

One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa

**Public Works Department (NH), Goa
Government of Goa**

**(Ministry of Road Transport & Highways)
Government of India**

**Technical Schedules
For**

**One Time Improvement to bypassed NH-66 at Margao
City from km 548.000 to km 555.300 in the state of Goa**

April, 2026

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

- 1.1 The site of non standard two lane/four lane project highway shall include land, buildings, structures and road works as described in Annex-I of this Schedule-A.
- 1.2 The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
- 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 Contractor, and such inventory shall form part of the memorandum referred to in Clause 10.3.1 of this Agreement.
- 1.4 The alignment plans of the Project Highway are specified in Annexure-III of Schedule-A.
- 1.5 The status of the environment clearances obtained or awaited is given in Annex-IV.

Annex - I

(Schedule-A)

Site for Project

1 Site

1.1 The Site of the Project Highway comprises the section of Old NH 66 commencing from Km 548.000 to km 555.300 i.e, from Goa Rajee junction to Bellem junction passing through the Margao City in the State of Goa. The land, carriageway and structures comprising the Site are described below.

1.2. Referencing System

Kilometre stones are existing in entire length of the project highway. It is called the “Existing Chainage”. During topography survey with Total Station, observations made are referred “Existing Chainage”. The relationship between the “Existing Chainage” and the “Design Chainage” as per field surveys of the location of existing km stones using the Total Station for the “Project Highway” is given at **Appendix A-I**. The existing length of and design length of project is 8.47 km.

Design Chainage (Km)	Easting#	Northing#
548.000	387098.7720	1692261.9475
555.300	389434.4232	1686161.6112

#-UTM co-ordinates based on WGS 84 datum and 43N zone

An index map showing the existing features of the Project Highway is given at Annex-III of Schedule-A. The design chainage co-ordinates (centre line) at every 500m distance are given at Annex-VI of Schedule-A.

2 Land

The Site of the Project Highway is an existing non standard 2 lane to 4 lane, comprises the land (sum total land already in possession and land to be possessed) as described below.

Sl. No.	Existing Chainage (km)		Right of Way (m)	Remarks
	From	To		
1	548.000	555.300	8.0 - 43m	-

Detailed break-up of land is given as Annexure-II of Schedule-A.

3 Carriageway

The details of existing carriageway are as given under.

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Sl. No.	Chainage (Km)		Length (Km)	Lane Configuration (Two Lane / Four Lane)	Carriageway (m)
	From	To			
1	548.000	549.540	1.540	2 lane	7.0
2	549.540	550.000	0.460	4 lane	2 x 7.5
3	550.000	550.570	0.570	4 lane with paved shoulder on LHS	8.5 + 7.5
4	550.570	550.900	0.330	Non standard 2 lane	5.5 to 7.0
5	550.900	551.300	0.400	Non standard 4 lane	5.5 + 3.75
6	551.300	553.150	1.850	2 lane	7.0
7	553.150	555.300	2.150	Non standard 4 lane	6.0 + 6.0
Total			7.300		
RHS Road					
8	550.630	551.500	0.870	Intermediate lane	5.0
9	551.500	551.800	0.300	2 lane	7.0
Total			1.170		

4 Major Bridges

The Site includes the following Major Bridges.

Sr. No.	Existing Chainage (Km)	Type of Structure			No. of Spans with Span length (m)	Width (m)
		Foundation	Sub Structure	Super Structure		
-Nil-						

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

The Site includes the following ROB (road over railway line)/RUB (road under railway line).

S. No.	Existing Chainage (km)	Length (m)	Super Structure	Deck Width (m)	ROB/ RUB
1	552.676	460	Box girder	8.5	ROB

6 Grade separators

The Site includes the following grade separators.

Sr. No.	Existing Chainage (Km)	Type of Structure		No. of Spans with Span length (m)	Width (m)
		Foundation	Superstructure		
Nil					

7 Minor bridges

The Site includes the following minor bridges.

S. No.	Existing Chainage (km)	Span Arrangement (No. x Span length in m)	Super Structure	Deck Width (m)
-Nil-				

8 Railway Level Crossings

The site includes the following Railway level crossings:

S. No	Design Chainage (Km)	Railway Line
-Nil-		

9 Vehicular Underpass

The Site includes the following vehicular underpasses.

S. No.	Existing Chainage (km)	Type of Structure	No. of Spans with span length (m)	Deck width (m)
Nil				

10 Subways

The site includes the following Railway level crossings:

S. No.	Existing Chainage (km)	Type of Structure	No. of Spans with span length (m)	Remarks
1	554.750	Box Type	1 x 20	Navelim church
2	545.020	Box Type	1 x 20	Near Agnel Ashram
3	546.200	Box Type	1 x 20	Nuvenm
4	547.600	Box Type	1 x 20	Near Nuvenm church

11 Culverts

The Site has the following culverts.

11.1 Hume Pipe Culverts

Sl. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)
1	549.53	Hume Pipe	2 X 10

11.2 Slab Culverts

Sl. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)
1	548.521	Slab cum Arch culvert	1 x 6.0
2	548.670	Slab culvert	1 x 2.0
3	549.850	Slab culvert	1 x 4.0
4	550.585	Slab culvert	1 x 6.0
5	550.647*	Slab culvert	1 x 6.0
6	550.915*	Slab culvert	1 x 2.0
7	551.412	Slab culvert	1 x 1.5
8	553.865	Slab culvert	1 x 2.0

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Sl. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)
9	554.870	Slab culvert	1 × 2.0
10	553.472	Slab Culvert	1.0 × 6.0

Note: * Cross drainage structure on RHS road

11.3 Box Culverts

Sl. No.	Existing Chainage (km)	Type of Culvert	Span /Opening with span length (m)
1	550.472	Box Culvert	1 × 3.0 + 1 × 2.0

12 Bus bays

The details of bus bays are as follows:

S. No.	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
1	550.055	50	Yes	-
2	551.675 (on RHS Road)	70	-	Yes

13 Truck lay byes

The details of the truck lay byes are as follows:

Sr. No.	Chainage (Km)	Length (m)	Left Hand Side	Right Hand side
-Nil-				

14 Road side drains

The details of the roadside drains are as follows:

Sr. No.	Existing Chainage (Km)		Side	Type	
	From	To		Masonry/CC (Pucca)	Earthen (Kutcha)
1	550.590	550.740	BS	CC	-
2	550.920	551.050	RHS	CC	-
3	551.050	551.080	BS	CC	-

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Sr. No.	Existing Chainage (Km)		Side	Type	
	From	To		Masonry/CC (Pucca)	Earthen (Kutcha)
4	551.080	551.180	RHS	CC	-
5	551.380	551.480	RHS	CC	-
6	551.480	551.780	BS	CC	-
7	553.040	553.075	RHS	CC	-
8	553.075	553.125	BS	CC	-
9	553.125	553.220	RHS	CC	-
10	553.220	553.220	BS	CC	-
11	553.340	553.440	LHS	CC	-
12	554.040	554.100	RHS	CC	-
13	554.440	555.130	BS	CC	-
RHS Road					
14	550.690	550.850	BS	CC	-
15	550.850	551.000	LHS	CC	-
16	551.000	551.800	BS	CC	-

15 Major junctions

The details of Major Junctions/Road Crossings are as follows:

S. No	Existing Location (Km)	Type of Intersection	Leads to		Category of Cross Road	Remarks
			Left	Right		
1	548.000	X	Arlem	NH-66	Old NH	-
2	555.300	Y	NH-66	-	Old NH	-

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

16 Minor junctions

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The details of the minor junctions are as follows:

Sr. No.	Existing Chainage (Km)	Type of Intersection	Side
1	548.287	T	RHS
2	548.760	T	LHS
3	549.080	T	LHS
4	549.520	Y	LHS
5	549.790	T	RHS
6	549.880	T	RHS
7	550.570	Y	RHS
8	550.675	T	LHS
9	550.820*	T	LHS
10	550.970	X	BS
11	551.040	T	LHS
12	551.180	T	RHS
13	551.270	Y	LHS
14	551.370	T	RHS
15	551.445	T	LHS
16	551.485	Staggered	BS
17	551.655	T	RHS
18	552.665	Y	RHS
19	552.030	T	LHS
20	552.120	T	RHS
21	552.210	Y	LHS
22	552.330	+	BS
23	553.200	+	BS
24	553.260	T	RHS
25	553.320	T	LHS
26	553.360	T	LHS

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Sr. No.	Existing Chainage (Km)	Type of Intersection	Side
27	553.620	T	LHS
28	553.730	T	RHS
29	553.790	T	LHS
30	553.880	T	LHS
31	553.980	T	LHS
32	554.070	T	LHS
33	554.280	Staggered	BS
34	554.420	+	BS
35	554.480	+	BS
36	554.620	T	LHS
37	554.720	T	LHS
38	554.830	T	RHS
39	554.910	T	LHS
40	554.990	T	RHS
41	555.080	T	LHS
42	555.240	T	LHS
43	550.720*	+	BS
44	550.760*	T	LHS
45	550.780*	Y	RHS
46	550.910*	T	LHS
47	550.960*	Staggered	BS
48	551.010*	T	RHS
49	551.050*	+	BS
50	551.080*	T	LHS
51	551.110*	T	RHS
52	551.200*	T	LHS
53	551.300*	T	RHS

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Sr. No.	Existing Chainage (Km)	Type of Intersection	Side
54	551.350*	T	LHS
55	551.370*	T	RHS
56	551.530*	+	BS
57	551.650*	T	RHS
58	551.850*	T	RHS

Note: * Junctions on RHS road

17 Bypasses

The details of the existing road sections proposed to be bypassed are as follows:

S. No.	Name of bypass (town)	Chainage (km) From km to km	Length (in Km)
Nil			

18 Toll Plaza

The details of Toll Plaza are as follows:

Sl. No	Existing Chainage (Km)	Location	Side	Remarks
Nil				

19 Cattle / Pedestrian Underpass

The Site includes the following cattle / pedestrian underpasses.

S. No.	Existing Chainage (km)	Type of Structure	No. of Spans with span length (m)	Deck Width (m)
Nil				

20 Bus shelters

S. No	Existing Chainage (km)	Side	Location
1	548.295	LHS	Gorvootti
2	551.215	LHS	Padre miranda road

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S. No	Existing Chainage (km)	Side	Location
3	551.680*	RHS	SBI Margao branch
4	554.380	LHS	Navelim

21 Wayside Amenities

The details of wayside amenities are as follows:

Sl. No	Existing Chainage (Km)	Location	Side	Remarks
Nil				

22 Utilities

The site includes utilities. Details at Annexure-V of Schedule-A.

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Design Chainage corresponding to Existing Chainage

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)
1	548.000	548.000
2	548.500	548.500
3	549.000	549.000
4	549.500	549.500
5	550.000	550.000
6	550.500	550.500
7	551.000	551.000
8	551.500	551.500
9	552.000	552.000
10	552.500	552.500
11	553.000	553.000
12	553.500	553.500
13	554.000	554.000
14	554.500	554.500
15	555.000	555.000
16	555.300	555.300
RHS Road		
17	550.630	550.630
18	551.000	551.000
19	551.500	551.500
20	551.800	551.800

Annex - II

(Schedule-A)

Dates for providing 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 (Km)		Length (km)	Existing ROW (m)	PROW (m)	Date of Providing ROW
From	To				
548.000	548.665	0.665	12.5	12.5	On Appointed Date
548.665	549.535	0.870	10.5	10.5	
549.535	550.560	1.025	22	22	
550.560	550.730	0.170	14	14	
550.730	550.775	0.045	8.7	8.7	
550.775	550.900	0.125	9	9	
550.900	551.030	0.130	43	43	
551.030	551.170	0.140	10.2	10.2	
551.170	551.270	0.100	18	18	
551.270	551.480	0.210	12	12	
551.480	551.840	0.360	10.8	10.8	
551.840	552.030	0.190	14.6	14.6	
552.030	552.100	0.070	15.1	15.1	
552.100	552.430	0.330	12.6	12.6	
552.430	553.000	0.570	8.5	8.5	
553.000	553.160	0.160	14	14	
553.160	554.280	1.120	14.5	14.5	
554.280	554.550	0.270	13	13	
554.550	555.300	0.750	14.5	14.5	

Annex - III

(Schedule-A)

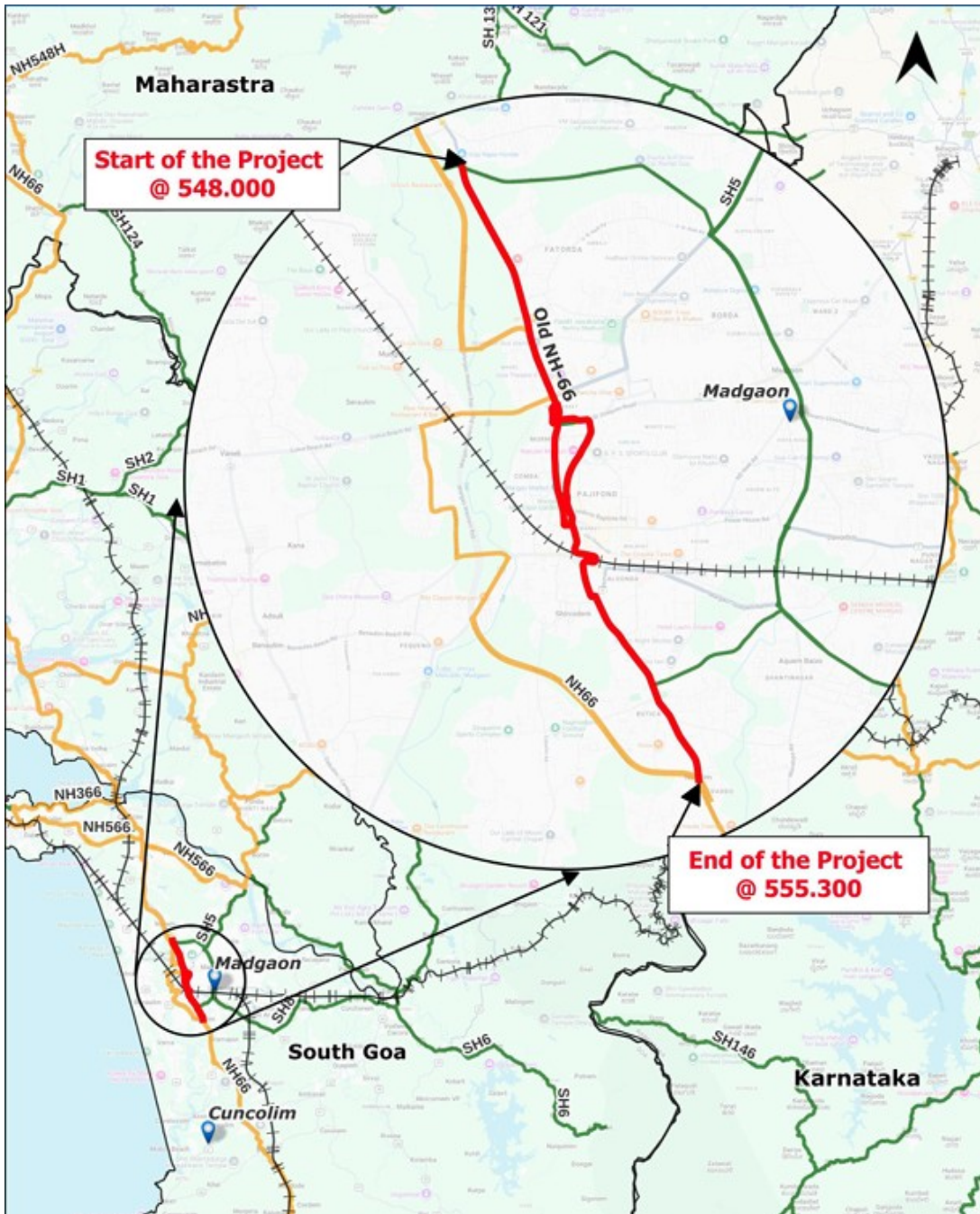
Alignment Plans

The alignment of the Project Highway is enclosed in alignment plan. The contractor shall improve/upgrade the Road profile based on site/design requirement.

Coordinates:-

Design Chainage (Km)	Easting#	Northing#
548.000	387098.772	1692261.9475
548.500	387290.5153	1691803.8155
549.000	387528.6933	1691364.1997
549.500	387696.5153	1690895.8187
550.000	387816.4499	1690410.7457
550.500	388002.6141	1689946.9213
551.000	388313.2594	1689720.8324
551.500	388216.92	1689302.8786
552.000	388157.058	1688825.7804
552.500	388270.1042	1688383.1409
553.000	388316.087	1688111.6081
553.500	388538.4661	1687694.174
554.000	388843.2213	1687299.2783
554.500	389070.6807	1686859.9123
555.000	389330.6056	1686435.3499
555.300	389434.4232	1686161.6112
RHS Road		
550.630	387994.703	1689837.931
551.000	388016.306	1689506.944
551.500	388047.171	1689009.117
551.800	388103.990	1688715.760

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Annex - IV

(Schedule-A)

Environment Clearances

1. **Forest Clearance:** Not required
2. **Environmental Clearance:** The MoEF clearance is not required as per Notification of MoEF dated 22/08/2013 for this project highway.

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Annex - V

(Schedule-A)

The site includes the following electrical utilities:-

(i) Electrical Utilities *

Extra High-Tension Lines (EHT Lines) *

S. No	Chainage (Km)		Length (in km)				Crossings			
	From	to	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
-Nil-										

High Tension/ Low Tension Lines (HT/LT Lines) *

Chainage (Km)	Section	Along the road length (In km)			Road Crossings (in Nos.)			DTC	
		33 kV	11 kV	L.T.	33 kV	11 kV	L.T.	kVA	Nos.
Between Km 548.000 to Km 555.300	Goa Rajee - Bellem junction	5.2 (U/G)	4.00 (U/G)	4.5	6	10	20	-	6

Note: - Above length/numbers/scope of the existing LT/HT line shifting with pole and others electrical structures is indicative and minimum specified. The actual length/numbers/scope of the existing LT/HT line shifting with pole and others electrical structures shall be determined by the Contractor as per existing site conditions. Any increase in the length/numbers/scope specified in this Clause of Schedule A shall not constitute a Change of Scope.

(ii) Public Health Utilities (Water/ Sewage Pipe Lines) *

The site includes the following Public Health Utilities:-

Sr. No	Type of Utility	Unit	Quantity	Chainage	Location
Water pipeline					
1	100mm dia	M	1.01	Km 548.000 to Km 555.300	Goa Rajee - Bellem junction
2	200mm dia	M	6.00		
Sewerage Manholes/Chambers					
3	Manholes/chambers	Nos	150	Km 548.000 to Km 555.300	Goa Rajee - Bellem junction

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Note: - Above length/numbers/scope of the existing pipe line and other items are indicative and minimum specified. The actual length/numbers/scope of the pipelines for shifting shall be determined by the Contractor as per existing site conditions. Any increase in the length/numbers/scope specified in this Clause of Schedule A shall not constitute a Change of Scope.

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Annexure VI

Schedule - A

Centreline Coordinates

The Co-ordinates of centreline are given below:-

Centre Line co-ordinates at every 500m Interval

S. No.	Chainage (Km.)	Easting	Northing
1	548.000	387098.772	1692261.9475
2	548.500	387290.5153	1691803.8155
3	549.000	387528.6933	1691364.1997
4	549.500	387696.5153	1690895.8187
5	550.000	387816.4499	1690410.7457
6	550.500	388002.6141	1689946.9213
7	551.000	388313.2594	1689720.8324
8	551.500	388216.92	1689302.8786
9	552.000	388157.058	1688825.7804
10	552.500	388270.1042	1688383.1409
11	553.000	388316.087	1688111.6081
12	553.500	388538.4661	1687694.174
13	554.000	388843.2213	1687299.2783
14	554.500	389070.6807	1686859.9123
15	555.000	389330.6056	1686435.3499
16	555.300	389434.4232	1686161.6112
RHS Road			
17	550.630	387994.703	1689837.931
18	551.000	388016.306	1689506.944
19	551.500	388047.171	1689009.117
20	551.800	388103.990	1688715.760

Northing and Easting in UTM co-ordinates are based on WGS84 as datum and Zone 43N

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Schedule - B

(See Clause 2.1)

Development of the Project Highway

1 Development of the Project Highway

Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C. The alignment plans of the Project Highway are specified in Annex-III of Schedule A.

