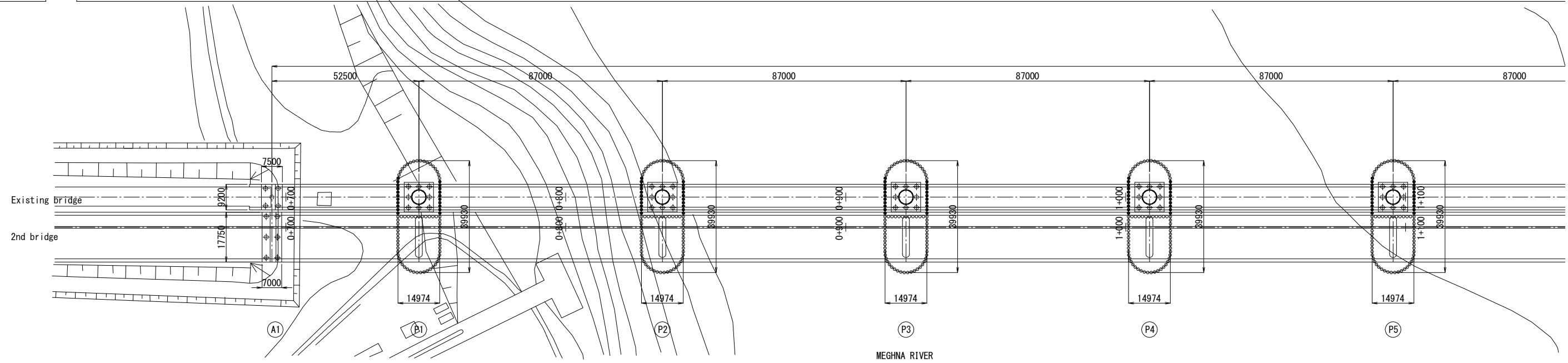


GRADIENT	3.005% L=421.500	
PROPOSED HEIGHT	11.559	11.709
GROUND HEIGHT	-8.56	-6.85
STATION	+695.0	+720
HORIZONTAL CURVE	VCL = 200.000 R = 7394	

PROPOSED HEIGHT	11.559	11.709	12.310	12.911	13.137	13.512	14.113	14.714	15.315	15.360	15.739	15.893	16.417	16.887	17.302	17.664	17.689	17.971	18.225	18.424	18.569	18.615	18.860	18.665	18.720	18.780	18.840	18.887	18.900	18.960	19.020
GROUND HEIGHT	-8.56	-6.85	+5.01	+4.97	+4.99	+3.26	+0.92	-4.47	-7.85	-6.10	-7.32	-6.90	-7.11	-7.01	-7.86	-9.83	-9.87	-8.32	-6.94	-6.49	-9.35	-9.34	-8.27	-8.08	-6.74	-6.15	-6.41	-7.91	-8.43	-6.75	-6.14
STATION	+695.0	+700	+720	+740	+747.5	+760	+780	+800	+820	+821.5	+834.5	+840	+860	+880	+900	+920	+921.5	+940	+960	+980	+1000	+1008.5	+1020	+1021.5	+1040	+1060	+1080	+1095.5	+1100	+1120	+1140

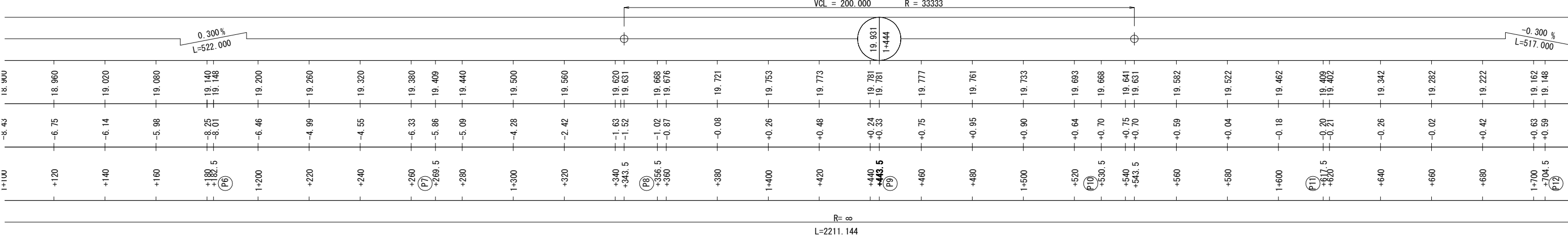
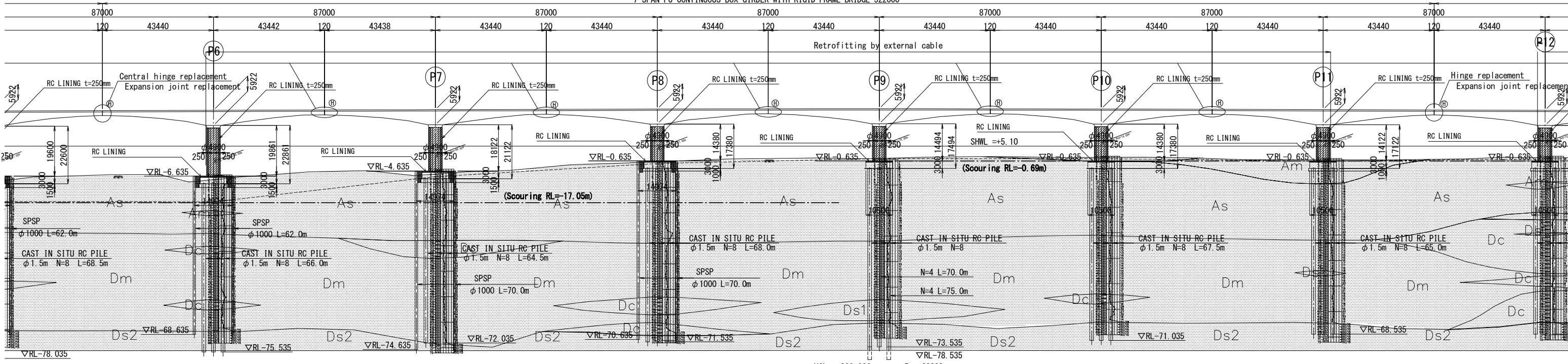


# GUMTI BRIDGE: GENERAL VIEW OF EXISTING BRIDGE

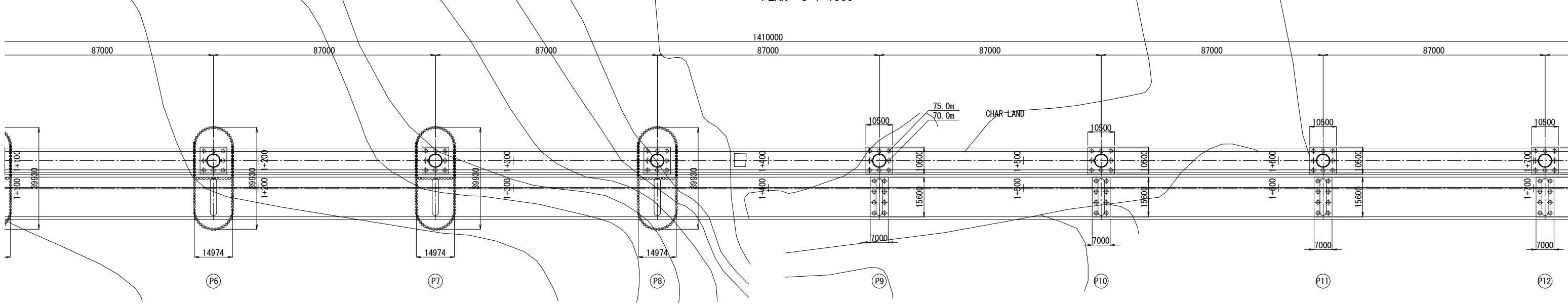
PROFILE S=1:1500

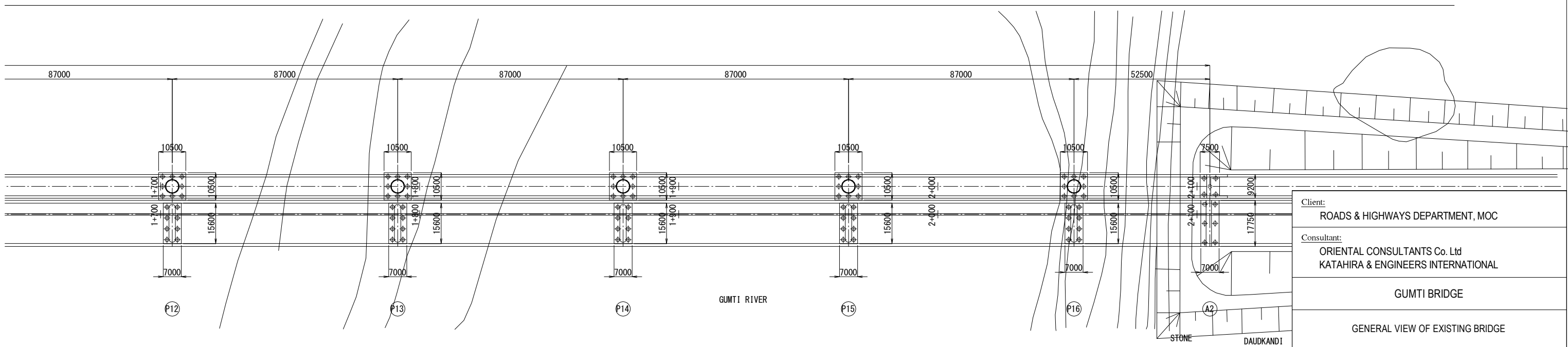
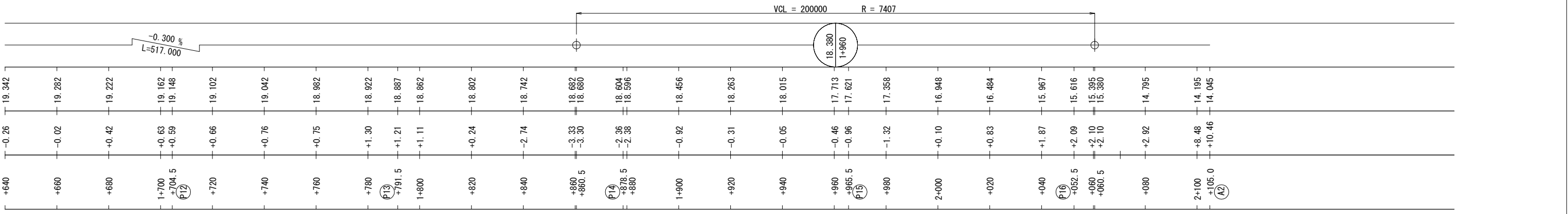
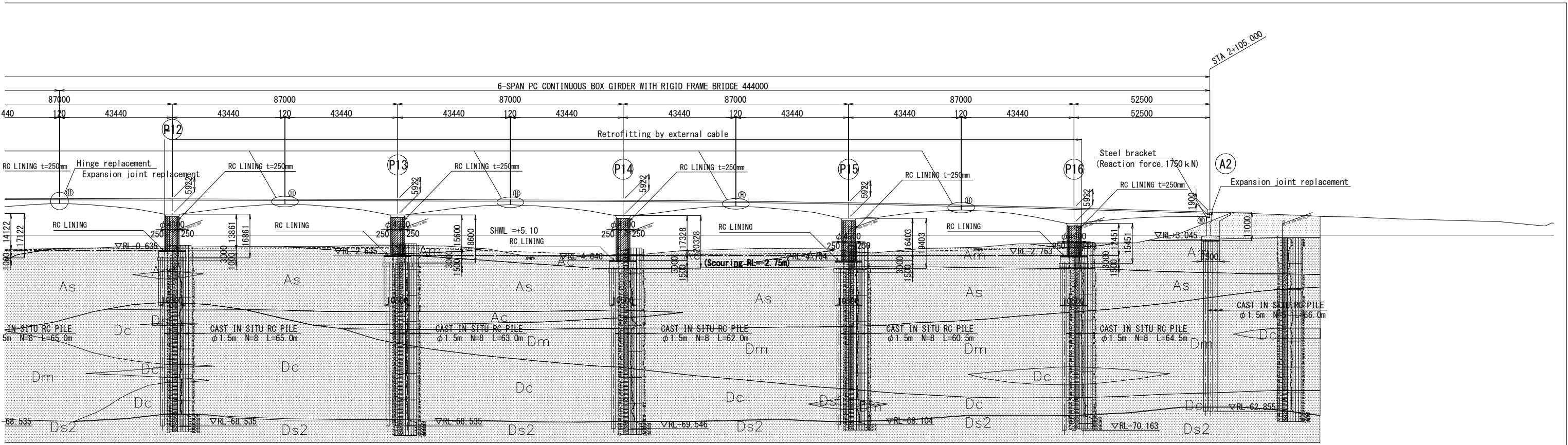
BRIDGE LENGTH L=1410000

7-SPAN PC CONTINUOUS BOX GIRDER WITH RIGID FRAME BRIDGE 522000



PLAN S=1:1500





Client:  
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:  
ORIENTAL CONSULTANTS Co. Ltd  
KATAHIRA & ENGINEERS INTERNATIONAL

