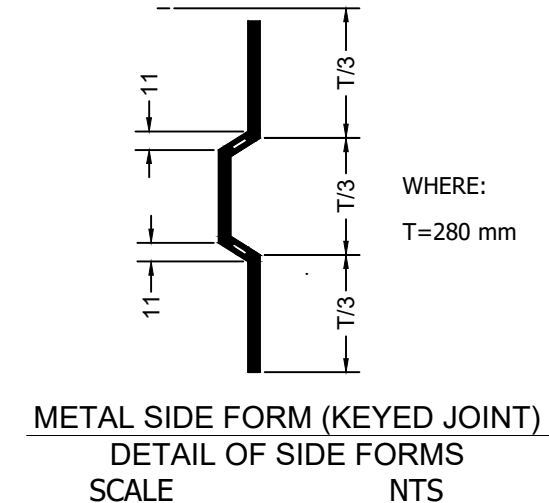
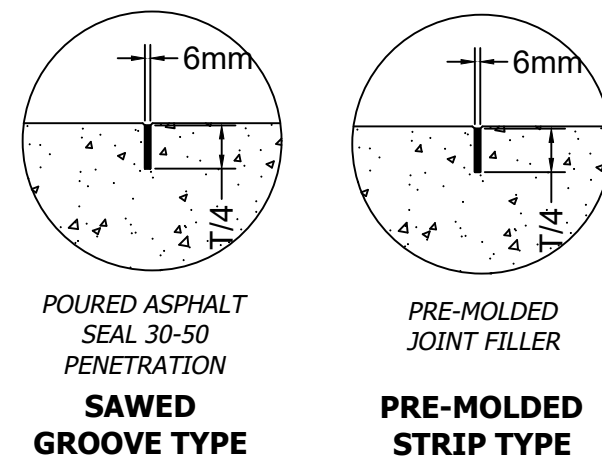
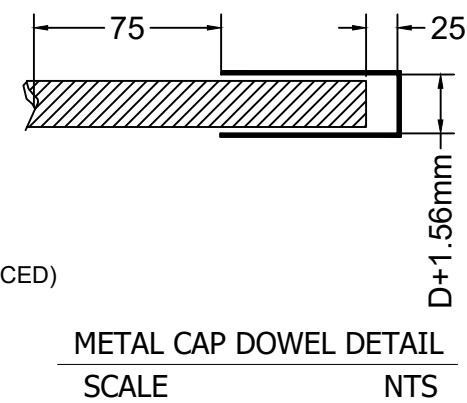
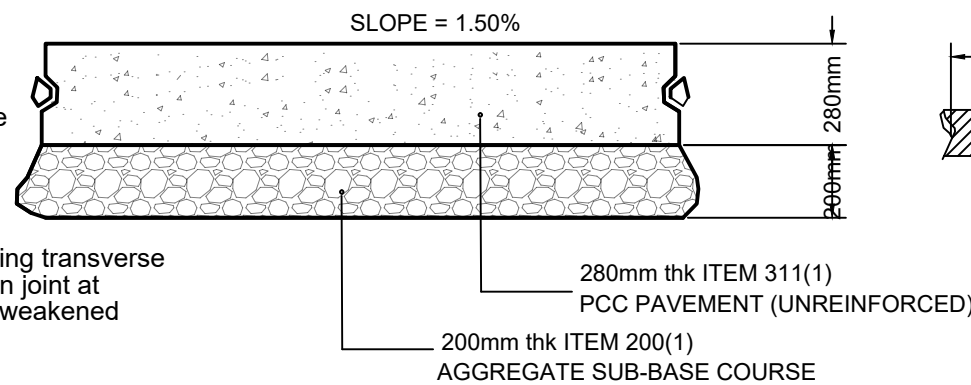
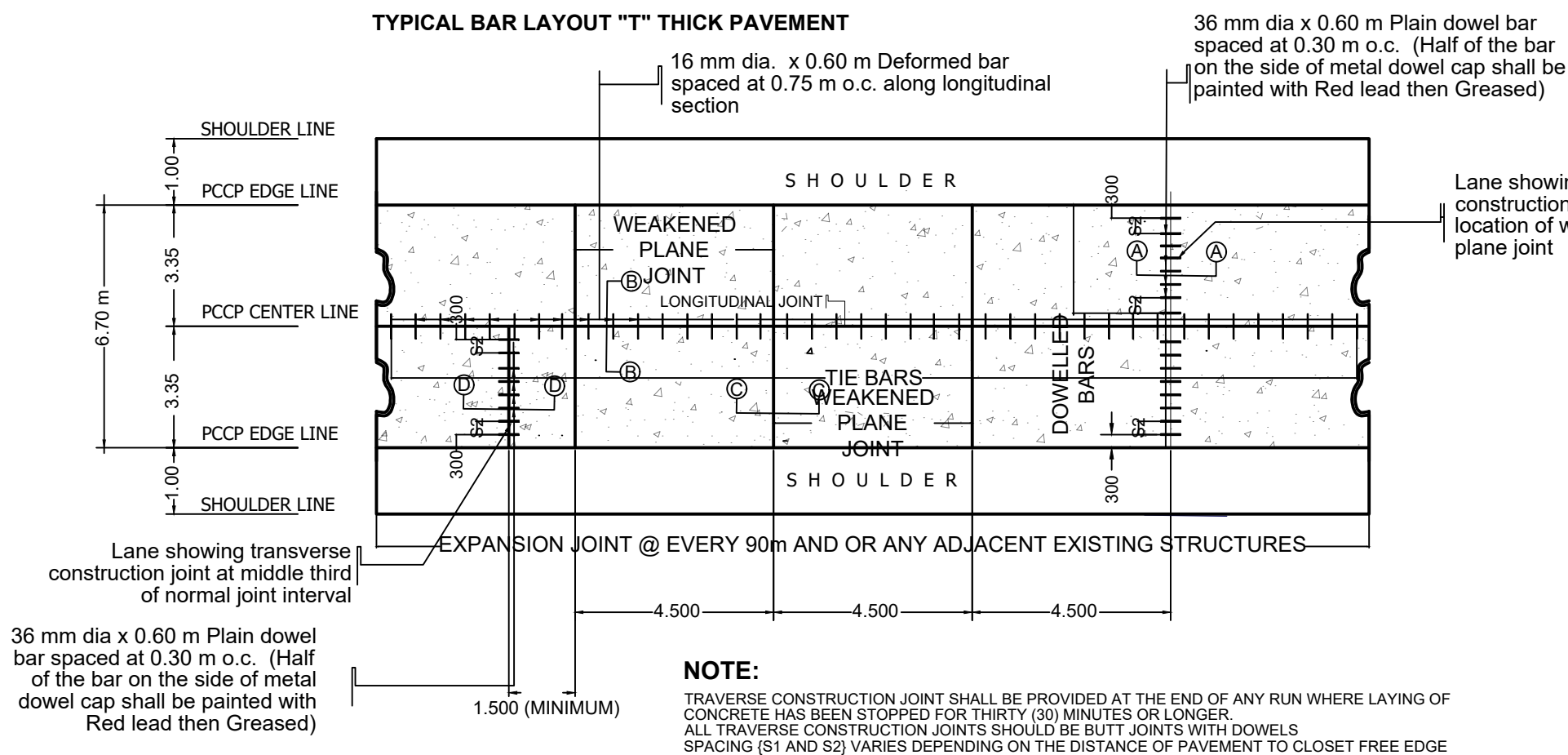


TYPICAL BAR LAYOUT "T" THICK PAVEMENT



SLAB THICKNESS (mm)	SPACING S1 (mm)	
	12 mm dia.	16 mm dia.
230	600	750
240	600	750
250	600	750
260	500	750
270	500	750
280	500	750
290	500	750
300	500	750
310	400	750
320	400	750
330	400	750
340	400	750

