Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 : CIVIL WORKS AND TRANSMISSION LINE

PART 2 : ELECTRO-MECHANICAL EQUIPMENT

VOLUME 4

DRAWINGS

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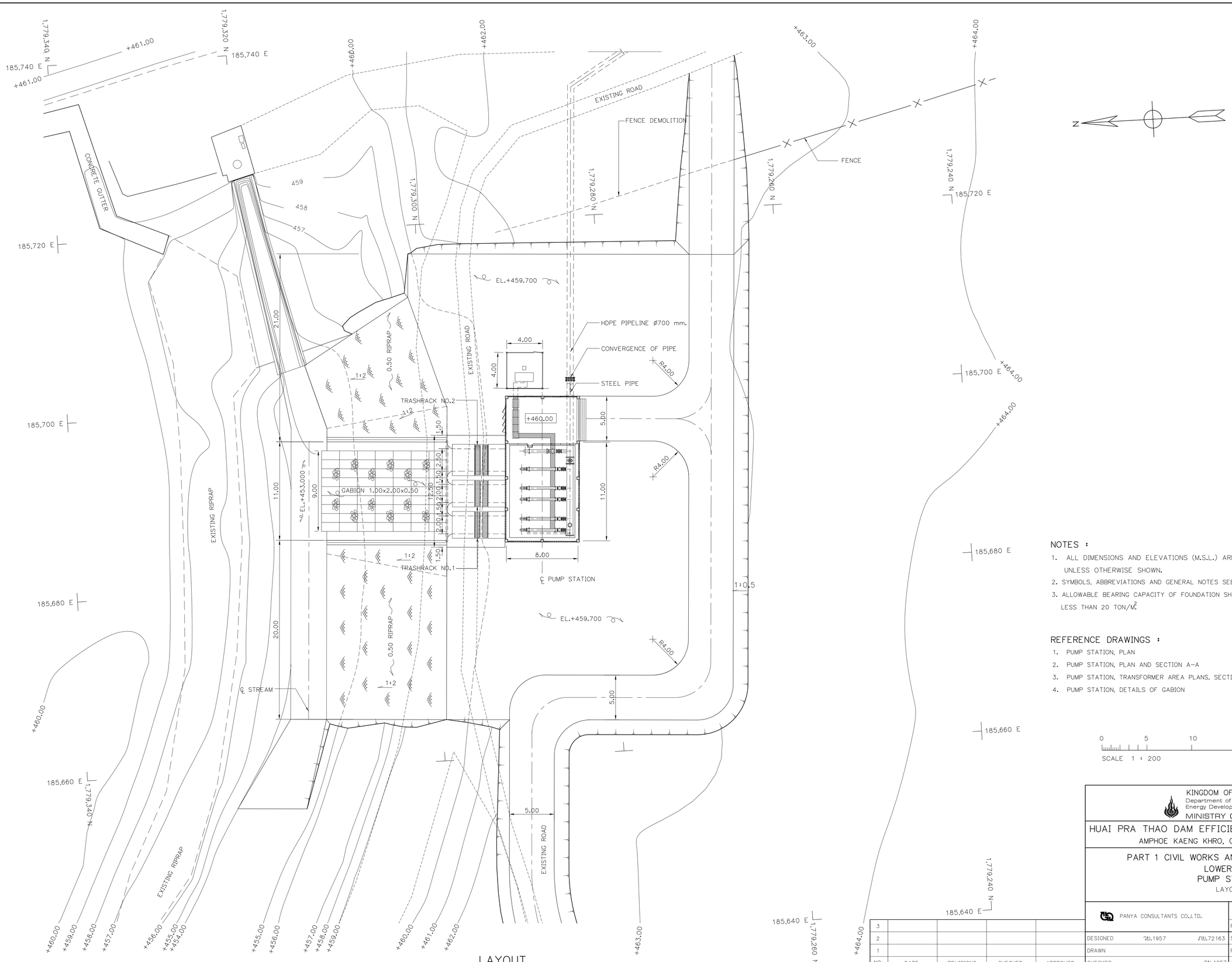
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

LIST OF DRAWINGS

SHEET NO.	DWG. NO.	DRAWING LISTS
PART 1 CIVIL WORKS AND TRANSMISSION LINE		
		LOWER DAM
		PUMP STATION
61	HEE-PT-L01	LAYOUT
62	HEE-PT-L02	PLAN
63	HEE-PT-L03	PLAN AND SECTION A-A
64	HEE-PT-L04	SECTION B-B
65	HEE-PT-L05	SECTION C-C
66	HEE-PT-L06	SECTION D-D
67	HEE-PT-L07	KEY PLAN AND REINFORCEMENT DETAILS (SHEET 1/2)
68	HEE-PT-L08	REINFORCEMENT DETAILS (SHEET 2/2)
69	HEE-PT-L09	ELEVATIONS
70	HEE-PT-L10	DETAILS OF DOOR AND WINDOWS
71	HEE-PT-L11	GROUND FLOOR PLAN AND ROOF PLAN
72	HEE-PT-L12	SLAB, BEAM, COLUMN AND FOOTING REINFORCEMENT DETAILS
73	HEE-PT-L13	TRUSS SECTIONS AND DETAILS
74	HEE-PT-L14	STEEL LADDER AND HANDRAIL DETAILS
75	HEE-PT-L15	TRASHRACK NO.1 DETAILS
76	HEE-PT-L16	TRASHRACK NO.2 DETAILS
77	HEE-PT-L17	TRANSFORMER AREA PLANS, SECTIONS AND DETAILS
78	HEE-PT-L18	DETAILS OF GABION
		PUMP PIPELINE
79	HEE-PP-L01	PLAN AND PROFILE, KM. 0+000 TO KM. 0+451.751
80	HEE-PP-L02	DATA CURVE AND INSTALLATION DATA
81	HEE-PP-L03	TYPICAL SECTION AND CONVERGENCE OF PUMP PIPELINE
		TAILRACE
82	HEE-TR-L01	LAYOUT
83	HEE-TR-L02	PLAN AND SECTIONS
84	HEE-TR-L03	REINFORCEMENT DETAIL
		FLAP GATE
85	HEE-FG-L01	LAYOUT
86	HEE-FG-L02	GENERAL PLAN AND SECTION
87	HEE-FG-L03	PLAN, SECTION AND DETAIL
88	HEE-FG-L04	PLAN, SECTION OF CONTROL HOUSE AND REINFORCEMENT DETAIL
89	HEE-FG-L05	SLAB, BEAM, COLUMN AND FOOTING REINFORCEMENT OF CONTROL HOUSE
		DAM CREST ROAD
90	HEE-DR-L01	GENERAL PLAN
91	HEE-DR-L02	LONGITUDINAL PROFILE
92	HEE-DR-L03	TYPICAL CROSS SECTION
		RIVER OUTLET
93	HEE-RO-L01	PLAN, PROFILE AND GENERAL SECTION
		TRANSMISSION LINE
94	HEE-TS-L01	LAYOUT OF PUMP STATION
95	HEE-TS-L02	LAYOUT OF FLAP GATE
96	HEE-TS-L03	POLE TYPE "A" AND "B"
97	HEE-TS-L04	POLE TYPE "C" AND "D"
98	HEE-TS-L05	POLE TYPE "E" AND "F"
99	HEE-TS-L06	TYPE OF ANCHOR GUY

SHEET NO.	DWG. NO.	DRAWING LISTS
PART 2 ELECTRO-MECHANICAL EQUIPMENT		
		LOWER DAM
		PUMP STATION
100	HEE-EM-L01	SINGLE LINE DIAGRAM
101	HEE-EM-L02	LIGHTING AND POWER ELECTRICAL PLAN
102	HEE-EM-L03	TYPICAL DETAIL FOR TRANSFORMER INSTALLATION
		FLAP GATE AND RIVER OUTLET
103	HEE-EM-L04	MAIN INCOMING FOR FLAP GATE & VALVE
104	HEE-EM-L05	SINGLE LINE DIAGRAM (SHEET 1/2)
105	HEE-EM-L06	SINGLE LINE DIAGRAM (SHEET 2/2)
106	HEE-EM-L07	LIGHTING AND POWER ELECTRICAL IN RIVER OUTLET 1&2 AND CONTROL HOUSE
107	HEE-EM-L08	LOAD SCHEDULE
108	HEE-EM-L09	TYPICAL DETAIL FOR TRANSFORMER INSTALLATION

LOWER DAM



LAYOUT
SCALE 1:200

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M^2.

REFERENCE DRAWINGS :

1.	PUMP STATION, PLAN	HEE-PT-L02
2.	PUMP STATION, PLAN AND SECTION A-A	HEE-PT-L03
3.	PUMP STATION, TRANSFORMER AREA PLANS, SECTIONS AND DETAILS	HEE-PT-L17
4.	PUMP STATION, DETAILS OF GABION	HEE-PT-L18

0 5 10 15 20
SCALE 1 : 200 M.

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AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
LAYOUT

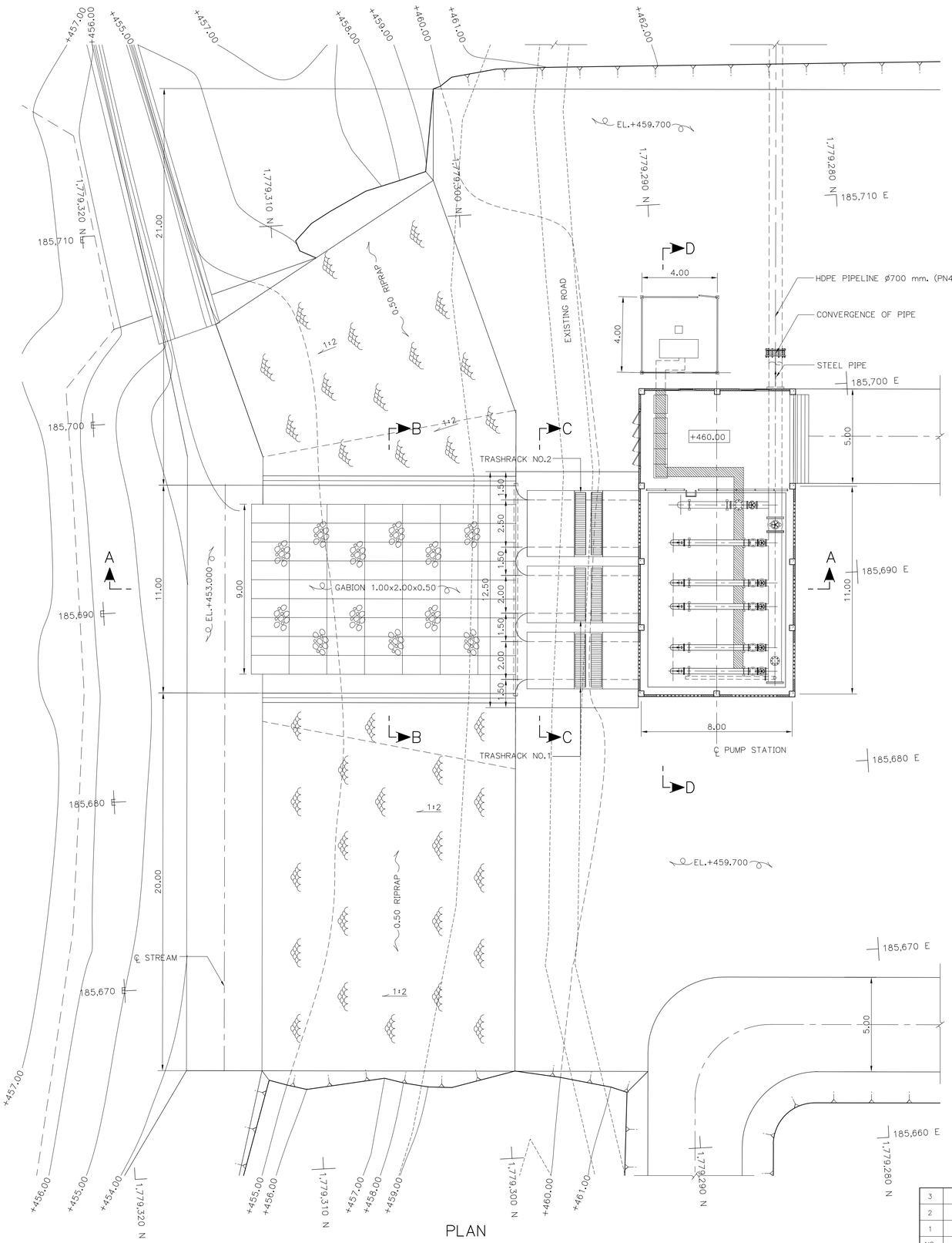
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DESIGNED	วบ.1957	วบ.72163	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	วบ.1957		APPROVED
PROJECT MANAGER	10/08/2021 DATE	DRAWING NO. HEE-PT-L01	SHEET NO. 61 OF 108

REVIEWED



PLAN

SCALE 1:125

N

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M^2.

REFERENCE DRAWINGS :

1.	PUMP STATION, LAYOUT	HEE-PT-L01
2.	PUMP STATION, PLAN AND SECTION A-A	HEE-PT-L03
3.	PUMP STATION, SECTION B-B	HEE-PT-L04
4.	PUMP STATION, SECTION C-C	HEE-PT-L05
5.	PUMP STATION, SECTION D-D	HEE-PT-L06
6.	PUMP STATION, KEY PLAN AND REINFORCEMENT DETAILS (SHEET 1/2)	HEE-PT-L07
7.	PUMP STATION, TRANSFORMER AREA PLANS, SECTIONS AND DETAILS	HEE-PT-L17
8.	PUMP STATION, DETAILS OF GABION	HEE-PT-L18

0 1 2 3 4 5 6 7 8 9 10

SCALE 1 : 125 M.

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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
PLAN

NO.	DATE	REVISIONS	CHECKED	APPROVED
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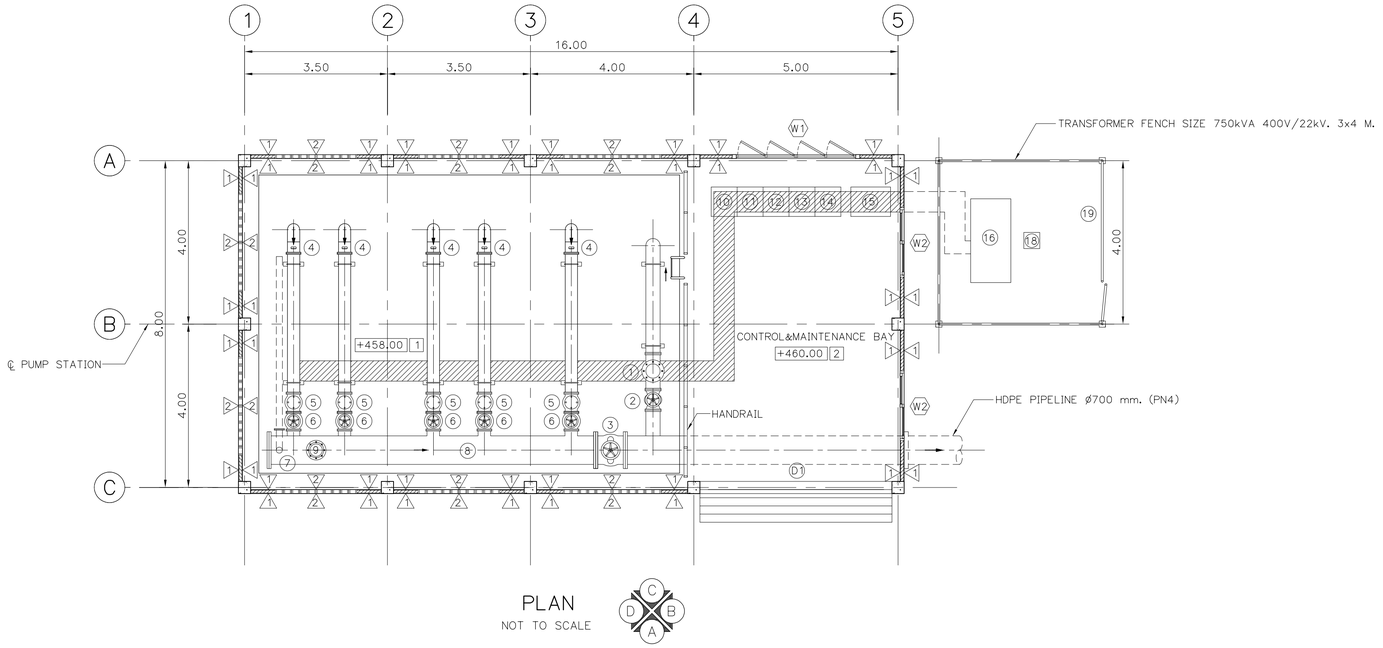
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DRAWN			SUBMITTED
CHECKED	วบ.1957		RECOMMENDED
PROJECT MANAGER		10/08/2021 DATE	APPROVED

DRAWING NO. HEE-PT-L02

SHEET NO. 62 OF 108



PLAN
NOT TO SCALE

NO.	DESCRIPTION
1	ANTI SURGE VALVE
2	GATE VALVE Ø350 mm. SHORT FACE TO FACE
3	GATE VALVE Ø700 mm. SHORT FACE TO FACE
4	PRESSURE GAUGE
5	NON RETURN VALVE SHORT FACE TO FACE
6	GATE VALVE
7	DRAIN VALVE Ø150 mm.
8	PIPELINE HEADER Ø700 mm.
9	AIR VALVE
10	CONTROL PUMP CUBICLE No.1
11	CONTROL PUMP CUBICLE No.2
12	CONTROL PUMP CUBICLE No.3
13	CONTROL PUMP CUBICLE No.4
14	CONTROL PUMP CUBICLE No.5 STAND BY
15	AC STATION 400V Ø3
16	TRANSFORMER 750kVA. 3Ø 400V/22kV.
17	TRAVELLING CRANE CAPACITY 5 TONS
18	ELECTRIC POLE 22 kV.
19	TRANSFORMER FENCE

FLOOR FINISH SYMBOLS :

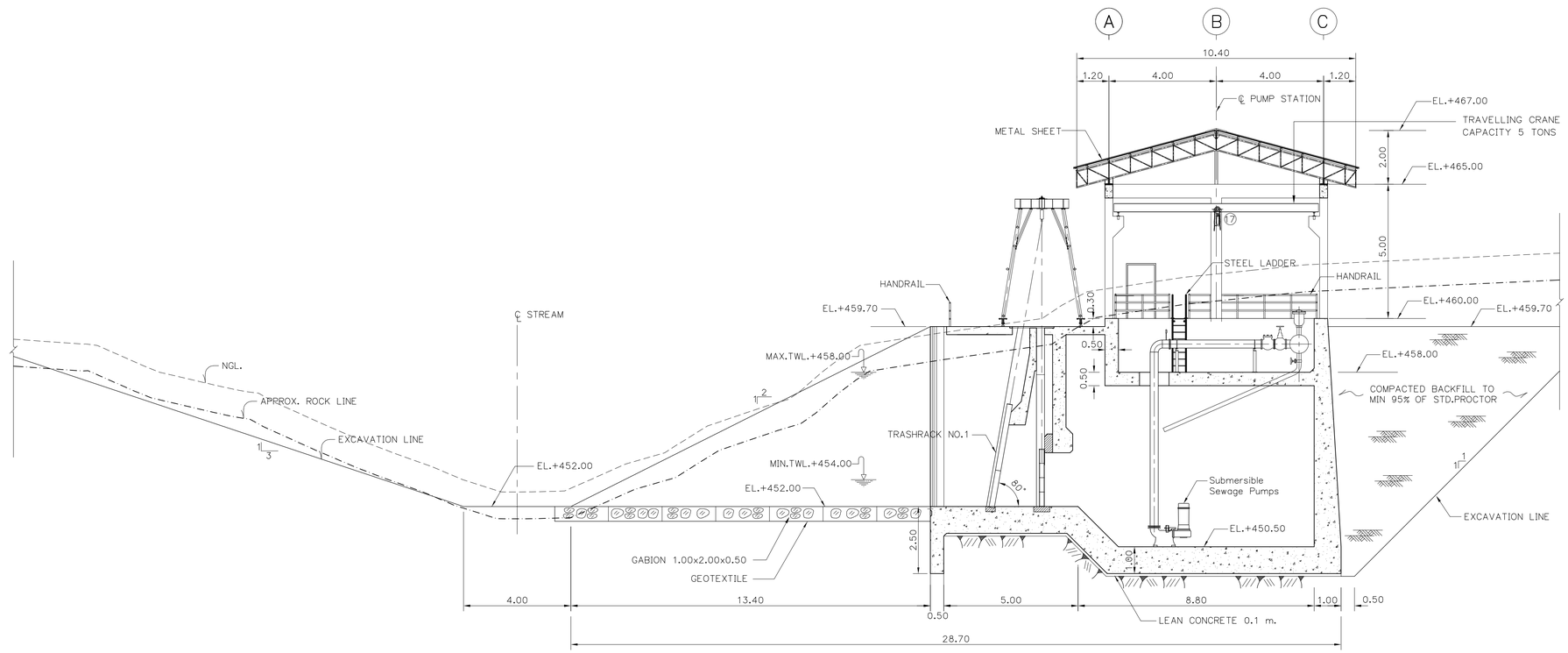
[1] COARSE FINISHED

[2] COATED WITH EPOXY RESIN

WALL FINISH SYMBOLS :

△1 CEMENT PLASTER

△2 GLASS BOX DIMENSIONS 19x19x9 cm.
(VERTICAL:4 BLOCKS , HORIZONTAL:17 BLOCKS)



SECTION A–A
NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M^2.

REFERENCE DRAWINGS :

1.	PUMP STATION, LAYOUT	HEE-PT-L01
2.	PUMP STATION, PLAN	HEE-PT-L02
3.	PUMP STATION, ELEVATIONS	HEE-PT-L09
4.	PUMP STATION, DETAILS OF DOOR AND WINDOWS	HEE-PT-L10
5.	PUMP STATION, GROUND FLOOR PLAN AND ROOF PLAN	HEE-PT-L11
6.	PUMP STATION, TRUSS SECTIONS AND DETAILS	HEE-PT-L13
7.	PUMP STATION, STEEL LADDER AND HANDRAIL DETAILS	HEE-PT-L14
8.	PUMP STATION, TRASHRACK NO.1 DETAILS	HEE-PT-L15
9.	PUMP STATION, DETAILS OF GABION	HEE-PT-L18

NO.	DATE	REVISIONS	CHECKED	APPROVED
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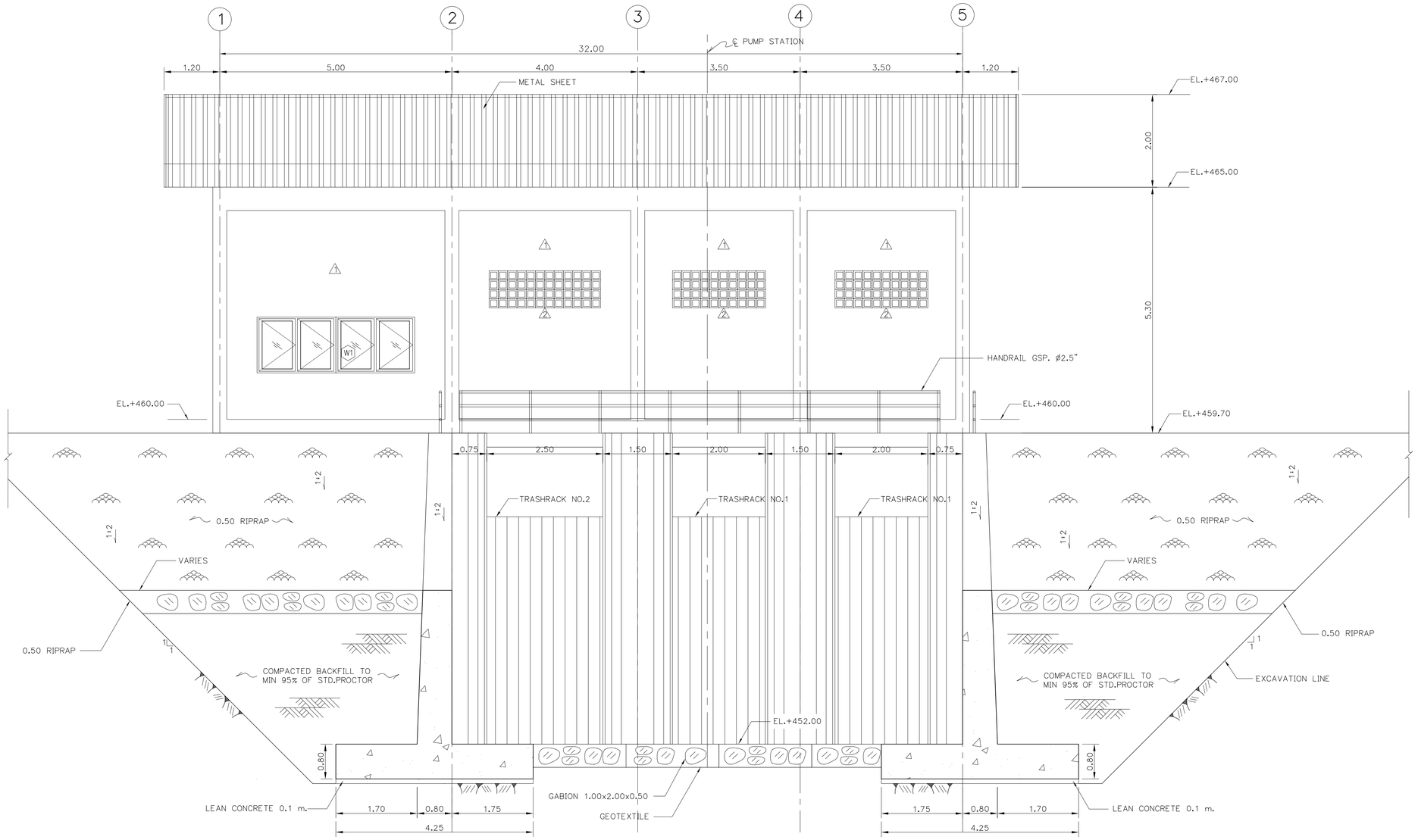
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
PLAN AND SECTION A–A

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10/08/2021 PROJECT MANAGER / DATE		DRAWING NO.	SHEET NO.
		HEE-PT-L03	63 OF 108



SECTION B-B

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1.	PUMP STATION, PLAN	HEE-PT-L02
2.	PUMP STATION, DETAILS OF DOOR AND WINDOWS	HEE-PT-L10
3.	PUMP STATION, STEEL LADDER AND HANDRAIL DETAILS	HEE-PT-L14
4.	PUMP STATION, DETAILS OF GABION	HEE-PT-L18

NO.	DATE	REVISIONS	CHECKED	APPROVED
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
SECTION B-B

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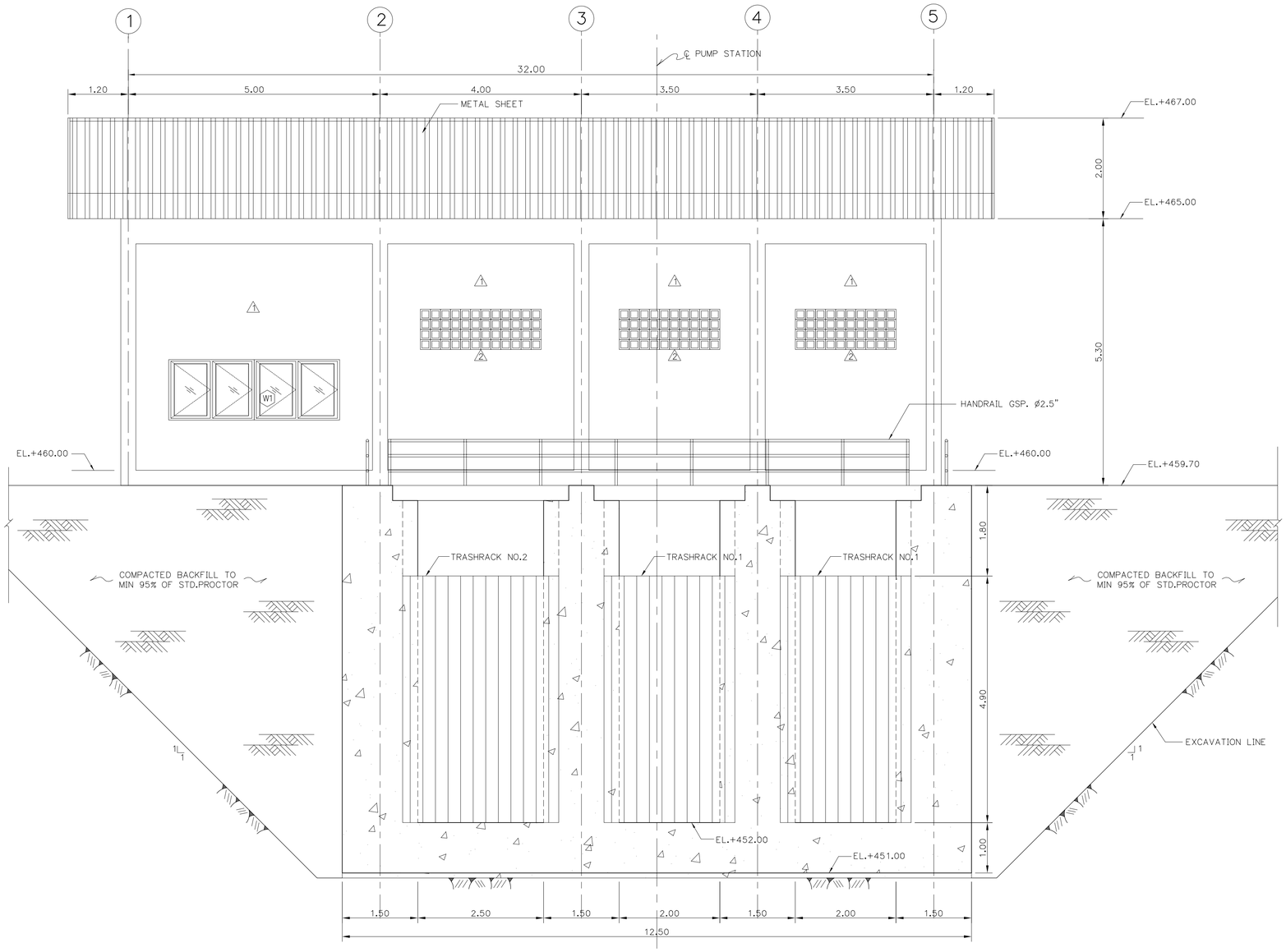
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DRAWN			RECOMMENDED
CHECKED	พ.ย.1957		APPROVED

PROJECT MANAGER — DATE 10/08/2021

DRAWING NO. HEE-PT-L04

SHEET NO. 64 OF 108



SECTION C–C

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M^2.

REFERENCE DRAWINGS :

1.	PUMP STATION, PLAN	HEE-PT-L02
2.	PUMP STATION, DETAILS OF DOOR AND WINDOWS	HEE-PT-L10
3.	PUMP STATION, STEEL LADDER AND HANDRAIL DETAILS	HEE-PT-L14

NO.	DATE	REVISIONS	CHECKED	APPROVED
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MINISTRY OF ENERGY

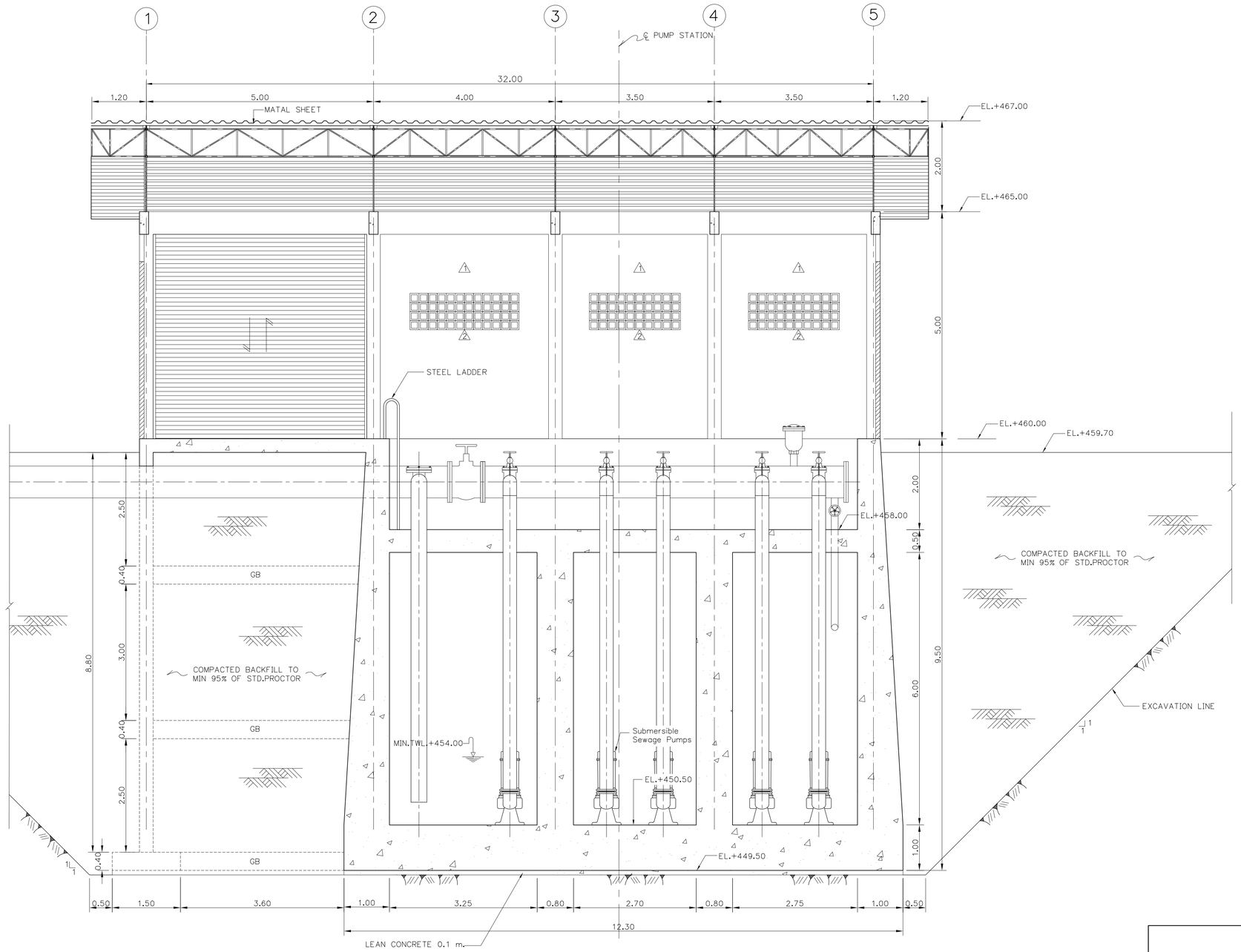
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
SECTION C–C

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PROJECT MANAGER — DATE 10/08/2021	DRAWING NO. HEE-PT-L05
	SHEET NO. 65 OF 108



SECTION D–D

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M^2.