GUMTI BRIDGE

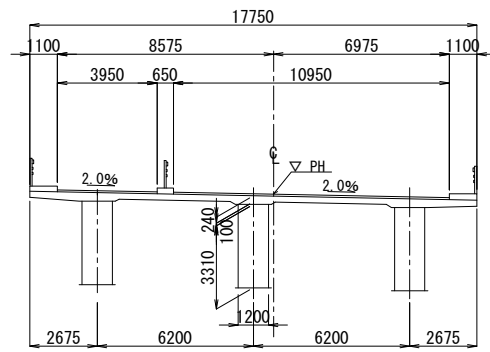
GENERAL VIEW OF EXISTING BRIDGE

SCALE : AS NOTED  
DATE : 3/2013

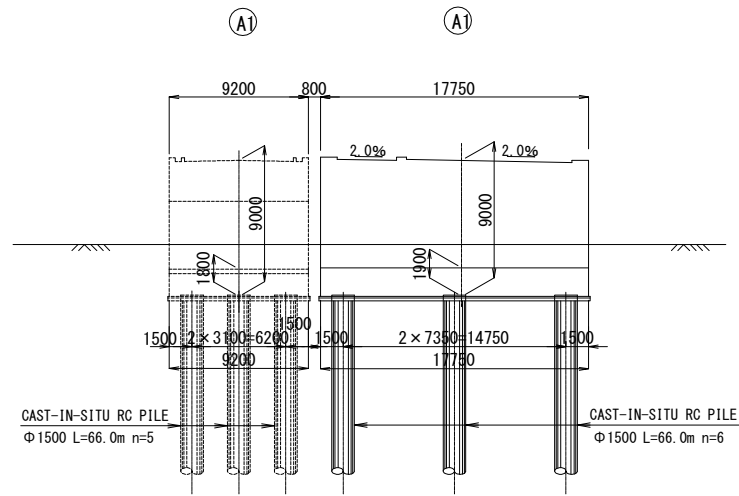
SHEET NO:  
D-12

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

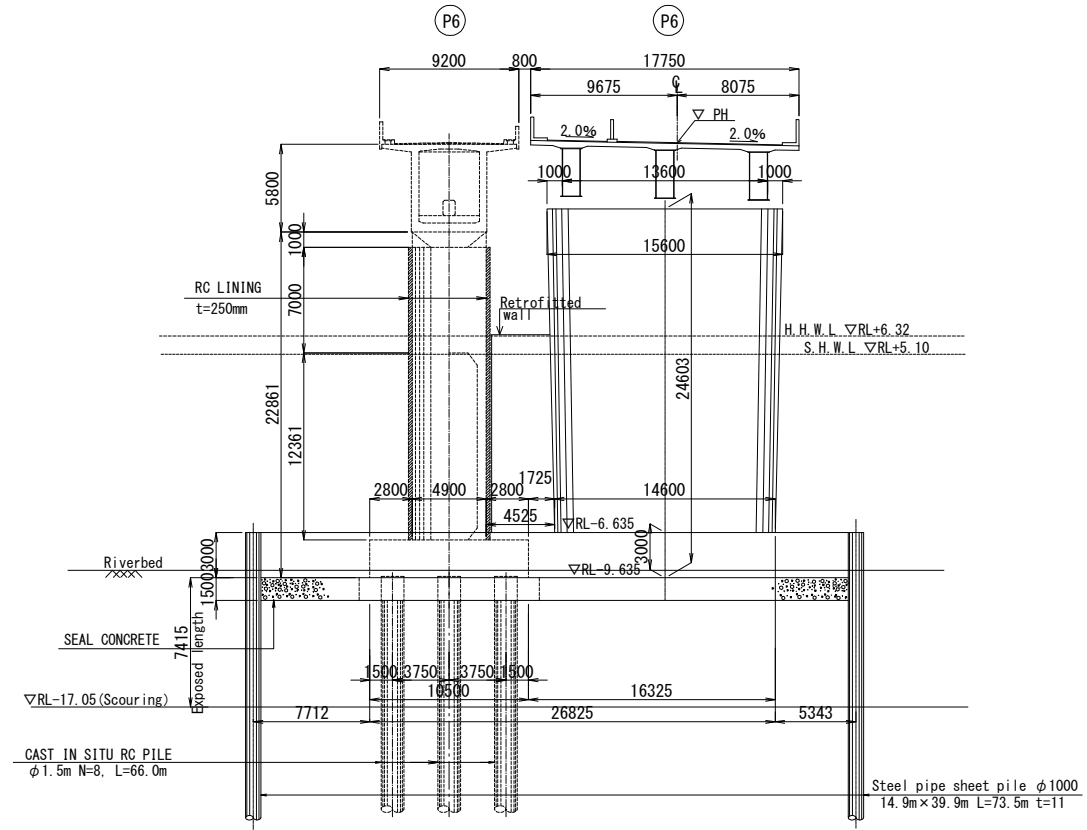
2nd Bridge S=1:300



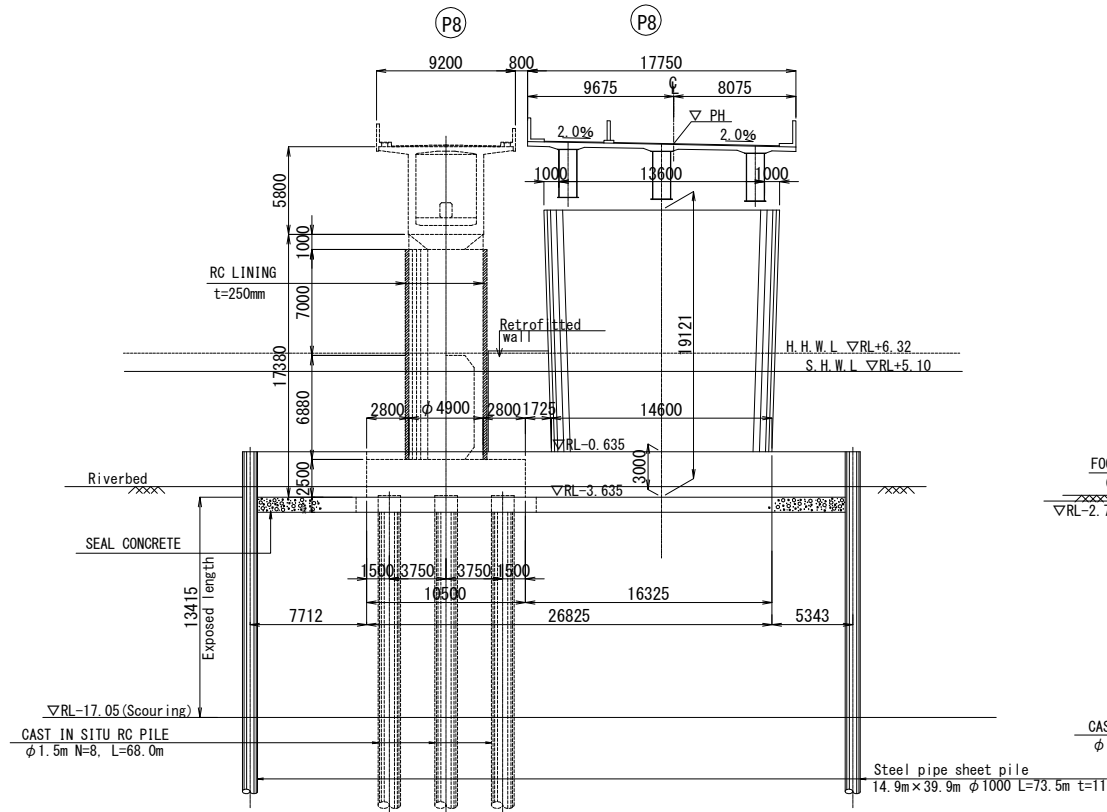
( EXISTING BRIDGE ) ( 2ND BRIDGE )



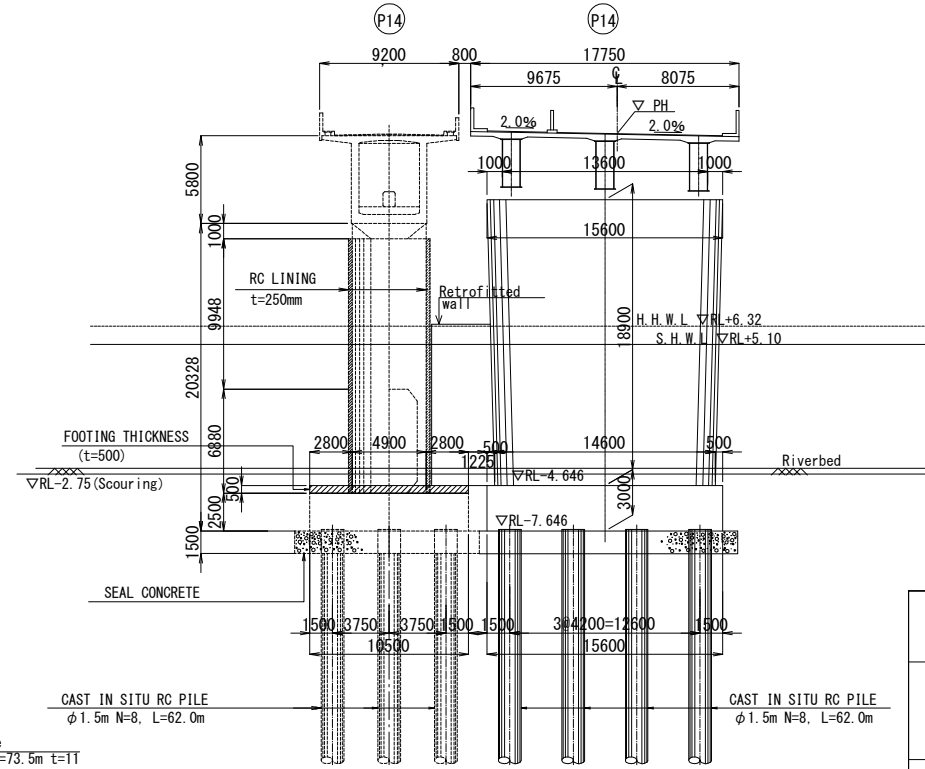
( EXISTING BRIDGE ) ( 2ND BRIDGE )



( EXISTING BRIDGE ) ( 2ND BRIDGE )



( EXISTING BRIDGE ) ( 2ND BRIDGE )



Client:  
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:  
ORIENTAL CONSULTANTS Co. Ltd  
KATAHIRA & ENGINEERS INTERNATIONAL

GUMTI BRIDGE

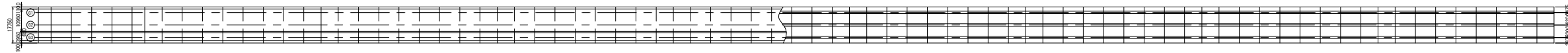
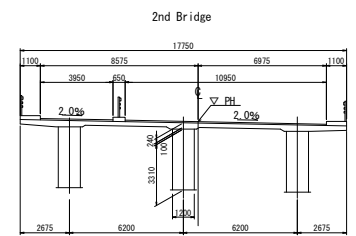
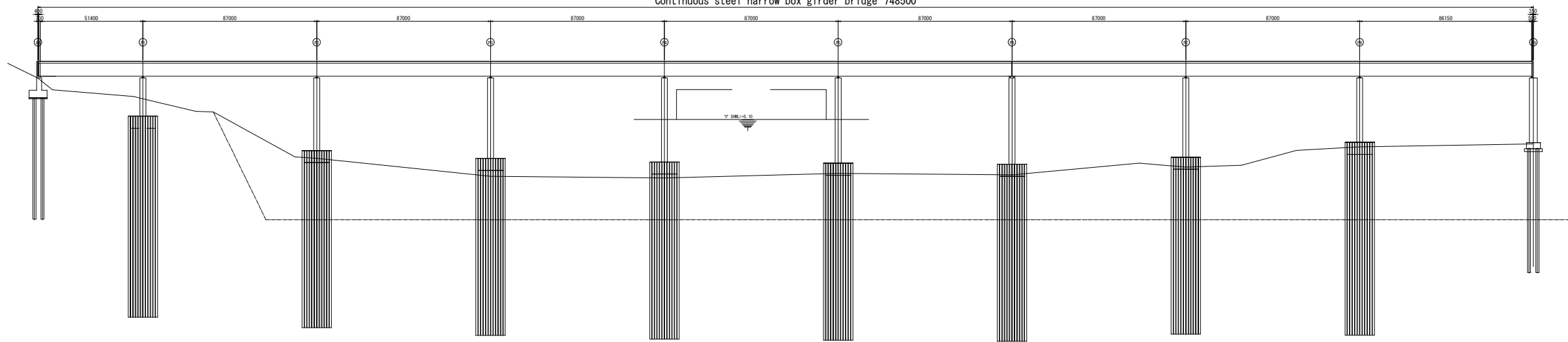
GENERAL VIEW OF SUBSTRUCTURE

SCALE: AS NOTED  
DATE: 3/2013

SHEET NO:  
D-13

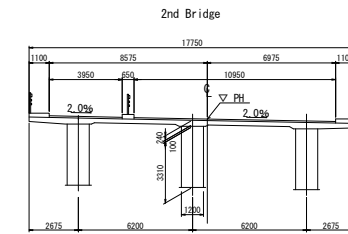
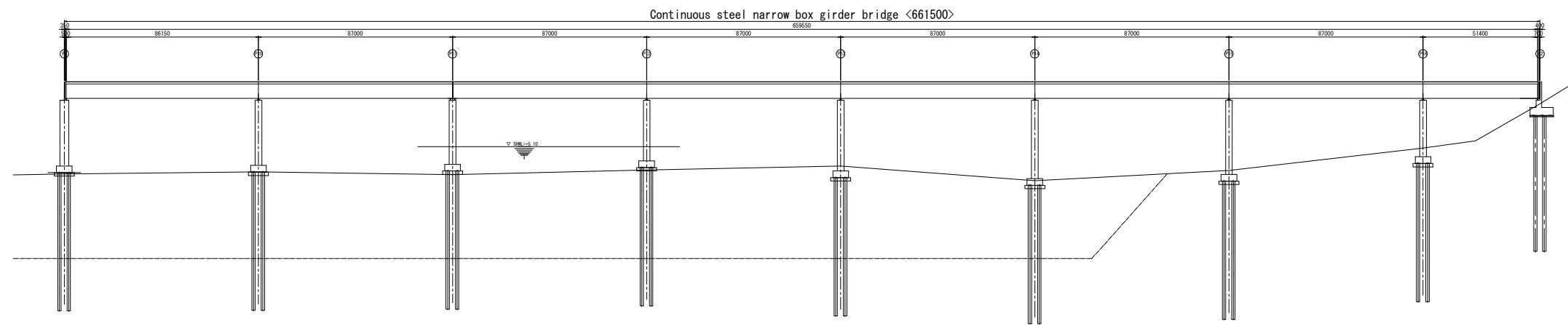
GUMTI BRIDGE: SUPERSTRUCTURE OF 2ND BRIDGE (1)

Continuous steel narrow box girder bridge 748500



Client ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant ORIENTAL CONSULTANTS Co. Ltd KATAHARA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
SUPERSTRUCTURE OF 2ND BRIDGE (1)	
SCALE: AS NOTED	SHEET NO. 0-14
DATE: 2013	

GUMTI BRIDGE: SUPERSTRUCTURE OF 2ND BRIDGE (2)



Client ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
SUPERSTRUCTURE OF 2ND BRIDGE (2)	
SCALE: AS NOTED	SHEET NO. 015
DATE: 2013	

# GUMTI BRIDGE: SUBSTRUCTURE (1) ( EXISTING BRIDGE ) ( 2ND BRIDGE )

S=1 : 500

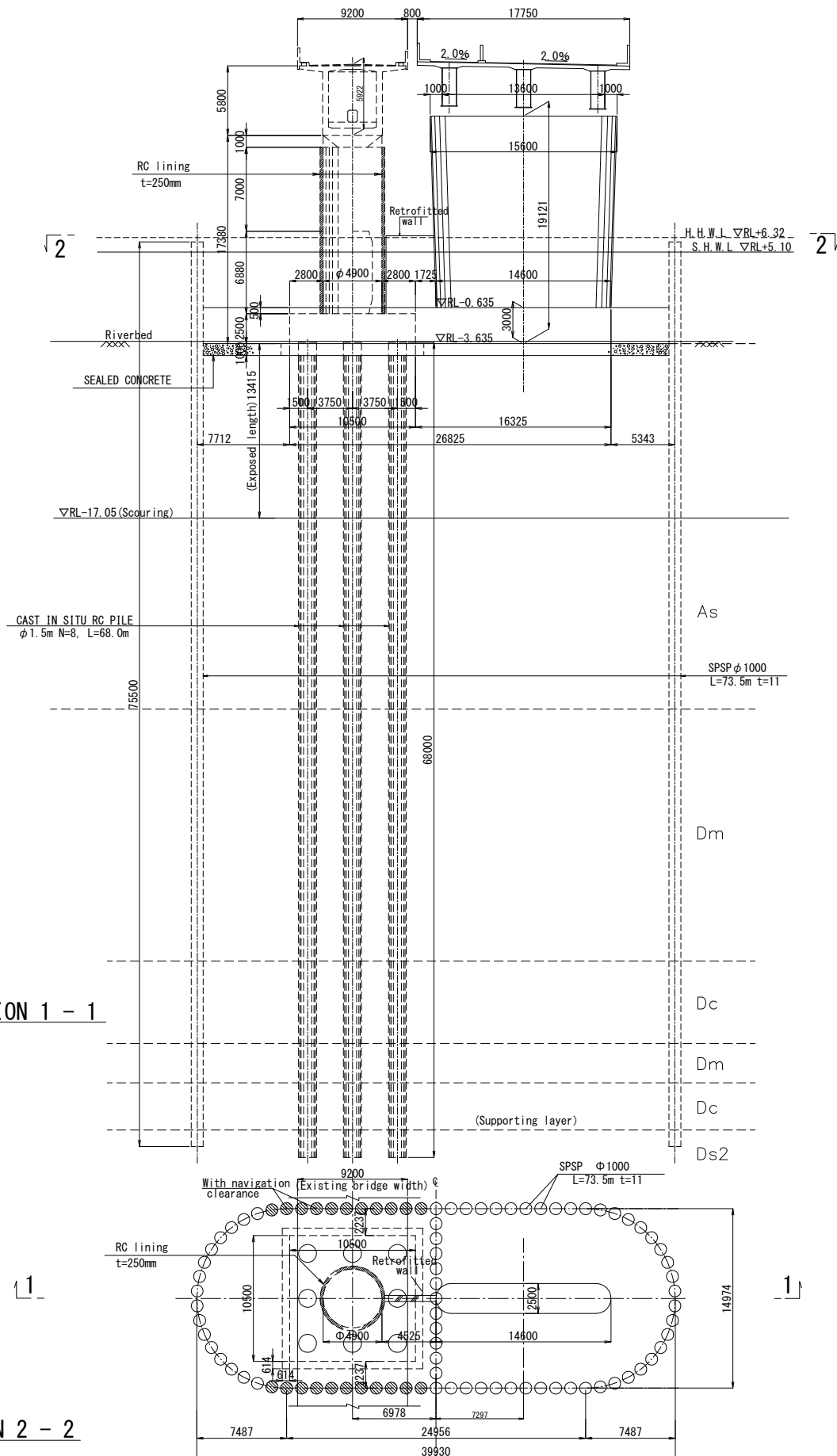
(P2 ~ P6)

(P2 ~ P6)

( EXISTING BRIDGE ) ( 2ND BRIDGE )