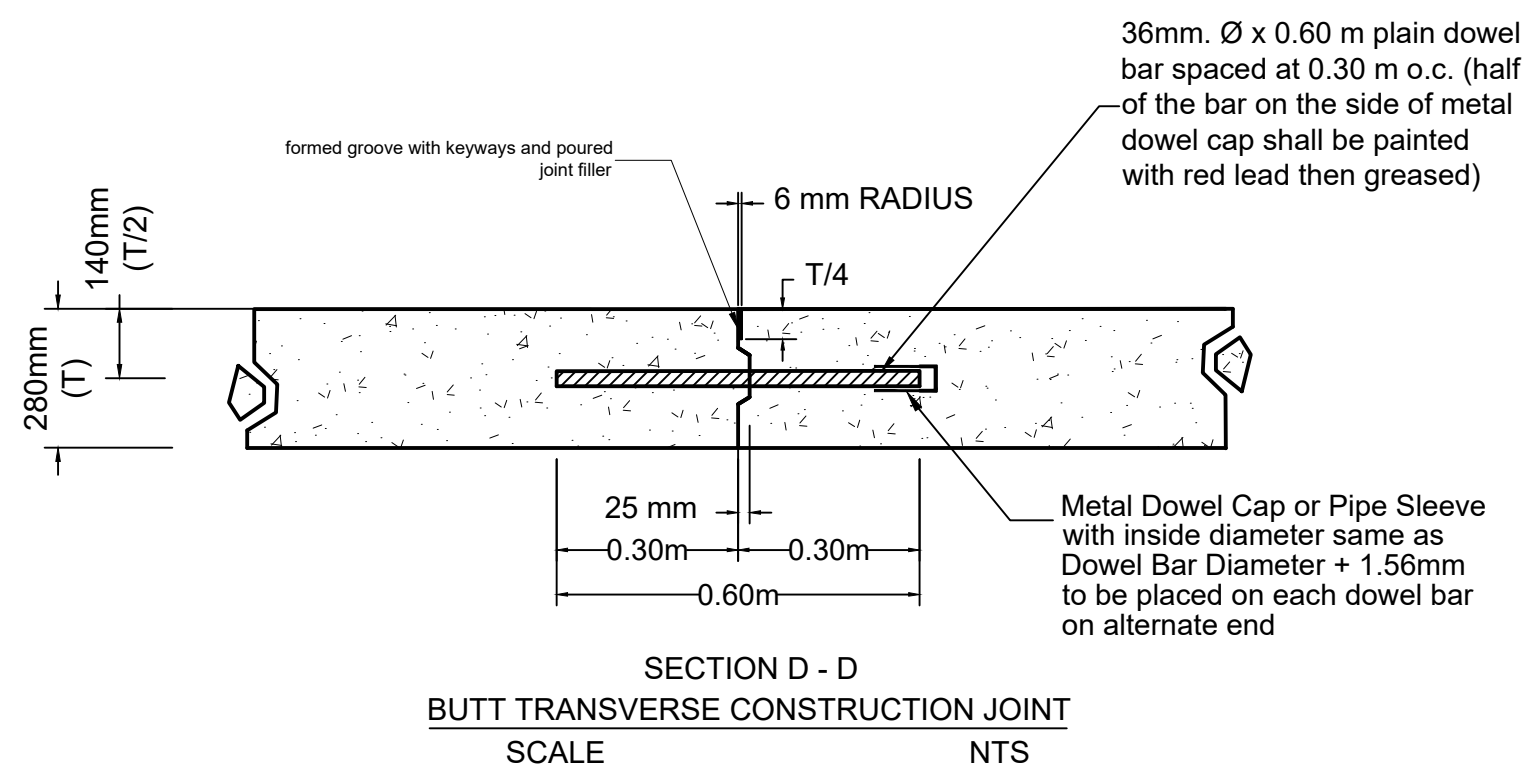
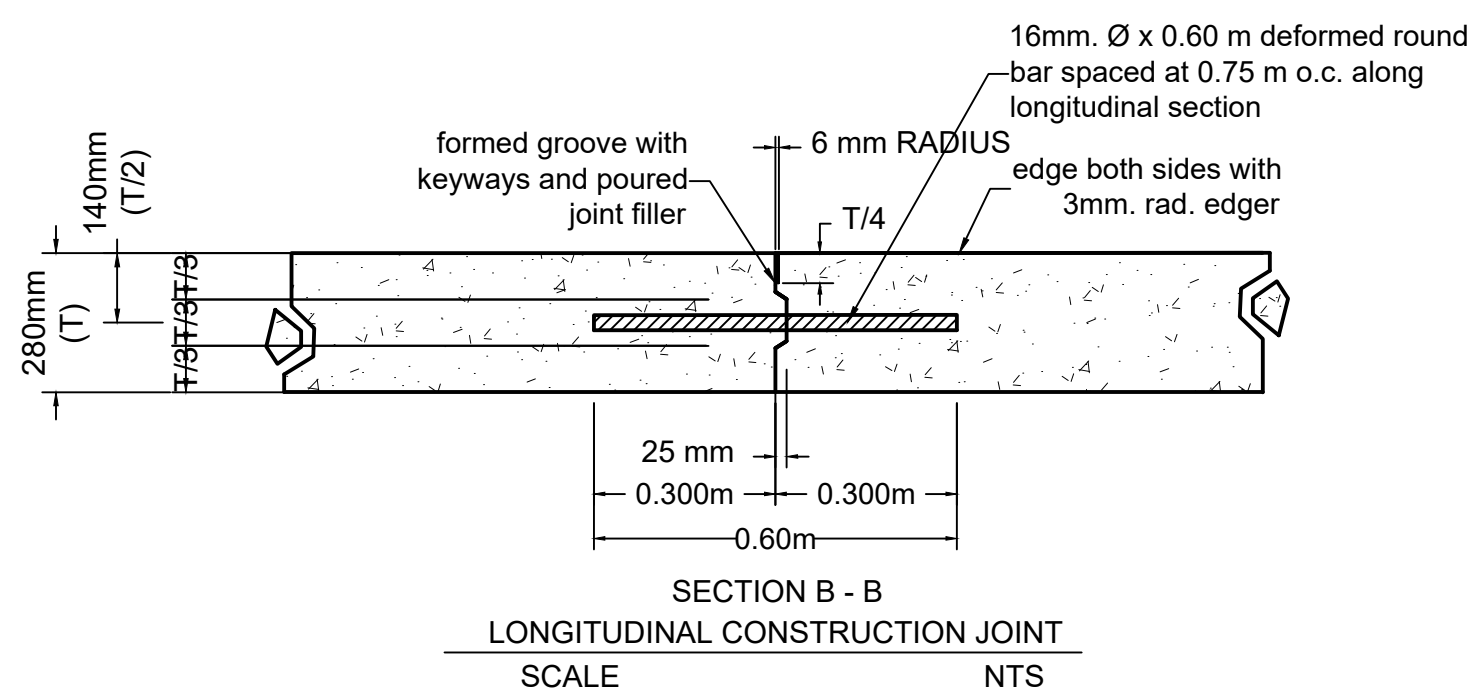
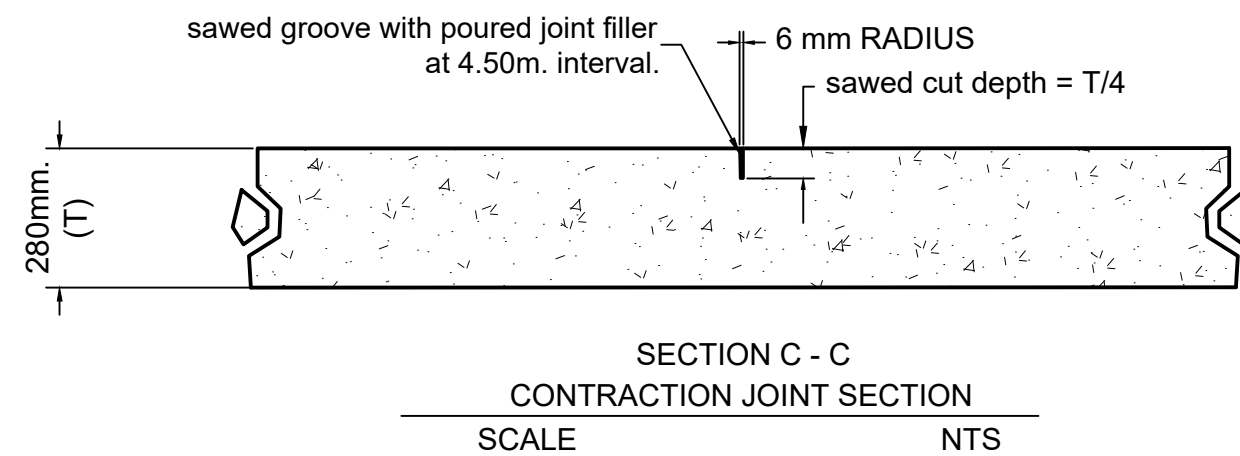
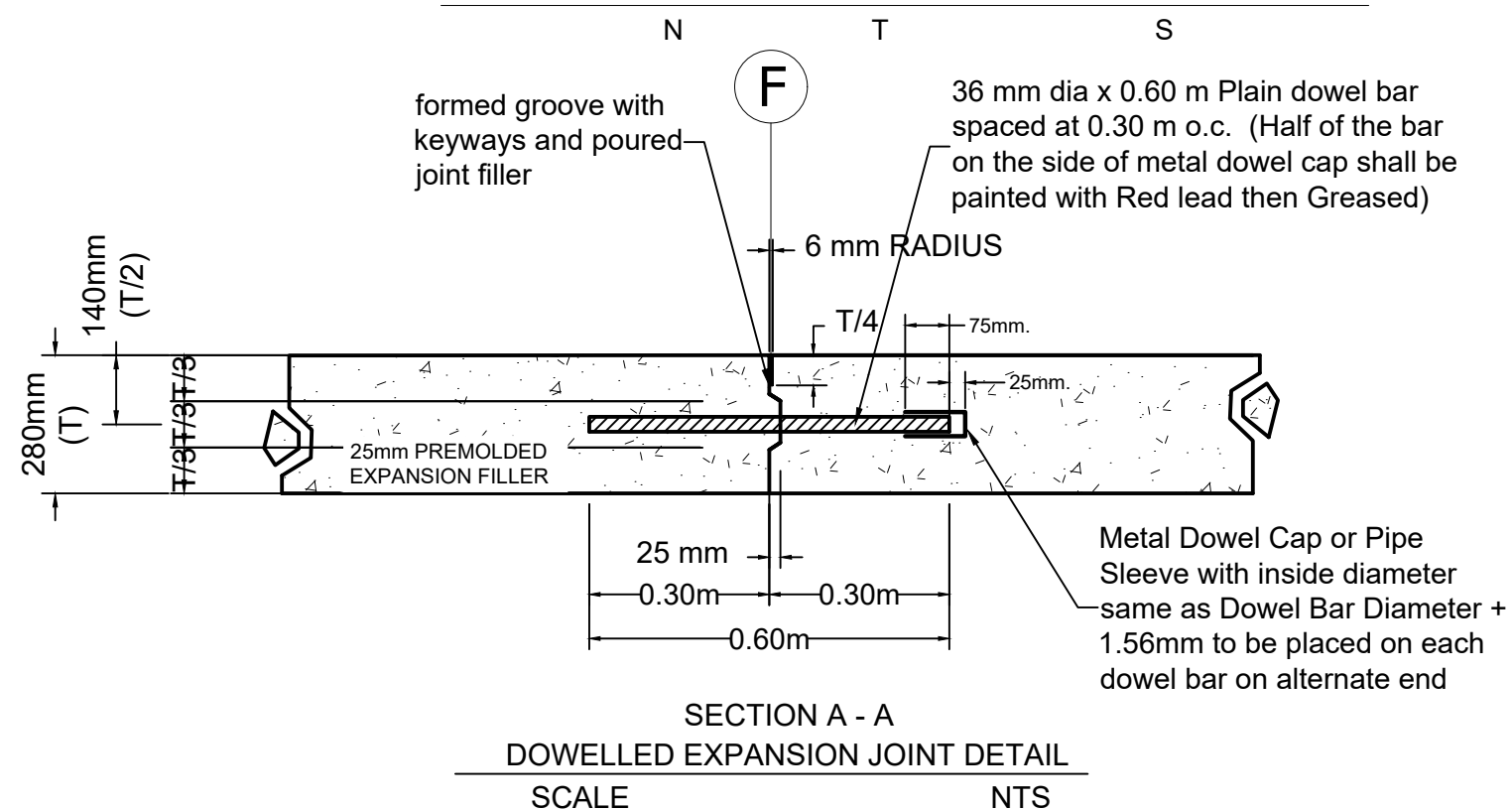
BASED ON AASHTO GUIDE FOR DESIGN OF PAVEMENT STRUCTURES 1993

