

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

Kothi Bridge(47-H001-307_A)

St. Ch : 615+236.40 ~ End Ch : 615+279.60

Detailed Drawing

Butwal - Gorusinghe Sector

November, 2022

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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:6-20/24
- For substructure and foundations - IRC:78-2014
- For seismic design - IRC:SP:14-2018. 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 (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-/2486
- 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.

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-NFP		CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with  ERMCM P (Ltd), Nepal and  Jyoti-Tech Studio of Engineering		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section		SHEET TITLE: General Notes-1 of Kotahi Bridge (46/H001/307_A)		SCALE: As Shown		NAME Saroj Bhattacharai P. Upadhyaya Dr. T.H.Choi		SIGNATURE   		REV NO.		DESCRIPTION		DATE: November,2022 DWG.NO.: 307_Kotahi Bridge SHEET NO.: 01/24	
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grout shall be mixed with mechanical mixers and shall be continuously kept agitated until pumped in.

period.

Notes

Notes on Bearings

- 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 to 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-71-2018, Clause 4.10. If not prescribed otherwise, transportation and handling operation shall follow the guidelines in Clause 4.9 of the same documents.

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

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.

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										CHECKED BY: P. Upadhyaya								DWG.NO.: 307_Kothi Bridge	
										APPROVED BY: Dr. T.H.Choi								SHEET NO.: (02/24)	

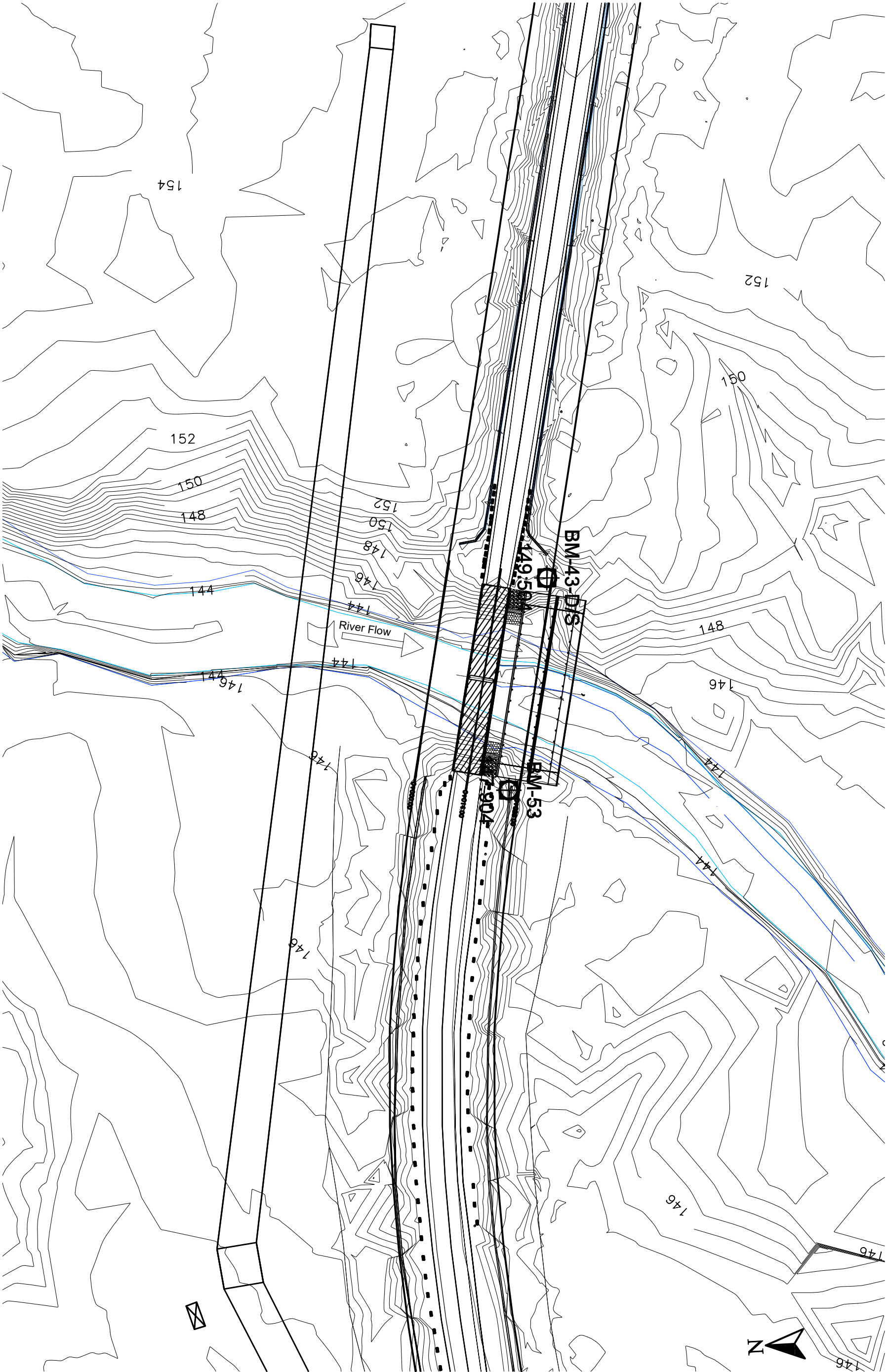
- Standard Specifications and Special provisions to the Standard Specifications (if any) and specific notes on the drawings shall be followed for the construction of the abutments, piers and foundations.
- Backfill behind the abutment shall be placed only after the concrete has achieved full 28 days 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.

Notes on Foundation and Substructure

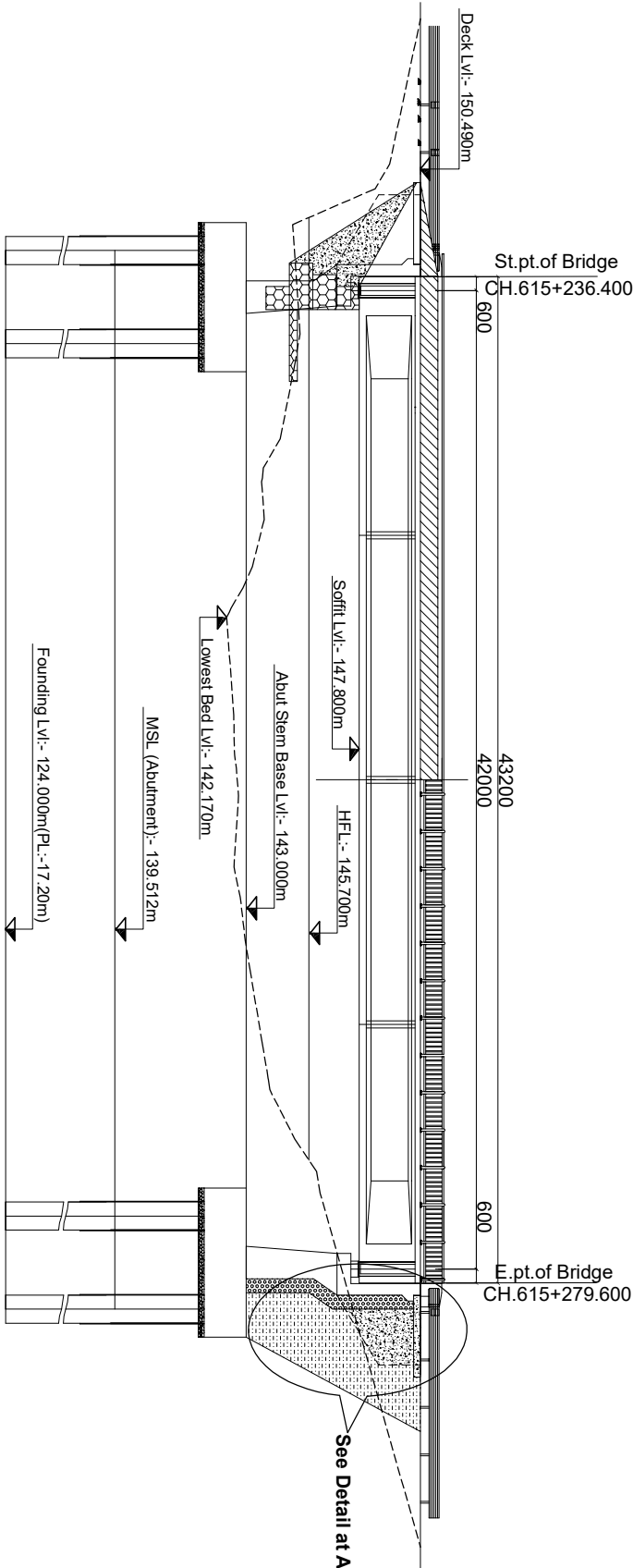
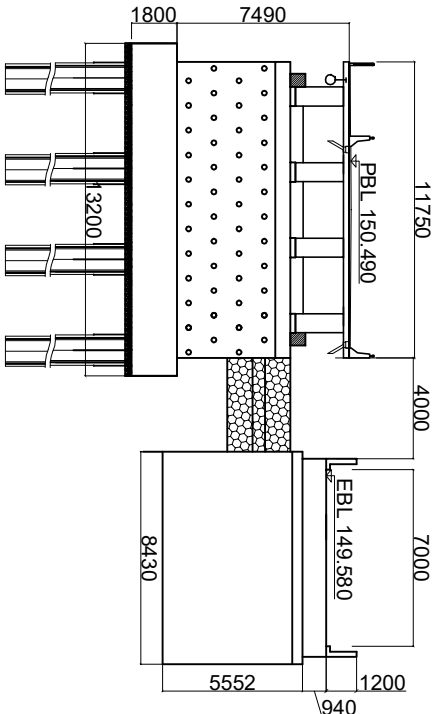
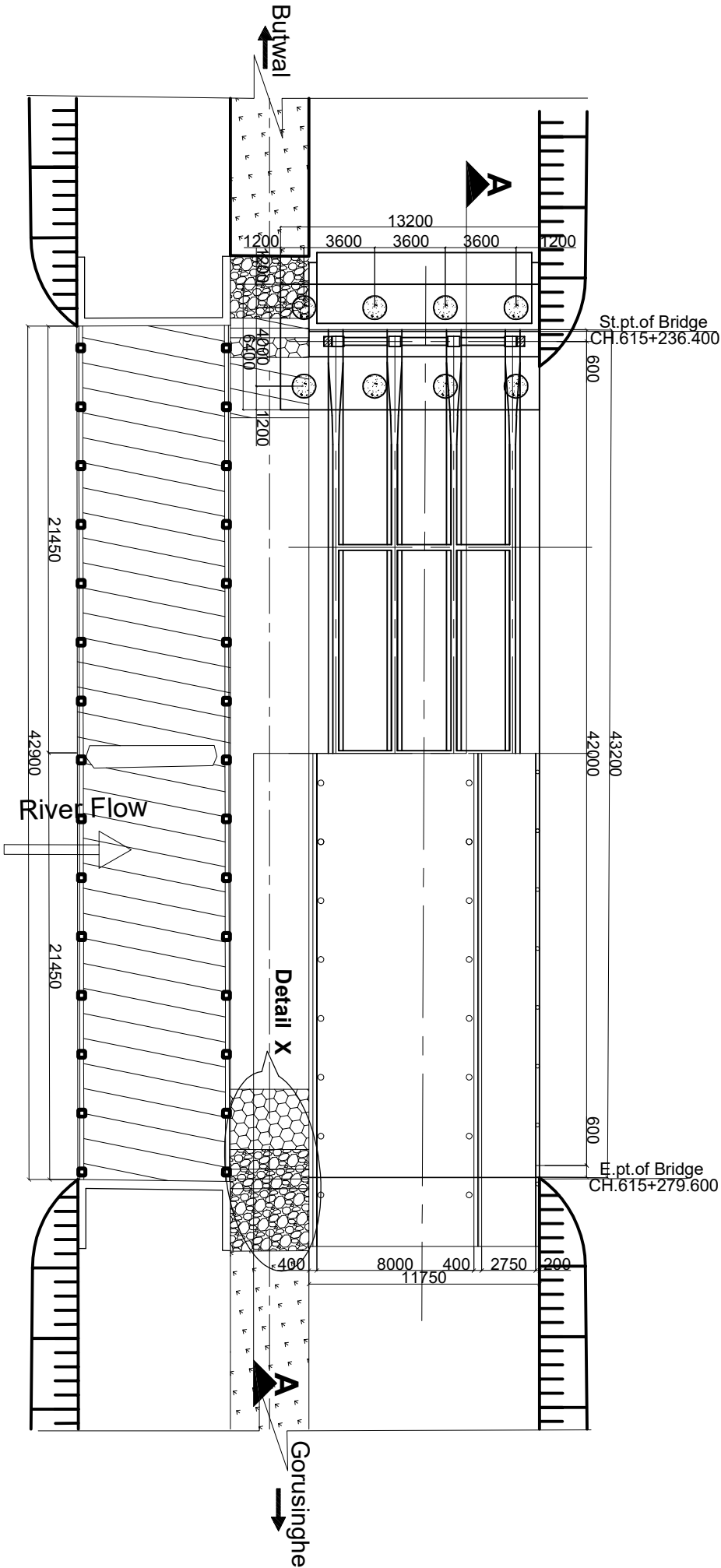
- The contractor shall supply, provide and install the bearings designed according to the loadings and other relevant information provided in the drawings or BOQ.
- The dimension and number of layers of the Elastomeric bearings shown in the drawings are tentative
- The bearings shall be designed, fabricated,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

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 Water 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 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 pilecap down to 0.5 m below the maximum scour depth or 1.5 whichever is larger.



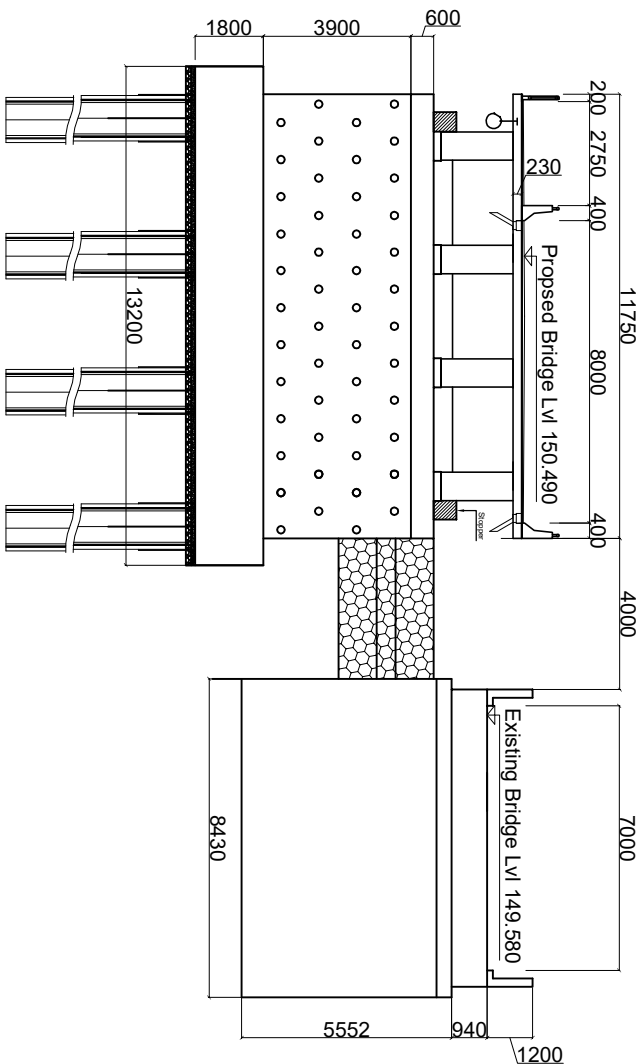
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP			CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with ERM C P (Ltd) and  JYK - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:				NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November , 2022	
		DOR, DCID				Topographic Map of Kothi Bridge (46/H001/307_A)		1:1				Designed by:		Saroj Bhattarai								
		ROAD NAME:										Checked by:		P. Upadhyaya								
		Butwal - Gorusinghe Section										Approved by:		Dr. T.H.Choi								
																				DWG.NO.: 307_Kothi		
																				SHEET NO.: 2.1/24		



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

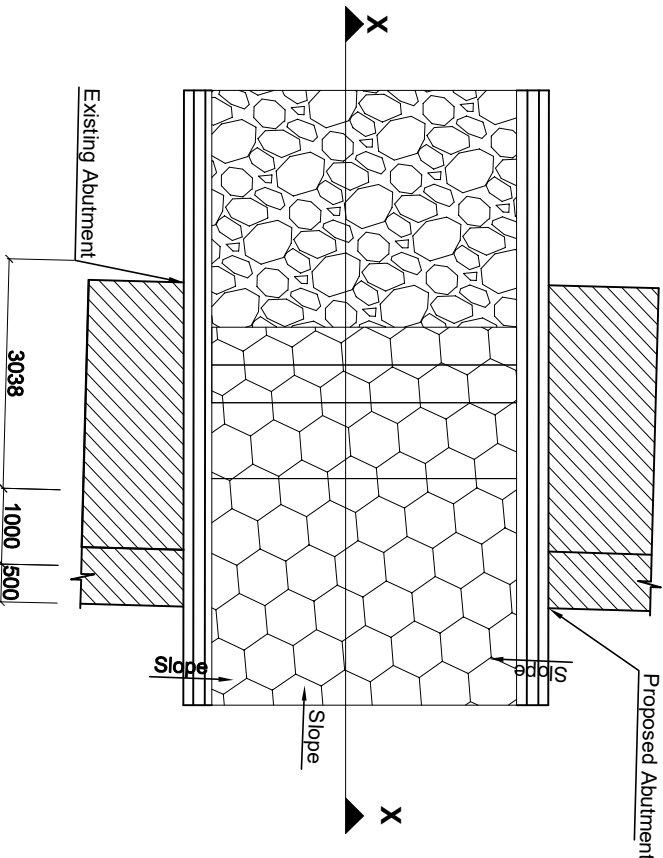
Name(NEC Number)		Signature
P. Engineer	P. Upadhyaya (Civil A 675)	
Structure Engineer	K.P.Wagle(Civil A 127) / P. Shrestha(Civil A 676) / S. Bhattarai (Civil A 904)	
Hydrologist	Dr. P. C. Jha(Civil A 166) / S. Adhikari (Civil A 408)	
Geotechnical Engineer	A. Adhikari(ka 199) / Dr. V. R. S. Shahi	

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										DWG.NO.: 307_Kothi	
										SHEET NO.: 03/24	



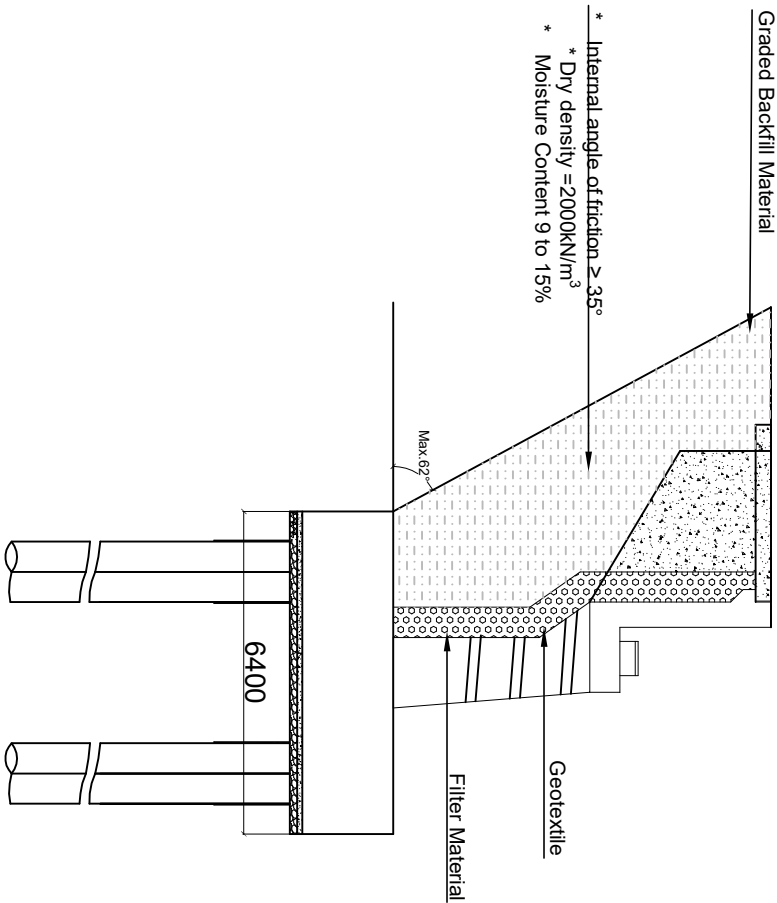
Elevation of Abutment

Scale:-1:200



Detail Plan of X
(Transition Between Approach Embankment)

Scale:-1:100



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 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				

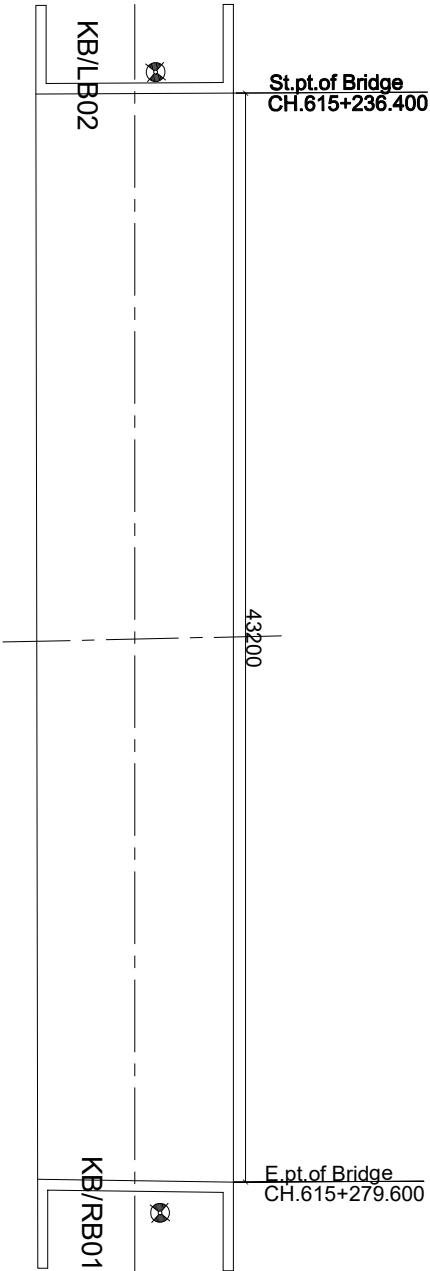
Detail of A

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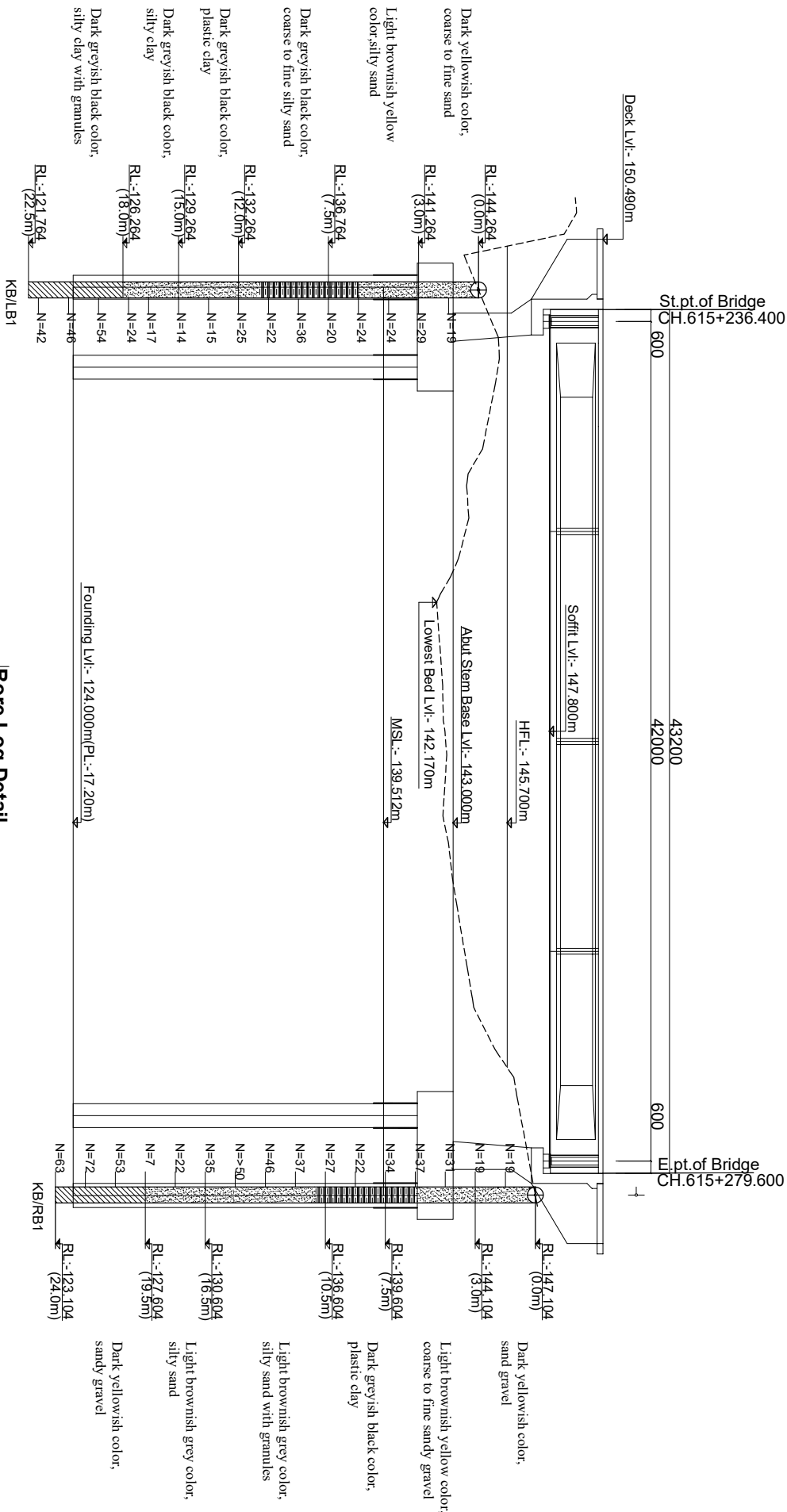
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Borehole No : KB/LB02
Easting : 83°13' 43.42 "
Northing : 27° 41' 38.15"
Elevation, m : 144.264
Borehole No : KB/RB01
Easting : 83° 13' 43.11"
Northing : 27° 41' 43.11"
Elevation, m : 147.104



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



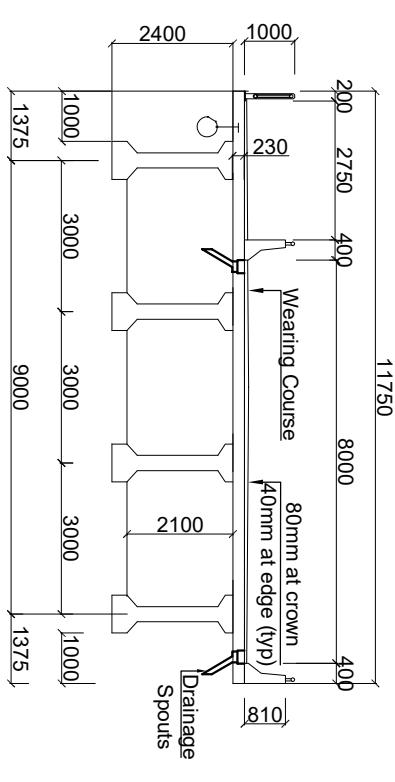
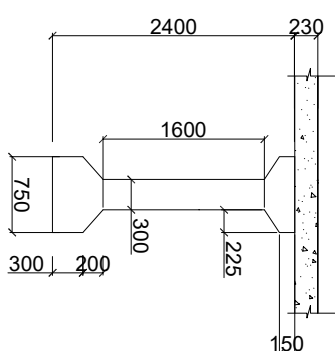
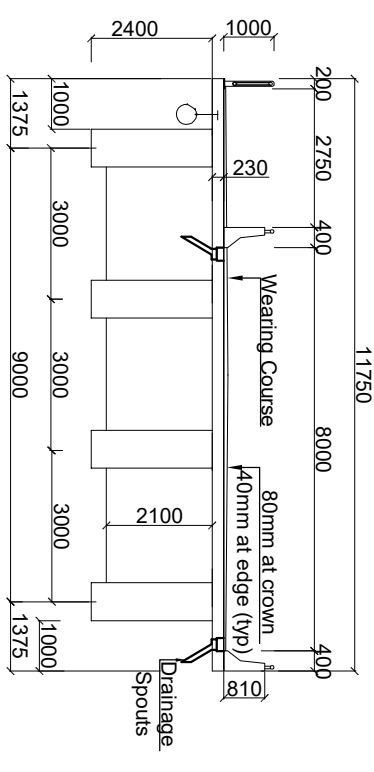
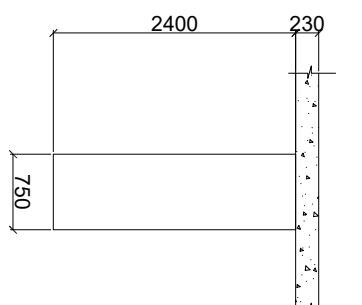
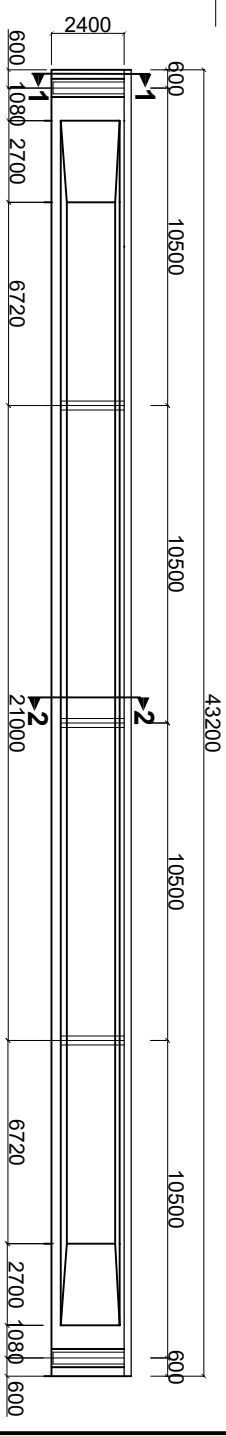
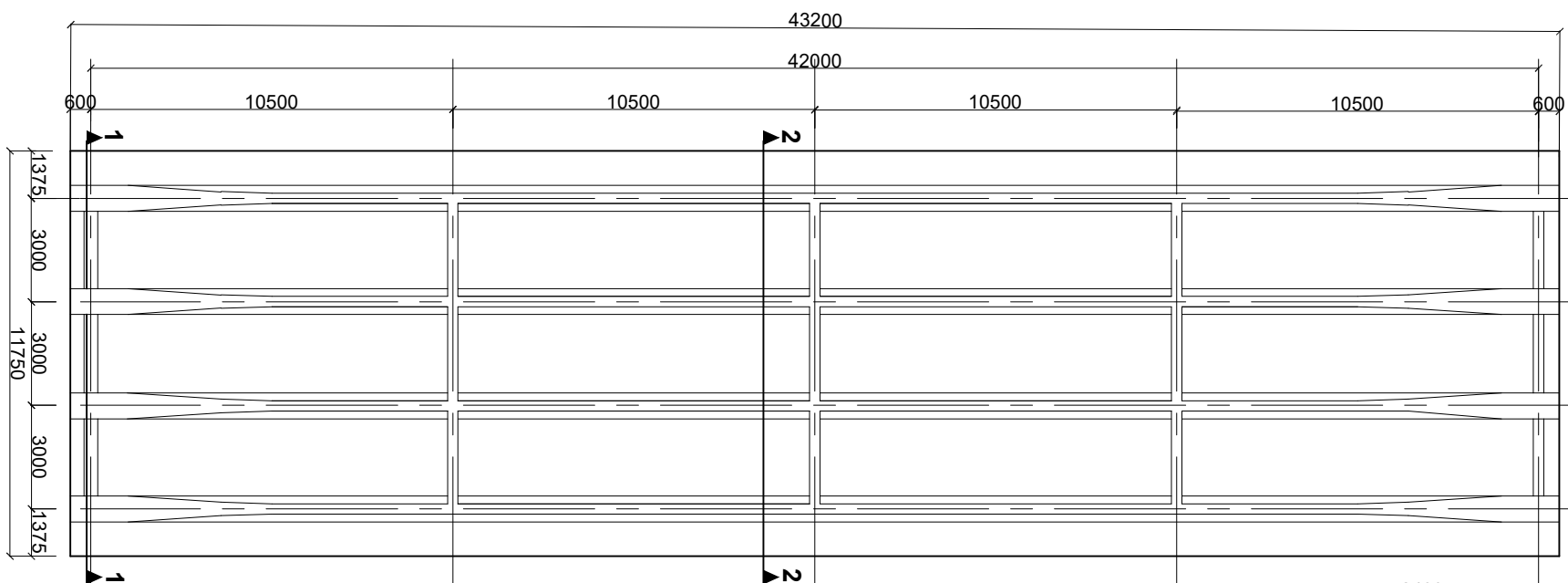
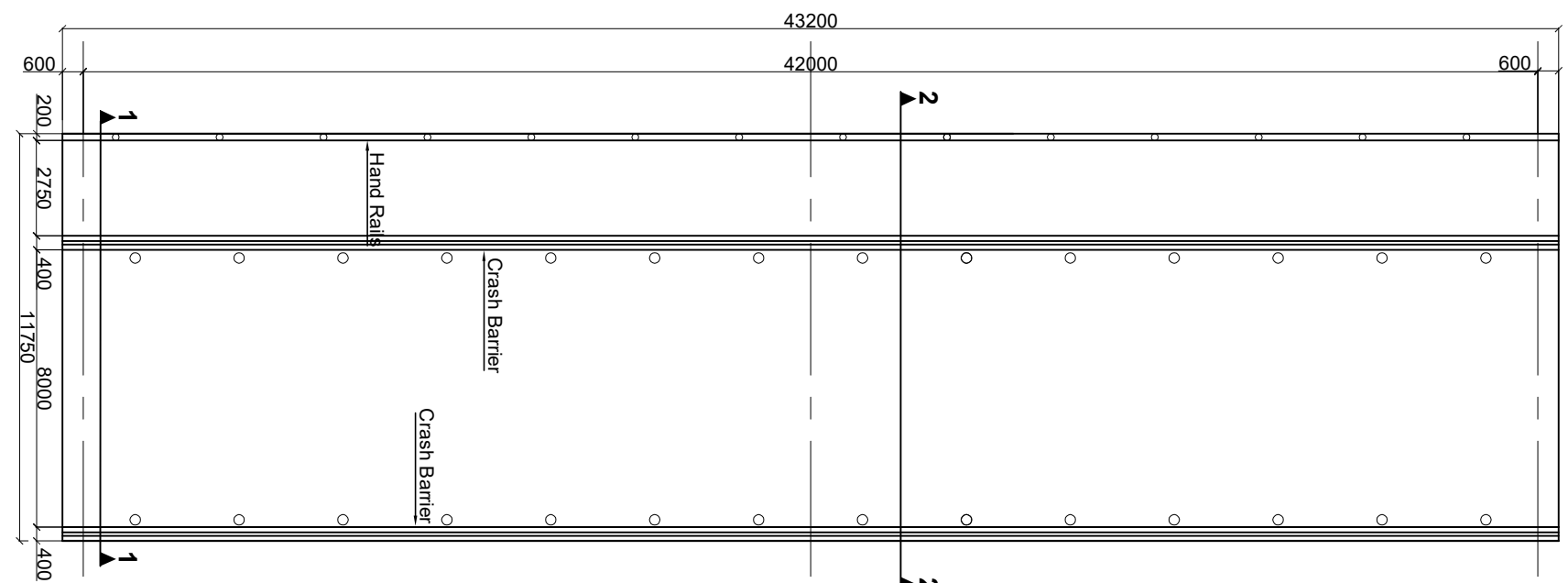
Bore Log Detail
Scale:-1:300

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 .

