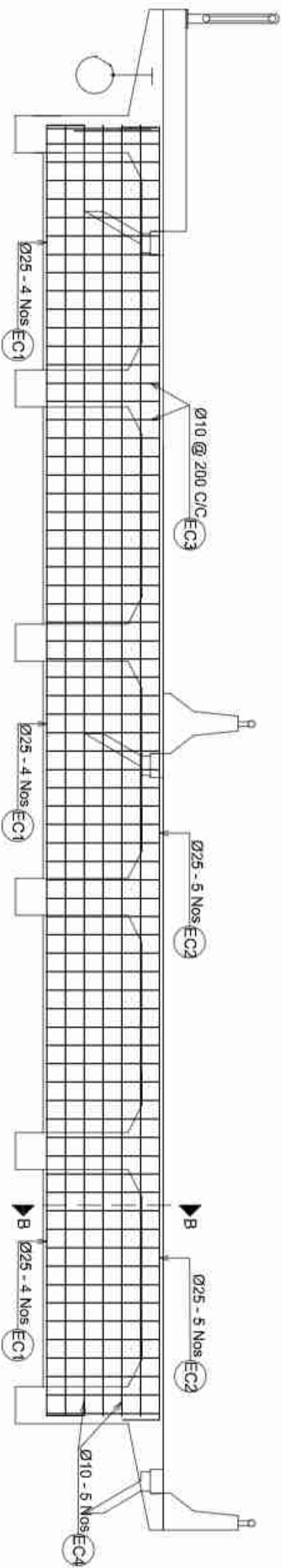
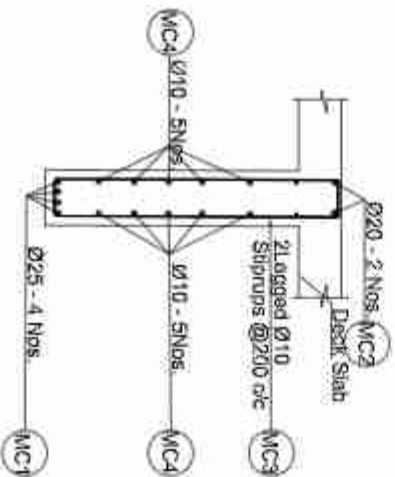


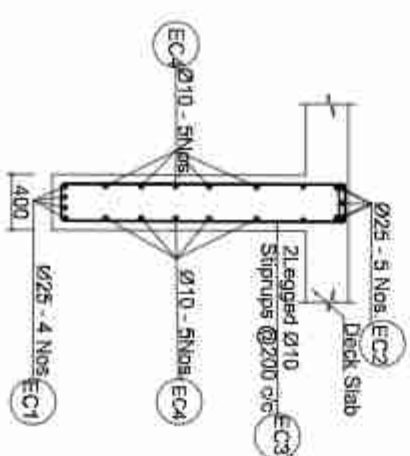
Intermediate Cross Girders
Scale:-1:50



End Cross Girders
Scale:-1:50

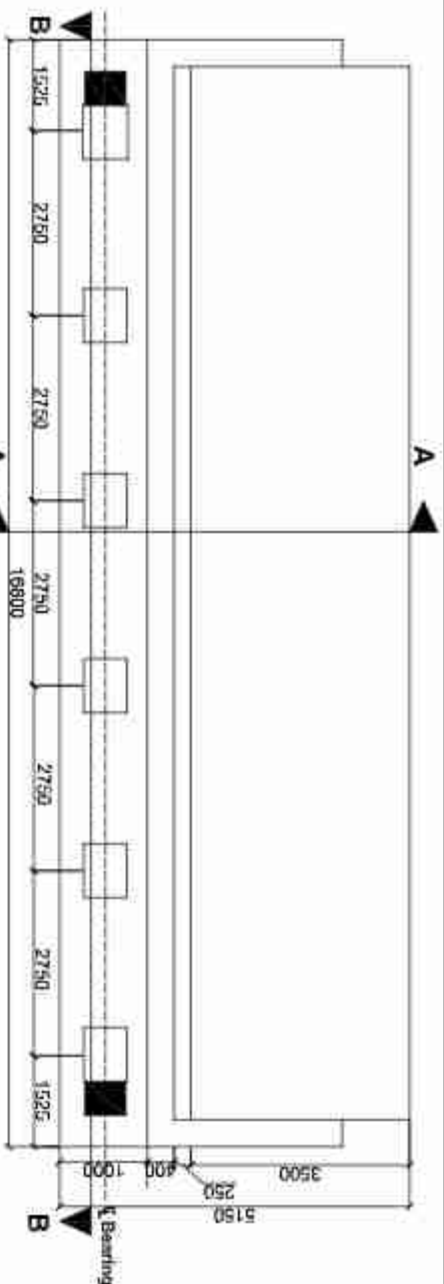


Section at A-A
Scale:-1:40



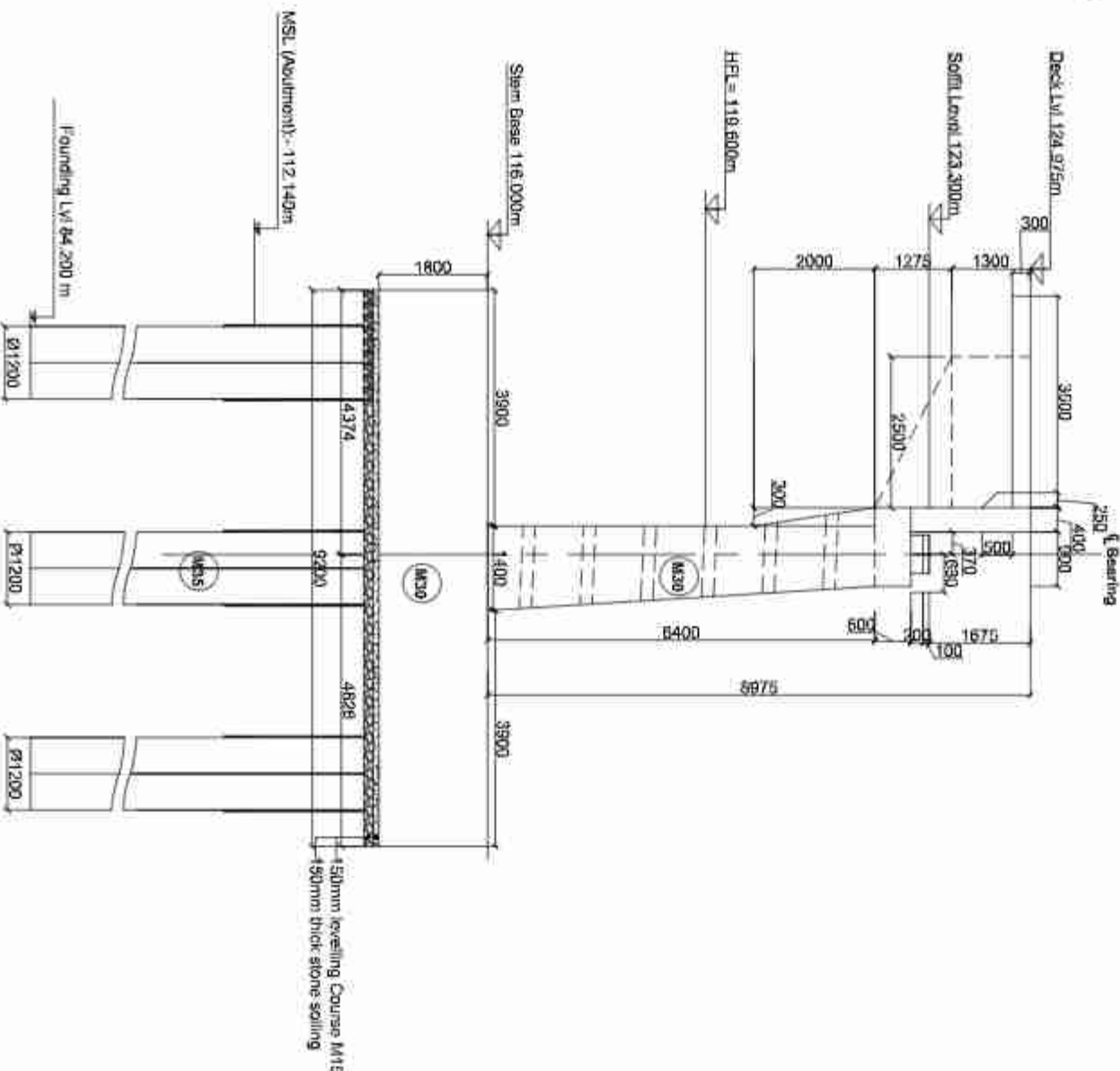
Section at B-B
Scale:-1:40

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	 CONSULTANT: Soosung Engineering Co. Ltd., Korea In association with ERMCP P (Ltd) and J99+ Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY:	DOR, DCID	SHEET TITLE: Reinforcement Details of Cross Girder of Meghwa bridge (46/H001/300_A)	SCALE: As Shown	Designed by:	Saroj Dhatharai		REV NO.	DESCRIPTION	DATE: November, 2022					
												ROAD NAME: East West Highway (H01)	Checked by:	P. Upadhyaya		SHEET NO.: 300, Meghwa



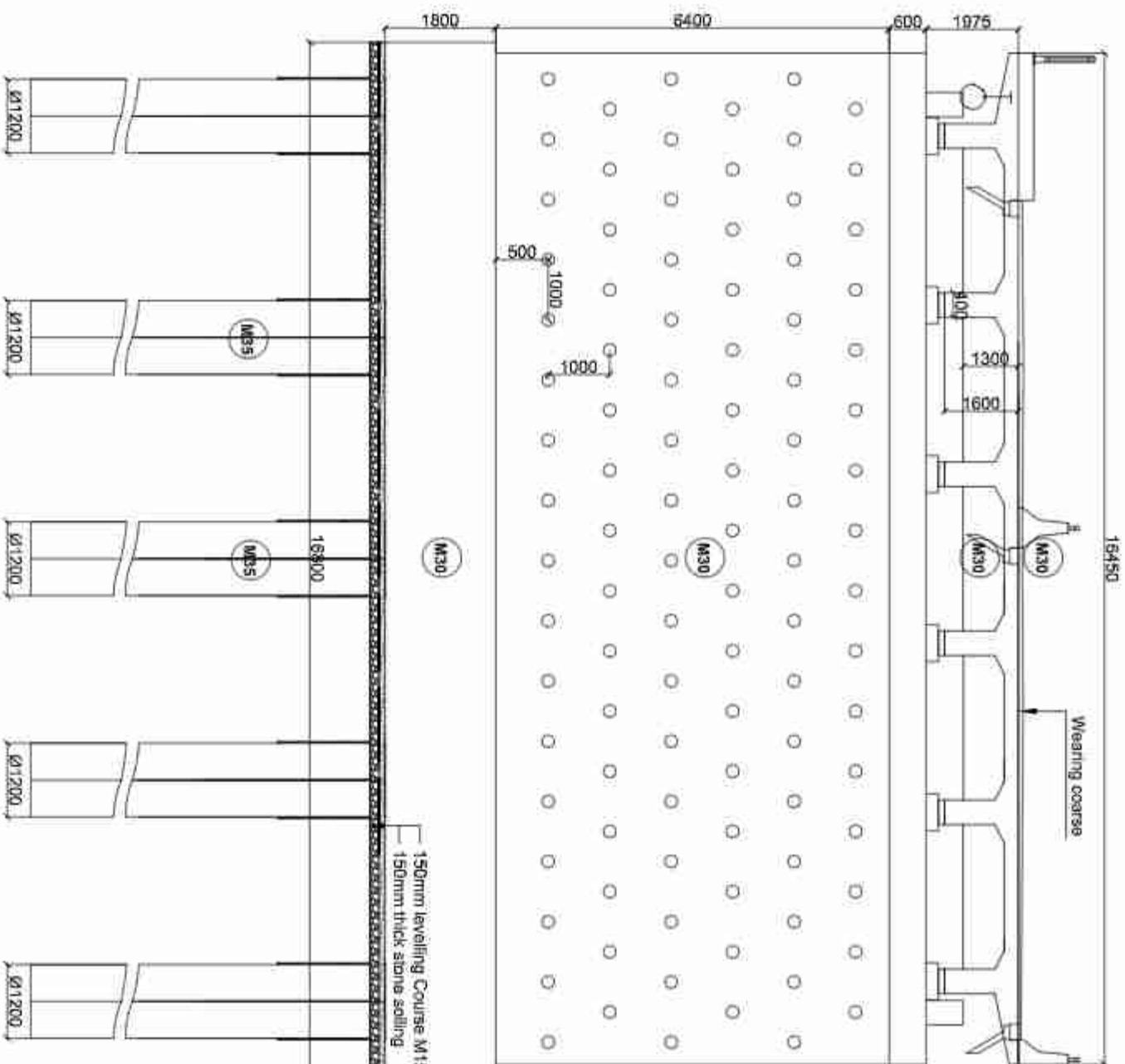
Plan Of Abutment

Scale: 1:100



Section of Abutment At (A-A)

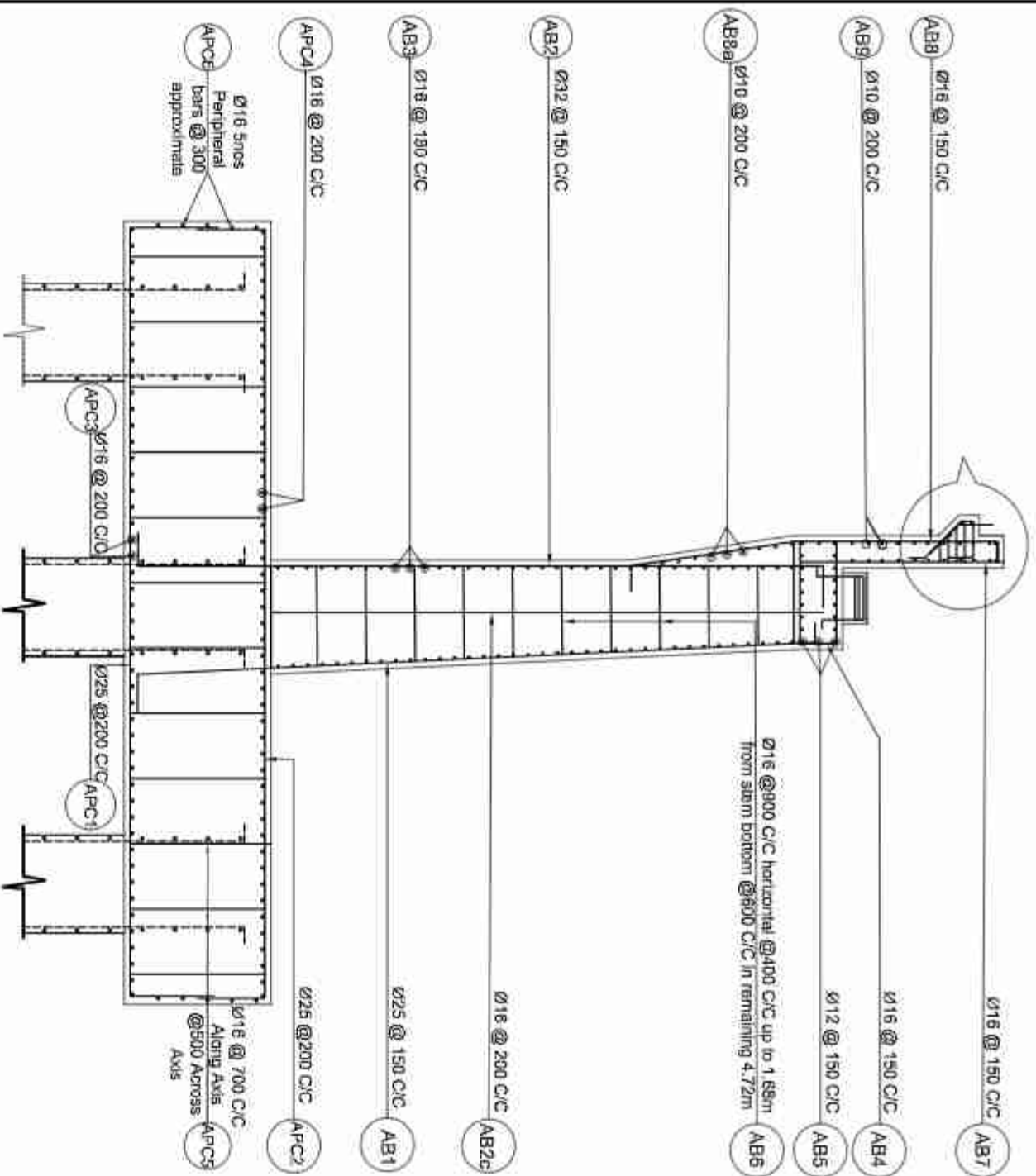
Scale: 1:10



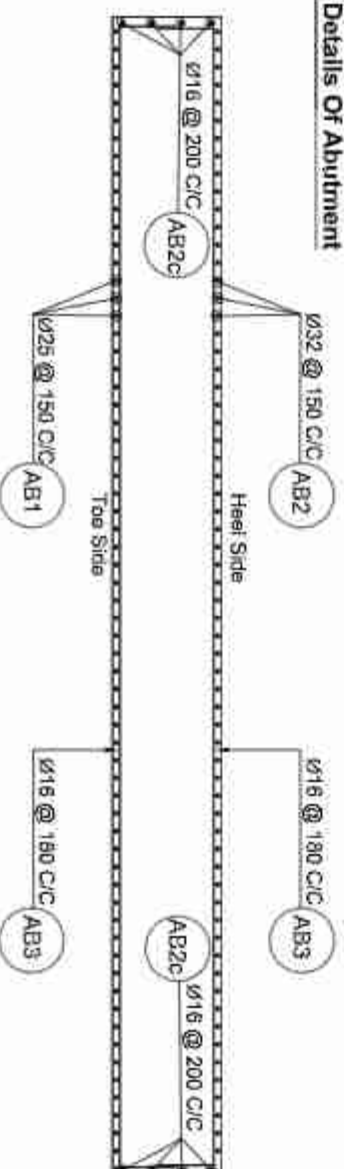
Section of Abutment At (B-B)

Scale: 1:10

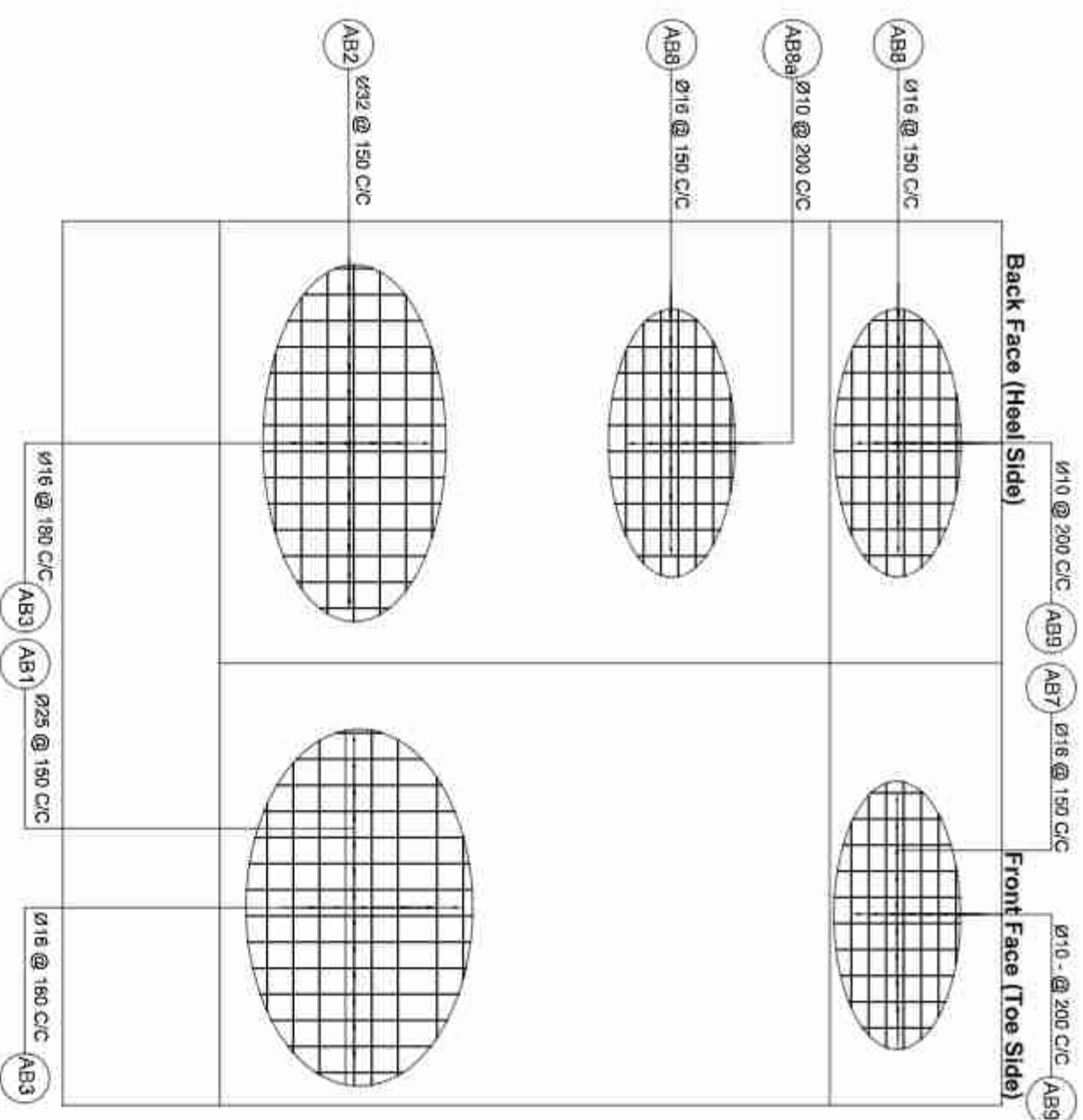
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd. Korea In association with ERM Co. P (Ltd) and J&T - Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
		DOR, DCID		Abutment of Plan of Maghwa bridge (46/H001/300_A)		As Shown		Designed by:		Saroj Bhattacharai						November, 2022	
		ROAD NAME:						Checked by:		P. Upadhyaya						DWG NO.: 300_Maghwa	
		East West Highway (H01)						Approved by:		Dr. T.H. Choi						SHEET NO.: 1223	
		Butwal - Goruingha Section															



Reinforcement Details Of Abutment
Scale:-1:75

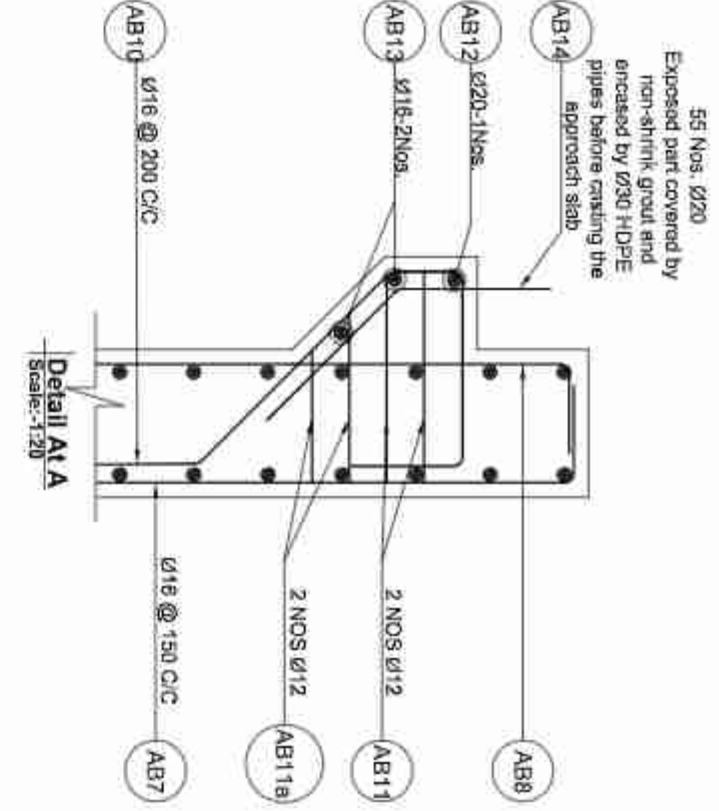
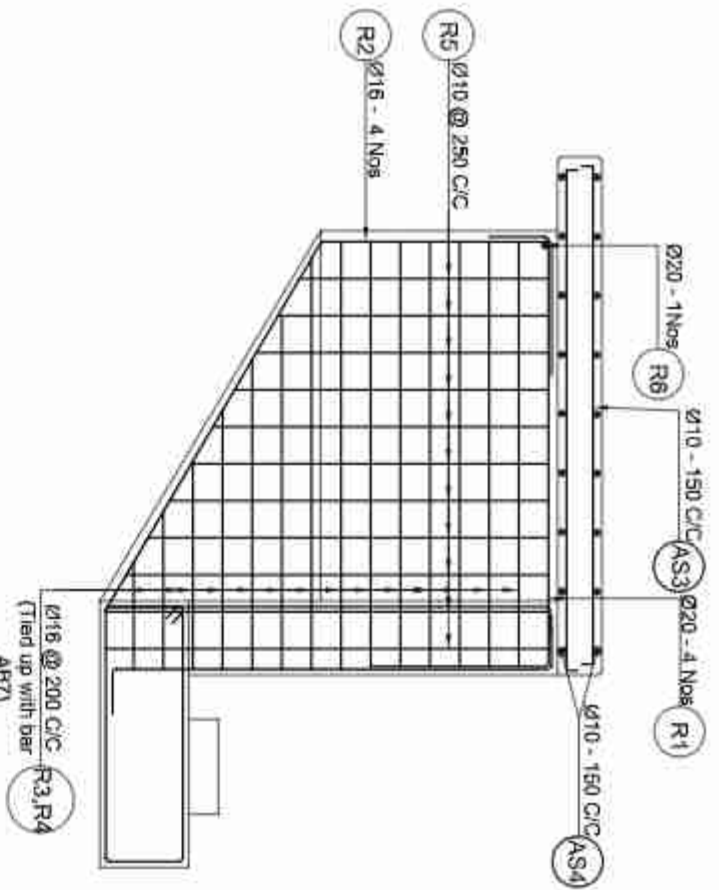


Section at A-A
Scale:-1:75



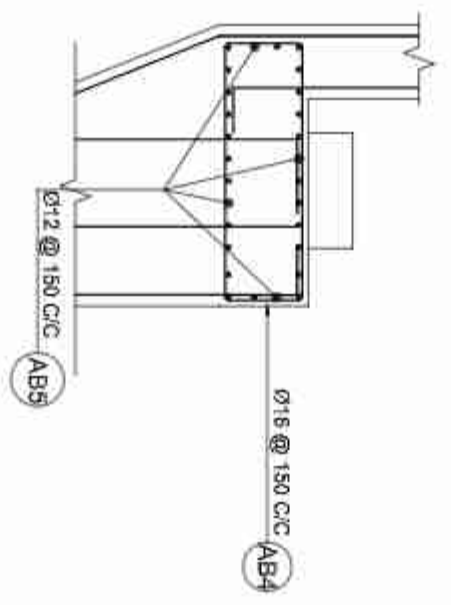
Reinforcement Details Of Abutment
Scale:-1:75

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd. Korea In association with ERMCo P (Ltd) and  J&P Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY: DOR, DCID	SHEET TITLE: Reinforcement Details of Abutment of Meghwa bridge (46/H-001/300_A)	SCALE: As Shown							DATE: November, 2022	
											DWG NO.: 300_MeghwaNB	
											SHEET NO.: 13/23	
			ROAD NAME: East West Highway (H01)									
			Butwal - Gorusinghe Section									



Reinforcement Details Of Wingwall

Scale:-1:50



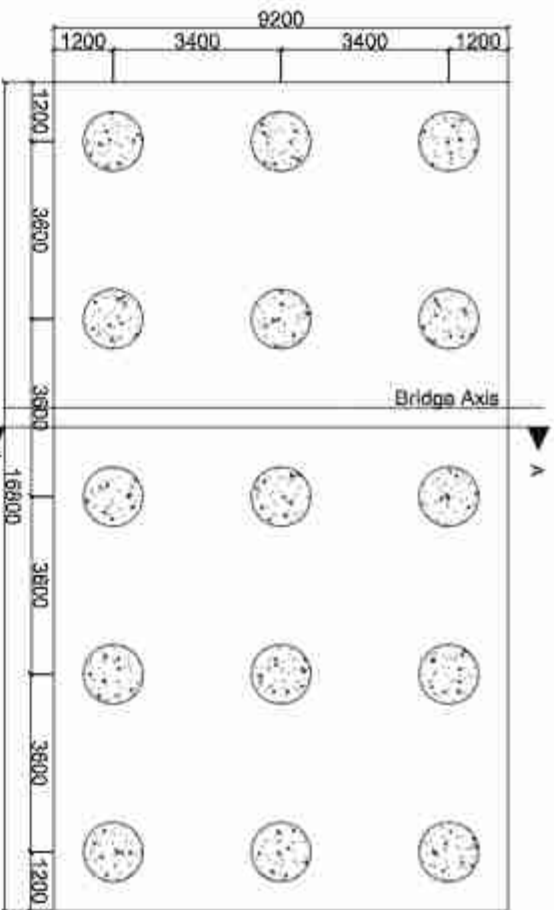
Reinforcement Details Of Abutment

Scale:-1:50

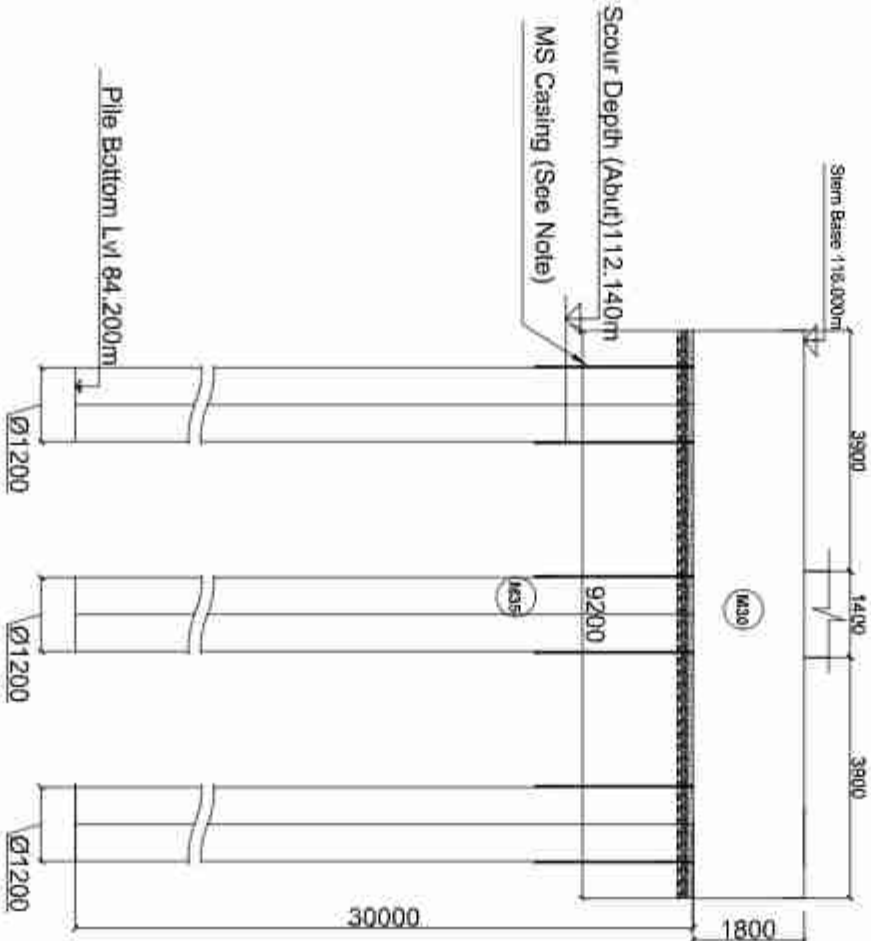
BAR BENDING SCHEDULE FOR WINGWALL						
BAR ID	SHAPE OF BAR (in mm (NOT TO SCALE))	SPACING (mm)	N OF BARS	NO. OF BARS	LENGTH (m)	WEIGHT, LENGTH TOTAL, WEIGHT (kg)
R1			20	8	4.407	2.405
R2			20	8	4.407	2.405
R3			200	16	8.158	1.578
R4			200	16	8.158	1.578
R5			200	16	8.158	1.578
R6			200	16	8.158	1.578
R7			200	16	8.158	1.578
R8			200	16	8.158	1.578
TOTAL IN 2 WINGWALL IN ONE ABUTMENT						435.439
TOTAL WEIGHT (IN METRIC TON)						0.435

BAR BENDING SCHEDULE OF ABUTMENT						
BAR ID	SHAPE OF BAR (in mm (NOT TO SCALE))	SPACING (mm)	N OF BARS	NO. OF BARS	LENGTH (m)	WEIGHT, LENGTH TOTAL, WEIGHT (kg)
AB1			150 mm c/c Approx	26	1.110	9.365
AB1a			150 mm c/c Approx	26	1.110	9.365
AB2			150 mm c/c Approx	32	1.110	9.365
AB2a			150 mm c/c Approx	32	1.110	9.365
AB3			150 mm c/c Approx	18	1.082	1.578
AB3a			150 mm c/c Approx	18	1.082	1.578
AB4			150 mm c/c Approx	18	1.082	1.578
AB4a			150 mm c/c Approx	18	1.082	1.578
AB5			150 mm c/c Approx	12	0.888	0.888
AB5a			150 mm c/c Approx	12	0.888	0.888
AB6			150 mm c/c Approx	12	0.888	0.888
AB6a			150 mm c/c Approx	12	0.888	0.888
AB7			150 mm c/c Approx	12	0.888	0.888
AB7a			150 mm c/c Approx	12	0.888	0.888
AB8			150 mm c/c Approx	12	0.888	0.888
AB8a			150 mm c/c Approx	12	0.888	0.888
AB9			150 mm c/c Approx	12	0.888	0.888
AB9a			150 mm c/c Approx	12	0.888	0.888
AB10			150 mm c/c Approx	12	0.888	0.888
AB10a			150 mm c/c Approx	12	0.888	0.888
AB11			150 mm c/c Approx	12	0.888	0.888
AB11a			150 mm c/c Approx	12	0.888	0.888
AB12			150 mm c/c Approx	12	0.888	0.888
AB12a			150 mm c/c Approx	12	0.888	0.888
AB13			150 mm c/c Approx	12	0.888	0.888
AB13a			150 mm c/c Approx	12	0.888	0.888
AB14			150 mm c/c Approx	12	0.888	0.888
AB14a			150 mm c/c Approx	12	0.888	0.888
TOTAL WEIGHT ABUTMENT KG						18725.089
TOTAL WEIGHT (IN METRIC TON)						18.729

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM Co. P (Ltd) and J&T - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section		SHEET TITLE: B. B. Schedule of Abutment & Wing Wall of Maghwa bridge (46/H001/300_A)		SCALE: As Shown		NAME Saroj Bhattacharya P. Upadhyaya Dr. T.H. Choi		SIGNATURE 		REV NO. 1 2 3		DESCRIPTION 1 2 3		DATE: November, 2022		DWG. NO.: 300_Maghwa		SHEET NO.: 14/23	
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Plan Of Abutment Piles
Scale:-1:150



Piles Section At A-A
Scale:-1:120

BAR BENDING SCHEDULE OF ABUTMENT PILECAP

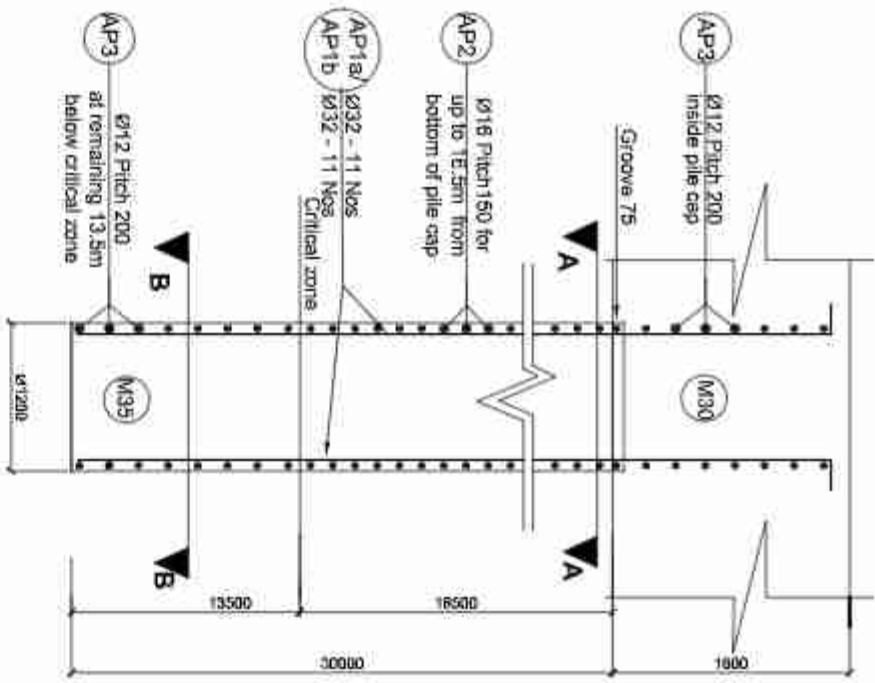
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
APC1	1080 9025	200	25	85	11.185	3.853	3853.494
APC2	1080 9025	200	25	85	11.185	3.853	3853.494
APC3	1080 10834	200	18	47	16.794	1.578	1394.176
APC4	1080 16634	200	16	47	18.794	1.578	1394.176
APC5	1570 1570 Curve length 251 Curve radius 40 Hook length 80	200	16	600	2.232	1.578	1761.427
APC6	1080 9050	200 approx	18	5	51.400	1.576	405.633
TOTAL IN PILE CAP OF ONE ABUTMENT							12282.401
TOTAL WEIGHT IN METRIC TON							12.282

BAR BENDING SCHEDULE FOR ABUTMENT PILES

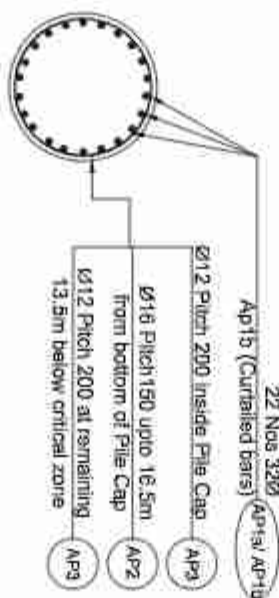
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
AP1a	208 31582 Full Length Bars	0	32	11	31.800	6.313	2208.413
AP1b	18200 Curtailed Bars	0	32	11	18.400	6.313	1277.824
AP2	150 150 Dia-1034 Pitch-150 15.5m From Bottom of pile cap	150	16	1	361.070	1.576	569.891
AP3	200 200 Dia-1034 Pitch-200 Inside pilecap 200 below critical zone	200	12	1	251.450	0.888	223.241
TOTAL IN ONE PILE							4279.370
TOTAL (IN METRIC TON)							4.279
TOTAL IN FIFTEEN PILES OF ONE ABUTMENT (IN METRIC TON)							64.191

Note: On MS permanent casing on piles. In case piling works are done without temporary casing, the piles shall be lined with form thick MS steel permanent casing up to 1.5 m or 0.5m below MSL whichever is larger (Subjected to instruction and approval by the Engineer)

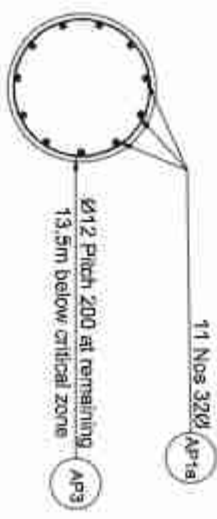
For Construction Methodology and Sequence Please See General Notes.



Reinforcement Details Of Pile
Scale:-1:50



Section At A-A
Scale:-1:50



Section At B-B
Scale:-1:50

Location	Design Pile Length m	Design Working Load on pile (non-seismic case)/kn	Allowable Bearing Capacity on pile (Seismic case)/kn	Allowable Bearing Capacity of the Pile (Non Seismic case)/kn
Abutment Pile	30.00	2012 00.00	2492 00.00	2638 00.00

Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

Project Directorate Office (ADB)

SASEC Highway Improvement Project-
Project Preparatory Consultant (SHIP-PPC)

ADB Loan No: 3722-NEP

CONSULTANT:

Soosung Engineering Co. Ltd.

Korea

In association with
ERMPC (P) (Ltd)

and
JSP- Tech Studio of Engineering
Nepal

IMPLEMENTING AGENCY:

DOR, DCID

ROAD NAME:

East West Highway (H01)

Butwal - Gauringhne Section

SHEET TITLE:

Reinforcement details of
Abutment Pile of
Meghwa bridge
(46/H001/300_A)

SCALE:

As Shown

Designed by:

Saroj Dhital

Checked by:

P. Upadhyaya

NAME

SIGNATURE

REV NO.

DESCRIPTION

DATE:

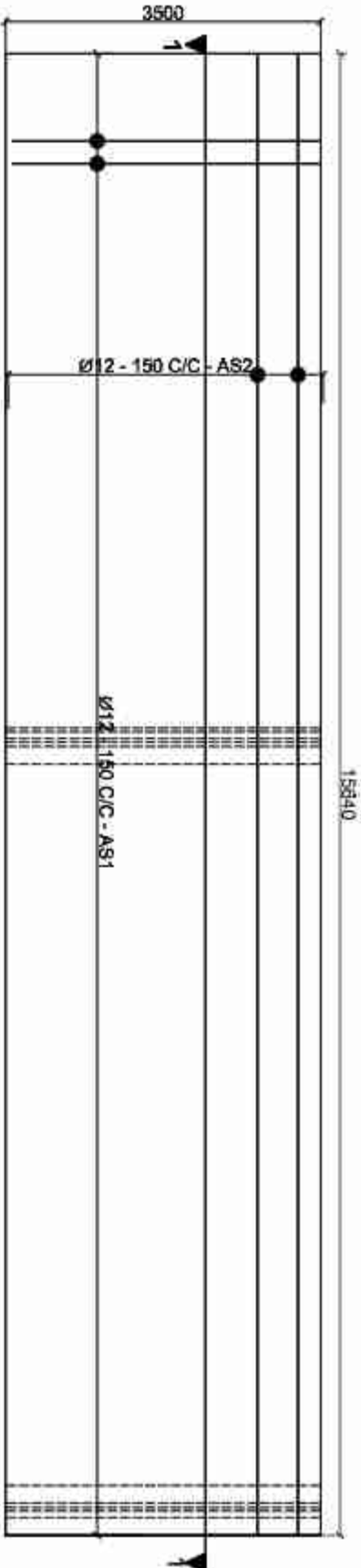
November, 2022

DWG. NO.:

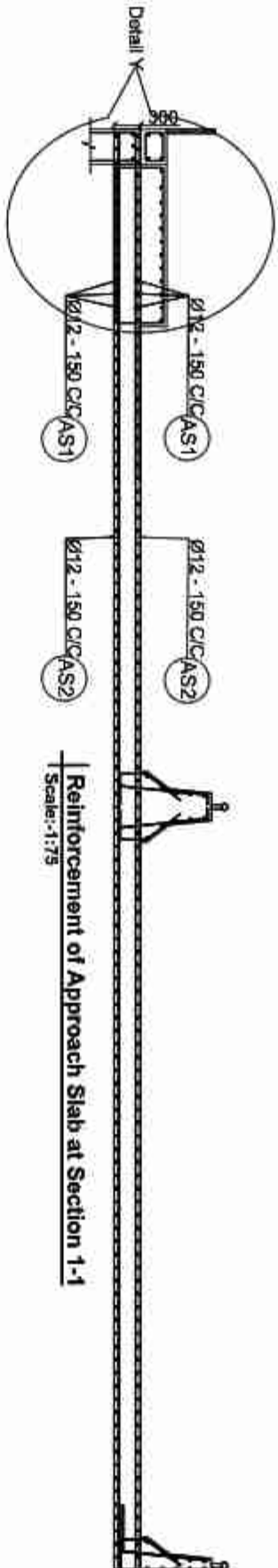
300_Meghwa

SHEET NO.:

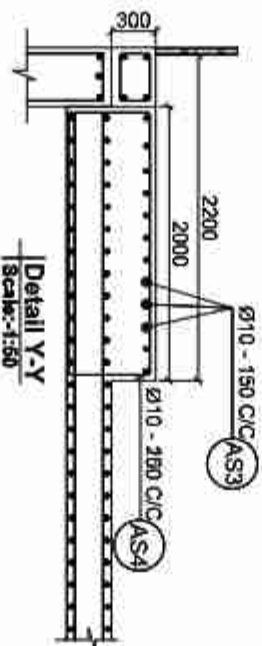
1523



Plan of Reinforcement Details of Approach Slab
Scale:-1:75

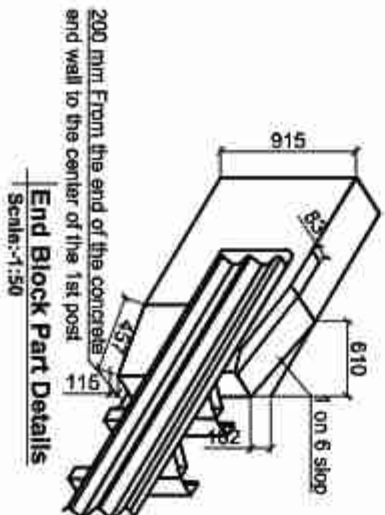


Reinforcement of Approach Slab at Section 1-1
Scale:-1:75

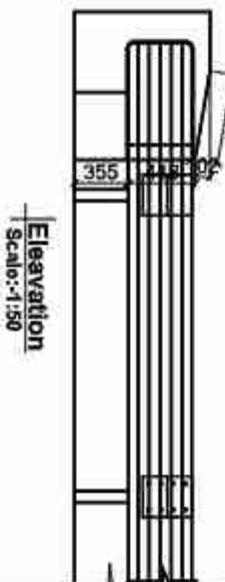


Detail Y-Y
Scale:-1:50

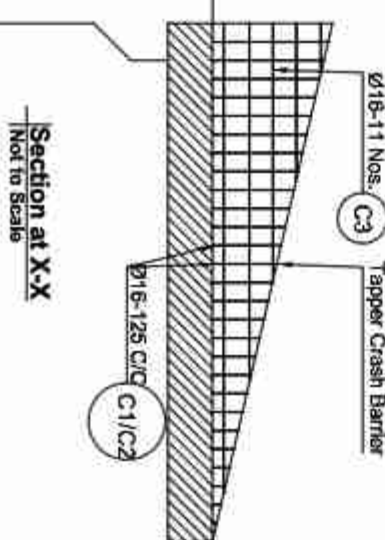
BAR BENDING SCHEDULE OF APPROACH SLAB						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	# OF BARS	NO. OF BARS	LENGTH (m)	WEIGHT (kg)
AS1	3400	12	210	3.400	0.288	633.901
AS2	15550	12	48	15.220	0.888	662.968
AS3	3400	10	15	3.400	0.617	91.443
AS4	15220	10	18	5.000	0.617	95.489
TOTAL IN ONE APPROACH SLAB						1383.498
TOTAL WEIGHT IN METRIC TON						1.383



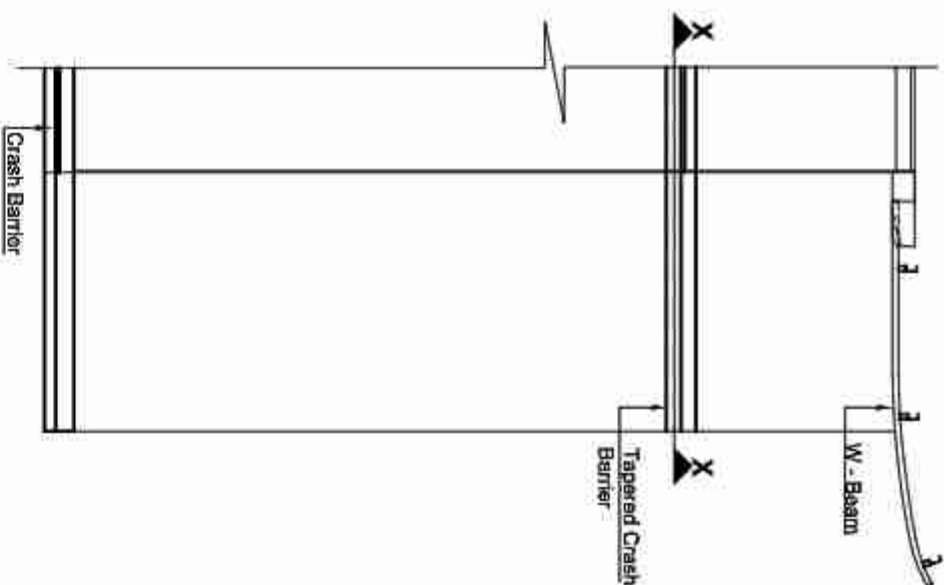
End Block Part Details
Scale:-1:50



Elevation
Scale:-1:50



Section at X-X
Not to Scale



Plan of Approach Slab
Not to Scale

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERMPC P (Ltd) and JSP- Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section		SHEET TITLE: Approach Slab of Maghwa bridge (46/H001/300_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
										Designed by:		Saroj Bhattarai						November, 2022	
										Checked by:		P. Upadhyaya						DWG. NO.:	
										Approved by:		Dr. T.H.Choi						300_Maghwa	
																		SHEET NO.:	
																		1823	

TOTAL FOR 1.0M IN NTTOTAL FOR 1.0M IN MT

be adjusted according to the slope.

End Block Part Details
Scale: 1:50

Utility ranger Detail
Scale: 1:50

Elevation
Scale:-1:50

1

Government of Nepal
Physical Infrastructure and Transport**CONSULTANT:**

DOR, DCID

DOR, DCID

LOAD NAME: _____

East West Highway (

Bittwal - Gorusinghe S

Designed by:

Saroj Bhattacharya

100

NOVEMBER

Mar. 2022

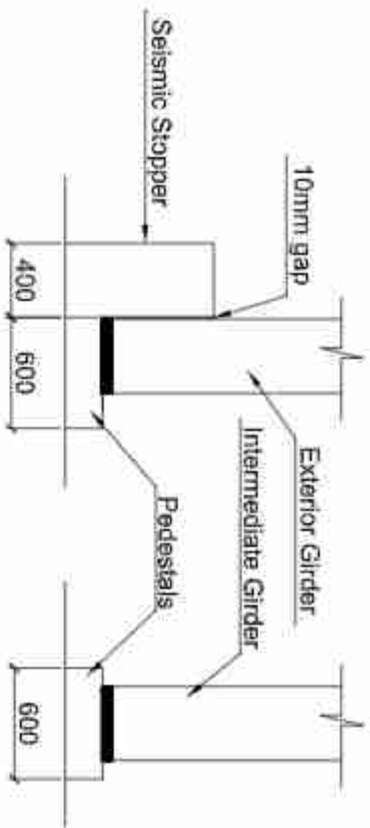
As Shown

NOVEMBER, 2022

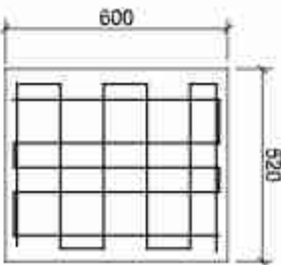
DWG. NO.:
3700 Mech.dwg

300. Meghana

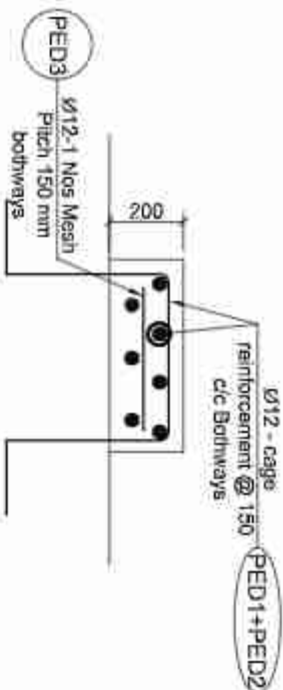
SHEET NO.: 17/23



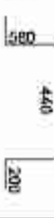
Abutment Cap With Stopper
Scale:- 1:50



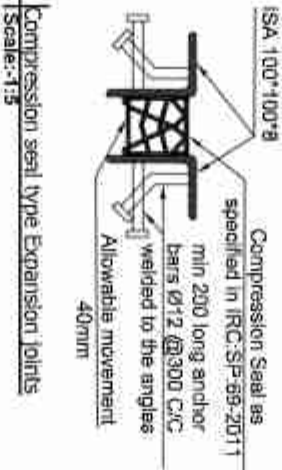
Pedestal Plan
Scale:- 1:20



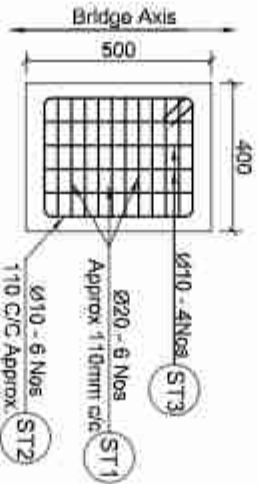
Pedestal Section
Scale:- 1:20

BAR BENDING SCHEDULE OF PEDESTAL						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	NO. OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
PED1		12	24	2.020	0.568	45.041
PED2		12	30	1.940	0.568	51.571
PED3		12	6	1.400	0.568	23.458
TOTAL BAR BENDING SCHEDULE OF PEDESTAL						
TOTAL WEIGHT (IN METRIC TON)					1.98 kg	0.118

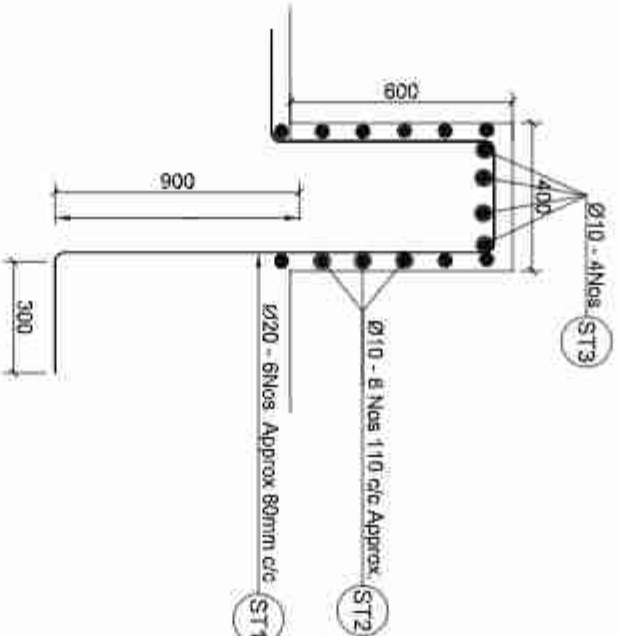
NOTE:
To match the height of base wall, the pedestal thickness shall be suitably modified.



