




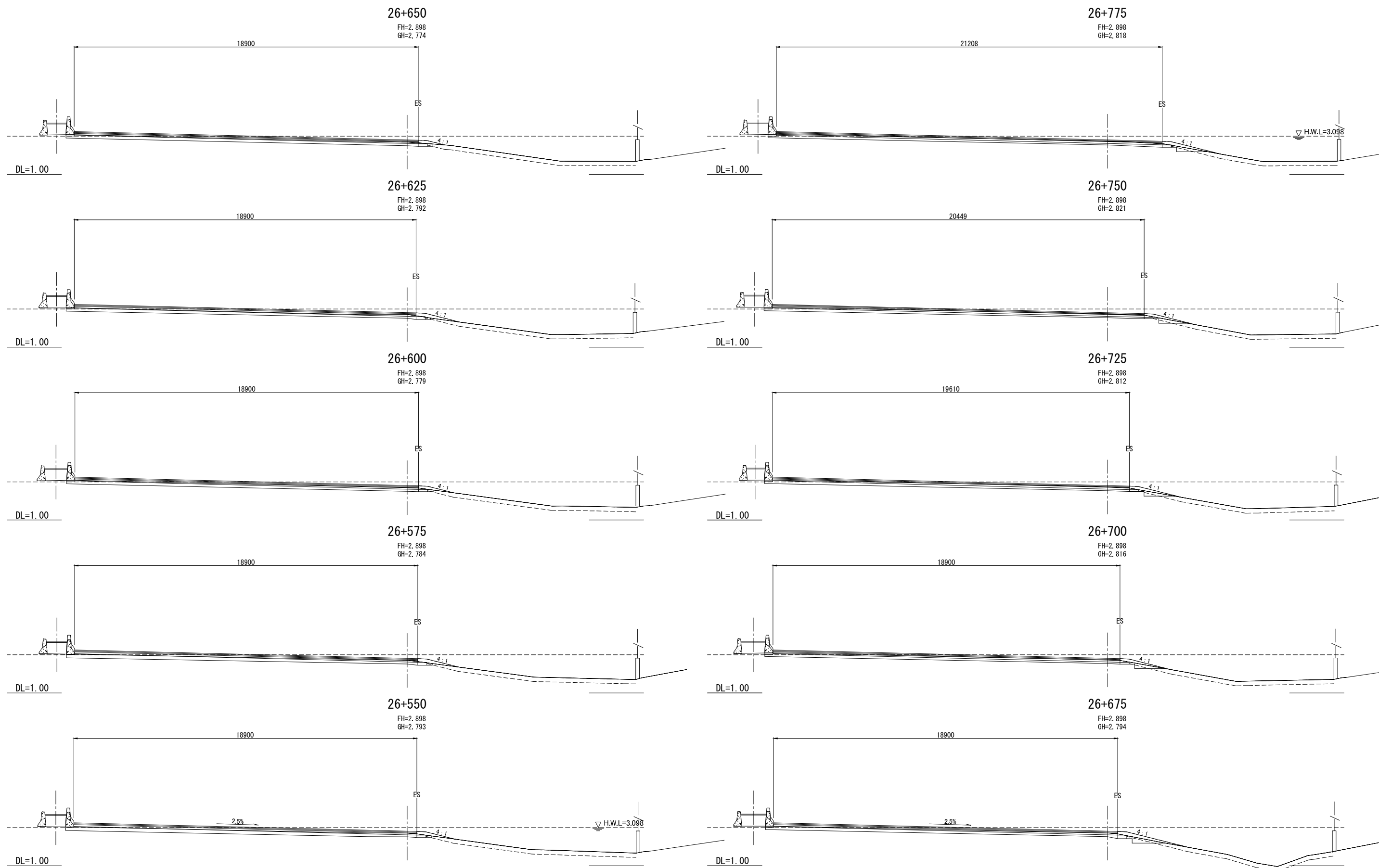
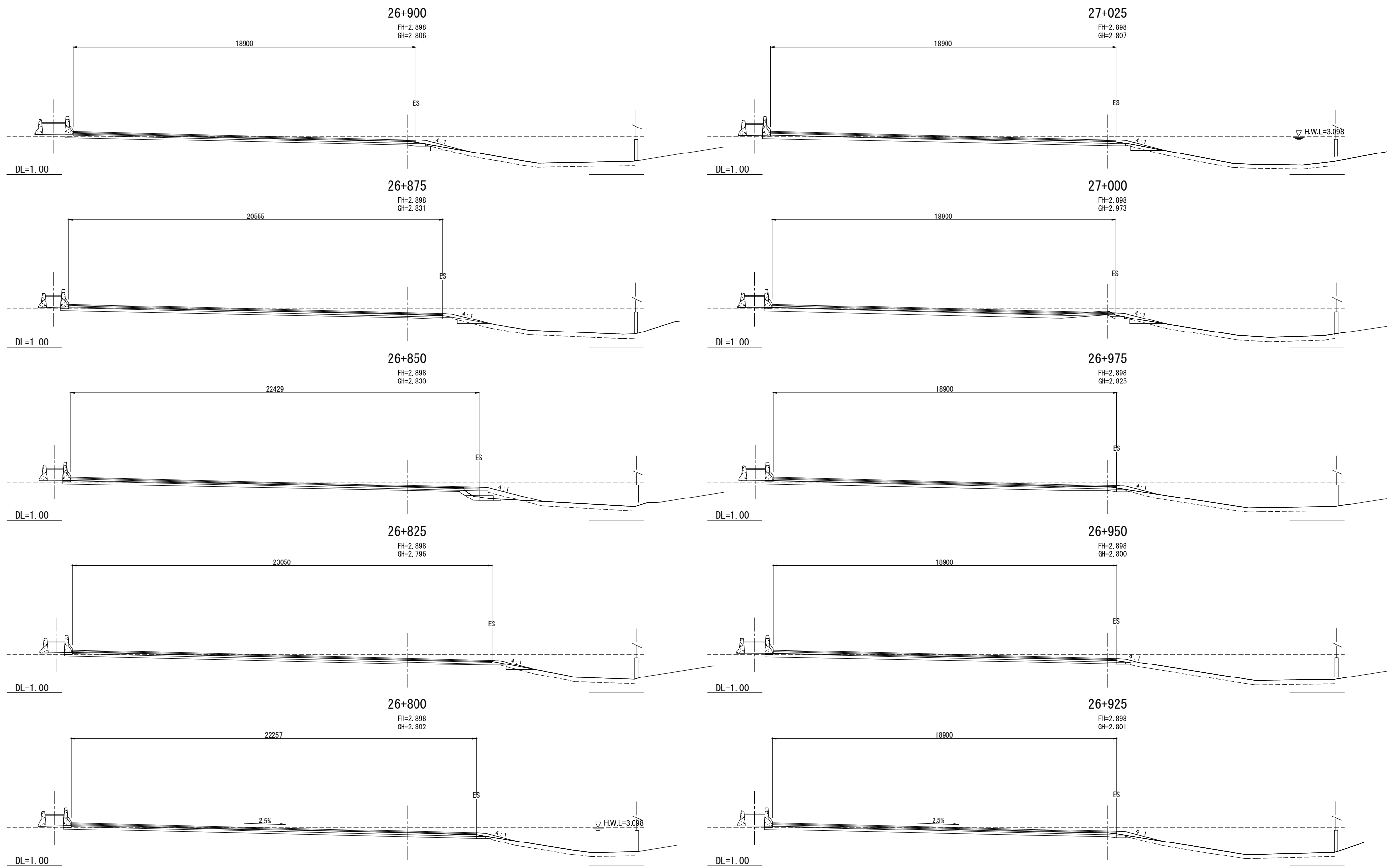


REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	 KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 CROSS SECTIONS (59 / 70)	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	 CTI ENGINEERING INTERNATIONAL CO., LTD.  ORIENTAL CONSULTANTS CO., LTD.  NIPPON KOEI CO., LTD.  CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE : AUGUST 2012	SCALE : SCALE 1:100
		DWG. NO. MW-110	SHEET NO. 115													



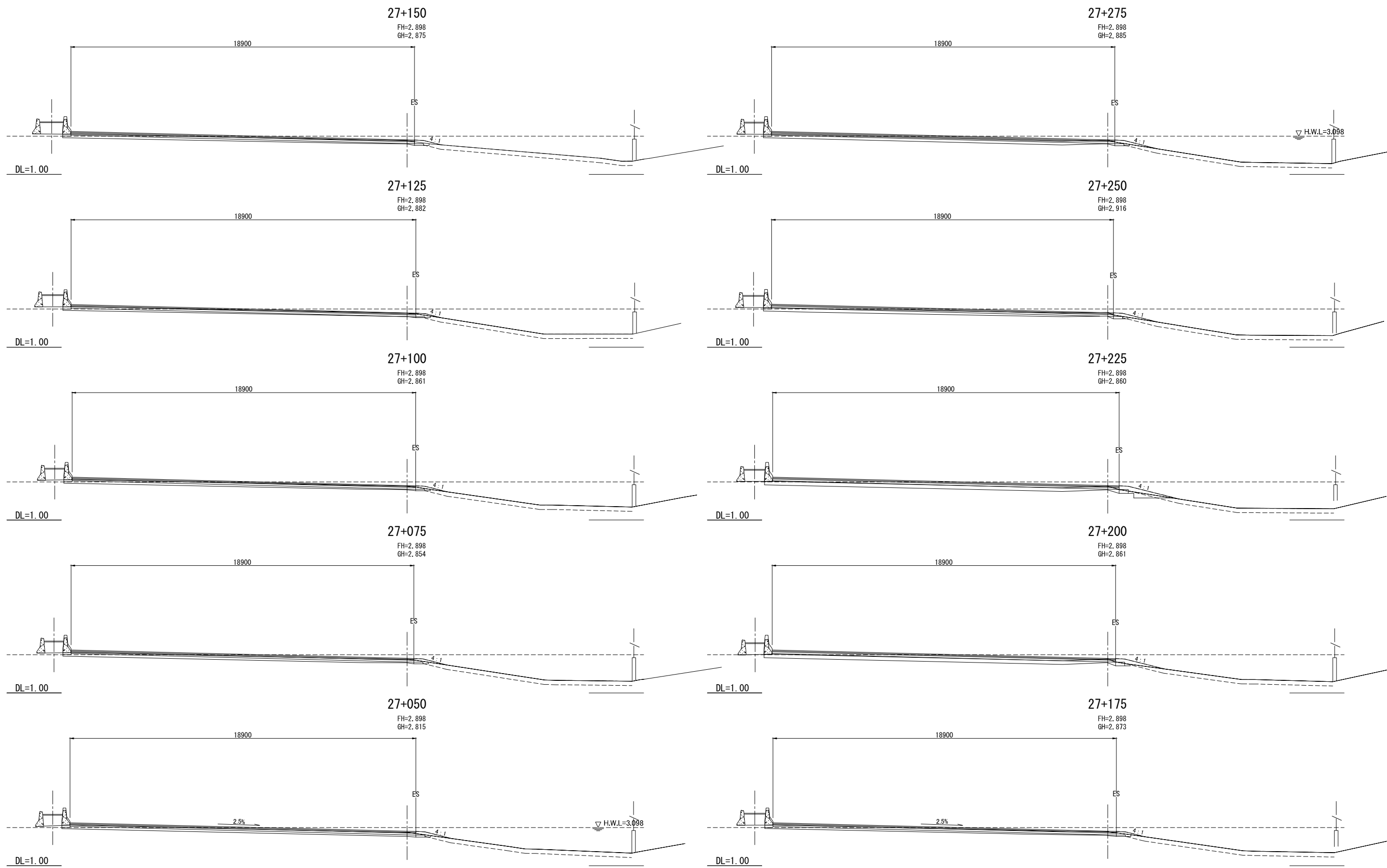
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		CHECKED	DATE	CHECKED	DATE								SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	SCALE 1:100
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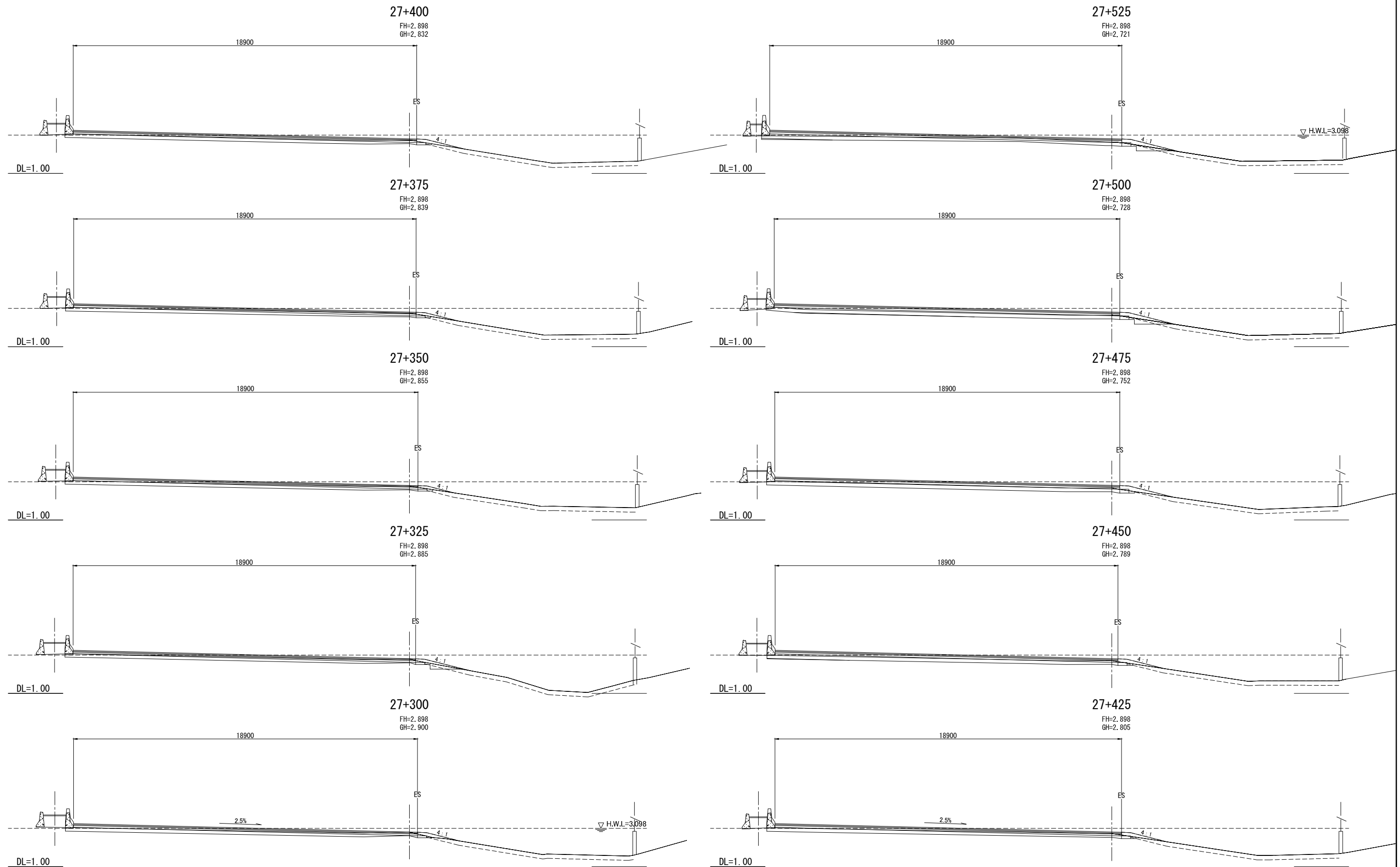
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														DWG. NO. MW-112	SHEET NO. 117



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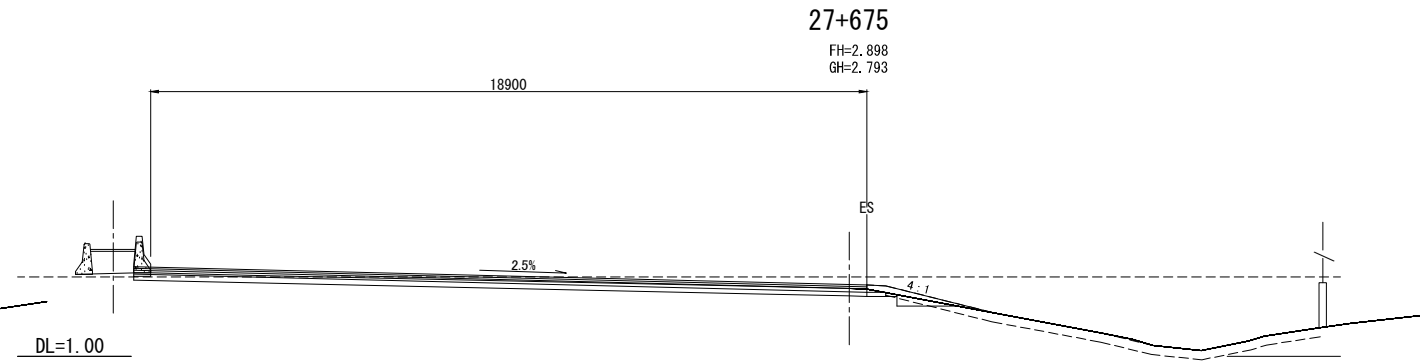
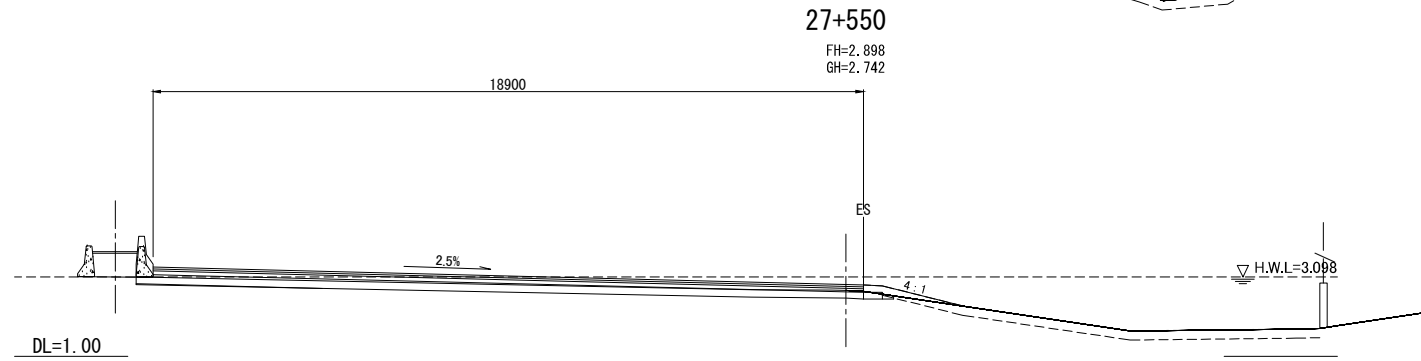
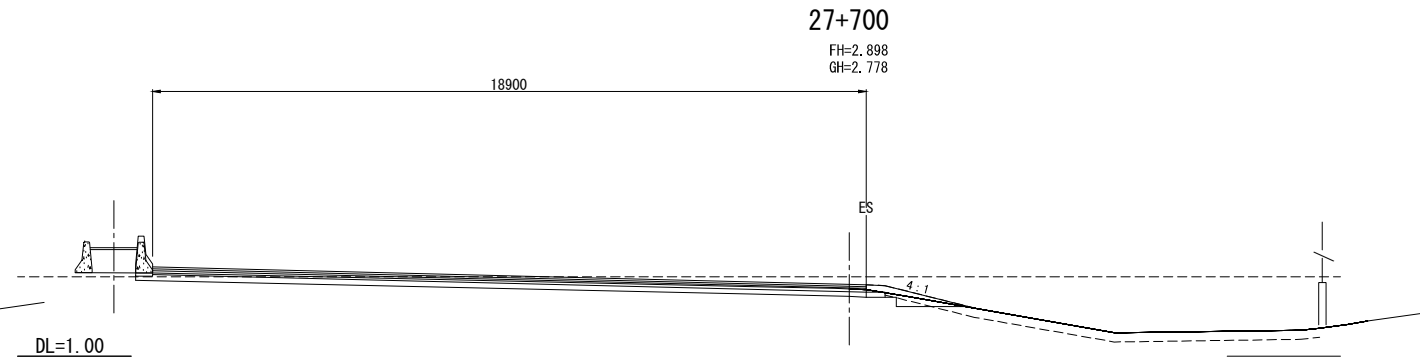
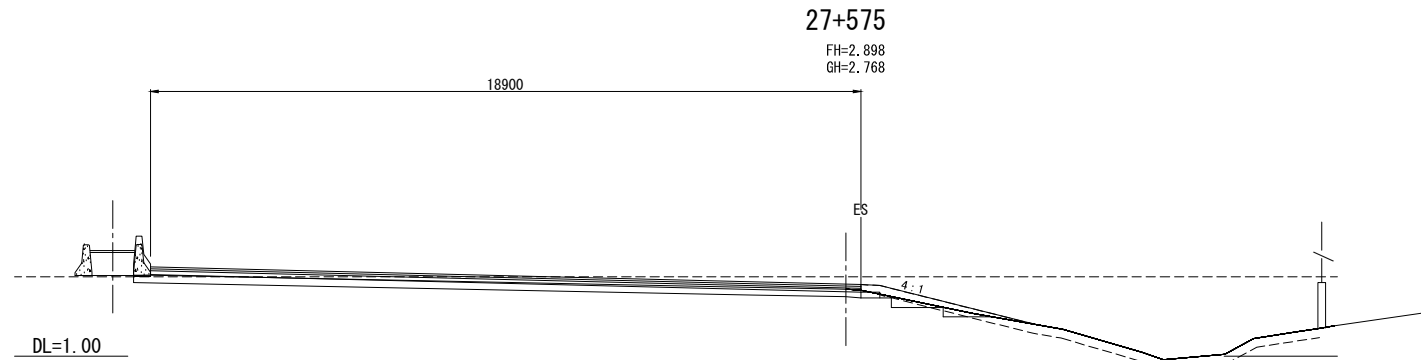
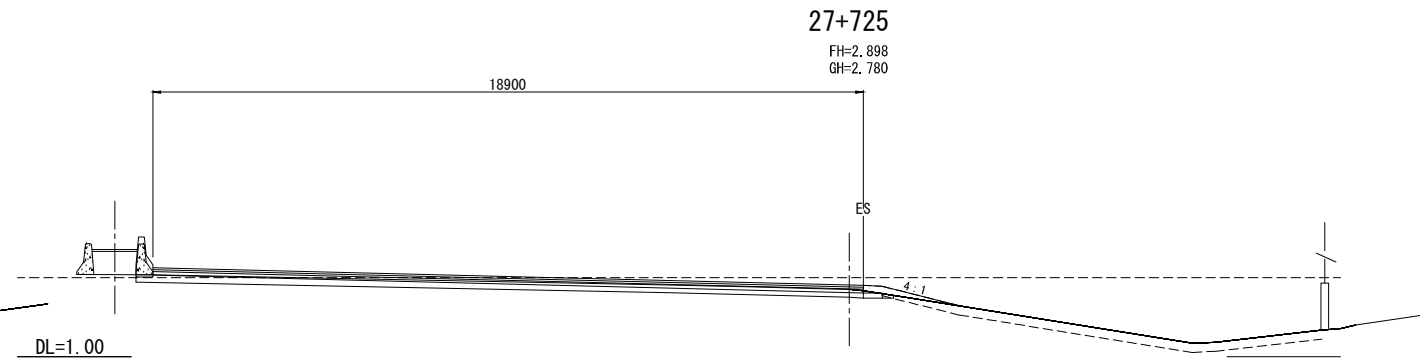
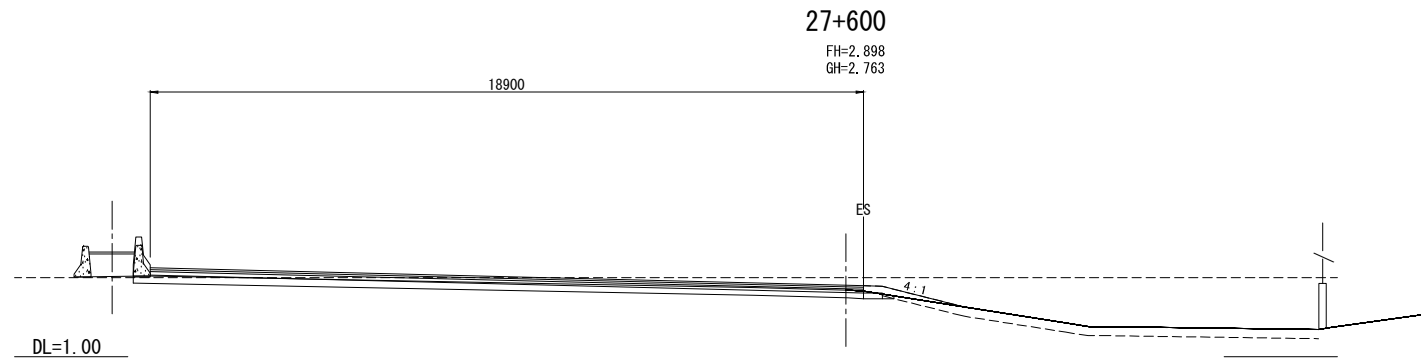
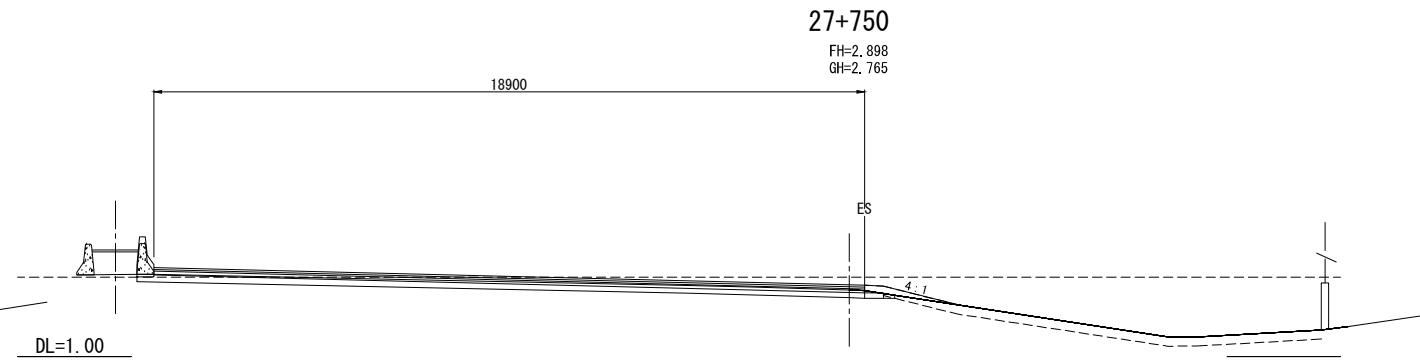
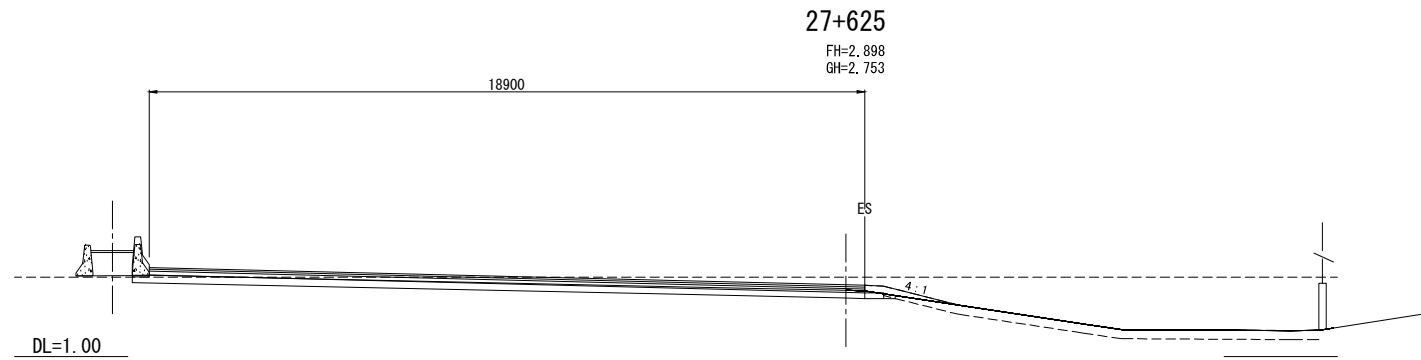
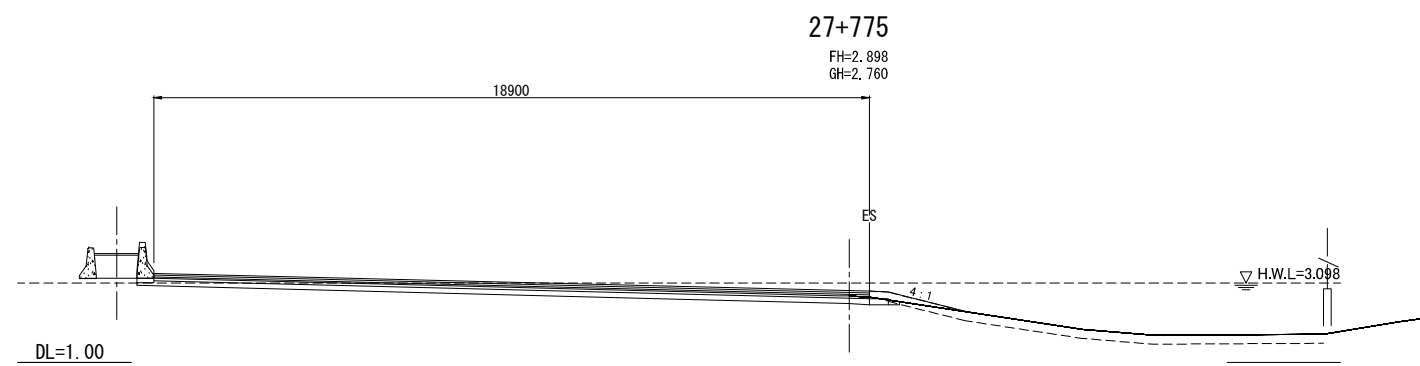
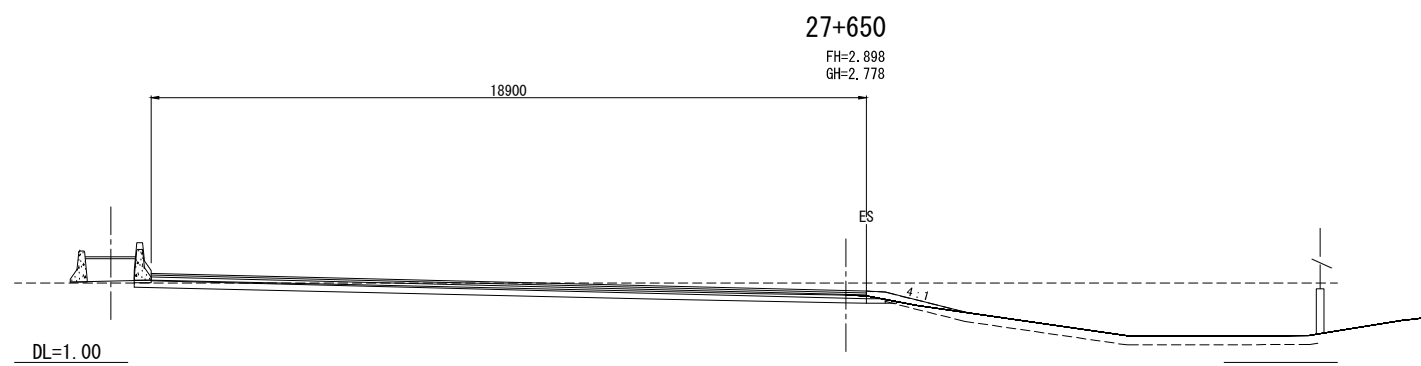
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		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	SCALE 1:100
														DWG. NO. MW-113	SHEET NO. 118



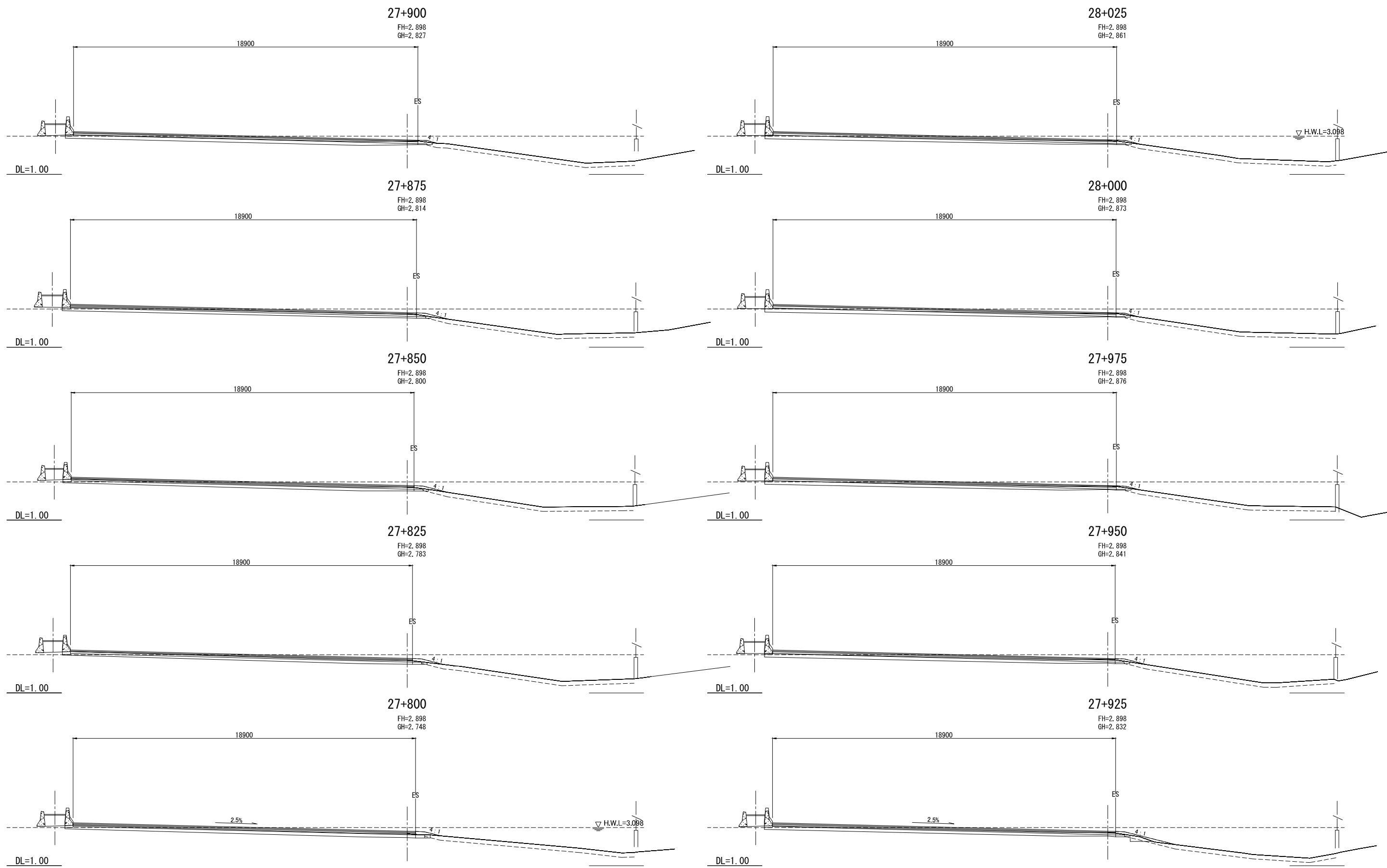
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														DWG. NO. MW-114	SHEET NO. 119



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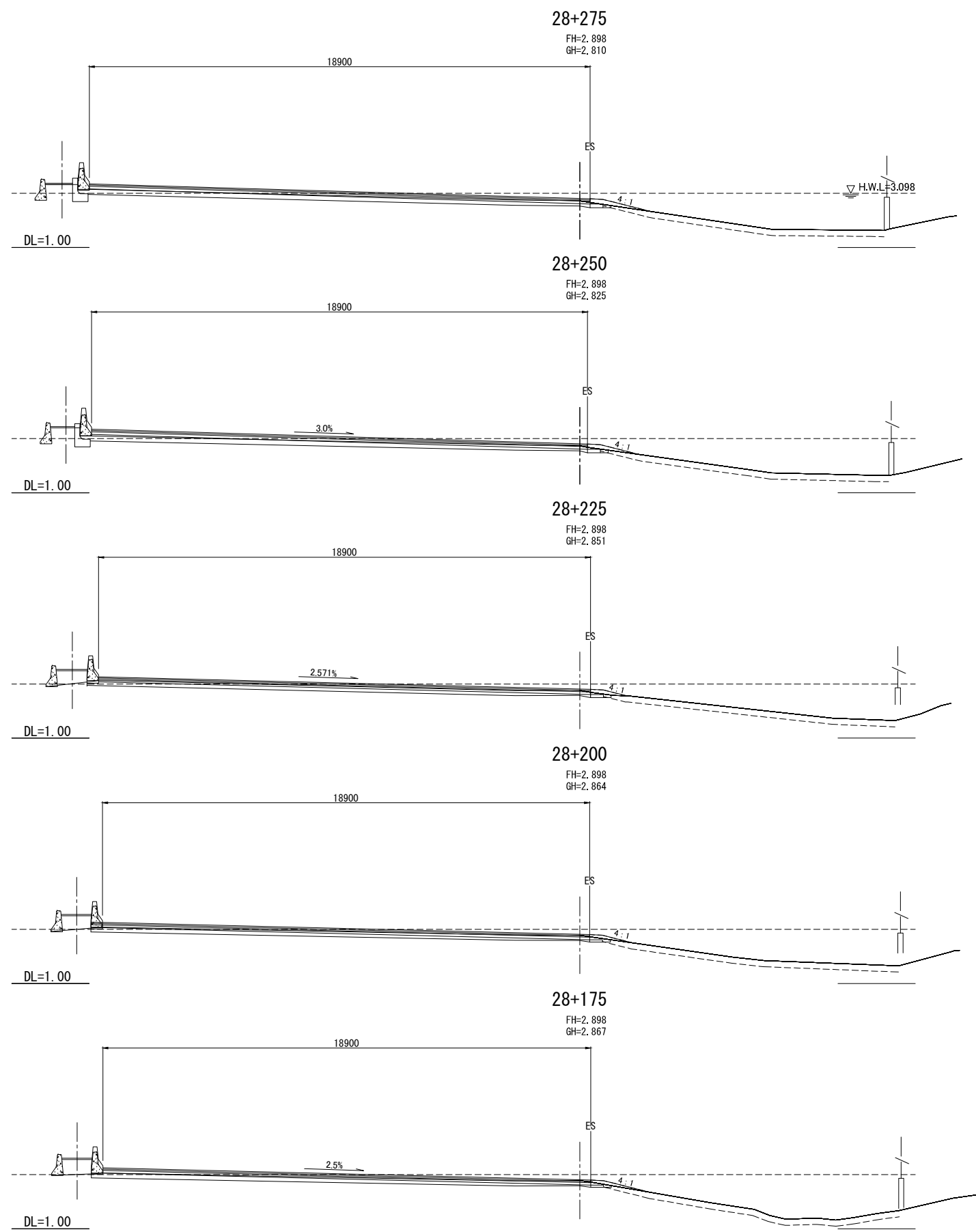
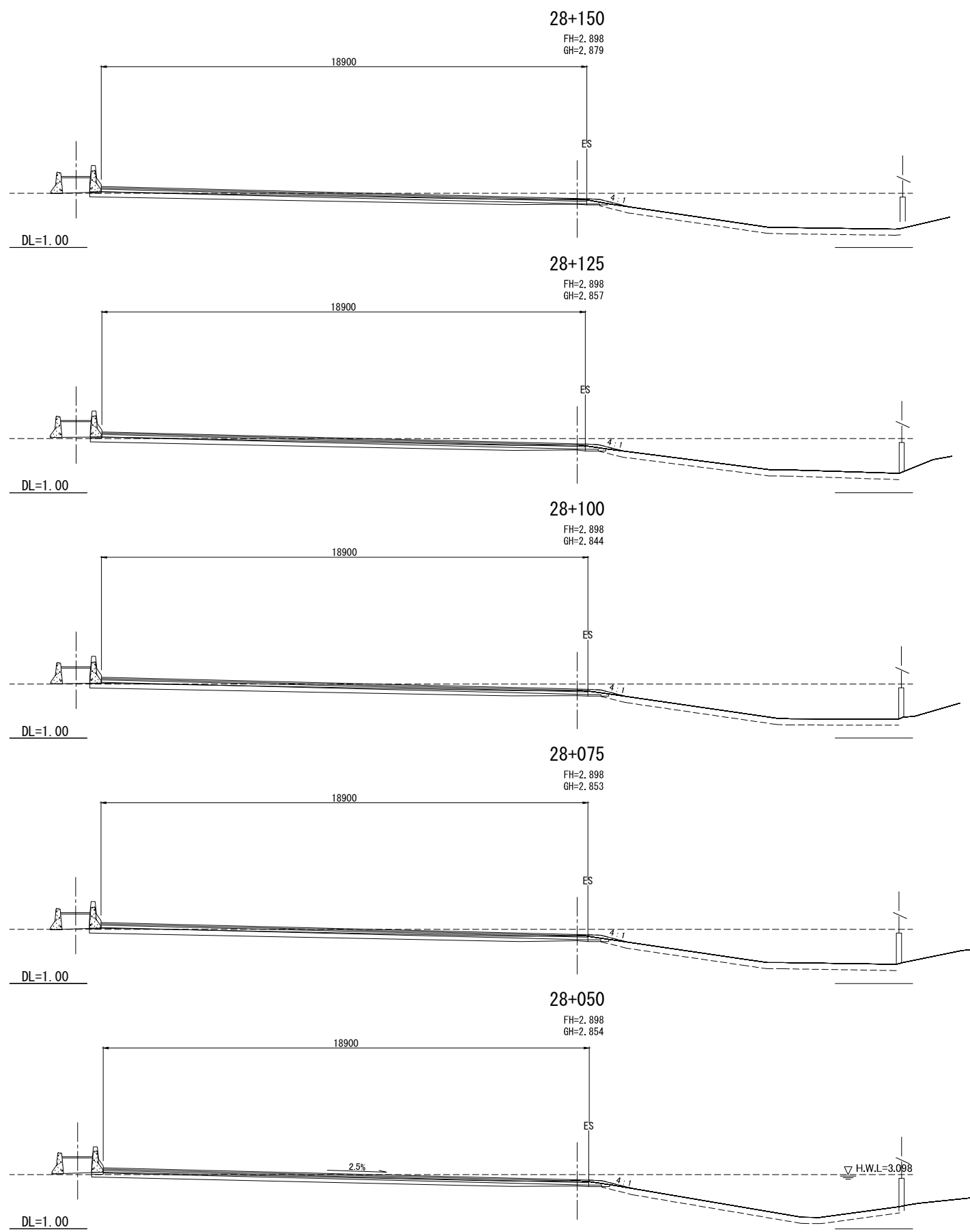


