Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CONTRACT C1

CIVIL WORKS AND ELECTRICAL SYSTEM

VOLUME 4
DRAWINGS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

CONTRACT C1 : LIST OF DRAWINGS

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SHEET NO.	DRAWING NO.	DRAWING DETAILS
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141	THN-RD-04	TYPICAL SECTIONS AND DETAILS
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144	THN-OM-02	SECTION A-A AND B-B
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149	THN-TS-03	POLE TYPE "C" AND "D"
150	THN-TS-04	POLE TYPE "E" AND "F"
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152	THN-TS-06	POLE ASSEMBLY ACCESSORIES, ANCHOR BOLT FOR GUY
153	THN-TS-07	OVER HEAD GROUND WIRE BAYONET ASSEMBLY
154	THN-TS-08	BURYING DEPTH AND FOUNDATION
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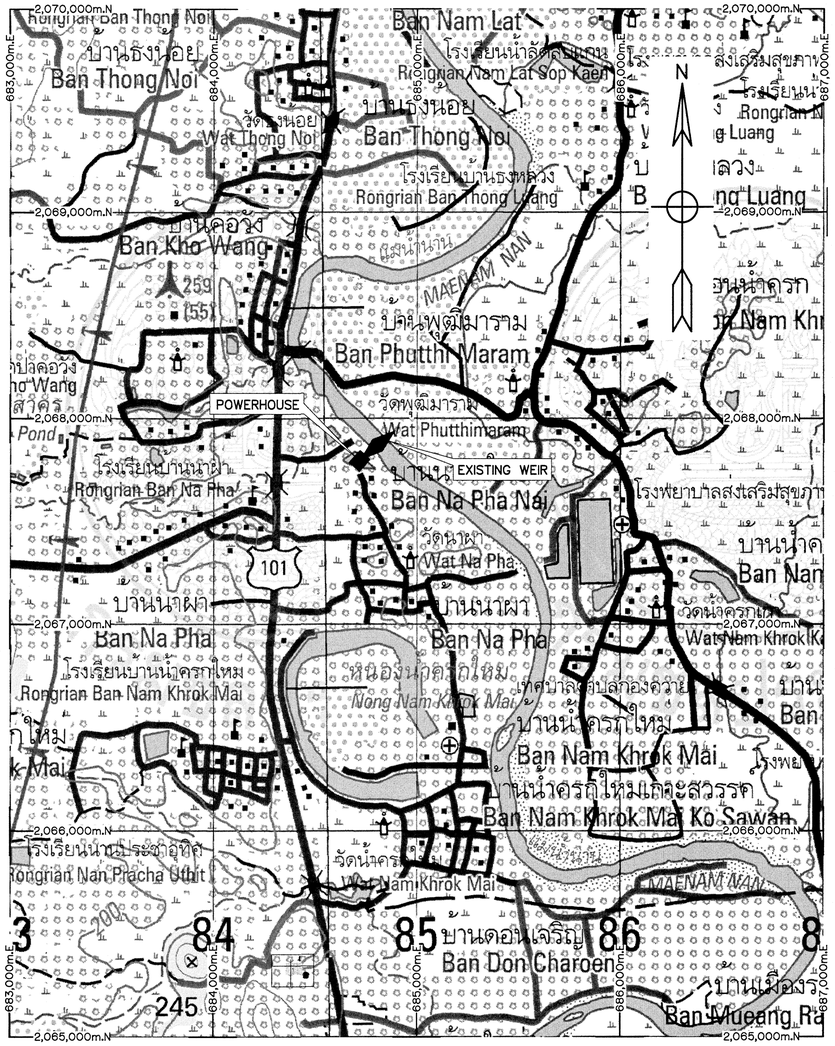
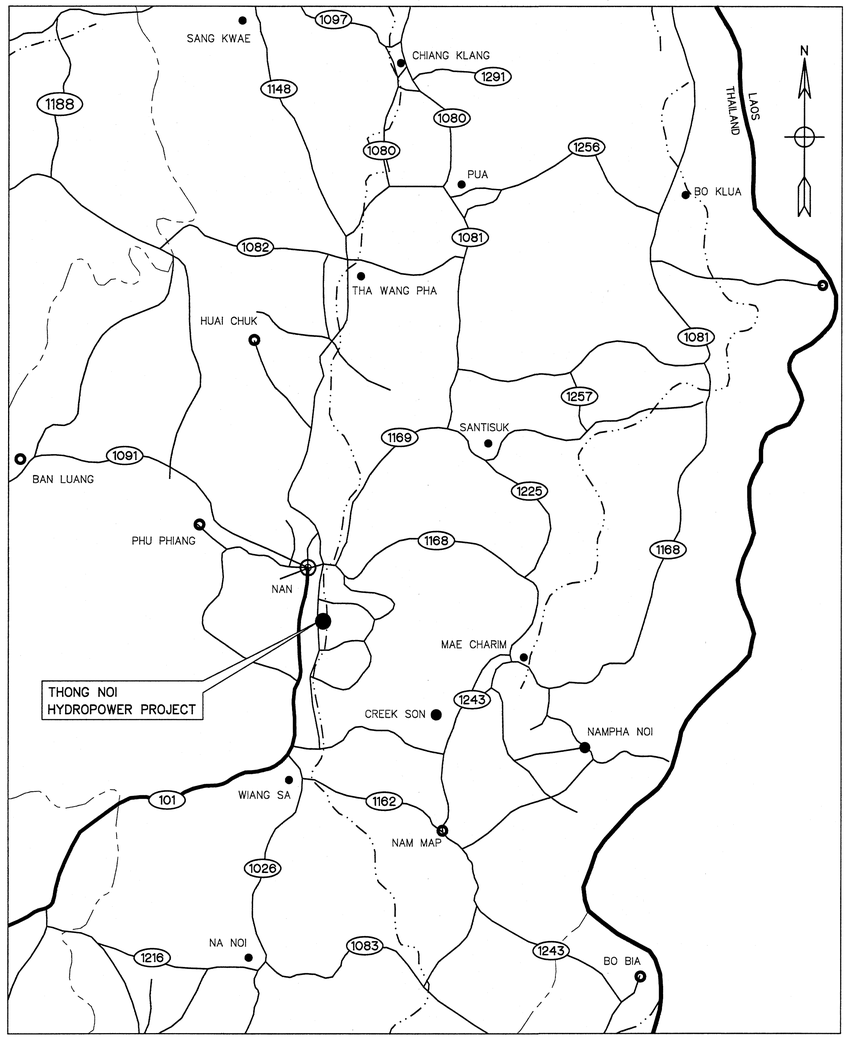
156	THN-TS-10	TRANSFORMER AND SWITCHYARD DETAILS (2/3)
157	THN-TS-11	TRANSFORMER AND SWITCHYARD DETAILS (3/3)



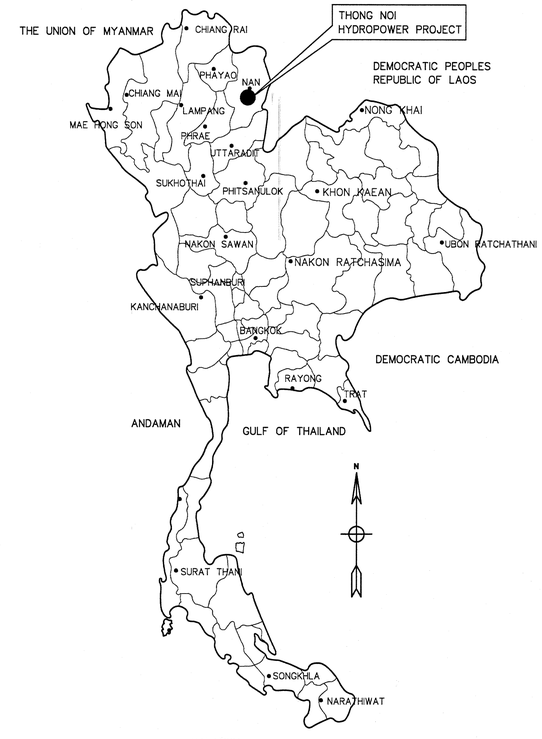
PROJECT AREA MAP

SCALE 1:15,000



SITE LOCATION

NOT TO SCALE



LOCATION MAP

NOT TO SCALE

LEGENDS :

- 105 — HIGHWAY
- STREAM
- EXISTING WEIR
- POWERHOUSE
- ACCESS ROAD
- PROPOSED NEW TRANSMISSION LINE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

0 0.1 0.2 0.4 0.6 0.8 1.0 1.2

SCALE 1:15,000 KILOMETERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

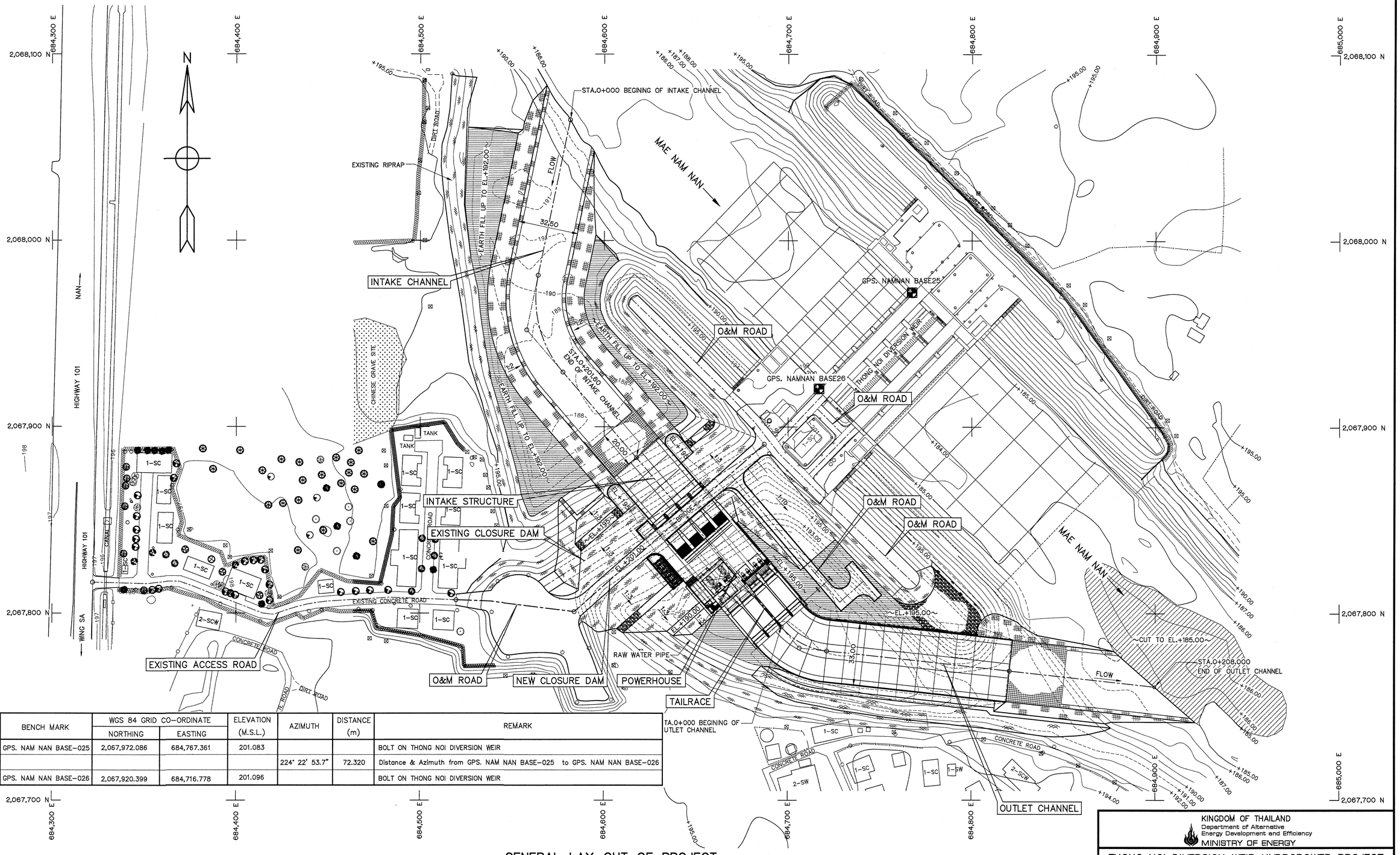
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

GENERAL

LOCATION MAP AND PROJECT AREA MAP

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED พ.ต.6650 พ.ต.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED พ.ต.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-GN-01	SHEET NO. 1 OF 157



NO.	BENCH MARK	WGS 84 GRID CO-ORDINATE		ELEVATION (M.S.L.)	AZIMUTH	DISTANCE (m)	REMARK
		NORTHING	EASTING				
1	GPS. NAM NAN BASE-025	2,067,972.086	684,767.361	201.083			BOLT ON THONG NOI DIVERSION WEIR
					224° 22' 53.7"	72.320	Distance & Azimuth from GPS. NAM NAN BASE-025 to GPS. NAM NAN BASE-026
2	GPS. NAM NAN BASE-026	2,067,920.399	684,716.778	201.096			BOLT ON THONG NOI DIVERSION WEIR

GENERAL LAY-OUT OF PROJECT

SCALE 1:1,000

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. GENERAL, LOCATION AND PROJECT AREA MAP	THN-GN-01
2. INTAKE CHANNEL, PLAN AND SECTION A-A	THN-IC-01
3. INTAKE STRUCTURE, PLAN AND SECTION A-A	THN-IS-01
4. POWERHOUSE, PLAN	THN-PH-01
5. TAILRACE, PLAN AND SECTION A-A	THN-TR-01
6. OUTLET CHANNEL, PLAN AND SECTION A-A	THN-OC-01
7. REALIGNMENT OF CLOSURE DAM, PLAN	THN-RD-01
8. O&M ROAD, PLAN	THN-OM-01

0 10 20 30 40 50 60 70 80

SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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KINGDOM OF THAILAND
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MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

GENERAL

GENERAL LAY-OUT OF PROJECT

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

DESIGNED ส.6650 ส.88523

SUBMITTED

DRAWN

RECOMMENDED

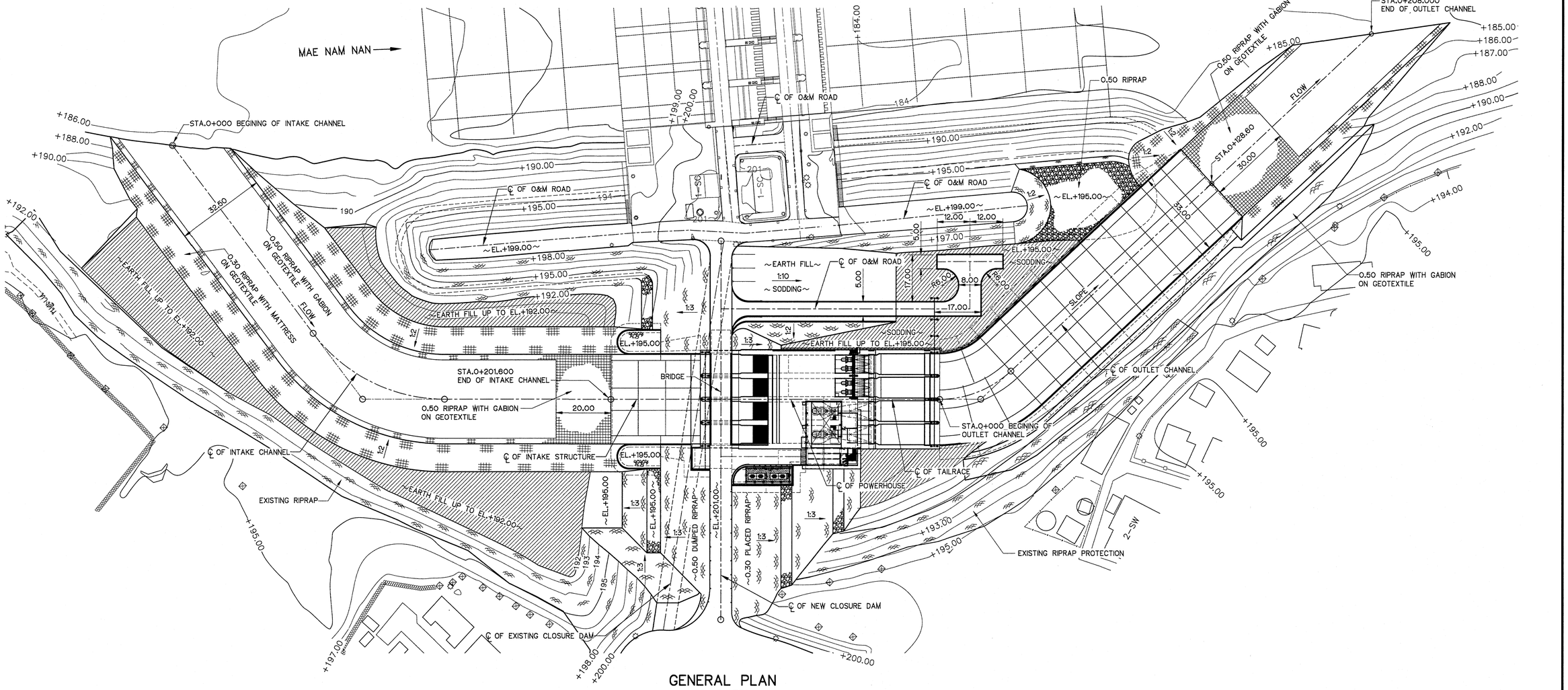
CHECKED ส.6651

APPROVED

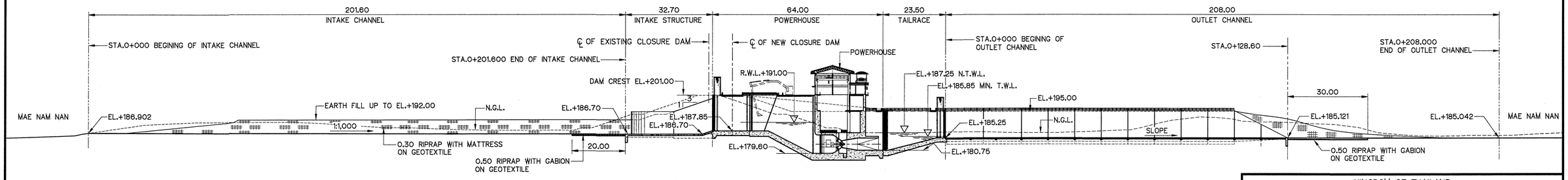
6/9/2024
PROJECT MANAGER DATE

DRAWING NO. THN-GN-02

SHEET NO. 2 OF 157



GENERAL PLAN
SCALE 1:750



LONGITUDINAL SECTION ALONG CENTER LINE OF CHANNEL
SCALE 1:750

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. GENERAL, GENERAL LAY-OUT OF PROJECT — THN-GN-02

0 10 20 30 40 50 60
SCALE 1:750 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

GENERAL

GENERAL PLAN AND LONGITUDINAL SECTION ALONG CENTERLINE OF CHANNEL

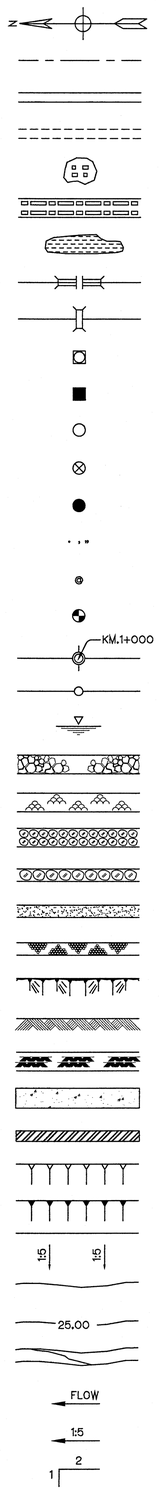
FEC FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED 28.6650 28.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED 28.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER / DATE	APPROVED
DRAWING NO. THN-GN-03	SHEET NO. 3 OF 157

ABBREVIATIONS :

A	CROSS-SECTION AREA OF FLOW
AC.	ASBESTOS CEMENT PIPE
AGG.	AGGREGATE
ALT.	ALTERNATIVE
APPROX.	APPROXIMATE
AZ.	AZIMUTH
B.	BEGINNING OF SURVEY
BC.	BEGINNING OF CURVE
BEG.	BEGINNING
BF.	BOTTOM FACE
B	BEAM
B.M.	BENCH MARK
BOTT.	BOTTOM
BRG.	BEARING
C.B.R.	CALIFORNIA BEARING RATIO
C/C	CENTER TO CENTER
℄	CENTER LINE
CL.	CLEARANCE
CM OR cm	CENTIMETER
CM/S OR cm/s	CENTIMETER PER SECOND
COL.	COLUMN
CONC.	CONCRETE
D	DEGREE OF CURVE
DB.	DEFORM BAR
d.	DEPTH OF WATER
DIA. OR Ø	DIAMETER
DOH.	DEPARTMENT OF HIGHWAY
DWG.	DRAWING
DEDE.	DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY
E	EAST
E	END OF SURVEY
EA.	EACH
E.C.	END OF CURVE
E.F.	END OF FACE
EL. OR ELEV.	ELEVATION
EXIST.	EXISTING
EXP.	EXPANSION
EXT.	EXTERIOR
EX.	EXTERNAL DISTANCE OF CURVE
f	FREE BOARD , FINISH
F.F.	FAR FACE
F.S.L.	FULL SUPPLY LEVEL
FTG.	FOOTING
HD.	HEAD
HEX.	HEXAGONAL
HOR.	HORIZONTAL
I.D.	INSIDE DIAMETER
I.F.	INSIDE FACE
IN OR "	INCH
INT.	INTERIOR
INV.	INVERT
Kg	KILOGRAM
Km	KILOMETER
KPH.	KILOMETER PER HOUR
KSC.	KILOGRAM PER SQUARE CENTIMETER
L	LENGTH OF CURVE
LC.	LENGTH OF HORIZONTAL CURVE
LONG.	LONGITUDINAL
LT.	LEFT
L.W.L.	LOW WATER LEVEL
M OR m	METER
M^2OR m^2	SQUARE METER
M^3OR m^3	CUBIC METER
MM OR mm	MILLIMETER
M/S OR m/s	METER PER SECOND
MIN.	MINIMUM
MIN. T.W.L.	MINIMUM TAIL WATER LEVEL

MAX.	MAXIMUM
M.S.L.	MEAN SEA LEVEL
MISC.	MISCELLANEOUS
N	NORTH
n	MANNING'S ROUGHINESS COEFFICIENT
N.F.	NEAR FACE
NGL.	NATURAL GROUND LEVEL
NO. OR #	NUMBER
N.T.W.L.	NORMAL TAIL WATER LEVEL
N.W.L.	NORMAL WATER LEVEL
OD.	OUTSIDE DIAMETER
O.F.	OUTSIDE FACE
O&M	OPERATION & MAINTENANCE
PC.	POINT OF HONRIZONTAL CURVATURE
PI.	POINT OF HORIZONTAL INTERSECTION
PL.	PLATE
P.O.C.	POINT ON CURVE
P.O.T.	POINT ON TANGENT
P.O.S.T.	POINT ON SUB-TANGENT
PRC.	POINT OF HORIZONTAL REVERSE CURVE
PT.	POINT OF TANGENT
PVC	POLYVINYL CHLORIDE
PVC.	POINT OF VERTICAL CURVATURE
PVI.	POINT OF VERTICAL INTERSECTION
PVRC.	POINT OF VERTICAL REVERSE CURVE
PVT.	POINT OF VERTICAL TANGENT
Q.	DISCHARGE
QTY. QUAN.	QUANTITY
R	RADIUS OF CURVATURE
r	HYDRAULIC RADIUS
RØ , Ø	ROUND BAR
RC.	REINFORCED CONCRETE
RD.	ROAD
REF.	REFERENCE
REINF.	REINFORCEMENT
REQ'D	REQUIRED
RID.	ROYAL IRRIGATION DEPARTMENT
R.W.L.	RETAINTION WATER LEVEL
SCH.	SCHEDULE
SE.	SUPERELEVATION
SETC.	SECTION
S.P.C.T.	STANDARD PROCTOR COMPACTION TEST
S.S.	SIDE SLOPE
STIR.	STIRRUP
STA.	STATION
STD.	STANDARD
STR.	STRUCTURE
SYMM.	SYMMETRICAL
T.	TANGENT LENGTH , THICKNESS
T OR t	TON
THK.	THICKNESS
T.F.	TOP FACE
T.I.S.	THAI INDUSTRIAL STANDARD
Ts.	SUPERELEVATION TRANSITION LENGTH
TYP.	TYPICAL
V	VELOCITY OF FLOW
V.C.	VERTICAL CURVE
Vc.	LENGTH OF VERTICAL CURVE
VER.	VERTICAL
VOL.	VOLUME
W/O	WITHOUT
W.C.	WATER CLOSET
O	ANGLE
△	DEFLECTION ANGLE

SYMBOLS :



TYPICAL NORTH ARROW
CENTER LINE
PAVED ROAD
DIRT ROAD, LATEITE ROAD OR TRACK
VILLAGE
CITY OR DISTRICT
POND OR SWAMP
CULVERT UNDER ROAD
BRIDGE
POLE
TEST PIT
EXISTING HAND AUGER
EXISTING DRILL HOLES
DRILL HOLES
DEGREE, MINUTE, SECOND
AT EQUAL DISTANCE BETWEEN CENTER TO CENTER
B.M.
STATION
BC., EC., PC., PI., PT., PCV., PVT.
WATER LEVEL
PLAN OF RIPRAP
PLAN OF SLOPE RIPRAP
SECTION OF DUMPED RIPRAP
SECTION OF HAND PLACED RIPRAP
SECTION OF SAND
SECTION OF GRAVEL OR COARSE AGGREGATE
SECTION OF ROCK
SECTION OF EARTH
SECTION OF BACKFILL
SECTION OF CONCRETE
STEEL SECTION
ELEVATION OR PLAN OF EARTH CUT OR FILL
ELEVATION OR PLAN OF ROCK CUT
ELEVATION OR PLAN OF SLOPE
NATURAL GROUND LEVEL
CONTOUR LINE
RIVER, STREAM OR NATURAL DRAIN
FLOW DIRECTION
SLOPE DIRECTION
SLOPE RATIO

GENERAL NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS UNLESS OTHERWISE SHOWN.
2. DURING THE CONTRUCTION PERIOD, IT IS THE CONTRACTOR'S DUTY TO CHECK THE CORRECTION OF ALL RELEVANT LOCATIONS, DIMENSIONS, ELEVATIONS AND OTHER DATA AS PROVIDED BY THE DRAWING AND TECHNICAL SPECIFICATIONS BEFORE THE IMPLEMENTATION OF THE WORKS.
3. IN CASE OF ANY DETAILS BEING NOT MENTIONED OR NOT SHOWN IN THE DRAWING OR TECHNICAL SPECIFICATIONS, OR IN CASE OF ANY DISCREPANCY, DEFECTIVE DESCRIPTION, ERROR, DIMENSION OR AMBIGUTY BETWEEN OR IN ANY OF THE DRAWINGS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO CORRECT AND/OR ADJUST THE RELEVENT DRAWINGS TO OBTAIN FIELD ENGINEER APPROVAL
4. ADDITIONAL SYMBOLS, IF REQUIRED, ARE DEFINED IN THE RESPECTIVE DRAWINGS.
5. THE SPECIFICATIONS AND THE QUANTITIES OF MATERIALS ARE SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
6. ALL PLAIN CONCRETE CORNERS ARE TO BE CHEMFERED 2 cm UNLESS OTHERWISE SHOWN.
7. SLOPE IN CUT AND FILL SECTIONS, UNLESS OTHERWISE SHOWN, SHALL BE CONFORMED TO THE FOLLOWING TABLE OR AS DIRECTED BY FIELD ENGINEER.

EXISTING GROUND SLOPE 1:S	EARTH		HARD ROCK	
	CUT 1:S	FILL 1:S	CUT 1:S	FILL 1:S
OVER 1:1	OVER 1:0.5 2/	1/	1:0	1/
1:1 – 1:1.5	1:0.5	1	1:0	1/
1:1.5 – 1:2	1:1	1:1	1:0	1:1
1:2 – 1:3	1:1	1:1.5	1:0	1:1.5
LOWER 1:3	1:1	1:2	1:0	1:2

2/ = FILL SHOULD BE AVOIDED
1/ = FOR DOUBTFUL CASES CONSULT FIELD ENGINEER

STRUCTURAL DESIGN NOTES :

1. THE ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE OF STANDARD CYLINDER (Ø0.15x0.30 m) TEST AT AGE 28 DAYS SHALL BE AS THE FOLLOWING, UNLESS OTHERWISE SHOWN.

fc' (ksc)	DESCRIPTION
425	PRESTRESS CONCRETE
240	1. INTAKE STRUCTURE
	2. POWERHOUSE AND EMERGENCY CHANNE
	3. TAILRACE
	4. OUTLET CHANNEL
210	1. HOUSING RENOVATION
	2. PUMPING SUMP
175	1. GUTTER, SIDE DITCH AND MANHOLE
140	LEAN CONCRETE

2. UNLESS OTHERWISE SHOWN, THE FOLLOWING CLEAR COVER OF CONCRETE OVER OF THE REINFORCEMENT SHALL BE USED :
   - FACE EXPOSED TO SCOUR 5.0 cm
   - FACE EXPOSED TO EARTH OR WEATHER 5.0 cm
   - FACE UNEXPOSED TO EARTH OR WEATHER 3.0 cm
3. THE REINFORCEMENT LAP SPLICES SHALL NOT BE LESS THAN 50 DIAMETERS OF BIGGER THAN BAR WITH HOOKS, UNLESS OTHERWISE SHOWN.
4. EMBEDDED METALWORK SHALL BE SECURELY FASTENED IN POSITION BEFORE PLACING CONCRETE.
5. ALL CONSTRUCTION JOINT SHOULD BE TREATED AS DIRECTED IN ORDER TO ASSURE THE BEST BOND.
6. A 5 cm (MIN.) LAYER OF LEAN CONCRETE (1:3:5 BY VOLUME) SHOULD BE PLACED BELOW CONCRETE STRUCTURES.
7. THE STRUCTURES SHOULD BE PLACED ON UNDISTURBED SOILS OR COMPACTED FILL AND BACKFILL AROUND THE STRUCTURES SHOULD BE COMPACTED.
8. THE FOUNDATION ELEVATIONS ARE SUBJECT TO CHANGE AS DIRECTED ACCORDING TO THE SOIL CONDITIONS.
9. ALL SIZES OF REINFORCING BARS AND STRUCTURAL STEELS ARE IN MILLIMETERS.
10. ALL STRUCTURAL STEELS SHALL BE CLASS SS400 AND CONFORM TO T.IS. 1227-2558.
11. REINFORCED STEEL BARS SHALL BE CONFORM TO T.I.S. AS FOLLOW :
    - DEFORMED BARS (SD30) – T.I.S. 24-2559
    - ROUND BARS (SR24) – T.I.S. 20-2559
12. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN AS FOLLOW :
    - INTAKE STRUCTURE $Q_a \geq 20\ T/M^2$
    - POWERHOUSE AND EMERGENCY CHANNEL $Q_a \geq 30\ T/M^2$
    - TAILRACE $Q_a \geq 25\ T/M^2$
    - OUTLET CHANNEL $Q_a \geq 20\ T/M^2$

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

GENERAL

SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED ส.ต.6650 ภ.ม.88523
DRAWN
CHECKED ส.ต.6651
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-GN-04
SHEET NO. 4 OF 157

TABLE 1 CLIMATOLOGICAL DATA FOR THE PERIOD 1990–2019

Station	NAN	Elevation of station above M.S.L.	200 Meters
Index station	48331	Height of barometer above M.S.L.	201.60 Meters
Latitude	18° 46' 47.0" N	Height of Thermometer above ground	1.20 Meters
Longitude	100° 46' 40.0" E	Height of wind vane above ground	12.00 Meters
		Height of rainguage	0.86 Meters

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Pressure (Hectopascal)													
Mean	1,014.1	1,012.1	1,009.5	1,008.0	1,006.4	1,005.2	1,005.1	1,005.6	1,007.8	1,011.1	1,013.2	1,015.0	1,009.4
Ext. max.	1,027.3	1,025.2	1,031.0	1,020.0	1,015.3	1,012.7	1,014.0	1,013.3	1,019.1	1,021.1	1,025.5	1,026.9	1,031.0
Ext. min.	1,002.8	1,001.2	998.5	997.9	996.7	996.9	996.3	995.9	997.4	999.1	1,002.2	1,002.2	995.9
Mean daily range	6.6	7.1	7.2	6.8	5.6	4.7	4.3	4.5	5.2	5.5	5.8	6.2	5.8
Temperature (Celsius)													
Mean	21.8	23.9	27.1	29.1	29.0	28.7	27.9	27.4	27.4	26.7	24.6	21.8	26.3
Mean max.	30.8	33.6	36.3	36.9	35.5	34.0	32.7	32.2	32.9	32.8	31.9	30.1	33.3
Mean min.	14.9	16.1	19.4	22.6	24.0	24.4	24.2	23.9	23.7	22.3	19.2	15.5	20.8
Ext. max.	36.8	38.8	41.8	43.3	42.5	40.3	39.5	37.5	37.0	37.0	36.7	35.3	43.3
Ext. min.	6.7	8.0	11.0	16.2	19.2	20.4	20.2	19.6	19.5	13.4	9.3	2.7	2.7
Relative Humidity (%)													
Mean	76.0	69.0	65.0	68.0	75.0	78.0	82.0	84.0	84.1	81.0	79.0	77.0	76.4
Mean max.	96.0	93.0	89.0	89.0	91.0	92.0	94.0	95.0	96.0	95.0	96.0	96.0	93.4
Mean min.	45.0	38.0	37.0	43.0	53.0	59.0	64.0	67.0	64.0	58.0	52.0	48.0	52.3
Ext. min.	19.0	17.0	13.0	19.0	25.0	26.0	38.0	29.0	43.0	35.0	33.0	26.0	13.0
Dew Point (Celsius)													
Mean	16.6	16.9	18.9	21.8	23.6	24.2	24.2	24.3	24.2	22.8	20.2	17.1	21.2
Pan Evaporation (mm.)													
Mean–Pan	82.2	96.0	127.1	140.8	138.9	117.4	103.0	93.7	97.8	102.0	87.5	78.6	1265.0
Cloudiness (0–10)													
Mean	2.1	1.5	1.9	3.4	5.7	7.0	7.8	8.0	6.9	4.7	2.8	2.2	4.5
Visibility (Km.)													
07.00 LST	4.1	4.5	4.0	6.0	8.4	9.4	9.2	8.4	7.0	5.5	4.5	4.0	6.3
Wind (knots)													
Mean	0.1	0.2	0.3	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.1	0.3
Prev. Wind	S	S	S	S	S	S	S	S	S	Calm	Calm	SE	–
Max.	14.0	14.0	35.0	45.0	30.0	35.0	30.0	20.0	17.0	21.0	15.0	14.0	45.0
Rainfall (mm.)													
Mean	15.3	10.0	39.2	100.2	165.5	135.5	216.4	289.1	205.9	62.2	15.9	13.9	1269.1
Num. of Days	2.1	1.6	4.2	8.9	14.8	15.6	19.4	22.3	17.6	9.8	2.7	1.4	120.4
Daily Max.	69.3	40.4	77.6	129.4	123.0	143.5	103.2	136.6	112.7	59.6	89.2	72.6	143.5
Phenomena (Days)													
Fog	7.3	0.8	0.1	0.1	0.0	0.0	0.0	0.0	1.1	4.7	10.0	13.3	37.4
Haze	8.1	13.9	23.2	14.5	2.4	0.5	0.2	0.1	1.2	3.7	4.4	5.3	77.5
Hail	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
ThunderStorm	0.3	0.5	2.8	7.6	9.5	6.3	5.0	7.0	6.4	2.6	0.5	0.2	48.7
Squall	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2

FIGURE 1 FLOW DURATION CURVE AT WEIR SITE

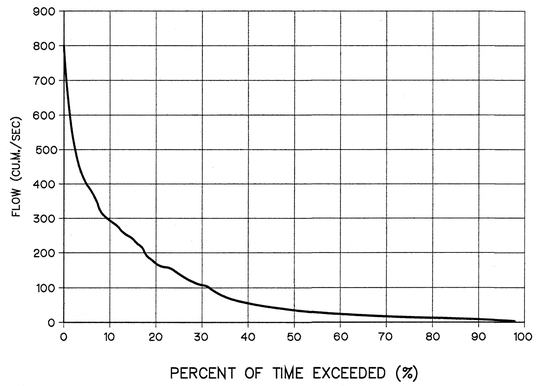


FIGURE 3 RATING CURVE AT WEIR CREST

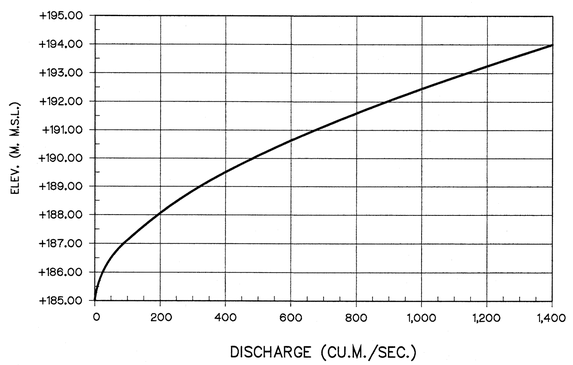


FIGURE 2 RELATIONSHIP BETWEEN ELEVATION AND CATCHMENT AREA

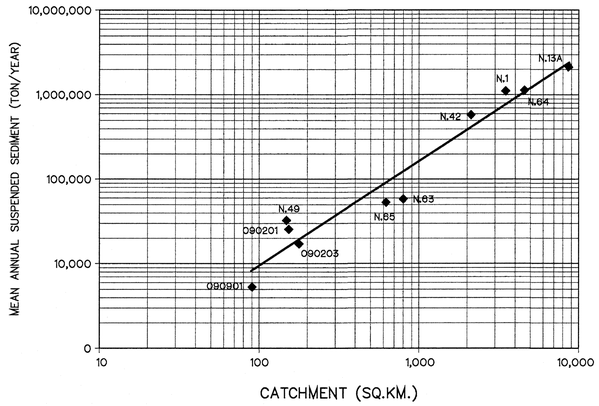


TABLE 2 FLOOD PEAK DISCHARGE FOR VARIOUS RETURN PERIODS

RETURN PERIOD (YEAR)	FLOOD PEAK DISCHARGE (M^3/SEC.)
2	1,321
5	1,799
10	2,152
25	2,735
50	3,215
100	3,812
200	4,375
500	5,368
1000	5,934

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
GENERAL
HYDROLOGY DATA

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

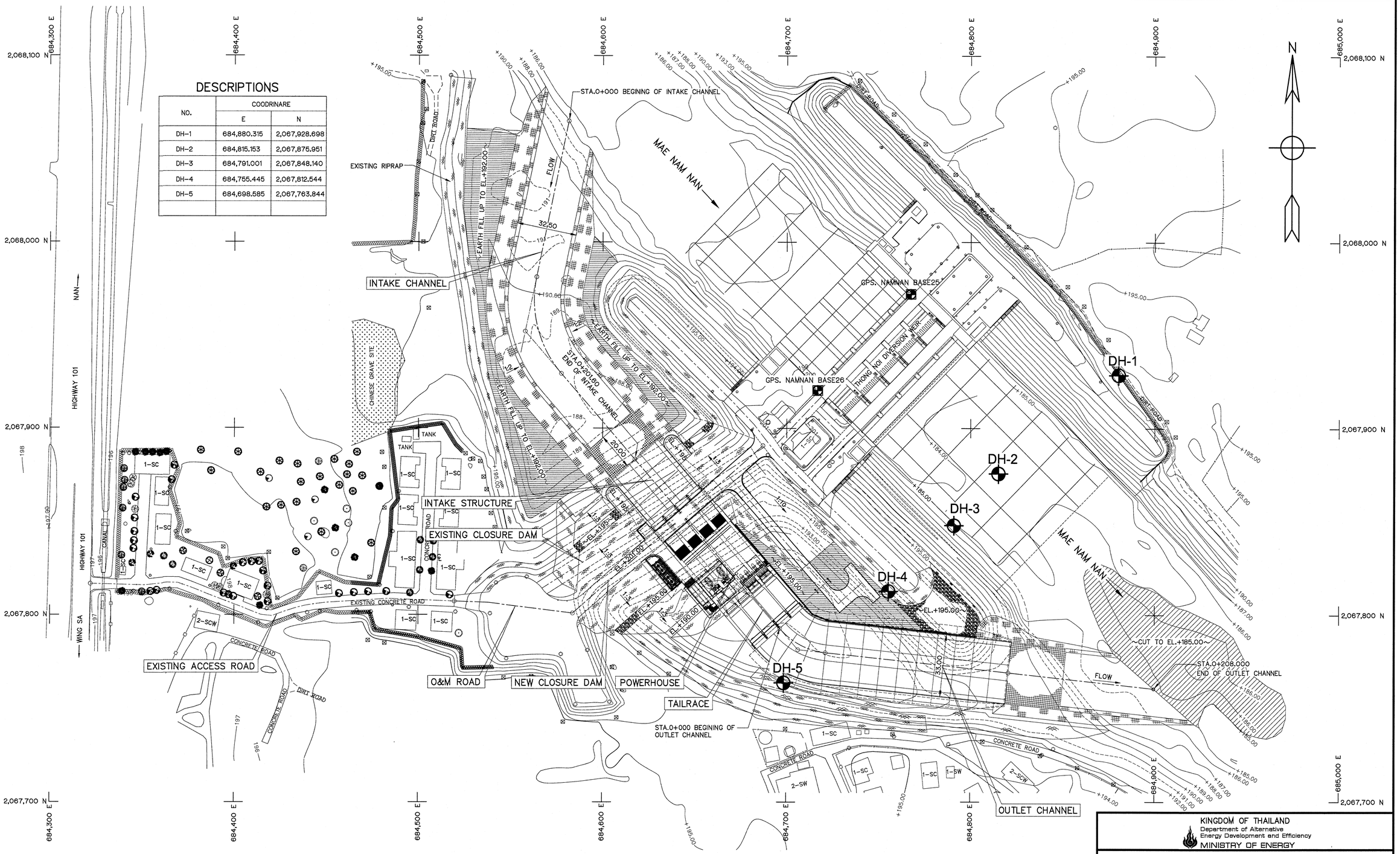
DESIGNED วิศ.6650 วิศ.88523
DRAWN
CHECKED วิศ.6651
PROJECT MANAGER 6/9/2024 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN–GN–05
SHEET NO. 5 OF 157

DESCRIPTIONS

NO.	COODRINARE	
	E	N
DH-1	684,880.315	2,067,928.698
DH-2	684,815.153	2,067,875.951
DH-3	684,791.001	2,067,848.140
DH-4	684,755.445	2,067,812.544
DH-5	684,698.585	2,067,763.844



BORING LOCATION PLAN

SCALE 1:1,000

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. GENERAL, LOCATION AND PROJECT AREA MAP	THN-GN-01
2. GENERAL, GEOLOGICAL PROFILE	THN-GN-07

SYMBOL

- BORE HOLE
- HAND AUGER BORE HOLE

0 10 20 30 40 50 60 70 80

SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

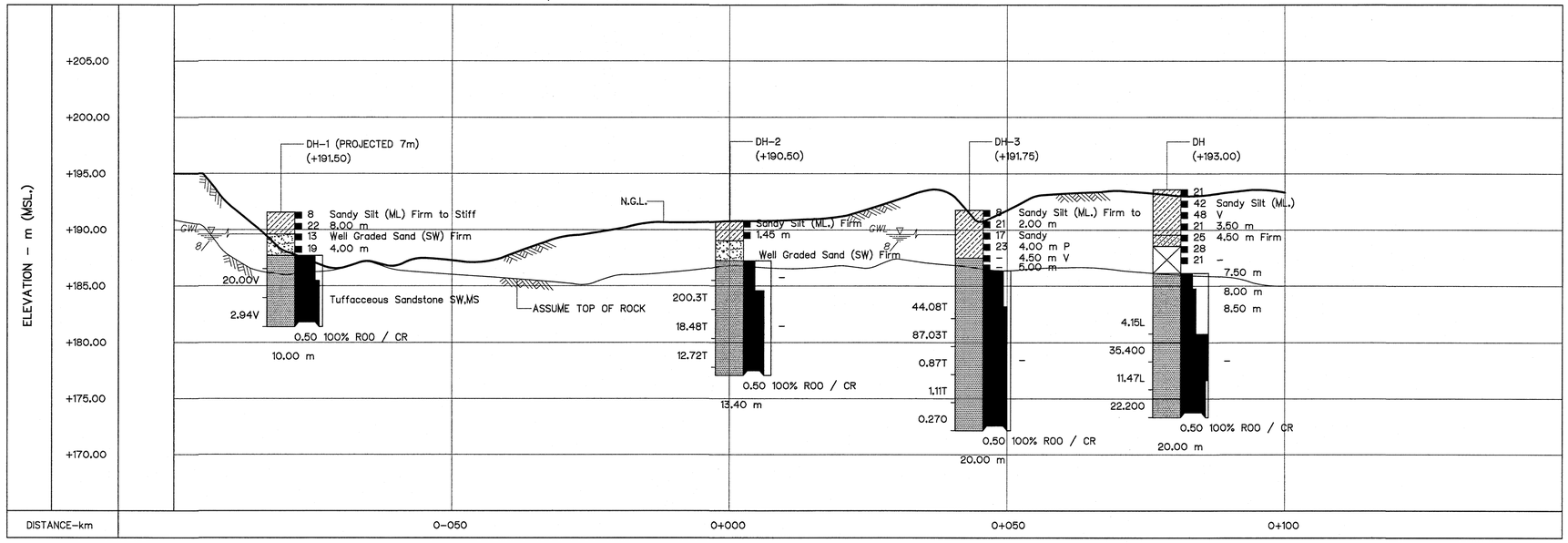
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

GENERAL

BORING LOCATION PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ต.6650 ก.ส.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ต.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-GN-06	SHEET NO. 6 OF 157

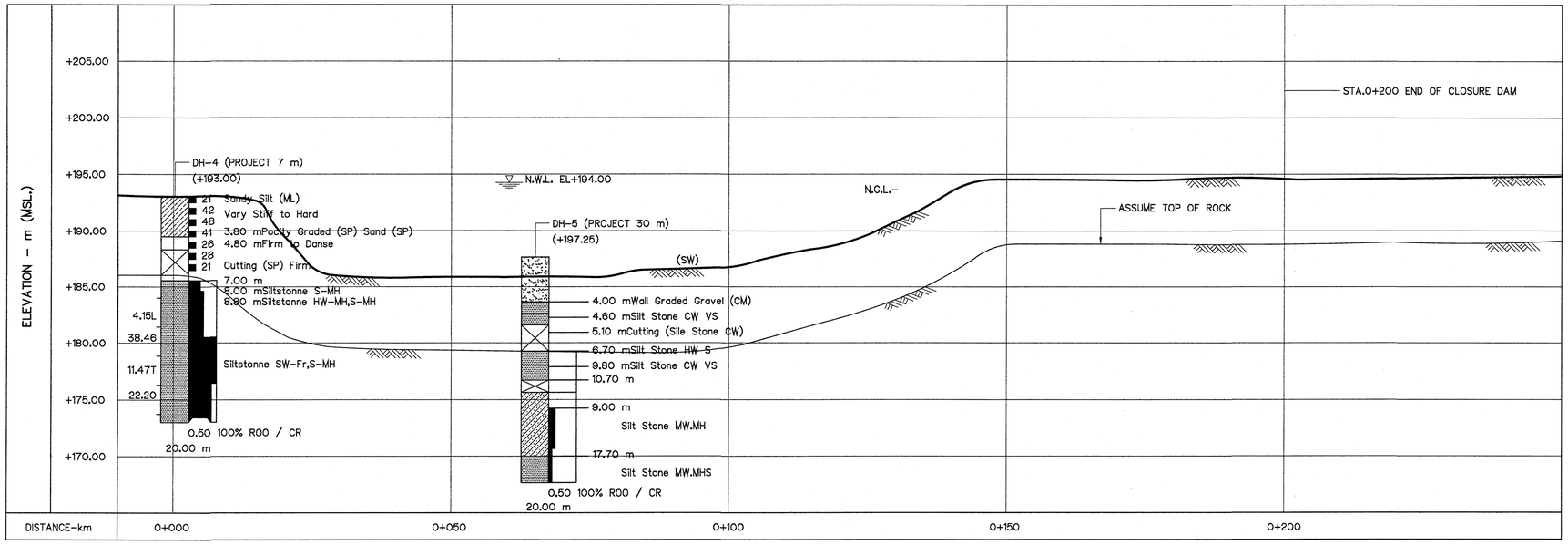


GEOLOGICAL PROFILE ALONG ℄ OF WEIR

(LOOKING DOWNSTREAM)

HOR. SCALE 1 : 250

VERT. SCALE 1 : 500



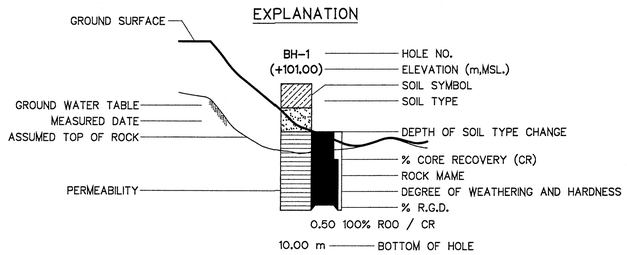
GEOLOGICAL PROFILE ALONG ℄ OF CLOSURE DAM

(LOOKING DOWNSTREAM)

HOR. SCALE 1 : 250

VERT. SCALE 1 : 500

EXPLANATION



SOIL SYMBOLS

- Sandy Silt (ML.)
- Well Graded Sand (SW) Pocity Graded Sand (SP)
- Sandy Clay (CL)

ROCK SYMBOLS

- TUFFACCEOUS SANDSTONE
- SILT STONE
- SANDSTONE
- CORE LOSS / CUTTING

DEGREE OF WEATHERING

FR = FRESH ROCK
SW = SUGHTLY WEATHERED ROCK
MW = MODERATELY WEATHERED ROCK
HW = HIGHLY WEATHERED ROCK
CW = COMPLETELY WEATHERED ROCK

DEGREE OF HARDNESS

VS = VERY SOFT ROCK
S = SOFT ROCK
MH = MEDUM HARD ROCK
H = HARD ROCK
VH = VARY HARD ROCK

% R.Q.D.

< 25 % = VERY POOR ROCK
25-50 % = POOR ROCK
50-75 % = FAIR ROCK
75-90 % = GOOD ROCK
90-100 % = VARY GOOD ROCK

DEGREE OF PERMEABILITY

< 1LU OR < 10^{-5}	Cm/SEC. = IMPERVIOUS
1-5 LU OR 10^{-5}-$5x10^{-5}$	Cm/SEC. = SEMI IMPERVIOUS
5-10 LU OR $5x10^{-5}$-10^{-4}	Cm/SEC. = SEMI PERVIOUS
10-50 LU OR 10^{-4}-$5x10^{-4}$	Cm/SEC. = RATHER PERVIOUS
>50 LU OR > $5x10^{-4}$	Cm/SEC. = PERVIOUS

RELATIVE DENSITY OF COHESIVE SOILS

N = 0-4	VERY LOOSE
N = 5-10	LOOSE
N = 11-30	FIRM
N = 31-50	DENSE
N > 50	VARY DENSE

RELATIVE DENSITY OF COHESIVE SOILS

N = 0-1	VERY SOFT
N = 2-4	SOFT
N = 5-8	FIRM
N = 9-15	STIFF
N = 15-30	VARY STIFF
N > 30	HARD

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

GENERAL

GEOLOGICAL PROFILE

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

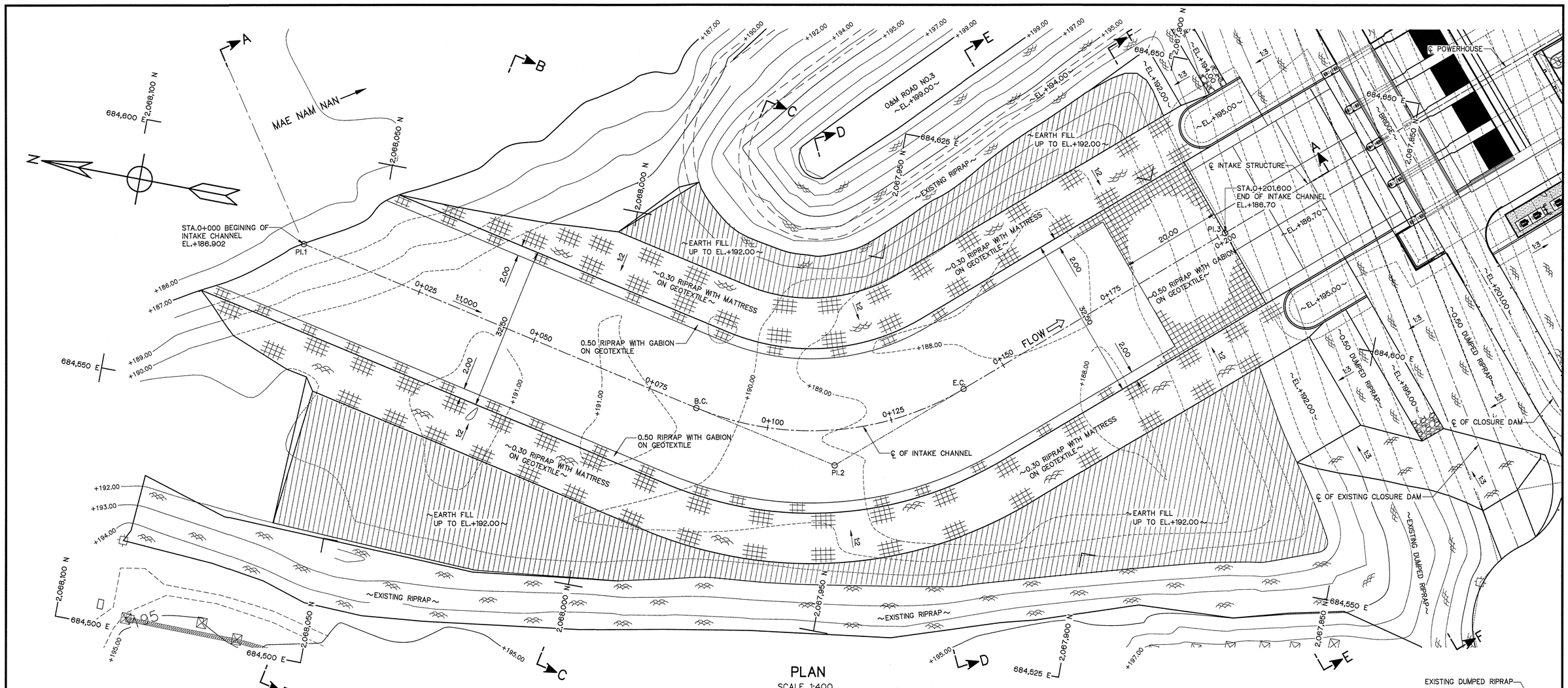
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิศ.6650	วิศ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิศ.6651		RECOMMENDED
			APPROVED

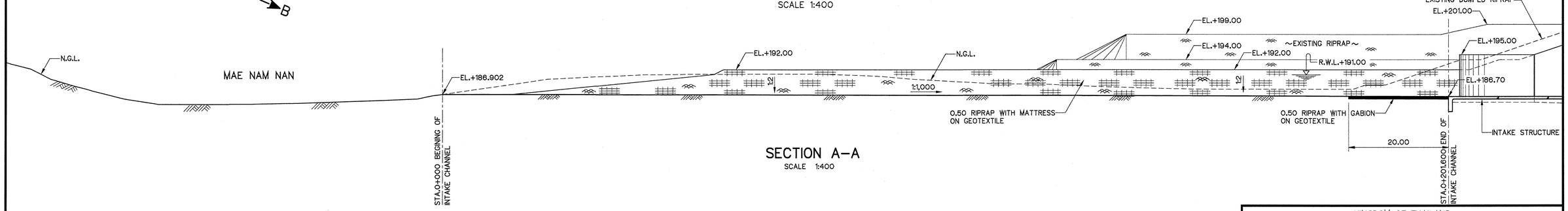
PROJECT MANAGER — DATE: 6/9/2024

DRAWING NO. THN-GN-07

SHEET NO. 7 OF 157



PLAN
SCALE 1:400



SECTION A–A
SCALE 1:400

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. GENERAL, GENERAL LAY–OUT OF PROJECT	THN–GN–02
2. INTAKE CHANNEL, SECTION B–B, C–C AND SECTION D–D	THN–IC–02
3. INTAKE CHANNEL, SECTION E–E AND F–F	THN–IC–03
4. INTAKE CHANNEL, MATTRESS DETAILS	THN–IC–04
5. INTAKE CHANNEL, GABIONS DETAILS	THN–IC–05

HORIZONTAL CURVE OF INTAKE CHANNEL

NO. PI.	COORDINATE N	COORDINATE E	PI – PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	TL. (m)	R (m)	LC. (m)	BC. STA. (km)	PI. STA. (km)	EC. STA. (km)	BEARING (N/S ° – ' – " E/W)
PI.1	2,068,064.611	684,581.484	–	–	–	–	–	–	0+000.000	–	–
PI.2	2,067,951.902	684,557.889	115.152	52°–53'–44.90"	30.000	60.308	55.677	0+085.152	0+115.152	0+140.829	S 11°–49'–25.68"W
PI.3	2,067,883.453	684,617.542	90.795	130°–59'–05.78"	–	–	–	–	0+201.600	–	–

0 5 10 20 30
SCALE 1:400 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

INTAKE CHANNEL

PLAN AND SECTION A–A

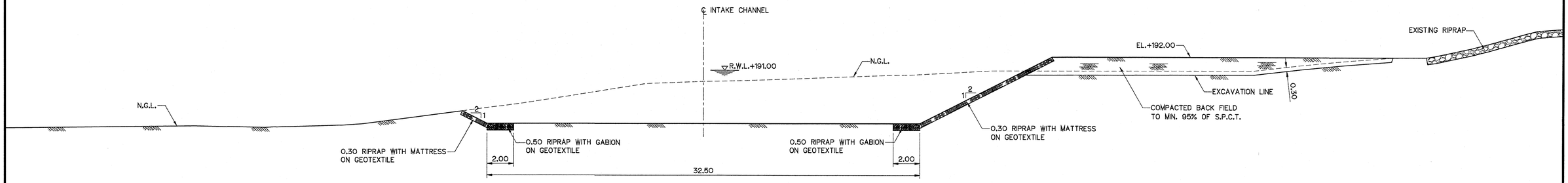
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

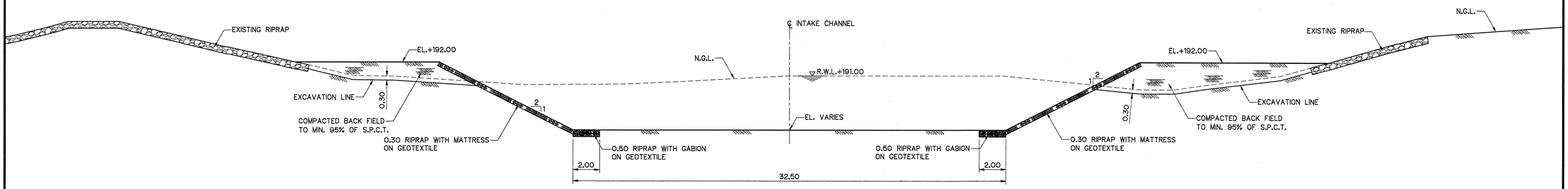
DESIGNED		REVIEWED	
DRAWN		SUBMITTED	
CHECKED		RECOMMENDED	
	6/9/2024	APPROVED	
PROJECT MANAGER	DATE		

DRAWING NO. THN–IC–01

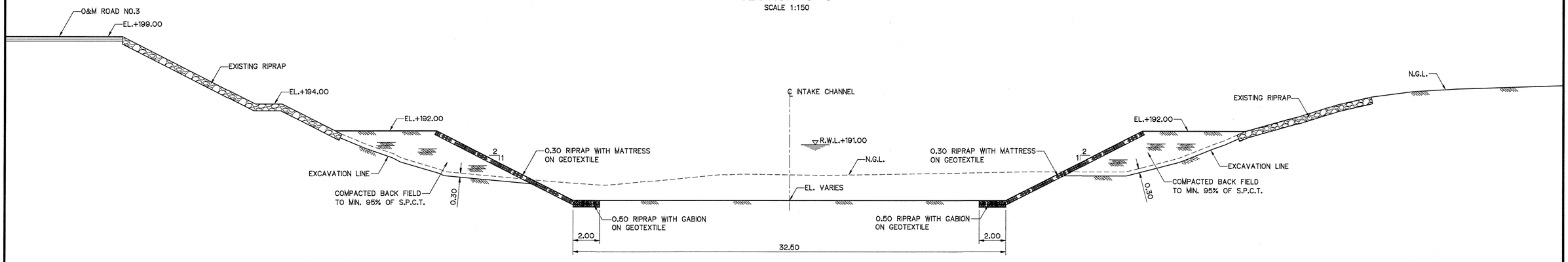
SHEET NO. 8 OF 157



SECTION B–B
SCALE 1:150



SECTION C–C
SCALE 1:150



SECTION D–D
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. INTAKE CHANNEL, PLAN AND SECTION A–A	THN–IC–01
2. INTAKE CHANNEL, SECTION E–E AND F–F	THN–IC–03
3. INTAKE CHANNEL, MATTRESS DETAILS	THN–IC–04
4. INTAKE CHANNEL, GABIONS DETAILS	THN–IC–05

0 2 4 6 8 10
SCALE 1:150 METERS

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KINGDOM OF THAILAND
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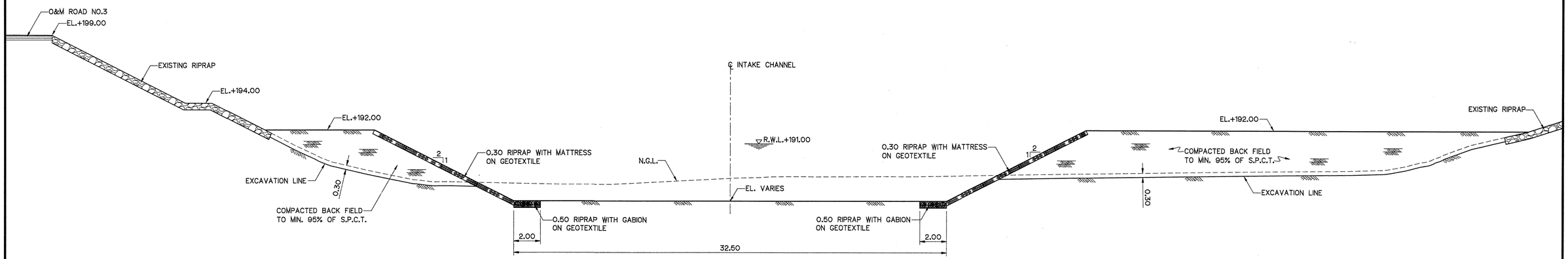
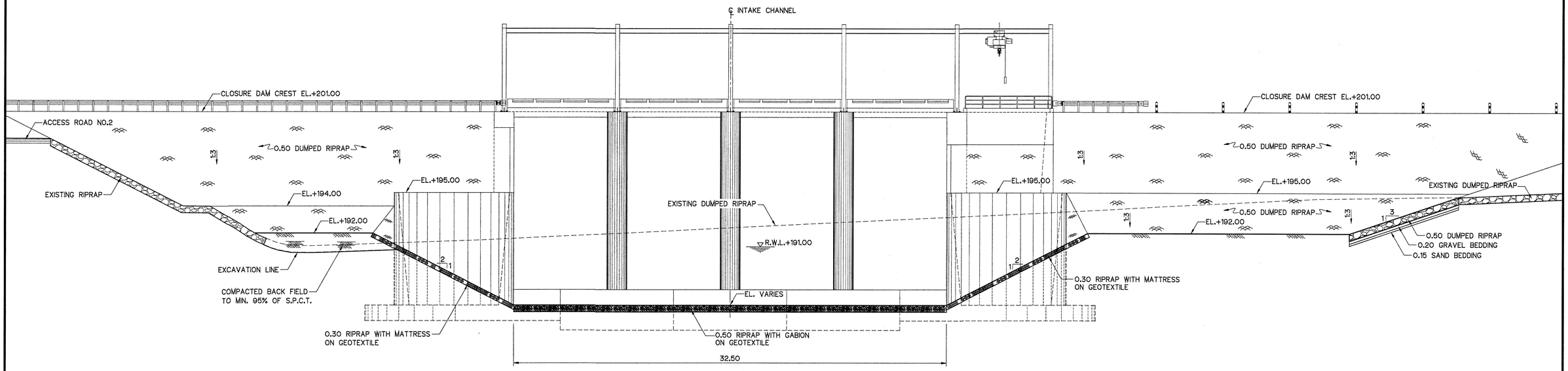
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE CHANNEL
SECTION B–B, C–C AND SECTION D–D

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วิศ.6650 วิศ.68523	REVIEWED
DRAWN	SUBMITTED
CHECKED วิศ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN–IC–02	SHEET NO. 9 OF 157



SECTION E–E
SCALE 1:150



SECTION F–F
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. INTAKE CHANNEL, PLAN AND SECTION A–A	THN–IC–01
2. INTAKE CHANNEL, SECTION B–B, C–C AND SECTION D–D	THN–IC–02
3. INTAKE CHANNEL, MATTRESS DETAILS	THN–IC–04
4. INTAKE CHANNEL, GABIONS DETAILS	THN–IC–05

0 2 4 6 8 10
SCALE 1:150 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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KINGDOM OF THAILAND
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AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE CHANNEL
SECTION E–E AND F–F

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DESIGNED	วิศ.6650	วิศ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิศ.6651		RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN–IC–03
SHEET NO. 10 OF 157

MATTRESS DETAILS

1. FILLING MATTERIALS :
   - 1.1 THE ROCK USED FOR THIS WORK SHALL BE HARD ENOUGH AND NOT CRUMBLE WHEN WET AND ENDURE REGARDNESS OF THE CLIMATE. THAE ROCK SHALL BE GRANITE, LIME STONE, SAND STONE AND GRAVEL.
   - 1.2 THE AVERAGE SIZE OF THE ROCKS SHALL NOT BE LESS THAN 0.10 M.
2. MATTRESS BOX DETAILS :
   - 2.1 MATTRESS BOXES SHALL BE RECTANGULAR SHAPE, ASSEMBLE FROM MESH BY FOLDING INTO BOXES AND LACED ALL SELVEDGES BY LACING WIRES. (FIGURE 1)
   - 2.2 THE GALVANIZED WIRES ARE MADE INTO 6 x 8 CM. HEXAGONAL NETTING JOINED TOGETHER BY TWISTING THE WIRES ROUND EACH OTHER TWICE AS SHOWN IN THE FIGURE 2.
   - 2.3 MESH WIRE, SELVEDGE WIRE AND LACING WIRE SHALL BE GALVANIZED STEEL WIRES WITH THE QUALIFICATIONS AS FOLLOW :
     - 2.3.1 TENSILE STRENGTH OF GALVANIZED WIRE SHALL BE 3,800-5,500 KG./CM.^{2}.
     - 2.3.2 WEIGHT OF ZINC COATING ON WIRE SURFACE SHALL CONFORM TO TIS.71-2532.
3. THE DIMENSIONS OF MATTRESS BOXES SHALL BE 2.00x3.00x0.30 M. (WIDTH x LENGTH x HEIGHT), UNLESS OTHHERWISE SHOWN.
4. IF THE BOX HAS A LONG SIDE THAT IS LONGER THAN 1 METER, IT SHALL BE DEVIDED EVERY 1 METER OR LESS BY THE INTERNAL DIAPHRAGMS.
5. THE LACING FOR ASSEMBLING OF MATTRESS BOX AND THE LACING TO ADJACENT BOX SHALL BE DONE BY GALVANIZED LACING WIRE BY SINGLE LOOP AND TRIPPLE LOOP WRAPPING AS SHOWN IN FOGURE 3.
6. CONTRACTOR SHALL SUBMIT BRAND OF PRODUCT, CATALOGES AND TECHNICAL DOCUMENT OF THE PRODUCT TO EMPLOYER FOR APPROVAL PRIOR TO CONSTRUCTION.
7. GEOTEXTILE DETAILS :
   - 7.1 GEOTEXTILE SHALL BE NONWOVEN TYPE AND MADE FROM POLYPROPYLENE OR POLYESTER.
   - 7.2 POLYESTER SHALL BE PRESSED INTO SHEETS, NOT EASY TO FALL APART.
   - 7.3 GEOTEXTILE WIDTH SHALL NOT BE LESS THAN 4.00 M.
   - 7.4 THE QUALIFICATIONS OF GEOTEXTILE SHALL BE AS FOLLOW :
     - 7.4.1 WEIGHT PER AREA (MASS / UNIT AREA), (ASTM D5261) SHALL NOT BE LESS THAN 310 GRAMS/M2.
     - 7.4.2 THICKNESS, (ASTM D5199:1991) SHALL NOT BE LESS THAN 2.8 MM.
     - 7.4.3 GRAB TENSILE, (ASTM D4632) SHALL NOT BE LESS THAN 1,100 NEWTONS.
     - 7.4.4 ELONGATION, (ASTM D4632) SHALL NOT BE LESS THAN 50%.
     - 7.4.5 TEAR STRENGTH, (ASTM D4533) SHALL NOT BE LESS THAN 450 NEWTONS.
     - 7.4.6 FLOW RATE, (BS 6906 : PART 3) SHALL NOT BE LESS THAN 100 LITES/SECOND/M.^{2}
     - 7.4.7 EFFECTIVE OPENNING SIZE (FRANZIUS INSTITUTE) SHALL BE 0.07-0.310 MM.
   - 7.5 JOINING GEOTEXTILES SHALL BE STITCH OR LAP JOINT AS FOLLOW :
     - 7.5.1 GEOTEXTILES SHALL BE SEWING TOGETHER WITH SINGLE STITCHING WHICH SPACING NOT MORE THAN 1 CM. AND TENSILE STRENGTH OF THE SEAM SHALL NOT BE LESS THAN 500 KG./M.
     - 7.5.2 STRING THREADS USED IN STITCHING SHALL HAVE QUALIFICATIONS AS FOLLOW :

WEIGTH NOT LESS THAN	220	TEX
DIAMETER NOT LESS THAN	4	MICRONS
TENSILE STRENGTH NOT LESS THAN	140	NEWTONS
TEAR ELONGATION NOT LESS THAN	20	%

     - 7.5.3 LAP JOINT SHALL BE PROVIDED LENGTH OF LAPPING NOT LESS THAN 1.00 M.
8. CONSTRUCTION DETAILS OF MATRESS :
   - 8.1 CLEAR THE AREA OF MATTRESS CONSTRUCTION AND MARK THE SHAPE OF SIDE SLOPE AS SHOWN IN THE DRAWING AS WELL AS COMPACT THE GROUND.
   - 8.2 LAY THE GEOTEXTOLE ON THE SIDE SLOPE BEFORE CONSTRUCTION THE MATTRESS.
   - 8.3 AFTER THE MATTRESS CONSTRUCTION IS FINISHED, SHAPE THE GROUND TO EXISTING CONDITION.

TABLE A

TYPE	HEIGHT M.	WIRE TYPE	DIAMETER MM.
MATTRESS	0.30	SELVEDGE WIRE	2.7
		MESH WIRE	2.2
		LACING WIRE	2.2

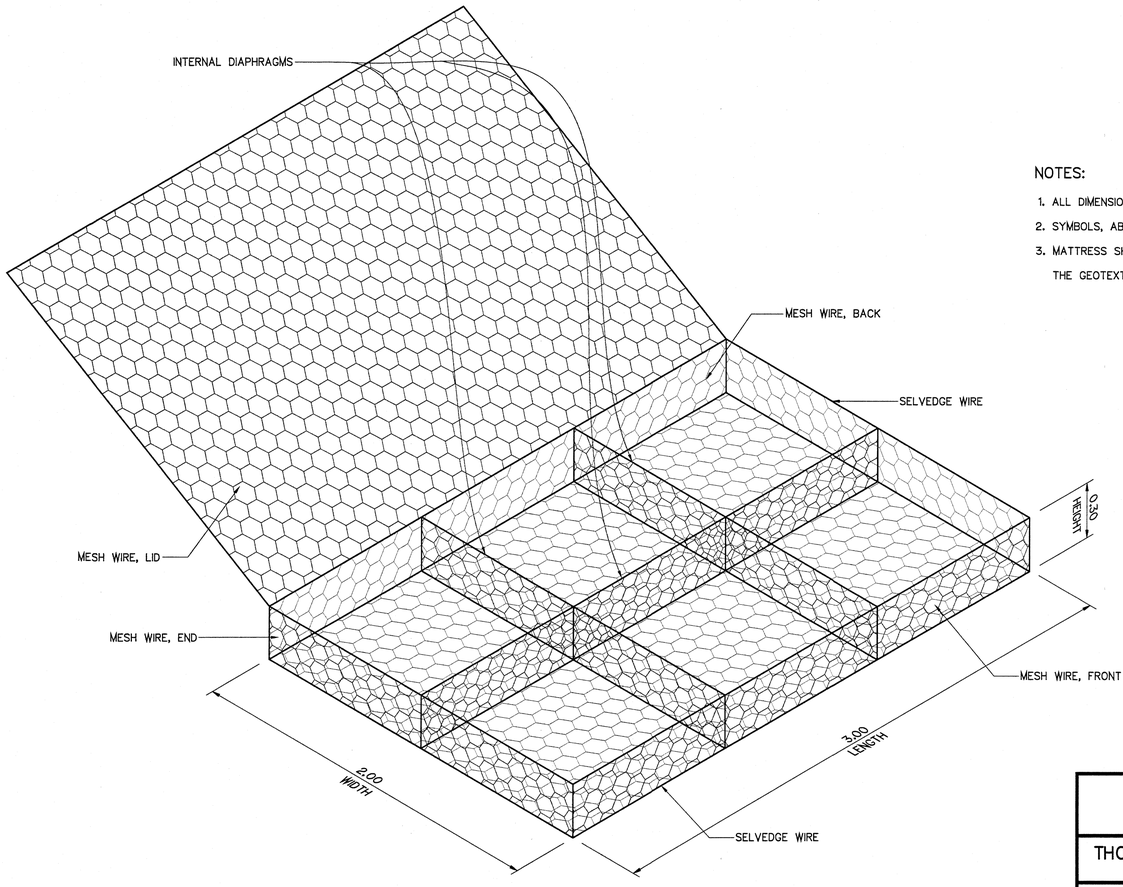

FIGURE 1 MATTRESS SIZE 3.00x2.00x0.30 M.

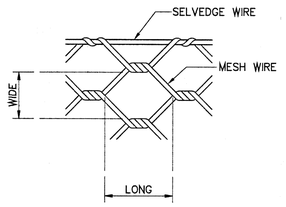

FIGURE 2

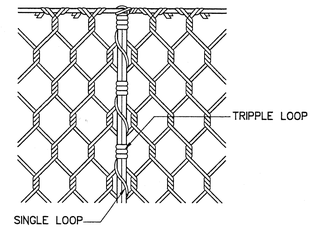

FIGURE 3

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. MATTRESS SHALL BE PLACED ON THE WELL COMPACTED GROUND AND MUST LAY THE GEOTEXTILE ON THE GROUND BEFORE CONSTRUCTION OF MATTRESS.

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KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE CHANNEL
MATTRESS DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

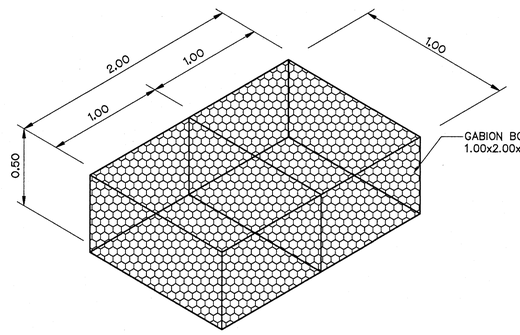
REVIEWED
DESIGNED วิ.6650 วิ.88523
SUBMITTED
DRAWN
RECOMMENDED
CHECKED วิ.6651
APPROVED
PROJECT MANAGER 6/9/2024 DATE
DRAWING NO. THN-IC-04
SHEET NO. 11 OF 157

GENERAL DETAILS OF GABION

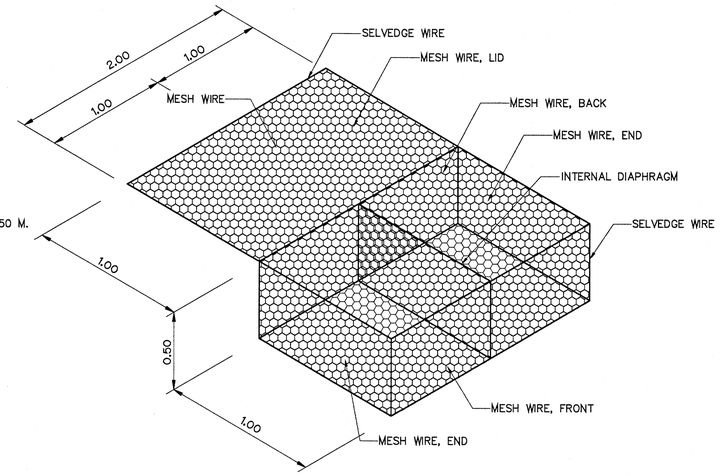
1. FILLING MATTERIALS :
   - 1.1 THE ROCK USED FOR THIS WORK SHALL BE HARD ENOUGH AND NOT CRUMBLE WHEN WET AND ENDURE REGARDNESS OF THE CLIMATE. THAE ROCK SHALL BE GRANITE, LIME STONE, SAND STONE AND GRAVEL.
   - 1.2 THE SIZE OF ROCKS SHALL NOT BE LARGER THAN 0.25 M. AND 85% BY WEIGHT OF ROCK SHALL NOT BE SMALLER THAN 0.10 M.
   - 1.3 IN DURING CONSTRUCTION, THE CONTRACTOR SHALL BE CAREFULLY NOT LET THE ROCKS SLIP THROUGH THE GABION BOXES.
   - 1.4 THE CONTRACTOR SHALL CLOSE THE LID NEATLY TO ENSURE THAT THE ROCKS CAN NOT SLIP THROUGH THE GABION BOXES.
2. GABION BOX DETAILS :
   - 2.1 GABION BOXES SHALL BE RECTANGULAR SHAPE, ASSEMBLE FROM MESH BY FOLDING INTO BOXES AND LACED ALL SELVEDGES BY LACING WIRES. (FIGURE 1)
   - 2.2 THE GALVANIZED WIRES ARE MADE INTO 8 x 10 CM. HEXAGONAL NETTING JOINED TOGETHER BY TWISTING THE WIRES ROUND EACH OTHER TWICE AS SHOWN IN THE FIGURE 2.
   - 2.3 MESH WIRE, SELVEDGE WIRE AND LACING WIRE SHALL BE GALVANIZED STEEL WIRES WITH THE QUALIFICATIONS AS FOLLOW :
     - 2.3.1 TENSILE STRENGTH OF GALVANIZED WIRE SHALL BE 3,800–5,500 KG./CM.2 .
     - 2.3.2 WEIGHT OF ZINC COATING ON WIRE SURFACE SHALL CONFORM TO TIS.71–2532.
3. THE DIMENSIONS OF GABION BOXES SHALL BE 1.00x2.00x0.50 M. (WIDTH x LENGTH x HEIGHT), UNLESS OTHHERWISE SHOWN.
4. IF THE GABION BOX HAS A LONG SIDE THAT IS LONGER THAN 1 METER, IT SHALL BE DEVIDED EVERY 1 METER OR LESS BY THE INTERNAL DIAPHRAGMS.
5. THE LACING FOR ASSEMBLING OF GABION BOX AND THE LACING TO ADJACENT BOX SHALL BE DONE BY GALVANIZED LACING WIRE BY SINGLE LOOP AND TRIPPLE LOOP WRAPPING AS SHOWN IN FOGURE 3.
6. CONTRACTOR SHALL SUBMIT BRAND OF PRODUCT, CATALOGES AND TECHNICAL DOCUMENT OF THE PRODUCT TO EMPLOYER FOR APPROVAL PRIOR TO CONSTRUCTION.
7. GEOTEXTILE DETAILS :
   - 7.1 GEOTEXTILE SHALL BE NONWOVEN TYPE AND MADE FROM POLYPROPYLENE OR POLYESTER.
   - 7.2 POLYESTER SHALL BE PRESSED INTO SHEETS, NOT EASY TO FALL APART.
   - 7.3 GEOTEXTILE WIDTH SHALL NOT BE LESS THAN 4.00 M.
   - 7.4 THE QUALIFICATIONS OF GEOTEXTILE SHALL BE AS FOLLOW :
     - 7.4.1 WEIGHT PER AREA (MASS / UNIT AREA), (ASTM D5261) SHALL NOT BE LESS THAN 310 GRAMS/M2.
     - 7.4.2 THICKNESS, (ASTM D5199:1991) SHALL NOT BE LESS THAN 2.8 MM.
     - 7.4.3 GRAB TENSILE, (ASTM D4632) SHALL NOT BE LESS THAN 1,100 NEWTONS.
     - 7.4.4 ELONGATION, (ASTM D4632) SHALL NOT BE LESS THAN 50%.
     - 7.4.5 TEAR STRENGTH, (ASTM D4533) SHALL NOT BE LESS THAN 450 NEWTONS.
     - 7.4.6 FLOW RATE, (BS 6906 : PART 3) SHALL NOT BE LESS THAN 100 LITES/SECOND/M.2
     - 7.4.7 EFFECTIVE OPENNING SIZE (FRANZIUS INSTITUTE) SHALL BE 0.07–0.310 MM.
   - 7.5 JOINING GEOTEXTILES SHALL BE STITCH OR LAP JOINT AS FOLLOW :
     - 7.5.1 GEOTEXTILES SHALL BE SEWING TOGETHER WITH SINGLE STITCHING WHICH SPACING NOT MORE THAN 1 CM. AND TENSILE STRENGTH OF THE SEAM SHALL NOT BE LESS THAN 500 KG./M.
     - 7.5.2 STRING THREADS USED IN STITCHING SHALL HAVE QUALIFICATIONS AS FOLLOW :

WEIGTH NOT LESS THAN	220	TEX
DIAMETER NOT LESS THAN	4	MICRONS
TENSILE STRENGTH NOT LESS THAN	140	NEWTONS
TEAR ELONGATION NOT LESS THAN	20	%

     - 7.5.3 LAP JOINT SHALL BE PROVIDED LENGTH OF LAPPING NOT LESS THAN 1.00 M.
8. CONSTRUCTION DETAILS OF GABIONS :
   - 8.1 CLEAR THE AREA OF GABION CONSTRUCTION AND MARK THE SHAPE OF SIDE SLOPE AS SHOWN IN THE DRAWING AS WELL AS COMPACT THE GROUND.
   - 8.2 LAY THE GEOTEXTOLE ON THE SIDE SLOPE BEFORE CONSTRUCTION THE GABIONS.
   - 8.3 AFTER THE GABIONS CONSTRUCTION IS FINISHED, SHAPE THE GROUND TO EXISTING CONDITION.



COMPLETE ASEMBLE GABION BOX



GABION BOX DIMENSION

FIGURE 1 GABION BOX SIZE 2.00X1.00X0.50 M.

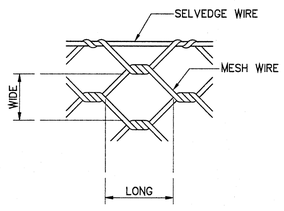


FIGURE 2

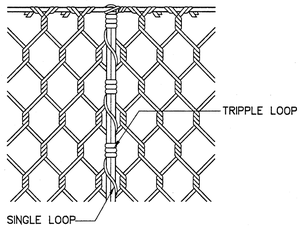


FIGURE 3

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. GABIONS SHALL BE PLACED ON THE WELL COMPACTED GROUND AND MUST LAY THE GEOTEXTILE ON THE GROUND BEFORE CONSTRUCTION OF MATTRESS.

TABLE A

TYPE	HEIGHT M.	WIRE TYPE	DIAMETER MM.
GABION	0.50	SELVEDGE WIRE	3.4
		MESH WIRE	2.7
		LACING WIRE	2.2

NO.	DATE	REVISIONS	CHECKED	APPROVED
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KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE CHANNEL
GABIONS DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

DESIGNED ส.ต.6650 ส.ต.88523

SUBMITTED

DRAWN

RECOMMENDED

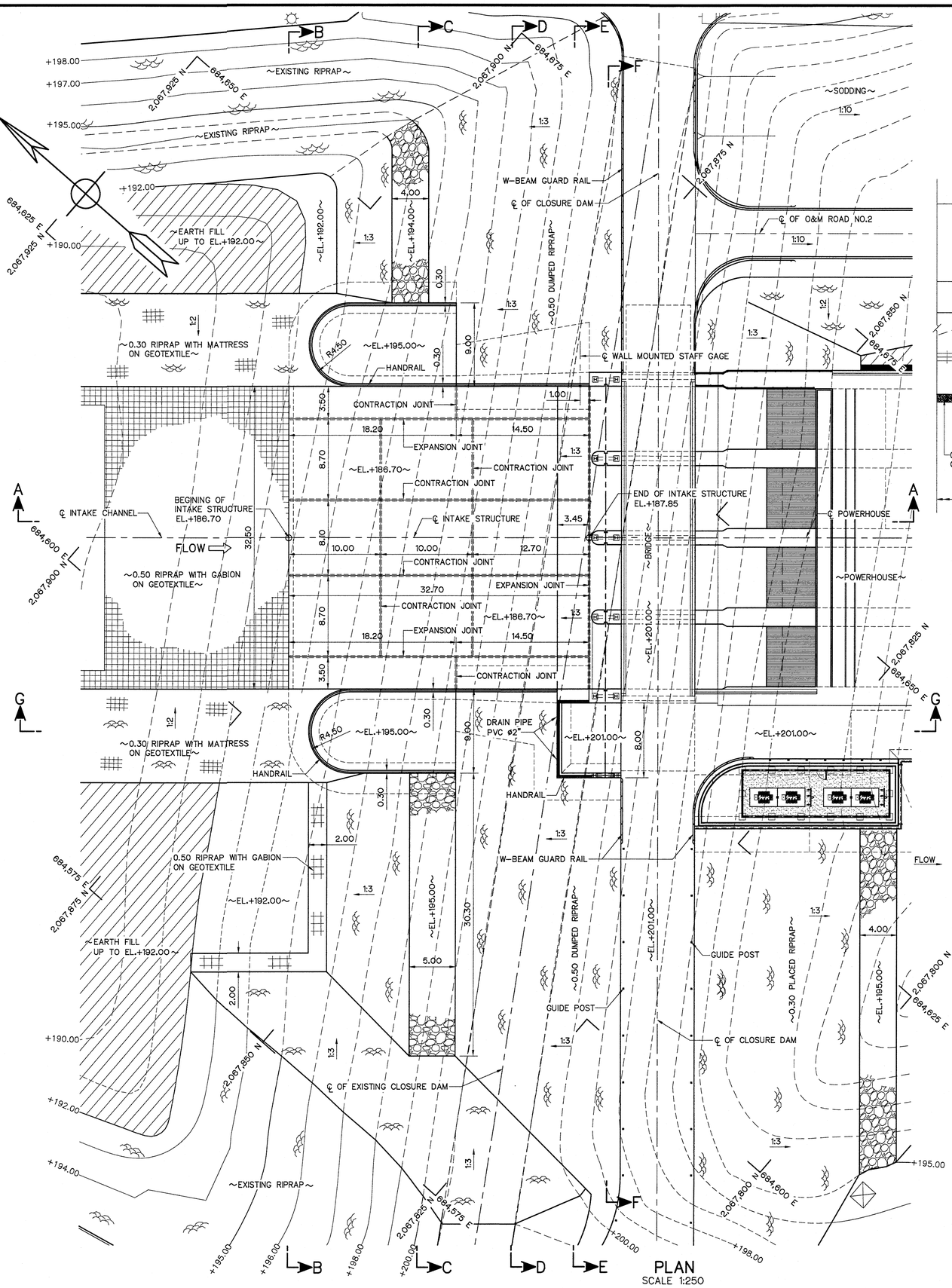
CHECKED ส.ต.6651

APPROVED

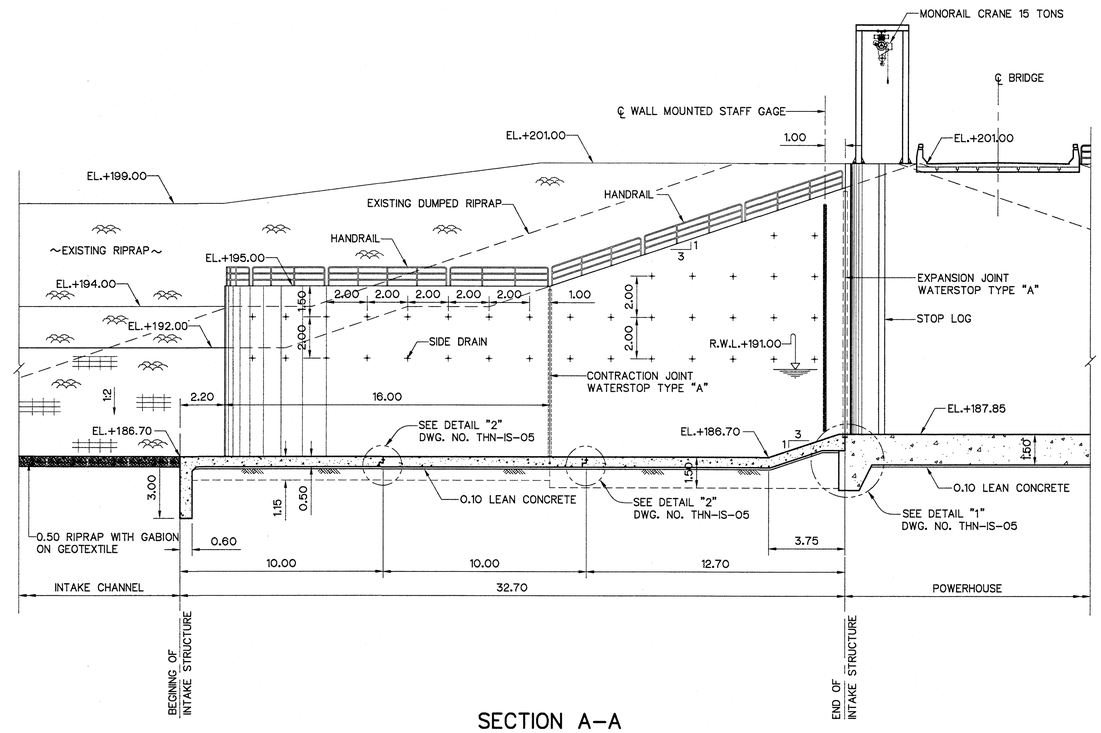
PROJECT MANAGER 6/9/2024 DATE

DRAWING NO. THN-IC-05

SHEET NO. 12 OF 157



PLAN
SCALE 1:250



SECTION A–A
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. INTAKE STRUCTURE SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1.	GENERAL, GENERAL LAY-OUT OF PROJECT	THN-GN-02
2.	INTAKE STRUCTURE, SECTION B-B AND C-C	THN-IS-02
3.	INTAKE STRUCTURE, SECTION D-D AND E-E	THN-IS-03
4.	INTAKE STRUCTURE, SECTION F-F AND G-G	THN-IS-04
5.	INTAKE STRUCTURE, HANDRAIL AND JOINTS DETAILS	THN-IS-05
6.	INTAKE STRUCTURE, WALL MOUNTED STAFF GAGE DETAIL	THN-IS-06
7.	OUTLET CHANNEL, SIDE DRAIN, HANDRAIL, GUTTER AND JOINTS DETAILS	THN-OC-05

0 2 4 6 8 10
SCALE 1:150 METERS

0 5 10 15 20
SCALE 1:250 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

INTAKE STRUCTURE

PLAN AND SECTION A–A

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FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

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CHECKED วิ.6651
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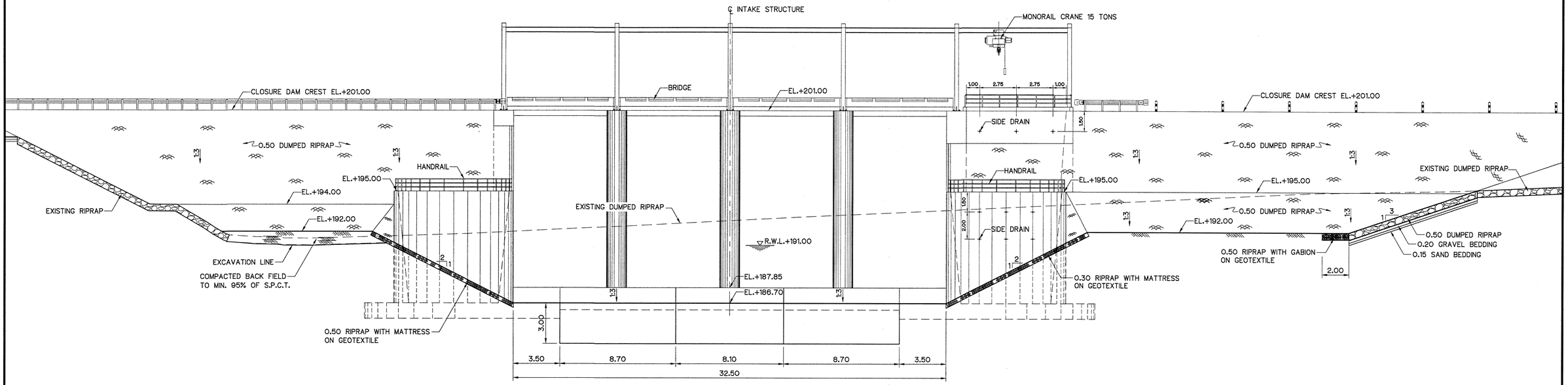
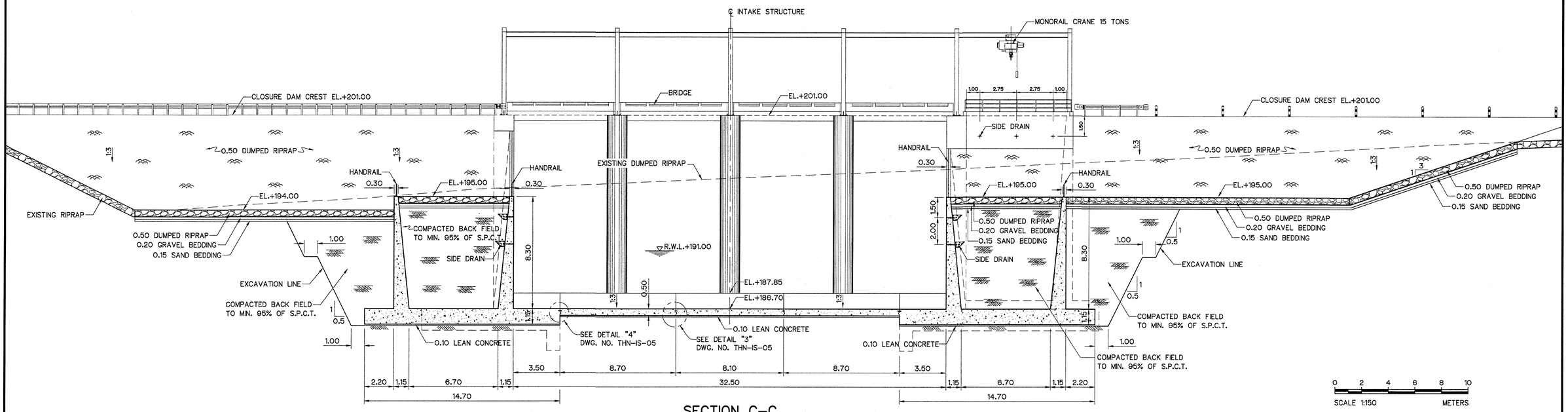
DRAWING NO. THN-IS-01
SHEET NO. 13 OF 157



SECTION B–B
SCALE 1:150



SECTION C–C
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. INTAKE STRUCTURE SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1. INTAKE STRUCTURE, PLAN AND SECTION A–A	THN–IS–01
2. INTAKE STRUCTURE, HANDRAIL AND JOINTS DETAILS	THN–IS–05
3. INTAKE STRUCTURE, WALL MOUNTED STAFF GAGE DETAIL	THN–IS–06

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE STRUCTURE
SECTION B–B AND C–C

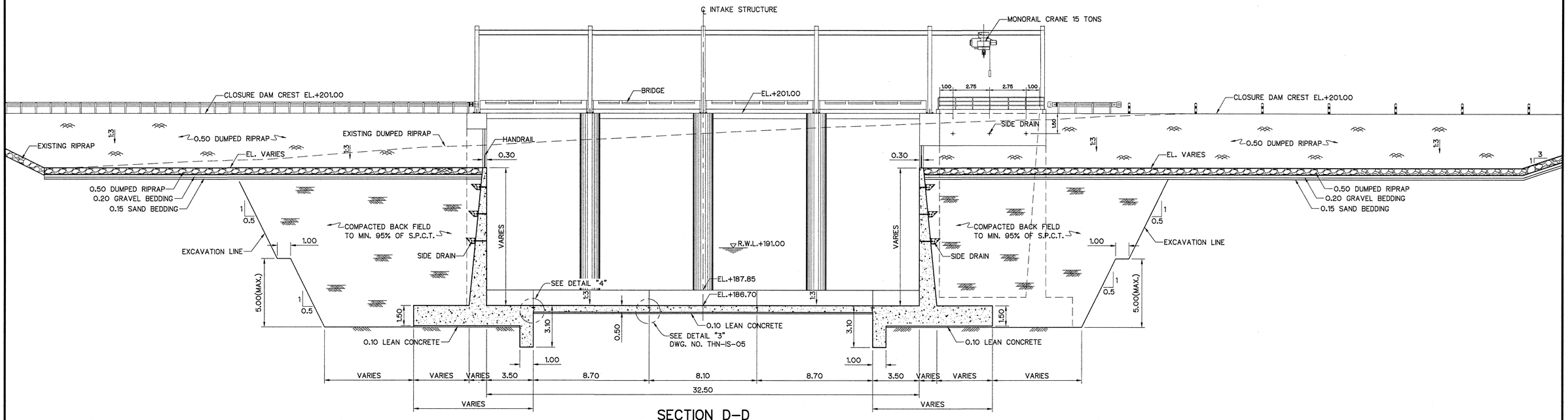
FEC FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

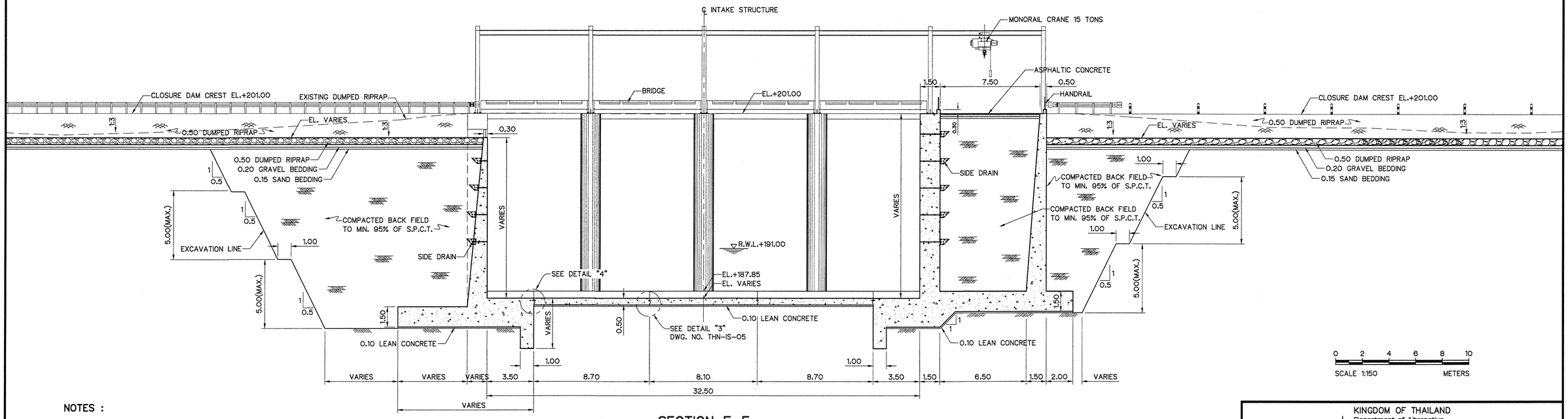
DESIGNED	ส.ต.6650	ส.ต.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	ส.ต.6651		RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN–IS–02

SHEET NO. 14 OF 157



SECTION D–D
SCALE 1:150



SECTION E–E
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. INTAKE STRUCTURE SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1. INTAKE STRUCTURE, PLAN AND SECTION A–A	THN-IS-01
2. INTAKE STRUCTURE, HANDRAIL AND JOINTS DETAILS	THN-IS-05
3. INTAKE STRUCTURE, WALL MOUNTED STAFF GAGE DETAIL	THN-IS-06

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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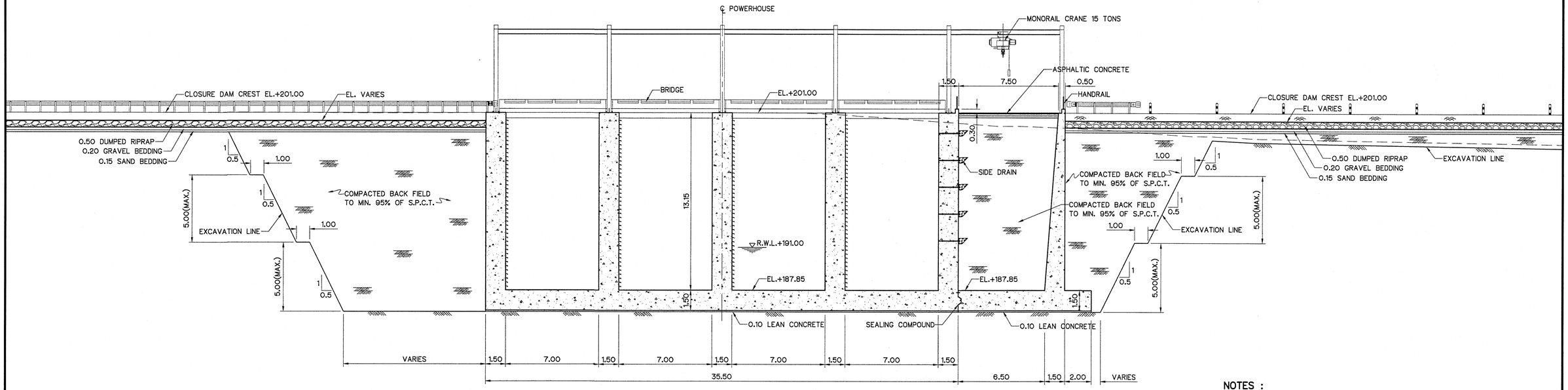
MINISTRY OF ENERGY

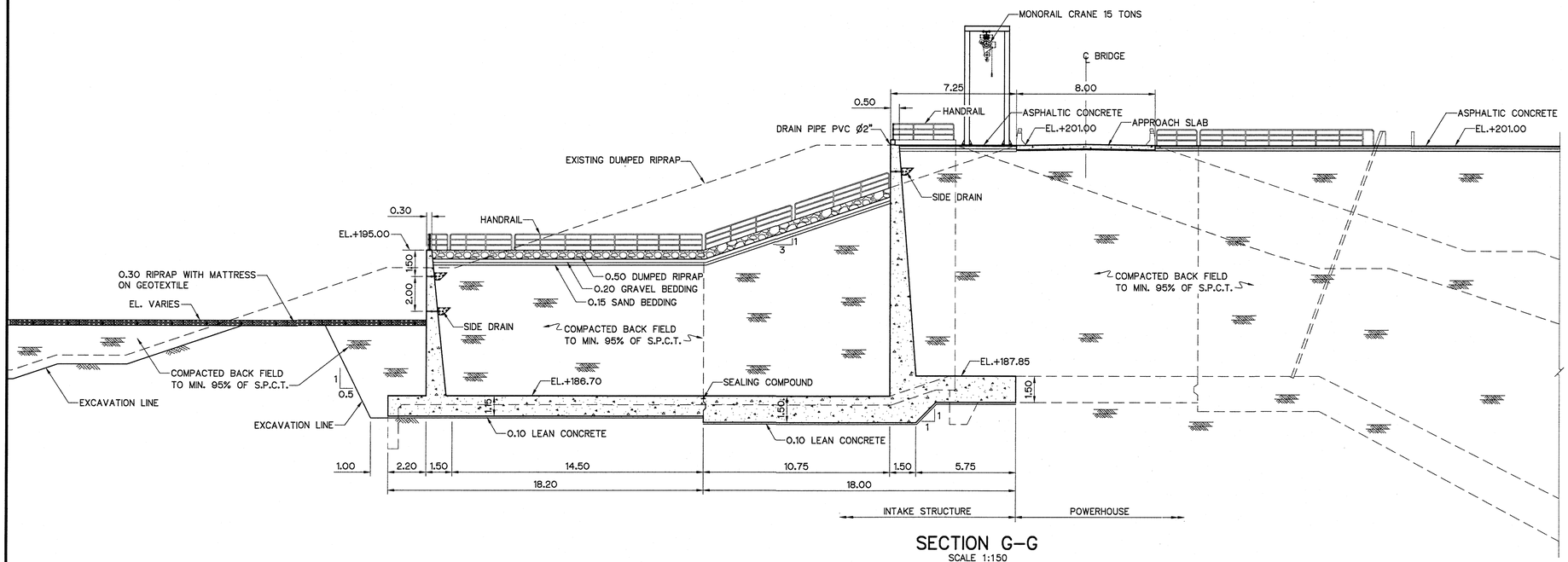
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE STRUCTURE
SECTION D–D AND E–E

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-IS-03	SHEET NO. 15 OF 157



SECTION F–F
SCALE 1:150



SECTION G–G
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. INTAKE STRUCTURE SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1. INTAKE STRUCTURE, PLAN AND SECTION A–A	THN–IS–01
2. INTAKE STRUCTURE, HANDRAIL AND JOINTS DETAILS	THN–IS–05
3. INTAKE STRUCTURE, WALL MOUNTED STAFF GAGE DETAIL	THN–IS–06

0 2 4 6 8 10
SCALE 1:150 METERS

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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
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CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE STRUCTURE
SECTION F–F AND G–G

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1				

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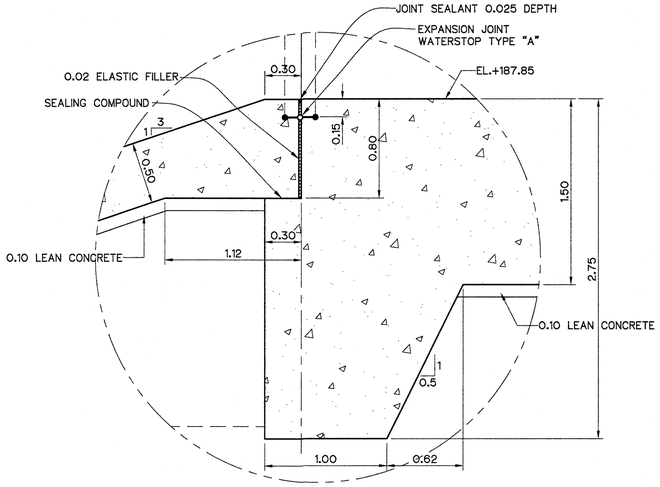
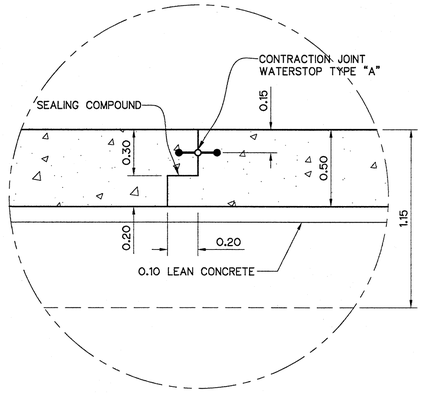
DESIGNED วศ.6650 ภท.88523
DRAWN
CHECKED วศ.6651
6/9/2024
PROJECT MANAGER DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

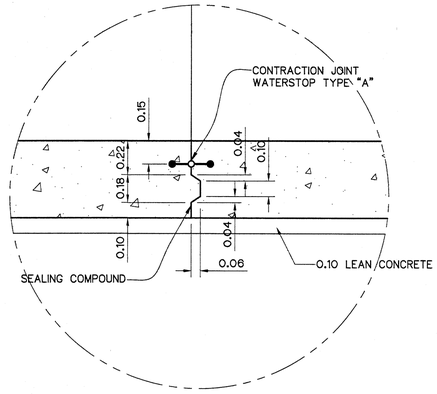
DRAWING NO. THN–IS–04
SHEET NO. 16 OF 157



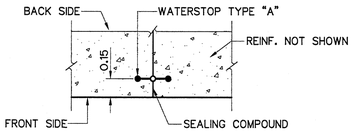
DETAIL "1"
SCALE 1:25



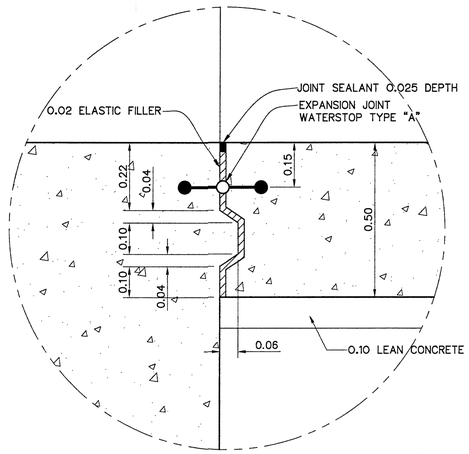
DETAIL "2"
SCALE 1:20



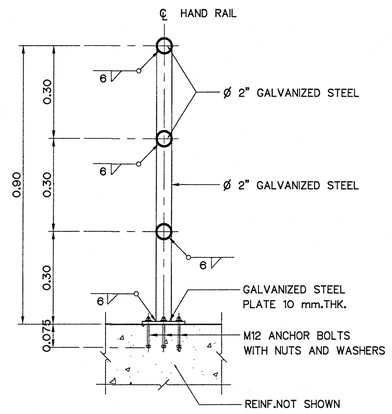
DETAIL "3"
SCALE 1:20

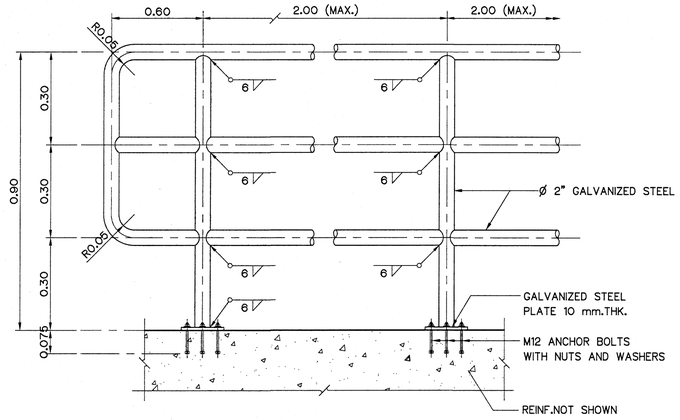


CONTRACTION JOINT AT SIDE WALL
SCALE 1:25

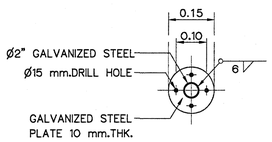


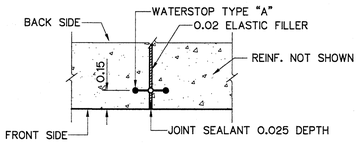
DETAIL "4"
SCALE 1:10



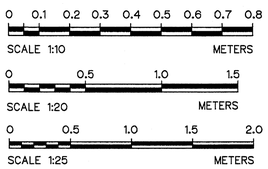


DETAIL OF HANDRAIL
SCALE 1:10





EXPANSION JOINT AT SIDE WALL
SCALE 1:25



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METER, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. INTAKE STRUCTURE, STANDARD PVC WATERSTOP, SECTION AND DETAILS THN-IS-07

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

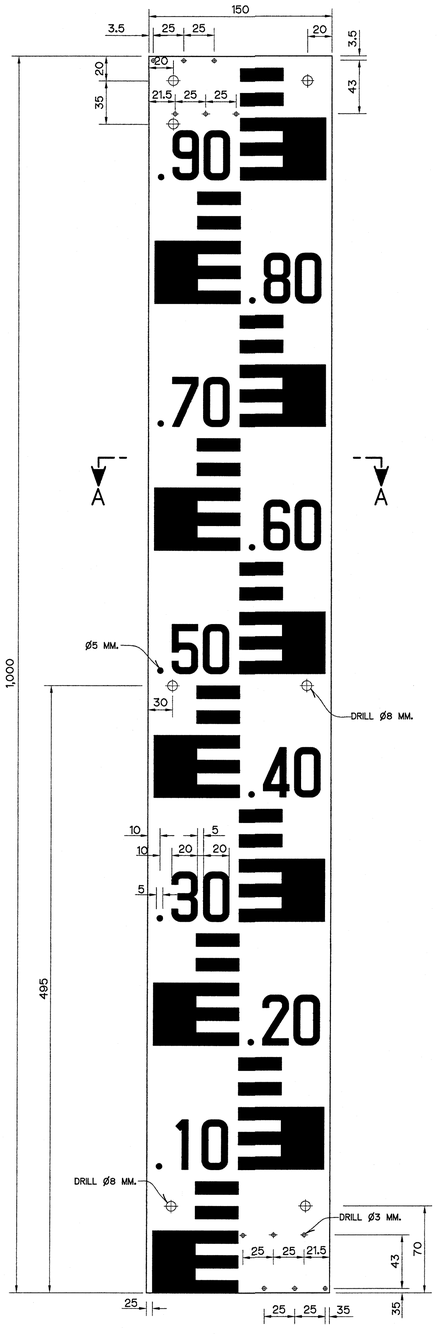
CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE STRUCTURE
HANDRAIL AND JOINTS DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED ส.ต.6650 ภ.ต.88523
DRAWN
CHECKED ส.ต.6651
6/9/2024
PROJECT MANAGER DATE

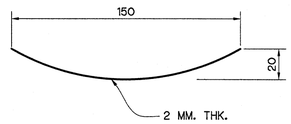
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-IS-05
SHEET NO. 17 OF 157



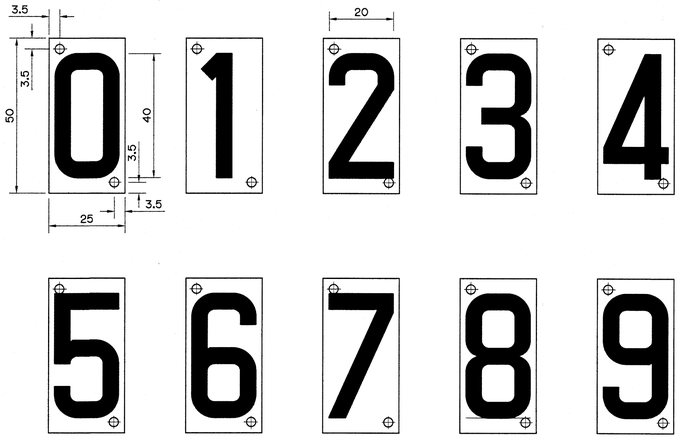
WALL MOUNTED STAFF GAGE

NOT TO SCALE



SECTION A–A

NOT TO SCALE



NUMBER PLATE

NOT TO SCALE

LIST OF WALL MOUNTED STAFF GAGE

DETAILED SPECIFICATIONS :

1. THE WALL MOUNTED STAFF GAGE IS A TYPE OF WATER LEVEL MEASURING PLATE MADE OF COATED STEEL, 100 CM LONG, 15 CM WIDE AND 0.2 CM THICK. THE CURVATURE OF THE SHEET AS SHOWN IN THE DRAWING.
2. THE SIZE OF THE HOLES AND THE LOCATION OF THE HOLES ARE MADE AS SHOWN IN THE DRAWING.
3. THE FRONT SIDE SURFACE OF WALL MOUNTED STAFF GAGE SHALL BE COATED IN YELLOW. THE DIVISION AND FIGURES SHALL BE COATED IN DARK BLUE THE BACK SIDE SHALL BE COATED IN BLACK FOR ALL.
4. ALL DIMENSIONS ARE IN CENTIMETERS EXCEPT OTHERWISE SPECIFIED IN THE DRAWING.
5. STEEL PLATES AND COATINGS USED TO MAKE WATER LEVEL NAMEPLATES SHALL BE OF GOOD QUALITY AND SHALL BE DONE WITH NEATNESS, SIZE AND SCALE CORRECTLY AS REQUIRED.

LIST OF NUMBER PLATE

DETAILED SPECIFICATIONS :

1. NUMBER PLATE OF VARIOUS NUMBERS SHALL BE MADE OF COATED STEEL SHEET, LENGTH 5 CM. WIDTH 2.5 CM. AND THICKNESS 0.15 CM.
2. THE FRONT SIDE OF NUMBER PLATES SHALL BE COATED IN WHITE. AND THE NUMBERS COATED IN DARK BLUE. THE BACK SIDE SHALL BE COATED IN BLACK FOR ALL.
3. STEEL PLATE AND COATING USED TO MAKE DIFFERENT NUMBER PLATE SHALL BE OF GOOD QUALITY, NOT EASY TO CRACK AND SHALL BE DONE WITH NEATNESS, SIZE AND SCALE CORRECTLY AS REQUIRED.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

INTAKE STRUCTURE

WALL MOUNTED STAFF GAGE DETAIL

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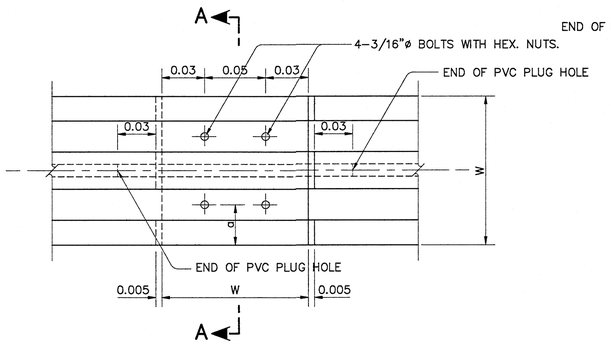
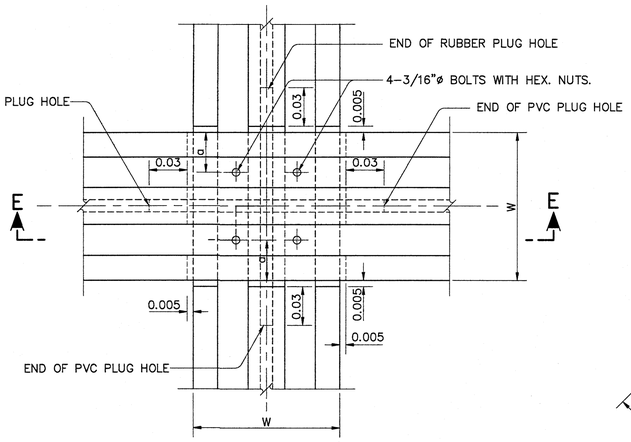
DESIGNED สย.6650 กม.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED สย.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-IS-06	SHEET NO. 18 OF 157



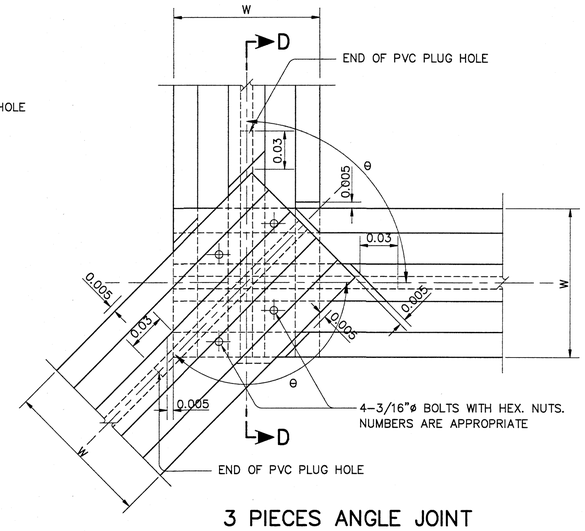
STRAIGHT JOINT

NOT TO SCALE



NORMAL LEAN JOINT

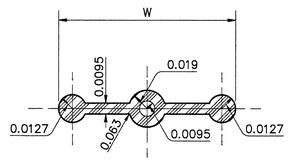
NOT TO SCALE



3 PIECES ANGLE JOINT

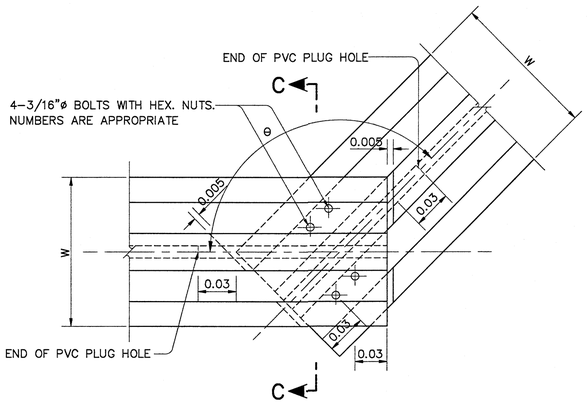
NOT TO SCALE

PVC WATERSTOP (M.)			
TYPE	W	a	R
A	0.2286	0.04	0.20
B	0.1524	0.04	0.15
C	0.1524	0.04	0.10



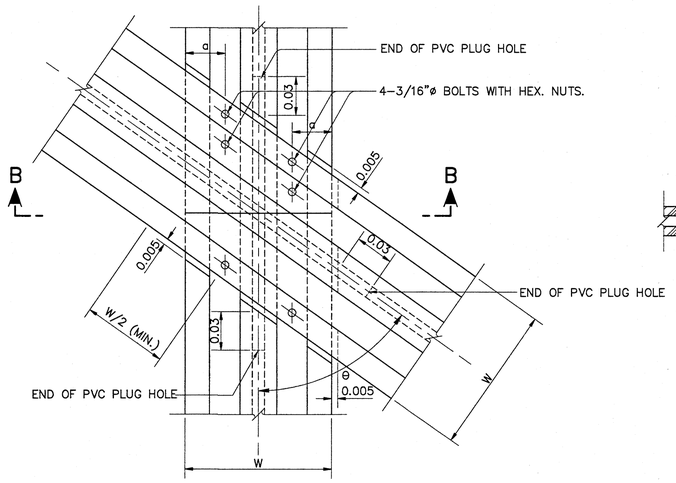
PVC WATERSTOP
(TYPE "A" & TYPE "B")

NOT TO SCALE



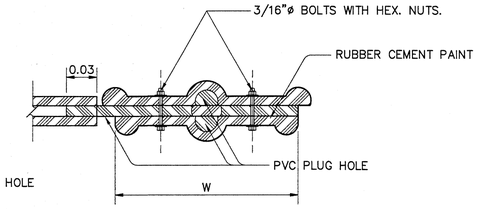
ANGLE JOINT

NOT TO SCALE



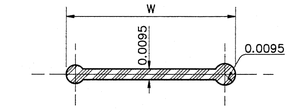
ANGLE LEAN JOINT

NOT TO SCALE



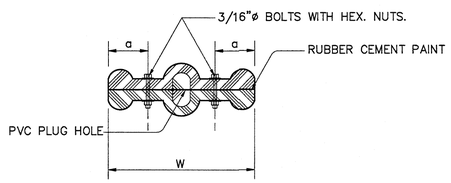
SECTION D-D

NOT TO SCALE



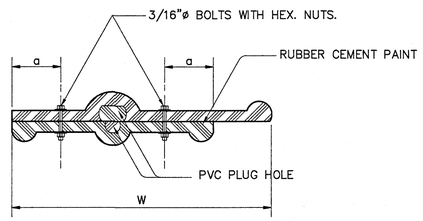
PVC WATERSTOP
(TYPE "C")

NOT TO SCALE



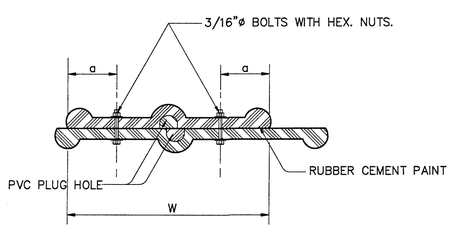
SECTION A-A

NOT TO SCALE



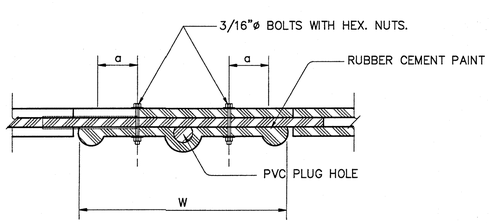
SECTION B-B

NOT TO SCALE



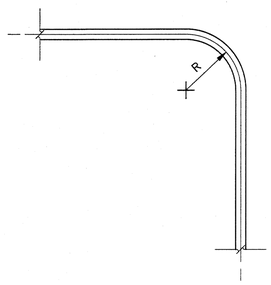
SECTION C-C

NOT TO SCALE



SECTION E-E

NOT TO SCALE



STANDARD CURVE

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. THN-GN-04.
3. PVC PLUG HOLES TIGHT AND STICK WITH PVC WATERSTOP.
4. BOLTS WITH HEX. NUTS ARE BRASS OR STAINLESS.