Compression seal type Expansion Joints
Scale:- 1:5



Stoppers Plan
Scale:- 1:20



Stoppers Details
Scale:- 1:20

BAR BENDING SCHEDULE OF STOPPER						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	NO OF BARS (mm)	NO OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
ST1		20	6	3.000	2.466	44.391
ST2		10	6	1.840	0.817	8.057
ST3		10	4	0.816	0.917	1.519
TOTAL BAR BENDING SCHEDULE OF STOPPER						51.977
TOTAL WEIGHT (IN METRIC TON)						0.052

Design Data for Bearings (Elastomeric Bearing) All Loads Unfactored

Maximum permanent and superimposed dead loads	4417.1 kN
Maximum load from surfacing (wearing course)	29.3 kN
Maximum live load reaction (including impact)	512.7 kN
Maximum horizontal seismic force	80 kN
Maximum braking force	101.8 kN
Total Maximum elongation of the deck	8 mm
Maximum Rotation due to dead load	0.0023 rad
Maximum rotation due to dead load + live load	0.0039 rad
Concrete for substructure	M30
Concrete for superstructure	M25/M30
Width of girder at bearings	400 mm
Length of bearing along bridge axis (Assumed length)	320 mm

Notes on Elastomeric Bearings:
The dimensions and properties of the bearings shown are tentative, based on IRC:83-2016, Part II, Table D2. The actual design shall be carried out by the manufacturer on the basis of provided load & deformation rate. The effective stiffness shall not exceed the shown value.

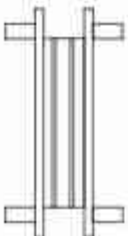
Initial stiffness corresponding to overall area and total thickness of elastomer = 2000 N/mm



Elastomeric Bearing
(partially free at longitudinal direction
Fixed at Transverse direction)



Elastomeric Bearing
Scale:- 1:25



Section Y-Y
Scale:- 1:25

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Project Directorate Office (ADB)
SASEC Highway Improvement Project-
Project Preparatory Consultant (SHIP-PPC)
ADB Loan No: 3722-NP

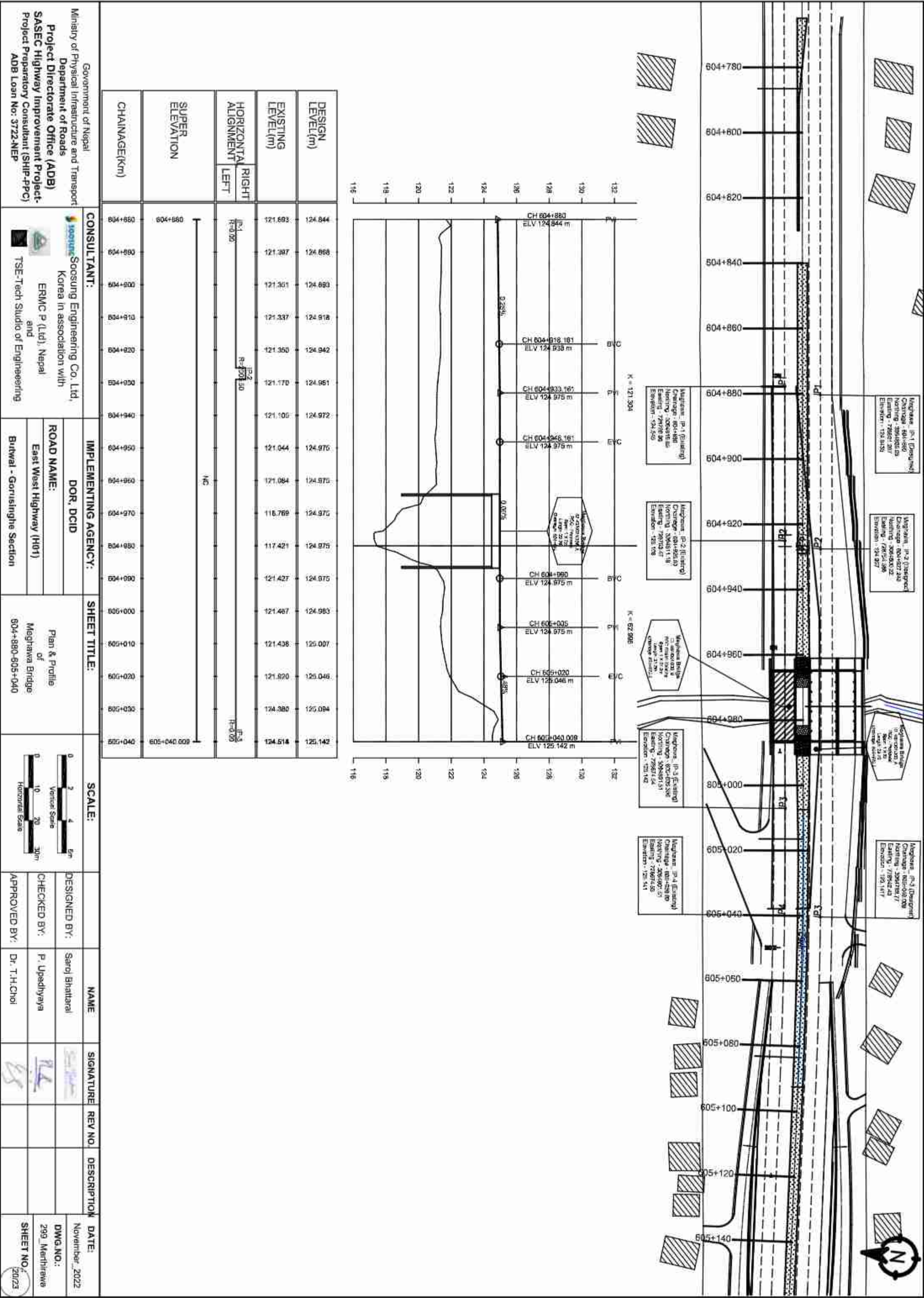
CONSULTANT:
Soosung Engineering Co. Ltd,
In association with
ERMPC P (Ltd)
and
J&K - Tech Studio of Engineering
Nepal

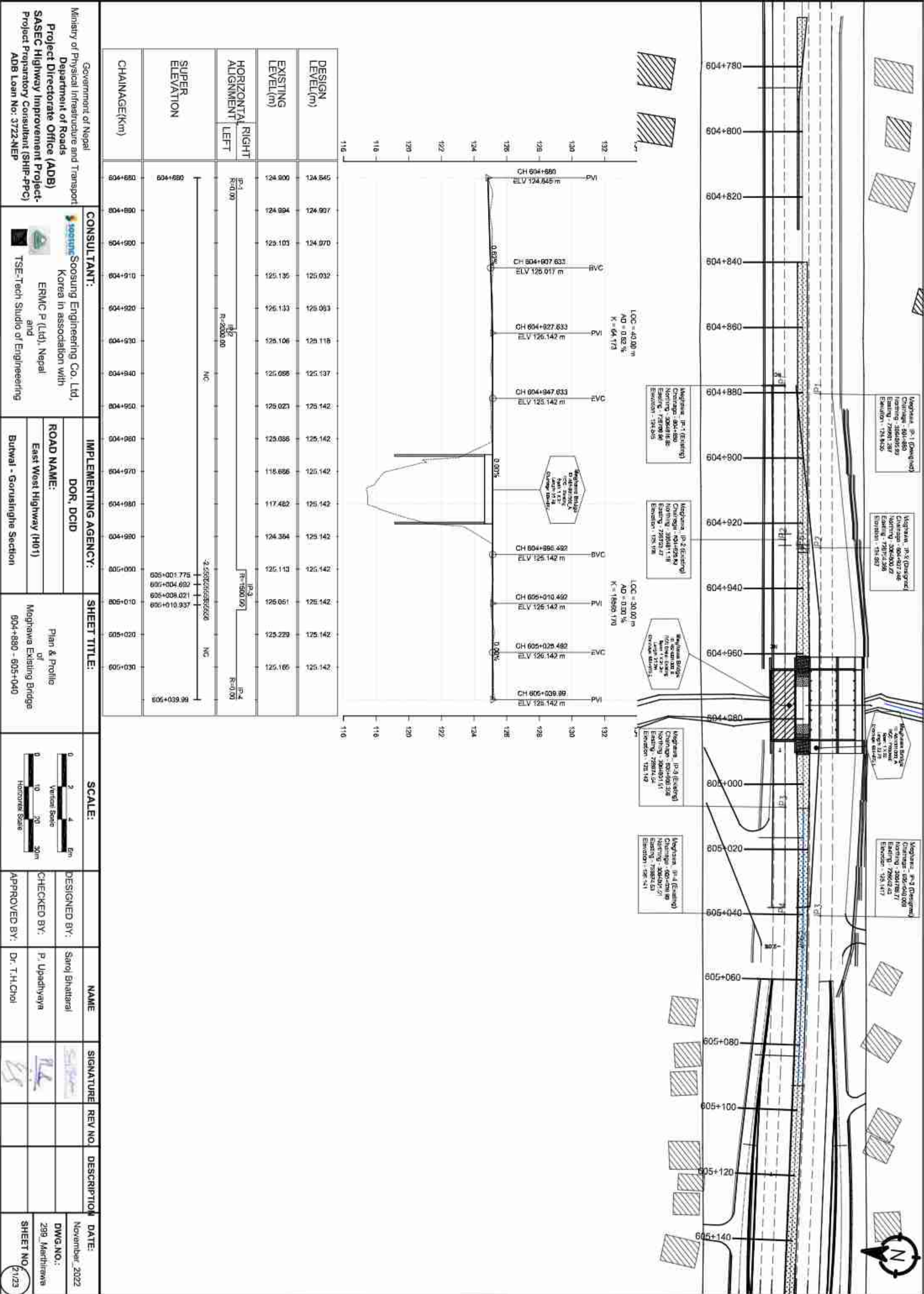
IMPLEMENTING AGENCY:
DOR, DCID
ROAD NAME:
East West Highway (H01)
Butwal - Gorusinghe Section

SHEET TITLE:
Miscellaneous Detail - 2
of
Meghwa bridge
(46/H-001/300_A)

SCALE:
As Shown

NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE:
Saroj Dhital			Designed by:	November, 2022
P. Upadhyaya			Checked by:	DWG. NO.: 300_Meghwa
Dr. T.H.Choi			Approved by:	SHEET NO.: 1823





Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE:		
	 Soosung Engineering Co. Ltd, Korea in association with ERMCO P (Ltd), Nepal and TSE-Tech Studio of Engineering 		DOR, DCID		Plan & Profile of Maghawa Existing Bridge 604+880 - 605+040		 Vertical Scale  Horizontal Scale		DESIGNED BY:					November, 2022		
			ROAD NAME:						CHECKED BY:						DWG.NO.:	
			East West Highway (H01)						P. Upadhyaya						298_Marithawa	
	Butwal - Gorusinghe Section						APPROVED BY:		Dr. T.H.Choi					SHEET NO.		
															21/23	

Ch:604+850
GL:123.835
DL:124.612

Qd = 8.225 m²
Pg = 38.892 m²

Ch:604+860
GL:123.911
DL:124.690

Qd = 7.892 m²
Pg = 45.679 m²

Ch:604+870
GL:123.780
DL:124.768

Qd = 7.839 m²
Pg = 45.798 m²

Ch:604+880
GL:124.165
DL:124.845

Qd = 8.472 m²
Pg = 47.069 m²

Ch:604+890
GL:123.948
DL:124.917

Qd = 8.798 m²
Pg = 57.276 m²

Ch:604+900
GL:124.022
DL:124.978

Qd = 7.338 m²
Pg = 45.677 m²

Ch:604+910
GL:124.005
DL:125.030

Qd = 7.077 m²
Pg = 46.047 m²

Ch:604+920
GL:124.084
DL:125.072

Qd = 8.404 m²
Pg = 46.023 m²

Ch:604+930
GL:123.999
DL:125.104

Qd = 5.854 m²
Pg = 57.065 m²

Ch:604+940
GL:123.928
DL:125.126

Qd = 5.175 m²
Pg = 61.776 m²

Ch:604+950
GL:123.780
DL:125.139

Qd = 4.785 m²
Pg = 66.344 m²

Ch:604+960
GL:123.778
DL:125.142

Qd = 4.720 m²
Pg = 63.864 m²

Ch:604+970
GL:118.804
DL:125.142

Qd = 118.770
DL:124.975
Bridge Th: 0.5 m

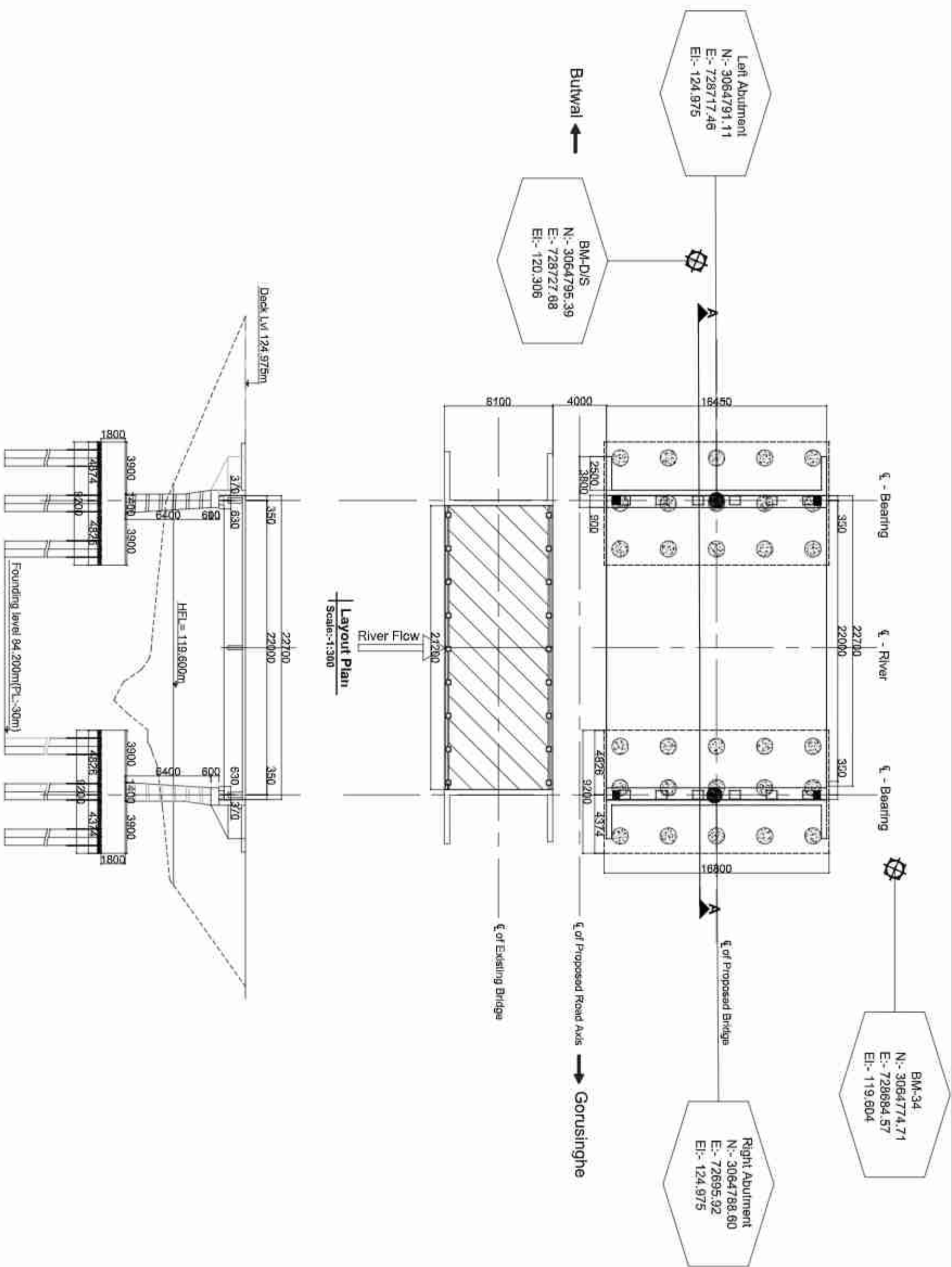
Ch:604+980
GL:117.481
DL:125.142

Qd = 117.421
DL:124.975
Bridge Th: 0.5 m

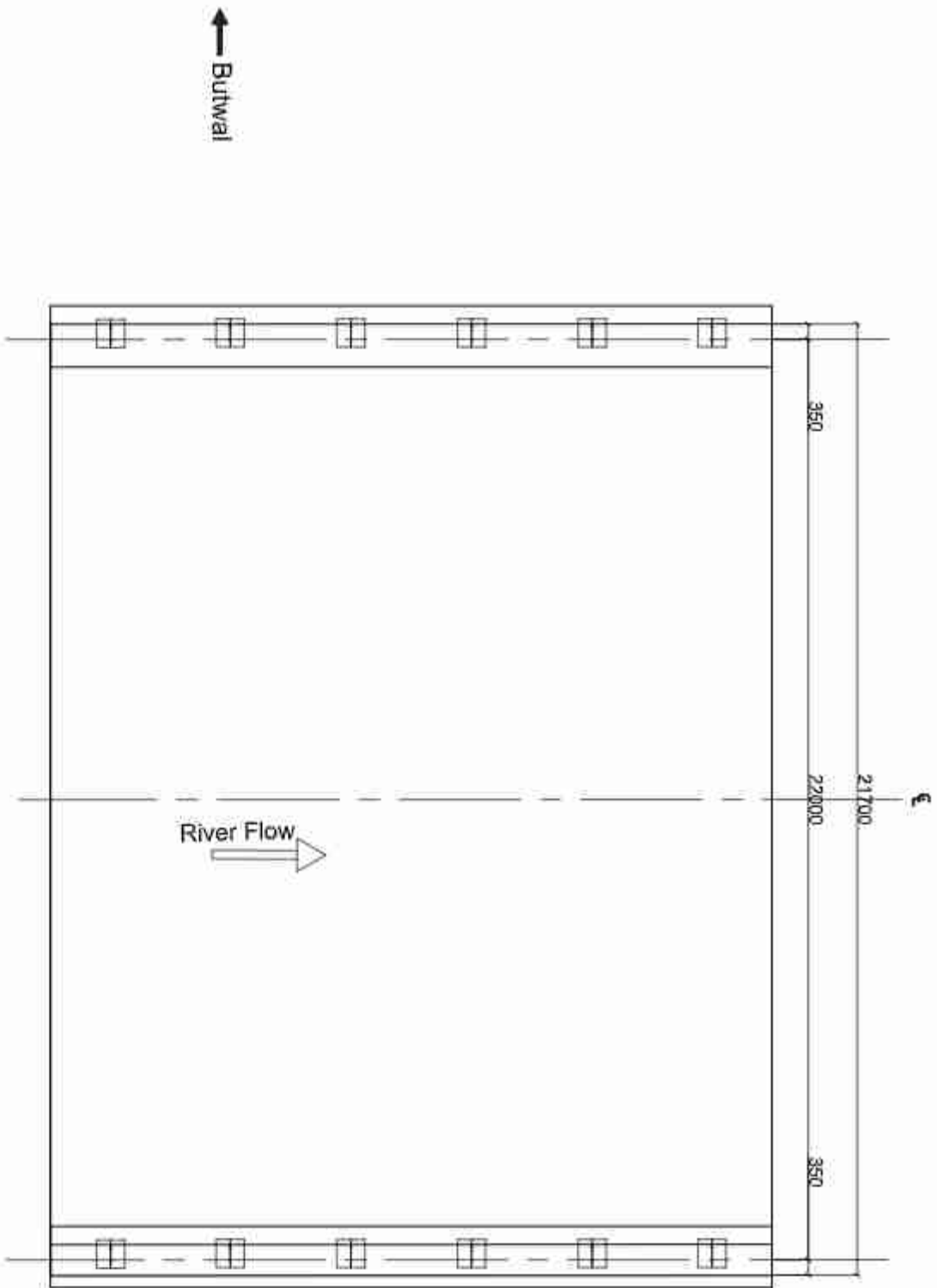
Ch:604+990
GL:123.789
DL:125.142

Qd = 0.285 m²
Pg = 62.432 m²

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparation Consultant (SHIP-PPC) ADB Loan No: 3722-NCP		CONSULTANT: Soosung Engineering Co., Ltd, Korea in association with ERM&C P (Ltd), Nepal and TSE - Tech Studio of Engineering		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butnial - Goursinghe Section		SHEET TITLE: Cross Section of Ch:604+850 - 604+990		SCALE: 0 2 4 6m 1:1000 Scale 0 10 20 30m 1:10000 Scale		DESIGNED BY: Sanyal Bhattacharya CHECKED BY: P. Upadhyaya APPROVED BY: Dr. T. H. Chandra		NAME: Sanyal Bhattacharya SIGNATURE: [Signature] REV NO.: DESCRIPTION: DATE: November, 2022		DWG NO.: 299_Mathikawa SHEET NO.: 21/223	
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Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM Co. P (Ltd) and J&T - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Goringhne Section		SHEET TITLE: Layout Plan of Meghawa Bridge (45/H-001/300_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
										Designed by:		Saroj Bhattarai						November, 2022	
										Checked by:		P. Upadhyaya						DWG. NO.:	
										Approved by:		Dr. T.H. Chel						300_Meghawa	
																		SHEET NO.:	
																		22/23	



Layout of Bearing
Scale:-1:150

Legend

-  Elastomeric bearing.
Partial movement allowed in longitudinal direction.
Restrained to transverse movement,Free to rotate in any direction.
-  Fixed Pot-bearing.
Restrained to lateral movement,Free to rotate in any direction.
-  Free Pot-bearing.
Partial movement allowed in longitudinal direction.
Restrained to transverse movement,Free to rotate in any direction.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT:  Soosung Engineering Co. Ltd. Korea In association with ERM Co. P (Ltd) and J&K - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID		SHEET TITLE: Layout Plan of Meghawa Bridge (45/H-001/300_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November, 2022	
ROAD NAME: East West Highway (H01)		Butwal - Gorusinghe Section								Designed by: Saroj Bhatnagar								DWG. NO.: 300_Meghawa	
										Checked by: P. Upadhyaya								SHEET NO.: 2823	
										Approved by: Dr. T.H. Chel									

Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

Project Directorate (ADB)

Implementing Agency : DOR, DCID

Project Preparatory Consultants

Under

SASEC Highway Improvement Project (SHIP-PPC)

(ADB Loan No: 3722 Nep)

Contract No. SHIP/PPC/2020/02

Inguria Bridge(46-H001-301_A)

St. Ch : 606+662.40 ~ End Ch : 606+705.60

Detailed Drawing

Butwal - Gorusinghe Sector

November, 2022

CONTENTS

S.No.	DESCRIPTION	DWG. NO	NO. OF SHEETS
1.	General Notes.	1 - 2	2
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3.	General Arrangement.	4-5	2
4.	Bore Logs.	6	1
5.	Detail of Superstructure.	7	1
6.	Reinforcement Details of Slab.	8	1
7.	Prestressing Details of Main Girder .	9	1
8.	Anchorage Details.	10	1
9.	Untensioned Reinforcement Details of Girder.	11	1
10.	Bar Bending Schedule of Slab & Main Girder.	12	1
11.	Reinforcement Details of Intermediate Cross Girder.	13	1
12.	Reinforcement Details of End Cross Girder.	14	1
13.	Abutment Details.	15	1
14.	Reinforcement Details of Abutment .	16	1
15.	Reinforcement Details of Wingwall .	17	1
16.	Reinforcement Details of Abutment Pile .	18	1
17.	Reinforcement Details of approach Slab.	19	1
18.	Miscellaneous Details.	20-21	2
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21.	Cross Sections.	24.1-24.2	2
22.	Layout Plan.	25-26	2

GENERAL NOTES

General

- Metric system of measurement is used in all drawings. Elevation and Stations are shown in Meter and all other dimensions are in Millimeters, except indicated otherwise.
- In case of contradictions, specific notes on respective sheet shall supersede the General Notes
- No dimensions shall be scaled from the drawings. Only written dimensions shall be followed. Any doubtful matter in the drawings shall be brought to the attention of the engineer-in-charge for any corrections before the execution of the works.

Design Notes

The design codes followed:

- For RCC and PSC concrete - IRC:112-2020
- For loads and stresses - IRC:6-2017
- For substructure and foundations - IRC:78-2014
- For seismic design - IRC:SP:114-2018, Seismic zone V, Importance factor 1.2

Design live loads:

For urban area bridges

- Case 1 - 3 lanes of class A + pedestrians; 1 lane of class A + 1 lane of class 70R + pedestrians
- Case 2 - 4 lanes or class A; 2 lanes of class A + 1 lane of class 70R, No pedestrians
- For non-urban area bridges
- Case 1 - 2 lanes of class A + pedestrians; 1 lane of class 70R + pedestrians
- Case 2 - 3 lanes of class A; 1 lane of class A + 1 lane of class 70R, No pedestrians.

Notes on Concrete

In General the grade of concrete to be used shall be as follows:
(unless otherwise specified in the respective drawing sheets)

For superstructure deck slab, wearing course, crash barriers:

For raised footpaths:

For main girders and cross girders of superstructure with PSC girders:

For main girders and cross girders of superstructure with RCC girders:

For substructure: Abutment stem, ballast wall, stoppers, bearing pedestals,

pier cap, pier stem and pile caps:

For bored and cast in situ piles:

For leveling course:

The maximum size of aggregate shall be as per IRC:112-2020, clause 18.4.4.2.

Admixture to the concrete

To improve workability and/or increase initial setting time of concrete and cement grout, admixture conforming to IS:9103 and ASTM C-494, (Type F - High Range Water Reducing admixture) can be added in appropriate dosage, subject to their satisfactory proven use.

Clear Cover to reinforcement (unless otherwise specified in the respective drawing sheets)

Reinforcement bars of all components of the superstructure:

Prestressing ducts or strands in superstructure:

All components of abutment, pier, pile caps and piles

(except stoppers and bearing pedestals):
75mm
Bearing pedestals and Stoppers:
50mm
Cover shall be ensured with the use of properly sized cement concrete blocks which can be secured to the re-bars or other devices approved by the engineer-in-charge. Use of loose stones or wooden pieces is not permitted.

Notes on Reinforcement

- All reinforcing steel bars shall be High Strength Deformed bars with grade Fe500 conforming to IS:1786
- Laps and Splices shall conform to IRC:112-2020, Clause 15.2.5. Use of mechanical coupler is permitted upon approval by the engineer.

Notes on Prestressing

- Prestressing strands shall be Class-2, uncoated 7 ply, low relaxation type with ultimate tensile stress 1862 N/mm², conforming to IS:14268.
- The diameter of strands, their number in a tendon and the total jacking force to be applied is specified in the respective drawing sheet. All the initial and long term losses are already incorporated in design.
- Corrugated HDPE Sheathing ducts shall be used with the minimum internal diameter not less than three times the cross sectional area of the tendon. The wall thickness and other properties of the sheathing shall be as per IRC:112-2020, clause 13.4.3
- The specified profile and the alignment of the ducts shall be strictly maintained by properly securing the ducts to the re-bars. If required, pieces of re-bars can be added or the re-bars slightly repositioned or bent to maintain the profile and alignment, with approval of the engineer-in-charge.
- The jacking equipment shall be fitted with appropriate force measuring device and shall be regularly checked and calibrated as prescribed by the manufacturer.
- Jacking shall be done from both ends simultaneously and gradually, recording the elongation both sides. The expected final elongation mentioned in the respective drawings sheet is based on modulus of elasticity of the strands (Es) equal to 1.95x10⁵ MPa. If the Es of supplied strands is different then the elongation values shall be recalculated by multiplying the Design values of elongation by the ratio of Design Es / Actual Es.
- In case the total elongation is not achieved at the prescribed jacking force, the jacking operation can be continued until the force reaches the maximum allowable value. If the required elongation is achieved at jacking force lower than the prescribed value, the jacking operation shall continue until the prescribed force is reached, provided the Sum of the additional elongations thus achieved is not more than 5% of the sum of the prescribed elongations.
- In adverse condition to any of the cases above, the jacking operation shall be stopped, the tendons removed and this matter reported to the engineer-in-charge for further instruction. The jacking force should NEVER exceed the Maximum allowable value.

Grouting

- The tendons which satisfy the above conditions shall be grouted properly, ensuring the duct is free of any foreign material and there is no leak or damage around the joints between the anchors and the ducts. Grouting can be normally done immediately after successful completion of tensioning operations and shall not be delayed by more than 5 days of tensioning of the cables.
- The grout shall be prepared with Ordinary Portland cement with suitable expansive admixture approved by the engineer. Admixture containing chloride and nitrate are not permitted. The water/cement ratio shall not be more than 0.48. Retempering of the grout shall not be permitted. The grout shall be mixed with mechanical mixers and shall be continuously kept agitated until pumped in.

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										Designed by:								DWG. NO.: 301_Inguna	
										Checked by:								SHEET NO.: 01/20	
										Approved by:									
										Dr. T.H. Choi									

Stages and sequence of Prestressing

- The Precast composite girders shall be prestressed in two stages. The specified number of the tendons shall be tensioned in the prescribed sequence shown in the respective drawing sheet.
- The remaining tendons shall be tensioned after specified days after casting of the deck slab, in the sequence shown in the respective drawing sheet.
- The prestressing of the precast girder shall be started only after confirming that the cube specimen has achieved 100% of the prescribed compressive strength. No early prestressing allowed.

Construction methodology and sequence for Precast Prestressed Composite superstructure

- The main girders are be precast near the bridge site at suitable location (approach road or dry river bed, if available) on well prepared casting yard. The choice of location also depends upon the equipment available for lifting or launching the girders. After completion of the prestressing works the girders are either lifted by suitable cranes or pushed/launched with the help of rails and jacks or launching girders and placed carefully over the already completed substructure. Care shall be taken that all the preparatory works for the bearings are done properly before the launching/placing of the girders.
- Lifting shall be done only by the hooks provided at both ends. In case of jacking the jacking points shall be only just under the location of the hooks. No support, lifting or jacking is allowed at any other section of the girder
- After placing all the main girders and finishing the works on the bearings, the formwork for deck slab and cross girders are prepared. All the formwork for deck slab and cross girders shall be supported by the main girders. The main girders shall remain un-propped during casting of the deck slab. Similarly there shall be no false-work or props from the ground or part of substructure during casting of the deck slab.
- The Contractor shall ensure stability of the girders during all stages of construction.
- Dimensional tolerances for the precast girders shall be as per IRC:SP-7.1-2018, Clause 4.10. If not prescribed otherwise, transportation and handling operation shall follow the guidelines in Clause 4.9 of the same documents.
- The prescribed time-line for construction of the superstructure is as follows

Prestressing of Precast Girder only (Stage 1)	After 28 days of casting or confirming 100% compressive strength of concrete
Lifting/Launching of the Girder	Within 14 days of first stage prestressing
Casting of the Deck Slab	Within 14 days of placing of girder over substructure
Prestressing of Girder (Stage 2)	After 14 days of casting of deck slab
Casting of Footpath, Crash Barrier, Wearing Course etc	Preferably within 7 days but not later than 14 days of Second stage prestressing

Deviation from the above time-line is subject to approval by the engineer. No other vehicle except the concreting apparatus are allowed on the deck until the deck slab has attained its full specified strength.

Construction methodology for Cast-in-situ RCC superstructure

- Construction of Monolithic cast in situ RCC superstructure shall follow the standard practices. The falsework for the girders and deck slab are supported on the ground and removed after specified time period.

Notes on Bearings

- The contractor shall supply, provide and install the bearings designed according to the loadings and other relevant information provided in the drawings or BOQ.
- The dimension and number of layers of the Elastomeric bearings shown in the drawings are tentative. The bearings shall be designed, fabricated, tested and installed as per IRC:83 - 2018, Part-2 for elastomeric bearing and Part-3 for Pot-PTFE bearings, as the case applies.

Notes on Foundation and Substructure

- Standard Specifications and Special provisions to the Standard Specifications (if any) and specific notes on the drawings shall be followed for the construction of the abutments, piers and foundations.
- Backfill behind the abutment shall be places only after the concrete has achieved full 28 days strength. Heavy compaction equipment weighing more than 10 Ton shall not be used within 2.0 meters from the back of the abutment until all the works on superstructure is completed.
- The graded backfill behind the abutment shall be at a slope not steeper than 62 degrees, starting from the back of the footing. The back fill material dry density shall be within 1900 to 2200 kN/m³ and moisture content between 9 to 15%.
- In case of new bridge adjacent to the existing bridge, care shall be taken not to render any damage to the elements of the existing bridge. Particular attention shall be paid to the foundation of the existing bridge. The contractor shall ensure that excavation for the foundation of the new bridge does not cause instability or settlement of the foundation of the existing bridge.
- If the existing bridge has a shallow foundation, the contractor shall protect the existing foundation by sheet piling or any other suitable means to the satisfaction of the engineer, before excavating for the foundation of the new bridge.

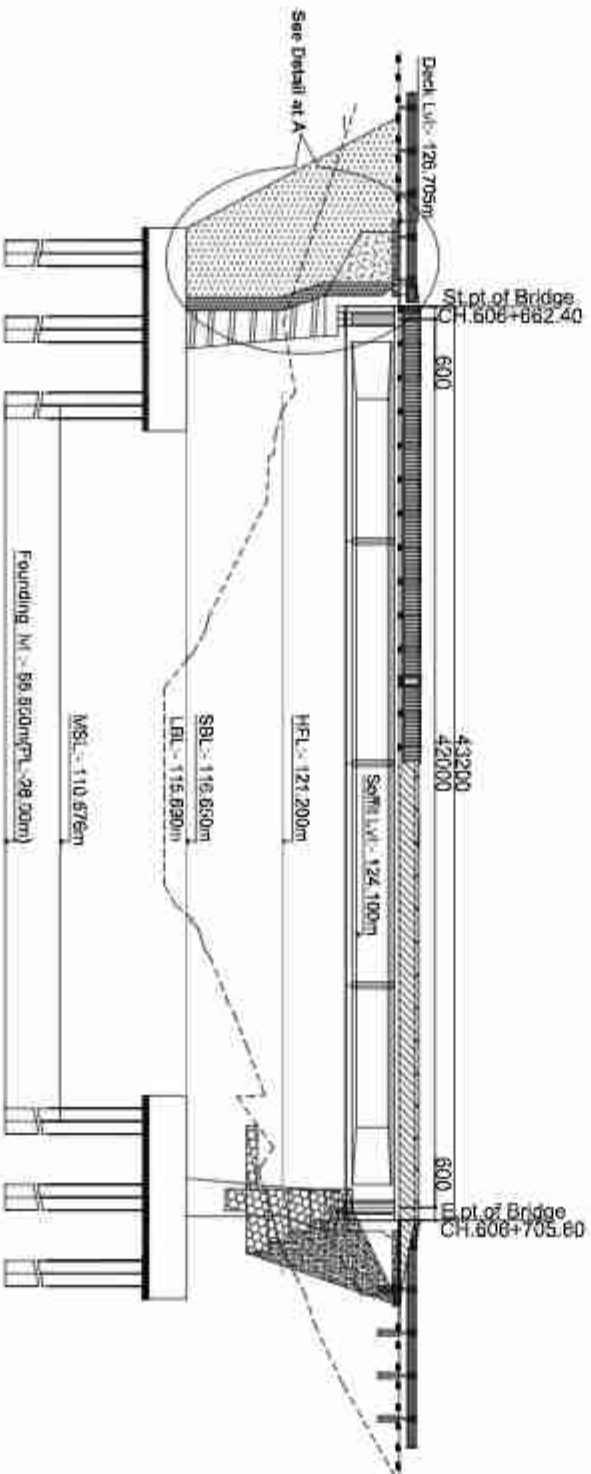
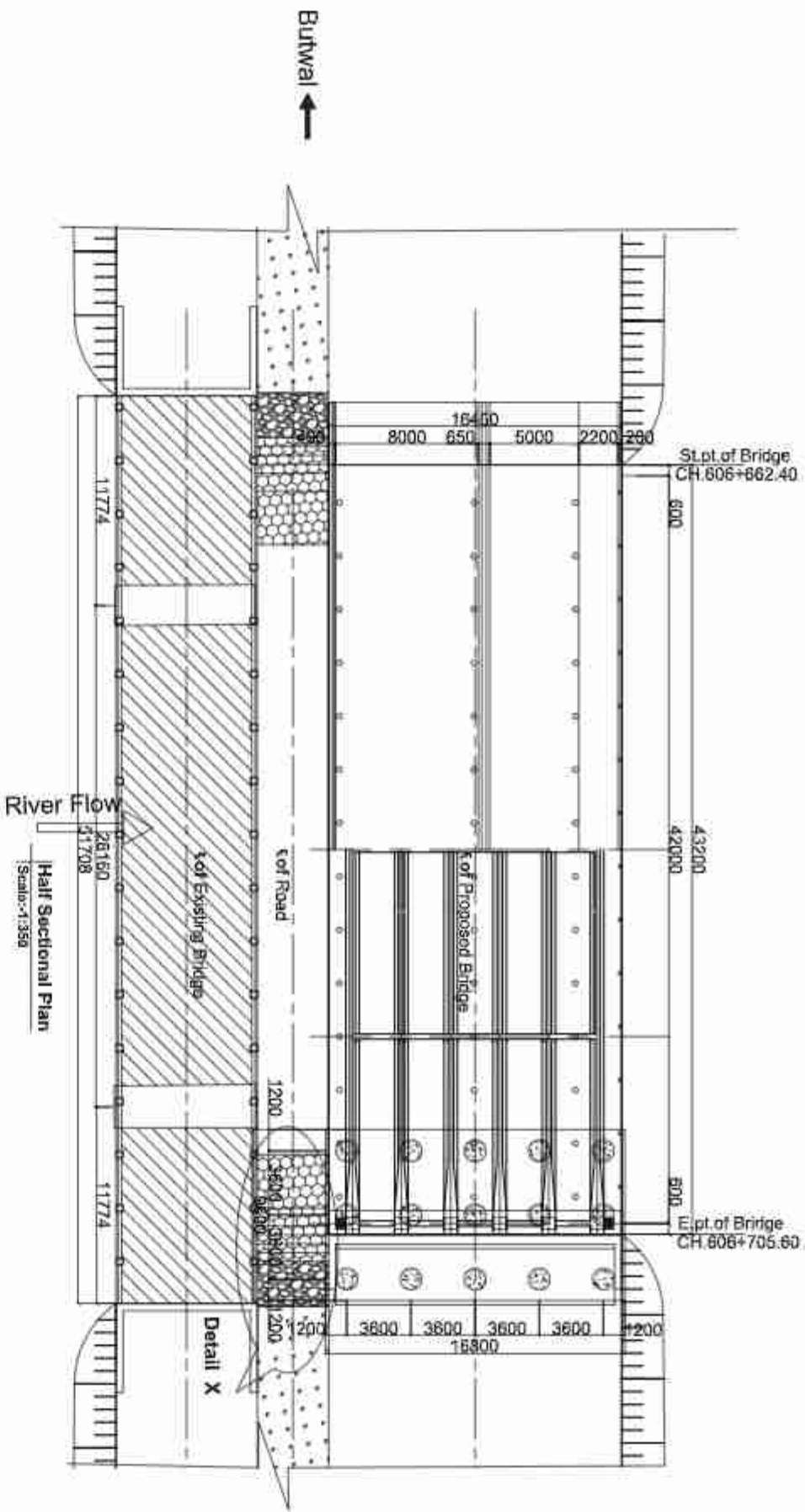
General Note: (For all Pile Foundation)

- Drilling/Boring works for pile is allowed only with rotary or oscillator type drilling equipment. No percussion method is allowed. Stability of borehole shall be ensured by the use of temporary casing. Use of other methods of borehole stability is subject to approval by the engineer, but in such case use of water/air/chemical jetting for boring process shall not be allowed.
- In case of drilling/boring without temporary casing, the contractor should ensure the stability and uniformity of the borehole before lowering the reinforcement cage and during concreting. Boring/Drilling of the piles is preferred in a staggered pattern. Boring/Drilling for any pile shall not commence before 24 hours of completion of concreting of any pile within a radius of 6 meters from its center.
- In case of drilling/boring without temporary casing , the pile shall be lined with 6mm thick permanent casing from the bottom of the pile cap down to 0.5 m below the maximum scour depth or 1.5 m whichever is larger.

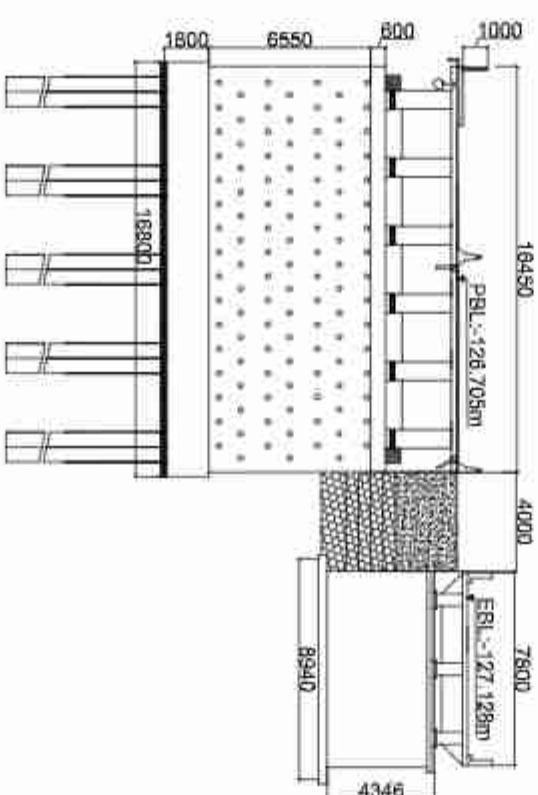
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NP	CONSULTANT:  Soosung Engineering Co. Ltd. Korea In association with ERMIC P (Ltd) and JSC - Tech Studio of Engineering Nepal	ROAD NAME:		SHEET TITLE:	SCALE:		NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022				
		East West Highway (H01)													
		General Notes - 2 of Ingura Bridge (4E/H001/301_A)		As Shown		Designed by:	Saroj Bhattacharj		Checked by:	P. Upadhyaya			Approved by:	Dr. T.H.Choi	
SHEET NO.: 02/26															



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										Designed by:		Saroj Bhatnari			November, 2022
										Checked by:		P. Upadhyaya			DWG. NO.: 301 Inguna
										Approved by:		Dr. T.H.Choi			SHEET NO.: 03/20

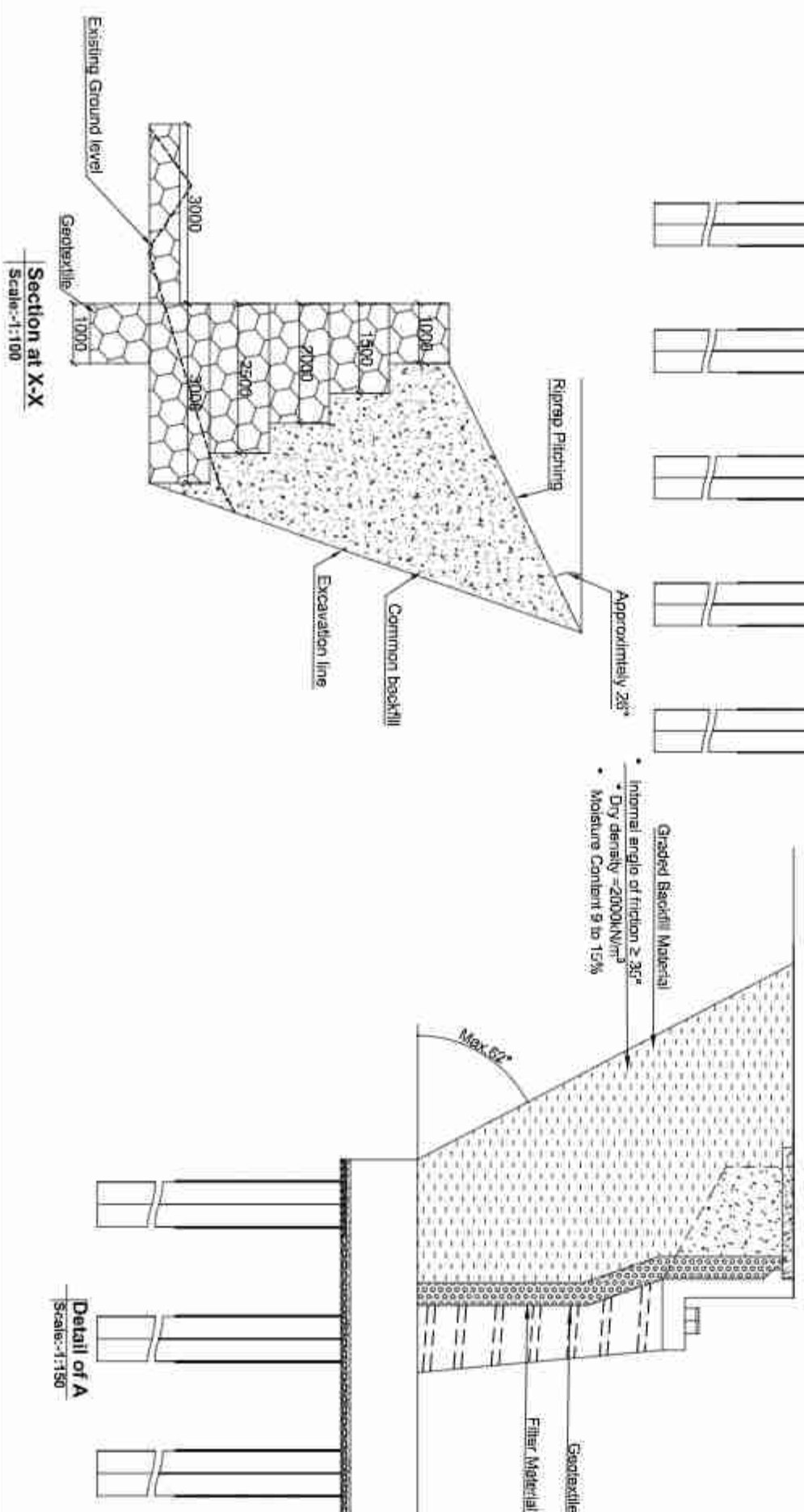
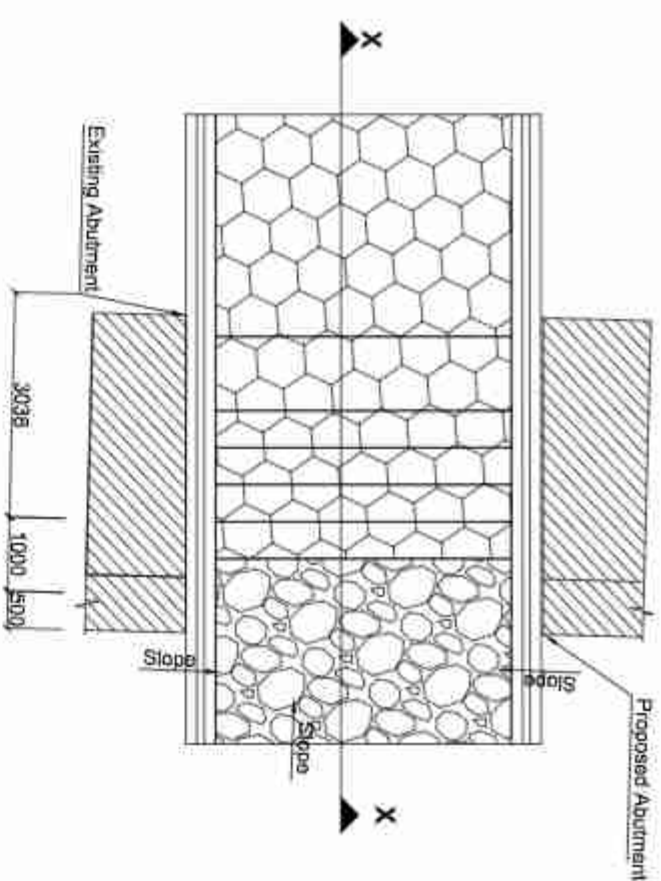
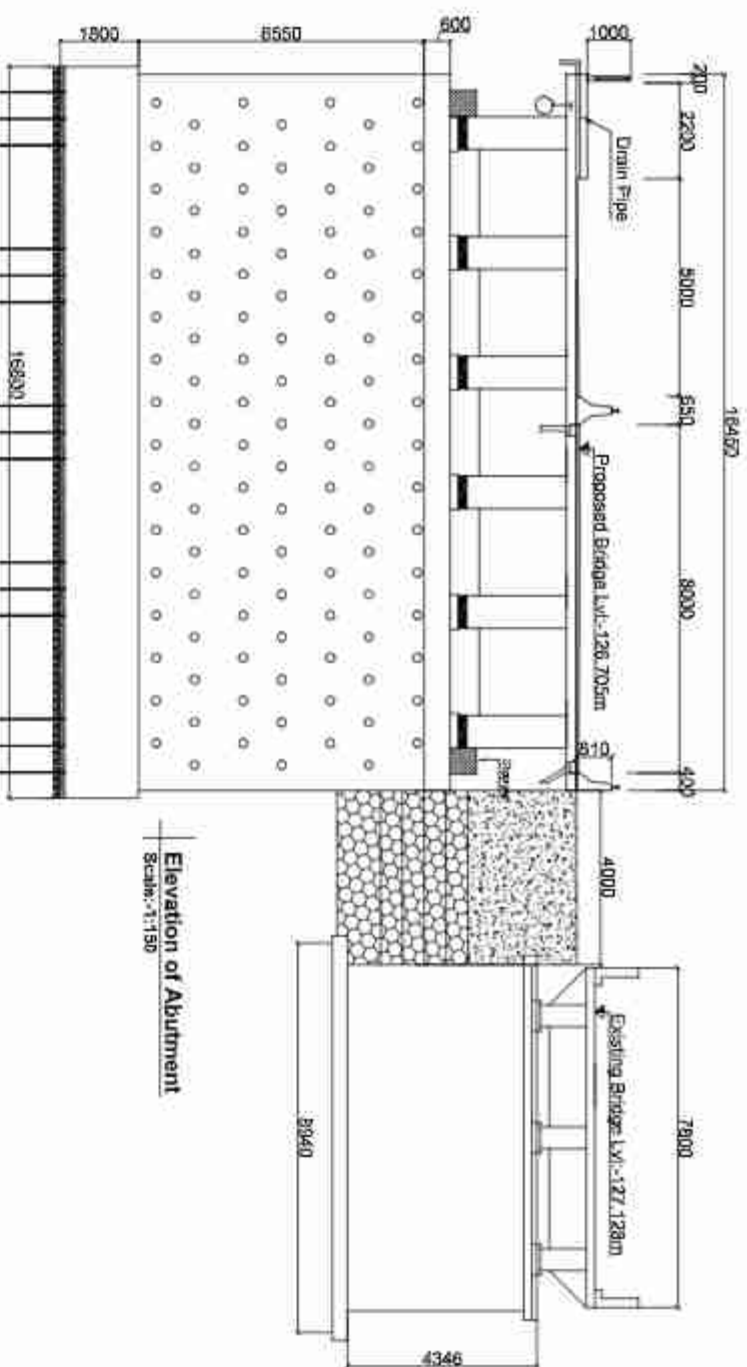