Location	Design Pile Length m	Design Working load on pile (non - seismic case)kn	Allowable Bearing Capacity on pile (Scour case) kn	Allowable Bearing Capacity of the Pile (Non Scour case)kn
Abutment	17.20	2151	4769	5299
Pier	0	0	0	0

Name(NEC Number)				Signature
P. Engineer	P. Upadhyaya (Civil A 675)			
Structure Engineer	K.P.Wagle(Civil A 127) / P.Shrastha(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			

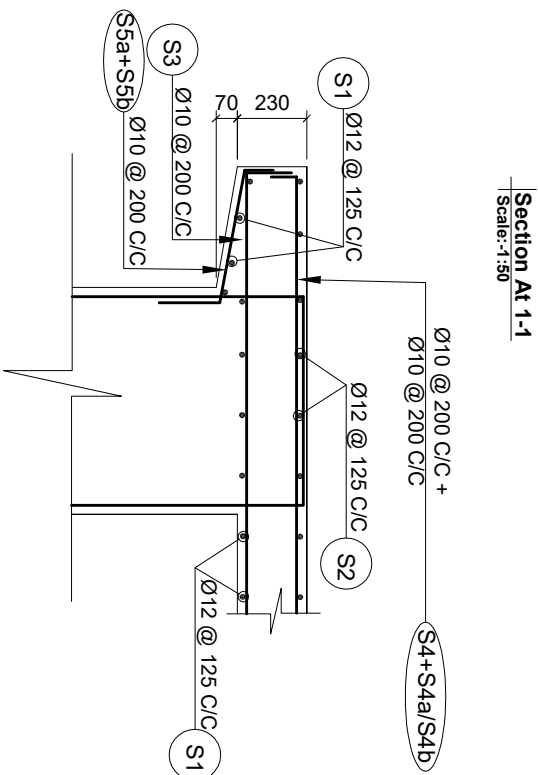
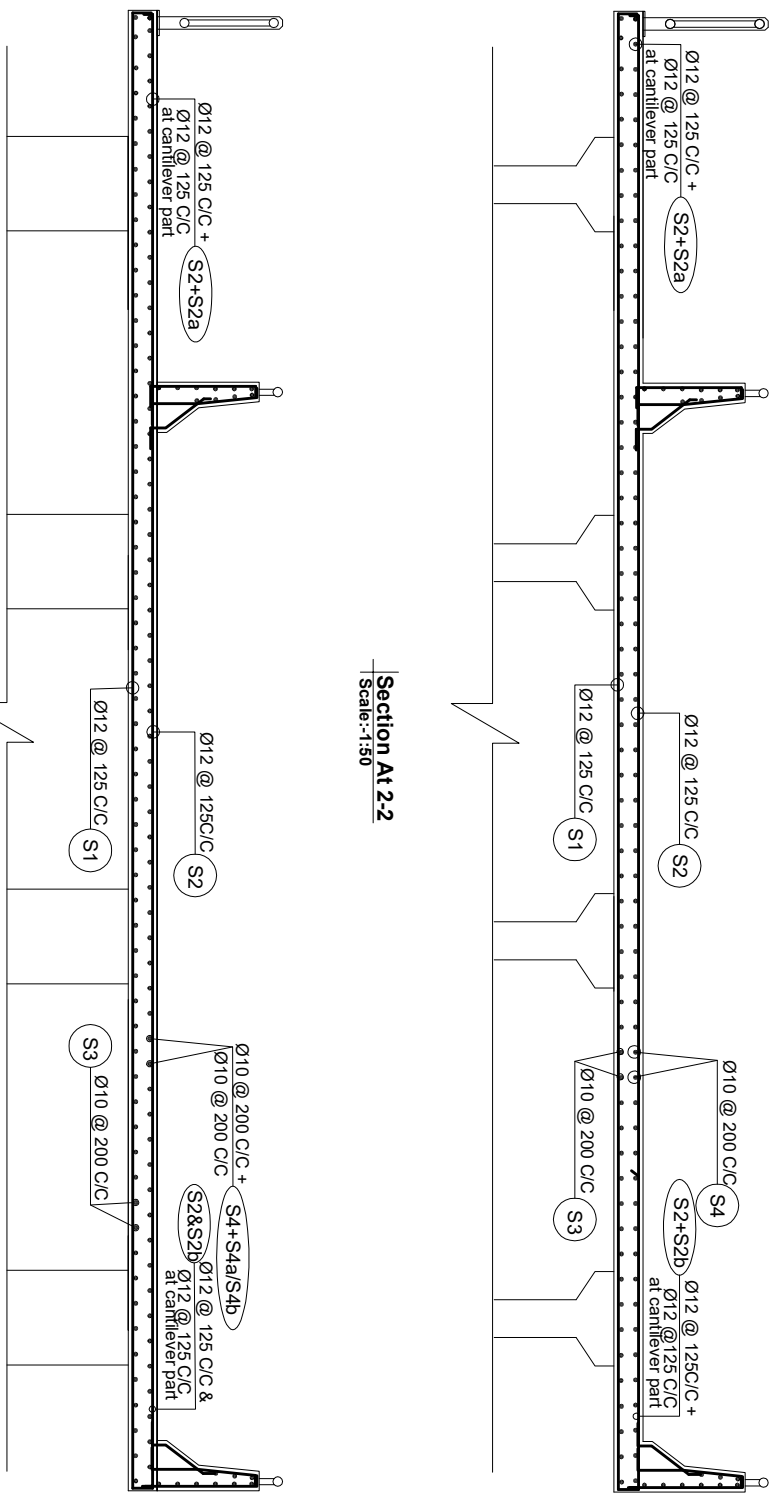
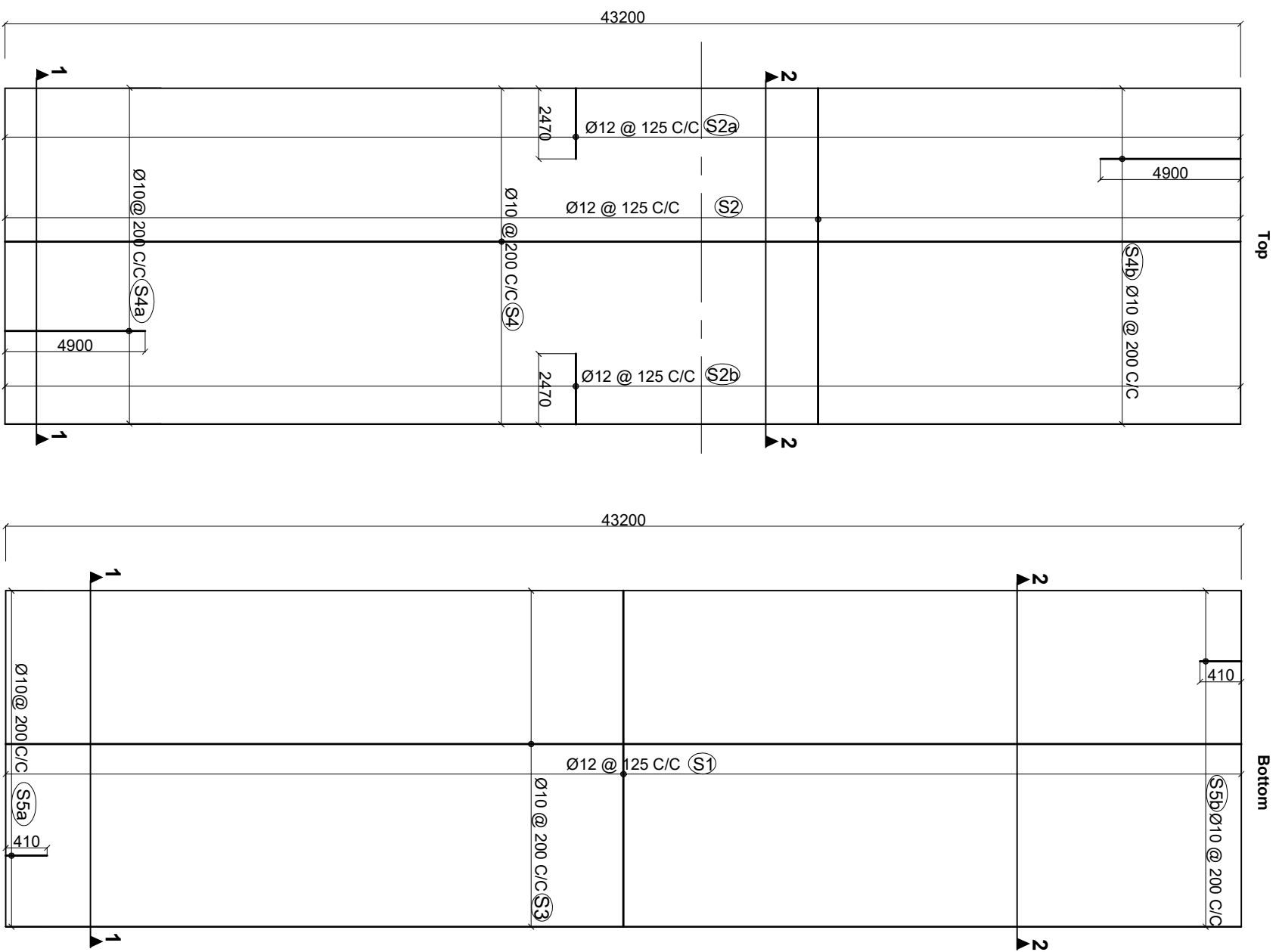
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NOTE: For maintenance, the deck shall be simultaneously jacked up at the locations marked "j"

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.

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					NAME	DWG. NO.:					
						307_Kothi Bridge					



Reinforcement Details At Deck Extension Between The Main Girder

NOTE:

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.

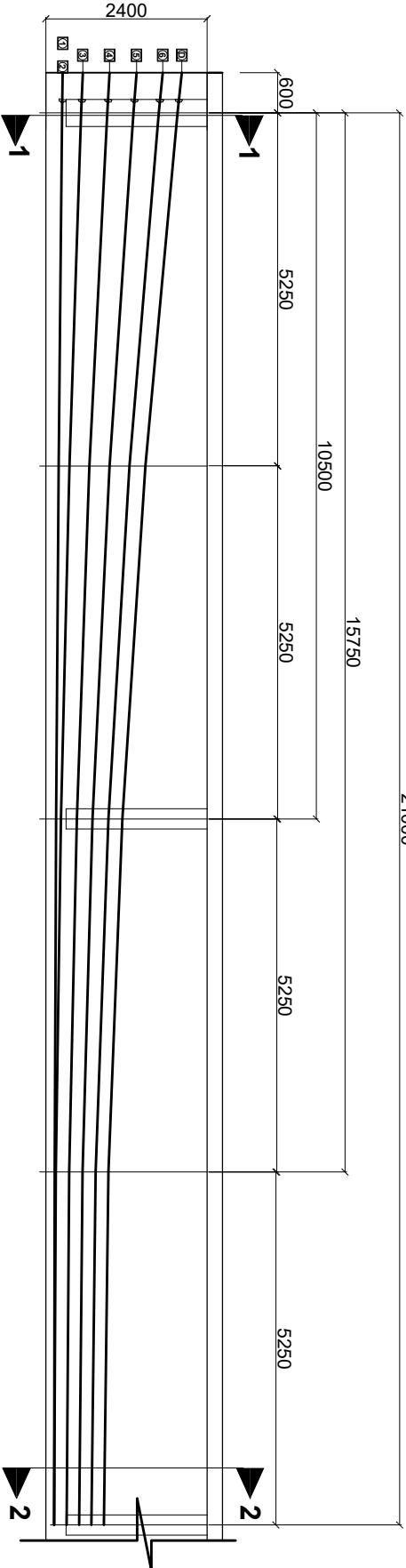
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		DOR, DCID	Reinforcement Details of Slab of	As Shown		DESIGNED BY:	Saroj Bhattacharai				November, 2022
		ROAD NAME:	Kothi Bridge (46/H001/307_A)			CHECKED BY:	P. Upadhyaya				DWG. NO.:
		East West Highway (H01)				APPROVED BY:	Dr. T.H. Choi				307_Kothi Bridge
		Butwal - Gorusinghe Section									SHEET NO.:
										07/24	

Tendon Layout Data

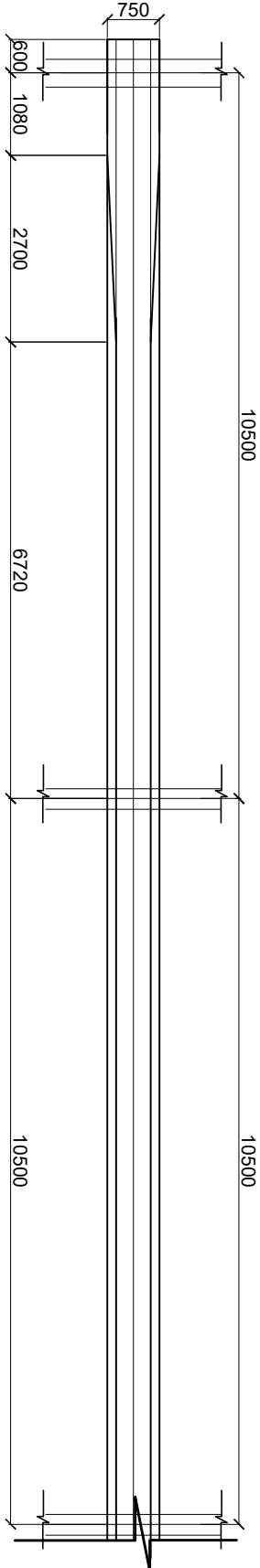
	Anchor face		Bearing centerline		Intermediate sections						Mid span	
	-600		0		5250	10500		15750	21000			
TENDON	Y	Z	Y	Z	Y	Y	Z	Y	Z	Y	Y	Z
1	250	175	243	176	191	-180	155	-183	132	-185	125	-185
2	250	175	243	176	191	180	155	183	132	185	125	185
3	550	0	527	0	351	0	226	0	150	0	125	0
4	950	0	915	0	650	0	461	0	348	0	310	0
5	1350	0	1303	0	950	0	697	0	546	0	495	0
6	1740	0	1682	0	1244	0	931	0	743	0	690	0
Dummy	2025	0	1962	0	1482	0	1139	0	934	0	865	0

Y = Elevation of the tendon center from the girder soffit

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



Longitudinal Section Of Main Girder
Scale:-1:100



Plan Of Main Girder
Scale:-1:100

Tendon Elongation and Emergence Angles		
TENDON	Total Jacking Force KN	Total Extension of both sides Emergence angle degree
1	2600	305 0.662
2	2600	305 0.662
3	2600	303 2.255
4	2600	303 3.392
5	2600	302 4.526
6	2600	301 5.606
Dummy		6.130

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 Prestressingallowed.
- 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:14268-2024. Maximum allowable total jacking force = 2733 kN.
- Prestressings tendon shall be done in 2 stages as follows:

Stage1
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

Stage2
After 14 days of Casting of desk slab.

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

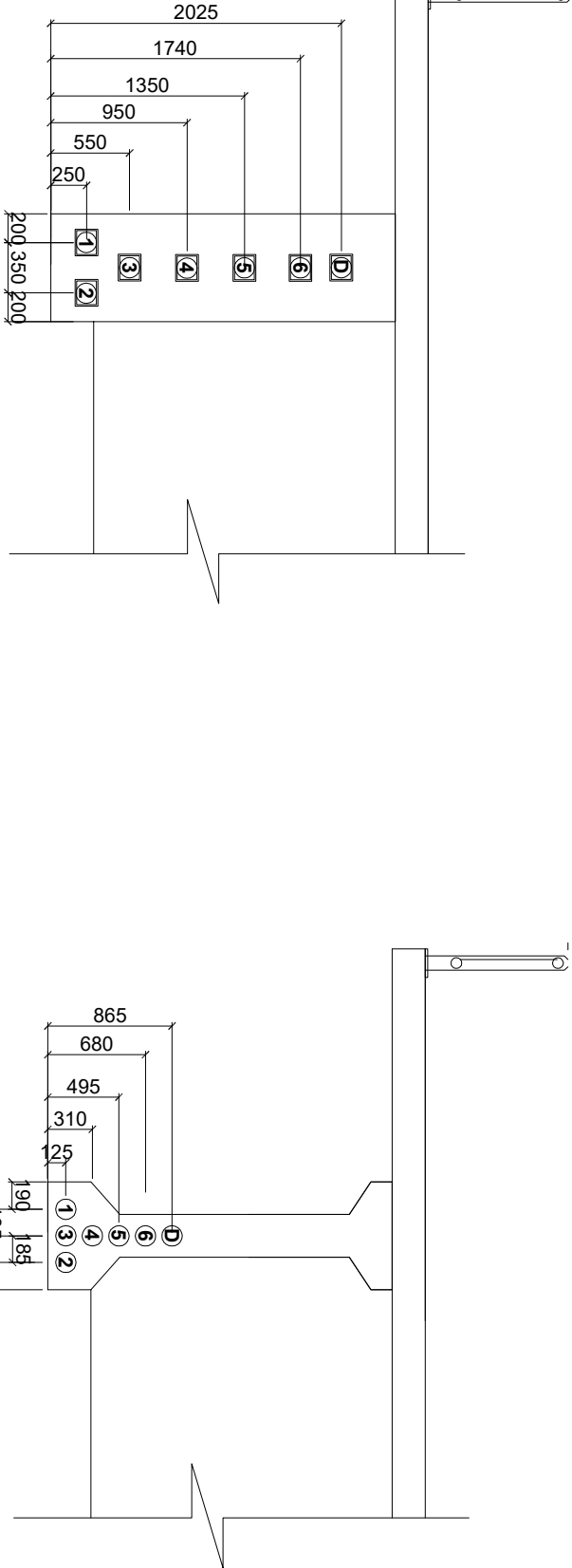
2	1	-	-	-	-	-	-
---	---	---	---	---	---	---	---

Total Jacking Force to each tendon in stage 2= 2600kn.

- Casting of footpath,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(instant 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 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 1.95x10⁵ Mpa. The manufacturers specification shallbe followed if provided.
- The tendon ducts shall be properly secured to the rebars to maintain the profile throughout concreting process.
- The specified profile and alignments 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 engineers instruction.

NOTES ON DUMMY CABLE

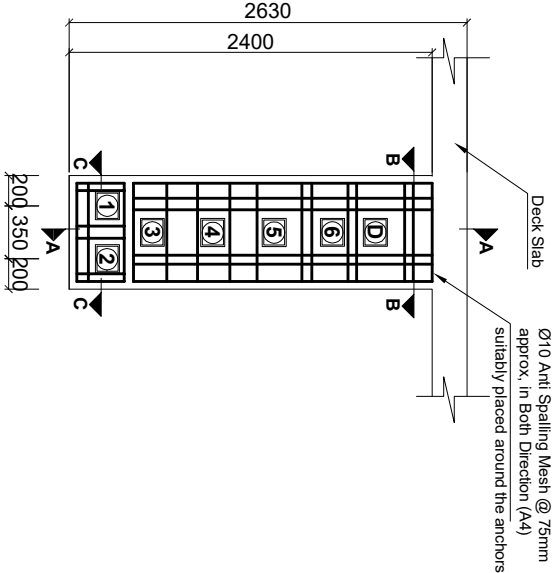
The cable marked "D" is for future tensioning or in case of emergency or excessive prestress loss. No tendon shall be provided during construction but the sheathing,anchorage block ,brusing reinforcement similar to the other tendons shall be properly installed. The duct shall be left hollow ensuring 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.



View 1-1
Scale:-1:50

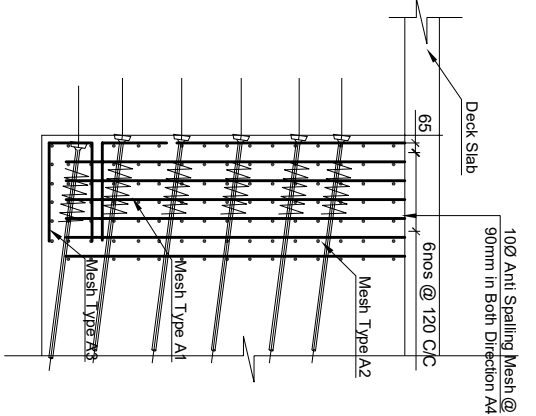
View 2-2
Scale:-1:50

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-NFP		CONSULTANT:	Soosung Engineering Co. Ltd, Korea in association with ERM C P (Ltd), Nepal and JYR - Tech Studio of Engineering		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		DATE:	
			DOR, DCID				Prestressing Details of Main Girder of Koshi Bridge (46/H001/307_A)		As Shown		November,2022	
			ROAD NAME:								DWG.NO.: 307_Koshi Bridge	
			East West Highway (H01)								CHECKED BY:	
			Butwal - Gorusinghe Section								APPROVED BY:	
											Dr. T.H.Choi	
											SHEET NO.:	
											(08/24)	



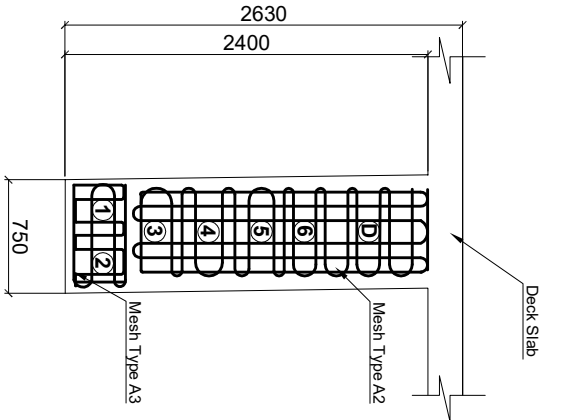
Anti Spalling Reinforcement

Scale:-1:50



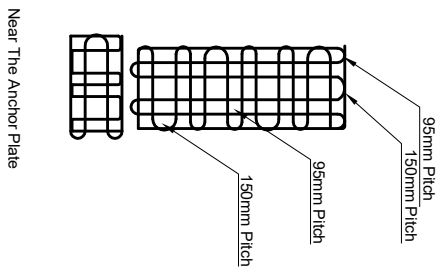
Section At A-A

Scale:-1:50



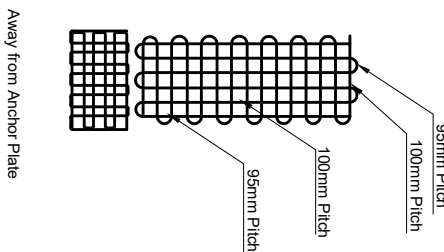
Section At D-D

Scale:-1:50



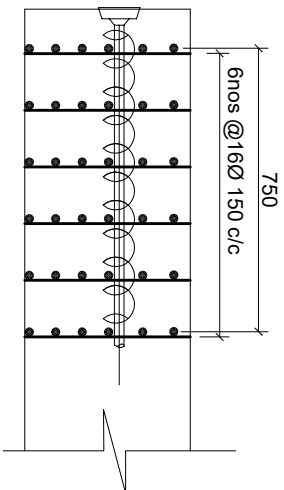
Mesh Type A2a

Scale:-1:50



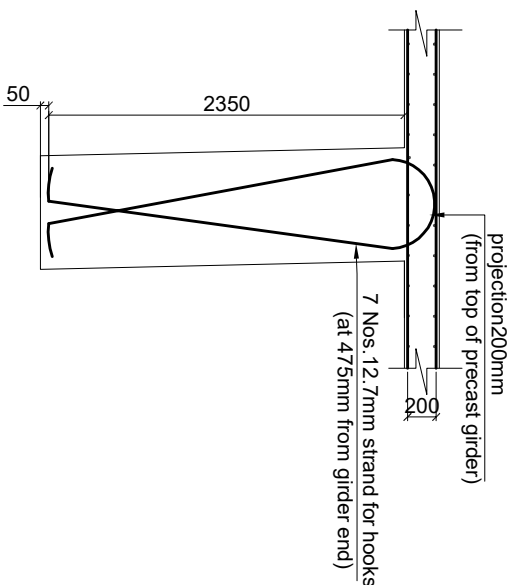
Mesh Type A2b

Scale:-1:50



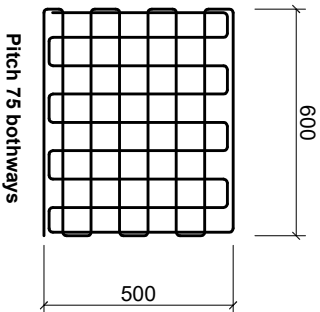
Section At B-B

Scale:-1:20



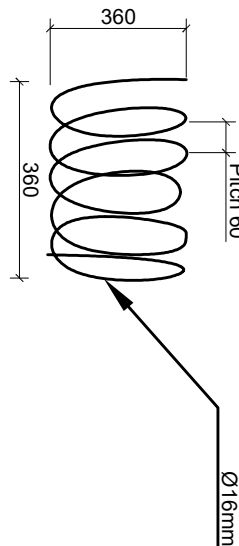
Hook Details At Both Ends Of Gride

Scale:-1:50



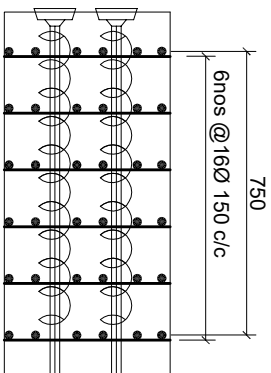
Mesh Type A3

Scale:-1:20



Typical Detail Of Spiral reinforcement A1

Scale:-1:20

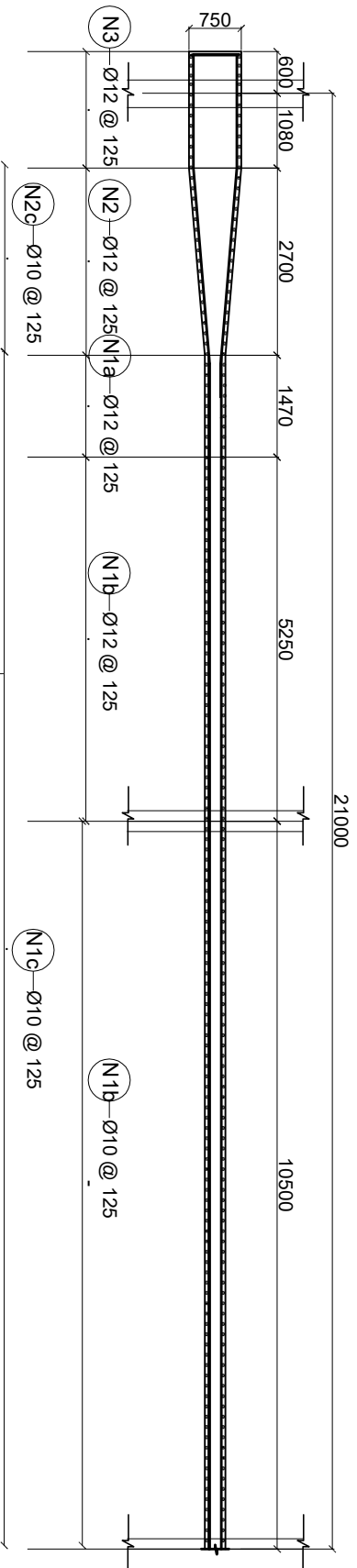
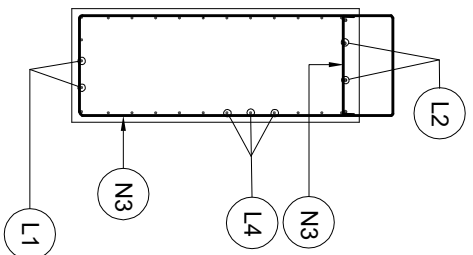
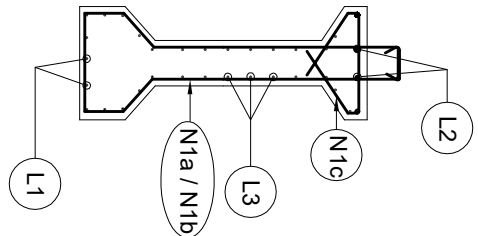
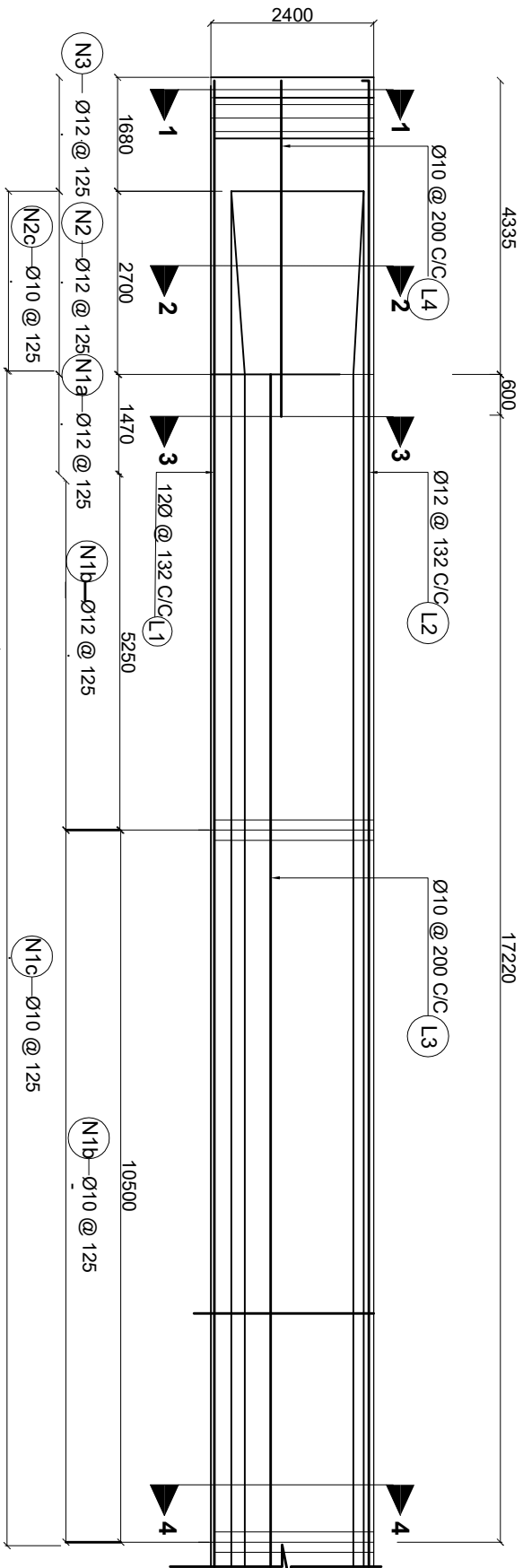


Section At C-C

Scale:-1:20

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

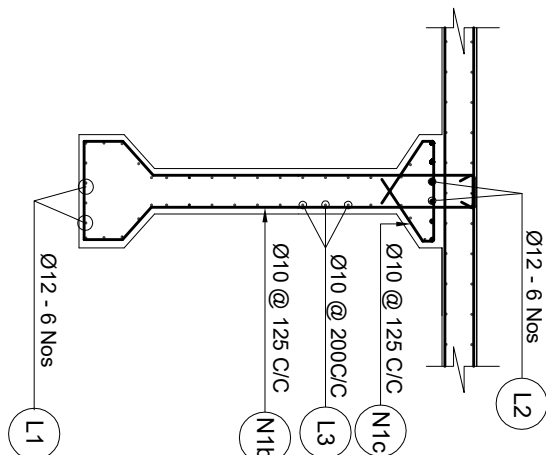
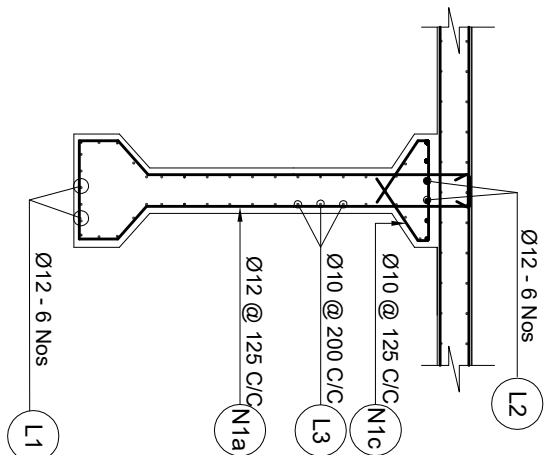
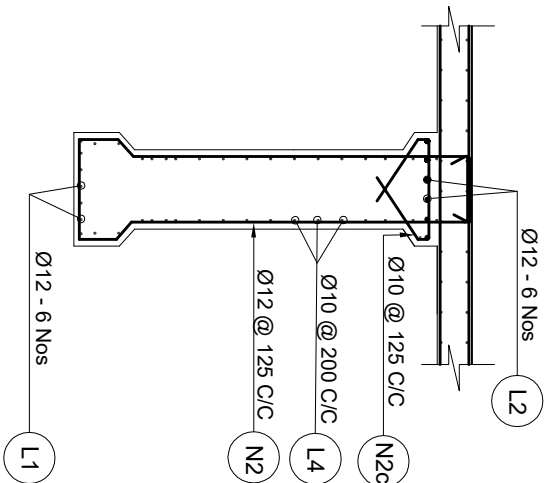
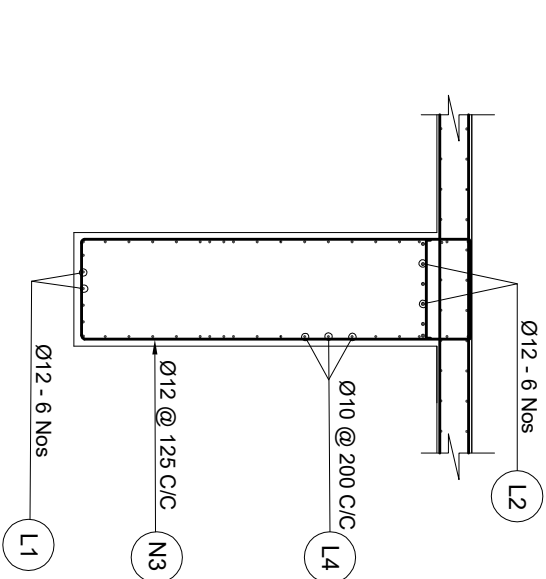
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NFP	 Soosung Engineering Co. Ltd, Korea in association with ERMCo P (Ltd), Nepal and JYV - Tech Studio of Engineering	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
		DOR, DCID		ROAD NAME:		Anchorage Details of Kotahi Bridge (46/H001/307_A)		As Shown		DESIGNED BY:		Saroj Bhattacharai						November, 2022	
		East West Highway (H01)								CHECKED BY:		P. Upadhyaya						307_Kotahi Bridge	
		Butwal - Gorusinghe Section								APPROVED BY:		Dr. T.H.Choi						SHEET NO.: 09/24	



Typical Reinforcement of Precast Girder at Center

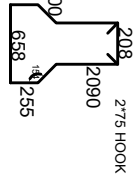
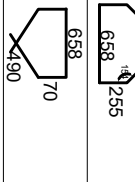
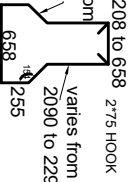
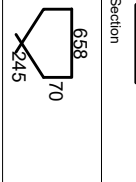
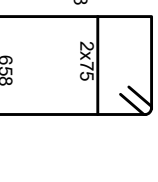
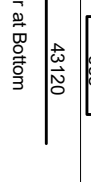
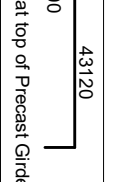
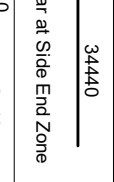
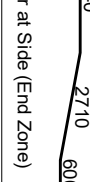
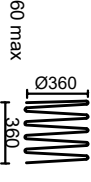
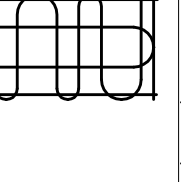
Typical Reinforcement of Precast Girder at End

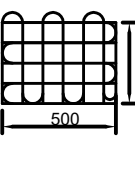
Section At A-A
Scale:-1:100

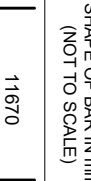
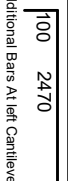
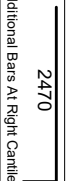
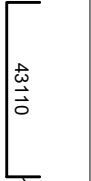
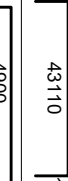
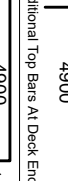
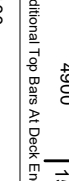
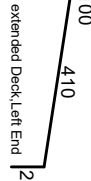
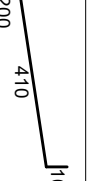


NOTE:
The vertical stirrups of the main girder to be tied to the transverse reinforcement of the slab.