2 Rehabilitation and augmentation

Construction shall include Provision of road safety measures, drains, road furniture etc between Km. 548.000 to Km. 555.300 on Old NH-66 as described in Annex-I of this Schedule-B and in Schedule-C.

3 Specifications and Standards

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

4. Site Clearance

Vegetation clearance, pruning, cutting of trees and dismantling of existing drains, compound walls / structures of RCC/Masonry, fences including disposal of unserviceable material within the ROW shall be carried out. Existing non standard, redundant, damaged sign boards, signals, poles shall be removed.

Annex - I

(Schedule-B)

1 Development of the Project Highway

The Project Highway shall generally follow the horizontal alignment shown in the plan specified in Annex-III of Schedule-A, unless otherwise specified by the Authority. Notwithstanding anything to the contrary contained in this Agreement or IRC:SP:84, the proposed plan, locations of different structures/drains, chainages of different structures/drains, length of different structures/drains 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 Contractor shall finalize their Detailed designs (Development stage) including plan & profile of the project highway and submit the same to Authority & its Engineer for 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 design of the components is to be submitted for consent/approval.

Any changes in the finally accepted DPR in respect of the proposed provision in Schedule B and Schedule C shall not constitute a change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provision of Article 16.

1.1 Width of Carriageway

- 1.1.1 Width of Carraigeway shall be as specified in the TCS enclosed
- 1.1.2 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.
- 1.1.5 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 not constitute a Change of Scope.
- 1.1.6 The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plan specified in Annex-III of Schedule-A. The Contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III of Schedule A based on site/design requirement.

2 Geometric Design and General Features

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2.1 General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual.

2.2 Design speed

The design speed shall be the as per clause no. 2.2 of Manual for Plain/rolling terrain.

2.3 Improvement of the existing road geometrics

2.3.1 The existing road geometrics shall be improved as per the codal provisions. In the sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and appropriate road signs, pavement markings and safety measures shall be provided.

2.3.2 The entire cross-sectional elements shall be accommodated in the available/proposed ROW. If required, suitable full height 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 not constitute a Change of Scope.

2.3.3 Realignments: The existing road shall be improved to the standards as specified in the manual at the following locations.

S. No	Design Chainage (Km)		Length (km)	Location
	From	To		
-Nil-				

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

S. No	Design Chainage (Km)		Length (km)	Location
	From	To		
-Nil-				

2.4 Right of Way

Details of the Right of Way along Project Highway are given in Annex II of Schedule-A. Construction of the highway shall be made within the ROW available.

Note: No additional land beyond proposed ROW as given in Annex II of Schedule A shall be permitted. Therefore, wherever required retaining wall of suitable heights shall be

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provided to confine free side slopes of highway embankment for main carriageway / service road etc. on either side to accommodate the typical cross sections as given in Schedule -B within the limit of proposed ROW without any additional cost to the Client.

2.5 Type of shoulders

2.5.1 The Design Specification of paved shoulders shall conform to the requirements specified in paragraph 5.10 of the manual.

2.5.2 Shoulders shall be constructed in accordance with the paragraph 2.6 of the Manual.

2.5.3 In built-up sections, footpaths/fully paved shoulders shall be provided in the following stretches:

Sl. No.	Stretch (from km to km) earthen	Fully paved shoulders/ footpaths	Side	Reference to cross section
1	From km 549.535 to km 550.560	Footpath	BS	TCS - II & III
2	From km 551.560 to km 550.730	Footpath	BS	TCS - IV(A) & V
3	From km 550.730 to km 551.480	Footpath	BS	TCS - VI & VII
4	From km 551.170 to km 551.480	Footpath	BS	TCS - XVI & XVII
6	From km551.840 to km 552.430	Footpath	BS	TCS - XIX, XX & XXI
8	From km 553.000 to km 553.160	Footpath	BS	TCS - IV(B)
10	From km 553.160 to km 554.280	Footpath	BS	TCS - X
11	From km 554.280 to km554.550	Fully paved shoulders & Footpath	BS	TCS - XI
12	From km 554.550 to km 555.300	Footpath	BS	TCS - X
RHS Road				
13	From km 550.630 to km 551.500	Footpath	BS	TCS - XII
14	From km 551.500 to km 551.660	Footpath	BS	TCS - XIII
15	From km 551.660 to km 551.730	Footpath	LHS	TCS - XIV

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Sl. No.	Stretch (from km to km) earthen	Fully paved shoulders/ footpaths	Side	Reference to cross section
16	From km 551.730 to km 551.800	Footpath	LHS	TCS - XV

Note: 1. Paver blocks of 60mm with 30mm sand bed thick and 200mm wet mix macadam shall be provided for footpath as per the TCS drawings

2. Ramp access to the adjacent properties

2.5.4 The shoulder width shall be provided as per the TCS enclosed with top 150 mm on earthen shoulder and CBR value 30% with well graded naturals and morrum gravel crust stones or combination thereof, confirming to Clause 401 of MoRTH specification. (Clause No. 5.11 IRC: SP:84).

2.5.5 Design and specifications of paved shoulders and granular material shall conform to the requirements specified in the relevant Manual.

2.6 Typical cross-section (TCS) of the Project Highway

S. No	Design Chainage (Km)		Length (km)	TCS Type	Remarks
	From	To			
1	548.000	548.665	0.665	I	-
2	548.665	549.535	0.870	II	-
5	549.535	550.560	1.025	III	-
6	550.560	550.730	0.170	IV(A)	-
7	550.730	550.775	0.045	V	-
8	550.775	550.900	0.125	VI	-
9	550.900	551.030	0.130	VII	-
10	551.030	551.170	0.140	VIII	-
11	551.170	551.270	0.100	XVI	-
12	551.270	551.480	0.210	XVII	-
13	551.480	551.840	0.360	XVIII	-
14	551.840	552.030	0.190	XIX	-

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S. No	Design Chainage (Km)		Length (km)	TCS Type	Remarks
	From	To			
15	552.030	552.100	0.070	XX	-
16	552.100	552.430	0.330	XXI	-
17	552.430	553.000	0.570	IX	-
18	553.000	553.160	0.160	IV(B)	-
19	553.160	554.280	1.120	X	-
20	554.280	554.550	0.270	XI	-
21	554.550	555.300	0.750	X	-
Total			7.300		
RHS Road					
17	550.630	551.500	0.870	XII	-
18	551.500	551.660	0.160	XIII	-
19	551.660	551.730	0.070	XIV	-
20	551.730	551.800	0.070	XV	-
Total			1.170		

For Typical cross section figures refer Annex-II of Schedule-B.

Note:

1. Any variations in the lengths specified in the above table shall not constitute a Change of Scope.
2. Lengths mentioned in the above list for cross section types concerned to structures are inclusive of structure length.
3. Retaining wall/ RE wall shall be provided for full height on all structures.
4. Toe/retaining wall to be provided where ROW is restricted and at water bodies along the proposed highway on the sections specified in Schedule-B.
5. Chainages may be adjusted according to location of structures as per drawings.
6. Median width tapering shall be provided 1 in 50 as per manual. (Clause no 2.5.4. IRC: SP:84)
7. Provide detailing of placement and specification of Railing, Fencing and electric poles, etc. (Clause No. 2.17 IRC: SP:84)

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8. Cross sections mentioned above is indicative and shall be decided as per project requirement, existing gas pipe lines and availability of ROW. No COS shall be admissible on this account.
9. Detailing of placement and specification of railing, boundary wall and electric pole etc. to be provided as per drawings.

3. Intersections and Grade Separators

All at-grade intersections and grade separated intersections shall be as per Section 3 of the Manual (IRC: SP 84). Existing at-grade intersections shall be improved to the prescribed standards. For improvement of intersections and at grade junction standards and type plan MoRT&H and IRC: SP:41 shall be followed.

Improvement of junctions shall be matched with design crossfall of main carriageway and within the extent of land availability. Side roads connecting to the main road shall be properly tie in with existing side road with acceptable gradient as per Manual.

The service road pavement composition shall be continued on crossroads 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 the types and features given in the tables below:

3.1 At-grade intersections

a) Major Intersections

Sl. No.	Design Chainage (Km)	Junction Type	Leads to		Median opening	Category of Cross Road	Carriageway width of cross road (m)	Length of crossroad to be developed (m)	
			LHS	RHS				LHS	RHS
1	548.000	+	Arlem	NH-66	Yes	MDR	7	50	50
2	555.300	Y	NH-66	Navelim	Yes	NH	14	50	50

b) Minor Intersections

S. No	Design Chainage (Km)	Type of intersection	Leads		Median Opening	Category of Crossroad	Carriageway width of crossroad (m)	Length of crossroad to be developed (m)	
			LHS	RHS				LHS	RHS
1	548.287	T	-	NH-66	Yes	Others	5	-	50
2	548.760	T	Davondem	-	Yes	Others	5.5	50	-

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S. No	Design Chainage (Km)	Type of intersection	Leads		Median Opening	Category of Crossroad	Carriage-way width of crossroad (m)	Length of crossroad to be developed (m)	
			LHS	RHS				LHS	RHS
3	549.080	T	Ambaji	-	Yes	Others	5.5	50	-
4	549.520	Y	Ambaji	-	Yes	Others	5.5	50	-
5	549.790	T	-	Fish market	Yes	Others	10	-	50
6	549.880	T	-	Madel	Yes	Others	5.5	-	50
7	550.570	Y	-	RHS Road	Yes	Others	7	-	50
8	550.675	T	Holyspirit church	-	No	Others	4	50	-
9	550.820*	T	Old NH	-	Yes	Others	5.5	50	-
10	550.970	X	Madgaon	Old NH	Yes	Others	5.5	50	50
11	551.040	T	Monte Hill	-	Yes	Others	7.5	50	-
12	551.180	T	-	Bernardo F Costa road	Yes	Others	5.5	-	50
13	551.270	Y	Hospocio Hospital Road	-	Yes	Others	7.5	50	-
14	551.370	T	-	Dr. Minguel Miranda road	Yes	Others	5.5	-	50
15	551.445	T	BPS Sports Club	-	Yes	Others	4	50	-
16	551.485	Staggered	City	Abade faria road	Yes	Others	5.5	50	50
17	551.655	T	-	Houses	Yes	Others	4	-	50
18	552.665	Y	-	City	Yes	Others	5	-	50
19	552.030	T	Isidoria Baptista road	-	Yes	Others	7	50	-

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S. No	Design Chainage (Km)	Type of intersection	Leads		Media n Opening	Category of Crossroad	Carriage-way width of crossroad (m)	Length of crossroad to be developed (m)	
			LHS	RHS				LHS	RHS
20	552.120	T	-	MMC	Yes	Others	10	-	50
21	552.210	Y	Old Station road	-	Yes	Others	5.5	50	-
22	552.330	+	City	City	Yes	Others	4	50	50
23	553.200	+	City	City	Yes	Others	5.5	50	50
24	553.260	T	-	City	Yes	Others	5.5	-	50
25	553.320	T	Houses	-	Yes	Others	4	50	-
26	553.360	T	Houses	-	Yes	Others	4	50	-
27	553.620	T	Houses	-	No	Others	5.5	50	-
28	553.730	T		Houses	No	Others	4	-	50
29	553.790	T	Houses	-	No	Others	5.5	50	-
30	553.880	T	Houses	-	No	Others	3.8	50	-
31	553.980	T	Houses	-	Yes	Others	4	50	-
32	554.070	T	Houses	-	Yes	Others	4	50	-
33	554.280	Staggered	Indoor stadium	Houses	Yes	Others	7	50	50
34	554.420	+	Dongorim	NH-66	Yes	Others	7 on LHS 14 on RHS	50	50
35	554.480	+	Houses	Houses	Yes	Others	4	50	50
36	554.620	T	Houses	-	No	Others	4	50	-

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S. No	Design Chainage (Km)	Type of intersection	Leads		Media n Opening	Category of Crossroad	Carriage-way width of crossroad (m)	Length of crossroad to be developed (m)	
			LHS	RHS				LHS	RHS
37	554.720	T	Houses	-	Yes	Others	4	50	-
38	554.830	T	-	Houses	Yes	Others	4	-	50
39	554.910	T	Houses	-	No	Others	4	50	-
40	554.990	T	-	Houses	Yes	Others	4	-	50
41	555.080	T	Houses	-	Yes	Others	4	50	-
42	555.240	T	Houses	-	Yes	Others	0	50	-
43	550.720*	+	Houses	Houses	Yes	Others	4	50	50
44	550.760*	T	Houses	-	Yes	Others	4	50	-
45	550.780*	Y	-	Houses	Yes	Others	5.5	-	50
46	550.910*	T	Subranayak road	-	Yes	Others	5.5	50	-
47	550.960*	Staggered	Houses	Houses	Yes	Others	4	50	-
48	551.010*	T	-	Houses	Yes	Others	4	50	50
49	551.050*	+	Houses	Houses	Yes	Others	4	-	50
50	551.080*	T	Houses	-	Yes	Others	4	50	50
51	551.110*	T	-	Houses	Yes	Others	4	50	-
52	551.200*	T	Houses	-	Yes	Others	5.5	-	50
53	551.300*	T	-	City	Yes	Others	5.5	50	-
54	551.350*	T	Houses	-	Yes	Others	4	-	50
55	551.370*	T	-	Houses	Yes	Others	4	50	-
56	551.530*	+	City	City	Yes	Others	7	-	50

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S. No	Design Chainage (Km)	Type of intersection	Leads		Median Opening	Category of Crossroad	Carriage-way width of crossroad (m)	Length of crossroad to be developed (m)	
			LHS	RHS				LHS	RHS
57	551.650*	T	-	Bus stand	Yes	Others	7.5	50	50
58	551.850*	T	-	SP office road	Yes	Others	7	-	50

Note* Junctions on RHS Road

Note:

- 1) Type of Junction to be improved as per manual. (clause No. 3.2.5 IRC:SP:84-2019)
- 2) 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 the manual. Auxiliary lanes including storage, acceleration, and deceleration lane along with physical islands to be provided as per the site conditions and ROW. The crossroad 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 crossroad at the gradient not more than 1:50. (Clause No. 3.2.2 IRC: SP:84)
- 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:84)
- 4) For U-turn, Self-Regulated U-Turn facility shall be created. (Fig 3.6 IRC:SP:84-2019)
- 5) There are 7 traffic islands nearby Margao Municipal Garden, the beautification of the same needs to be carried out. The work shall include Site development, Civil & Hardscaping, Electrical and lighting, soft landscaping, drainage & irrigation, Sculpture & Art. Refer drawings attached.

3.2 Grade separated intersection with/without ramps

Sl. No	Design Chainage (Km)	Junction type	Minimum length of viaduct to be provided	Remarks
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Sl. No.	Design Chainage (Km)	Junction type	Minimum length of viaduct to be provided	Remarks
-Nil-				

3.2.1 Transverse Bar marking: - The crossroad junctions as mentioned above shall be provided with Traverse bar marking by thermoplastic paint at the approach of junctions as per IRC: 99.

3.2.2 Raised Table Top crossings:- Raised Table top crossings shall be provided as per IRC 103.

Note: -

The list of above major & minor junctions is indicative only and any additional junctions required in the Project Highway shall have to be constructed by the Contractor in consultation with the Authority. However, no change of scope on account of additional junction will be accepted.

It is clarified that any other deficient junctions with cross BT/CC road is identified during development period in addition to those mentioned above shall be improved as per standard set forth in Schedule 'D'. Any Increase in the junction specified in the clause of Schedule B shall not constitute a Change of Scope.

For crossroad drainage facility, new HP culverts on crossroads shall be constructed as per Manual.

Improvement of culverts/drain up to 50m on the cross/connecting roads on Major & Minor junctions shall be in the scope of the Contractor.

The crossroad at junctions shall be regraded to attain gradient as per MoRTH standards & Type Designs for Intersections on National Highways.

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.

Junction improvement under grade separators shall be carried out as per manual with proper entry/exit to crossroads and slip/service roads, etc. Auxiliary lanes including storage, acceleration and deceleration lane along with physical islands to be provided.

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 B shall be treated as minimum requirement.

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Based on site/design requirement, the 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 Authority within the available Right of Way.

Use of Pond Ash and Design of Pond Ash embankment shall be specified (Clause No. 4.2.4 & 4.4.4.i (d) IRC: SP:84)

5. Pavement Design

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

5.2 Type of pavement

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

5.2.1 Design requirements

Flexible Pavement shall be designed for a minimum design period of 20 years and minimum effective subgrade CBR of 8% and maximum effective subgrade CBR of 10%. Stage construction shall not be permitted. Design of Flexible pavement shall conform to the guidelines of IRC: 37.

5.2.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for a design traffic of 25MSA for main carriageway. In case the traffic is more than specified above at the time of the traffic survey done by Contractor and at the time of design of project highway, then the higher traffic shall be adopted for design. During construction of flexible pavement existing bituminous layers shall be milled to 150mm depth & pavement shall be reconstructed with the below given minimum crust or as per design done by Contractor whichever is higher.

Following crust thickness shall be followed for the Main Carriageway :

Crust	Thickness (mm)
BC	40
DBM	75
WMM	250
GSB	200

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 crossroads/ 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 Reconstruction of stretches with new pavement (clause no. 5.9.4 IRC:SP:84).

Reconstruction of the stretches is as per the TCS enclosed.

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5.5 Bituminous Mix for Overlay (clause no. 5.9.8 IRC:SP:84)

Milling and overlay shall be followed as per the schedule below:

- Milling of 150mm and Overlay of 60mm DBM and 40mm BC:

S.No	From (km)	To (km)	Length (km)
1	550.560	552.430	1.870
2	550.630	551.800	1.170
Total length			3.04

- Milling and Overlay of 40mm BC:

S.No	From (km)	To (km)	Length (km)
1	548.000	550.560	2.560
2	552.430	555.300	2.870
Total length			5.43

Note : Similar composition of pavement shall be adopted for cross road development

6 Roadside Drainage

6.1 Drainage system including surface and subsurface drains for the Project Highway including crossroads shall be provided as per section 6 of the Manual. RCC Drain cum footpaths shall conform to the cross-sectional features and other details as given in Annexures to Schedule-B and shall be provided as under:

- a) Details of RCC Drain cum Footpath (Clause No. 2.13 & 6.2.6 IRC SP 84)

Sr. No	Design Chainage (Km)		Length (km)		Width of Drain (m)	TCS Type	Total Length (Km)
	From	To	LHS	RHS			
1	548.665	549.535	0.870	0.870	1.2	TCS - II	1.740
2	549.535	550.560	1.025	1.025	1.5	TCS - III	2.050
3	550.775	551.030	0.255	-	1.5	TCS - VI & VII	0.255
4	551.170	551.480	0.310	-	1.5	TCS - XVI & XVII	0.310
5	551.840	552.100	0.260	0.260	1.5	TCS - XIX & XX	0.520
6	552.100	552.430	0.330	0.330	1.5	TCS - XXI	0.660
7	553.160	554.280	1.120	1.120	1.2	TCS - X	2.240
8	554.550	555.300	0.750	0.750	1.2	TCS - X	1.500

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Sr. No.	Design Chainage (Km)		Length (km)		Width of Drain (m)	TCS Type	Total Length (Km)
	From	To	LHS	RHS			
9	551.500*	551.800*	0.300	-	1.5	TCS - XIII, IV & XV	0.300
Total			5.220	4.355			9.575

b) Details of RCC drain with perforated cover slab (for wheel loading)

Sr. No.	Design Chainage (Km)		Length (km)		Width of Drain (m)	TCS Type	Total Length (Km)
	From	To	LHS	RHS			
1	550.560	550.730	0.170	0.170	0.900	TCS - IV(A)	0.340
2	551.270	551.480	-	0.210	0.900	TCS - XVIII	0.210
3	551.480	551.840	0.360	0.360	0.900	TCS - XVIII	0.720
4	553.000	553.160	0.160	0.160	0.900	TCS - IV(B)	0.320
5	550.630*	551.500*	0.870	0.870	0.900	TCS - XII	1.740
6	551.730*	551.800*	-	0.070	0.900	TCS - XV	0.070
Total			1.560	1.840			3.400

c) Details of Saucer drain

Sr. No.	Design Chainage (Km)		Length (km)		Width of Drain (m)	TCS Type	Total Length (Km)
	From	To	LHS	RHS			
1	548.665	549.535	0.870	0.870	0.3	TCS - II	1.740
2	550.730	550.775	0.045	0.045	0.6	TCS - V	0.090
3	550.775	551.030	0.255	-	0.3	TCS - VI & VII	0.255
4	550.775	551.030	-	0.255	0.6		0.255
5	551.030	551.170	0.140	0.140	0.6	TCS - VIII	0.280
6	551.170	551.480	0.310	-	0.3	TCS - XVI & XVII	0.310
7	551.170	551.270	-	0.100	0.6	TCS - XVI	0.100
8	551.840	552.430	-	0.590	0.3	TCS - XIX & XX	0.590
9	553.160	554.280	1.120	1.120	0.3	TCS - X	2.240
10	554.550	555.300	0.750	0.750	0.3	TCS - X	1.500

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Sr. No	Design Chainage (Km)		Length (km)		Width of Drain (m)	TCS Type	Total Length (Km)
	From	To	LHS	RHS			
11	551.500*	551.730*	-	0.230	0.6	TCS - XIII & XIV	0.230
Total			3.490	4.100			7.590

Note:

1. Replacement of damaged/broken slab on the covered drain
2. The existing retained drain shall be cleaned.
3. Raising and/or replacement of damaged kerbs and paver blocks shall be carried out at locations with retained existing drains and footpaths.
4. Saucer drain, drain and drain cum footpath shall be of precast type.
5. Paver blocks of 60mm with 30mm sand bed thick shall be provided for footpath over drain slab as per the TCS drawings
6. Design chainage given in the above table is including structure length. Drain should be designed for vehicle loading.