REFERENCE DRAWINGS :

1.	PUMP STATION, PLAN	HEE-PT-L02
2.	PUMP STATION, DETAILS OF DOOR AND WINDOWS	HEE-PT-L10
3.	PUMP STATION, STEEL LADDER AND HANDRAIL DETAILS	HEE-PT-L14

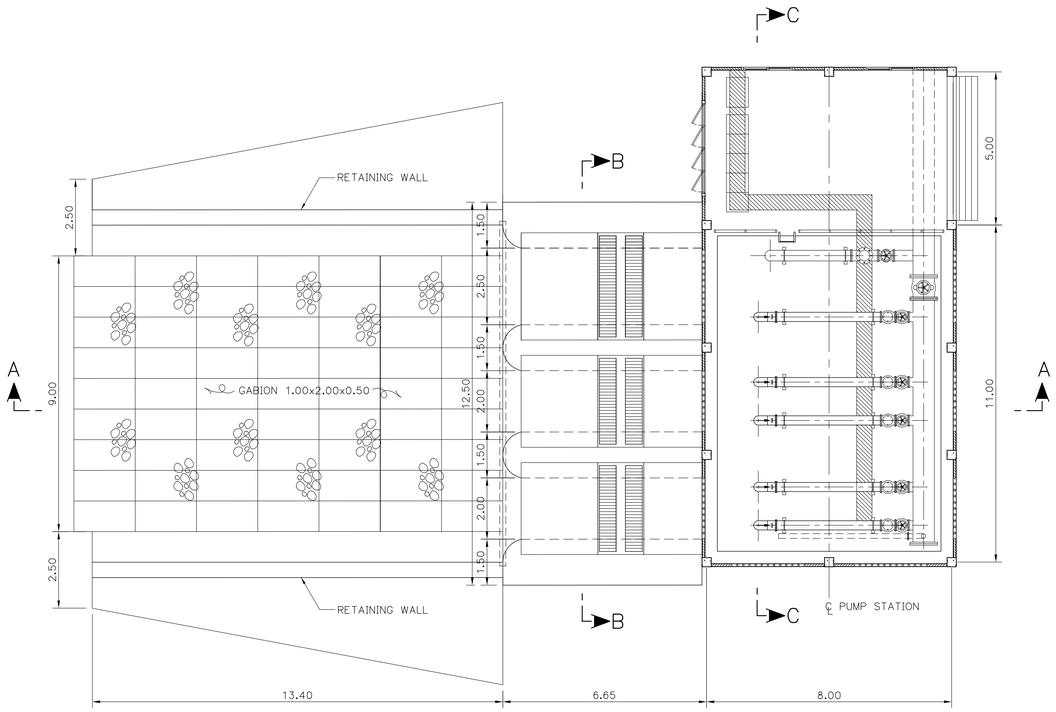
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

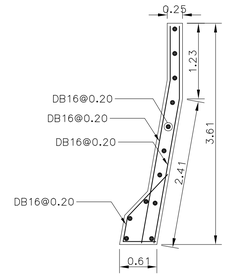
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
SECTION D–D

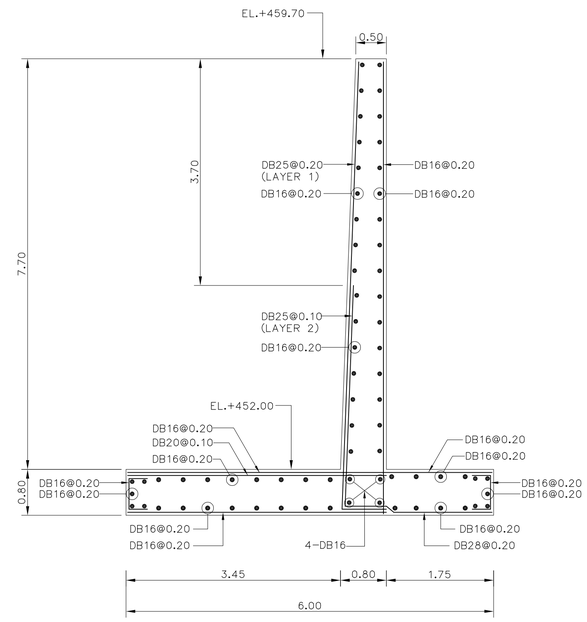
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PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-PT-L06
	SHEET NO. 66 OF 108



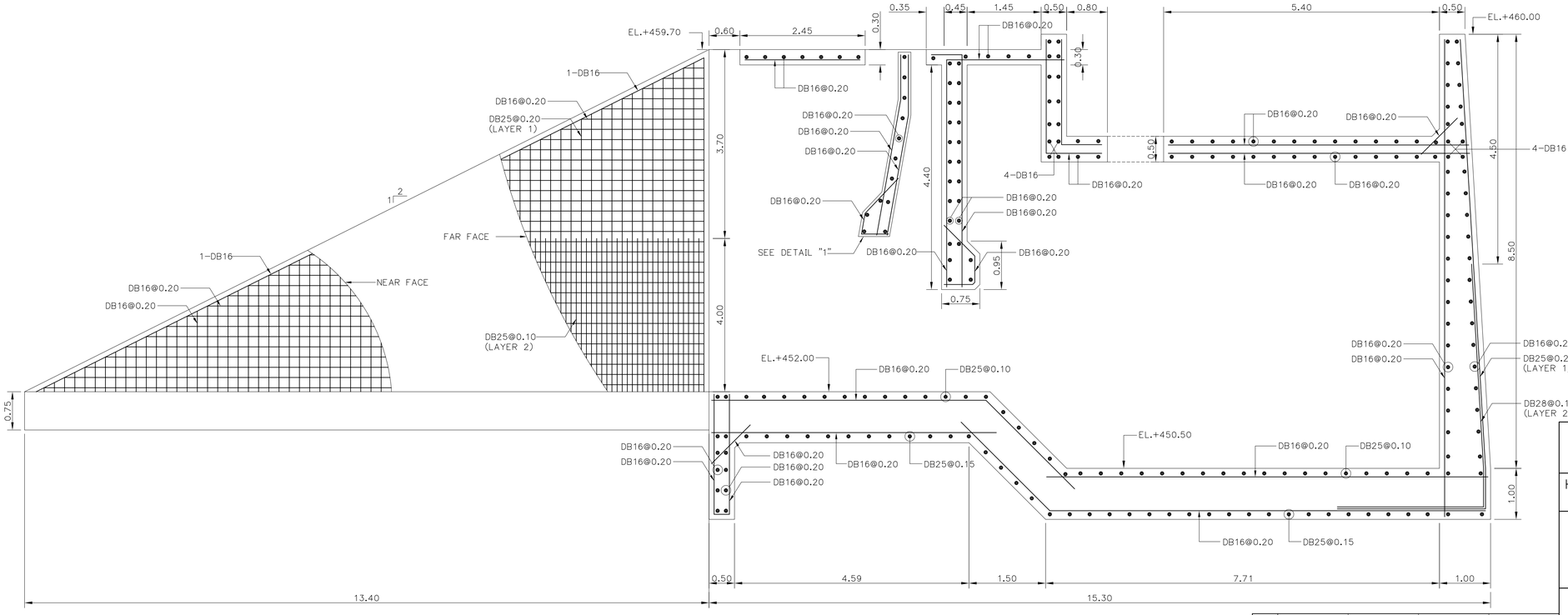
KEY PLAN
NOT TO SCALE



DETAIL "1"
NOT TO SCALE



RETAINING WALL
NOT TO SCALE



SECTION A–A
NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1. PUMP STATION, PLAN — HEE-PT-L02
2. PUMP STATION, REINFORCEMENT DETAILS (SHEET 2/2) — HEE-PT-L08

NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

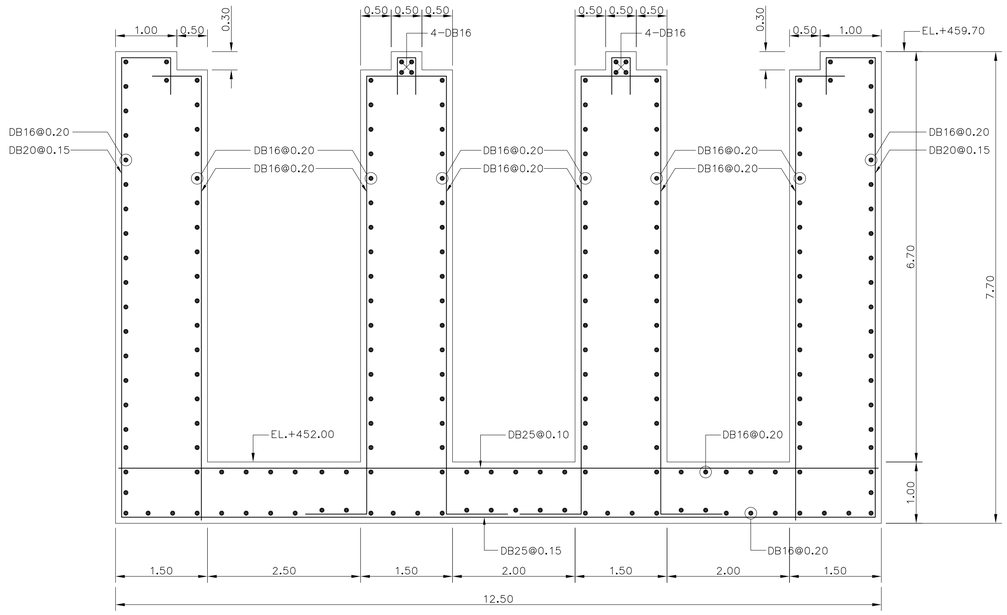
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION

KEY PLAN AND REINFORCEMENT DETAILS (SHEET 1/2)

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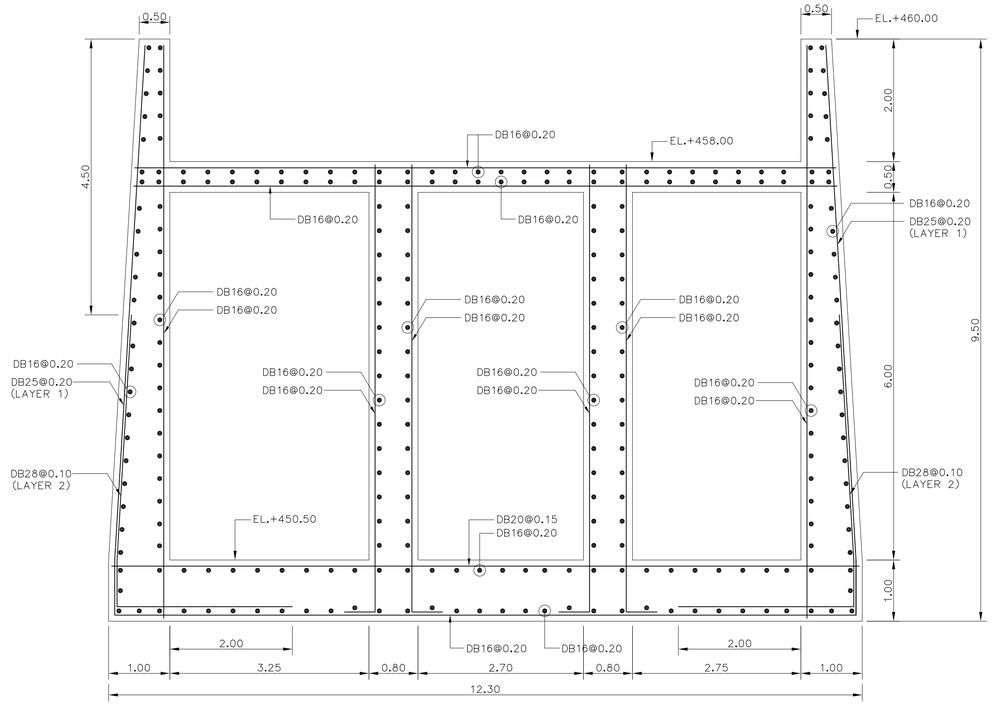
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MINISTRY OF ENERGY

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DRAWN		RECOMMENDED	
CHECKED		APPROVED	พ.ย.1957
PROJECT MANAGER	10/08/2021 DATE	DRAWING NO.	HEE-PT-L07
		SHEET NO.	67 OF 108



SECTION B-B

NOT TO SCALE



SECTION C-C

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 20 TON/M^2.

REFERENCE DRAWINGS :

1. PUMP STATION, KEY PLAN AND REINFORCEMENT DETAILS (SHEET 1/2) HEE-PT-L07

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

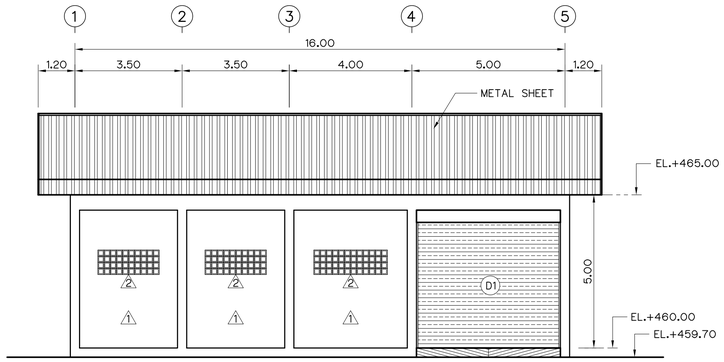
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
REINFORCEMENT DETAILS (SHEET 2/2)

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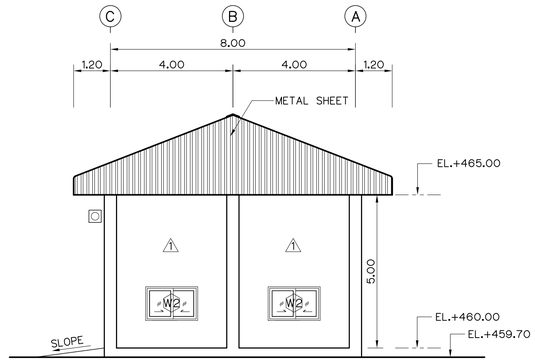
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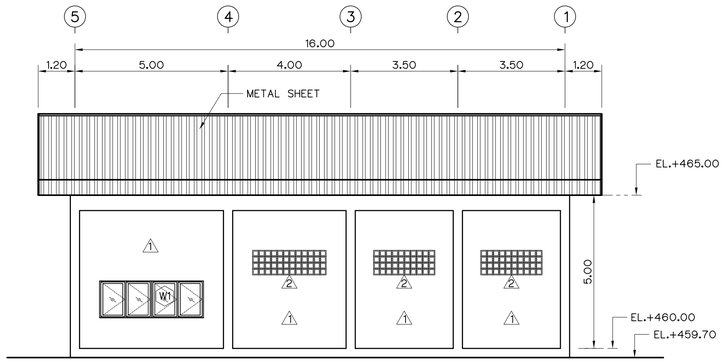
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DESIGNED วบ.1957	วบ.72163	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วบ.1957	APPROVED	
PROJECT MANAGER	10/08/2021 DATE	DRAWING NO. HEE-PT-L08	SHEET NO. 68 OF 108



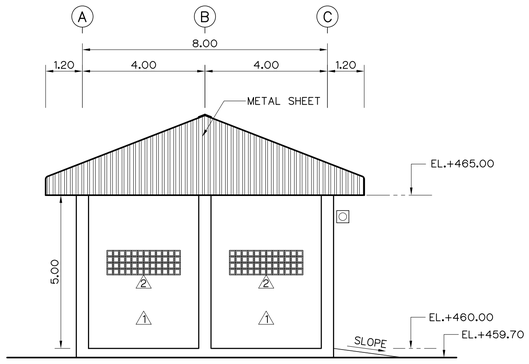
ELEVATION "A"
SCALE 1:100



ELEVATION "B"
SCALE 1:100



ELEVATION "C"
SCALE 1:100



ELEVATION "D"
SCALE 1:100

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.

REFERENCE DRAWINGS :

1. PUMP STATION, PLAN AND SECTION A-A HEE-PT-L03

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
ELEVATIONS

PANYA CONSULTANTS CO.,LTD.

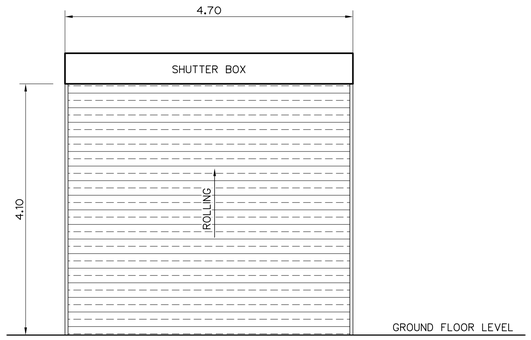
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิ.1957	ภิ.72163	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิ.1957		RECOMMENDED
			APPROVED

10/08/2021
PROJECT MANAGER DATE

DRAWING NO. HEE-PT-L09

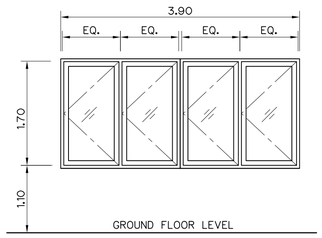
SHEET NO. 69 OF 108



D1

ROLLING SHUTTER

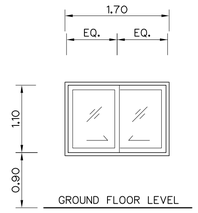
SCALE 1:50



W1

OPENNING WINDOW

SCALE 1:50



W2

SLIDING WINDOW

SCALE 1:50

SYMBOL	DESCRIPTIONS	SIZE		FRAME	RAIL & STILE	PANEL	HINGE	LOCKSET	HANDLE	REMARKS
		WIDTH	HEIGHT							
D1	ROLLER SHUTTER DOOR (STEEL 1.2 mm. THK.)	4.70	4.10	GALVANIZED STEEL	—	—	—	NORMAL KEY	—	MOTOR OPERATING
W1	OPENNING WINDOW	3.90	1.70	ALUMINIUM 1.5 mm.thk.	GALVANIZED STEEL	GLASS 6 mm.thk.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
W2	SLIDING WINDOW	1.70	1.10	ALUMINIUM 1.5 mm.thk.	—	GLASS 6 mm.thk.	—	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
●	SHALL BE USED SPACIFIED ACCESSORIES									

0 0.5 1.0 2.0 3.0 4.0

SCALE 1:50 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.

REFERENCE DRAWINGS :

1.	PUMP STATION, PLAN AND SECTION A-A	HEE-PT-L03
2.	PUMP STATION, SECTION B-B	HEE-PT-L04
3.	PUMP STATION, SECTION C-C	HEE-PT-L05
4.	PUMP STATION, SECTION D-D	HEE-PT-L06

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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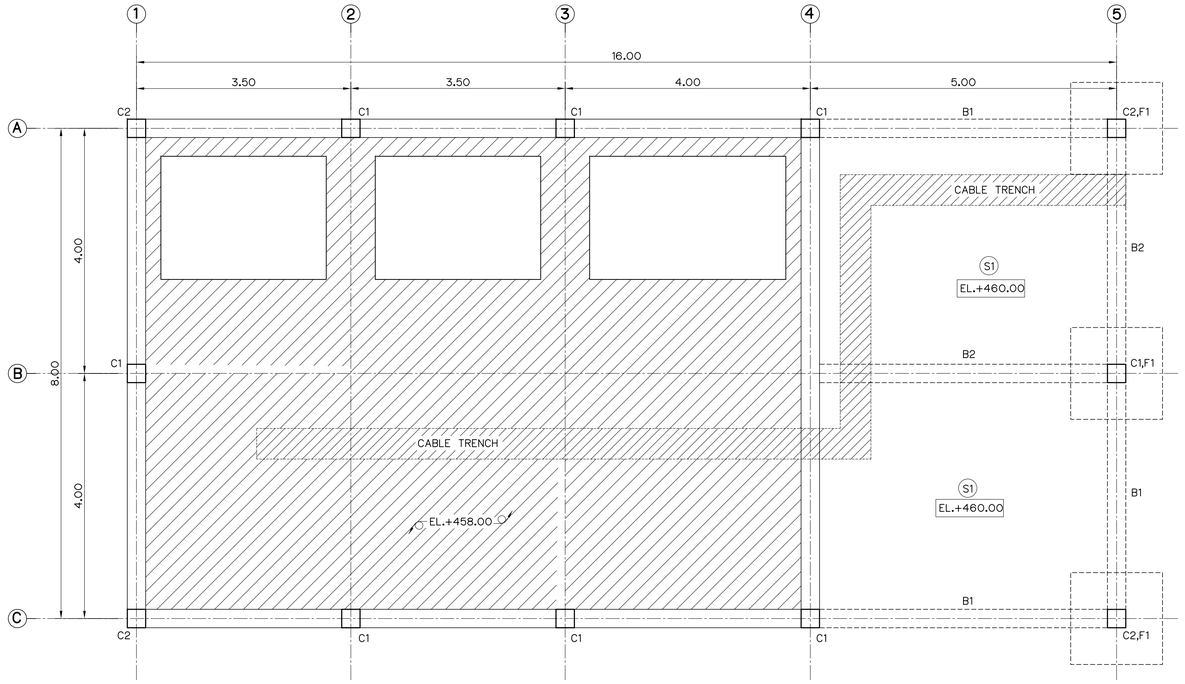
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
DETAILS OF DOOR AND WINDOWS

PANYA CONSULTANTS CO.,LTD.

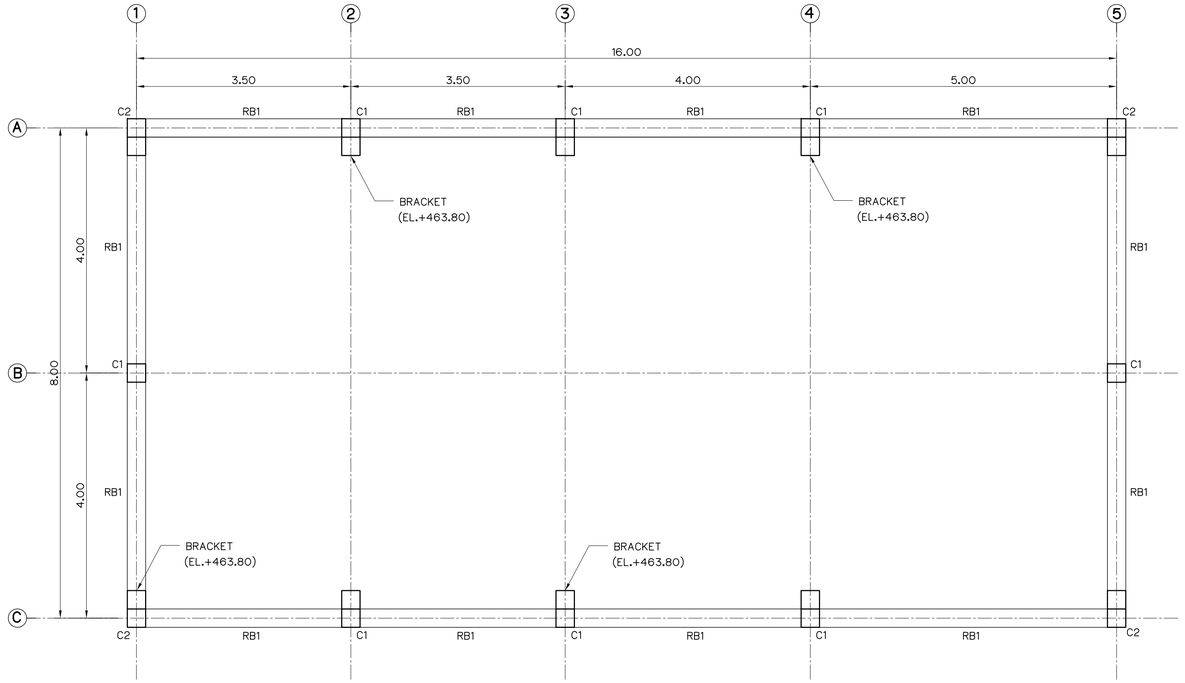
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

	REVIEWED
DESIGNED วิ.1957 / วิ.72163	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.1957	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-PT-L10
	SHEET NO. 70 OF 108



GROUND FLOOR PLAN

SCALE 1:50



ROOF PLAN

SCALE 1:50

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.

REFERENCE DRAWINGS :

1. PUMP STATION, PLAN AND SECTION A-A	HEE-PT-L03
2. PUMP STATION, SLAB, BEAM, COLUMN AND FOOTING REINFORCEMENT DETAILS	HEE-PT-L12

0 1 2 3 4 5

SCALE 1 : 50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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2				
1				
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

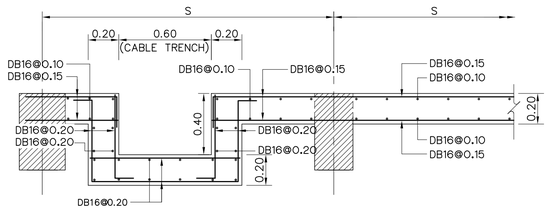
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION

GROUND FLOOR PLAN AND ROOF PLAN

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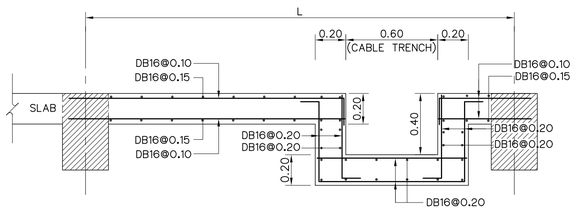
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

		REVIEWED	
DESIGNED	วย.1957	SUBMITTED	ภย.72163
DRAWN		RECOMMENDED	
CHECKED	วย.1957	APPROVED	
PROJECT MANAGER	10/08/2021 DATE	DRAWING NO.	HEE-PT-L11
		SHEET NO.	71 OF 108



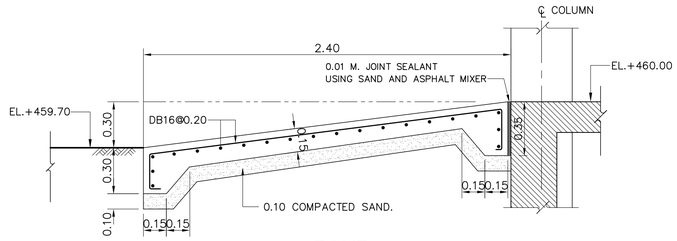
SLAB S1 (SHORT)

SCALE 1:20



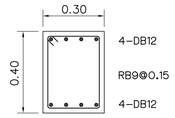
SLAB S1 (LONG)

SCALE 1:20



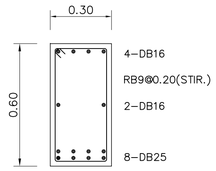
RAMP

SCALE 1:20



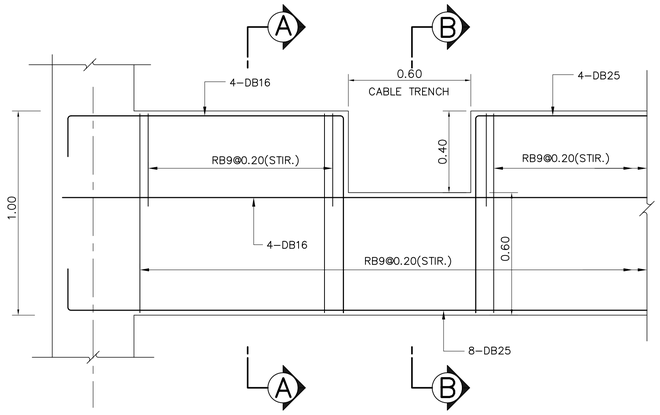
BEAM GB

SCALE 1:15



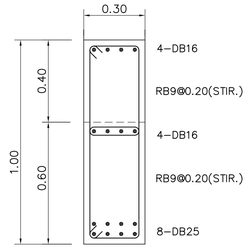
BEAM B1

SCALE 1:15



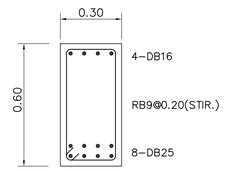
BEAM B2

SCALE 1:15



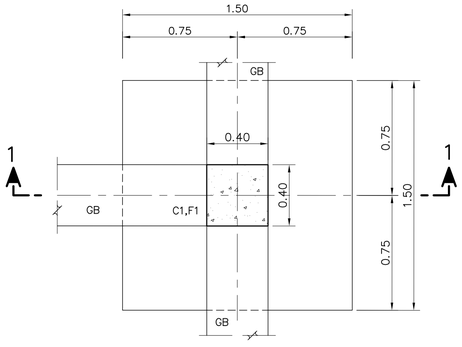
SECTION A–A

SCALE 1:15



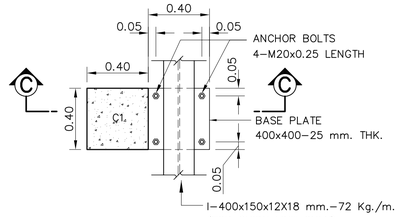
SECTION B–B

SCALE 1:15



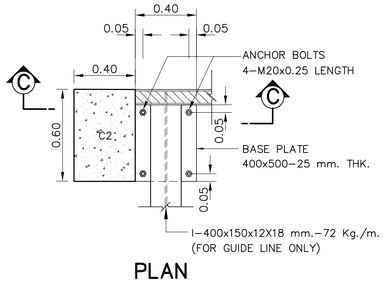
FOOTING (F1)

SCALE 1:20



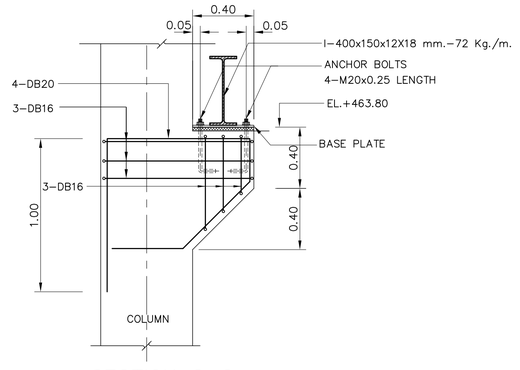
PLAN

SCALE 1:20



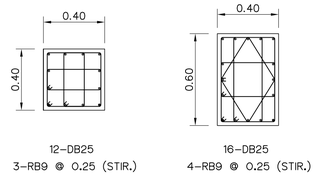
PLAN

SCALE 1:20



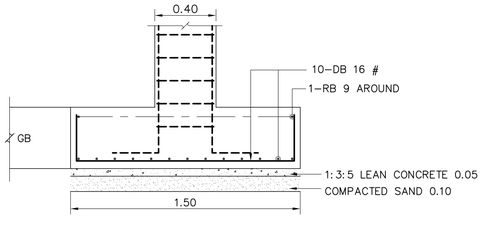
SECTION C–C

SCALE 1:20



C1

C2



SECTION 1–1

SCALE 1:20

0 0.5 1.0 1.5

SCALE 1:15 METERS

0 0.5 1.0 1.5

SCALE 1:20 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METERS, REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. BACK FILL UNDER CONCRETE STRUCTURE SHELL BE COMPACTED TO MIN 95% S.P.C.T.
4. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO DEDE FOR APPROVAL.

