

NATIONAL HIGHWAYS AUTHORITY OF INDIA

(Ministry of Road, Transport & Highways)

Government of India



**“Construction of De Scoped Length of Four Lane Bypass (NH 206) for
Shivamogga City”**

**Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design
Chainage) under NH (O) on EPC Mode in the State of Karnataka**

BID DOCUMENT.

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Government of India

New Delhi

Schedules

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SCHEDULE – A

(See Clause 10.1)

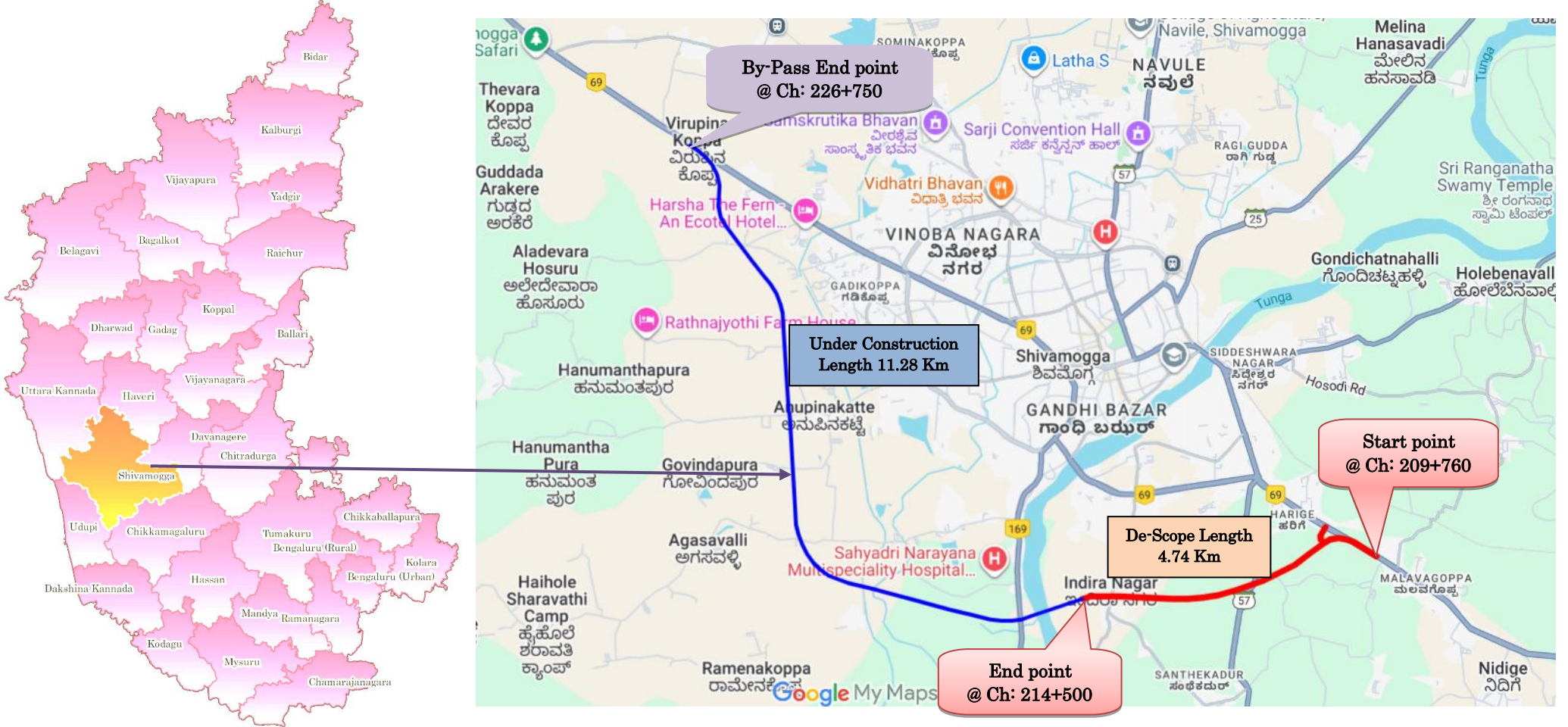
SITE OF THE PROJECT

1. The Site

- 1.1 The Site of Project is a greenfield alignment which takes-off at Ch:209+760 of NH-206 near Malavagoppa on Arsikere – Shivamogga main road, deviates towards left and runs through green field intersecting SH 57 near Santhekadur Village and ends at Chainage 214+500 near Indiranagar, on intersecting with Mattur road, with a Design Length 4.740 Km in the State of Karnataka.
- 1.2 The Index Map and Location Map of the Project Highway is given in Appendix A1 of this report.
- 1.3 An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Concessionaire, and such inventory shall form part of the memorandum referred to in Clause 10.3.1 of the Agreement.

Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.

Appendix A1 Index Map of Project Highway



Annex - I

(Schedule-A)

SITE FOR THE PROJECT

1. Site

1.1 Project Road

The project alignment starts near Malavagoppa on Arsikere – Shivamogga main road at existing Ch: 209+760 of NH-206, from this point, the alignment deviates towards left and runs through green field intersecting SH 57 near Santhekadur Village, and ends at Chainage 214+500 near Indiranagar, on intersecting with Mattur road, with a Design Length 4.740 Km in the State of Karnataka.

1.2 Alignment

The Alignment plan and profile is given **Annex IV of schedule A**.

2. Land

The project is a green field alignment for major length, except at take-off reach and merging length where alignment follows existing alignment.

Existing Chainage		Design Chainage		Length	Existing ROW
From	To	From	To	m	m
209+760	210+190	209+760	210+190	430	50
210+190	210+330	210+190	210+330	140	32
Green Filed Alignment		210+330	214+060	3730	-
		214+060	214+500	440	50
Total Length				4740	

3. Carriageway

Project alignment follows existing alignment at take-off reach and merging length, where the existing road is of 4 lane configurations with 18 m Carriageway.

4. Major / Minor Bridges

Sl No	Existing Chainage	Type of Structure			Existing Span Arrangement (m)	Width (m)
		Foundation	Sub Structure	Super Structure		
Nil						

5. Road over-bridges (ROB)/ Road under-bridges (RUB)

The site includes the following ROB (road over railway line)/RUB (road under railway line):

Sl No	Existing Chainage	Type of Structure			Existing Span Arrangement (m)	Width (m)	Existing Structure
		Foundation	Sub Structure	Super Structure			
Nil							

6. Grade separators – Nil

7. Culverts

Sl No	Existing Chainage	Design Chainage	Type of Culvert	Existing Span Arrangement (m)	Width (m)
1	166+500	210+253	Pipe Culvert	2x1.20	21.00

8. Bus bays and Truck Lay byes – Nil

9. Cross Roads

Sl. No	Design Chainage	Type of Cross Road
1	211+870	SH-57
2.	213+410	Village Road
3.	214+060	Mattur Road

10. The Major junctions - Nil

The details of major junctions are as follows:

Sl No	Existing Chainage (km)	At grade	Separated	Category of Road				Cross Road
				NH	SH	MDR	OTHERS	
Nil								

(NH: National Highway, SH: State Highway, MDR: Major District Road)

11. Minor Junctions

The details of the minor junctions are as follows:

Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.



Sl No	Chainage	Type of Junction	Type of Crossing
Nil			

12. Details of Existing Utilities

The details of the existing Utilities are given in the **Annex-III of Schedule-A**

Annex – II

(Schedule-A)

Alignment Plans

The Plan & Profile of the Project Highway is enclosed for indication purposes

(Annexure-III)

Schedule-A

Utilities

The Site includes the following Utilities

- i. Electrical utilities
 - a) Extra High-Tension Lines (EHT Lines)
 - b) High Tension Lines (HT-Lines)

Sl No	Design Chainage	KV
1	210+330	66
2	210+350	110
3	210+410	110
4	210+440	110
5	210+465	110
6	210+500	110

Sl No	Design Chainage	KV
7	210+570	220
8	210+600	220
9	210+920	220
10	211+740	66
11	213+370	220
12	213+460	220

- c) Other Electrical Lines

Sl.no	Chainages		Electric poles	Transformers	Lamp Pole	High mast
	From	To				
1	209+700	210+200	12	1	-	-
2	210+200	210+700	8	-		
3	210+700	211+200	-	-		
4	211+200	211+700	2	-		
5	211+700	212+200	6	2		
6	212+200	212+700	16	2		
7	212+700	213+200	-	-		
8	213+200	213+700	-	-		
9	213+700	214+200	13	-		
10	214+200	214+500	4	-		
Total			61	5		

No change of Scope shall be paid for any over ground utilities. However, for any underground utilities not mentioned in Schedule ‘B’ shall form change of scope, which shall be worked out as per estimation of concerned utility owning dept. and shall be payable.

Annex-IV

(As per Clause 8.3 (i))

(Schedule-A)

Right of Way of Construction Zone

The dates on which the Authority shall provide Right of Way of Construction Zone to the Contractor on different stretches of the Site are stated below:

Design Chainage		Length in m	Available RoW in m	Additional RoW in m	Total RoW in m
From	To				
209+760	210+190	430	50	0	50
210+190	210+330	140	32	18	50
210+330	214+060	3730	0	50	50
214+060	214+500	440	50	0	50
Total Length in m		4740			

*The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date for Additional RoW.

Annexure – I

SCHEDULE – B

DESCRIPTION OF THE PROJECT

1. Development of the Project Highway

The Project Highway shall generally follow the horizontal alignment shown in the plan specified in **Annexure- II of Schedule-A**, unless otherwise specified by the Authority. Notwithstanding anything to the contrary contained in this Agreement or IRC:SP:84 2019, the proposed plan & profile, locations of different structures/drains/service & slip road/RS walls, chainages of different structures/drains/service & slip road/RS walls, length of different structures/drains/service & slip road/RS walls etc. of the project highway as indicated In the Schedule A, Schedule B, Schedule C and their Annexures shall be treated as minimum requirement. Based on site/design requirement, the Concessionaire / Contractor shall finalize their Detailed Designs (Development Stage) including plan & profile of the project highway and submit the same to Authority & its Engineer for its Consent/Approval and Safety Audit by Safety Auditor, before the start of the execution of project. The designs so approved shall not be in contradiction with the scope of project. For avoidance of doubt, the provisions mentioned in schedule B & C cannot be changed, only the design of the components is to be submitted for consent/ approval.

The Contractor shall deploy at its own cost and Expenses, the Grading/ paving/ Compaction Equipment fitted with system of Automated Intelligent Machine-aided Construction (AI-MC) for finishing of all Grades including embankment, Subgrade, GSB, WMM. The system of Automated Intelligent Machine- aided Construction (AI-MC) used by the Contractor shall be capable of delivering accuracy as per the applicable IRC specifications. During the Construction Period, the Concessionaire/ consultant shall furnish all the Physical Progress Data (All desired type of surface Grading Data, Compaction and Temperature Data etc.) obtained through System of Automated Intelligent Machine-aided Construction (AI-MC) / CMS to Authority for monitoring of Construction on Daily Basis. These Digital Data and desired output shall be made available at the Location (Server/Cloud) finalised by Authority.

Project Highway

- The proposed road is a green field alignment, de-scoped length of the NH-206 section near the entry of Shivamogga bypass. The proposed project alignment will be part of

NH 206, the new alignment takes-off at Ch:209+760 of NH-206 near Malavagoppa on Arsikere – Shivamogga main road, deviates towards left and runs through green field intersecting SH 57 near Santhekadur Village and ends at Chainage 214+500 near Indiranagar, on intersecting with Mattur road, with a Design Length 4.740 Km

- The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in **Annex-I of Schedule-D**.
- Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.

1.1 Width of Carriageway

1.1.1 Four with paved shoulders and earthen shoulders shall be undertaken. The paved carriageway shall be 20m (for New Jersey Barrier median with 0.5m shyness width) and for Six lining with paved shoulders and earthen shoulders shall be undertaken. The paved carriageway shall be 27m (for New Jersey Barrier median with 0.5m shyness width)

Sl.No	From	To	Length, m	Main carriage way, m						
				LHS			Median	RHS		
				ES	PS	MCW		MCW	PS	ES
1.	209+760	210+050	290	-	2.5	7	1.610	7	2.5	-
2.	210+050	213+220	3170	-	2.5	10.5	1.610	10.5	2.5	-
3.	213+220	213+400	180	-	2.5	10.5	1.610	10.5	2.5	-
4.	213+400	213+630	230	2	1.5	10.5	1.610	10.5	1.5	2
5.	213+630	213+700	70	2	1.5	10.5	1.610	10.5	1.5	2
6.	213+700	213+850	150	2	1.5	10.5	1.610	10.5	1.5	2
7.	213+850	214+050	200	2	1.5	10.5	1.610	10.5	1.5	2
8.	214+050	214+500	450	-	2.5	10.5	1.610	10.5	2.5	-
Total Length, m			4740							

*The total width of median includes 0.5 m shyness on either side (**Annexure II of Schedule B**)

Note: Width of Carriageway / Shoulder is in accordance to following circulars:

1. E file No.RW/NH-33044/22/2020-S&R, dated 4th June 2024
2. NHAI/Bharatmala/EC/DPR/2016/143430, dated 30.10.2019

1.1.2 – Deleted

1.1.3 Except as otherwise provided in this Agreement, the width shall be adjusted to fit into appropriate plans and cross sections developed in accordance with TCS enclosed.

1.1.4 The entire cross-sectional elements shall be accommodated in the available/proposed ROW. If required, suitable retaining structures shall be provided to accommodate the highway cross section within the available/ proposed ROW. The details of such sections are mentioned in Schedule-B. In case of any other section not included in Schedule-B, where retaining structures are to be provided, shall constitute a Change of Scope.

1.2 Width of Median

1.2.1 The Median shall be of New Jersey Barrier type and having a width of 1.61m including 0.5m shy off on either side.

1.2.2 - Deleted

1.2.3 - Deleted

1.2.4 A suitable anti-glare measures shall be proposed

2. Geometric Design and General Features

2.1 General:

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the manual. Intermediate Sight distance (Desirable Minimum Sight Distance) shall be followed for design of all vertical curves including structures as well as highways.

2.2 Design Speed:

The project road shall be designed for 100 Kmph for plain and rolling terrain in accordance with clause 2.2.1 of IRC SP-84-2019

2.3 Improvement of the existing road geometrics

2.3.1 – Deleted

2.3.2 Realignment: - Deleted.

2.3.3 Bypasses: The existing road shall be bypassed to the standards as specified in the Manual at the following locations.

The project road is a new green field alignment for descoped length of Shivamogga Bypass and Plan and Profile shall be the Minimum Requirement.

2.4 Right of Way

Details of the Right of Way along Project Highways and Side Roads are given in **Annexure-IV of Schedule-A.**

2.5 Type of shoulders

- 2.5.1 The Design Specification of paved shoulder shall conform to the requirements specified in paragraph 5.10 of the Manual.
- 2.5.2 Paved shoulders and strip on median side shall be of same specification and pavement composition as of main carriageway.
- 2.5.3 Deleted.
- 2.5.4 Deleted.
- 2.5.5 In open country, paved shoulders of 1.5m width shall be provided.
- 2.5.6 The earthen shoulder shall be 1.0 meter on outer side, additional 1.0 m earthen shoulder width in plain and rolling Terrain shall be constructed.
- 2.5.7 The Design Specification of earthen shoulder shall conform to the requirements specified in paragraph 5.11 of the Manual.
- 2.5.8 The earthen shoulder on shoulder side shall be provided with top 150 mm on earthen shoulder with well graded naturals and morrum gravel crust stones or combination thereof, confirming to Clause 401 of MoRTH specification.
- 2.5.9 The earthen shoulder of 1.0m width on median side for depressed median shall be provided with top 150 mm on earthen shoulder with well graded naturals and morrum gravel crust stones or thereof, confirming to Clause 401 of MoRTH specification to fix MBCB and confirm placement requirement of MBCB.

2.6 Lateral and Vertical Clearance at Underpasses

- 2.6.1 In case of VUP/ LVUP/ SVUP, the finished road level of VUP/LVUP/SVUP shall be kept 150 mm above the ground level/service road/ crossroad (whichever is higher) to ensure that these VUP/ LVUP/ SVUP don't become water accumulation points.
- 2.6.2 The vertical and horizontal clearance at the underpasses shall be as per Clause 2.10.2 of the Manual.

Sl. No.	Location Chainage (Km)	Span / opening (m)	Remarks
1	212+487	2x12.00x5.50*	VUP; At KSRTC Bus depot location
2	213+041	1x7.00x4.00*	SVUP; Crossing Village Road

* Clear Span

2.7 Lateral and vertical clearances at Overpasses

2.7.1 Lateral and vertical clearances for overpasses shall be as per paragraph 2.11 of the Manual.

2.7.2 Lateral clearance: The width of the opening at the Overpasses shall be as follows:

Sl. No.	Location Chainage (Km)	Span Arrangement* (m)	Remarks
1	214+060	2x14.255(SQ)	VOP; Crossing MDR; Skew-10 Deg.

*SQ-Square Clear Span

2.8 Service roads/Slip roads/Connecting Roads:

2.8.1 Service Road: The height of embankment of service road shall confirm to clause 4.2.1.

2.8.2 The Service roads / connecting roads shall be constructed at the locations and for the lengths indicated below:

Sl No.	Design Chainage		Length (m)		Paved Carriageway Width including shyness (m)	Total Length (m)	Remarks
	From	To	LHS	RHS			
1.	209+760	210+050	290	290	7.5+7.5=15	580	BHS
2.	210+050	213+220	3170	3170	7.5+7.5=15	6340	BHS
3.	213+220	213+400	180	180	7.5+7.5=15	360	BHS
4.	214+050	214+500	450	450	7.5+7.5=15	900	BHS
Total Length on each side, m			4090	4090	Total Length, m	8180	

** (LHS – Left Hand Side, RHS – Right Hand Side, BHS – Both Hand Side)

2.8.3 Deleted

2.8.4 Slip Road: Deleted.

2.8.5 Separator Between Main Carriageway and Service/Slip Road

A separator with Crash Barrier/ **pedestrian guard Rail** between main carriageway and service/slip road shall be provided to prevent the pedestrians, local vehicles and animals entering the highway.