Note:-
MSL :- Maximum Scour Level
HFL :- High Flood Level
LRL :- Lowest Bed Level
PL :- Reduced Level
PL :- Pile Length



Name(NEC Number)		Signature
P. Engineer	P. Upadhyaya (Civil A 675)	
Structure Engineer	K.P. Wagle(Civil A 127) / P. Shrestha(Civil A 675) / S. Bhattacharj (Civil A 904)	
Hydrologist	Dr. P.C. Jha(Civil A 158) / S. Adhikari (Civil A 408)	
Geotechnical Engineer	A. Adhikari(ka 159) / Dr. V. R. S. Shahi	

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT: Soosung Engineering Co. Ltd. Korea In association with ERM Co. P (Ltd) and JSPS - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID		SHEET TITLE: General Arrangement of Inguna Bridge (46/H001/301_A)		SCALE: As Shown		Designed by: Saroj Bhattacharj		DATE: November, 2022	
	ROAD NAME: East West Highway (H01)		Butwal - Goringhne Section		Checked by: P. Upadhyaya		DWG. NO.:		301_Inguna		SHEET NO.:	
					Approved by: Dr. T.H. Chai							
											04/20	



	Name(NEC Number)	Signature
P. Engineer	P. Upadhyaya (Civil A 675)	
Structure Engineer	K.P. Wagle(Civil A 127) / P. Shrestha(Civil A 676) / S. Bhattacharj(Civil A 904)	  
Hydrologist	Dr. P. C. Jha(Civil A 186) / S. Adhikari (Civil A 408)	 
Geotechnical Engineer	A. Adhikari(Ka 196) / Dr. V. R. S. Shahi	 

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Project Directorate Office (ADB)
SASEC Highway Improvement Project-
Project Preparatory Consultant (SHIP-PPC)
ADB Loan No: 3722-NP

CONSULTANT: Soosung Engineering Co., Ltd.
Korea
In association with
ERMIC P (Ltd)
and
JSPS - Tech Studio of Engineering

IMPLEMENTING AGENCY:
DOR, DCID
OAD NAME:
East West Highway (H01)
Butwal - Gorusinghe Section

SHEET TITLE:

General Arrangement
of
Inguna Bridge
(46/H001/301_A)

SCALE:

A5 SHOWN

Designed by:
Checked by:
Approved by:

NAME	
Saroj Bhatnagar	
P. Upadhyaya	
Dr. T.H. Chel	

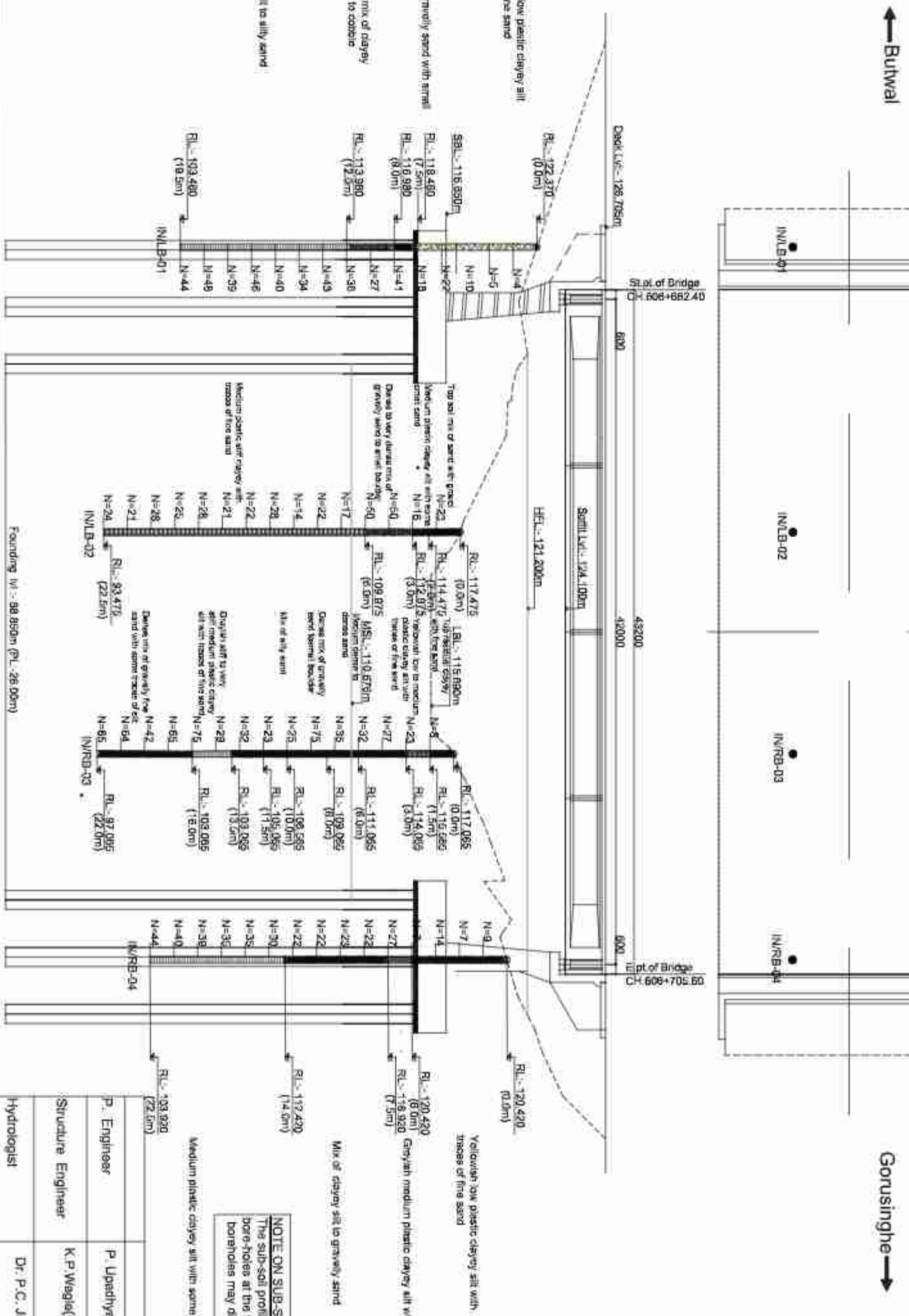
SIGNATURE			

DATE:	November, 2022
DWG NO.:	301_Ingruina
SHEET NO.:	06/26



Borehole No : INLB-01	Easting : 83° 18' 7.89"
	Northing : 27° 41' 20.78"
	Elevation, m : 122.002
Borehole No : INLB-02	Easting : 83° 18' 7.57"
	Northing : 27° 41' 20.98"
	Elevation, m : 117.170
Borehole No : IN/RB-03	Easting : 83° 18' 6.97"
	Northing : 27° 41' 21.07"
	Elevation, m : 116.756
Borehole No : IN/RB-04	Easting : 83° 18' 6.29"
	Northing : 27° 41' 21.17"
	Elevation, m : 120.109

Note :-
MSL :- Maximum Spill Level
HFL :- High Flood Level
LBL :- Lowest Bed Level
RL :- Reduced Level
PL :- Pile Length



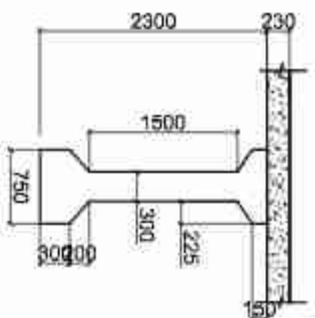
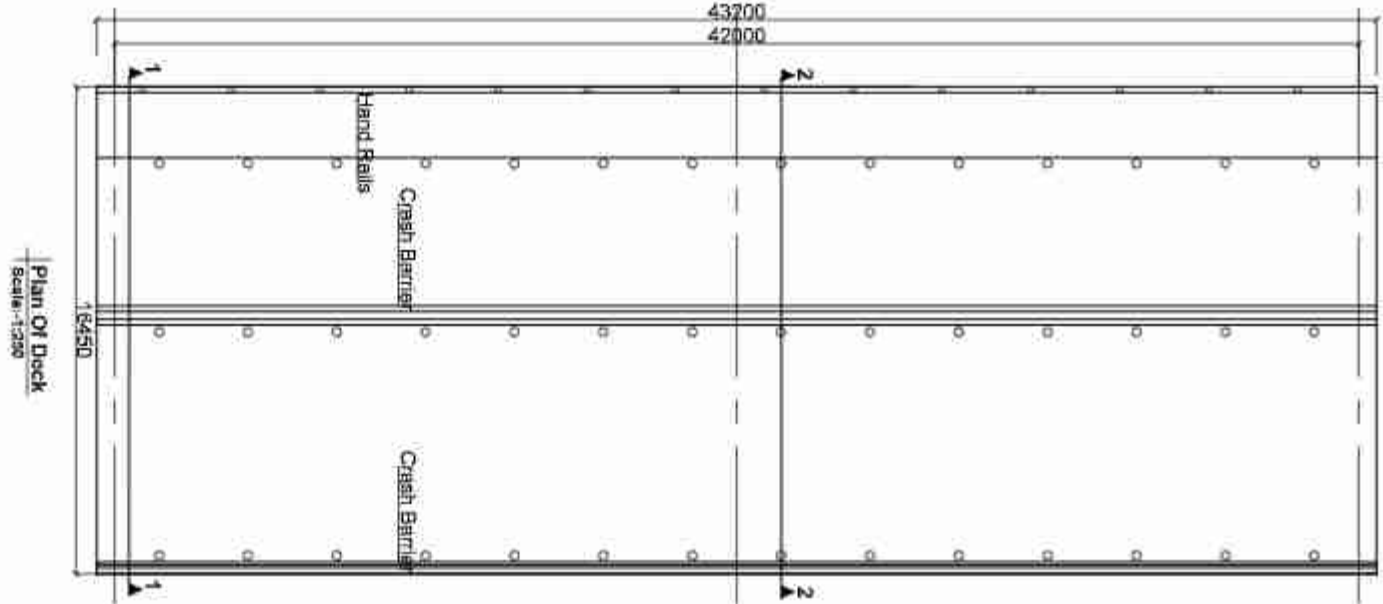
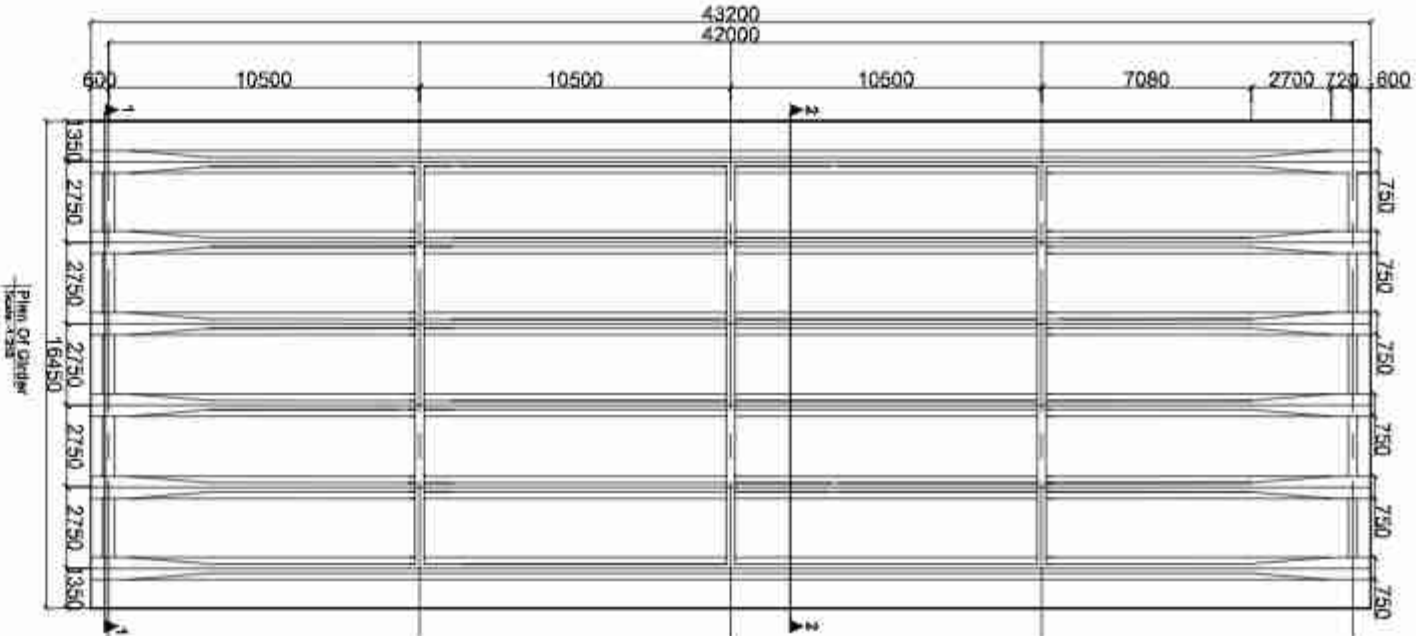
NOTE ON SUB-SOIL PROFILE
The sub-soil profile shown here is based on information obtained from the investigation bore-holes at the locations as shown. The actual soil type away from the vicinity of the boreholes may differ.

P. Engineer	P. Upadhyaya (Civil A 675)	Signature
Structure Engineer	K.P. Wagle(Civil A 127) / P. Shrestha(Civil A 676) / S. Bhatnari (Civil A 904)	Signature
Hydrologist	Dr. P.C. Jha(Civil A 108) / S. Adhikari (Civil A 408)	Signature
Geotechnical Engineer	A. Adhikari(Ka 199) / Dr. V. R. S. Shahi	Signature

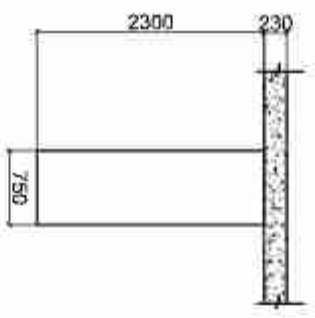
Location	Design Pile Length in	Design Working load on pile (non - seismic case) in	Allowable Boring Capacity on pile (Non Seismic case) in	Allowable Bearing Capacity of the Pile (Non Seismic case) in
Asbuilt	26	2425	3403	3731

Bore Log Detail
Scale:- 1:300

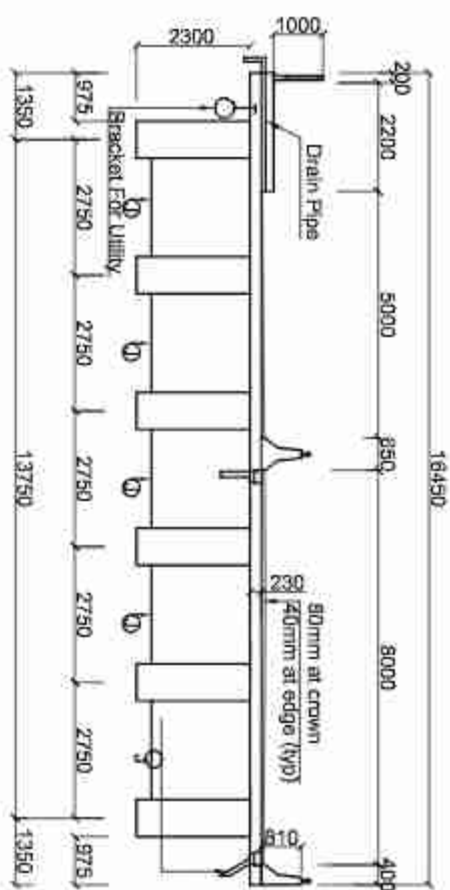
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM C P (Ltd) and J&K - Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01)	SHEET TITLE: Bore Log of Inguna Bridge (46/H001/301_A)	SCALE: As Shown	NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022
					Designed by:	Saroj Bhatnari			DWG. NO.: 301_Inguna
					Checked by:	P. Upadhyaya			SHEET NO.: 0620
					Approved by:	Dr. T.H. Chai			



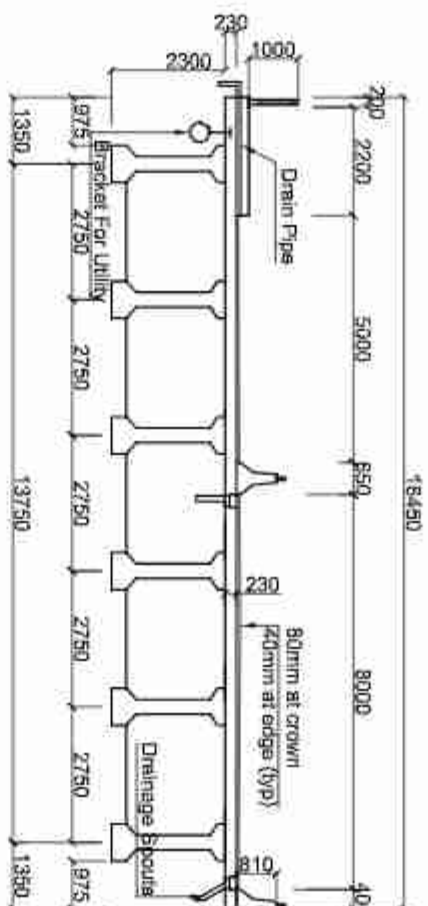
Section 2-2 Main Girder
Scale:-1:75



Section 1-1 Main Girder
Scale:-1:75

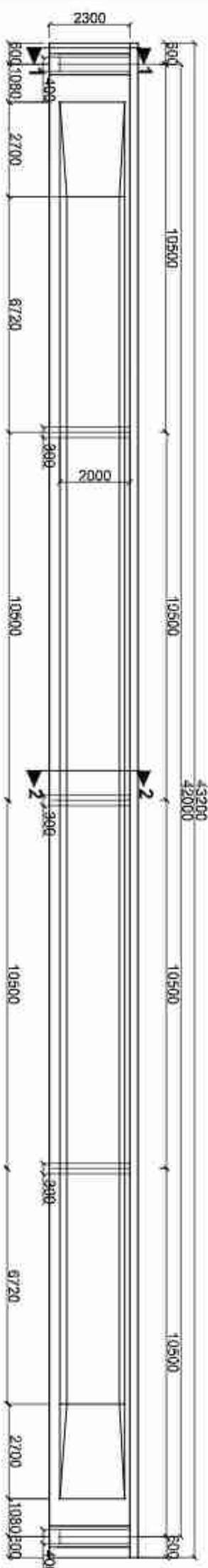


Section At 1-1
Scale:-1:150



Section At 2-2
Scale:-1:150

NOTE:
1. On Shear Connection: The transverse bars of the deck slab(S2) shall be tied to vertical stirrups of the longitudinal girders.
2. Top Surface of the Main Girder: Surface to be roughened by wire brush immediately after initial setting. The surface shall be properly cleaned by pressure blower prior to casting of the deck concrete.
3. On Wearing Course: The level of wearing course along the longitudinal direction shall be kept horizontal throughout the length of the deck. The thickness of wearing course towards the ends along the deck shall be increased suitably to compensate for the slope due to hogging of the girder by pre stress.

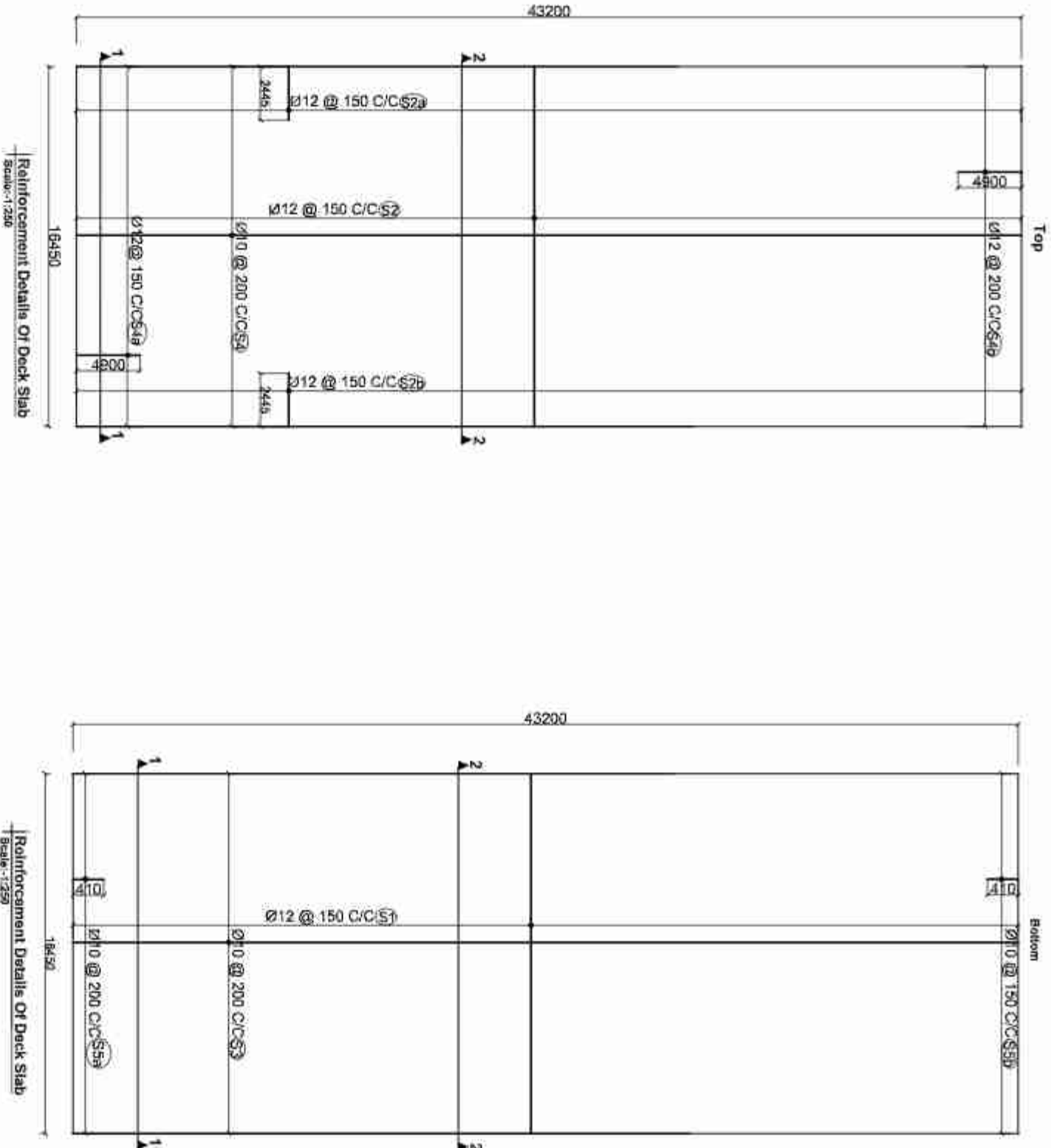


Longitudinal Sectional Elevation
Scale:-1:150

NOTE:
For maintenance, the deck shall be simultaneously jacked up at the locations marked "y".

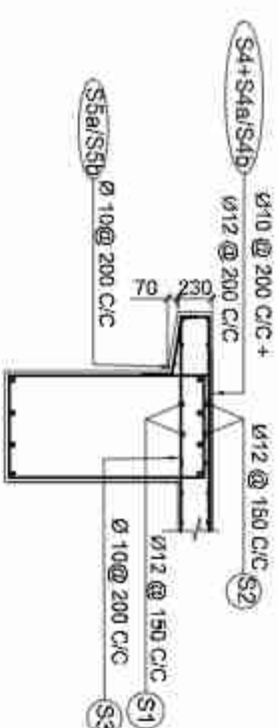
Note:
The bridge has been designed to safely carry Three driving lanes. If required in future the footpath can be used as driving lane, moving the crash barrier to the location of the hand-rails.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM Co. P (Ltd) and JSP- Tech Studio of Engineering Nepal		ROAD NAME: East West Highway (H01)		SHEET TITLE: Detail of Superstructure-1 of Inguna Bridge (46/H001/301_A)		SCALE: As Shown		Designed by: Saroj Bhatnagar	SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022
										Checked by: P. Upadhyaya				DWG. NO.: 301_Inguna
										Approved by: Dr. T.H. Chel				SHEET NO.: 07/26

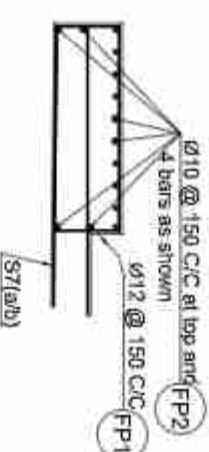


Reinforcement Details Of Deck Slab
Scale:-1:250

Reinforcement Details Of Deck Slab
Scale:-1:250

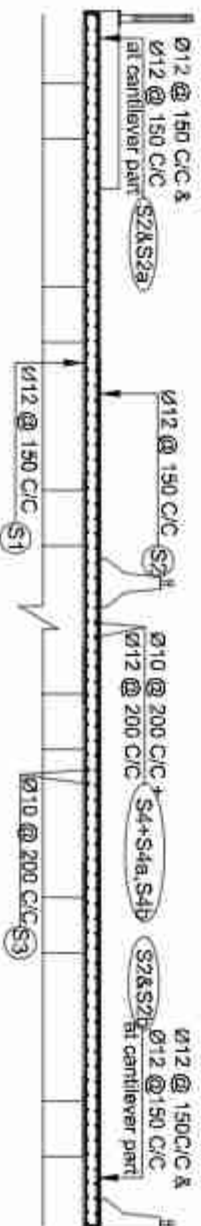


Reinforcement Details at Deck Extension
(Between The Main Girder)

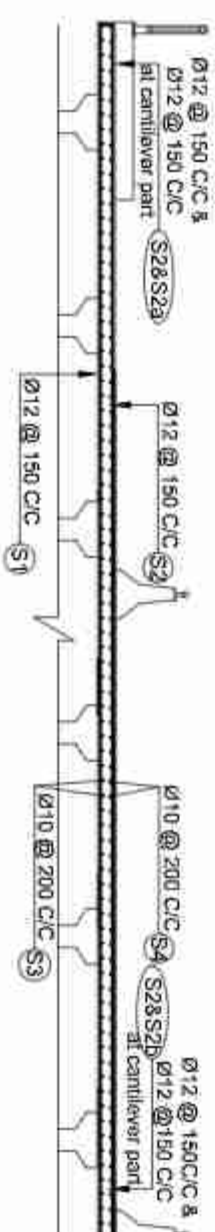


Reinforcement Details At Footpath
Scale:-1:50

NOTE:
1.On Shear Connection:
The transverse bars of the deck slab(S2) shall be tied to vertical stirrups of the longitudinal girders.
2.Top Surface of the Main Girder:
Surface to be roughened by wire brush immediately after initial setting. The surface shall be properly cleaned by pressure blower prior to casting of the deck concrete
3.On Wearing Course:
The level of wearing course along the longitudinal direction shall be kept horizontal throughout the length of the deck. The thickness of wearing course towards the ends along the deck shall be increased suitably to compensate for the slope due to hogging of the girder by pre stress.

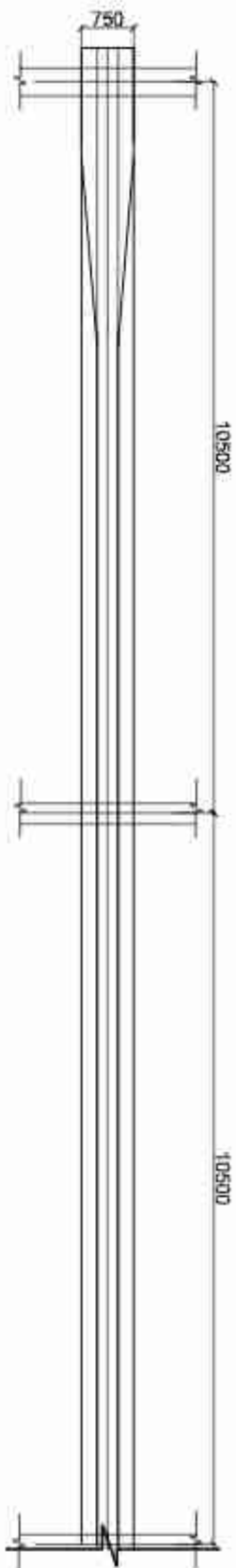


Section A1 1-1
Scale:-1:100



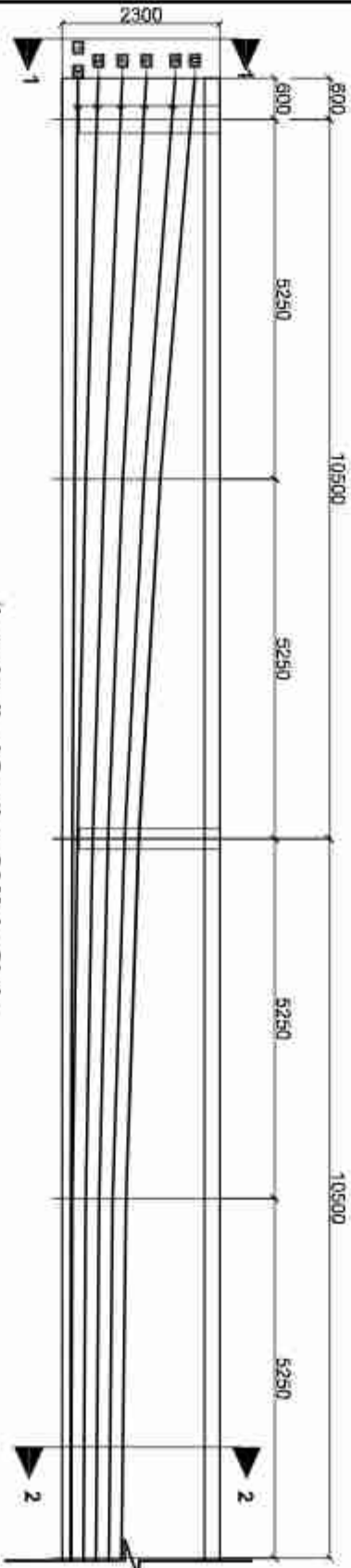
Section A2 2-2
Scale:-1:100

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd. Korea In association with ERMPC P (Ltd) and  JSP- Tech Studio of Engineering Nepal	ROAD NAME:		SHEET TITLE: Reinforcement Details of Slab of Inguna Bridge (48/H001/301_A)	SCALE: As Shown	NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022
		East West Highway (H01)				Designed by: Saroj Bhattachai					
		Dutwal - Gaurasingha Section				Checked by: P. Upadhyaya					
						Dr. T.H.Choi					
DWG. NO.: 301_Inguna SHEET NO.: 08/26											



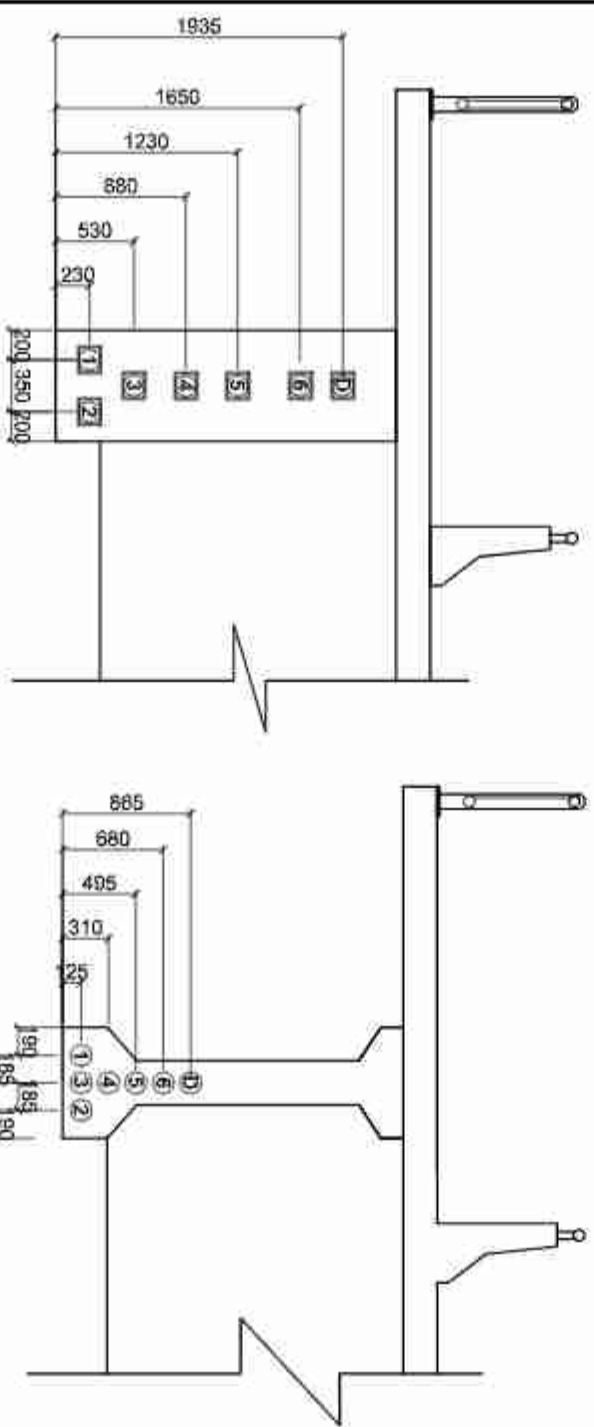
Plan Of Main Girder

Scale:-1:100



Longitudinal Section Of Main Girder

Scale:-1:100



View 1-1

Scale:-1:50

View 2-2

Scale:-1:50

Tendon Layout Data

Anchor face	Bearing centerline		Intermediate sections								Mid span	
	-800	0	5250	10500	15750	21000						
TENDON	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	230	-175	224	-176	181	-180	150	-183	131	-185	125	-185
2	230	175	224	176	181	180	150	183	131	185	125	185
3	530	0	506	0	340	0	221	0	149	0	125	0
4	880	0	848	0	613	0	445	0	344	0	310	0
5	1230	0	1190	0	896	0	689	0	539	0	495	0
Dummy	1935	0	1677	0	1434	0	1118	0	928	0	885	0

Y = Elevation of the tendon center from the girder soffit.

Z = Horizontal distance of the tendon center from the centerline of the girder.

Tendon Elongation and Emergence Angles			
TENDON	Total Jacking Force kN	Total Extension of both sides	Emergence angle degree
1	2600	305	0.556
2	2600	305	0.606
3	2600	304	2.149
4	2600	303	3.022
5	2600	302	3.895
Dummy			5.658

NOTES ON PRE STRESSING:

- All the prestressing operation shall commence after 28 days of casting confirming that the cube specimen has achieved 100% of the prescriptive compressive strength (34N/mm²) No early prestressing allowed.
- Each prestressing tendon shall be multi-strand cable comprising of 18 strands each strand of 12.7mm diameter (19K13) 7 ply low relaxation, Class-II, High Tensile Steel conforming IS:14286-2017.
- Prestressings tendon shall be done in 2 stages as follows:

Stage 1

Precast girder only. After 28days of Casting.

Tendons to be stressed in stage 1 shall be in the following Sequence:

6 5 4 3 - - - -

Total Jacking Force to each tendon in stage 1= 2600kN

Stage 2

After 14 days of Casting of deck slab.

Tendons to be stressed in stage 2 shall be in the following Sequence:

2 1 - - - - - -

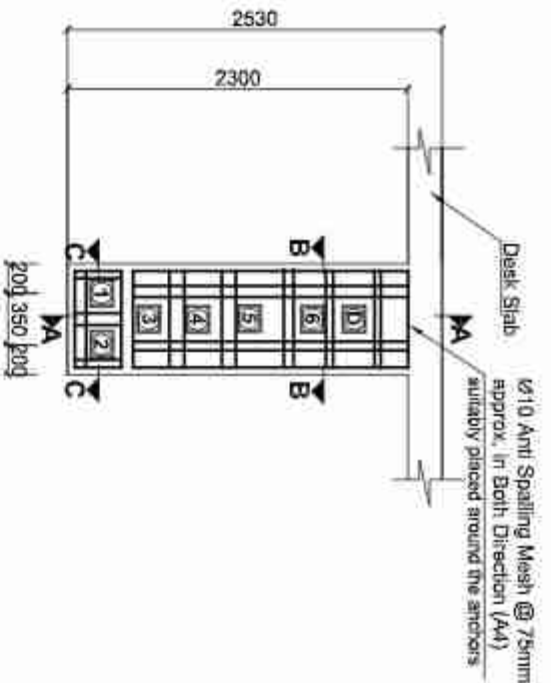
Total Jacking Force to each tendon in stage 2= 2600kN

- Casting of footpaths, crash barriers and wearing course will done only after second stage prestressing.
- Jacking of tendons shall be done from both ends. All the prestress (losses/increased and long term) have been already considered in the design.
- The composite action is considered only for live loads. There shall be no take-work or props to the girder during 2nd stage of prestressing. The formwork for deck slab and cross girders can be supported on the main precast girders.
- The cable elongation at their jacking ends, measured as per the assumption that the Modulus of Elasticity of the cable steel is 1.90x10⁵ N/mm². The manufacturer's specification shall be followed if provided.
- The tendon ducts shall be properly secured to the rebar to maintain the profile throughout concreting process.
- The specified profile and alignment of the tendon shall be strictly maintained if required, the reinforcement bars can be suitably repositioned or slightly bent to accommodate the tendons as per the engineer's instruction.

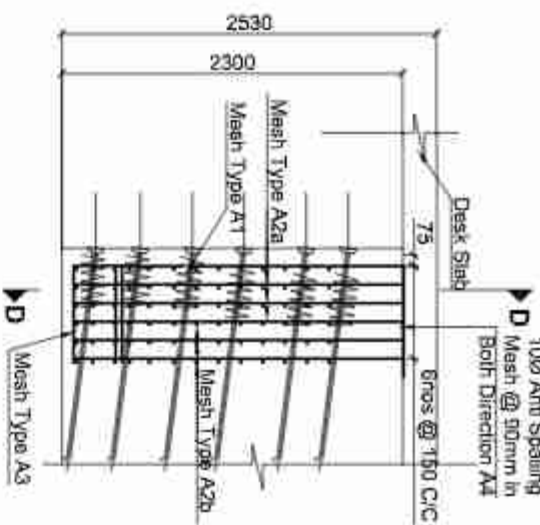
NOTES ON DUMMY CABLE

The cable marked "D" is for future tensioning or in cases of emergency or excessive prestress loss. No tendon shall be provided during construction but the sheathing/anchorage block, bracing reinforcement similar to the other tendons shall be properly installed. The duct shall be left hollow ensuring it is free of debris inside. The anchorage should be capped suitably to keep it free from ingress of foreign material and marked "D" to identify in future.

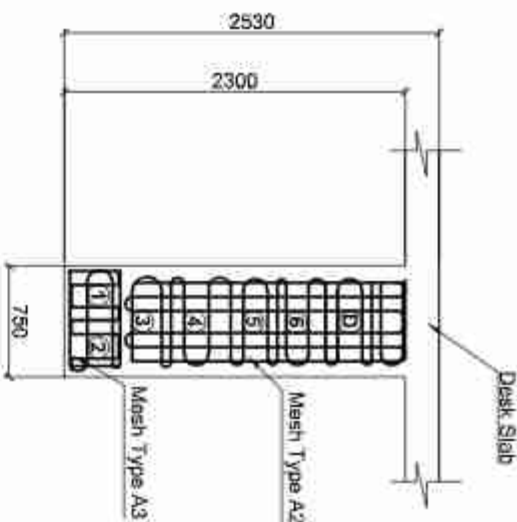
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM Co. P (Ltd) and J&P - Tech Studio of Engineering Nepal		ROAD NAME: East West Highway (H01)		SHEET TITLE: Prestressing Details of Main Girder of (46/H-001/301_A)		SCALE: As Shown		NAME Saroj Dhital		SIGNATURE		REV NO.		DESCRIPTION		DATE: November, 2022	
																		DWG. NO.: 301_Inguir'a	
																		SHEET NO.: 03/26	



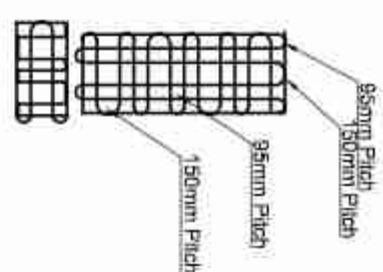
Anti Spalling Reinforcement
Scale:-1:50



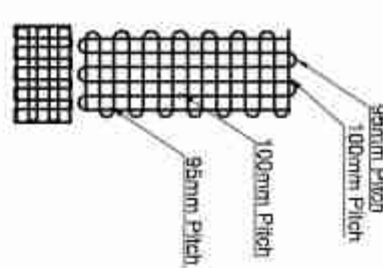
Section A-A
Scale:-1:50



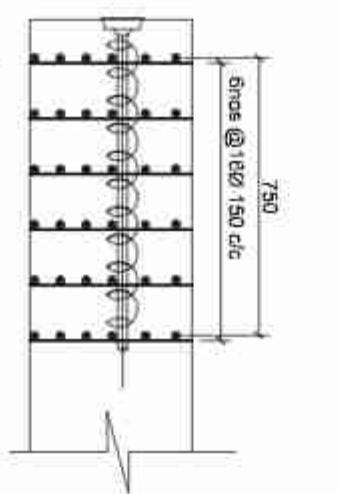
Section D-D
Scale:-1:50



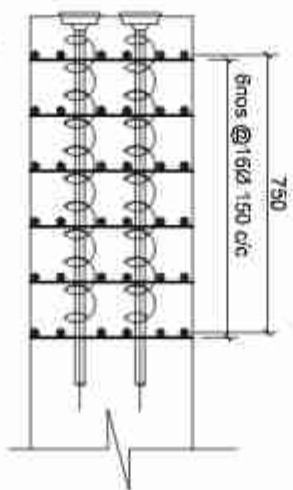
Mesh Type A2a
Scale:-1:50



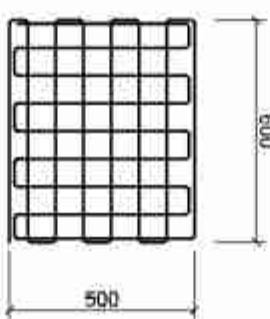
Mesh Type A2b
Scale:-1:50



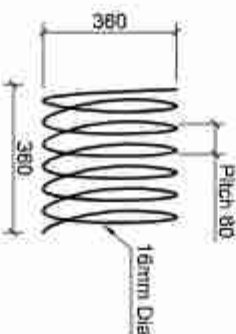
Section A-B
Scale:-1:20



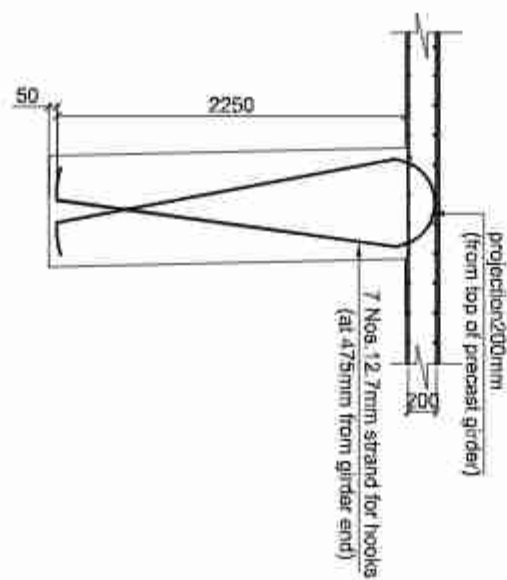
Section C-C
Scale:-1:20



Mesh Type A3
Scale:-1:20



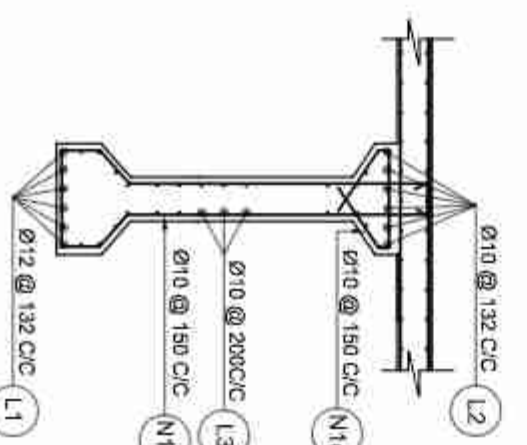
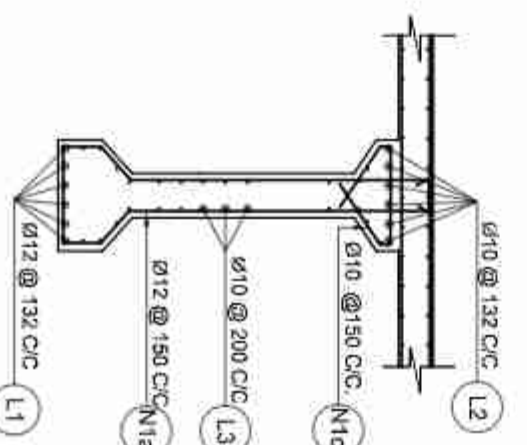
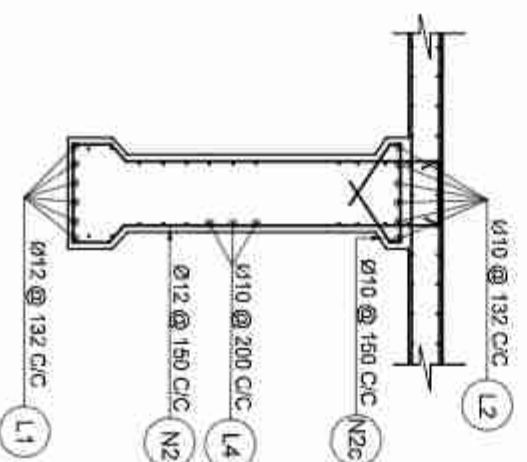
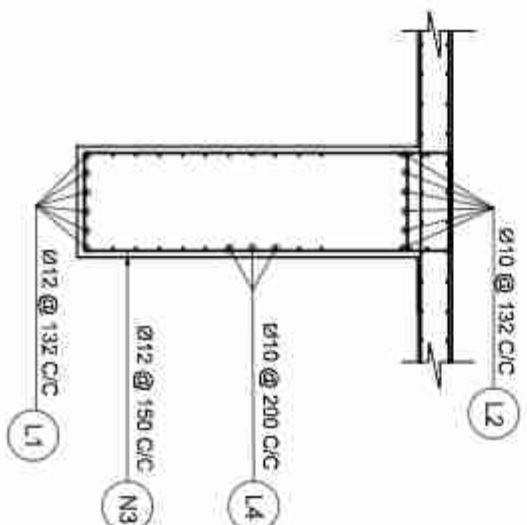
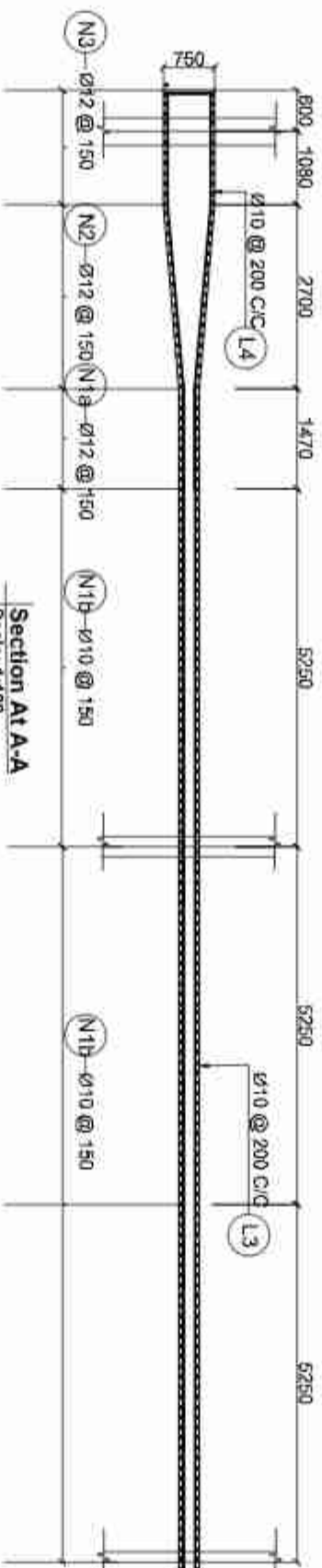
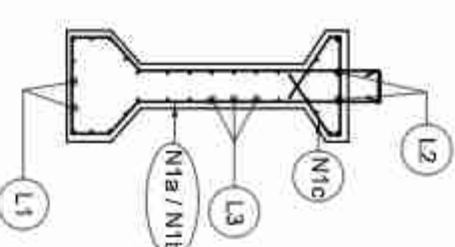
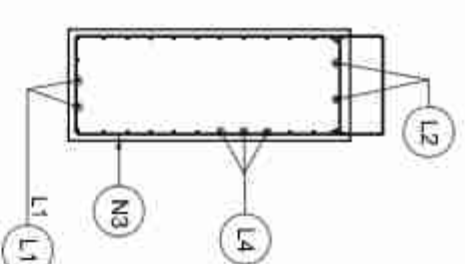
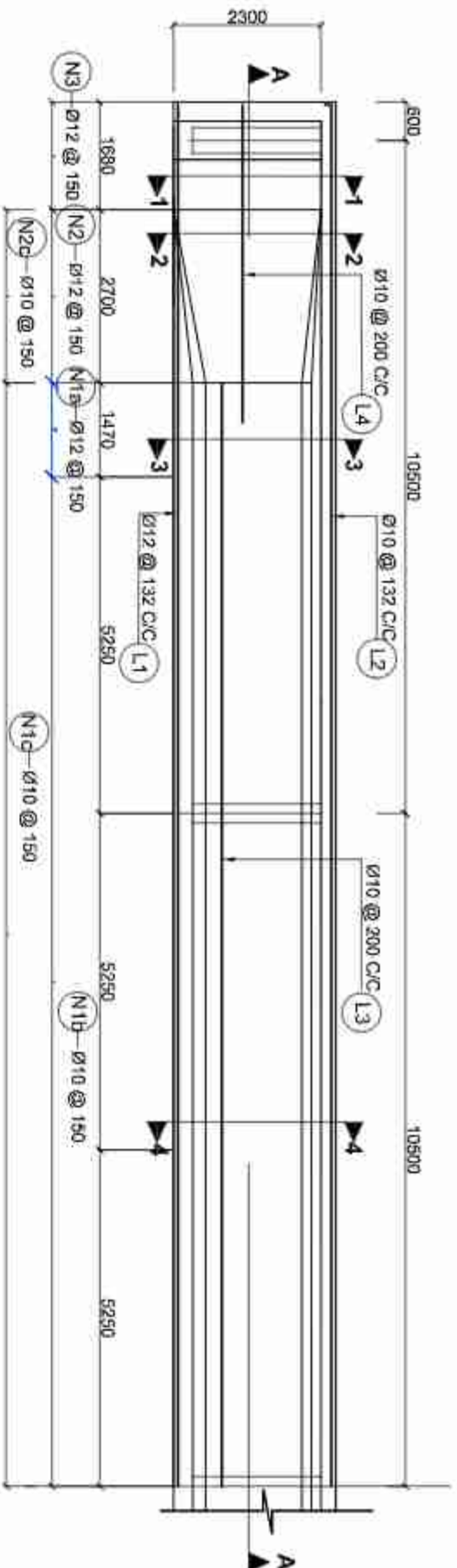
Typical Detail Of Spiral reinforcement A1
Scale:-1:20