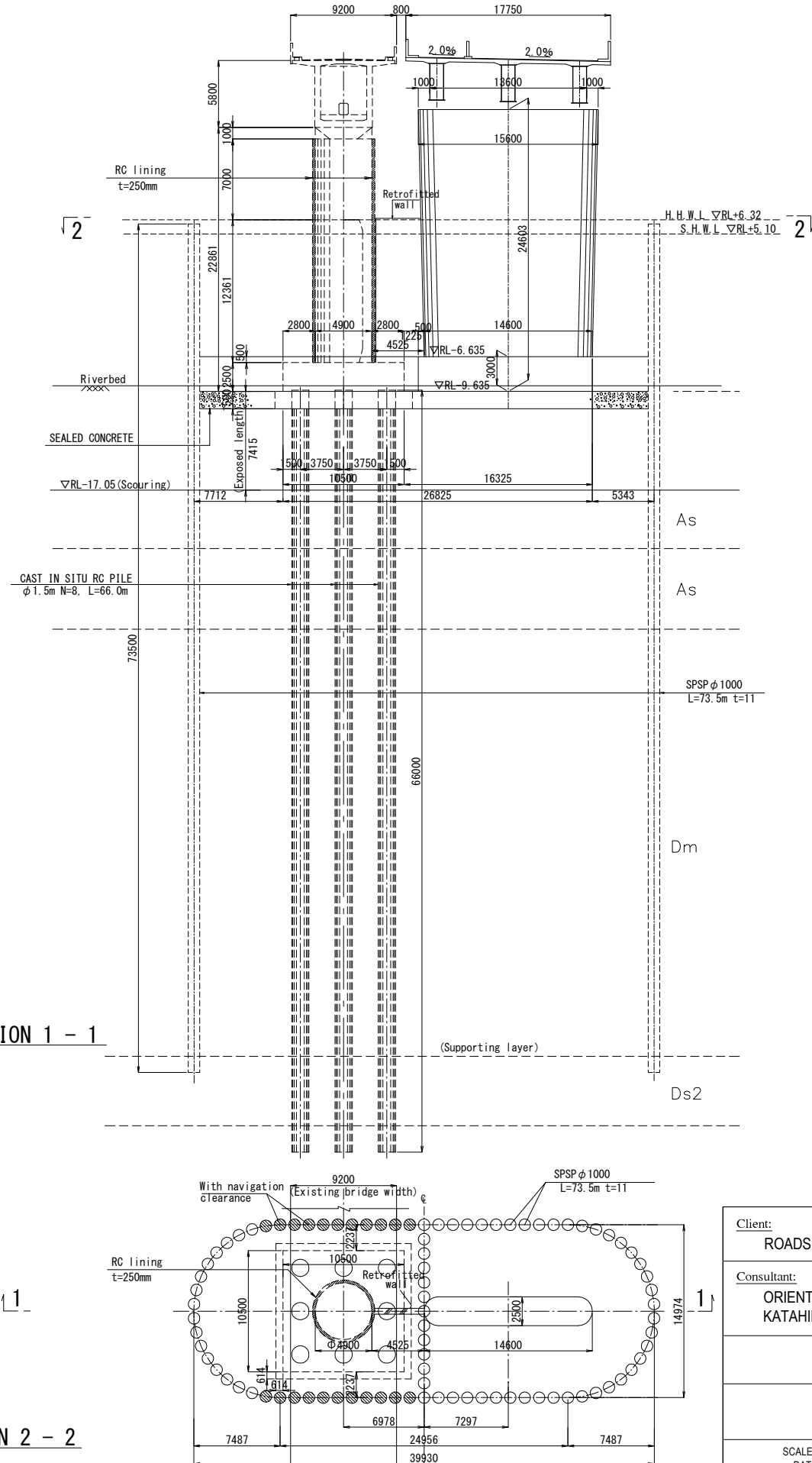
(P1, P7 ~ P8)

(P1, P7 ~ P8)



SECTION 1 - 1

PLAN 2 - 2

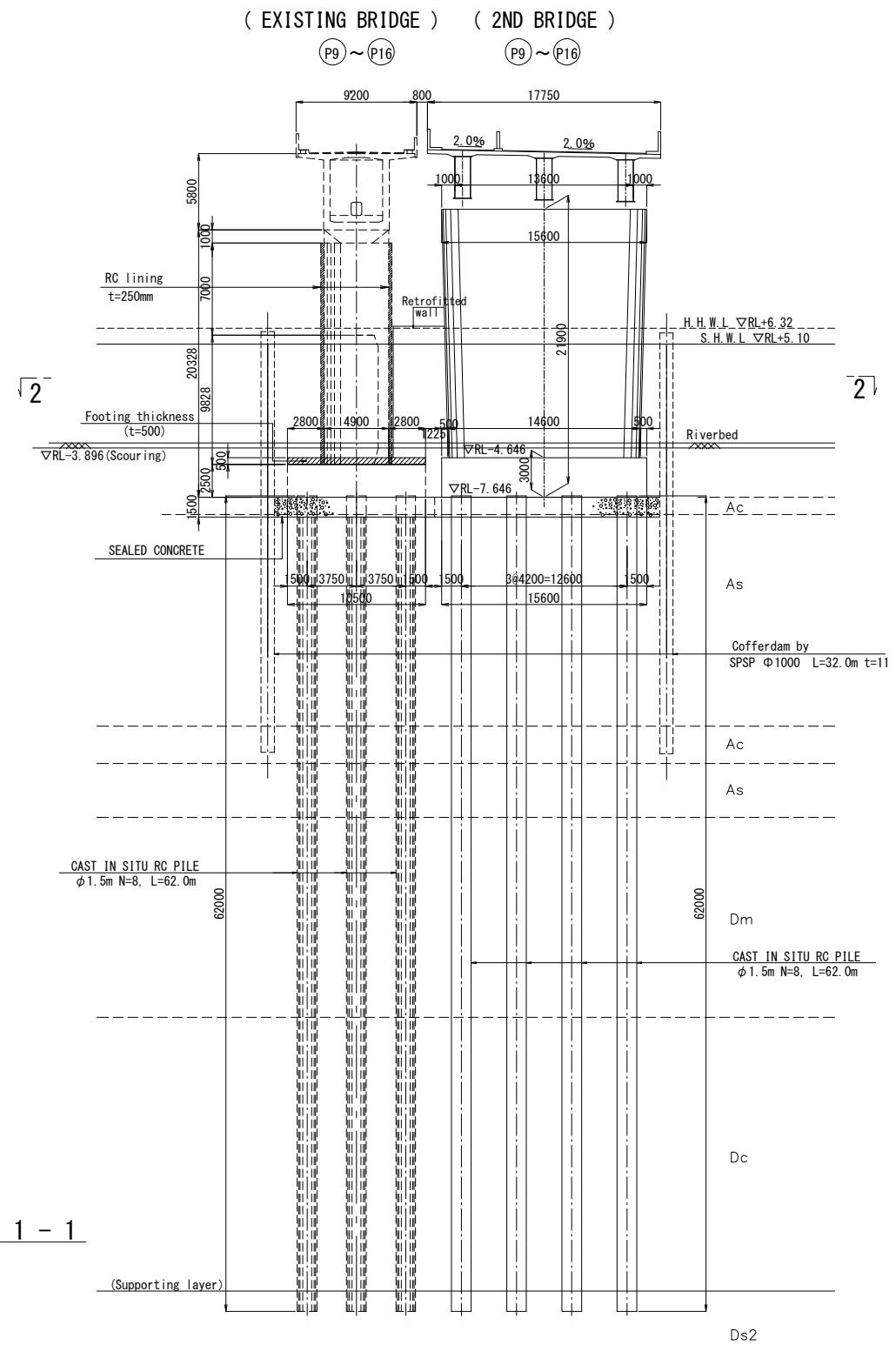


SECTION 1 - 1

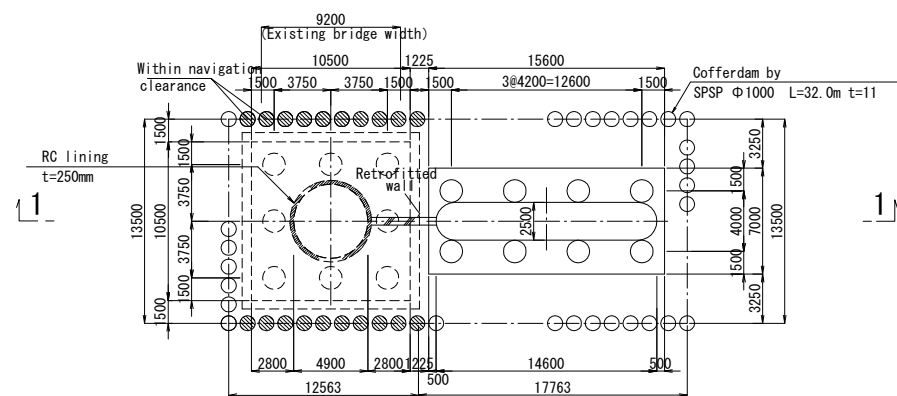
PLAN 2 - 2

Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
SUBSTRUCTURE (1)	
SCALE : AS NOTED DATE : 3/2013	SHEET NO: D-16

# GUMTI BRIDGE: SUBSTRUCTURE (2) S=1 : 500



SECTION 1 - 1



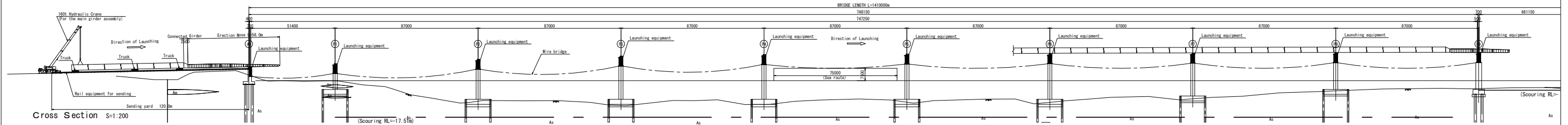
PLAN 2 - 2

Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
SUBSTRUCTURE (2)	
SCALE : AS NOTED DATE : 3/2013	SHEET NO: D-17

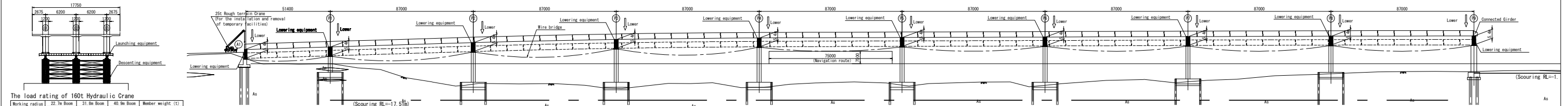


# GUMTI BRIDGE: CONSTRUCTION FOR SUPERSTRUCTURE OF 2ND BRIDGE (1)

Side view S=1:600



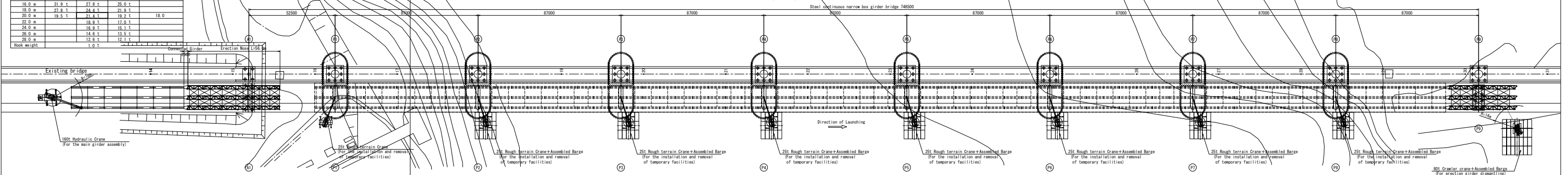
Cross Section S=1:200



The load rating of 160t Hydraulic Crane

Working radius	22.5m Boom	31.5m Boom	40.5m Boom	Member weight (t)
12.0 m	40.7 t	37.9 t	32.1 t	
14.0 m	39.1 t	32.2 t	28.0 t	
16.0 m	31.9 t	27.8 t	25.0 t	
18.0 m	27.8 t	24.4 t	21.9 t	
20.0 m	19.5 t	21.4 t	19.2 t	18.0
22.0 m		18.9 t	17.0 t	
24.0 m		16.9 t	15.1 t	
26.0 m		14.6 t	13.5 t	
28.0 m		12.6 t	12.1 t	
Roof weight	1.0 t			

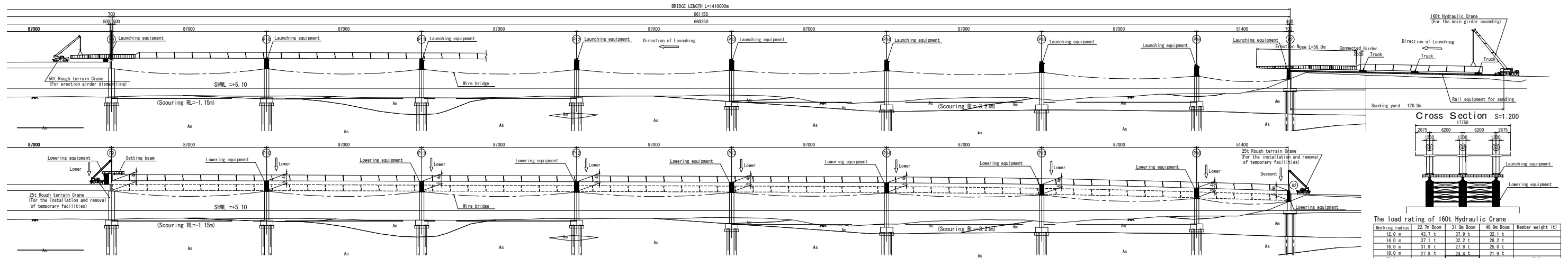
Layout plan S=1:600



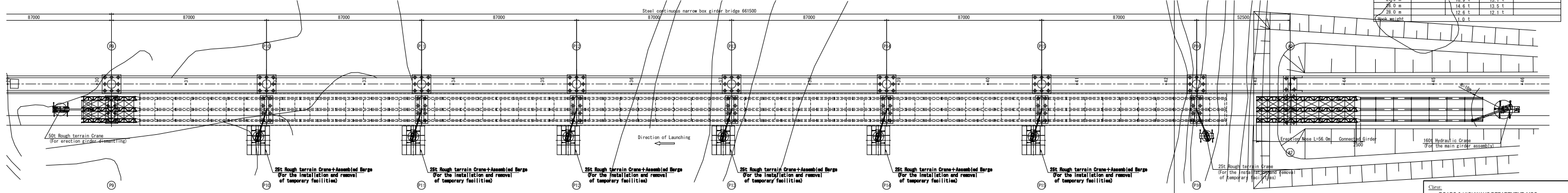
Client:		ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:		ORIENTAL CONSULTANTS Co. Ltd KATAHRA & ENGINEERS INTERNATIONAL
Project Name:		GUMTI BRIDGE
Sheet Title:		CONSTRUCTION FOR SUPERSTRUCTURE OF 2ND BRIDGE (1)
Scale:	AS NOTED	Sheet No:
Date:	3/2013	D-19

# GUMTI BRIDGE: CONSTRUCTION FOR SUPERSTRUCTURE OF 2ND BRIDGE (2)

Side view S=1:600



Layout plan S=1:600



Client:  
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:  
ORIENTAL CONSULTANTS Co. Ltd  
KATAHIRA & ENGINEERS INTERNATIONAL

GUMTI BRIDGE

CONSTRUCTION FOR SUPERSTRUCTURE OF 2ND BRIDGE (2)

SCALE: AS NOTED  
DATE: 2013

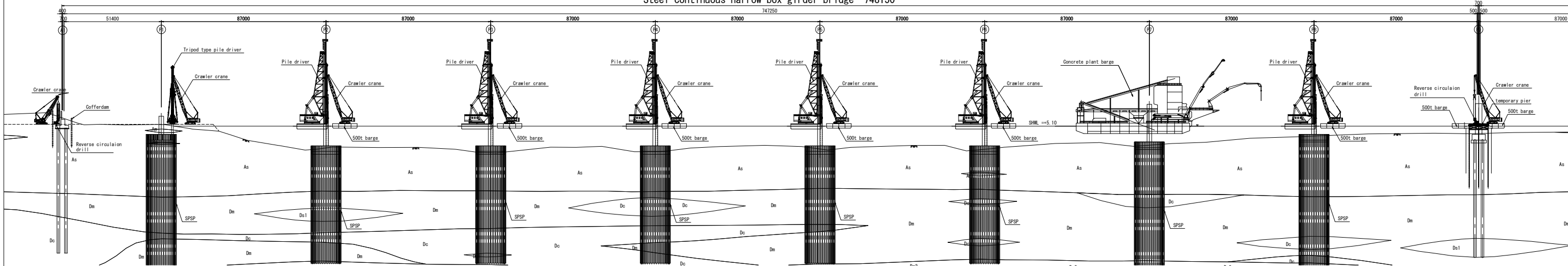
SHEET NO: D-13

**GUMTI BRIDGE: CONSTRUCTION FOR SUBSTRUCTURE (1)**

Side view S=1:600

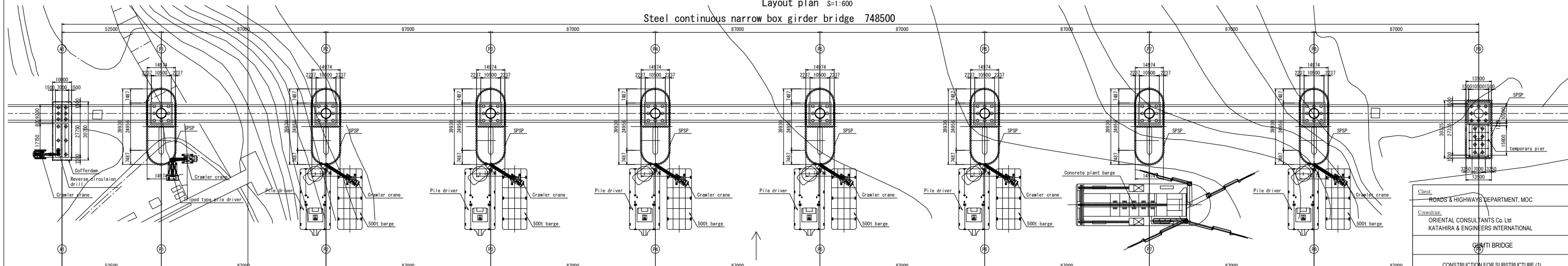
Steel continuous narrow box girder bridge 748150

NOTE 1: About piles of the scene of basement's hitting, use the reverse circulation drill method for construction.  
 NOTE 2: About piles of steel pipe plate's hitting, use the silent pier method for construction while under the Existing bridge's limited section, otherwise use the middle excavation method or the silent pier method.