Notwithstanding to the above mentioned schedule, contractor shall provide Footpath cum drain as per the site requirement and as specified by the Authority. Any changes in length shall not be a change of scope.

Note: -

- i) No Change of Scope on account of change in above specified length shall be considered.
- ii) The invert level of Roadside drains shall be minimum 500 mm below GSB bottom level & additional weep holes of 100 mm dia @1m c/c spacing shall be provided at GSB level in inner wall of built-up drain.
- iii) Drain top level shall be kept such as to suit/match the surface drainage requirements as per proposed FRL in built-up sections.
- iv) The cross section of earthen drain in open country section shall have minimum bottom width of 0.5m with side slopes of 1:1. Invert level of earthen side drains shall be as per hydraulic requirement & minimum 1 mt. below adjoining ground level.
- v) Drain should connect to the nearest Cross Drainage Structures.
- vi) Longitudinal slope of the drain shall be as per Manual.

In all built up areas RCC covered drains with Footpath shall be provided. **FRP heavy duty chambers fitted with premoulded frame** shall be provided at appropriate spacing. Suitable crossing shall be provided at approaches to properties etc. invert levels of drains shall be decided on the basis of ground slopes of adjoining properties and open grounds. Pedestrian guard rails shall invariably be provided in

all built-up sections as per the site requirement and directed by the Authority for separating pedestrian traffic from the NH traffic as per IRC-99 and IRC-103.

Above length of the lined drains shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority. Any increase in the length specified in this Clause of Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

6.2 Unlined Drains cleaning require for existing drain

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

6.3 Drainage where Embankment Height is more than 3m.

Chute drain shall be provided at suitable intervals 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 MBCB to channelize storm water into chute. (Clause No. 6.8.2.4 of IRC: SP:84)

6.4 Drainage for Structures

A suitable drainage arrangement for storm water from deck slab shall be provided. Falling of water on any surface of the structures, flow of underneath or remain standing or flowing over the road below the structure is not permitted in any circumstances. (Clause No. 6.8 IRC: SP:84)

7 Design of Structures

7.1 General

Project Highway is proposed to be constructed to two lane/non standard 4 lane configuration. As such, superstructures of all bridges, culverts and other structures shall be designed for edge movement of the vehicle considering stitching of new superstructure in future during widening to additional lanes. IRC Special vehicle loading is to be considered in the design of all bridges, culverts and structures.

All structures except wherever expansion joints have been provided, the pavement layers shall be continued over the structures so as to ensure smooth riding quality in project highway. These structures shall be designed considering the dead load of pavement layers.

All major structures shall be designed preferably with continuous structure to reduce the number of expansion joints on the MJB/ ROBs/ flyover/ Interchange etc.

7.1.1 Bridges, culverts and structures shall be designed for IRC class Special Vehicle (SV) loading as per recommendation of IRC: 6 and constructed in accordance with

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section-7 of the manual. All structures shall conform to the cross-sectional features and other details specified therein.

7.1.2 The overall width of the structures shall be given in Annex-I of Schedule-B (Clause No.7.3 IRC SP:84 2019).

7.1.3 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. (Clause No. 7.17 IRC: SP:84)

Details of Structures with footpaths

Sr. No.	Location at km	Skew Angle	Footpath Width (m)		Remarks
			Left	Right	
-Nil-					

7.1.4 Bridges in the improvement proposal need to be of high level bridge.

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

7.1.6 Cross section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross sections given in Section 2.10 of the Schedule-B.

7.1.7 In bypass/realignment locations if the structure in existing crossroads is replaced to new locations. No change of scope shall be allowed.

7.1.8 If any new structures are proposed at canal cum bund roads along the project highway in consultation with concerned irrigation department/IE. No change of scope shall be applicable.

7.1.9 Wherever liquefaction is observed, ground improvement shall be done by replacing suitable material and compacting the soil to increase the penetration resistance to satisfy the clause 8.4.4 (v) of IRC114.

7.1.10 Proposed levels at structure locations as shown in plan & profile are only for guidance and any changes in levels shall not constitute change of scope provided at any location of bridges and grade separated structures the FRL as in drawing shall not be lowered.

7.1.11 The structures falling within acceleration / deceleration lane /taper shall be constructed to the required width at the location. These changes shall not be treated as a change of scope.

7.1.12 An effective drainage system for bridge decks shall be provided as specified in the Manual.

7.1.13 Repairs and rehabilitation of all existing bridges shall include but not limited to general cleaning of bridge and area around bridge, restoration of slopes and protective

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works, removal and relaying of existing wearing coat, repair and replacement of drainage spouts, construction of new crash barriers in place of old railing, providing of new expansion joints and bearings in place of old ones wherever required and repair and rehabilitation of damaged concrete, if any, and providing floor protection with rigid and flexible apron and embankment slope protection if any etc. to the complete satisfaction and as per directions of Authority's Engineer/Authority. All the repairs and rehabilitation works shall be carried out as per standards and manuals.

7.1.14 The structures proposed to be retained, the FRL of those structures shall be maintained as per existing structure, widening/New construction shall be done as per the designed Finished Road level provided in any circumstances soffit level of proposed new bridge shall not be less than soffit of the existing bridge.

7.2 Culverts

7.2.1 Overall width of all culverts shall be equal to the roadway width of the approaches. Barrel Length may change as per height of embankment and shall get approval from Authority's Engineer, this will not be considered under change of scope. 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.

The locations, vents and type of Culverts are tentative and Changes in the locations, vents and type of Culverts, if any shall be finalized as per site conditions in consultation with Authority, which shall not constitute COS.

Changes in the location and number of culverts, if any shall be finalized as per site conditions in consultation with Authority which shall not be considered as Change of Scope.

The invert level of proposed Box type structure at cart track/Cross drainage locations shall not be lower than the existing ground level.

The Contractor shall use precast concrete elements/segments (box culverts and girders) complying with Ministry circular no. RW/NH-34049/01/2020-S&R (B) dated 08.04.2022.

Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

7.2.2 Widening of existing pipe culverts (Clause No. 7.3 iii IRC:SP:84-2019)

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.

Sr. No	Design Chainage (Km)	Culvert Type	Skew Angle	Span/Opening (m)	Repairs / Rehabilitation proposals	Culvert Crossing Type (Balancing/Stream, etc)	Remarks
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-Nil-

7.2.3 Retaining & Rehabilitation of existing culverts (Clause No. 7.3 iii IRC:SP:84)

Sr. No	Design Chainage (Km)	Culvert Type	Skew Angle	Span/Opening (m)	Repairs / Rehabilitation proposals	Culvert Crossing Type (Balancing/Stream, etc)	Remarks
1	549.534	Hume pipe	Normal	2 X 1	Existing culvert is retained with rehabilitation work such as removing debris / garbage / vegetation, clearing flow obstructing blockages, repairing Protection works - (aprons & curtain walls), pitching work, Safety barriers, painting, etc.,	Balancing	-
2	550.472	Box	Normal	1 X 3 + 1 X 2		Balancing	-
3	553.472	Slab	Normal	1 X 6		Balancing	-

7.2.4 Reconstruction of existing pipe culverts to Box Culverts:

The existing pipe/slab culverts at the following locations shall be re-constructed as new culverts:

(Culverts to be constructed in accordance with the paragraph 7.3 of the manual)

Sl. No.	Design Chainage (Km)	Existing Culvert Type	Skew Angle	Span/Opening (m)	New / Reconstruction	Culvert Crossing type (Balancing/stream, etc)
-Nil-						

7.2.5 Reconstruction of existing box/slab culverts to Box Culverts:

The existing slab/box culverts at the following locations shall be re-constructed as new culverts:

(Culverts to be constructed in accordance with the paragraph 7.3 of the manual)

Sl. No.	Design Chainage (Km)	Existing Culvert Type	Skew Angle	Span/Opening (m)	New / Reconstruction	Culvert Crossing type (Balancing/stream, etc)
1	548.521	Slab cum Arch culvert	Normal	1 x 6.0	Precast Box culvert	Balancing

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Sl. No.	Design Chainage (Km)	Existing Culvert Type	Skew Angle	Span/ Opening (m)	New / Reconstruction	Culvert Crossing type (Balancing/stream, etc)
2	548.670	Slab culvert	Normal	1 × 2.0	Precast Box culvert	Balancing
3	548.085	Slab culvert	Normal	1 × 4.0	Precast Box culvert	Balancing
4	550.585	Slab culvert	Normal	1 × 6.0	Precast Box culvert	Balancing
5	551.412	Slab culvert	Normal	1 × 1.5	Precast Box culvert	Balancing
6	553.865	Slab culvert	Normal	1 × 2.0	Precast Box culvert	Balancing
7	554.870	Slab culvert	Normal	1 × 2.0	Precast Box culvert	Balancing

Note: - It is clarified that as per site requirement if any new culverts are identified and required for drainage arrangement same shall be constructed during development as per standard set forth in Schedule 'D' & as per instruction of Authority's Engineer.

As per clause 2.10.2 of IRC: SP:84, Wherever box culverts and bridges allow a vertical clearance of more than 2 m, these can be used in dry season for pedestrian and cattle crossing by providing necessary flooring.

7.2.6 Reconstruction of existing pipe culverts to Pipe Culverts:

The existing pipe culverts at the following locations shall be re-constructed as new culverts:

(Culverts to be constructed in accordance with the paragraph 7.3 of the manual)

Sl. No.	Design Chainage (Km)	Culvert Type	Skew Angle	Span/ Opening (m)	New / Reconstruction	Culvert Crossing type (Balancing/stream, etc)
-Nil-						

Note: - It is clarified that as per site requirement if any new culverts are identified and required for drainage arrangement same shall be constructed during development as per standard set forth in Schedule 'D' & as per instruction of Authority's Engineer.

Culverts should also extend to service road/slip lane as per applicable in 2 (viii) if this schedule. Also, culverts shall be provided for full width as per applicable Typical Cross section.

The dimensions and numbers given above are minimum and the proposed dimensions shall be based on hydraulic calculations and approval from Authority's Engineer. Any changes to above dimensions shall not be constitute a change of scope.

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7.2.7 Widening of existing box culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in the provision of relevant Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sr. No	Design Chainage (Km)	Culvert Type	Skew Angle	Span/ Opening (m)	Repairs / Rehabilitation proposals	Culvert Crossing Type (Balancing/ Stream, etc)	Remarks
-Nil-							

7.2.8 Additional new box culverts

5 no. of additional Box culverts of 2 x 2m size of precast type shall be constructed as per the General Arrangement Drawings.

Note:- Location of the new box culverts are tentative and to be finalised in consultation with Authority, any changes in the location shall not be considered as Change of Scope.

7.2.9 Repairs/replacements of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

Sl. No.	Location at km	Type of repair required
-Nil-		

7.2.11 Details of Additional New Culverts:

Box culverts of minimum size 1.5m x 1.5m shall be provided on each side of crossroads to maintain the longitudinal continuity of drain water flow along the Project Highway as per section 6 of the Manual.

7.3 Bridges

7.3.1 Existing bridges to be re- constructed/widened:

(i) The existing bridges at the following locations shall be re-constructed as new Structures.

Sl. No	Design Chainage (km)	Existing span (m)	Total Proposed length (m)	Total proposed width (m)		Skew Angle	Remarks
				MCW	SR		
-Nil-							

7.3.2 The following narrow bridges shall be widened:

Sl. No.	Location (km)	Existing width (m)	Extent of widening (m)	Cross-section at deck level for widening @
-Nil-				

7.3.3 Additional new Major bridges

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

Sl. No.	Location (km)	Total length (m)	Remarks, if any
Nil			

7.3.4 Additional new Minor 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.

Sl. No.	Design Chainage (km)	Total Proposed length (m)	Total proposed width (m)		Skew Angle	Remarks
			MCW	SR		
-Nil-						

7.3.5 The railings of existing bridges shall be replaced by crash barriers at the following locations:

Sl. No.	Location at km	Remarks
Nil		

7.3.6 Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows:

Sl. No.	Location at km	Remarks
Nil		

7.3.7 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in the 7.20 of the Manual

7.3.8 Structures in marine environment

All structures near to and within the vicinity of 15Km to sea coast is susceptible to chloride induced corrosion of reinforcement. As a precautionary measure, to meet with the service life of the bridge as per design. The reinforcement for all RCC works shall confirm to MoRTH circulars and guidelines in this regard.

Note:

- Width is excluding Median (M) gap and the gap between Main Carriageway (MCW) & Service/Slip Road (SR).
- Location and span are indicative. Exact location may be decided in consultation with PWD and the same shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 16.
- Span arrangement mentioned above is tentative and may be changed based on design of structure, latest construction techniques and aesthetics of structures. The span lengths mentioned are optimum required span and should not be

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reduced. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any increase in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

- In Case of bridges proposed for widening/repair as per details above, the same shall be re-constructed if the design shows that these are unsafe for design loads. No change of scope shall be considered in such cases.
- Expansion joints shall be minimized by deck continuity/ continuous superstructure over multiple spans. Deck length between two expansion joints shall not be less than 120m except where structure length falls short of it. Expansion joints shall be Finger joint type in compliance with IRC: SP:69-2011, Table 5.4.1 criteria for adoption of different types of expansion joints. Contractor shall ensure quality control as per good industry practice and shall ensure presence of manufacturer of expansion joints at the time of installation for quality control supervision.

7.4 Rail-road bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be in accordance with Section 7 of the Manual.

7.4.2 Road over-bridges

Existing Road over-bridges (road over rail) shall be retained at the following location:

Sr. No.	Design Chainage (Km)	Length (m)	Type of super-structure	Name of crossing	Total Width (m)	Remarks
1	552.670	460	Box Girder	ROB	8.5	Retained

7.5 Grade separated structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2 (ix) and 3 of this Annex-I.

7.6 FOB/ Skywalks

FoB/Skywalks shall be provided in built up areas/ near schools.

Sr. No.	Location at km	FoB Type	Remarks
-Nil-			

7.7 Subways

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Existing Subways at following locations shall be repaired.

Sr. No.	Location (km)	Remarks
1	554.750	Retained with repairs
2	545.020	
3	546.200	
4	547.600	

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

Sr. No.	Name of the Structure	Total Numbers	Remarks
1	ROB	1	Retained
2	Subway	4	Retained with repairs
3	Precast Box culvert	7	(Demolishing existing & reconstruction)
4	Box culvert	1	Retain with Rehabilitation
5	Slab culvert	1	
6	Hume pipe culvert	1	
7	Precast box culvert	5	Additional Culverts
Total		20	

The repair of subways shall include following:

1. Providing and applying an elastic elastomeric membrane forming system with anticarbonation and berathing properties. The system (EMCECOLORFLEX + PRIMEX 250) or equivalent – 1492 cum (min qty).
2. Painting on Steel Surfaces – 73sqm (min qty)
3. Dismantling the tile work in floors and roofs – 886.50sqm (min qty)
4. Providing and fixing 1st quality ceramic glazed wall tiles (Johnson, Somany, Kajaria), Wall Ceramic Glazed Tiles : 300 x 600 – 499 sqm (min qty)
5. Guniting concrete surface with cement mortar applied with compressor after cleaning surface and spraying with epoxy (MC Dur 1250 & Accelerated compound Torkrethilfe BE of MC Bauchemie or Equivalent) – 205sqm (min qty)
6. Providing and inserting nipples with approved fixing compound MC Fix ST of MC Bauchemie or Equivalent – 412 Sqm (min qty)

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7. Sealing of crack / porous concrete with Epoxy Grout (MC Dur 1264 of MC Bauchemie or Equivalent) by injection – 2884 sqm (min qty)
8. Providing & applying Rustonil (P.no.569) or equivalent – 205 sqm (min qty)
9. Removal of existing cement concrete wearing coat including its disposal complete (Thickness 75 mm). – 205sqm (min qty)
10. Electrical work for subway including wirings, points, fixtures, etc as per site conditions and as per directions of Engineer in charge, - L.S. 4 nos.
11. Providing and fixing in position S.S. hand rail in main stair case, and landing as per approved design – 72m (min qty)
12. Precast plain cement chequered tiles 22 mm thick of required shades – 200sqm (min qty)
13. Providing and fixing in position collapsible steel shutters with vertical channels 20 mm x 10 mm x 2 mm and braced with flat iron diagonals 20mm x 5mm size with top and bottom rails of T-iron, 40 x 40 x 6 mm with 38 mm dia. Steel pullys completely bolts locking arrangement, stopper, handles including applying a priming coat of red lead paint. – 34.75sqm (min qty)
14. Providing and laying vitrified floor tiles in different sizes of Johnson, Somany, Kajaria - 187.50sqm (min qty).

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 Manual.

8.2. Traffic Signs:

Traffic signs shall be provided as per IRC 67 as mentioned in Schedule-C.

8.3. Pavement Marking:

Pavement markings shall be completed as per IRC 35 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, MCB barrier to Concrete Barrier (Clause No. 9.7.2 (b) IRC: SP:84)

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

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The details of the location are as below:

S. No	Item	Chainage		Total Length (Km)	Remarks
		(From in Km.)	(To in Km.)		
1	New Jersey Crash Barrier	551.170	551.270	0.100	In median
		553.160	554.280	1.120	
		554.550	555.300	0.750	
		551.660(on RHS road)	551.730(on RHS road)	0.070	
Total				2.040	

Above length of the crash barriers is indicative and minimum specified. The actual length shall be determined by the Contractor in accordance with the Manual requirements with approval from Authority. Any increase in the length shall not constitute a Change of Scope.

The crash barrier shall follow the Codal provisions of IRC:119.

9 Roadside Furniture

9.1 Roadside furniture shall be provided in accordance with the provisions of Section 11 of the Manual. It shall be provided as per the details mentioned in Schedule-C.

Note: All Traffic Signs for Road Users would be provided as per IRC-SP-84 Manual. However, the Contractor shall provide numbers of Cautionary, Mandatory, Warning and Informatory Traffic Sign Boards at hazardous locations considering pedestrian and vehicle safety. The locations shall be finalized in consultation with Authority's Engineer.

10 Shifting of Utilities

Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department is part of the scope of work of the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. The specifications of concerned Utility Owning Department shall be applicable and followed.

Notes:

- a. The type/spacing/size/specifications of poles/towers/line/cables to be used in shifting work are as per the guidelines of utility owning department and it is solely between Contractor and the Utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type / spacing / size / specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per

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requirement of utility owning department and / or construction of project highway.

