



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

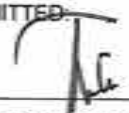
REGIONAL OFFICE No. XI

GOV. CHAVEZ COR. R. MAGSAYSAY ST. DAVAO CITY
C.Y. 2025 DPWH REGULAR INFRASTRUCTURE PROGRAM
DETAILED ENGINEERING DESIGN PLAN FOR

**CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER,
BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO**

SECTION	:	BRGY. MAGNAGA
LOCATION	:	PANTUKAN, DAVAO DE ORO
STATION LIMITS	:	STA. 1+846.350 TO STA. 2+035.000 AT LEFT BANK
NET LENGTH OF PROJECT	:	188.650 LN.M.
NET LENGTH OF REVETMENT	:	188.650 LN.M. / 565.95 SQ.M.
HEIGHT OF STRUCTURE	:	3.0 METERS
THICKNESS OF SLOPE PROTECTION:		200mm

SUBMITTED:


JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

DATE:

RECOMMENDED:


JOSELITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

DATE:

APPROVED:


JUBY B. CORDON
REGIONAL DIRECTOR

DATE:

GENERAL NOTES

FACILITIES FOR ENGINEER

1. THE CONTRACTOR SHALL AT ALL TIMES DURING THE DURATION OF THE CONTACT PROVIDE FOR THE USE OF ENGINEER ALL EQUIPMENT, INSTRUMENTS AND APPARATUS, ALL INFORMATION AND RECORDS AND QUALIFIED CHAINMEN AND LABORERS REQUIRED BY THE ENGINEER FOR INSPECTING AND MEASURING THE WORKS. SUCH EQUIPMENT, INSTRUMENTS AND APPARATUS SHALL INCLUDE THOSE LISTED IN THE SPECIAL PROVISIONS.
2. 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.

OTHER GENERAL REQUIREMENTS

1. ALIGNMENT AND GRADES ARE SUBJECT TO ADJUSTMENTS TO SUIT FIELD CONDITIONS.
2. DISTANCES AND ELEVATIONS ARE IN METERS 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. 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 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.
6. 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 OR FLARES, SHALL BE PROVIDED. ALL LIGHTS FOR THIS PURPOSE SHALL BE KEPT BURNING FROM SUNSET TO SUNRISE.
7. 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.
8. BEFORE THE START OF ACTUAL CONSTRUCTION, THE AS-STAKED PLAN SHOULD BE SUBMITTED TO THE REGIONAL OFFICE IN ORDER THAT IMMEDIATE STEPS MAY BE TAKEN TO CORRECT OR ADJUST WHATEVER APPRECIABLE DEVIATION THERE MAY BE FROM THE ORIGINAL PLAN.
9. THE IMPLEMENTING OFFICE SHALL IDENTIFY THE LOCATIONS OF AND PROVIDE ACCESSIBILITY FACILITIES FOR PERSONS WITH DISABILITIES IN ACCORDANCE WITH DO NO. 37, S. 2009.
10. QUARRY SITE FOR ITEM 1707(1) IS LOCATED AT TAGBALACBAO QUARRY, DISPOSAL SITE IS (6) KMS. WITHIN PROJECT LIMIT.
11. DESIGN WAS BASED ON SURVEY DATA SUBMITTED BY THE SURVEY AND INVESTIGATION SECTION OF PLANNING AND DESIGN DIVISION OF THE DPWH-REGIONAL OFFICE XI.

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 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.
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 DISTURBED.
3. EMBANKMENT SHALL CONTAIN NO MUCK, PEAT, SOO, ROOTS OR OTHER DELETERIOUS MATTER.
4. EMBANKMENT OF EARTH MATERIAL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 200mm LOOSE MEASUREMENT AND SHALL BE COMPACTED AS SPECIFIED BEFORE THE NEXT LAYER IS PLACED. THE MATERIALS PLACED IN ALL EMBANKMENT LAYERS AND THE MATERIAL SCARIFIED TO THE DESIGNATED DEPTH BELOW SUBGRADE IN CUT SECTIONS SHALL BE COMPACTED UNTIL A UNIFORM DENSITY OF NOT LESS THAN 95 MASS PERCENT OF THE MAXIMUM DRY DENSITY IS ATTAINED AT A MOISTURE CONTENT DETERMINED BY THE ENGINEER TO BE SUITABLE FOR SUCH DENSITY.
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.

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, GRADIENTS, 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.

1. DURING CONSTRUCTION, ANY EXISTING PIPES FOUND DAMAGED OR DEFECTIVE SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ENGINEER. THE REMOVAL OF EXISTING STRUCTURES SHALL BE PAID FOR UNDER ITEM 101(A) - 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 SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEMS. THE COST OF PERFORMANCE THEREOF SHALL BE CONSIDERED TO BE INCLUDED IN THE UNIT PRICE BID FOR THOSE ITEMS.

MATERIAL SPECIFICATION

CONCRETE BLOCKS

1. CONCRETE SHALL BE CLASS A (20.68 MPa).

1712 (2) - CONCRETE, SLOPE PROTECTION

1. STEEL REINFORCEMENT SHALL BE GRADE 40.
2. CONCRETE SHALL BE CLASS A (20.68 MPa).
3. WEEPHOLES SHALL BE 75mm Ø PVC WITH FILTERING MATERIALS AS INDICATED ON THE PLAN.

OTHERS

1. ANY DEFECTIVE WORK WHETHER THE RESULT OF POOR WORKMANSHIP, USE OF DEFECTIVE MATERIALS, DAMAGE THROUGH CARELESSNESS, OR OF ANY OTHER CAUSE, FOUND PRIOR TO ACCEPTANCE, SHALL BE REMOVED IMMEDIATELY AND REPLACED BY WORK AND MATERIALS WHICH SHALL CONFORM TO THE SPECIFICATIONS.
2. DAMAGES TO ANY PORTION OF WORK BEFORE FINAL ACCEPTANCE EXCEPT DAMAGES DUE TO UNFORESEEABLE CAUSES BEYOND THE CONTROL OF AND WITHOUT FAULT OF NEGLIGENCE BY THE CONTRACTOR SHALL BE REBUILT, REPAIRED AND RESTORED.
3. THE PROJECT ENGINEER AND THE CONTRACTOR SHALL COORDINATE WITH THE CONCERNED IMPLEMENTING COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICES (CENRO) OF THE DENR REGARDING THE TURNOVER OF THE TIMBER AND OTHER DERIVABLE WOOD MATERIALS RECOVERED FROM THE TREES CUT/REMOVED.

DESIGN PARAMETERS

HYDRAULIC PARAMETERS			
	RETURN PERIOD		M.E.F.I. DESIGN FLOOD
	50 YEARS	100 YEARS	
DRAINAGE AREA	34.178 km ²		
DISCHARGE	243,054 m ³ /sec	257,322 m ³ /sec	326,000 m ³ /sec
FLOOD LEVEL	39.258 m - 40.682 m	39.368 m - 41.003 m	39.614 m - 41.265 m
VELOCITY	1.81 m/s - 2.44 m/s	1.84 m/s - 2.55 m/s	1.87 m/s - 2.77 m/s
FREEBOARD (MIN.)	0.80 m		

CODES AND REFERENCES

1. DPWH DESIGN GUIDELINES, CRITERIA, AND STANDARDS (DGCS) - VOL. III, 2015 EDITION
2. DPWH STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND AIRPORTS - VOL. II, 2013 EDITION
3. DPWH STANDARD SPECIFICATIONS FOR PUBLIC WORKS STRUCTURES (BUILDINGS, PORTS AND HARBORS, FLOOD CONTROL AND DRAINAGE STRUCTURES AND WATER SUPPLY SYSTEMS) - VOL. III, 2019 EDITION
4. 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 58, s. 2005

SURVEY SPECIFICATION

1. ALL PROJECT CONTROL POINTS ARE PROJECTED IN PRS'92 GRID COORDINATE SYSTEM (ZONE 9)
2. SURVEY INSTRUMENT USED: ROVER - CHC (70+) SN1049120, BASE - CHC (70+) 1042656
3. DATE SURVEYED: JUNE 9-13, 2025
4. PROJECT CONTROL POINTS, REFER TO SHEET 00/00



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REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. B. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION

CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS

GENERAL NOTES

DRAFTED AND PREPARED

JAMAICA A. MANDING
ENGINEER II

DATE

REVIEWED

ALAIN JOHN L. SOTTO
ENGINEER III, SENIOR CIVIL

DATE

SUBMITTED

JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

DATE

RECOMMENDING APPROVAL

JOSEITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

DATE

APPROVED

JURY B. CORDON
REGIONAL DIRECTOR

DATE

SET NO.

A
01/15

SHEET NO.

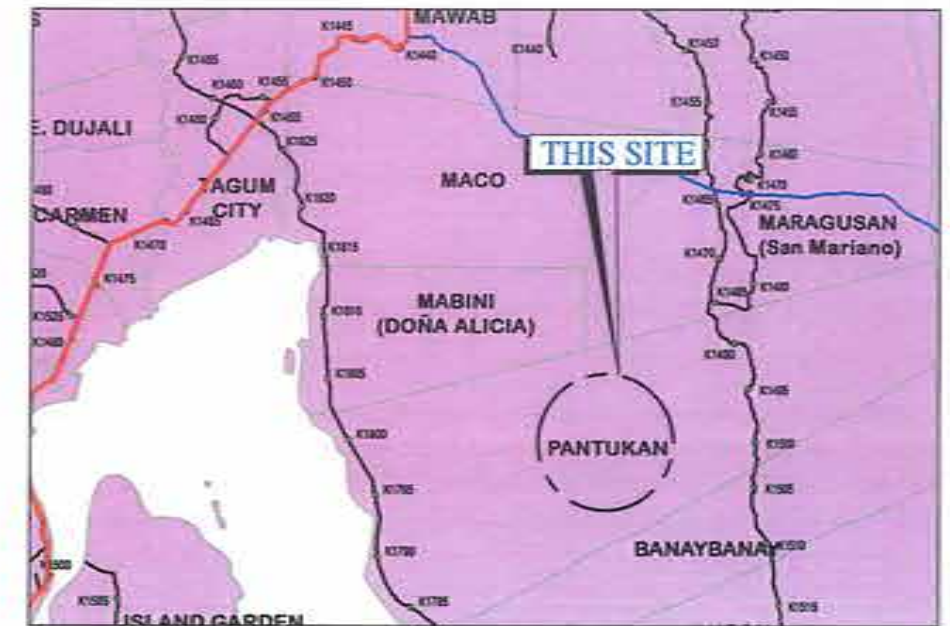
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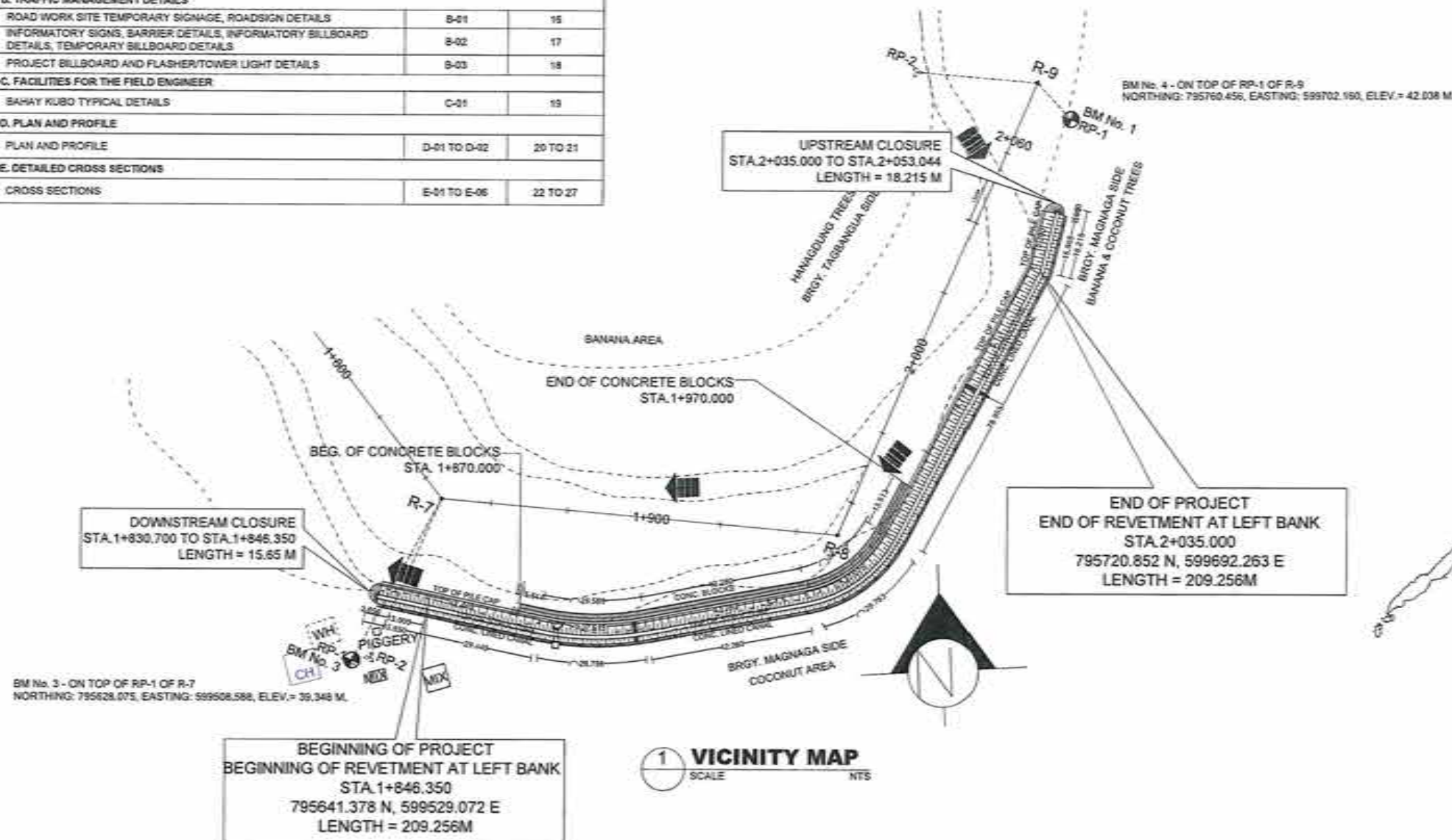
PROJECT LIMIT

LEFT BANK:

BEGINNING OF REVETMENT : STA. 1+846.350
END OF REVETMENT : STA. 2+035.000 = 188.650 LN.M.
NET LENGTH = 188.650 LN.M.



2 LOCATION MAP
SCALE 1" = 1 MILE



1 VICINITY MAP
SCALE 1" = 1 MILE



3 KEY MAP
SCALE 1" = 1 MILE



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REGIONAL OFFICE NO. XI
GOV. CHARLES COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHAR RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
INDEX OF SHEETS
VICINITY MAP
LOCATION MAP
KEY MAP

DRAFTED AND PREPARED
JAMAICA A. MANONG
ENGINEER II

REVIEWED
ALAN JOHN B. SOTTO
ENGINEER III, SECTION CHIEF

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

RECOMMENDING APPROVAL
JOSELOTO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR

SET NO. A
02/15
SHEET NO. 02
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ABBREVIATIONS

ABUTMENT	ABUT	PERCENT	PW
AHEAD STATIONING	AK STA	PHILIPPINES	%
AND	A	PIECES	PHE
AREA	ACP	PLUS / MINUS	P
ASPHALT CONCRETE PAVEMENT	Q	PUBLIC LAND SUBDIVISION	PLS
AT	QZM	POINT OF INTERSECTION	PI
AZIMUTH	SK STA	POINT OF CURVATURE	PC
BACK STATION	BRGY.	POINT OF VERTICAL INTERSECTION	PVC
BARANGAY	SOC	POINT OF VERTICAL TANGENT	PIV
BEGINNING OF CIRCULAR CURVE	SBS	POINT OF TANGENT	POT
BEARING	SEG	PORTLAND CEMENT CONCRETE PAVEMENT	PCCP
BEGINNING	SM	PROJECT	PROJ.
BELOW MEAN SEA LEVEL	RET.	PROJECT ROAD	PROJ. RD
BENCH-MARK	SH	PRIVATE SURVEY	P.S.
BETWEEN	SS	RADIUS	R
BORE HOLE	SV	REFERENCE POINT	RP
BOTH SIDES	SQT	REINFORCED CONCRETE BOX CULVERT	RCBC
BOTH WAYS	SR	REINFORCED CONCRETE PIPE CULVERT	RCPC
BOTTOM	SSQ	RETAINING WALL	RET. WALL
BRIDGE	BLM	RIGHT OF WAY	ROW
SUBDIVISION OF DECREASED PROPERTY	CTR	ROAD	RD
BY BUREAU OF LANDS SURVEYORS	CTR	SOUTH	S
BUREAU OF LANDS LOCATION MONUMENT	CHB	SIDEWALK	SDWK
CENTER	CLR	SUBDIVISION OF INCREASED PROPERTY	SQ
CENTERLINE	COL	SQUARE	SQ. METER
CENTIMETER	COMC	STANDARD	STC
CONCRETE HOLLOW BLOCK	CHB	STATION	STR.
CLEAR	COMC. MON.	STRAIGHT	ST.
COLUMN	CONC.	STREET	STRUCT.
CONCRETE	CONC.	STRUCTURE	T
CONCRETE HOLLOW BLOCK	CONC.	TANGENT DISTANCE	TEMP.
CONCRETE MONUMENT	CONC.	TEMPERATURE	TEMP.
CONSTRUCTION	CONC.	TEMPORARY BENCHMARK	TEMP.
CORNER	CONC.	VERTICAL	VERT.
COVER	CONC.	WIDTH	W
CROSS PIPE	CONC.		
CUBIC METER	CONC.		
CYLINDRICAL	CONC.		
DEGREE OF CURVE	CONC.		
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS	CONC.		
DETAIL	CONC.		
DIAMETER	CONC.		
DIAPHRAGM	CONC.		
DISTANCE	CONC.		
DRAWING	CONC.		
EAST	CONC.		
ELEVATION	CONC.		
END OF CIRCULAR CURVE	CONC.		
END OF PAVEMENT	CONC.		
ENGINEER	CONC.		
EQUATION	CONC.		
EXCAVATION	CONC.		
EXISTING	CONC.		
EXPANSION	CONC.		
EXTENSION	CONC.		
EXTERIOR	CONC.		
EXTERNAL DISTANCE/EXTENS	CONC.		
FINISHED	CONC.		
FINISHED GRADE	CONC.		
FINISHED PAVEMENT LEVEL	CONC.		
GENERAL	CONC.		
GROUND LEVEL	CONC.		
HEAD WALL	CONC.		
HIGH FLOOD LEVEL	CONC.		
HIGH TIDE LEVEL	CONC.		
HIGH WATER LEVEL	CONC.		
HORIZONTAL	CONC.		
INCHES	CONC.		
INTERSECTION ANGLE	CONC.		
INSIDE DIAMETER	CONC.		
INTERIOR	CONC.		
KILOGRAM	CONC.		
KILOMETER	CONC.		
KILOMETER PER HOUR	CONC.		
LEFT	CONC.		
LENGTH OF CIRCULAR CURVE	CONC.		
LENGTH OF VERTICAL CURVE	CONC.		
LONGITUDINAL	CONC.		
MAXIMUM	CONC.		
MAXIMUM FLOOD LEVEL	CONC.		
MEAN SEA LEVEL	CONC.		
METER	CONC.		
MILLIMETER	CONC.		
MINIMUM	CONC.		
MONUMENT	CONC.		
NORTHING	CONC.		
NOT APPLICABLE	CONC.		
NUMBER	CONC.		
ORDINARY WATER LEVEL	CONC.		
ORIGINAL GROUND LEVEL	CONC.		
OUTSIDE DIAMETER	CONC.		
PAVEMENT WIDTH	CONC.		