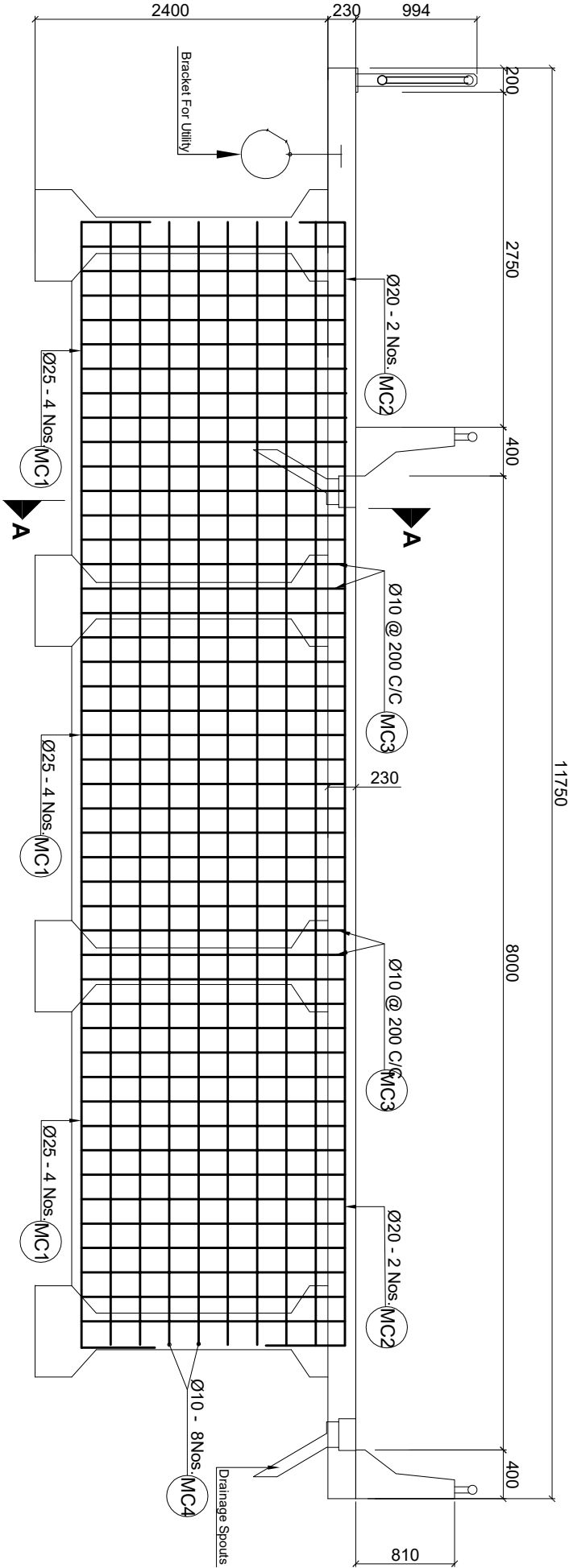
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NFP			CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with  ERM P (Ltd), Nepal and  JYR-Tech Studio of Engineering			IMPLEMENTING AGENCY:			SHEET TITLE:			SCALE:												DATE: November, 2022											
						DOR, DCID			Untensioned Reinforcement Details of Girder of Kothi Bridge (46/H001/307_A)			As Shown			DESIGNED BY:			NAME			SIGNATURE			REV NO.			DESCRIPTION			DWG.NO.: 307_Kothi Bridge					
						ROAD NAME:												CHECKED BY:			P. Upadhyaya														
						East West Highway (H01)												APPROVED BY:			Dr. T.H.Choi														
Butwal - Gorusinghe Section																																	SHEET NO.: 10/24		

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		VARIES	12	108	6.510	0.888 624.206
N1b		VARIES	10	168	6.510	0.617 674.296
N1c		VARIES AS PER N1	10	276	1.780	0.617 302.893
N2		125	12	44	6.860	0.888 267.978
N2C		125	10	44	1.290	0.617 34.995
N3		125	12	28	6.540	0.888 162.577
		125	10	28	0.778	0.617 13.431
L1		132	12	6	43.120	0.888 229.696
L2		132	12	6	43.120	0.888 229.696
L3		200	10	28	34.440	0.617 594.541
L4		200	10	56	5.600	0.617 193.347
A1		(Use Manufacturer's specifications if available)				
		VARIES	16	14	7.930	1.578 175.227
A2		(Use Manufacturer's specifications if available)				
		150	16	12	26.130	1.578 494.904
		(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				

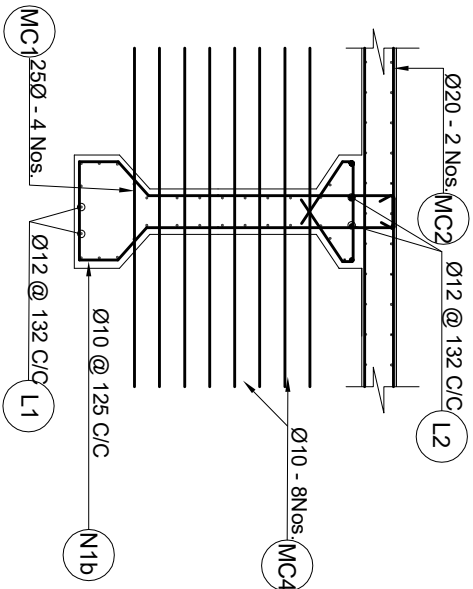
BAR BENDING SCHEDULE OF MAIN GIRDER						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m) TOTAL WEIGHT (kg)
A3		VARIES	10	4	10.200	0.617 25.155
TOTAL IN ONE GIRDER						
TOTAL IN ONE GIRDER (IN METRIC TON)						
						4.023

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		125	12	353	11.870	0.888 3720.047
S2		125	12	346	11.870	0.888 3646.279
S2a		125	12	346	2.570	0.888 789.464
S2b		125	12	346	2.570	0.888 789.464
S3		MID DECK 200	10	60	43.420	0.617 1606.207
S4		LEFT CANT. 200	10	6	43.420	0.617 160.621
		RIGHT CANT. 200	10	6	43.420	0.617 160.621
S4		200	10	60	43.420	0.617 1606.207
S4a		200	10	60	5.055	0.617 186.996
S4b		200	10	60	5.055	0.617 186.996
S5a		200	10	50	0.710	0.617 21.887
S5b		200	10	50	0.710	0.617 21.887
TOTAL EXCLUDING FOOTPATHS KG						
TOTAL WEIGHT IN METRIC TON						12.897

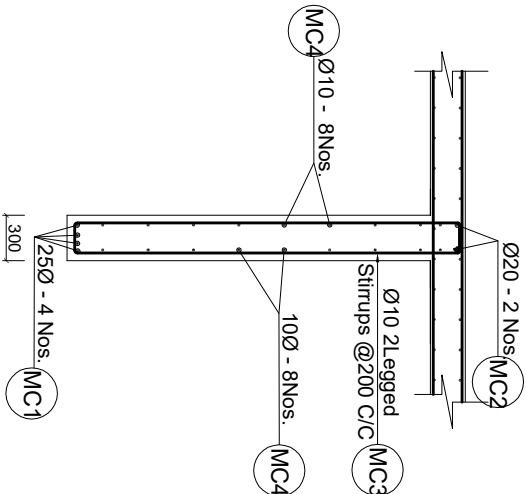
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NFP		CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with  ERM P (Ltd), Nepal and  JYR-Tech Studio of Engineering		IMPLEMENTING AGENCY: <table><tr><td colspan="2">DOR, DCID</td></tr><tr><td colspan="2">ROAD NAME:</td></tr><tr><td colspan="2">East West Highway (H01)</td></tr><tr><td colspan="2">Butwal - Gorusinghe Section</td></tr></table>		DOR, DCID		ROAD NAME:		East West Highway (H01)		Butwal - Gorusinghe Section		SHEET TITLE: B.B.S of Slab & Main Girder of Koshi Bridge (46/H001/307_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November, 2022	
DOR, DCID																											
ROAD NAME:																											
East West Highway (H01)																											
Butwal - Gorusinghe Section																											
								DESIGNED BY: Saroj Bhattacharai								DWG.NO.: 307_Koshi Bridge											
								CHECKED BY: P. Upadhyaya								SHEET NO.: 11/24											
								APPROVED BY: Dr. T.H.Choi																			



Intermediate Cross Girders
Scale:-1:50



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

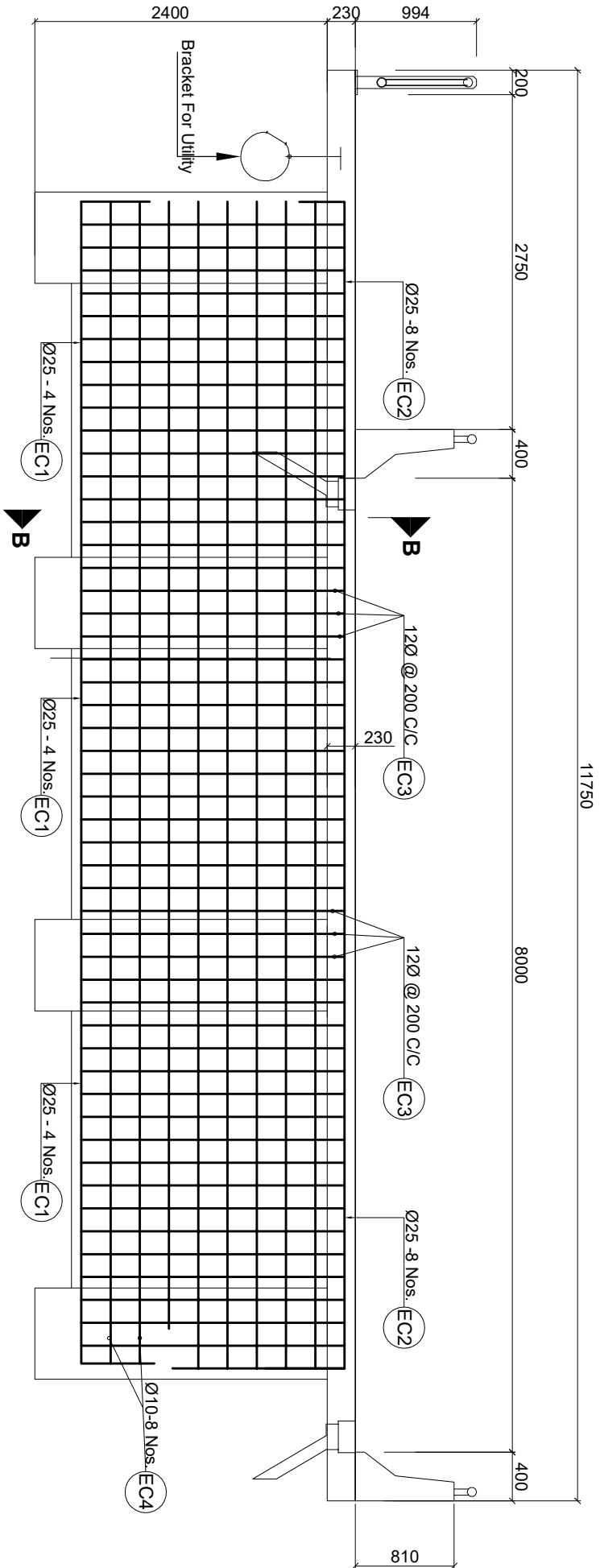


Section At A-A
Scale:-1:50

NOTE:

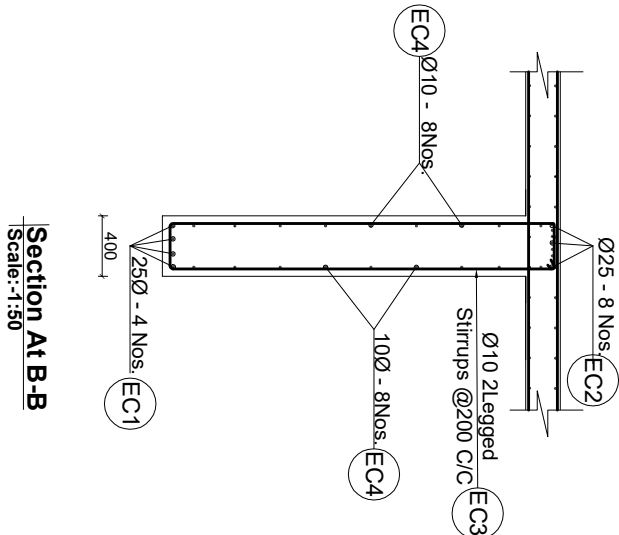
Dowel bars similar to the longitudinal bars of the cross girders shall be pre-installed in the precast main girder before casting. The longitudinal bars of the cross girder shall be lapped to the dowel bars, which shall have a lap length of 60 dia. of the corresponding bars.

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-NFP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE:
	Soosung Engineering Co. Ltd, Korea in association with		DOR, DCID		Reinforcement Details of Intermediate Cross Girder of		As Shown		Saroj Bhattacharai					November, 2022
	ERMCM P (Ltd), Nepal and		ROAD NAME:		Koshi Bridge				P. Upadhyaya					DWG.NO.: 307_Koshi Bridge
	JYR - Tech Studio of Engineering		East West Highway (H01)		(46/H001/307_A)				Dr. T.H.Choi					SHEET NO.: 12/24



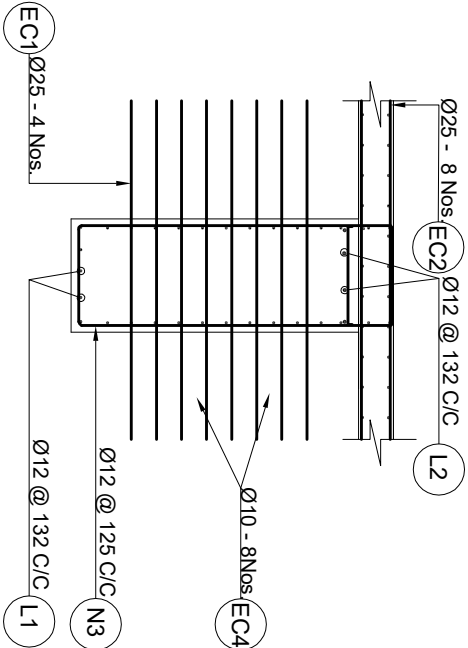
End Cross Girders

Scale:-1:50



Section At B-B

Scale:-1:50



Dowel bar of End Cross Girder

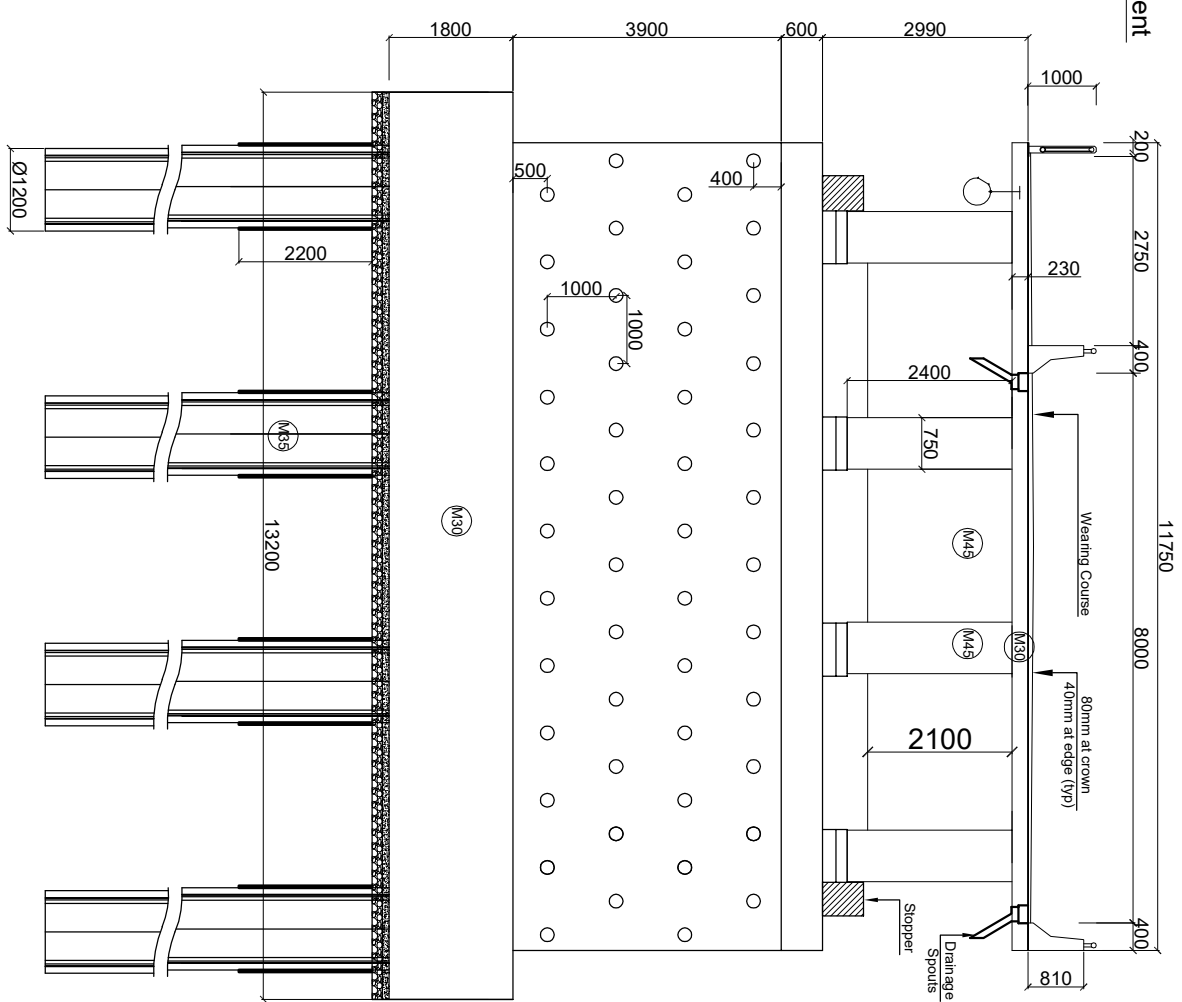
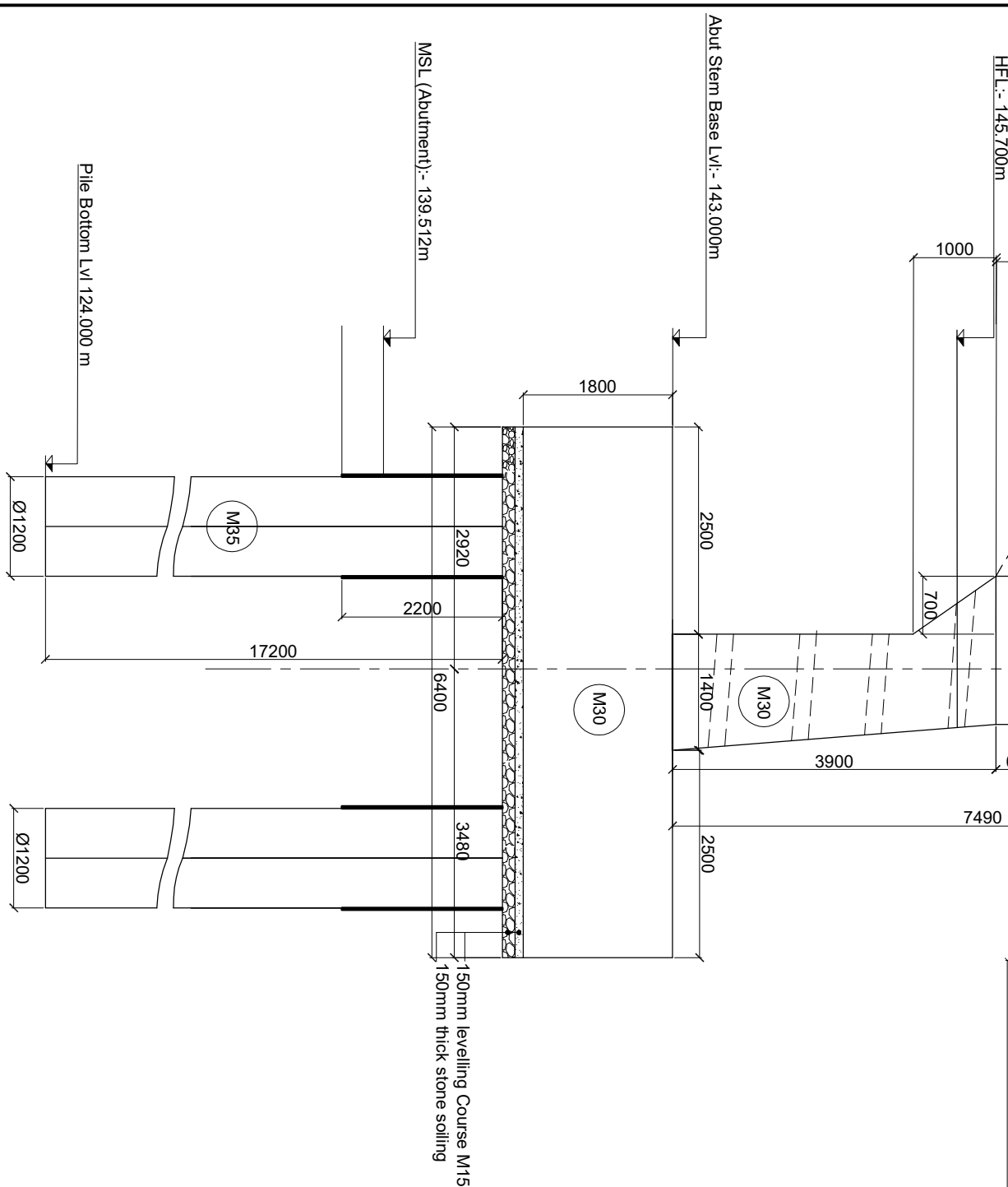
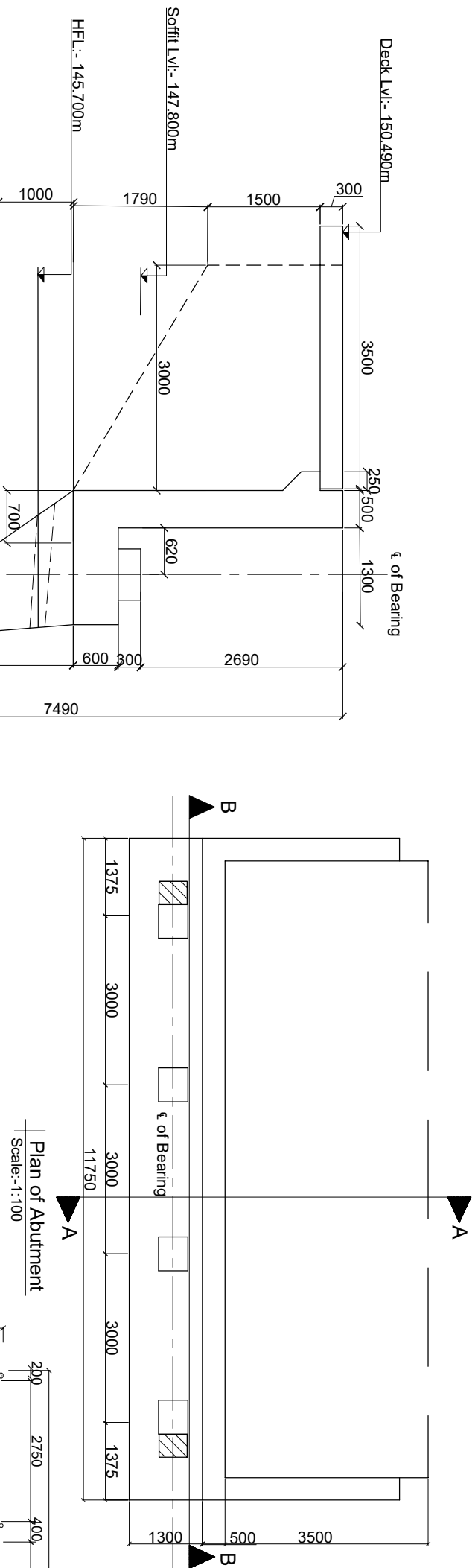
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BAR BENDING SCHEDULE OF END CROSS GIRDER						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (MM)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGT (KG/m)
EC1		9645	25	4	10.445	3.853
EC2		9645	25	8	10.445	3.853
EC3		200	12	50	5.242	0.888
EC4		300	10	16	9.320	0.617
TOTAL IN ONE GIRDER						807.616
TOTAL GIRDER (IN METRIC TON)						1.615

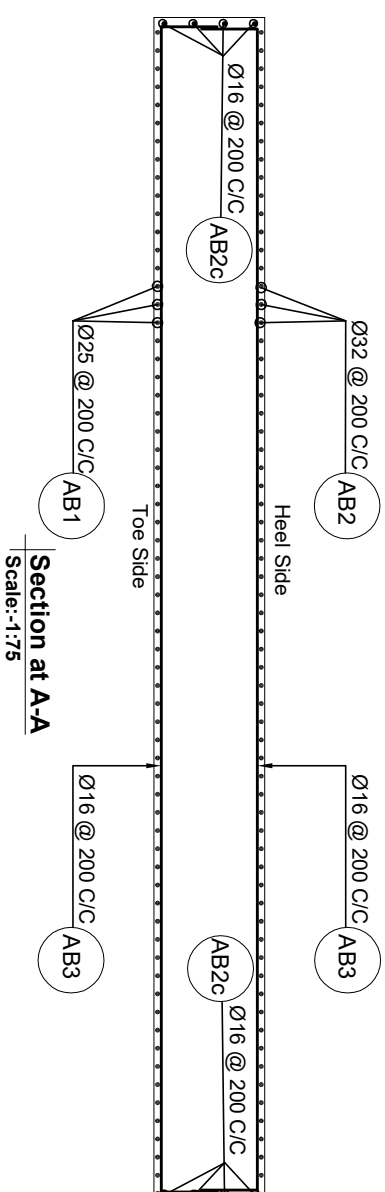
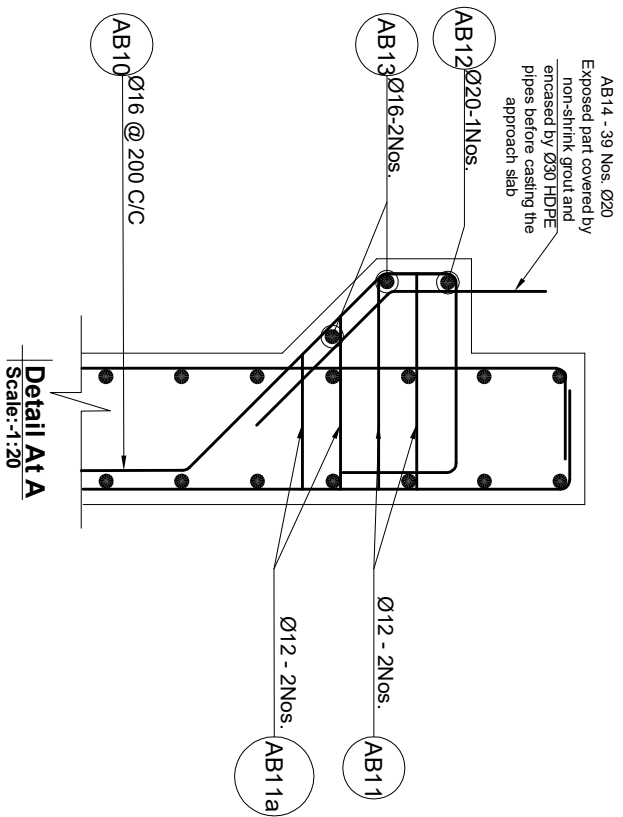
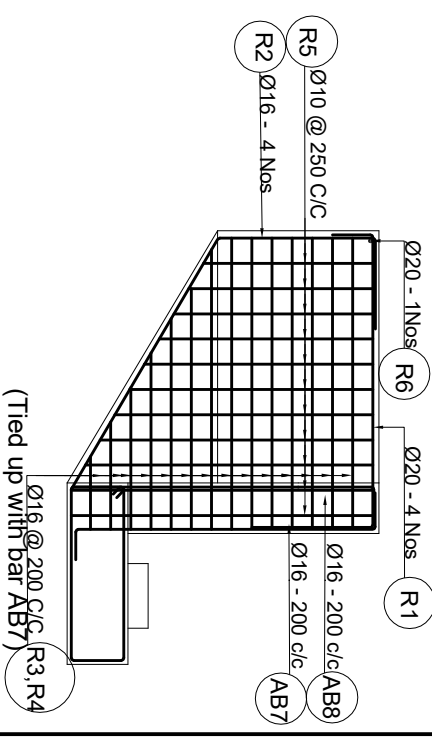
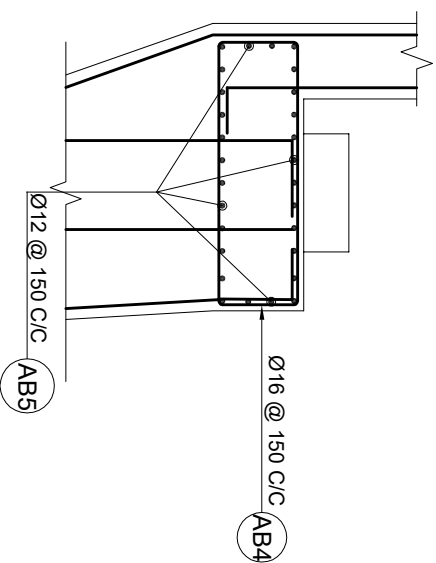
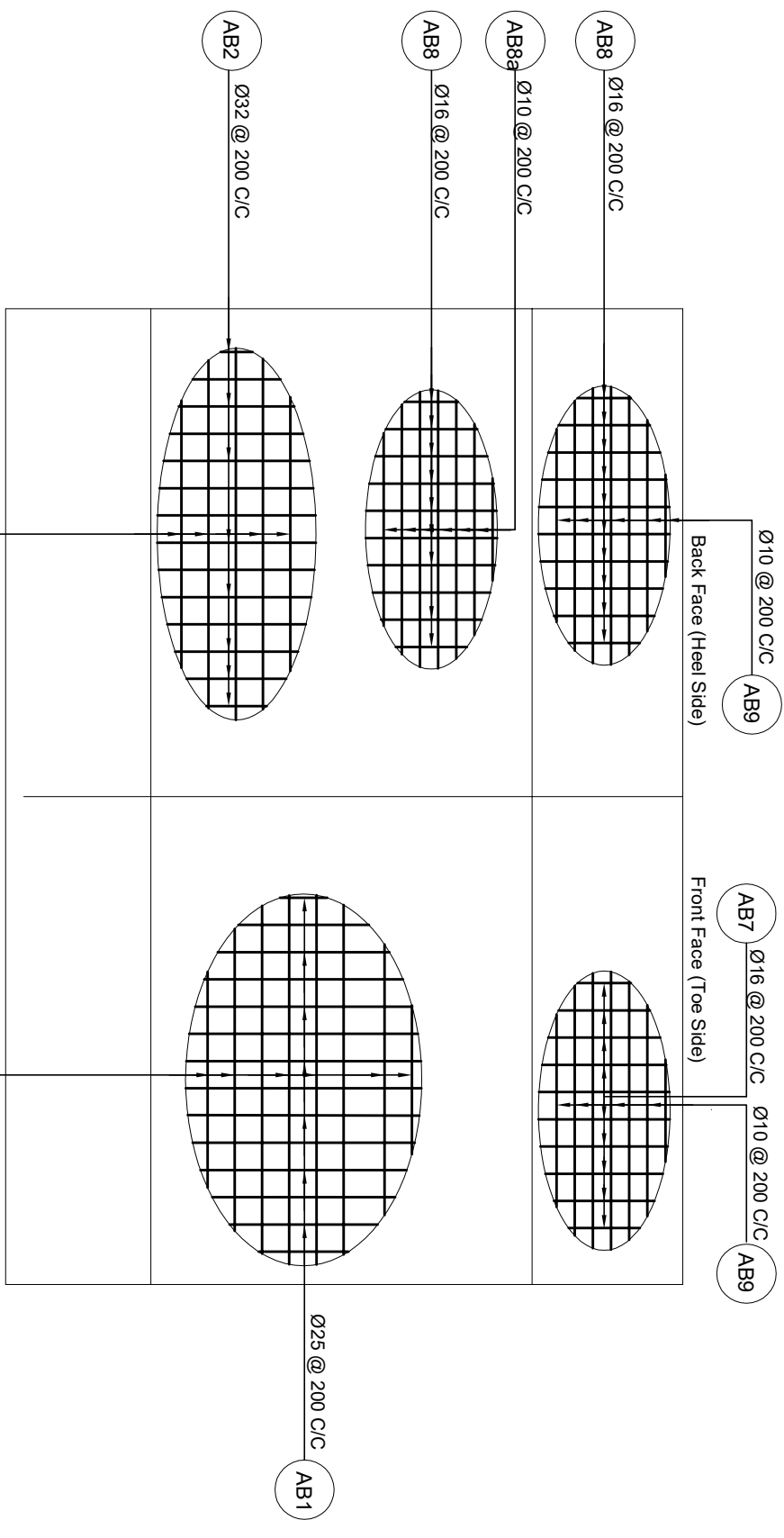
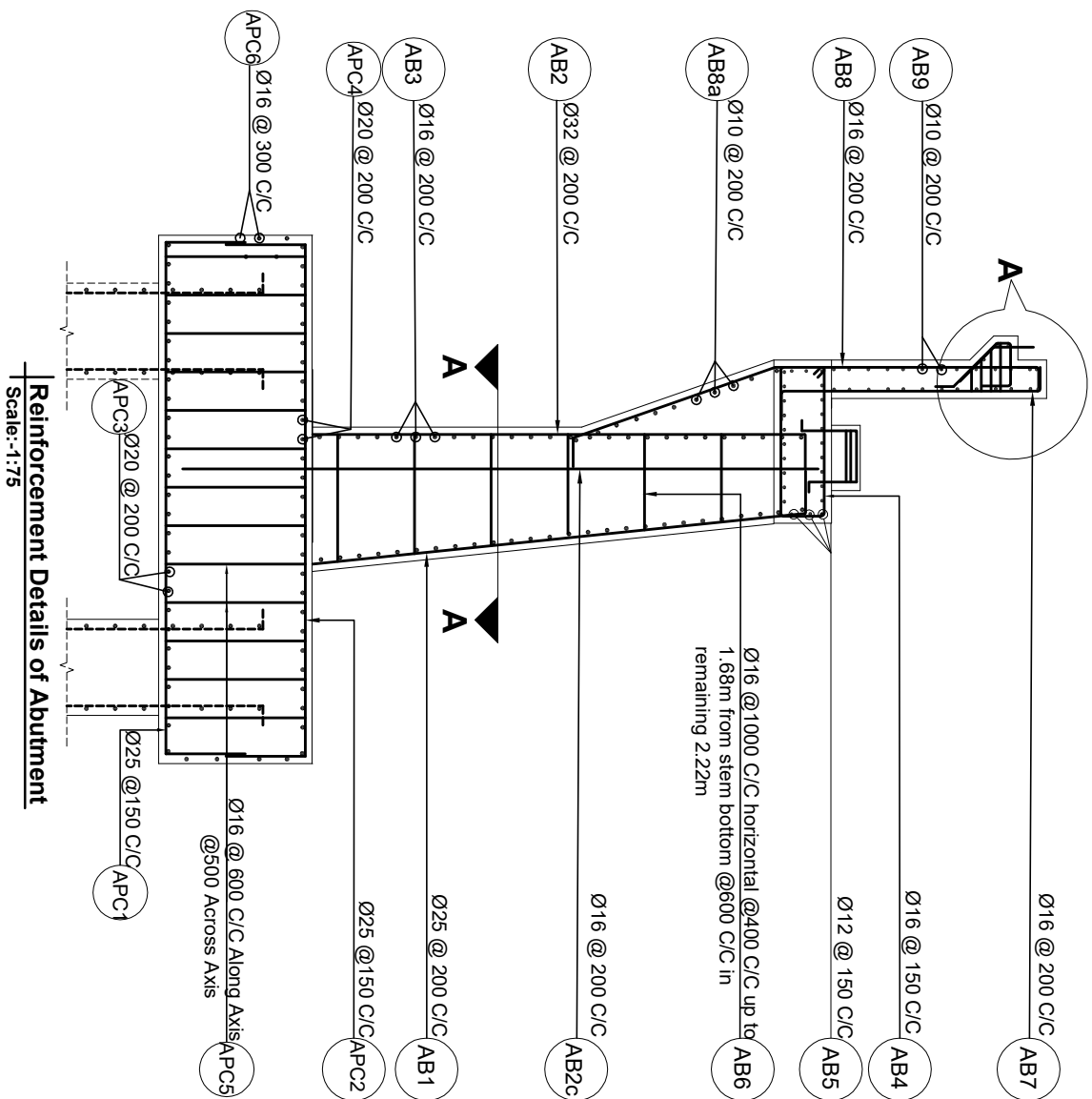
NOTE:

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-NP			CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with  ERM C P (Ltd), Nepal and  JYR - Tech Studio of Engineering			IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section			SHEET TITLE: Reinforcement Details of End Cross Girder of Kotahi Bridge (46/H001/307_A)			SCALE: As Shown			NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November, 2022	
										DESIGNED BY: Saroj Bhattacharai								DWG.NO.: 307_Kotahi Bridge						
										CHECKED BY: P. Upadhyaya														
										APPROVED BY: Dr. T.H. Choi								SHEET NO.: (13/24)						



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 ERMC P (Ltd), Nepal and 398-Tech Studio of Engineering		DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section		Abutment Details of Kothi Bridge (46/H001/307_A)		As Shown		DESIGNED BY:		Saroj Bhattacharai								November, 2022	
										CHECKED BY:		P. Upadhyaya									
										APPROVED BY:		Dr. T.H. Choi									
										DWG. NO.:		307_Kothi Bridge									
SHEET NO.:																		(14/24)			



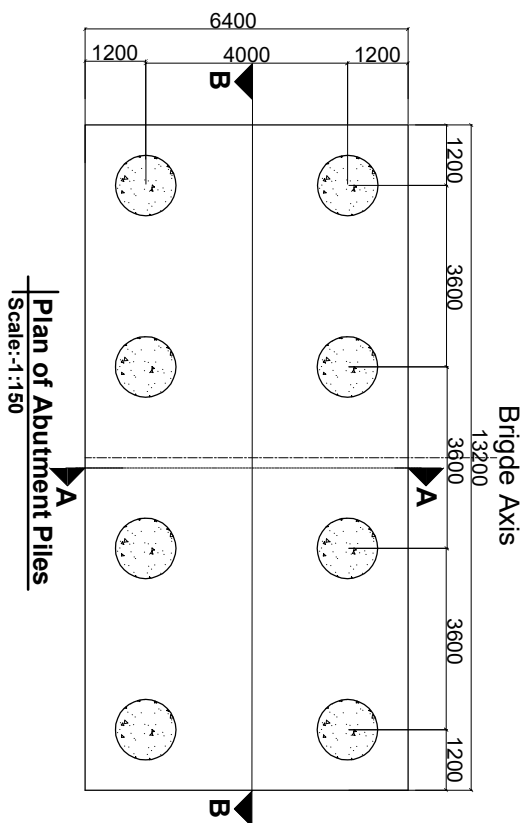
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASREC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP			CONSULTANT:		Soosung Engineering Co. Ltd, Korea in association with ERMCo P (Ltd), Nepal and 3578-Tech Studio of Engineering	
IMPLEMENTING AGENCY:			SHEET TITLE:		SCALE:	
DOR, DCID			Reinforcement Details of Abutment of		As Shown	
ROAD NAME:			Kothi Bridge (46/H001/307_A)		DESIGNED BY:	
East West Highway (H01)					Saroj Bhattacharai	
Butwal - Gorusinghe Section					CHECKED BY:	
					P. Upadhyaya	
					APPROVED BY:	
					Dr. T.H.Choi	
					SIGNATURE	
					REV NO.	
					DESCRIPTION	
					DATE:	
					November, 2022	
					DWG. NO.:	
					307_Kothi Bridge	
					SHEET NO.:	
					(15/24)	

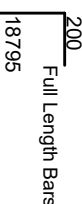
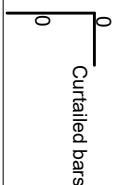
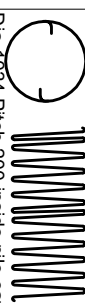
BAR BENDING SCHEDULE OF ABUTMENT						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	TOTAL WEIGHT (Kg)
AB1		200 mm c/c Approx	25	59	6.880	1564.159
AB1a		-	-	-	-	-
AB2		200 mm c/c Approx	32	59	7.080	2637.216
AB2c		At sideface 200 mm c/c	16	14	6.580	145.397
AB3		200 mm c/c Approx	16	42	24.970	1655.268
AB4		150 mm c/c Approx	16	80	4.500	568.202
AB5		150 mm c/c Approx	12	29	11.600	298.661
AB6		1000 mm C/C horizontal 500 mm C/C vertical upto 1.56m from stem bottom 800 mm C/C vertical at remaining 3.39 m	16	109	1.533	263.736
AB7		200 mm c/c Approx	16	59	4.240	394.837
AB8		200 mm c/c Approx	16	59	5.386	501.555
AB8a		200 mm c/c Approx	10	8	11.600	57.215
AB9		200 mm c/c Approx	10	16	23.850	235.271
AB10		200 mm c/c Approx	16	55	1.947	169.017
AB11			12	110	1.000	97.660
AB11a			12	110	0.700	68.362
AB12			20	1	11.600	28.607

