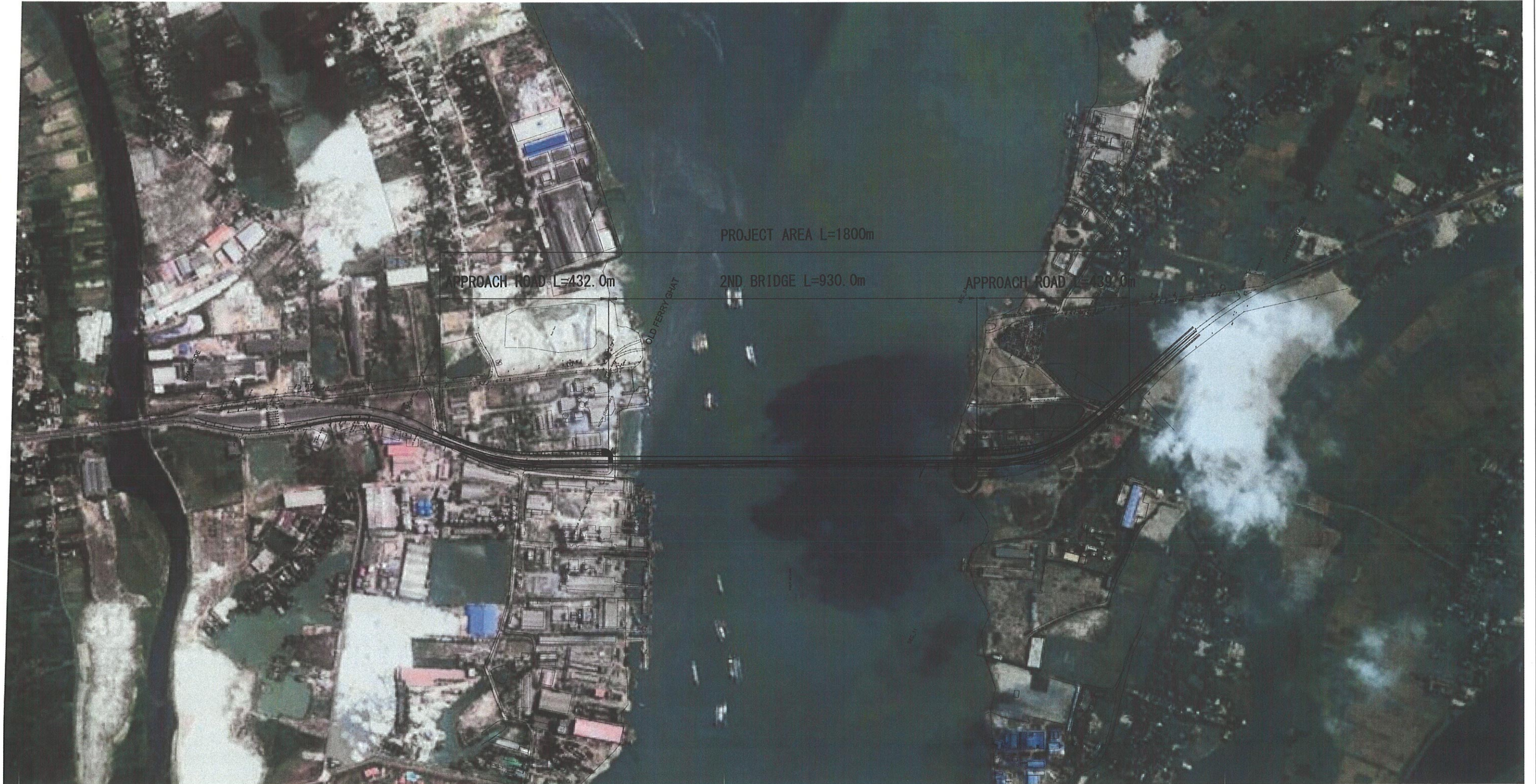


C.
MEGHNA BRIDGE DESIGN

MAGHNA BRIDGE: LOCATION MAP S=1/10000



Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

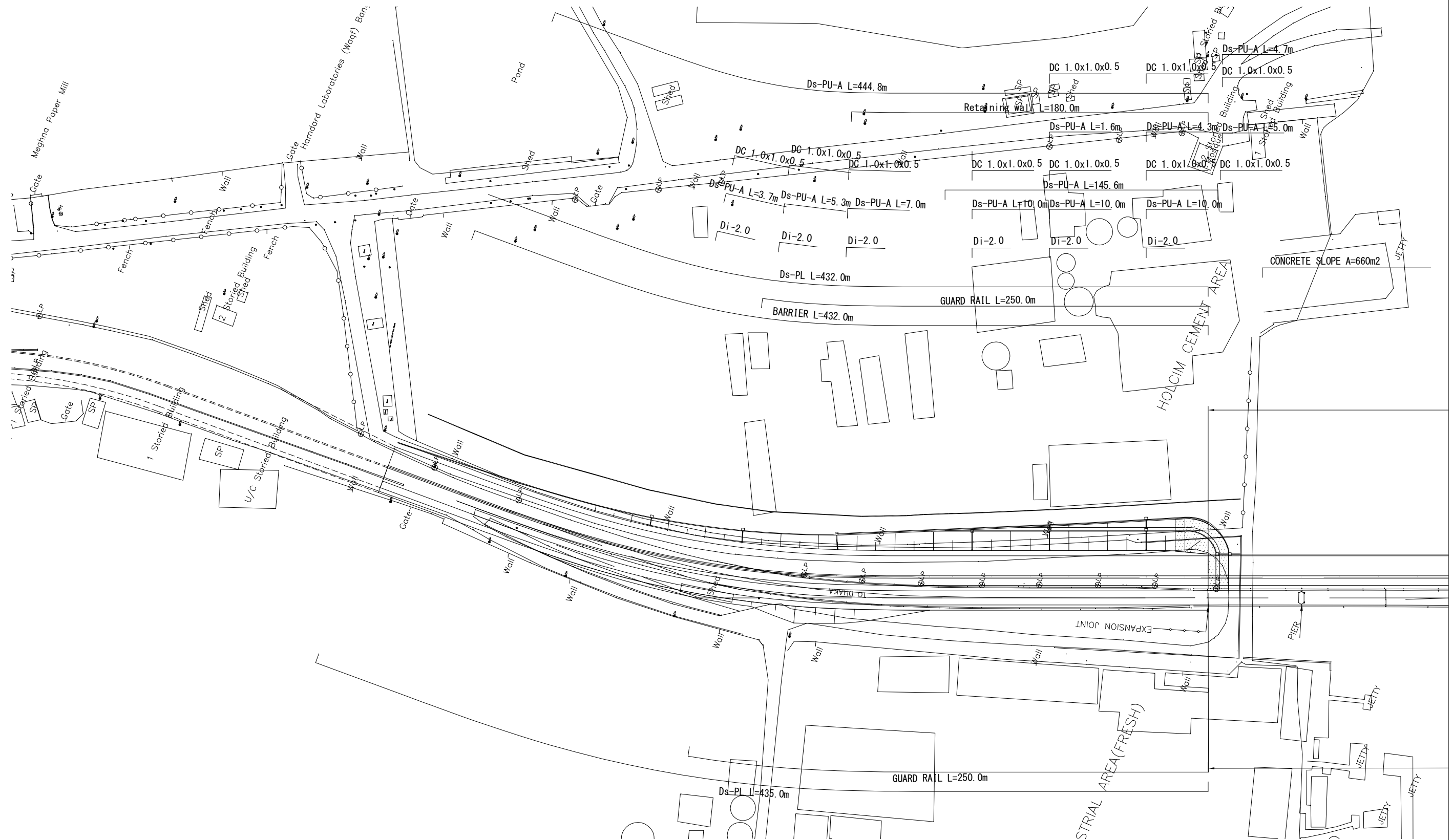
MEGHNA BRIDGE

LOCATION MAP

SCALE : AS NOTED
DATE: 3/2013

SHEET NO:
C-01

MEGHNA BRIDGE: PLAN (1) S=1/1000

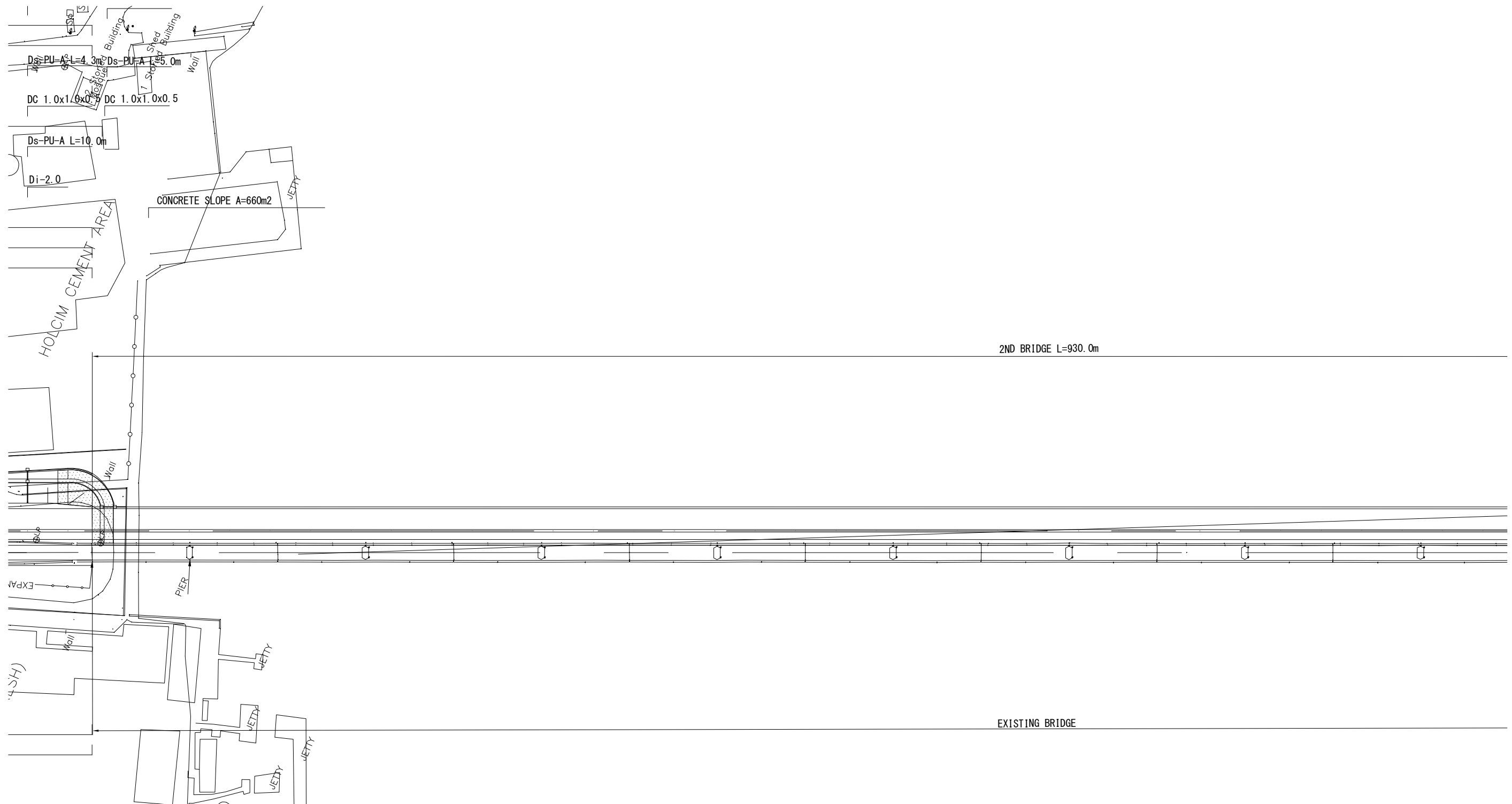


List of drainage type

Title	Name	Remarks
Ds-PL	Drainage side ditch - precast L-shape gutter	
Ds-PU-A	Drainage side ditch - precast - type A	Width 0.3m, Depth 0.2m
Dc 1.0 X 1.0 X 0.5	Drainage catch pit	Width 1.0m, Depth 0.5m, Length 1.0m
Di-2.0	Drainage intake pit	Width 0.2m, Depth 0.3m, Length 2.0m

Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
PLAN (1)	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-02

MEGHNA BRIDGE: PLAN (2) S=1/1000



List of drainage type

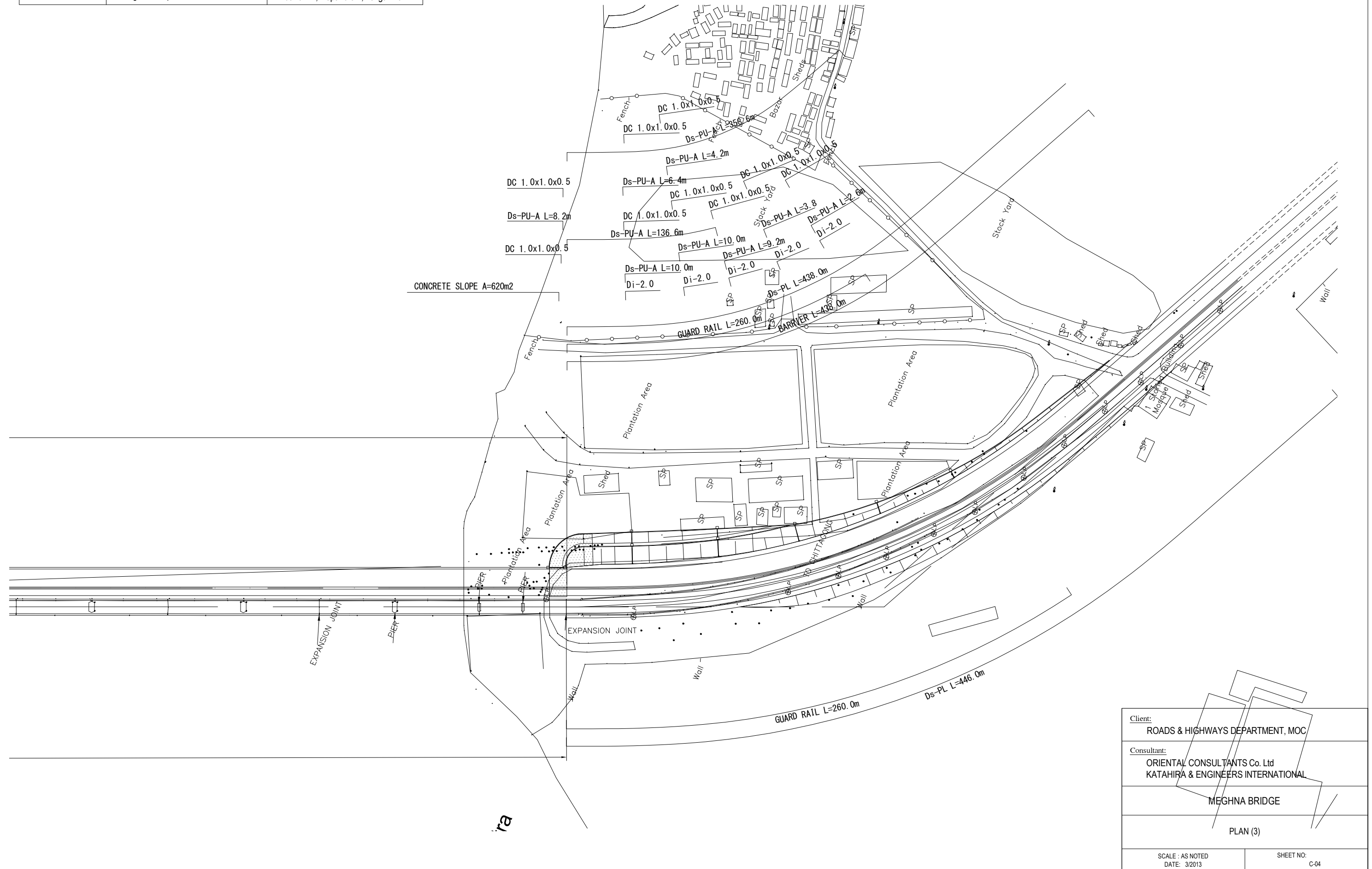
Title	Name	Remarks
Ds-PL	Drainage side ditch - precast L-shape gutter	
Ds-PU-A	Drainage side ditch - precast - type A	Width 0.3m, Depth 0.2m
Dc 1.0 X 1.0 X 0.5	Drainage catch pit	Width 1.0m, Depth 0.5m, Length 1.0m
Di-2.0	Drainage intake pit	Width 0.2m, Depth 0.3m, Length 2.0m

Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
PLAN (2)	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-03

List of drainage type

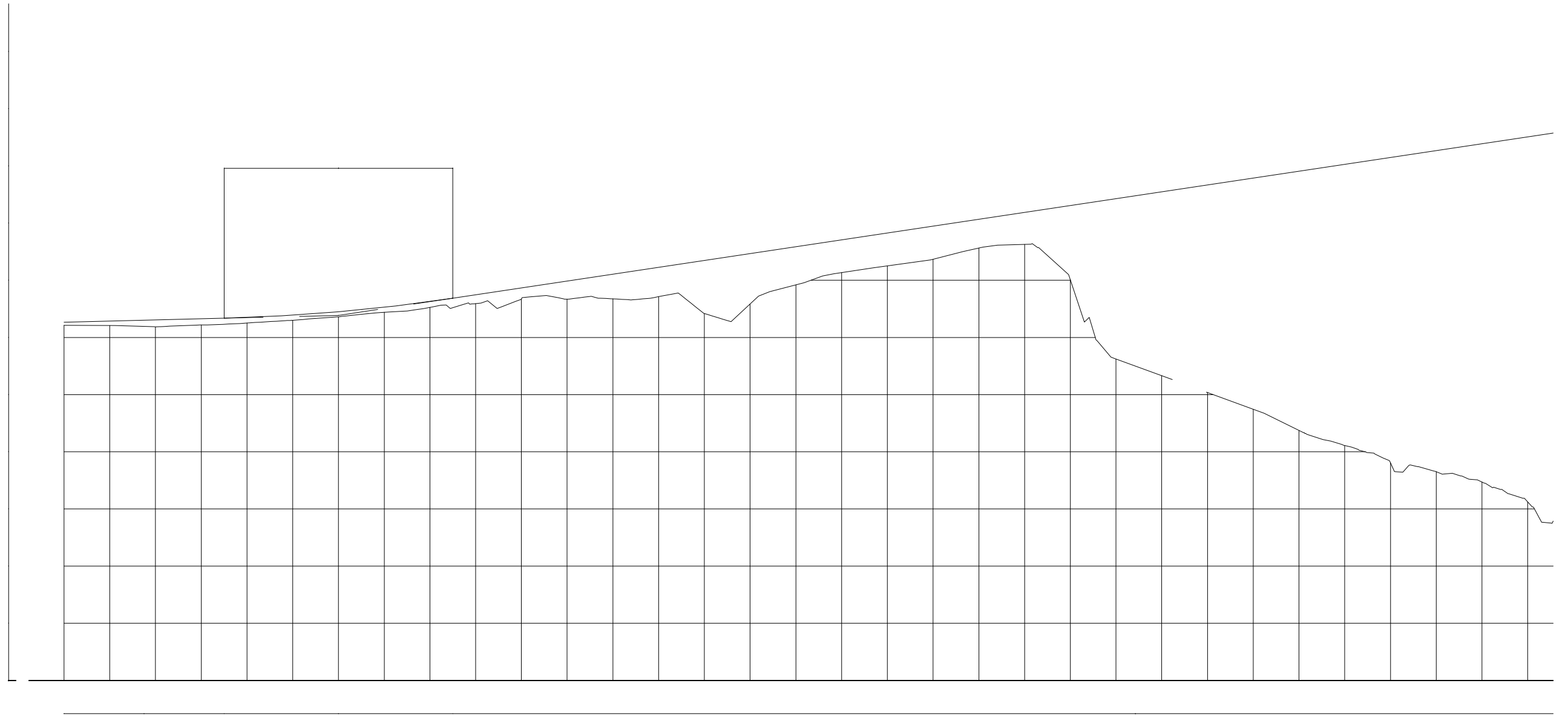
Title	Name	Remarks
Ds-PL	Drainage side ditch - precast L-shape gutter	
Ds-PU-A	Drainage side ditch - precast - type A	Width 0.3m, Depth 0.2m
Dc 1.0 X 1.0 X 0.5	Drainage catch pit	Width 1.0m, Depth 0.5m, Length 1.0m
Di-2.0	Drainage intake pit	Width 0.2m, Depth 0.3m, Length 2.0m

MEGHNA BRIDGE: PLAN (3) S=1/1000



Client:	ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:	ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL
MEGHNA BRIDGE	
PLAN (3)	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-04

MEGHNA BRIDGE: PROFILE (1)



Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

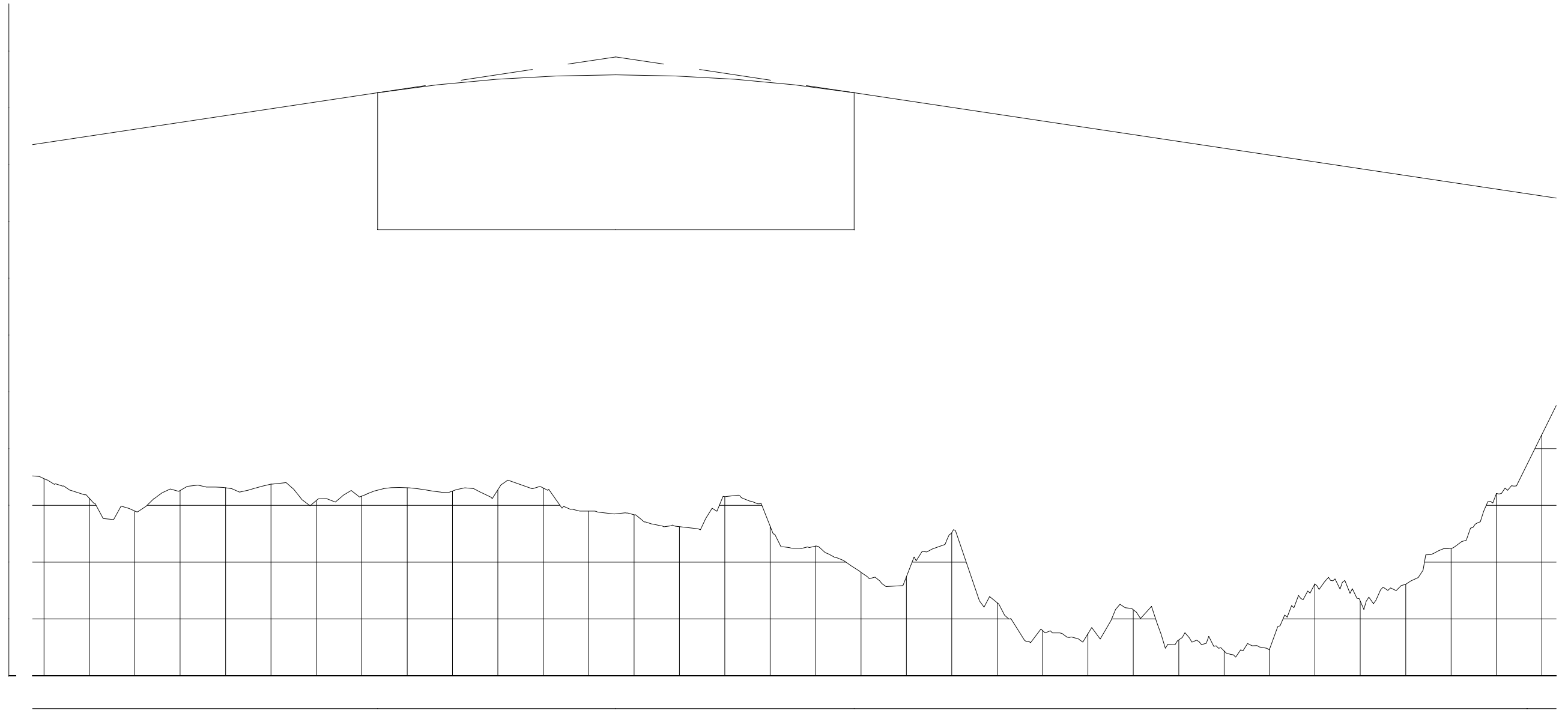
MEGHNA BRIDGE

PROFILE (1)

SCALE : AS NOTED
DATE: 3/2013

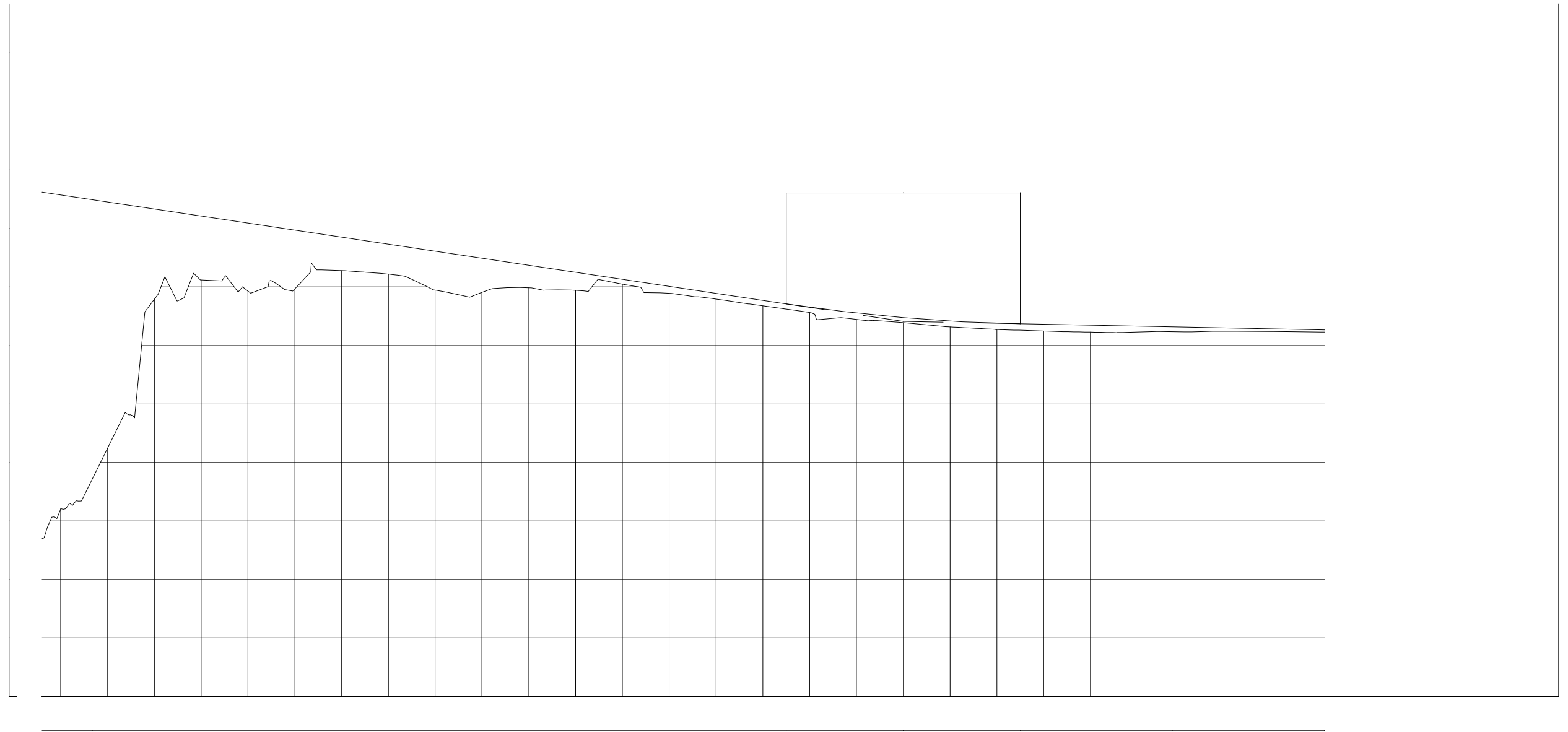
SHEET NO:
C-05

MEGHNA BRIDGE: PROFILE (2)



Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
PROFILE (2)	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-06

MEGHNA BRIDGE: PROFILE (3)



Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

PROFILE (3)

SCALE : AS NOTED
DATE: 3/2013

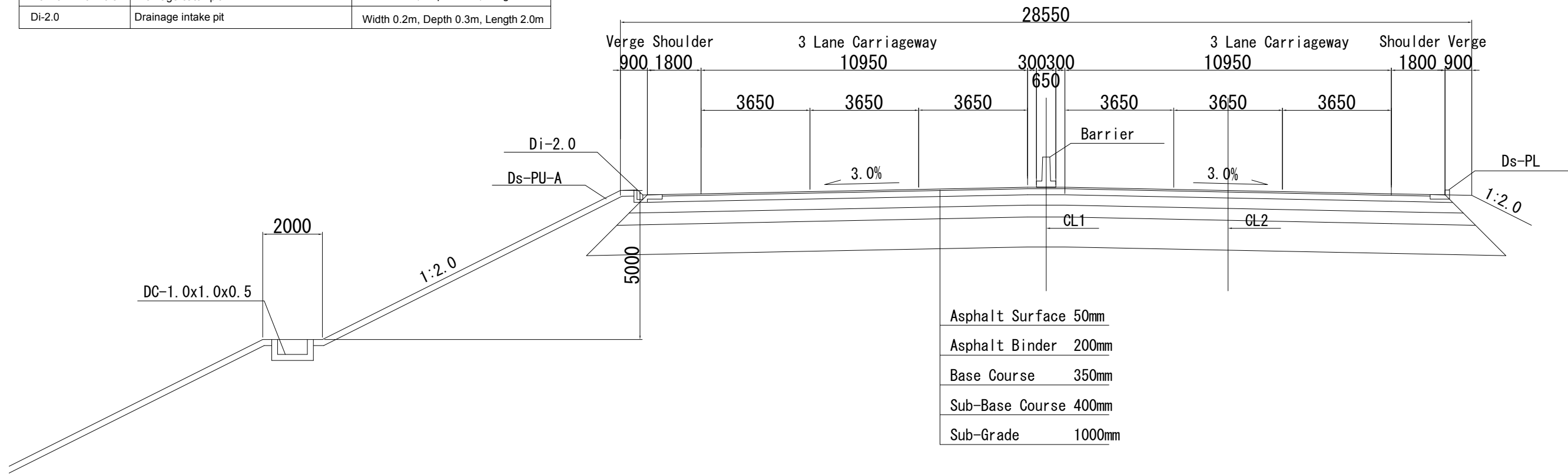
SHEET NO:
C-07

MEGHNA BRIDGE: TYPICAL CROSS SECTION S=1/150

List of drainage type

Title	Name	Remarks
Ds-PL	Drainage side ditch - precast L-shape gutter	
Ds-PU-A	Drainage side ditch - precast - type A	Width 0.3m, Depth 0.2m
Dc 1.0 X 1.0 X 0.5	Drainage catch pit	Width 1.0m, Depth 0.5m, Length 1.0m
Di-2.0	Drainage intake pit	Width 0.2m, Depth 0.3m, Length 2.0m

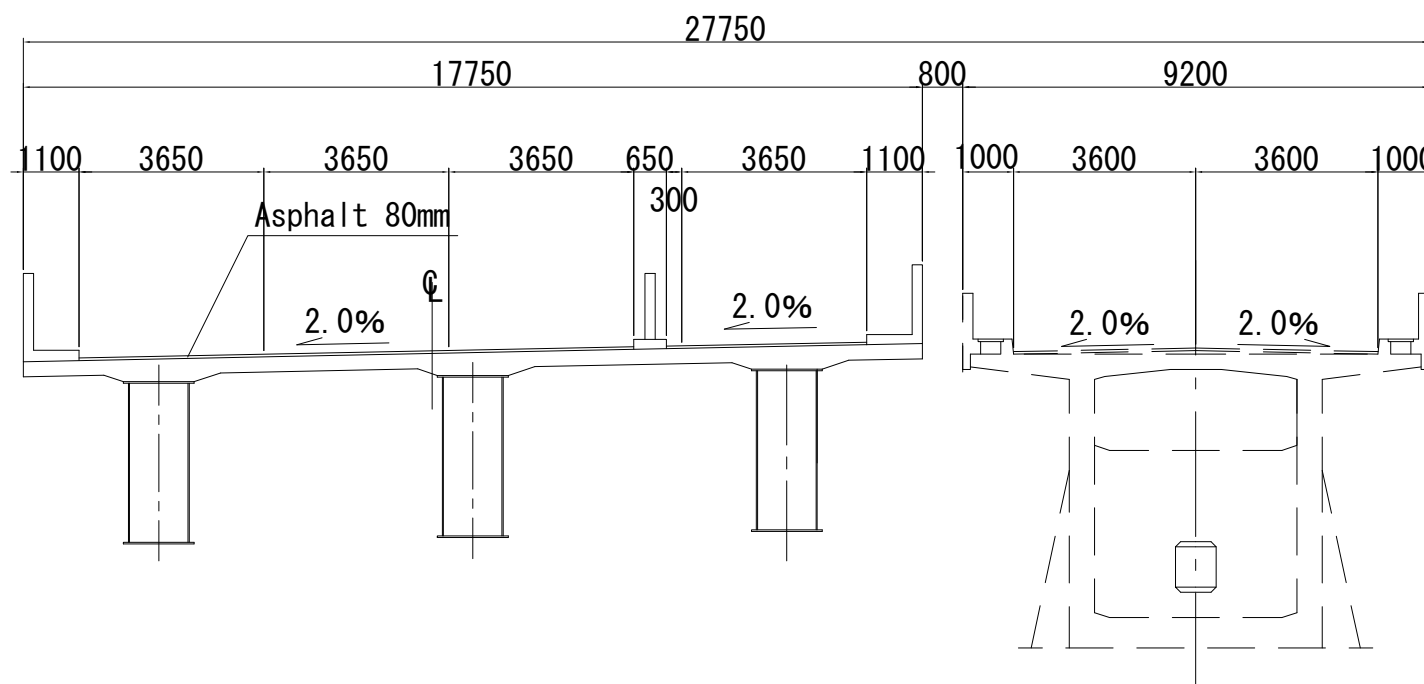
ROAD SECTION



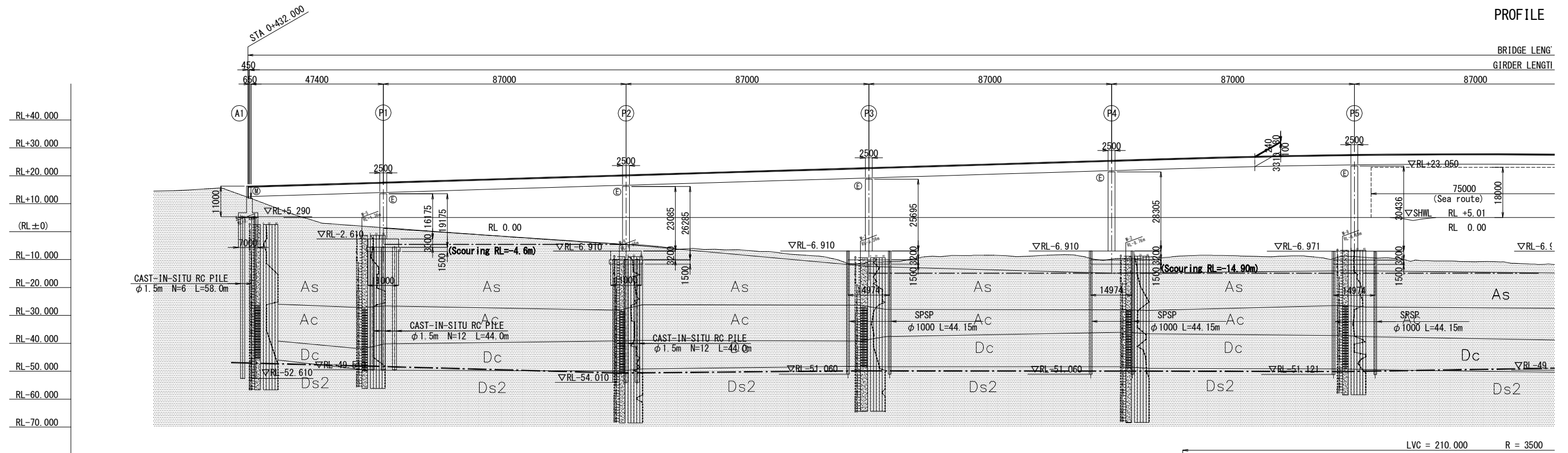
BRIDGE SECTION

(2ND BRIDGE)

(EXISTING BRIDGE)

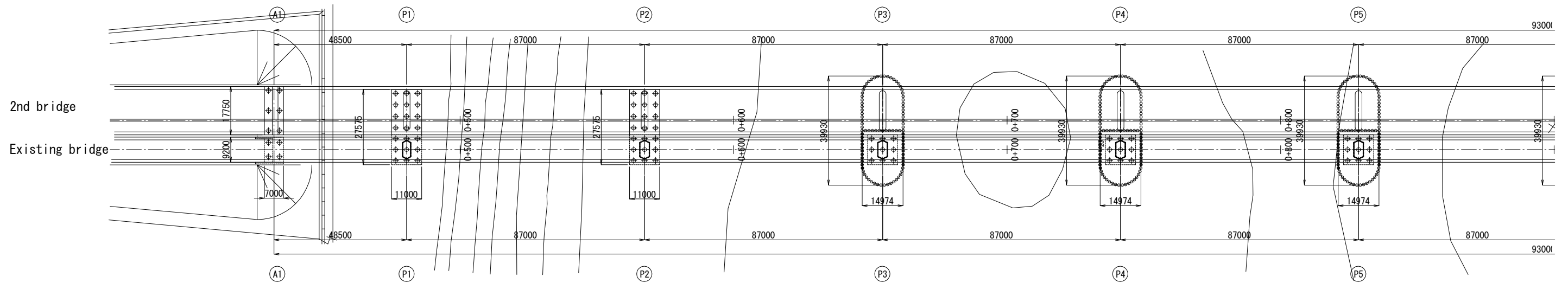


Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
TYPICAL SECTION	
SCALE : AS NOTED DATE : 3/2013	SHEET NO: C-08



GRADIENT	
PROPOSED HEIGHT	
GROUND HEIGHT	
STATION	
HORIZONTAL CURVE	
SUPER ELEVATION	

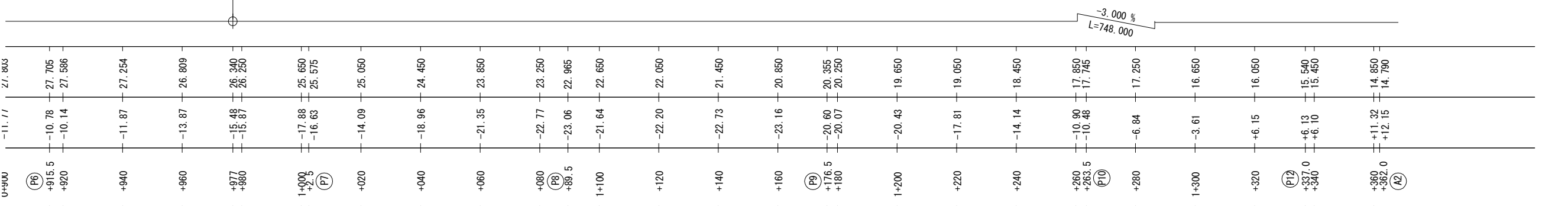
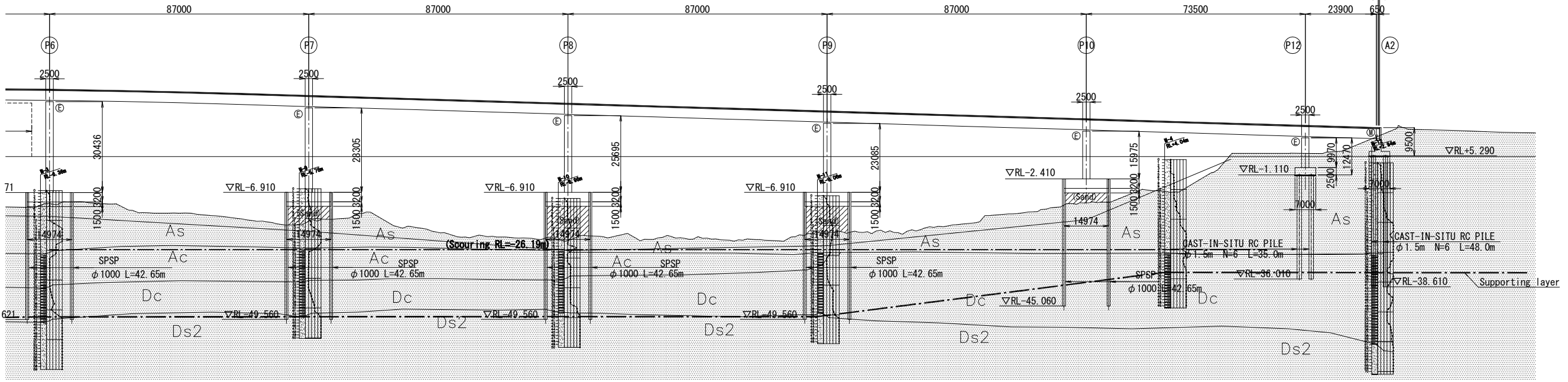
GRADIENT	3.000% L=752.000	
PROPOSED HEIGHT	16.290, 16.530, 17.130, 17.730, 17.745, 18.330, 18.930, 19.530, 20.130, 20.355, 20.730, 21.330, 21.930, 22.530, 22.965, 23.130, 23.730, 24.330, 24.930, 25.530, 25.575, 26.130, 26.340, 26.706, 27.174, 27.529, 27.645, 27.769, 27.894, 27.915, 27.906	
GROUND HEIGHT	+12.29, +9.31, +2.94, +1.47, +1.43, 0.00, -1.46, -2.82, -4.13, -4.57, -5.41, -6.36, -7.29, -9.31, -10.78, -10.78, -8.96, -8.50, -8.40, -10.07, -9.83, -9.32, -8.71, -8.53, -8.92, -9.99, -8.94, -9.33, -10.50, -10.80, -10.83	
STATION	A1, +432.0, +440, +460, +480, +480.5, P1, 0+500, +520, +540, +560, +567.5, P2, +580, 0+600, +620, +640, P3, +654.5, +660, +680, 0+700, +720, +740, +741.5, P4, +760, +767, +780, 0+800, +820, +828.5, P5, +840, +860, +872, +880	
HORIZONTAL CURVE	R=∞ L=1073.853	
SUPER ELEVATION	2.000% -2.000%	