LEGENDS AND SYMBOLS

DRAWING SYMBOLS			TOPOGRAPHIC FEATURES, INFRASTRUCTURE AND UTILITIES		
SYMBOL	ABBREVIATION	DESCRIPTION	SYMBOL	ABBREVIATION	DESCRIPTION
		ROADWAY CENTERLINE			MAJOR CONTOUR
		NORTH ARROW			MINOR CONTOUR
		ELEVATION CALLOUT			EDGE OF ROAD (EXISTING)
		WATER LEVEL			EDGE OF ROAD (PROPOSED)
		WATER FLOW			ASPHALT CONCRETE PAVEMENT
		POINT OF INTERSECTION		PCCP	PORTLAND CEMENT CONCRETE PAVEMENT
		MATCH LINE			CHISELED CONCRETE/ EARTH CANAL
		GRID COORDINATES			NATIONAL HIGHWAY
	AZM	AZIMUTH			EXISTING CANAL (PLAN)
		PLAN AND PROFILE CALLOUT			EXISTING CANAL (PROFILE)
		RCPC REVERSE ELEVATION PROFILE CALLOUT		BR	BRIDGE
		DIRECTION			CROSS-DRAIN
		MAIN DRAWING TITLE			LATERAL PIPE
		SECONDARY DRAWING TITLE			RCBC
		CROSS SECTION SYMBOL (COMPLEX)			BOREHOLE
		CROSS SECTION SYMBOL (COMPLEX)			GUARDRAIL
		DETAIL CALLOUT			CONCRETE SLOPE PROTECTION
DRAWING SYMBOLS					GRADED RIPRAP SLOPE PROTECTION
	BH	BORE HOLE			RIVER / CREEK
		CROSS SECTION MONUMENT			
	BM	BENCH MARK			
	IBM	INTERMEDIATE BENCH MARK			
	PBM	PERMANENT BENCH MARK			
	TP	TEST PIT			
	GPS	GLOBAL POSITIONING SYSTEM			
		TRAVERSE POINT			
		TRAVERSE STATION AND LINE			



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CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAH RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
ABBREVIATIONS LEGENDS AND SYMBOLS

DRAFTED AND PREPARED
JAMAICA A. MANDING
ENGINEER II
DATE

REVIEWED
ALAN JOHN B. SOTTO
ENGINEER III, SECTION CHIEF
DATE

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

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JURY B. CORDON
REGIONAL DIRECTOR
DATE

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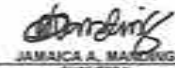
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Thursday, July 24, 2020

SUMMARY OF QUANTITIES

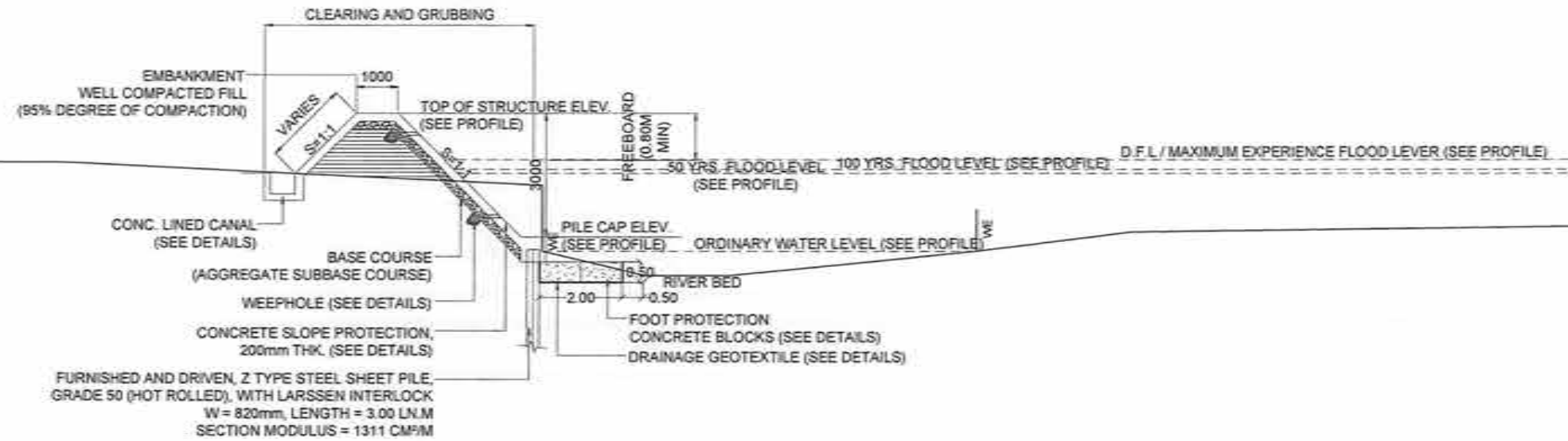
ITEM No.	DESCRIPTION OF WORK	UNIT	QUANTITY	REMARKS
PART A. FACILITIES FOR THE ENGINEER				
A.1.1 (3)	CONSTRUCTION OF FIELD OFFICE FOR THE ENGINEER	LS	1.00	"BAHAY KUBO"
A.1.1 (16)	OPERATION & MAINTENANCE OF FIELD OFFICE FOR THE ENGINEER	MONTH	6.00	
PART B. OTHER GENERAL REQUIREMENT				
B.3	PERMITS AND CLEARANCES	LS	1.00	
B.4 (1)	CONSTRUCTION SURVEY AND STAKING	KM	0.189	
B.5	PROJECT BILLBOARD/SIGNBOARD (2-OPWH)	EACH	2.00	
B.5	PROJECT BILLBOARD/SIGNBOARD (2-DENR-EMB)	EACH	2.00	
B.5	PROJECT BILLBOARD/SIGNBOARD (2-COA)	EACH	2.00	
B.7 (2)	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	LS	1.00	
B.8 (1)	TRAFFIC MANAGEMENT	MONTH	6.00	
B.9	MOBILIZATION / DEMOBILIZATION	LS	1.00	
PART L-A. EARTHWORK				
103 (3)	FOUNDATION FILL	CUM	23.78	FOR FLARED TYPE HEADWALL, CONCRETE CATCH BASIN AND CONCRETE LINED CANAL
105 (1)a	SUBGRADE PREPARATION, COMMON MATERIAL	SQM	2,320.00	
1700 (1)	CLEARING AND GRUBBING	SQM	4,184.38	
1700 (3)a1	INDIVIDUAL REMOVAL OF TREES, 150-300 MM Ø, SMALL	EACH	58.00	FOR EXISTING TREES
1701 (1)	UNSUITABLE EXCAVATION	CUM	220.58	
1701 (2)	SURPLUS COMMON EXCAVATION	CUM	312.51	
1702 (1)a	STRUCTURE EXCAVATION, COMMON SOIL	CUM	340.45	FOR RETENMENT, FLARED TYPE HEADWALL, CONCRETE CATCH BASIN & LINED CANAL
1702 (5)a	PIPE CULVERTS AND DRAIN EXCAVATION, COMMON SOIL	CUM	6.00	FOR CROSS DRAIN
1704 (1)a	EMBANKMENT FROM ROADWAY/STRUCTURE EXCAVATION	CUM	456.94	
1707 (1)	AGGREGATE SUBBASE COURSE	CUM	573.38	
PART L-B. BANK AND SLOPE PROTECTION WORKS				
1712 (1)	CONCRETE SLOPE PROTECTION	CUM	486.51	INCL. REINFORCING BAR = 14,904.00 KGS
1717 (4)b	FURNISHED AND DRIVEN OF STEEL SHEET PILE, Z-TYPE, GRADE 50 (HOT ROLLED)	M	855.00	SECTION MODULUS = 1311 cm ⁴ /m; WIDTH=820mm
PART F. DRAINAGE CONSTRUCTION				
404 (1)a	REINFORCING STEEL, GRADE 40	KG	51.82	FOR FLARED TYPE HEADWALL
405 (1)a2	STRUCTURAL CONCRETE, 20.68 MPa, CLASS A, 14 DAYS	CUM	118.00	FOR CONCRETE BLOCKS
405 (1)a3	STRUCTURAL CONCRETE, 20.68 MPa, CLASS A, 28 DAYS	CUM	1.45	FOR FLARED TYPE HEADWALL
PART L-C. DRAINAGE WORKS				
1718 (1)a3	PIPE CULVERTS, 910 MM Ø, CLASS IV, RCPC	LN.M	4.00	FOR CROSS DRAIN
1718 (21)b1	LINED CANAL, RECTANGULAR, CONCRETE	LN.M	236.95	
1719 (8)a5	RECTANGULAR ALUMINUM FLAP GATE 1200mm X 1200mm	EACH	1.00	FOR CROSSDRAIN (CONTROL THE BACKFLOW OF WATER FROM RIVER)
1720(3)a3	CATCH BASINS, 910mmØ	EACH	1.00	FOR CROSS DRAIN
PART H. MISCELLANEOUS STRUCTURES				
611 (1)	TREES FURNISHING AND TRANSPLANTING	EACH	5,800.00	FOR THE REPLACEMENT OF EXISTING TREES TO BE REMOVED (AS PER DO 234 s2022)
715 (3)	DRAINAGE GEOTEXTILE	SQM	348.00	FILTER MATERIAL FOR CONCRETE BLOCKS

NOTE: QUANTITIES ARE SUBJECT TO INCREASE/DECREASE DEPENDING ON THE ACTUAL FIELD CONDITIONS.

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ CDR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	DRAFTED AND PREPARED	REVIEWED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	SUMMARY OF QUANTITIES	 JAMALCA A. MANDING ENGINEER II	 CLAIN JOHN V. SOTTO ENGINEER II, SENIOR ENGINEER	 JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	 JOSE LITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	 JUBY B. CORDON REGIONAL DIRECTOR		
DATE: _____ DATE: _____ DATE: _____ DATE: _____ DATE: _____ DATE: _____									

SLOPE PROTECTION

1. CONCRETE SHALL BE CLASS "A", 20.68 MPa
2. REINFORCING STEEL BE GRADE 40
3. WEEPHOLES SHALL BE 75mm PVC WITH FILTERING MATERIALS AS INDICATED ON THE PLAN



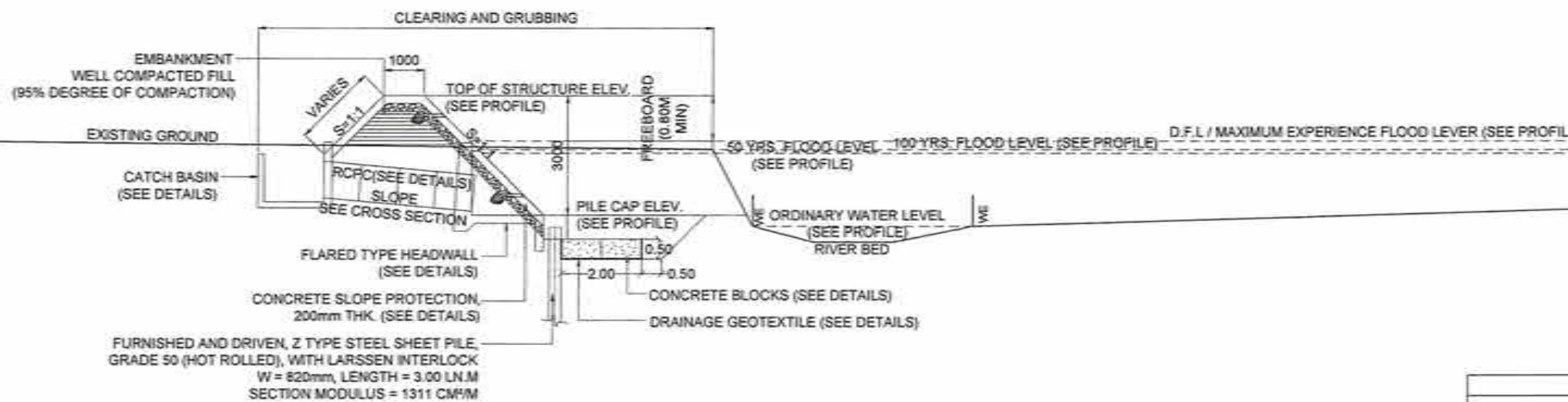
TYPICAL CROSS SECTION



SCALE 1:100

EMBANKMENT

1. PRIOR TO CONSTRUCTION OF EMBANKMENT, ALL NECESSARY CLEARING AND GRUBBING IN THAT AREA SHALL HAVE BEEN PERFORMED IN CONFORMITY WITH ITEM 800, CLEARING AND GRUBBING.
2. EMBANKMENT AND BACKFILLS SHALL CONTAIN NO MUCK, PEAT, SOD, ROOTS, OR OTHER DELETERIOUS MATTER. ROCKS, BROKEN CONCRETE OR OTHER SOLID, BULKY MATERIALS SHALL NOT BE PLACED IN EMBANKMENT AREAS WHERE PILING IS TO BE PLACED OR DRIVEN.
3. EMBANKMENT OF EARTH MATERIALS SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 200MM, LOOSE MEASUREMENT, AND SHALL BE COMPACTED AS SPECIFIED BEFORE THE NEXT LAYER IS PLACED. AS COMPACTION OF EACH LAYER PROGRESSES, CONTINUOUS LEVELING AND MANIPULATING WILL BE REQUIRED TO ASSURE UNIFORM DENSITY.
4. EMBANKMENT PLACED ON EXISTING SLOPES THAT ARE STEEPER THAN 3:1 WHEN MEASURED AT RIGHT ANGLES TO THE ROADWAY SHALL BE CONTINUOUSLY BENCHED IN LAYERS SUBJECT TO THE ENGINEERS APPROVAL PLEASE REFER TO STANDARD SPECIFICATIONS FOR HIGHWAYS ON METHOD OF CONSTRUCTION FOR EMBANKMENT.
5. MAXIMUM THICKNESS = 200 MM



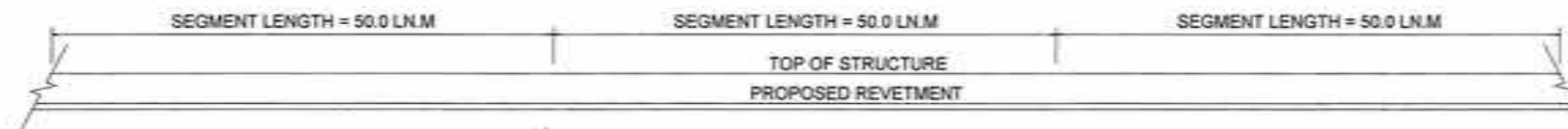
TYPICAL CROSS SECTION WITH CROSS DRAIN



SCALE 1:100

MINIMUM REQUIRED FREEBOARD	
DESIGN FLOOD DISCHARGE (m ³ /s)	FREEBOARD (m)
LESS THAN 200	0.60
200 AND UP TO 500	0.80
500 AND UP TO 2,000	1.00
2,000 AND UP TO 5,000	1.20
5,000 AND UP TO 10,000	1.50

HYDRAULIC PARAMETERS			
	RETURN PERIOD		M.E.F.L. DESIGN FLOOD
	50 YEARS	100 YEARS	
DRAINAGE AREA		34.176 km ²	
DISCHARGE	243,054 m ³ /sec	267,322 m ³ /sec	326,000 m ³ /sec
FLOOD LEVEL	39.258 m - 40.882 m	39.368 m - 41.003 m	39.614 m - 41.285 m
VELOCITY	1.81 m/s - 2.44 m/s	1.84 m/s - 2.55 m/s	1.87 m/s - 2.77 m/s
FREEBOARD (MIN.)	0.80 m		



DETAILS FOR PARTITION WORKS / SEGMENT LENGTH



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
OOV, CHAVEZ COR. B. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAH RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
TYPICAL CROSS SECTION
TYPICAL CROSS SECTION SHOWING CROSS DRAIN
DETAILS FOR PARTITION WORKS / SEGMENT LENGTH

DRAFTED AND PREPARED
JAMAICA A. MANDING
ENGINEER II
DATE

REVIEWED
ALAIN JOHN L. SOTO
ENGINEER III
DATE

SUBMITTED
JUDY B. CORDON
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

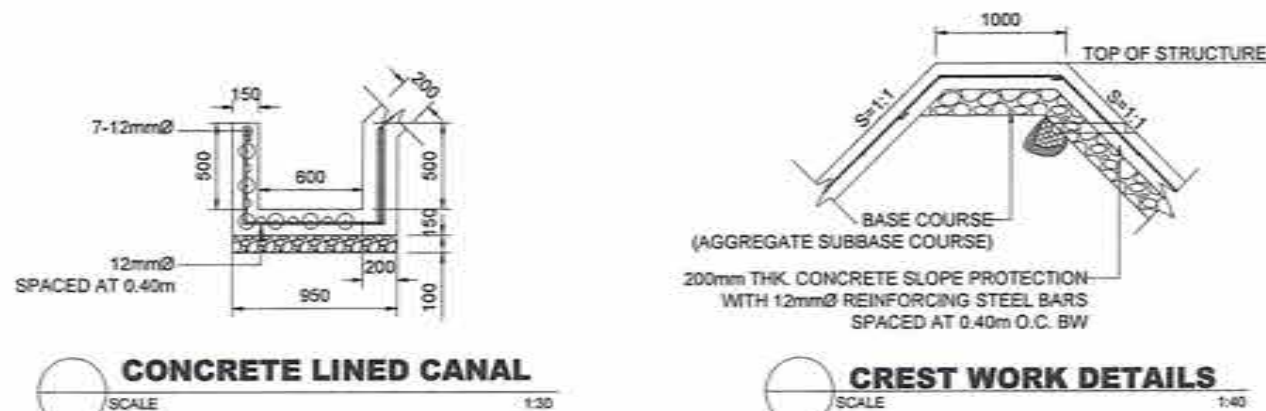
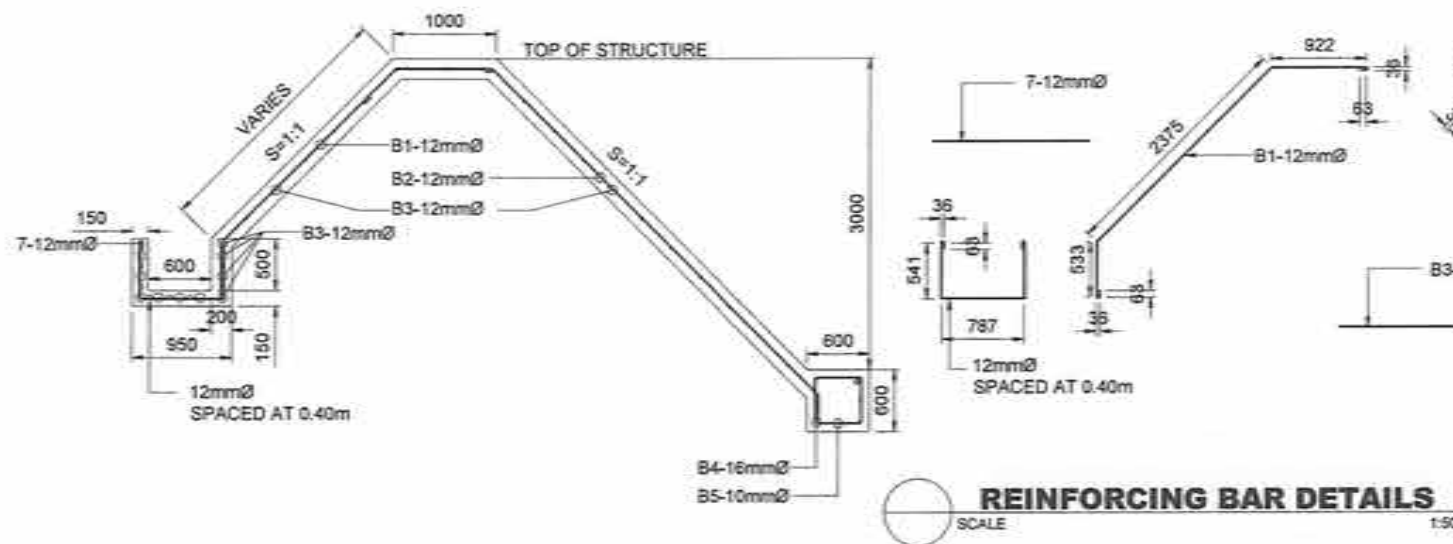
APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.
A
05/15

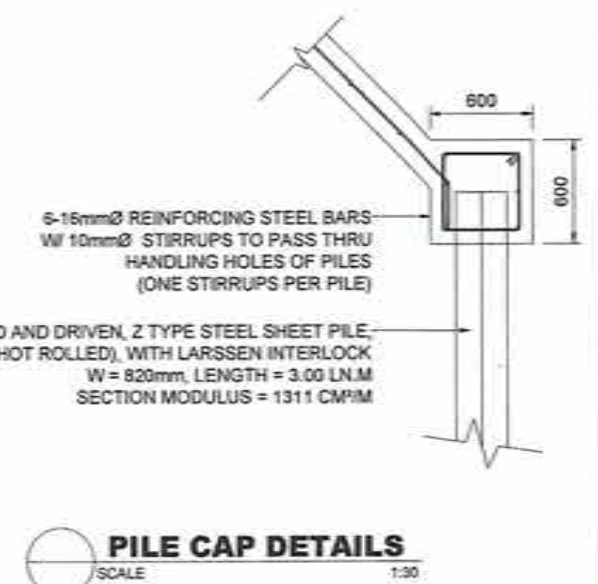
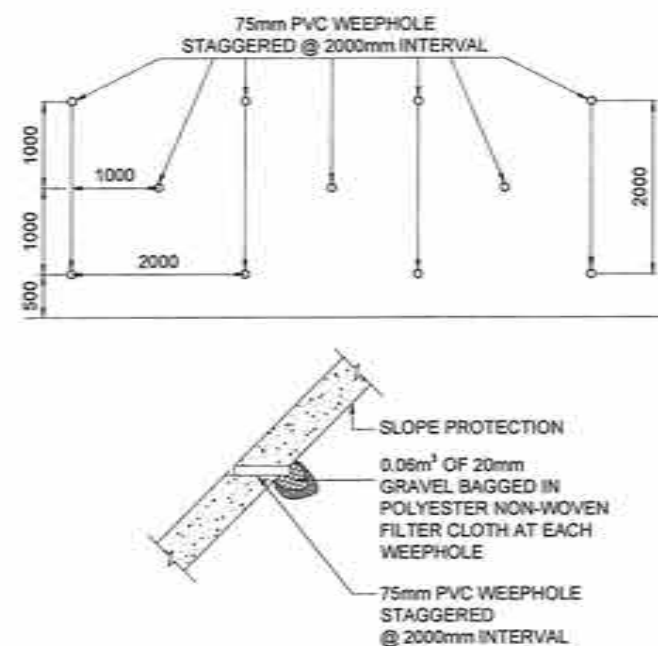
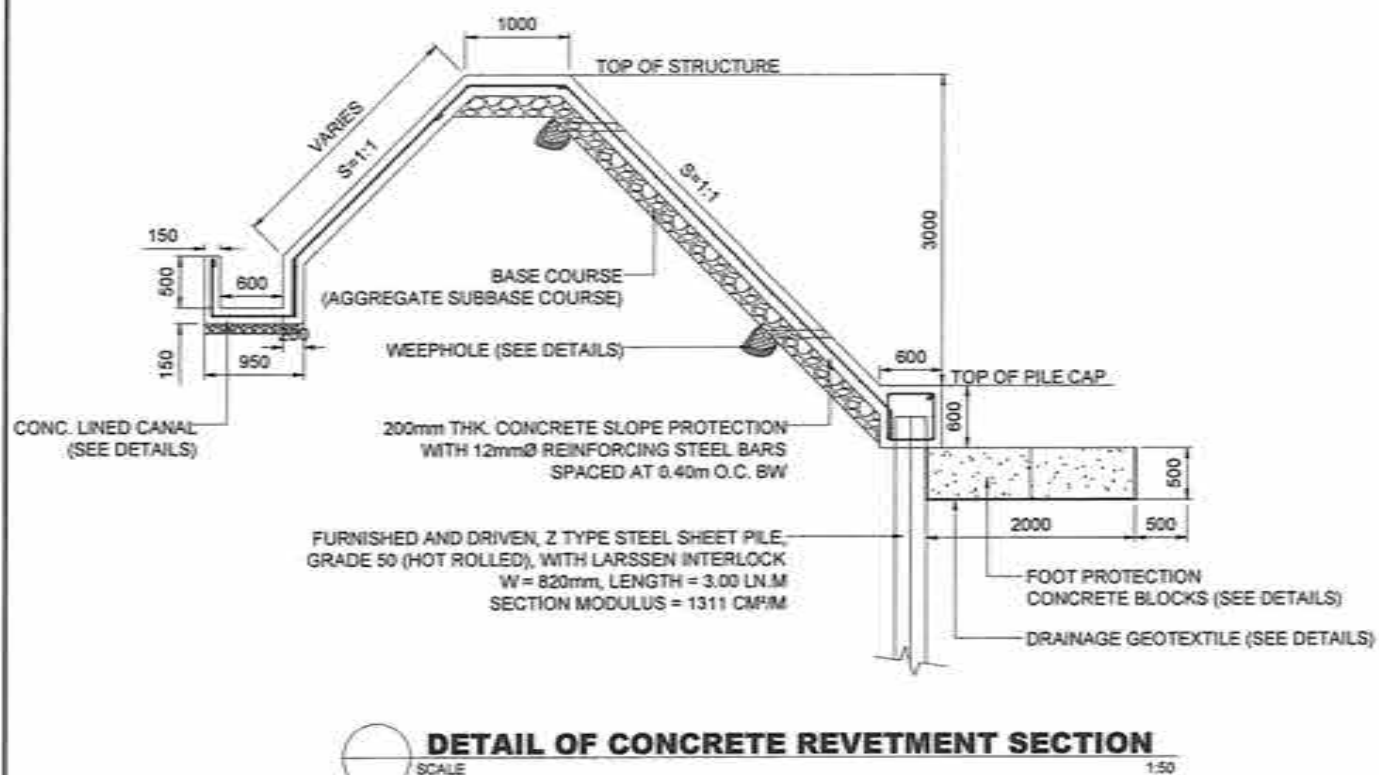
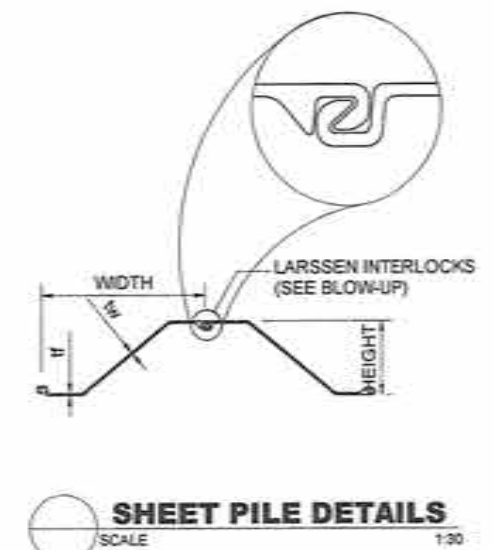
SHEET NO.
05
27