Layout plan S=1:600

Steel continuous narrow box girder bridge 748500



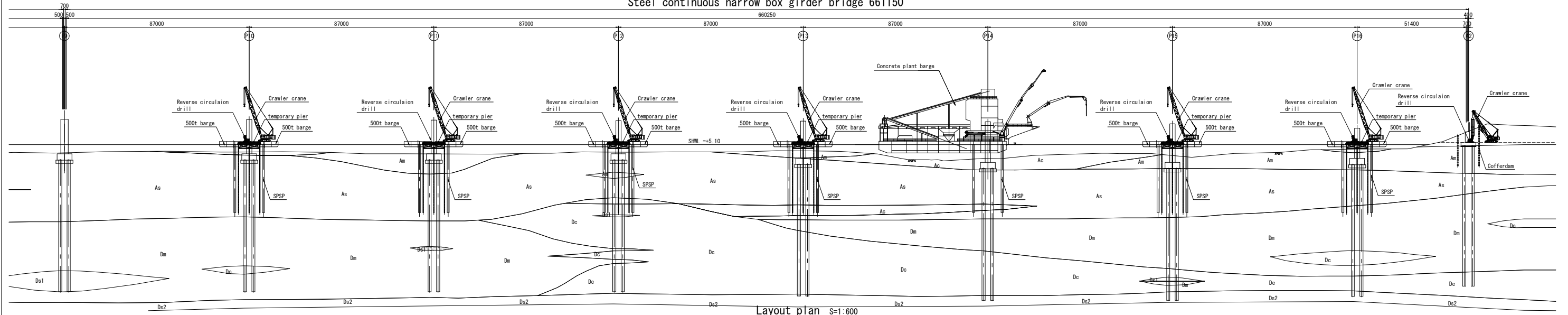
Steel continuous narrow box girder bridge 748500

Client:	ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:	ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL
GUMTI BRIDGE	
CONSTRUCTION FOR SUBSTRUCTURE (1)	
SCALE: AS NOTED DATE: 3/2013	SHEET NO: D-20

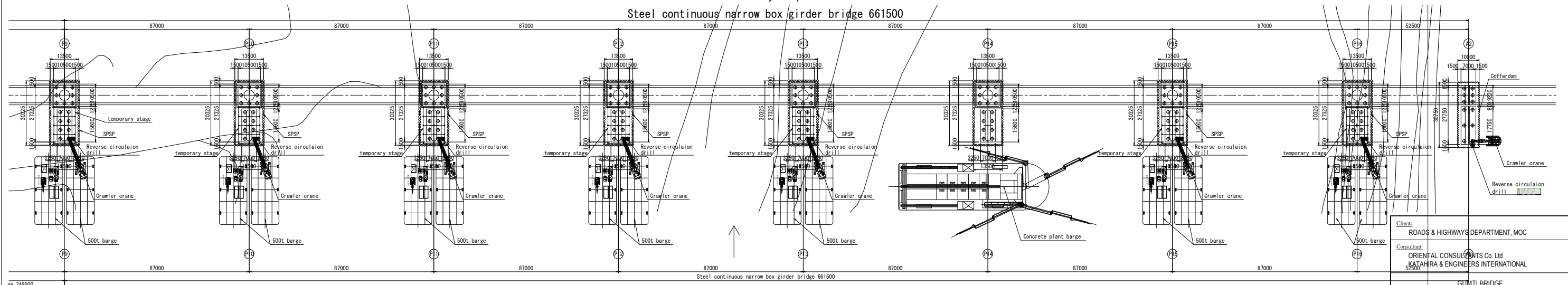
# GUMTI BRIDGE: CONSTRUCTION FOR SUBSTRUCTURE (2)

Side view S=1:600

Steel continuous narrow box girder bridge 661150



Layout plan S=1:600



Steel continuous narrow box girder bridge 661500

Steel continuous narrow box girder bridge 661500

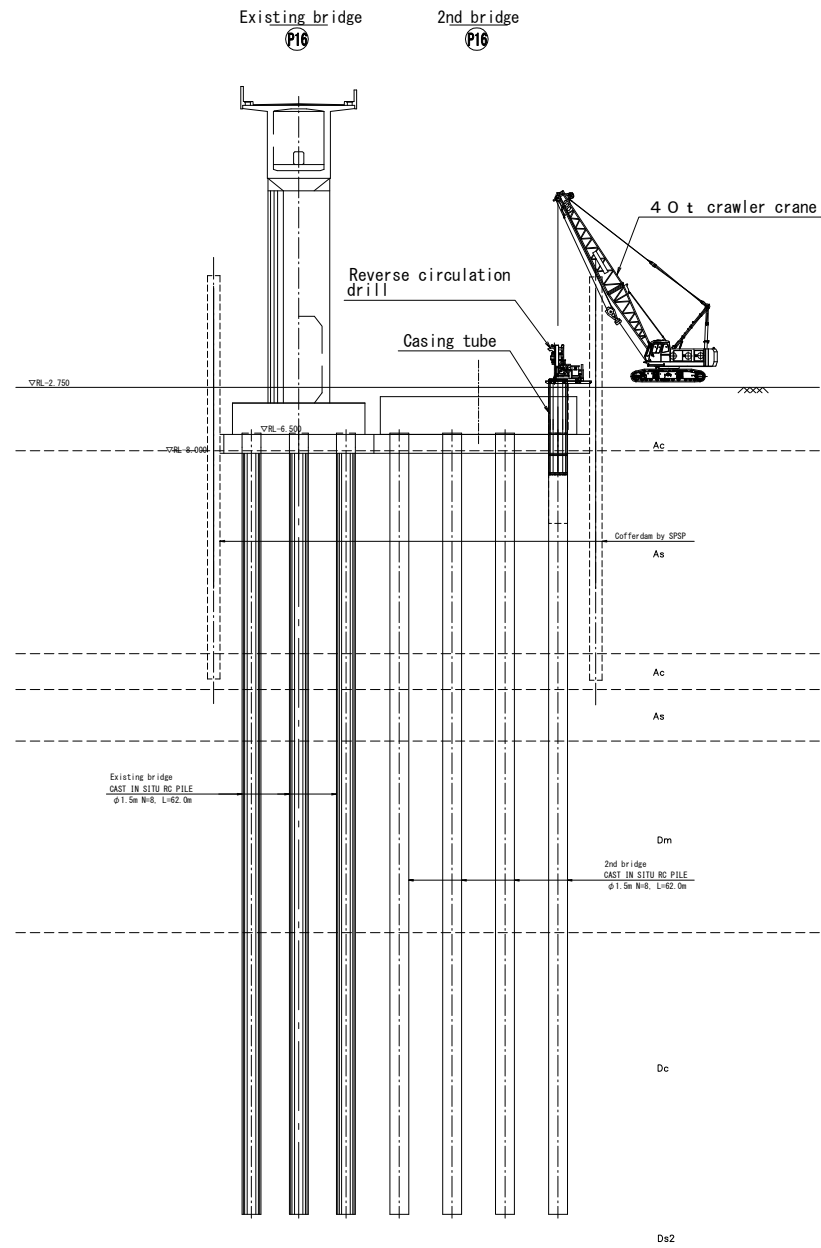
Client:	ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:	ORIENTAL CONSULTANTS Co. Ltd KATAHRA & ENGINEERS INTERNATIONAL
GUMTI BRIDGE	
CONSTRUCTION FOR SUBSTRUCTURE (2)	
SCALE: AS NOTED DATE: 30/13	SHEET NO: D-21

NOTE 1: About piles of the scene of basement's hitting, use the reverse circulation drill method for construction.

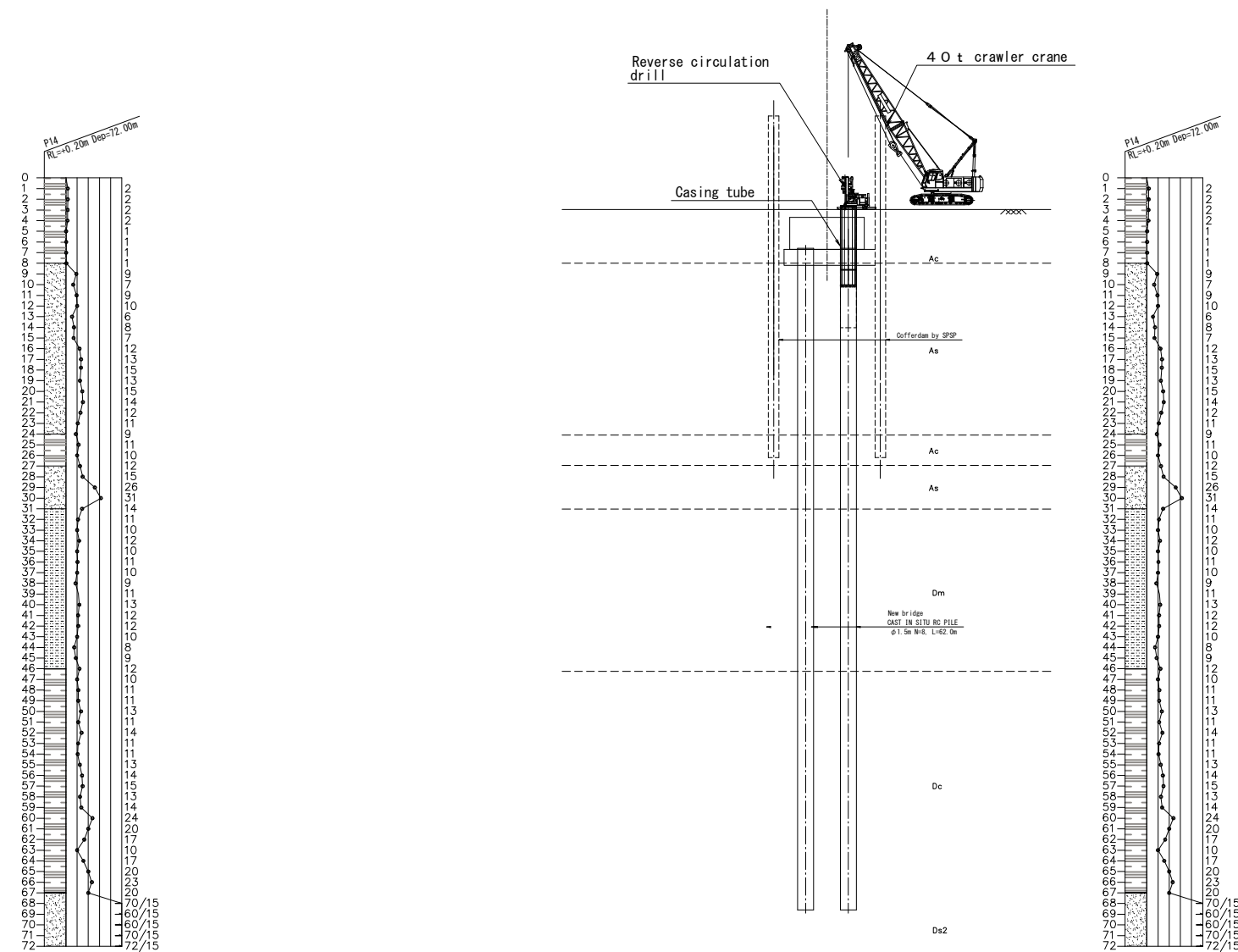
# GUMTI BRIDGE: CONSTRUCTION FOR REVERSE CIRCULATION METHOD (ONSHORE)