Sl No.	Design Chainage		Length (m)		Total Length (m)	Remarks
	From	To	LHS	RHS		
Pedestrian Guard Rail						
1.	209+760	210+050	290	290	580	BHS
2.	213+220	213+400	180	180	360	BHS
Total Length on each side, m			470	470	940	
Separator Between Main Carriageway and Service Road						
3	210+050	213+220	3170	3170	6340	BHS
Total Length on each side, m			3170	3170	6340	

** (LHS – Left Hand Side, RHS – Right Hand Side, BHS – Both Hand Side)

2.8.6 Note:

i. Above length of the service/slip roads is minimum specified. The actual length of the service/slip/connecting roads shall be determined by the Concessionaire / Contractor in accordance with the approved plan & profile and design approved from the Independent Engineer. Any additional requirement at new location shall be dealt in CoS clause as per respective CA.

ii. The Acceleration, deceleration lane, right turning storage lane, entry/exit lanes shall be constructed in addition to length given in above table and shall be deemed to be part of the scope and no Change of Scope shall be considered for the same. (Clause No. 2.12.2 IRC: SP:84-2019)

2.9 Grade Separated Structures

Grade separated structures shall be constructed as per paragraph 2.13 of the Manual. Proposed levels at structure locations as shown in plan & profile specified in **Annexure-II of schedule A** are minimum requirement and only for guidance and any increase in levels shall not constitute any change of scope. Entry/Exit arrangement from main carriageway shall be 50m before/after the start/end of approach road to grade separator i.e. start/end of valley curve. RCC barrier shall start from start of valley curve and end after grade separator at end of valley curve.

The sub-structure shall be continued in the median portion with RCC barrier wherever superstructure has not been proposed in median portion.

Where crash barrier on the median side is not continuous along the project highway, 50m long MBCB Safety barriers on median side shall be provided on both sides approaches of the structures. MBCB provided towards median side of each of the structure with corresponding end treatment. (Clause No. 4.3.5 and 4.9, IRC 119).

Where crash barrier on the shoulder sides are not continuous along the project highway, 50m long MBCB Safety barriers on shoulder side shall be provided on both sides approaches of the bridge/ structures or till 3m embankment height whichever is more.

2.5m wide footpaths for VUP, Flyovers and 1.5m for LVUP, SVUP and Cattle Underpass shall be provided at grade intersection below structures for each direction of pedestrian movement (refer fig 3.1 to 3.6 IRC: SP:84-2019 refer fig 3.8 to 3.12).

The requisite particulars are given below:

2.9.1 Vehicle Overpass (VOP)

Sl. No	Design Chainage	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Skew Span Arrangement/Length (m)	Minimum Vertical Clearance (m)	Skew Angle	Remarks
1	214+060	15.00 (SQ) (2 Lane Structure)		NA	2 X 14.255(SQ)*	5.5	10°	Major District Road (Mattur)

*-Square Clear Span; SQ-Square dimension.

2.9.2 Vehicle Underpass (VUP)

Sl. No	Design Chainage	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Skew Span Arrangement / Length (m)	Minimum Vertical Clearance (m)	Skew Angle	Remarks
1	212+487	28.610		Yes	2x12.00*	5.5	-	At KSRTC Bus depot location

*-Square Clear Span

2.9.3 Light Vehicle Underpass (LVUP)

Sl. No	Design Chainage	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median (m)	Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle	Remarks
Nil								

* Span from Centre to Centre of Expansion Joint.

** - Square Clear Span.

2.9.4 Small Vehicle Underpass (SVUP)

Sl. No	Design Chainage	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median (m)	Skew Span Arrangement / Length (m)	Minimum Vertical Clearance (m)	Skew Angle	Remarks
1	213+041	28.610		Yes	1x7.00*	4.00	0	Crossing Village Road

* - Square Clear Span.

2.9.5 Cattle / Pedestrian Underpass

Cattle and pedestrian underpass shall be constructed as follows:

SL No	Design Chainage	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Square Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle	Remarks
NIL								

2.9.6 Boxes for passage of pedestrians

Sl. No.	Design Chainage (Km)	Width (m)	Size of opening (WxH)	Minimum Vertical Clearance (m)	Skew Angle (to be specified)	Remarks
NIL						

2.9.7 Flyover

Sl. No.	Design Chainage (Km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Square Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle	Remarks
1	210+615	28.610(SQ)		Yes	1x18.32+1x32.80 +1x18.32*	5.5	10°	At the start of Shimoga bypass
2	211+870	28.610(SQ)		Yes	2 x 36.00*	5.5	40°	Crossing SH-57; LHS- Shivamogga Airport; RHS- Shivamogga city

*Skew Span from Centre to Centre of Expansion Joint; SQ-Square dimension.

2.9.8 Viaduct

Sl.	Design	LHS	RHS	Super	Square Span	Minimum	Skew	Remarks
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No.	Chainage (Km)	Roadway Width (m)	Roadway Width (m)	Structure Provision in Median	Arrangement (m)	Vertical Clearance (m)	Angle	
NIL								

2.9.9 Tunnel

Sl. No.	Design Chainage (Km)		Tunnel configuration (Single/ Twin)	LHS	RHS	Remarks
	From	To				
NIL						

1. All underpasses without slip roads shall be provided with steps for accessing the bottom in alternate two-cone filling portion.

2. 2 height barriers on either side of the underpasses for the height less than 5.5m to be provided.

Notes:

- I. At all locations of built-up areas and in semi-urban areas where high traffic growth is projected in the time to come, a minimum of 3 spans for vehicular underpass should be provided with a minimum lateral clearance of 30 m for the main span & 15 m for the viaduct spans on either side.
- II. At locations other than (i) above, single span underpass shall be provided with minimum lateral clearance of 12-15 m which includes 1.5 - 2.5m raised footpath for pedestrians on either side.
- III. At such single span underpasses, suitable traffic calming measures viz. road signs, markings, etc. shall be installed as per IRC:99 provisions. Further, the section of cross road below the main span of all VUPs and the entry service road in either direction shall be provided with paver block/ cut stone pavement for a distance of 60-90 m from the junction for enforcing speed restrictions.
- IV. For providing better line of sight, the visibility between the traffic plying on the cross road and the traffic on slip road shall be improved at the junction of RS wall and the structure by adopting suitable measures such as chamfering/ beveling, tapering, provision of gap slab etc., as indicated in the enclosed drawings and the structure be designed accordingly. Further, the lateral clearance between the outer face of the structure & the inner edge of the service/ slip road on either side shall be maintained between 1.5m to 4.5m at the point of approaching the crossroad, depending on the ROW available.

- V. In order to avoid crisscrossing of pedestrians on divided highways especially at start & end of approaches to the structures, New Jersey Type Concrete Crash Barriers (NJB) or Steel Railing with a height of 1.2m (to make it unclimbable) shall be provided for a minimum length of 50m so as to discourage such crisscrossing and avoid accidents. NJB may be provided where cutting of railing/ theft/ vandalism is expected, otherwise steel railing may be provided for better aesthetics and to avoid blinding effect. If pedestrian cross traffic is high at such locations, even FOBs shall be planned.

2.9.1 Interchanges (IC) – Deleted

Sl. No	Design Chainage (km)	Name of structure	Skew Span Arrangement* (m)	Square Total Width (m)	Typical Cross Section	Remarks
Nil						

Note: Layout, Geometric Design and Typical Cross Sections of Interchange is included in **Annexure III to schedule-B**.

2.9.2 Details of Ramps, Cross Roads and Connecting Roads at Interchanges (IC) – Deleted

Sl. No	Carriageway widths including Kerb shyness	Length (m)	Description of Ramps, Cross Roads and Connecting Roads	Remarks
Nil				

2.10 Typical Cross Section (TCS) of the Project Highway

The Project Highway shall be constructed to Four/Six lane configuration. Typical cross sections required to be developed in different sections of the Project Highway are given below:

Sl No	From	To	Length in m	Type of TCS	Remarks
1	209+760	210+050	290	TCS - IV	Symmetrical widening built-up with Service Road & Flush Median.
2	210+050	213+220	3170	TCS - XII	Grade Separator/VUP/LVUP at 50m PROW Both Side Service Road.
3	213+220	213+400	180	TCS - IV B	At Grade 6-Lane with Flush Median With Service Road.
4	213+400	213+630	230	TCS - IV A	Embankment With Flush Median Without Service Road (< 3.0m Height)

Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.



Sl No	From	To	Length in m	Type of TCS	Remarks
5	213+630	213+700	70	TCS - IV C	Embankment With Flush Median Without Service Road with Nala Drain RHS.
6	213+700	213+850	150	TCS - XIVB	VOP Approach At 50m PROW Cutting Section without Service Road with Nala Drain
7	213+850	214+050	200	TCS - XIV	VOP Approach At 50m PROW Cutting Section Without Service Road
8	214+050	214+500	450	TCS - XIVA	VOP Approach At 50m PROW Cutting Section With Service Road
Total Length in m			4740		

Summary of TCS

Sl No	Type of TCS	Length, m	Remarks
1	TCS - IV	290	Symmetrical widening built-up with Service Road & Flush Median.
2	TCS - XII	3170	Grade Separator/VUP/LVUP at 50m PROW Both Side Service Road.
3	TCS - IV B	180	At Grade 6-Lane with Flush Median with Service Road.
4	TCS - IV A	230	Embankment With Flush Median Without Service Road (< 3.0m Height)
5	TCS - IV C	70	Embankment With Flush Median Without Service Road with Nala Drain RHS.
6	TCS - XIVB	150	VOP Approach At 50m PROW Cutting Section without Service Road with Nala Drain
7	TCS - XIV	200	VOP Approach At 50m PROW Cutting Section Without Service Road
8	TCS - XIVA	450	VOP Approach At 50m PROW Cutting Section with Service Road
Total Length, m		4740	

Note: Typical Cross Sections is included in the **Annexure II of Schedule B**

2.10.1 Note:

- Any variations in the lengths of various TCS as specified in the Table 2.10 shall not constitute a Change of Scope. However, any authorized/ approved change in the length of the project highway, CoS clause is applicable as per respective CA.
- Lengths mentioned in the above list for cross section types concerned to structures are inclusive of structure length.

- iii. RS wall shall be provided at the edge of the shoulder for full height.
- iv. Toe wall (0.6m height) or retaining wall up to full height (height as required for side slopes) above 0.6m to maintain the slope of filling wherever restriction in ROW is required leaving space for utility corridor/ drain/ service road etc. as applicable and water bodies along the proposed highway on the sections specified in Schedule-B.
- v. Chainages may be adjusted according to location of structures as per drawings.
- vi. Carriageway width tapering shall be provided 1 in 50 as per Manual Clause no 2.5.4.
- vii. Intermediate Sight Distance (Desirable Minimum Sight Distance) shall be followed for design of all vertical curves (Summit and Valley Curves) including structures as well as highways

3. Intersections and Grade Separated Intersections

All at-grade intersections and grade separated intersections shall be as per Section 3 of the Manual. Existing at-grade intersections shall be improved to the prescribed standards.

The service road pavement composition shall be continued on cross roads of the intersections for the length specified for at-grade and grade separated intersections.

Properly designed intersections shall be provided at the locations and of types and features given in the tables below:

3.1 At-grade intersections – Deleted.

(a) Major Intersections: – Deleted.

The following junctions shall be considered for improvement:

Sr. No.	Design Chainage	Junction Type	Lane Configuration	Leads to		Median Opening	Category of Cross Road	Carriageway width of cross road, m	Length of cross road to be developed, m
				LHS	RHS				
NIL									

(b) Minor Intersections – Not Applicable

Sr. No.	Design Chainage (Km)	Junction Type	Leads to		Median Opening	Category of Cross Road	Carriageway width of cross road	Length of cross road to be developed	
			LHS	RHS				LHS	RHS
NIL									

3.1.1 Note:

Typical Layout as per type Designs for Intersections on National Highways, 1992, Geometric Design and Typical Cross Sections of Major Junction is included in **Annexure – IV to Schedule – B.**

1. Type of Junction to be improved as per type Designs for Intersections on National Highways, 1992.
2. The Concessionaire/ Contractor shall take up ‘Detailed Engineering study’ to ascertain further details of all intersections and treatment of the intersections shall be designed in accordance with the latest guidelines mentioned out in section-3 of the Manual. Auxiliary lanes including storage, acceleration and deceleration lane along with physical islands to be provided.

The cross road at the junctions which are having a level difference from the main carriageway, are to be improved at the level of main carriageway for the length of 30 metre and then to be merged with the cross road at the gradient not more than 1:50. (Clause No. 3.2.2 IRC: SP:87-2019)

3. For minor / major layout for left-in / left out arrangement with physical islands with hazard marking. Where there is space constraint to provide physical islands, the effect of junction kept wide opened can be avoided by ghost island with marking. (Fig 3.7, IRC: SP:87- 2019)
4. “For 6 Lane projects” For U-turn, Self-Regulated U-Turn facility shall be created. (Fig 3.6 IRC: SP:87- 2019) as per fig 3.6 of Manual. “For 4 Lane projects” U-Turn facility shall be created.

3.2 At-Grade Intersections below Grade Separators/ Interchanges:

These shall be provided as given at para of this **Annexure-I of the Schedule B.**

Major Junctions

Sl. No.	Design Chainage	Junction Type	Leads to		U-Turn provision in Viaduct Spans	Category of Cross Roads	Carriageway width of cross road	Length of cross road to be developed	
			LHS	RHS				LHS	RHS
1	210+250	Y-Junction	-	Shivamogga	Yes	NH-206	7.5	-	250m for Y Junction; 400m for Existing Road
2	211+870	Staggered junction	Santhekadur	Shivamogga	Yes	SH - 57	7.5	50	50

Minor Junctions

Sl. No.	Design Chainage	Junction Type	Leads to		U-Turn provision in Viaduct Spans	Category of Cross Roads	Carriageway width of cross road	Length of cross road to be developed	
			LHS	RHS				LHS	RHS
1	211+490	+ Junction	Dummali	Shivamogga	Yes	Rural road	3.5	50	50
2	212+010	+ Junction	SH - 57	Shivamogga	Yes	Rural road	3.5	50	50
3	213+040	Staggered junction	Santhekadur	Shivamogga	Yes	Rural road	3.5	50	50
4	214+060	+ Junction	Mattur	Shivamogga	Yes	MDR	3.5	50	50

3.2.1 Note:

1. The Contractor shall take up 'Detailed Engineering study' to ascertain further details of all intersections and treatment of the intersections shall be designed in accordance with the latest guidelines mentioned out in section-3 of Manual.
2. Junction improvement under grade separators shall be carried out as per manual with proper entry/exit to cross roads and slip/service roads, etc. Auxiliary lanes including storage, acceleration and deceleration lane along with physical islands to be provided.
3. Location of grade-separated structures are indicative. Exact location should be decided in consultation with Independent Engineer
4. Intersection Layout, Entry/Exit, Right Turning Lane, U-Turns, Geometric Design & Typical Cross Sections of Interchange is included in **Annexure III to schedule-B**.
5. Only Entry or Exit shall be designed at any location (provision of entry/exit by ghost island not permitted).

4. Road Embankment and Cut Section

Construction of road embankment/cuttings shall conform to the Specifications and Standards given in **section 4** of the Manual. Notwithstanding anything to the contrary contained in this Agreement or Manual, the proposed profile of the project highway as indicated in the **Annex-III of Schedule A** shall be treated as minimum requirement.

Based on site/design requirement, the Concessionaire/ Contractor shall design the alignment plans and profiles of the project highway based on site/design requirement mentioned in Schedule B with approval from the Independent Engineer/Authority Engineer within the available Right of way.

In case of green field stretches / realignments stretches / bypasses/ full reconstruction of existing stretches (if the existing stretches have been overtopped in past during rains /floods), the bottom of subgrade shall be 1000 mm above highest flood level (HFL)/ ground water table/ Natural ground level /pond level, whichever is higher.

The side slopes shall not be steeper than 2H:1V. In case, there is a ROW constraint than, suitable soil retaining structures shall be provided.

For stability of slope upto 3 metre height the turfing can be adapted. For the slope from 3-6 metre suitable, geocell, geo-grid, geo-green etc. can be provided with suitable drainage chutes and suitable energy dissipaters as per IRC 56. For the slope more than 6 metre height, a complete slope stability analysis as per IRC:75 shall be done and the slopes shall be compulsory protected with stone pitching within stone masonry grid structure of 4x4 metre and suitable drains/chutes and energy dissipaters etc. shall be provided for effective drainage of the water.

Use of Pond Ash and Design of Pond Ash embankment shall be specified

If pond ash is being utilized for construction of embankment/approach it shall be as per IRC SP 58:2001. Concessionaire/ Contractor shall have to procure and use Pond/ Flyash preferably. In case of non-availability of the same, Concessionaire/ Contractor shall make their own arrangement for procurement of alternative material/ Good earth and no change of scope will be considered. The cost benefit if any to the contractor for use of Pond Ash will not be passed to Authority.

Mitigation measures work for slope be provided as per specifications wherever steep cutting section is involved.

5. Pavement design

5.1 Pavement design shall be carried out in accordance with Section 5 of the Manual.

5.2 Type of Pavement and Design requirement

The pavement shall be flexible type for entire length of project highway.

5.2.1 Design Period and Strategy Pavement shall be constructed for the entire length of Project Highway including paved shoulders. Flexible Pavement shall be designed for a minimum design period of 20 years and minimum effective sub grade CBR of 8 % and maximum effective sub grade CBR of 10 %. Stage construction shall not be permitted.

5.2.2 Recommended Pavement Design Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Concessionaire / Contractor shall **design the pavement of main carriageway for design traffic of 20 MSA.**

5.2.3 The pavement for service road/slip road/ connecting roads shall be designed for projected traffic subject to minimum as follows:

i. Service Roads in Built-up areas for minimum 20 MSA

ii. Service Road/ Slip Road/ Connecting roads in Rural Area for minimum 10 MSA – **Not Applicable.**

5.2.4 If Plastic waste material is available it shall be used for construction of Bituminous Concrete pavement in service road in confirmation to IRC SP 98-2020.

5.2.5 In case the contractor uses the service road as diversion road. Then the pavement for service road shall be designed for a traffic **20 MSA.**

5.2.6 The pavement for slip roads / service roads shall be designed for projected traffic subject to a minimum of 20 MSA.