SLOPE PROTECTION

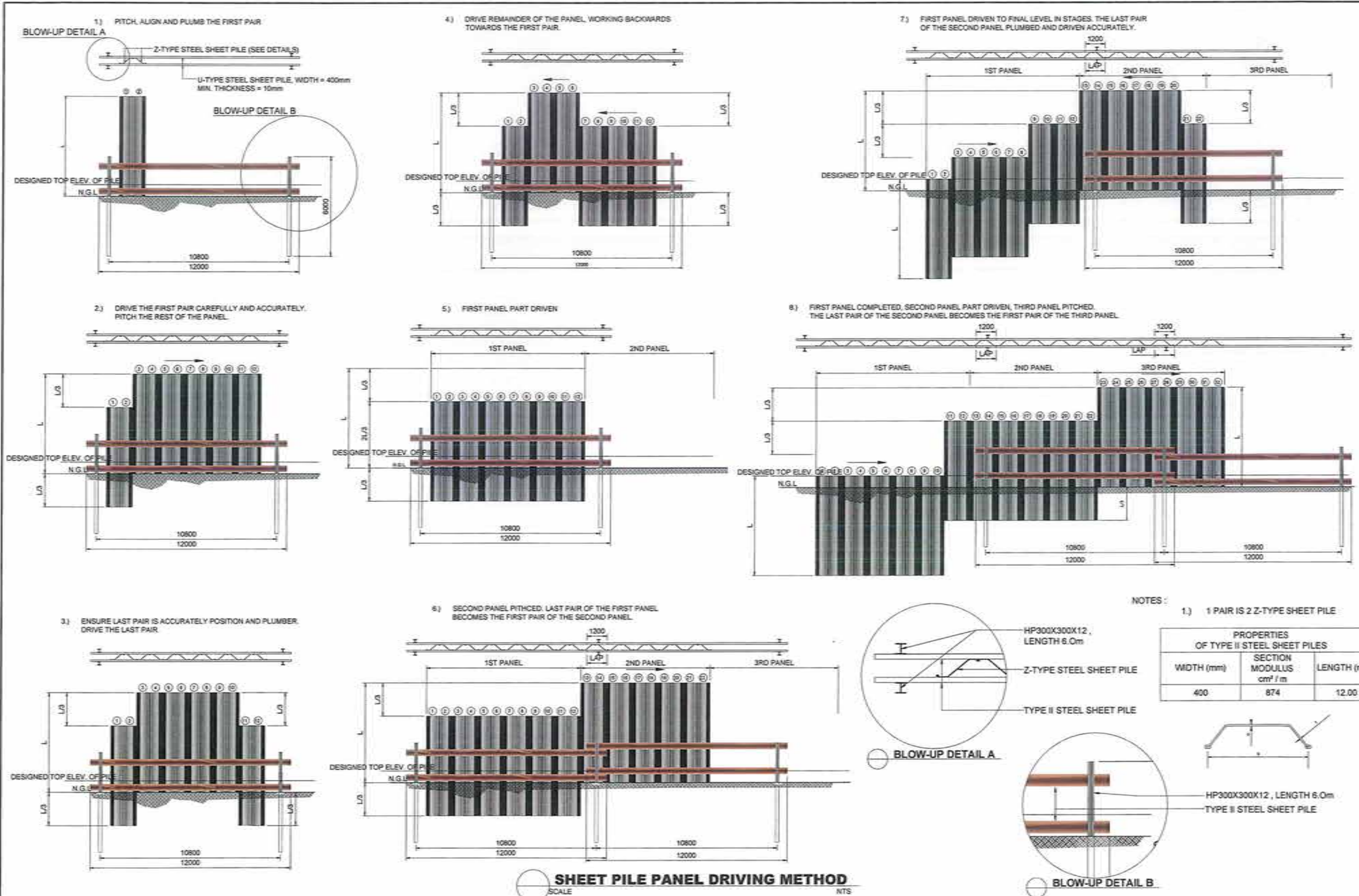
1. CONCRETE SHALL BE CLASS "A", 20.68 MPa
2. REINFORCING STEEL BE GRADE 40
3. WEEPHOLES SHALL BE 75mm PVC WITH FILTERING MATERIALS AS INDICATED ON THE PLAN



PROPERTIES OF HOT ROLLED Z-TYPE S TEEL SHEET PILES WITH LARSEN INTERLOCKS					
STEEL GRADE	THICKNESS		WIDTH (mm)	SECTION MODULUS cm ⁴ / m	LENGTH (mm)
	FLANGE	WEB			
355	7.80 min.	7.70 min.	820 min.	1311 min.	3000



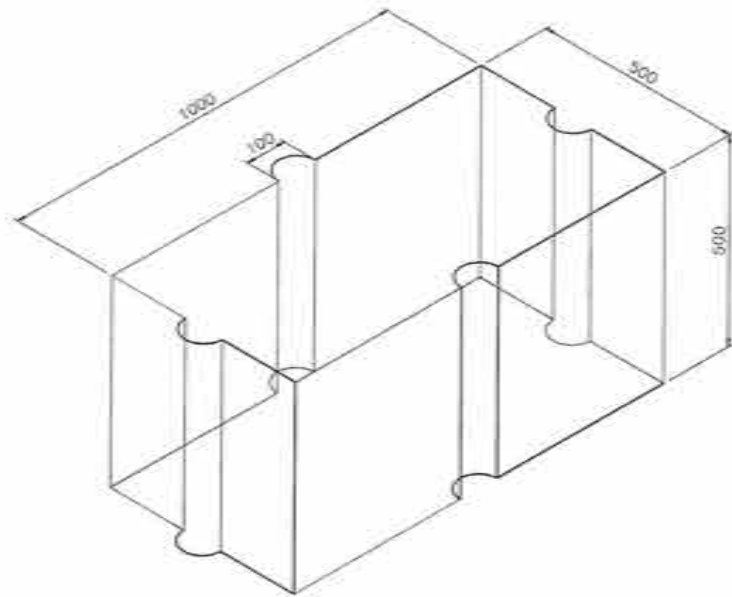
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	DRAWN AND PREPARED	REVIEWED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	REINFORCING BAR DETAILS CONCRETE LINED CANAL CREST WORK DETAILS DETAIL OF CONCRETE REVETMENT SECTION WEEPHOLES DETAILS SHEET PILE AND PILE CAP DETAILS	JAMICA A. MANABING ENGINEER I	ALAN JOHN SOTTO ENGINEER II	JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	JOSE LITO S. CABALLERO ASSISTANT REGIONAL DIRECTOR	JUDY B. CORDON REGIONAL DIRECTOR	A 0615	06 27



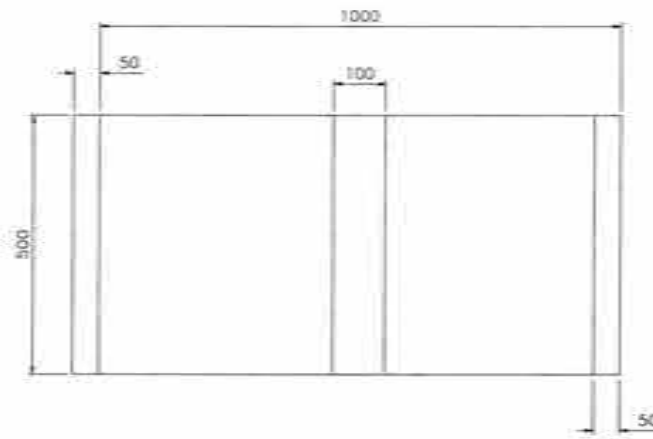
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. INGAYSAW AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	DRAWN AND PREPARED	REVIEWED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	SHEET PILE PANEL DRIVING METHOD	JAMAICA A. BONDING ENGINEER I	ALAIN JOHN R. SOTTO ENGINEER II	JUDY ANN T. BERNARDINO CHIEF PLANNING AND DESIGN DIVISION	JOSELITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	JUDY B. COROON REGIONAL DIRECTOR	A 07/15	07 27

DATE: _____ DATE: _____ DATE: _____ DATE: _____

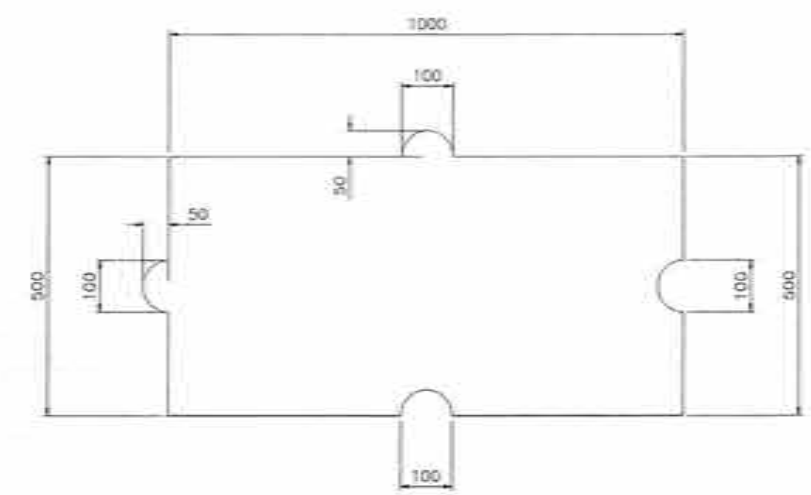
21/FLOOD CONTROL PROJECTS/2025/7, LAHI RIVER, BRGY MAGNAGA, PANTUKAN, DDO-06-17-2025/PLAW-CA05-11, RETENTION TYPICAL DWG



ISOMETRIC VIEW
SCALE 1:10

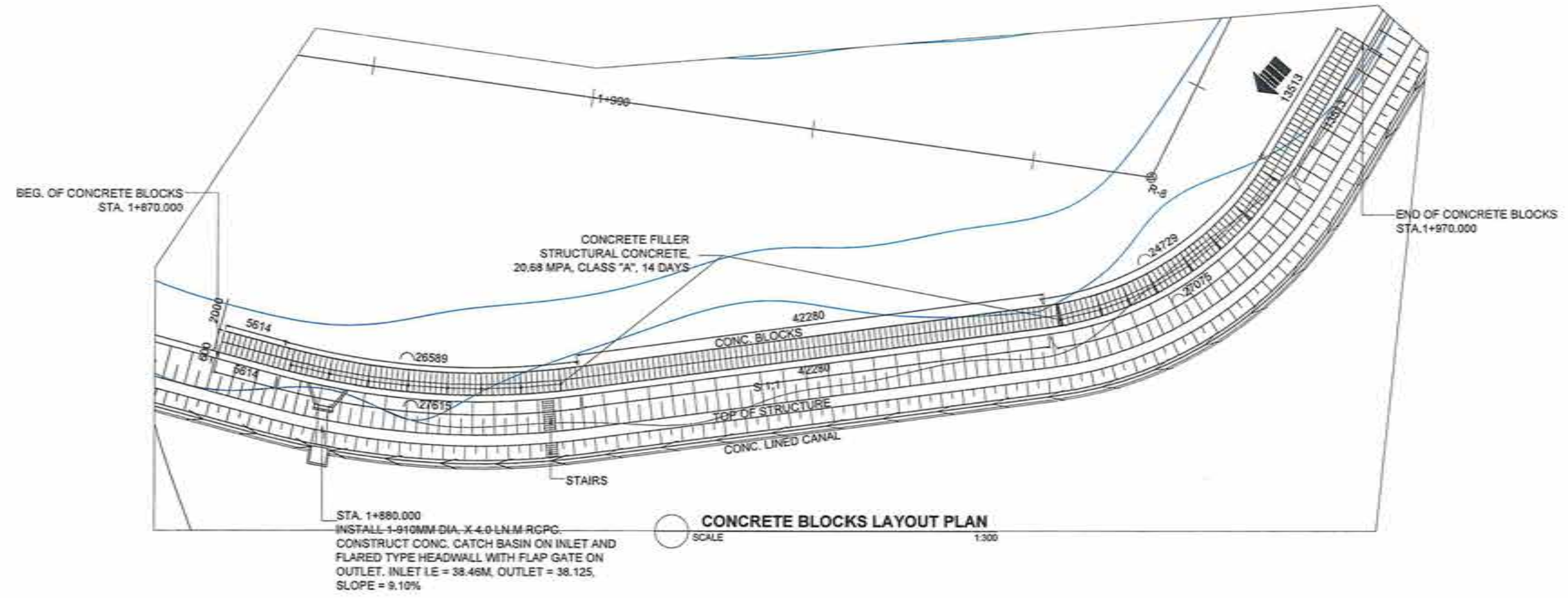


SECTION VIEW
SCALE 1:10



TOP VIEW
SCALE 1:10

NOTE :
COMPRESSIVE STRENGTH OF CONCRETE
SHOULD BE EQUAL TO 3000 PSI OR 20.68 MPA.



CONCRETE BLOCKS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
CONCRETE BLOCKS

DRAFTED AND PREPARED
JAMACA A. MANDING
ENGINEER I

REVIEWED
ALAIN JOHN R. SOKTO
ENGINEER II, DESIGN CHIEF

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION

RECOMMENDING APPROVAL
JOSELITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

APPROVED
JURY B. CORDON
REGIONAL DIRECTOR

SET NO. A
SHEET NO. 08
08/15 27

3. DRAINAGE GEOTEXTILE (ITEM 715.7.1)

MECHANICAL PROPERTIES	TEST METHOD	UNIT	MINIMUM AVERAGE VALUES	
			MACHINE DIRECTION	CROSS DIRECTION
PROPERTY	TWO LAYER COMPOSITE GEOTEXTILE MECHANICALLY BONDED 100% CONTINUOUS POLYPROPYLENE, (BLUE COLOR) PROTECTION GEOTEXTILE WHILE (GRAY COLOR) IS THE FILTER GEOTEXTILE			
NUMBER OF FILTER CONSTRUCTIONS	acc. GROUND		25-40	
OPENING SIZE	ISO 12956	l/m2s	0.08	
PERMEABILITY NORMAL TO THE PLANE 50mm HEAD	ISO 11058	kN	35	
TENSILE STRENGTH	ISO 10319	kN/m	30 (min.)	30 (min.)
ELONGATION AT BREAK	ISO 10319	%	90 (max)	40 (max)
DYNAMIC DROP CONE	ISO 13433	mm	40 (max)	
CBR PUNCTURE STRENGTH	ISO 12236		4.50 (min)	
THICKNESS 2 kPa	ISO 9863	mm	4.50 (min)	
MASS	ISO 9864	g.m2	600 (min)	
UV RESISTANCE STRAIN STRENGTH (3 MONTHS OUTDOOR ASEAN CONDITION)	ASTM D4355	% retained	75 (min)	

GEOTEXTILE

THE GEOTEXTILE SHALL BE UNROLLED AS SMOOTHLY AS POSSIBLE ON THE PREPARED SUBGRADE IN THE DIRECTION OF CONSTRUCTION TRAFFIC. ADJACENT GEOTEXTILE ROLLS SHALL BE OVERLAPPED IN THE DIRECTION OF SUBBASE PLACEMENT USING THE GUIDELINES TABLE 3. SEWING IS RECOMMENDED WHERE SUBGRADE SOILS HAVE A C.B.R. VALUES LESS THAN 1. THE GEOTEXTILE MAY BE HELD IN PLACE PRIOR TO SUBBASE PLACEMENT BY PINS, STAPLES, OR PILES OF FILL OR ROCK. ON CURVES, THE GEOTEXTILE MAYBE FOLDED OR CUT TO CONFORM TO THE CURVE. THE FOLD OR OVERLAP SHALL BE IN THE DIRECTION OF CONSTRUCTION AND HELD IN PLACE AS PRESCRIBED ABOVE.

TABLE 3 RECOMMENDED OVERLAPS

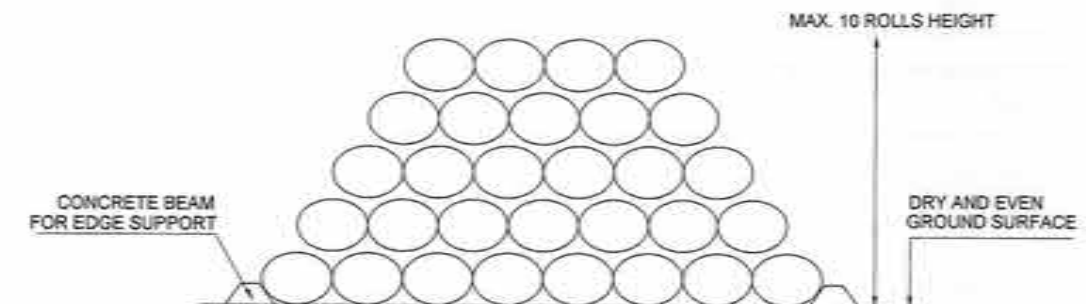
SOIL STRENGTH (CBR)	UNSEWN OVERLAP (mm)	OVERLAP (mm)
LESS THAN 1	-	229
1 - 2	965	203
2 - 3	762	76
3 AND ABOVE	610	-

METHODS OF STORAGE

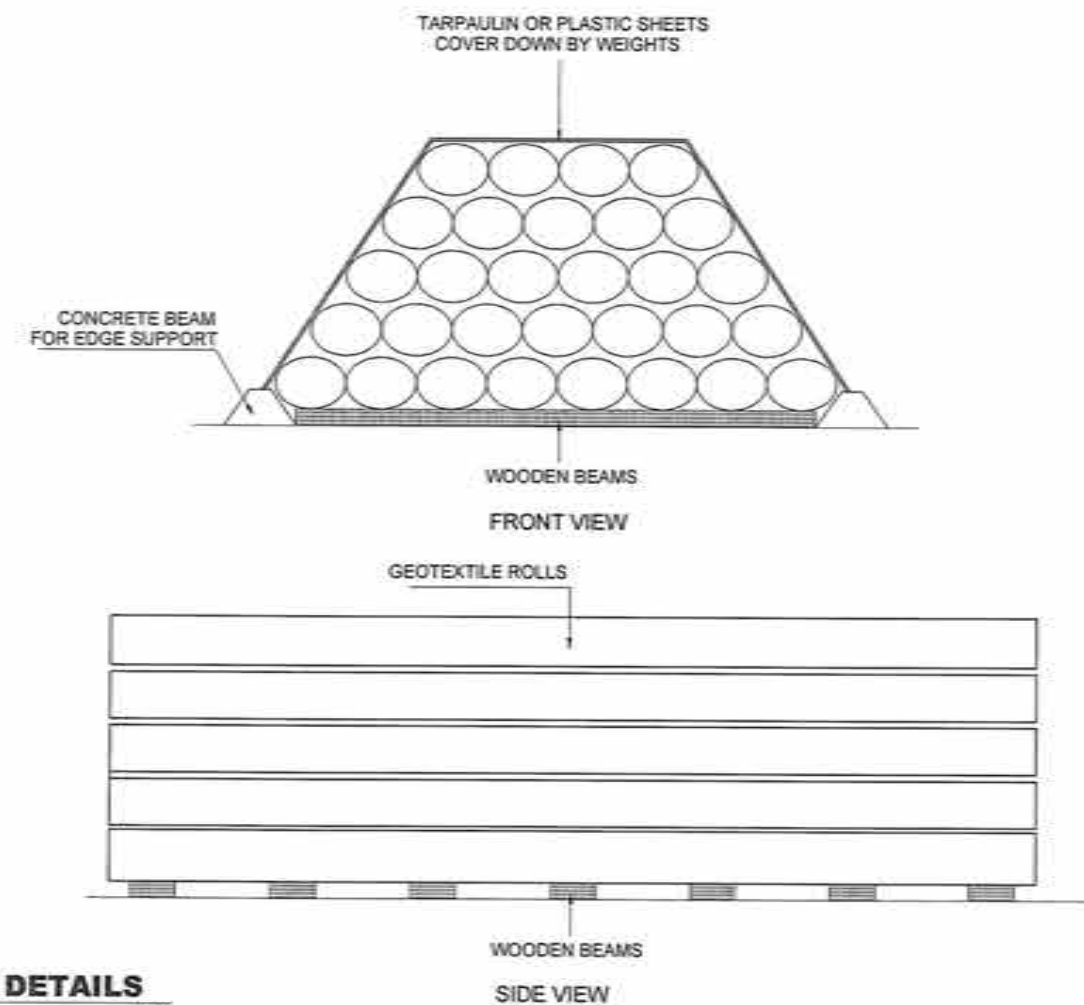
THE GEOTEXTILES DELIVERED TO SITE SHALL BE STORED IN COVERED AREA ON A FIRM AND LEVEL FOUNDATION. THE GEOTEXTILE SHALL BE PREFERABLY BE PLACED ON WOODEN BEAM SUPPORT (ELEVATED SAY 100mm ABOVE GROUND LEVEL) TO AVOID DIRECT CONTACT WITH THE GROUND LEVEL. THIS IS TO PREVENT THE GEOTEXTILE FROM GETTING SOAK OR WET DURING RAIN FLOODING.