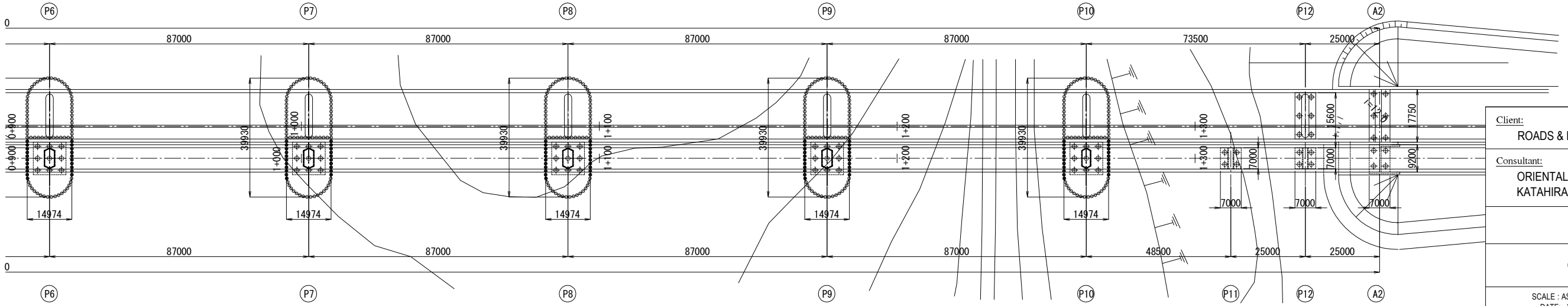
VIEW OF 2ND BRIDGE

S=1:1500

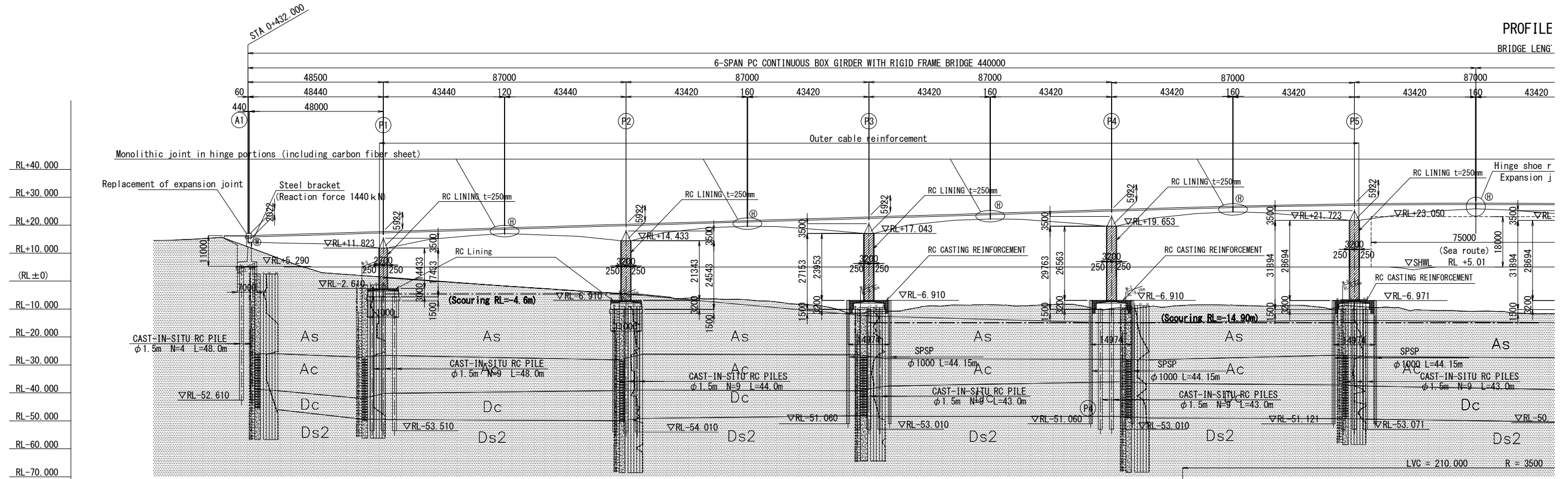
H 930000
L=929100



S=1:1500



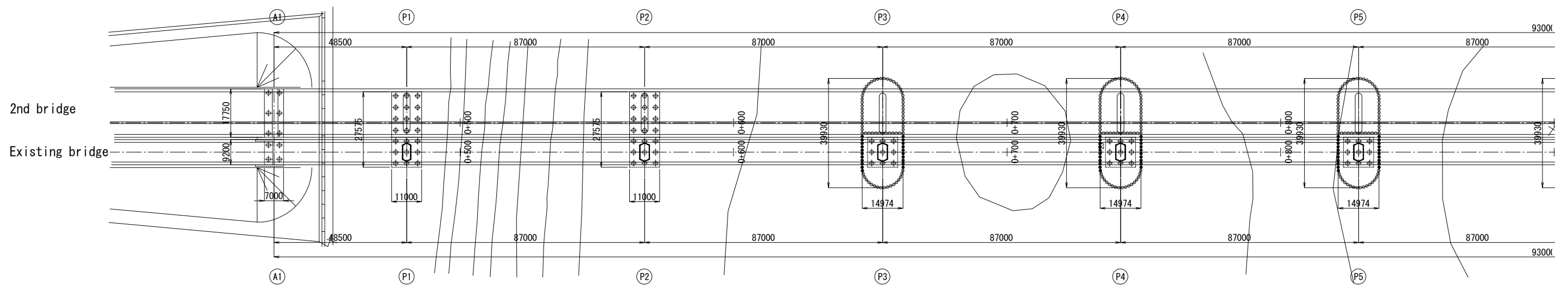
Client:	ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:	ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL
MEGHNA BRIDGE	
GENERAL VIEW OF 2ND BRIDGE	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-9



GRADIENT	
PROPOSED HEIGHT	
GROUND HEIGHT	
STATION	
HORIZONTAL CURVE	

GRADIENT	3.000% L=752.000																														
PROPOSED HEIGHT	16.290	16.530	17.130	17.730	17.745	18.330	18.930	19.530	20.130	20.355	20.730	21.330	21.930	22.530	22.965	23.130	23.730	24.330	24.930	25.530	25.575	26.130	26.340	26.706	27.174	27.529	27.645	27.769	27.894	27.915	27.906
GROUND HEIGHT	+12.29	+9.31	+2.94	+1.47	+1.43	0.00	-1.46	-2.82	-4.13	-4.57	-5.41	-6.36	-7.29	-9.31	-10.78	-10.78	-8.96	-8.50	-8.40	-10.07	-9.83	-9.32	-8.71	-8.53	-8.92	-9.99	-8.94	-9.33	-10.50	-10.80	-10.83
STATION	A1+432.0	+440	+460	+480	+480.5	0+500	+520	+540	+560	+567.5	+580	0+600	+620	+640	P3+654.5	+660	+680	0+700	+720	+740	+741.5	P4+760	+767	+780	0+800	+820	+828.5	+840	+860	+872	+880
HORIZONTAL CURVE																					R=∞ L=1073.853	29.490 0+872									

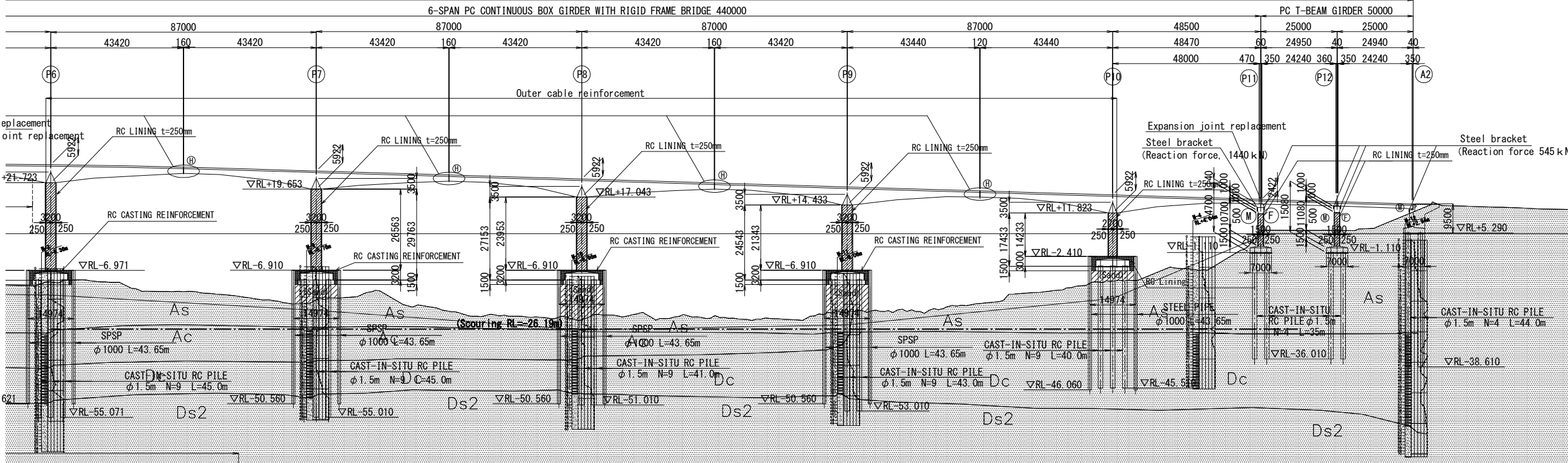
PLAN



IEW OF EXISTING BRIDGE

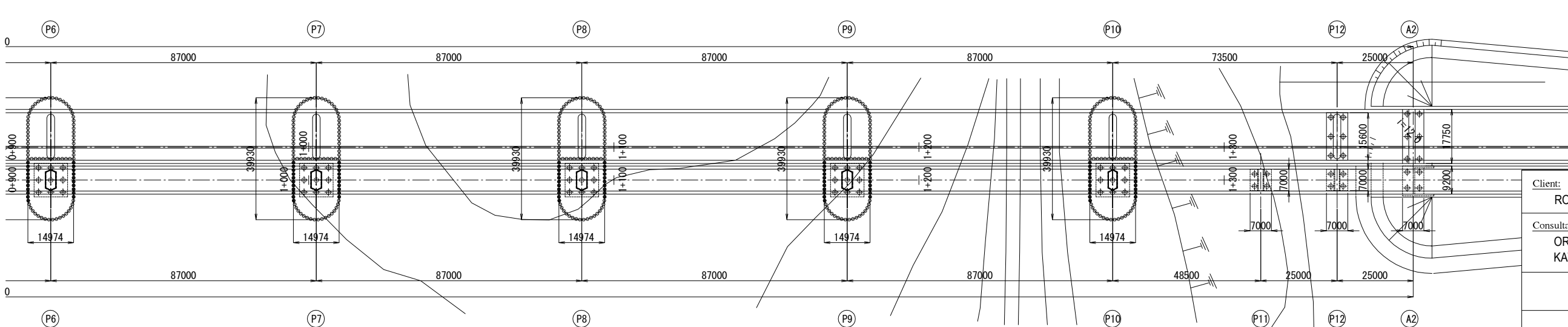
S=1:1500

H 930000



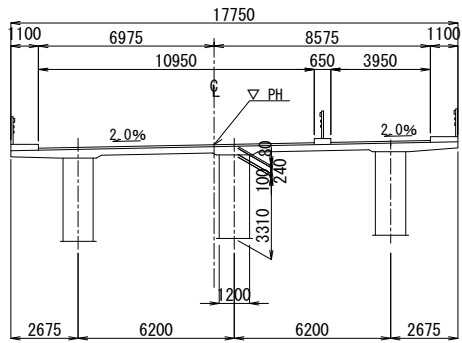
27.803	27.705	27.586	27.254	26.809	26.340	25.650	25.050	24.450	23.850	23.250	22.650	22.050	21.450	20.850	20.250	19.650	19.050	18.450	17.850	17.250	16.650	16.050	15.450	14.850			
-11.77	-10.78	-10.14	-11.87	-13.87	-15.48	-16.63	-14.09	-18.96	-21.35	-22.77	-23.06	-22.20	-22.73	-23.16	-20.60	-20.43	-17.81	-14.14	-10.90	-6.84	-3.61	+5.73	+6.15	+6.13	+11.32		
U+900	Ⓟ915.5	+920	+940	+960	+977	+980	1+000	+040	+060	+080	+89.5	1+100	+120	+140	+160	Ⓟ176.5	+180	1+200	+220	+240	+260	+312.0	+320	Ⓟ337.0	+340	+360	+362.0

S=1:1500

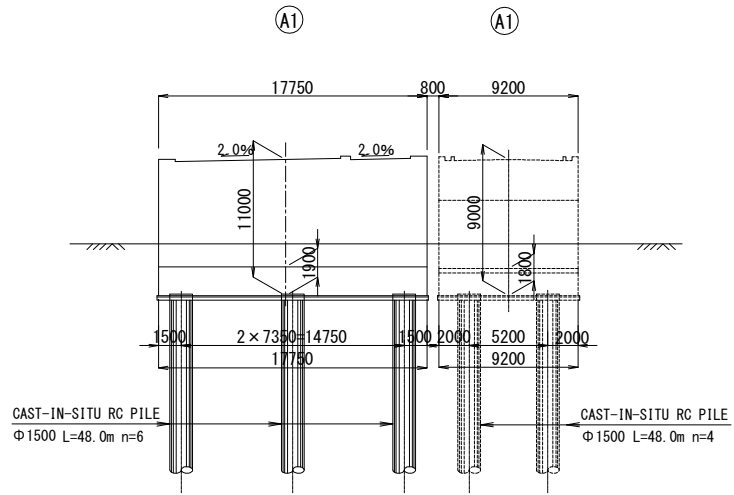


Client:	ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:	ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL
MEGHNA BRIDGE	
GENERAL VIEW OF EXISTING BRIDGE	
SCALE: AS NOTED DATE: 3/2013	SHEET NO: C-10

2nd Bridge S=1:300



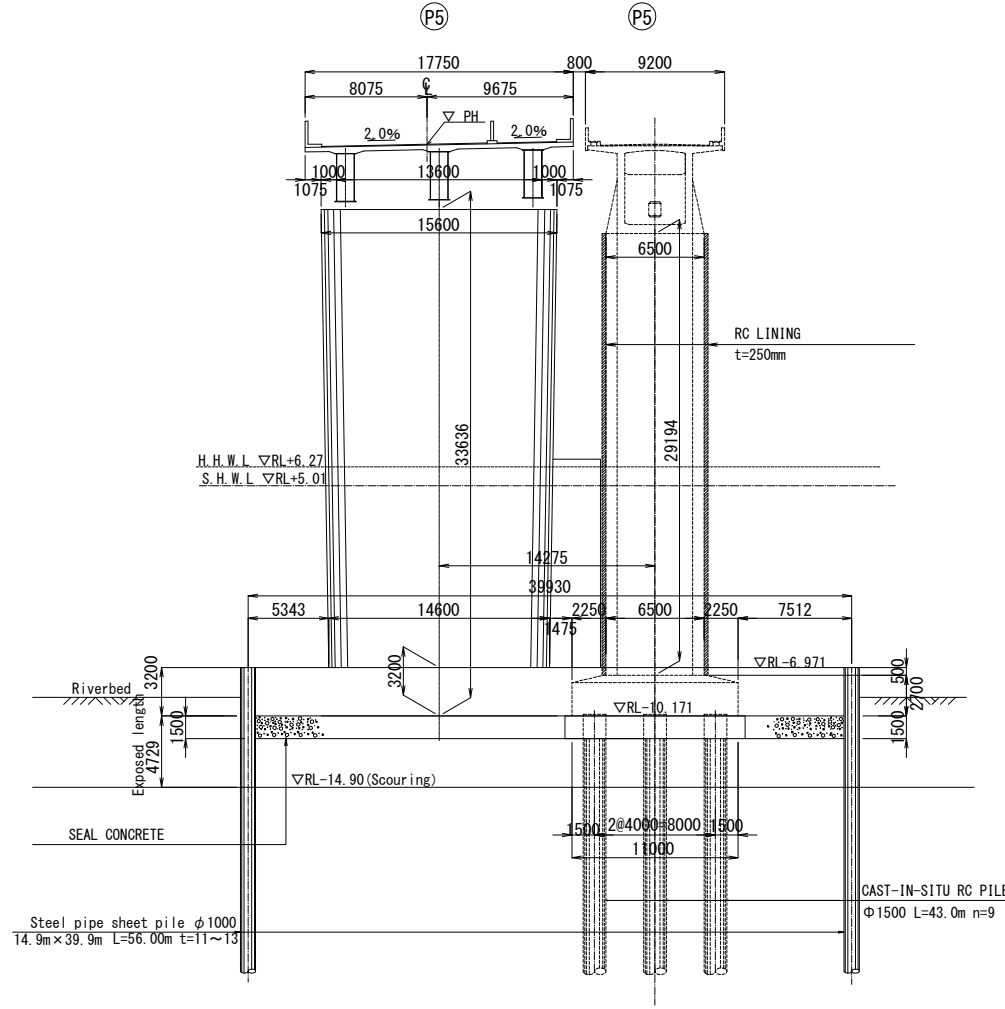
(2ND BRIDGE) (EXISTING BRIDGE)



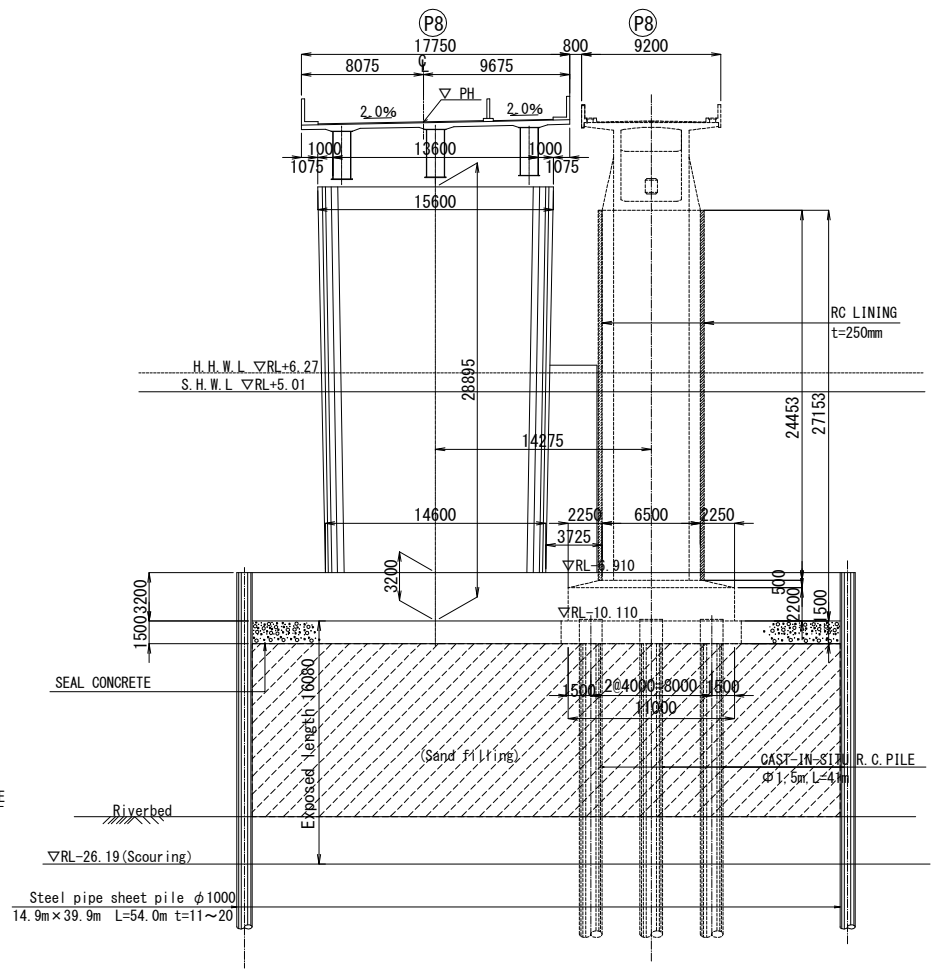
(2ND BRIDGE) (EXISTING BRIDGE)