- b. The Contractor shall carry out joint inspection with utility owning department and get the shifting scheme sanctioned from utility owning department.
- c. The assistance of the Authority is limited to forwarding letter on the proposal of Contractor to utility owning department whenever asked by the Contractor.
- d. The decision/approval of utility owning department shall be binding on the Contractor.
- e. Project road is city road and may have various unknown underground utilities. During work/excavation if any utility gets damaged by the Contractor knowingly or un-knowingly, Contractor have to re-instruct the utility immediately at his own cost. If any new underground utilities are found during the execution at site, the Contractor shall shift the utilities and it does not constitute any change of scope.
- f. The supervision charges at the rates/charges applicable between the Authority and utility owning department as and when Contractor furnishing a demand of Utility Owing Department along with a copy of estimated cost given by the later shall be paid directly by the Authority to the Utility owning Department or the Contractor may pay these charges to the utility owning department if directed by Engineer in Charge & the same will be reimbursed to him by the Authority.
- g. The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor/Contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor is required to deposit the dismantled material to utility owning department as per the norm & practice and in that case the amount of credit for dismantled material may be availed by the Contractor as per estimate agreed between them.
- h. The utilities shall be handed over after shifting work is completed to Utility Owing Department after due testing as desired by them & up to their entire satisfaction.
- i. The maintenance liability shall rest with the Utility Owing Department after handing over process is complete as far as utility shifting works are concerned.
- j. The above scope of electrical shifting involves all the necessary fixtures & fastenings as per site condition, specification & standard practice of utility owning entity
- k. The above quantities may vary depending upon actual alignment & site conditions, hence above quantities are subjected to negative CoS.
- l. The Contractor & Authority's Engineer shall try to optimize the quantum of

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shifting. Actual length & location of shifting will be decided by Joint Inspection with Authority's Engineer & Utility Owning Entity.

- m. The above scope of water shifting involves all necessary sluice valves. Air Valves, Connections, Lowering, fixing, jointing fixtures & fastenings as per guidelines & specifications of utility owning entity.
- n. Shifting of all existing, buried and overhead utility lines are to be shifted by the Contractor within the scope of the Contractor. No change of scope shall be accepted on account of any change in quantities / specifications of the utility lines to be shifted.

The Utilities shall be shifted to extreme edge of Row as per relevant TCS & as directed by Authority's Engineer.

11 Change of Scope

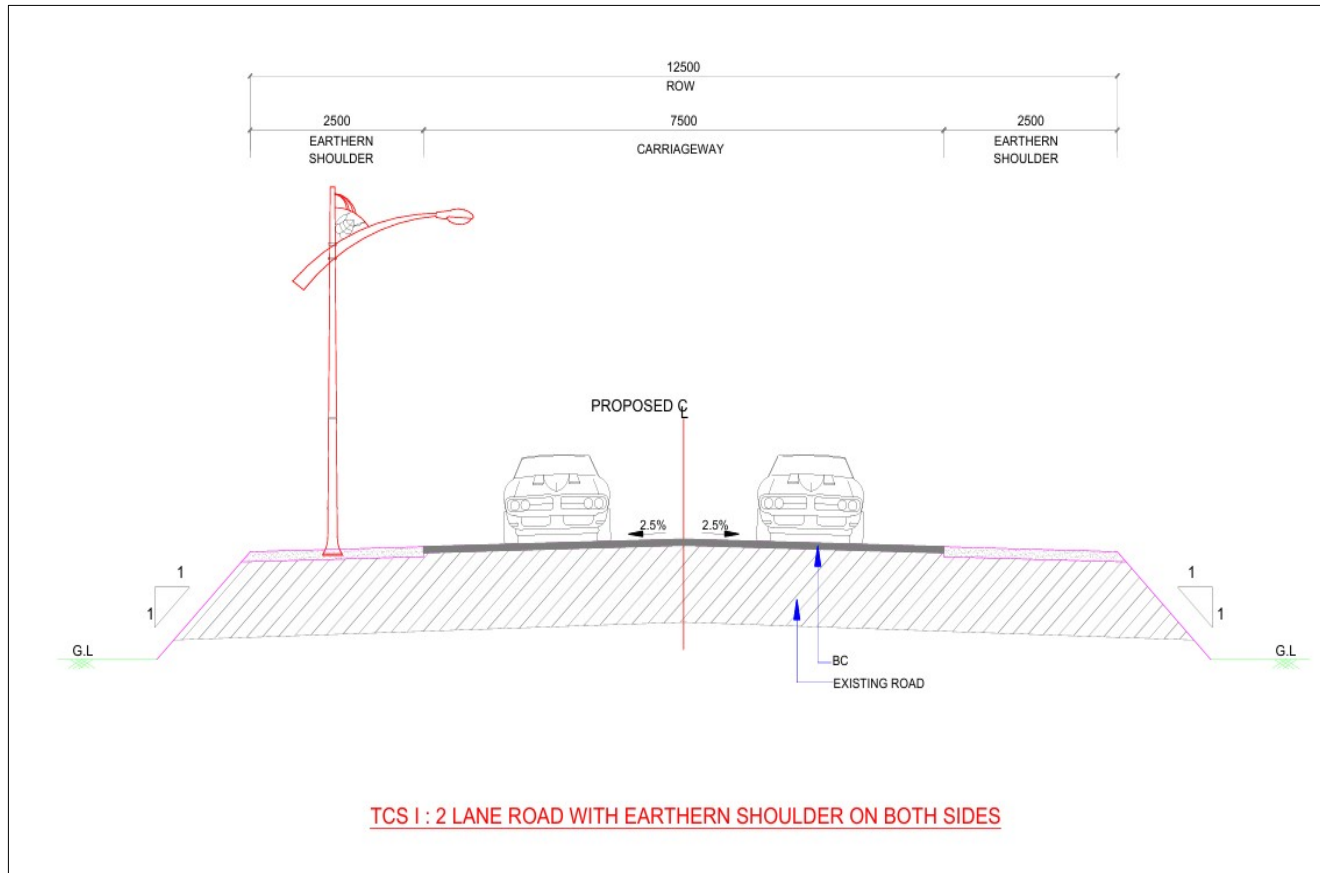
The length of Footpath Cum Drain, drain, parking, Crash barrier specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

12 Work Zone Traffic Management Plans

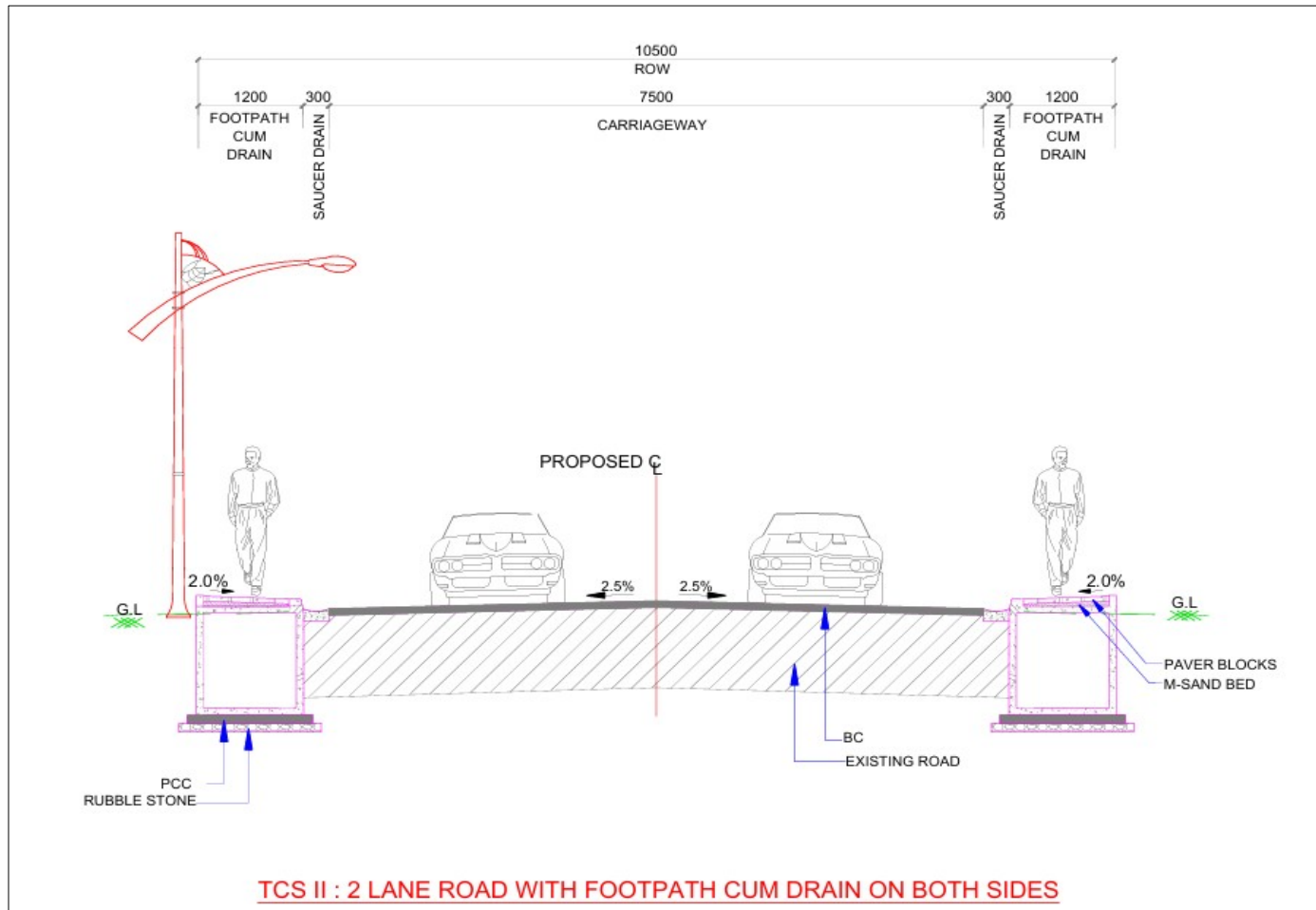
The traffic diversion plans shall be prepared as per IRC SP 55 for smooth flow of traffic and safety. A diversion plan shall be proposed for construction of Culvert, Grade Separated Structures, Bridges, RoB/RUB, etc. and traffic management plan for widening/ reconstruction of carriageway. (Clause No. 7.19 IRC: SP:84)

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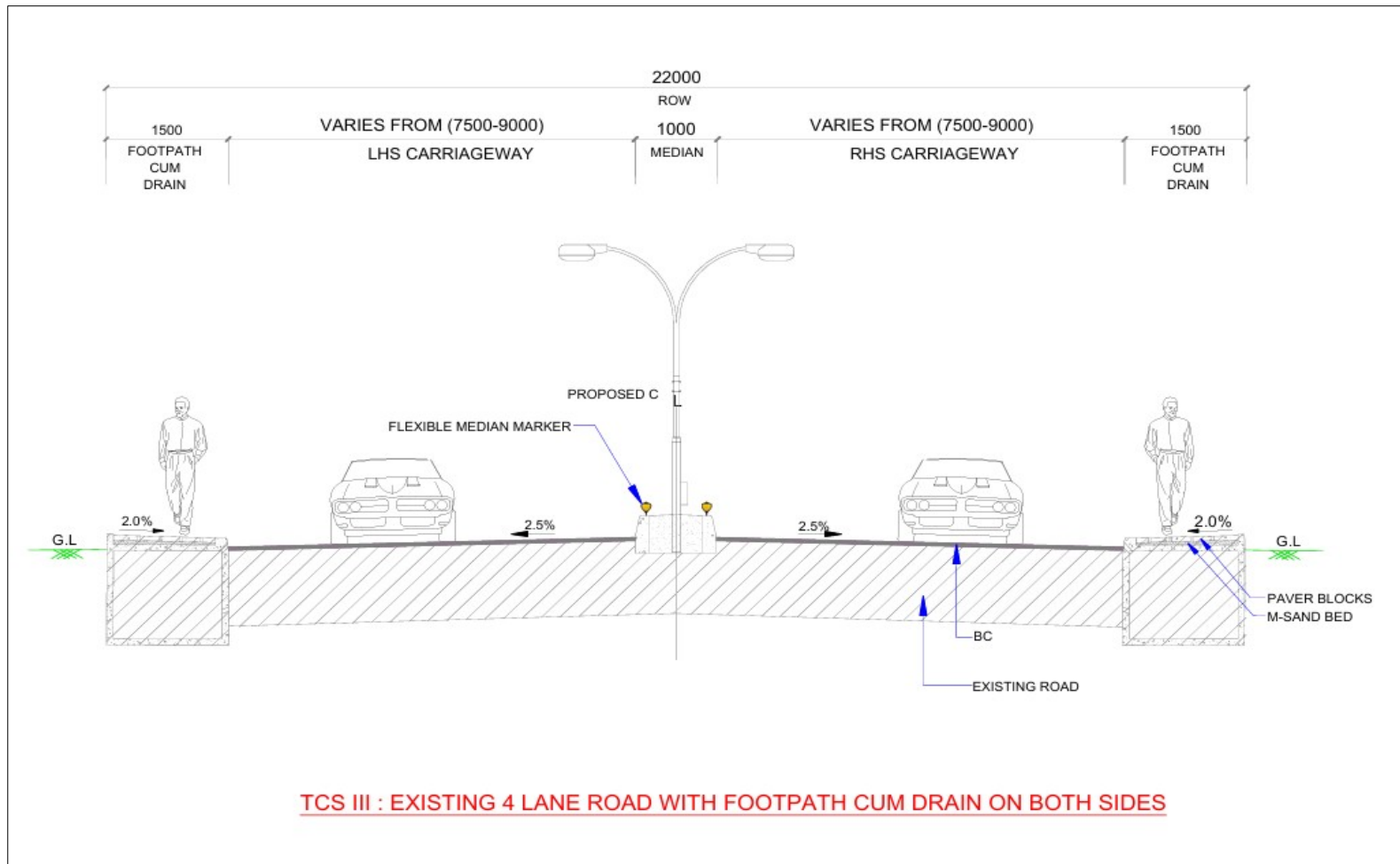
Annex-II
(Schedule-B)
Typical Cross sections:



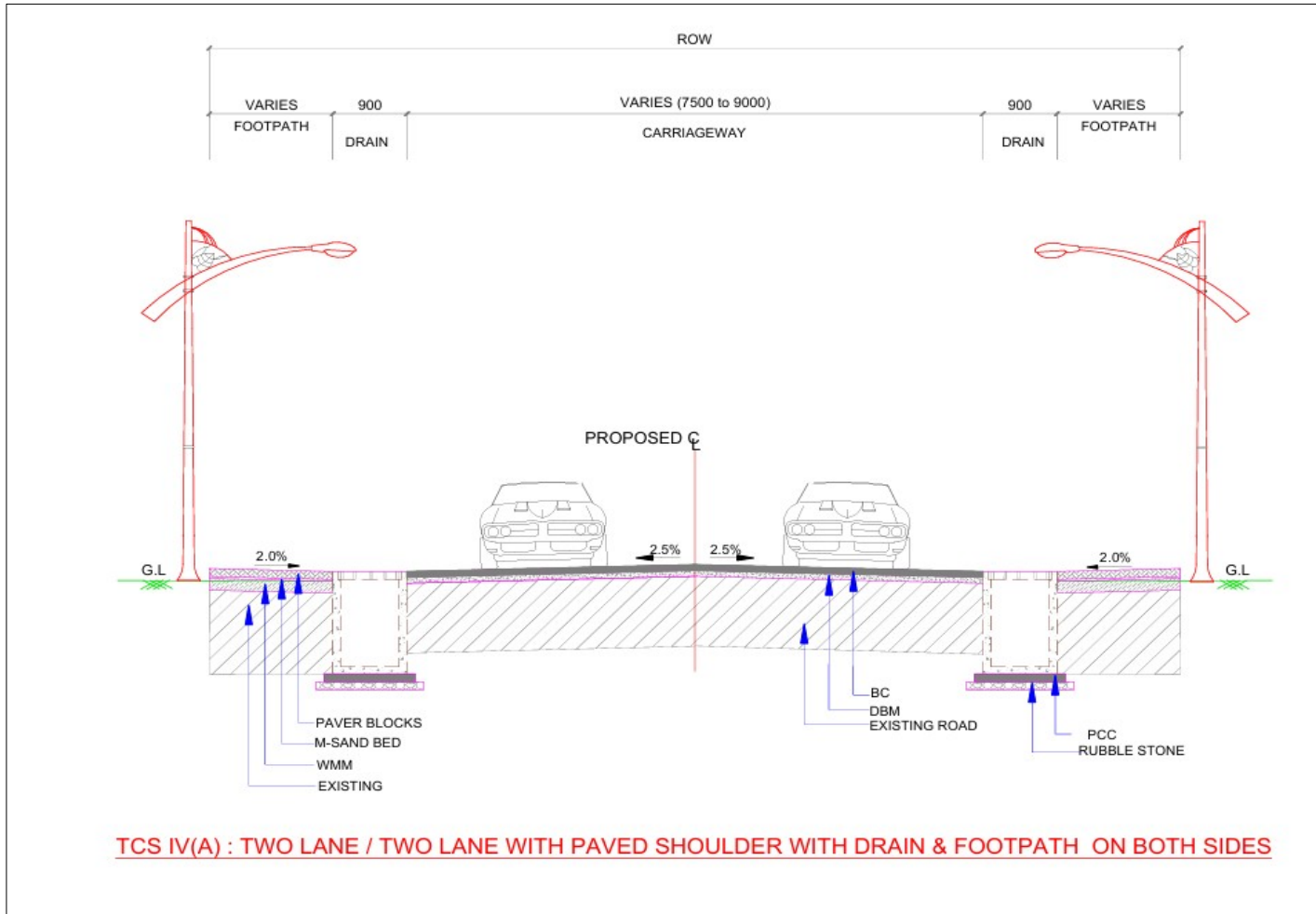
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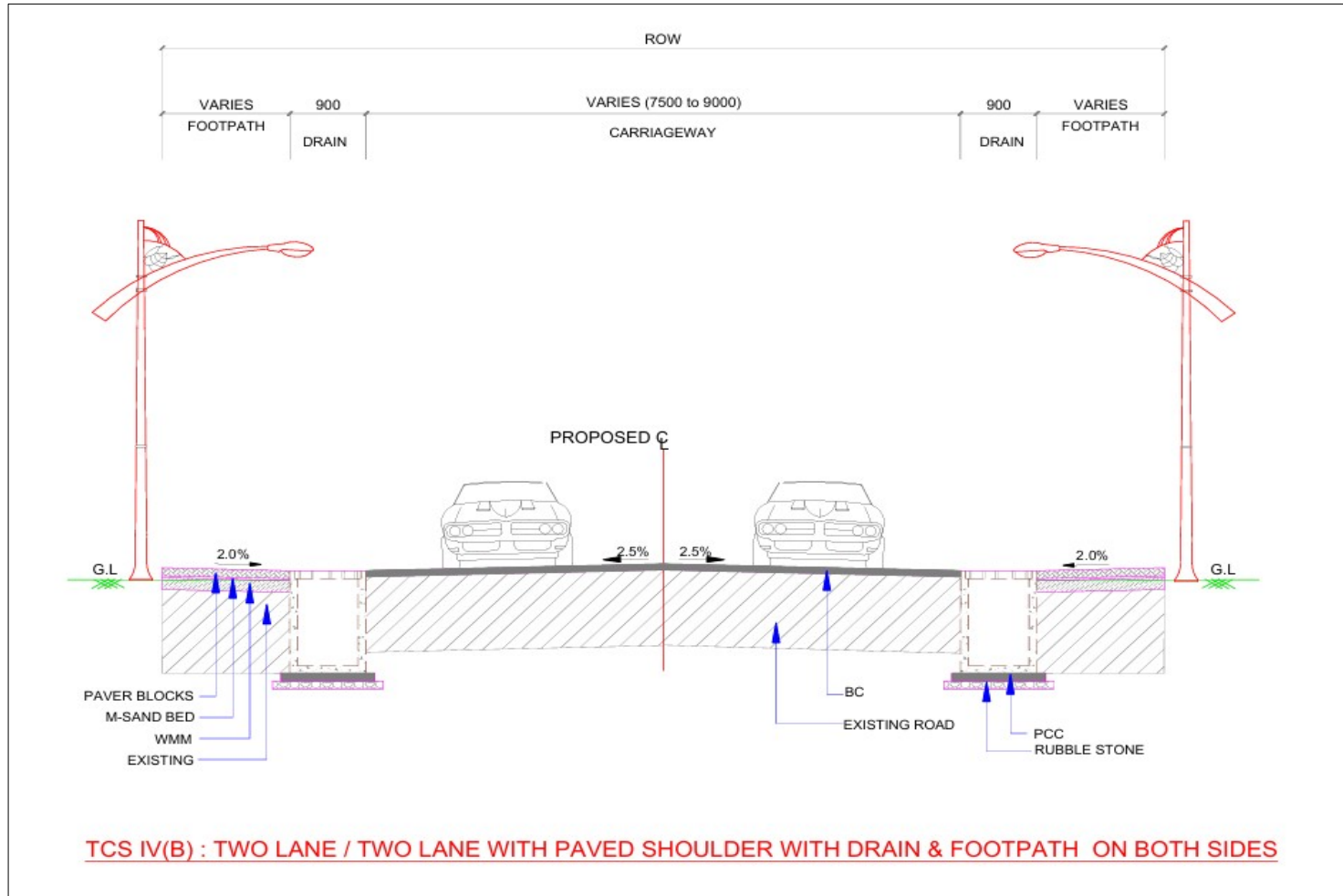
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