SLAB THICKNESS (mm)	DIAMETER, D (mm)	SPACING, S2(mm)
230	28	300
240	30	300
250	32	300
260	32	300
270	34	300
280	36	300

NOTE: DIAMETER AND SPACING OF PLAIN DOWEL BARS MAY BE MODIFIED AS LONG AS THE EQUIVALENT STEEL AREA IS SUSTAINED.

- Materials and workmanship shall conform with the DPWH Standard Specification for Highways, Bridges and Airport, 2013
- Contraction 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 1.50 m. from the weakened plane joint.
- At construction joint (longitudinal or transverse) care should be taken that no concrete from the last slab placed overhangs any portion of the first slab.
- Tie bars should be deformed steel bars. All dowel bars were smooth round steel bar free from rust and other defects which might restrict their movement.
- Type of weakened plane joint to be used shall be specified in the plans and only one type should be used for the whole project.
- Material for the metal side form shall be brand new sheet metal Gauge no. 15 of black iron free from rust and links.
- At least six (6) successive dowelled butt joints at normal joint spacing shall be provided before or after an expansion joint.
- The groove or cracks 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 sealed should be poured in such manner that spalling shall be prevented/eliminated, thus, provide a smooth leveling/ riding surface.
- All transverse joints except construction joint shall be continuous from edge to edge.
- All longitudinal joints shall meet at intersections with no gaps or offset.
- All dimensions are in millimeters unless otherwise specified.
- Avoid stoppage of formworks along curves.
- Constructed expansion joint at every 90 meters and/or every adjacent existing structures.

TYPICAL PLAN FOR TWO-LANE PAVEMENT



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:

CONCRETING OF ROAD
IN BARANGAY ISING, CARMEN,
DAVAO DEL NORTE

SHEET CONTENTS:

STANDARD PORTLAND CEMENT CONCRETE
PAVEMENT JOINTS

DRAFTED:

HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:

WARREN S. PINEZ
ENGINEER II

REVIEWED:

BENILDA S. PACQUIAO
ENGINEER III

DATE:

SUBMITTED:

JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

GARRY E. VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:

ARTURO P. LONGYAPON
DISTRICT ENGINEER

DATE:

SET NO.

E
1 1

SHEET NO.

6
16

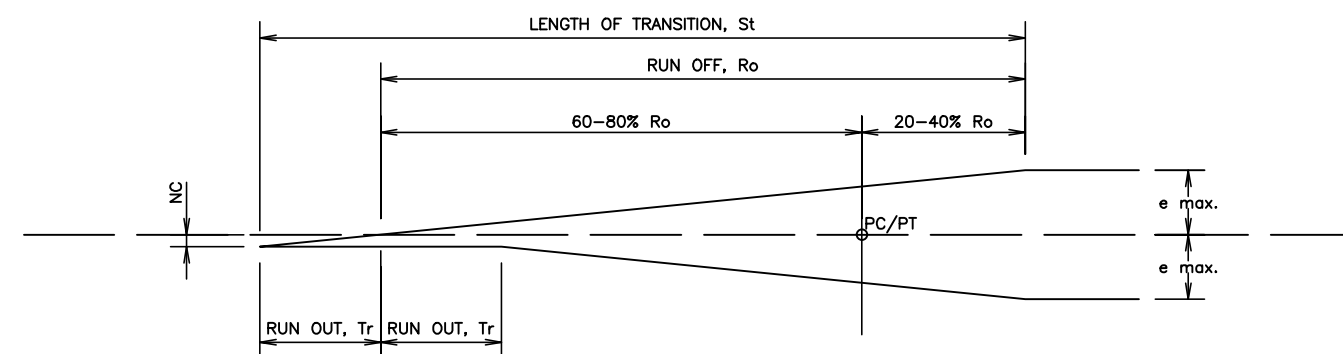


PI	=	POINT OF INTERSECTION
I	=	INTERSECTION ANGLE (CENTRAL ANGLE)
T	=	TANGENT DISTANCE
R	=	RADIUS
Lc	=	LENGTH OF CURVE
E	=	TOTAL EXTERNAL DISTANCE
PC	=	POINT OF CURVATURE
PT	=	POINT OF TANGENCY

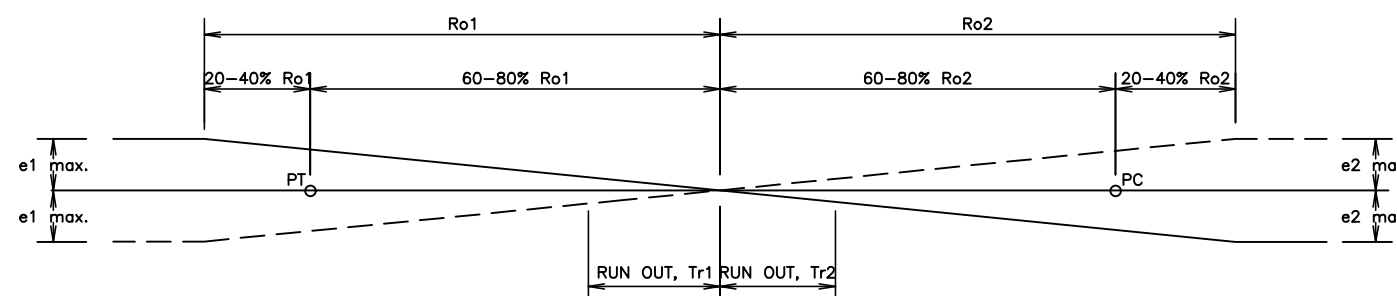
1. NO HORIZONTAL CURVE IS REQUIRED WHEN THE INTERSECTION (CENTRAL ANGLE) I IS LESS THAN ONE DEGREE (1°00').
2. LENGTH OF CIRCULAR CURVE, $L_c = (p)R/180$.



VERTICAL PARABOLIC CURVE



SHOWING HALF OF TRANSITION/EASEMENT - HORIZONTAL CURVATURE AND SUPERELEVATION
(DIAGRAMMATIC PROFILE - PAVEMENT REVOLVED ABOUT CENTERLINE)



SHOWING HALF OF TRANSITION/EASEMENT - REVERSED HORIZONTAL CURVATURE AND SUPERELEVATION
(DIAGRAMMATIC PROFILE - PAVEMENT REVOLVED ABOUT CENTERLINE)

PVI	=	POINT OF VERTICAL INTERSECTION
PVC	=	POINT OF VERTICAL CURVATURE
PVT	=	POINT OF VERTICAL TANGENCY
L	=	LENGTH OF VERTICAL CURVE
g	=	GRADE IN PERCENT
Mo	=	MIDDLE ORDINATE
x	=	DISTANCE FROM PVC OR PVT TO ANY POINT OF CURVE
y	=	VERTICAL OFFSET IN METERS
A	=	ALGEBRAIC DIFFERENCE OF GRADES

1. NO VERTICAL CURVE IS REQUIRED WHEN THE ALGEBRAIC DIFFERENCE IN GRADES IS LESS THAN 0.50% IN ANY VERTICAL PARABOLIC CURVE.

$$Mo = \frac{AL}{800}$$
$$y = \frac{x^2(\text{Mo})}{(1/2)^2}$$

UNSYMMETRICAL

$$M_o = \frac{A L_1 L_2}{200 L}$$
$$y = \frac{x^2(\text{Mo})}{(1 - y^2) \text{ or } (1 - y)^2 ?}$$

RADIUS OF CURVE	ROADWAY WIDTH = 6.10 MTS.					
	DESIGN SPEED (KPH)					
	50	60	70	80	90	100
3000	0.2	0.2	0.3	0.3	0.3	0.3
2500	0.2	0.3	0.3	0.3	0.3	0.3
2000	0.3	0.3	0.3	0.3	0.3	0.4
1500	0.3	0.3	0.4	0.4	0.4	0.4
1000	0.4	0.4	0.4	0.5	0.5	0.5
900	0.4	0.4	0.5	0.5	0.5	0.6
800	0.4	0.5	0.5	0.5	0.6	0.6
700	0.5	0.5	0.5	0.6	0.6	0.7
600	0.5	0.6	0.6	0.6	0.7	0.7
500	0.6	0.6	0.7	0.7	0.8	0.8
400	0.7	0.7	0.8	0.8	0.9	0.9
300	0.8	0.9	0.9	1.0	1.1	1.1
250	0.9	1.0	1.1	1.1	1.2	
200	1.1	1.2	1.3	1.3		
150	1.4	1.5	1.6	1.6		
140	1.5	1.6				
130	1.6	1.7				
120	1.7	1.8				
110	1.8	1.9				
100	1.9	2.0				
90	2.1					
80	2.3					
70	2.6					