MEGHNA BRIDGE: GENERAL VIEW OF SUBSTRUCTURE S=1:500

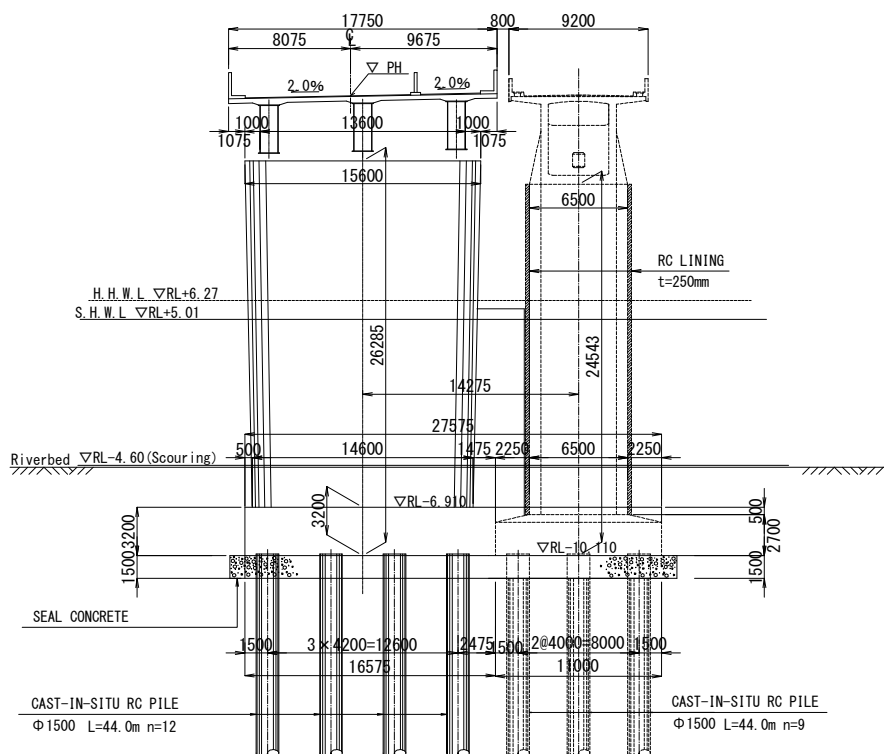
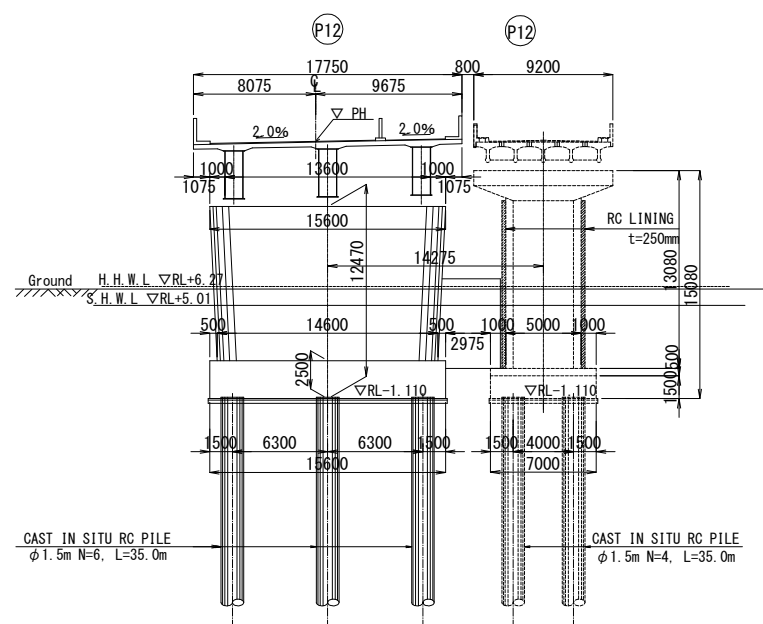
(2ND BRIDGE) (EXISTING BRIDGE)



(2ND BRIDGE) (EXISTING BRIDGE)



(2ND BRIDGE) (EXISTING BRIDGE)



Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

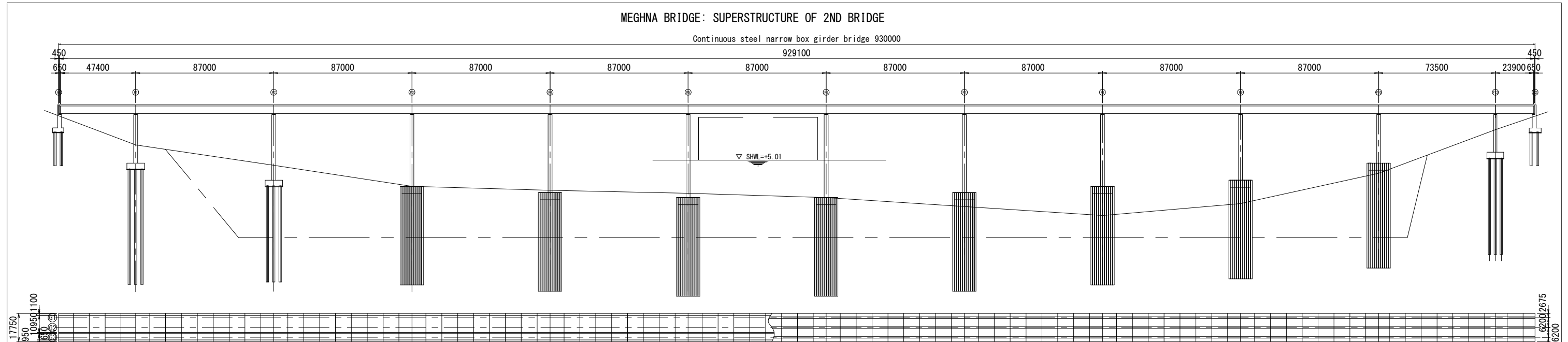
GENERAL VIEW OF SUBSTRUCTURE

SCALE : AS NOTED
DATE : 3/2013

SHEET NO:
C-11

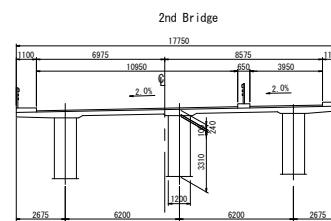
MEGHNA BRIDGE: SUPERSTRUCTURE OF 2ND BRIDGE

Continuous steel narrow box girder bridge 930000



17750
3050
1100 10950 1100

2675 6200 2675
6200



Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

SUPERSTRUCTURE OF 2ND BRIDGE

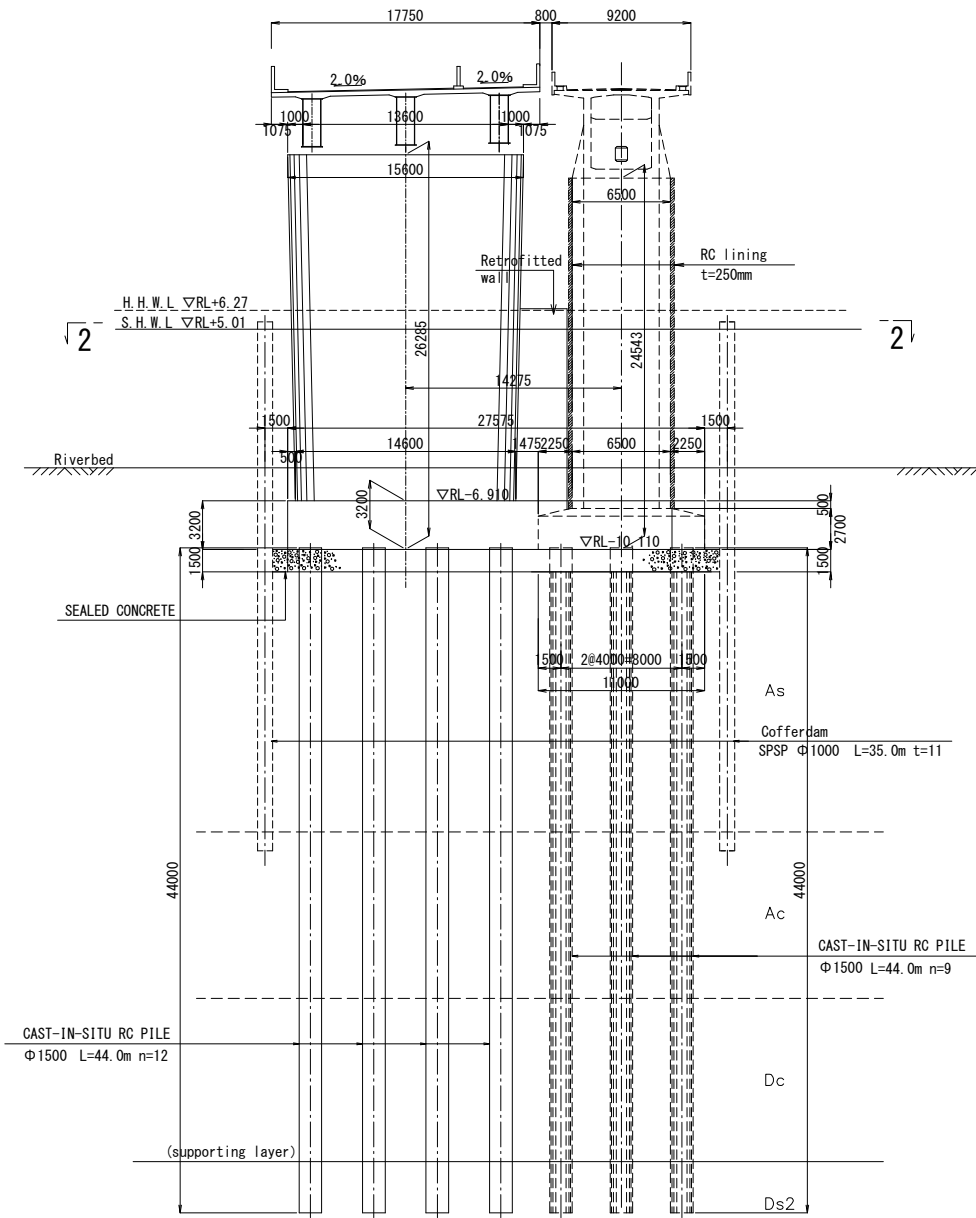
SCALE: AS NOTED
DATE: 3/2013

SHEET NO:
C-12

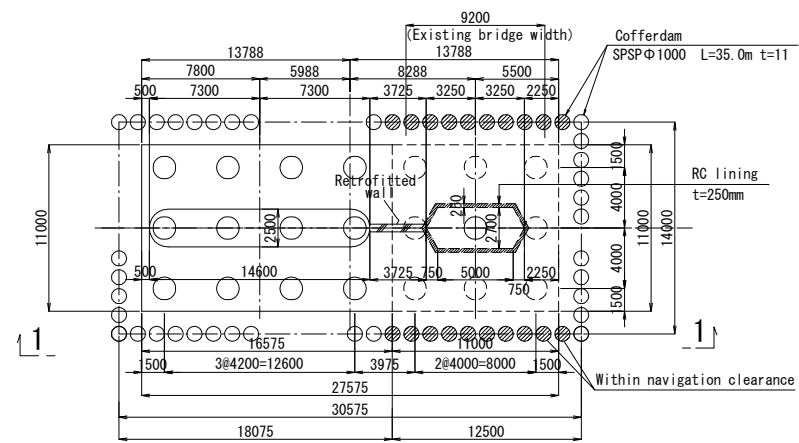
MEGHNA BRIDGE: SUBSTRUCTURE (1)

(2ND BRIDGE) (EXISTING BRIDGE)

(P1) (P2) (P1) (P2)



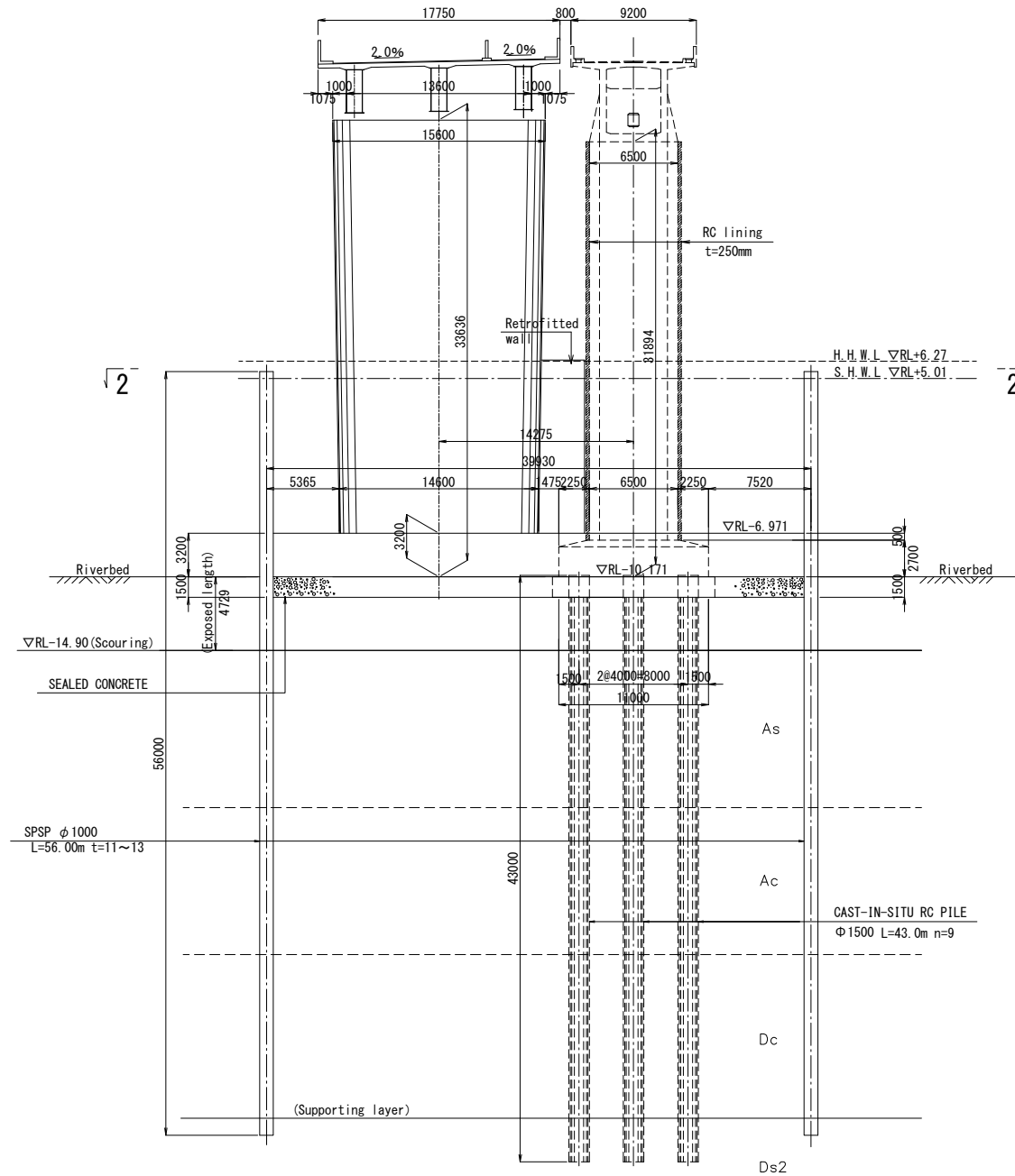
SECTION 1 - 1



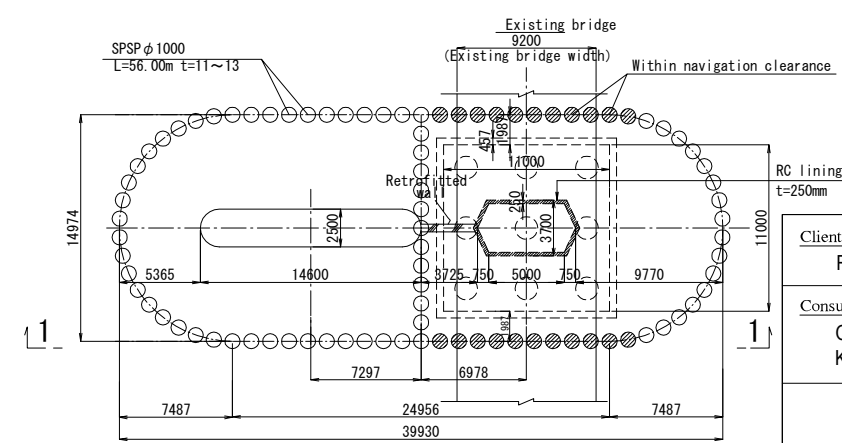
PLAN 2 - 2

S=1 : 500

(2ND BRIDGE) (EXISTING BRIDGE)
(P3) ~ (P5) (P3) ~ (P5)



SECTION 1 - 1



PLAN 2 - 2

Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

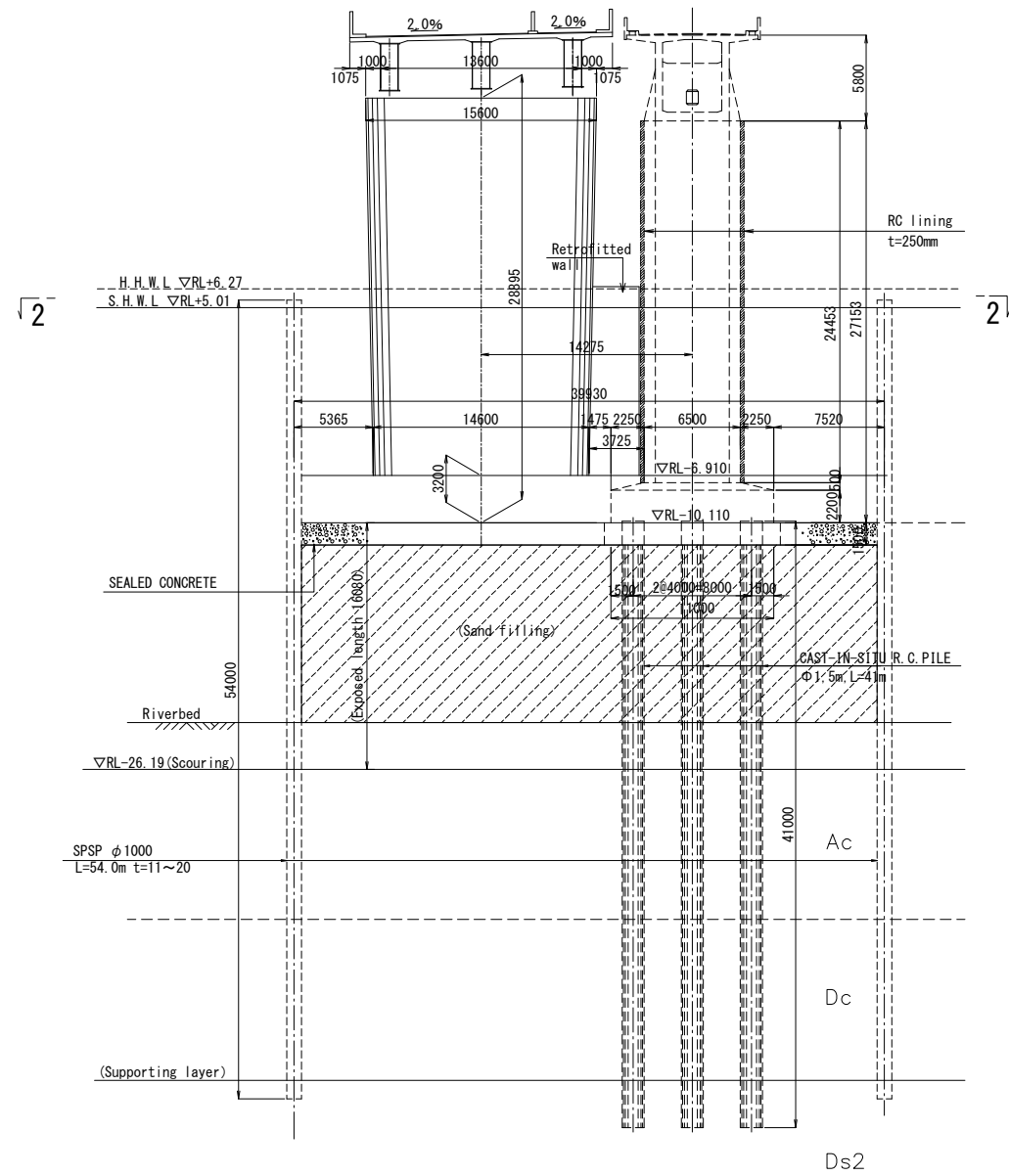
SUBSTRUCTURE (1)

SCALE : AS NOTED
DATE : 3/2013

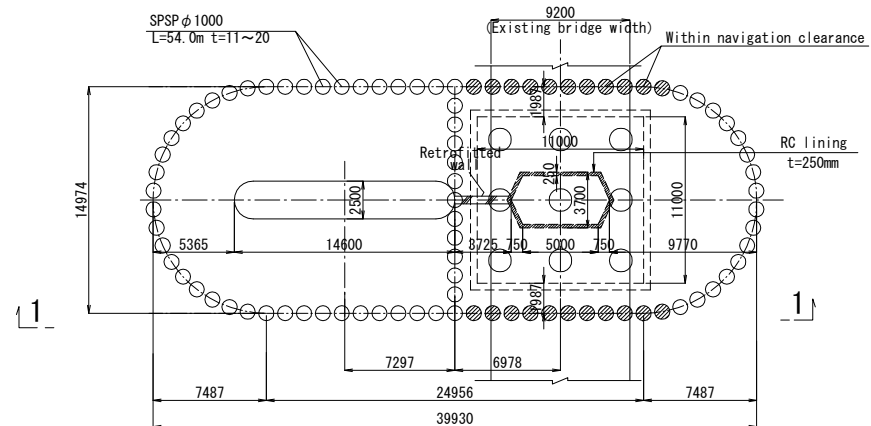
SHEET NO:
C-13

MEGHNA BRIDGE: SUBSTRUCTURE (2) S=1 : 500

(2ND BRIDGE) (EXISTING BRIDGE)
 (P6 ~ P10) (P6 ~ P10)