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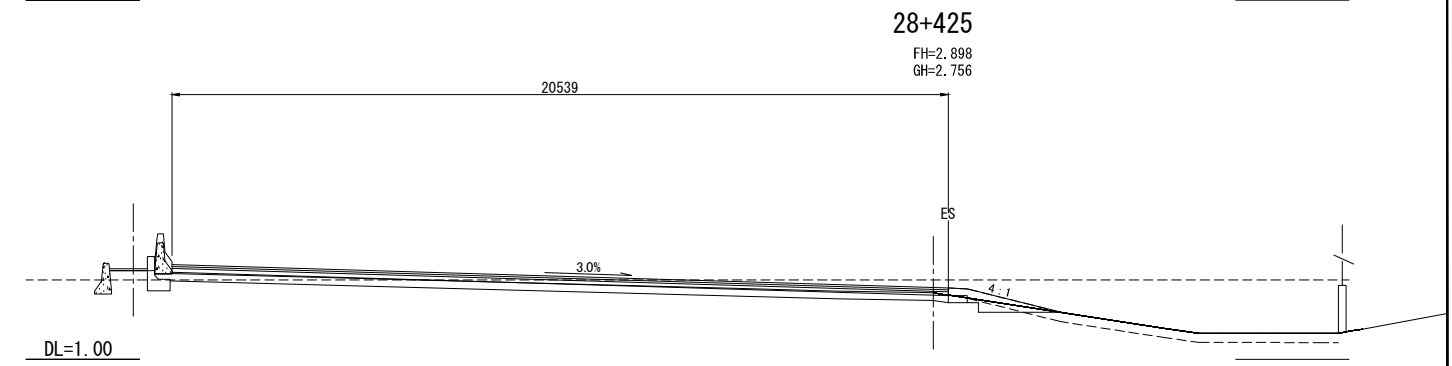
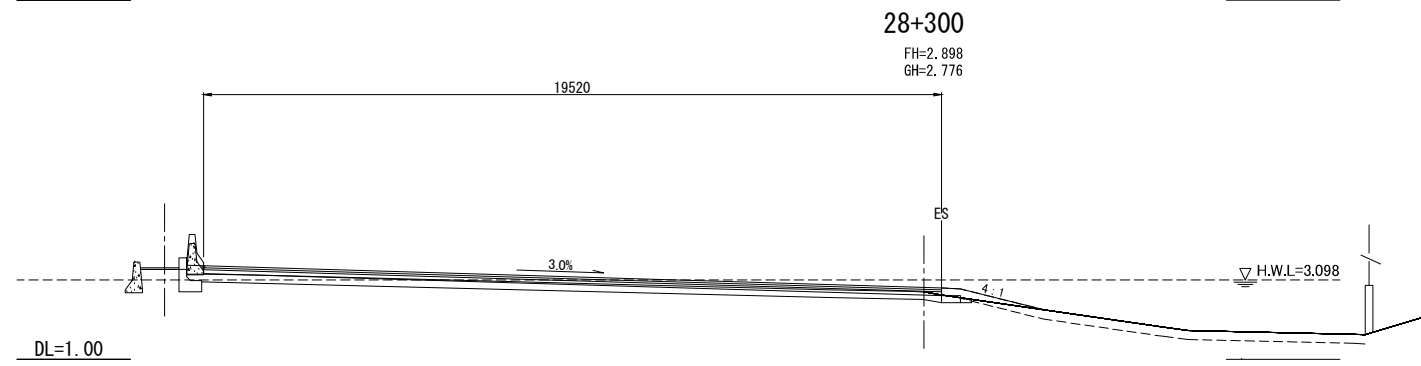
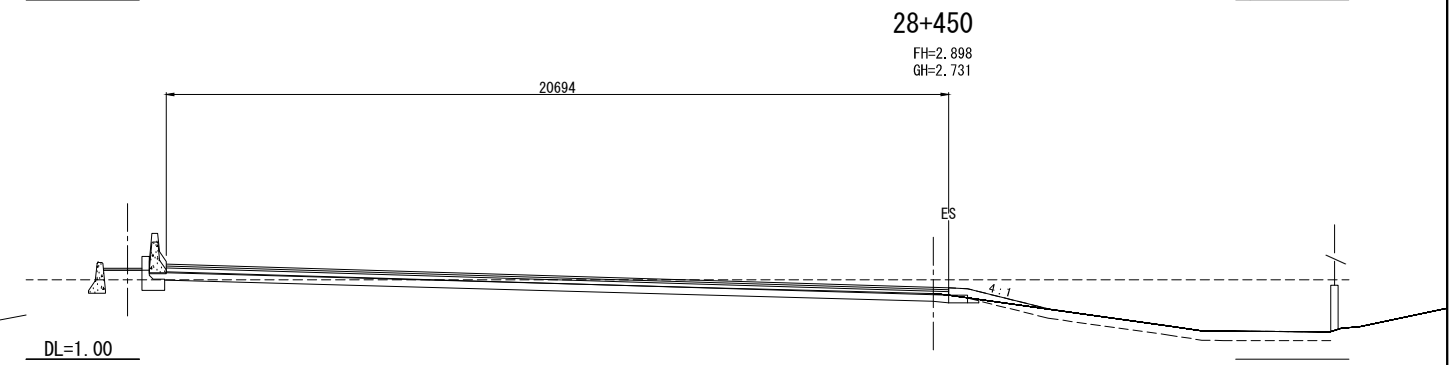
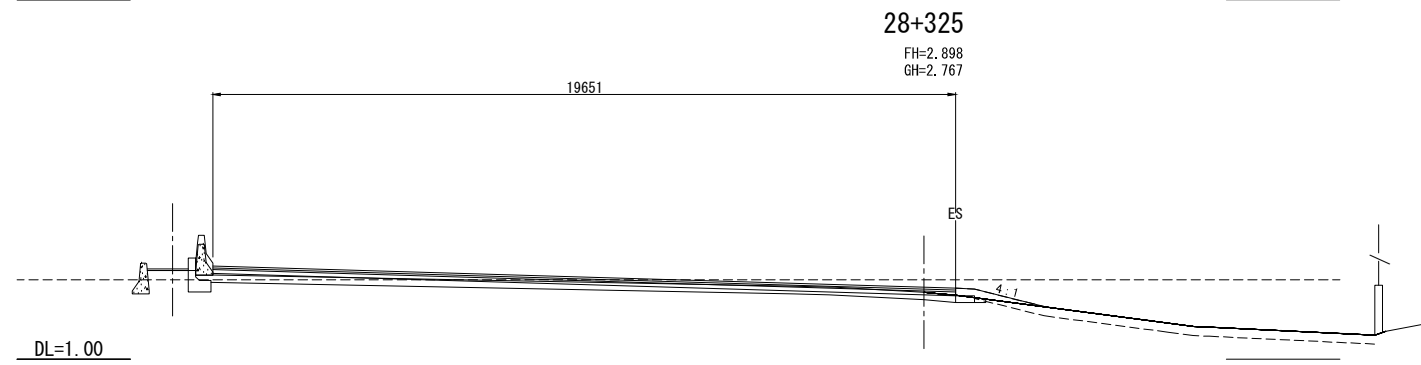
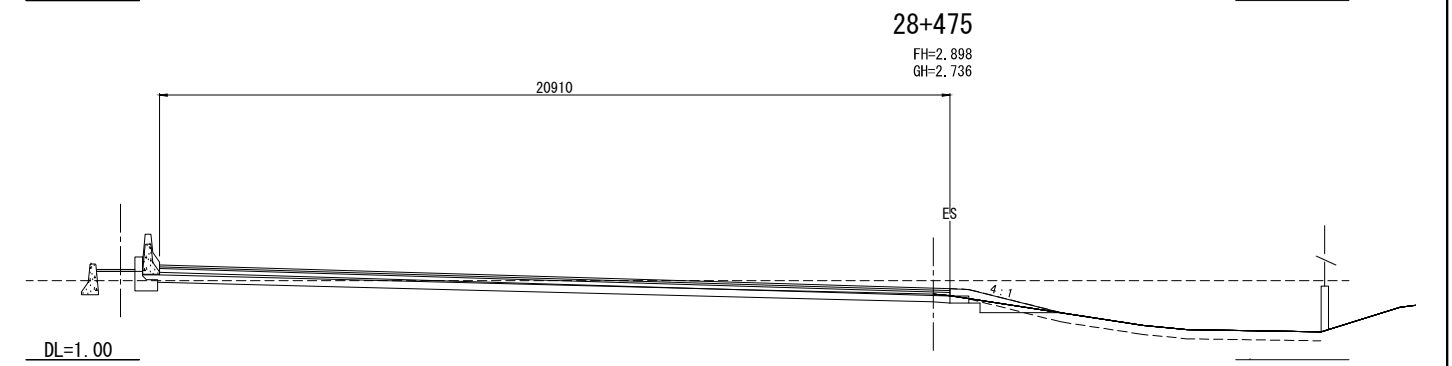
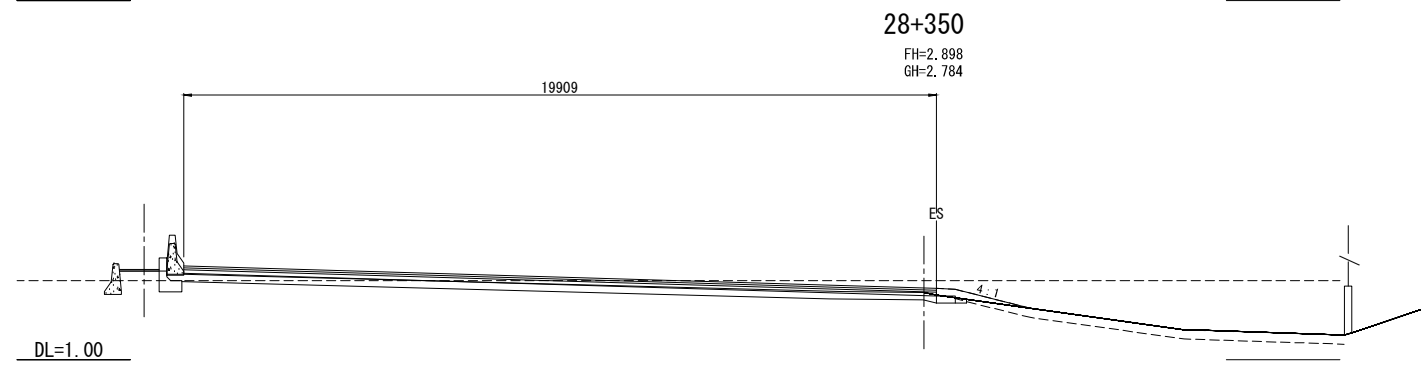
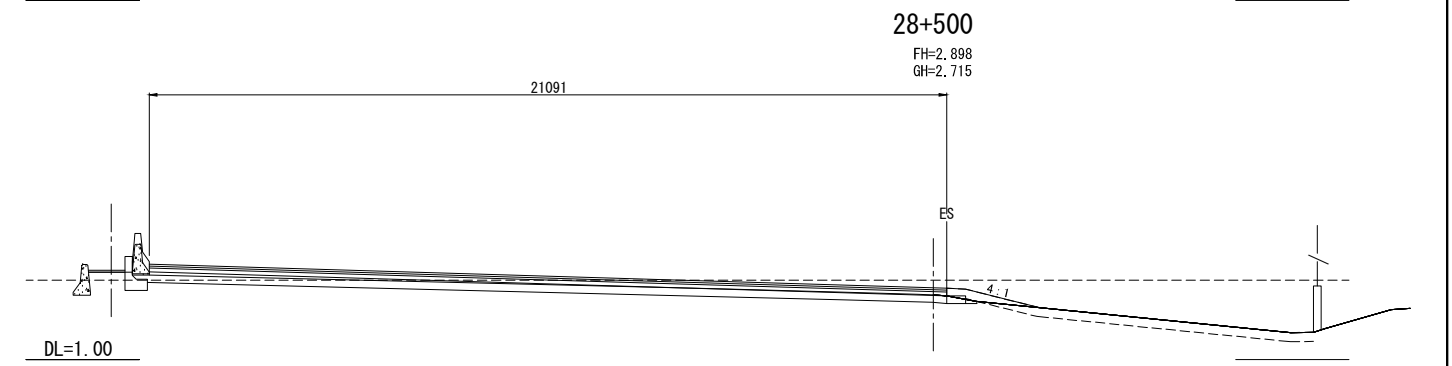
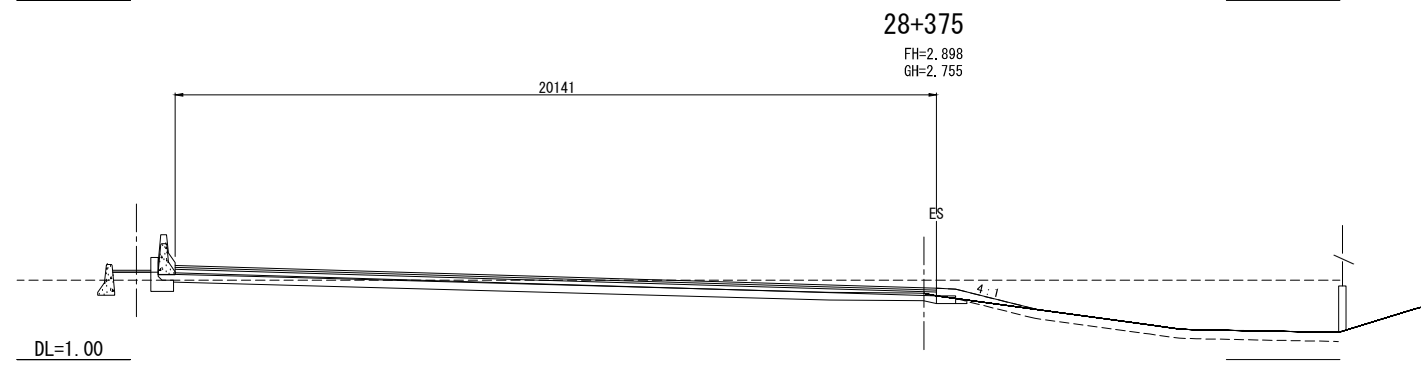
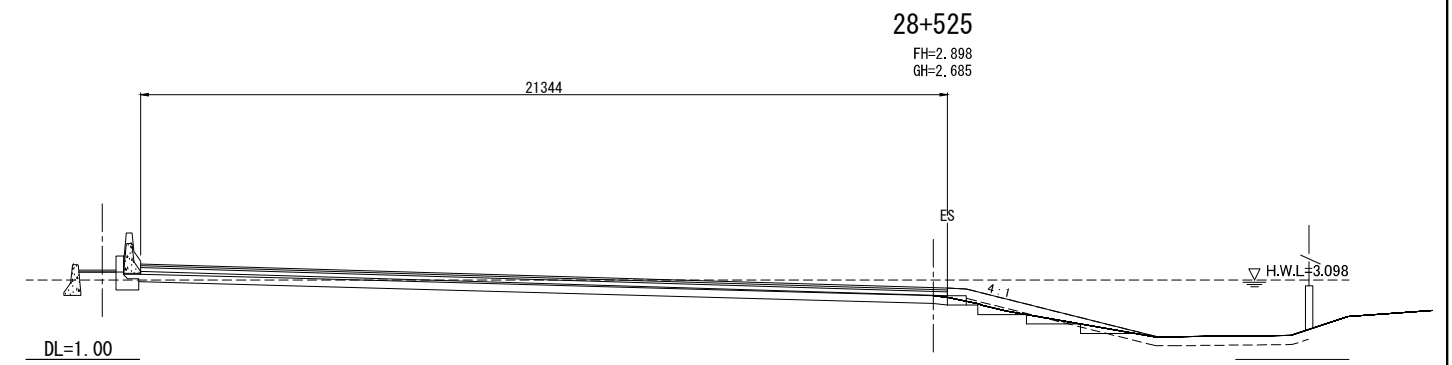
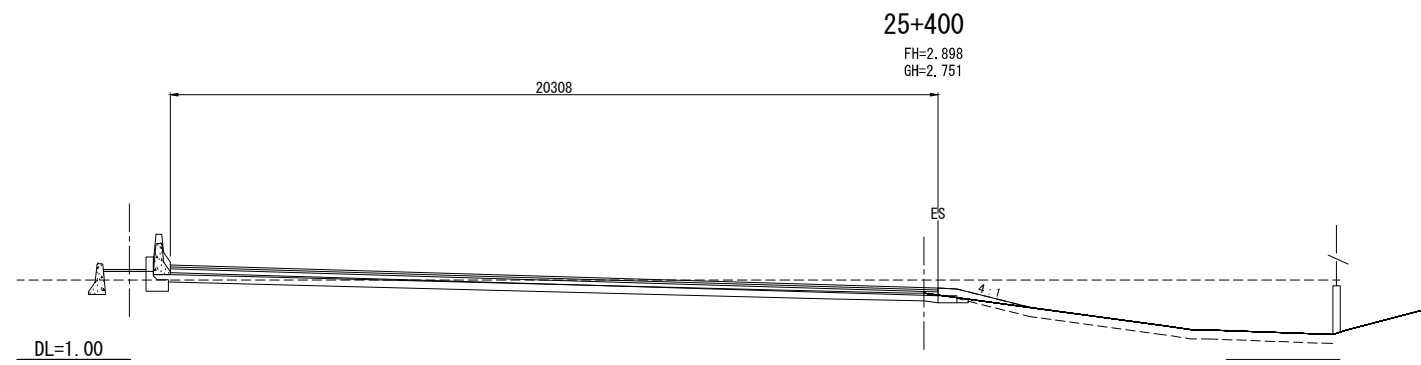


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		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	SCALE 1:100
														DWG. NO. MW-116	SHEET NO. 121

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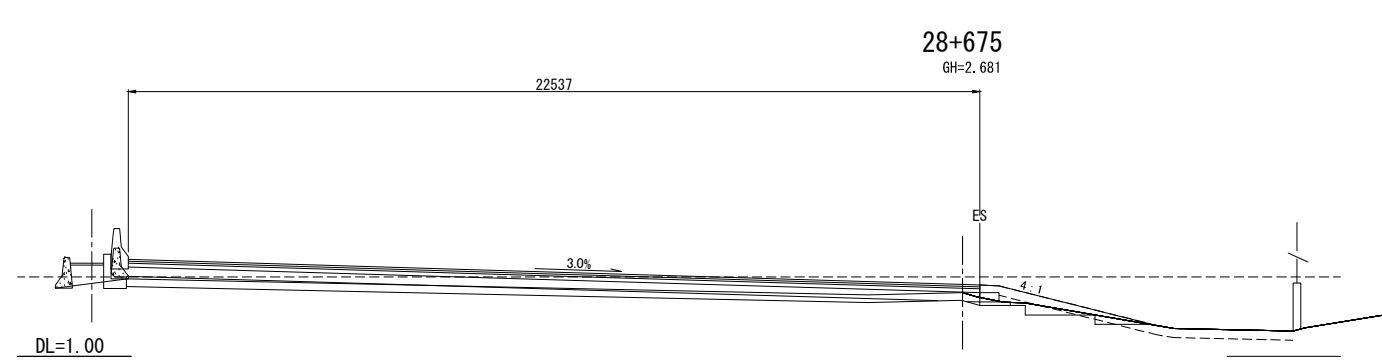
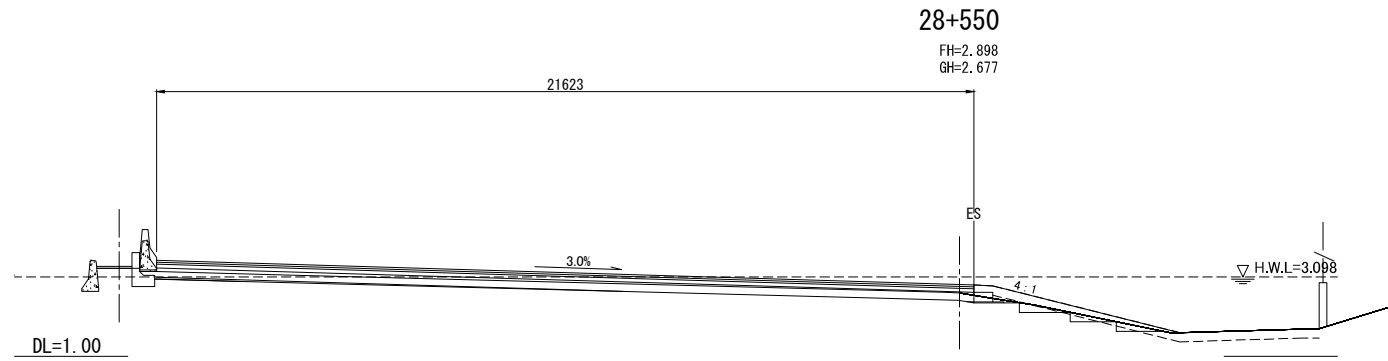
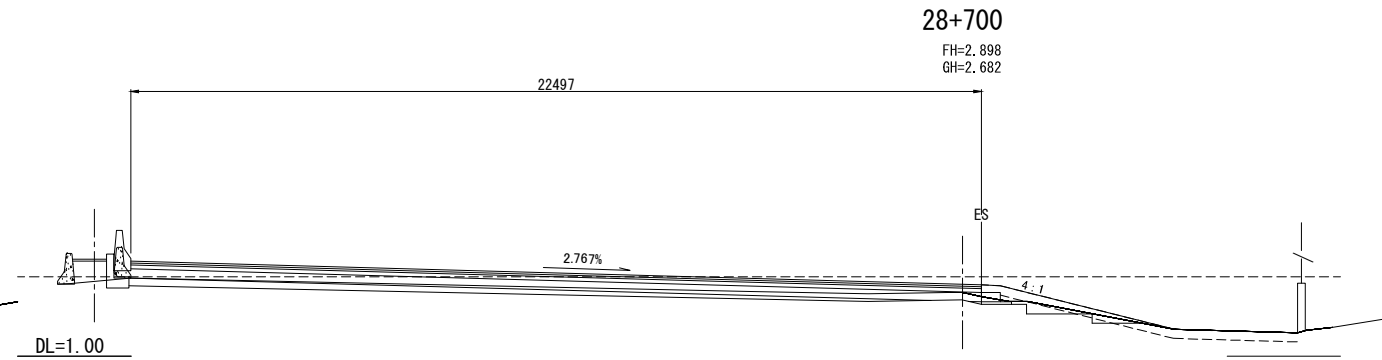
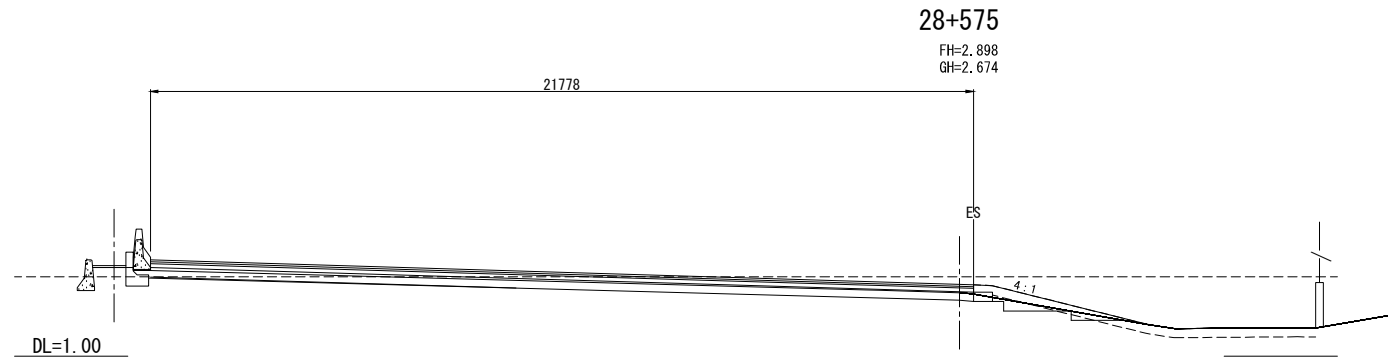
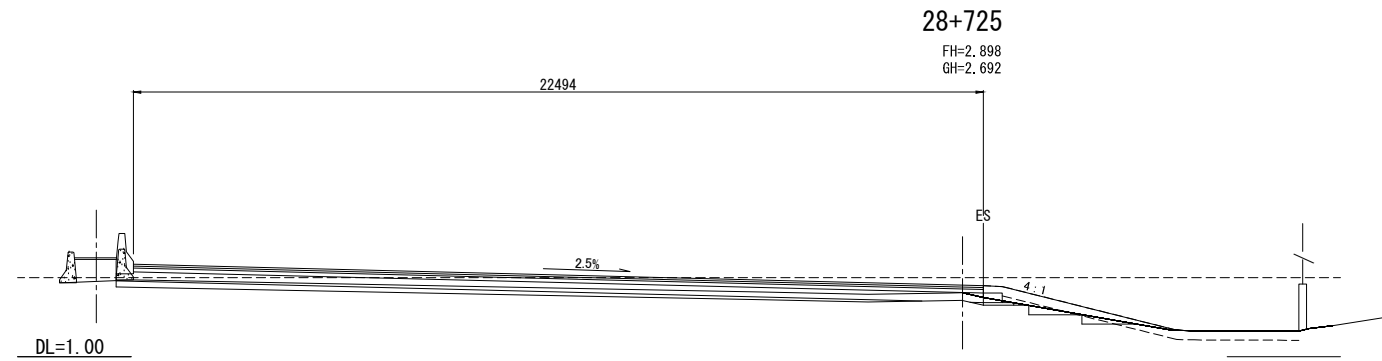
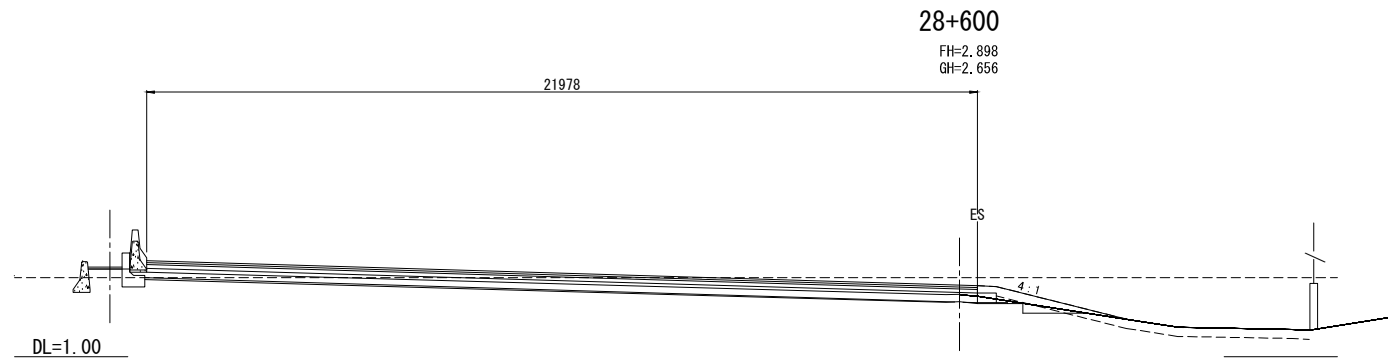
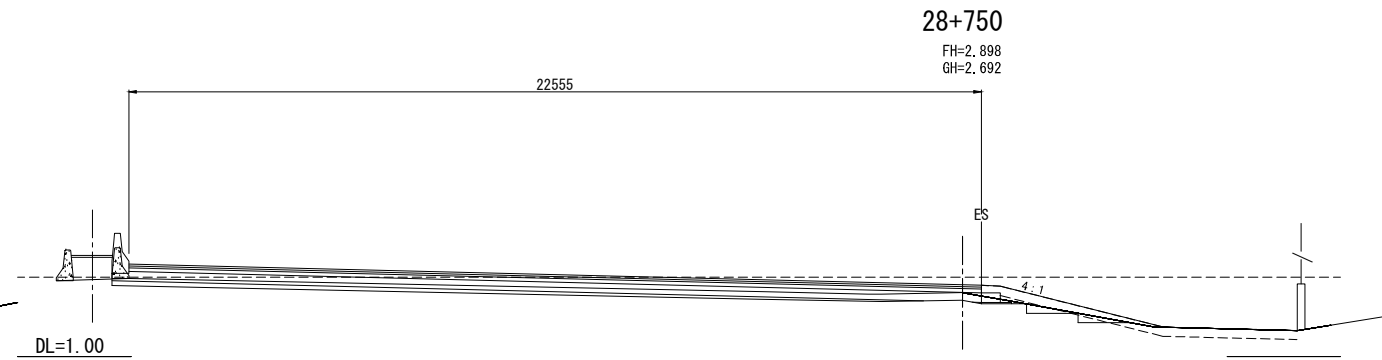
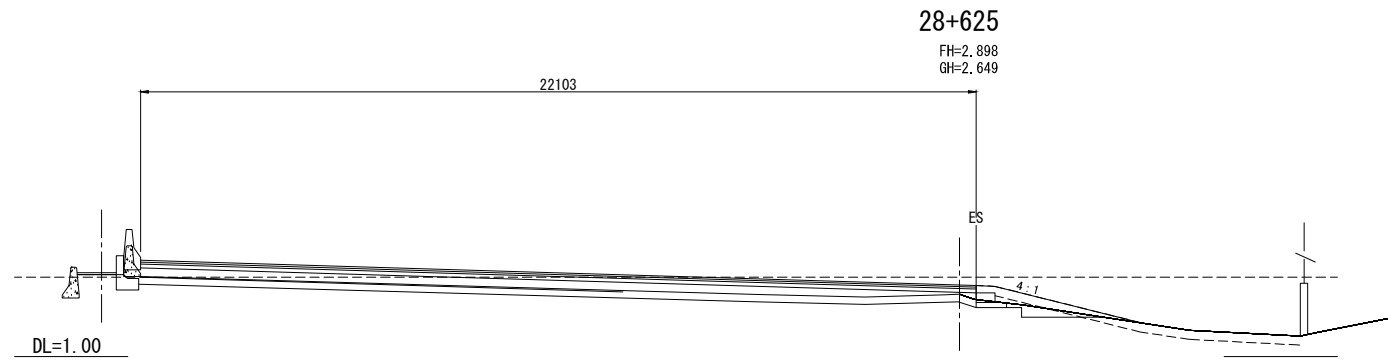
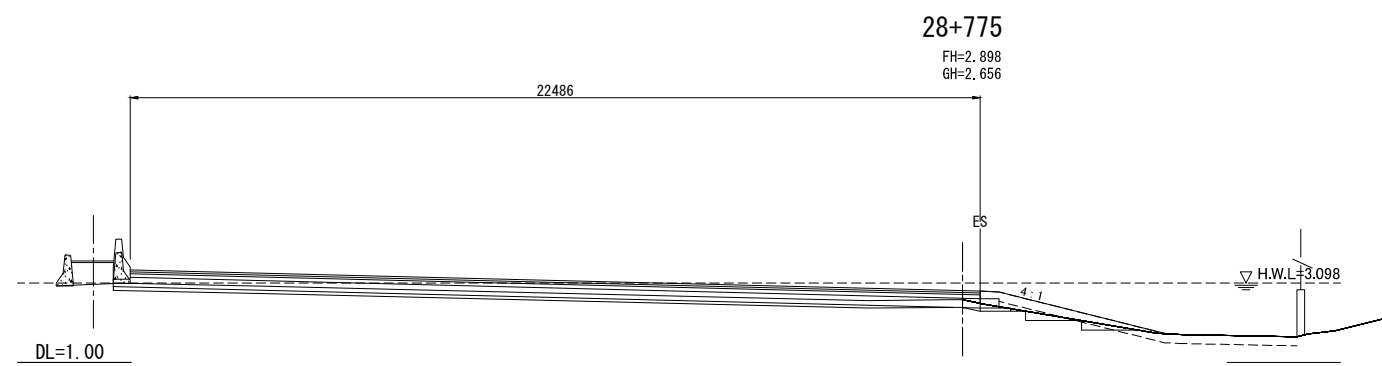
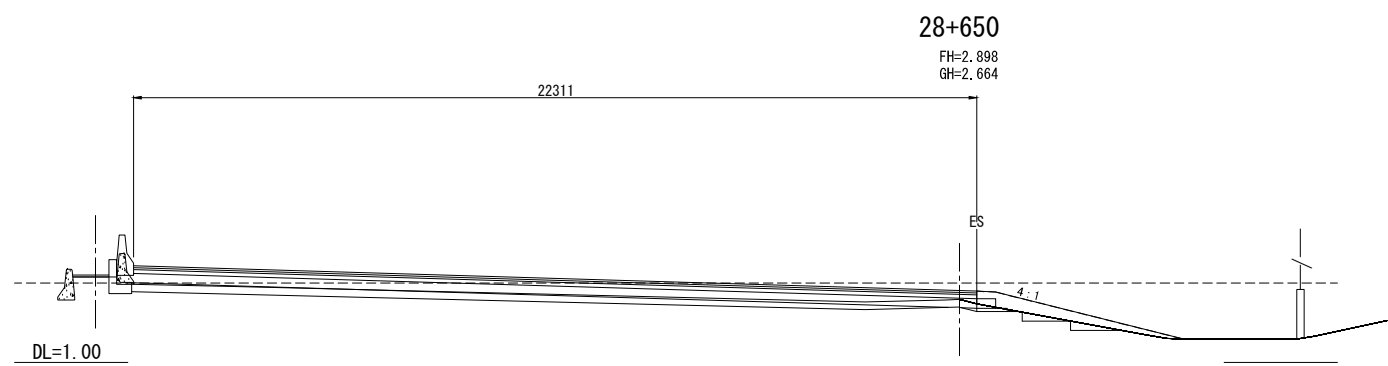


REV. NO.	DESCRIPTION	ENGINEER CHECKED DATE	DOH CHECKED DATE	REV. NO.	APPROVED BY	<p>KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS</p>	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE		DESIGNED BY	CHECKED BY	DATE	SCALE
							<p>CROSS SECTIONS (66 / 70)</p>	<p>The Inter-City Motorways Division Department of Highways Ministry of Transport</p>	<p>The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road</p>		<p>SAGARA Hidetaka ROAD ENGINEER</p>	<p>WATANABE Ryohei CHIEF ENGINEER</p>	<p>AUGUST 2012</p>	<p>SCALE 1:100</p>
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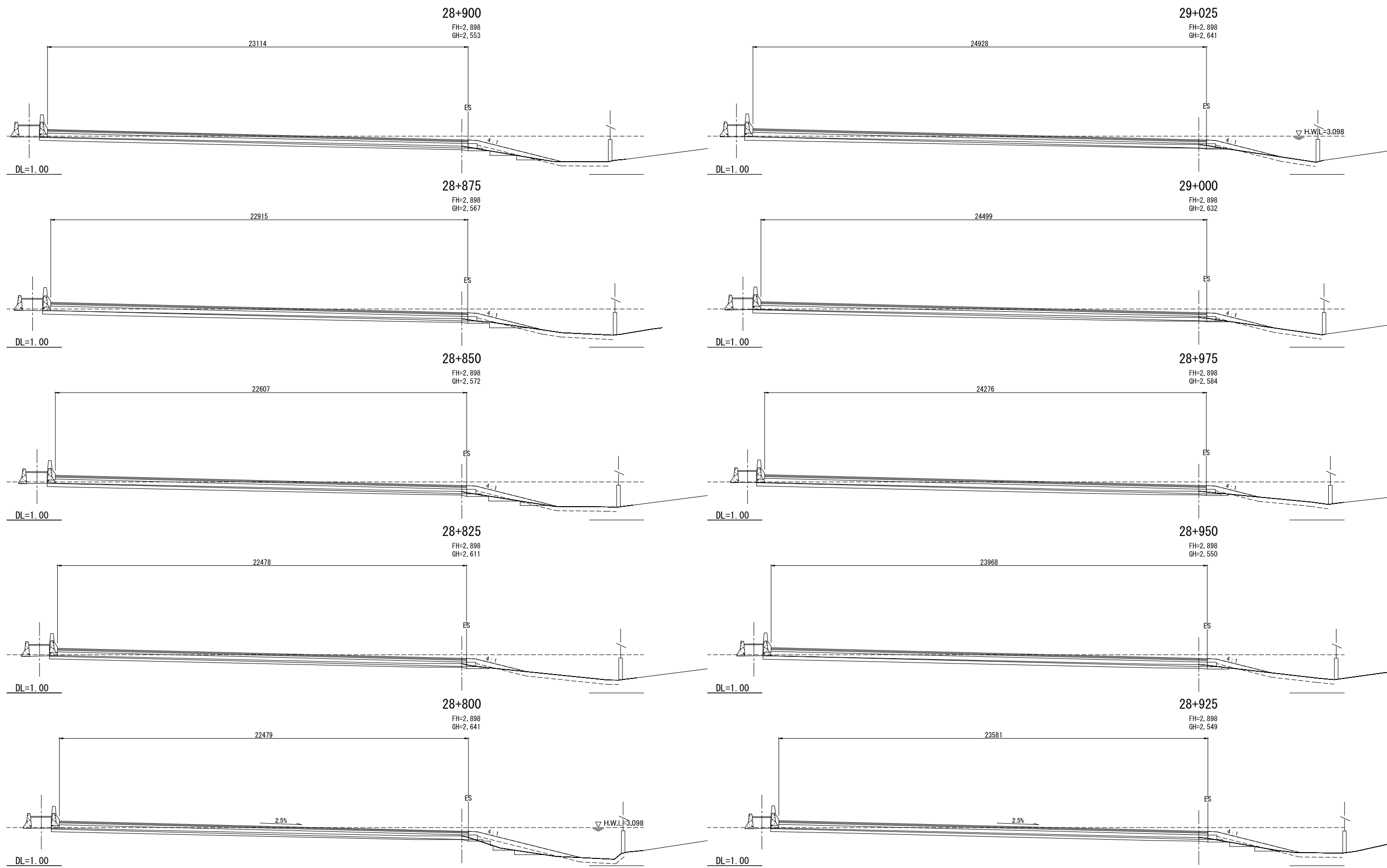







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									CROSS SECTIONS (67 / 70)					DWG. NO. MW-118	SHEET NO. 123

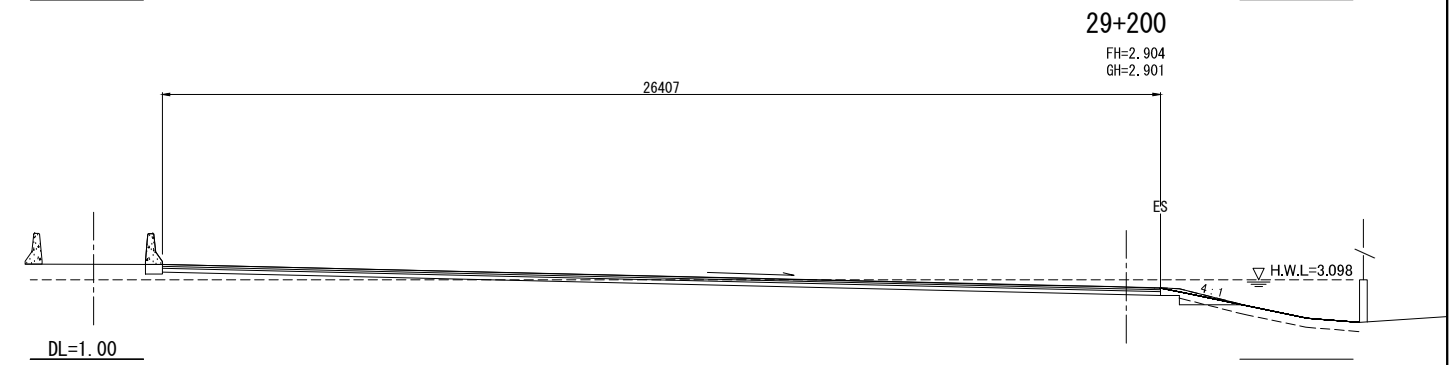
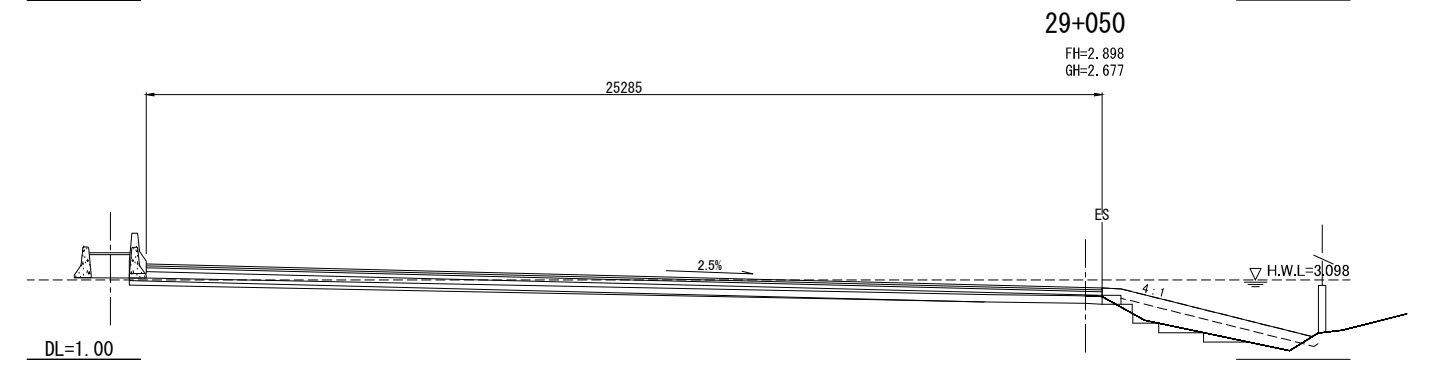
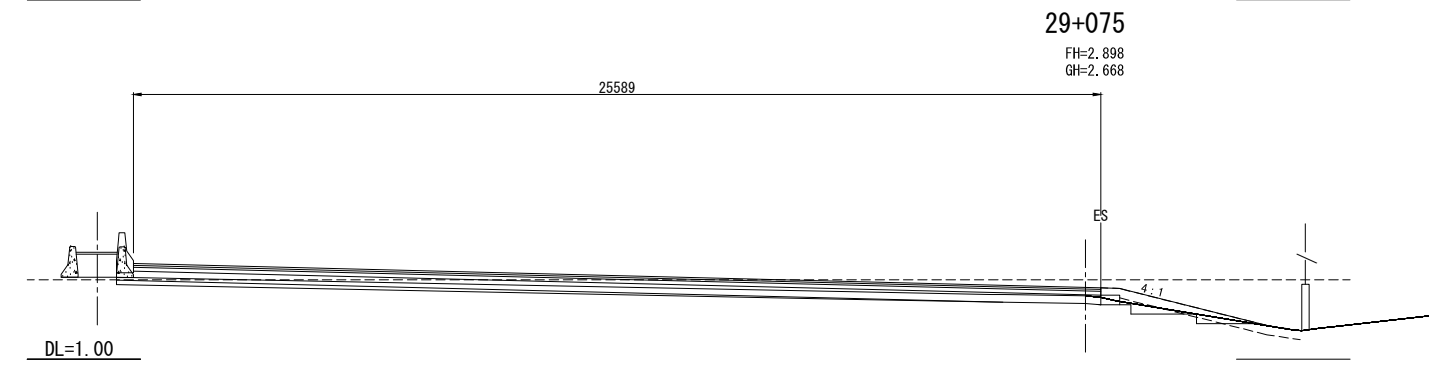
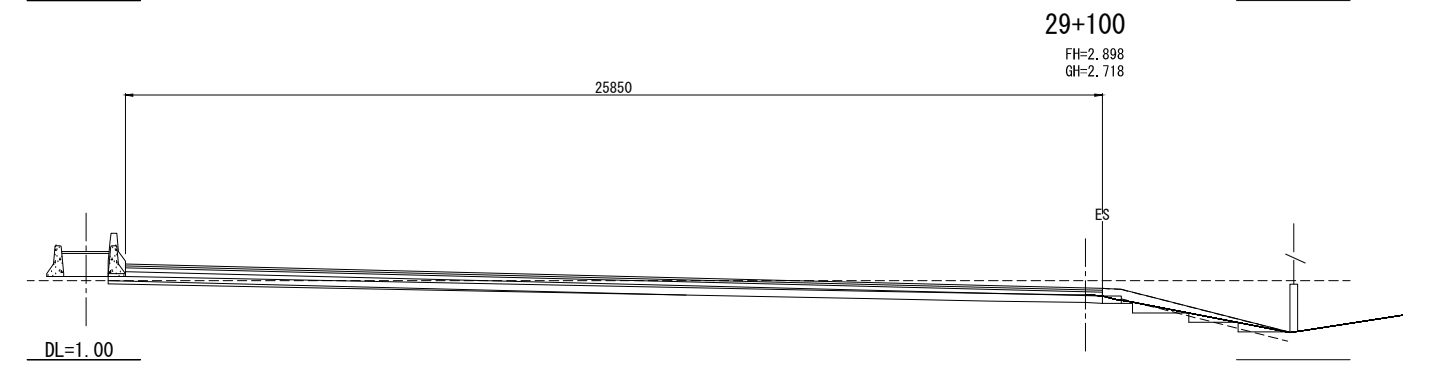
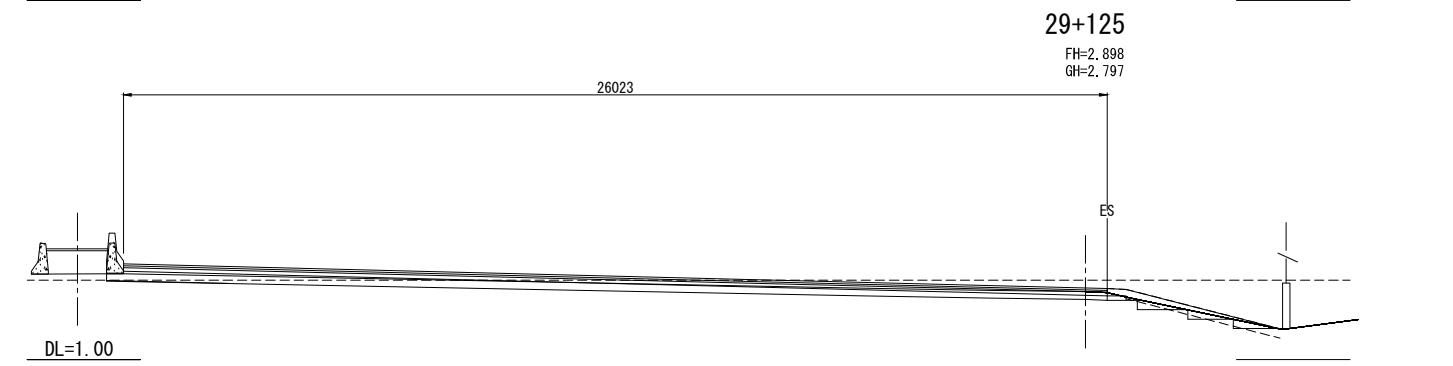
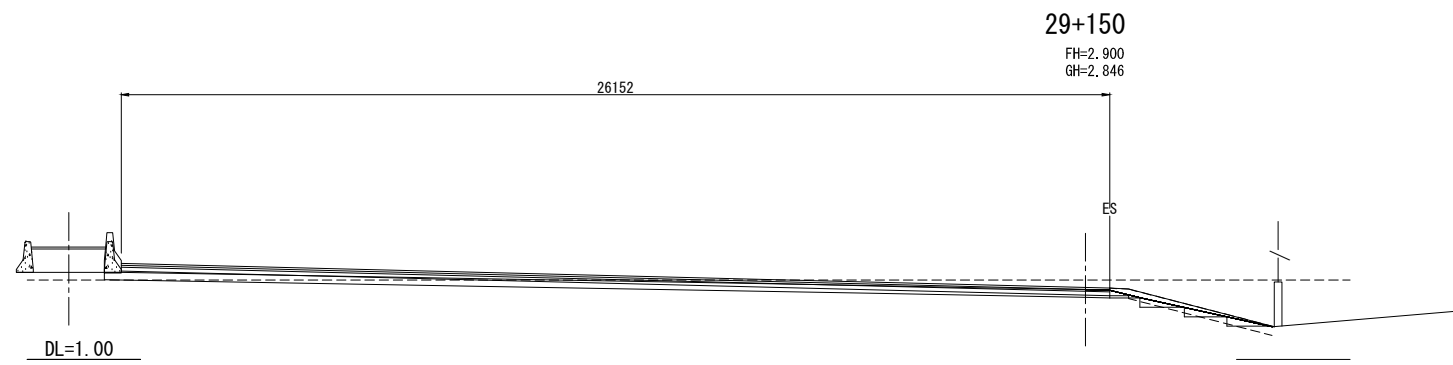
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														DWG. NO. MW-119	SHEET NO. 124



REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	 KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	 CTI ENGINEERING INTERNATIONAL CO., LTD.  ORIENTAL CONSULTANTS CO., LTD.  NIPPON KOEI CO., LTD.  CTI ENGINEERING CO., LTD.	DESIGNED BY	CHECKED BY	DATE:	SCALE:
		CHECKED	DATE	CHECKED	DATE								SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	SCALE 1:100
									The Inter-City Motorways Division Department of Highways Ministry of Transport	The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road				DWG. NO. MW-120	SHEET NO. 125	



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		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	SCALE 1:100
									CROSS SECTIONS (70 / 70)					DWG. NO. MW-121	SHEET NO. 126

3. TOLL GATE

DESIGN STANDARD

- STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, AASHTO-1996
- BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE , ACI 318-99
- DOH STANDARD DRAWINGS.