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

INTAKE STRUCTURE

STANDARD PVC WATERSTOP, SECTION AND DETAILS

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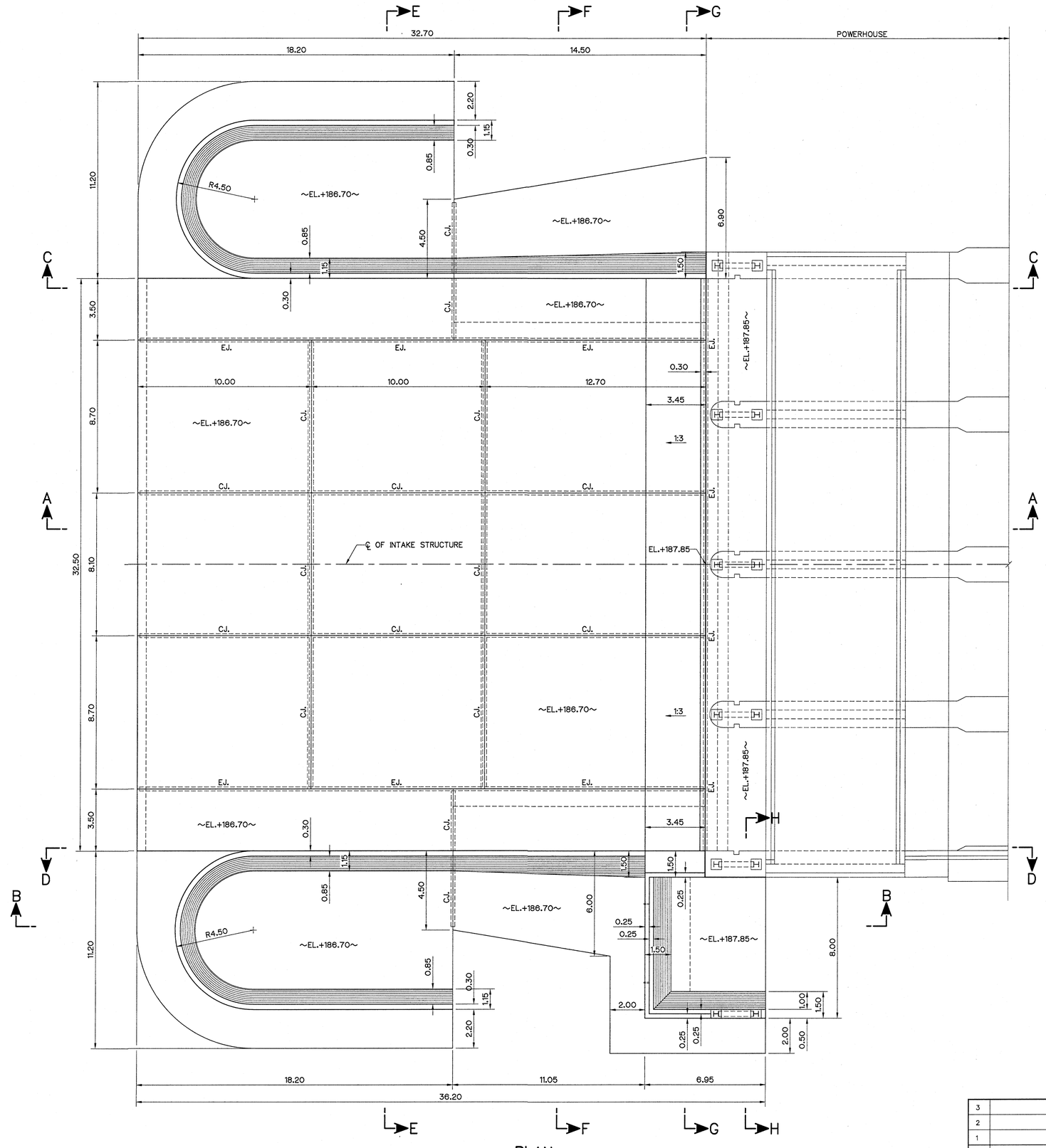
DESIGNED ส.ต.6650 ส.ต.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ต.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER DATE	APPROVED
DRAWING NO. THN-IS-07	SHEET NO. 19 OF 157



PLAN
SCALE 1:125

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. C.J. = CONTRACTION JOINT
   E.J. = EXPANSION JOINT

REFERENCE DRAWINGS :

1.	INTAKE STRUCTURE, PLAN AND SECTION A-A	THN-IS-01
2.	INTAKE STRUCTURE, REINFORCEMENT DETAIL (SHEET 2/6)	THN-IS-09
3.	INTAKE STRUCTURE, REINFORCEMENT DETAIL (SHEET 3/6)	THN-IS-10
4.	INTAKE STRUCTURE, REINFORCEMENT DETAIL (SHEET 4/6)	THN-IS-11
5.	INTAKE STRUCTURE, REINFORCEMENT DETAIL (SHEET 5/6)	THN-IS-12
6.	INTAKE STRUCTURE, REINFORCEMENT DETAIL (SHEET 6/6)	THN-IS-13

0 1 2 4 6 8 10
SCALE 1:125 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

INTAKE STRUCTURE

REINFORCEMENT DETAIL (SHEET 1/6)

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

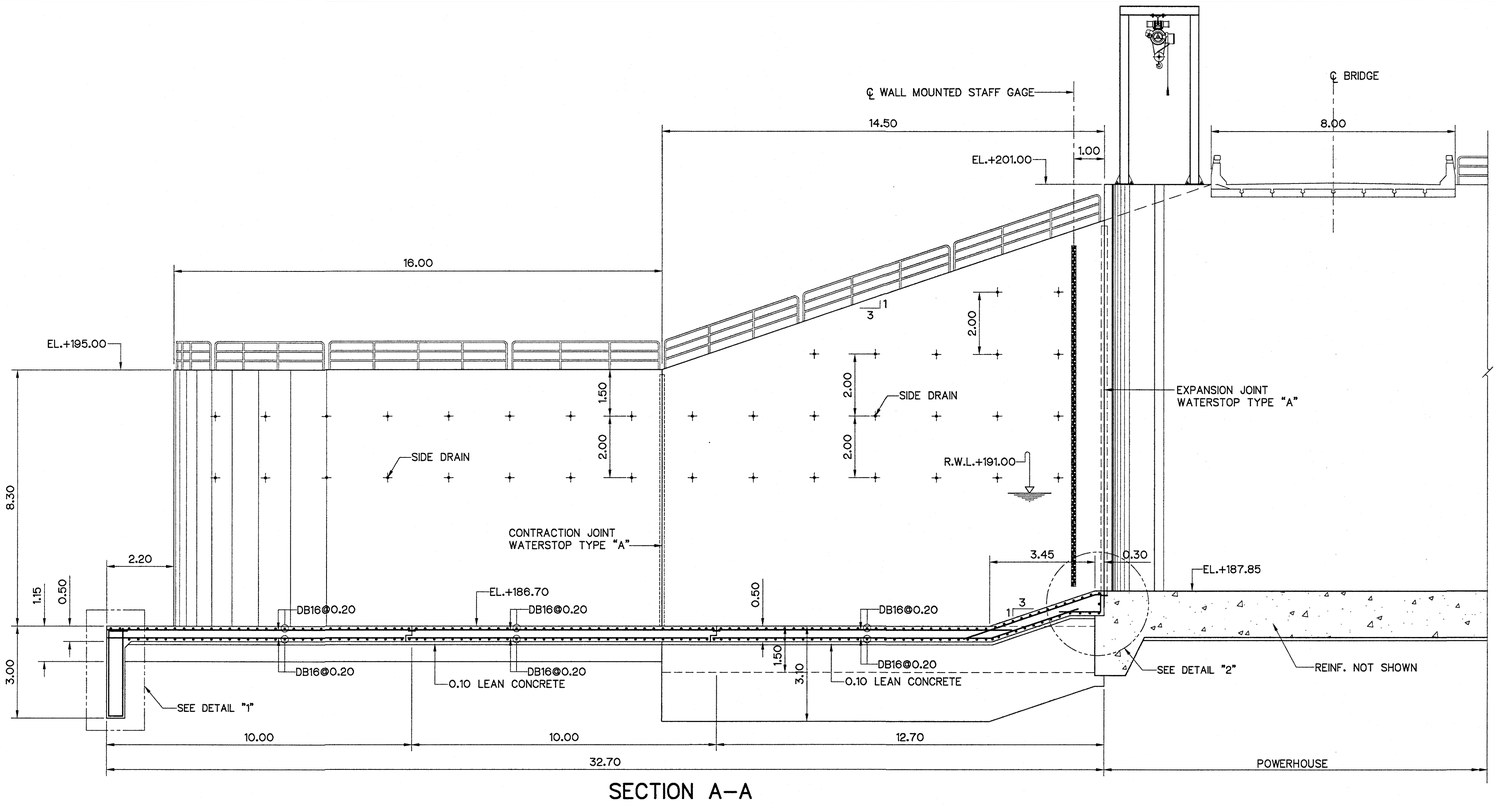
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

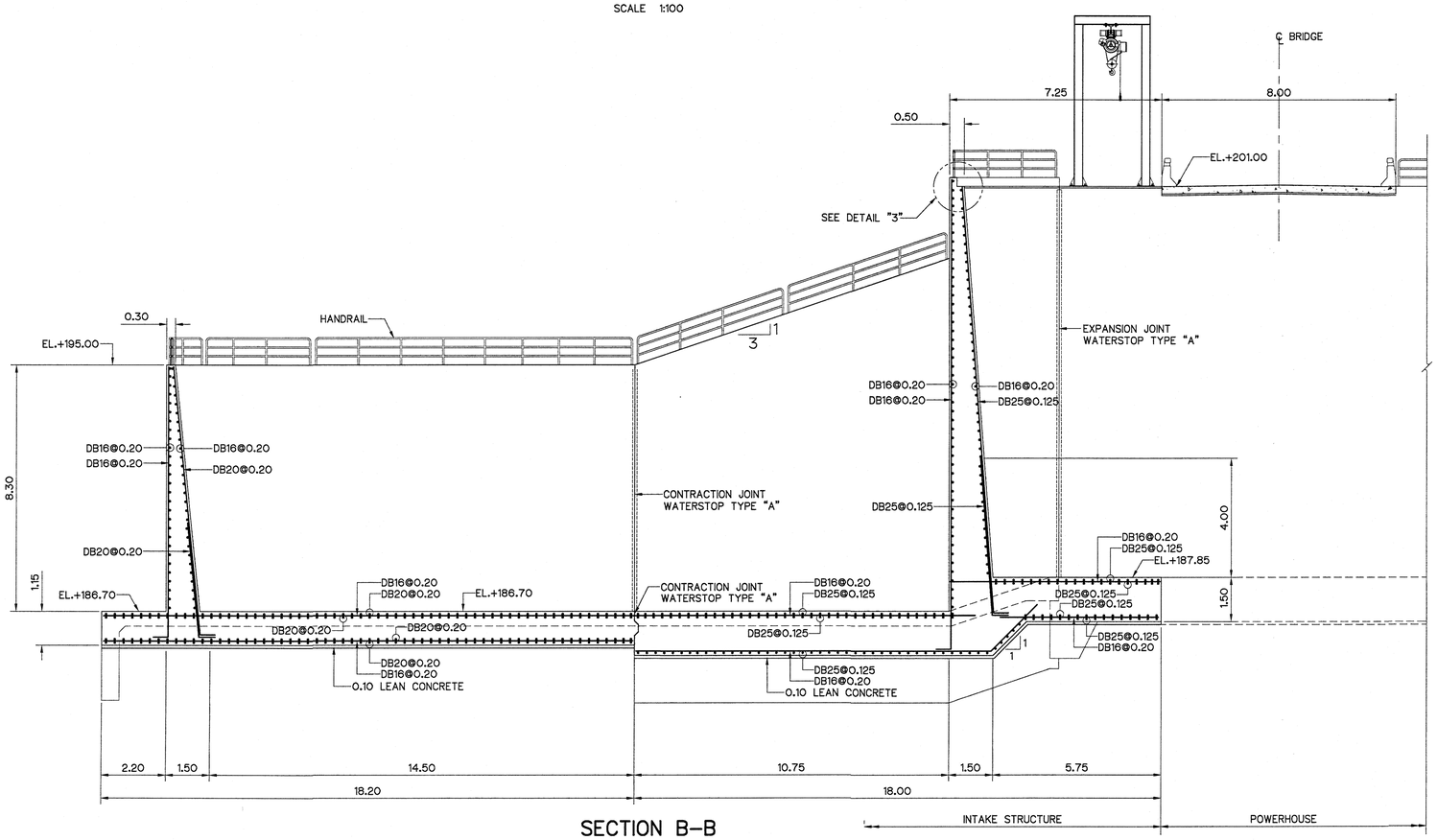
DESIGNED ส.ต.6650 ว.ส.88523
DRAWN
CHECKED ส.ต.6651
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

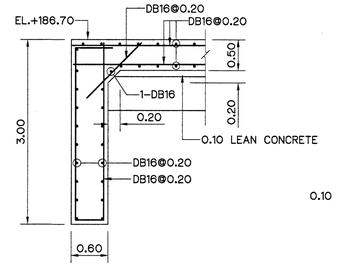
DRAWING NO. THN-IS-08
SHEET NO. 20 OF 157



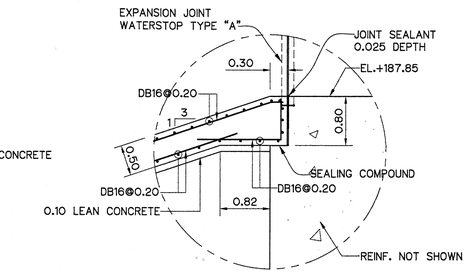
SECTION A–A
SCALE 1:100



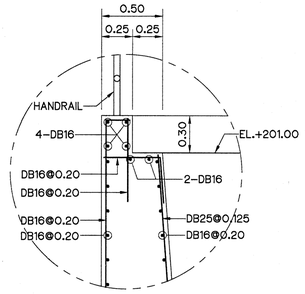
SECTION B–B
SCALE 1:100



DETAIL "1"
SCALE 1:50



DETAIL "2"
SCALE 1:50



DETAIL "3"
SCALE 1:25

NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :
1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/6) THN–IS–08

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

0 1 2 3 4
SCALE 1:50 METERS

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

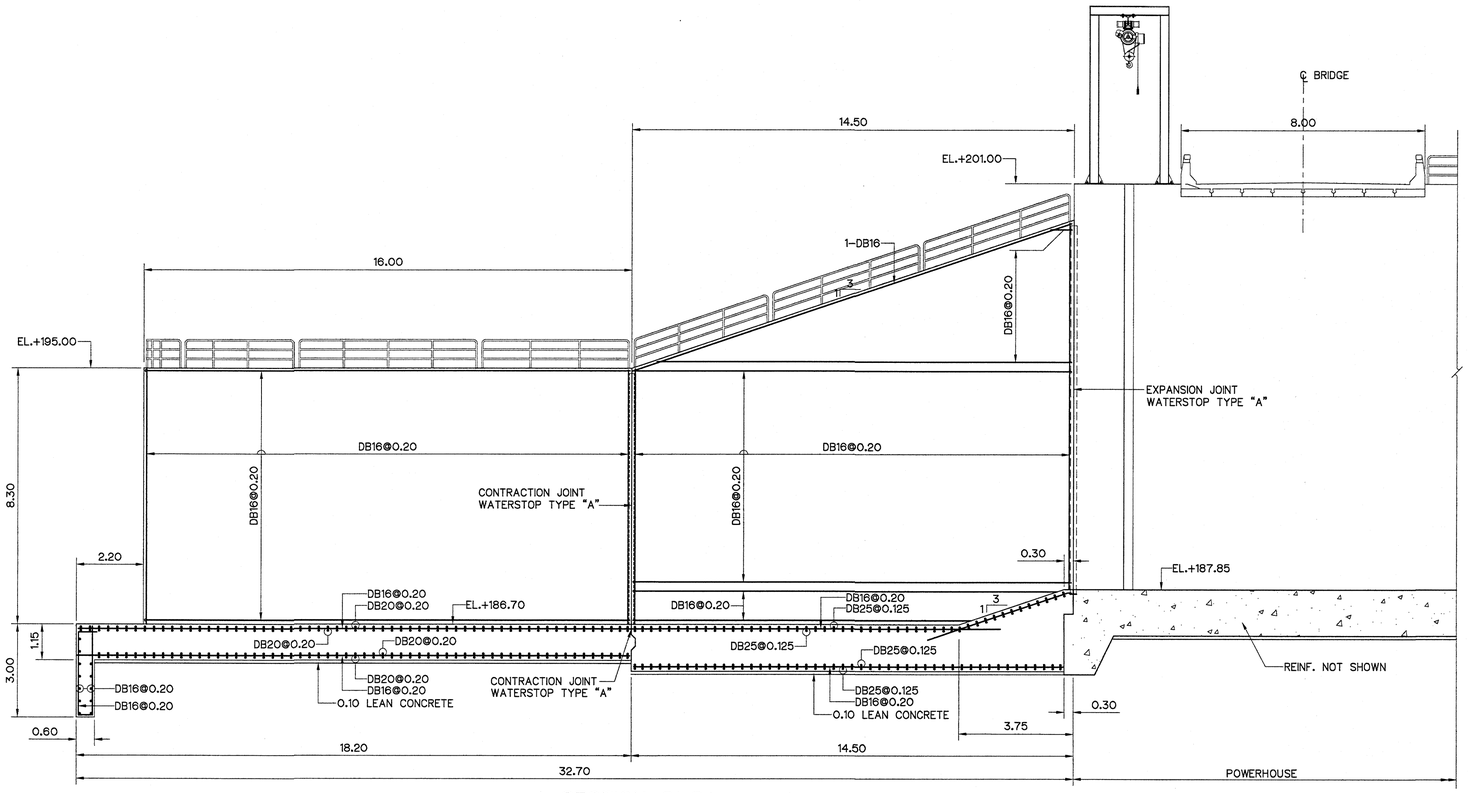
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

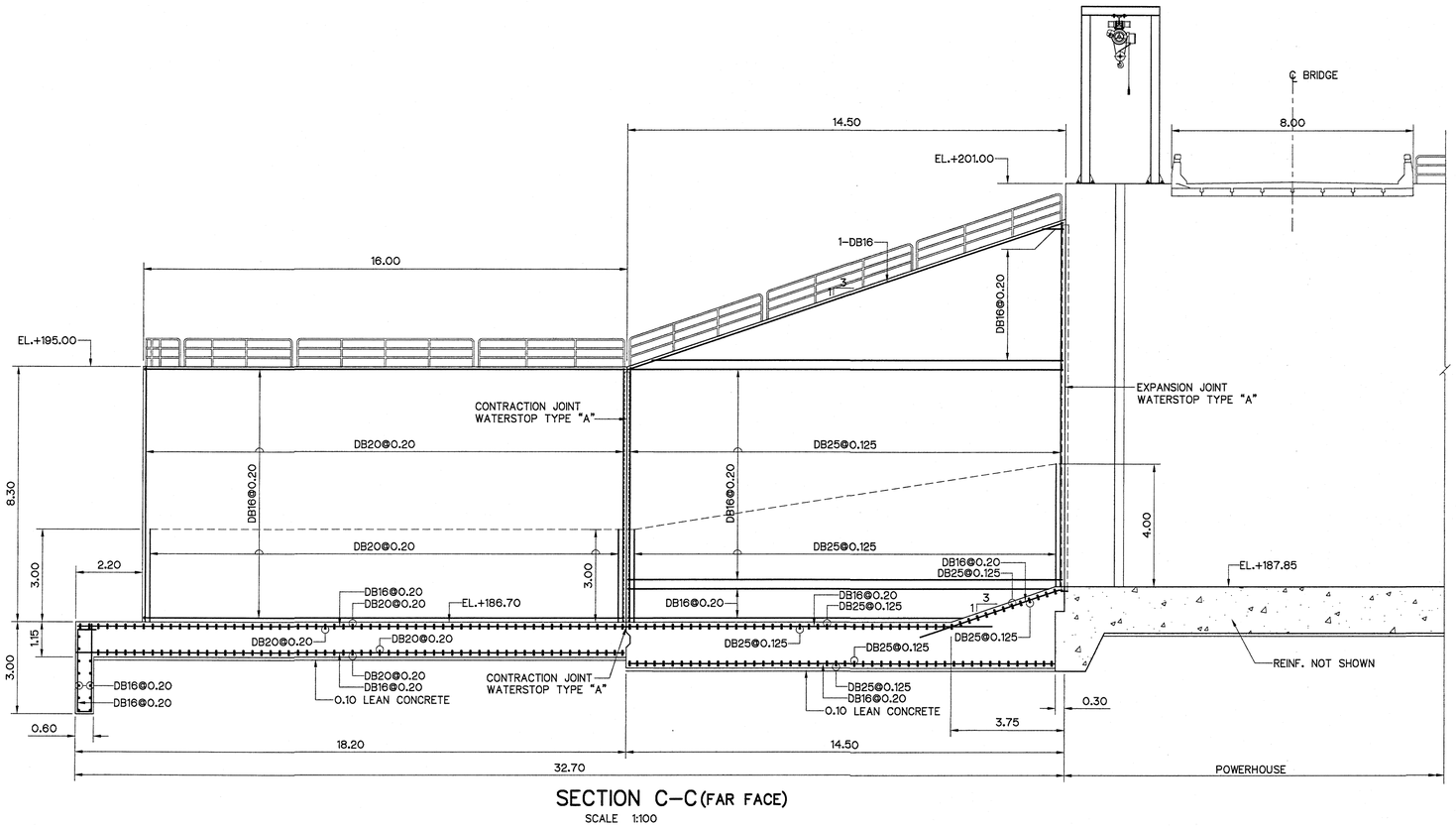
CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE STRUCTURE
REINFORCEMENT DETAIL (SHEET 2/6)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
PROJECT MANAGER 6/9/2024	APPROVED
DRAWING NO. THN–IS–09	SHEET NO. 21 OF 157



SECTION C–C (NEA FACE)

SCALE 1:100



SECTION C–C (FAR FACE)

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/6) THN-IS-08

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

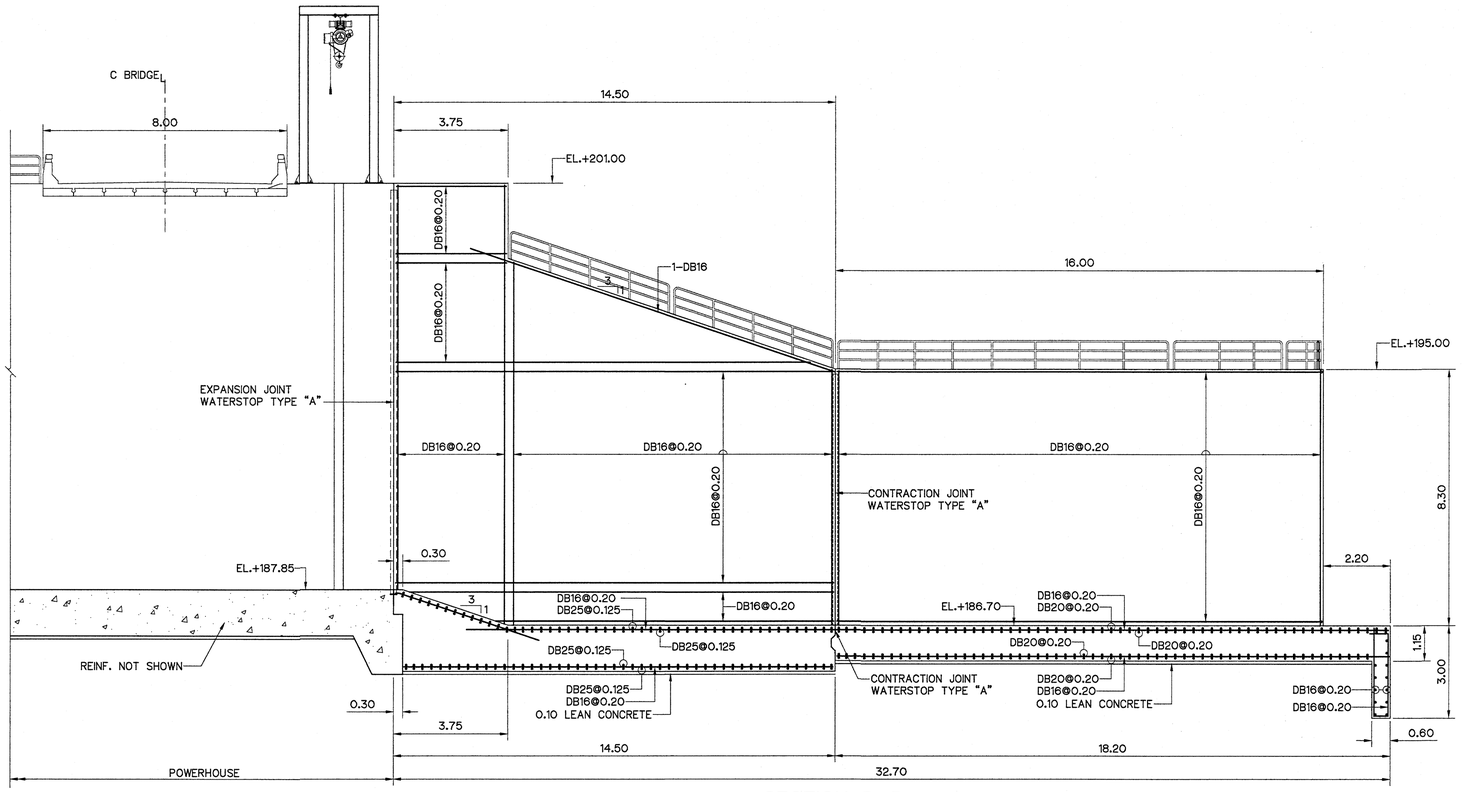
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

INTAKE STRUCTURE

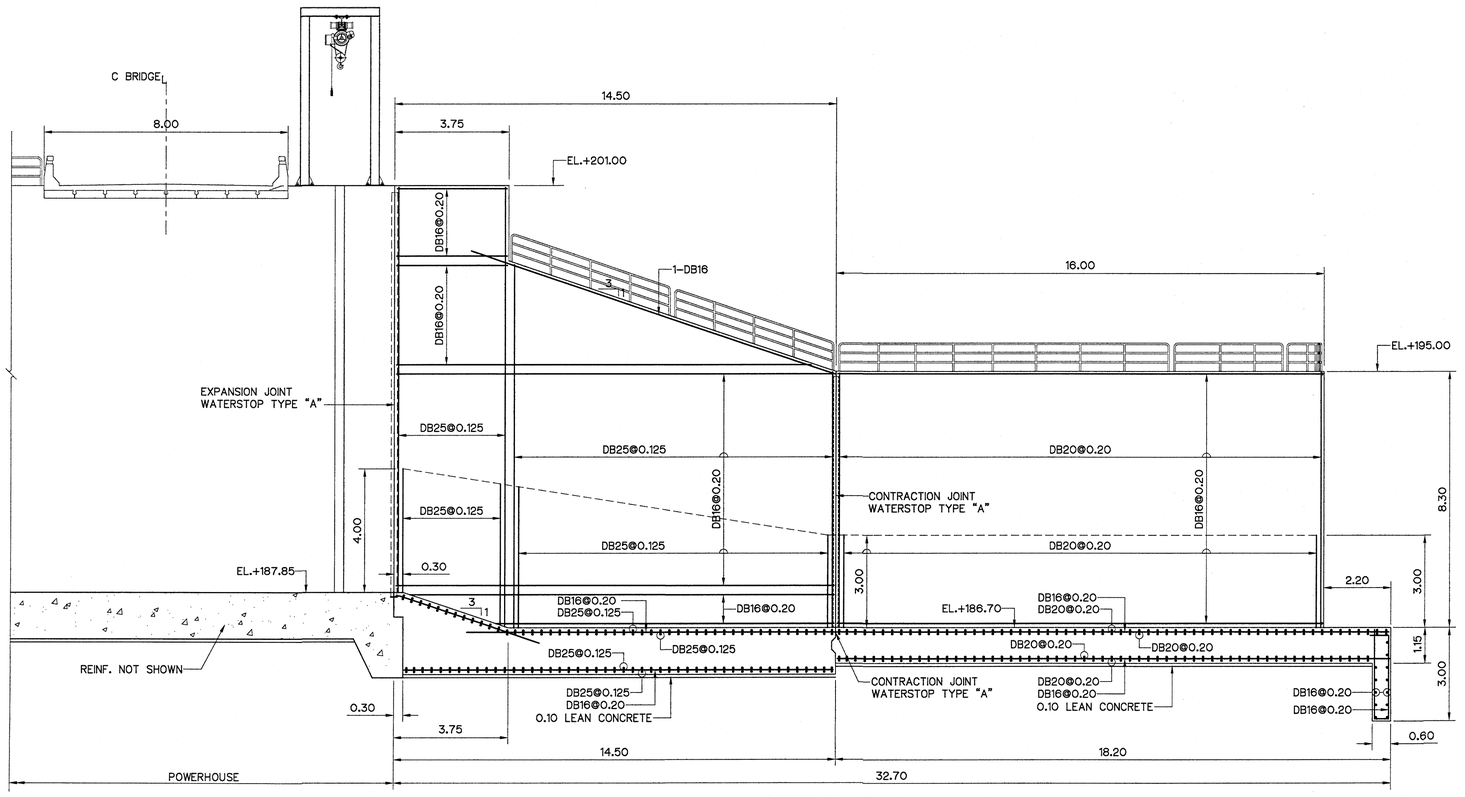
REINFORCEMENT DETAIL (SHEET 3/6)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ต.6650 ก.ย.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ต.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
	DRAWING NO. THN-IS-10
	SHEET NO. 22 OF 157



SECTION D–D (NEA FACE)

SCALE 1:100



SECTION D–D (FAR FACE)

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/6) THN-IS-08

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

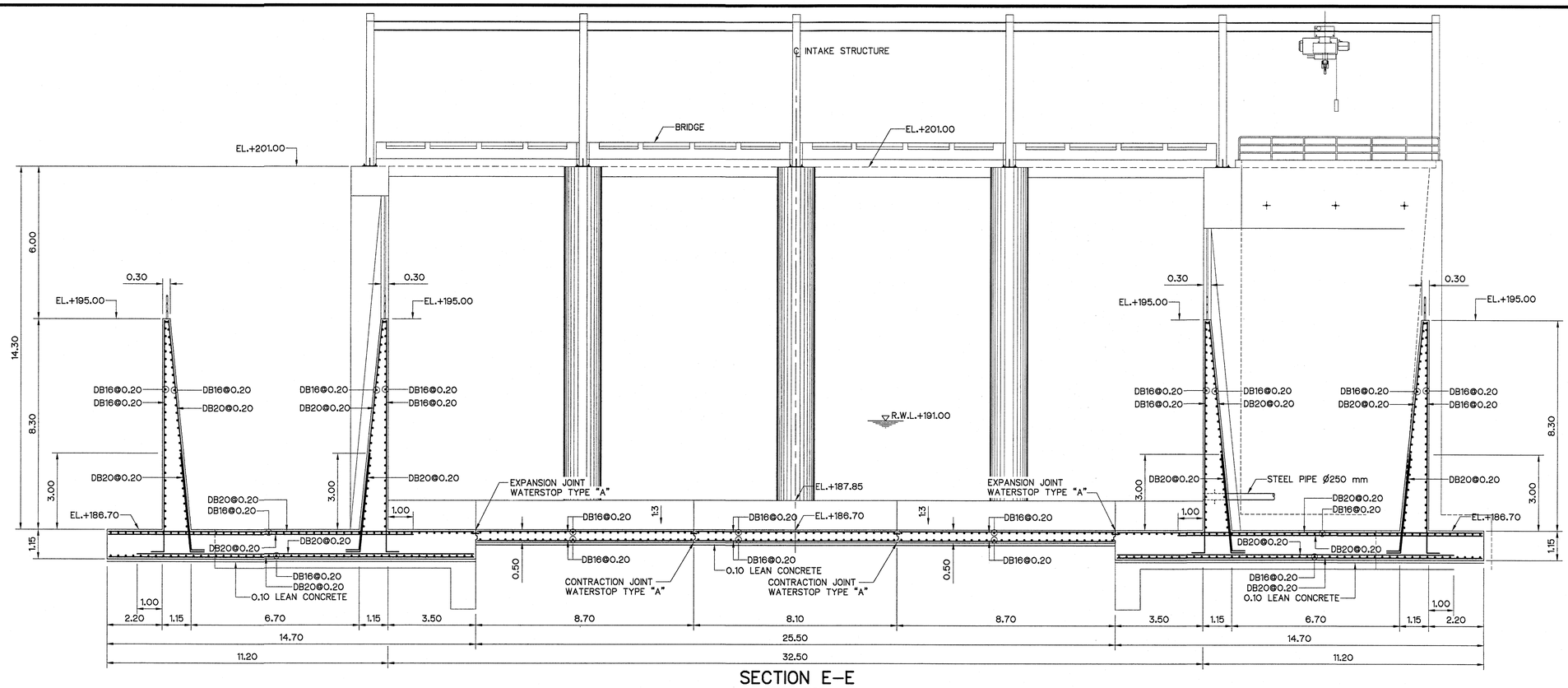
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

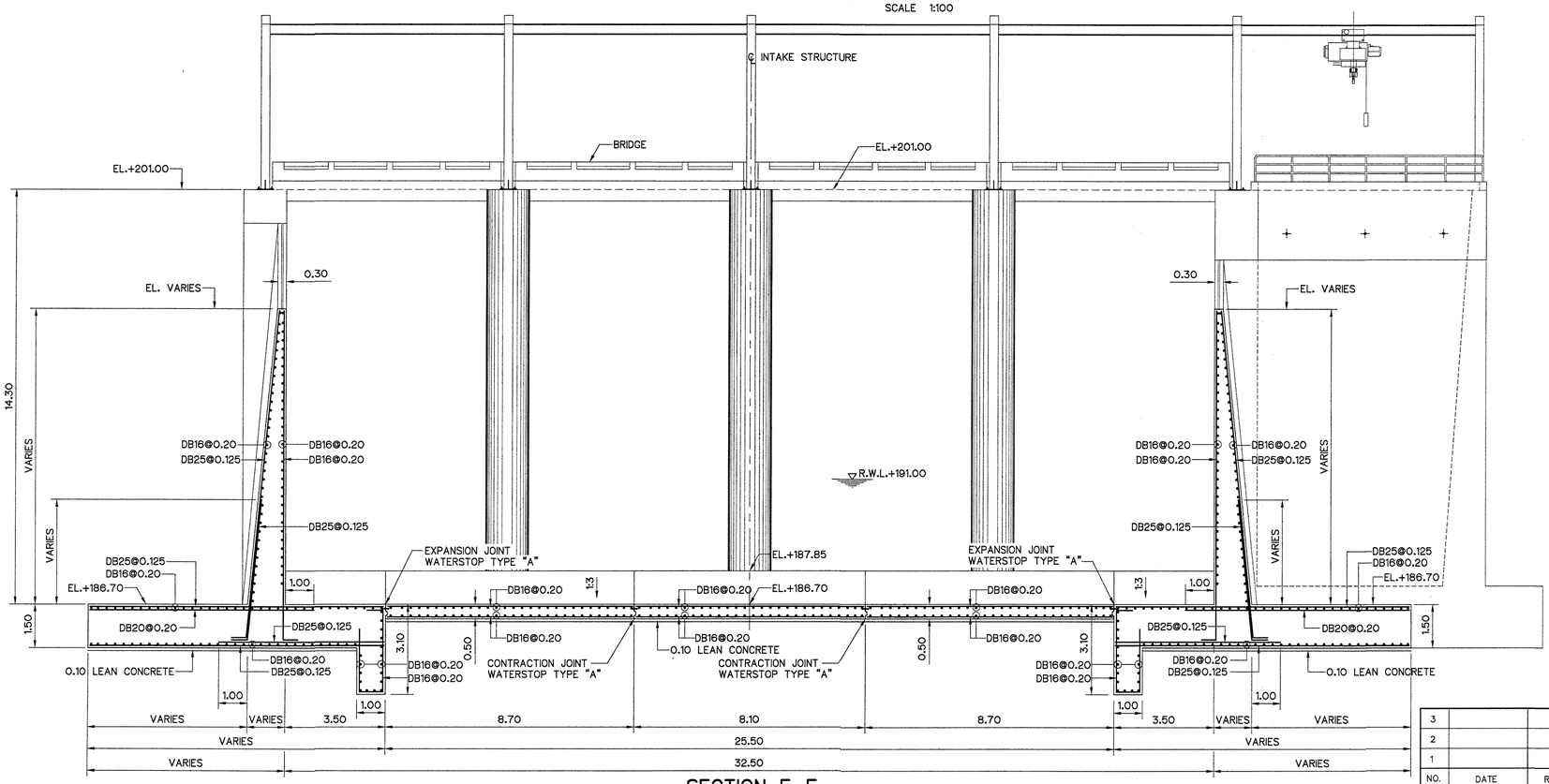
INTAKE STRUCTURE

REINFORCEMENT DETAIL (SHEET 4/6)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
PROJECT MANAGER 6/9/2024	APPROVED
DRAWING NO. THN-IS-11	SHEET NO. 23 OF 157



SECTION E–E
SCALE 1:100



SECTION F–F
SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/6) THN-IS-08

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

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
INTAKE STRUCTURE
REINFORCEMENT DETAIL (SHEET 5/6)

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

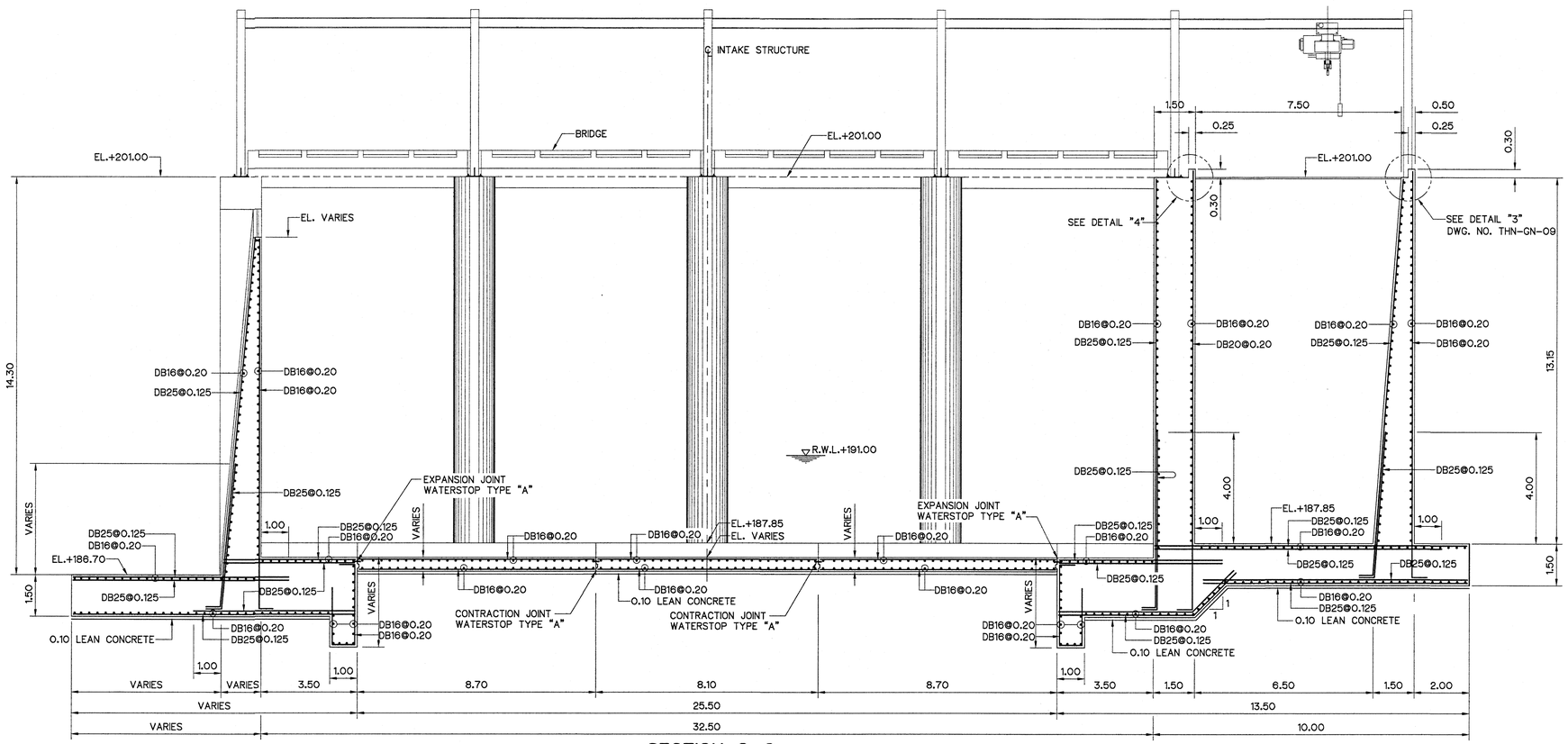
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วิศ.6650 วิศ.88523 — REVIEWED
DRAWN — SUBMITTED
CHECKED วิศ.6651 — RECOMMENDED
APPROVED

PROJECT MANAGER 6/9/2024 DATE

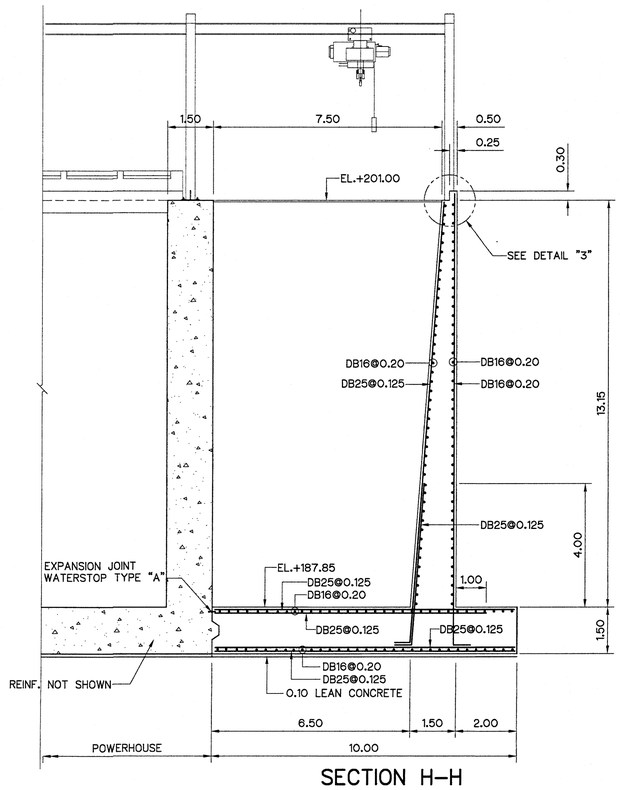
DRAWING NO. THN-IS-12

SHEET NO. 24 OF 157



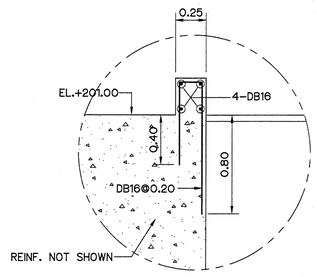
SECTION G–G

SCALE 1:100



SECTION H–H

SCALE 1:100



DETAIL "4"

SCALE 1:25

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/6) THN-IS-08

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

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

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

INTAKE STRUCTURE

REINFORCEMENT DETAIL (SHEET 6/6)

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FEC FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

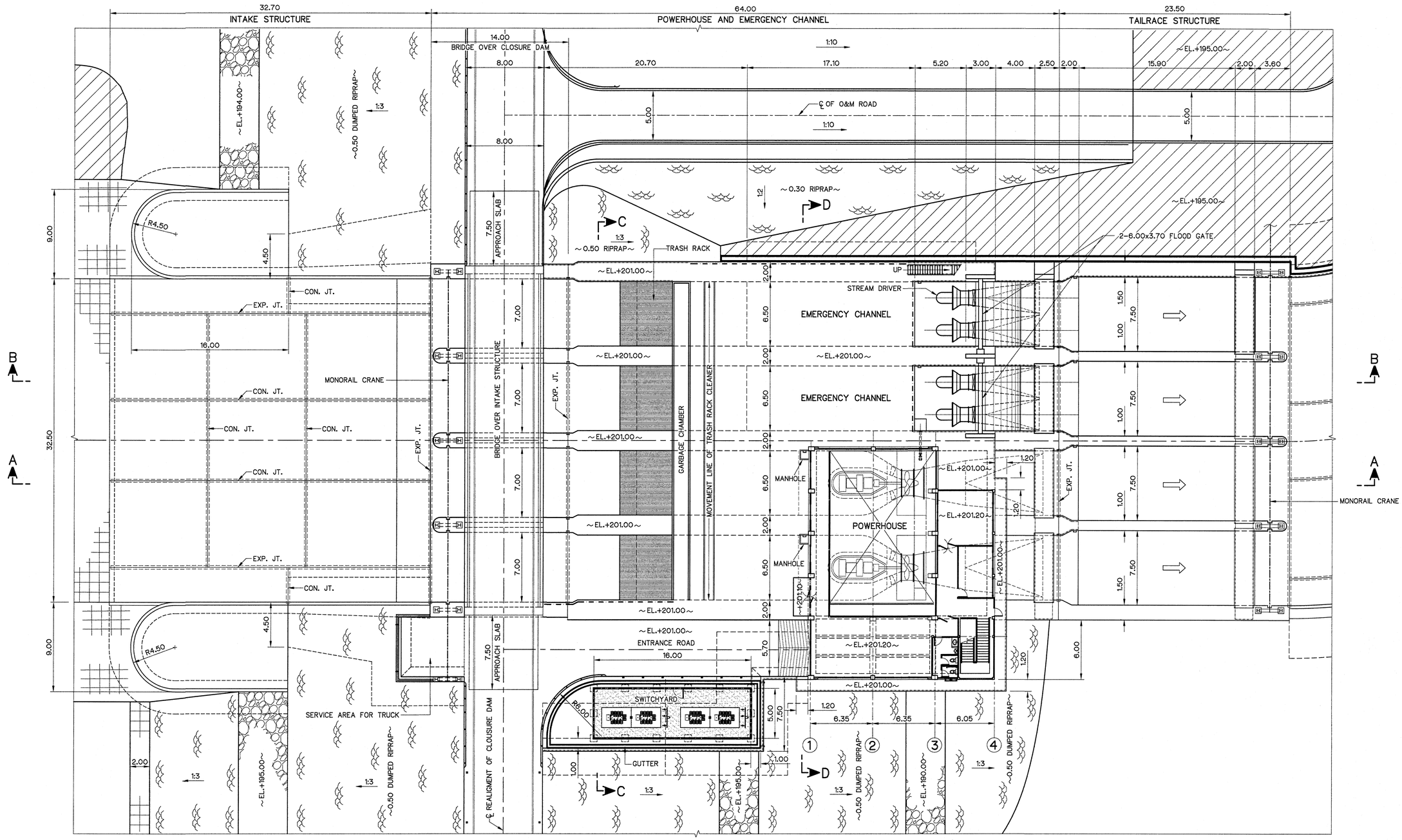
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วิ.6650 วิ.88523
DRAWN
CHECKED วิ.6651
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-IS-13

SHEET NO. 25 OF 157



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. THE BUILDING SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY NOT LESS THAN 30 TON/m^2

SYMBOLS

HANDRAIL TYPE "1"

HANDRAIL TYPE "2"

REFERENCE DRAWINGS:

1.	GENERAL, GENERAL LAY-OUT OF PROJECT	THN-GN-02
2.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS & DETAILS 1/3	THN-PH-02
3.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS & DETAILS 2/3	THN-PH-03
4.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS & DETAILS 3/3	THN-PH-04
5.	POWERHOUSE, STANDARD OF HANDRAIL, MANHOLE AND LADDER RUNG	THN-PH-22
6.	POWERHOUSE ENTRANCE, PLAN, SECTIONS AND DETAILS	THN-PH-64
7.	BRIDGE ON CLOSURE DAM, PLAN, SECTONS AND DETAILS	THN-PH-66

GENERAL PLAN

SCALE 1:200

0 5 10 15

SCALE 1:200 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

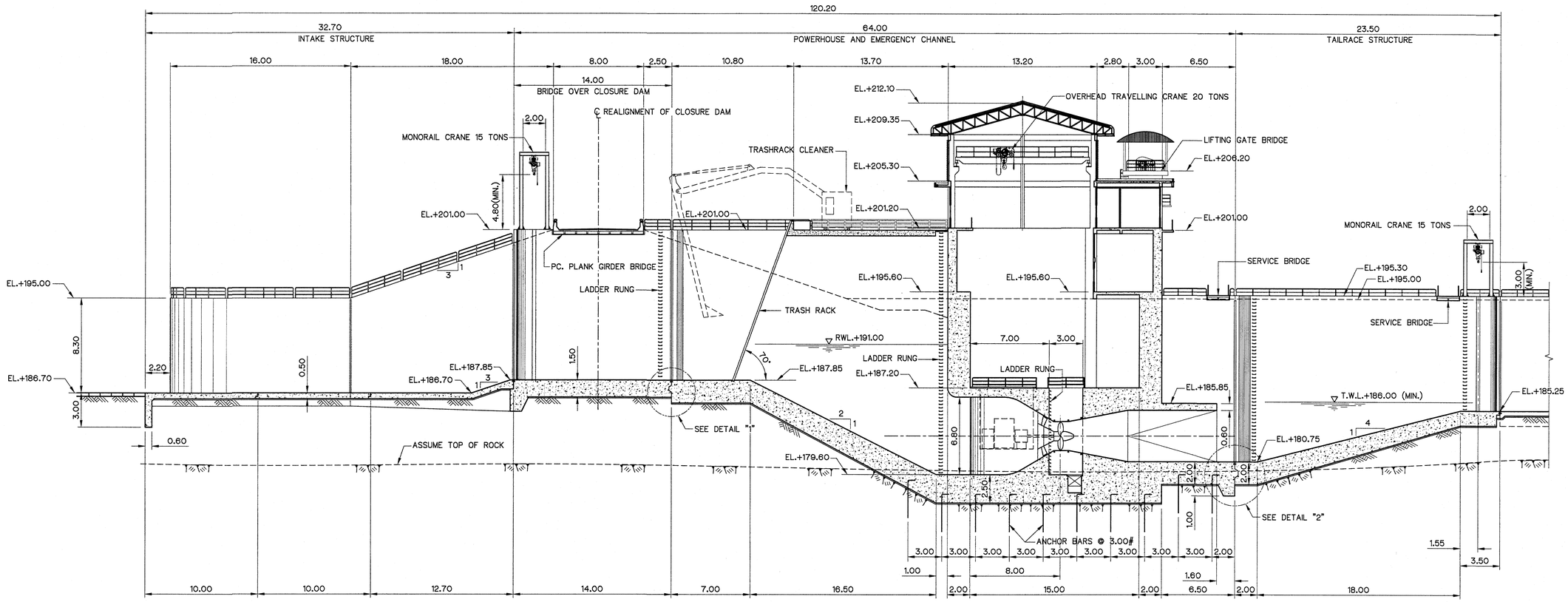
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

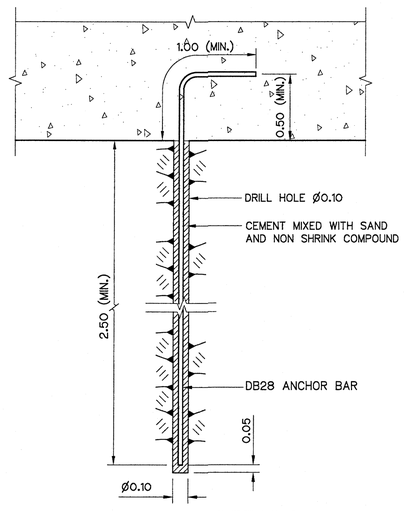
GENERAL PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	วิ.6650 วิ.88523	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วิ.6651	APPROVED	
PROJECT MANAGER	6/9/2024 DATE	DRAWING NO. THN-PH-01	SHEET NO. 26 OF 157



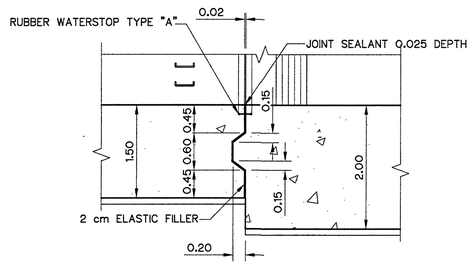
SECTION A–A

SCALE 1:200



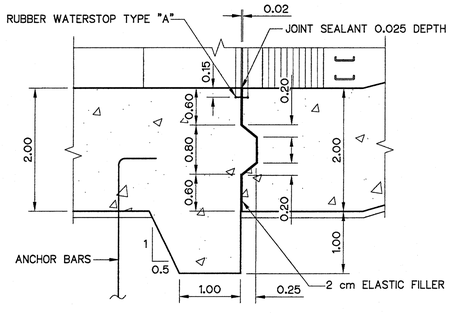
ANCHOR BAR DETAILS

NOT TO SCALE



DETAIL "1"

SCALE 1:50



DETAIL "2"

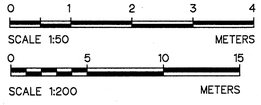
SCALE 1:50

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. THE BUILDING SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY NOT LESS THAN 30 TON/m^2

REFERENCE DRAWINGS:

1.	POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	THN-PH-01
2.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS AND DETAILS 2/3	THN-PH-03
3.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS AND DETAILS 3/3	THN-PH-04
4.	INTAKE STRUCTURE, STANDARD PVC WATERSTOP, SECTION AND DETAILS	THN-IS-07



NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

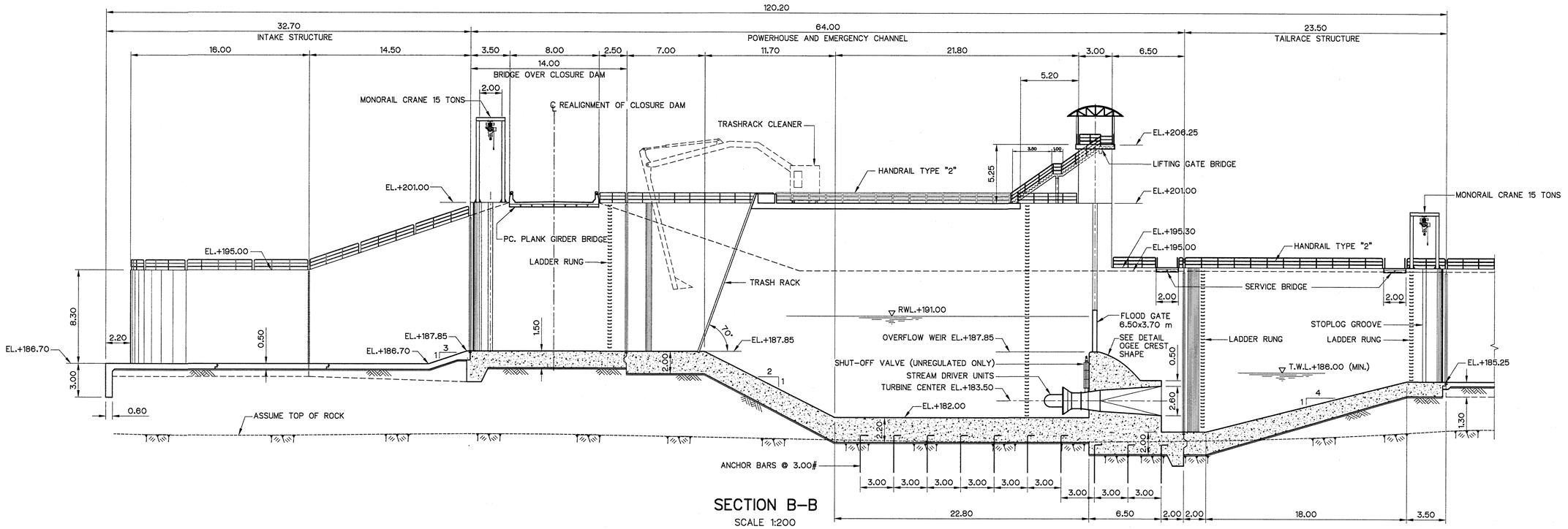
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

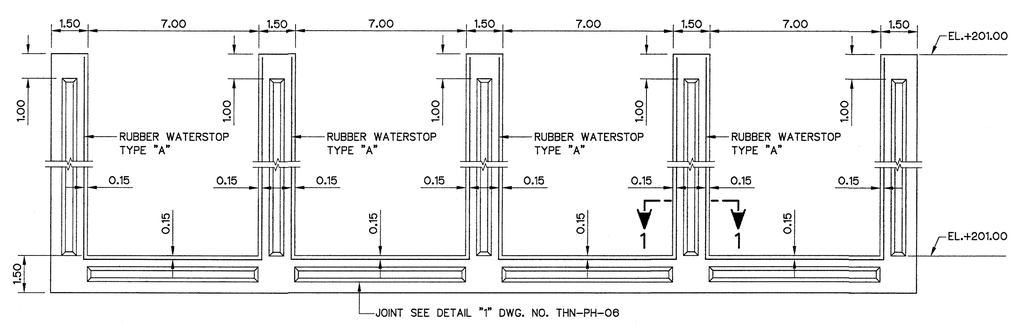
POWERHOUSE AND EMERGENCY CHANNEL

SECTIONS AND DETAILS 1/3

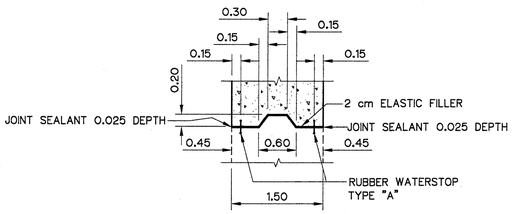
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	วิศ.6650	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วิศ.6651	APPROVED	
PROJECT MANAGER	6/9/2024 DATE	DRAWING NO. THN-PH-02	SHEET NO. 27 OF 157



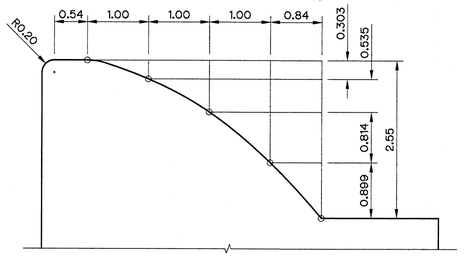
SECTION B–B
SCALE 1:200



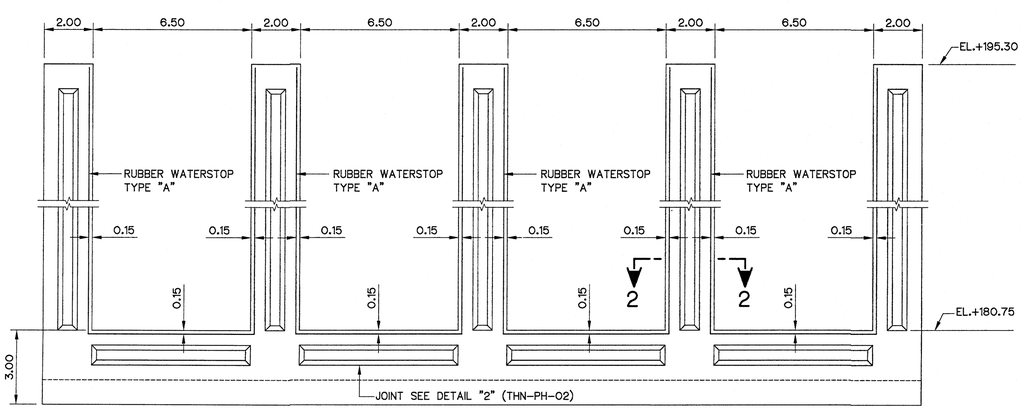
DETAILS OF TRANSVERSE JOINTS BETWEEN BRIDGE PIERS AND POWERHOUSE
SCALE 1:125



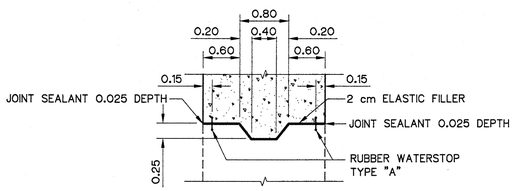
SECTION 1–1
SCALE 1:50



OGEE CREST SHAPE DETAIL
SCALE 1:50



DETAILS OF TRANSVERSE JOINTS BETWEEN POWERHOUSE AND TAILRACE
SCALE 1:125



SECTION 2–2
SCALE 1:50

0 1 2 3 4 METERS
SCALE 1:50

0 1 2 3 4 5 6 7 8 9 10 METERS
SCALE 1:125

0 5 10 15 METERS
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. THN-GN-04

REFERENCE DRAWINGS:

1.	POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	THN-PH-01
2.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS AND DETAILS 3/3	THN-PH-04
3.	INTAKE STRUCTURE, STANDARD PVC WATERSTOP, SECTION AND DETAILS	THN-IS-07
4.	EMERGENCY CHANNEL, SERVICE BRIDGE DETAILS	THN-PH-63

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

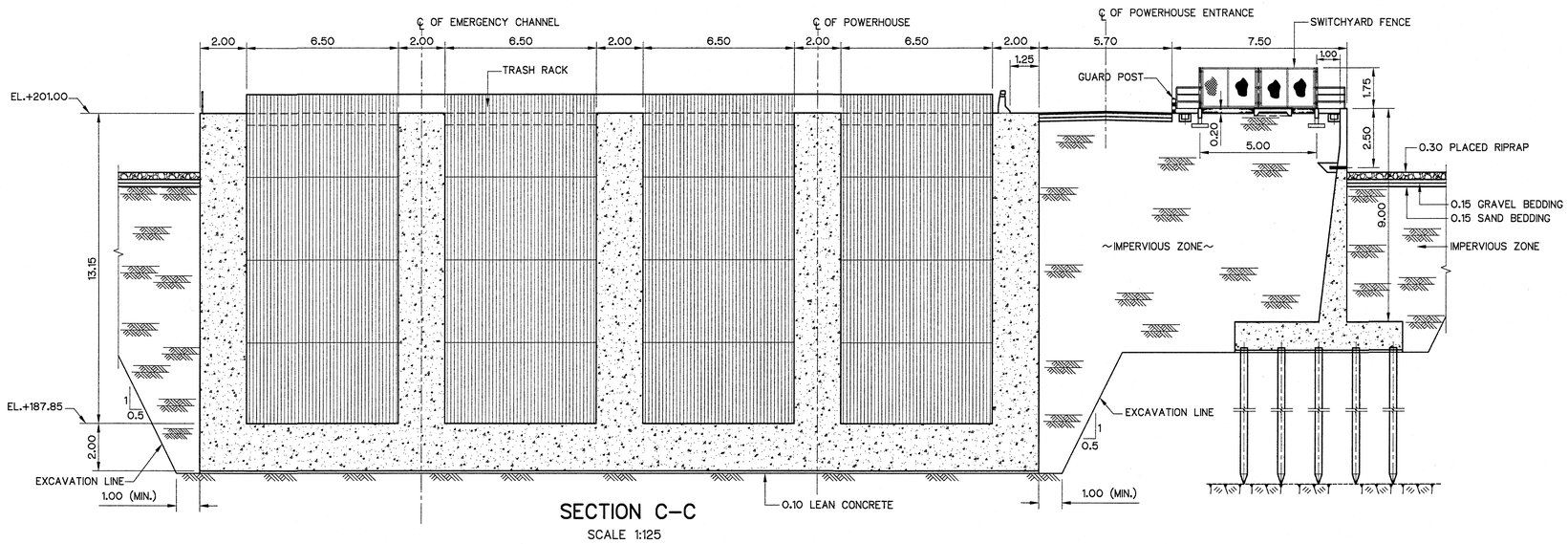
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE AND EMERGENCY CHANNEL
SECTIONS AND DETAILS 2/3

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

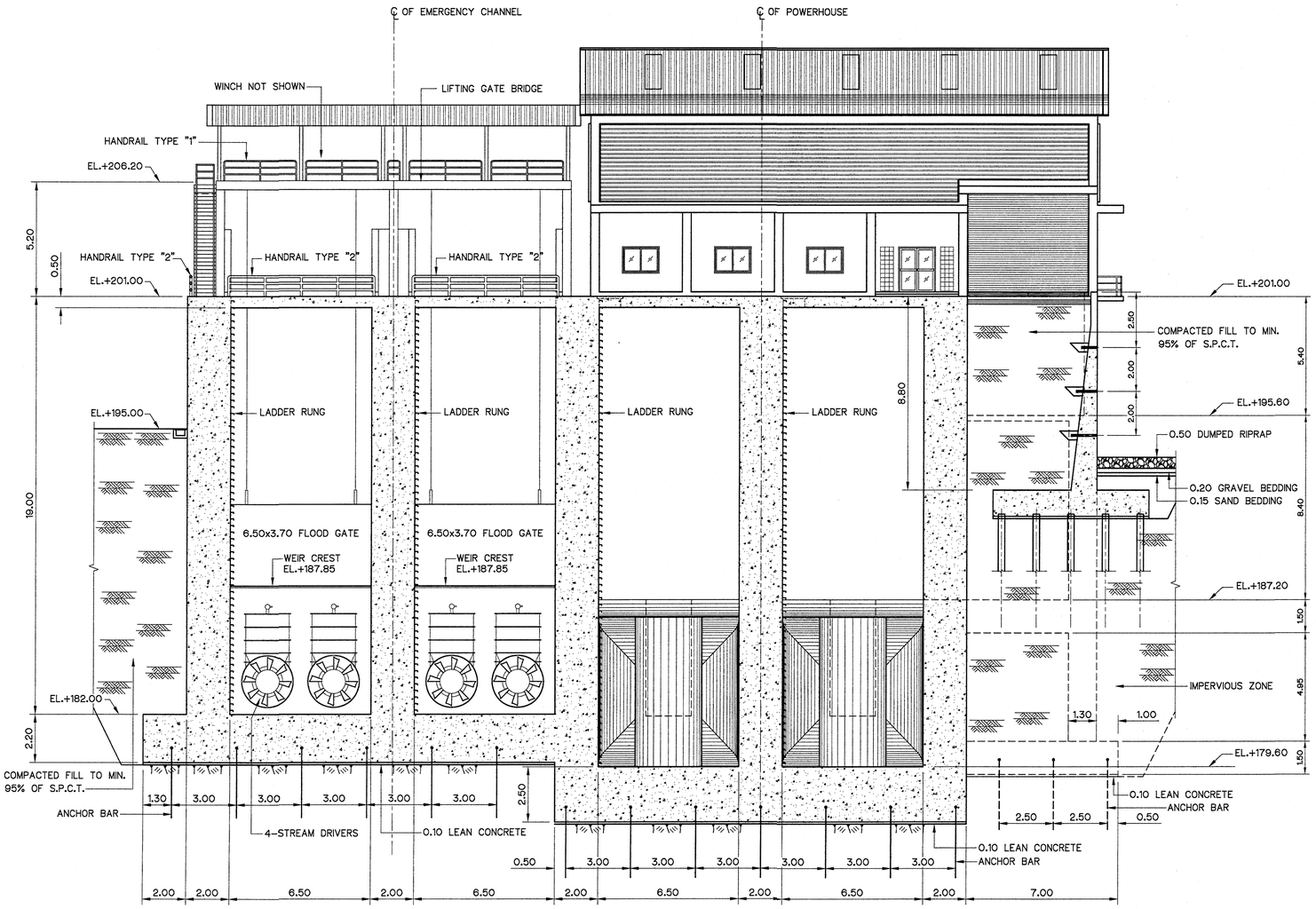
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิ.6650 ณ.88523
DRAWN	
CHECKED	วิ.6651
PROJECT MANAGER	6/9/2024 DATE
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	THN-PH-03
SHEET NO.	28 OF 157



SECTION C–C

SCALE 1:125



SECTION D–D

SCALE 1:125

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS:

1.	POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	THN–PH–01
2.	EMERGENCY CHANNEL, FLOODGATE RAISING BRIDGE DETAILS 1/2	THN–PH–56
3.	POWERHOUSE ENTRANCE, PLAN, SECTIONS AND DETAILS	THN–PH–64

0 1 2 3 4 5 6 7 8 9 10
SCALE 1:125 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTIONS AND DETAILS 3/3

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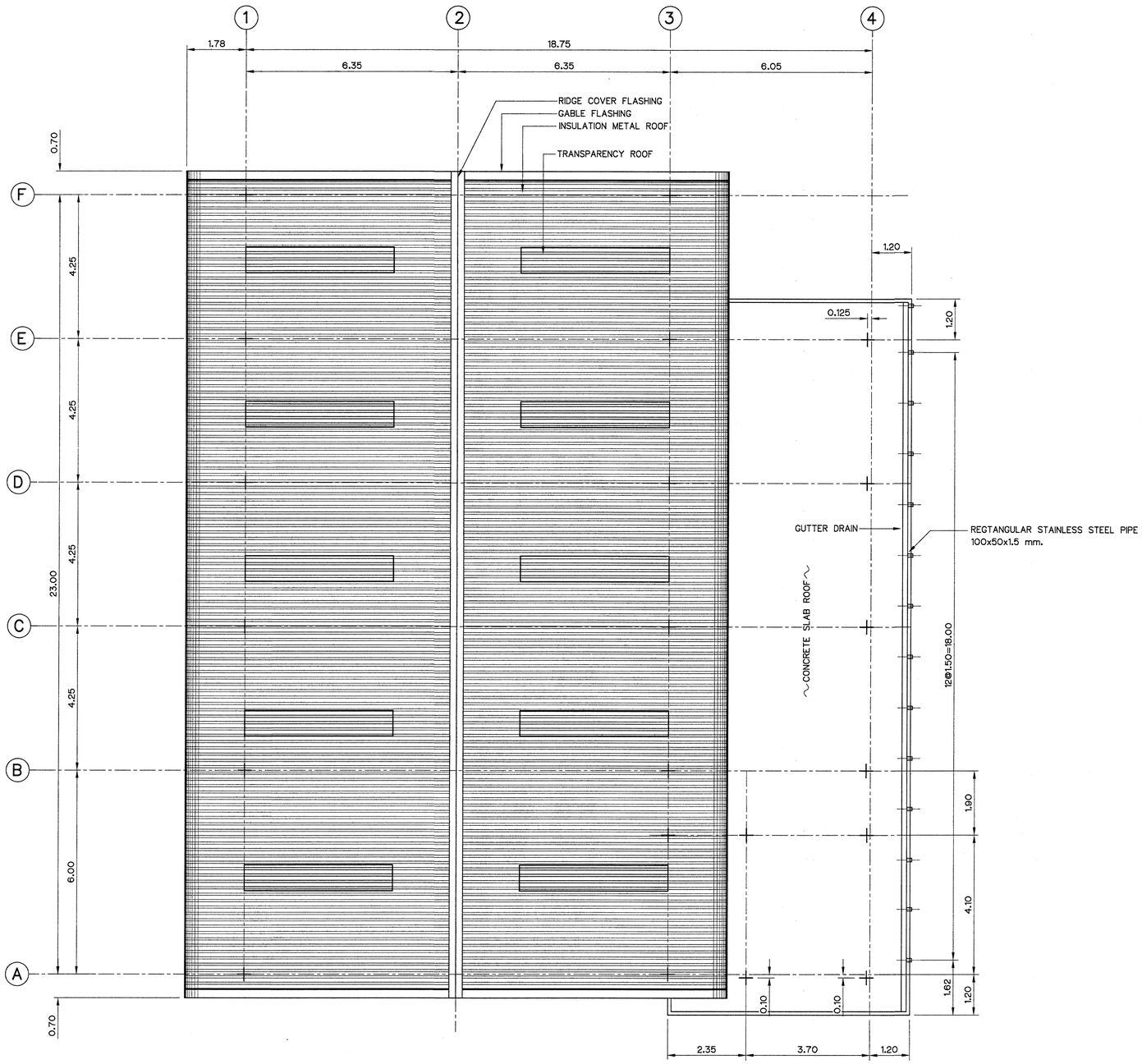
	REVIEWED
DESIGNED วิ.แ.6650 วิ.แ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.แ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–04 / SHEET NO. 29 OF 157



ROOF PLAN
SCALE 1:75

0 1 2 3 4 5 6
SCALE 1:75 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. THN-GN-04
3. INSULATION METAL ROOF, THE THICKNESS OF BASE METAL INCLUDING THE COATING LAYER AND PAINT LAYER IS NOT LESS THAN 0.5 mm

REFERENCE DRAWINGS:

1.	POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	THN-PH-01
2.	GROUND FLOOR PLAN (EL.+201.20)	THN-PH-06

NO.	DATE	REVISIONS	CHECKED	APPROVED
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
ROOF PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

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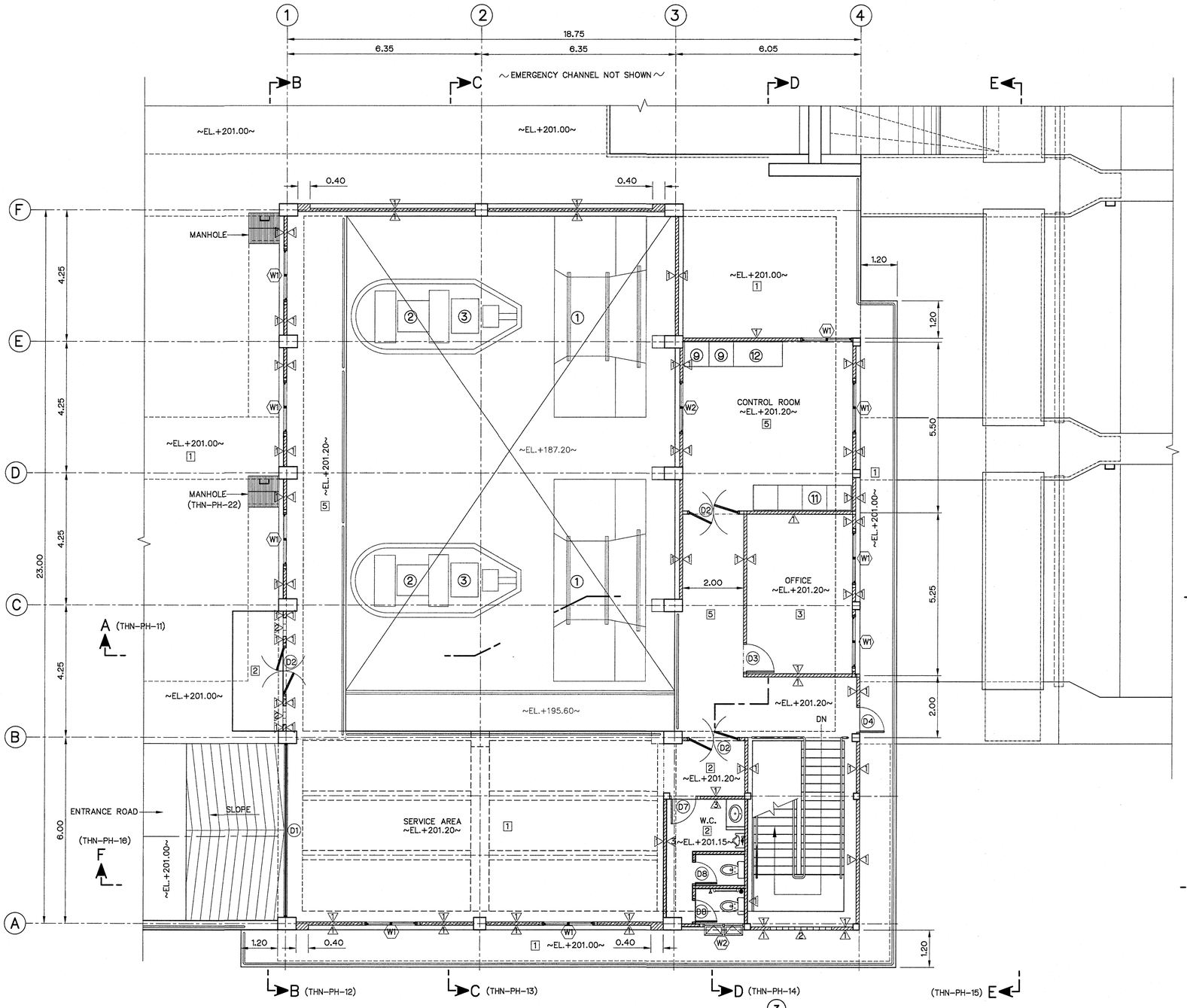
MINISTRY OF ENERGY

DESIGNED	สิ.6650	วิ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	สิ.6651		RECOMMENDED
PROJECT MANAGER	DATE 6/9/2024		APPROVED

DRAWING NO. THN-PH-05
SHEET NO. 30 OF 157



GROUND FLOOR PLAN (EL.+201.20)

SCALE 1:75

SCALE 1:75 — 0 1 2 3 4 5 6 METERS

DESCRIPTIONS :

1. KAPLAN TURBINE
2. GENERATOR
3. GENER BOX
4. HYDRAULIC POWER UNIT
5. TURBINE-GOVERNOR BOARD
6. GOOLING WATER SYSTEM
7. AIR COMPRESSOR
8. DRAINAGE CONTROL BOARD
9. CONTROL PANEL FOR FLOOD GATE
10. BATTERY AND RACK
11. MAIN CONTROL SWITCHBOARD
12. AC AND DC SWITCHBOARD AND BATTERY CHAGER CUBICLE
13. HIGH VOLATAGE SWITCHGEAR 22 KV.
14. TRANSFORMER
15. AXIAL FLOW TURBINE
16. E-CONTAINER FOR AXIAL FLOW TURBINE

SYMBOLS :

- EXHAUST FAN
- AIR CONDITIONING
- EMERGENCY LAMP
- BLOCK OUT

FLOOR FINISH SYMBOLS :

1. COARSE FINISHED
2. 0.40x0.40 NON SLIP CERAMIC FLOOR TILES
3. 0.40x0.40 CERAMIC FLOOR TILES
4. 0.60x0.60 CERAMIC FLOOR TILES
5. COATED WITH EPOXY RESIN

FLOOR FINISH BOUNDARY

WALL MATERIALS AND FINISH SYMBOLS :

1. MASONRY WALLS PLASTERING W/PAINT
2. GLASS BLOCK
3. MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
4. MASONRY WALLS PLASTERING UNPAINTED
5. EXPOSED CONCRETE W/PAINT
6. EXPOSED CONCRETE UNPAINTED
7. METAL LOUVER

MASONRY WALL

CEILING :

1. METAL PANEL, LYSAGHT PANELRIP MODEL OR EQUIVALENT
2. 9 mm THK. GYPSUM BOARD WITH STEEL FRAME W/PAINT
3. 4 mm THK. ASBESTOS CEMENT WITH STEEL FRAME W/PAINT
4. 4 mm THK. ASBESTOS CEMENT ON ALUMINUM T-BAR FRAME W/PAINT (REMOVABLE CEILING)
5. PLASTERING W/PAINT
6. EXPOSED CONCRETE UNPAINTED

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1.	POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN-PH-07
2.	POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN-PH-08
3.	POWERHOUSE, ELEVATION 1	THN-PH-09
4.	POWERHOUSE, ELEVATION 2, 3 AND 4	THN-PH-10
5.	POWERHOUSE, SECTION A-A	THN-PH-11
6.	POWERHOUSE, SECTION B-B	THN-PH-12
7.	POWERHOUSE, SECTION C-C	THN-PH-13
8.	POWERHOUSE, SECTION D-D	THN-PH-14
9.	POWERHOUSE, SECTION E-E	THN-PH-15
10.	POWERHOUSE, SECTION F-F	THN-PH-16
11.	POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN-PH-19

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

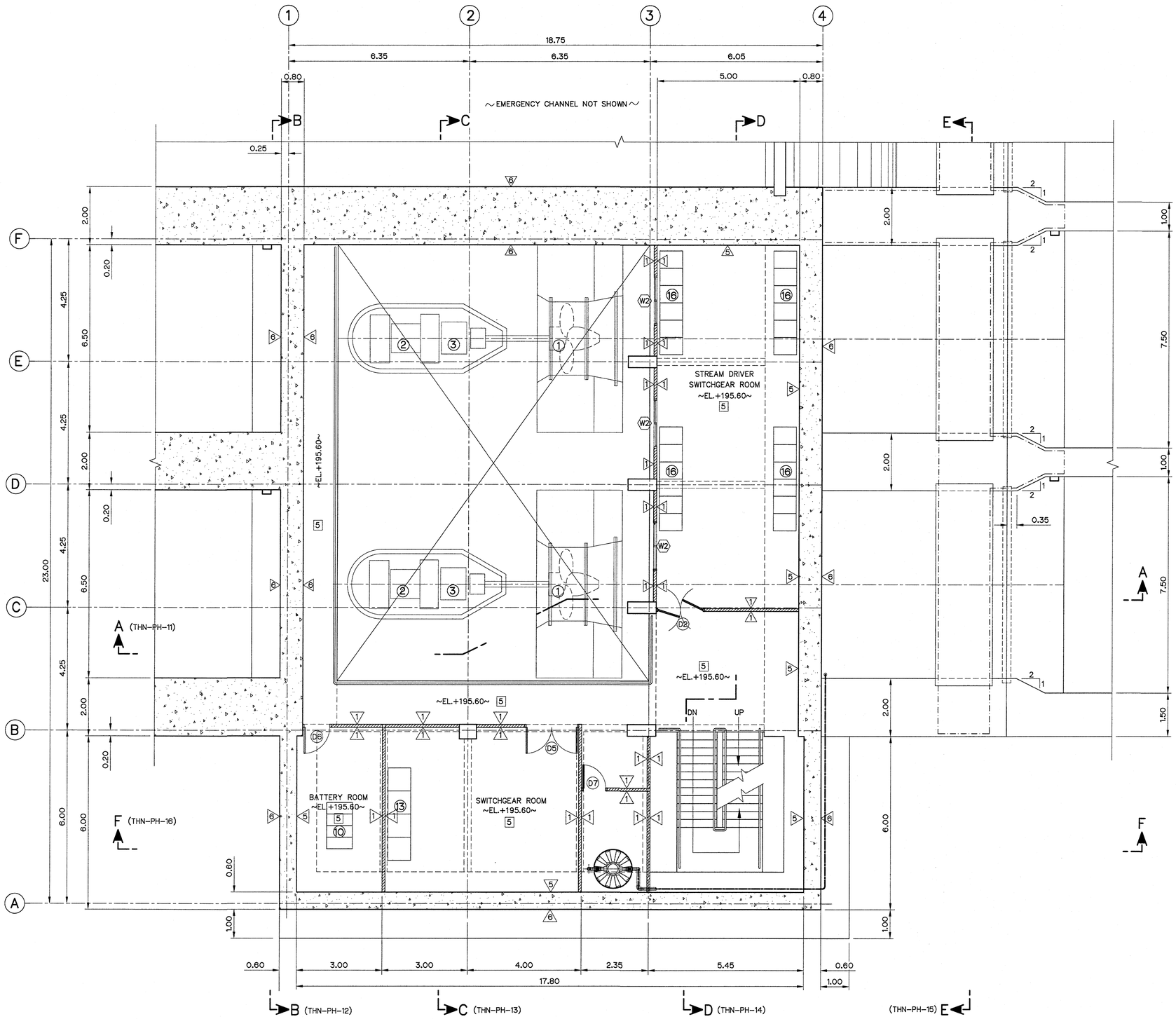
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

GROUND FLOOR PLAN (EL.+201.20)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED ณ.6650 ณ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED ณ.6651	APPROVED
6/9/2024 PROJECT MANAGER / DATE	DRAWING NO. THN-PH-06 / SHEET NO. 31 OF 157



UNDERGROUND FLOOR PLAN (EL.+195.60)

SCALE 1:75

SCALE 1:75 0 1 2 3 4 5 6 METERS

DESCRIPTIONS :

1. KAPLAN TURBINE
2. GENERATOR
3. GENER BOX
4. HYDRAULIC POWER UNIT
5. TURBINE-GOVERNOR BOARD
6. GOOLING WATER SYSTEM
7. AIR COMPRESSOR
8. DRAINAGE CONTROL BOARD
9. CONTROL PANEL FOR FLOOD GATE
10. BATTERY AND RACK
11. MAIN CONTROL SWITCHBOARD
12. AC AND DC SWITCHBOARD AND BATTERY CHAGER CUBICLE
13. HIGH VOLATAGE SWITCHGEAR 22 KV.
14. TRANSFORMER
15. AXIAL FLOW TURBINE
16. E-CONTAINER FOR AXIAL FLOW TURBINE

SYMBOLS :

- EXHAUST FAN
- AIR CONDITIONING
- EMERGENCY LAMP
- BLOCK OUT

FLOOR FINISH SYMBOLS :

1. COARSE FINISHED
2. 0.40x0.40 NON SLIP CERAMIC FLOOR TILES
3. 0.40x0.40 CERAMIC FLOOR TILES
4. 0.60x0.60 CERAMIC FLOOR TILES
5. COATED WITH EPOXY RESIN

FLOOR FINISH BOUNDARY

WALL MATERIALS AND FINISH SYMBOLS :

1. MASONRY WALLS PLASTERING W/PAINT
2. GLASS BLOCK
3. MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
4. MASONRY WALLS PLASTERING UNPAINTED
5. EXPOSED CONCRETE W/PAINT
6. EXPOSED CONCRETE UNPAINTED
7. METAL LOUVER

MASONRY WALL

CEILING :

1. METAL PANEL, LYSAGHT PANELRIP MODEL OR EQUIVALENT
2. 9 mm THK. GYPSUM BOARD WITH STEEL FRAME W/PAINT
3. 4 mm THK. ASBESTOS CEMENT WITH STEEL FRAME W/PAINT
4. 4 mm THK. ASBESTOS CEMENT ON ALUMINUM T-BAR FRAME W/PAINT (REMOVABLE CEILING)
5. PLASTERING W/PAINT
6. EXPOSED CONCRETE UNPAINTED

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN-PH-06
2. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN-PH-08
3. POWERHOUSE, SECTION A-A	THN-PH-11
4. POWERHOUSE, SECTION B-B	THN-PH-12
5. POWERHOUSE, SECTION C-C	THN-PH-13
6. POWERHOUSE, SECTION D-D	THN-PH-14
7. POWERHOUSE, SECTION E-E	THN-PH-15
8. POWERHOUSE, SECTION F-F	THN-PH-16
9. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN-PH-19

KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

UNDERGROUND FLOOR PLAN (EL.+195.60)

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

DESIGNED สิน.6650 กิน.88523

SUBMITTED

DRAWN

RECOMMENDED

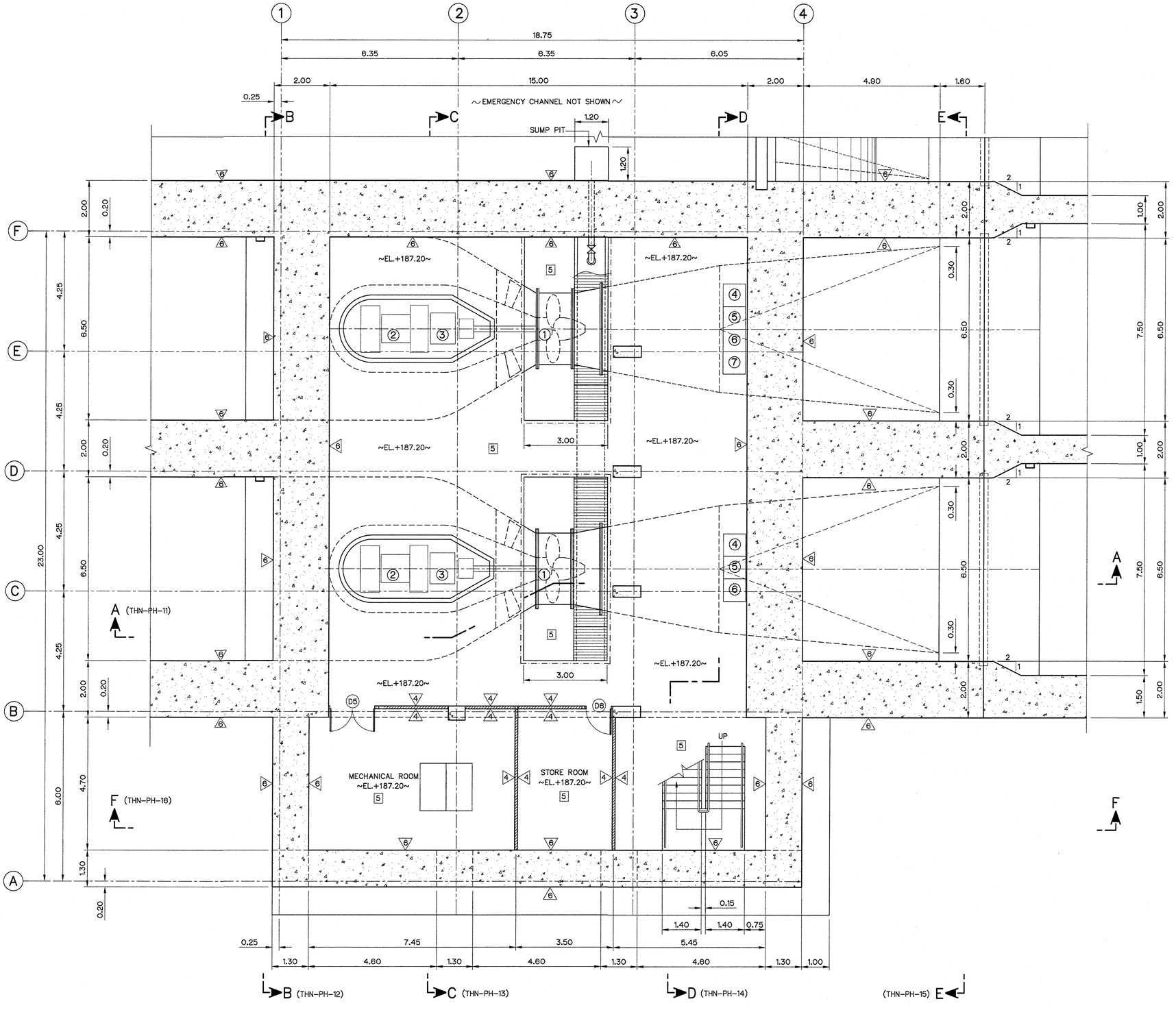
CHECKED สิน.6651

APPROVED

PROJECT MANAGER — 6/9/2024 DATE

DRAWING NO. THN-PH-07

SHEET NO. 32 OF 157



UNDERGROUND FLOOR PLAN (EL.+187.20)

SCALE 1:75

SCALE 1:75 METERS 0 1 2 3 4 5 6

DESCRIPTIONS :

1. KAPLAN TURBINE
2. GENERATOR
3. GENER BOX
4. HYDRAULIC POWER UNIT
5. TURBINE-GOVERNOR BOARD
6. GOOLING WATER SYSTEM
7. AIR COMPRESSOR
8. DRAINAGE CONTROL BOARD
9. CONTROL PANEL FOR FLOOD GATE
10. BATTERY AND RACK
11. MAIN CONTROL SWITCHBOARD
12. AC AND DC SWITCHBOARD AND BATTERY CHAGER CUBICLE
13. HIGH VOLATAGE SWITCHGEAR 22 KV.
14. TRANSFORMER
15. AXIAL FLOW TURBINE
16. E-CONTAINER FOR AXIAL FLOW TURBINE

SYMBOLS :

- EXHAUST FAN
- AIR CONDITIONING
- EMERGENCY LAMP
- BLOCK OUT

FLOOR FINISH SYMBOLS :

1. COARSE FINISHED
2. 0.40x0.40 NON SLIP CERAMIC FLOOR TILES
3. 0.40x0.40 CERAMIC FLOOR TILES
4. 0.60x0.60 CERAMIC FLOOR TILES
5. COATED WITH EPOXY RESIN

FLOOR FINISH BOUNDARY

WALL MATERIALS AND FINISH SYMBOLS :

1. MASONRY WALLS PLASTERING W/PAINT
2. GLASS BLOCK
3. MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
4. MASONRY WALLS PLASTERING UNPAINTED
5. EXPOSED CONCRETE W/PAINT
6. EXPOSED CONCRETE UNPAINTED
7. METAL LOUVER

MASONRY WALL

CEILING :

1. METAL PANEL, LYSAGHT PANELRIP MODEL OR EQUIVALENT
2. 9 mm THK. GYPSUM BOARD WITH STEEL FRAME W/PAINT
3. 4 mm THK. ASBESTOS CEMENT WITH STEEL FRAME W/PAINT
4. 4 mm THK. ASBESTOS CEMENT ON ALUMINUM T-BAR FRAME W/PAINT (REMOVABLE CEILING)
5. PLASTERING W/PAINT
6. EXPOSED CONCRETE UNPAINTED

REFERENCE DRAWINGS :

1. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN-PH-06
2. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN-PH-07
3. POWERHOUSE, SECTION A-A	THN-PH-11
4. POWERHOUSE, SECTION B-B	THN-PH-12
5. POWERHOUSE, SECTION C-C	THN-PH-13
6. POWERHOUSE, SECTION D-D	THN-PH-14
7. POWERHOUSE, SECTION E-E	THN-PH-15
8. POWERHOUSE, SECTION F-F	THN-PH-16
9. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN-PH-19

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

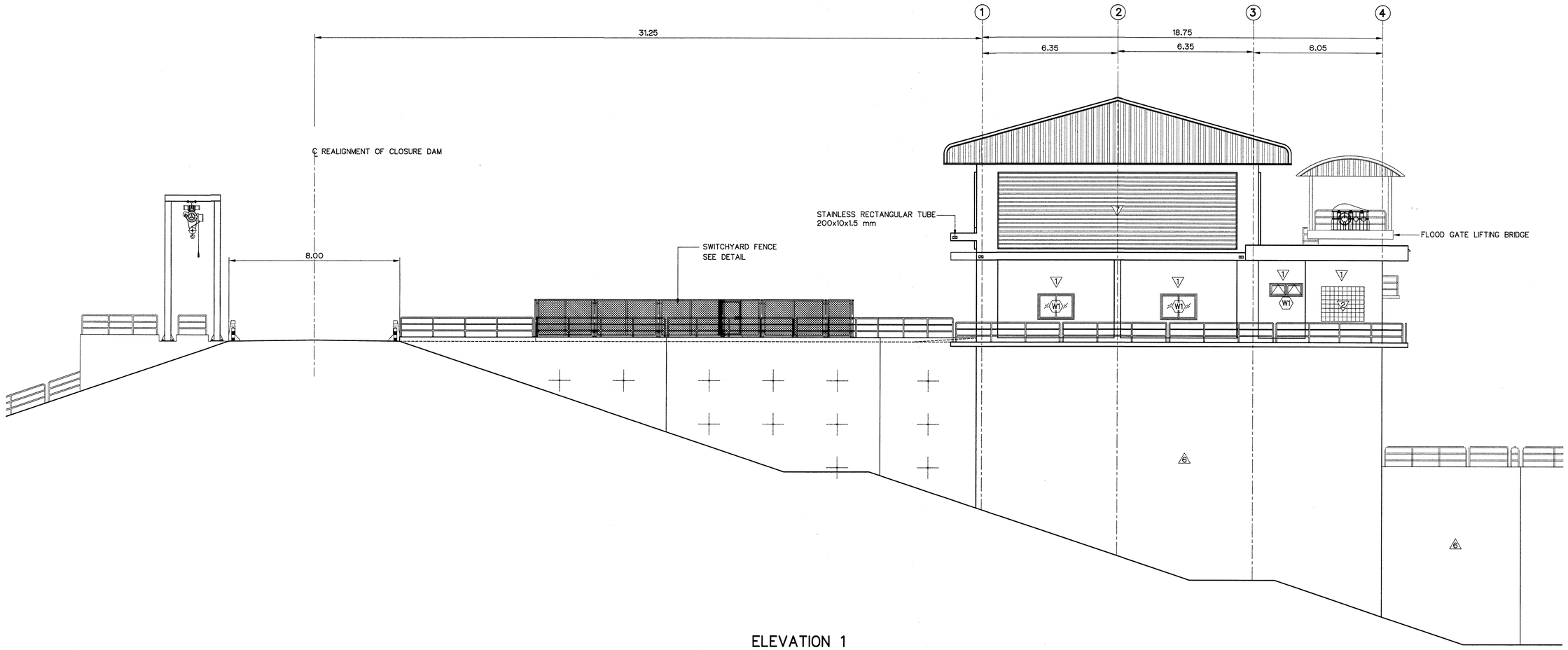
UNDERGROUND FLOOR PLAN (EL.+187.20)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED วิ.6650 วิ.88523
DRAWN
CHECKED วิ.6651
6/9/2024
PROJECT MANAGER DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-PH-08
SHEET NO. 33 OF 157



ELEVATION 1
SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MNS-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	THN-PH-01
2. POWERHOUSE, ROOF PLAN	THN-PH-05
3. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN-PH-06

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

ELEVATION 1

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MINISTRY OF ENERGY

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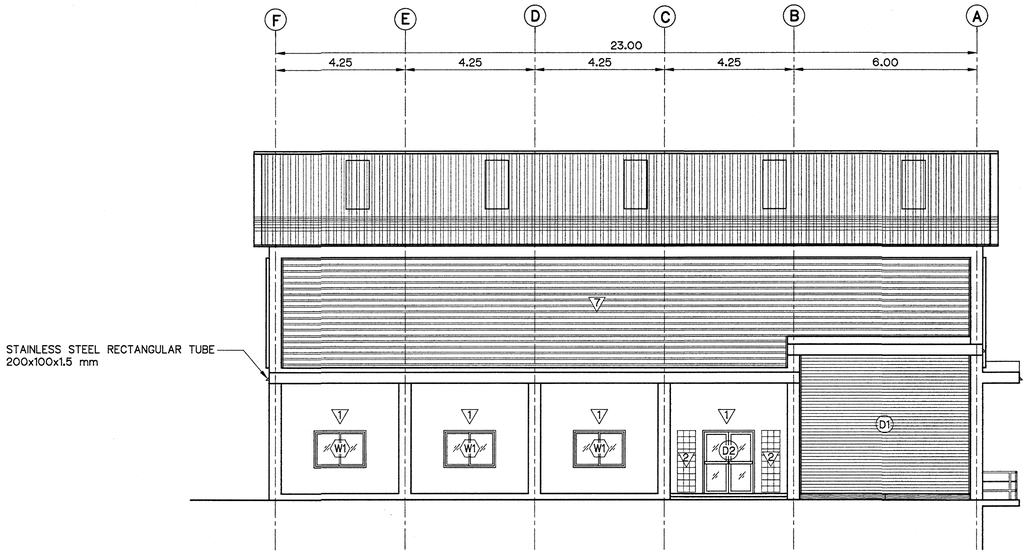
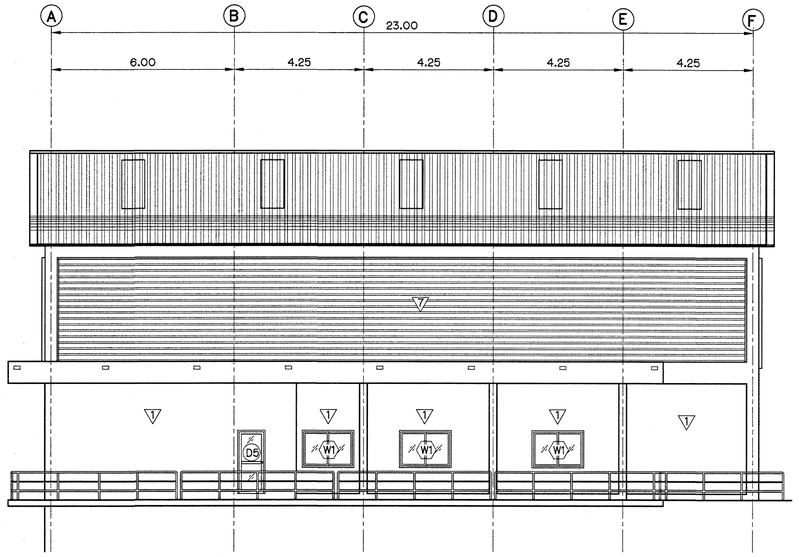
DRAWN			SUBMITTED
CHECKED	สุ.6651		RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN-PH-09

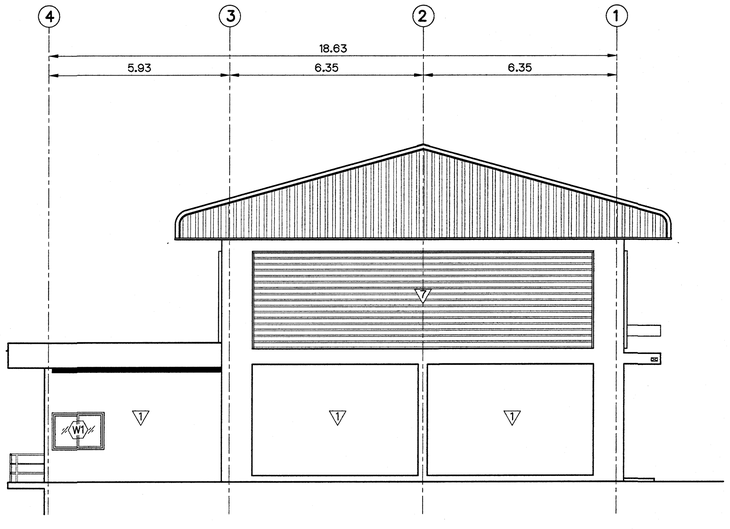
SHEET NO. 34 OF 157



ELEVATION 2
SCALE 1:100



ELEVATION 4
SCALE 1:100



ELEVATION 3
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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	THN-PH-01
2. POWERHOUSE, ROOF PLAN	THN-PH-05
3. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN-PH-06

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

ELEVATION 2, 3 AND 4

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED

DESIGNED วศ.6650 วศ.88523

SUBMITTED

DRAWN

RECOMMENDED

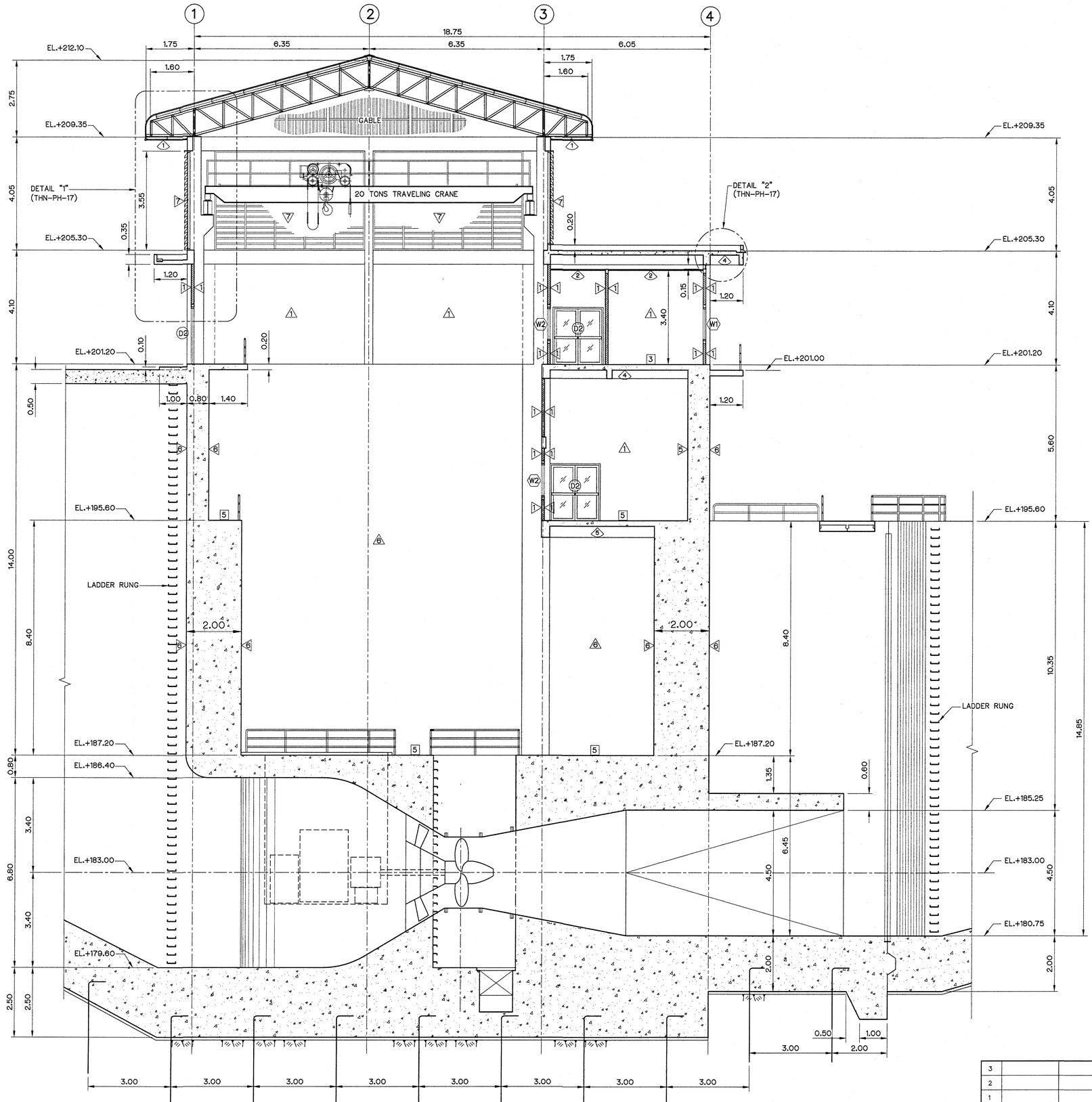
CHECKED วศ.6651

APPROVED

PROJECT MANAGER 6/9/2024 DATE

DRAWING NO. THN-PH-10

SHEET NO. 35 OF 157



SECTION A–A (THN–PH–06)

SCALE 1:75

FLOOR FINISH SYMBOLS :

- [1] COARSE FINISHED
- [2] 0.40x0.40 NON SLIP CERAMIC FLOOR TILES
- [3] 0.40x0.40 CERAMIC FLOOR TILES
- [4] 0.60x0.60 CERAMIC FLOOR TILES
- [5] COATED WITH EPOXY RESIN
- FLOOR FINISH BOUNDARY

WALL MATERIALS AND FINISH SYMBOLS :

- 1 MASONRY WALLS PLASTERING W/PAINT
- 2 GLASS BLOCK
- 3 MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
- 4 MASONRY WALLS PLASTERING UNPAINTED
- 5 EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
- 6 EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED
- 7 METAL LOUVER
- MASONRY WALL

CEILING :

- 1 METAL PANEL, LYSAGHT PANELRIP MODEL OR EQUIVALENT
- 2 9 mm THK. GYPSUM BOARD WITH STEEL FRAME W/PAINT
- 3 4 mm THK. ASBESTOS CEMENT WITH STEEL FRAME W/PAINT
- 4 4 mm THK. ASBESTOS CEMENT ON ALUMINUM T-BAR FRAME W/PAINT (REMOVABLE CEILING)
- 5 EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
- 6 EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF PLAN	THN–PH–05
2. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN–PH–06
3. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN–PH–07
4. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN–PH–08
5. POWERHOUSE, EAVES AND METAL LOUVER INSTALLATION DETAILS	THN–PH–17
6. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN–PH–19

0 1 2 3 4 5 6

SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

SECTION A–A

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED วิ.6650 วิ.88523

DRAWN

CHECKED วิ.6651

PROJECT MANAGER 6/9/2024 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

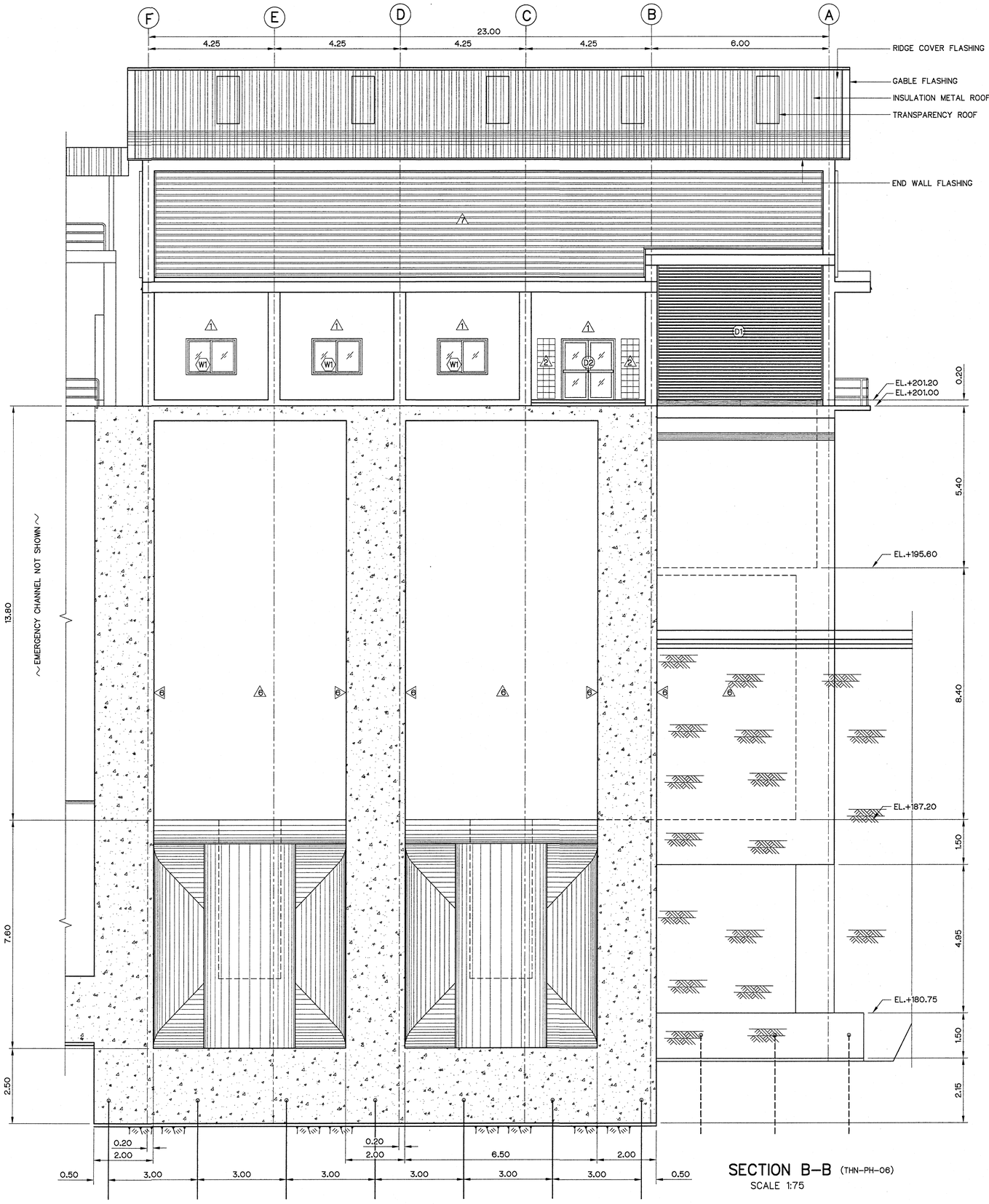
SUBMITTED

RECOMMENDED

APPROVED

DRAWING NO. THN–PH–11

SHEET NO. 36 OF 157



SECTION B–B (THN–PH–06)
SCALE 1:75

WALL MATERIALS AND FINISH SYMBOLS :

1. MASONRY WALLS PLASTERING W/PAINT
2. GLASS BLOCK
3. MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
4. MASONRY WALLS PLASTERING UNPAINTED
5. EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
6. EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED
7. METAL LOUVER

MASONRY WALL

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF PLAN	THN–PH–05
2. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN–PH–06
3. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN–PH–07
4. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN–PH–08
6. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN–PH–19

0 1 2 3 4 5 6
SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

SECTION B–B

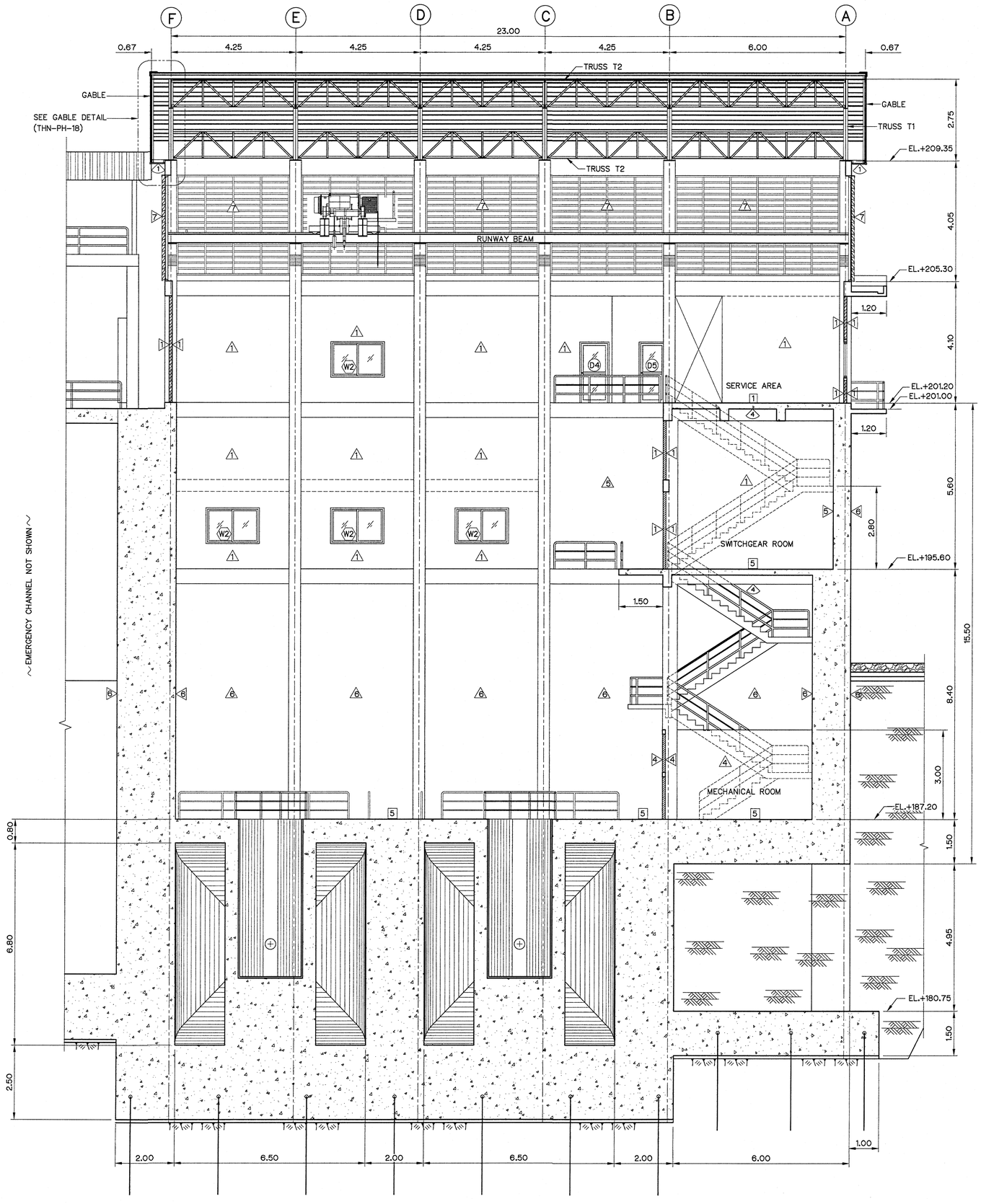
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED		REVIEWED	
DRAWN		SUBMITTED	
CHECKED		RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

DRAWING NO. THN–PH–12

SHEET NO. 37 OF 157



SECTION C–C (THN-PH-06)
SCALE 1:75

FLOOR FINISH SYMBOLS :
- [1] COARSE FINISHED
- [2] 0.40x0.40 NON SLIP CERAMIC FLOOR TILES
- [3] 0.40x0.40 CERAMIC FLOOR TILES
- [4] 0.60x0.60 CERAMIC FLOOR TILES
- [5] COATED WITH EPOXY RESIN
- FLOOR FINISH BOUNDARY

WALL MATERIALS AND FINISH SYMBOLS :
- 1 MASONRY WALLS PLASTERING W/PAINT
- 2 GLASS BLOCK
- 3 MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
- 4 MASONRY WALLS PLASTERING UNPAINTED
- 5 EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
- 6 EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED
- 7 METAL LOUVER
- MASONRY WALL

CEILING :
- 1 METAL PANEL, LYSAGHT PANELRIP MODEL OR EQUIVALENT
- 2 9 mm THK. GYPSUM BOARD WITH STEEL FRAME W/PAINT
- 3 4 mm THK. ASBESTOS CEMENT WITH STEEL FRAME W/PAINT
- 4 EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
- 5 EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED

NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF PLAN	THN-PH-05
2. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN-PH-06
3. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN-PH-07
4. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN-PH-08
5. POWERHOUSE, EAVES AND METAL LOUVER INSTALLATION DETAILS	THN-PH-17
6. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN-PH-19

0 1 2 3 4 5 6
SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
SECTION C–C

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

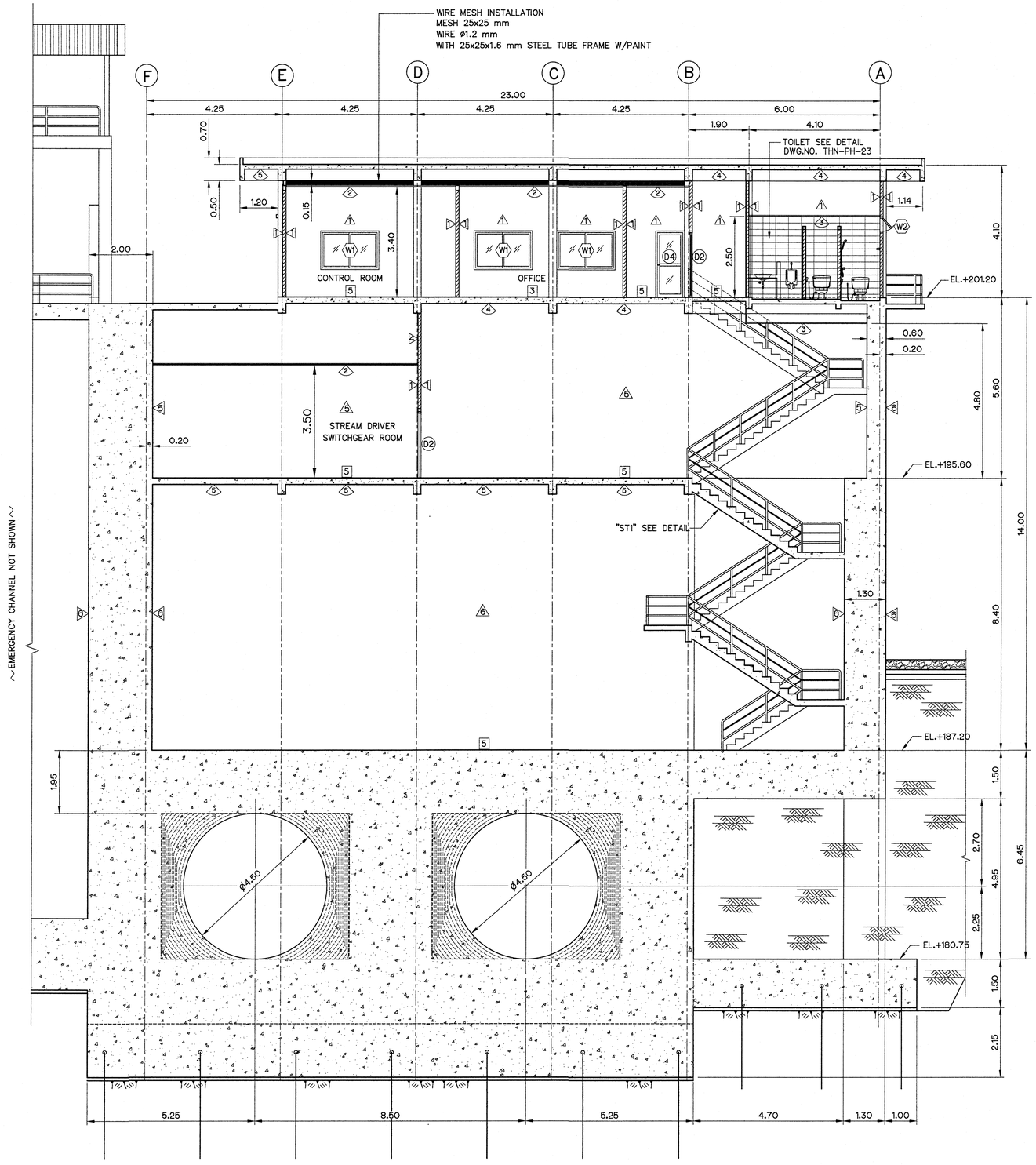
CONSULTANTS | DEDE

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED วิ.6650 DRAWN วิ.88523 CHECKED วิ.6651
PROJECT MANAGER 6/9/2024 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-PH-13
SHEET NO. 38 OF 157



SECTION D–D (THN–PH–06)

SCALE 1:75

0 1 2 3 4 5 6

SCALE 1:75 METERS

FLOOR FINISH SYMBOLS :

- [1] COARSE FINISHED
- [2] 0.40x0.40 NON SLIP CERAMIC FLOOR TILES
- [3] 0.40x0.40 CERAMIC FLOOR TILES
- [4] 0.60x0.60 CERAMIC FLOOR TILES
- [5] COATED WITH EPOXY RESIN
- FLOOR FINISH BOUNDARY

WALL MATERIALS AND FINISH SYMBOLS :

- (1) MASONRY WALLS PLASTERING W/PAINT
- (2) GLASS BLOCK
- (3) MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
- (4) MASONRY WALLS PLASTERING UNPAINTED
- (5) EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
- (6) EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED
- (7) METAL LOUVER
- MASONRY WALL

CEILING :

- (1) METAL PANEL, LYSAGHT PANELRIP MODEL OR EQUIVALENT
- (2) 9 mm THK. GYPSUM BOARD WITH STEEL FRAME W/PAINT
- (3) 4 mm THK. ASBESTOS CEMENT WITH STEEL FRAME W/PAINT
- (4) EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
- (5) EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF PLAN	THN–PH–05
2. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN–PH–06
3. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN–PH–07
4. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN–PH–08
5. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN–PH–19
6. POWERHOUSE, STAIR DETAILS	THN–PH–54

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

SECTION D–D

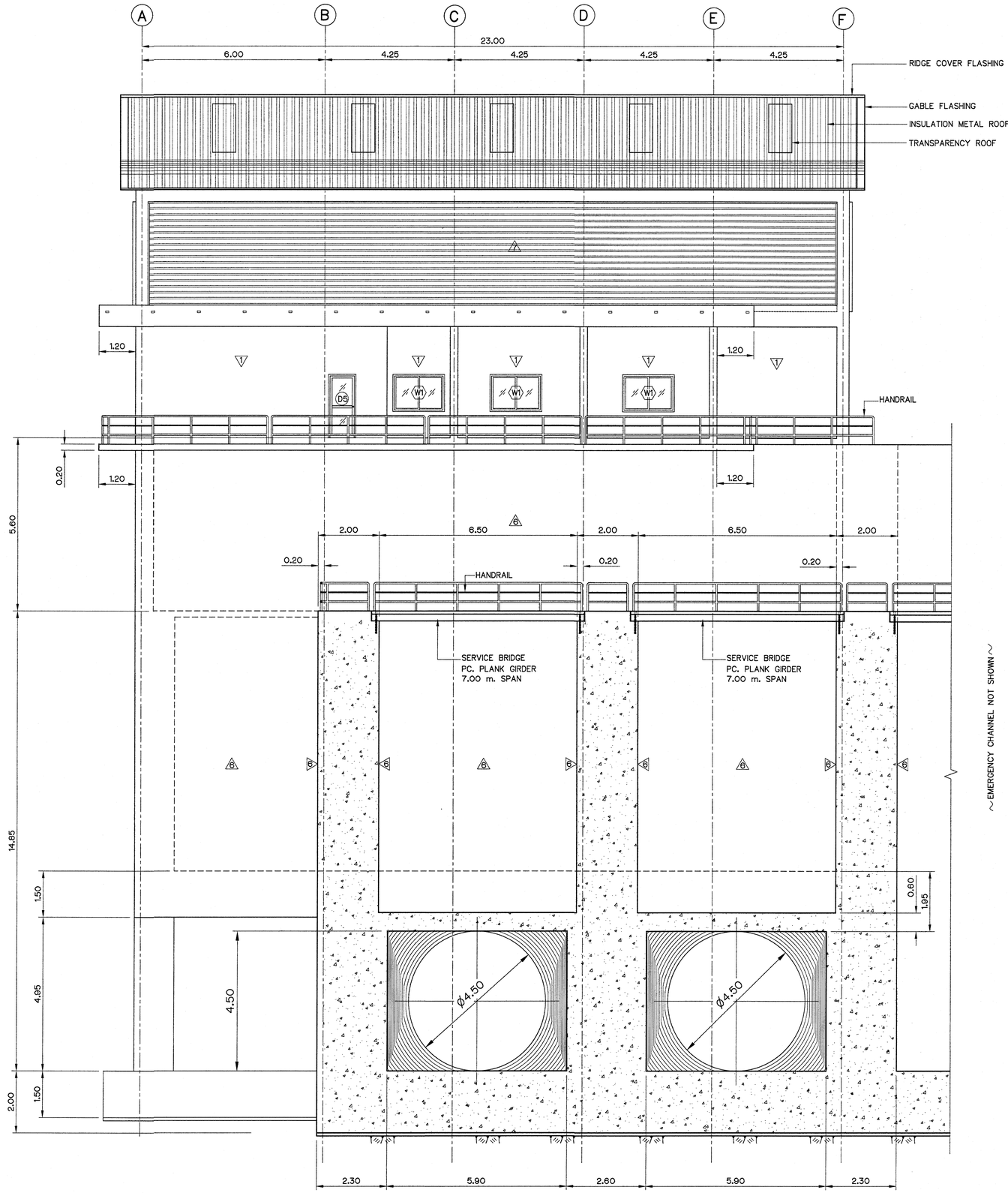
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิศ.6650	วิศ.68523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิศ.6651		RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN–PH–14

SHEET NO. 39 OF 157



SECTION E–E (THN–PH–06)

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04
3. INSULATION METAL ROOF, THE THICKNESS OF BASE METAL INCLUDING THE COATING LAYER AND PAINT LAYER IS NOT LESS THAN 0.5 mm

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF PLAN	THN–PH–05
2. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN–PH–06
3. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN–PH–07
4. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN–PH–08
5. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN–PH–19

0 1 2 3 4 5 6

SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

SECTION E–E

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED วิ.6650 ณ.88523

DRAWN

CHECKED วิ.6651

6/9/2024
PROJECT MANAGER DATE

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED

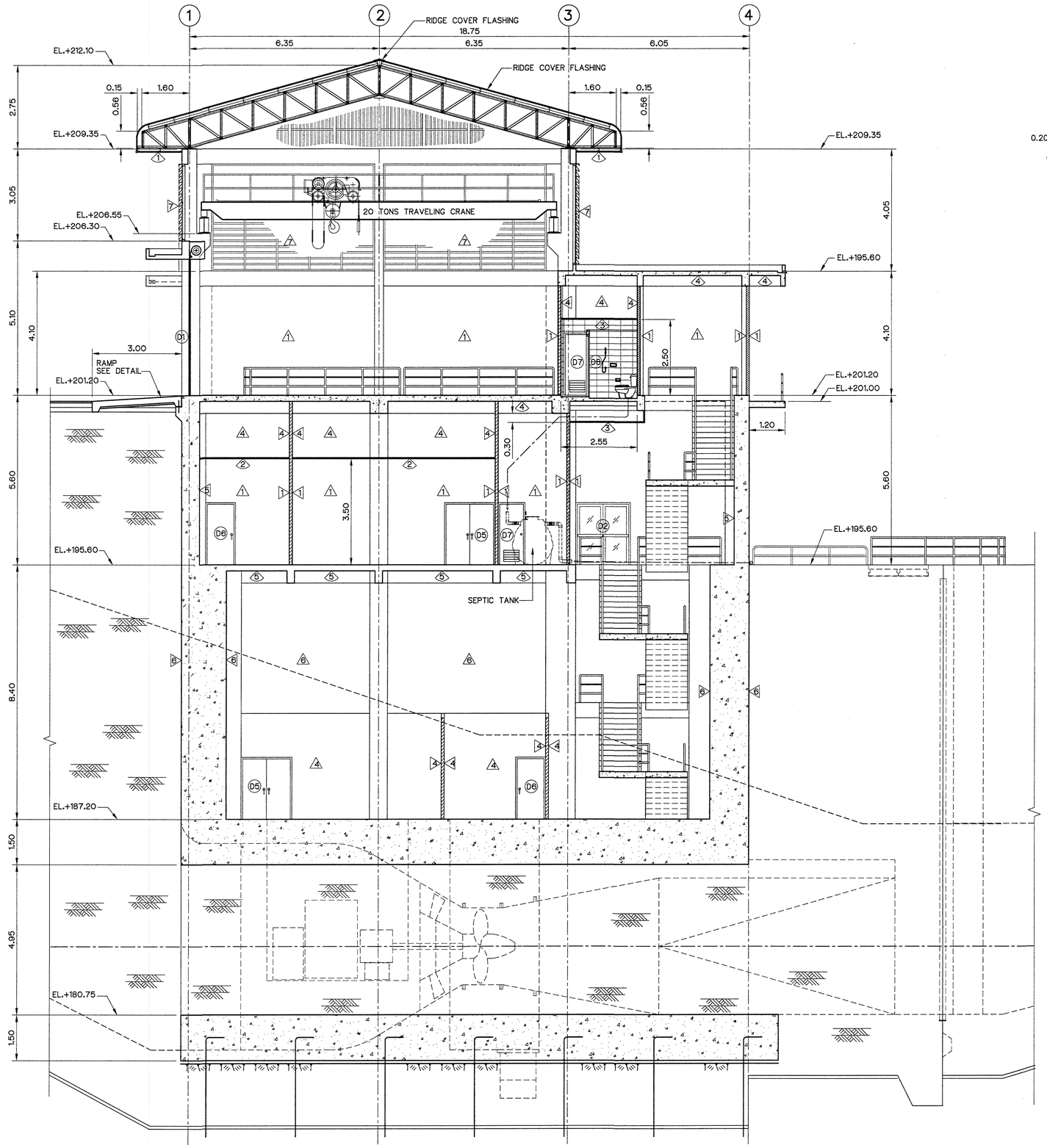
SUBMITTED

RECOMMENDED

APPROVED

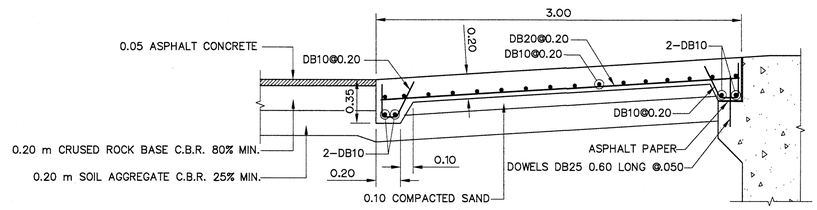
DRAWING NO. THN–PH–15

SHEET NO. 40 OF 157



SECTION F–F (THN–PH–06)

SCALE 1:75



RAMP DETAILS

SCALE 1:25

FLOOR FINISH SYMBOLS :

- [1] COARSE FINISHED
- [2] 0.40x0.40 NON SLIP CERAMIC FLOOR TILES
- [3] 0.40x0.40 CERAMIC FLOOR TILES
- [4] 0.60x0.60 CERAMIC FLOOR TILES
- [5] COATED WITH EPOXY RESIN
- FLOOR FINISH BOUNDARY

WALL MATERIALS AND FINISH SYMBOLS :

- 1 MASONRY WALLS PLASTERING W/PAINT
- 2 GLASS BLOCK
- 3 MASONRY WALLS WITH 0.20x0.40 CERAMIC TILES
- 4 MASONRY WALLS PLASTERING UNPAINTED
- 5 EXPOSED CONCRETE SMOOTH SURFACE W/PAINT
- 6 EXPOSED CONCRETE SMOOTH SURFACE UNPAINTED
- 7 METAL LOUVER
- MASONRY WALL

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF PLAN	THN–PH–05
2. POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN–PH–06
3. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN–PH–07
4. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN–PH–08
5. POWERHOUSE, DETAIL OF DOORS, WINDOWS AND SIGNBOARD	THN–PH–19
6. POWERHOUSE, STAIR DETAILS	THN–PH–54

0 1 2 3 4 5 6

SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

SECTION F–F

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED สิ.6650 วิ.88523

DRAWN

CHECKED สิ.6651

PROJECT MANAGER 6/9/2024 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

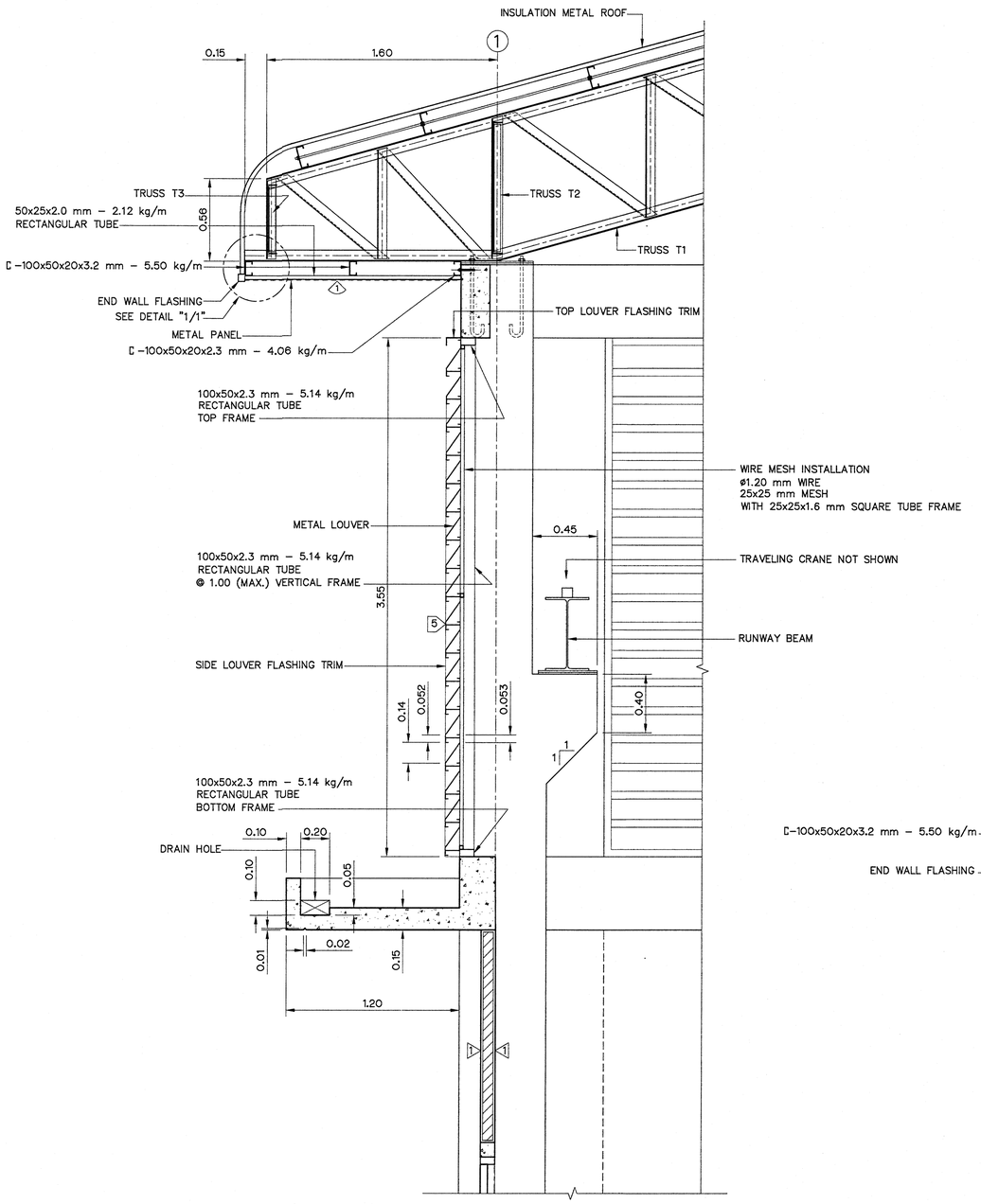
SUBMITTED

RECOMMENDED

APPROVED

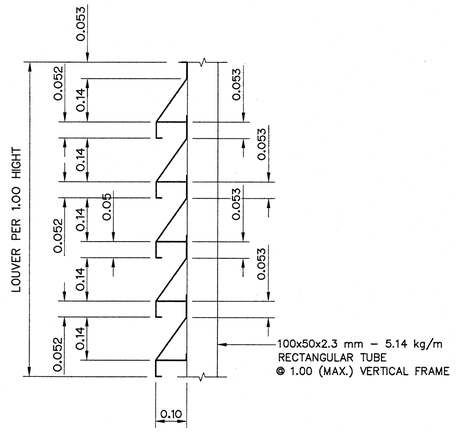
DRAWING NO. THN–PH–16

SHEET NO. 41 OF 157



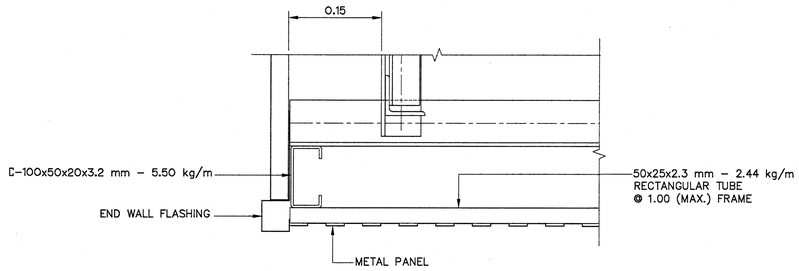
DETAIL "1" (THN–PH–11)