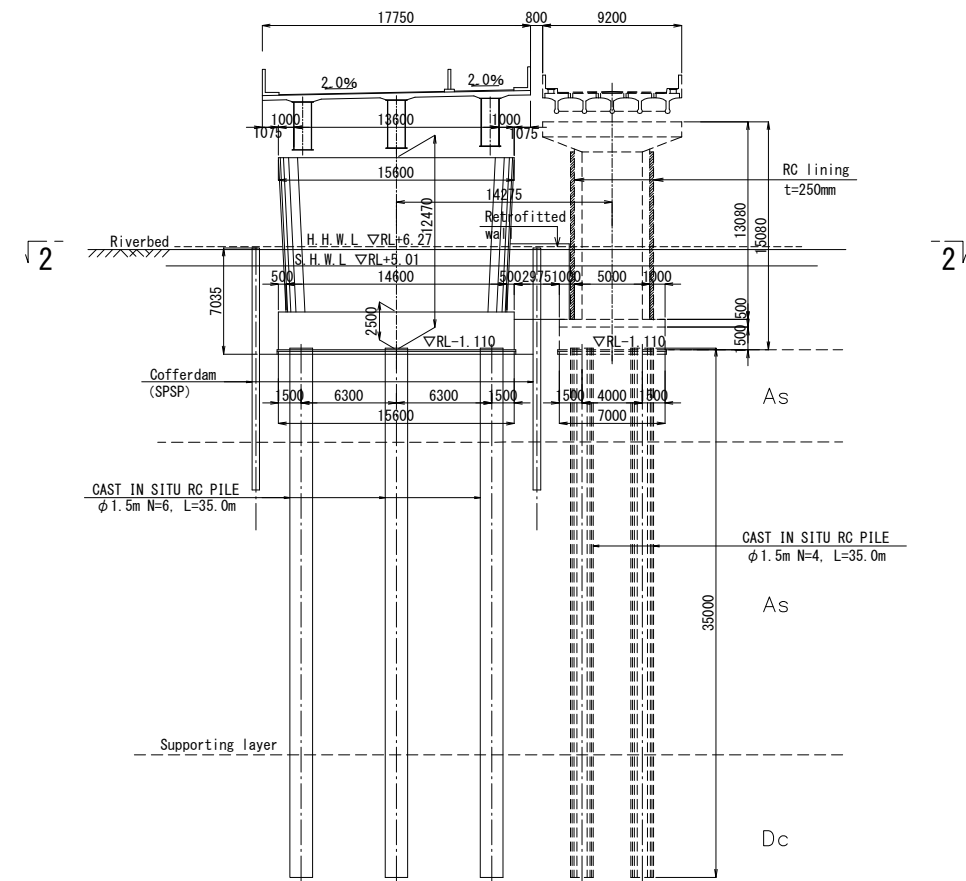


SECTION 1 - 1

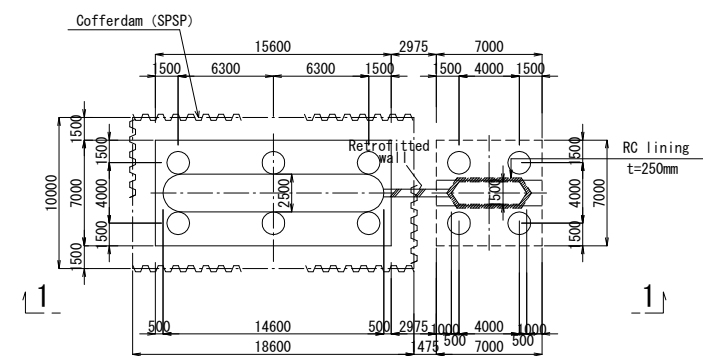


PLAN 2 - 2

(2ND BRIDGE) (EXISTING BRIDGE)
 (P12) (P12)



SECTION 1 - 1



PLAN 2 - 2

Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

SUBSTRUCTURE (2)

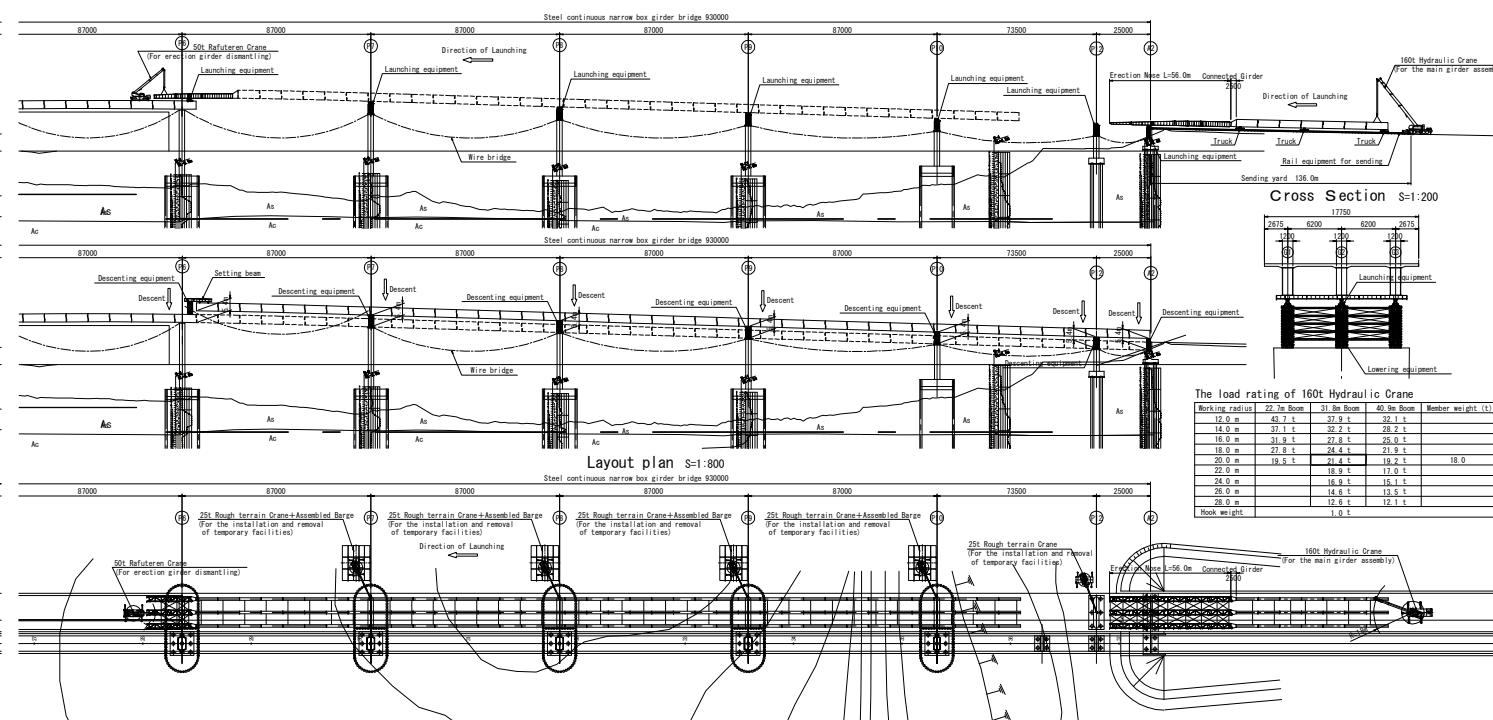
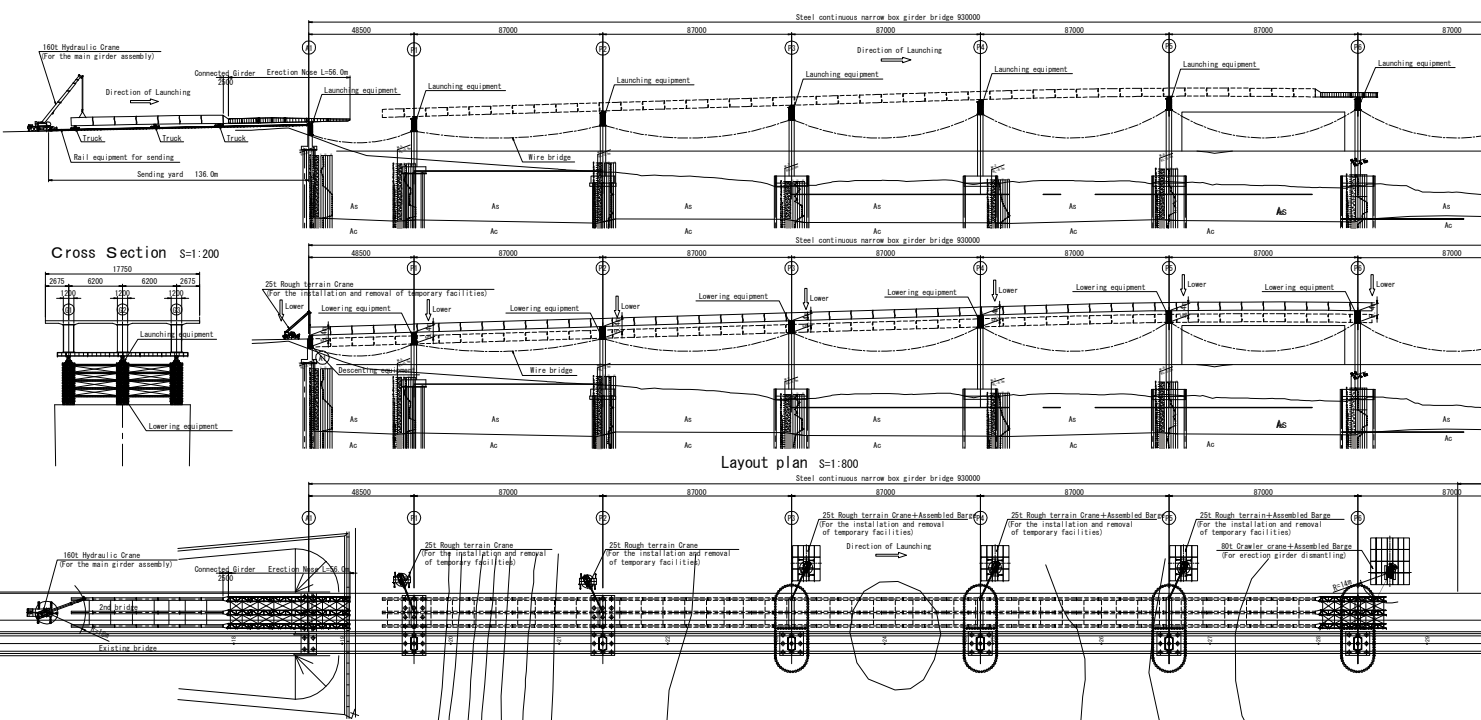
SCALE : AS NOTED
DATE : 3/2013

SHEET NO:
C-14

MEGHNA BRIDGE: CONSTRUCTION FOR SUPERSTRUCTURE OF 2ND BRIDGE

Side view S=1:800

Side view S=1:800



The load rating of 160t Hydraulic Crane

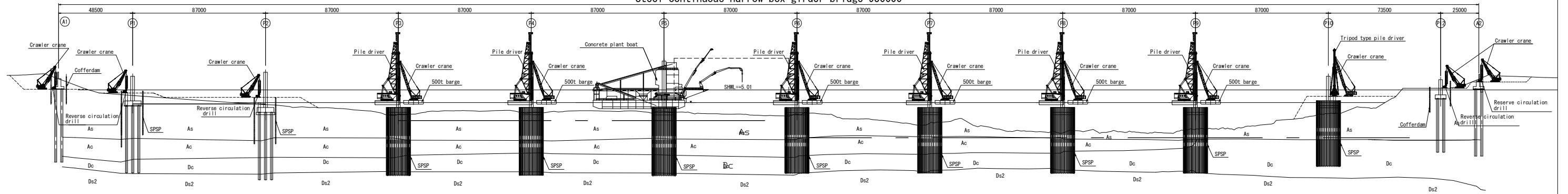
Working condition	27.5m Boom	31.5m Boom	40.5m Boom	Number weight (t)
12.0 m	43.1 t	37.9 t	32.1 t	
14.0 m	37.1 t	32.2 t	26.2 t	
16.0 m	31.2 t	26.5 t	20.3 t	
18.0 m	27.6 t	24.4 t	21.9 t	
20.0 m	19.6 t	20.4 t	18.2 t	18.0
22.0 m		18.9 t	17.0 t	
24.0 m		16.9 t	15.1 t	
26.0 m		14.5 t	13.2 t	
28.0 m		12.6 t	12.1 t	
Roof weight			1.0 t	

Client: ROADS & HIGHWAYS DEPARTMENT, MOC
 Consultant: ORIENTAL CONSULTANTS Co. Ltd
 KATAHIRA & ENGINEERS INTERNATIONAL
 MEGHNA BRIDGE
 CONSTRUCTION FOR SUPERSTRUCTURE OF 2ND BRIDGE
 SCALE AS NOTED SHEET NO. C-16

MEGHNA BRIDGE: CONSTRUCTION FOR SUBSTRUCTURE

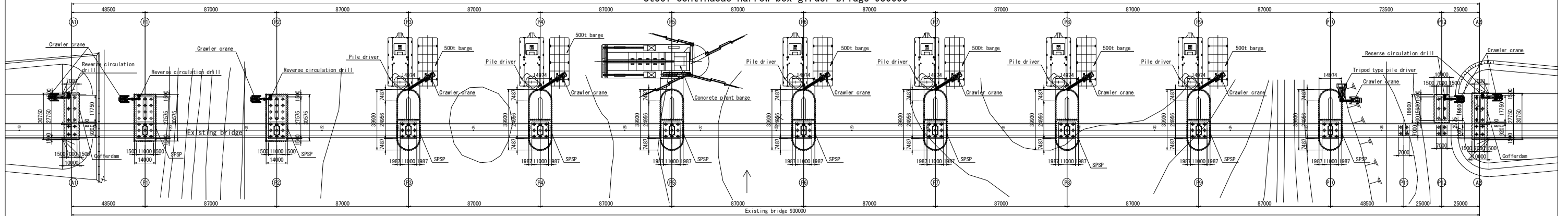
Side view S=1:800

Steel continuous narrow box girder bridge 930000



Layout plan S=1:800

Steel continuous narrow box girder bridge 930000

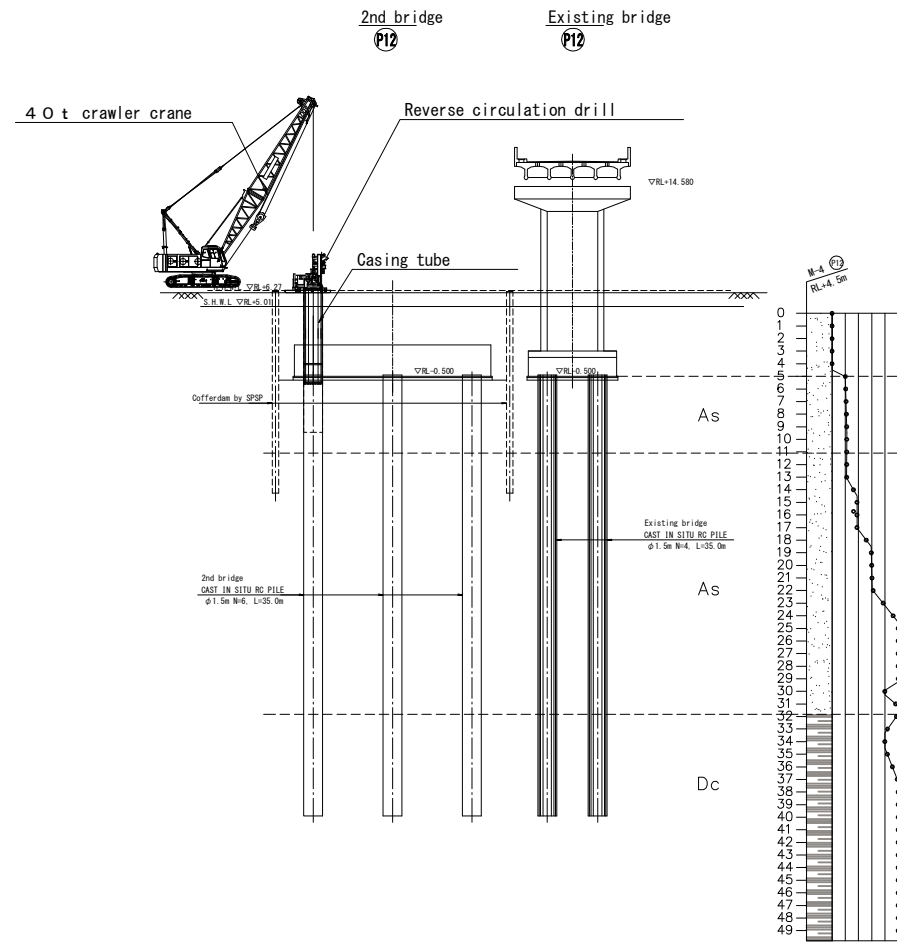


NOTE 1: For pressing the boring pile, use the reverse circulation drill method for construction.
 NOTE 2: For pressing the piles of steel pipe plate, use the silent piler method for construction under limited space in existing bridge, otherwise use the middle excavation method or the silent piler method.

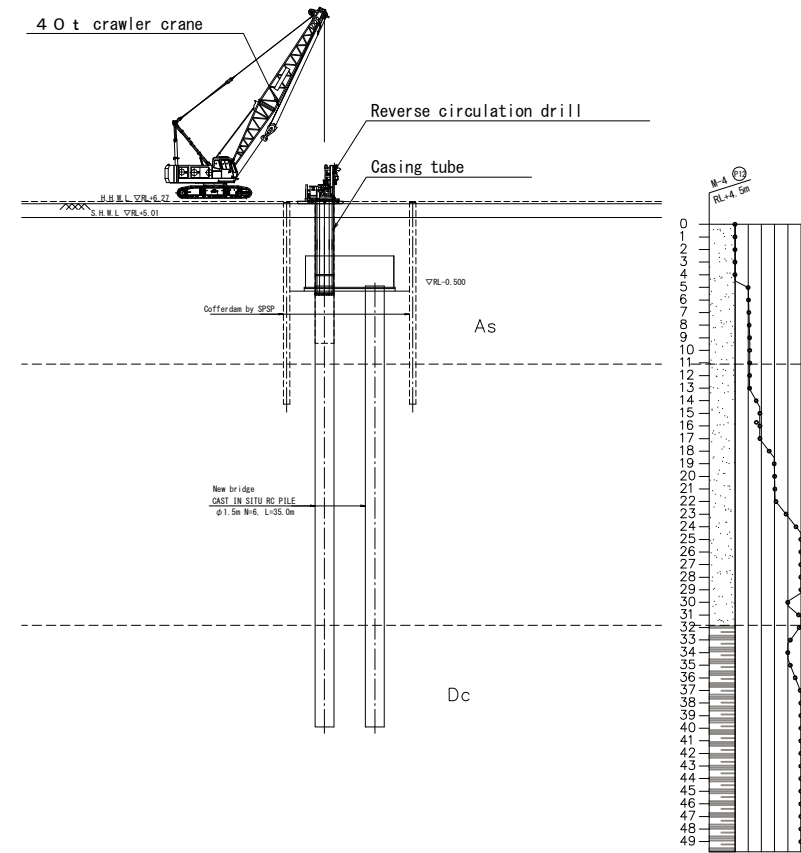
Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
CONSTRUCTION FOR SUBSTRUCTURE	
SCALE: AS NOTED DATE: 3/2013	SHEET NO: C-16

MEGHNA BRIDGE: CONSTRUCTION FOR REVERSE CIRCULATION METHOD (ONSHORE) S=1/300

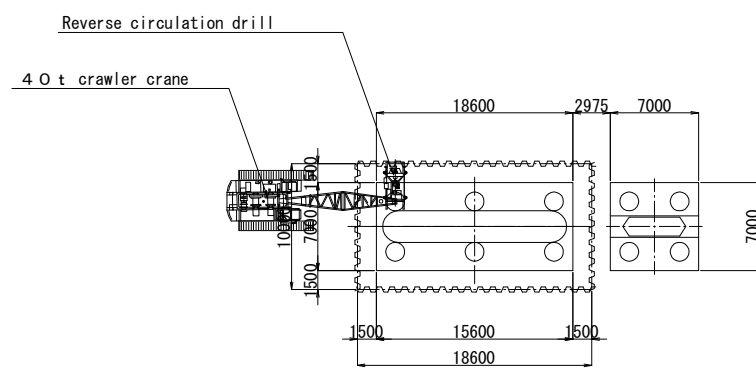
Cross section



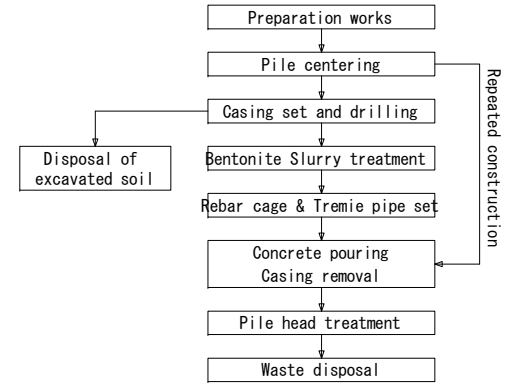
Side view



Layout plan



Construction flow



Construction equipment specification

Equipment	Standard
Reverse circulation drill	Air lift and suction pump type
Crawler crane (Rotary type)	Hydraulic type winch · Ratch jib type 40 t
Back hoe	Exhaust gas inhibitor Crawler (set) Piling 0.45m ³ (plannar volume 0.35m ³)

Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

CONSTRUCTION FOR REVERSE CIRCULATION METHOD (ONSHORE)