S=1/300

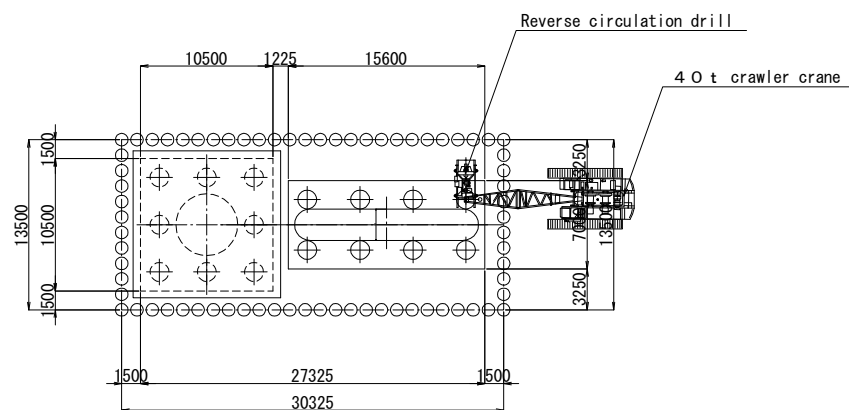
Cross section



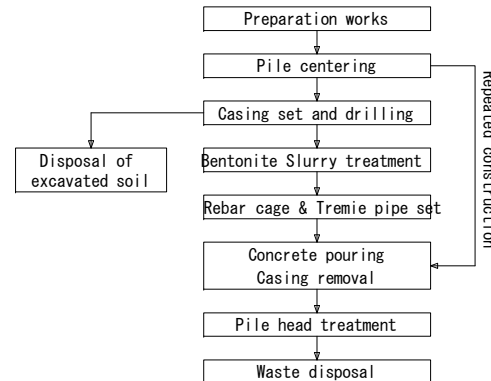
Side view



Layout plan



Construction flow



Construction equipment specification

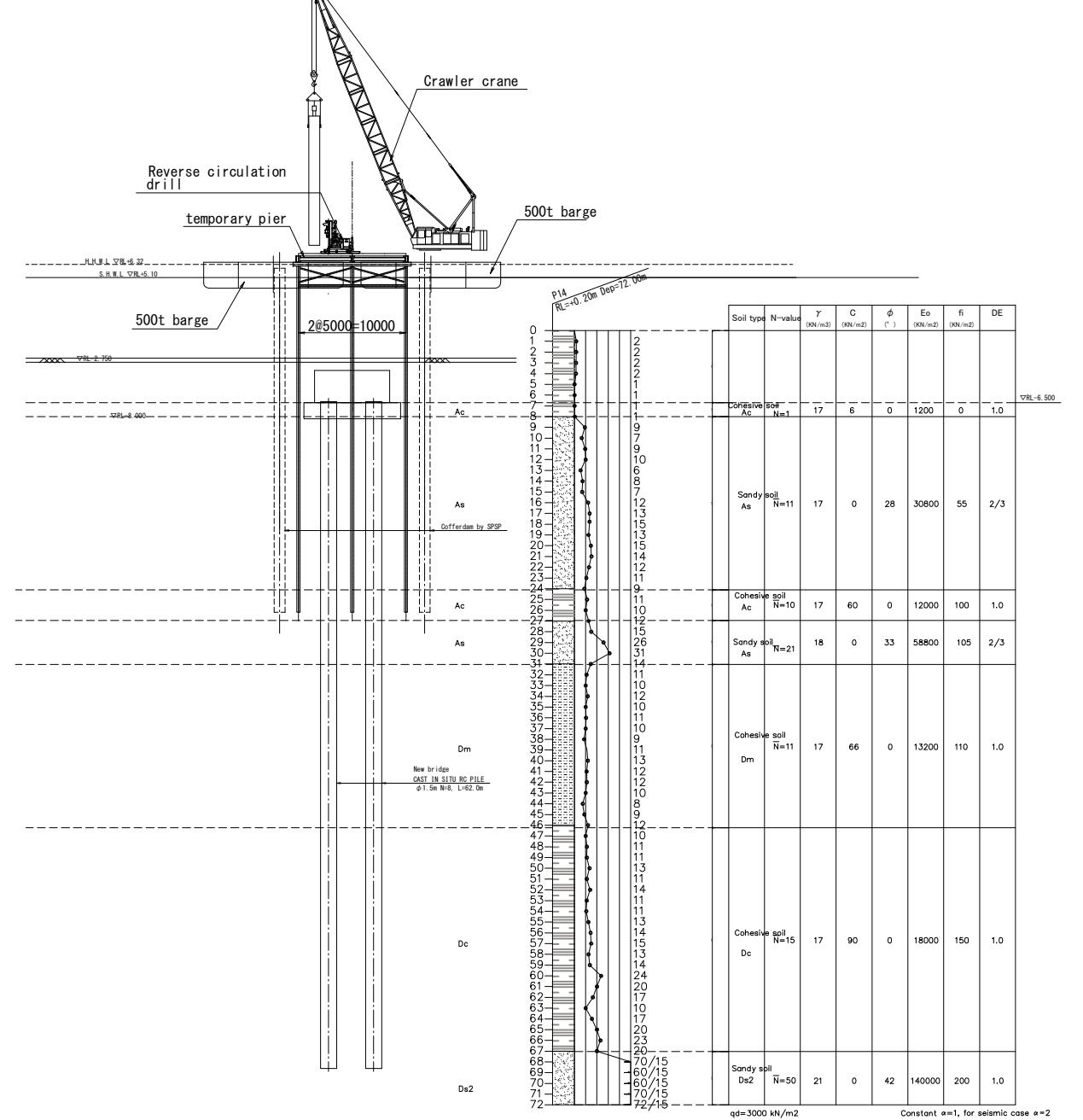
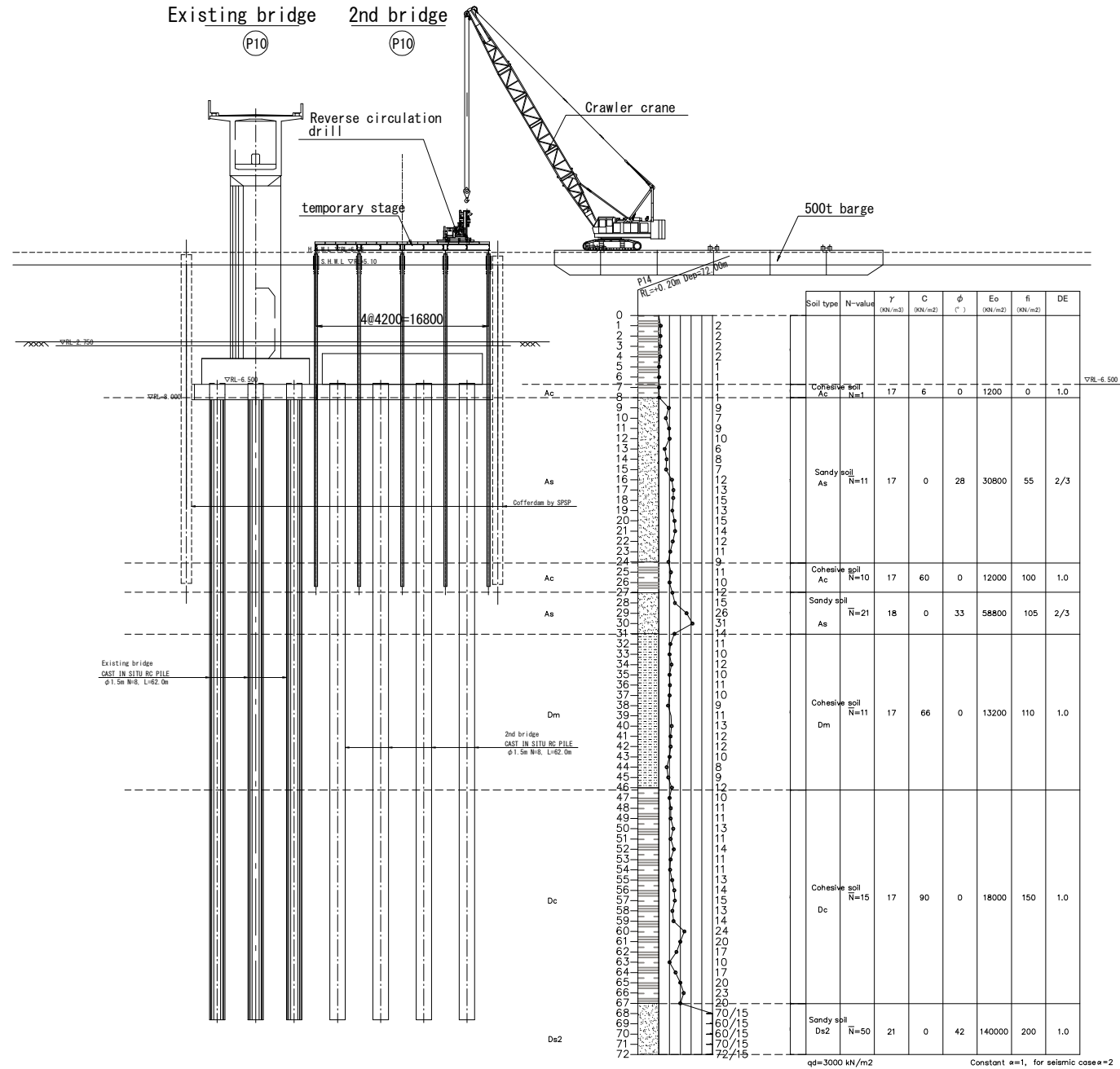
Equipment	Standard
Reverse circulation drill	Air lift and suction pump type
Crawler crane (Rotary type)	Hydraulic type winch · Ratch jib type 40 t
Back hoe	Exhaust gas inhibitor Crawler (set) Piling 0.45m <sup>3</sup> (plannar volume 0.35m <sup>3</sup> )

Client:	ROADS & HIGHWAYS DEPARTMENT, MOC
Consultant:	ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL
GUMTI BRIDGE	
CONSTRUCTION FOR REVERSE CIRCULATION METHOD (ONSHORE)	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: D-22

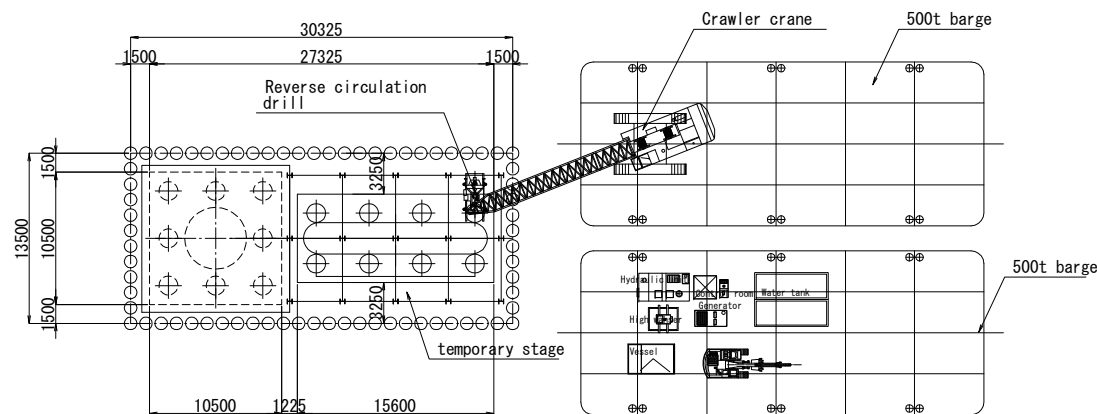
# GUMTI BRIDGE: CONSTRUCTION FOR REVERSE CIRCULATION METHOD (ON RIVER) S=1/300

Cross section  
Existing bridge    2nd bridge

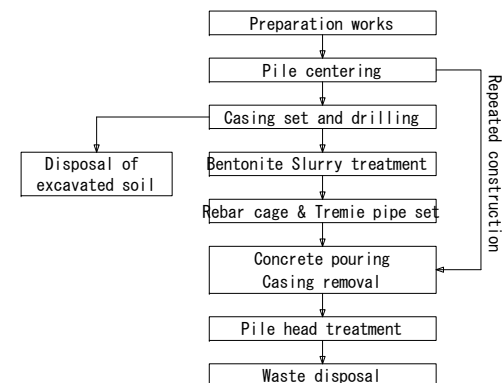
Side view



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 80 t
Barge	500 t
Tug boat	D500PS
Anchor boat	D5 t
Diver's boat	D180PS 3~5 t
Back hoe	Exhaust gas inhibitor Crawler (set) Piling 0.5m <sup>3</sup> (plannar volume 0.4m <sup>3</sup> )

Client:  
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:  
ORIENTAL CONSULTANTS Co. Ltd  
KATAHIRA & ENGINEERS INTERNATIONAL

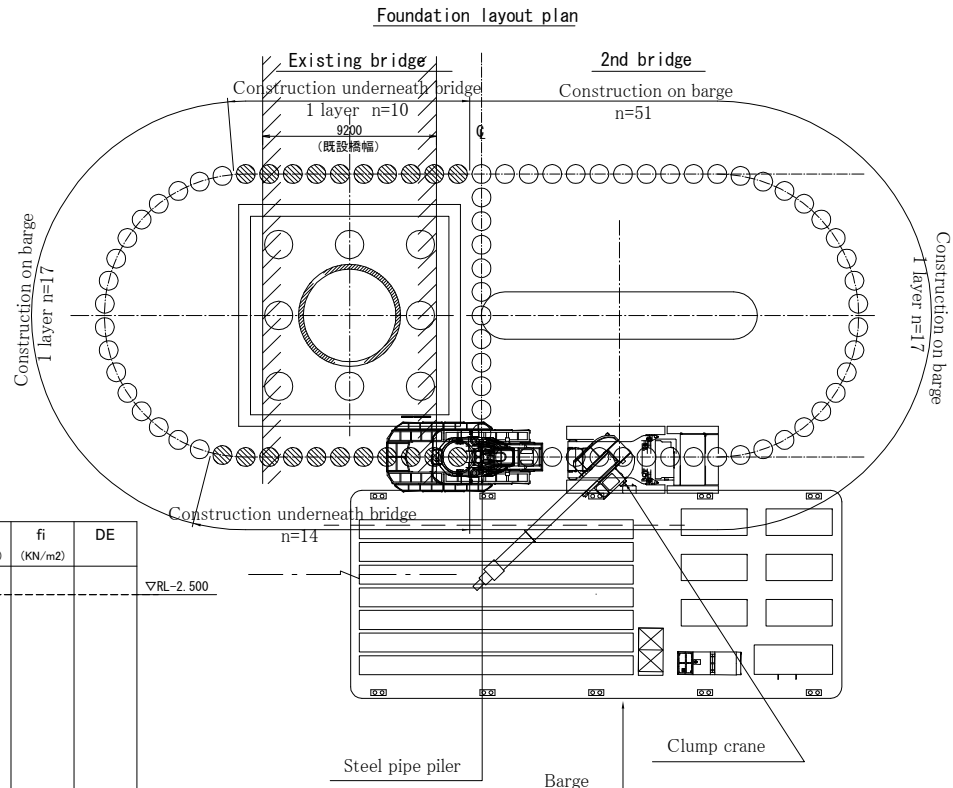
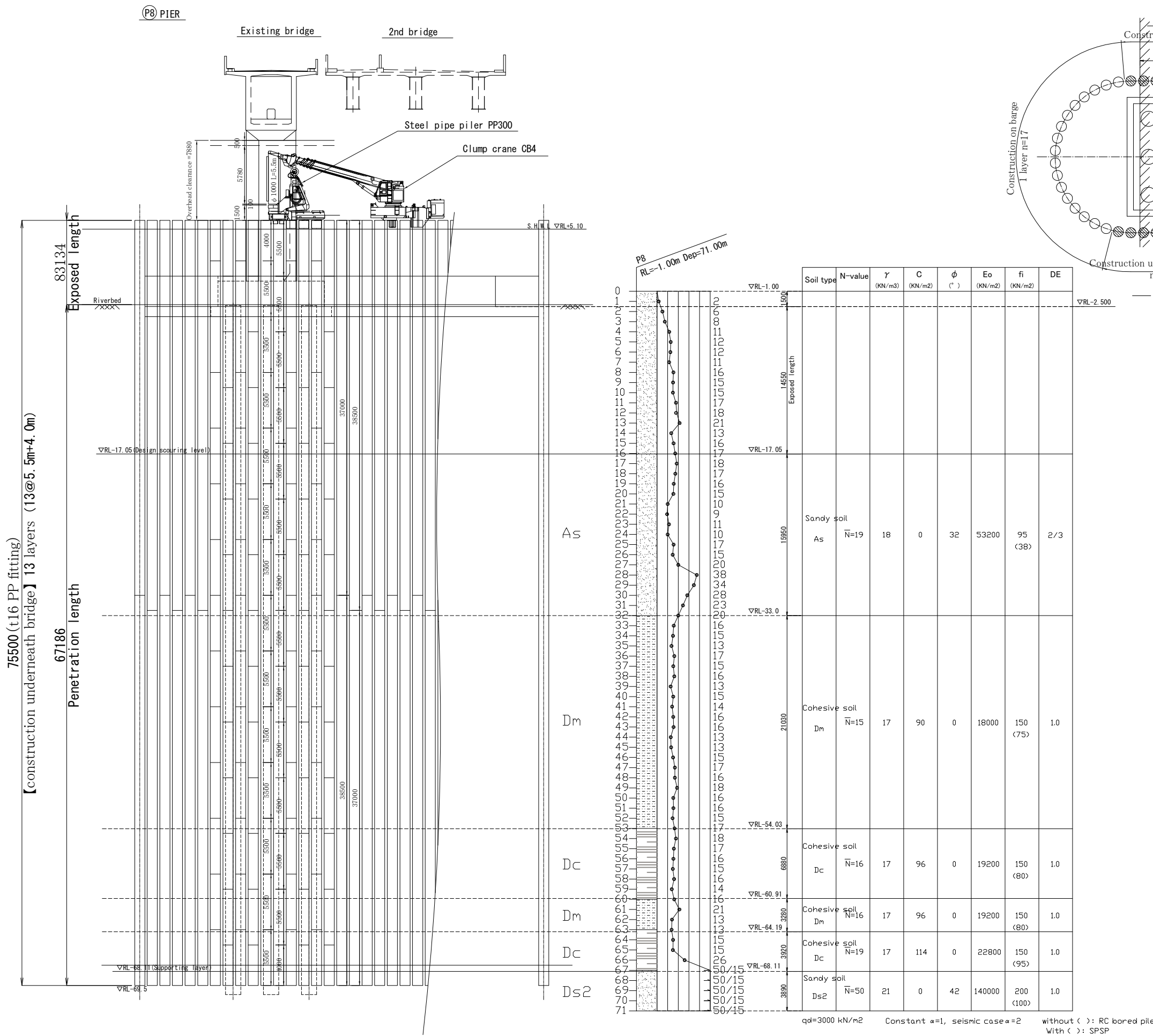
GUMTI BRIDGE

CONSTRUCTION FOR REVERSE CIRCULATION METHOD  
(ON RIVER)