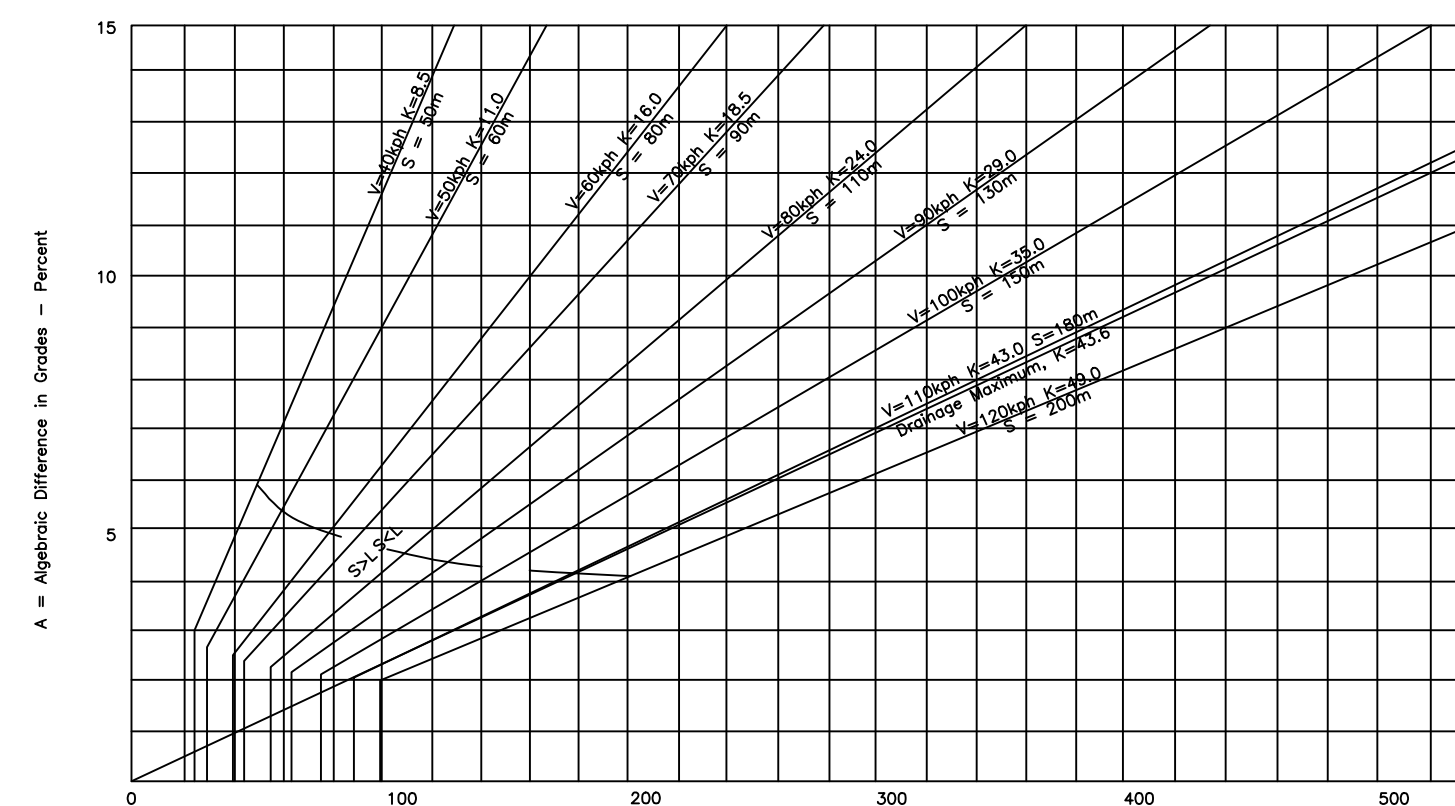
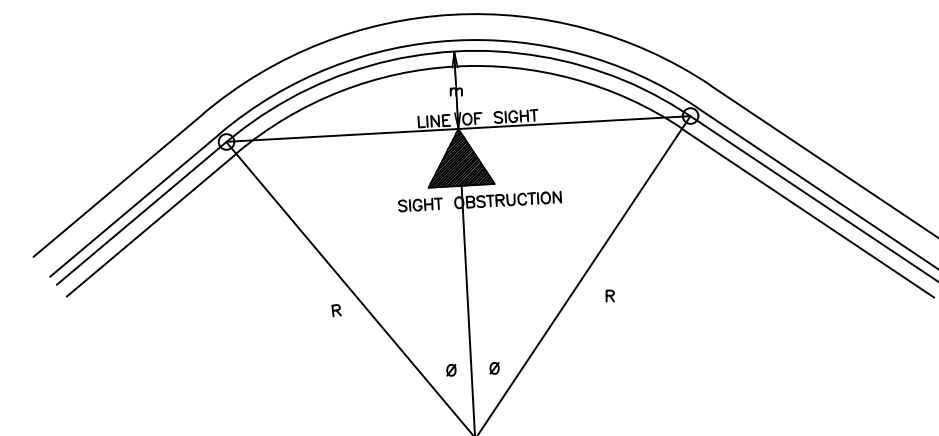
$$m = R \text{ vers } \emptyset$$

$$m = \frac{1145.92}{D} \text{ vers } \frac{SD}{40}$$

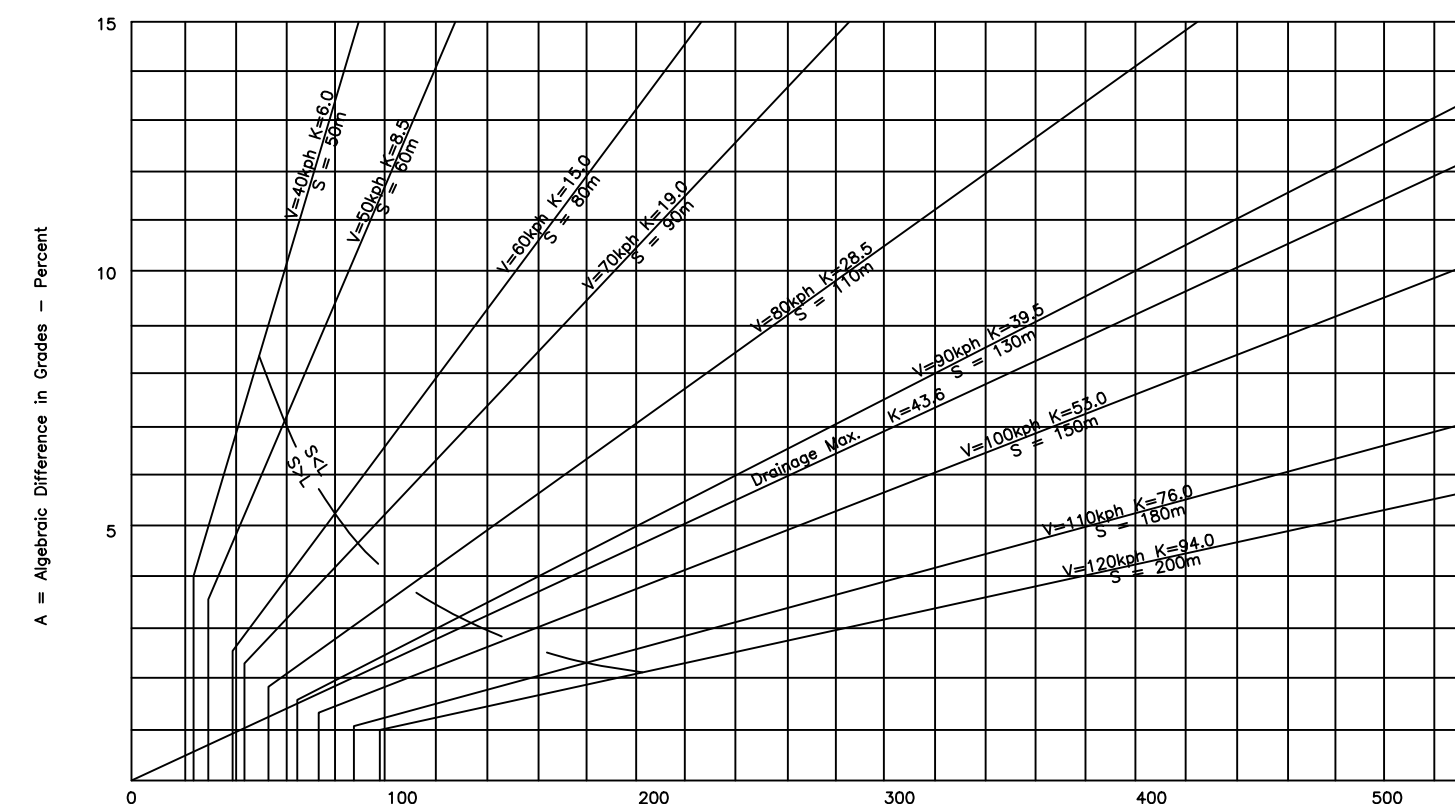
$$m = R \text{ vers } \frac{28.65 S}{R}$$

$$S = \frac{R}{28.65} \cos^{-1} \frac{R-m}{R}$$

D	=	DEGREE OF CURVE
R	=	RADIUS OF CURVE
V	=	ASSUMED DESIGN SPEED
S	=	STOPPING SIGHT DISTANCE
m	=	MIDDLE ORDINATE
θ	=	1/2 OF INTERSECTION ANGLE



L=MINIMUM LENGTH OF VERTICAL CURVES - METERS
DESIGN CONTROLS FOR SAG VERTICAL CURVE
BASED ON MINIMUM STOPPING SIGHT DISTANCE, (HEADLIGHT DISTANCE)


$$K = \frac{s^2}{426} \quad (K \text{ ROUNDED})$$

L=MINIMUM LENGTH OF VERTICAL CURVES - METERS
DESIGN CONTROLS FOR CREST VERTICAL CURVE
BASED ON MINIMUM STOPPING SIGHT DISTANCE, (S)

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

**CONCRETING OF ROAD
IN BARANGAY ISING, CARMEN,
DAVAO DEL NORTE**

DESIGN REQUIREMENTS OF CURVE

HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:


WARREN S. PIÑEZ
ENGINEER II

BENILDA S. PACQUIAO
ENGINEER III

DATE:

JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE: _____


GARRY E. WERANO
OFFICER-IN-CHARGE
OF THE ASSISTANT DISTRICT ENGINEER
DATE:

DATE:

ARTURO P. LONGYAPON
DISTRICT ENGINEER

DATE _____

A circle with a horizontal line through its center. The letter 'G' is positioned above the line, and the number '1' is positioned below the line on both the left and right sides.