REFERENCE DRAWINGS :

1. PUMP STATION, GROUND FLOOR PLAN AND ROOF PLAN HEE-PT-L11

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
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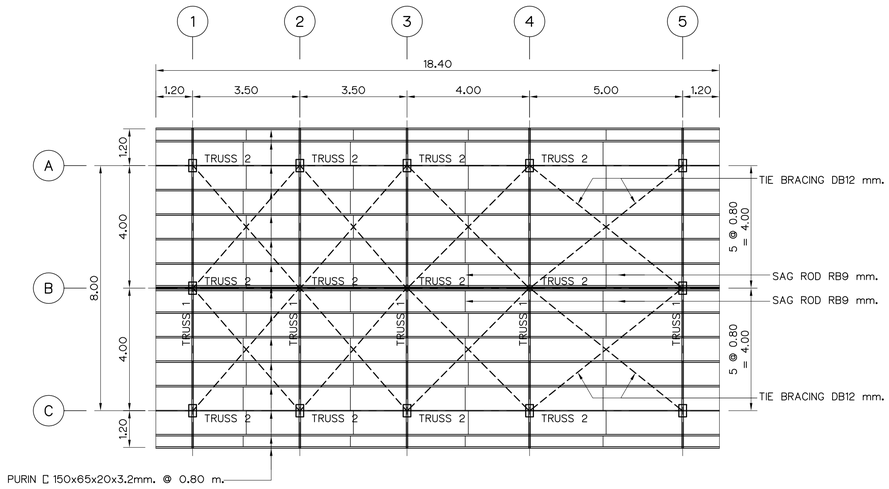
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION

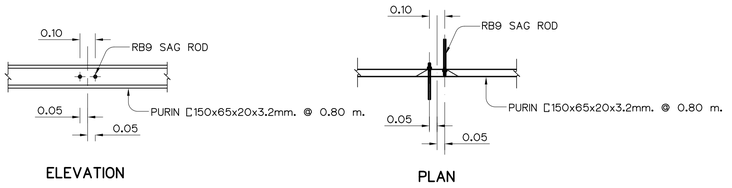
SLAB, BEAM, COLUMN AND FOOTING REINFORCEMENT DETAILS

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DRAWN	SUBMITTED
CHECKED วิ.1957	RECOMMENDED
10/08/2021	APPROVED
PROJECT MANAGER / DATE	DRAWING NO. HEE-PT-L12 / SHEET NO. 72 OF 108



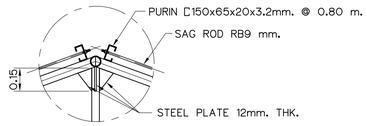
ROOF STRUCTURE PLAN

SCALE 1:100



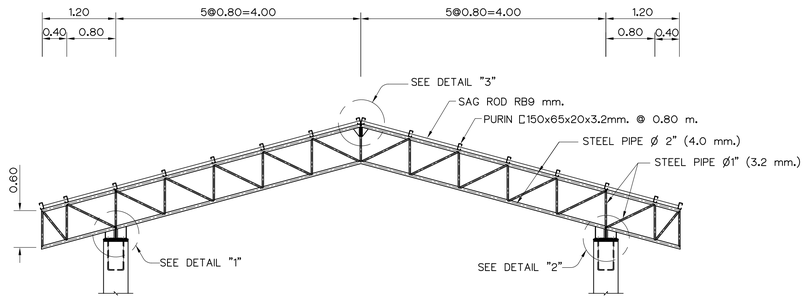
SAG ROD DETAILS

SCALE 1:20



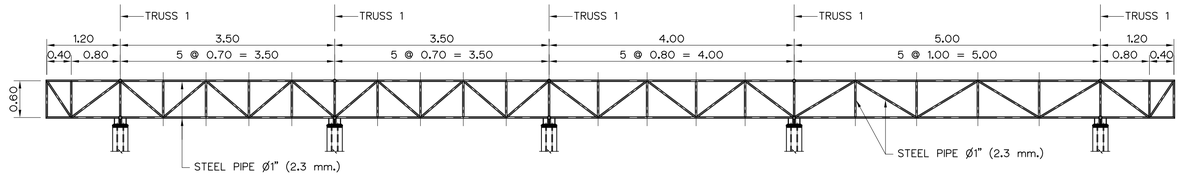
DETAIL "3"

SCALE 1:20



TRUSS T1

SCALE 1:50



TRUSS T2

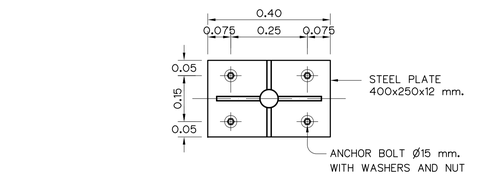
SCALE 1:50

NOTES :

1. ALL DIMENSIONS ARE IN METRES
2. REINFORCEMENT BARS ARE IN MILLIMETRES, UNLESS OTHERWISE SHOWN.
3. ALL WELDING CONNECTIONS USE 6 mm. E60
4. STEEL SHALL BE IN ACCORDANCE WITH ASTM A36-81 a. OR TIS. 1227-2539 SS400
5. BOLT AND CONNECTOR SHALL CONFORM TO ASTM 325 OR TIS.171-2530 CLASS 8.8, HEX NUT SHALL CONFORM TO TIS.672-2530 TYPE1 CLASS A OR CLASS B, SPRING WASHER SHALL CONFORM TO TIS.259-2531, ANCHOR BOLT, CONNECTOR, HEX NUT AND SPRING WASHER USED HOT DIP GALVANIZED 305 g/m^2 THK. SHALL CONFORM TO ASTM-A 153

REFERENCES :

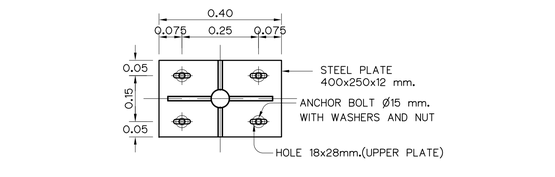
1. PUMP STATION, PLAN AND SECTION A-A HEE-PT-LO3



DETAIL "1"

FIXED END SUPPORT

SCALE 1:10



DETAIL "2"

FREE END SUPPORT

SCALE 1:10

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

0 0.5 1 2 3 4
SCALE 1:50 METERS

0 .5 1.0 1.5
SCALE 1:20 METERS

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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1				
	CONSULTANTS		DEDE	

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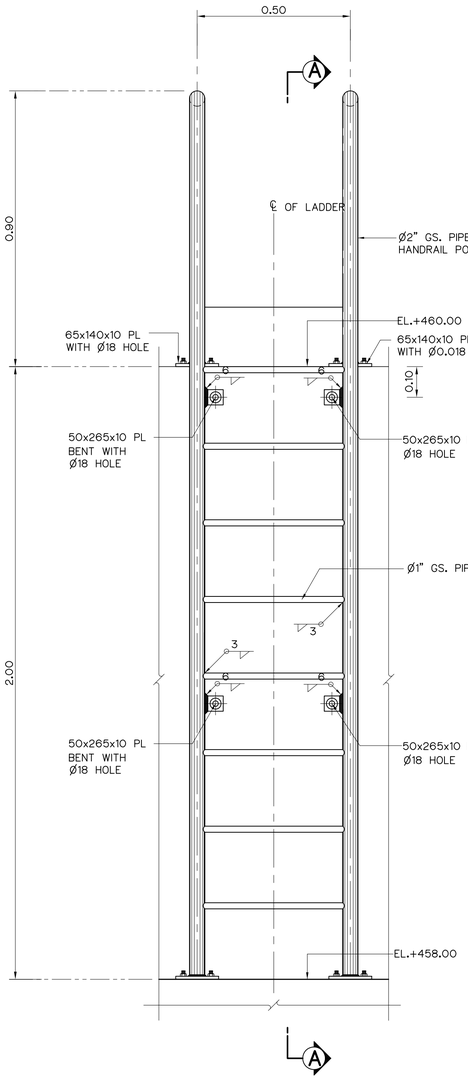
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

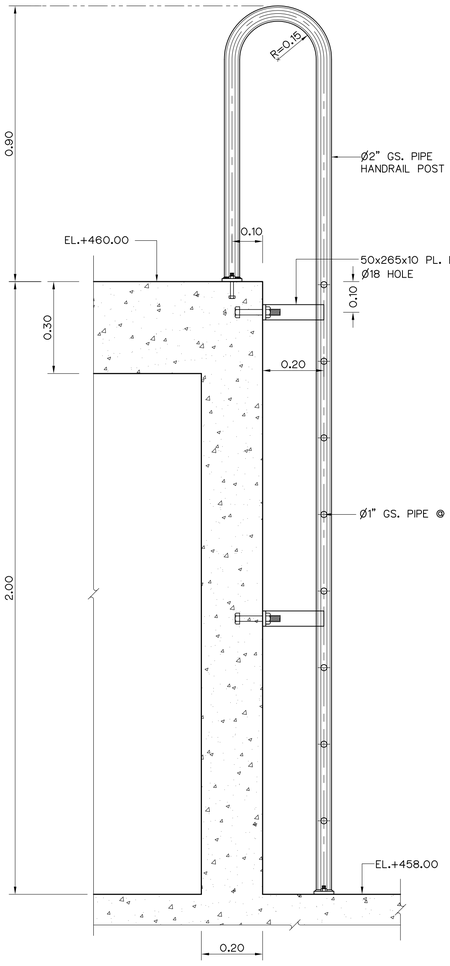
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION

TRUSS SECTIONS AND DETAILS

PANYA CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
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CHECKED วิ.1957	APPROVED
PROJECT MANAGER / 10/08/2021 DATE	DRAWING NO. HEE-PT-L13 / SHEET NO. 73 OF 108



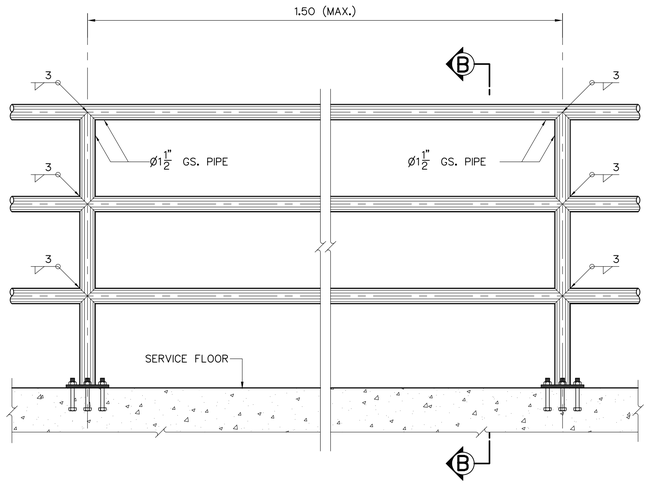
FRONT VIEW



SECTION A–A

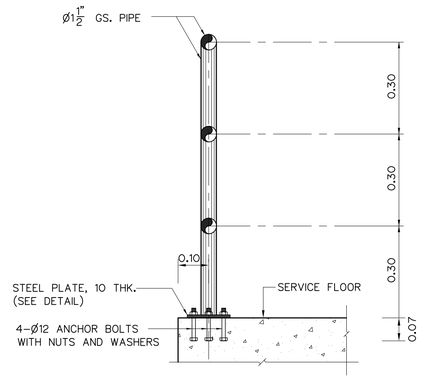
TYPICAL STEEL LADDER

SCALE 1:10



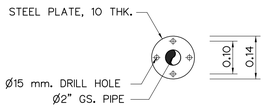
TYPICAL HANDRAIL ON SLAB

SCALE 1:10



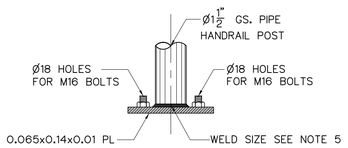
SECTION B–B

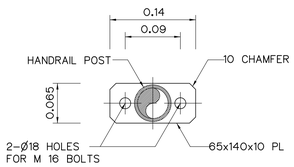
SCALE 1:10



STEEL PLATE DETAIL

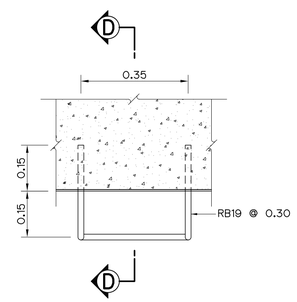
SCALE 1:10





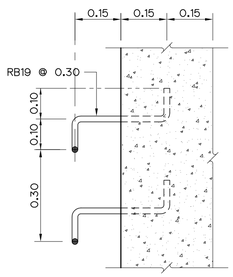
POST MOUNTING

SCALE 1:5



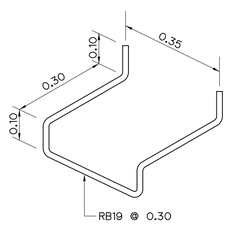
DETAIL OF LADDER RUNG

SCALE 1:10



SECTION D–D

SCALE 1:10



ISOMETIC VIEW

SCALE 1:10

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METRES
   REINFORCING BARS ARE IN MILLIMETRES.
2. STEEL SHALL BE IN ACCORDANCE WITH ASTM. A 36–81 a.
3. GALVANIZED STEEL PIPE SHALL BE IN ACCORDANCE WITH ASTM–A120
4. BOLTS AND SCREWS SHALL BE IN ACCORDANCE WITH ASTM. A 36–81 a.
   AND ASTM. A 307–80
5. WELD CHS JOINT WITH CONTINOUS BEAD EQUAL TO CHS WALL THICKNESS
6. WELD AND CORNERS OF CHS, PLATES, PLUGS, ET SHALL BE DRESSED SMOOTH.
7. HANDRAILS SHALL BE ATTACHED TO CONCRETE WITH EXPANSION ANCHORS.

REFERENCE DRAWINGS :

1.	PUMP STATION, PLAN	HEE–PT–LO2
2.	PUMP STATION, PLAN AND SECTION A–A	HEE–PT–LO3

0 0.05 0.1 0.2 0.3 0.4
SCALE 1 : 5 M.

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1 : 10 M.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

KINGDOM OF THAILAND
Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

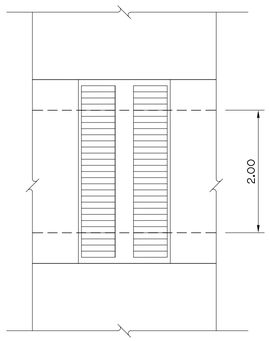
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION

STEEL LADDER AND HANDRAIL DETAILS

PANYA CONSULTANTS CO.,LTD.

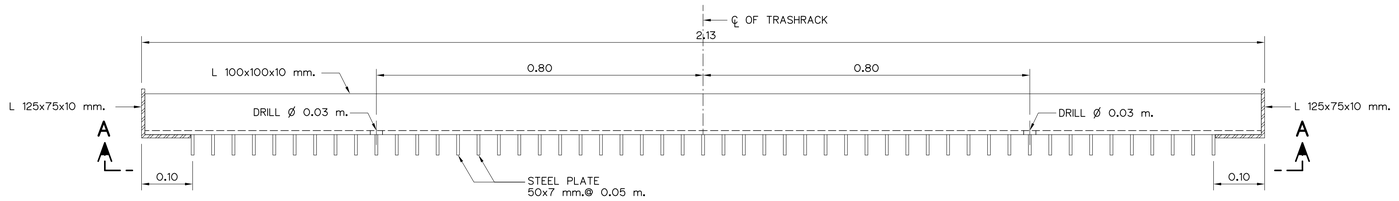
Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

		REVIEWED	
DESIGNED	วิ.1957	ภ1.72163	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	วิ.1957		APPROVED
PROJECT MANAGER	10/08/2021 DATE	DRAWING NO. HEE–PT–L14	SHEET NO. 74 OF 108



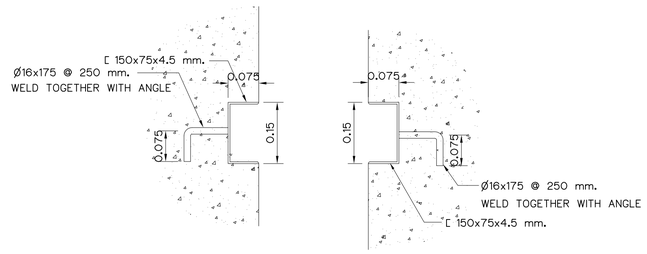
PLAN

SCALE 1:50



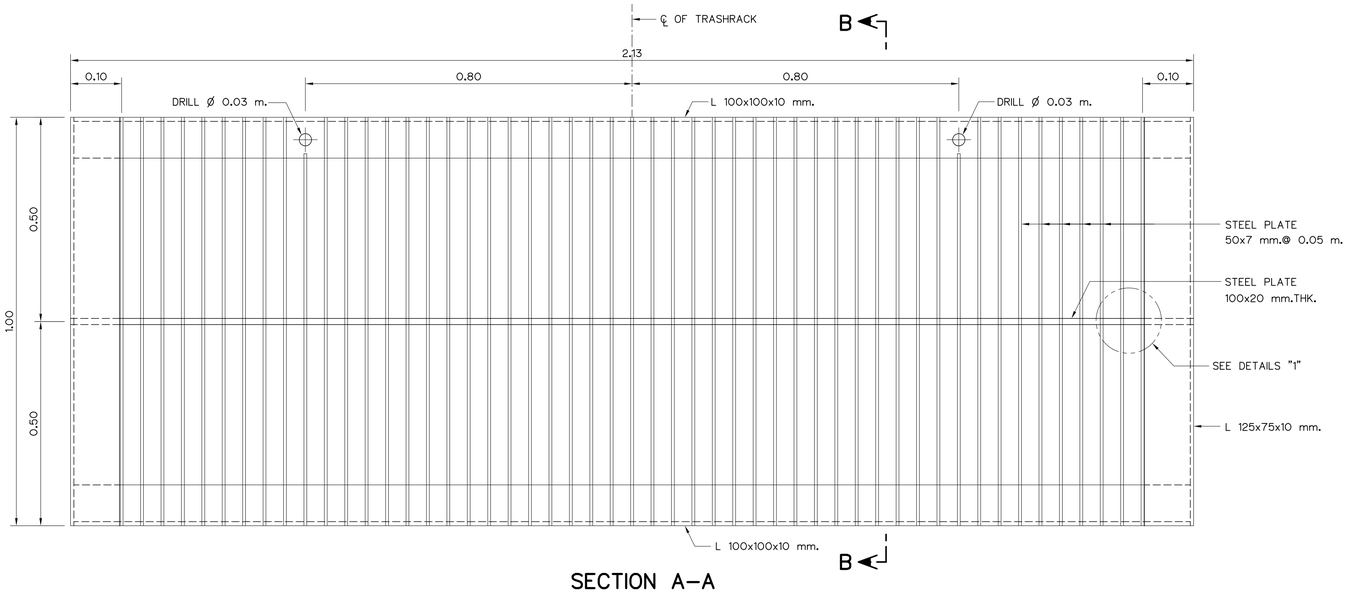
PLAN OF TRASHRACK NO.1

NOT TO SCALE



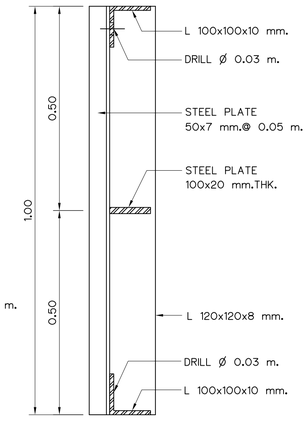
GROOVE DETAIL OF TRASHRACK

SCALE 1:7.5



SECTION A–A

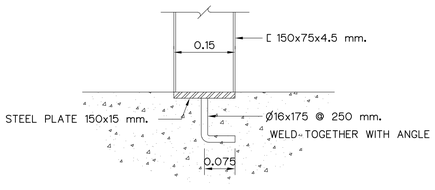
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5 PIECES

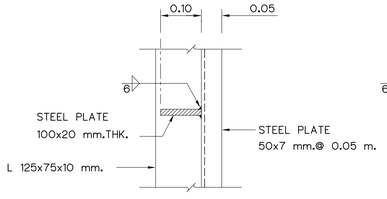
SECTION B–B

SCALE 1:7.5

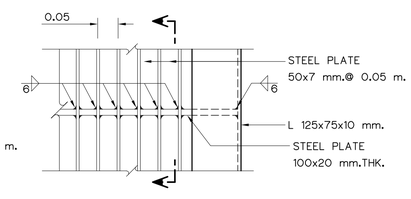


BOTTOM DETAIL OF TRASHRACK

SCALE 1:7.5



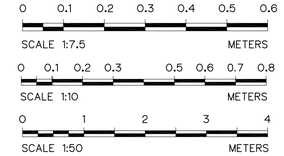
SECTION



ELEVATION

DETAIL "1"

SCALE 1:7.5



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS
   REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALL WELDING IS 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.

REFERENCE DRAWINGS :

1. PUMP STATION, LAYOUT	HEE-PT-L01
2. PUMP STATION, PLAN	HEE-PT-L02
3. PUMP STATION, PLAN AND SECTION A-A	HEE-PT-L03

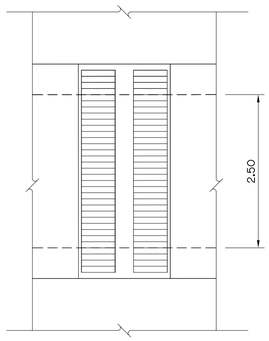
NO.	DATE	REVISIONS	CHECKED	APPROVED
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

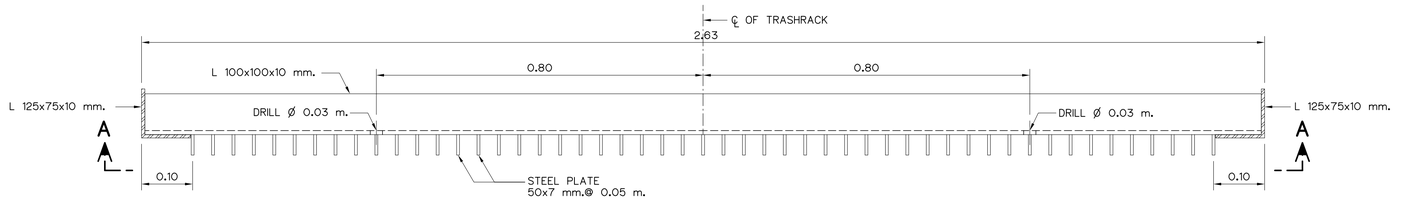
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
TRASHRACK NO.1 DETAILS

PANYA CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED พ.ย.1957 ภัทร.72163	SUBMITTED
DRAWN	RECOMMENDED
CHECKED พ.ย.1957	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-PT-L15
	SHEET NO. 75 OF 108



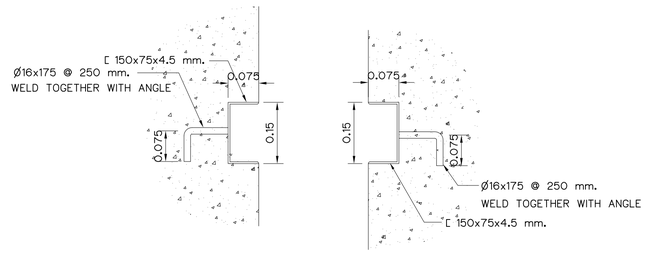
PLAN

SCALE 1:50



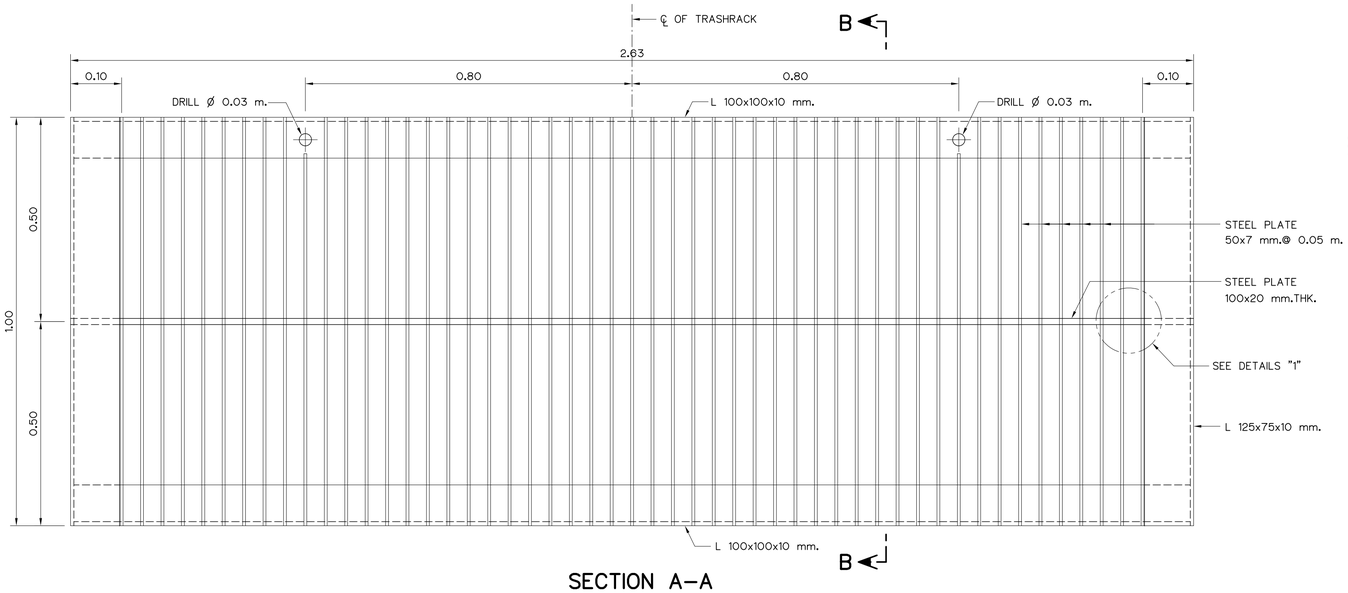
PLAN OF TRASHRACK NO.2

NOT TO SCALE



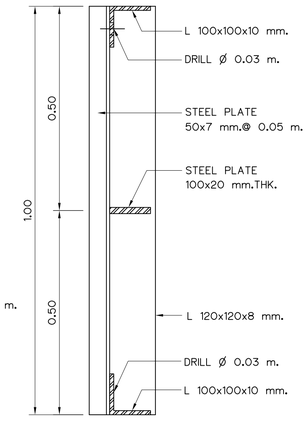
GROOVE DETAIL OF TRASHRACK

SCALE 1:7.5



SECTION A–A

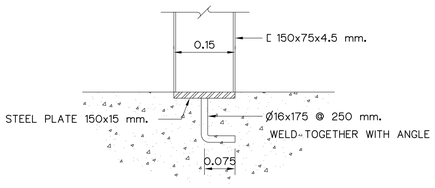
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5 PIECES

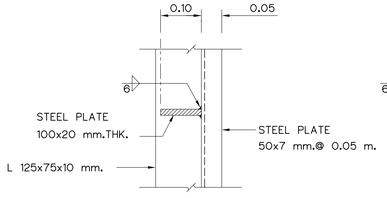
SECTION B–B

SCALE 1:7.5

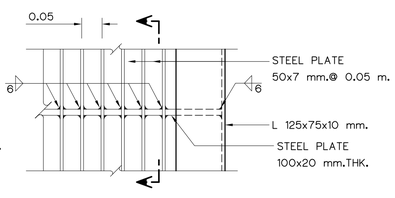


BOTTOM DETAIL OF TRASHRACK

SCALE 1:7.5



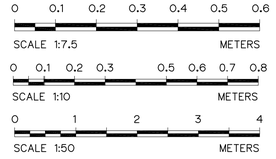
SECTION



ELEVATION

DETAIL "1"

SCALE 1:7.5



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS
   REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. ALL WELDING IS 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.

REFERENCE DRAWINGS :

1. PUMP STATION, LAYOUT	HEE-PT-L01
2. PUMP STATION, PLAN	HEE-PT-L02
3. PUMP STATION, PLAN AND SECTION A-A	HEE-PT-L03

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

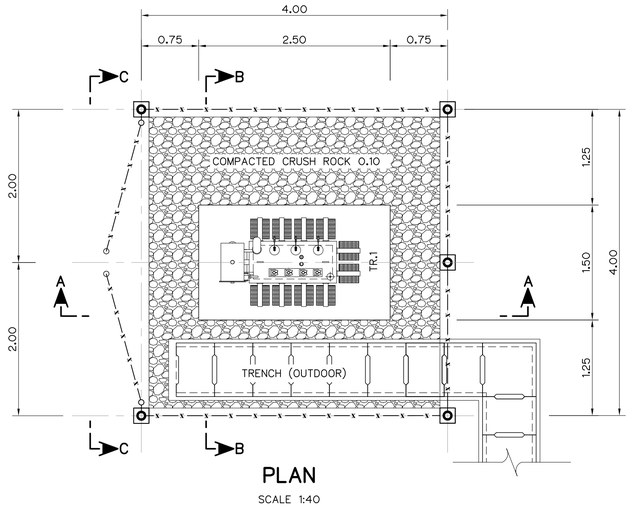
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION

TRASHRACK NO.2 DETAILS

PANYA CONSULTANTS CO.,LTD.

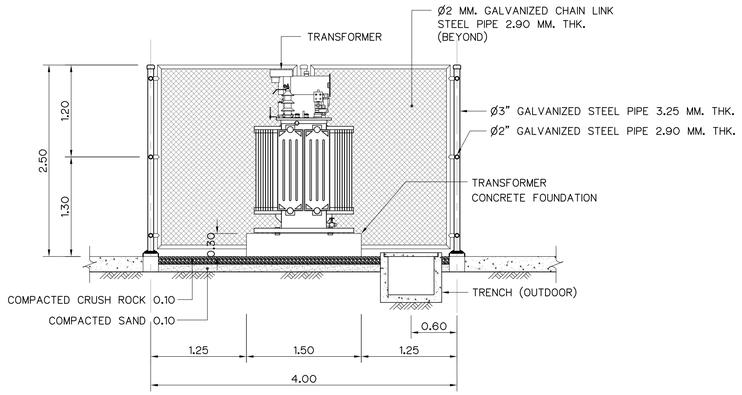
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED	
DESIGNED พ.ย.1957 ภัทร.72163	SUBMITTED
DRAWN	RECOMMENDED
CHECKED พ.ย.1957	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-PT-L16
	SHEET NO. 76 OF 108



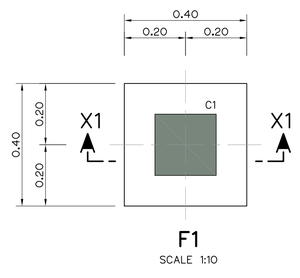
PLAN

SCALE 1:40



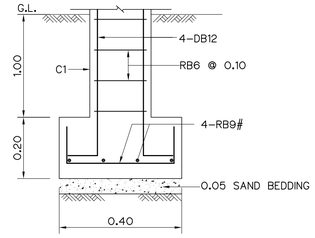
SECTION B–B

SCALE 1:40



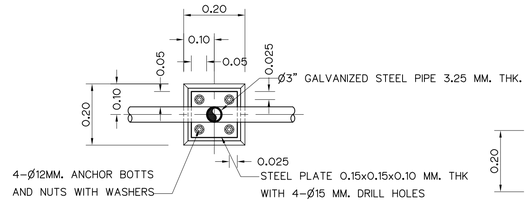
F1

SCALE 1:10



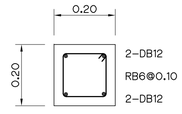
SECTION X1–X1

SCALE 1:10



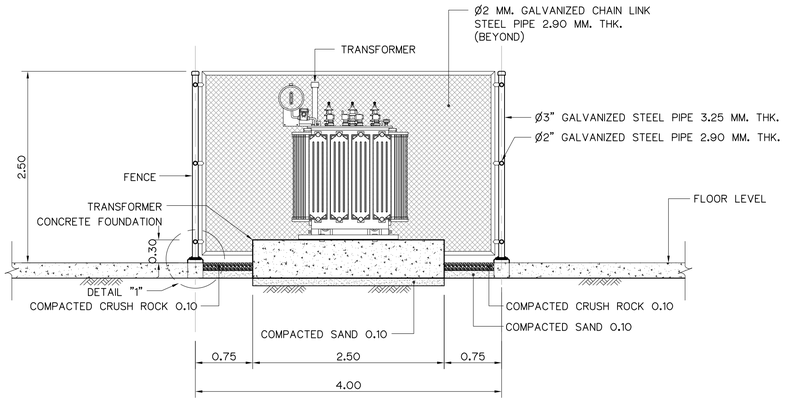
SECTION X2–X2

SCALE 1:10



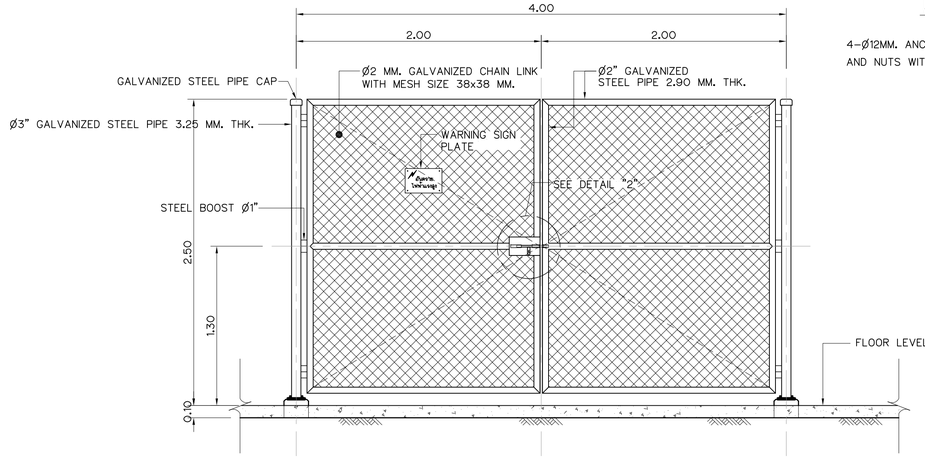
C1

SCALE 1:10



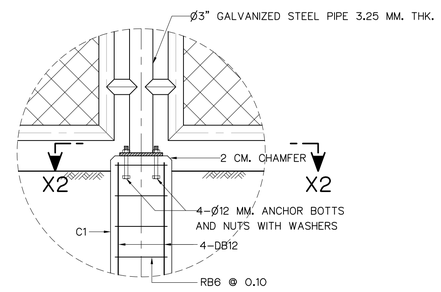
SECTION A–A

SCALE 1:40



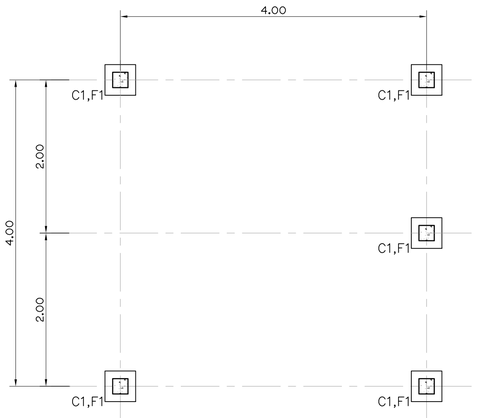
SECTION C–C
CHAIN LINK FENCE AND GATE

SCALE 1:25



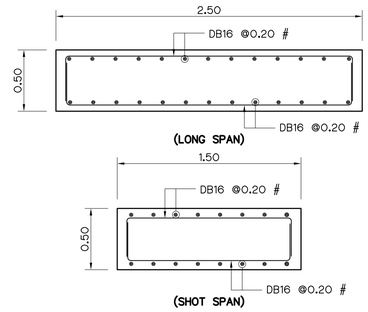
DETAIL "1"

SCALE 1:10



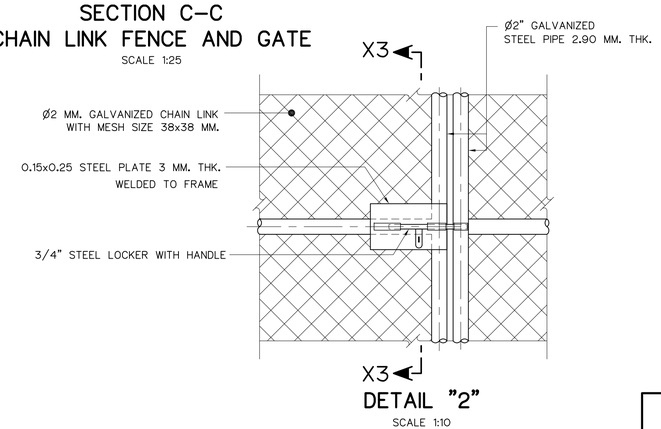
FOUNDATION PLAN

SCALE 1:40



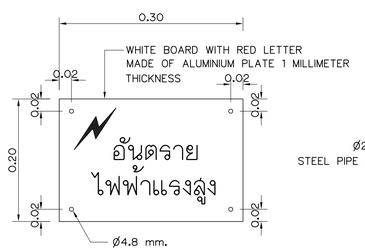
TRANSFORMER CONCRETE FOUNDATION REINFORCEMENT DETAIL

SCALE 1:25



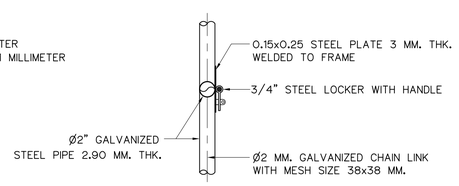
DETAIL "2"

SCALE 1:10



WARNING SIGN PLATE

SCALE 1:5



SECTION X3–X3

SCALE 1:10

0 0.10 0.20 0.30 0.40 0.50
SCALE 1:5 METERS

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

0 1 2 3
SCALE 1:40 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE–GN–03
3. REINFORCEMENT BARS ARE IN MILLIMETRES, UNLESS OTHERWISE SHOWN.
4. THE TRANSFORMER AREA WILL BE ACCORDING TO PEA STANDARD.

REFERENCE DRAWINGS :

1.	PUMP STATION, LAYOUT	HEE–PT–L01
2.	PUMP STATION, PLAN	HEE–PT–L02

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION

TRANSFORMER AREA PLANS, SECTIONS AND DETAILS

PANYA CONSULTANTS CO.,LTD.