5.3 In order to meet the intended functional requirement of respective pavement layers on main carriageway, the minimum thickness of respective pavement layers for main carriageway and connecting cross roads / service roads / slip roads / entry / exit locations, acceleration / deceleration lane, right turning lanes shall, however, in no case be less than as given below:

5.4 Deleted

5.4.1 **Main carriageway, paved shoulder, median side paved strip, entry / exit locations, Acceleration / deceleration lane, right turning lanes, Toll Plaza.**

5.4.1.1 Deleted

5.4.1.2 Deleted

5.4.1.3 Deleted

5.4.1.4 Deleted

5.4.1.5 Deleted

5.4.1.6 Deleted

5.4.1.7 Bituminous Surface Course with Granular Base and CTSB,

Minimum pavement crust thickness for the project road with design traffic of 20 msa minimum effective sub grade CBR of 8 % and maximum effective sub grade CBR of 10 % is as below

Pavement Composition	Minimum Crust Thickness (mm)
Subgrade	500
CTSB	200
WMM	150
DBM	50
BC	40

5.4.1.8 **DLC/PQC – Deleted**

5.4.2 **Crossroads – Deleted**

5.4.3 **Service roads / Connecting Roads**

5.4.3.1 **Deleted**

5.4.3.2 Deleted

5.4.3.3 Deleted

5.4.3.4 Deleted

5.4.3.5 Bituminous Surface Course with WMM and CTSB

Service road shall be designed for minimum design traffic of 20 msa minimum effective sub grade CBR of 8 % and maximum effective sub grade CBR of 10 %.

Pavement Composition	Minimum Crust Thickness (mm)
Subgrade	500
CTSB	200
WMM	150
DBM	50
BC	40

5.4.3.6 **DLC/PQC – Deleted**

5.4.4 **Slip roads – Deleted**

5.4.5 **Service roads which are proposed to be used as Diversion Road – Deleted**

5.4.6 **Summary of type of Pavement for Main Carriageway**

Sl No.	Design Chainage		Type of Pavement	Side	Remarks
	From	To			
1.	209+760	214+500	Flexible Pavement	Both side	New Construction

5.4.7 Summary of type of Pavement for Service Road, Slip Road, Diversion Road

Sl. No	Design Chainage (Km)		Type of Pavement	Remarks
	From	To		
1	209+760	210+050	Flexible Pavement	New Construction
2	210+050	213+220	Flexible Pavement	New Construction
3	213+220	213+400	Flexible Pavement	New Construction
4	214+050	214+500	Flexible Pavement	New Construction

5.4.8 Note:

The design Consultant shall mention the crust thickness based on the design traffic assessed during traffic survey and CBR.

5.5 Reconstruction of Stretches with New pavement - Deleted

5.6 Bituminous Mix for Overlay - Deleted

6. Roadside Drainage

6.1 Drainage system

Including surface and subsurface drains for the Project Highway including cross roads shall be provided as per section 6 of the Manual. Contractor shall provide a drainage plan along with its drainage profile which should be reviewed and approved by the Engineer:

RCC Drain cum footpaths shall conform to the cross- sectional features and other details as given in **Annexure – II (Schedule – B)** and shall be provided as under:

Details of RCC Drain Cum Footpath/ Traffic Load.

Details of RCC Drain cum Footpath (Drain Type - Rectangle)

Vehicular Drain													
Sl No.	From	To	Main Carriageway				Service Road				Footpath width, m	Total length, m	Remarks
			Length in m		Min. bottom width x Min. Depth of drain		Length in m		Min. bottom width x Min. Depth of drain				
LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS				
1.	210+050	213+220	-	-	-	-	3170	3170	1.5 x 1.9	1.5 x 1.9		6340	BHS
2.	213+220	213+400	-	-	-	-	180	180	1.5 x 1.9	1.5 x 1.9		360	BHS
3.	214+050	214+500	-	-	-	-	450	450	1.5 x 1.9	1.5 x 1.9		900	BHS
Total Length on each side (MCW), m			0	0	Total Length on each side (SR), m		3800	3800	Total Length, m			7600	

Non-Vehicular Drain													
Sl No.	From	To	Main Carriageway				Service Road				Footpath width, m	Total length, m	Remarks
			Length in m		Min. bottom width x Min. Depth of drain		Length in m		Min. bottom width x Min. Depth of drain				
			LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS			
1.	209+760	210+050	-	-	-	-	290	290	1.5 x 1.9	1.5 x 1.9	1.5	580	BHS_Closed Drain
2.	213+400	213+630	230	230	1.2 x 1.0	1.2 x 1.0	-	-	-	-	-	460	RHS_Open Drain
3.	213+700	213+850	150	150	1.2 x 0.8	1.2 x 0.8	-	-	-	-	-	300	BHS_Closed Drain
4.	213+850	214+050	200	200	1.2 x 0.8	1.2 x 0.8	-	-	-	-	-	400	BHS_Closed Drain
5.	214+050	214+500	450	450	0.75 x 0.8	0.75 x 0.8	-	-	-	-	-	900	BHS_Closed Drain
Total Length on each side (MCW), m			1030	1030	Total Length on each side (SR), m		290	290	Total Length, m			2640	

Details of minimum Storm water inlets spacing of the project stretch – Not Applicable

6.1.1 Details of Lined Drain (Trapezoidal) – Deleted.

6.2 Unlined Drains

Other than above mentioned locations shall be provided in the entire project length which gets terminated at all cross road locations. In case, the definite outfall is not available, a rainwater harvesting system shall be provided at the deepest location for dispersal of water.

The size of Unlined drain should have a minimum width of 0.6m at bottom, minimum depth of 0.6m and a minimum side slope of 2H to 1V. The Bed slope should be based on drainage profile.

The drainage plan shall account for the water from the ROW area along with the area outside the ROW as well.

6.3 Median Drain

Lined drain shall be provided in the center of the median at super elevation locations and depressed median. Draining of storm water from one carriageway to another carriageway is not permitted. the Concessionaire/ Contractor shall design the median drain based on site/design requirement mentioned in Schedule D with approval from the Independent Engineer and shall be connected with the nearest culvert/ outfall.

6.4 Drainage arrangement between Main Carriageway and Service/Slip Roads:

A suitable drainage arrangement for draining storm water of main carriageway shall be provided. Storm water of main carriageway to service road is not permitted.

6.5 Drainage where Embankment Height is more than 3m

Drainage chutes shall be provided at suitable interval on embankment slopes. The drainage arrangement shall include kerb, cement concrete drainage channel at the edge roadway. Cement Concrete Chutes, CC bedding, energy dissipation basin, etc. Mountable Kerb shall be provided beyond the post of MCB to channelize storm water into chute.

6.6 Drainage for Structures

A suitable drainage arrangement for draining storm water from deck slab shall be provided. Water shall not fall on any surface of the structures, or remain standing or flowing over the road below structure.

Gravity drainage arrangement shall be provided to lead off the water to nearest lead off point.

6.7 Drainage for Underpass and Subways Structures

A suitable drainage arrangement for draining storm water from Underpass and Subways shall be provided.

6.8 Drainage arrangement of Retaining Structures

Vertical Drop-down drainage pipes with suitable cleaning provision shall be provided at suitable interval. Drainage fixtures and dropdown pipes shall be of rigid, corrosion resistant material not less than 100 mm dia. The Storm water of main carriageway draining on service road is not permitted.

7. Design of Structures

7.1 General

Project Highway is proposed to be constructed to Four/Six-lane configuration with provision for widening to Six/eight-lane configuration in future. As such, superstructure of all bridges, culverts and structures is to be designed for edge movement of the vehicle considering stitching of new superstructure in future due to widening for additional lane. **Special vehicle loading is to be considered in design of all bridges, culverts and structures (IRC 6).**

All structures except wherever expansion joints have been provided, the pavement layers WMM, DBM & BC shall be continued over the structures for smooth riding quality of the project highway. These structures shall be designed considering the dead load of pavement (WMM, DBM, BC, etc) layers.

All major structures will be designed preferably as continuous slab to reduce the number of expansion joints on the MJB/ ROB/ flyover/ Interchange etc.

7.1.1 All bridges, culverts and structures shall be designed for IRC class Special Vehicle (SV) loading as per IRC: 6 and constructed in accordance with section-7 of the Manual and shall conform to the cross-sectional features and other details specified therein.

7.1.2 Clear width of Culverts (measured from inside of Head Wall to inside of Head Wall) should be equal to the overall roadway width of its approach (width of carriageway+ width of paved shoulder+ width of earthen shoulder+ width of median including shyness strip towards median as applicable).

7.1.3 Clear deck width of bridges/grade separated structures/RoBs (measured from inside to inside of crash barrier) shall be equal to the roadway width (carriageway width+ paved shoulder width+ earthen shoulder width+ width of median including shyness for raised median /depressed median as applicable) in their approaches.

Wherever footpath is provided on bridge/RoB, RCC crash barrier should be provided between footpath and carriageway and pedestrian guard rail at outer edges of the bridge/RoB. In case of footpath on bridge/RoB, the width of earthen shoulder shall be tapered at the rate of 1:15

7.1.4 The Safety Barrier and Footpath on Bridges and RoB shall continue on approaches. The footpath shall be provided with paved surface & railing till the embankment height is more than 3m.

Details of Structures with footpaths

Sl. No	Location at km	Skew Angle	Footpath Width(m)		Remarks
			Left	Right	
1	211+750	14	1.5	1.5	Crossing Nala; Footpath in service Road bridge
2	212+014	-	1.5	1.5	Crossing Canal; Footpath in service Road bridge

7.1.5 All bridges shall be high level bridges.

7.1.6 All structures shall be designed to carry utility services on outer side of RCC barrier/Railing as per site requirement.

7.1.7 Cross section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross sections given in **Annexure II of the Schedule-B**.

7.2 Culverts

7.2.1 Overall width of all culverts shall be equal to the roadway width of the approaches. The overall width of culverts shall be including width of main carriageway and slip/service roads/Entry ramps/Exit Ramps/ Acceleration/Deceleration lanes, etc. All culverts shall also be continued in median and in gap between main carriageway and service road.

7.2.2 New/Reconstruction of existing RCC pipe culverts: The existing culverts at the following locations shall be re-constructed as new culverts:

Sl No	Design Chainage	Culvert Type	Skew Angle	Span/ Opening (m)	New/ Reconstruction	Culvert Crossing Type
Nil						

7.2.3 Widening of existing RCC pipe culverts.

All existing culverts which are to be retained shall be widened to the proposed roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sl No	Design Chainage	Skew Angle	Span/ Opening (m)	Repairs/Rehabilitation Proposals	Culvert Crossing Type
Nil					

7.2.4 Construction of Box Culverts:

7.2.5 New culverts (given in table below) shall be constructed for width equal to the proposed roadway width of the Project Highway & as per typical cross-section given in schedule B. The details are given as under: -

Sl No	Design Chainage	Culvert Type	Skew Angle	Span/ Opening (m)	New/ Reconstruction	Culvert Crossing Type	Remarks
1	210+628	Box Culvert	34	1x1.50x1.50	New Construction	Field channel	-
2	210+678	Box Culvert	-	1x1.50x1.50	New Construction	Field channel	-
3	210+758	Box Culvert	44	1x3.00x2.00	New Construction	Branch Nala	-
4	210+880	Box Culvert	23	1x1.50x1.50	New Construction	Field channel	-
5	211+060	Box Culvert	16	1x1.50x1.50	New Construction	Field channel	-
6	211+097	Box Culvert	-	1x1.50x1.50	New Construction	Field channel	-
7	211+122	Box Culvert	-	1x1.50x1.50	New Construction	Branch Nala	-
8	211+290	Box Culvert	18	1x2.0x2.0	New Construction	Branch Nala	-
9	211+497	Box Culvert	10	1x3.00x1.5	New Construction	Canal	-
10	211+600	Box Culvert	23	1x1.50x1.50	New Construction	Field channel	-
11	211+950	Box Culvert	-	1x2.0x2.0	New Construction	Branch Nala	-
12	212+150	Box Culvert	13	1x1.50x1.50	New Construction	Field channel	-
13	212+585	Box Culvert	-	1x1.50x1.50	New Construction	Field channel	-

Sl No	Design Chainage	Culvert Type	Skew Angle	Span/ Opening (m)	New/ Reconstruction	Culvert Crossing Type	Remarks
14	212+748	Box Culvert	18	1x5.00x2.0	New Construction	Nala	-
15	213+050	Box Culvert	0	1x4.00x1.50	New Construction	Canal	-
16	213+255	Box Culvert	10	1x2.00x1.50	New Construction	Canal	-
17	213+633	Box Culvert	20	1x2.00x2.00	New Construction	Branch Nala	-

Nala Training

Sl No.	From	To	Nala Training				Total length, m	Remarks
			Length in m		Min. bottom width x Min. Depth of drain			
			LHS	RHS	LHS	RHS		
1	213+630	213+850	-	220	-	2.0* x 2.0*	220	Nala Training on RHS
Total Length on each side, m			-	220	Total Length, m		220	

*Clear dimension of drain

7.2.6 Widening / Reconstruction of existing box culverts

All existing culverts which are to be retained shall be widened to the proposed roadway width of the Project Highway as per the typical cross section given in Schedule-B. Repairs and strengthening of existing structures where required shall be carried out.

Sl No	Design Chainage	Skew Angle	Span/ Opening (m)	Repairs/ Rehabilitation Proposals	Culvert Crossing Type	Remarks
1	210+253	13	1x2.0x2.0	Reconstruction	Branch Nala	Crossing branch Nala in agricultural field

7.2.7 Culverts on Cross roads are provided at following locations.

Sl .No.	Design Chainage	Junction Type	Leads To	
			LHS	RHS
Nil				

7.2.8 Utility ducts in bypasses (Greenfield as well as Brownfield which is being upgraded) in form of NP-4 RCC Pipe dia 600 mm shall be provided across the Project Highway@ 0.50 km c/c and along with inspection chamber were directed for crossing of utilities anywhere as per Manual (Clause 2.16) requirements.

Location for Utility Ducts

Sr. No	Design Chainage (km)		Remark (No. of Utility ducts to be provided)
	From	To	
1	209+760	214+500	9 Nos.

Note:

The locations of the utility ducts shall be finalized in consultation with Engineer/NHAI.

7.3 Bridges

7.3.1 Existing bridges to be re-constructed/widened – Deleted

7.3.2 Additional New Bridges: New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

- 1 All Major and Minor Bridges to be designed for approach protection with concrete Toe wall with filter media and stone/ block pitching up to HFL of bridge +0.6 m with full height stone/ block pitching in cone filling portion of all four sides of abutments.
- 2 All river bridges & underpasses without slip roads shall be provided with steps for accessing the bottom in all four-cone filling portion for easy assessable bridges and approaches.

Major Bridge

Sl No	Design Chainage	Total Proposed Length(m)**	Type of Crossing	Total Proposed width(m)#		Typical Cross Section of Manual	Skew Angle
				MCW	SR		
Nil							

Minor Bridge

Sl No	Design Chainage	Total Proposed Length(m) **	Type of Crossing	Total Proposed width(m)		Typical Cross Section of Manual	Skew Angle
				MCW	SR		
1	211+750	14.00 (2x7.00) (SQ) **	Nala	28.610 (SQ)	2x11.00 (SQ)	As per attached GAD	14
2	212+014	MCW-12.00(1x12.00) *; SR-6.0** (1x6.00)	Mud Road and Canal	28.610	2x11.00	As per attached GAD	-

*Span from Centre to centre of expansion joint.

** Clear Span and vent height

(SQ) – Square Dimension

7.3.3 Deleted

7.3.4 The existing bridges/ RoB/ Grade Separators/ RUB retained on the project highway shall be upgraded and rehabilitation measures/proposals shall be specified as follows:

Sl. No.	Location at Km	Rehabilitation Proposals	Remarks
Nil			

7.3.5 Structures in marine environment: - Deleted

7.4 Railroad Bridges (ROB/RUB) - Deleted

7.4.1 Deleted

7.4.2 Deleted

7.4.3 Note: Deleted

7.5 Deleted

7.6 Grade Separated Structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9 & 3 of **Annexure I of Schedule-B**.

7.7 FOB / Skywalks - Deleted

7.8 A summary of Culverts, Bridges and Structures shall be presented as follows:

Sl No	Name of the Structure	Numbers	Remarks
1	Flyover	02	New Construction
2	Vehicular Underpass	01	New Construction
3	Small Vehicular Underpass	01	New Construction
4	Vehicular Overpass	01	New Construction
5	Minor Bridge	02	New Construction
6	Box Culvert	18	New Construction-17, Reconstruction-1
Total no. of Structures		25	-

7.9 Span lengths for all the culvert and structures under this clause (7) are the base lengths for the Contract. Any authorized/ approved increase or decrease in the span length or/ and type/ specification of the structures will be subject to positive/ negative change of scope.

8. Traffic Control Devices and Road Safety Works.

8.1 Traffic control devices and road safety works shall be provided in accordance with Section 9 of the IRC: SP:84.

8.2 Traffic Signs:

Traffic signs shall be provided as per IRC 67, MoRTH circular no. RT-25035/07/2023-RS (Part) (221534) dated 24th December 2024, and NHAI Policy Circular No 12.40/2025 dated 20th September & 12.41/2025 dated 23rd September 2025 as mentioned in Schedule-C.

8.3 Pavement Marking:

Pavement markings shall be completed as per IRC 35 & RT-25035/07/2023-RS (Part) (221534) dated 24th December 2024 as mentioned in Schedule-C.

8.4 Safety Barrier:

The safety barriers shall be provided in accordance with Section-9 of the Clause 9.7 of the Manual. The Safety Barrier length proposed are excluding the safety barrier already proposed on Culverts, Grade Separated Structures, Interchange, Bridges, RoB and RUB as applicable cross sections respectively.

End Treatment of Steel barriers/Rope Barrier shall be specified i.e. MELT or P-4 confirming to EN 1317-4, TT, MBCB barrier to Concrete Barrier.

End Treatment to Concrete barrier shall be done as specified in Clause No. 9.7.3 (b) IRC: SP:84- 2019

The New Jersey Crash Barrier with Antiglare will be installed along the median on the entire stretch of the improvement length.

