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

CONSTRUCTION OF RIVER BANK PROTECTION ALONG TUGANAY RIVER, SANTO TOMAS, DAVAO DEL NORTE.

SECTION : BRGY. LA LIBERTAD

LOCATION : SANTO TOMAS, DAVAO DEL NORTE

STATION LIMITS: STA. 24+820.00 - STA. 25+000.00= 180.00 LN.M CONCRETE REVETMENT(L/S) UPSTREAM
STATION LIMITS: STA. 24+820.00 - STA. 25+000.00= 180.00 LN.M CONCRETE REVETMENT(R/S) UPSTREAM
STATION LIMITS: STA. 25+030.00 - STA. 25+178.325= 148.325 LN.M CONCRETE REVETMENT(L/S) DOWNSTREAM
STATION LIMITS: STA. 25+030.00 - STA. 25+178.325= 148.325 LN.M CONCRETE REVETMENT(R/S) DOWNSTREAM

NET LENGTH: 656.65 LN.M

SUBMITTED:

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

REVIEWED:

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

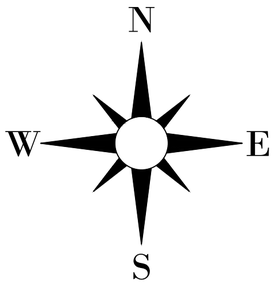
RECOMMENDED:

ARTURO P. LONGYAPON
DISTRICT ENGINEER
DATE:

PROJECT LIMITS :

STA. 24+820.00 - STA. 25+000.00 = 180.00 Ln.m. Concrete Revetment (R/S) - UPSTREAM
STA. 24+820.00 - STA. 25+000.00 = 180.00 Ln.m. Concrete Revetment (L/S) - UPSTREAM
STA. 25+030.00 - STA. 25+178.325 = 148.325 Ln.m. Concrete Revetment (R/S) - DOWNSTREAM
STA. 25+030.00 - STA. 25+178.325 = 148.325 Ln.m. Concrete Revetment (L/S) - DOWNSTREAM