SCALE 1:20



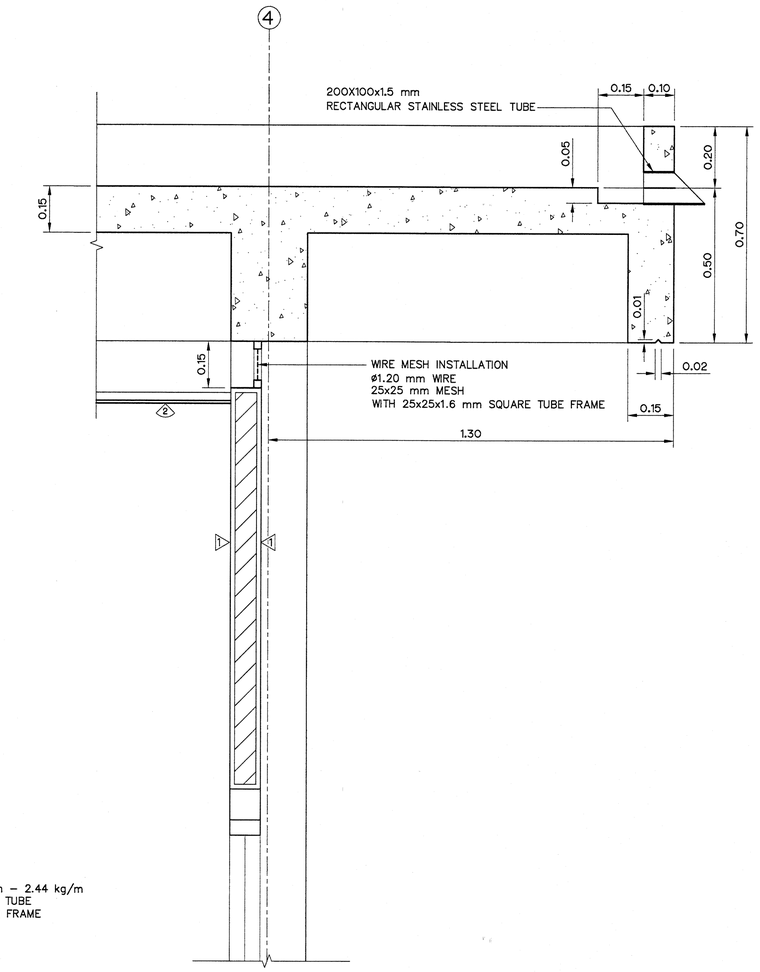
METAL LOUVER DETAIL

SCALE 1:10



DETAIL "1/1"

SCALE 1:5



DETAIL "2" (THN–PH–14)

SCALE 1:10

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN–PH–10
2. POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN–PH–11
3. POWERHOUSE, SECTION A–A	THN–PH–14

0 0.1 0.2 0.3 0.4
SCALE 1:5 METERS

0 0.1 0.2 0.4 0.6 0.8
SCALE 1:10 METERS

0 0.5 1.0 1.5
SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

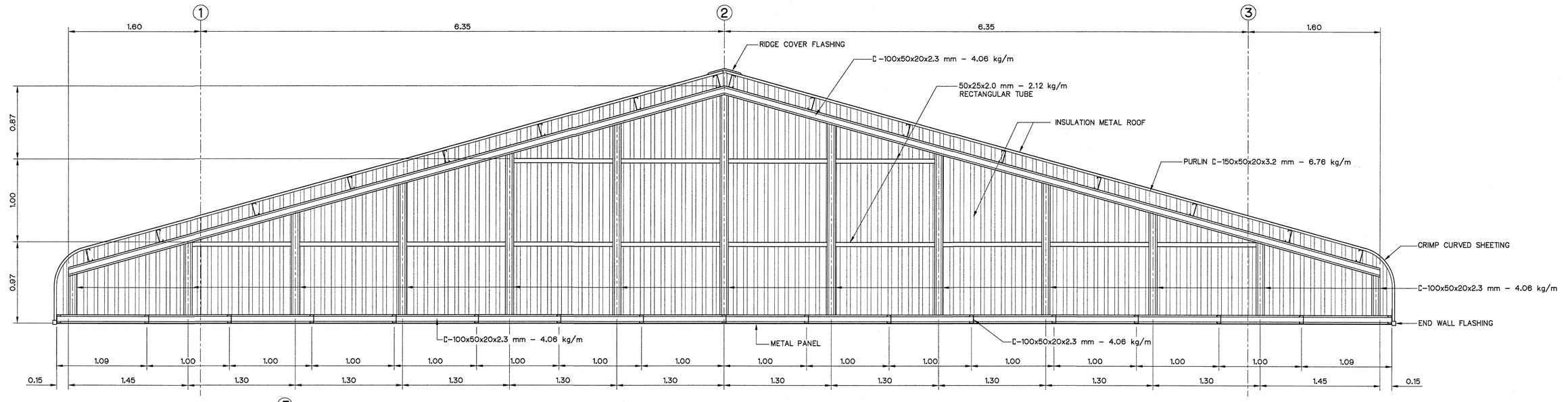
POWERHOUSE

EAVES AND METAL LOUVER INSTALLATION DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

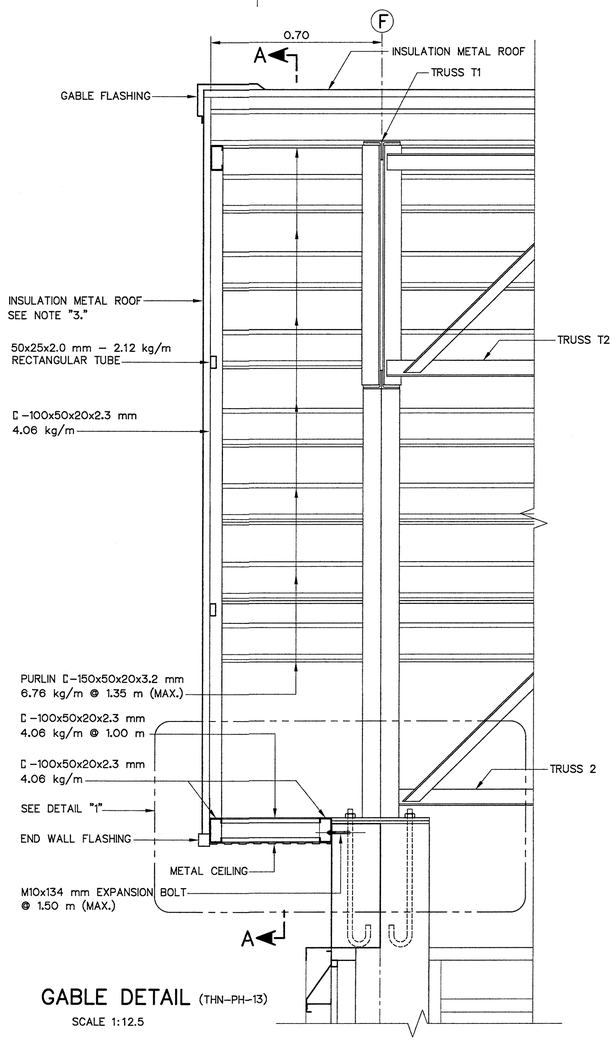
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิ.6650	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วิ.6651	APPROVED	
PROJECT MANAGER	6/9/2024 DATE	DRAWING NO.	THN–PH–17
		SHEET NO.	42 OF 157



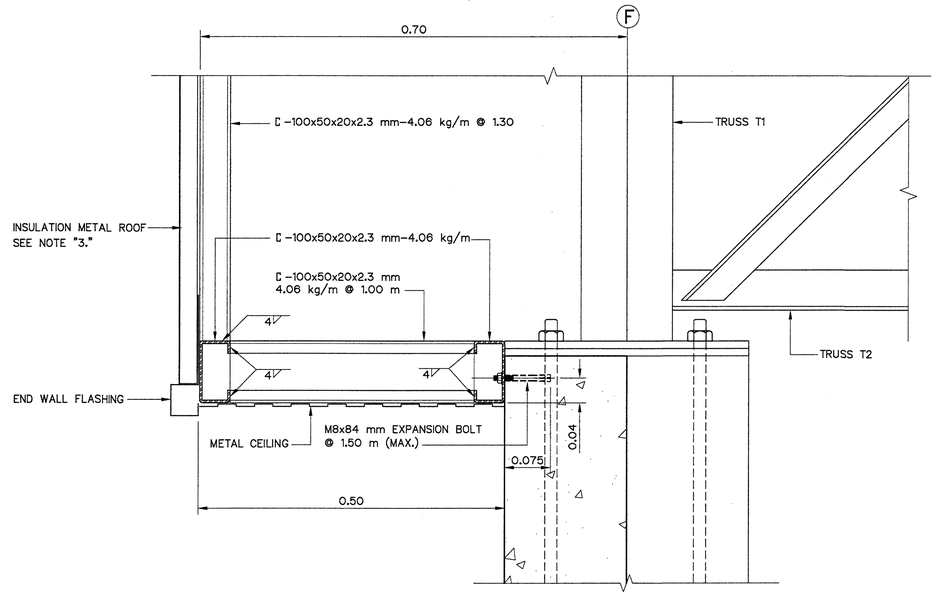
SECTION A-A

SCALE 1:25



GABLE DETAIL (THN-PH-13)

SCALE 1:12.5



DETAIL "1"

SCALE 1:5

0 0.1 0.2 0.3 0.4
SCALE 1:5 METERS

0 0.2 0.4 0.5 0.6 0.7
SCALE 1:12.5 METERS

0 0.5 1.0 1.5 2.0
SCALE 1:25 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. THN-GN-04
3. INSULATION METAL ROOF, THE THICKNESS OF BASE METAL INCLUDING THE COATING LAYER AND PAINT LAYER IS NOT LESS THAN 0.5 mm

REFERENCE DRAWINGS :

1. POWERHOUSE, SECTION A-A — THN-PH-11

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

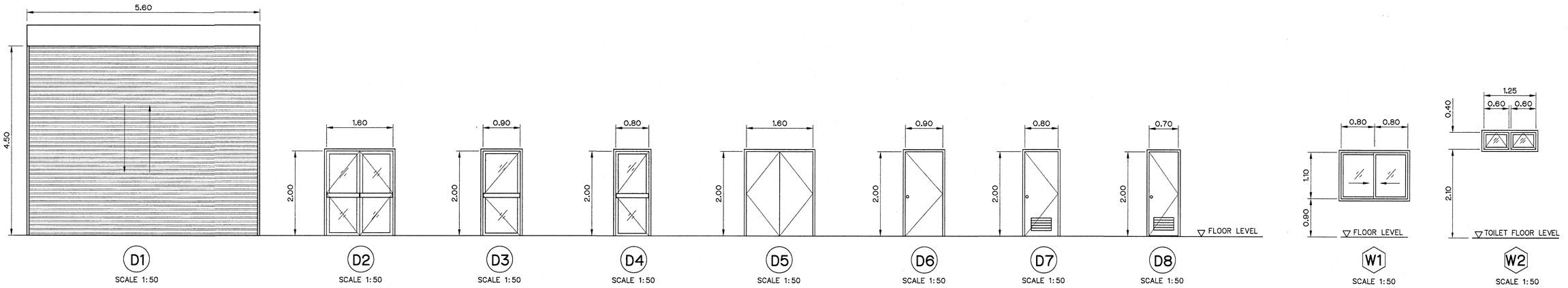
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

GABLE DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วิ.6650 วิ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วิ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-PH-18	SHEET NO. 43 OF 157

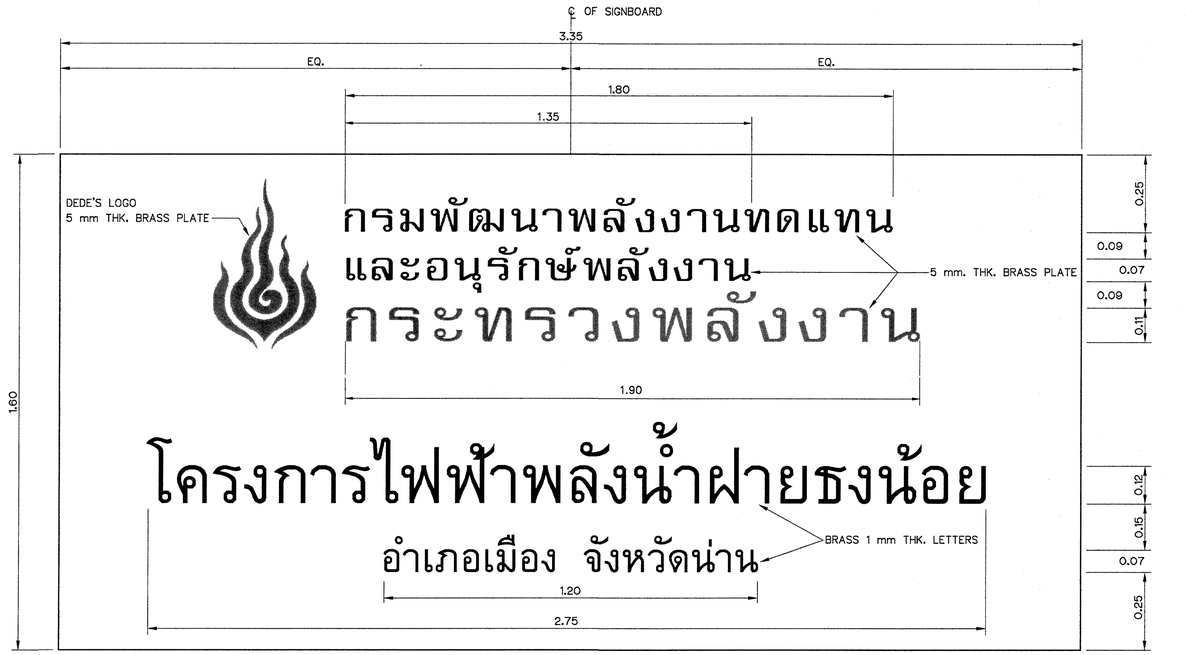


D1 SCALE 1:50 | D2 SCALE 1:50 | D3 SCALE 1:50 | D4 SCALE 1:50 | D5 SCALE 1:50 | D6 SCALE 1:50 | D7 SCALE 1:50 | D8 SCALE 1:50 | W1 SCALE 1:50 | W2 SCALE 1:50

DOORS AND WINDOWS SCHEDULE

SYMBOL	DESCRIPTIONS	SIZE		FRAME	PANEL	HINGE	LOCKSET	HANDLE	REMARKS
		WIDTH	HEIGHT						
D1	ROLLING SHUTTER (STEEL 1.2 mm THK.)	5.60	4.50	GALVANIZED STEEL	—	—	NORMAL KEY	—	MOTOR OPERATING
D2	TWIN OPENNING DOOR	1.60	2.00	ALUMINIUM 1.5 mm THK.	GLASS 6 mm THK.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
D3	SINGLE OPENNING DOOR	0.90	2.00	ALUMINIUM 1.5 mm THK.	GLASS 6 mm THK.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
D4	SINGLE OPENNING DOOR	0.80	2.00	ALUMINIUM 1.5 mm THK.	GLASS 6 mm THK.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
D5	TWIN OPENNING DOOR	1.60	2.00	STEEL 1.6 mm THK.	STEEL 1.6 mm THK.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
D6	SINGLE OPENNING DOOR	0.90	2.00	STEEL 1.6 mm THK.	STEEL 1.6 mm THK.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
D7	SINGLE OPENNING DOOR	0.80	2.00	P.V.C. 2"x 4"	P.V.C.	STAINLESS STEEL 4"x3"x2.5 mm	CYINDER LOCK	—	FULL SET OF ACCESSORIES FROM MANUFACTURER
D8	SINGLE OPENNING DOOR	0.70	2.00	P.V.C. 2"x 4"	P.V.C.	STAINLESS STEEL 4"x3"x2.5 mm	CYINDER LOCK	—	FULL SET OF ACCESSORIES FROM MANUFACTURER
W1	SLIDING WINDOW	1.60	1.10	ALUMINIUM 1.5 mm THK.	GLASS 6 mm THK.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
W2	TWIN PUSHING WINDOW	1.25	0.50	ALUMINIUM 1.5 mm THK.	GLASS 6 mm THK.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER

● SHALL BE USED SPACIFIED ACCESSORIES



FRONT VIEW OF SIGNBOARD
NOT TO SCALE

SCALE 1:50 0 1 2 3 4 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. THN-GN-04

REFERENCE DRAWINGS :

1.	POWERHOUSE, GROUNG FLOOR PLAN (EL.+201.20)	THN-PH-06
2.	POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+195.60)	THN-PH-07
3.	POWERHOUSE, UNDERGROUND FLOOR PLAN (EL.+187.20)	THN-PH-08
4.	POWERHOUSE, ELEVATION 1	THN-PH-09
5.	POWERHOUSE, ELEVATION 2, 3 AND 4	THN-PH-10
6.	POWERHOUSE, SECTION A-A	THN-PH-11
7.	POWERHOUSE, SECTION B-B	THN-PH-12
8.	POWERHOUSE, SECTION C-C	THN-PH-13
9.	POWERHOUSE, SECTION D-D	THN-PH-14
10.	POWERHOUSE, SECTION E-E	THN-PH-15
16.	POWERHOUSE, SECTION F-F	THN-PH-16

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

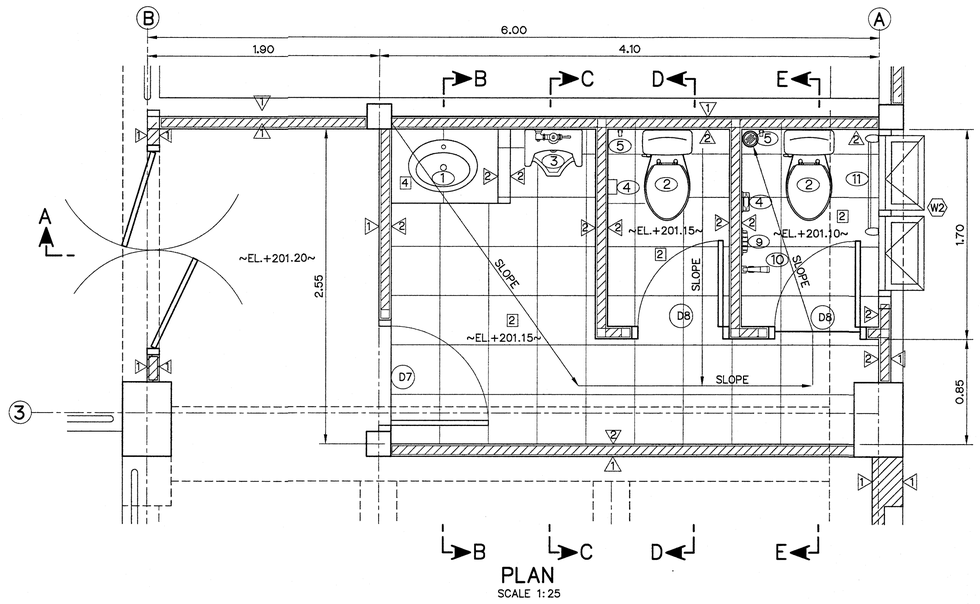
CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
DETAIL OF DOORS, WINDOWS AND SIGNBOARD

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

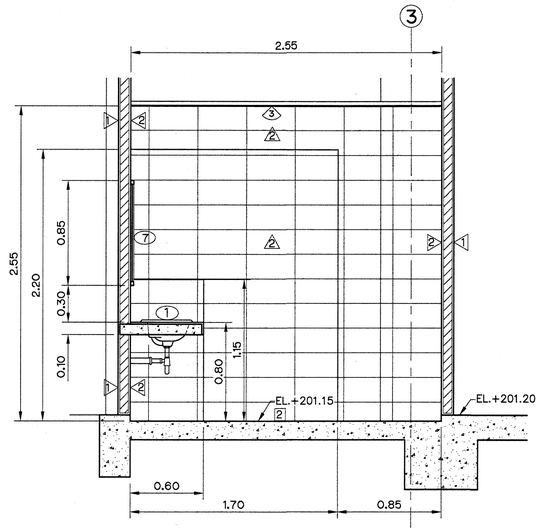
DESIGNED สม.6650 กม.88523
DRAWN
CHECKED สม.6651
6/9/2024
PROJECT MANAGER DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

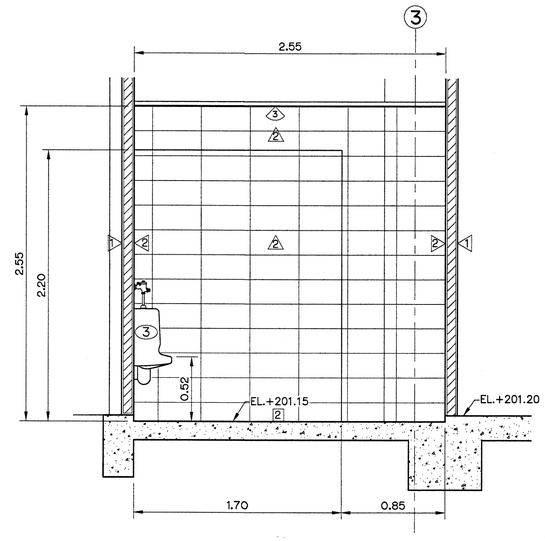
DRAWING NO. THN-PH-19
SHEET NO. 44 OF 157



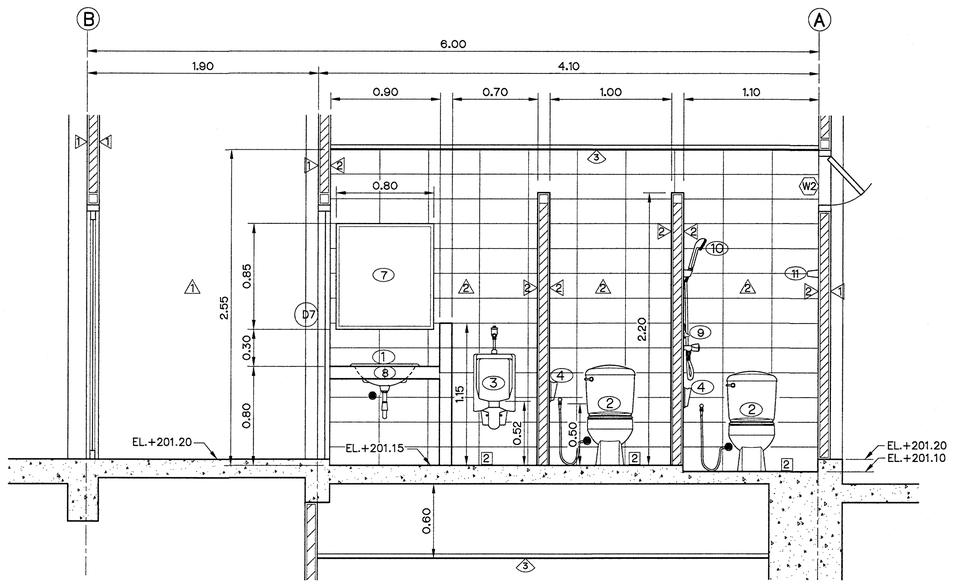
PLAN
SCALE 1:25



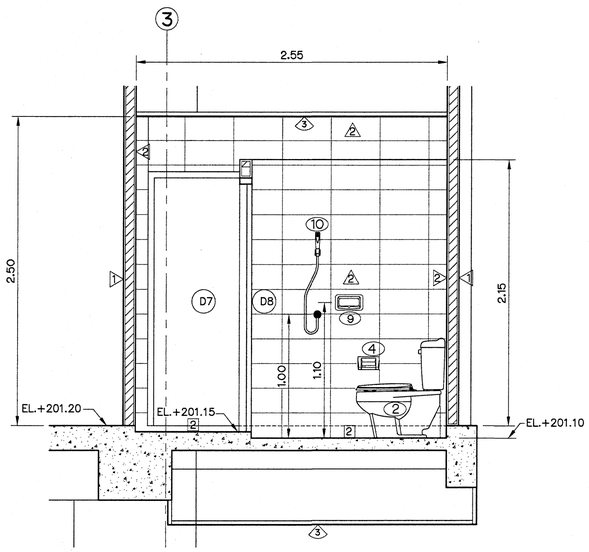
SECTION B–B
SCALE 1:25



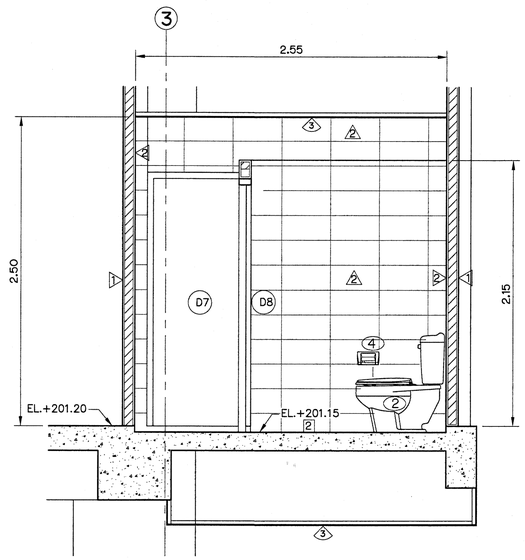
SECTION C–C
SCALE 1:25



SECTION A–A
SCALE 1:25



SECTION D–D
SCALE 1:25



SECTION E–E
SCALE 1:25

SANITARY ITEMS

NO.	DESCRIPTIONS	PRODUCT NAME	MODEL	COLOR	ACCESSORIES	REMARKS
①	LAVATORY	COTTO	C008	WHITE	FULL SET FROM MANUFACTURER	OR EQUIVALENT
②	TOILET W/FLUSH TANK	COTTO	C116	WHITE	FULL SET FROM MANUFACTURER	OR EQUIVALENT
③	URINAL	COTTO	C307	WHITE	FULL SET FROM MANUFACTURER	OR EQUIVALENT
④	PAPER HOLDER	COTTO	C814	WHITE	FULL SET FROM MANUFACTURER	OR EQUIVALENT
⑤	BIDET HOSE	COTTO	CT667	WHITE	–	–
⑥	FLOOR DRAIN	–	–	–	–	–
⑦	MIRROR	–	–	–	–	–
⑧	COUNTER	–	–	WHITE	RC. WITH CERAMIC TILES	OR EQUIVALENT
⑨	SOAP HOLDER	COTTO	C805	WHITE	–	–
⑩	SHOWER	COTTO	–	WHITE	–	–
⑪	TOWEL RACK	–	–	–	–	–

NOTES :

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

REFERENCE DRAWINGS :

1. GROUND FLOOR PLAN (EL.+201.20)	THN–PH–09
2. POWERHOUSE, TOILET SANITARY SYSTEM	THN–PH–22

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

TOILET DETAILS

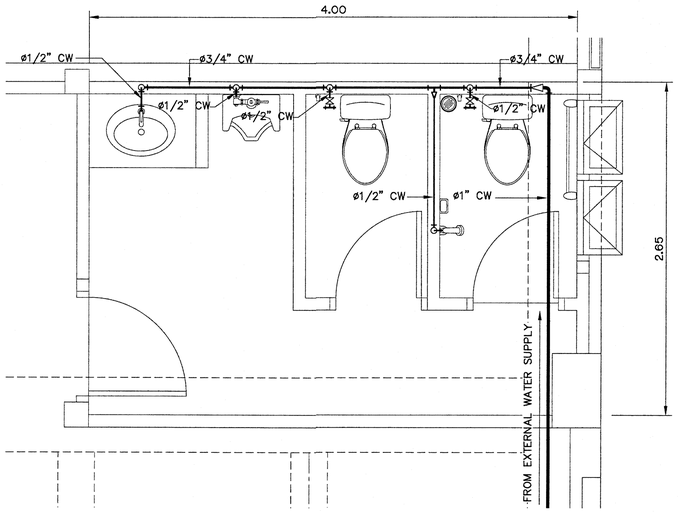
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

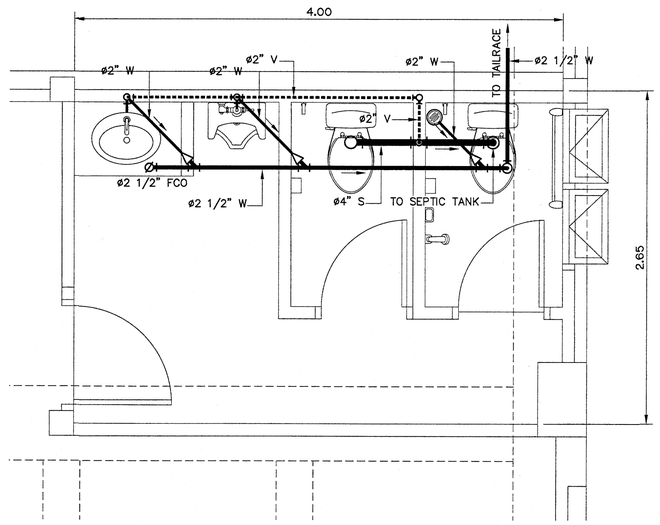
DESIGNED วศ.6650 วศ.88523
DRAWN
CHECKED วศ.6651
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

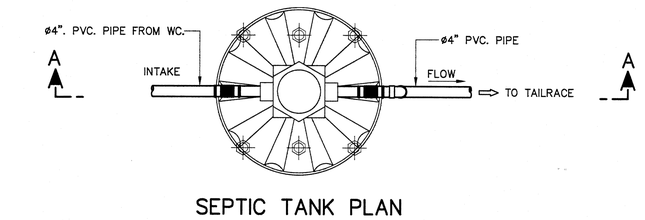
DRAWING NO. THN–PH–20
SHEET NO. 45 OF 157



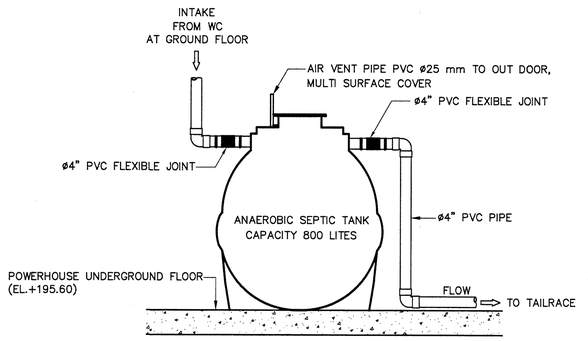
PLAN OF COLD WATER PIPING
SCALE 1:25



PLAN OF SOIL, WASTE AND VENT PIPING
SCALE 1:25

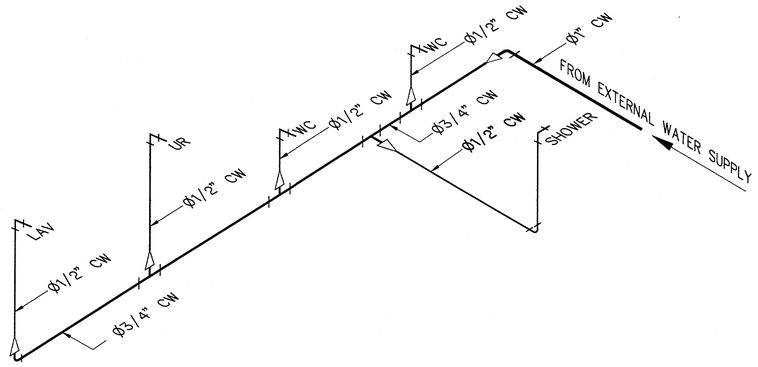


SEPTIC TANK PLAN
SCALE 1:25

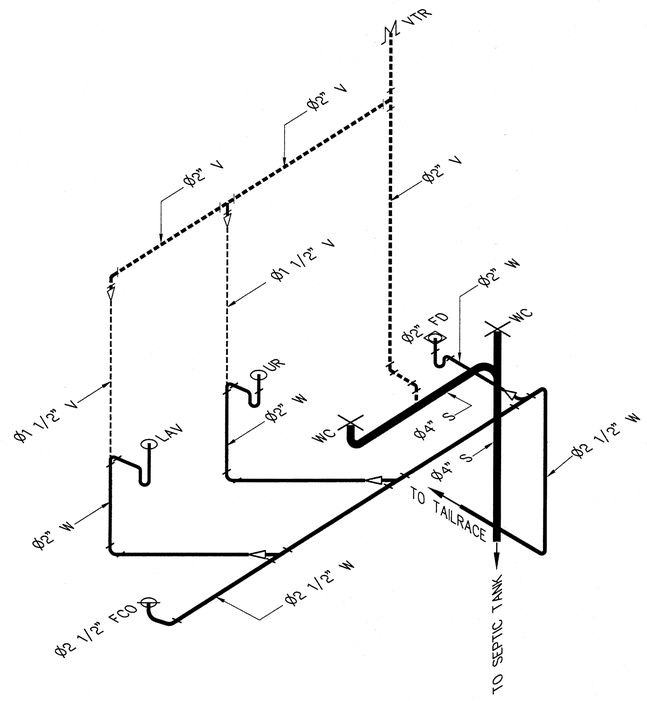


SEPTIC TANK

SECTION A–A
SCALE 1:25



ISIMETRIC OF COLD WATER PIPING



ISOMETRIC OF SOIL, WASTE AND VENT PIPING

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, TOILET DETAILS — THN–PH–20

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

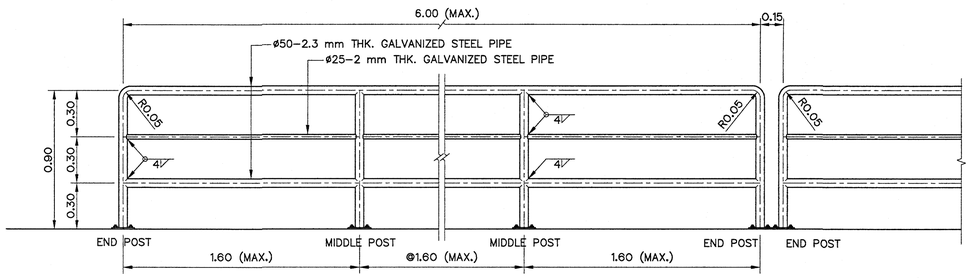
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
SANITARY SYSTEM AND SEPTIC TANK

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

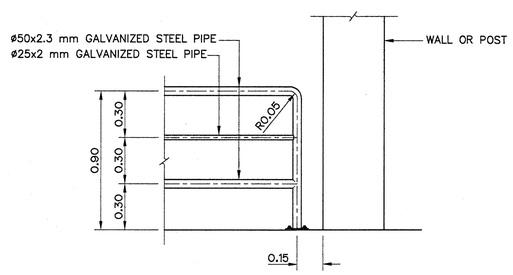
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วศ.6650 วศ.88523
DRAWN	
CHECKED	วศ.6651
PROJECT MANAGER	6/9/2024 DATE
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	THN–PH–21
SHEET NO.	46 OF 157



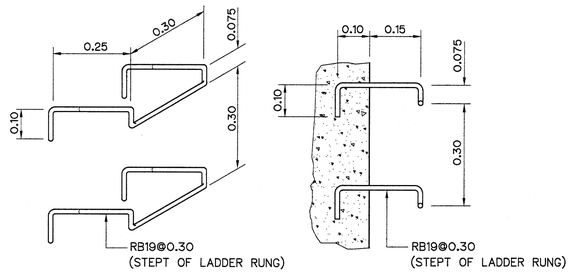
HANDRAIL TYPE "1"

SCALE 1:20



END OF HANDRAIL AT WALL OR POST

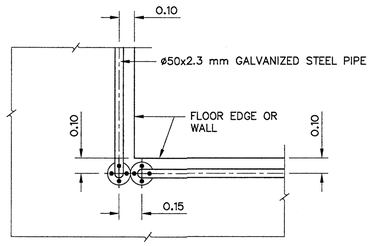
SCALE 1:20



ISOMETRIC SECTION

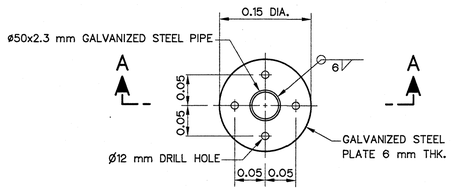
LADERRUNG DETAIL

NOT TO SCALE



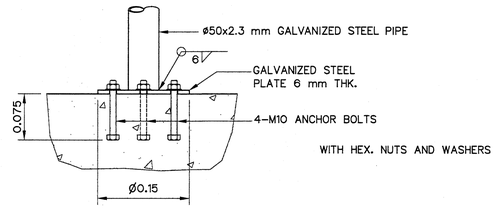
HANDRAIL AT CORNER

SCALE 1:20



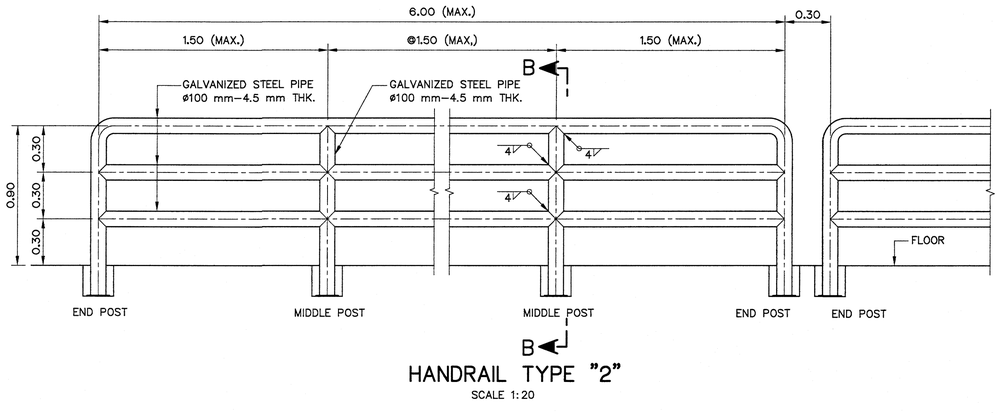
HANDRAIL POST INSTALLATION PLAN

SCALE 1:5



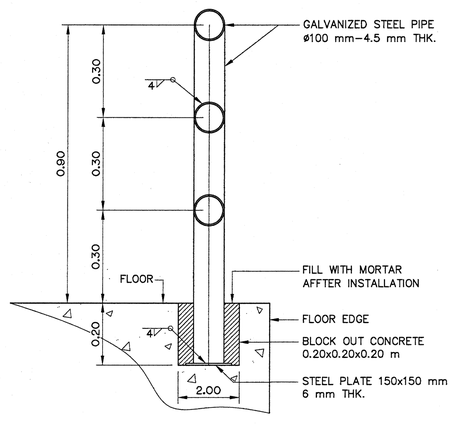
SECTION A-A

SCALE 1:5



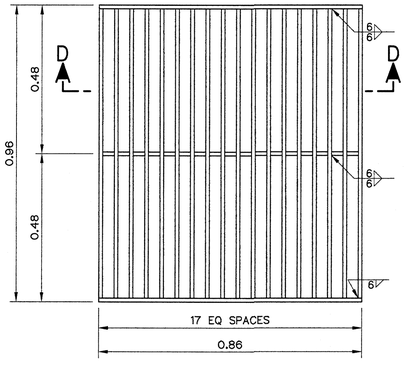
HANDRAIL TYPE "2"

SCALE 1:20



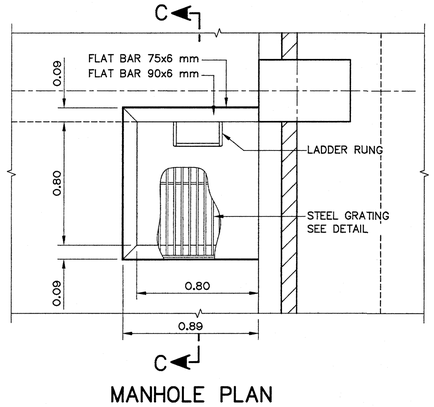
SECTION B-B

SCALE 1:10



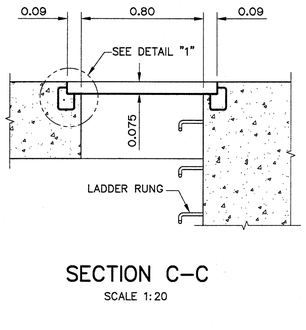
STEEL GRATING DETAILS

SCALE 1:10



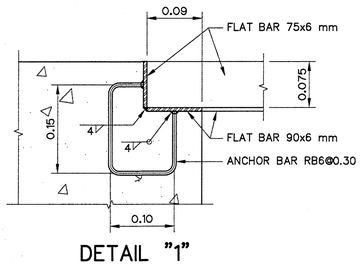
MANHOLE PLAN

SCALE 1:20



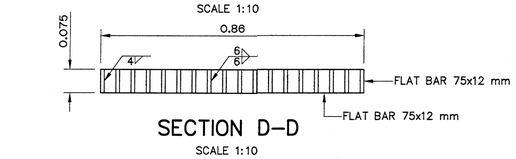
SECTION C-C

SCALE 1:20



DETAIL "1"

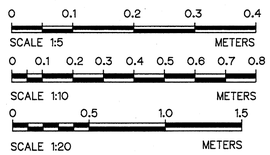
SCALE 1:5



SECTION D-D

SCALE 1:10

MANHOLE DETAILS (THN-PH-06)



NOTES:

1. ALL DIMENSIONS AND ELEVATION ARE IN METERS, UNLESS OTHERWISE SHOWN
2. FOR GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1.	POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	THN-PH-01
2.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS AND DETAILS 1/3	THN-PH-02
3.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS AND DETAILS 2/3	THN-PH-03
4.	POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS AND DETAILS 3/3	THN-PH-04
1.	POWERHOUSE, GROUND FLOOR PLAN (EL.+201.20)	THN-PH-06
2.	POWERHOUSE UNDERGROUND FLOOR PLAN (EL.+195.60)	THN-PH-07
3.	POWERHOUSE UNDERGROUND FLOOR PLAN (EL.+187.20)	THN-PH-08
4.	POWERHOUSE, SECTION A-A	THN-PH-11
5.	POWERHOUSE, SECTION B-B	THN-PH-12
6.	POWERHOUSE, SECTION C-C	THN-PH-13
7.	POWERHOUSE, SECTION D-D	THN-PH-14
8.	POWERHOUSE, SECTION E-E	THN-PH-15
9.	POWERHOUSE, SECTION F-F	THN-PH-16

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

STANDARD OF HANDRAILS, LADDER RUNG AND MANHOLE

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

DESIGNED วศ.6650 วศ.88523

SUBMITTED

DRAWN

RECOMMENDED

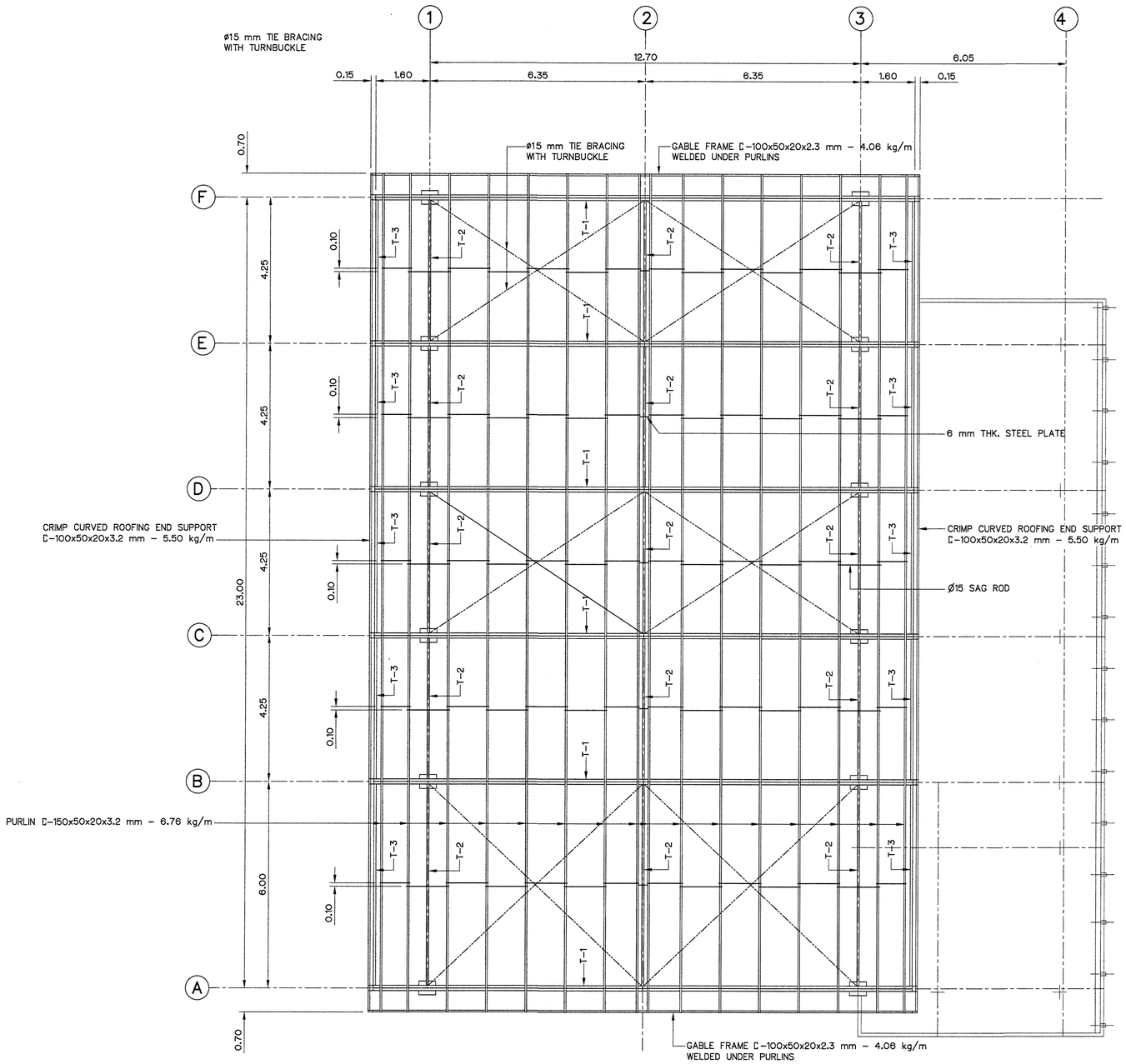
CHECKED วศ.6651

APPROVED

PROJECT MANAGER 6/9/2024 DATE

DRAWING NO. THN-PH-22

SHEET NO. 47 OF 157



ROOF STRUCTURE PLAN

SCALE 1:75

0 1 2 3 4 5 6

SCALE 1:75 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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, GROUNG FLOOR PLAN (EL.+201.20)	THN-PH-06
2. POWERHOUSE, ROOF STRUCTURE DETAILS 1/3	THN-PH-24
3. POWERHOUSE, ROOF STRUCTURE DETAILS 2/3	THN-PH-25
4. POWERHOUSE, ROOF STRUCTURE DETAILS 3/3	THN-PH-26

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

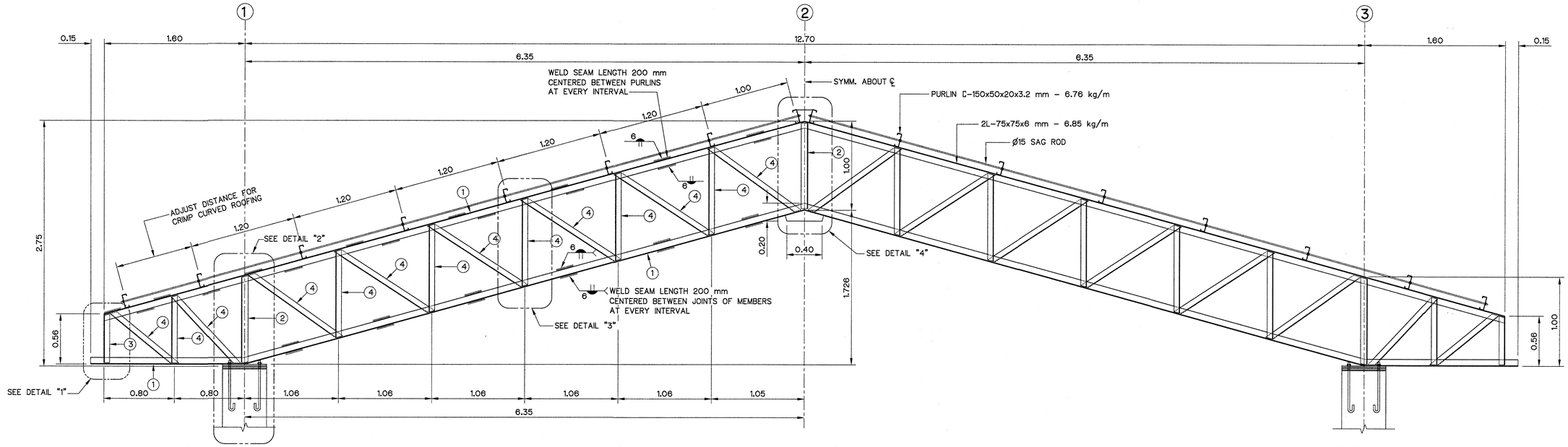
POWERHOUSE

ROOF STRUCTURE PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	สิ.6650	วิ.88523	SUBMITTED
DRAWN			RECOMMENDED
CHECKED		สิ.6651	APPROVED
PROJECT MANAGER		6/9/2024 DATE	DRAWING NO. THN-PH-23
REVIEWED			SHEET NO. 48 OF 157

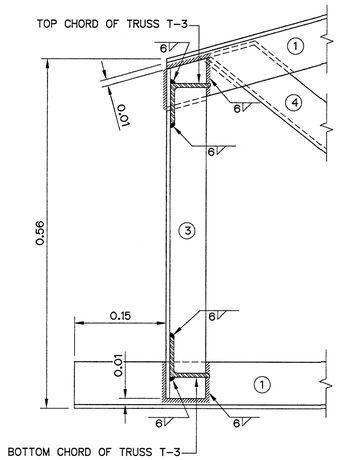


FIXED END

TRUSS "T-1"

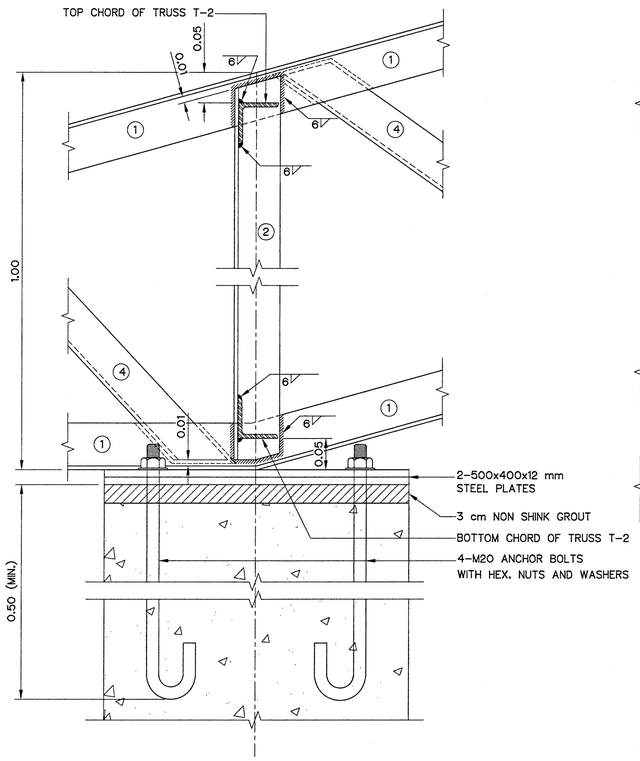
SCALE 1:25

FREE END



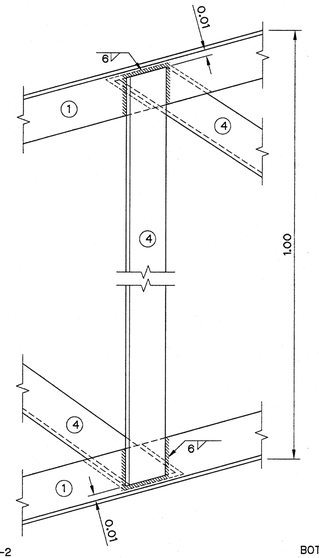
DETAIL "1"

SCALE 1:5



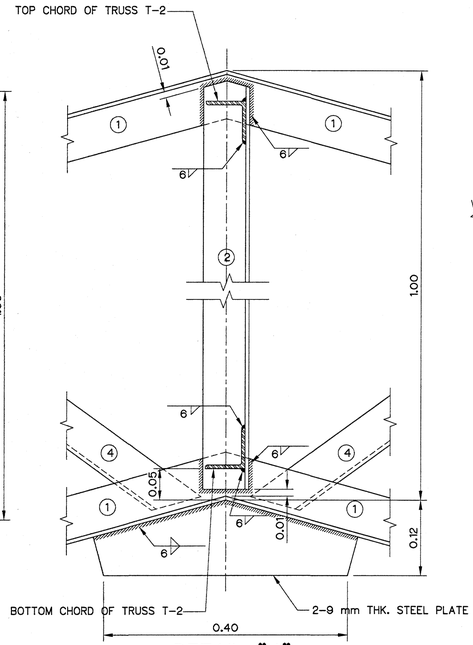
DETAIL "2"

SCALE 1:5



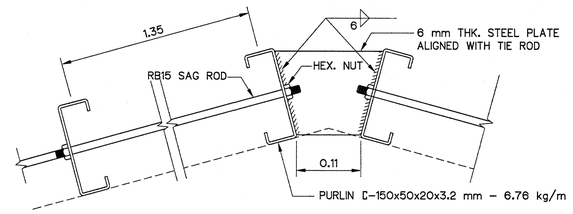
DETAIL "3"

SCALE 1:5



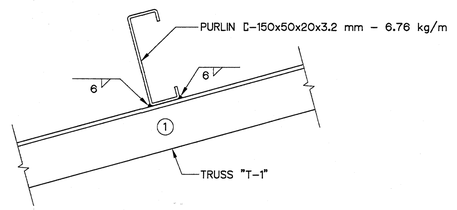
DETAIL "4"

SCALE 1:5



SAG RODS AT MID SPAN OF PURLINS

SCALE 1:5



PURLINS INSTALLATION ON TRUSS "T-1"

SCALE 1:5

SYMBOLS

(1) 2L-75x75x6-6.85 kg/m WELDED TOGETHER
(2) 2L-75x75x6-6.85 kg/m
(3) 2L-65x65x6-5.91 kg/m
(4) L-65x65x6-5.91 kg/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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF STRUCTURE PLAN THN-PH-23

0 0.1 0.2 0.3 0.4
SCALE 1:5 METERS
0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

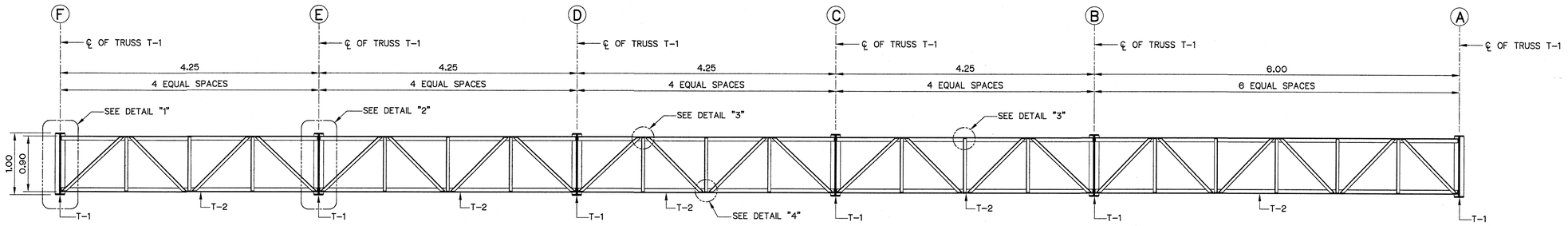
ROOF STRUCTURE DETAILS 1/3

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

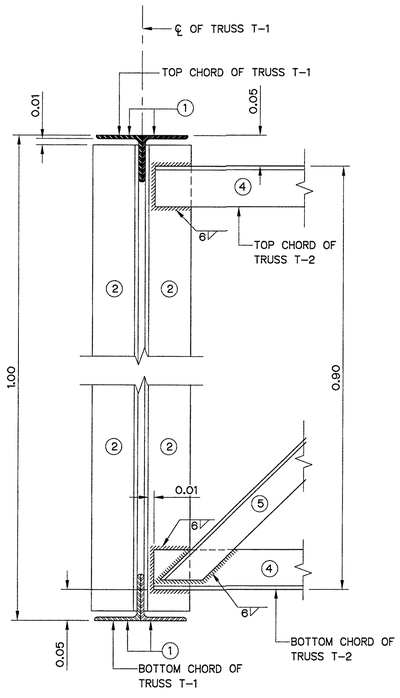
DESIGNED ส.ต.6650 ภ.ส.88523
DRAWN
CHECKED ส.ต.6651
PROJECT MANAGER 6/9/2024 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

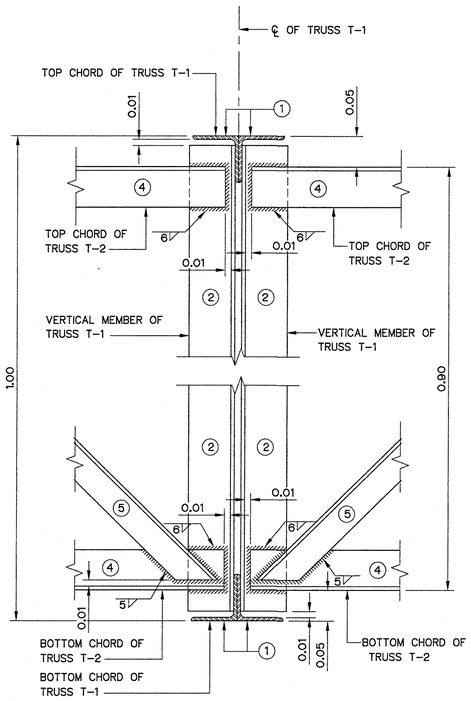
DRAWING NO. THN-PH-24
SHEET NO. 49 OF 157



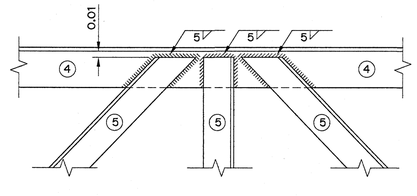
TRUSS "T-2"
SCALE 1:25



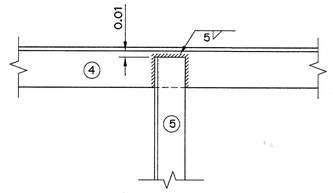
DETAIL "1"
(CONNECTING TRUSS T-2 TO TRUSS T-1 AT EDGE SUPPORT)
SCALE 1:5



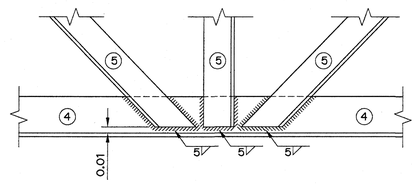
DETAIL "2"
(CONNECTING TRUSS T-2 TO TRUSS T-1 AT INNER SUPPORT)
SCALE 1:5



DETAIL "3"
SCALE 1:5



DETAIL "5"
SCALE 1:5



DETAIL "4"
SCALE 1:5

SYMBOLS
(1) 2L-75x75x6-6.85 kg/m WELDED TOGETHER
(2) 2L-75x75x6-6.85 kg/m
(3) 2L-65x65x6-5.91 kg/m
(4) L-65x65x6-5.91 kg/m
(5) L-50x50x5-3.77 kg/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. THN-GN-04

REFERENCE DRAWINGS :
1. POWERHOUSE, ROOF STRUCTURE PLAN — THN-PH-23

0 0.1 0.2 0.3 0.4
SCALE 1:5 METERS
0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

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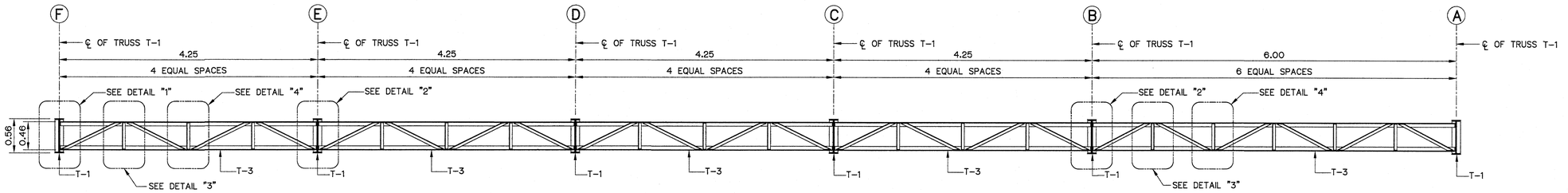
KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

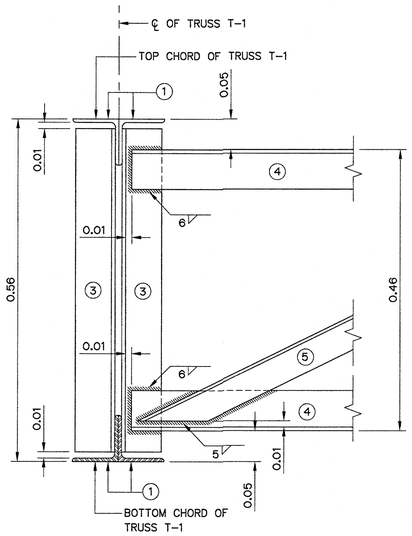
CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
ROOF STRUCTURE DETAILS 2/3

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วิ.6650 วิ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วิ.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER / DATE	APPROVED
	DRAWING NO. THN-PH-25 / SHEET NO. 50 OF 157



TRUSS "T-3"

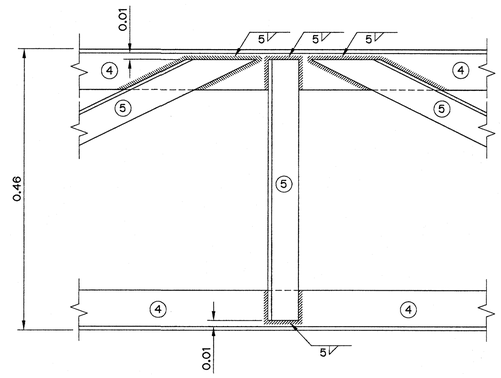
SCALE 1:25



DETAIL "1"

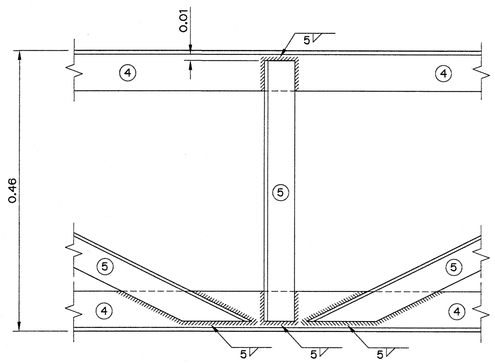
(CONNECTING TRUSS T-3 TO TRUSS T-1 AT EDGE SUPPORT)

SCALE 1:5



DETAIL "3"

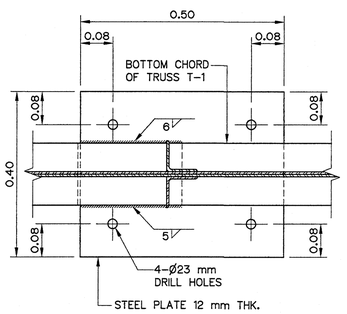
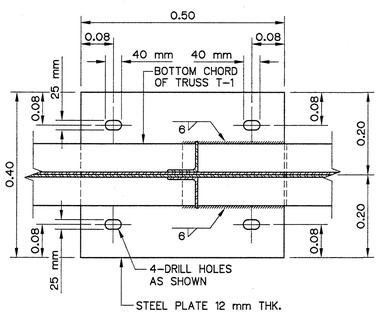
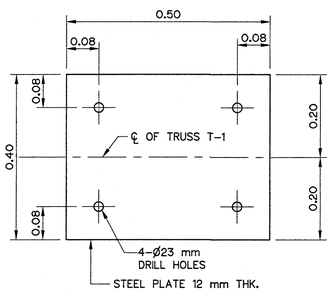
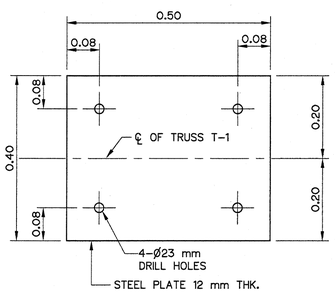
SCALE 1:5



DETAIL "4"

SCALE 1:5

DETAILS OF STEEL PLATE SUPPORTING THE ROOF STRUCTURE

FIXED END PLATES	FREE END PLATES
	
TOP STEEL PLATE SCALE 1:7.5	TOP STEEL PLATE SCALE 1:7.5
	
BOTTOM STEEL PLATE SCALE 1:7.5	BOTTOM STEEL PLATE SCALE 1:7.5

SYMBOLS

1. 2L-75x75x6-6.85 kg/m WELDED TOGETHER
2. 2L-75x75x6-6.85 kg/m
3. 2L-65x65x6-5.91 kg/m
4. L-65x65x6-5.91 kg/m
5. L-50x50x5-3.77 kg/m

NOTES :

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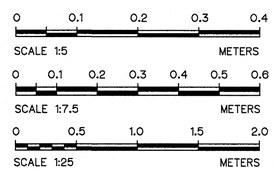
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, ROOF STRUCTURE PLAN — THN-PH-23



NO.	DATE	REVISIONS	CHECKED	APPROVED
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

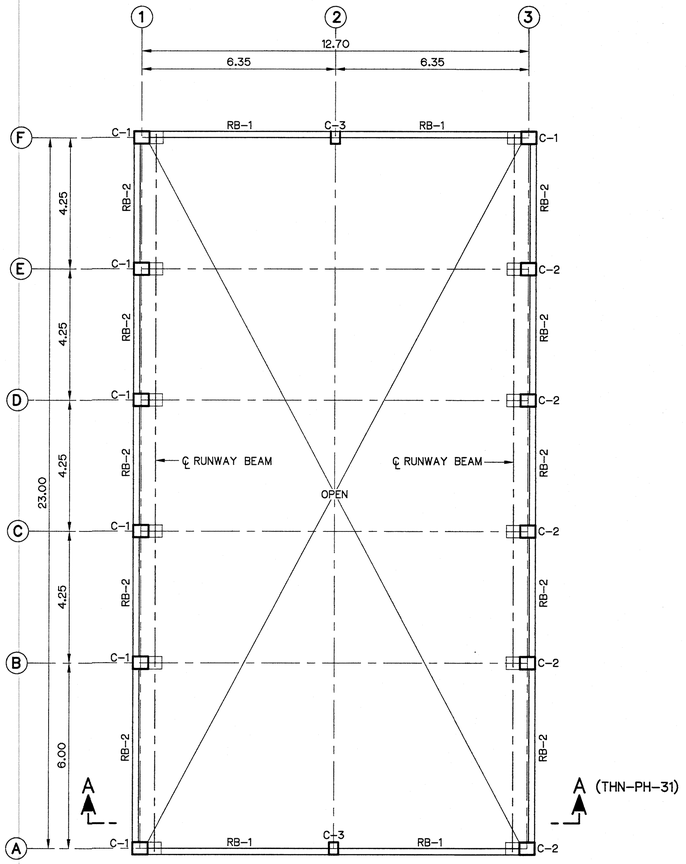
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

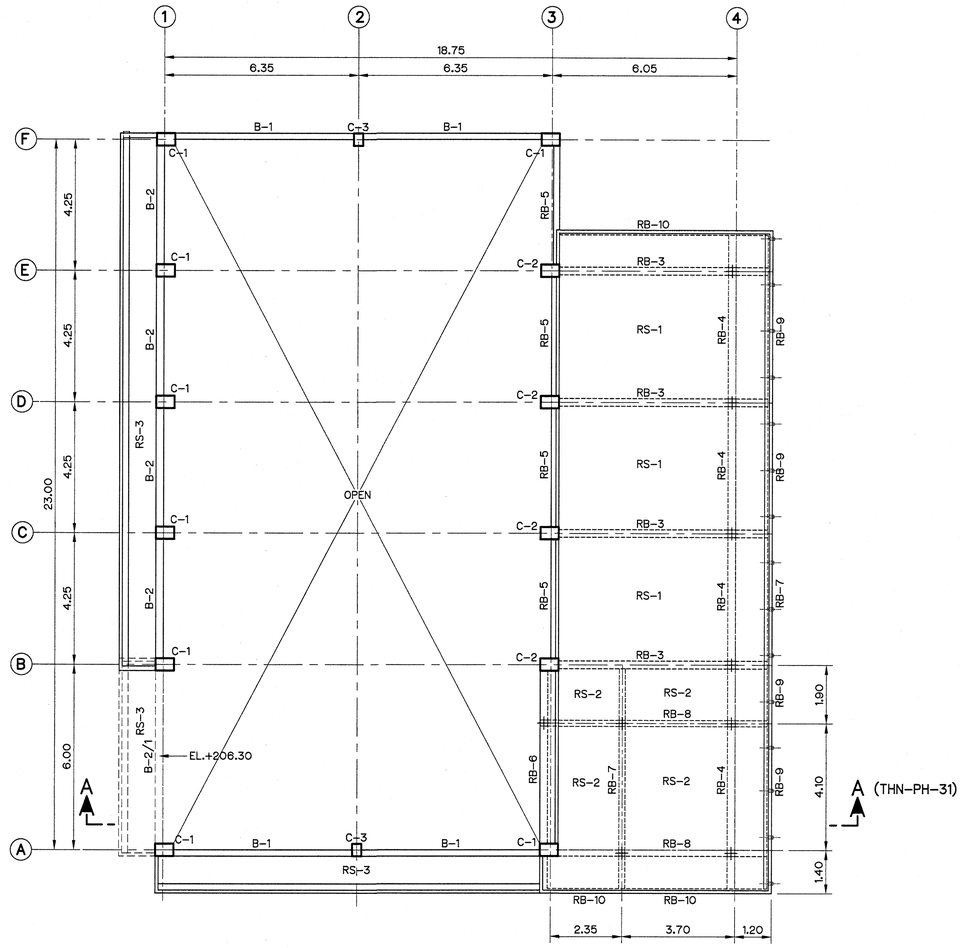
ROOF STRUCTURE DETAILS 3/3

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 วิ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-26 / SHEET NO. 51 OF 157



STRUCTURAL PLAN EL.+209.35

SCALE 1:100



STRUCTURAL PLAN EL.+205.30

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1.	POWERHOUSE, ROOF STRUCTURE PLAN	THN-PH-23
2.	POWERHOUSE, BEAM RB-1, RB-2, RB-3 AND RB-4 REINFORCEMENT DETAILS	THN-PH-40
3.	POWERHOUSE, BEAM RB-5, RB-6, RB-7, RB-8, RB-9 AND RB-10 REINFORCEMENT DETAILS	THN-PH-41
4.	POWERHOUSE, RUNWAY BEAM INSTALLATION AND COLUMN REINFORCEMENT DETAILS	THN-PH-53

0 1.0 2.0 4.0 6.0 8.0

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

STRUCTURAL PLAN EL.+209.35 AND EL.+205.30

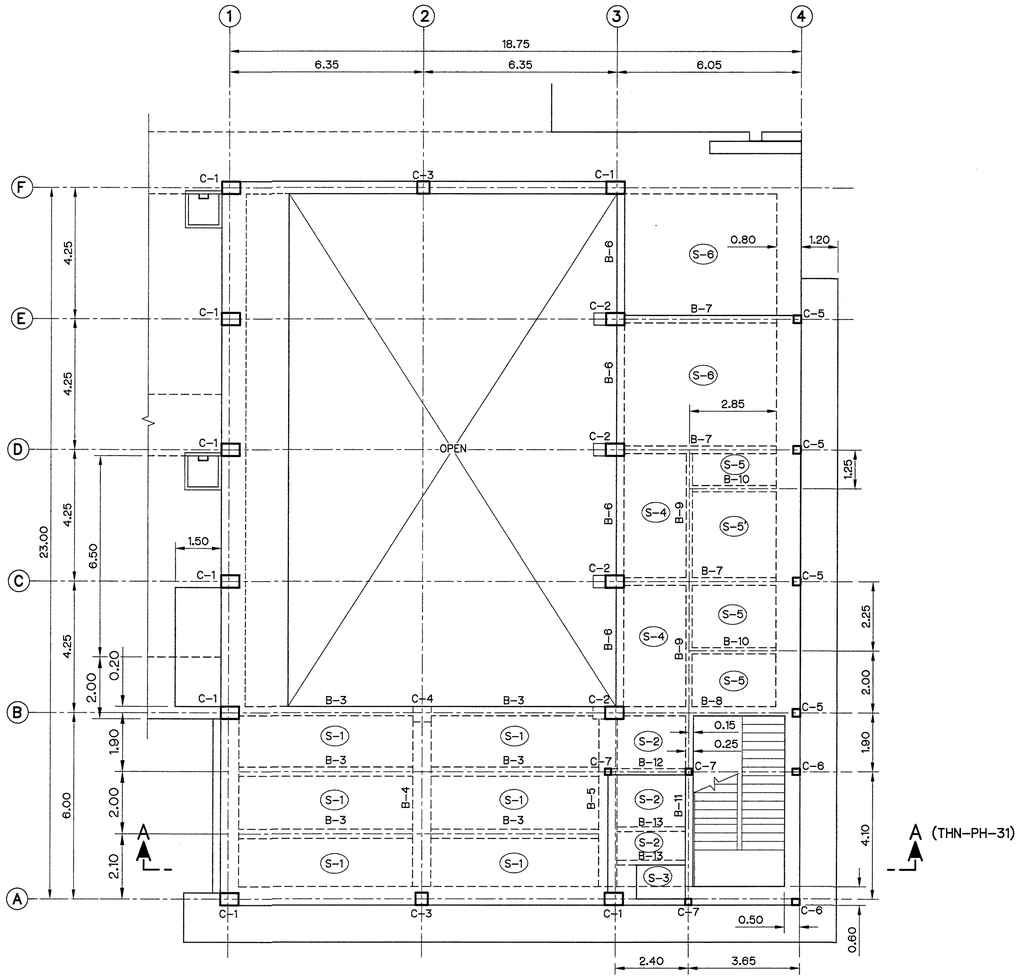
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วิ.6650 วิ.88523
DRAWN
CHECKED วิ.6651
PROJECT MANAGER 6/9/2024 DATE

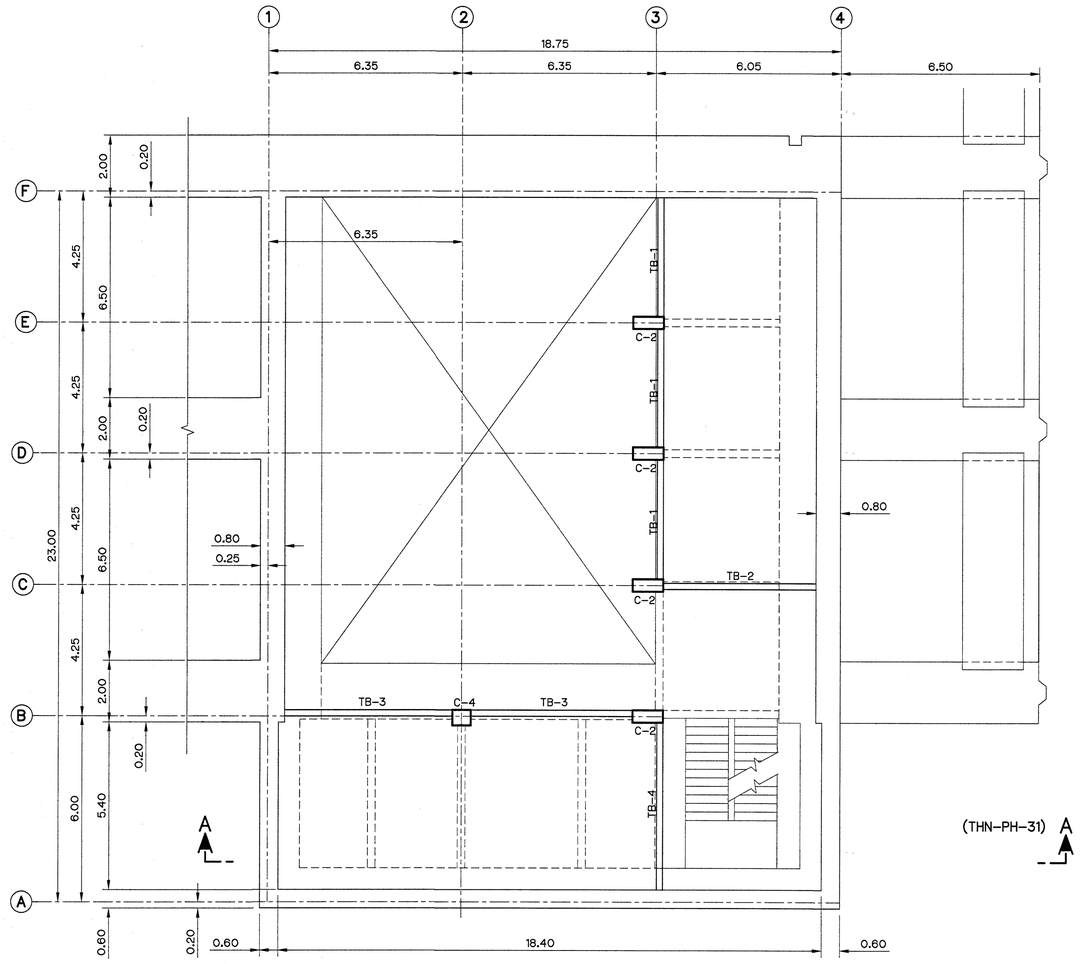
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-PH-27
SHEET NO. 52 OF 157



STRUCTURAL PLAN EL.+201.20

SCALE 1:100



STRUCTURAL PLAN EL.+198.60

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1.	POWERHOUSE, ROOF STRUCTURE PLAN	THN-PH-23
2.	POWERHOUSE, BEAM RB-1, RB-2, RB-3 AND RB-4 REINFORCEMENT DETAILS	THN-PH-40
3.	POWERHOUSE, BEAM RB-5, RB-6, RB-7, RB-8, RB-9 AND RB-10 REINFORCEMENT DETAILS	THN-PH-41
4.	POWERHOUSE, BEAM TB-1, TB-2, TB-3 AND TB-4 REINFORCEMENT DETAILS	THN-PH-46
5.	POWERHOUSE, RUNWAY BEAM INSTALLATION AND COLUMN REINFORCEMENT DETAILS	THN-PH-53

0 1.0 2.0 4.0 6.0 8.0

SCALE 1:100 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

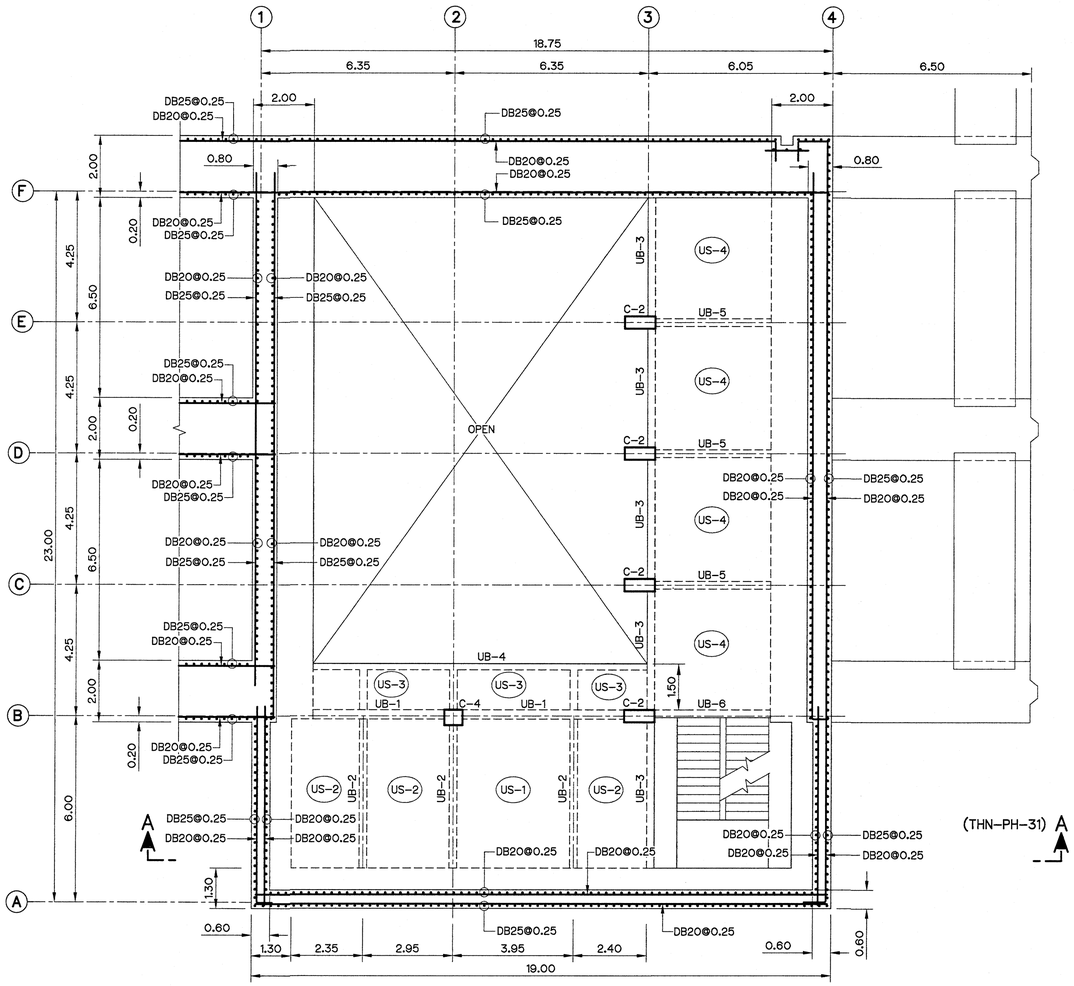
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

STRUCTURAL PLAN EL.+201.20, EL.+198.60 AND REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED ส.ต.6650 ภ.ม.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED ส.ต.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-28 / SHEET NO. 53 OF 157



STRUCTURAL PLAN EL.+195.60

SCALE 1:100

STRUCTURAL PLAN EL.+187.20

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, SLAB US-1, US-2, AND US-3 REINFORCEMENT DETAILS	THN-PH-51
2. POWERHOUSE, SLAB US-4 REINFORCEMENT DETAILS	THN-PH-52
3. POWERHOUSE, RUNWAY BEAM INSTALLATION AND COLUMN REINFORCEMENT DETAILS	THN-PH-53

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

1.0 2.0 4.0 6.0 8.0
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

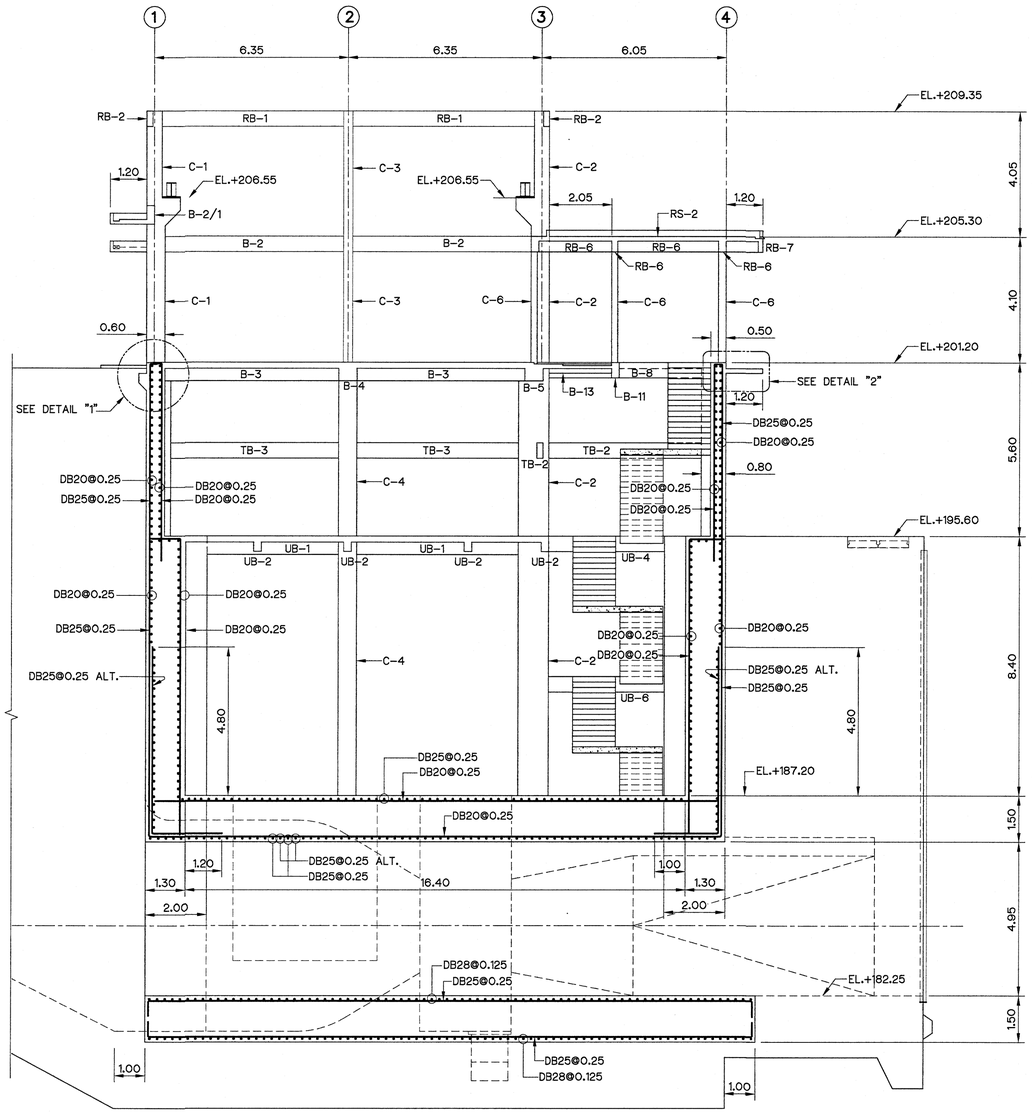
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

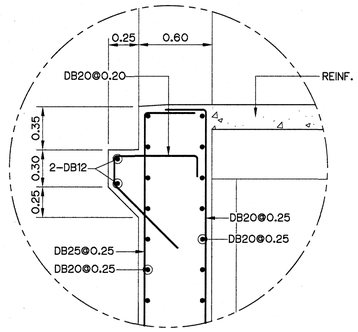
POWERHOUSE

STRUCTURAL PLAN EL.+195.60, EL.+187.20 AND REINFORCEMENT DETAILS

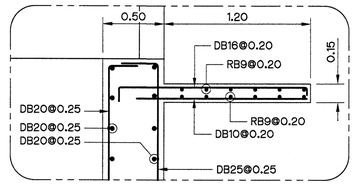
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 วิ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-29 / SHEET NO. 54 OF 157



SECTION A–A
SCALE 1:100



DETAIL "1"
SCALE 1:25



DETAIL "2"
SCALE 1:25

NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, BEAM RB-1, RB-2, RB-3 AND RB-4 REINFORCEMENT DETAILS	THN-PH-40
2. POWERHOUSE, BEAM RB-5, RB-6, RB-7, RB-8, RB-9 AND RB-10 REINFORCEMENT DETAILS	THN-PH-41
3. POWERHOUSE, BEAM B-1, B-1' AND B-2 REINFORCEMENT DETAILS	THN-PH-42
3. POWERHOUSE, BEAM B-3, B-4 AND B-5 REINFORCEMENT DETAILS	THN-PH-43
3. POWERHOUSE, BEAM B-6, B-7 AND B-8 REINFORCEMENT DETAILS	THN-PH-44
3. POWERHOUSE, BEAM B-9, B-10, B-11, B-12 AND B-13 REINFORCEMENT DETAILS	THN-PH-45
3. POWERHOUSE, BEAM TB-1, TB-2, TB-3 AND TB-4 REINFORCEMENT DETAILS	THN-PH-46
3. POWERHOUSE, BEAM UB-1, UB-2, UB-3 AND UB-4 REINFORCEMENT DETAILS	THN-PH-47
3. POWERHOUSE, SLAB RS-1 AND RS-2 REINFORCEMENT DETAILS	THN-PH-48
3. POWERHOUSE, SLAB S-1, S-2 AND S-3 REINFORCEMENT DETAILS	THN-PH-49
3. POWERHOUSE, SLAB S-4, S-5, S-5' AND S-6 REINFORCEMENT DETAILS	THN-PH-50
3. POWERHOUSE, SLAB US-1, US-2, AND US-3 REINFORCEMENT DETAILS	THN-PH-51
3. POWERHOUSE, SLAB US-4 REINFORCEMENT DETAILS	THN-PH-52
3. POWERHOUSE, RUNWAY BEAM INSTALLATION AND COLUMN REINFORCEMENT DETAILS	THN-PH-53

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

0 1.0 2.0 4.0 6.0 8.0
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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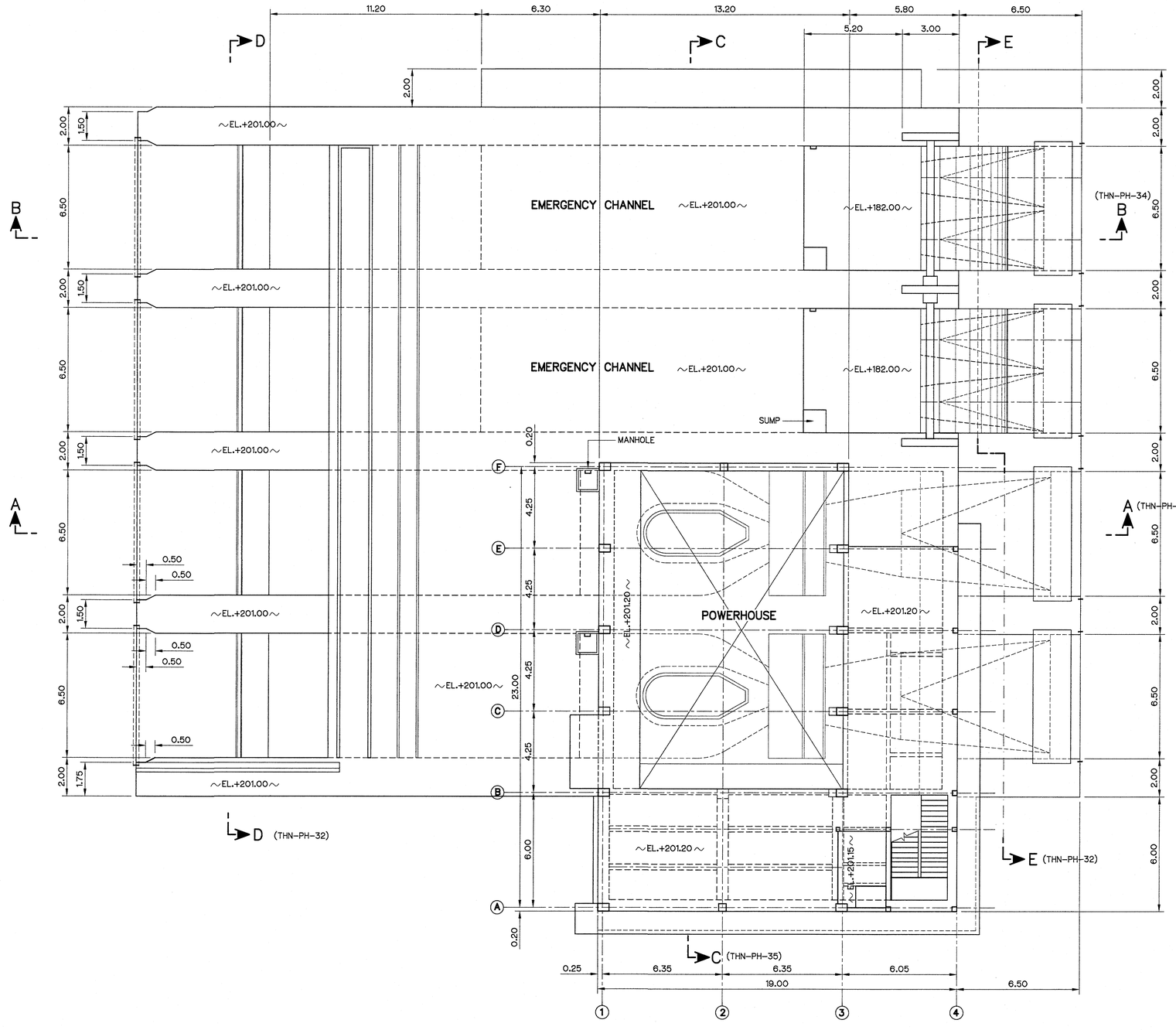
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
SECTION A–A REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED สม.6650 กม.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED สม.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER DATE	APPROVED
DRAWING NO. THN-PH-30	SHEET NO. 55 OF 157



STRUCTURAL PLAN EL.+201.20

SCALE 1:125

0 1 2 3 4 5 6 7 8 9 10

SCALE 1:125 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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, SECTION A-A REINFORCEMENT DETAILS	THN-PH-32
2. POWERHOUSE AND EMERGENCY CHANNEL, SECTION A1-A1 REINFORCEMENT DETAILS	THN-PH-33
3. POWERHOUSE AND EMERGENCY CHANNEL, SECTION B-B REINFORCEMENT DETAILS	THN-PH-34
4. POWERHOUSE AND EMERGENCY CHANNEL, SECTION C-C REINFORCEMENT DETAILS	THN-PH-35
5. POWERHOUSE AND EMERGENCY CHANNEL, SECTION C1-C1 REINFORCEMENT DETAILS	THN-PH-36
6. POWERHOUSE AND EMERGENCY CHANNEL, SECTION C2-C2, C3-C3 REINFORCEMENT DETAILS	THN-PH-37
7. POWERHOUSE AND EMERGENCY CHANNEL, SECTION D-D REINFORCEMENT DETAILS	THN-PH-38
8. POWERHOUSE AND EMERGENCY CHANNEL, SECTION E-E REINFORCEMENT DETAILS	THN-PH-39

KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

STRUCTURAL PLAN EL.+201.20

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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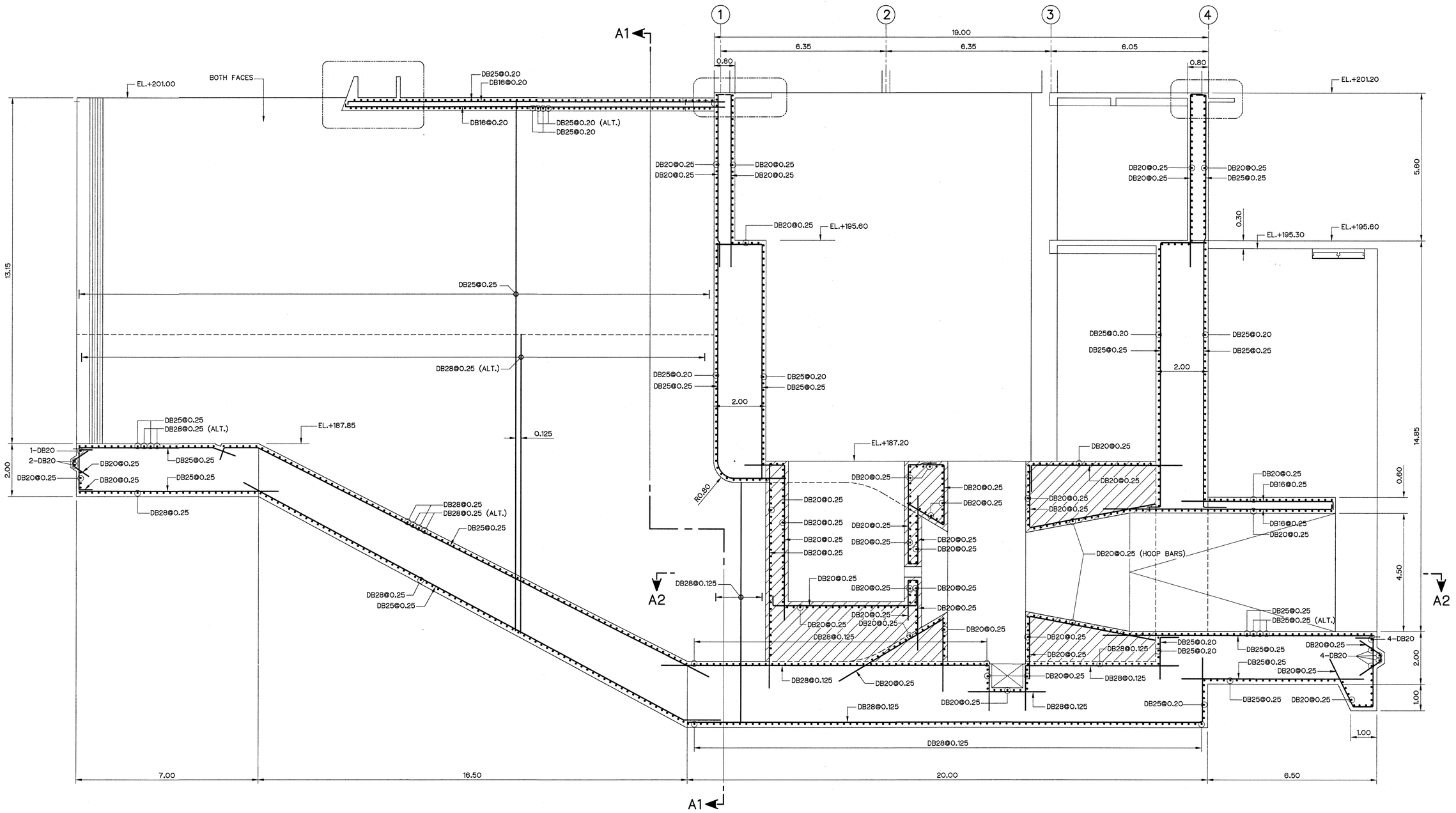
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิ.6650	วิ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิ.6651		RECOMMENDED
			APPROVED
PROJECT MANAGER	6/9/2024 DATE		DRAWING NO. THN-PH-31
			SHEET NO. 56 OF 157


1
2
3
4
A1
A2
19.00
6.35
6.35
6.05
0.80
0.80
EL.+201.00
EL.+201.20
BOTH FACES
DB25@0.20
DB16@0.20
DB16@0.20
DB25@0.20 (ALT.)
DB25@0.20
DB20@0.25
DB20@0.25
DB20@0.25
DB20@0.25
DB20@0.25
DB25@0.25
DB20@0.25
EL.+195.60
EL.+195.30
EL.+195.60
0.30
5.60
13.15
DB25@0.25
DB28@0.25 (ALT.)
DB25@0.20
DB25@0.25
DB25@0.20
DB25@0.25
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2.00
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DB28@0.25 (ALT.)
EL.+187.85
0.125
1-DB20
2-DB20
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DB28@0.25
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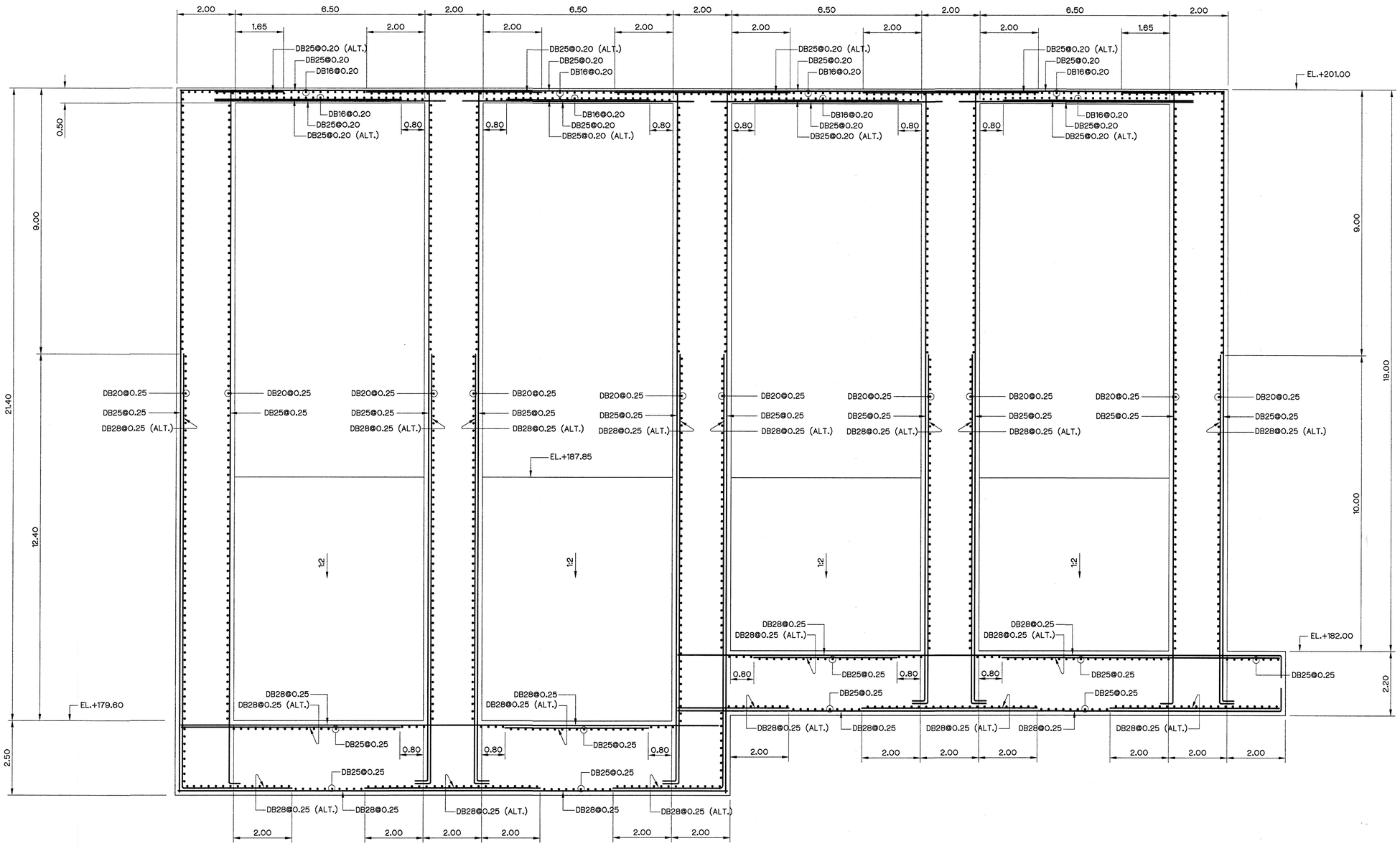


SECTION A1–A1 (THN–PH–32)

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

SYMBOL

SECOND STAGE CONCRETE

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, STRUCTURAL PLAN EL.+201.20 THN–PH–31

0 1 2 3 4 5 6

SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

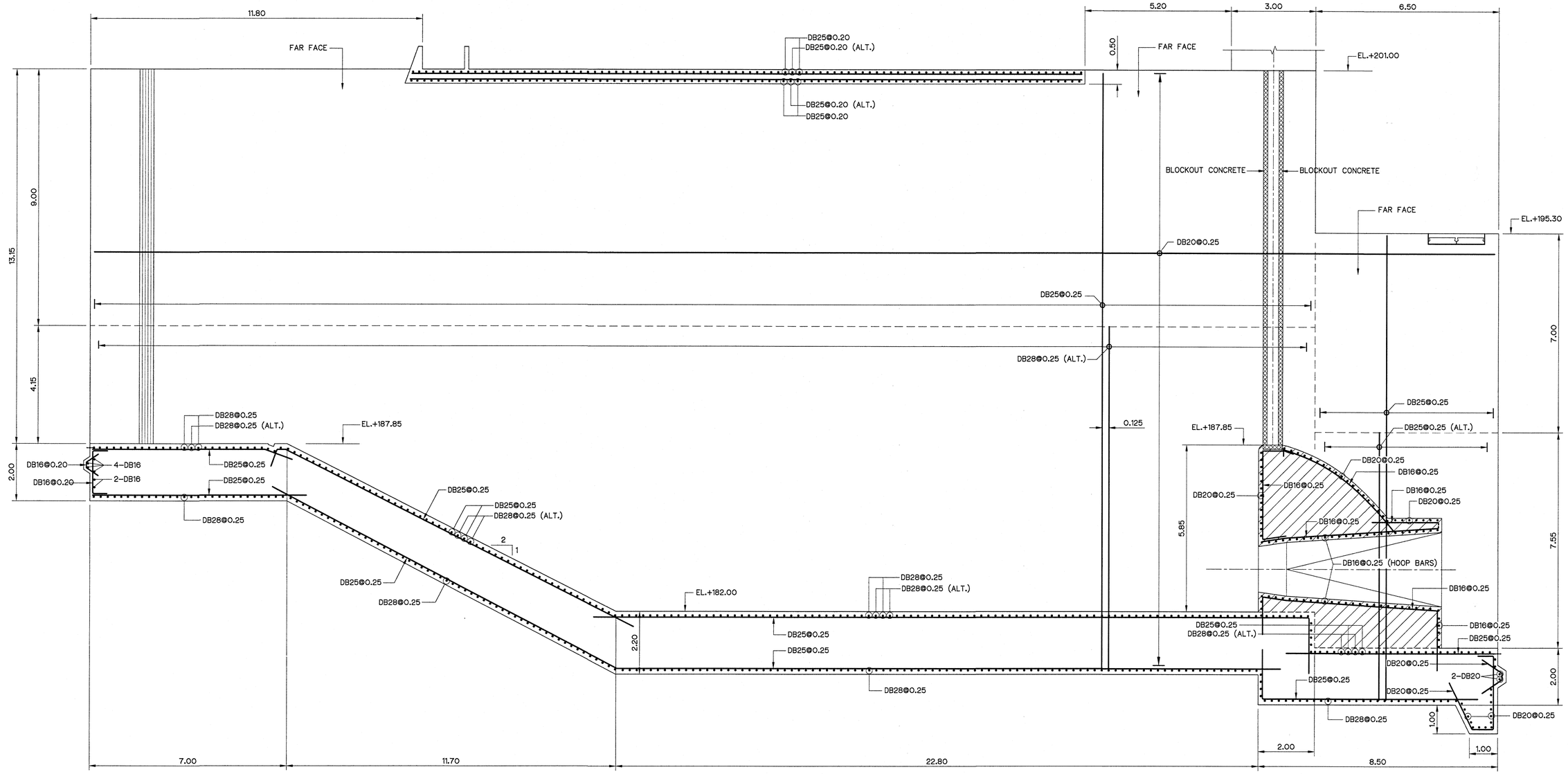
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTION A1–A1 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ต.6650 ส.ต.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ต.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER DATE	APPROVED
DRAWING NO. THN–PH–33	SHEET NO. 58 OF 157



SBCTION B–B (THN–PH–31)

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

SYMBOL

SECOND STAGE CONCRETE

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, STRUCTURAL PLAN EL.+201.20 THN–PH–31

0 1 2 3 4 5 6

SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

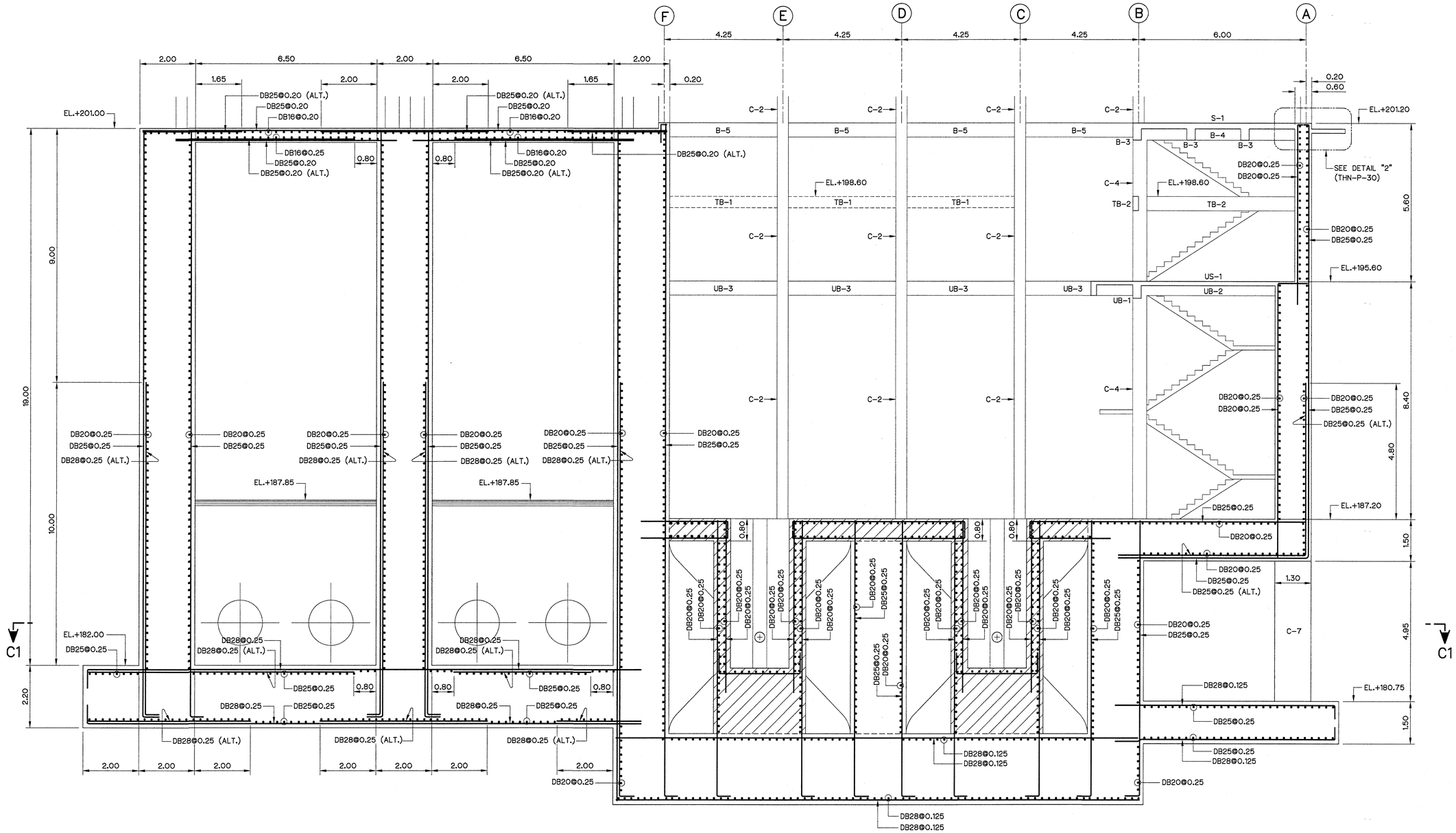
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTION B–B REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิศ.6650 วิศ.68523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิศ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–34 / SHEET NO. 59 OF 157



SECTION C–C (THN–PH–31)

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

SYMBOL

SECOND STAGE CONCRETE

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, STRUCTURAL PLAN EL.+201.20 THN–PH–31

0 1 2 3 4 5 6

SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTION C–C REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED สิ.6650 ณ.88523 — REVIEWED

DRAWN — SUBMITTED

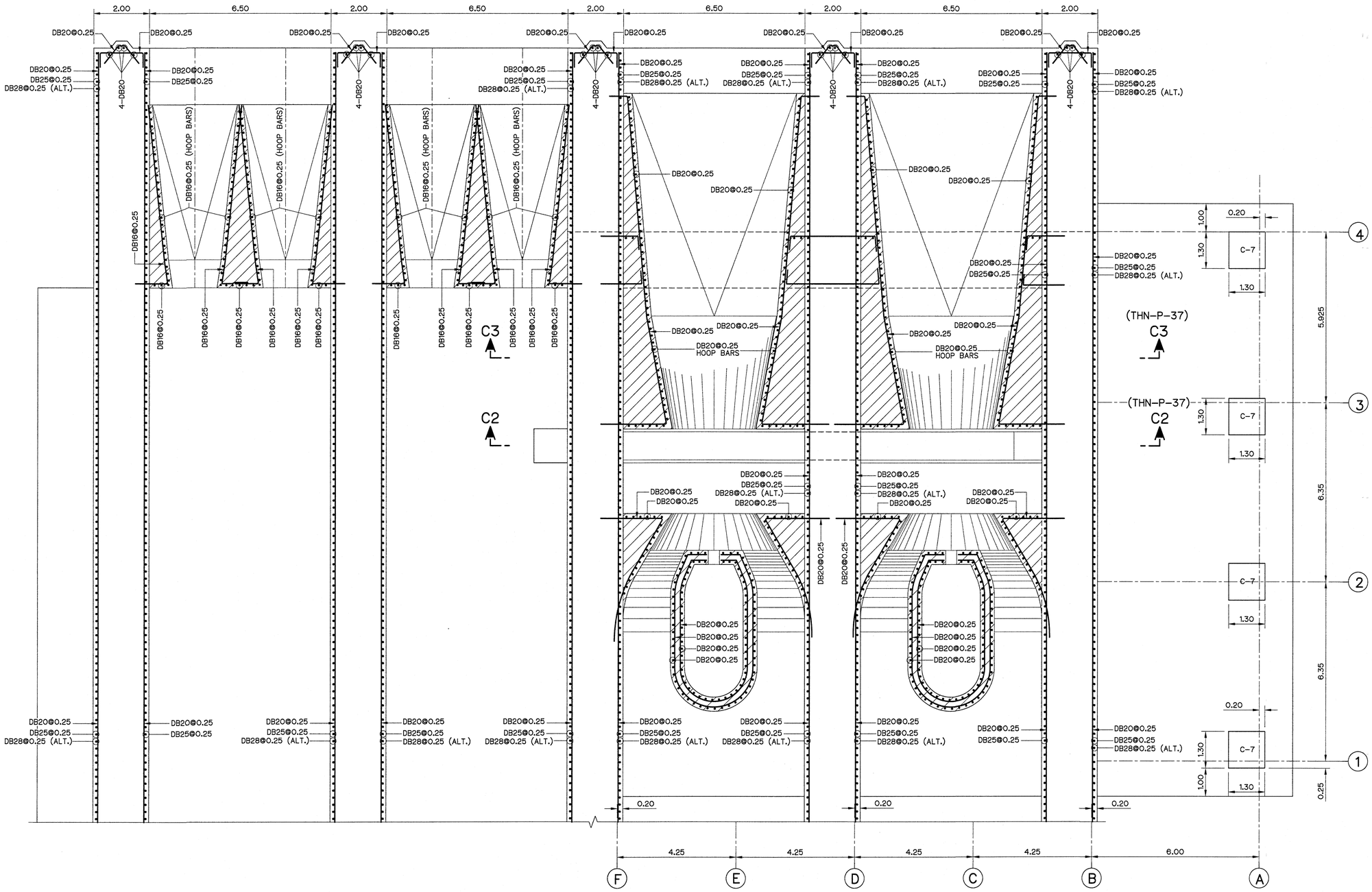
CHECKED สิ.6651 — RECOMMENDED

APPROVED

PROJECT MANAGER 6/9/2024 DATE

DRAWING NO. THN–PH–35

SHEET NO. 60 OF 157



SECTION C1–C1 (THN–P–35)

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

SYMBOL

SECOND STAGE CONCRETE

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, SECTION C–C REINFORCEMENT DETAILS THN–PH–35

0 1 2 3 4 5 6
SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

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CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTION C1–C1 REINFORCEMENT DETAILS

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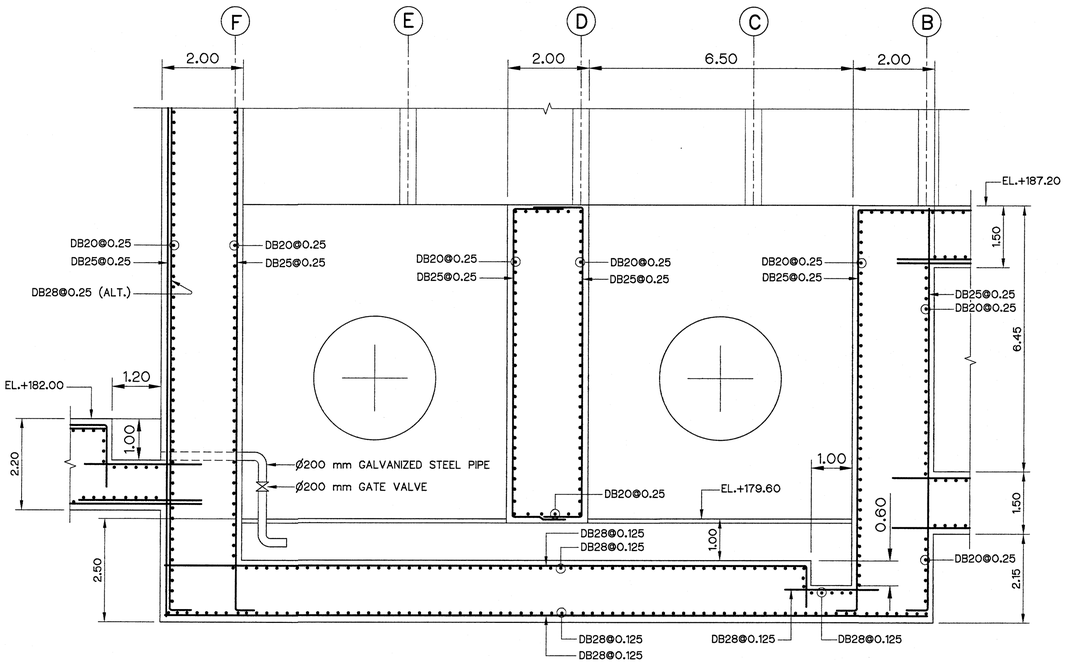
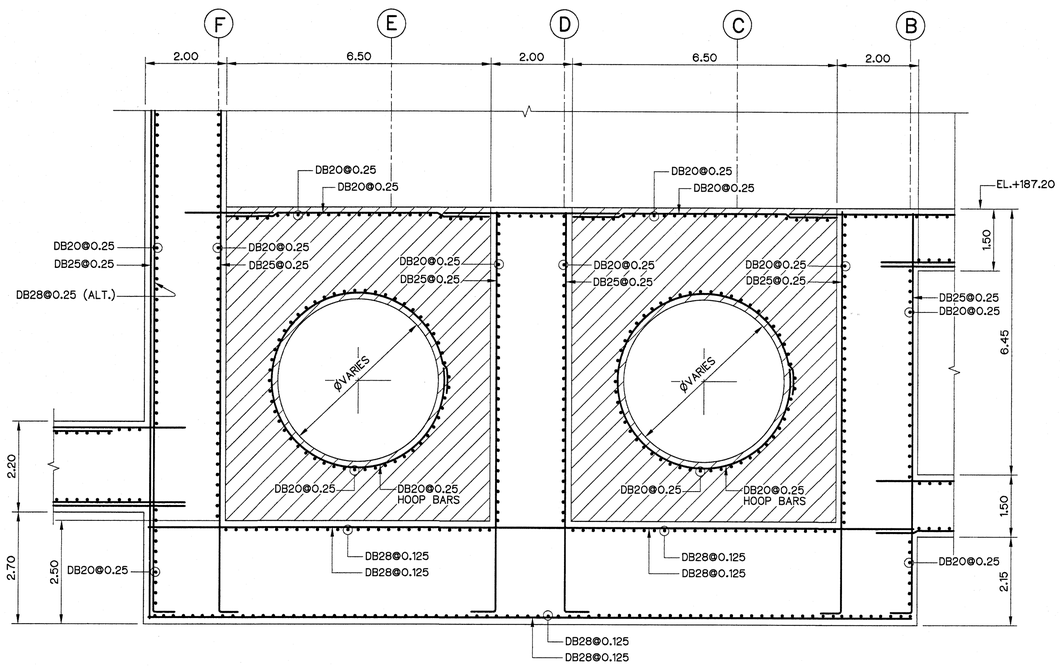
DRAWN	SUBMITTED
CHECKED ณ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN–PH–36	SHEET NO. 61 OF 157



SECTION C2–C2 (THN–P–36)
SCALE 1:75



SECTION C3–C3 (THN–P–36)
SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

SYMBOL

SECOND STAGE CONCRETE

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, SECTION C1–C1 REINFORCEMENT DETAILS THN–PH–36

0 1 2 3 4 5 6
SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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		CONSULTANTS	DEDE	

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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

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CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTION C2–C2, C3–C3 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
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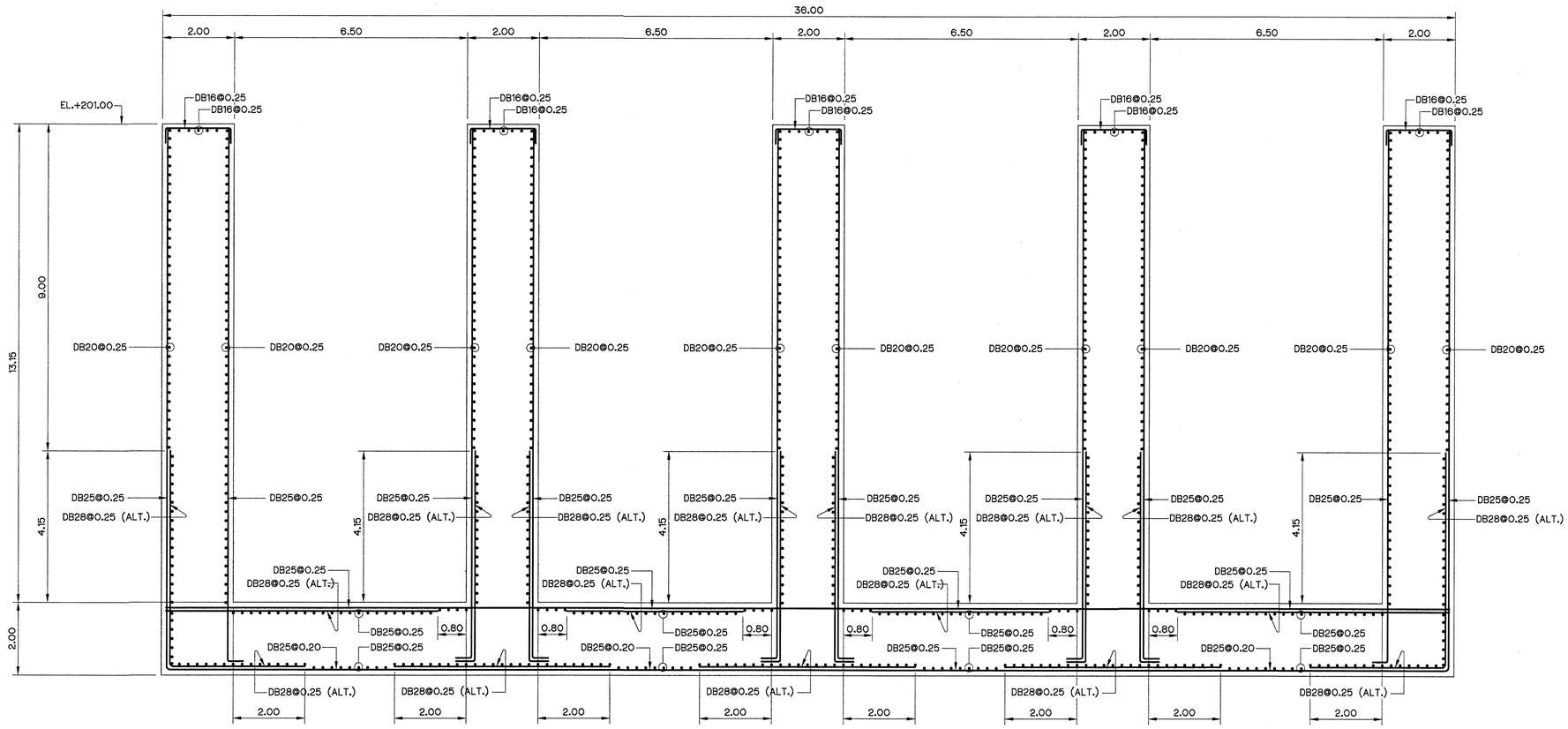
DRAWN	SUBMITTED
CHECKED วศ.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER DATE	APPROVED
DRAWING NO. THN–PH–37	SHEET NO. 62 OF 157



SECTION D–D

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

SYMBOL

SECOND STAGE CONCRETE

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, STRUCTURAL PLAN EL.+201.20 THN–PH–31

0 1 2 3 4 5 6

SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

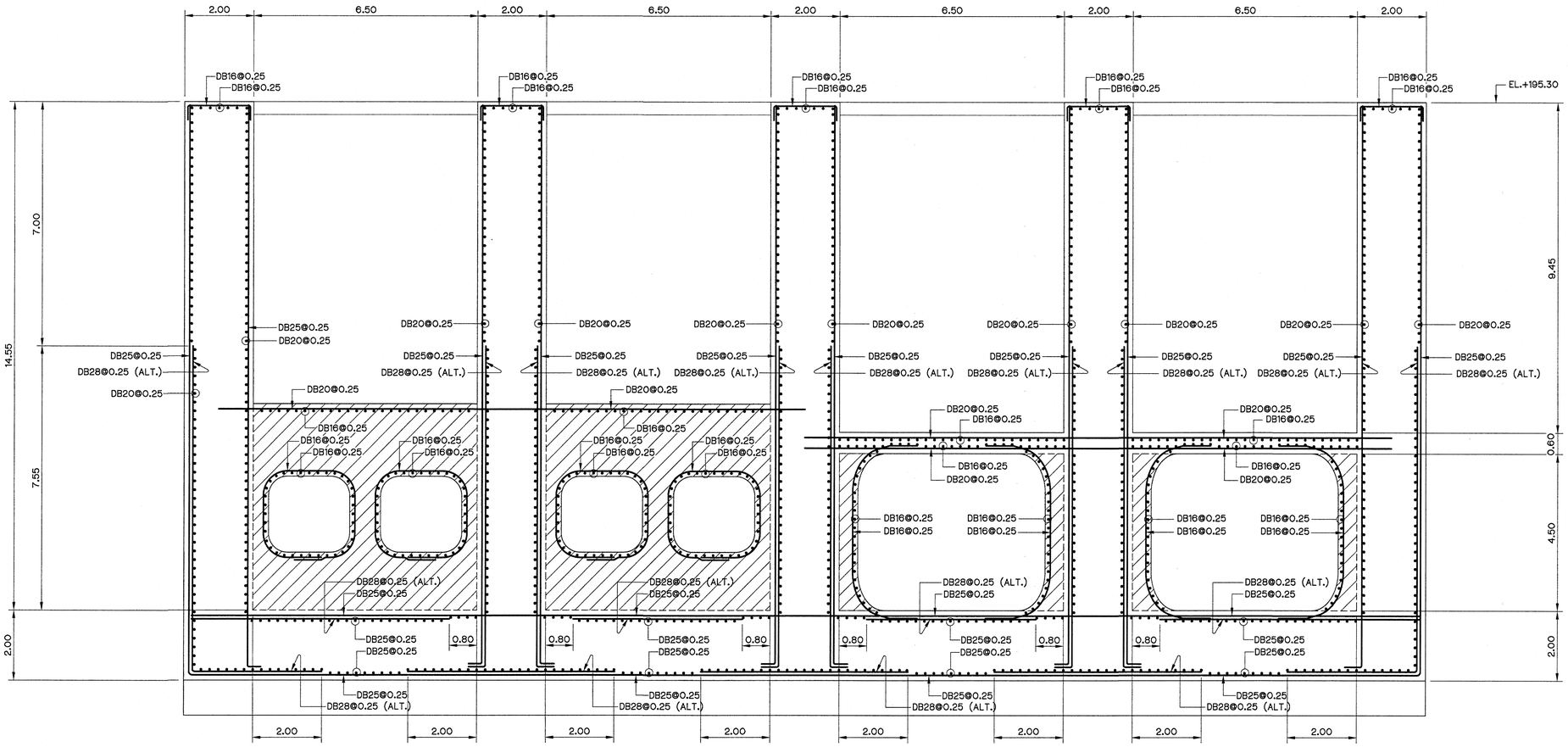
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTION D–D REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 วิ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–38 / SHEET NO. 63 OF 157



SECTION E–E

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

SYMBOL

SECOND STAGE CONCRETE

REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, STRUCTURAL PLAN EL.+201.20 THN–PH–31