The details of the location are as below:

Sl.No.	Item	LHS		RHS		Total Length (m)	Remarks
		From	To	From	To		
1	W-Beam Single faced metal crash barrier	213+400	213+630	213+400	213+630	460	BHS
		213+630	213+700	213+630	213+700	140	BHS
		213+700	213+850	213+700	213+850	300	BHS
		213+850	214+050	213+850	214+050	400	BHS
		Total Length (m)				1300	
2	New Jersey Crash Barrier	209+760 to 214+500				4740	Median
		Total Length (m)				4740	
3	RCC Crash Barrier	210+050	212+020	210+050	212+020	6340	BHS
		214+050	214+500	214+050	214+500	900	BHS
		Total Length (m)				7240	

9. Roadside Furniture

9.1 It shall be provided as per the details mentioned in Schedule-C.

10. Hazardous Locations

The safety barriers shall be provided at the following hazardous location such as ponds, well, electric sub-station, Electric tower, spilt carriageway, etc.

11. Special Requirement:

Retaining Structure and protection works shall be provided at locations as indicated below and as provided in TCS schedule in cl. 2.11 of schedule-B.

Sr. No.	Design Chainage (Km)		Length (m)	Side	Height (m)	RS Wall Retaining Structure / Toe Wall	Type of Safety Barrier	Remarks
	From	To						
1	210+050	213+220	3170	BHS	5.8 (Average)	RS Wall	RCC Crash Barrier	-
2	214+050	214+500	450	BHS	3.8 (Average)	Retaining Wall	RCC Crash Barrier	-
	Total		3620					

12. Open Well within RoW

The Open well shall be identified and appropriate treatment shall be provided.

13. Shifting of Utilities

The Concessionaire / Contractor shall undertake the work of shifting of any utility (including electric lines, water pipes, gas pipelines and telephone cables) to an appropriate location or alignment, in accordance with the provisions of Concession Agreement.

13.1 Shifting of obstructing utilities indicated in Schedule A to an appropriate location in accordance with standards and specifications of concerned Utility Owing Department is part of the scope of work of the Concessionaire. Copy of utility relocation plan is enclosed in **Annexure – VI**. The specifications of concerned Utility Owing Department shall be applicable.

13.2 The type/ spacing/ size/ specifications of poles/ towers/ lines/cables to be used in shifting work shall be as per the guidelines of Utility Owing Department and it is to be agreed solely between the Concessionaire and the Utility Owing Department. No change of scope shall be admissible, and no cost shall be paid for

using different type/ spacing/ size/ specifications in shifting work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of utility Owning department and/ or construction of project highway. The Concessionaire shall carry out joint inspection with Utility Owning Department and get the estimates from Utility Owning Department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Concessionaire to Utility Owning Department whenever asked by the Concessionaire. The decision/ Approval of utility owning department shall be binding on the Concessionaire.

- 13.3 The dismantled material/ scrap of existing Utility to be shifted/ dismantled shall belong to the Concessionaire/ Contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the Concessionaire/ Contractor is required to deposit the dismantled material to Utility Owning Department as per the norms and practice and, in that case the amount of credit for dismantled material may be availed by the Concessionaire/ Contractor as per estimate agreed between them.
- 13.4 The utilities shall be handed over after shifting work is completed to Utility Owning Department up to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned
- 13.5 The supervision charges at the rates / charges applicable of the utility owing department shall be paid directly by the authority to the utility owing department as and when Concessionaire/ Contractor furnishes demand of utility owing department along with a copy of estimated cost given by the letter.
- 13.6 Existing lights, junction boxes, connection to individual properties along the affected section shall be disconnected and reconnected as part of utility relocation and the same shall be in the scope of the Concessionaire/ Contractor.

14. Work Zone Traffic Management Plans

The traffic diversion plans shall be prepared as per IRC SP 55 for smooth flow of traffic and safety. A diversion plan shall be proposed for construction of Culvert, Grade Separated Structures, Bridges, RoB/RUB, etc. and traffic management plan for widening/ reconstruction of carriageway.

Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.



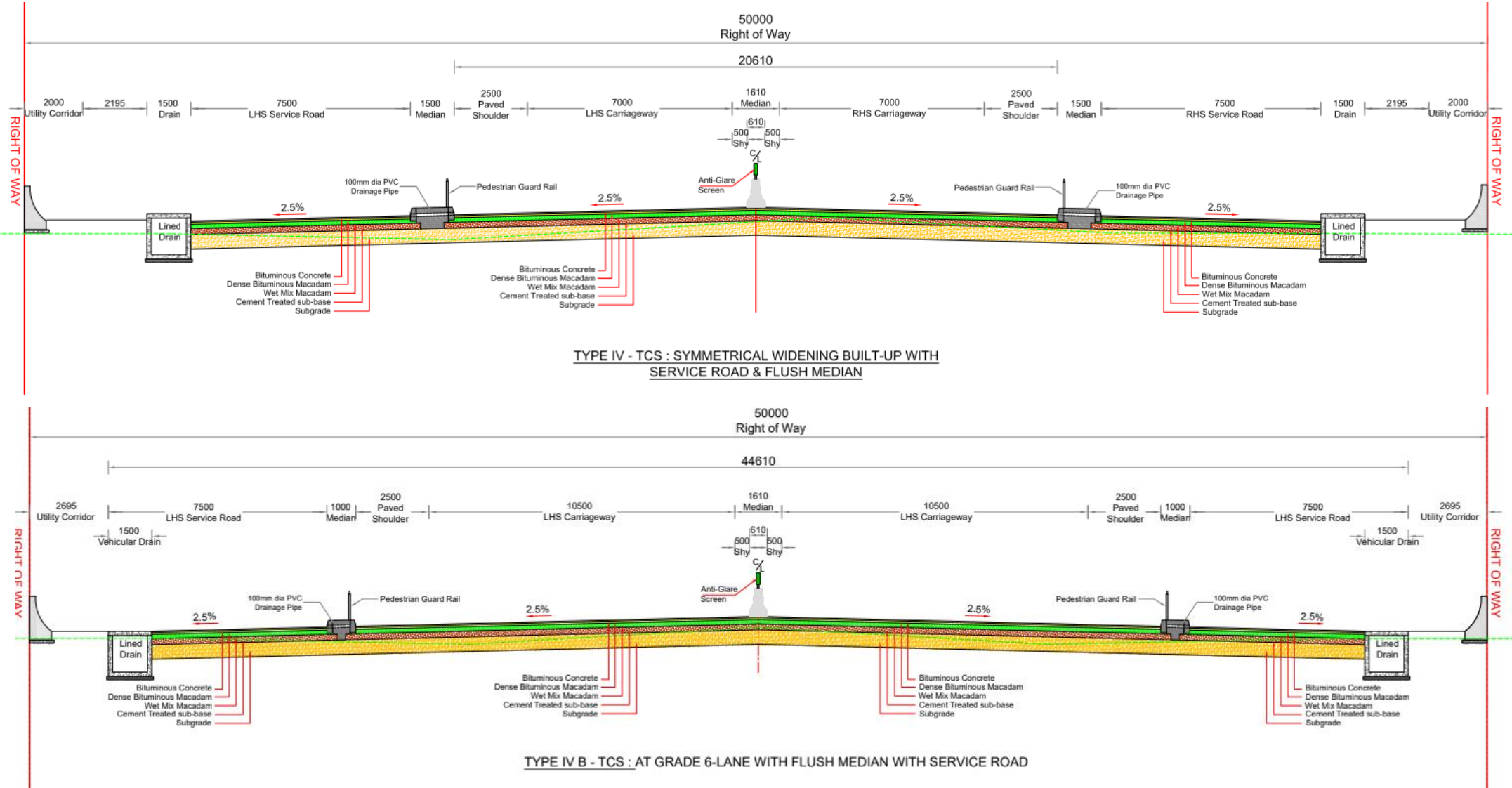
Schedule B

Sl No.	Design Chainage (Km)		Construction Activity	Diversion	Traffic Management Plan	Barricading Type – III/IV/CC Barrier with Lighting along barrier	Deployment of Flagman In Habitation/ Schools/ Hospital, etc.	Remarks
	From	To						
			Construction of Pavement / grade Separators / Bridges / Structures etc.					

Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.

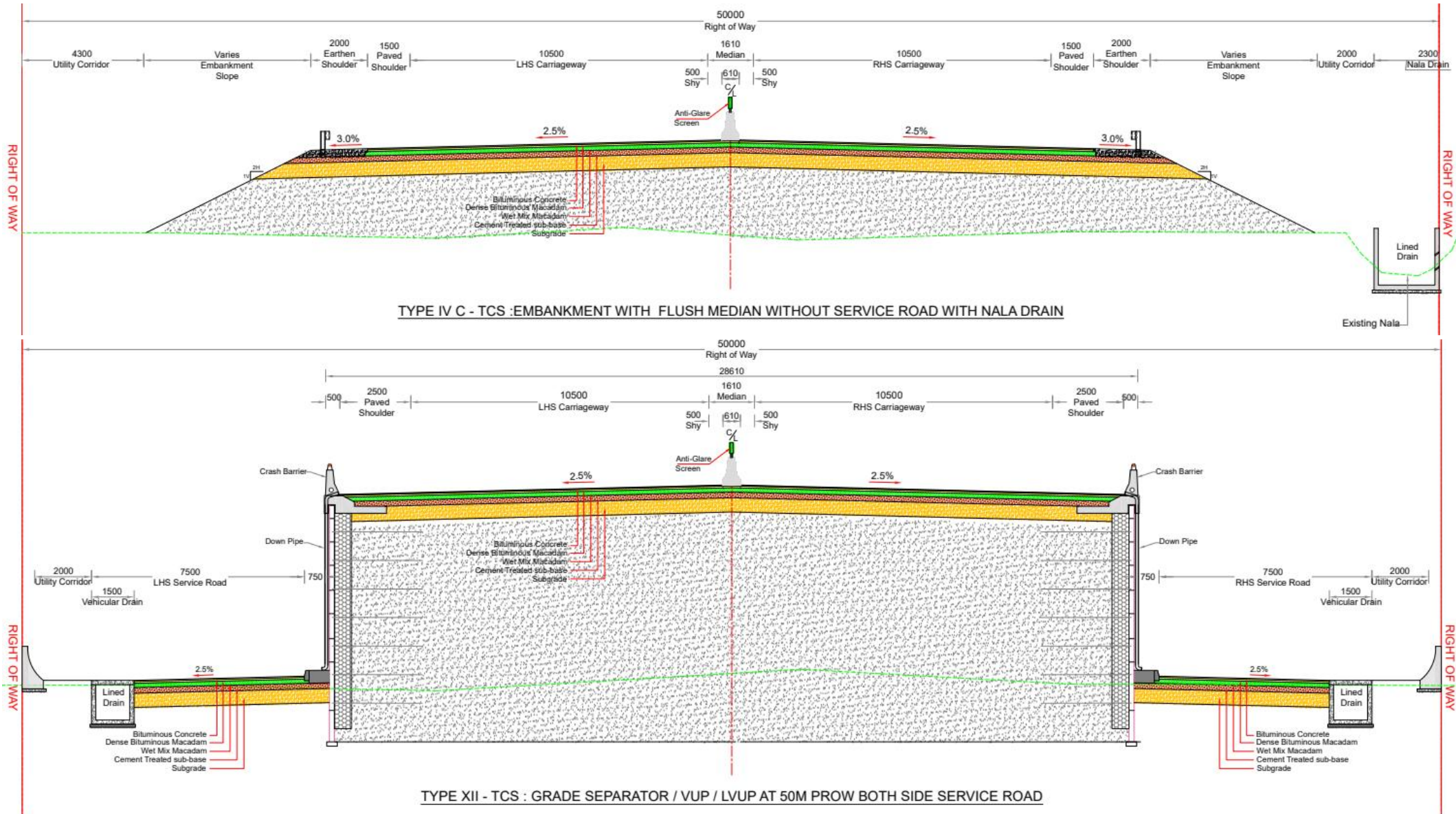
Annexure II of Schedule B

Annexure – II (Schedule – B) Typical Cross Sections



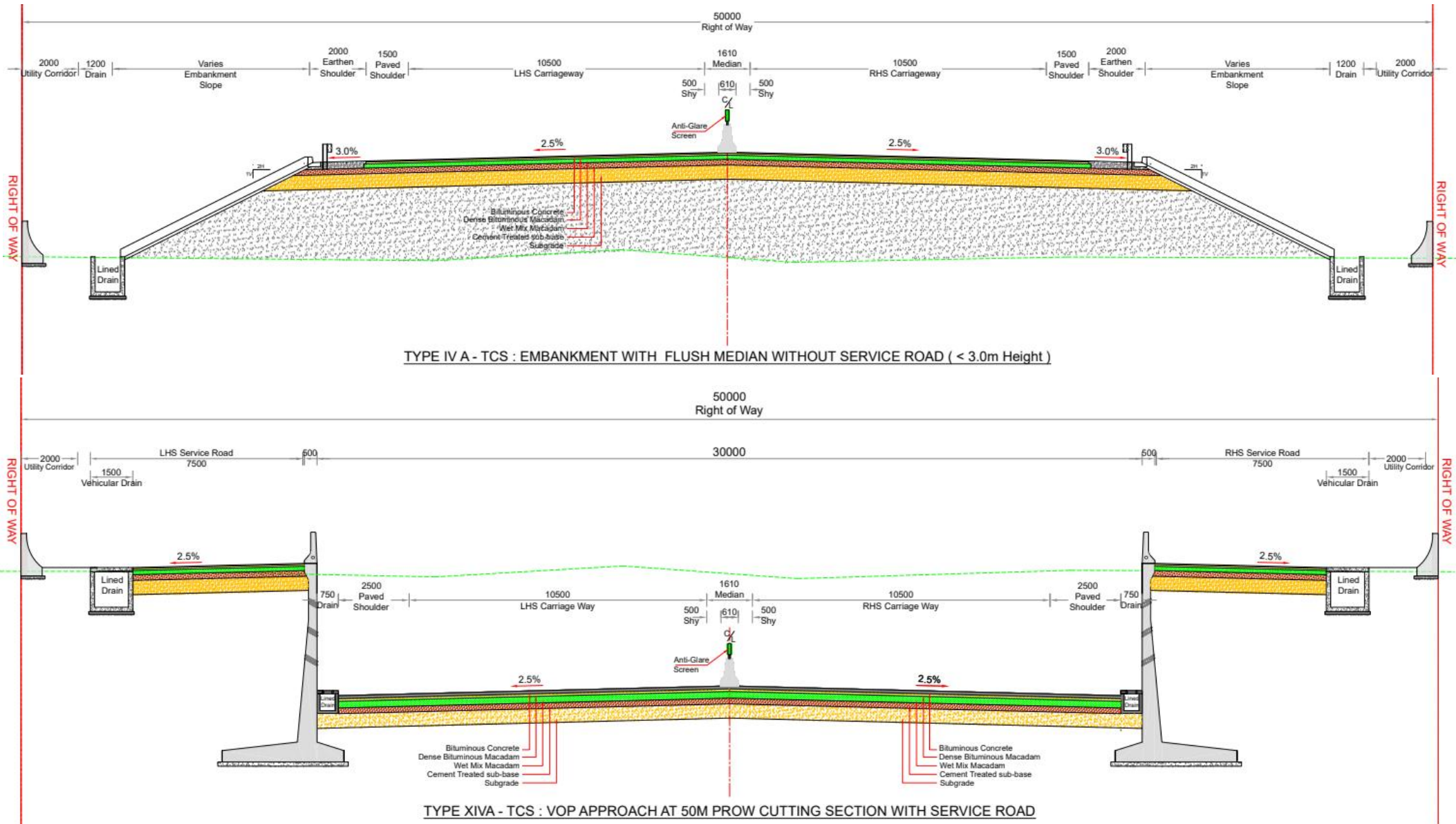
Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.

Annexure II of Schedule B



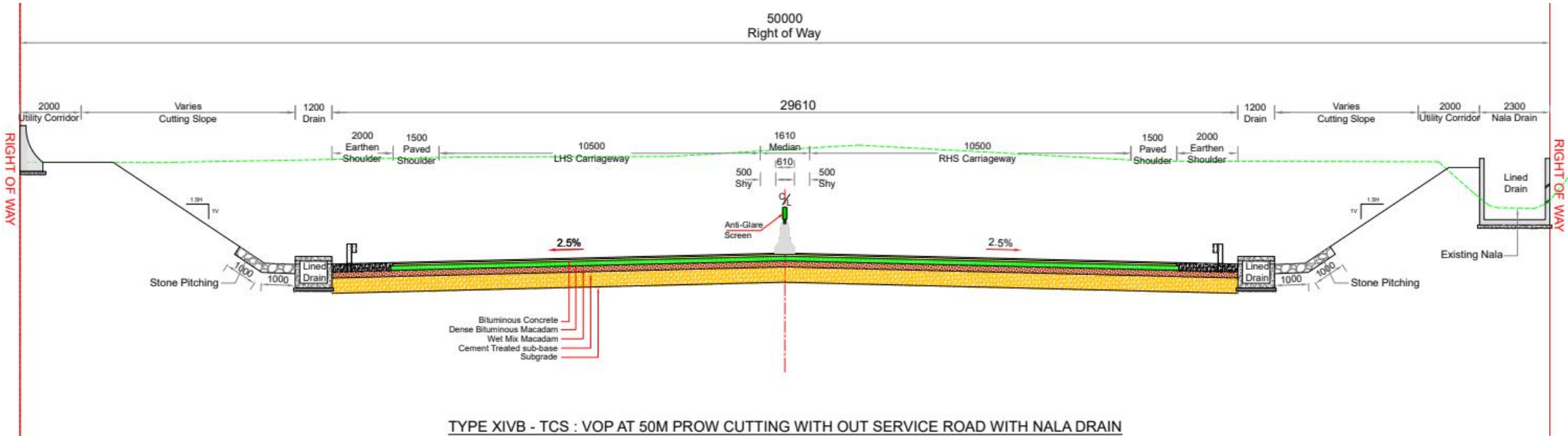
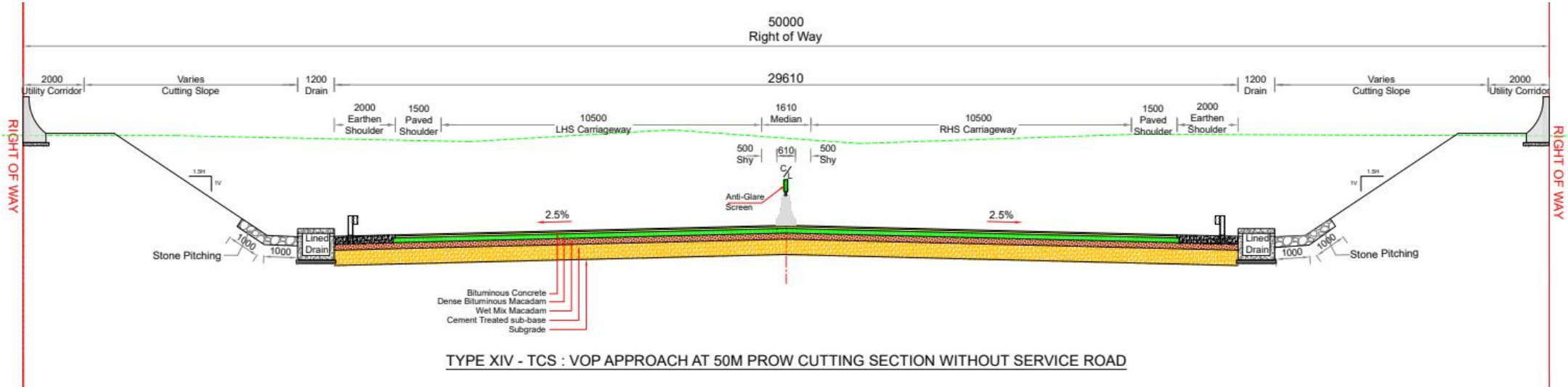
Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.

