SCHEDULE – A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

1.1 Site of the Two-Laning of Existing Joram – Koloriang Road on EPC basis from design km 59.363 to km 77.363 (Existing km 70.000 to km 88.700)in the state of Arunachal Pradesh under SARDP-NE, Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.
The Project alignment is approachable for all location for execution of works.

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's Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.

1.4 The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be modified.

1.5 The status of the environment clearances obtained or awaited is given in **Annex-IV.**

Annex I

(Schedule-A)

1. Site

The Site of the [Two-Lane] Project Highway comprises the section of Joram – Koloriang road commencing from design km 59+363 to km 77+363 (Existing km 70.000 to km 88.700) i.e from the end of New Palin bridge to Lungba village in the State of Arunachal Pradesh. The road is of sub-standard single lane with poor road surface, passing through mountainous terrain, in general. The road is deficient in geometric features at almost all locations. The stretch lies within Kra-dadi district.

The project corridor i.e. Joram - Koloriang passes through settlements of New Palin bridge and Lungba village.

The Index Map is appended at the end of this Schedule–A.

2. Chainage References (Existing vs Design)

"Existing Chainage" means Km Stones existing on the Project Highway. During topography survey, observations are made to these Km stones and after finalization of alignment by improving the existing geometry the chainage has been referred to "Design Chainage". The relationship between the " Existing Chainage" and the" Design Chainage" as per field surveys of the location of existing Km stones for the "Project Highway" is given below:

Sl No.	Existing Chainage (Km)	Design chainage (Km)	Remarks
1	70+000	59+363	
2	70+318	59+663	
3	70+494	59+793	
4	70+534	59+833	
5	70+700	59+963	

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6	72+200	61+463	
7	72+620	61+593	
8	73+640	62+613	
9	73+860	62+753	
10	75+400	64+293	
11	75+395	64+443	
12	76+235	65+283	
13	76+398	65+398	
14	76+873	65+873	
15	76+926	65+983	
16	77+186	66+243	
17	77+290	66+338	
18	77+615	66+663	
19	77+965	66+863	
20	78+135	67+033	
21	78+208	67+103	
22	78+468	67+363	
23	78+678	67+483	
24	79+978	68+783	
25	80+200	68+913	
26	80+350	69+063	
27	80+437	69+153	
28	83+187	71+903	

29	83+405	72+003	
30	83+695	72+293	
31	83+814	72+403	
32	84+074	72+663	
33	84+450	73+063	
34	88+700	77+363	

3. Land

The Site of the Project Highway comprises the land described below:

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Existing/Available ROW (m)	Remarks
	From	To	From	To			
1	70+000	88+700	59+363	77.363	18000	6m	No ROW available in realignment stretches of total 2.22 Km as given in para 3.3 of Annexure-1 Schedule B

4. Carriageway

The present carriageway of the Project Highway is substandard single lane configuration. The type of the existing pavement is flexible.

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Lane Width (m)	Remarks
	From	To	From	To			
1	70+000	88+700	59+363	77.363	18000	3.0- 3.25	Lane width other than realignment portion

5. Major Bridges

The Site includes the following Major Bridges:

Sl. No.	Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Superstructure		
NIL						

6. Railway over-bridges (ROB)

The Site includes the following Railway Over Bridges

Sl. No.	Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
NIL						

7. Grade Separators

The Site includes the following Grade separators

Sl. No.	Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
NIL						

8. Minor Bridges

The Site includes the following minor Bridges:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structures			No. of Spans with Span Length (m)	Total Width (m)
			Foundation	Sub-Structure	Super Structure		
1	New Palin bridge to Lungba village	82.559	Open	RCC	Steel	1(one) with 20.00 m	3.5

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structures			No. of Spans with Span Length (m)	Total Width (m)
			Foundation	Sub-Structure	Super Structure		
2	New Palin bridge to Lungba village	84.585	Open	RCC	Steel	1(one) with 30.00 m	3.35

9. Railway level crossings / Railway Track

The Site includes the following railway level crossings:

Sl. No.	Road Segment	Existing Chainage (km)	Remarks
Nil			

10. Underpasses (vehicular, Non Vehicular)

The Site includes the following underpasses:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structure	No. of Spans with Span Length (m)	Width (m)
Nil					

11. Culverts

The Site includes the 84 Nos of culverts at the following locations and types:

Sl no.	Existing Chainage	Type of Culvert	Span/Dia (m)	Width (m)	Remarks
1	70535	SLAB	2	4	
2	70704	SLAB	2	4	
3	70784	SLAB	2	4	
4	70946	SLAB	2	4	
5	71135	SLAB	2	4	
6	71263	SLAB	2	4	

Sl no.	Existing Chainage	Type of Culvert	Span/Dia (m)	Width (m)	Remarks
7	71570	SLAB	2	4	
8	71711	SLAB	2	4	
9	71824	SLAB	2	4	
10	71975	SLAB	2	4	
11	72032	SLAB	2	4	
12	72115	SLAB	2	4	
13	72271	SLAB	2	4	
14	72550	BOX	2	4	
15	72670	BOX	2	4	
16	72770	SLAB	2	4	
17	72900	SLAB	2	4	
18	73013	SLAB	2	4	
19	73102	SLAB	2	4	
20	73355	SLAB	2	4	
21	73637	SLAB	2	4	
22	73760	SLAB	2	4	
23	74043	SLAB	2	4	
24	74212	SLAB	2	4	
25	74367	SLAB	2	4	
26	74775	SLAB	2	4	
27	74845	SLAB	2	4	

Sl no.	Existing Chainage	Type of Culvert	Span/Dia (m)	Width (m)	Remarks
28	74934	SLAB	2	4	
29	75026	SLAB	2	4	
30	75185	SLAB	2	4	
31	75427	SLAB	2	4	
32	75587	SLAB	2	4	
33	75970	SLAB	2	4	
34	76325	SLAB	2	4	
35	76464	SLAB	2	4	
36	76503	SLAB	2	4	
37	76724	SLAB	2	4	
38	77018	SLAB	2	4	
39	77363	SLAB	2	4	
40	78355	SLAB	2	4	
41	78630	SLAB	2	4	
42	78715	SLAB	2	4	
43	78765	SLAB	2	4	
44	78845	SLAB	2	4	
45	79132	SLAB	2	4	
46	79330	SLAB	2	4	
47	79575	SHP	2	4	
48	79895	SLAB	2	4	

Sl no.	Existing Chainage	Type of Culvert	Span/Dia (m)	Width (m)	Remarks
49	80038	SLAB	2	4	
50	80130	SLAB	2	4	
51	80345	SLAB	2	4	
52	80440	SLAB	2	4	
53	80674	SLAB	2	4	
54	81016	SLAB	2	4	
55	81453	SLAB	2	4	
56	81667	SLAB	2	4	
57	81990	SLAB	2	4	
58	82359	SLAB	2	4	
59	82455	SLAB	2	4	
60	82713	SLAB	2	4	
61	82855	SLAB	2	4	
62	83110	SLAB	2	4	
63	83290	SLAB	2	4	
64	83635	SLAB	2	4	
65	83727	SLAB	2	4	
66	83915	SLAB	2	4	
67	84352	SLAB	2	4	
68	84720	SLAB	2	4	
69	85425	SLAB	2	4	

Sl no.	Existing Chainage	Type of Culvert	Span/Dia (m)	Width (m)	Remarks
70	85700	SLAB	2	4	
71	85860	SLAB	2	4	
72	85905	SLAB	2	4	
73	86125	SLAB	2	4	
74	86377	SLAB	2	4	
75	86523	SLAB	2	4	
76	86837	SLAB	2	4	
77	87250	SLAB	2	4	
78	87345	BOX	2	4	
79	87568	SLAB	2	4	
80	87952	SLAB	2	4	
81	88020	SLAB	2	4	
82	88117	SLAB	2	4	
83	88332	SLAB	2	4	
84	88457	SLAB	2	4	

12. Bus Shelters

The details of bus shelters on the Site are as follows:

S. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
Nil					

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13. Truck Lay Bye

The details of truck lay byes on the Site are as follows:

S. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
Nil					

14. Road side drains

The details of the road side drains on the Site are as follows:

Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
1	70000	70110	LHS	-	✓
2	70261	70269	RHS	-	✓
3	70290	70826	LHS	-	✓
4	70320	70420	RHS	-	✓
5	70478	70595	RHS	-	✓
6	70632	70659	RHS	-	✓
7	70714	70729	RHS	-	✓
8	70770	70780	RHS	-	✓
9	70801	70809	RHS	-	✓
10	70826	71975	LHS	-	✓
11	70875	70999	RHS	-	✓
12	71021	71139	RHS	-	✓
13	71190	71265	RHS	-	✓
14	71273	71313	RHS	-	✓
15	71340	71431	RHS	-	✓

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Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
16	71456	71503	RHS	-	✓
17	71521	71534	RHS	-	✓
18	71586	71675	RHS	-	✓
19	71690	71818	RHS	-	✓
20	71862	71895	RHS	-	✓
21	72016	72072	LHS	-	✓
22	72081	72460	LHS	-	✓
23	72102	72219	RHS	-	✓
24	72282	72332	RHS	-	✓
25	72370	72420	RHS	-	✓
26	72485	72570	RHS	-	✓
27	72501	73974	LHS	-	✓
28	72582	72620	RHS	-	✓
29	72683	72751	RHS	-	✓
30	72801	72856	RHS	-	✓
31	72968	73033	RHS	-	✓
32	73123	73272	RHS	-	✓
33	73283	73538	RHS	-	✓
34	73579	73598	RHS	-	✓
35	73628	73696	RHS	-	✓
36	73765	73939	RHS	-	✓

Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
37	74011	76119	LHS	-	✓
38	74028	74057	RHS	-	✓
39	74087	74139	RHS	-	✓
40	74160	74175	RHS	-	✓
41	74328	76063	RHS	-	✓
42	76076	76108	RHS	-	✓
43	76119	76313	LHS	-	✓
44	76133	76209	RHS	-	✓
45	76237	76284	RHS	-	✓
46	76342	76357	LHS	-	✓
47	76362	76377	LHS	-	✓
48	76571	76728	LHS	-	✓
49	76578	76925	RHS	-	✓
50	76743	76904	LHS	-	✓
51	76955	77239	RHS	-	✓
52	76984	77052	LHS	-	✓
53	77072	77232	LHS	-	✓
54	77254	77329	RHS	-	✓
55	77261	77375	LHS	-	✓
56	77329	77358	RHS	-	✓
57	77416	77500	LHS	-	✓

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Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
58	77488	77579	RHS	-	✓
59	77541	80004	LHS	-	✓
60	77633	77686	RHS	-	✓
61	77777	77839	RHS	-	✓
62	77888	77944	RHS	-	✓
63	77990	78057	RHS	-	✓
64	78136	78775	RHS	-	✓
65	78791	79881	RHS	-	✓
66	79979	80392	RHS	-	✓
67	80168	81862	LHS	-	✓
68	80505	80555	RHS	-	✓
69	80643	80731	RHS	-	✓
70	80930	81619	RHS	-	✓
71	81653	81714	RHS	-	✓
72	81796	81829	RHS	-	✓
73	81889	82000	LHS	-	✓
74	81896	82011	RHS	-	✓
75	82000	82018	LHS	-	✓
76	82044	82154	LHS	-	✓
77	82047	82146	RHS	-	✓
78	82215	82251	RHS	-	✓

Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
79	82270	83042	LHS	-	✓
80	82483	82602	RHS	-	✓
81	82622	82634	RHS	-	✓
82	82680	82730	RHS	-	✓
83	82824	83042	RHS	-	✓
84	83218	83639	RHS	-	✓
85	83218	83409	LHS	-	✓
86	83716	83872	RHS	-	✓
87	83808	84071	LHS	-	✓
88	83959	84063	RHS	-	✓
89	84126	85340	LHS	-	✓
90	84317	84376	RHS	-	✓
91	84392	84425	RHS	-	✓
92	84714	84724	RHS	-	✓
93	84756	84930	RHS	-	✓
94	84944	85031	RHS	-	✓
95	85175	85262	RHS	-	✓
96	85399	85705	LHS	-	✓
97	85464	85492	RHS	-	✓
98	85590	85648	RHS	-	✓
99	85777	86610	LHS	-	✓

Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
100	85859	85908	RHS	-	✓
101	86106	86135	RHS	-	✓
102	86598	86726	RHS	-	✓
103	86651	87072	LHS	-	✓
104	86771	86829	RHS	-	✓
105	86916	86946	RHS	-	✓
106	86991	87049	RHS	-	✓
107	87121	87721	LHS	-	✓
108	87194	87367	RHS	-	✓
109	87552	87744	RHS	-	✓
110	87734	88460	LHS	-	✓

15. Major Junctions

The details of major junctions are as follows:

Sl. No.	Location		At Grade	Separated	Category of Cross Roads			
	Existing Ch.	Design Ch.			NH	SH	MDR	Others
NIL								

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

16. Minor Junctions

The details of major junctions are as follows:

S. No.	Existing Chainage (Km)	Design Chainage (Km)	Type	
			'Y' Junction	Cross Road both sides
1	73365	62.373	Y-Junction	-
2	73635	62.663	Y-Junction	-
3	76155	65.363	Y-Junction	-
4	77480	66.163	Y-Junction	-
5	77540	66.738	Y- Junction	-
6	77665	66.738	Y-Junction	-
7	80905	66.888	Y-Junction	-
8	87155	75.963	Y-Junction	-

17. Bypasses

The details of bypasses are as follows:

S. No.	Name of Bypass (Town)	Road Segment	Existing Chainage		Length (km)	Carriageway	
			From (km)	To (km)		Width m)	Type
Nil							

18. Other Structures/Details

The details of other structures are as follows:

S No.	Type	Existing Chainage (km)	Length (m)	Width
Nil				

Annex-II

(Schedule-A)

Details for Providing Right of Way

The dates on which the Authority shall provide Right of Way (ROW) to the Contractor on Different stretches of the Site are stated below:

Sl. No	Design Chainage		Length in km	Existing ROW as per Clause-3 of Schedule A	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
(i) 90% of ROW(full width)	59.363	77.363	18.00	6.00	20 m -60 m wide for construction work.	90 % at Appointed Date
(ii) Balance ROW (full width)	59.363	77.363	18.00	6.00	20 m -60 m wide for construction work.	Within 90 days after the appointed date as per clause 8.2 of DCA

Annex-III

(Schedule-A)

Alignment Plans

It is enclosed.

Annex-IV

(Schedule-A)

Environmental Clearances

The following Forest clearance has been obtained:

The project highway does not required environment clearance as per MoEF corrigendum dated 22.08.2013.

In addition, the stage-I clearance is applied online dated 15.12.2016 which is likely to be received shortly. The Money will be deposited with MoEF for final approval on receipt of stage-I clearance. Temporary working provision will be ensured before appointed date. All conditions imposed by MoEF while issuing the approval in principle (AIP) and final forest clearance (FC) to be adhered during construction stage and after construction stage are to be complied with.

The muck dumping sites in forest area stand identified and freezed by forest department to be abided by agency during dumping of muck as stated in Schedule 'F'.

INDEX MAP OF PROJECT HIGHWAY SECTIONS

It is enclosed.

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.

2 Rehabilitation and augmentation

Rehabilitation and augmentation shall include [Two laning and strengthing]of Project Highway 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.

Annex I

(Schedule-B)

Project is construction/ improvement of the existing single lane road to two lane with paved shoulder in accordance with IRC-SP: 73:2015, IRC-SP:48:1998 and other relevant codes including standard good practice of the road construction.

1. SCOPE OF THE PROJECT

1.1 GENERAL

The following sections of this schedule briefly highlight the scope of the work of the 'Project'. The descriptions of the requirements for the various elements of the Project Highway given herein under are the bare minimum requirements for the 'Project'.