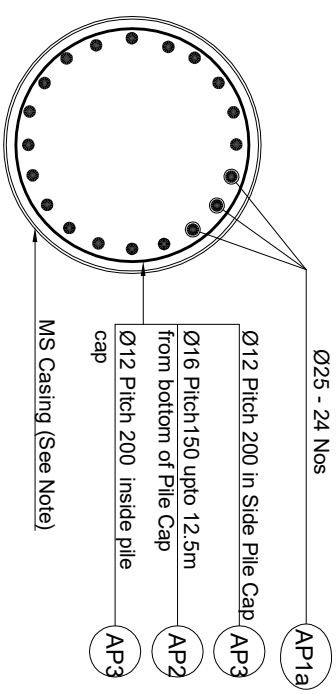
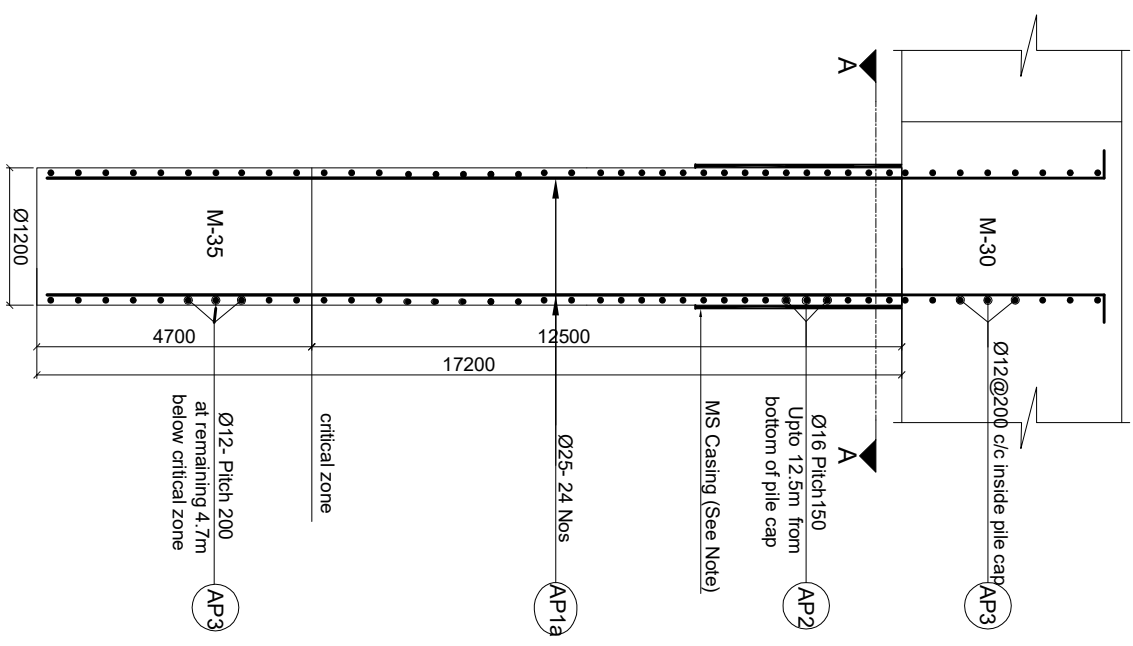
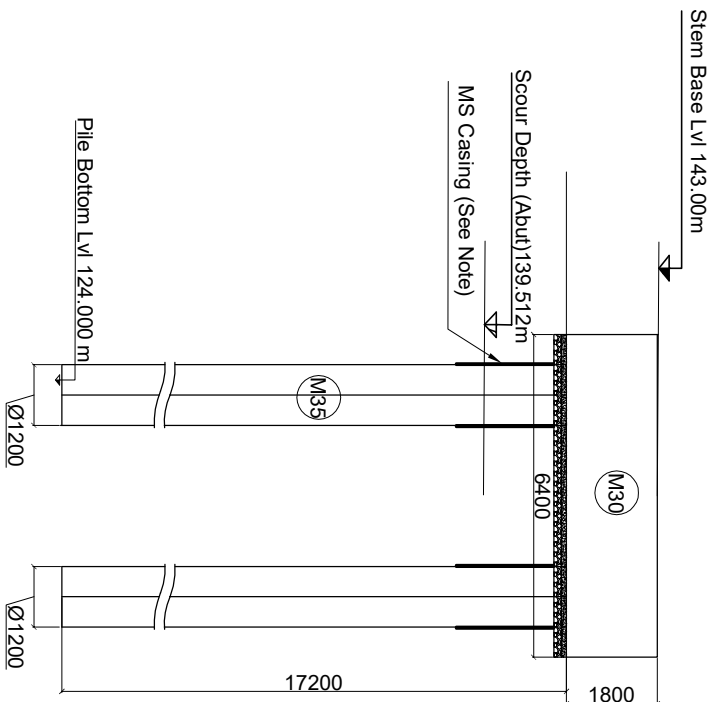
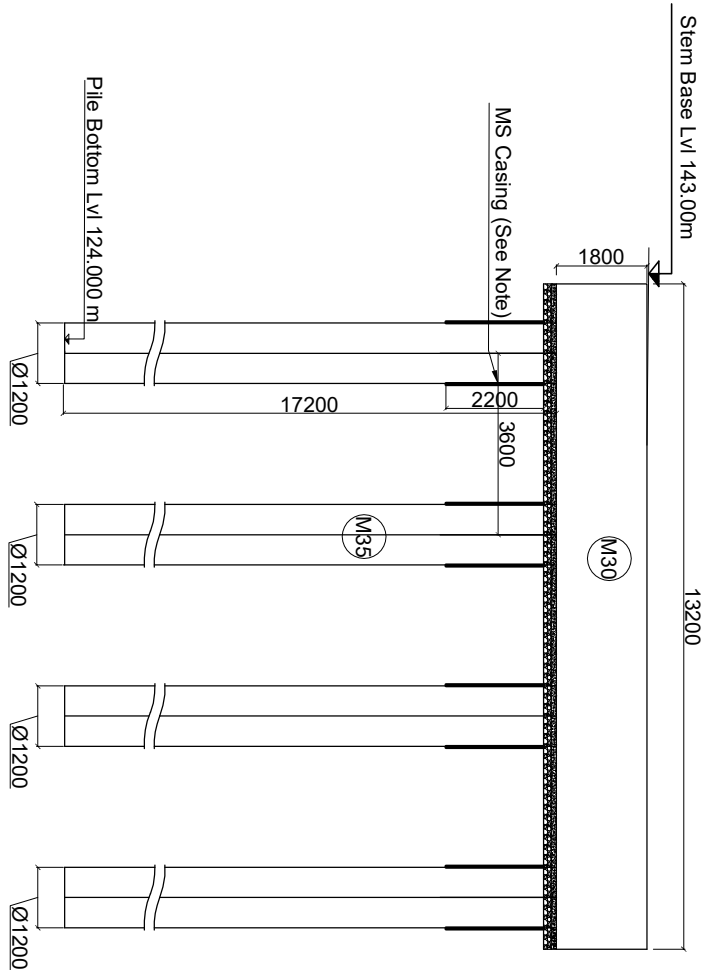
BAR BENDING SCHEDULE OF ABUTMENT						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACING (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	TOTAL WEIGHT (Kg)
AB13			16	2	11.600	36.617
AB14			20	39	0.900	86.562
TOTAL WEIGHT ABUTMENT KG						8808.344
TOTAL WEIGHT (IN METRIC TON)						8.808

BAR BENDING SCHEDULE FOR ABUTMENT PILECAP						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACIN G (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	TOTAL WEIGHT (Kg)
APC1		150	25	88	8.385	2843.324
APC2		150	25	88	8.385	2843.324
APC3		150	20	33	15.190	1236.210
APC4		150	20	33	15.190	1236.210
APC5		0	16	322	2.232	1134.359
APC6		300	16	5	38.600	304.620
TOTAL IN PILE OF ONE ABUTMENT						9598.046
TOTAL WEIGHT (IN METRIC TON)						9.598

BAR BENDING SCHEDULE FOR WINGWALL						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACIN G (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	TOTAL WEIGHT (Kg)
R1		0	20	8	5.007	98.784
R2		0	16	8	5.502	69.472
R3		200	16	18	7.356	208.985
R4		200	16	18	3.928	111.595
R5		250	10	26	6.050	96.982
R6		0	20	2	0.307	1.514
R7		0	10	0	3.400	0.000
R8		0	10	0	1.320	0.000
TOTAL IN 2 WINGWALL IN ONE ABUTMENT						587.332
TOTAL WEIGHT (IN METRIC TON)						0.587



BAR BENDING SCHEDULE FOR ABUTMENT PILES							
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	SPACIN G (mm)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (kg/m)	TOTAL WEIGHT (Kg)
AP1a	 Full Length Bars 18795		25	24	19.000	3.853	1757.136
AP1b	 Curtailed bars		0	0	0.000	0.000	0.000
AP2	 Dia-1034, Pitch-150 12.5m From Bottom of pile cap	150	16	1	273.530	1.578	431.723
AP3	 Dia-1034, Pitch-200 inside pile cap 200 Below Critical Zone	200	12	1	105.880	0.888	94.002
TOTAL IN ONE PILE							2282.861
TOTAL (IN METRIC TON)							2.283
TOTAL IN 8 PILES OF ONE ABUTMENT (IN METRIC TON)						8	18.263

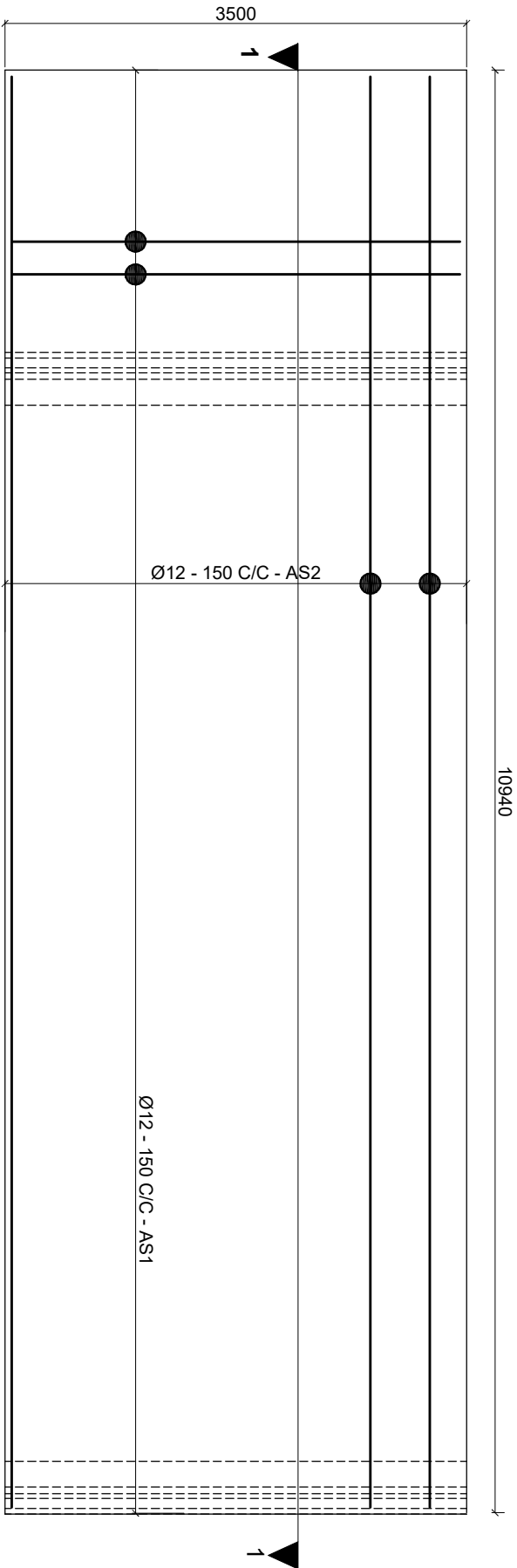


Location	Design Pile Length m	Design Working load on pile (non - seismic case)kn	Allowable Bearing Capacity on pile (Scour case) kn	Allowable Bearing Capacity of the Pile (Non Scour case)kn
Abutment	17	2151	4769	5299
Pier	0	0	0	0

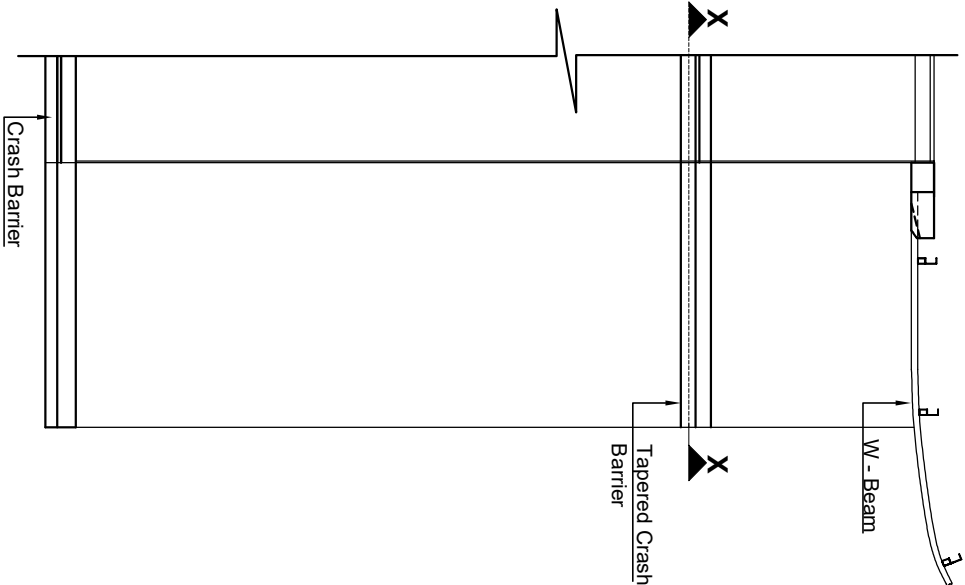
Note On MS permanent casing on piles: In case piling works are done without temporary casing, the piles shall be lined with 6mm thick MS steel permanent casing up to 1.5 m or 0.5m below MSL whichever is larger (Subject to instruction and approval by the Engineer)

For Construction Methodology and Sequence Please See General Notes.

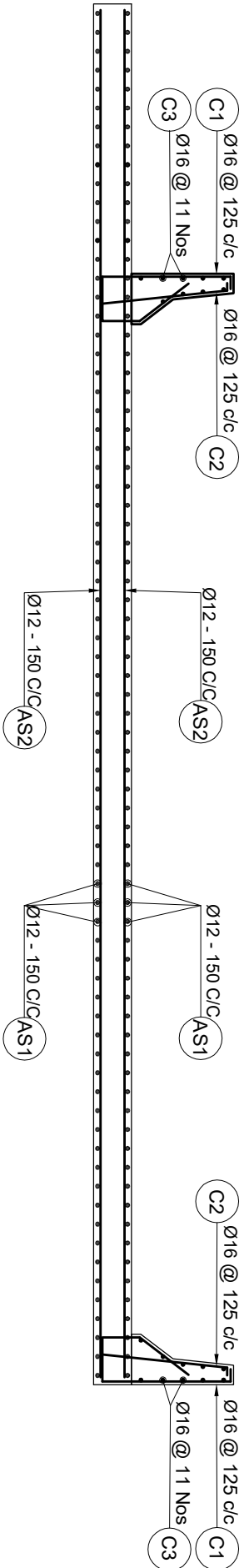
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with ERM P (Ltd), Nepal and <i>358c</i> -Tech Studio of Engineering	IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01)	SHEET TITLE: Reinforcement Details of Abutment Piles of Kothi Bridge (46/H001/307_A)	SCALE: As Shown	DESIGNED BY:	Saroj Bhattachai	SIGNATURE	REV NO.	DESCRIPTION	DATE:
					CHECKED BY:	P. Upadhyaya				DWG.NO.: 307_Kothi Bridge
					APPROVED BY:	Dr. T.H. Choi				SHEET NO.: (17/24)



Plan of Reinforcement Details of Approach Slab
Scale:-1:50

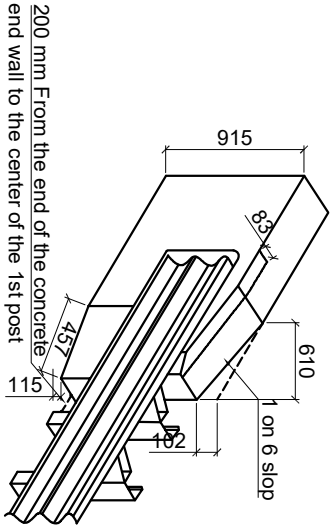


Plan of Approach Slab
Not to Scale

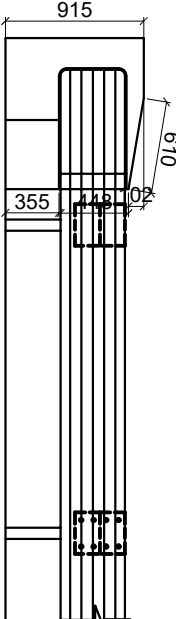


Section at 1-1
Scale:-1:50

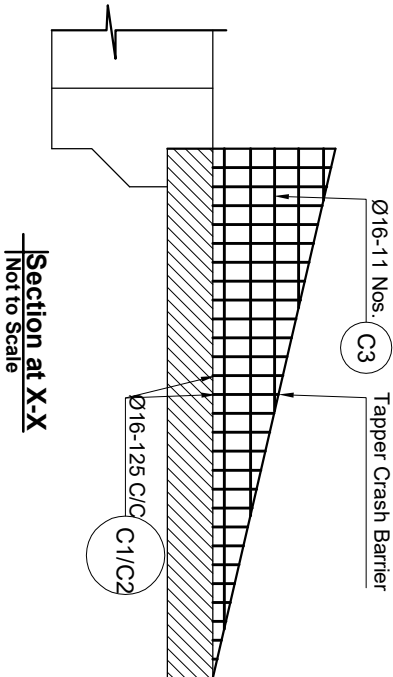
BAR BENDING SCHEDULE OF APPROACH SLAB						
BAR ID	SHAPE OF BAR IN mm (NOT TO SCALE)	Ø OF BARS (mm)	NO. OF BARS	LENGTH (m)	WEIGHT/LENGTH (Kg/m)	TOTAL WEIGHT (Kg)
AS1	<u>3400</u>	12	148	3.400	0.888	446.749
AS2	<u>10850</u>	12	48	10.850	0.888	462.375
TOTAL IN ONE APPROACH SLAB						909.124
TOTAL WEIGHT IN METRIC TON						0.909



End Block Part Details
Scale:-1:50

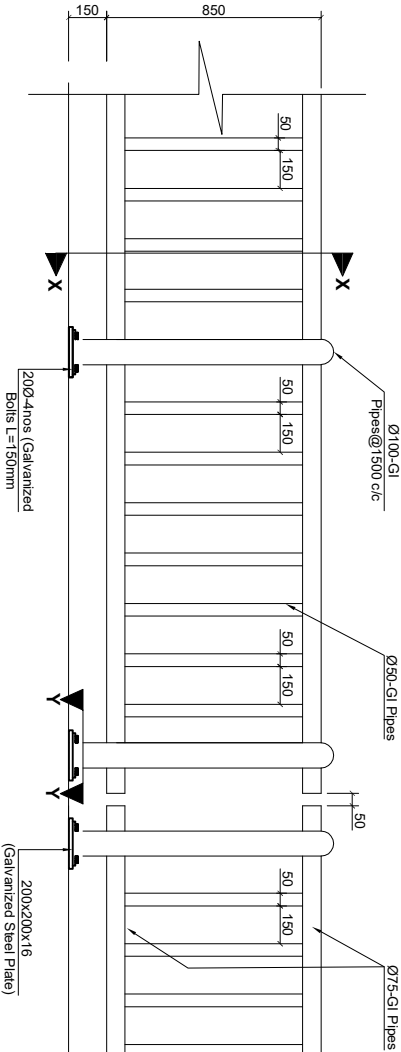


Elevation
Scale:-1:50



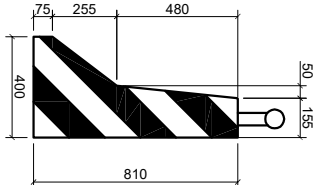
Section at X-X
Not to Scale

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-NFP		CONSULTANT: Soosung Engineering Co. Ltd, Korea in association with ERM/C P (Ltd), Nepal and JYR& - Tech Studio of Engineering		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE:	
DOR, DCID		ROAD NAME:		Reinforcement Details of Approach Slab of Kotahi Bridge (46/H001/307_A)		As Shown		DESIGNED BY:		Saroj Bhattacharai		CHECKED BY:		P. Upadhyaya		APPROVED BY:		November, 2022	
East West Highway (H01)		Butwal - Gorusinghe Section																DWG.NO.: 307_Kotahi Bridge	
																		SHEET NO.: 18/24	



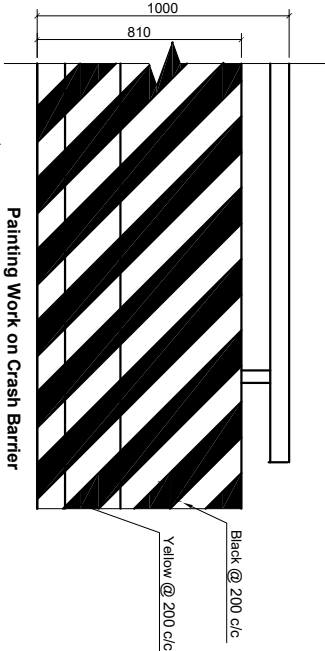
Railing Post Details

Scale:-1:20



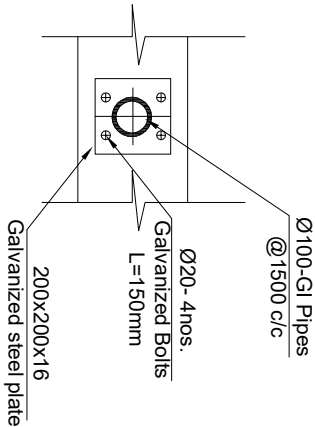
Painting Work on Crash Barrier

Scale:-1:20



Painting Work on Crash Barrier
on The Surface Facing Towards Carriageway

Scale:-1:20



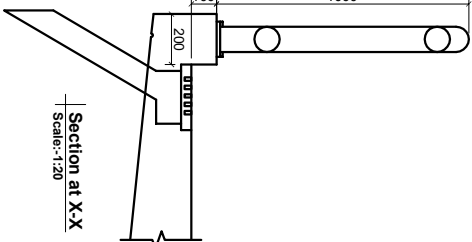
Section at Y-Y

Scale:-1:20



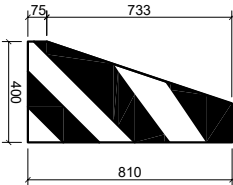
Details at -A-A

Scale:-1:20



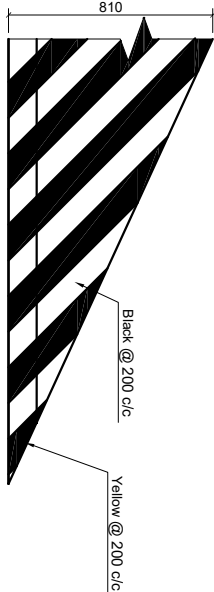
Section at X-X

Scale:-1:20



Painting Work on Tapper Crash Barrier

Scale:-1:20

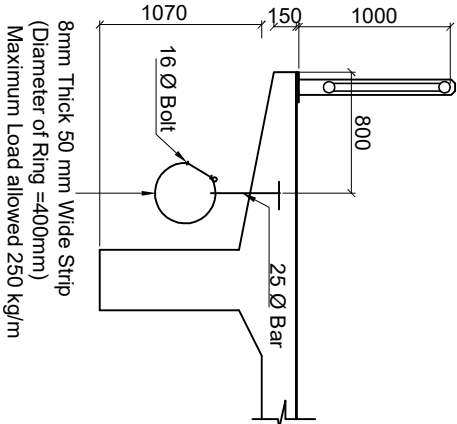


Painting Work on Crash Barrier
on The Surface Facing Towards Carriageway

Scale:-1:20

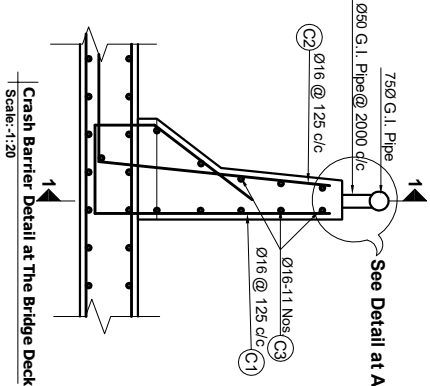
BAR BENDING SCHEDULE OF CRASH BARRIER (For each 1m)

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		150 Approximate	16	8	2.030	1.578	25.632
C2		150 Approximate	16	8	1.415	1.578	17.867
C3			16	11	0.960	1.578	16.667
TOTAL FOR 1 M							60.166
TOTAL FOR 1.0M (IN METRIC TON)							0.006



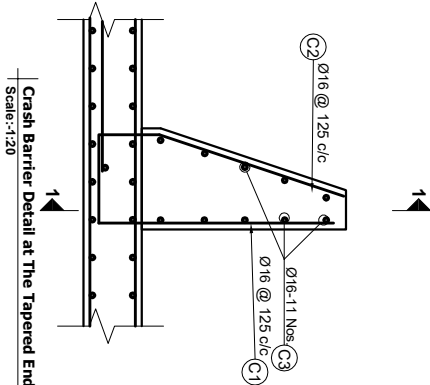
Utility hanger Detail

Scale:-1:50



Crash Barrier Detail at The Bridge Deck

Scale:-1:20

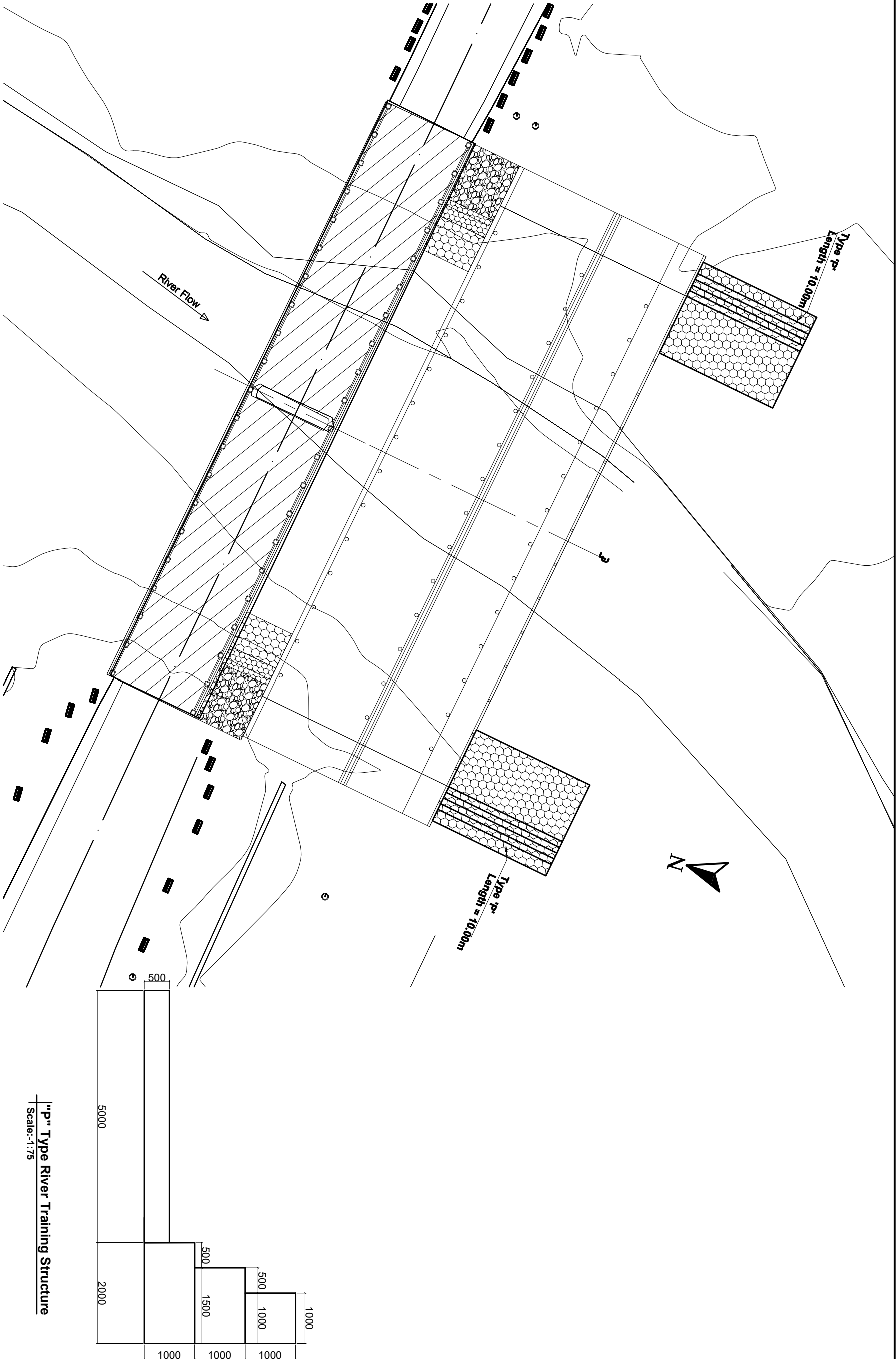


Crash Barrier Detail at The Tapered End

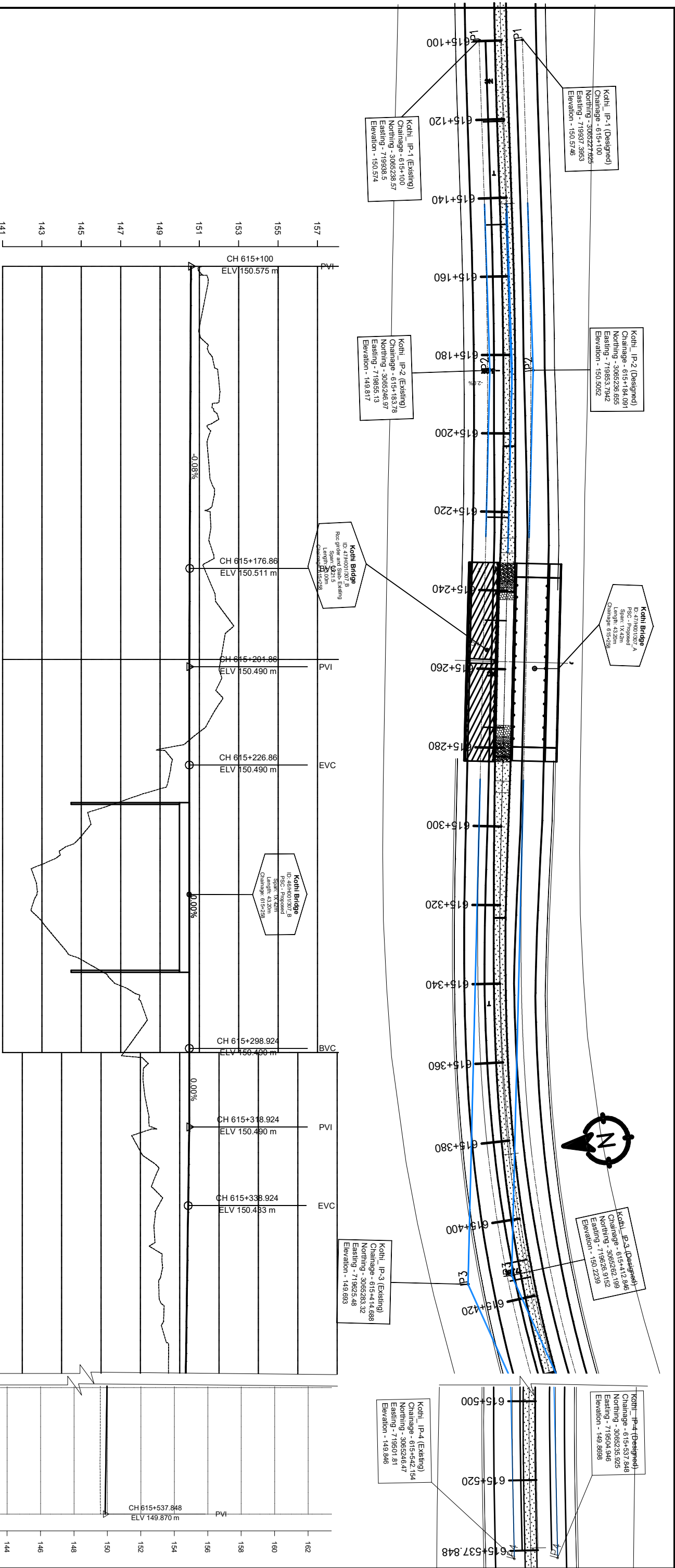
Scale:-1:20

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.

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										Saroj Bhattacharai					DWG.NO.: 307_Koshi Bridge
										P. Upadhyaya					SHEET NO.: 19/24
										Dr. T.H.Choi					



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-NFP		CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with ERMCo P (Ltd), Nepal and  JYK - Tech Studio of Engineering		IMPLEMENTING AGENCY: DOR, DCID		SHEET TITLE: River Training Work of Koshi Bridge (46/H001/307_A)		SCALE: As Shown		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022
ROAD NAME: East West Highway (H01)		Butwal - Gorusinghe Section		DESIGNED BY: Saroj Bhattacharai		CHECKED BY: P. Upadhyaya		APPROVED BY: Dr. T.H. Choi		DWG. NO.: 307_Koshi Bridge		SHEET NO.: 20/124			



DESIGN LEVEL(m)	EXISTING LEVEL(m)	HORIZONTAL ALIGNMENT		SUPER ELEVATION	CHAINAGE(Km)
		RIGHT	LEFT		
150.575	151.142	IP-1 R=0.00		615+100	615+100
150.566	151.220	NC		615+110	615+110
150.558	151.461	T		615+120.552	615+120
150.550	152.009	T		615+130	615+130
150.541	151.642	T		615+140	615+140
150.533	151.480	T		615+146.802	615+150
150.525	151.687	T		615+160	615+160
150.516	151.502	T		615+170	615+170
150.508	151.516	T		615+180	615+180
150.501	152.531	IP-2 R=1505.50		615+190	615+190
150.496	152.092	T		615+200	615+200
150.492	152.189	T		615+210	615+210
150.490	150.619	T		615+220	615+221.38
150.490	149.458	T		615+230	615+230
150.490	145.387	T		615+240	615+240
150.490	143.860	T		615+250	615+247.63
150.490	142.731	NC		615+260	615+260
150.490	143.535	T		615+270	615+274.854
150.490	146.273	T		615+280	615+280
150.490	148.237	IP-3 R=344.50 R=344.50 R=344.50		615+290	615+290
150.490	147.167	T		615+300	615+300
150.486	148.207	T		615+310	615+310
150.474	148.237	T		615+320	615+320
150.456	148.900	T		615+330	615+330
150.430	148.805	T		615+340	615+340
150.402	148.703	T		615+350	615+350
150.374	148.946	T		615+360	615+360
150.345	149.103	T		615+370	615+370
150.317	149.435	IP-4 R=0.00		615+380	615+380
	149.977	T		615+500	615+500
	149.949	T		615+510	615+510
	149.920	T		615+520	615+520
	149.892	T		615+530	615+530
		T		615+537.848	615+537.848

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), Nepal
and
TSE-Tech Studio of Engineering

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

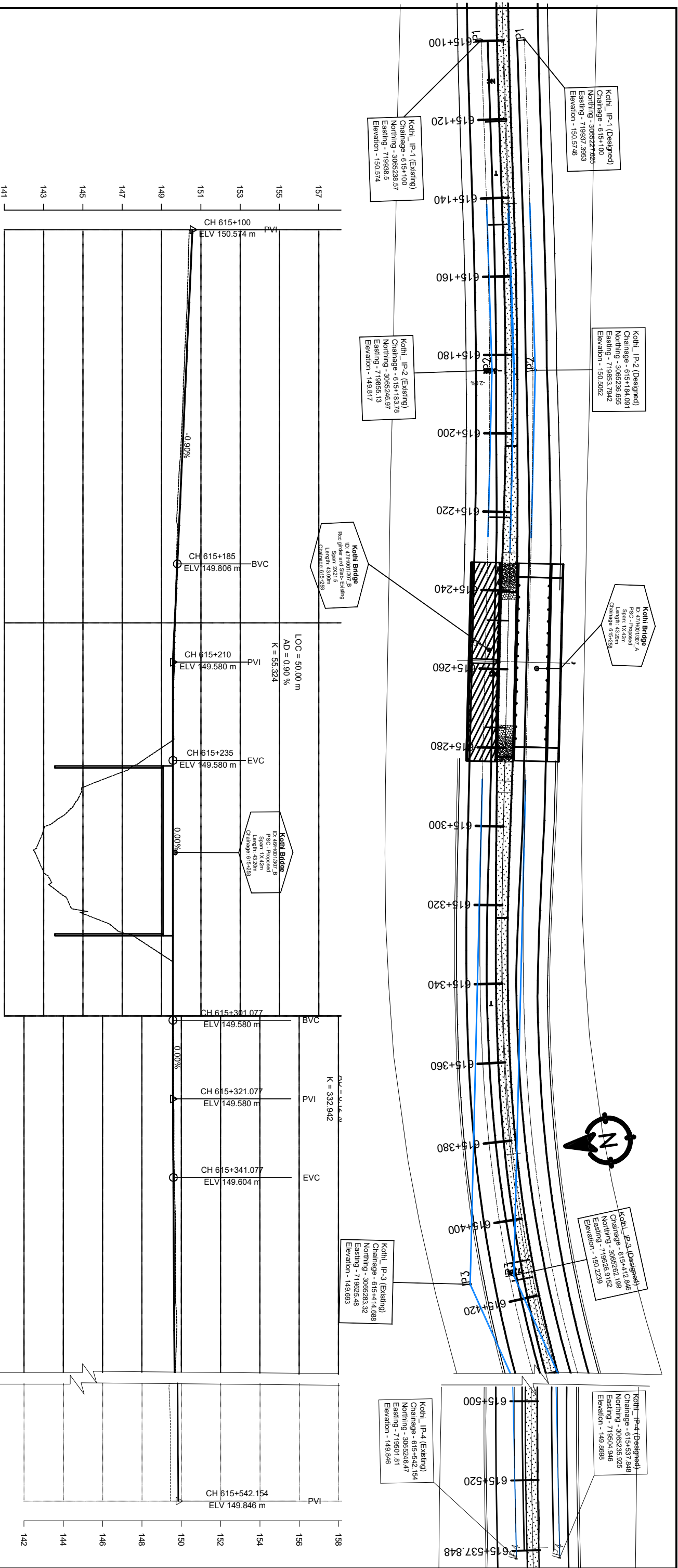
SHEET TITLE:
Plan & Profile
of
Kothi Bridge
615+100-615+300

SCALE:
Vertical Scale
Horizontal Scale

NAME
DESIGNED BY:
Saroj Bhattacharai
CHECKED BY:
P. Upadhyaya
APPROVED BY:
Dr. T.H.Choi

SIGNATURE
REV NO.