THE GEOTEXTILE SHALL BE STACKED IN TRIANGULAR MANNER NOT MORE THAN 10 ROLLS IN HEIGHT AND SUFFICIENT LATERAL RESTRAINT MUST BE PROVIDED TO PREVENT COLLAPSE OF THE STACKED ROLLS. LATERAL RESTRAINT CAN BE PROVIDED THROUGH HEAVY CONCRETE BLOCKS PLACED ON BOTH ENDS OF THE STACK.

WHERE PROPER COVERED STORAGE AREA IS NOT AVAILABLE THE ENTIRE STACKED ROLLS OF GEOTEXTILES SHALL BE COVERED WITH TARPAULIN OR PLASTIC SHEET AND FIRMLY WEIGHTED DOWN.



STORAGE OF GEOTEXTILE ROLLS IN DRY AREA AND METHOD OF STACKING THE ROLLS IN DRY AREA.



DRAINAGE GEOTEXTILE DETAILS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. WINGDAYS AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
DRAINAGE GEOTEXTILE DETAILS

DRAFTED AND PREPARED
JAMAICA A. MANDING
ENGINEER I
DATE

REVIEWED
JUAN JOHNA SOTO
ENGINEER II, DESIGNER
DATE

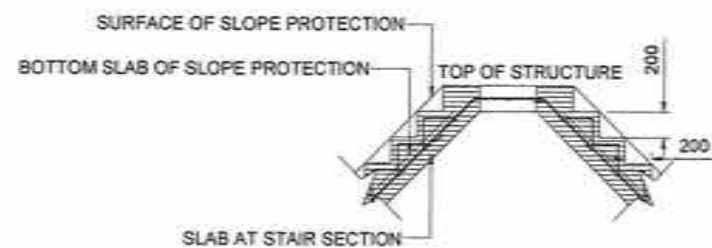
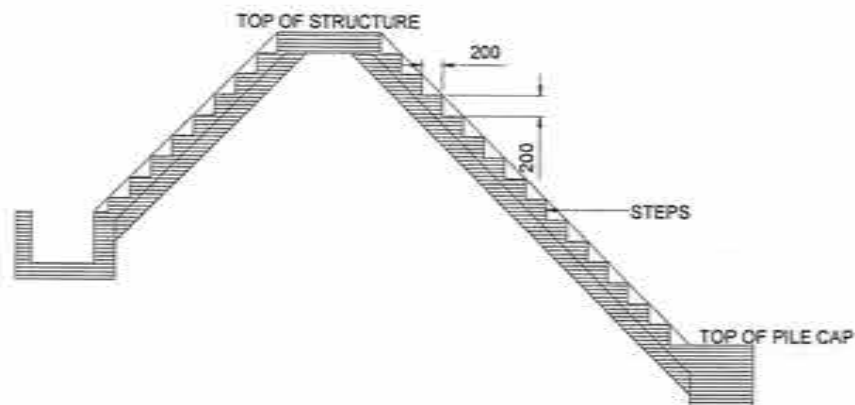
SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSELITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

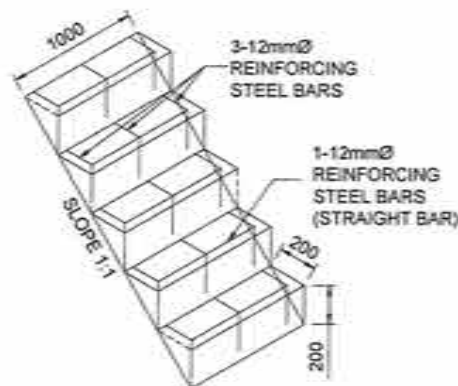
SET NO.
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09/15

SHEET NO.
09
27



STAIRS SCHEDULE	
LEFT BANK	
1+900.000	
2+000.000	

SECTION

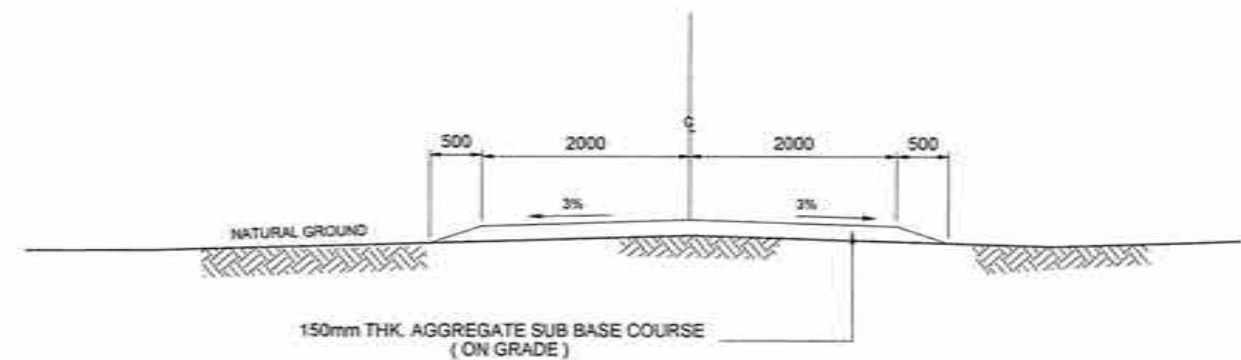


ISOMETRIC VIEW

STAIRS DETAILS
SCALE 1:40



SERVICE ROAD LOCATION PLAN



DETAILS FOR SERVICE ROAD
SCALE NTS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAUO CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAUO DE ORO

SHEET CONTENTS:
STAIRS DETAILS
SERVICE ROAD LOCATION PLAN
DETAILS FOR SERVICE ROAD

DRAFTED AND PREPARED
JAMAICA A. MANDING
ENGINEER I
DATE

REVIEWED
ALAIN JOHN R. SOTO
ENGINEER II, DESIGN GROUP
DATE

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

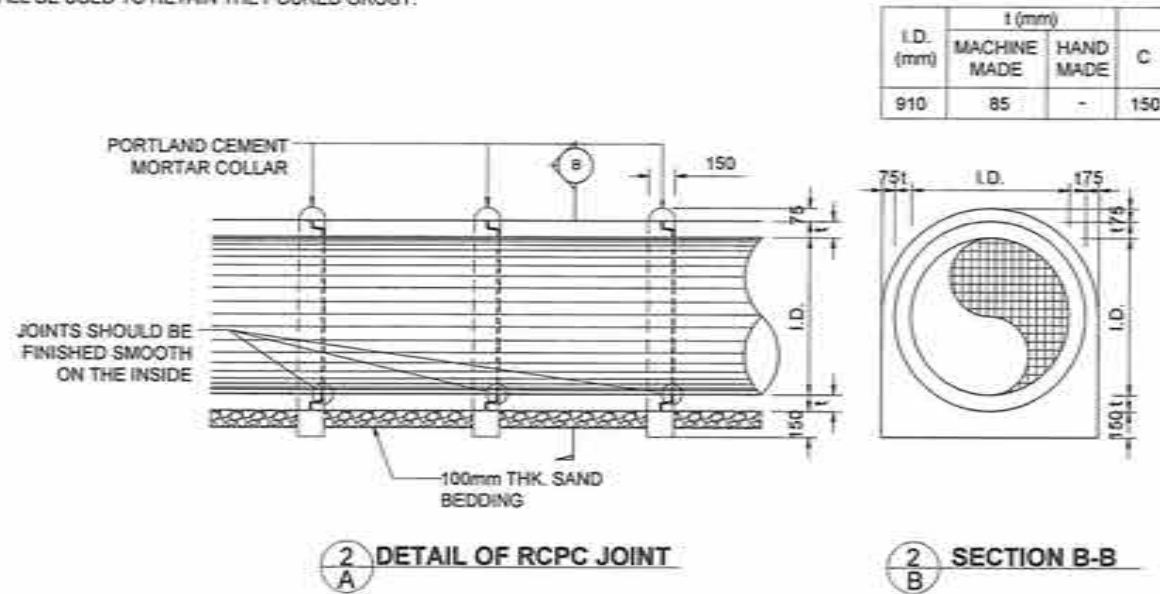
RECOMMENDING APPROVAL
JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JUBY S. CORDON
REGIONAL DIRECTOR
DATE

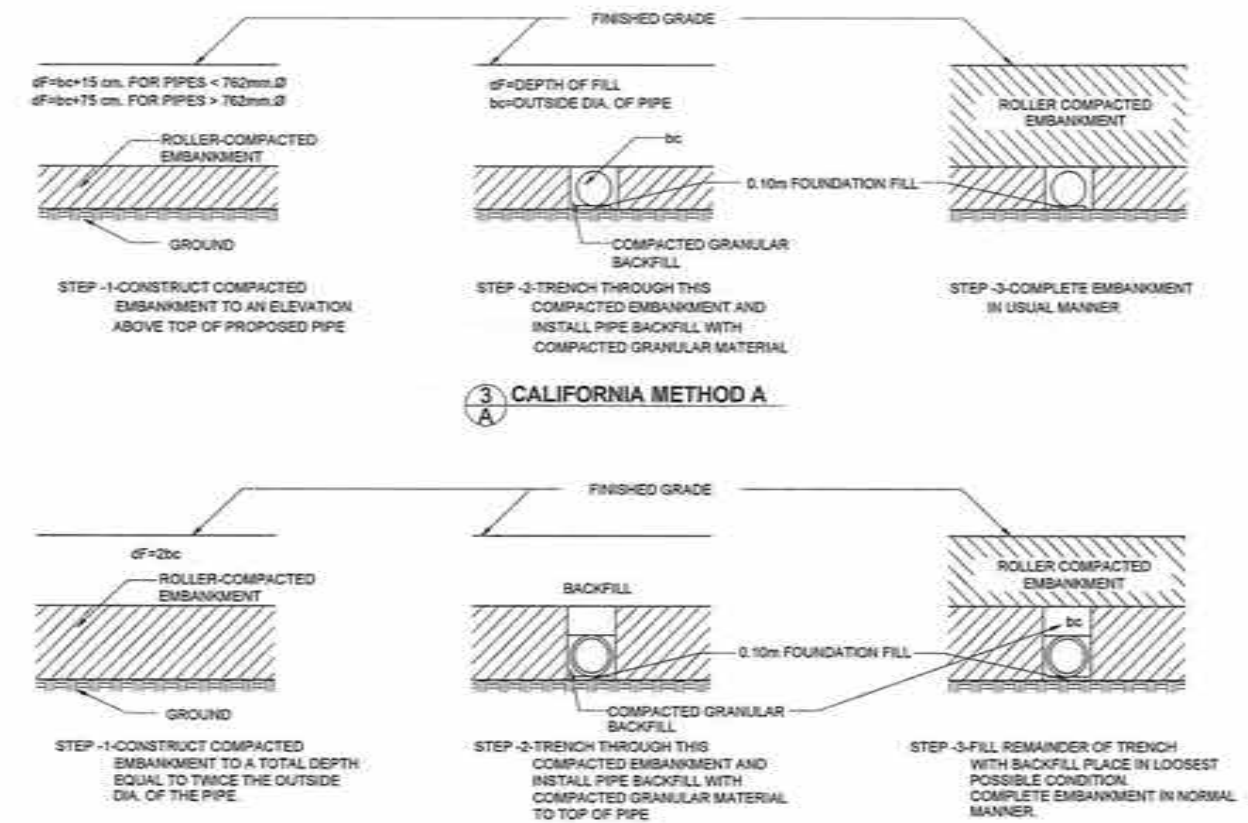
SET NO. 11/15
SHEET NO. 11/27

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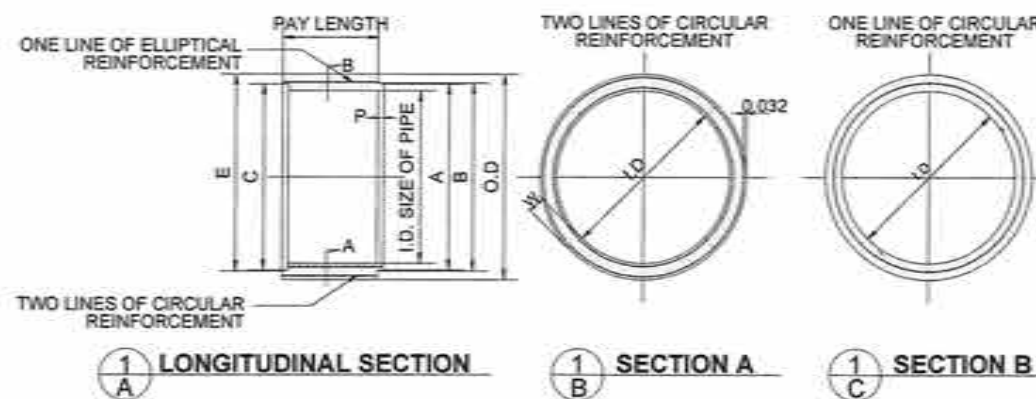
JOINTS SHALL BE MADE WITH (A) PORTLAND CEMENT MORTAR, AS MAY BE SPECIFIED. MORTAR JOINTS SHALL BE MADE WITH AN EXCESS OF MORTAR TO FORM A CONTINUOUS BEAD AROUND THE OUTSIDE OF THE CONDUIT AND FINISHED SMOOTH ON THE INSIDE. FOR GROUTED JOINTS, MOLDS AND RUNNERS SHALL BE USED TO RETAIN THE POURED GROUT.



2 REINFORCED CONCRETE PIPE CULVERT DETAILS
SCALE 1:30



3 METHOD OF PIPE INSTALLATION
SCALE 1:15



1 DESIGN REQUIREMENTS OF REINFORCED OF CONCRETE PIPE CULVERT
SCALE 1:15

SIZE OF PIPE		CONCRETE 317 KG/SQ. CM. (4,500 LB/SQ. IN.)					
IN.	M.	WALL THICKNESS (M)	TONGUE (M)		GROOVE (M)	DEPTH (M)	MINIMUM REINFORCEMENT SQ. CM./M. OF PIPE *
		W	A	B	C	E	P
36"	0.91	0.085	0.988	1.007	1.994	1.013	0.064
							CIRCULAR REINFORCEMENT 2 LINE EACH 4.66

* - THE DISTANCE FROM CENTERLINE OF THE REINFORCEMENT TO THE NEAREST SURFACE OF THE CONCRETE HAS BEEN ASSUMED AS 0.032 M. FOR PIPES WITH A SHELL THICKNESS OF 0.064 M. OR MORE.

NOTE: DESIGN REQUIREMENTS ARE BASED ON THE SPECIFICATIONS FOR MATERIALS OF AASHTO M-170



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION

CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS

DESIGN REQUIREMENTS FOR RCPC
REINFORCED CONCRETE PIPE CULVERT DETAILS
METHODS OF PIPE INSTALLATION

DRAFTED AND PREPARED

JAMAICA A. MANONG
ENGINEER II

REVIEWED

ALAIN JOHN SOTTA
ENGINEER II, SEC. 1

SUBMITTED

JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION

RECOMMENDING APPROVAL

JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

APPROVED

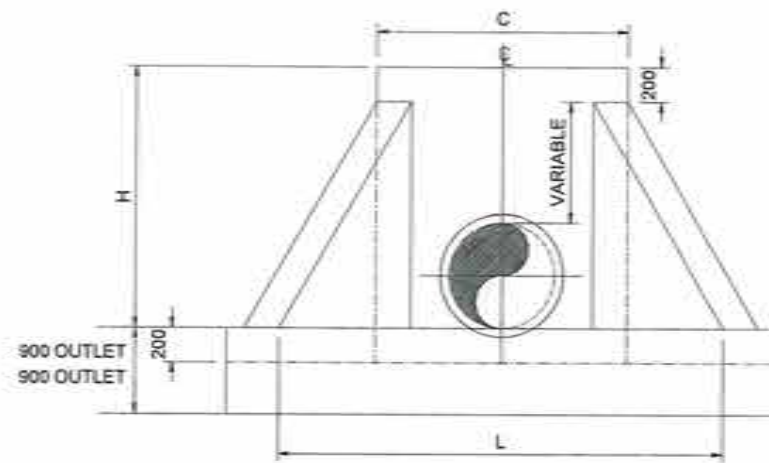
JURY B. CORDON
REGIONAL DIRECTOR

SET NO.

A
12/15

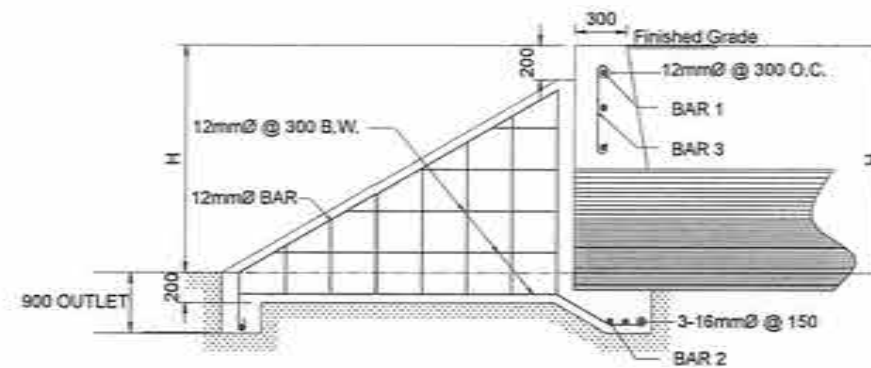
SHEET NO.

12
27

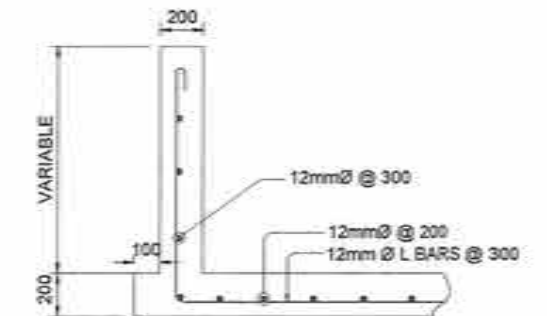


2A ELEVATION

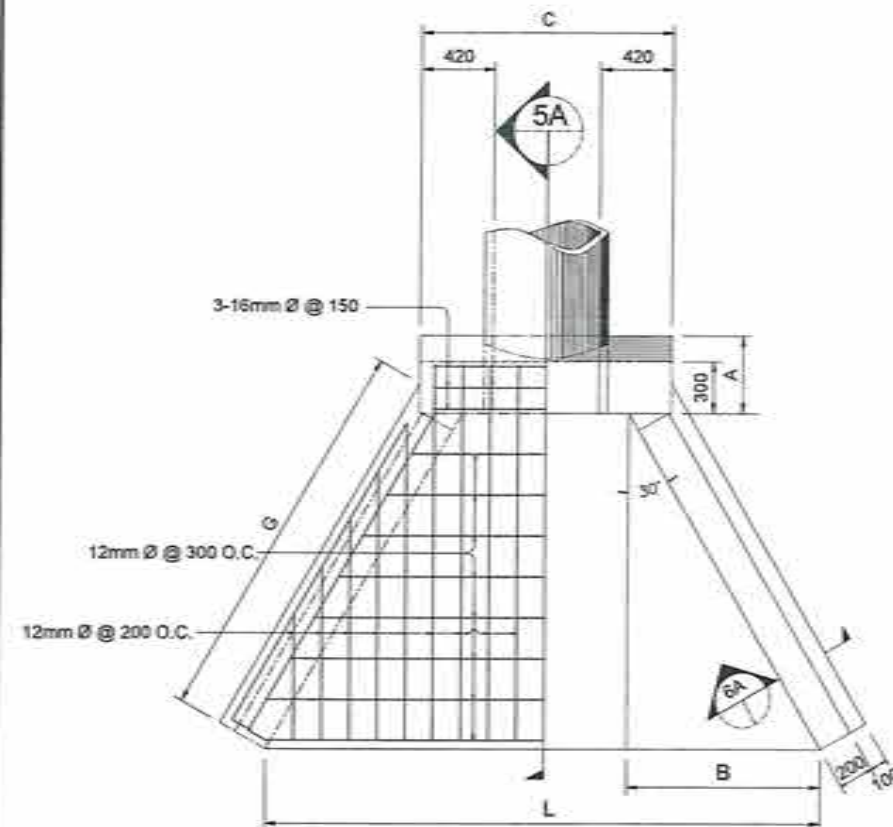
HEADWALL FOR SINGLE BARREL PIPE CULVERTS
TYPE B₁ (SQUARE)



5A SECTION A



6A SECTION B



1A PLAN

HEADWALL FOR SINGLE BARREL PIPE CULVERTS
TYPE B₁ (SQUARE)

INLET OR OUTLET CONCRETE HEADWALL DIMENSIONS
FOR SINGLE AND MULTI BARREL RCPC
DIMENSIONS IN CENTIMETERS

PIPE DIAMETER Ø (mm)		610	760	910	1070	1220	1520
COMMON TO ALL NUMBER OF BARRELS	H	151	166	181	197	212	242
	A	45	45	45	60	60	60
	d	20	25	30	25	30	35
	h	131	146	161	177	192	222
SINGLE BARREL	c	145	160	175	191	206	236
DOUBLE BARREL	c	267	312	357	405	450	540
TRIPLE BARREL	c	389	464	539	619	694	844
B FOR VARIOUS EMBANKMENT SLOPE	3/2	119.5	132.5	145.5	159.5	172.5	198.5
	2/1	157.5	174.5	192	210.5	227.5	262.5
	3/1	233	259	285	312.5	338.5	390.5
	4/1	308.5	343	378	415	450	518.5
G FOR VARIOUS EMBANKMENT SLOPE	3/2	227	253	279	307	333	385
	2/1	303	337	372	409	443	513
	3/1	454	506	558	613	665	789
	4/1	605	674	744	818	888	1025

FLARED TYPE HEADWALL DETAILS
SCALE NTS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHARLES COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS:
FLARED TYPE HEADWALL DETAILS

