80	0.75	0.70	0.65	0.60	0.55	0.50	0.47	0.44

NOTES:
1. ΔS SHOULD NOT BE LESS THAN 0.30% FOR EFFECTIVE DRAINAGE
2. WHEN THE SUPERELEVATION IS GREATER THAN 3% THEN THE SLOPE OF THE LOWER SHOULDER SHALL BE THE SAME AS FOR THE TRAVELED WAY.
3. SUPERELEVATION CAN BE ATTAINED BY REVOLVING THE PAVEMENT ABOUT THE ROADWAY CENTERLINE
4. IN ORDER TO DISTINGUISH WHICH EDGE OF THE CURVE IS TO BE SUPERELEVATED OR TILTED, THE FULL LINE (————) REPRESENTS OUTER EDGE, AND THE BROKEN LINES (— —) REPRESENTS INNER EDGE.

SHOULDER CROSS SLOPE ALONG SUPERELEVATED SECTION AT THE OUTER SIDE OF THE CURVE

2%	−3%
3%	−3%
4%	−3%
5%	−2%
6%	−1%
7%	0%
8%	+1%

LEGEND:
- KPH – KILOMETER PER HOUR
- Lo – SUPERELEVATION RUN−OFF
- ef – FULL SUPERELEVATION
- RC – REMOVE ADVERSE CROWN, SUPERELEVATE AT NORMAL CROWN SLOPE
- PC – POINT OF CURVATURE
- PT – POINT OF TANGENCY
- ℄ – CENTERLINE
- R – RADIUS
- ef – FULL SUPERELEVATION IN %
- L1orL2 – LENGTH BETWEEN SUPERELEVATION 0% AND 2.0% FOR PCCP.
- NC – NORMAL CROWN (2.0% FOR PCCP)
- ΔS – RELATIVE SLOPE OF PAVEMENT EDGE %
- V – DESIGN SPEED

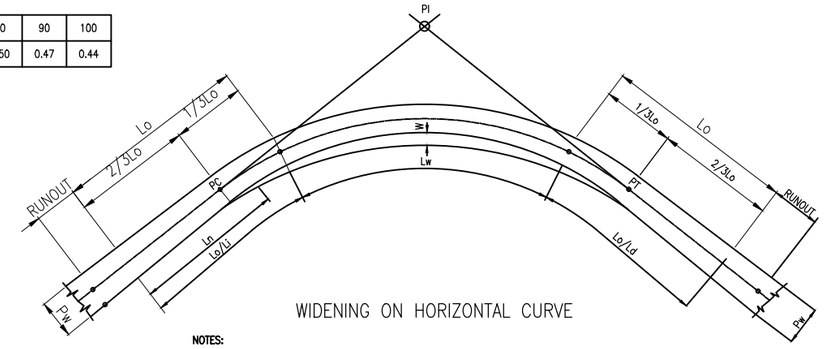
STD−H SUPERELEVATION AND PAVEMENT WIDENING
SCALE AS SHOWN

WIDENING OF PAVEMENT ON CURVES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

R	DESIGN SPEED (km/hr)				
(m)	30	40	50	60	70
30	1.50				
40	1.50				
50	1.20	1.50			
60	1.20	1.50			
70	1.20	1.50			
80	1.20	1.20	1.30		
90	1.00	1.20	1.20		
100	1.00	1.20	1.00		
110	1.00	1.00	1.00		
120	0.80	0.90	0.90	1.00	
130	0.80	0.80	0.90	1.00	
140	0.70	0.80	0.80	0.90	
150	0.60	0.70	0.80	0.80	
160	0.60	0.60	0.70	0.80	0.90
170	0.60	0.60	0.70	0.80	0.90
190	0.60	0.60	0.70	0.80	0.80
200		0.60	0.60	0.60	0.70
220			0.60	0.60	0.70
230			0.60	0.60	0.60
250			0.60	0.60	0.60
260			0.60	0.60	0.60
280				0.60	0.60
290				0.60	0.60
300				0.60	0.60
340					0.60
370					
400					
460					
500					
600					
700					
800					

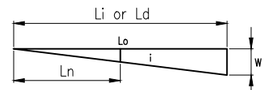
NOTES:
1. VALUES LESS THAN 0.60m. MAY BE DISREGARDED.
2. FOR 3−LANE PAVEMENTS, MULTIPLY VALUES DERIVED BY 1.5.
3. FOR 4−LANE PAVEMENTS, MULTIPLY VALUES DERIVED BY 2.0.
4. WHERE SEMITRAILERS ARE SIGNIFICANT, INCREASE TABULAR VALUES OF WIDENING BY: 0.15m. FOR CURVES OF 7.0 TO 10.5 DEGREES AND BY 0.30m. FOR CURVES SHARPER THAN 10.5 DEGREES.



WIDENING ON HORIZONTAL CURVE

NOTES:
1. WIDENING SHALL BE APPLIED ON THE INNER SIDE OF THE CURVE AND SHALL BE ATTAINED LINEARLY ALONG THE REQUIRED SUPERELEVATION RUN−OFF
2. WIDENING SHALL BE APPLIED ON TWO−LANE PAVEMENT.

LEGEND:
- W = WIDENING WIDTH
- Lo = LENGTH OF SUPERELEVATION RUN−OFF
- Lw = LENGTH WIDTH OF FULL WIDENING
- Lo/Li = SUPERELEVATION RUNOFF/TRANSITION LENGTH OF WIDENING (INCREASING SECTION)
- Lo/Ld = SUPERELEVATION RUNOFF/TRANSITION LENGTH OF WIDENING (DECREASING SECTION)
- Pw = NORMAL PAVEMENT WIDTH



$i = \frac{W\ Ln}{Li\ or\ Ld}$

METHODS OF WIDENING ON TRANSITION LENGTH

B 4 LONGITUDINAL SECTION
SCALE NTS

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