DESCRIPTION
DATE:
November, 2022
DWG. NO.:
307_Kothi
SHEET NO.
21/24



DESIGN LEVEL(m)	EXISTING LEVEL(m)	HORIZONTAL ALIGNMENT		SUPER ELEVATION	CHAINAGE(km)
		RIGHT	LEFT		
150.574	150.413	IP-1 R=0.00	IP-2 R=1494.50	615+100 615+141.552 615+146.802 615+220.759 615+226.009 615+300 615+314.955 615+514.421	615+100
150.484	150.355				615+110
150.393	150.298				615+120
150.303	150.194				615+130
150.213	150.108				615+140
150.122	150.037				615+150
150.032	149.920				615+160
149.942	149.812				615+170
149.851	149.787				615+180
149.763	149.734				615+190
149.691	149.653	IP-3 R=355.50 IP-4 R=0.00	IP-3 R=355.50 IP-4 R=0.00	615+300 615+314.955 615+514.421	615+200
149.636	149.648				615+210
149.600	149.600				615+220
149.582	149.533				615+230
149.580	145.930				615+240
149.580	143.699				615+250
149.580	142.708				615+260
149.580	144.173				615+270
149.580	147.685				615+280
149.580	149.588				615+290
149.580	149.601	IP-4 R=0.00	IP-4 R=0.00	615+514.421 615+542.154	615+300
149.581	149.613				615+310
149.585	149.614				615+320
149.593	149.634				615+330
149.603	149.647				615+340
149.615	149.698				615+350
149.627	149.719				615+360
149.639	149.718				615+370
149.651	149.775				615+380
149.663	149.707				615+390
149.819	149.429	IP-4 R=0.00	IP-4 R=0.00	615+542.154	615+520
149.831	149.448				615+530
149.843	149.447				615+540

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

SHEET TITLE:
Plan & Profile
of
Existing Kotih Bridge
615+100 - 615+300

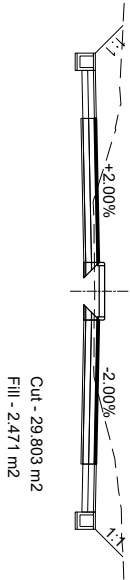
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Vertical Scale
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NAME
DESIGNED BY:
Saroj Bhattacharai
CHECKED BY:
P. Upadhyaya
APPROVED BY:
Dr. T. H. Choi

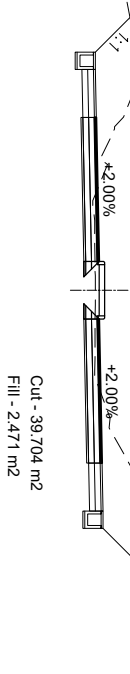
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DATE:
November, 2022
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307_Kotih
SHEET NO.:
22/24

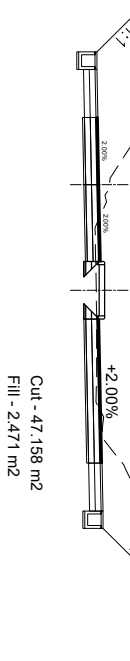
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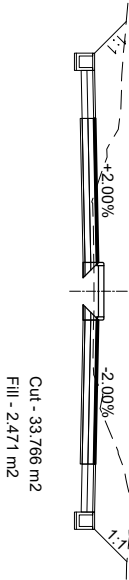
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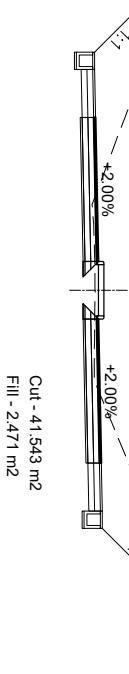
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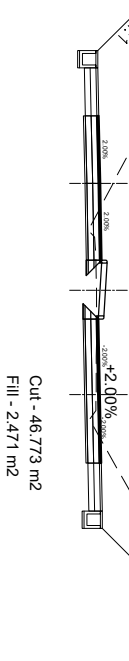
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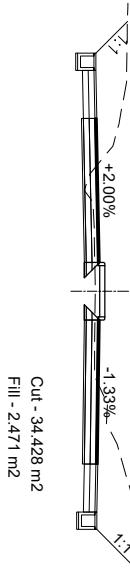
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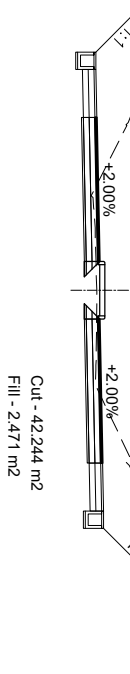
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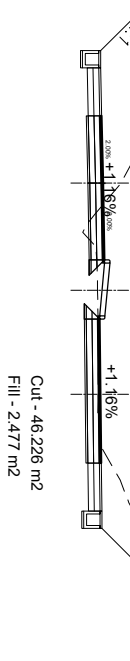
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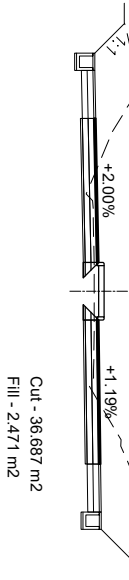
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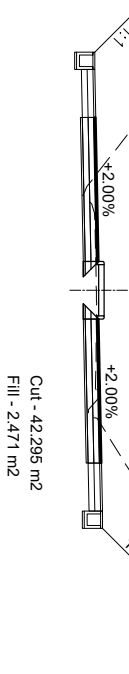
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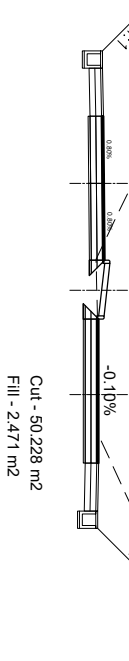
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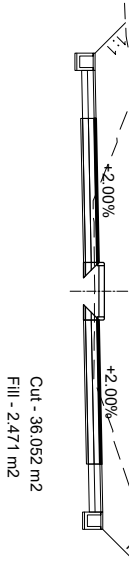
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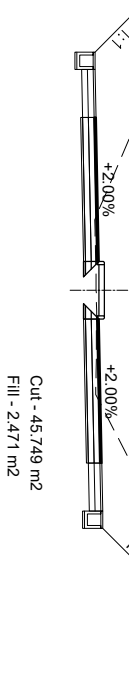
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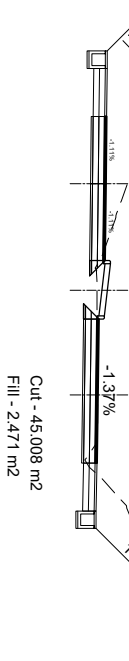
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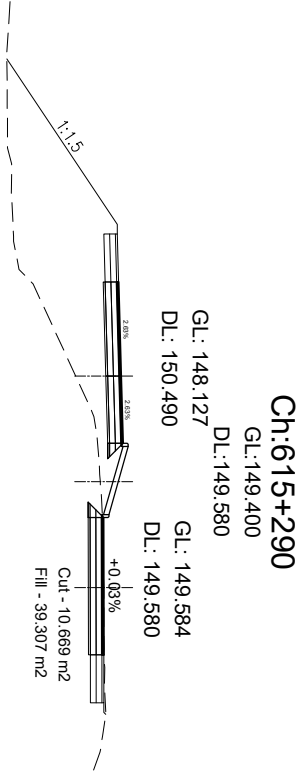
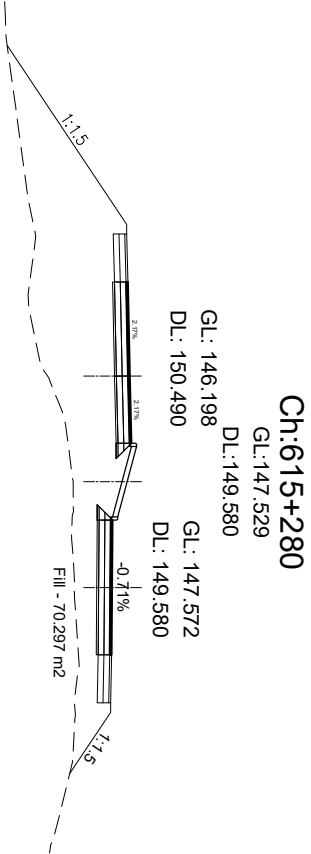
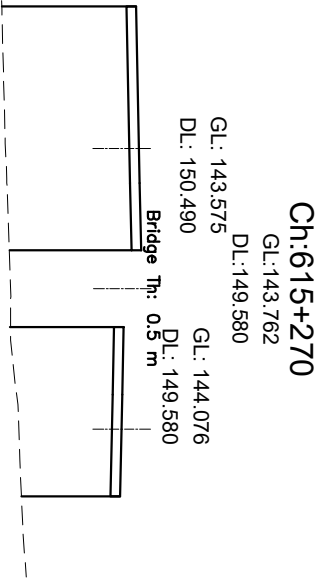
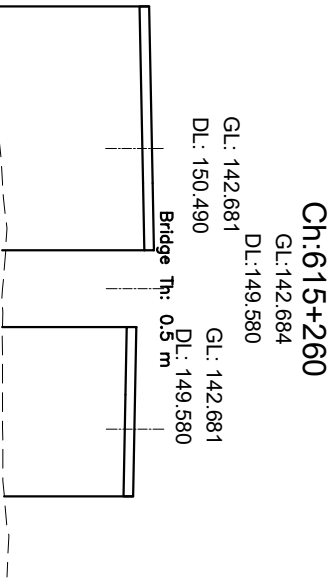
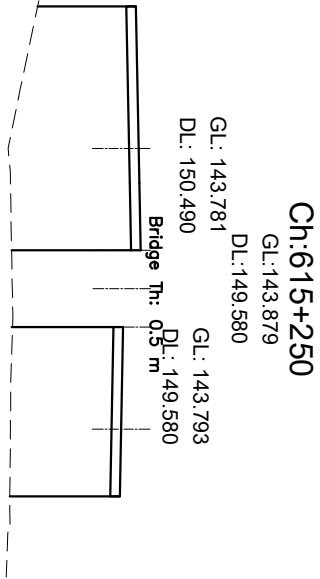
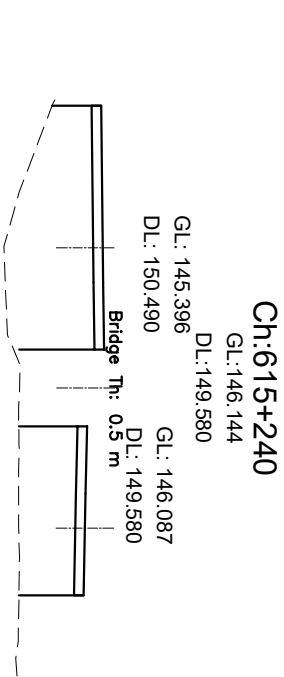
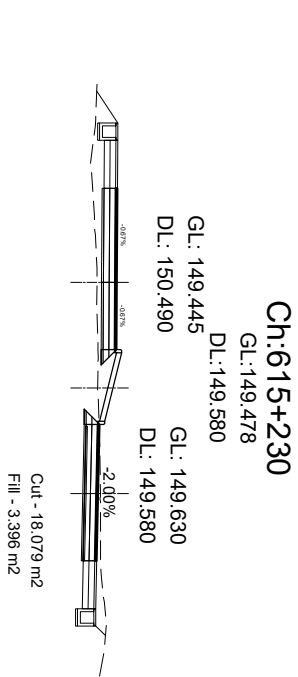
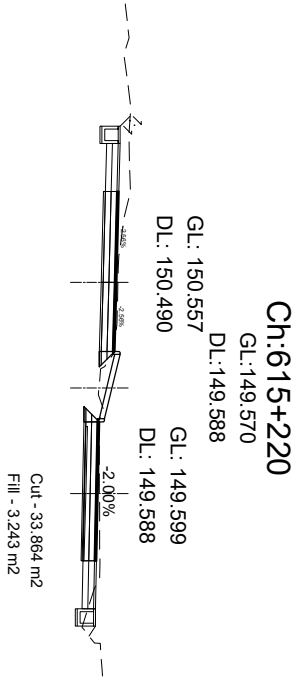
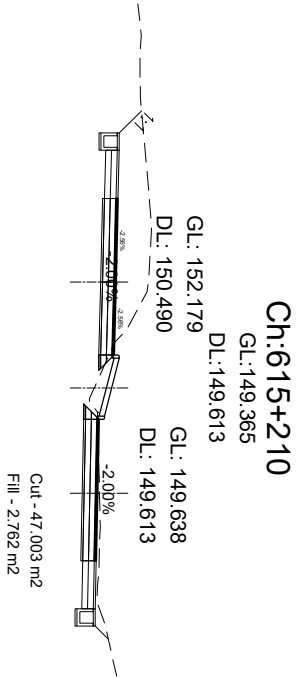
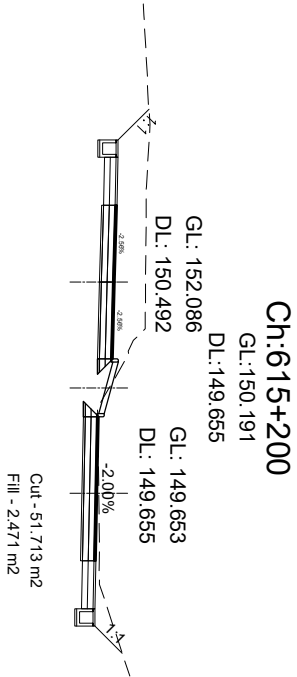
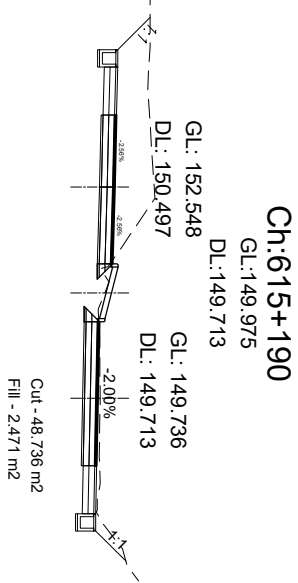
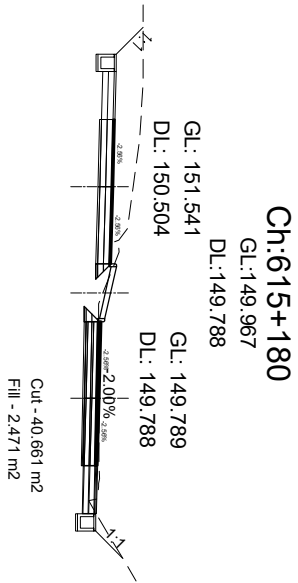
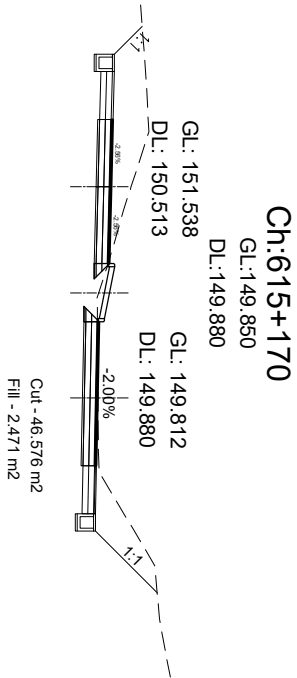
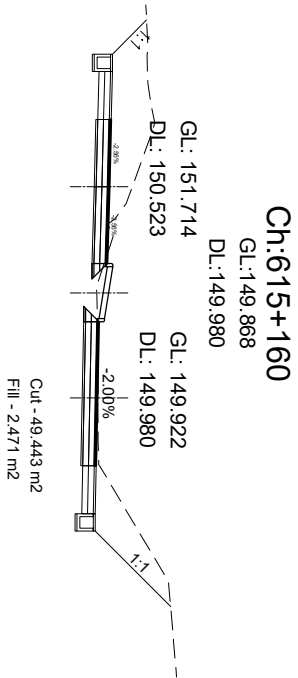
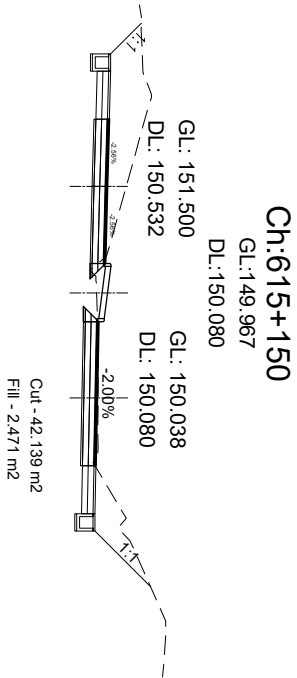
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Ch:615+140
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Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE:	
	Soosung Engineering Co. Ltd, Korea in association with		DOR, DCID		Cross Section of Ch:615+000 - 615+140		DESIGNED BY:		Saroj Bhattacharai					November, 2022	
	ERM C P (Ltd), Nepal and		ROAD NAME:				CHECKED BY:		P. Upadhyaya					DWG. NO.:	
	TSE-Tech Studio of Engineering		East West Highway (H01)				APPROVED BY:		Dr. T.H.Choi					307_Kothi	
			Butwal - Gorusinghe Section											SHEET NO.	

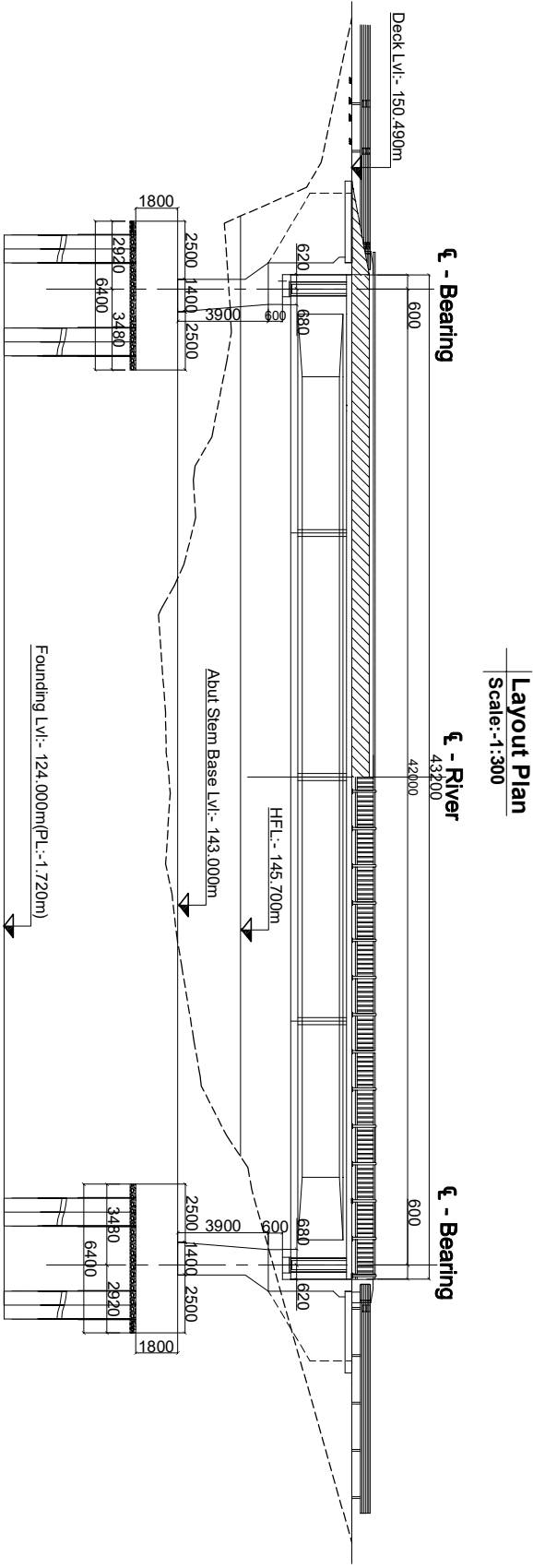
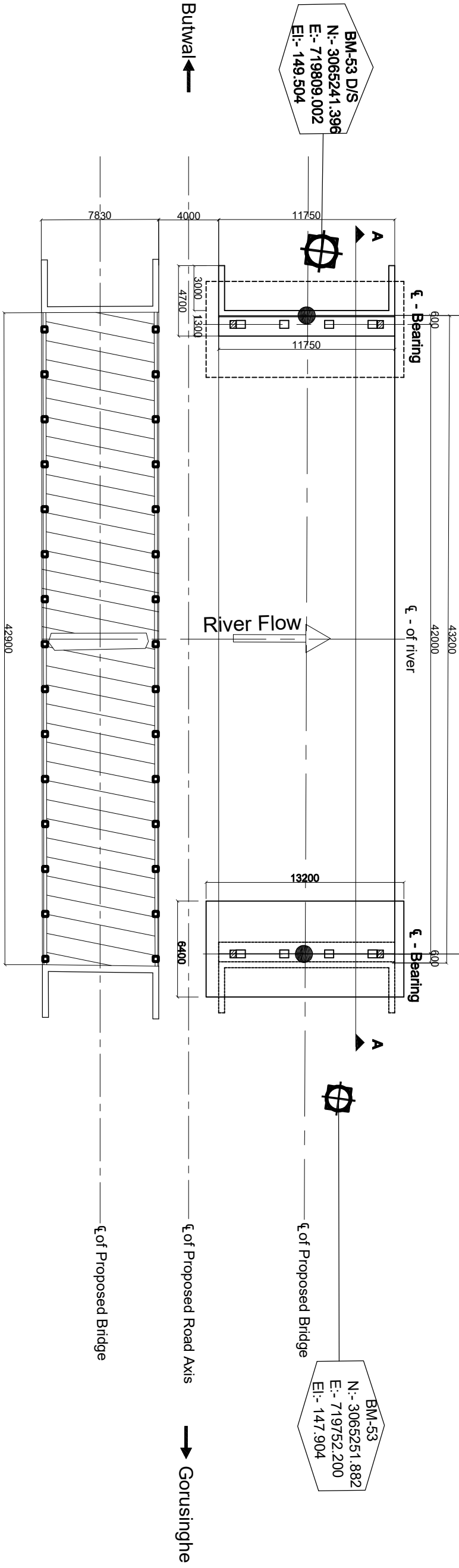


Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with  ERM C P (Ltd), Nepal and  TSE-Tech Studio of Engineering	IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section	SHEET TITLE: Cross Section of Ch:615+150 - 615+290	SCALE: 0 2 4 6m Vertical Scale 0 10 20 30m Horizontal Scale	DESIGNED BY:	NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022 DWG.NO.: 307_Kothi SHEET NO. 22.2/24
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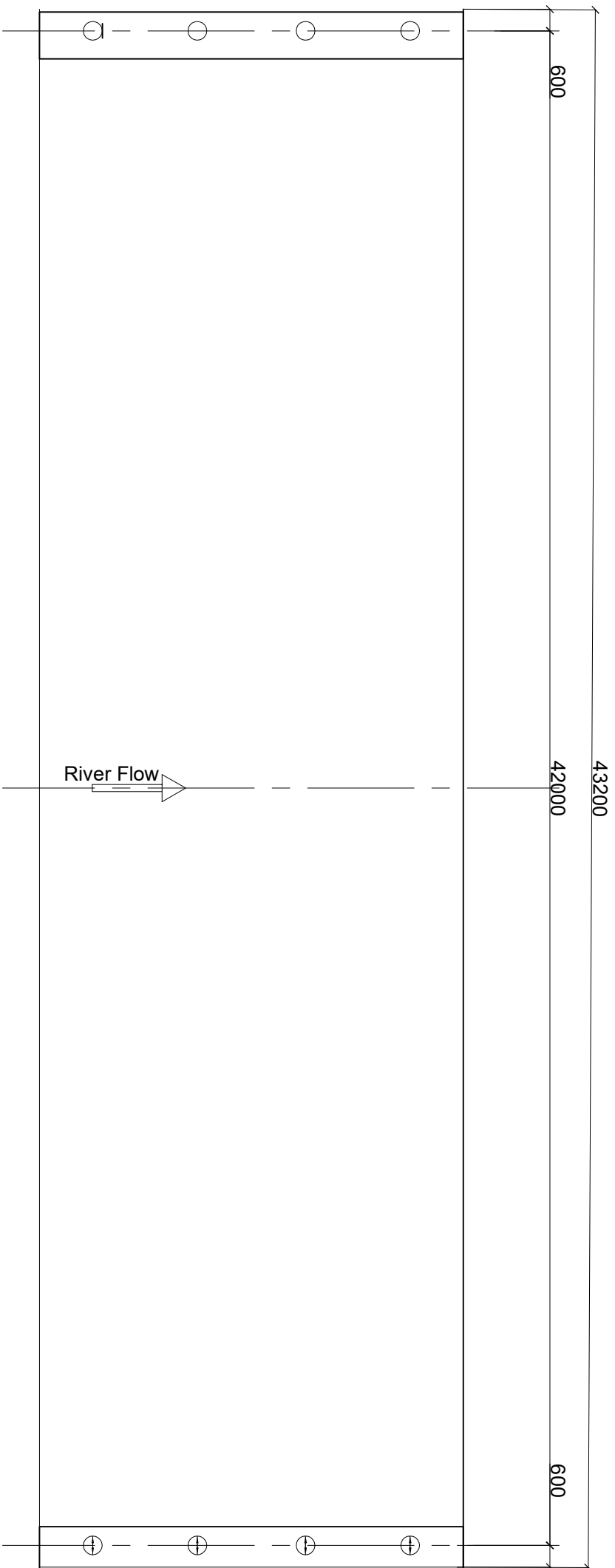


Left Abutment
N:- 3065241.98
E:- 719801.10
EI:- 150.490

Right Abutment
N:- 3065248.73
E:- 719758.43
EI:- 150.490



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-NFP		CONSULTANT: Soosung Engineering Co. Ltd, Korea in association with ERMCo P (Ltd) and JWC - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID		SHEET TITLE: General Arrangement of Kothi Bridge (46/H001/307_A)		SCALE: As Shown		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November, 2022	
ROAD NAME: East West Highway (H01)		Butwal - Gorusinghe Section		Designed by:		Saroj Bhattacharai		Checked by:		P. Upadhyaya		Approved by:		Dr. T.H. Choi		DWG. NO.: 307_Kothi		SHEET NO.: 23/24	



Layout of Bearing

Scale:-1:200

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.

Tree Pot-bearing.

artial 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/C P (Ltd) and  JYGC-Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:				NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November,2022	
				DOR, DCID		General Arrangement of As Shown				Designed by:		Saroj Bhattacharai								DWG.NO.: 307_Kothi	
				ROAD NAME: East West Highway (H01)						Checked by:		P. Upadhyaya								SHEET NO.: 24/24	
				Butwal - Gorusinghe Section						Approved by:		Dr. T.H.Choi									

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

Gageda Bridge(47-H001-308_AB)

St. Ch : 619+999.40 ~ End Ch : 620+012.60

Detailed Drawing

Butwal - Gorusinghe Sector

November,2022

CONTENTS

S.No.	DESCRIPTION	DWG. NO	NO. OF SHEETS
1.	General Notes.	1	1
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 confirming 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

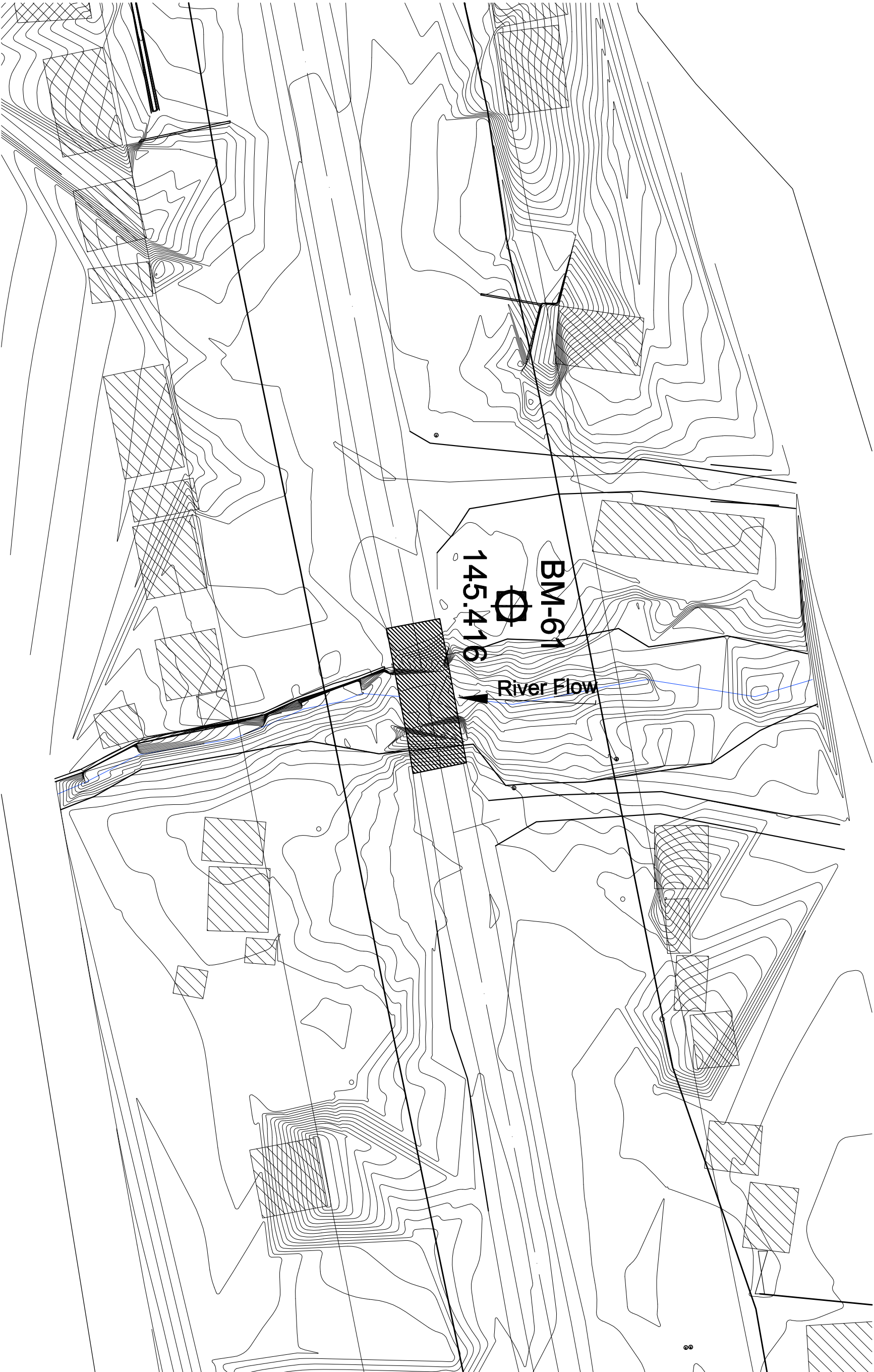
The clear cover to steel reinforcement steel is 40mm.

Safety Kerb

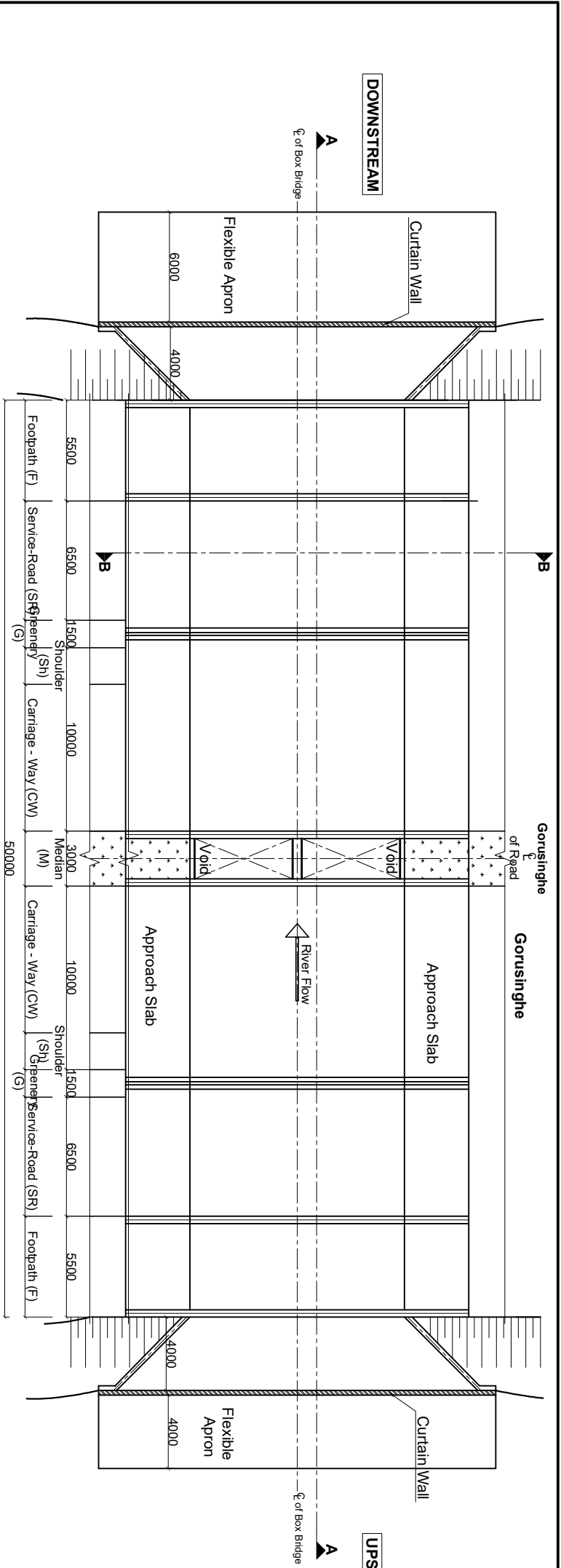
The clear cover to steel reinforcement steel is 25mm.

h) All dimensions are in millimeters except otherwise mentioned.

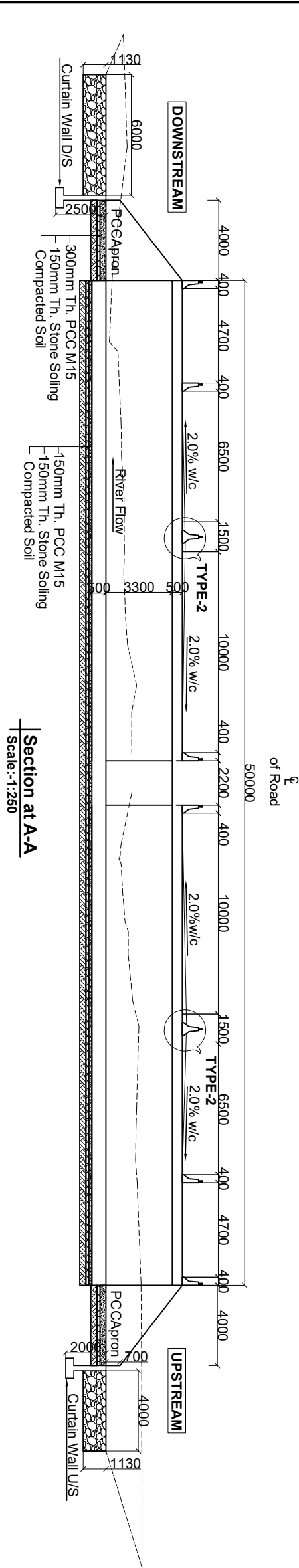
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				DOR, DCID		General Notes of Gageda Box Bridge - (6x3.3) (47/H001/308_A,B) CH-620+006		As Shown		Designed by:		P. Shrestha								DWG.NO.: 308_Gageda	
				ROAD NAME: East West Highway (H01)						Checked by:		P. Upadhyaya								SHEET NO.: 01/10	
				Butwal - Gorusinghe Section						Approved by:		Dr. T.H. Choi									



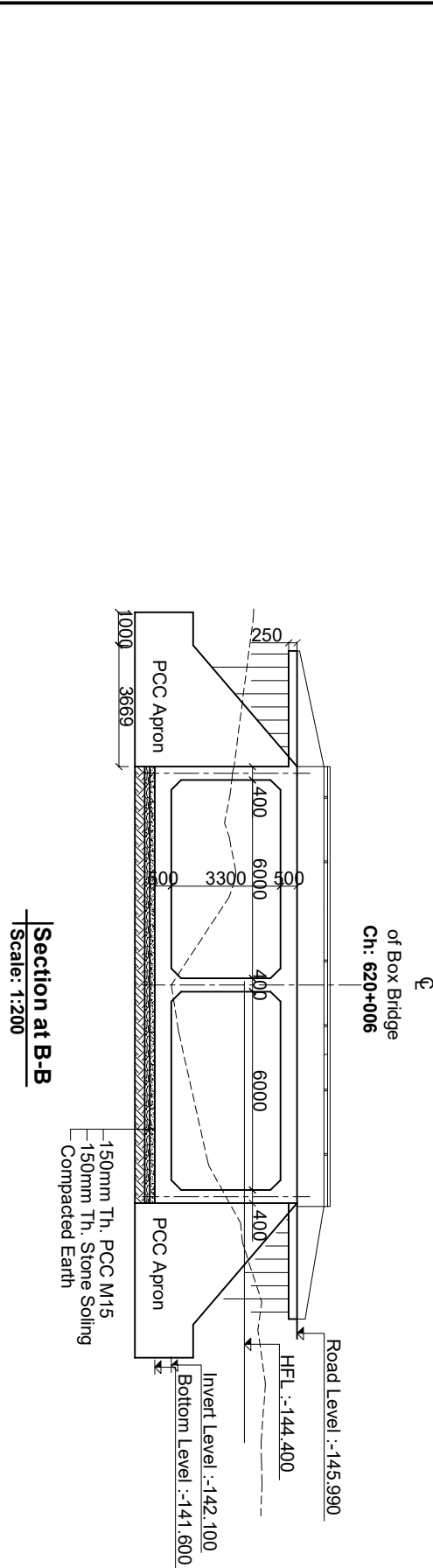
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ROAD NAME:		DOR, DCID		Topographic Map of Gageda Box Bridge - (6x3.3) (47/H001/308_A,B) CH-620+006		2:1		Designed by:		P. Shrestha								DWG.NO.:		
		Checked by:						P. Upadhyaya								308_Gageda				
		Butwal - Gorusinghe Section						Approved by:		Dr. T.H.Choi								SHEET NO.:		
																		02/10		



Plan
Scale:-1:300



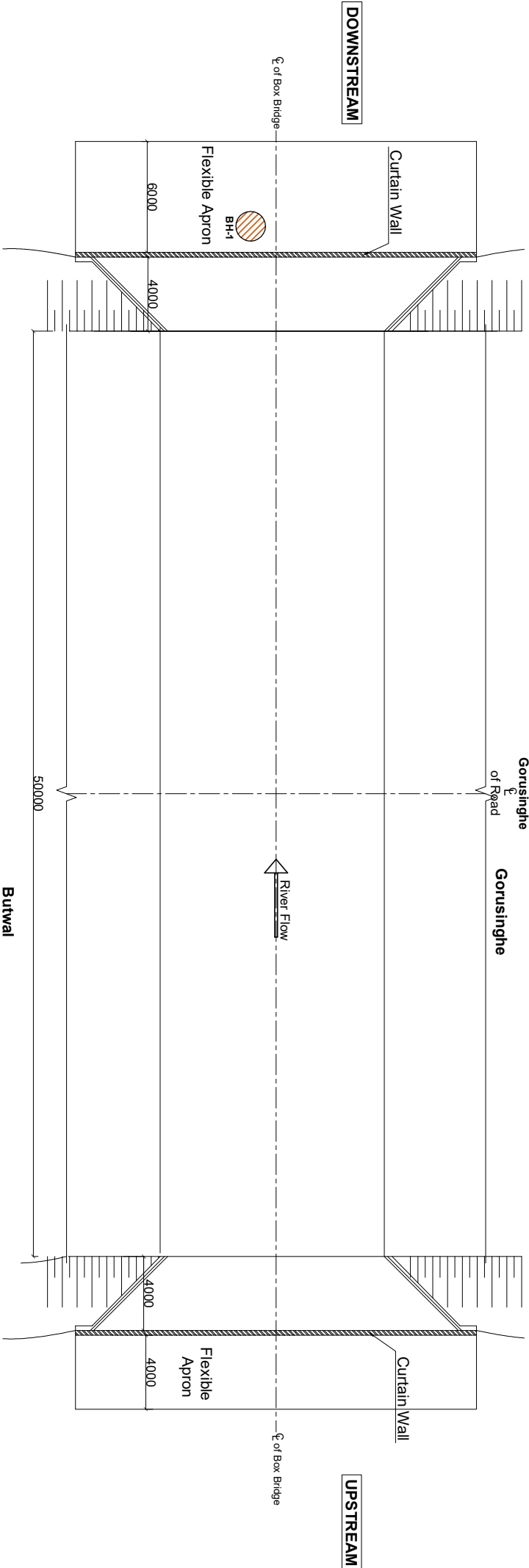
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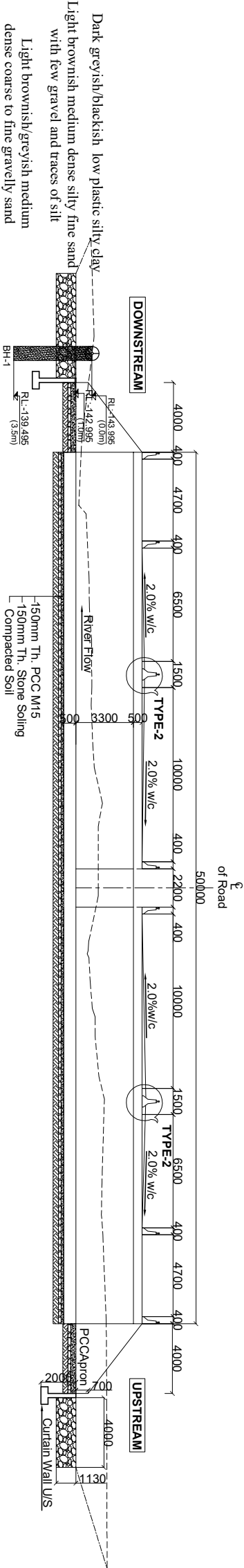
Section at B-B
Scale: 1:200

Name(NMC Number)		Signature
P. Engineer	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	

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 C P (Ltd) and JYK - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusinghe Section		SHEET TITLE: General Arrangement of Gageda Box Bridge - (6x3.3) (47/H001/308_A,B) CH-620+006		SCALE: As Shown		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE: Nov, 2022		DWG.NO.: 308_Gageda	SHEET NO.: 03/10
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										Checked by:		P. Upadhyaya						
										Approved by:		Dr. T.H.Choi						