Annexure II of Schedule B



Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.

Annexure II of Schedule B



Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.

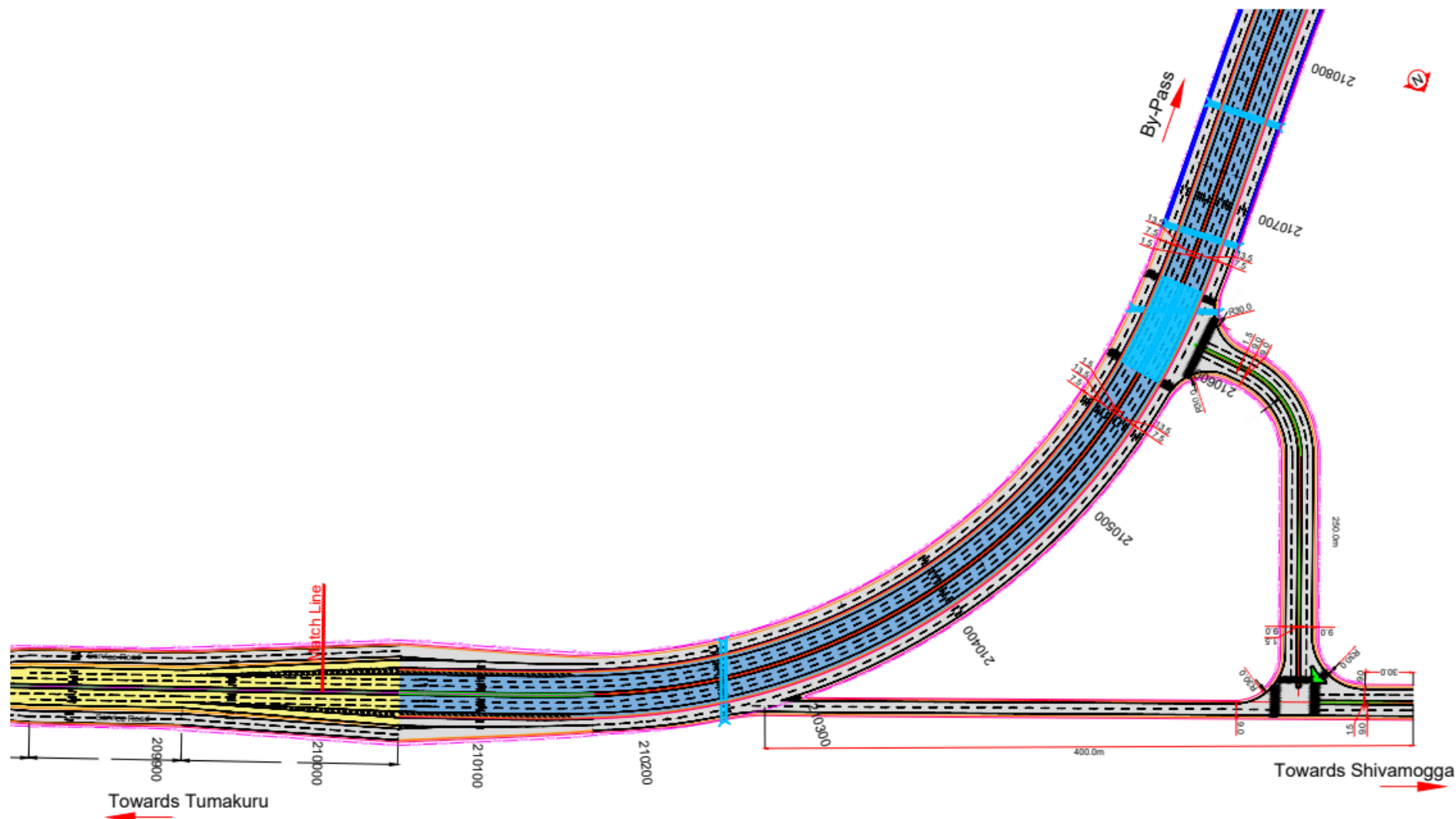


Annexure III of Schedule B

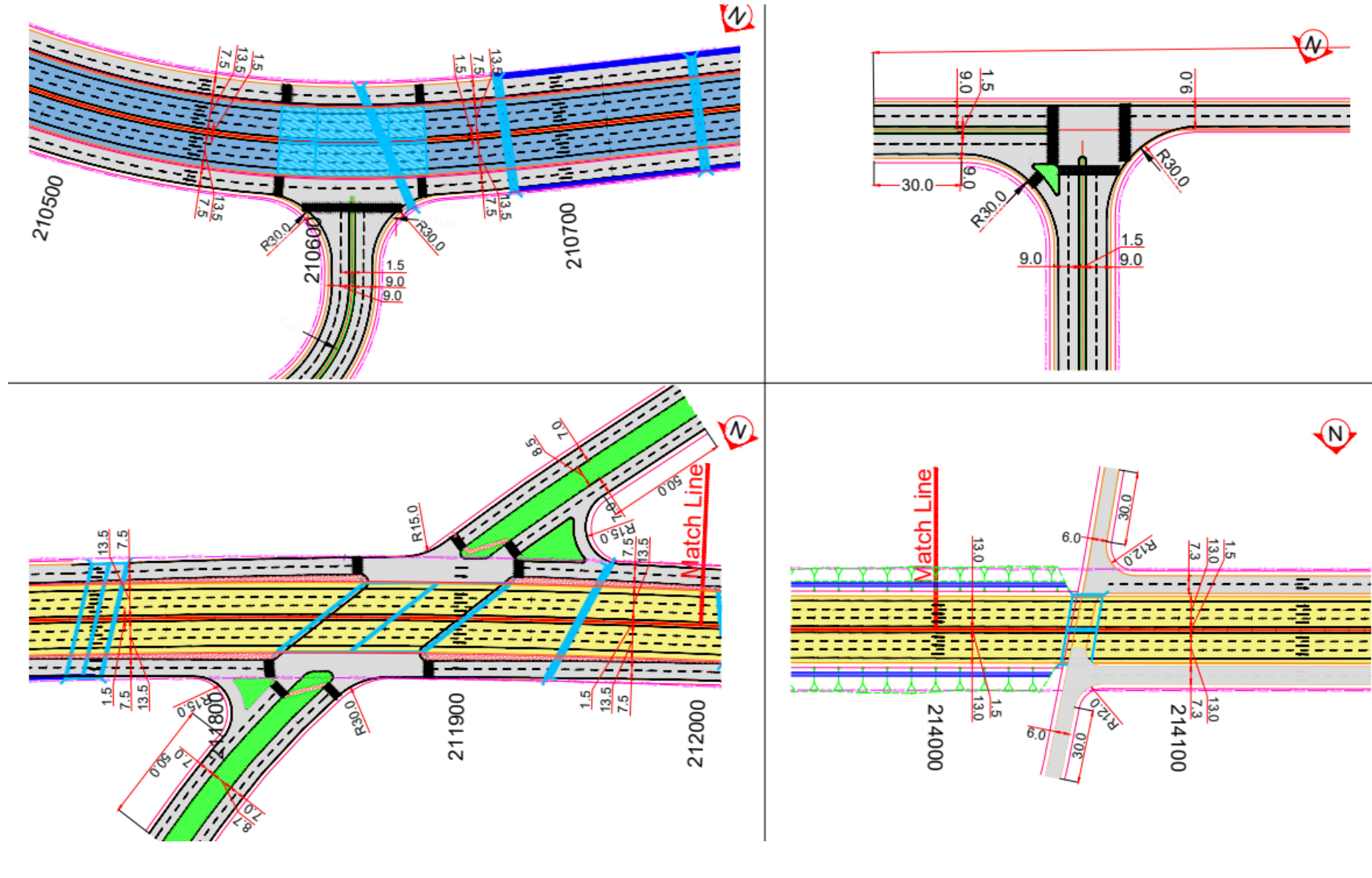
Annexure – III – Deleted

Annexure – IV

Layout, Geometric design and Typical Cross Sections of Junctions

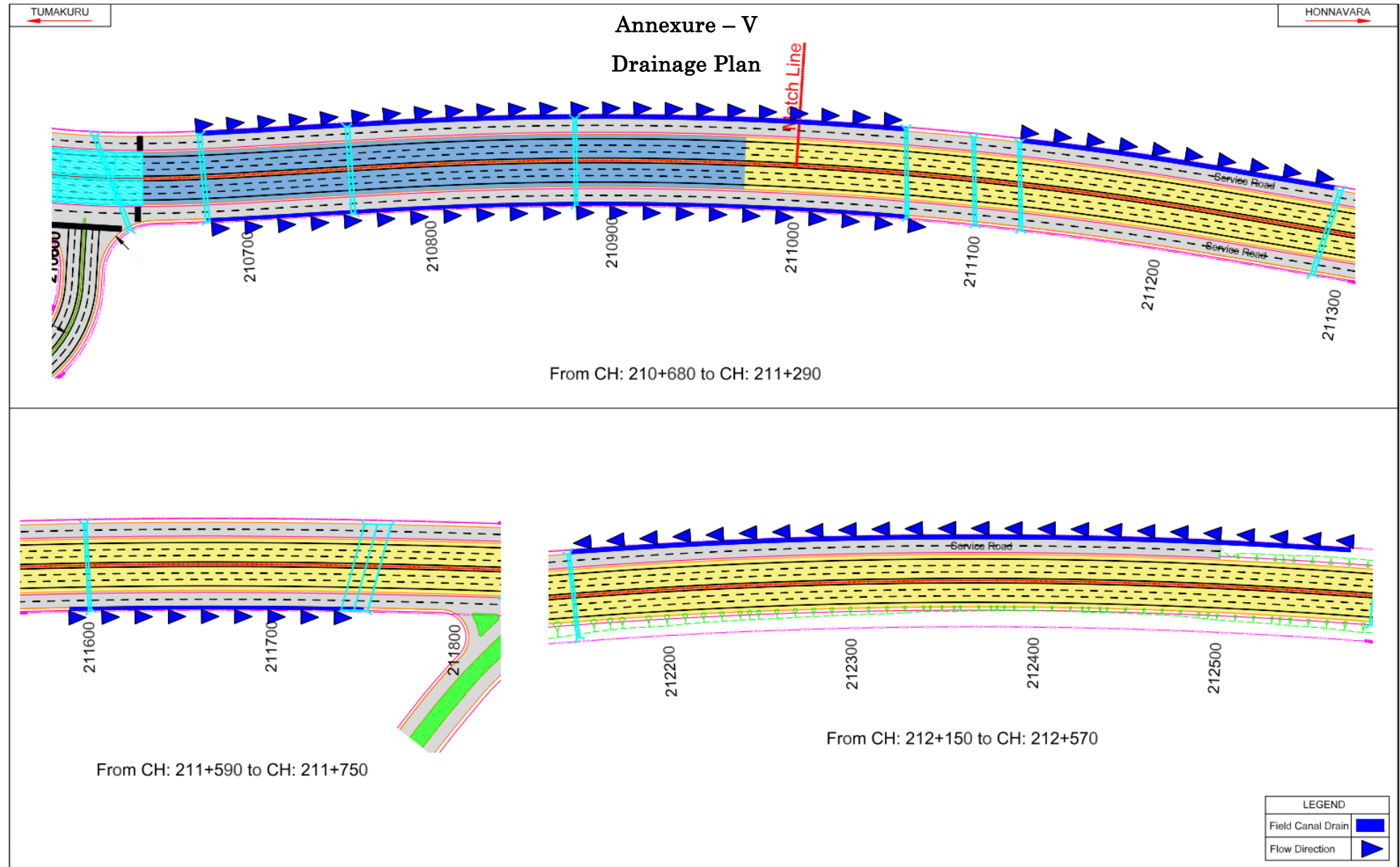


Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.



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Annexure V of Schedule



Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.

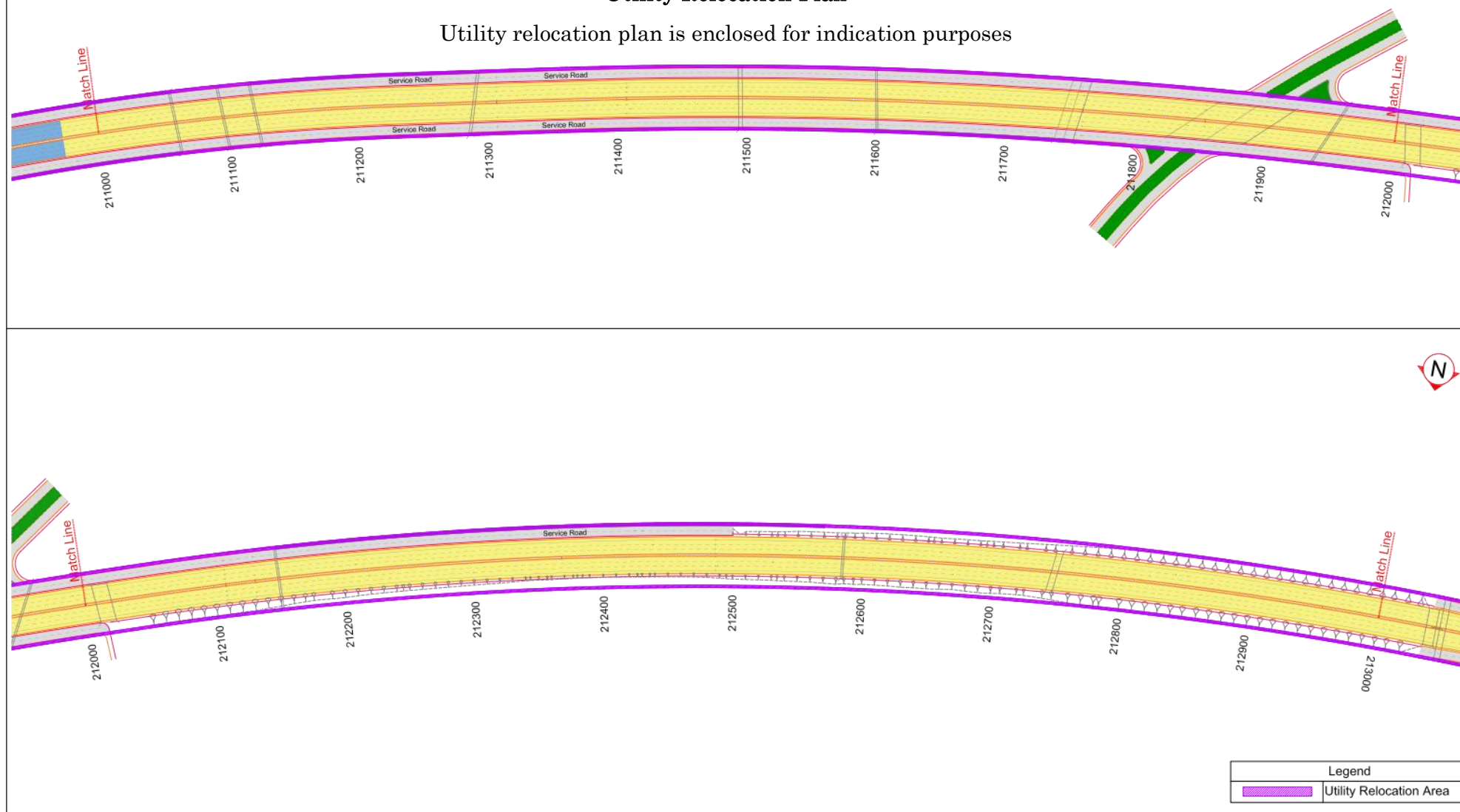


Annexure VI of Schedule B

Annexure – VI

Utility Relocation Plan

Utility relocation plan is enclosed for indication purposes

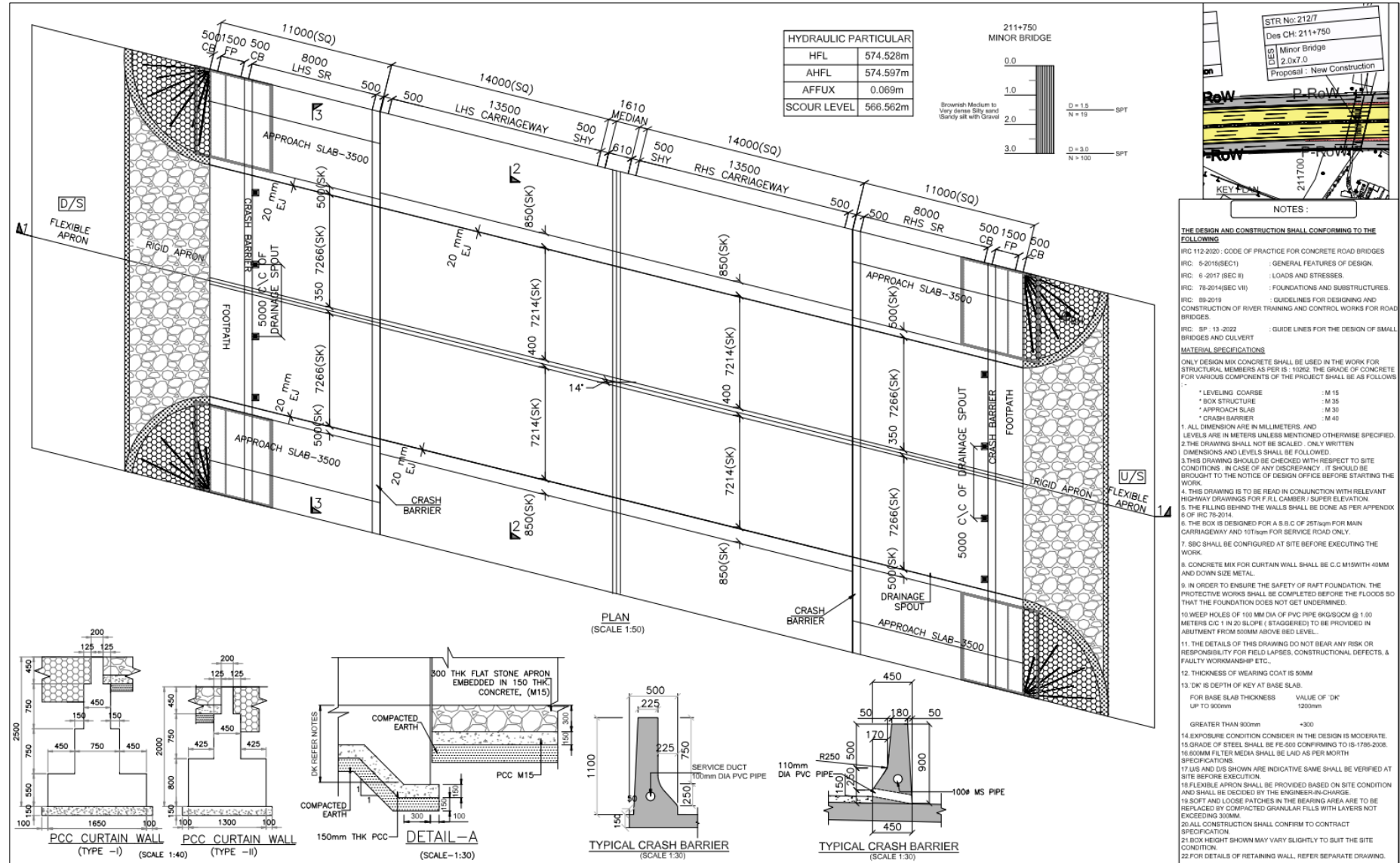


Construction of De Scoped Length of Four Lane Bypass (NH 206) for Shivamogga City” Project Length – 4.74 Km from Km.209.760 to Km.214.500 (Design Chainage) under NH (O) on EPC Mode in the State of Karnataka.