DESIGN LOAD

- LIVE LOAD WALKWAY = 400 KG/M²
- LIVE LOAD OF ROOF = 50 KG/M²

GENERAL

- THE LAYOUT AND LOCATIONS OF GUTTERS, STAIRS, HANDRAILS, DRAIN HOLES, DOWEL SLEEVES AND LIGHTING POLES SHOWN THIS DRAWING ARE ONLY FOR INFORMATION. THE CONTRACTOR HAS TO VERIFY THE CORRECT LOCATIONS, DIMENSIONS AND DETAILS OF ABOVE MENTIONED ELEMENTS TO MEET THE OWNERS REQUIREMENT OR AS SPECIFIED IN THE GENERAL LAYOUT DRAWING.

CONCRETE

DESCRIPTION	CLASS OF CONCRETE	MIN. CEMENT (Kg./M ³)	MIN. STRENGTH AT 28 DAY** (Kg./CM ²)
PRESTRESSED CONCRETE STRUCTURES	SPECIAL A	400	420*
ORDINARY REINFORCED CONCRETE	A (1 1/2)	330	300
CONCRETE BORED PILE	A (1 1/2)	330	300
LEAN CONCRETE	C	-	180

* REQUIRED 15 CM. CUBE COMPRESSIVE STRENGTH FOR PRESTRESSED CONCRETE STRUCTURAL AT JACKING FORCE STATE SHALL BE AT LEAST 330 Kg/CM²

** SPECIFIED FOR 15 CM. CUBE COMPRESSIVE STRENGTH

REINFORCING STEEL

1. DEFORM BARS (DB) SHALL CONFORM TO TIS 24 GRADE SD40.
2. ROUND BARS (RB) SHALL CONFORM TO TIS 20 GRADE SR24.

CUTTING

- BARS SHALL BE SHEARED, FLAME CUTTING SHALL NOT BE PERMITTED UNLESS APPROVED BY THE ENGINEER.

DEVELOPMENT LENGTH

- UNLESS OTHERWISE SPECIFIED, THE DEVELOPMENT LENGTH FOR VARIOUS CASES SHALL BE COMPUTED ACCORDING TO ARTICLE 8.24 TO 8.31 OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGE 1996

SPLICING

1. SPLICES, OTHER THAN THOSE SHOWN ON THE DRAWING. MAY BE MADE ONLY WITH THE APPROVAL OF THE ENGINEER
2. SPLICES IN ADJACENT BARS SHALL BE STAGGERED AT LEAST 60 CM. ALL LAP SPLICE LENGTH OF DEFORMED BARS SHALL BE COMPUTED ACCORDING TO ARTICLE 8.32 OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 1996 EDITION. PLAIN ROUND BARS SHALL HAVE A MINIMUM LAP LENGTH OF 60 BAR DIAMETERS WITH HOOKED END.
3. WELDED SPLICES OR OTHER MECHANICAL CONNECTIONS MAY USED IF AUTHORIZED BY THE ENGINEER. A FULL WELDED SPLICE OR A MECHANICAL CONNECTION SHALL DEVELOP IN TENSION OR COMPRESSION AS REQUIRED AT LEAST 125 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE BAR

BENDING

- BARS SHALL BE COLD BENT AROUND A PIN WITH THE FOLLOWING MINIMUM DIAMETER (D) IN RELATION TO THE DIAMETER OF THE BAR (d):

FOR MAIN REINFORCING BAR

D = 6d FOR RB6, RB9 , DB12 , DB16 , DB20 , DB25

D = 8d FOR DB28 , DB32

FOR STIRRUP AND TIE

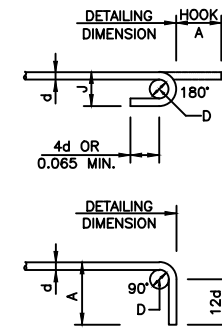
D = 4d FOR DB16 OR SMALLER

D = 6d FOR DB20 , DB25

HOOKS

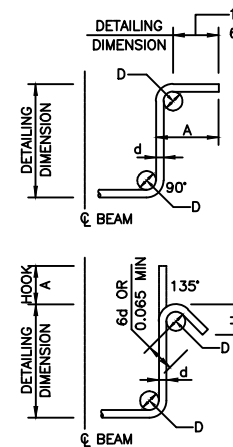
- ALL HOOKS, IF NOT SHOWN ON THE DRAWING, SHALL COMPLY WITH ACI STANDARD HOOK AS SET FORTH FOLLOW :

MAIN REINFORCING BAR HOOK DIMENSIONS (IN METER)



BAR SIZE	180° HOOK		90°HOOK
	A	J	A
RB6	0.11	0.06	0.10
RB9	0.13	0.08	0.15
DB12	0.15	0.10	0.20
DB16	0.20	0.13	0.25
DB20	0.24	0.15	0.30
DB25	0.30	0.20	0.40
DB28	0.40	0.28	0.50
DB32	0.45	0.32	0.55

STIRRUP AND TIE HOOK DIMENSIONS (IN METER)



BAR SIZE	135° HOOK		90°HOOK
	A	H APPROX	A
RB6	0.065	0.05	0.065
RB9	0.09	0.06	0.09
DB12	0.12	0.08	0.12
DB16	0.16	0.10	0.16
DB20	0.20	0.15	0.32
DB25	0.25	0.18	0.40

SPACING

1. CLEAR HORIZONTAL DISTANCE BETWEEN BARS OR PAIR OF BARS SHALL BE AT LEAST 1.5 BAR DIAMETER OR 40 MM.
2. CLEAR VERTICAL DISTANCE BETWEEN INDIVIDUAL BARS SHALL BE AT LEAST 25 MM.
3. CLEAR VERTICAL DISTANCE BETWEEN PAIR OF BARS SHALL BE AT LEAST 40 MM.
4. CLEAR HORIZONTAL AND VERTICAL DISTANCE BETWEEN TENDONS SHALL BE AT LEAST 50 MM.
5. CLEAR HORIZONTAL AND VERTICAL DISTANCE BETWEEN STRANDS SHALL BE AS SHOWN ON THE DRAWINGS.

CONCRETE COVER

UNLESS NOTED ON THE DRAWINGS THE FOLLOWING MINIMUM CONCRETE COVER (FROM FACE OF CONCRETE TO FACE OF BAR) SHALL BE PROVIDED:

- BOTTOM OF ALL PILE CAPS. 7.5 CM.
- SIDE AND TOP OF PILE CAPS. 5 CM.
- SIDE AND TOP OF ALL COLUMNS, PIERS, ABUTMENTS AND WALLS. 4 CM.
- ALL FACES OF BOX CULVERTS AND CHANNEL TRANSITIONS. 4 CM.
- TOP OF ALL DECK SLABS. 4 CM.
- BOTTOM OF ALL DECK SLABS. 2.5 CM.
- ALL FACES OF BARRIERS, CURBS AND PARAPETS. 3 CM.
- TOP OF STAIRS AND STAIR SLABS. 3.5 CM.
- SIDE AND BOTTOM OF STAIRS AND STAIR SLABS. 2.5 CM.
- ALL FACES OF BEAMS, GIRDERS AND DIAPHRAGMS. 4 CM.

CHAMFERING

- ALL EXPOSED CONCRETE CORNERS SHALL BE 2.0 CM. CHAMFER UNLESS OTHERWISE NOTED.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL SHAPES AND PLATES, UNLESS SPECIFIED ON THE DRAWINGS, SHALL BE OF STRUCTURAL STEEL GRADE CONFORMING TO THE REQUIREMENTS STATED IN THE SPECIFICATIONS, WITH A MINIMUM YIELD STRENGTH OF 2400 KG/CM².
2. ALL STRUCTURAL STEEL PREFABRICATED WORKS INCLUDING THEIR FASTENERS SHALL BE GALVANIZED AS MENTIONED IN THE SPECIFICATIONS. THE WEIGHT OF ZINC COATING SHALL NOT BE LESS THAN 1,100 GRAMS/M².
3. ALL ANCHOR BOLTS SHALL BE GALVANIZED ONLY AT THE EXPOSED PORTIONS.
4. ALL WELDING SYMBOLS ARE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS).
5. SIZE, INCREMENT LENGTH AND PITCH OF WELD SHOWN ARE IN MILLIMETERS.

MISCELLANEOUS

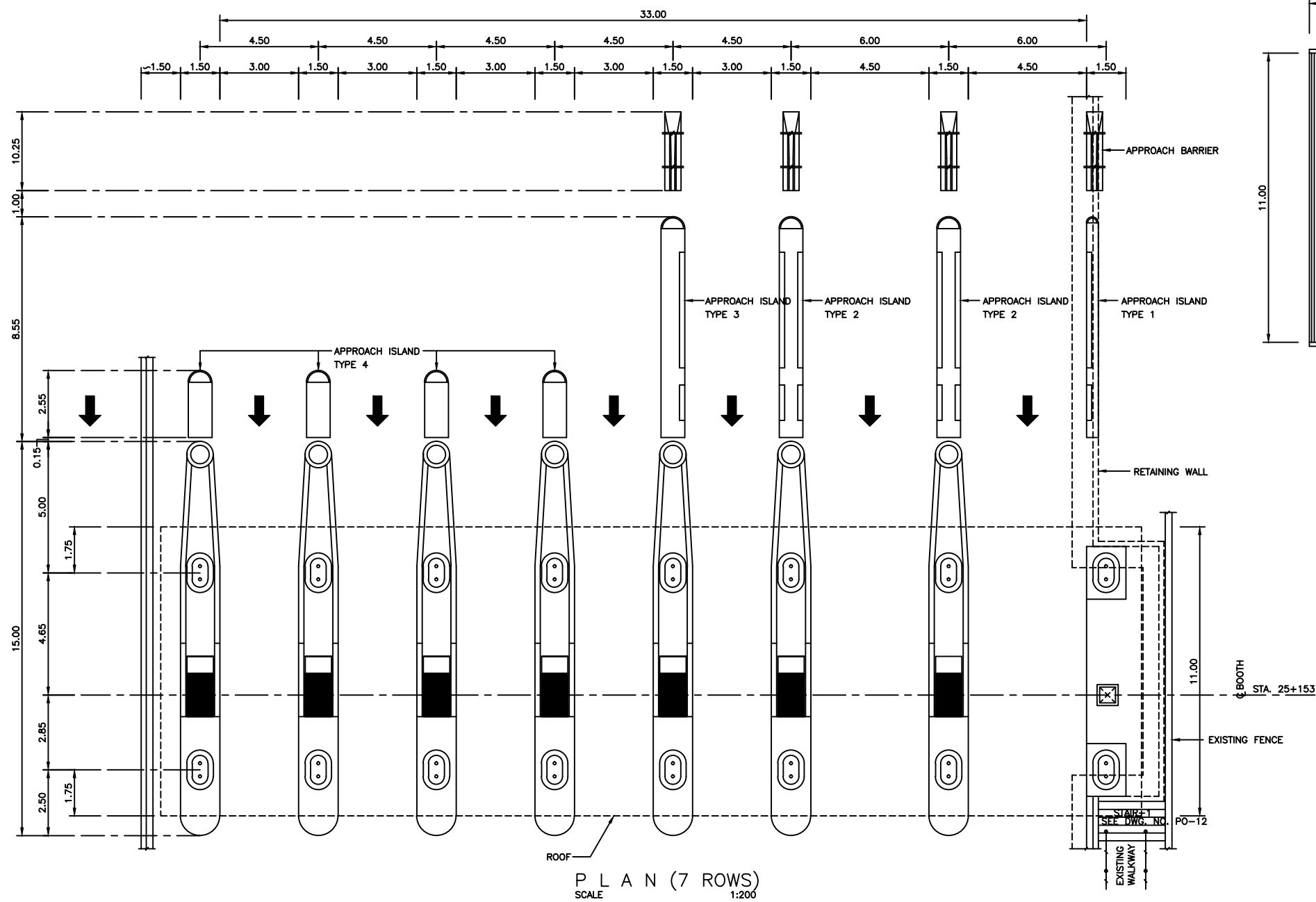
FOOTING

- TOP OF SPREAD FOOTING SHALL BE AT LEAST 1.00 M. BELOWER THAN THE ORIGINAL GROUND LEVEL.
- ALLOWABLE BEARING CAPACITY OF SOIL UNDER TOLL ISLAND AND COLUMN BASE SHALL NOT BE LESS THAN 5 TONNE/M².

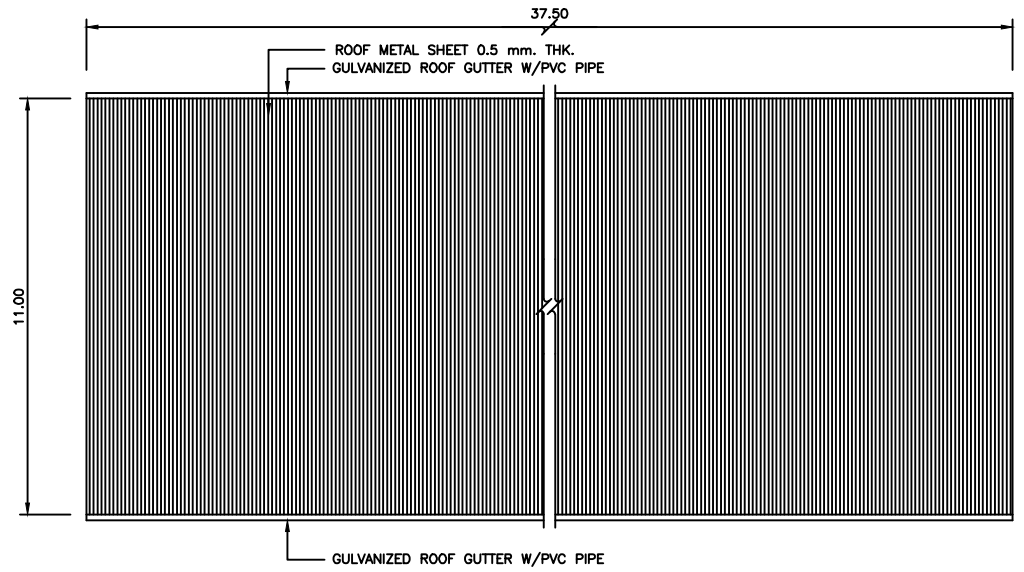
DRAWINGS

- THIS DRAWINGS REFERED TO DOH'S STANDARD DRAWINGS.

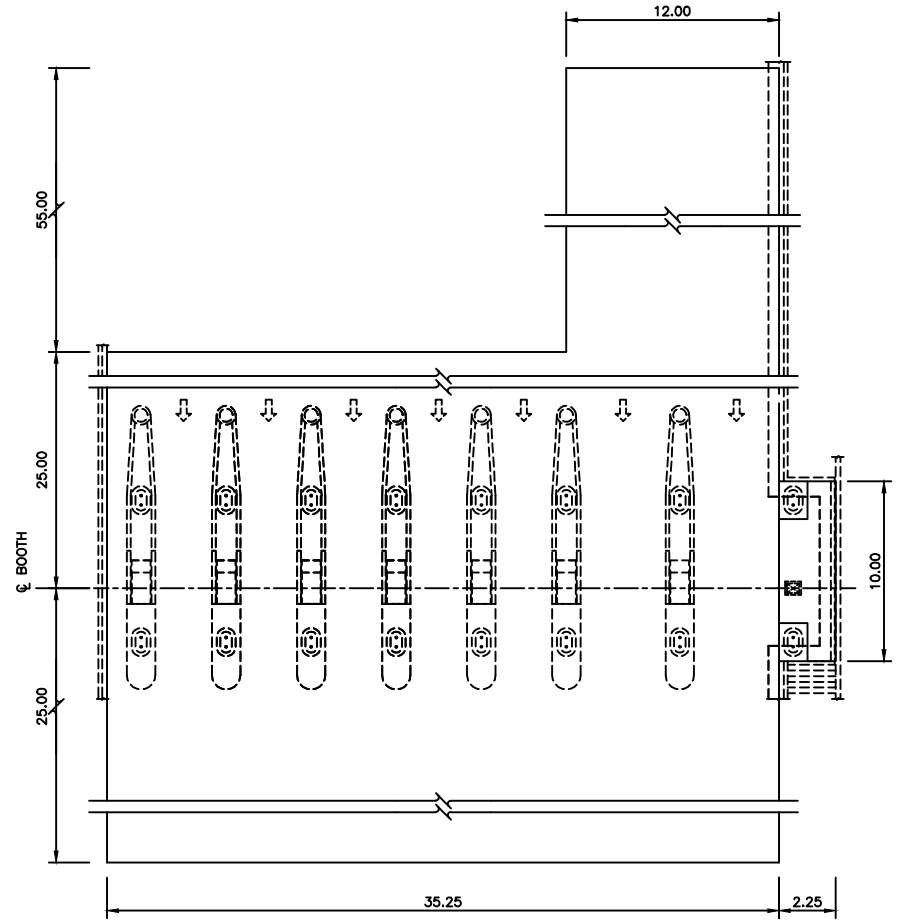
REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	-
														DWG. NO. TG-01	SHEET NO. 127



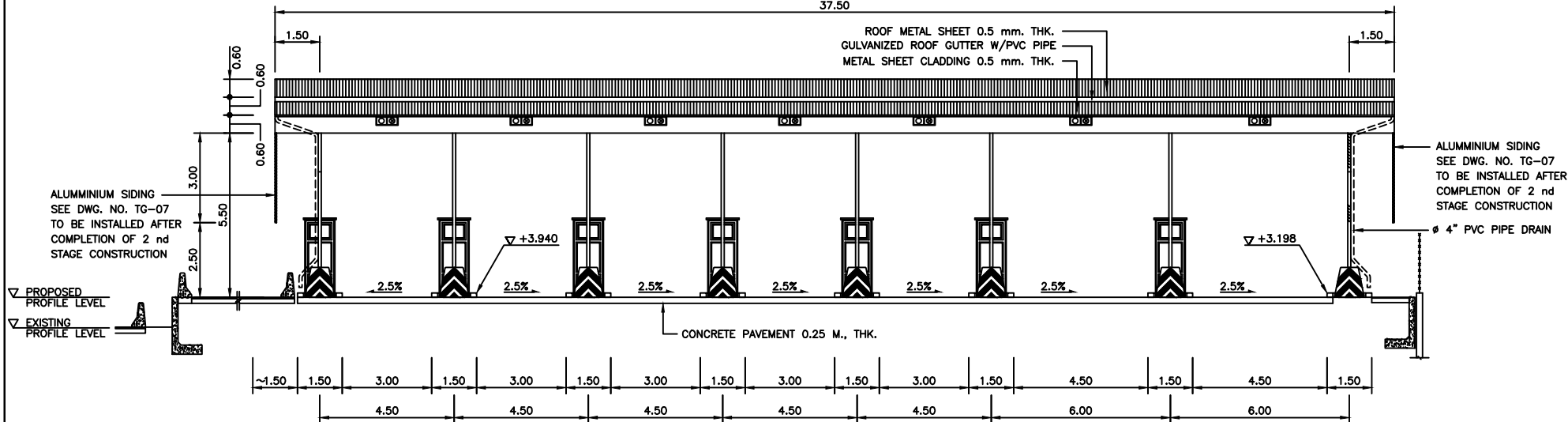
P L A N (7 R O W S)
SCALE 1:200



R O O F P L A N (7 R O W S)
SCALE 1:200

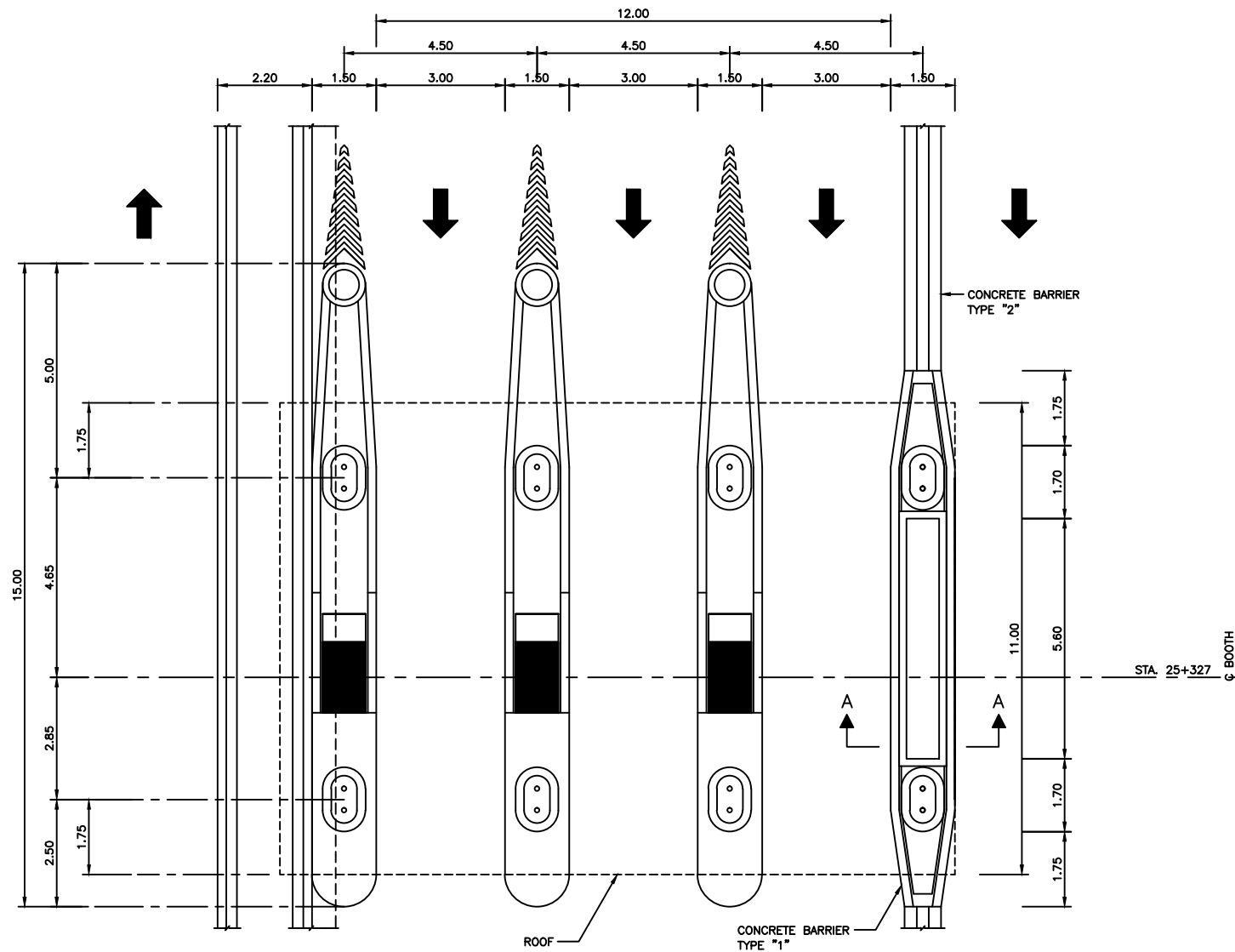


P A V E M E N T L A Y O U T (7 R O W S)
SCALE 1:400

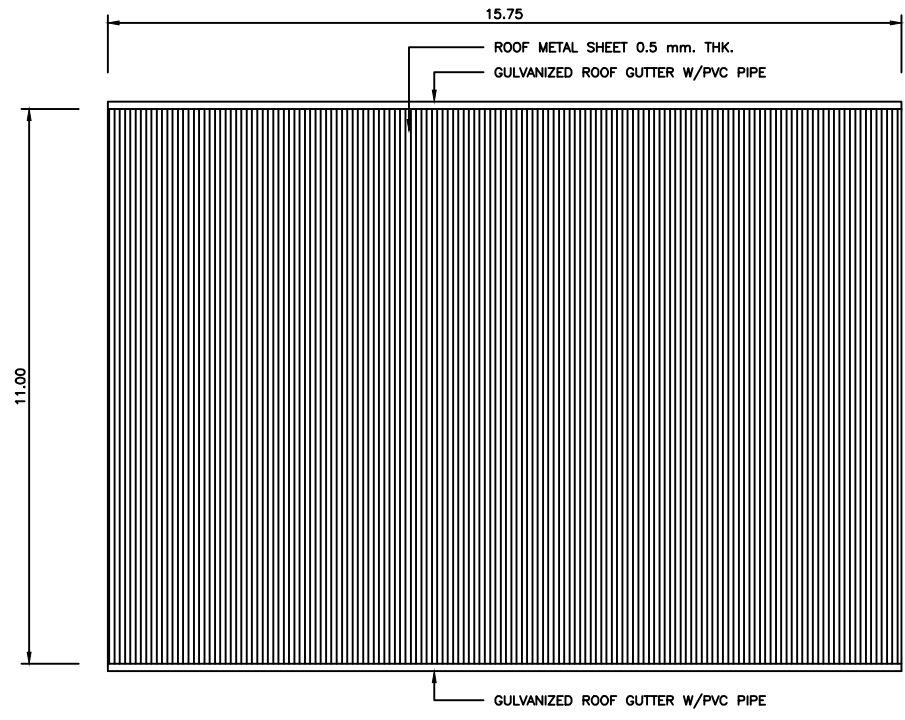


E L E V A T I O N (7 R O W S)
SCALE 1:200

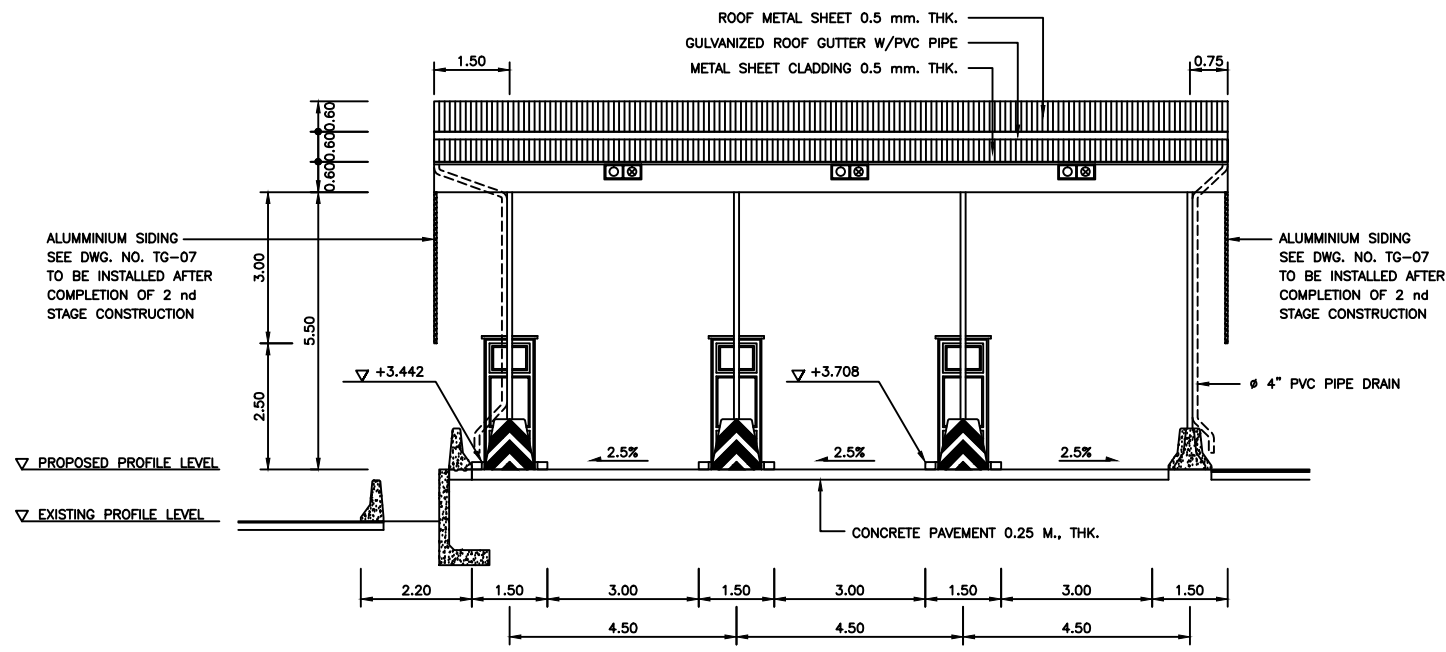
REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 TOLL GATE	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE AUGUST 2012	SCALE AS SHOWN
															DWG. NO. TG-03	SHEET NO. 129



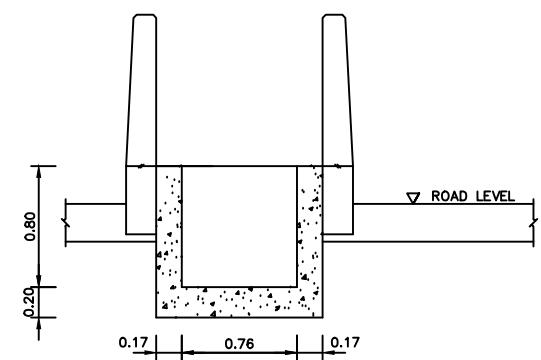
PLAN (3 ROWS)
SCALE 1:150



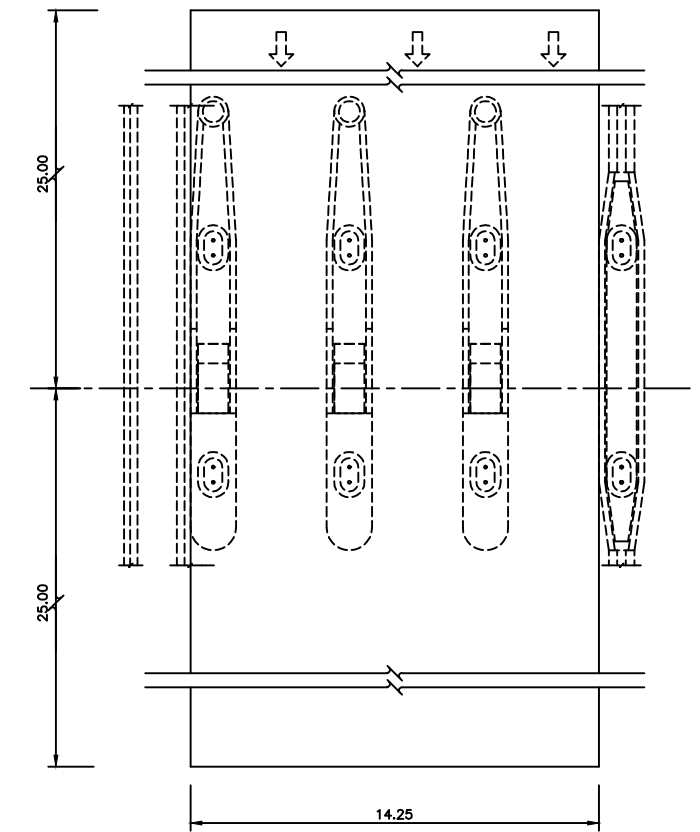
ROOF PLAN (3 ROWS)
SCALE 1:150



ELEVATION (3 ROWS)
SCALE 1:150



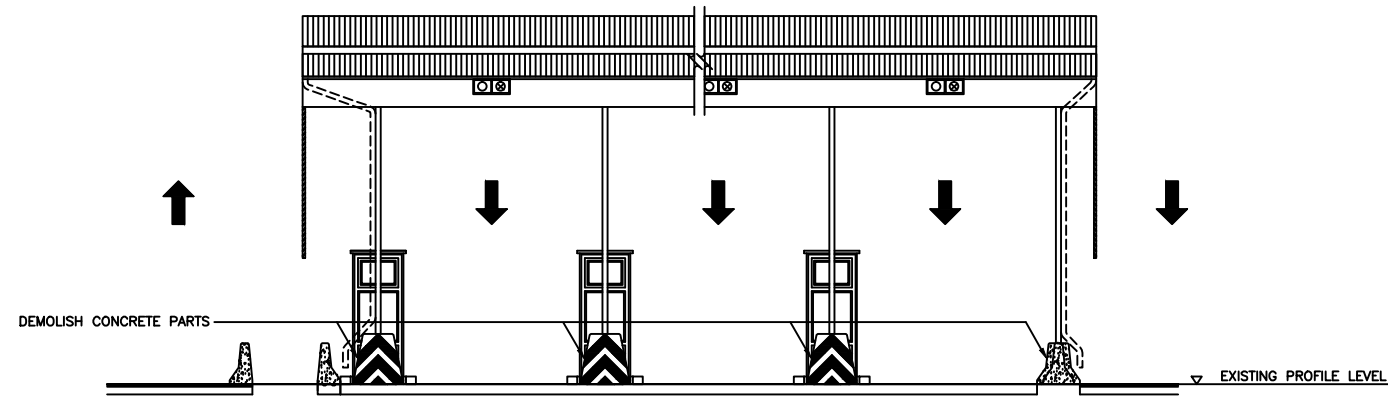
SECTION A-A
SCALE 1:50



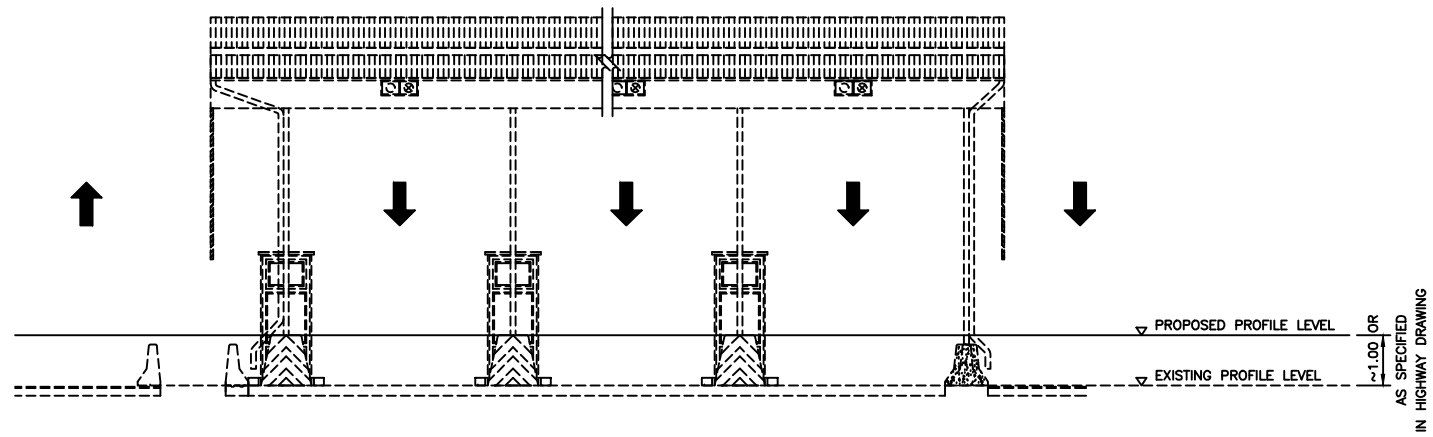
PAVEMENT LAYOUT (3 ROWS)
SCALE 1:250

REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE AUGUST 2012	SCALE AS SHOWN
									TOLL GATE						DWG. NO. TG-04	SHEET NO. 130

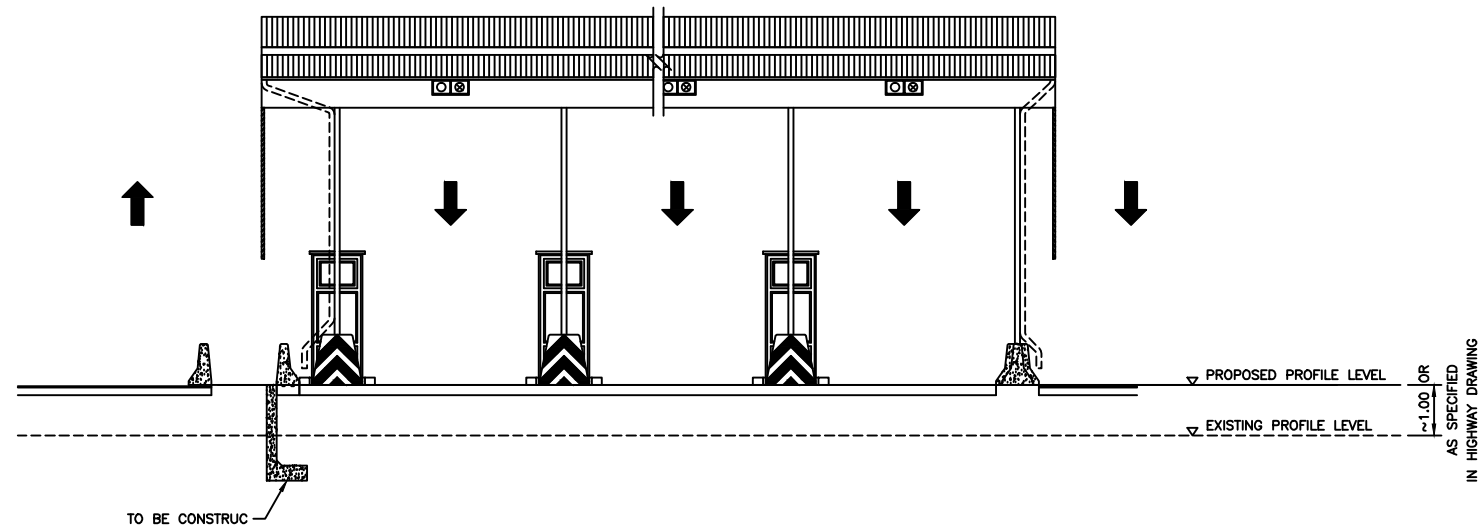
1. EXISTING TOLL GATE TO BE REMOVED.