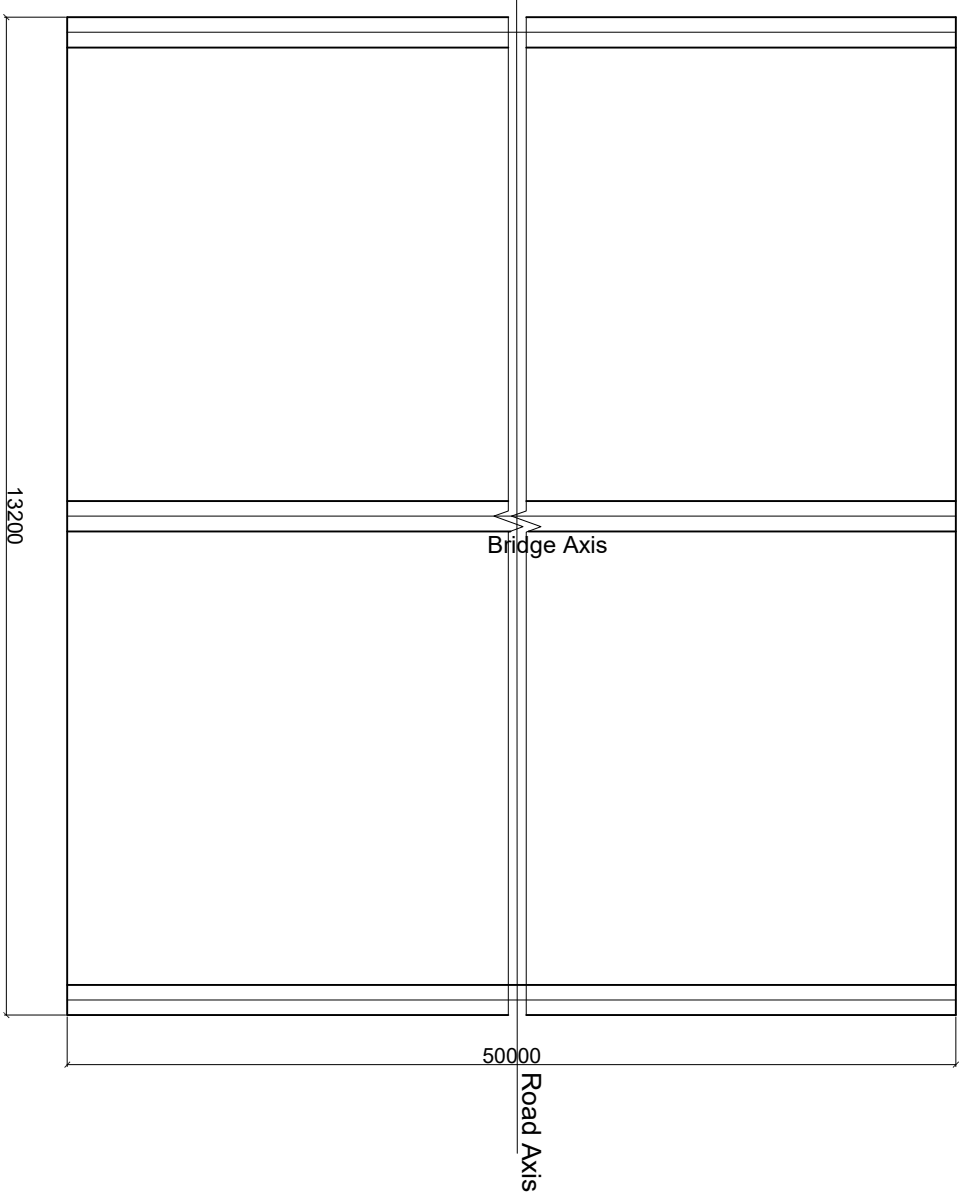
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Borlog Details
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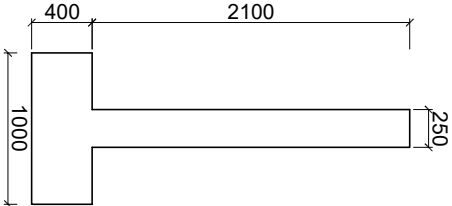
Name(NMC Number)		Signature
P. Engineer	P. Upadhyaya (Civil A 675)	
Structure Engineer	K.P. Magle(Civil A 127) / P. Shrestha(Civil A 676) / S. Bhattarai (Civil A 904)	
Hydrologist	Dr. P. C. Jha(Civil A 166) / S. Adhikari (Civil A 408)	
Geotechnical Engineer	A. Adhikari(ka 199) / Dr. V . R. S. Shahi	

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										P. Shrestha								DWG.NO.: 308_Gageda	
										P. Upadhyaya								SHEET NO.: 	
										Dr. T.H. Choi									



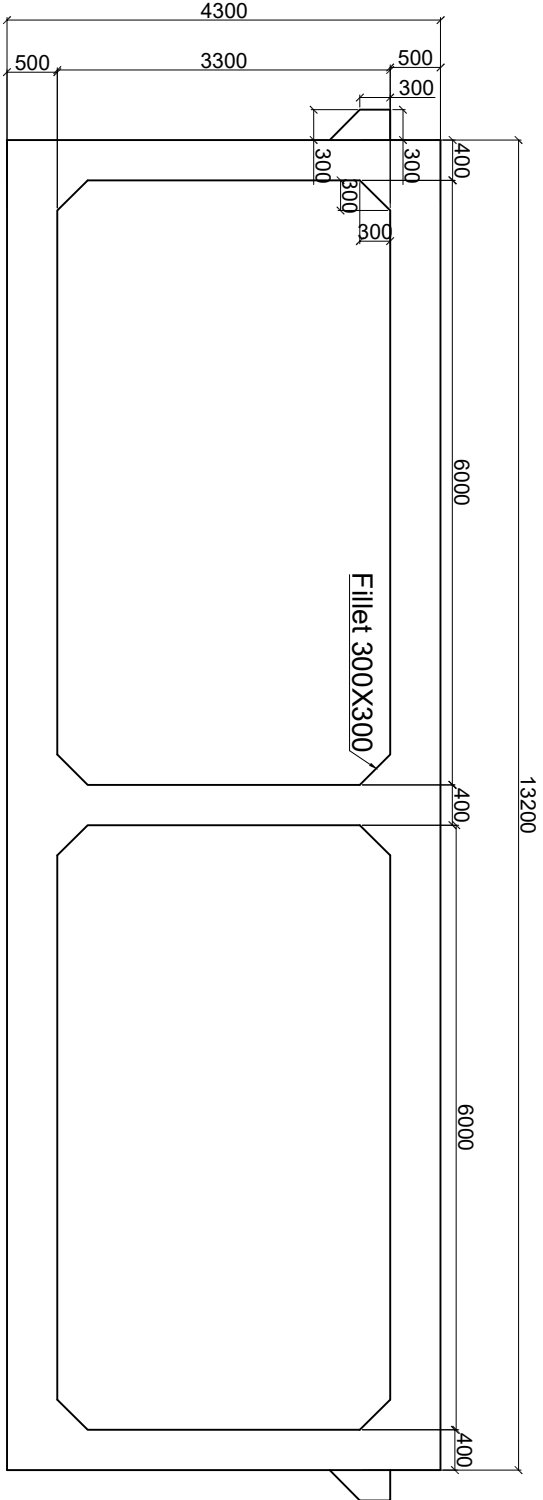
Concrete Outlines (Plan)

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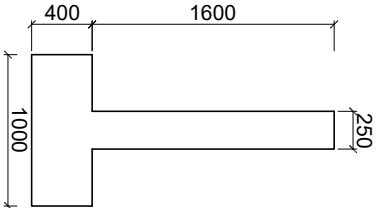
Curtain Wall D/S

Scale:-1:50



Concrete Outlines (Sectional Elevation)

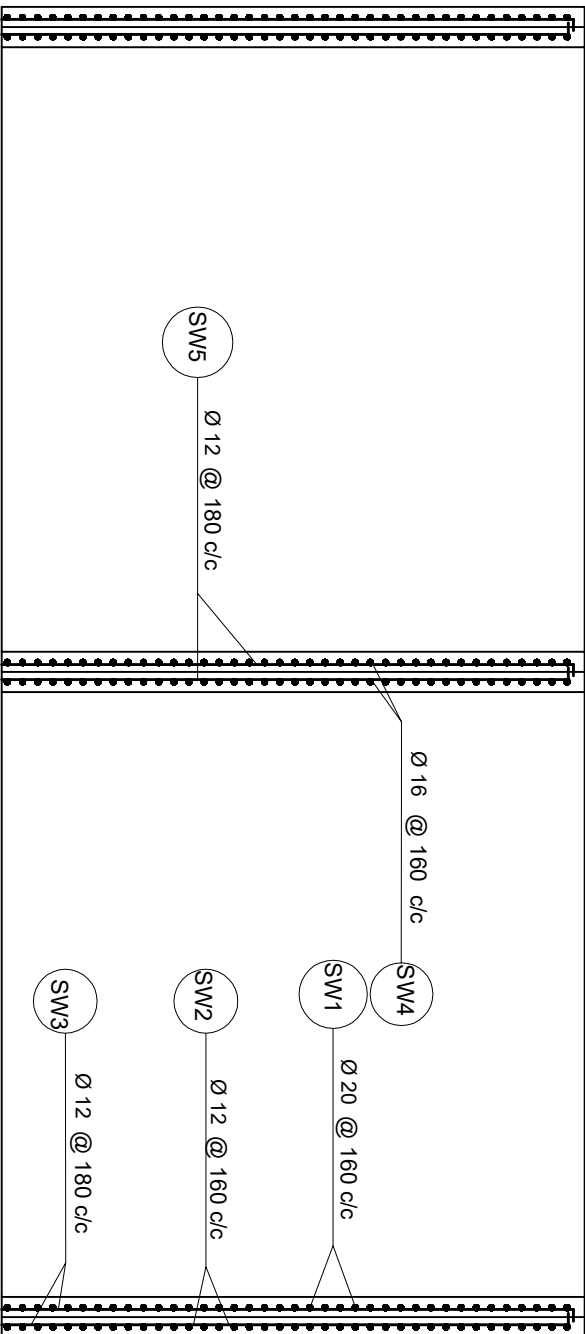
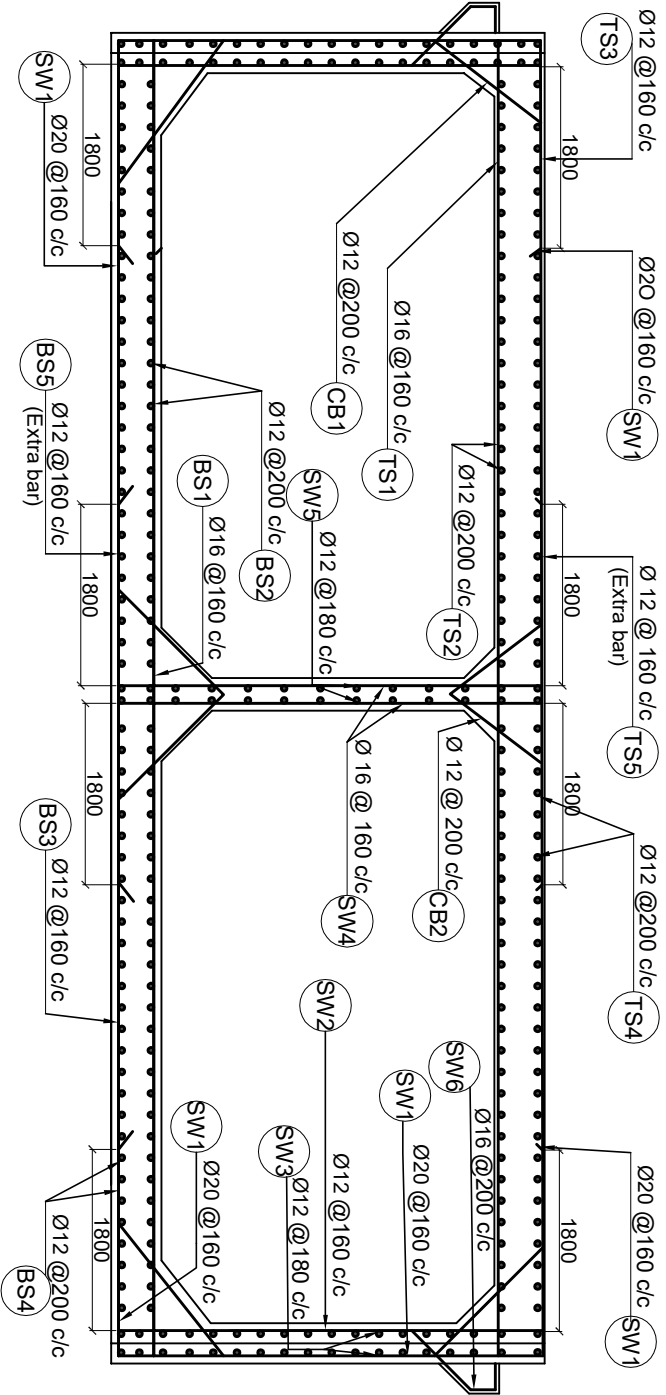
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Curtain Wall U/S

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, Korea in association with ERM/C P (Ltd) and  JYK - Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: <table><tr><td colspan="2">DOR, DCID</td></tr><tr><td colspan="2">ROAD NAME: East West Highway (H01)</td></tr><tr><td colspan="2">Butwal - Gorusinghe Section</td></tr></table>		DOR, DCID		ROAD NAME: East West Highway (H01)		Butwal - Gorusinghe Section		SHEET TITLE: Concrete Outline of Gageda Box Bridge - (6x3.3) (47/H001/308_A,B) CH-620+006		SCALE: As Shown		<table><tr><td>Designed by:</td><td>P. Shrestha</td><td></td><td>REV NO.</td><td></td><td>DESCRIPTION</td></tr><tr><td>Checked by:</td><td>P. Upadhyaya</td><td></td><td></td><td></td><td></td></tr><tr><td>Approved by:</td><td>Dr. T.H. Choi</td><td></td><td></td><td></td><td></td></tr></table>		Designed by:	P. Shrestha		REV NO.		DESCRIPTION	Checked by:	P. Upadhyaya					Approved by:	Dr. T.H. Choi					<table><tr><td colspan="2">DATE: Nov,2022</td></tr><tr><td>DWG.NO.: 308_Gageda</td><td rowspan="2">SHEET NO.: 05/10 </td></tr><tr><td></td></tr></table>		DATE: Nov,2022		DWG.NO.: 308_Gageda	SHEET NO.: 05/10	
DOR, DCID																																											
ROAD NAME: East West Highway (H01)																																											
Butwal - Gorusinghe Section																																											
Designed by:	P. Shrestha		REV NO.		DESCRIPTION																																						
Checked by:	P. Upadhyaya																																										
Approved by:	Dr. T.H. Choi																																										
DATE: Nov,2022																																											
DWG.NO.: 308_Gageda	SHEET NO.: 05/10																																										



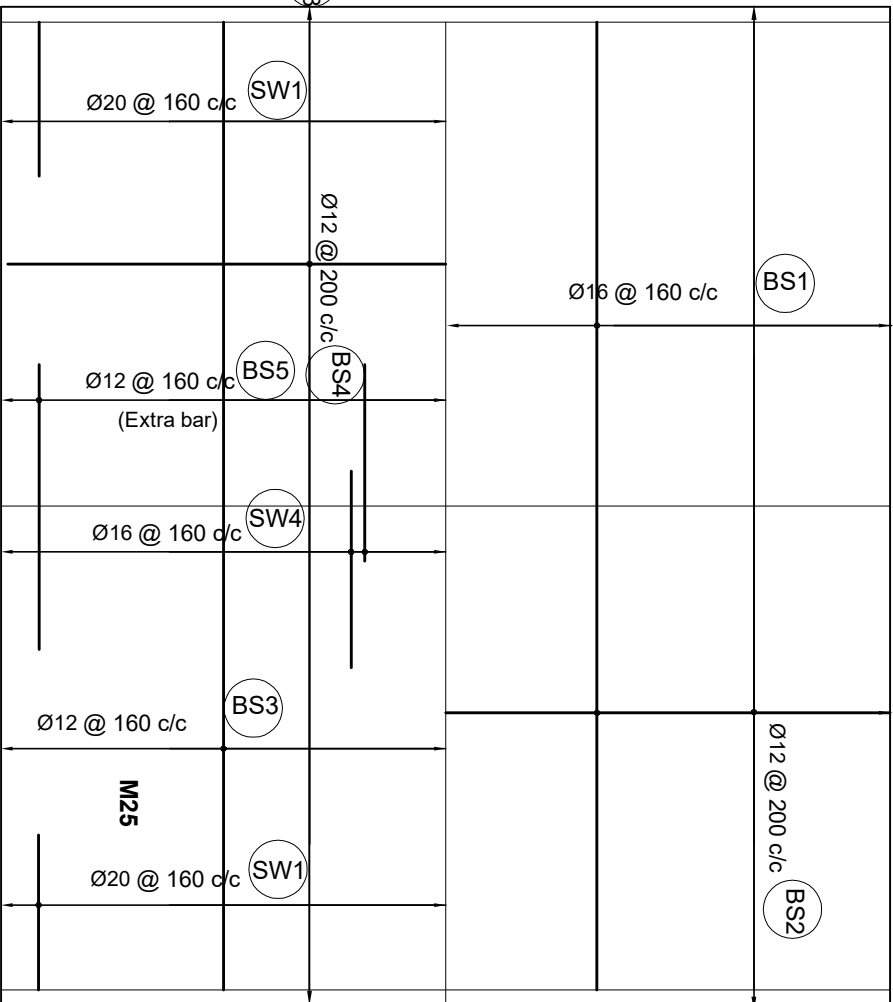
Sectional Elevation

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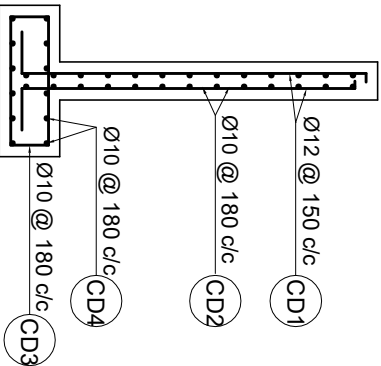
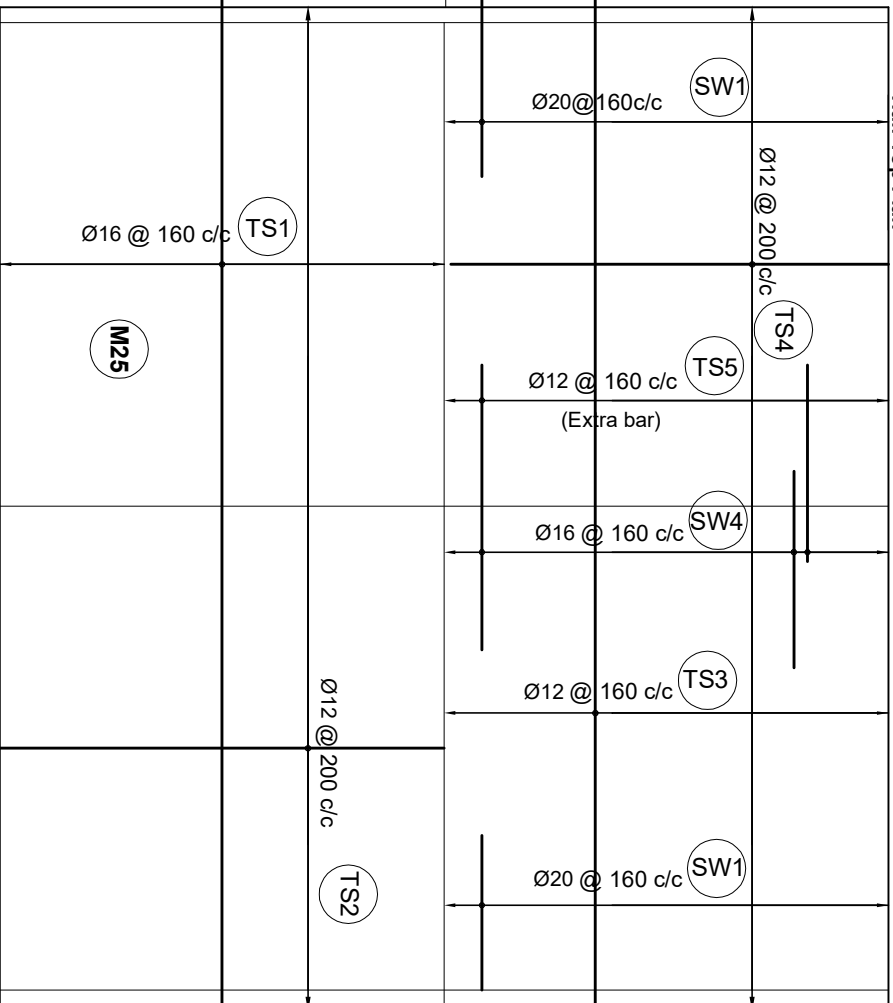
Sectional Plan of Vertical Wall

Scale:-1:75

Half Top Plan

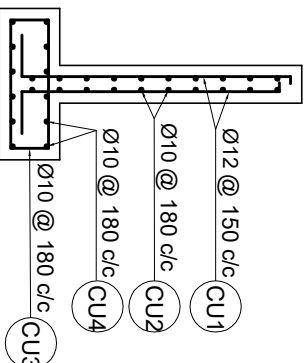


Half Bottom Plan



Downstream

Scale:-1:50



Upstream

Scale:-1:50

CURTAIN WALLS

Scale:-1:50

Half Bottom Plan

Bottom Sectional Plan

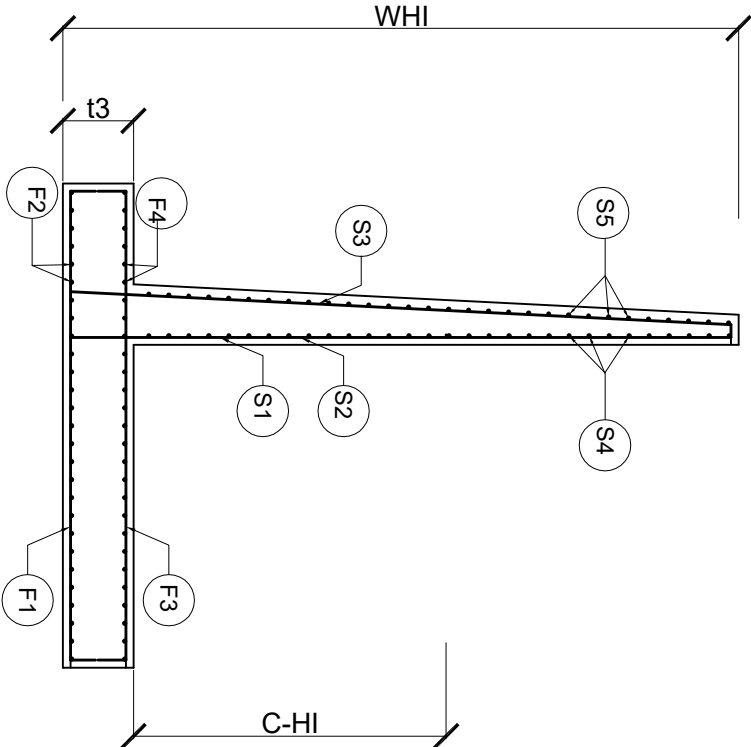
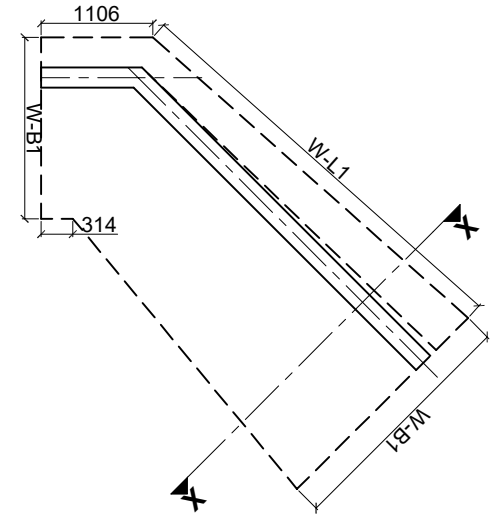
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Half Bottom Plan

Top Sectional Plan

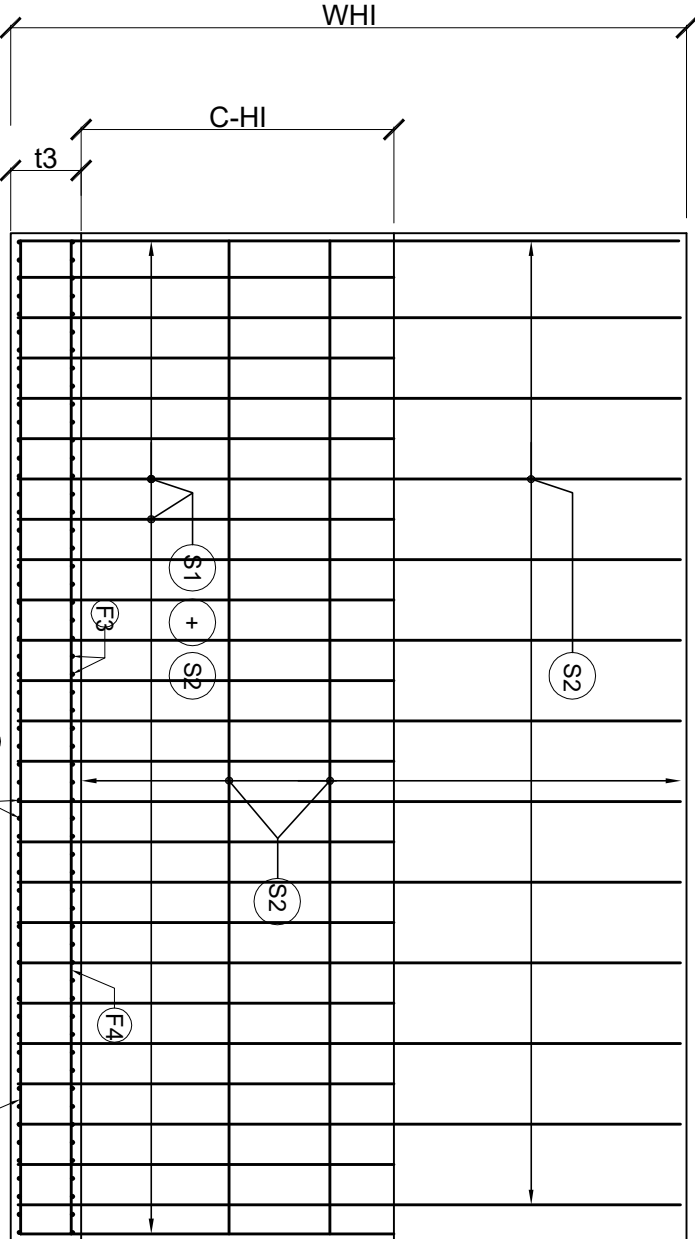
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Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NFP			CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with ERM/C P (Ltd) and  JYK - Tech Studio of Engineering Nepal			IMPLEMENTING AGENCY:			SHEET TITLE:			SCALE:			NAME			SIGNATURE			REV NO.			DESCRIPTION			DATE: Nov, 2022		
						DOR, DCID			Reinforcement Details of Gageda Box Bridge - (6x3.3) (47/H001/308_A,B) CH-620+006			As Shown			Designed by: P. Shrestha												DWG.NO.: 308_Gageda		
						ROAD NAME: East West Highway (H01)									Checked by: P. Upadhyaya														
						Butwal - Gorusinghe Section									Approved by: Dr. T.H. Choi												SHEET NO.: 		



Wing Wall Plan
Scale:-1:75

Section at X -X
Scale:-1:75



Typical Wing Wall
Scale:-1:75

S.No.	W-H1(m)	W-L1 Length	W-B1	W-B2	t1	t2	t3	x	y
1.	2.00	4300	1800	1800	200	200	200	300	1300
2.	2.50	4300	2200	1800	200	240	200	300	1660
3.	3.00	4300	2400	1800	200	280	250	450	1670
4.	3.50	500	2800	1800	200	300	250	450	2050
5.	4.00	5700	3200	1800	250	350	300	500	2350
6.	4.50	6000	3500	1800	250	400	350	500	2600
7.	5.00	6500	4000	1800	300	500	500	800	2700
8.	6.00	7000	4800	1800	300	600	700	1000	3200

REINFORCEMENT DETAIL OF WING WALL

HEIGHT W-H1	Curtailment Height C-H1	F1		F2		F3		F4		S1		S2		S3		S4		S5		Remarks
		Diameter	Spacing	Diameter	Spacing	Diameter	Spacing	Diameter	Spacing	Diameter	Spacing	Diameter	Spacing	Diameter	Spacing	Diameter	Spacing	Diameter	Spacing	
m	m	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
2.0		8	230	8	230	12	200	8	230	12	100			10	200	8	230	8	230	
2.5		8	230	8	230	12	160	8	230	16	160			10	160	8	230	8	230	
3.0	1.60	10	230	8	230	12	140	8	230	12	180	12	180	10	180	8	230	8	230	
3.5	1.55	10	230	8	230	16	160	10	230	16	200	16	200	12	200	8	230	8	230	
4.0	1.65	10	230	10	300	16	150	10	230	16	200	16	200	12	200	10	230	10	230	
4.5	2.10	10	230	10	300	16	140	10	230	16	200	16	200	12	150	10	230	10	230	
5.0	2.45	12	220	10	250	12	150	10	250	16	180	16	180	12	160	10	230	10	230	
6.0	3.10	12	180	10	180	12	150	10	180	20	200	20	200	12	120	10	160	10	160	

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,

Korea

in association with

ERM C P (Ltd)

and

JYK - Tech Studio of Engineering

Nepal

CONSULTANT:

IMPLEMENTING AGENCY:

SHEET TITLE:

SCALE:

NAME

SIGNATURE

REV NO.

DESCRIPTION

DATE:

DOR, DCID

ROAD NAME:

East West Highway (H01)

Butwal - Gorusinghe Section

Typical Drawing of Wing Wall of

Gageda Box Bridge - (6x3.3)

(47/H001/308_A,B)

CH-620+006

As Shown

Designed by:

Checked by:

Approved by:

P. Shrestha

P. Upadhyaya

Dr. T.H.Choi



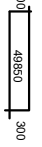
DWG.NO.:

308_Gageda

SHEET NO.:

07/10

Bar Bending Schedule of Top Slab										
Sketch	Spacing (mm)	Bar Mark	Ø, mm	No	Lot	Length, m	Total Length, m	Weight Kg/m	Total wt. Kg	
Top Slab										
	200	160	TS1	16	296	1	13.52	4001.92	1.58	6324.02
	200	200	TS2	12	134	1	23.82	3191.88	0.89	2837.23
	200	160	TS3	12	296	1	13.52	4001.92	0.89	3557.26
	200	200	TS4	12	134	1	23.82	3191.88	0.89	2837.23
	200	160	TS5	12	296	1	4.40	1302.40	0.89	1157.69
Sub-Total (Top Slab) =								16713.4		
Base Slab										
	200	160	BS1	16	313	1	13.45	4209.85	1.58	6652.60
	200	200	BS2	12	67	1	50.25	3366.75	0.89	2992.67
	200	160	BS3	12	313	1	13.45	4209.85	0.89	3742.09
	200	200	BS4	12	67	1	50.25	3366.75	0.89	2992.67
	200	160	BS5	12	626	1	4.40	2754.40	0.89	2448.36
Sub-Total (Base Slab) =								18828.4		

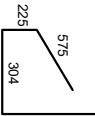
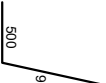
Bar Bending Schedule of Side Walls									
Sketch	spacing (mm)	Bar Mark	Ø, mm	No	Lot	Length, m	Total Length, m	Weight Kg/m	Total wlt Kg
	160	SW1	20	626	1	8.54	5342.91	2.47	13192.37
	160	SW2	12	626	1	4.49	2807.61	0.89	2495.65
	180	SW3	12	38	1	100.30	3811.40	0.89	3387.91
	160	SW4	16	626	1	8.54	5342.91	1.58	8443.12
	180	SW5	12	19	1	100.30	1905.70	0.89	1693.96
	200	SW6	16	502	1	1.83	917.66	1.58	1450.12
	200	CB 1	12	1004	1	1.54	1541.14	0.89	1369.90
	200	CB 2	12	88	1	3.07	270.16	0.89	240.14
Sub-Total (Side Walls) =							32273.2		

Bar Bending Schedule of Curtain Walls								
Sketch	Spacing (mm)	Bar Mark	Ø, mm	Lot	Length, m	Total Length, m	Weight Kg/m	Total wt. Kg
Downstream								
	150	CD1	12	294	1	2.65	779.10	0.89
	180	CD2	10	15	1	43.90	658.50	0.62
	180	CD3	10	123	1	2.20	270.60	0.62
	180	CD4	10	12	1	21.85	262.20	0.62
Sub-Total (Downstream) =								1427.9
Upstream								
	150	CU1	12	294	1	2.15	632.10	0.89
	180	CU2	10	12	1	43.90	526.80	0.62
	180	CU3	10	123	1	2.20	270.60	0.62
	180	CU4	10	12	1	21.85	262.20	0.62
Sub-Total (Upstream) =								1215.9

Bar Bending Schedule of Wing Wall

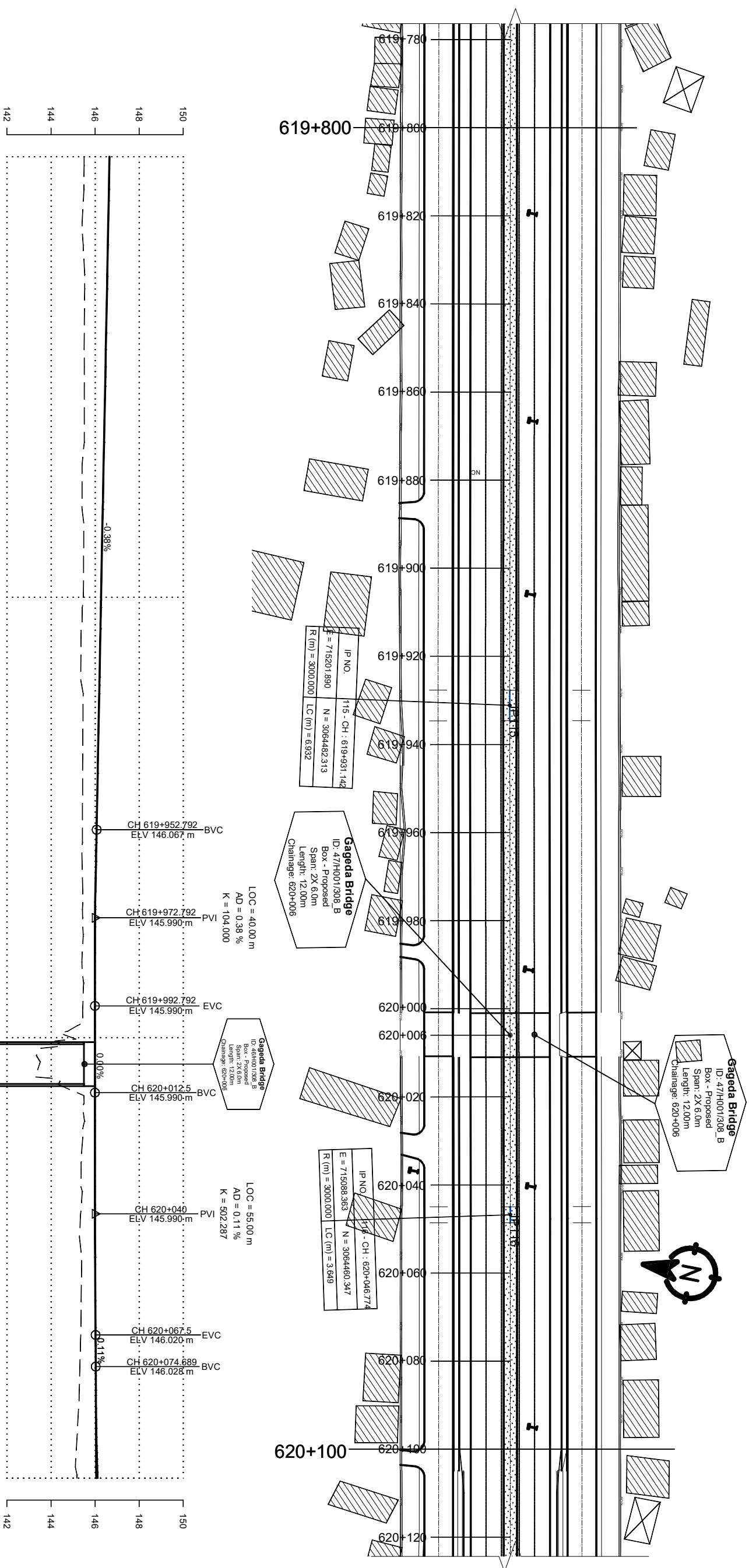
Sketch	Spacing (mm)	Bar Mark	Ø, mm	No	Lot	Length, m	Total Length, m	Weight Kg/m	Total wt. Kg
	180	S1	16	38	4	2.44	92.18	1.58	145.66
	180	S2	16	38	4	4.04	152.62	1.58	241.18
	160	S3	12	42	4	4.04	171.20	0.89	152.17
	230	S4	10	15	4	6.62	99.30	0.62	61.30
	230	S5	10	15	4	6.62	99.30	0.62	61.30
	220	F1	12	31	4	2.94	91.41	0.89	81.25
	250	F2	10	11	4	6.62	72.82	0.62	44.95
	150	F3	12	45	4	2.94	132.69	0.89	117.95
	250	F4	10	11	4	6.62	72.82	0.62	44.95
Sub-Total (Base Slab) =								950.7	

Bar Bending Schedule of Approach Slab									
Sketch	Spacing (mm)	Bar Mark	Ø	No	Lot	Length, m	Total Length, m	Weight Kg/m	Total wt. Kg
	150	AS1	12	334	2	3.80	2538.40	0.89	2256.36
	150	AS2	12	24	2	50.30	2414.40	0.89	2146.13
	150	AS3	12	334	2	3.80	2538.40	0.89	2256.36
	150	AS4	12	24	2	50.30	2447.93	0.89	2175.94
Sub-Total (Approach Slab) =								8834.8	

Bar Bending Schedule of Safety Barrier Type - 1									
Sketch	Spacing (mm)	Bar Mark	Ø, mm	No	Lot	Length, m	Total Length, m	Weight Kg/m	Total wt. Kg
	125	C1	16	81	1	2.03	164.59	1.58	260.10
	125	C2	16	81	1	1.42	114.62	1.58	181.12
		C3	16	11	1	9.96	109.56	1.58	173.13

Bar Bending Schedule of Safety Barrier Type - 2									
Sketch	Spacing (mm)	Bar Mark	Ø, mm	No	Lot	Length, m	Total Length, m	Weight Kg/m	Total wt. Kg
	150	C1	16	8	1	2.21	17.64	1.58	27.88
	150	C2	16	16	1	1.65	26.32	1.58	41.59
		C3	16	12	1	0.96	11.52	1.58	18.20
Sub-Total (Safety Barrier Type - 2) =									
									87.7

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Designed by: P. Shrestha		SIGNATURE		REV NO.		DESCRIPTION		DWG.NO.: 308_Gageda		SHEET NO.: 08/10	
Checked by: P. Upadhyaya		SIGNATURE		REV NO.		DESCRIPTION					
Approved by: Dr. T.H.Choi		SIGNATURE		REV NO.		DESCRIPTION					



CHAINAGE(Km)	SUPER ELEVATION	HORIZONTAL ALIGNMENT		EXISTING LEVEL(m)	DESIGN LEVEL(m)
		LEFT	RIGHT		
619+800	619+800			145.498	146.655
619+810				145.465	146.616
619+820				145.455	146.578
619+830				145.523	146.539
619+840				145.508	146.501
619+850				145.512	146.462
619+860				145.510	146.424
619+870				145.410	146.385
619+880				145.412	146.347
619+890				145.480	146.308
619+900				145.468	146.270
619+910				145.362	146.232
619+920				145.388	146.193
619+930			P-115 R=3000.00	145.446	146.155
619+940				145.434	146.116
619+950		NC		145.427	146.078
619+960				145.406	146.042
619+970				145.435	146.015
619+980				145.426	145.998
619+990				145.459	145.990
620+000			144.953	145.990	
620+010			144.405	145.990	
620+020			145.471	145.991	
620+030			145.366	145.993	
620+040		P-116 R=5000.00	145.344	145.998	
620+050			145.391	146.004	
620+060			145.368	146.012	
620+070			145.334	146.023	
620+080			145.285	146.037	
620+090			145.185	146.070	
620+100	620+100		145.175	146.124	

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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

Banganga Bridge(47-H001-309_A)

St. Ch : 621+863.91 ~ End Ch : 622+176.09

Detailed Drawing

Butwal - Gorusinghe Sector

November,2022

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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: 75mm

All components of abutment, pier, pile caps and piles

(except stoppers and bearing pedestals):

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 operation 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 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 ERMC P (Ltd), Nepal and  309e-Tech Studio of Engineering		DOR, DCID	General Notes of Banganga Bridge(Left Side) (46/H001/309_A)	As Shown	DESIGNED BY:	Saroj Bhattacharai				November, 2022	
						ROAD NAME:	East West Highway (H01)	CHECKED BY:	P. Upadhyaya			
						Butwal - Gorusinghe Section	APPROVED BY:	Dr. T.H. Choi				
											DWG. NO.: 309_Banganga SHEET NO.: (01/61)	

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:71-2018, 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.