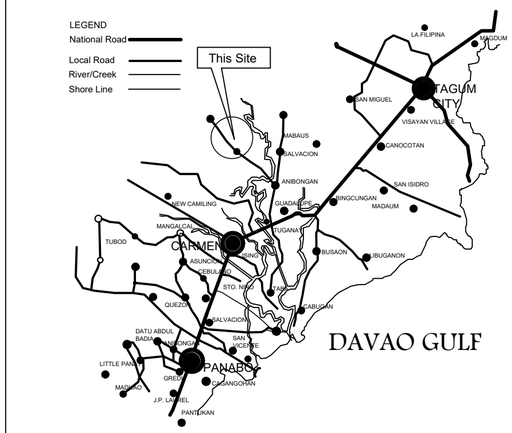
NET LENGTH = 656.65 Ln.m



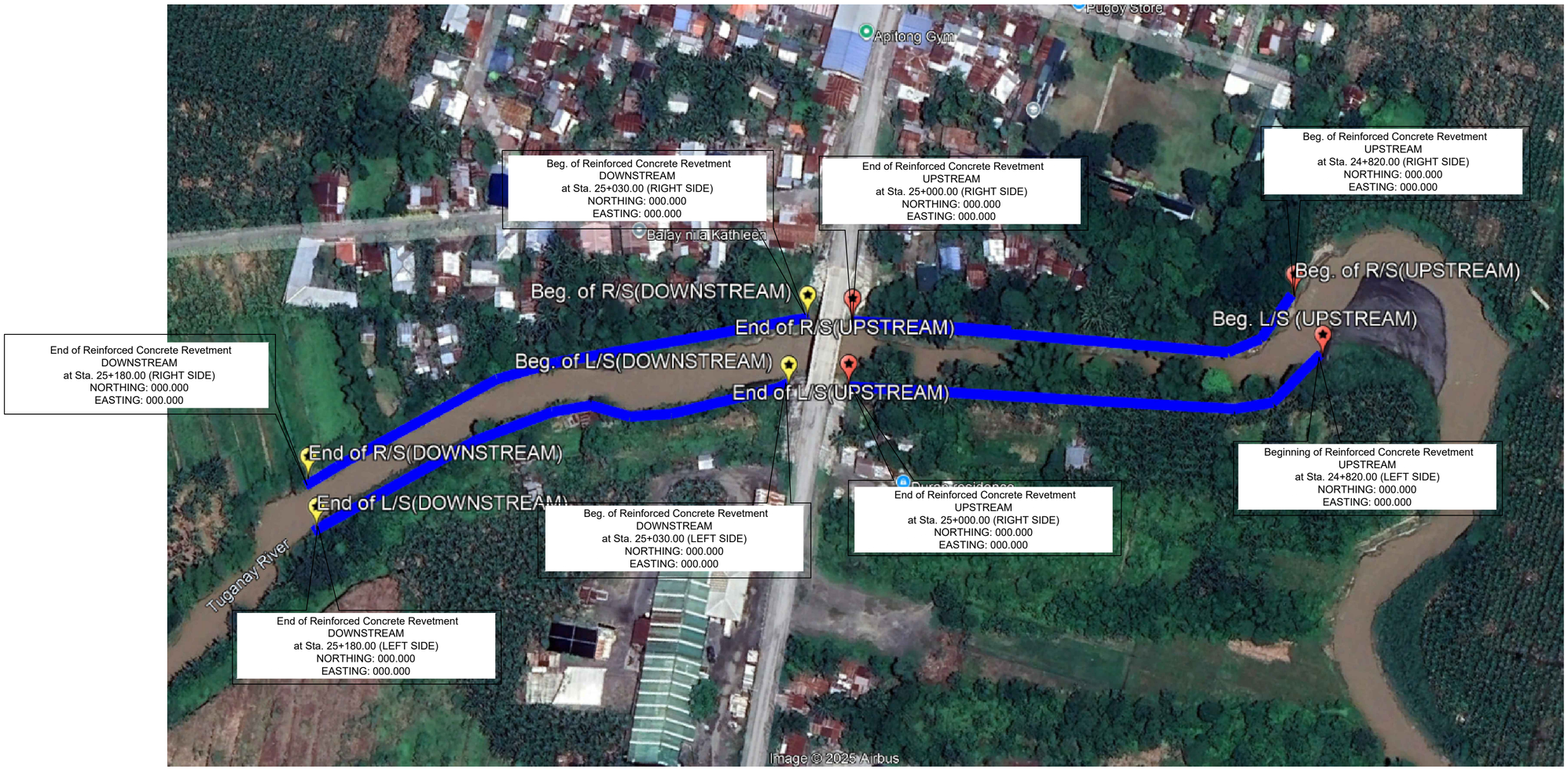
LOCATION PLAN

SCALE 1 : 2500 m

SHEET NO.	INDEX OF SHEETS
0	COVER PAGE
1	PROJECT LIMITS, INDEX OF SHEETS, VICINITY MAP & LOCATION PLAN
2	GENERAL NOTES & LEGEND
3	SUMMARY OF QUANTITIES
4	TYPICAL DRAINAGE SECTIONS
5-6	DETAILED SECTION OF SINGLE BARREL BOX CULVERT, BAR BENDING DIAGRAM, BAR SCHEDULE, CONCRETE LINED CANAL DETAILS AND GENERAL NOTES
7	DRAINAGE SCHEDULE, REMOVAL OF STRUCTURES/ OBSTRUCTION AND DRAINAGE SUMMARY
8	TRAFFIC MANAGEMENT PLAN
9	STANDARD BILLBOARD DETAIL
10	PLAN AND PROFILE
11-28	CROSS SECTION