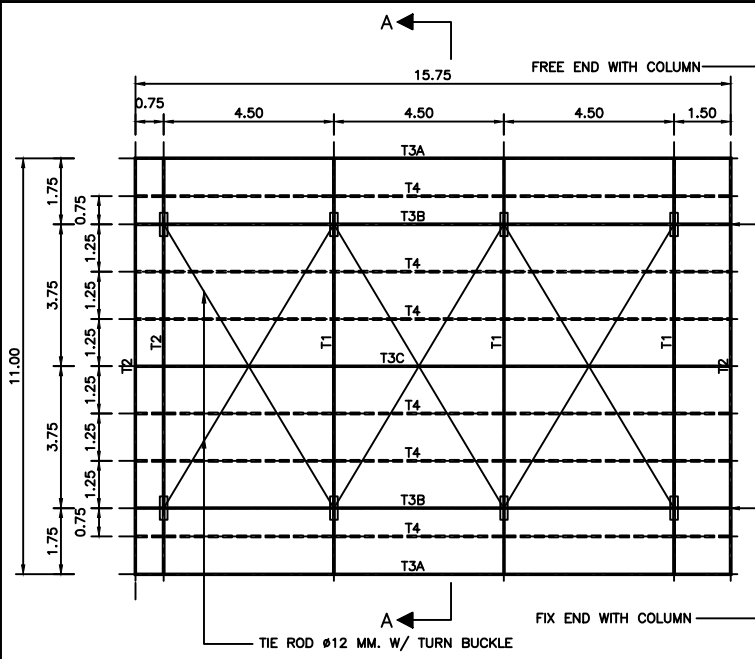
2. FILL AND COMPACT ROADWAY TO NEW ELEVATION AFTER REMOVED ALL EXISTING TOLL GATE.



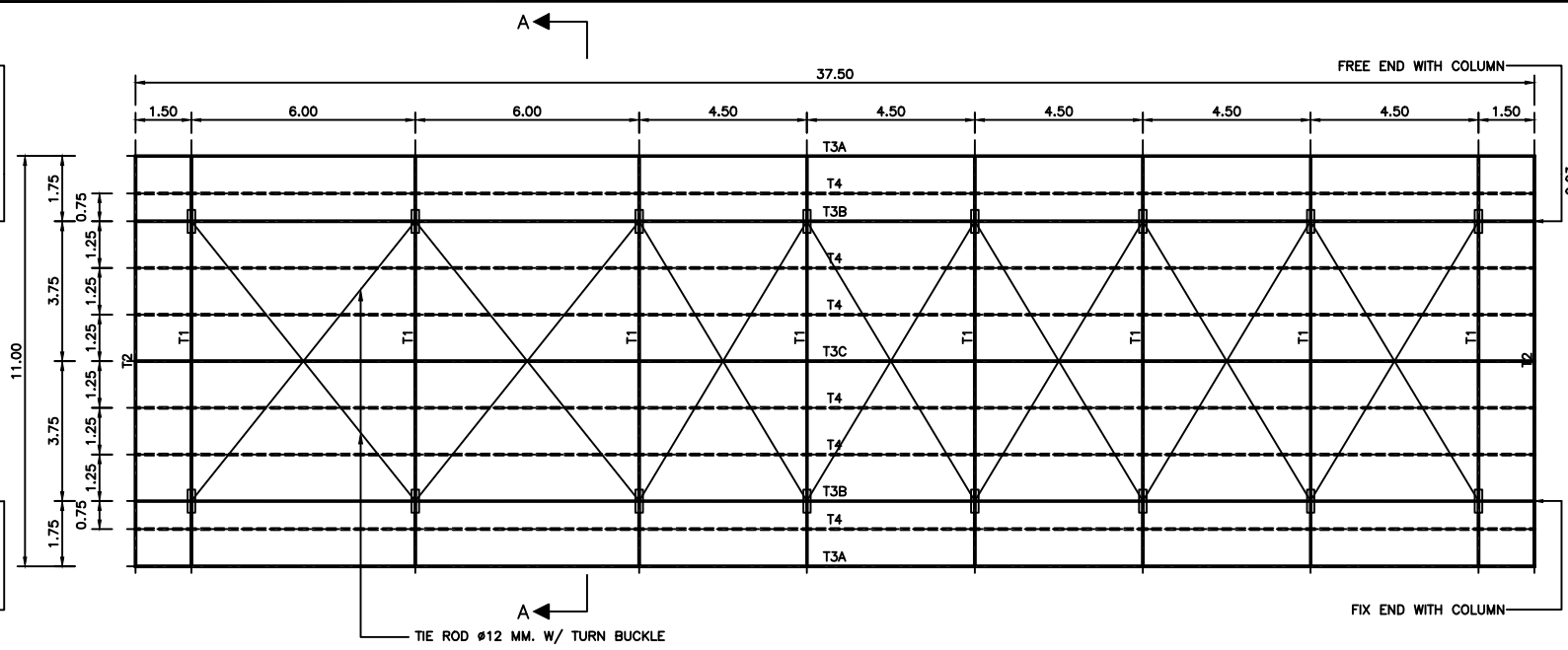
3. CONSTRUCT NEW TOLL GATE BY USING THE FOLLOWING DRAWINGS.



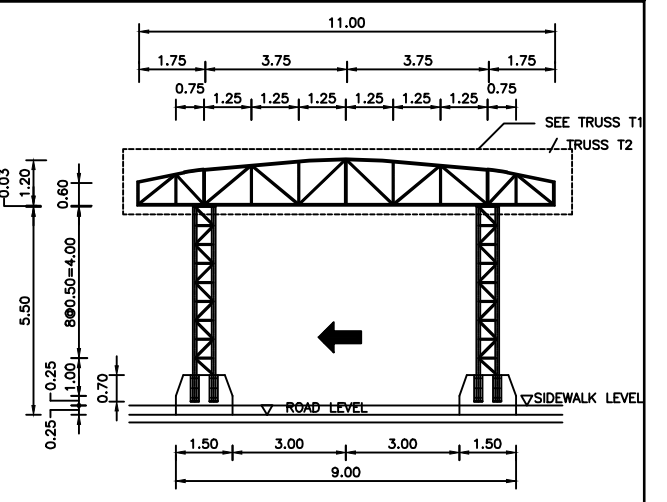
REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 TOLL GATE	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY	CHECKED BY	DATE	SCALE
		CHECKED	DATE	CHECKED	DATE								SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	AS SHOWN
															DWG. NO. TG-05	SHEET NO. 131



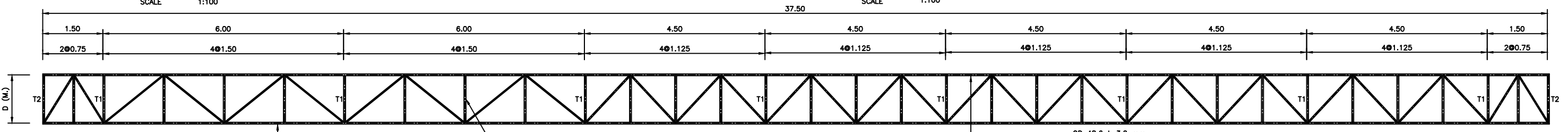
ROOF PLAN (3 ROWS)
SCALE 1:100



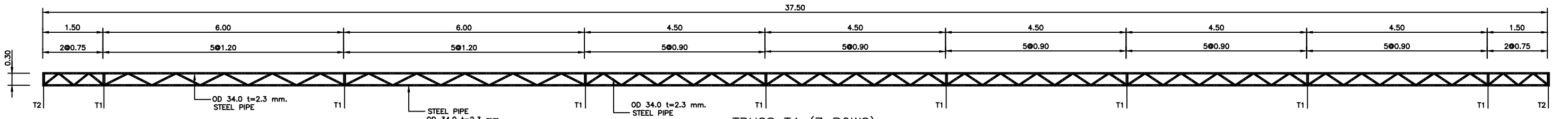
ROOF PLAN (7 ROWS)
SCALE 1:100



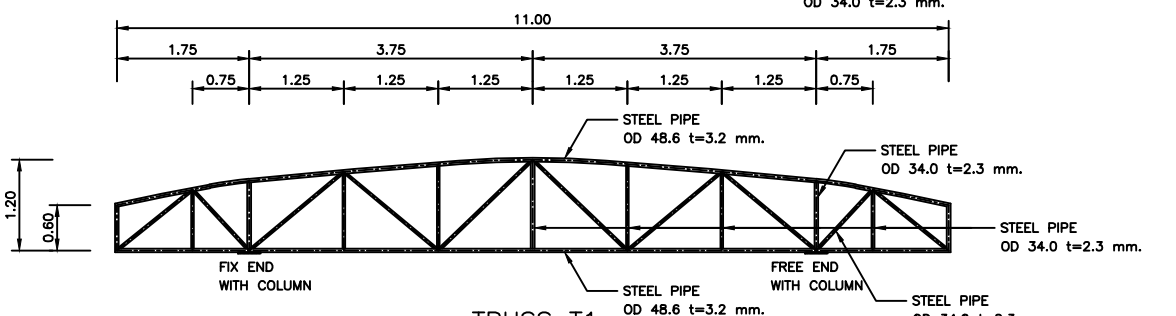
SECTION A-A
SCALE 1:100



TRUSS T3 A,B,C (7 ROWS)
SCALE 1:50

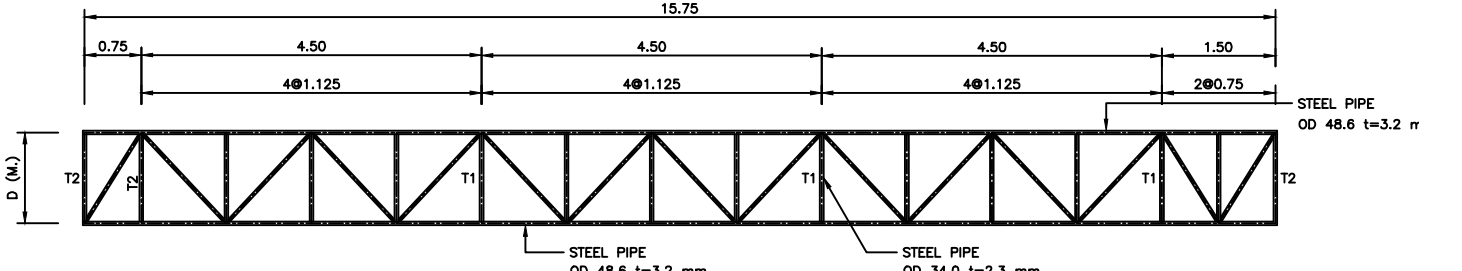


TRUSS T4 (7 ROWS)
SCALE 1:50

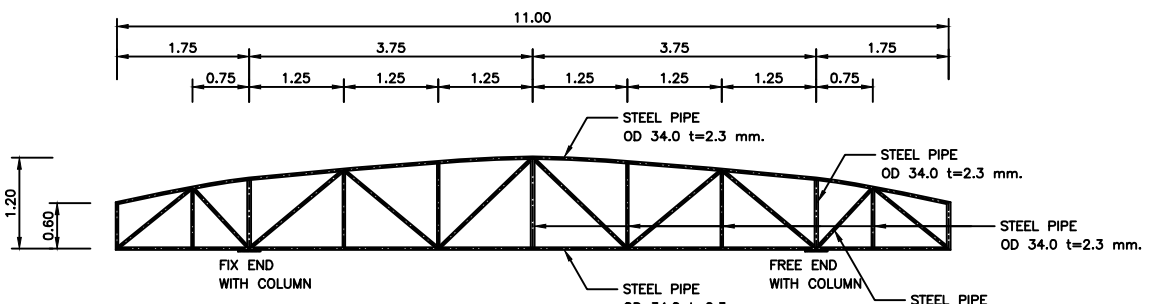


TRUSS T1
SCALE 1:50

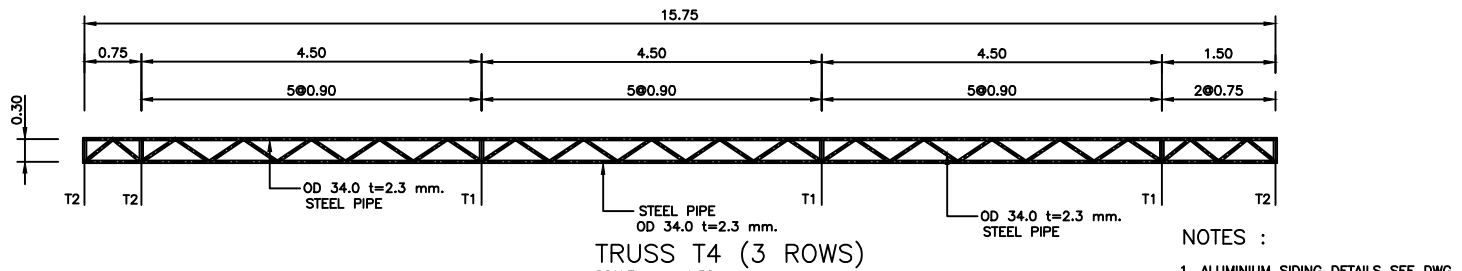
TRUSS	D (M.)
T3A	0.60
T3B	0.922
T3C	1.20



TRUSS T3 A,B,C (3 ROWS)
SCALE 1:50



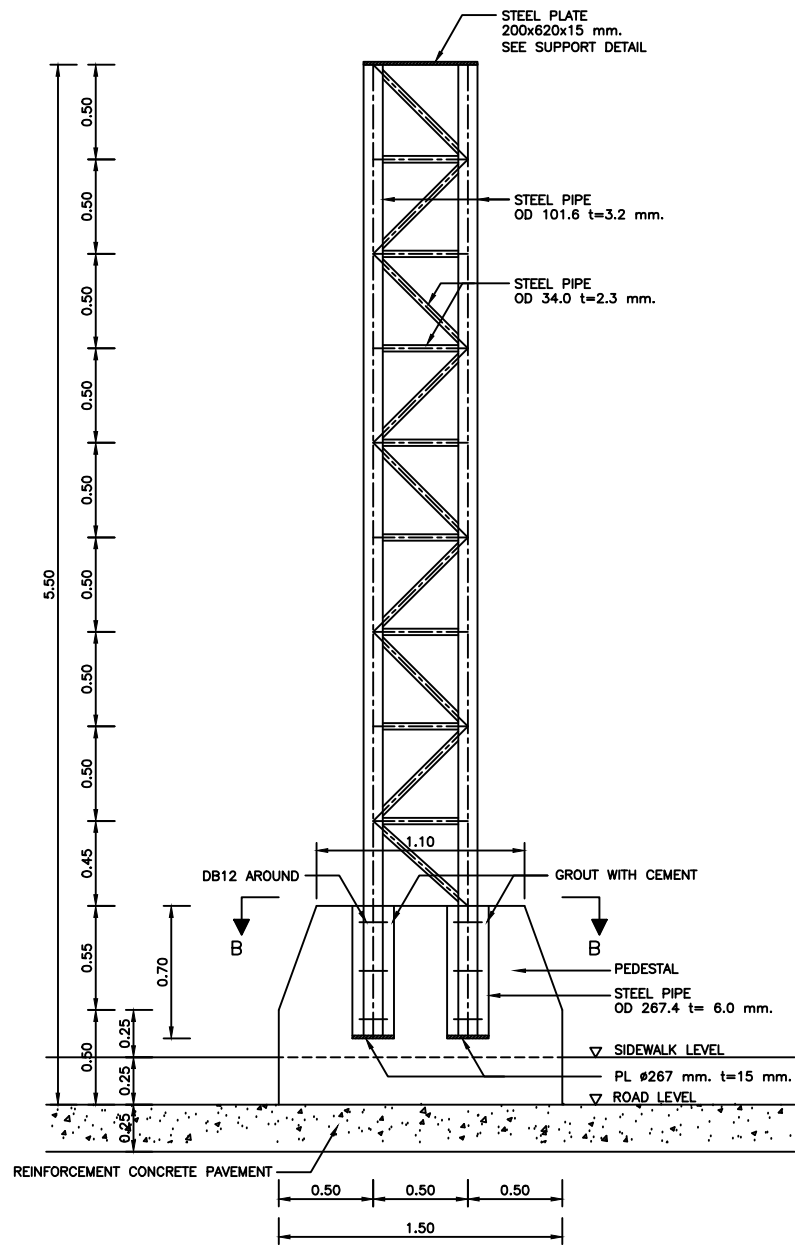
TRUSS T2
SCALE 1:50



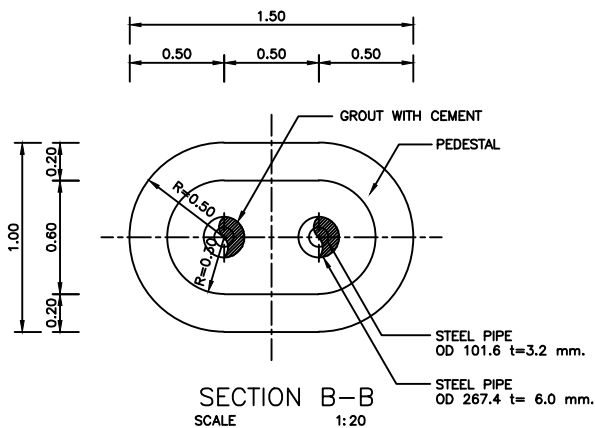
TRUSS T4 (3 ROWS)
SCALE 1:50

NOTES :
1. ALUMINIUM SIDING DETAILS SEE DWG. TG-07

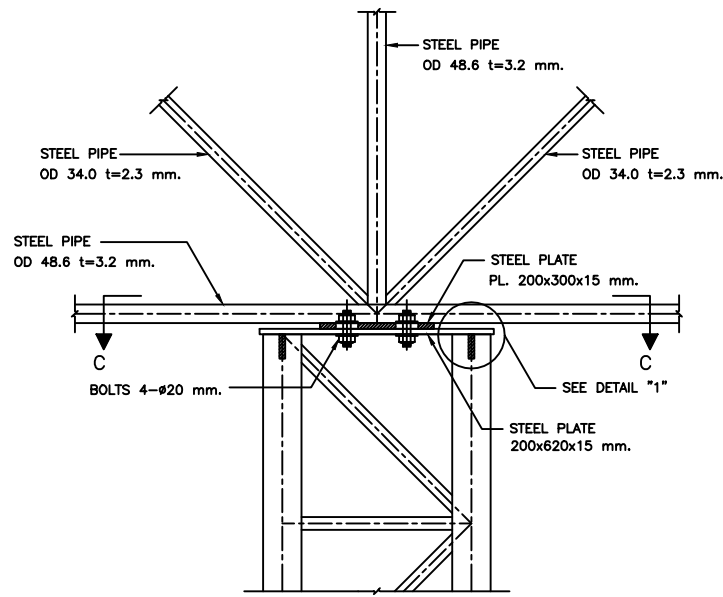
REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	DESIGNED BY	CHECKED BY	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	AS SHOWN
														DWG. NO.	SHEET NO.
												SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	TG-06	132



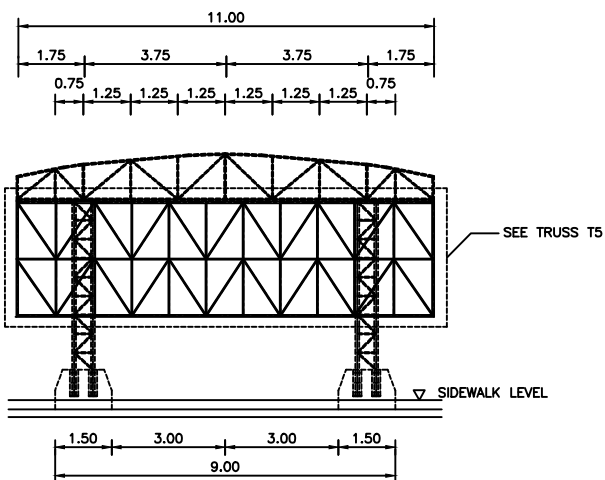
COLUMN DETAIL
SCALE 1:20



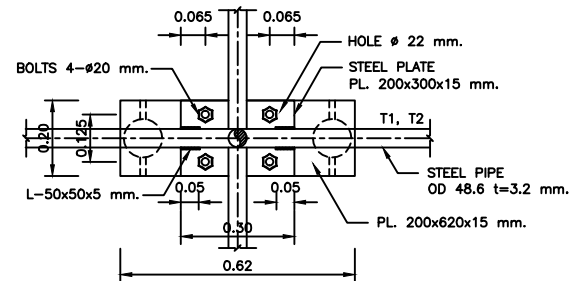
SECTION B-B
SCALE 1:20



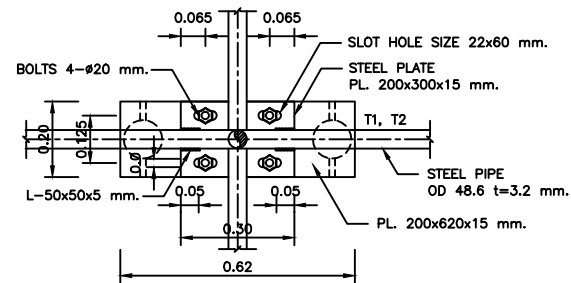
SUPPORT DETAIL (FREE END & FIX END)
SCALE 1:10



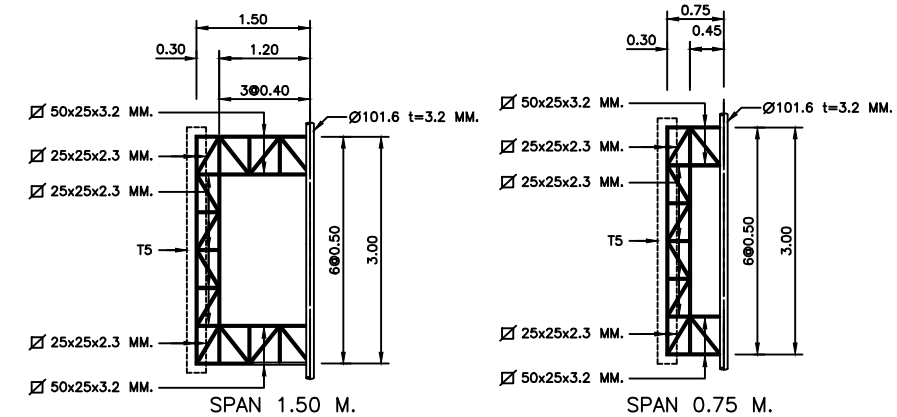
ALUMINIUM SIDING ELEVATION
SCALE 1:100



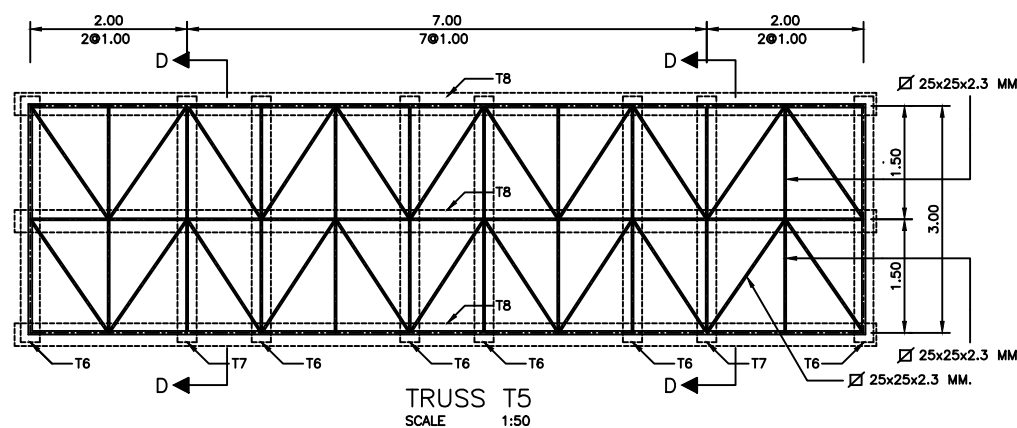
SECTION C-C (FIXED END)
SCALE 1:10



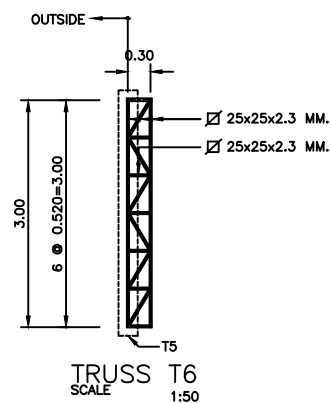
SECTION C-C (FREE END)
SCALE 1:10



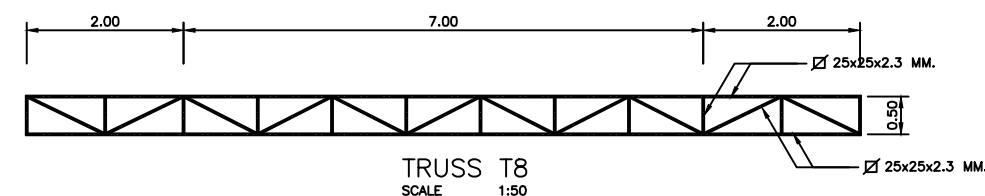
SECTION D-D (TRUSS T7)
SCALE 1:50



TRUSS T5
SCALE 1:50

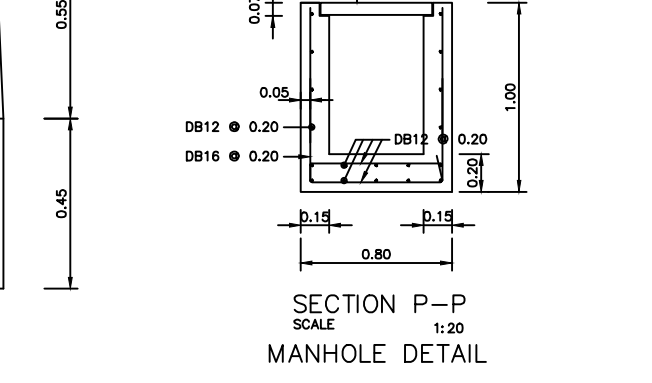
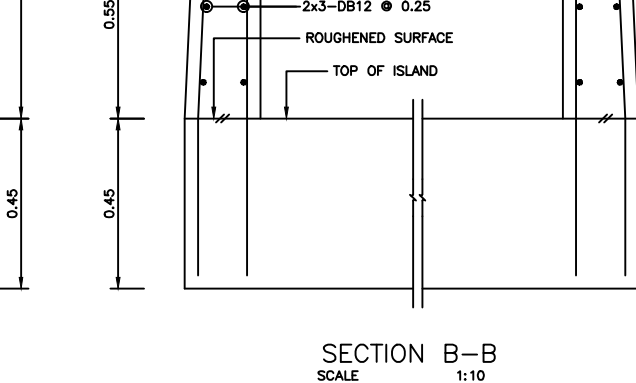
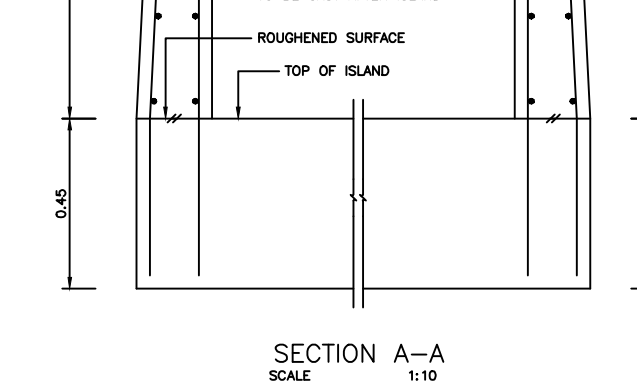
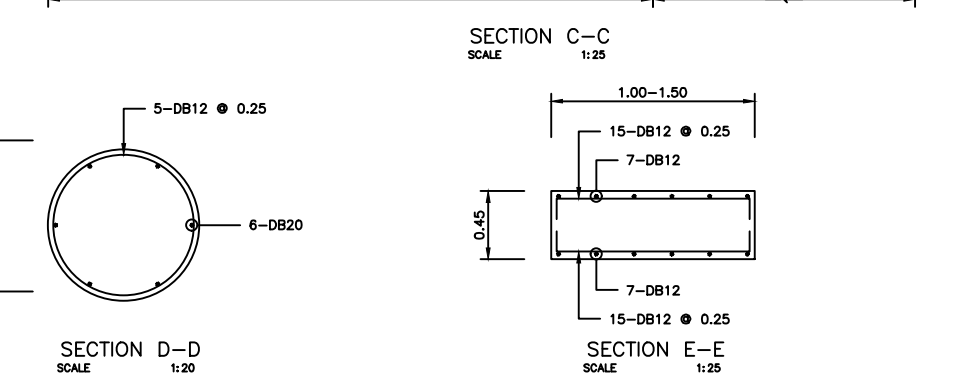
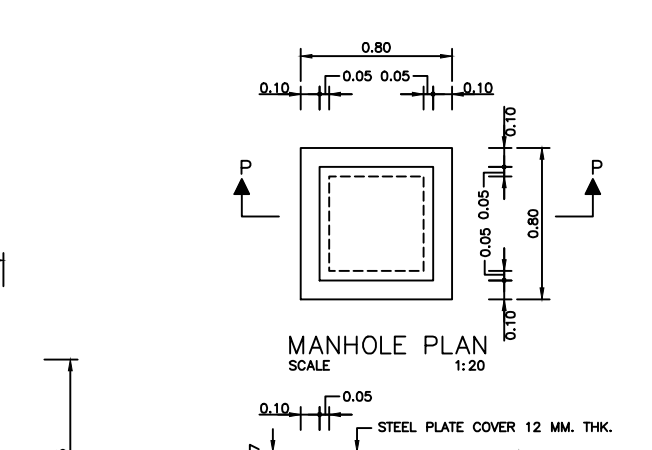
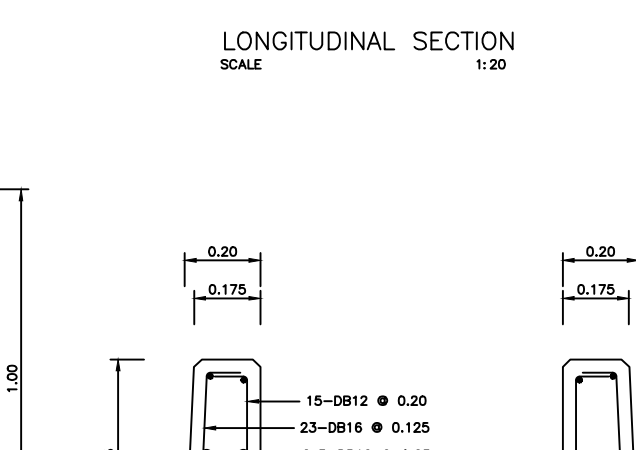
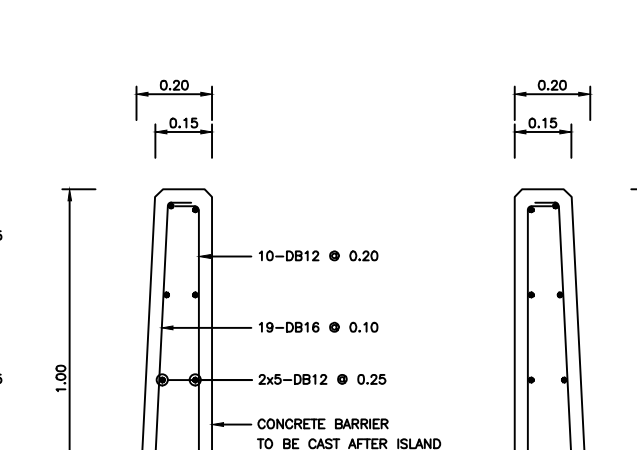
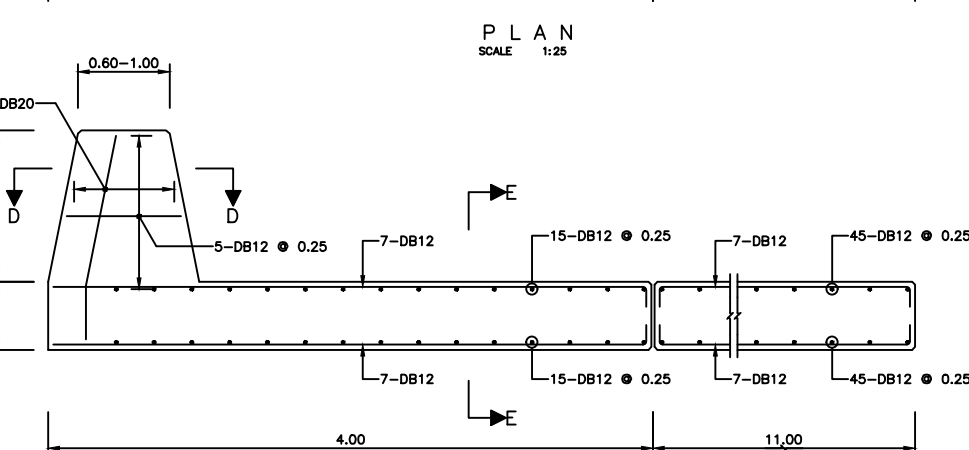
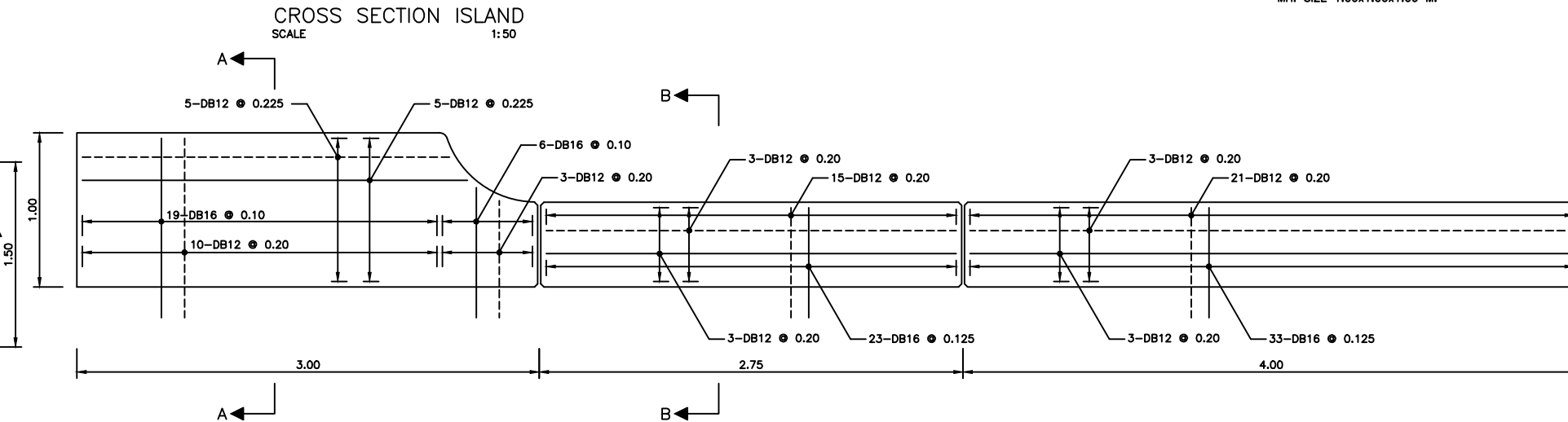
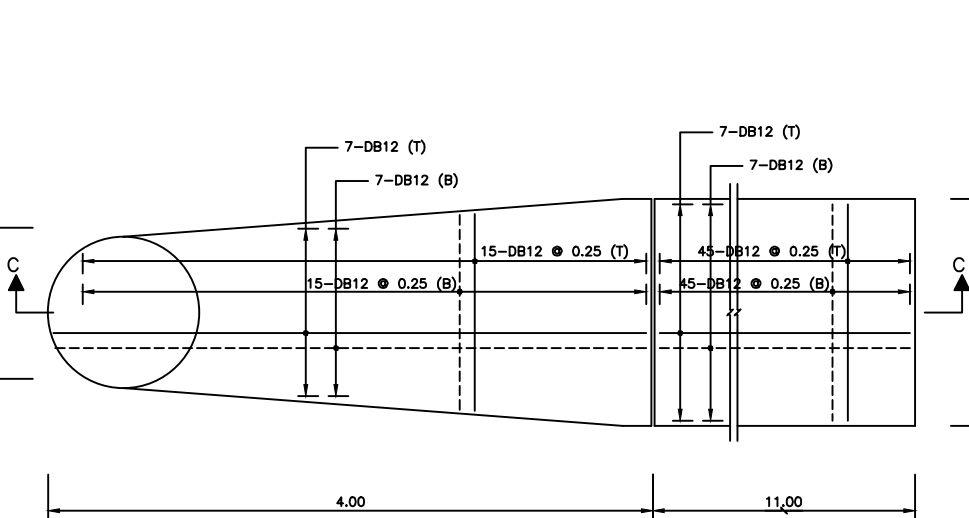
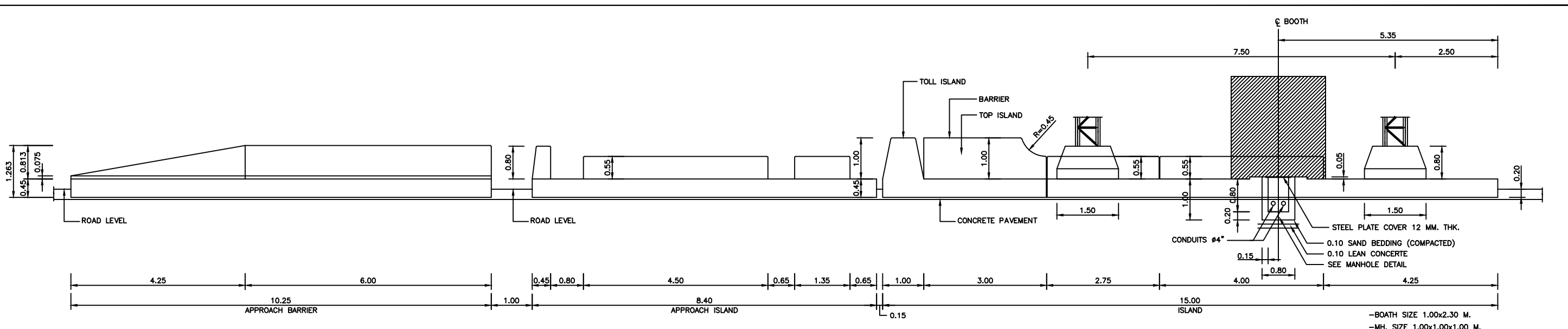


TRUSS T6
SCALE 1:50

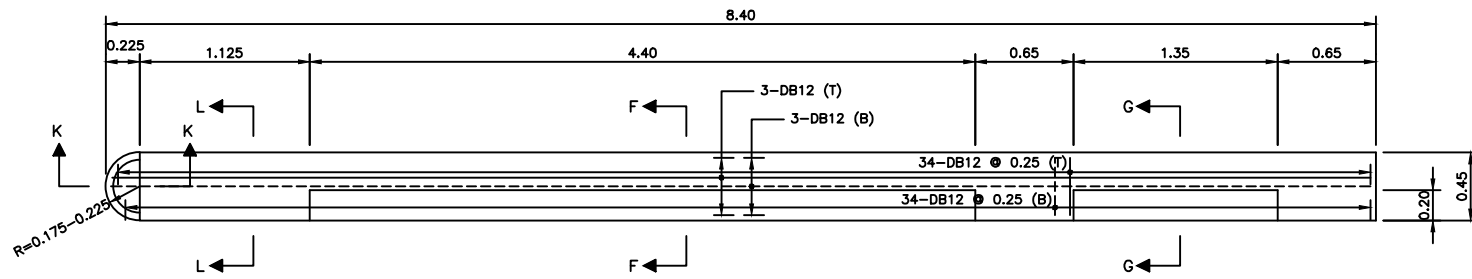


TRUSS T8
SCALE 1:50

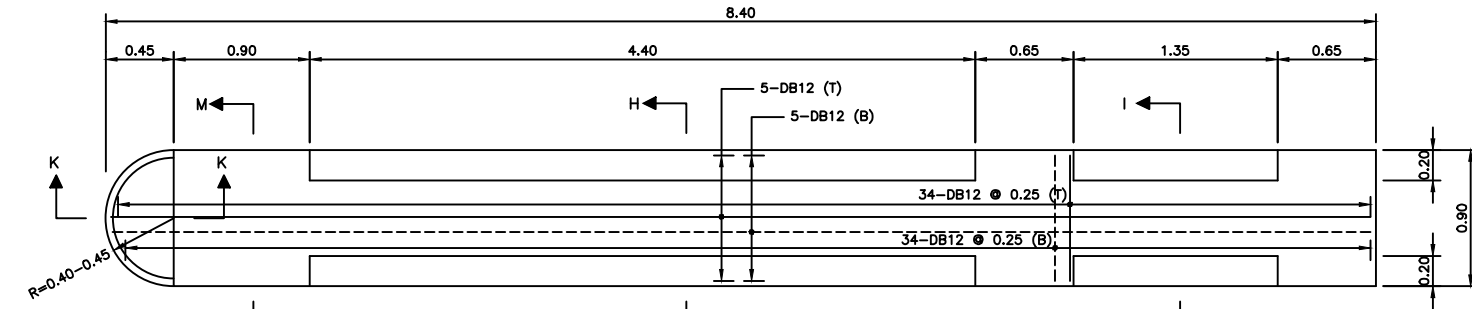
REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE AUGUST 2012	SCALE AS SHOWN
									TOLL GATE						DWG. NO. TG-07	SHEET NO. 133



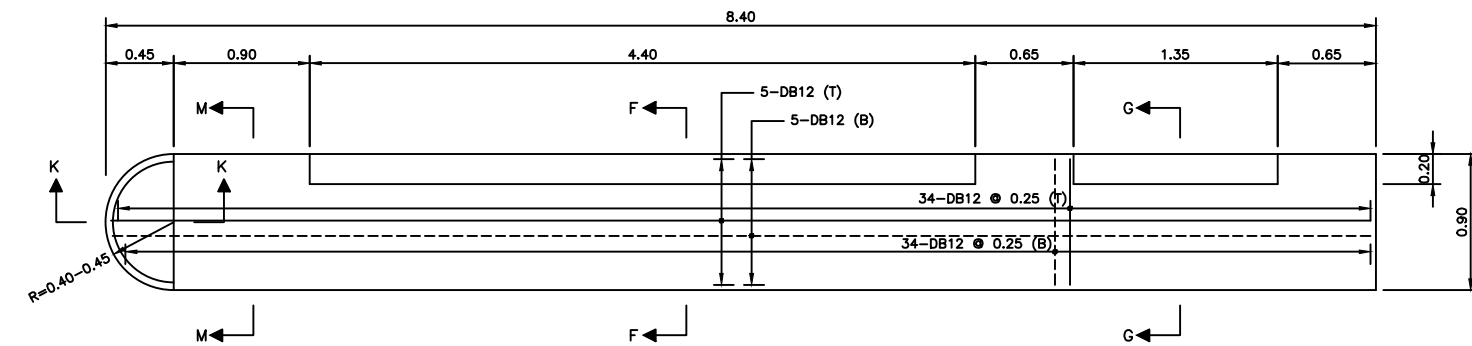
REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE:	SCALE:
		CHECKED	DATE	CHECKED	DATE										AUGUST 2012	AS SHOWN
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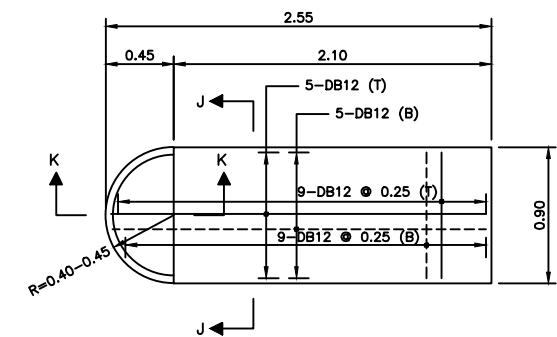
APPROACH ISLAND TYPE 1 PLAN
SCALE 1:25