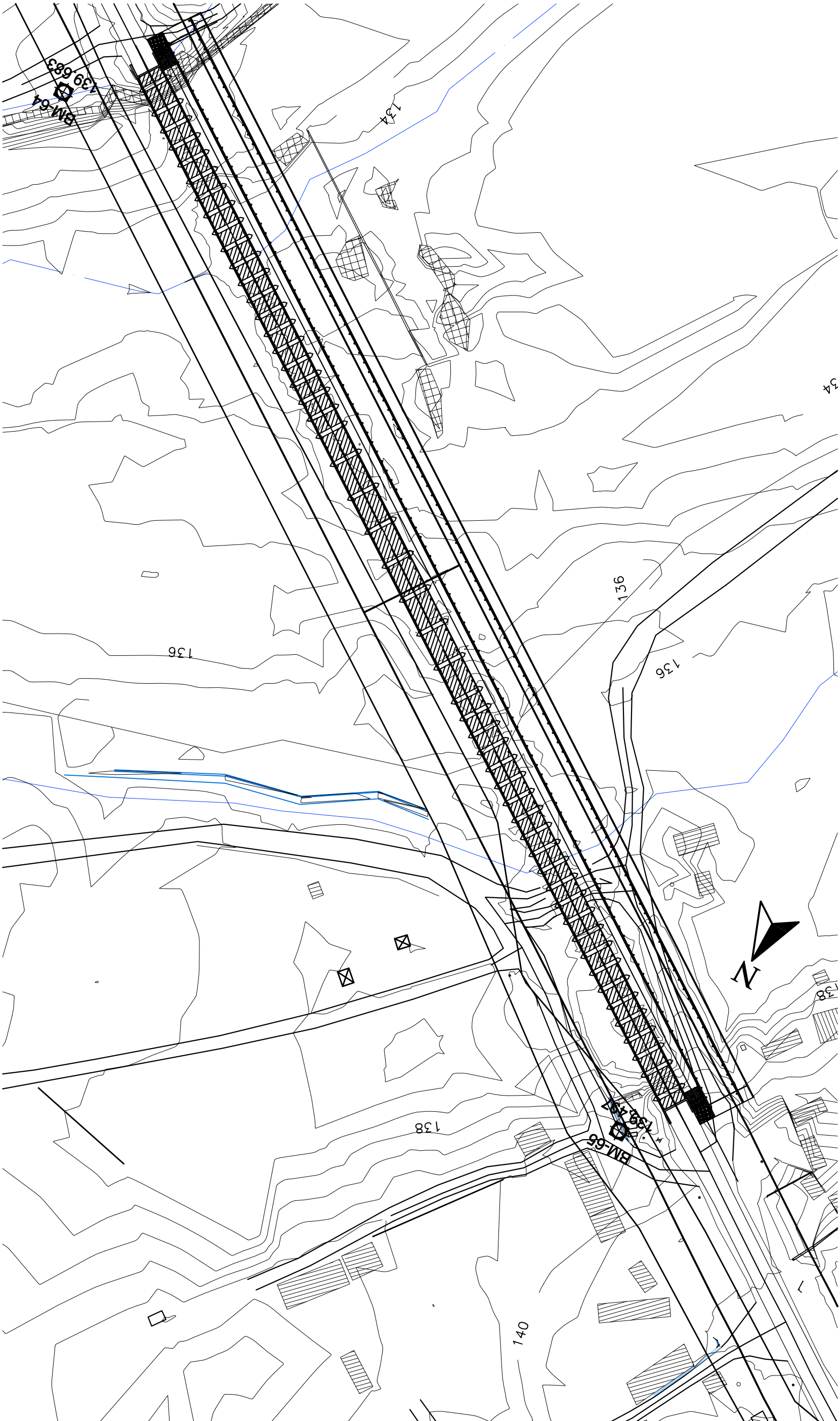
Notes on Foundation and Substructure

- 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.

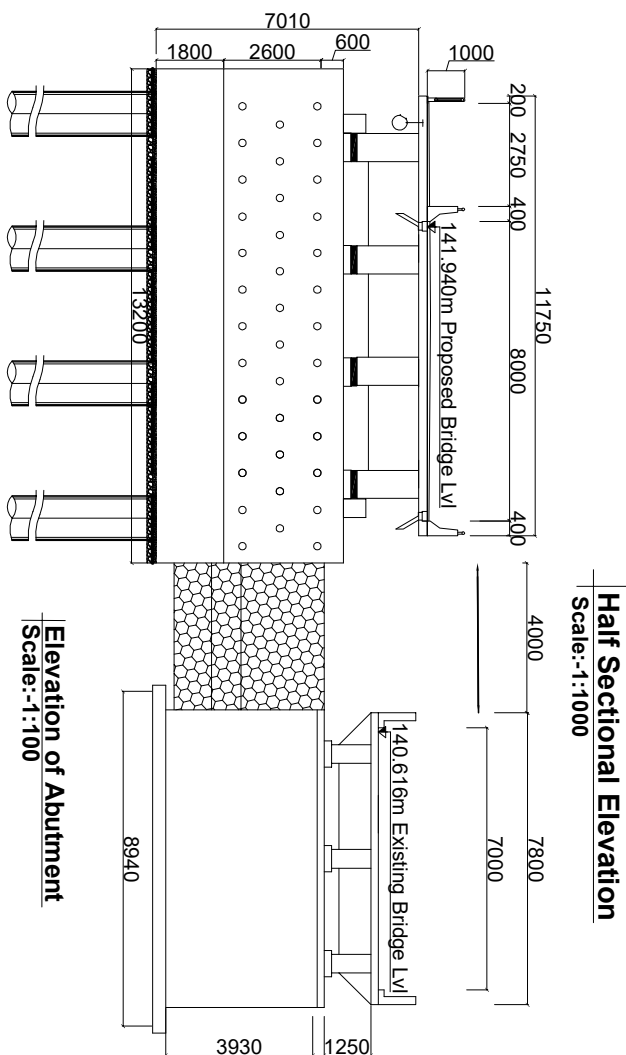
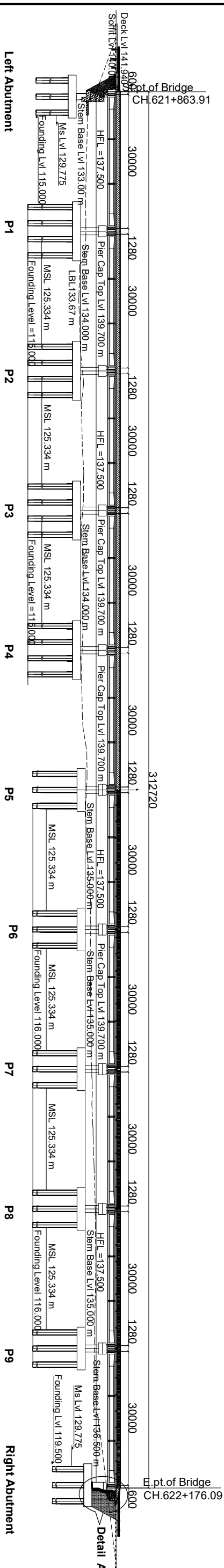
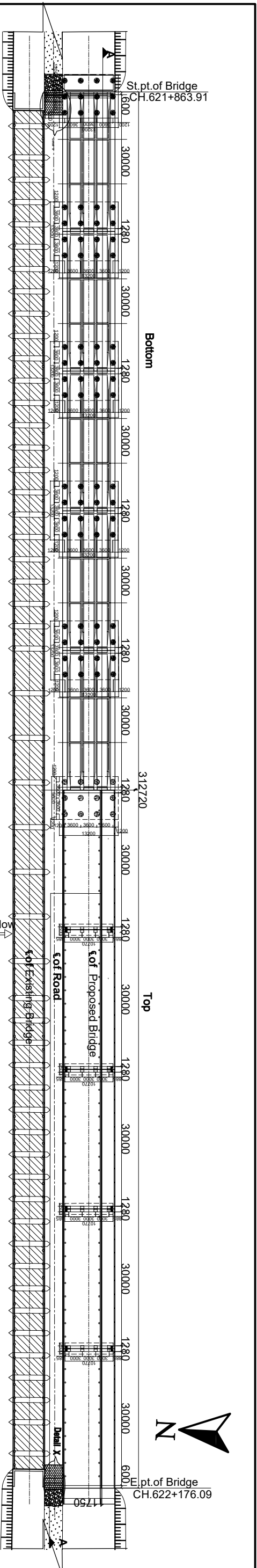
General Note: (For all Pile Foundation)

- 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.

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		DOR, DCID		General Notes of Banganga Bridge(Left Side) (46/H001/309_A)		As Shown		DESIGNED BY: Saroj Bhattarai						November,2022						
																ROAD NAME:				
																East West Highway (H01)				
		Butwal - Gorusinghe Section						CHECKED BY: P. Upadhyaya						DWG.NO.: 309_Banganga						
								APPROVED BY: D. T.H.Choi										SHEET NO.: 02/61		



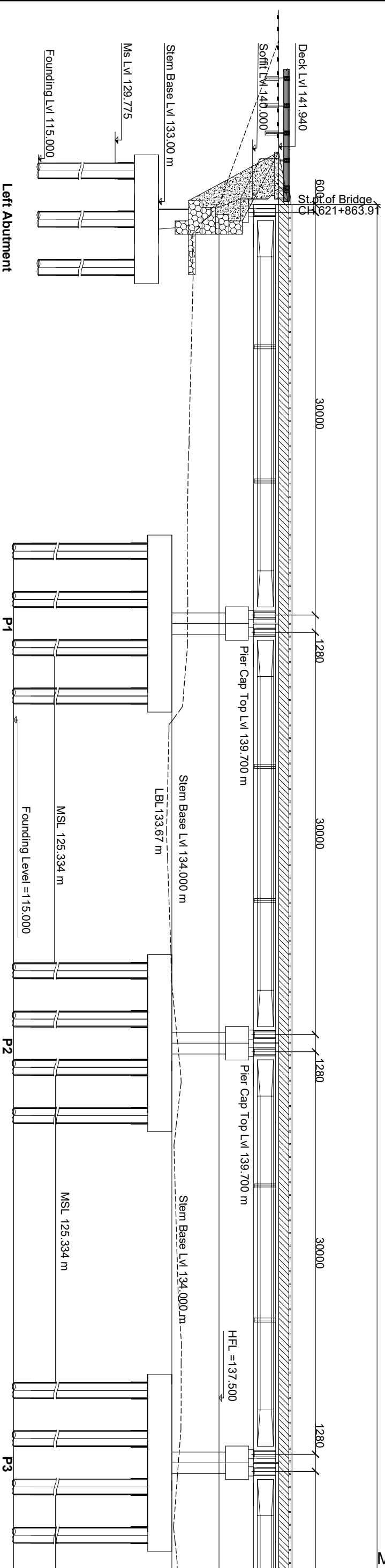
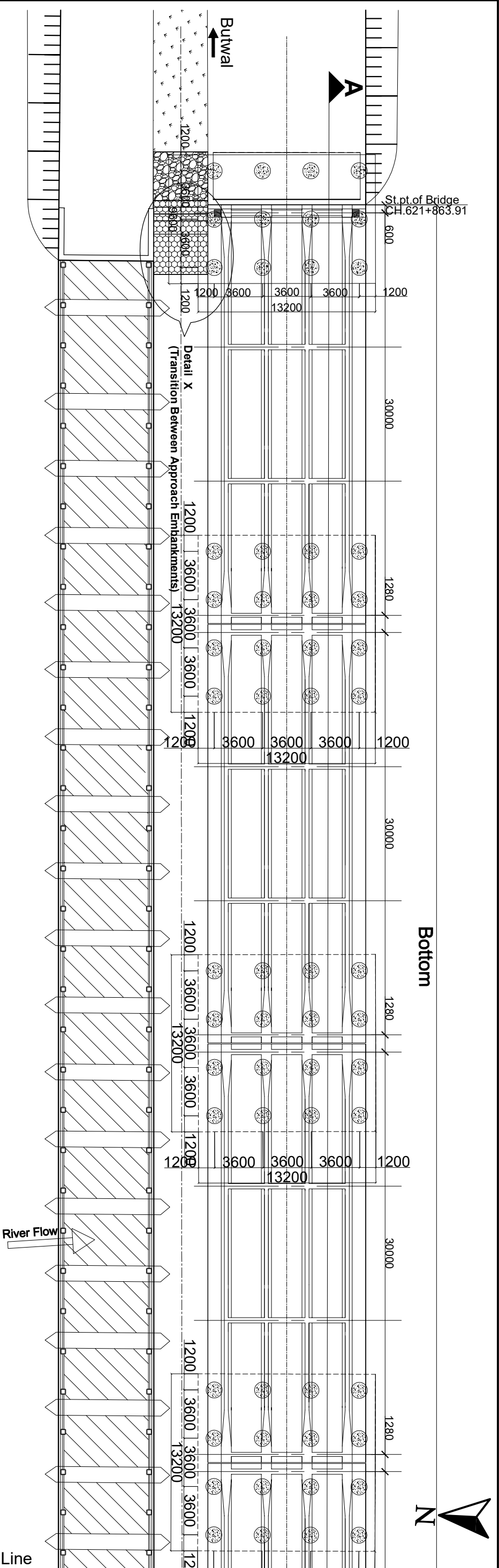
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP		CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with ERM/C P (Ltd) and  Jyoti Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY: <table><tr><td colspan="2">DOR, DCID</td></tr><tr><td colspan="2">ROAD NAME:</td></tr><tr><td colspan="2">East West Highway (H01)</td></tr><tr><td colspan="2">Butwal - Gorusinghe Section</td></tr></table>		DOR, DCID		ROAD NAME:		East West Highway (H01)		Butwal - Gorusinghe Section		SHEET TITLE: <table><tr><td colspan="2">Topo Map of Banganga Bridge (47/H001/309_A)</td></tr></table>		Topo Map of Banganga Bridge (47/H001/309_A)		SCALE: 1:1		NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November,2022	
DOR, DCID																													
ROAD NAME:																													
East West Highway (H01)																													
Butwal - Gorusinghe Section																													
Topo Map of Banganga Bridge (47/H001/309_A)																													
						Designed by:		Saroj Bhattacharai								DWG.NO.: 309_Banganga													
						Checked by:		P. Upadhyaya								SHEET NO.: (03/61)													
						Approved by:		Dr. T.H. Choi																					



	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.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	 

Note :-
MSL :- Maximum Scour Level
HFL :- High Flood Level
LBL :- Lowest Bed Level
RL :- Reduced Level

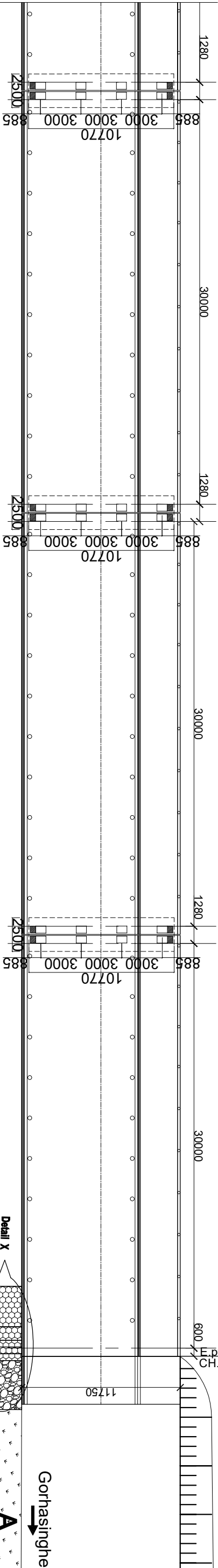
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with ERM/C P (Ltd) and  Jyoti-Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorusingha Section	SHEET TITLE: General Arrangement of Banganga Bridge (46/H001/309_A)	SCALE: 1:900	Designed by: Checked by: Approved by:	NAME SIGNATURE REV NO. DESCRIPTION	DATE: November, 2022 DWG.NO.: 309_Banganga SHEET NO.: 04/61
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		DOR, DCID			General Arrangement of Banganga Bridge (46/H001/309_A)		1:300		Designed by:		Saroj Bhattacharai			November 2022	
		ROAD NAME:							Checked by:		P. Upadhyaya			DWG.NO.: 309_Banganga	
		Butwal - Gorusinghe Section							Approved by:		Dr. T.H. Choi			SHEET NO.: (06/61)	



E. pt. of Bridge
CH.622+176.09



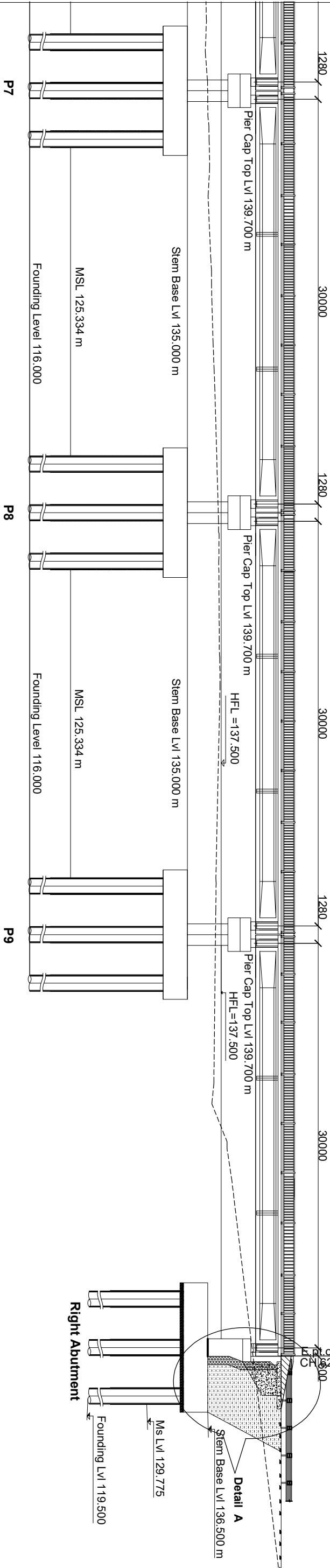
River Flow

Detail X

Gorasinghe

A

E. pt. of Bridge
CH.622+176.09



HFL =137.500

HFL=137.500

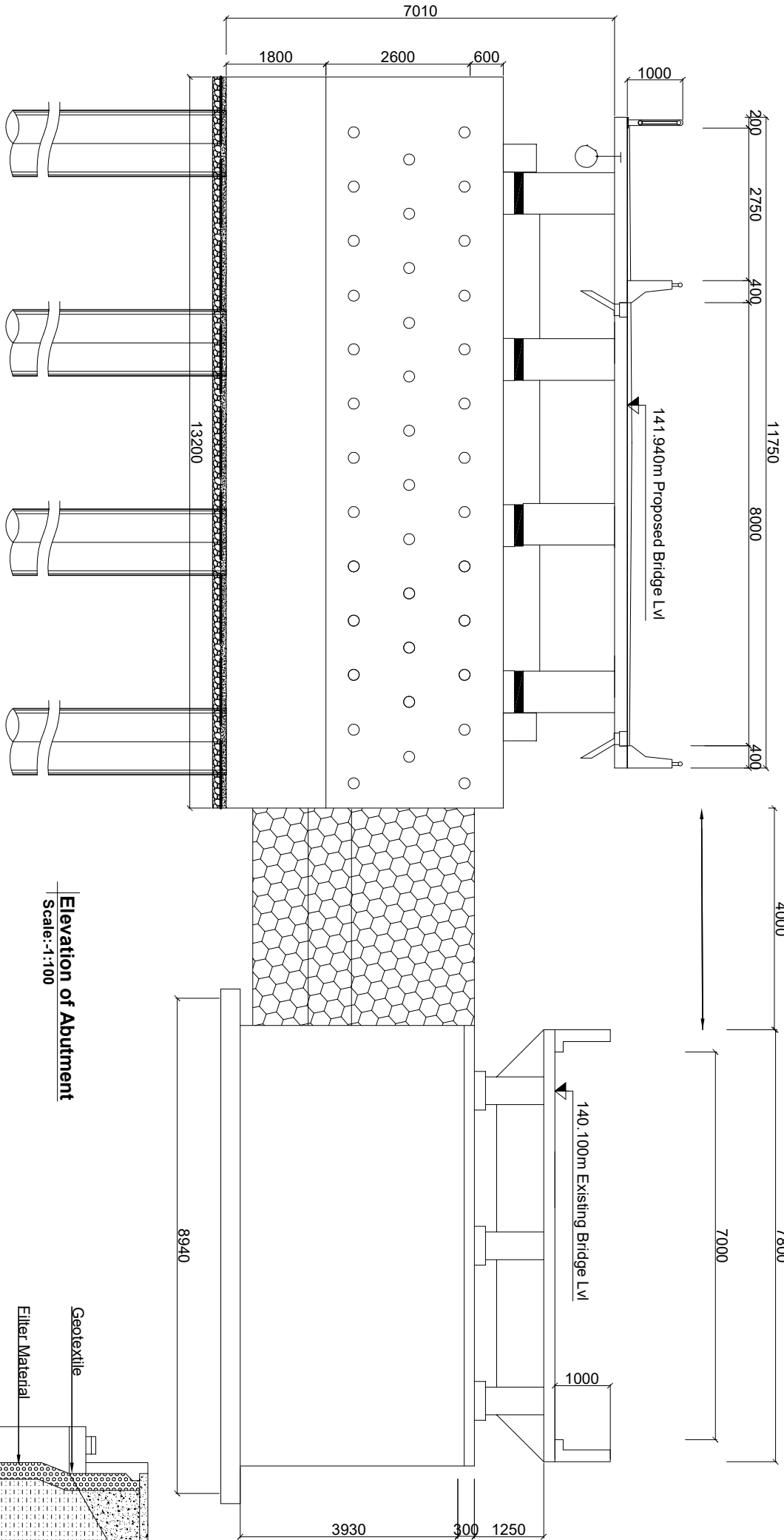
Detail A

Right Abutment

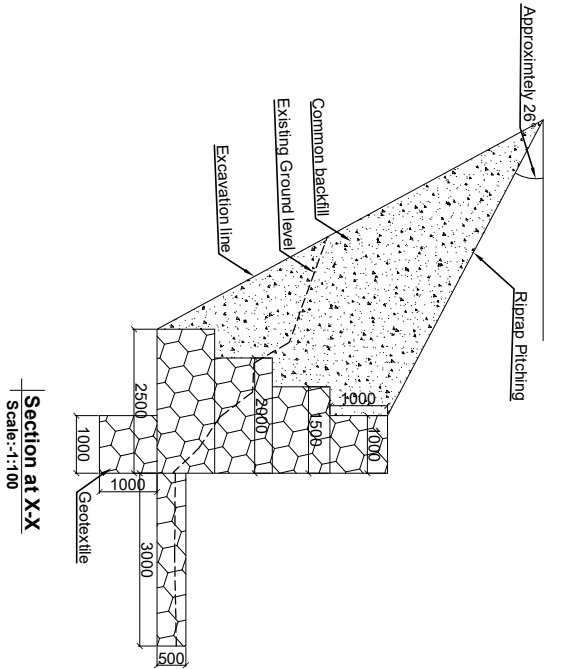
Ms Lvl 129.775

Founding Lvl 119.500

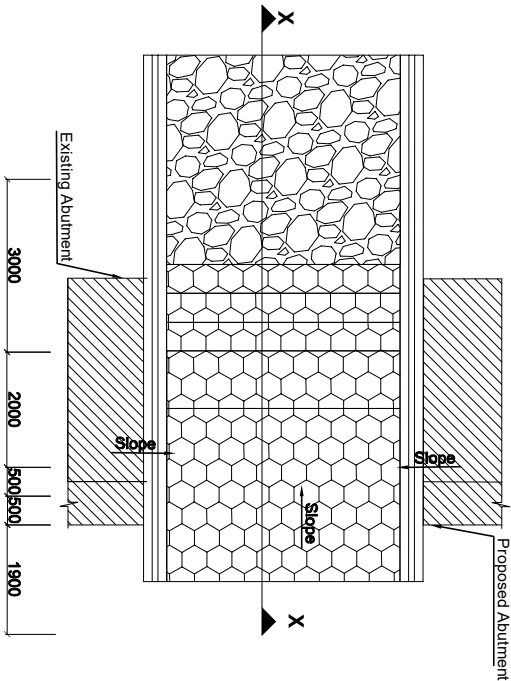
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		East West Highway (H01)			Approved by:						SHEET NO.:
		Butwal - Gorusinghe Section									07/61



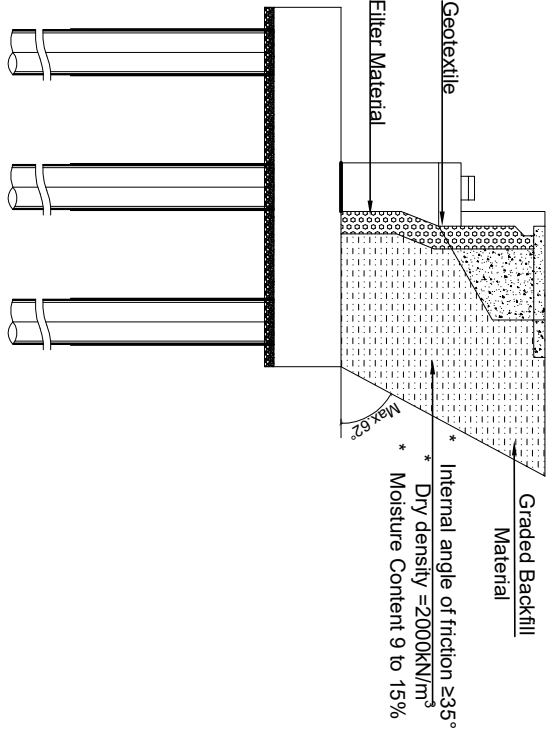
Elevation of Abutment
Scale:-1:100



Section at X-X
Scale:-1:100



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



Detail of A
Scale:-1:200

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. Bhattacharya (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	

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					Checked by:						
					Approved by:						
		Butwal - Gorusinghe Section									SHEET NO.: (08/61)

Borehole No : BAN/LB-1
Easting : 83° 9' 42.33 "
Northing : 27° 41' 35.58"
Elevation, m : 135.151
Borehole No : BAN/LB-2
Easting : 83° 9' 43.73"
Northing : 27° 41' 34.76"
Elevation, m : 133.793
Borehole No : BAN/LB-3
Easting : 83° 9' 44.88"
Northing : 27° 41' 33.95"
Elevation, m : 134.278

Borehole No : BAN/LB-4
Easting : 83° 9' 45.97"
Northing : 27° 41' 33.26"
Elevation, m : 134.705
Borehole No : BAN/LB-5
Easting : 83° 9' 49.19"
Northing : 27° 41' 32.47"
Elevation, m : 135.318
Borehole No : BAN/LB-6
Easting : 83° 9' 48.13"
Northing : 27° 41' 31.9"
Elevation, m : 136.347

Borehole No : BAN/RB-7
Easting : 83° 9' 49.09"
Northing : 27° 41' 31.3"
Elevation, m : 136.257
Borehole No : BAN/RB-8
Easting : 83° 9' 49.96"
Northing : 27° 41' 30.89"
Elevation, m : 136.752
Borehole No : BAN/RB-9
Easting : 83° 9' 50.91"
Northing : 27° 41' 30.2"
Elevation, m : 137.370

Borehole No : BAN/RB-10
Easting : 83° 9' 51.47"
Northing : 27° 41' 29.91"
Elevation, m : 139.261

Note :-
MSL :- Maximum Scour Level
HFL :- High Flood Level
LBL :- Lowest Bed Level
RL :- Reduced Level



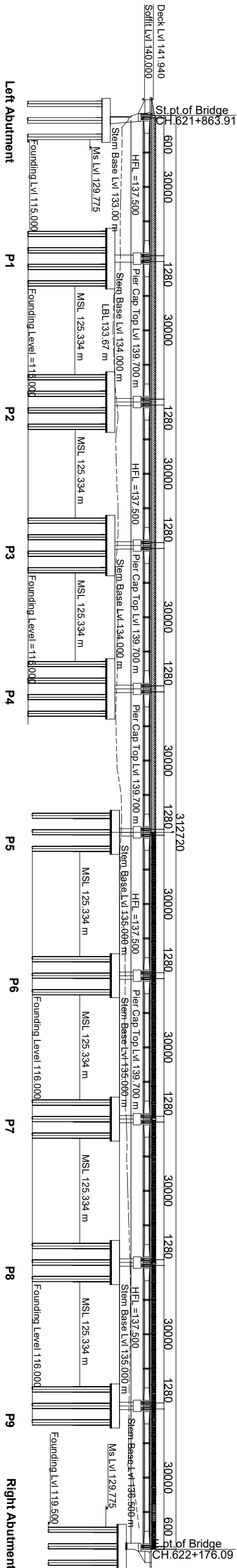
St.pt.of Bridge
CH.621+863.91

312720

E.pt.of Bridge
CH.622+176.09

← Butwal

Gorhasinghe →



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 .

Location	Design Pile Length m	Design Working load on pile (non - seismic case)kn	Allowable Bearing Capacity on pile (Scour case) kn	Allowable Bearing Capacity of the Pile (Non Scour case)kn
Left				
Abutment	16.50	2275		12790
Pier	17.00	988		1843
Right				
Abutment	15.20	1797		2354
Pier	17.00	1220		1811

	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.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. Shani	

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					Designed by:	Saroj Bhattarai				DWG.NO.: 309_Banganga	
					Checked by:	P. Upadhyaya				SHEET NO.:	
					Approved by:	Dr. T.H.Choi				09/61	



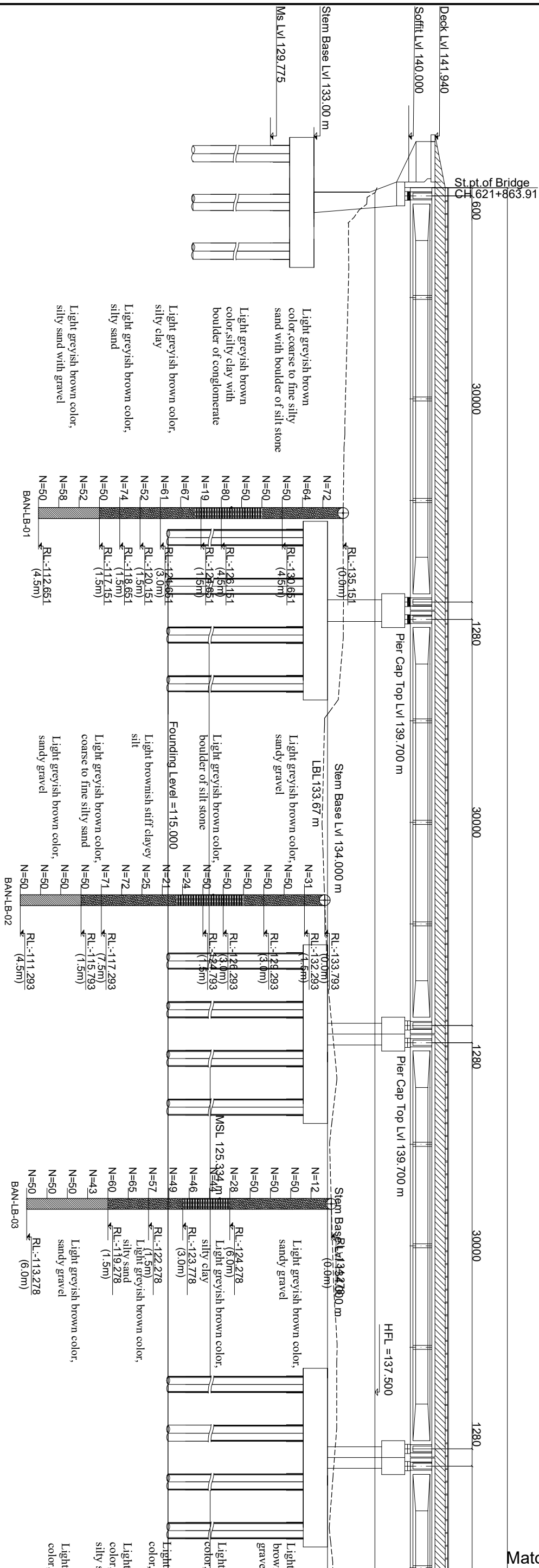
St.pt.of Bridge
CH.621+863.91

Butwal

BAN-LB-01

BAN-LB-02

BAN-LB-03



Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:  Soosung Engineering Co. Ltd, Korea In association with ERMCO P (Ltd) and  Jyoti-Tech Studio of Engineering Nepal	IMPLEMENTING AGENCY:	SHEET TITLE:	SCALE:		NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE:		
		DOR, DCID ROAD NAME: East West Highway (H01) Butwal - Gorurisinghe Section	Bore Log of Banganga Bridge (46/H001/309_A)	1:250	Designed by:						November,2022	
					Checked by:						DWG.NO.:	
					Approved by:							SHEET NO.:



312720

BAN-LB-04

BAN-LB-05

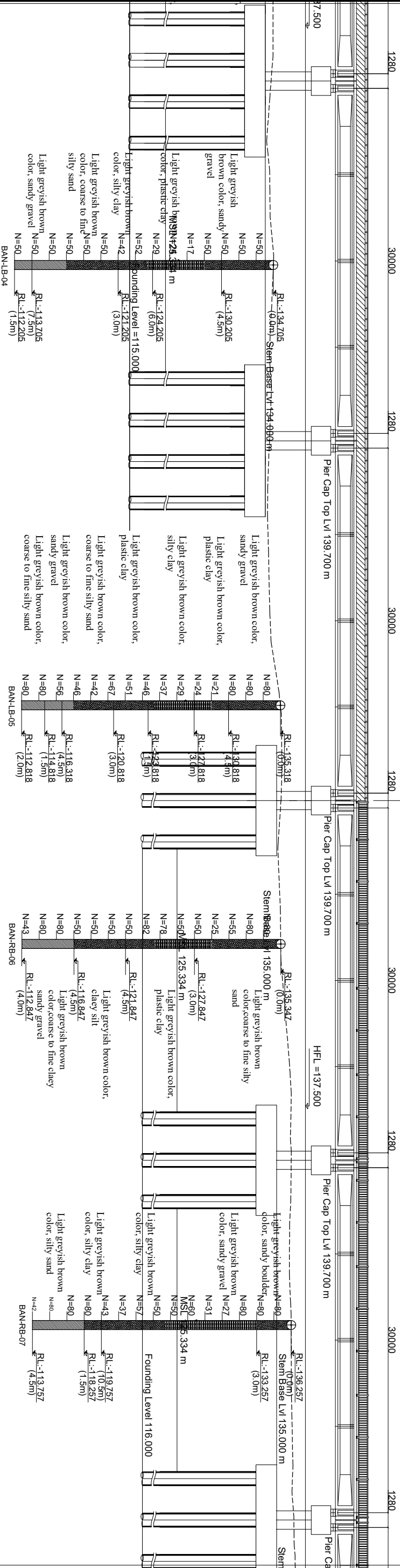
BAN-RB-06

BAN-RB-07

Match Line

312720

Match Line



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/C P (Ltd) and  Jyoti-Tech Studio of Engineering Nepal		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:				NAME		SIGNATURE		REV NO.		DESCRIPTION		DATE: November,2022	
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					ROAD NAME:		Banganga Bridge (46/H001/309_A)				Checked by:										SHEET NO.: (1/61)	
					Butwal - Gorusinghe Section						Approved by:											