VICINITY MAP



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:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:		APPROVED:	SET NO.	SHEET NO.
CONSTRUCTION OF RIVER BANK PROTECTION ALONG TUGANAY RIVER, STO TOMAS, DAVAO DEL NORTE	**INDEX OF SHEETS LOCATION PLAN VICINITY MAP**	**HERWIN EVAN J. HABABAG** ENGINEER II PREPARED: **BENILDA S. PACQUIAO** ENGINEER III	**WARREN S. PIÑEZ** ENGINEER II	**JEZABEL E. TULING, MPA** CHIEF, PLANNING AND DESIGN SECTION DATE:	**GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:	**ARTURO P. LONGYAPON** DISTRICT ENGINEER DATE:	A 1 | 2	1 28

GENERAL NOTES

SPECIFICATION

1. STEEL SHEET PILES
   STEEL SHEET PILES SHALL BE OF THE TYPE, WEIGHT AND SECTION MODULUS INDICATED ON THE PLANS OR SPECIAL PROVISIONS, AND SHALL CONFORM TO THE REQUIREMENT OF ITEM 1717(2)a1.
2. PILE LENGTH
   THE DESIGNED PILE LENGTH IS BASED ON THE ACTUAL BORING TEST RESULT.
3. HEIGHT OF THE STRUCTURE
   THE DESIGNED HEIGHT OF THE STRUCTURE IS BASED ON THE DESIGN FLOOD LEVEL PLUS 1.00 M. FREEBOARD.
4. DISCHARGE VOLUME
   THE DISCHARGE VOLUME OF FLOOD WATER WAS BASED ON 50 YEARS RETURN PERIOD.

5. THIS ITEM SHALL CONSIST OF THE CONSTRUCTION OF EMBANKMENT IN ACCORDANCE WITH THE SPECIFICATION AND IN CONFORMITY WITH THE LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER.

CONSTRUCTION REQUIREMENTS

10. STEEL SHEET PILES
    SHEET PILES SHALL BE DRIVEN TO ELEVATION SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. WHERE IMPRACTICAL TO DRIVE TO PLAN ELEVATION DUE TO SUBSURFACE CONDITIONS, THE DRIVING OF PILES MAY BE STOPPED AT A HIGHER ELEVATION WITH THE WRITTEN PERMISSION OF THE ENGINEER.
11. STRUCTURAL CONCRETE
    THIS ITEM SHALL CONSIST OF FURNISHING, PLACING AND FINISHING CONCRETE IN ALL STRUCTURES EXCEPT PAVEMENTS IN ACCORDANCE WITH THIS SPECIFICATION AND CONFORMING TO THE LINES, GRADES, AND DIMENSIONS SHOWN ON THE PLANS. CONCRETE SHALL CONSIST OF A MIXTURE OF PORTLAND CEMENT, FINE AGGREGATE, COARSE AGGREGATE, ADMIXTURE WHEN SPECIFIED, AND WATER MIXED IN THE PROPORTIONS SPECIFIED OR APPROVED BY THE ENGINEER.
12. ALL ELEVATION SHALL BASE ON PHILIPPINE REFERENCE SYSTEM OF 1992(PRS92).

13. PRE-CONSTRUCTION SURVEY SHALL BE CONDUCTED BY THE REPRESENTATIVE OF THE IMPLEMENTING OFFICE AND THE CONTRACTOR. CORRESPONDING "AS STAKED PLAN" SHALL BE PREPARED AND SUBJECT FOR APPROVAL BY THE DISTRICT ENGINEER.

14. OTHER ITEMS OF WORK SHALL CONFORM WITH THE DPWH STANDARD SPECIFICATIONS FOR PUBLIC WORKS AND HIGHWAYS, 2004 EDITION, VOLUME II AND DESIGN GUIDELINES CRITERIA AND STANDARD 2015 EDITION.