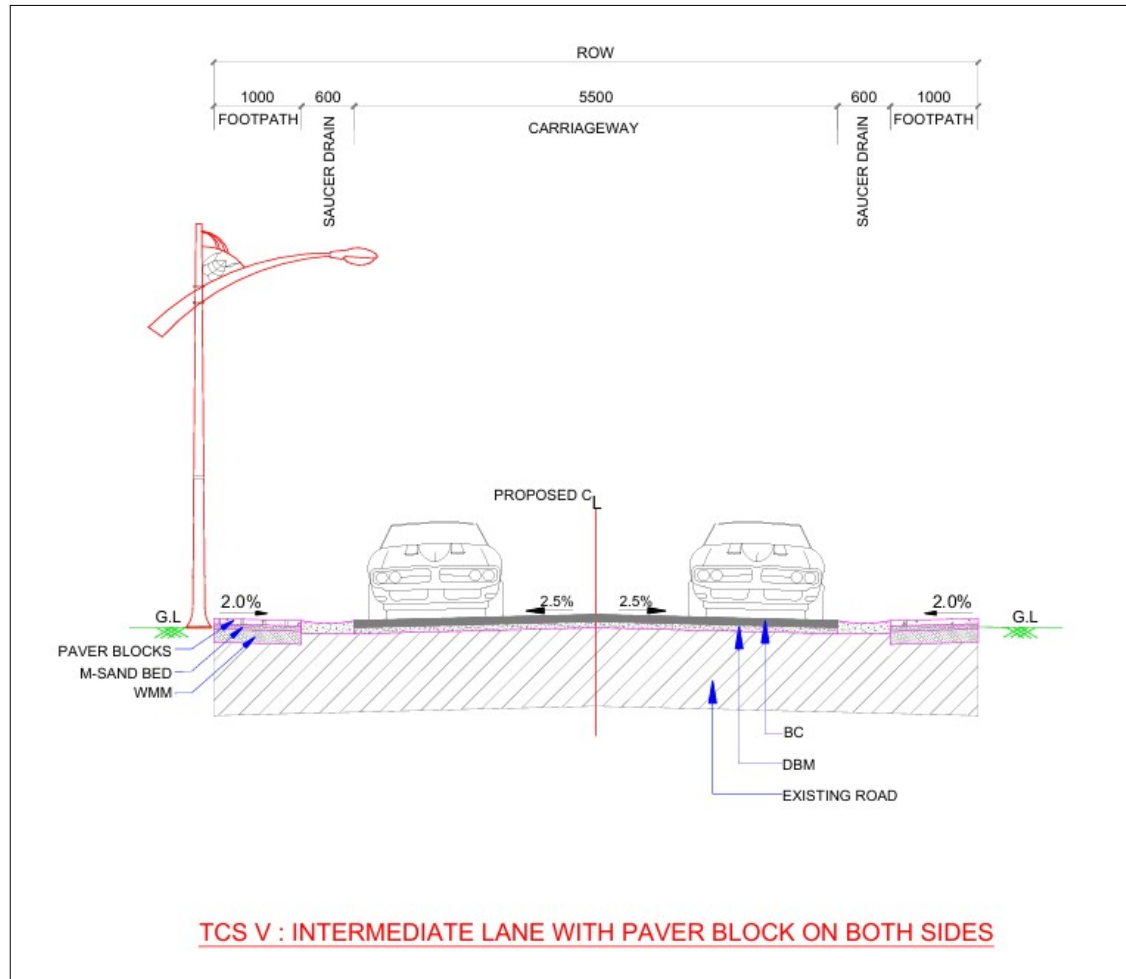
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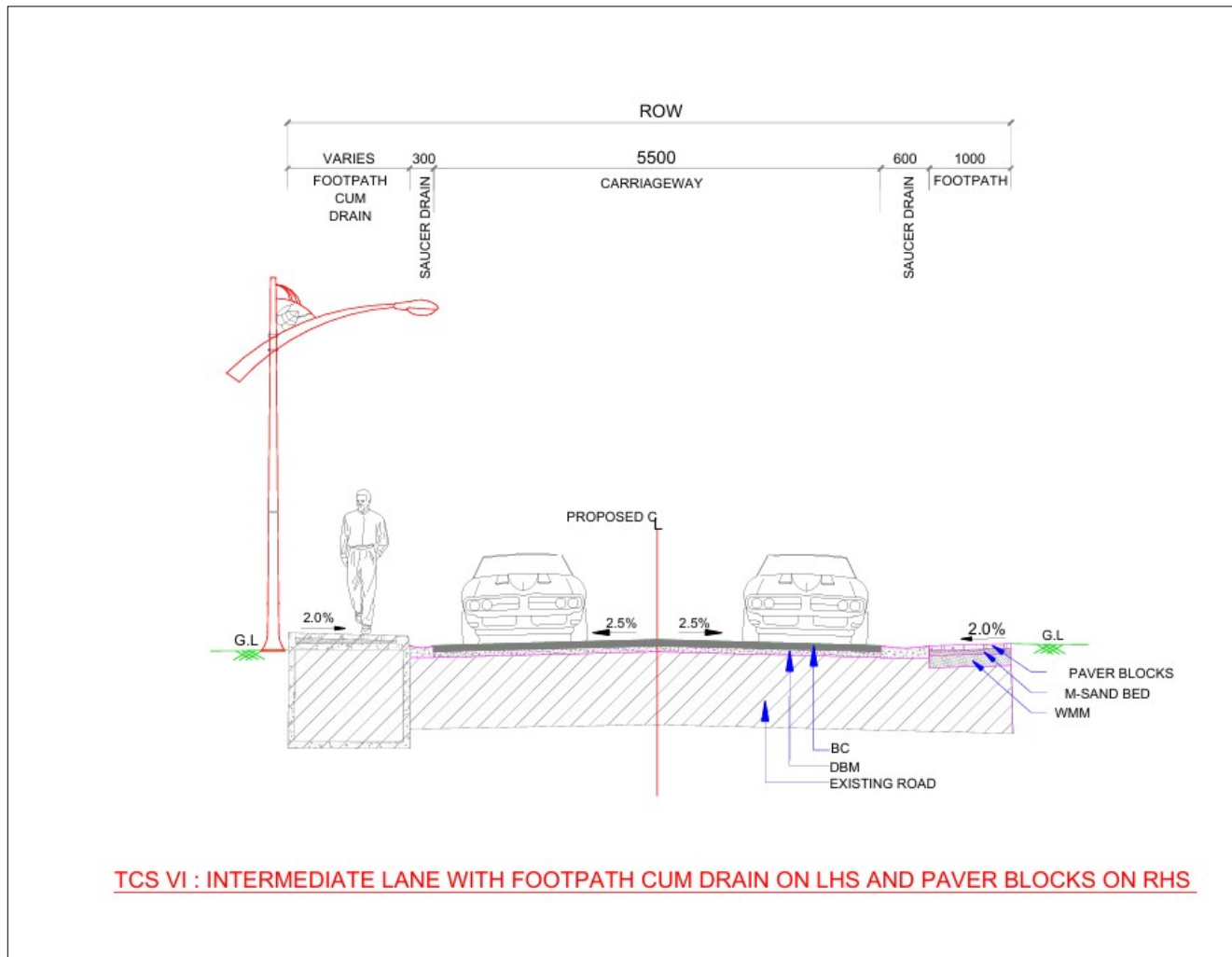
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



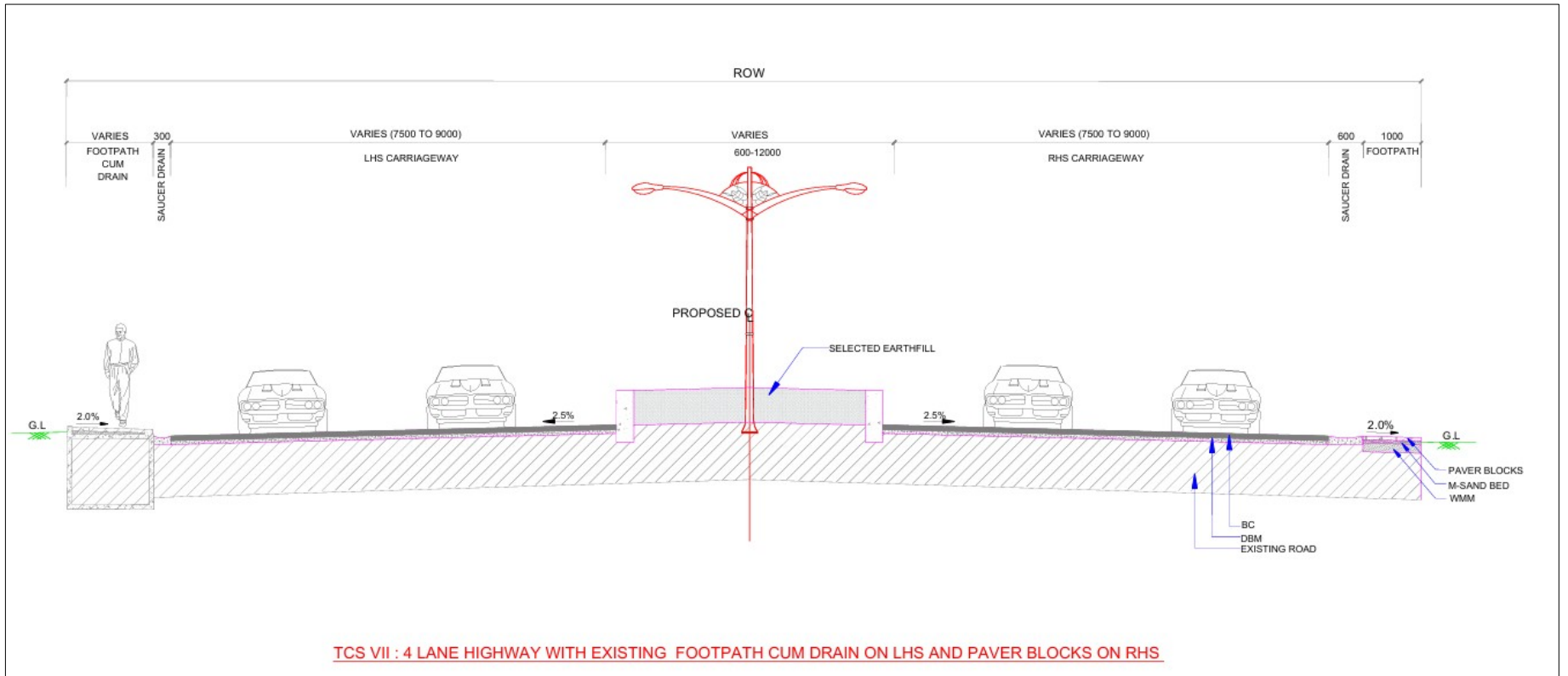
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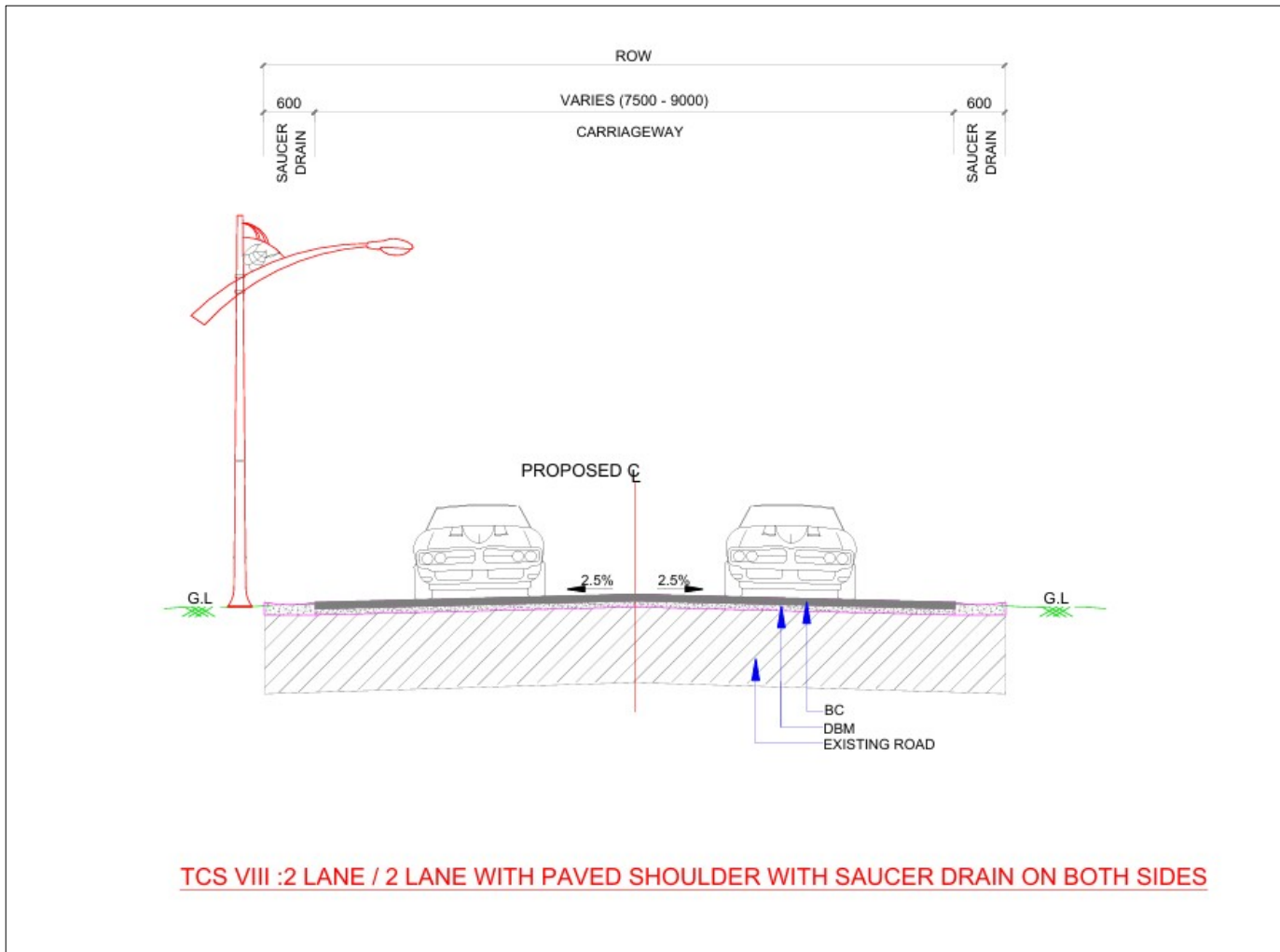
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



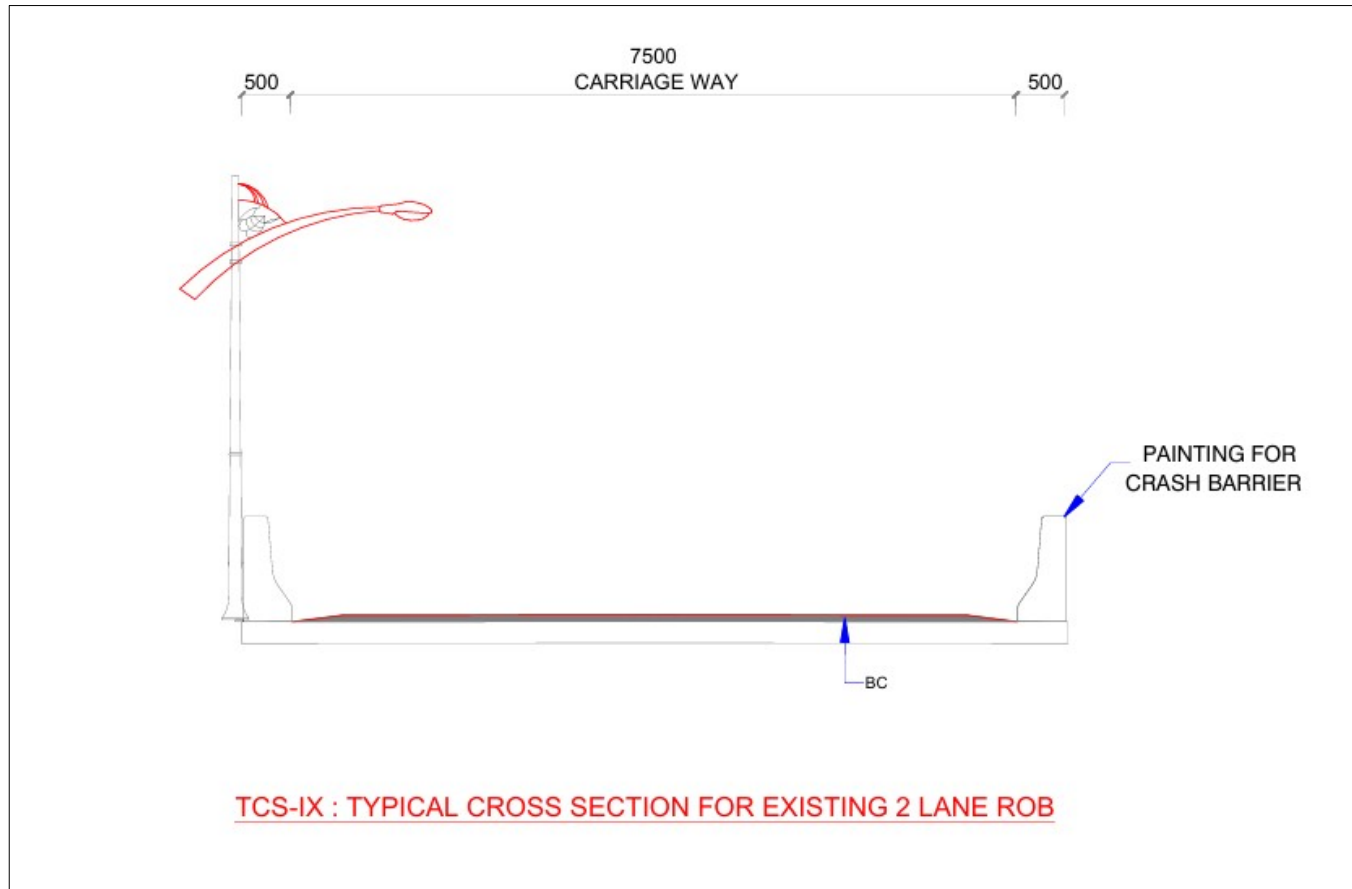
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