0 1 2 3 4 5 6

SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

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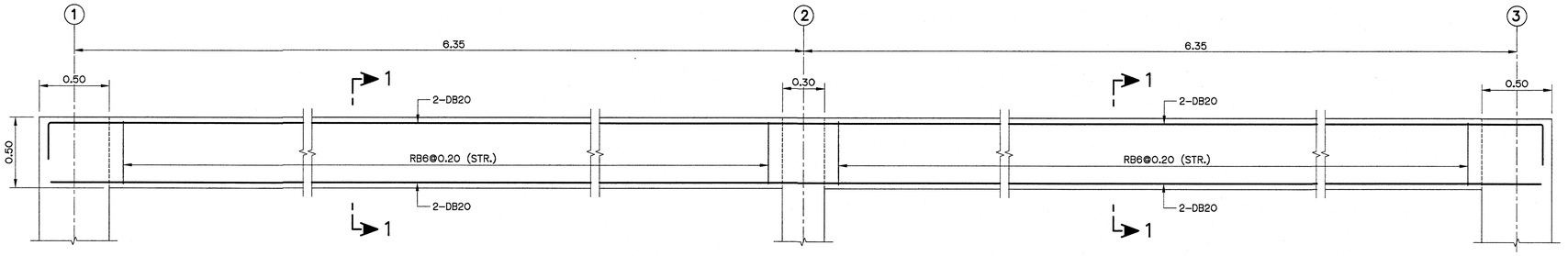
CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

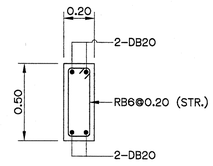
SECTION E–E REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 ว.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–39 / SHEET NO. 64 OF 157



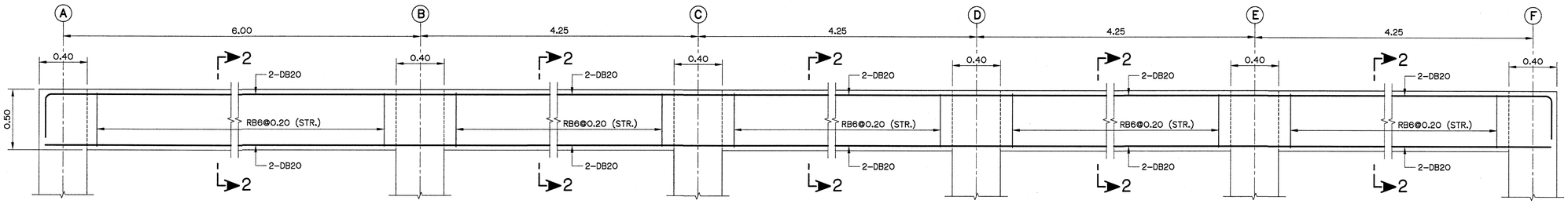
BEAM RB-1

SCALE 1:20



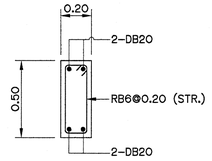
SECTION 1-1

SCALE 1:20



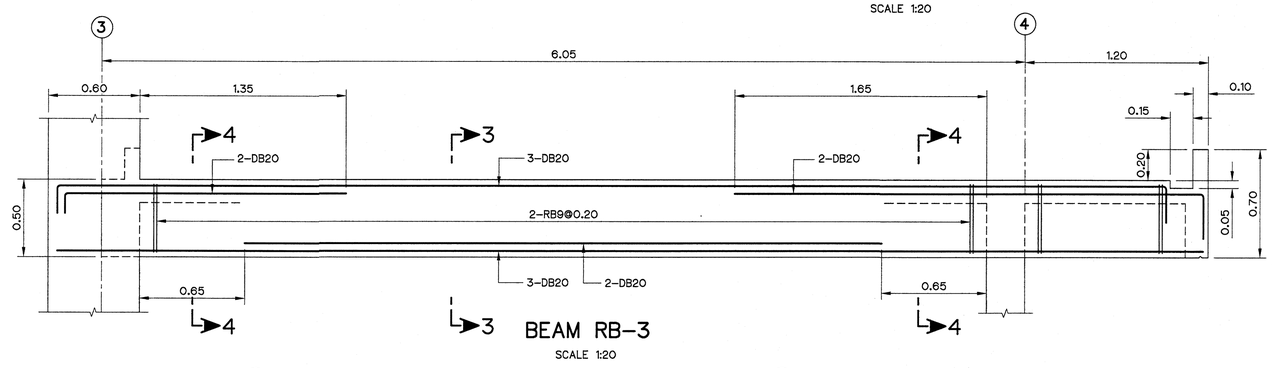
BEAM RB-2

SCALE 1:20



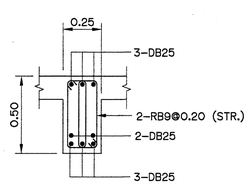
SECTION 2-2

SCALE 1:20



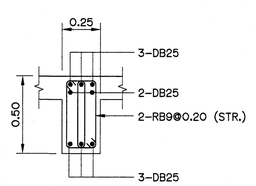
BEAM RB-3

SCALE 1:20



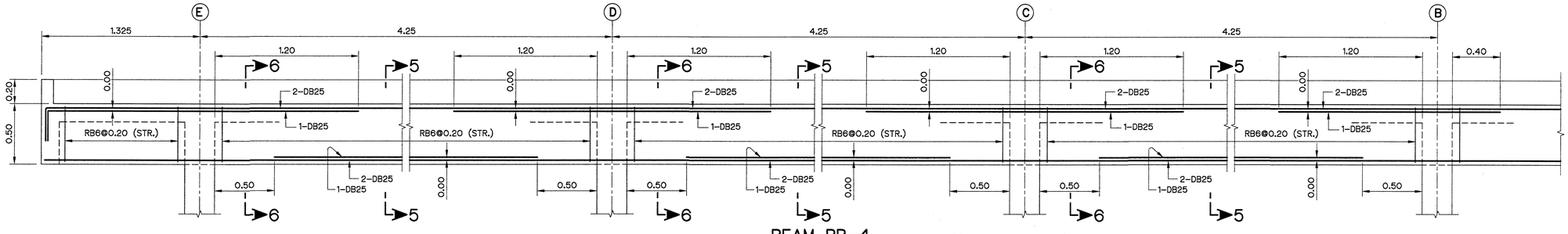
SECTION 3-3

SCALE 1:20



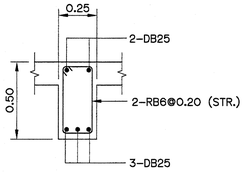
SECTION 4-4

SCALE 1:20



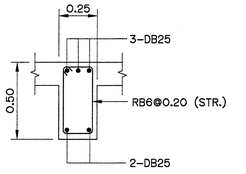
BEAM RB-4

SCALE 1:20



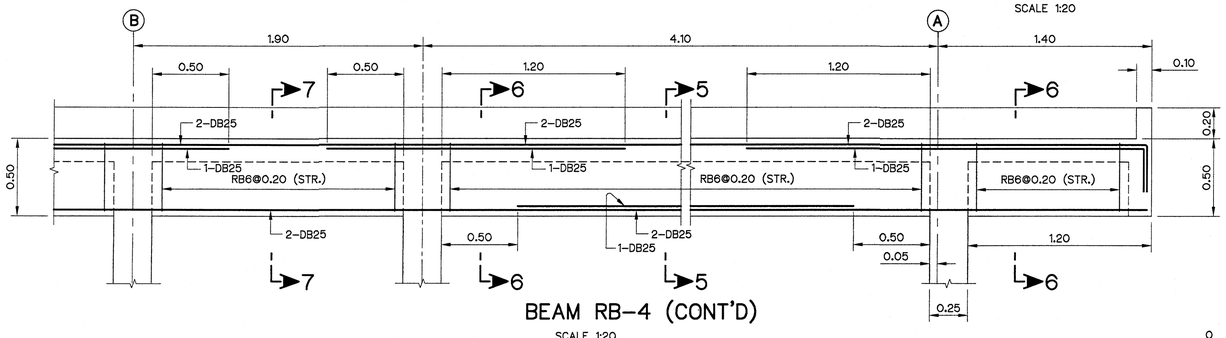
SECTION 5-5

SCALE 1:20



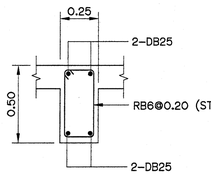
SECTION 6-6

SCALE 1:20



BEAM RB-4 (CONT'D)

SCALE 1:20



SECTION 7-7

SCALE 1:20

0 0.5 1.0 1.5

SCALE 1:20 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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+209.35 AND EL.+205.30 THN-PH-27

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

BEAM RB-1, RB-2, RB-3 AND RB-4 REINFORCEMENT DETAILS

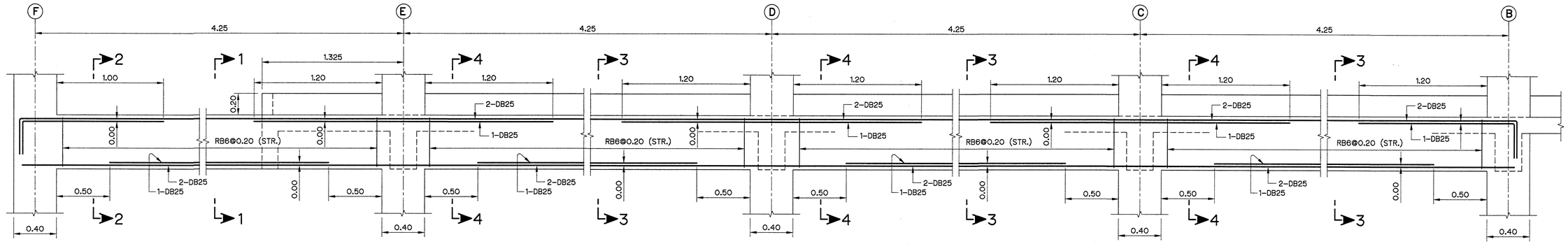
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	สิ.6650	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	สิ.6651	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

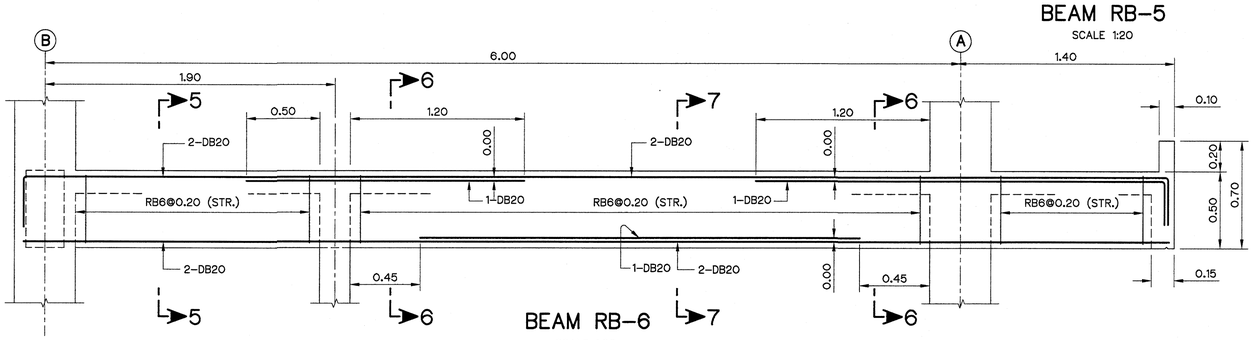
DRAWING NO. THN-PH-40

SHEET NO. 65 OF 157



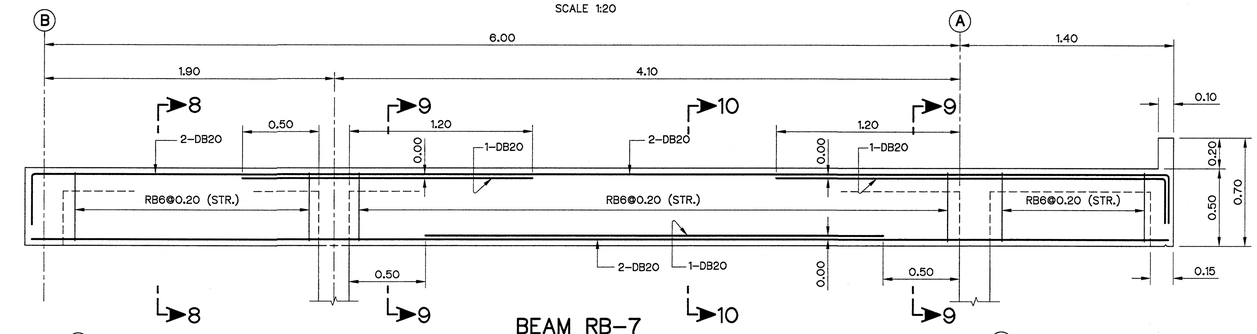
BEAM RB-5

SCALE 1:20



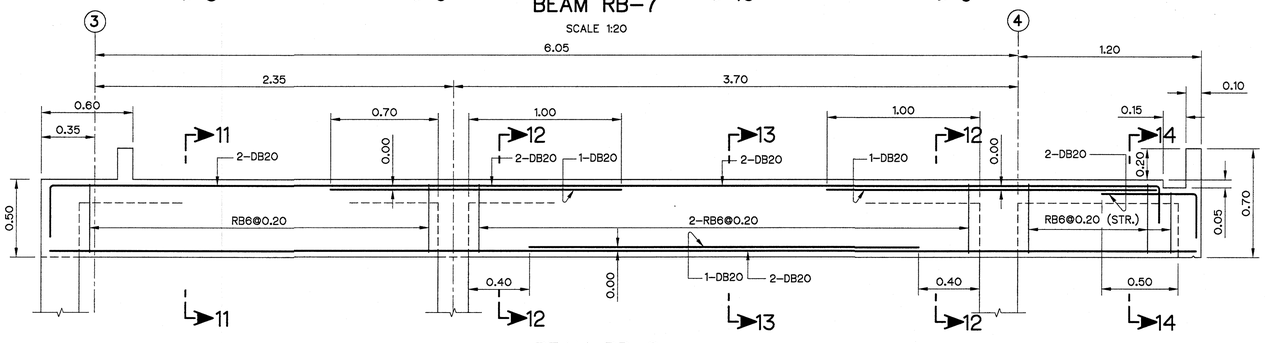
BEAM RB-6

SCALE 1:20



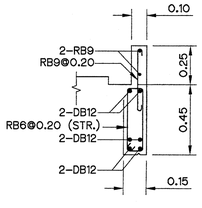
BEAM RB-7

SCALE 1:20



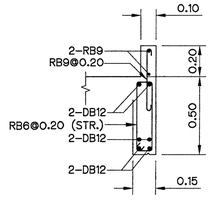
BEAM RB-8

SCALE 1:20



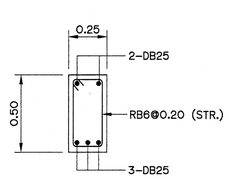
BEAM RB-9

SCALE 1:20



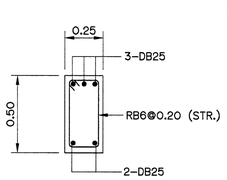
BEAM RB-10

SCALE 1:20



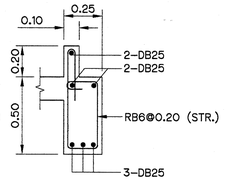
SECTION 1-1

SCALE 1:20



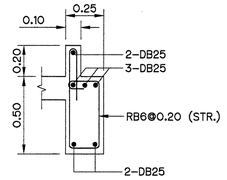
SECTION 2-2

SCALE 1:20



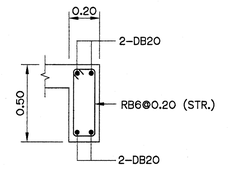
SECTION 3-3

SCALE 1:20



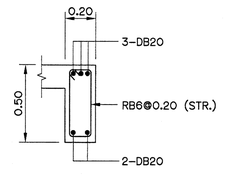
SECTION 4-4

SCALE 1:20



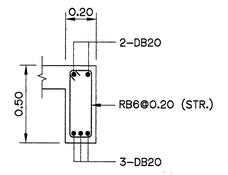
SECTION 5-5

SCALE 1:20



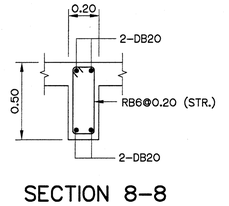
SECTION 6-6

SCALE 1:20



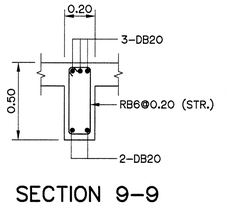
SECTION 7-7

SCALE 1:20



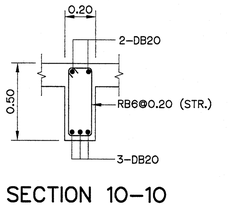
SECTION 8-8

SCALE 1:20



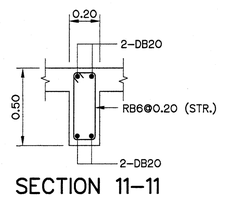
SECTION 9-9

SCALE 1:20



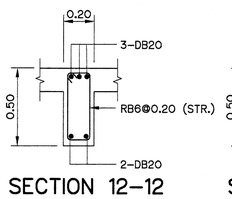
SECTION 10-10

SCALE 1:20



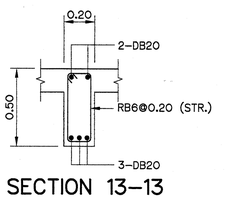
SECTION 11-11

SCALE 1:20



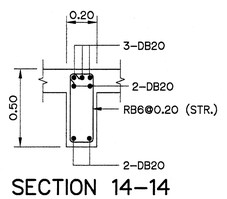
SECTION 12-12

SCALE 1:20



SECTION 13-13

SCALE 1:20



SECTION 14-14

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+209.35 AND EL.+205.30 THN-PH-27

0 0.5 1.0 1.5

SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

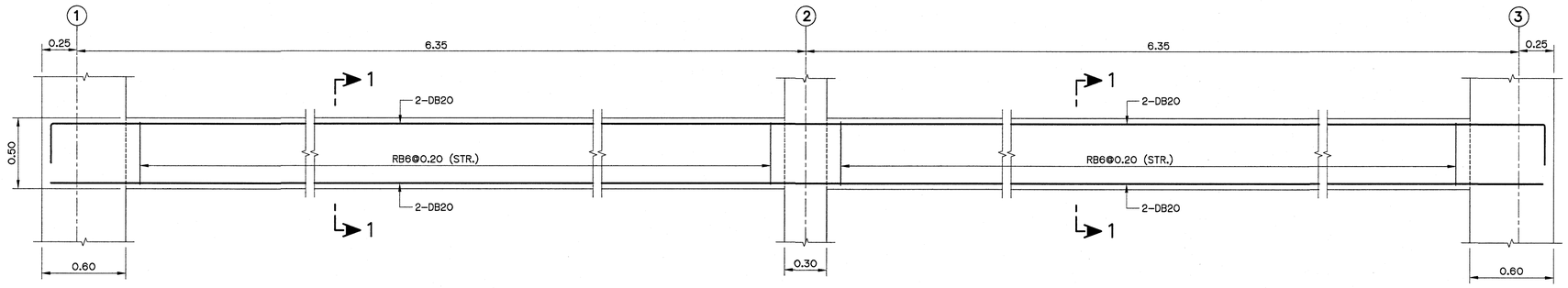
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

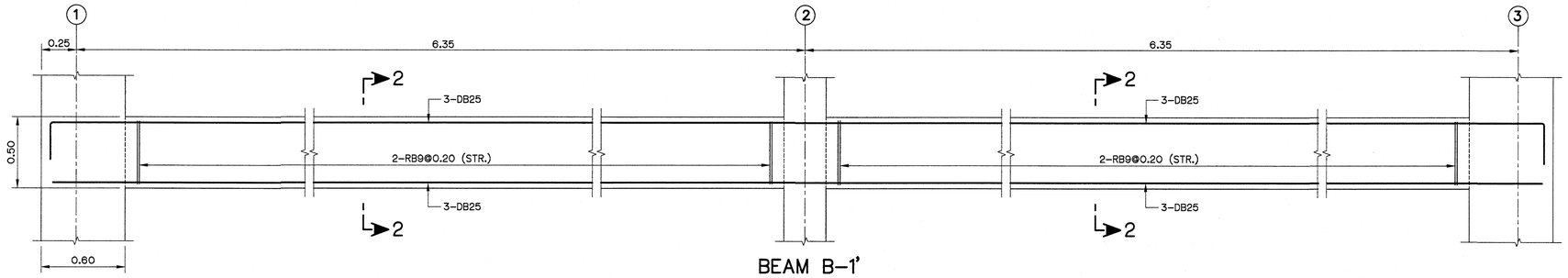
BEAM RB-5, RB-6, RB-7, RB-8, RB-9 AND RB-10 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED สิ.6650 ภัสสร สิ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED สิ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-PH-41	SHEET NO. 66 OF 157



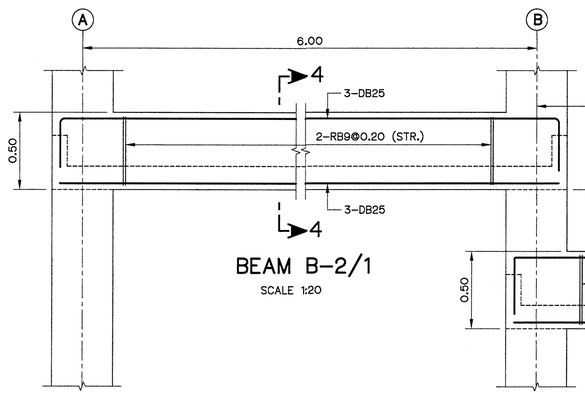
BEAM B-1

SCALE 1:20



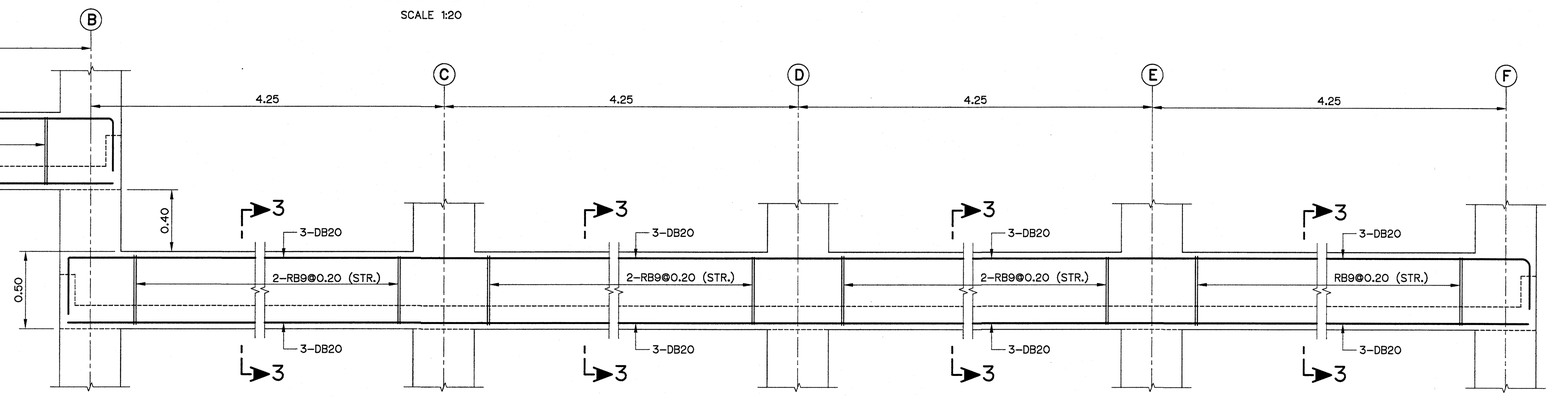
BEAM B-1'

SCALE 1:20



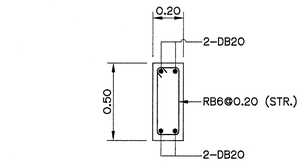
BEAM B-2/1

SCALE 1:20



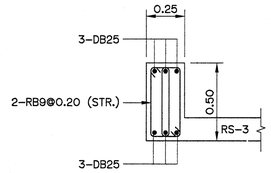
BEAM B-2

SCALE 1:20



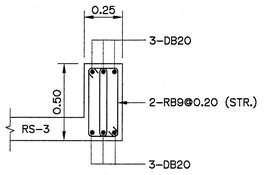
SECTION 1-1

SCALE 1:20



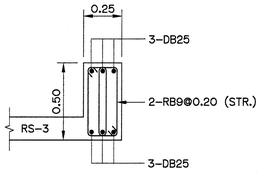
SECTION 2-2

SCALE 1:20



SECTION 3-3

SCALE 1:20



SECTION 4-4

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+209.35 AND EL.+205.30 THN-PH-27

0 0.5 1.0 1.5

SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

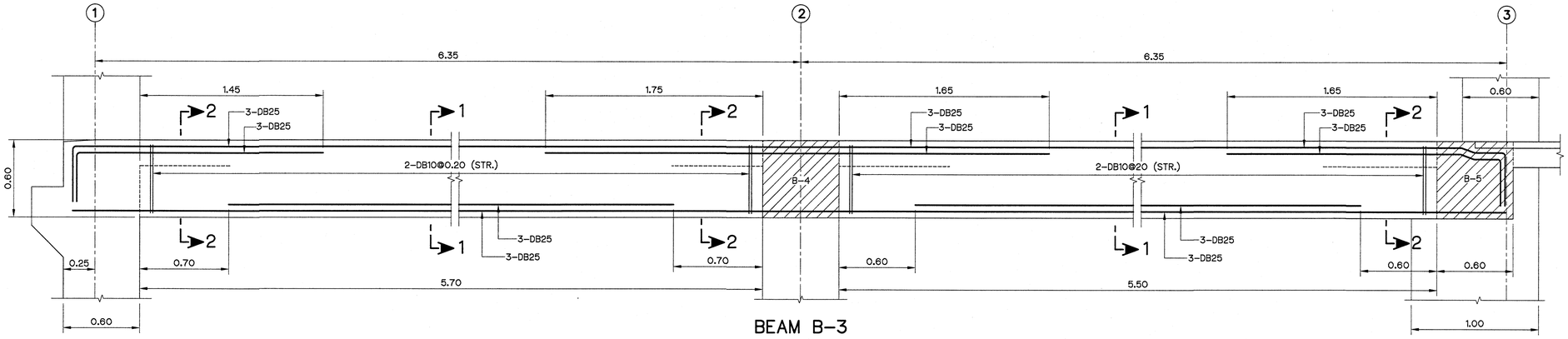
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

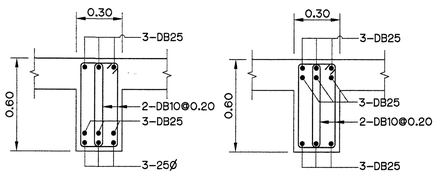
BEAM B-1, B-1' AND B-2 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วิ.6650 วิ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วิ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-PH-42	SHEET NO. 67 OF 157



BEAM B-3

SCALE 1:20

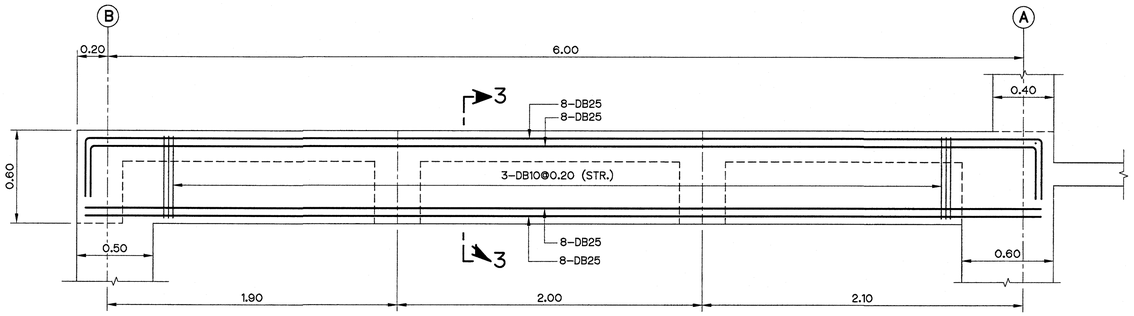


SECTION 1-1

SCALE 1:20

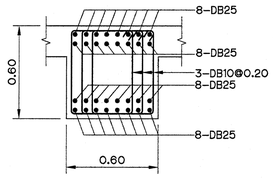
SECTION 2-2

SCALE 1:20



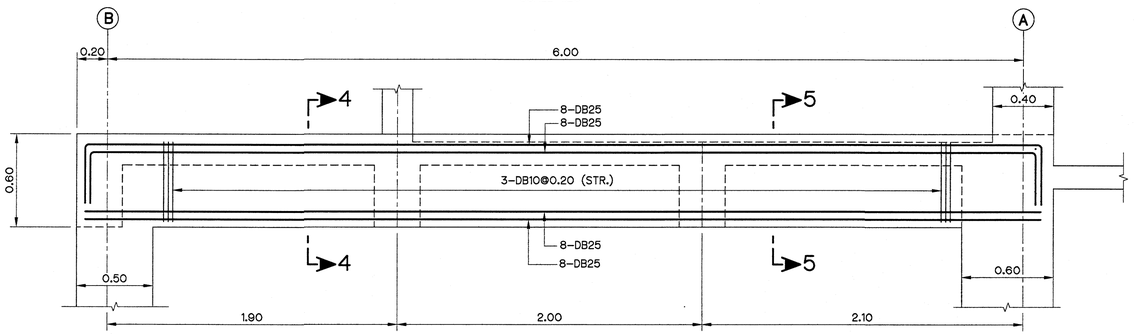
BEAM B-4

SCALE 1:20



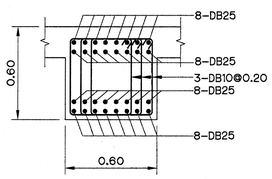
SECTION 3-3

SCALE 1:20



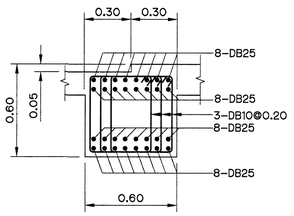
BEAM B-5

SCALE 1:20



SECTION 4-4

SCALE 1:20



SECTION 5-5

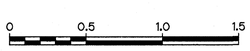
SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+201.20, EL.+195.60 AND REINFORCEMENT DETAILS THN-PH-28



NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
BEAM B-3, B-4 AND B-5 REINFORCEMENT DETAILS

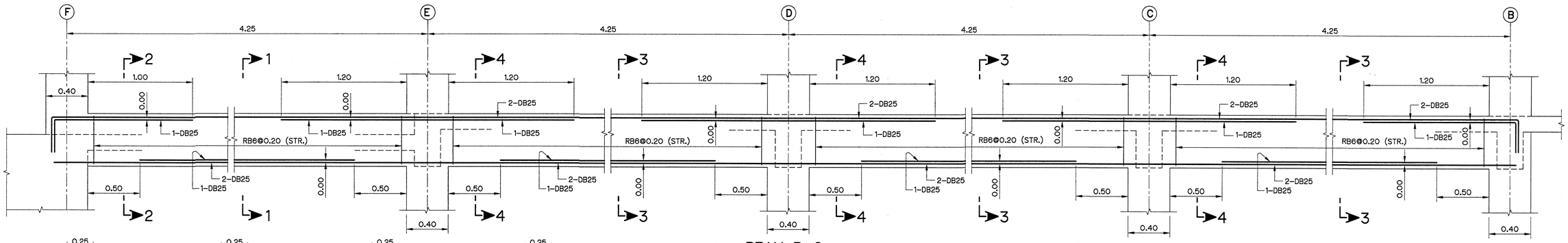
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

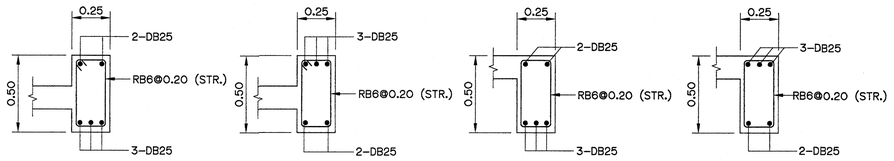
DESIGNED วิศ.6650 วิศ.88523
DRAWN
CHECKED วิศ.6651
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-PH-43
SHEET NO. 68 OF 157



BEAM B-6
SCALE 1:20

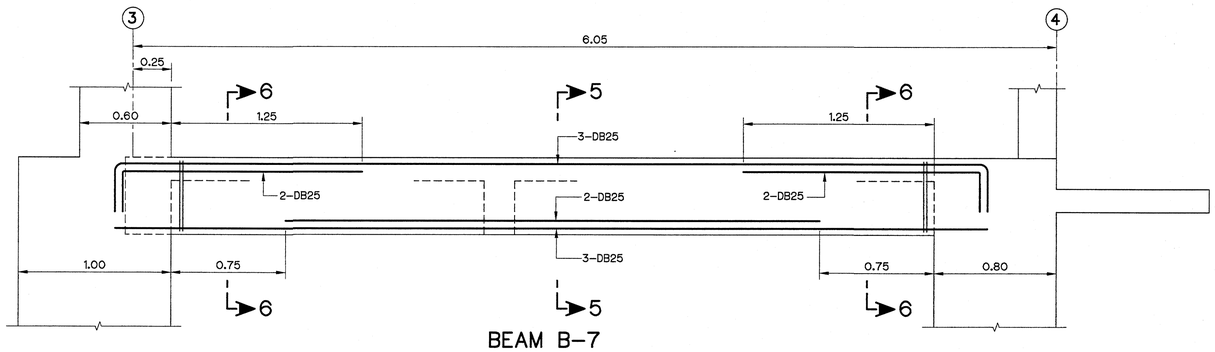


SECTION 1-1
SCALE 1:20

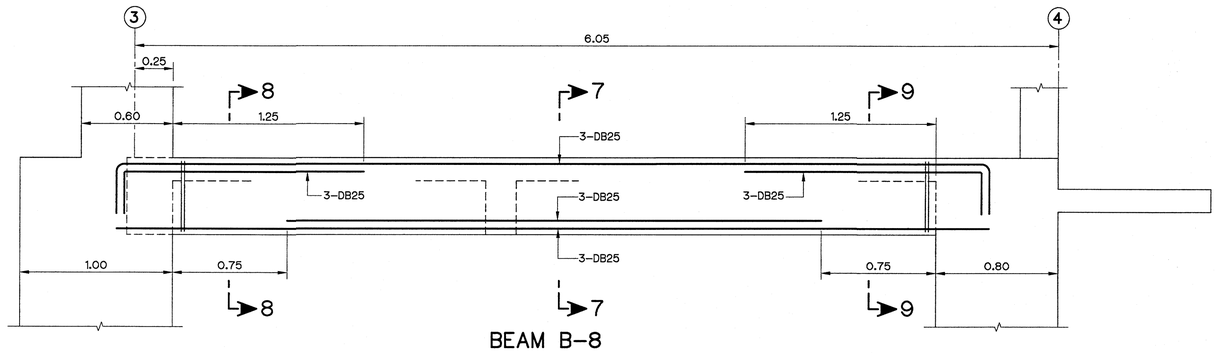
SECTION 2-2
SCALE 1:20

SECTION 3-3
SCALE 1:20

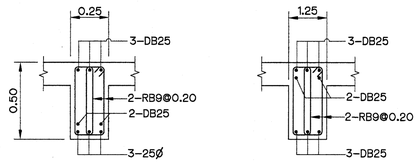
SECTION 4-4
SCALE 1:20



BEAM B-7
SCALE 1:20

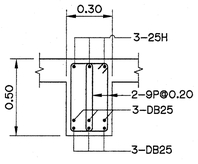


BEAM B-8
SCALE 1:20

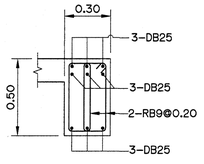


SECTION 5-5
SCALE 1:20

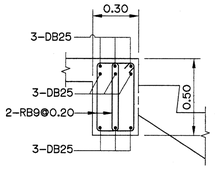
SECTION 6-6
SCALE 1:20



SECTION 7-7
SCALE 1:20



SECTION 8-8
SCALE 1:20



SECTION 9-9
SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+201.20, EL.+195.60 AND REINFORCEMENT DETAILS THN-PH-28

0 0.5 1.0 1.5
SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

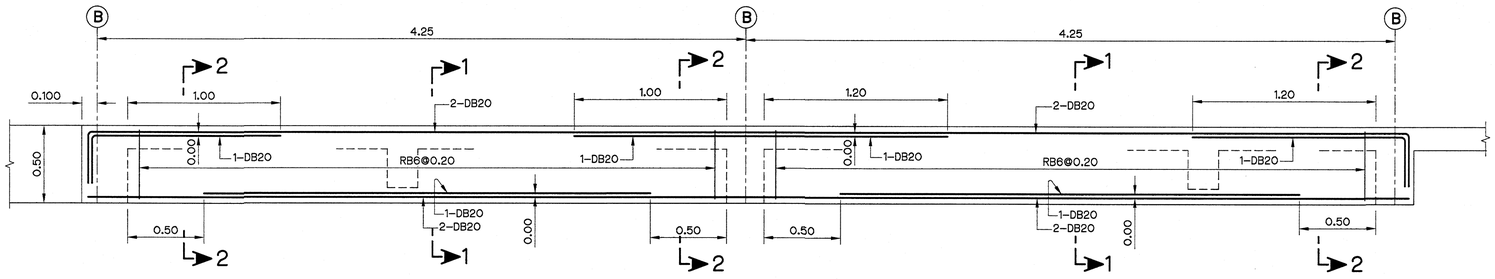
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

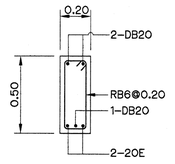
POWERHOUSE

BEAM B-6, B-7 AND B-8 REINFORCEMENT DETAILS

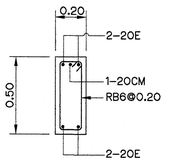
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ต.6650 ภ.ส.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ต.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-PH-44	SHEET NO. 69 OF 157



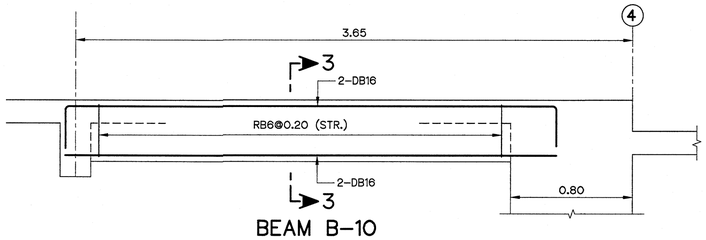
BEAM B–9
SCALE 1:20



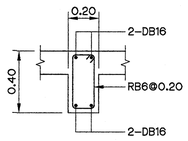
SECTION 1–1
SCALE 1:20



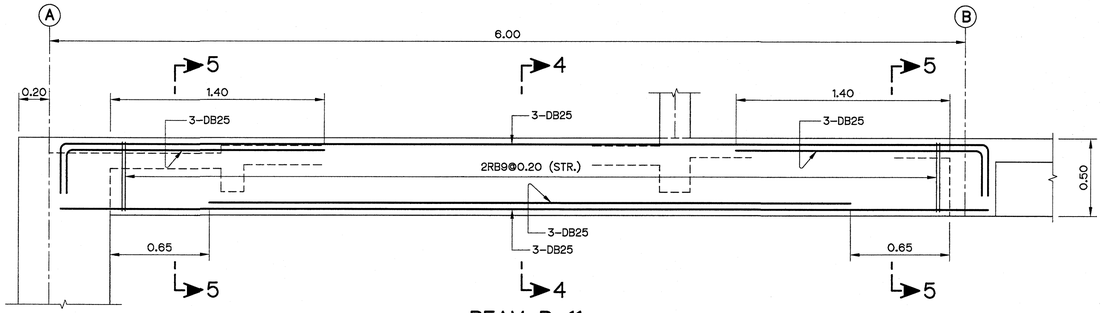
SECTION 2–2
SCALE 1:20



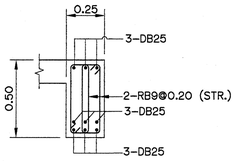
BEAM B–10
SCALE 1:20



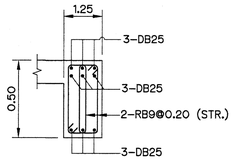
SECTION 3–3
SCALE 1:20



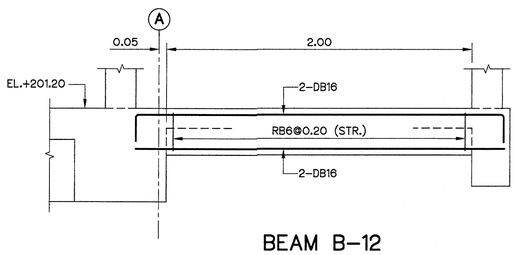
BEAM B–11
SCALE 1:20



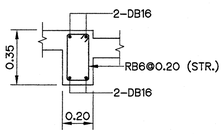
SECTION 4–4
SCALE 1:20

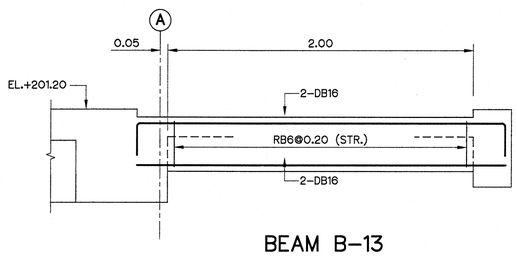


SECTION 5–5
SCALE 1:20

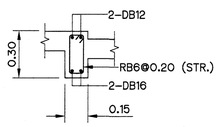


BEAM B–12
SCALE 1:20





BEAM B–13
SCALE 1:20



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+201.20, EL.+195.60 AND REINFORCEMENT DETAILS THN–PH–28

0 0.5 1.0 1.5
SCALE 1:20 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

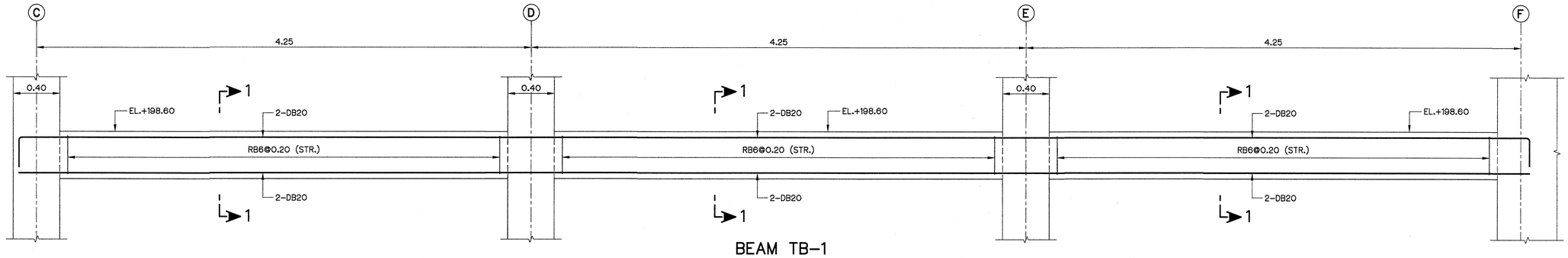
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

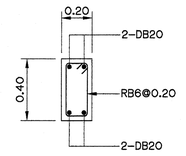
BEAM B–9, B–10, B–11, B–12 AND B–13 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED สม.6650 กม.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED สม. สม.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–45 / SHEET NO. 70 OF 157



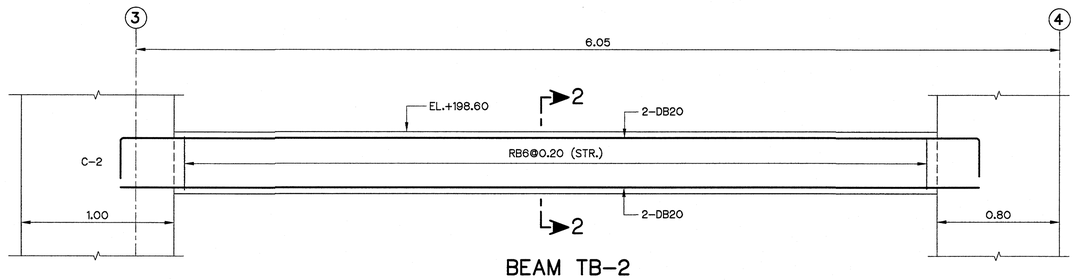
BEAM TB-1

SCALE 1:20



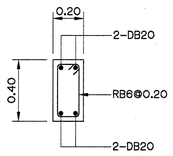
SECTION 1-1

SCALE 1:20



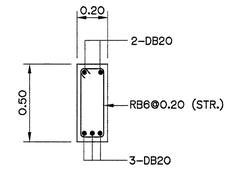
BEAM TB-2

SCALE 1:20



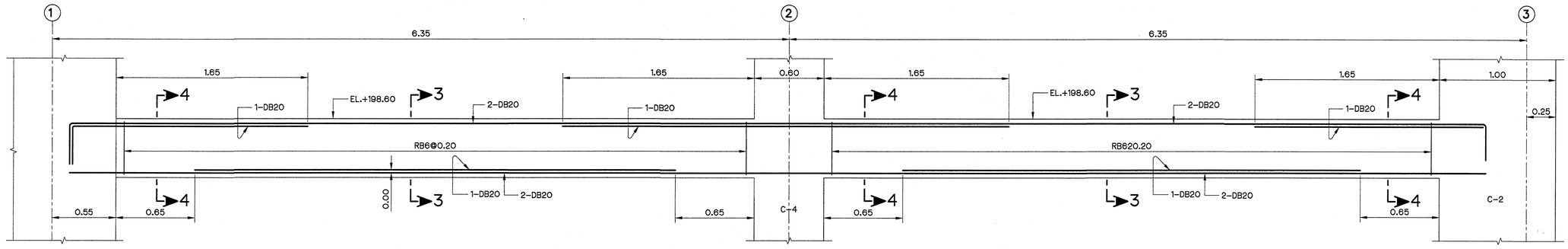
SECTION 2-2

SCALE 1:20



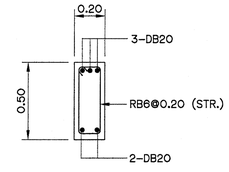
SECTION 3-3

SCALE 1:20



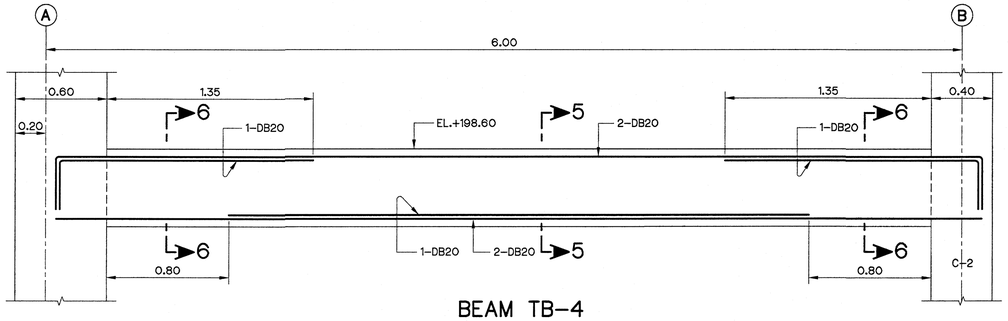
BEAM TB-3

SCALE 1:20



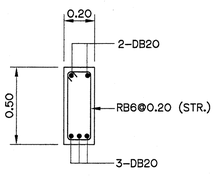
SECTION 4-4

SCALE 1:20



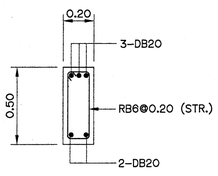
BEAM TB-4

SCALE 1:20



SECTION 3-3

SCALE 1:20



SECTION 4-4

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+201.20, EL.+195.60 AND REINFORCEMENT DETAILS THN-PH-28

0 0.5 1.0 1.5

SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

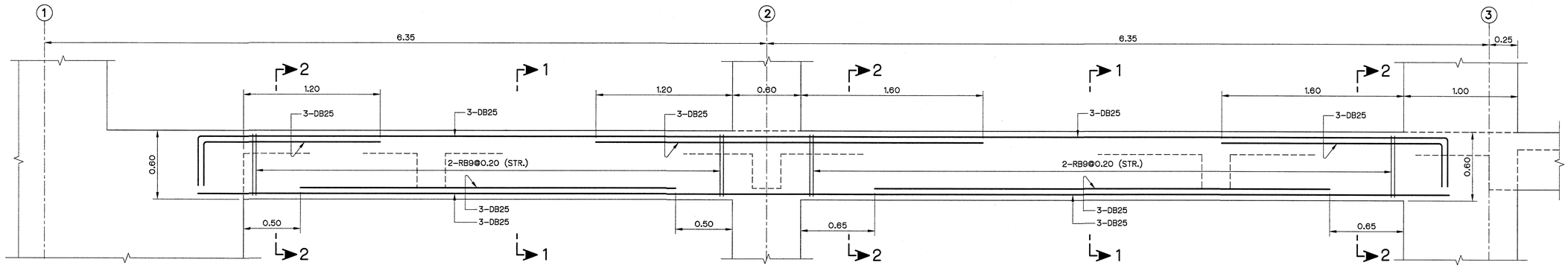
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

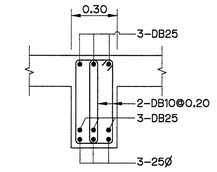
BEAM TB-1, TB-2, TB-3 AND TB-4 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 วิ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-46 / SHEET NO. 71 OF 157



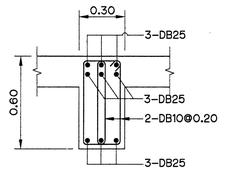
BEAM UB-1

SCALE 1:20



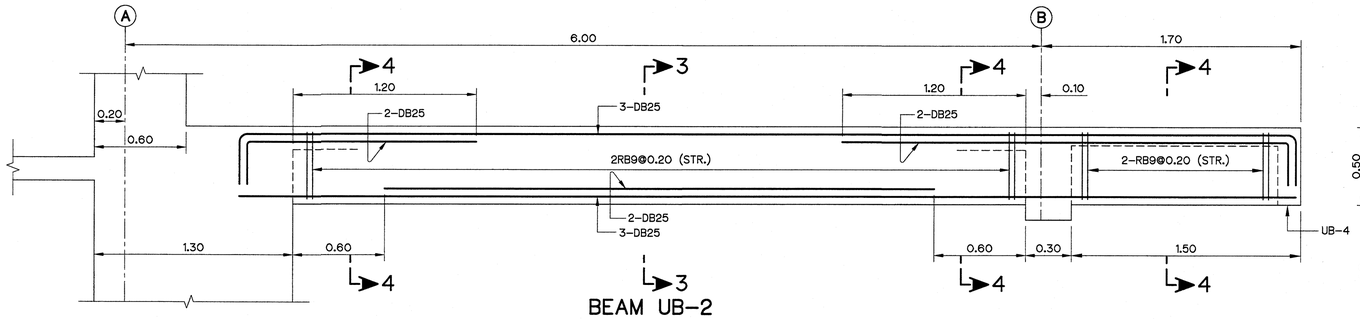
SECTION 1-1

SCALE 1:20



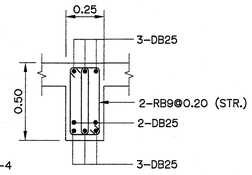
SECTION 2-2

SCALE 1:20



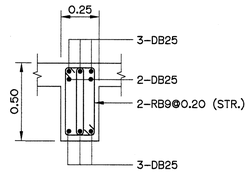
BEAM UB-2

SCALE 1:20



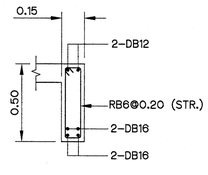
SECTION 3-3

SCALE 1:20



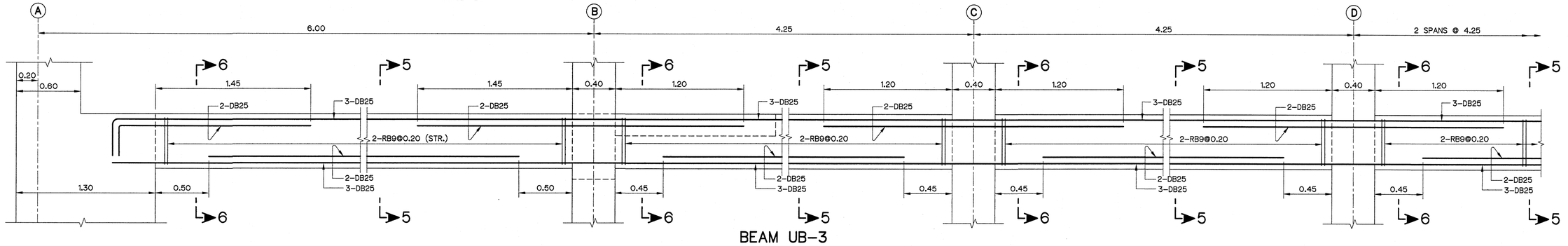
SECTION 4-4

SCALE 1:20



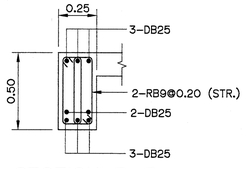
BEAM UB-4

SCALE 1:20



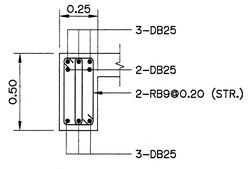
BEAM UB-3

SCALE 1:20



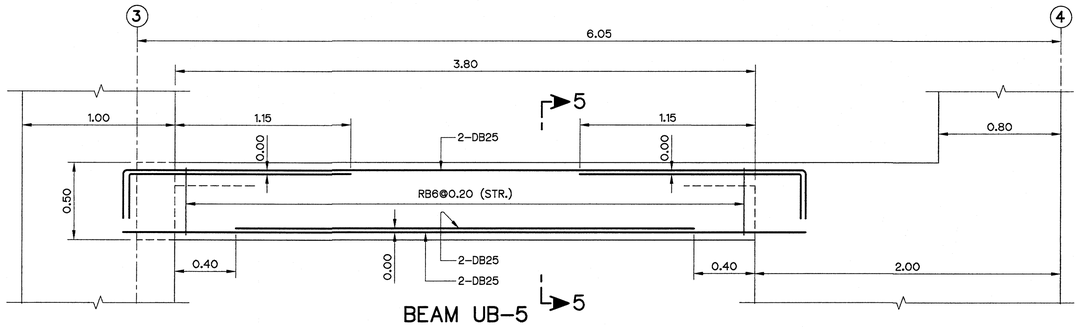
SECTION 5-5

SCALE 1:20



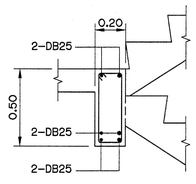
SECTION 6-6

SCALE 1:20



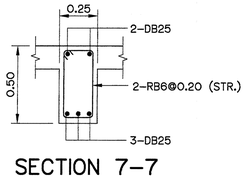
BEAM UB-5

SCALE 1:20



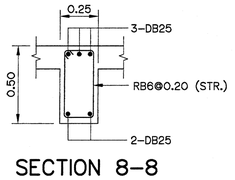
BEAM UB-6

SCALE 1:20



SECTION 7-7

SCALE 1:20



SECTION 8-8

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+195.60, EL.+187.20 AND REINFORCEMENT DETAILS THN-PH-29

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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KINGDOM OF THAILAND
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MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

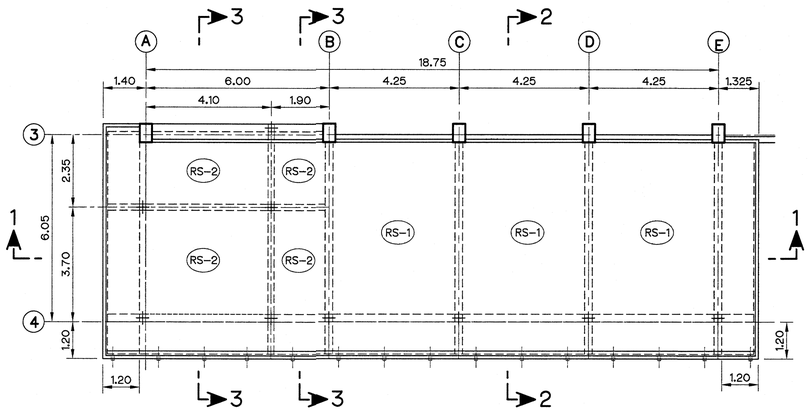
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

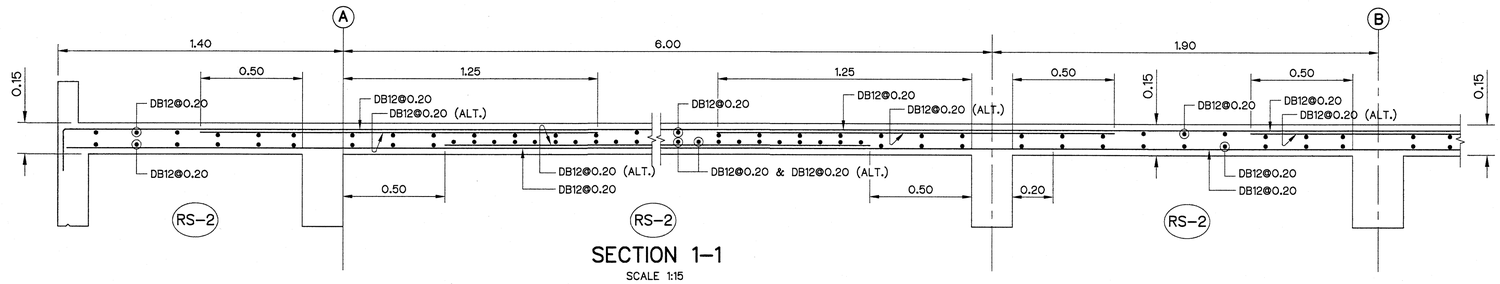
BEAM UB-1, UB-2, UB-3, UB-4, UB-5 AND UB-6 REINFORCEMENT DETAILS

TEC FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ธีร.6650 วิศ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ธีร.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
	DRAWING NO. THN-PH-47
	SHEET NO. 72 OF 157



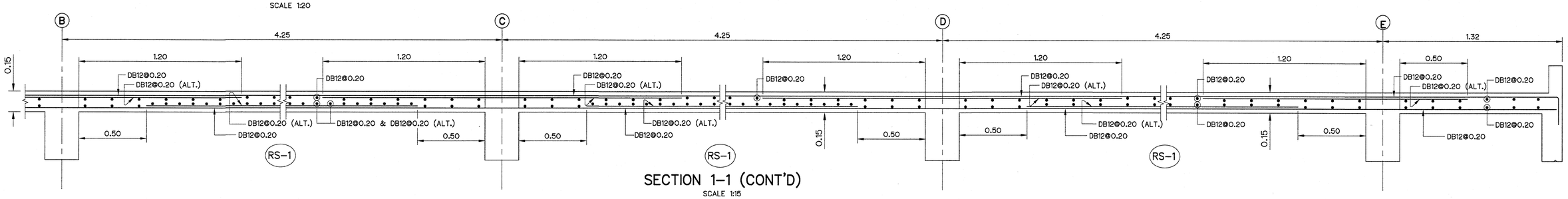
PLAN OF SLAB RS-1 AND RS-2

SCALE 1:20



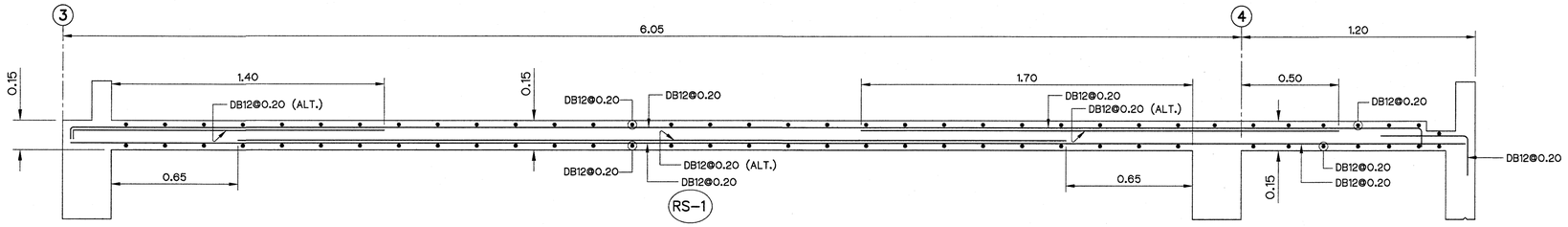
SECTION 1–1

SCALE 1:15



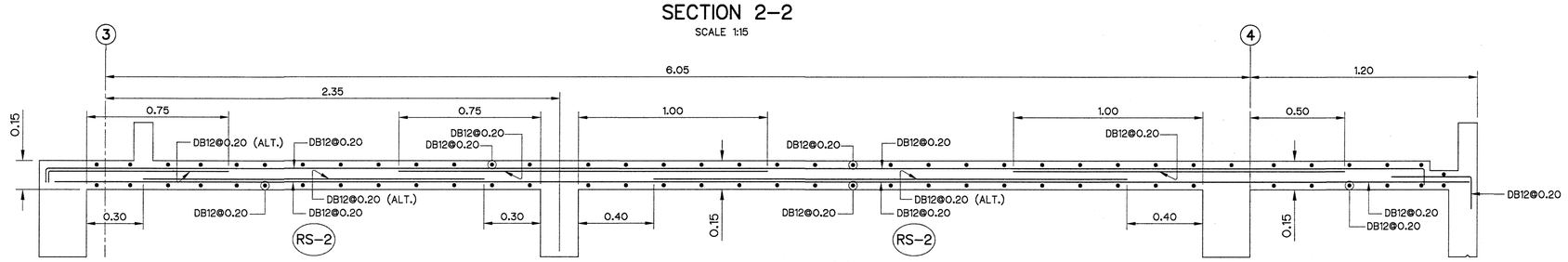
SECTION 1–1 (CONT'D)

SCALE 1:15



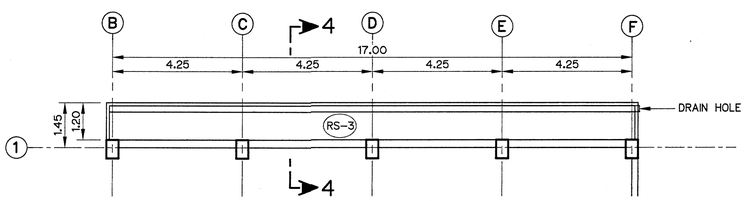
SECTION 2–2

SCALE 1:15



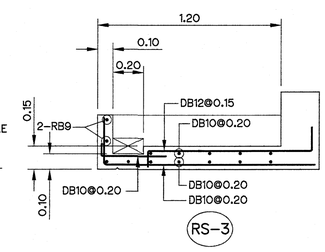
SECTION 3–3

SCALE 1:15



PLAN OF SLAB RS-3

SCALE 1:100



SECTION 4–4

SCALE 1:20

SCALE 1:15 METERS

SCALE 1:20 METERS

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. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+209.35 AND EL.+205.30 THN–PH–27

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

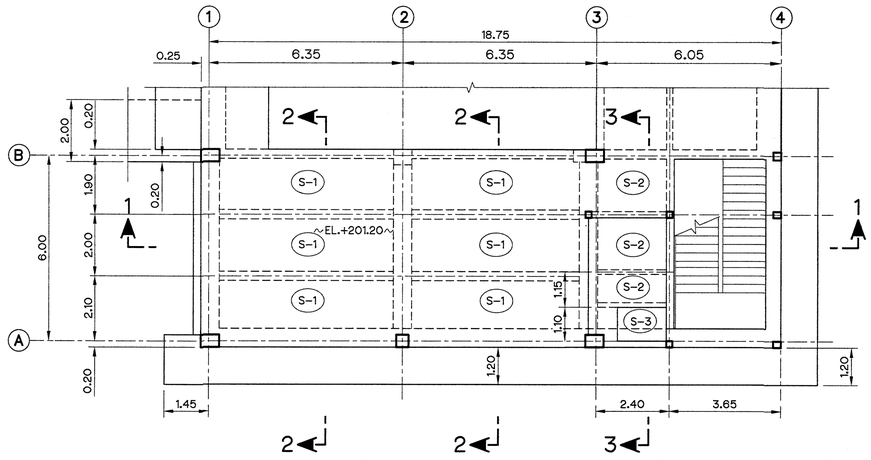
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

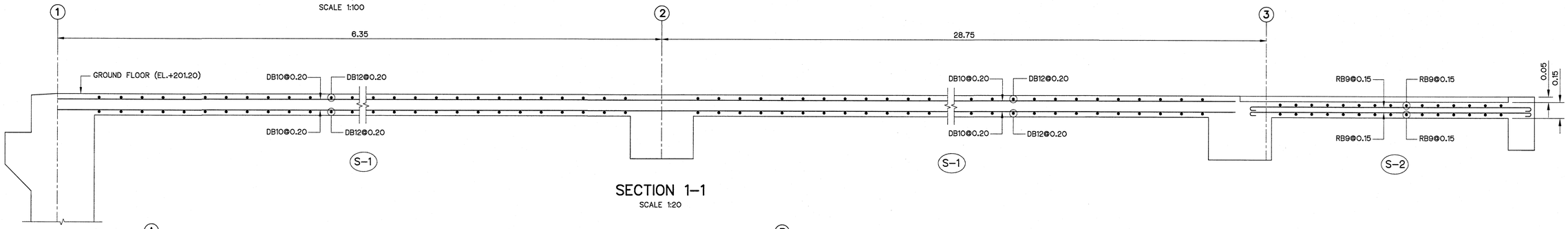
SLAB RS-1, RS-2 AND RS-3 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ย.6650 ส.ย.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ย.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN–PH–48	SHEET NO. 73 OF 157



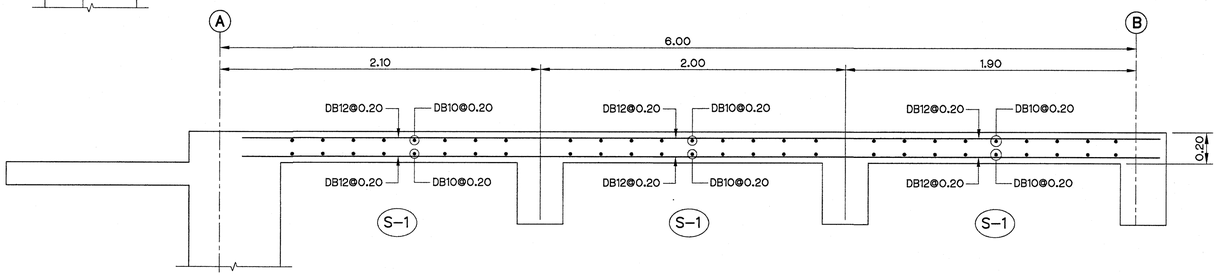
PLAN OF SLAB S-1, S-2 AND S-3

SCALE 1:100



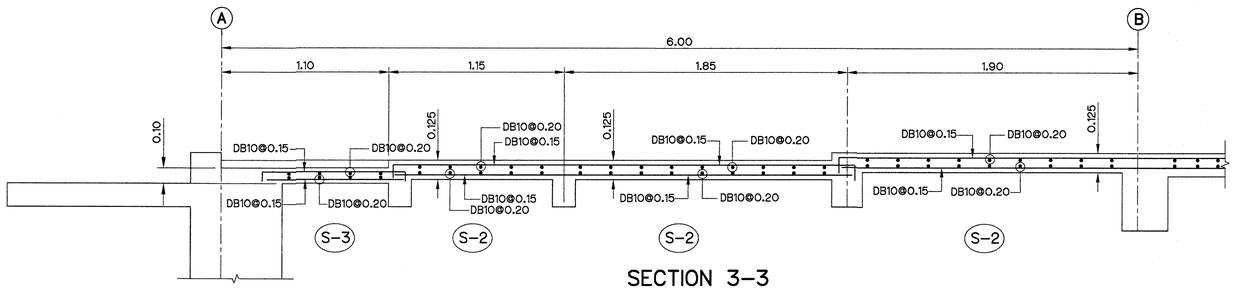
SECTION 1-1

SCALE 1:20



SECTION 2-2

SCALE 1:20



SECTION 3-3

SCALE 1:20

0 0.5 1.0 1.5

SCALE 1:20 METERS

0 1.0 2.0 4.0 6.0 8.0

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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+201.20, EL.+195.60 AND REINFORCEMENT DETAILS THN-PH-28

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

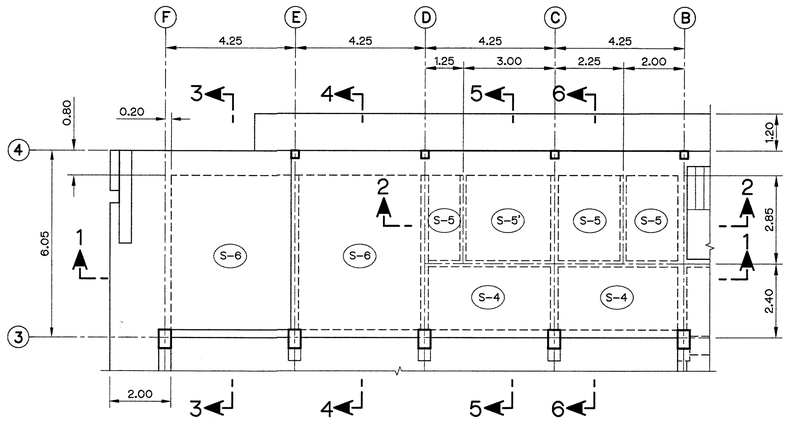
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

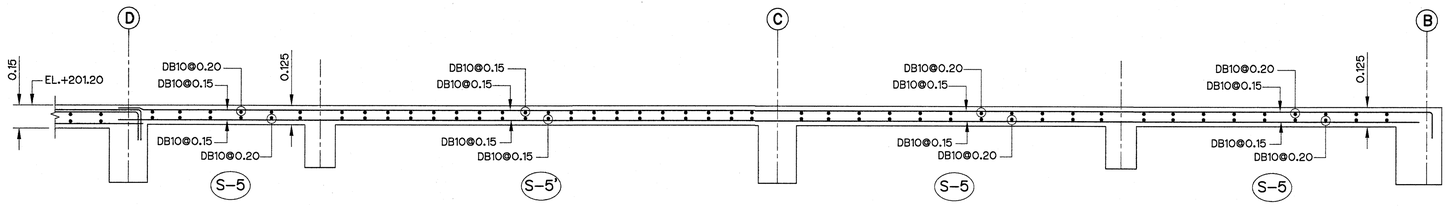
SLAB S-1, S-2 AND S-3 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 วิ.8523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-49 / SHEET NO. 74 OF 157



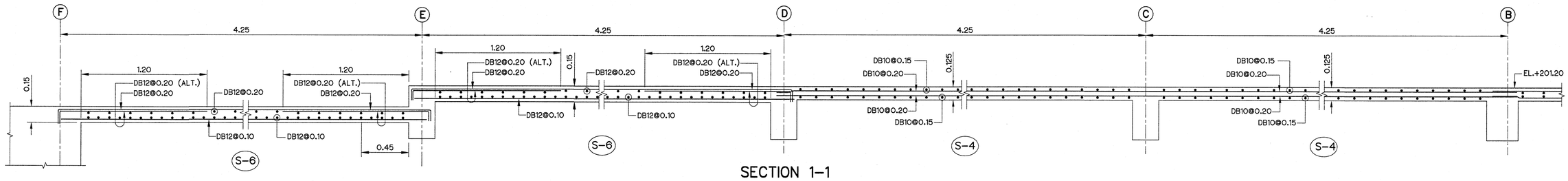
PLAN OF SLAB S-4, S-5, S-5' AND S-6

SCALE 1:100



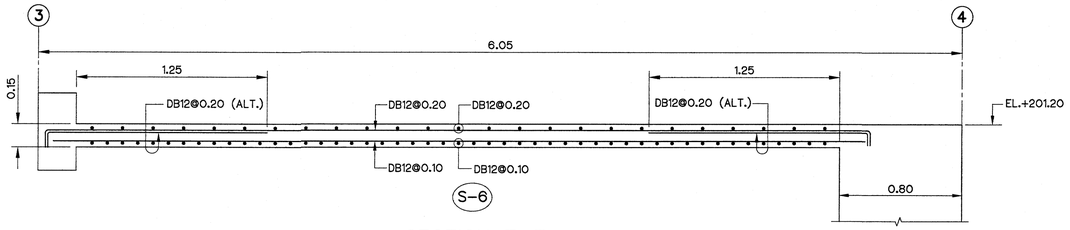
SECTION 2-2

SCALE 1:20



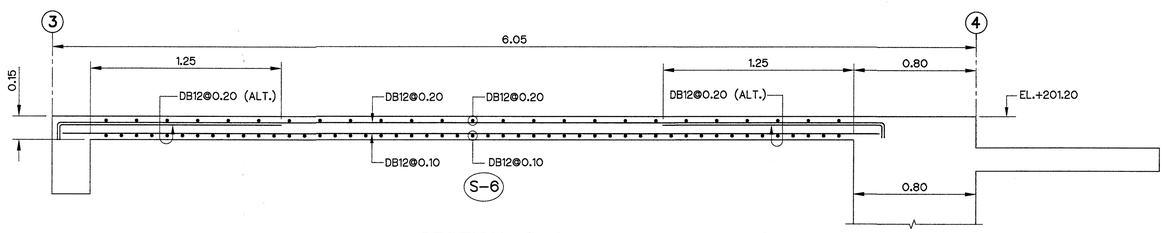
SECTION 1-1

SCALE 1:20



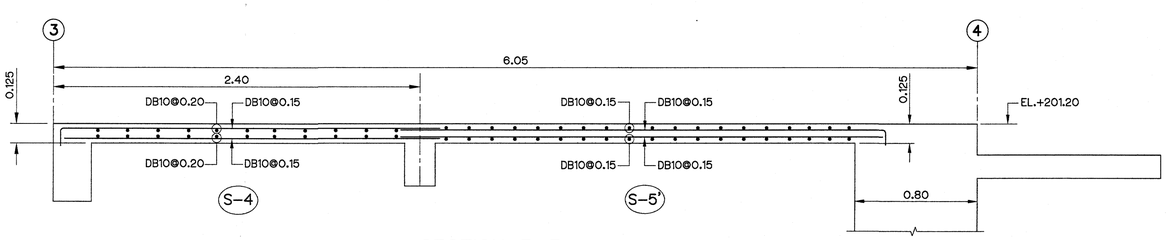
SECTION 3-3

SCALE 1:20



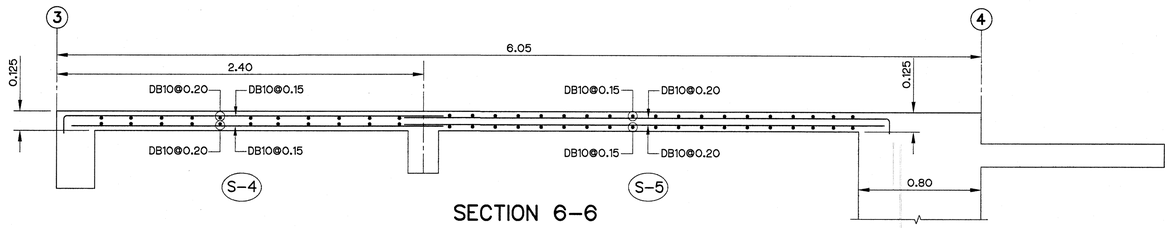
SECTION 4-4

SCALE 1:20



SECTION 5-5

SCALE 1:20



SECTION 6-6

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+201.20, EL.+195.60 AND REINFORCEMENT DETAILS THN-PH-28

0 0.5 1.0 1.5

SCALE 1:20 METERS

0 1.0 2.0 4.0 6.0 8.0

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

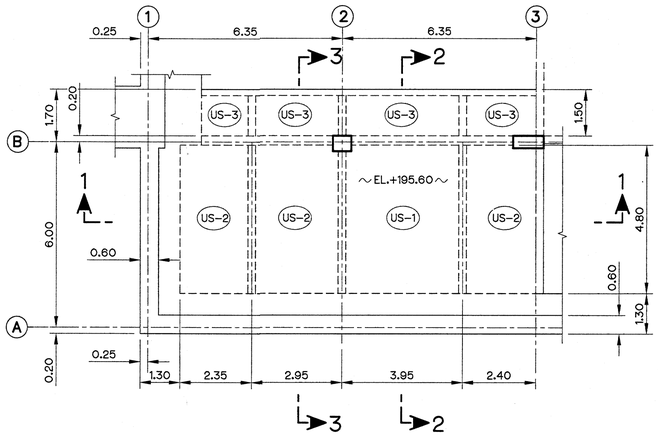
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

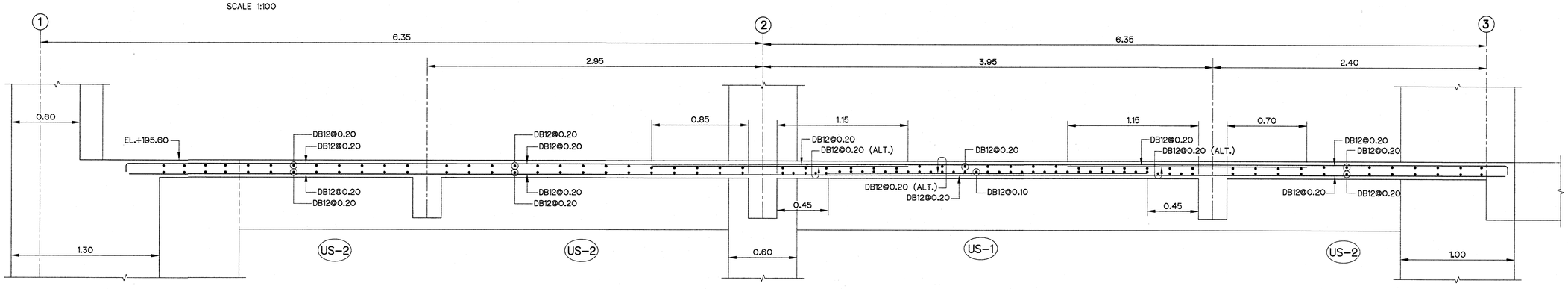
SLAB S-4, S-5, S-5' AND S-6 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED ส.6650 ส.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED ส.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-50 / SHEET NO. 75 OF 157



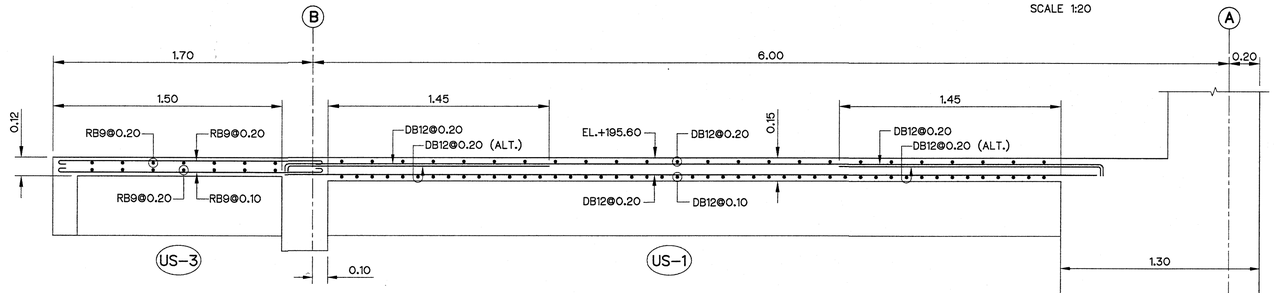
PLAN OF SLAB US-1, US-2 AND US-3

SCALE 1:100



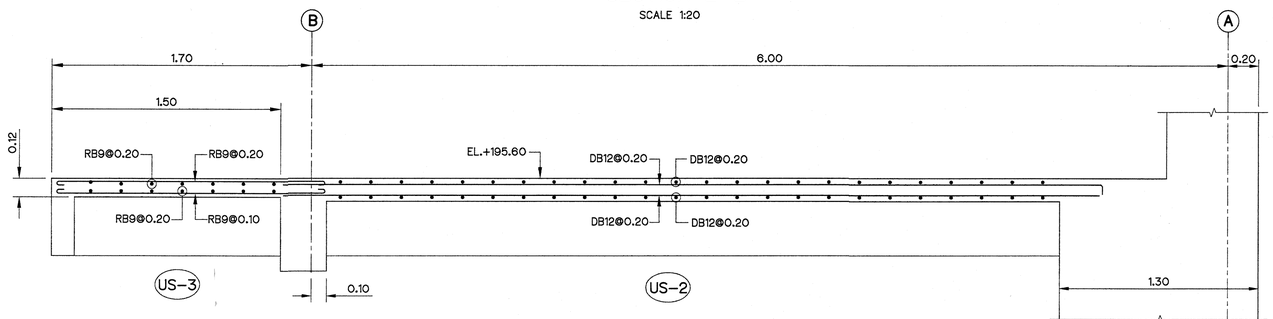
SECTION 1–1

SCALE 1:20



SECTION 2–2

SCALE 1:20



SECTION 3–3

SCALE 1:20

0 0.5 1.0 1.5

SCALE 1:20 METERS

0 1.0 2.0 4.0 6.0 8.0

SCALE 1:100 METERS

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. THN-GN-04

REFERENCE DRAWING :

1. POWERHOUSE, STRUCTURAL PLAN EL.+195.60, EL.+187.20 AND REINFORCEMENT DETAILS THN-PH-29

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

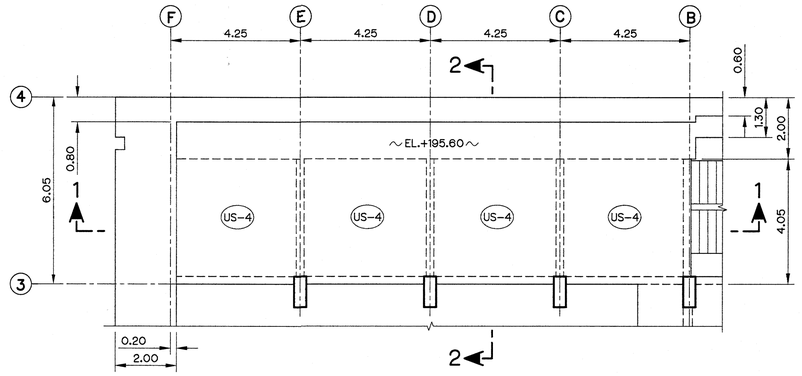
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

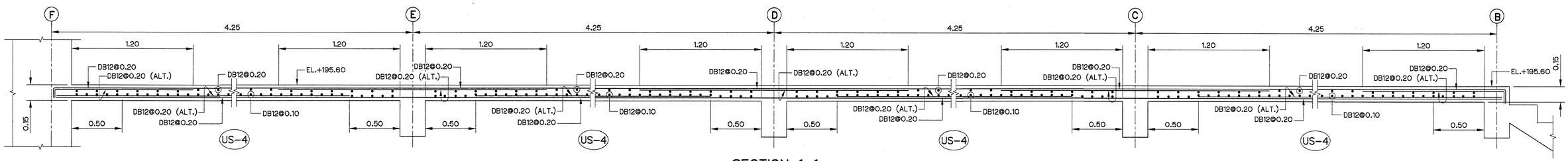
SLAB US-1, US-2, AND US-3 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วศ.6650 วศ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วศ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-51 / SHEET NO. 76 OF 157



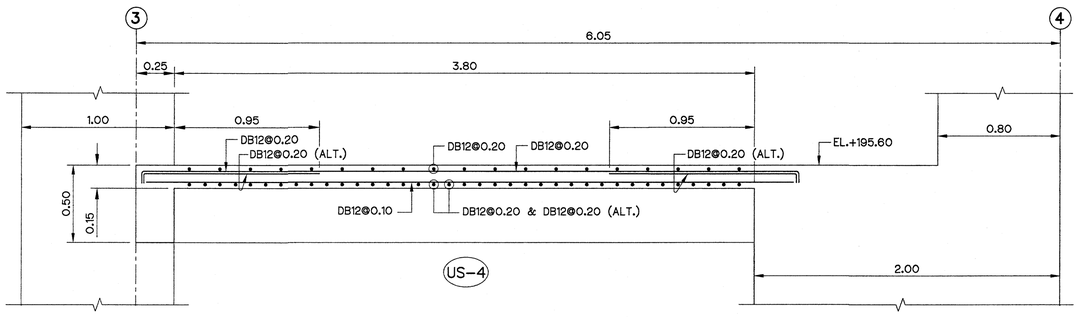
PLAN OF SLAB US-4

SCALE 1:100



SECTION 1-1

SCALE 1:20



SECTION 2-2

SCALE 1:20

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. THN-GN-04

REFERENCE DRAWING :

1. POWERHOUSE, STRUCTURAL PLAN EL.+195.60, EL.+187.20 AND REINFORCEMENT DETAILS THN-PH-29

0 0.5 1.0 1.5

SCALE 1:20 METERS

0 1.0 2.0 4.0 6.0 8.0

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

SLAB US-4 REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED วิ.6650 กิ.88523

DRAWN

CHECKED วิ.6651

PROJECT MANAGER 6/9/2024 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

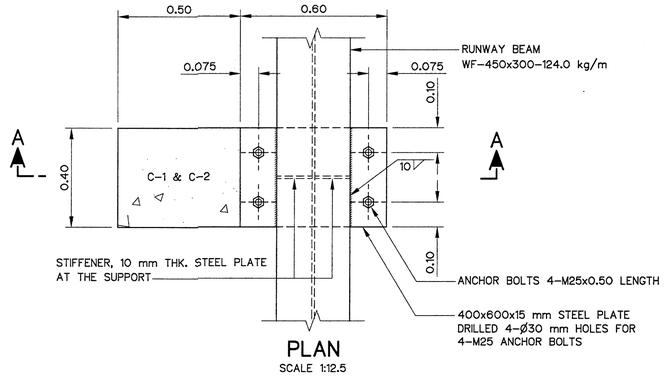
SUBMITTED

RECOMMENDED

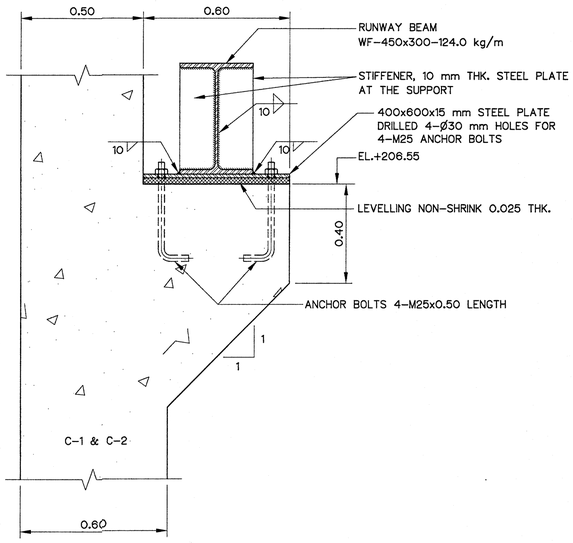
APPROVED

DRAWING NO. THN-PH-52

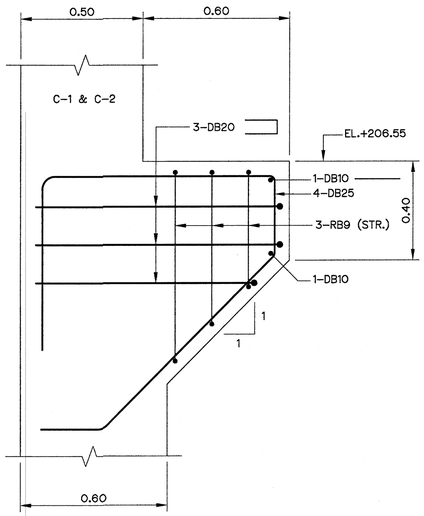
SHEET NO. 77 OF 157



PLAN
SCALE 1:12.5



SECTION A-A
SCALE 1:12.5



SECTION A-A
(REINFORCEMENT DETAILS)
SCALE 1:12.5

RUNWAY BEAM INSTALLATION

COLUMN SCHEDULE

COLUMNS / ELEVATION	C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8
EL.+209.35 ↑ EL.+206.55	0.40 × 0.50 16-DB25 4-RB9 @ 0.25 (STR.)	0.40 × 0.50 16-DB25 4-RB9 @ 0.25 (STR.)	0.40 × 0.40 8-DB16 2-RB9 @ 0.25 (STR.)	—	—	—	—	—
EL.+206.55 ↑ EL.+205.30	0.40 × 0.60 18-DB25 4-RB9 @ 0.25 (STR.)	0.40 × 0.60 18-DB25 4-RB9 @ 0.25 (STR.)		—	—	—	—	—
EL.+205.30 ↑ EL.+201.20	0.40 × 0.60 18-DB25 4-RB9 @ 0.25 (STR.)	0.40 × 0.60 18-DB25 4-RB9 @ 0.25 (STR.)		—	0.25 × 0.25 8-DB16 2-RB6 @ 0.20 (STR.)	0.25 × 0.20 6-DB16 1-RB6 @ 0.20 (STR.)	0.20 × 0.20 4-DB16 1-RB6 @ 0.20 (STR.)	—
EL.+201.20 ↑ EL.+195.60	—	0.40 × 1.00 26-DB25 5-RB9 @ 0.25 (STR.)	—	0.50 × 0.60 14-DB25 3-RB9 @ 0.25 (STR.)	—	—	—	—
EL.+195.60 ↑ EL.+187.20	—	0.40 × 1.00 26-DB25 5-RB9 @ 0.25 (STR.)	—	0.60 × 0.60 16-DB25 3-RB9 @ 0.25 (STR.)	—	—	—	—
EL.+187.20 ↑ EL.+182.25	—	—	—	—	—	—	—	1.30 × 1.30 36-DB25 5-RB9 @ 0.25 (STR.)

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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STRUCTURAL PLAN EL.+209.35 AND EL.+205.30 — THN-PH-27
2. POWERHOUSE, STRUCTURAL PLAN EL.+201.20, EL.+195.60 AND REINFORCEMENT DETAILS — THN-PH-28
3. POWERHOUSE, STRUCTURAL PLAN EL.+195.60, EL.+187.20 AND REINFORCEMENT DETAILS — THN-PH-29

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
SCALE 1:12.5 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

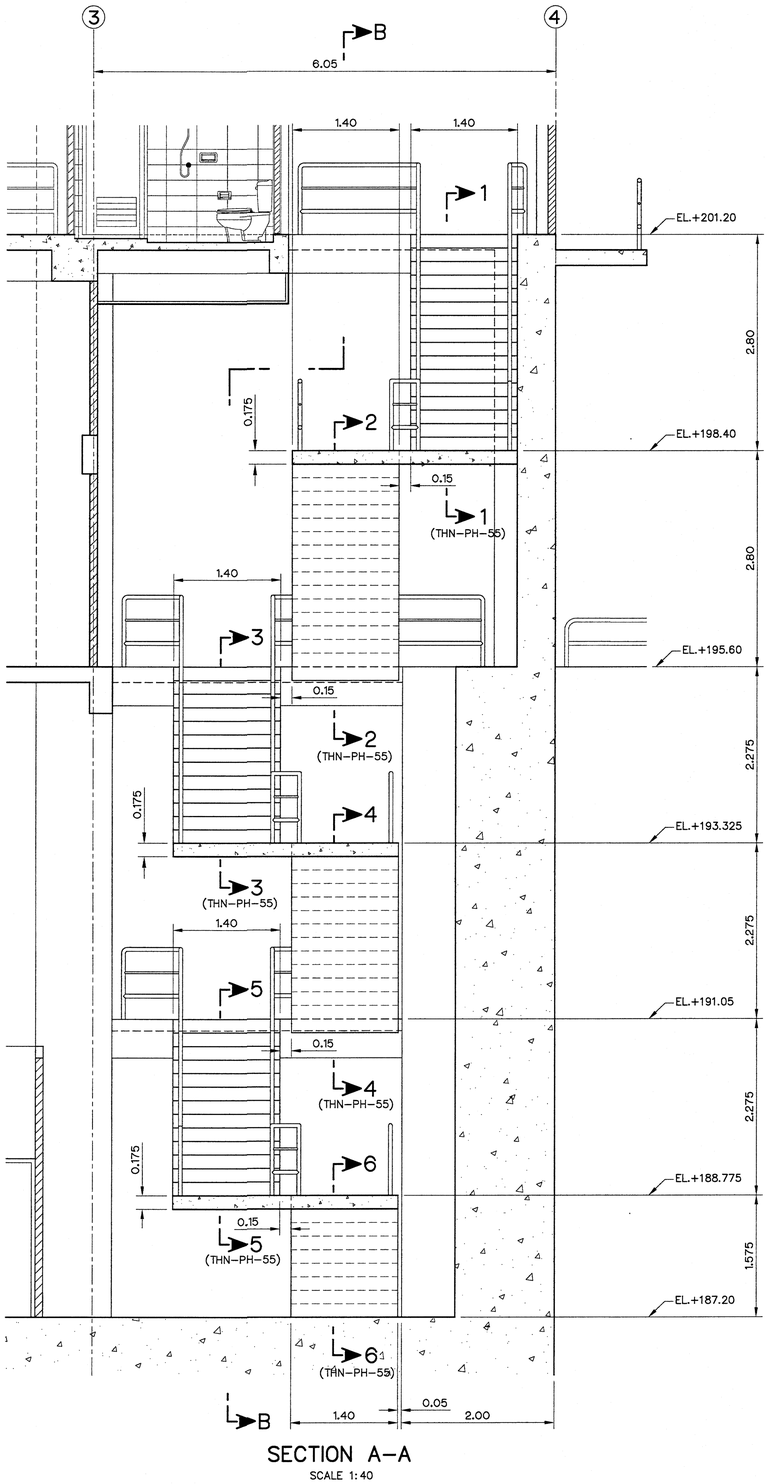
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
RUNWAY BEAM INSTALLATION AND COLUMN REINFORCEMENT DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

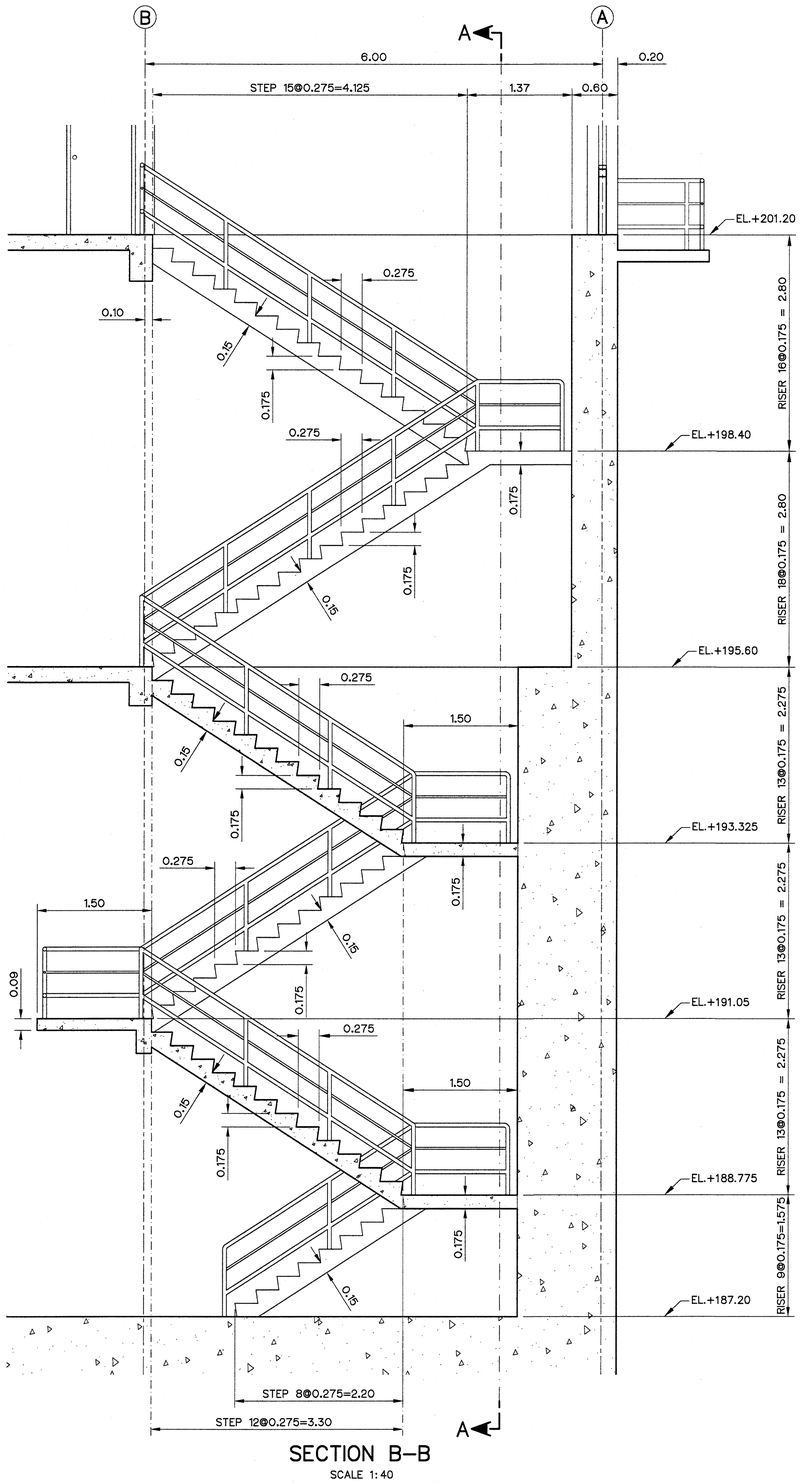
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วศ.6650	วศ.88523	SUBMITTED
DRAWN			RECOMMENDED
CHECKED		วศ.6651	APPROVED
PROJECT MANAGER	6/9/2024 DATE		DRAWING NO. THN-PH-53
			SHEET NO. 78 OF 157



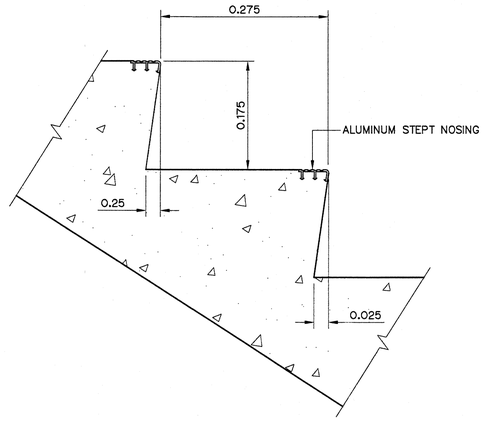
SECTION A–A

SCALE 1:40



SECTION B–B

SCALE 1:40



STAIR STEPT DETAILS

SCALE 1:5

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. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, STAIR REINFORCEMENT DETAILS THN-PH-55

STAIR DETAILS

0 0.5 1.0 1.5 2.0 2.5 3.0

SCALE 1:40 METERS

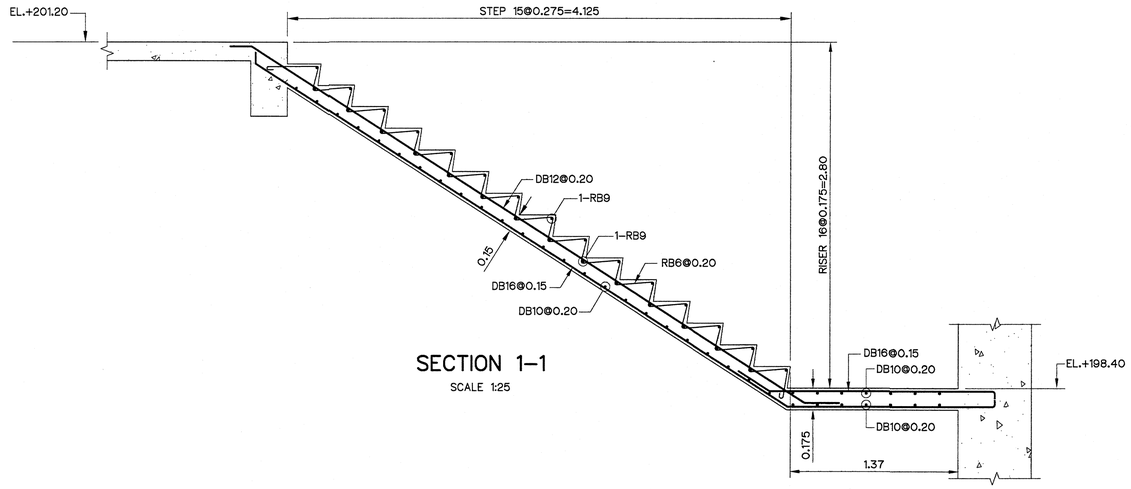
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

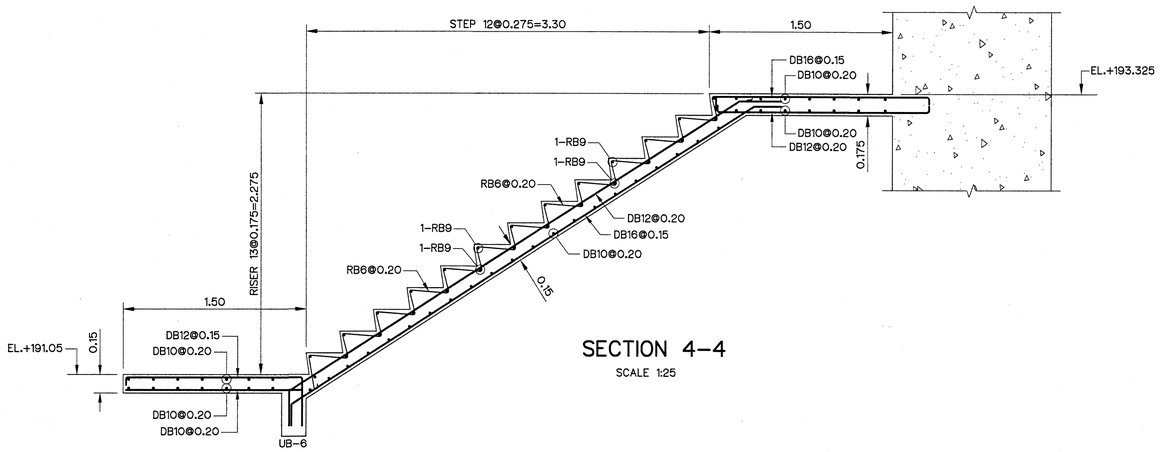
CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
STAIR DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED	SUBMITTED
DRAWN	RECOMMENDED
CHECKED	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-54 / SHEET NO. 79 OF 157



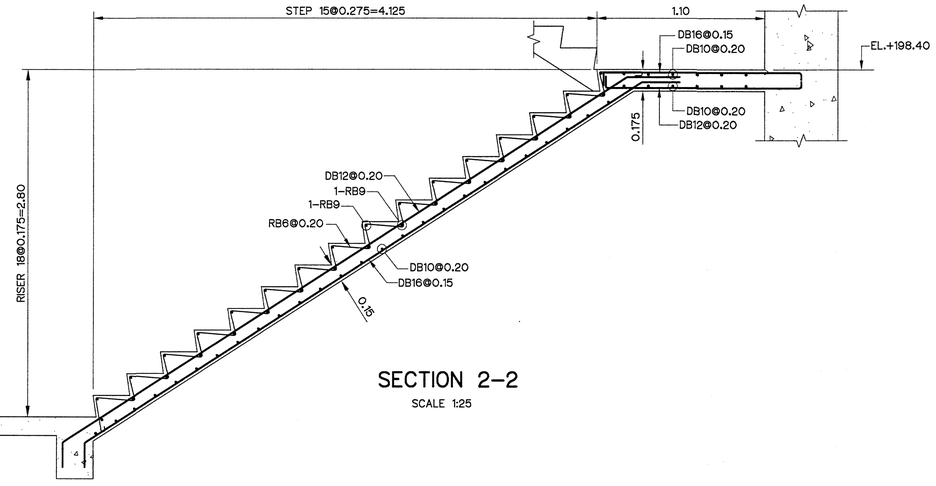
SECTION 1–1

SCALE 1:25



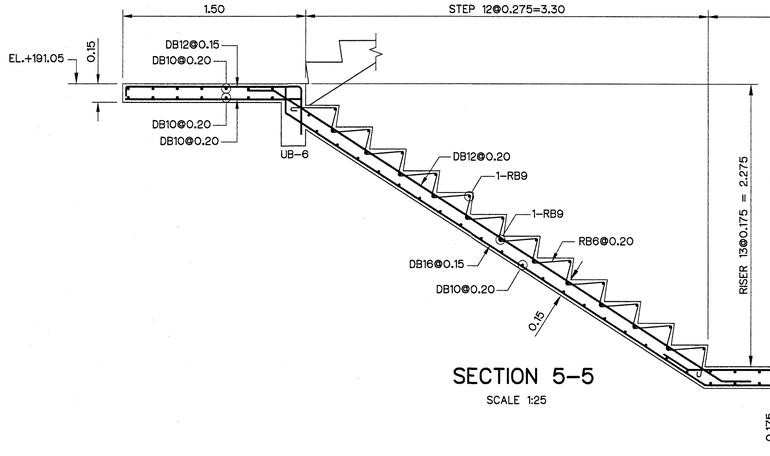
SECTION 4–4

SCALE 1:25



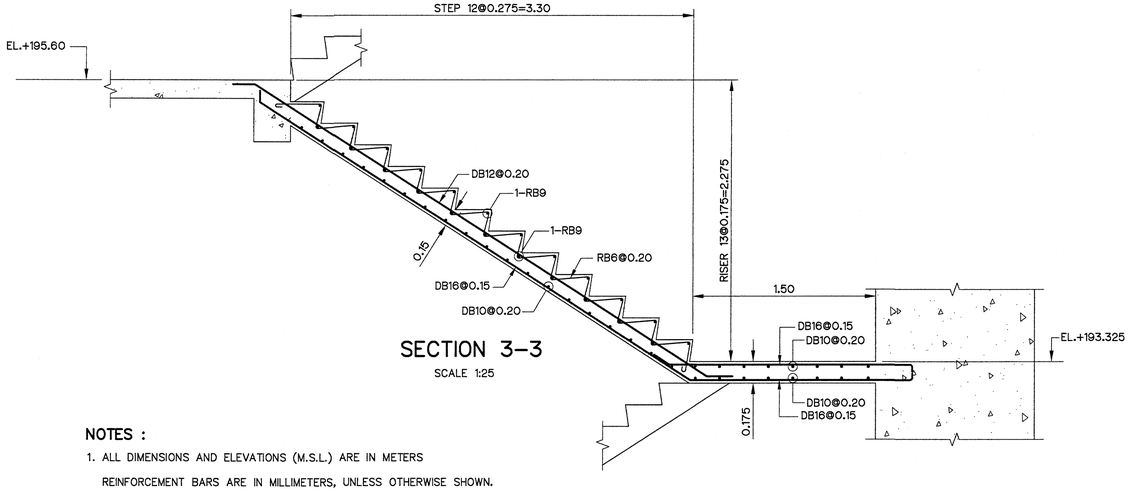
SECTION 2–2

SCALE 1:25



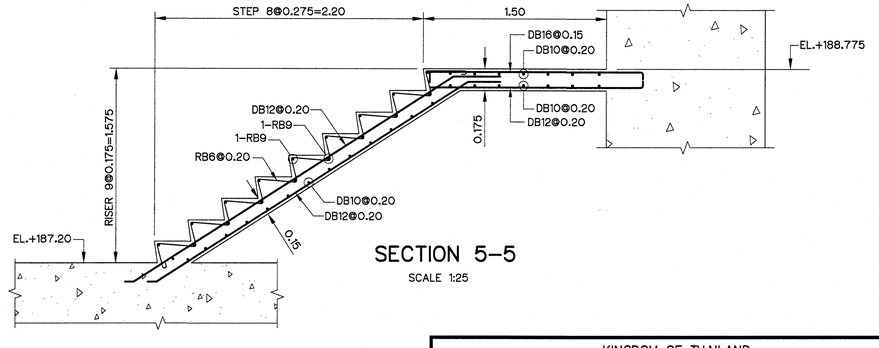
SECTION 5–5

SCALE 1:25



SECTION 3–3

SCALE 1:25



SECTION 5–5

SCALE 1:25

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. THN–GN–04

REFERENCE DRAWINGS :

1. POWERHOUSE, STAIR DETAILS THN–PH–54

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

STAIR REINFORCEMENT DETAILS

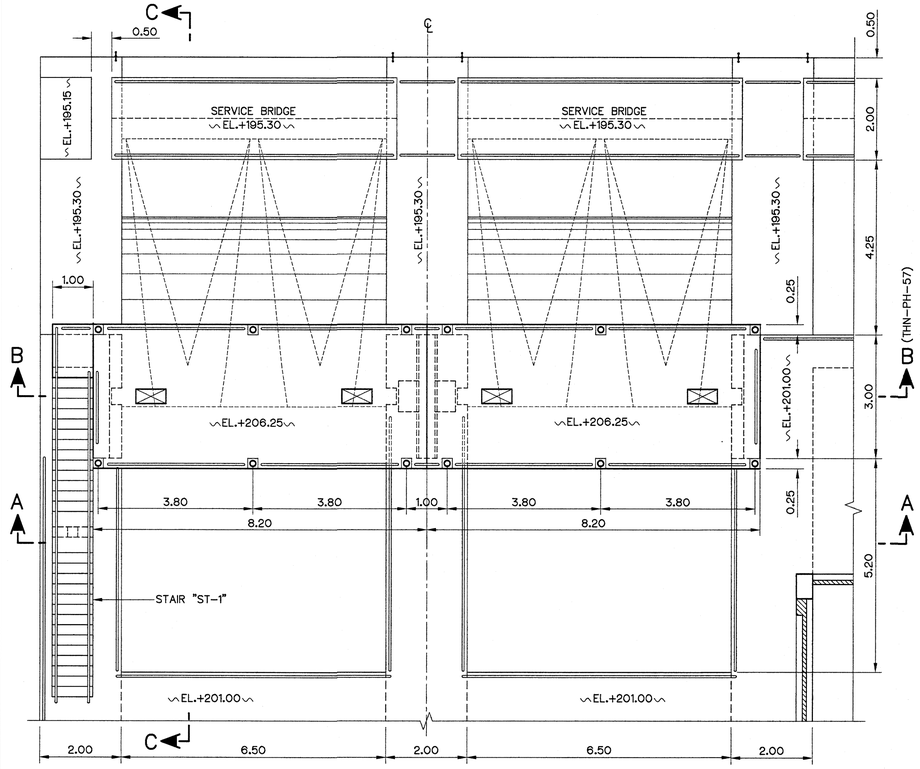
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิ.แก้วมณี	วิ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิ.แก้วมณี		RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

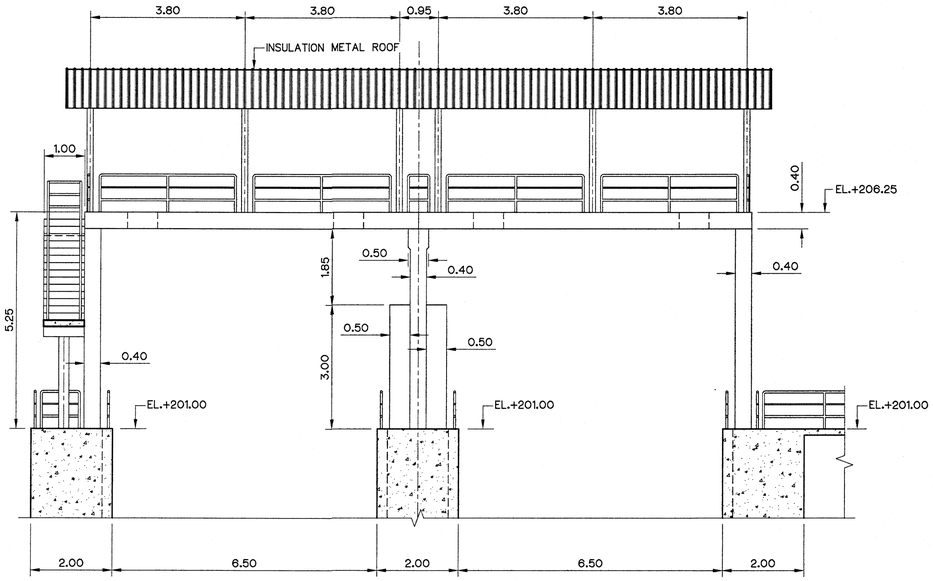
DRAWING NO. THN–PH–55

SHEET NO. 80 OF 157



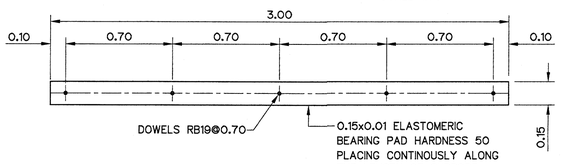
PLAN

SCALE 1:75



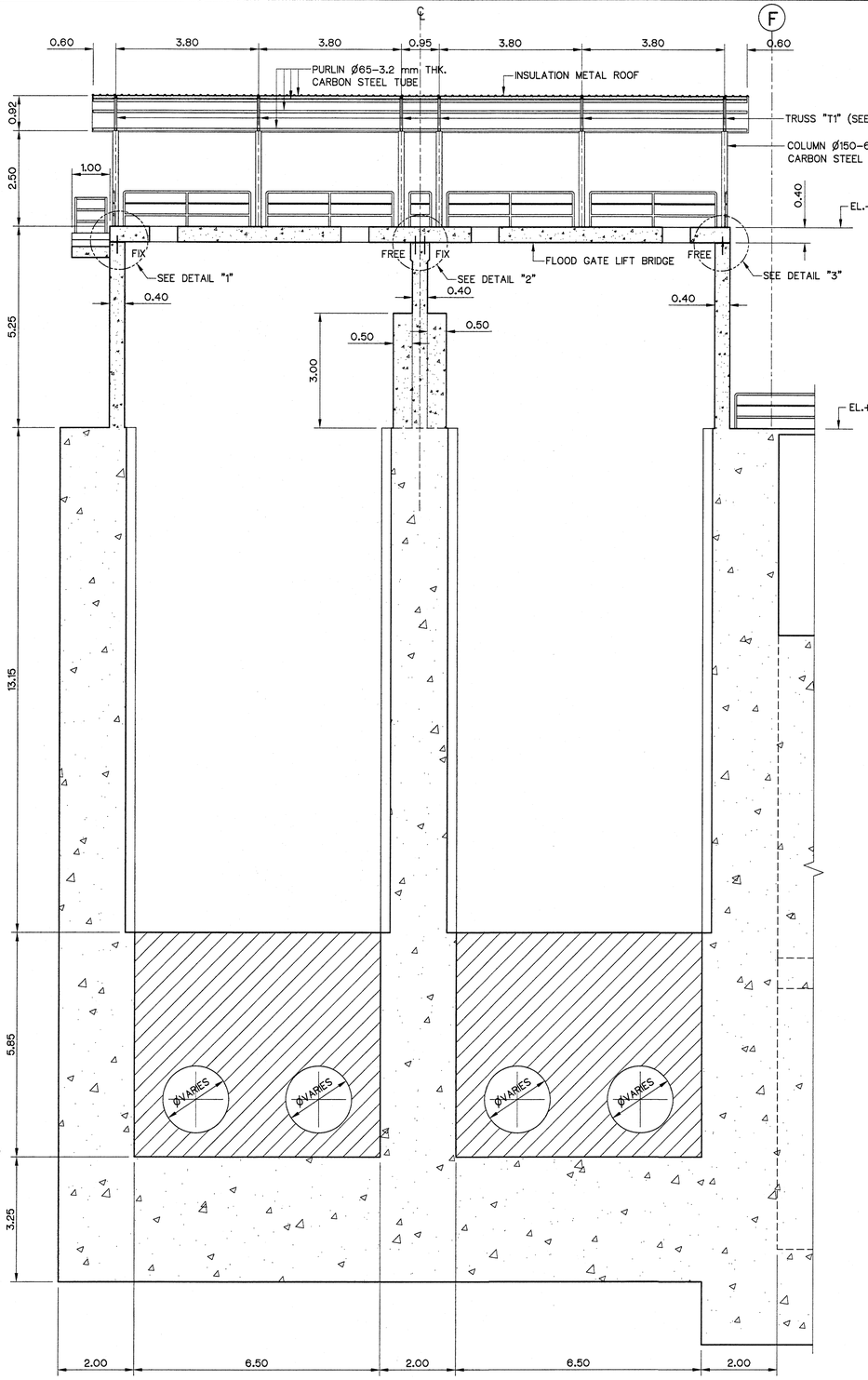
SECTION A–A

SCALE 1:75



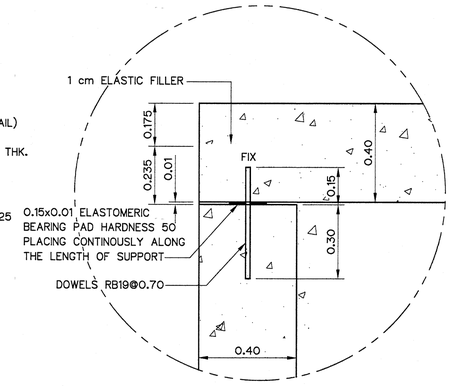
ELASTOMERIC BEARING PAD PLAN

SCALE 1:20



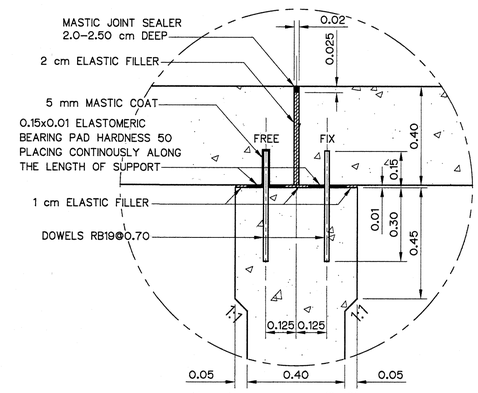
SECTION B–B

SCALE 1:75



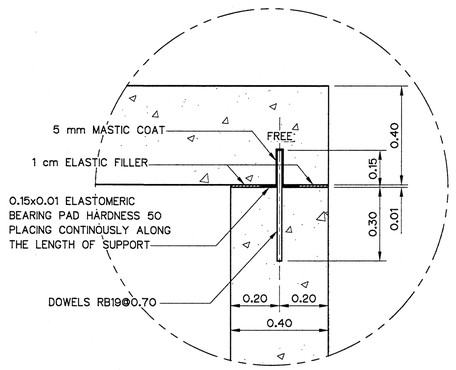
DETAIL "1"

SCALE 1:12.5



DETAIL "2"

SCALE 1:12.5



DETAIL "3"

SCALE 1:12.5

SYMBOLS

SECONDARY STAGE CONCRETE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. EMERGENCY CHANNEL, FLOOD GATE SECTION, ROOF STRUCTURE AND DETAILS THN-PH-57
2. EMERGENCY CHANNEL, STAIR "ST-1" PLAN, SECTIONS AND REINFORCEMENT DETAILS THN-PH-58

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
SCALE 1:12.5 METERS
0 0.5 1.0 1.5
SCALE 1:20 METERS
0 1 2 3 4 5 6
SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

FLOOD GATE PLAN, SECTIONS AND DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

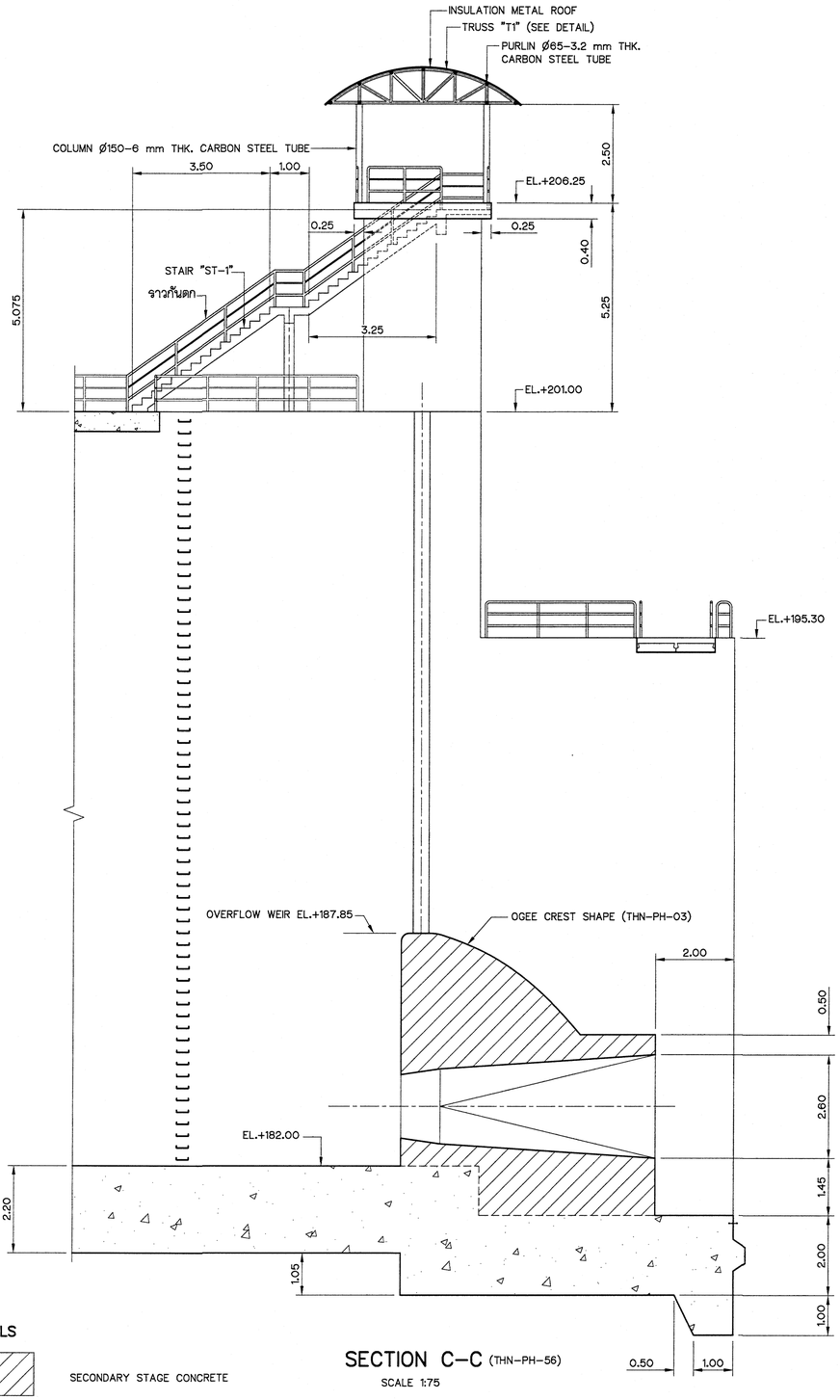
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	สถ.6650	สถ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	สถ.6651		RECOMMENDED
			APPROVED

PROJECT MANAGER — 6/9/2024 DATE

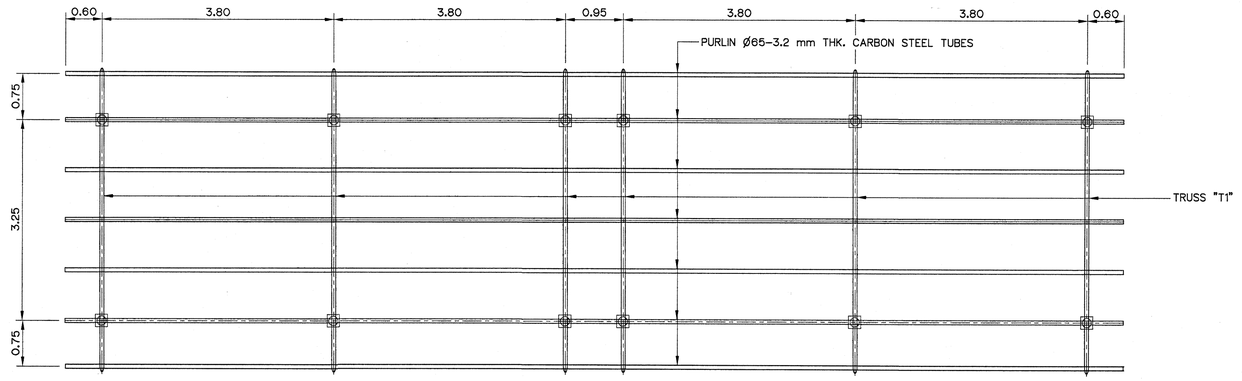
DRAWING NO. THN-PH-56

SHEET NO. 81 OF 157



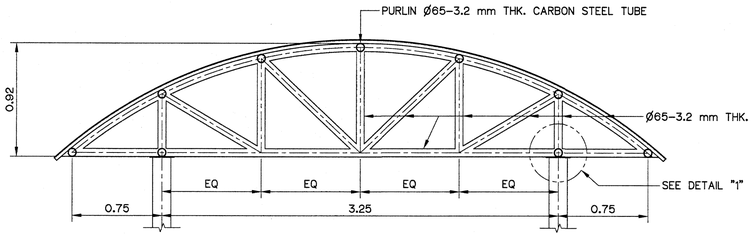
SECTION C-C (THN-PH-56)

SCALE 1:75



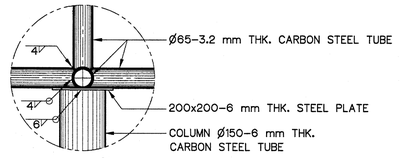
ROOF STRUCTURE PLAN

SCALE 1:50



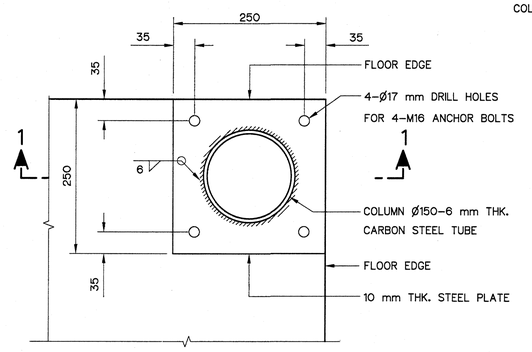
TRUSS "T1" DETAILS

SCALE 1:25



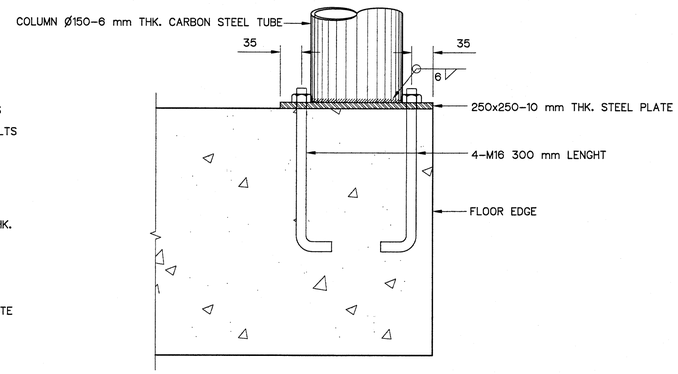
DETAIL "1"

SCALE 1:10



PLAN

SCALE 1:5



SECTION 1-1

SCALE 1:5

COLUMN INSTALLATION DETAILS

DIMENSIONS ARE IN MILLIMETERS

SYMBOLS

SECONDARY STAGE CONCRETE

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. THN-GN-04

REFERENCE DRAWING :

1. EMERGENCY CHANNEL, FLOOD GATE PLAN, SECTIONS AND DETAILS THN-PH-56

0 0.1 0.2 0.3 0.4
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 4
SCALE 1:50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

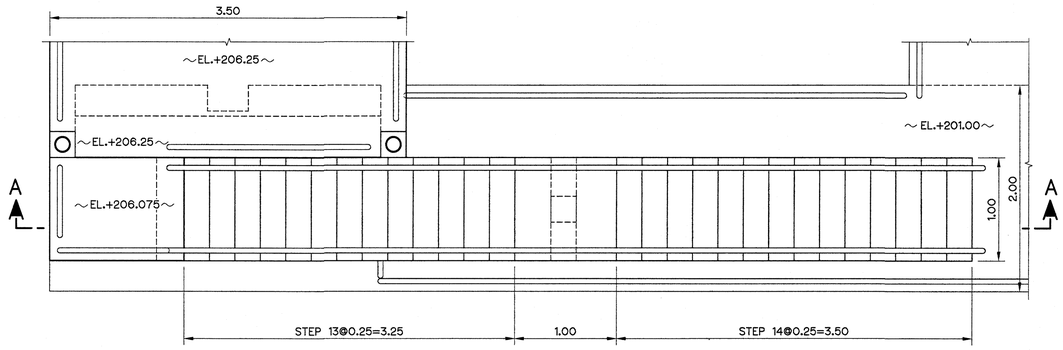
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