15. BEFORE COMMENCING THE FORMATION OF EMBANKMENTS, THE CONTRACTOR SHALL SUBMIT IN WRITING TO THE ENGINEER FOR APPROVAL HIS PROPOSALS FOR THE COMPACTION OF EACH TYPE OF FILL MATERIAL TO BE USED IN THE WORKS. THE PROPOSALS SHALL INCLUDE THE RELATIONSHIP BETWEEN THE TYPES OF COMPACTION EQUIPMENT, AND THE NUMBER OF PASSES REQUIRED AND THE METHOD OF ADJUSTING MOISTURE CONTENT. THE CONTRACTOR SHALL CARRY OUT FULL SCALE COMPACTION TRIALS ON AREAS NOT LESS THAN 10M WIDE AND 50M LONG AS REQUIRED BY THE ENGINEER AND USING HIS PROPOSED PROCEDURES OR SUCH AMENDMENTS THERETO AS MAY BE FOUND NECESSARY TO SATISFY THE ENGINEER THAT ALL THE SPECIFIED REQUIREMENTS REGARDING COMPACTION CAN BE CONSISTENTLY ACHIEVED.

FACILITIES FOR THE ENGINEER

16. THE CONTRACTOR SHALL AT ALL TIMES DURING THE DURATION OF THE CONTRACT PROVIDE FOR THE USE OF THE ENGINEER ALL EQUIPMENT, INSTRUMENTS AND APPARATUS, ALL INFORMATION AND RECORDS AND QUALIFIED CHAINMEN AND LABOURERS REQUIRED BY THE ENGINEER FOR INSPECTING AND ASURING THE WORKS. SUCH EQUIPMENT, INSTRUMENTS AND APPARATUS SHALL INCLUDE THOSE LISTED IN THE SPECIAL PROVISIONS.

17. THE CONTRACTOR SHALL PROVIDE WITHIN THIRTY (30) CALENDAR DAYS AFTER NOTICE TO COMMENCE WORK, THE VEHICLE LISTED IN THE SPECIAL PROVISIONS FOR THE EXCLUSIVE USE OF THE ENGINEER. THE VEHICLES ON DELIVERY SHALL BE NEW AND SHALL BE DRIVEN BY A COMPETENT QUALIFIED AND EXPERIENCED DRIVER WHO SHALL BE UNDER THE DIRECT ORDER OF THE ENGINEER.

MATERIALS

1. CONCRETE
   a. CONCRETE STRENGTH BY CLASS

STRUCTURAL MEMBER	CLASS	28-DAY CYLINDER STRENGTH		MAX SIZE OF COARSE AGGREGATE, mm(in.)
		MPa	PSI	
CAST -IN-PLACE SLABS, DIAPHRAGMS, BACKWALLS, COPINGS,COLUMNS,SIDEWALK	A	27.59	4000	20

   b. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL THE PLACING SEQUENCES FOR ALL TYPES OF CONCRETING WORK.
   c. DESIGN OF CONCRETE SHALL BE AS SET FORTH UNDER ITEM NO. 1 OF MATERIALS.
   d. CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE GENERAL SPECIFICATIONS.
   e. FOR CONCRETE DEPOSITED AGAINST THE GROUND, LEAN CONCRETE SHALL BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF THE CONCRETE SECTION.

2. REINFORCING STEEL
   a. REINFORCING STEEL NON WELDABLE SHALL CONFORM TO ASTM615/A615M & WELDABLE STEELBARS SHALL CONFORM TO ASTM A706/A706M. MINIMUM YIELD STRENGTH AS LISTED BELOW UNLESS OTHERWISE SPECIFIED IN THE DRAWING:
   Fy=414 MPa (Gr. 60) FOR 16mm Ø AND LARGER
   Fy=276 MPa (Gr. 40) FOR 12mm Ø AND SMALLER
   b. REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

3. STEEL SHEET PILE
   a. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL PROVISIONS IN ITEM 1717 - SHEET PILES OF DPWH STANDARD SPECIFICATIONS.
   b. STEEL SHEET PILES SHALL MEET THE REQUIREMENTS OF AASHTO M 202 (ASTM A328), OR AASHTO M 223. THE JOINTS SHALL BE PRACTICALLY WATER-TIGHT WHEN THE PILES ARE IN PLACE.