In the planning, design and execution of the works and other works in connection with the repair, maintenance or improvement of the Project Highway and functions associated with the construction of the Project Highway and roadside facilities, the Construction Contractor shall take all such actions and do all such things (including, but not limiting to, organizing itself, adopting measures and standards, executing procedures, including inspection procedures and highway patrols, and engaging and managing agents and employees) as will;

a. enable the NHIDCL to provide an acceptably safe highway in respect of its condition (structural safety) and use (road safety);

b. enable the NHIDCL to fulfill its statutory and common law obligations;

c. enable the NHIDCL to provide a congestion free uninterrupted flow of traffic on the Project Highway;

d. enable the NHIDCL to provide a level of highway service to the public not inferior to that provided on the trunk road during construction or improvement works;

e. enable the police, local authorities, and others with statutory duties or functions in relation to the Project Highway or adjoining roads to fulfill those duties and functions;

f. minimize the occurrence and adverse effects of accidents and ensure that all accidents and emergencies are responded to as quickly as possible;

g. minimize the risk of damage, destruction or disturbance to third party property;

h. ensure that members of the public are treated with all due courtesy and consideration;

i. provide a safe, clear and informative system of road signs;

j. comply with any specified programme requirements, including for the completion of the new road;

k. enable standards of reliability, durability, accessibility, maintainability, quality control and assurance, and fitness for purpose appropriate to a highway of the character of the Project Highway to be achieved throughout the Contract Period;

l. ensure adequate off-street parking facilities for both passenger and goods vehicles;

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m. provide adequate bus bays for stopping of buses and bus shelters for commuters to wait under protection;

n. achieve a high standard in the appearance and aesthetic quality of the Project Highway and achieve integration of the Project Highway with the character of the surrounding landscape through both sensitive design and sensitive management of all visible elements including those on the existing road;

o. Undertake proper safety audit through an appropriate consultant (i.e. apart from the Authority Engineer);

p. Carry out accident recording and reporting (to NHIDCL) by type on regular basis; and

q. Ensure adequate safety of the Project Workers on the work site.

2. WIDENING OF THE EXISTING HIGHWAY

2.1 Notwithstanding the basic alignment plans enclosed with this document the Construction Contractor shall himself carryout and be responsible for engineering surveys, investigation and detailed engineering designs and prepare the working drawings for all the components relevant for the improvement and up-gradation of the Project Highway to fulfill the scope of the project as envisaged herein under. These shall comply with design specifications and standards given in **Schedule–D.** The designs for different project facilities shall follow the locations and indicative designs given in **Schedule–C** and shall comply with design specifications and standards outlined in **Schedule–D.** All the designs and drawings shall be reviewed by the Authority Engineer prior to execution.

The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for [plain/rolling] terrain to the extent land is available.

2.2 Width of Carriageway

2.2.1 Two-Laning with paved shoulders shall be undertaken. The paved carriageway shall be [7(seven) m] wide and paved shoulder in accordance with the typical cross sections drawings in the Manual.

2.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 2.1 above.

3. GEOMETRIC DESIGN AND GENERAL FEATURES

3.1 General

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

3.2 Design speed

The design speed shall be as per IRC 73:2015 however in exceptional cases the minimum design speed of [30 km per hr for hilly and mountainous terrain].

3.3 Improvement of the existing road geometries

[Refer to paragraph 2.1 (v) of the Manual and provide details]

The hilly gradients shall be corrected in such a way so as to attain a limiting gradient of 6% in order to achieve longitudinal drainage. Also vertical curves shall be improved/introduced so that the vertical curves meet IRC: SP-73 - 2015 standards.

The horizontal alignment of the Project Highway shall be improved as per the standards set out in **Schedule–D.**

The improvement shall be done in consultation with the Independent consultant / Project Company ensuring that the proposed improvements are accommodated within the land width available as far as practical otherwise action to acquire more land shall be resorted to through NHIDCL.