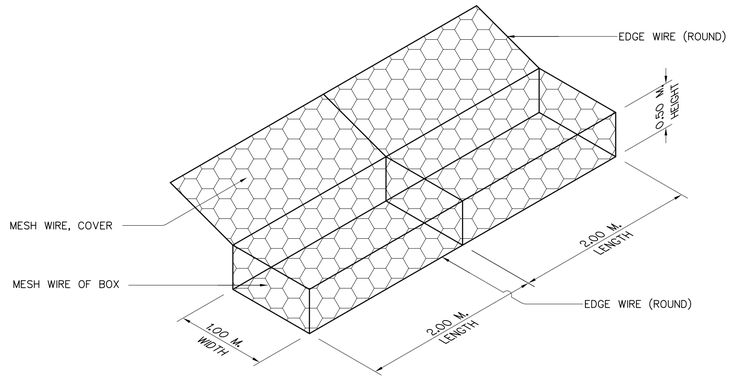
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิชิ.1957	วิชิ.72163
DRAWN		
CHECKED	วิชิ.1957	
PROJECT MANAGER	10/08/2021 DATE	

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

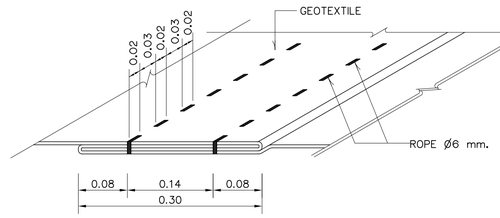
DRAWING NO. HEE–PT–L17

SHEET NO. 77 OF 108



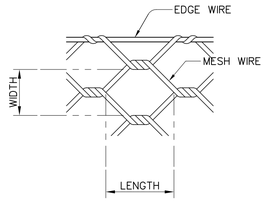
GABION BOX SIZE 1.00x2.00x0.50 M.

NOT TO SCALE

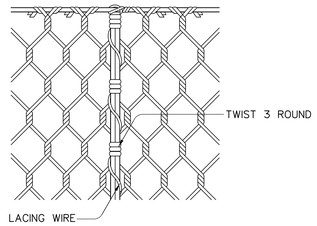


GEOTEXTILE JOINT

NOT TO SCALE



MESH WIRE DETAIL



LACING DETAIL

BOX TYPE	WIRE TYPE	DIAMETER mm.	WEIGHT OF ZINC COAT g/m.^{2}
GABION,MATTRESS	EDGE WIRE	3.4	275
	MESH WIRE	2.7	260
	LACING WIRE	2.2	240

GABION SPECIFICATIONS

1. GABIONS ARE BASKETS MADE OF MESH 8 DOUBLE TWISTED STEEL WOVEN WIRE MESH. GABIONS ARE FILLED WITH STONES SIZE 15.0–25.0 CM. AT THE PROJECT SITE TO FORM FLEXIBLE, PERMEABLE, MONOLITHIC STRUCTURES SUCH AS RETAINING WALLS.
2. THE STEEL WIRE USED IN THE MANUFACTURE OF THE GABION IS HEAVILY ZINC COATED SOFT TEMPER STEEL. A PVC COATING IS THEN APPLIED TO PROVIDE ADDED PROTECTION FOR USE IN POLLUTED ENVIRONMENTS WHERE SOILS OR WATER ARE ACIDIC: IN SALT OR FRESH WATER, OR WHEREVER THE RISK OF CORROSION IS PRESENT.
3. THE WIRE USED FOR THE MANUFACTURE OF GABIONS (EDGE WIRE, PORE WIRE, TIE WIRE AND DIAPHRAGM) SHALL HAVE A TENSILE STRENGTH BETWEEN 350–500 MPA SHALL BE CONFORMED TO TIS 71–2532.
4. THE PVC COATING HAS A NOMINAL THICKNESS OF 0.50 MM.
5. ELONGATION SHALL NOT BE LESS THAN 10%.
6. THE MINIMUM QUANTITIES OF ZINC COATING ON THE WIRE IS 240 GR/SQ.M.

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.

REFERENCE DRAWING :

1. PUMP STATION, LAYOUT	HEE-PT-L01
2. PUMP STATION, PLAN	HEE-PT-L02
3. PUMP STATION, PLAN AND SECTION A-A	HEE-PT-L03
4. PUMP STATION, SECTION B-B	HEE-PT-L04

NO.	DATE	REVISIONS	CHECKED	APPROVED
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

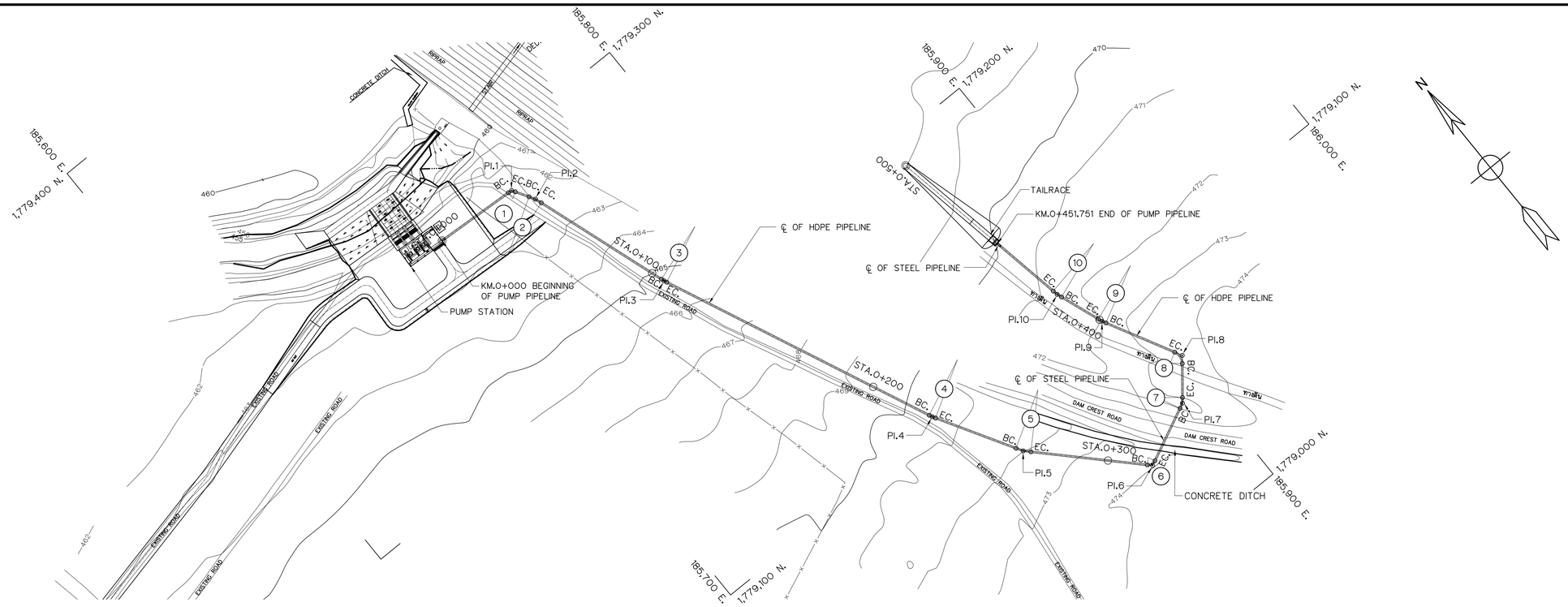
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP STATION
DETAILS OF GABION

PANYA CONSULTANTS CO.,LTD.

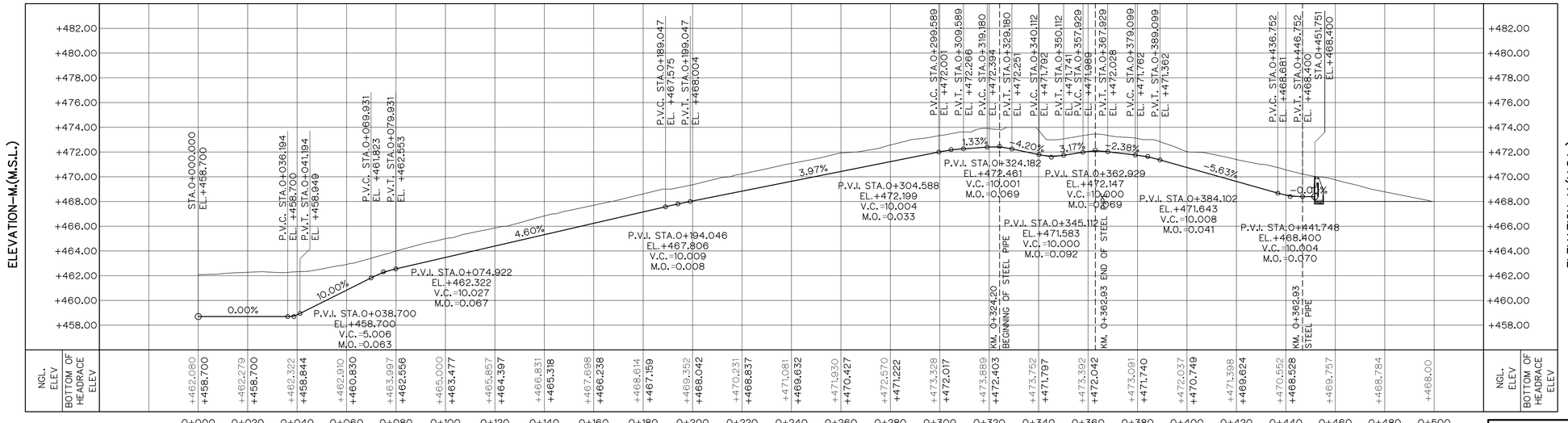
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED พ.ย.1957 ภ.ท.72163	REVIEWED
DRAWN	SUBMITTED
CHECKED พ.ย.1957	RECOMMENDED
PROJECT MANAGER 10/08/2021 DATE	APPROVED
DRAWING NO. HEE-PT-L18	SHEET NO. 78 OF 108



PLAN

SCALE 1:1,000



PROFILE

HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:200

SCALE 1 : 200 M.

SCALE 1 : 1,000 M.

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L) ARE IN METERS, UNLESS OTHERWISE SHOWN.

REFERENCE DRAWINGS :

1. PUMP PIPELINE, DATA CURVE AND INSTALLATION DATA	HEE-PP-L02
2. PUMP PIPELINE, TYPICAL SECTION AND CONVERGENCE OF PUMP PIPELINE	HEE-PP-L03
3. TAILRACE, LAYOUT	HEE-TR-L01

NO.	DATE	REVISIONS	CHECKED	APPROVED
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP PIPELINE

PLAN AND PROFILE, KM. 0+000 TO KM. 0+451.751

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	APPROVED

PROJECT MANAGER 10/08/2021 DATE

DRAWING NO. HEE-PP-L01

SHEET NO. 79 OF 108

HORIZONTAL ALIGNMENT DATA CURVE OF PUMP PIPELINE

NO. OF CURVE	PI. Sta.	PI. TO PI. m.	COORDINATE OF PI. N	COORDINATE OF PI. E	ANGLE	T m.	R m.	L m.	BC. Sta.	EC. Sta.	BEARING
BEGIN	0+000.00		1,779,283.796	185,700.007	–	–	–	–	–	–	S86° 42' 42"E
1	0+034.44	34.44	1,779,281.820	185,734.395	55°43'06"	1.59	3.00	2.92	0+032.86	0+035.78	S30° 59' 37"E
2	0+044.42	10.23	1,779,273.050	185,739.663	12°34'21"	2.75	25.00	5.49	0+041.66	0+047.15	S18° 25' 15"E
3	0+105.67	61.27	1,779,214.921	185,759.023	5°33'00"	1.21	25.00	2.42	0+104.46	0+106.88	S23° 58' 15"E
4	0+226.65	120.99	1,779,104.369	185,808.177	6°17'40"	1.38	25.00	2.75	0+225.28	0+228.02	S30° 15' 56"E
5	0+265.71	39.06	1,779,070.631	185,827.865	14°09'02"	3.10	25.00	6.17	0+262.61	0+268.78	S44° 24' 57"E
6	0+318.08	52.40	1,779,033.201	185,864.539	70°50'01"	2.13	3.00	3.71	0+315.95	0+319.66	N64° 45' 02"E
7	0+345.33	27.80	1,779,045.060	185,889.685	25°55'30"	2.30	10.00	4.53	0+343.02	0+347.55	N38° 49' 32"E
8	0+364.48	19.24	1,779,060.046	185,901.745	66°38'07"	3.29	5.00	5.82	0+361.19	0+367.01	N27° 48' 35"W
9	0+398.80	35.07	1,779,091.069	185,885.381	7°54'07"	1.73	25.00	3.45	0+397.07	0+400.52	N19° 54' 28"W
10	0+419.83	21.03	1,779,110.845	185,878.220	9°24'12"	2.06	25.00	4.10	0+417.77	0+421.87	N10° 30' 15"W
11	0+451.75	31.82	1,779,142.135	185,872.418	–	–	–	–	–	–	–

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L) ARE IN METERS, UNLESS OTHERWISE SHOWN.

REFERENCE DRAWINGS :

1. PUMP PIPELINE, PLAN AND PROFILE, KM. 0+000 TO KM. 0+451.751 HEE-PP-L01

NO.	DATE	REVISIONS	CHECKED	APPROVED
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP PIPELINE

DATA CURVE AND INSTALLATION DATA

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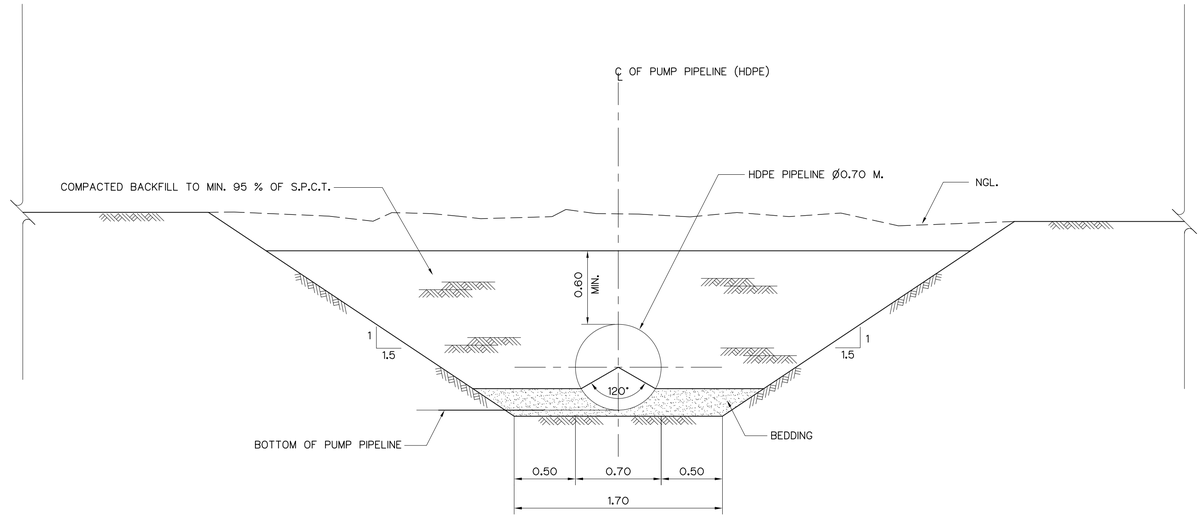
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		REVIEWED
DESIGNED	วสิ.1957	วิษ.72163 SUBMITTED
DRAWN		RECOMMENDED
CHECKED	วสิ.1957	APPROVED

10/08/2021
PROJECT MANAGER — DATE

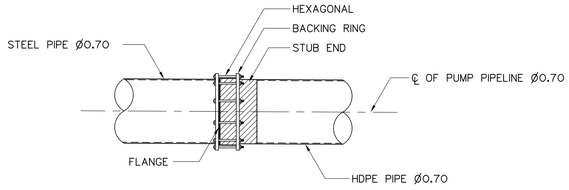
DRAWING NO. HEE-PP-L02

SHEET NO. 80 OF 108



TYPICAL SECTION OF PUMP PIPELINE

SCALE 1:25



CONVERGENCE OF PUMP PIPELINE

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.

REFERENCE DRAWINGS :

1. PUMP PIPELINE, PLAN AND PROFILE, KM. 0+000 TO KM. 0+451.751	HEE-PP-L01

0 0.5 1.0 1.5 2.0 M.

SCALE 1 : 25

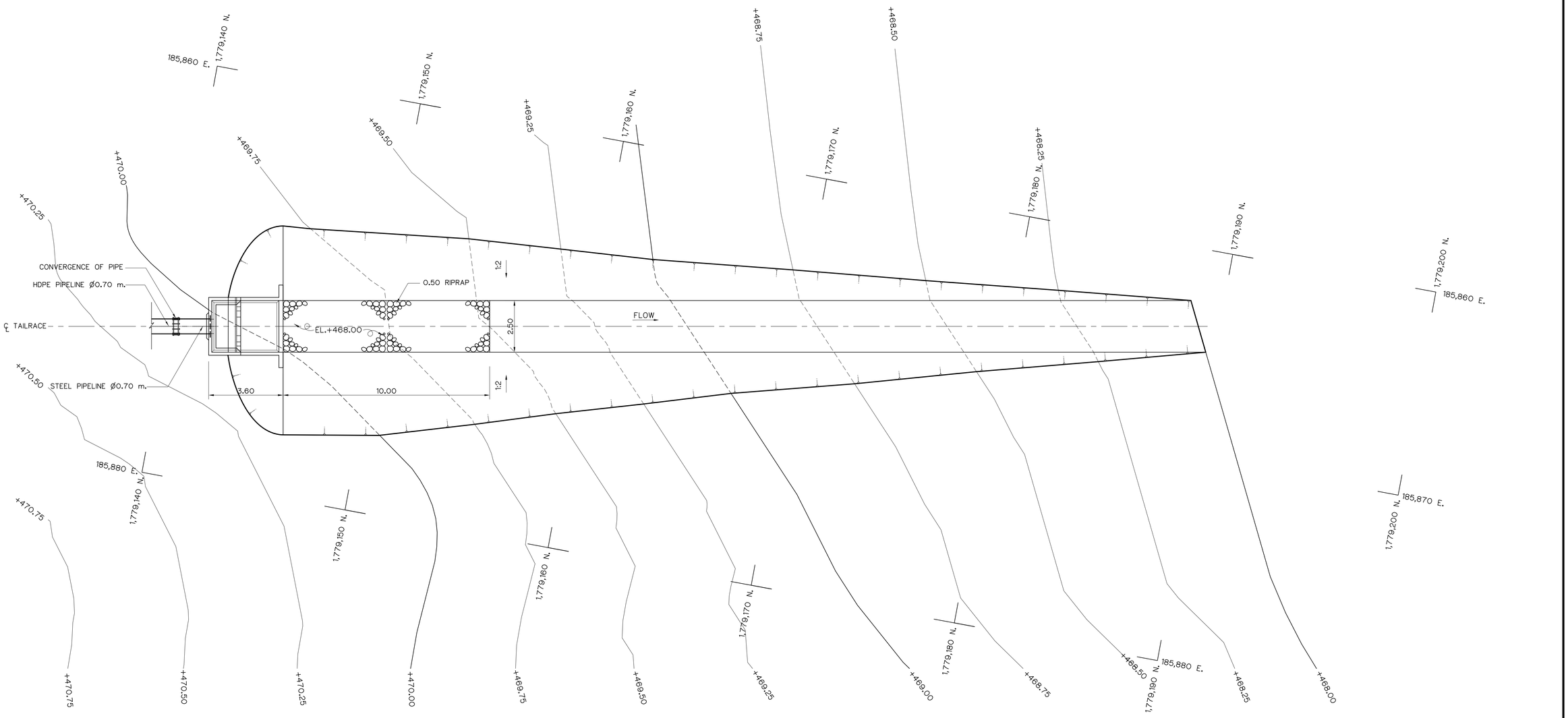
NO.	DATE	REVISIONS	CHECKED	APPROVED
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
PUMP PIPELINE
TYPICAL SECTION AND CONVERGENCE OF PUMP PIPELINE

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PROJECT MANAGER — 10/08/2021 DATE	DRAWING NO. HEE-PP-L03 — SHEET NO. 81 OF 108



LAYOUT

SCALE 1:100

0 1 2 3 4 5 6 7 8

SCALE 1 : 100 M.

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.

REFERENCE DRAWINGS :

1. TAILRACE, PLAN AND SECTIONS — HEE-PP-L02

NO.	DATE	REVISIONS	CHECKED	APPROVED
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

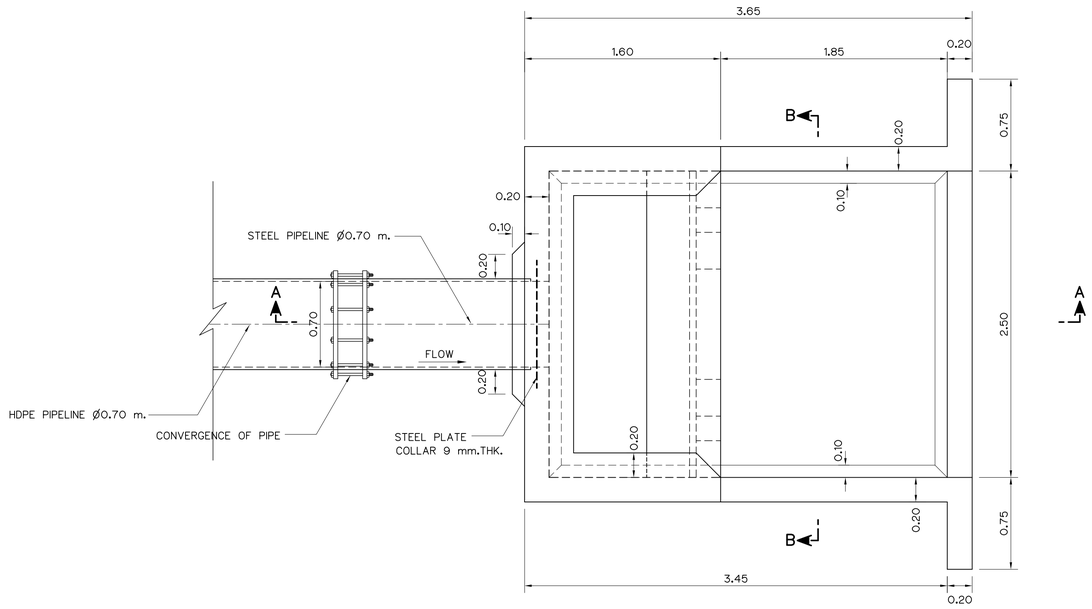
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TAILRACE
LAYOUT

PANYA CONSULTANTS CO.,LTD.

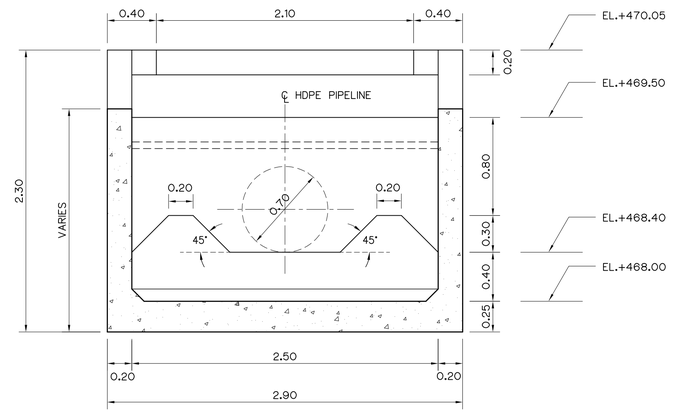
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DESIGNED	วสิ.1957	ภิม.72163	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	วสิ.1957		APPROVED
PROJECT MANAGER		10/08/2021 DATE	DRAWING NO. HEE-TR-L01
			SHEET NO. 82 OF 108



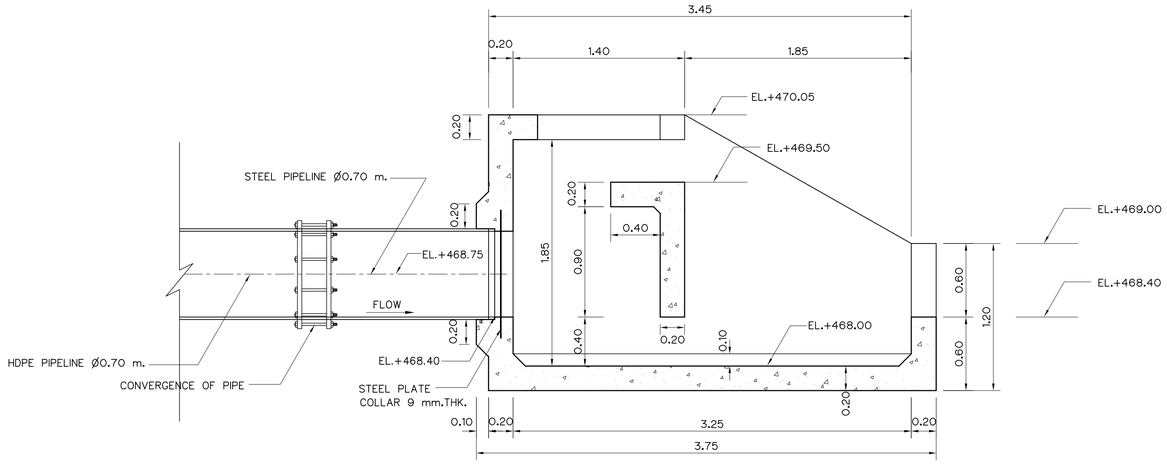
PLAN

SCALE 1:25



SECTION B–B

SCALE 1:25



SECTION A–A

SCALE 1:25

0 0.5 1.0 1.5 2.0

SCALE 1 : 25 M.

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE–GN–03.

REFERENCE DRAWINGS :

1.	TAILRACE, LAYOUT	HEE–TR–L01
2.	TAILRACE, REINFORCEMENT DETAILS	HEE–TR–L03

NO.	DATE	REVISIONS	CHECKED	APPROVED
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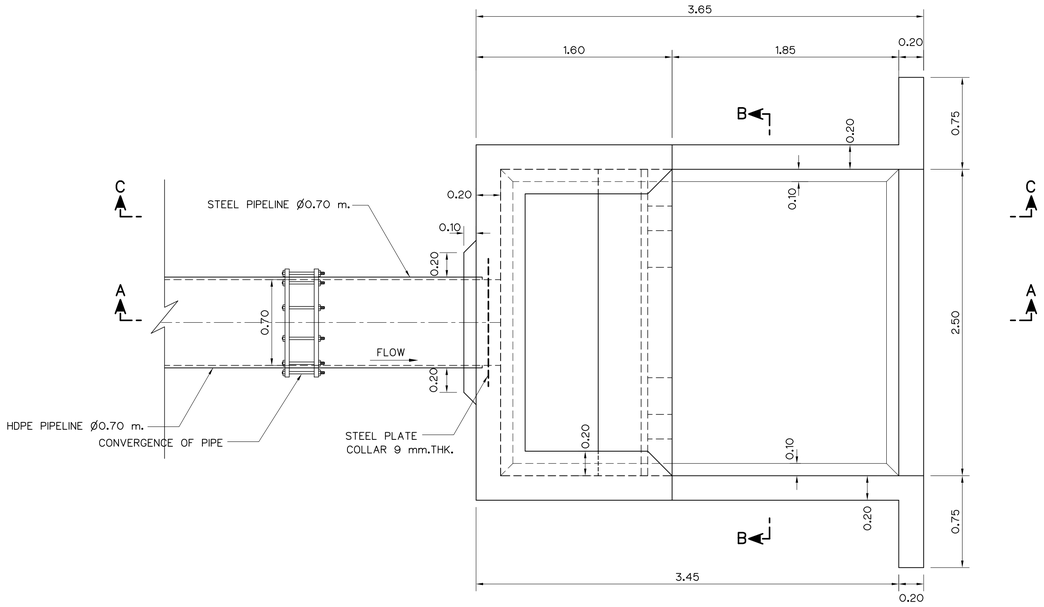
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TAILRACE
PLAN AND SECTIONS

PANYA CONSULTANTS CO.,LTD.

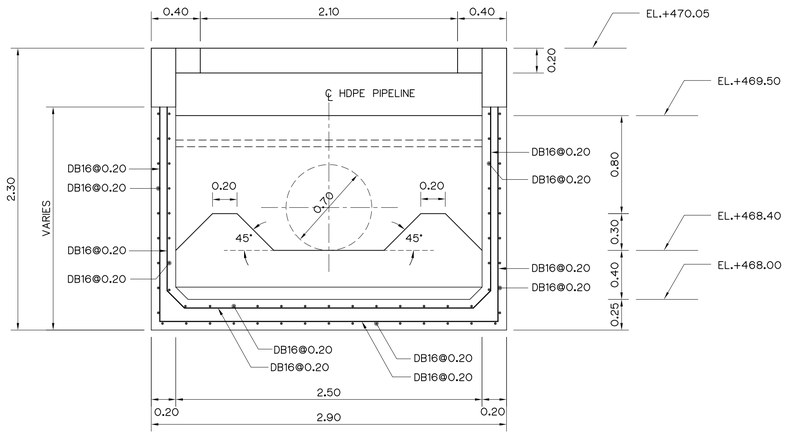
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PROJECT MANAGER 10/08/2021 DATE	APPROVED
DRAWING NO. HEE–TR–L02	SHEET NO. 83 OF 108



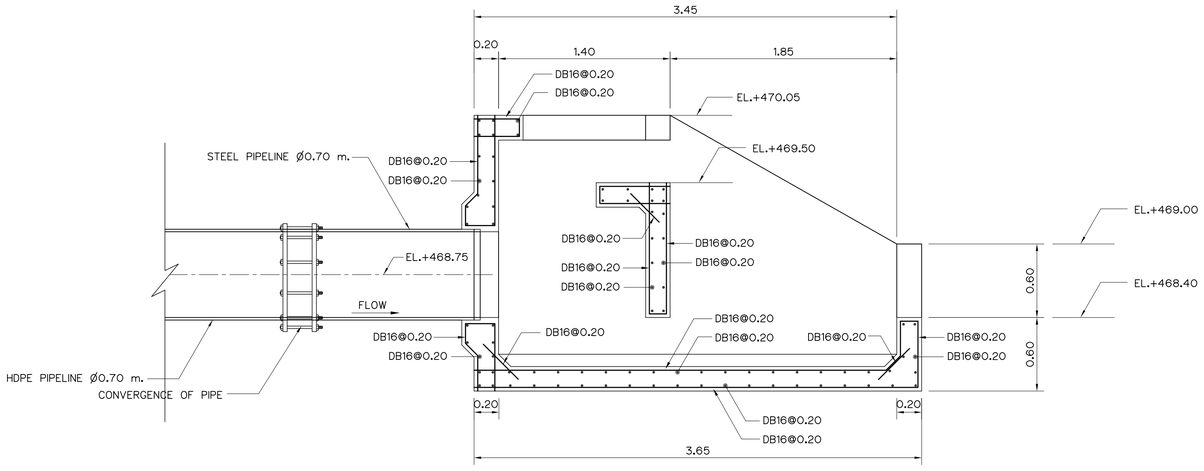
PLAN

SCALE 1:25



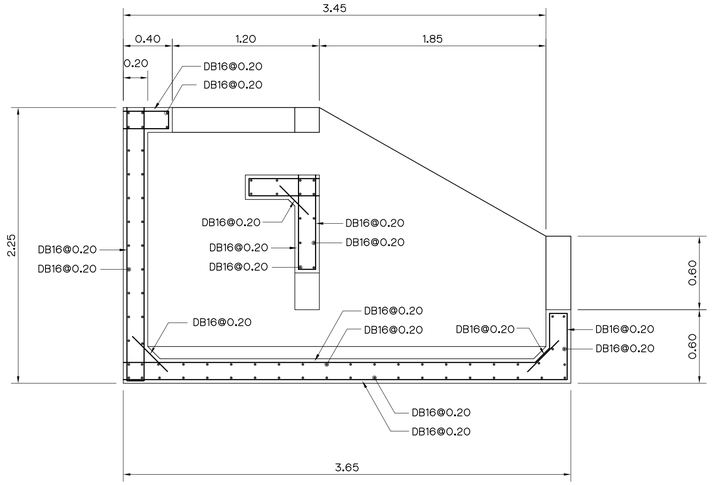
SECTION B–B

SCALE 1:25



SECTION A–A

SCALE 1:25



SECTION C–C

SCALE 1:25

0 0.5 1.0 1.5 2.0

SCALE 1 : 25 M.

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE–GN–03.

REFERENCE DRAWINGS :

1. TAILRACE, PLAN AND SECTIONS — HEE–TR–L02

NO.	DATE	REVISIONS	CHECKED	APPROVED
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

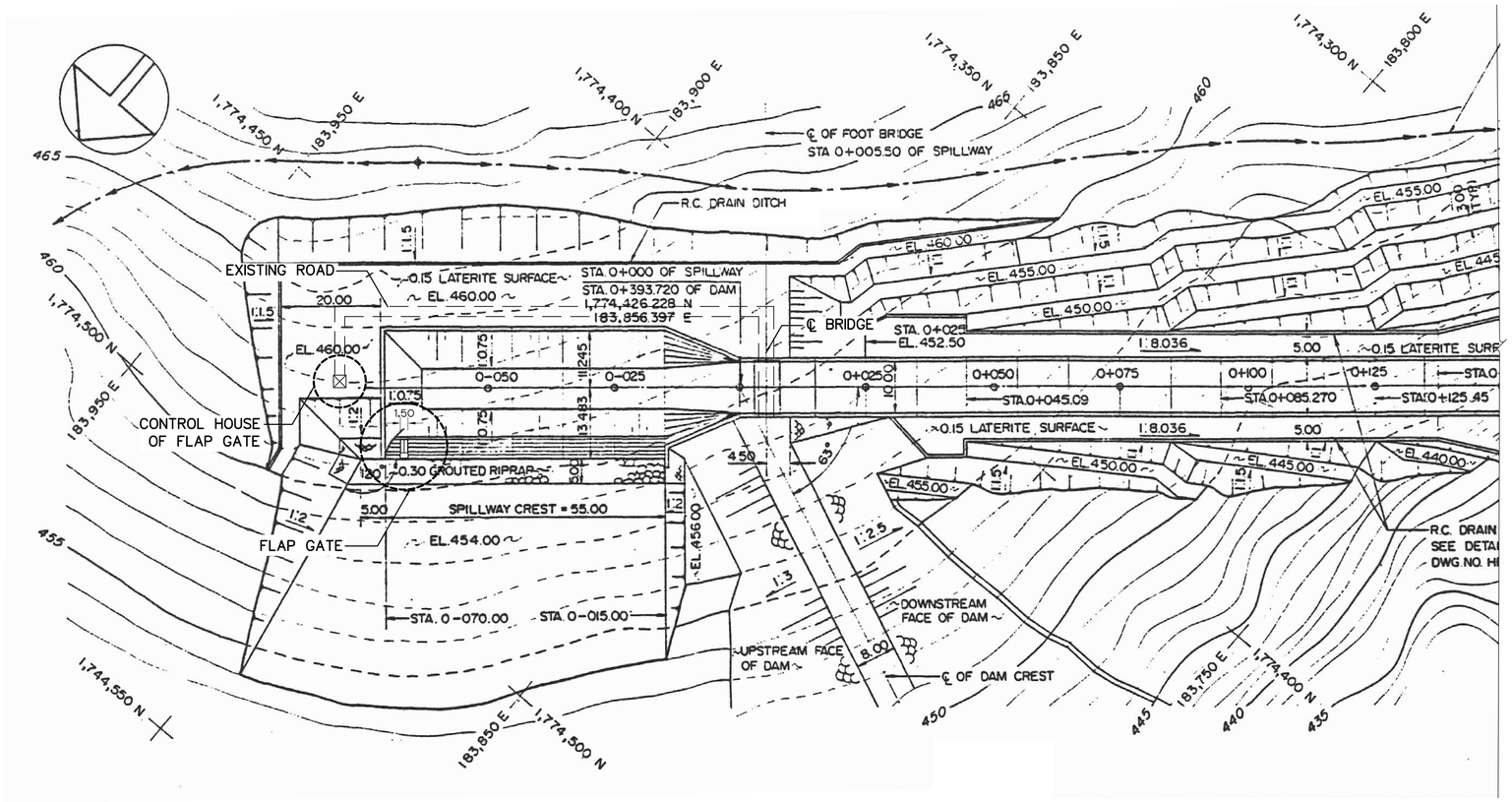
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TAILRACE

REINFORCEMENT DETAILS

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

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DRAWN		RECOMMENDED
CHECKED	วิ.1957	APPROVED
PROJECT MANAGER	10/08/2021 DATE	DRAWING NO. HEE–TR–L03
		SHEET NO. 84 OF 108



LAYOUT

SCALE 1:600

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (MSL.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.