SURVEY SPECIFICATIONS
1. ALL PROJECT CONTROL POINTS ARE PROJECTED IN PRS'92 GRID COORDINATE SYSTEM (ZONE 5).
2. SURVEY INSTRUMENT USED. STONEX 800
DATE SURVEYED: JANUARY 28, 2025

3. PROJECT CONTROL POINTS, REFER TO 'PLAN AND PROFILE'

OTHER GENERAL REQUIREMENTS

1. ALIGNMENT AND GRADES ARE SUBJECT TO ADJUSTMENTS TO SUIT ACTUAL FIELD CONDITIONS.
2. DISTANCES AND ELEVATIONS ARE IN METER UNLESS OTHERWISE INDICATED.
3. GRADES SHOWN ARE TOP OF FINISHED PAVEMENT.
4. ALL WORKS SHALL COMPLY WITH THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, REVISED 2013 AND "A POLICY ON GEOMETRIC DESIGN", AASHTO 2001.
5. WHERE NO DETOURS ARE AVAILABLE, TRAFFIC SHALL BE HANDLED IN ACCORDANCE TO PROVISION OF CLAUSE 75 OF DPWH STANDARD SPECIFICATIONS, VOLUME 1, REQUIREMENTS AND CONDITIONS OF CONTRACT (1988).
6. 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 STANDARD SPECIFICATIONS, VOLUME 1, REQUIREMENTS AND CONDITIONS OF CONTRACT (1988). THE CONTRACTOR SHALL BEAR EXPENSES FOR CONSTRUCTING, RECONSTRUCTING IF NECESSARY AND MAINTAINING SUCH ROAD DETOURS, APPROACHES, INCLUDING RUN-AROUND TEMPORARY BRIDGES WITHOUT COMPENSATION.
7. THE APPARENT SILENCE OF SPECIFICATIONS, PLANS, SPECIAL PROVISIONS AND SUPPLEMENTARY SPECIFICATIONS, AS TO ANY DETAIL OR THE APPARENT OMISSION FROM THEM OF DETAILED DESCRIPTION CONCERNING ANY POINT SHALL BE REGARD 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.
8. ROAD CLOSED TO TRAFFIC SHALL BE PROTECTED BY EFFECTIVE BARRICADES, AND OBSTRUCTIONS SHALL BE ILLUMINATED AT NIGHT, SUITABLE WARNING SIGNS, ILLUMINATED AT NIGHT BY LANTERNS OR FLARES, SHALL BE PROVIDED, ALL LIGHTS FOR THIS PURPOSE SHALL BE KEPT BURNING FROM SUNSET TO SUNRISE.
9. 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.
10. BEFORE THE START OF ACTUAL CONSTRUCTION, THE AS-STAKED PLAN SHOULD BE SUBMITTED TO THE DAVAO DEL NORTE 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.
11. QUARRY SITE FOR AGGREGATES IS LOCATED AT MABUHAY, CARMEN, 16.00 KM AWAY FROM PROJECT SITE.
12. DESIGN WAS BASED ON SURVEY DATA SUBMITTED BY THE SURVEY INVESTIGATION SECTION OF THE PLANNING AND DESIGN SECTION OF THE DPWH DAVAO DEL NORTE SUB-DISTRICT ENGINEERING OFFICE.

EARTHWORK

1. CLEARING SHALL EXTEND ONE (1) METER BEYOND THE TOE OF THE FILL SLOPES OR BEYOND ROUNDING OF CUT SLOPES AS THE CASE MAY BE FOR 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 PROJECTS.
2. 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 DISTRUBED.
3. 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.
4. ALL EMBANKMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 1704(1)b EMBANKMENT. IT SHALL BE COMPACTED IN HORIZONTAL LAYERS NOT EXCEEDING 200mm (LOOSE MEASUREMENT). AFTER FIVE SUCCESSIVE LAYERS. THE PROCEDURE SHALL BE REPEATED UNTIL THE DESIRED ELEVATION IS ATTAINED.
5. 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.
6. CUT SLOPES, EXCEPT IN ROCKS AND FILL SLOPES SHALL BE ADJUSTED AND WARPED FLOW INTO EACH OTHER OR INTO NATURAL GROUND SURFACE WITHOUT NOTICEABLE BREAK.
7. 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.