LEGEND:

BENCH MARK

PROPOSED PCCP

EXISTING PCCP

VARIOUS TREES

WATER FLOW

CONTOUR

WARNING SIGN

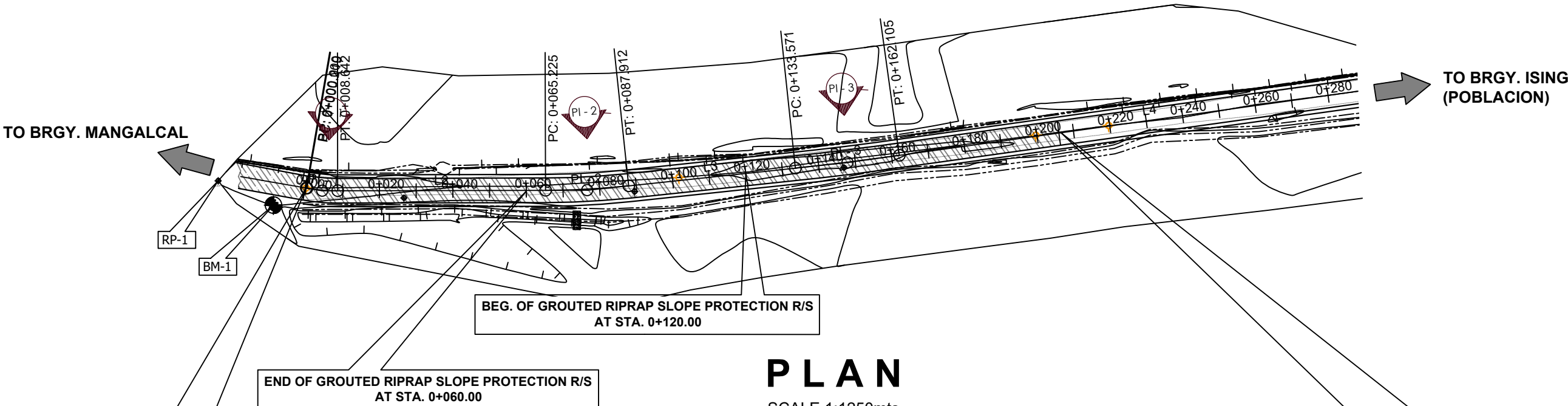
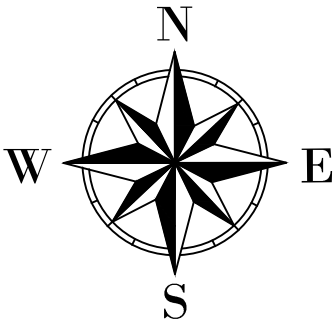
FENCES

ELEMENTS OF CURVE														
PI No.	PI STATION	NORTHING	EASTING	I	Dc	R	Lc	T	E	Pc	Pt	e	w	V(kph)
PI - 1	0+004.441	814685.9241	575882.9897	9-59-07	23-42-29	48.334	8.423	4.222	0.184	0+000.219	0+008.642			40
PI - 2	0+076.579	814686.0819	575955.1481	5-55-45	5-13-37	219.234	22.687	11.354	0.294	0+065.225	0+087.912			40
PI - 3	0+147.839	814693.6001	576026.0312	1-52-35	1-18-55	871.278	28.534	14.268	0.117	0+133.571	0+162.105			40

BENCHMARK					
BM. #	AZIMUTH	DISTANCE	NORTHINGS	EASTINGS	ELEVATION
BM - 1	242° 19' 53.7	10.039 m.	814682.0082 m	575869.7079 m	-3.944 m
R.P. - 1 : NAILED AT COCO TREE R/S					

REFERENCE POINT				
RP NO.	LENGTH	AZIMUTH	NORTHING	EASTING
RP1	24.045 m	274° 39' 06.76"	814688.6347 m	575854.6479 m
RP-1 : CONCRETE ELECTRIC POST R/S				

TRAVERSE (NEW)		
PI No.	DISTANCE	AZIMUTH
L1 - PI-1	0.219	279-51-35.530
PI-1 - PI-2	72.138	269-52-28.751
PI-2 - PI-3	70.421	263-56-43.984



PLAN
SCALE 1:1250mts

PROFILE
SCALE 1:1250mts HOR.
SCALE 1:125mts VERT.

LEGEND:

FILL AREA

CUT AREA

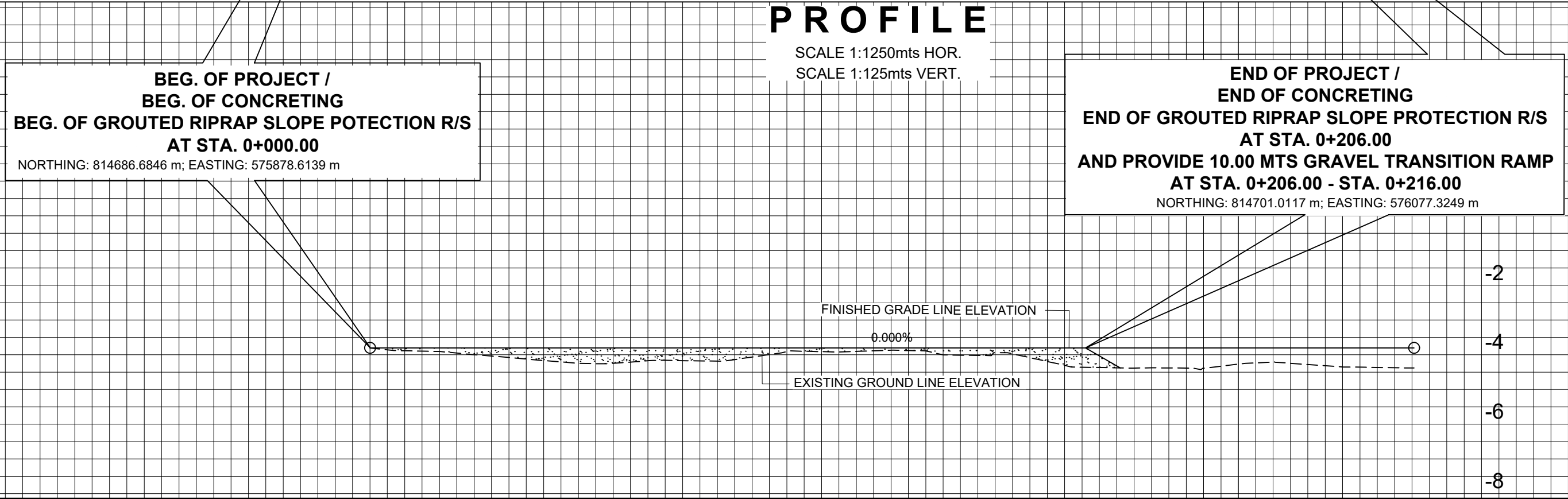
FINISH GRADE LINE

EXISTING GROUND LINE

I. E. OF LINED CANAL

**BEG. OF PROJECT /
BEG. OF CONCRETING
BEG. OF GROUTED RIPRAP POTECTION R/S
AT STA. 0+000.00**
NORTHING: 814686.6846 m; EASTING: 575878.6139 m

**END OF PROJECT /
END OF CONCRETING
END OF GROUTED RIPRAP SLOPE PROTECTION R/S
AT STA. 0+206.00
AND PROVIDE 10.00 MTS GRAVEL TRANSITION RAMP
AT STA. 0+206.00 - STA. 0+216.00**
NORTHING: 814701.0117 m; EASTING: 576077.3249 m



STATION	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200
FINISHED GRADE LINE ELEVATION	-3.804	-3.804	-3.804	-3.804	-3.804	-3.804	-3.804	-3.804	-3.804	-3.804	-3.804
EXISTING GROUND LINE ELEVATION	-3.804	-3.905	-4.078	-4.243	-4.173	-4.183	-3.911	-3.903	-3.887	-3.938	-4.304
WIDENING	W = 0										
SUPER ELEVATION	NORMAL CROWN = -1.50%										

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:

CONCRETING OF ROAD
IN BARANGAY ISING, CARMEN,
DAVAO DEL NORTE

SHEET CONTENTS:

TRAFFIC MANAGEMENT PLAN AND DETAILS

DRAFTED:

HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:

WARREN S. PINEZ
ENGINEER II

REVIEWED:

BENILDA S. PACQUIAO
ENGINEER III

DATE:

SUBMITTED:

JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

GARRY E. VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:

ARTURO P. LONGYAPON
DISTRICT ENGINEER

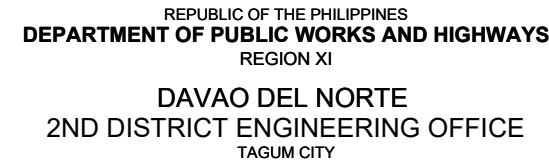
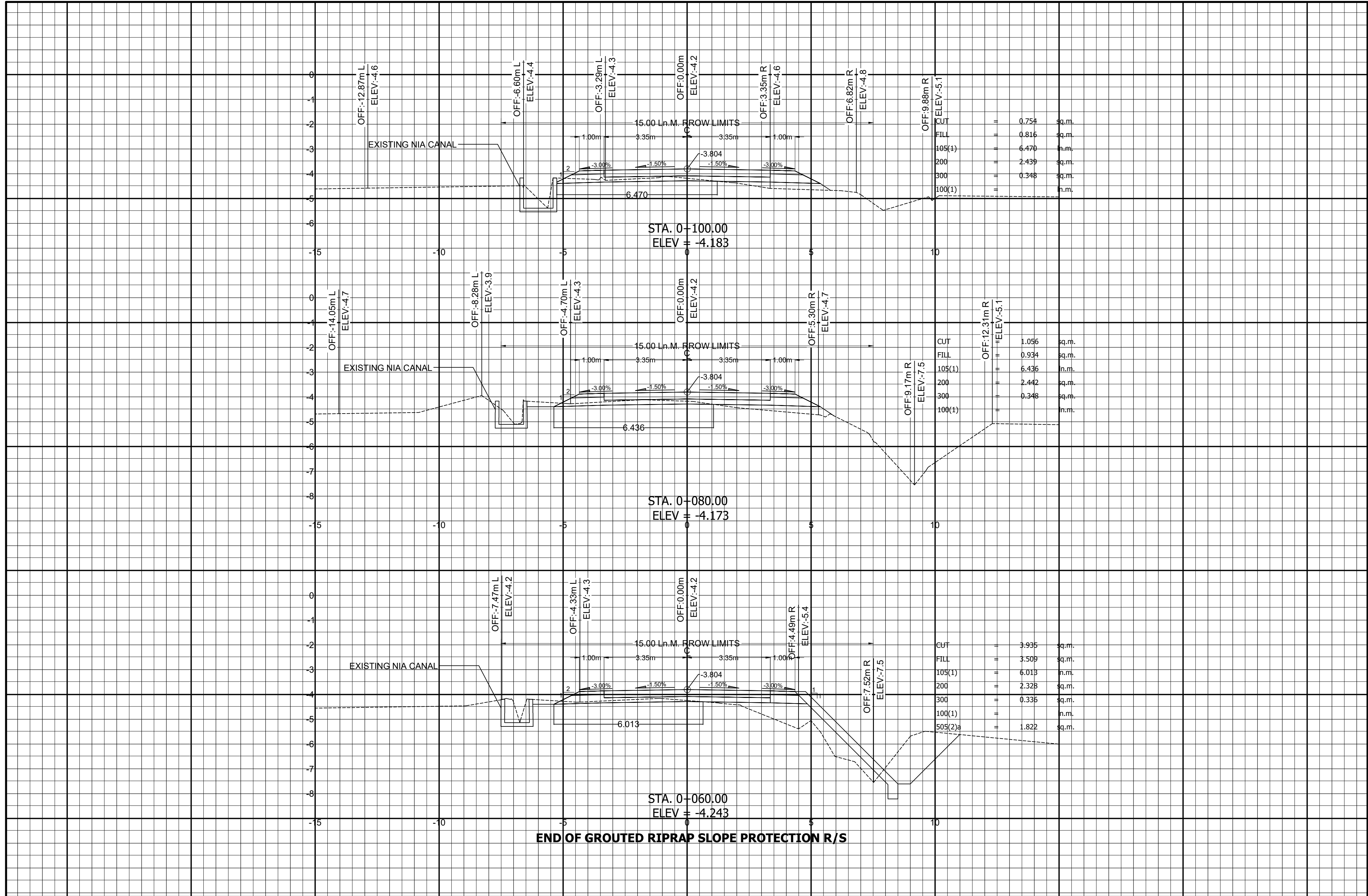
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SHEET NO.

12
16



**CONCRETING OF ROAD
IN BARANGAY ISING, CARMEN,
DAVAO DEL NORTE**

CROSS SECTION

$$\frac{14}{16}$$




REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR
**CONCRETING OF ROAD IN BARANGAY ISING,
CARMEN, DAVAO DEL NORTE**

SECTION	:	BRGY. ISING ROAD
LOCATION	:	CARMEN, DAVAO DEL NORTE
STATION LIMITS	:	STA. 0+000.00 - STA. 0+206.00
NET LENGTH	:	206.00 LN.M CONCRETING/ 0.412 LANE-KM.

SUBMITTED:



JEZABEL E. TULING, MPA
CHIEF, PLANNING & DESIGN SECTION

DATE:

RECOMMENDED:


GARRY E. VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:


ARTURO P. LONGYAPON
DISTRICT ENGINEER

DATE:

PROJECT LIMITS

BEG. OF PROJECT/ BEG. OF CONCRETING = STA. 0+000.00
END OF PROJECT/ END OF CONCRETING = STA. 0+206.00

NET LENGTH = 206 LN.M. CONCRETING (TWO LANES)

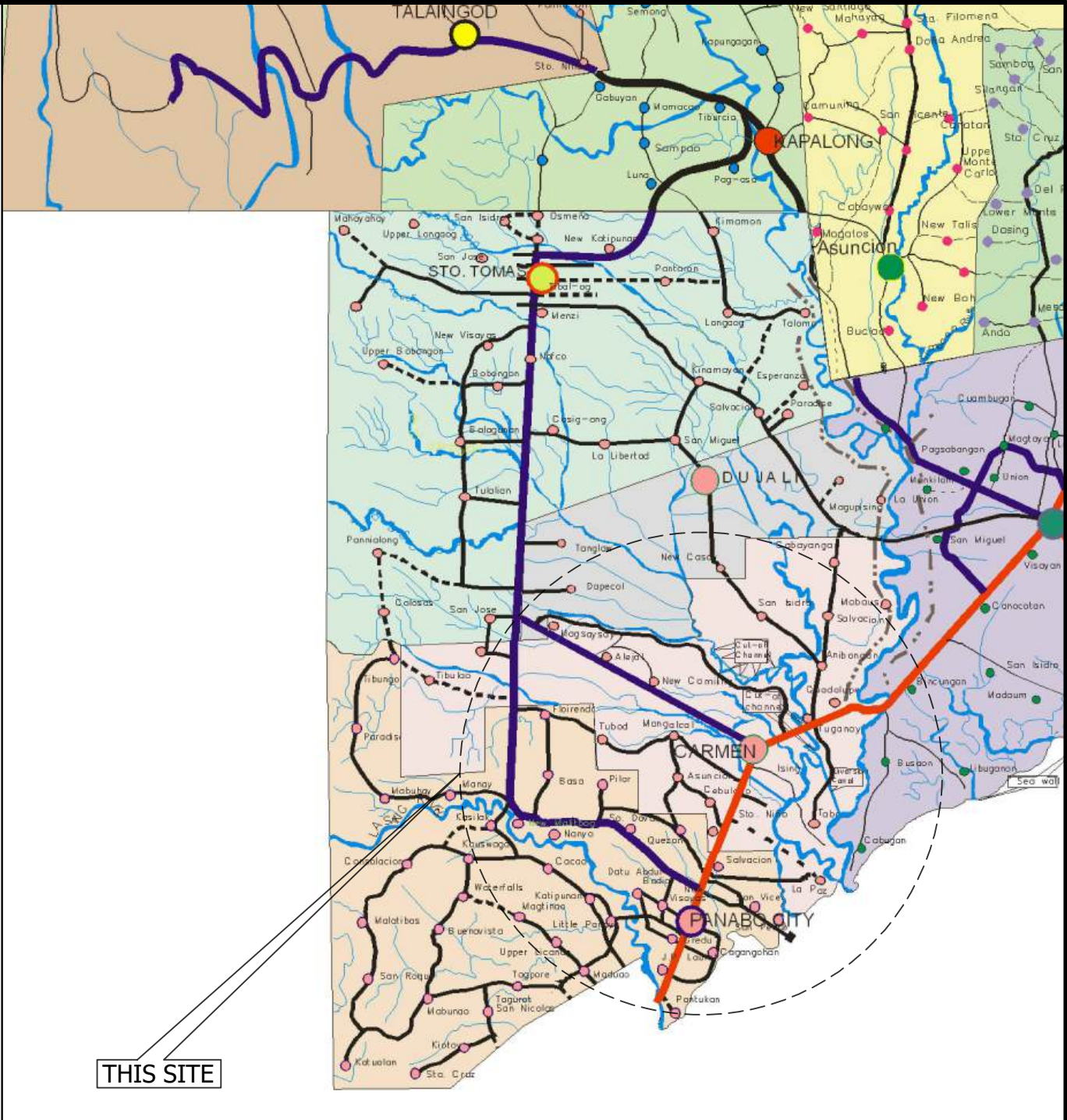
BEG. OF GROUTED RIPRAP SLOPE PROTECTION R/S = STA. 0+000.00
END OF GROUTED RIPRAP SLOPE PROTECTION R/S = STA. 0+060.00

BEG. OF GROUTED RIPRAP SLOPE PROTECTION R/S = STA. 0+120.00
END OF GROUTED RIPRAP SLOPE PROTECTION R/S = STA. 0+206.00

NET LENGTH = 146.00 LN.M. GROUTED RIPRAP SLOPE PROTECTION R/S

NOTE:
PROVIDE 10 mts GRAVEL TRANSITION RAMP AT THE END OF THE CONCRETING STA. 0+206.00 - STA 0+216.00 (INCLUDED IN THE SCOPE OF WORKS)