REFERENCE DRAWING :

1. FLAP GATE, GENERAL PLAN AND SECTION	HEE-FG-L02
2. FLAP GATE, PLAN, SECTION AND DETAIL	HEE-FG-L03
3. FLAP GATE, PLAN, SECTION OF CONTROL HOUSE AND REINFORCEMENT DETAIL	HEE-FG-L04

0 5 10 15 20 30 40 50 60
SCALE 1 : 600 M.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

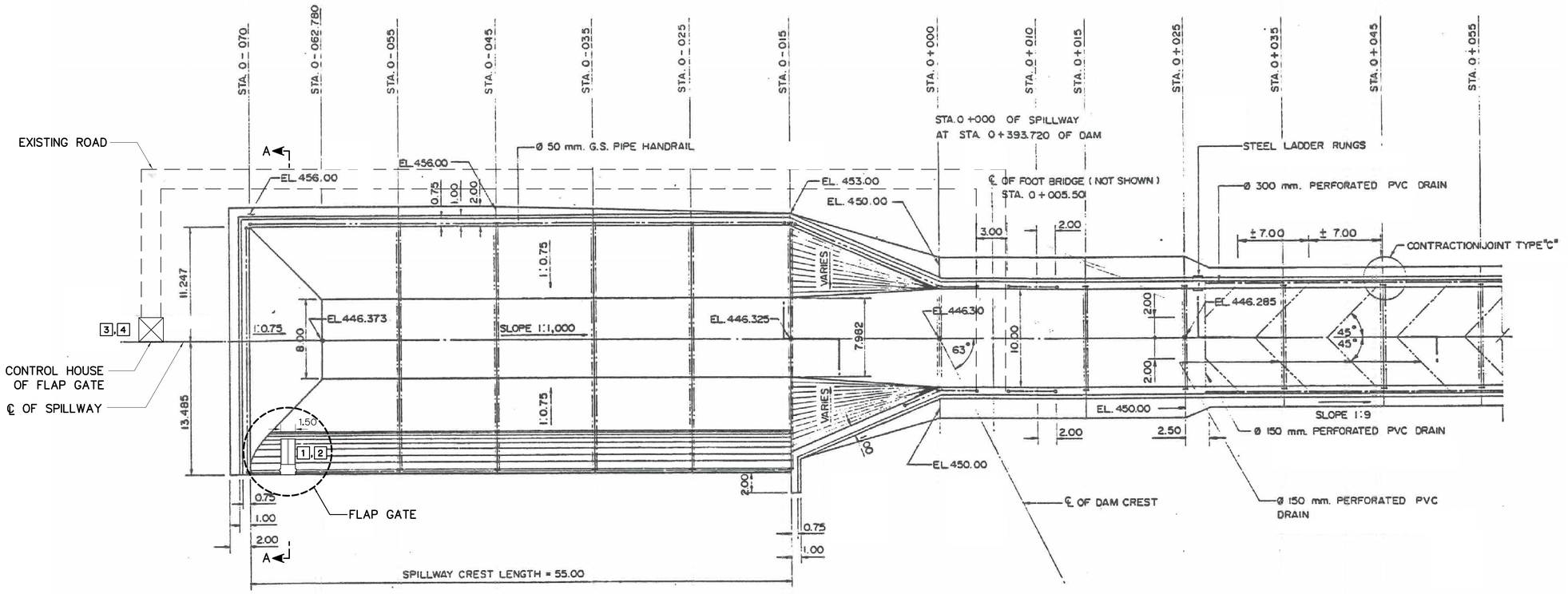
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
FLAP GATE
LAYOUT

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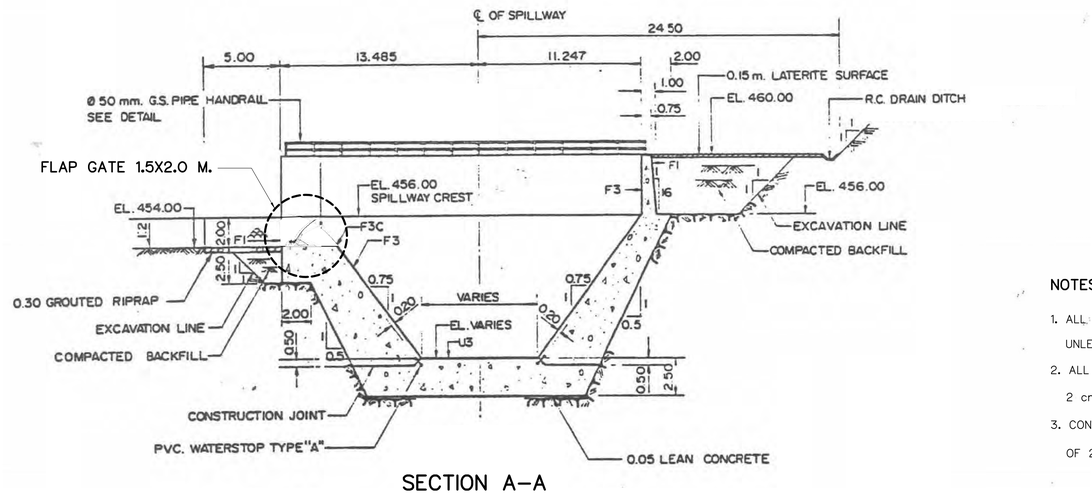
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DESIGNED 28.1957 / 28.72163	SUBMITTED
DRAWN	RECOMMENDED
CHECKED 28.1957	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-FG-L01
	SHEET NO. 85 OF 108



GENERAL PLAN

SCALE 1:250

ITEMS	DESCRIPTIONS	LISTS OF IMPROVEMENT OR INSTALLATION
1	FLAP GATE	INSTALLING FLAP GATE 1.50 X 2.00 M. (W X H) WITH HYDRAULIC CONTROL
2	FLAP GATE INSTALLING	EXTRACT THE WEIR HEAD TO INSTALL THE FLAP GATE.
3	CONTROL HOUSE	–
4	CLOSED CIRCUIT TELEVISION CAMERAS	NEW INSTALLING.



SECTION A–A

SCALE 1:200

0 5 10 15 20
SCALE 1 : 200 M.

0 1 2 3 4 5 10 15 20 25
SCALE 1 : 250 M.

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (MSL.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL EXPOSED EDGES OF CONCRETE ARE TO BE CHAMFERED 2 cm, UNLESS OTHERWISE SHOWN.
3. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 ksc FOR STANDARD CYLINDER AT 28 DAYS (CLASS C)

REFERENCE DRAWING :

1. FLAP GATE, LAYOUT — HEE-FG-LO1
2. FLAP GATE, PLAN, SECTION AND DETAIL — HEE-FG-LO3
3. FLAP GATE, PLAN, SECTION OF CONTROL HOUSE AND REINFORCEMENT DETAIL — HEE-FG-LO4

NO.	DATE	REVISIONS	CHECKED	APPROVED
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MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
FLAP GATE

GENERAL PLAN AND SECTION

PANYA CONSULTANTS CO.,LTD.

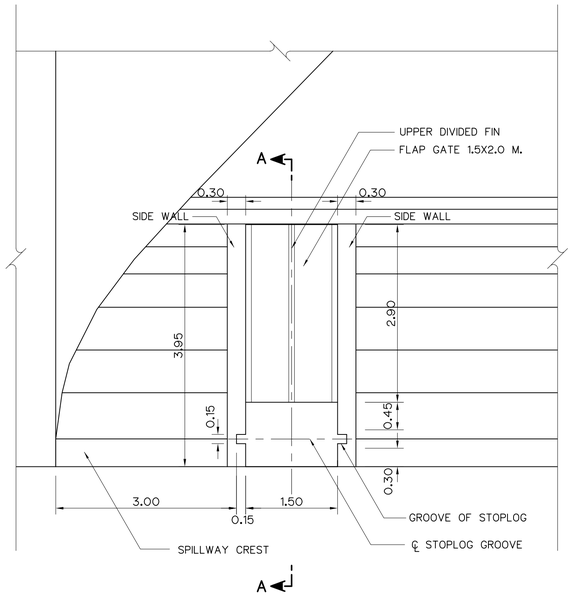
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MINISTRY OF ENERGY

DESIGNED	วิ.1957	วิ.72163	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิ.1957		RECOMMENDED
			APPROVED

PROJECT MANAGER — 10/08/2021 DATE

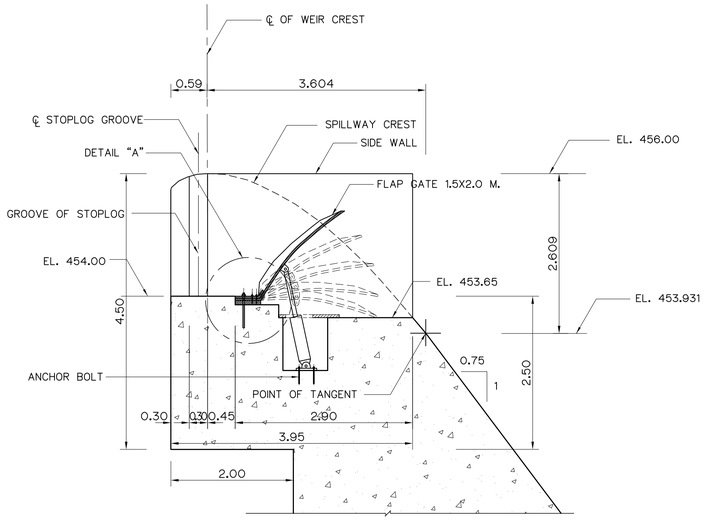
DRAWING NO. HEE-FG-LO2

SHEET NO. 86 OF 108



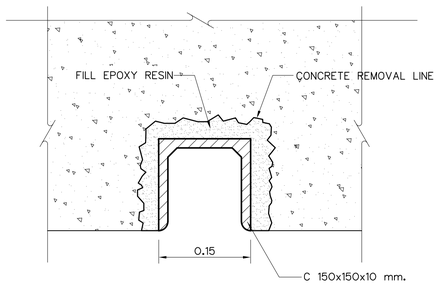
PLAN OF FLAP GATE

SCALE 1:50



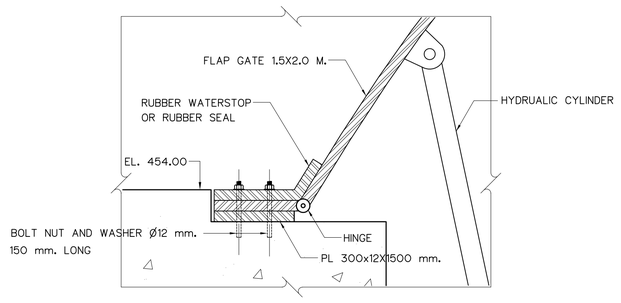
SECTION A–A

SCALE 1:50



GROOVE DETAIL OF STOP LOG

SCALE 1:5



DETAIL "A"

SCALE 1:10

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (MSL.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. THE CONTRACTOR MUST PRESENT THE FLAP GATE FORM METHOD OF INSTALLATION TO DUPE FOR APPROVAL BEFORE PROCEEDING.
3. TO ATTACHING THE SIDE WALL TO THE EXISTING WEIR STRUCTURE, USE INSTALL REBAR BY EPOXY IN DRILLING HOLES @0.30 AND 0.50 m DEEP.

0 0.05 0.1 0.2 0.3 0.4
SCALE 1 : 5 M.

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 M.

0 0.5 1.0 2.0 3.0 4.0
SCALE 1 : 50 M.

REFERENCE DRAWING :

1. FLAP GATE, LAYOUT	HEE-FG-LO1
2. FLAP GATE, GENERAL PLAN AND SECTION	HEE-FG-LO2

NO.	DATE	REVISIONS	CHECKED	APPROVED
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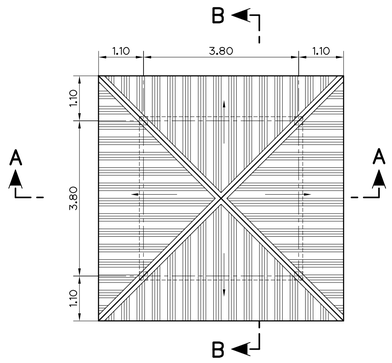
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
FLAP GATE
PLAN, SECTION AND DETAIL

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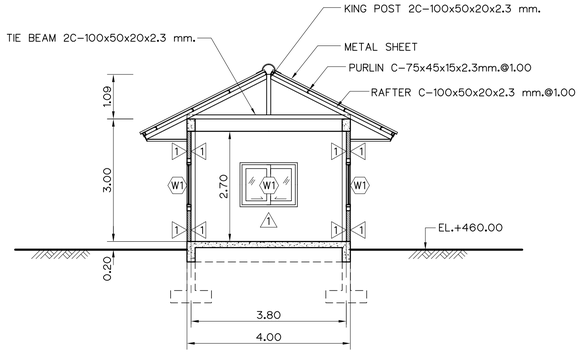
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MINISTRY OF ENERGY

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DRAWN		RECOMMENDED
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PROJECT MANAGER	10/08/2021 DATE	DRAWING NO. HEE-FG-LO3
		SHEET NO. 87 OF 108



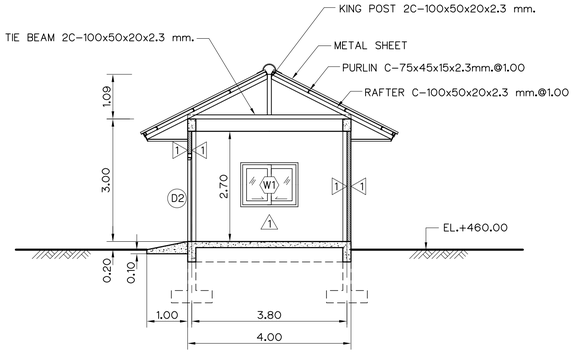
ROOF PLAN

SCALE 1:75



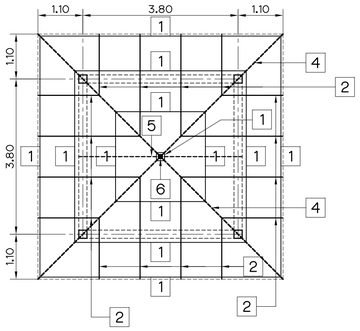
SECTION A-A

SCALE 1:75



SECTION B-B

SCALE 1:75

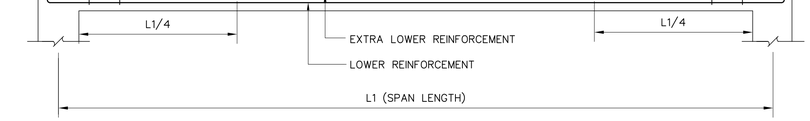


ROOF STRUCTURE PLAN

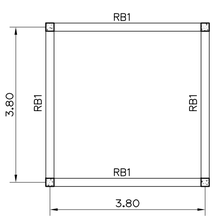
SCALE 1:75

DESCRIPTION

1	PURLIN	[	75x45x15x2.3mm.@1.00m.
2	RAFTER	[	100x50x20x2.3mm.@1.00m.
3	RIDGE	2- [	150x50x20x2.3mm.
4	HIP RAFTE	2- [	100x50x20x2.3mm.
5	TIE BEAM	2- [	100x50x20x2.3mm.
6	KING POST	⊠	100x100x2.3mm. OR
		2- [	100x50x20x2.3mm.

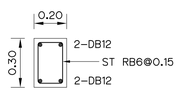


BEAM REINFORCEMENT DETAIL



ROOF BEAM PLAN

SCALE 1:75



RB1

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (ABOVE M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEEL ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DRAWING NO. HEE-GN-03
4. WELDING CONNECTION USE 4 mm. AND WELDING ROD USE E60, UNLESS OTHERWISE SHOWN.
5. ALL STRUCTURAL STEEL AND STEEL PLATES USE JIS G 3101 SS400.
6. ALL BOLTS AND NUTS USE ASTM A325
7. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 10 TON/M.^{2}

0 1.0 2.0 3.0 4.0 5.0 6.0

SCALE 1 : 75 M.

REFERENCE DRAWING :

1. FLAP GATE, LAYOUT	HEE-FG-L01
2. FLAP GATE, GENERAL PLAN AND SECTION	HEE-FG-L02
3. FLAP GATE, SLAB, BEAM, COLUMN AND FOOTING REINFORCEMENT OF CONTROL HOUSE	HEE-FG-L05

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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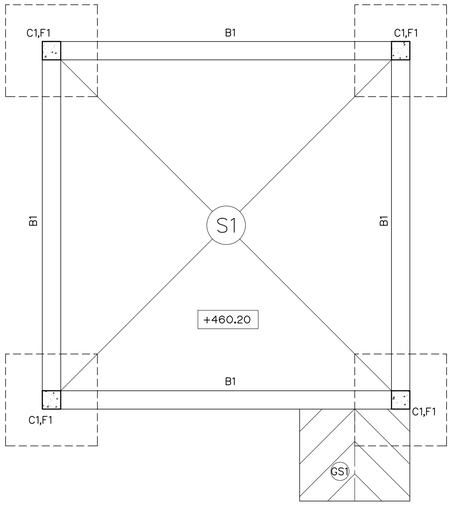
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
FLAP GATE

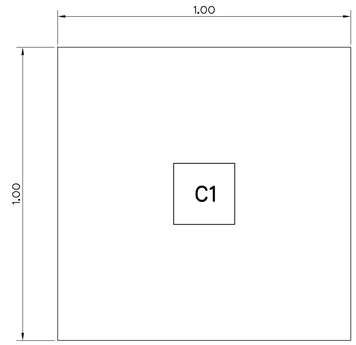
PLAN, SECTION OF CONTROL HOUSE AND REINFORCEMENT DETAILS

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CHECKED	วสิ.1957	APPROVED	
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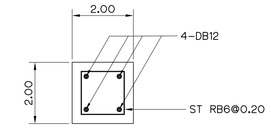
GROUND FLOOR PLAN

NOT TO SCALE



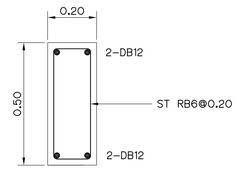
PLAN OF F1

NOT TO SCALE

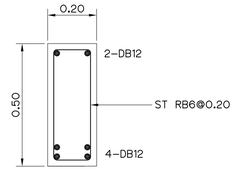


C1

NOT TO SCALE



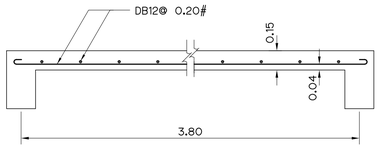
END



MIDDLE

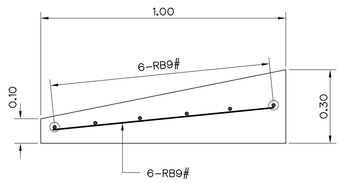
B1

NOT TO SCALE



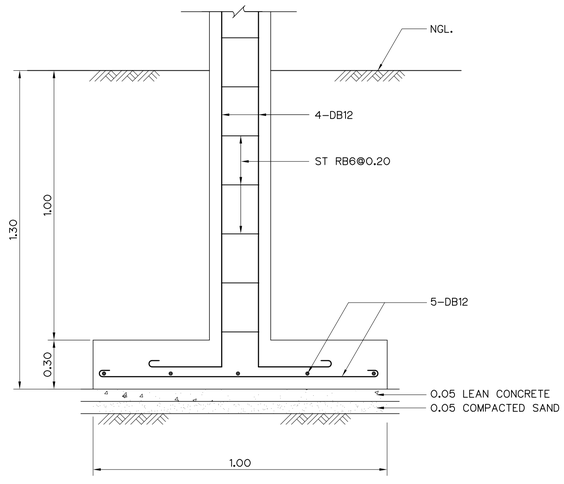
S1

NOT TO SCALE



GS1

NOT TO SCALE



SECTION OF F1

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (ABOVE M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEEL ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DRAWING NO. HEE-GN-03
4. WELDING CONNECTION USE 4 mm. AND WELDING ROD USE E60, UNLESS OTHERWISE SHOWN.
5. ALL STRUCTURAL STEEL AND STEEL PLATES USE JIS G 3101 SS400.
6. ALL BOLTS AND NUTS USE ASTM A325
7. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 10 TON/M^2.

REFERENCE DRAWING :

1. FLAP GATE, PLAN, SECTION OF CONTROL HOUSE AND REINFORCEMENT DETAIL HEE-FG-L04

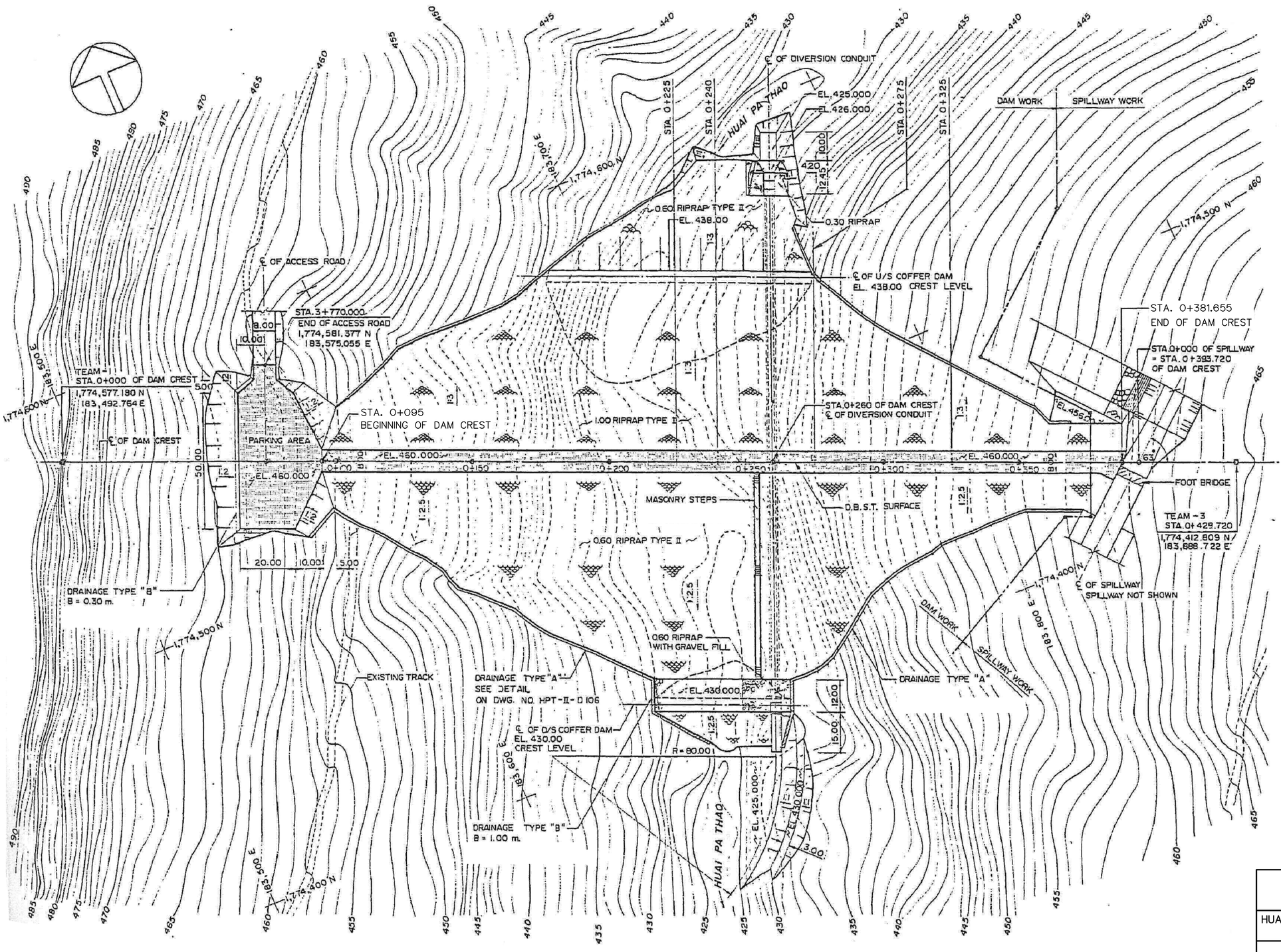
NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
FLAP GATE
SLAB, BEAM, COLUMN AND FOOTING REINFORCEMENT OF CONTROL HOUSE

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GENERAL PLAN

SCALE 1:750

REFERENCE DRAWING :

1. DAM CREST ROAD, LONGITUDINAL PROFILE	HEE-DR-LO2
2. DAM CREST ROAD, TYPICAL CROSS SECTION	HEE-DR-LO3

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (MSL.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HEE-GN-03.
3. HORIZONTAL CONTROL BENCH MARKS FOR CENTER LINE OF DAM ARE
   TEAM-1 @ 1,774,577.180 N
   183,492.764 E
   TEAM-3 @ 1,774,412.809 N
   183,888.722 E
4. VERTICAL CONTROL BENCH MARK FOR DAM WORK IS TEAM-1 @ EL.484.394 m. (MSL.)

0 5 10 20 30 50 70

SCALE 1 : 750 M.

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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
DAM CREST ROAD
GENERAL PLAN

NO.	DATE	REVISIONS	CHECKED	APPROVED
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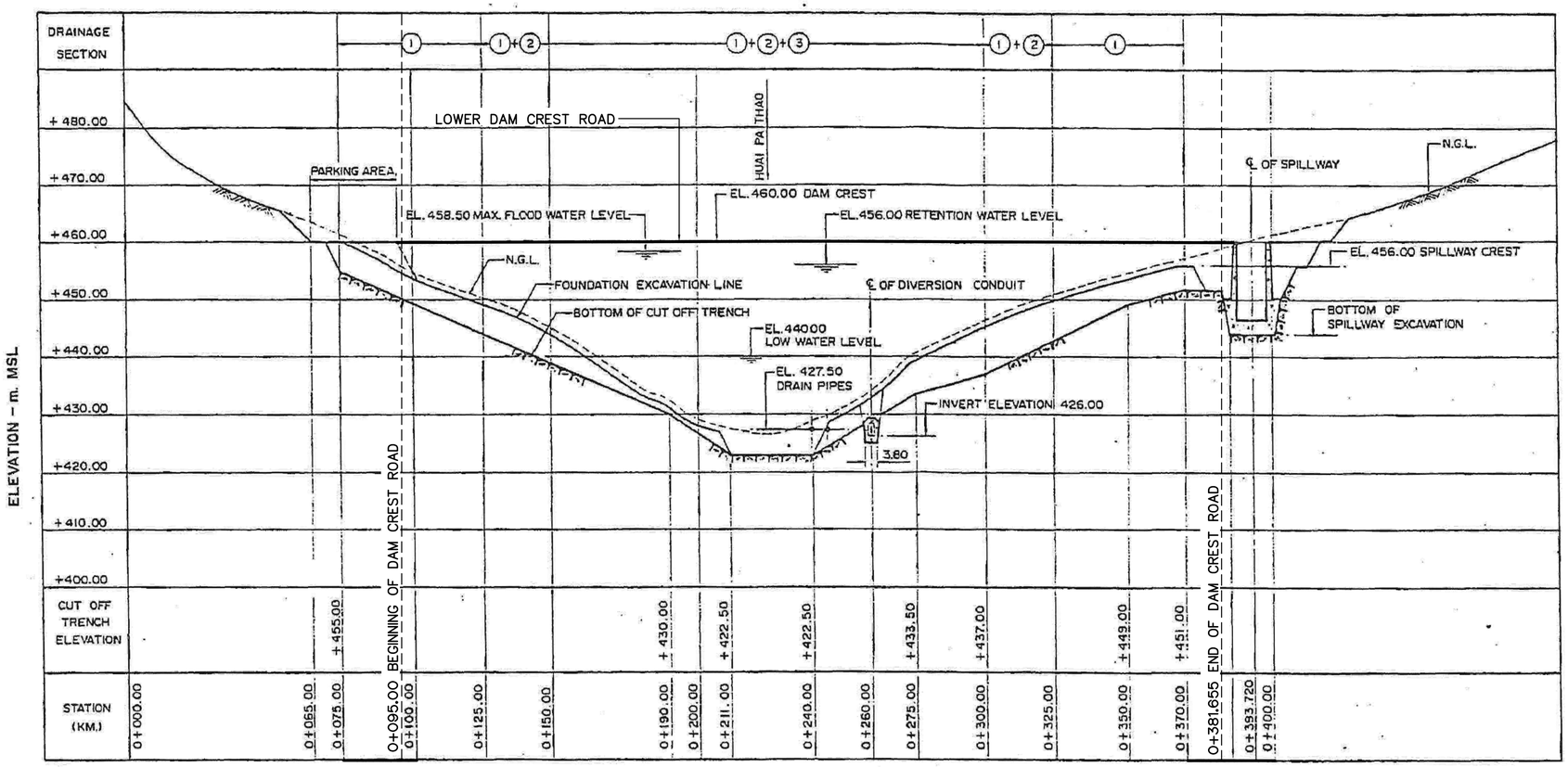
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DRAWING NO. HEE-DR-LO1

SHEET NO. 90 OF 108



LONGITUDINAL PROFILE

HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:500

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (MSL.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. DRAINAGE SECTIONS :
   - (1) = CHIMNEY DRAIN
   - (2) = BLANKET DRAIN
   - (3) = DRAIN PIPE

REFERENCE DRAWING :

1. DAM CREST ROAD, GENERAL PLAN	HEE-DR-L01
2. DAM CREST ROAD, TYPICAL CROSS SECTION	HEE-DR-L03

0 5 10 20 30 40 50
SCALE 1 : 500 M.

0 10 20 30 40 50 60 70 80 90 100
SCALE 1 : 1,000 M.

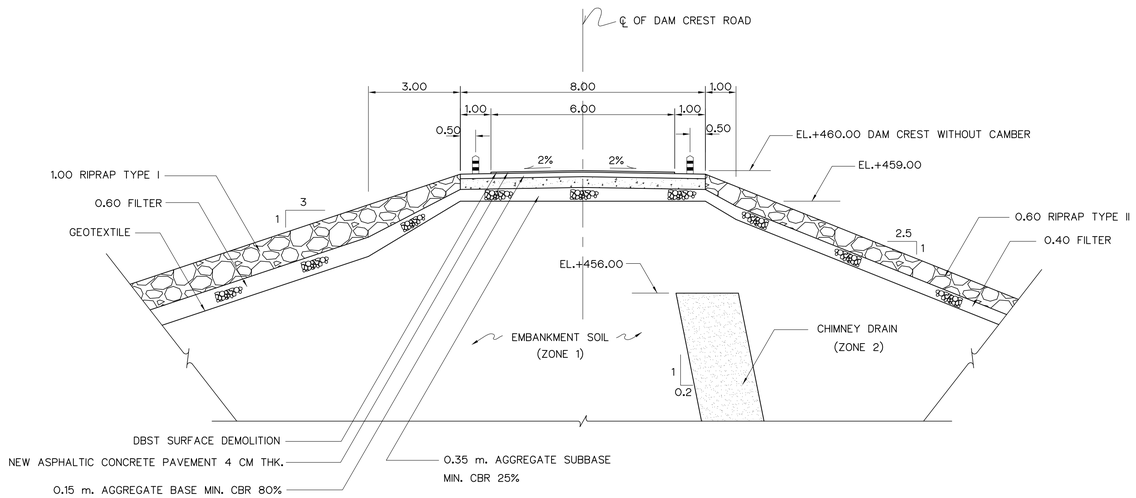
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
DAM CREST ROAD
LONGITUDINAL PROFILE

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PROJECT MANAGER — 10/08/2021 DATE	DRAWING NO. HEE-DR-L02 — SHEET NO. 91 OF 108



TYPICAL CROSS SECTION OF LOWER CREST DAM

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (MSL.) ARE IN METERS, UNLESS OTHERWISE SHOWN.