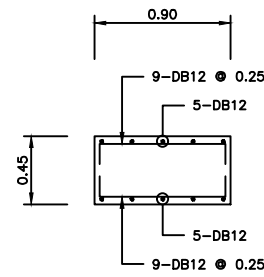
APPROACH ISLAND TYPE 2 PLAN
SCALE 1:25



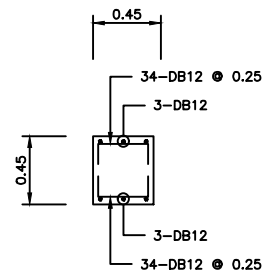
APPROACH ISLAND TYPE 3 PLAN
SCALE 1:25



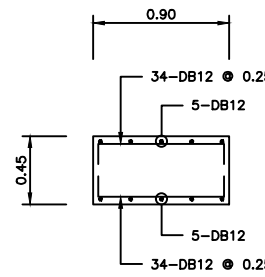
APPROACH ISLAND TYPE 4 PLAN
SCALE 1:25



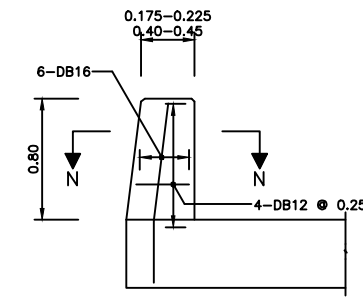
SECTION J-J
SCALE 1:25



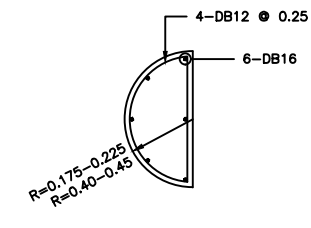
SECTION L-L
SCALE 1:25



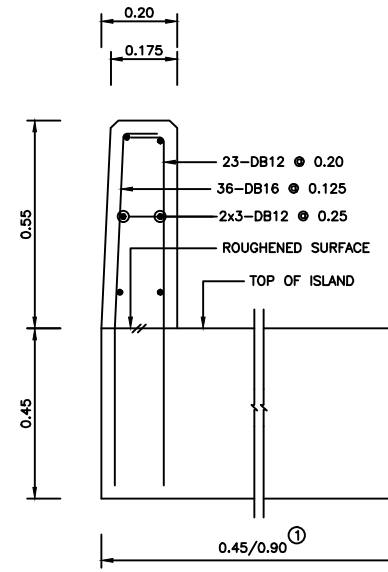
SECTION M-M
SCALE 1:25



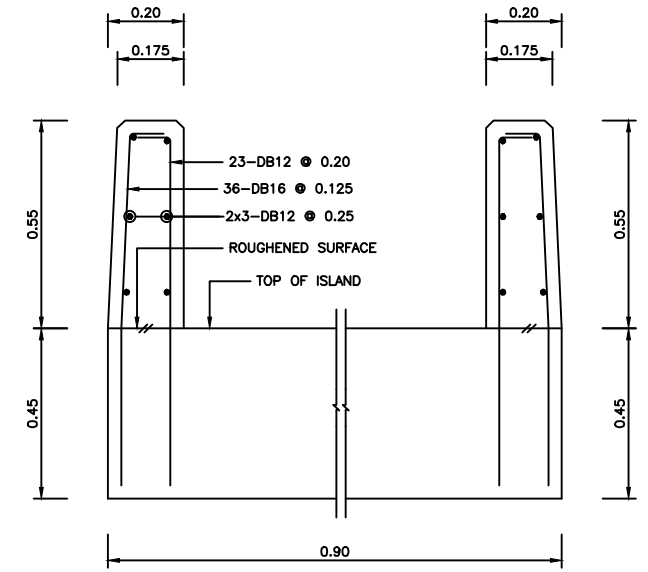
SECTION K-K
SCALE 1:20



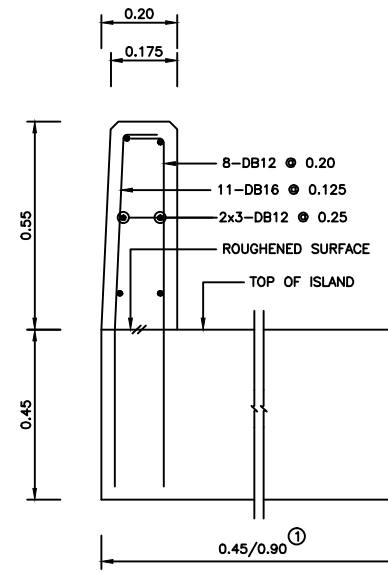
SECTION N-N
SCALE 1:20



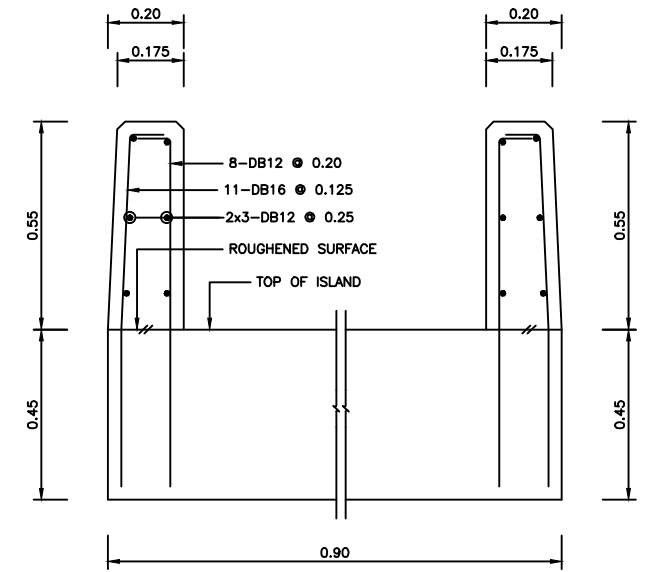
SECTION F-F
SCALE 1:10



SECTION H-H
SCALE 1:10



SECTION G-G
SCALE 1:10

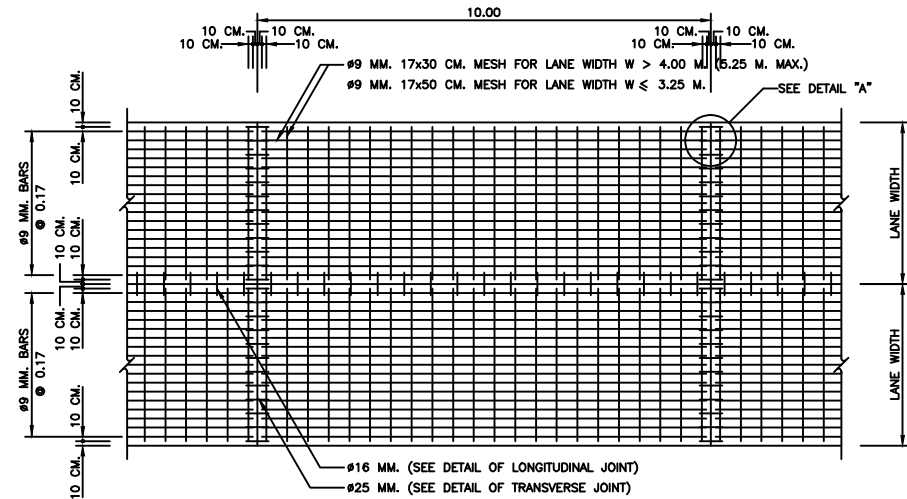


SECTION I-I
SCALE 1:10

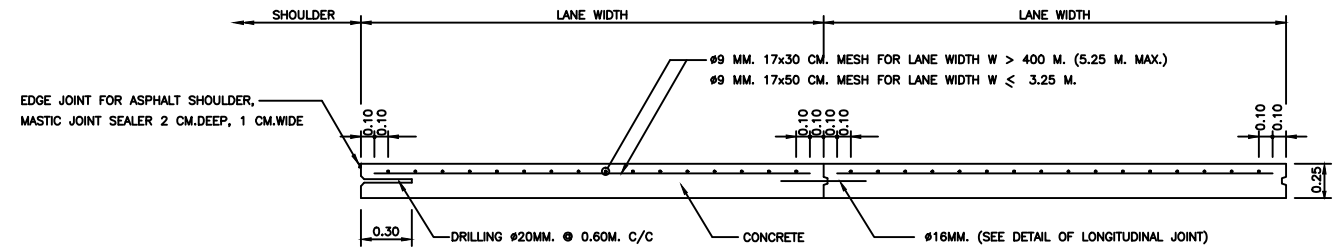
NOTE

① APPROACH ISLAND TYPE 1/APPROACH ISLAND TYPE 4.

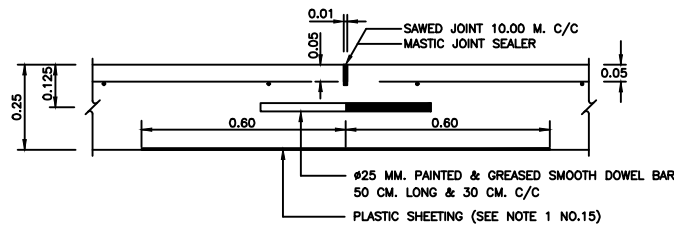
REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	<p>KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS</p>	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	<p>CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.</p>	DESIGNED BY	CHECKED BY	DATE	SCALE
									TOLL GATE	The Inter-City Motorways Division Department of Highways Ministry of Transport	The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road		SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	AS SHOWN
													DWG. NO.	TG-09	SHEET NO.	135



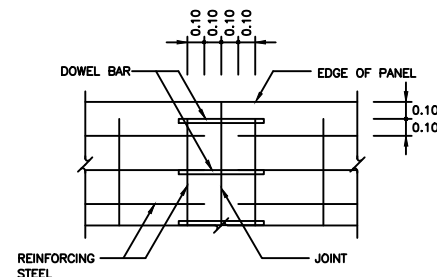
PLAN OF REINFORCED CONCRETE PAVEMENT
SCALE 1:75



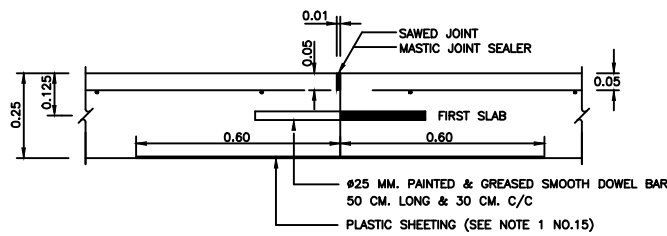
REINFORCEMENT DETAIL OF CONCRETE PAVEMENT CROSS-SECTION
SCALE 1:25



DETAIL OF CONTRACTION JOINT (J-4, J-5)

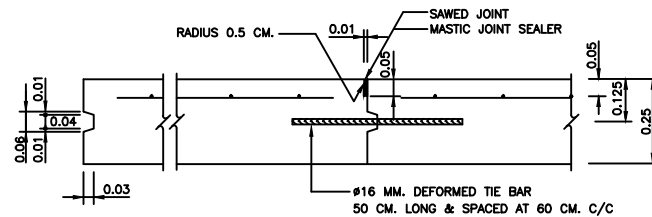


DETAIL "A"
SCALE 1:20

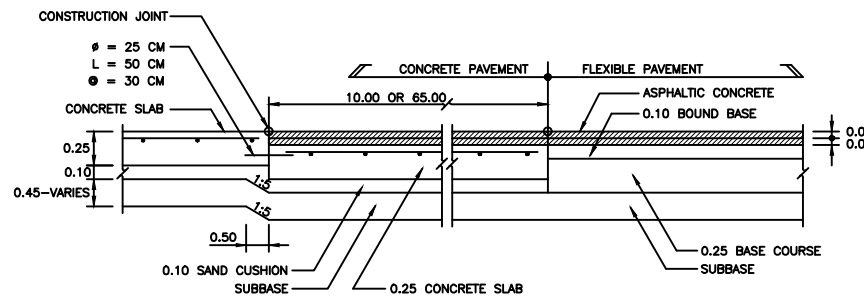


DETAIL OF CONSTRUCTION JOINT (J-2)

DETAIL OF TRANSVERSE JOINTS
SCALE 1:10



DETAIL OF LONGITUDINAL JOINT (J-1, J-3)
SCALE 1:10



DETAIL OF JOINT BETWEEN CONCRETE PAVEMENT & FLEXIBLE PAVEMENT
SCALE

NOTES 1 :

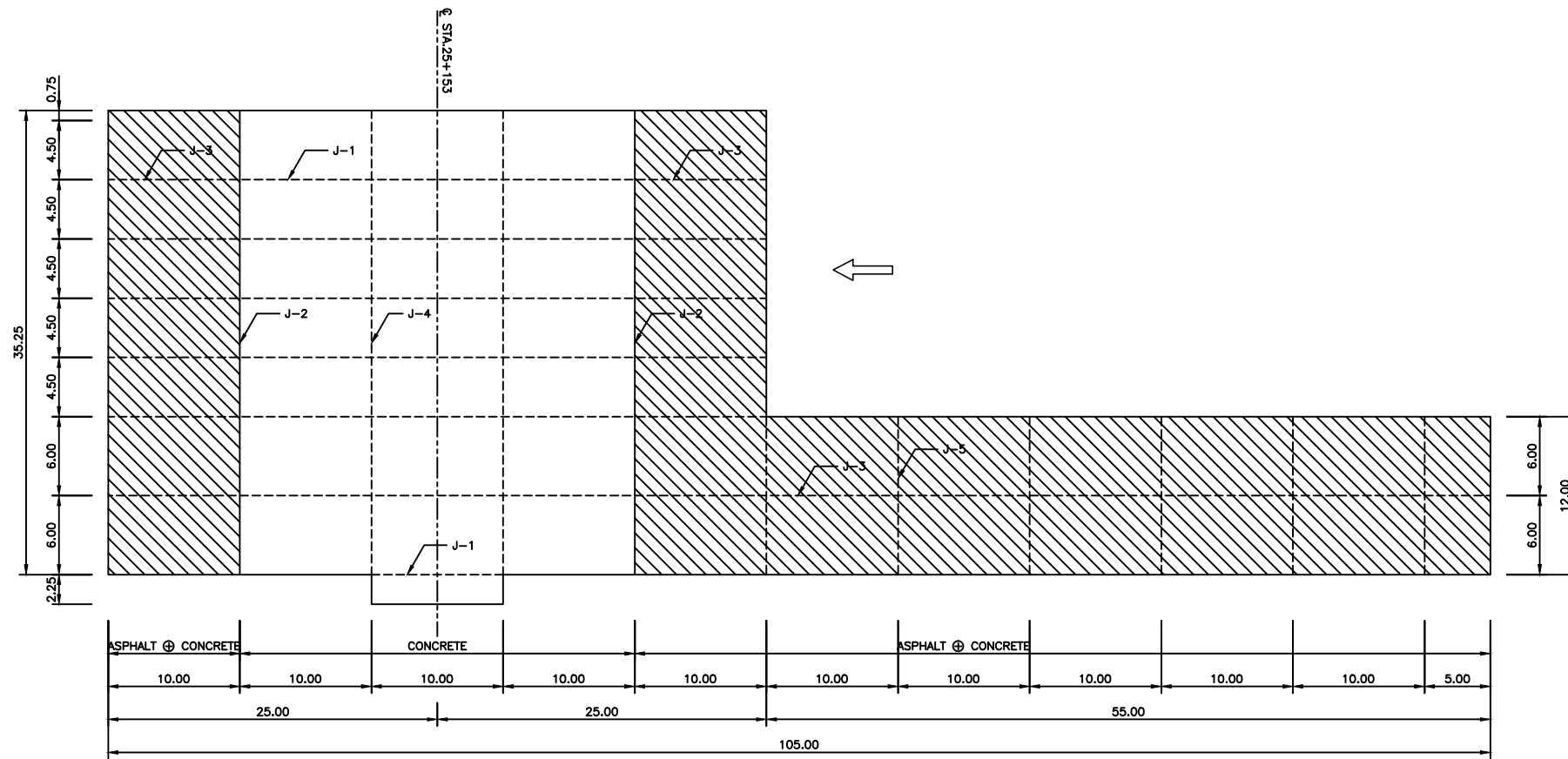
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- EXPANSION JOINT SHALL BE CONSTRUCTED AT THE INTERVAL OF 350 METERS. IF THE LAST INTERVAL IS LESS THAN 350 METERS, THE INTERVALS SHALL BE AVERAGED BUT BETWEEN 300 AND 350 METERS.
- EXPANSION JOINT SHALL BE PROVIDED AT THE OUTER EDGE OF BOTH SIDES OF THE BOX CULVERT CROSSING.
- MASTIC JOINT SEALER SHALL BE OF THE HOT POURED ELASTIC TYPE CONFORMING TO TIS. 479.
- JOINT FILLER SHALL CONFORM TO THE AASHTO M. 213-74 OR ASTM. D1751-73 SPECIFICATION.
- CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 325 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOWS :

PORTLAND CEMENT TYPE 1	350	KG. (MIN.)
SAND	0.43	M ³
CRUSHED ROCK OR GRAVEL	0.86	M ³
CONCRETE SLUMP	7	CM. (MAX.)
- REINFORCING STEEL SHALL CONFORM TIS.20 GRADE SR 24 FOR ROUND BARS AND TIS. 24 GRADE SD 30 FOR DEFORMED BAR.
- WELDED WIRE CAN BE USED IN PLACE OF BAR MESH. (SEE NOTE ②)
- CONCRETE PAVEMENT SHALL BE REQUIRED FOR CONCRETE POURING. IN CASE OF NECESSARY POURING CONCRETE BY MAN-POWER, CONCRETE SHALL BE POURED ONLY GAP SPACE NOT MORE THAN 30.00 METERS LONG.
- ALL JOINTS EXCEPT EXPANSION JOINT SHALL BE MADE BY SLOT CUTTING MACHINE ONLY. FOAM SHEET, PLYWOOD, TIMBER OR MATERIAL OF THE SAME TYPE SHALL NOT BE ALLOWED.
- TRAFFIC SHALL BE ALLOWED ONLY IF THE ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE CUBE CONFORMS TO THE REQUIREMENT IN NOTE NO.6
- ROAD CONSTRUCTION MATERIAL NOT SPECIFIED IN THIS DRAWING SHALL CONFORM TO THE STANDARD OF THE DEPARTMENT OF HIGHWAYS.
- PREPARATION OF JOINT FOR MASTIC JOINT SEALER.
 - THE JOINT SHALL BE CLEANED WITH A BLOWER TO GET RID OF ALL KINDS OF DIRT THE JOINT SHALL BE COMPLETELY DRY.
 - PRIMER SHALL BE APPLIED TO THE JOINT WITH A BRUSH OR SPRAYER THE JOINT SHALL BE LET DRY BEFORE THE POURING OF MASTIC JOINT SEALER WHICH HAS BEEN BOILED AND DISSOLVED BY MEANS OF HEAT CONDUCTIVITY TO THE SPECIFIED TEMPERATURE.
 - JOINTS SHALL BE CUT AND MASTIC JOINT SEALER SHALL BE DROPPED AS SOON AS POSSIBLE.
 - MASTIC JOINT SEALER SHALL BE DROPPED WITH JOINT SEALANT APPLYING MACHINE.
- THE THICKNESS OF FLEXIBLE PAVEMENT CORRESPONDED TO THE FIGURE CONFORMING TO TYPICAL CROSS-SECTION.
- PLASTIC SHEET USED IN CONSTRUCTION SHALL HAVE THE FOLLOWING REQUIREMENTS :
 - THICKNESS OF 0.07 MM. WITH A TOLERANCE OF NOT MORE THAN 7% SHALL BE REQUIRED.
 - WIDTH SHALL NOT BE LESS THAN 1.20 M.
 - IT SHALL BE COLOURLESS, TRANSPARENT AND WATERPROOF, FREE FROM POROUS AREA, TURN AREA AND BLISTERING AREA WHICH ARE VISIBLE BY NAKED EYE. EDGE SHALL BE STRAIGHT.
 - CONTINUOUS LENGTH SHALL BE REQUIREMENT TO THE WIDTH OF TRAFFIC LANES. CONNECTION ALLOWED AT LONGITUDINAL JOINTS WITH NOT LESS THAN 20 CM. OVERLAPPING SHALL BE REQUIRED.
- CONCRETE PAVEMENT CONSTRUCTION CONTROL SHALL CONFORM TO THE STANDARD DH-S 409/2530 REGARDING "REGULATIONS OF CONSTRUCTION CONTROL OF PORTLAND CEMENT CONCRETE PAVEMENT."

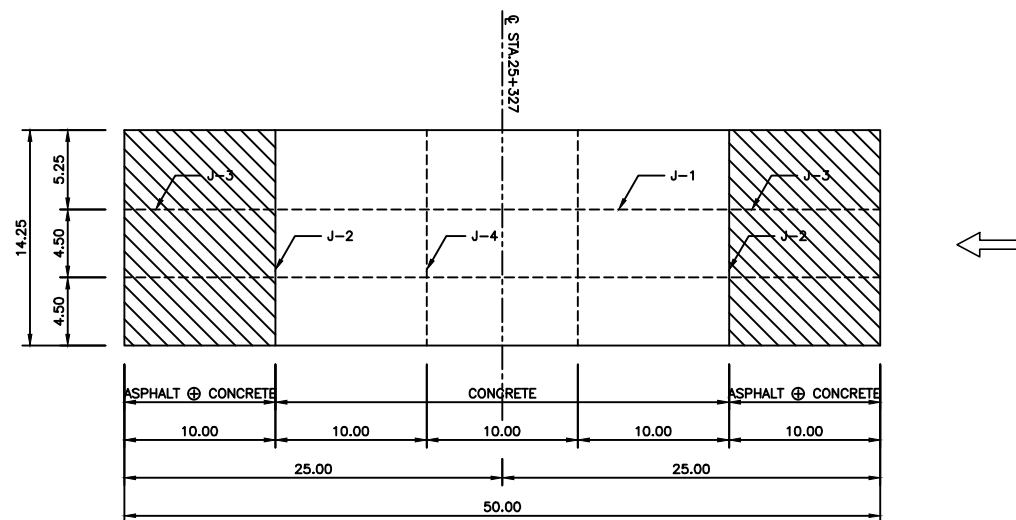
NOTES 2 :

- BAR MESH 9 MM. AS SHOWN IN THIS DRAWING SHALL BE REPLACED BY WELDED STEEL WIRE WITH PROPERTIES CONFORMING TO STANDARD SPECIFICATION FOR WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT, AASHTO DESIGNATION M 55 - 75 (ASTM. DESIGNATION A 185 - 73). BEFORE USING WELDED STEEL WIRE FABRIC, THE SAMPLES SHALL BE SENT TO MATERIAL AND RESEARCH DIVISION DOH. FOR APPROVING.
- MINIMUM SIZE OF WIRE TO BE USED SHALL NOT BE LESS THAN STANDARD WIRE AASHTO DESIGNATION M 32 - 78 (ASTM DESIGNATION A 82 - 76) SIZE NUMBER W. 12 AT NOMINAL DIAMETER OF 3.15 MM. AND NOMINAL AREA OF 0.007 CM². WIRE TO BE USED SHALL HAVE YIELD STRENGTH OF NOT LESS THAN 65,000 LB/INCH² (PSI).
- LAP SPLICES OF BAR MESH SHALL NOT BE LESS THAN 40 TIMES OF WIRE DIAMETER AND NOT LESS THAN SPACING OF CROSS WIRE + 5 CM.
- QUANTITY OF STEEL WIRE FABRIC CALCULATED FROM NOMINAL AREA AND SPACING IN EACH DIRECTION SHALL CONFORM TO THE FOLLOWING REQUIREMENT :
 - LONGITUDINAL STEEL (STEEL BETWEEN TRANSVERSE JOINT) SHALL HAVE THE MINIMUM AREA OF 1.511 CM²/M.
 - TRANSVERSE STEEL :
 - MINIMUM OF 0.453 CM²/M. SHALL REQUIRED IF SPACE BETWEEN LONGITUDINAL JOINT OR FREE EDGE IS MEASURED AT 3.00 M.
 - MINIMUM OF 0.491 CM²/M. SHALL REQUIRED IF SPACE BETWEEN LONGITUDINAL JOINT OR FREE EDGE IS MEASURED AT 3.25 M.
 - MINIMUM OF 0.529 CM²/M. SHALL REQUIRED IF SPACE BETWEEN LONGITUDINAL JOINT OR FREE EDGE IS MEASURED AT 3.50 M.
- QUANTITY OF WELDED STEEL WIRE FABRIC SPECIFIED REFERS TO QUANTITY OF WELDED STEEL WIRE FABRIC MEASURED AGAINST AVERAGE SPACE LENGTH OF 1 METER FROM THE TOTAL SPACE LENGTH BETWEEN JOINT OR FREE EDGE.
- WELDING POINTS SHALL BE ADEQUATELY STRONG AND SHALL NOT COME OFF DURING TRANSPORTATION OR PLACING. HOWEVER, THEY SHALL NOT BE SUBJECT TO REJECTION IF COMING OFF DURING CONSTRUCTION WITH WHATEVER REASON EXCEPT THAT DISCONNECTED POINTS EXCEED 1% OF ALL WELDING POINTS. IF ROLLED OVER, DISCONNECTED POINTS SHALL NOT EXCEED 1% OF ALL POINTS IN THE AREA OF 14 M². DISCONNECTED POINTS FOR ONE WELDED STEEL WIRE FABRIC SHALL NOT EXCEED HALF OF ALL ALLOWABLE DISCONNECTED WELDING POINTS.
- WELDED STEEL WIRE FABRIC SHEET SHALL BE SMOOTH NOT ROLL OR TWIST ALL DIRECTIONS, WHILE BEING PLACED DURING CONSTRUCTION.
- CLEAR CONCRETE COVER SPACE OF WELDED STEEL WIRE FABRIC SHALL CONFORM TO BAR MESH SPECIFICATION IN THIS DRAWING.

REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 TOLL GATE 25 CM. CONCRETE PAVEMENT (1 / 2)	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE : AUGUST 2012	SCALE : AS SHOWN
															DWG. NO. TG-11	SHEET NO. 137



7-ROWS
SCALE 1:50

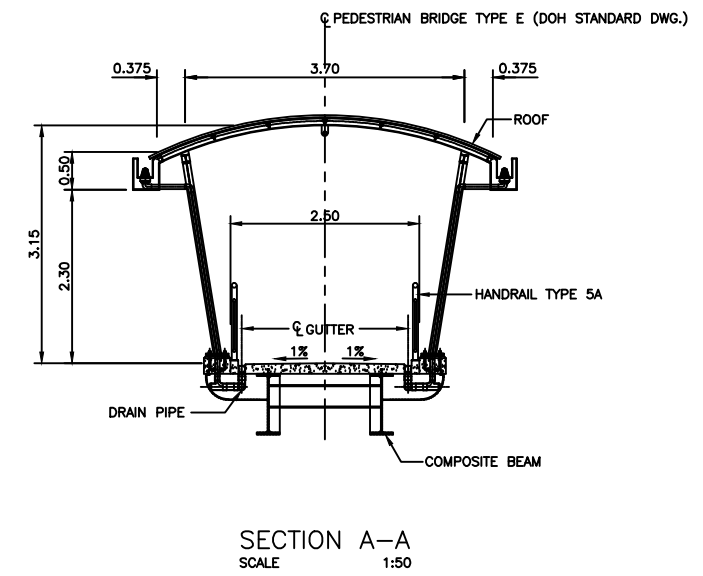
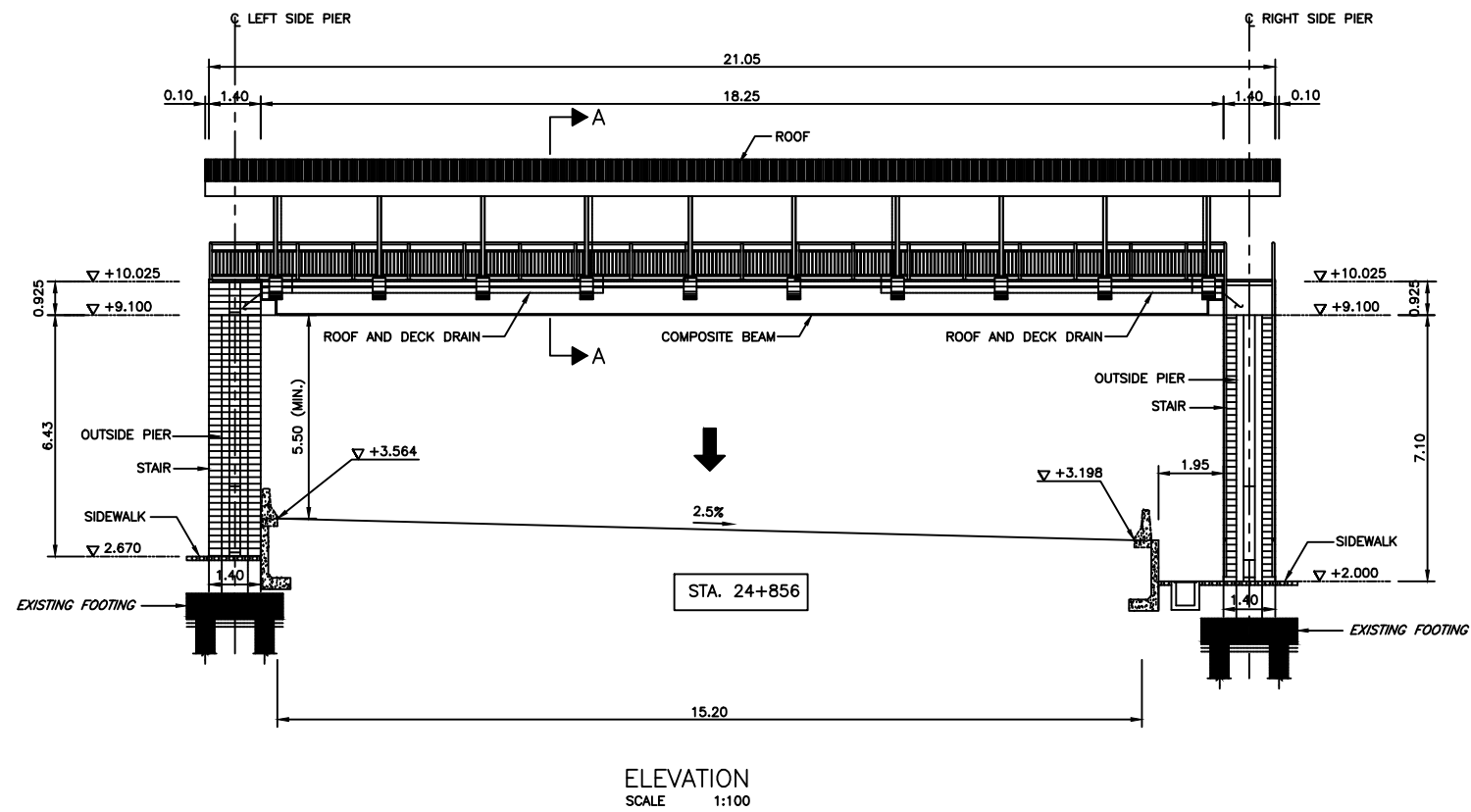


3-ROWS
SCALE 1:50

PAVEMENT AND JOINT LAYOUT PLAN

REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	 KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	 CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY	CHECKED BY	DATE:	SCALE:
		CHECKED	DATE	CHECKED	DATE								SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	1:50
									TOLL GATE	The Inter-City Motorways Division Department of Highways Ministry of Transport	The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road			DWG. NO.	SHEET NO.	
									25 CM. CONCRETE PAVEMENT (2 / 2)				TG-12	138		

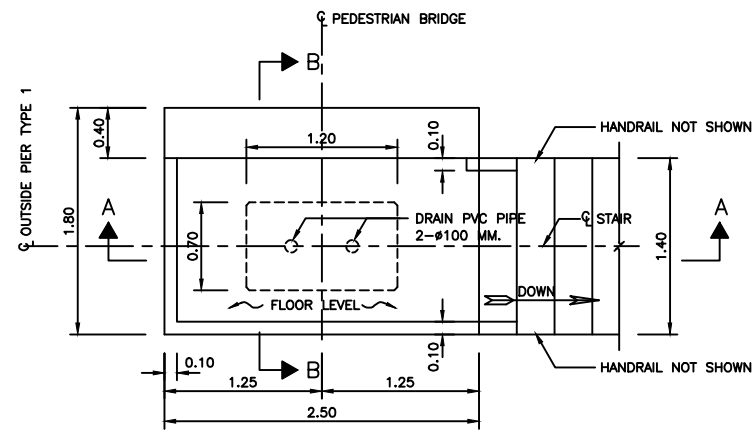
4. PEDESTRIAN OVERPASS FOR TOLL GATE ACCESS



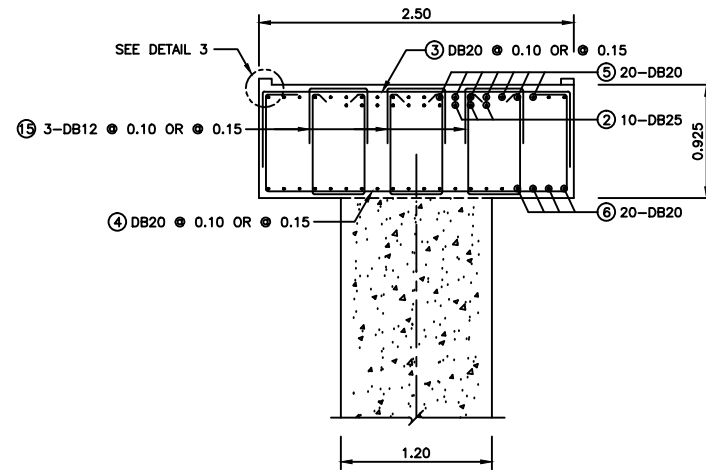
NOTES :

1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
2. STAIRS AND PIER ARE REINFORCED CONCRETE, WHEREAS THE BRIDGES THEMSELVES ARE COMPOSITE MEMBER OF STEEL GIRDER AND REINFORCED CONCRETE DECK.
3. FOR STRUCTURAL NOTES AND GENERAL LAYOUTS OF PEDESTRIAN SEE DWG. NO. TG-01 TO TG-02.
4. FOR COMPOSITE BEAM OF BRIDGE SEE DWG. NO. PO-03.
5. FOR PIER DETAILS SEE DWG. NO. PO-04.
6. FOR STAIR DETAILS SEE DWG. NO. PO-05 TO PO-06.
7. FOR ROOF FRAME STRUCTURE TYPE 5 DETAILS SEE DWG. NO. PO-07 TO PO-08.
8. FOR ROOF AND DECK DRAIN DETAILS SEE DWG. NO. PO-10 TO PO-11.
10. FOR RETAINING WALL DETAILS SEE DWG. NO. PO-12.

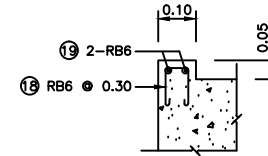
REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	 KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	 CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY	CHECKED BY	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE								SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	AS SHOWN
									TOLL GATE PEDESTRIAN BRIDGE	The Inter-City Motorways Division Department of Highways Ministry of Transport	The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road			PO-01	139	



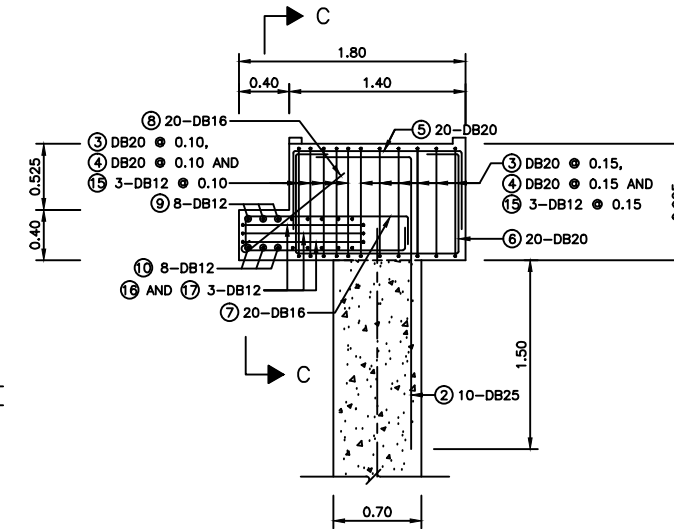
OUTSIDE PIER PLAN
SCALE 1:30



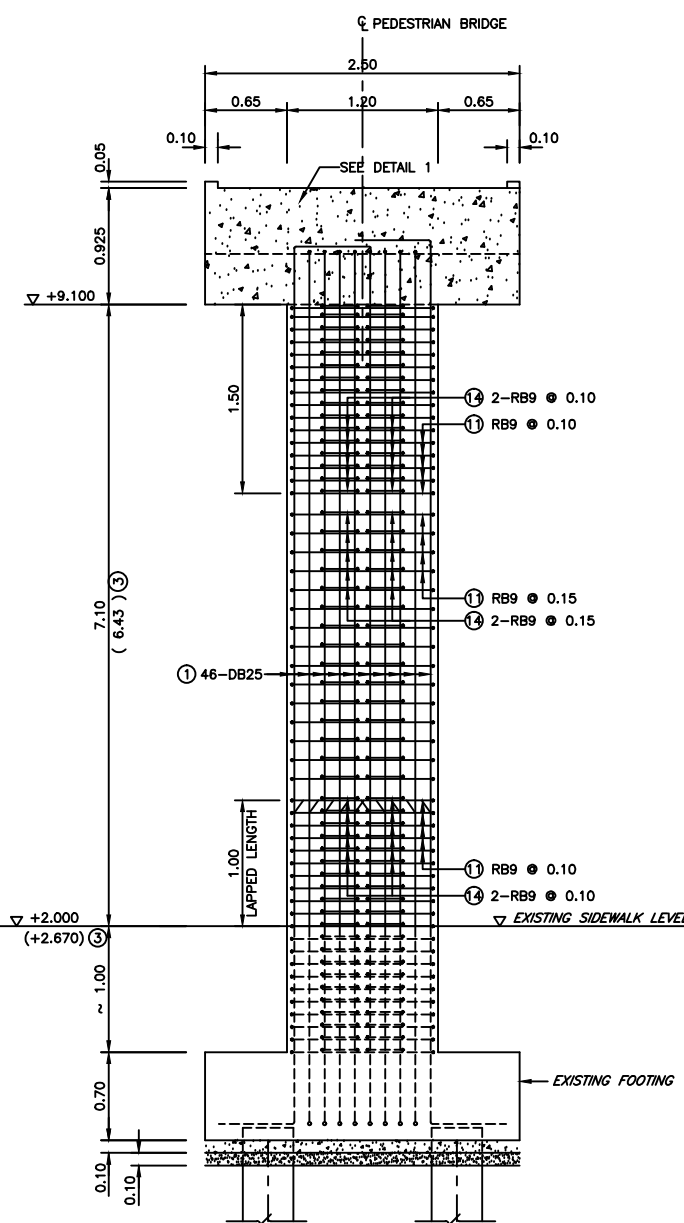
DETAIL 1
SCALE 1:30



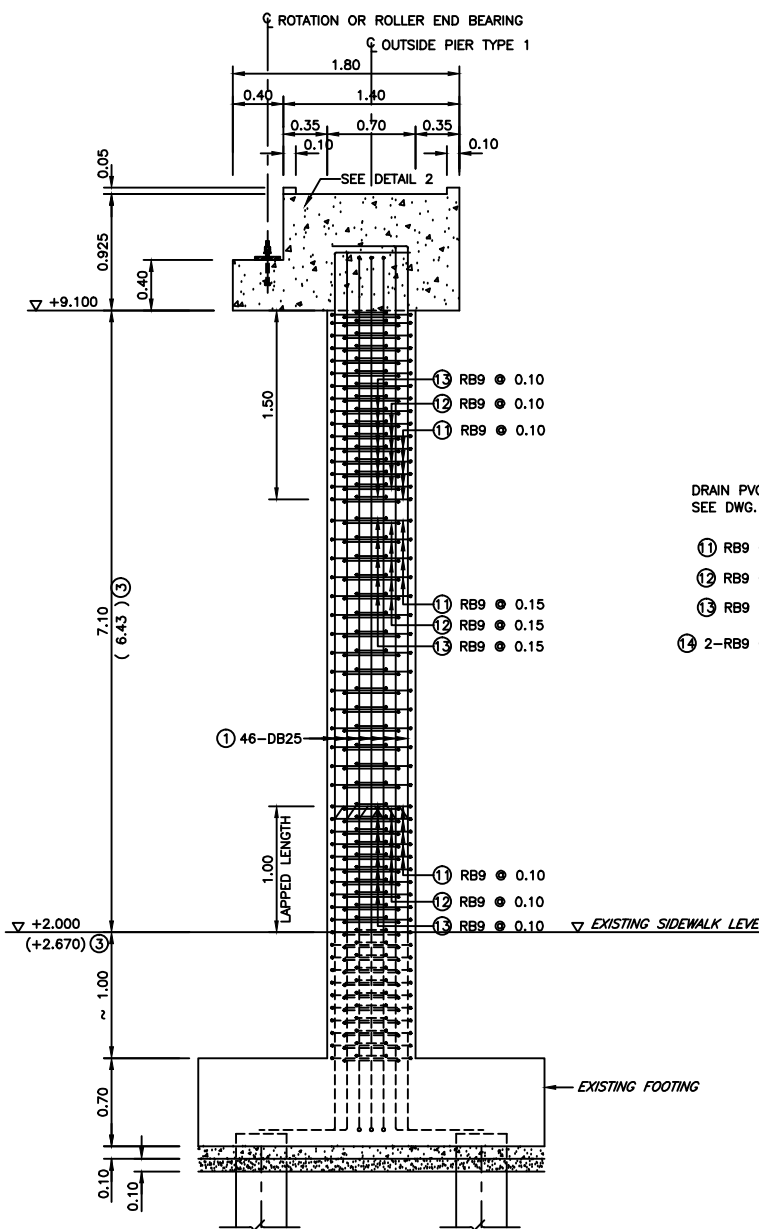
DETAIL 3
SCALE 1:10



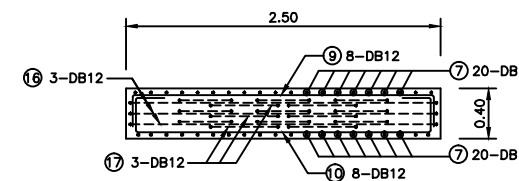
DETAIL 2
SCALE 1:30



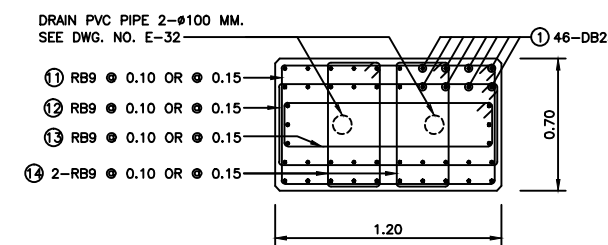
SECTION A-A
SCALE 1:30



SECTION B-B
SCALE 1:30



SECTION C-C
SCALE 1:30



TYPICAL COLUMN
SCALE 1:20

TABLE OF REINFORCEMENT		
BAR MARK	BAR DIAMETER (MM.)	BAR BENDING DIAGRAM
①	DB25	
②	DB25	
③	DB20	
④	DB20	
⑤	DB20	
⑥	DB20	
⑦	DB16	
⑧	DB16	
⑨	DB12	
⑩	DB12	
⑪	RB9	
⑫	RB9	
⑬	RB9	
⑭	RB9	
⑮	DB12	
⑯	DB12	
⑰	DB12	
⑱	RB6	
⑲	RB6	

NOTES :

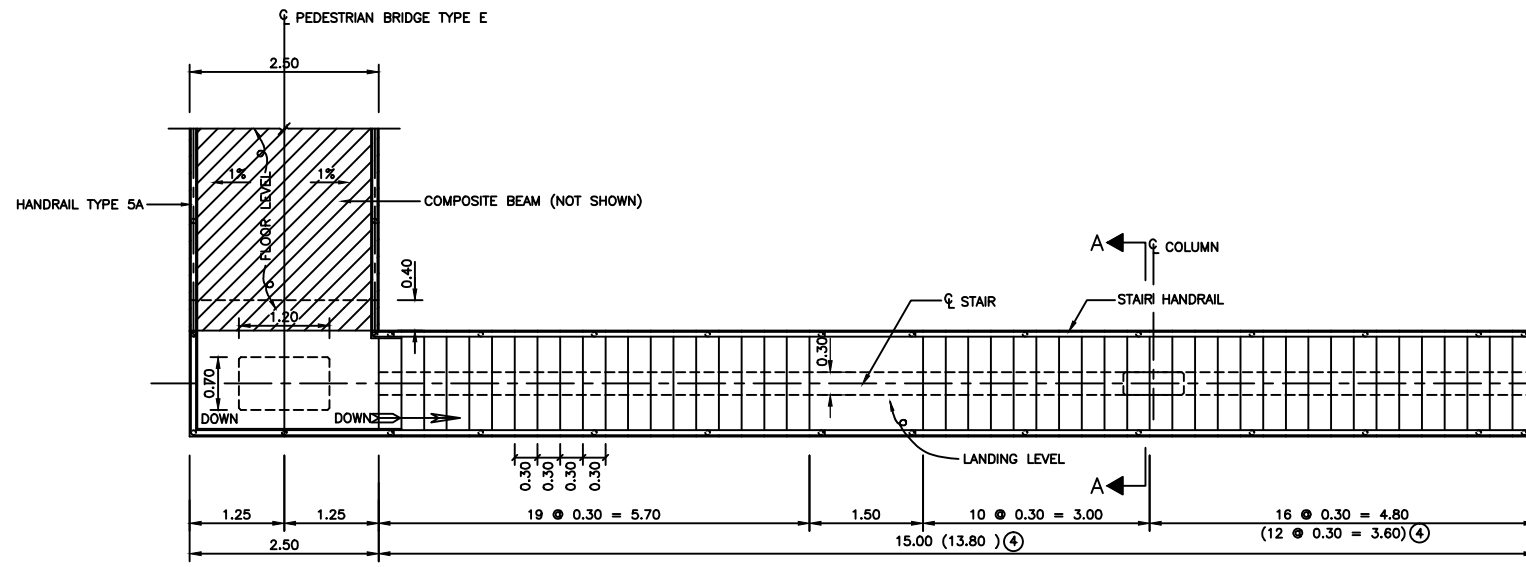
- ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
- DUE TO TENSION FORCE IN REINFORCEMENT OF COLUMN, IT REQUIRES 1.3 Ld FOR LAP SPLICE LENGTH WHERE Ld EQUALS TENSILE DEVELOPMENT LENGTH.
- RIGHT SIDE PIER / (LEFT SIDE PIER)

REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	DESIGNED BY	CHECKED BY	DATE	SCALE
								TOLL GATE PEDESTRIAN BRIDGE	The Inter-City Motorways Division Department of Highways Ministry of Transport	The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	AS SHOWN
													DWG. NO.	SHEET NO.
													PO-04	142

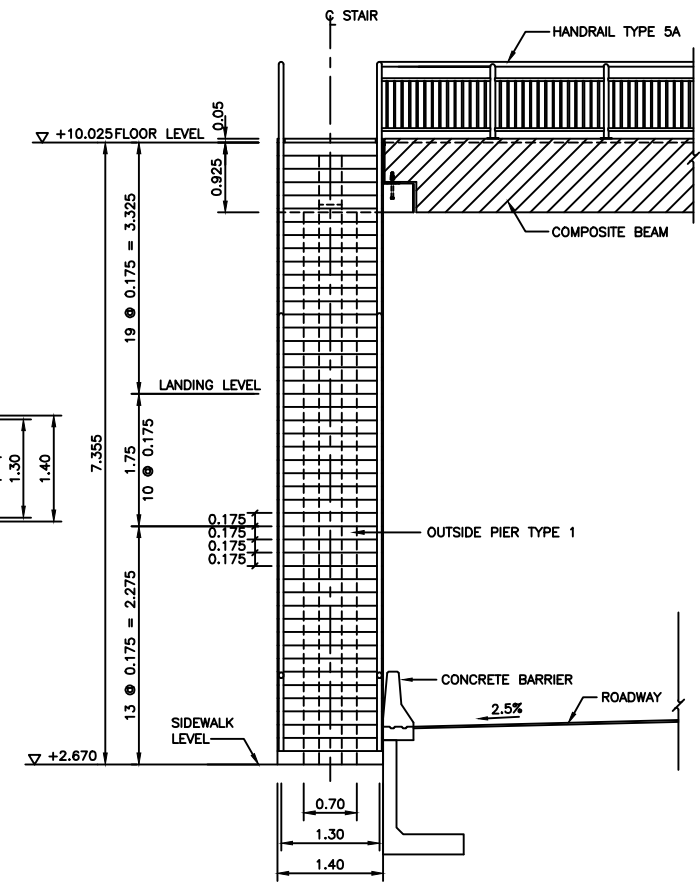
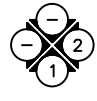


KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
DEPARTMENT OF HIGHWAYS

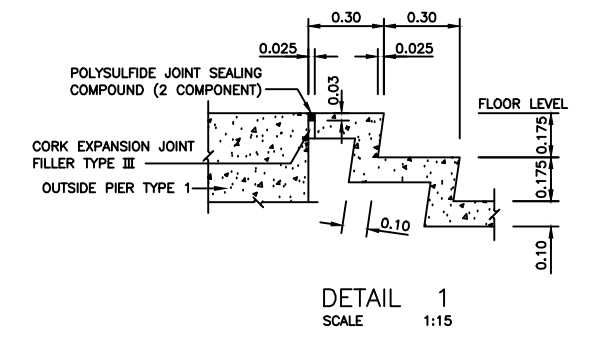
CTI ENGINEERING INTERNATIONAL CO., LTD.
ORIENTAL CONSULTANTS CO., LTD.
NIPPON KOEI CO., LTD.
CTI ENGINEERING CO., LTD.