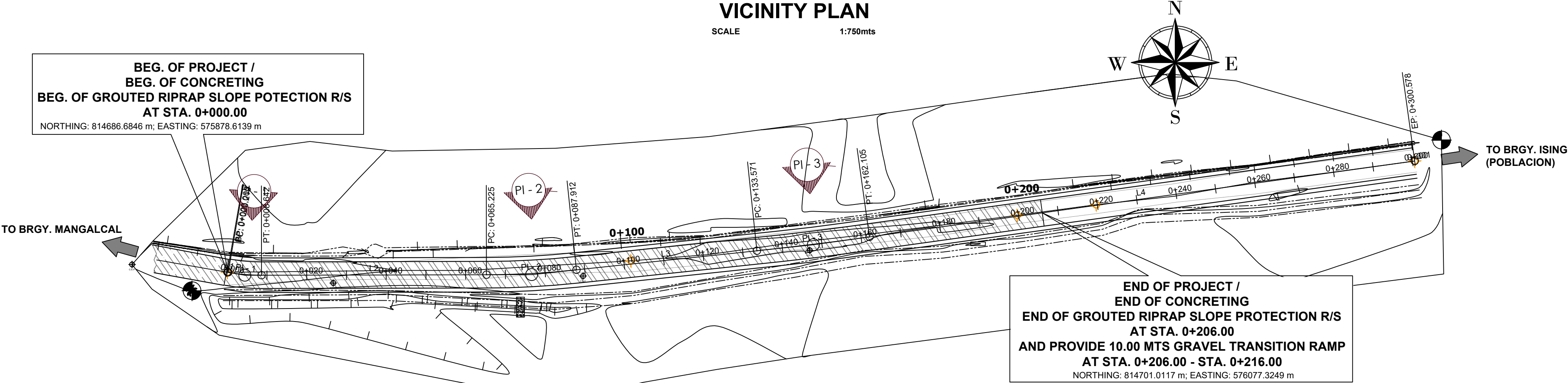
SHEET NO.	SHEET CONTENTS
0	COVER PAGE
1	PROJECT LIMITS, INDEX OF DRAWINGS, LOCATION MAP, VICINITY PLAN
2-3	GENERAL NOTES, LEGENDS
4	SUMMARY OF QUANTITIES
5	TYPICAL ROADWAY SECTION, DESIGN PARAMETERS, RIGID PAVEMENT ANALYSIS
6	STANDARD PORTLAND CEMENT CONCRETE PAVEMENT JOINTS
7	REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS DETAILS AND SCHEDULE PCCP TRANSITION RAMP FLARE DETAIL, REMOVAL AND RELOCATION OF UTILITIES
8	DESIGN REQUIREMENTS OF CURVE
9	DPWH, COA AND DENR BILLBOARD DETAILS
10-11	TRAFFIC MANAGEMENT PLAN AND DETAILS
12	PLAN AND PROFILE
14-16	CROSS SECTION



LOCATION MAP
DRAWN NOT TO SCALE

VICINITY PLAN

SCALE 1:750mts



GENERAL NOTES

SPECIFICATIONS

- All works shall comply with the "DPWH STANDARD SPECIFICATION VOLUME II, HIGHWAYS, BRIDGES AND AIRPORTS 2013", special provision and supplemental specifications pertaining to this project.

DIMENSIONS

- Distance between the horizontal control points including reference points are measured and expressed in meters.
- Unless otherwise specified, dimensions of pipes, box culverts, bridges and other structures are measured and expressed in millimeters.
- All other dimensions are expressed in meters.

SURVEY SPECIFICATIONS

- All project control points are projected in PRS '92 Grid Coordinate System (Zone 5)
- Survey Instrument used, Stonex S9111 Plus STNS95321007 (Base), Stonex S9111 Plus STNS95491002 (Rover)
- Date surveyed: December 3, 2024
- Project Control Points, Refer to Plan and Profile

ELEVATIONS AND GRADES

- Finished grade elevation shown on plan and profile sheets refers to finished pavement level as indicated in the typical roadway section.
- Ground grade shown on the plan and profile sheets refers to the elevation of the original ground along the centerline of the project road.

OTHER GENERAL REQUIREMENTS

- Alignment and grades are subject to adjustments to suit actual field conditions.
- Distances and elevations are in meter unless otherwise indicated.
- Grades shown are top of finished pavement.
- All works shall comply with the Standard Specifications for Highways and Bridges, Revised 2013 and "A Policy on Geometric Design", AASHTO 2011.
- Where no detours are available, traffic shall be handled in accordance to the provisions of Clause 75 of the DPWH Standard Specifications, Volume 1, Requirements and Conditions of Contract (2013).
- The contractor shall continuously keep the road undergoing improvement and the section detours in such condition satisfactory to the Engineer that traffic will be accommodated during the entire contract period without any inconvenience to the traveling public in accordance to Clause 38 of the DPWH Standards Specifications, Volume 1, Requirements and Conditions of Contract (2013). The contractor shall bear all expenses for constructing, reconstructing if necessary and maintaining such road detours, approaches, including run-around temporary bridges without compensation.
- The apparent silence of specifications, plans, special provisions and supplementary specifications, as to any detail or the apparent omission from them of a detailed description concerning any point shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of first class quality are to be used.
- Roads closed to traffic shall be protected by effective barricades, and obstructions shall be illuminated at night. Suitable warning signs, illuminated at night by lanterns of flares, shall be provided. All lights for this purpose shall be kept burning from sunset to sunrise.
- The contractor will be required to erect warning signs outside of, and 150m from, each end of the project, and 150m in advance at any place on the project where operations interfere with the use of the road by traffic, and at all intermediate points where the new work crosses or coincides with an existing road.
- Before the start of actual construction, the As-Staked Plan should be submitted to the Davao del Norte 2nd-District Engineering Office in order that immediate steps may be taken to correct or adjust whatever appreciable deviation there may be from the original plan.**
- The Implementing office shall identify the locations of and provide accessibility facilities for persons with disabilities in accordance with DO NO. 37, S. 2009.
- Quarry site for Item 200 and Item 104 is Mabuhay, Carmen (40.00 km. from the project site), Disposal site is one (1) km. away from project limit.
- Design was based on survey data submitted by the Survey Investigation Unit of the Planning and Design Section of the DPWH-Davao del Norte, 2nd District Engineering Office.

SUBBASE AND BASE COURSE

- Re-preparation and compaction of the existing base/ subbase to the required density shall be done prior to gravel resurfacing in accordance with DPWH Standard Specifications, Volume II, 2004, using vibrating rollers and pneumatic tire rollers. In areas where the said equipment cannot be used, a portable mechanical compactor shall be used.

SURFACE COURSE

- Use steel forms for item 311- Portland Cement Concrete Pavement
- When concrete is to be placed adjoining a previously constructed lane and mechanical equipment will be operated upon the existing lane, that previously constructed lane shall have attained the strength of fourteen (14) day concrete. If only finishing equipment is carried on the existing lane, paving in adjoining lanes may be permitted after three (3) days.
- At transverse construction joints, holes of 60mm dia. and spaced at 300mm (for 230mm and 280mm thick concrete pavement) shall be drilled at one-half (1/2) of the existing concrete pavement thickness so as to permit the load transfer device (28mm dia. plain dowel bars for 230mm thick PCCP; 36mm dia plain dowel bars for 280mm thick PCCP; 36mm dia. for 300mm thick PCCP) to be inserted at one-half (1/2) of its length. The said device shall be installed firmly at the holes and shall be held in position parallel to the surface of the slab. The dowel bars shall be painted with red lead and the surface of one-half (1/2) of the length to be inserted shall be coated with concrete epoxy while the other half shall be coated with approved bituminous materials. -DO 54, s.2012
- Transverse contraction joint shall be cut using a concrete saw to the required depth (one-fourth to one-third of the concrete pavement thickness) and width as shown in the approved plans.
- All joints shall be sufficiently sealed with asphalt sealant prior to opening to vehicular traffic.
- The contractor shall prepare the design mix based on the absolute volume method as outlined in the American Concrete Institute (ACI) Standard 211.1, "Recommended Practice For Selecting Proportions for Normal and Heavyweight Concrete". The Engineer shall determine from laboratory tests of the materials to be used, the cement content and the proportions of aggregate and water that will produce workable concrete having a slump of between 40 and 75 mm. if not vibrated or between 10 and 40 mm. if vibrated, and a flexural strength of not less than 3.8 MPA when tested by the third-point method or 4.5 MPA when tested by the mid-point method at fourteen (14) days in accordance with AASHTO T 97 and T 177, respectively; or a compressive strength of 24.1 MPA for cores taken at fourteen (14) days and tested in accordance with AASHTO T 24.