DRAFTED AND PREPARED:
JAMAICA A. MANDING
ENGINEER II

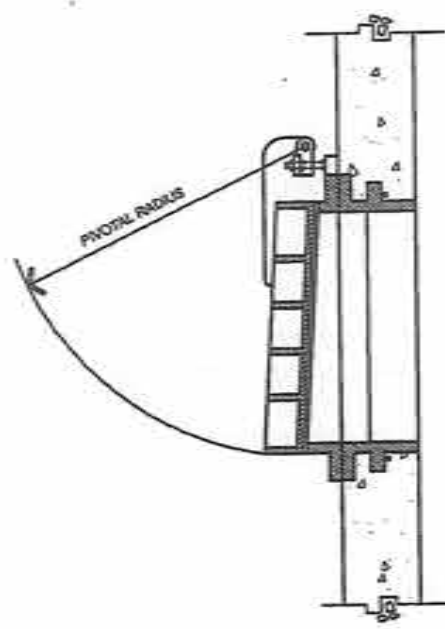
REVIEWED:
ALAN JOHN L. SOTTO
ENGINEER III, SENIOR DESIGNER

SUBMITTED:
JUDY A. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

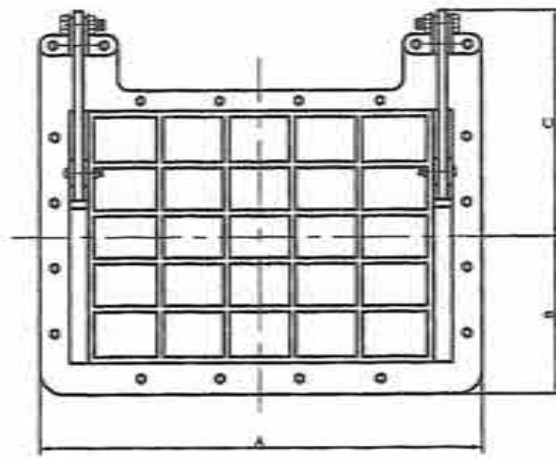
RECOMMENDING APPROVAL:
JOSELYN B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

APPROVED:
JUDY B. CORDON
REGIONAL DIRECTOR

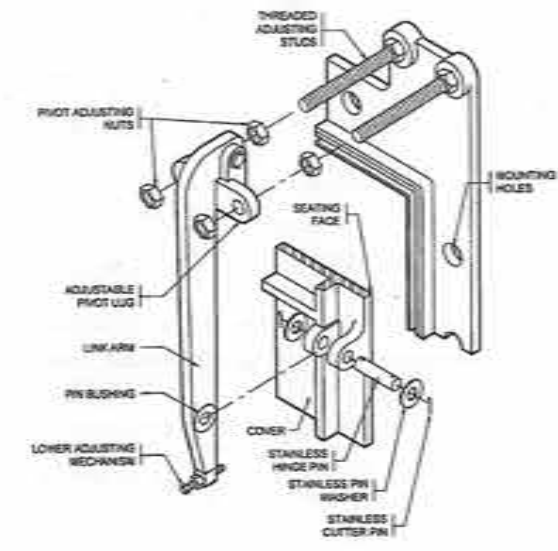
SET NO. 13/15
SHEET NO. 27



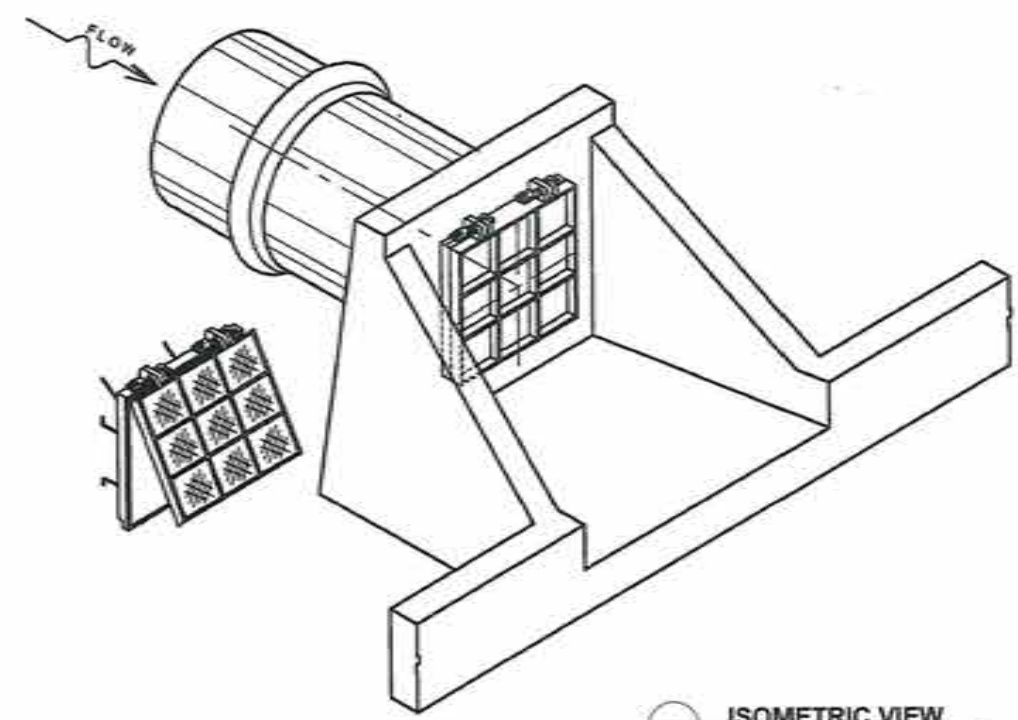
○ SIDE VIEW



○ FRONT VIEW



○ DETAILS OF ADJUSTABLE TOP PIVOT AND LINK ASSEMBLY

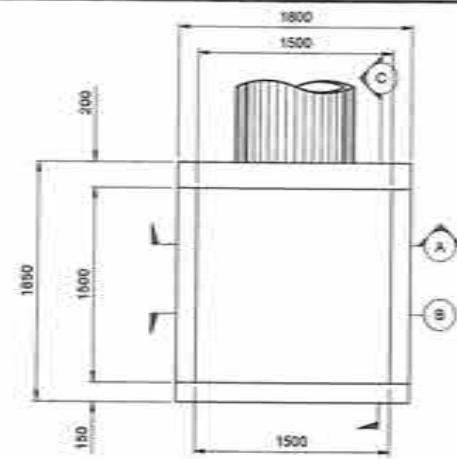


○ ISOMETRIC VIEW

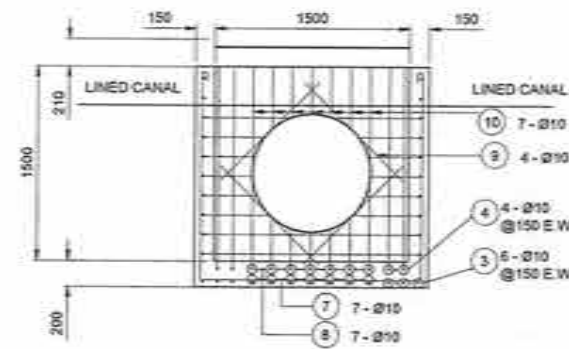
RECTANGULAR FLAP GATE				
WIDTH (mm) X HEIGHT (mm)	DIMENSION (mm)			PIVOT RADIUS (mm)
	A	B	C	
1200 X 1200	1450	725	943.75	1543.75

1 TYPICAL DETAILS FOR RECTANGULAR FLAP GATE

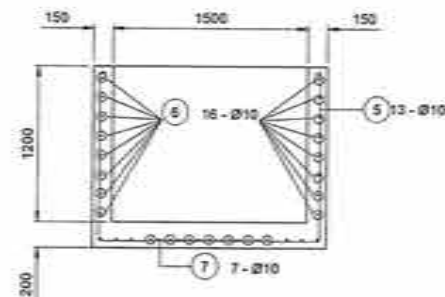
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. B. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	DRAFTED AND PREPARED	REVIEWED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAH RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	TYPICAL DETAILS FOR RECTANGULAR FLAP GATE	JAMAICA A. MANDING ENGINEER I	ALAIN JOHN R. SOTTO ENGINEER II, SECTION CHIEF	JUDY ANN T. BERNARDINO CHIEF PLANNING AND DESIGN DIVISION	JOSE LITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	JUBY B. CORDON REGIONAL DIRECTOR	A 14/15	14 27
			DATE	DATE	DATE	DATE	DATE		



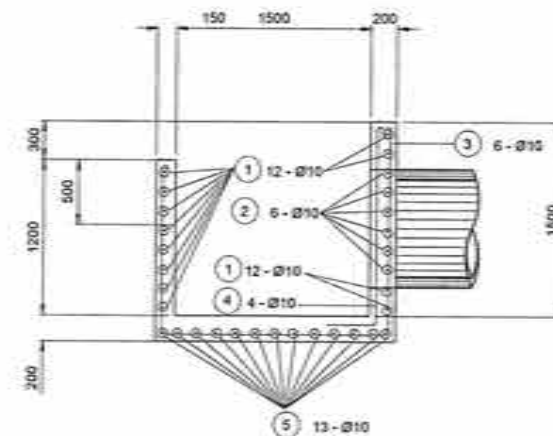
PLAN



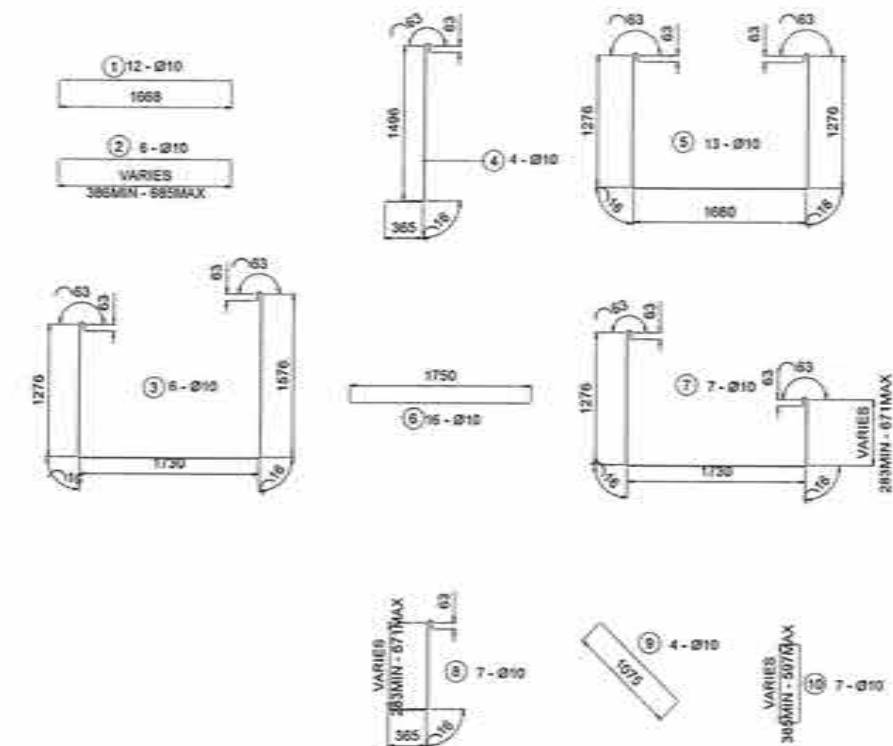
SECTION "A"



SECTION "B"



SECTION "C"



BAR BENDING DIAGRAM

CONCRETE CATCH BASIN FOR 36"Ø RCPC
SCALE 1:40

STATION	DESCRIPTION	1702(1)a	1702(5)a	1718(1)b3	1718(21)b1	1719(6)a5	1720(3)a3	404(1)a	405(1)a3	103(3)
		cu.m.	cu.m.	ln.m.	ln.m.	each	each	kgs.	cu.m.	cu.m.
1+880.000	STA. 1+880.000 INSTALL 1-910MM DIA. X 4.0 LN.M RCPC. CONSTRUCT CONC. CATCH BASIN ON INLET AND FLARED TYPE HEADWALL WITH FLAP GATE ON OUTLET. INLET LE = 38.46M, OUTLET = 38.125, SLOPE = 9.10%	16.71	6.03	4.00		1.00	1.00	51.02	1.45	0.91
1+235.000 TO 1+235.000	236.95 Ln.m. CONCRETE LINED CANAL (0.6m x 0.5m)				236.95					22.87
TOTAL		16.71	6.03	4.00	236.95	1.00	1.00	51.02	1.45	23.78

DRAINAGE SCHEDULE



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION

CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS

CONCRETE CATCH BASIN FOR 36"Ø RCPC
DRAINAGE SCHEDULE

DRAFTED AND PREPARED

JAMAICA A. MANDING
ENGINEER I

DATE

REVIEWED

ALAIN JOHN SOTO
ENGINEER II, SECTION CHIEF

DATE

SUBMITTED

JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION

DATE

RECOMMENDING APPROVAL

JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

DATE

APPROVED

JUBY S. CORDON
REGIONAL DIRECTOR

DATE

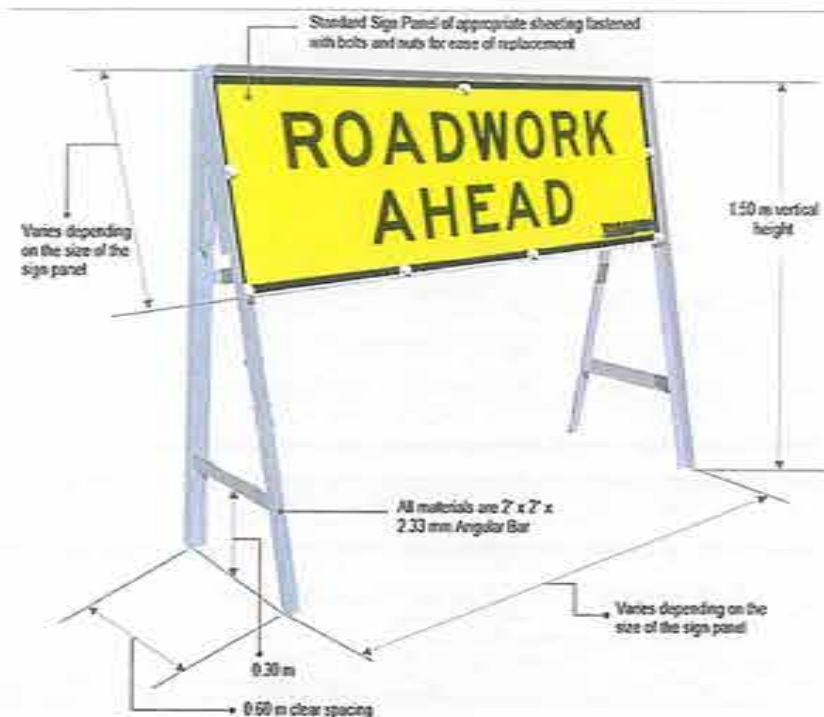
SET NO.

A
15/15

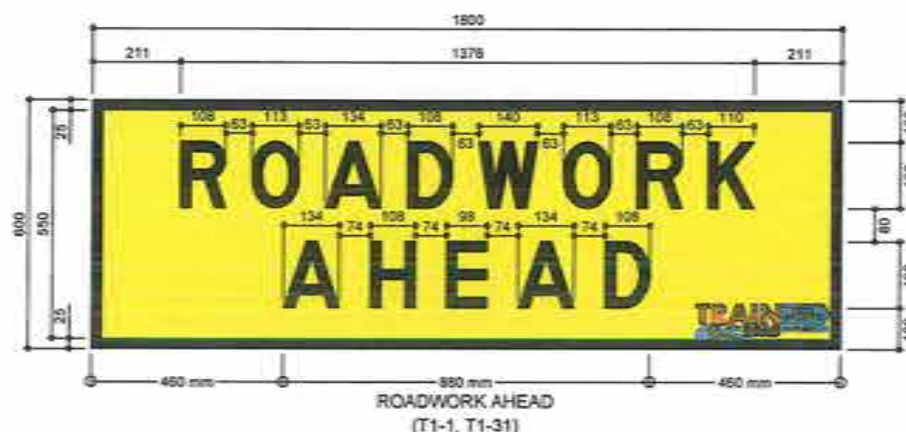
SHEET NO.

15
27

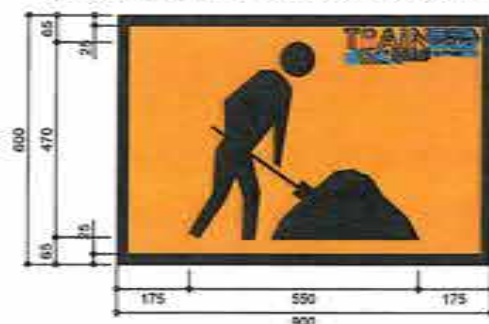
Thursday, July 24, 2025



ROADSIGN DETAILS
SCALE 1:20



NOTE: BLACK SYMBOLS AND BORDER
RED/ORANGE FLOURESCENT BACKGROUND FOR DAYTIME USE
ORANGE RETRO-REFLECTIVE BACKGROUND FOR NIGHTTIME USE



WORKMEN AHEAD (SYMBOLIC)
(T1-5)

ADVANCE WARNING SIGNS
SCALE 1:10

NOTE: BLACK LETTERS AND BORDERS ON A YELLOW RETRO-REFLECTIVE BACKGROUND EXCEPT FOR WORKMEN AHEAD SIGN.
USE APPROPRIATE LAYOUT BASED ON D.O. NO. 13 SERIES OF 2018



TRAFFIC HAZARD AHEAD
(T1-10)

SIGNS FOR ROAD CONDITIONS & HAZARD
SCALE 1:10

NOTE: BLACK LETTERS AND BORDERS ON A YELLOW RETRO-REFLECTIVE BACKGROUND.
USE APPROPRIATE LAYOUT BASED ON D.O. NO. 13 SERIES OF 2018

NOTE

1. THE TAPE (CAUTION) SHALL BE TIED OR SUPPORT APPROXIMATELY 1 METER HIGH.
2. THE TAPE SHALL BE 100MM WIDE WITH ALTERNATING BLACK AND YELLOW STRIPES.



CONSTRUCTION SAFETY FENCE
SCALE NTS



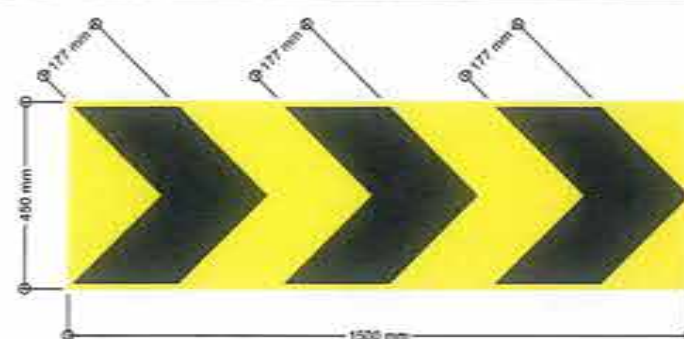
ROAD MACHINERY AHEAD
(T1-3)

NOTE:

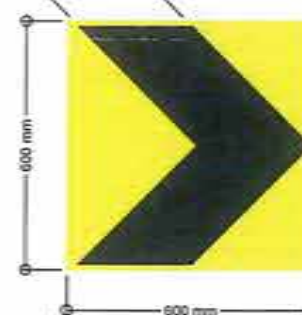
1. TRAFFIC CONE SHALL BE FLUORESCENT RED OR ORANGE PLASTIC THAT IS RESILIENT TO IMPACT AND WILL NOT DAMAGE VEHICLES WHEN HIT AT LOW SPEED.
2. HEIGHT OF TRAFFIC CONE VARIES FROM 450MM TO 750MM FOR USE IN EXPRESSWAY OR IN VERY HIGH SPEED SITUATIONS.
3. FOR NIGHT TIME OPERATION THE BOLLARDS MUST BE FITTED WITH REFLECTIVE TAPE WITH A MINIMUM BANDWIDTH OF 150MM.



TRAFFIC CONE
SCALE 1:20



TEMPORARY HAZARD MARKER
(T5-4)



TEMPORARY HAZARD MARKER
(T5-5)

TEMPORARY HAZARD MARKERS
SCALE 1:10

NOTE: BLACK SYMBOLS ON A YELLOW RETRO-REFLECTIVE BACKGROUND.
USE APPROPRIATE LAYOUT BASED ON D.O. NO. 13 SERIES OF 2018



PREPARE TO STOP
(T1-18)



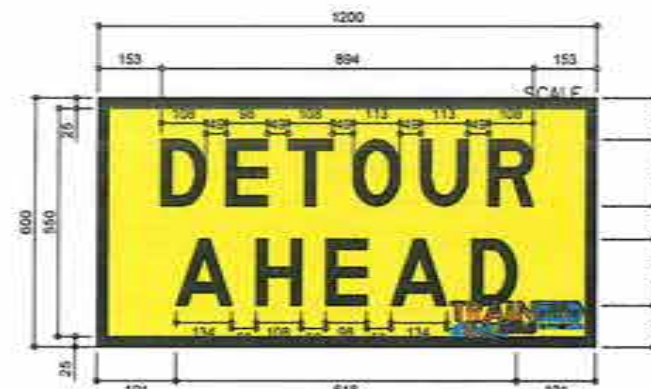
SPEED RESTRICTION
(R4-1)



END SPEED RESTRICTION
(R4-2)

REGULATORY SIGNS
SCALE 1:10

USE APPROPRIATE LAYOUT BASED ON D.O. NO. 13 SERIES OF 2018



DETOUR AHEAD
(T1-6)



DETOUR MARKER
(T5-6)



DETOUR (LEFT OR RIGHT)
(T5-1)



DETOUR SIGNS
SCALE 1:10

NOTE: BLACK LETTERS, ARROWS AND BORDERS ON A YELLOW RETRO-REFLECTIVE BACKGROUND.
USE APPROPRIATE LAYOUT BASED ON D.O. NO. 13 SERIES OF 2018



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHARVET COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
WORK SITE TEMPORARY SIGNAGE
ROADSIGN DETAILS

DRAFTED AND PREPARED
JAMAICA A. MANDING
ENGINEER I
DATE

REVIEWED
ALAN JOHN R. SOTTO
ENGINEER II, DESIGN DIVISION
DATE

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JUDY S. CORDON
REGIONAL DIRECTOR
DATE

SHEET NO.
B 01/03
16 27

Technical drawing of a yellow rectangular sign with a black border. The sign contains the following text in bold, black, sans-serif capital letters:

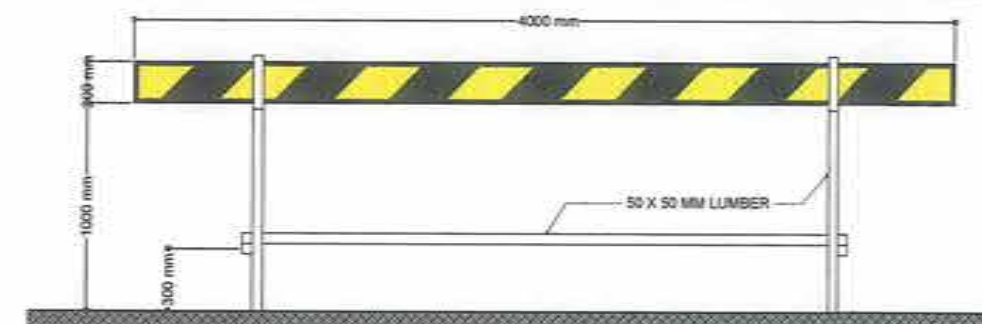
- CAUTION
- ROAD CONSTRUCTION ON-GOING
- REGIONAL OFFICE
- REGION-XI

In the bottom right corner, there is a small logo for "TRAIN TO THE TOP" with a graphic of a train. The drawing includes dimensions in millimeters:

- Overall width: 1800
- Overall height: 600
- Left side dimensions (from top to bottom): 25, 30, 100, 25, 80, 25, 25, 25.