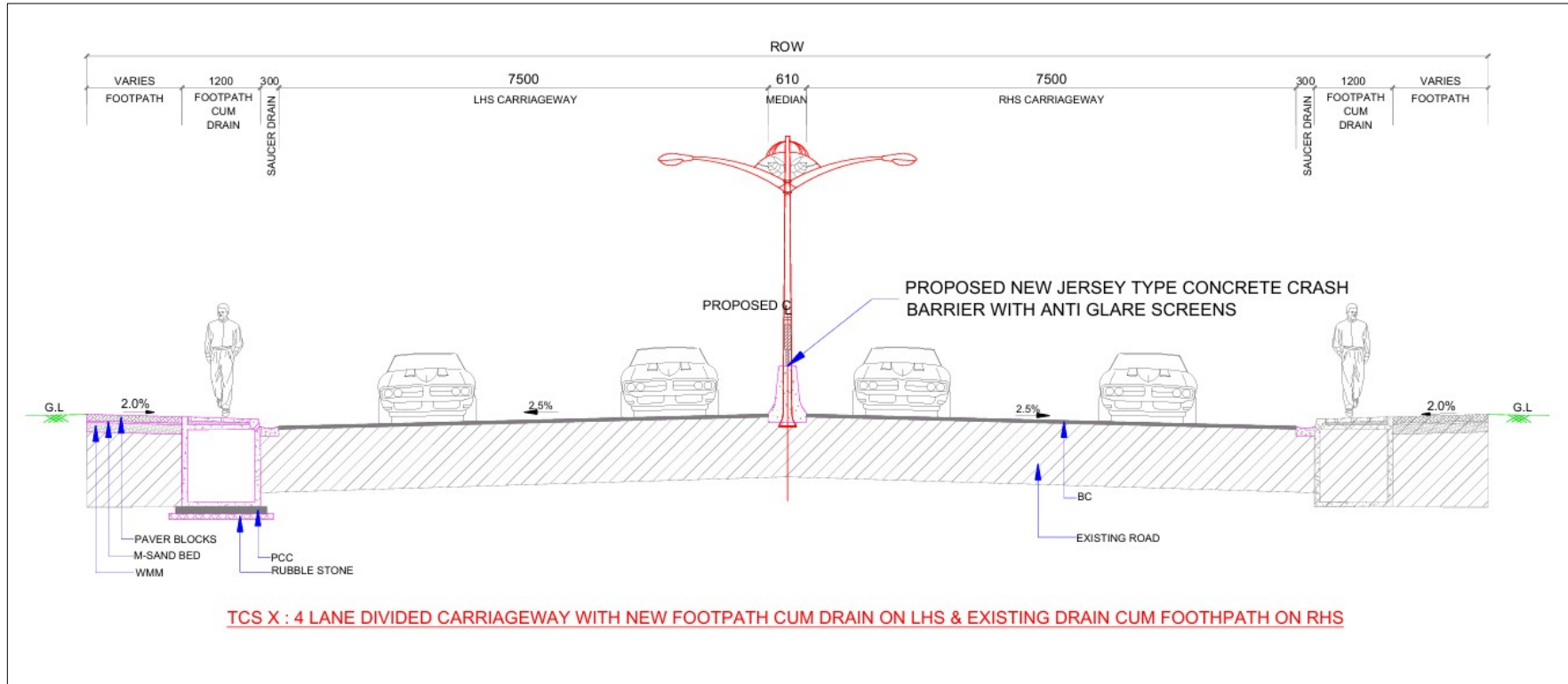
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



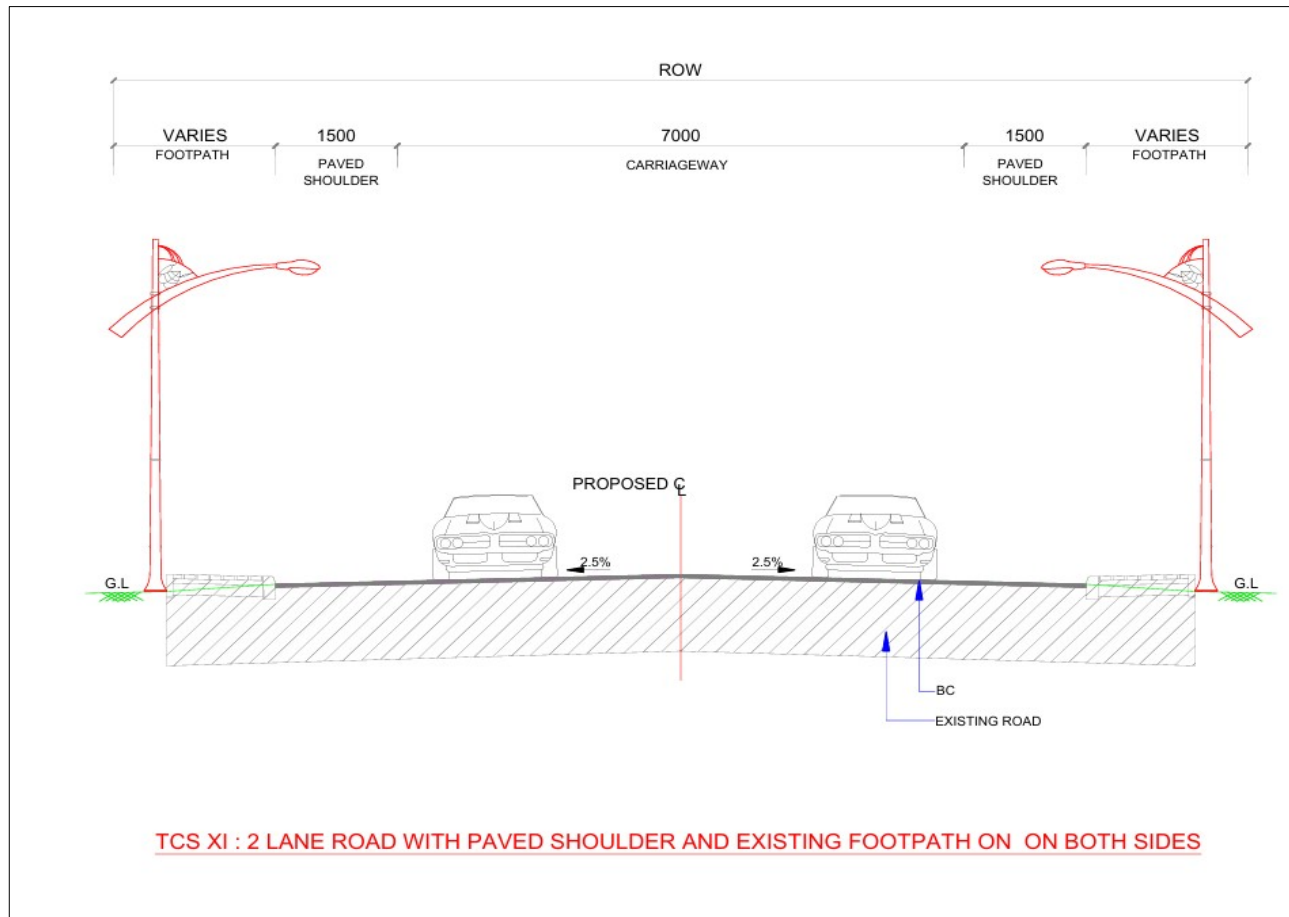
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



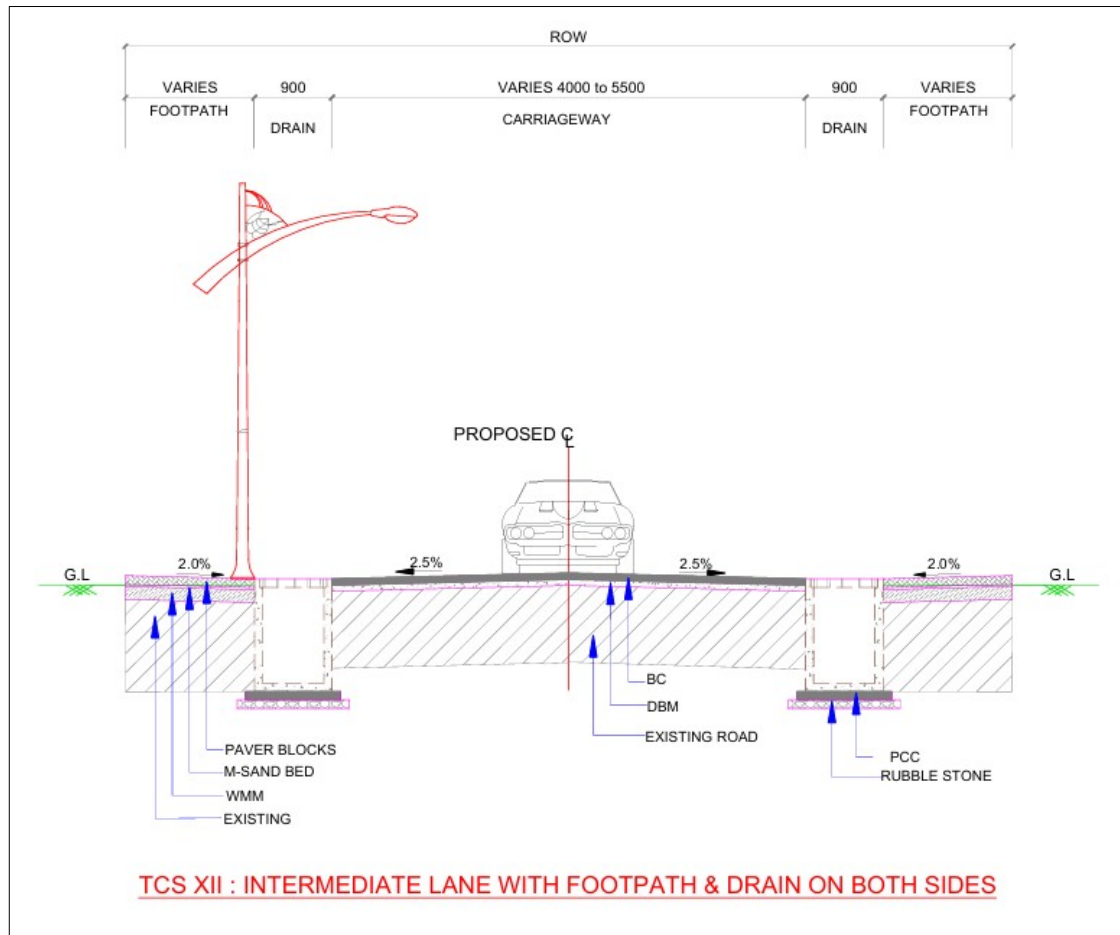
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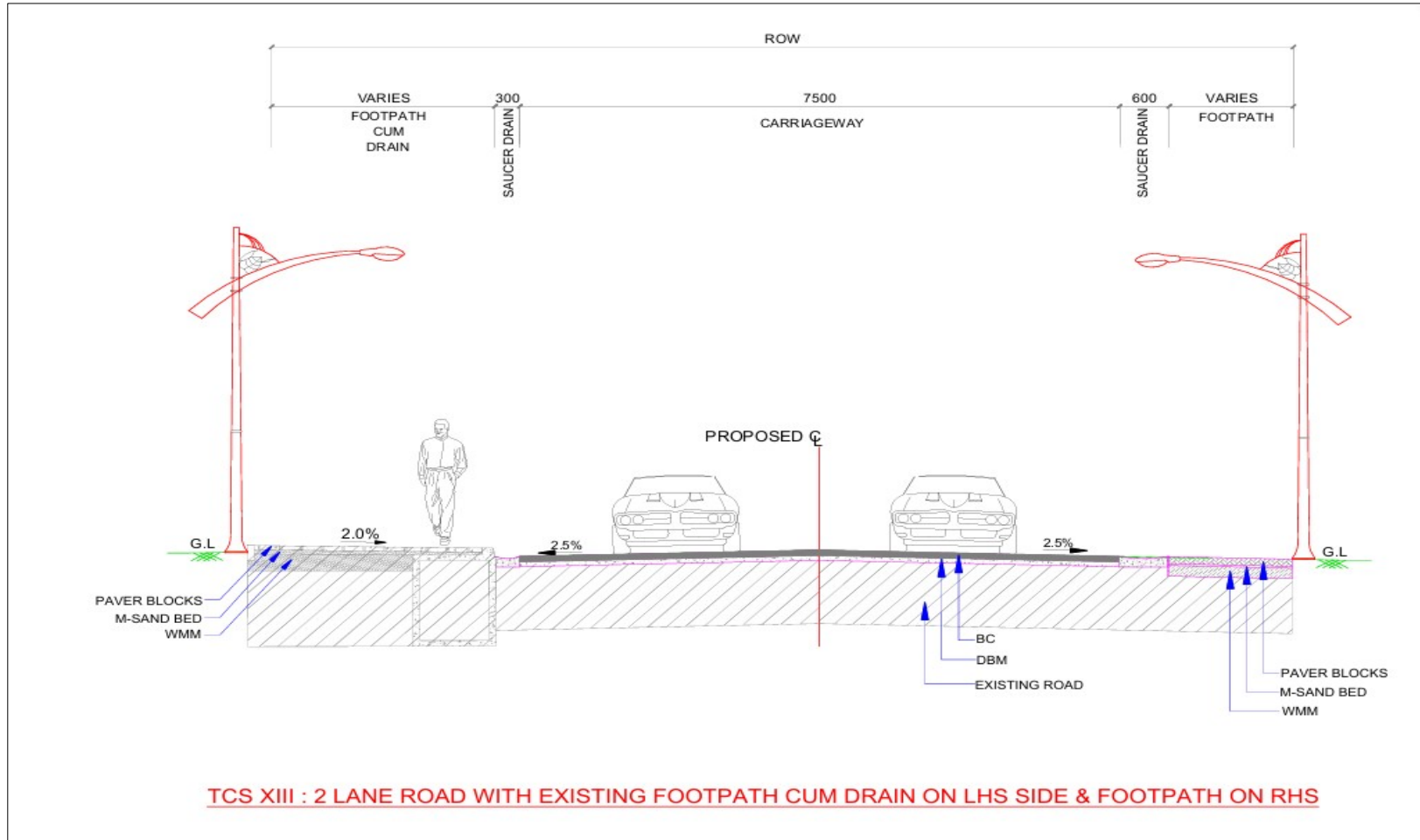
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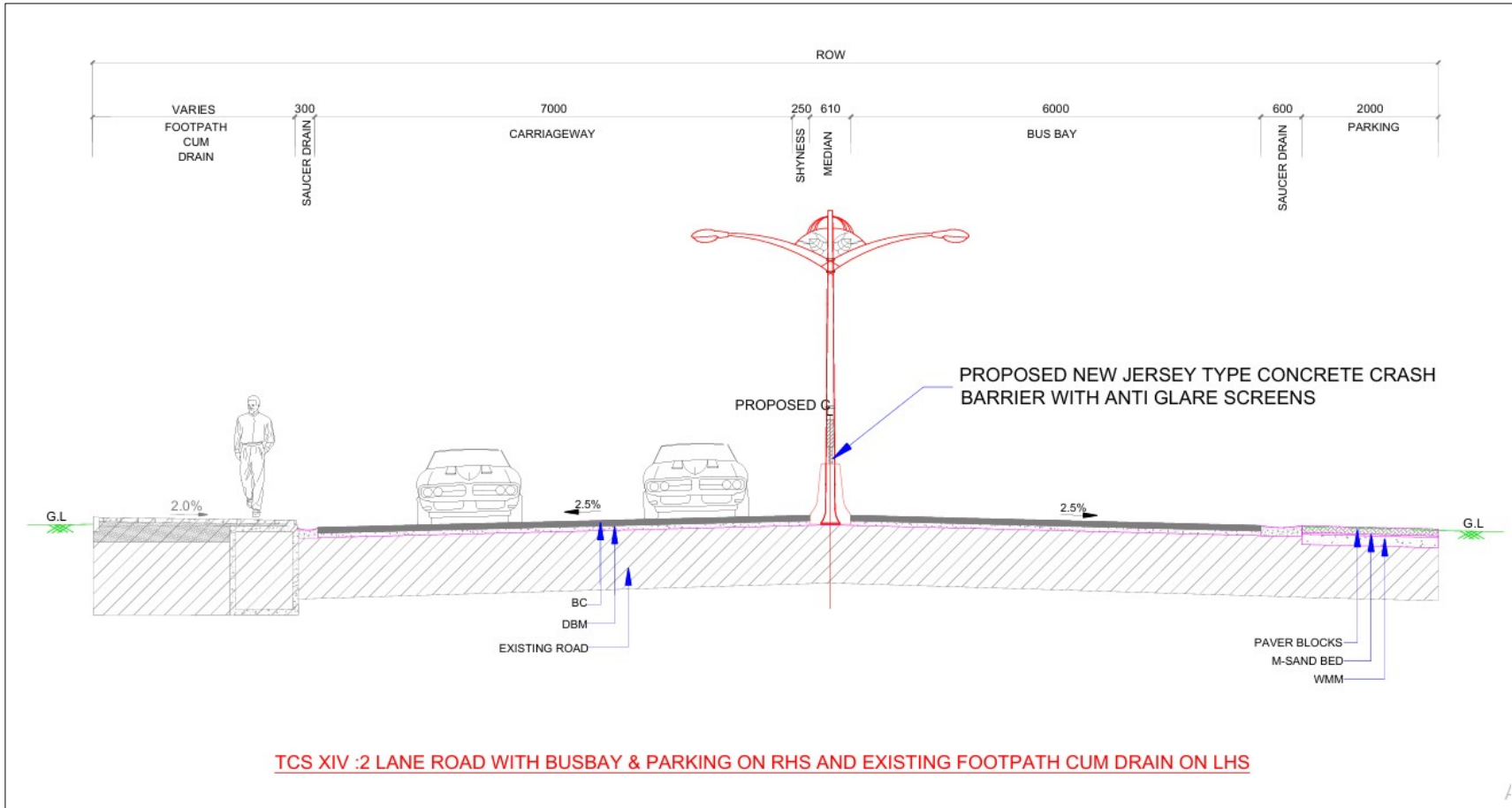
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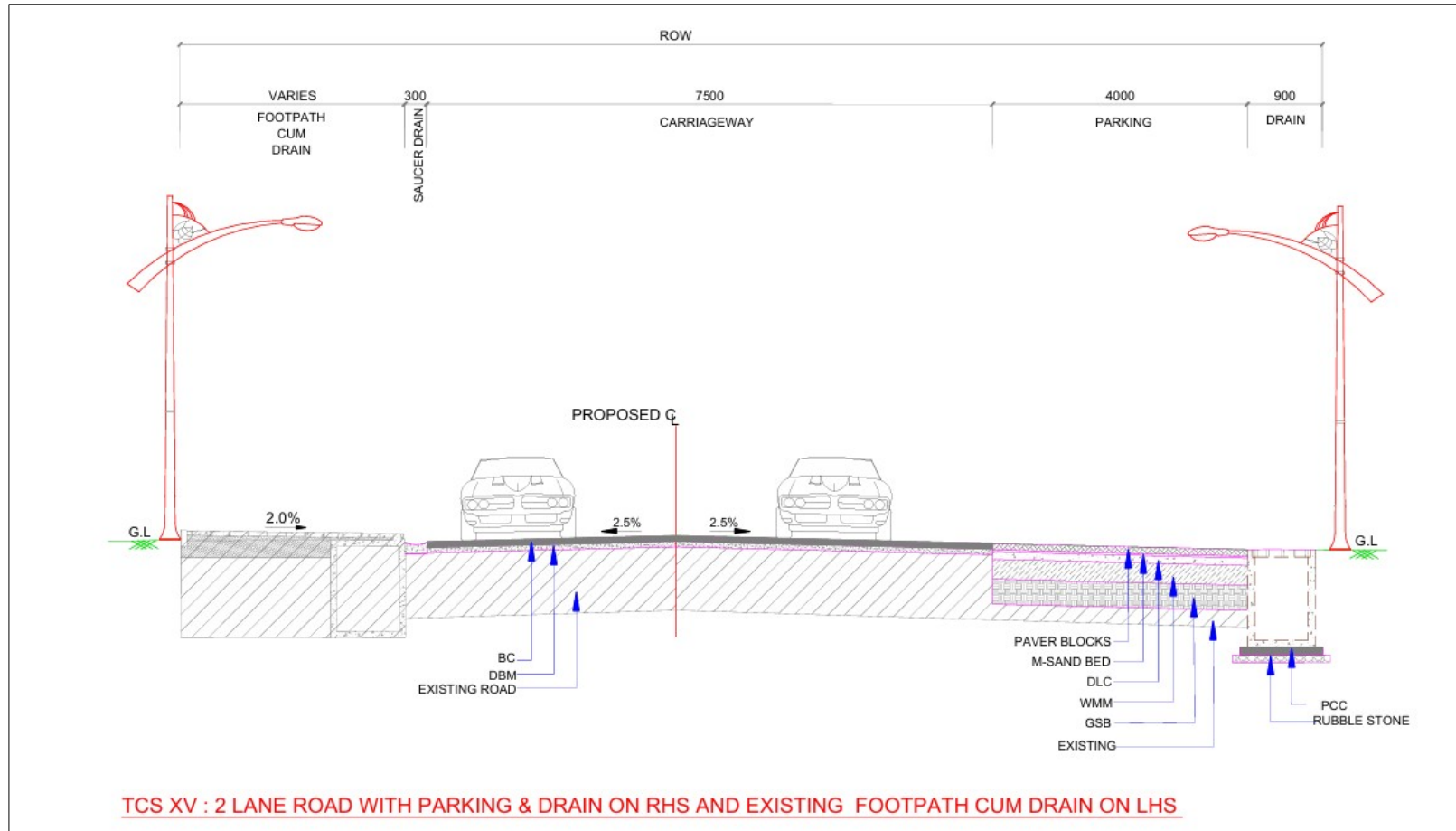
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