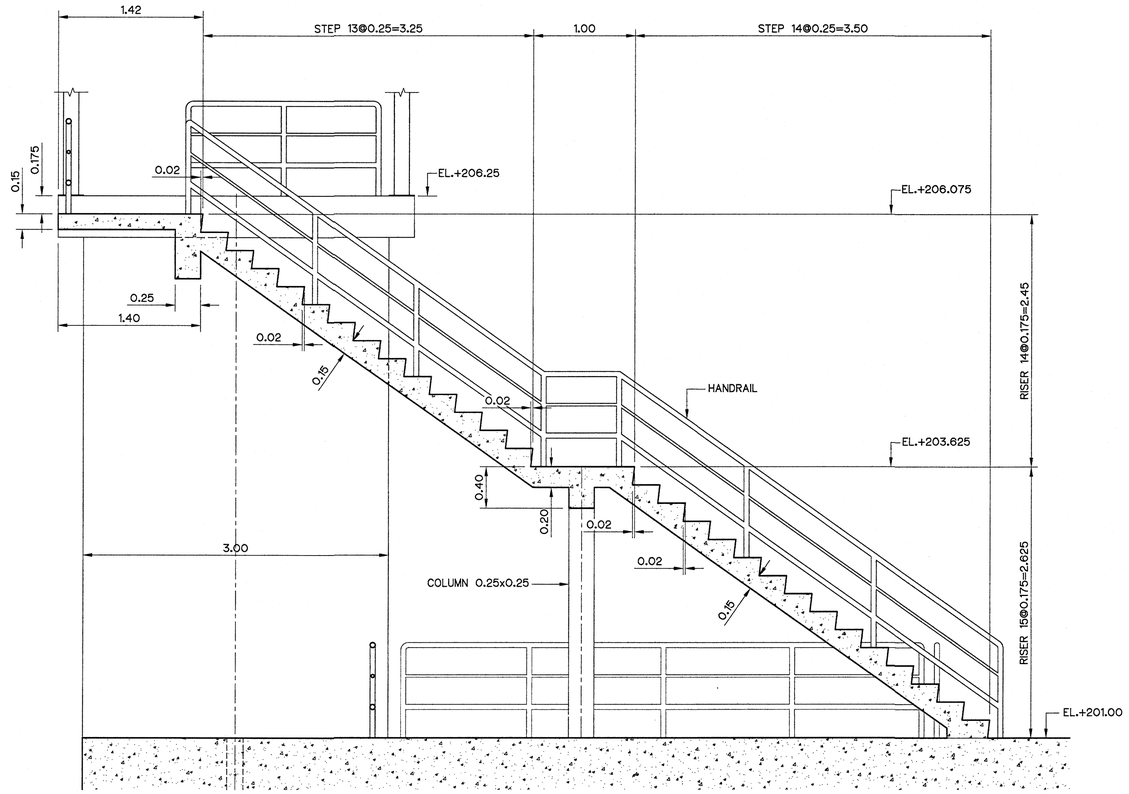
EMERGENCY CHANNEL

FLOOD GATE SECTION, ROOF STRUCTURE PLAN AND DETAILS

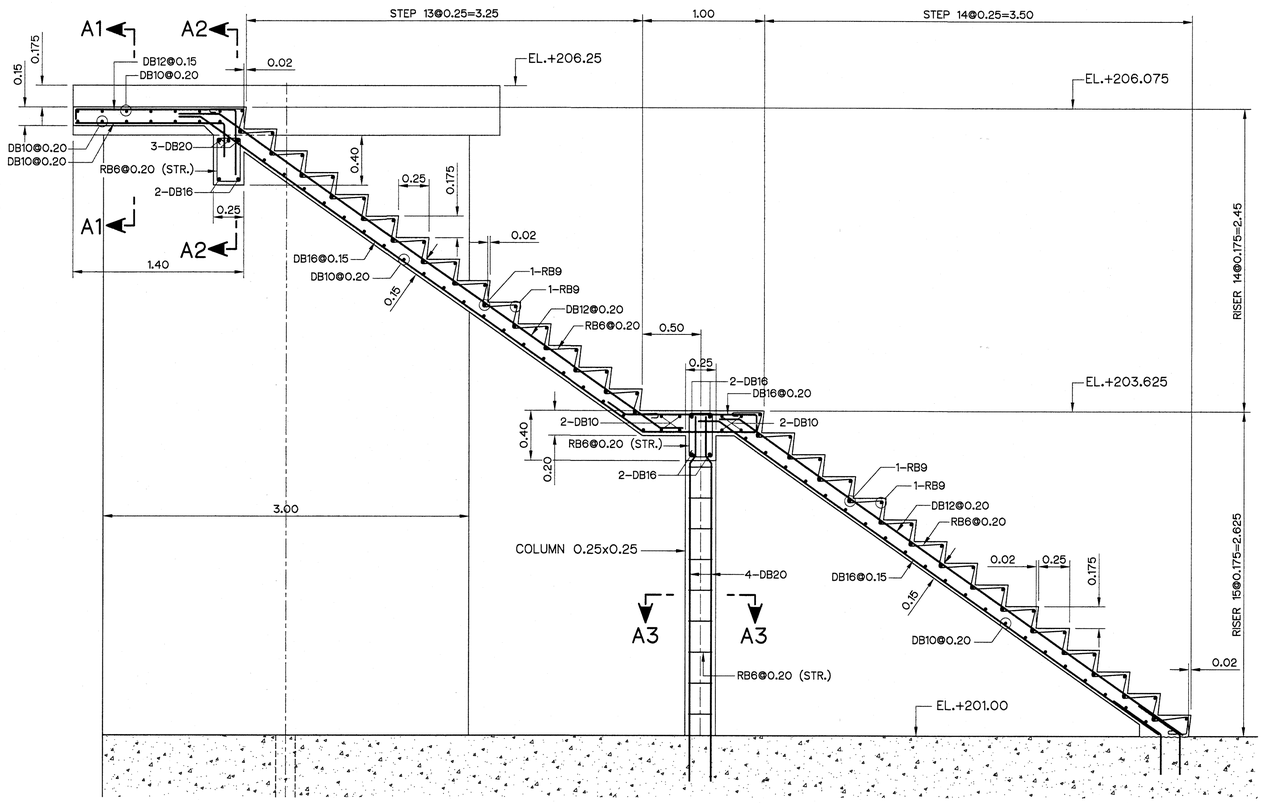
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED พ.ย.6650	SUBMITTED
DRAWN	RECOMMENDED
CHECKED พ.ย.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-PH-57 / SHEET NO. 82 OF 157



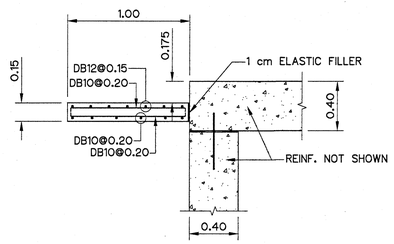
PLAN
SCALE 1:30



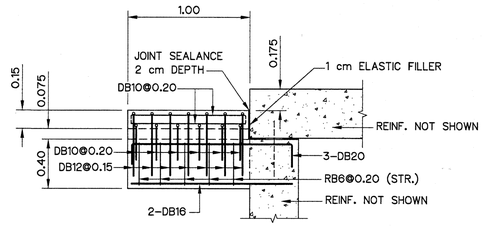
SECTION A–A
SCALE 1:30



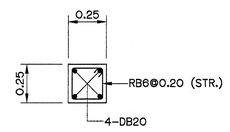
SECTION A–A
(REINFORCEMENT DETAILS)
SCALE 1:25



SECTION A1–A1
SCALE 1:25



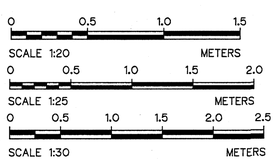
SECTION A2–A2
SCALE 1:25



SECTION A3–A3
(COLUMN)
SCALE 1:20

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. THN–GN–04

REFERENCE DRAWING :
1. EMERGENCY CHANNEL, FLOOD GATE PLAN, SECTIONS AND DETAILS THN–PH–56



NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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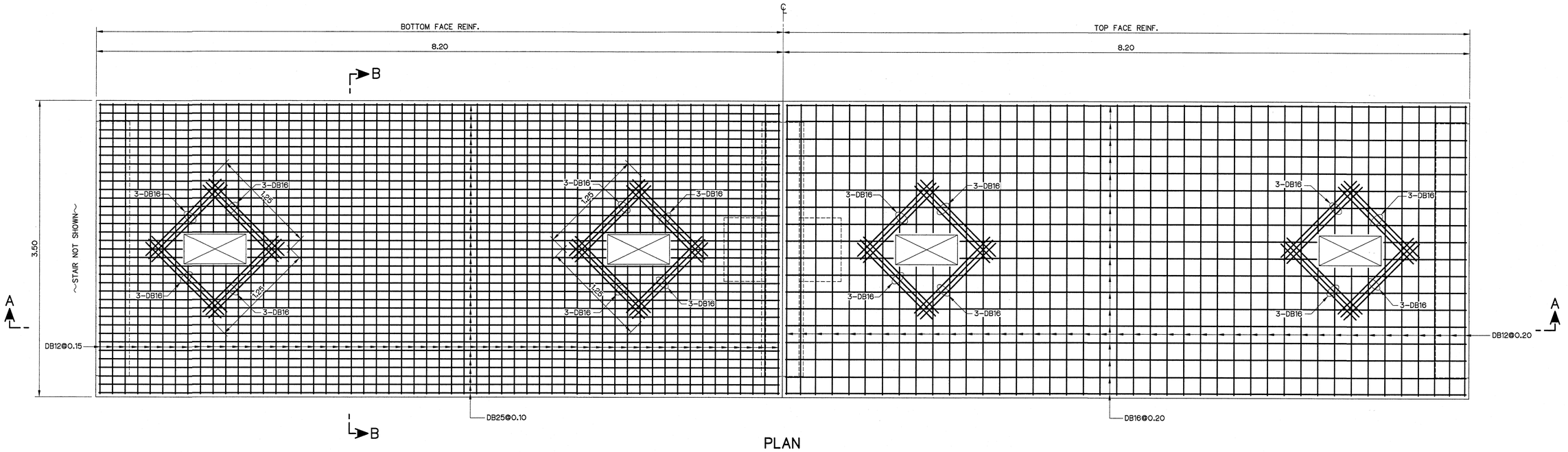
MINISTRY OF ENERGY

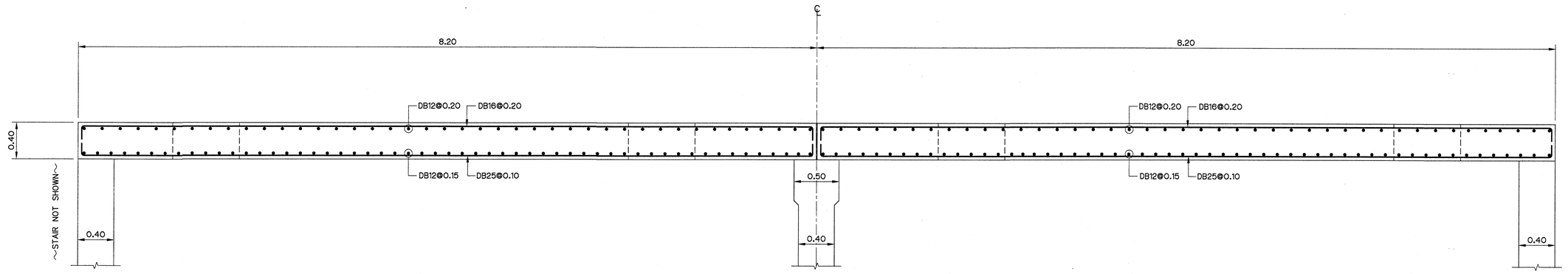
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
EMERGENCY CHANNEL
STAIR "ST–1" PLAN, SECTIONS AND REINFORCEMENT DETAILS

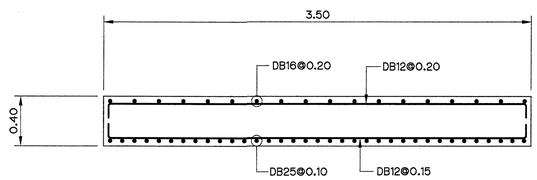
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วิ.6650 วิ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วิ.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER DATE	APPROVED
DRAWING NO. THN–PH–58	SHEET NO. 83 OF 157



PLAN
SCALE 1:25



SECTION A–A
SCALE 1:25



SECTION B–B
SCALE 1:25

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. THN–GN–04

REFERENCE DRAWING :

1. EMERGENCY CHANNEL, FLOOD GATE PLAN, SECTIONS AND DETAILS THN–PH–56

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
EMERGENCY CHANNEL
FLOOD GATE RAISING BRIDGE REINFORCEMENT DETAILS

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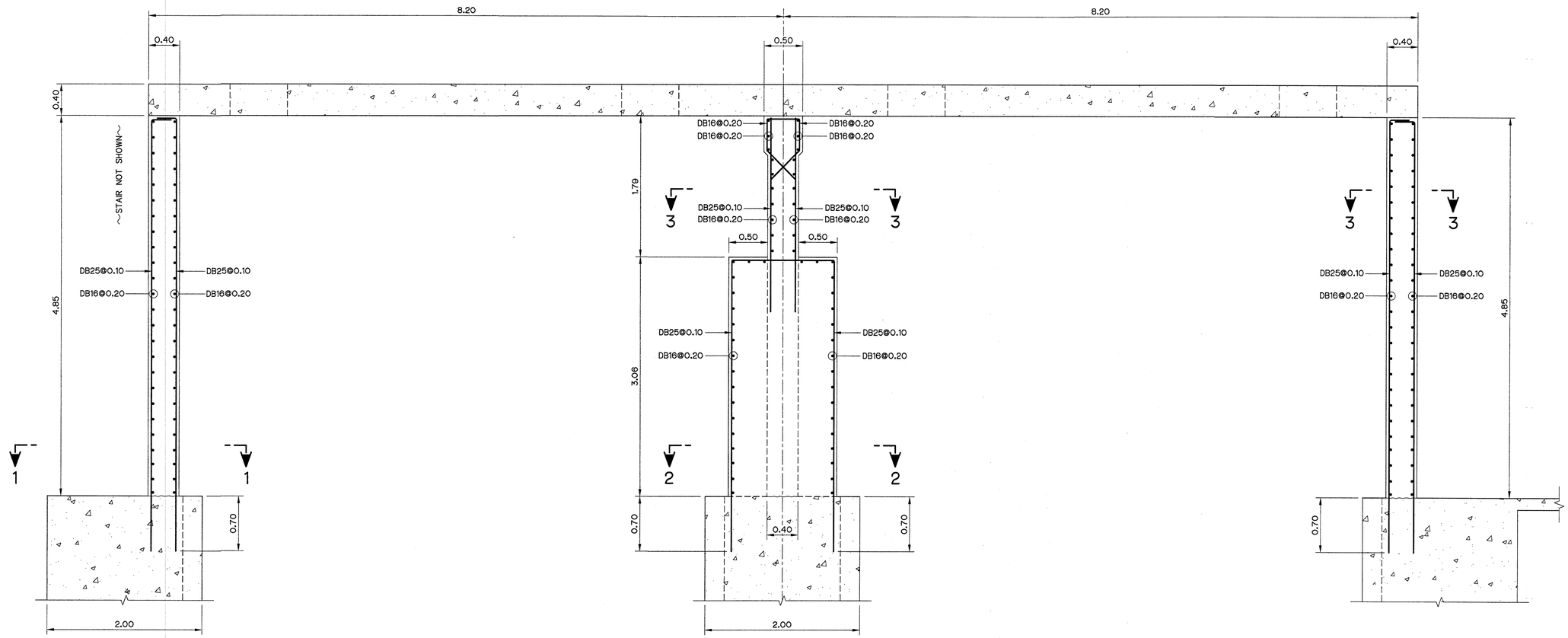
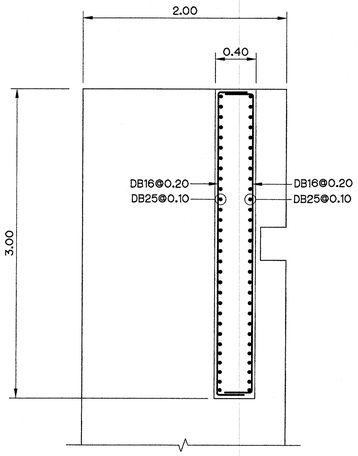
DESIGNED	สม.6650	สม.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	สม.	สม.6651	RECOMMENDED
PROJECT MANAGER	สม.	6/9/2024 DATE	APPROVED

DRAWING NO. THN–PH–59
SHEET NO. 84 OF 157



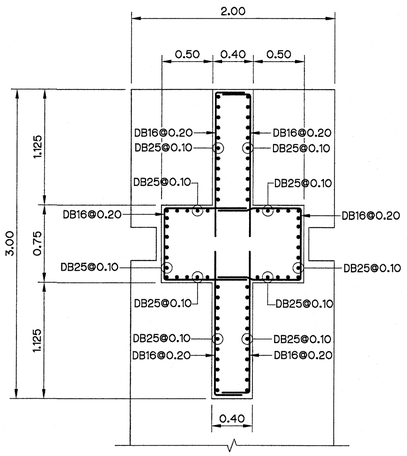
BRIDGE SUPPORT REINFORCEMENT DETAILS

SCALE 1:30



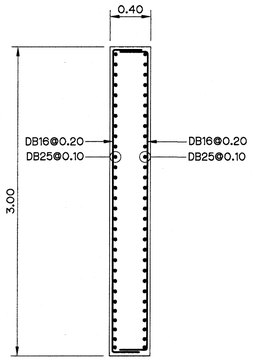
SECTION 1–1

SCALE 1:30



SECTION 2–2

SCALE 1:30



SECTION 3–3

SCALE 1:30

0 0.5 1.0 1.5 2.0 2.5

SCALE 1:30 METERS

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. THN–GN–04

REFERENCE DRAWING :

1. EMERGENCY CHANNEL, FLOOD GATE PLAN, SECTIONS AND DETAILS THN–PH–56

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

FLOOD GATE RAISING BRIDGE SUPPORT REINFORCEMENT DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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1				
	CONSULTANTS		DEDE	

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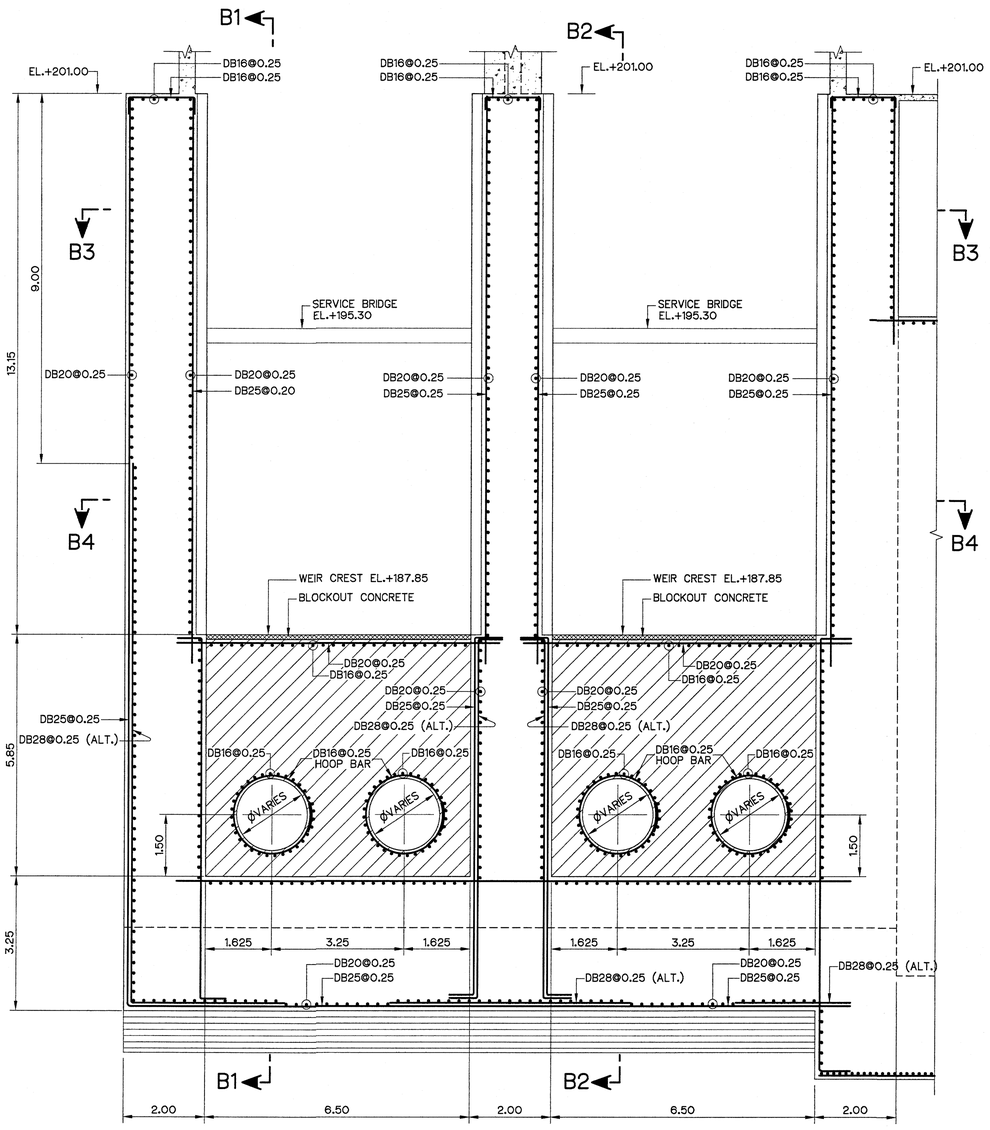
DESIGNED	สถ.6650	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	สถ.6651	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

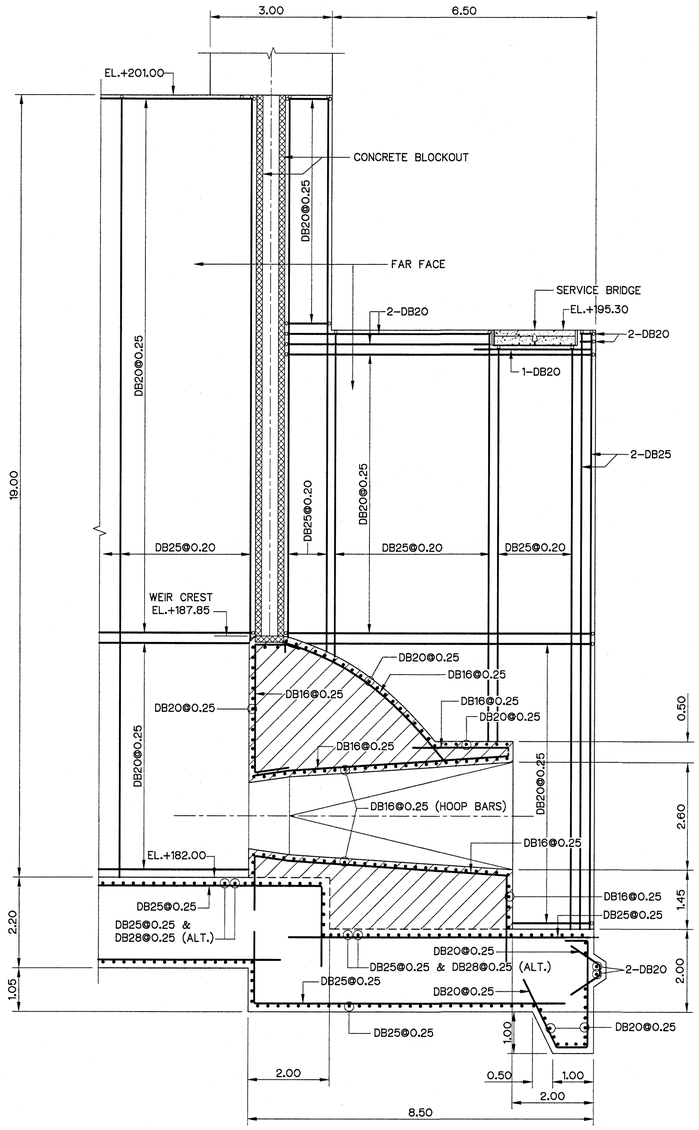
DRAWING NO. THN–PH–60

SHEET NO. 85 OF 157



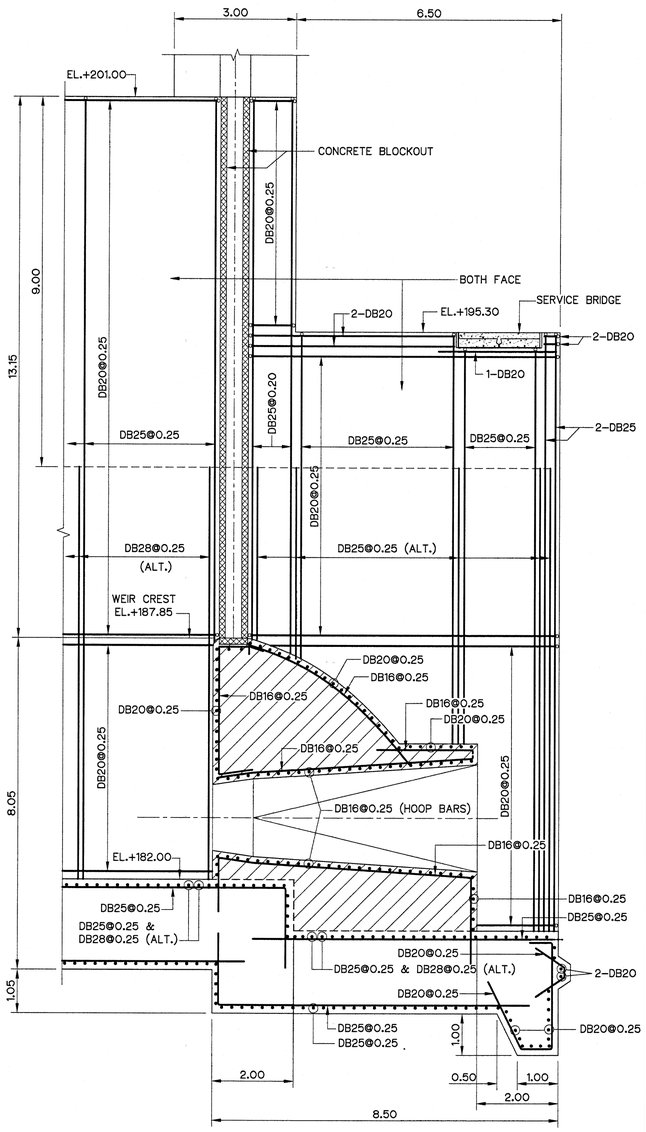
SECTION B–B (THN–PH–56)

SCALE 1:75



SECTION B1–B1

SCALE 1:75



SECTION B2–B2

SCALE 1:75

SYMBOLS

SECONDARY STAGE CONCRETE

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. THN–GN–04

REFERENCE DRAWINGS :

1. EMERGENCY CHANNEL, FLOOD GATE PLAN, SECTIONS AND DETAILS THN–PH–56
2. EMERGENCY CHANNEL, FLOOD GATE PIER AND WEIR REINFORCEMENT DETAILS 2/2 THN–PH–62

0 1 2 3 4 5 6

SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

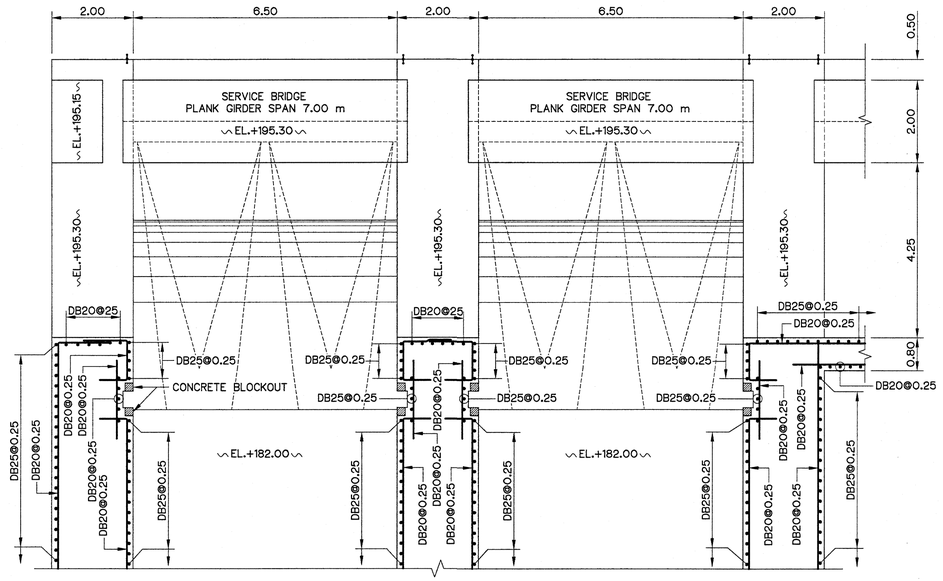
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

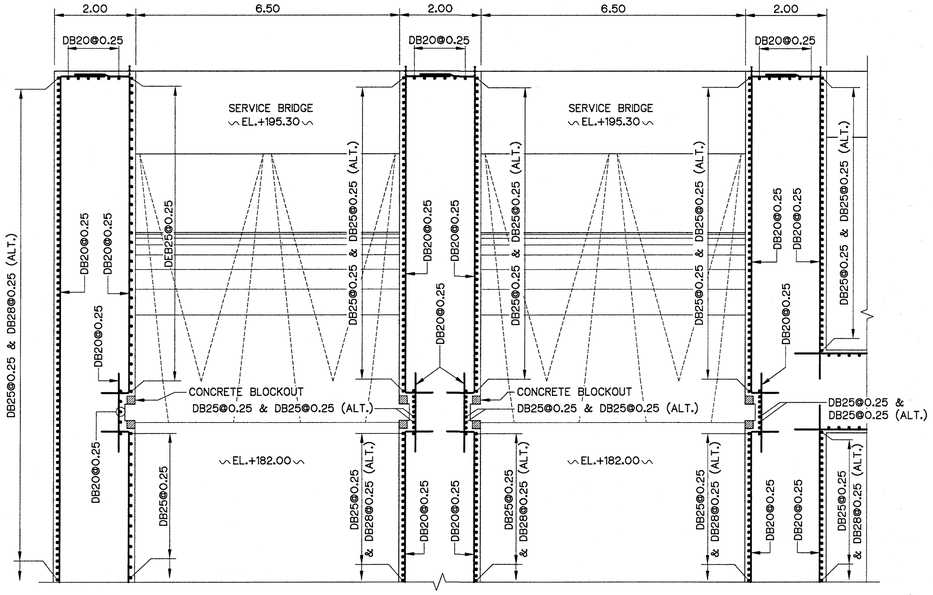
FLOOD GATE PIER AND WEIR REINFORCEMENT DETAILS 1/2

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED ส.ต.6650 ส.ต.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED ส.ต.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–61 / SHEET NO. 86 OF 157



SECTION B3–B3

SCALE 1:75



SECTION B4–B4

SCALE 1:75

0 1 2 3 4 5 6

SCALE 1:75 METERS

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. THN–GN–04

REFERENCE DRAWINGS :

1. EMERGENCY CHANNEL, FLOOD GATE PLAN, SECTIONS AND DETAILS THN–PH–56
2. EMERGENCY CHANNEL, FLOOD GATE PIER AND WEIR REINFORCEMENT DETAILS 1/2 THN–PH–61

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

FLOOD GATE PIER AND WEIR REINFORCEMENT DETAILS 2/2

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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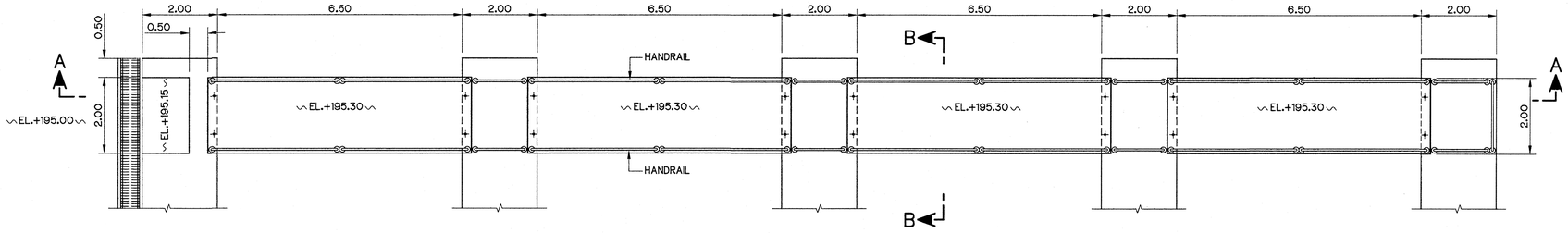
CONSULTANTS: FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DEDE: Department of Alternative Energy Development and Efficiency, MINISTRY OF ENERGY

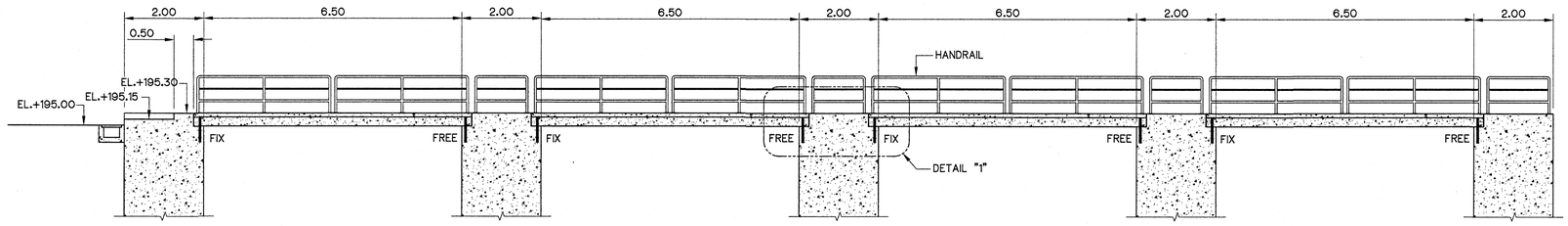
DESIGNED วิศ.6650 วิศ.88523
DRAWN
CHECKED วิศ.6651
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

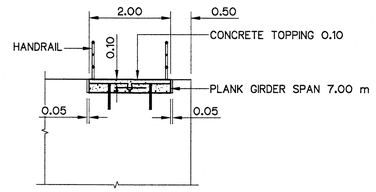
DRAWING NO. THN–PH–62
SHEET NO. 87 OF 157



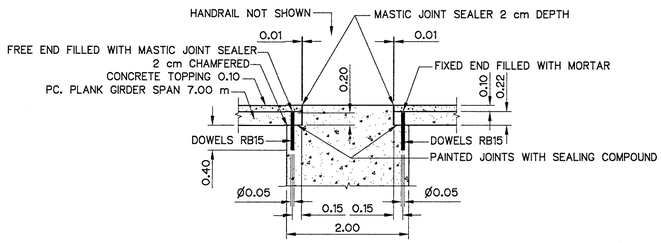
PLAN
SCALE 1:75



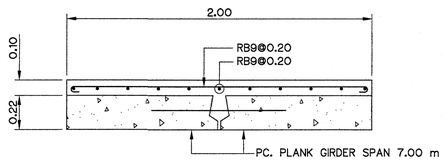
SECTION A–A
SCALE 1:75



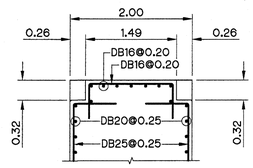
SECTION B–B
SCALE 1:75



DETAIL "1"
SCALE 1:50



BRIDGE REINFORCEMENT DETAILS
SCALE 1:20



BRIDGE SUPPORT REINFORCEMENT DETAILS
SCALE 1:50

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. THN–GN–04

REFERENCE DRAWING :

1. EMERGENCY CHANNEL, FLOOD GATE PLAN, SECTIONS AND DETAILS THN–PH–56
2. EMERGENCY CHANNEL, FLOOD GATE PIER AND WEIR REINFORCEMENT DETAILS 1/2 THN–PH–61
3. EMERGENCY CHANNEL, FLOOD GATE PIER AND WEIR REINFORCEMENT DETAILS 2/2 THN–PH–62

0 0.5 1.0 1.5
SCALE 1:20 METERS

0 1 2 3 4
SCALE 1:50 METERS

0 1 2 3 4 5 6
SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE AND EMERGENCY CHANNEL
SERVICE BRIDGE DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

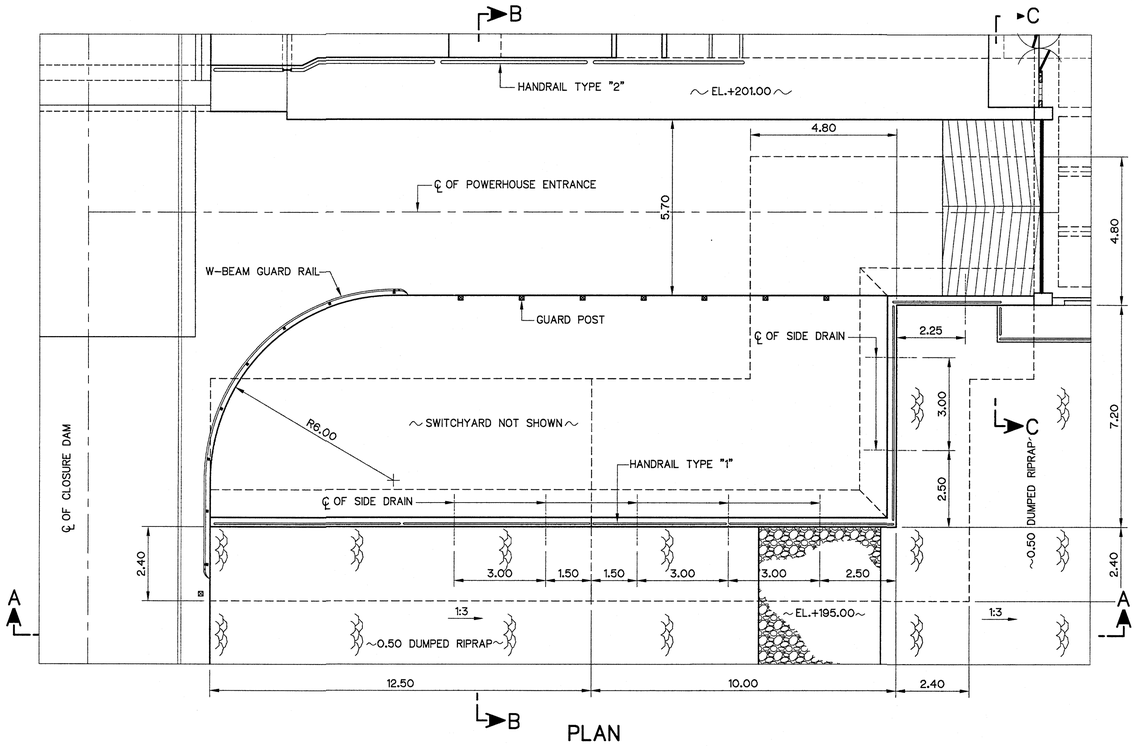
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิศ.6650	วิศ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิศ.6651		RECOMMENDED
			APPROVED

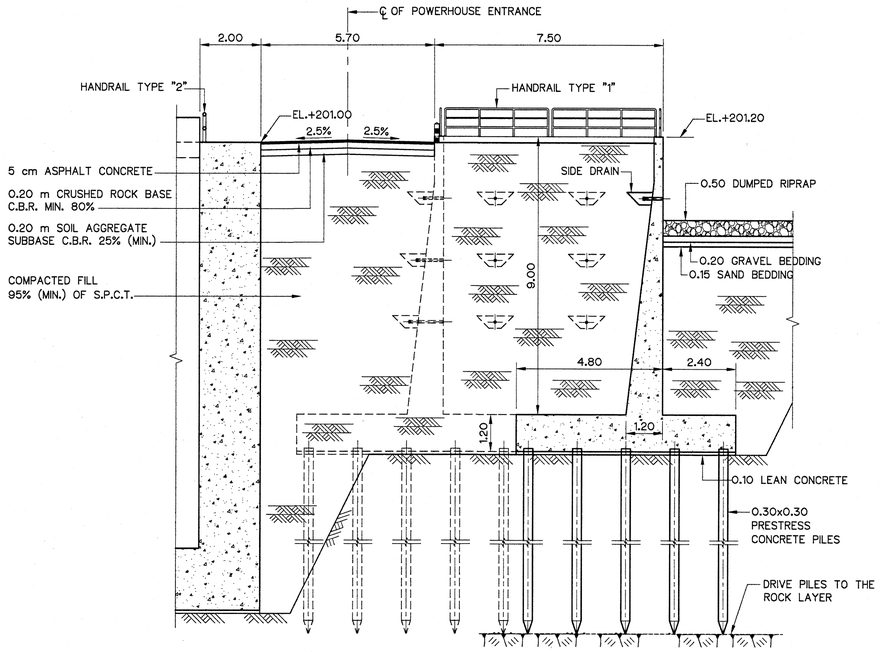
PROJECT MANAGER 6/9/2024 DATE

DRAWING NO. THN–PH–63

SHEET NO. 88 OF 157



PLAN
SCALE 1:100



SECTION B–B
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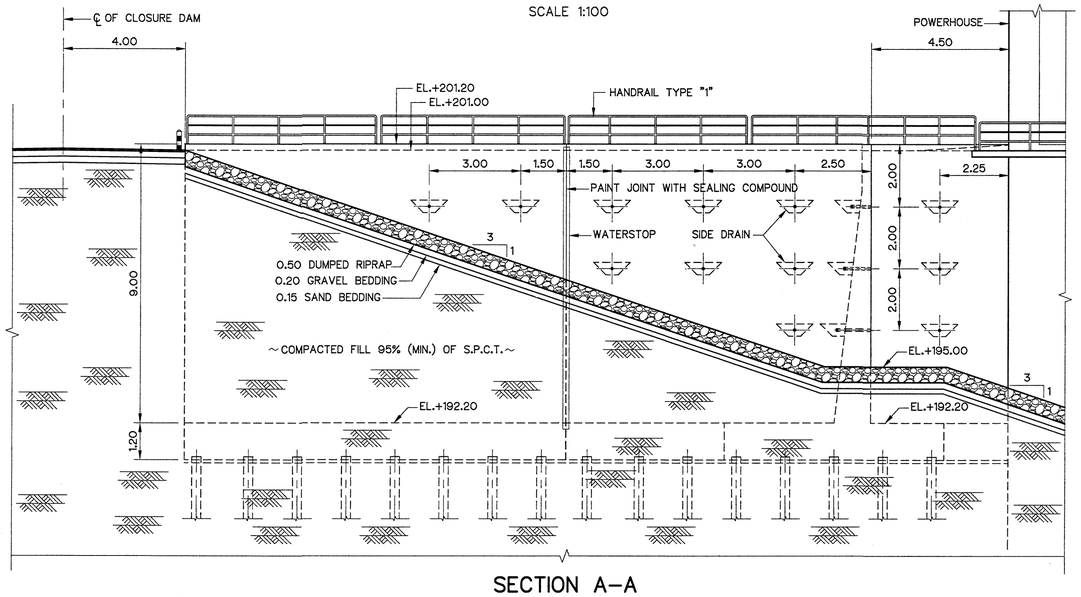
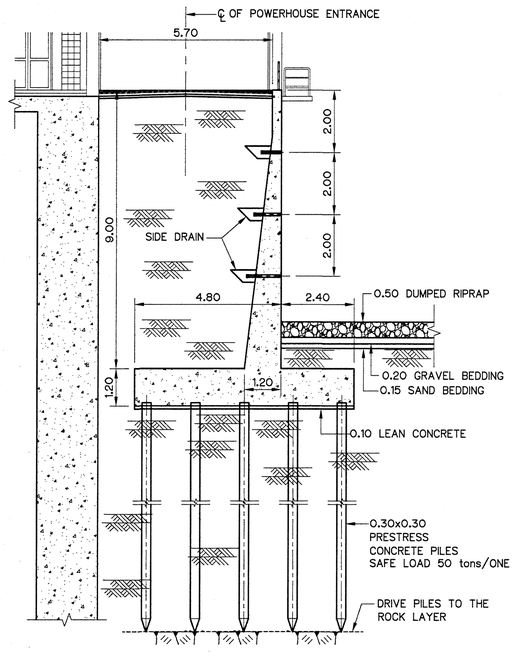
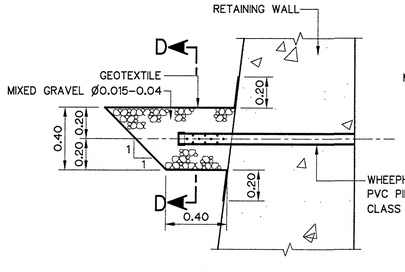


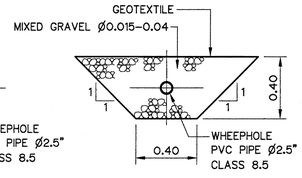
SECTION A–A
SCALE 1:100



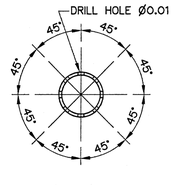
SECTION C–C
SCALE 1:100



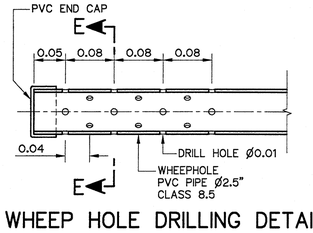
SIDE DRAIN DETAIL
SCALE 1:20



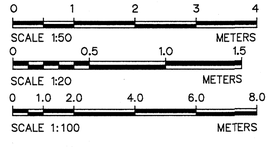
SECTION D–D
SCALE 1:20



SECTION E–E
SCALE 1:5



WHEEP HOLE DRILLING DETAIL
SCALE 1:5



NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS:
1. POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN — THN-PH-01
2. POWERHOUSE ENTRANCE, PILING PLAN, PLAN AND REINFORCEMENT DETAILS OF RETAINING WALL — THN-PH-65

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE ENTRANCE
PLAN, SECTIONS AND DETAILS

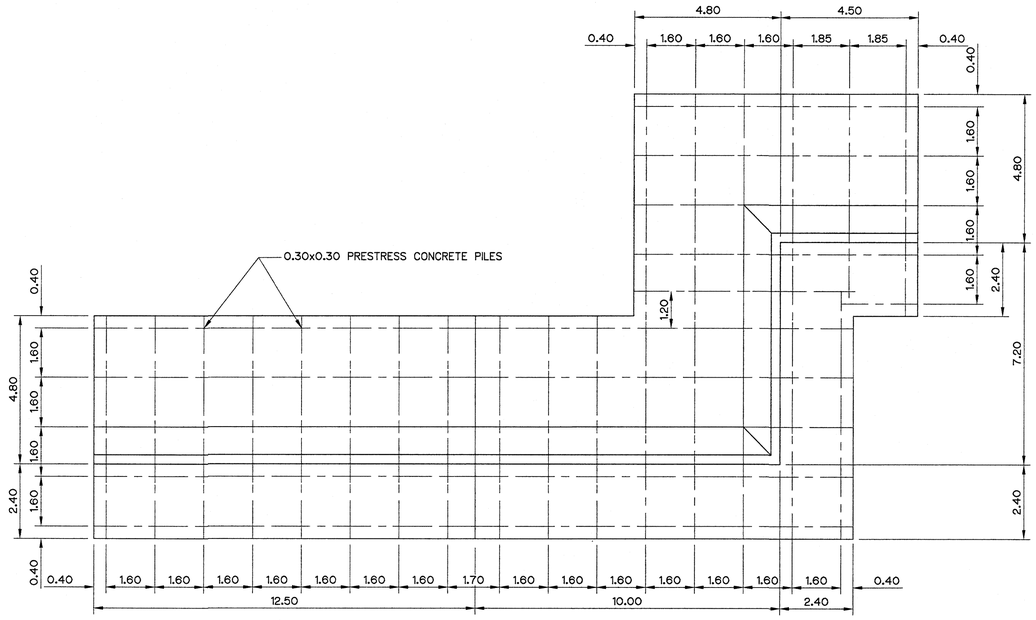
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS: FRONTIER ENGINEERING CONSULTANTS CO.,LTD. — DEDE

DESIGNED วิ.6650 ณ.88523
DRAWN
CHECKED วิ.6651
PROJECT MANAGER 6/9/2024 DATE

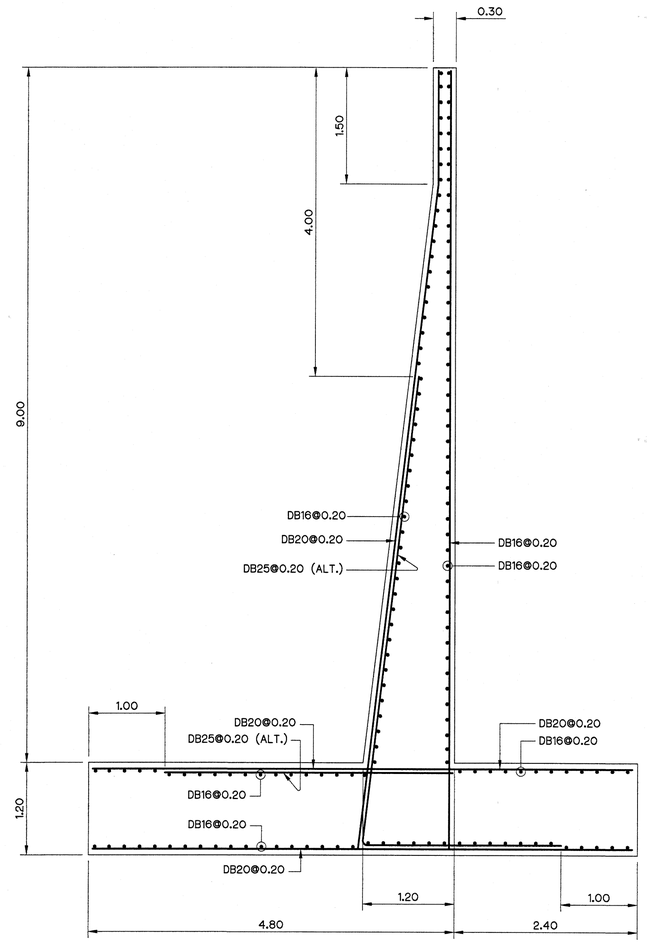
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-PH-64
SHEET NO. 89 OF 157



PILING PLAN OF RETAINING WALL

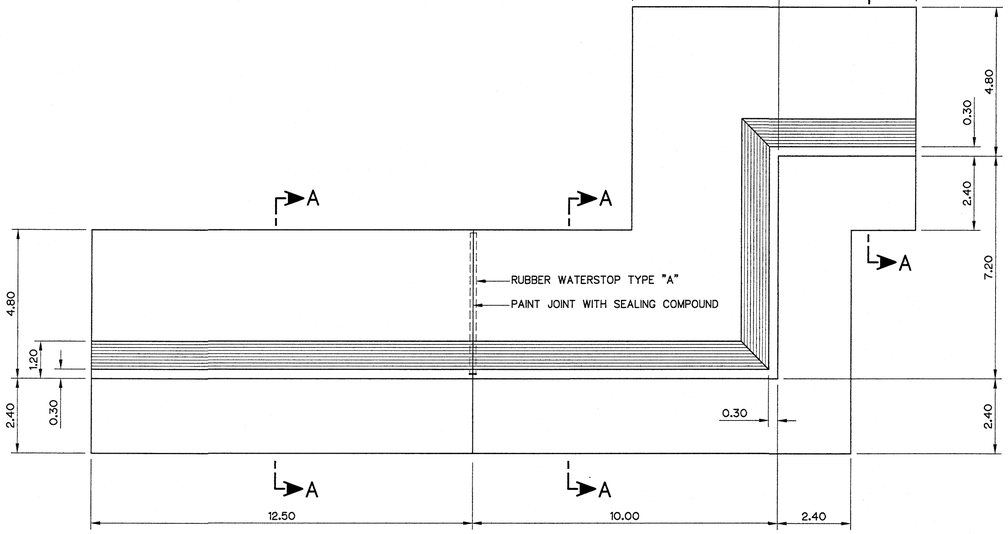
SCALE 1:100



SECTION A–A

(REINFORCEMENT DETAILS)

SCALE 1:40



PLAN OF RETAINING WALL

SCALE 1:100

SYMBOLS :

+ 0.30x0.30 PRESTRESS CONCRETE PILES

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE ENTRANCE, PLAN, SECTIONS AND DETAILS THN-PH-64

0 1 2 3
SCALE 1:40 METERS

0 1.0 2.0 4.0 6.0 8.0
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

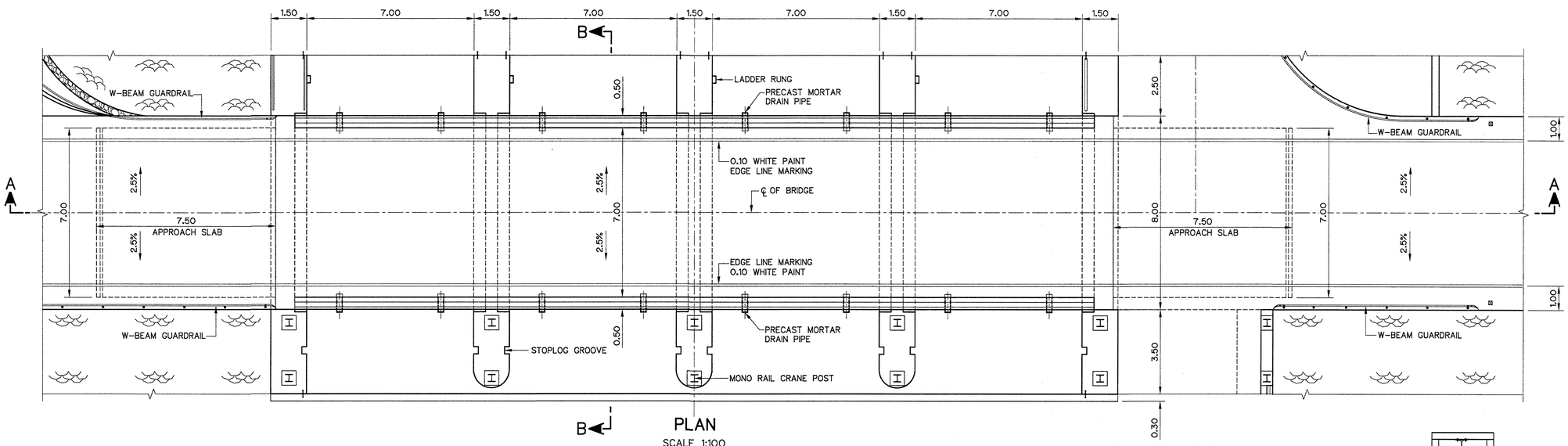
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE ENTRANCE

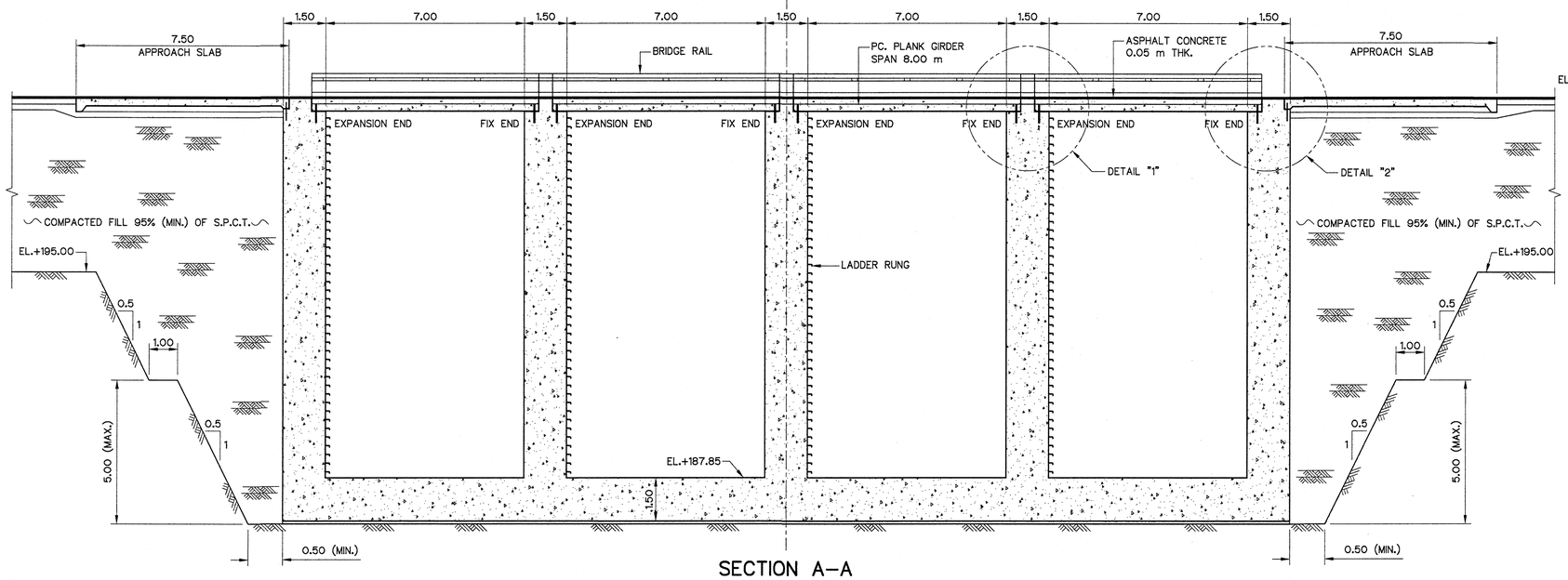
PILING PLAN, PLAN AND REINFORCEMENT DETAILS OF RETAINING WALL

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วิ.เ.6650 วิ.เ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วิ.เ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-PH-65	SHEET NO. 90 OF 157



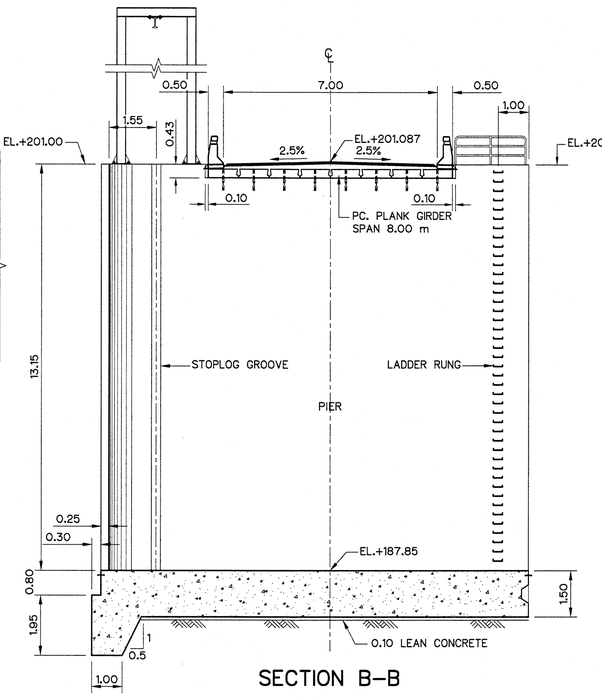
PLAN

SCALE 1:100



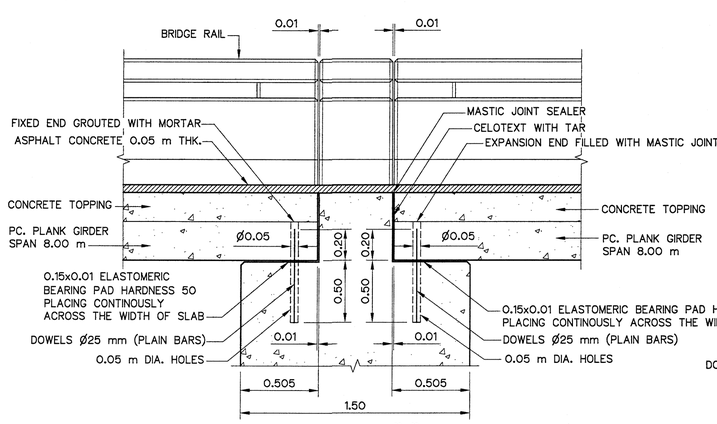
SECTION A–A

SCALE 1:100



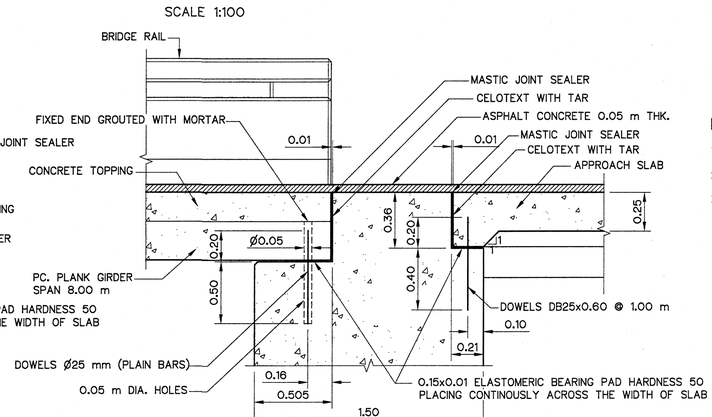
SECTION B–B

SCALE 1:100



DETAIL "1"

SCALE 1:20



DETAIL "2"

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS:

1. POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN — THN-PH-01
2. BRIDGE ON CLOSURE DAM, SECTIONS AND DETAILS — THN-PH-67
3. BRIDGE ON CLOSURE DAM, TRAFFIC RAILING AND APPROACH SLAB — THN-PH-68

0 0.5 1.0 1.5

SCALE 1:20 METERS

0 1.0 2.0 4.0 6.0 8.0

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

BRIDGE ON CLOSURE DAM

PLAN, SECTIONS AND DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

DESIGNED วศ.6650 วศ.88523

SUBMITTED

DRAWN

RECOMMENDED

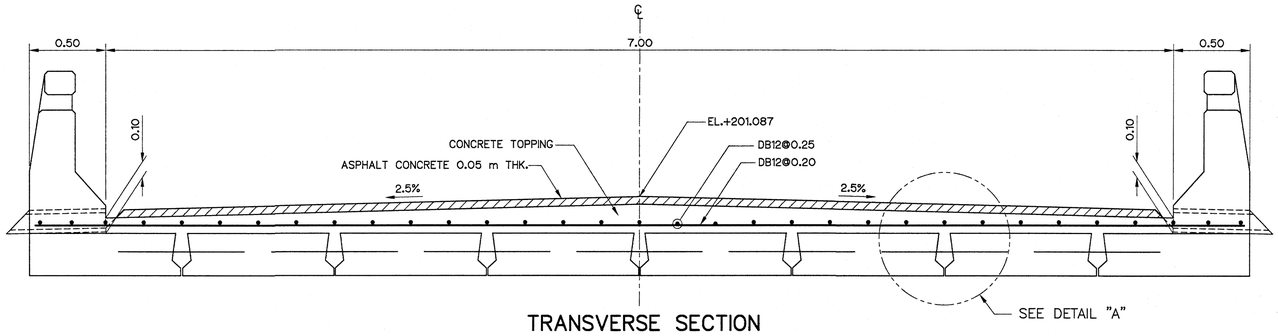
CHECKED วศ.6651

APPROVED

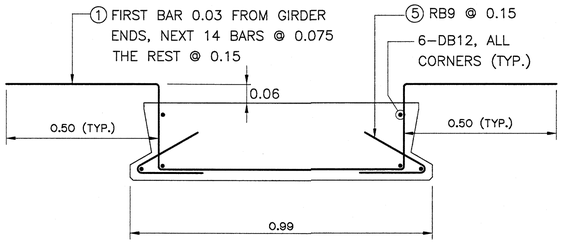
PROJECT MANAGER 6/9/2024 DATE

DRAWING NO. THN-PH-66

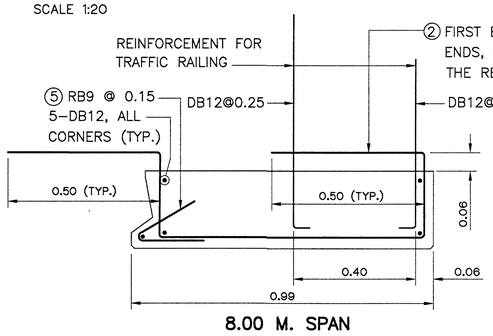
SHEET NO. 91 OF 157



TRANSVERSE SECTION
SCALE 1:20

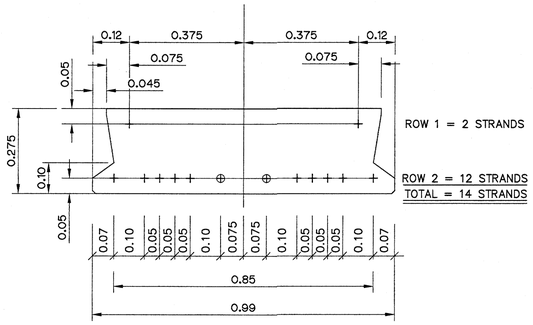


8.00 M. SPAN
INTERIOR GIRDER CROSS SECTIONS
SCALE 1:10

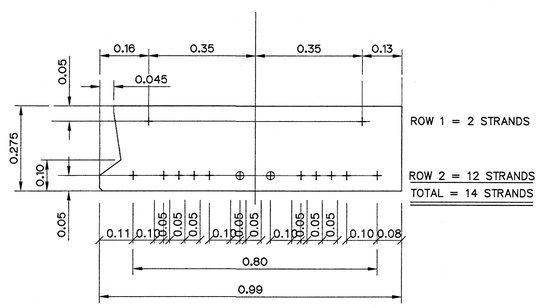


8.00 M. SPAN
EXTERIOR GIRDER CROSS SECTION
SCALE 1:10

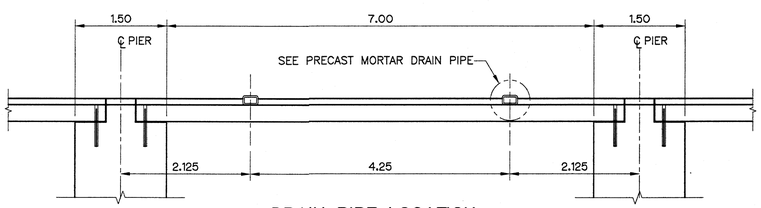
BAR BENDING DIAGRAMS (M.)	BAR MARK	REBAR (M.)
0.50 0.50 ①	①	DB12
0.50 0.50 ②	②	DB12
VARIES ③	③	DB12
VARIES ④	④	DB12
0.30 ⑤ 0.30	⑤	RB9



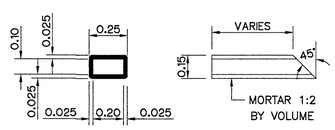
8.00 M. SPAN
INTERIOR GIRDER STRAND ARRANGEMENTS
SCALE 1:10



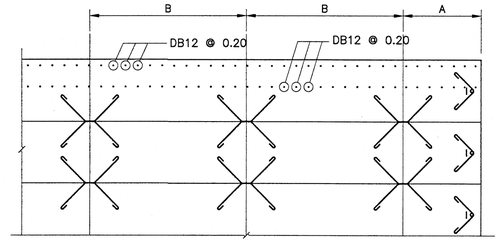
8.00 M. SPAN
EXTERIOR GIRDER STRAND ARRANGEMENTS
SCALE 1:10



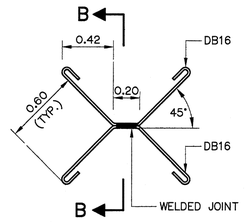
DRAIN PIPE LOCATION
SCALE 1:50



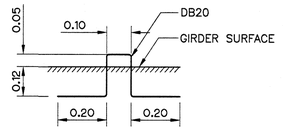
PRECAST MORTAR DRAIN PIPE
SCALE 1:20



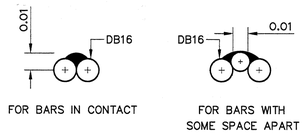
PC. PLANK GIRDER AND CAST–IN–SITU RAILING PLAN
SCALE 1:50



SHEAR CONNECTOR DETAIL
SCALE 1:25



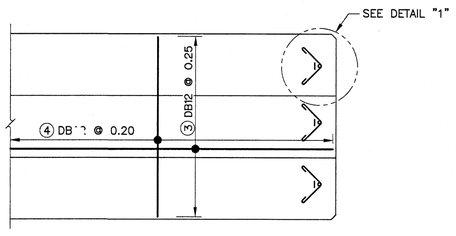
LIFTING POINT DETAIL
SCALE 1:12.5



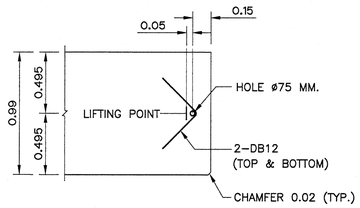
SECTION B–B
SCALE 1:2

TABLE PLANK GIRDER OUTLINE

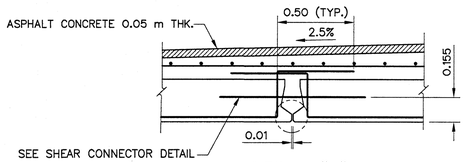
SPAN (M.)	TOTAL SHEAR CONNECTOR PER GIRDER			
	A	B	INTERIOR	EXTERIOR
8.00	0.70	1.648	20	10



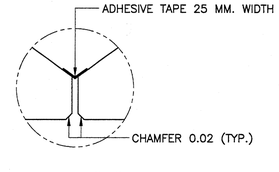
LAYOUT OF OF REINFORCE CONCRETE TOPPING OVER PLANK GIRDERS
SCALE 1:50



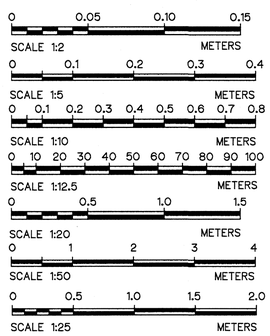
DETAIL "1"
SCALE 1 : 25



DETAIL "A"
SCALE 1 : 20



DETAIL "B"
SCALE 1 : 5



REFERENCE DRAWINGS:

1. POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN	DWG. NO. THN–PH–01
2. BRIDGE ON CLOSURE DAM, PLAN, SECTIONS AND DETAILS	DWG. NO. THN–PH–67
3. BRIDGE ON CLOSURE DAM, TRAFFIC RAILING AND APPROACH SLAB DETAILS	DWG. NO. THN–PH–68

NOTES :

1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
2. DESIGN LIVE LOAD: HL–93.
3. A MINIMUM ULTIMATE COMPRESSIVE STRENGTH FOR A 150x150x150 MM. CUBE AT 28 DAYS AS FOLLOWS:
   - A) FOR PRESTRESSED PLANK GIRDER 50 MPa. (510 KG/CM^2)
   - B) FOR BRIDGE SLAB TOPPING AND SHEAR KEY 40 MPa. (408 KG/CM^2)
   - C) FOR SIDEWALK AND BARRIER 35 MPa. (357 KG/CM^2)
4. PRESTRESSING STRANDS MAY BE RELEASED AFTER CONCRETE HAS ATTAINED A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 35 MPa. (357 KG/CM^2) FOR THE STANDARD CUBE.
5. REBARS SMALLER THAN RB9 MM. SHALL BE TIS 20 GRADE SR 24 PLAIN ROUND BARS, OTHERS SHALL BE TIS 24 GRADE SD 40 DEFORMED BARS UNLESS OTHERWISE INDICATED.
6. SYMBOLS OF PRESTRESSING STRANDS
   - + —— BOND PRESTESSING STRANDS
   - ⊕ —— DEBOND PRESTESSING STRANDS, DEBONDING LENGTHS FROM GIRDER ENDS
7. PC. PLANK GIRDER SHALL BE LIFTED AT BOTH ENDS, MIDSPAN LIFTING IS PROHIBITED.
8. THIS TYPE OF PC. PLANK GIRDER MAY BE USED WITH PIERS FOR SLAB BRIDGE HAVING THE SAME SPAN LENGTH.
9. DOWELS FOR HOLDING PC. PLANK GIRDER OVER PIERS SHALL BE PROVIDED AT EVERY ALTERNATE GIRDER.
10. IF PIERS FALL WITHIN THE TRANSITION OF HORIZONTAL CURVE, THE TOP OF CAP BEAM SHALL BE SUPERELEVATED IN ACCORDANCE WITH THE ROADWAY SUPERLEVATION SO THAT THE PC. PLANK GIRDER SHALL BE ON A SMOOTH PLANE. ELEVATION OF FINISHED SURFACE SHALL BE ATTAINED BY ADJUSTING THE CONCRETE TOPPING THIS SHALL BE DONE WITH THE APPROVAL OF THE ENGINEER.
11. CASTING LENGTH OF A GIRDER SHALL BE 1 CM. SHORTER THAN THE SPAN LENGTH.
12. REPLACE MASTIC JOINT SEALER WITH COMPRESSION SEAL FOR CONCRETE SURFACE
13. THIS DRAWING IS USED IN CONJUNCTION WITH DWG. NO. THN–PH–66, THN–PH–68

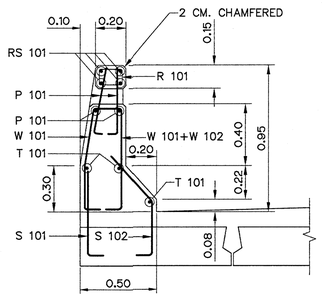
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

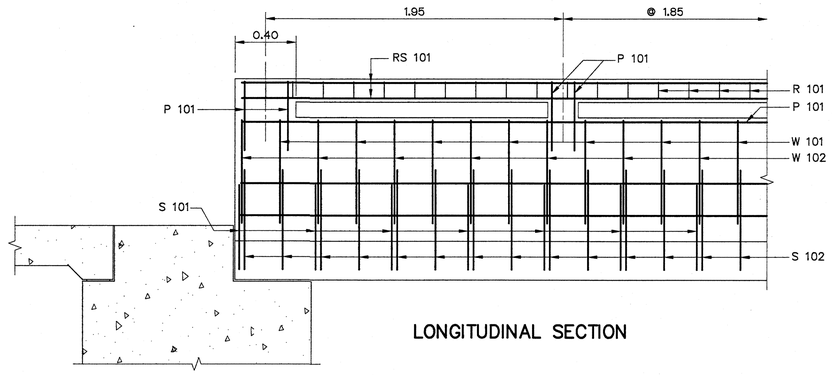
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
BRIDGE ON CLOSURE DAM
SECTIONS AND DETAILS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ย.6650 ท.น.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ย.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN–PH–67	SHEET NO. 92 OF 157



TRANSVERSE SECTION

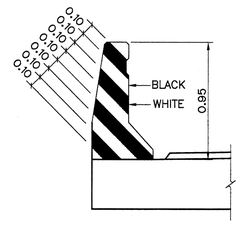


LONGITUDINAL SECTION

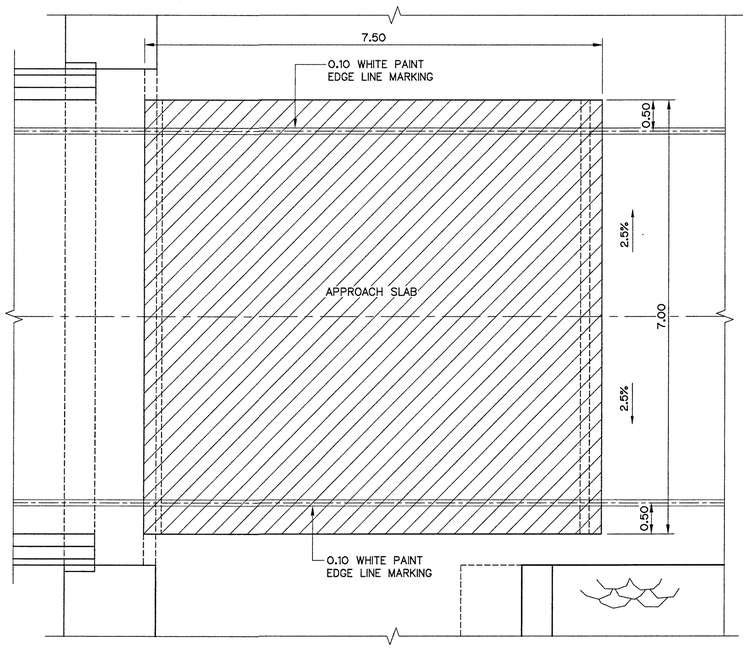
TRAFFIC RAILING
SCALE 1:20

TABLE OF RAILING REINFORCEMENT					
BAR BENDING DIAGRAMS	BAR MARK	#	@ (CM.)	NO.	L (CM.)
44, 7	P 101	4	–	4	4
15, 5, 10	R 101	2	20	–	–
795	RS 101	4	–	5	5
7.5, 795, 7.5	T 101	3	–	–	–
65, 19, 10, 10	W 101	4	50	–	–
10, 65, 10	W 102	4	50	–	–
55, 10	S 101	4	50	–	–
36, 40, 10	S 102	4	25	–	–

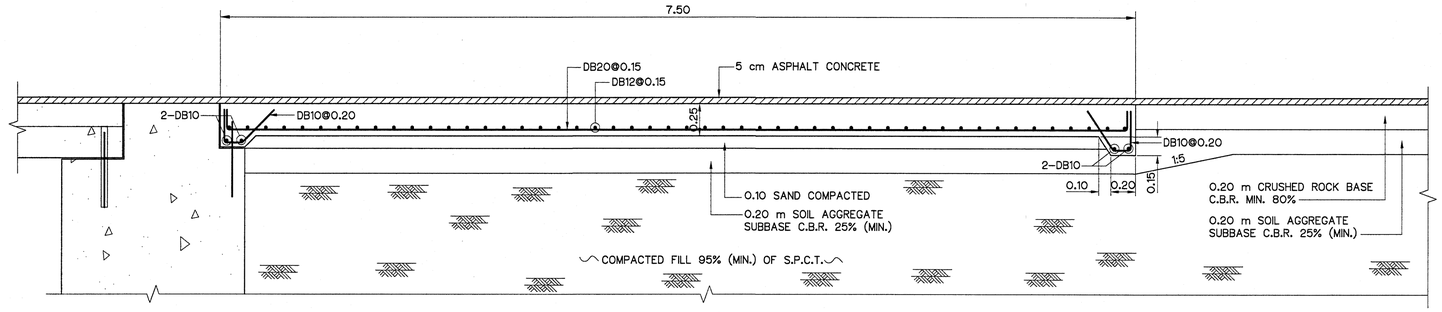
L = TOTAL LENGTH OF EACH BAR
NO. = TOTAL AMOUNT OF BARS
* = AMOUNT OF REINFORCEMENT IN ON POST
#2 = ø6 MM.
#3 = ø9 MM.
#4 = ø12 MM.
#5 = ø16 MM.



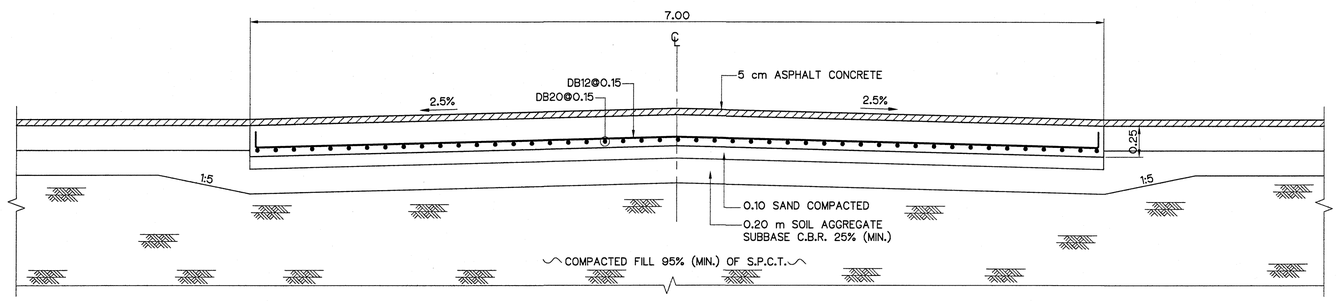
PAINT END OF TRAFFIC RAILING
SCALE 1:25



APPROACH SLAB PLAN
SCALE 1:50



SECTION A–A
SCALE 1:25



SECTION B–B
SCALE 1:25

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS:

1. BRIDGE ON CLOSURE DAM, PLAN, SECTIONS AND DETAILS THN-PH-66

0 0.5 1.0 1.5
SCALE 1:20 METERS
0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
BRIDGE ON CLOSURE DAM
TRAFFIC RAILING AND APPROACH SLAB DETAILS

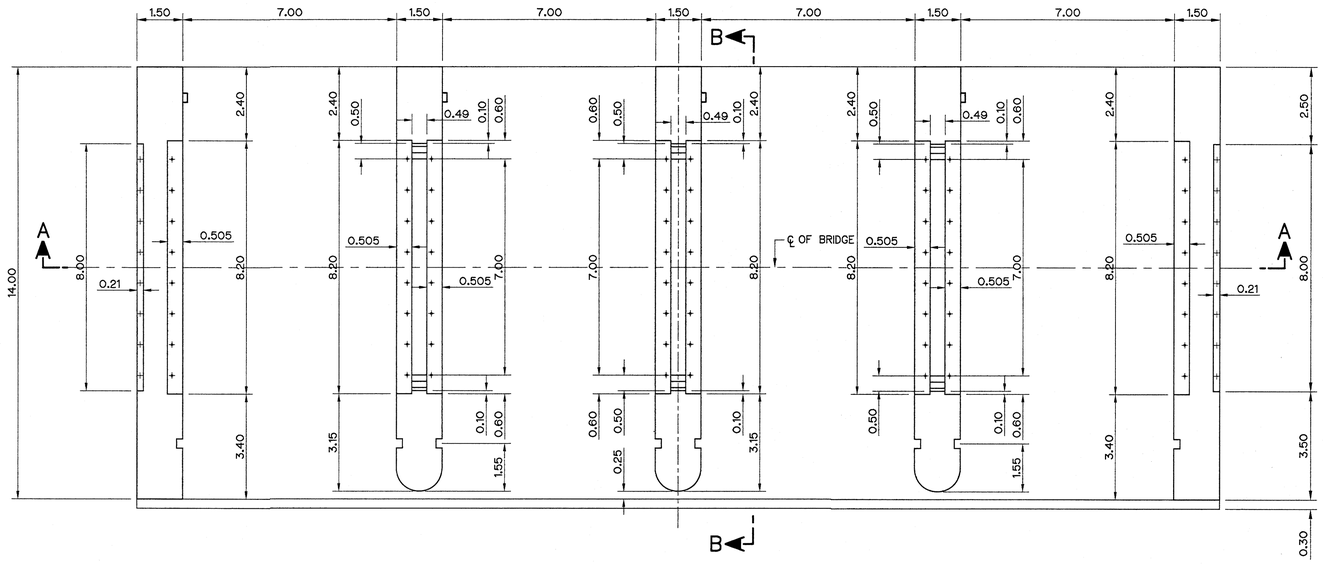
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

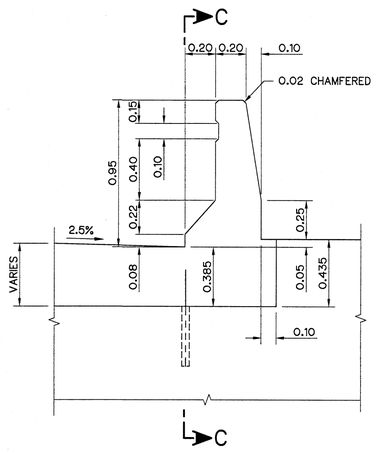
DESIGNED วิ.6650 วิ.88523
DRAWN
CHECKED วิ.6651
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

PROJECT MANAGER 6/9/2024 DATE

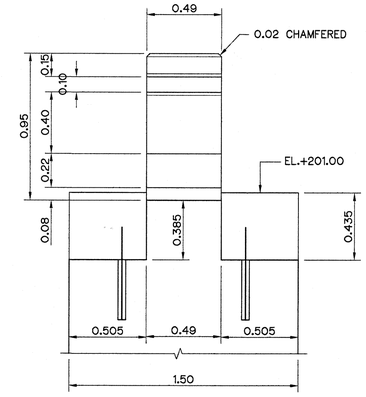
DRAWING NO. THN-PH-68
SHEET NO. 93 OF 157



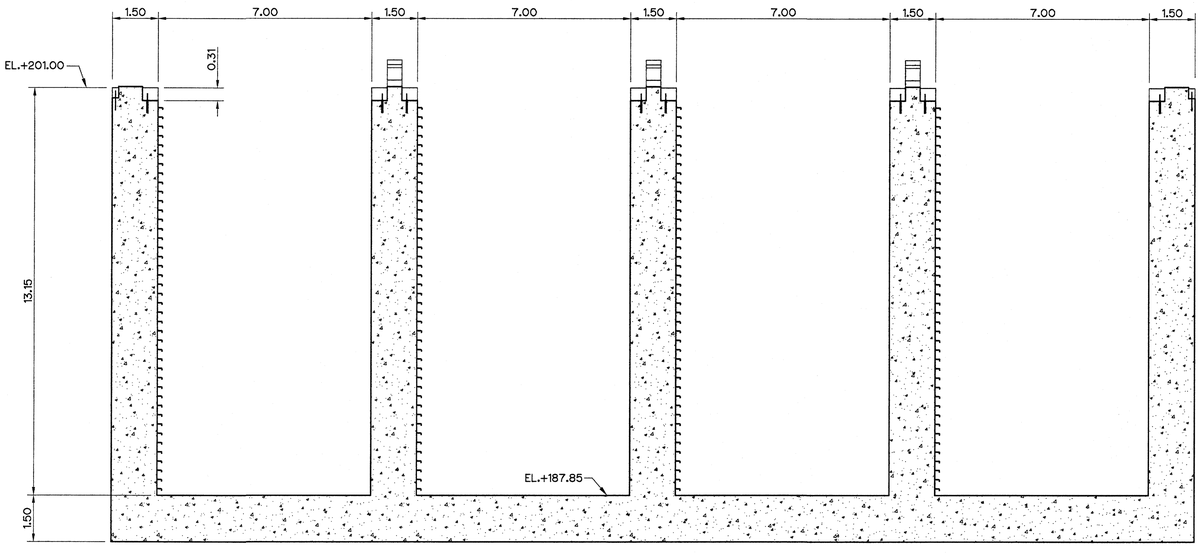
PIER PLAN
SCALE 1:100



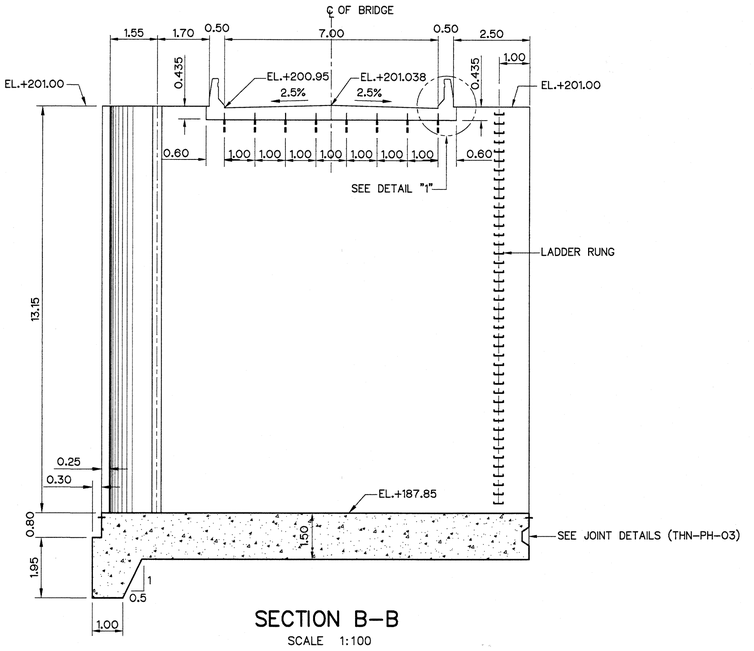
DETAIL "1"
SCALE 1:20



SECTION C–C
SCALE 1:20



SECTION A–A
SCALE 1:100



SECTION B–B
SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS:

1. BRIDGE ON CLOSURE DAM, PLAN, SECTIONS AND DETAILS — THN–PH–66
2. BRIDGE ON CLOSURE DAM, PIER REINFORCEMENT DETAILS — THN–PH–70

0 0.5 1.0 1.5
SCALE 1:20 METERS

0 1.0 2.0 4.0 6.0 8.0
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

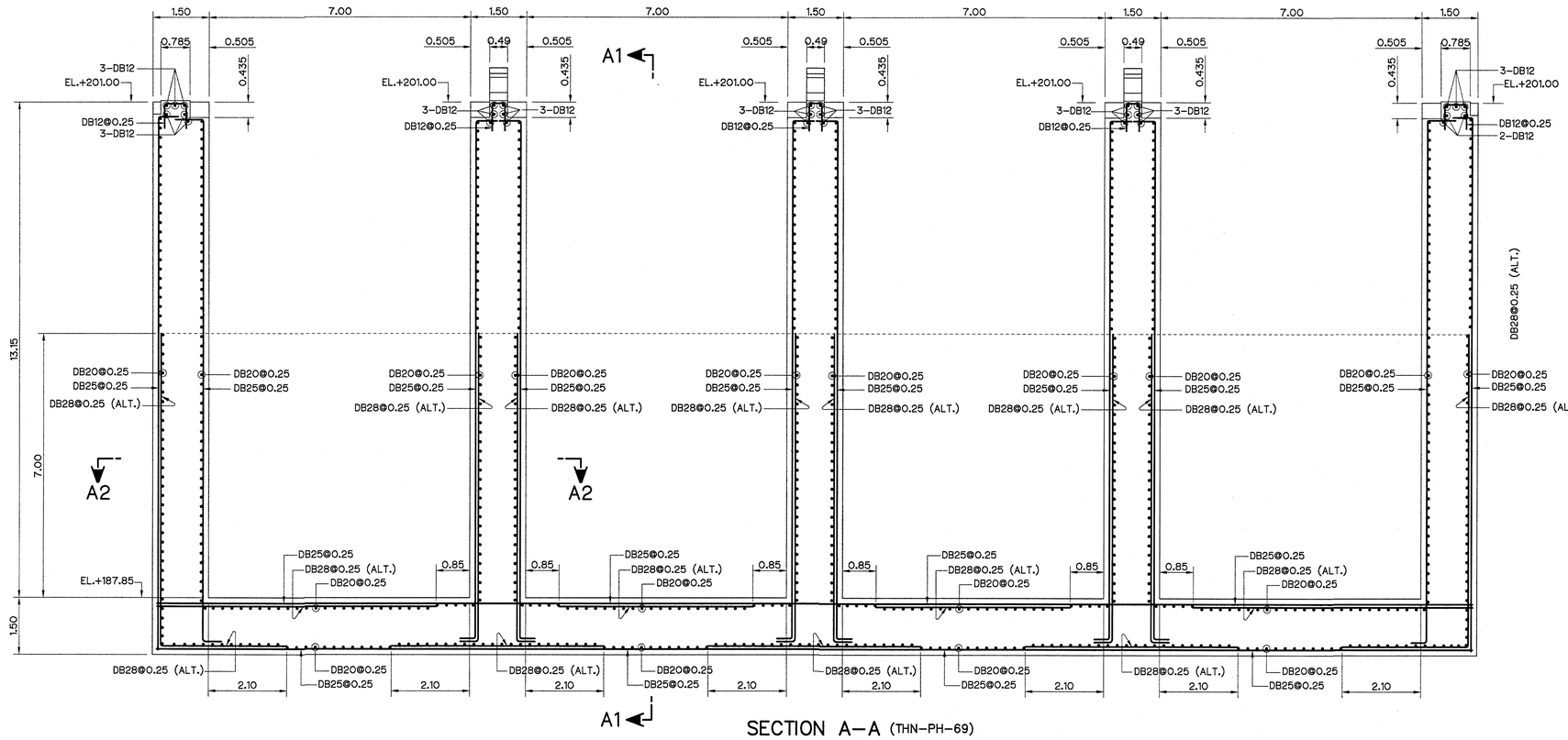
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

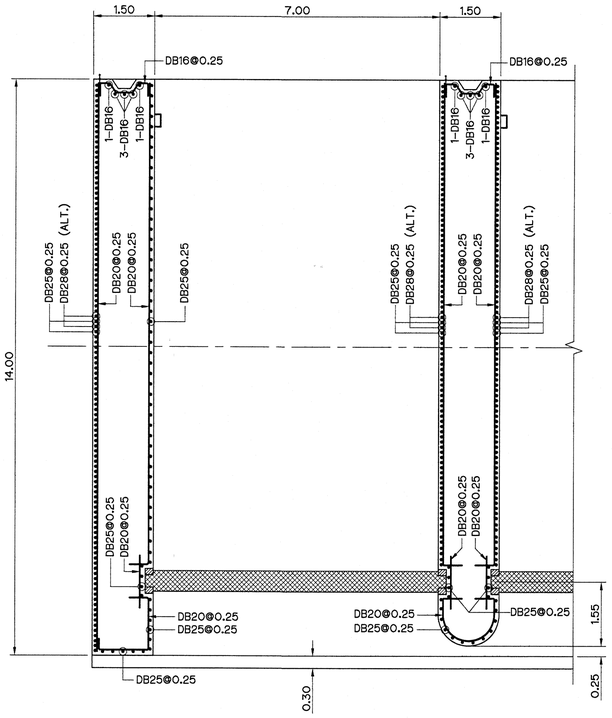
BRIDGE ON CLOSURE DAM

PIERS DETAILS

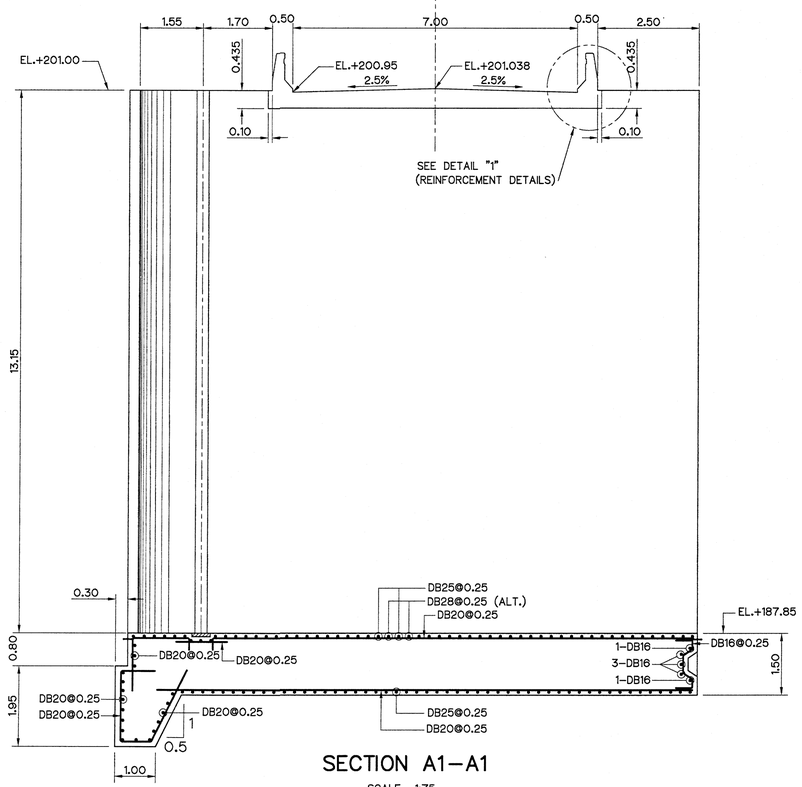
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิฬ.6650 วิฬ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิฬ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–69 / SHEET NO. 94 OF 157



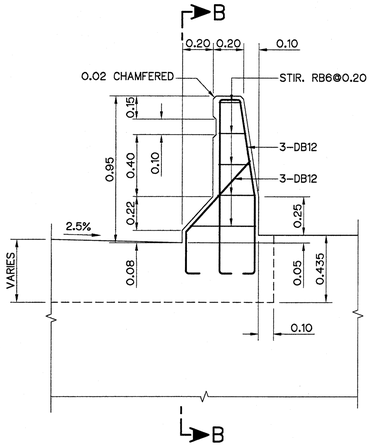
SECTION A–A (THN–PH–69)
(REINFORCEMENT DETAILS)
SCALE 1:75



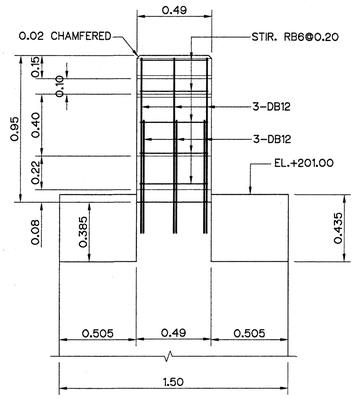
SECTION A2–A2
SCALE 1:75



SECTION A1–A1
SCALE 1:75



DETAIL "1"
(REINFORCEMENT DETAILS)
SCALE 1:20



SECTION B–B
SCALE 1:20

NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS:
1. BRIDGE ON CLOSURE DAM, PLAN, SECTIONS AND DETAILS THN–PH–66
2. BRIDGE ON CLOSURE DAM, PLAN, PIER DETAILS THN–PH–69

0 0.5 1.0 1.5
SCALE 1:20 METERS
0 1 2 3 4 5 6
SCALE 1:75 METERS

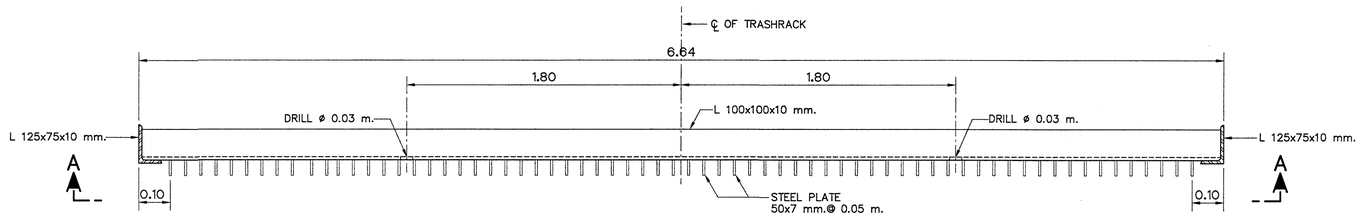
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

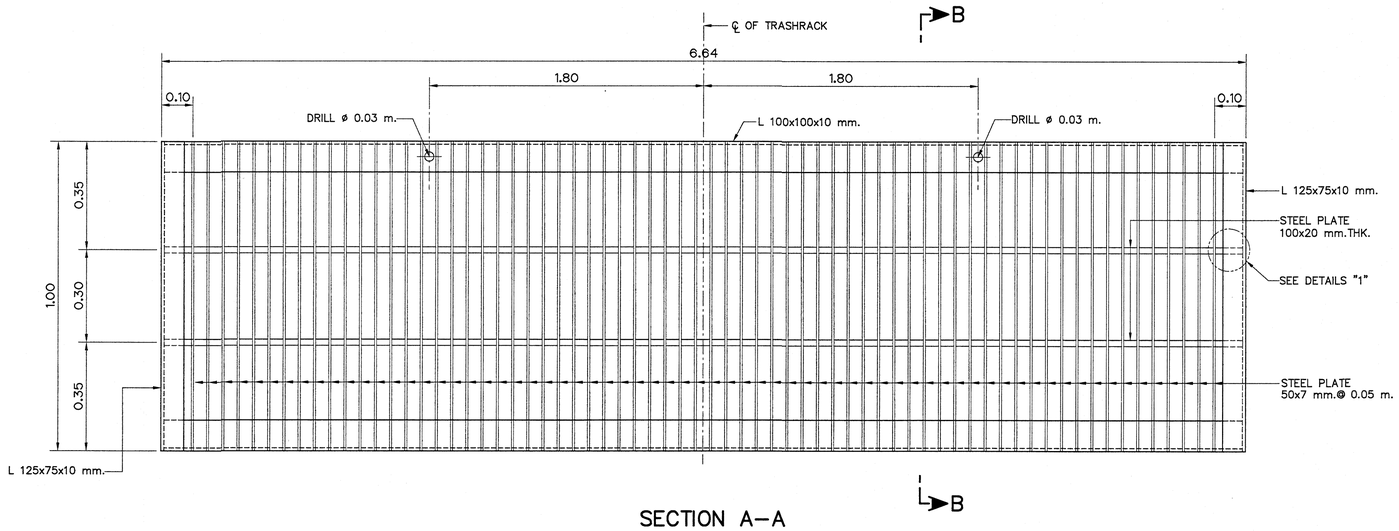
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
BRIDGE ON CLOSURE DAM
PIERS REINFORCEMENT DETAILS

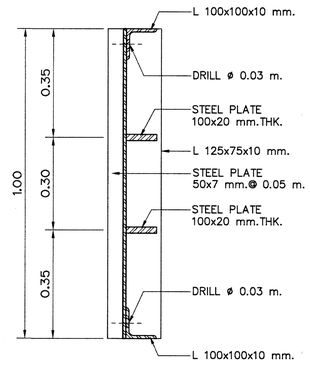
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
APPROVED	
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–PH–70
	SHEET NO. 95 OF 157



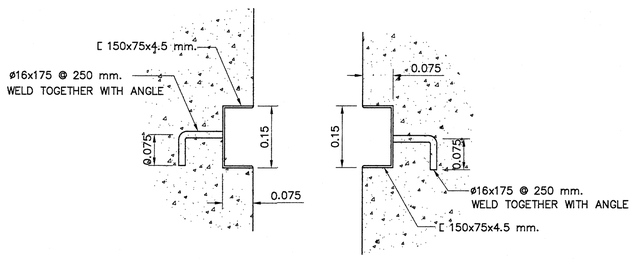
DETAIL OF TRASHRACK
(REQUIRE 15 UNITS)
SCALE 1:10



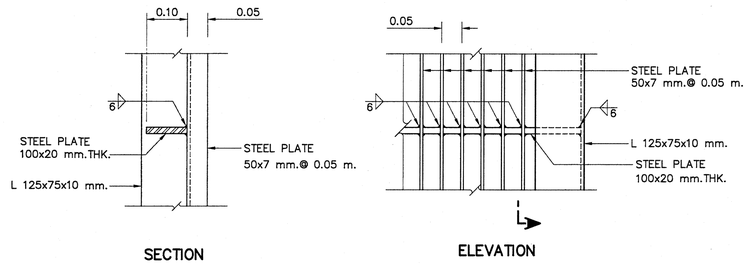
SECTION A–A
SCALE 1:10



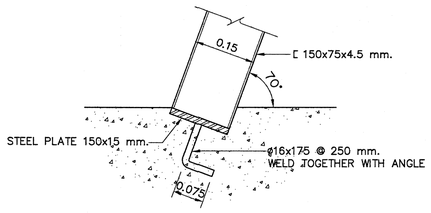
SECTION B–B
SCALE 1:10



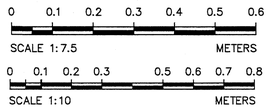
GROOVE DETAIL OF TRASHRACK
SCALE 1:7.5



DETAIL "1"
SCALE 1:7.5



BOTTOM DETAIL OF TRASHRACK
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. THN–GN–04
3. ALL WELDING WILL BE 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.

REFERENCE DRAWINGS :
1. POWERHOUSE AND EMERGENCY CHANNEL, GENERAL PLAN THN–PH–01
2. POWERHOUSE AND EMERGENCY CHANNEL, SECTIONS AND DETAILS 1/3 THN–PH–02

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE
TRASHRACK DETAILS

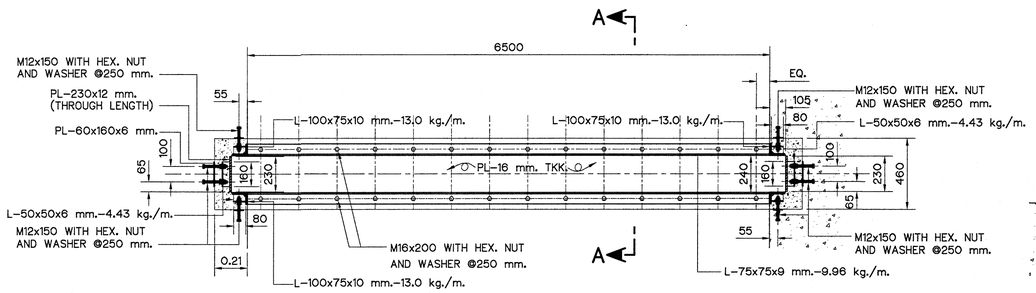
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วศ.6650 วศ.88523
DRAWN
CHECKED วศ.6651
PROJECT MANAGER 6/9/2024 DATE

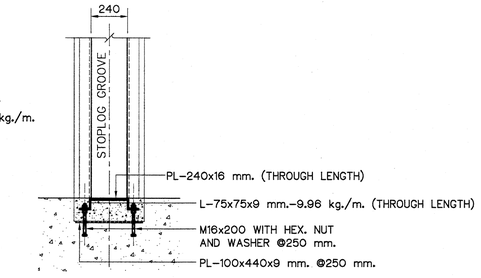
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN–PH–71
SHEET NO. 96 OF 157



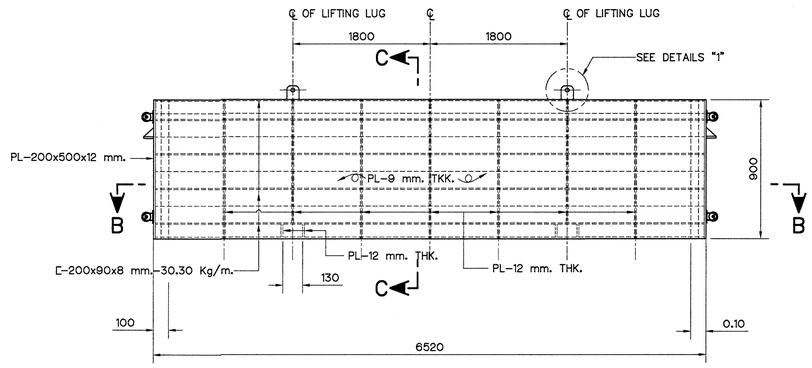
PLAN OF STOPLOG SILL

SCALE 1:20



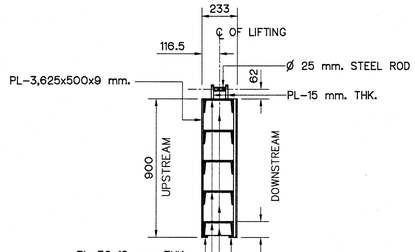
SECTION A-A

SCALE 1:20



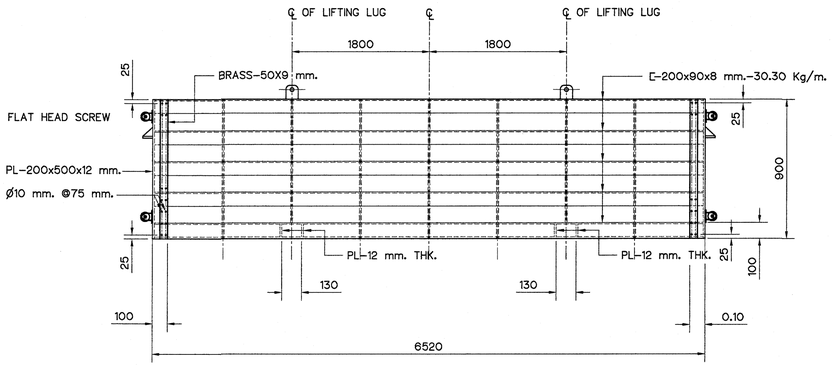
FRONT VIEW OF STOPLOG (UPSTREAM)

SCALE 1:20



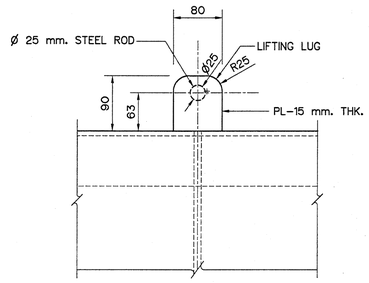
SECTION C-C

SCALE 1:20



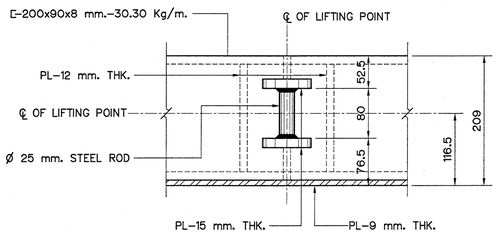
BACK VIEW OF STOPLOG (DOWNSTREAM)

SCALE 1:20



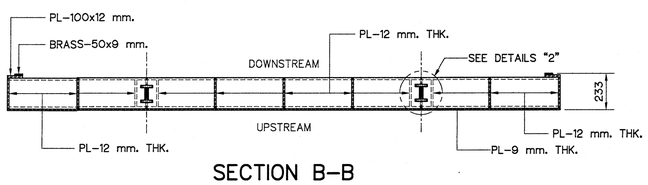
DETAIL "1"

SCALE 1:5



DETAIL "2"

SCALE 1:5



SECTION B-B

SCALE 1:20

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEELS TO CONFORM TO T.I.S.-1227 SS-400 OR OTHER EQUIVALENT STANDARDS.
3. WELDS TO BE CONTINUOUS 6 FILLET WELDS UNLESS OTHERWISE SHOWN AND ARE IN MILLIMETERS.
4. THIS DRAWING SHOWS TENTATIVE DESIGN OF STOPLOGS, AND LIFTING DEVICE, GROOVE, AND BLOCKOUT AND EXPRESS IN GENERAL REQUIREMENT FOR FINAL DESIGN WHICH SHALL BE ELABORATED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS OF THE STOPLOG AND LIFTING BEAM INCLUDING ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO THE FABRICATION.
6. STOPLOG IN THIS DRAWING IS SHOWN FOR ONE ELEMENT ONLY, THE CONTRACTOR SHALL PROVIDE 48 STOPLOGS FOR THAIS PROJECT (12 STOPLOGS PER 1 CHANNEL).
7. ALL STOPLOGS ARE DESIGNED FOR 5 METERS OF WATER HEIGHT DO NOT USE EXCEED THE DESIGN HEAD.

0 50 100 200 300 400
SCALE 1:5 MILLIMETERS

0 100 200 400 600 800
SCALE 1:10 MILLIMETERS

0 500 1,000 1,500
SCALE 1:20 MILLIMETERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE AND EMERGENCY CHANNEL
STOPLOG DETAILS 1/3

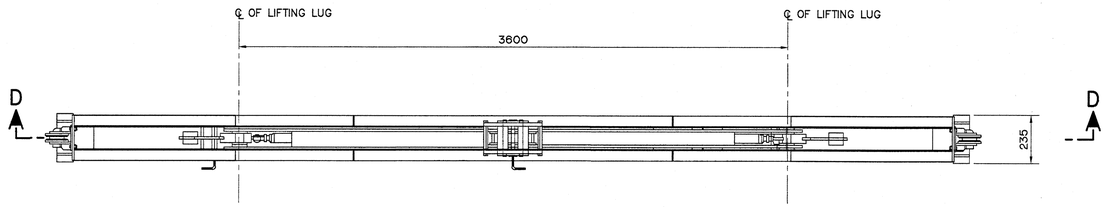
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED		
DESIGNED	สุรินทร์ เหง้าน้อย	สก.2197
DRAWN		
CHECKED	สุรินทร์ เหง้าน้อย	สก.2197
PROJECT MANAGER		6/9/2024 DATE
SUBMITTED		
RECOMMENDED		
APPROVED		

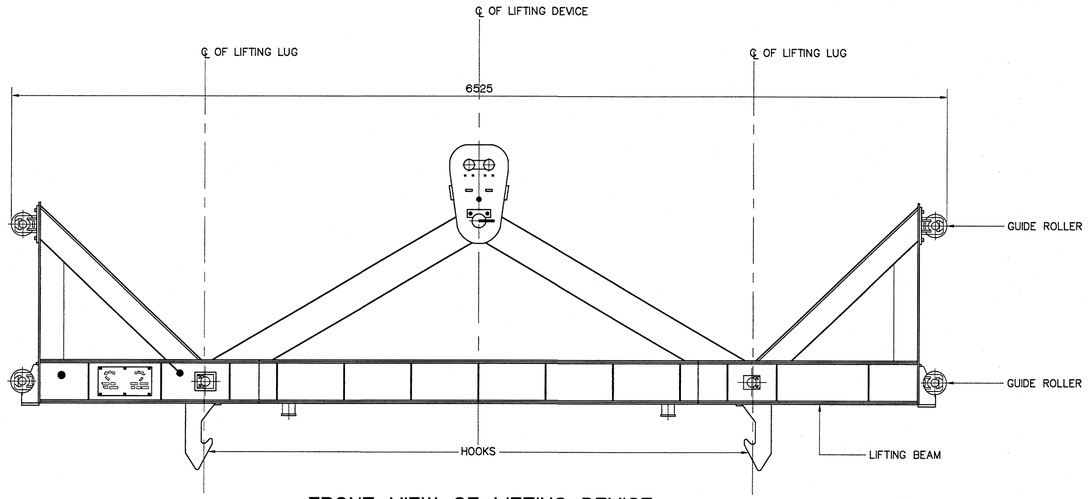
DRAWING NO. THN-PH-72

SHEET NO. 97 OF 157



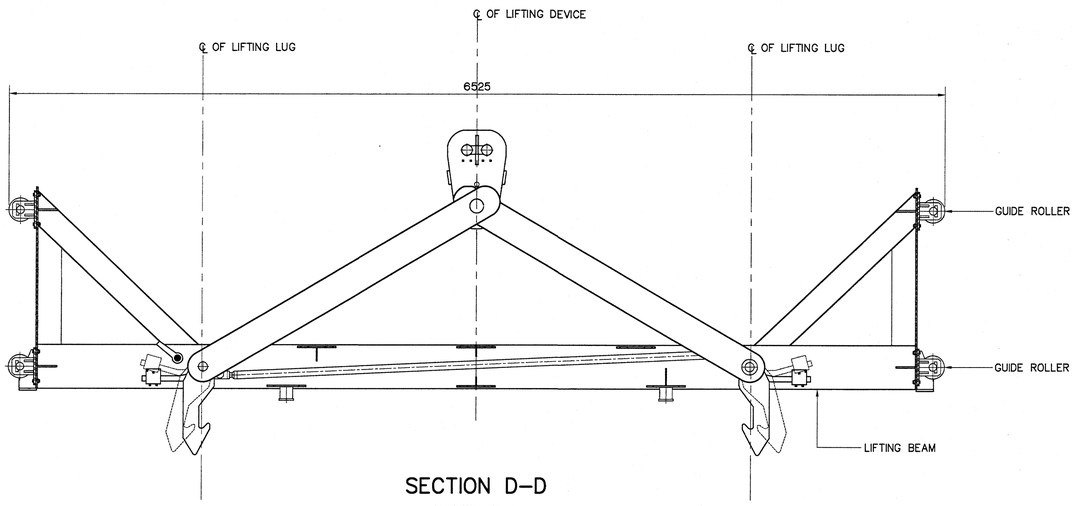
PLAN OF LIFTING DEVICE

NOT TO SCALE



FRONT VIEW OF LIFTING DEVICE

NOT TO SCALE



SECTION D–D

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEELS TO CONFORM TO T.I.S.-1227 SS-400 OR OTHER EQUIVALENT STANDARDS.
3. WELDS TO BE CONTINUOUS 6 FILLET WELDS UNLESS OTHERWISE SHOWN AND ARE IN MILLIMETERS.
4. THIS DRAWING SHOWS TENTATIVE DESIGN OF STOPLOGS, AND LIFTING DEVICE, GROOVE, AND BLOCKOUT AND EXPRESS IN GENERAL REQUIREMENT FOR FINAL DESIGN WHICH SHALL BE ELABORATED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS OF THE STOPLOG AND LIFTING BEAM INCLUDING ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO THE FABRICATION.
6. STOPLOG IN THIS DRAWING IS SHOWN FOR ONE ELEMENT ONLY, THE CONTRACTOR SHALL PROVIDE 48 STOPLOGS FOR THAIS PROJECT (12 STOPLOGS PER 1 CHANNEL).
7. ALL STOPLOGS ARE DESIGNED FOR 5 METERS OF WATER HEIGHT DO NOT USE EXCEED THE DESIGN HEAD.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

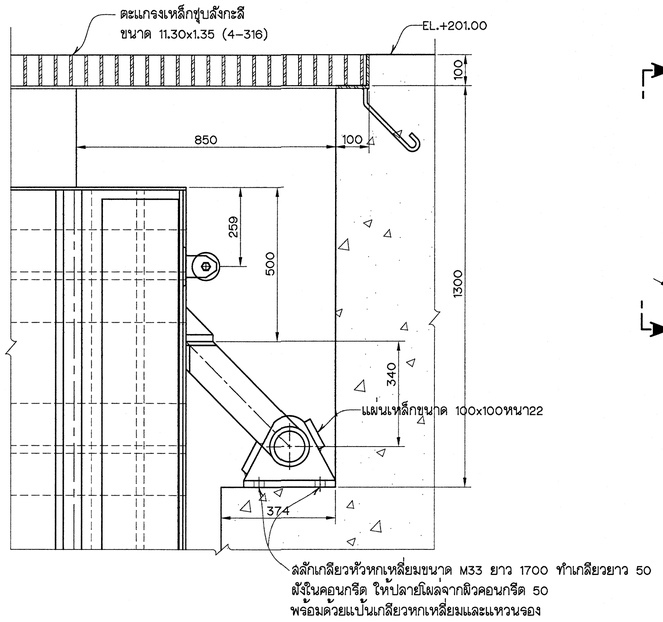
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

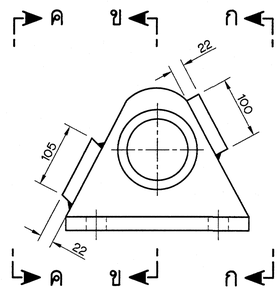
STOPLOG DETAILS 2/3

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED สุทิพพ เหว้อน้อ ส.ค.2197	REVIEWED
DRAWN	SUBMITTED
CHECKED สุทิพพ เหว้อน้อ ส.ค.2197	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN-PH-73	SHEET NO. 98 OF 157



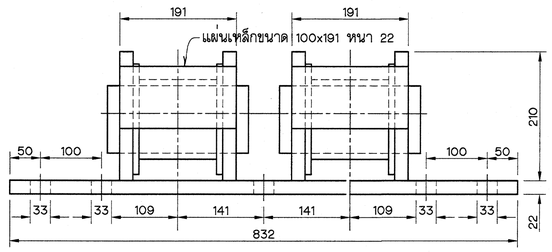
รูปขยายการติดตั้งแขนยึดบาน

มาตราส่วน 1:10



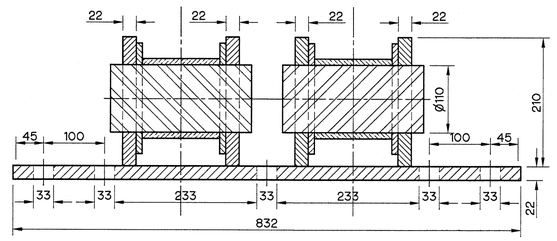
รูปด้านข้าง

มาตราส่วน 1:5



รูปด้าน ก-ก

มาตราส่วน 1:5



รูปตัด ข-ข

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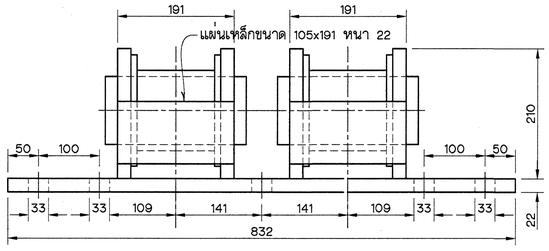
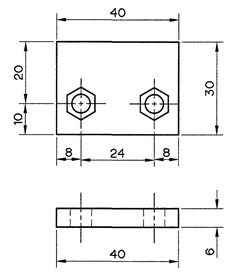


รูปด้าน ค-ค

มาตราส่วน 1:5



PIN GUARD สำหรับลลัก

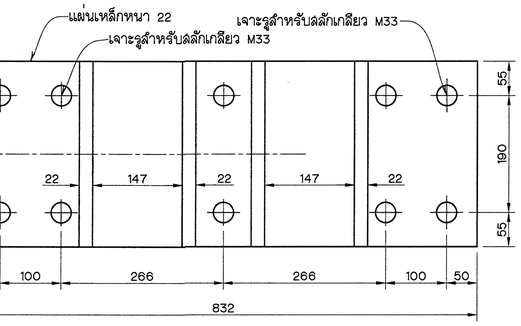
มาตราส่วน 1:1

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEELS TO CONFORM TO T.I.S.-1227 SS-400 OR OTHER EQUIVALENT STANDARDS.
3. WELDS TO BE CONTINUOUS 6 FILLET WELDS UNLESS OTHERWISE SHOWN AND ARE IN MILLIMETERS.
4. THIS DRAWING SHOWS TENTATIVE DESIGN OF STOPLOGS, AND LIFTING DEVICE, GROOVE, AND BLOCKOUT AND EXPRESS IN GENERAL REQUIREMENT FOR FINAL DESIGN WHICH SHALL BE ELABORATED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS OF THE STOPLOG AND LIFTING BEAM INCLUDING ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO THE FABRICATION.
6. STOPLOG IN THIS DRAWING IS SHOWN FOR ONE ELEMENT ONLY, THE CONTRACTOR SHALL PROVIDE 48 STOPLOGS FOR THAIS PROJECT (12 STOPLOGS PER 1 CHANNEL).
7. ALL STOPLOGS ARE DESIGNED FOR 5 METERS OF WATER HEIGHT DO NOT USE EXCEED THE DESIGN HEAD.

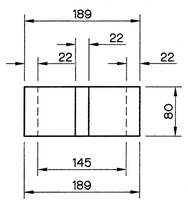
REFERENCE DRAWINGS :

1. POWERHOUSE AND EMERGENCY CHANNEL, STOPLOG DETAILS 1/3 THN-PH-72
2. POWERHOUSE AND EMERGENCY CHANNEL, STOPLOG DETAILS 2/3 THN-PH-73



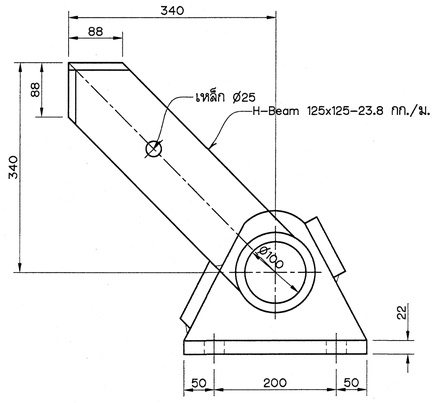
แปลนฐานขายึดบาน

มาตราส่วน 1:5



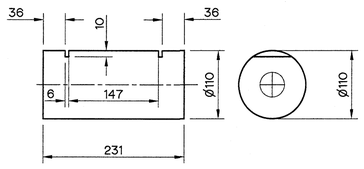
แปลน

มาตราส่วน 1:5



การติดตั้งแขนรับบานระบาย

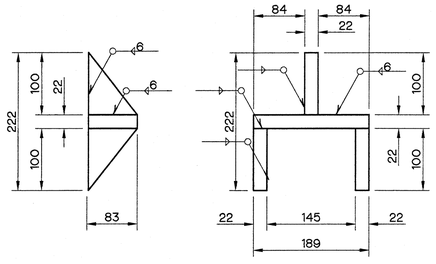
มาตราส่วน 1:5



PIN

JISG 4105 S 45 C

มาตราส่วน 1:5



รูปด้านข้าง

มาตราส่วน 1:5

รูปด้านหน้า

มาตราส่วน 1:5

0 10 20 30 40 50 60 70 80
มาตราส่วน 1:1 มิลลิเมตร

010 50 100 150 200 250
มาตราส่วน 1:3 มิลลิเมตร

0 50 100 200 300 400
มาตราส่วน 1:5 มิลลิเมตร

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

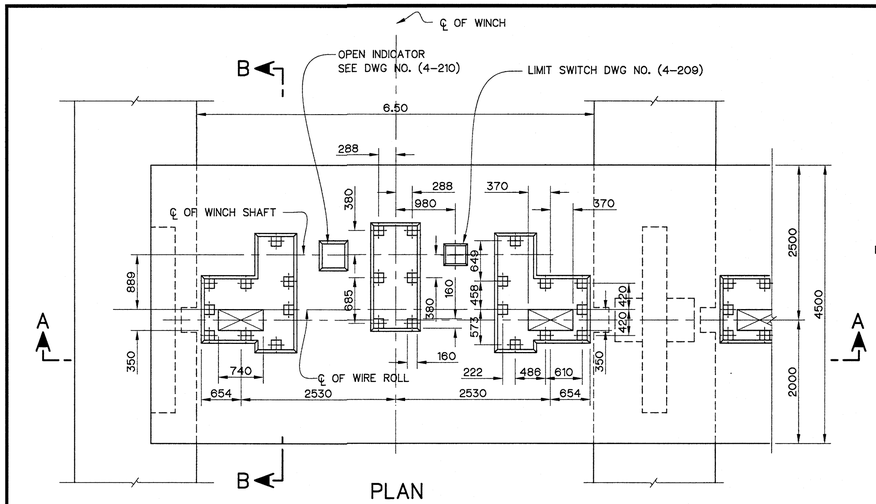
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

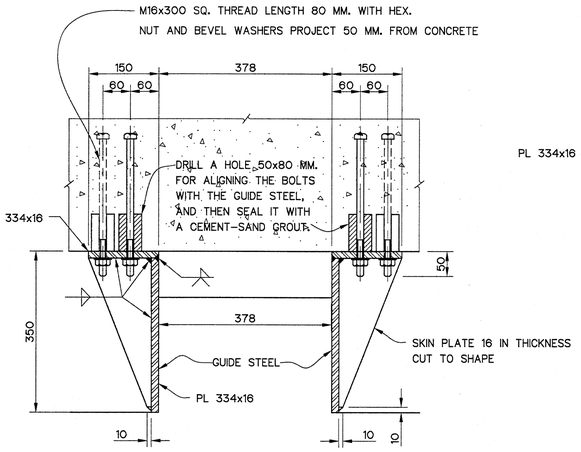
STOPLOG DETAILS 3/3

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED สุทธพ เหว้อน้อย ลก.2197	SUBMITTED
DRAWN	RECOMMENDED
CHECKED สุทธพ เหว้อน้อย ลก.2197	APPROVED
6/9/2024 DATE / PROJECT MANAGER	DRAWING NO. THN-PH-74 / SHEET NO. 99 OF 157



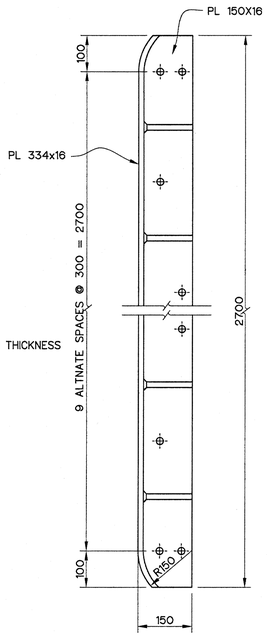
PLAN

SCALE 1:50



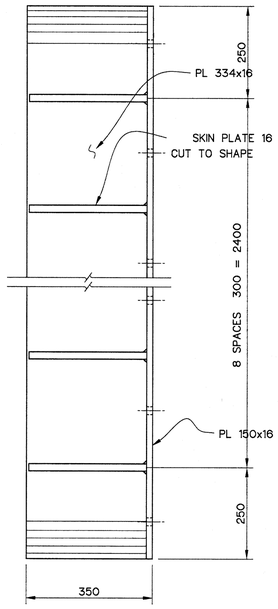
SECTION B1–B1

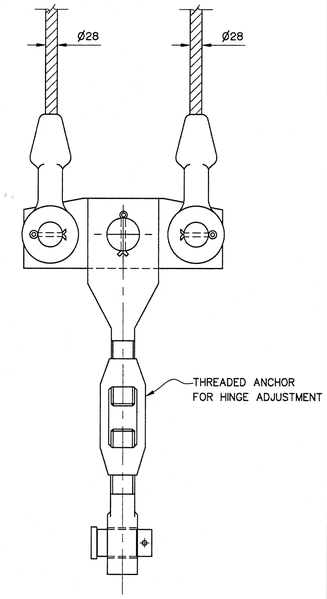
NOT TO SCALE



GUIDE STEEL

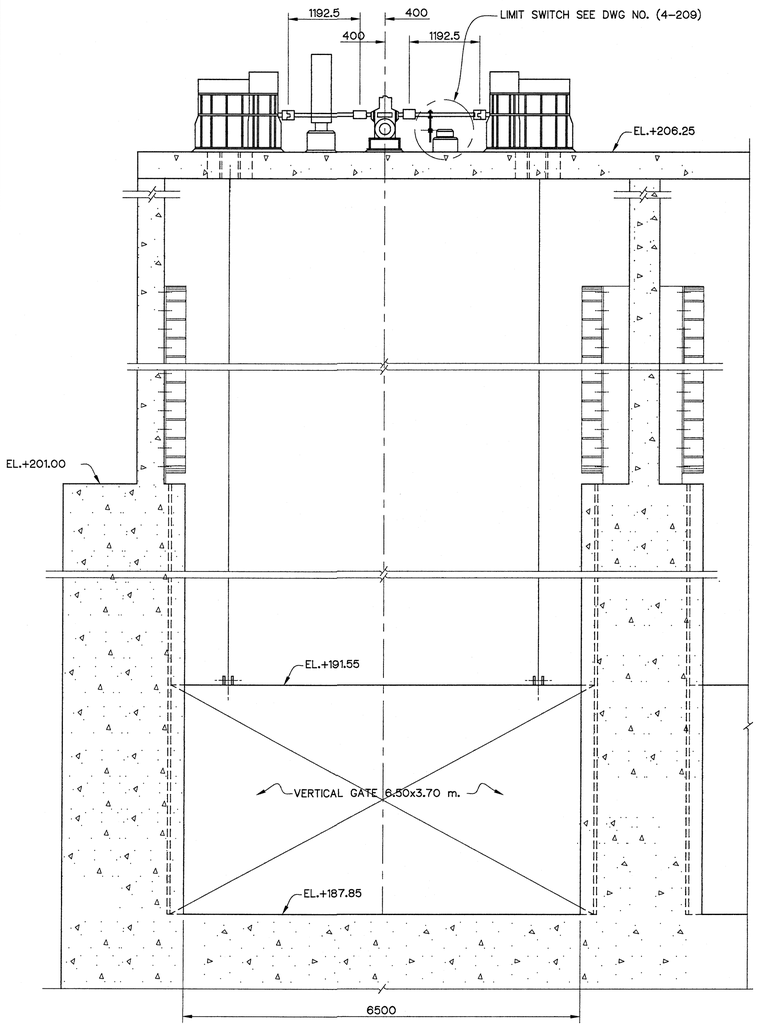
NOT TO SCALE





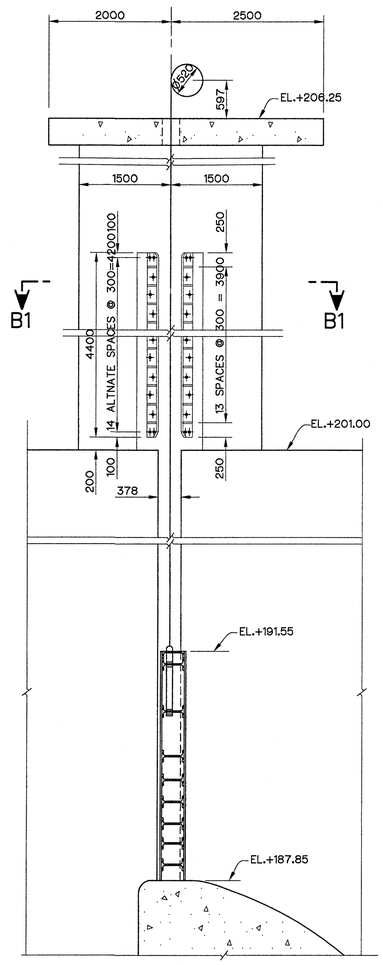
WIRE SUPPORT STEEL AND THREADED ANCHOR

NOT TO SCALE



SECTION A–A

SCALE 1:50



SECTION B–B

SCALE 1:50

NOTES :

1. ALL ELEVATIONS (M.S.L.) ARE IN METER AND DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
   TOLERANCE FOR INSTALLATION SHOULD NOT EXCEED 1 MILLIMETER.
2. ALL WELDING WILL BE 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. ALL PLATE STEEL ARE T.I.S. 1479–2541 STANDARD, GRADE SS 400 BOLTS AND STUD ARE T.I.S. 259–2531 STANDARD,
   ALL NUTS ARE T.I.S. 672–2530 STANDARD, SPRING WASHERS ARE T.I.S. 259–2531 STANDARD,
   BOLTS, NUTS AND SPRING WASHERS SHALL BE HOT DIP GALVENIZED
   THICKNESS OF NO LESS THAN 305 G/SQ M. IN ASTM–A153 STANDARD, EXCEPT FOR PARTS EMBEDDED
   IN CONCRETE DEEPER THAN 50 MILLIMETER
4. FOR COATING, PREPARE THE STEEL SURFACE BY SANDBLASTING OR METAL ABRASIVE BLASTING TO MEET SSPC–CP–10 STANDARDS
   BEFORE APPLYING THE PRIMER. FOR THE WINCH AND CONTROL CABINET, APPLY TWO COATS OF IRON OXIDE PRIMER WITH A TOTAL THICKNESS
   OF NOT LESS THEN 0.07 METERS. APPLY TWO COATS OF HIGH GLOSS ENAMEL PRIMER WITH A TOTAL THICKNESS OF NOT LESS THAN 0.07 METERS.
5. ALL WIRE ROPE ARE JIS G 3525 (1983) GRADE A (UNGALVANIZED) OR B OR EQUIVALENT TYPE 6 OR TYPE 11 (a) OR EQUIVALENT
   RIGNT HAND LAY, NOMINAL DIAMETER 28 MM. OR THE STANDARD T.I.S. 514–2531
6. THE NUMBER OF GATE PANELS IS 4 .
7. GEAR MOTER WITH DISK BRAKE, 6 H.P. 360 R.P.M.