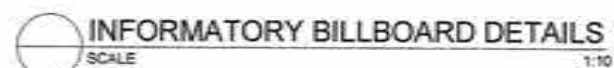
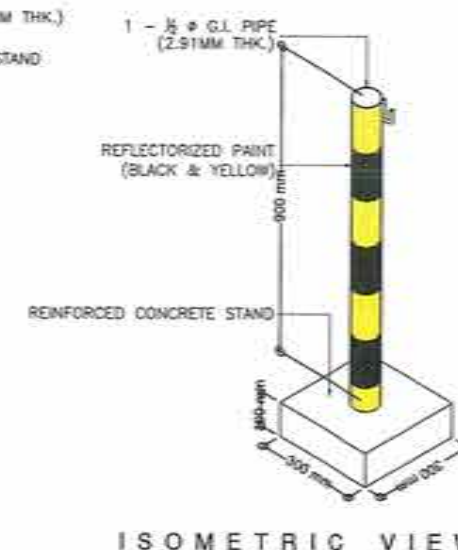
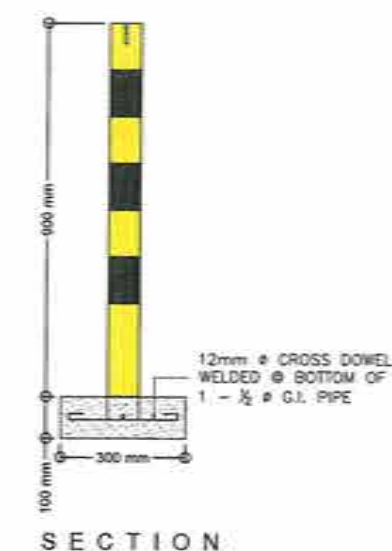
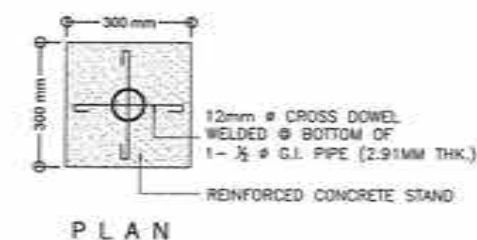
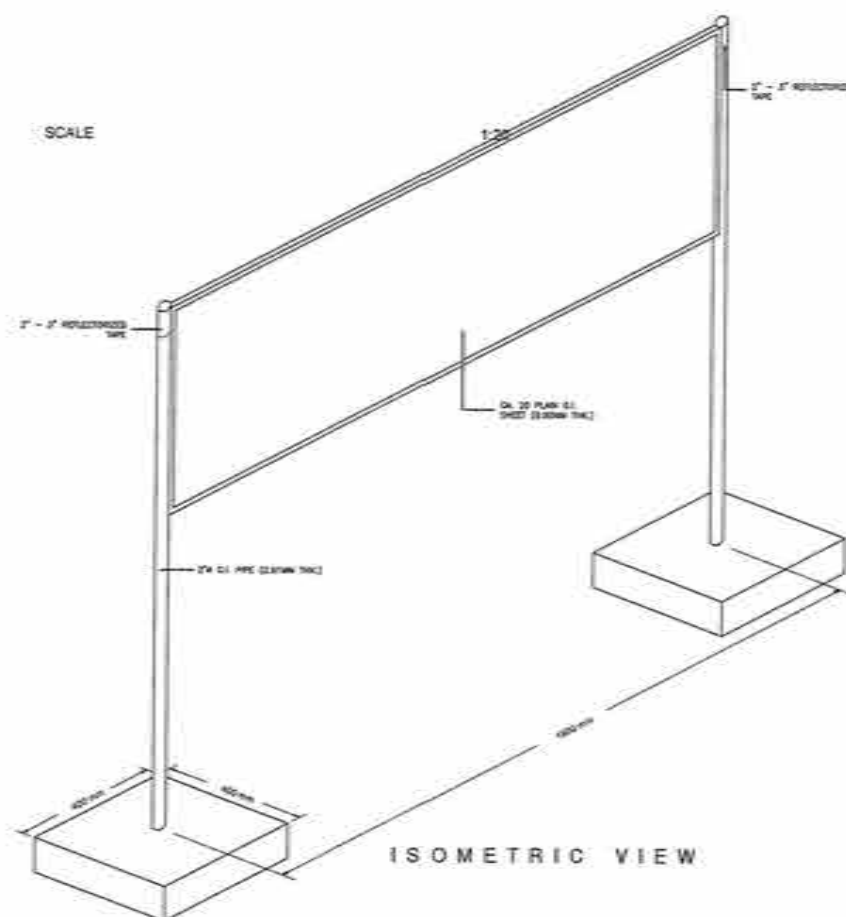
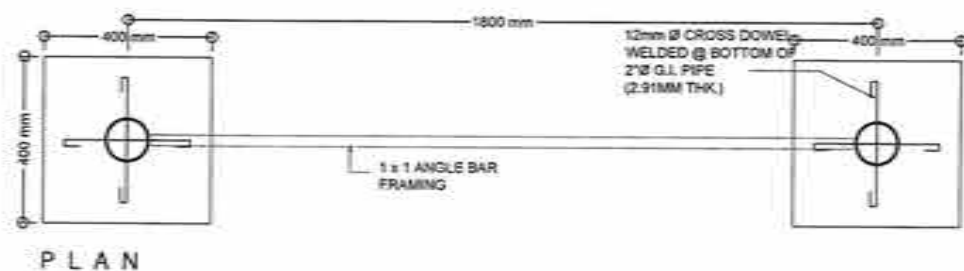
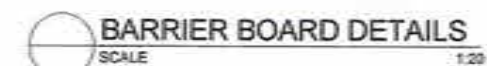


ISOMETRIC VIEW



NOTE

1. BOARD DIMENSIONS: (48" X 0.15" X 0.20") WITH DIAGONAL BLACK AND REFLECTIVE YELLOW STRIPES PREFERABLY TERMINATING IN YELLOW AT 1" END.
2. MOUNTING HEIGHT: APPROXIMATELY 1 METER USING PRESTILES (SHOULD BE ERRECTED PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW).
3. BARRIER BOARD SHALL NOT BE USED FOR DELINEATION PURPOSES OR INSTALLED PARALLEL TO VEHICULAR TRAFFIC UNLESS THERE IS AN OFFSET OF AT LEAST FOUR (4) METERS FROM THE TRAVELLED PATH.



PROJECT NAME AND LOCATION

CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVO DE ORO

SHEET CONTENTS:

INFORMATORY SIGN	1
BARRIER BOARD DETAILS	2
INFORMATORY BILLBOARD DETAILS	3
TEMPORARY BOLLARD DETAIL	4

DRAFTED AND PREPARED


JAMAICA A. MANNING
ENGINEER I

REVIEWED:


ALAIN JOHN R. SOTO
ENGINEER II, PROFESSIONAL

SUBMITTED: 
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

RECOMMENDING APPROVAL
JOSELITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR

APPROVED
JURY B. COORDON Business Development

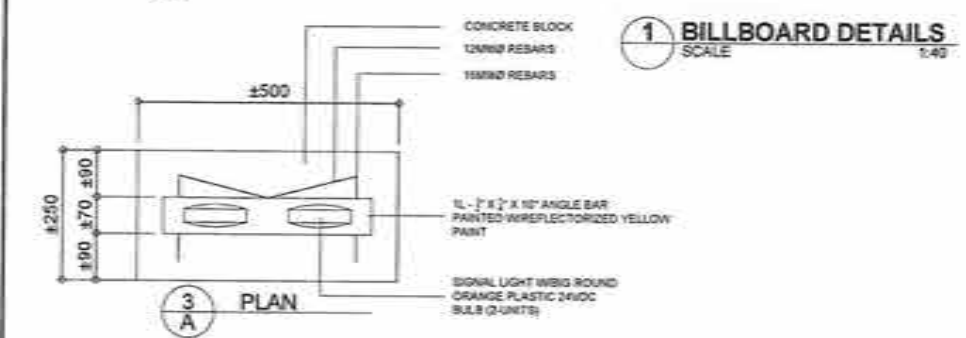
SET NO.	
B	
02/03	

SHEET NO.
17
27

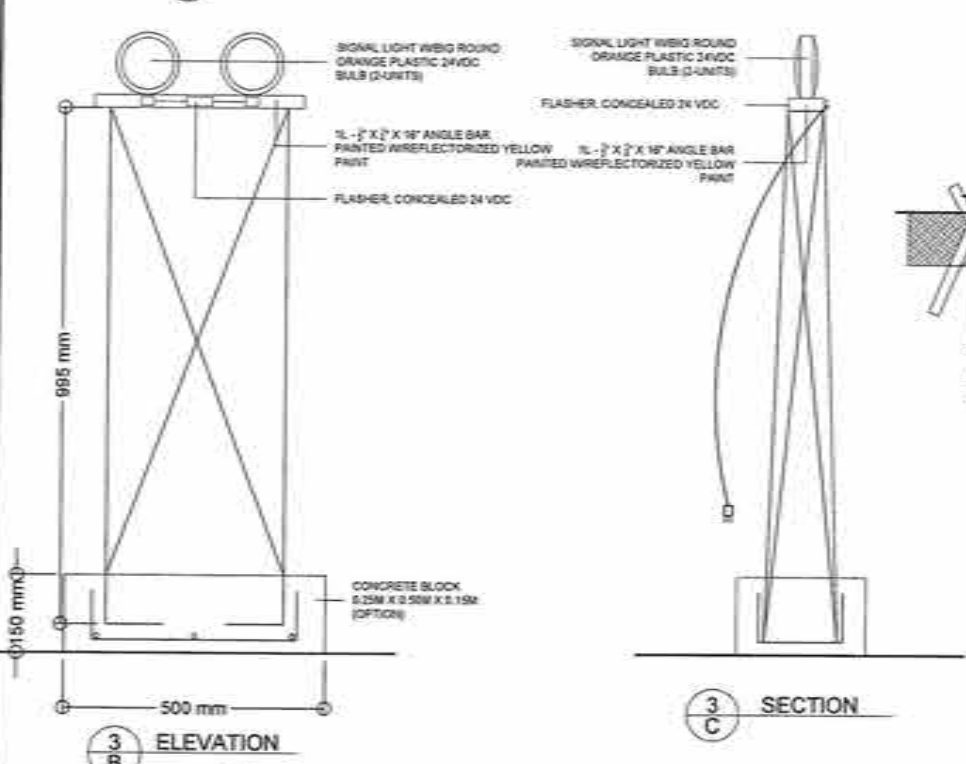


1 FRONT ELEVATION (OPTION 1)

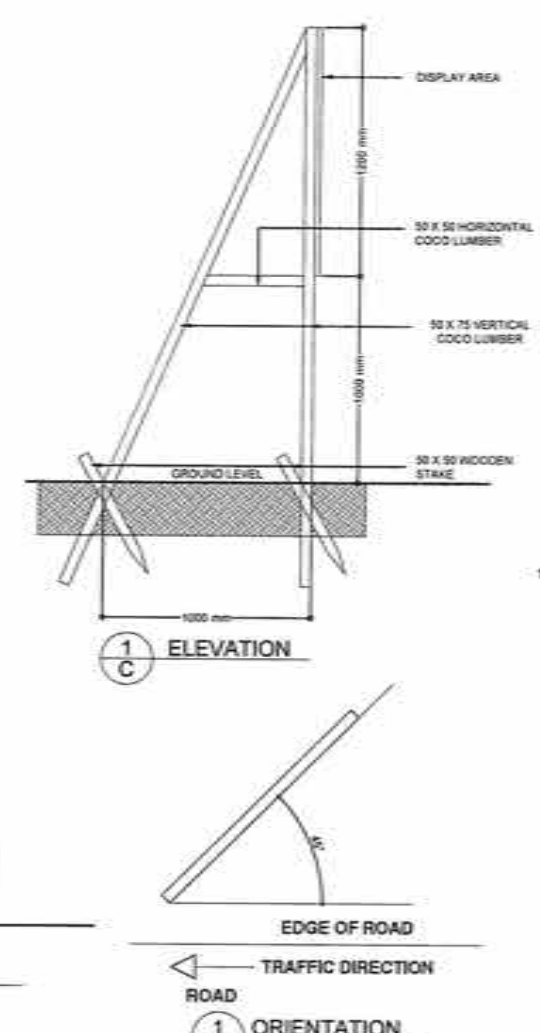
1 FRONT ELEVATION (OPTION 2)



1 BILLBOARD DETAILS
SCALE 1:40



3 FLASHER / TOWER LIGHT DETAILS
SCALE NTS



1 ELEVATION

1 D ORIENTATION



Republic of the Philippines
Department of Environment and Natural Resources

NOTICE TO THE PUBLIC

This _____ (PROJECT NAME)
of the Department of Public Works and Highways XI has been issued an
ECC/CNC (Control Number) by Environmental Management
Bureau of the Department of Environment and Natural Resources, Region XI, on
(Date Issued).

Warning: Do not remove or damage this billboard as installed pursuant to the ECC/CNC issued under Presidential Decree No. 1586.



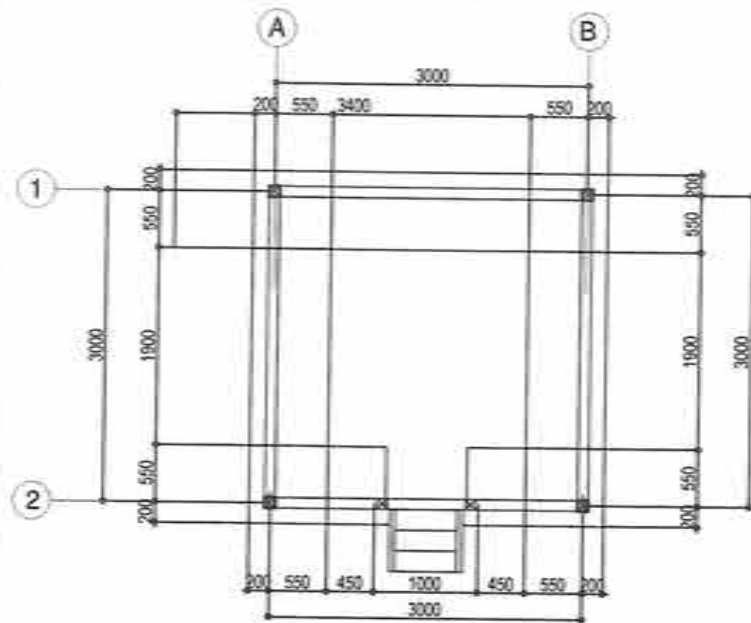
THIS IS WHERE YOUR TAXES GO

NAME OF PROJECT:
LOCATION:
NAME OF CONTRACTOR:
DATE STARTED:
CONTRACT COMPLETION DATE:
CONTRACT COST:
IMPLEMENTING OFFICE:
SOURCES OF FUND

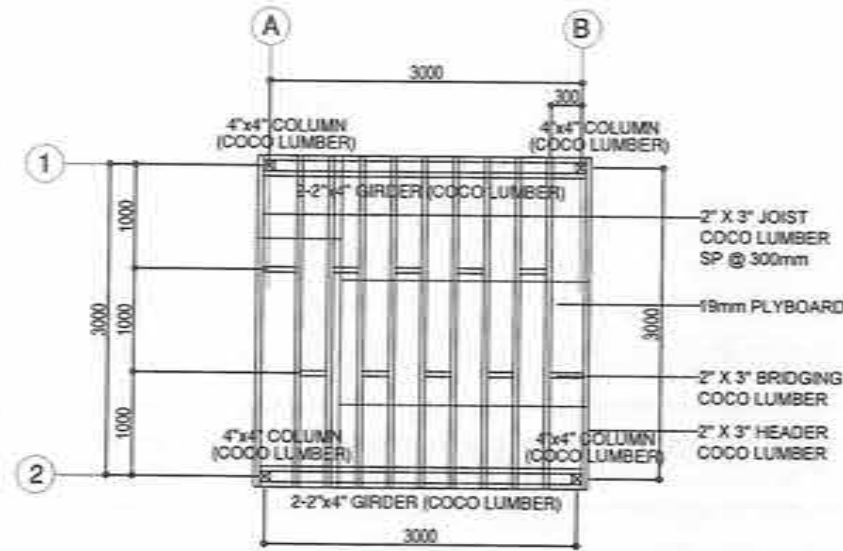
Department of Public Works and Highways
Text 250 or call (02) 165-02 for any concern on this project
www.dpw.gov.ph

2 PROJECT BILLBOARD
SCALE NTS

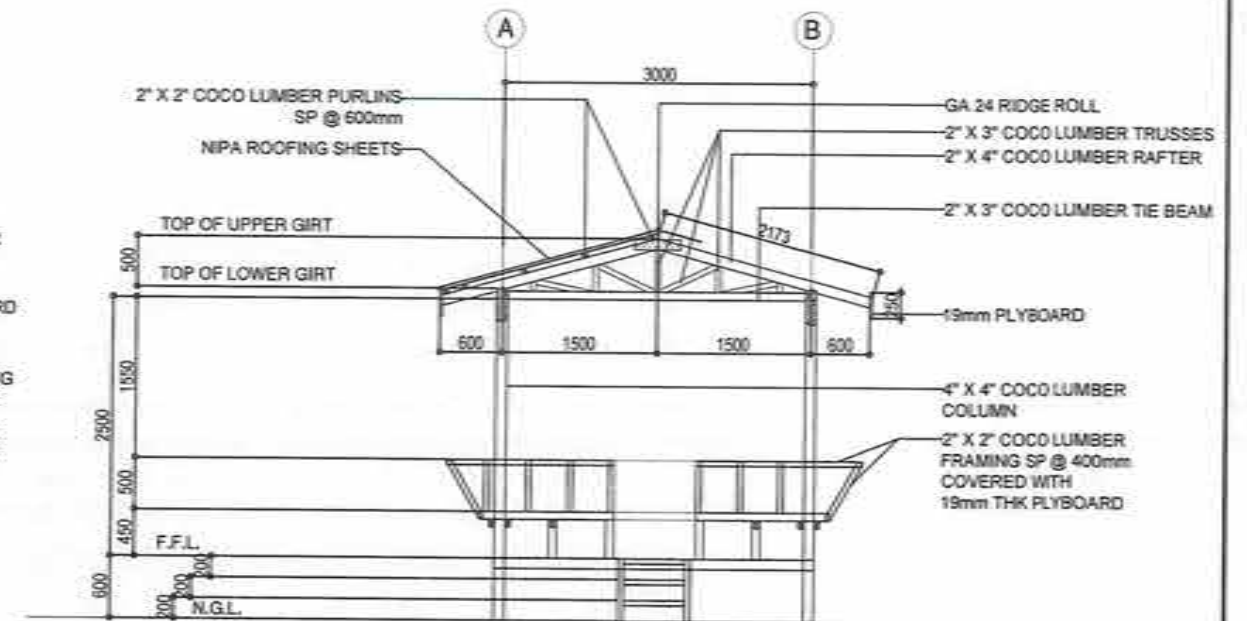
 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI OOY, DRAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION: CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	SHEET CONTENTS: BILLBOARD DETAILS PROJECT BILLBOARD FLASHER / TOWER LIGHT DETAILS	DRAFTED AND PREPARED: JAMAICA A. MANDING ENGINEER I	REVIEWED: ALAN JOHN SOTTO ENGINEER II, SECTION CHIEF	SUBMITTED: JUDYANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	RECOMMENDING APPROVAL: JOSEITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	APPROVED: JUBY B. CORDON REGIONAL DIRECTOR	SET NO. 18 SHEET NO. 27
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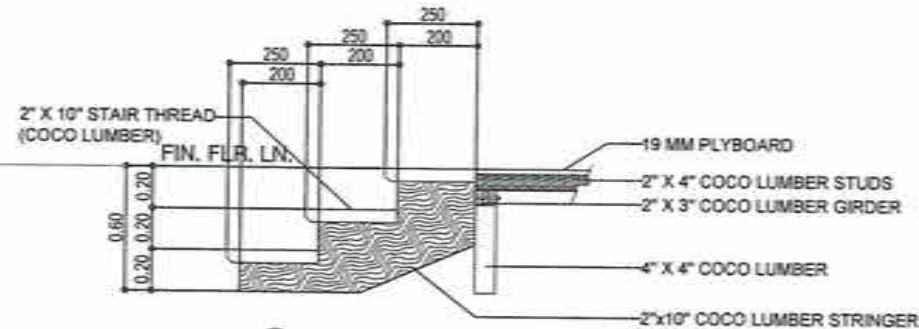
1 FLOOR PLAN