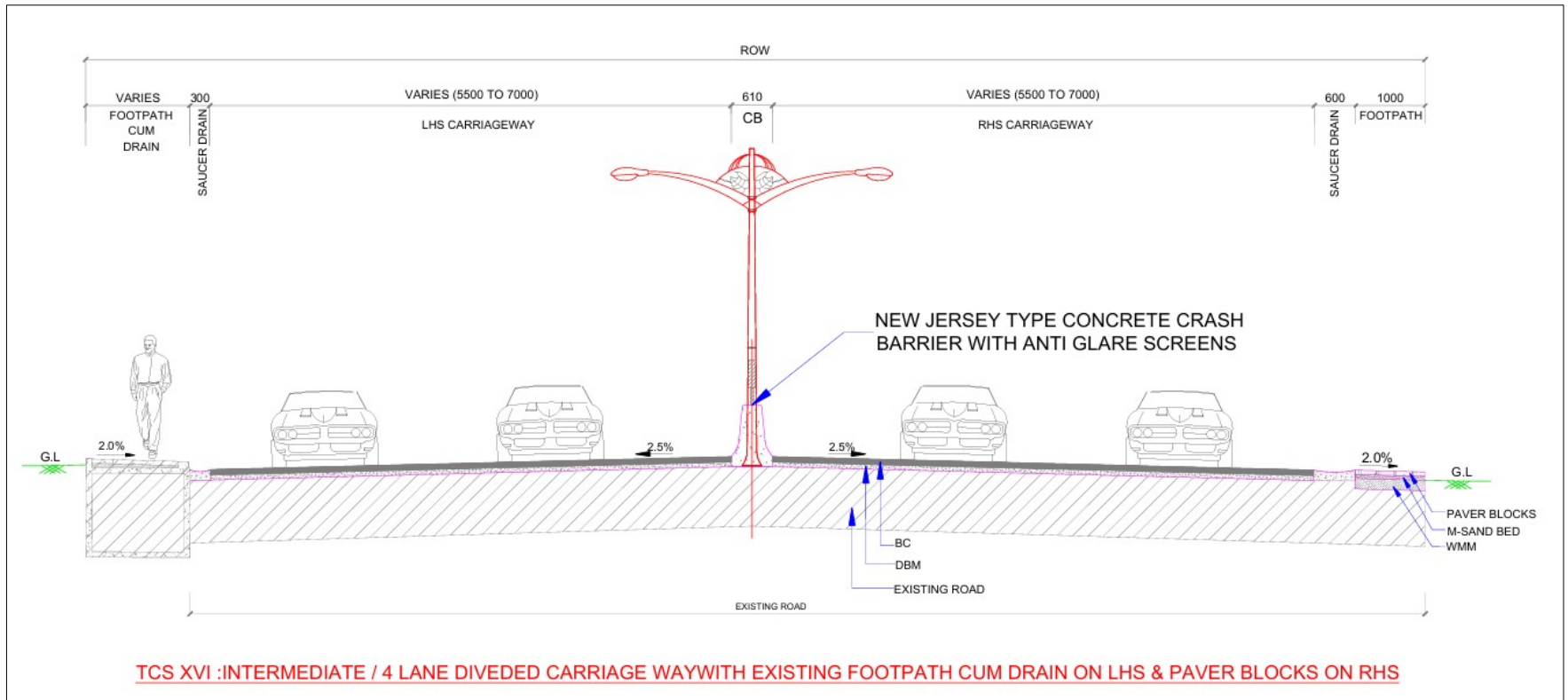
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



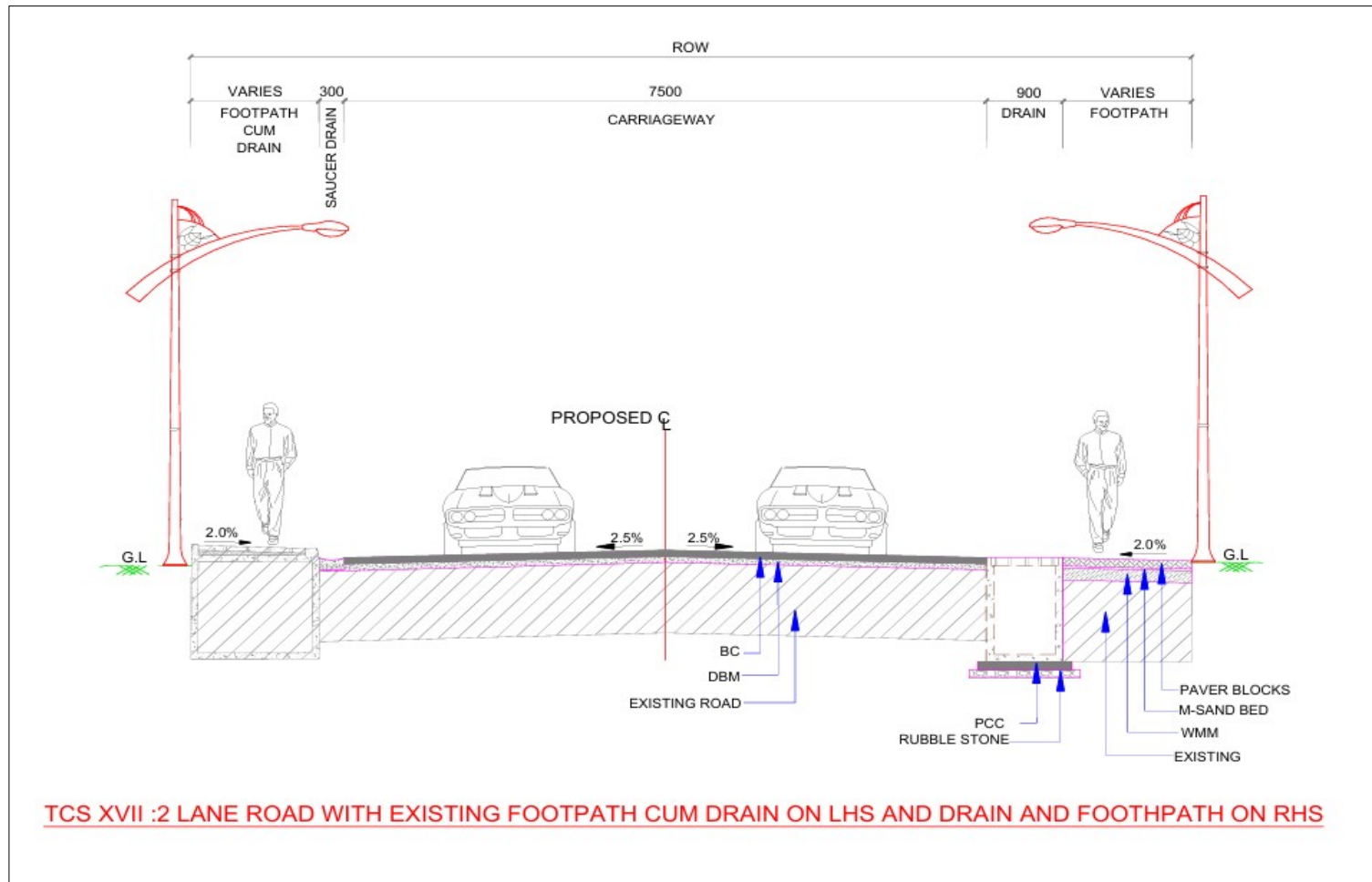
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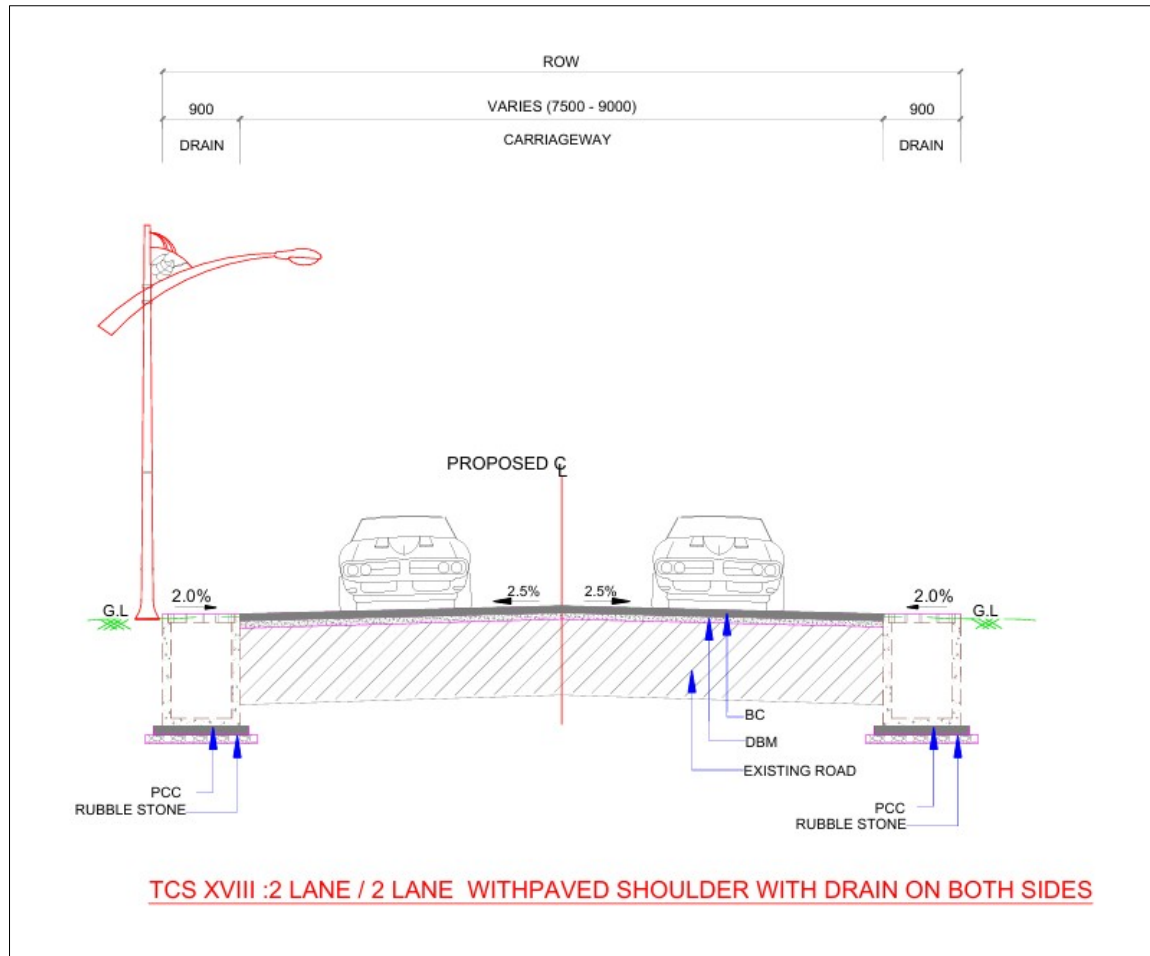
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



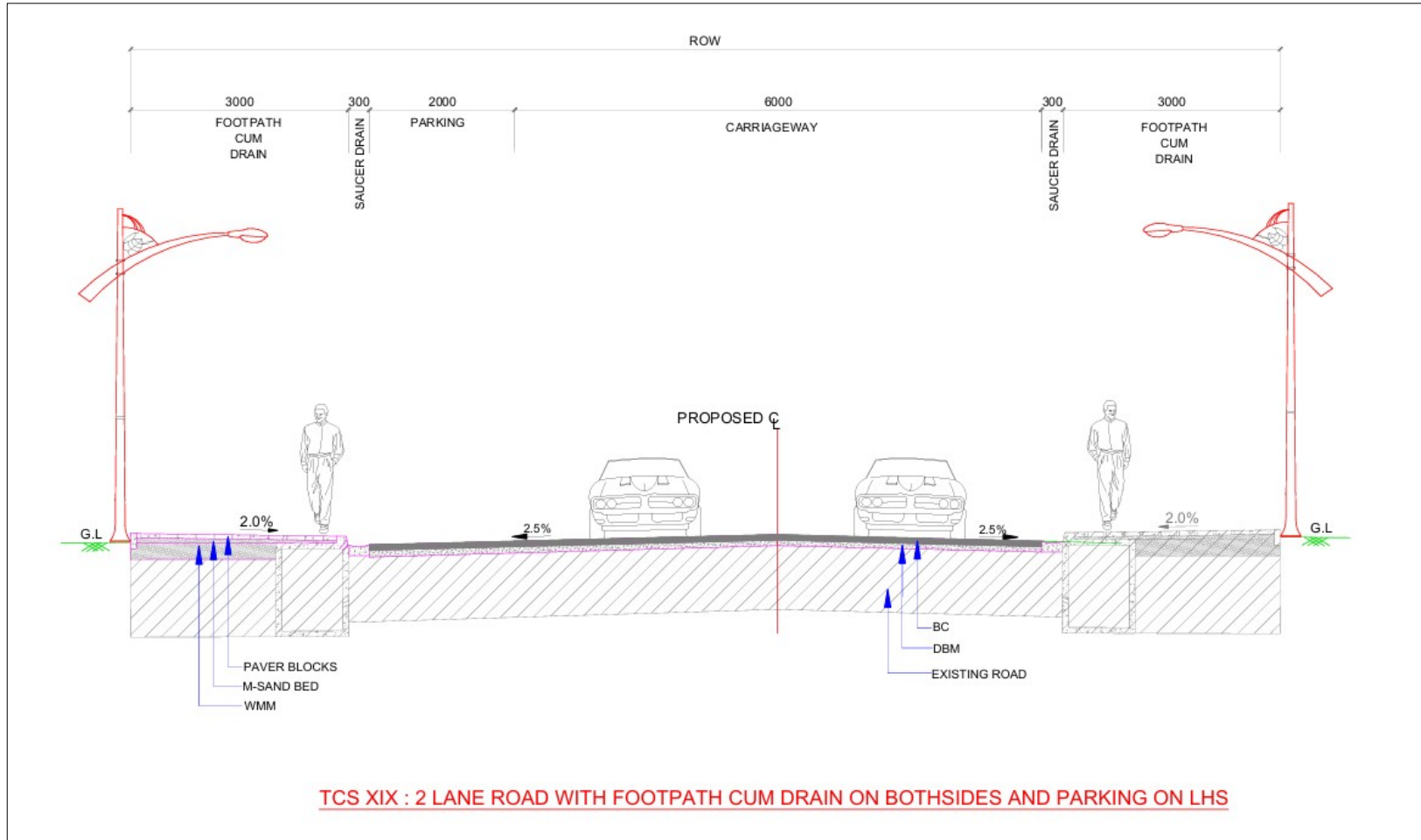
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



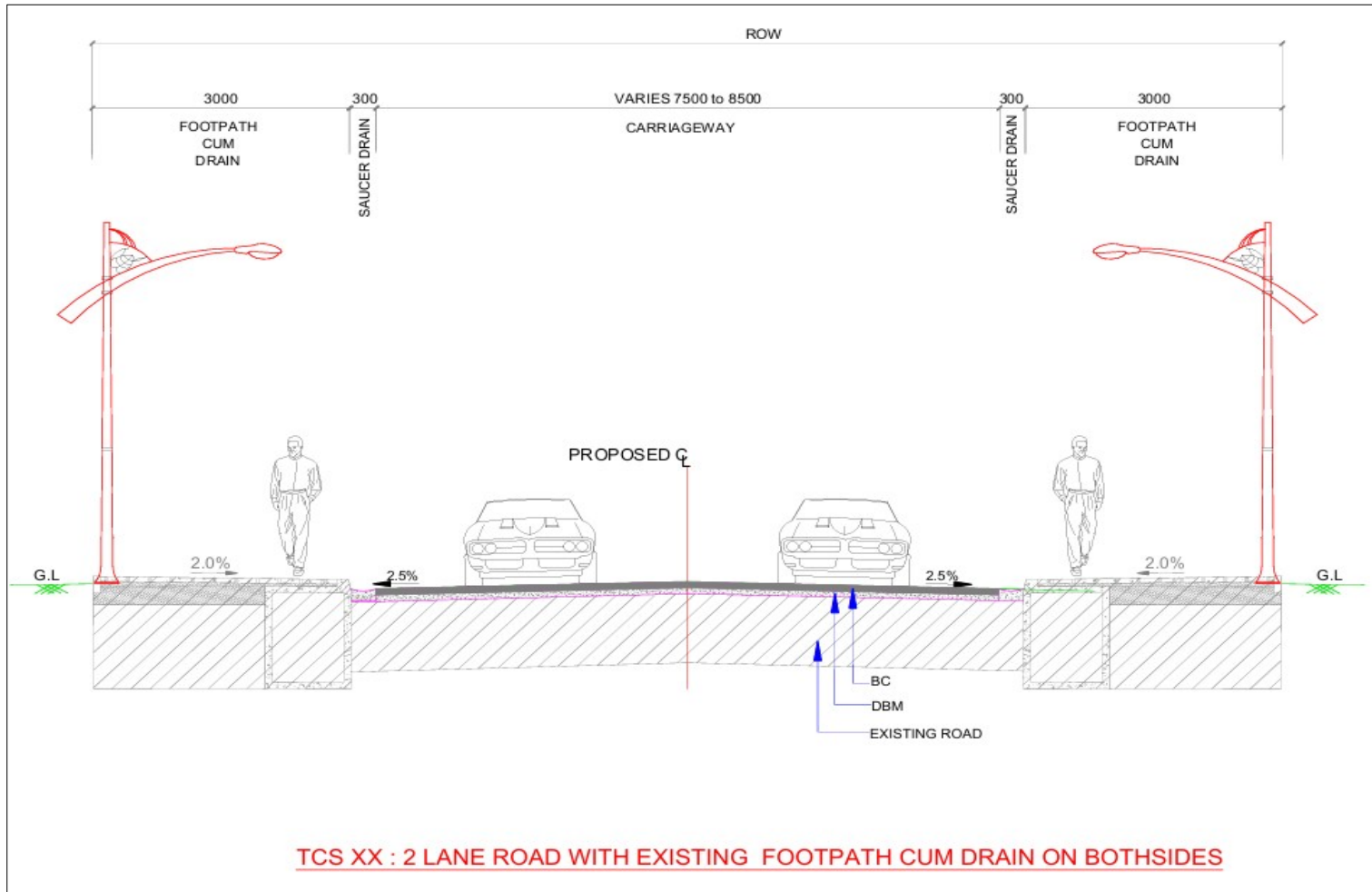
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