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

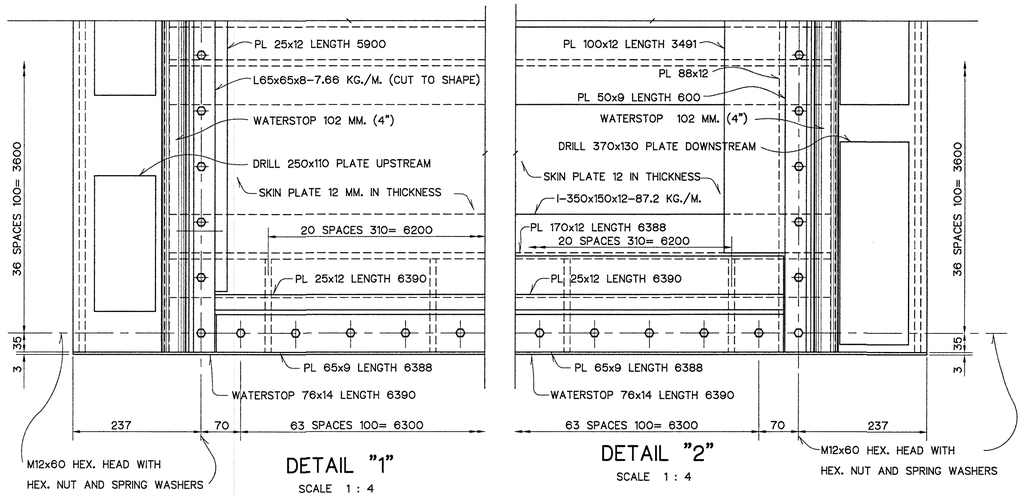
CIVIL WORKS AND ELECTRICAL SYSTEM
EMERGENCY CHANNEL
6.50x3.70 M. VERTICAL GATE
WINCH INSTALLATION, FLOOD GATE AND GUIDE STEEL

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

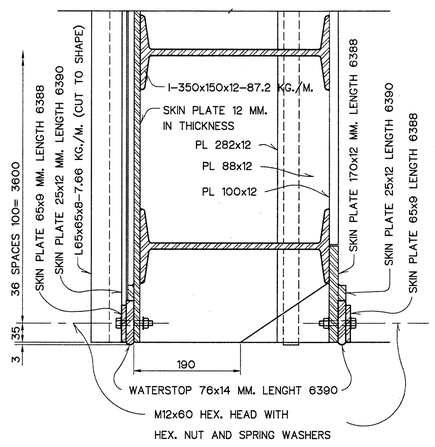
DESIGNED	สุกิจ เกษมณี	ส.ค.2197	REVIEWED
DRAWN			SUBMITTED
CHECKED	สุกิจ เกษมณี	ส.ค.2197	RECOMMENDED
	6/9/2024		APPROVED
PROJECT MANAGER	DATE		DRAWING NO. THN–PH–75

SHEET NO. 100 OF 157



DETAIL "1"
SCALE 1 : 4

DETAIL "2"
SCALE 1 : 4



DETAIL "3"
SCALE 1 : 4

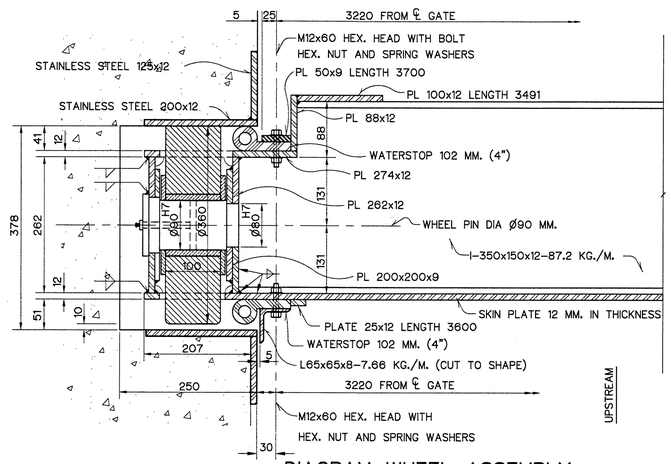
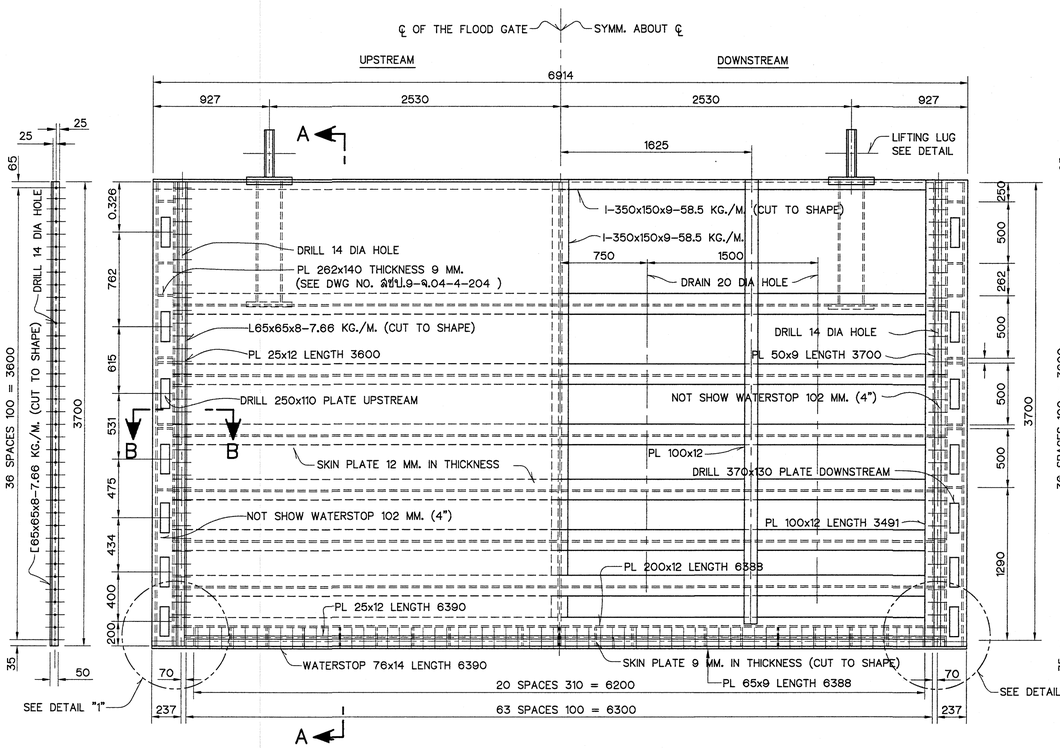
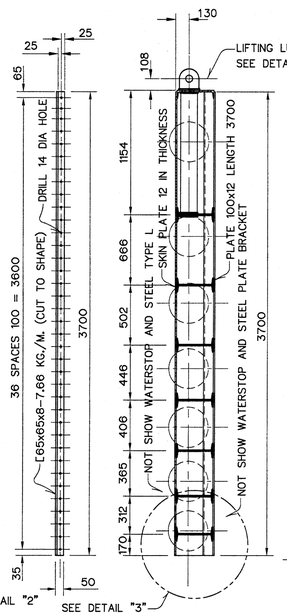


DIAGRAM WHEEL ASSEMBLY
SCALE 1 : 4





SECTION A–A
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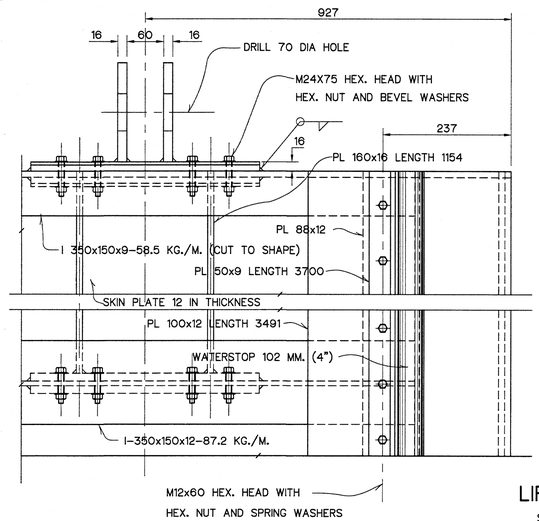
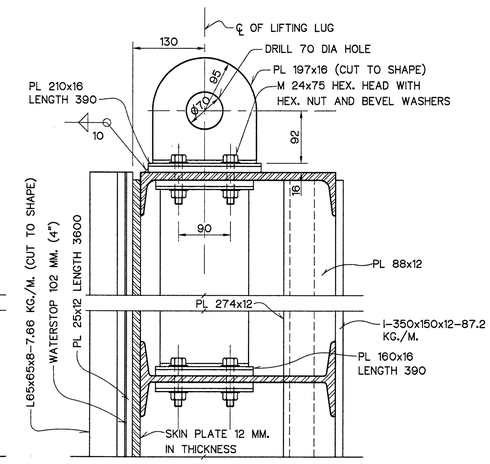
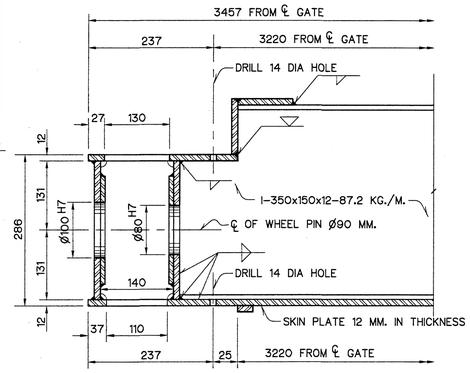
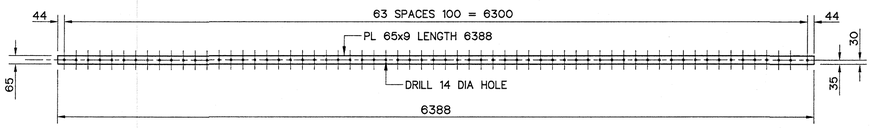




LIFTING LUG
SCALE 1 : 4



SECTION B–B
SCALE 1 : 4



GATE LEAF
NOT TO SCALE

REFERENCE DRAWINGS :

1. WINCH INSTALLATION , FLOOD GATE AND GUIDE STEEL
2. DETAIL THRESHOLD STEEL, GATE GROOVE AND INSTALLATION
3. DETAIL GATE, WHEEL, WHEEL PIN Ø90 MM. AND PARTS

NOTES :

1. ALL DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED, TOLERANCE FOR INSTALLATION SHOULD NOT EXCEED 1 MILLIMETER.
2. ALL WELDING WILL BE 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. ALL PLATE STEEL ARE JIS G 3114 SMA 490, ALL STRUCTURAL STEEL ARE T.I.S. 1227–2539 STANDARD, GRADE SS400, THRESHOLD STEEL AND GATE GROOVE STEEL ARE JIS G 4304 SUS 304 OR EQUIVALENT
4. BOLTS AND STUDS ARE T.I.S. 171–2530 STANDARD, GRADE 8.8 ALL NUTS ARE T.I.S. 672–2530 STANDARD, TYPE 1 PRODUCT GARDE A หรือ B, DESIGN 1 , ALL SPRING WASHER ARE T.I.S. 259–2521 STANDARD, BOLTS, NUTS AND WASHER SHALL BE HOT DIP GALVANIZED THICKNESS OF NO LESS THAN 305 G/SQ M. IN ASTM–A153 STANDARD
5. THE WATERSTOP MUST MEET THE SPECIFICATIONS OF THE IRRIGATION DEPARTMENT STANDARD NO. ชปป.0638 dated 21 March 1984
6. 4. FOR COATING, PREPARE THE STEEL SURFACE BY SANDBLASTING OR METAL ABRASIVE BLASTING TO MEET SSPC–CP–10 STANDARD, BEFORE APPLY THE PRIMER.
   APPLY MASTIC EPOXY PRIMER (ALUMINUM) SUITABLE FOR UNDERWATER APPLICATIONS, WITH A THICKNESS OF NOT LESS THAN 0.20 MM.
   APPLY COAL TAR EPOXY SUITABLE FOR UNDERWATER APPLICATIONS, WITH A THICKNESS OF NOT LESS THAN 0.20 MM.
7. THE WEIGHT OF EACH GATE IS APPROXIMATELY 12.80 TONS, AND 4 GATE ARE REQUIRED.
8. WHEEL DETAIL, WHEEL PIN Ø90 AND PARTS SEE DRAWING NO. สปป.9–9.04/2548–4–204

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

6.50x3.70 M. VERTICAL GATE, GATE DETAIL, WHEEL AND SECTION

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

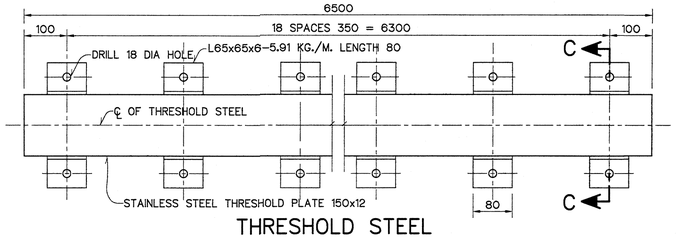
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	สุวิทย เหง้าน้อย	ส.ค.2197
DRAWN		
CHECKED	สุวิทย เหง้าน้อย	ส.ค.2197
PROJECT MANAGER		6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

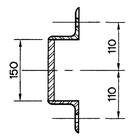
DRAWING NO. THN–PH–76

SHEET NO. 101 OF 157



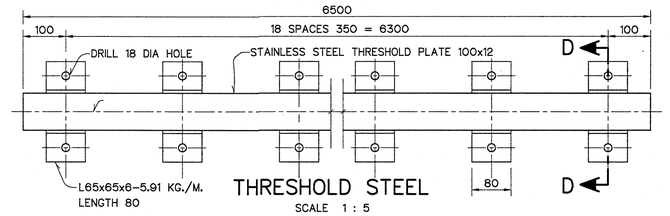
THRESHOLD STEEL

SCALE 1 : 5



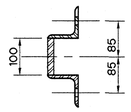
SECTION C–C

SCALE 1 : 5



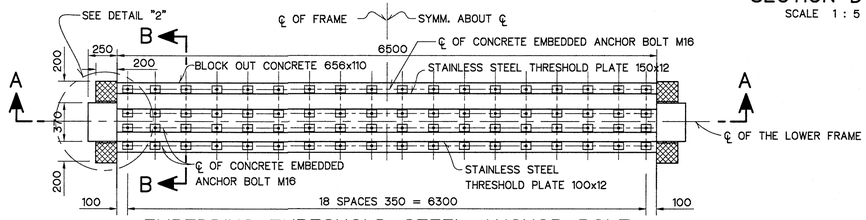
THRESHOLD STEEL

SCALE 1 : 5



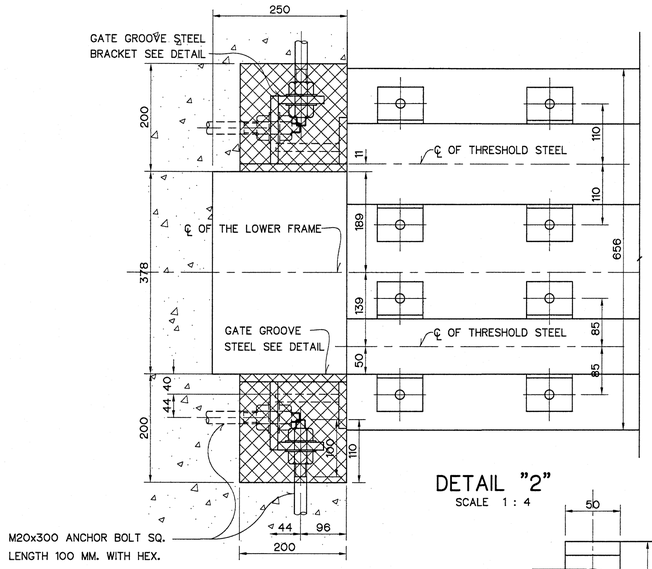
SECTION D–D

SCALE 1 : 5



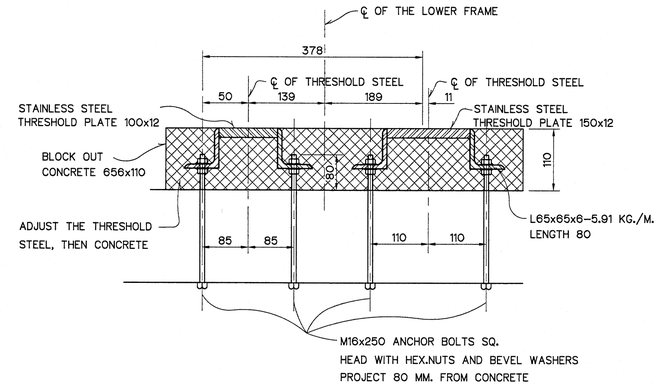
EMBEDDING THRESHOLD STEEL ANCHOR BOLT

SCALE 1 : 20



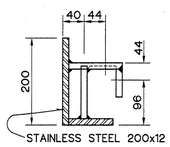
DETAIL "2"

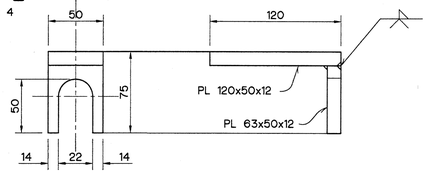
SCALE 1 : 4



DETAIL "1"

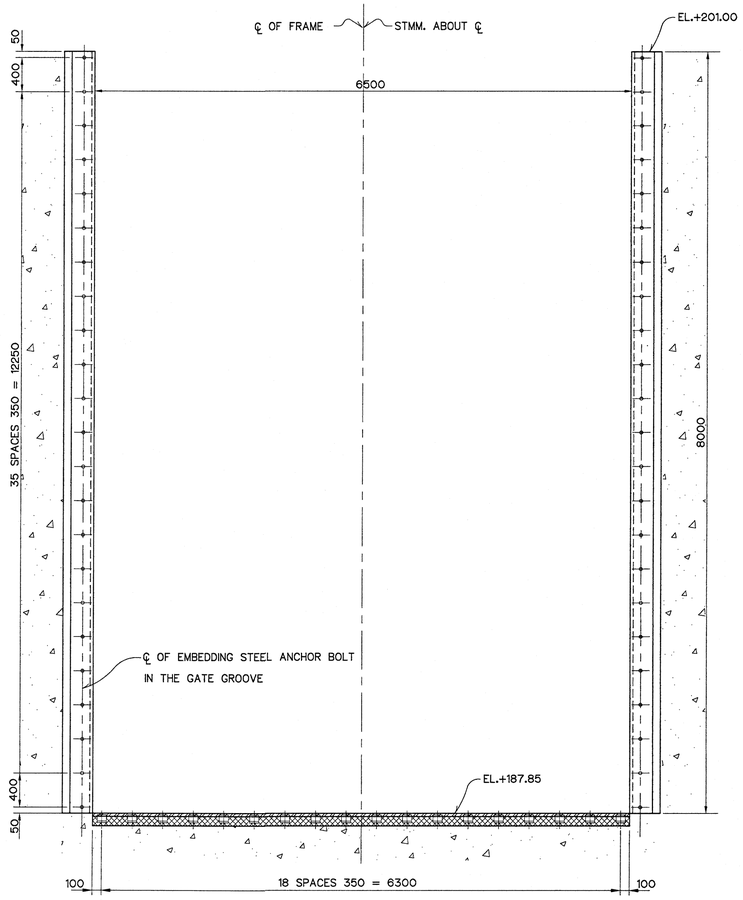
SCALE 1 : 4





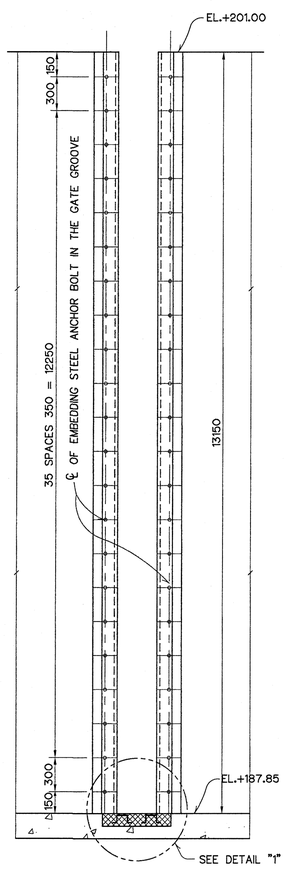
GATE GROOVE STEEL BRACKET

SCALE 1 : 2



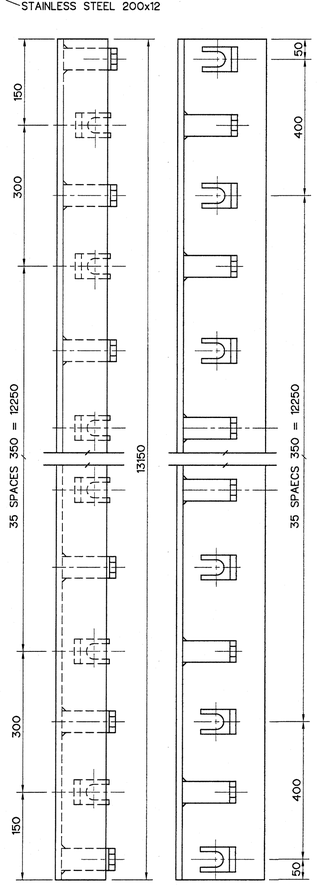
SECTION A–A

SCALE 1 : 20



SECTION B–B

SCALE 1 : 20



NOTES :

1. ALL ELEVATIONS (M.S.L.) ARE IN METER AND DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
2. ALL WELDING WILL BE 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. ALL PLATE STEEL ARE JIS G 3101 SS 400, ALL STRUCTURAL STEEL ARE T.I.S. 1227–2539 STANDARD, GRADE SS400, ALL THRESHOLD STEEL AND GATE GROOVE ARE JIS G 4304 SUS 304 OR EQUIVALENT
4. ALL BOLTS ARE T.I.S. 171–2530 STANDARD, GRADE 8.8, ALL NUTS ARE T.I.S. 672–2530 STANDARD, ALL PLAIN WASHERS ARE T.I.S. 258–2530 STANDARD, BOLTS, NUTS AND PLAIN WASHERS SHALL BE HOT DIP GALVANIZED THICKNESS OF NO LESS THAN 305 G/SQ M. IN ASTM–A153 STANDARD, EXCEPT FOR PARTS EMBEDDED IN CONCRETE DEEPER THAN 50 MILLIMETER
5. INSTALLATION THE THRESHOLD STEEL AND GATE FRAME STEEL TOGETHER WITH THE GATE, AND ADJUST THE GATE TO THE CORRECT POSITION THEN FILL THE REMAINING GAP WITH CONCRETE.

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

6.50x3.70 M. THRESHOLD STEEL, GATE GROOVE AND SECTION

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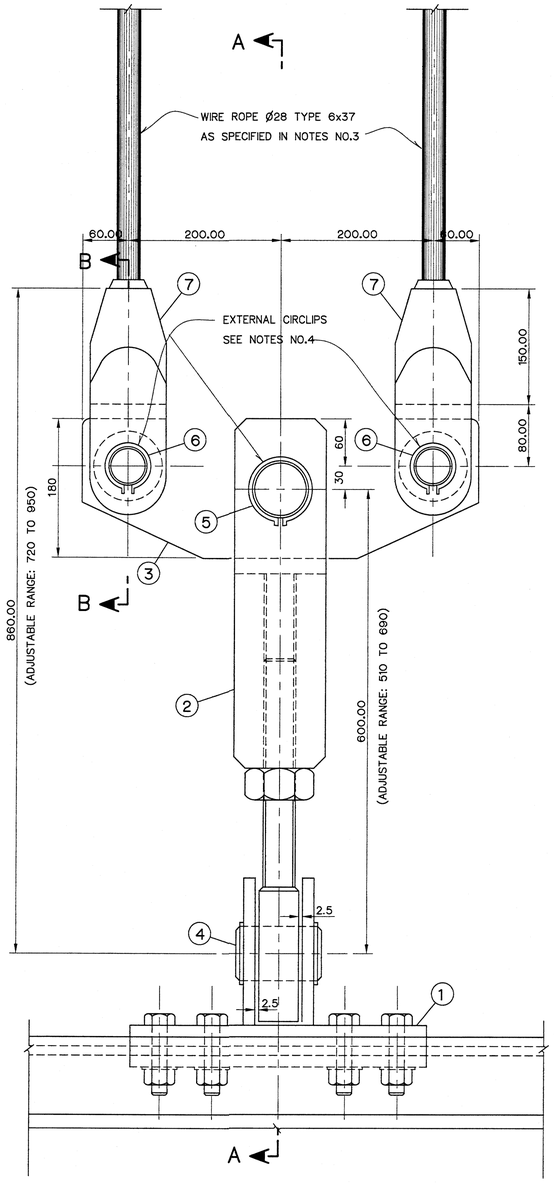
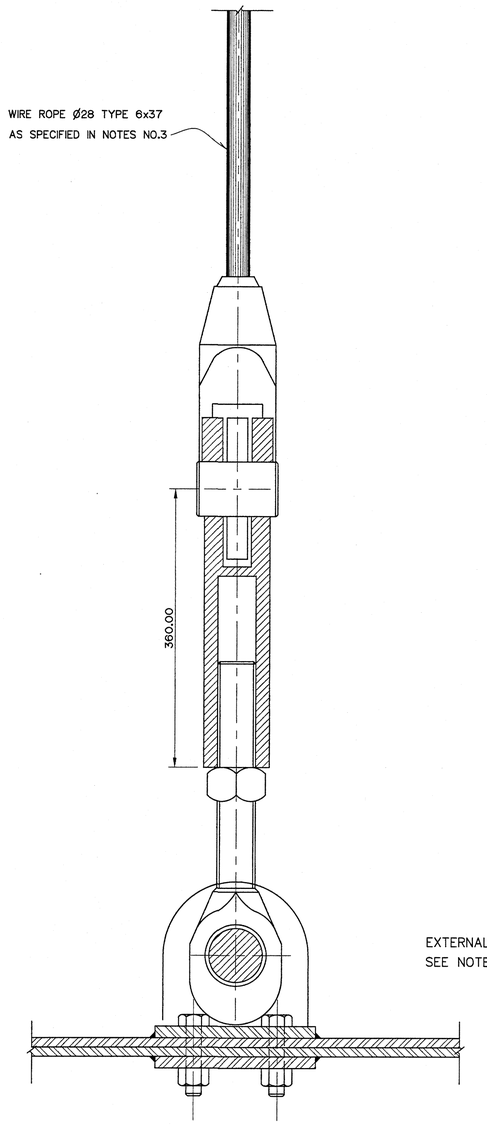
DESIGNED	วุฒิพงษ์ เหว่ยน้อย	สก.2197	REVIEWED
DRAWN			SUBMITTED
CHECKED	วุฒิพงษ์ เหว่ยน้อย	สก.2197	RECOMMENDED
PROJECT MANAGER		6/9/2024 DATE	APPROVED
			DRAWING NO. THN–PH–77
			SHEET NO. 102 OF 157



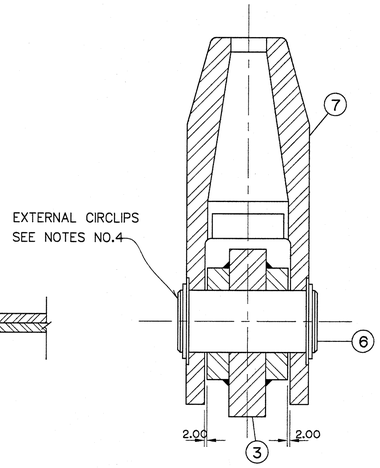
SHOW INSTALLATION LIFTING LUG AND THREADED ANCHOR

SCALE 1:2.5



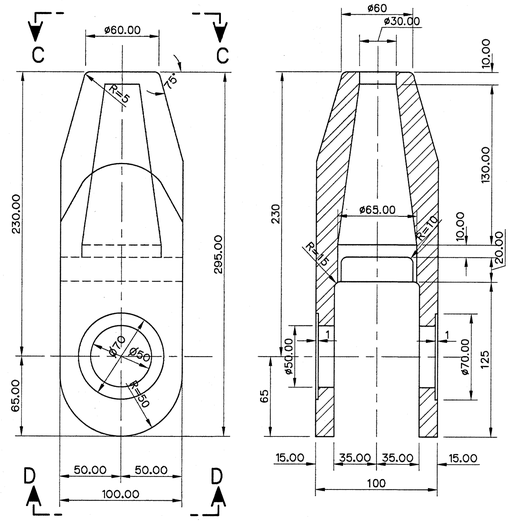
SECTION A–A

SCALE 1:2.5



SECTION B–B

SCALE 1:4

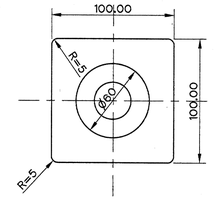


⑦

WIRE ROPE CLAMP

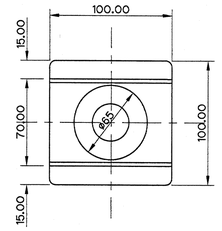
CARBON STEEL AISI 1045 OF 4 PIECES

SCALE 1:4



SECTION C–C

SCALE 1:4



SECTION D–D

SCALE 1:4

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
2. BOLTS ARE T.I.S. 171–2530 STANDARD, GRADE 8.8 NUTS ARE
   T.I.S. 672–2530 STANDARD, TYPE 1 GRADE A OR B TYPE 1 SPRING WASHERS ARE
   T.I.S. 259–2521 STANDARD, BOLTS, NUTS AND WASHERS SHALL BE DIP GALVENIZED ASTM A153 STANDARD
3. WIRE ROPE ARE JIS G–3525 (1983) GRADE A (UNGALVANIZED) OR GRADE B, TYPE 6
   OR TYPEII(a), RIGHT HAND REGULAR LAY OR EQUIVALENT T.I.S. 514–2531 STANDARD,
4. SECURE LIFTING LUG PINS AND BEAM PINS TO THE WIRE ROPE ANCHOR WITH EXTERNAL CIRCLIP SHALL BE WITH STANDARD DIN 471

REFERENCE DRAWINGS :

1. LIFTING LUG AND WIRE ROPE ACCESSORIES FOR WINCH 25 TONS (SHEET 2/2)	THN–PH–79
2. WINCH 25 TONS OF FLOOD GATE	THN–PH–83

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

VERTICAL GATE LIFTING LUG AND WIRE ROPE ACCESSORIES FOR WINCH 25 TONS (SHEET 1/2)

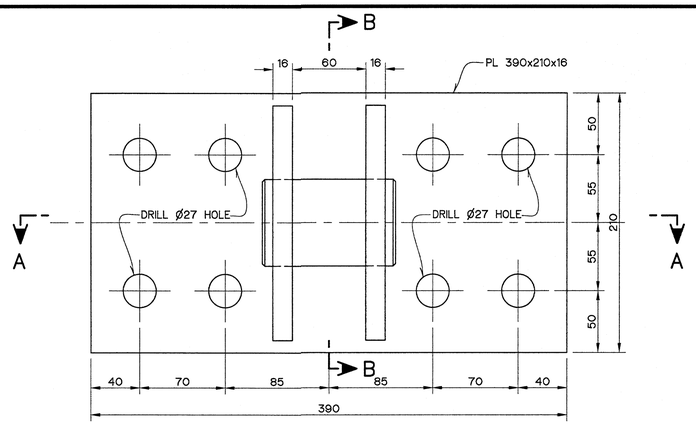
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	สุภาพ แก้วน้อย สก.2197	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	สุภาพ แก้วน้อย สก.2197	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

DRAWING NO. THN–PH–78

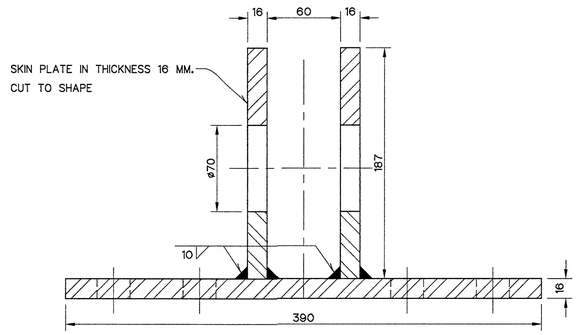
SHEET NO. 103 OF 157



① LIFTING LUG

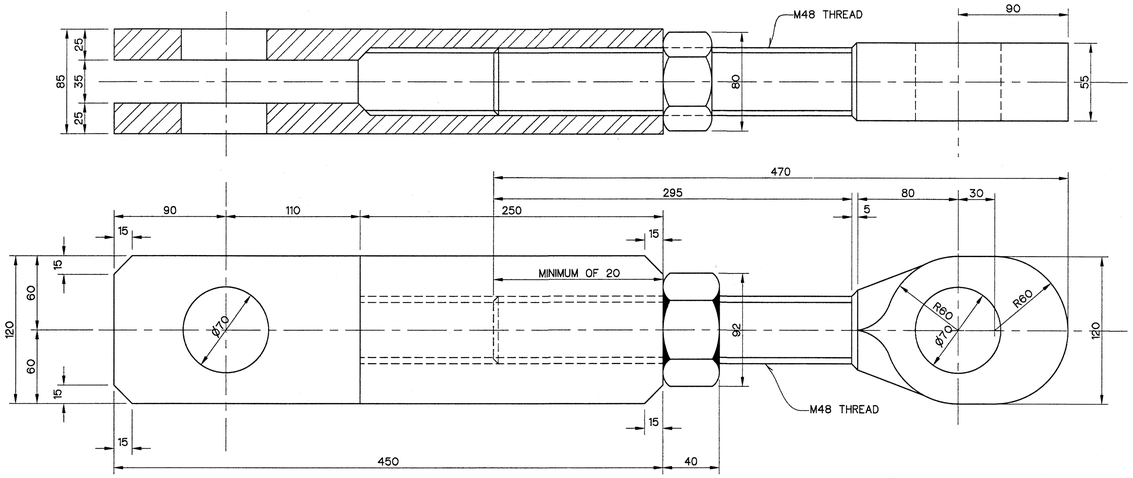
CARBON STEEL OF 2 PIECES

SCALE 1:2.5



SECTION A–A

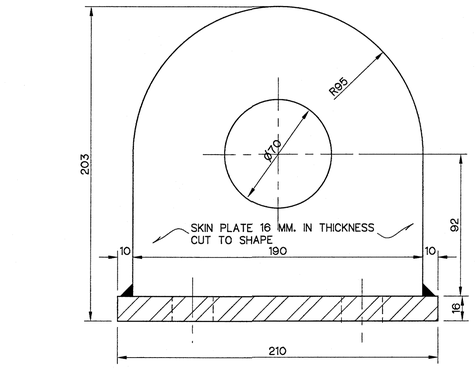
SCALE 1:2.5



② THREADED ANCHOR

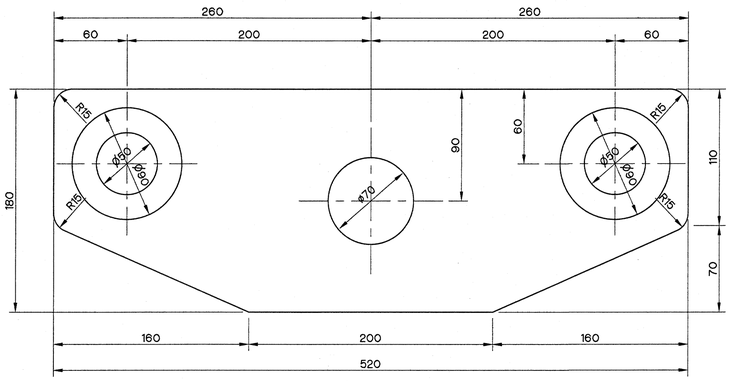
CARBON STEEL AISI 1045 OF 2 PIECES

SCALE 1:2.5



SECTION B–B

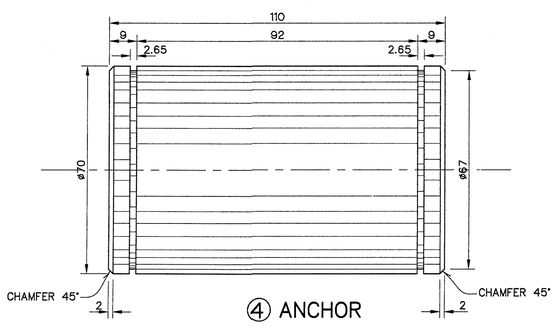
SCALE 1:2



③ BEAM

CARBON STEEL AISI 1045 OF 2 PIECES

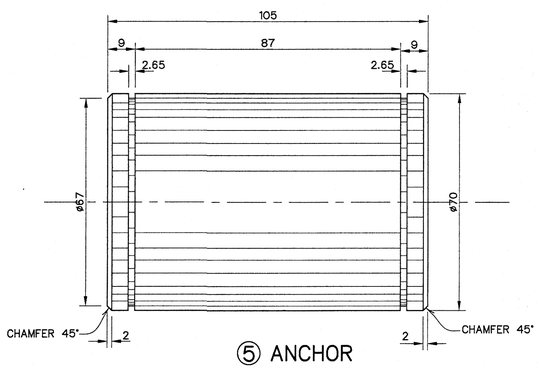
SCALE 1:2



④ ANCHOR

CARBON STEEL AISI 1045 OF 2 PIECES

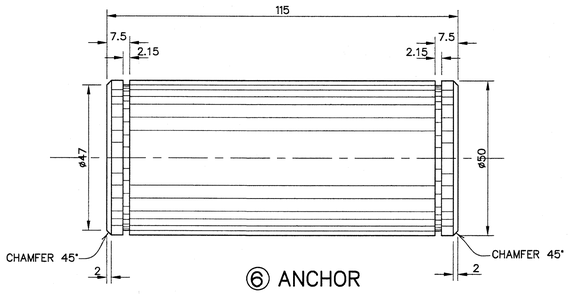
SCALE 1:2



⑤ ANCHOR

CARBON STEEL AISI 1045 OF 2 PIECES

SCALE 1:20



⑥ ANCHOR

CARBON STEEL AISI 1045 OF 4 PIECES

SCALE 1:2

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
2. LIFTING LUG ARE JIS G3101 SS 41 STEEL PLATE

NO.	DATE	REVISIONS	CHECKED	APPROVED
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

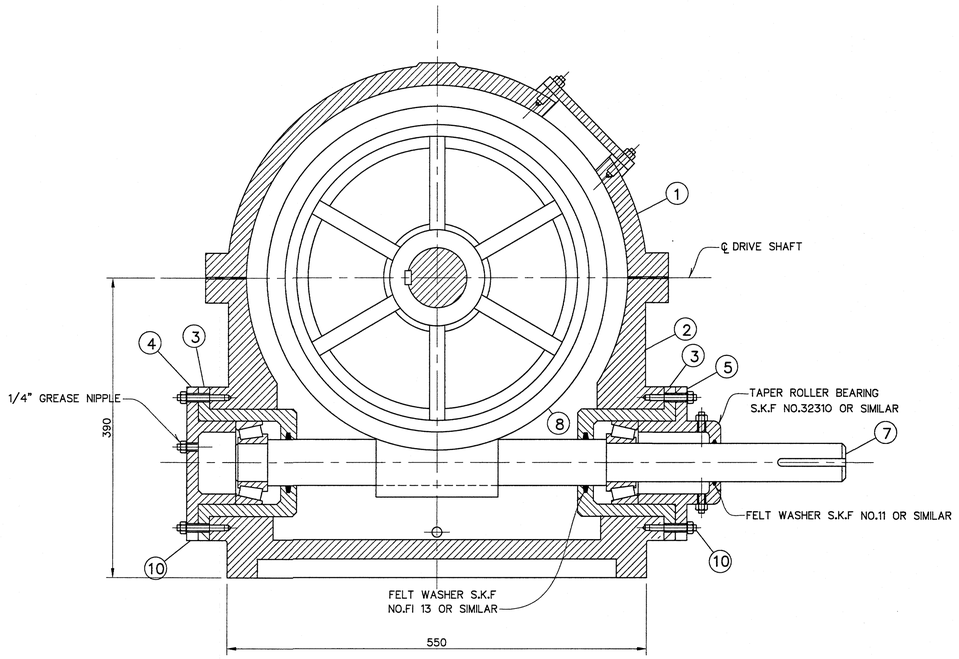
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

EMERGENCY CHANNEL

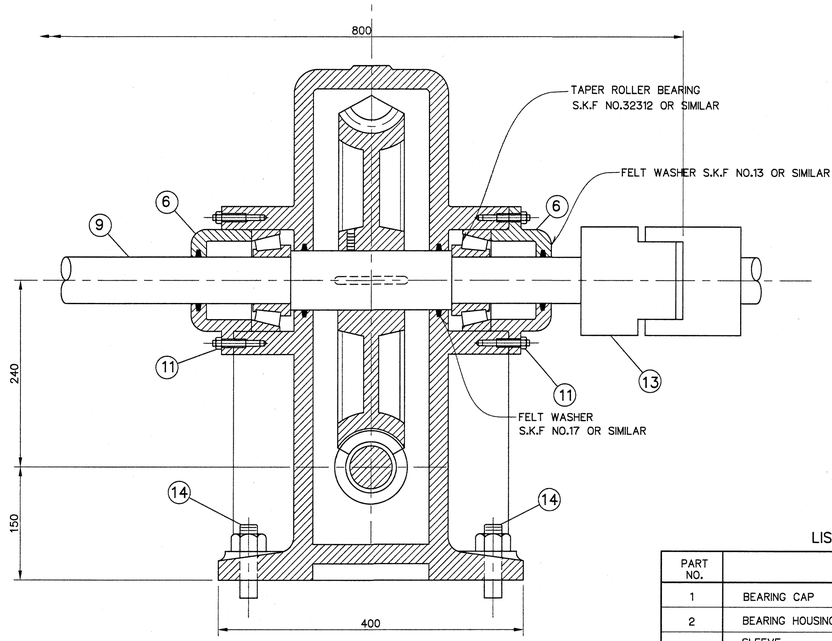
VERTICAL GATE LIFTING LUG AND WIRE ROPE ACCESSORIES FOR WINCH 25 TONS (SHEET 2/2)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
DESIGNED สุภัทร แก้วอินทร์ ส.ก.2197	REVIEWED	
DRAWN	SUBMITTED	
CHECKED สุภัทร แก้วอินทร์ ส.ก.2197	RECOMMENDED	
PROJECT MANAGER 6/9/2024 DATE	APPROVED	
	DRAWING NO. THN-PH-79	SHEET NO. 104 OF 157



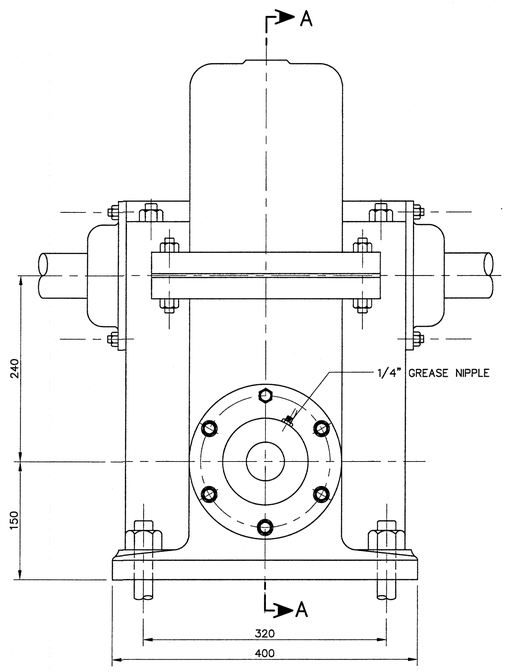
SECTION A–A

SCALE 1:2.5



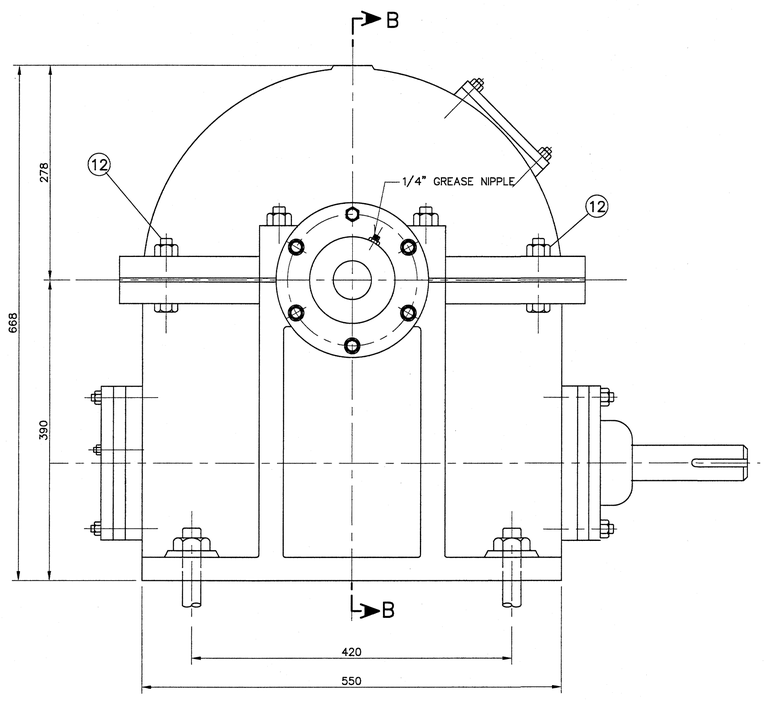
SECTION B–B

SCALE 1:2.5



FRONT VIEW

SCALE 1:2.5



SIDE VIEW

SCALE 1:2.5

LIST OF PARTS FOR ONE HOIST

PART NO.		NO. REQ'D
1	BEARING CAP	1
2	BEARING HOUSING	1
3	SLEEVE	2
4	COVER	1
5	COVER	1
6	COVER	2
7	WORM	1
8	WORM GEAR	1
9	WORM GEAR SHAFT	1
10	3/8" DIA–16 THDS PER INCH x2 1/4" LONG CAP SCREW BOTTOM TAP–1 1/2" DEEP IN BEARING 2	12
11	3/8" DIA–16 THDS PER INCH x 1 1/4" LONG CAP SCREW BOTTOM TAP–1 1/4" DEEP IN CAP 1 AND BEARING 2	12
12	1/2" – 13 NC–2 HEX.HD MACH BOLT WITH HEX NUT, 3" LONG	4
13	COUPLING	2
14	1x3 15/16" STUDS	4

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.

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2				
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
EMERGENCY CHANNEL
VERTICAL GATE
WINCH 25 TONS OF FLOOD GATE, DRIVE UNIT ASSEMBLY

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

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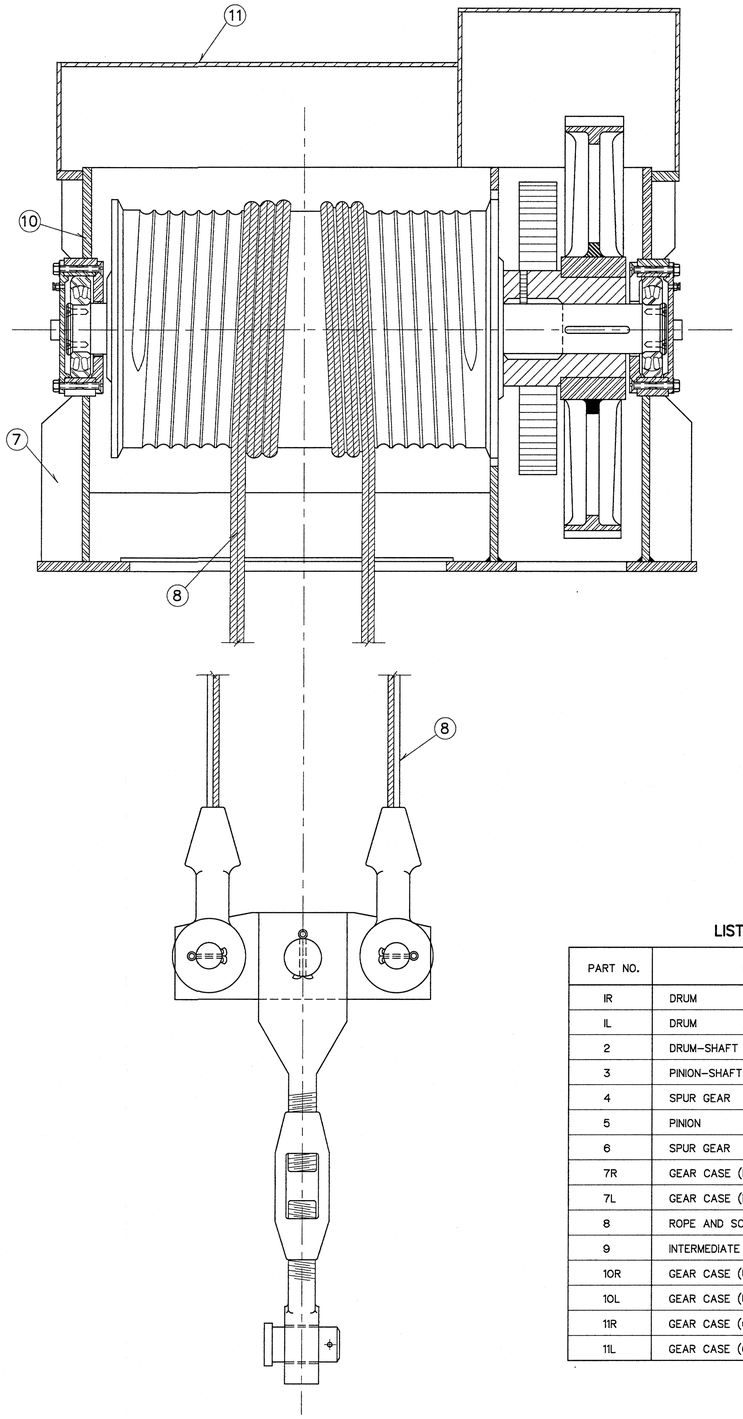
DRAWN			SUBMITTED
CHECKED	สุวิทย เหว้อน้อ	ส.ค.2197	RECOMMENDED
	6/9/2024		APPROVED
	PROJECT MANAGER	DATE	

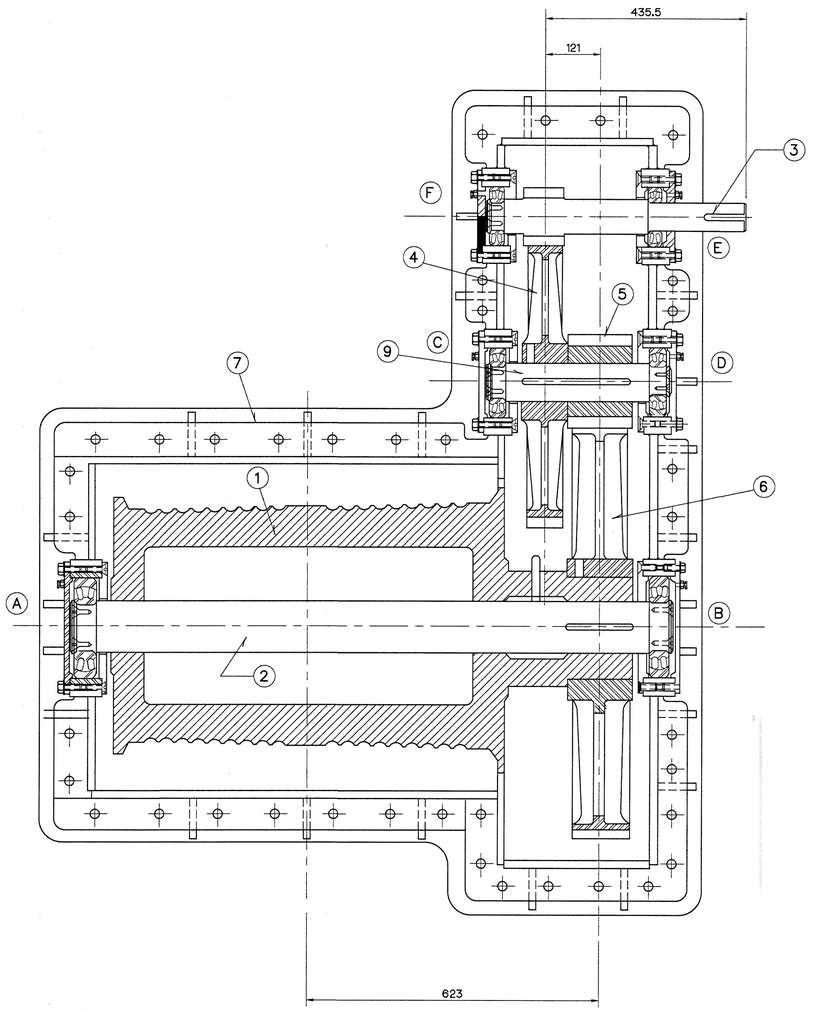
DRAWING NO. THN–PH–80

SHEET NO. 105 OF 157



FRONT VIEW

SCALE 1 : 5



SECTION OF WINCH

SCALE 1 : 5

LIST OF PARTS FOR ONE HOIST

PART NO.	DESCRIPTION	MATERIAL	NO.REQ"D
1R	DRUM	COST IRON-CLASS 30	1
1L	DRUM	COST IRON-CLASS 30	1
2	DRUM-SHAFT	STEEL S.A.E. 1045	2
3	PINION-SHAFT	STEEL S.A.E. 1045	2
4	SPUR GEAR	CAST STEEL	2
5	PINION	STEEL S.A.E. 1045	2
6	SPUR GEAR	CAST STEEL	2
7R	GEAR CASE (LOWER PART)	STEEL	1
7L	GEAR CASE (LOWER PART)	STEEL	1
8	ROPE AND SOCKET	STEEL	1
9	INTERMEDIATE	STEEL S.A.E. 1045	2
10R	GEAR CASE (UPPER PART)	STEEL	1
10L	GEAR CASE (UPPER PART)	STEEL	1
11R	GEAR CASE (COVER)	STEEL	1
11L	GEAR CASE (COVER)	STEEL	1

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
EMERGENCY CHANNEL
VERTICAL GATE
WINCH 25 TONS OF FLOOD GATE, GENERAL VIEW OF SIDE HOIST

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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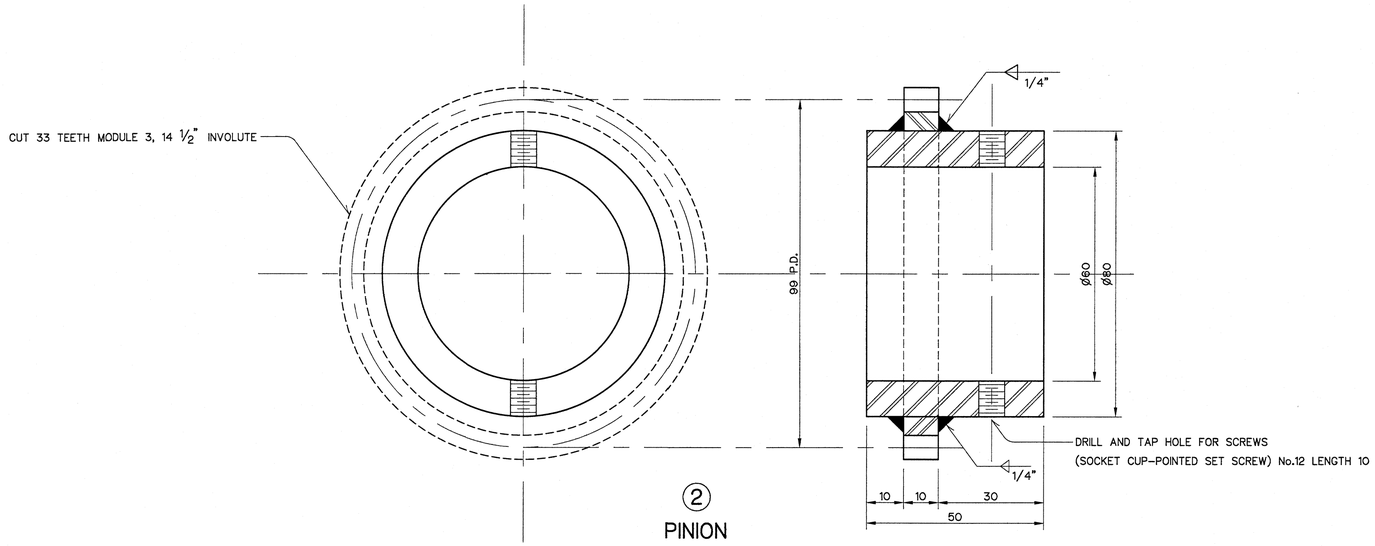
DRAWN			SUBMITTED
CHECKED	สุวิทย เหว่อน้อย	ส.ค.2197	RECOMMENDED
			APPROVED

PROJECT MANAGER — DATE 6/9/2024

DRAWING NO. THN-PH-81

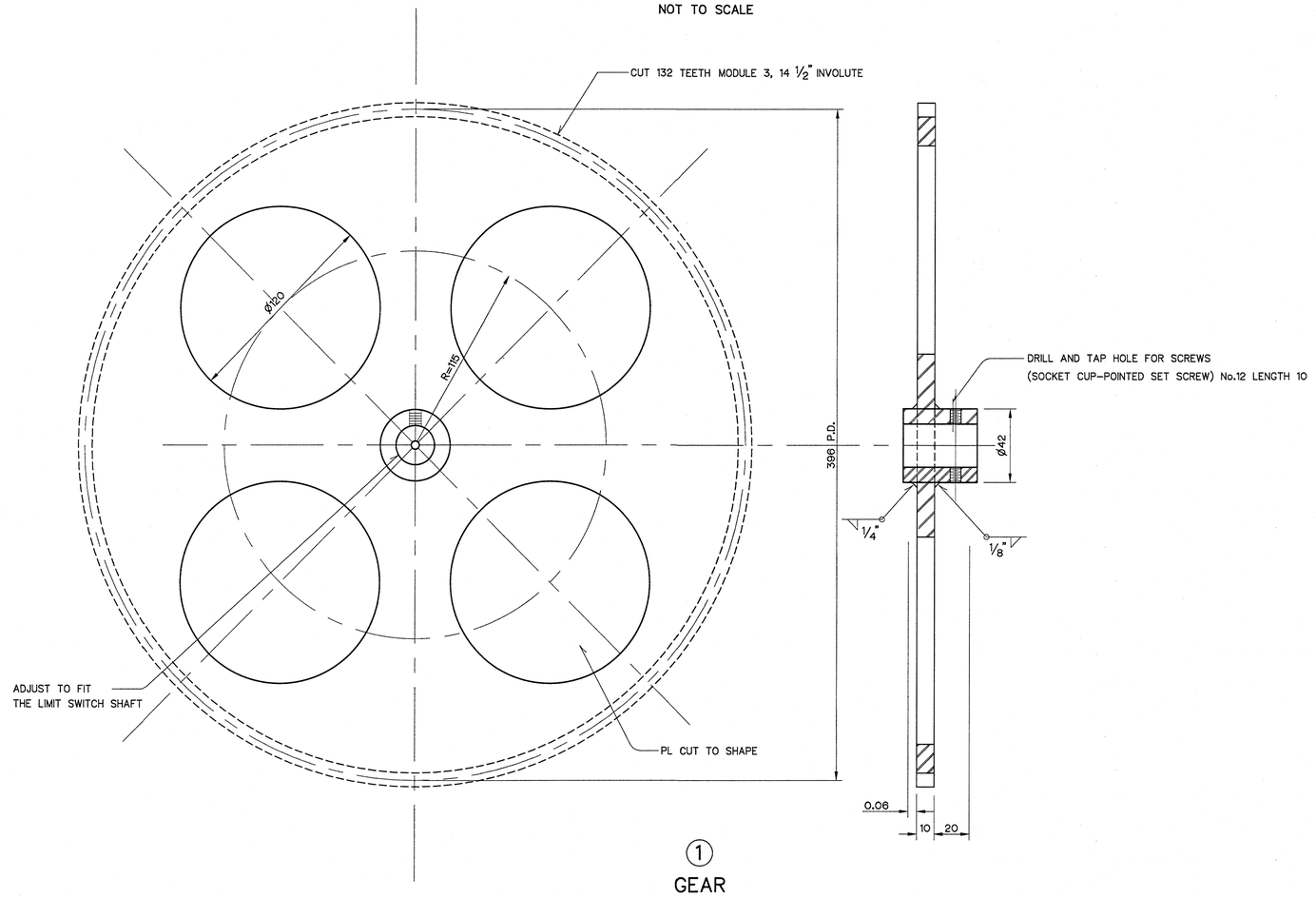
SHEET NO. 106 OF 157



② PINION

CARBON STEEL OF 1 PIECES

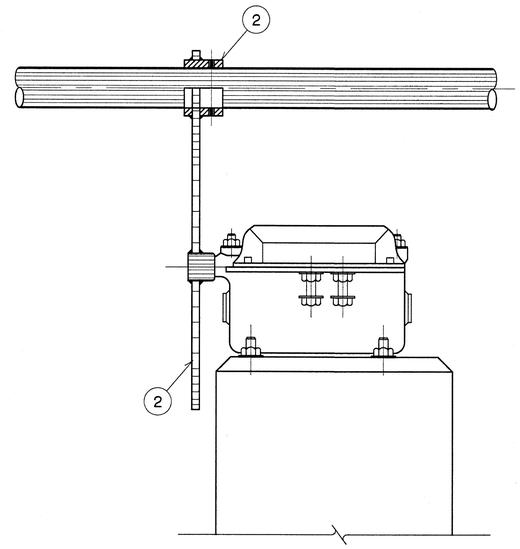
NOT TO SCALE



① GEAR

CARBON STEEL OF 1 PIECES

NOT TO SCALE



ASSEMBLY AND INSTALLATION DIAGRAM

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
2. THE QUANTITY SPECIFIED IS FOR ONE WINCH SET ONLY

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
EMERGENCY CHANNEL
VERTICAL GATE WINCH 25 TONS OF FLOOD GATE
DETAIL LIMIT SWITCH DRIVING GEARS

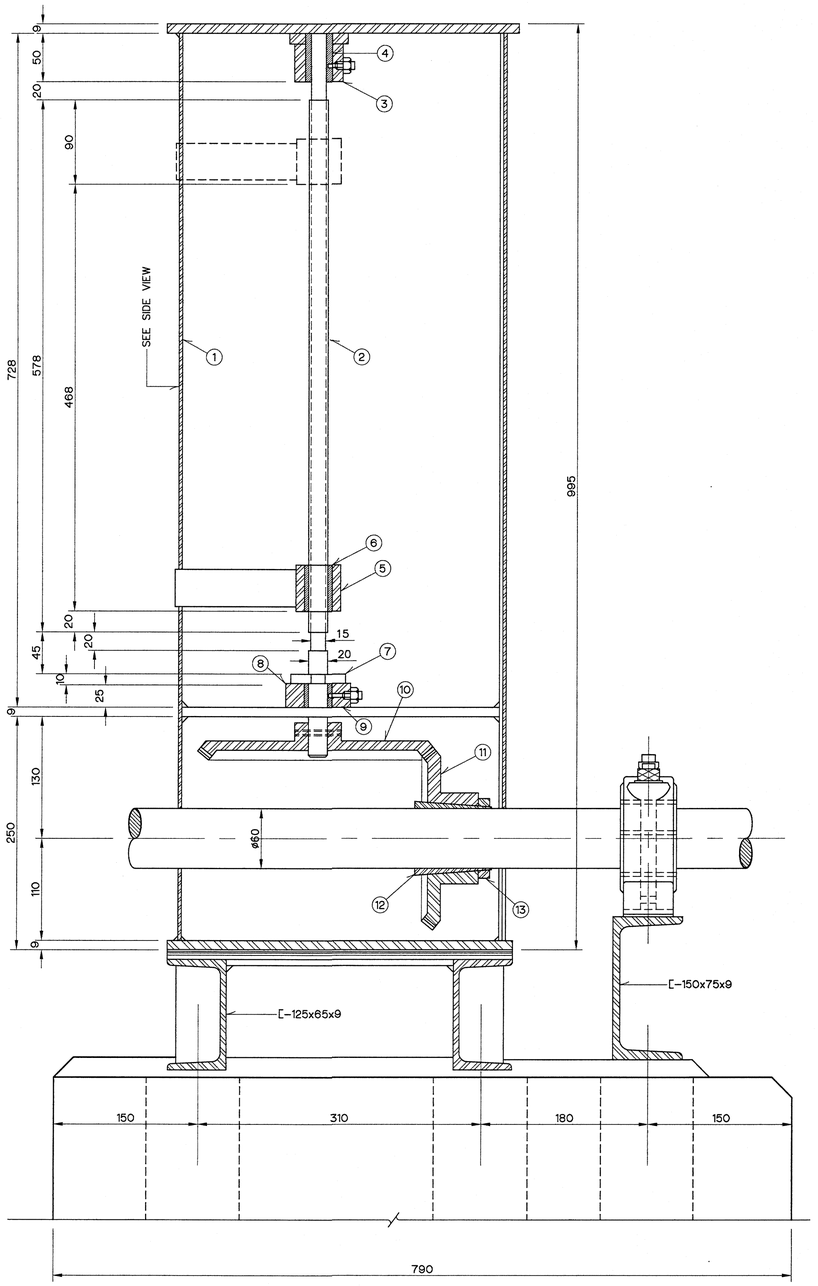
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

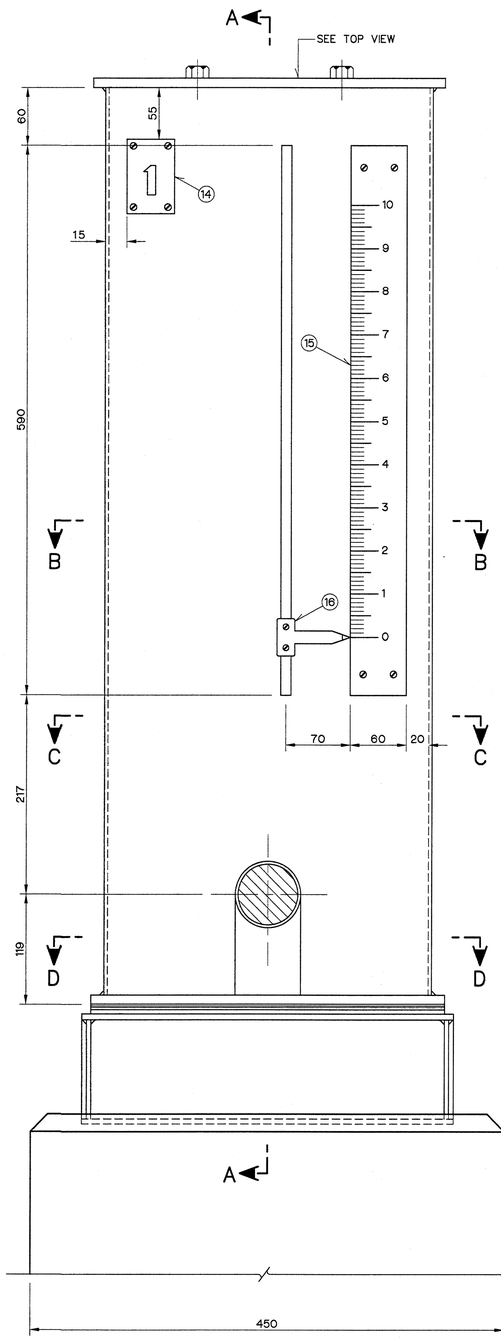
DESIGNED	สุวิทย์ แก้วน้อย	ส.ค.2197	REVIEWED
DRAWN			SUBMITTED
CHECKED	สุวิทย์ แก้วน้อย	ส.ค.2197	RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN-PH-82

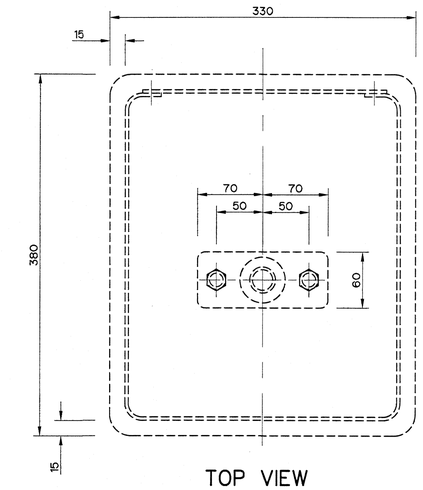
SHEET NO. 107 OF 157



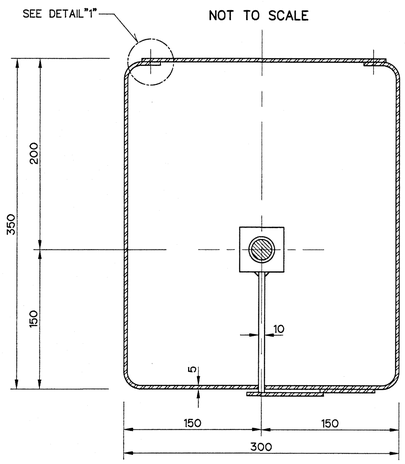
SECTION A–A
NOT TO SCALE



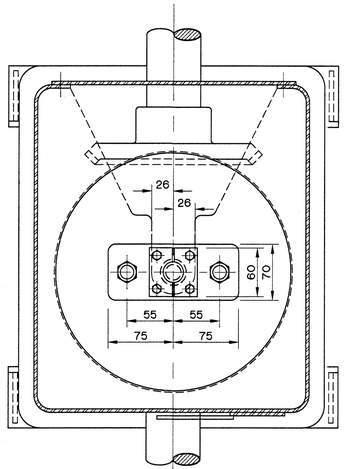
SIDE VIEW
NOT TO SCALE



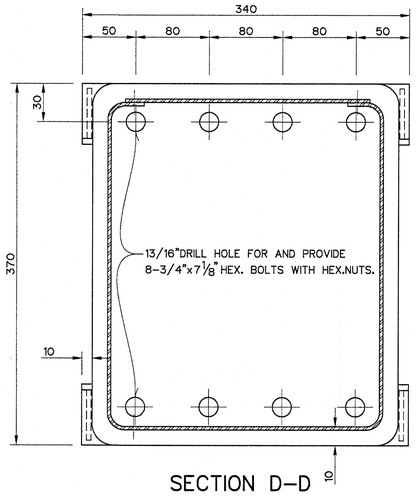
TOP VIEW
NOT TO SCALE



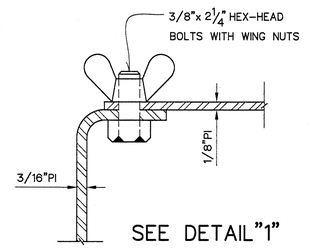
SECTION B–B
NOT TO SCALE



SECTION C–C
NOT TO SCALE



SECTION D–D
NOT TO SCALE



SEE DETAIL"1"
NOT TO SCALE

LIST OF PARTS FOR ONE HOIST

PART	DESCRIPTION	MATERIAL	NO.REQD
1	CASE	STEEL	1
2	LIFTING SHAFT	STEEL	1
3	BEARING	STEEL	1
4	BUSH	BRONZE	1
5	INDICATOR	STEEL	1
6	BUSHING NUT	BRONZE	1
7	BEARING	BRONZE SAE 65	2
8	SEAT	STEEL	1
9	BUSH	BRONZE	1
10	BEVEL GEAR	STEEL	1
11	BEVEL PINION	STEEL	1
12	ADAPTER SLEEVE	STEEL	1
13	WITHDRAWAL NUT	STEEL	1
14	GATE NUMBER PLATE	NO.14 GABRASS	1
15	DEPTH SCALE	NO.14 GABRASS	1
16	POINTER	NO.14 GABRASS	1

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
2. THE QUANTITY SPECIFIED IS FOR ONE WINCH SET ONLY

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
EMERGENCY CHANNEL
VERTICAL GATE WINCH 25 TONS OF FLOOD GATE
OPENING INDICATOR ASSEMBLY–LIST OF PARTS

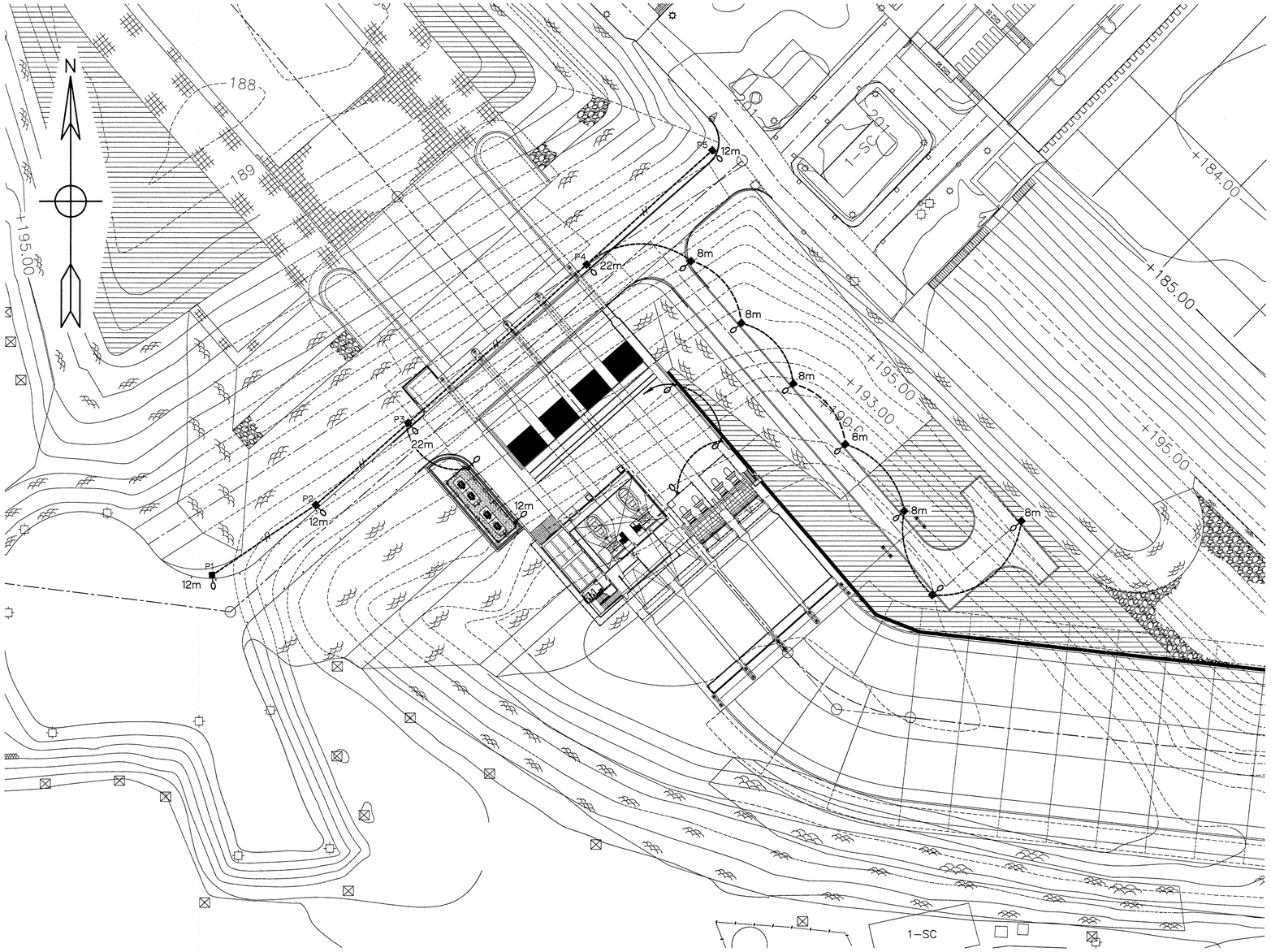
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	สุภาพ เทวัญ	ส.ค.2197	REVIEWED
DRAWN			SUBMITTED
CHECKED	สุภาพ เทวัญ	ส.ค.2197	RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

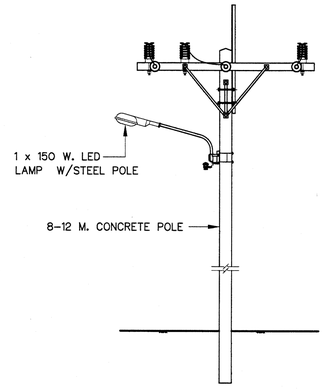
DRAWING NO. THN-PH-83

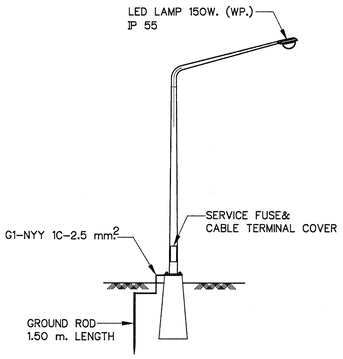
SHEET NO. 108 OF 157

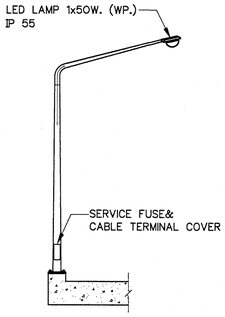


EXTERIOR LIGHTING PLAN

SCALE 1:500







DETAIL OF STREET LIGHTING

NOT TO SCALE

LOAD SCHEDULE (OLP1)														
PANEL NO : OLP1		ELECTRICAL SYSTEM : 3ø , 4W , 400 V , 50Hz												
MAX CKT : 12		LOCATION : SERVICE AREA							MOUTED : WALL					
CKT NO.	DESCRIPTION	CIRCUIT BREAKER				CABLE		CONDUIT		LOAD CONNECTION(VA)		
		P	AT	AF	IC	SECTION (mmǾ)	TYPE	DIA (INCH)	TYPE	A	B	C
1	OUT DOOR LIGHT NO.1	1	16	50	IC ≥ 10 kA	2C-10.0	CV.	3/4"	HDPE	900		
3	OUT DOOR LIGHT NO.2	1	16	50		2C-6.0	CV.	3/4"	HDPE		900	
5	OUT DOOR LIGHT NO.3	1	16	50		2C-10.0	CV.	3/4"	HDPE			900
7	OUT DOOR LIGHT NO.4	1	16	50		2C-10.0	CV.	3/4"	HDPE	900		
9	OUT DOOR LIGHT NO.5	1	16	50		2C-25.0	CV.	1 1/4"	HDPE		900	
11	FLOOD LIGHT	1	16	50		2C-6.0	CV.	3/4"	HDPE			900
2	SPARE FOR VESIDENCE	1	16	50		-	-	-	-	1,500		
4	SPARE FOR VESIDENCE	1	16	50		-	-	-	-		1,500	
6	SPARE FOR VESIDENCE	1	16	50		-	-	-	-			1,500
8	SPARE	3	20	50		-	-	-	-	1,020		
10											1,020	
12												1,020
MAIN	☑ BREAKER ☐ LUG IC : 25 kA	3	50	100		CONDUCTOR : 4x35/4G mmǾ THW				4,320	4,320	3,920
BUS	PHASE : 100 A NEUTRAL : 100 A					CONDUIT : ø1 1/2" IMC CONDUIT				12,560		
INCOME LINE : MDB												

LEGENDS :

- 8, 12m — CONCRETE POLE, SUFFIX INDICATES HEIGHT OF POLE
- STREET LIGHTING FIXTURE, 150 W LED LAMP, ON CONCRETE POLE
- STREET LIGHTING ON STEEL POLE HESIGHT 9 m.
- STREET LIGHTING POLE SINGLE ARM
- CONCRETE POLE WITH GUY WIRE
- MAIN DISTRIBUTION PANEL
- J — JUNCTION BOX
- LOAD CENTER
- PB — WEATHERPROOF (WP) GALVANIZED STEEL PULL BOX
- SAFETY SWITCH OR DISCONNECT SWITCH, NEMA 3R ON CONCRETE POLE
- —P— PRIMARY LINES, 22 KV OVERHEAD BARE CONDUCTORS
- -//-S- SECONDARY LINES, 380/220 V 50 MM THW OVERHEAD INSULATED CABLES, 3Ø 4 WIRE
- —SL— STREET LIGHTING LINES
- CONCEALED WIRING IN CONDUIT IN CONCRETE STRUCTURE OR CABLE TRENCH
- POWER CABLE DROP FOR ELECTRICAL SUPPLY TO BUILDING 3Ø OR 1Ø
- UNDERGROUND WIRING IN CONDUIT
- LV. CABLE, ABOVE GROUND
- SPACE AERIAL CABLE 50 mm.
- GUY
- TRANSFORMER 500 kVA. (POWER RATED SEE SINGLE LINE DIAGRAM)

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL CONCRETE POLES, HARDWARES, TRANSFORMER, AND INSTALLATION SHALL STRICTLY CONFORM TO PEA'S STANDARD AND REGULATIONS.
3. SPLICING OF CABLES IS NOT ALLOWED IN CONDUITS OR HAND HOLES EXCEPT AT JUNCTION BOXES OR PULL BOXES ABOVE GROUND LEVEL WITH APPROVED SPLICING FITTINGS.

0 5 10 20 30 40

SCALE 1:500 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

EXTERIOR LIGHTING PLAN

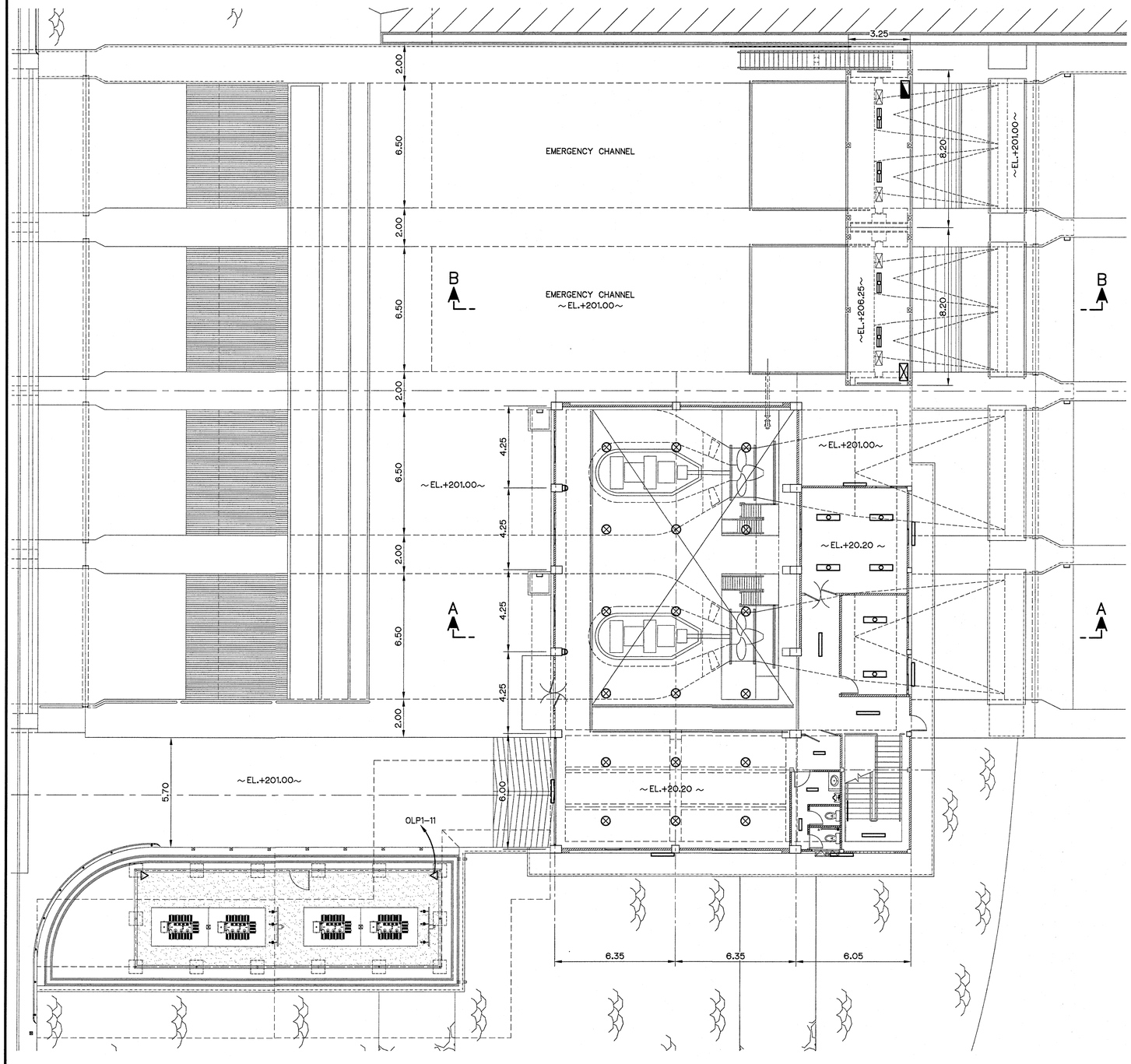
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วพก.1029	REVIEWED
DRAWN		SUBMITTED
CHECKED	วพก.1029	RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE	APPROVED

DRAWING NO. THN-PH-84

SHEET NO. 109 OF 157



1st FLOOR LIGHTING PLAN

SCALE 1:125

0 1 2 4 6 8 10

SCALE 1:125 METERS

NOTE :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. THE CONTRACTOR HAS TO SUBMIT THE SHOP DRAWING OF GROUNDING SYSTEM FOR APPROVAL.

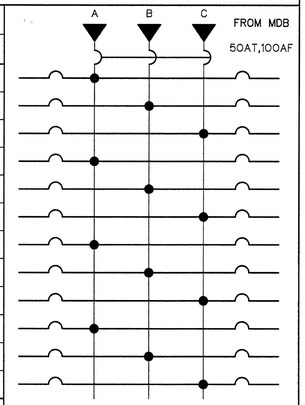
DIAGRAM

LOCATION : MACHINE HALL — "PB" LOAD CENTER 3Ø 4W WITH MCCB. 3P 50AT 100AF (24 CKTS,BRANCH MCB 5 KAIC) — IC > 25 KA AT 380 VOLT

CKT NO	DESCRIPTION	LOAD (VA) A	B	C	MCB POLE	AT	CONDUCTOR SIZE(MM)^2	TYPE
1	RECEPTACLES	1,200			1	15	2/1.5 THW	1/2" BMT
3	RECEPTACLES		1,000		1	15	2/1.5 THW	1/2" BMT
5	RECEPTACLES			1,800	1	15	–	–
7	HIGH BAY NO.1	800			1	10	2x6 THW	1/2" BMT
9	HIGH BAY NO.2		1,200		1	10	2x6 THW	1/2" BMT
11	HIGH BAY NO.3			800	1	10	2x4 THW	1/2" BMT
13	A/C 12,000 BTU/Hr	1,500			1	20	4/4 THW	3/4" BMT
15	RECEPTACLES		1,000		1	20	–	–
17	A/C 12,000 BTU/Hr			1,500	1	20	2x4/4 THW	3/4" BMT
19	BASE LIHT-1	162			1	10	2x2.5 THW	1/2" BMT
21	RECEPTACLES		1,200		1	15	2x2.5 THW	1/2" BMT
23	SPARE			–	1	20	–	–
2	EXHAUST FAN	240			1	10	2x2.5 THW	1/2" BMT
4	EXHAUST FAN		600		1	10	2x2.5 THW	1/2" BMT
6	12,000 BTU/Hr			1,500	1	20	2x4/4 THW	–
8	LIGHTING	420			1	10	2x2.5 THW	1/2" BMT
10	LIGHTING		350		1	10	2x2.5 THW	1/2" BMT
12	LIGHTING			420	1	10	2x2.5 THW	1/2" BMT
14	12,000 BTU/Hr	1,500			1	20	2x4/4 THW	–
16	EMERGENCY LIGHT		216		1	10	2x2.5 THW	1/2" BMT
18	SPARE	4,020	3,300		1	20	–	–
20	BASE LIHT-2	100			1	10	2x2.5 THW	1/2" BMT
22	RECEPTACLES		126		1	10	2x2.5 THW	1/2" BMT
24	SPARE			–	1	20	–	
		4,362	4,625	18,644				

TOTAL CONNECTED LOAD	13,998	VA
DEMAND FACTOR	75%	
CALCULATED LOAD	9,035	VA

MAIN CIRCUIT BRCAKER 3P-50AT/100AT
MAIN CABLE/CONDUIT 4x35/4G mm. THW.
CONDUIT Ø1 1/2" IMC CONDUIT



LEGENDS :

- 1 x 200 W LED HIGH BAY
- 2 x 18 W LED LAMP WITH ALUMINIUM ANODIZED REFLECTOR
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 160 W LED FLOOD LIGHT
- 180 W LED FLOOD LIGHT ON STEEL POLE HEIGTH 6.0 m.
- EXHAUST FAN Ø 10 inch.
- 2 x 9 W LED LIGHT WITH BATTERY OPERATE RECEPTACLE
- AIR CONDITION , CEILING TYPE
- LOAD CENTER PANEL (PB)
- DUPLEX RECEPTACLE
- SIMPLEX RECEPTACLE
- POWER RECEPTACLE , 3Ø
- S a,b,c ONE WAY SWITCH, 15A ,1Ø , 250V
- 1 x 9 W LED, OUTDOOR LUMINAIRE
- AIR CONDITIONING
- FCP FIRE ALARM CONTROL PENEL
- S Bx SMOKE BEAM DETECTOR
- S SMOKE DETECTOR
- D HEAT DETECTOR
- M MANUAL STATION
- HORM AND STROBE LIGHT

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

1st FLOOR LIGHTING PLAN

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS — DEDE

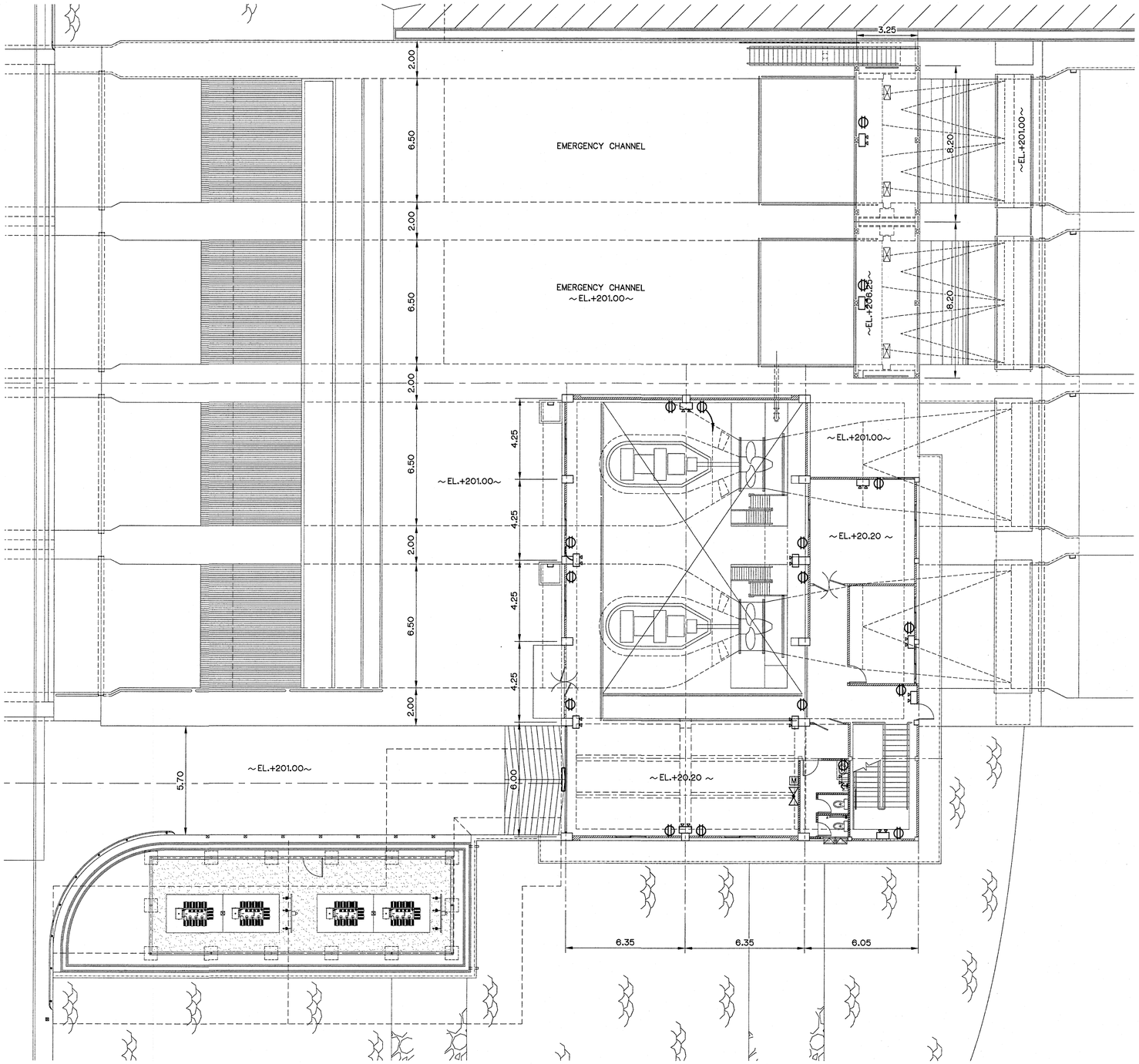
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิฑูรย์	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วิฑูรย์	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

DRAWING NO. THN-PH-85

SHEET NO. 110 OF 157



1st FLOOR RECEPTACLE PLAN

SCALE 1:125

SCALE 1:125 — 0 1 2 4 6 8 10 METERS

NOTE :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. THE CONTRACTOR HAS TO SUBMIT THE SHOP DRAWING OF GROUNDING SYSTEM FOR APPROVAL.

LEGENDS :

- ⊗ 1 x 200 W LED HIGH BAY
- 2 x 18 W LED LAMP WITH ALUMINIUM ANODIZED REFLECTOR
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 160 W LED FLOOD LIGHT
- 180 W LED FLOOD LIGHT ON STEEL POLE HEIGTH 6.0 m.
- EXHAUST FAN Ø 10 inch.
- 2 x 9 W LED LIGHT WITH BATTERY OPERATE RECEPTACLE
- AIR CONDITION , CEILING TYPE
- PB LOAD CENTER PANEL
- DUPLEX RECEPTACLE
- SIMPLEX RECEPTACLE
- POWER RECEPTACLE , 3Ø
- Sa,b,c ONE WAY SWITCH, 15A ,1Ø , 250V
- 1 x 9 W LED, OUTDOOR LUMINAIRE
- AIR CONDITIONING
- FCP FIRE ALARM CONTROL PENEL
- (S)Bx SMOKE BEAM DETECTOR
- (S) SMOKE DETECTOR
- (D) HEAT DETECTOR
- (M) MANUAL STATION
- HORM AND STROBE LIGHT

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

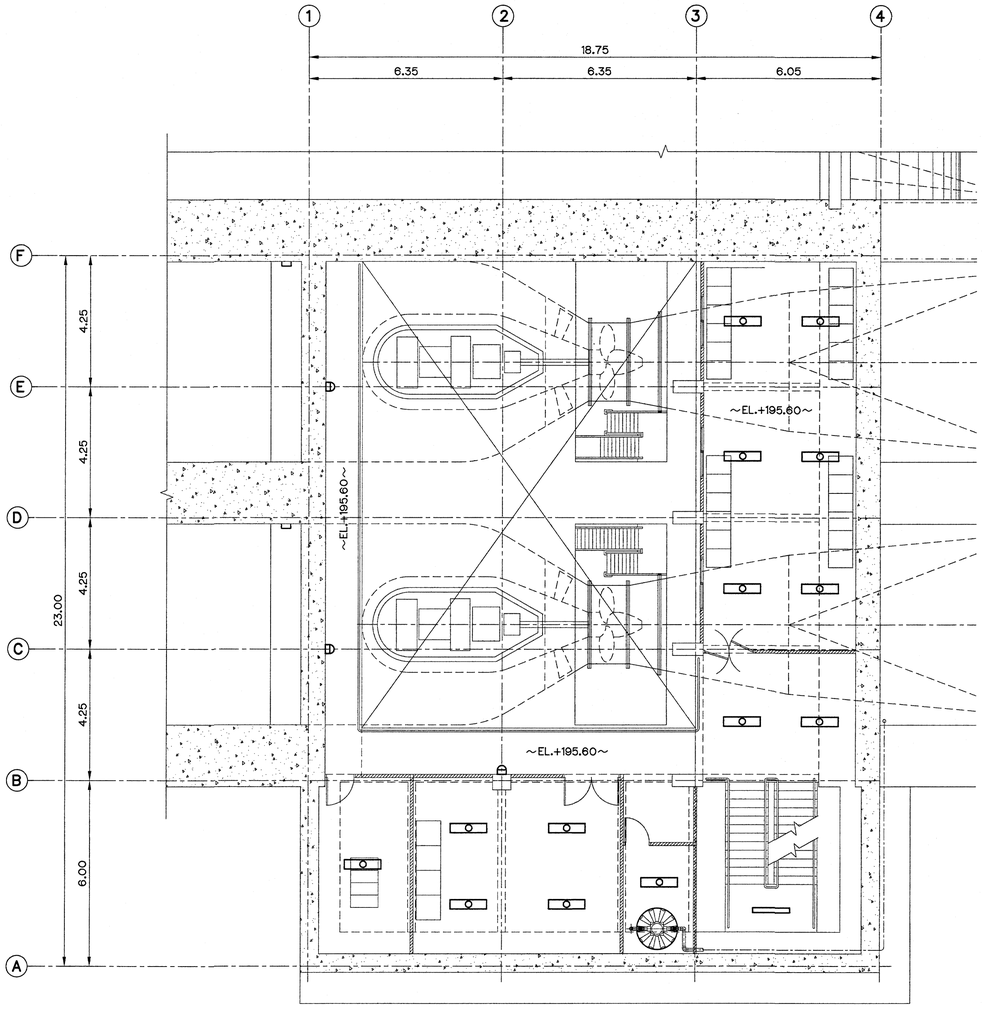
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

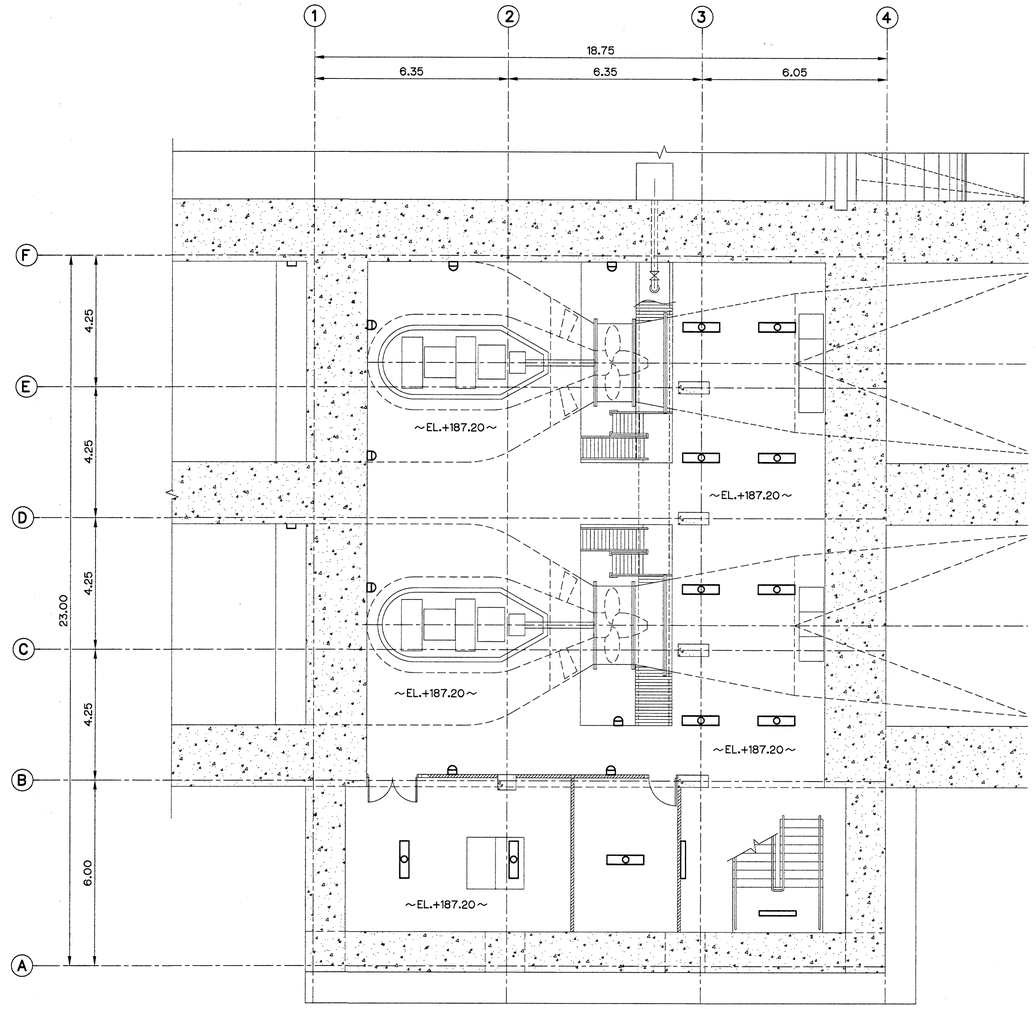
1st FLOOR RECEPTACLE PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
DESIGNED	วฟก.1029	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วฟก.1029	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	
		DRAWING NO. THN-PH-86	SHEET NO. 111 OF 157



GROUND FLOOR LIGHTING PLAN (EL.+195.60)

SCALE 1:100



GROUND FLOOR LIGHTING PLAN (EL.+187.20)

SCALE 1:100

LEGENDS :

- 1 x 200 W LED HIGH BAY
- 2 x 18 W LED LAMP WITH ALUMINIUM ANODIZED REFLECTOR
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 160 W LED FLOOD LIGHT
- 180 W LED FLOOD LIGHT ON STEEL POLE HEIGTH 6.0 m.
- EXHAUST FAN Ø 10 inch.
- 2 x 9 W LED LIGHT WITH BATTERY OPERATE RECEPTACLE
- AIR CONDITION , CEILING TYPE
- LOAD CENTER PANEL (PB)
- DUPLEX RECEPTACLE
- SIMPLEX RECEPTACLE
- POWER RECEPTACLE , 3Ø
- Sa,b,c ONE WAY SWITCH, 15A ,1Ø , 250V
- 1 x 9 W LED, OUTDOOR LUMINAIRE
- AIR CONDITIONING
- FCP FIRE ALARM CONTROL PENEL
- SBx SMOKE BEAM DETECTOR
- S SMOKE DETECTOR
- D HEAT DETECTOR
- M MANUAL STATION
- HORM AND STROBE LIGHT

NOTE :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. THE CONTRACTOR HAS TO SUBMIT THE SHOP DRAWING OF GROUNDING SYSTEM FOR APPROVAL.

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

GROUND FLOOR LIGHTING PLAN (EL.+195.60 AND EL.+187.20)

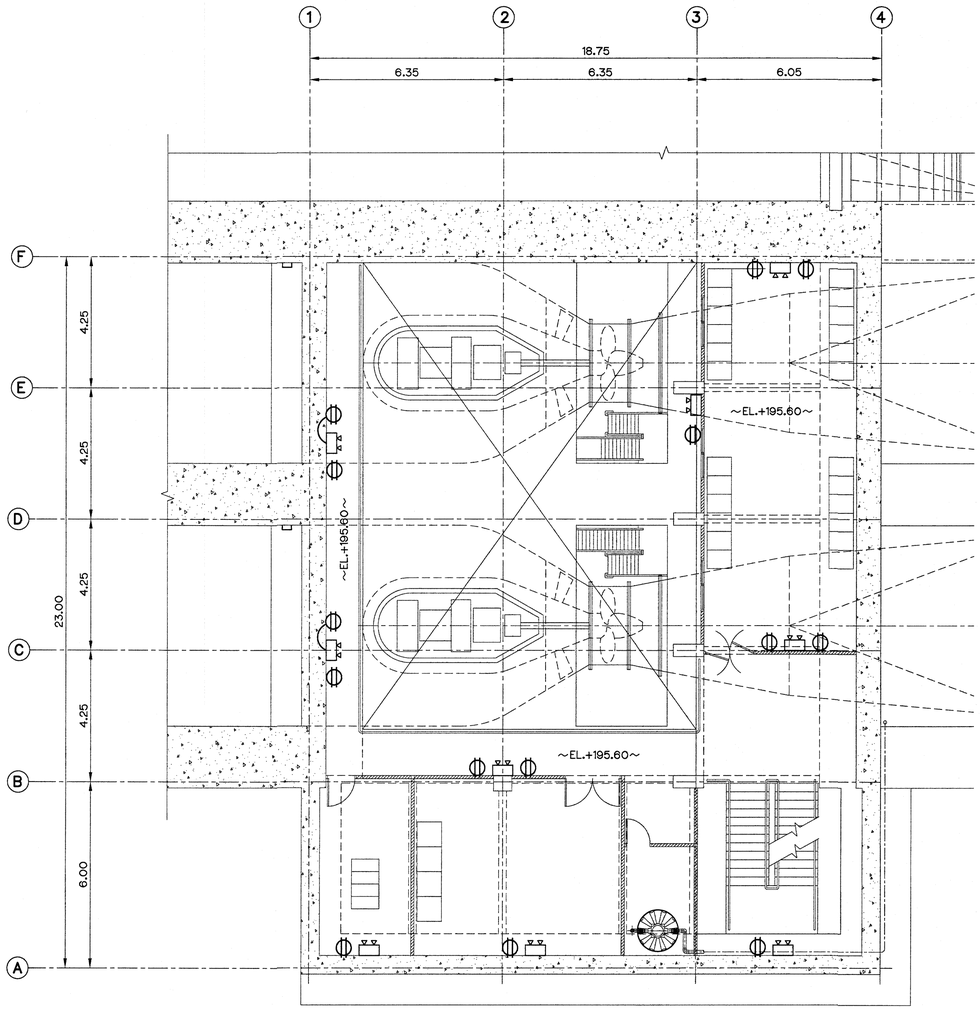
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วพก.1029	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วพก.1029	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

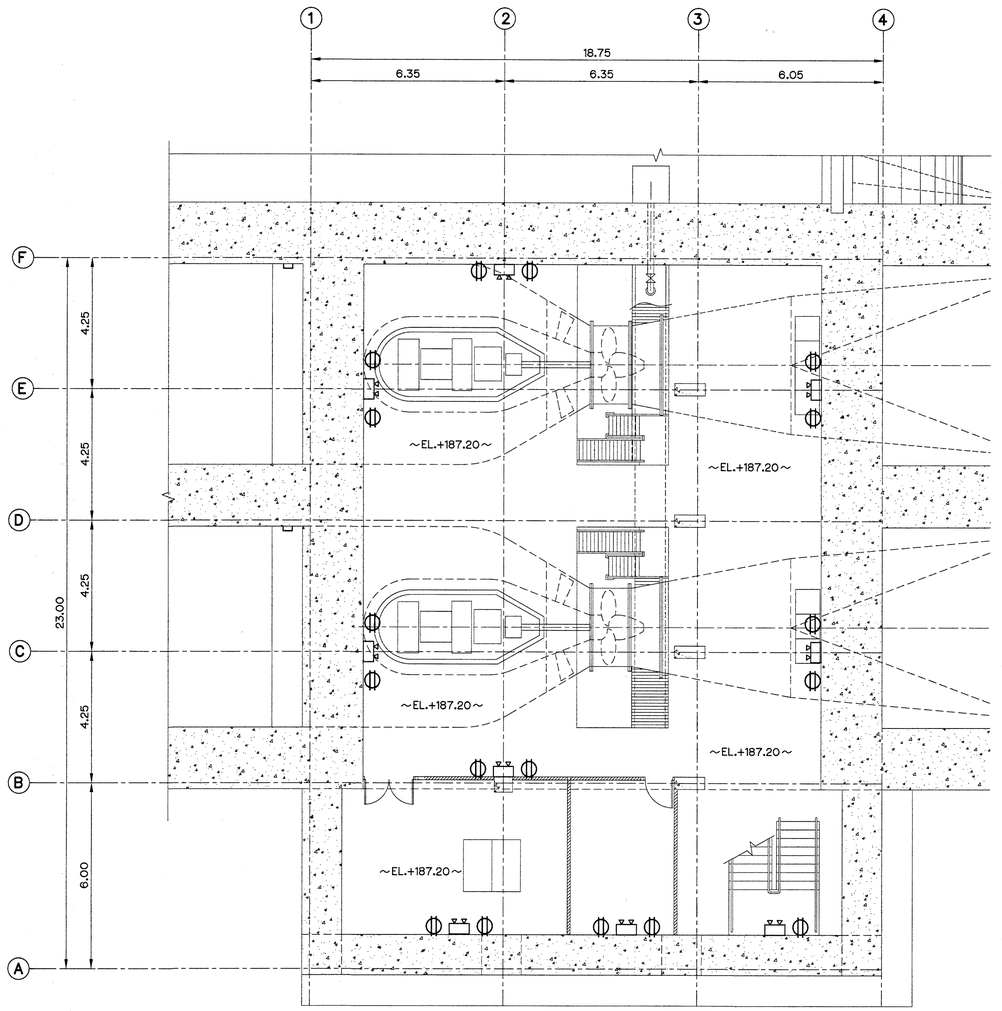
DRAWING NO. THN-PH-87

SHEET NO. 112 OF 157



GROUND FLOOR RECEPTACLE PLAN (EL.+195.60)

SCALE 1:100



GROUND FLOOR RECEPTACLE PLAN (EL.+187.20)

SCALE 1:100

LEGENDS :

- 1 x 200 W LED HIGH BAY
- 2 x 18 W LED LAMP WITH ALUMINIUM ANODIZED REFLECTOR
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 1 x 18 W LED LAMP BATTEN LUMINAIR TYPE
- 160 W LED FLOOD LIGHT
- 180 W LED FLOOD LIGHT ON STEEL POLE HEIGTH 6.0 m.
- EXHAUST FAN Ø 10 inch.
- 2 x 9 W LED LIGHT WITH BATTERY OPERATE RECEPTACLE
- AIR CONDITION , CEILING TYPE
- LOAD CENTER PANEL (PB)
- DUPLEX RECEPTACLE
- SIMPLEX RECEPTACLE
- POWER RECEPTACLE , 3Ø
- Sa,b,c ONE WAY SWITCH, 15A ,1Ø , 250V
- 1 x 9 W LED, OUTDOOR LUMINAIRE
- AIR CONDITIONING
- FCP FIRE ALARM CONTROL PENEL
- Bx SMOKE BEAM DETECTOR
- S SMOKE DETECTOR
- D HEAT DETECTOR
- M MANUAL STATION
- HORM AND STROBE LIGHT

NOTE :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. THE CONTRACTOR HAS TO SUBMIT THE SHOP DRAWING OF GROUNDING SYSTEM FOR APPROVAL.

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

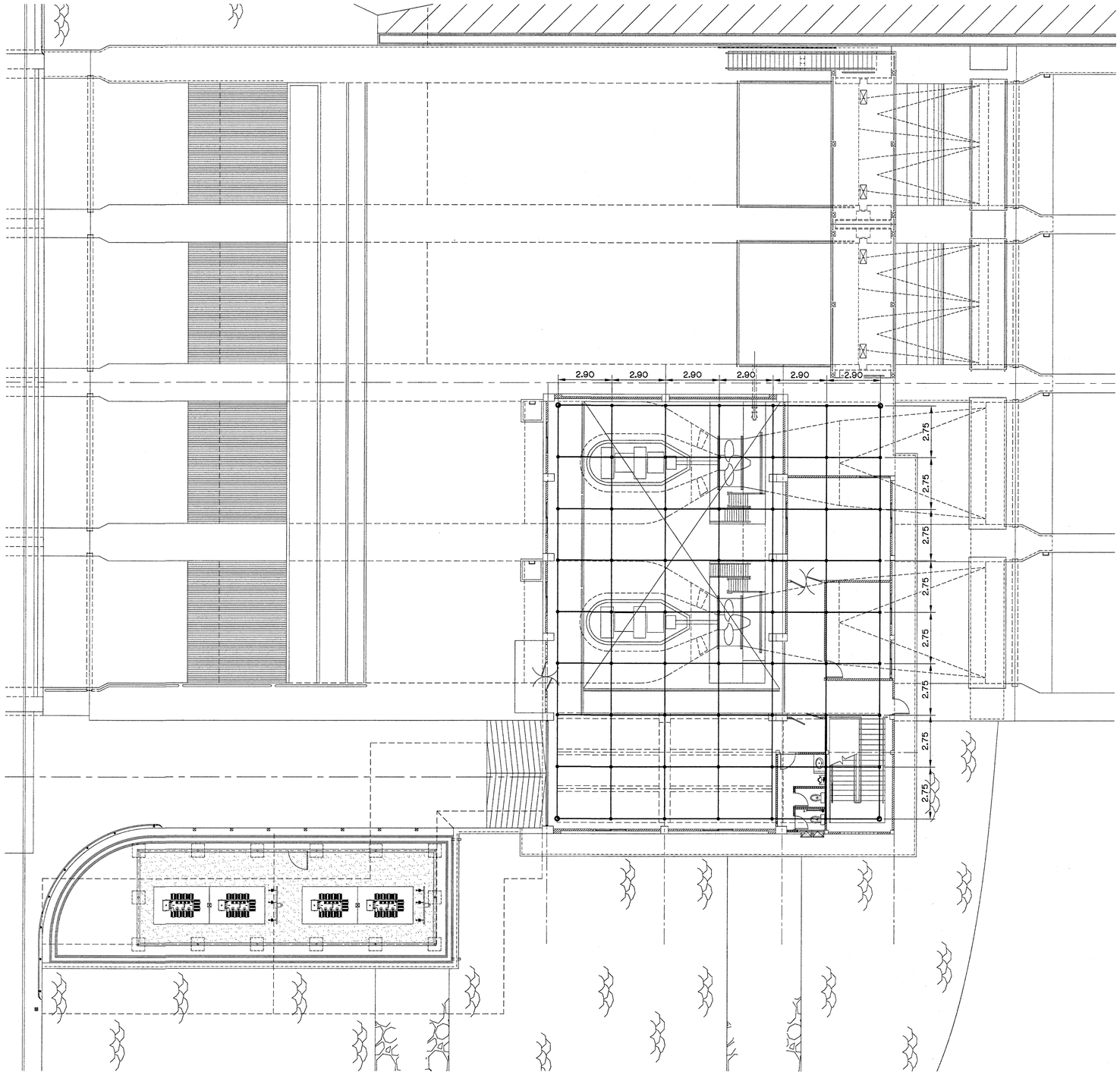
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE

GROUND FLOOR RECEPTACLE PLAN (EL.+195.60 AND EL.+187.20)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	วฬก.1029	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วฬก.1029	APPROVED	
PROJECT MANAGER	6/9/2024 DATE	DRAWING NO. THN-PH-88	SHEET NO. 113 OF 157



GROUNDING SYSTEM PLAN

SCALE 1:125

0 1 2 4 6 8 10

SCALE 1:125 METERS

NOTES :

1. GROUNDING CONDUCTOR, TAP AND RISER FROM GROUNDING NETWORK TO POWER EQUIPMENT SHALL BE FORMED BY BARE COPPER CONDUCTOR NOT LESS THAN 95 SQ.MM.
2. GROUNDING SYSTEM RESISTANCE WILL NOT EXCEED 5 OHM.
3. CONNECTOR TO WITH IN & BETWEEN THE GROUNDING NETWORK TO POWER PLANT EQUIPMENT WILL BE MADE BY THERMAL CADWELD.
4. GROUND ROD WILL BE COPPER COVER STEEL DIAMETER 15.87 MM. 2,400 MM. LONG
5. THIS DRAWING USE FOR GUIDE ONLY.

LEGENDS :

○	GROUND ROD
⊛	GROUND POINT FOR POWER PLANT EQUIPMENT GROUNDING
————	BARE CUPPER CONDUCTOR
S	ONE WAY SWITCH, 15A ,1Ø , 250V
∅	AIR TERMINAL Ø5/8" x 0.6 m
◉	GROUND ROD Ø5/8", 10" LONG
—— L ——	ROOF CONDUCTOR, 70 mm^2 BARE COPPER WIRE
—— D ——	DOWN CONDUCTOR, 70 mm^2 BARE COPPER WIRE
	IN Ø 1" PVC COMPLETED WITH ALUMINUM ENCLOSER GROUND TEST BOX INSTALLED 1 m FROM AFF
	GROUNDING CONDUCTOR, 95 mm^2 BARE COPPER WIRE BURIED INSTALLATION 0.5 m FROM GROUND SURFACE
—— OR ——	EXOTHERMITE WELDING FOR GROUNDING CONDUCTOR CONNECTION
—— G ——	THW. 1C-120 mm^2 IN HDPE $1\frac{1}{2}$"
—— G ——	THW. 1C-120 mm^2 IN IMC $1\frac{1}{2}$"
G	COPPER EROUND BAR TERMINAL

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

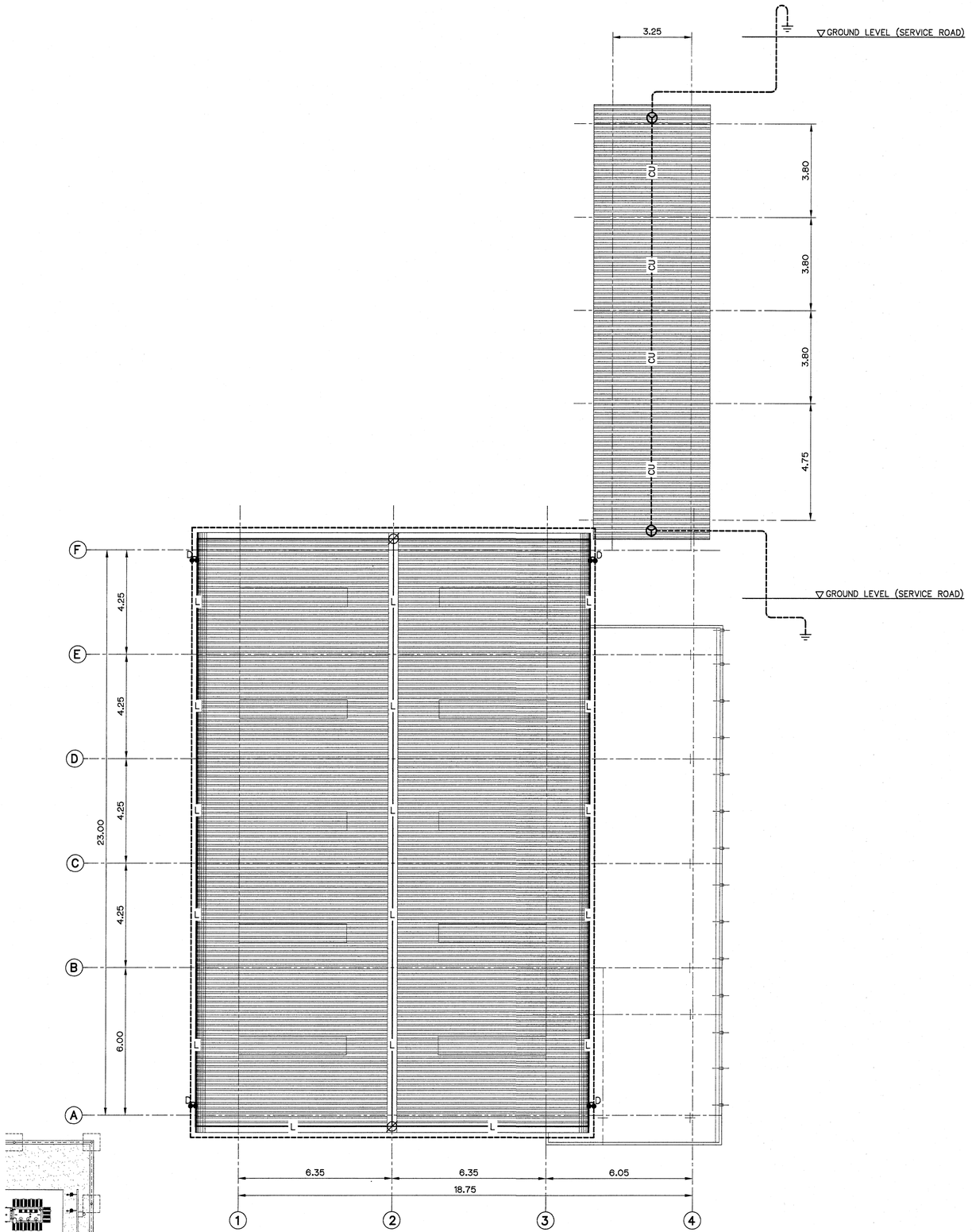
POWERHOUSE AND EMERGENCY CHANNEL

GROUNDING SYSTEM PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	๒๒ก.๑๐๒๙	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	๒๒ก.๑๐๒๙	RECOMMENDED	
		APPROVED	
PROJECT MANAGER	6/9/2024 DATE	DRAWING NO.	THN-PH-98
		SHEET NO.	114 OF 157



LIGHTNING PROTECTION AND GROUNDING SYSTEM

SCALE 1:100

NOTES :

1. GROUNDING CONDUCTOR, TAP AND RISER FROM GROUNDING NETWORK TO POWER EQUIPMENT SHALL BE FORMED BY BARE COPPER CONDUCTOR NOT LESS THAN 95 SQ.MM.
2. GROUNDING SYSTEM RESISTANCE WILL NOT EXCEED 5 OHM.
3. CONNECTOR TO WITH IN & BETWEEN THE GROUNDING NETWORK TO POWER PLANT EQUIPMENT WILL BE MADE BY THERMAL CADWELD.
4. GROUND ROD WILL BE COPPER COVER STEEL DIAMETER 15.87 MM. 2,400 MM. LONG
5. THIS DRAWING USE FOR GUIDE ONLY.