Hook Details At Both Ends Of Grille
Scale:-1:50

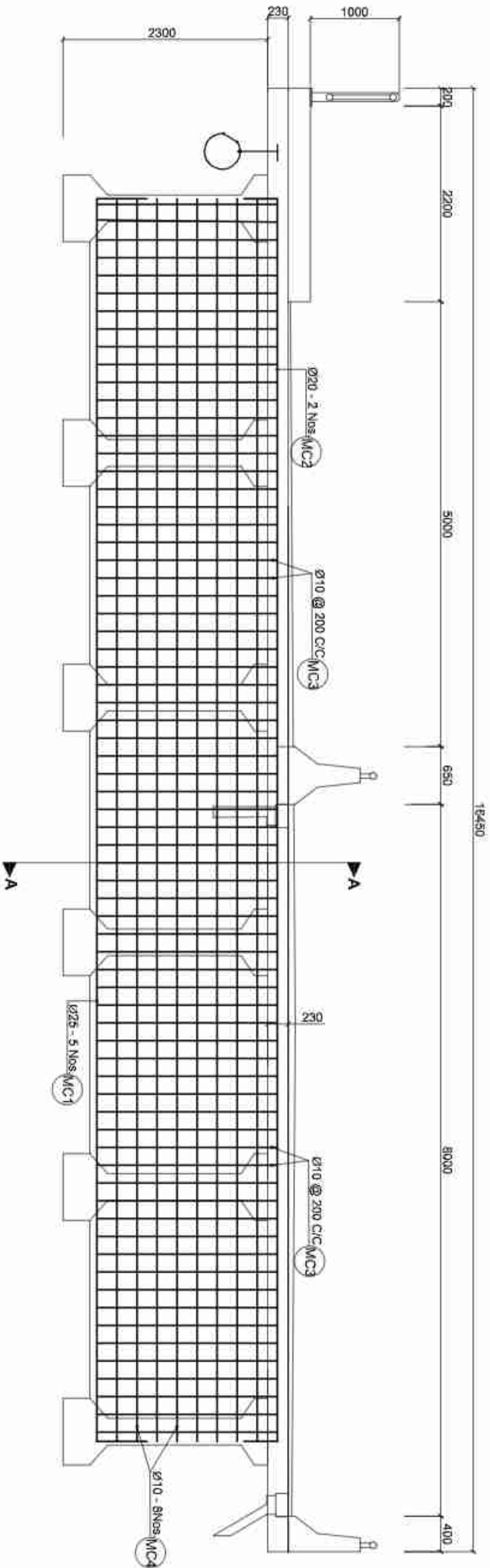
- NOTE:
- The pitch of the mesh should be adjusted to accommodate the anchors and to maintain the duct profile.
 - The spiral and mesh reinforcement shown is indicative, use the anchorage manufacturer's specification if provided.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd, Korea In association with ERM Co P (Ltd) and  JSP-Tech Studio of Engineering Nepal	ROAD NAME:		SHEET TITLE:	SCALE:		NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE:								
											November, 2022								
		East West Highway (H01)									Anchorage Details of Inguna Bridge (46/H001/301_A)	As Shown	Designed by:	Saroj Bhattarai					DWG NO.:
		Dutwal - Gausinge Section											Checked by:	P. Upadhyaya					301 Inguna
				Approved by:	Dr. T.H. Choi						SHEET NO.:								
											10/26								



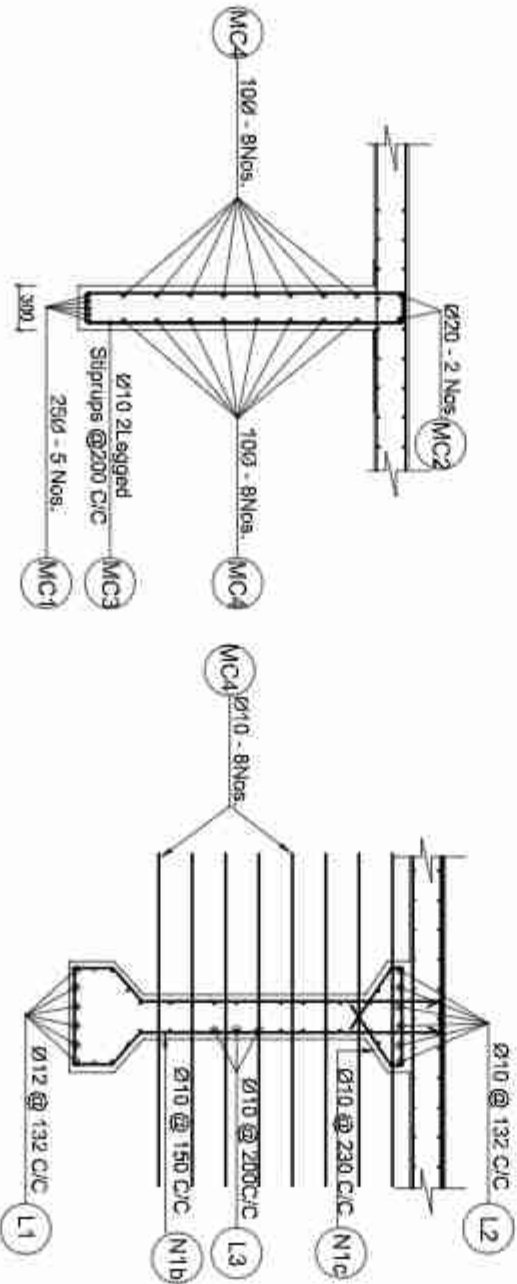
NOTES:
The vertical stirrups of the main girder to be tied to the transverse reinforcement of the slab.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM Co. P (Ltd) and JSPC-Tech Studio of Engineering Nepal		ROAD NAME: East West Highway (H01)		SHEET TITLE: Reinforcement Details of Girder of Ingura Bridge (48/H001/301_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
										Designed by:		Saroj Bhattarai						November, 2022	
										Checked by:		P. Upadhyaya						DWG. NO.:	
										Approved by:		Dr. T.H. Chel						301 Ingura	
																		SHEET NO.:	
																		11/26	



Intermediate Cross Girders

Scale:-1:30



Section A-A

Scale:-1:50

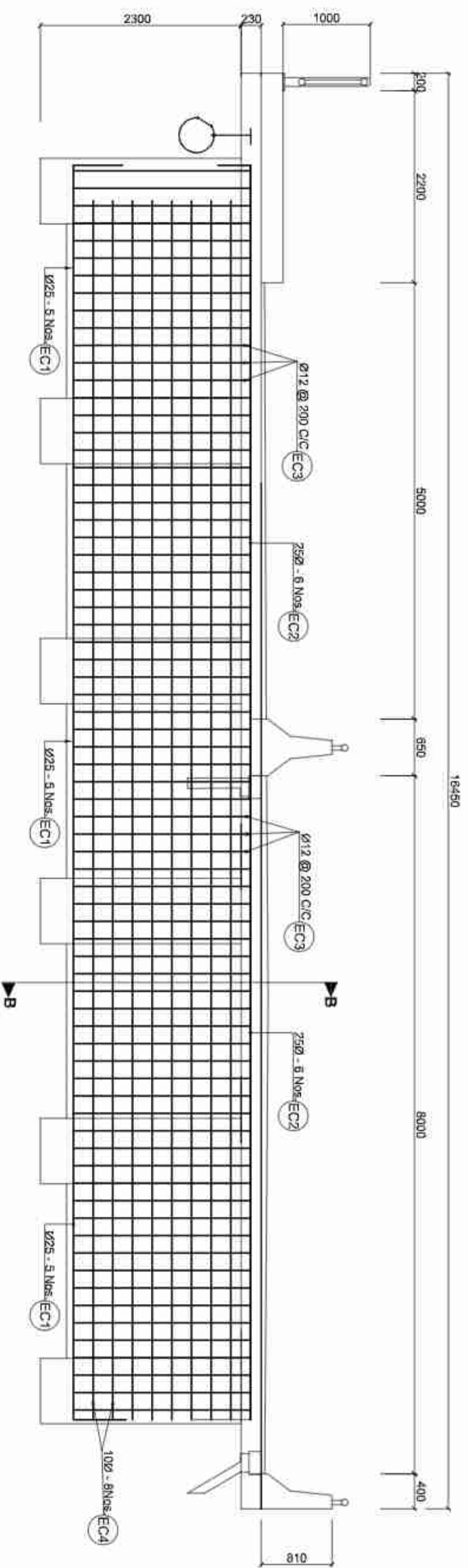
Dowel bar of Intermediate Cross Girder

Scale:-1:50

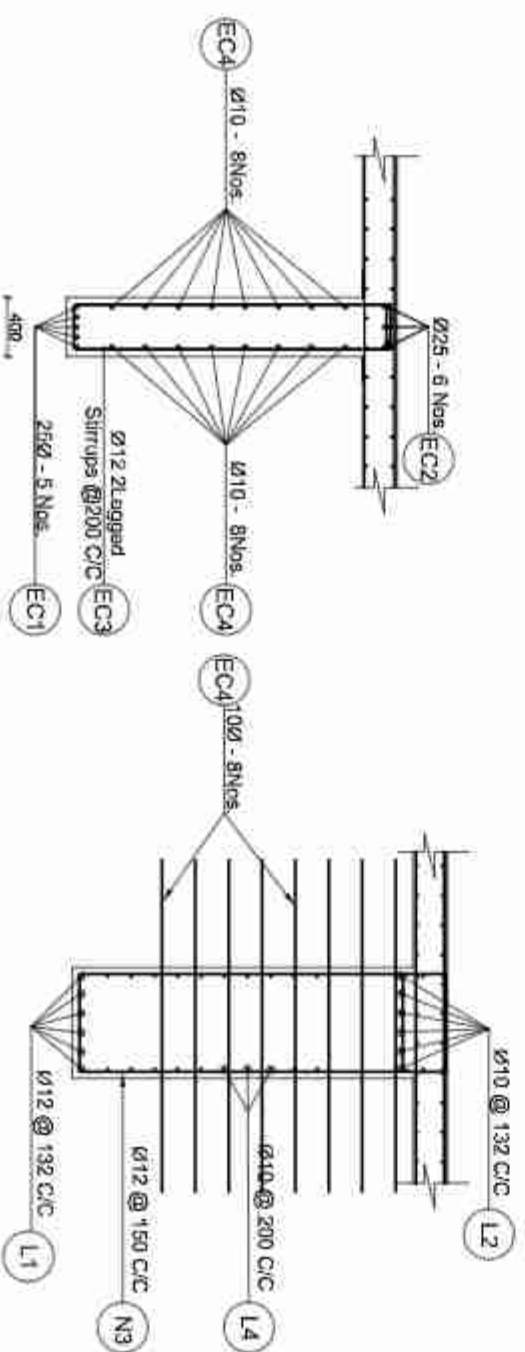
BAR BENDING SCHEDULE OF INTERMEDIATE CROSS GIRDER							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (MM)	NO OF BARS (mm)	NO OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
MC1		25	5	12.155	3.653	292.760	
MC2		0	20	2	12.155	2.456	74.946
MC3		200	10	60	4.820	0.617	206.049
MC4		300	10	18	13.970	0.617	137.608
TOTAL IN ONE GIRDER						710.964	
TOTAL IN ONE GIRDER (IN METRIC TON)						3	2.132

NOTES:
Dowel bars similar to the longitudinal bars of the cross girders shall be pre-installed in the precast main girder before casting. The longitudinal bars of the cross girder shall be lapped to the dowel bars, which shall have a lap length of 60 dia. of the corresponding bars.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		ROAD NAME:		SHEET TITLE:		SCALE:		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
	Soosung Engineering Co. Ltd. In association with ERM P (Ltd) and J&P - Tech Studio of Engineering Nepal		East West Highway (H01)		Reinforcement Details of Intermediate Cross Girder of Ingura Bridge (46/H-001/301_A)		As Shown		Saroj Bhattarai		P. Upadhyaya		Dr. T.H. Choi		DWG. NO.: 301_Ingura		November, 2022	



End Cross Girders
Scale: 1:50



Section At B-B
Scale: 1:50

Dowel bar of End Cross Girder
Scale: -1:50

BAR BENDING SCHEDULE OF END CROSS GIRDER							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (MM)	N OF BAR (mm)	N OF BAR (mm)	LENGTH (m)	WEIGHT/LENGTH H (kg/m)	TOTAL WEIGHT (KG)
EC1		3	25	5	15.195	3.555	282.750
EC2		3	25	5	15.195	3.555	351.312
EC3		200	12	73	0.042	0.808	328.775
EC4		300	10	16	14.070	0.617	158.775
TOTAL IN ONE GIRDER						3108.542	
TOTAL IN ONE GIRDER (IN METRIC TON) 2							2.219

NOTES:

Dowel bars similar to the longitudinal bars of the cross girders shall be pre-installed in the precast main girder before casting. The longitudinal bars of the cross girder shall be lapped to the dowel bars, which shall have a lap length of 60 dia. of the corresponding bars.

NOTES:

Dowel bars similar to the longitudinal bars of the cross

girders shall be pre-installed in the precast main girder before casting. The full depth of the concrete deck

shell be leaped to the dower bars, which shell have a lap

length of 60 dia. of the corresponding bars.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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SIGNATURE	REV NO	DESCRIPTION	DATE
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11/21/2019	11/21/2019	11/21/2019
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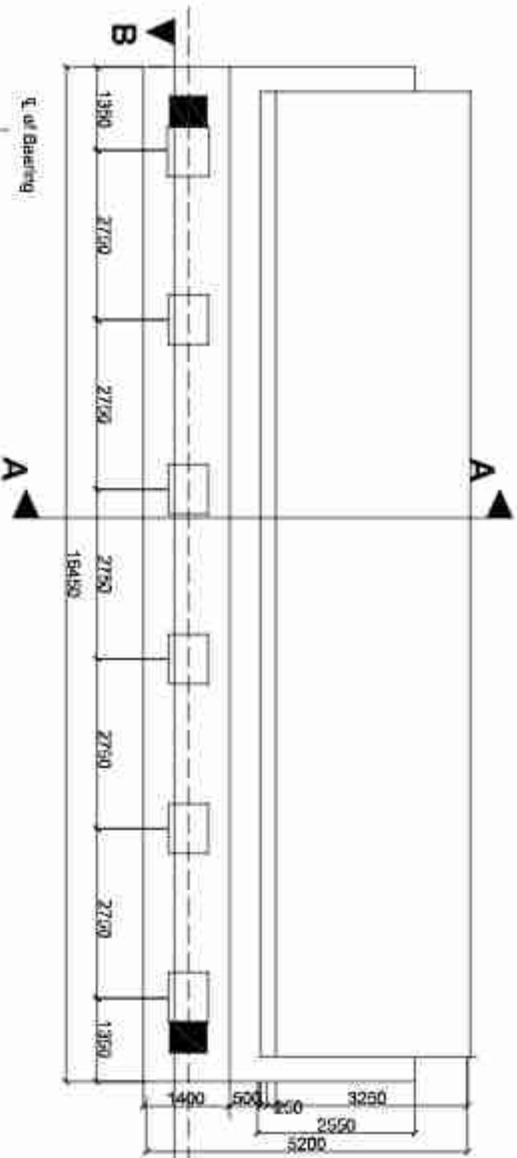
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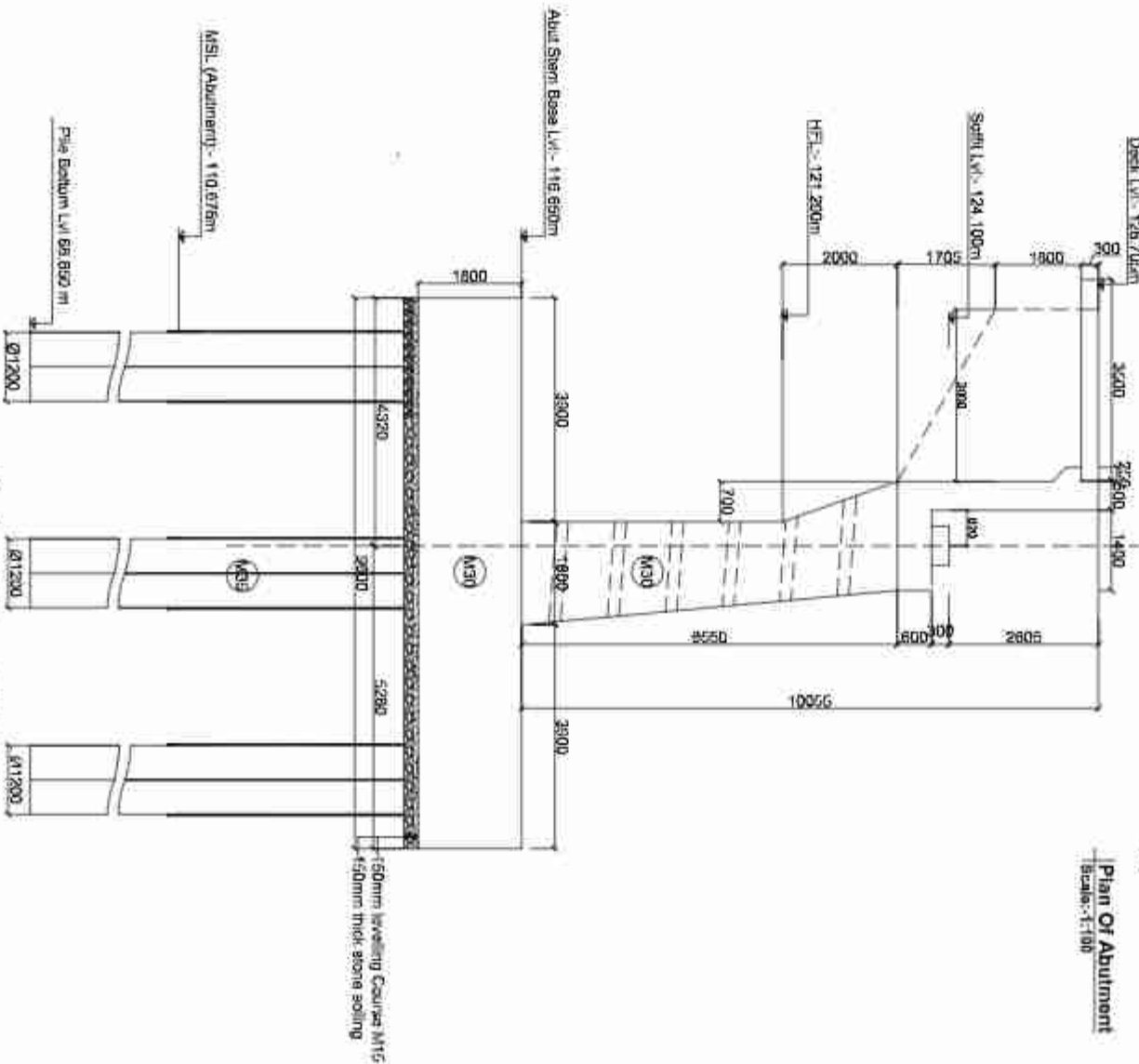
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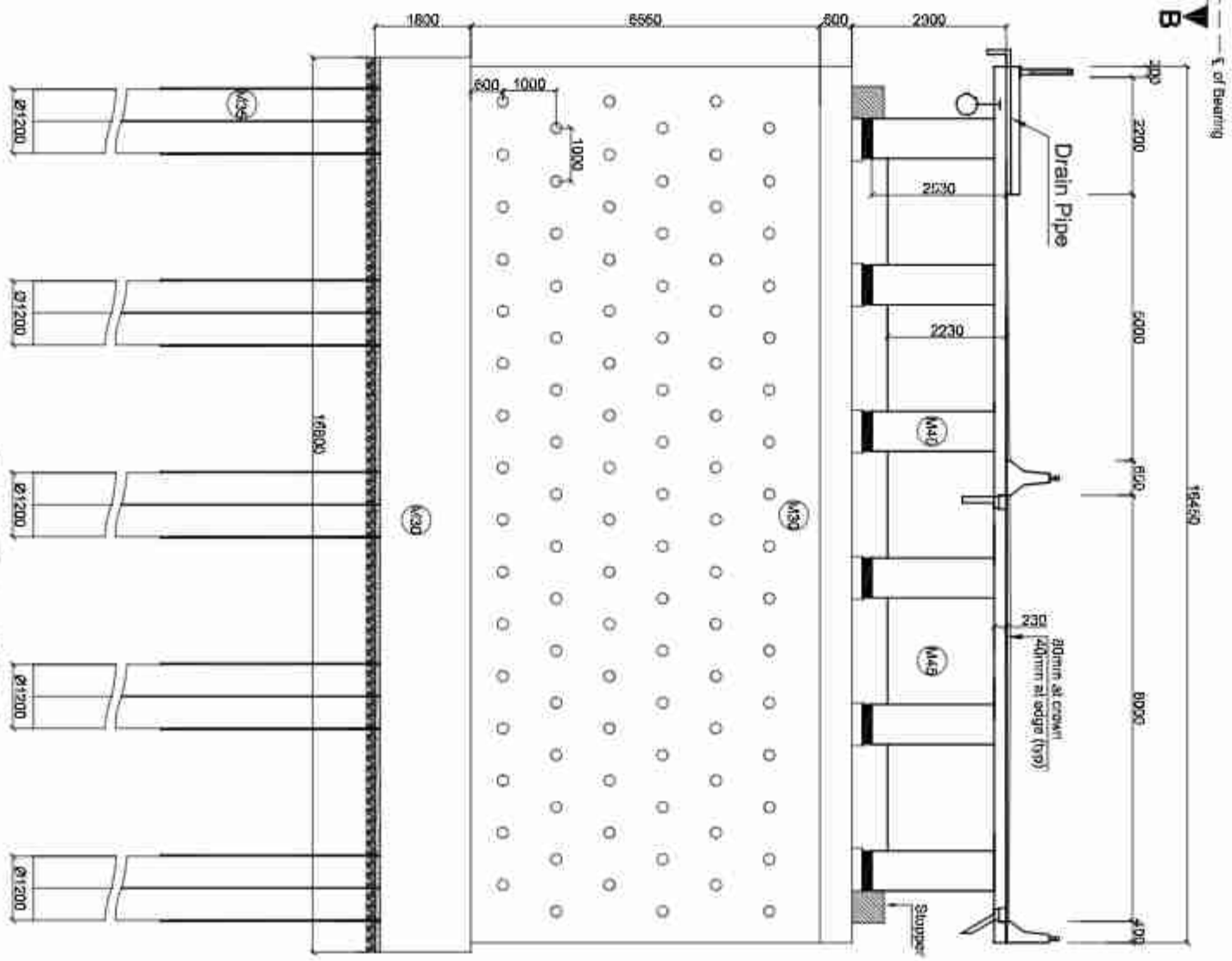
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Plan Of Abutment
Scale: 1:100

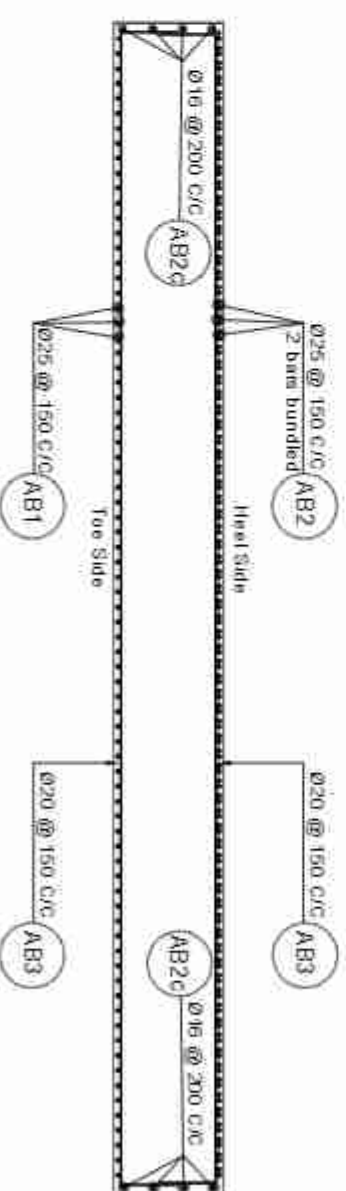
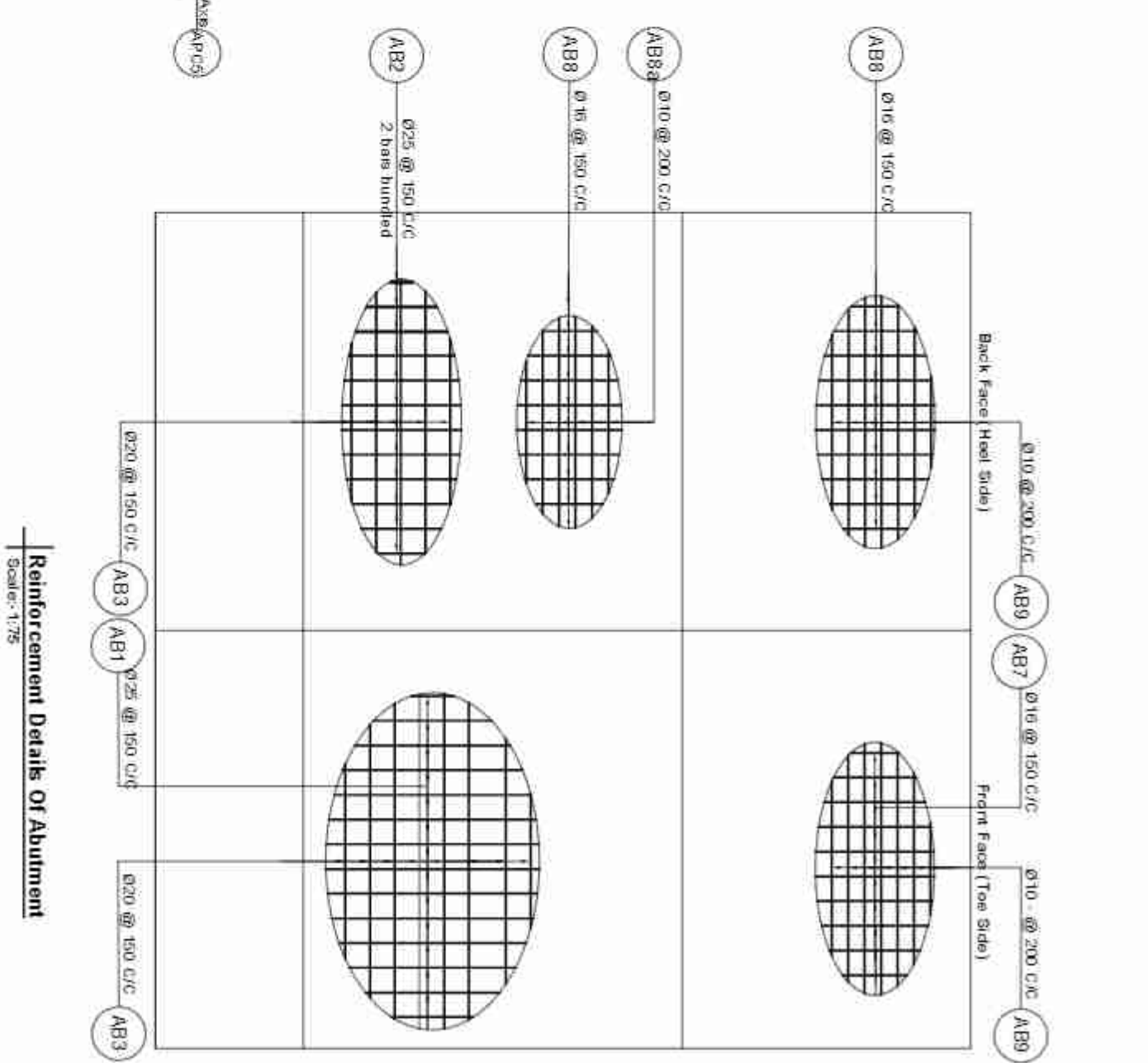
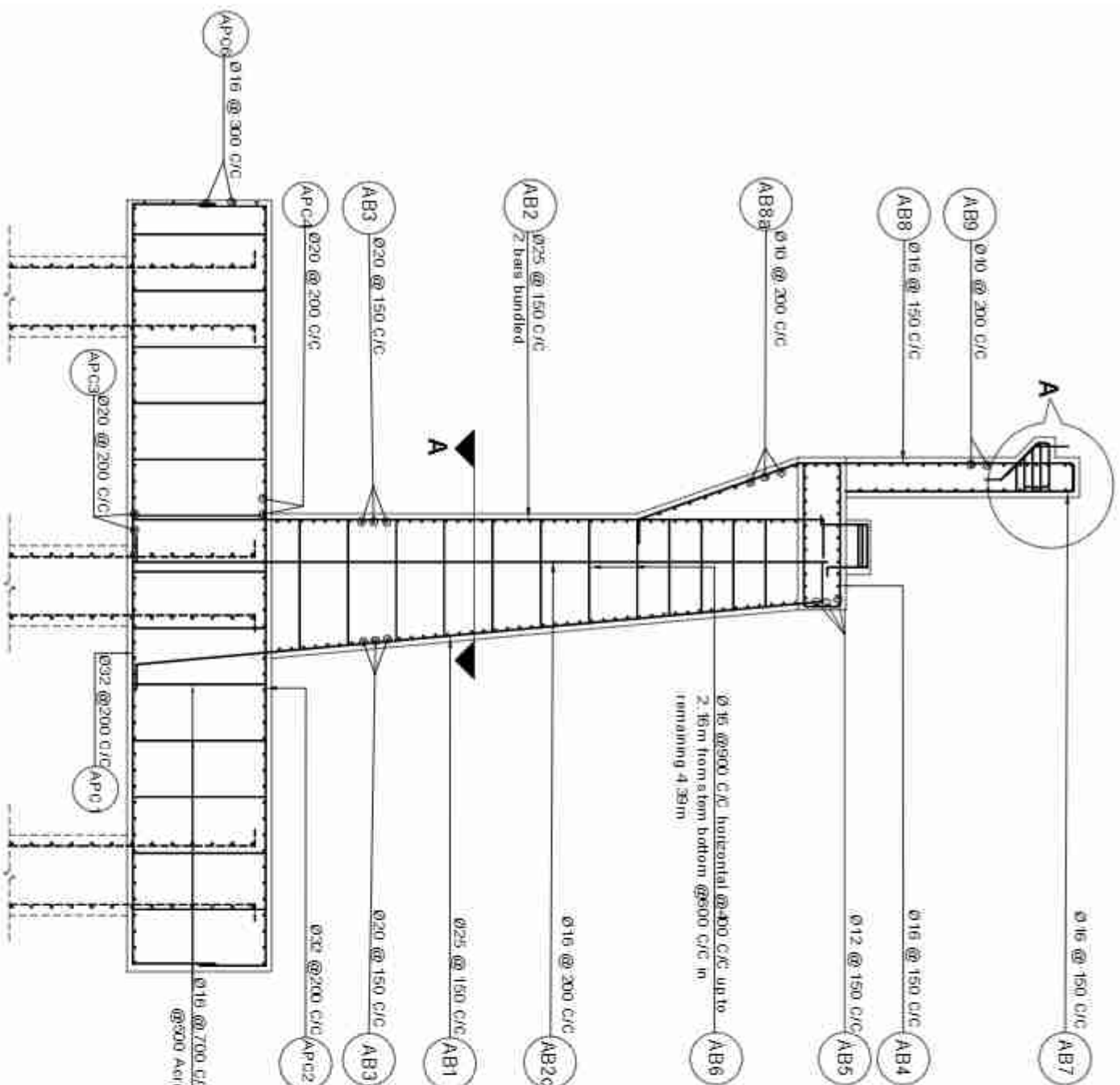


Section of Abutment At (A-A)
Scale: 1:10



Section Of Abutment At (B-B)
Scale: 1:10

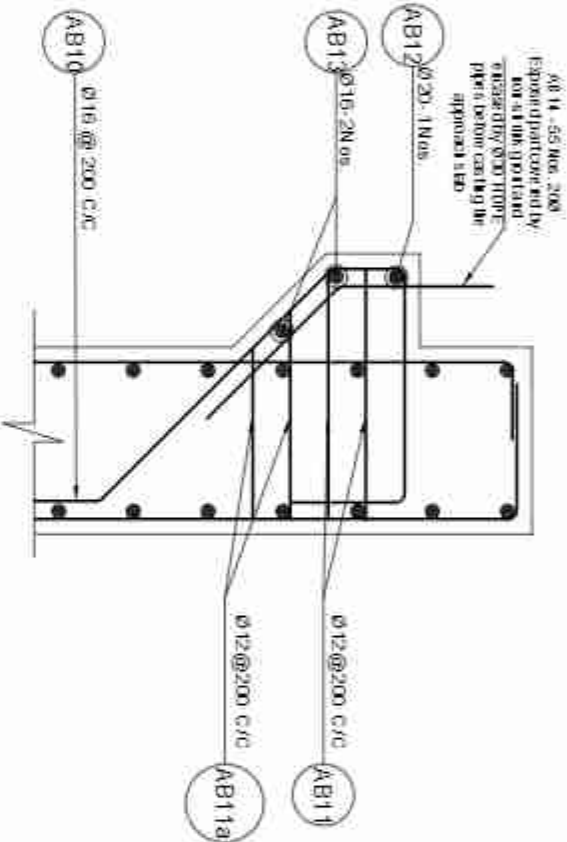
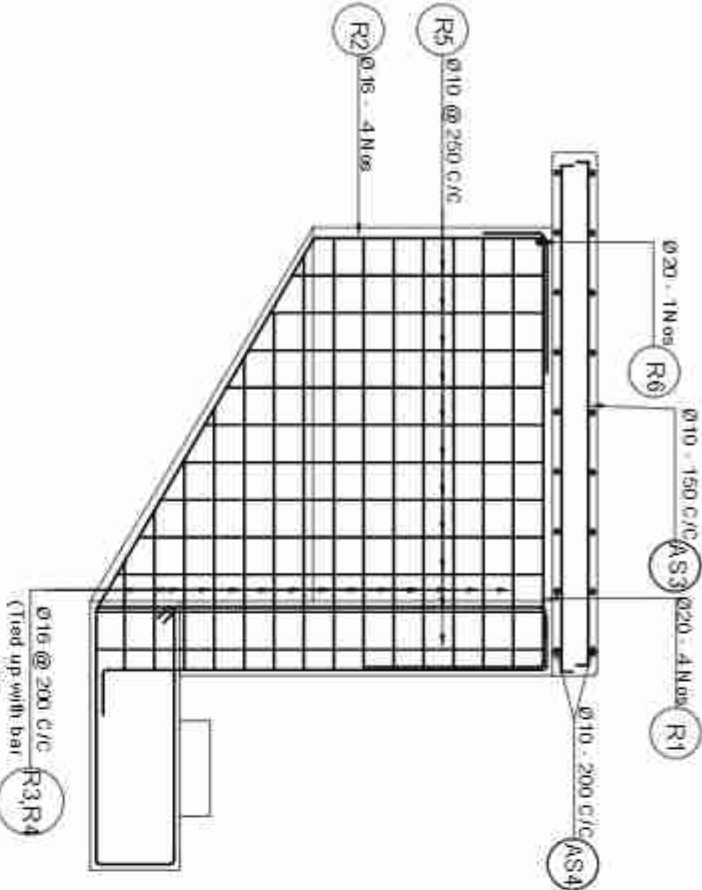
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										Designed by:		Saroj Bhattarai						November, 2022	
										Checked by:		P. Upadhyaya						DWG. NO.:	
										Approved by:		Dr. T.H.Choi						301 Inguna	
																		SHEET NO.:	
																		15/20	



Reinforcement Details of Abutment
Scale: 1/75

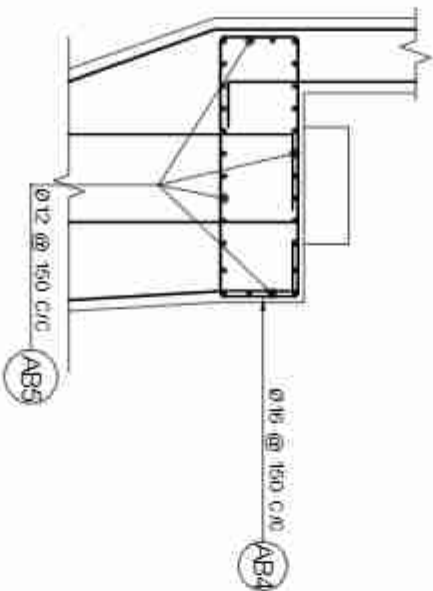
Section at A-A
Scale: 1/75

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASREC Highway Improvement Project Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT: Ssangyong Engineering Co. Ltd. Korea In association with ERMAC P. (Ltd) and 3722-NEP Tech Studio of Engineering Nepal	ROAD NAME: East West Highway (101)		SHEET TITLE: Reinforcement Details of Abutment of Inguria Bridge (AB/H001/201_A)		SCALE: As Shown		NAME: Sanoj Bhattacharya Checked by: P. Upadhyaya Approved by: Dr. T. H. Chel		SIGNATURE: 		REV NO.: 		DESCRIPTION: 		DATE: November 2022		DWG. NO.: 301_Inguria		SHEET NO.: 10/28	
		ROAD NAME: East West Highway (101)		SHEET TITLE: Reinforcement Details of Abutment of Inguria Bridge (AB/H001/201_A)		SCALE: As Shown		NAME: Sanoj Bhattacharya Checked by: P. Upadhyaya Approved by: Dr. T. H. Chel		SIGNATURE: 		REV NO.: 		DESCRIPTION: 		DATE: November 2022		DWG. NO.: 301_Inguria		SHEET NO.: 10/28	



Reinforcement Details Of Wingwall

Detail At A



Reinforcement Details Of Abutment

BAR BENDING SCHEDULE OF WING WALL						
BAR NO	SHAPE OF BAR IN mm (mm TO SCALE)	SPECIFIC (mm)	# OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT (kg)
R1		1200	20	8	5.007	2.466
R2		1200	20	8	5.402	1.578
R3		1200	20	8	5.402	1.578
R4		1200	20	8	5.402	1.578
R5		1200	20	8	5.402	1.578
R6		1200	20	8	5.402	1.578
R7		1200	20	8	5.402	1.578
R8		1200	20	8	5.402	1.578
TOTAL IN 2 WING WALL IN ONE ABUTMENT						608.579
TOTAL WEIGHT IN METRIC TON						0.609

BAR BENDING SCHEDULE OF ABUTMENT						
BAR NO	SHAPE OF BAR IN mm (mm TO SCALE)	SPECIFIC (mm)	# OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT (kg)
AB1		1200	20	8	5.007	2.466
AB2		1200	20	8	5.402	1.578
AB3		1200	20	8	5.402	1.578
AB4		1200	20	8	5.402	1.578
AB5		1200	20	8	5.402	1.578
AB6		1200	20	8	5.402	1.578
AB7		1200	20	8	5.402	1.578
AB8		1200	20	8	5.402	1.578
AB9		1200	20	8	5.402	1.578
AB10		1200	20	8	5.402	1.578
AB11		1200	20	8	5.402	1.578
AB12		1200	20	8	5.402	1.578
AB13		1200	20	8	5.402	1.578
AB14		1200	20	8	5.402	1.578
TOTAL WEIGHT IN ONE ABUTMENT						25175.610
TOTAL WEIGHT IN METRIC TON						25.176

Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

Project Directorate Office (ADB)

SASEC Highway Improvement Project

Project Preparatory Consultant (SHIP-PPC)

ADB Loan No: 3722-NEP

CONSULTANT:

Soosung Engineering Co. Ltd.

in association with

ET&M P (Ltd)

and

30308-Tech Studio of Engineering Nepal

ROAD NAME:

East West Highway (H01)

SHEET TITLE:

Reinforcement Details of Wingwall

SCALE:

As Shown

Designed by:

Garaj Bhattacharya

Checked by:

P. Upadhyaya

Approved by:

Dr. T.H. Choi

DATE:

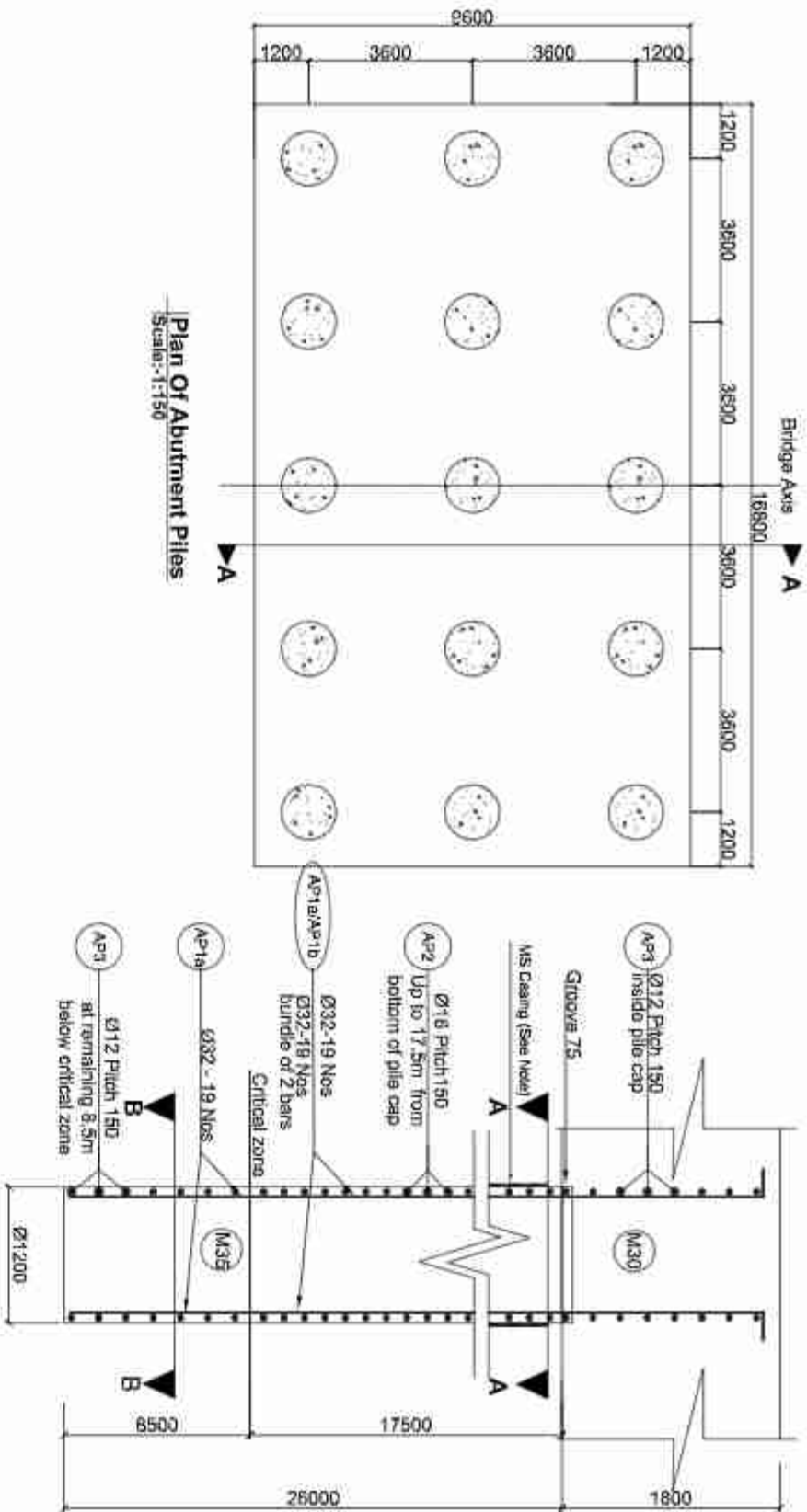
November, 2022

0706/NO:

301_Injuria

SHEET NO:

17/26



BAR BENDING SCHEDULE OF ABUTMENT PILECAP						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	NO. OF BARS	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)
APC1	1080 9418		32	65	11.576	6.313
APC2	1080 9418		32	85	11.578	6.313
APC3	1080 16630		20	49	18.790	2.466
APC4	1080 16630		20	45	18.790	2.466
APC5	1570 1570 Hook length 80		16	500	2.232	1.578
APC6	16650 9450		16	5	62.200	1.578
TOTAL IN PILE CAP OF ONE ABUTMENT						19140.596
TOTAL WEIGHT IN METRIC TON						19.141

BAR BENDING SCHEDULE FOR ABUTMENT PILES						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	NO. OF BARS	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)
AP1a	200 27500		32	19	27.790	6.313
AP1b	200 11600		32	19	19.800	6.313
AP2	1080 17500		16	1	362.050	1.578
AP3	1080 1500		12	1	223.200	0.886
TOTAL WEIGHT IN KG						6467.196
TOTAL IN ALL PILE WEIGHT IN MT						6.467

For Construction Methodology and Sequence Please See General Notes:

Note: On MS permanent casing on piles. In case piling works are done without temporary casing, the piles shall be lined with 6mm thick MS steel permanent casing up to 1.5 m or 0.5m below MSL, whichever is higher (Subject to instruction and approval by the Engineer)

Location	Design Pile Length m	Design Working load on pile (non - seismic case) kn	Allowable Bearing Capacity on pile (Seismic case) kn	Allowable Bearing Capacity of the Pile (Non Seismic case) kn
Abutment	26.0	2425	3403	3731
Pier	0.0	00	00	00

Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

Project Directorate Office (ADB)

SASEC Highway Improvement Project-
Project Preparatory Consultant (SHIP-PPC)

ADB Loan No: 3722-NEP

CONSULTANT:

Soosung Engineering Co. Ltd.

Korea

In association with
ERMPC P (Ltd)

and
.89%-Tech Studio of Engineering
Nepal

ROAD NAME:

East West Highway (H01)

SHEET TITLE:

Reinforcement Details of
Abutment Piles of
Ingura Bridge
(46/H-001/301_A)

SCALE:

As Shown

NAME

Saroj Dhital

SIGNATURE

REV NO.

DATE:

November, 2022

Designed by:

Saroj Dhital

Checked by:

P. Upadhyaya

Approved by:

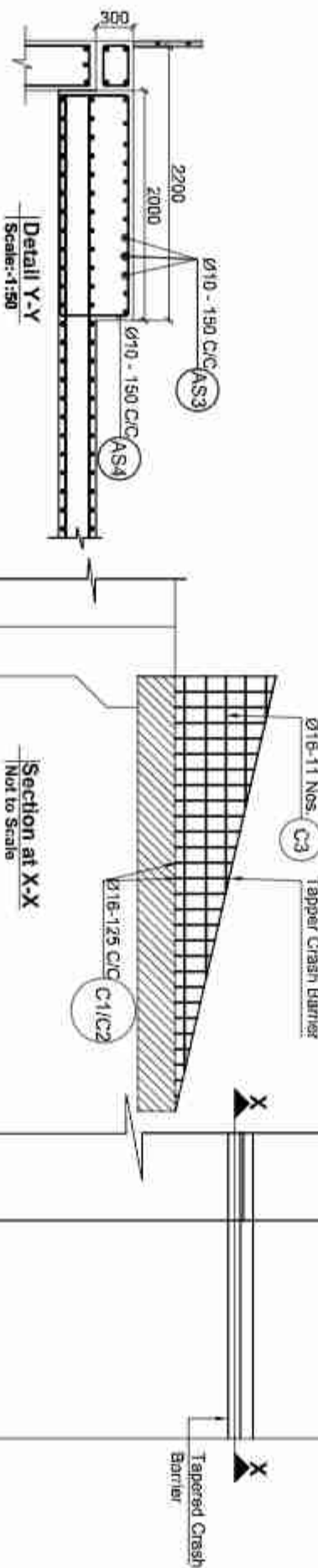
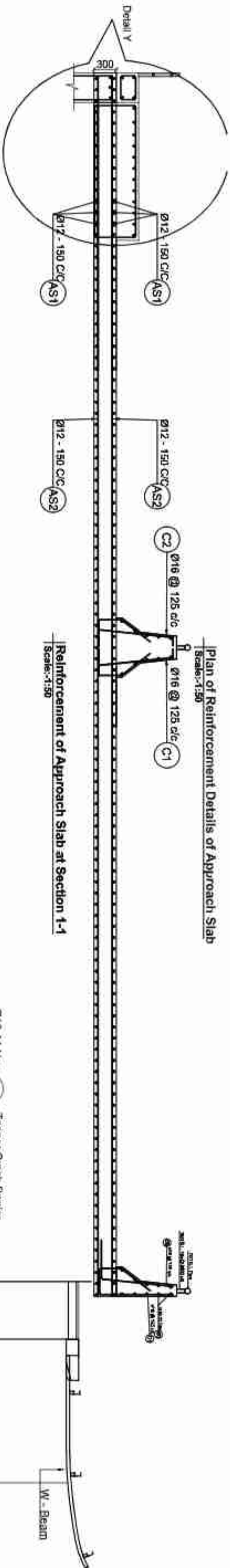
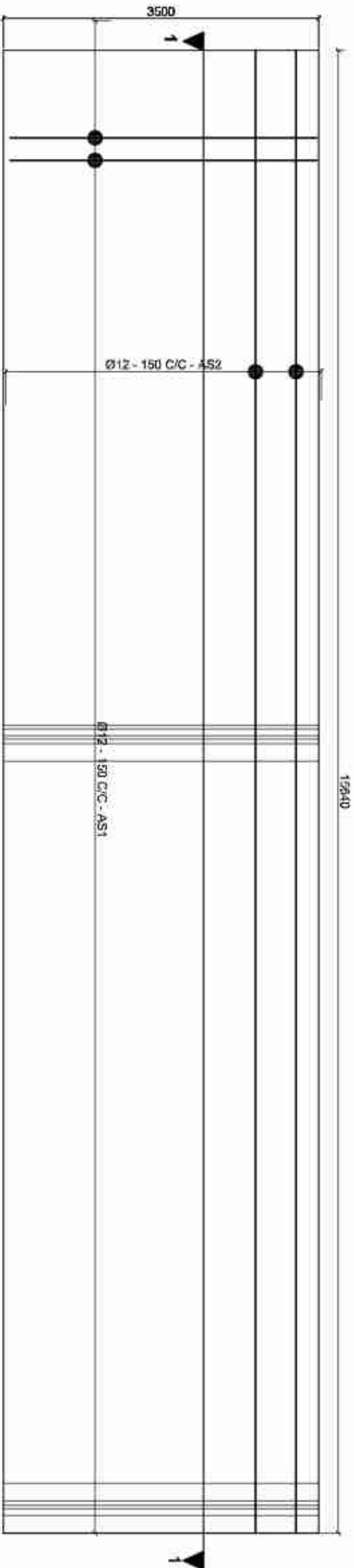
Dr. T.H. Choi

DWG. NO.:

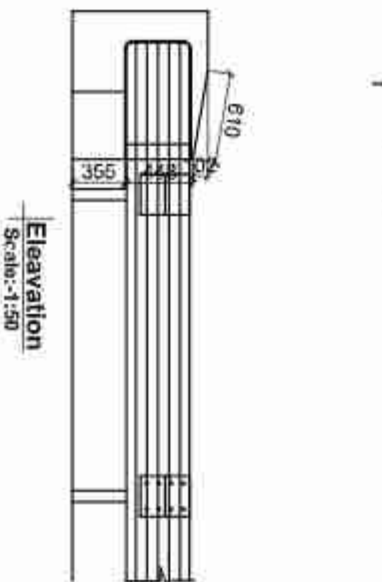
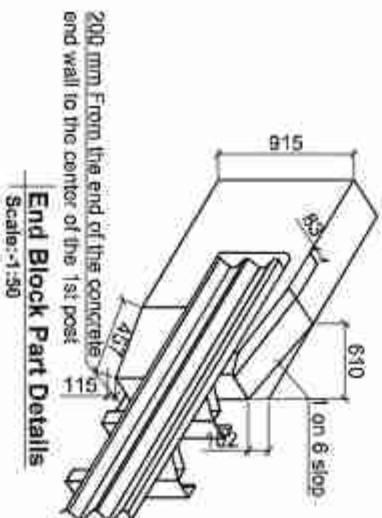
301 Ingura

SHEET NO.:

18/20

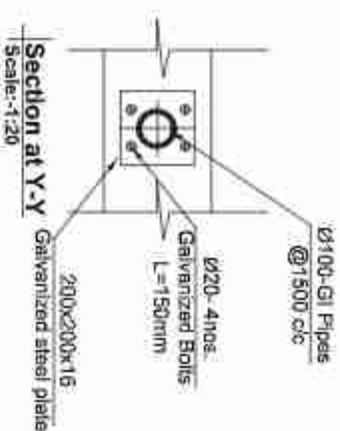


BAR BENDING SCHEDULE OF APPROACH SLAB					
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	NO OF BARS (mm)	NO OF BARS (mm)	LENGTH (mm)
AS1	3400	12	210	3400	0.896
AS2	15550	12	48	15550	0.896
AS3	3400	10	35	3400	0.817
AS4	15550	10	48	15550	0.817
TOTAL IN ONE APPROACH SLAB					1383.489
TOTAL WEIGHT IN METRIC TON					1.383



Plan of Approach Slab
Not to Scale

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM P (Ltd) and JSPS-Tech Studio of Engineering (Nepal)	ROAD NAME: East West Highway (H01)		SHEET TITLE: Reinforcement Details of Approach Slab of Ingura Bridge (46/H001/301_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
		Detail - Gousinge Section		As Shown		Designed by: Saroj Bhattarai		Checked by: P. Upadhyaya		Approved by: Dr. T.H. Choi		DWG. NO.: 301 Ingura		SHEET NO.: 19/20		November, 2022	



10'0" x 12'0" (C3)

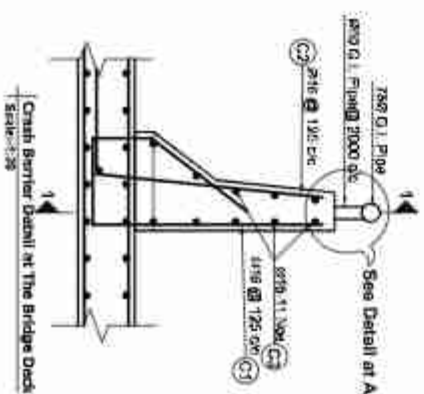
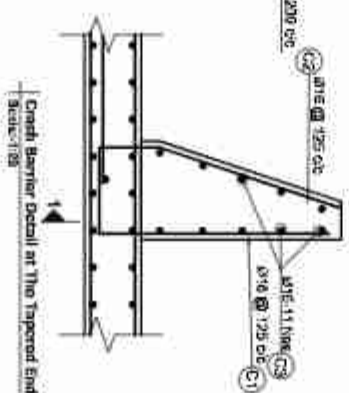
8'10" x 11'0" (C2)

8'10" x 8'10" (C1)

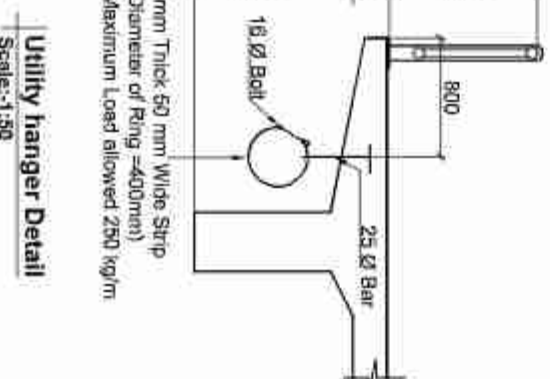
See Detail at A

Central Crash Barrier at The Bridge Deck

Scale: 1:20

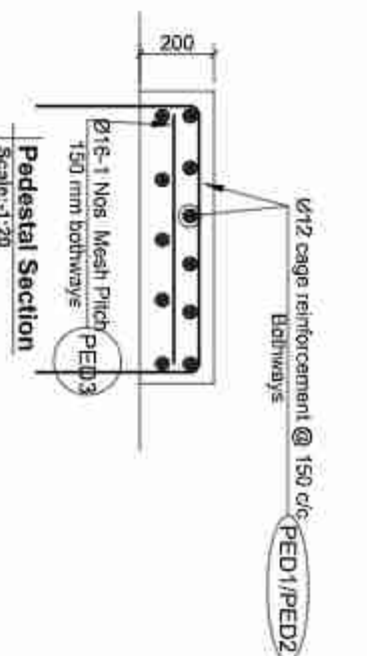
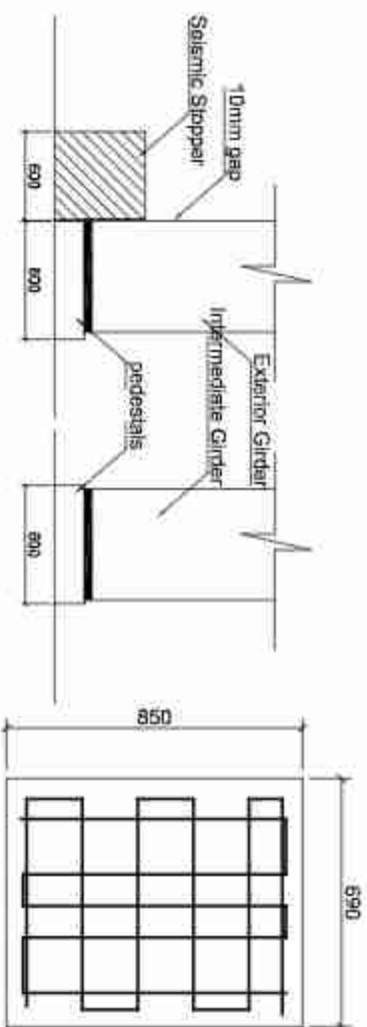


NOTES:
The crash barrier shall be sloped at both ends of the bridge as shown and the reinforcement shall be adjusted according to the slope.