0 1 2 3 4 5 6 7 8 9 10

SCALE 1 : 100 METERS

REFERENCE DRAWING :

1. DAM CREST ROAD, GENERAL PLAN	HEE-DR-L01
2. DAM CREST ROAD, LONGITUDINAL PROFILE	HEE-DR-L02

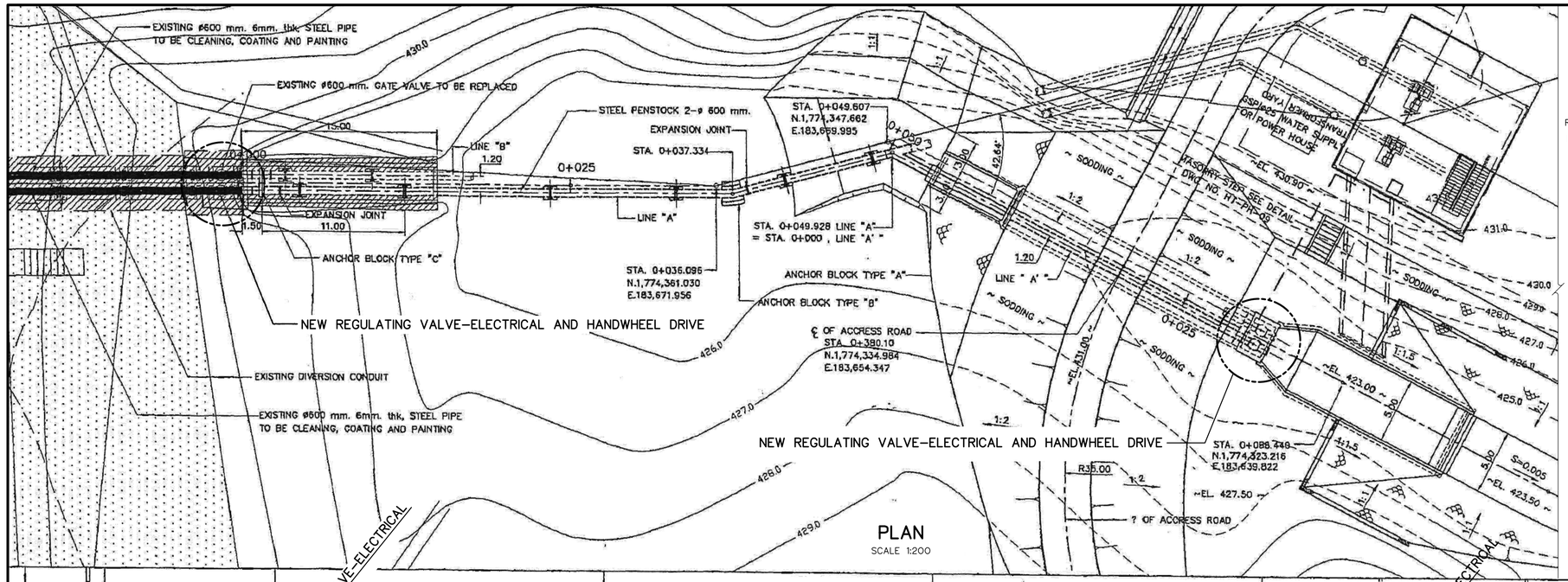
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KINGDOM OF THAILAND
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

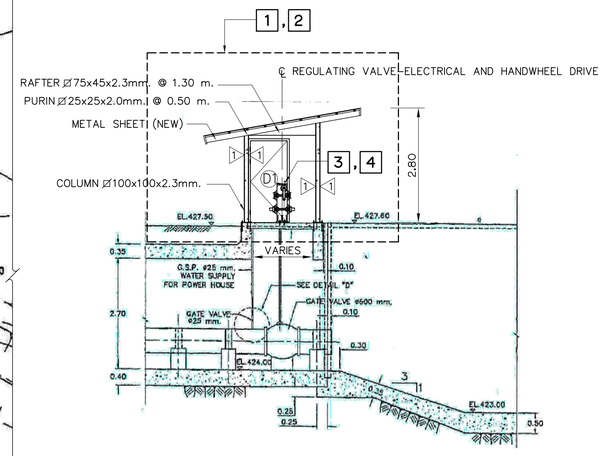
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
DAM CREST ROAD
TYPICAL CROSS SECTION

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	SHEET NO. 92 OF 108



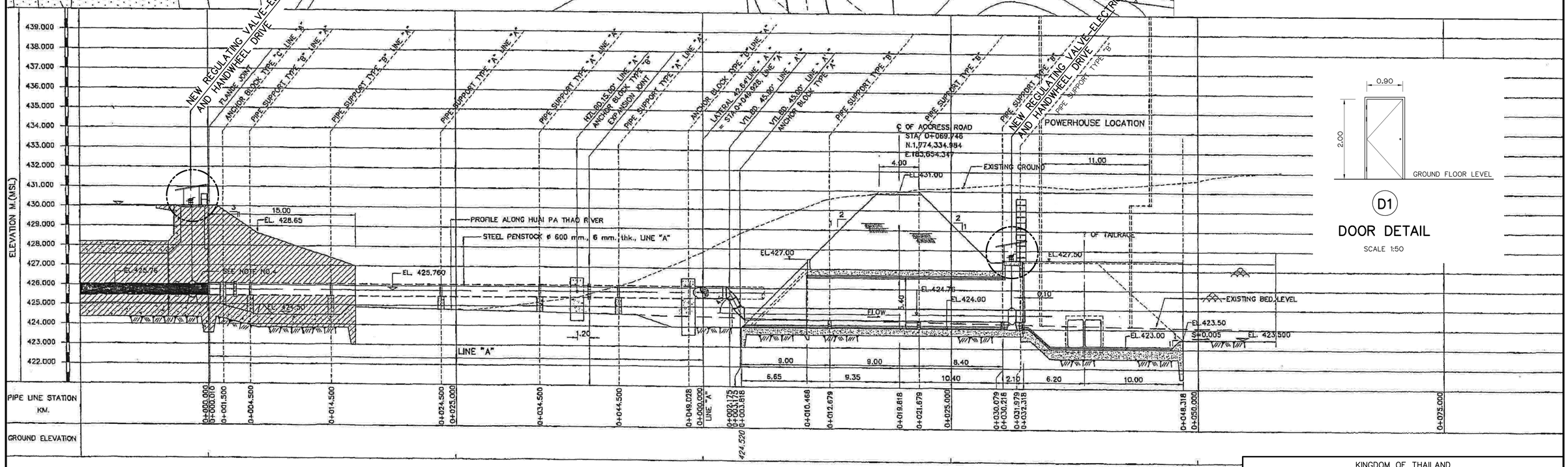
PLAN

SCALE 1:200



GENERAL SECTION

SCALE 1:75



D1

DOOR DETAIL

SCALE 1:50

PROFILE

HORIZONTAL SCALE 1:200

VERTICAL SCALE 1:100

SCALE 1 : 75 (0 1 2 3 4 5 6 7 M.)

SCALE 1 : 100 (0 1 2 3 4 5 6 7 8 9 10 M.)

SCALE 1 : 200 (0 5 10 15 20 M.)

REFERENCE DRAWING :

1. GENERAL, GENERAL LAYOUT HEE-GR-LO2

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (MSL.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE HEE-GN-03
3. EXISTING GATE VALVE SHALL BE REPLACED WITH THE NEW ONES.

WALL FINISH SYMBOLS :

1 CEMENT PLASTER

ITEMS	DESCRIPTIONS	LISTS OF IMPROVEMENT OR INSTALLATION
1	REGULATING VALVE CONTROL	ADD THE BUILDING AND COVER.
2	CLOSED CIRCUIT TELEVISION CAMERAS	NEW INSTALLING.
3	REGULATING VALVE	INSTALLING THE NEW ACTUATOR FOR ELECTRICAL REGULATING VALVE.
4	REGULATING VALVE	INSTALL THE NEW ON-OFF CONTROL CABINET REGULATING VALVE.

LEGEND :

EXISTING DIVERSION CONDUIT

EXISTING STEEL PIPE

0+053.746 STATIONS ALONG CENTER LINE OF CHANNEL

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

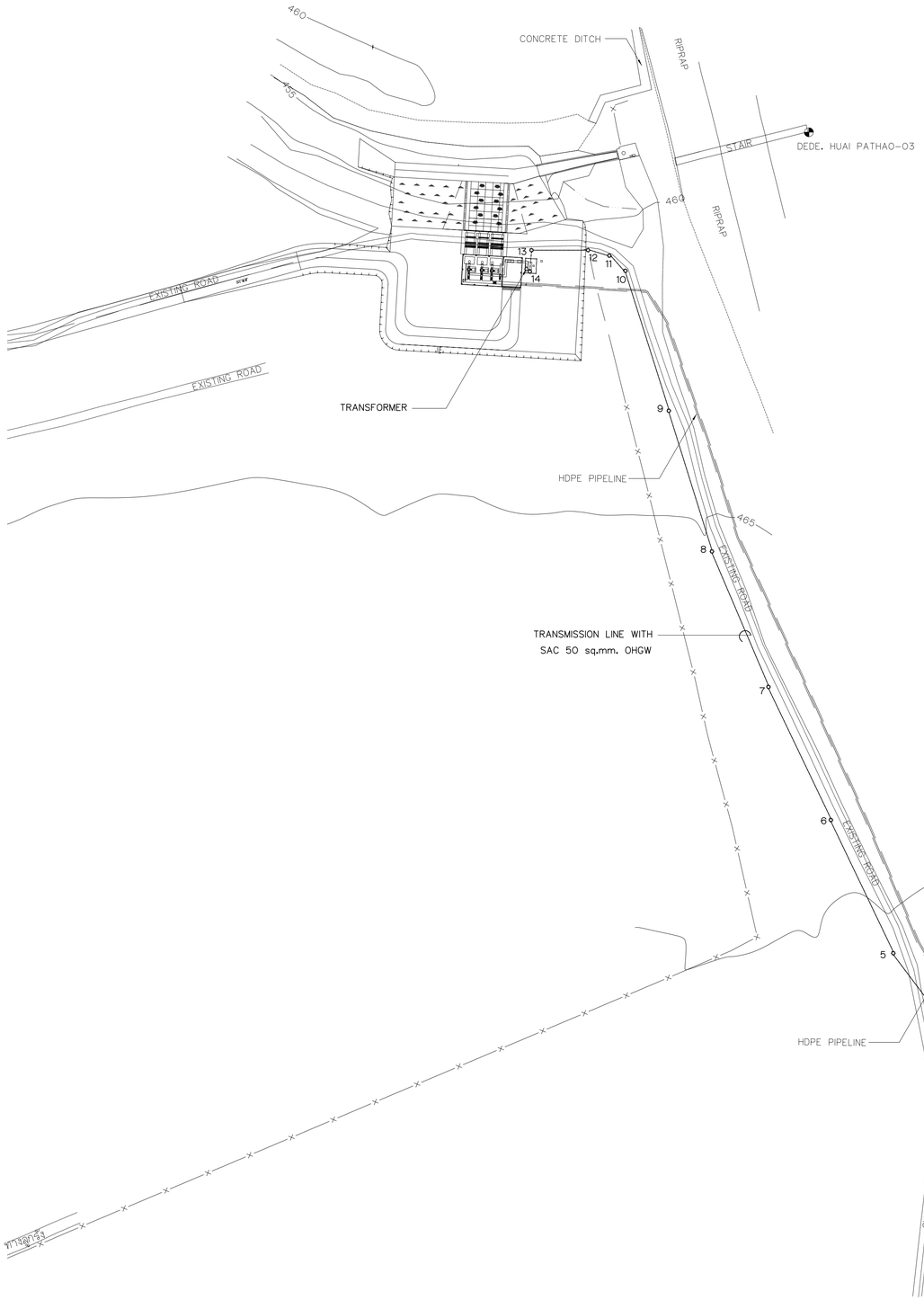
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
RIVER OUTLET

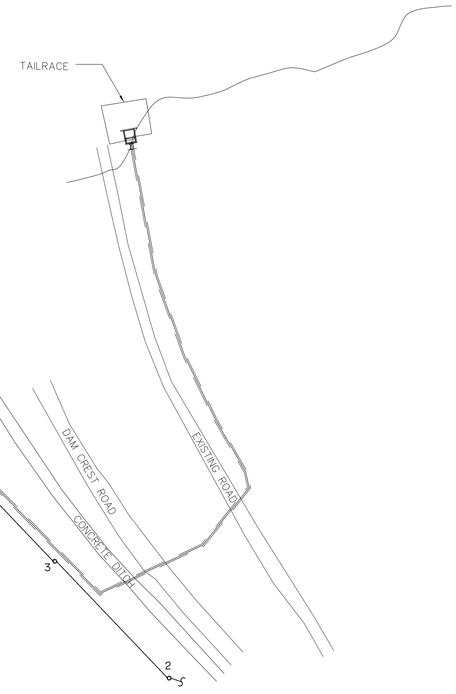
PLAN, PROFILE AND GENERAL SECTION

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METERING POINT 22 kV PEA INTERCONNECTION POLE
(AT EXISTING TRANSFORMER)

LAYOUT OF PUMP STATION
SCALE 1:750



AREA MAP
NOT TO SCALE

SYMBOL	DESCRIPTION
☼	CONCRETE POLE 22kV BASED ON PEA. STANDARD
———	TRANSMISSION LINE WITH SAC 50 sq.mm. OHGW BASED ON PEA. STANDARD
☼△☼	INSTALLING TRANSFORMER ON THE SCAFFOLD AND 22 kV HIGH VOLTAGE ELECTRICAL EQUIPMENT.

POLE NO.	DISTANCE (m)	TYPE
EXISTING POLE	0	–
1	40	A
2	40	A
3	40	A
4	40	A
5	40	B
6	40	A
7	40	A
8	40	A
9	40	A
10	40	C
11	7	B
12	7	C
13	18	D
14	7	E
Total	439	

REFERENCE DRAWING :

1. TRANSMISSION LINE, POLE TYPE "A" AND "B" HEE-TS-LO3
2. TRANSMISSION LINE, POLE TYPE "C" AND "D" HEE-TS-LO4
3. TRANSMISSION LINE, POLE TYPE "E" AND "F" HEE-TS-LO5
4. TRANSMISSION LINE, TYPE OF ANCHOR GUY HEE-TS-LO6

0 5 10 20 30 50 70
SCALE 1 : 750 M.

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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TRANSMISSION LINE
LAYOUT OF PUMP STATION

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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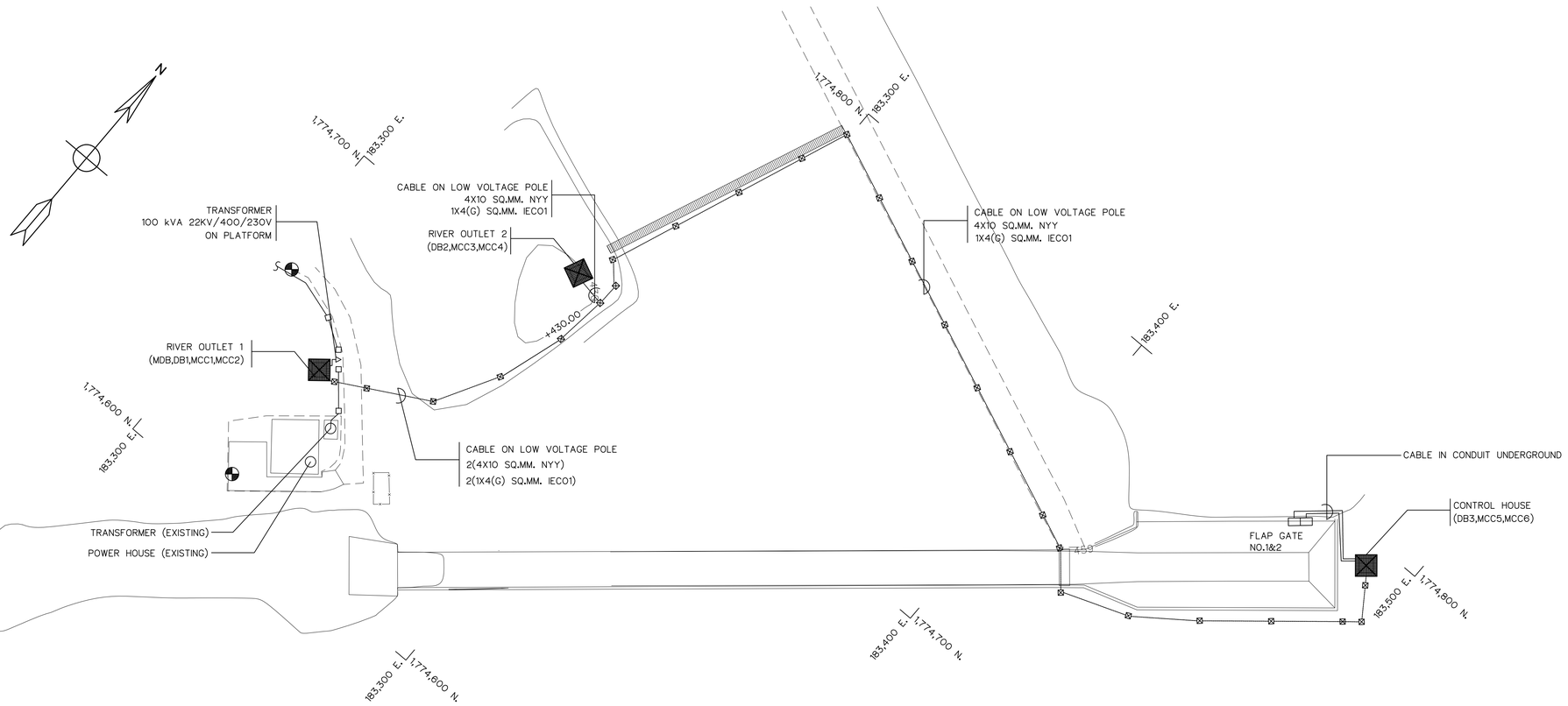
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10/08/2021 DATE	

DRAWING NO. HEE-TS-LO1

SHEET NO. 94 OF 108



LAYOUT OF FLAP GATE

SCALE 1:750

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.

0 5 10 20 30 40 50 60

SCALE 1 : 750 M.

REFERENCE DRAWING :

1. TRANSMISSION LINE, POLE TYPE "A" AND "B"	HEE-TS-L03
2. TRANSMISSION LINE, POLE TYPE "C" AND "D"	HEE-TS-L04
3. TRANSMISSION LINE, POLE TYPE "E" AND "F"	HEE-TS-L05
4. TRANSMISSION LINE, TYPE OF ANCHOR GUY	HEE-TS-L06

NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

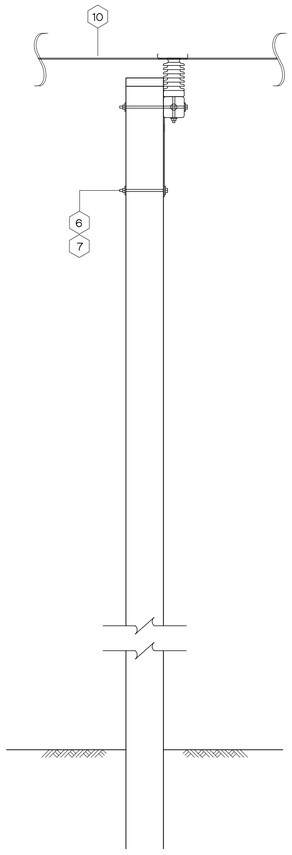
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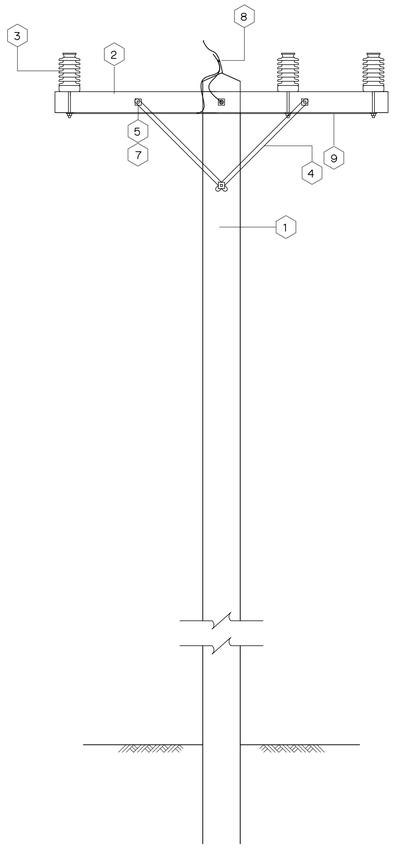
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TRANSMISSION LINE
LAYOUT OF FLAP GATE

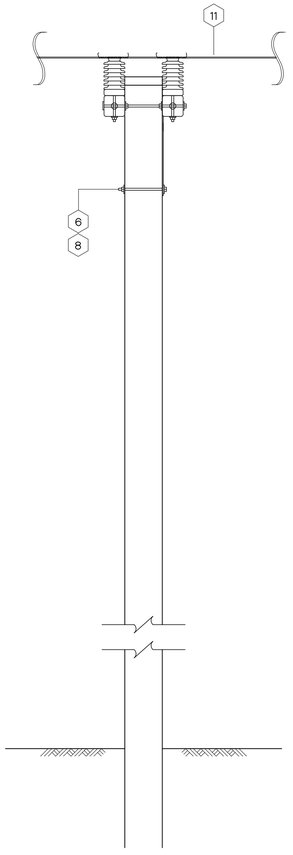
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DRAWN	RECOMMENDED
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PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-TS-L02 / SHEET NO. 95 OF 108

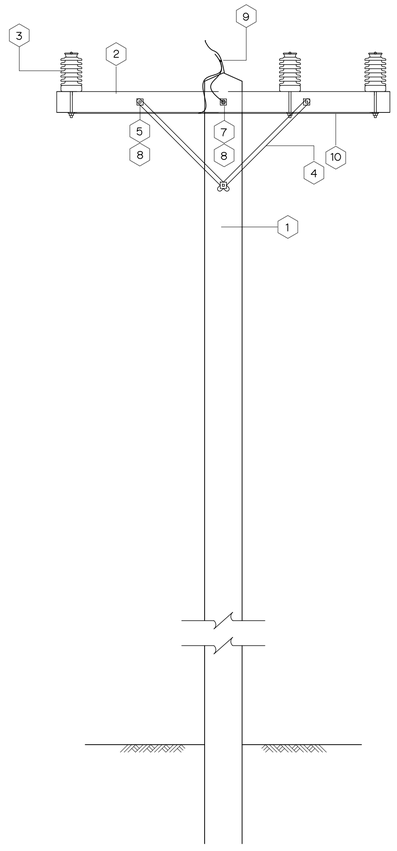
POLE TYPE "A"
(0°–5°)





POLE TYPE "B"
(5°–60°)





BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M. LONG
2	CROSSARM, SPUN PRESTERSSED CONCRETE, 120x120x2,000 mm.
3	INSULATOR, LINE POST TYPE, ANSI C 29.7 CLASS 57-2L
4	BRACE, FLAT, FOR CROSSARM, 30x6x760 mm.
5	BOLT, MACHINE, M16x170 mm.
6	BOLT, MACHINE, M16x200 mm.
7	WASHER, SQUARE FLAT, 52x52x4.5 mm. HOLE Dia. 18 mm. TIS 258
8	CLAMP, SINGLE U-BOLT, M 8
9	WIRE STEEL SOLID Dia. 4 MM.
10	25kV-CC (SAC)

BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M.LONG
2	CROSSARM, SPUN PRESTERSSED CONCRETE, 120x120x2,000 mm.
3	INSULATOR, LINE POST TYPE, ANSI C 29.7 CLASS 57-2L
4	BRACE, FLAT, FOR CROSSARM, 30x6x760 mm.
5	BOLT, MACHINE, M16x170 mm.
6	BOLT, MACHINE, M16x200 mm.
7	BOLT,MACHINE, M16x400 mm.
8	WASHER, SQUARE, FLAT, 52x52x4.5 mm. HOLE Dia. 18 mm.TIS 258
9	CLAMP, SINGLE U-BOLT, M 8
10	WIRE STEEL SOLID Dia. 4 MM.
11	25kV-CC (SAC)

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

REFERENCE DRAWING :

1. TRANSMISSION LINE, LAYOUT OF PUMP STATION HEE-TS-L01
2. TRANSMISSION LINE, LAYOUT OF FLAP GATE HEE-TS-L02

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

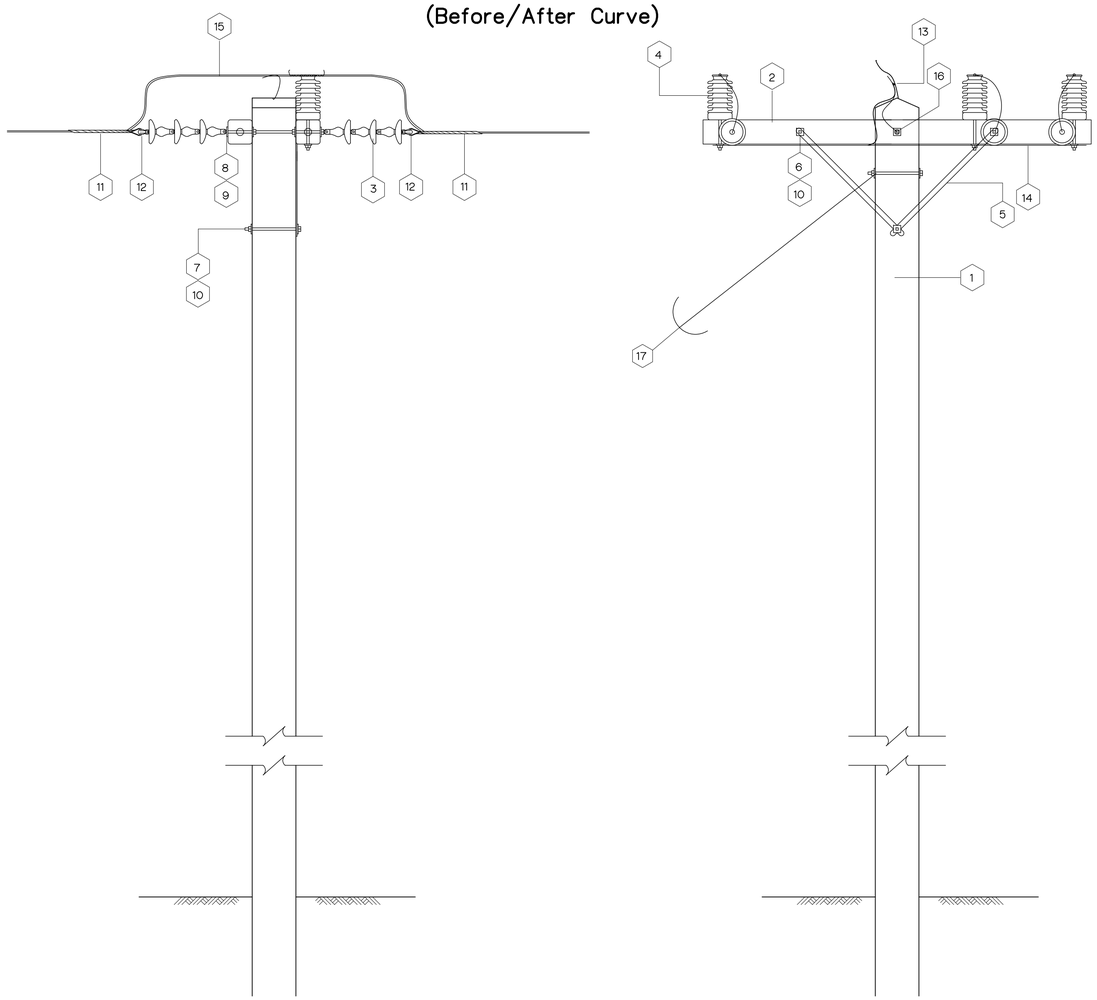
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TRANSMISSION LINE
POLE TYPE "A" AND "B"

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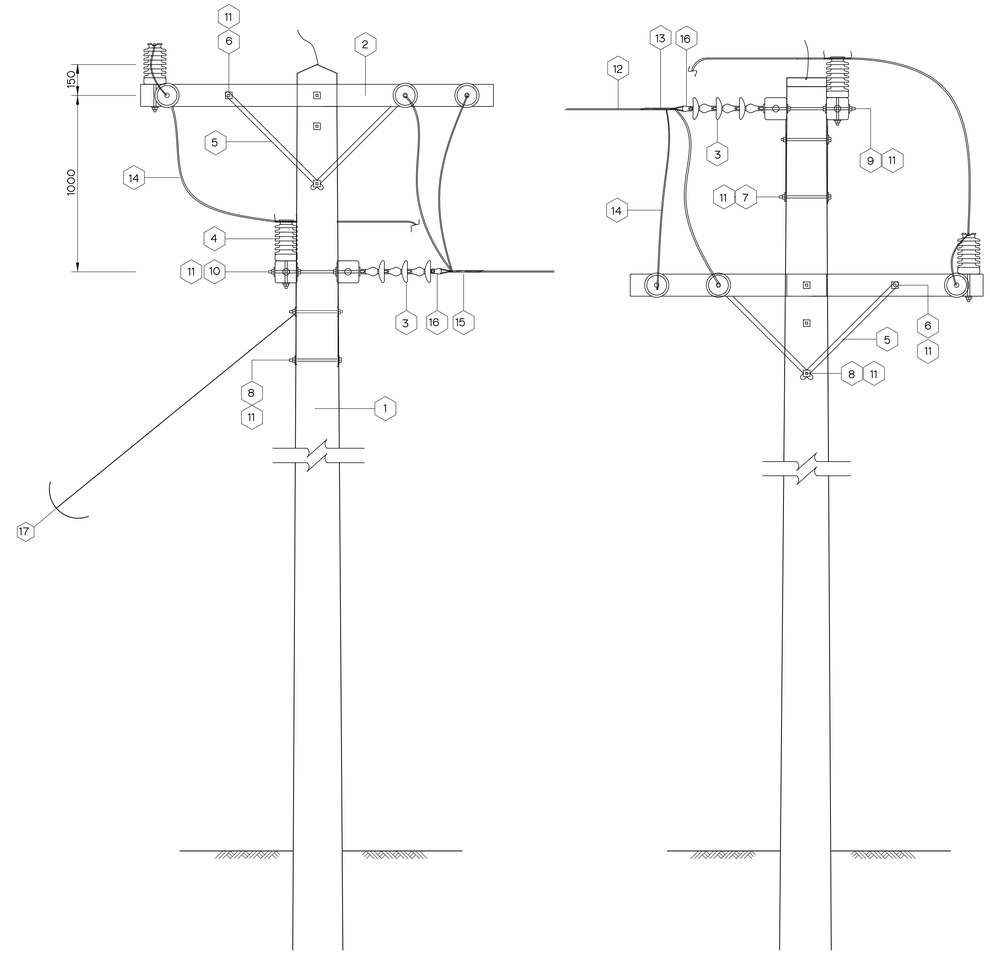
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วพก.604	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วพก.604	RECOMMENDED	
PROJECT MANAGER	10/08/2021 DATE	APPROVED	
		DRAWING NO.	HEE-TS-L03
		SHEET NO.	96 OF 108

POLE TYPE "C"
(Before/After Curve)



POLE TYPE "D"
(60-90°)



BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M. LONG
2	CROSSARM, SPUN PRESTERSSED CONCRETE, 120x120x2,000 mm.
3	INSULATOR, SUSPENSION TYPE, TIS 354 , TYPE A (CLASS 52-1)
4	INSULATOR, LINE POST TYPE, ANSI C 29.7 CLASS 57-2L
5	BRACE, FLAT, FOR CROSSARM, 30x6x760 mm.
6	BOLT, MACHINE, M16x170 mm.
7	BOLT, MACHINE, M16x200 mm.
8	BOLT,DOUBLE ARMING,ROUND EYE, M16x450 mm.
9	NUT, EYE, M 16, DIN 582
10	WASHER, SQUARE, FLAT, 52x52x4.5 mm. HOLE Dia. 18 mm.TIS 258
11	PREFORMED DEAD-END FOR SAC 35-95 sq.mm.
12	CLEVIS, THIMBLE, FOR PREFORMED DEAD-END
13	CLAMP, SINGLE U-BOLT, M 8
14	WIRE STEEL SOLID Dia. 4 MM.
15	25kV-CC (SAC)
16	WIRE STEEL STRANDED 50/7 DIN 48201
17	GUY (STEEL STANDARD WIRE 95 Sq.mm.)

BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M.LONG
2	CROSSARM, SPUN PRESTERSSED (FOR DEADENDING), 120x120x2,000 mm.
3	INSULATOR, SUSPENSION TYPE,TIS 354 , TYPE A (CLASS 52-1)
4	INSULATOR, LINE POST TYPE, ANSI C 29.7 CLASS 57-2L
5	BRACE, FLAT, FOR CROSSARM, 30x6x760 mm.
6	BOLT, MACHINE, M16x170 mm.
7	BOLT, MACHINE, M16x200 mm.
8	BOLT, MACHINE, M16x250 mm.
9	BOLT, DOUBLE ARMING, ROUND EYE, M16x450 mm.
10	BOLT, DOUBLE ARMING, ROUND EYE, M16x500 mm.
11	WASHER, SQUARE, FLAT, 52x52x4.5 mm. HOLE Dia.18 mm. TIS 258
12	ALUMINIUM CONDUCTOR STEEL REINFORCED
13	PERFOR DEAD-END FOR SAC 35-95 sq.mm.
14	25kV-CC (SAC)
15	PERFOR DEAD-END FOR AERIAL CABLE 50 sq.mm.
16	CLEVIS, THIMBLE, FOR PERFORMED DEAD-END
17	GUY (STEEL STANDARD WIRE 95 Sq.mm.)