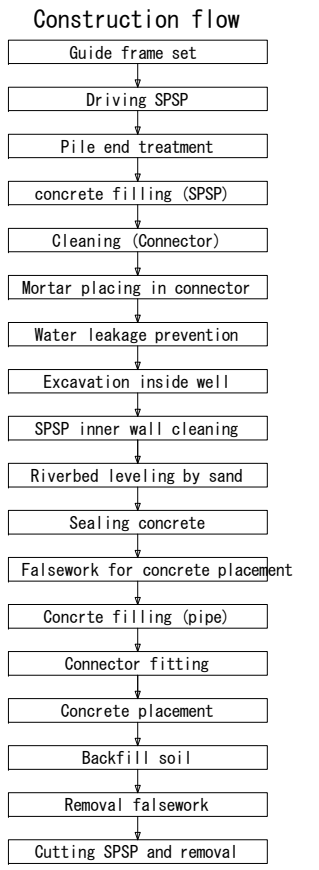
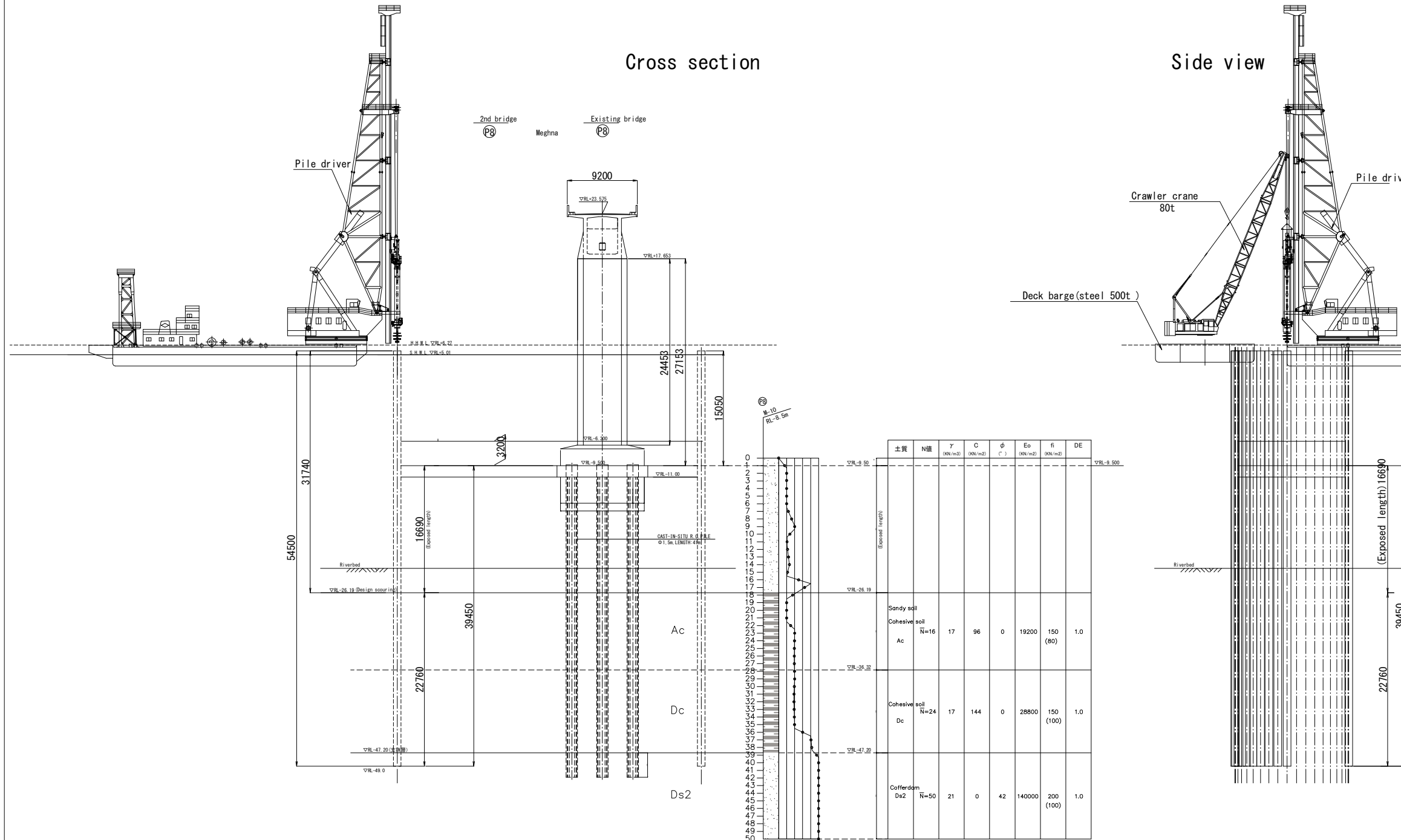
SCALE : AS NOTED
DATE : 3/2013

SHEET NO:
C-17

MEGHNA BRIDGE: CONSTRUCTION FOR SPSP FOUNDATION S=1/300

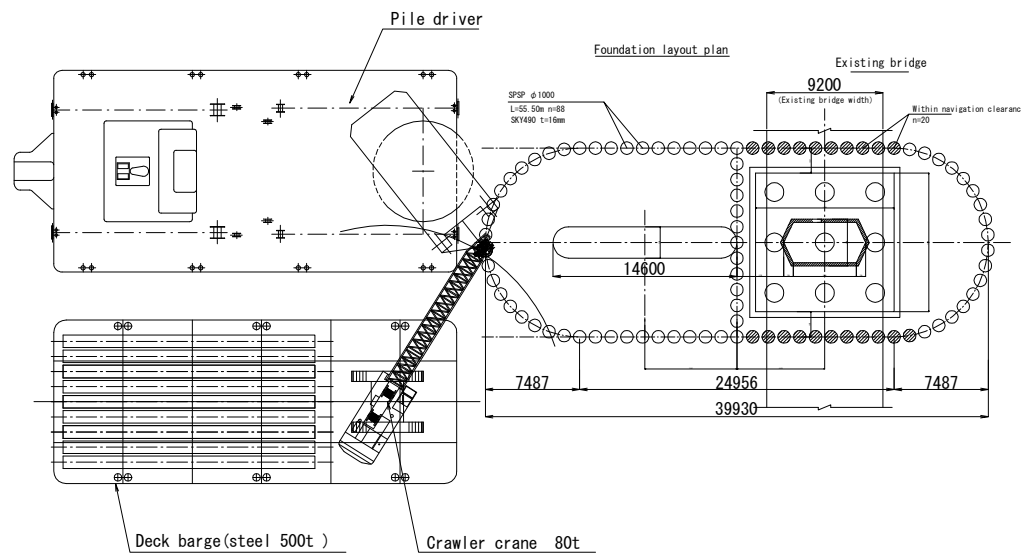
Cross section

Side view



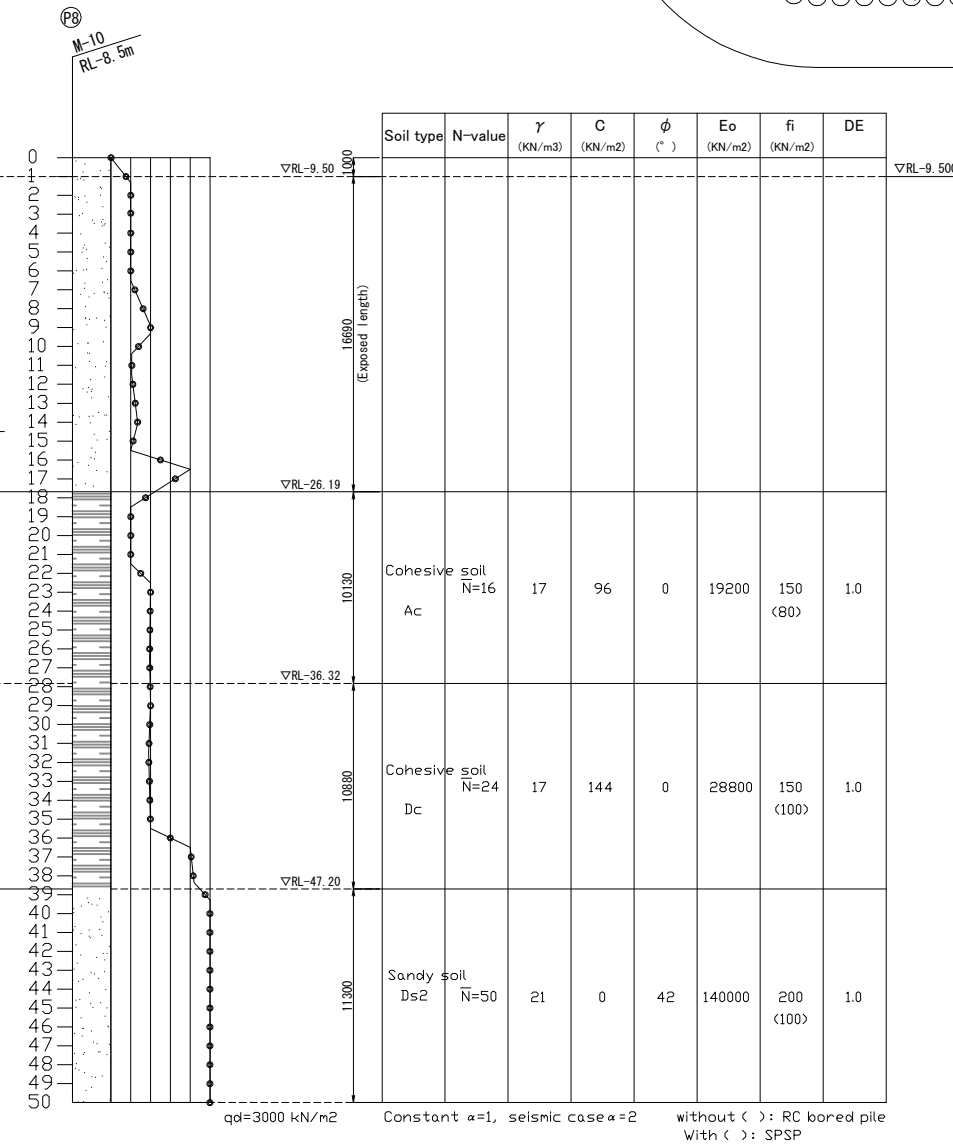
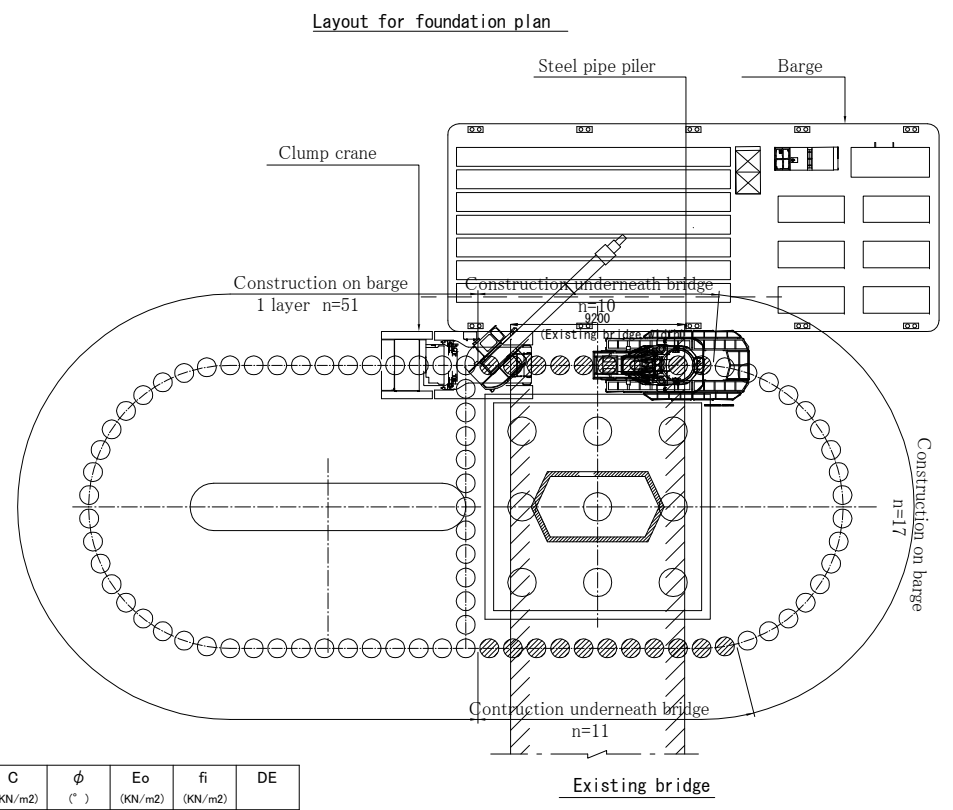
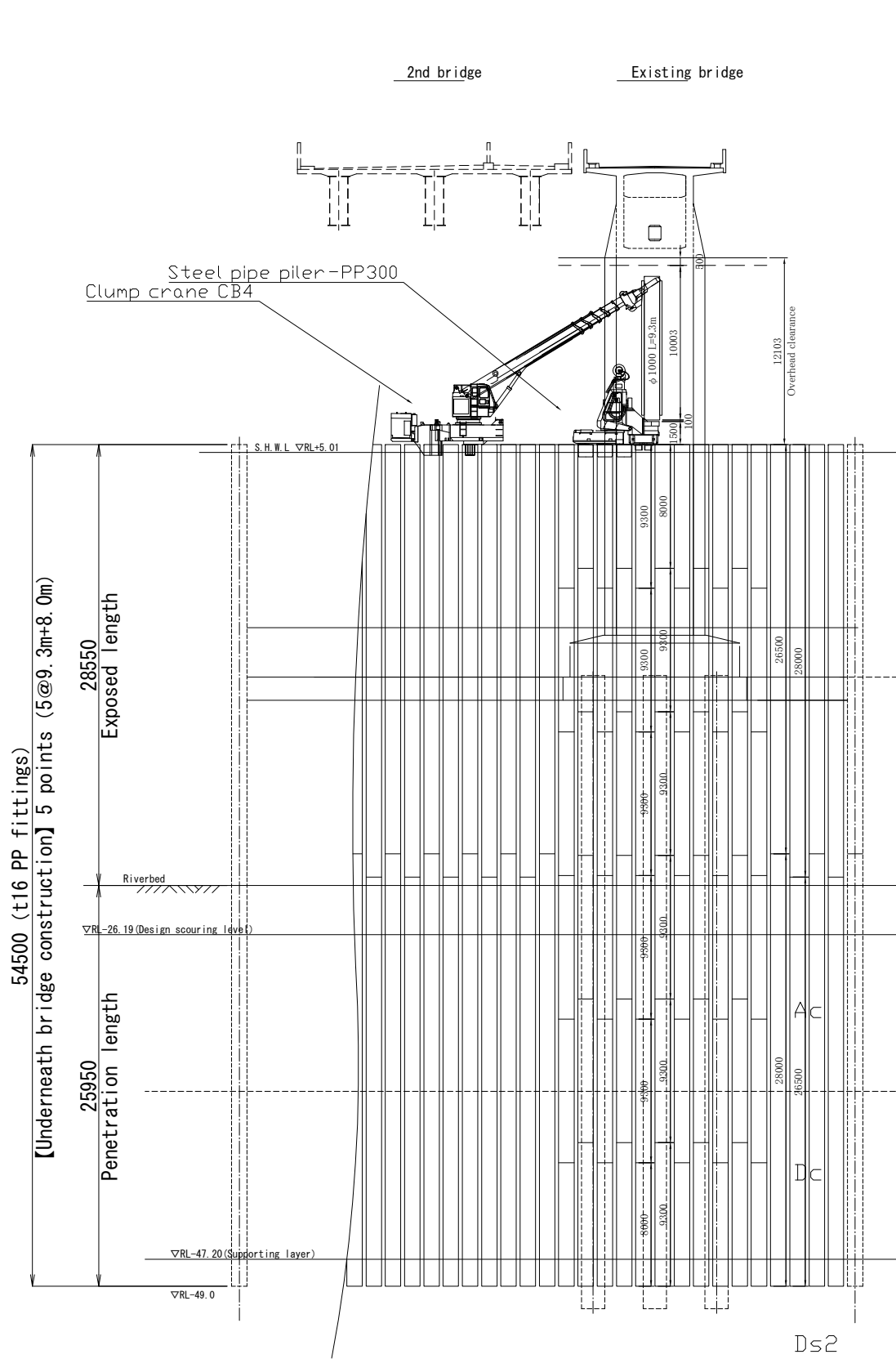
Construction equipment specifications

Equipment	Standards
Pile driver	Excavation by earth auger 90kw
Crawler crane	Hydra. drive winch-latch jib 80t
Deck barge	Steel 500 t volume
Tug boat	Steel D500PS
Anchor boat barge	Steel D5 t
Boat diver	D180PS 3~5 t
Back hoe	Crawler (set) Gas exhaust inhibitor Piling 0.5m ³ (plannar volume 0.4m ³)
Mortar plant	500 l × 2 281~300 l /min
Hammer grab	
Clumshell	Hydraulic rope type Crawler set (plannar volume) 0.8m ³
Concrete plant barge	1000m ³
Piling	Engine type Gas exhaust inhibitor
Water jet	Pump pressure 14.7MPa (150kg/cm ²) Discharge rate 325 l /min
Cutting tools under water	
Vibro hammer	60kw
Rebar stud (const. mach.)	2,000A
Welding machine	Semi-automatic arc welding 500A
Generator	Gas exhaust inhibitor Diesel engine 250kVA



Client:	ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:	ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL
MEGHNA BRIDGE	
CONSTRUCTION FOR SPSP FOUNDATION	
SCALE : AS NOTED DATE : 3/2013	SHEET NO: C-18

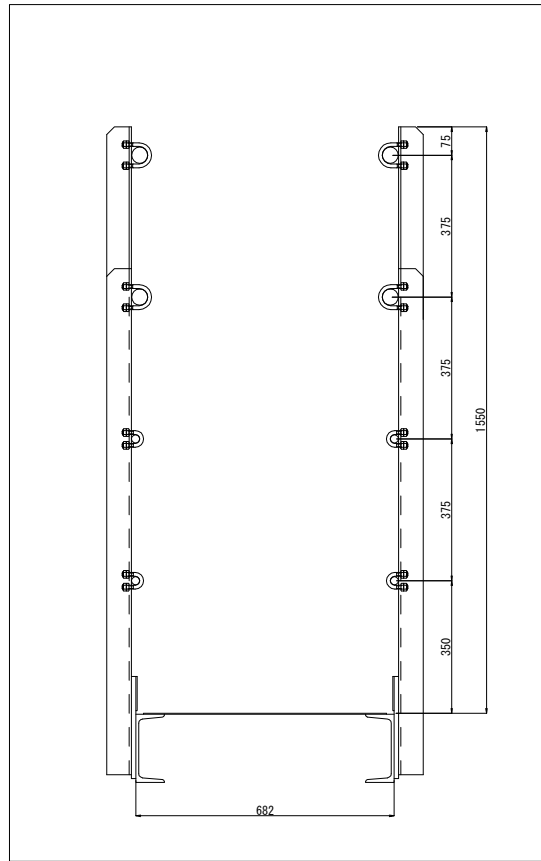
MEGHNA BRIDGE: CONSTRUCTION FOR SPSP FOUNDATION (SILENT PILER METHOD) S=1/400



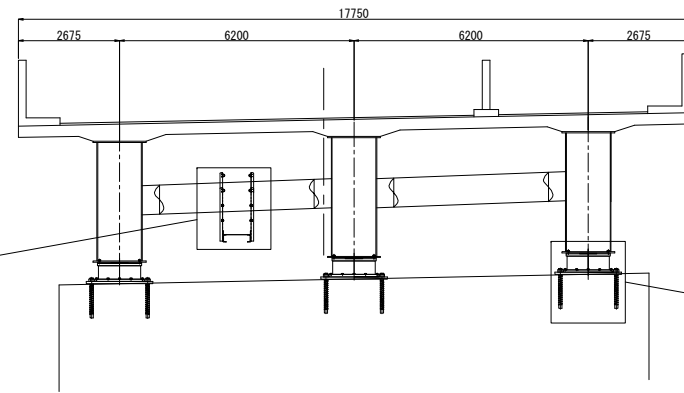
Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
CONSTRUCTION FOR SPSP FOUNDATION (SILENT PILER METHOD)	
SCALE : AS NOTED DATE : 3/2013	SHEET NO: C-19