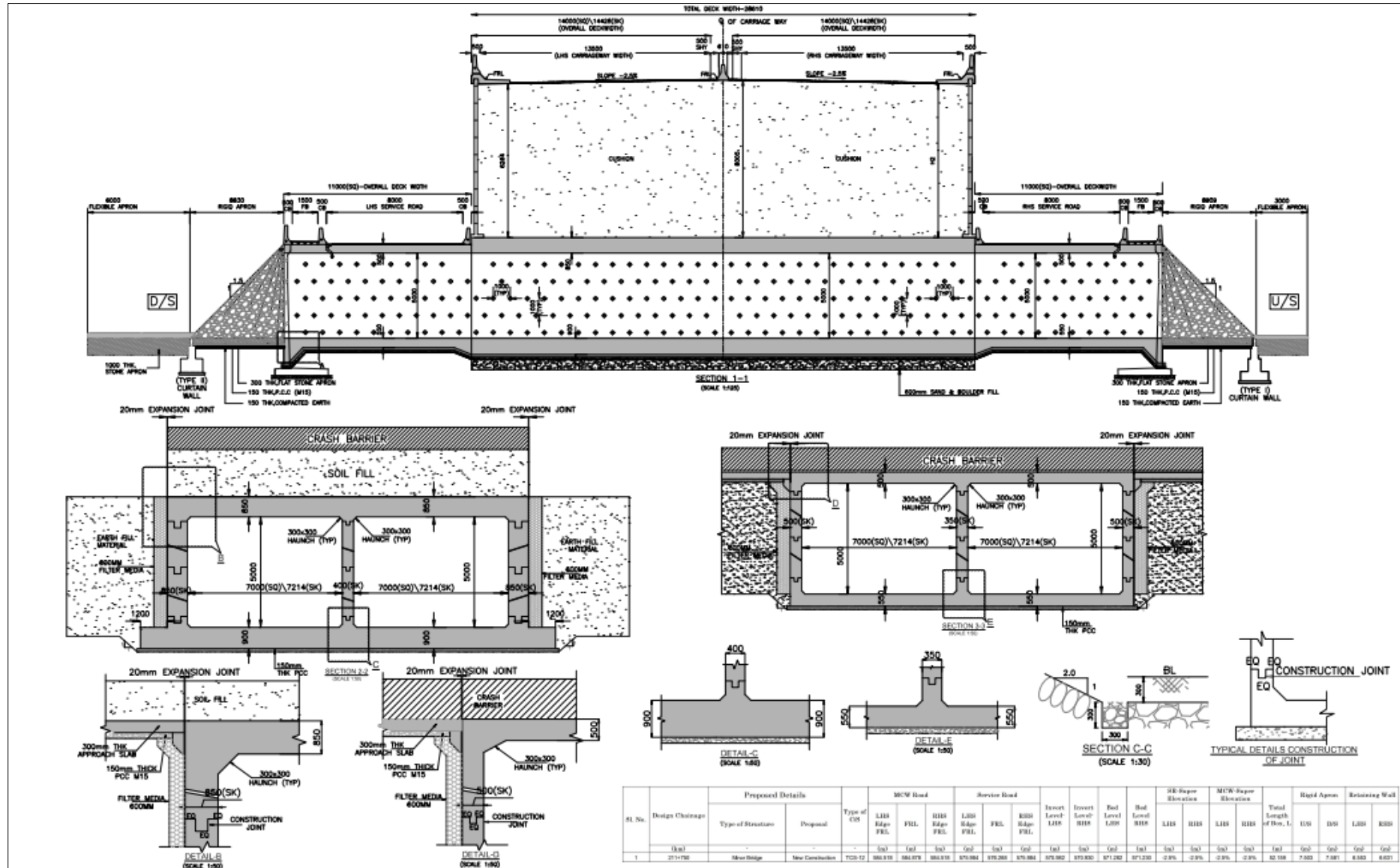
Annexure VII of Schedule B

Annexure – VII General Arrangement Drawings

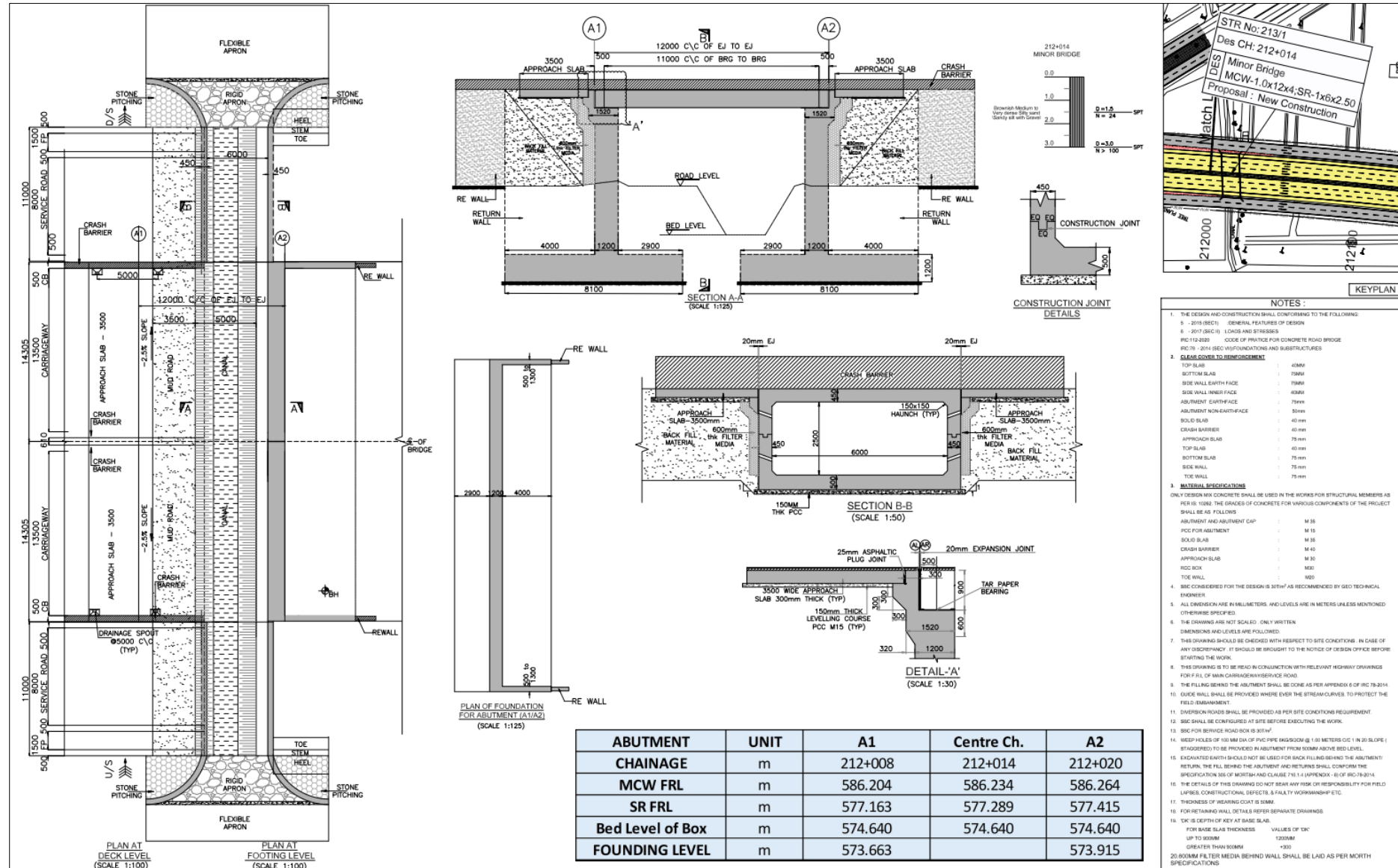


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Annexure VII of Schedule B

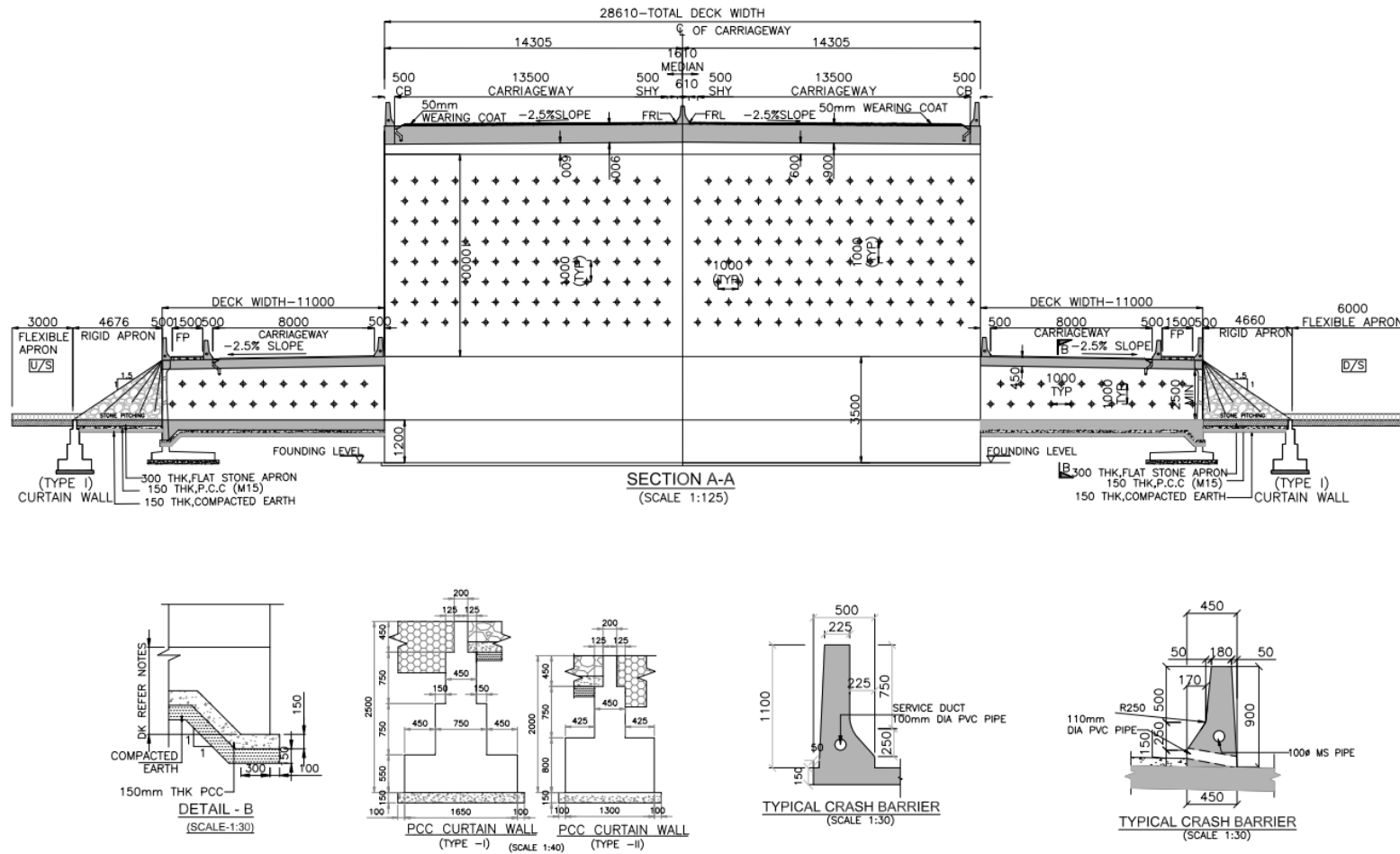


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Annexure VII of Schedule B



Sl. No.	Design Chainage	Existing Details			Proposed Details							Type of C/S	MCW Road			Service Road		Invert Level-LHS	Invert Level-RHS	Bed Level LHS	Bed Level RHS	SR-Super Elevation		Total Length of Box, L	Rigid Apron		Retaining Wall	
		Type of Structures	Span Arrangement	Proposal	Span Arrangement			Dimensions			LHS Edge FRL		FRL	RHS Edge FRL	LHS Edge FRL	RHS Edge FRL	LHS					RHS	U/S		D/S	LHS	RHS	
					No. of Spans	Span, a	Height, b	Top Slab, c'	Side Wall, d'	Bottom Slab, e'																		
1	212+014	Box Culvert	1 X 6	New Construction	1	6.00	2.50	0.45	0.45	0.50	TCS-12	576.901	577.163	576.901	576.901	576.901	574.340	574.351	574.640	574.651	-2.50%	-2.50%	6.900	3.841	3.824	2.941	2.924	

Annexure-I Schedule C Project Facilities

SCHEDULE - C

(See Clause 2. 1)

PROJECT FACILITIES

1. Project Facilities

The Concessionaire shall construct the project facilities in accordance with the provisions of this agreement. Such Project facilities shall include:

- a) **Toll Plaza - deleted**
- b) **Road side furniture**
 - a. Kilometer and Hectometer Stones
 - b. Traffic Signs
 - c. Overhead Signs
 - d. Road Marking
 - e. Road Delineators
 - f. Reflective Pavement Markers & Solar Studs
 - g. Traffic Impact Attenuators
 - h. Boundary wall and Fencing
 - i. Antiglare screen
 - j. Providing End Terminals
- c) Operation and Maintenance centres - deleted
- d) Way side Amenities / Service Areas - deleted
- e) Truck lay-byes - deleted
- f) Bus Bay and Bus shelter - deleted
- g) Pedestrian Facilities - deleted
- h) Highway Lighting
- i) Rainwater Harvesting- deleted
- j) Environmental Management Plan - deleted
- k) Land Scaping and Tree Plantation
- l) Advanced Traffic Management System (ATMS)
- m) Highway Patrol Units - deleted
- n) Emergency medical services - deleted
- o) Crane Service - deleted
- p) Buildings for Traffic Aid Posts (For HAM Projects) - deleted
- q) Building for Medical Aid Post (For Ham Projects) - deleted

1.1 Project Facilities to be completed on or before project completion date have been described in **Annexure-I of this Schedule-C.**

Annexure - II
(Schedule-C)

PROJECT FACILITIES

1. Project Facilities

The Concessionaire shall construct the project facilities in accordance with the provisions of this agreement. Such Project facilities shall include:

- a) **Toll Plaza - deleted**
- b) **Road side furniture**
 - a. Kilometer and Hectometer Stones
 - b. Traffic Signs
 - c. Overhead Signs
 - d. Road Marking
 - e. Road Delineators
 - f. Reflective Pavement Markers & Solar Studs
 - g. Traffic Impact Attenuators
 - h. Boundary wall and Fencing
 - i. Antiglare screen
 - j. Providing End Terminals
- c) **Operation and Maintenance centres - deleted**
- d) **Way side Amenities / Service Areas - deleted**
- e) **Truck lay-byes - deleted**
- f) **Bus Bay and Bus shelter - deleted**
- g) **Pedestrian Facilities**
- h) **Highway Lighting**
- i) **Rainwater Harvesting- deleted**
- j) **Environmental Management Plan - deleted**
- k) **Land Scaping and Tree Plantation**
- l) **Advanced Traffic Management System (ATMS)**
- m) **Highway Patrol Units - deleted**
- n) **Emergency medical services - deleted**
- o) **Crane Service - deleted**
- p) **Buildings for Traffic Aid Posts (For Ham Projects) - deleted**
- q) **Building for Medical Aid Post (For Ham Projects) - deleted**

Description of Project Facilities

Each of the Project Facilities is briefly described below:

1.1 Toll Plaza – Deleted

1.1.1 Note: - Deleted

1.2 Roadside furniture

1.2.1 Kilometre and Hectometre Stones

Sl. No	Item	Number	Remarks
1	Kilometer Marker/ Stones (including 5th Kilometer stone)	17	The KM / Hectometre stones/Marker can be Concrete/Stones and shall be placed on both outer side of the earthen shoulder. The size of Kilometer / 5th Kilometer / Hectometre will be as per Manual.
2	Hectometre Marker/Stones	63	In case KM/ Hectometre marker are to be fixed on separator between Main Carriageway & Service Road then these should be fixed as reflective signs. In case of Access Control Highway/Expressway, KM/ Hectometre marker should be fixed as reflective signs. Km/ Hectometre stones are required to provide on main carriageway and Service Road, both if continuous Service Road is provided throughout project length (Service Road length is more than 1Km).