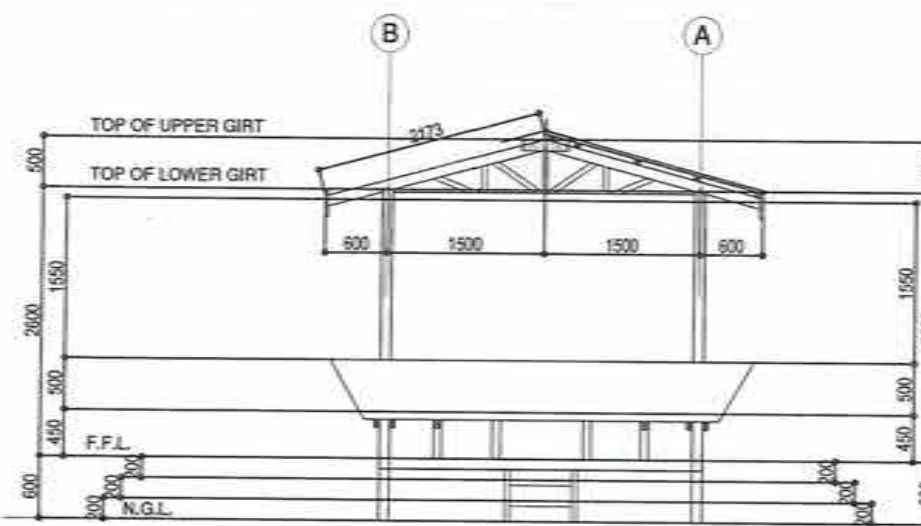
2 FLOOR FRAMING



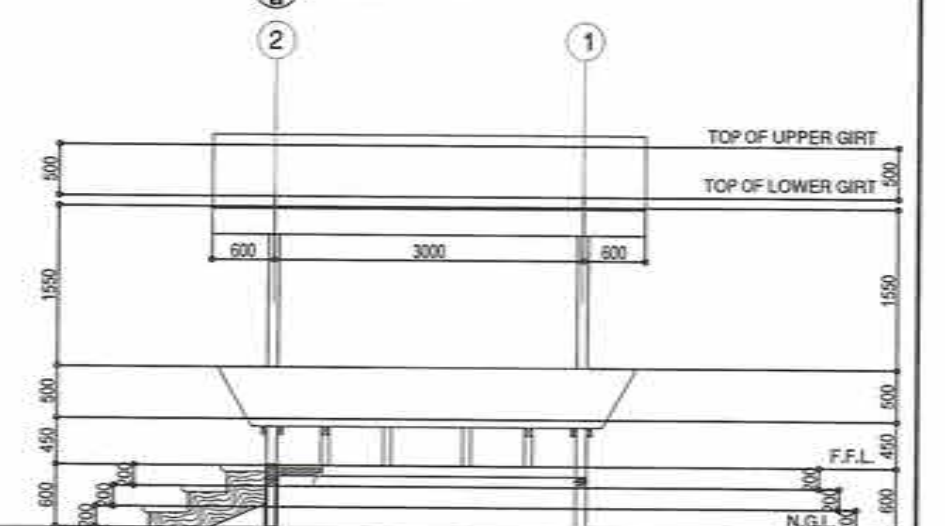
3 SECTION



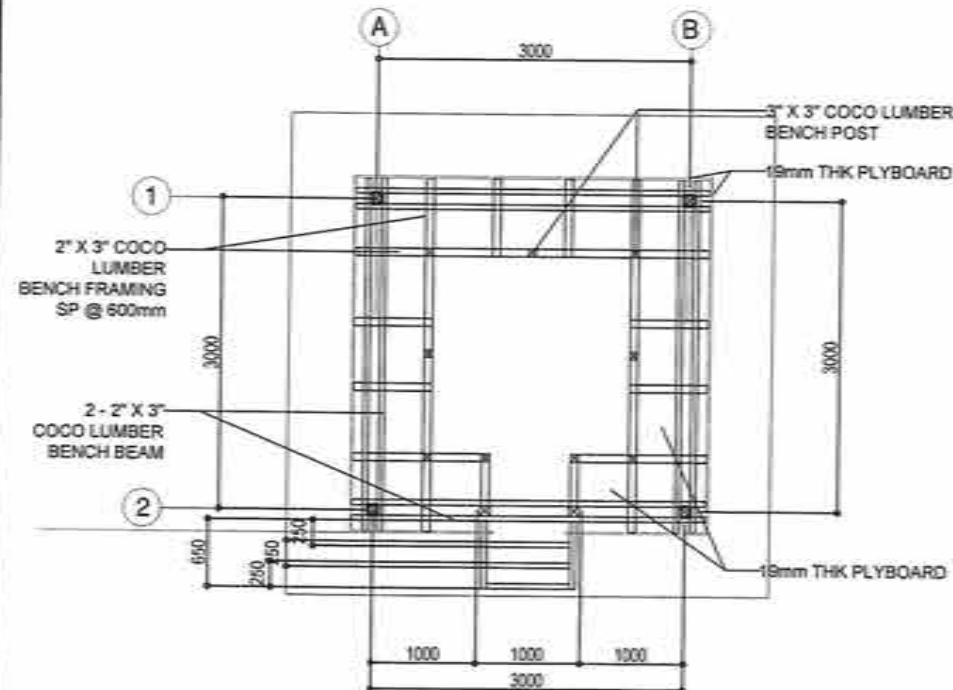
4 STAIR DETAIL



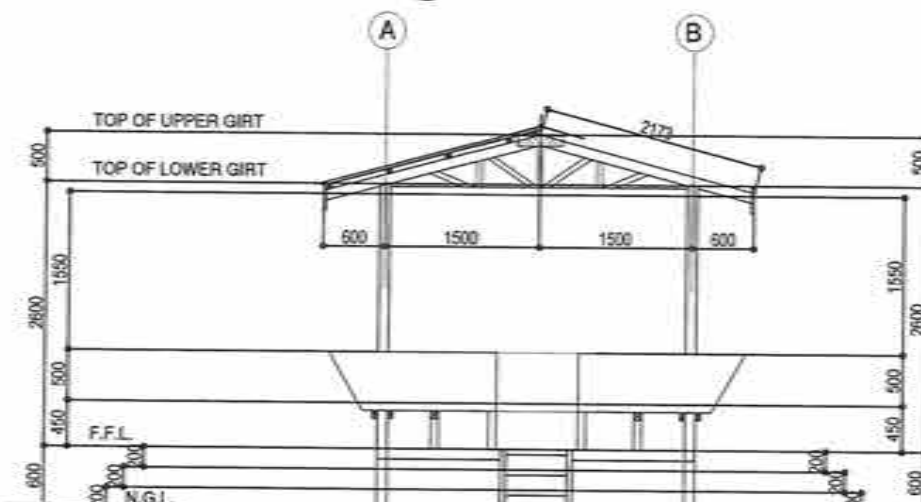
6 REAR ELEVATION



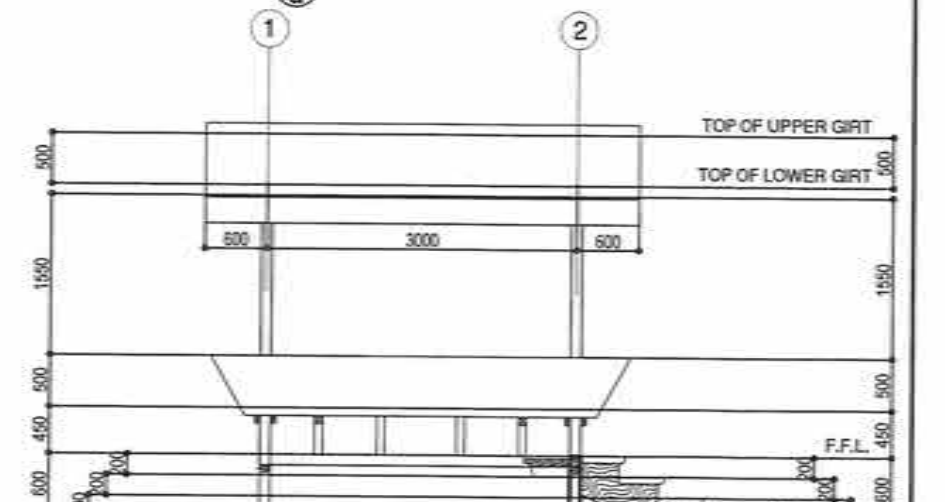
7 RIGHT SIDE ELEVATION



5 BENCH FRAMING



8 FRONT ELEVATION



9 LEFT SIDE ELEVATION

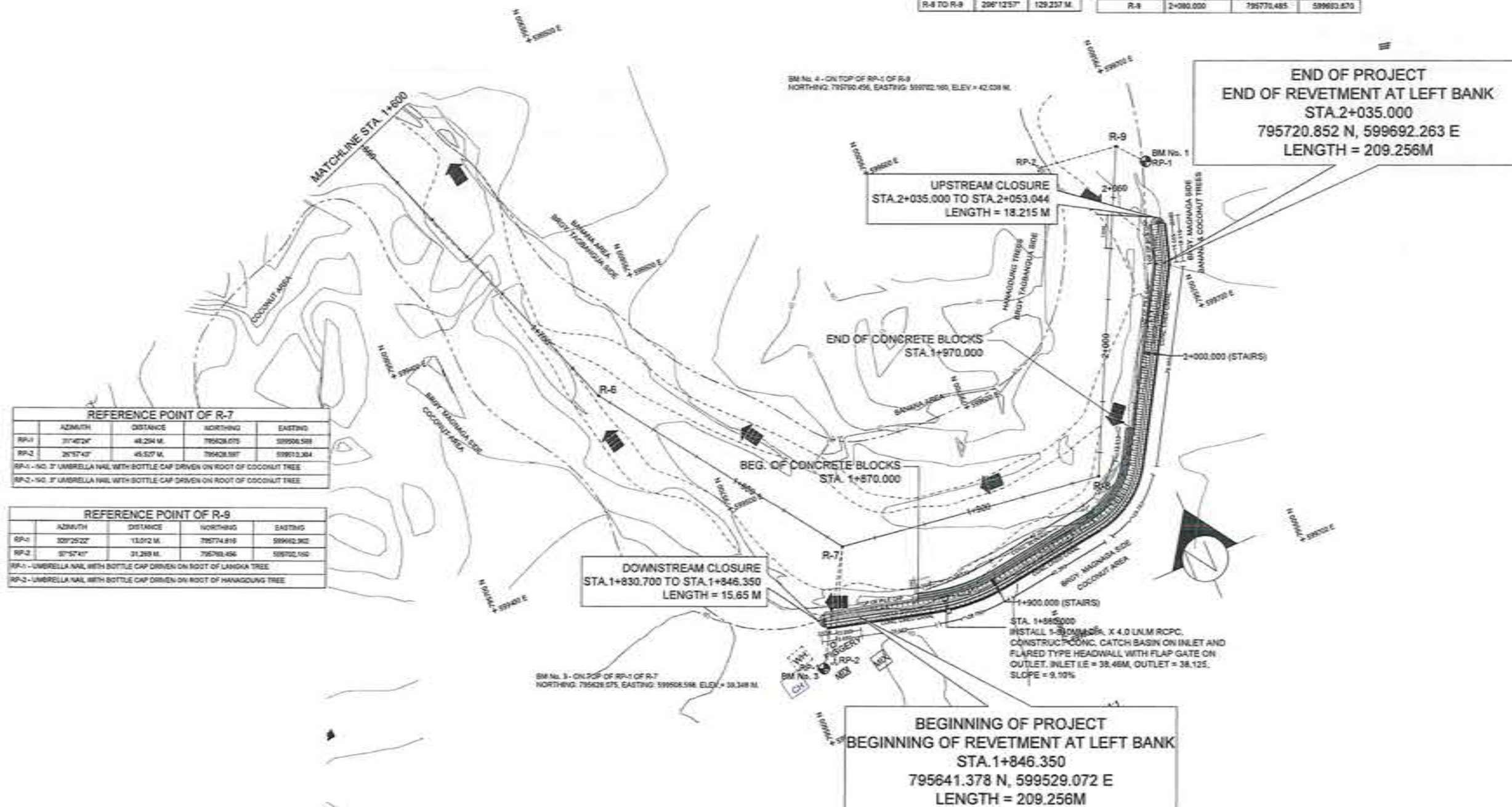
 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHARIZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAH RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	SHEET CONTENTS BAHAY KUBO TYPICAL DETAILS	DRAFTED AND PREPARED FERDINAND M. BAÑOSA ARCHITECT	REVIEWED ALGIN A. GIVAN ENGINEER	SUBMITTED JUDY ANN T. BERNARDINO CHIEF PLANNING AND DESIGN DIVISION	RECOMMENDING APPROVAL JOSEFITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	APPROVED JUDY B. CORDON REGIONAL DIRECTOR	SET NO. C 01/01 SHEET NO. 19 27
--	---	--	---	---	--	--	--	---

LEGEND:

- WH WOODEN / ANAHAW HOUSE
- TREES
- WATER LINE
- BANK
- PROPOSED CONCRETE RETEMENT
- PROPOSED CROSSLRAIN WITH CONC. CATCH BASIN ON INLET AND FLARED HEADWALL WITH FLAP GATE ON OUTLET
- PROPOSED CONCRETE BLOCKS

TRAVERSE LINE		
PI-#	AZMUTH	DISTANCE
R-4 TO R-5	242°52'08"	142.214 M.
R-5 TO R-6	340°02'57"	163.419 M.
R-6 TO R-7	325°19'11"	112.136 M.
R-7 TO R-8	278°09'53"	103.869 M.
R-8 TO R-9	298°12'57"	129.237 M.

STATION COORDINATES			
POINT	STATION	NORTHING	EASTING
R-5	1+571.338	795915.001	599414.38
R-6	1+734.758	795761.390	599470.14
R-7	1+846.894	795668.178	599533.94
R-8	1+950.783	795654.542	599636.77
R-9	2+080.000	795770.485	599692.87



REFERENCE POINT OF R-7	POINT	STATION	NORTHING	EASTING
RP-1	31°42'24"	48.294 M.	795628.075	599508.589
RP-2	26°57'43"	45.527 M.	795628.587	599513.364

RP-1 - NO. 3" UMBRELLA NAIL WITH BOTTLE CAP DRIVEN ON ROOT OF COCONUT TREE.
RP-2 - NO. 3" UMBRELLA NAIL WITH BOTTLE CAP DRIVEN ON ROOT OF COCONUT TREE.

REFERENCE POINT OF R-9	POINT	STATION	NORTHING	EASTING
RP-1	309°25'22"	13.012 M.	795774.818	599602.962
RP-2	97°57'41"	31.289 M.	795768.456	599702.192

RP-1 - UMBRELLA NAIL WITH BOTTLE CAP DRIVEN ON ROOT OF LANGKA TREE.
RP-2 - UMBRELLA NAIL WITH BOTTLE CAP DRIVEN ON ROOT OF HANAGONG TREE.

PLAN
SCALE 1:1250 m.



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARAMUNAG MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
PLAN

SURVEYED
RUEL M. SACKAY
ENGINEER II
REVIEWED
DANILLO M. CARAGA
ENGINEER II, SECTION CHIEF

PREPARED
JAMAICA A. MANDING
ENGINEER II
REVIEWED
JOHN JOHN P. SOTTO
ENGINEER II, SECTION CHIEF

SUBMITTED
JUDYANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JURY B. CORCON
REGIONAL DIRECTOR
DATE

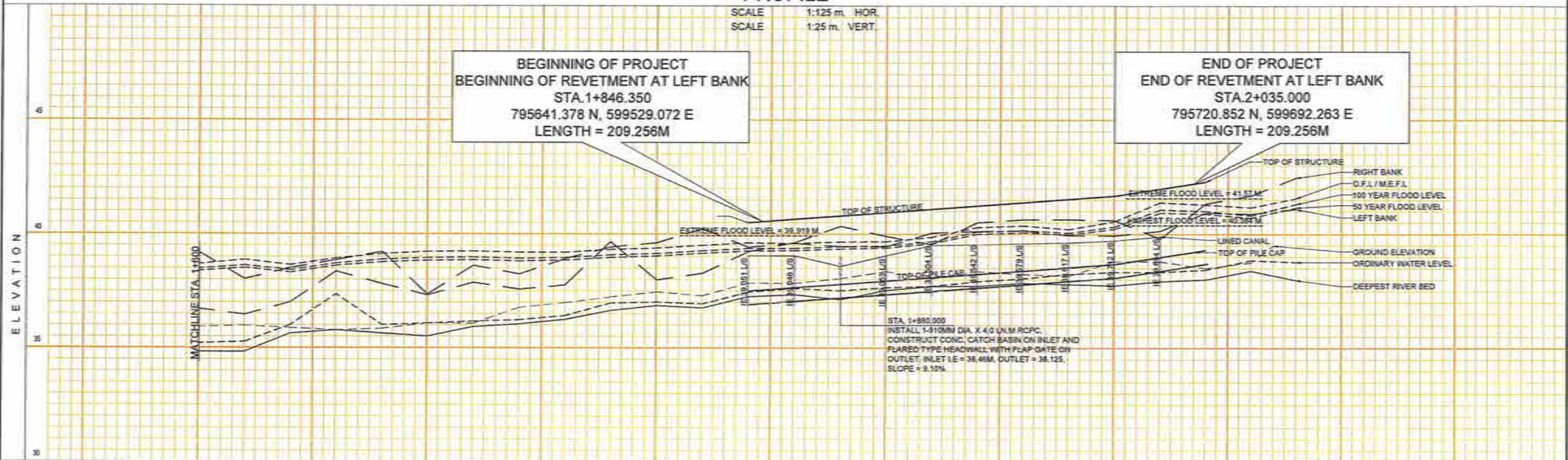
SET NO.
D
01/02
SHEET NO.
20
27

PROFILE

SCALE 1:125 m. HOR.
SCALE 1:25 m. VERT.

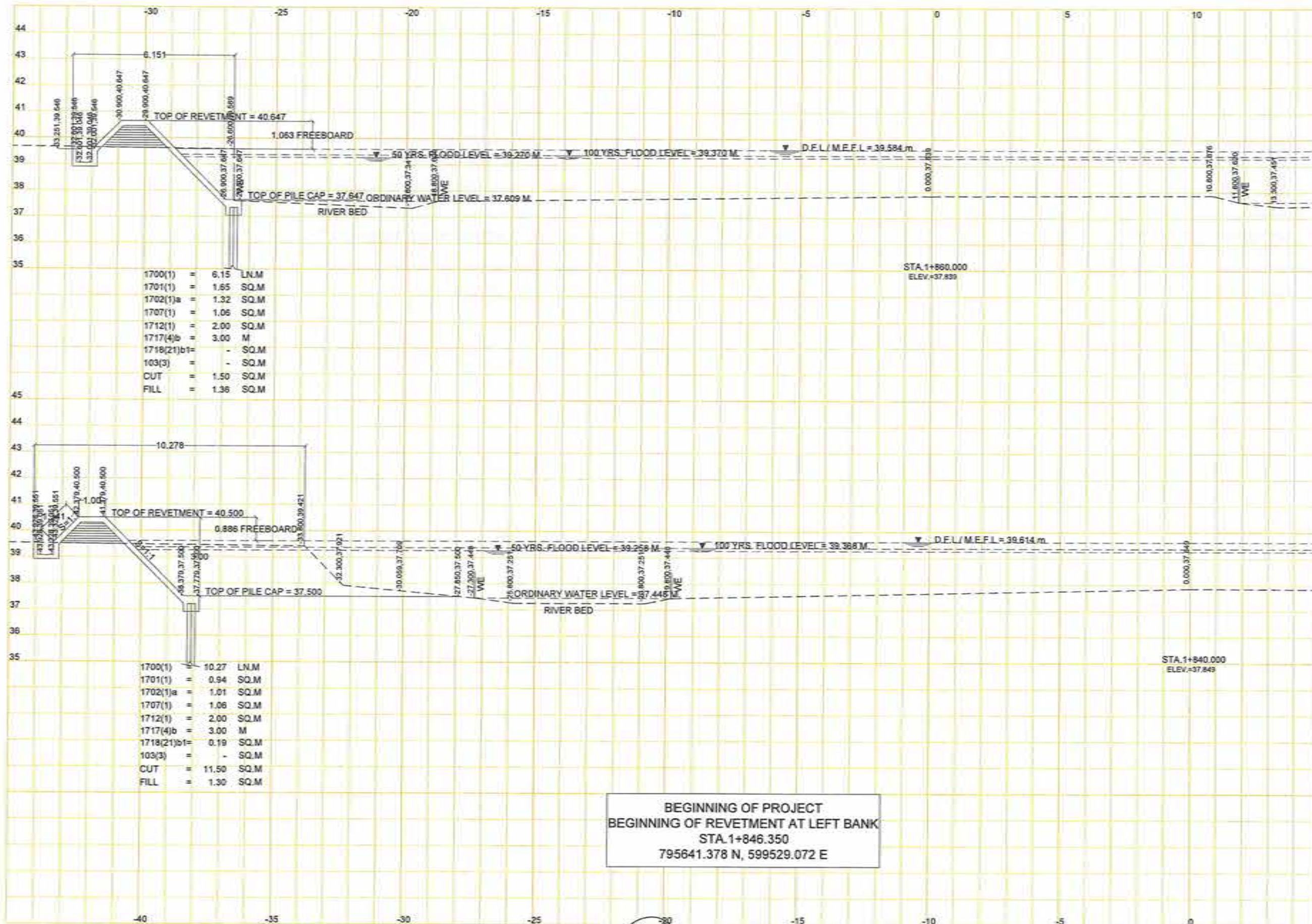
BEGINNING OF PROJECT
BEGINNING OF REVETMENT AT LEFT BANK
STA.1+846.350
795641.378 N, 599529.072 E
LENGTH = 209.256M

END OF PROJECT
END OF REVETMENT AT LEFT BANK
STA.2+035.000
795720.852 N, 599692.263 E
LENGTH = 209.256M



STATION	1+600	1+700	1+800	1+900	2+000	2+100
TOP OF STRUCTURE						
TOP OF PILE CAP						
50 YEAR FLOOD LEVEL	38.377	38.502	38.614	38.705	38.758	38.879
100 YEAR FLOOD LEVEL	38.671	38.759	38.831	38.891	38.931	39.051
D.F.L./M.E.F.L.	35.200	35.230	35.246	35.255	35.260	35.261
ORDINARY WATER LEVEL	35.191	35.211	35.211	35.211	35.211	35.211
LEFT BANK	34.621	34.621	34.621	34.621	34.621	34.621
DEEPEST RIVER BED	34.621	34.621	34.621	34.621	34.621	34.621
RIGHT BANK	35.921	35.921	35.921	35.921	35.921	35.921
GROUND ELEVATION	35.921	35.921	35.921	35.921	35.921	35.921

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI DOH, CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	SURVEYED	PREPARED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	PROFILE	 REMY BACAY ENGINEER	 JAMARICA A. MANDING ENGINEER II	 JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	 JOSECIUTO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	 JURY B. CORDON REGIONAL DIRECTOR		