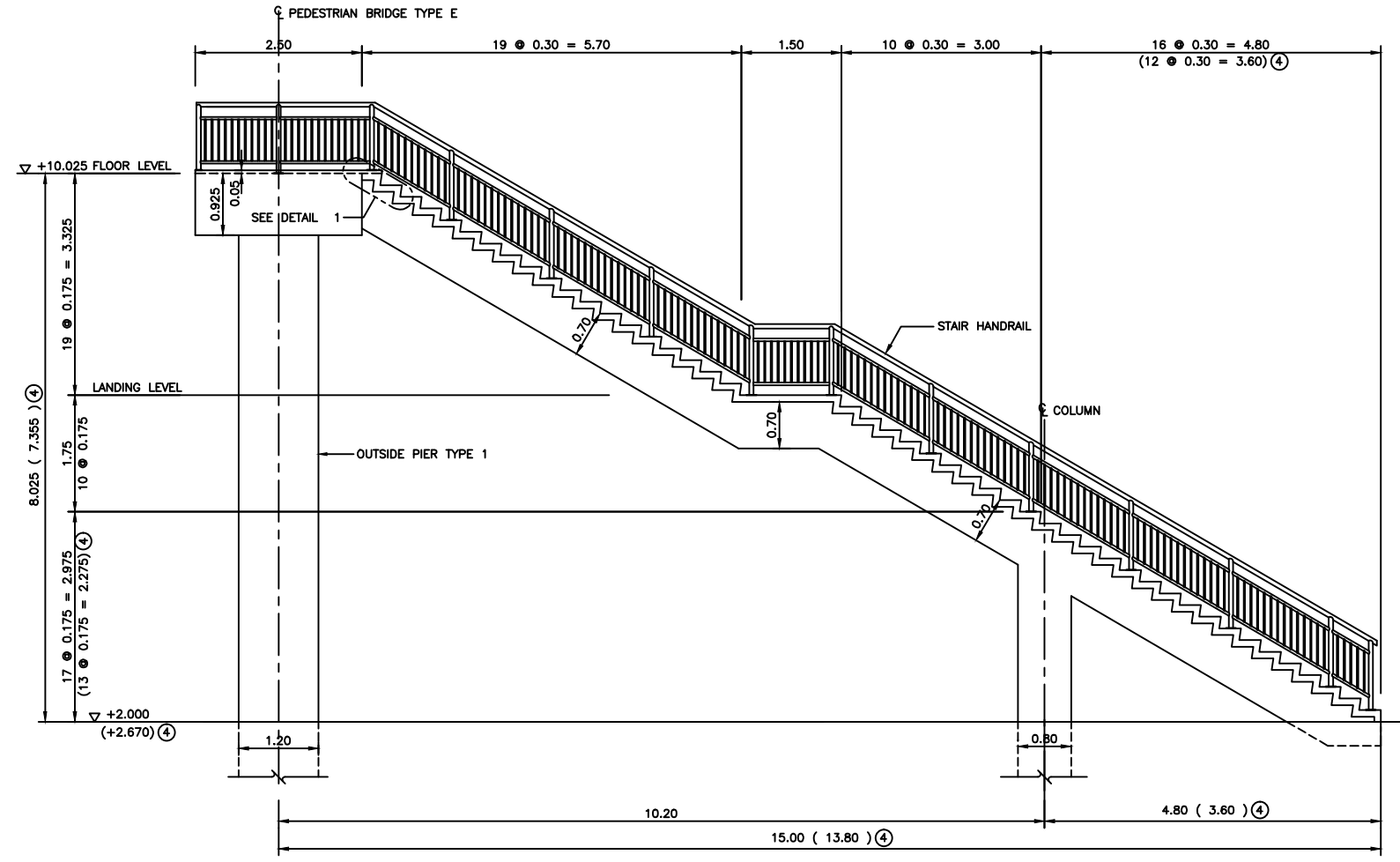
STAIR PLAN
SCALE 1:50



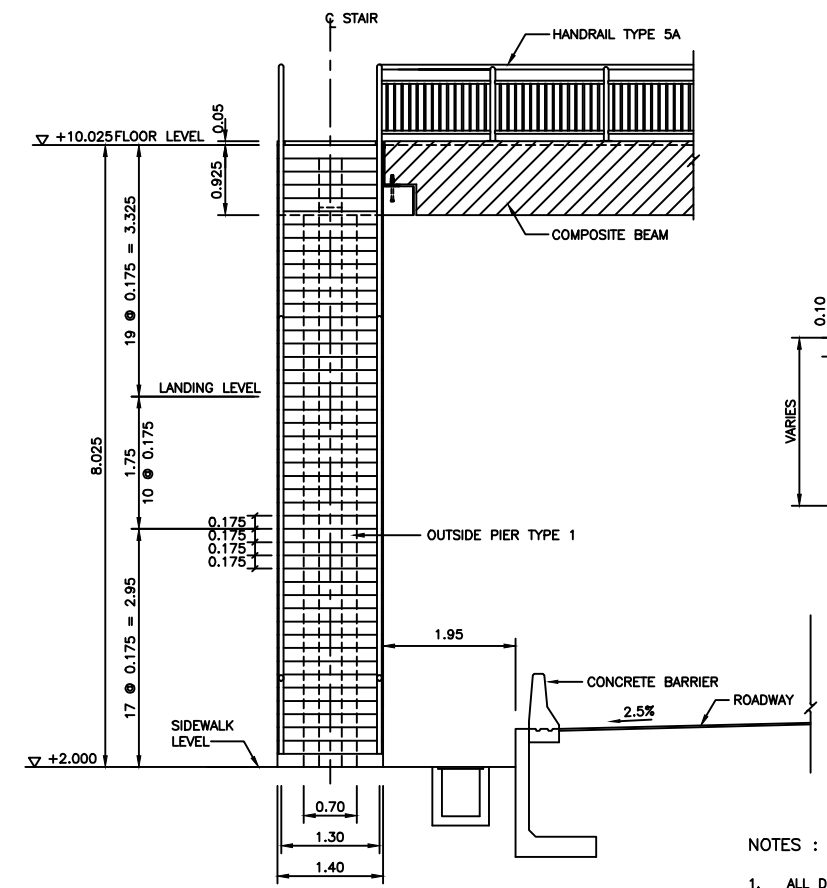
STAIR ELEVATION 2 (LEFT SIDE PIER)
SCALE 1:50



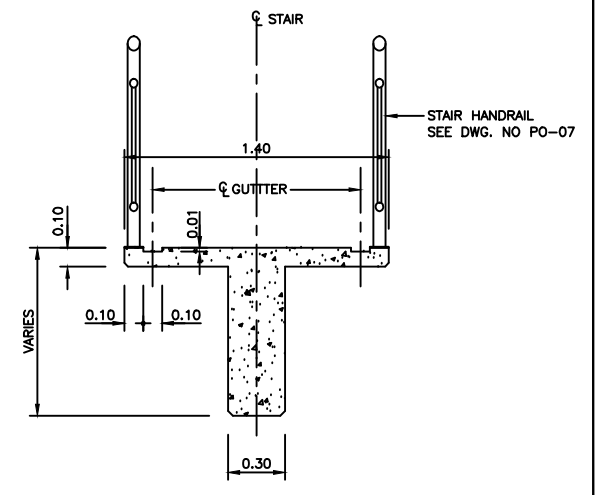
DETAIL 1
SCALE 1:15



STAIR ELEVATION 1
SCALE 1:50



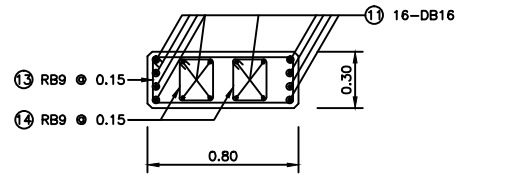
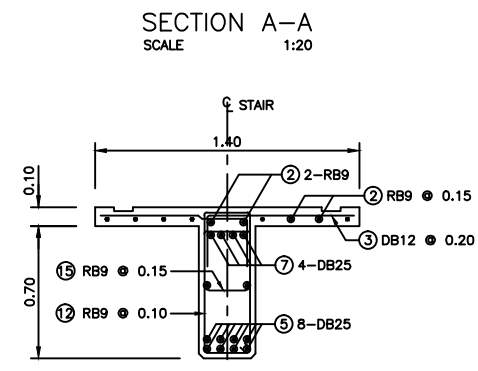
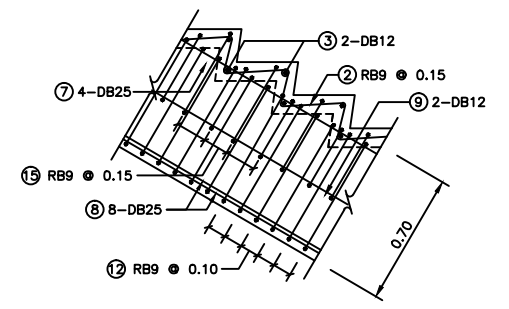
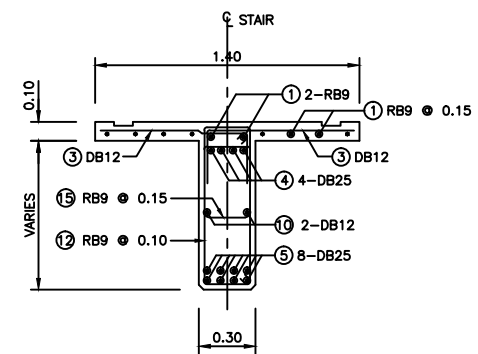
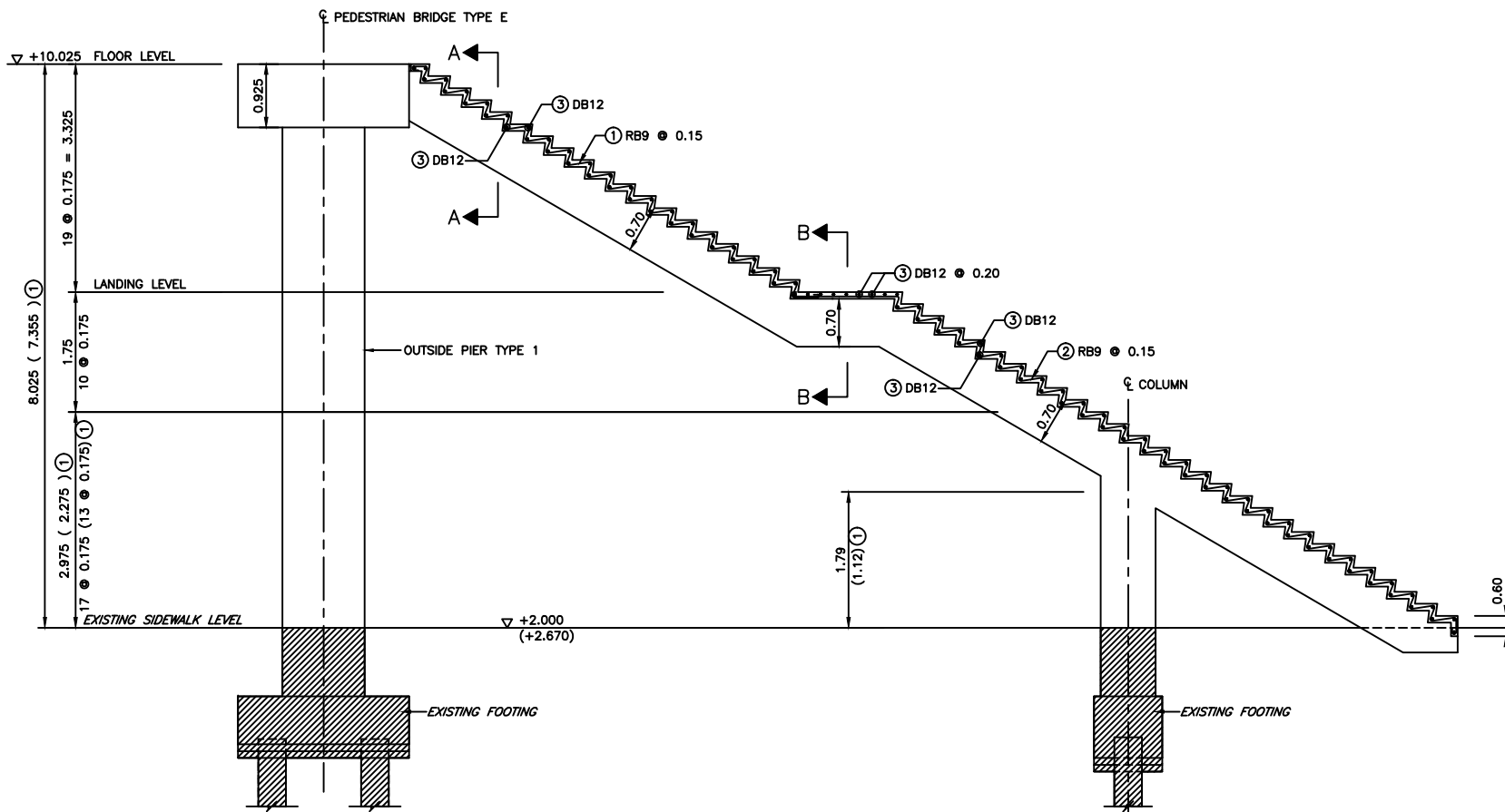
STAIR ELEVATION 2 (RIGHT SIDE PIER)
SCALE 1:50



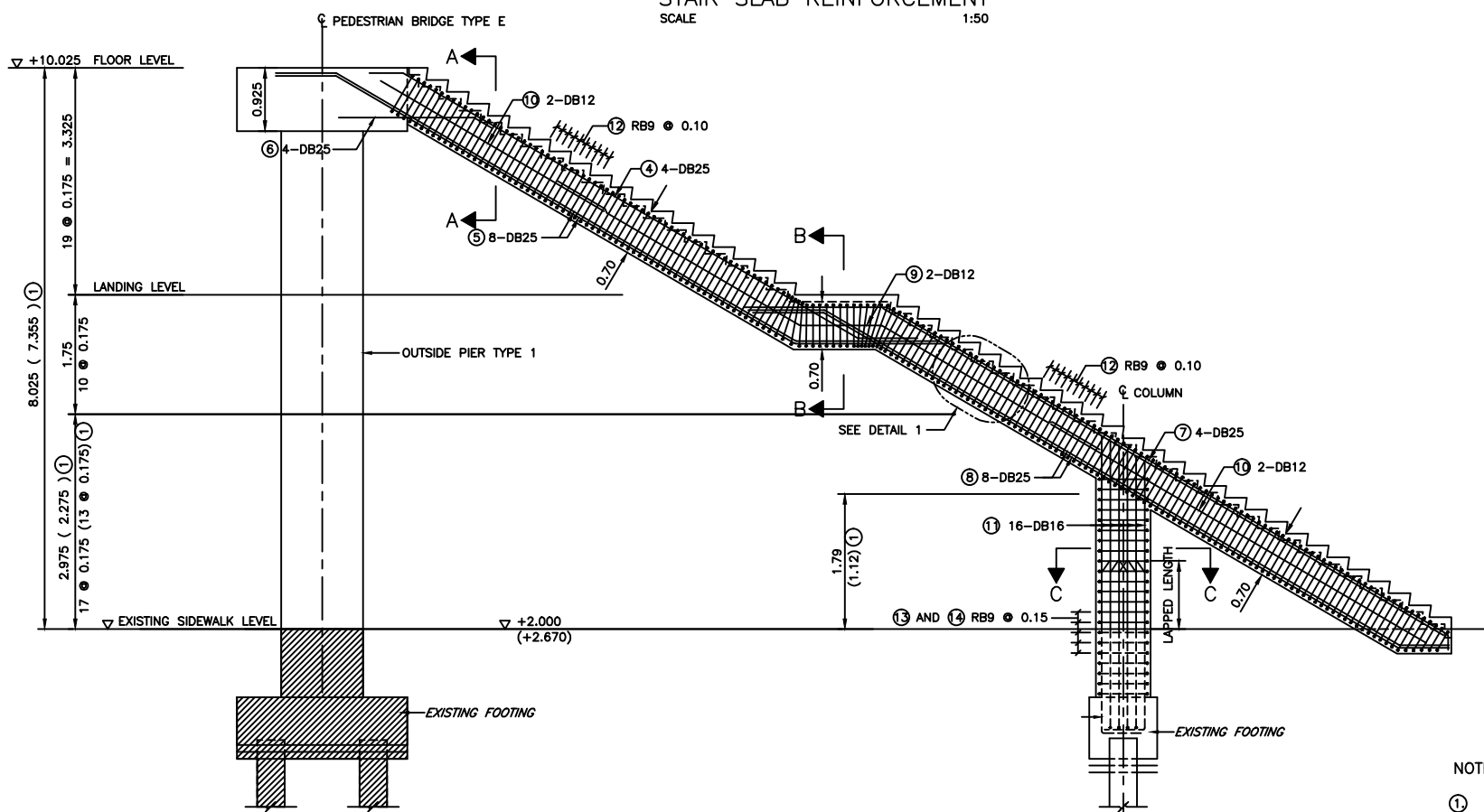
SECTION A-A
SCALE 1:20

- NOTES :
1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
 2. OUTSIDE PIERS SEE DWG. NO. PO-04.
 3. FOR STEEL ROOF OF STAIR AND WALKWAY SEE DWG. PO-06 TO PO-09.
 4. RIGHT SIDE PIER/(LEFT SIDE PIER)

REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 TOLL GATE PEDESTRIAN BRIDGE	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE AUGUST 2012	SCALE AS SHOWN
															DWG. NO. PO-05	SHEET NO. 143



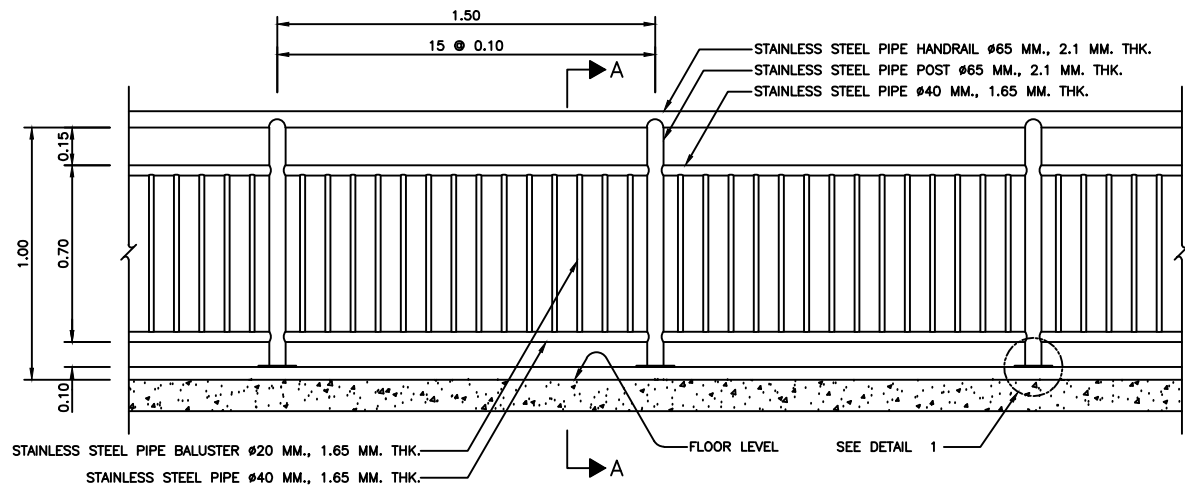
STAIR SLAB REINFORCEMENT
SCALE: 1:50



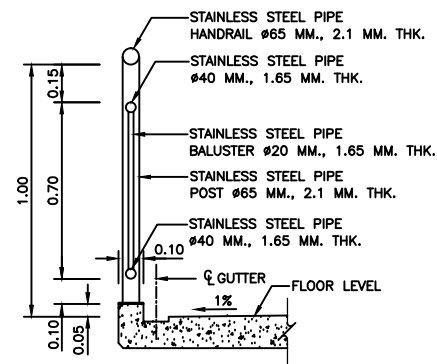
STAIR BEAM REINFORCEMENT
SCALE: 1:50

TABLE OF REINFORCEMENT		
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②	RB9	
③	DB12	
④	DB25	
⑤	DB25	
⑥	DB25	
⑦	DB25	
⑧	DB25	
⑨	DB12	
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⑪	DB16	
⑫	RB9	
⑬	RB9	
⑭	RB9	
⑮	RB9	

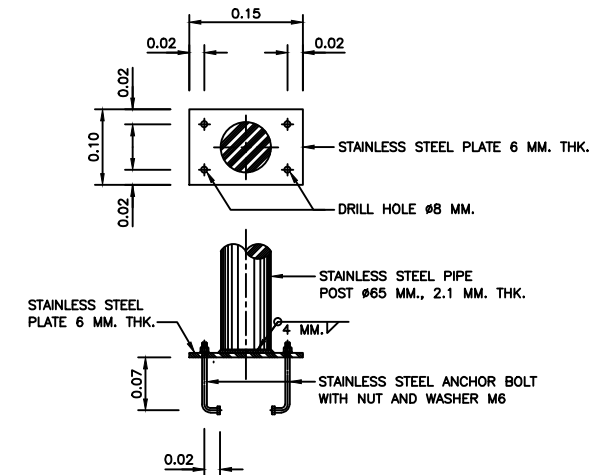
NOTES :
① RIGHT SIDE PIER/(LEFT SIDE PIER)



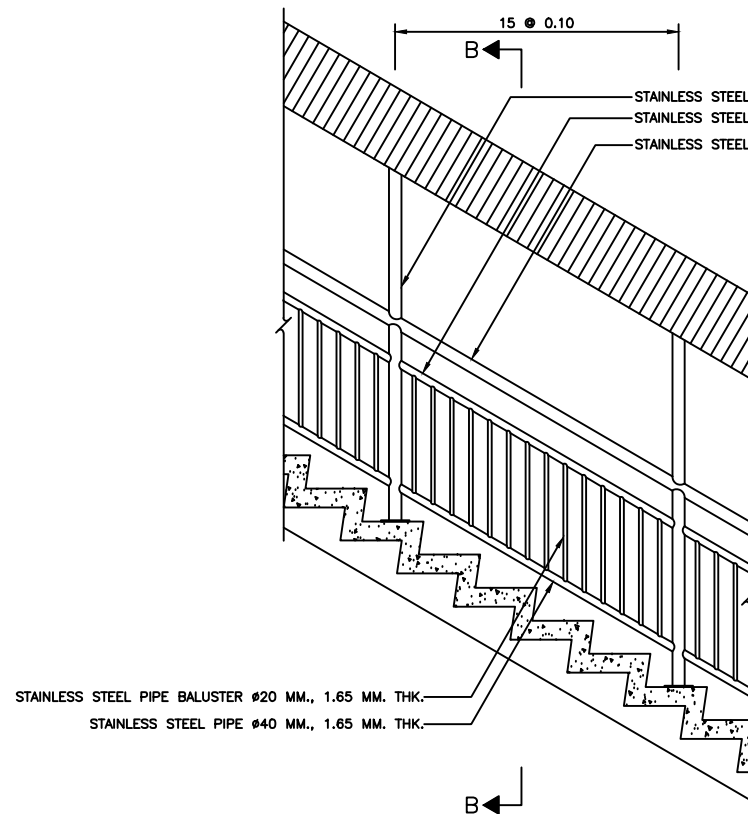
HANDRAIL TYPE 5A
SCALE 1:15



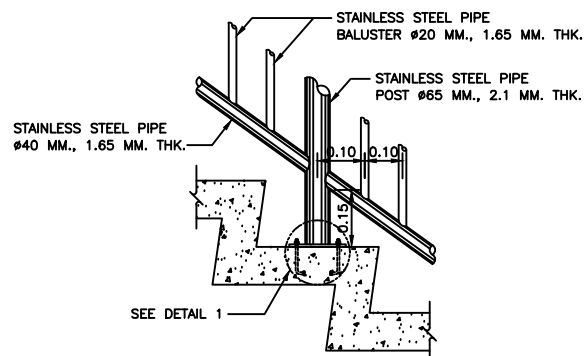
SECTION A-A
SCALE 1:15



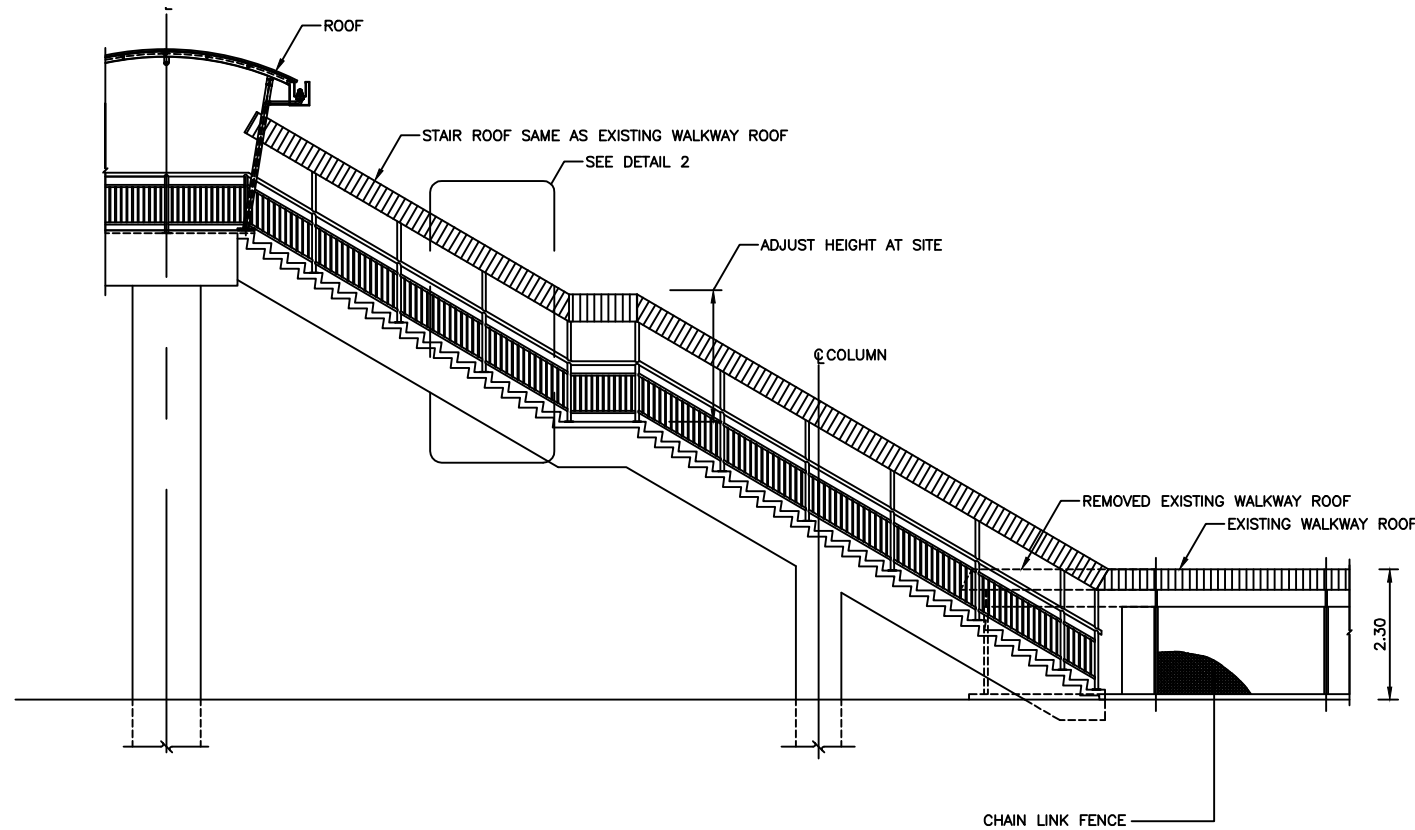
DETAIL 1
SCALE 1:5



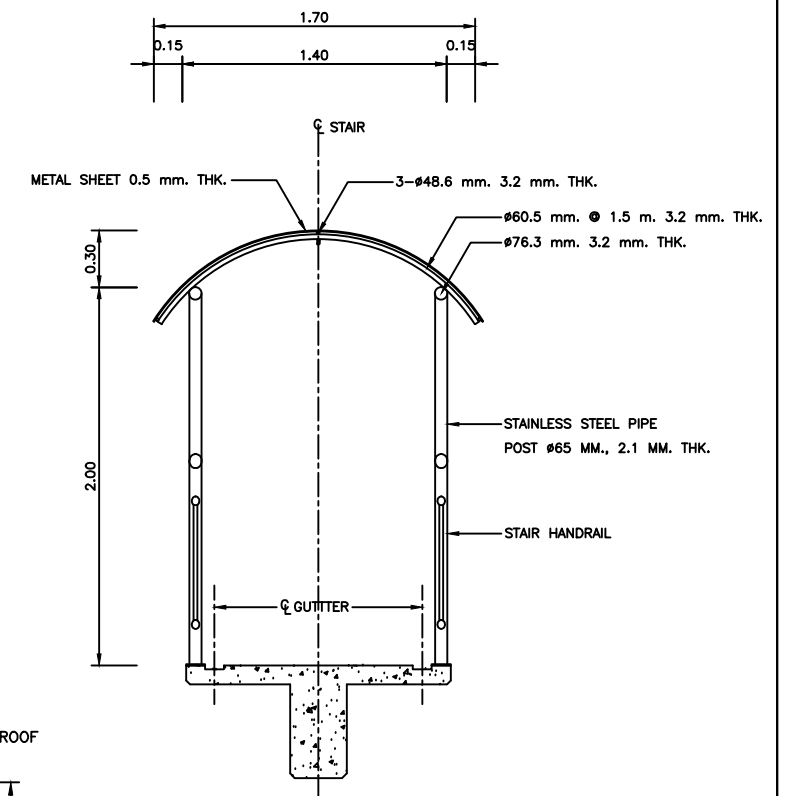
DETAIL 2
SCALE 1:20



STAIR HANDRAIL
SCALE 1:10



ELEVATION OF ROOF (STAIR)
SCALE 1:15

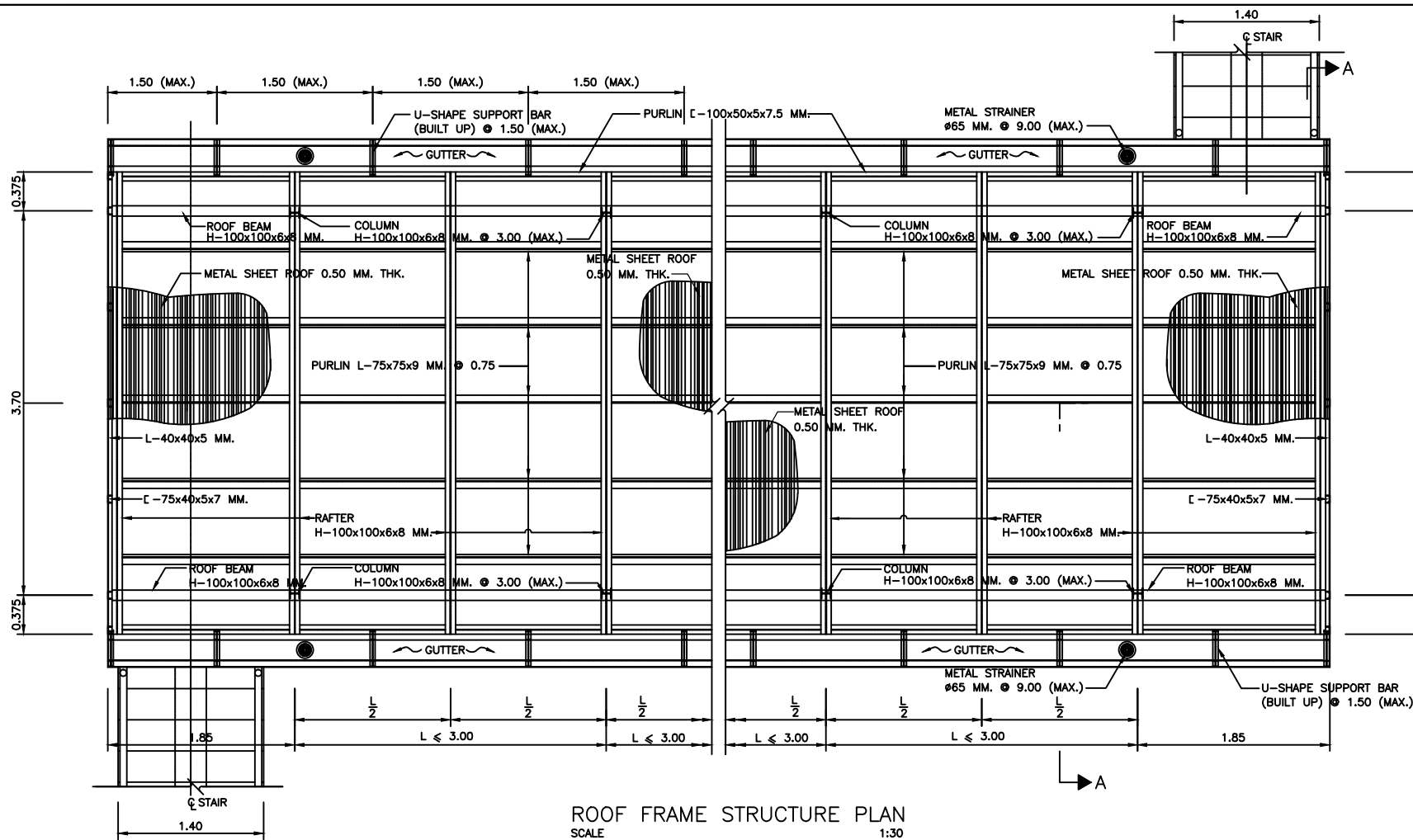


SECTION B-B
SCALE 1:20

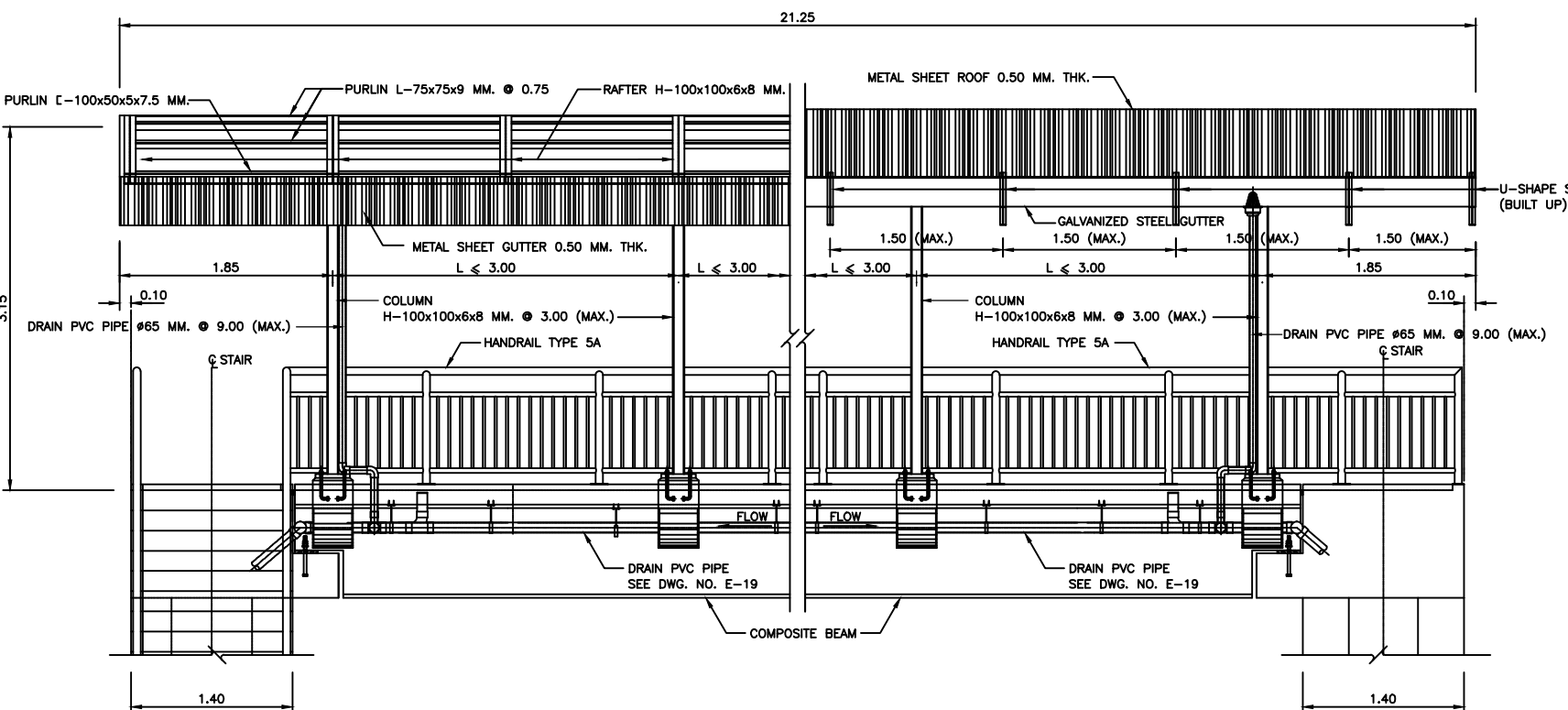
NOTES :

1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
2. STAINLESS STEEL PIPE SHALL CONFORM TO TIS 1006 GRADE 304
3. BLACK STEEL PIPE SHALL CONFORM TO TIS 276 CLASS 2
4. MATERIAL OF RAILING SHALL BE AS DIRECTED BY THE DESIGNER AND SPECIFIED IN LIST OF WORK REQUIRED.