1.2.2 Traffic Signs

Traffic Signs include roadside signs, overhead signs and kerb mounted signs etc. shall be provided along the entire Project Highway and on all Side, Roads joining the main carriageway/service road. A QR code shall be marked on back of each sign as per IRC 67. Traffic signs shall be provided as per IRC 67, MoRTH circular no. RT-25035/07/2023-RS (Part) (221534) dated 24th December 2024, and NHAI Policy Circular No 12.40/2025 dated 20th September & 12.41/2025 dated 23rd September 2025.

All sign shall be of Micro Prismatic Grade Sheeting Corresponding to Class C sheeting as per ASTM D 4956 Type VIII, IX and XI.

All shoulder mounted signs shall be supported on GI Pipes, minimum diameter of 80mm. Overhead Signs shall be placed on a structurally sound gantry or cantilever structure made of GI pipes.

On multi lane roads (6 lanes or above), signs shall be mounted overhead

The siting of signs shall confirm to Table 4.1 and Fig 4.1 of IRC 67. The two successive signs shall be placed at a minimum distance of $0.6 \times V$ metre (V is design speed in Kmph).

1.2.3 The overhead gantry signs shall be placed as given below:

Sl. No	Item	Carriageway (Left, Right, Both)
1	Overhead Gantry Signs	Both
a	Start of Project	209+780
b	End of Project	-
c	Toll Plaza location on both side	-
d	Advance direction sign ahead of a Grade separated junction / Interchange	210+615
e	Speed gantry	212+600
2	Overhead Cantilever Gantry signs	Either Left or Right
a	At all major location's crossroads i.e. NH, SH, MDR (start of grade separated structure/at grade interchange)	-
b	At major trauma center, roads leading to religious places or any other important location	-
3	Double/Butterfly Cantilever	-

The detailed minimum number of signages indicating places, direction, distances, and other features shall be marked on the alignment plan and submitted, which are as mentioned below.

Sl. No	Road Signs	Number / Length	Remarks
I	Mandatory / Regulatory	-	-
1	Stop signs	7	-
2	Give Way Signs	2	-
3	Prohibitor signs		-
4	No parking signs	8	-
5	No Stopping signs		-
6	Speed Limit signs (Circular)	4	-
7	Speed Limit signs (Vehicle Type)	4	-
8	Vehicle Control signs		-
9	Restriction Ends signs		-
10	Compulsory Direction Control and other signs		-
II	Cautionary/Warning	-	-

Sl. No	Road Signs	Number / Length	Remarks
11	Left/Right Curve	-	-
12	Left/Right Curve with side road	-	-
13	Right/Left Hairpin Bend	-	-
14	Right/Left Reverse Bend	-	-
15	Series of Bends	-	-
16	270 Degree Loop	-	-
17	Side Road Left	2	-
18	Y-intersection	-	-
19	Cross Road	-	-
20	Roundabout	-	-
21	Traffic Signals	-	-
22	T-Intersection with Major Road	2	-
23	T-Intersection with Minor Road	1	-
24	Staggered Inter-Section	-	-
25	Merging Traffic Ahead (left)	3	-
26	Merging Traffic Ahead (Right)	2	-
27	Narrow Road Ahead	-	-
28	Road Widens	-	-
29	Narrow Bridges Ahead	-	-
30	Steep Ascent/Descent	-	-
31	Reduced Carriageway	-	-
32	Start/End of Dual Carriageway	-	-
33	Gap in Median	-	-
34	Pedestrian Crossing	13	-
35	Pedestrian crossing with backing board	-	-
36	School Ahead	-	-
37	Built Up Area	-	-
38	Two Way Operation (on main carriage way /service road	-	-
39	Two-way Traffic on Cross Road Ahead	-	-
40	Danger Warning Sign	-	-
41	Deaf or Blind Persons Likely on Road Ahead	-	-
42	Cycle Crossing	-	-
43	Cycle Route Ahead (warning for Cycles on road ahead)	-	-
44	Dangerous Dip	-	-
45	Speed Breaker	-	-
46	Rumble Strip	1	-
47	Rough Road	-	-
48	Dangerous Ditch	-	-
49	Slippery Road	-	-
50	Slippery Road because of Ice	-	-

Sl. No	Road Signs	Number / Length	Remarks
51	Opening or Swing Bridge	-	-
52	Overhead Cable	-	-
53	Playground Ahead	-	-
54	Quay Side or Riverbank	-	-
55	Sudden Side Winds	-	-
56	Tunnel Ahead Warning	-	-
57	Falling Rocks	-	-
58	Cattle Crossing	-	-
59	Wild Animals Likely to be on Road Ahead	-	-
60	Queues Likely ahead	-	-
61	Low flying Air Craft	-	-
62	Unguarded Railway Crossing	-	-
63	Guarded Railway Crossing	-	-
64	Crash prone area ahead	-	-
65	U-Turn	-	-
66	X-junction	4	-
67	Height Limit	9	-
III	Informatory Signs Boards	-	-
68	Advance Sign Board	12	-
69	Reassurance	8	-
70	Bus Stop	-	-
71	Bus Lane	-	-
72	Truck lay bye	-	-
73	Place Identification sign	-	-
74	Flag Type	-	-
75	Route Marker Sign	4	-
76	Gantry Mounted Sign Board	-	-
77	Toll plaza ahead Overhead cantilever sign	-	-
78	Toll plaza lane information overhead sign	-	-
79	Toll plaza ahead canopy sign	-	-
80	For Fast Tag lanes - at the toll plaza	-	-
81	Filling station	-	-
82	Airport	1	-
83	Horn Sound	4	-
84	Heavy vehicle Keep left lane	6	-
85	Emergency Helpline Number	4	-
86	QR sign	4	-
IV	Chevron Signs	-	-
87	Single Chevron	40	-
88	Double Chevron	16	-

Sl. No	Road Signs	Number / Length	Remarks
89	Triple Chevron	-	-
V	Object Hazard Marker Sign	-	-
90	Object Hazard (Left)	45	-
91	Object Hazard (Right)	46	-
92	Two Way Object Hazard	1	-

1.2.3.1 Note: The locations of the placement of signages shall be finalized in consultation with Independent Engineer/ NHAI, as per site requirement.

1.2.4 Road Marking

Road Markings shall be Hot applied thermoplastic materials with reflectorized beads to achieve visibility confirming to clause 2.7.2 of IRC 35.

The cold applied plastics pavement markings shall be used for School Zone Markings, Audible Raised Profile Edge Lines and Block Markings (BM 01 /02/03).

Sl No.	Item	Unit	Remarks
		Number	
1	Longitudinal Marking	0	-
2	Transverse Marking	0	-
3	Hazard Marking	0	-
4	Block Marking	0	-
5	Arrow Marking	30	-
6	Directional Marking	0	-
7	Facility Marking	0	-
8	Centre Line	8400	-
9	Traffic Lane Lines	0	-
10	No Overtaking Lines	0	-
11	Warning Lines	0	-
12	Border or Edge Lines	24600	-
13	Longitudinal Markings for Undivided Roads	0	-
14	Longitudinal Markings for divided Roads	0	-
15	Longitudinal Markings for Ramps / Slip Roads / One Way Streets	-	-
16	Stop Line	120	-
17	Give Way Lines	0	-
18	Diagonal Markings	0	-
19	Chevron Markings	444	-

Sl No.	Item	Unit	Remarks
20	Continuity Line	0	-
21	Word Messages	0	-
22	Lane Change	0	-
23	Merging/Diverging Markings	0	-
24	Hatch Markings	0	-
25	Raised Profile Edge Lines	0	-
26	Lane Reduction I Narrowing Situations and Transitions (lane Balancing)	0	-
27	Directional Arrows	0	-
28	Mandatory Turn Arrows	0	-
29	Guidance Arrows	0	-
30	Deflection Arrows	0	-
31	Bifurcation Arrows	0	-
32	Arrows on Side Road Approaches	0	-
33	Arrows on Main Road Approaches	60	-
34	Word Messages	0	-
35	Yellow Box Markings	0	-
36	Ghost Island	0	-
37	Marking for Speed Breakers	12	-
38	Pedestrian Crossing	884	-
39	Markings when highway passes through settlement fig 9.4 of IRC SP 84/87	0	-
40	Transverse Bar Markings	1080	-
41	Bus bay Marking	0	-
42	Truck Lay-by Markings	0	-
43	Toll Plaza Marking	0	-
44	School Zone Markings	0	-
45	Object Markings within Carriageway	0	-
46	Objects Markings adjacent to Carriageway	0	-
47	Subway Piers, Abutments, Culverts Head Walls, Concrete Barrier	0	-
48	Electrical Poles	0	-
49	Guard Rails	0	-
50	Trees	0	-

Sl No.	Item	Unit	Remarks
51	Kerbs	0	-
52	Directional Markings as per Annexure: A Table: A.6 of IRC:35-2015	0	-
53	Facility Markings as per Annexure A Table: A.6 of IRC:35-2015	0	-

Note: The locations of the marking shall be finalized in consultation with Independent Engineer/NHAI, as per site requirement.

1.2.5 Road Delineators

Sl No.	Item	Number / Length (m)	Remarks
1	Roadway Indicators	-	Number
2	Median Marker on Median / RCC Barrier (Clause 4 of IRC 79-2019)	1810	Number
3	Object Markers		-
4	Flexible object markers (Clause 6 of IRC 79 2019) i. On Metal Beam Barrier ii. On Tollbooth / Toll Island iii. On Entry / Exit of Tunnel iv. On Exit from Main Carriageway	-	Length (m)
5	Reflective NHAI logo Marker (100x100mm type XI) on all the MBCB posts facing the direction of traffic	6245	Numbers
6	Solar Blinkers on Median Opening, on exit from main carriageway and traffic islands of grade separated intersections.	1	Number

Note: The locations of the marking shall be finalized in consultation with Independent Engineer/NHAI, as per site requirement.

1.2.6 Reflective Pavement Markers & Solar Studs

The Prismatic Retro-Reflective type confirming to ASTM 0-4280 Pavement Markers & Solar Power Studs on Highway shall be provided in accordance with Schedule - D.

Sl. No.	Item	Number	Location	Remarks
A– For 4/6 Lane Projects				
1	White Colour one coloured face Road Studs	1849	Traffic lane line & centre of carriageway	Uni-directional carriageway
2	Red Colour one coloured face Road Studs	1831	Left hand edge of the carriageway, entry to truck lay bye / bus bay, start of service road, chevron / diagonal markings on gorqe	
3	Yellow / Amber Colour one coloured face Road Studs	702	Median side edge line, zebra crossing	
4	Green Colour one coloured face Road Studs	150	Lay byes, left hand side of the carriageway in case of multi-lane divided carriageways, crossable continuous line like in Acceleration / deceleration lanes involving lane changing	
B – For 2 lane PS Projects				
5	White Colour Two coloured face Road Studs	-	Traffic lane line & centre of carriageway	Bi-directional carriageway
6	Red Colour Two coloured face Road Studs	-	Left hand edge of the carriageway, entry to truck lay bye / bus bay, start of service road, chevron/diagonal	
7	Green Colour Two coloured face Road Studs	-	Lay byes, left hand side of the carriageway in case of multi-lane divided carriageways, crossable continuous line like in Acceleration / deceleration lanes involving lane changing	
8	Solar Studs on Major /Minor bridge, ROB and all structures (Interchange / Flyover / VUP) and Built-up areas, in storage lane of median opening and Exit/Entry from main carriageway	-	-	

1.2.7 Traffic Impact Attenuators

- 1.2.7.1 Provide Impact Attenuators in Gore Areas, it shall be self-restoring confirming to section 10.6 of IRC SP 99 i.e. Manual of Specifications and Standards for Expressways at toll plaza locations.

Sl No.	Design Chainage	LHS / RHS	Quantity	Remarks
1	210+080	LHS	1	Start of approach ramp

- 1.2.7.2 **Providing End Terminals** Provide End Terminals P-4 type confirming to EN 1317-4 to Parapet Walls of Culverts, Structures ends for the safety of approaching traffic etc

Sl No.	Item	Chainage / Number	Remarks
1	Culvert ends	Nil	-
2	Structure ends	Nil	-
3	Any other location which Safety Hazard	Nil	-

- 1.2.7.3 **Antiglare screen**

Sl.No.	Item	Median		Total Length (m)	Remarks
		From	To		
1	Antiglare	209+760	214+500	4740	Median

1.2.8 Boundary wall / Toe Wall

Boundary wall/ Toe Wall shall be provided along the length 8.70 Km on either side (including transverse requirements at structure locations) as per the detail given below. Road boundary walls shall be provided at the boundary on both sides of the right of way available under the control of the Authority, except at ingress and egress points. The boundary walls / Toe wall shall be of reinforced cement concrete as per figure enclosed as **Annexure IV of Schedule C**. No modification in the design shall be allowed.

Consideration for Designing the boundary wall.

- The mean probable design life considered shall be minimum 25 years.
- Wind load parameters being considered for the design as per IS-875 (Part 3):2015 such as k₁, k₂, k₃, k₄ and even C_t etc. for calculation of design wind speed to assess the wind load shall be strictly conforming to Contractual Provisions/ Site Conditions

- The SBC cited in the drawing shall be checked along alignment of Boundary Wall by the Contractor /Concessionaire by carrying out geotechnical investigations before construction (at a regular interval as per codal provision)
- Due to uneven NGL, stepping in Boundary Wall is to be done keeping one level till difference in NGL is more than 450 mm.
- Wind force is given by
- $F = C_f \cdot A_e \cdot P_z$
- $C_f = 2.0$

At all CD structure locations, the boundary wall shall be discontinued by turning and joining it with the wing/return wall to allow crossing through these structures during dry seasons.

In case of Pre cast panel fencing, provide cast in situ coping beam on top of fencing. Provide detailed drawings as **Annexure IV Schedule C**.

Location of Boundary wall are as follows

Sl. No.	Chainage		Length, m	Side	Remarks
	From	To			
1	209+990	214+060	4070	BHS	Boundary Wall
2	210+610		280	BHS	At Junction Boundary Wall
Total, m			4350	BHS	Total 8700m Boundary Wall

***BHS - Both Hand Side**

1.3 Operation and Maintenance centres – Deleted

1.4 Way side Amenities / Service Areas / Rest Area – Deleted

1.5 Truck lay-byes - Deleted

1.6 Bus Bay and Bus shelter: - Deleted

1.7 Pedestrian Facilities

Pedestrian Facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Clause 9.8 of Schedule D and IRC 103 2022. This shall consist of footpath (sidewalks), pedestrian guard rails and pedestrian crossing.

The details are as mentioned below:

Sl. No.	Pedestrian Facilities	Design Chainage		Side	Remarks
		From	To		
1	Pedestrian guardrails shall be 150 mm from Carriageway/Paved Shoulder	209+760	210+050	BHS	–
	i. Hazardous Locations on Straight Stretches				
3	ii. At Junctions/Intersections	–	–	–	–
	iii. Schools				
	iv. Bus Stop/Railway Stations				
	v. Overpass, Subway				
	vi. Central Reserve				
2	Footpath paving including fixing of Tactile pavers	–	–	–	–
3	Pedestrian Crossing	–	–	–	–
	i. With Zebra Marking	–	–	–	–
	ii. With Tabletop Crossing	–	–	–	–
	iii. At Intersections	210+580	210+650	BHS	–
		211+840	211+900	BHS	-
		213+060	213+070	BHS	
		214+070	214+080	BHS	
	iv. At Schools	-		–	–

1.8 Highway Lighting

The street light poles shall be 1 piece, continuous-tapered, octagonal poles and shall be manufactured from one length of steel sheet, formed in continuous tapered tube, with one continuous arc-welded vertical seam. The minimum wall thickness for lighting poles shall not be less than 4 mm. The Bottom Diameter shall be minimum 175 mm. The Top Diameter shall be minimum 75 mm. The door on window of pole shall be antitheft. All electrical cable should be concealed. All electrical lighting fixers shall be LED. The fixtures shall be concealed except on poles. Lighting poles shall be fixed on outer side of steel/concrete barrier. The lighting shall be providing at the following locations:

Sl. No.	Lighting facilities	Chainage		Side	No. of Poles		Height of Poles, m	Lighting Source:
		From	To		Double Arm	Single Arm		Electricity Board/ Generator/ Solar
1	Toll Plaza area: The lighting in and around toll plaza, toll booths, office building, on the approach road, etc. shall be as per Section 12 of the Manual. In addition to at least two high mast light shall be provided on either side of toll plaza	-	-	-	-	-	-	-
2	Rest Areas: The entire Rest areas shall be provided	-	-	-	-	-	-	-

Sl. No.	Lighting facilities	Chainage		Side	No. of Poles		Height of Poles, m	Lighting Source:
		From	To		Double Arm	Single Arm		Electricity Board/ Generator/ Solar
	with lighting with average illumination to 40 Lux							
3	Truck lay-bye: The entire area of truck lay-byes and 50m length of the project highway on its either side shall be illuminated at night to provide an average illumination of 40Lux. Suitable designed electric poles having aesthetic appeal and energy saving bulbs (LED) may be used to provide required illumination. Alternatively, photo voltaic lamps may be used	-	-	-	-	-	-	-
4	Bus Bay & bus shelter locations: The entire bus bay & bus shelter area shall be provided with Lighting (Average illumination of 40Lux.).	-	-	-	-	-	-	-
5	Grade separated structures, interchanges, flyovers, underpasses (vehicular/ pedestrian) and Vehicle overpasses: Lighting requirement shall be as per section 12 of the Manual. The top and underside of the grade separated structures including service road/ slip road, interchange area at the ground level up to 50m beyond the point from where flaring of the main carriageway takes place shall be provided with lighting. Also, on all legs of at grade interchange/ crossings the lighting shall be provided 50m beyond the point of Centre on all legs. The minimum illumination shall be 40 Lux., at the extreme edge of the Highway	-	-	-	-	-	-	-
6	Built-up sections on the project highway both in the median of main carriageway and on the service roads on both sides	-	-	-	-	-	-	-
7	Median /Service Road	209+760	210+050	BHS	24	-	9	Electricity Board

Sl. No.	Lighting facilities	Chainage		Side	No. of Poles		Height of Poles, m	Lighting Source:
		From	To		Double Arm	Single Arm		Electricity Board/ Generator/ Solar
	Median Lighting	210+050	212+050	BHS	160	-	9	Electricity Board
		212+050	212+500	BHS	18	18	9	Electricity Board
		212+500	213+040	BHS	-	44	9	Electricity Board
		213+040	213+190	BHS	12	-	9	Electricity Board
		213+190	213+270	BHS	6	-	9	Electricity Board
		213+270	213+750	BHS	-	38	9	Electricity Board
		213+750	214+060	BHS	-	25	9	Electricity Board
		214+060	214+500	BHS	35		9	Electricity Board
8	On Median Openings provide 1 no. high mast lighting of 25m height	-	-	-	-	-	-	-
9	On major bridges and its approaches higher than 3m.	-	-	-	-	-	-	-

1.9 Rainwater Harvesting - Deleted

1.10 Environmental Management Plan (Attach MOEF Mitigation Report in Schedule-D) - Deleted

1.11 Land Scaping and Tree Plantation

The Concessionaire shall plant trees and shrubs of required numbers and types at the appropriate locations within Right of Way and in the land earmarked by the Authority for afforestation as per Schedule D at the following areas.