BEGINNING OF PROJECT
BEGINNING OF REVETMENT AT LEFT BANK
STA.1+846.350
795641.378 N, 599529.072 E



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
RODEL B. BACAY
ENGINEER
REVIEWED
DANIEL M. BARIAGA
ENGINEER II, SECTION CHIEF

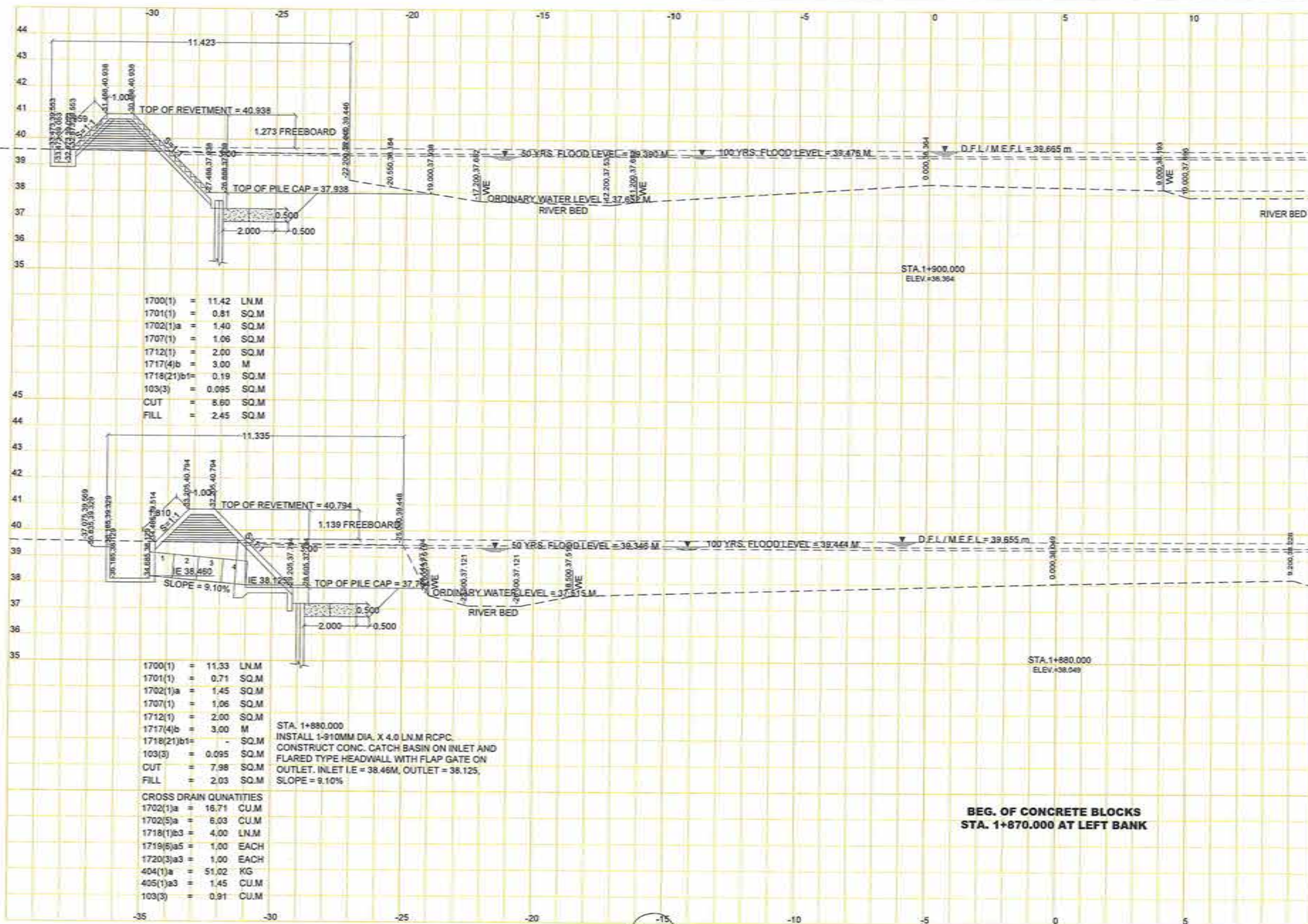
PREPARED
JAMAICA A. MANDING
ENGINEER II
REVIEWED
ALAN JOHN R. SOTTO
ENGINEER III, TECHNICAL STAFF

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JURY B. COSCON
REGIONAL DIRECTOR
DATE

SET NO.
E
01/06
SHEET NO.
22
27



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHAR RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
RUEL M. BACAY
ENGINEER
REVIEWED
DANILON M. MAGNAGA
ENGINEER IN CHIEF

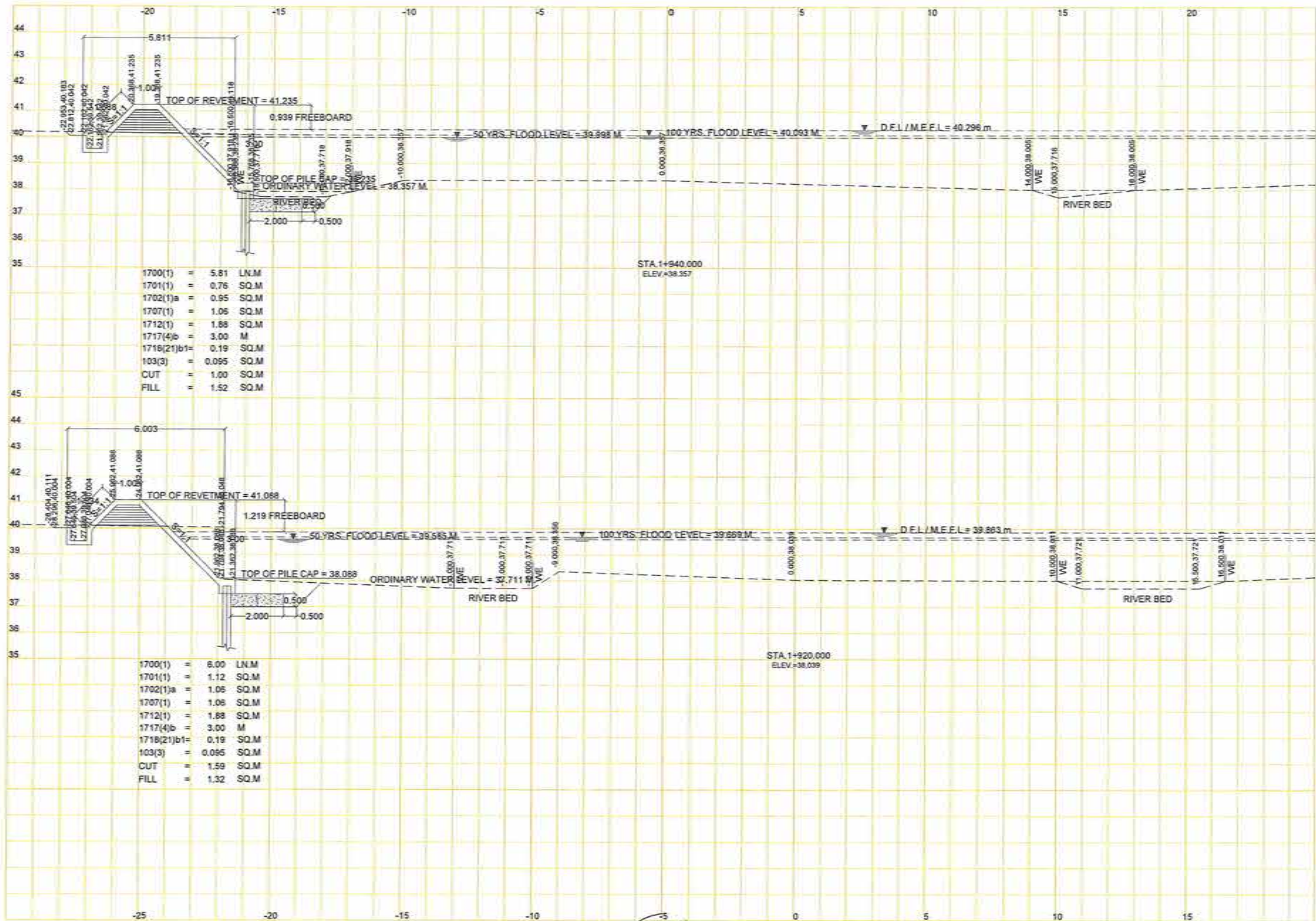
PREPARED
JAMICA A. MANDING
ENGINEER
REVIEWED
ALAN JOHN R. SORIO
ENGINEER IN CHIEF

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSELITO S. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JURY B. CORISON
REGIONAL DIRECTOR
DATE

SET NO.
E
02/06
SHEET NO.
23
27



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAUI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
RUEL M. MACAY
ENGINEER I
REVIEWED
DANICO M. PARRAGA
ENGINEER II, SECTION CHIEF

PREPARED
JAMICA A. MANDING
ENGINEER II
REVIEWED
ALAIN JOHN R. SOTOL
ENGINEER III, SECTION CHIEF

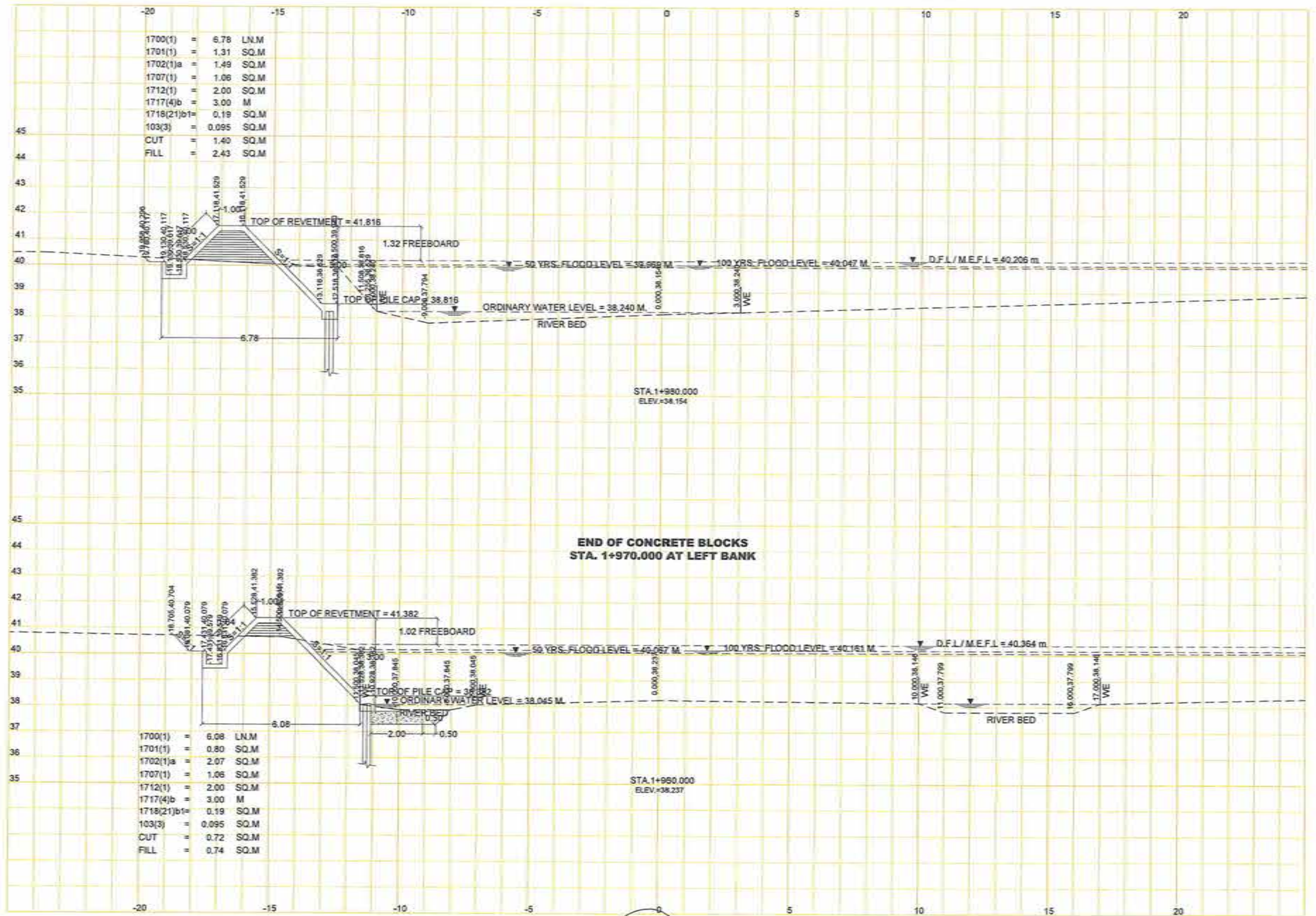
SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSELITO B. CARALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JURY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.
E
03/06

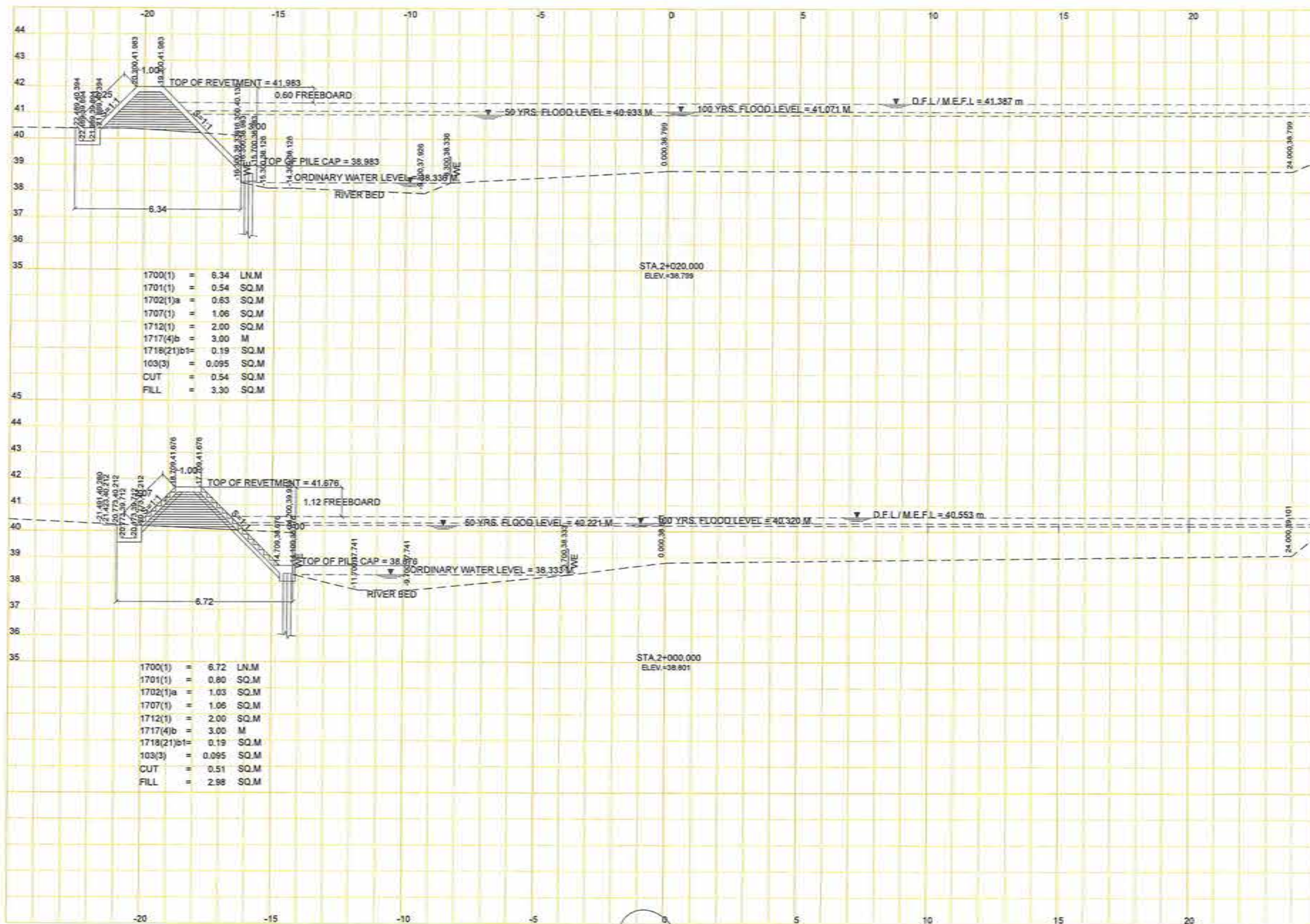
SHEET NO.
24
27



REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ DOR R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	SURVEYED:	PREPARED:	SUBMITTED:	RECOMMENDING APPROVAL:	APPROVED:	SET NO.	SHEET NO.
	CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER, BARANGKAY MAGNAGA, PANTUKAN, DAVAO DE ORO	CROSS SECTIONS	RUEL W. BACAY ENGINEER II DAVIDO M. CARRAGA ENGINEER II, SECTION CHIEF	JAMICA A. MANABOG ENGINEER II ALAN JOHN S. SOTTO ENGINEER II, SECTION CHIEF	JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	JOSELITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	JUDY B. CORDON REGIONAL DIRECTOR	E 04/06	25 27

DATE: Thursday, July 24, 2025

DI/FLOOD CONTROL PROJECTS/2025/7, LAHI RIVER, BRGY MAGNAGA, PANTUKAN, DDO (06-17-2025)PLW/CAQ/25-27, 1+968 - 2+086.DWG



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF FLOOD MITIGATION STRUCTURE
ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN,
DAVAO DE ORO

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
RUECH BACAY
ENGINEER II
REVIEWED
DANLO M. DARRAGA
ENGINEER III, SECTION CHIEF

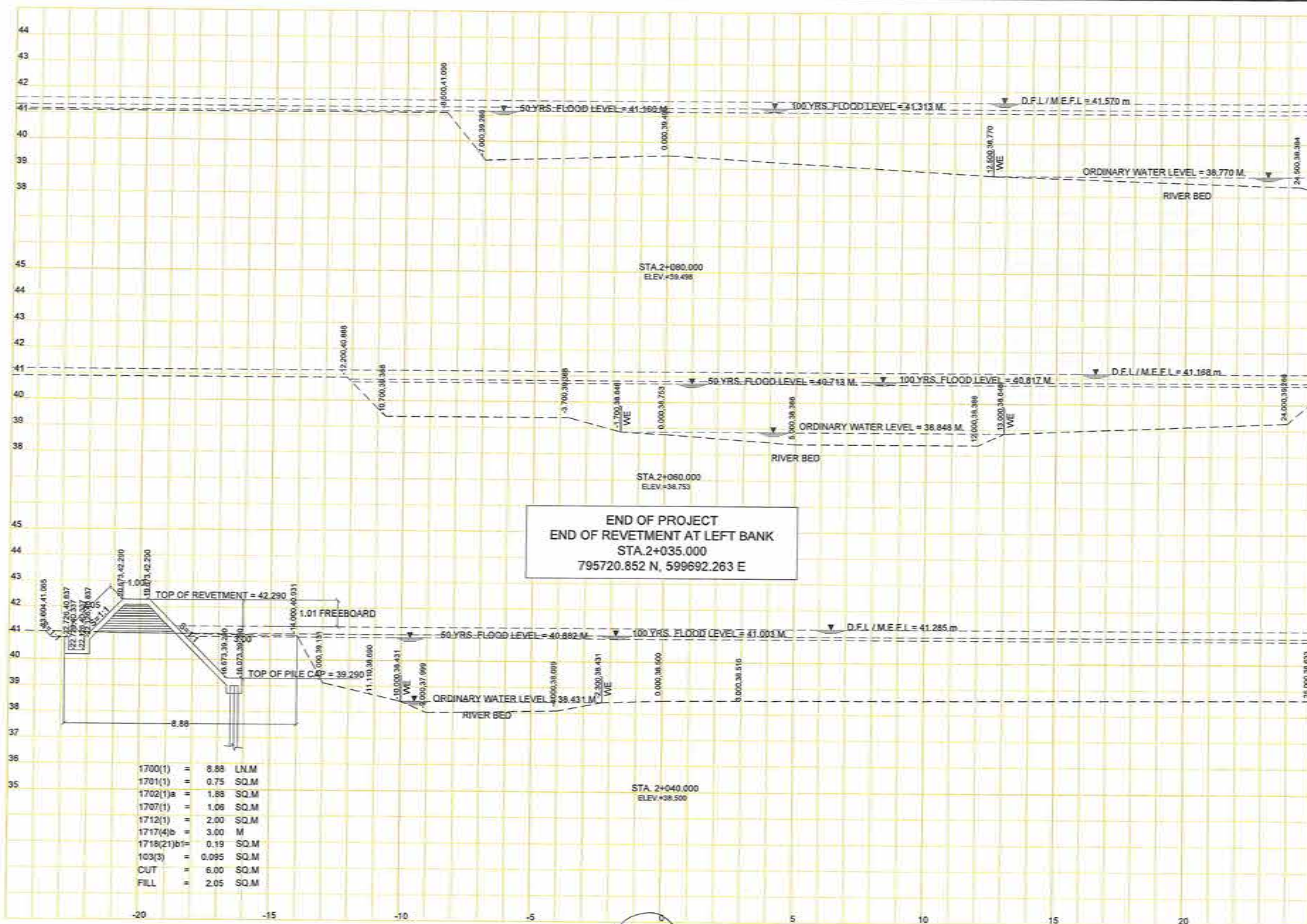
PREPARED
JAMICA A. MANDING
ENGINEER II
REVIEWED
ALAN JOHN R. SOTTIS
ENGINEER III, SECTION CHIEF

SUBMITTED
JUDY T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSE LITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JUBY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.
E
05/06
SHEET NO.
26
27



REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	SUBMITTER	PREPARED	REVIEWED	RECOMMENDING APPROVAL	APPROVED	NET NO.	SHEET NO.
	CONSTRUCTION OF FLOOD MITIGATION STRUCTURE ALONG LAHI RIVER, BARANGAY MAGNAGA, PANTUKAN, DAVAO DE ORO	CROSS SECTIONS	RUEL M. BACAY ENGINEER II	JAMAICA A. MANDING ENGINEER II	JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	JOSELITO S. CABALLERO ASSISTANT REGIONAL DIRECTOR	JURY B. CORDON REGIONAL DIRECTOR	E 06/06	27 27

DATE: _____

D:\FLOOD CONTROL\PROJECTS\2023\7. LAHI RIVER, BRGY MAGNAGA, PANTUKAN, DDO (06-17-2023)\PLAN\CAD25-27. 1+960 - 2+080.DWG