SUBBASE AND BASE COURSE

1. 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, 2013, USING VIBRATING ROLLERS AND PNEUMATIC TIRE ROLLERS. IN AREAS WHERE THE SAID EQUIPMENT CANNOT BE USED, A PORTABLE MECHANICAL COMPACTOR SHALL BE USED.

DRAINAGE AND SLOPE PROTECTION STRUCTURES

1. EXACT LOCATION, GRADIENT, LENGTHS, TOP AND INVERT ELEVATIONS OF ALL DRAINAGE STRUCTURES THAT ARE REQUIRED SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
2. EXTENSIONS AND OTHER IMPROVEMENTS OF EXISTING DRAINAGE STRUCTURES ARE SUBJECT TO CHANGE AND SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER IN-CHARGE.
3. DURING CONSTRUCTION, ANY EXISTING PIPES FOUND DAMAGED OR DEFECTIVE SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ENGINEER, THE REMOVAL OF EXISTING SHALL BE PAID FOR UNDER ITEM 101(4) - REMOVAL OF EXISTING PIPE CULVERT.
4. ANY MISCELLANEOUS REMOVAL NOT SHOWN ON THE PLANS INCLUDING REMOVAL OF HEADWALLS AND WINGWALLS OF EXISTING DRAINAGE STRUCTURES THAT ARE TO BE EXTENDED OR IMPROVED AND DISPOSAL OF RESULTING MATERIALS SHALL BE CONSIDERED TO BE INLUDED IN THE UNIT PRICE BID FOR THOSE ITEMS.

REFERENCES :

1. 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
   - DO. 56, s.2005

2. DPWH DESIGN GUIDELINES, CRITERIA & STANDARDS (DGCS), 2015 EDITION
   - FOR THE DESIGN OF HIGHWAYS, BRIDGES, BUILDINGS AND FLOOD CONTROL PROJECTS COVERING THE MINIMUM REQUIREMENTS, SPECIFICATIONS AND PROCEDURES.
   - DO. 179, s.2015
3. DPWH STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND AIRPORTS VOL II, 2013 EDITION.
4. DPWH STANDARD SPECIFICATIONS FOR PUBLIC WORKS STRUCTURES (BUILDING, PORTS AND HARBORS, FLOOD CONTROL & DRAINAGE STRUCTURES & WATER SUPPLY SYSTEMS) - VOL. III, 2019 EDITION

LEGEND

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
CH	CONCRETE HOUSE		BENCH MARK
P	PUROK		NATURAL GROUND
WH	WOODEN HOUSE	CEP	CONCRETE ELECTRIC POST
	EXISTING RCC PIPE	WEP	WOODEN ELECTRIC POST
	BRIDGE		EASEMENT
	SIDE SHOT REMARK		CONTOUR LINES
	JUNCTION RIVER		CYLINDRICAL MONUMENT
	VARIOUS TREES	PI	POINT OF INTERSECTION
RP-2 RP-1	REFERENCE POINTS		BARBWIRE FENCE
	WATER FLOW DIRECTION	T-0	TURNING POINTS
	WATERWAY		WATER LEVEL
	RCC PIPE PROFILE		
	FENCE		

HYDRAULIC ANALYSIS

	50 YRS.	100 YRS.
DRAINAGE AREA (DA)	24.00 sq.km	24.00 sq.km
DISCHARGE (Q)	218.00 cu.m/sec	218.00 cu.m/sec
FREE BOARD	1.00 m (min)	1.00 m (min)
ELEV. AT PT. OF ORIGIN	240.00 m	240.00 m
ELEV. AT PT. OF INTEREST	5.00 m	5.00 m
VELOCITY MIN. - MAX.	1.38 m/s - 2.23 m/s	

This is to certify that the detailed engineering surveys and designs have been conducted according to the prescribed agency standards and specifications in conformance with the provisions of Annex "A" of the Revised Implementing Rules and Regulations of RA 9184, and that the detailed engineering outputs are adequate for the procurement at hand.