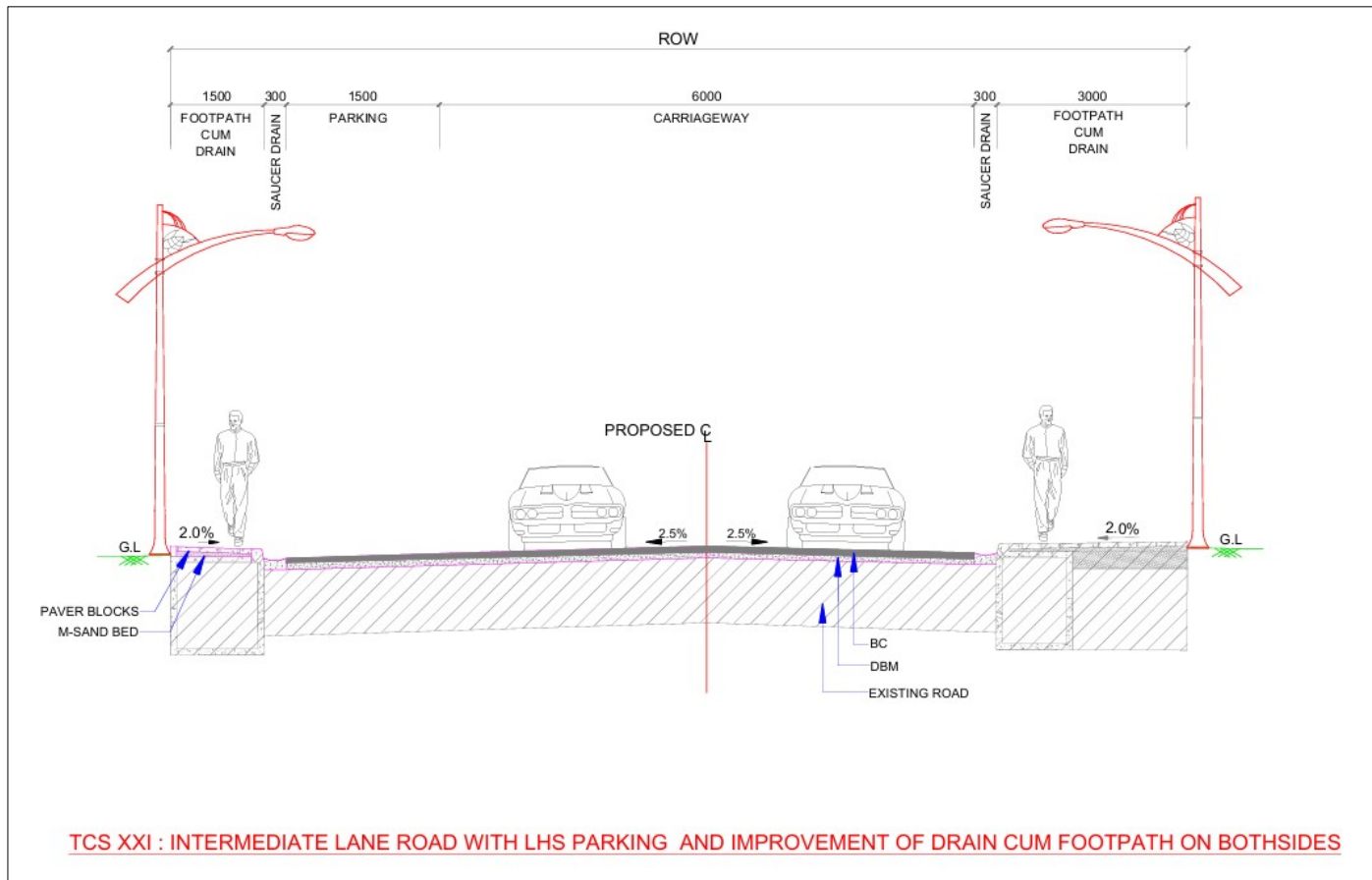
One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



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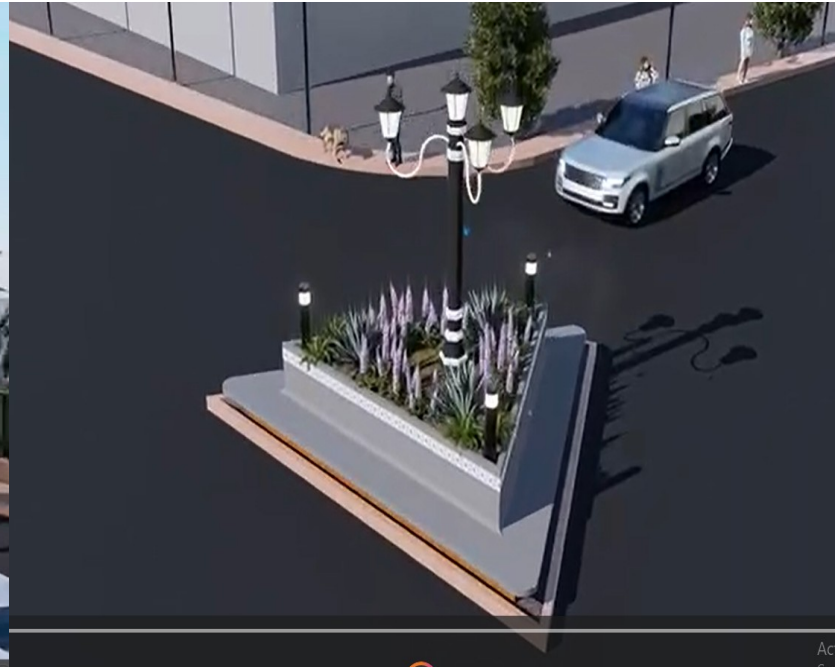


One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa

TRAFFIC ISLANDS



One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa



Schedule - C

(See Clause 2.1)

PROJECT FACILITIES

1. Project Facilities

The Contractor shall construct the Project Facilities in accordance with the provisions of this Agreement. Such Project Facilities shall include:

- .a. Roadside furniture.
- .b. Pedestrian facilities.
- .c. Bus shelters
- .d. Bus bay including Shelter and Cobble Stone Pavement near Hospicio Hospital
- .e. Highway lighting
- .f. Rainwater Harvesting
- .g. Beautification of Islands and median plantation
- .h. Anti carbonation paint for ROB, Painting for piers and Subways etc
- .i. Utility crossing ducts
- .j. Sub-way

2. Description of Project Facilities

Each of the Project Facilities is briefly described below:

a) Roadside Furniture shall be provided as follows: -

Traffic Signs and Pavement Markings

Traffic signs and pavement markings shall include roadside signs, overhead signs, curve mounted signs and road marking along the project highway. Aluminium Composite Material (ACM) sheets shall be used for sign boards. Singange plan is enclosed for reference. The locations for these provisions shall be finalised in consultation with Authority and as per IRC: 67 and IRC: 35 standards. The detailed signage plan indicating places, direction, distances and other features marked on the change plan shall be prepared as per manual requirements, and the same shall be finalized in consultation with PWD as per site requirement.

Traffic Safety Devices shall be provided in consultation with Authority & Latest IRC standards.

Road Delineators, reflective pavement markers, flexible median markers shall be provided in accordance with Schedule-D.

Transverse Zebra Crossing Markings shall be provided at mid blocks and all cross road junctions as per IRC: 35.

Hazard Markers shall be provided as per IRC standards.

Road studs of white/green/red/yellow colors shall be provided as per the IRC guidelines.

Provision of reflective stickers at Structures, trees, electrical poles and Compound wall etc.

Solar Traffic blinker signal (L.E.D) and convex mirrors shall be provided at intersections, frequent public moving areas and hazardous locations.

RCC Bollards shall be provided. Locations of placement shall be finalized in consultation with the Authority.

Existing Non standard sign boards shall be removed.

Transverse Bar Markings of Thermoplastic paint shall be provided at all crossroad junction and Hazardous locations as per IRC: 99.

b) Pedestrian Facilities

Pedestrian Facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule D and IRC 103 2022.

Pedestrian Facilities include the provision of:

i) Pedestrian railing:

Pedestrian railing of stainless steel shall be provided for minimum length of 2 km at built-up sections and intersections in consultation with the Authority and as per specifications of the manual.

ii) Pedestrian crossings:

Pedestrian crossings shall be provided at built-up sections, mid block, frequent public moving areas, schools etc and intersections as specified in the manual.

Notwithstanding to the length mentioned in schedule, contractor shall provide the facilities as per the site requirement and as specified by the Authority. Any changes in length/area shall not be a change of scope.

The additional pedestrian facilities in the form of guard rails, footpath, lighting etc. shall be provided in built-up area. Paver blocks shall be provided on Drain cum Footpath locations.

c) Shot blasted Paver blocks for footpath and Parking areas

Shot blasted Paver blocks shall be provided as per the TCS drawings and schedule.

One Time Improvement to bypassed NH-66 at Margao City from km 548.000 to km 555.300 in the state of Goa

In addition to the area/length mentioned in the TCS and TCS schedule following quantity shall be provided as per the requirement of the site and in consultation with the Authority.

i) Providing and laying 60 mm thick shot blasted paver blocks over a 30 mm sand bed and 200 mm thick WMM base covering an area of 5000 sq.m for footpath construction.

ii) Providing and laying 100 mm thick shot blasted paver blocks over a 30 mm sand bed, DLC of 100mm, 150 mm thick WMM base and 200 mm thick GSB covering an area of 5000 sq.m for for parking areas.

Notwithstanding to the length mentioned in schedule, contractor shall provide Paver blocks as per the site requirement and as specified by the Authority. Any changes in length/area shall not be a change of scope.

d) Busbays/Bus Shelters

a. Bus shelters shall be provided at the following locations as per the IRC guidelines.

S. No.	Design Chainage (Km)	Side	Location Name
1	548.295	LHS	Gorvootti
2	549.180	LHS	Fatorda
3	551.215	LHS	Padre miranda road
4	551.680 (on RHS Road)	RHS	Madgaon
5	552.040	LHS	Margao Kamat (Pajifond)
6	553.200	LHS	Shirvodem
7	554.380	LHS	Navelim

Note:- The locations of the Bus shelter is tentative & shall be approved / provided in consultation with the Authority.

b) The existing bus bay areas shall be paved with shot blasted paver blocks of 100mm thick overlay, 30mm sand bed, DLC of 100mm, 150 mm thick WMM base and 200 mm thick GSB.

e) Bus bay including Shelter and Cobble Stone Pavement near Hospicio Hospital

The land before the Hospocio Hospital, Margao at Km 549.150 shall be developed with cobble stone pavement with an area of 3000 sq.m including provision of Bus bay along with bus shelter, lighting, parking areas, separator, drain, landscaping etc in consultation with the authority. The Scheme and drawing shall be designed in consultation with the authority.

f) Highway Lighting

Streetlight: Street lighting on decorative lamp post with LED /energy efficient lighting system of standard make with minimum 40 Lux capacity shall be provided at Bus shelters locations and built up sections. The design and type of decorative lamp posts and arms shall be approved by the Authority.

Note: -

- i) The Contractor shall provide high mast lighting wherever necessary in consultation with the Authority. However, this shall not be treated as Change of Scope.
- ii) Solar lights blinkers shall be provided at major junctions etc.
- iii) The lighting work shall be got done from the qualified specialised agency.
- iv) The scope includes providing entire lighting systems, trenching, underground / building in cabling, transformers etc. and obtaining electric supply / approval from concern Govt. department, if required.

Note: After construction, erection and energizing same shall be maintained/replaced, if required, till maintenance period by the Contractor.

g) Rainwater Harvesting System

A minimum 02 (Two) Nos of Rainwater harvesting units per km length of the project stretch shall be provided as part of the scope of the project. Location shall be finalized in consultation with the Authority.

i) The Locations and design of stretch (i.e.) diameter/length of recharge shaft etc. shall be based on the rain fall intensity and geo-technical strata and based on enclosed drawing. The guidelines and norms issued by the Central Ground Board may also be adopted while finalizing the location and design of rainwater harvesting units.

ii) Rainwater Harvesting and Artificial recharging shall be provided on all the Public Toilets and bus shelters, grade separated structures, etc. which are to be developed as a part of project corridor.

h) Beautification of Islands and median plantation in the instant stretch

The beautification of traffic islands around the Margao Muncpal Garden and median areas, including landscaping and plantation of suitable trees, shrubs and ground cover shall have to be implemented by the Contractor in consultation

with the Authority. There are 7 traffic islands nearby Margao Municipal Garden, the beautification of the same needs to be carried out. The work shall include Site development, Civil & Hardscaping, Electrical and lighting, soft landscaping, drainage & irrigation, Sculpture & Art. Refer drawings attached.

i) Painting

Anti-carbonation painting shall be carried out on all exposed concrete surfaces of existing ROB/viaduct structure, including piers, abutments, parapets, deck soffits, and subway walls/ceilings. The painting system shall consist of a suitable epoxy/acrylic-based anti-carbonation coating applied as per the relevant IRC/RDSO guidelines.

Mural painting shall be carried out on piers, girders of ROB, subway walls/ceilings, RCC/Masonry walls along the highway Portuguese/Goa Azulejos tiled, as per design, colour scheme, and specifications approved by the Authority.

j) Utility crossing ducts

Utility crossing ducts of 600mm dia shall be provided across the road at every 500 m intervals along with project road.

k) Others:

1. Speed breaker shall be provided on cross roads as per the IRC 99 and relevant codes.
2. Removal of vegetation within ROW.
3. Ramp access to the adjacent properties
4. Replacement of damaged/broken slab on the covered drain.
5. Raising and/or replacement of damaged kerbs and paver blocks shall be carried out at locations with retained existing drains and footpaths.

3) Facilities to be provided to the Employer for Project Supervision/Monitoring:

The Contractor shall provide a vehicle - Ertiga or equivalent, not more than five years old for the use of Office of the Executive Engineer, WD-XIV(NH), Fatorda, Goa for the period of one year from the date of appointment or for further extended period as directed by the Authority. This provision shall be incidental to the work and shall not be paid for extra.

Schedule - D

(See Clause 2.1)

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 Laning of Highways (IRC: SP: 84-2019) referred to herein as the Manual for 4-Lane project road.
- All materials, works & Construction operation shall conform to MORTH Specifications for Road and Bridge Works, IRC:58-2015 for Rigid Pavement Design, IRC:37-2018 for Flexible Pavement Design and other IRC codes based on design requirements.
- The provision of mandatory use of factory manufactured precast concrete elements in project within 100 km radius of the precast factory shall be governed by Ministry's Circular No. RW/NH-34049/01/2020-S&R(B) dated 08.04.2022. The minimum mandatory usage should be 25% of the total concrete volume other than the foundations and substructures of bridges/via duct/ ROB. Any relaxation may be granted by Authority only if the Contractor/Contractor is able to demonstrate that the manufacturer(s) is not able to provide such products matching to the works programme of the Contractor or the prices demanded by the manufacturer is more than the prices derived for cast-in-situ condition at the rates of SoR prevailing on 28th days before the bid due date.
- The use of fly ash in road/ flyover embankment construction on national highways work shall be governed by Ministry's Circular No. RW/NH-33044/01/2019-S&R(P&B) RSCE-Pt.1 dated 18.04.2022 and guidelines/ notification issued by MoEF& CC and MOP and applicable guidelines of Indian IRC & BIS.
- The use of UHPFRC shall be governed by Ministry's Circular No. RW/NH-33049/01/2020-S&R (B) Pt. dated 22.02.2022
- The use of manufactured aggregates in National Highway works shall be governed by Ministry's Circular No. RW/NH-34066/09/2017-S&R(B) dated 21.07.2020.
- Toll Plaza shall be governed by NHA Circular No. NHA/Policy Guidelines/Management of Plaza/2021, Policy Circular No. 17.5.82 Dated 24th May 2021.
- Circular No. RW/NH-34066/09/2017-S&R (B) dated 12.02.2021 on reinforcing

Provision of road safety measures between Km. 562.000 to Km. 570.000 on NH-66 in the state of Goa under Road Safety Works

- Steel Bars: Clause 100.9.3.1 of Ministry's Specifications for Road and Bridge Works and Circular No. RW/NH-34049/03/2020-S&R(B) dated 22.01.2021 on use of Stainless Steel in Bridges on National Highways to be constructed in marine Environment Susceptible to Severe Corrosion.

Note: -Latest revisions of all relevant codes published 28 days before NIT date shall be applicable for this tender.

Annex - I
(Schedule-D)

SPECIFICATIONS AND STANDARDS FOR CONSTRUCTION

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Four Laning of Highway through PPP (IRC: SP: 84-2019) and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

Following Manual or references shall be followed

Reference	Description
Primary References	
IRC:SP:88	Road Safety Audit Manual
IRC:SP:84	Manual of Specifications and Standards for Four Laning of Highways
IRC:SP:55	Guidelines on Traffic Management in Roads
IRC:103	Guidelines for Pedestrian Facilities
IRC:67	Code of Practice for Road Signs
IRC:35	Code of Practice for Road Markings
IRC: 99	Guidelines on Traffic Calming measures in Urban and rural Roads
IRC SP 63	Guidelines for the use of Interlocking concrete block pavement
Other References	
IRC:SP:44-1996	Highway Safety Code
MoRTH	Manual for Safety in Road Design
IRC:SP:32	Road Safety for Children (5-12 Years old)
IRC:SP:31	New Traffic Signs
IRC:119	Guidelines for Traffic Safety Barriers
IRC:37	Guidelines for the Design of Flexible Pavements

IRC:SP-85	Guidelines for Variable Message Signs
IRC:73	Geometric Design Standards for Rural (Non-Urban) Highways
IRC:66	Recommended Practice for Sight Distance on Rural Highways
IRC:SP:23	Vertical Curves for Highways
IRC:53	Road Accident Forms A-1 and 4
MoRTH	National Road Safety Policy
MoRTH	Sundar Committee Report on Road Safety and Traffic Management
Additional References	
MoRTH Circular 602	Road Signs & Markings
MoRTH Circular 604	Highway Safety Railings
MoRTH Circular 605	Traffic Regulation
MoRTH Circular 606	Accidents
MoRTH Circular 607	Highway Patrolling
MoRTH Circular 1920	Safety measures
IRC:2	Route Marker Signs for National Highways
IRC:8	Type Designs for Highway Kilometer Stones
IRC:11	Recommended Practice for the Design and Layout of Cycle Tracks
IRC:31	Route Marker Signs for State Routes
IRC:62	Guidelines for Control of Access of Highways
IRC:64	Guidelines for Capacity of Roads in Rural Areas
IRC:79	Recommended Practice for Road Delineators
IRC:80	Type Designs for Pick-up Bus Stops on Rural (i.e., Non-Urban) Highways
IRC:93	Guidelines on Design and Installation of Road Traffic Signals
IRC:SP:41	Guidelines on Design of At-Grade Intersections in Rural & Urban Areas

IRC 112	Guidelines on Practice for Concrete road bridges
IRC 6	Guidelines on standard specifications and code for road bridges
IRC SP 56	Guidelines for Steel Pedestrian Bridges
MoRTH	Type Designs for Intersections on National Highways, 1992
NBC/IS Codes	Relevant guidelines for Installation, inspection, Maintenance and Operation of Lifts and Escalators
References from other countries / practices	
AASTHO	Highway Safety Manual
AASTHO	Highway Safety Design and Operations Guide
AASTHO	AASTHO Safety Leadership Forum V – Toward Zero Deaths (TZD): Aggressive Plans to Meet Aggressive Goals .
AASTHO	AASHTO Strategic Highway Safety Plan -- A Comprehensive Plan to Substantially Reduce Vehicle-Related Fatalities and Injuries on the Nation's Highways

2 Deviations from the Manual

Notwithstanding anything to the contrary contained in the aforesaid 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:

S.no	Item	Clause in Manual	Provision as per Manual	Modified Provision
1	Typical Cross section	2.17	TCS as given in Fig. 2.2 to 2.10	As per modified TCS given in Schedule-B

IRC Codes: (Latest revision)

- IRC:5-2015 Standard Specifications and Code of Practice for Road Bridges, Section I - General Features of Design
- IRC:6-2017 Standard Specifications and Code of Practice for Road Bridges, Section-II Loads and Combinations
- IRC:38 - Guidelines for Design of Horizontal Curves for Highways and Design Tables
- IRC:58-2015 Guidelines for the Design of Plain Jointed Rigid Pavements for Highways (Fourth Revision).
- IRC:37-2018 Guidelines for the Design of Flexible Pavements (Fourth Revision).
- IRC:83-2015 (Part I) Standard Specifications and Code of Practice for Road Bridges, Section IX- Bearings, Part I : Roller & Rocker Bearings
- IRC:83-2018 (Part II) Standard Specifications and Code of Practice for Road Bridges, Section IX - Bearings (Elastomeric Bearings), Part II
- IRC:83-2018 (Part III) Standard Specifications and Code of Practice for Road Bridges, Section IX - Bearings, Part III: POT-CUM-PTFE, PIN and Metallic Guide Bearings
- IRC:119 - 2015 - Guidelines for Traffic Safety Barriers
- IRC: SP:23 - Vertical Curves for Highways
- IRC: SP:42 - Guidelines on Road Drainage
- IRC: SP:84 Manual of specifications & Standards for Four Laning of Highways with Paved Shoulders.
- IS: 6006-1983 (Reaffirmed 2008) - Specification for Uncoated Stress Relieved Strand for Pre-Stressed Concrete

The above latest version of IRC Codes and all other relevant latest IRC applicable as on 28 days prior to bid due date to be considered.