Sl. No.	Types of Plantations	Location (Km)	Number of trees to be planted	Remarks
1	Shrubs	In median except Structures+ Frist row from side of drain	1 row of 333 plants for the median of 2-3 metre at every km. and 2 rows of 333 plants (staggered) for the median of 3 metre and more	Ornamental type plantation shall be provided
2	Land Scaping	O & M Centers, Vacant land parcels, land within loops of flyovers, Toll Plaza building and surroundings Vacant space below the flyovers	Landscaping plans will be submitted by the Concessionaire/ Contractor which shall include ornamental trees, decorative statues and landscaping	The number of Ornamental type plantation and other things shall be decided on the basis availability of land.

Drip irrigation system for median plantation by gravity/pressure sources with all necessary components I systems and emitting devices at plants shall be provided.

The Concessionaire shall maintain the trees and shrubs in good condition during concession period as per the concession agreement.

1.12 Advanced Traffic Management System (ATMS) (NHAI Policy Circular)

The Concessionaire is required to design, install, operate and maintain Advanced Traffic Management System (ATMS) as part of the project facilities. Advanced Traffic Management System shall be provided as per standards and specifications specified in the Manual and as per NHAI circular and shall be maintained throughout the contract period.

The ATMS components to be deployed shall inter alia include:

1.12.1 General

The ATMS Project shall broadly include the following sub-systems to be provided as per the standards & specifications mentioned in NHAI Policy Circular

- 1.12.1.1 Video Surveillance System / Traffic Monitoring Camera System (TMCS)
- 1.12.1.2 Video Incident Detection System (VIDS)
- 1.12.1.3 Vehicle Actuated Speed Display System (VASDS)
- 1.12.1.4 Fixed and Portable Variable Message Sign (VMS) System
- 1.12.1.5 Communication Network with OFC Backbone
- 1.12.1.6 Provision of Emergency Cell Boxes (ECBS)
- 1.12.1.7 Common ATMS Command & Control Center for Km. 0.000 to Km. 26.130
- 1.12.1.8 Power Supply for Field Equipment as well as for ATMS Command & Control Center
- 1.12.1.9 Operation & Maintenance (O&M) of the entire ATMS Facility
- 1.12.1.10 Maintenance Vehicle

The requirements stated herein shall be construed as minimum requirement and meeting the respective requirements individually shall not relieve the Contractor from the responsibility. The entire system should function efficiently as an integrated solution during the entire O&M period.

1.12.1.1 Video Surveillance System / Traffic Monitoring Camera system (TMCS)

- D The system monitors vehicular and other road related activity along the highway stretch through PTZ Camera mounted on Poles. Generally, the camera should be placed at a distance not greater than 1 km so as to effectively monitor all the lanes of

the entire stretch of Highway. In case certain stretches include regular curves, ramps etc not allowing central line of sight, then additional TMCS camera shall be put to ensure effective surveillance of the entire stretch. The TMCS cameras should also be placed on the following Junctions below the Grade Separated Structure.

II) The TMCS should also be provided at the following Junctions so as to monitor the traffic at the following junctions:

1.12.1.2 Video Incident Detection System (VIDS}

The VIDS include Gantry Mounted ANPR Cameras, Overview Cameras and associated incident detection software system to effectively detect pre-defined actionable incidents which triggers enforcement and incident response system. The VIDS should also act as Automatic Traffic Counting and Classifying (ATCC) system. The VIDS should be provided at following locations:

**[The Table should include a Column informing whether Full Gantry is available at that location or not. VIDS system requires full Gantry on both LHS & RHS]

1.12.1.3 Vehicle Actuated Speed Display (VASD) System

The VASD system shall include gantry mounted Radar and Speed Display system for each lane to warn the road users of their speed. The system shall act as a Speed Calming Measure. VASD System should be provided at following locations along the Expressways:

** [The Table should include a Column informing whether Full Gantry is available at that location or not. VIDS system requires full Gantry on both LHS & RHS]

1.12.1.4 Variable Message Sign (VMS) System

The VMS shall provide road users advance information of road conditions ahead and shall be controlled from the local ATMS Control centre. The VMS shall be installed at following locations:

1.12.1.5 Communication Network with OFC Backbone

The entire Expressway stretch shall be provided with minimum 24 Core OFC Backbone as per the standards & specifications. The short haul connections like between field equipment to access points, access points to OFC backbone etc shall be done with minimum 12 Core cable. The OFC shall be laid strictly as per the Standards and Specification.

1.12.1.6 ATMS Command and Control Center

The ATMS Command and Control Centre structure will be constructed by Civil Contractor of NHAI at Km. The ATMS Contractor shall set up and operate the ATMS Command and Control Center as per the Standards and Specification. The ATMS Contractor shall undertake any additional civil works, interior works, MEP works, for setting up the Command Center, including all additional related electrical, lighting, electrical connection, DG set, power backup, HVAC works, access control, building CCTV, PTZ cameras outside building, firefighting system, alarm, fire extinguishers, raised floor, housekeeping, building cleaning, maintenance, recurring charges including electricity bills, telephone bills, DG fuel, servicing, security.

1.12.1.7 Power Supply for ATMS Command & Control Center and Field Equipment

The Contractor shall ensure 24x7 supply for the ATMS Command and Control Centre and Field Equipment with supply power from Electricity Department as primary source supported by UPS renewable power (solar etc) and DG Set of adequate capacity. There shall be NO obligation of NHAI with regard to providing power/ electricity supply/connections for testing commission, operation & maintenance of any component of me ATMS. Further, the following points are to also be observed by the ATMS contractor:

- a. The Contractor shall perform all the necessary application procedures to the Power Company required for the power to be supplied to the Traffic Management Centre, Sub-Centre and the field equipment in their own name. All the expenses charged by Power Companies regarding such applications and execution of work shall be borne by the Contractor as part of the scope of this contract. Any damage to the highway during such execution of work shall have to be repaired by the ATMS Contractor to the pre-existing condition without any cost implications to NHAI.
- b. The Contractor shall make all necessary arrangements for the electricity needed for the execution of the Works and O&M period for the entire period of the Contract. In case electricity is not made available through electricity companies, alternate electricity arrangement such as through renewable energy/DG Set should be made by the Contractor. Under no circumstances NHAI shall grant an extension of time for achieving the milestones if the contractor is unable to make the electricity arrangement either for the execution of the work or for the O&M activities.

c. The fixed charges, installation charges, recurring charges, electricity bill, DG set fuel, maintenance etc. for each field equipment, TMC, Control Centre, Sub-centre, Contractor's site office, or any other facility being used by the Contractor under the scope of this Contract shall be in the scope of the Contractor only for the entire Contract period i.e., Design phase, procurement, installation, testing, trail-run, commissioning, operations, and maintenance period. The Authority shall not be responsible for any provision for power supply during implementation as well as operations and maintenance period.

1.12.1.8 Operation & Maintenance (O&M) of the entire ATMS Facility.

a. The O&M period after the successful completion of works shall include Operation & Maintenance of the entire ATMS Facility as per the Service Level Agreement (SLA) with Qualified Manpower mentioned in Standards & Specifications including supply of adequate spares, parts, consumables and maintenance equipment required for the facility. The Contractor shall maintain required spare parts to maintain required service levels.

b. The Contractor shall have sufficient infrastructure and capability to keep/store spares required for maintenances and will at all times during the contract period maintain sufficient inventory of spares and consumables for maintaining the ATMS and to meet the Service Level requirements.

c. Before the start of O&M Period, the Contractor shall deploy the O&M Personnel mentioned at Appendix-C of Standards & Specification with prior approval of the Authority.

1.12.1.9 Maintenance Vehicle

The ATMS Contractor shall keep adequate numbers of dedicated vehicles (minimum 1 vehicle per 50km) to attend the maintenance requirement during the Operation & Maintenance period.

1.13 Highway Patrol Units - Not Applicable

Highway Patrol units shall be established and operate at toll plaza location as per Schedule- D Clause 12.10 (strictly as per details mentioned in Annexure-C of IRC: SP:84-2019/ IRC:SP:87-2019), which shall continuously patrol the highway in a stretch not exceeding 50 km (if the stretch is more than 50 km additional 1 number of patrol

vehicle per 50 km or less shall be provided). The vehicle shall be brand new with fuel, driver, and insurance all-inclusive for the entire contract period. Highway Patrol units shall be fitted with GPS and GSM based vehicle tracker system. Highway Patrol Vehicles shall be stationed on layby constructed on Project Highway@ every 20 km of each Toll Plaza.

1.14 Emergency medical services - Deleted

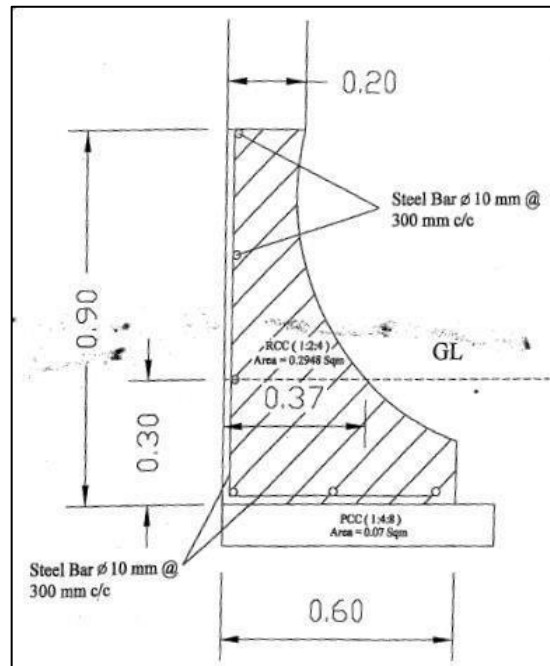
1.15 Crane Service: - Deleted

1.16 Buildings for Traffic Aid Posts (For Ham Projects) – Deleted

1.17 Building for Medical Aid Post (For Ham Projects) – Deleted

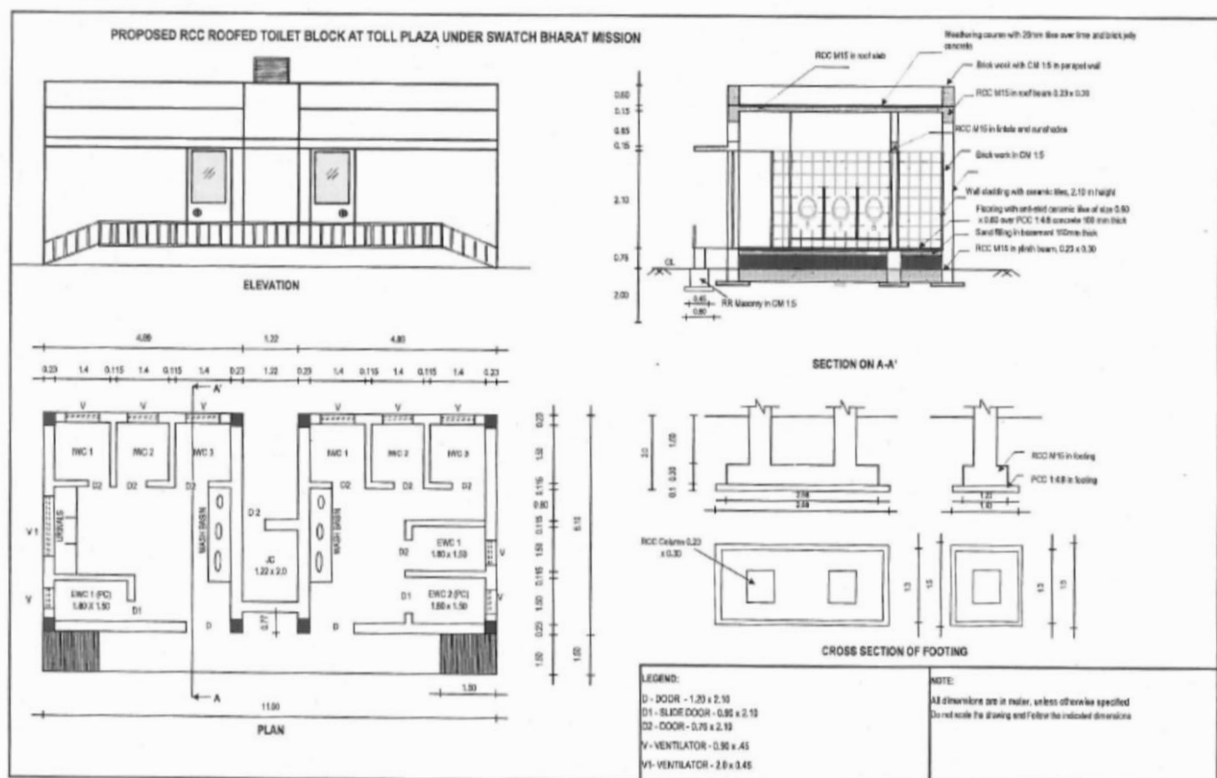
Annexure IV

Standard Drawing for Boundary wall



Annexure V

Standard Drawing for Toilet – Not Applicable



SCHEDULE - D

(See Clause 2.1)

D. SPECIFICATIONS AND STANDARDS

1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex- I of this Schedule-D for construction of the Project Highway.

2. Design Standards

The Project Highway including Project Facilities shall conform to design requirements set out in the following documents:

Manual of Specifications and Standards for Four/Six Laning of Highways with Paved shoulder IRC: SP: 84-2019, referred to herein as the Manual for 4-Lane project road.

3. As regards, the work of utility shifting, the relevant specifications, relevant rules, regulations and acts of Utility owning department/agencies shall be applicable.

Annex – I: SPECIFICATIONS AND STANDARDS OF THE PROJECT

(Schedule-D)

1. Specifications and Standards of The Project

Four/Six laning of project shall conform to the Manual of Specifications and Standards for Four/Six-Laning of Highways IRC: SP:84-2019 with all amendments and additions till date (Referred to as “Manuals” in this Schedule) and MORTH Specifications for Road and Bridge Works (5th revision). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority Engineer. Further **NHAI Office Memorandum letter No. NHAI/Bharatmala/EC/DPR/2016/143437 dated 30.10.2019** and following guidelines are considered.

Sl. No.	Policy Circular No	Date	Subject
1	MoRT&H circular no RT-25035/07/2023-RS(Part) (221534)	24th December 2024.	Guidelines for provision of Signage on Expressway and Highways
2	Policy Circular No. 12.40/2025	20th September 2025.	Legend Formats of Advance Direction signs of Overhead and shoulder mounted boards, Toll Plaza, KM Stones etc
3	Policy Circular No. 12.41/2025	23rd September 2025.	Placement of NHAI Project information sign board with QR code signs and Horizontal sign on Pavement
4	Policy Circular No 4.37/2025	11th November 2025.	Policy Guidelines specifications for NHAI Logo.
5	Policy Circular 11.65/2025	25.02.2025	Guidelines for provision of Cattle Shelter

2. Deviations from the Specifications and Standards

- i The term “Concessionaire”, “Independent Engineer”, and “Concession agreement” used in the manual shall be deemed to be substituted by the terms “Contractor”, “Authority’s Engineer” and “Agreement” Successfully.
- ii Notwithstanding anything to the contrary contained in Paragraph 1 above, manual the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:

SL No.	Provision in IRC: SP 84-2019/ IRC: SP 87-2019		Description of Deviation
	Clause No.	Details of Item	
1.	Clause 2.17	Cross section	Cl 2.17 recommends 2.5 m Paved shoulder and 1.5 m Earthen shoulder. For the proposal, paved shoulder of 2.5 m and earthen shoulder of 2.0 m is adopted as per earlier CA, to maintain the uniformity with the existing road which is already constructed.
2.	Fig.7.8	Deck width of Grade Separated Structure	Width of Grade Separated Structure as per manual is 15.10 m (14m Carriageway, 0.5m crash barrier on both sides and 0.1m Projection on both sides). However, Deck width of Grade separated structure shall be as per clause 2.9 of Schedule-B as per E: file No.RW/NH-33044/22/2020-S&R, dated 4th June 2024
3.	Fig.7.3	Deck width of Bridge with Service Road on both sides- Main Carriageway	Width of Bridge with Service Road on both sides (Main Carriageway) as per manual is 15.10 m (14m Carriageway, 0.5m crash barrier on both sides and 0.1m Projection on both sides). However, Deck width of Grade Minor bridge shall be as per clause 7.3.2 of Schedule-B as per E: file No.RW/NH-33044/22/2020-S&R, dated 4th June 2024
4.	9.5	Reflective Pavement Markers (Road Studs)	In addition to Table 9.1 of Clause 9.5 of IRC: SP:84/87:2019, RRPMs shall be provided on all traffic lanes, shoulder and median side edge lines at spacing of 27m on Project Highway.