MEGHNA BRIDGE: BRIDGE ACCESSORIES

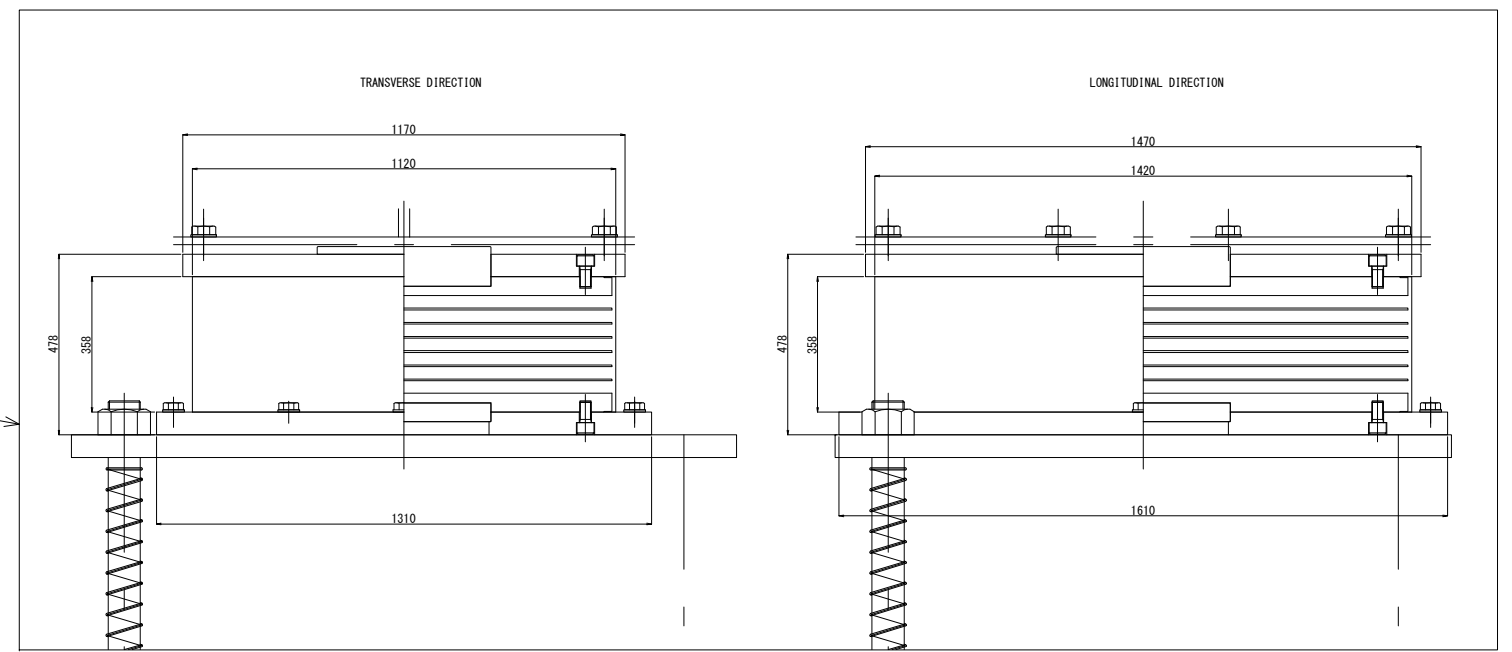
INSPECTION WAY S=1:10



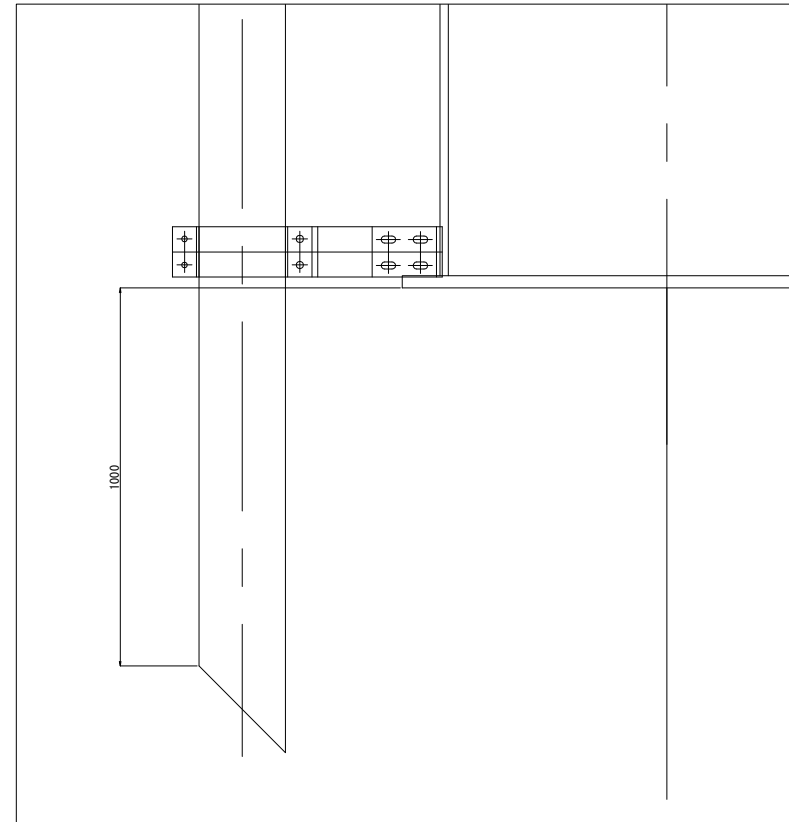
CROSS SECTION S=1:100
AT PIER



BEARING S=1:10

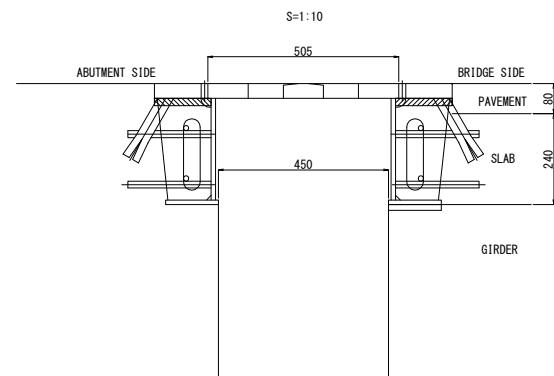
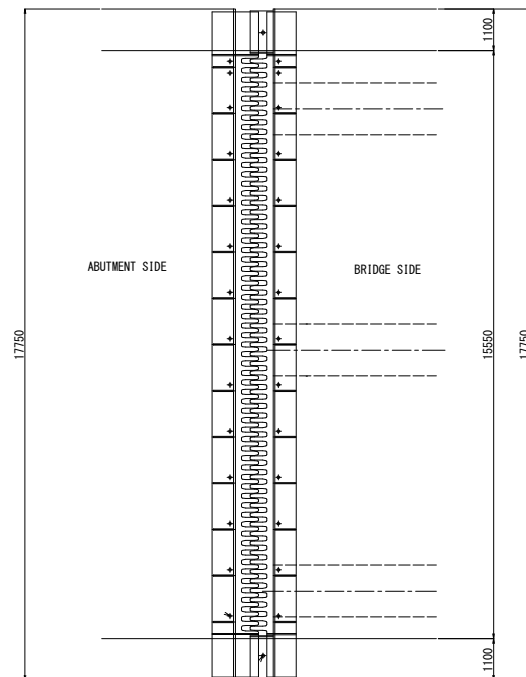


DRAINAGE S=1:10

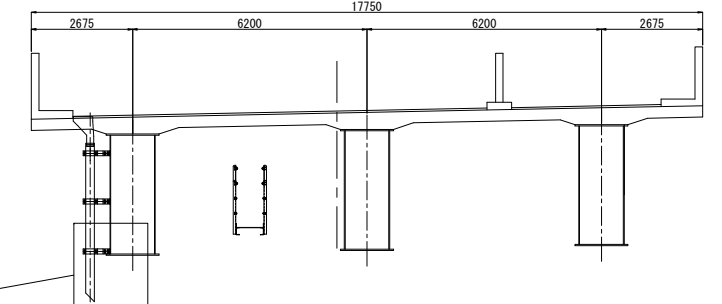


EXPANSION JOINT

PLAN S=1:100
AT ABUTMENT



CROSS SECTION S=1:100
AT CENTER



Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

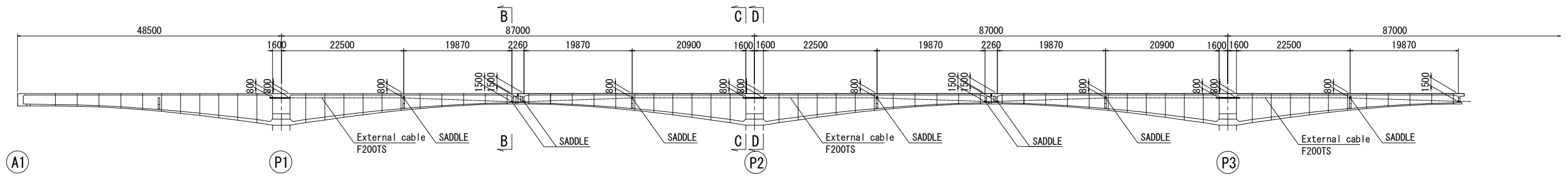
BRIDGE ACCESSORIES

SCALE : AS NOTED
DATE: 3/2013

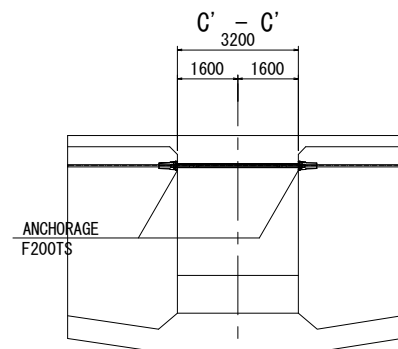
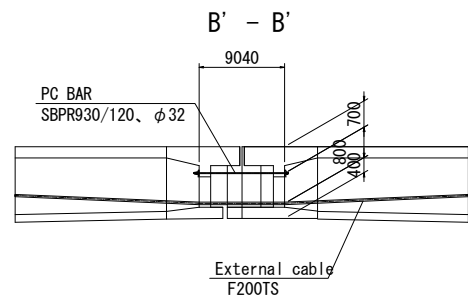
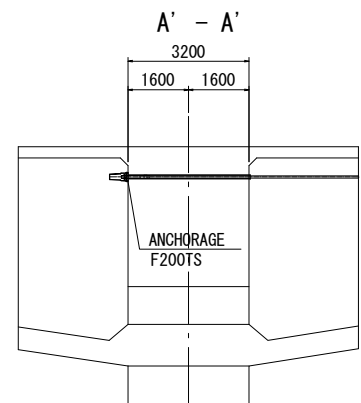
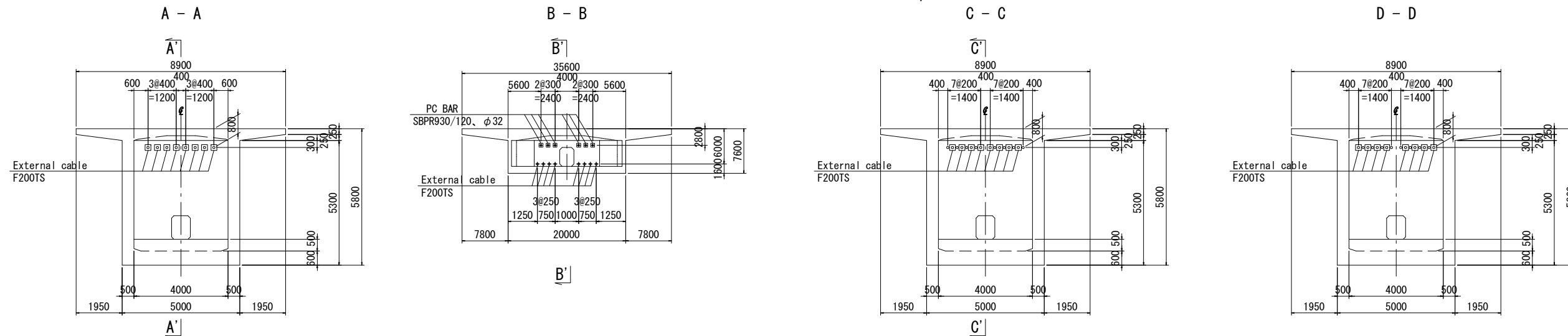
SHEET NO:
C-20

MEGHNA BRIDGE: EXTERNAL CABLES OF EXISTING BRIDGE

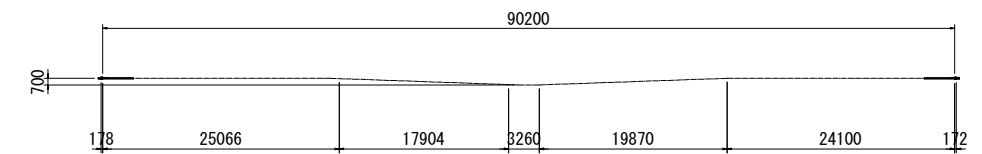
SIDE VIEW S=1/400



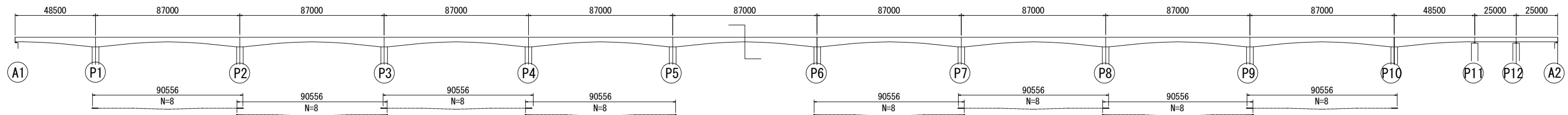
CROSS SECTION S=1/400



CABLE ARRANGEMENT



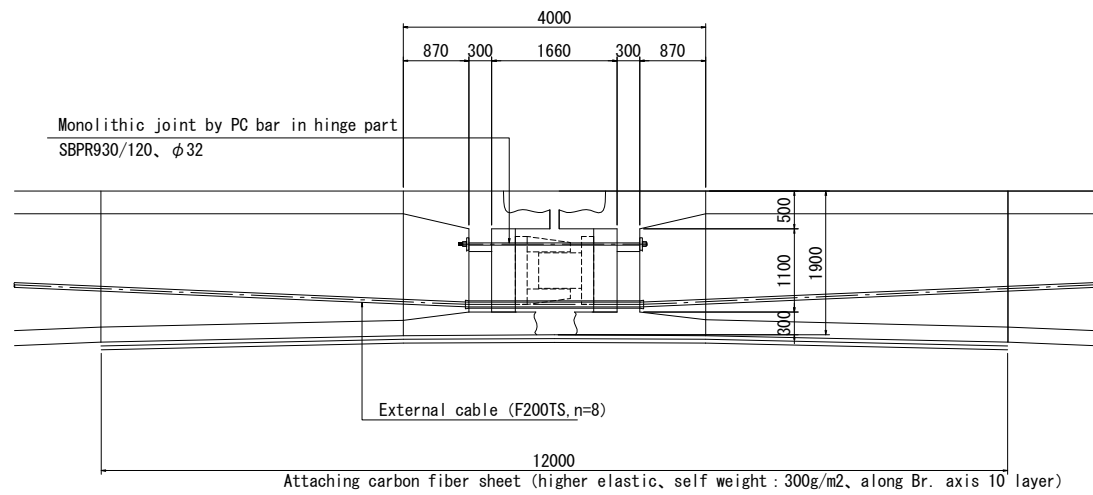
EXTERNAL CABLE LAYOUT PLAN



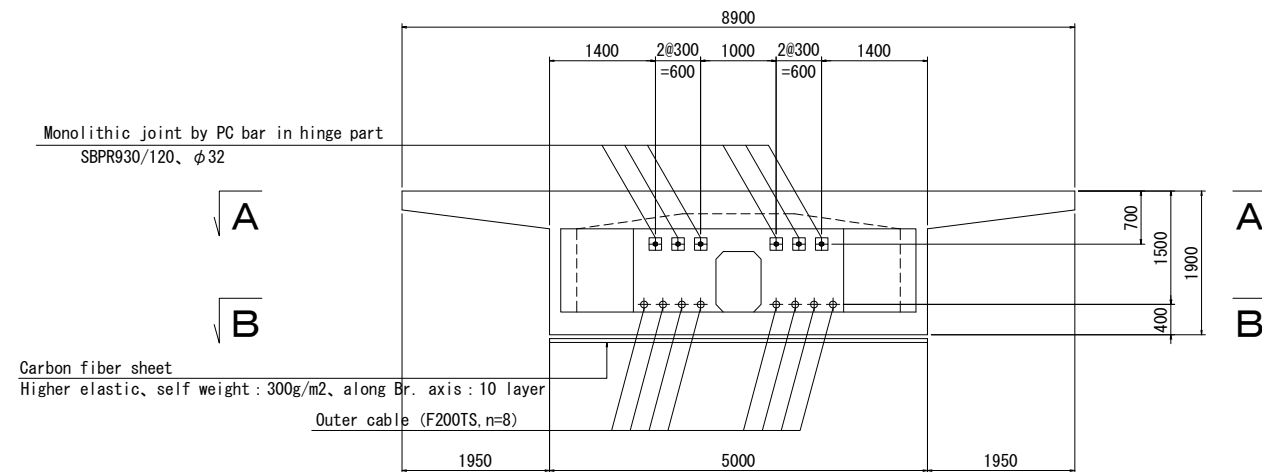
Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
EXTERNAL CABLES OF EXISTING BRIDGE	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-21