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

REFERENCE DRAWING :

1. TRANSMISSION LINE, LAYOUT OF PUMP STATION HEE-TS-L01
2. TRANSMISSION LINE, LAYOUT OF FLAP GATE HEE-TS-L02

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TRANSMISSION LINE

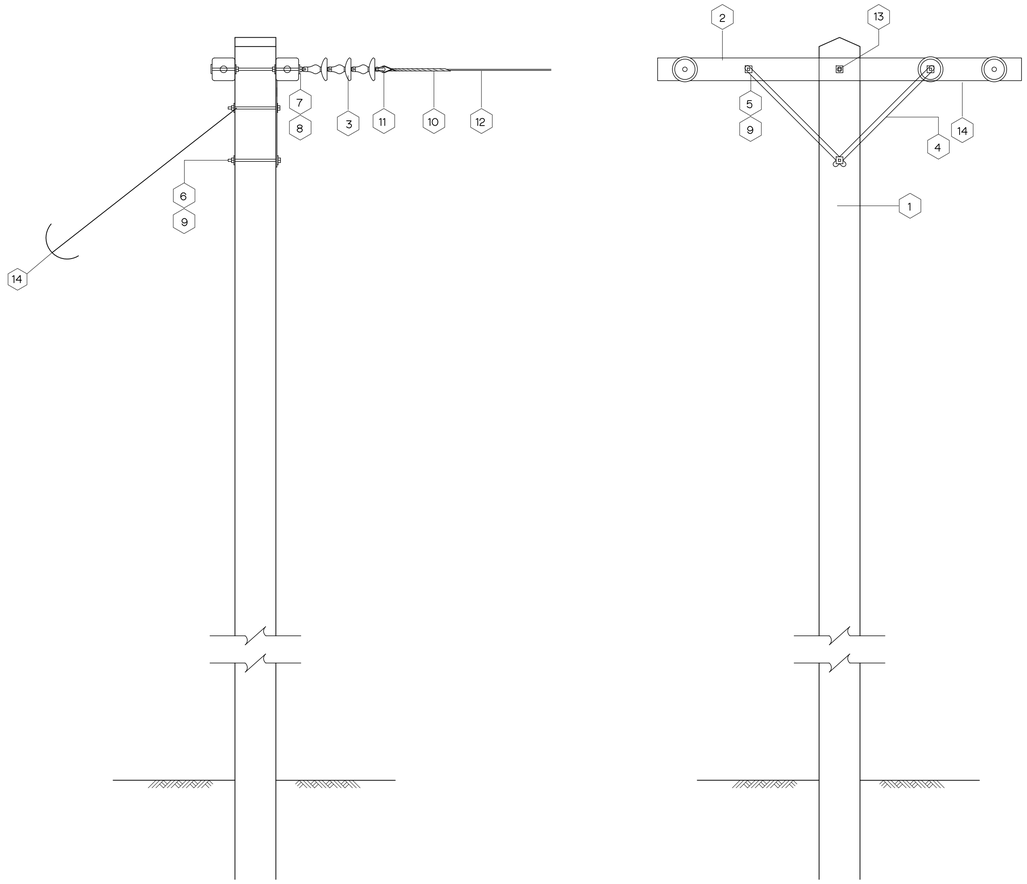
POLE TYPE "C" AND "D"

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

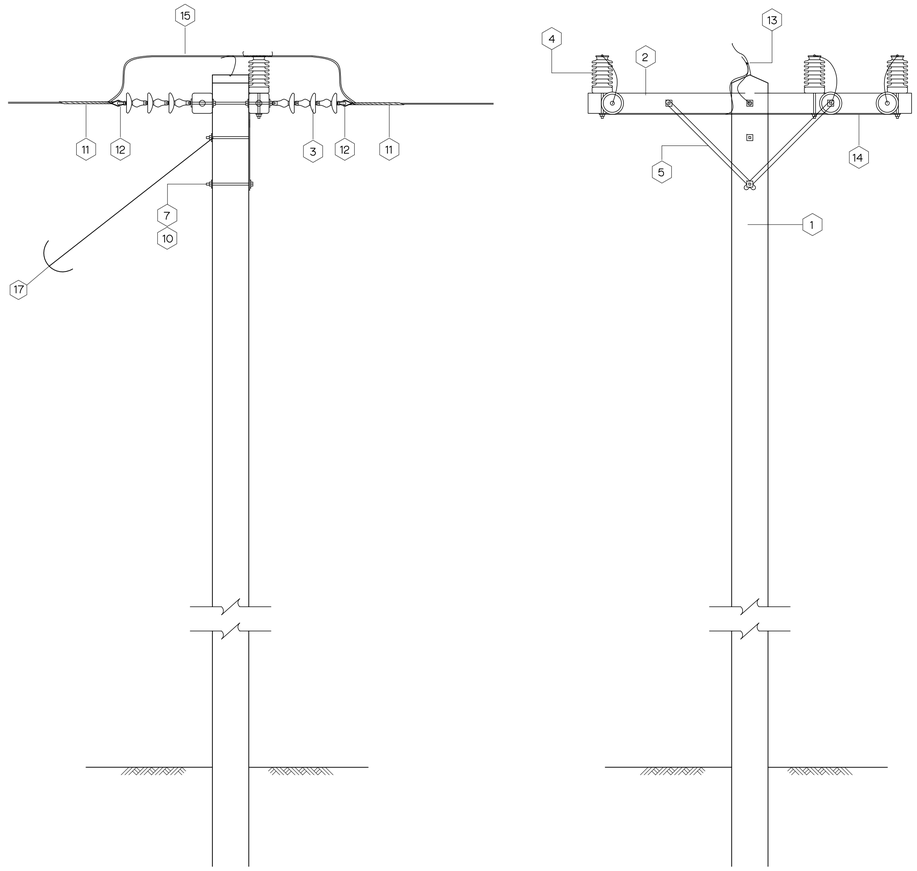
DESIGNED	วพ.604	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วพ.604	RECOMMENDED	
PROJECT MANAGER	10/08/2021 DATE	APPROVED	
		DRAWING NO.	HEE-TS-L04
		SHEET NO.	97 OF 108

POLE TYPE "E"
(End Pole)



BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M. LONG
2	CROSSARM, SPUN PRESTERSSED CONCRETE, 120x120x2,000 mm.
3	INSULATOR, SUSPENSION TYPE, TIS 354 , TYPE A (CLASS 52-1)
4	BRACE, FLAT, FOR CROSSARM, 30x6x760 mm.
5	BOLT, MACHINE, M16x170 mm.
6	BOLT, MACHINE, M16x200 mm.
7	BOLT, DOUBLE ARMING ,ROUND EYE, M16x450 mm.
8	NUT, EYE, M 16, DIN 582
9	WASHER, SQUARE, FLAT, 52x52x4.5 mm. HOLE Dia.18 mm.TIS 258
10	PREFORMED DEAD-END FOR SAC 35-95 sq.mm.
11	CLEVIS, THIMBLE, FOR PREFORMED DEAD-END
12	25kV-CC (SAC)
13	WIRE STEEL STRANDED 50/7 DIN 48201
14	GUY (STEEL STANDARD WIRE 95 Sq.mm.)

POLE TYPE "F"
(Before/After Curve)



BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M. LONG
2	CROSSARM, SPUN PRESTERSSED CONCRETE, 120x120x2,000 mm.
3	INSULATOR, SUSPENSION TYPE, TIS 354 , TYPE A (CLASS 52-1)
4	INSULATOR, LINE POST TYPE, ANSI C 29.7 CLASS 57-2L
5	BRACE, FLAT, FOR CROSSARM, 30x6x760 mm.
6	BOLT, MACHINE, M16x200 mm.
7	BOLT, DOUBLE ARMING, ROUND EYE, M16x450 mm.
8	NUT, EYE, M 16, DIN 582
9	WASHER, SQUARE, FLAT, 52x52x4.5 mm. HOLE Dia. 18 mm. TIS 258
10	PREFORMED DEAD-END FOR SAC 35-95 sq.mm.
11	CLEVIS, THIMBLE, FOR PREFORMED DEAD-END
12	CLAMP, SINGLE U-BOLT, M 8
13	WIRE STEEL SOLID Dia. 4 MM.
14	25kV-CC (SAC)
15	WIRE STEEL STRANDED 50/7 DIN 48201
16	GUY (STEEL STANDARD WIRE 95 Sq.mm.)

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

REFERENCE DRAWING :

1. TRANSMISSION LINE, LAYOUT OF PUMP STATION	HEE-TS-LO1
2. TRANSMISSION LINE, LAYOUT OF FLAP GATE	HEE-TS-LO2

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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

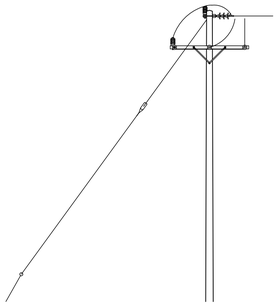
PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TRANSMISSION LINE
POLE TYPE "E" AND "F"

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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	CONSULTANTS		DEDE	

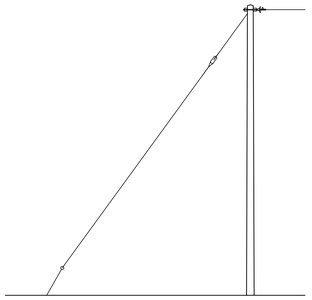
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DESIGNED วพ.604	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วพ.604	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-TS-LO5
	SHEET NO. 98 OF 108

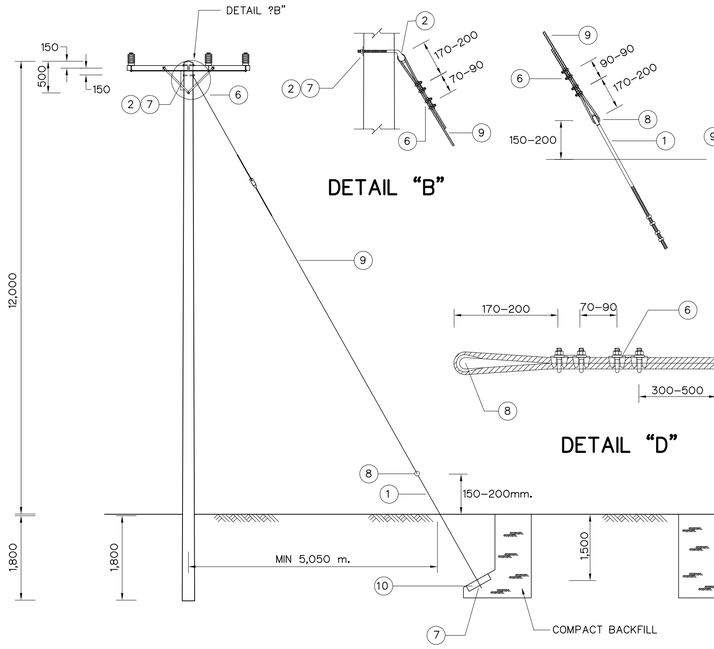


G5
BUCK ARM, 60°– 90°
DEAD END GUY

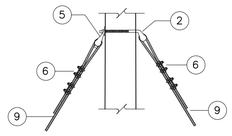


G4
DEAD END GUY

METHOD OF SINGLE ANCHOR GUY



DETAIL "B"



DETAIL"C"

DETAIL "D"

METHOD OF DOUBLE ANCHOR GUY

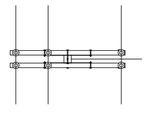
BILL OF MATERIAL FOR ANCHOR GUY							
ITEM	DESCRIPTION	REQ'D					
		G1	G2	G3	G4	G5	G6
1	ANCHOR ROD, M. 16 x 2,000 mm. COMPLETE WITH SQUARE NUT	1	1	2	1	2	4
2	BOLT, SINGLE STRANDED EYE 45° M. 16 x 250 mm. COMPLETE WITH SQUARE NUT	1	1	1	1	2	2
3	BOLT, SINGLE STRANDED EYE 30° M. 16 x 250 mm. COMPLETE WITH SQUARE NUT	–	1	–	1	2	–
4	BOLT, DOUBLE ARMING, ROUND EYE, M. 16 x 200 mm. COMPLETE WITH SQUARE NUT	–	–	–	–	–	–
5	STRAND EYE SINGLE ANGLE 45°	–	–	1	–	–	2
6	CLAMP, DOUBLE U–BOLT, M. 16 mm.	4	8	8	8	16	16
7	WASHER, SQUARE FLAT 50 x 50 x 5 mm. HOLE Ø18 mm.	2	2	2	4	6	4
8	GUY, THIMBLE, FOR STEEL STRANDED WIRE 50 Sq.mm.	1	2	2	2	4	4
9	STEEL STRANDED WIRE 50 Sq.mm.	15 m.	35 m.	30 m.	35 m.	70	60
10	CONCRETE ANCHOR 550 x 550 x 180 mm.	1	1	2	2	2	4
11	STRAIN INSULATOR CLASS 54–4	1	1	2	2	2	4

NOTE :

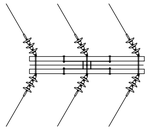
1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

REFERENCE DRAWING :

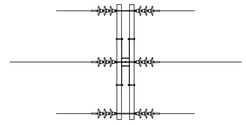
1. TRANSMISSION LINE, LAYOUT OF PUMP STATION HEE–TS–LO1
2. TRANSMISSION LINE, LAYOUT OF FLAP GATE HEE–TS–LO2



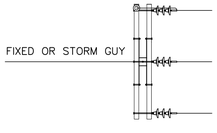
G1
SIDE GUY 5°– 30°



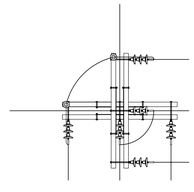
G2
SIDE GUY 30°– 60°



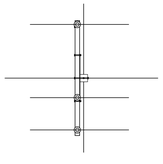
G3
LINE GUY



G4
DEAD END GUY



G5
BUCK ARM, 60°– 90°
DEAD END GUY



G6

KINGDOM OF THAILAND
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 1 CIVIL WORKS AND TRANSMISSION LINE
LOWER DAM
TRANSMISSION LINE
TYPE OF ANCHOR GUY

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

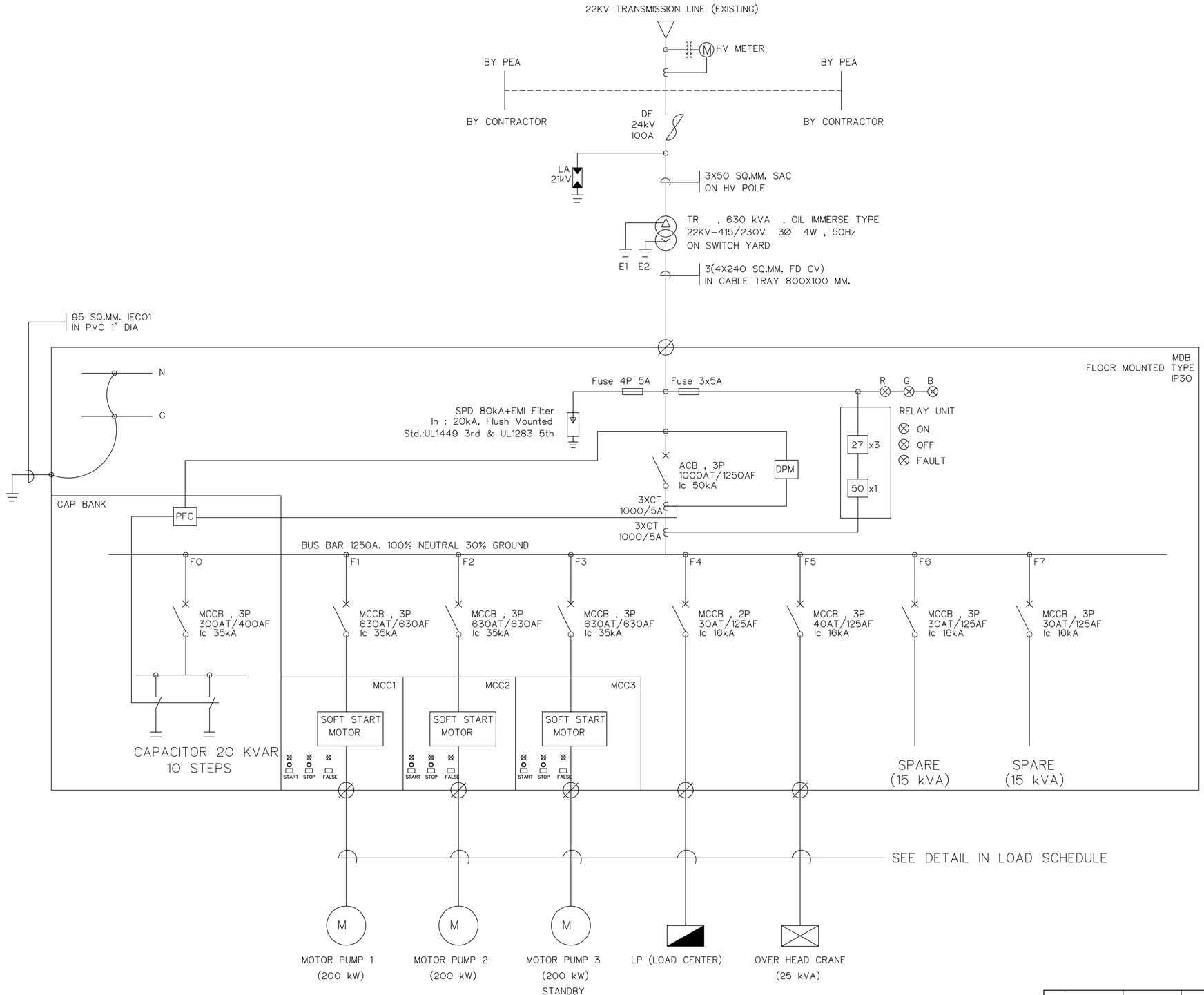
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DRAWN		SUBMITTED	
CHECKED	วพก.604	RECOMMENDED	
PROJECT MANAGER	10/08/2021 DATE	APPROVED	

DRAWING NO. HEE–TS–LO6

SHEET NO. 99 OF 108



SINGLE LINE DIAGRAM

NOT TO SCALE

LEGEND

STEP-UP POWER TRANSFORMER	12	OVER SPEED DEVICE
WITHDRAWABLE AIR CIRCUIT BRKAKER (ACB)	13	SYNCHRONOUS-SPEED DEVICE
MOLDED CASE CIRCUIT BREAKER (MCCB)	14	UNDER SPEED DEVICE
DISCONNECTING SWITCH	15	SPEED OR FREQUENCY , MATCHING DEVICE
DISCONNECTING SWITCH WITH FUSE	25	SYNCHRONOUS CHECK DEVICE
FUSE	27	UNDER VOLTAGE RELAY
LIGHTNING ARRESTER	32	DIRECTIONAL POWER REALY
FREQUENCY METER	38	BEARING PROTECTIVE DEVICE
VOLT METER	39	RESERVE FOR FUTURE APPLICATION
AMP METER	40	FIELD RELAY
WATT METER	46	REVERSE-PHASE , PHASE BALANCE
SELECTOR SWITCH	50	INSTANTANEOUS OVER CURRENT
CURRENT TRANSFORMER	51	A-C TIME OVER CURRENT RELAY
POTENTIAL TRANSFORMER	57	SHORT CIRCUITING , GROUNDING DEVICE
SYNCHRO CHECK RELAY	60	VOLTAGE BALANCE REALY
REMANENT UNDER VOLTAGE RELAY	64	GROUND PROTECTIVE RELAY
UNDER AND OVER VOLTAGE RELAY	81	FREQUENCY RELAY (OVER/UNDER)
REVERSE POWER RELAY	87	DIFFERENTIAL PROTECTION RELAY
PHASE OVERCURRENT RELAY	88	AUXILIARY MOTOR , MOTOR GENERATOR
GROUND OVERCURRRENT RELAY	90	REGULATING DEVICE
RESIDUAL VOLTAGE RELAY		
DIRECTIONAL PHASE FAULT RELAY		
DIRECTIONAL GROUD FAULT RELAY		
EMERGENCY DIESEL GENERATOR		
WYE CONNECTION		
DELTA CONNECTION		
OPENED DELTA CONNECTION		
STATION SURGE ARRESTER		
MECHANICAL INTERLOCK		

NO.	DATE	REVISIONS	CHECKED	APPROVED
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Department of Alternative Energy Development and Efficiency
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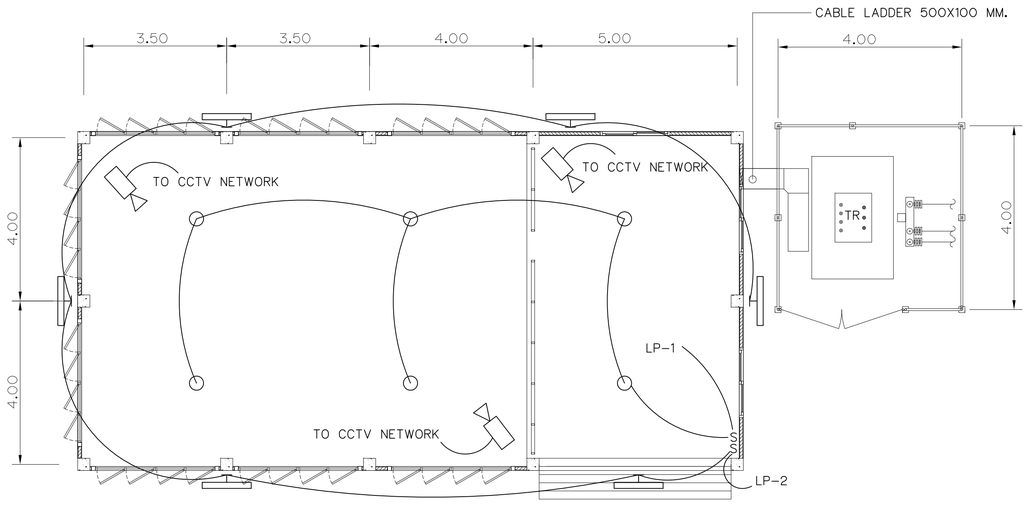
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
PUMP STATION
SINGLE LINE DIAGRAM

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

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DESIGNED วพก.604	SUBMITTED
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CHECKED วพก.604	APPROVED
PROJECT MANAGER / DATE 10/08/2021	DRAWING NO. HEE-EM-LO1
	SHEET NO. 100 OF 108

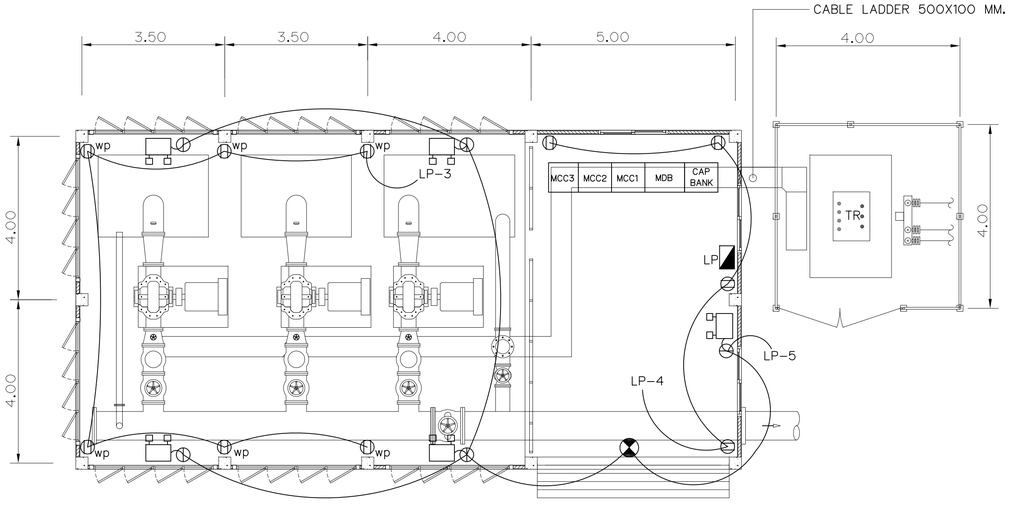


LIGHTING PLAN

DIAGRAM	LOAD SCHEDULE												
	PANEL NO : MDB ELECTRICAL SYSTEM : 3Ø, 4w, 400/230 v, 50Hz												
	MAX CKT : 7 LOCATION :PUMP STATION MOUTED : FLOOR												
N R S T	CKT NO.	DESCRITION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA) R	S	T	
G	0	CAP BANK	3	300	400									
	1	MOTOR PUMP 1	3	630	630		2(3X150)/1X35G	NYY	CABLE TRAY		81000	81000	81000	
	2	MOTOR PUMP 2	3	630	630		2(3X150)/1X35G	NYY	CABLE TRAY		81000	81000	81000	
	3	MOTOR PUMP 3	3	630	630		2(3X150)/1X35G	NYY	CABLE TRAY		81000	81000	81000	STANDBY
	4	LP	2	30	125		2X6/1X2.5G	IEC01	1/2	EMT	5420			
	5	OVERHEAD CRANE	3	45	125		4X16/1X6G	IEC01	1	EMT	8400	8400	8400	
	6	SPARE	3	30	125						5000	5000	5000	
	7	SPARE	3	30	125						5000	5000	5000	
						35 KA < 50								
	MAIN BREAKER: ☑ LUG :☐		3	1000	1250		CONDUCTOR : 3(4x240q.mm NYY) 1x95(G)q.mm IEC01				185820	180400	180400	
	BUS PHASE : 1250 A										100% LOAD: 545620 VA			
	INCOME LINE :TR CAP : 630KVA						WIRING IN CABLE TRAY							

DIAGRAM	LOAD SCHEDULE											
	PANEL NO : LP ELECTRICAL SYSTEM : 1Ø, 3w, 230 v, 50Hz											
	MAX CKT : 6 LOCATION :PUMP STATION MOUTED : WALL											
N L	CKT NO.	DESCRITION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA)	
	1	LIGHTING	1	16	50		2x2.5/1x2.5	IEC01	1/2	EMT	1200	ROOM
	2	LIGHTING	1	16	50		2x2/1x2.5	IEC01	1/2	EMT	200	EXTERNAL
	3	RECEPTACLE	1	20	50		2x4/1x2.5	IEC01	1/2	EMT	1320	ROOM
	4	RECEPTACLE	1	20	50		2x4/1x2.5	IEC01	1/2	EMT	880	ROOM
	5	RECEPTACLE	1	20	50		2x4/1x2.5	IEC01	1/2	EMT	1320	EMERGENCY & FIRE EXIT
	6	SPARE	1	16	50						500	
G	MAIN BREAKER: ☑ LUG : ☐		2	30	50		CONDUCTOR : 2x6/2.5G sq.mm IEC01				100% LOAD: 5420 VA	
	BUS PHASE : 50 A											
	INCOME LINE : MDB						WIRING IN CONDUIT 1/2" DIA EMT					

REMARKS: CB "E" IS EARTH LEAK CIRCUIT BREAKER 30 mA.



POWER ELECTRICAL PLAN

0 1.0 2.0 3.0 4.0 5.0 6.0

SCALE 1 : 75 M.

KINGDOM OF THAILAND
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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
PUMP STATION
LIGHTING AND POWER ELECTRICAL PLAN

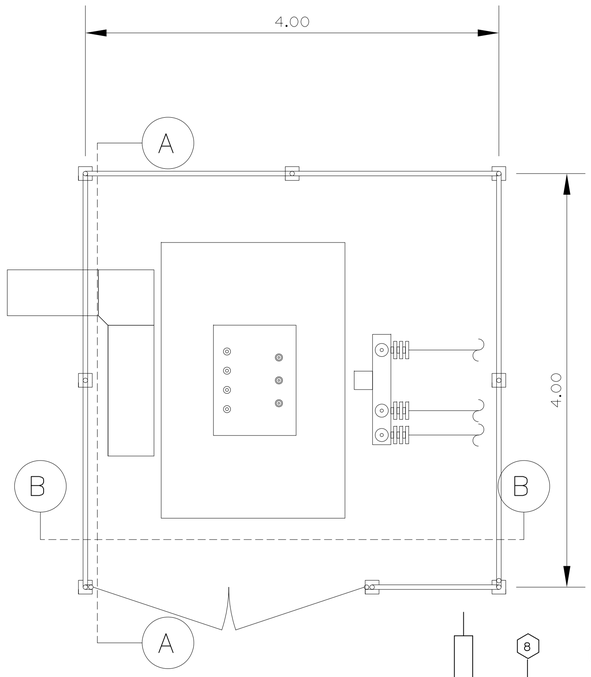
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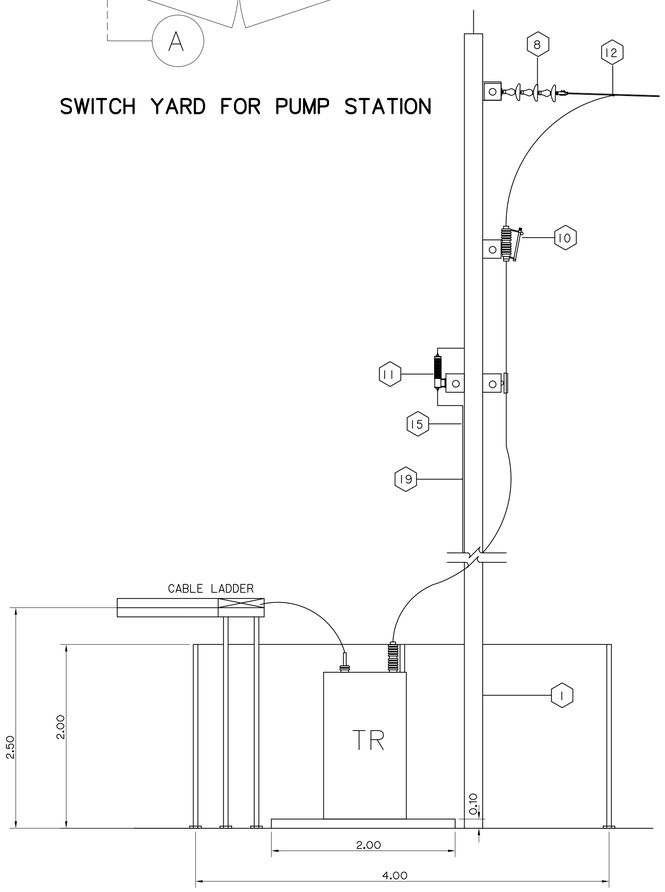
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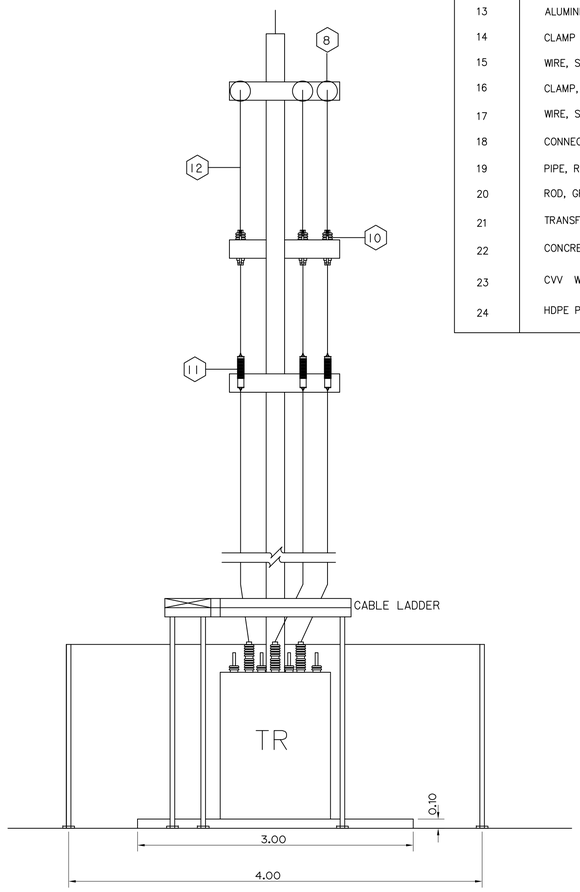
REVIEWED	
DESIGNED ว่าที่ร.ต.ดล	SUBMITTED
DRAWN	RECOMMENDED
CHECKED ว่าที่ร.ต.ดล	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-EM-L02
	SHEET NO. 101 OF 108



SWITCH YARD FOR PUMP STATION



SECTION "B"



SECTION "A"

BILL OF MATERIAL

ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M.LONG
2	CROSSARM,SPUN PRESTERSSED CONCRETE,100x100x2,500 mm.
3	CROSSARM,SPUN PRESTERSSED CONCRETE,120x120x2,000 mm.
4	BEAM SPUN, PRESTRESSD CONCRETE, 100x100x3,200 mm.
5	CONCRETE BEAM 150x250x3,450 mm.FOR TRANS.PLATFORM
6	BRACE,FLAT,FOR CROSSARM,30x6x760 mm.
7	BOLT,MACHINE HEXAGON M16x550 mm.
8	INSULATOR, SUSPENSION TYPE (CLASS 52-1)
9	INSULATOR, LINE POST TYPE CLASS 57-2L
10	CUT-OUT,FUSE, OPEN TYPE, SINGLE INSULATOR, DROP-OUT 100A.
11	SURGE ARRESTERS 3 kV. 5 kA.
12	CABLE 50 sq.mm SAC
13	ALUMINIUM CONDUCTOR STEEL REINFORCED
14	CLAMP STRAIN FOR Al 35-70 sq.mm.
15	WIRE, STEEL STRANDED, 50/7 DIN 48201
16	CLAMP, SINGLE U-BOLT, M 8
17	WIRE, STEEL, SOLID, DIMETER 4 mm.
18	CONNECTOR, PARALLEL GROOVE, DOUBLE BOLT, Al 25-95 sq.mm.
19	PIPE, RIGID PVC. 20x2,500 mm. COMP. WITH FIXER
20	ROD, GROUND 60x60x5 mm. 2,000 mm. LONG
21	TRANSFORMER 3 PHASE 22KV-400/230 V.
22	CONCRETE 1 : 2 : 4
23	CVV WIRE
24	HDPE PIPE

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MINISTRY OF ENERGY

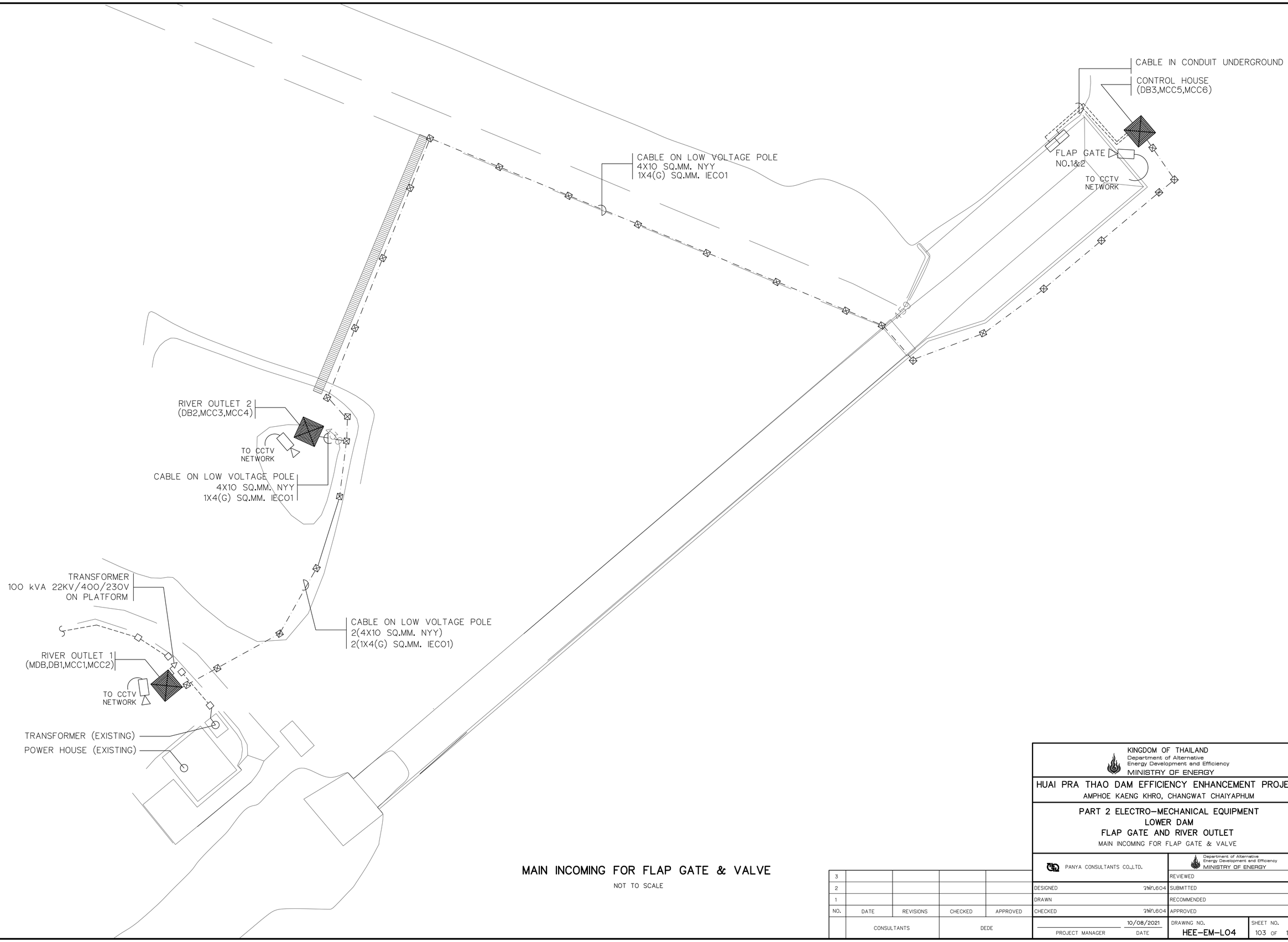
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
PUMP STATION
TYPICAL DETAIL FOR TRANSFORMER INSTALLATION