E.pt.of Bridge
CH.622+176.09

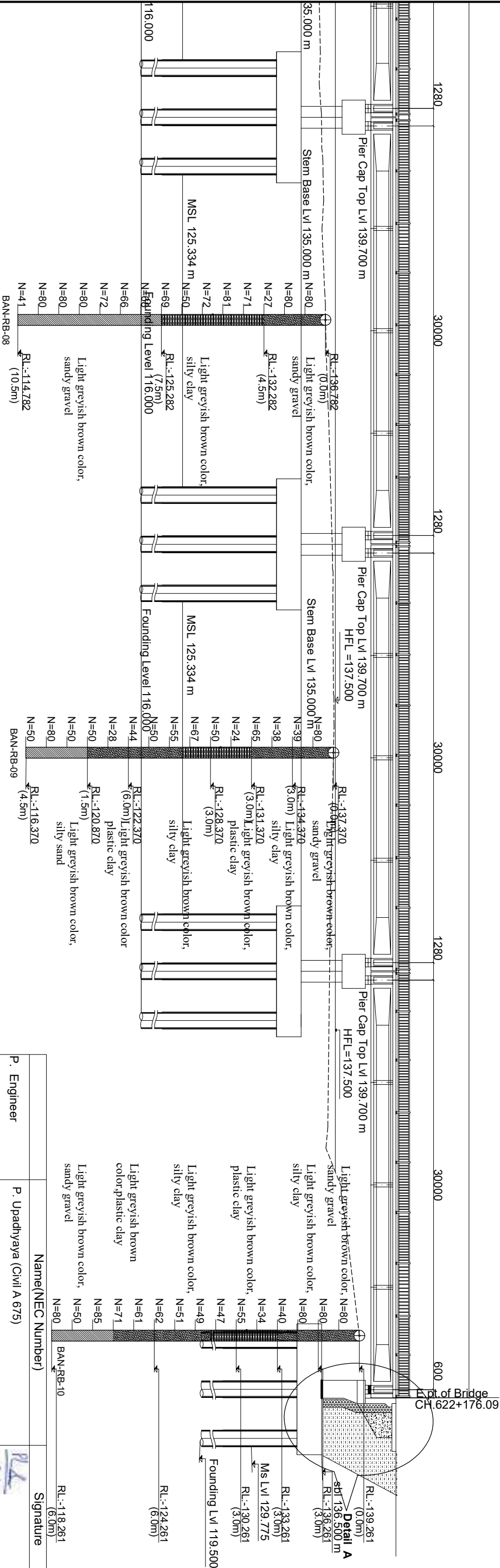
Gorhasinghe →

BAN-RB-08

BAN-RB-09

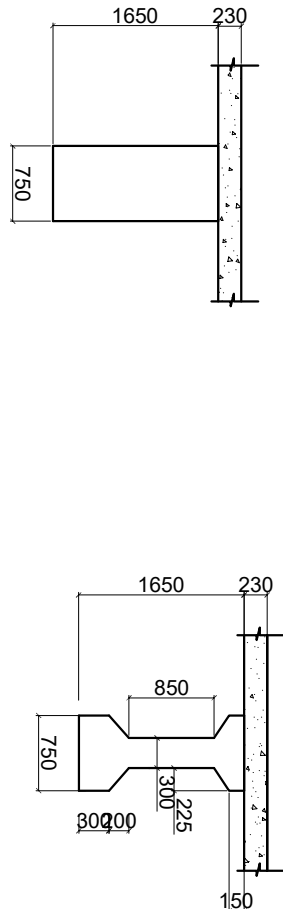
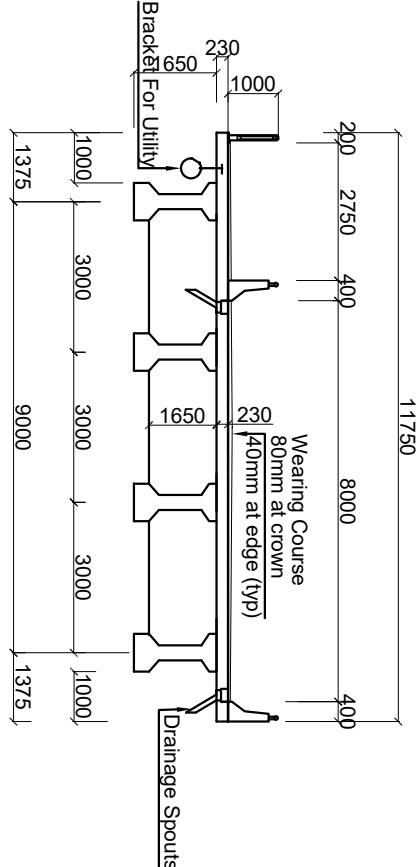
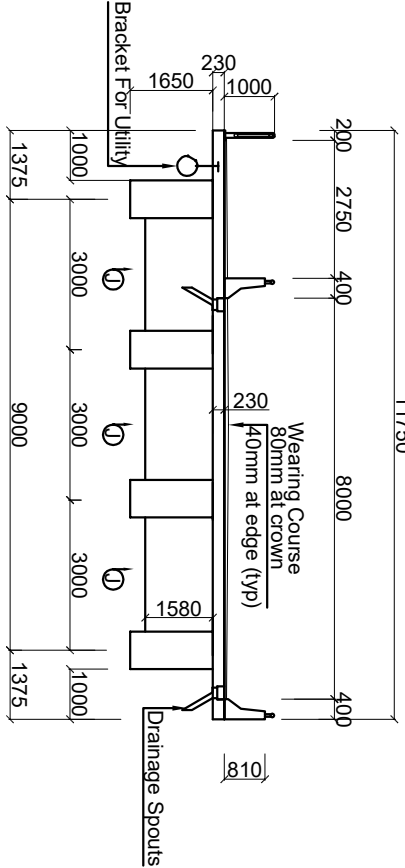
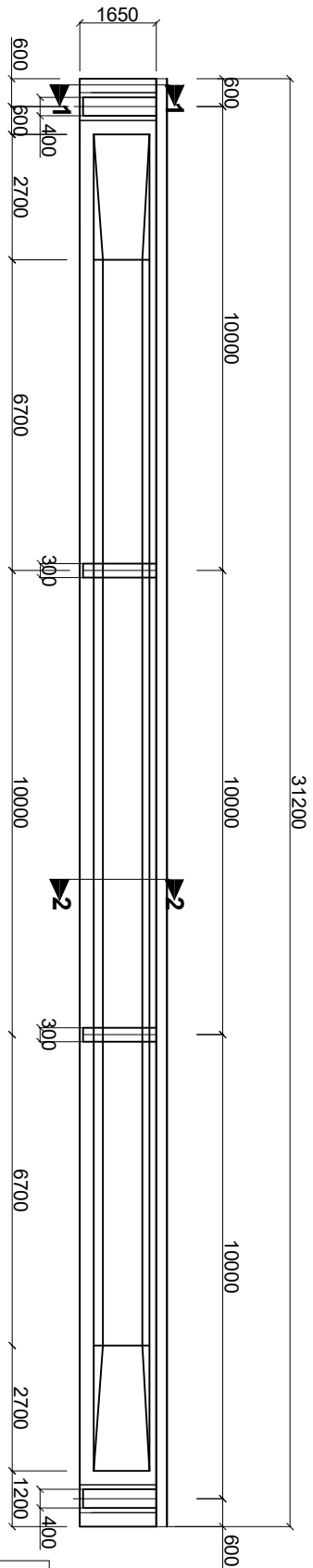
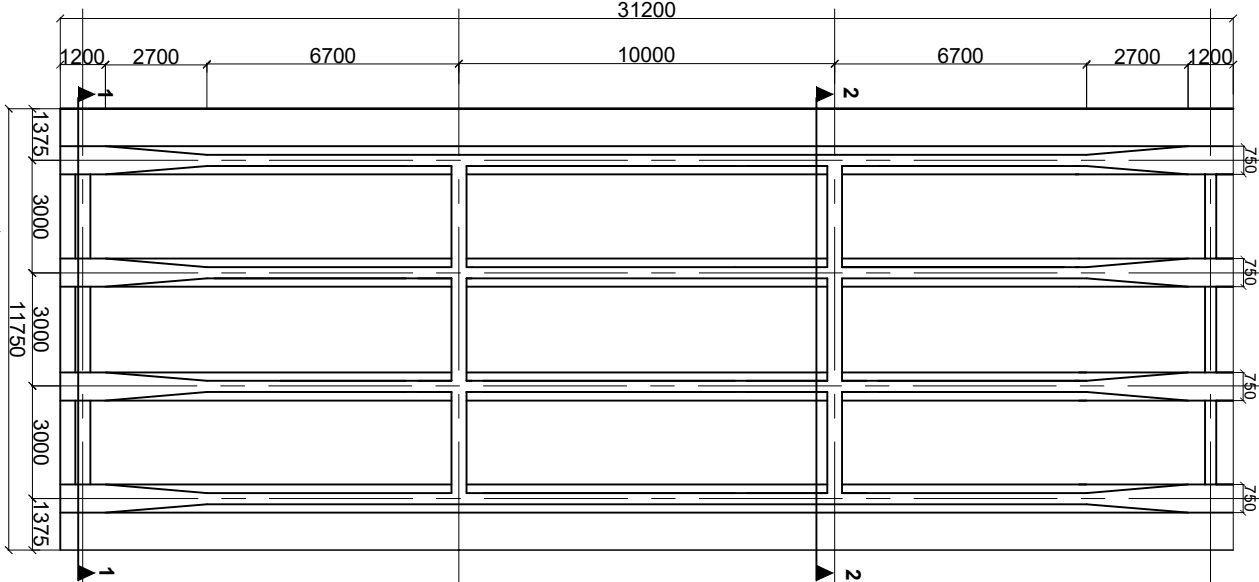
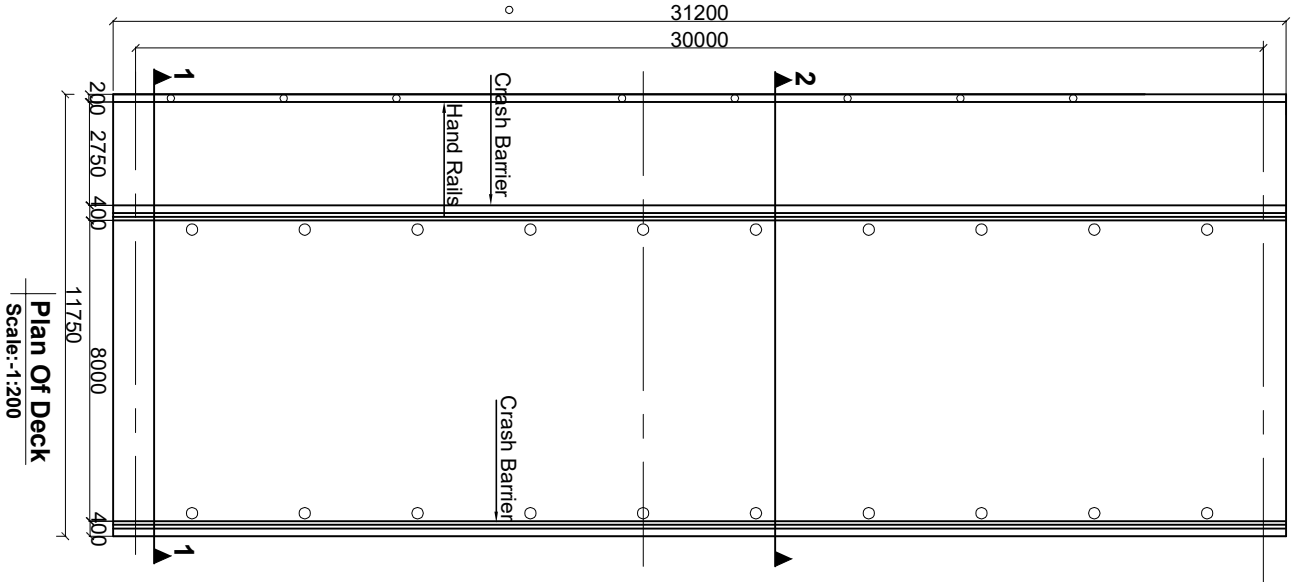
BAN-RB-10

Match Line



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. 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	

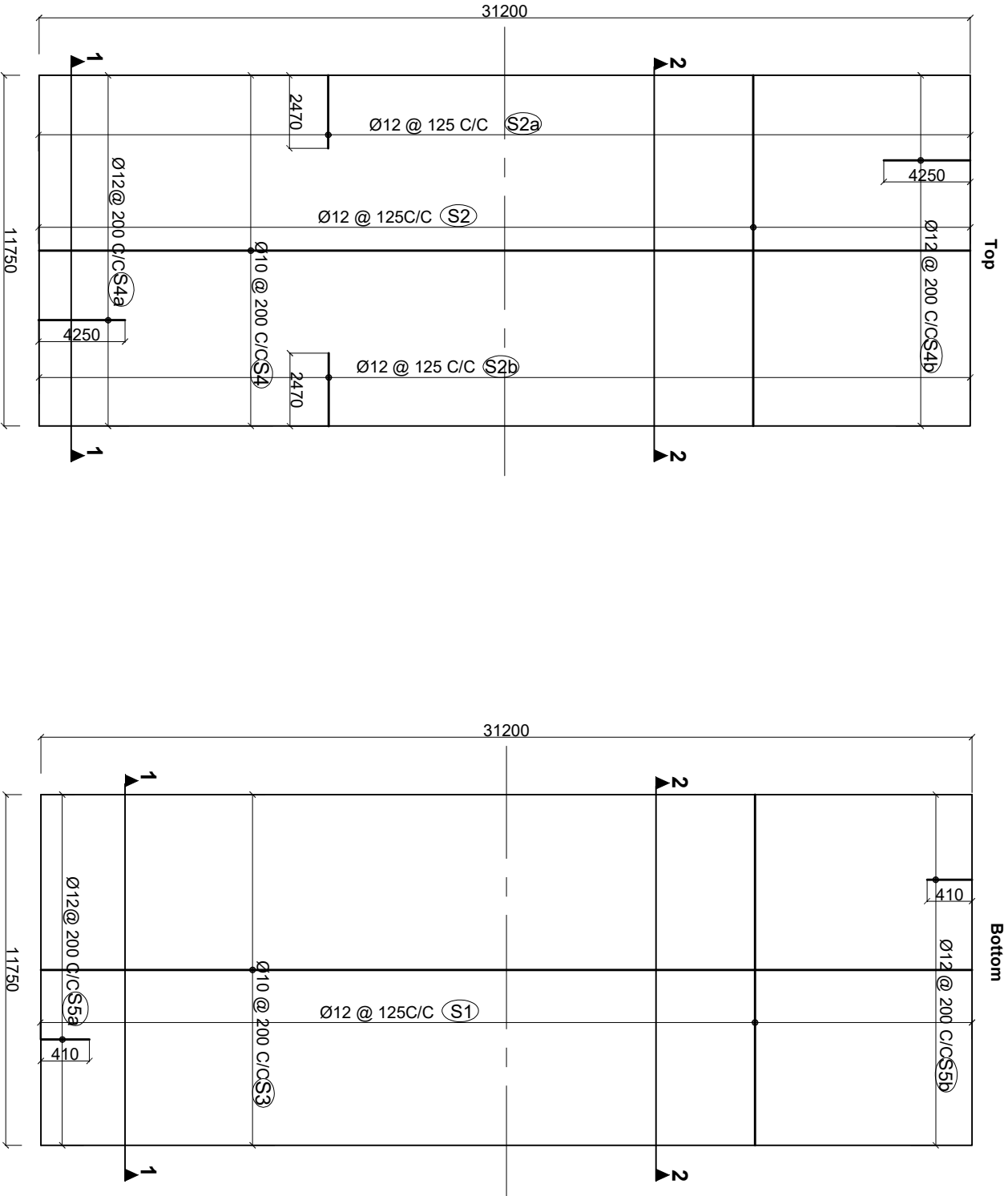
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NFP			CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with ERM C P (Ltd) and  JRC -Tech Studio of Engineering Nepal			IMPLEMENTING AGENCY: DOR, DCID ROAD NAME: East West Highway (H01)			SHEET TITLE: Bore Log of Banganga Bridge (46/H001/309_A)			SCALE: 1:250			Designed by: Checked by: Approved by:			NAME			SIGNATURE			REV NO.			DESCRIPTION			DATE: November,2022			DWG.NO.: 309_Banganga			SHEET NO.: 12/61		
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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.

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

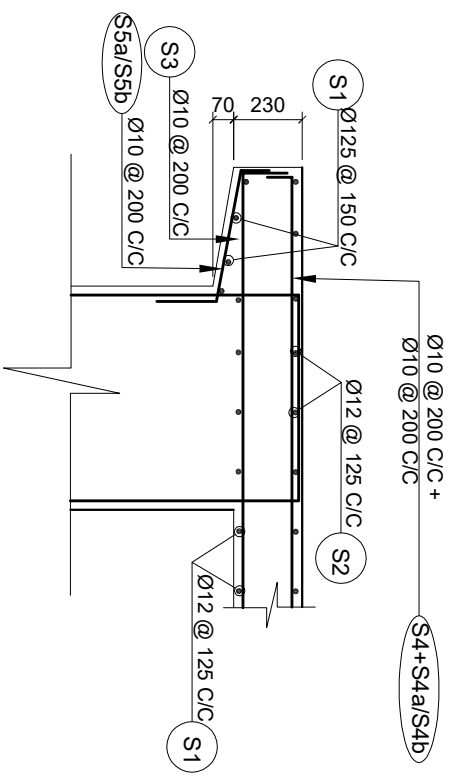
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP			CONSULTANT:  Soosung Engineering Co. Ltd, Korea in association with  ERM P (Ltd), Nepal and  376-Tech Studio of Engineering		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</	
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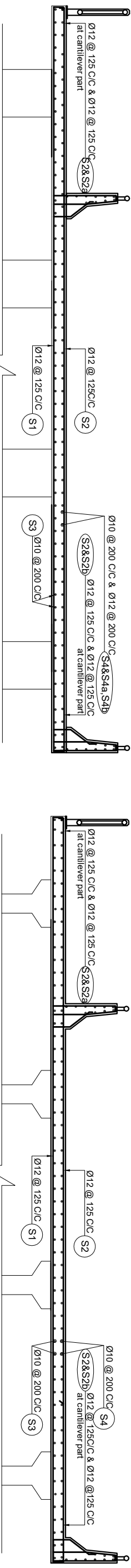
Reinforcement Details Of Deck Slab
Scale:-1:200

Reinforcement Details Of Deck Slab
Scale:-1:200

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.



Reinforcement Details At Deck Extension
Between The Main Girder



Section At 1-1
Scale:-1:50

Section At 2-2
Scale:-1:50

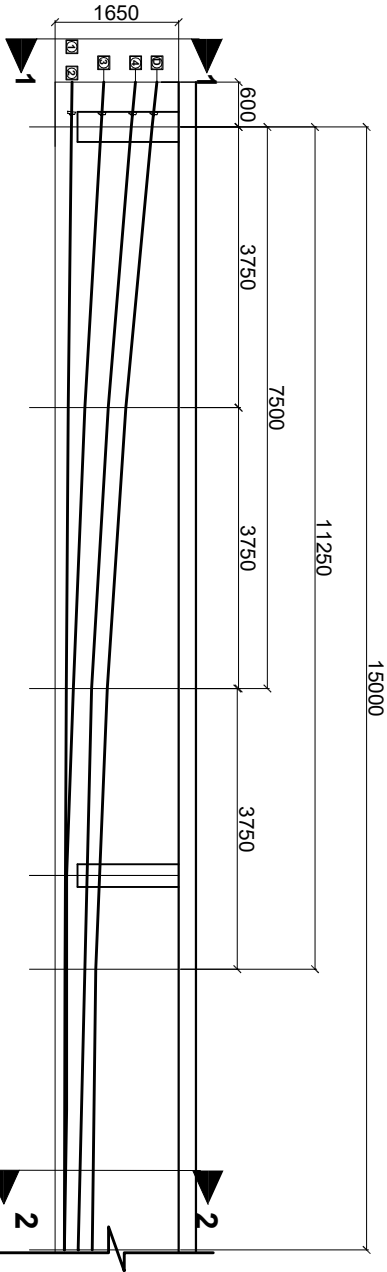
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	 CONSULTANT: Soosung Engineering Co. Ltd, Korea in association with ERMC P (Ltd), Nepal and <i>JYG</i> -Tech Studio of Engineering		IMPLEMENTING AGENCY:	SHEET TITLE:	SCALE:	Reinforcement Details of Slab of Banganga Bridge(Left Side) (46/H001/309_A)	As Shown	DESIGNED BY:	NAME	SIGNATURE	REV NO.	DESCRIPTION	DATE:
								CHECKED BY:	P. Upadhyaya				November, 2022
								APPROVED BY:	Dr. T.H. Choi				
								DWG. NO.:					
								309_Banganga					
SHEET NO.:													
14/6													

Tendon Layout Data

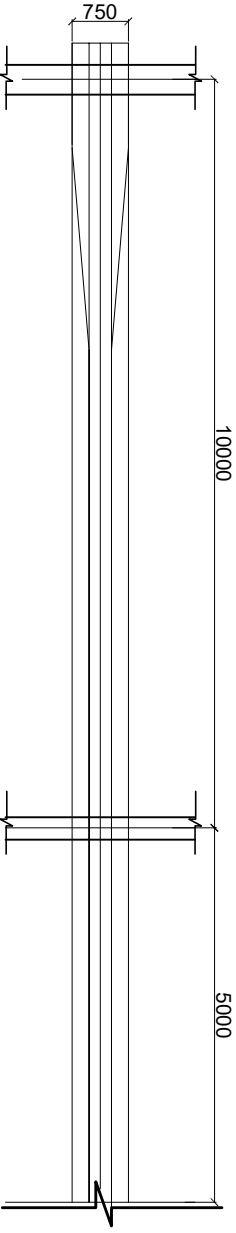
	Anchor face		Bearing centerline		Intermediate sections								Mid span	
	-600	0	3750	7500	11250	15000								
TENDON	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	225	-175	217	-176	177	-180	148	-183	131	-185	125	-185		
2	225	175	217	176	177	180	148	183	131	185	125	185		
3	650	0	610	0	398	0	246	0	155	0	125	0		
4	1075	0	1017	0	708	0	487	0	354	0	310	0		
Dummy	1360	0	1297	0	946	0	696	0	545	0	495	0		

Y = Elevation of the tendon center from the girder soffit

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



Longitudinal Section Of Main Girder
Scale:-1:100



Plan Of Main Girder
Scale:-1:100

Tendon Elongation and Emergence Angles			
TENDON	Total Jacking Force KN	Total Extension of both sides	Emergence angle degree
1	2600	220	0.731
2	2600	220	0.731
3	2600	218	3.848
4	2600	217	5.599
Dummy			6.328

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(M50) 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:14268-2017. Maximum allowed total jacking force 2733KN
- Prestressings operations shall be done in 1 stages as follows:

Stage1

Precast girder only. After 28days of Casting.

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

3	1	2	4	-	-	-	-
---	---	---	---	---	---	---	---

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

Stage2 - Not applicable

After 14 days of Casting of deck slab.

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

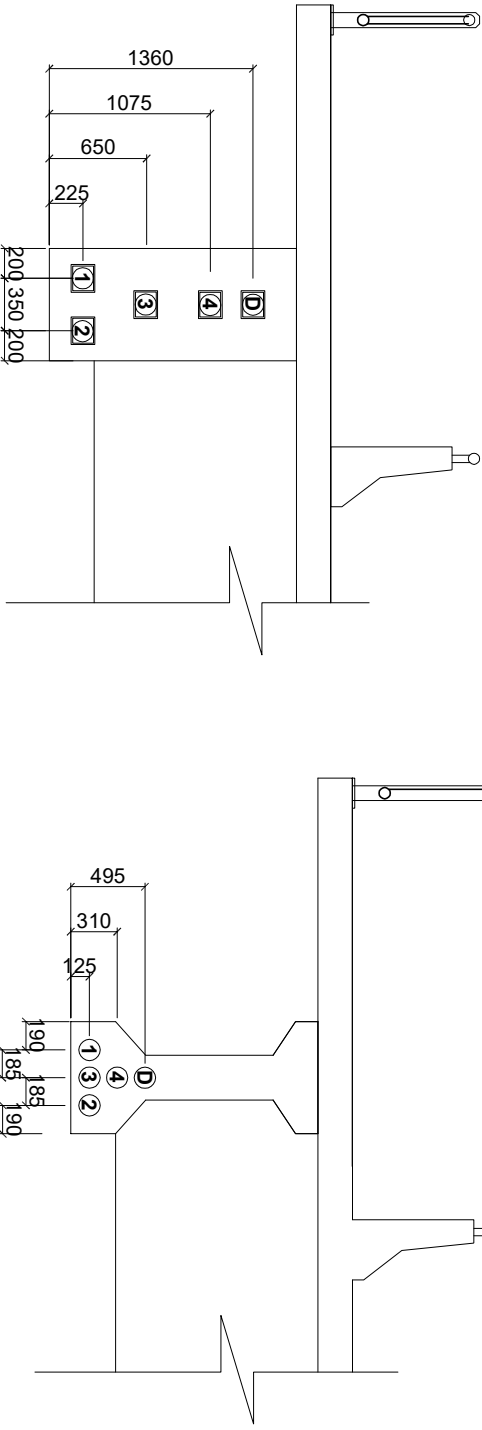
-	-	-	-	-	-	-	-
---	---	---	---	---	---	---	---

Total Jacking Force to each tendon in stage 2= 0000KN

- Casting of footpath, crash barriers and wearing course will done only after second stage prestressing. Not applicable
- Jacking of tendons shall be done from both ends. All the prestress losses(instant 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 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 1.95x10⁵ Mpa. The manufacturers specification shallbe followed if provided.
- The tendon ducts shall be properly secured to the rebars to maintain the profile throughout concreting process.
- The specified profile and alignments 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 engineers instruction.

NOTES ON DUMMY CABLE

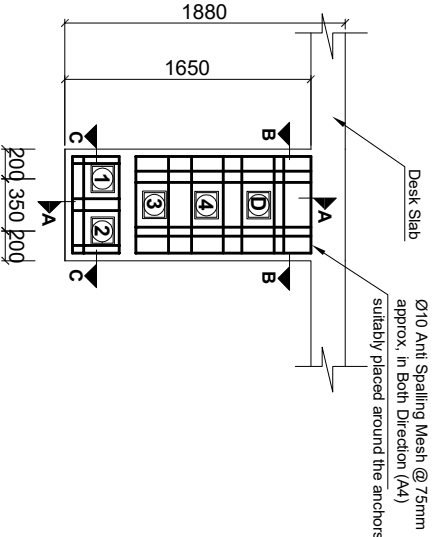
The cable marked "D" is for future tensioning or in case of emergency or excessive prestress loss. No tendon shall be provided during construction but the sheathing, anchorage block, brusing reinforcement similar to the other tendons shall be properly installed. The duct shall be left hollow ensuring 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



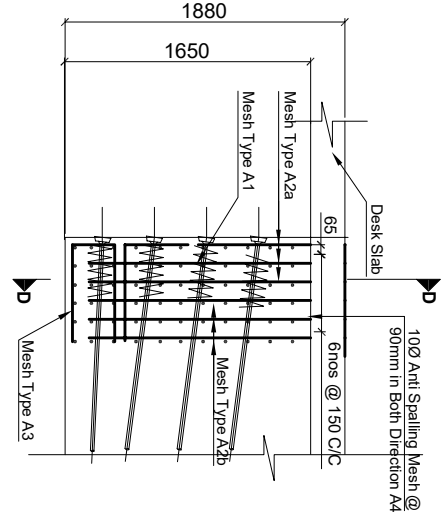
View 1-1
Scale:-1:50

View 2-2
Scale:-1:50

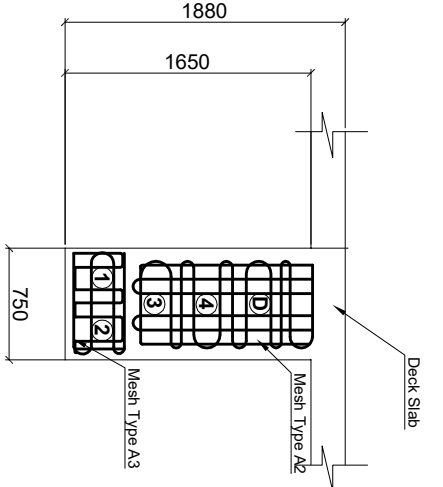
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE: November, 2022 DWG. NO.: 309_Banganga SHEET NO.: 15/61
	Soosung Engineering Co. Ltd, Korea in association with		DOR, DCID		Prestressing Details of Main Girder of		As Shown		Saroj Bhattacharai					
	ERMCo P (Ltd), Nepal and		ROAD NAME:		Banganga Bridge(Left Side) (46/H001/309_A)				P. Upadhyaya					
	398-Tech Studio of Engineering		East West Highway (H01)						Dr. T.H.Choi					
			Butwal - Gorusinghle Section											



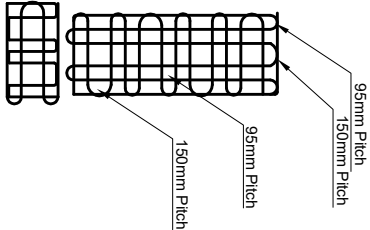
Anti Spalling Reinforcement



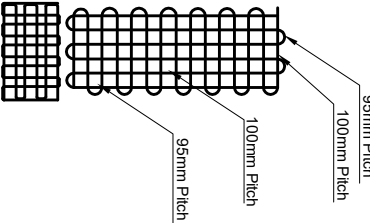
Section At A-A



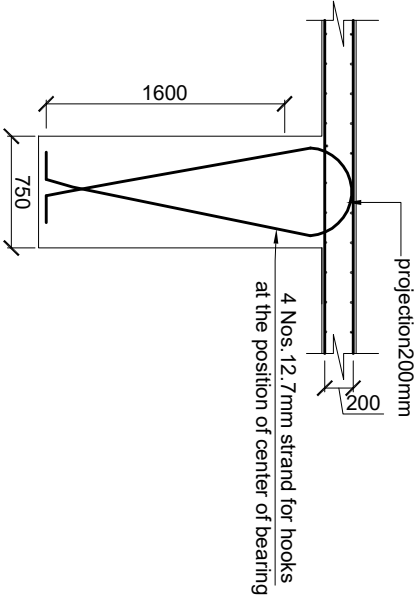
Section At D-D



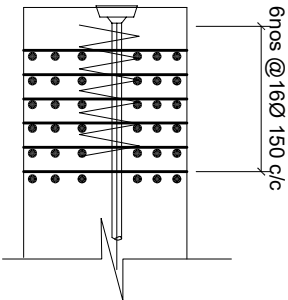
Mesh Type A2a
(Near the Anchor Plate)



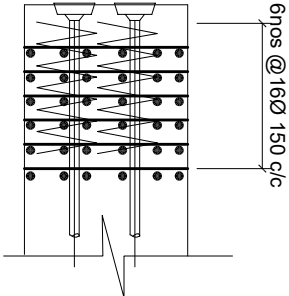
Mesh Type A2b
(Away From Anchor Plate)



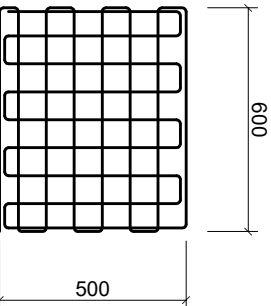
Hook Details at Both Ends Of Grider



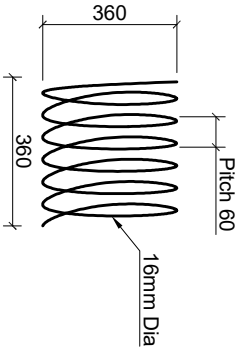
Section At B-B



Section At C-C



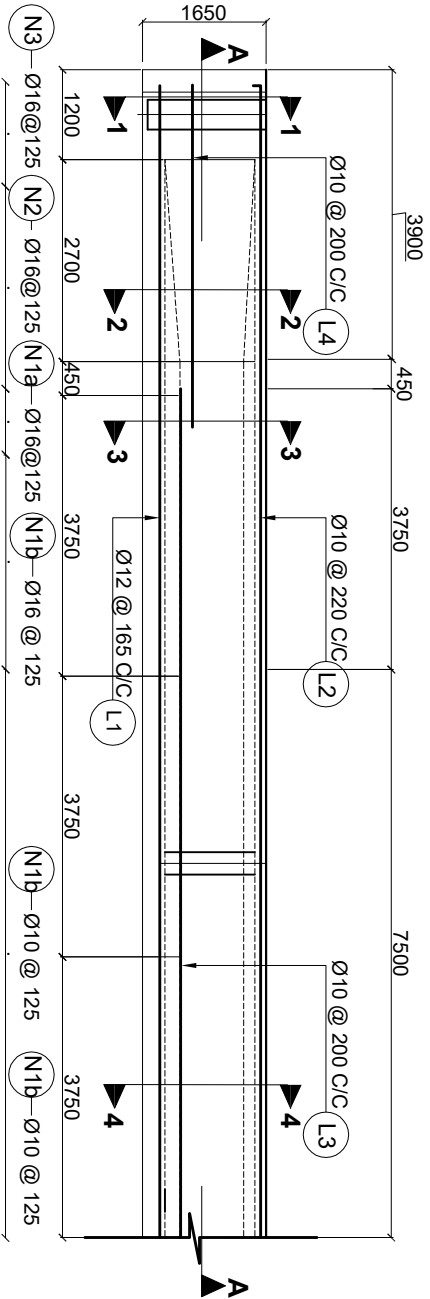
Mesh Type A3



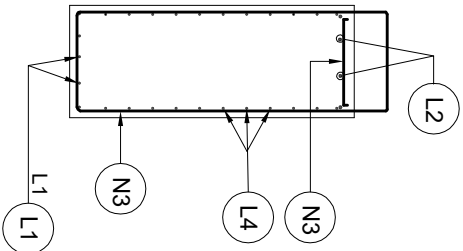
Typical Detail Of Spiral reinforcement A1

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

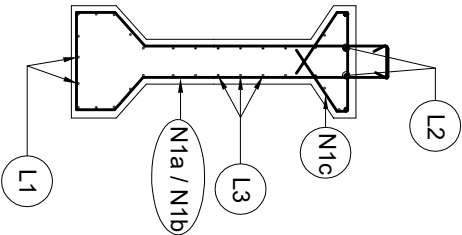
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Project Directorate Office (ADB) SASEC Highway Improvement Project- Project Preparatory Consultant (SHIP-PPC) ADB Loan No: 3722-NEP	CONSULTANT:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE:
	Soosung Engineering Co. Ltd, Korea in association with ERMC P (Ltd), Nepal and JYK - Tech Studio of Engineering		DOR, DCID		Anchorage Details of Banganga Bridge(Left Side) (46/H001/309 _A)		As Shown		Saroj Bhattacharai					November, 2022
			ROAD NAME:						P. Upadhyaya					DWG.NO.:
			East West Highway (H01)						Dr. T.H. Choi					309_Banganga
			Butwal - Goruringshe Section											SHEET NO.:



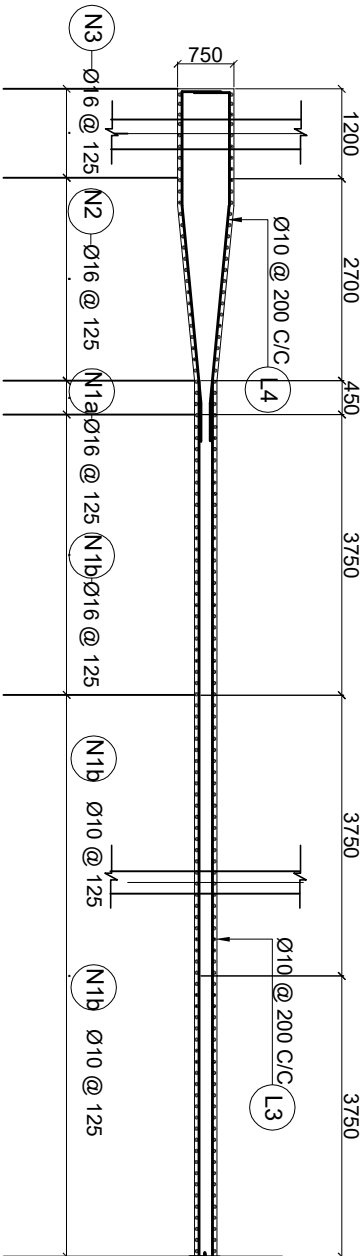
Reinforcement Details at Sectional Elevation Of Main Girder
Scale:-1:100



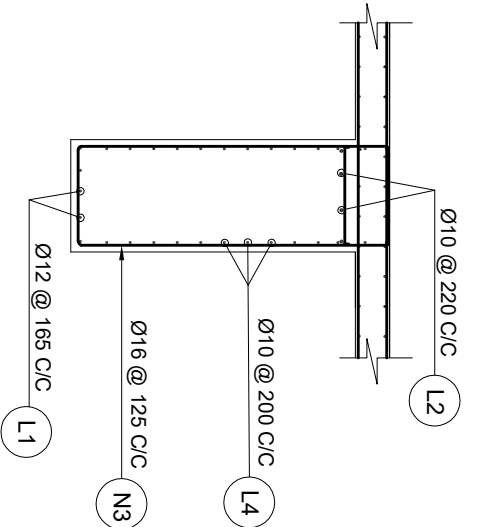
Typical Reinforcement
of Precast Girder at End



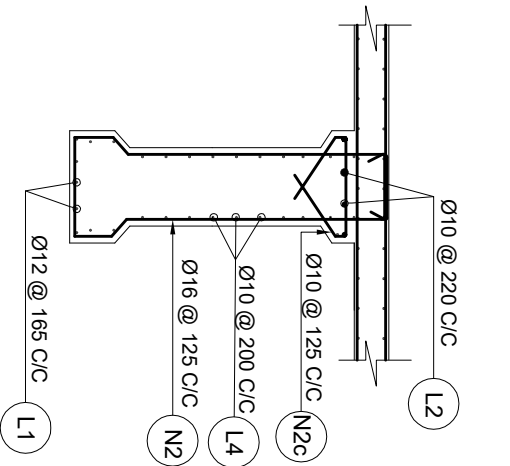
Typical Reinforcement
of Precast Girder at Center



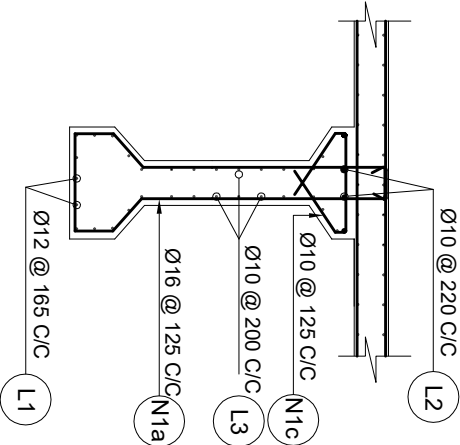
Section At A-A
Scale:-1:100



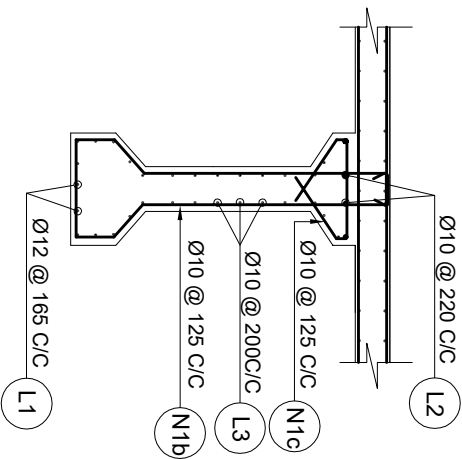
Section At 1-1
Scale:-1:50



Section At 2-2
Scale:-1:50



Section At 3-3
Scale:-1:50



Section At 4-4
Scale:-1:50

NOTE:
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:		IMPLEMENTING AGENCY:		SHEET TITLE:		SCALE:		NAME		SIGNATURE	REV NO.	DESCRIPTION	DATE: November,2022 DWG.NO.: 309_Banganga SHEET NO.: (17/61)
	Soosung Engineering Co. Ltd, Korea in association with ERM C P (Ltd), Nepal and Jyoti-Tech Studio of Engineering		DOR, DCID		Untensioned Reinforcement Details of Girder of Banganga Bridge(Left Side) (46/H001/309_A)		As Shown		Saroj Bhattarai					
			ROAD NAME:						DESIGNED BY:					
			East West Highway (H01)						CHECKED BY:					
	Butwal - Gorusinghe Section								APPROVED BY:					