LEGENDS :

●	GROUND ROD
⊛	GROUND POINT FOR POWER PLANT EQUIPMENT GROUNDING
— — — —	BARE CUPPER CONDUCTOR
S	ONE WAY SWITCH, 15A ,1Ø , 250V
Ø	AIR TERMINAL Ø5/8" x 0.6 m
◉	GROUND ROD Ø5/8", 10" LONG
—— L ——	ROOF CONDUCTOR, 70 mm^2 BARE COPPER WIRE
—— D ——	DOWN CONDUCTOR, 70 mm^2 BARE COPPER WIRE
	IN Ø 1" PVC COMPLETED WITH ALUMINUIM ENCLOSER GROUND TEST BOX INSTALLED 1 m FROM AFF
———	GROUNDING CONDUCTOR, 95 mm^2 BARE COPPER WIRE BURIED INSTALLATION 0.5 m FROM GROUND SURFACE
—● OR ●—	EXOTHERMITE WELDING FOR GROUNDING CONDUCTOR CONNECTION
—— G ——	THW. 1C–120 mm^2 IN HDPE 1 1/2"
—— G ——	THW. 1C–120 mm^2 IN IMC 1 1/2"
G	COPPER EROUND BAR TERMINAL

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

LIGHTNING PROTECTION AND GROUNDING SYSTEM

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	๖๒๐.๑๐๒๙	REVIEWED	
DRAWN		SUBMITTED	
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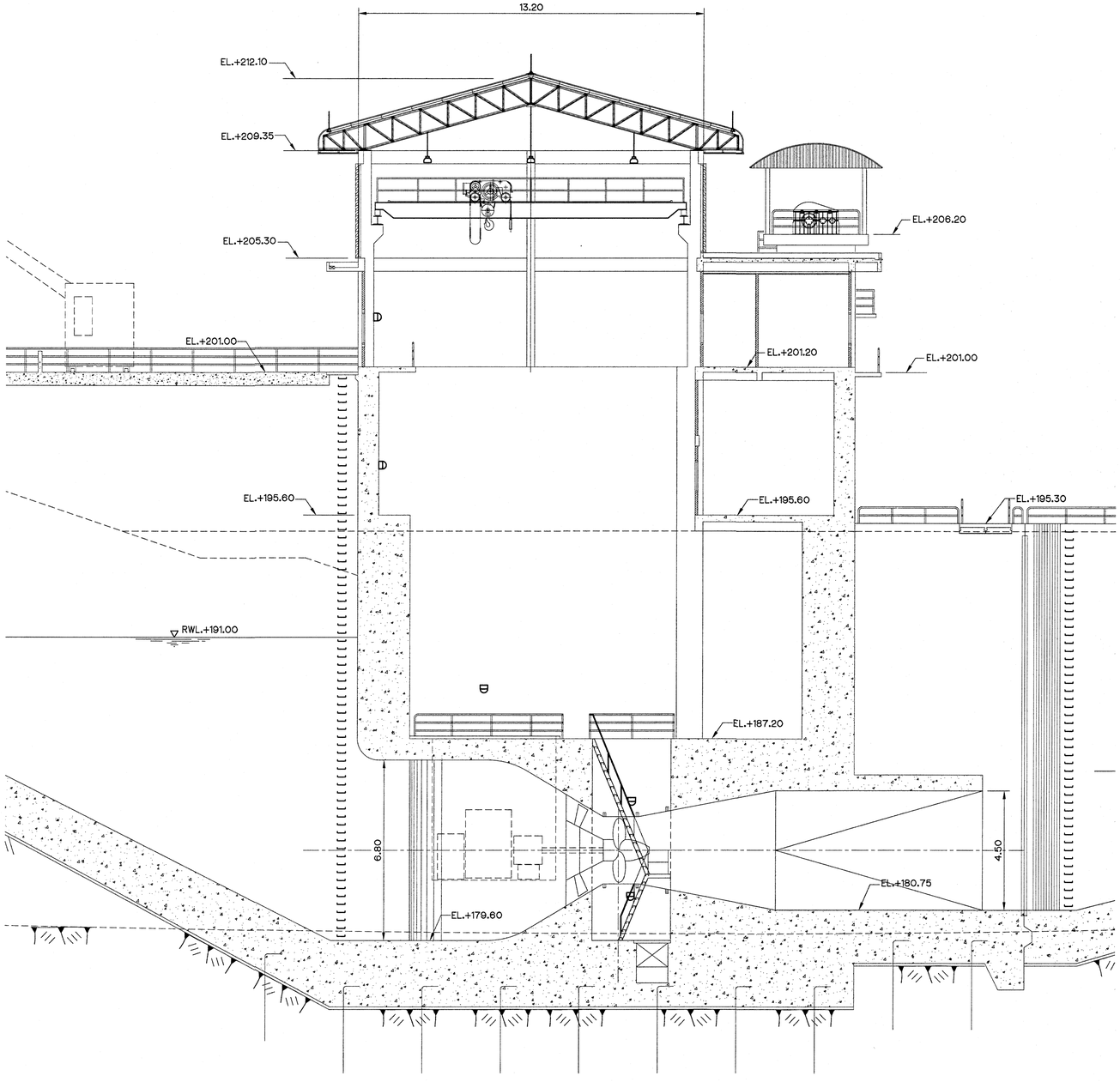
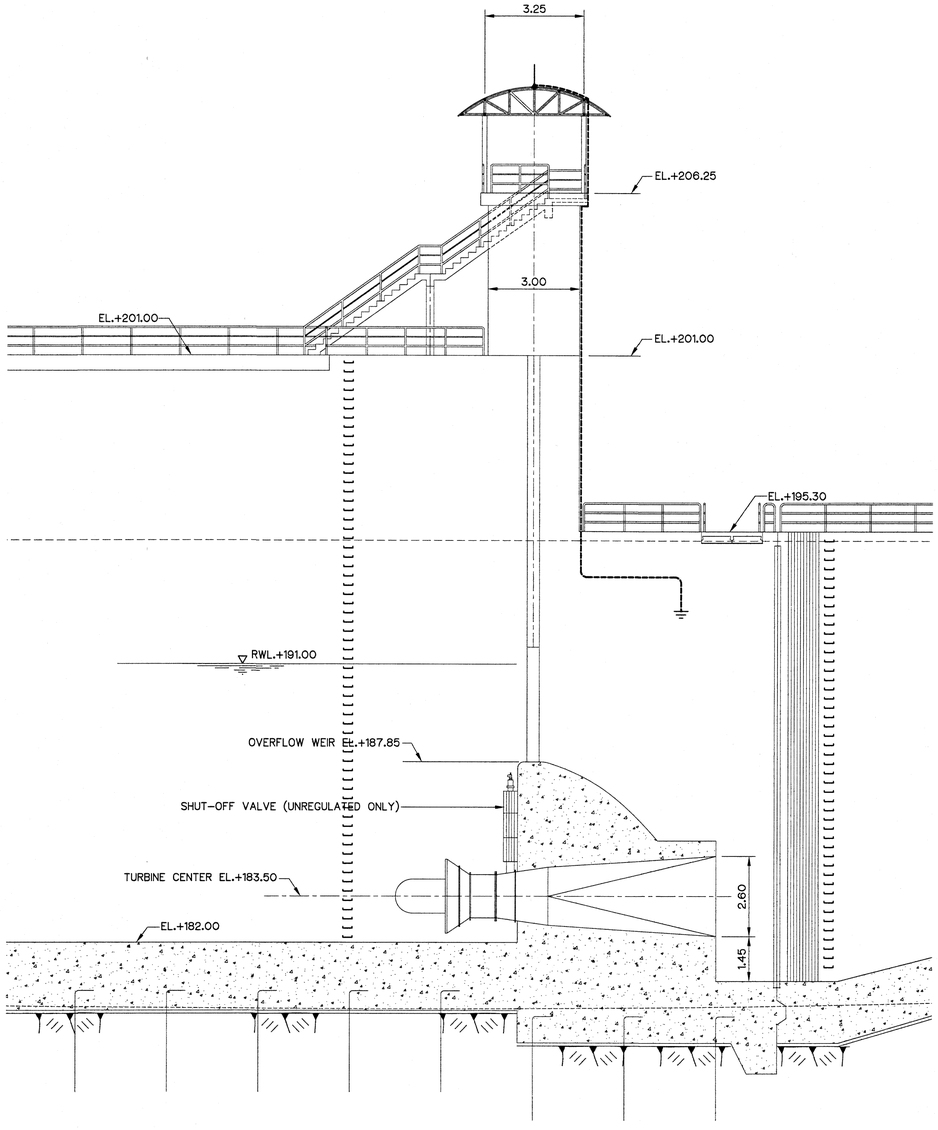
PROJECT MANAGER	6/9/2024 DATE	APPROVED	
		DRAWING NO. THN-PH-90	SHEET NO. 115 OF 157



SECTION A–A
SCALE 1:100



SECTION B–B
SCALE 1:100

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

SECTION A–A AND SECTION B–B

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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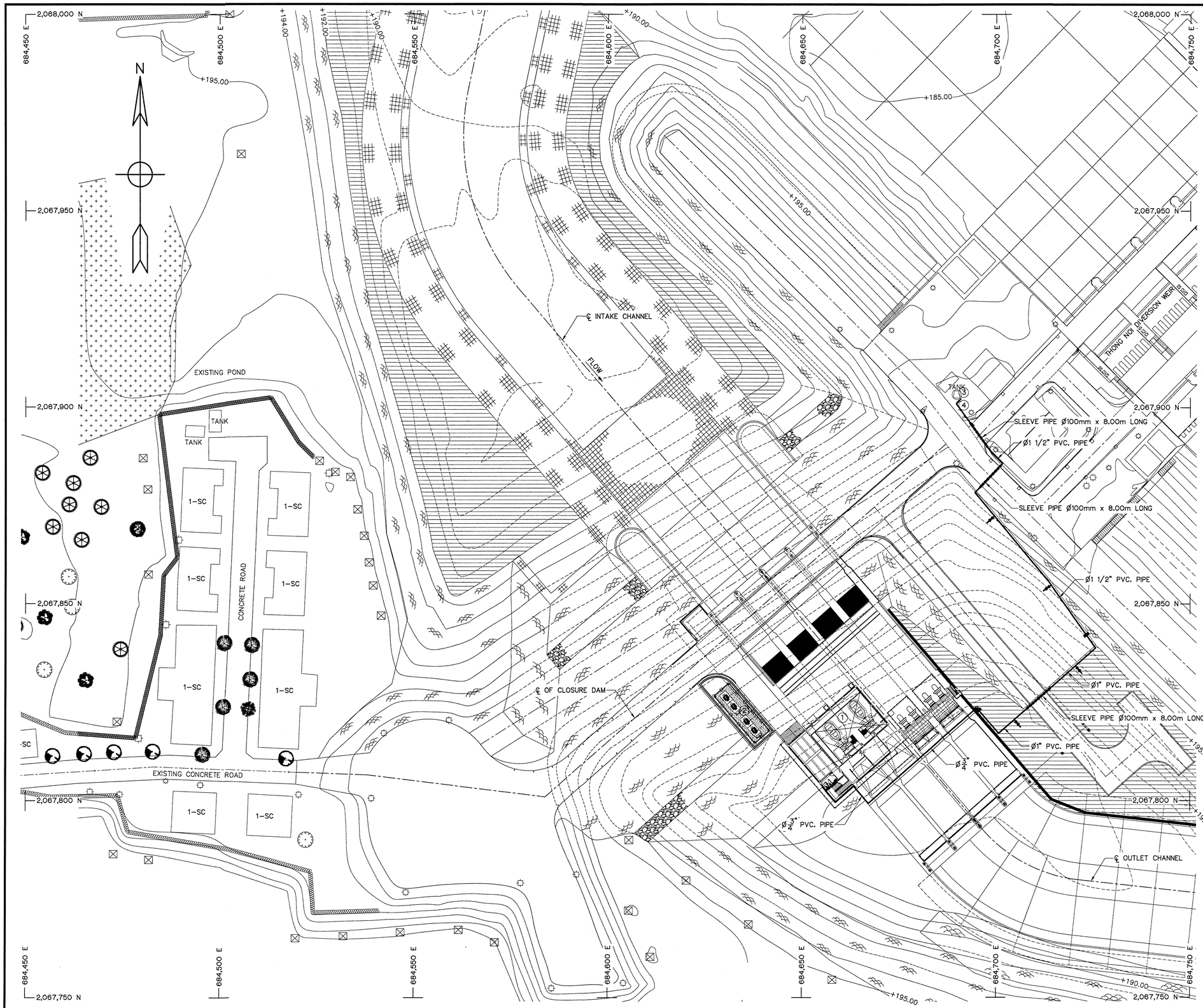
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วฟก.1029	REVIEWED
DRAWN		SUBMITTED
CHECKED	วฟก.1029	RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE	APPROVED

DRAWING NO. THN–PH–91

SHEET NO. 116 OF 157



WATER SUPPLY PIPELINE SYSTEM LAY OUT

SCALE 1:500

LEGENDS :

1. POWER HOUSE
2. SWITCHYARD
3. EXISTING TANK
4. GATE VALVE Ø75 mm.

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. POWERHOUSE, PIT VALVE, FIELD TAP AND SLOPE PROTECTION DETAILS — THN-PH-94

0 5 10 20 30 40

SCALE 1:500 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

WATER SUPPLY PIPELINE SYSTEM LAY-OUT

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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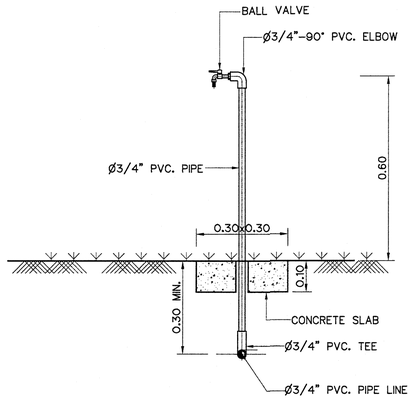
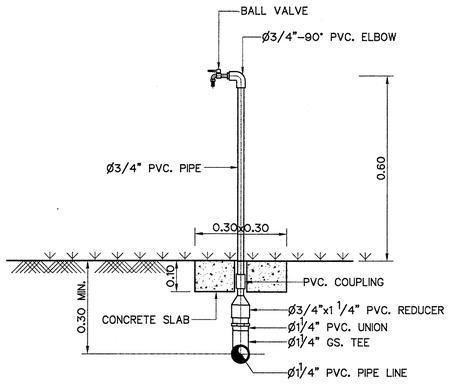
DESIGNED	วิ.6650	วิ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิ.6651		RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN-PH-92

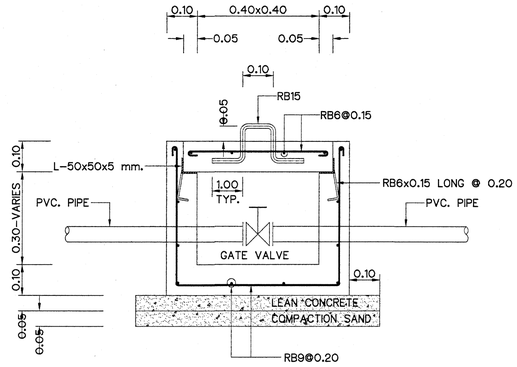
SHEET NO. 117 OF 157



FIELD TAP TYPICAL INSTALLATION DETAIL "1"
SCALE 1:10



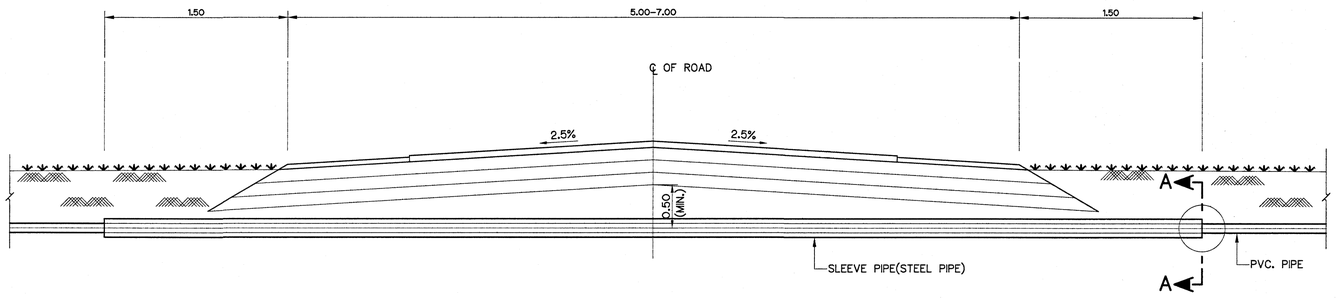
FIELD TAP TYPICAL INSTALLATION DETAIL "2"
SCALE 1:10



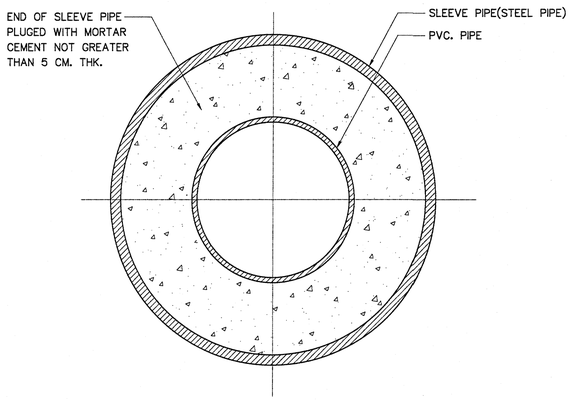
PIT VALVE DETAIL
SCALE 1:10

DIMENSIONS OF SLEEVE PIPE (STEEL PIPE)

SIZE OF WATER SUPPLY PIPE (MM.)	SIZE OF SLEEVE PIPE (MM.)	THICKNESS (MM.)
20 (3/4")	100	2.65
25 (1")	100	2.65
35 (1 1/4")	100	2.65
40 (1 1/2")	100	2.65
55 (2")	100	2.65
60 (2 1/2")	150	3.45
80 (3")	150	3.45



TYPICAL SECTION FOR SLEEVE PIPE INSTALLATION
SCALE 1:25



SECTION A-A
SCALE 1:25

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. REINFORCING BARS ARE IN MILLIMETERS
3. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 175 KSC. FOR STANDARD CYLINDER AT 28 DAYS
4. REINFORCING STEEL SHALL CONFORM TO SR24, TIS 20-2543

REFERENCE DRAWINGS :

1. POWERHOUSE, WATER SUPPLY PIPELINE SYSTEM LAY-OUT THN-PH-92

0 0.5 0.8
SCALE 1:10 METERS

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
POWERHOUSE AND EMERGENCY CHANNEL
PIT VALVE, FIELD TAP
AND SLOPE PROTECTION DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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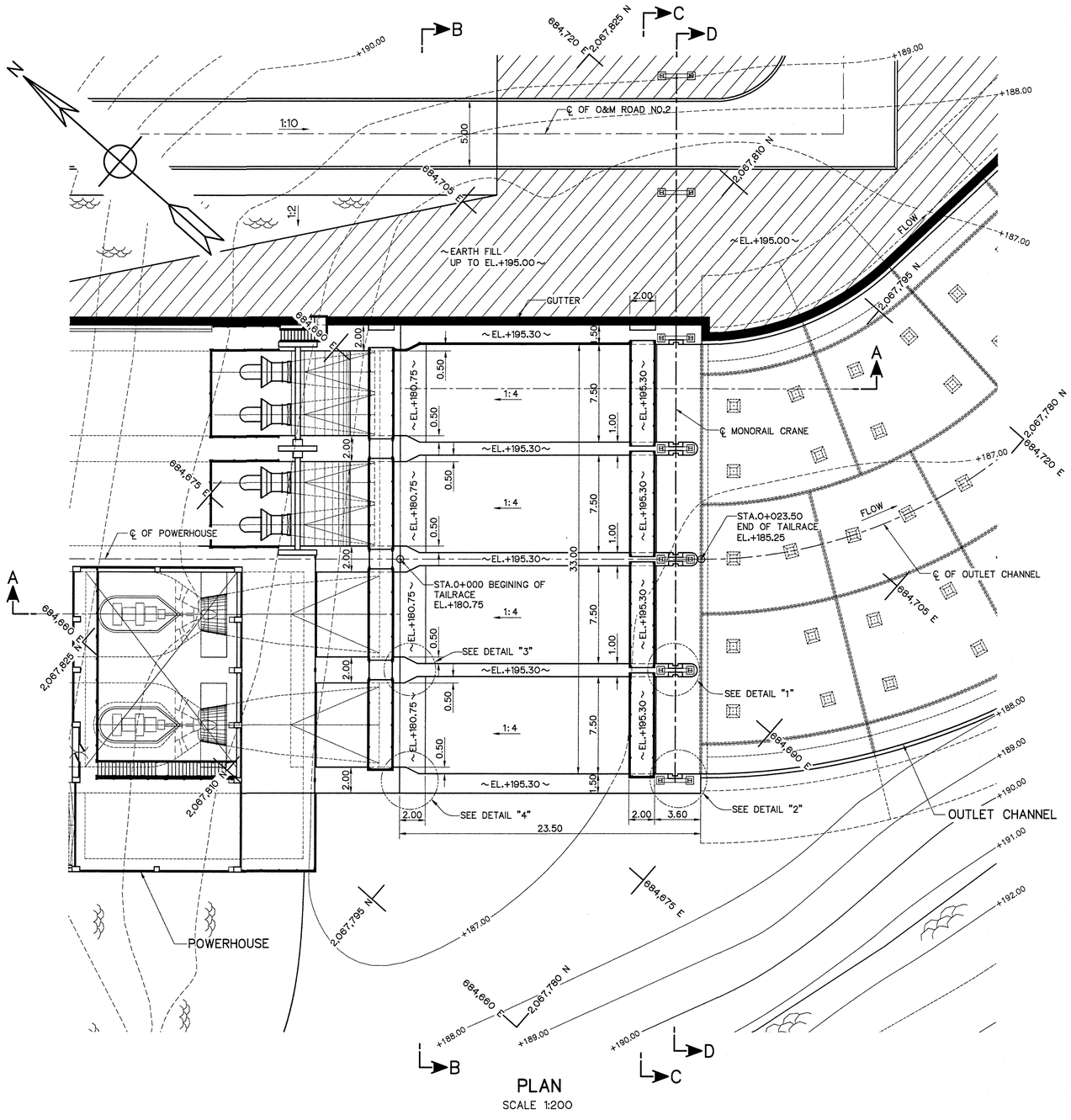
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

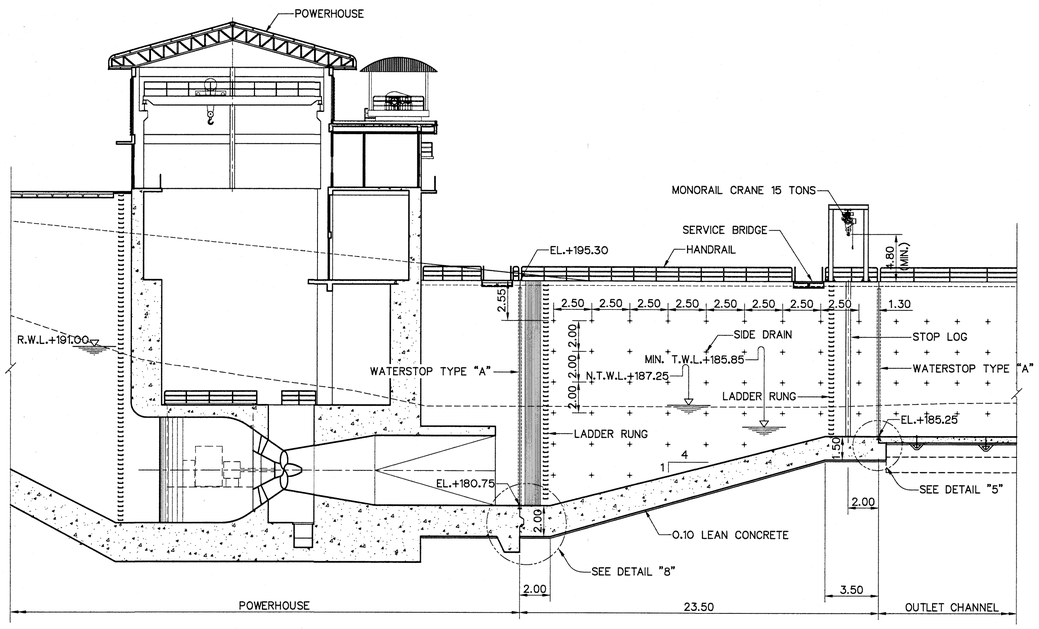
DESIGNED วศ.6650 วศ.88523
DRAWN
CHECKED วศ.6651
6/9/2024
PROJECT MANAGER DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-PH-93
SHEET NO. 118 OF 157



PLAN
SCALE 1:200



SECTION A–A
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. THN–GN–04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. TAILRACE SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 25 TON/M.^{2}

REFERENCE DRAWINGS :

1. GENERAL, GENERAL LAY–OUT OF PROJECT	THN–GN–02
2. TAILRACE, SECTION B–B, C–C AND SECTION D–D	THN–TR–02
2. TAILRACE, DETAILS	THN–TR–03
3. OUTLET CHANNEL, SIDE DRAIN, HANDRAIL, GUTTER AND JOINTS DETAILS	THN–OC–05

0 5 10 15
SCALE 1:200 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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		CONSULTANTS	DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

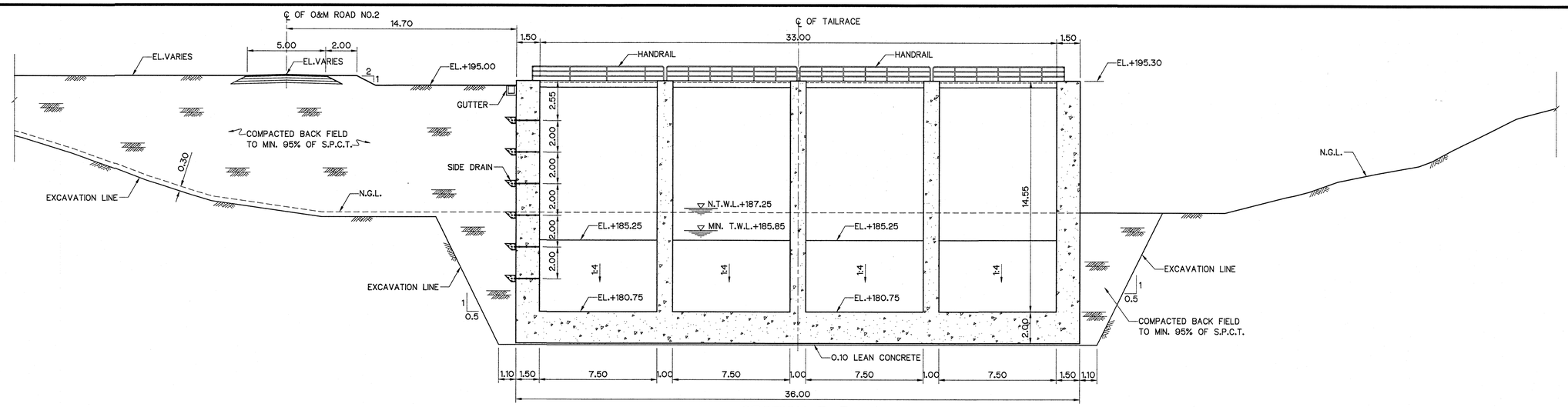
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TAILRACE

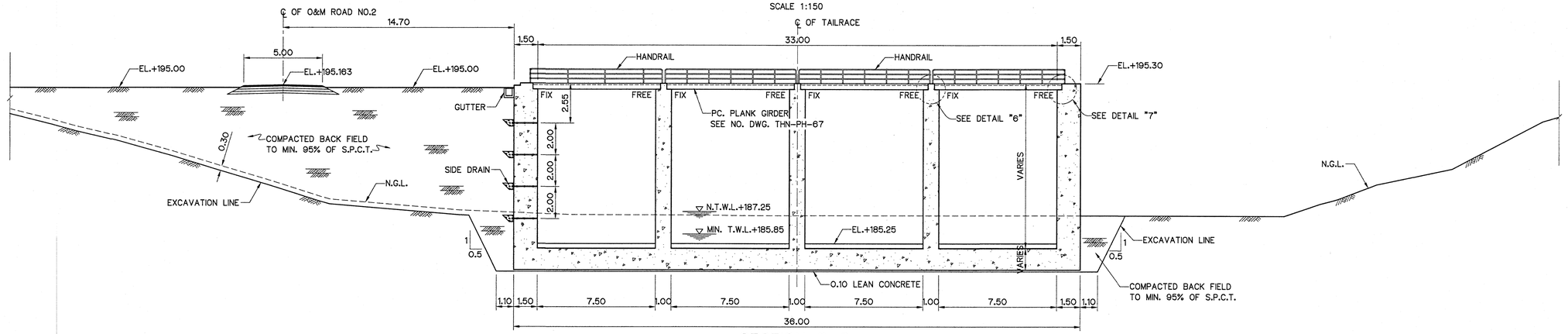
PLAN AND SECTION A–A

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ต.6650 ภ.ส.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ต.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN–TR–01	SHEET NO. 119 OF 157



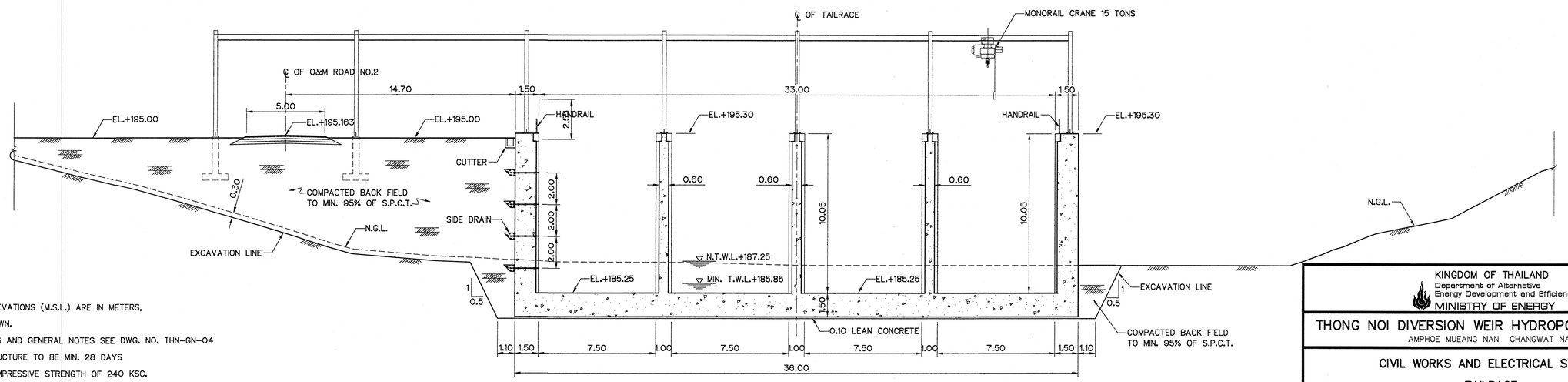
SECTION B–B

SCALE 1:150



SECTION C–C

SCALE 1:150



SECTION D–D

SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. TAILRACE SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 25 TON/M.^{2}

REFERENCE DRAWINGS :

1. TAILRACE, PLAN AND SECTION A–A	THN–TR–01
2. OUTLET CHANNEL, DETAILS	THN–TR–03
3. OUTLET CHANNEL, SIDE DRAIN, HANDRAIL, GUTTER AND JOINTS DETAILS	THN–OC–05

0 2 4 6 8 10

SCALE 1:150 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TAILRACE

SECTION B–B, C–C AND SECTION D–D

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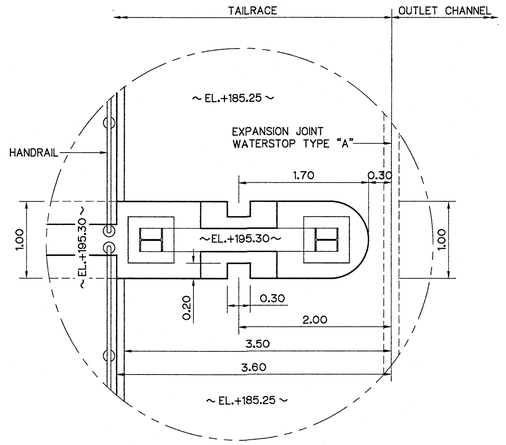
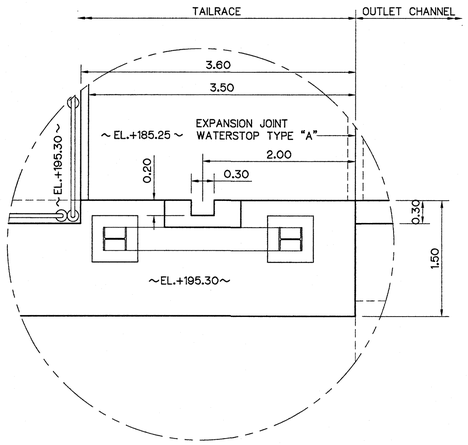
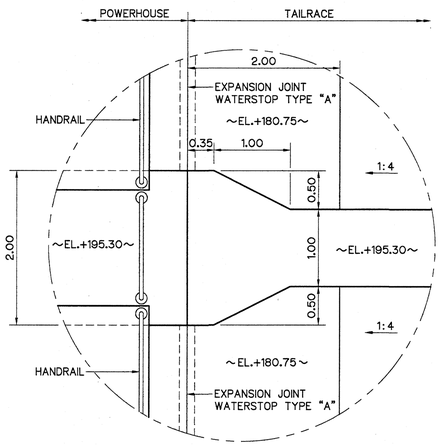
PROJECT MANAGER — DATE: 6/9/2024	DRAWING NO. THN–TR–02 — SHEET NO. 120 OF 157



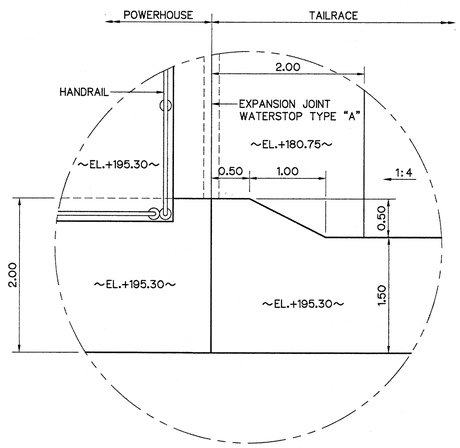
DETAIL "1"
SCALE 1:40



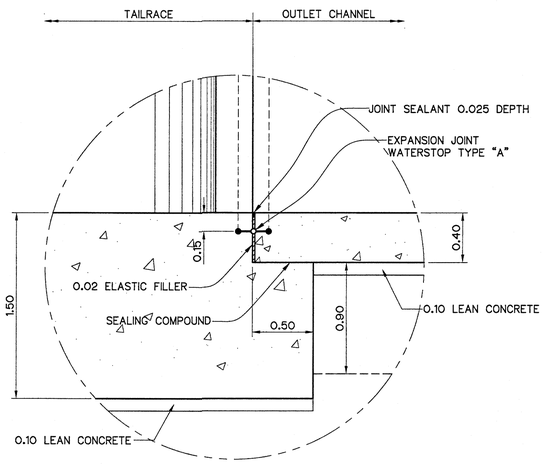
DETAIL "2"
SCALE 1:40



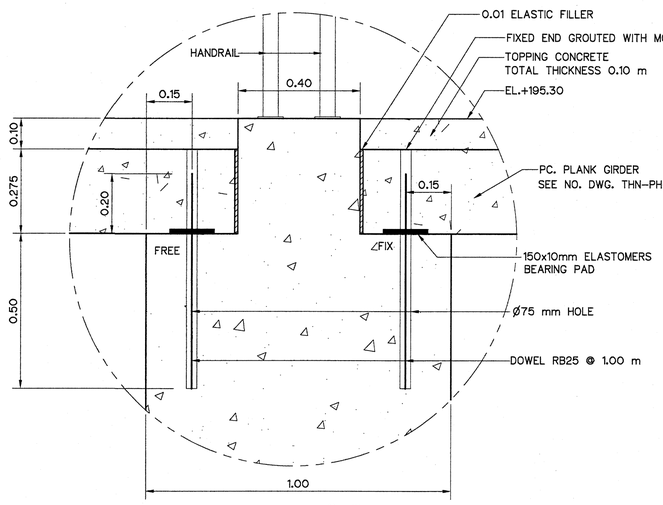
DETAIL "3"
SCALE 1:40



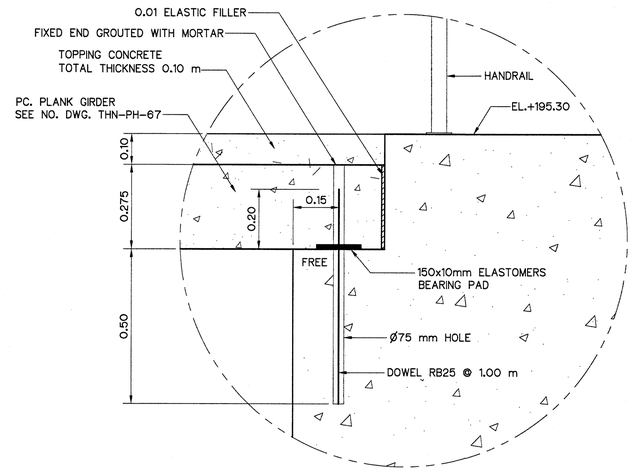
DETAIL "4"
SCALE 1:40



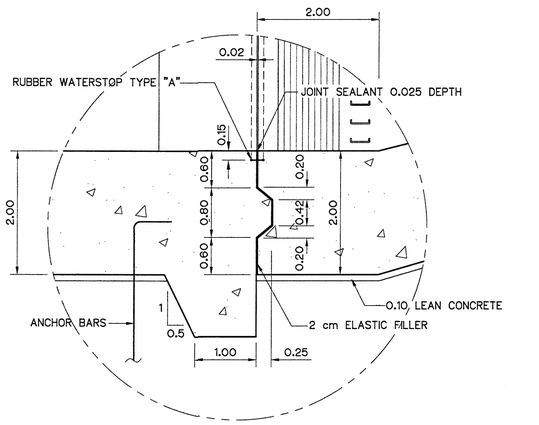
DETAIL "5"
SCALE 1:25



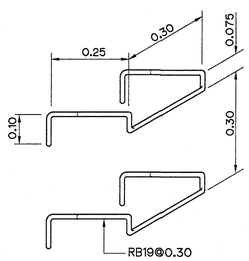
DETAIL "6"
SCALE 1:10



DETAIL "7"
SCALE 1:10



DETAIL "8"
SCALE 1:50



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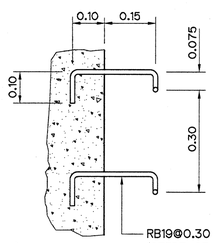

SECTION

LADERRUNG DETAIL
NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METER, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. INTAKE STRUCTURE, STANDARD PVC WATERSTOP, SECTION AND DETAILS — THN-IS-07
2. BRIDGE ON CLOSURE DAM, SECTIONS AND DETAILS — THN-PH-67

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 0.5 1 2 3
SCALE 1:40 METERS

0 1 2 3 4
SCALE 1:50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

Ccivil works and electrical system

TAILRACE

DETAILS

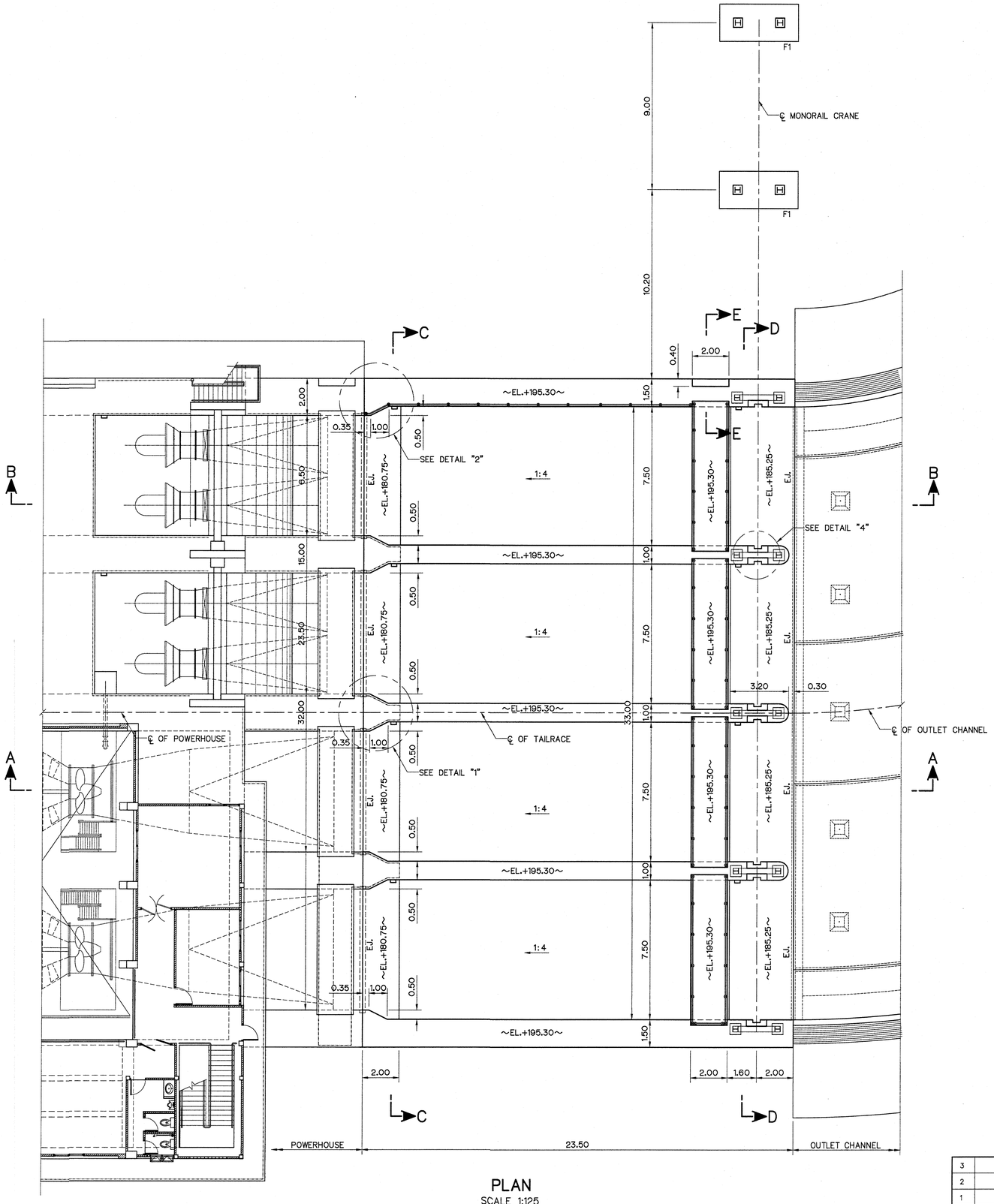
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

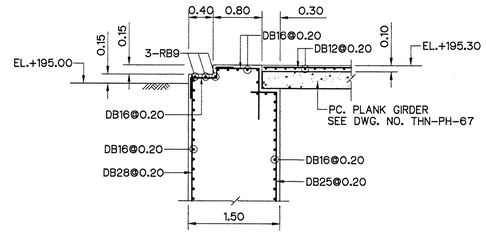
DESIGNED	สย.6650	วศ.88523	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	สย.	สย.6651	APPROVED
PROJECT MANAGER		6/9/2024 DATE	DRAWING NO. THN-TR-03

REVIEWED

SHEET NO. 121 OF 157



PLAN
SCALE 1:125



SECTION E-E
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. THN-GN-04
3. C.J. = CONTRACTION JOINT
   E.J. = EXPANSION JOINT

REFERENCE DRAWINGS :

1.	TAILRACE, PLAN AND SECTION A-A	THN-TR-01
2.	TAILRACE, REINFORCEMENT DETAIL (SHEET 2/4)	THN-TR-05
3.	TAILRACE, REINFORCEMENT DETAIL (SHEET 3/4)	THN-TR-06
4.	TAILRACE, REINFORCEMENT DETAIL (SHEET 4/4)	THN-TR-07

0 1 2 3 4
SCALE 1:50 METERS

0 1 2 4 6 8 10
SCALE 1:125 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TAILRACE

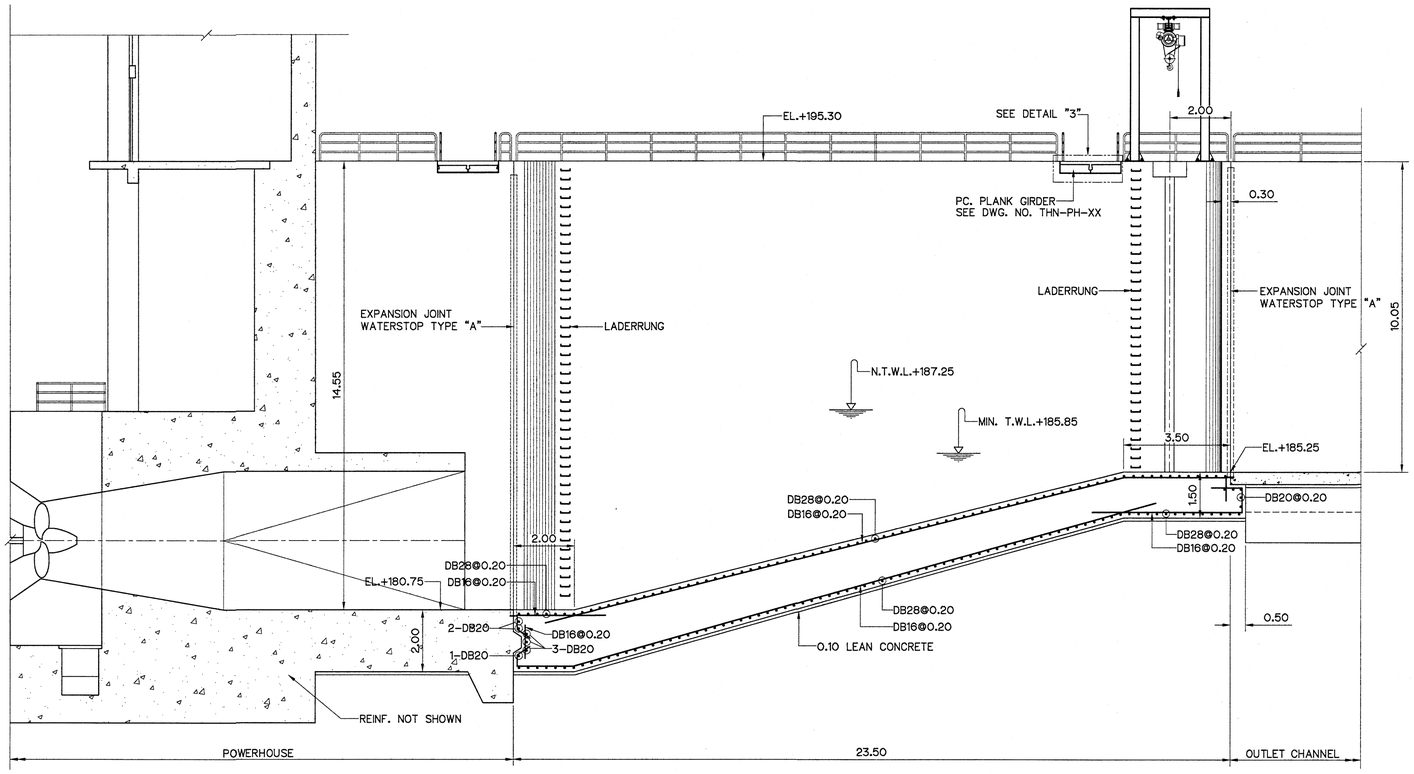
REINFORCEMENT DETAIL (SHEET 1/4)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

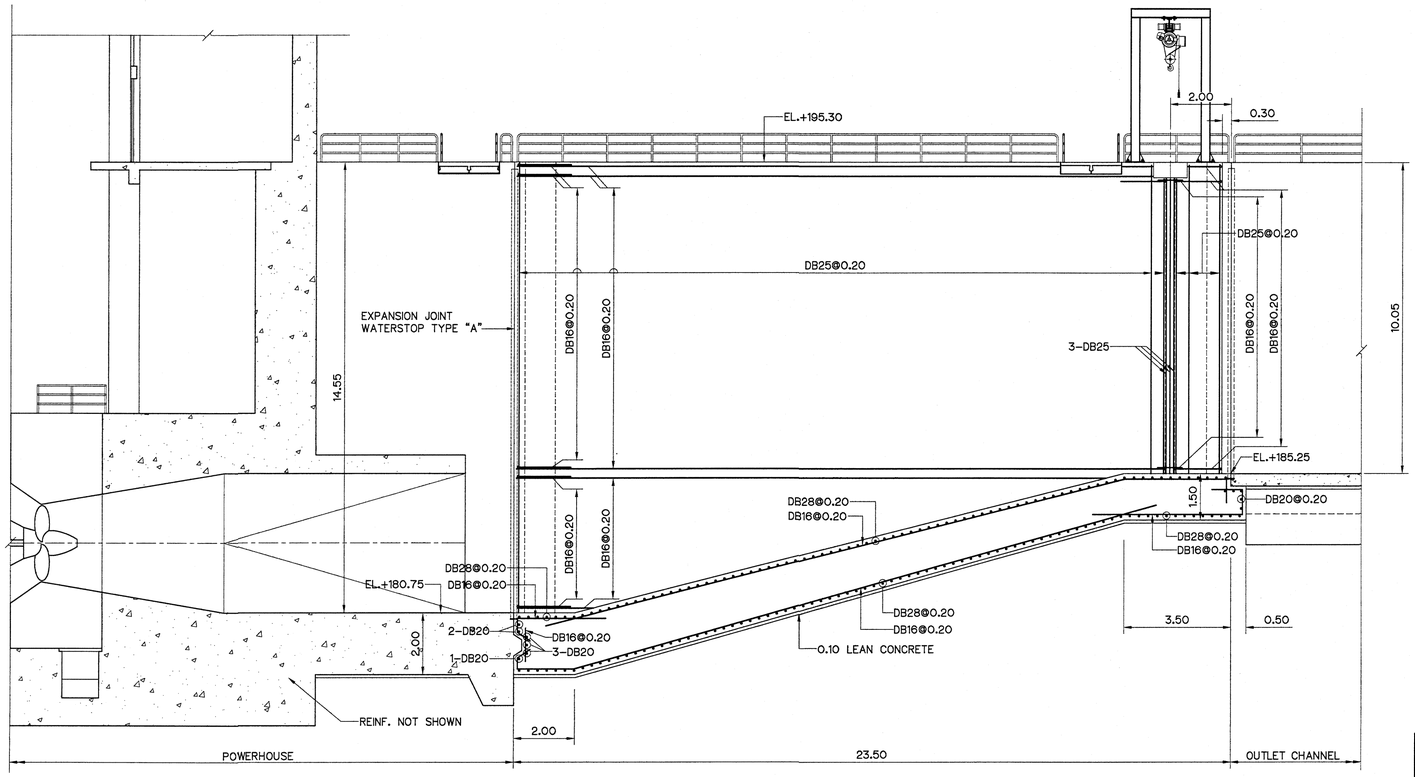
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	สถ.6650	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	สถ.6651	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

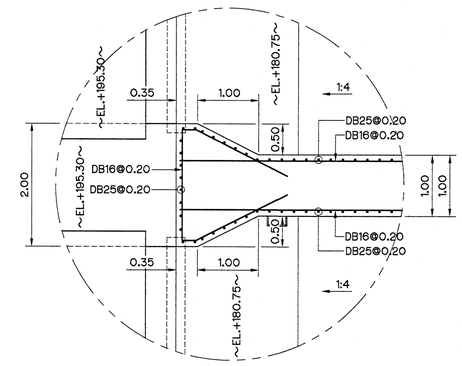
DRAWING NO. THN-TR-04
SHEET NO. 122 OF 157



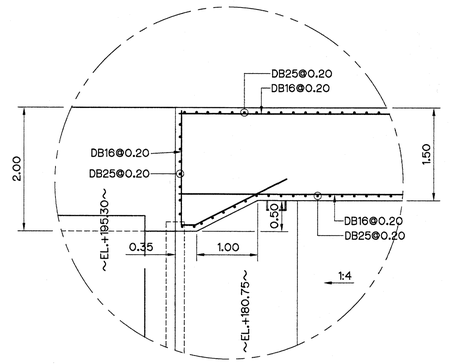
SECTION A–A
SCALE 1:100



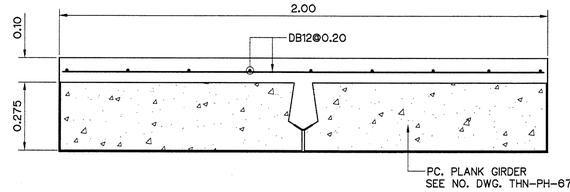
SECTION A–A (BOTH FACE)
SCALE 1:100



DETAIL "1"
SCALE 1:50



DETAIL "2"
SCALE 1:50



DETAIL "3"
SCALE 1:12.5

NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :
1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/4) THN-TR-04
2. BRIDGE ON CLOSURE DAM, SECTIONS AND DETAILS THN-PH-67

0 0.1 0.2 0.3 0.4 0.5 1.0
SCALE 1:12.5 METERS

0 1 2 3 4
SCALE 1:50 METERS

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

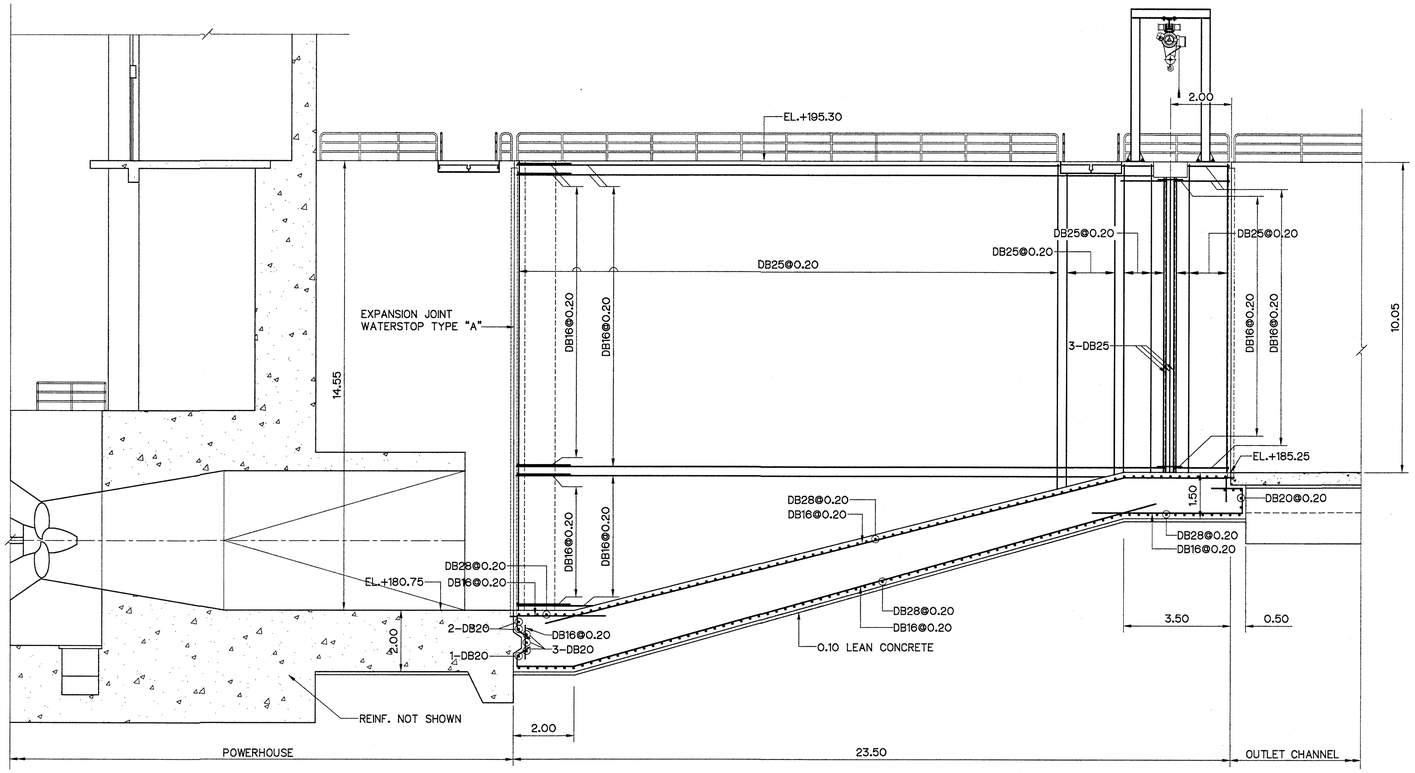
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

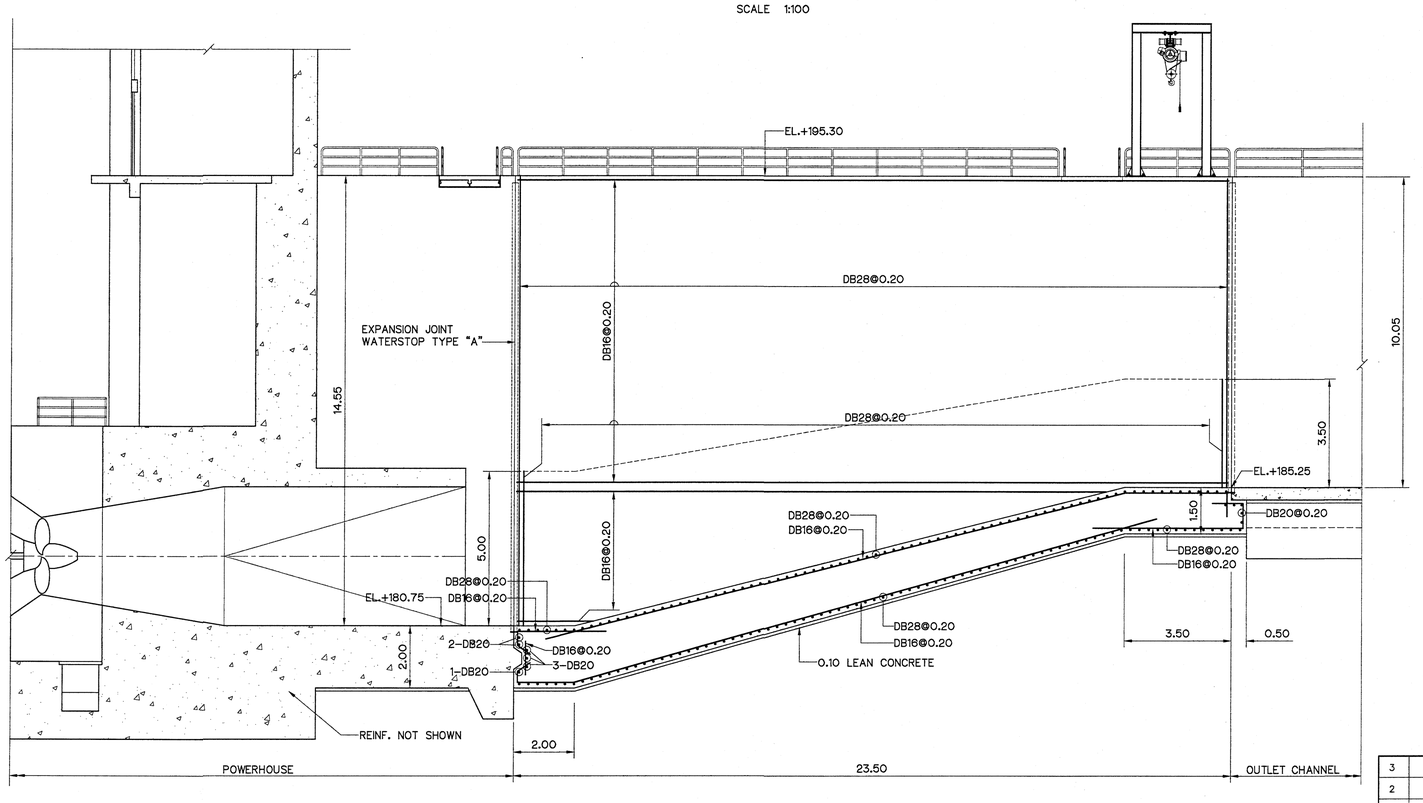
CIVIL WORKS AND ELECTRICAL SYSTEM
TAILRACE
REINFORCEMENT DETAIL (SHEET 2/4)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วิศ.6650 วิศ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วิศ.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER DATE	APPROVED
DRAWING NO. THN-TR-05	SHEET NO. 123 OF 157



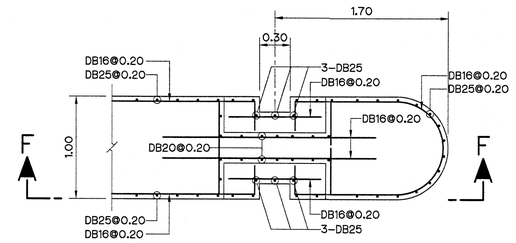
SECTION B–B (NEA FACE)

SCALE 1:100



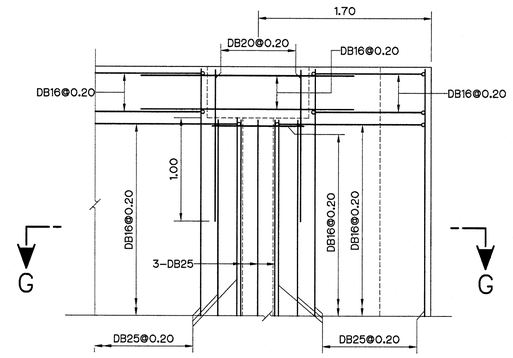
SECTION B–B (FAR FACE)

SCALE 1:100



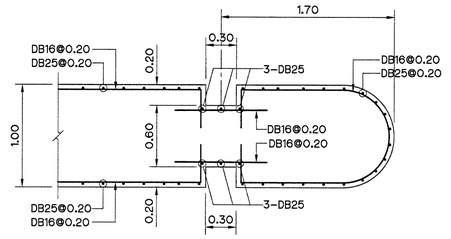
DETAIL "4"

SCALE 1:30



SECTION E–E

SCALE 1:30



SECTION G–G

SCALE 1:30

0 0.5 1 1.5 2 2.5

SCALE 1:30 METERS

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. THN–GN–04

REFERENCE DRAWINGS :

1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/4) THN–TR–04

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TAILRACE

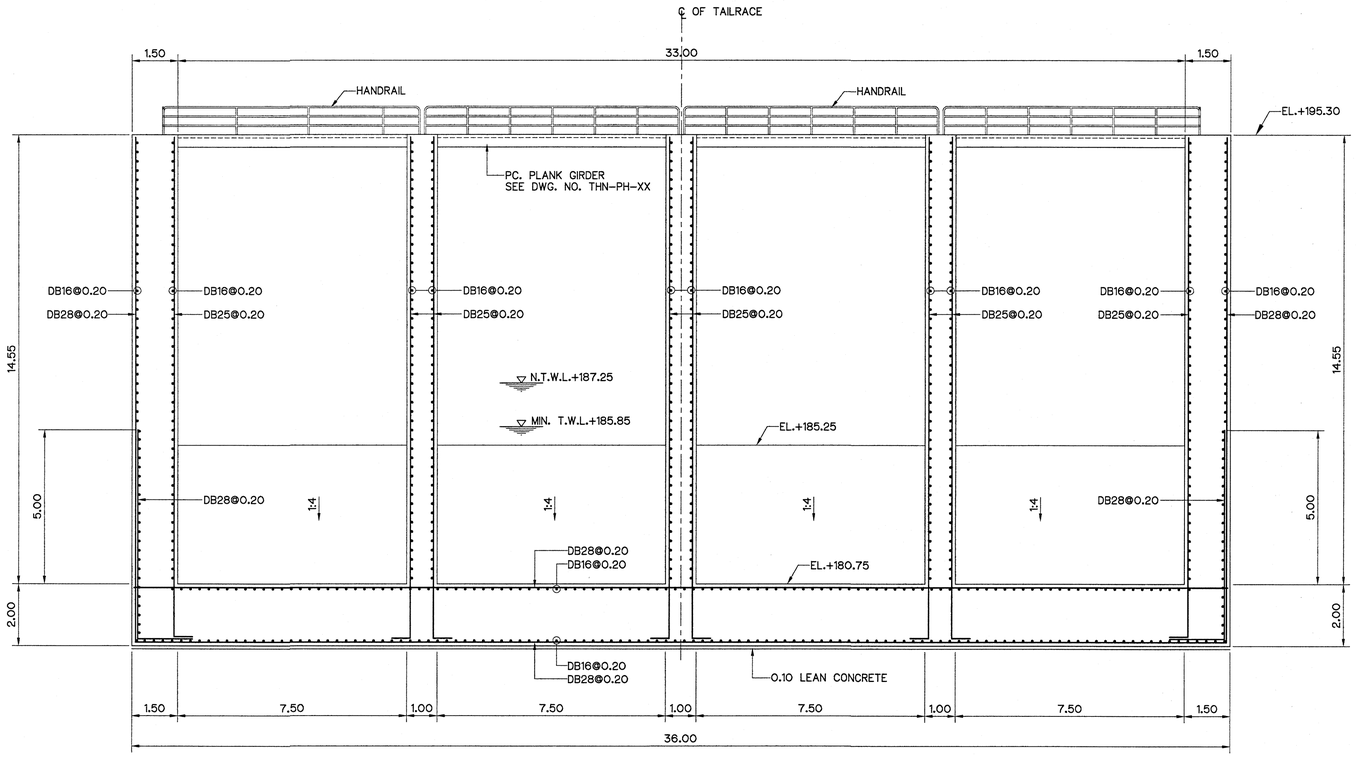
REINFORCEMENT DETAIL (SHEET 3/4)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

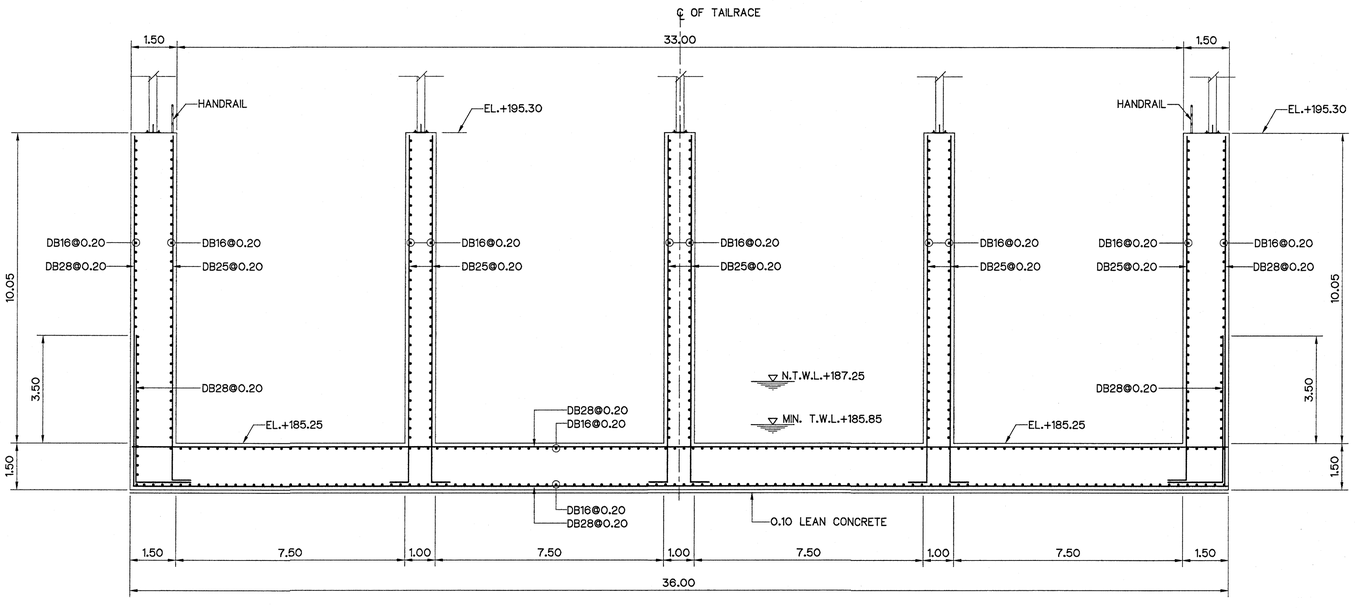
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิศ.6650	วิศ.88523	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	วิศ.	วิศ.6651	APPROVED
PROJECT MANAGER	วิศ.	6/9/2024 DATE	DRAWING NO. THN–TR–06

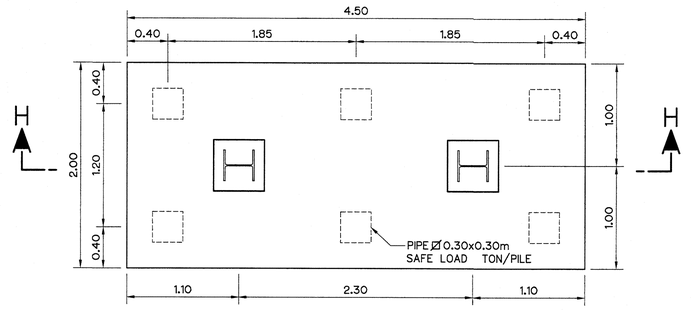
SHEET NO. 124 OF 157



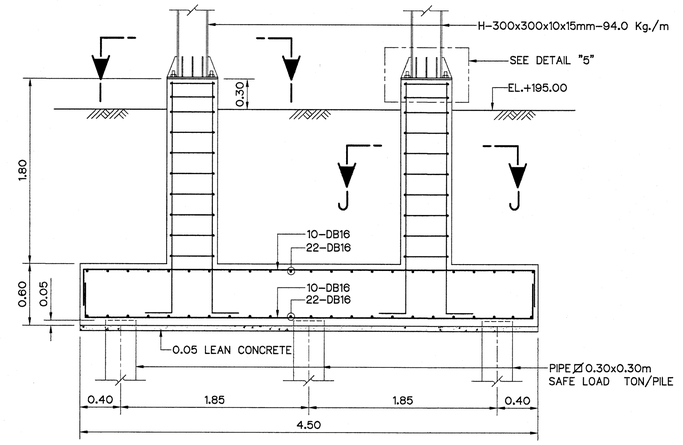
SECTION C–C
SCALE 1:100



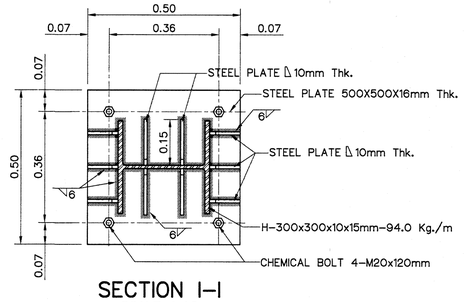
SECTION D–D
SCALE 1:100



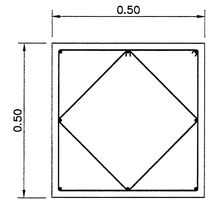
PLAN FOOTING (F1)
SCALE 1:30



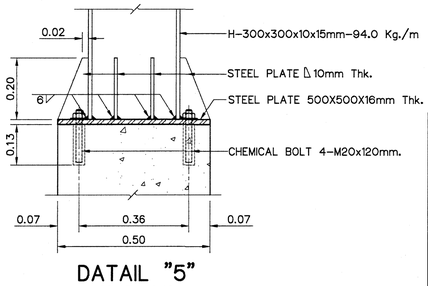
SECTION H–H
SCALE 1:30



SECTION I–I
SCALE 1:10



SECTION J–J
SCALE 1:10



DATAIL "5"
SCALE 1:10

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. TAILRACE, REINFORCEMENT DETAIL (SHEET 1/4) THN-TR-04

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

0 0.5 1 1.5 2 2.5
SCALE 1:30 METERS

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TAILRACE

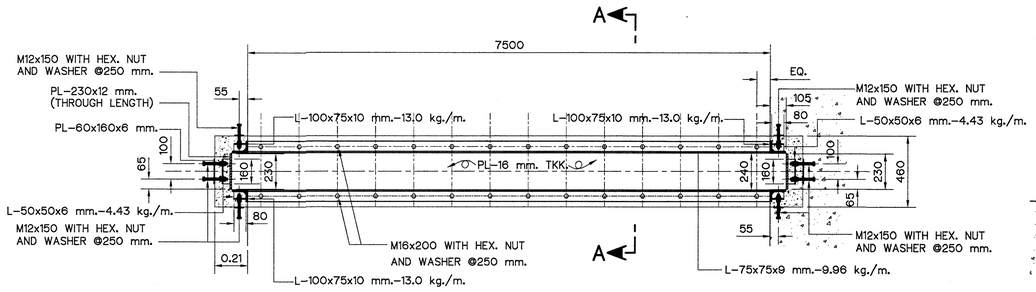
REINFORCEMENT DETAIL (SHEET 4/4)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

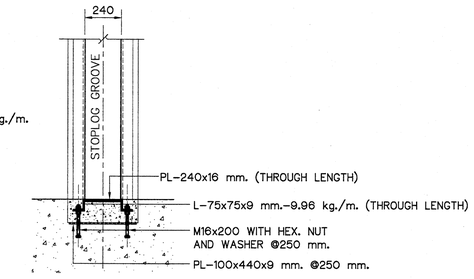
DESIGNED	สม.6650	วท.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	สม.6651		RECOMMENDED
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN-TR-07 SHEET NO. 125 OF 157



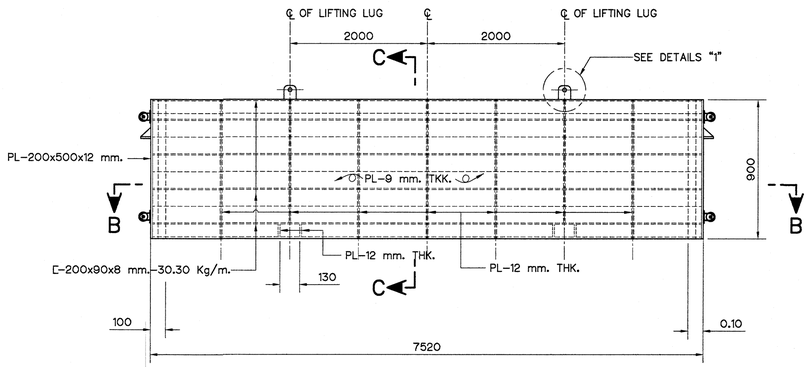
PLAN OF STOPLOG SILL

SCALE 1:20



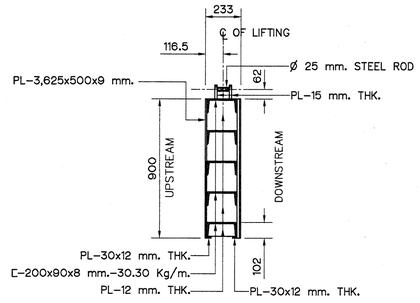
SECTION A-A

SCALE 1:20



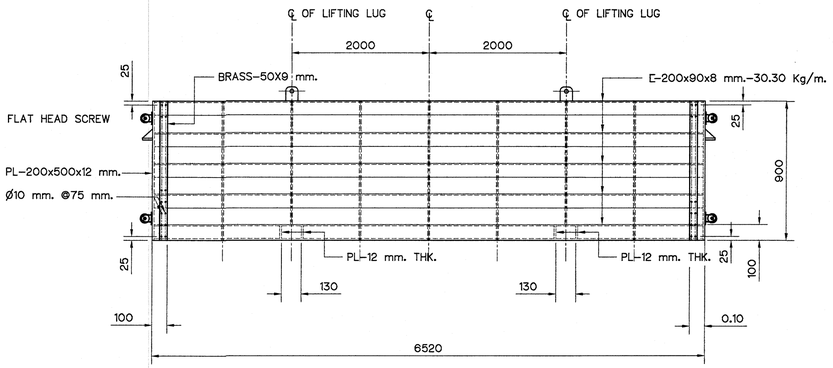
FRONT VIEW OF STOPLOG (UPSTREAM)

SCALE 1:20



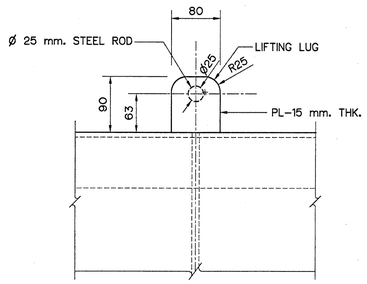
SECTION C-C

SCALE 1:20



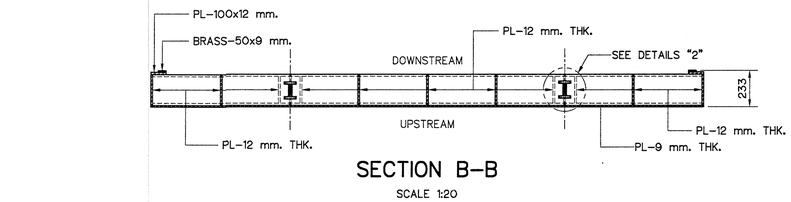
BACK VIEW OF STOPLOG (DOWNSTREAM)

SCALE 1:20



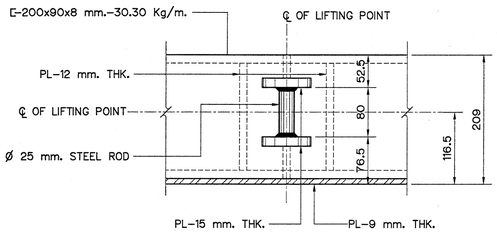
DETAIL "1"

SCALE 1:5



SECTION B-B

SCALE 1:20



DETAIL "2"

SCALE 1:5

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEELS TO CONFORM TO T.I.S.-1227 SS-400 OR OTHER EQUIVALENT STANDARDS.
3. WELDS TO BE CONTINUOUS 6 FILLET WELDS UNLESS OTHERWISE SHOWN AND ARE IN MILLIMETERS.
4. THIS DRAWING SHOWS TENTATIVE DESIGN OF STOPLOGS, AND LIFTING DEVICE, GROOVE, AND BLOCKOUT AND EXPRESS IN GENERAL REQUIREMENT FOR FINAL DESIGN WHICH SHALL BE ELABORATED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS OF THE STOPLOG AND LIFTING BEAM INCLUDING ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO THE FABRICATION.
6. STOPLOG IN THIS DRAWING IS SHOWN FOR ONE ELEMENT ONLY, THE CONTRACTOR SHALL PROVIDE 48 STOPLOGS FOR THAIS PROJECT (12 STOPLOGS PER 1 CHANNEL).
7. ALL STOPLOGS ARE DESIGNED FOR 5 METERS OF WATER HEIGHT DO NOT USE EXCEED THE DESIGN HEAD.

0 50 100 200 300 400
SCALE 1:5 MILLIMETERS

0 100 200 400 600 800
SCALE 1:10 MILLIMETERS

0 500 1,000 1,500
SCALE 1:20 MILLIMETERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

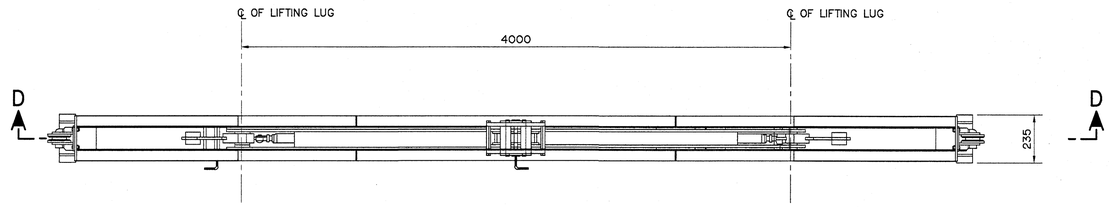
TAILRACE

STOPLOG DETAILS 1/3

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

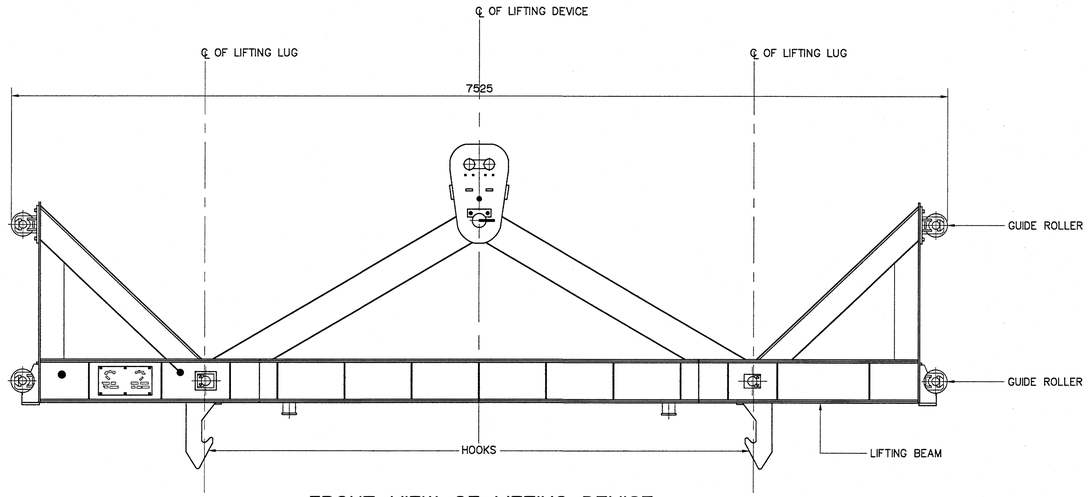
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วุฒิพงษ์ เทพอ่อน	ส.ค.2197	REVIEWED
DRAWN			SUBMITTED
CHECKED	วุฒิพงษ์ เทพอ่อน	ส.ค.2197	RECOMMENDED
			APPROVED
PROJECT MANAGER		6/9/2024 DATE	DRAWING NO. THN-TR-08
			SHEET NO. 126 OF 157



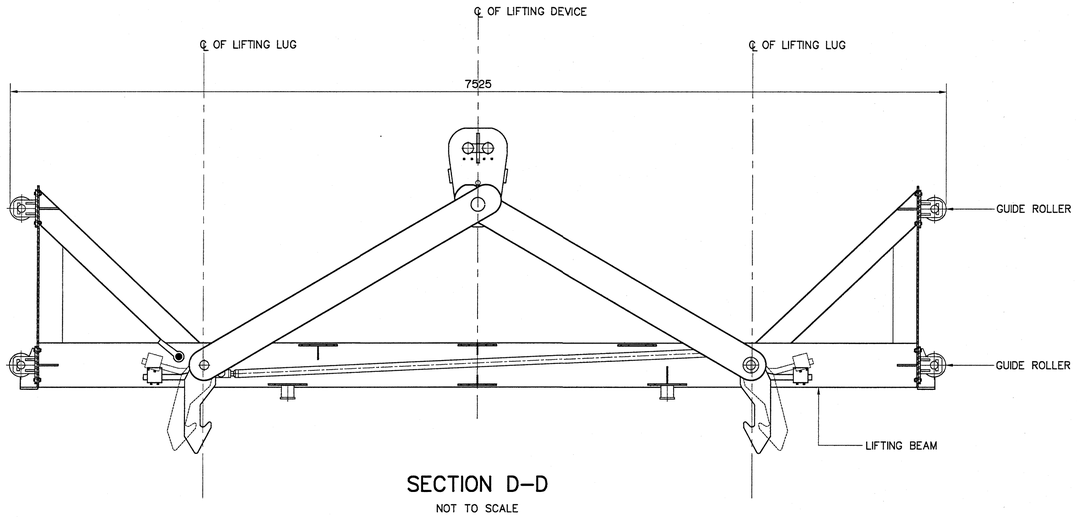
PLAN OF LIFTING DEVICE

NOT TO SCALE



FRONT VIEW OF LIFTING DEVICE

NOT TO SCALE



SECTION D–D

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEELS TO CONFORM TO T.I.S.–1227 SS–400 OR OTHER EQUIVALENT STANDARDS.
3. WELDS TO BE CONTINUOUS 6 FILLET WELDS UNLESS OTHERWISE SHOWN AND ARE IN MILLIMETERS.
4. THIS DRAWING SHOWS TENTATIVE DESIGN OF STOPLOGS, AND LIFTING DEVICE, GROOVE, AND BLOCKOUT AND EXPRESS IN GENERAL REQUIREMENT FOR FINAL DESIGN WHICH SHALL BE ELABORATED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS OF THE STOPLOG AND LIFTING BEAM INCLUDING ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO THE FABRICATION.
6. STOPLOG IN THIS DRAWING IS SHOWN FOR ONE ELEMENT ONLY, THE CONTRACTOR SHALL PROVIDE 48 STOPLOGS FOR THAIS PROJECT (12 STOPLOGS PER 1 CHANNEL).
7. ALL STOPLOGS ARE DESIGNED FOR 5 METERS OF WATER HEIGHT DO NOT USE EXCEED THE DESIGN HEAD.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TAILRACE

STOPLOG DETAILS 2/3

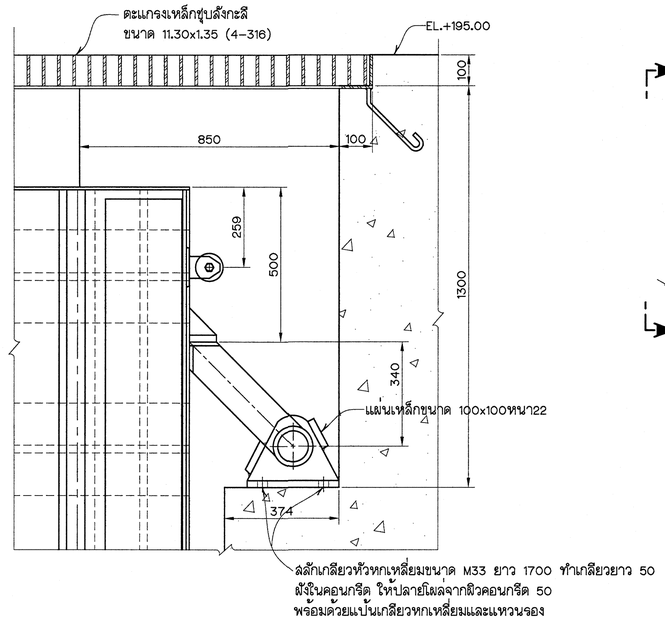
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED		ธ.ค.2197	REVIEWED
DRAWN			SUBMITTED
CHECKED		ธ.ค.2197	RECOMMENDED
PROJECT MANAGER		6/9/2024 DATE	APPROVED

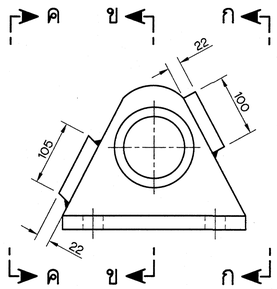
DRAWING NO. THN–TR–09

SHEET NO. 127 OF 157



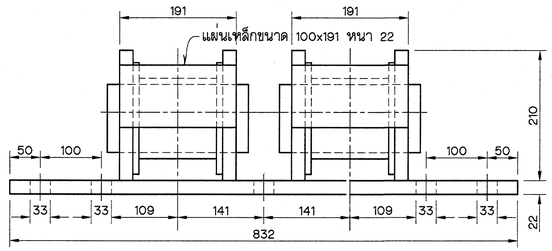
รูปขยายการติดตั้งแขนยึดบาน

มาตราส่วน 1:10



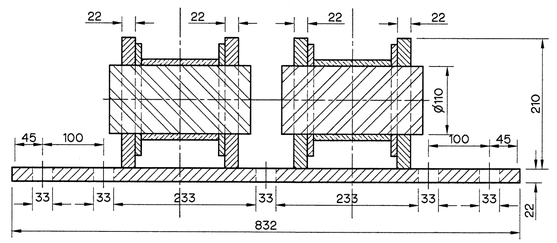
รูปด้านข้าง

มาตราส่วน 1:5



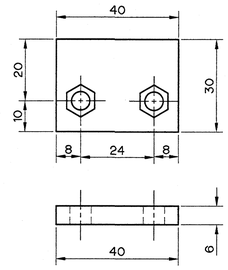
รูปด้าน ก-ก

มาตราส่วน 1:5



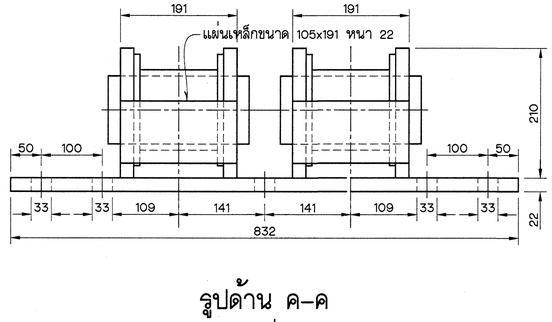
รูปตัด ข-ข

มาตราส่วน 1:5



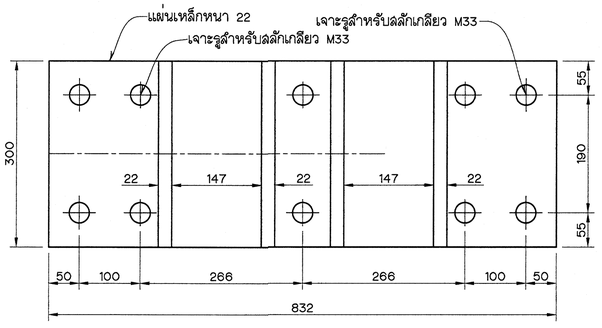
PIN GUARD สำหรับสลัก

มาตราส่วน 1:1



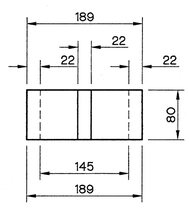
รูปด้าน ค-ค

มาตราส่วน 1:5



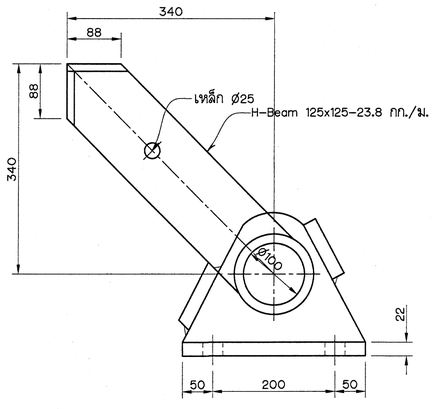
แปลนฐานขายึดบาน

มาตราส่วน 1:5



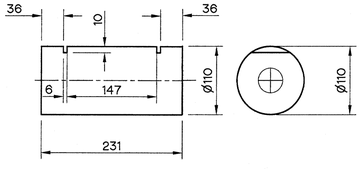
แปลน

มาตราส่วน 1:5



การติดตั้งแขนรับบานระบาย

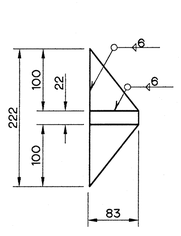
มาตราส่วน 1:5



PIN

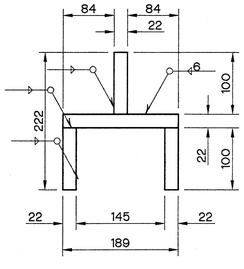
JISG 4105 S 45 C

มาตราส่วน 1:5



รูปด้านข้าง

มาตราส่วน 1:5



รูปด้านหน้า

มาตราส่วน 1:5

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. ALL STRUCTURAL STEELS TO CONFORM TO T.I.S.-1227 SS-400 OR OTHER EQUIVALENT STANDARDS.
3. WELDS TO BE CONTINUOUS 6 FILLET WELDS UNLESS OTHERWISE SHOWN AND ARE IN MILLIMETERS.
4. THIS DRAWING SHOWS TENTATIVE DESIGN OF STOPLOGS, AND LIFTING DEVICE, GROOVE, AND BLOCKOUT AND EXPRESS IN GENERAL REQUIREMENT FOR FINAL DESIGN WHICH SHALL BE ELABORATED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS OF THE STOPLOG AND LIFTING BEAM INCLUDING ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO THE FABRICATION.
6. STOPLOG IN THIS DRAWING IS SHOWN FOR ONE ELEMENT ONLY, THE CONTRACTOR SHALL PROVIDE 48 STOPLOGS FOR THAIS PROJECT (12 STOPLOGS PER 1 CHANNEL).
7. ALL STOPLOGS ARE DESIGNED FOR 5 METERS OF WATER HEIGHT DO NOT USE EXCEED THE DESIGN HEAD.

REFERENCE DRAWINGS :

1. TAILRACE, STOPLOG DETAILS 1/3	THN-TR-08
2. TAILRACE, STOPLOG DETAILS 2/3	THN-TR-09

0 10 20 30 40 50 60 70 80
มาตราส่วน 1:1 มิลลิเมตร

0 10 50 100 150 200 250
มาตราส่วน 1:3 มิลลิเมตร

0 50 100 200 300 400
มาตราส่วน 1:5 มิลลิเมตร

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

POWERHOUSE AND EMERGENCY CHANNEL

STOPLOG DETAILS 3/3

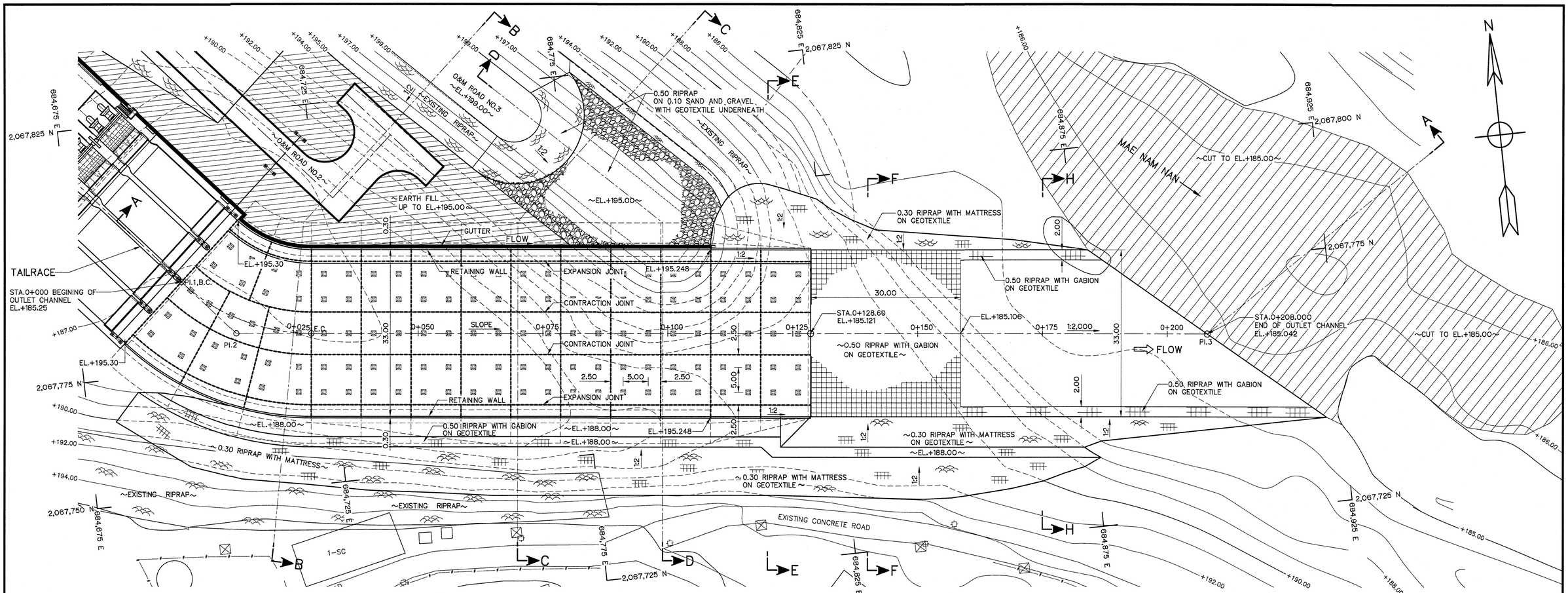
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

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

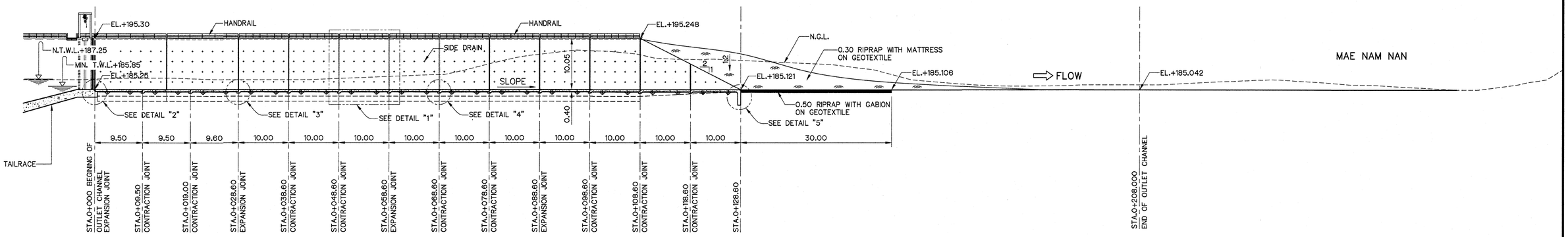
DESIGNED สุรพล แซ่อึ้ง ส.ค.2197
DRAWN
CHECKED สุรพล แซ่อึ้ง ส.ค.2197
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-TR-10
SHEET NO. 128 OF 157



PLAN
SCALE 1:400



SECTION A–A
SCALE 1:400

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. OUTLET CHANNEL SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1. GENERAL, GENERAL LAY-OUT OF PROJECT	THN-GN-02
2. OUTLET CHANNEL, SECTION B-B, C-C AND SECTION D-D	THN-OC-02
3. OUTLET CHANNEL, SECTION E-E, F-F AND SECTION H-H	THN-OC-03
4. OUTLET CHANNEL, DETAILS	THN-OC-04
5. OUTLET CHANNEL, SIDE DRAIN, HANDRAIL, GUTTER AND JOINTS DETAILS	THN-OC-05

HORIZONTAL CURVE OF OUTLET CHANNEL

NO. PI.	COORDINATE N	COORDINATE E	PI. – PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	TL. (m)	R (m)	LC. (m)	BC. STA. (km)	PI. STA. (km)	EC. STA. (km)	BEARING (N/S ° – ' – " E/W)
PI.1	2,067,792.826	684,696.502	–	–	–	–	–	–	0+000.000	–	–
PI.2	2,067,781.514	684,706.357	15.003	42°-47'-05.90"	15.000	38.290	28.593	0+000.003	0+015.003	0+028.596	S 41°- 03'- 44.42"E
PI.3	2,067,760.678	684,899.642	194.405	88°-23'- 56.18"	–	–	–	–	0+208.000	–	–

0 5 10 20 30
SCALE 1:400 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
OUTLET CHANNEL
PLAN AND SECTION A–A

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

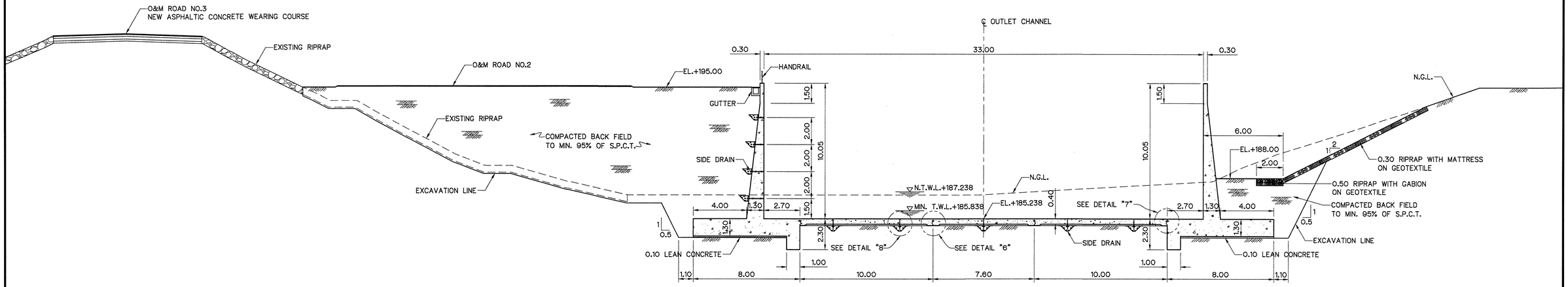
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
	APPROVED

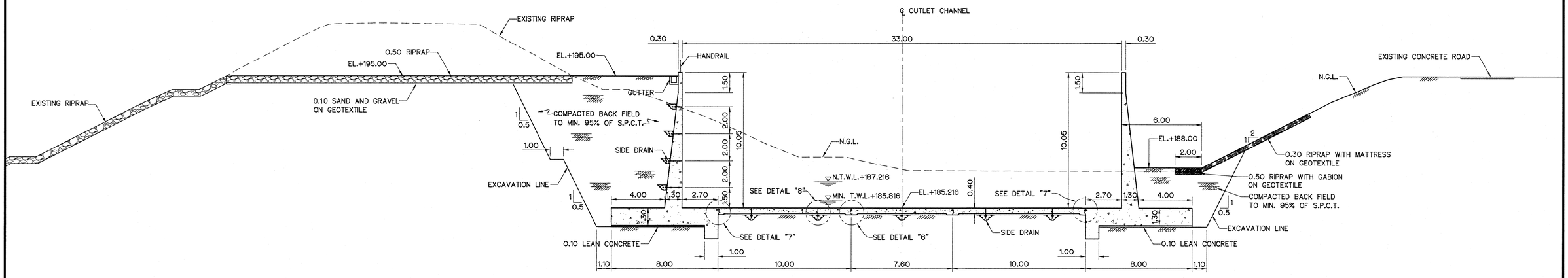
PROJECT MANAGER — DATE: 6/9/2024

DRAWING NO. THN-OC-01

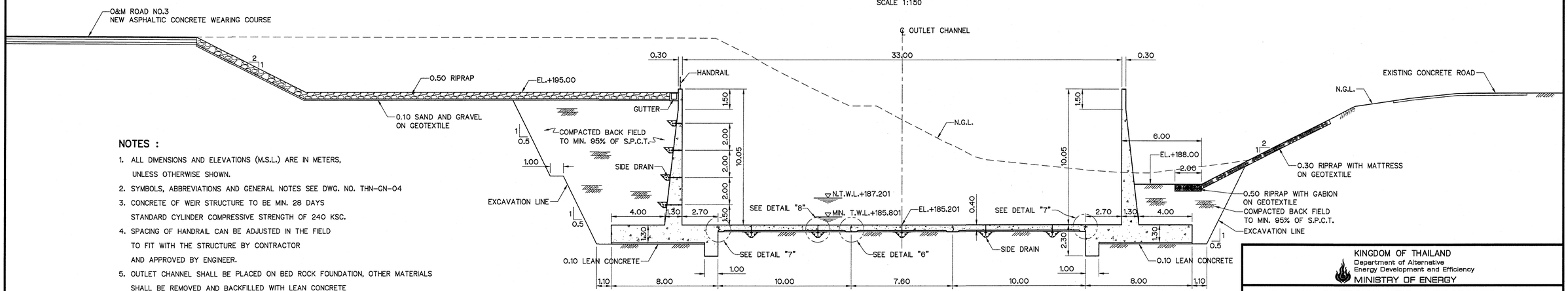
SHEET NO. 129 OF 157



SECTION B–B
SCALE 1:150



SECTION C–C
SCALE 1:150



SECTION D–D
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. OUTLET CHANNEL SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1. OUTLET CHANNEL, PLAN AND SECTION A–A	THN–OC–01
2. OUTLET CHANNEL, SECTION E–E, F–F AND SECTION H–H	THN–OC–03
3. OUTLET CHANNEL, DETAILS	THN–OC–04
4. OUTLET CHANNEL, SIDE DRAIN, HANDRAIL, GUTTER AND JOINTS DETAILS	THN–OC–05

0 2 4 6 8 10
SCALE 1:150 METERS

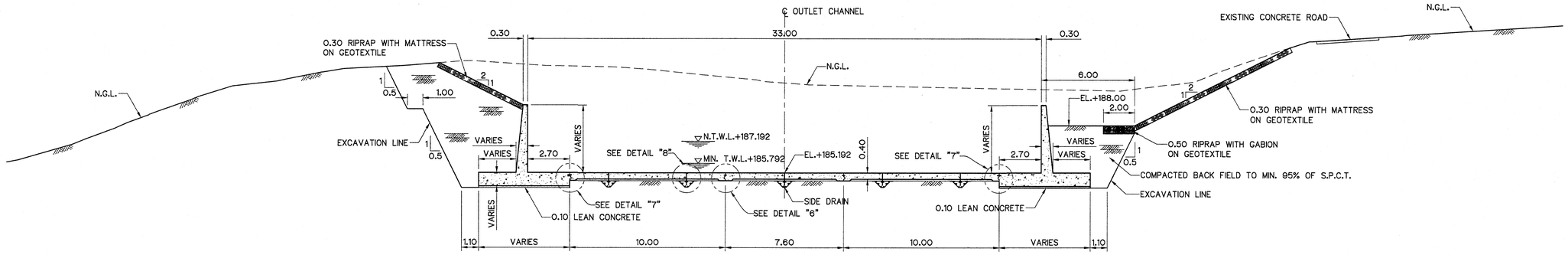
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

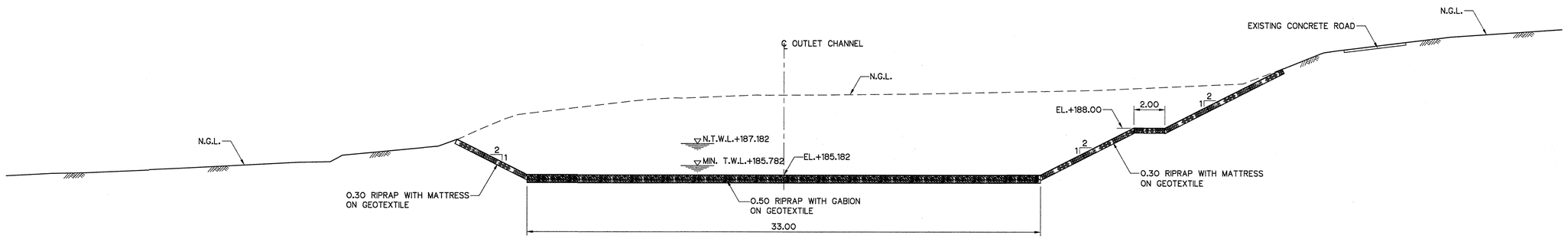
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
OUTLET CHANNEL
SECTION B–B, C–C AND SECTION D–D

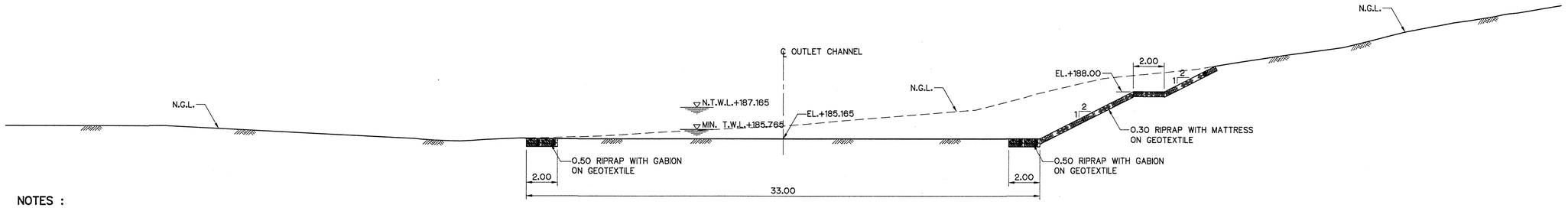
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ERGY
DESIGNED วศ.6650 วศ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วศ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN–OC–02	SHEET NO. 130 OF 157



SECTION E–E
SCALE 1:150



SECTION F–F
SCALE 1:150



SECTION H–H
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04
3. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 240 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. OUTLET CHANNEL SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY OF FOUNDATION NOT LESS THAN 20 TON/M.^{2}

REFERENCE DRAWINGS :

1.	OUTLET CHANNEL, PLAN AND SECTION A–A	THN–OC–01
2.	OUTLET CHANNEL, SECTION B–B, C–C AND SECTION D–D	THN–OC–02
3.	OUTLET CHANNEL, DETAILS	THN–OC–04
4.	OUTLET CHANNEL, SIDE DRAIN, HANDRAIL, GUTTER AND JOINTS DETAILS	THN–OC–05

0 2 4 6 8 10
SCALE 1:150 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

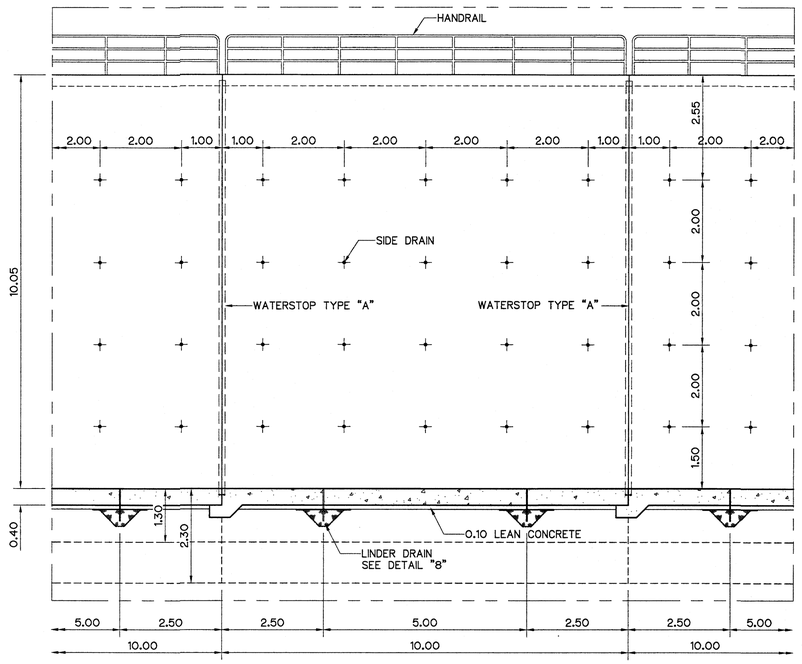
CIVIL WORKS AND ELECTRICAL SYSTEM
OUTLET CHANNEL
SECTION E–E, F–F AND SECTION H–H

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

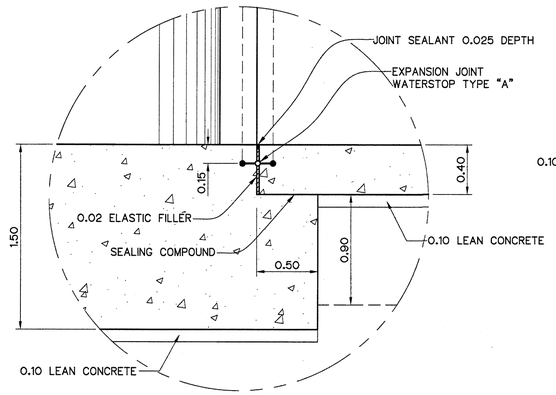
DESIGNED	สิ.6650	ภ.88523	
DRAWN			
CHECKED	สิ.6651		
PROJECT MANAGER	6/9/2024	DATE	

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

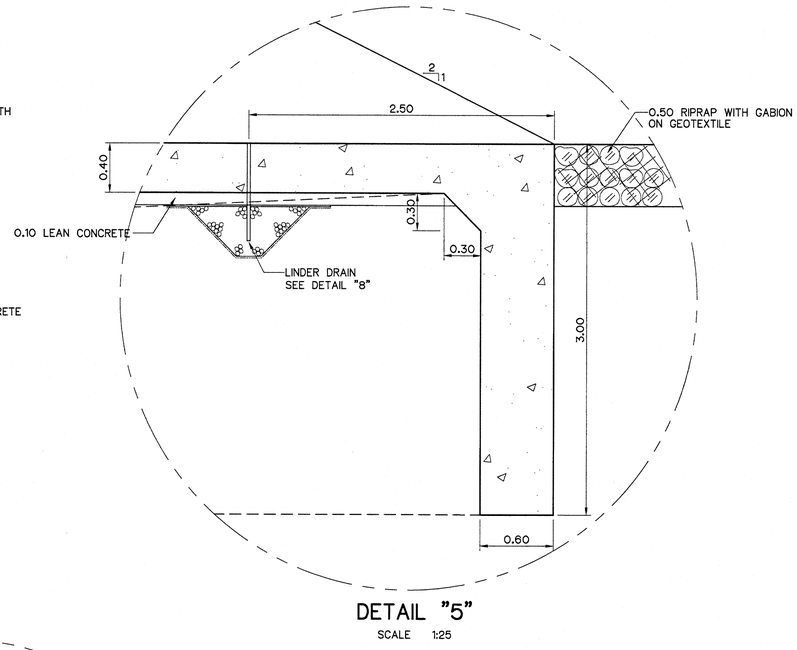
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	THN–OC–03
SHEET NO.	131 OF 157



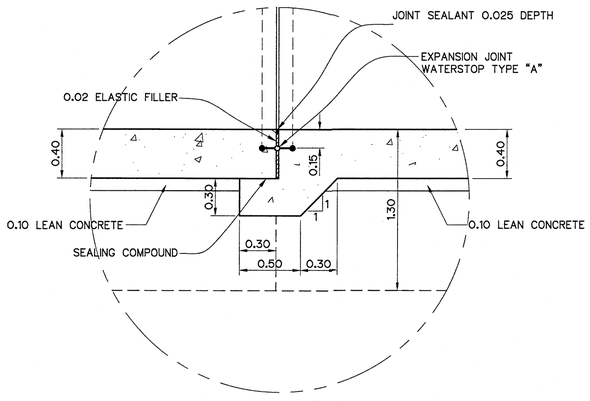
DETAIL "1"
SCALE 1:75



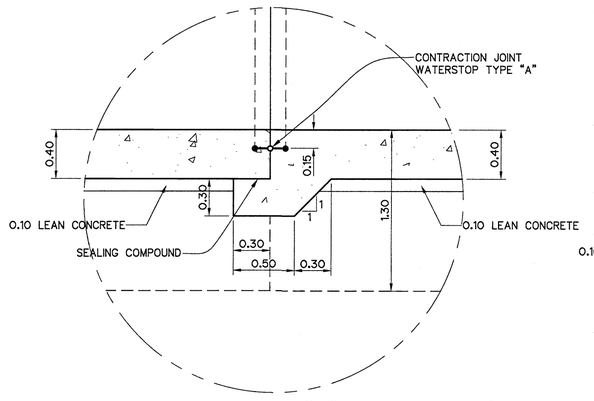
DETAIL "2"
SCALE 1:25



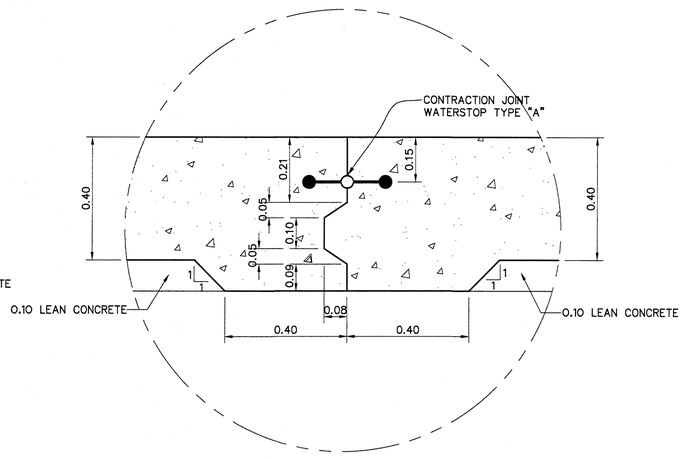
DETAIL "5"
SCALE 1:25



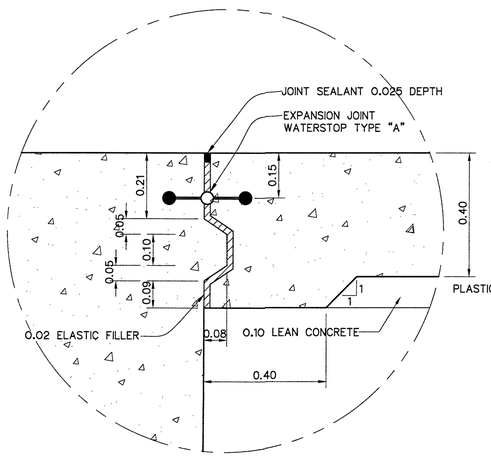
DETAIL "3"
SCALE 1:25



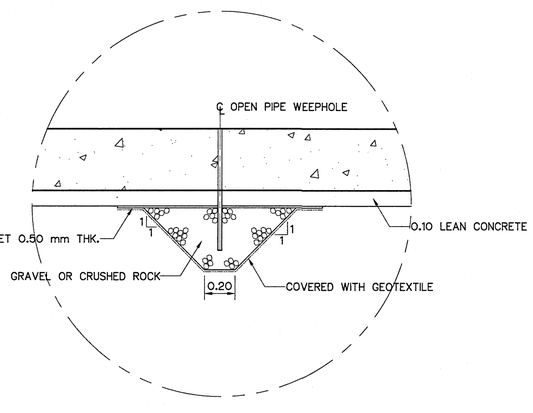
DETAIL "4"
SCALE 1:25



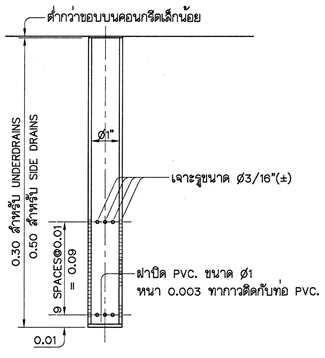
DETAIL "6"
SCALE 1:10



DETAIL "7"
SCALE 1:10



DETAIL "8"
SCALE 1:20



OPEN PIPE WEEPHOLE
สำหรับ
FOUNDATION MATERIAL
NOT FREE DRAINING
NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METER,UNLESS OTHERWISE SHOWN
2. FOR GENERAL NOTES SEE DWG. NO THN-GN-04

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
SCALE 1:20 METERS

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

0 1 2 3 4 5 6
SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

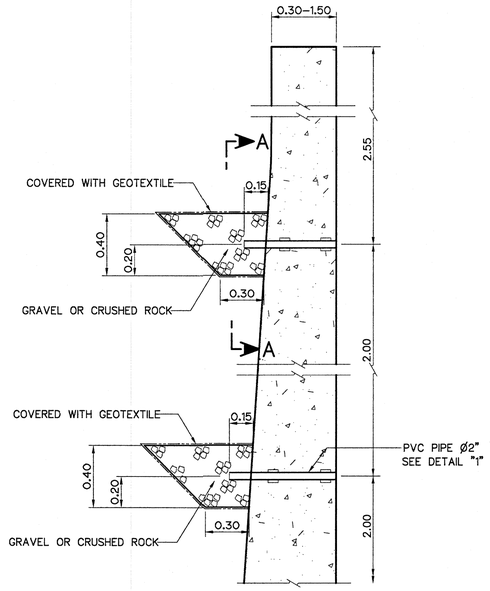
CIVIL WORKS AND ELECTRICAL SYSTEM
OUTLET CHANNEL
DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

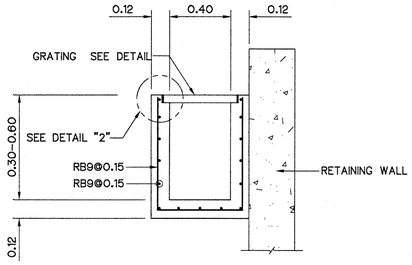
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED			
DESIGNED	ลย.6650	ภย.88523	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	ลย.6651		APPROVED
PROJECT MANAGER	6/9/2024 DATE	DRAWING NO. THN-OC-04	SHEET NO. 132 OF 157



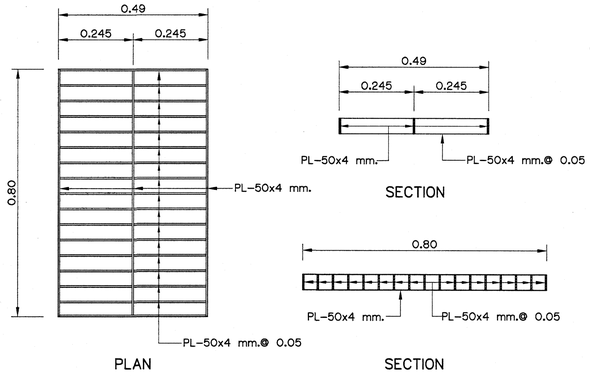
DETAIL OF SIDE DRAIN

NOT TO SCALE



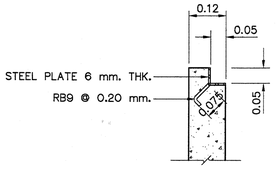
DETAIL OF GUTTER

SCALE 1:20



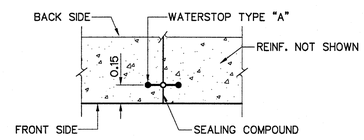
DETAIL OF GRATING

SCALE 1:10



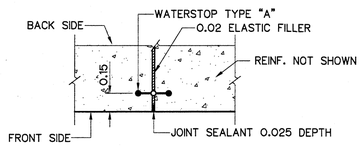
DETAIL "2"

SCALE 1:10



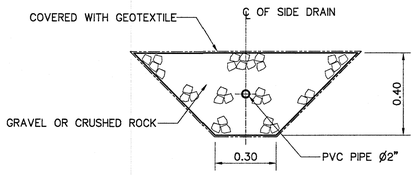
CONTRACTION JOINT AT SIDE WALL

SCALE 1:25



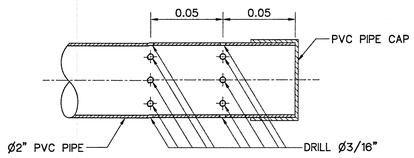
EXPANSION JOINT AT SIDE WALL

SCALE 1:25



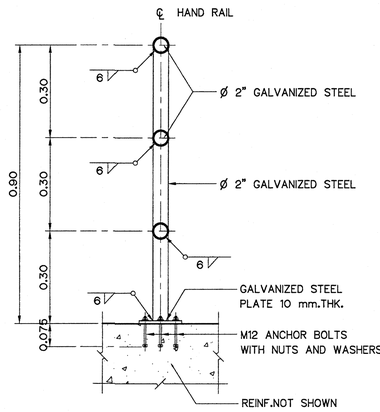
SECTION A–A

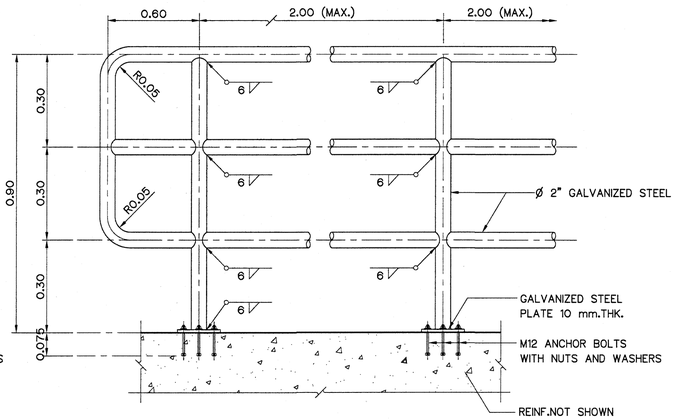
SCALE 1:15



DETAIL "1"

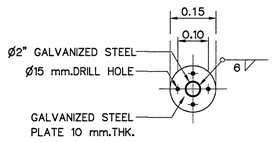
NOT TO SCALE





DETAIL OF HANDRAIL

SCALE 1:10



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METER,UNLESS OTHERWISE SHOWN
2. FOR GENERAL NOTES SEE DWG. NO THN-GN-04

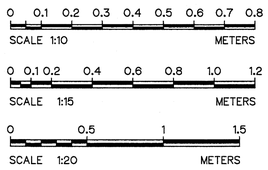


TABLE 1 GRADATION OF FILTER MATERIALS

FILTER MATERIALS	PERCENT BY WEIGHT RETAINED ON STANDARD SIEVE									
	NO. 200	NO. 100	NO. 50	NO. 30	NO. 16	NO. 8	NO. 4	3/8"	3/4"	1 1/2"
SAND	97–100	93–97	74–85	38–70	15–45	5–23	0–5	–	–	–
COARSE AGGREGATE					95–100	75–90	60–80	40–60	20–35	0

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

OUTLET CHANNEL

SIDE DRAIN, HANDRAIL, GUTTER AND JOINTS DETAILS

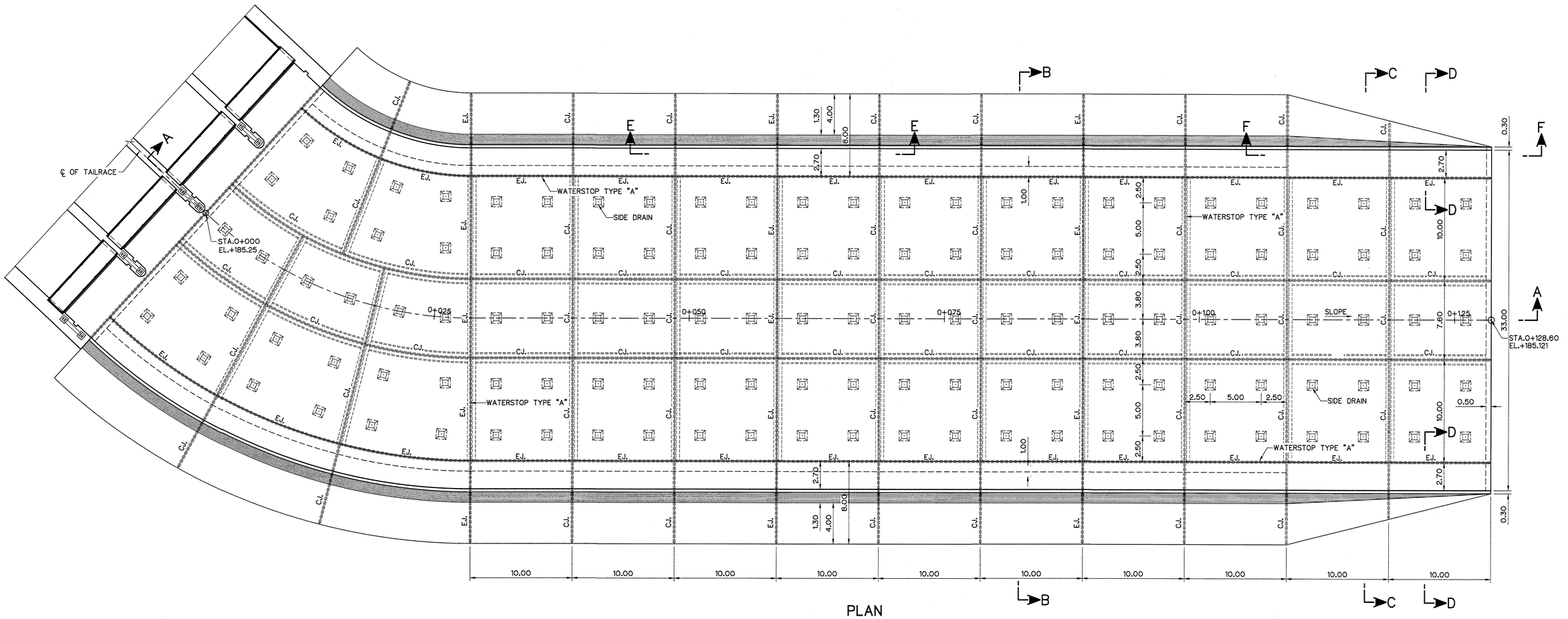
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วิ.6650 วิ.88523
DRAWN
CHECKED วิ.6651
PROJECT MANAGER 6/9/2024 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN-OC-05
SHEET NO. 133 OF 157



PLAN
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. THN-GN-04
3. CJ. = CONTRACTION JOINT
   EJ. = EXPANSION JOINT

REFERENCE DRAWINGS :

1.	OUTLET CHANNEL, PLAN AND SECTION A-A	THN-OC-01
2.	OUTLET CHANNEL, REINFORCEMENT DETAIL (SHEET 2/4)	THN-OC-07
3.	OUTLET CHANNEL, REINFORCEMENT DETAIL (SHEET 3/4)	THN-OC-08
4.	OUTLET CHANNEL, REINFORCEMENT DETAIL (SHEET 4/4)	THN-OC-09

0 5 10 15
SCALE 1:200 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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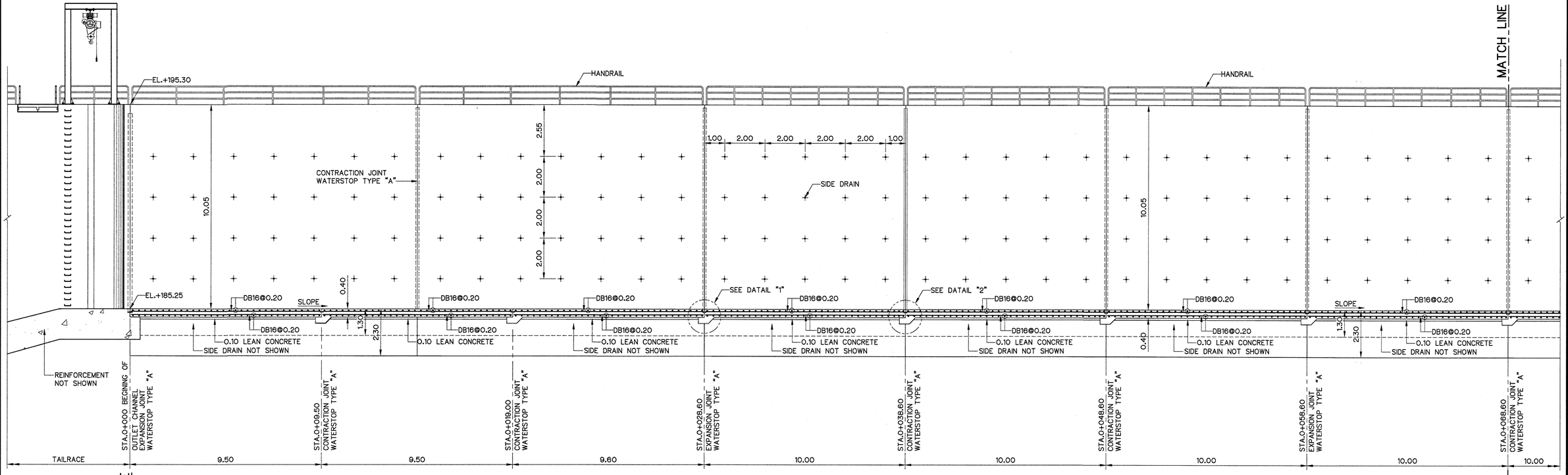
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

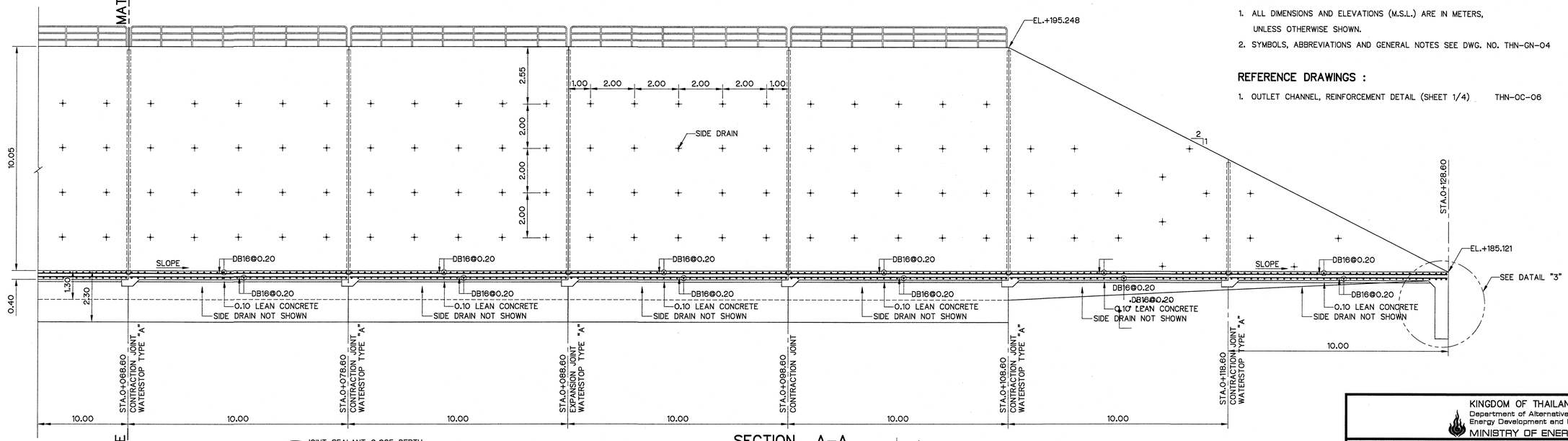
OUTLET CHANNEL

REINFORCEMENT DETAIL (SHEET 1/4)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ส.ต.6650 ภ.ส.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED ส.ต.6651	RECOMMENDED
6/9/2024 PROJECT MANAGER / DATE	APPROVED
DRAWING NO. THN-OC-06	SHEET NO. 134 OF 157



SECTION A–A
SCALE 1:100



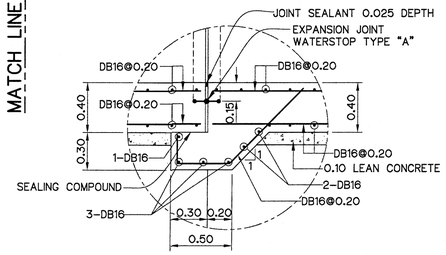
SECTION A–A
SCALE 1:100

NOTES :

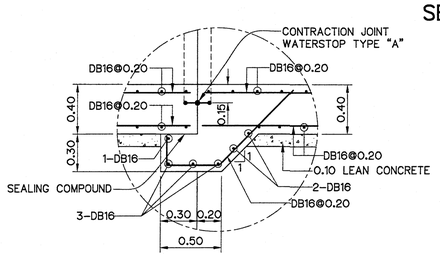
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

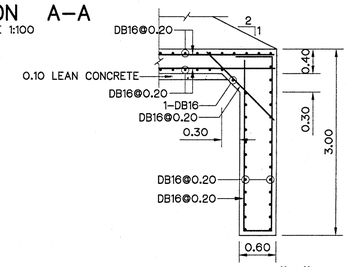
1. OUTLET CHANNEL, REINFORCEMENT DETAIL (SHEET 1/4) THN-OC-06



DETAIL "1"
SCALE 1:25



DETAIL "2"
SCALE 1:25



DETAIL "3"
SCALE 1:50

SCALE 1:25 METERS (0 0.5 1 1.5 2)

SCALE 1:50 METERS (0 1 2 3 4)

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1.				
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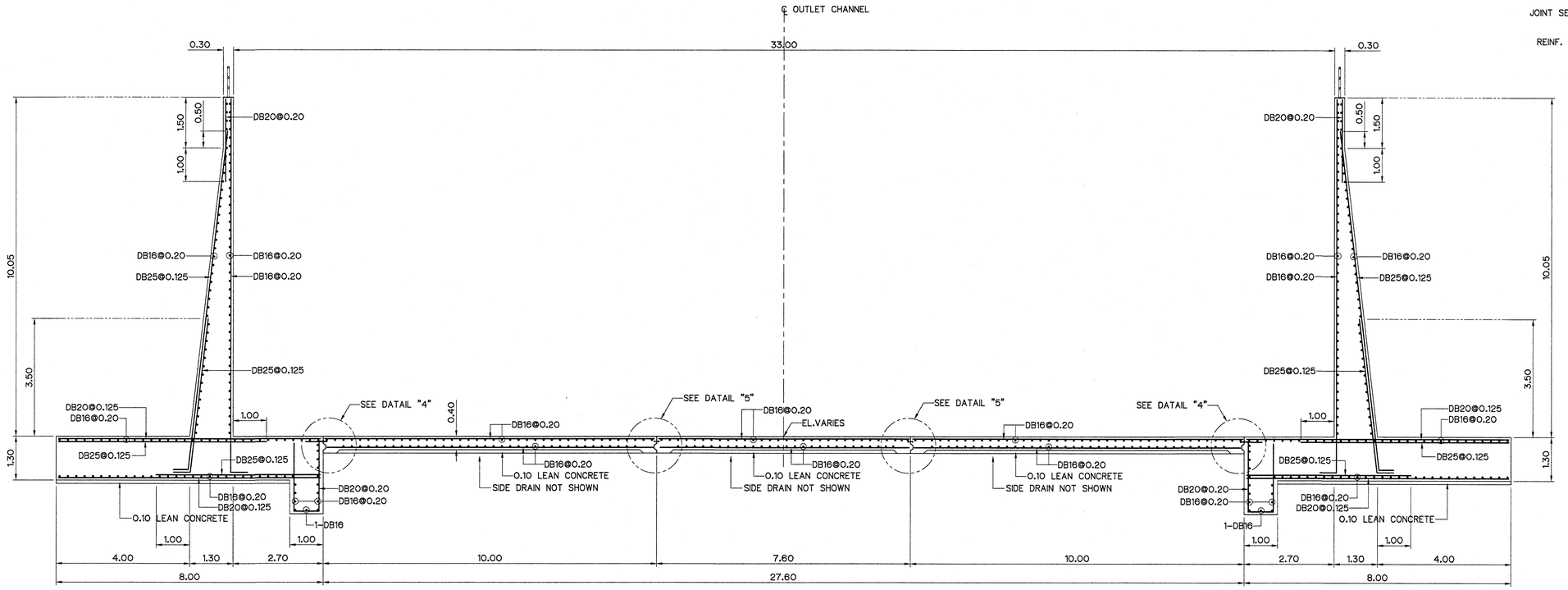
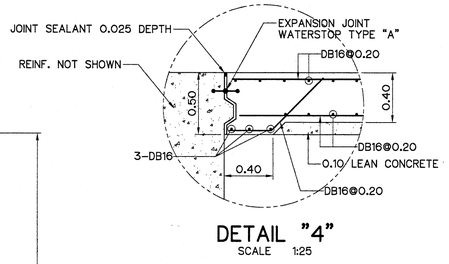
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
OUTLET CHANNEL
REINFORCEMENT DETAIL (SHEET 2/4)