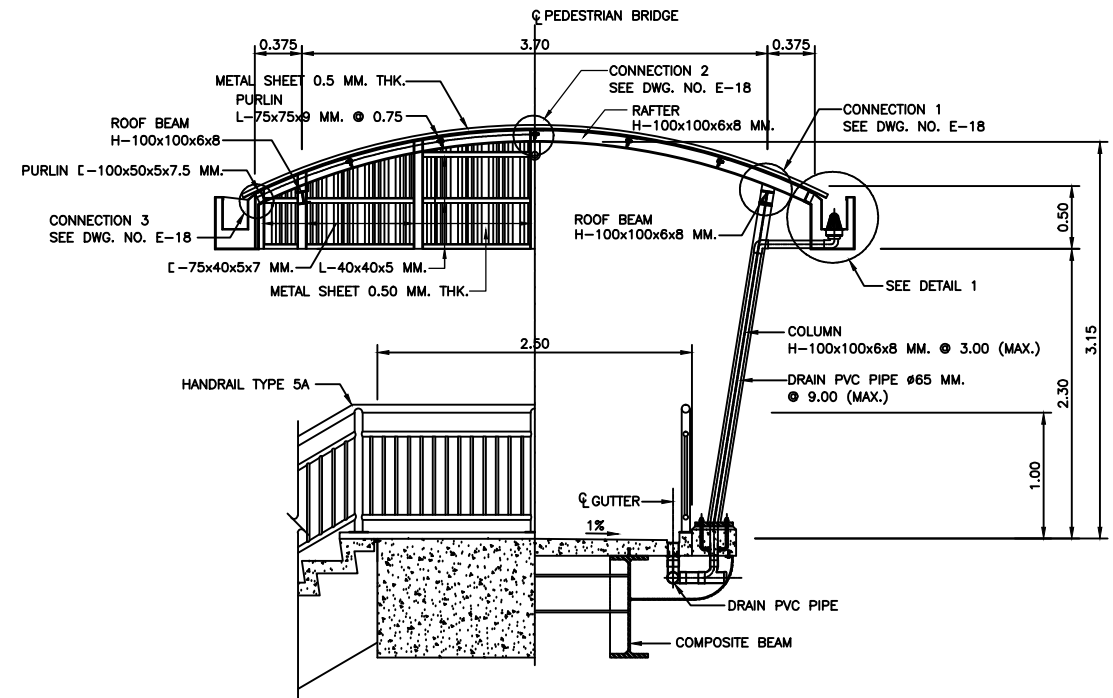
REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE										AUGUST 2012	AS SHOWN
									TOLL GATE PEDESTRIAN BRIDGE						DWG. NO. PO-07	SHEET NO. 145



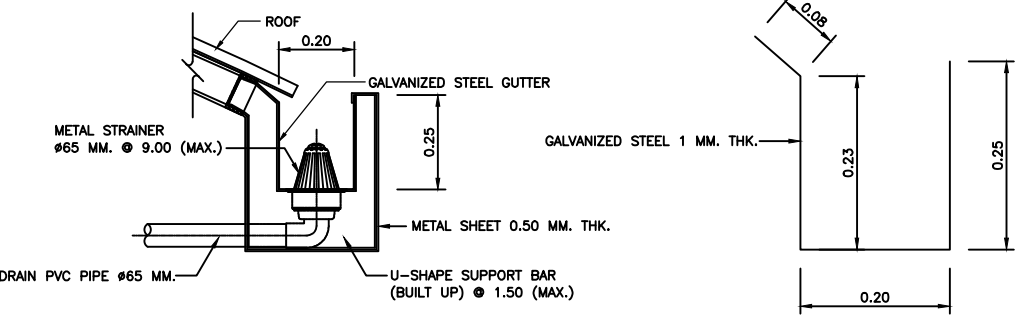
ROOF FRAME STRUCTURE PLAN
SCALE 1:30



ROOF FRAME STRUCTURE ELEVATION
SCALE 1:30

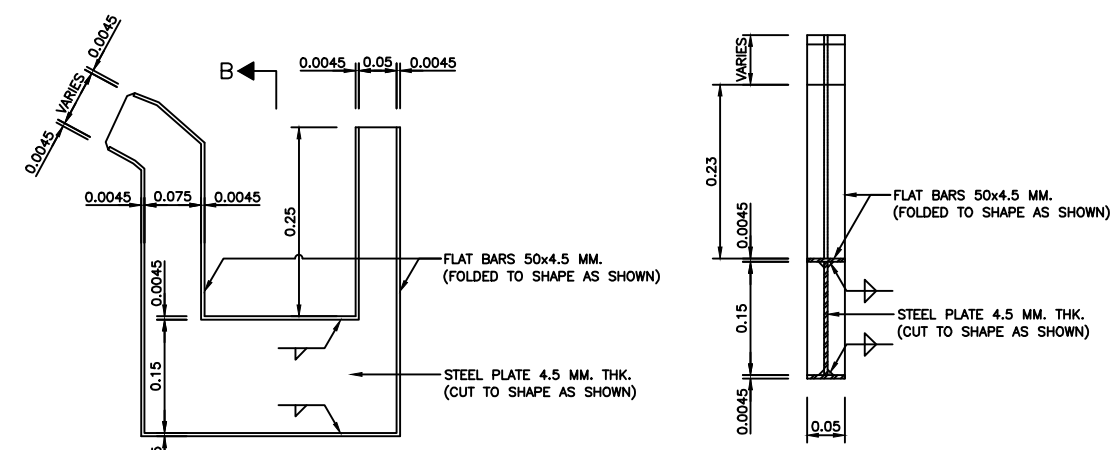


SECTION A-A
SCALE 1:30



DETAIL 1
SCALE 1:10

GUTTER
SCALE 1:5

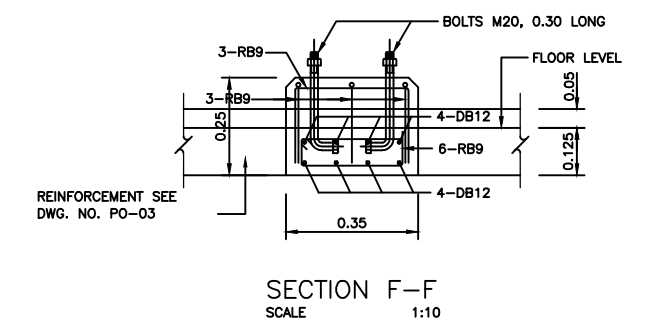
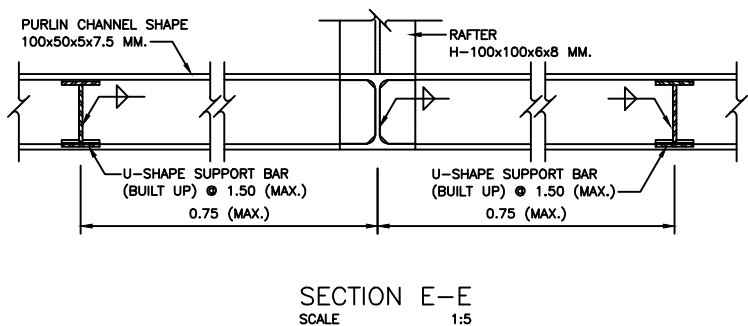
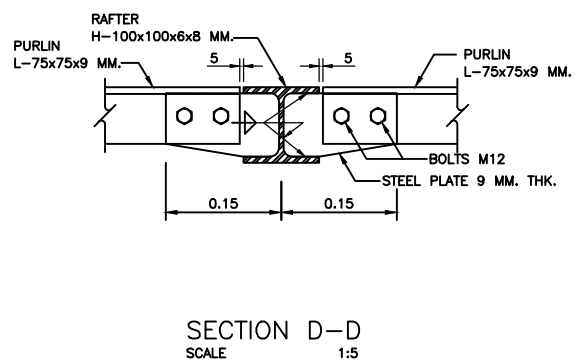
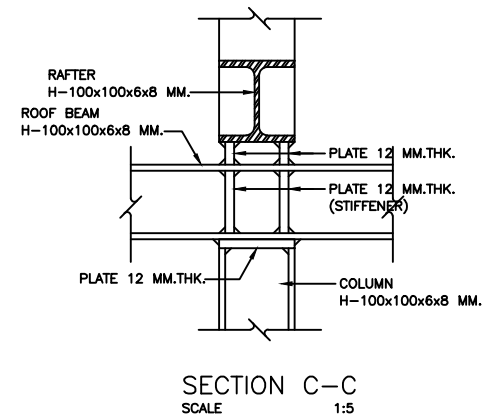
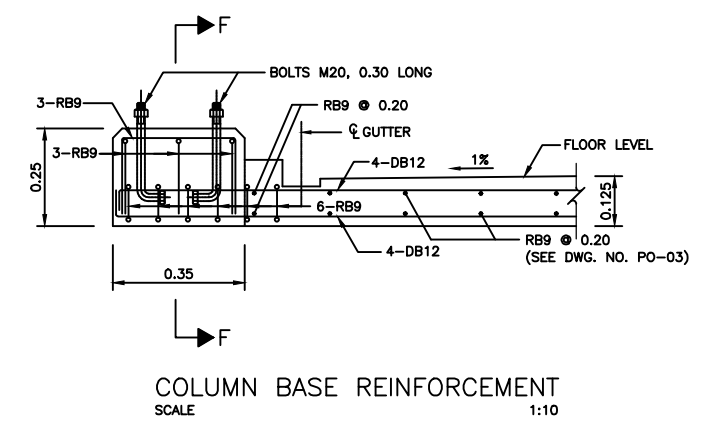
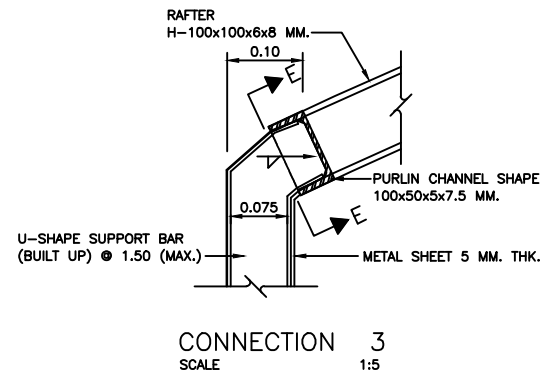
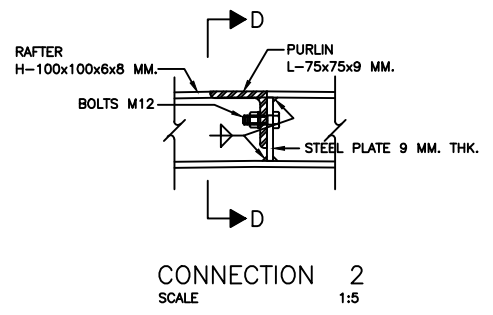
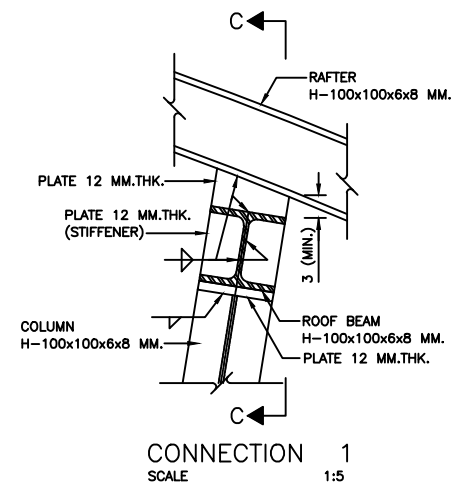
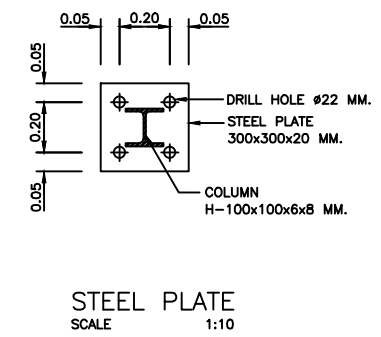
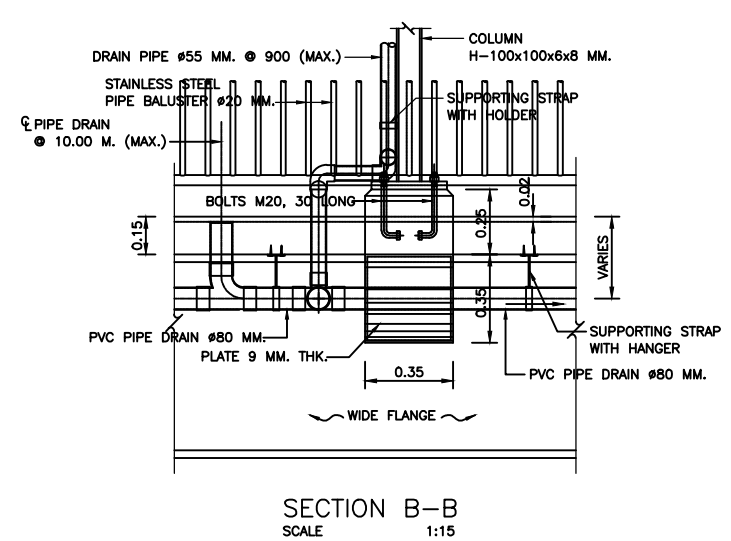
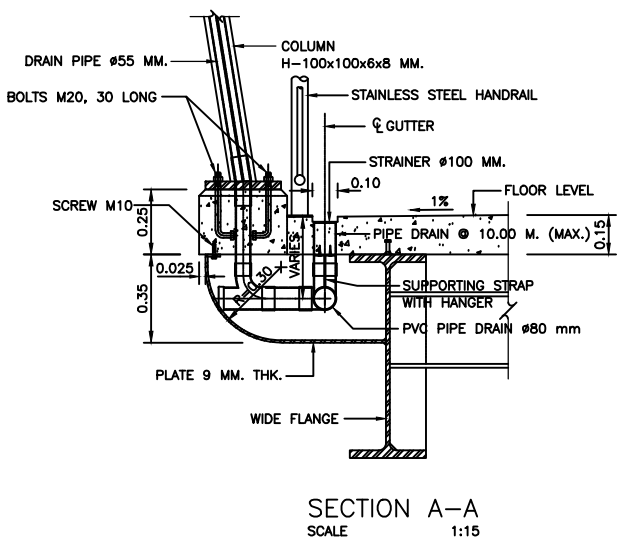
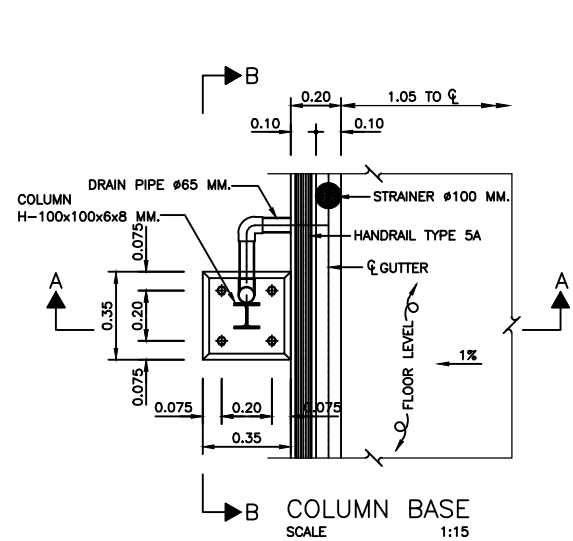


U-SHAPE SUPPORT BAR
SCALE 1:5

SECTION B-B
SCALE 1:5

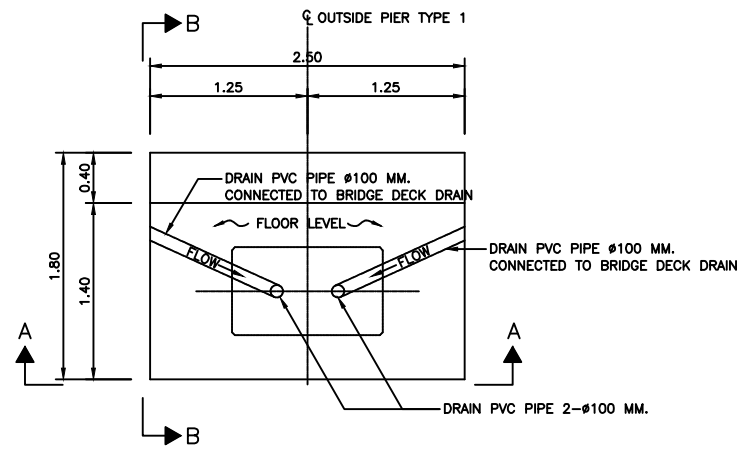
- NOTES :
1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
 2. WELDING SEE DWG. NO. G-02
 3. METAL STRAINER (ROOF DRAINS) SHALL CONFORM TO TIS 1052

REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 TOLL GATE PEDESTRIAN BRIDGE	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE AUGUST 2012	SCALE AS SHOWN
														DWG. NO. PO-08	SHEET NO. 146

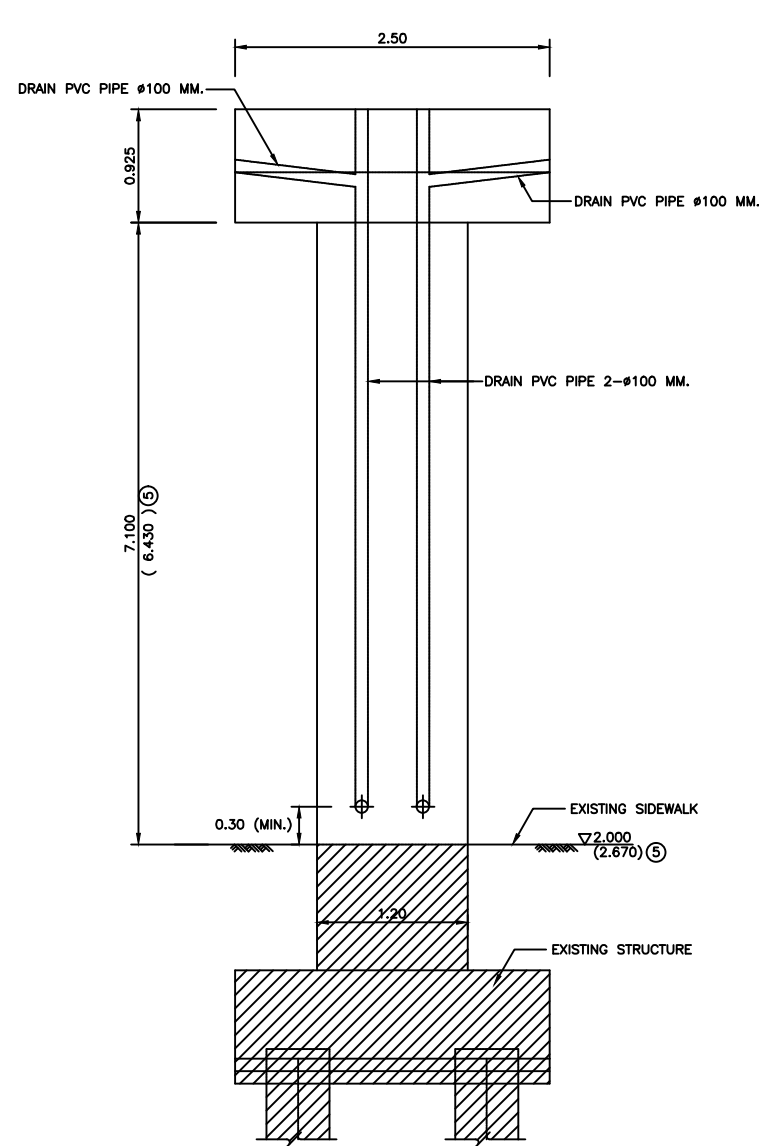


- NOTES :
- ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
 - WELDING SEE DWG. NO. TG-02
 - METAL SHEET
 - DESCRIPTION
 - METAL SHEET SHALL BE HIGH TENSILE STEEL SHEET HOT DIP ZINC-ALUMINIUM ALLOY COATING (AL%=50-55%) AND PVDF (20-25 MICRONS THICK) PAINT COATING
 - THE TOTAL METAL SHEET THICKNESS SHALL NOT BE LESS THAN 0.53 MM.
 - FINISH COATING
 - ALL ALUMINIUM-ZINC ALLOY COATED METAL SHEET SHALL HAVE A CONVERSION AND A PRIMER (NOT LESS THAN 5 MICRONS THICK) COATING BEFORE RECEIVING THE FINISH COATING FOR ROOFING SHALL RECEIVE ALUMINIUM AND ZINC ALLOY COATING OF NOT LESS THAN 150 G/M²
 - METAL SHEET PROFILE SHALL HAVE SPACING OF CREST NOT MORE THAN 130 MM. AND HIGH OF CREST NOT LESS THAN 23 MM. OR CORRUGATED PROFILE
 - METAL SHEET FIXING SYSTEM MUST BE HEX DRILL POINT SCREW WITH EPDM SEAL FASTENER GUAGE 12
 - METAL SHEET SDREW FIXING SPACING SHALL BE EVERY INTERNAL ALTERNATE CREST.

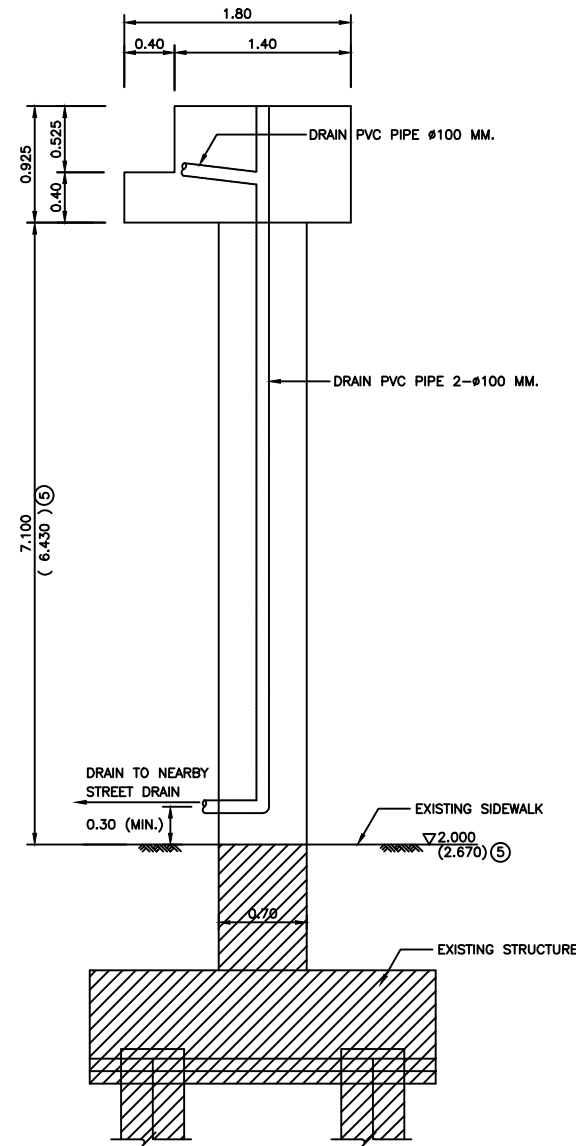
REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 The Preparatory Survey on the Rehabilitation Project of PEDESTRIAN BRIDGE	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE : AUGUST 2012	SCALE : AS SHOWN
															DWG. NO. PO-09	SHEET NO. 147



PLAN



SECTION A-A



SECTION B-B

COLUMN DRAIN PIPE FOR OUTSIDE PIER TYPE 1
SCALE 1:30

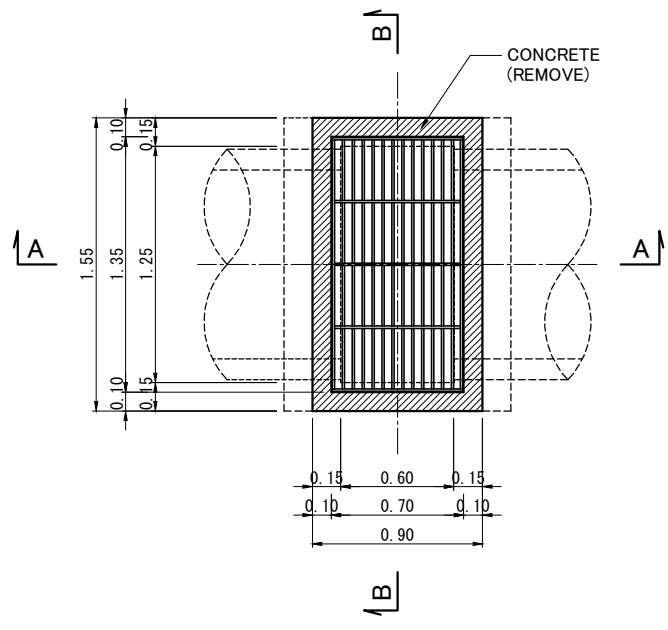
NOTES :

1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
 2. ROOF AND DECK DRAIN DETAILS SEE DWG. NO. PO-10.
 3. UNPLASTICIZED POLYVINYL CHLORIDE PIPES SHALL CONFORM TO TIS 17 CLASS 13.5
 4. THE DETAILS ABOVE ARE TENTATIVE LAYOUT OF WHICH THE CONTRACTOR SHALL SUBMITTED SHOP DRAWING TO THE ENGINEER FOR APPROVAL.
- ⑤ RIGH SIDE PIER/(LEFT SIDE PIER)

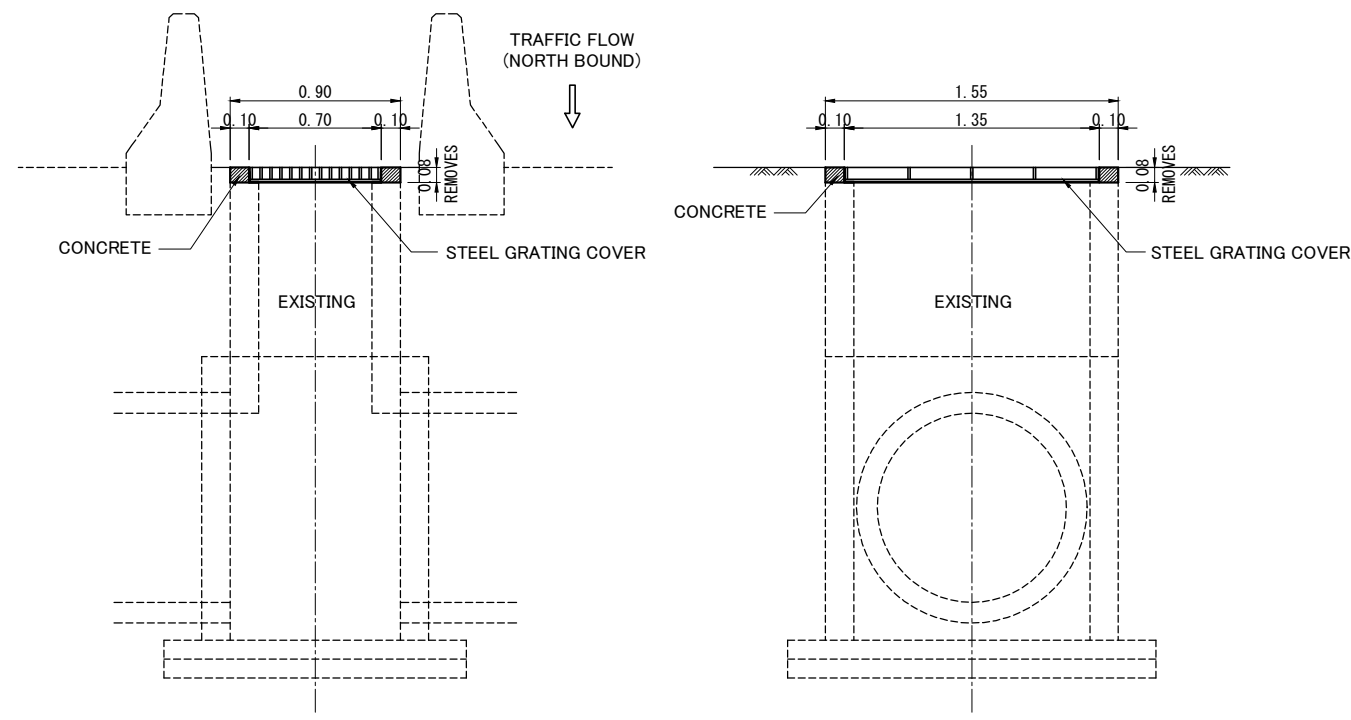
REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY	CHECKED BY	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE								SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	AS SHOWN
									TOLL GATE PEDESTRIAN BRIDGE	The Inter-City Motorways Division Department of Highways Ministry of Transport	The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road			DWG. NO.	SHEET NO.	
														PO-11	149	

5. DRAINAGE WORK

**5-1 HEIGHT ADJUSTMENT OF
EXISTING CATCH BASIN AT
MEDIAN**



PLAN



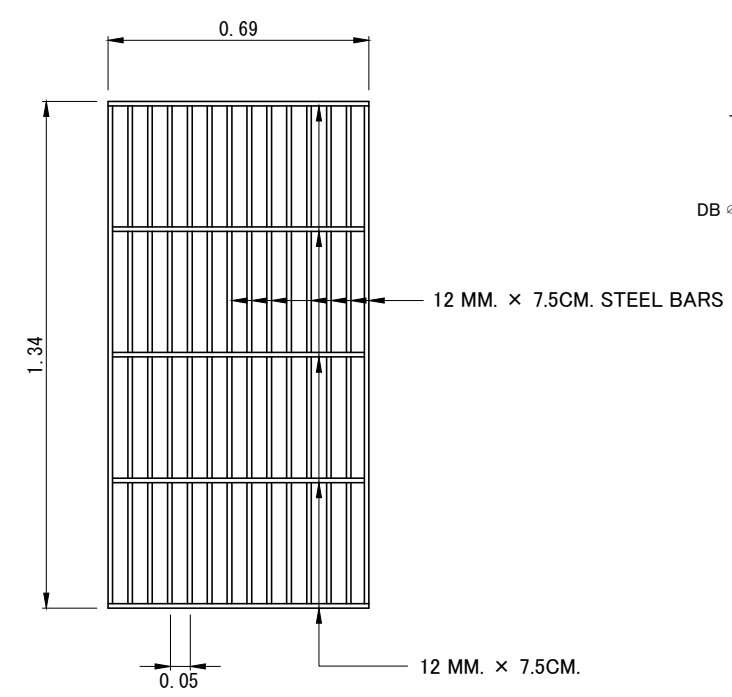
SECTION A-A

SECTION B-B

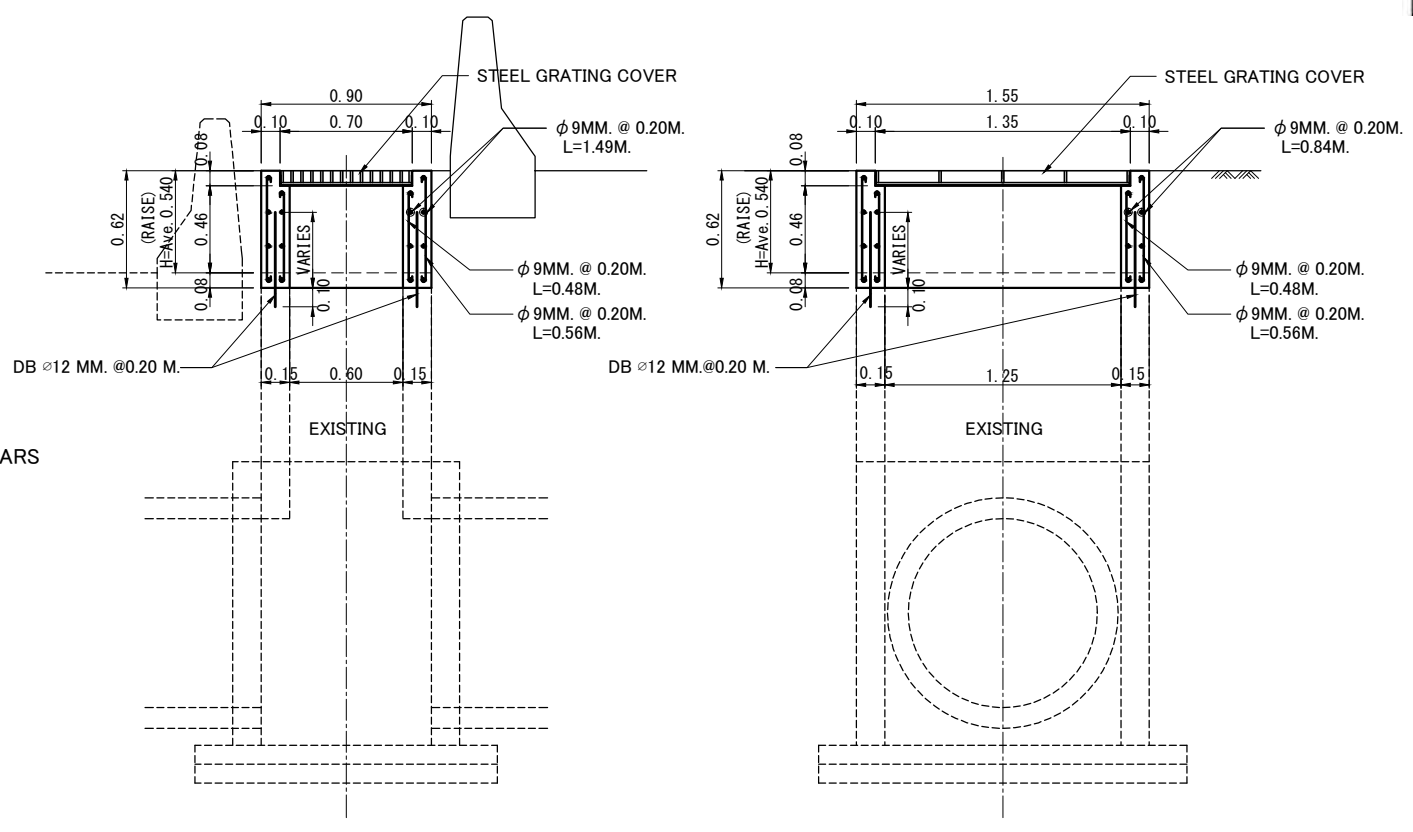
REMOVAL WORK
SCALE 1:20

SCHEDULED LIST OF HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN (MEDIAN)

NO.	STA	H (m)	NO.	STA	H (m)	NO.	STA	H (m)	
1	STA 10+613.9	0.630	31	STA 15+193.3	0.590	61	STA 24+230.6	0.000	
2	STA 10+615.9	0.630	32	STA 15+331.7	0.580	62	STA 25+820.9	0.600	
3	STA 10+830.0	0.570	33	STA 15+490.4	0.550	63	STA 25+840.5	0.600	
4	STA 11+629.8	0.570	34	STA 15+605.5	0.580	64	STA 26+165.0	0.600	
5	STA 11+745.3	0.610	35	STA 15+726.3	0.520	65	STA 26+261.0	0.590	
6	STA 11+832.8	0.600	36	STA 15+958.4	0.550	66	STA 26+397.8	0.580	
7	STA 12+087.3	0.610	37	STA 16+205.3	0.610	67	STA 26+675.6	0.600	
8	STA 12+239.8	0.610	38	STA 16+320.0	0.610	68	STA 27+014.5	0.590	
9	STA 12+371.2	0.600	39	STA 16+461.9	0.600	69	STA 27+320.1	0.590	
10	STA 12+373.5	0.600	40	STA 16+609.5	0.490	70	STA 27+577.6	0.600	
11	STA 12+470.7	0.460	41	STA 16+707.7	0.560	71	STA 27+670.9	0.570	
12	STA 12+649.0	0.350	42	STA 16+863.4	0.250	72	STA 27+930.0	0.590	
13	STA 12+809.0	0.100	43	STA 17+026.2	0.600	73	STA 28+165.1	0.520	
14	STA 13+024.0	0.610	44	STA 17+340.5	0.600	74	STA 28+533.9	0.070	
15	STA 13+398.8	0.460	45	STA 17+460.3	0.610	75	STA 28+815.3	0.570	
16	STA 13+402.4	0.460	46	STA 17+609.8	0.550	76	STA 29+049.2	0.620	
17	STA 13+619.9	0.630	47	STA 17+791.9	0.600				
18	STA 13+781.2	0.620	48	STA 17+868.9	0.630				
19	STA 14+022.6	0.610	49	STA 18+083.2	0.610				
20	STA 14+136.9	0.530	50	STA 18+439.8	0.620				
21	STA 14+296.5	0.560	51	STA 18+713.0	0.610				
22	STA 14+416.6	0.560	52	STA 18+863.8	0.610				
23	STA 14+538.2	0.620	53	STA 19+046.0	0.610				
24	STA 14+662.4	0.590	54	STA 19+281.0	0.630				
25	STA 14+718.6	0.570	55	STA 19+487.8	0.610				
26	STA 14+830.8	0.580	56	STA 19+674.6	0.540				
27	STA 14+942.7	0.610	57	STA 20+579.9	0.560				
28	STA 15+022.9	0.550	58	STA 23+762.6	0.560				
29	STA 15+189.0	0.590	59	STA 23+946.5	0.040				
30	STA 15+191.2	0.590	60	STA 24+073.0	0.000				
								Total H=40.510m	
								Ave. H=0.540m	



DETAIL OF STEEL GRATING COVER
SCALE 1:10



SECTION A-A

SECTION B-B

HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN (MEDIAN)
SCALE 1:20

NOTES :

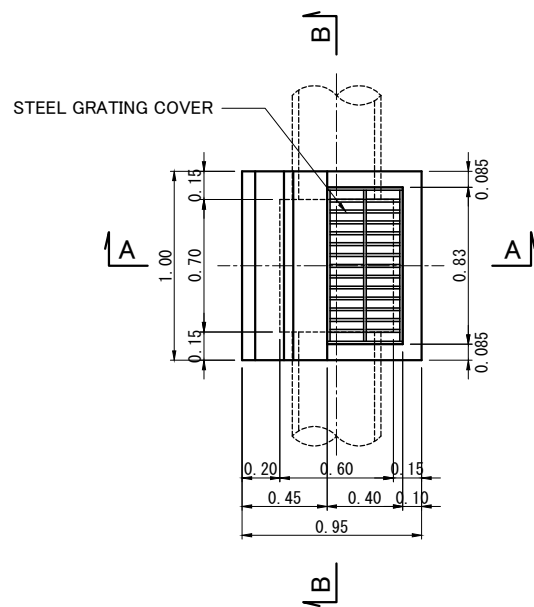
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOW :

PORTLAND CEMENT TYPE 1	350 KG. (MIN.)
SAND	0.43 M.
CRUSHED ROCK OR GRAVEL	0.86 M.
CONCRETE SLUMP	10 CM.
- REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR24 FOR ROUND BARS AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.