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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CONSULTANTS: PANYA CONSULTANTS CO.,LTD.
DEDE: Department of Alternative Energy Development and Efficiency, MINISTRY OF ENERGY

DESIGNED	วพ.604	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วพ.604	RECOMMENDED	
PROJECT MANAGER	10/08/2021 DATE	APPROVED	
DRAWING NO.	HEE-EM-L03	SHEET NO.	102 OF 108



MAIN INCOMING FOR FLAP GATE & VALVE

NOT TO SCALE

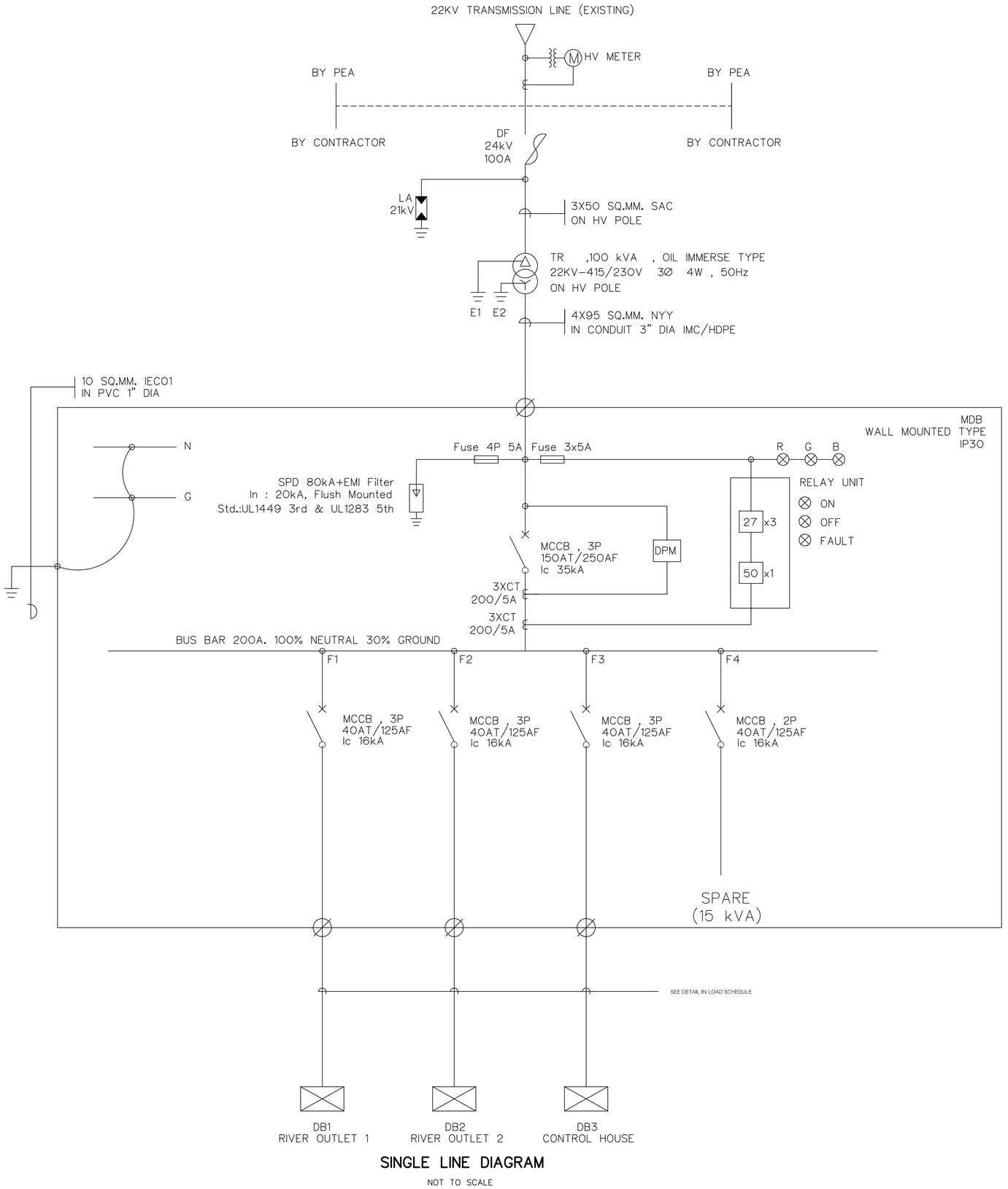
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	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
FLAP GATE AND RIVER OUTLET
MAIN INCOMING FOR FLAP GATE & VALVE

PANYA CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วพก.604	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วพก.604	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-EM-L04
	SHEET NO. 103 OF 108



SINGLE LINE DIAGRAM

NOT TO SCALE

LEGEND

	STEP-UP POWER TRANSFORMER	12	OVER SPEED DEVICE
	WITHDRAWABLE AIR CIRCUIT BRKAKER (ACB)	13	SYNCHRONOUS-SPEED DEVICE
	MOLDED CASE CIRCUIT BREAKER (MCCB)	14	UNDER SPEED DEVICE
	DISCONNECTING SWITCH	15	SPEED OR FREQUENCY , MATCHING DEVICE
	DISCONNECTING SWITCH WITH FUSE	25	SYNCHRONOUS CHECK DEVICE
	FUSE	27	UNDER VOLTAGE RELAY
	LIGHTNING ARRESTER	32	DIRECTIONAL POWER REALY
(f)	FREQUENCY METER	38	BEARING PROTECTIVE DEVICE
(V)	VOLT METER	39	RESERVE FOR FUTURE APPLICATION
(A)	AMP METER	40	FIELD RELAY
(W)	WATT METER	46	REVERSE-PHASE , PHASE BALANCE
	SELECTOR SWITCH	50	INSTANTANEOUS OVER CURRENT
	CURRENT TRANSFORMER	51	A-C TIME OVER CURRENT RELAY
	POTENTIAL TRANSFORMER	57	SHORT CIRCUITING , GROUNDING DEVICE
(25)	SYNCHRO CHECK RELAY	60	VOLTAGE BALANCE REALY
(27R)	REMANENT UNDER VOLTAGE RELAY	64	GROUND PROTECTIVE RELAY
(27 59)	UNDER AND OVER VOLTAGE RELAY	81	FREQUENCY RELAY (OVER/UNDER)
(32)	REVERSE POWER RELAY	87	DIFFERENTIAL PROTECTION RELAY
(50 51)	PHASE OVERCURRENT RELAY	88	AUXILIARY MOTOR , MOTOR GENERATOR
(50N 51N)	GROUND OVERCURRRENT RELAY	90	REGULATING DEVICE
(59N)	RESIDUAL VOLTAGE RELAY		
(67)	DIRECTIONAL PHASE FAULT RELAY		
(67N)	DIRECTIONAL GROUD FAULT RELAY		
(EDG)	EMERGENCY DIESEL GENERATOR		
	WYE CONNECTION		
	DELTA CONNECTION		
	OPENED DELTA CONNECTION		
	STATION SURGE ARRESTER		
	MECHANICAL INTERLOCK		

NO.	DATE	REVISIONS	CHECKED	APPROVED
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

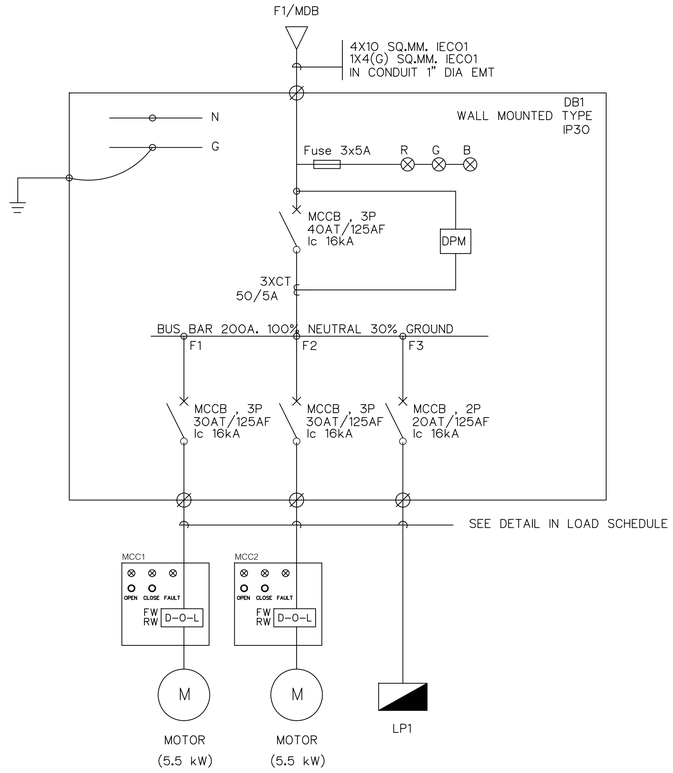
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
FLAP GATE AND RIVER OUTLET
SINGLE LINE DIAGRAM (SHEET 1/2)

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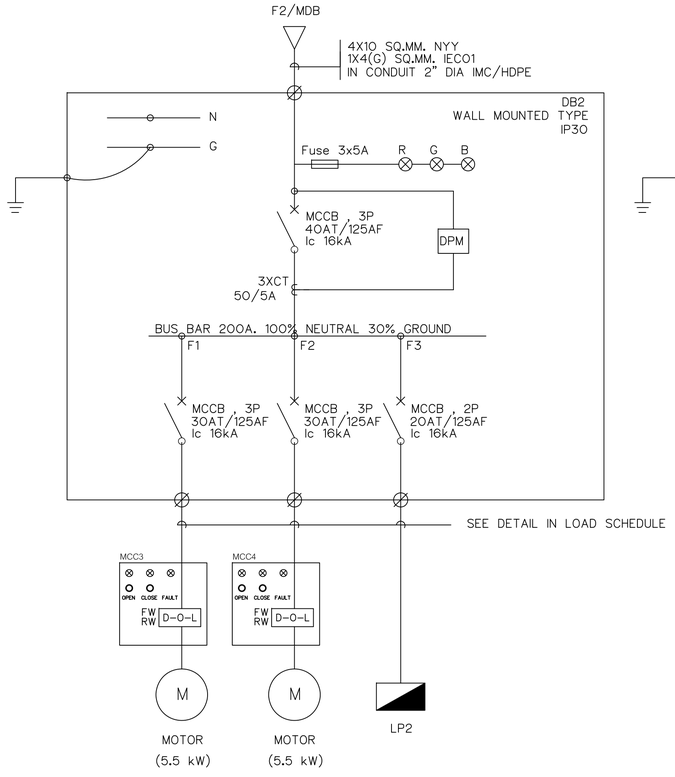
Department of Alternative Energy Development and Efficiency
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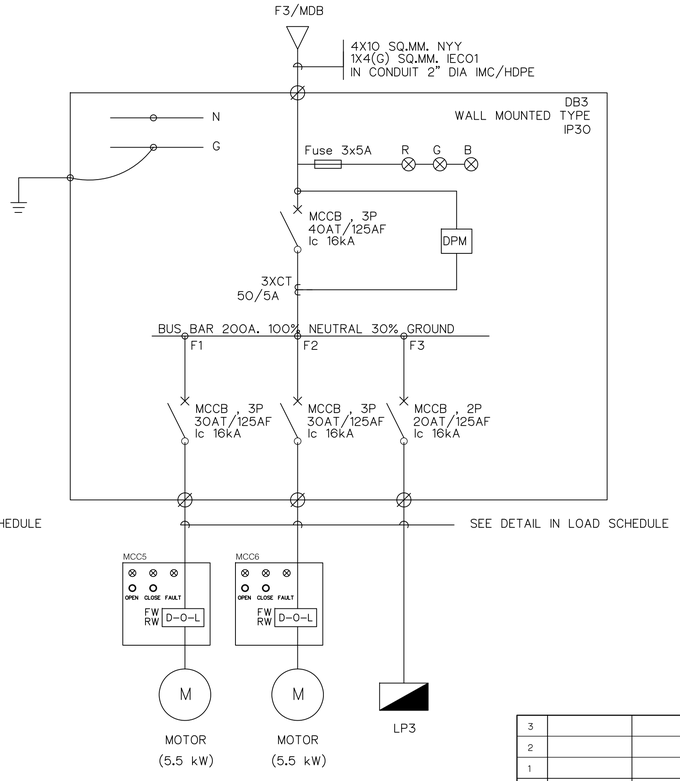
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DESIGNED วพ.604	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วพ.604	APPROVED
PROJECT MANAGER 10/08/2021 DATE	DRAWING NO. HEE-EM-L05
	SHEET NO. 104 OF 108



LEGEND

	STEP-UP POWER TRANSFORMER	12	OVER SPEED DEVICE
	WITHDRAWABLE AIR CIRCUIT BRKAKER (ACB)	13	SYNCHRONOUS-SPEED DEVICE
	MOLDED CASE CIRCUIT BREAKER (MCCB)	14	UNDER SPEED DEVICE
	DISCONNECTING SWITCH	15	SPEED OR FREQUENCY , MATCHING DEVICE
	DISCONNECTING SWITCH WITH FUSE	25	SYNCHRONOUS CHECK DEVICE
	FUSE	27	UNDER VOLTAGE RELAY
	LIGHTNING ARRESTER	32	DIRECTIONAL POWER REALY
(f)	FREQUENCY METER	38	BEARING PROTECTIVE DEVICE
(V)	VOLT METER	39	RESERVE FOR FUTURE APPLICATION
(A)	AMP METER	40	FIELD RELAY
(W)	WATT METER	46	REVERSE-PHASE , PHASE BALANCE
	SELECTOR SWITCH	50	INSTANTANEOUS OVER CURRENT
	CURRENT TRANSFORMER	51	A-C TIME OVER CURRENT RELAY
	POTENTIAL TRANSFORMER	57	SHORT CIRCUITING , GROUNDING DEVICE
(25)	SYNCHRO CHECK RELAY	60	VOLTAGE BALANCE REALY
(27R)	REMANENT UNDER VOLTAGE RELAY	64	GROUND PROTECTIVE RELAY
(27/59)	UNDER AND OVER VOLTAGE RELAY	81	FREQUENCY RELAY (OVER/UNDER)
(32)	REVERSE POWER RELAY	87	DIFFERENTIAL PROTECTION RELAY
(50/51)	PHASE OVERCURRENT RELAY	88	AUXILIARY MOTOR , MOTOR GENERATOR
(50G/51G)	GROUND OVERCURRRENT RELAY	90	REGULATING DEVICE
(50N)	RESIDUAL VOLTAGE RELAY		
(67)	DIRECTIONAL PHASE FAULT RELAY		
(67N)	DIRECTIONAL GROUD FAULT RELAY		
(EDG)	EMERGENCY DIESEL GENERATOR		
	WYE CONNECTION		
	DELTA CONNECTION		
	OPENED DELTA CONNECTION		
	STATION SURGE ARRESTER		
	MECHANICAL INTERLOCK		





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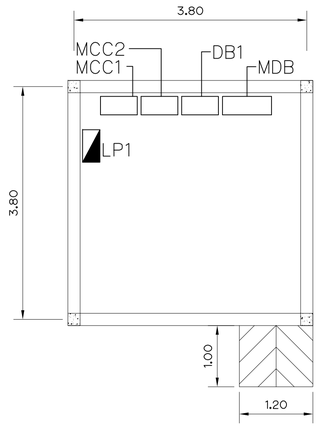
HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
FLAP GATE AND RIVER OUTLET
SINGLE LINE DIAGRAM (SHEET 2/2)

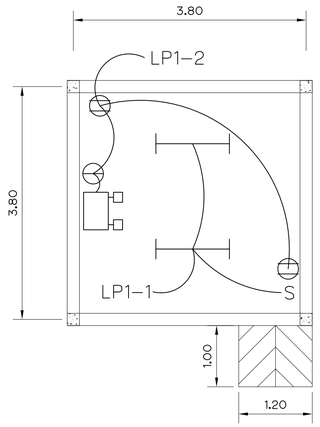
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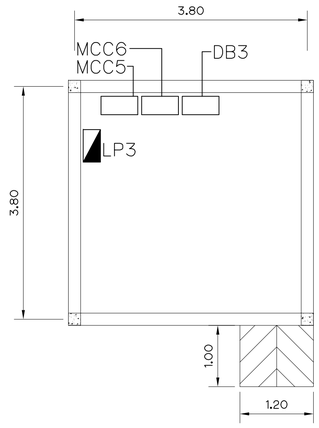
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DESIGNED	SUBMITTED
DRAWN	RECOMMENDED
CHECKED	APPROVED
10/08/2021 PROJECT MANAGER / DATE	DRAWING NO. HEE-EM-L06
	SHEET NO. 105 OF 108



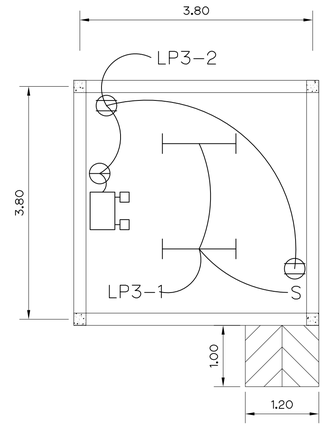
MAIN CUBICAL PLAN
RIVER OUTLET 1



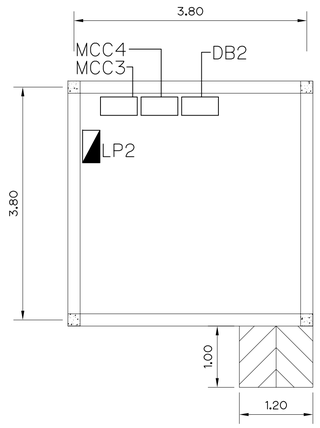
LIGHTING AND POWER ELECTRICAL PLAN
RIVER OUTLET 1



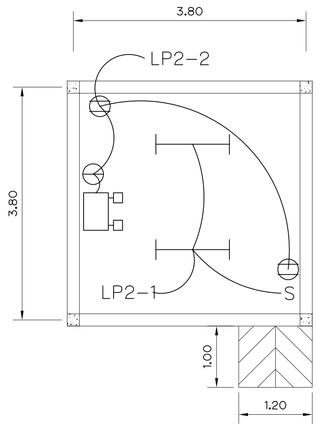
MAIN CUBICAL PLAN
CONTROL HOUSE



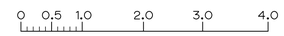
LIGHTING AND POWER ELECTRICAL PLAN
CONTROL HOUSE



MAIN CUBICAL PLAN
RIVER OUTLET 2



LIGHTING AND POWER ELECTRICAL PLAN
RIVER OUTLET 2



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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO–MECHANICAL EQUIPMENT
LOWER DAM
FLAP GATE AND RIVER OUTLET
LIGHTING AND POWER ELECTRICAL IN RIVER OUTLET 1&2 AND CONTROL HOUSE

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DESIGNED	วพก.604		SUBMITTED
DRAWN			RECOMMENDED
CHECKED	วพก.604		APPROVED
PROJECT MANAGER	10/08/2021 DATE	DRAWING NO. HEE–EM–L07	SHEET NO. 106 OF 108

LOAD SCHEDULE

PANEL NO : MDB ELECTRICAL SYSTEM : 3Ø, 4w, 400/230 v, 50Hz
MAX CKT : 4 LOCATION RIVER OUTLET 1 MOUTED : WALL

DIAGRAM: N R S T, G

CKT NO.	DESCRIPTION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA) R	S	T
1	DB1	3	40	125	IC > 16 kA	4X10/1X4G	IEC01	1	EMT	9280	6200	6200
2	DB2	3	40	125	IC > 16 kA	4X10/1X4G	NYY	2	IMC/HDPE	6200	9280	6200
3	DB3	3	40	125	IC > 16 kA	4X10/1X4G	NYY	2	IMC/HDPE	6200	6200	9280
4	SPARE	3	40	125	IC > 16 kA					5000	5000	5000
MAIN BREAKER: ☑ LUG :☐		3	150	250	IC > 25 kA	CONDUCTOR : 4x95q.mm NYY, 1x10(G)q.mm IEC01				21680	21680	21680
BUS PHASE : 200 A						WIRING IN CONDUIT 3" DIA IMC/HDPE				100% LOAD: 65040 VA		
INCOME LINE :TR CAP : 100 kVA												

LOAD SCHEDULE

PANEL NO : LP1 ELECTRICAL SYSTEM : 1Ø, 3w, 230 v, 50Hz
MAX CKT : 6 LOCATION RIVER OUTLET 1 MOUTED : WALL

DIAGRAM: N L, G

CKT NO.	DESCRIPTION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA)	
1	LIGHTING	1	16	50		2x2.5/1x2.5	IEC01	1/2	EMT	200	ROOM
2	RECEPTACLE	1	20	50		2x4/1x2.5	IEC01	1/2	EMT	880	RECEPTACLE & EMERGENCY
3	SPARE	1	16	50						500	
4	SPARE	1	16	50						500	
5	SPARE	1	16	50						500	
6	SPARE	1	16	50						500	
MAIN BREAKER: ☑ LUG : ☐		2	20	50		CONDUCTOR : 2x6/2.5G sq.mm IEC01				100% LOAD: 3080 VA	
BUS PHASE : 50 A											
INCOME LINE : DB1						WIRING IN CONDUIT 1/2" DIA EMT					

REMARKS: CB "E" IS EARTH LEAK CIRCUIT BREAKER 30 mA.

LOAD SCHEDULE

PANEL NO : DB1 ELECTRICAL SYSTEM : 3Ø, 4w, 400/230 v, 50Hz
MAX CKT : 3 LOCATION RIVER OUTLET 1 MOUTED : WALL

DIAGRAM: N R S T, G

CKT NO.	DESCRIPTION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA) R	S	T
1	DB1	3	30	125	IC > 16 kA	4X6/1X2.5G	IEC01	3/4	EMT	3100	3100	3100
2	DB2	3	30	125	IC > 16 kA	4X6/1X2.5G	IEC01	3/4	EMT	3100	3100	3100
3	LP1	2	20	125	IC > 16 kA	2X6/1X2.5G	IEC01	1/2	EMT	3080		
MAIN BREAKER: ☑ LUG :☐		3	40	125	IC > 16 kA	CONDUCTOR : 4x10q.mm IEC01, 1x4(G)q.mm IEC01				9280	6200	6200
BUS PHASE : 200 A						WIRING IN CONDUIT 1" DIA IMC/HDPE				100% LOAD: 21680 VA		
INCOME LINE : MDB												

LOAD SCHEDULE

PANEL NO : LP2 ELECTRICAL SYSTEM : 1Ø, 3w, 230 v, 50Hz
MAX CKT : 6 LOCATION RIVER OUTLET 2 MOUTED : WALL

DIAGRAM: N L, G

CKT NO.	DESCRIPTION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA)	
1	LIGHTING	1	16	50		2x2.5/1x2.5	IEC01	1/2	EMT	200	ROOM
2	RECEPTACLE	1	20	50		2x4/1x2.5	IEC01	1/2	EMT	880	RECEPTACLE & EMERGENCY
3	SPARE	1	16	50						500	
4	SPARE	1	16	50						500	
5	SPARE	1	16	50						500	
6	SPARE	1	16	50						500	
MAIN BREAKER: ☑ LUG : ☐		2	20	50		CONDUCTOR : 2x6/2.5G sq.mm IEC01				100% LOAD: 3080 VA	
BUS PHASE : 50 A											
INCOME LINE : DB2						WIRING IN CONDUIT 1/2" DIA EMT					

REMARKS: CB "E" IS EARTH LEAK CIRCUIT BREAKER 30 mA.

LOAD SCHEDULE

PANEL NO : DB2 ELECTRICAL SYSTEM : 3Ø, 4w, 400/230 v, 50Hz
MAX CKT : 3 LOCATION RIVER OUTLET 2 MOUTED : WALL

DIAGRAM: N R S T, G

CKT NO.	DESCRIPTION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA) R	S	T
1	DB1	3	30	125	IC > 16 kA	4X6/1X2.5G	IEC01	3/4	EMT	3100	3100	3100
2	DB2	3	30	125	IC > 16 kA	4X6/1X2.5G	IEC01	3/4	EMT	3100	3100	3100
3	LP1	2	20	125	IC > 16 kA	2X6/1X2.5G	IEC01	1/2	EMT		3080	
MAIN BREAKER: ☑ LUG :☐		3	40	125	IC > 16 kA	CONDUCTOR : 4x10q.mm NYY, 1x4(G)q.mm IEC01				6200	9280	6200
BUS PHASE : 200 A						WIRING IN CONDUIT 2" DIA IMC/HDPE				100% LOAD: 21680 VA		
INCOME LINE : MDB												

LOAD SCHEDULE

PANEL NO : LP3 ELECTRICAL SYSTEM : 1Ø, 3w, 230 v, 50Hz
MAX CKT : 6 LOCATION CONTROL HOUSE MOUTED : WALL

DIAGRAM: N L, G

CKT NO.	DESCRIPTION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA)	
1	LIGHTING	1	16	50		2x2.5/1x2.5	IEC01	1/2	EMT	200	ROOM
2	RECEPTACLE	1	20	50		2x4/1x2.5	IEC01	1/2	EMT	880	RECEPTACLE & EMERGENCY
3	SPARE	1	16	50						500	
4	SPARE	1	16	50						500	
5	SPARE	1	16	50						500	
6	SPARE	1	16	50						500	
MAIN BREAKER: ☑ LUG : ☐		2	20	50		CONDUCTOR : 2x6/2.5G sq.mm IEC01				100% LOAD: 3080 VA	
BUS PHASE : 50 A											
INCOME LINE : DB3						WIRING IN CONDUIT 1/2" DIA EMT					

REMARKS: CB "E" IS EARTH LEAK CIRCUIT BREAKER 30 mA.

LOAD SCHEDULE

PANEL NO : DB3 ELECTRICAL SYSTEM : 3Ø, 4w, 400/230 v, 50Hz
MAX CKT : 3 LOCATION CONTROL HOUSE MOUTED : WALL

DIAGRAM: N R S T, G

CKT NO.	DESCRIPTION	CIRCUIT BREAKER CABLE P	AT	AF	IC	SECTION (sq.mm)	TYPE	CONDUIT DIA (INCH)	TYPE	LOAD CONNECTION(VA) R	S	T
1	DB1	3	30	125	IC > 16 kA	4X6/1X2.5G	IEC01	3/4	EMT	3100	3100	3100
2	DB2	3	30	125	IC > 16 kA	4X6/1X2.5G	IEC01	3/4	EMT	3100	3100	3100
3	LP1	2	20	125	IC > 16 kA	2X6/1X2.5G	IEC01	1/2	EMT			3080
MAIN BREAKER: ☑ LUG :☐		3	40	125	IC > 16 kA	CONDUCTOR : 4x10q.mm NYY, 1x4(G)q.mm IEC01				6200	6200	9280
BUS PHASE : 200 A						WIRING IN CONDUIT 2" DIA IMC/HDPE				100% LOAD: 21680 VA		
INCOME LINE : MDB												

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HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT

AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
FLAP GATE AND RIVER OUTLET
LOAD SCHEDULE

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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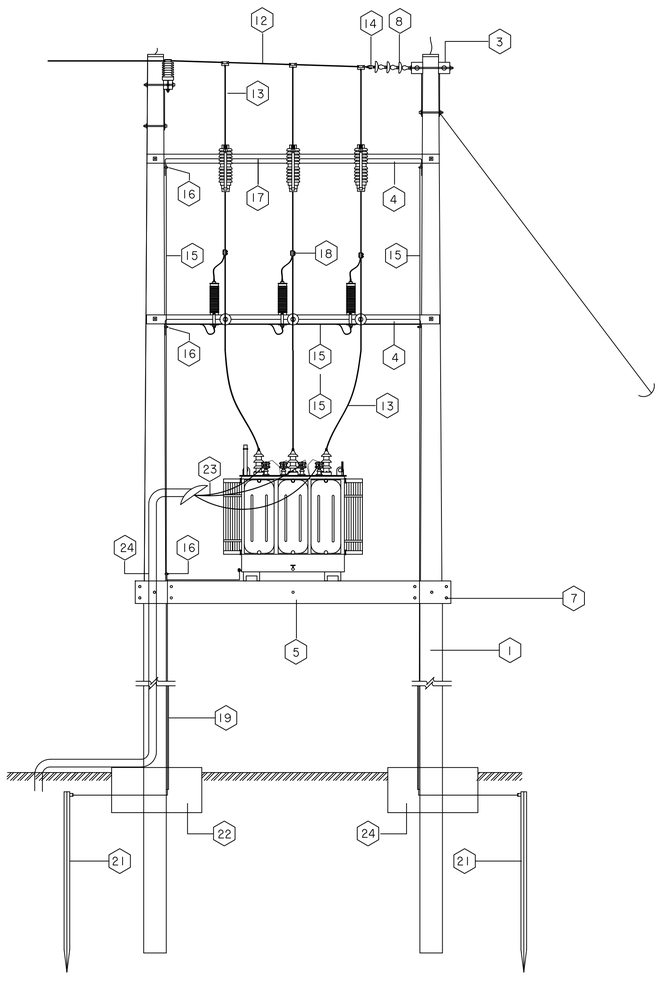
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED			
DESIGNED	วพ.604	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วพ.604	APPROVED	

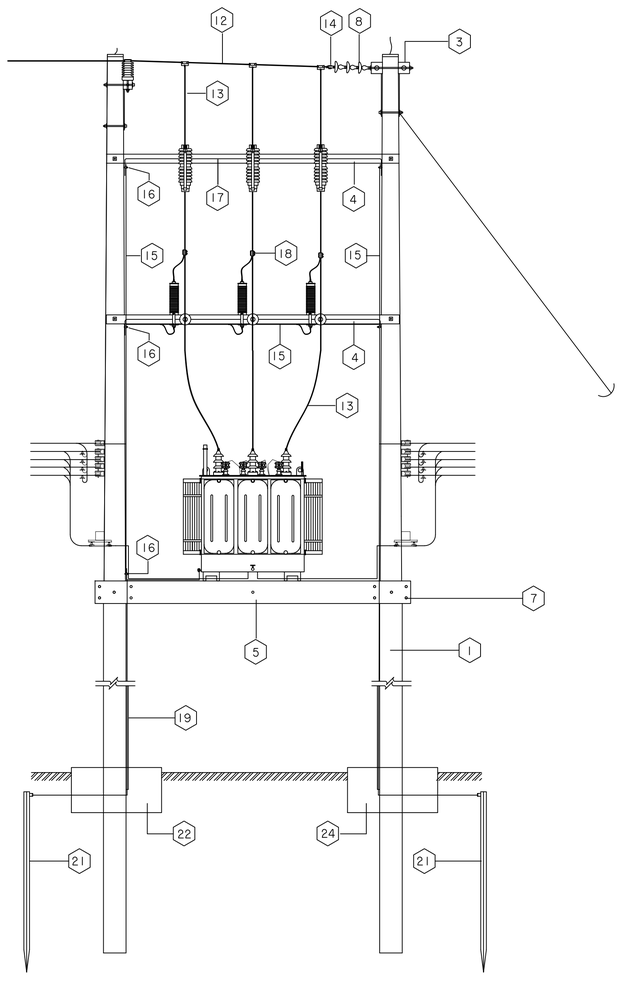
10/08/2021
PROJECT MANAGER — DATE

DRAWING NO. HEE-EM-L08
SHEET NO. 107 OF 108

POLE TYPE "G"



POLE TYPE "H"
WITH LOW VOLTAGE CABLE



BILL OF MATERIAL

ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M.LONG
2	CROSSARM,SPUN PRESTERSSED CONCRETE,100x100x2,500 mm.
3	CROSSARM,SPUN PRESTERSSED CONCRETE,120x120x2,000 mm.
4	BEAM SPUN, PRESTRESSD CONCRETE, 100x100x3,200 mm.
5	CONCRETE BEAM 150x250x3,450 mm.FOR TRANS.PLATFORM
6	BRACE,FLAT,FOR CROSSARM,30x6x760 mm.
7	BOLT,MACHINE HEXAGON M16x550 mm.
8	INSULATOR, SUSPENSION TYPE (CLASS 52-1)
9	INSULATOR, LINE POST TYPE CLASS 57-2L
10	CUT-OUT,FUSE, OPEN TYPE, SINGLE INSULATOR, DROP-OUT 100A.
11	SURGE ARRESTERS 3 kV. 5 kA.
12	CABLE 50 sq.mm SAC
13	ALUMINIUM CONDUCTOR STEEL REINFORCED
14	CLAMP STRAIN FOR Al 35-70 sq.mm.
15	WIRE, STEEL STRANDED, 50/7 DIN 48201
16	CLAMP, SINGLE U-BOLT, M 8
17	WIRE, STEEL, SOLID, DIMETER 4 mm.
18	CONNECTOR, PARALLEL GROOVE, DOUBLE BOLT, Al 25-95 sq.mm.
19	PIPE, RIGID PVC. 20x2,500 mm. COMP. WITH FIXER
20	ROD, GROUND 60x60x5 mm. 2,000 mm. LONG
21	TRANSFORMER 3 PHASE 3,500-400/230 V.
22	CONCRETE 1 : 2 : 4
23	CVV WIRE
24	HDPE PIPE

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PRA THAO DAM EFFICIENCY ENHANCEMENT PROJECT
AMPHOE KAENG KHRO, CHANGWAT CHAIYAPHUM

PART 2 ELECTRO-MECHANICAL EQUIPMENT
LOWER DAM
FLAP GATE AND RIVER OUTLET
TYPICAL DETAIL FOR TRANSFORMER INSTALLATION

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS: PANYA CONSULTANTS CO.,LTD.
DEDE: Department of Alternative Energy Development and Efficiency, MINISTRY OF ENERGY

DESIGNED	วพ.604	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วพ.604	RECOMMENDED	
PROJECT MANAGER	10/08/2021 DATE	APPROVED	

DRAWING NO. HEE-EM-L09
SHEET NO. 108 OF 108