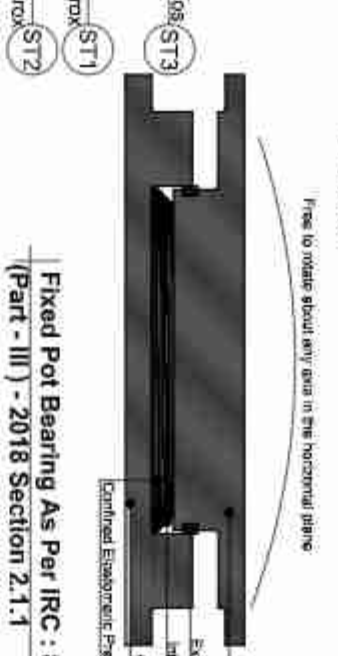


Ø75 G.I. Pipe
 Ø50 G.I. Pipe @ 2000 c/c
 Galvanized Steel Plate (100x150)
 Ø20 Galvanized Drilled
 Epoxy Anchor (L=100mm)

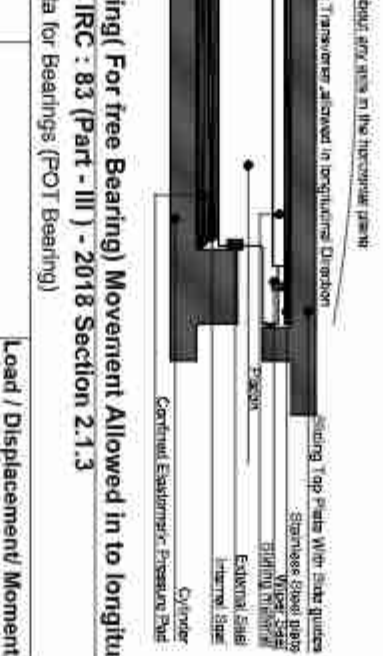
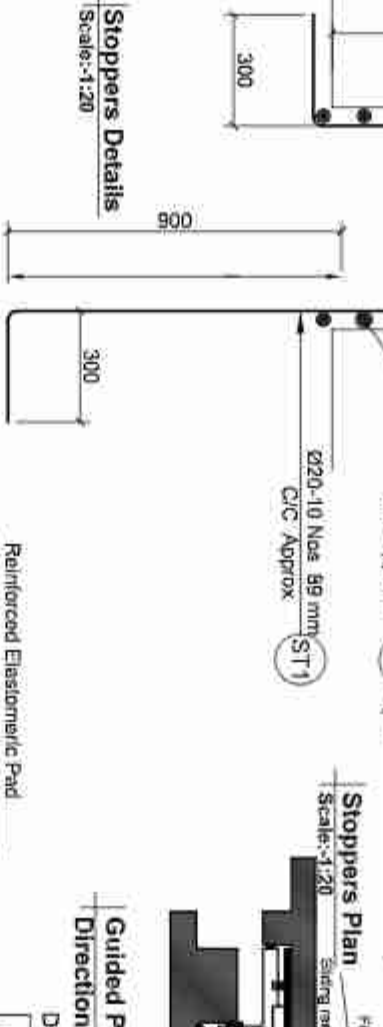
In association with
ERMIC P (Ltd)
and
Jyoti - Tech Studio of Engineering
Nepal



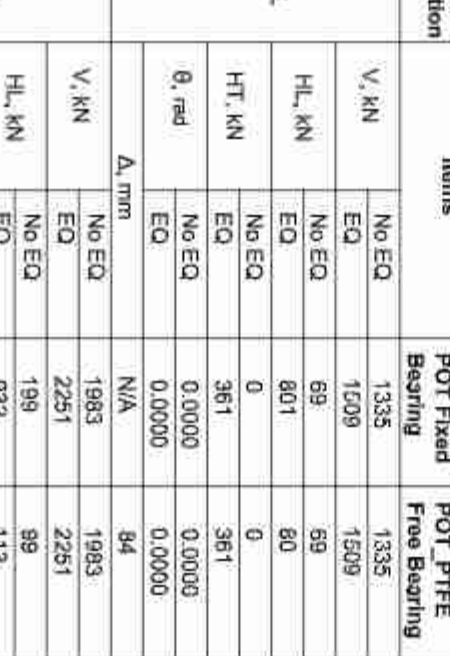
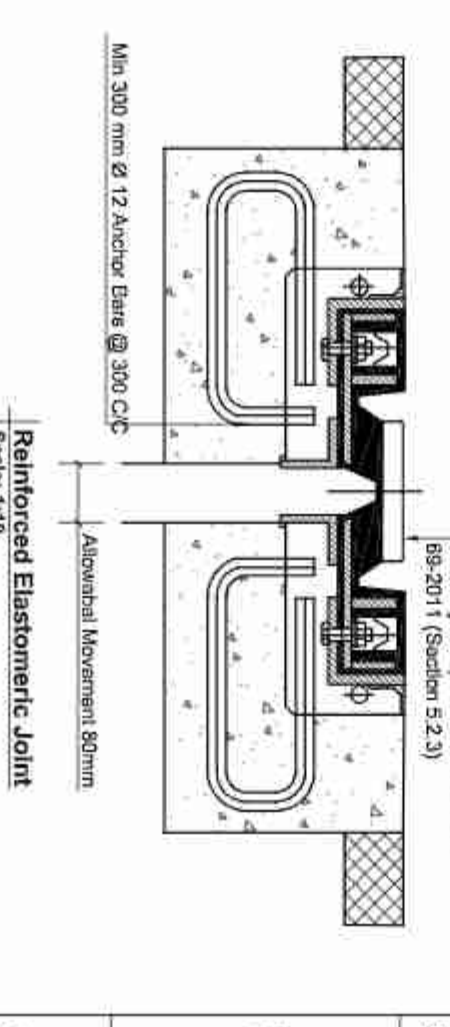
BAR BENDING SCHEDULE OF PEDESTAL						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (MM)	N OF BARS (mm)	N.O. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)
PED1		720	200	16	6	3.010
PED2		610	920	16	7	2.850
PED3		724	624	16	2	8.520
TOTAL WEIGHT IN KG					66.888	
TOTAL WEIGHT IN MT					0.067	



BAR BENDING SCHEDULE OF STOPPER						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (MM)	N OF BARS (mm)	N.O. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)
ST1		600	1500	20	10	3.200
ST2		520	400	10	8	2.840
ST3		800	10	4	0.800	0.617
TOTAL WEIGHT IN KG					91.395	
TOTAL WEIGHT IN MT					0.091	



Guided Pot Bearing (For free Bearing) Movement Allowed in to longitudinal Direction As Per IRC : 83 (Part - III) - 2018 Section 2.1.3						
Load Condition	Items	Load / Displacement Moment	POT Fixed Bearing	POT_PTFE Free Bearing		
Under DL only	V, KN	No EQ	1335	1335		
		EQ	1509	1509		
	HL, KN	No EQ	69	69		
		EQ	801	80		
Under HT only	HT, KN	No EQ	0	0		
		EQ	361	361		
	θ, rad	No EQ	0.0000	0.0000		
		EQ	0.0000	0.0000		
Δ, mm					84	
Under Maximum Live Load	V, KN	No EQ	1983	1983		
		EQ	2251	2251		
	HL, KN	No EQ	199	89		
		EQ	832	113		
Under Maximum Live Load	HT, KN	No EQ	0	0		
		EQ	498	498		
	θ, rad	No EQ	0.0004	0.0004		
		EQ	0.0004	0.0004		
Δ, mm					84	

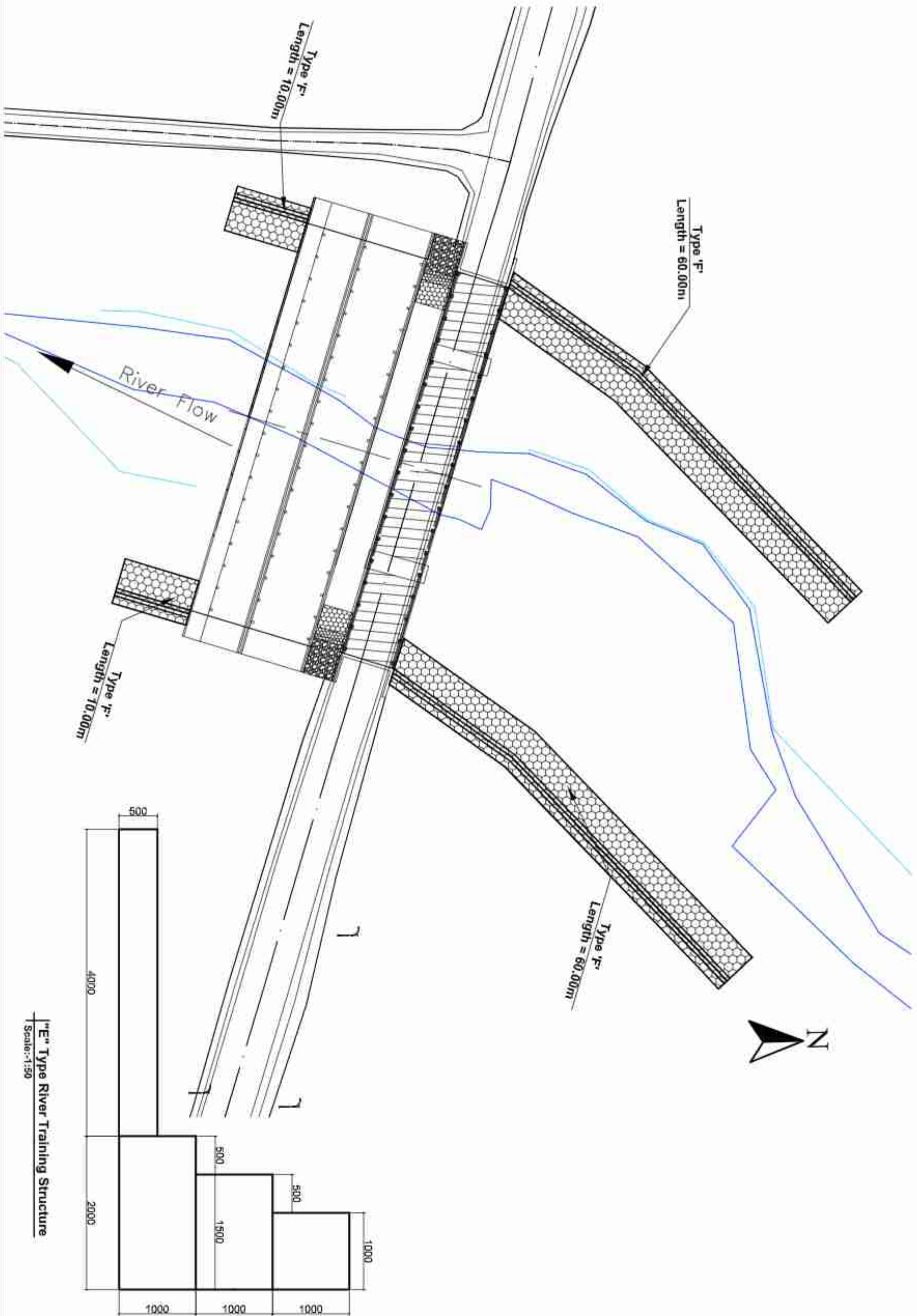


Notes: Proposed Type of Bearing - POT-PTFE bearings						
1)	The POT-Fixed bearings are fixed in position and free to rotate in all directions					
2)	The POT-PTFE Free bearings are free to rotate in all direction, Free to slide along the bridge axis and Fixed in position in transverse direction					
3)	The coefficient of friction, μ for PTFE free bearings is taken as 0.05					



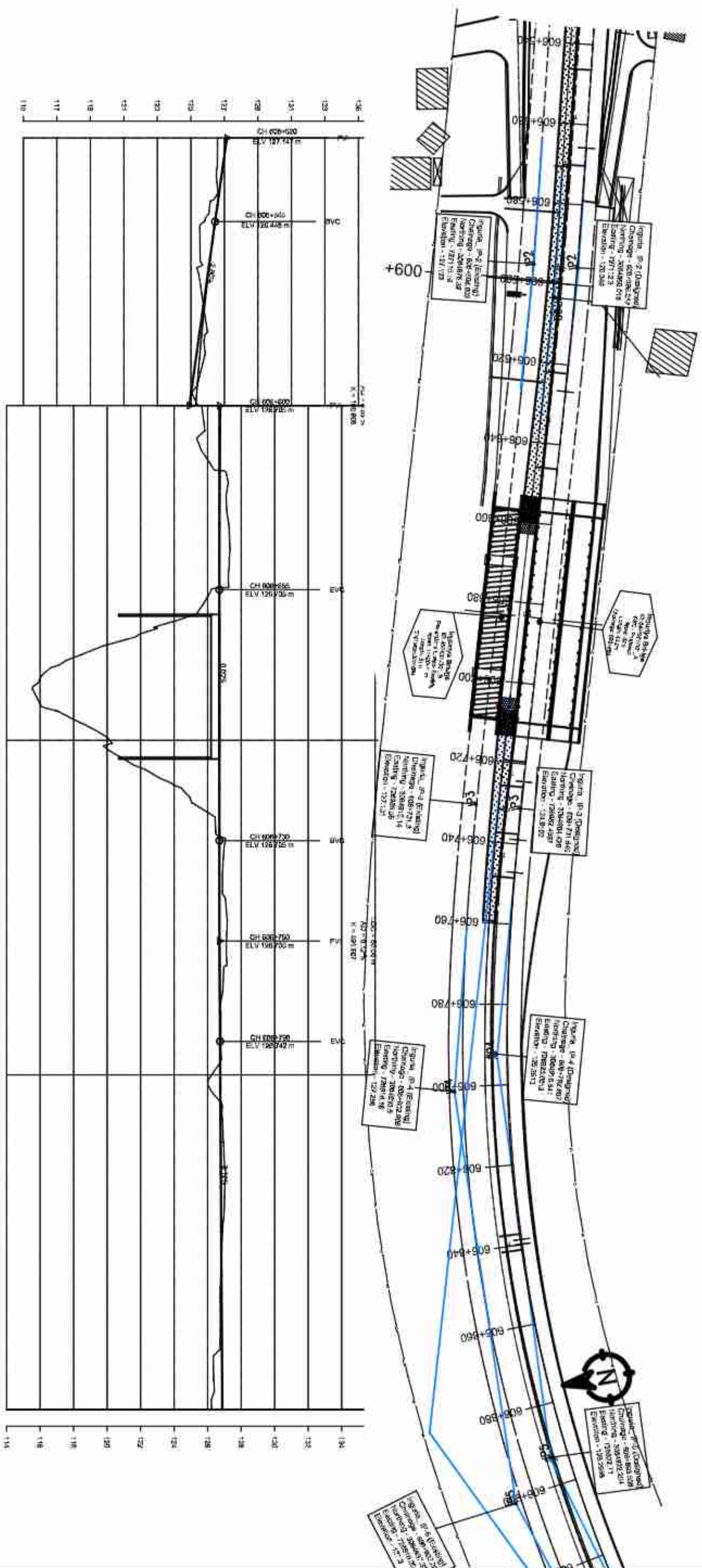
Notes: On Pedestal Thickness The thickness of the pedestal can be suitably adjusted as per engineer's instruction to retain the height of the ballast well						
1)	The POT-Fixed bearings are fixed in position and free to rotate in all directions					
2)	The POT-PTFE Free bearings are free to rotate in all direction, Free to slide along the bridge axis and Fixed in position in transverse direction					
3)	The coefficient of friction, μ for PTFE free bearings is taken as 0.05					

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM Co. P (Ltd) and JSP- Tech Studio of Engineering Nepal		ROAD NAME: East West Highway (H01)		SHEET TITLE: Miscellaneous Details - 2 of Inguna Bridge (46/H-001/301_A)		SCALE: As Shown		DATE: November, 2022	
								DESIGNED BY: Saroj Bhattacharjee		DWG. NO.: 301 Inguna	
								CHECKED BY: P. Upadhyaya		SHEET NO.: 21/20	
								APPROVED BY: Dr. T.H. Chel			

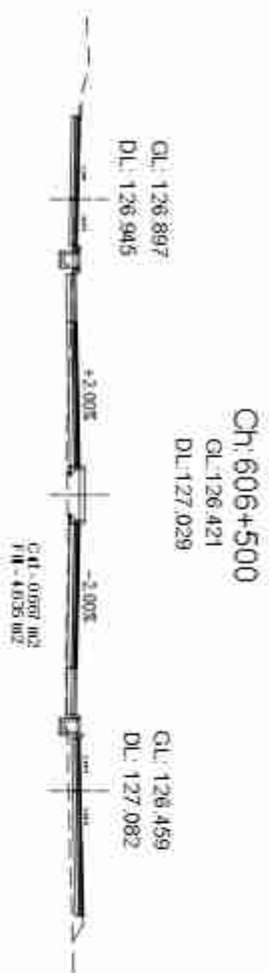


"E" Type River Training Structure
Scale:-1:50

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with ERMCo P (Ltd) and JSPC- Tech Studio of Engineering Nepal	ROAD NAME: East West Highway (H01)	SHEET TITLE: River Training Work of Inguna Bridge (46/H-001/301_A)	SCALE: As Shown	NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022
			Dutwal - Gausinsing Section			Designed by:	Saroj Bhattarai				DWG. NO.: 301_Inguna
						Checked by:	P. Upadhyaya				SHEET NO.: 22/20
						Approved by:	Dr. T.H.Choi				



DESIGN LEVEL(m)	EXISTING LEVEL(m)	HORIZONTAL ALIGNMENT		SUPER ELEVATION	CHAINAGE(Km)
		LEFT	RIGHT		
127.147	126.087	B-30.60	B-30.60	AC	606+000
126.968	126.027				
126.968	126.027				
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126.968	126.027	T	T	T	606+050
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126.968	126.027	T	T	T	606+100
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126.968	126.027	T	T	T	606+150
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126.968	126.027				
126.968	126.027	T	T	T	606+200
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126.968	126.027				
126.968	126.027	T	T	T	606+250
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126.968	126.027	T	T	T	606+300
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Ch: 606+510
GL: 126.561
DL: 127.097



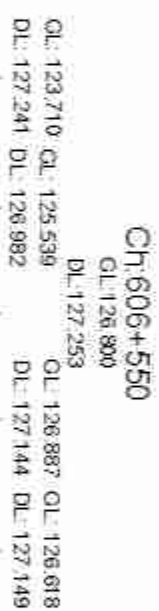
Ch: 606+520
GL: 126.689
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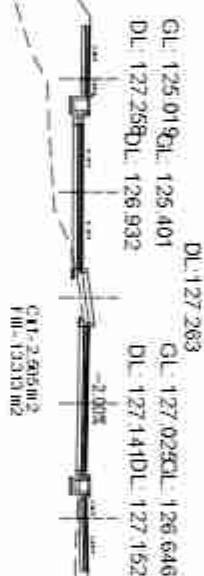
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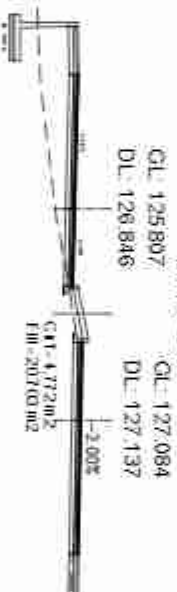
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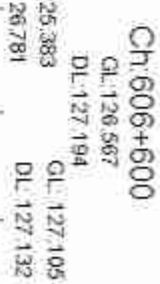
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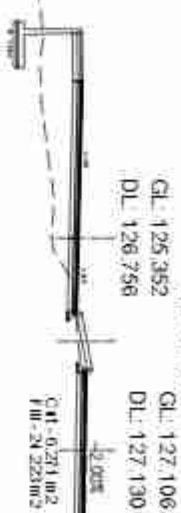
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Ch: 606+590
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Ch: 606+610
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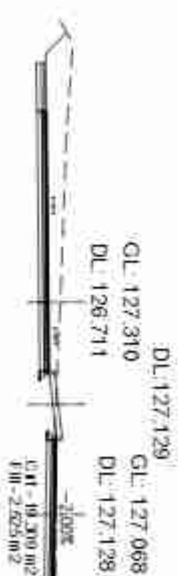
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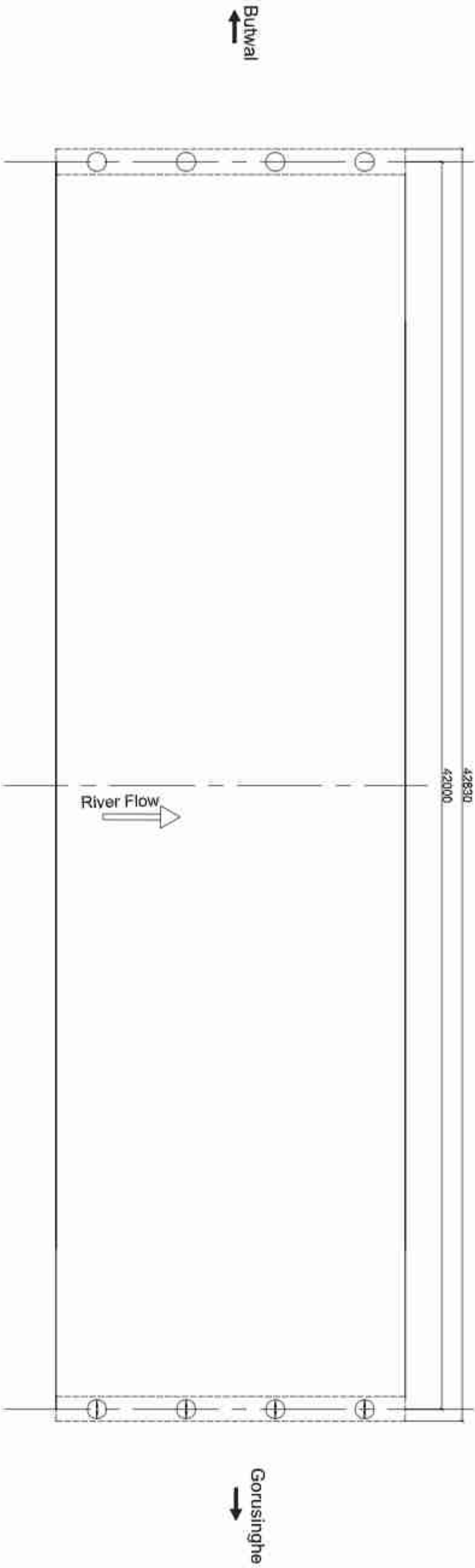
Ch: 606+630
GL: 127.030
DL: 127.136



Ch: 606+640
GL: 127.088
DL: 127.129



Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd., Korea in association with  ERM Co. P (Ltd), Nepal and  TSE Tech Studio of Engineering	IMPLEMENTING AGENCY:	SHEET TITLE:	SCALE:		NAME	SIGNATURE	REV. NO.	DESCRIPTION	DATE:	
		DOR, DCID	Cross Section of East West Highway (H01) Ch 605+500 - 600+640		DESIGNED BY:	S.B. Shrestha					November, 2022
					CHECKED BY:	P. Upadhyaya					DWG. NO.: 301_Inquire
					APPROVED BY:	Dt. T.H.Chd					SHEET NO.: 04.126



Layout of Bearing
Scale:-1:150

Legend

-  Elastic bearing.
Partial movement allowed in longitudinal direction.
Restrained to transverse movement.Free to rotate in any direction.
-  Fixed bearing.
Restrained to lateral movement.Free to rotate in any direction.
-  Free bearing.
Partial movement allowed in longitudinal direction.
Restrained to transverse movement.Free to rotate in any direction.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT:  Soosung Engineering Co. Ltd. Korea In association with ERM Co. P (Ltd) and J&K - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID		SHEET TITLE:		SCALE:		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
				ROAD NAME:		Layout Plan of Inguna Bridge (45/H001/301_A)		As Shown		Designed by:								November, 2022	
				East West Highway (H01)						Checked by:								DWG. NO.:	
				Butwal - Gorusinghe Section						Approved by:								301_Inguna	
																		SHEET NO.:	
																		26/20	

Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

Project Directorate (ADB)

Implementing Agency : DOR, DCID

Project Preparatory Consultants

Under

SASEC Highway Improvement Project (SHIP-PPC)

(ADB Loan No. 3722 Nep)

Contract No. SHIP/PPC/2020/02

Banarhawa Bridge(46-H001-302_A)

St. Ch : 607+165.40 ~ End Ch : 607+206.60

Detailed Drawing

Butwal - Gorusinghe Sector

November,2022

S.No.	DESCRIPTION	DWG. NO	NO. OF SHEETS
1.	General Notes.	1 - 2	2
2.	Topographic Map.	3	1
3.	General Arrangement.	4-5	2
4.	Bore Logs.	6	1
5.	Detail of Superstructure.	7	1
6.	Reinforcement Details of Slab.	8	1
7.	Prestressing Details of Main Girder .	9	1
8.	Anchorage Details.	10	1
9.	Untensioned Reinforcement Details of Girder.	11	1
10.	Bar Bending Schedule of Slab & Main Girder.	12	1
11.	Reinforcement Details of Intermediate Cross Girder.	13	1
12.	Reinforcement Details of End Cross Girder.	14	1
13.	Abutment Details.	15	1
14.	Reinforcement Details of Abutment .	16	1
15.	Reinforcement Details of Wingwall .	17	1
16.	Reinforcement Details of Abutment Pile .	18	1
17.	Reinforcement Details of approach Slab.	19	1
18.	Miscellaneous Details.	20-21	2
19.	River Training Work.	22	1
20.	Plan & Profile.	23-24	2
21.	Cross Section.	24.1-24.2	2
22.	Layout Plan.	25-26	2

GENERAL NOTES

General

- Metric system of measurement is used in all drawings. Elevation and Stations are shown in Meter and all other dimensions are in Millimeters, except indicated otherwise.
- In case of contradictions, specific notes on respective sheet shall supersede the General Notes
- No dimensions shall be scaled from the drawings. Only written dimensions shall be followed. Any doubtful matter in the drawings shall be brought to the attention of the engineer-in-charge for any corrections before the execution of the works.

Design Notes

The design codes followed:

- For RCC and PSC concrete - IRC:112-2020
- For loads and stresses - IRC:6-2017
- For substructure and foundations - IRC:78-2014
- For seismic design - IRC:SP:114-2018, Seismic zone V, Importance factor 1.2

Design live loads:

For urban area bridges

Case 1 - 3 lanes of class A + pedestrians, 1 lane of class A + 1 lane of class 70R + pedestrians

Case 2 - 4 lanes or class A; 2 lanes of class A + 1 lane of class 70R, No pedestrians

For non-urban area bridges

Case 1 - 2 lanes of class A + pedestrians; 1 lane of class 70R + pedestrians

Case 2 - 3 lanes of class A; 1 lane of class A + 1 lane of class 70R, No pedestrians.

Notes on Concrete

In General the grade of concrete to be used shall be as follows:

(unless otherwise specified in the respective drawing sheets)

For superstructure deck slab, wearing course, crash barriers:

M30

For raised footpaths:

M25

For main girders and cross girders of superstructure with PSC girders:

M45

For main girders and cross girders of superstructure with RCC girders:

M30

For substructure: Abutment stem, ballast wall, stoppers, bearing pedestals,

pier cap, pier stem and pile caps:

M30

For bored and cast in situ piles:

M35

For leveling course:

M15

The maximum size of aggregate shall be as per IRC:112-2020, clause 18.4.4.2

Admixture to the concrete

To improve workability and/or increase initial setting time of concrete and cement grout, admixture conforming to IS:9103 and ASTM C-494, (Type F - High Range Water Reducing admixture) can be added in appropriate dosage, subject to their satisfactory proven use.

Clear Cover to reinforcement (unless otherwise specified in the respective drawing sheets)

Reinforcement bars of all components of the superstructure:

40mm

Prestressing ducts or strands in superstructure:

75mm

All components of abutment, pier, pile caps and piles

75mm

(except stoppers and bearing pedestals):

50mm

Bearing pedestals and Stoppers:

Cover shall be ensured with the use of properly sized cement concrete blocks which can be secured to the re-bars or other devices approved by the engineer-in-charge. Use of loose stones or wooden pieces is not permitted.

Notes on Reinforcement

- All reinforcing steel bars shall be High Strength Deformed bars with grade Fe500 conforming to IS:1786
- Laps and Splices shall conform to IRC:112-2020, Clause 15.2.5. Use of mechanical coupler is permitted upon approval by the engineer.

Notes on Prestressing

- Prestressing strands shall be Class-2, uncoated 7 ply, low relaxation type with ultimate tensile stress 1862 N/mm², conforming to IS:14268.
- The diameter of strand, their number in a tendon and the total jacking force to be applied is specified in the respective drawing sheet. All the initial and long term losses are already incorporated in design.
- Corrugated HDPE Sheathing ducts shall be used with the minimum internal diameter not less than three times the cross sectional area of the tendon. The wall thickness and other properties of the sheathing shall be as per IRC:112-2020, clause 13.4.3
- The specified profile and the alignment of the ducts shall be strictly maintained by properly securing the ducts to the re-bars. If required, pieces of re-bars can be added or the re-bars slightly repositioned or bent to maintain the profile and alignment, with approval of the engineer-in-charge.
- The jacking equipment shall be fitted with appropriate force measuring device and shall be regularly checked and calibrated as prescribed by the manufacturer.
- Jacking shall be done from both ends simultaneously and gradually, recording the elongation both sides. The expected final elongation mentioned in the respective drawings sheet is based on modulus of elasticity of the strands (Es) equal to 1.95x10⁵ MPa. If the Es of supplied strands is different then the elongation values shall be recalculated by multiplying the Design values of elongation by the ratio of Design Es / Actual Es.
- In case the total elongation is not achieved at the prescribed jacking force, the jacking operation can be continued until the force reaches the maximum allowable value. If the required elongation is achieved at jacking force lower than the prescribed value, the jacking operation shall continue until the prescribed force is reached, provided the Sum of the additional elongations thus achieved is not more than 5% of the sum of the prescribed elongations.
- In adverse condition to any of the cases above, the jacking operation shall be stopped, the tendons removed and this matter reported to the engineer-in-charge for further instruction. The jacking force should NEVER exceed the Maximum allowable value.

GROUTING

- The tendons which satisfy the above conditions shall be grouted properly, ensuring the duct is free of any foreign material and there is no leak or damage around the joints between the anchors and the ducts. Grouting can be normally done immediately after successful completion of tensioning operations and shall not be delayed by more than 5 days of tensioning of the cables.
- The grout shall be prepared with Ordinary Portland cement with suitable expansive admixture approved by the engineer. Admixture containing chloride and nitrate are not permitted. The water/cement ratio shall not be more than 0.48. Retempering of the grout shall not be permitted. The grout shall be mixed with mechanical mixers and shall be continuously kept agitated until pumped in.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparation Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	 Soosung Engineering Co. Ltd, In association with ERM C P (Ltd) and XXXX Tech Studio of Engineering Nepal	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE		SCALE:		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE	
		DOR, DCID		ROAD NAME:		General Notes of Banshwa Bridge (43/1100/302_A)		As Shown		Designed by:		Saroj Bhattachai						November, 2022	
		East West Highway (HW)								Checked by:		P. Upathyaya						DWG NO: 302_Banshwa	
		Banshwa - Consulting Section								Approved by:		Dr. T. H. Choi						SHEET NO: 01/26	

Stages and sequence of Prestressing

- The Precast composite girders shall be prestressed in two stages. The specified number of the tendons shall be tensioned in the prescribed sequence shown in the respective drawing sheet.
- The remaining tendons shall be tensioned after specified days after casting of the deck slab, in the sequence shown in the respective drawing sheet.
- The prestressing of the precast girder shall be started only after confirming that the cube specimen has achieved 100% of the prescribed compressive strength. No early prestressing allowed.

Construction methodology and sequence for Precast Prestressed Composite superstructure

- The main girders are be precast near the bridge site at suitable location (approach road or dry river bed, if available) on well prepared casting yard. The choice of location also depends upon the equipment available for lifting or launching the girders. After completion of the prestressing works the girders are either lifted by suitable cranes or pushed/launched with the help of rails and jacks or launching girders and placed carefully over the already completed substructure. Care shall be taken that all the preparatory works for the bearings are done properly before the launching/placing of the girders.
- Lifting shall be done only by the hooks provided at both ends. In case of jacking the jacking points shall be only just under the location of the hooks. No support, lifting or jacking is allowed at any other section of the girder
- After placing all the main girders and finishing the works on the bearings, the formwork for deck slab and cross girders are prepared. All the formwork for deck slab and cross girders shall be supported by the main girders. The main girders shall remain un-propped during casting of the deck slab. Similarly there shall be no false-work or props from the ground or part of substructure during casting of the deck slab.
- The Contractor shall ensure stability of the girders during all stages of construction.
- Dimensional tolerances for the precast girders shall be as per IRC:SP-7.1-2018, Clause 4.10. If not prescribed otherwise, transportation and handling operation shall follow the guidelines in Clause 4.9 of the same documents.
- The prescribed time-line for construction of the superstructure is as follows

Prestressing of Precast Girder only (Stage 1)	After 28 days of casting or confirming 100% compressive strength of concrete
Lifting/Launching of the Girder	Within 14 days of first stage prestressing
Casting of the Deck Slab	Within 14 days of placing of girder over substructure
Prestressing of Girder (Stage 2)	After 14 days of casting of deck slab
Casting of Footpath, Crash Barrier, Wearing Course etc	Preferably within 7 days but not later than 14 days of Second stage prestressing

Deviation from the above time-line is subject to approval by the engineer. No other vehicle except the concreting apparatus are allowed on the deck until the deck slab has attained its full specified strength.

Construction methodology for Cast-in-situ RCC superstructure

- Construction of Monolithic cast in situ RCC superstructure shall follow the standard practices. The falsework for the girders and deck slab are supported on the ground and removed after specified time period.

Notes on Bearings

- The contractor shall supply, provide and install the bearings designed according to the loadings and other relevant information provided in the drawings or BOQ.
- The dimension and number of layers of the Elastomeric bearings shown in the drawings are tentative. The bearings shall be designed, fabricated, tested and installed as per IRC:83 - 2018, Part-2 for elastomeric bearing and Part-3 for Pot-PITF bearings, as the case applies.

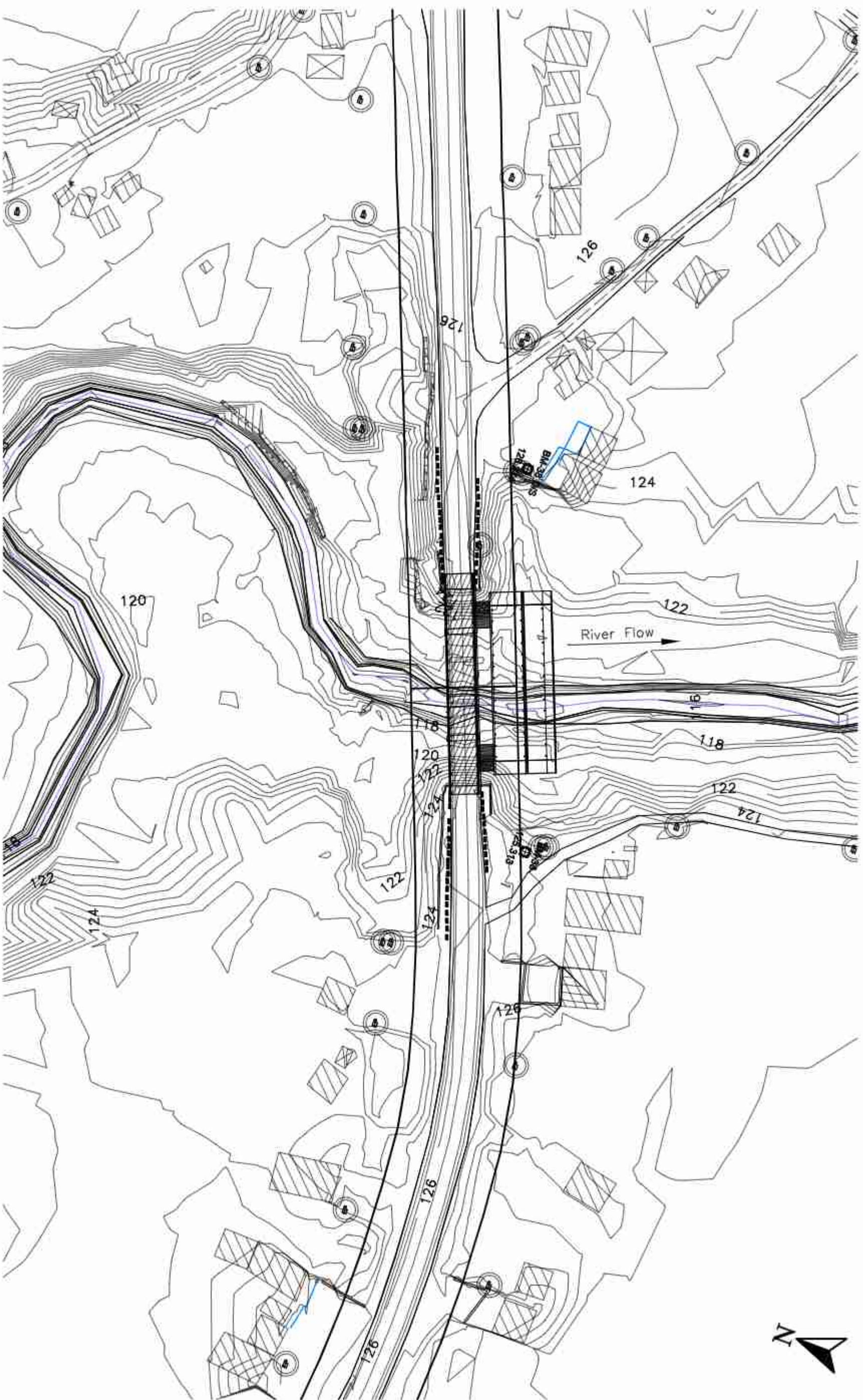
Notes on Foundation and Substructure

- Standard Specifications and Special provisions to the Standard Specifications (if any) and specific notes on the drawings shall be followed for the construction of the abutments, piers and foundations.
- Backfill behind the abutment shall be placed only after the concrete has achieved full 28 days strength. Heavy compaction equipment weighing more than 10 Ton shall not be used within 2.0 meters from the back of the abutment until all the works on superstructure is completed.
- The graded backfill behind the abutment shall be at a slope not steeper than 62 degrees, starting from the back of the footing. The back fill material dry density shall be within 1900 to 2200 kN/m³ and moisture content between 9 to 15 %
- In case of new bridge adjacent to the existing bridge, care shall be taken not to render any damage to the elements of the existing bridge. Particular attention shall be paid to the foundation of the existing bridge. The contractor shall ensure that excavation for the foundation of the new bridge does not cause instability or settlement of the foundation of the existing bridge.
- If the existing bridge has a shallow foundation, the contractor shall protect the existing foundation by sheet piling or any other suitable means to the satisfaction of the engineer, before excavating for the foundation of the new bridge.

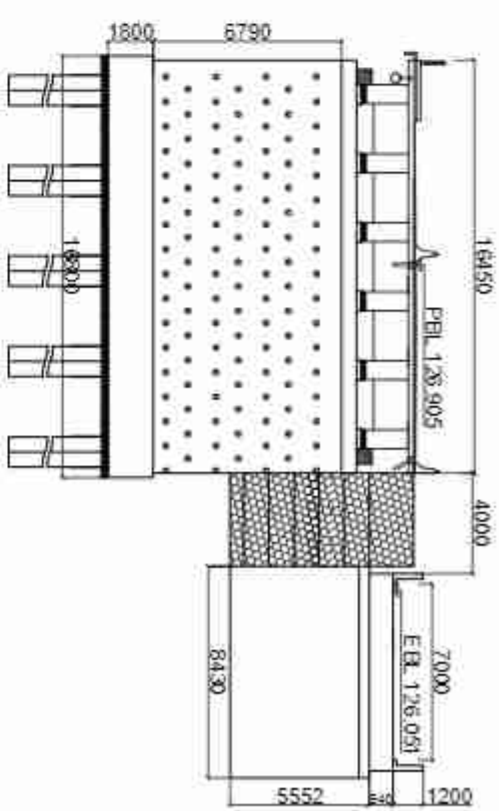
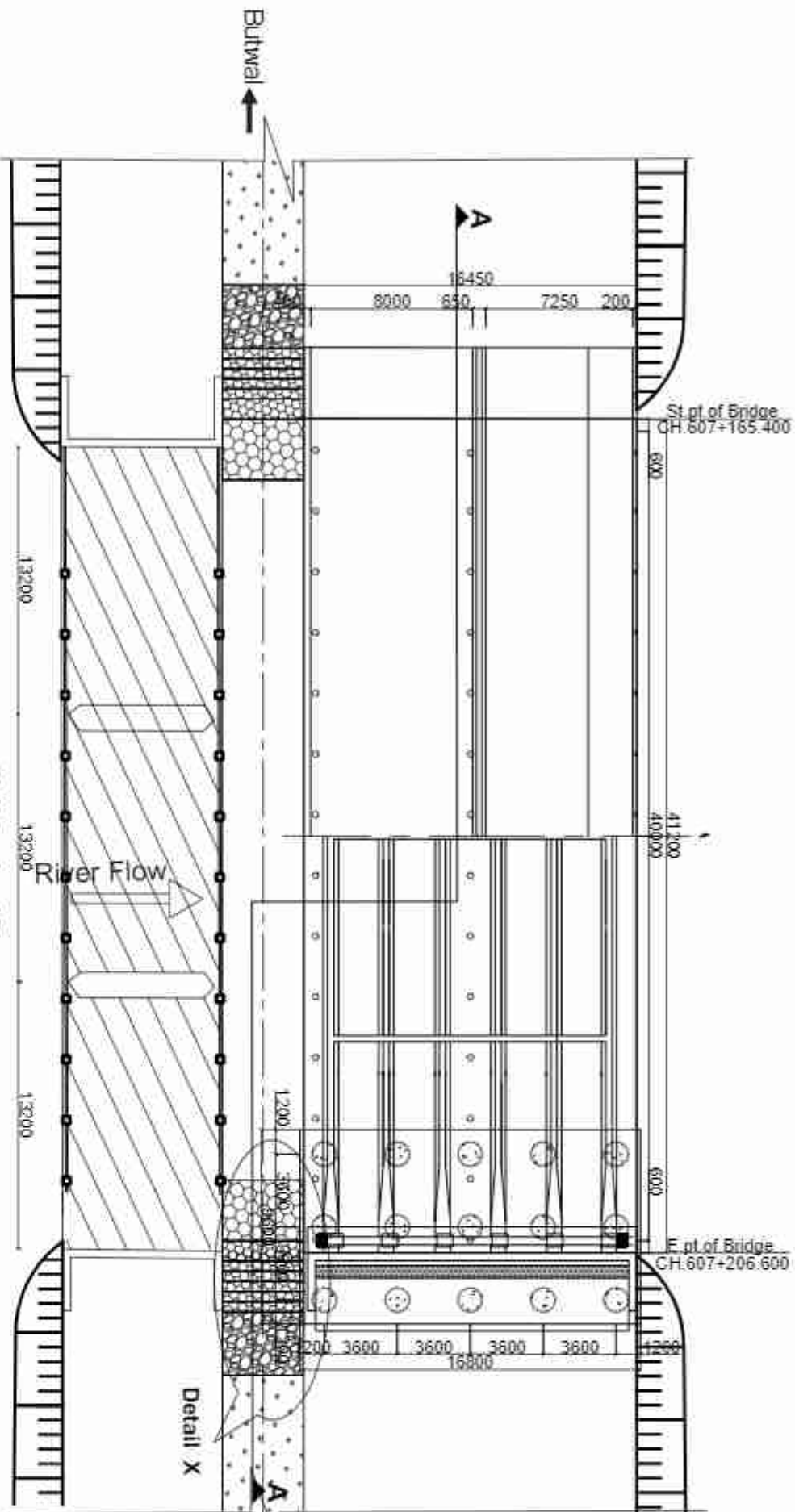
General Note: (For all Pile Foundation)

- Drilling/Boring works for pile is allowed only with rotary or oscillator type drilling equipment. No percussion method is allowed. Stability of borehole shall be ensured by the use of temporary casing. Use of other methods of borehole stability is subject to approval by the engineer, but in such case use of water/air/chemical jetting for boring process shall not be allowed.
- In case of drilling/boring without temporary casing, the contractor should ensure the stability and uniformity of the borehole before lowering the reinforcement cage and during concreting.
- Boring/Drilling of the piles is preferred in a staggered pattern. Boring/Drilling for any pile shall not commence before 24 hours of completion of concreting of any pile within a radius of 6 meters from its center.
- In case of drilling/boring without temporary casing , the pile shall be lined with 6mm thick permanent casing from the bottom of the pile cap down to 0.5 m below the maximum scour depth or 1.5 m whichever is larger.