SCALE : AS NOTED  
DATE: 3/2013

SHEET NO:  
D-23

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

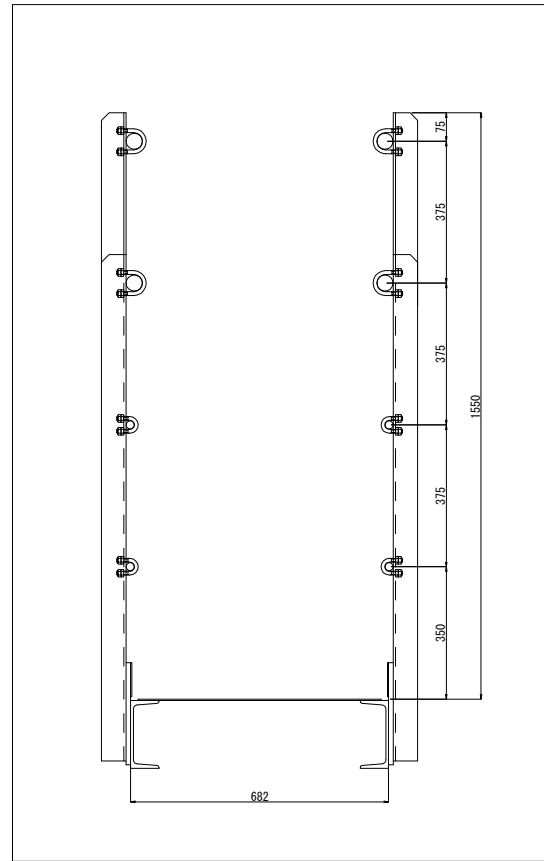


Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
CONSTRUCTION FOR SPSP FOUNDATION (SILENT PILER METHOD)	
SCALE : AS NOTED DATE : 3/2013	SHEET NO: D-24

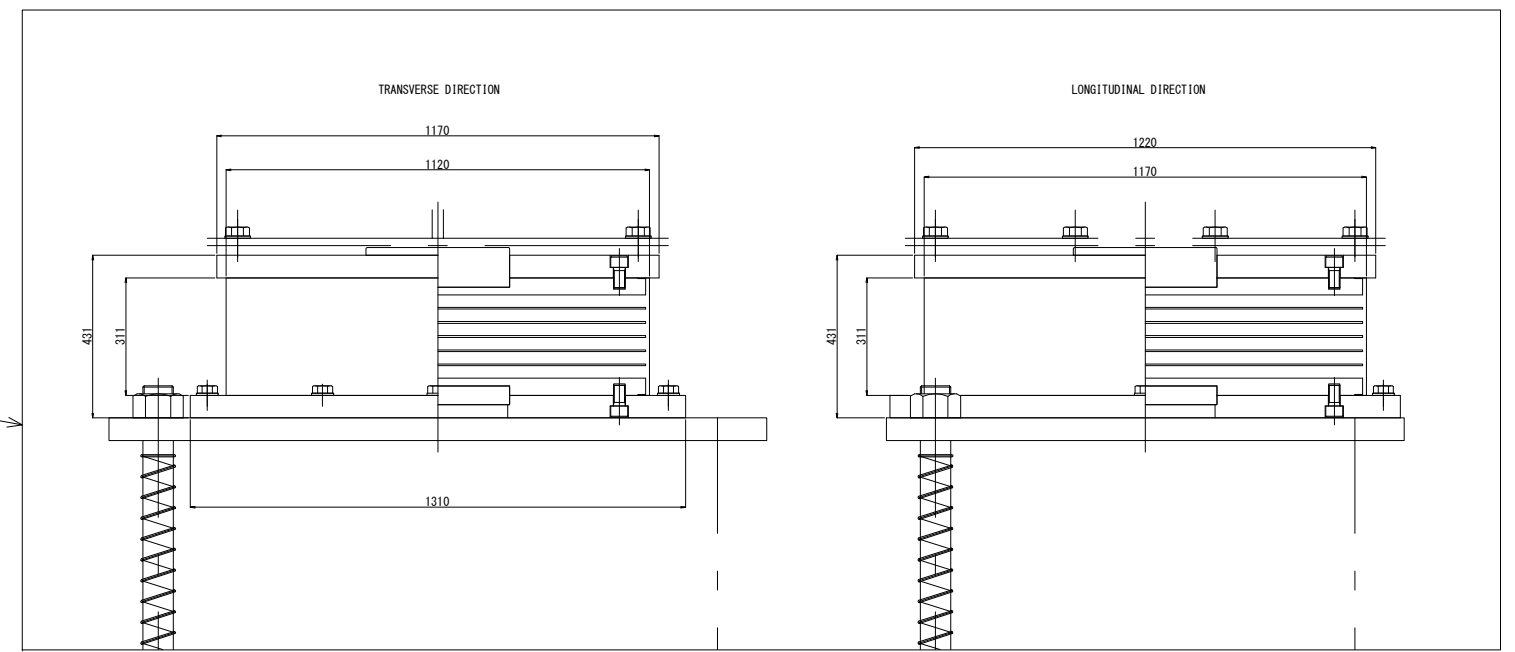
qd=3000 kN/m<sup>2</sup>    Constant  $\alpha=1$ , seismic case  $\alpha=2$     without ( ) : RC bored pile  
With ( ) : SPSP

# GUMTI BRIDGE: BRIDGE ACCESSORIES

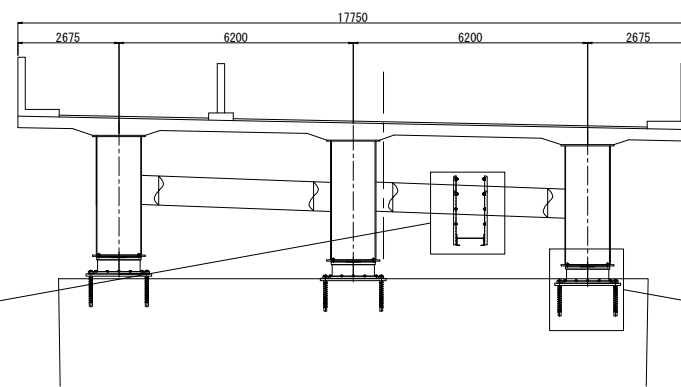
INSPECTION WAY S=1:10



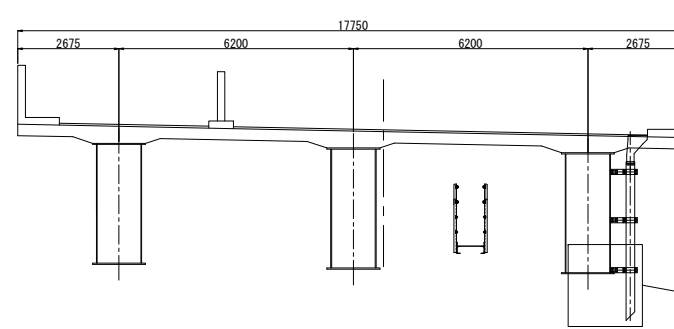
BEARING S=1:10



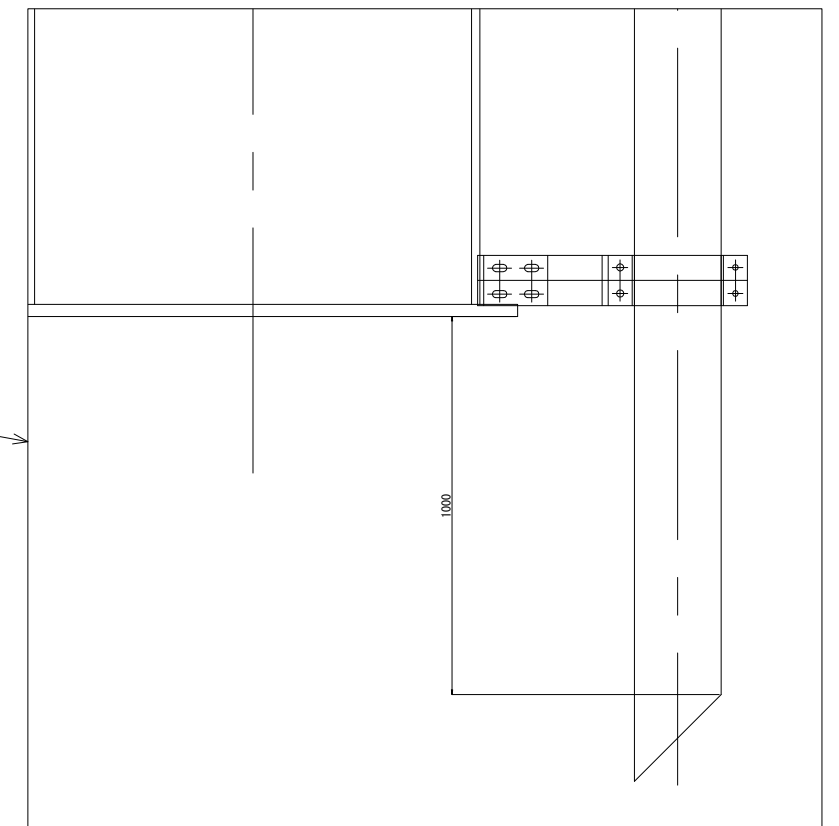
CROSS SECTION S=1:100 AT PIER



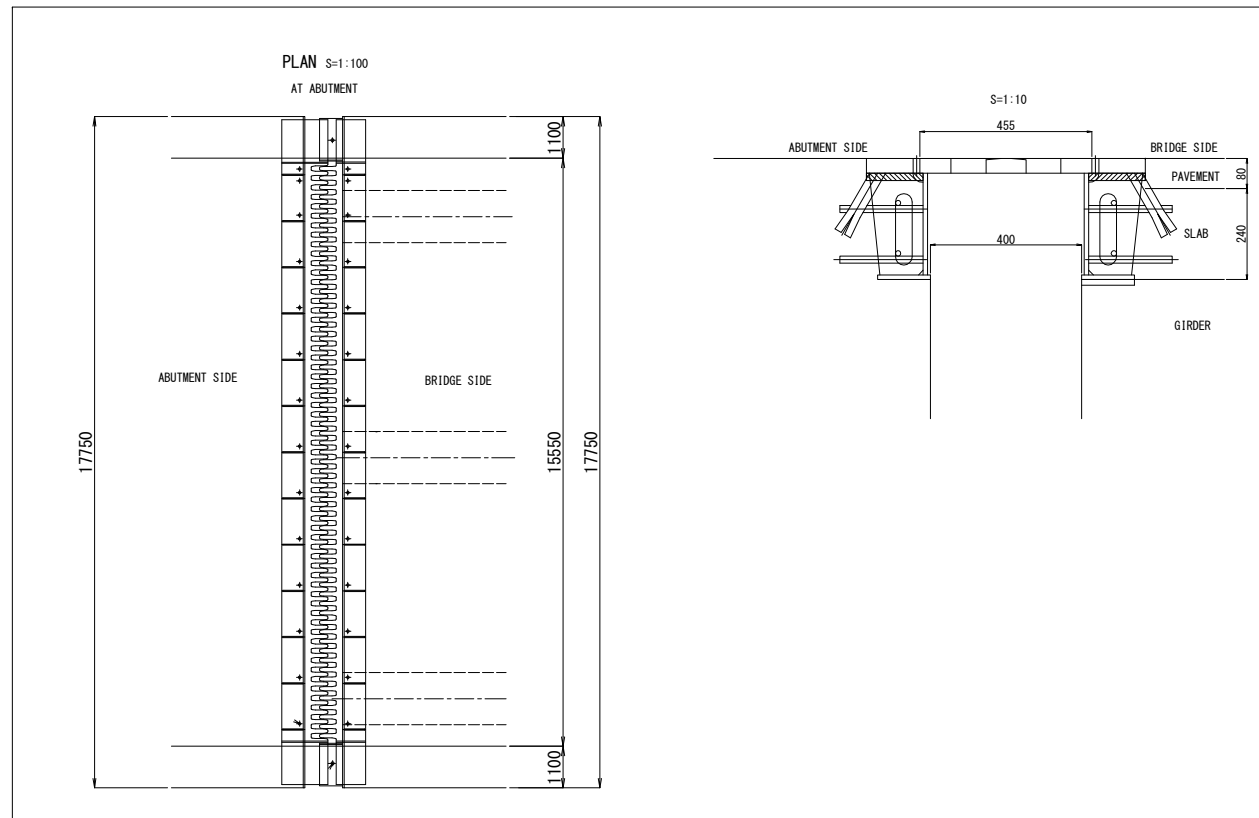
CROSS SECTION S=1:100 AT CENTER



DRAINAGE S=1:10



EXPANSION JOINT



Client:  
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:  
ORIENTAL CONSULTANTS Co. Ltd  
KATAHIRA & ENGINEERS INTERNATIONAL

GUMTI BRIDGE

BRIDGE ACCESSORIES

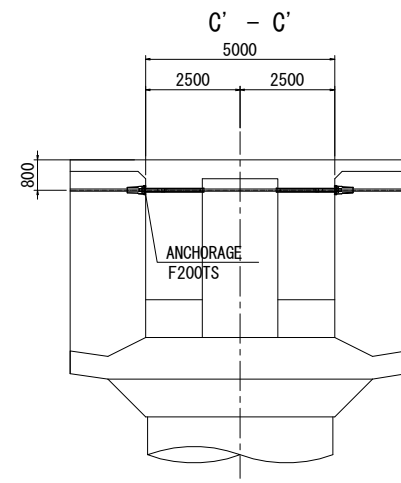
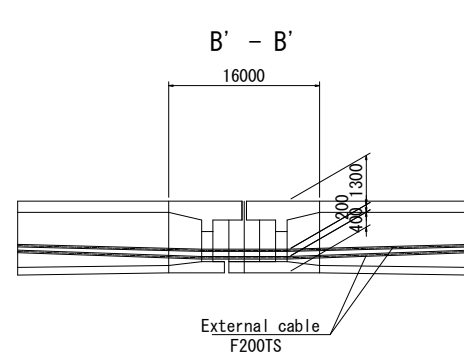
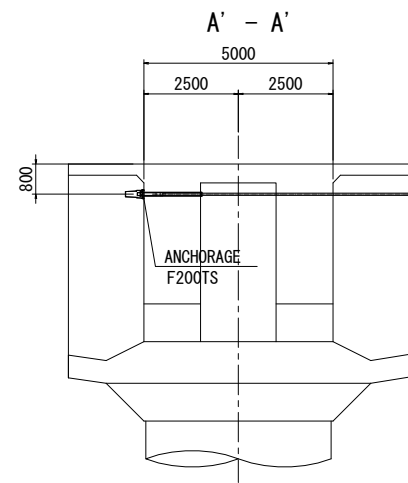
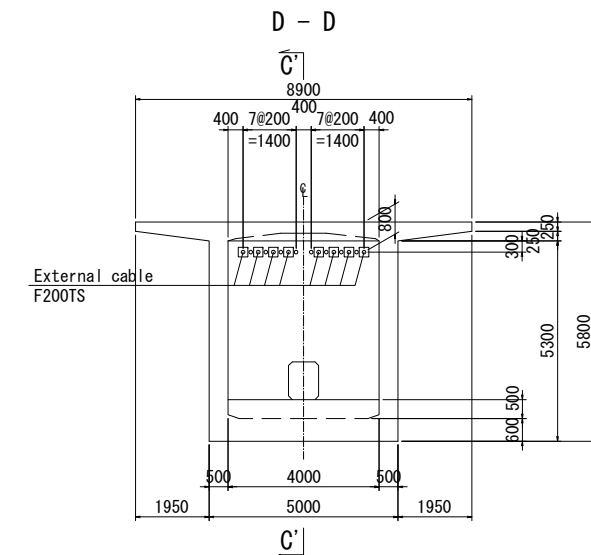
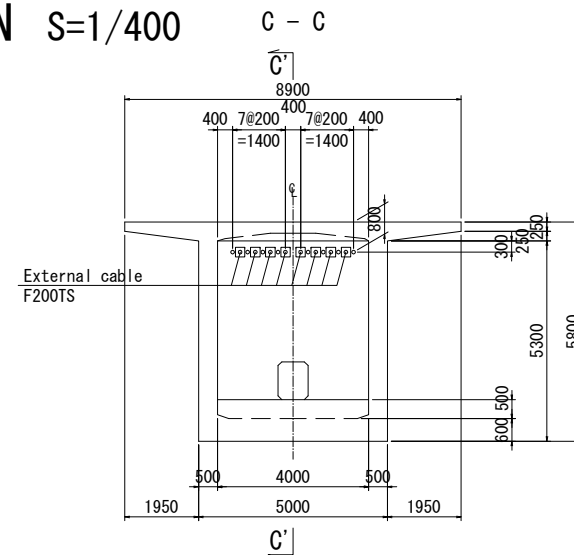
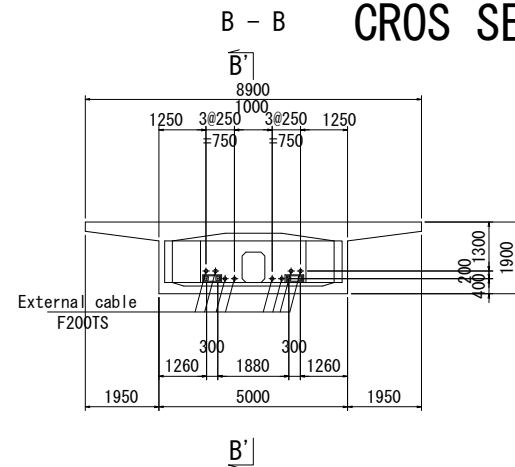
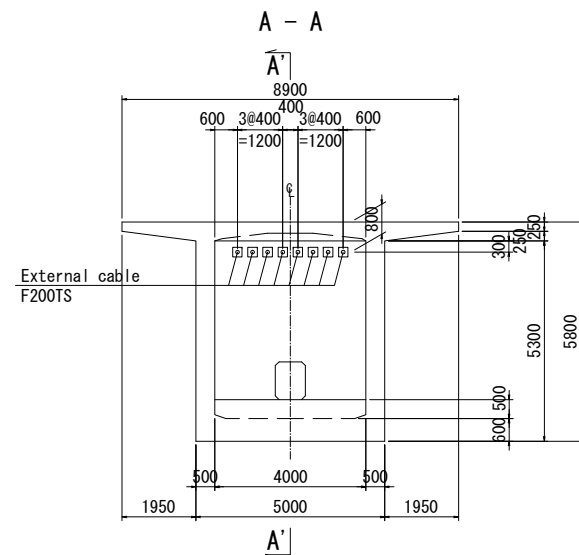
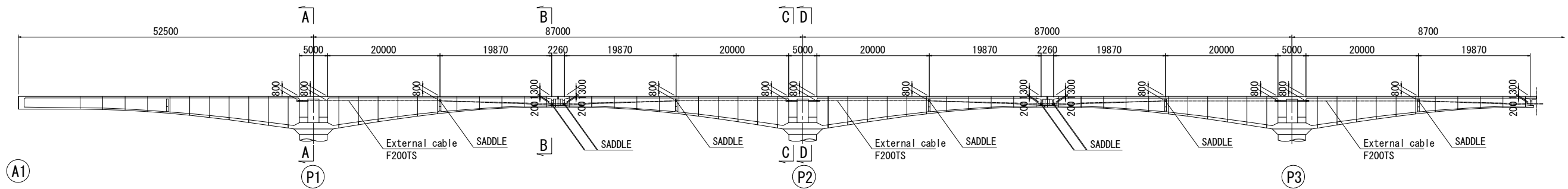
SCALE : AS NOTED  
DATE: 3/2013