WARREN S. PIÑEZ
ENGINEER II

REPUBLIC OF THE PHILIPPINES
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2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF RIVER BANK PROTECTION ALONG TUGANAY RIVER, STO TOMAS, DAVAO DEL NORTE

SHEET CONTENTS:
INDEX OF SHEETS
LOCATION PLAN
VICINITY MAP

DRAFTED: **HERWIN EVAN J. HABABAG**, ENGINEER II
PREPARED: **BENILDA S. PACQUIAO**, ENGINEER III

REVIEWED: **WARREN S. PIÑEZ**, ENGINEER II

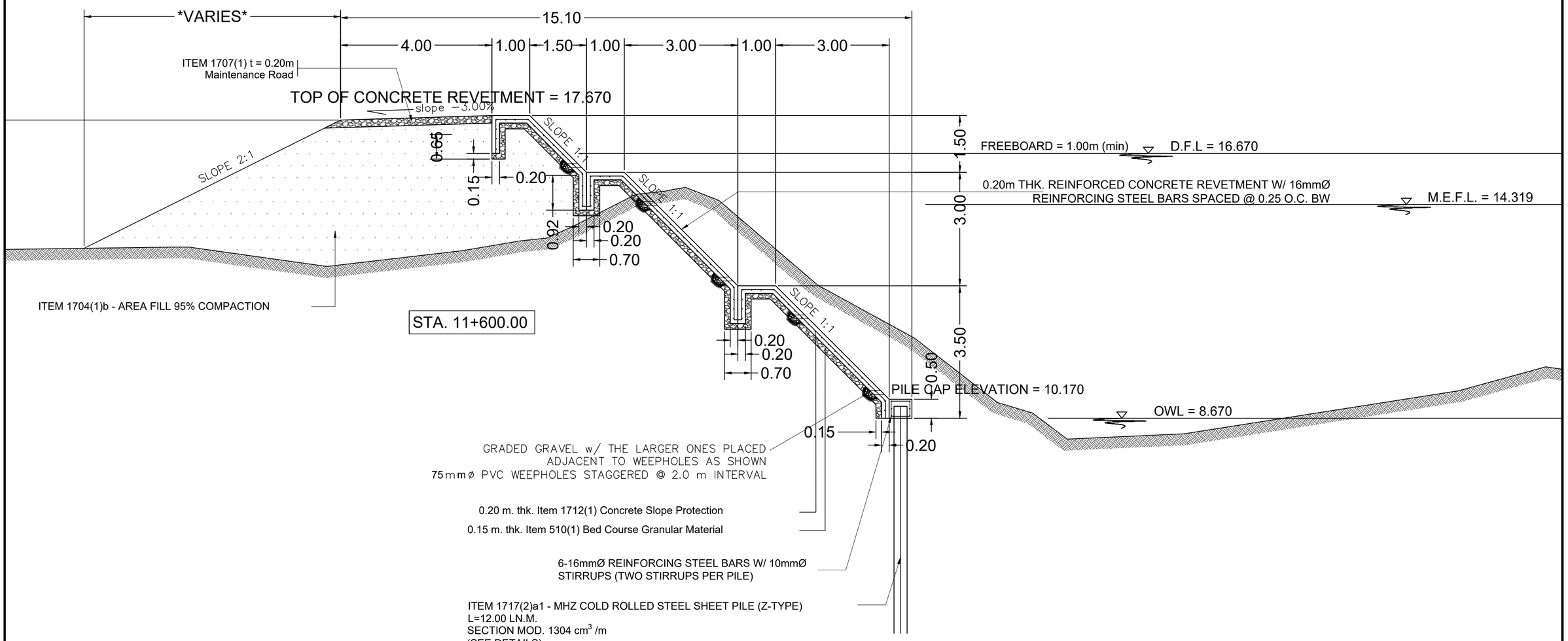
SUBMITTED: **JEZABEL E. TULING, MPA**, CHIEF, PLANNING AND DESIGN SECTION, DATE:

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

APPROVED: **ARTURO P. LONGYAPON**, DISTRICT ENGINEER, DATE:

SET NO. B 1 1

SHEET NO. 2 28



TYPICAL SECTION OF REINFORCED CONCRETE REVETMENT

SCALE 1:100 mts.