MEGHNA BRIDGE: HINGE REPLACEMENT OF EXISTING BRIDGE S=1/50

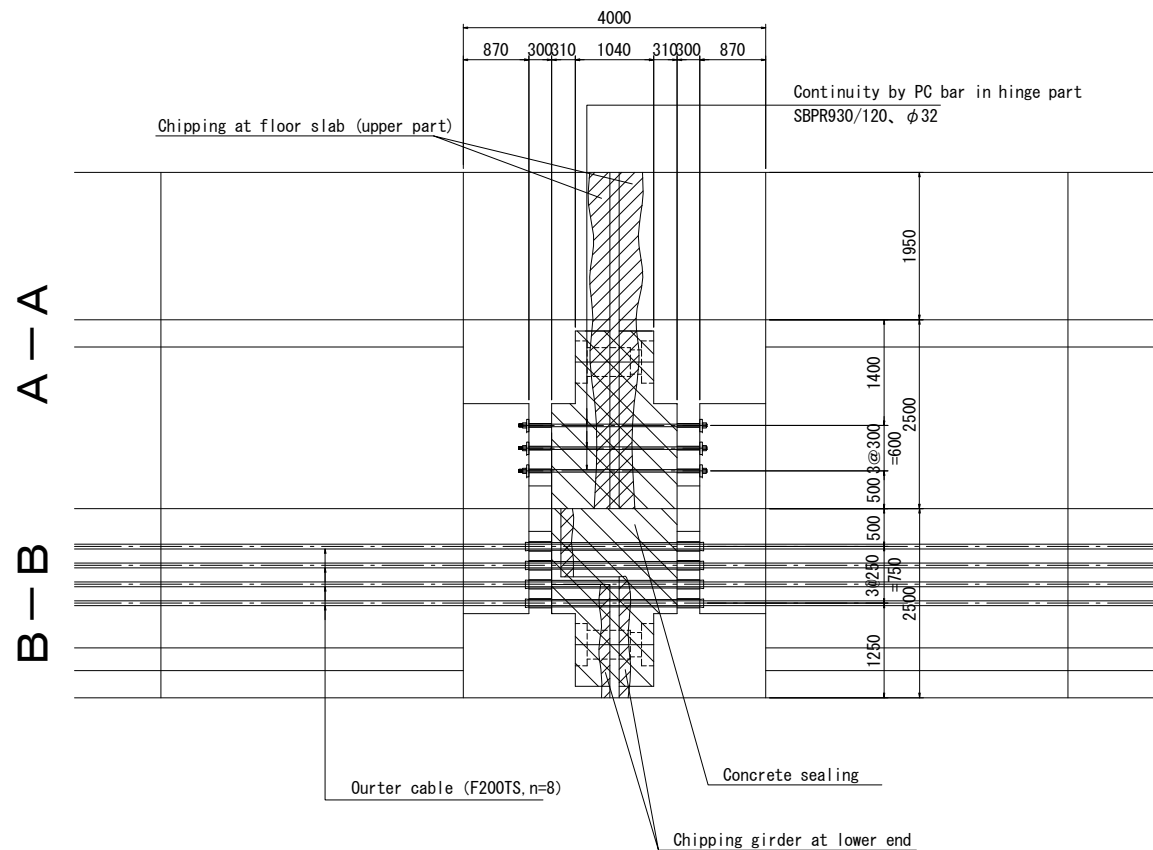
Side view



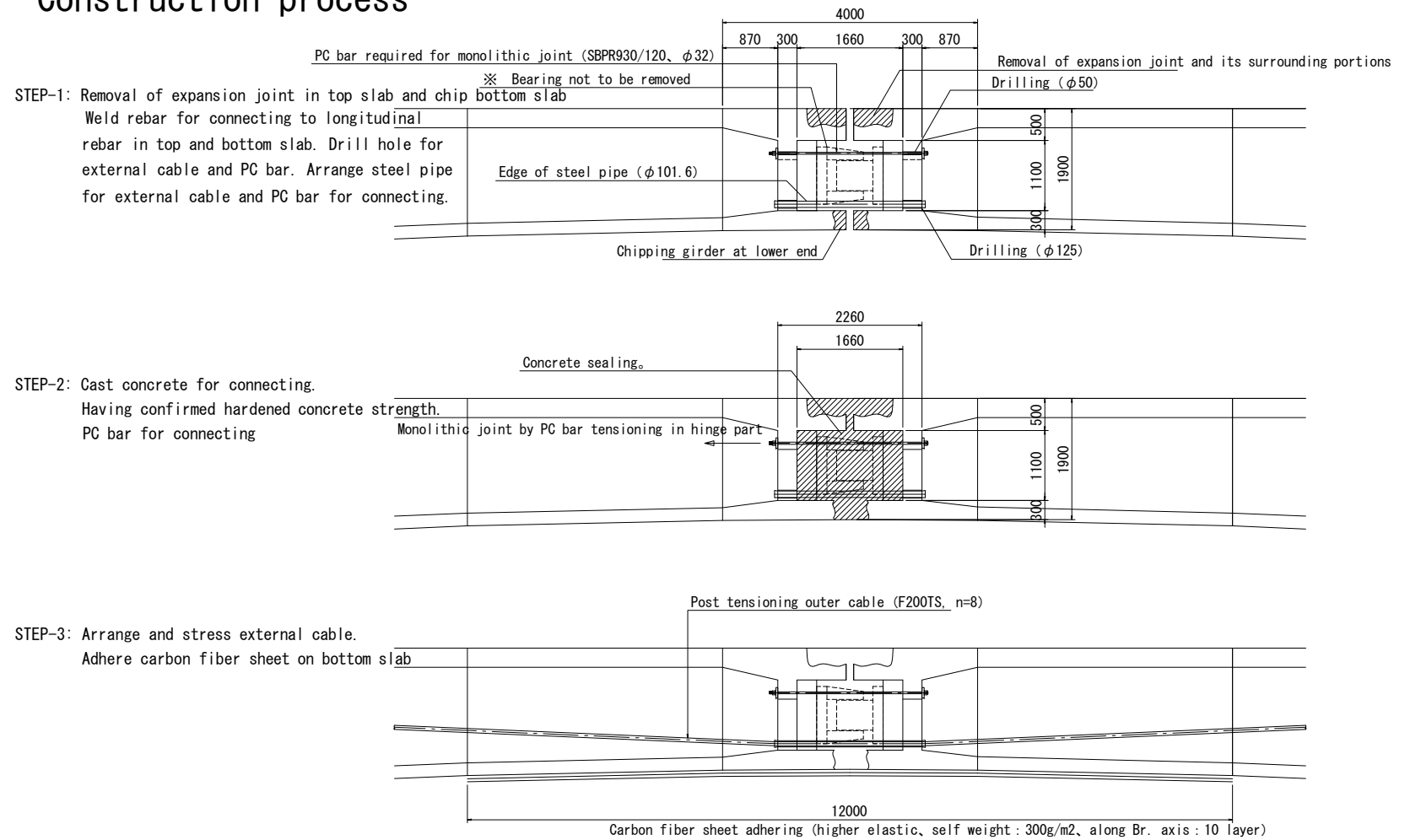
Cross section



Layout plan



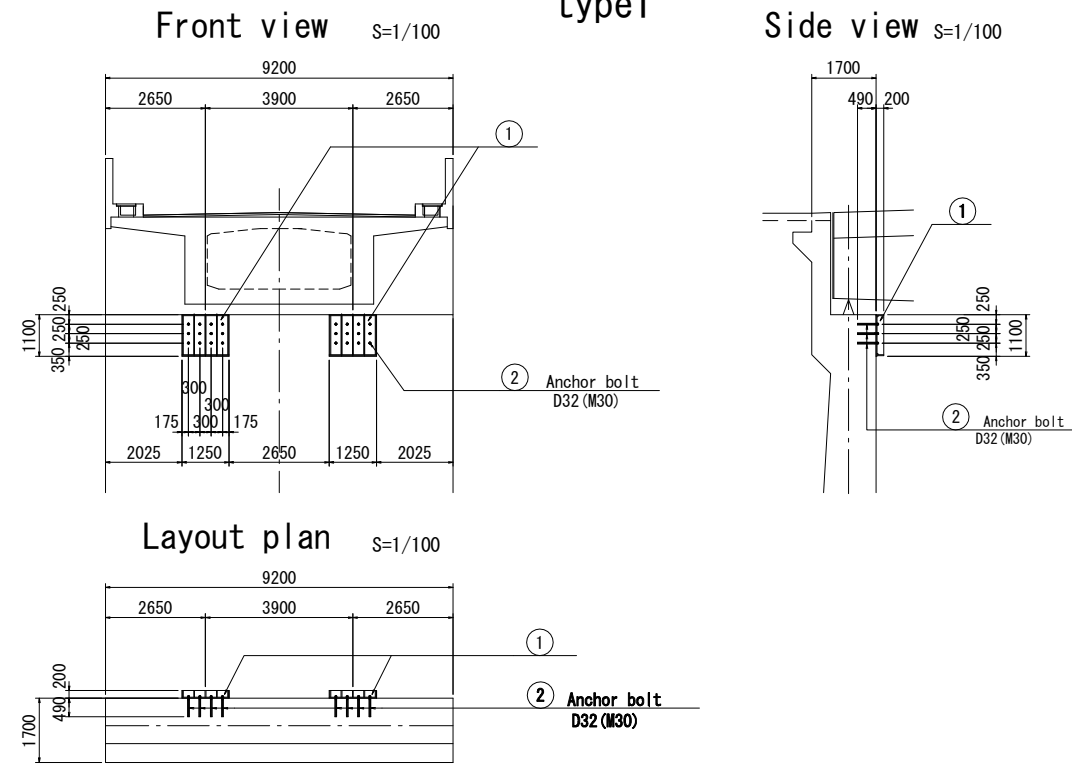
Construction process



Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
HINGE REPLACEMENT OF EXISTING BRIDGE	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-22

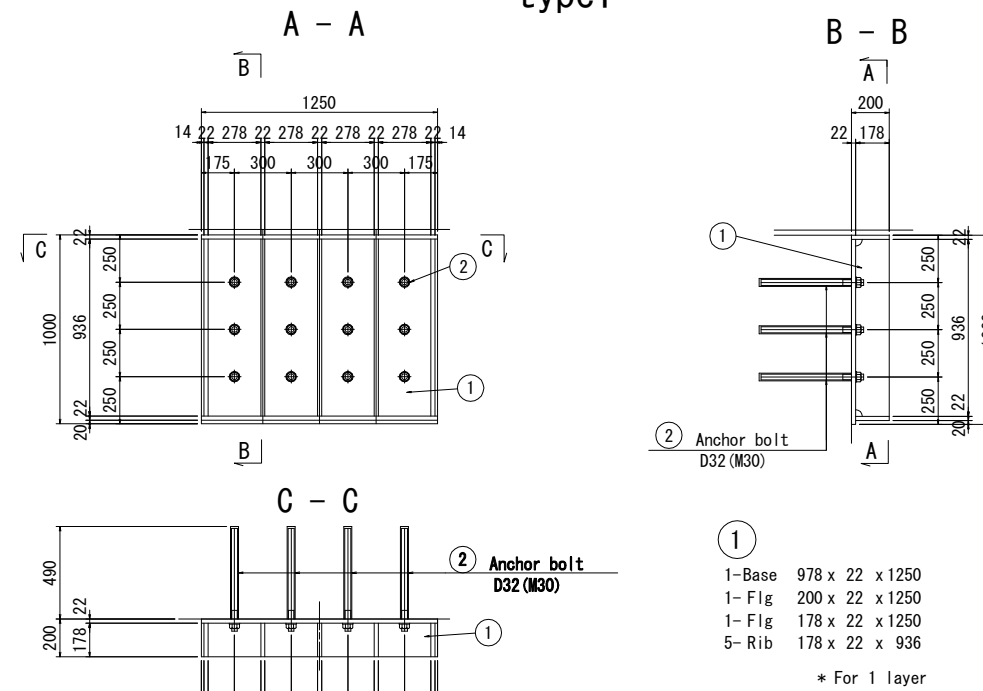
MEGHNA BRIDGE: PREVENTION WORKS FOR BRIDGE FALL OF EXISTING BRIDGE

type1

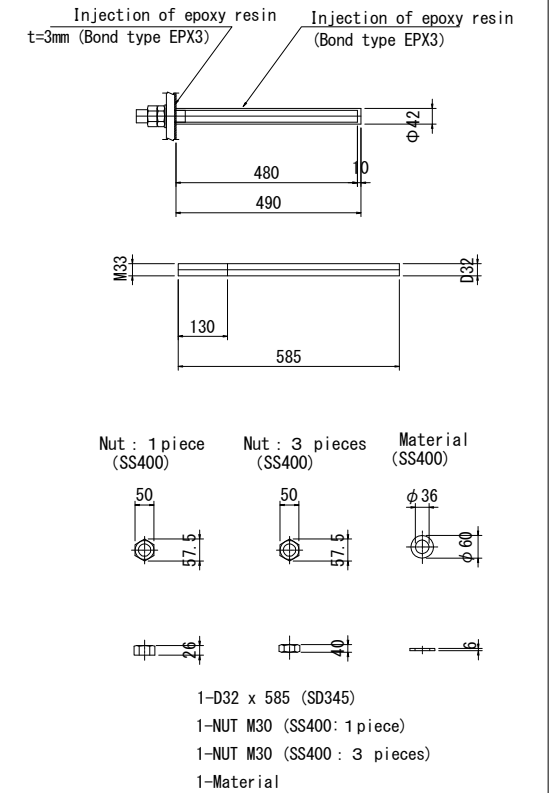


Detailing of Steel Brackets type1

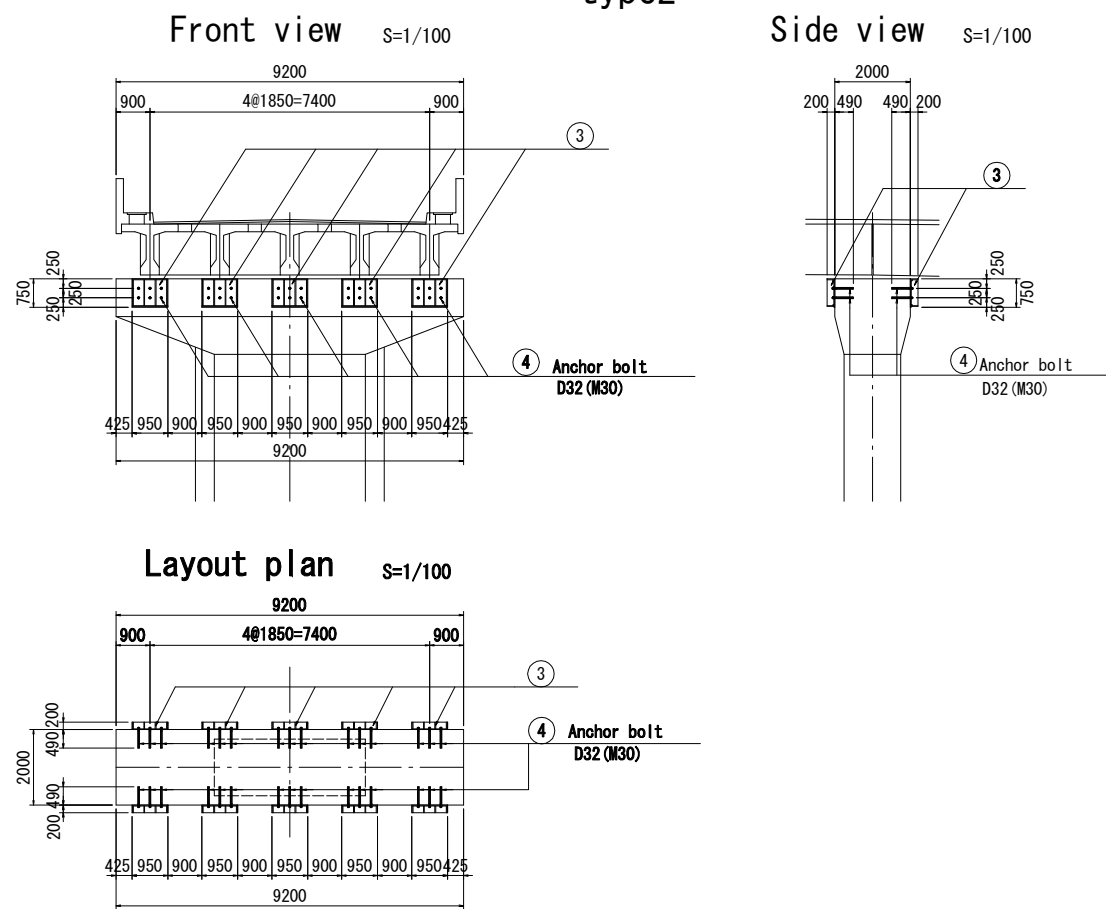
S=1/10



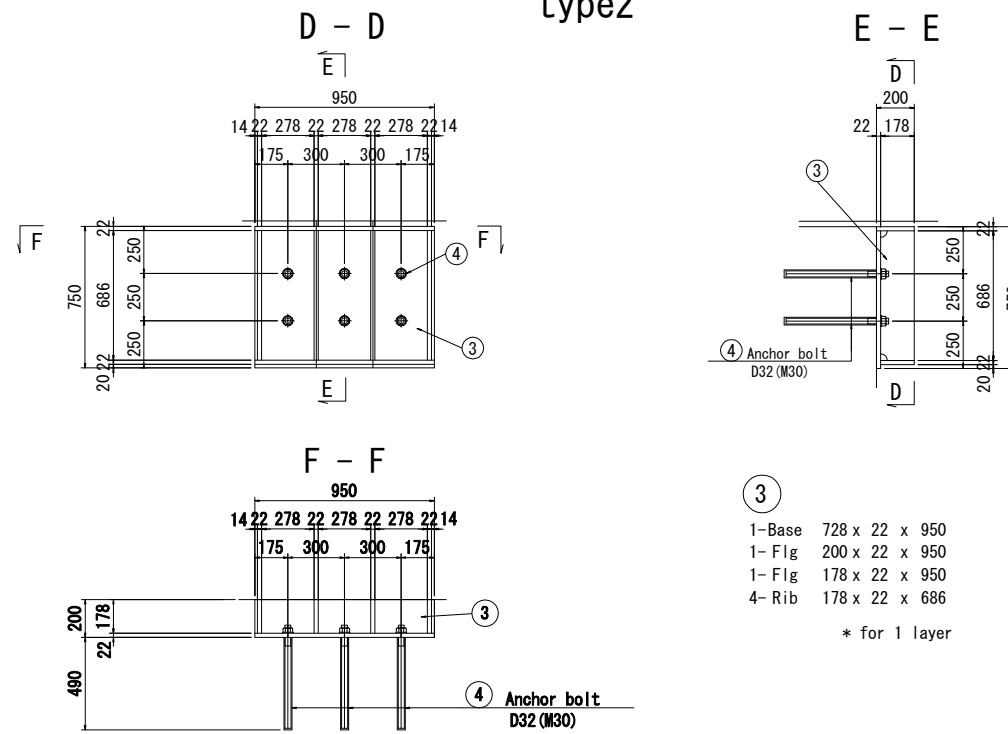
Anchor bolt S=1/5



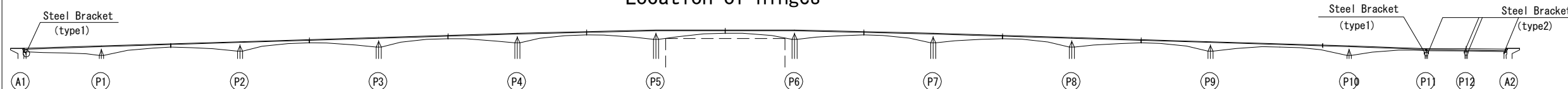
type2



type2



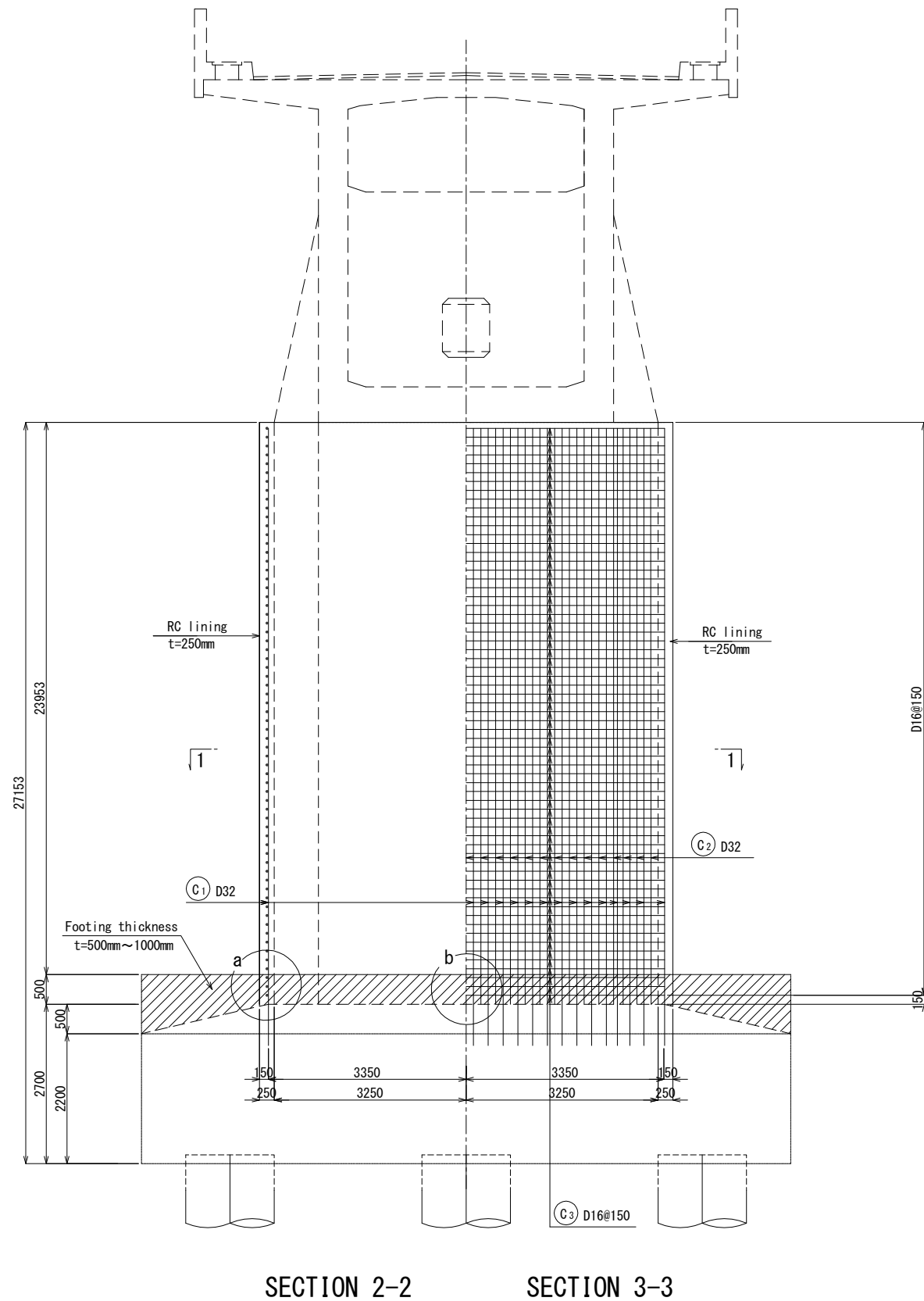
Location of hinges



Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
MEGHNA BRIDGE	
PREVENTION WORKS FOR BRIDGE FALL OF EXISTING BRIDGE	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: C-23

MEGHNA BRIDGE: REBAR ARRANGEMENT IN EXISTING PIER S=1 : 100

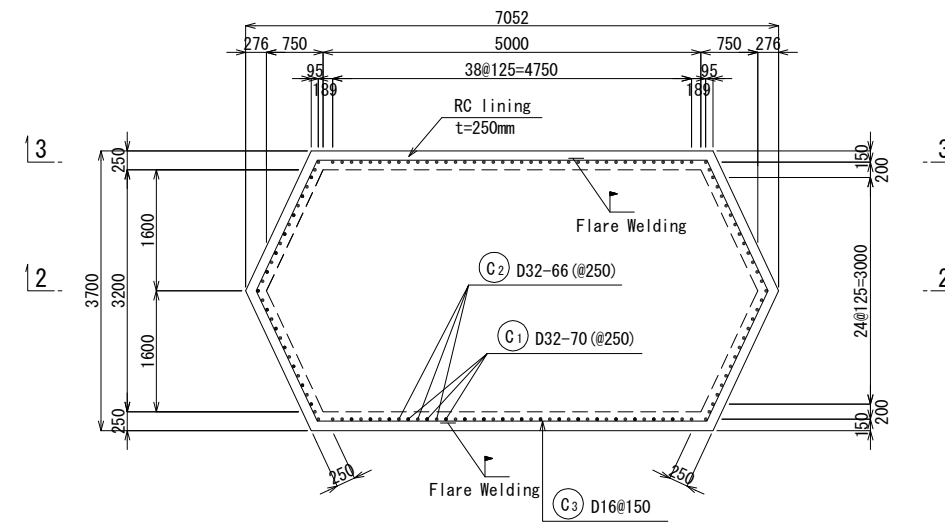
(P8)



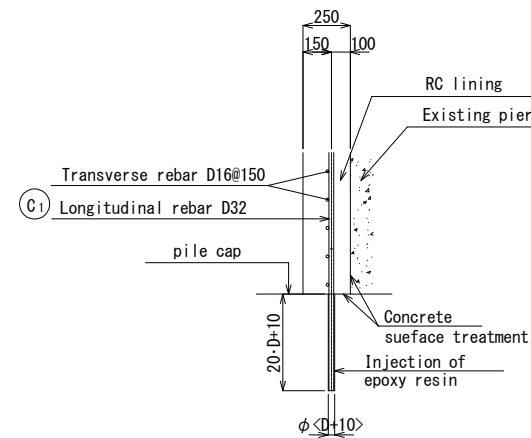
SECTION 2-2

SECTION 3-3

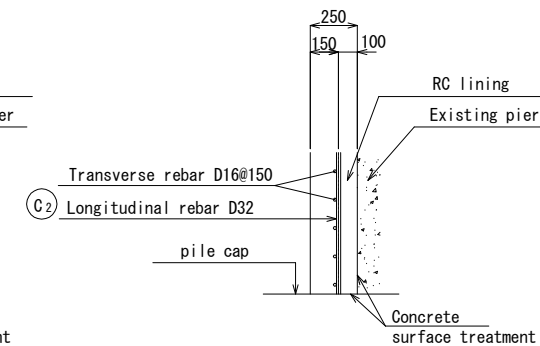
PLAN 1-1



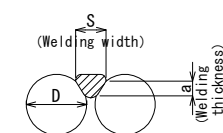
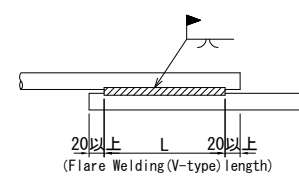
a part S=1:40



b part S=1:40



Flare Welding part S=1:10



Rebar dia	D (mm)	16	19	22	25
Welding size	S (mm)	8.0	9.5	11.0	12.5
thickness	a (mm)	3.2	4.4	5.6	5.8
Welding length	L (mm)	160	190	220	250

Client:
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:
ORIENTAL CONSULTANTS Co. Ltd
KATAHIRA & ENGINEERS INTERNATIONAL

MEGHNA BRIDGE

REBAR ARRANGEMENT IN EXISTING PIER

SCALE : AS NOTED
DATE: 3/2013

SHEET NO:
C-24