EARTHWORK

- Clearing shall extend one (1) meter beyond the toe of the fill slopes or beyond rounding of cuts slopes as the case may be for the entire length of the project unless otherwise shown on the plans or as directed by the Engineer and provided it is within the right of way limits of the project.
- All concrete pavement, base course, sidewalks, curbs, gutters, etc., designated for removal shall be broken into pieces, the size of which shall not exceed 300mm (12in) in any dimension and stockpiled at designated locations on the project or as directed by the Engineer.
- All excavations shall be finished to reasonably smooth and uniform surfaces. No materials shall be wasted without authority of the Engineer. Excavation operations shall be conducted so that material outside of the limit of slopes will not be disturbed.
- Spoils from demolished/ excavated materials shall not be allowed to be stockpiled at the shoulder or part of the traveled roadway and shall be removed immediately to prevent obstruction. Spoils removed shall be disposed off in designated areas approved by the Engineer.
- In case of use, all explosives shall be stored in a secure manner, in compliance with local laws and ordinances, and all such storage places shall be marked clearly "DANGEROUS EXPLOSIVES". Where no local laws or ordinance apply, storage shall be provided in a place satisfactory to the Engineer, and in general, not closer than 300m from any building or camping area.
- Borrow materials shall not be placed until after the readily accessible roadway excavation has been placed in the fill, unless otherwise permitted or directed by the Engineer. If the contractor places more borrow than is required and thereby causes a waste of excavation, the amount of such waste will be deducted from the borrow volume.
- All embankments shall be constructed in accordance with the requirements of Item 104-Embankment. It shall be compacted in horizontal layers not exceeding 200mm (loose measurement). After five successive layers, the fill/ embankment shall be saturated with water then dried before placing the succeeding layers. The procedure shall be repeated until the desired elevation is attained.
- Watering and compacting of all embankments shall be considered as subsidiary work pertaining to other contract items. The cost of performance thereof shall be considered to be included in the contract unit bid price for other items.
- Cut slopes, except in rocks and fill slopes shall be adjusted and warped to flow into each other or into natural ground surface without noticeable break.
- Approaches and road connections shall be constructed as shown on the plans or as directed by the Engineer in such manners as to ensure proper connections to the riding surfaces.
- Prior to commencing preparation of the subgrade, all culverts, cross drains, ducts and the like (including their fully completed backfill), ditches, drains and drainage outlets shall be completed. Any work on the preparation of the subgrade shall not be started unless prior work herein described shall have been approved by the Engineer.

REMOVAL OF EXISTING STRUCTURES AND OBSTRUCTIONS

- No payment shall be made for removal of other miscellaneous structures that may be required as subsidiary work pertaining to other contract items except for specific items expressly identified for payment.
- Improvements and other similar structures that will be affected during the implementation of this project shall be paid for under the road right-of-way improvement.

MISCELLANEOUS STRUCTURES

- Obstructions within the roadway, if not illuminated shall be marked with reflectorized hazard markers (Refer to Section 7 of the Highway Safety Design Standards Part 2 May 2012 Edition). For Additional Emphasis, It is advisable to mark obstructions with no less than five alternating reflectorized black and white stripes.
- The application of paint for pavement markings shall be preferably carried out by a machine specially made for this propose but where brushed are used, only round or oval brushes not exceeding 100mm in width will be permitted. The paint shall be so applied as to produce a uniform, even coating in close contact with the surface being painted.
- The applied thermoplastic pavement markings shall have a minimum of 2 years of longevity/durability.
- Materials which are defective or have been applied in an unsatisfactory manner or to incorrect dimensions or in a wrong location shall be removed. The road pavement shall be made good and materials replaced, reconstructed and/or properly located, all at the contractor's expense and to the satisfaction of the engineer.

CONSTRUCTION REQUIREMENTS

Staking activities shall be included in the construction schedule to be submitted by the contractor. dates and sequence of each staking activity shall be included.

The engineer shall set initial reference lines, horizontal and vertical control points, and shall furnish the data for use in establishing control for the completion of each element of the work. data relating to horizontal and vertical alignments, theoretical slope stake catch points, and other design data shall be furnished.

The contractor shall be responsible for the true settling of the works or improvements and for correctness of positions, levels, dimensions and alignment of all parts of the works. he shall provide all necessary instruments, appliances, materials and supplies, and labor in connection therewith. the contractor shall provide a survey crew supervisor at the project site whenever surveying/staking activity is in progress.

Prior to construction, the engineer shall be notified of any missing initial reference lines, controls, points, or stakes. the engineer shall reestablish missing initial reference lines, controls, points, or stakes.

The contractor for convenient use of government-furnished data shall perform additional calculations. immediate notification of apparent errors in the initial staking or in the furnished data shall be provided.

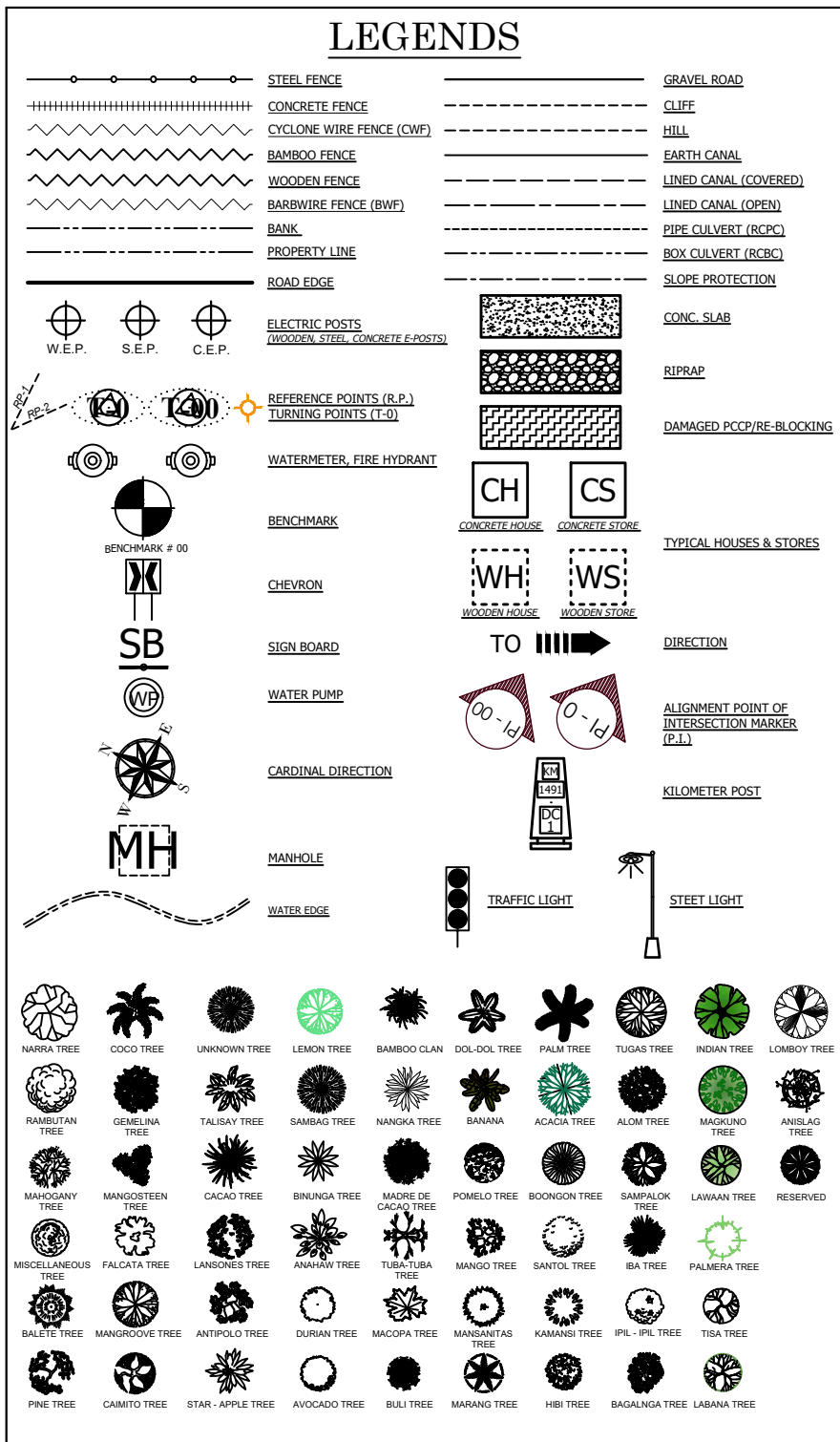
All initial reference and control points shall be preserved. at the start of construction, all destroyed or disturbed initial reference or control points necessary to the work shall be replaced.

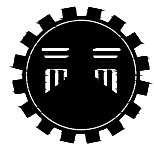
Before surveying and staking, the contractor shall discuss and coordinate the following with the Engineer:

- SURVEYING AND STAKING METHODS
- STAKE MARKING/CONCRETE MONUMENTS
- GRADE CONTROL FOR COURSES OF MATERIAL
- REFERENCING
- STRUCTURE CONTROL
- ANY OTHER PROCEDURES AND CONTROLS NECESSARY FOR THE WORK

REFERENCES:

- Revised DPWH Manual on Highway Safety Design Standards, May 2012 Edition
 - For road safety planning and design activities as well as road safety maintenance activities such as the proper way of installing ,applying road signs,road safety devices and pavement markings - D.O. 41,s. 2012
- Labor Code of the Philippines and its Implementing Rules and Regulations DOLE DO No. 13,s. 1998, Occupational Safety and Health Standards and its Procedural Guidelines.
 - For monitoring, enforcement and implementation of construction safety and health - D.O. 56,s. 2005
- Design References
 - DPWH Design Guidelines, Criteria & Standards (DGCS), 2015 Edition
 - Guidelines for the preparation of cost estimates for traffic management and safety & health requirements for the construction and maintenance of roads, bridges and safety & health requirements for school buildings, 2018
 - AASHTO a policy on geometric design standard of highways and streets, 2011 6th Edition
 - AASHTO guide on pavement design, 1993 Edition
 - Highway Safety Design Standards: Part 1 - Road Safety Design, and Part 2 - Road Signs and Pavement Markings, 2012 Edition



 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGION XI DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE TAGUM CITY	PROJECT NAME AND LOCATION: CONCRETING OF ROAD IN BARANGAY ISING, CARMEN, DAVAO DEL NORTE	SHEET CONTENTS: GENERAL NOTES AND LEGENDS	DRAFTED: HERWIN EVAN J. HABABAG ENGINEER II PREPARED: WARREN S. PINEZ ENGINEER II	REVIEWED: BENILDA S. PACQUIAO ENGINEER III DATE:	SUBMITTED: JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION DATE:	RECOMMENDED: GARRY E. VERANO OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:	APPROVED: ARTURO P. LONGYAPON DISTRICT ENGINEER DATE:	SET NO. B 1 2	SHEET NO. 2 16