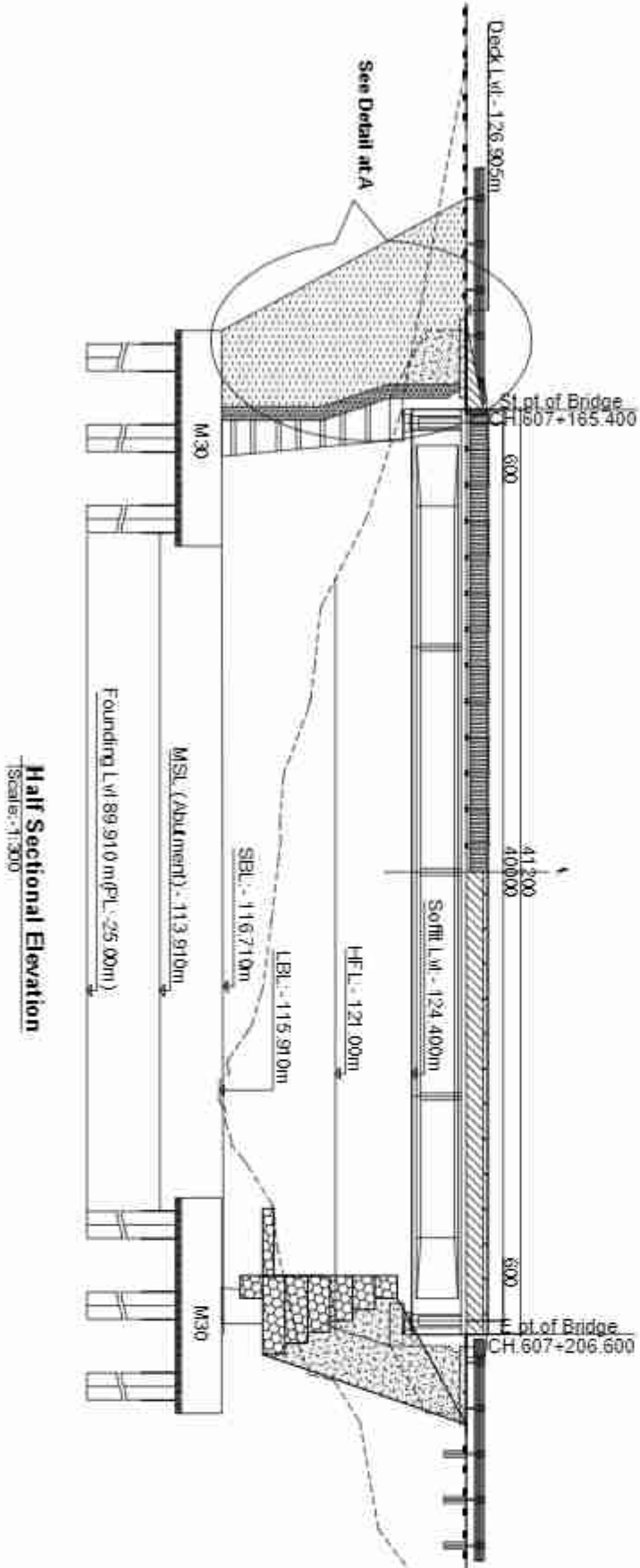
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:											
	 Seosung Engineering Co. Ltd., Korea In association with ERMIC P (Ltd) and  80% Tech Studio of Engineering Nepal		DOR, DCID		General Notes of Banathwa Bridge (A&B-D01/D02_A)		As Shown											
			ROAD NAME:															
			East West Highway (H01)															
			Butwal - Gorurughe Section															
																</		



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										Designed by: Sard Bhatara					DWG. NO.: 302_Baranwa
										Checked by: P. Upadhyaya					
										Approved by: Dr. T. H. Chandra					SHEET NO.: 03/26



Notes:-
PEL=Proposed Bridge Level
EBL=Existing Bridge Level
MSL=Maximum Scour Level
LBL=Lowest Bed Level
SBL=Stem Base Level
PL=Pile Length



Name(NEC Number)		Signature
P. Engineer	P. Upadhyaya (Civil A 675)	
Structure Engineer	K. P. Wagle (Civil A 127) / P. Shrestha (Civil A 676) / S. Bhattacharjya (Civil A 904)	
Hydrologist	Dr. P. C. Jha (Civil A 166) / S. Adhikari (Civil A 408)	
Geotechnical Engineer	A. Adhikari (A 189) / Dr. V. R. S. Shah	

Half Sectional Elevation
Scale: 1:300

Half Sectional Plan
Scale: 1:300

Elevation of Abutment
Scale: 1:300

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Project Directorate Office (ADP)
SASEC Highway Improvement Project
Project Preparation Consultant (SHP-PPC)
ADB Loan No: 3722-NEP

CONSULTANT:
Soosung Engineering Co. Ltd.
In association with
EPMC P. (Ltd.)
and
Korea Tech Studio of Engineering
Nepal

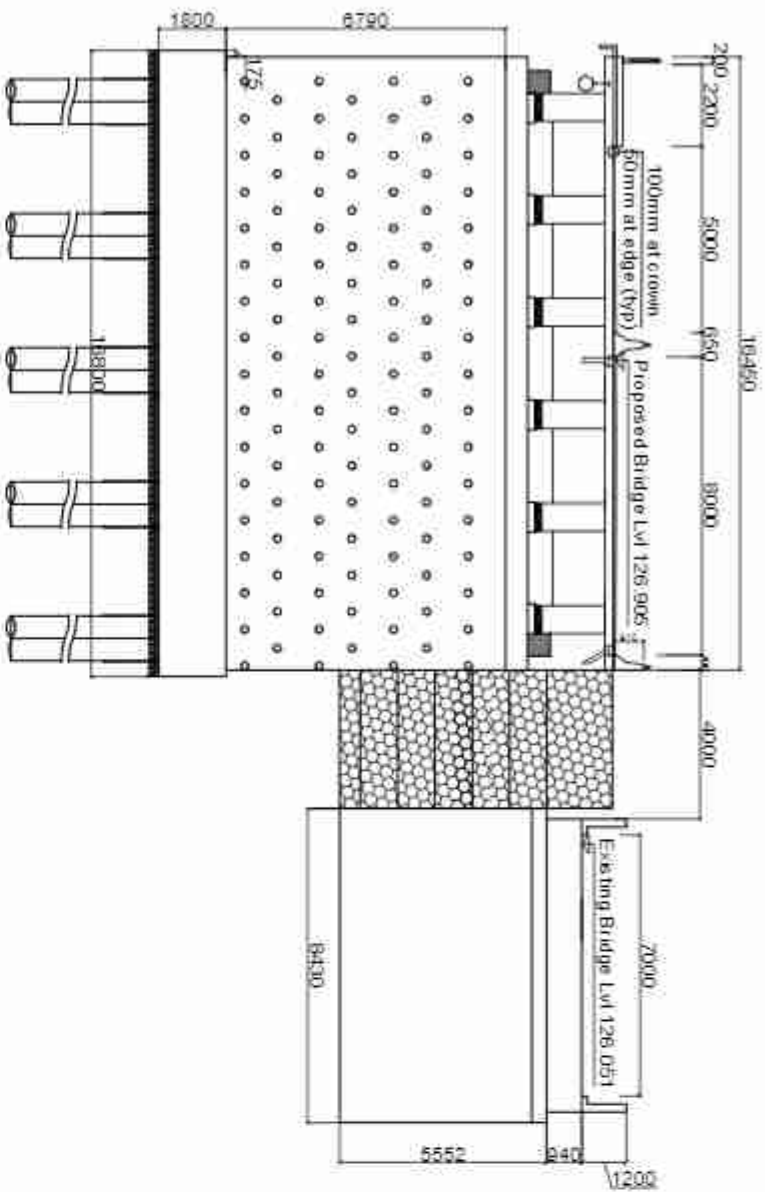
IMPLEMENTING AGENCY:
DOR DCID
ROAD NAME:
East West Highway (101)
Butwal - Goursinghe Section

SHEET TITLE:
General Arrangement
of
Banariva Bridge
(460+001 to 502+001)

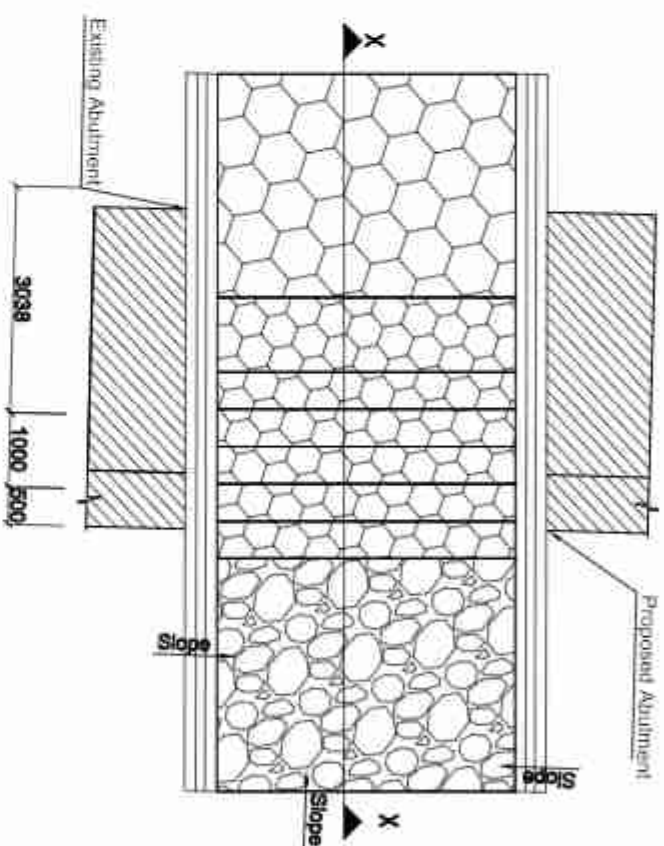
SCALE:
As Shown

NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE
Designed by				November, 2022
Checked by:	P. Upadhyaya			
Approved by:	Dr. T. H. Chandra			

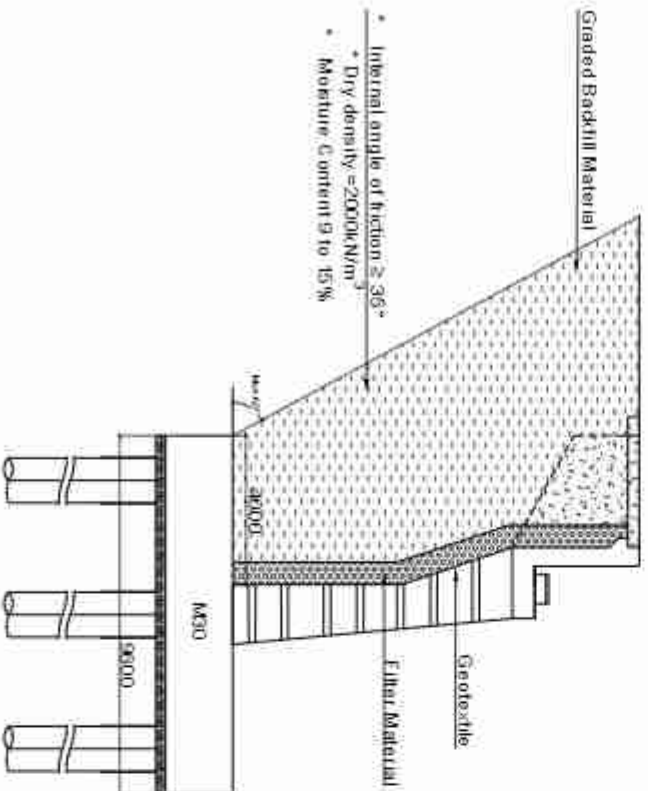
DWG. NO.:
302, Banariva
SHEET NO.:
(04/26)



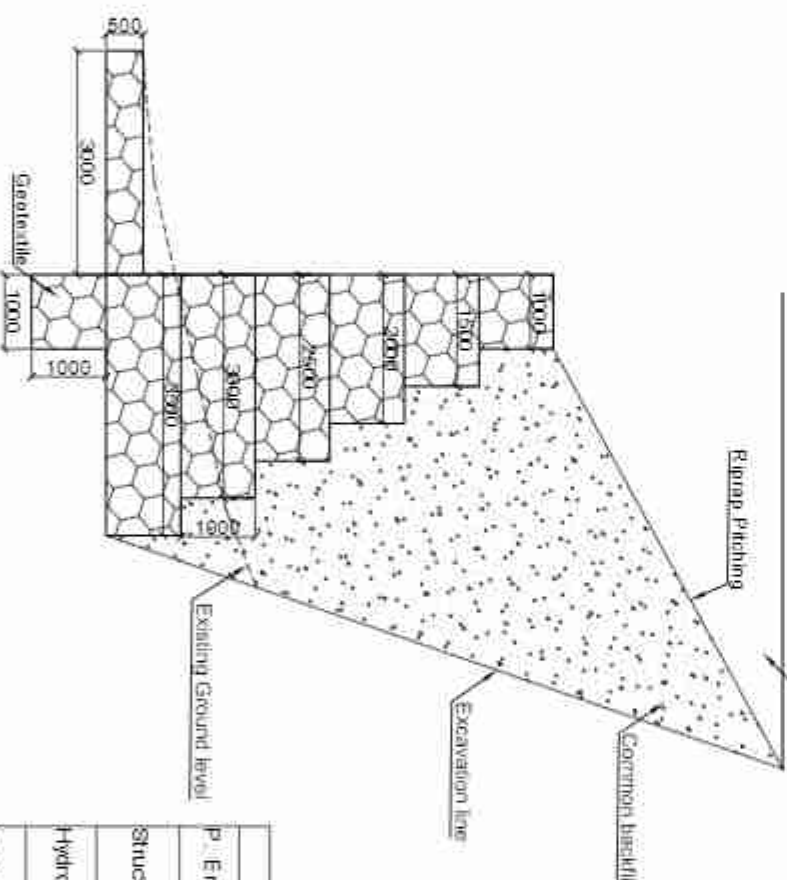
Elevation of Abutment
Scale: 1:200



Detail Plan of X
(Transition Between Approach Embankment)
Scale: 1:100



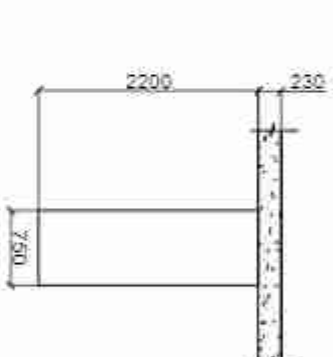
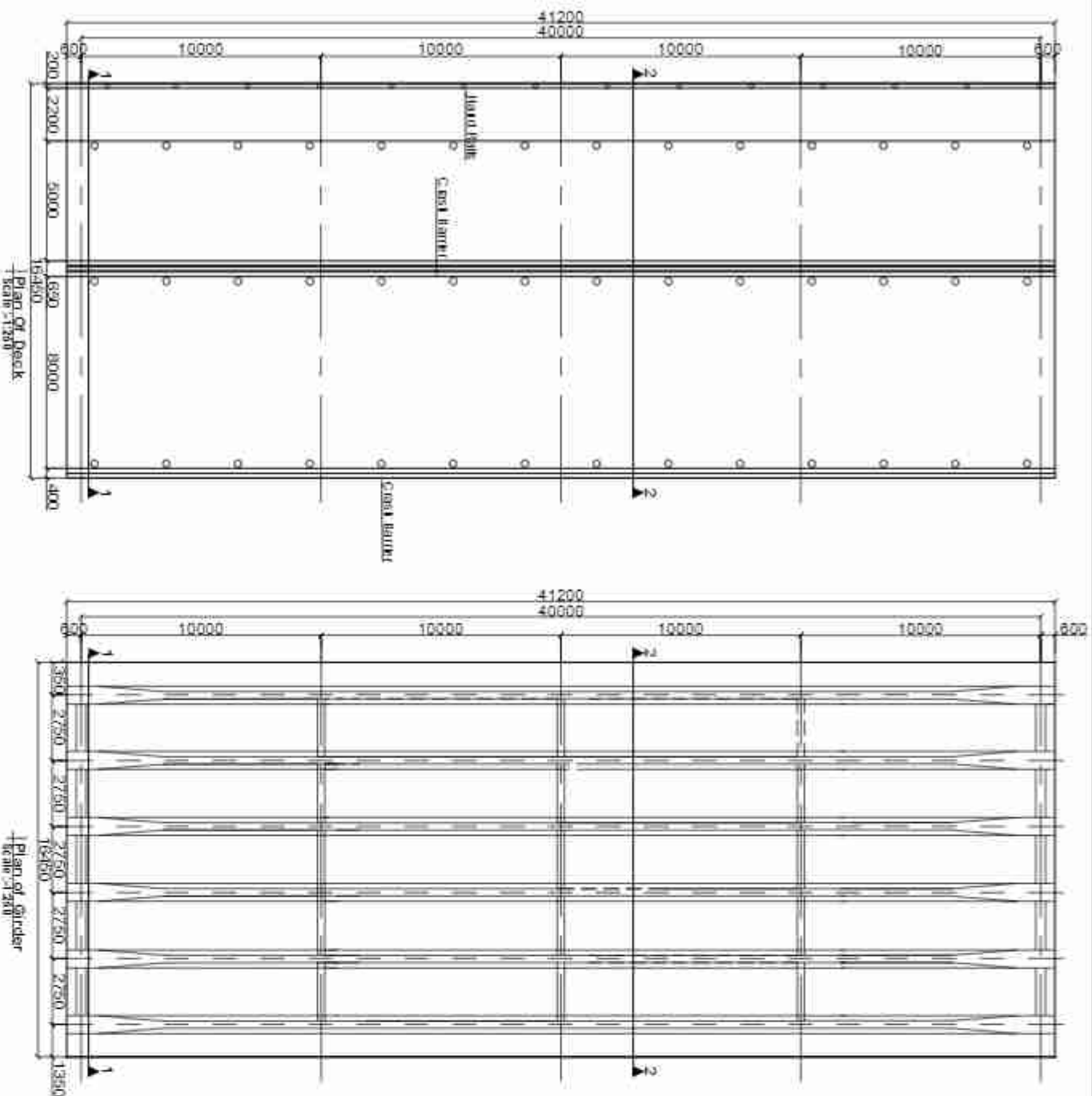
Detail of A
Scale: 1:200



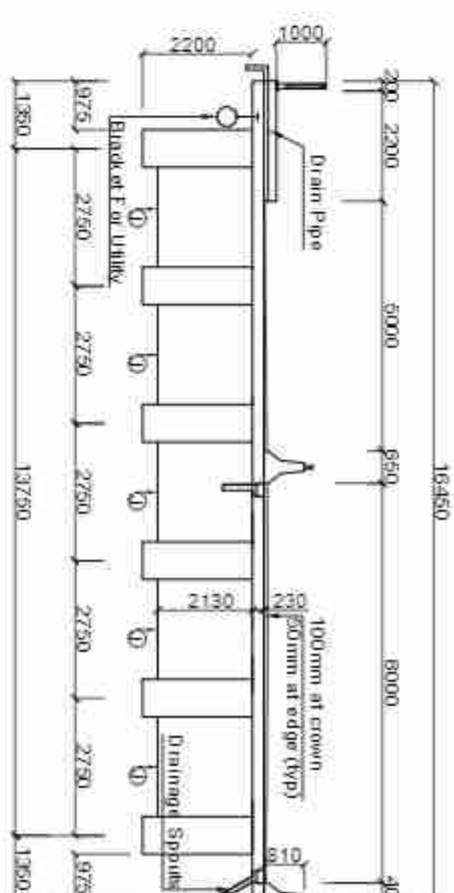
Section at X-X
Scale: 1:100

Name (NEC Number)		Signature
P. Engineer	P. Upadhyaya (Civil A 675)	
Structure Engineer	K.P. Wagle (Civil A 127) / P. Shrestha (Civil A 675) / S. Bhattacharya (Civil A 904)	
Hydrologist	Dr. P.C. Jha (Civil A 105) / S. Adhikari (Civil A 408)	
Geotechnical Engineer	A. Adhikari (ka 100) / Dr. V. R. S. Shahi	

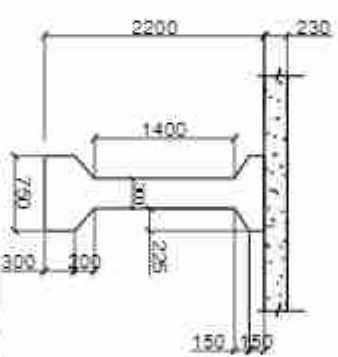
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADP) SASEC Highway Improvement Project Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. in association with ERM P (Ltd) and 2008-Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Bilateral - Consulting Section		SHEET TITLE: General Arrangement of Barahat Bridge (A5/H001/G02_A)		SCALE: As Shown		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022
										Designed by:		Saroj Bhattacharya			
										Checked by:		P. Upadhyaya			
										Approved by:		Dr. T. H. Choudhary			



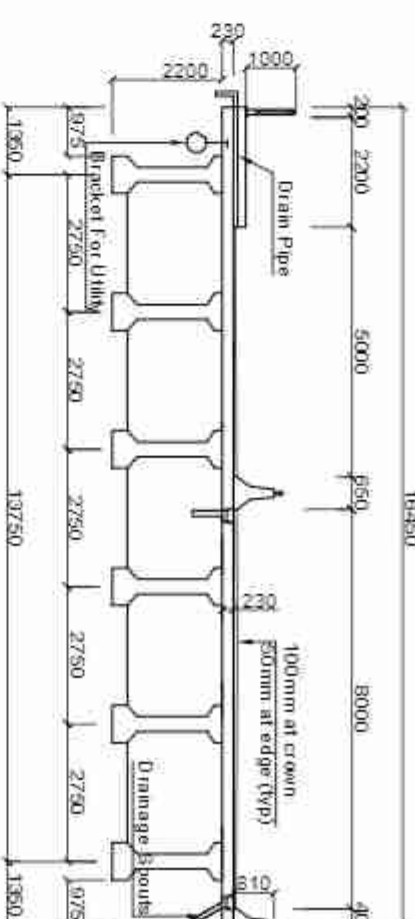
Section 1-1 Main Girder
Scale: 1:75



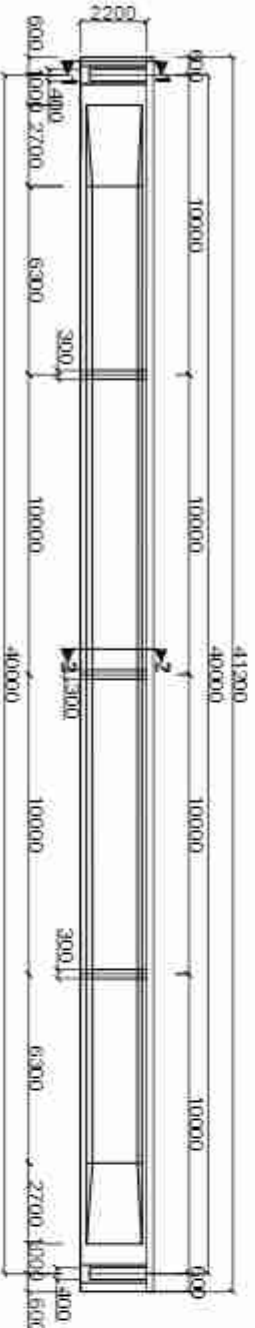
Section At 1-1
Scale: 1:150



Section 2-2 Main Girder
Scale: 1:75



Section At 2-2
Scale: 1:150



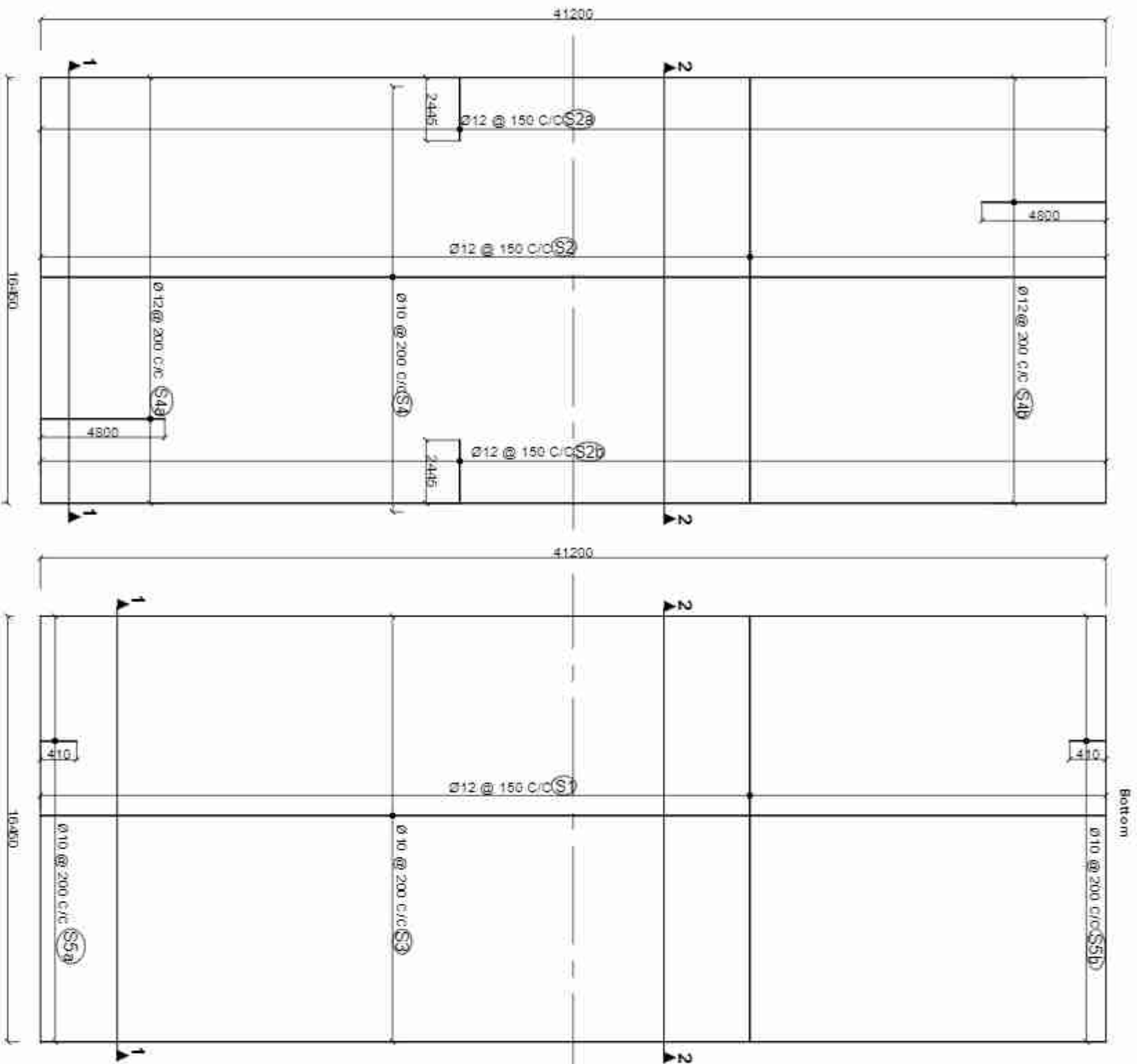
Longitudinal Sectional Elevation
Scale: 1:250

NOTE:
For maintenance, the deck shall be simultaneously jacked up at the locations marked "Y".

Note:
The bridge has been designed to safely carry three driving lanes. If required in future the footpath can be used as driving lane, moving the crash barrier to the location of the handrails.

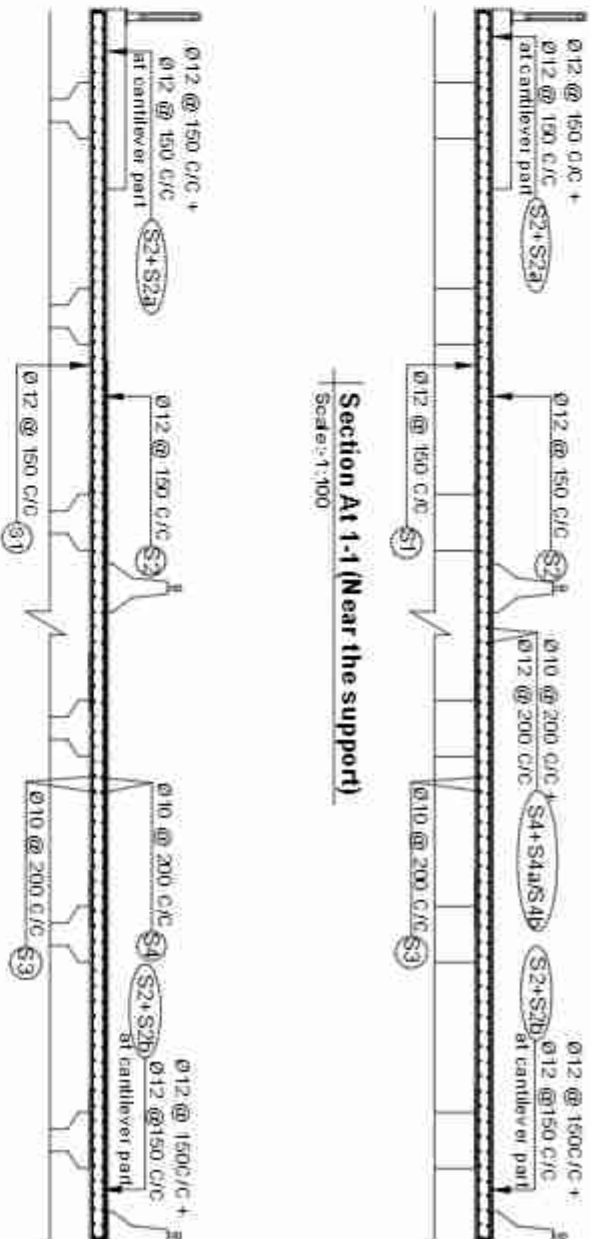
NOTE:
1. On Shear Connection:
The transverse bars of the deck slab(S2) shall be tied to vertical stirrups of the longitudinal girders.
2. Top Surface of the Main Girder:
Surface to be roughened by wire brush immediately after initial setting. The surface shall be properly cleaned by pressure blower prior to casting of the deck concrete.
3. On Wearing Course:
The level of wearing course along the longitudinal direction shall be kept horizontal throughout the length of the deck. The thickness of wearing course towards the ends along the deck shall be increased suitably to compensate for the slope due to hogging of the girder by pre stress.

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										Designed by: Saej Bhattacharj					07/20
										Checked by: P. Upadhyaya					07/20
										Approved by: Dr. T.H. Choudhary					07/20



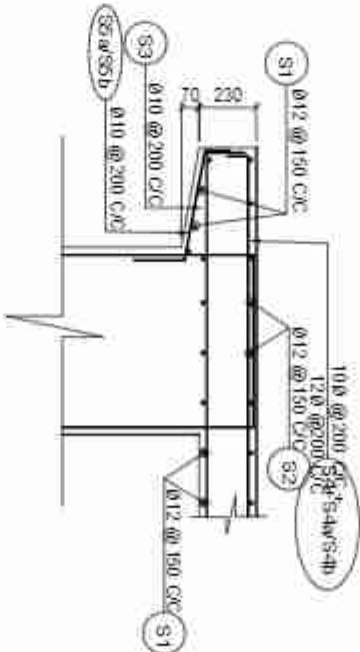
Reinforcement Details Of Deck Slab (Top Face)

Reinforcement Details Of Deck Slab (Bottom Face)

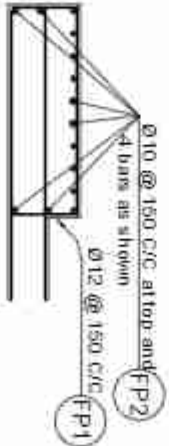


Section At 1-1 (Near the support)

Section At 2-2 (at mid-span)



Reinforcement Details At Deck Extension Between The Main Girder



Reinforcement Details At Footpath

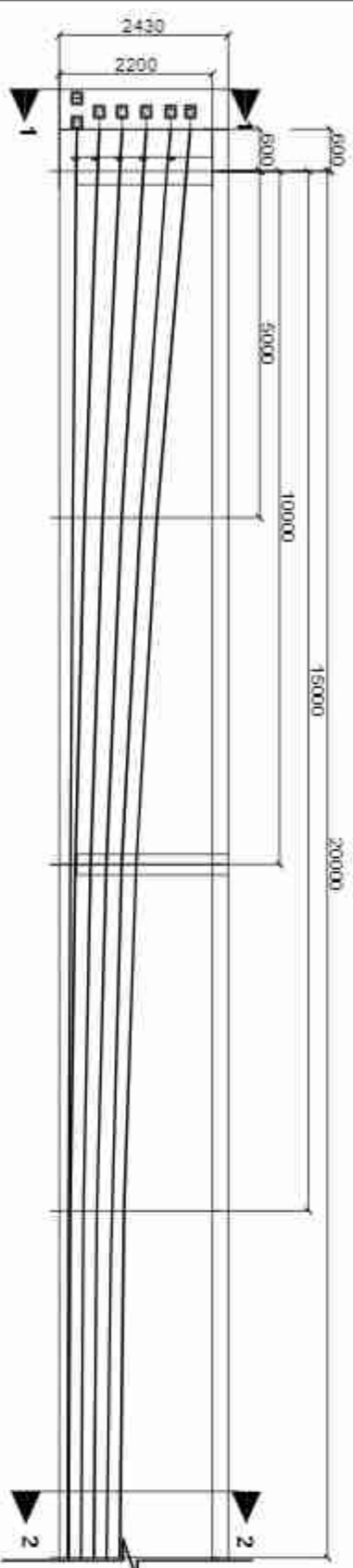
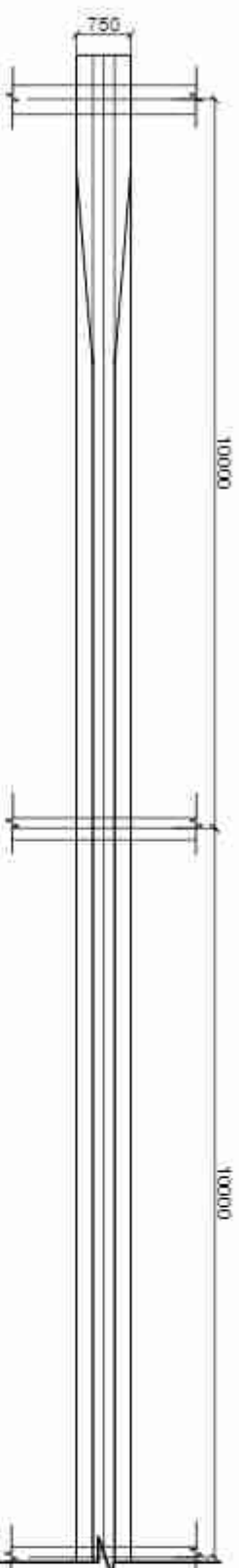
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Prepared: Preparatory Consultant (SHIP-PC) ADB Loan No.: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:	SHEET TITLE:	SCALE:		NAME	SIGNATURE	REV. NO.	DESCRIPTION	DATE	
	 Soosung Engineering Co., Ltd. Korea In association with ERM C P (Ltd) and  SWH Tech Studio of Engineering Nepal		DOIR, DOID ROAD NAME: East West Highway (H01) Bilateral - Consulting Section	Reinforcement Details of Slab of Baranawa Bridge (45/1100/1302_A)	As Shown			Designed by: Saroj Bhattacharj				November, 2022
							Checked by: P. Upadhyaya				OWG NO.: 302_Baranawa	
							Approved by: D. T. H. Chel				SHEET NO.: 08/26	

Tendon Layout Data

TENDON	Anchor face		Healing section		Intermediate section						Mid span	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	250	-175	240	-170	191	-180	155	-181	132	-165	125	-185
2	250	-175	241	-176	191	-180	155	-181	132	-165	125	-185
3	575	0	549	0	364	0	231	0	162	0	125	0
4	900	0	866	0	623	0	449	0	345	0	310	0
5	1250	0	1207	0	890	0	673	0	540	0	405	0
6	1000	0	1541	0	1166	0	881	0	714	0	580	0
Summary	1085	0	8527	0	1405	0	1106	0	925	0	665	0

Y = Elevation of the tendon (mm) from the girder soffit

Z = Horizontal distance of the tendon (mm) from the centre line of the girder

Longitudinal Section Of Main Girder
Scale: 1:100Plan Of Main Girder
Scale: 1:100

NOTES ON PRE STRESSING:

- All the prestressing operation shall commence after 28 days of casting confirming that the cube specimen has achieved 100% of the prescribed compressive strength (M45). No early prestressing allowed.
- Each prestressing tendon shall be multistrand cable comprising of 19 strands, each strand of 12.7mm diameter (19K13), 7 ply low relaxation, Class II, High Tensile Steel conforming IS 14238:2017 Maximum allowed jacking force=2733kN
- Prestressing operations shall be done in 2 stages as follows:

Stage 1

Precast girder only. After 28days of Casting.

Tendons to be stressed in stage 1 shall be in the following Sequence:

0 0 4 3 - - - -

Total Jacking Force to each tendon in stage 1= 2500kN

Stage 2

After 14 days of Casting of deck slab.

Tendons to be stressed in stage 2 shall be in the following Sequence:

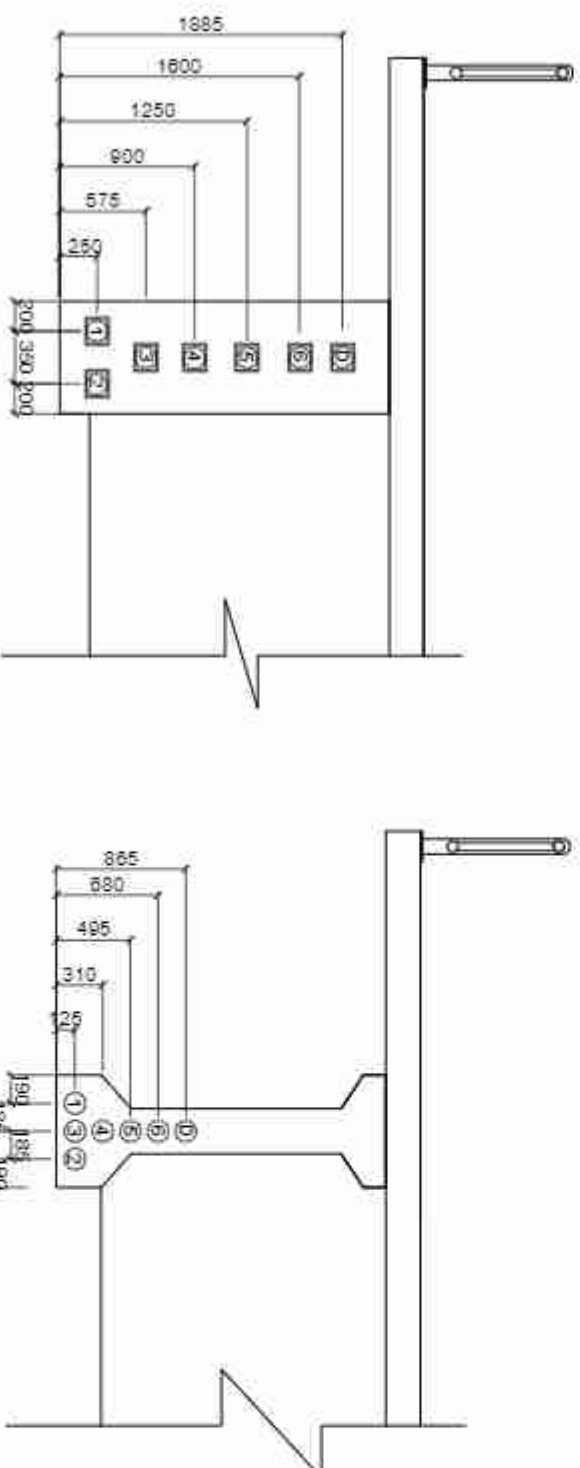
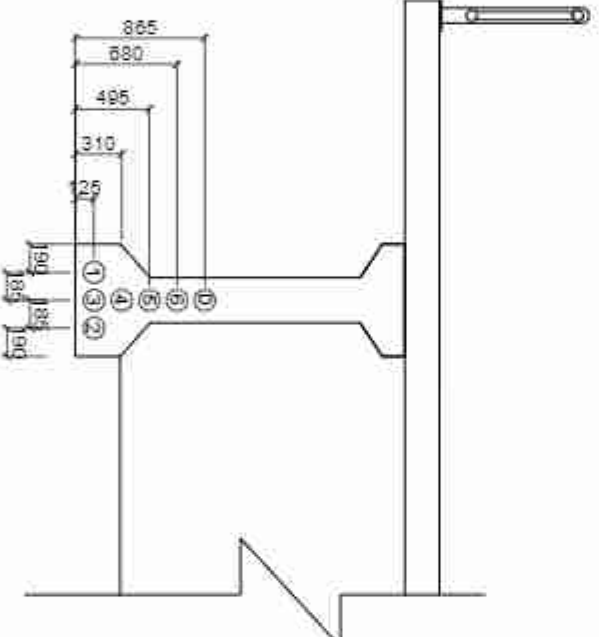
1 2 - - - - -

Total Jacking Force to each tendon in stage 2= 2500kN

- Casting of footpaths, crash barriers and wearing course will done only after second stage prestressing
- Jacking of tendons shall be done from both ends. All the prestress losses (strand and long term) have been already considered in the design.
- The composite action is considered only for live loads. There shall be no false work or props to the girder during 2nd stage of prestressing. The formwork for deck slab and cross girder can be supported on the main precast girders.
- The cable elongation at their jacking ends mentioned are based on the assumption that the Modulus of Elasticity of the cable steel is 1.95e10 N/m². The maintained stress specification shall be followed if provided.
- The tendon ducts shall be properly secured to the rebars to maintain the profile throughout concreting process.
- The specified profile and alignment of the tendon shall be strictly maintained. If required the reinforcement bars can be suitably respecified or slightly bent to accommodate the tendons as per the engineer's instruction.

NOTES ON DUMMY CABLE

The cable marked "TR" is for future tensioning or in case of interruption of excessive prestressing loss. No tendon shall be provided during construction but the sheathing, anchorage block, jacking reinforcement similar to the other tendons shall be properly installed. The duct shall be left hollow ensuring it is free of debris inside. The anchorage should be capped suitably to keep it free from ingress of foreign material and marked "U" to identify in future.

View 1-1
Scale: 1:50View 2-2
Scale: 1:50

Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

Project Directorate Office (ADB)

SASEC Highway Improvement Project

Project Preparatory Consultant (SHIP-PPC)

ADB Loan No: 3722-NEP

CONSULTANT:

Soosung Engineering Co. Ltd.

In association with

ERM C P (Ltd)

and

XXXX-Tech Studio of Engineering

IMPLEMENTING AGENCY:

DOR, DCID

ROAD NAME:

East West Highway (H01)

Birewal - Consulting Section

SHEET TITLE

Prestressing Details of Main

Girder of

Birewal Bridge

(43/H01/302_A)

SCALE:

As Shown

NAME

Saroj Bhattacharya

SIGNATURE

Saroj Bhattacharya

REV NO.

1

DESCRIPTION

1

DATE

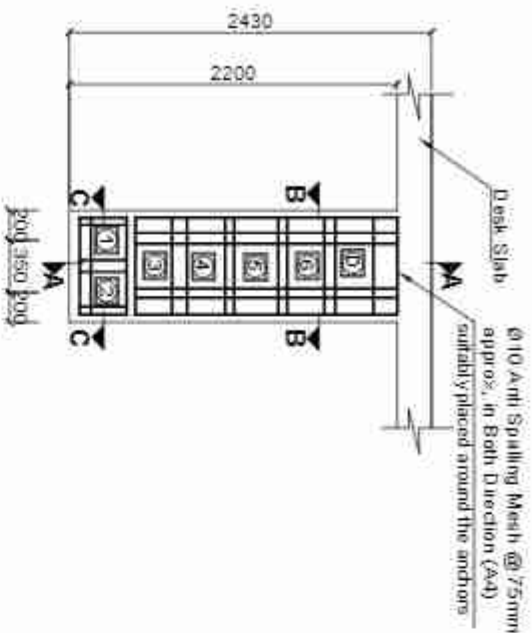
November, 2022

DWG. NO.

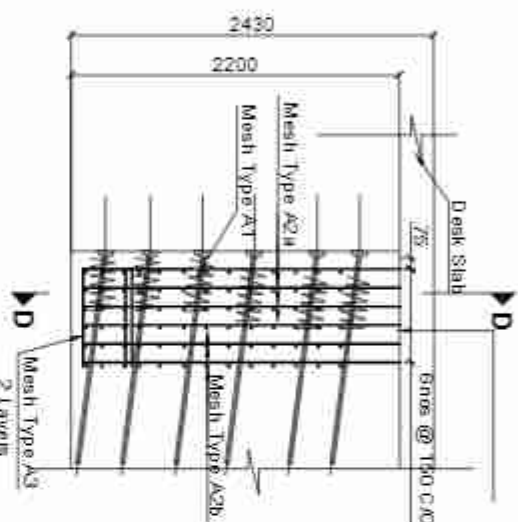
302_Birewal

SHEET NO.

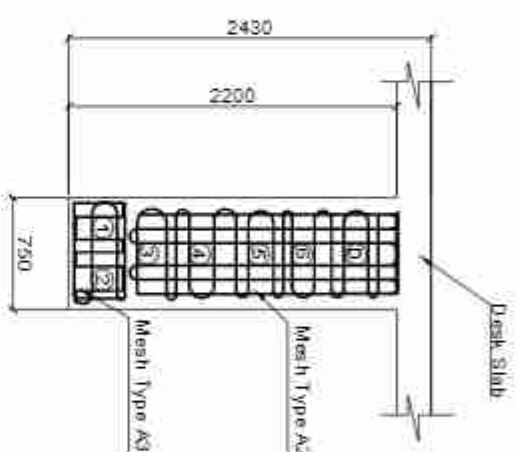
08/26



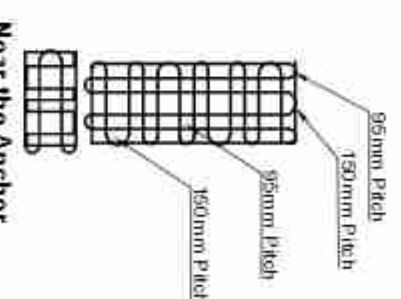
Anti Spalling Reinforcement
Scale: 1:50



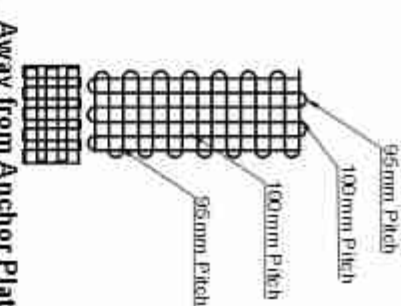
Section A-A
Scale: 1:50



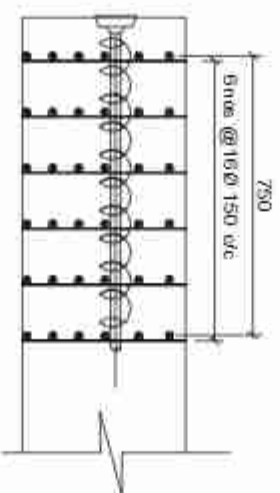
Section D-D
Scale: 1:50



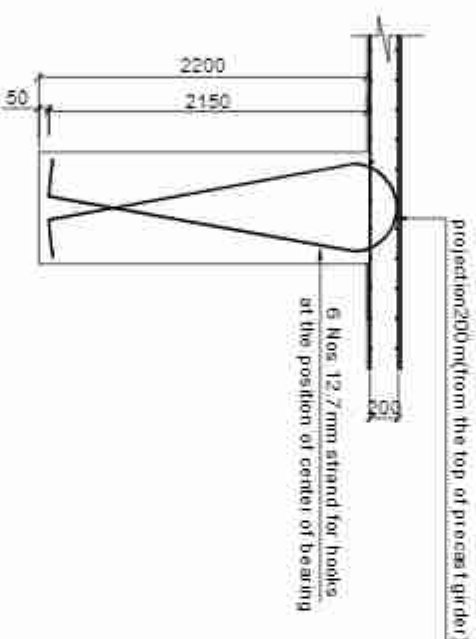
Near the Anchor
Mesh Type A2a
Scale: 1:50



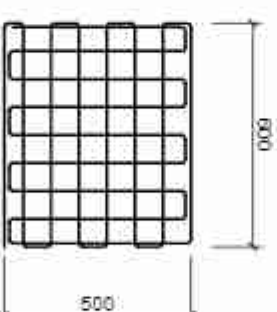
Away from Anchor Plate
Mesh Type A2b
Scale: 1:50



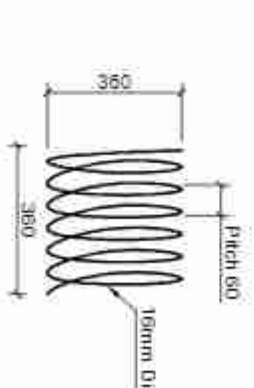
Section A1 B-B
Scale: 1:20



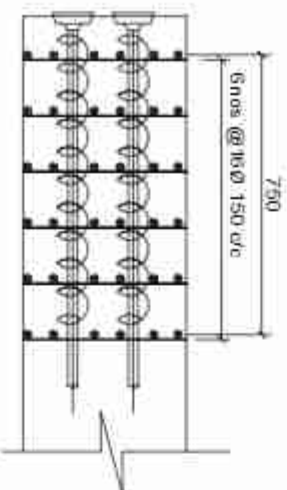
Hook Details At Both Ends Of Girder
Scale: 1:30



Mesh Type A3
Scale: 1:20



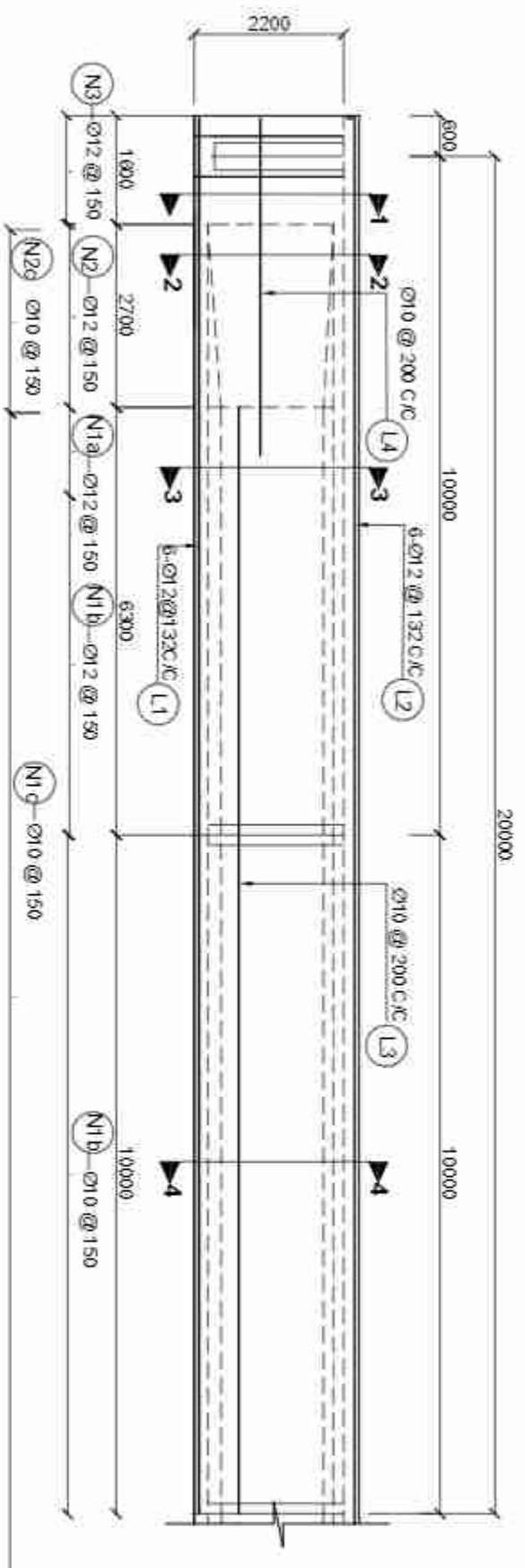
Typical Detail Of Spiral reinforcement A1
Scale: 1:20



Section A1 C-C
Scale: 1:20

- NOTE:
- The pitch of the mesh should be adjusted to accommodate the anchors and to maintain the duct profile.
 - The spiral and mesh reinforcement shown is indicative, use the anchorage manufacturer's specification if provided.

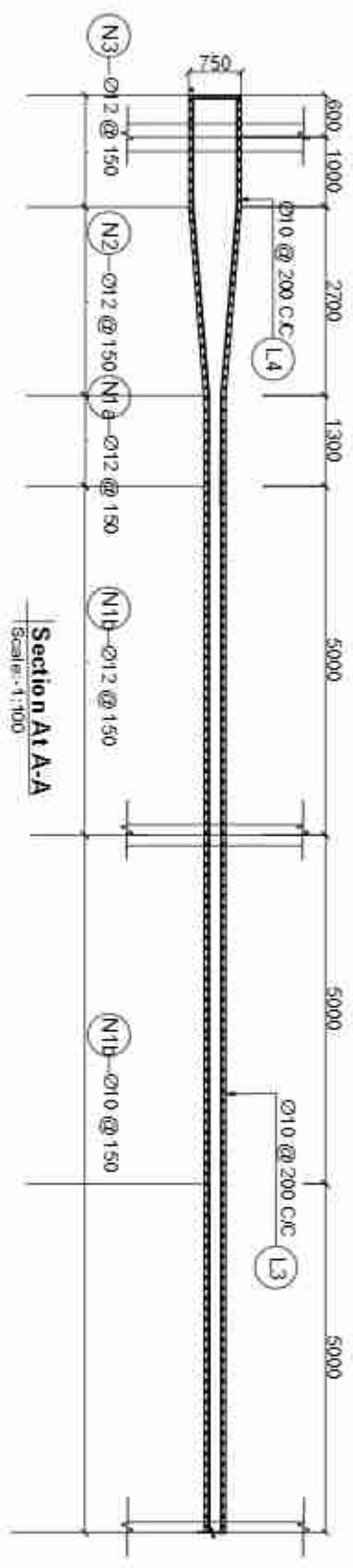
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADBS) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No. 3722-NEP		CONSULTANT:  Seosung Engineering Co. Ltd., Korea in association with ERM C P (Ltd) and  2008-Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:													
				DOR, DCID		Anchorage Details of Baranawa Bridge (A5/H001/GD_A)		As Shown													
				ROAD NAME:						Designed by:		Garaj Bhattacharya				REV NO.		DESCRIPTION		DATE: November, 2022	
				East West Highway (H01)						Checked by:		P. Upadhyaya								DWG. NO.: 302_Banarawa	
		Bilateral - Consulting Section								Approved by:		Dr. T.H. Choi								SHEET NO.: (10/20)	



Reinforcement Details At Sectional Elevation Of Main Girder

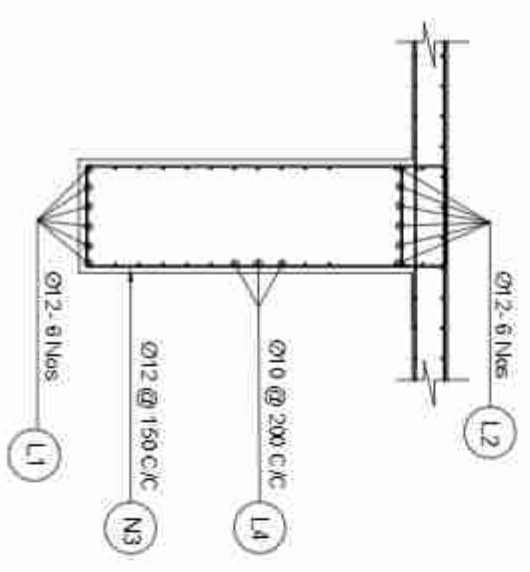
Scale: 1:100

NOTES:
The vertical stirrups of the main girder to be tied to the transverse reinforcement of the slab.