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CONSTRUCTION OF RIVER BANK PROTECTION ALONG TUGANAY RIVER, STO TOMAS, DAVAO DEL NORTE	**TYPICAL SECTION OF REINFORCED CONCRETE REVETMENT**	**HERWIN EVAN J. RABABAG** ENGINEER II PREPARED: **BENILDA S. PACQUIAO** ENGINEER III	**WARREN S. PIÑEZ** ENGINEER II	**JEZABEL E. TULING, MPA** CHIEF, PLANNING AND DESIGN SECTION DATE:	**GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:	**ARTURO P. LONGYAPON** DISTRICT ENGINEER DATE:	C 1 1	33 28

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	REMARKS
Part A	**Facilities for the Engineer**			
A.1.2(2)	Provision of 4x4 Pick Up Types Service Vehicle for the Engineer on Bare Rental Basis	Vehicle-Month	8.92	
A.1.2(3)	Construction of Field Office for the Engineer		1.00	
A.1.2 (5)	Operation and Maintenance of 4x4 Pick Up Types Service Vehicle for the Engineer	Vehicle-Month	8.92	
Part B	**Other General Requirements**			
B.3(1)	Permits and Clearance	ls	1.00	
B.4(1)	Construction Survey and Staking	km	0.330	
B.5(1)	Project Billboard/Signboard	ea	4.00	COA Billboard and DPWH Billboard
B.7(1)	Occupational Safety and Health Program	ls	1.00	
B.9(1)	Mobilization and Demobilization	ls	1.00	
Part L-A	**Earthworks**			
801 (1)	Removal of Stuctures and Obstruction	ls	1.00	
1700(3)a2	Individual Removal of Trees (301-500 mm dia.)	ea	50.00	
1701(1)	Unsuitable Excavation	cu.m.	20,659.82	
1702(4)a	Shoring, Cribbing and Drain Excavation	ls	1.00	
1704(1)b	Embankment from Borrow (Common Soil)	cu.m.	3,719.41	
1707(1)	Aggregate Subbase Course	cu.m.	968.56	
Part D	**REINFORCED CONCRETE**			
900(1)d	Structural Concrete, Class "A"(4000 PSI), 28 days	cu.m.	236.39	
902(1)a1	Reinforcing Steel (Grade 40)	kg	2,227.00	
902(1)a2	Reinforcing Steel (Grade 60)	kg	6,219.00	
Part L-B	**BANK AND SLOPE PROTECTION WORKS**			
1712(1)	Concrete (Slope Protection)	cu.m.	2,365.25	
1717(2)a1	Sheet Piles (Steel), Slope Protection	l.m.	10,233.51	
Part G	**DRAINAGE AND SLOPE PROTECTION STRUCTURES**			
510(1)	BED COURSE GRANULAR MATERIAL (CONCRETE)	cu.m.	1,757.20	
Part H	**MISCELLANEOUS STRUCTURES**			
611(1)	Trees Furnishing and Transplating	ea	4,000.00	

NOTE: THE QUANTITIES OF ALL WORK ITEMS INVOLVED ARE SUBJECT TO INCREASE/ DECREASE AS PER ACTUAL FIELD REQUIREMENTS.

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CONSTRUCTION OF RIVER BANK PROTECTION ALONG TUGANAY RIVER, STO TOMAS, DAVAO DEL NORTE

SHEET CONTENTS:
TYPICAL SECTION OF REINFORCED CONCRETE REVETMENT

DRAFTED:
HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:
BENILDA S. PACQUIAO
ENGINEER III

REVIEWED:
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