SHEET NO:  
D-25

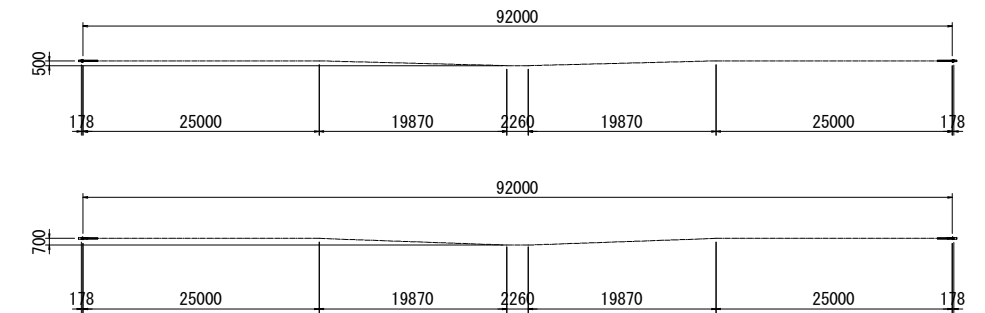


# GUMTI BRIDGE: EXTERNAL CABLES OF EXISTING BRIDGE

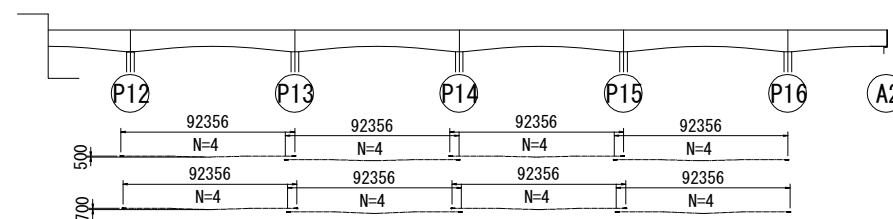
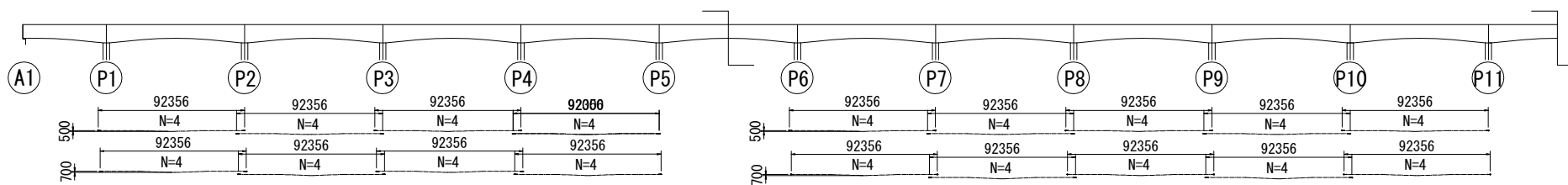
SIDE VIEW S=1/400