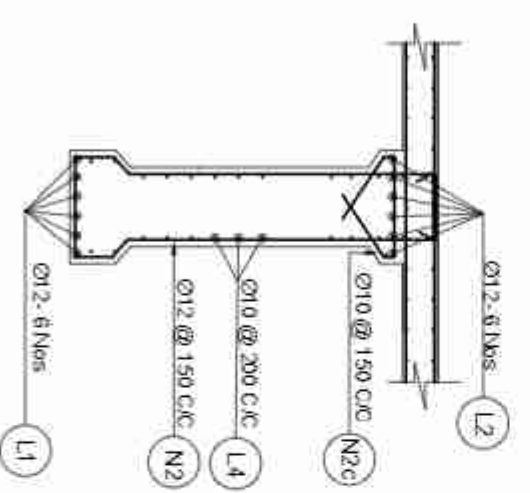
Section A-A

Scale: 1:100



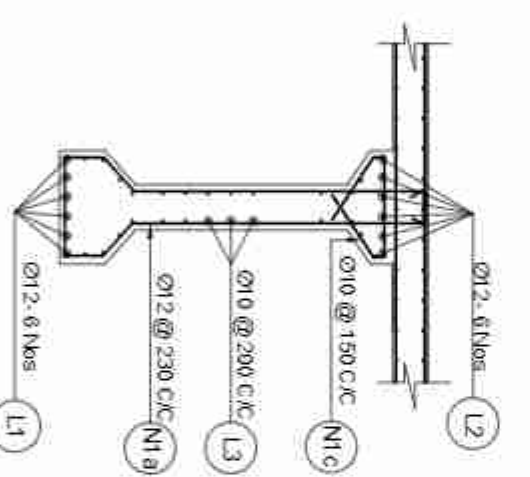
Section At 1-1

Scale: 1:30



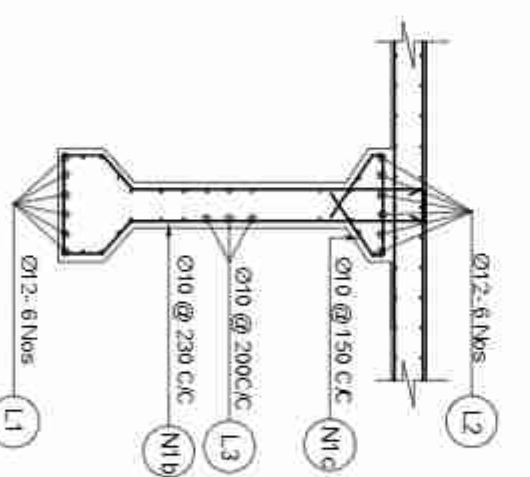
Section At 2-2

Scale: 1:30



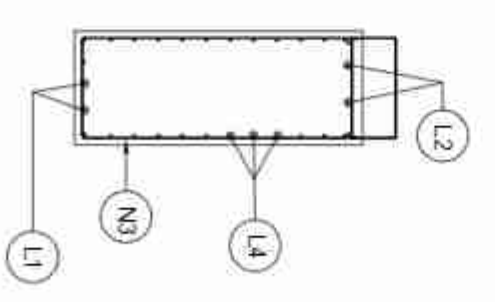
Section At 3-3

Scale: 1:30

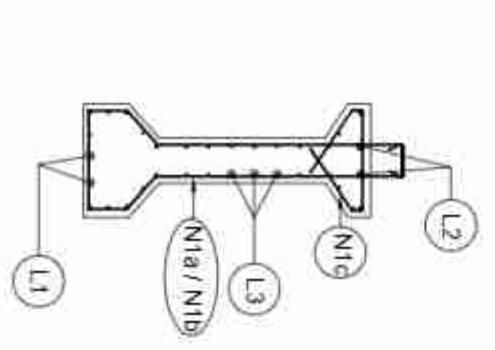


Section At 4-4

Scale: 1:30



Typical Reinforcement of Precast Girder at End

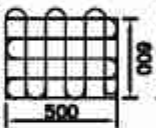


Typical Reinforcement of Precast Girder at Center

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHP-PPC) ADB Loan No: 3722-NEP	CONSULTANT: Soosung Engineering Co. Ltd., In association with EPMC P (Ltd) and Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
		DOR DCID		Road Name:		As Shown		Saroj Bhadrara		[Signature]						November, 2022	
		East West Highway (H01)		Unreinforced Reinforcement Details of Center of Sarathwa Bridge (A&B-D01/302_A)				P. Lipadivarya		[Signature]						DWG NO.: 302_Banathwa	
		Butwal - Gauringthe Section						Dr. T.H.Chandra		[Signature]						SHEET NO.: 11/26	

BAR BENDING SCHEDULE OF MAIN GIRDER							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
N1a		VARIABLE	12	80	0.110	0.888	466.512
N1b		VARIABLE	10	136	0.110	0.617	512.319
N1c		VARIABLE AS PER N1	10	222	1.780	0.617	243.632
N2		150	12	36	6.460	0.888	206.471
N2c		150	10	36	1.290	0.617	28.632
N3		150	12	22	6.140	0.888	119.926
		150	10	22	0.776	0.617	10.553
L1		132	12	6	41.120	0.888	210.042
L2		132	12	6	41.120	0.888	220.107
L3		200	10	26	32.000	0.617	622.578
L4		200	10	52	5.520	0.617	176.971
A1		VARIABLE	16	14	7.930	1.578	175.227
		(Use Manufacturer's specifications if available)					
A2		150	16	12	24.000	1.578	464.562
		(Use Manufacturer's specifications if available)					
The Sketch shown here is indicative, for the purpose of estimate only. The pitch of the bars to be adjusted as per the tendon's size and positions.							

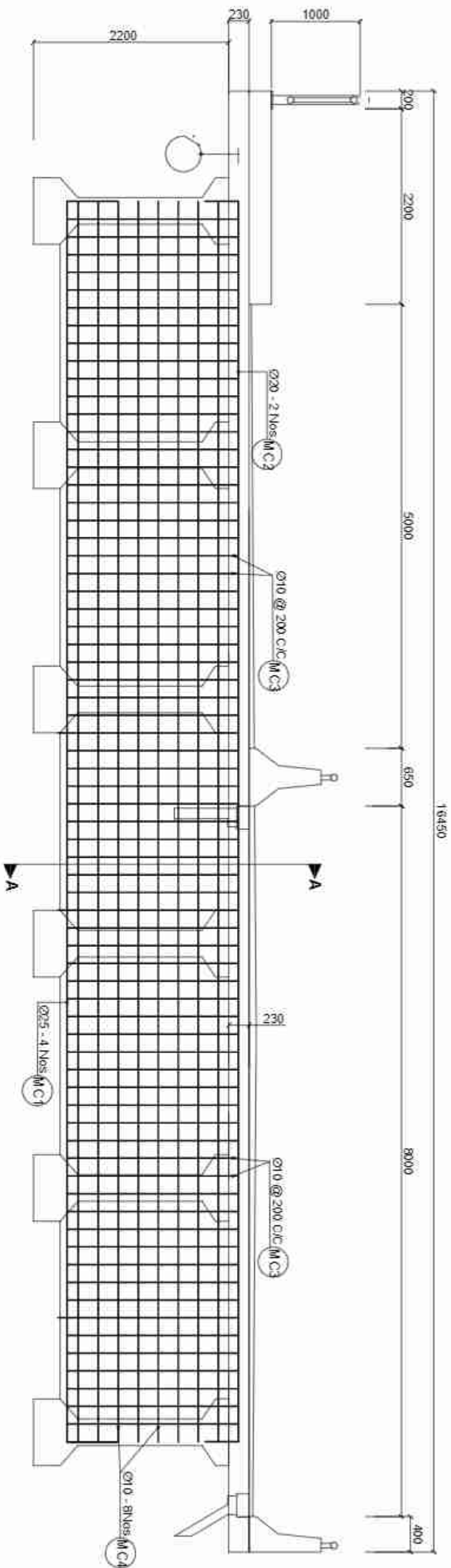
(Use Manufacturer's specifications if available)
The Sketch shown here is indicative, for the purpose of estimate only. The pitch of the bars to be adjusted as per the tendon's size and positions.

BAR BENDING SCHEDULE OF MAIN GIRDER								
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)	
A3	PITCH=75 both way  Overs Beam Layers = 2			10	4	10.200	0.617	25.166
TOTAL IN ONE GIRDER							3381.687	
TOTAL IN ONE GIRDER (IN METRIC TON)							3.382	

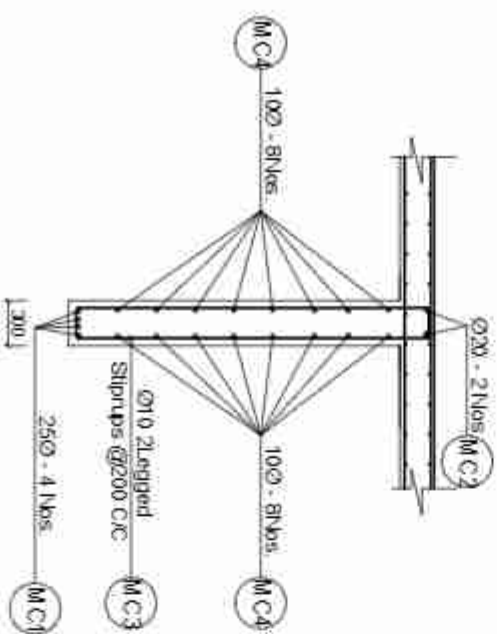
BAR BENDING SCHEDULE OF DECK SLAB							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
S1		150	12	201	10.570	0.888	4133.823
S2		150	12	276	16.570	0.888	4060.267
S2a		150	12	276	2.550	0.888	624.846
S2b		150	12	276	2.550	0.888	624.846
S3		200	10	83	41.420	0.617	2119.575
S4		200	10	83	41.420	0.617	2119.575
S4a		200	12	83	4.955	0.888	305.128
S4b		200	12	83	4.955	0.888	305.128
S5a		200	10	74	0.710	0.617	32.393
S5b		200	10	74	0.710	0.617	32.393
TOTAL EXCLUDING FOOTPATHS K.O.							14784.416
TOTAL WEIGHT IN METRIC TON							14.784

BAR BENDING SCHEDULE OF RAISED FOOTPATH							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø of BARS (mm)	NO. of BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
F1		150	12	276	5.040	0.888	1382.016
F2		150	10	21	41.110	0.617	332.294
ONE SIDE							1914.294
TOTAL WEIGHT IN METRIC TON							1.914

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Prepared by: SASEC Highway Improvement Project- ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. in association with E R M C P (Ltd) and SASEC Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCD ROAD NAME: East West Highway (H01) Battul - Gorunigle Section		SHEET TITLE: B.B.S. of Slab & Main Girder of Banswa Bridge (40x100x1302 A)		SCALE: As Shown		DESIGNED BY: Saroj Bhandari		CHECKED BY: P. Upadhyaya		APPROVED BY: Dr. T.H. Chel		DATE: November, 2022		DWG. NO.: 302_Banswa		SHEET NO.: 1/25	
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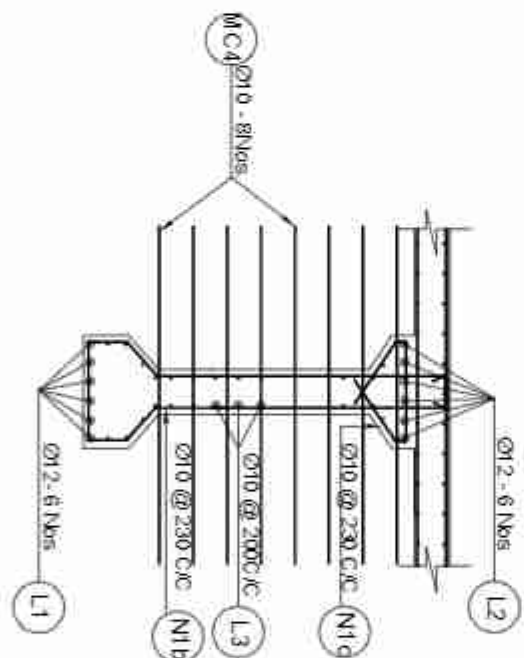


Intermediate Cross Girders
Scale: 1:30



Section A-A
Scale: 1:50

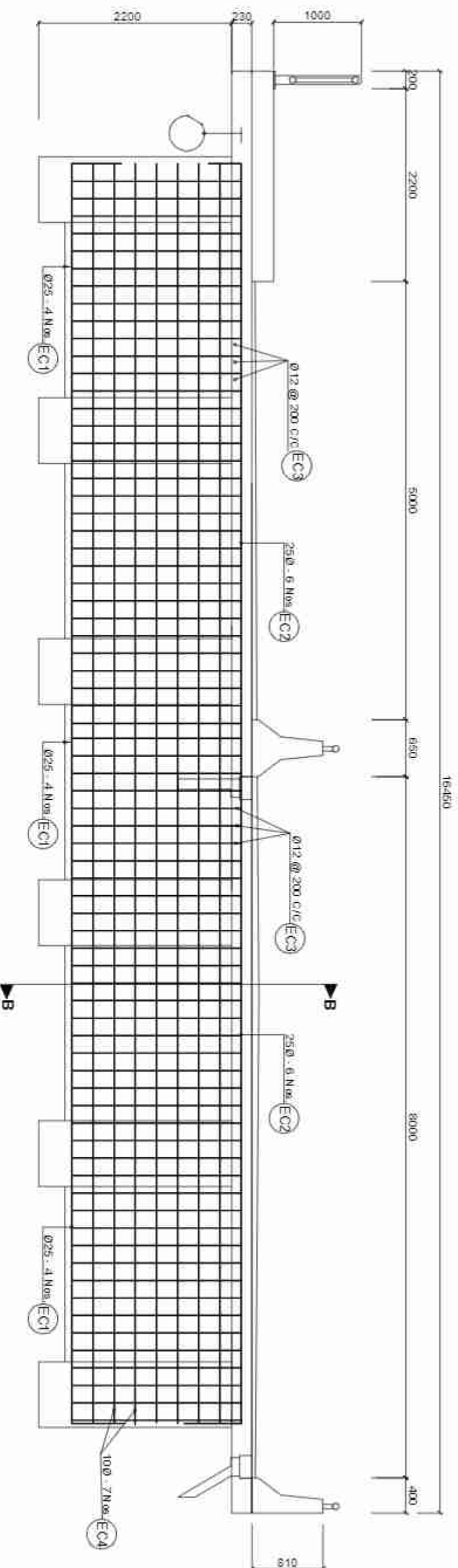
NOTES:
Dowel bars similar to the longitudinal bars of the cross girders shall be pre-installed in the precast main girder before casting. The longitudinal bars of the cross girder shall be lapped to the dowel bars, which shall have a lap length of 60 dia. of the corresponding bars.



Dowel bar of Intermediate Cross Girder
Scale: 1:50

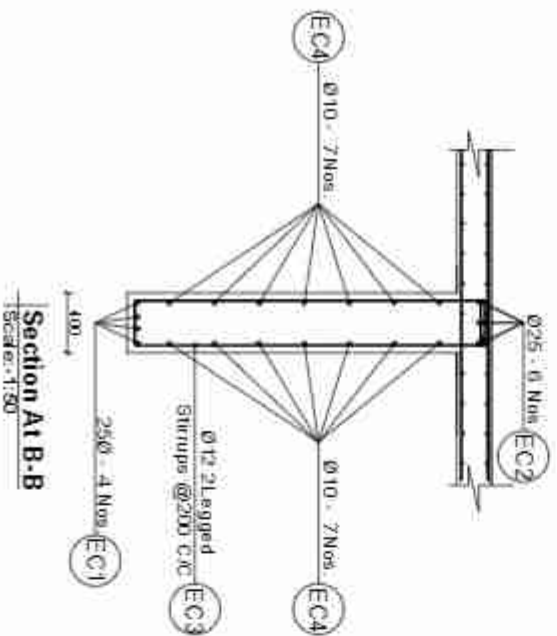
BAR BENDING SCHEDULE OF INTERMEDIATE CROSS GIRDER									
BAR NO.	SHAPE & BAR DIM (AS PER IS: 1786)	SPACING (mm)	# OF BARS	NO. OF LAPS	LENGTH (mm)	WEIGHT (kg)	TO TOTAL WEIGHT (kg)		
MC1	100 x 100 x 10	1000	25	4	15105	3.883	234.208		
MC2	100 x 100 x 10	1000	0	2	15105	2.406	74.940		
MC3	200 x 200 x 10	200	10	09	4620	0.617	196.640		
MC4	200 x 200 x 10	200	10	16	13970	0.617	137.800		
TOTAL IN ONE GIRDER							643.503		
TOTAL IN ONE GIRDER (IN METRE) TO 40.0							1.901		

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd., Korea In association with EPMC P. (Pvt.) and  Korea Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY:		SHEET TITLE: Reinforcement Details of Intermediate Cross Girder of Baranwa Bridge (46+1001.302_A)	SCALE: As Shown	NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022									
											DOR DCID	ROAD NAME East West Highway (H01)							
													Butwal - Gonsinghe Section						
															Designed by	Santosh Bhattacharya			DWG. NO.: 302_Baraniwa
															Checked by:	P. Upadhyaya			SHEET NO.: 1326
															Approved by	Dr. T.H.Chel			

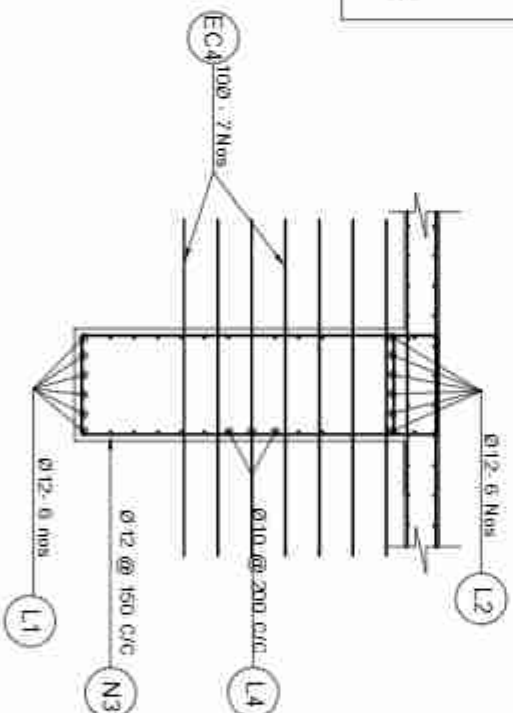


End Cross Girders
Scale: 1:50

NOTES:
Dowel bars similar to the longitudinal bars of the cross girders shall be pre-installed in the precast main girder before casting. The longitudinal bars of the cross girder shall be lapped to the dowel bars, which shall have a lap length of 50 dia. of the corresponding bars.

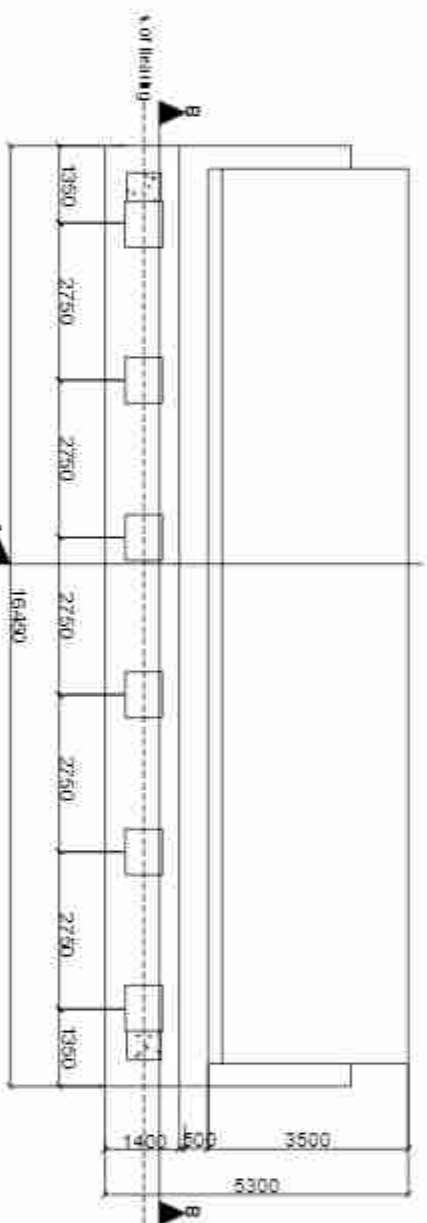


Dowel bar of End Cross Girder
Scale: 1:50

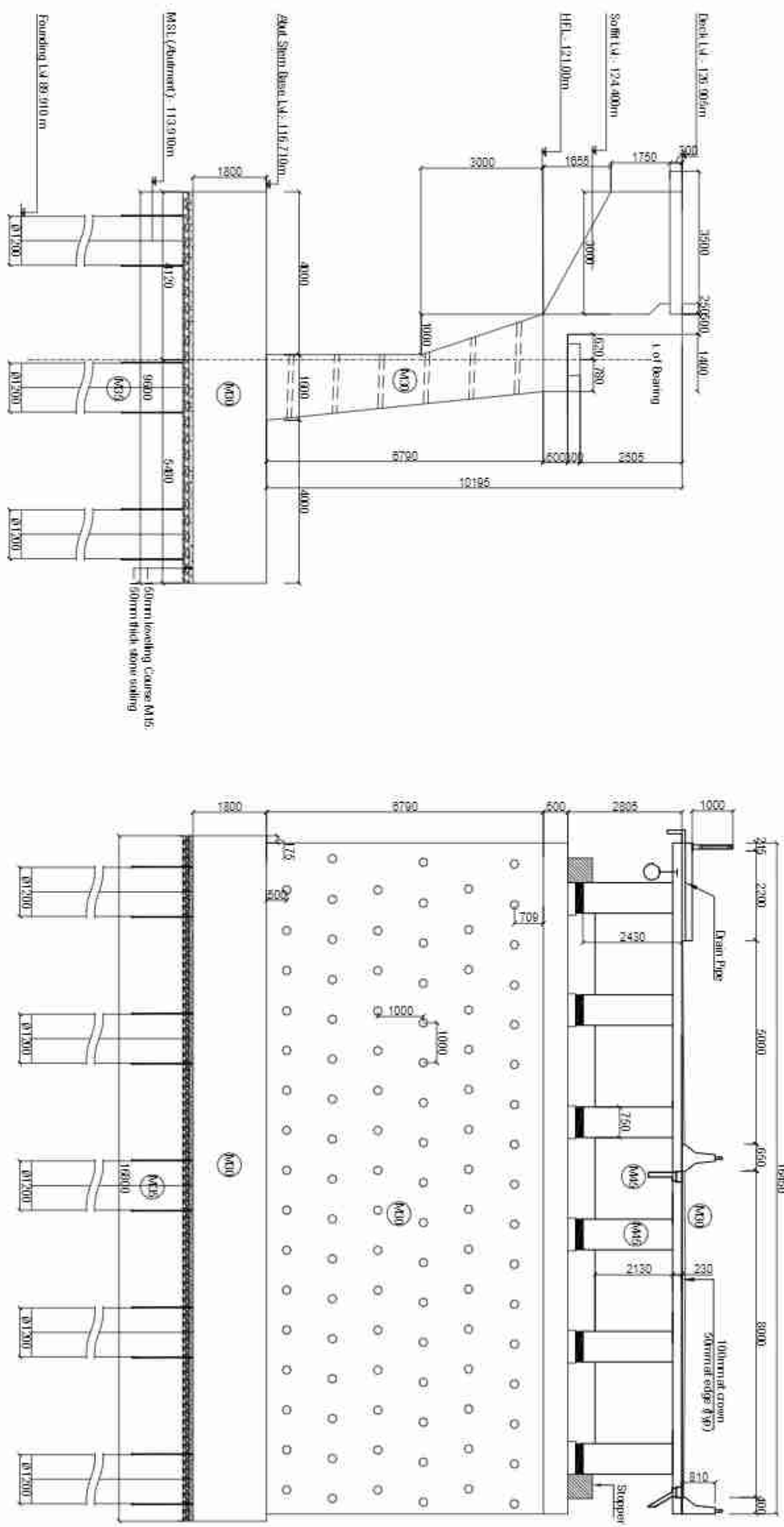


BAR BENDING SCHEDULE OF END CROSS GIRDER							
BAR NO.	SHAPE OF BAR IN mm (METRIC SYMBOLS)	SPACING (mm)	NO. OF BARS	LENGTH (mm)	WEIGHT (kg)	WEIGHT (kg)	TOTAL WEIGHT (kg)
EC1		0	25	16,195	3.853	2.24	2.24
EC2		0	25	16,195	3.853	2.24	2.24
EC3		200	12	4,342	0.888	3.13	3.13
EC4		300	10	14,070	0.917	3.21	3.21
TOTAL IN ONE GIRDER						10.20	10.20
TOTAL IN ONE GIRDER (IN METRIC TON)						2.042	2.042

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT: Soosung Engineering Co. Ltd. In association with ERM C P (Ltd) and Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY: DOR, DGD	ROAD NAME: East West Highway (H1)	SHEET TITLE: Reinforcement Details of Cross Girder of Banawa Bridge (45/1001/302_A)	SCALE: As Shown	DESIGNED BY:	NAME:	SIGNATURE:	REV. NO.	DESCRIPTION:	DATE:				
						CHECKED BY:	P. Upadhyaya								
						APPROVED BY:	D. T. H. Chel								
DRAWING NO: 302_Banawa SHEET NO: 1420															



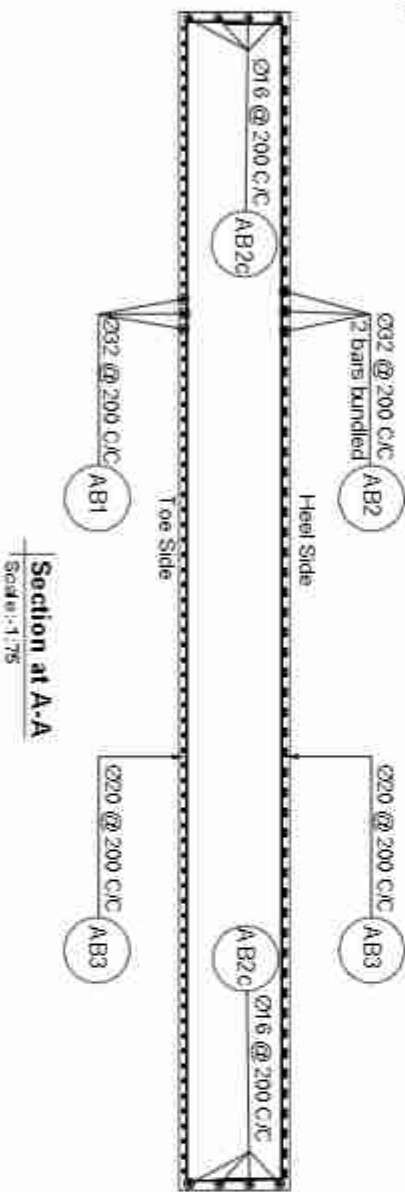
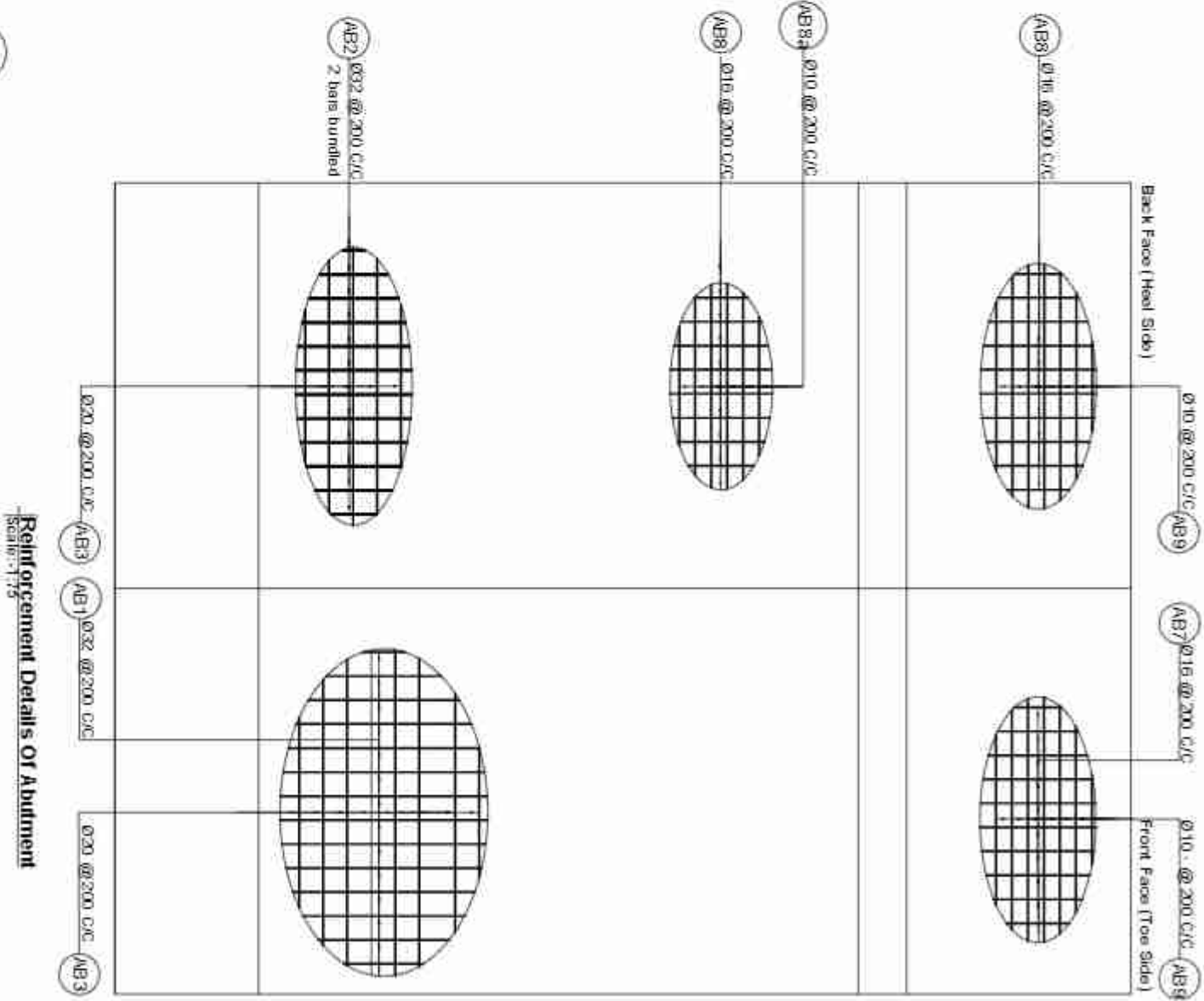
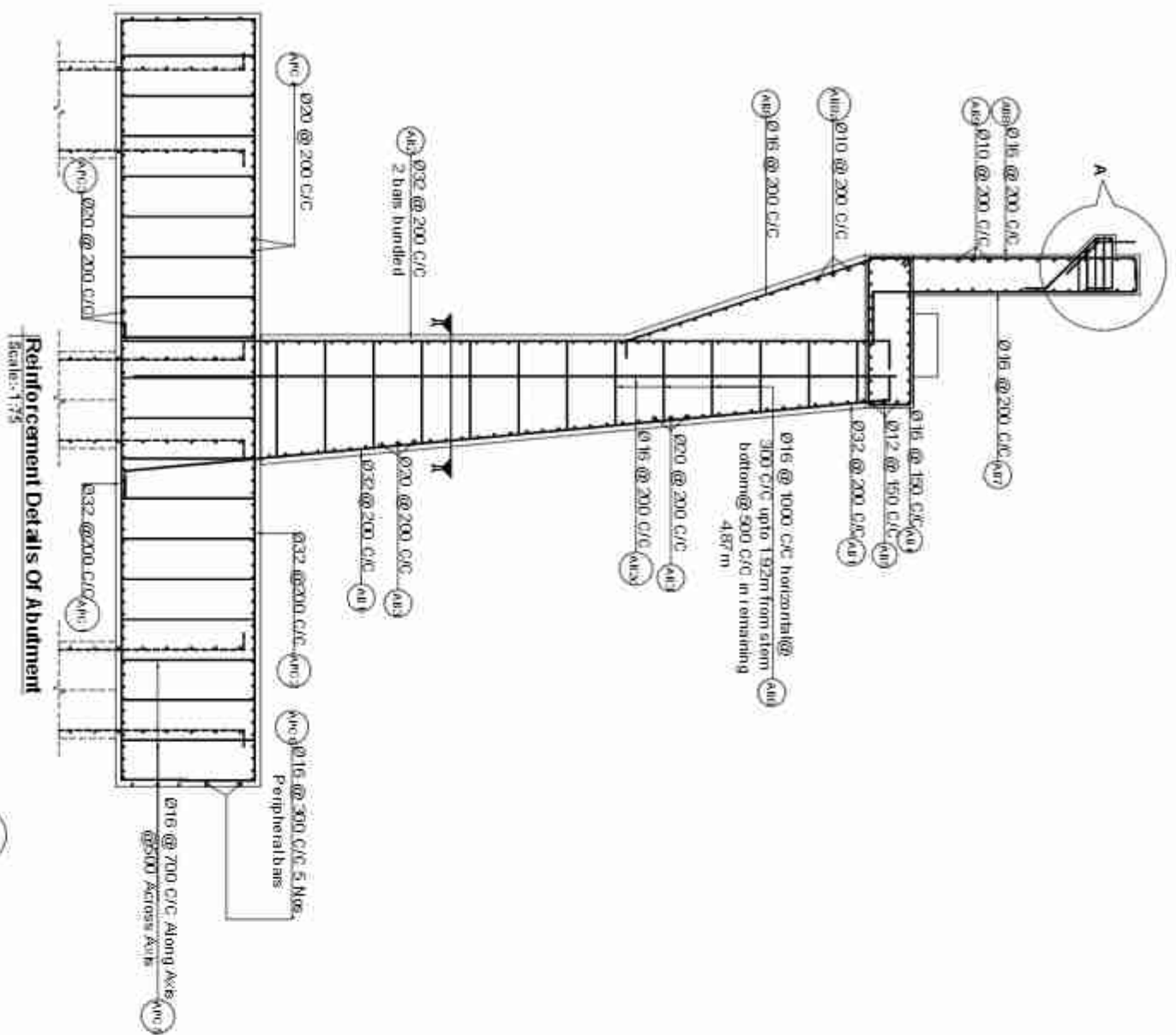
Plan of Abutment
Scale: 1:150

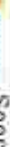


Section of Abutment At (A-A)
Scale: 1:100

Section of Abutment At (B-B)
Scale: 1:100

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project Project Preparatory Consultant (SHP-PPC) ADB Loan No: 372-NEP	CONSULTANT: Saang Engineering Co. Ltd. In association with EPMC P. (Ltd) and 80% Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOE, DCID		SHEET TITLE Detail of Abutment of Banarwa Bridge (46+100/302.2)		SCALE: As Shown		NAME		SIGNATURE	REV. NO.	DESCRIPTION	DATE: November, 2022 DWG. NO.: 302_Banarwa SHEET NO.: 15/26
									Designed by:		Saroj Bhattacharj			
									Checked by:		P. Upadhyaya			
									Approved by:		Dr. T.H. Chou			



Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project/Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	 Soosung Engineering Co. Ltd.  (in association with ERMC P. (Ltd) and Tech Studio of Engineering Nepal)	IMPLEMENTING AGENCY:		SHEET TITLE	SCALE:	NAME	SIGNATURE	REV. NO.	DESCRIPTION	DATE: November, 2022
		DOR, DCID								
		ROAD NAME								
		East West Highway (H01)								
		Butwal - Gorunghat Section								
		Reinforcement Details of Abutment of Banarhi Bridge (46+100/302.2A)								
		As Shown								
		Designed by	Sang Bhattarai							
		Checked by	P. Upadhyaya							
		Approved by:	Dr. T. H. Chandra							
SHEET NO.: 1628										



Scale m: 1:50

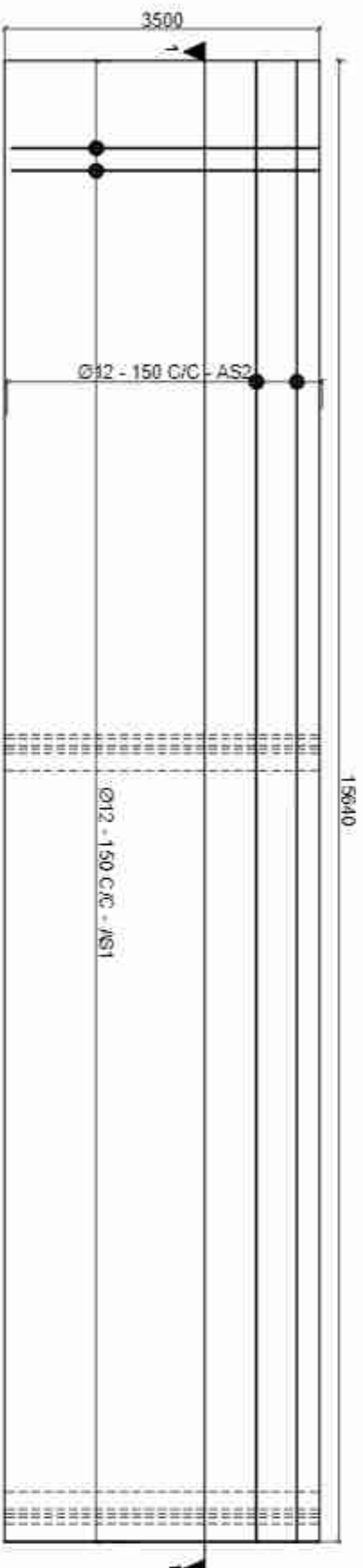


Reinforcement Details Of Abutment

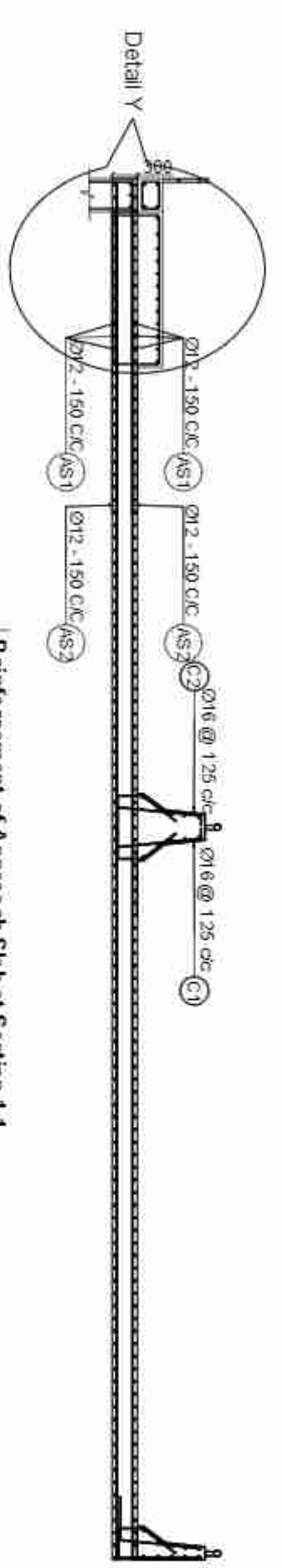
BAR BENDING SCHEDULE OF WING WALL							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
R1			30	8	5.007	2.466	98784
R2			16	8	5.387	1.578	68020
R3			16	18	7.356	1.578	208385
R4			16	18	3.928	1.578	111595
R5			10	26	5.820	0.617	83295
R6			20	2	0.307	2.466	1514
R7			10	4	3.400	0.617	83365
R8			10	18	1.320	0.617	14049
TOTAL IN 2 WING WALL IN ONE ABUTMENT							606227
TOTAL WEIGHT IN METRIC TON							0.606

BAR BENDING SCHEDULE OF ABUTMENT							
BAR NO	SHAPE & SIZE IN mm (GO TO SCALE)	SPACING (mm)	Ø of BARS (mm)	N.O. of BARS	LENGTH (m)	WEIGHT (kg)	TOTAL WEIGHT (kg)
AB 1		200	32	83	9.700	6.313	5114.20
AB2		200	32	86	9.900	6.313	10038.256
AB2C		200	16	40	9.400	1.518	149.311
AB3		200	20	70	24.500	2.466	5900.425
AB4		100	16	111	4.700	1.578	823.430
AB5		100	12	30	16.300	0.888	434.142
AB6		100	16	200	1.530	1.578	701.683
AB7		200	16	83	4.065	1.578	531.214
AB8		200	16	83	6	1.578	814.310
AB8a		200	10	13	16.300	0.877	130.646
AB9		200	10	16	33.250	0.617	201.439
AB10		200	16	79	19.47	1.578	242.709
AB11		200	12	68	1.000	0.888	140.276
AB11a		200	12	68	0.700	0.888	68.192
AB12		200	20	1	16.300	2.466	40.138
AB13		10	16	2	16.300	1.578	51.464
AB14		20	20	66	0.300	2.466	122.076
TOTAL WEIGHT IN ONE ABUTMENT							20106.803
TOTAL WEIGHT IN METRIC TON							20.106

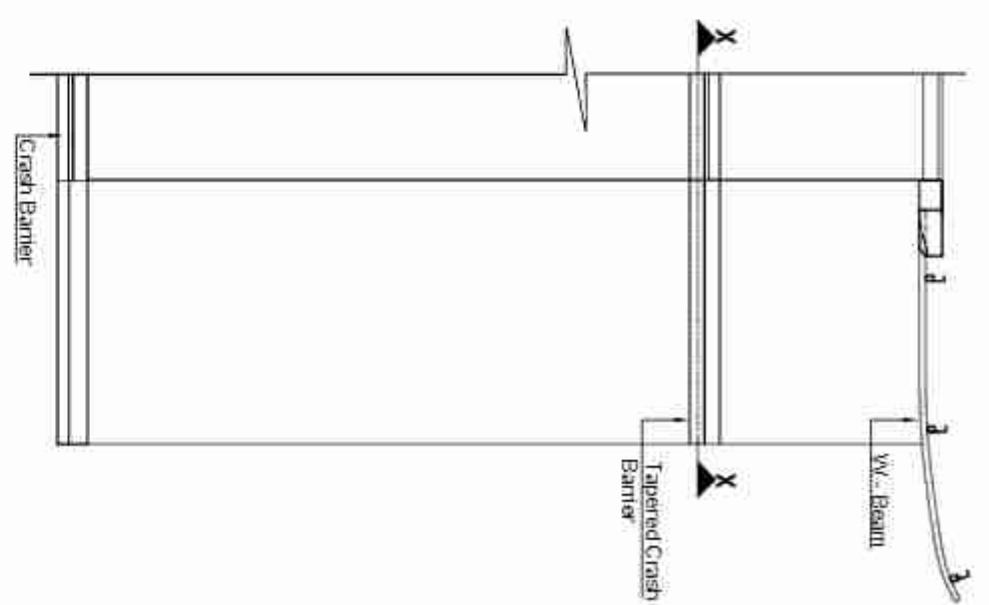
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:								DATE:		
	Soo Sung Engineering Co. Ltd.,  Korea		DOR, DCID		Reinforcement Details of Wingwall of Banarhas Bridge (667+001 (302_A))		As Shown		Designed by:		NAME		SIGNATURE		REV NO.		
	In association with EPMC P (Ltd)		ROAD NAME						Checked by:		P. Upadhyaya						
	and 06702 Tech Studio of Engineering Nepal		East West Highway (H01)						Approved by:		Dr. T.H.Choi						
			Birtul - Gonsingh Section														0706, NO. 302, Banarhas SHEET NO. 17/26



Plan of Reinforcement Details of Approach Slab
Scale: 1:75

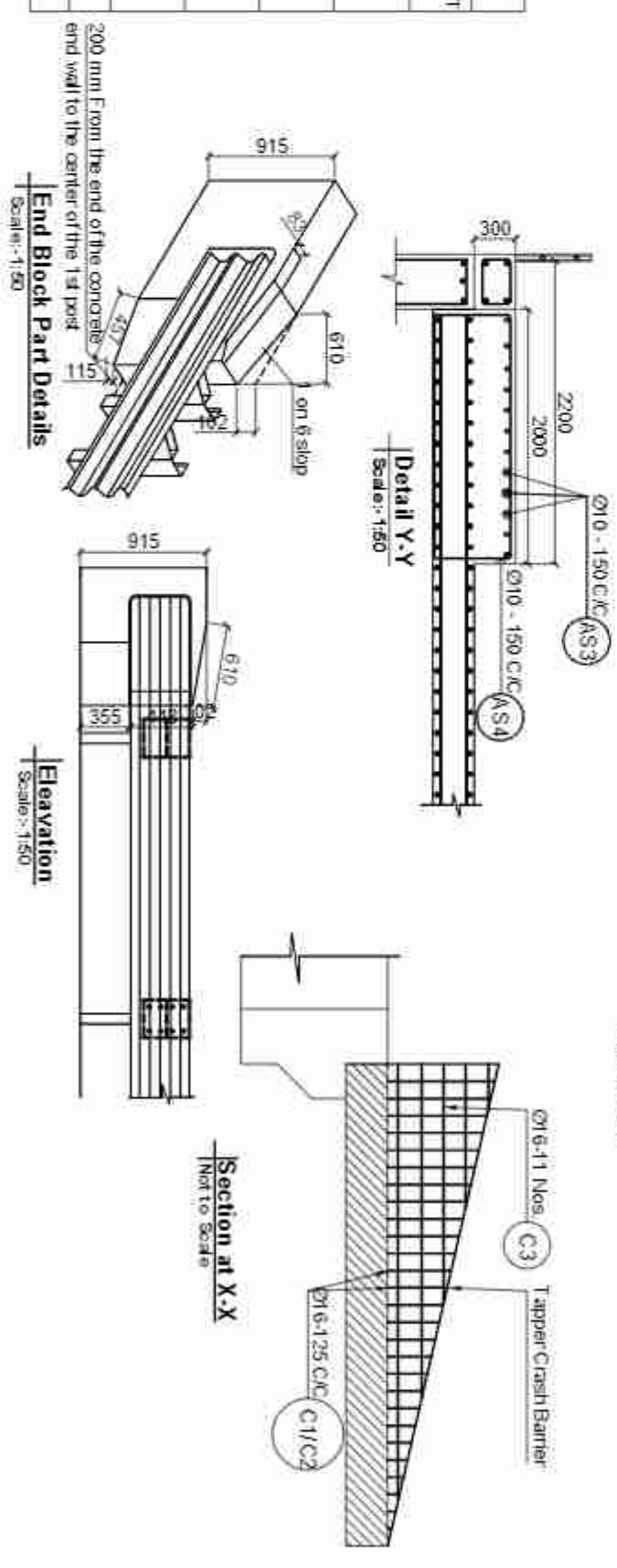


Reinforcement of Approach Slab at Section 1-1
Scale: 1:75



Plan of Approach Slab
Not to Scale

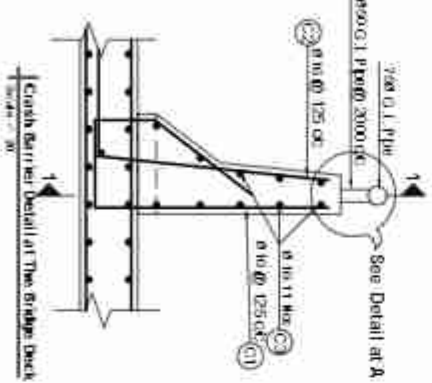
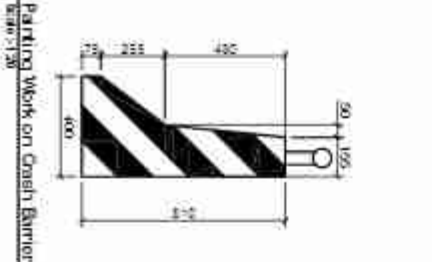
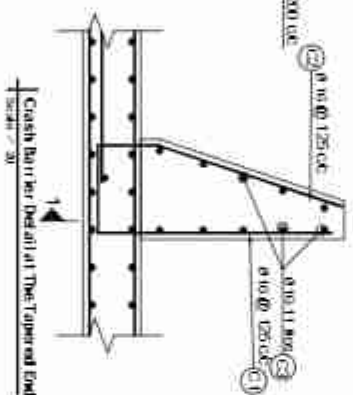
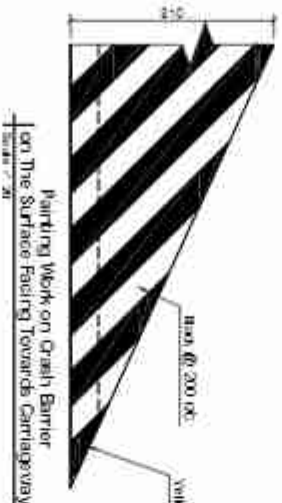
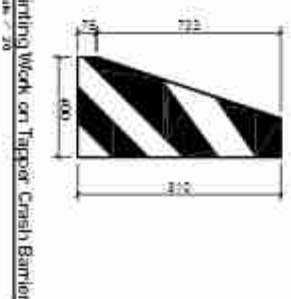
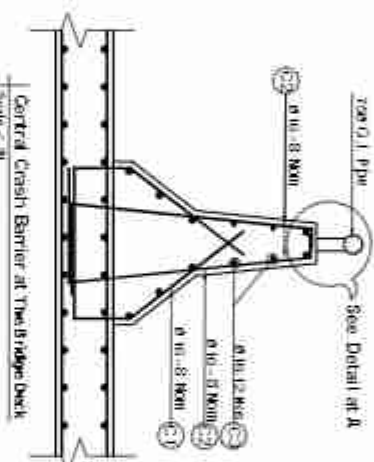
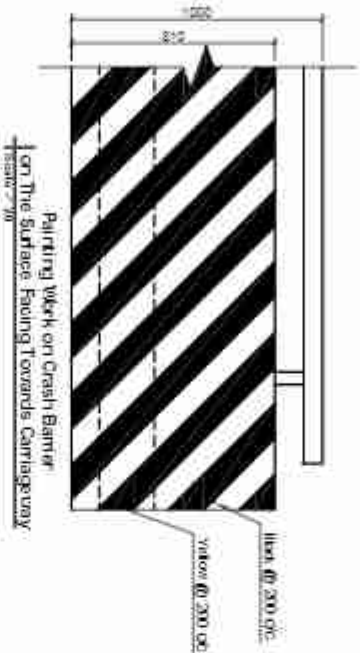
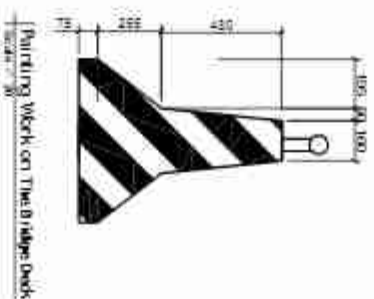
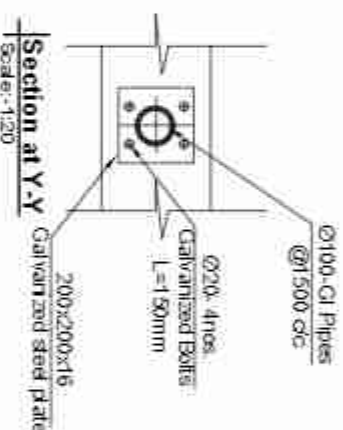
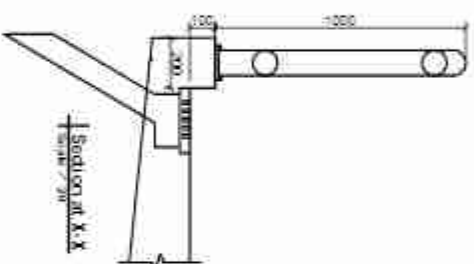
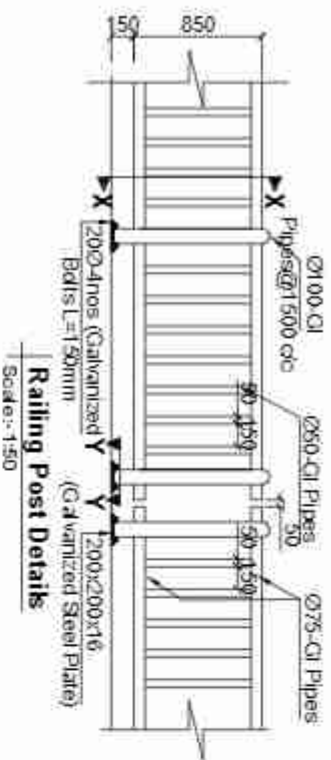
BAR BENDING SCHEDULE OF APPROACH SLAB					
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	NO. OF LENGTH (m)
AS1	1400	12	12	210	3.400
AS2	1500	12	12	48	15.500
AS3	3400	10	10	15	3.400
AS4	1520	10	10	18	5.000
TOTAL IN ONE APPROACH SLAB					1333.409
TOTAL WEIGHT IN METRIC TON					1.383



End Block Part Details
Scale: 1:50

Elevation
Scale: 1:50

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADO) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd. In association with EPMC P (Ltd) and Korea Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR DCID ROAD NAME: East West Highway (H01) Butwal - Gousinghe Section		SHEET TITLE: Reinforcement Details of Approach Slab of Barnahwa Bridge (46/4-1001/302_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
										Designed by: Saroj Bhattacharai		Signature						November, 2022	
										Checked by: P. Upadhyaya		Signature						DWG. NO.: 302_Barnahwa	
										Approved by: Dr. T.H. Choe		Signature						SHEET NO.: 18/28	



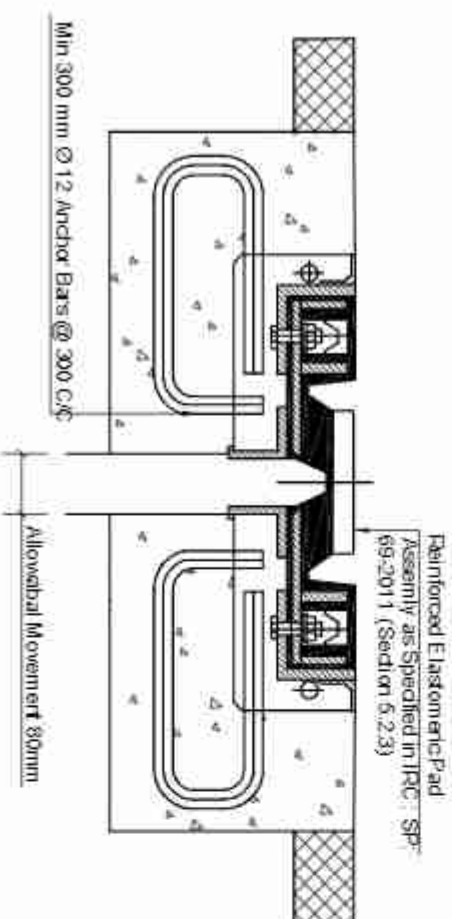
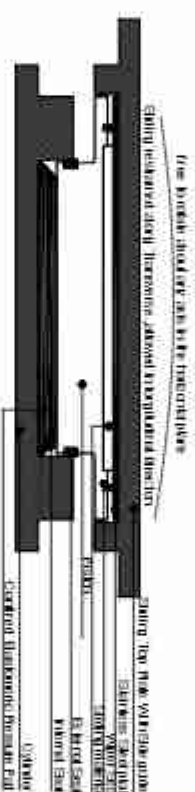
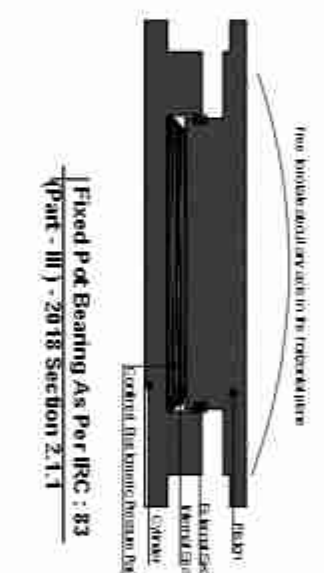
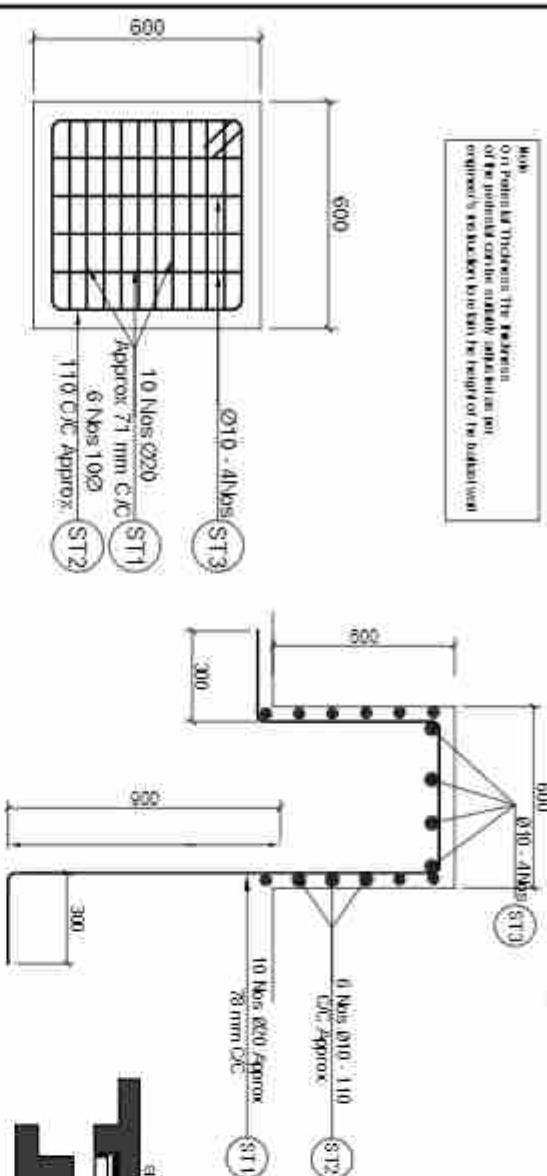
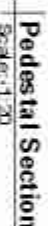
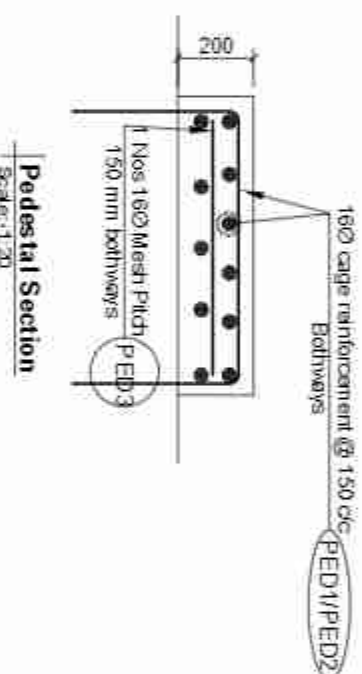
NOTES:
The crash barrier shall be sloped at both ends of the bridge as shown and the reinforcement shall be adjusted according to the slope.