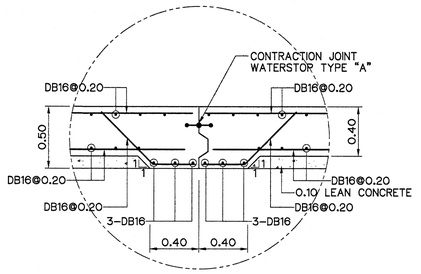
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วศ.6650 วศ.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED วศ.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
	DRAWING NO. THN-OC-07
	SHEET NO. 135 OF 157



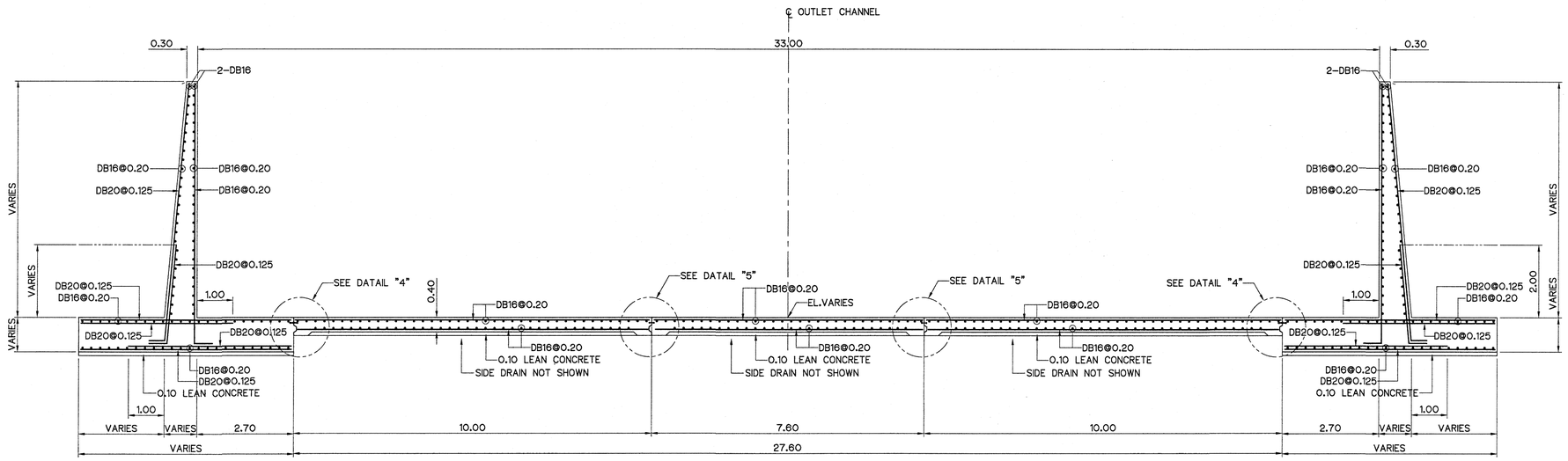
SECTION B–B
SCALE 1:75



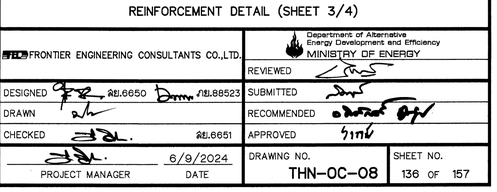
DETAIL "4"
SCALE 1:25



DETAIL "5"
SCALE 1:25



SECTION C–C
SCALE 1:75



SECTION D–D
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. THN–GN–04

REFERENCE DRAWINGS :
1. OUTLET CHANNEL, REINFORCEMENT DETAIL (SHEET 1/4) THN–OC–06

0 0.5 1 1.5 2 — SCALE 1:25 METERS
0 1 2 3 4 — SCALE 1:50 METERS
0 1 2 3 4 5 6 — SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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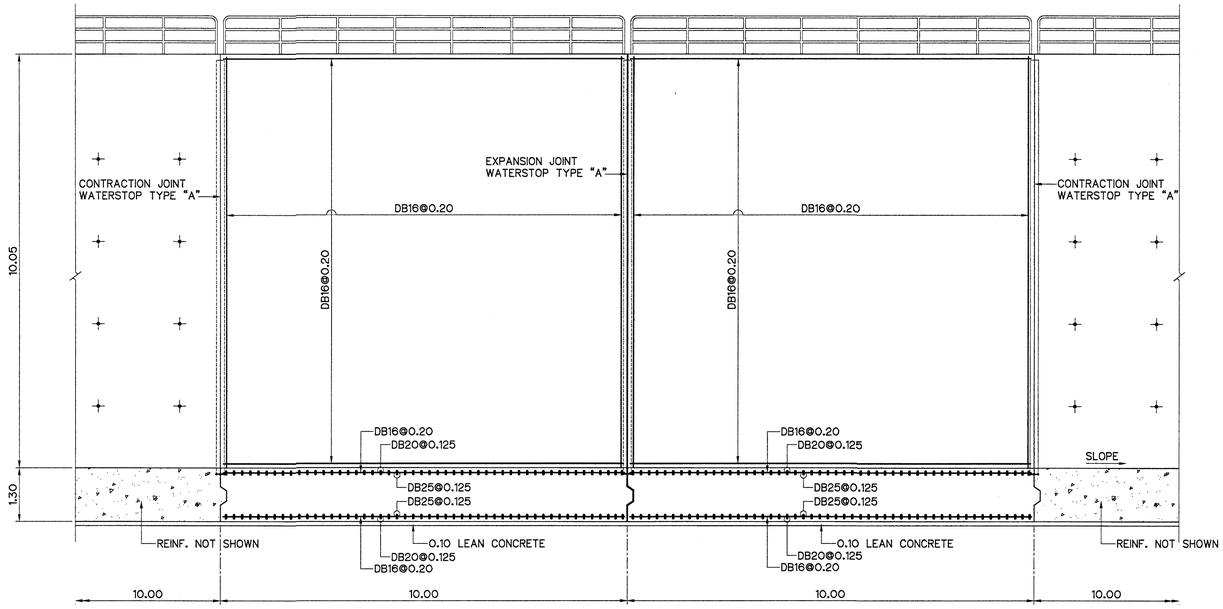
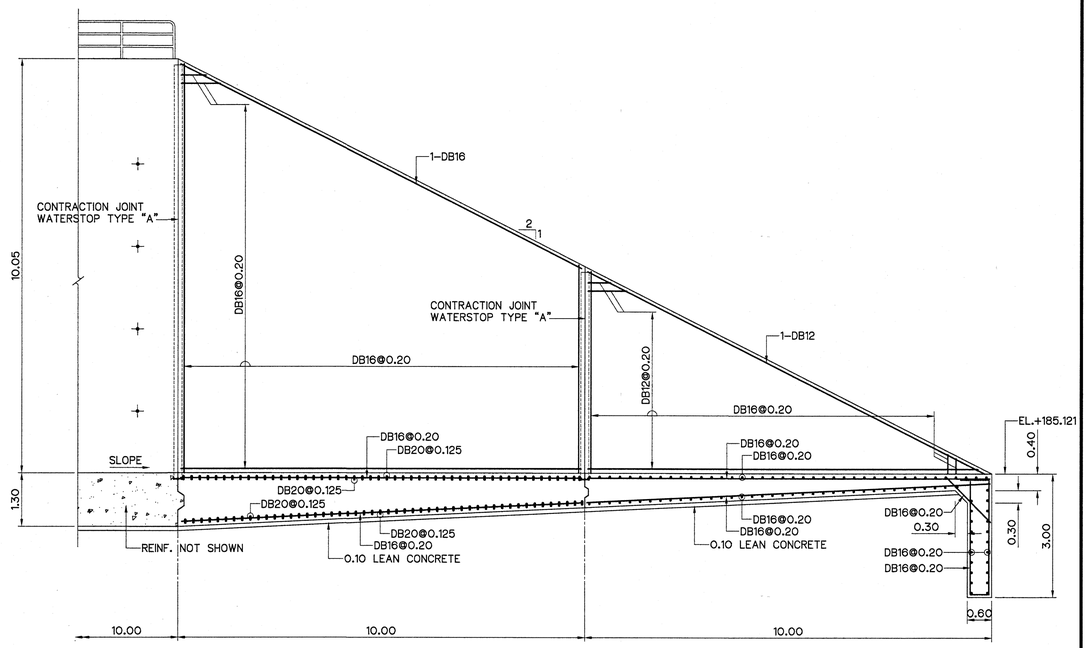
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
OUTLET CHANNEL
REINFORCEMENT DETAIL (SHEET 3/4)

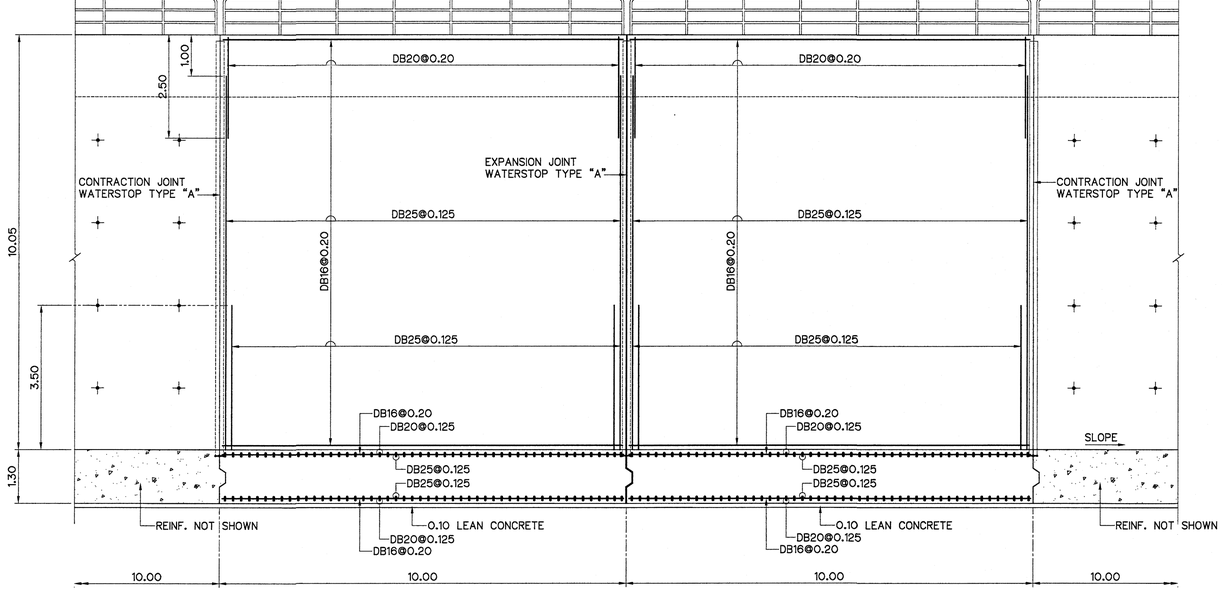
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 วิ.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–OC–08 / SHEET NO. 136 OF 157



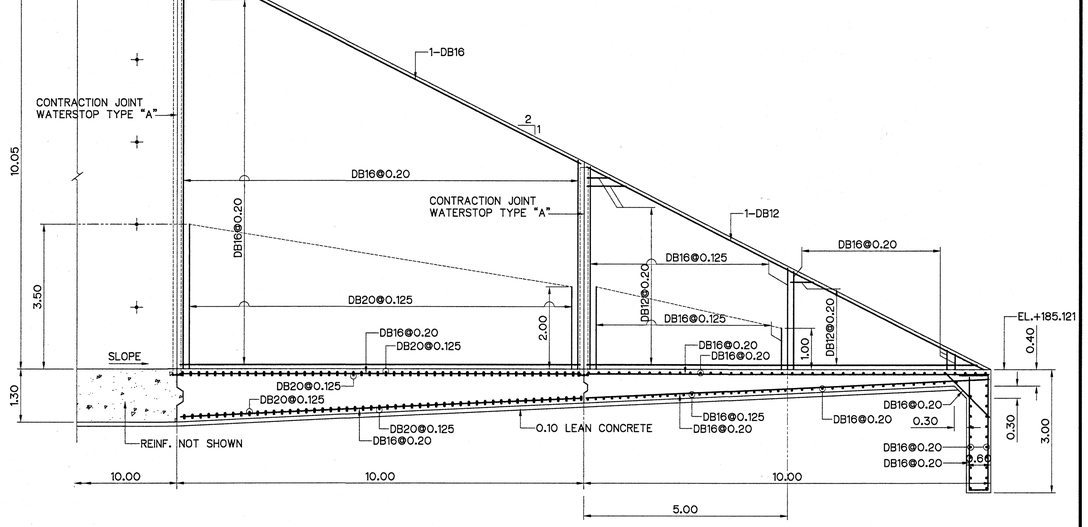
SECTION E–E (NEAR FACE)
SCALE 1:75



SECTION F–F (NEAR FACE)
SCALE 1:75



SECTION E–E (FAR FACE)
SCALE 1:75



SECTION F–F (FAR FACE)
SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. OUTLET CHANNEL, REINFORCEMENT DETAIL (SHEET 1/4) THN–OC–06

0 1 2 3 4 5 6
SCALE 1:75 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

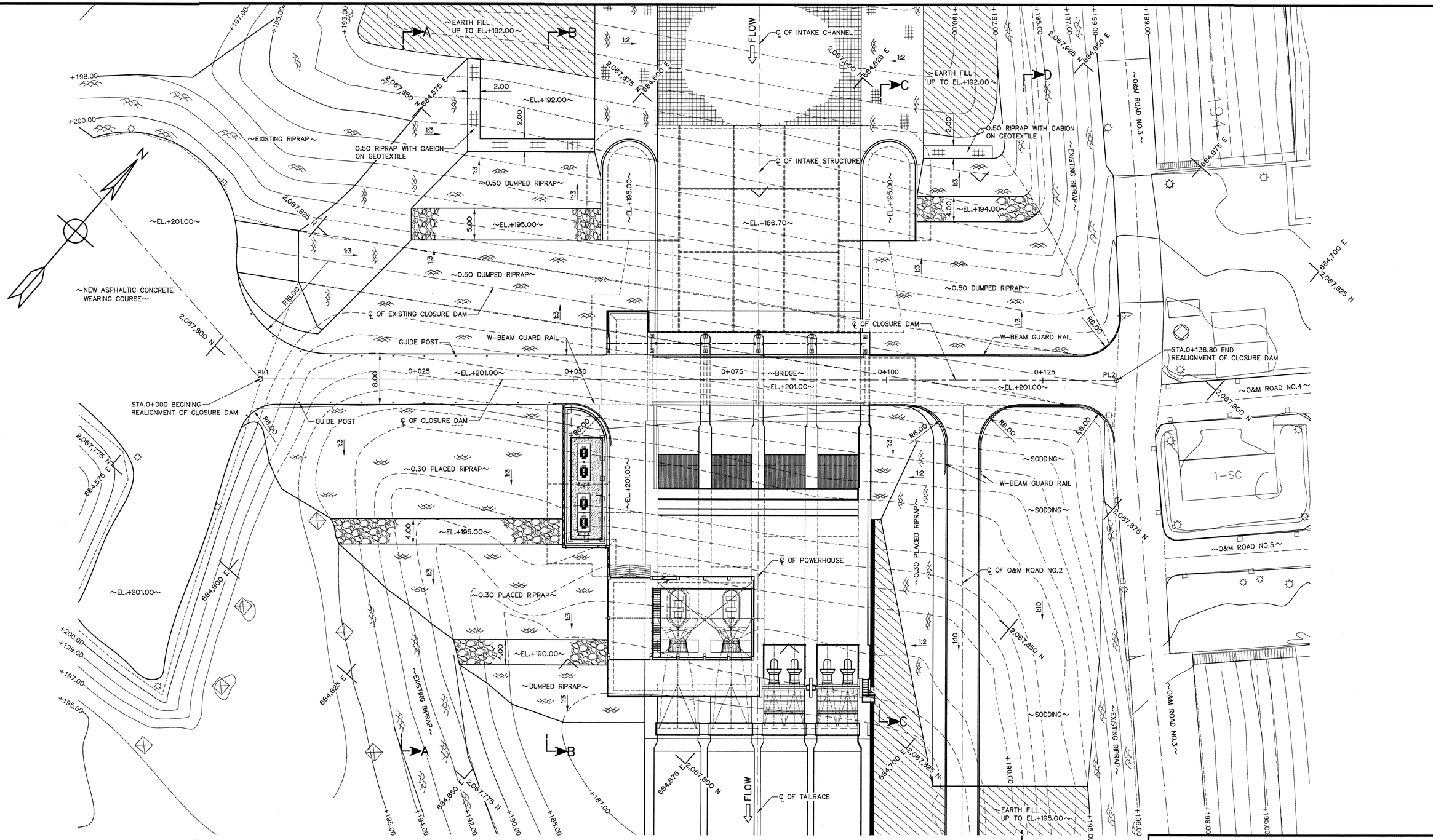
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

OUTLET CHANNEL

REINFORCEMENT DETAIL (SHEET 4/4)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED สม.6650 กม.88523	REVIEWED
DRAWN	SUBMITTED
CHECKED สม.6651	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
DRAWING NO. THN–OC–09	SHEET NO. 137 OF 157



PLAN
SCALE 1:300

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. GENERAL, GENERAL LAY-OUT OF PROJECT	THN-GN-02
2. REALIGNMENT OF CLOSURE DAM, SECTION A-A AND B-B	THN-RD-02
3. REALIGNMENT OF CLOSURE DAM, SECTION C-C AND D-D	THN-RD-03
4. REALIGNMENT OF CLOSURE DAM, TYPICAL SECTIONS AND DETAILS	THN-RD-04
5. REALIGNMENT OF CLOSURE DAM, DOUBLE W-BEAM GUARDRAIL	THN-RD-05

HORIZONTAL ALINEMENT OF CLOSURE DAM

NO. PI.	COORDINATE		PI. – PI.	DEFLECTION ANGLE	PI. STA.	BEARING
	N	E	(m)	(° – ' – ")	(km)	(N/S ° – ' – " E/W)
PI.1	2,067,800.866	684,583.952	–	–	0+000.000	–
PI.2	2,067,890.704	684,687.060	136.756	164°-22'-02.18"	0+136.800	N 48°-56'-03.71" E

0 1 5 10 15 20 25
SCALE 1:300 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
REALIGNMENT OF CLOSURE DAM
PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

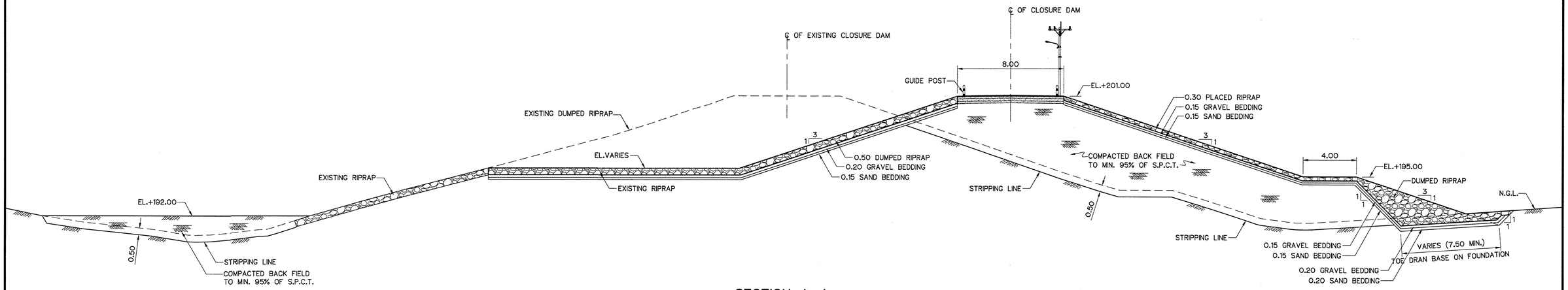
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วศ.6650	วศ.88523	REVIEWED
DRAWN			SUBMITTED
CHECKED	วศ.6651		RECOMMENDED
			APPROVED

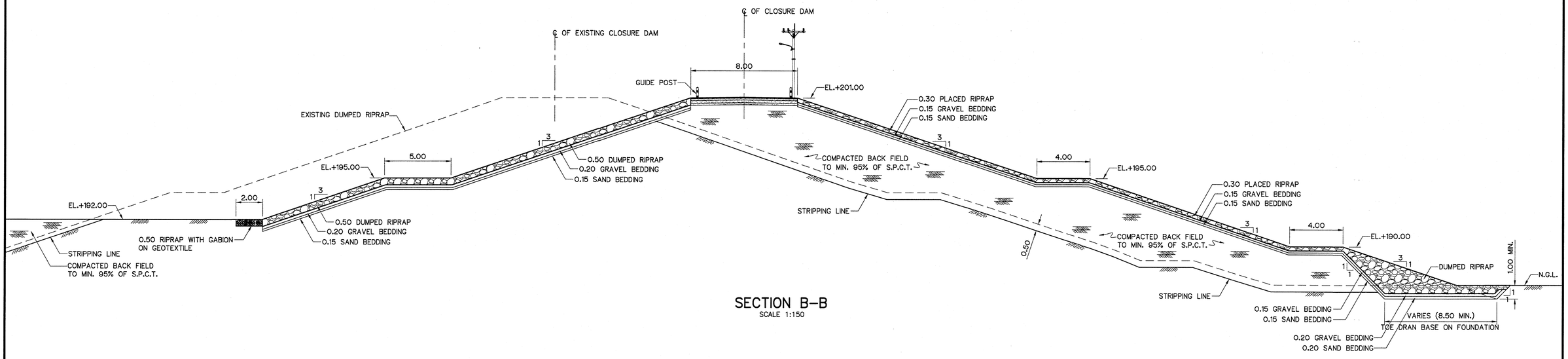
PROJECT MANAGER — 6/9/2024 DATE

DRAWING NO. THN-RD-01

SHEET NO. 138 OF 157



SECTION A–A
SCALE 1:150



SECTION B–B
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. REALIGNMENT OF CLOSURE DAM, PLAN — THN–RD–01
2. REALIGNMENT OF CLOSURE DAM, SECTION C–C AND D–D — THN–RD–03
3. REALIGNMENT OF CLOSURE DAM, TYPICAL SECTIONS AND DETAILS — THN–RD–04

0 2 4 6 8 10
SCALE 1:150 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
REALIGNMENT OF CLOSURE DAM
SECTION A–A AND B–B

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

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DRAWN			
CHECKED	สย.6651		
PROJECT MANAGER	6/9/2024	DATE	

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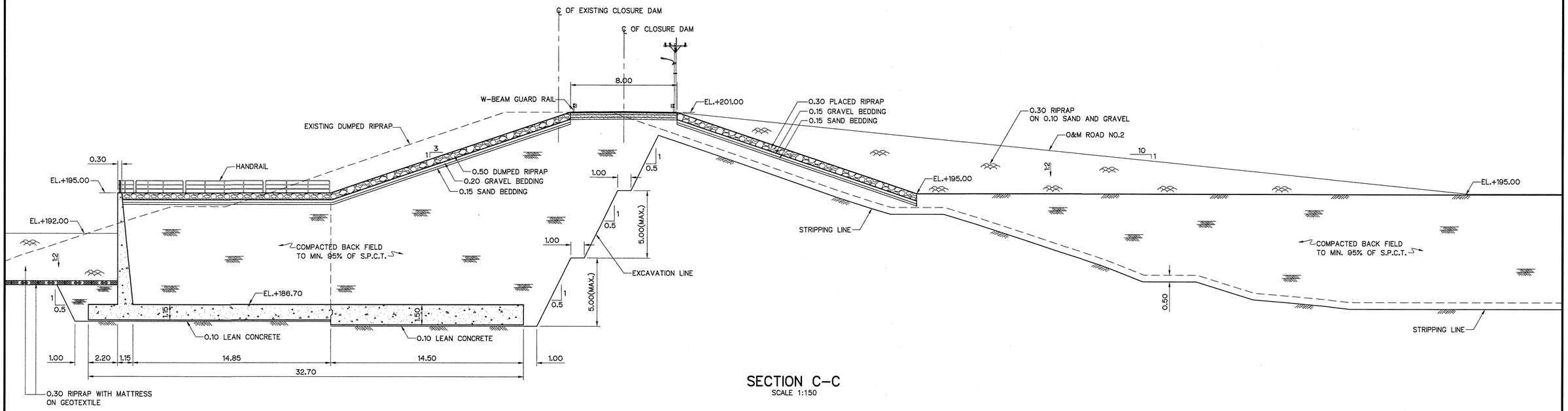
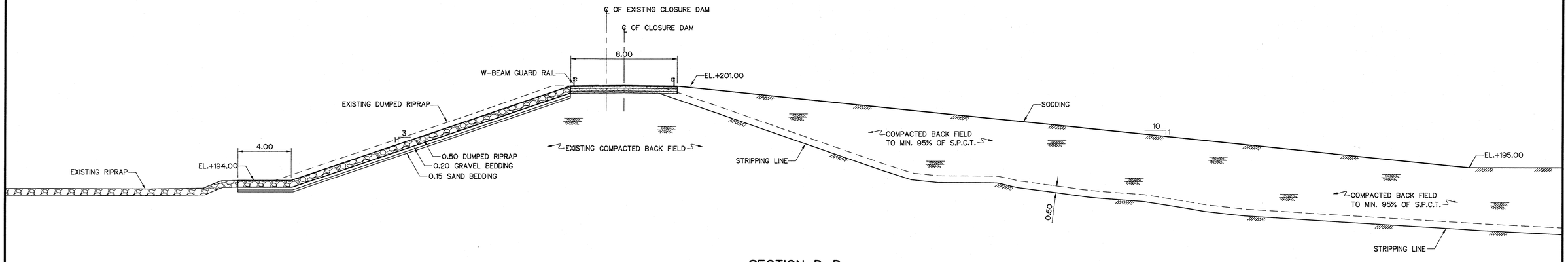
RECOMMENDED	
APPROVED	
DRAWING NO.	THN–RD–02
SHEET NO.	139 OF 157



SECTION C–C
SCALE 1:150



SECTION D–D
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. REALIGNMENT OF CLOSURE DAM, PLAN	THN-RD-01
2. REALIGNMENT OF CLOSURE DAM, SECTION A-A AND B-B	THN-RD-02
3. REALIGNMENT OF CLOSURE DAM, TYPICAL SECTIONS AND DETAILS	THN-RD-04
4. REALIGNMENT OF CLOSURE DAM, DOUBLE W-BEAM GUARDRAIL DETAILS	THN-RD-05

0 2 4 6 8 10
SCALE 1:150 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
REALIGNMENT OF CLOSURE DAM
SECTION C–C AND D–D

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Department of Alternative Energy Development and Efficiency
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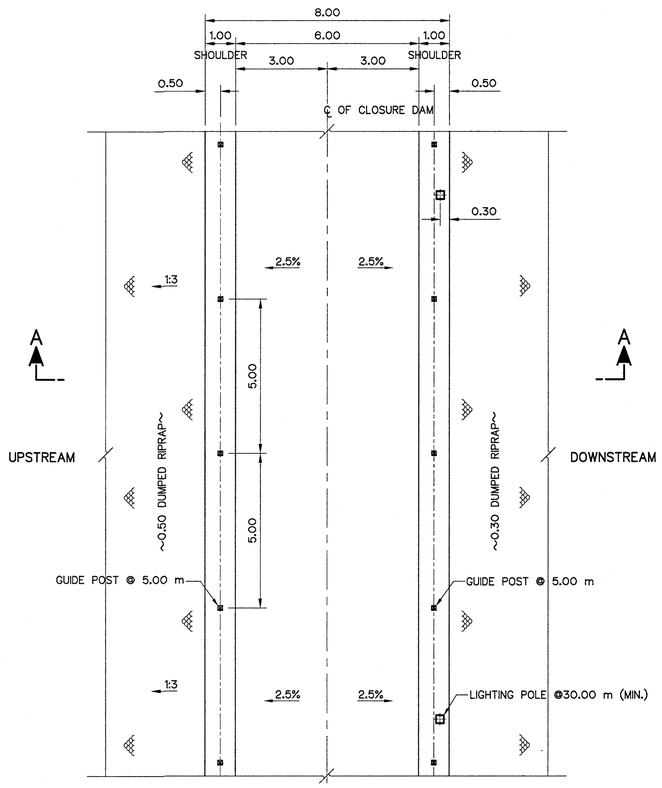
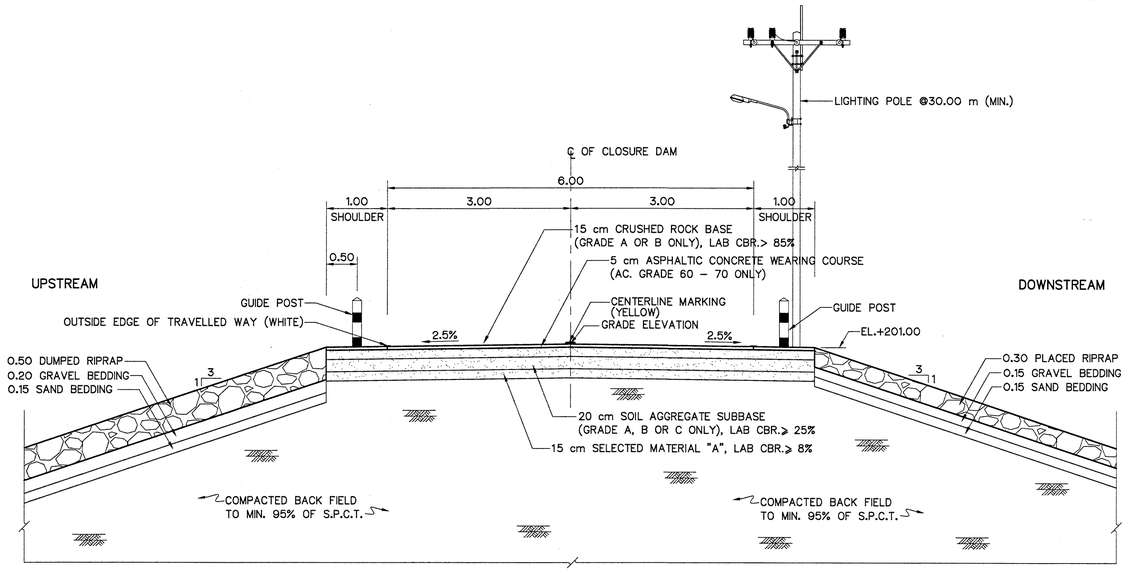
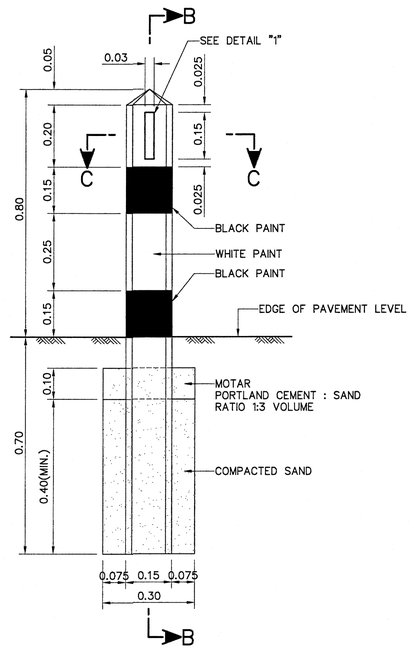
DESIGNED	สิริ.6650	ภัท.88523	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	สิริ.6651		APPROVED
PROJECT MANAGER	6/9/2024 DATE		DRAWING NO. THN-RD-03 / SHEET NO. 140 OF 157



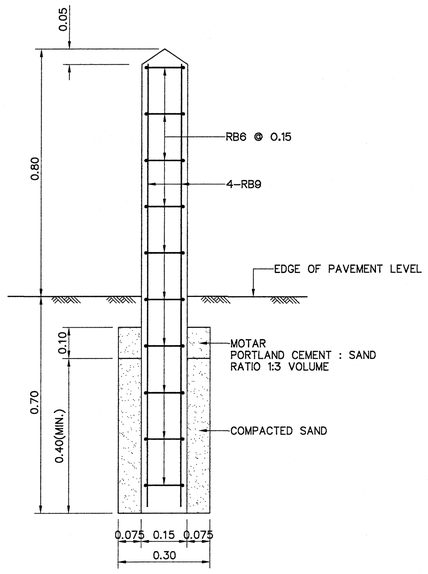
PLAN DETAIL
GUIDE POST AND LIGT POLE
SCALE 1:100



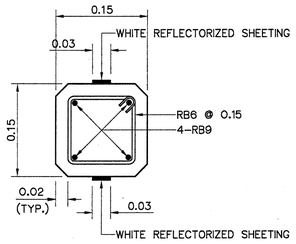
SECTION A–A
TYPICAL SECTION OF CLOSURE DAM CREST
SCALE 1:50



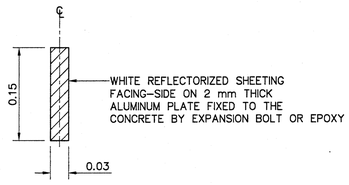
DETAIL OF GUIDE POST
SCALE 1:10



SECTION B–B
SCALE 1:10



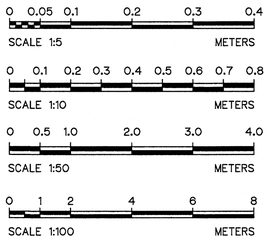
SECTION C–C
SCALE 1:5



DETAIL "1"
SCALE 1:5

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METER, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04



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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
REALIGNMENT OF CLOSURE DAM
TYPICAL SECTIONS AND DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

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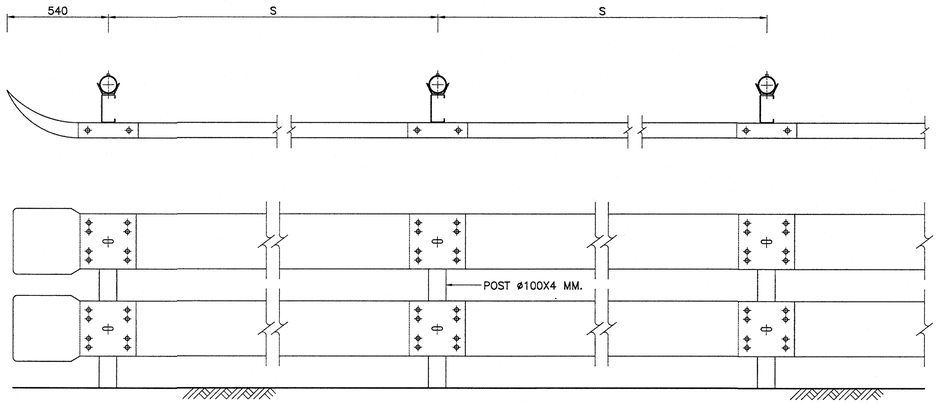
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

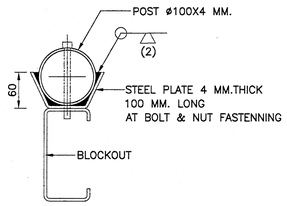
DESIGNED ฐิติ.6650 ภัทร.88523
DRAWN
CHECKED ฐิติ. ฐิติ.6651
PROJECT MANAGER ฐิติ. 6/9/2024 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

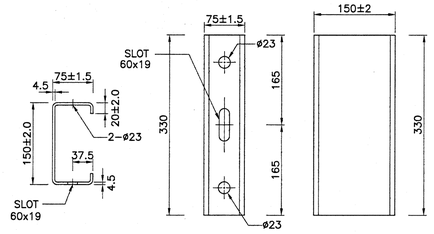
DRAWING NO. THN–RD–04
SHEET NO. 141 OF 157



PLAN AND SECTION
NOT TO SCALE

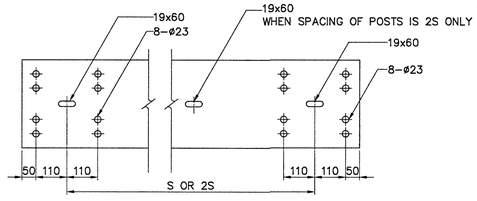


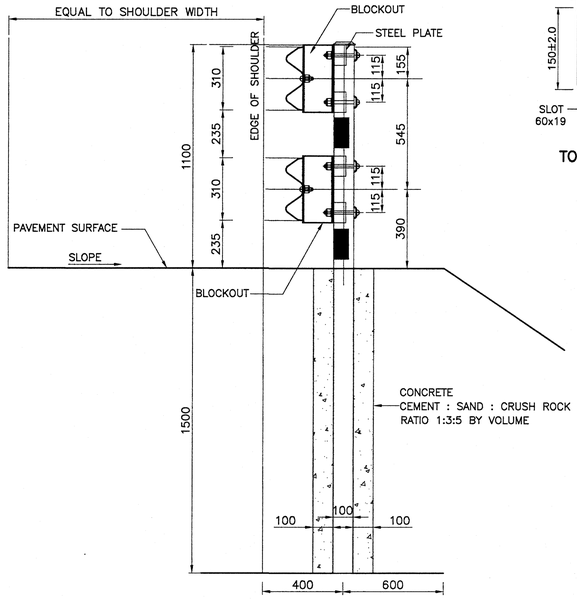
DETAIL "A"
NOT TO SCALE

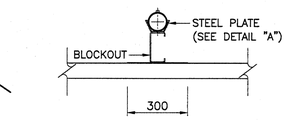


TOP VIEW FRONT VIEW SIDE VIEW

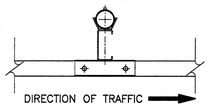
BLOCKOUT DETAILS
SCALE 1 : 5

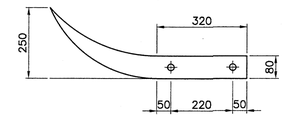


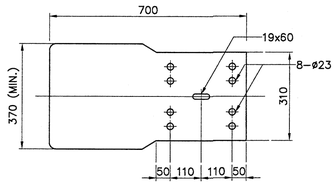




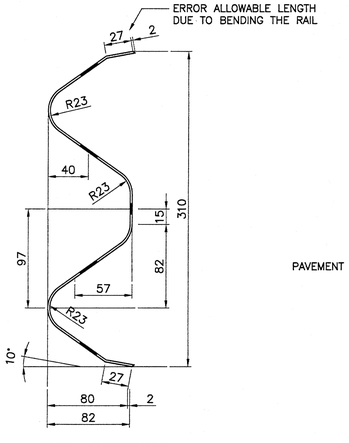
BACKUP PLATE
SCALE 1 : 15

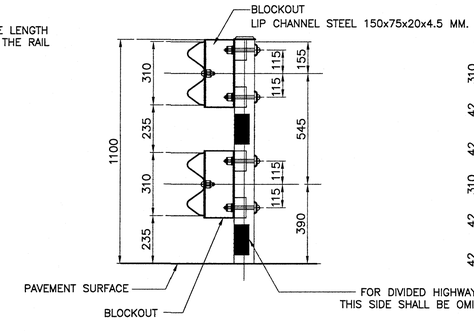


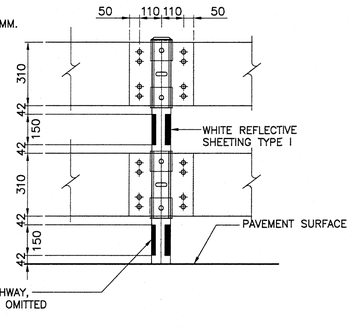


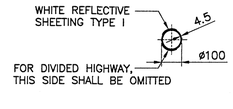


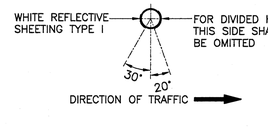
TERMINAL SECTION
SCALE 1 : 10



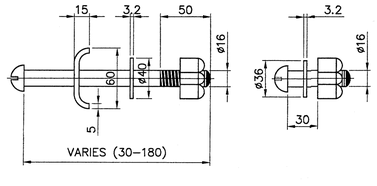








POST
SCALE 1 : 15



BOLT & NUT
SCALE 1 : 3

RAIL SECTION
SCALE 1 : 3

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. GUARDRAIL SHALL CONFORM TO THE FOLLOWING REQUIREMENT :
   2.1 STEEL RAIL SHALL BE MADE FROM STEEL OF THICKNESS NOT LESS THAN THE MINIMUM THICKNESS SPECIFIED FOR EACH CLASS OF RAIL AND SHALL BE GALVANIZED WITH THE MINIMUM WEIGHT OF ZINC COATING ACCORDING TO THE TYPE OF RAIL AS SPECIFIED IN TABLE BELOW.

RAIL		MIN.RAIL THICKNESS (MILLIMETER)	MIN.WEIGHT OF ZINC COATING (GRAMS PER SQUAREMETER)
CLASS	TYPE		
1	1	3.2	550
	2	3.2	1,100
2	1	2.5	550
	2	2.5	1,100

2.2 MECHANICAL PROPERTES OF RAIL

RAIL		MIN.ULTIMATE TENSILES STRENGTH (KG./MM.^{2})	MIN.PERCENTAGE OF ELONGATION	MAX. DEFLECTION			
				MAX. LOAD TRAFFIC FACE UP		MAX. LOAD TRAFFIC FACE DOWN	
CLASS	TYPE			KG.	DEFLECTION (MIN.)	KG.	DEFLECTION (MIN.)
1	1	41	21	910	50	720	50
	2	41	21	1,360	75	1,090	75
2	1	41	21	680	50	545	50
	2	41	21	910	75	720	75

2.3 POST SHALL BE IN ACCORDANCE WITH TIS. 107.
2.4 THE GALVANIZING OF BOLTS, NUTS, WASHERES AND SIMILAR THREADED FASTENERS SHALL BE IN ACCORDANCE WITH TIS. 171 CLASS 5.8.
2.5 BLOCKOUT SHALL BE IN ACCORDANCE WITH TIS. 1228.
2.6 STEEL PLATE SHALL BE IN ACCORDANCE WITH TIS. 1499 SM 400.
2.7 ALL STEEL SHALL BE GALVANIZED ZINC COATING SHALL NOT BE LESS THAN 550 GRAMS PER SQUARE METER.

3. UNLESS OTHERWISE SPECIFIED, GUARDRAIL CLASS 1 SHALL BE USED FOR HIGHWAY CLASS D AND CLASS 1 FOR OTHER HIGHWAY CLASS, GUARDRAIL CLASS 2 SHALL BE USED.
4. IN CASE OF HIGH RESISTANCE TO CORROSION REQUIREMENT, GUARDRAIL TYPE 2 SHALL BE USED.
5. SPACING OF POSTS SHALL BE LOCATION AS FOLLOWS.

RADIUS OF CURVE R (M.)	SPACING OF POSTS S (M.)
ON TANGENT OR ⩾ 700	2.00
450 ⩽ R < 700	1.50
R < 450	1.00

*HEIGHT OF FILL H (M.)	SPACING OF POSTS S (M.)
H ⩽ 300	2.00
3.00 < H ⩽ 4.00	1.50
4.00 < H	1.00

* FOR SIDE SLOPE 2:1 OR STEEPER
FOR HORIZONTAL CURVE WITH HIGH FILL, THE MINIMUM SPACING VALUE OF THE ONE SHALL BE GOVERN.

6. IN GENERAL, GUARDRAIL IS MORE SUITABLE THAN GUIDE POST ON HORIZONTAL CURVE SECTION WITH HIGH FILL MORE THAN 5.00 M. (AND SIDE SLOPE IS STEEPER THAN 3:1) AND NOT RECOMMENDED FOR HIGH FILL OVER 7.00 M.
7. GUARDRAIL INSTALLED IN CURVE WHERE RADIUS IS LESS THAN 50 M. SHALL BE PRE-BENT FROM THE FACTORY.
8. BACKUP PLATE OF THE SAME CLASS AND TYPE AS THE RAIL WITH INTERMEDIATE POST SHALL BE PROVIDED WHERE SPACING OF POSTS IS 2S M.
9. UNLESS OTHERWISE SPECIFIED ON THIS DRAWING, GUARDRAIL SHALL BE IN ACCORDANCE WITH TIS. 248.
10. REFLECTIVE SHEETING SHALL CONFORM TO TIS. 606 TYPE 1. (COEFFICIENT OF RETRO-REFLECTION LEVEL 1)
11. W-BEAM GUARDRAIL INSTALLATION SEE DRAWING NO. RS-605 OR RS-606.

REMARK :

THE DOUBLE W-BEAM GUARDRAIL IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITION. IN CASE OF SUFFICIENT OR HAZARD AREA, THE CONCRETE BARRIER SHOULD BE INSTALLED. IT SHOULD BE APPLIED WITH THE FIRM INFORMATION CONCERNED AND RECOMMENDED BY THE ENGINEER.

KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

REALIGNMENT OF CLOSURE DAM

DOUBLE W-BEAM GUARDRAIL DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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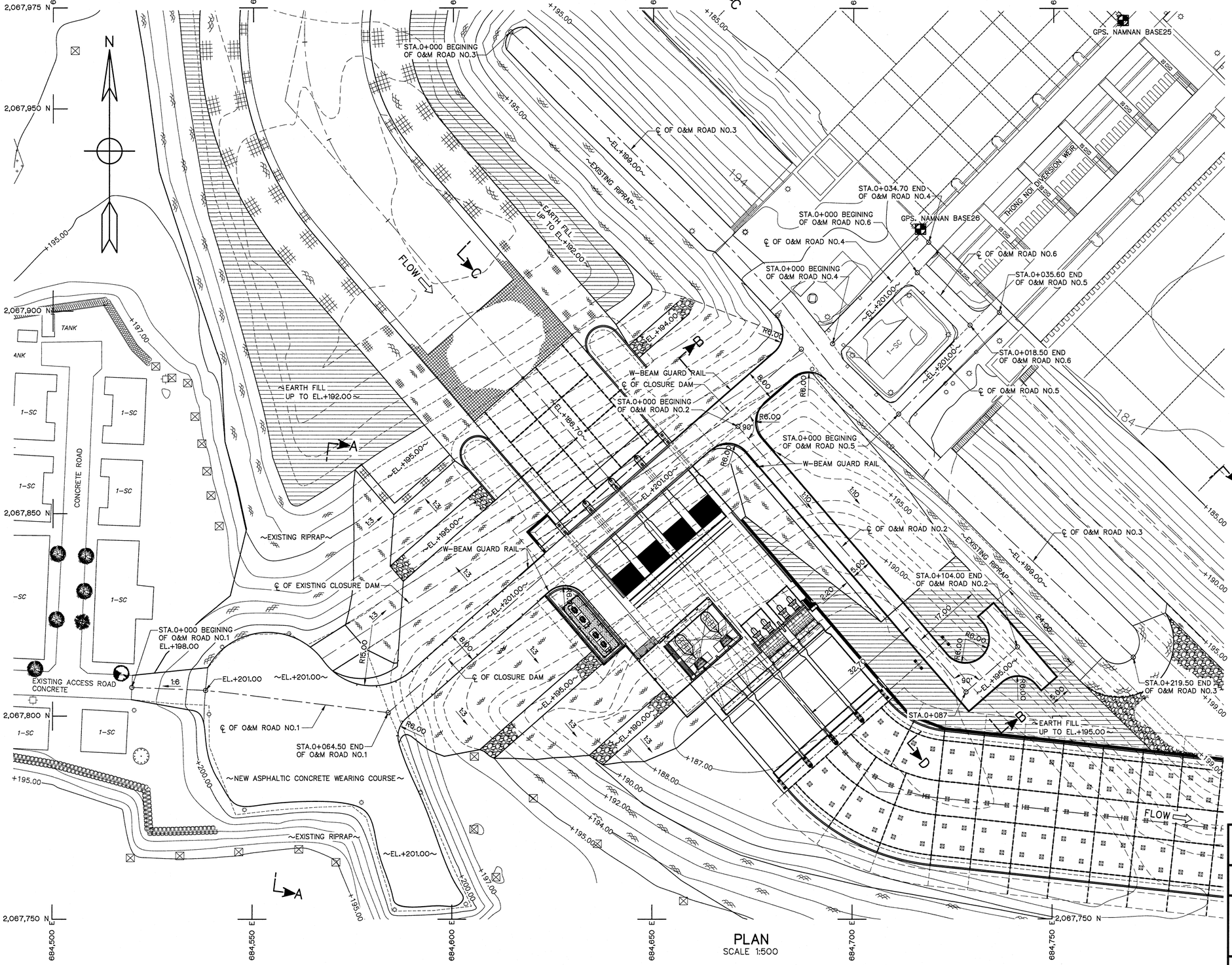
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	สธ.6650	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	สธ.6651	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	
		DRAWING NO.	THN-RD-05
		SHEET NO.	142 OF 157



PLAN
SCALE 1:500

NO.	BENCH MARK	WGS 84 GRID CO-ORDINATE		ELEVATION (M.S.L.)	AZIMUTH	DISTANCE (m)	REMARK
		NORTHING	EASTING				
1	GPS. NAM NAN BASE-025	2,067,972.086	684,767.361	201.083			BOLT ON THONG NOI DIVERSION WEIR
					224° 22' 53.7"	72.320	Distance & Azimuth from GPS. NAM NAN BASE-025 to GPS. NAM NAN BASE-026
2	GPS. NAM NAN BASE-026	2,067,920.399	684,716.778	201.096			BOLT ON THONG NOI DIVERSION WEIR

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04

REFERENCE DRAWINGS :

1. GENERAL, GENERAL LAY-OUT OF PROJECT	THN-GN-02
2. O&M ROAD, SECTION A-A AND B-B	THN-OM-02
3. O&M ROAD, SECTION C-C AND D-D	THN-OM-03
4. O&M ROAD, TYPICAL SECTIONS	THN-OM-04
5. REALIGNMENT OF CLOSURE DAM, DOUBLE W-BEAM GUARDRAIL DETAILS	THN-RD-05

0 5 10 20 30 40
SCALE 1:500 METERS

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
O&M ROAD
PLAN

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

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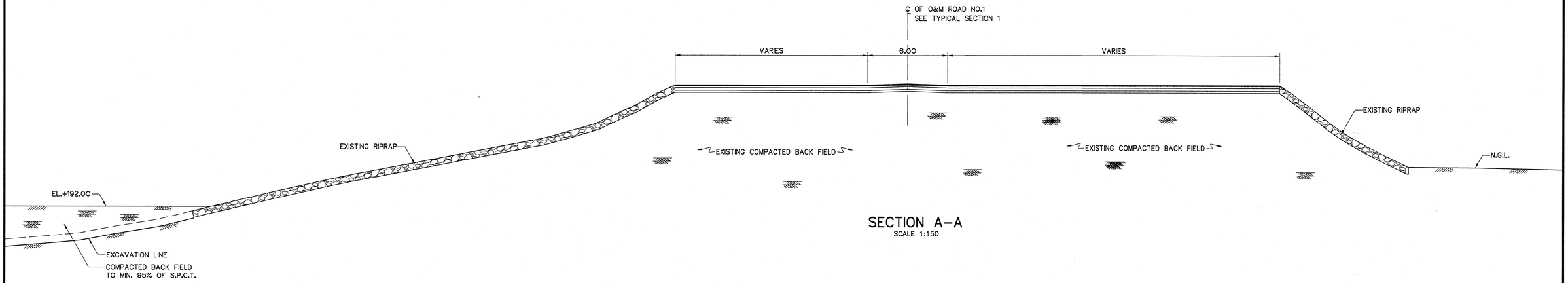
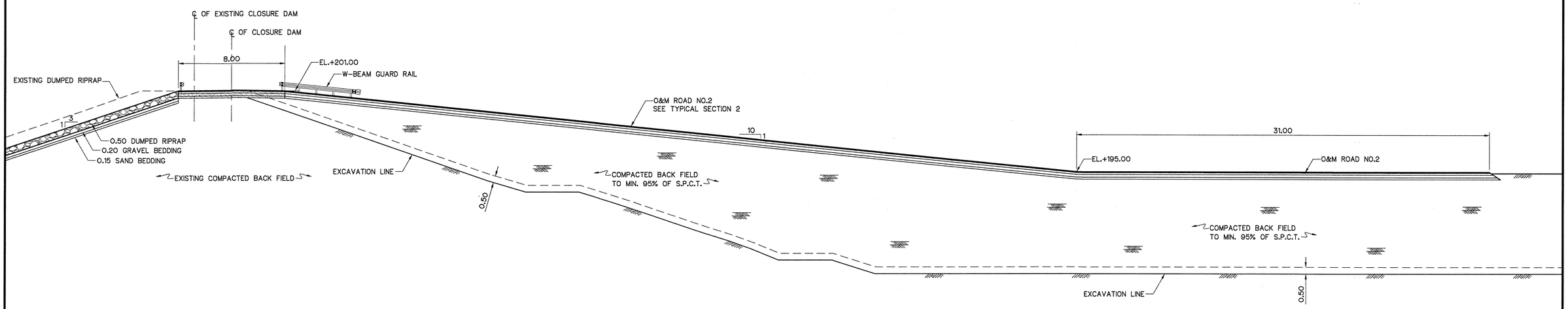
PROJECT MANAGER	6/9/2024 DATE		APPROVED

DRAWING NO. THN-OM-01
SHEET NO. 143 OF 157



SECTION A–A
SCALE 1:150



SECTION B–B
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. O&M ROAD, PLAN	THN–OM–01
2. O&M ROAD, SECTION A–A AND B–B	THN–OM–03
3. O&M ROAD, TYPICAL SECTIONS	THN–OM–04
4. REALIGNMENT OF CLOSURE DAM, DOUBLE W–BEAM GUARDRAIL DETAILS	THN–RD–05

0 2 4 6 8 10
SCALE 1:150 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
O&M ROAD
SECTION A–A AND B–B

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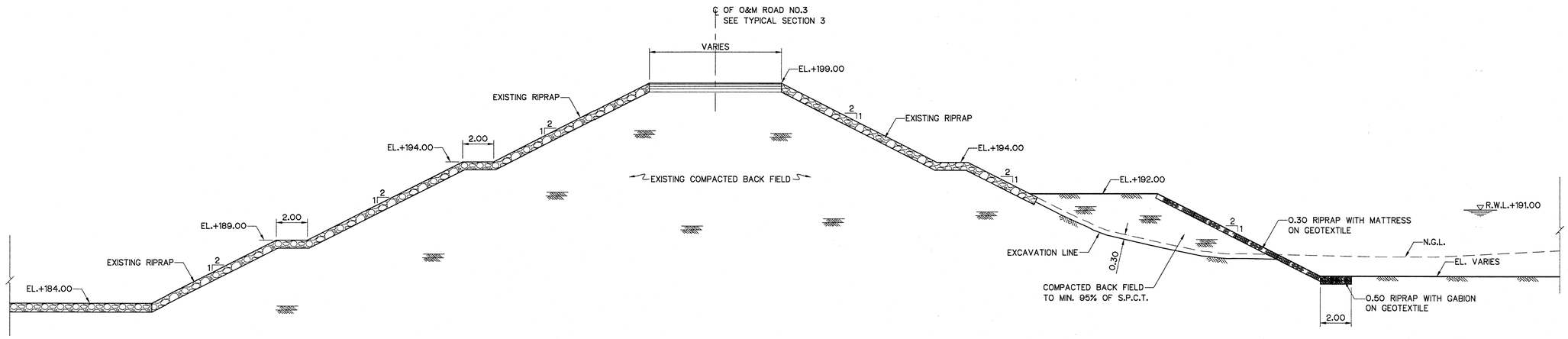
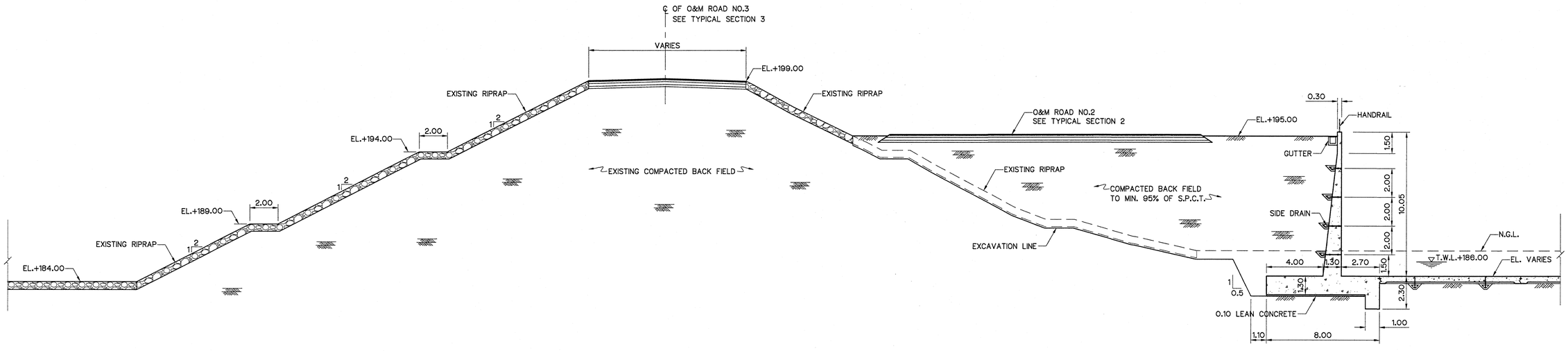
DRAWN			RECOMMENDED
CHECKED	สิ.6651		APPROVED
PROJECT MANAGER	6/9/2024 DATE		DRAWING NO. THN–OM–02
			SHEET NO. 144 OF 157



SECTION C–C
SCALE 1:150



SECTION D–D
SCALE 1:150

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–04

REFERENCE DRAWINGS :

1. O&M ROAD, PLAN	THN–OM–01
2. O&M ROAD, SECTION A–A AND B–B	THN–OM–02
3. O&M ROAD, TYPICAL SECTIONS	THN–OM–04

SCALE 1:150 — 0 2 4 6 8 10 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
O&M ROAD
SECTION C–C AND D–D

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

DESIGNED วิศ.6650 วิศ.88523
DRAWN
CHECKED วิศ.6651
PROJECT MANAGER 6/9/2024 DATE

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MINISTRY OF ENERGY
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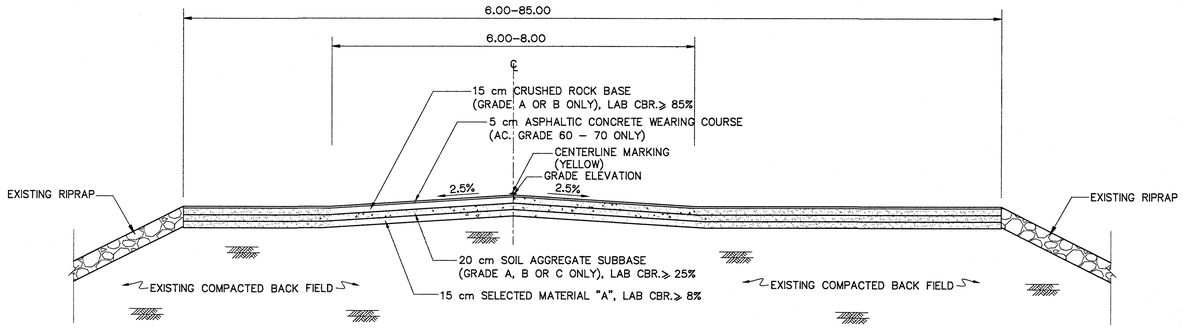
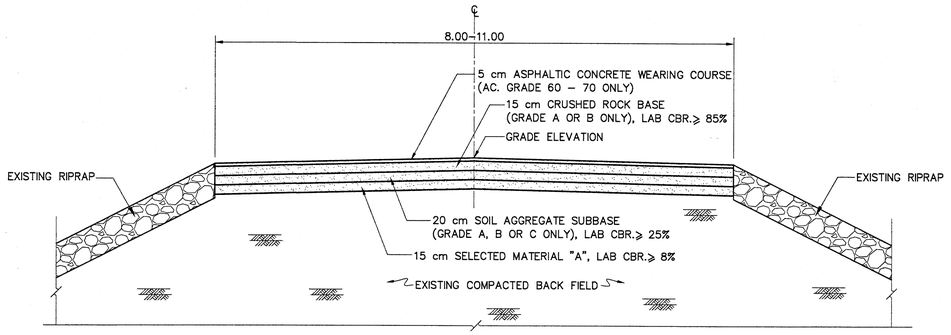
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. THN–OM–03
SHEET NO. 145 OF 157



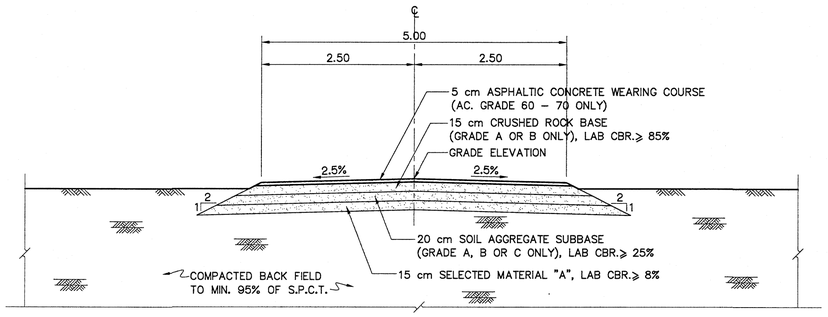
TYPICAL SECTION 1 OF O&M ROAD

NOT TO SCALE



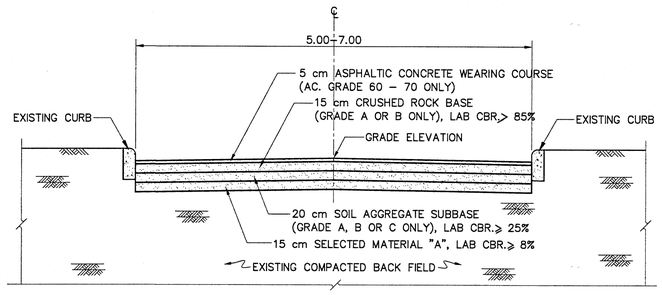
TYPICAL SECTION 3 OF O&M ROAD

NOT TO SCALE



TYPICAL SECTION 2 OF O&M ROAD

NOT TO SCALE



TYPICAL SECTION 4 OF O&M ROAD

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. THN-GN-04

NO.	DATE	REVISIONS	CHECKED	APPROVED
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2				
1				
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

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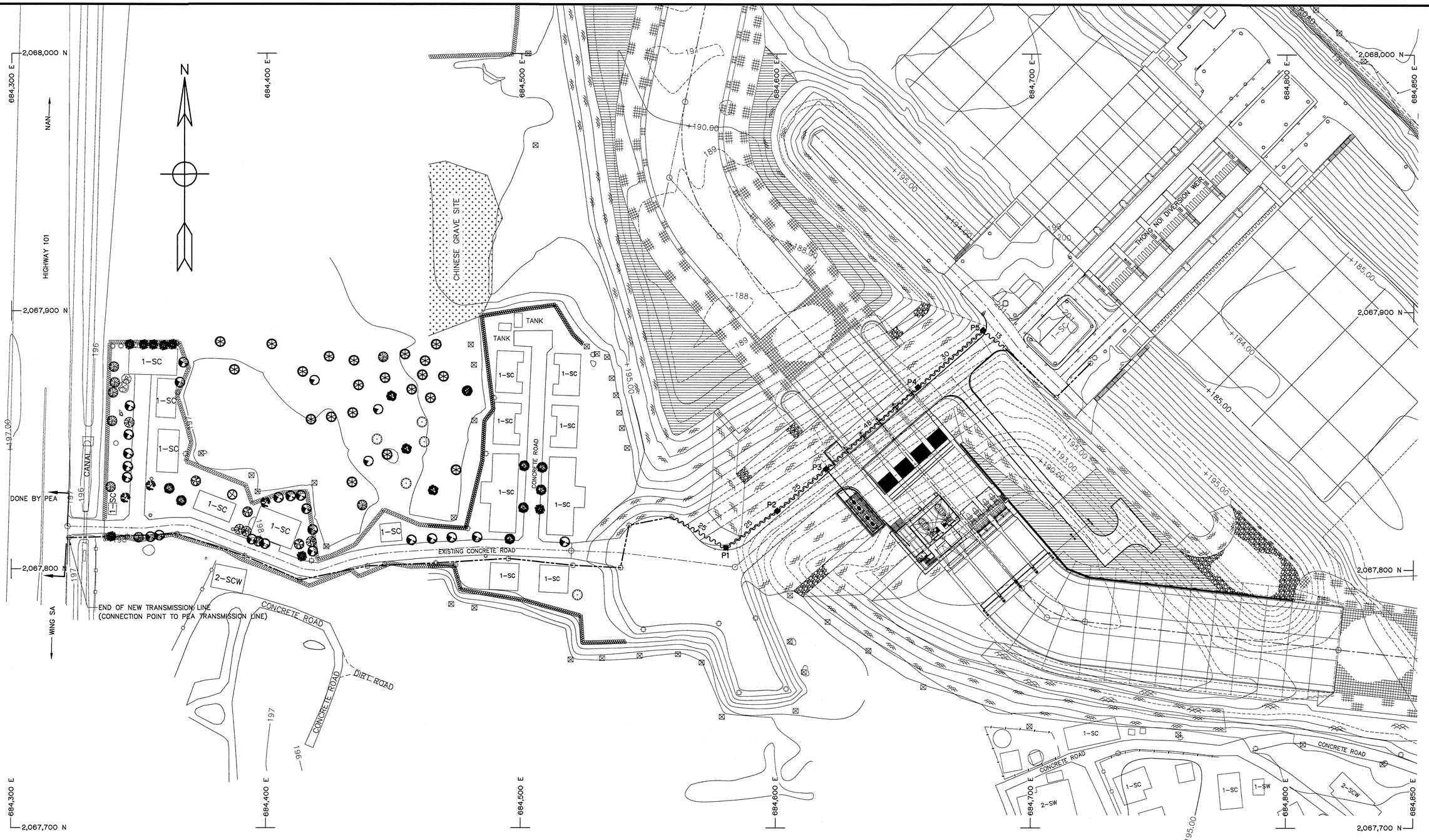
CIVIL WORKS AND ELECTRICAL SYSTEM

O&M ROAD

TYPICAL SECTIONS

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วิ.6650 ว.88523	SUBMITTED
DRAWN	RECOMMENDED
CHECKED วิ.6651	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-OM-04 / SHEET NO. 146 OF 157



ALIGNMENT
SCALE 1:750

NOTES:
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN-GN-04
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

LEGENDS :
- 22 kV. SPACE AERIAL CABLE
- EXISTING TRANSMISSION LINE 3 PHASE SYSTEM
- MODIFY EXISTING TRANSMISSION LINE TO BE 3 PHASE SYSTEM
- NEW 12 m CONCRETE POLE
- EXISTING 12 m CONCRETE POLE
- REMOVE 12 m CONCRETE POLE

0 5 10 20 30 40 50 60
SCALE 1:750 METERS

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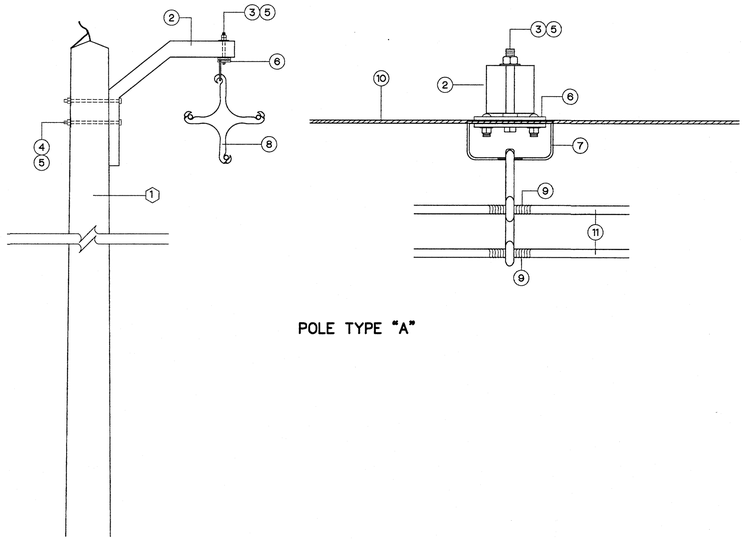
KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

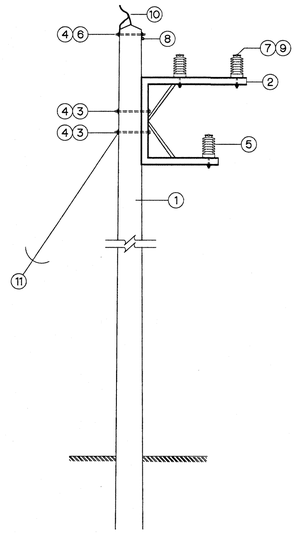
THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

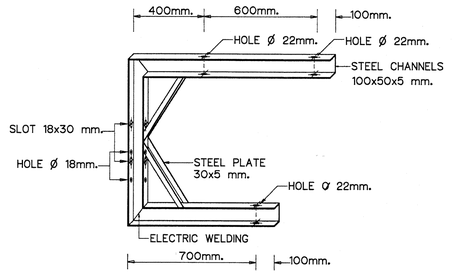
CIVIL WORKS AND ELECTRICAL SYSTEM
TRANSMISSION LINE
ALIGNMENT

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED วพก.1029	REVIEWED
DRAWN	SUBMITTED
CHECKED วพก.1029	RECOMMENDED
PROJECT MANAGER 6/9/2024 DATE	APPROVED
	DRAWING NO. THN-TS-01
	SHEET NO. 147 OF 157

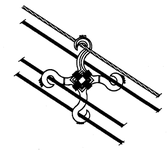


POLE TYPE "A"





POLE TYPE "B"



CABLE SPACER INSTALLATION CERAMIC

BILL OF MATERIAL POLE TYPE "A"	
ITEM	DESCRIPTION
1	POLE CONCRETE 12 M.LONG
2	BRACKET FOR AERIAL CABLE FOR STRAIGHT TYPE
3	BOLT,MACHINE, M16x170 mm.
4	BOLT,MACHINE, M16x250 mm.
5	WASHER,SQUARE,FLAT, 52x52x4.5 mm. HOLE Dia.18 mm. TIS 258
6	CLAMP, GUY, TRIPLE BOLT
7	LINK, CABLE SPACER (MADE OF GALV. STEEL Dia. 9 mm.)
8	CABLE SPEACER, 22 KV.-CERAMIC
9	TIE WIRE 4.0 sq.mm.
10	WIRE, STEEL STRANDED, 50/7 DIN 48201
11	AERIAL CABLE 50 sq.mm.25 KV. (SAC)

BILL OF MATERIAL POLE TYPE "B"	
ITEM	DESCRIPTION
1	POLE, CONCRETE 12 M.LONG
2	BRACKET AERIAL CABLE FOR CORNER TYPE
3	BOLT,MACHINE, M16x350 mm.
4	WASHER,SQUARE,FLAT, 52x52x4.5 mm. HOLE Dia. 18 mm. TIS 258
5	INSULATOR,LINE POST TYPE, ANSI C 29.7 CLASS 57-2L
6	GROUND WIRE SUPPORT AND CLAMP FOR CONCRETE POLE
7	AERIAL CABLE 50 sq.mm. 25kV. (SAC)
8	GROUND WIRE SUPPORT AND STEEL STRANDED 50/7 DIN 48201
9	TIE WIRE 4.0 sq.mm.
10	CLAMP, SINGLE U-BOLT M8
11	GUY (STEEL STARNDARD WIRE 50 Sq.mm.)

NOTE :

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

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TRANSMISSION LINE

POLE TYPE "A" AND "B"

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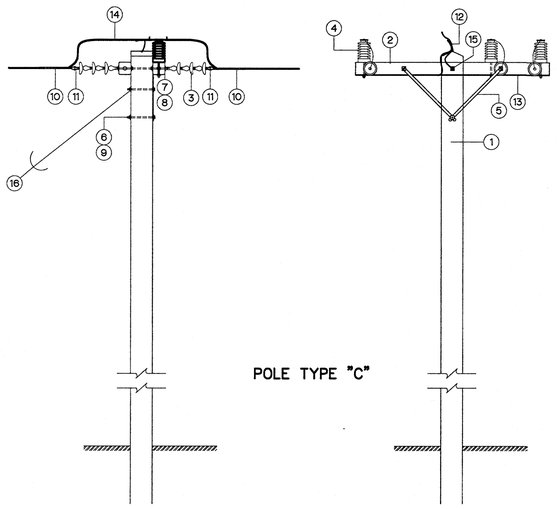
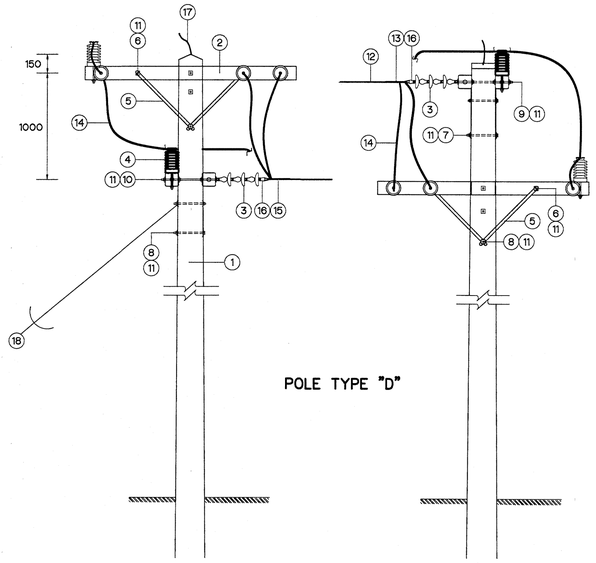
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-TS-02 / SHEET NO. 148 OF 157



POLE TYPE "C"



POLE TYPE "D"

BILL OF MATERIAL POLE TYPE "C"	
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	WASHE SQUARE FLAT 52x52x4.5 mm. HOLE Dia. 18 mm.TIS 258
10	PREFORMED DEAD-END FOR AERIAL CABLE 50 sq.mm. (SAC)
11	CLEVIS THIMBLE FOR PREFORMED DEAD-END
12	CLAMP SINGLE U-BOLT M 8
13	WIRE STEEL SOLID Dia. 4 MM.
14	AERIAL CABLE 50 sq.mm. 25kV.
15	GROUND WIRE STEEL STRANDED 50/7 DIN 48201
16	GUY (STEEL STARNDARD WIRE 50 Sq.mm.)

BILL OF MATERIAL POLE TYPE "D"	
ITEM	DESCRIPTION
1	POLE CONCRETE 12 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 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	AERIAL CABLE 50 sq.mm. 25 kV.
13	PERFOR DEAD-END FOR AERIAL CABLE 50 sq.mm.
14	AERIAL CABLE 50 sq.mm. 25 kV.
15	PERFOR DEAD-END FOR AERIAL CABLE 50 sq.mm. (SAC)
16	CLEVIS THIMBLE FOR PERFORMED DEAD-END
17	CLAMP SINGLE U-BOLT M 8
18	GUY (STEEL STARNDARD WIRE 50 Sq.mm.)

NOTE :

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

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TRANSMISSION LINE

POLE TYPE "C" AND "D"

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
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DESIGNED วฟก.1029	SUBMITTED
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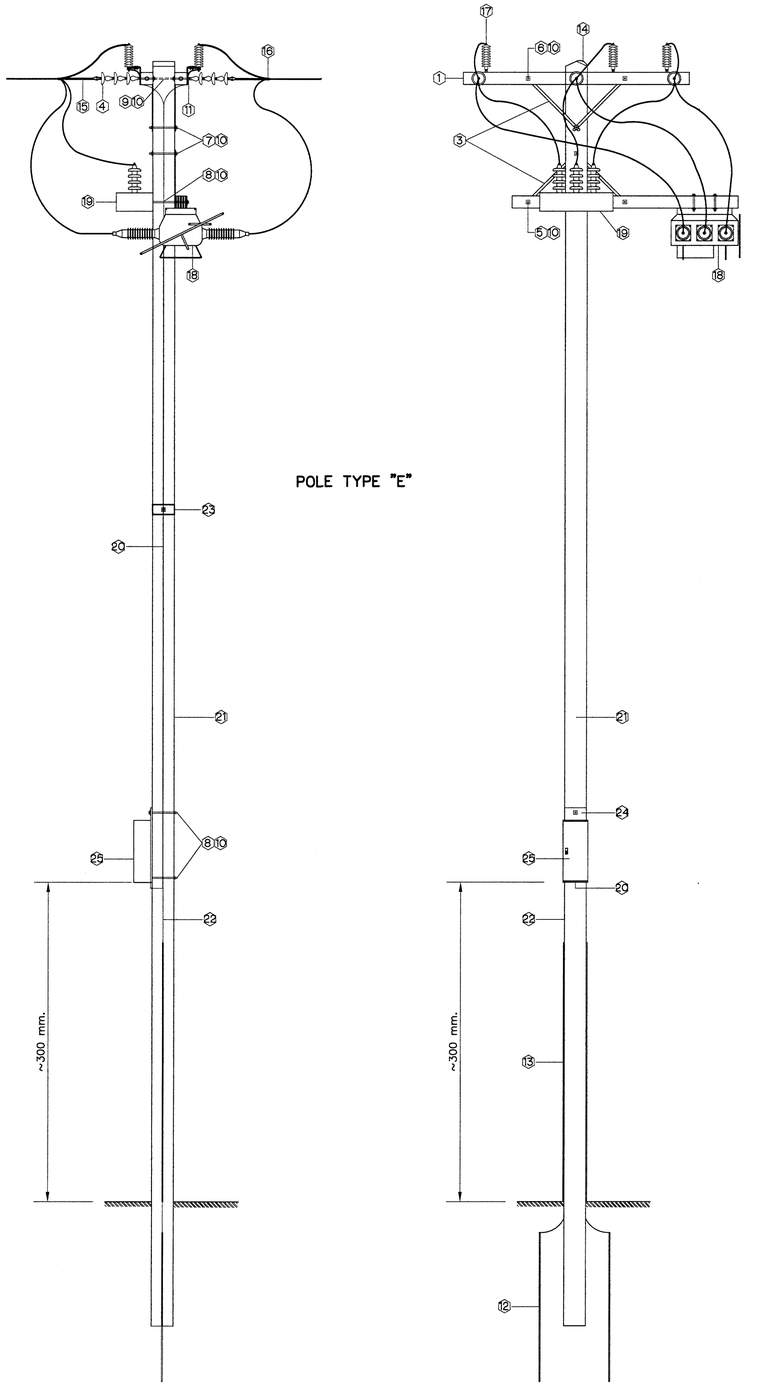
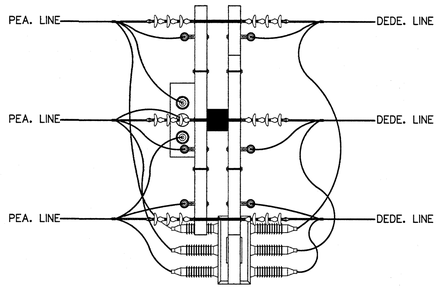
CHECKED วฟก.1029	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-TS-03 / SHEET NO. 149 OF 157



SIDE VIEW

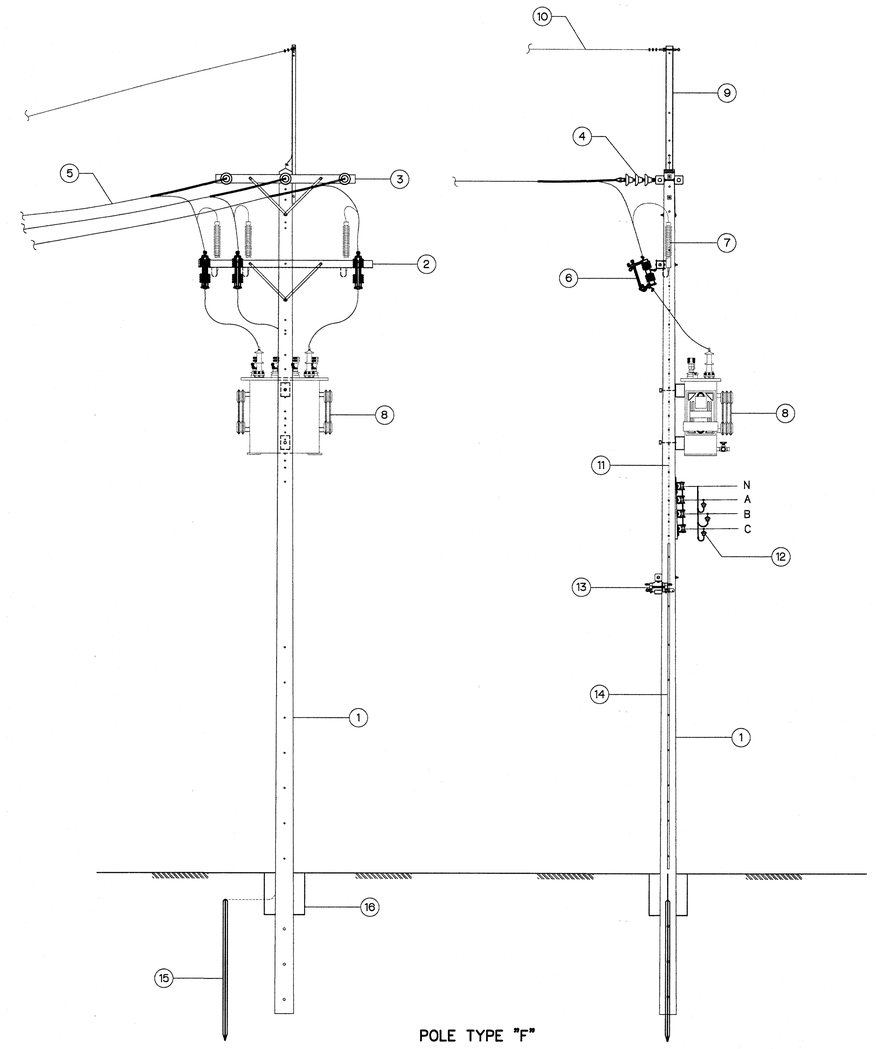
FRONT VIEW

POLE TYPE "E"



TOP VIEW

BILL OF MATERIAL POLE TYPE "E"	
ITEM	DESCRIPTION
1	CROSS ARM, SPUN, PRESTRESSED CONCRETE 120X120x2,000mm.
2	STEEL, SQUARE, 100 x 3.2 mm., 2,000mm. LONG
3	BRACE,FLAT FOR CROSS ARM 30X6X760mm.
4	INSULATOR,SUSPENSION (TYPE D TIS.354) TYPE (CLASS 52-3)
5	BOLT,MACHINE M.16X130mm. COMPLETE WITH SQUARE NUT
6	BOLT,MACHINE M.16X170mm. COMPLETE WITH SQUARE NUT
7	BOLT,MACHINE M.16X250mm. COMPLETE WITH SQUARE NUT
8	BOLT,MACHINE M.16X300mm. COMPLETE WITH SQUARE NUT
9	BOLT,DOUBLE ARMING,ROUND EYE M.16X450mm. COMPLETE WITH SQUARE NUT
10	WASHER,SQUARE,FLAT 50X50X5mm.HOLE Dia.18mm.
11	NUT,EYE M.16 DIN 582
12	ROD,GROUND, 60X60X5mm. LONG
13	CONDUIT,PVC,RIGID,DIA 20X2,500mm. TIS.216
14	CLAMP,SINGLE U-BOLT,M.8 (WIRE ROPE CLIP)
15	PREFORMED DEAD-END, FOR AERIAL CABLE 25 KV. 70 sq.mm. (SAC)
16	CONNECTOR,PARALLEL GROOVE,TRIPLE BOLT,AL, 50-185 sq.mm.
17	LIGHTING ARRESTER 21KV. 10 KA.
18	LOAD BREAK SWITCH, SF6, 630A, 24KV.
19	TRANSFORMER,VOLTAGE 3PHASE, OUTDOOR,RATIO 22,000/100 V., 10 VA.
20	CONTROL CABLE
21	POLE, CONCRETE, 12 m. LONG
22	WIRE, STEEL STRANDED 50/7 sq.mm. TIS.404
23	PLATE,WOOD, SIZE 2X20X30 cm.
24	PLATE,WOOD, SIZE 2X20X60 cm.
25	CONTROL UNIT, AUTOMATIC REMOTE CONTORLLED, FOR SF6



POLE TYPE "F"

BILL OF MATERIAL POLE TYPE "F"	
ITEM	DESCRIPTION
1	POLE CONCRETE 12 M.
2	SPUN CONCRETE 100x100x2,500 mm.
3	SPUN CONCRETE 120x120x2,000 mm.
4	INSULATOR SUSPENSION TYPE 22 KV.
5	AERIAL CABLE 50 sq.mm
6	DROP OUT FUSE CUT-OUT 22 KV. 100 A.
7	LIGHTNING ARRESTER 21 KV. 5 KA.
8	TRANSFORMER 3Ø4W 22000-400/230 V. 100 KVA
9	OVERHEAD GROUND WIRE DEADEND CHANNEL STEEL 100x50x5 mm.Long 2.25m.
10	WIRE STEEL STRANDED 25 sq.mm
11	WIRE STEEL STRANDED 50 sq.mm (SAC)
12	LIGHTNING ARRESTER 500V. 5 KA.
13	L.T SWITCH.400A.500V.
14	PIPE S'LON FOR WIRE GROUNDING
15	ROD GROUND
16	CONCRETE POLE 1:2:4

NOTE :

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

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2				
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TRANSMISSION LINE

POLE TYPE "E" AND "F"

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

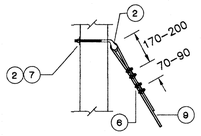
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วพก.1029	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วพก.1029	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

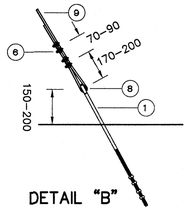
DRAWING NO. THN-TS-04

SHEET NO. 150 OF 157

METHOD OF SINGLE ANCHOR GUY



DETAIL "A"



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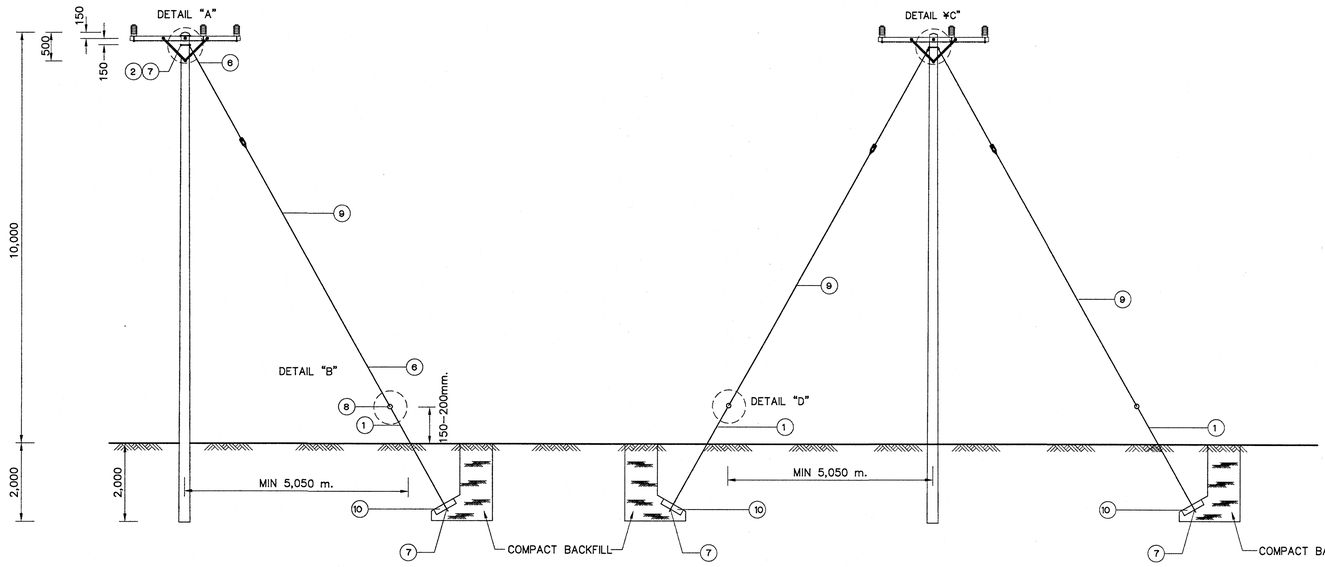
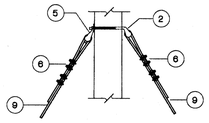
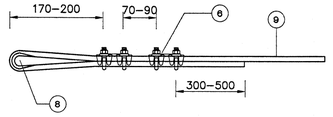


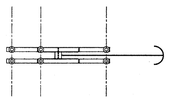
METHOD OF DOUBLE ANCHOR GUY



DETAIL "C"



DETAIL "D"

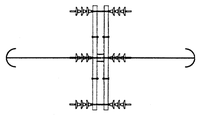


G1

SIDE GUY 5° – 30°

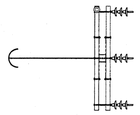
G2

SIDE GUY 30° – 60°



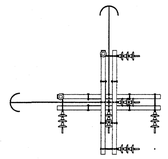
G3

LINE GUY



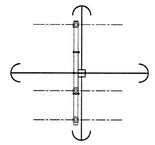
G4

DEAD END GUY



G5

BUCK ARM, 60° – 90°
DEAD END GUY



G6

FIXED OR STORM 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°X% M. 16 x 250 mm. COMPLETE WITH SQUARE NUT	1	1	1	1	2	2
3	BOLT, SINGLE STRANDED EYE 30°X% 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°X%	–	–	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 Ø X% 18 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.

NO.	DATE	REVISIONS	CHECKED	APPROVED
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2				
1				
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MINISTRY OF ENERGY

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TRANSMISSION LINE

TYPE OF ANCHOR GUY

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
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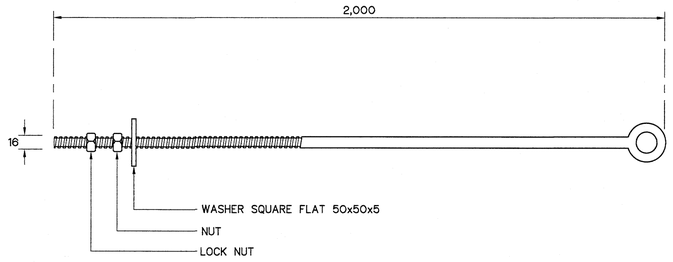
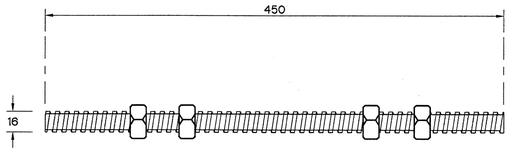
DRAWN	RECOMMENDED
CHECKED ๒๒ก.1029	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-TS-05
	SHEET NO. 151 OF 157



DETAIL OF ANCHOR BOLT FOR GUY WIRE

NOT TO SCALE

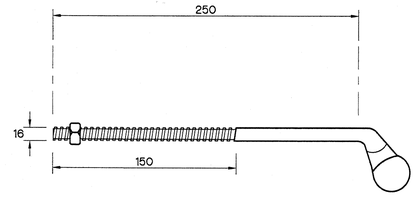


BOLT, DOUBLE ARMING

NOT TO SCALE

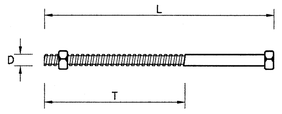
STRAND EYE SINGLE ANGLE 30°

NOT TO SCALE



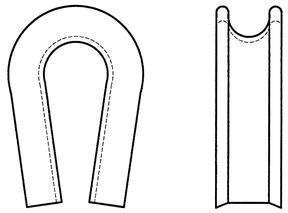
BOLT, SINGLE STRANDED EYE 45°

NOT TO SCALE



NOT TO SCALE

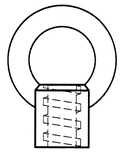
BOLT, MACHINE (D x L)	
1	M. 16 x 130 mm. (T = 35 mm.)
2	M. 16 x 170 mm. (T = 50 mm.)
3	M. 16 x 200 mm. (T = 50 mm.)
4	M. 16 x 250 mm. (T = 75 mm.)
5	M. 16 x 300 mm. (T = 75 mm.)
6	M. 16 x 400 mm. (T = 100 mm.)



GUY THIMBLE

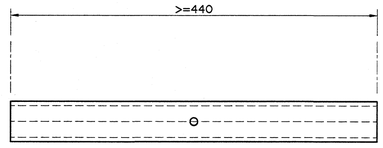
FOR STEEL STRAND GUY WIRE 35Sq.mm.

NOT TO SCALE



NUT EYE

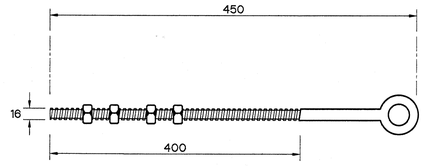
NOT TO SCALE



CONNECTOR, SPLICE, COMPRESSION TYPE

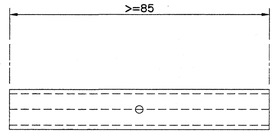
TENSION LOADED FOR PIC(ACSR) 120/8 Sq.mm.

NOT TO SCALE



BOLT, DOUBLE ARMING, ROUND EYE

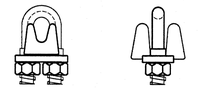
NOT TO SCALE



CONNECTOR, SPLICE, COMPRESSION TYPE

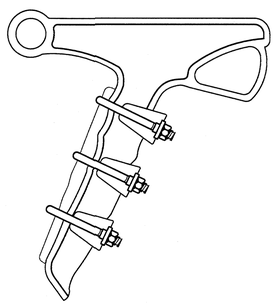
TENSIONLESS LOADED FOR PIC(ACSR) 120/8 Sq.mm.

NOT TO SCALE



CLAMP, SINGLE U-BOLT M.8

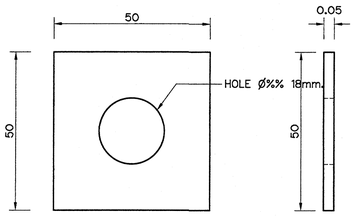
NOT TO SCALE



CLAMP, STRAIN, WITH CLAMPING KEEPER

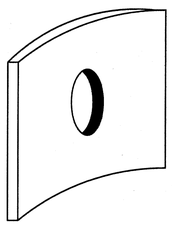
FOR PIC (ACSR) 120/8 Sq.mm.

NOT TO SCALE



WASHER SQUARE FLAT

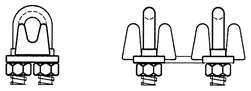
NOT TO SCALE



WASHER, CURVE, SQUARE 60x60x5mm.

HOLE Ø%% 22 mm.

NOT TO SCALE



CLAMP, SINGLE U-BOLT M.16

NOT TO SCALE

NOTE :

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

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

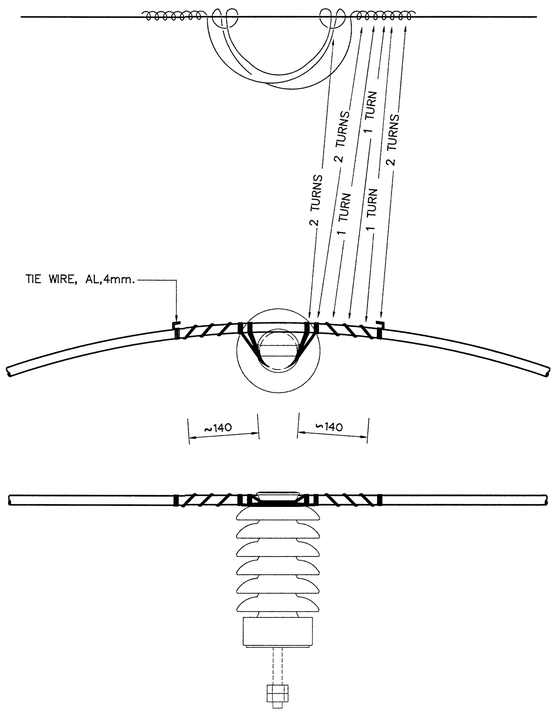
CIVIL WORKS AND ELECTRICAL SYSTEM

TRANSMISSION LINE

POLE ASSEMBLY ACCESSORIES, ANCHOR BOLT FOR GUY

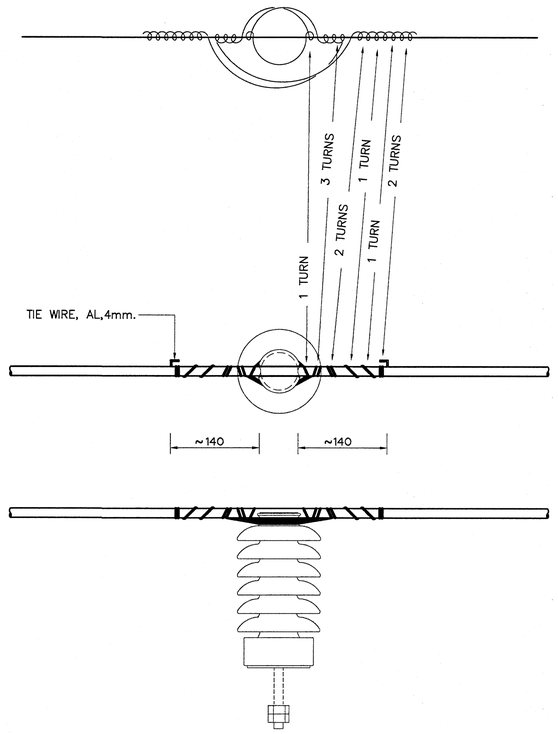
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED ... วพก.1029	SUBMITTED
DRAWN	RECOMMENDED
CHECKED ... วพก.1029	APPROVED
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN-TS-06 / SHEET NO. 152 OF 157

PARTIALLY INSULATED CONDUCTOR TIE,
ON H.T. PIN TYPE INSULATOR
(FOR SIDE GROOVE TIE)

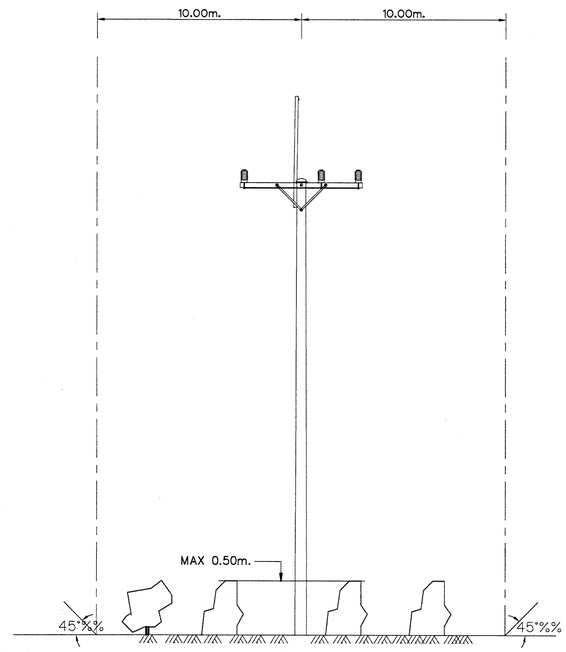


SIDE GROOVE TIE

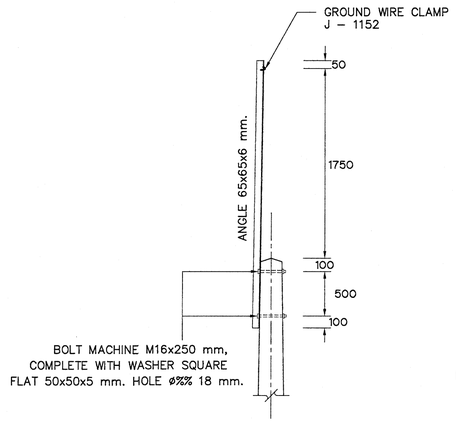
PARTIALLY INSULATED CONDUCTOR TIE,
ON H.T. PIN TYPE INSULATOR
(FOR TOP GROOVE TIE)



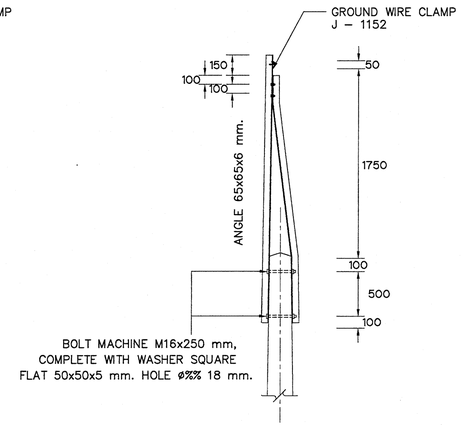
TOP GROOVE TIE



TREE TRIMMING
NOT TO SCALE

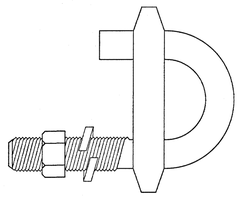


STRAIGHT BAYONET



CORNER BAYONET

OVER HEAD GROUND WIRE BAYONET ASSEMBLY
NOT TO SCALE



GROUND WIRE CLAMP J–1152
NOT TO SCALE

NOTE :

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

KINGDOM OF THAILAND
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
TRANSMISSION LINE
OVERHEAD GROUND WIRE BAYONET ASSEMBLY

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

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MINISTRY OF ENERGY

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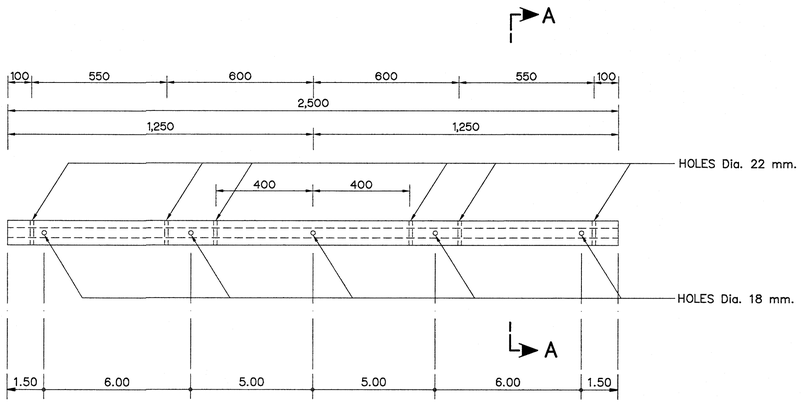
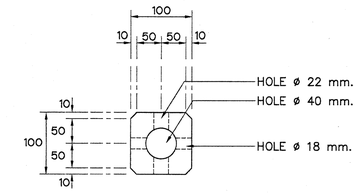
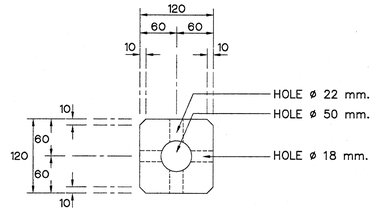
DRAWN	
CHECKED	วฬก.1029
PROJECT MANAGER	6/9/2024 DATE
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	THN–TS–07
SHEET NO.	153 OF 157



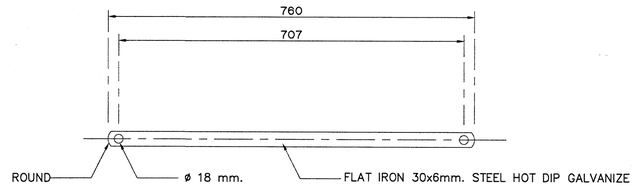
PRESTRESSED CROSS ARM 100x100x2,500mm.



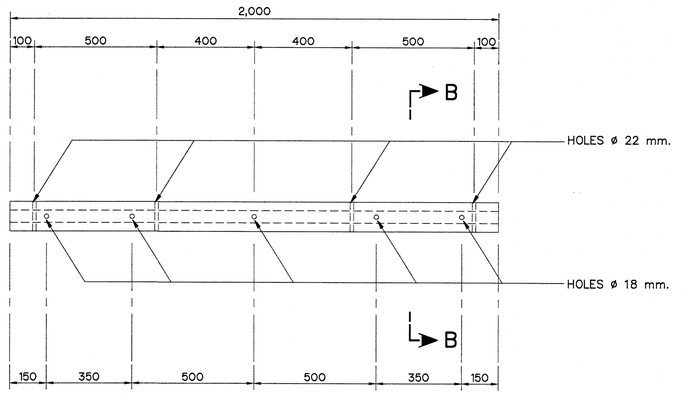
SECTION A–A



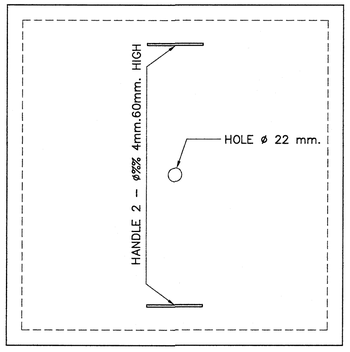
SECTION B–B

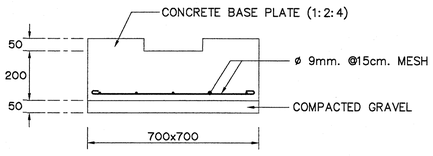


BRECE FLAT FOR CROSS ARM

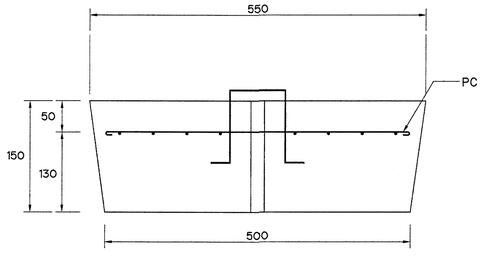


PRESTRESSED CROSS ARM 120X120x2,000mm.

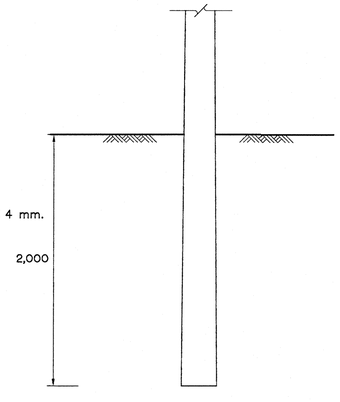




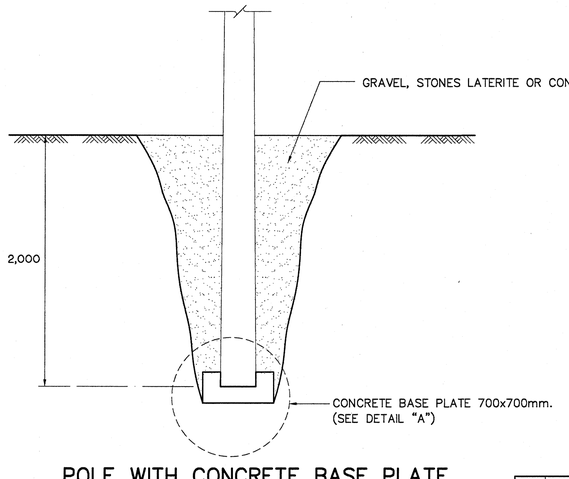
DETAIL "A"



REINFORCED CONCRETE ANCHOR PLATE
550x550x180mm.



FOR NORMAL SOIL CONDITION



POLE WITH CONCRETE BASE PLATE

NOTES :

CONCRETE BASE PLATE WILL BE USE FOR
1. POLES WITH ANCHOR GUY TYPES G5 AND G6
2. POLES CONSTRUCTED ON SOFT SOIL WITH PRESSURE NOT MIN 1 kg/Sq.mm.
3. CONTRACTOR SHALL INVESTIGATE THE SOIL CONDITION FOR EVERY POLES AND VERIFY TO USE CONCRETE BASE PLATE OR NOT. THE INVESTIGATION RESULT SHALL BE SUBMITTED TO FIELD ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
TRANSMISSION LINE
BURYING DEPTH AND FOUNDATION

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

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DRAWN
CHECKED ๒พ.1029
6/9/2024
PROJECT MANAGER DATE

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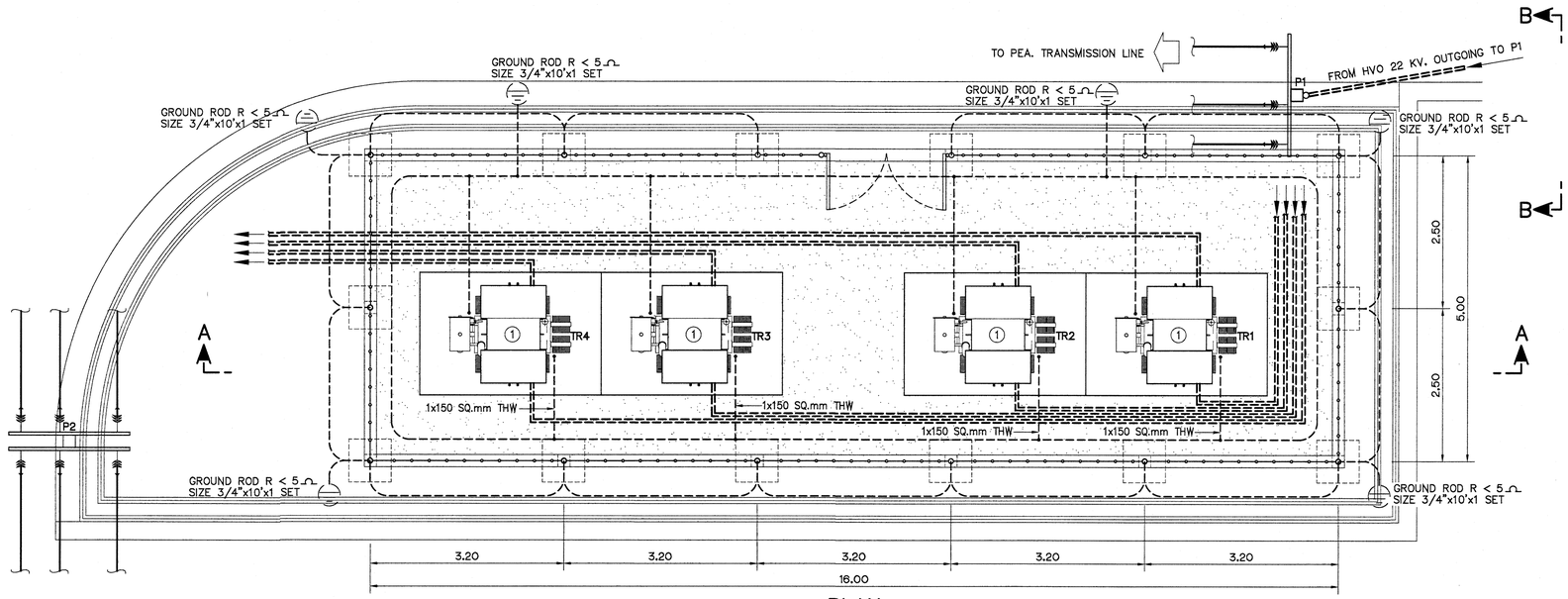
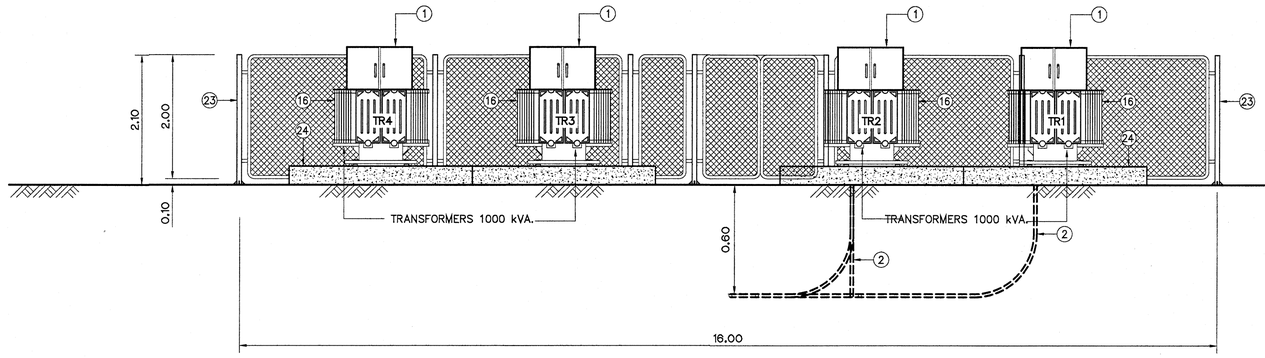
MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

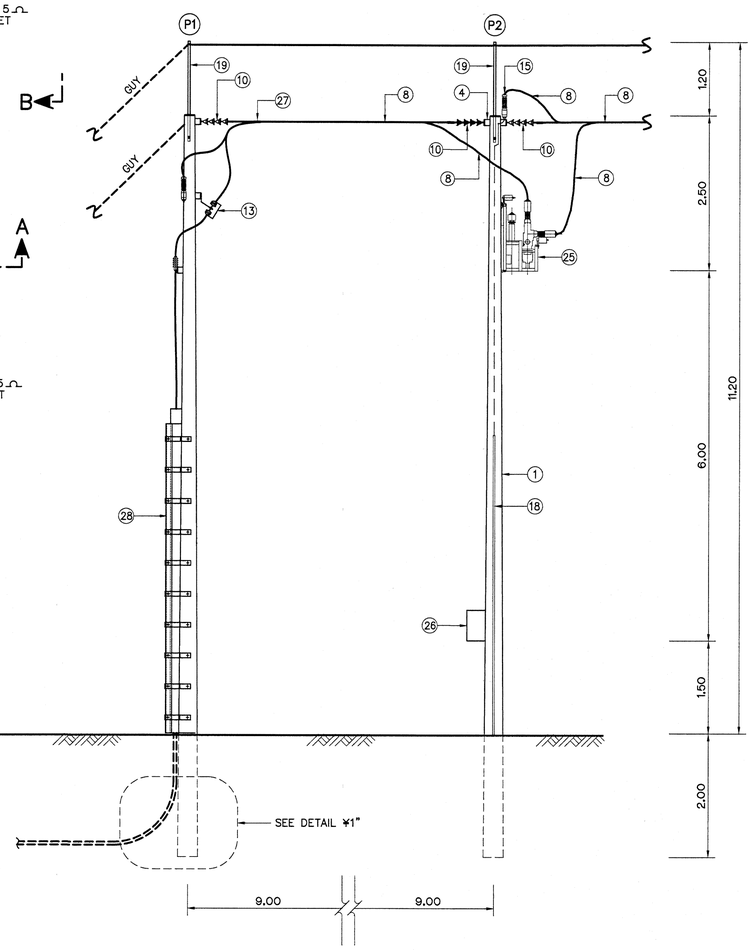
DRAWING NO. THN–TS–08
SHEET NO. 154 OF 157



PLAN
SCALE 1:50



SECTION A–A
NOT TO SCALE



SECTION B–B
NOT TO SCALE

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	TRANSFORMER COVER (WP.)	14	FUSE LINK TYPE K 27 kV.
2	HDPE PN6 CLASS 1 ø5"	15	LIGHTNING ARRESTER, 21 kV, 10 kA
3	–	16	TRANSFORMER SIZE 1,000 kVA
4	CROSSARM, CONCRETE, H.T 120x120x2,000 mm. LONGS	17	CLEVIS, THIMBLE DEADEND
5	–	18	PIPE, S'LON ø 20x4,000 mm COMPLETE WITH FIXING ACCESSORIES
6	–	19	ANGLE STEEL SIZE 100x50x5 mm. LONGS 2.25 m.
7	–	20	GROUND ROD.5/8"x10'
8	ALL ALUMINUIM CONDUCTOR 185 SQ.mm. (AAC)	21	OVERHEAD GROUND WIRE 25 SQmm.
9	LINE POST TYPE INSULATOR ANSI STANDARD 57–2L 22kV. (POWER ARC.)	22	DEADEND CLAMP FOR AAC 185 SQmm.
10	INSULATOR SUSPENSION TYPE, EEI–NEMA CLASS 52–1 COMPLETE WITH PIN	23	FENCE
11	SLEEVE COMPRESSION TYPE FOR AERIAL CABLE 185 SQ.mm	24	TRANSFORMER CONCRETE FOUNDATION
12	WIRE, STEEL STRANDED, 50/7 Sqmm.	25	RECLOSER 24 kV.
13	DROPOUT FUSE CUTOUT 27 kV. 100 A. BASE	26	CONTROL CABINET
		27	CLAMP STIRRUP & CLAMP HOT LINE
		28	HDPE 5" CONDUCT

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–03
3. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL.

REFERENCE DRAWING :

1.	TRANSMISSION LINE, GENERAL PLAN	THN–TS–01
2.	TRANSMISSION LINE, TRANSFORMER AND SWITCHYARD DETAILS (2/3)	THN–TS–10
3.	TRANSMISSION LINE, TRANSFORMER AND SWITCHYARD DETAILS (3/3)	THN–TS–11

SYMBOLS

- ☒ 8.00 m HEIGHT STEEL PIPE
- □ 12.00 m CONCRETE POLE
- o=====o UNDERGROUND CONDUCT (UG.)

NO.	DATE	REVISIONS	CHECKED	APPROVED
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
TRANSMISSION LINE
TRANSFORMER AND SWITCHYARD DETAILS (1/3)

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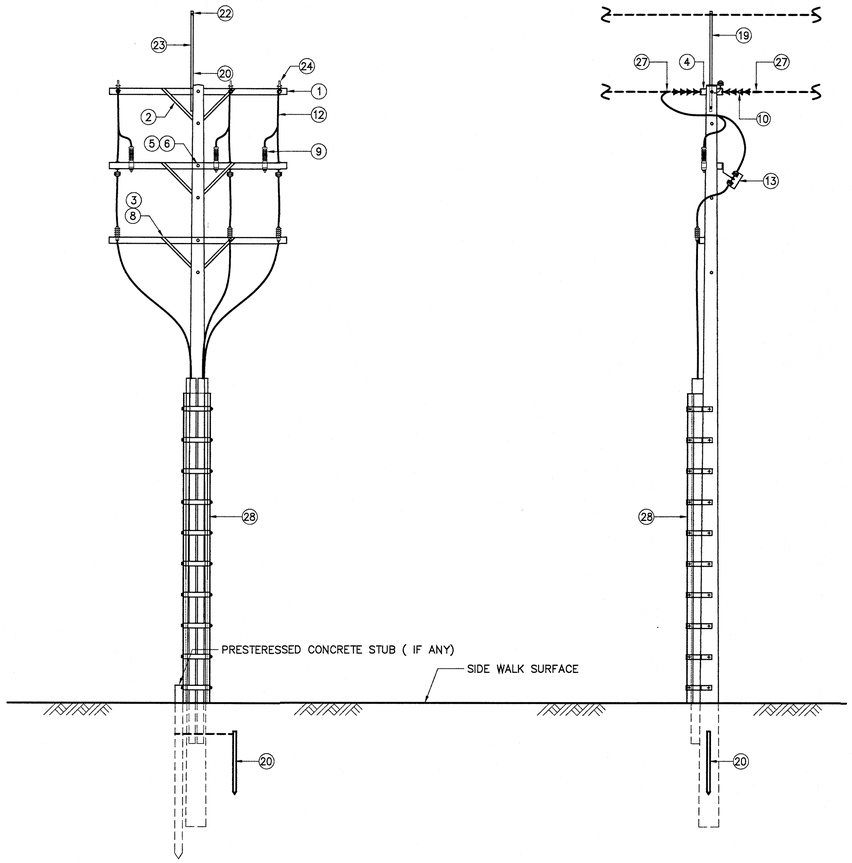
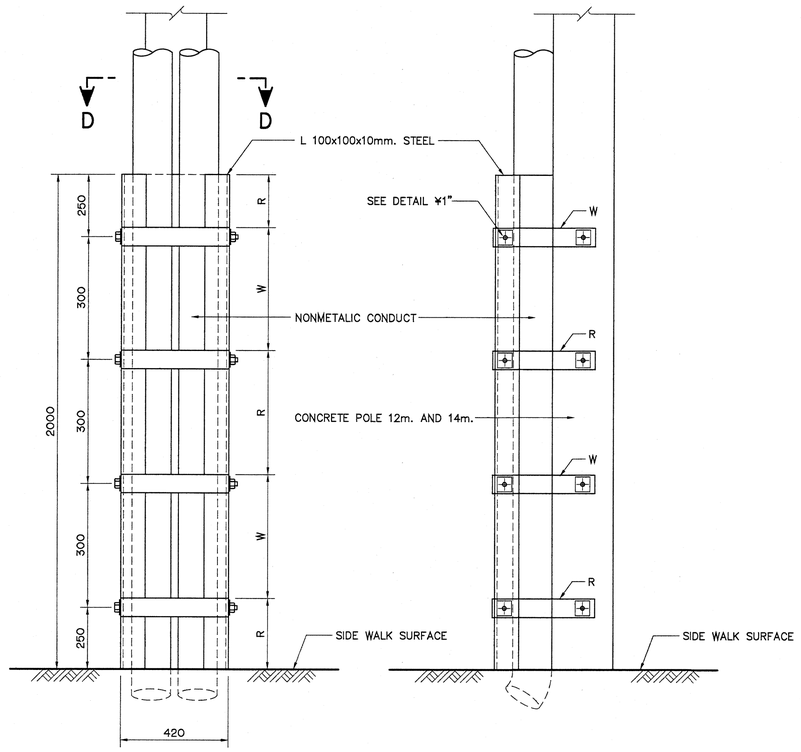
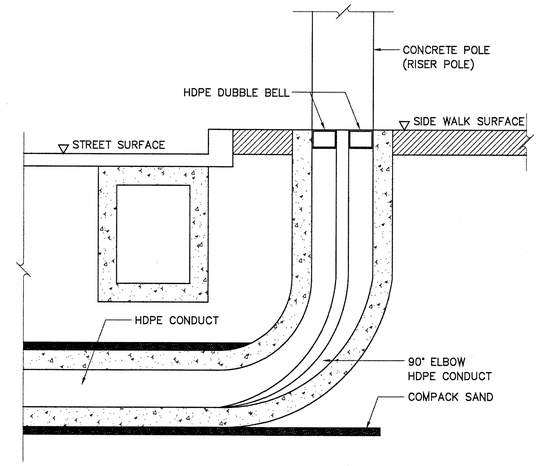
CHECKED	๖พ.1029	APPROVED	
PROJECT MANAGER	6/9/2024 DATE	DRAWING NO. THN–TS–09	SHEET NO. 155 OF 157



STRUCTURE FOR POLE CABLE RISER PEA. (22KV.)

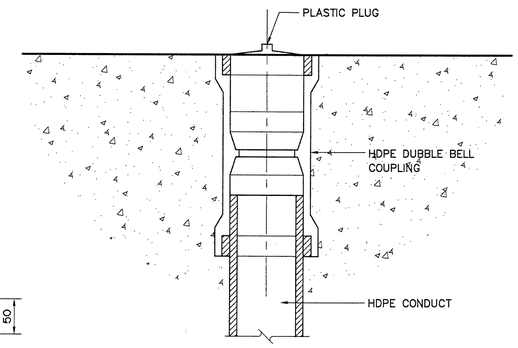
NOT TO SCALE

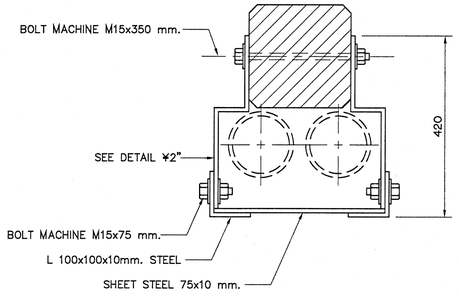




DETAIL ?1"

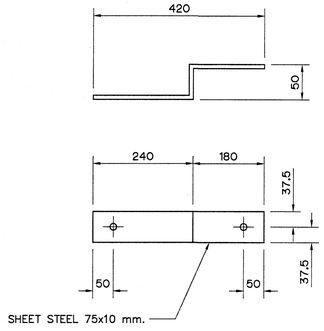
NOT TO SCALE





SECTION D–D

NOT TO SCALE



DETAIL ?2"

NOT TO SCALE

STEEL GUARD CONSTRUCTION PEA ASSEMBLY

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–03
3. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

REFERENCE DRAWING :

1. TRANSMISSION LINE, TRANSFORMER AND SWITCHYARD DETAILS (1/3) THN–TS–09
2. TRANSMISSION LINE, TRANSFORMER AND SWITCHYARD DETAILS (3/3) THN–TS–11

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT

AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM

TRANSMISSION LINE

TRANSFORMER AND SWITCHYARD DETAILS (2/3)

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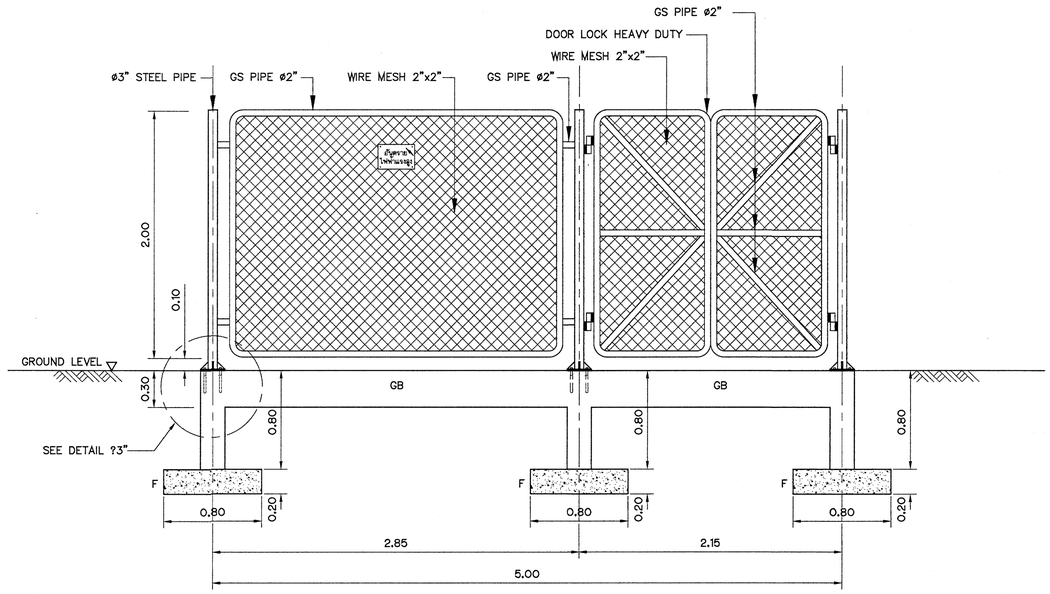
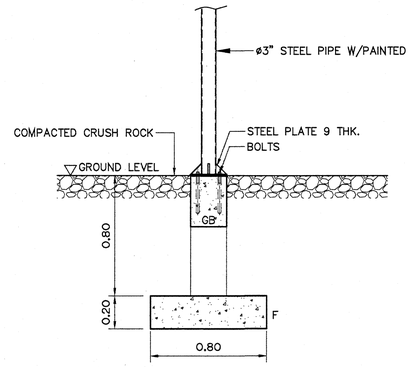
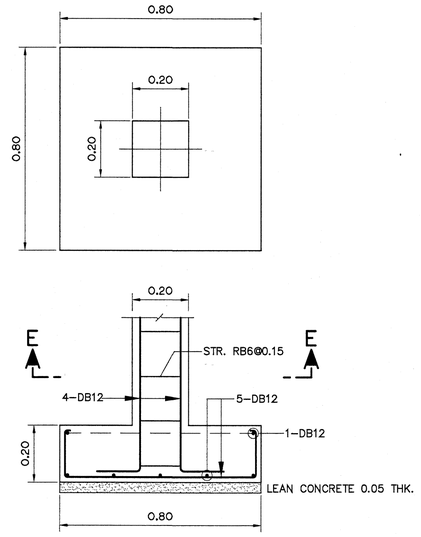
PROJECT MANAGER 6/9/2024 DATE	DRAWING NO. THN–TS–10 / SHEET NO. 156 OF 157



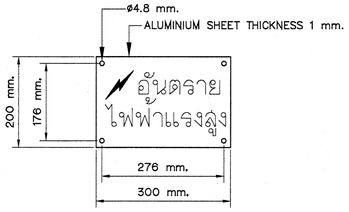
SECTION C–C
NOT TO SCALE



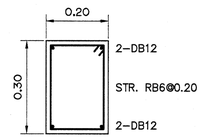
DETAIL OF FOOTING (F)
NOT TO SCALE



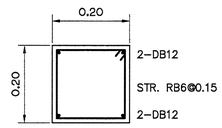
REINFORCEMENT OF FOOTING (F)
NOT TO SCALE



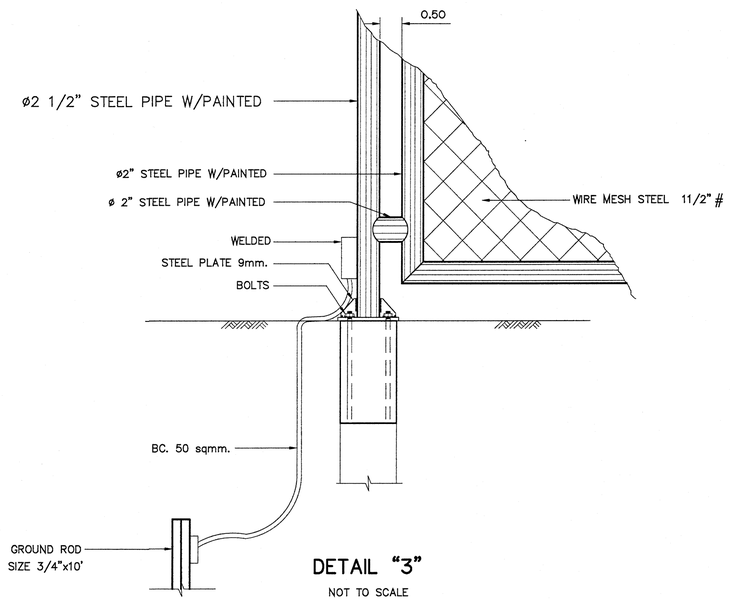
WARNING SIGN
NOT TO SCALE



REINFORCEMENT OF BEAM (GB)
NOT TO SCALE



SECTION E–E
NOT TO SCALE



DETAIL "3"
NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. THN–GN–03
3. THE TRANSFORMER YARD WILL BE ACCORDING TO PEA STANDARD.

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, TRANSFORMER AND SWITCHYARD DETAILS (1/3) THN–TS–09
2. TRANSMISSION LINE, TRANSFORMER AND SWITCHYARD DETAILS (2/3) THN–TS–10

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

THONG NOI DIVERSION WEIR HYDROPOWER PROJECT
AMPHOE MUEANG NAN CHANGWAT NAN

CIVIL WORKS AND ELECTRICAL SYSTEM
TRANSMISSION LINE
TRANSFORMER AND SWITCHYARD DETAILS (3/3)

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	ส.ต.ท.6650	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	ส.ต.ท.6651	RECOMMENDED	
PROJECT MANAGER	6/9/2024 DATE	APPROVED	

DRAWING NO. THN–TS–11
SHEET NO. 157 OF 157