## CABLE ARRANGEMENT



## EXTERNAL CABLES LAYOUT PLAN



Client:  
ROADS & HIGHWAYS DEPARTMENT, MOC

Consultant:  
ORIENTAL CONSULTANTS Co. Ltd  
KATAHIRA & ENGINEERS INTERNATIONAL

GUMTI BRIDGE

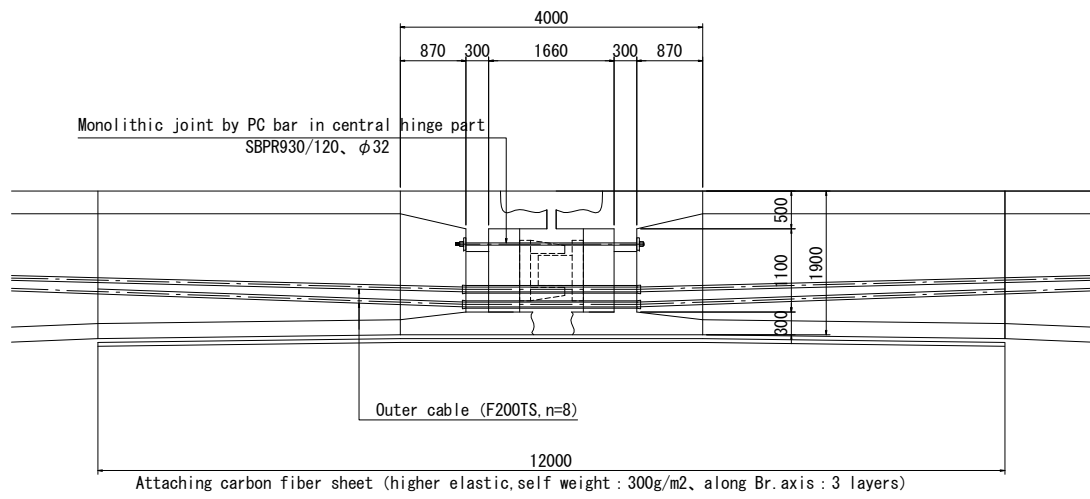
EXTERNAL CABLES OF EXISTING BRIDGE

SCALE : AS NOTED  
DATE : 3/2013

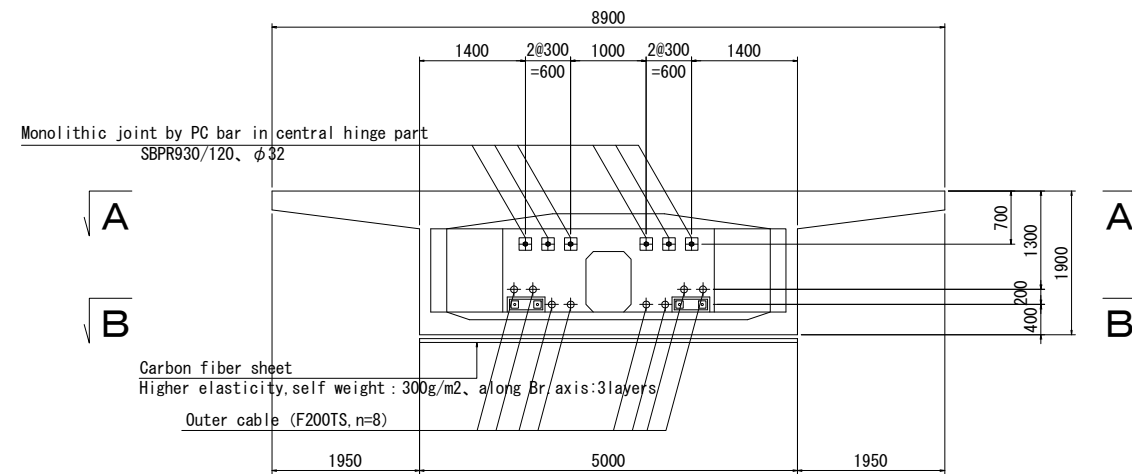
SHEET NO:  
D-26

# GUMTI BRIDGE: HINGE REPLACEMENT OF EXISTING BRIDGE S=1/50

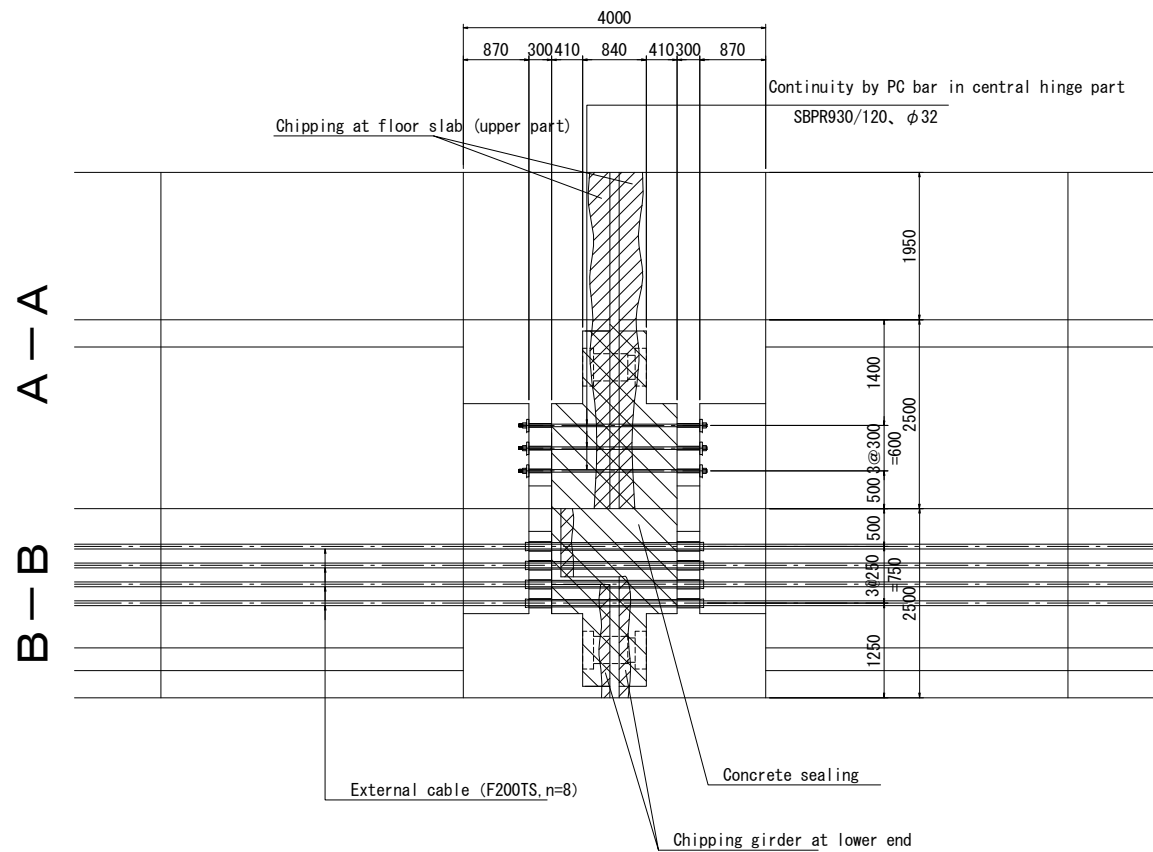
Side view



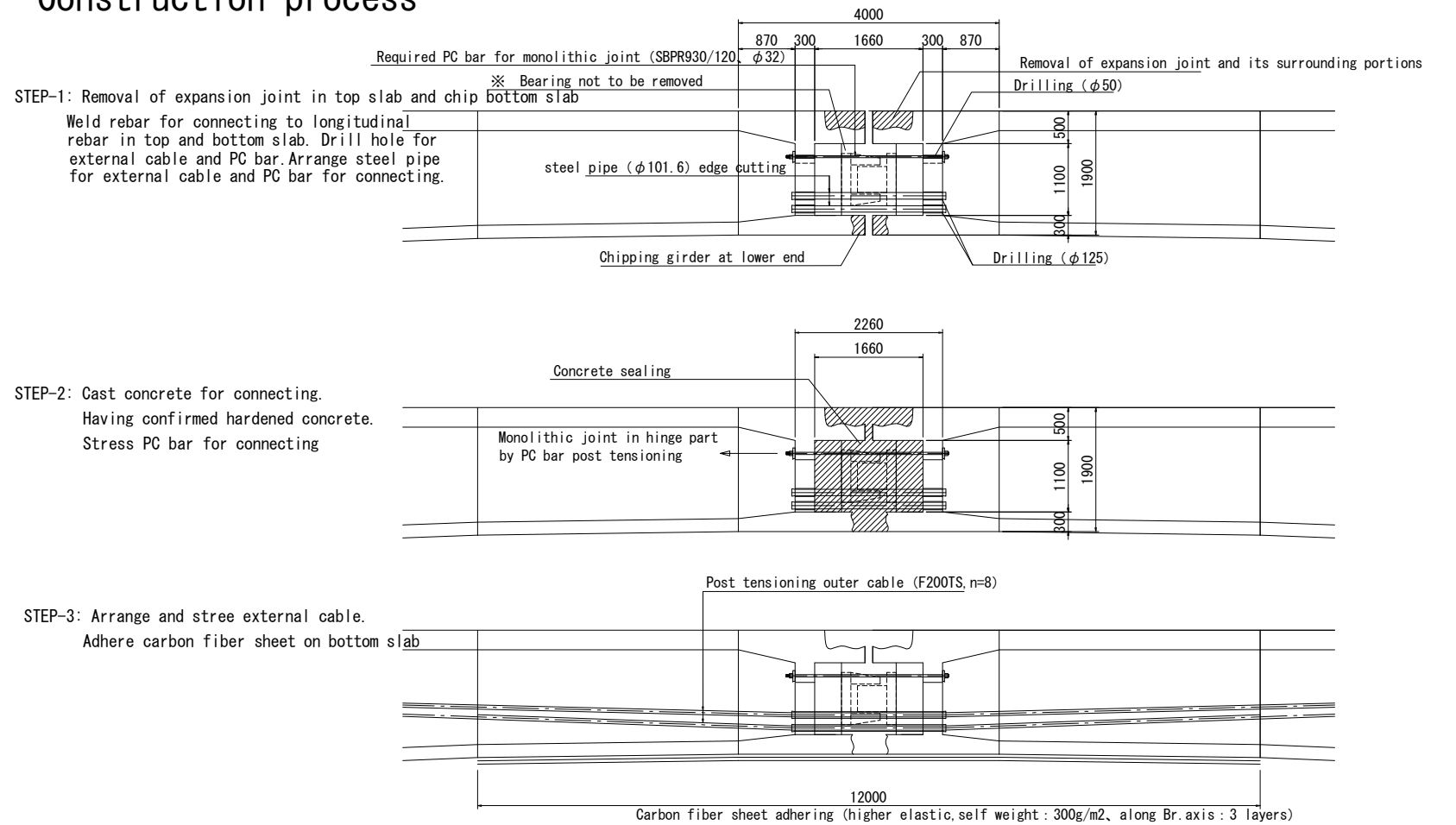
Cross section



Layout plan



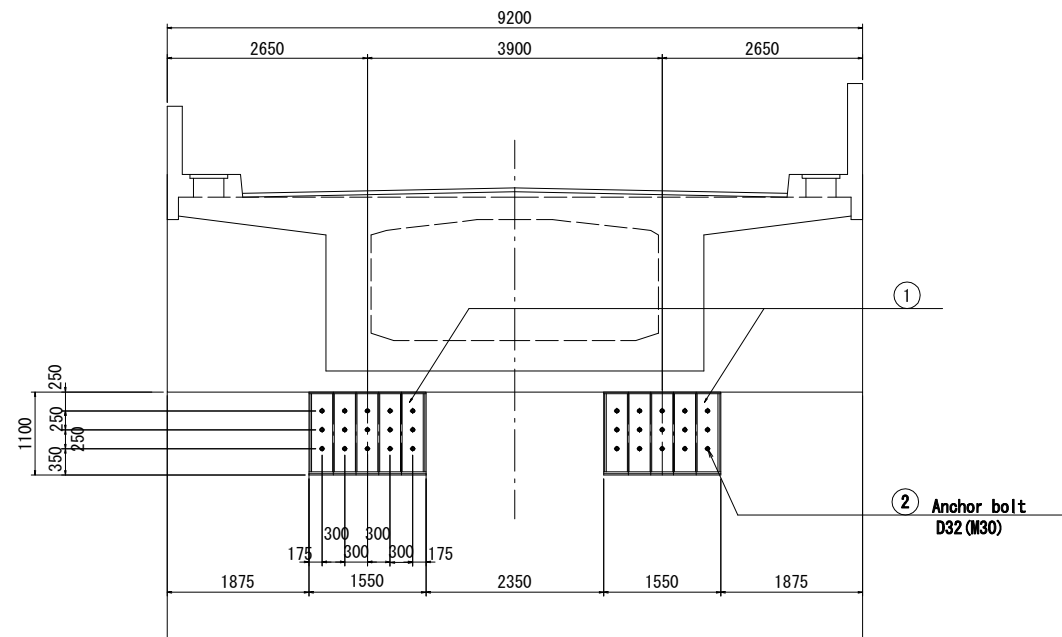
Construction process



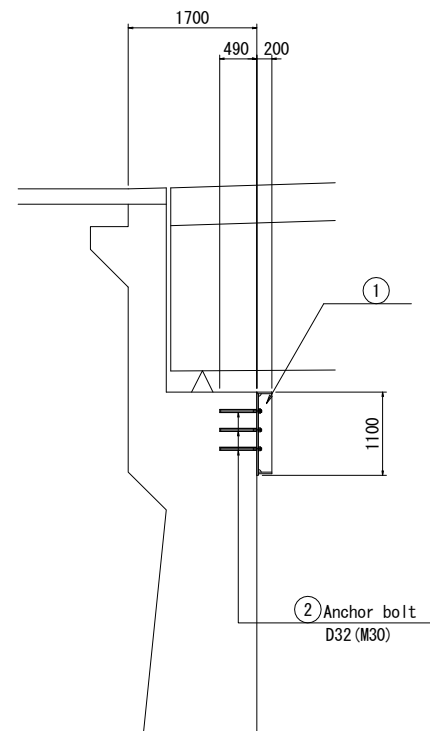
Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
HINGE REPLACEMENT OF EXISTING BRIDGE	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: D-27

# GUMTI BRIDGE: PREVENTION WORKS FOR BRIDGE FALL OF EXISTING BRIDGE

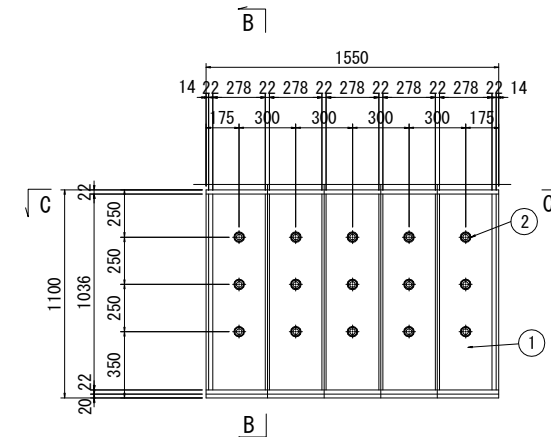
Front view S=1/50



Side view S=1/50

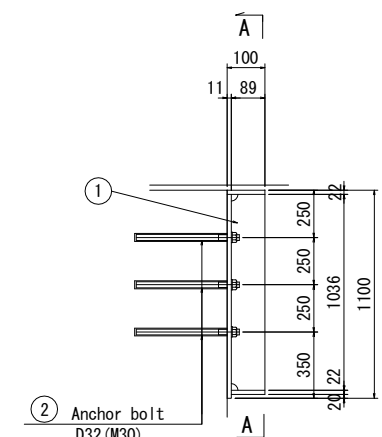


A - A

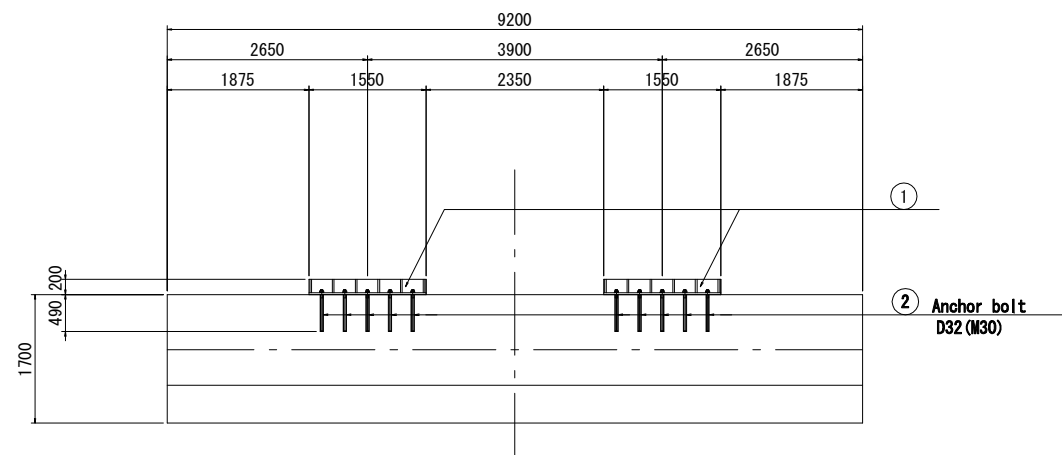


S=1/20

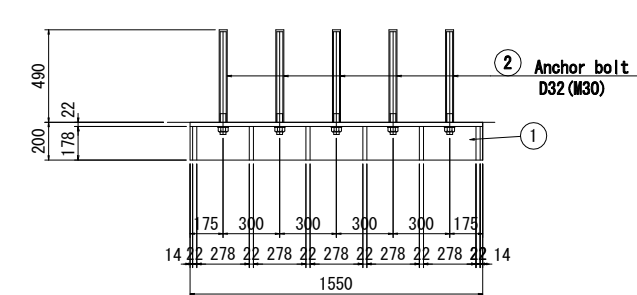
B - B



Layout plan S=1/50



C - C

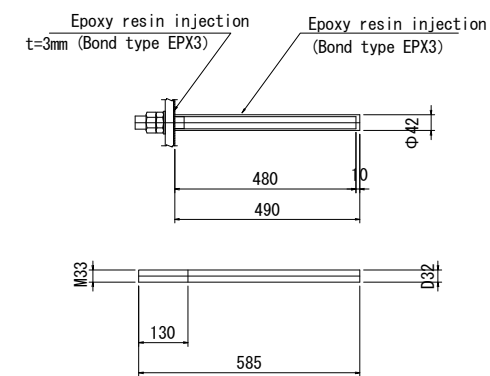


1

- 1- Base 1078 x 22 x 1550
- 1- Flg 200 x 22 x 1550
- 1- Flg 178 x 22 x 1550
- 6- Rib 178 x 22 x 1036

\* 1 set

2 Anchor bolt S=1/10



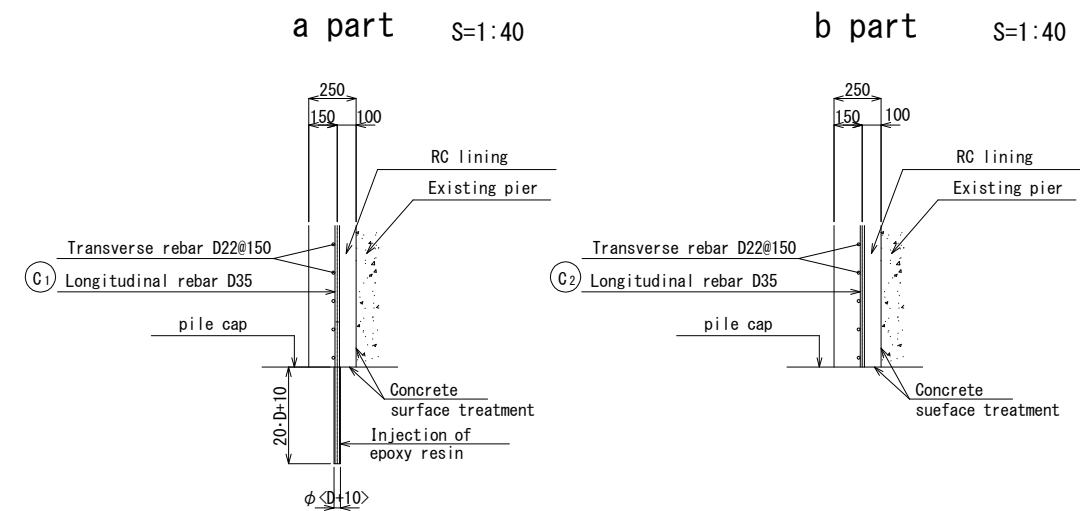
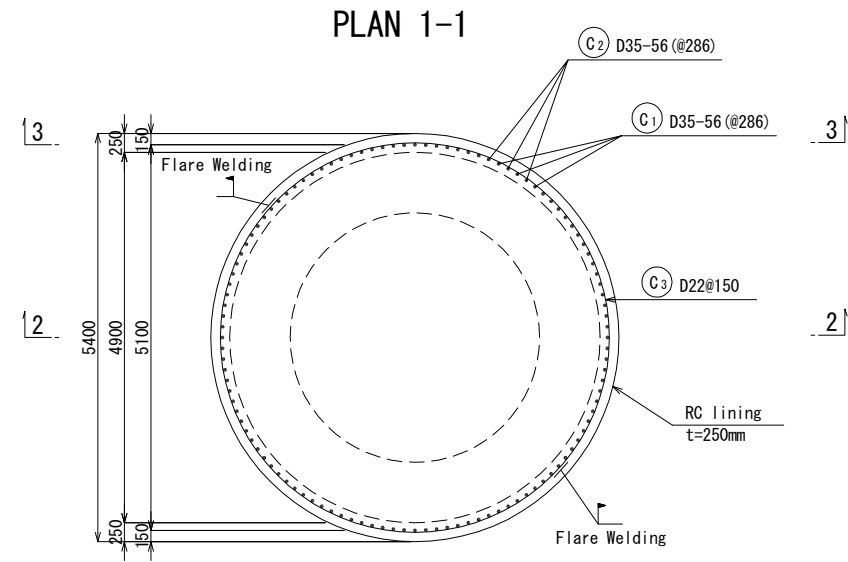
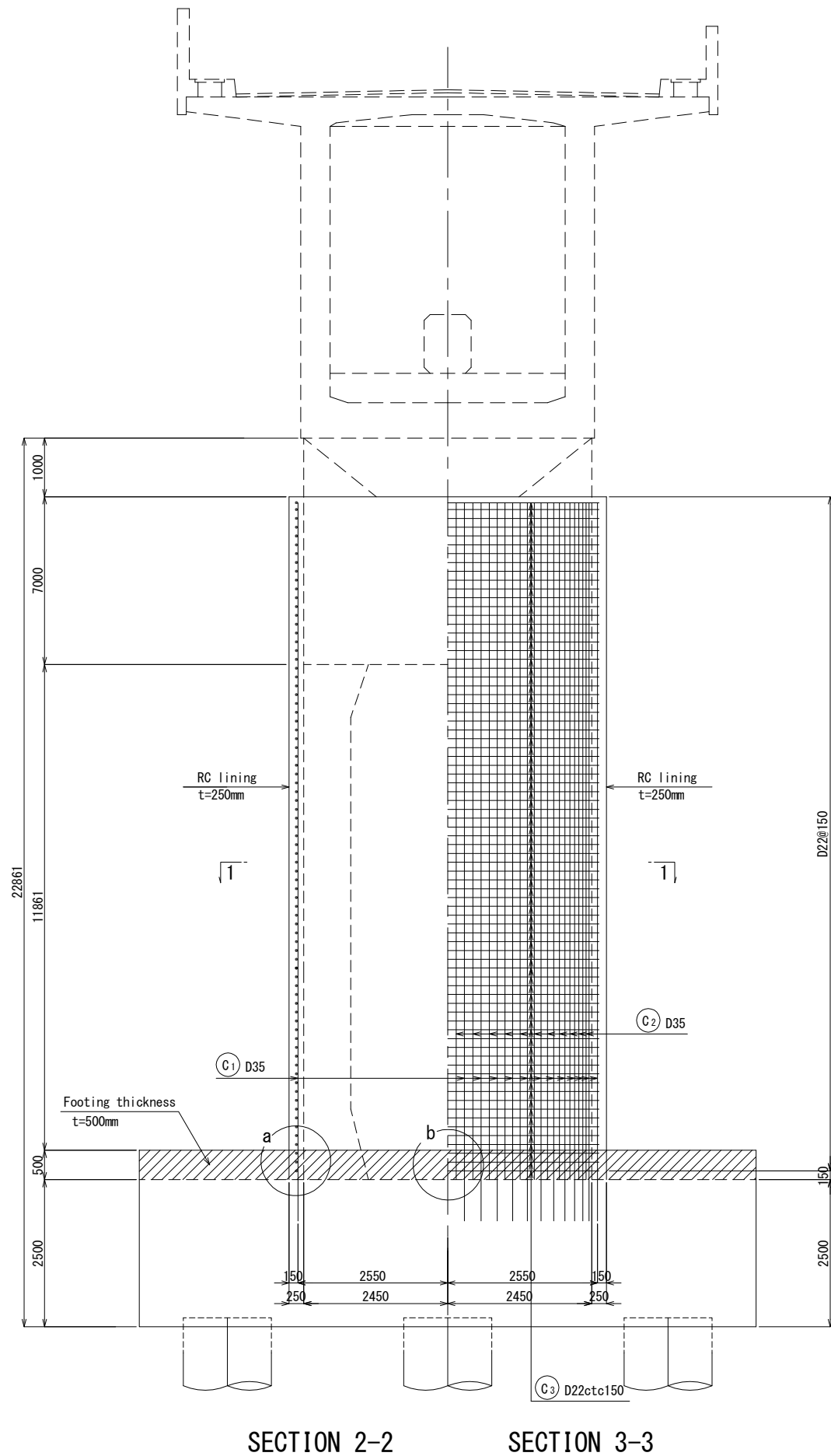
Layout plan



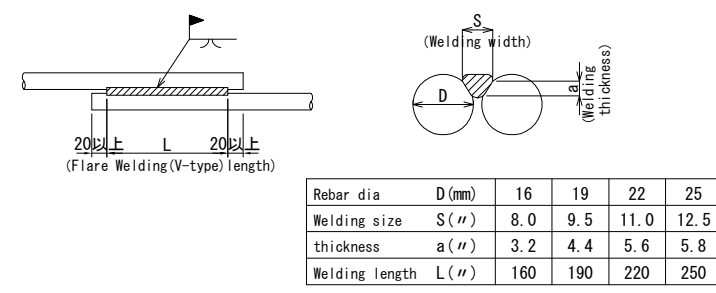
Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
PREVENTION WORKS FOR BRIDGE FALL OF EXISTING BRIDGE	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: D-28

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

(P6)



Flare Welding part S=1:10



Client: ROADS & HIGHWAYS DEPARTMENT, MOC	
Consultant: ORIENTAL CONSULTANTS Co. Ltd KATAHIRA & ENGINEERS INTERNATIONAL	
GUMTI BRIDGE	
REBAR ARRANGEMENT IN EXISTING PIER	
SCALE : AS NOTED DATE: 3/2013	SHEET NO: D-29