Utility hanger Detail
Scale: 1:50

BAR BENDING SCHEDULE OF CENTRAL CRASH BARRIER							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
C1		125	16	8	2.210	1.578	27.905
C2		125	16	16	1.580	1.578	39.900
C3		16	16	11	0.960	1.578	16.967
TOTAL FOR 1M							84.473
TOTAL FOR 1.0M IN MT							0.084

BAR BENDING SCHEDULE OF CRASH BARRIER							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
C1		125	16	8	2.030	1.578	25.632
C2		125	16	8	1.415	1.578	17.867
C3		16	16	11	0.960	1.578	16.967
TOTAL FOR 10M							60.166
TOTAL FOR 1.0M IN MT							0.006

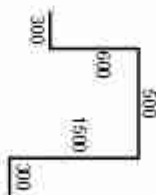
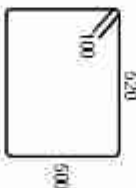
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project/Preparatory Consultant (SHP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung E Engineering Co. Ltd. In association with ERMC P (Ltd) and Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME East West Highway (401) Butwal - Gornuganga Section		SHEET TITLE Miscellaneous Details - I of Banarhas Bridge (46+100/1302 JV)		SCALE: As Shown		Designed by: Sarg Bhartara Checked by: P. Upadhyaya Approved by: Dr. T. H. Chandra		SIGNATURE REV. NO. DESCRIPTION DATE: November, 2022 DWG. NO.: 302_Banarhas SHEET NO.: 2028	
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Load Condition	Items	Load / Displacement / Moment	
		POT Fixed Bearing	POT /PTE Free Bearing
Under DL only	V, kN	No EQ	1252
		EQ	1415
	HL, kN	No EQ	64
		EQ	751
	HT, kN	No EQ	0
		EQ	336
	θ , rad	No EQ	0.0000
		EQ	0.0000
Under Maximum Live Load	Δ , mm	N/A	80
	V, kN	No EQ	1912
		EQ	2170
	HL, kN	No EQ	96
		EQ	899
	HT, kN	No EQ	0
		EQ	478
θ , rad	No EQ	0.0002	
	EQ	0.0002	

The Contractor Shall Provide and Supply POT - PTFE Bearings According to Provided load and Deformation:

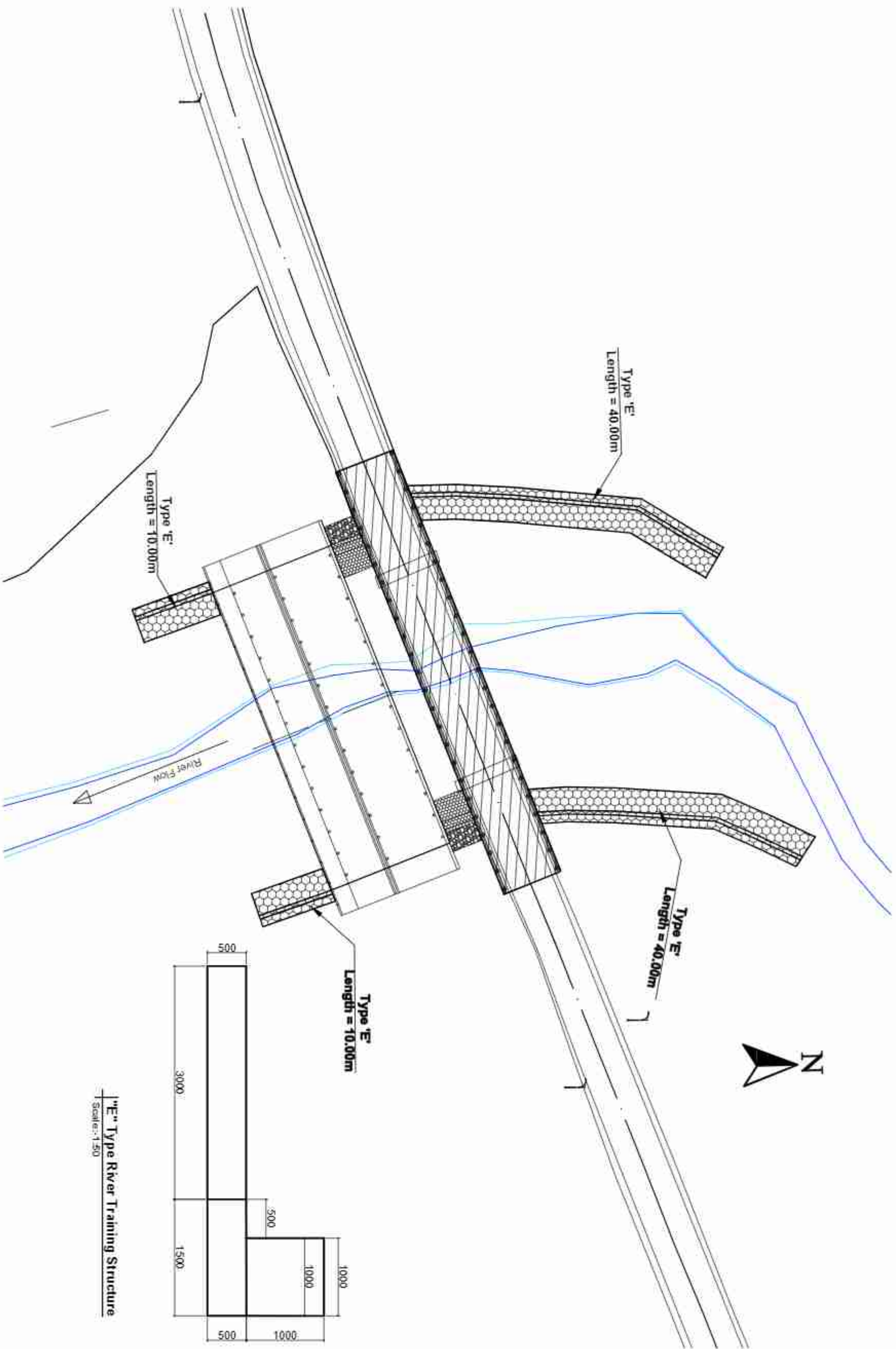
BAR BENDING SCHEDULE OF PEDESTAL							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (MM)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
PE-D1			16	6	3.010	1.578	28.505
PE-D2			16	7	2.850	1.578	31.438
PE-D3			16	1	8.520	1.578	13.447
TOTAL WEIGHT IN KG							73.440
TOTAL WEIGHT IN MT							0.073

BAR BENDING SCHEDULE OF STOPPER							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (kg)
ST1			20	10	3.200	2.465	78.917
ST2			10	6	2.840	0.617	9.706
ST3			10	4	0.700	0.617	4.726
TOTAL WEIGHT IN KG							93.409
TOTAL WEIGHT IN MT							0.093

Legends:
EQ = Earthquake condition
V = Vertical load
HL = Horizontal force along the bridge axis
HT = Horizontal force transverse to bridge axis
 θ = Rotation about transverse axis
 Δ = Maximum longitudinal movement allowed

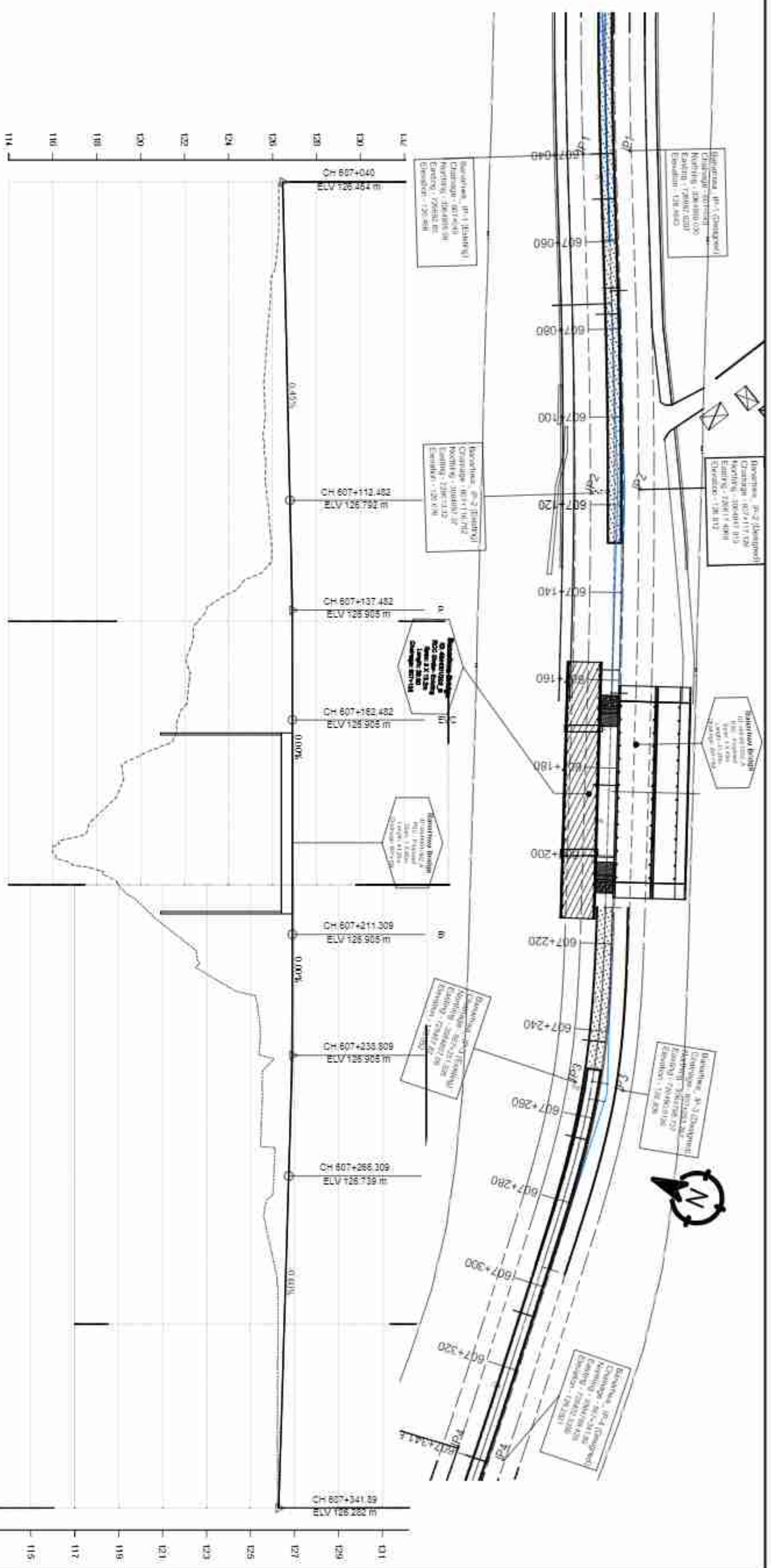
Notes
Proposed T type of Bearing - P.O.T, P.TFE bearings:
1) The P.O.T-Fixed bearings are fixed in position and free to rotate in all directions
2)The P.O.T-PTFE Free bearings are free to rotate in all direction, Free to slide along the bridge axis and Fixed in position in transverse direction
3) The coefficient of friction, μ for PTFE free bearings is taken as 0.05

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHP-PPC) ADB Loan No.: 3722-NP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:													
	 Soosung Engineering Co. Ltd., Korea  In association with EPMC P. (Ltd.) and  Tetra Studio of Engineering Nepal		DOR, DQID ROAD NAME: East West Highway (H01) Bilateral - Gorkusanghe Section		Miscellaneous Details - 2 of Satani Bridge (A6/H01/S02_A)		As Shown													



"E" Type River Training Structure
Scale: 1:50

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd., Korea In association with EPMC P (Ltd) and Korea Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Bupal - Gauranghe Section		SHEET TITLE: River Training Work of Banathwa Bridge (A64-D01/302_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
										Designed by: Saroj Bhattacharya		Checked by: P. Lipadhyaya		Approved by: Dr. T.H.Chandra				November, 2022	
																		DWG NO.: 302_Banathwa	
																		SHEET NO.: 22/26	



DESIGN LEVEL(m)	EXISTING LEVEL(m)	HORIZONTAL ALIGNMENT		SUPER. ELEVATION	CHAINAGE(Km)
		RIGHT	LEFT		
126.261	126.261	P-1 R=1000.00	NC	607+040	607+040
126.259	126.259			607+050	607+050
126.555	126.555			607+060	607+060
126.600	126.545			607+070	607+070
126.645	126.591			607+080	607+076.864
126.680	126.538	P-2 R=1000.00	-3	607+090	
126.738	126.535			607+100	
126.781	126.719			607+110	
126.823	126.906			607+120	
126.857	126.934			607+130	
126.882	122.607	P-3 R=1000.00	T	607+140	
126.898	122.130			607+150	
126.905	121.851			607+160	607+157.888
126.905	120.205			607+170	
126.905	118.897			607+180	607+183.938
126.905	116.313	P-4 R=1000.00	NC	607+190	
126.905	116.989			607+200	607+200.000
126.905	121.262			607+210	
126.901	122.692			607+220	
126.988	125.361			607+230	
126.680	126.003	P-5 R=1000.00	-3	607+240	607+242.454
126.823	126.506			607+250	
126.775	126.116			607+260	607+255.1
126.717	126.028			607+270	
126.638	125.789			607+280	
126.598	126.211	P-6 R=1000.00	T	607+290	
126.535	126.250			607+300	607+307.196
126.475	126.236			607+310	
126.414	126.226			607+320	
126.354	126.231			607+330	
126.294	126.236	P-7 R=1000.00	NC	607+340	607+341.85

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Project Directorate Office (ADB)
SASEC Highway Improvement Project-
Preparatory Consultant (SHP-PPC)
ADB Loan No: 3722-NEP

CONSULTANT:

Soosung Engineering Co. Ltd.
Korea in association with
ERM Co. P (Ltd), Nepal
and
TSE Tech Studio of Engineering

IMPLEMENTING AGENCY:

DOR, DCID

SHEET TITLE:

Plan & Profile
OF
Banarhawa Bridge
607+040 - 607+340

SCALE:

0 2 4
Vertical Scale
0 10 20 30m
Horizontal Scale

NAME

SIGNATURE

REVNO

DESCRIPTION

DATE:

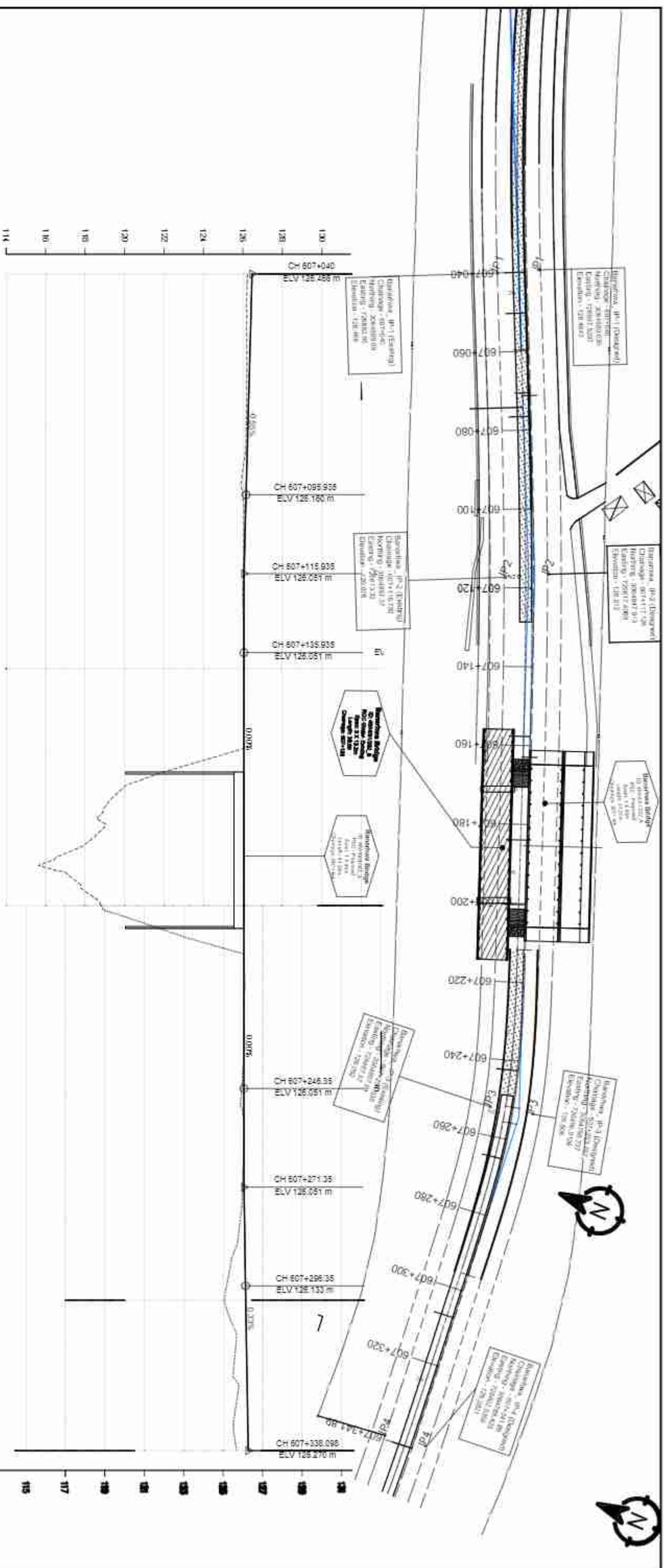
DESIGNED BY:

CHECKED BY:

APPROVED BY:

DWG. NO.:

SHEET NO.:



DESIGN LEVEL(m)	HORIZONTAL ALIGNMENT		EXISTING LEVEL(m)	SUPER ELEVATION	CHAINAGE(Km)
	RIGHT	LEFT			
128.456	128.456	128.456	128.231	607+040	607+040
128.411	128.411	128.411	128.224	607+050	607+050
128.387	128.387	128.387	128.201	607+060	607+060
128.302	128.302	128.302	128.187	607+070	607+070
128.247	128.247	128.247	128.165	607+080	607+080
128.193	128.193	128.193	128.160	607+090	607+090
128.139	128.139	128.139	128.088	607+100	607+100
128.097	128.097	128.097	128.051	607+110	607+110
128.055	128.055	128.055	128.051	607+120	607+120
128.053	128.053	128.053	128.033	607+130	607+130
128.051	128.051	128.051	128.057	607+140	607+140
128.051	128.051	128.051	128.045	607+150	607+150
128.051	128.051	128.051	128.028	607+160	607+160
128.051	128.051	128.051	119.976	607+170	607+170
128.051	128.051	128.051	119.988	607+180	607+180
128.051	128.051	128.051	119.765	607+190	607+190
128.051	128.051	128.051	118.815	607+200	607+200
128.051	128.051	128.051	124.437	607+210	607+210
128.051	128.051	128.051	128.094	607+220	607+220
128.051	128.051	128.051	128.054	607+230	607+230
128.051	128.051	128.051	128.020	607+240	607+240
128.051	128.051	128.051	128.891	607+250	607+250
128.057	128.057	128.057	128.035	607+260	607+260
128.088	128.088	128.088	128.809	607+270	607+270
128.088	128.088	128.088	128.859	607+280	607+280
128.114	128.114	128.114	128.402	607+290	607+290
128.145	128.145	128.145	128.040	607+300	607+300
128.178	128.178	128.178	128.886	607+310	607+310
128.211	128.211	128.211	128.890	607+320	607+320
128.244	128.244	128.244	128.921	607+330	607+330

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Preparation Consultant (SHP-PPC) ADB Loan No: 3722-NEP		CONSULTANT: Soosung Engineering Co. Ltd., Korea in association with ERM Co. P. (Ltd), Nepal and TSE Tech Studio of Engineering		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gansingh Section		SHEET TITLE: Plan & Profile OF Banarhawa Bridge 607+040 - 607+330		SCALE: Vertical Scale Horizontal Scale		DESIGNED BY: S.B. Shrestha		CHECKED BY: P. Upadhyaya		APPROVED BY: D. T. H. Chd		DATE: November, 2022		DWG. NO.: 302_Banarhawa		SHEET NO.: 24/25	
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Ch:606+950
GL:126.757
DL:126.990
GL:126.645
DL:126.937



Ch:607+000
GL:126.443
DL:126.708



Ch:607+050
GL:126.267
DL:126.410
GL:126.294
DL:126.509



Ch:606+960

GL:126.723
DL:126.941
GL:126.717
DL:127.167



Ch:607+010

GL:126.424
DL:126.649



Ch:607+060

GL:126.198
DL:126.350



Ch:606+970

GL:126.691
DL:126.887



Ch:607+020

GL:126.399
DL:126.589



Ch:607+070

GL:126.153
DL:126.299
GL:126.845
DL:126.600



Ch:606+980

GL:126.643
DL:126.826



Ch:607+030

GL:126.359
DL:126.529



Ch:607+080

GL:126.132
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GL:126.691
DL:126.645



Ch:606+990

GL:126.569
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Ch:607+040

GL:126.322
DL:126.469
GL:126.281
DL:126.464



Ch:607+090

GL:125.987
DL:126.172
GL:125.640
DL:126.690



Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

Project Directorate Office (ADB)

SASEC Highway Improvement Project-
Project Preparation Consultant (SHP-PPC)

ADB Loan No: 3722-NEP

CONSULTANT:

Soosung Engineering Co. Ltd.,
Korea in association with



ERM Co. P (Ltd), Nepal

TSE Tech Studio of Engineering

IMPLEMENTING AGENCY:

DOR, DCID

ROAD NAME:

East West Highway (H01)

SHEET TITLE:

Cross Section
of
Ch:606+950 - 607+090

SCALE:



NAME

S.B. Shrestha

SIGNATURE

[Signature]

REVNO

DESCRIPTION

DATE:

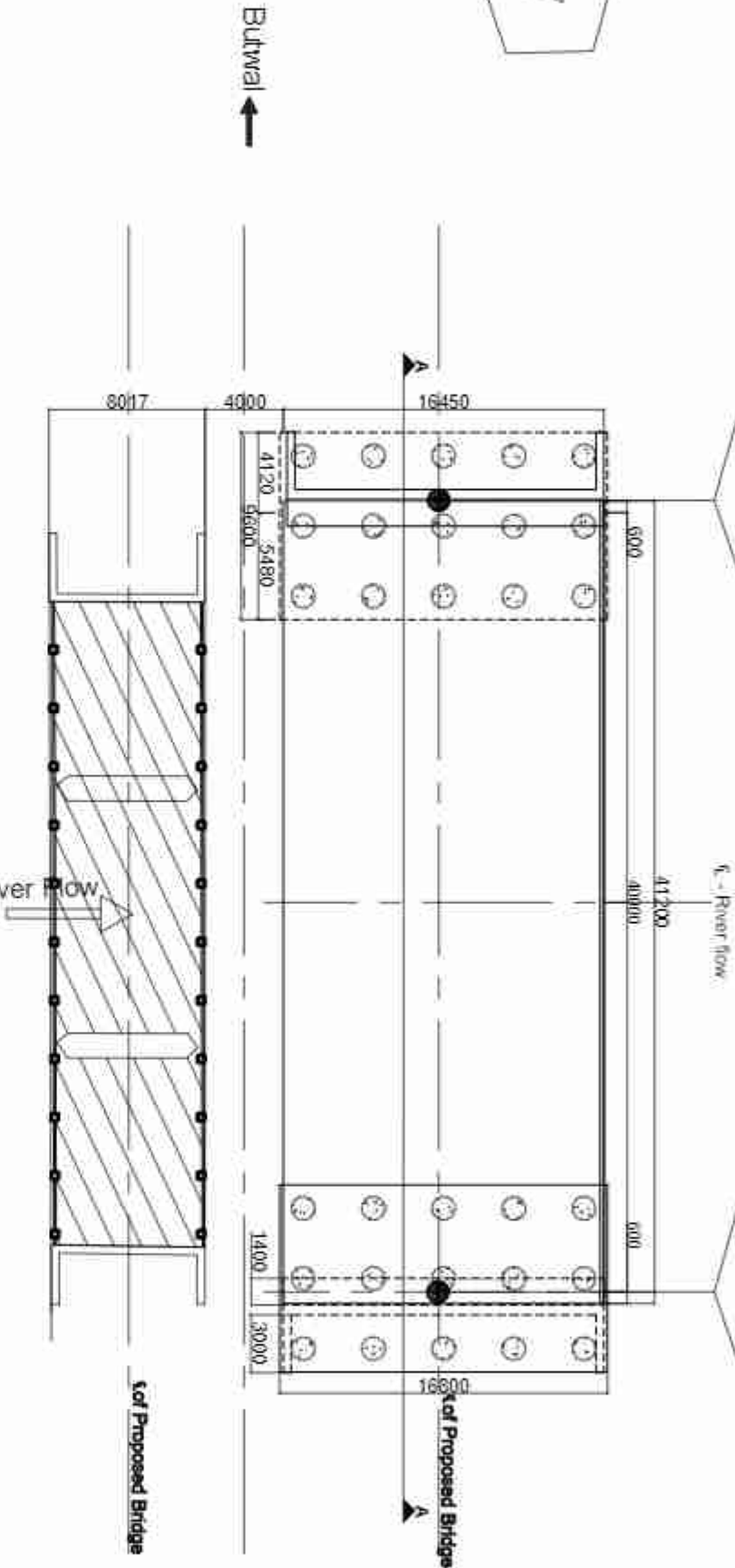
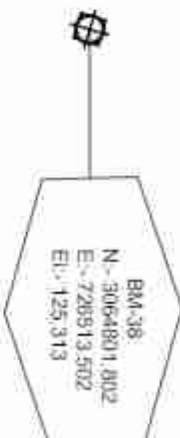
November, 2022

DWG. NO.:

302_Banahawa

SHEET NO.:

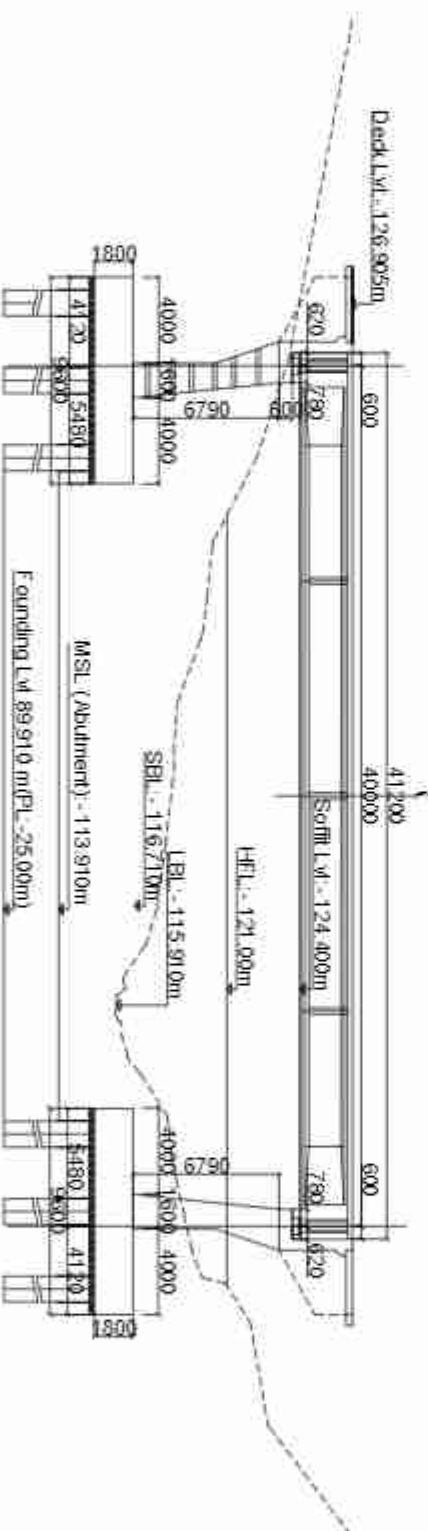
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Butwal →

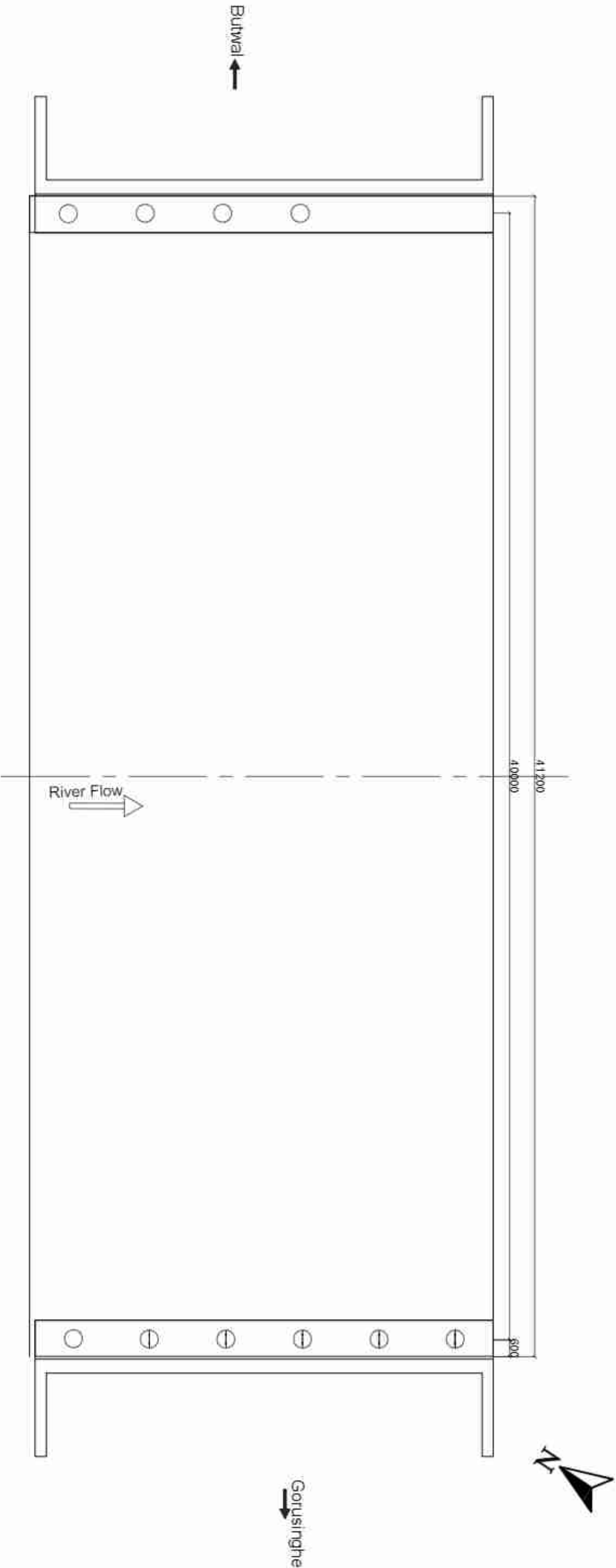
→ Gorusinghe

Layout Plan
Scale: 1:350



Section A-A
Scale: 1:350

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project Project Preparatory Consultant (SHIP-PPC) ADB Loan No. 3722-NEP		CONSULTANT: Soosung E Engineering Co. Ltd. In association with EPMC P (Pvt) and Korea Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section		SHEET TITLE: Layout Plan of Barnahwa Bridge (46+001/502_A)		SCALE: As Shown		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE:
										Designed by: Sard Bhatara					November, 2022
										Checked by: P. Upadhyaya					DWG. NO.: 302_Barnahwa
										Approved by: Dr. T.H.Chd					SHEET NO.: 25/26



Layout of Bearing
Scale:-1:150

Legend

-  Elastomeric bearing.
Partial movement allowed in longitudinal direction.
Restrained to transverse movement.Free to rotate in any direction.
-  Fixed Pot-bearing.
Restrained to lateral movement.Free to rotate in any direction.
-  Free Pot-bearing.
Partial movement allowed in longitudinal direction.
Restrained to transverse movement.Free to rotate in any direction.

Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHP-PPC) ADB Loan No: 3722-NEP		CONSULTANT:  Seosung Engineering Co. Ltd., Korea in association with EPMC P (Ltd) and XXXX Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section		SHEET TITLE: Layout Plan of Banshwa Bridge (A&B/D01/302_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November , 2022	
										Designed by:								DWG NO.:	
										Checked by:								302_Banshwa	
										Approved by:								SHEET NO.:	
																		(26/26)	

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Project Directorate (ADB)
Implementing Agency : DOR, DCID

Project Preparatory Consultants
Under
SASEC Highway Improvement Project (SHIP-PPC)
(ADB Loan No: 3722 Nep)
Contract No. SHIP/PPC/2020/02

Dry Nala Bridge(46-H001-303_AB)

St. Ch : 607+837.80 ~ End Ch :607+851.20

Detailed Drawing

Butwal - Gorusinghe Sector

November,2022

CONTENTS

S.No.	DESCRIPTION	DWG. NO	NO. OF SHEETS
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2.	Topographic Map.	2	1
3.	General Arrangement.	3	1
4.	BorLog Details.	4	1
5.	Concrete Outline.	5	1
6.	Reinforcement Details.	6	1
7.	Typical Drawing of Wing Wall.	7	1
8.	Bar Bending Schedule.	8	1
9.	Layout Plan.	9	1
10.	Plan & Profile.	10	1

GENERAL NOTES

a) Bridge Design Specifications

IRC Standard Specifications and Code of Practice for Road Bridges - All Relevant Sections.

b) Bridge Design Method

Limit State method.

c) Live Load

IRC Class A and IRC Class 70R, Tracked and Wheeled vehicles. Load combinations are adopted as per IRC-6-2017, Section II, Loads and Load Combinations.

Pedestrian Load: 4kN/m².

d) Concrete

Concrete Class for box, Approach Slab and Safety Kerb is M25.

e) Steel Reinforcement

Reinforcing Steel shall be HYSD bars of grade Fe 500 conforming to IS: 1786-2008.

f) Lap Length

Minimum Lap Length is 65xdiameter of steel reinforcement.

Laps shall be in staggered position.

Lapped bars more tha 50% shall not be allowed.

g) Clear covers

Top Slab

The clear cover to steel reinforcement is 40mm.

Side Wall and Base Slab

The clear cover to steel reinforcement steel is 75mm.

Approach Slab

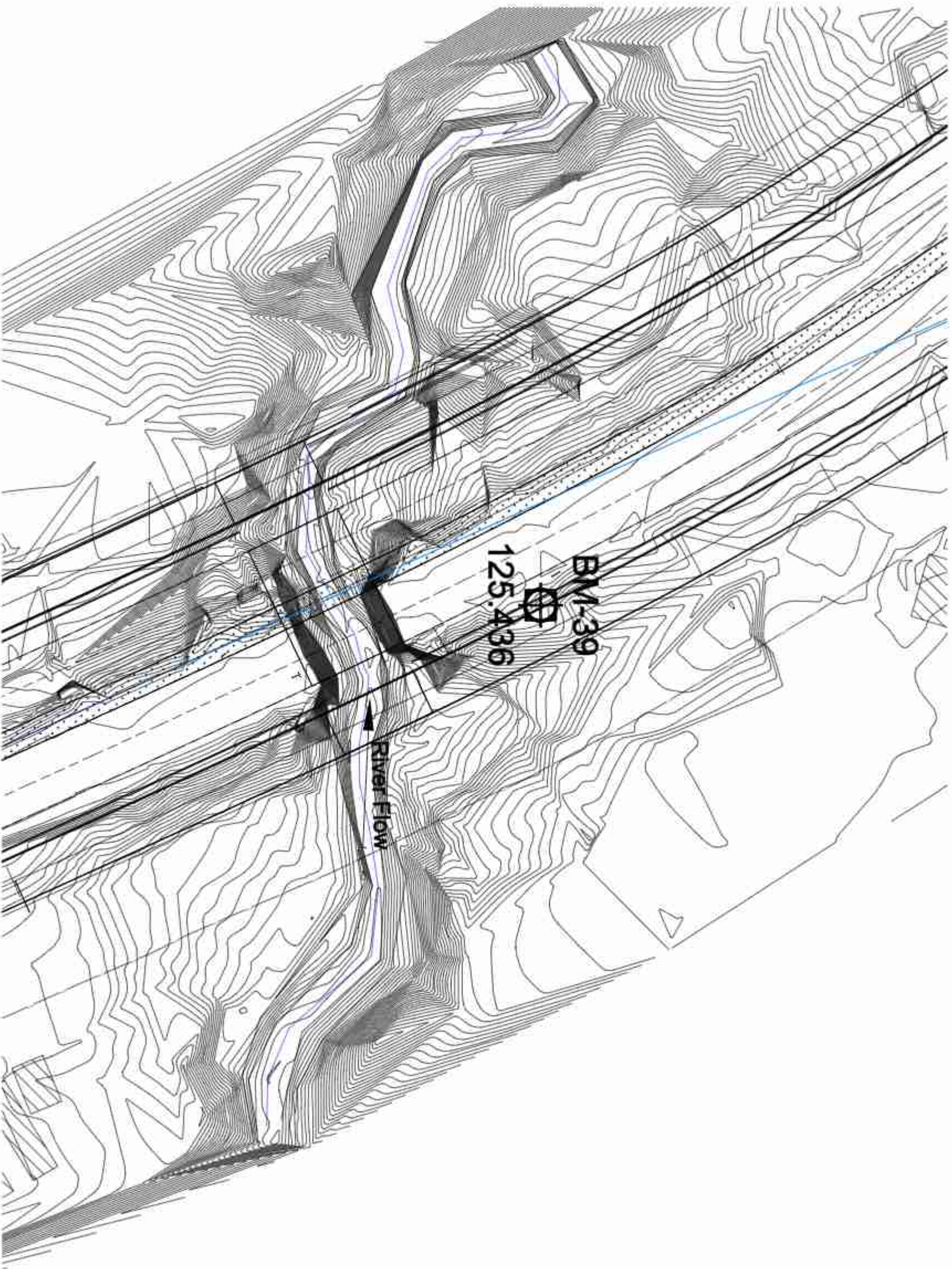
The clear cover to steel reinforcement steel is 40mm.

Safety Kerb

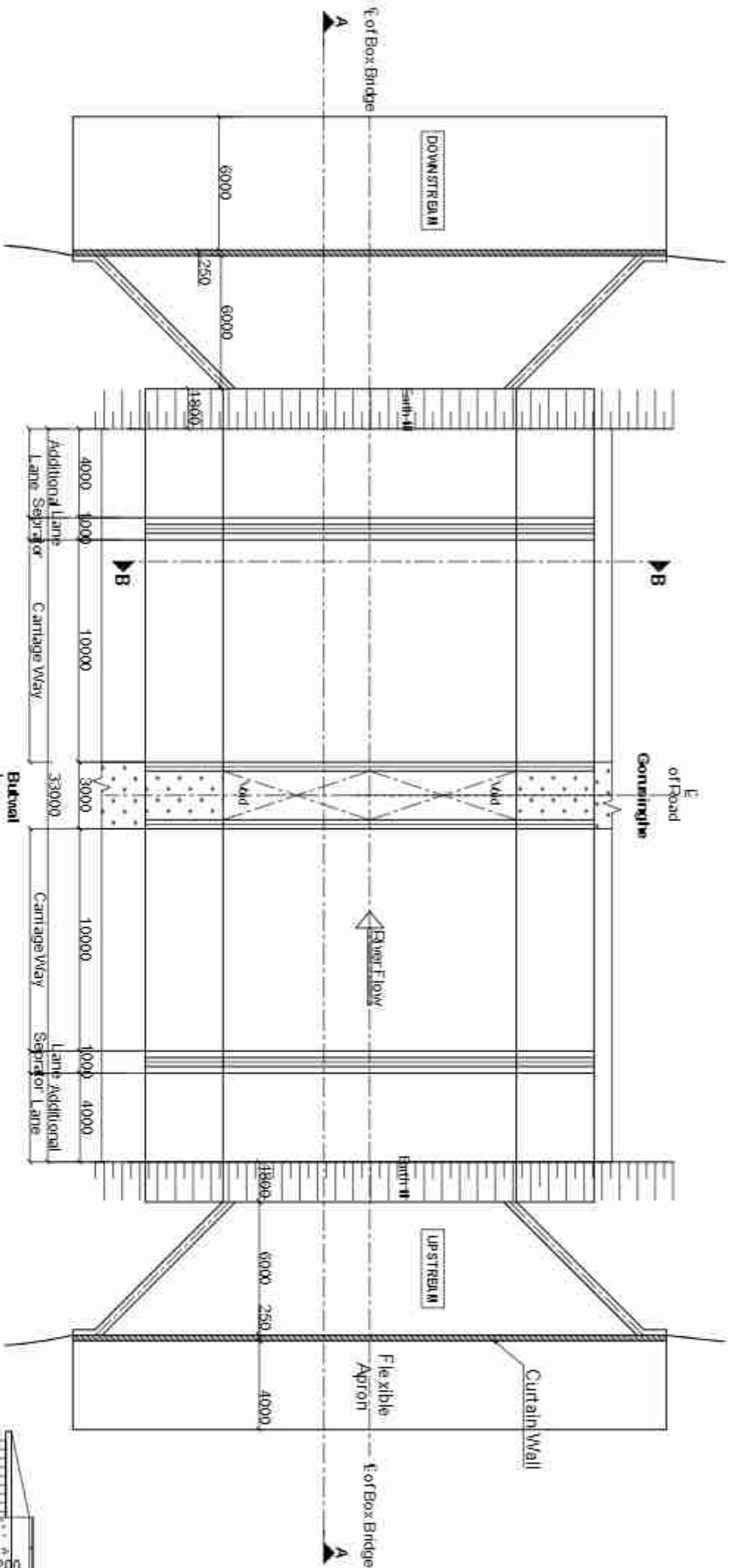
The clear cover to steel reinforcement steel is 25mm.

h) All dimensions are in millimeters except otherwise mentioned.

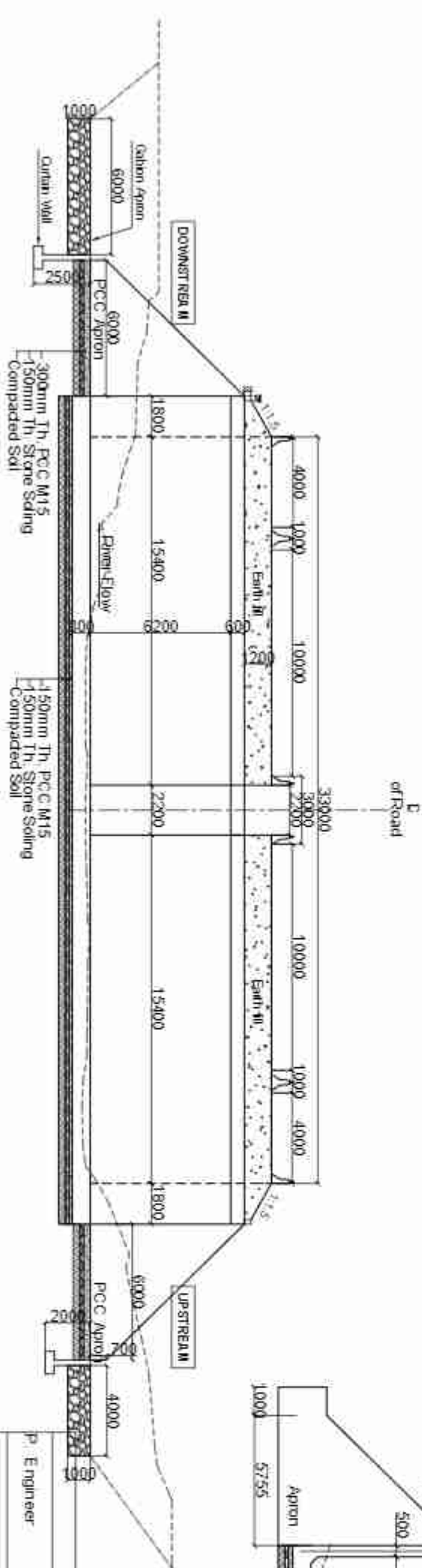
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:				NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE	
	 Seosung Engineering Co. Ltd., Korea In association with ERMIC P (Ltd) and  Tech Studio of Engineering Nepal		DOR, DCD		General Notes		As Shown		Designed by:		P. Shrestha								Nov/2022	
	ROAD NAME:		East West Highway (H01)		of				Checked by:		P. Upadhyaya								DWG NO.: 303_Dry Nala	
	Butual - Gorusinghe Section		Dry Nala Box Bridge_B - (6x 6.2)		(46H-001/003 A,B)				Approved by:		Dr. T.H.Chandra								SHEET NO.: 01/10	
					CH-007/1844.5															



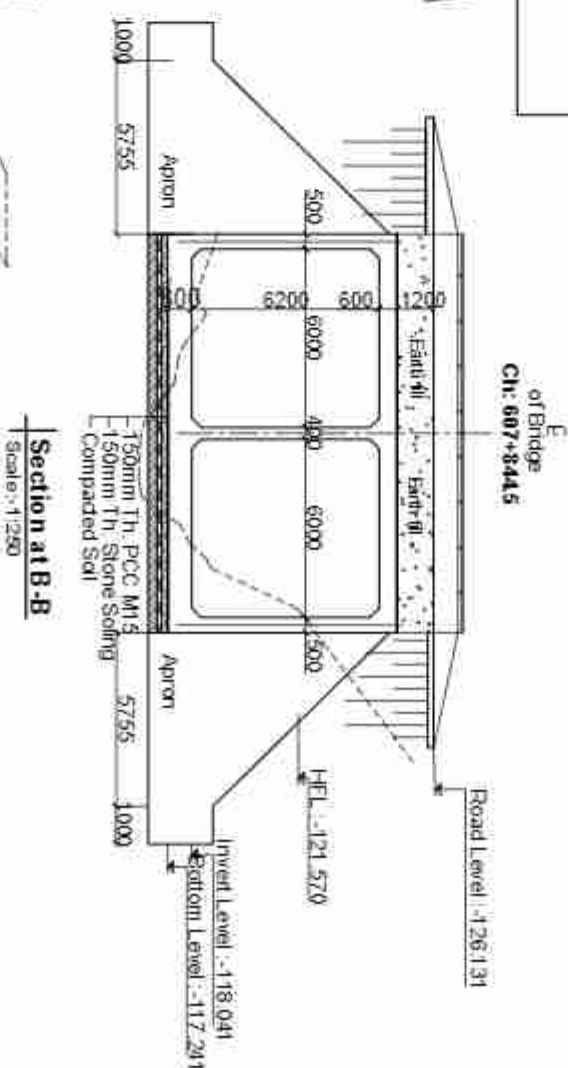
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project Project Preparation Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT:  Soosung Engineering Co. Ltd. Korea In association with ERM C.P. (Ltd) and  SXTS Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID		SHEET TITLE		SCALE:		NAME		SIGNATURE	REV. NO.	DESCRIPTION	DATE
ROAD NAME: East West Highway (H01)		Topographic Map of Dry Nala Box Bridge, B - (BX 6.2) (467H001/003 A,B) CH-607+844.5		2:1		Designed by: P. Shrestha		Checked by: P. Upadhyaya		Approved by: Dr. T.H. Choe					DWG. NO.: 303_Dry Nala SHEET NO.: (02/10)
Bureau - Consulting Section															



Buttress
Plan
Scale: 1:250



Section at A-A
Scale: 1:250



Section at B-B
Scale: 1:250

Name(NMC Number)		Signature
P. E ngineer	P. Upadhyaya (Civil A 675)	
Structure Engineer	K.P. Wagle(Civil A 127) / P. Shrestha(Civil A 676) / S. Bhattarai (Civil A 904)	
Hydrologist	Dr. P. C. Jha(Civil A 166) / S. Adhikari (Civil A 408)	
Geotechnical Engineer	A. Adhikari(Ka 199) / Dr. V. R. S. Shahi	

Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT: Soosung Engineering Co. Ltd. In association with EPM C P (Ltd) and 8738-Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID		SHEET TITLE: General Arrangement of Dry Nala Box Bridge_B - (6x 6.2) (As/H-1001/203 AB) CH-407+844.5/5		SCALE: As Shown		NAME		SIGNATURE	REV. NO.	DESCRIPTION	DATE: Nov, 2022
	ROAD NAME: East West Highway (H01)		Butwal - Consulting Section		Dry Nala Box Bridge_B - (6x 6.2)		As Shown		Designed by:		P. Shrestha			Nov, 2022
									Checked by:		P. Upadhyaya			Nov, 2022
									Approved by:		Dr. T. H. Chd			Nov, 2022