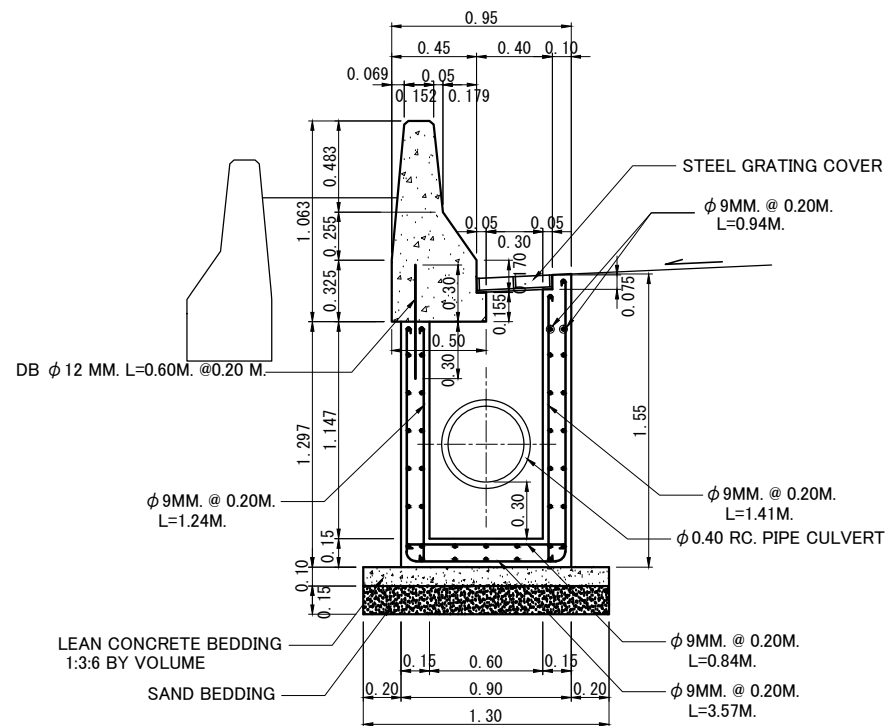
REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9 HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN AT MEDIAN	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE : AUGUST 2012	SCALE : 1:10 / 1:20
									DWG. NO. DR-1	SHEET NO. 151						

**5-2 HEIGHT ADJUSTMENT OF
EXISTING CATCH BASIN AT
SHOULDER**

**5-3 DETAILS OF INLET CATCH BASIN
AT MEDIAN & PIPE CULVERT**



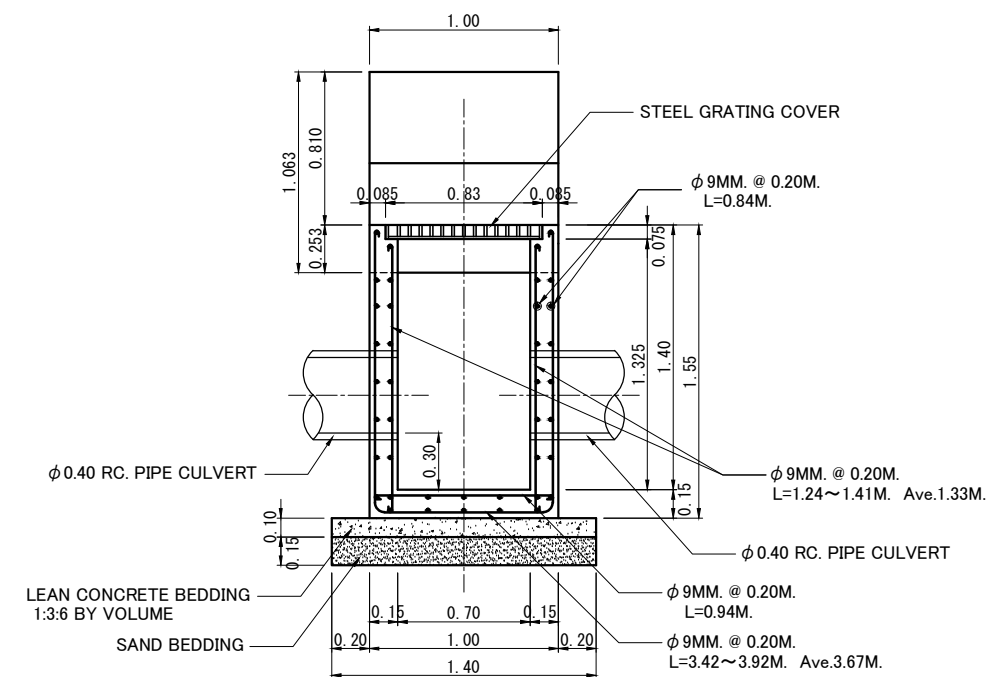
PLAN



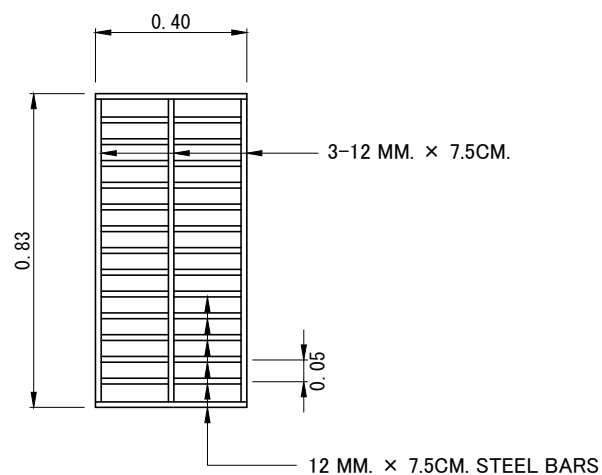
SECTION A-A

CATCH BASIN (SHOULDER)

SCALE 1:20

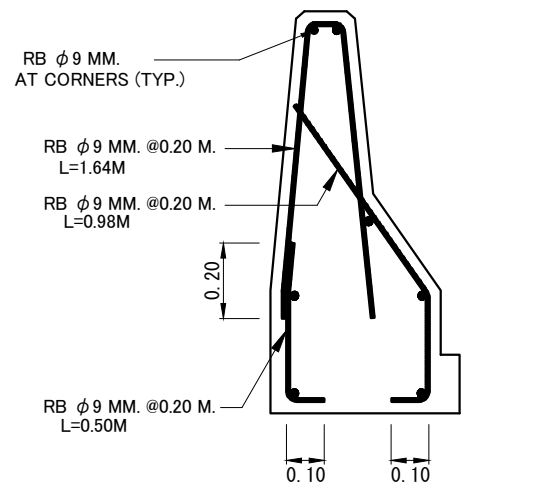


SECTION B-B



STEEL GRATING COVER

SCALE 1:10



REINFORCEMENT DETAIL

SCALE 1:10

SCHEDULED LIST OF CATCH BASIN (SHOULDER)

STA	Nos.	REMARKS
1) STA 19+666.5	1	
2) STA 19+674.6	1	
3) STA 19+678.4	1	
4) STA 19+698.4	1	
5) STA 19+708.4	1	
6) STA 19+765.6	1	
7) STA 20+313.2	1	
8) STA 20+322.5	1	
9) STA 20+327.5	1	
10) STA 20+342.5	1	
11) STA 20+352.5	1	
12) STA 20+362.5	1	
13) STA 20+372.5	1	
14) STA 20+382.5	1	

NOTES :

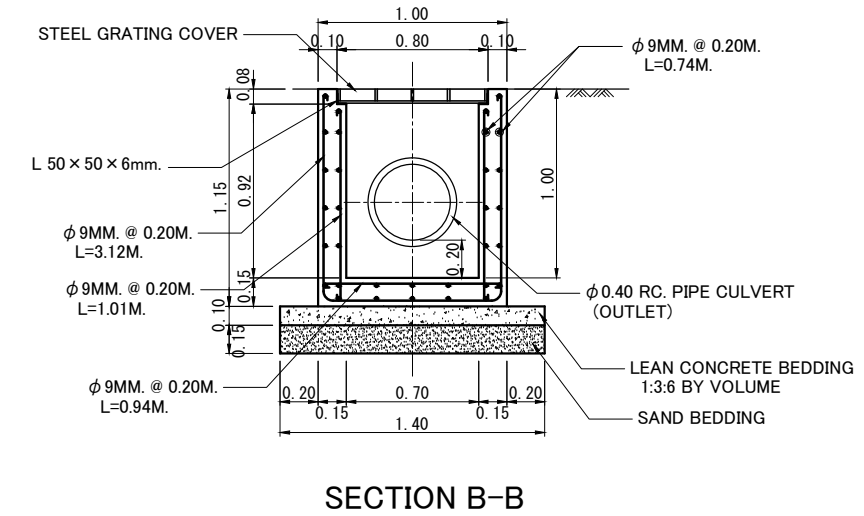
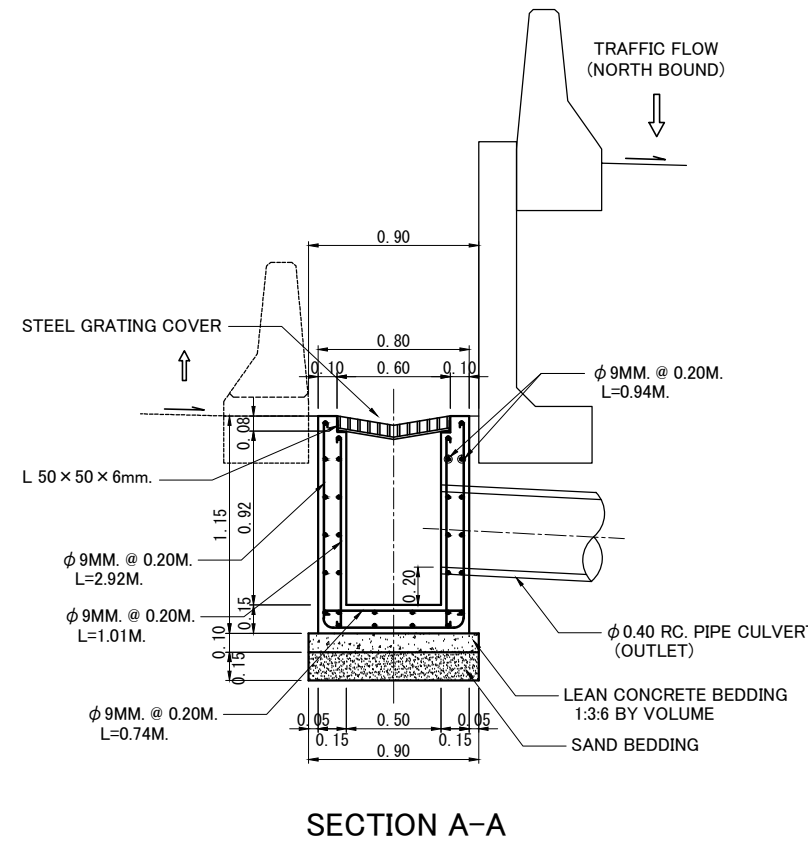
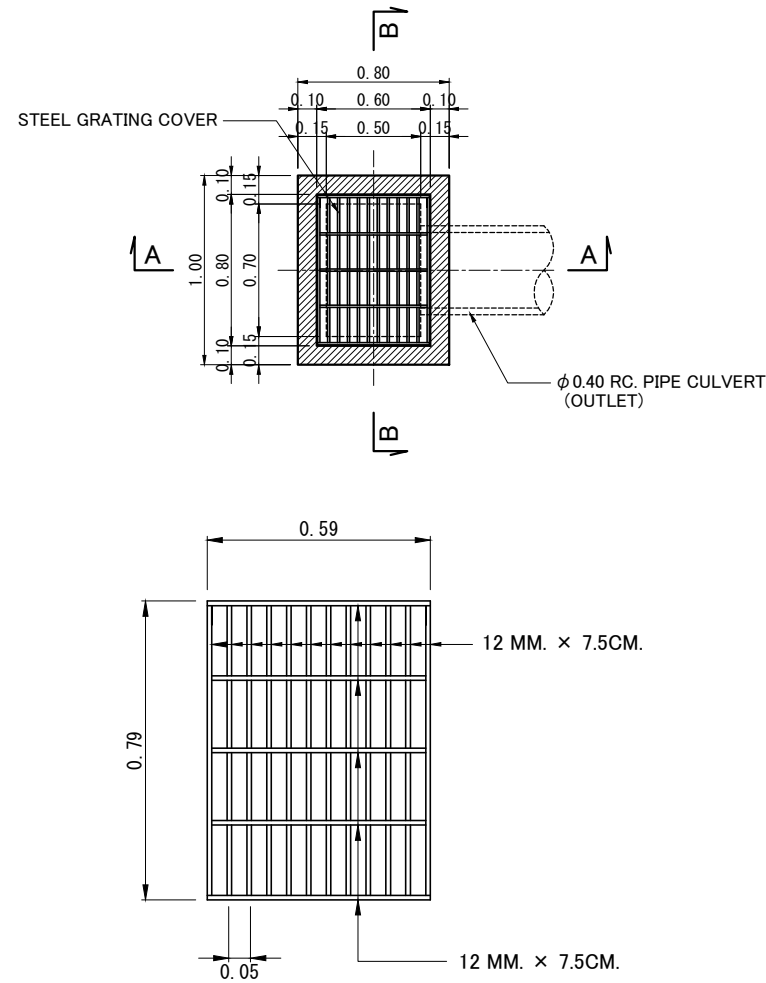
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOW :

PORTLAND CEMENT TYPE 1	350 KG. (MIN.)
SAND	0.43 M.
CRUSHED ROCK OR GRAVEL	0.86 M.
CONCRETE SLUMP	10 CM.
- REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR24 FOR ROUND BARS AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.

REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	1:10 / 1:20
														DWG. NO.	SHEET NO.
														DR-3	153

SCHEDULED LIST OF CATCH BASIN (MEDIAN)

STA	Nbs.	REMARKS
1) STA 24+430.0	1	
2) STA 24+512.0	1	
3) STA 24+594.0	1	
4) STA 24+650.0	1	
5) STA 24+690.0	1	
6) STA 24+750.0	1	
7) STA 24+815.0	1	
8) STA 24+867.0	1	
9) STA 24+920.0	1	
10) STA 24+975.0	1	



CATCH BASIN (MEDIAN)
SCALE 1:20

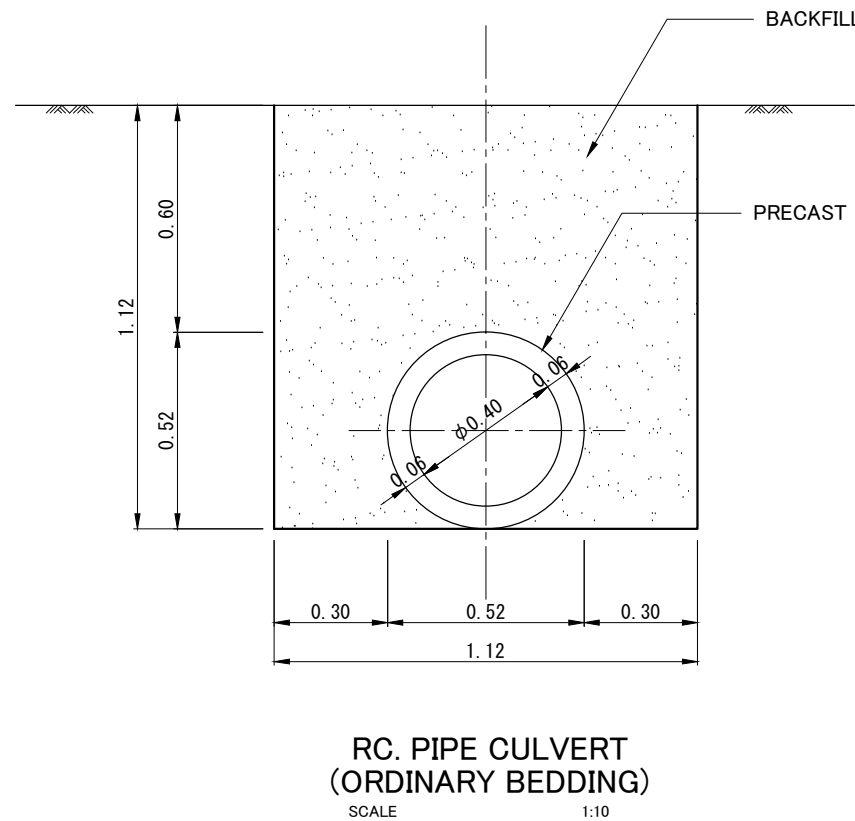
DETAIL OF STEEL GRATING COVER
SCALE 1:10

SCHEDULED LIST OF ϕ 0.40 RC. PIPE CULVERT FOR CROSSING

STA	DISTANCE (m)	REMARKS
1) STA 19+674.6	1.0	
2) STA 20+382.5	30.0	
3) STA 24+430.0	29.0	
4) STA 24+512.0	24.0	
5) STA 24+594.0	20.0	
6) STA 24+650.0	20.0	
7) STA 24+690.0	20.0	
8) STA 24+750.0	20.0	
9) STA 24+815.0	20.0	
10) STA 24+867.0	17.0	
11) STA 24+920.0	17.0	
12) STA 24+975.0	19.0	

SCHEDULED LIST OF ϕ 0.40 RC. PIPE CULVERT FOR LONGITUDINAL

STA	DISTANCE (m)	REMARKS
1) STA.19+667.0 - STA.19+718.3	51.3	
2) STA.20+313.7 - STA.20+382.0	68.3	



RC. PIPE CULVERT
(ORDINARY BEDDING)
SCALE 1:10

NOTES :

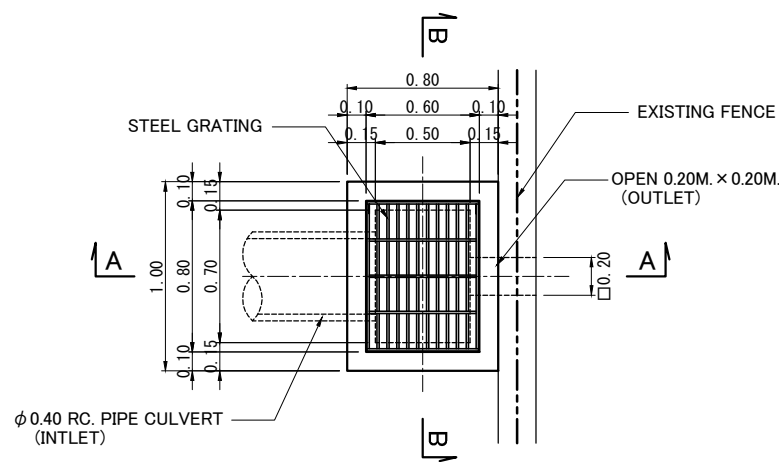
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOW :

PORTLAND CEMENT TYPE 1	350 KG. (MIN.)
SAND	0.43 M.
CRUSHED ROCK OR GRAVEL	0.86 M.
CONCRETE SLUMP	10 CM.
- REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR24 FOR ROUND BARS AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.
- DETAILS OF R.C.PIPE CULVERT SHALL CONFORM TO THE STANDARD OF DOH OF THAILAND.

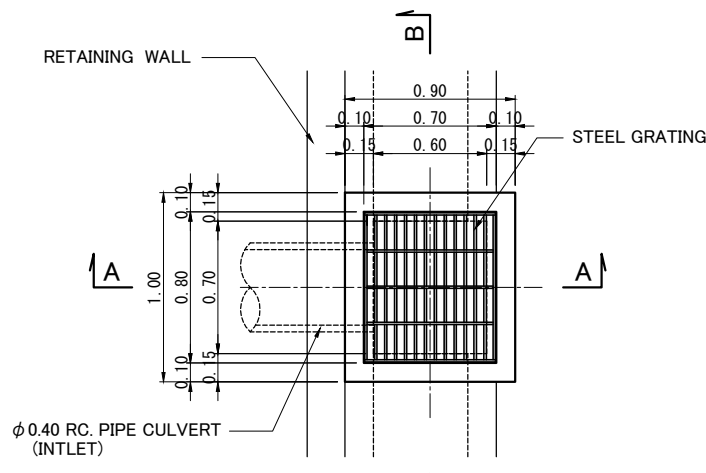
DETAILS OF INLET CATCH BASIN AT MEDIAN AND PIPE CULVERT
SCALE VARIES

REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	1:10 / 1:20
														DWG. NO. DR-4	SHEET NO. 154

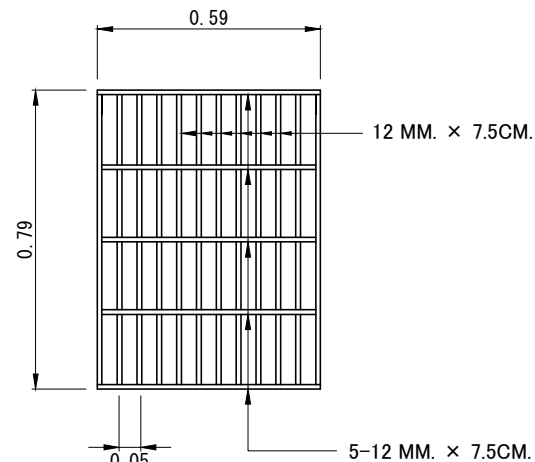
**5-4 DETAILS OF OUTLET CATCH
BASIN AT SHOULDER**



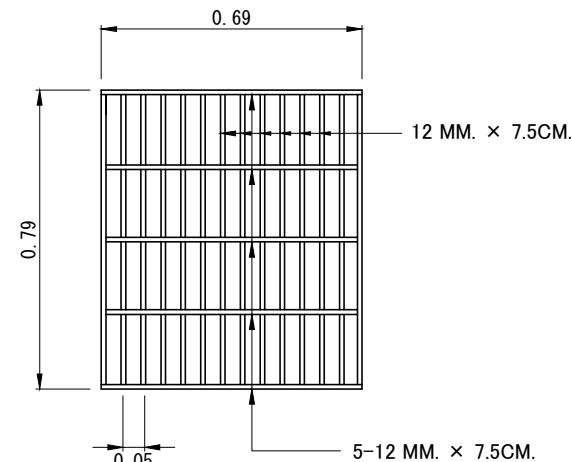
PLAN



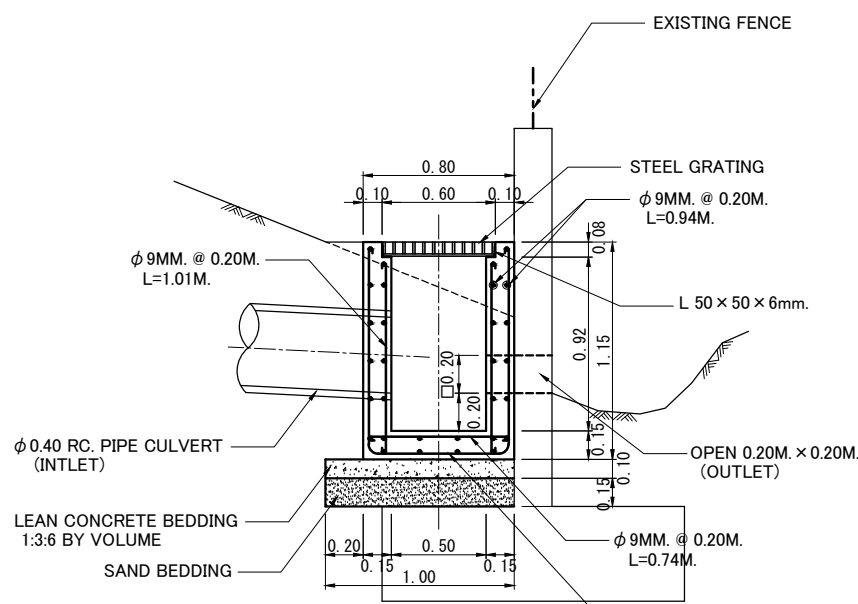
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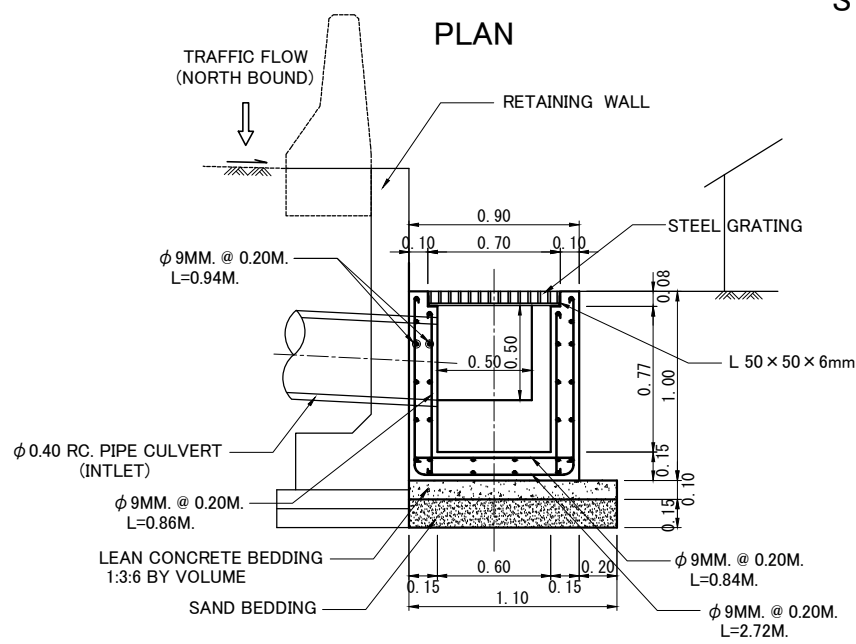
STEEL GRATING COVER (TYPE 1)



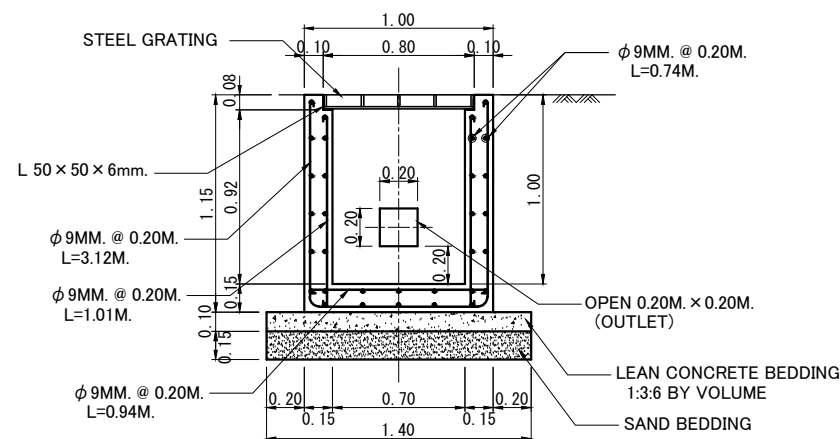
STEEL GRATING COVER (TYPE 2)



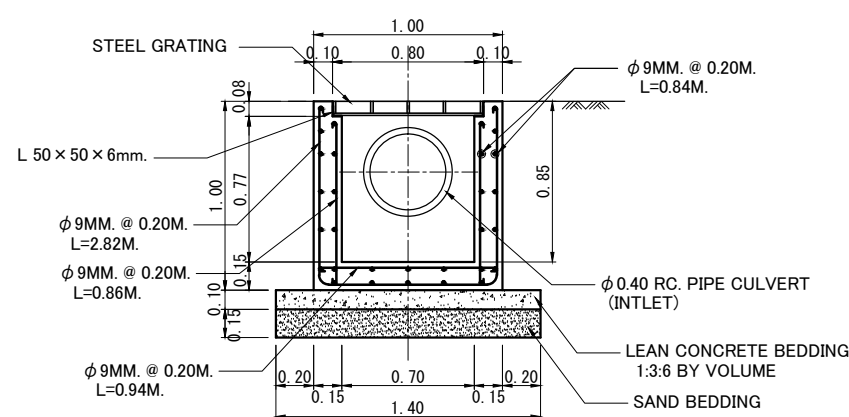
SECTION A-A



SECTION A-A



SECTION B-B



SECTION B-B

CATCH BASIN (Type1)

CATCH BASIN (Type2)

DETAILS OF OUTLET CATCH BASIN AT SHOULDER

SCHEDULED LIST OF CATCH BASIN (Type1)

STA	No.	REMARKS
1) STA 20+382.5	1	
2) STA 24+430.0	1	
3) STA 24+512.0	1	
4) STA 24+594.0	1	
5) STA 24+650.0	1	
6) STA 24+690.0	1	
7) STA 24+750.0	1	
8) STA 24+815.0	1	

SCHEDULED LIST OF CATCH BASIN (Type2)

STA	No.	REMARKS
1) STA 24+667.0	1	
2) STA 24+920.0	1	
3) STA 24+975.0	1	

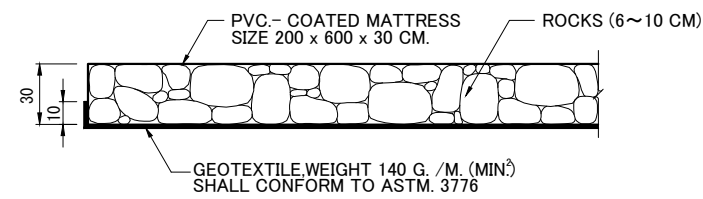
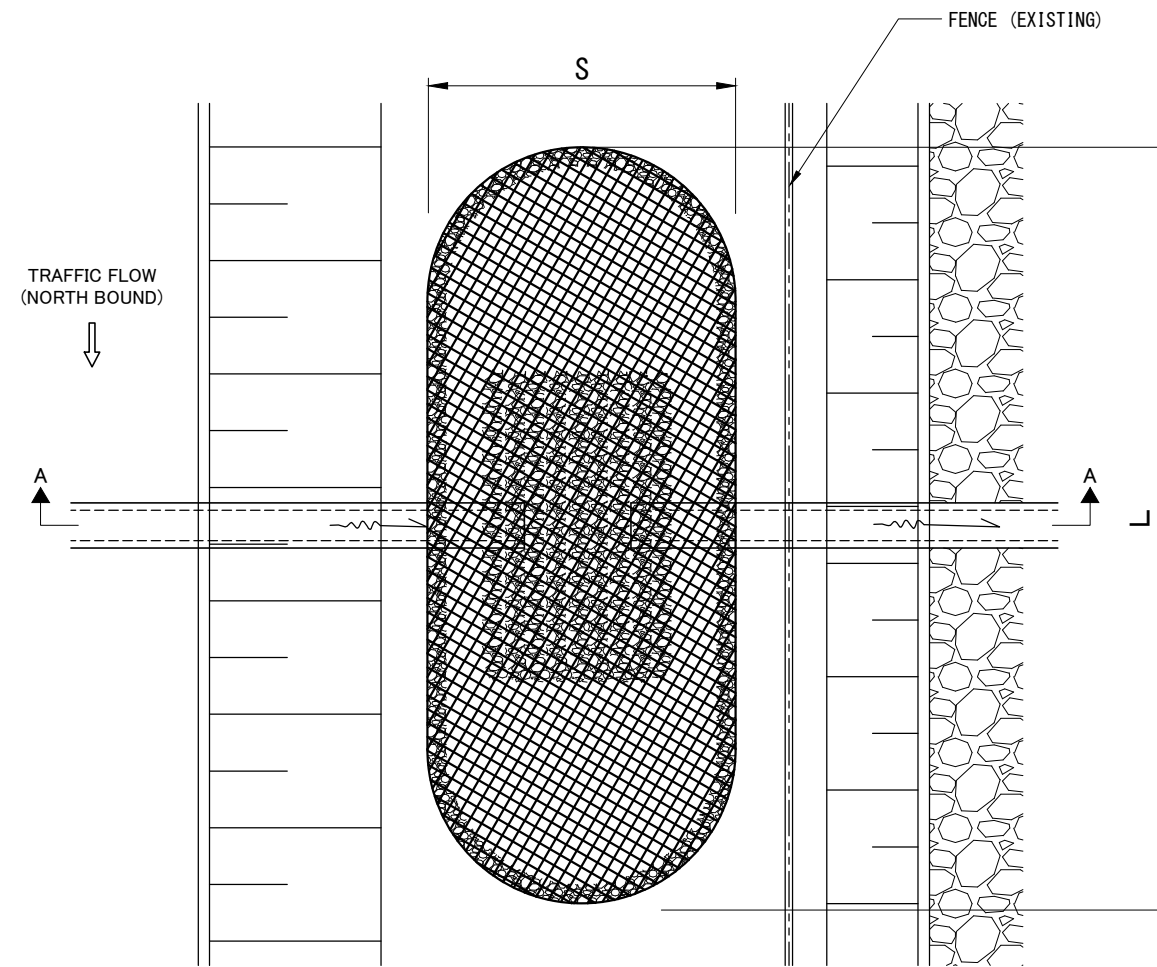
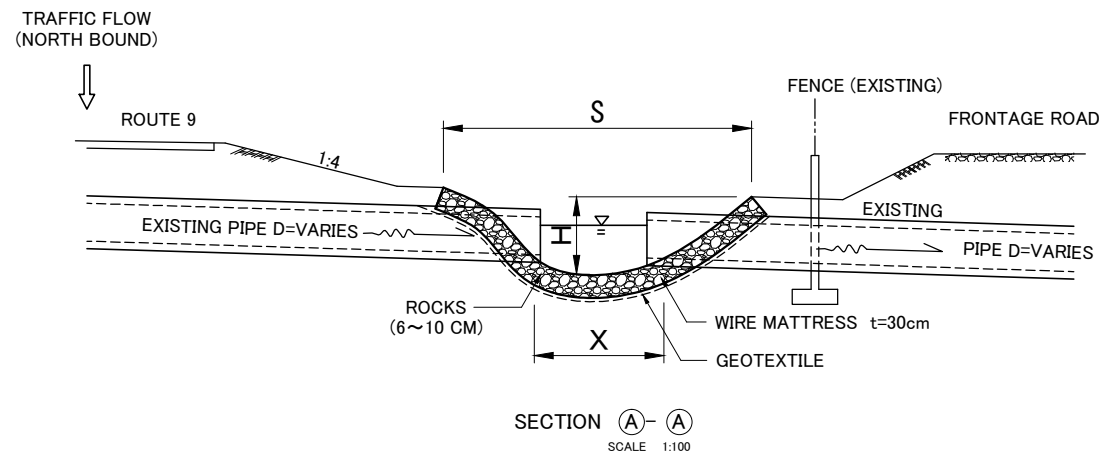
NOTES :

- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOW :

PORTLAND CEMENT TYPE 1	350 KG. (MIN.)
SAND	0.43 M.
CRUSHED ROCK OR GRAVEL	0.86 M.
CONCRETE SLUMP	10 CM.
- REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR24 FOR ROUND BARS AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.
- DETAILS OF R.C.PIPE CULVERT SHALL CONFORM TO THE STANDARD OF DOH OF THAILAND.

REV. NO.	DESCRIPTION	ENGINEER CHECKED	ENGINEER DATE	DOH CHECKED	DOH DATE	REV. NO.	APPROVED BY	HIGHWAY ROUTE NO. 9	OWNER	PROJECT TITLE	DESIGNED BY	CHECKED BY	DATE	SCALE
								DETAILS OF OUTLET CATCH BASIN AT SHOULDER	The Inter-City Motorways Division Department of Highways Ministry of Transport	The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	SAGARA Hidetaka ROAD ENGINEER	WATANABE Ryohei CHIEF ENGINEER	AUGUST 2012	1:10 / 1:20
													DR-5	SHEET NO. 155

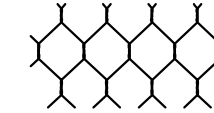
**5-5 DETAILS OF INLET / OUTLET
PROTECTION**



DETAILS OF DRAINAGE INLET/OUTLET PROTECTION
SCALE 1:100

WIRE MATTRESS
PVC-COATED RENO MATTRESS: OR GALVANIZED WIRES THAT IS COATED WITH PVC. DETAILS ARE AS FOLLOWS:

1. NETTING
THE GALVANIZED WIRES COATED WITH PVC. ARE MADE INTO 6 x 8 CM.(+10%) HEXAGONAL NETTING JOINED TOGETHER BY TWISTING THE WIRES ROUND EACH OTHER TWICE AS SHOWN IN THE PICTURE.



2. WIRES
THE WIRE MUST BE ABLE TO RESIST THE TENSION OF 28.5-51 KG./MM.² (ACCORDING TO BS 1052/1980 STANDARD)
THE DIAMETER OF WIRE FOR FRAME IS AT LEAST 2.7 MM.
THE DIAMETER OF WIRE FOR NETTING IS AT LEAST 2.0 MM.
THE DIAMETER OF WIRE FOR BOX WRAPPING IS AT LEAST 2.0 MM.
AND THE WIRE IS LONG ENOUGH TO BE USED IN INSTALLATION (ABOUT 5% OF RENO MATTRESS' WEIGHT).

3. GALVANIZING
THE WIRES MUST BE GALVANIZED ACCORDING TO BS 443/1982 STANDARD.

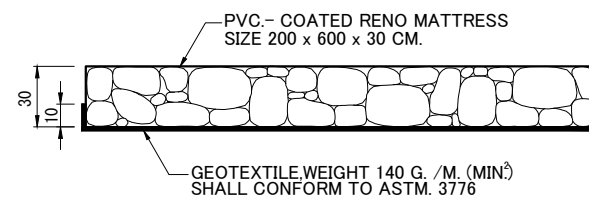
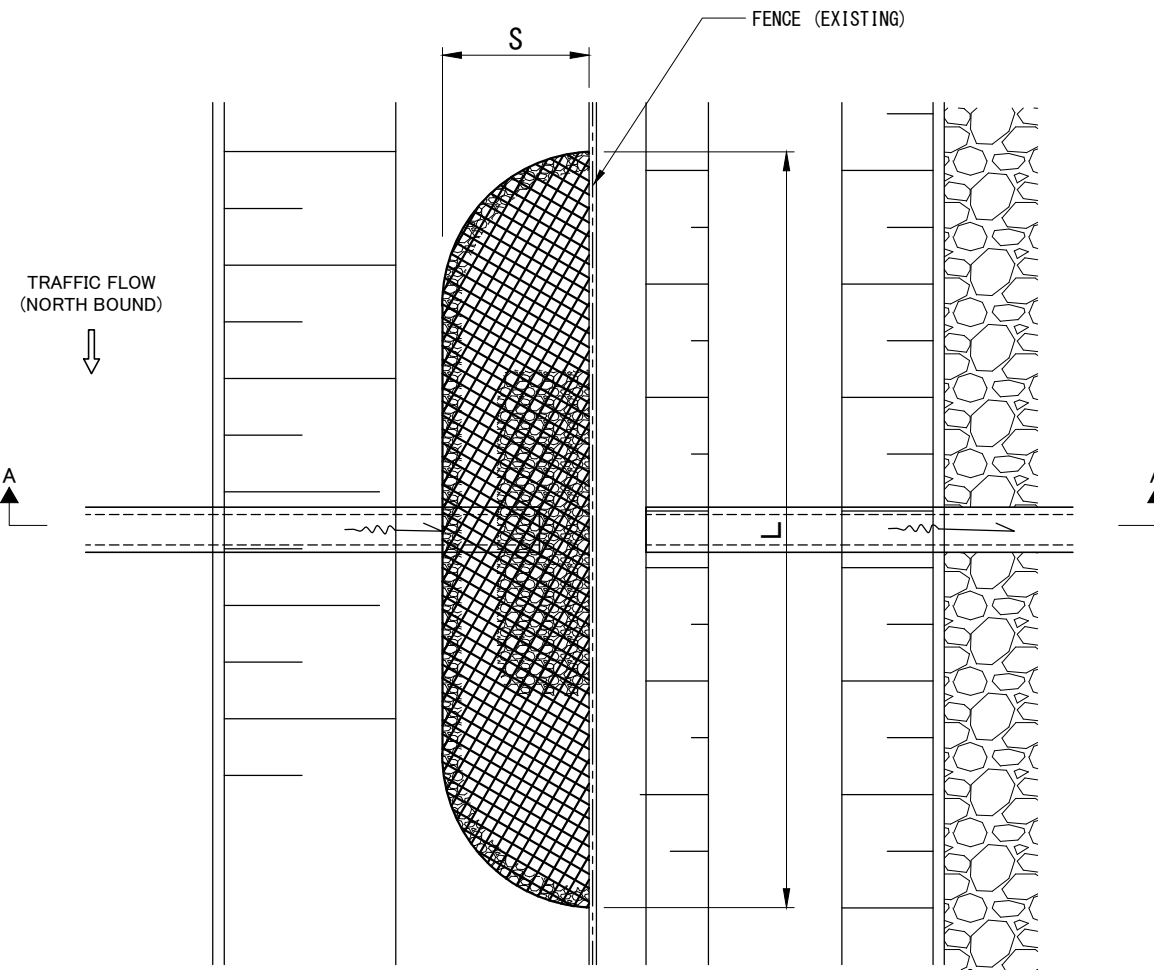
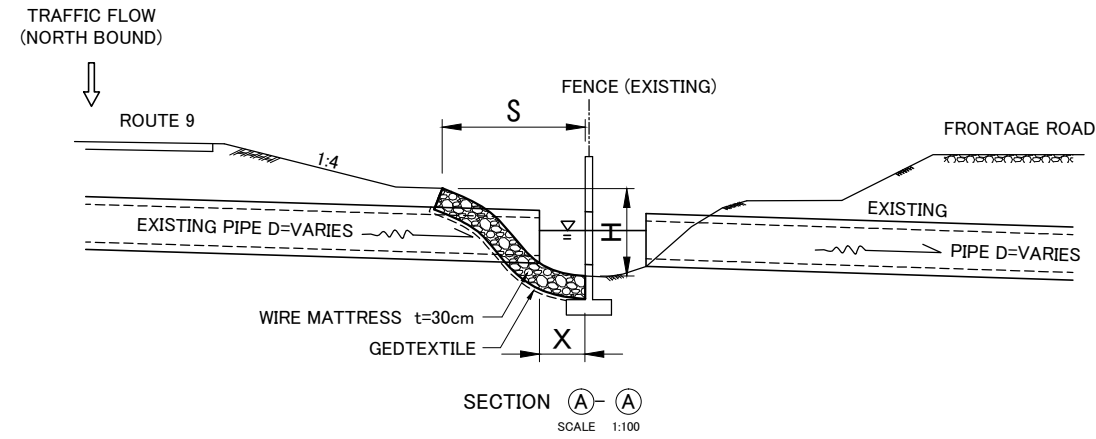
4. DEVIATION
THE DEVIATION OF THE WIRE'S DIAMETER SHALL BE LESS THAN ± 2.5%

5. ROCKS
THE ROCKS USED FOR THIS WORK MUST BE HARD ENOUGH AND NOT CRUMBLE WHEN WET AND ENDURE REGARDLESS OF THE CLIMATE.THEY ARE GRANITE.
SIZE OF THE ROCKS SHOULD BE 6-10 CM. OR ±(5%-7%).

SCHEDULED LIST OF DRAINAGE INLET/OUTLET PROTECTION

NO.	STA	Height (H) (m)	Gap (X) (m)	Width (S) (m)	Length (L) (m)	REMARKS
1	STA 23+961	2.00	1.80	7.20	13.20	
2	STA 24+079	2.00	1.80	7.50	14.70	
3	STA 24+240	2.10	1.90	7.50	30.00	
4	STA 25+502	2.10	1.00	7.70	12.70	
5	STA 25+828	2.20	1.75	8.00	13.80	
6	STA 25+947	2.20	1.80	7.50	9.90	
7	STA 26+050	2.30	0.00	7.60	10.00	No Drainage on R9
8	STA 26+172	2.20	1.45	7.80	11.70	
9	STA 26+404	2.20	1.65	8.00	12.50	
10	STA 26+682	2.20	0.90	7.60	14.40	
11	STA 27+021	2.10	1.30	8.70	12.30	
12	STA 27+327	2.30	1.45	7.80	15.20	
13	STA 27+584	2.20	0.80	7.50	15.00	Concrete slope around pipe
14	STA 27+678	2.00	0.90	7.00	13.20	
15	STA 27+937	2.40	1.10	7.70	13.50	
16	STA 28+184	2.10	1.40	7.80	12.30	
17	STA 28+544	2.30	0.75	6.50	13.90	

REV. NO.	DESCRIPTION	ENGINEER		DOH		REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE :	SCALE :
		CHECKED	DATE	CHECKED	DATE									AUGUST 2012	1:100
														DWG. NO. DR-6	SHEET NO. 156



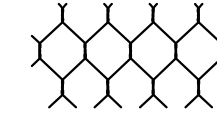
DETAILS OF DRAINAGE INLET/OUTLET PROTECTION
SCALE 1:100

RENO OR WIRE MATTRESS

PVC-COATED RENO MATTRESS: OR GALVANIZED WIRES THAT IS COATED WITH PVC. DETAILS ARE AS FOLLOWS:

1. NETTING

THE GALVANIZED WIRES COATED WITH PVC ARE MADE INTO 6 x 8 CM (+10%) HEXAGONAL NETTING JOINED TOGETHER BY TWISTING THE WIRES ROUND EACH OTHER TWICE AS SHOWN IN THE PICTURE.



2. WIRES

THE WIRE MUST BE ABLE TO RESIST THE TENSION OF 28.5-51 KG./MM.² (ACCORDING TO BS 1052/1980 STANDARD)
THE DIAMETER OF WIRE FOR FRAME IS AT LEAST 2.7 MM.
THE DIAMETER OF WIRE FOR NETTING IS AT LEAST 2.0 MM.
THE DIAMETER OF WIRE FOR BOX WRAPPING IS AT LEAST 2.0 MM.
AND THE WIRE IS LONG ENOUGH TO BE USED IN INSTALLATION (ABOUT 5% OF RENO MATTRESS WEIGHT).

3. GALVANIZING

THE WIRES MUST BE GALVANIZED ACCORDING TO BS 443/1982 STANDARD.

4. DEVIATION

THE DEVIATION OF THE WIRE'S DIAMETER SHALL BE LESS THAN ± 2.5%

5. ROCKS

THE ROCKS USED FOR THIS WORK MUST BE HARD ENOUGH AND NOT CRUMBLE WHEN WET AND ENDURE REGARDLESS OF THE CLIMATE.
THE SIZE OF THE ROCKS SHOULD BE 6-10 CM. OR ±(5%-7%).

SCHEDULED LIST OF DRAINAGE INLET/OUTLET PROTECTION

NO.	STA	Height (H) (m)	Between (X) (m)	Width (S) (m)	Length (L) (m)	REMARKS
1	STA 12+651.0	2.10	0.50	2.50	15.00	fence is low
2	STA 12+810.8	2.10	0.50	2.50	15.00	fence is low
3	STA 15+616.2	2.00	0.80	4.50	12.00	
4	STA 15+736.1	2.00	2.40	3.90	9.00	
5	STA 19+878.4	2.10	2.20	3.50	8.00	
6	STA 20+103.2	2.10	2.00	3.30	8.00	
7	STA 20+319.6	2.10	0.00	3.00	7.40	
8	STA 20+581.7	2.10	1.50	3.50	6.40	

REV. NO.	DESCRIPTION	ENGINEER CHECKED DATE	DOH CHECKED DATE	REV. NO.	APPROVED BY	KINGDOM OF THAILAND MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS	HIGHWAY ROUTE NO. 9	OWNER The Inter-City Motorways Division Department of Highways Ministry of Transport	PROJECT TITLE The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road	CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.	DESIGNED BY SAGARA Hidetaka ROAD ENGINEER	CHECKED BY WATANABE Ryohei CHIEF ENGINEER	DATE : AUGUST 2012	SCALE : 1:100
							DETAILS OF INLET / OUTLET PROTECTION						DWG. NO. DR-7	SHEET NO. 157