In the following 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 proper road signs and safety measures shall be provided:

Improvement due to Realignments: (PKG-I)

Sl.NO.	DESIGN CHAINAGE		EXISTING CHAINAGE		LENGTH
	FROM	TO	FROM	TO	(m)
1	59663	59793	70318	70494	130
2	59833	59963	70534	70700	130
3	61463	61593	72200	72620	130
4	62613	62753	73640	73860	140
5	64293	64443	75400	75395	150
6	65283	65398	76235	76398	115
7	65873	65983	76873	76926	110

Sl.NO.	DESIGN CHAINAGE		EXISTING CHAINAGE		LENGTH
	FROM	TO	FROM	TO	(m)
8	66243	66338	77186	77290	95
9	66663	66863	77615	77965	200
10	67033	67103	78135	78208	70
11	67363	67483	78468	78678	120
12	68783	68913	79978	80200	130
13	69063	69153	80350	80437	90
14	71903	72003	83187	83405	100
15	72293	72403	83695	83814	110
16	72663	73063	84074	84450	400
Total					2220

Improvement due to Sharp Curves: Package-I

SL. No	Design Chainage(m)		Side	Remarks
	From	To		
1	59431	59593	LEFT	Radius <300
2	59671	59698	LEFT	Radius <300
3	59793	59834	RIGHT	Radius <300
4	59945	59983	RIGHT	Radius <300
5	60101	60138	LEFT	Radius <300
6	60137	60158	LEFT	Radius <300
7	60348	60429	RIGHT	Radius <300
8	60659	60686	LEFT	Radius <300
9	60781	60799	RIGHT	Radius <300
10	60859	60908	LEFT	Radius <300

SL. No	Design Chainage(m)		Side	Remarks
11	60961	61018	RIGHT	Radius <300
12	61067	61080	LEFT	Radius <300
13	61149	61150	RIGHT	Radius <300
14	61229	61261	LEFT	Radius <300
15	61426	61453	RIGHT	Radius <300
16	61686	61771	LEFT	Radius <300
17	61871	61873	RIGHT	Radius <300
18	61936	61946	LEFT	Radius <300
19	62005	62013	RIGHT	Radius <300
20	62123	62130	RIGHT	Radius <300
21	62188	62190	LEFT	Radius <300
22	62243	62252	RIGHT	Radius <300
23	62345	62364	LEFT	Radius <300
24	62411	62415	RIGHT	Radius <300
25	62474	62489	LEFT	Radius <300
26	62536	62589	RIGHT	Radius <300
27	62648	62680	LEFT	Radius <300
28	62747	62832	RIGHT	Radius <300
29	62898	62988	LEFT	Radius <300
30	63020	63061	RIGHT	Radius <300
31	63117	63146	LEFT	Radius <300
32	63211	63236	RIGHT	Radius <300
33	63302	63321	LEFT	Radius <300

SL. No	Design Chainage(m)		Side	Remarks
34	63377	63398	LEFT	Radius <300
35	63454	63464	RIGHT	Radius <300
36	63554	63595	LEFT	Radius <300
37	63713	63740	LEFT	Radius <300
38	63809	63886	RIGHT	Radius <300
39	63969	64000	RIGHT	Radius <300
40	64139	64154	LEFT	Radius <300
41	64242	64277	RIGHT	Radius <300
42	64375	64432	LEFT	Radius <300
43	64518	64548	RIGHT	Radius <300
44	64687	64710	RIGHT	Radius <300
45	64853	64962	LEFT	Radius <300
46	65004	65070	RIGHT	Radius <300
47	65131	65146	LEFT	Radius <300
48	65189	65236	RIGHT	Radius <300
49	65314	65332	LEFT	Radius <300
50	65396	65397	RIGHT	Radius <300
51	65467	65478	LEFT	Radius <300
52	65560	65573	RIGHT	Radius <300
53	65660	65669	LEFT	Radius <300
54	65768	65789	LEFT	Radius <300
55	65875	65900	LEFT	Radius <300
56	65904	65946	LEFT	Radius <300

SL. No	Design Chainage(m)		Side	Remarks
57	66028	66061	RIGHT	Radius <300
58	66176	66197	LEFT	Radius <300
59	66269	66271	RIGHT	Radius <300
60	66339	66348	LEFT	Radius <300
61	66421	66427	RIGHT	Radius <300
62	66519	66537	LEFT	Radius <300
63	66606	66613	RIGHT	Radius <300
64	66687	66730	LEFT	Radius <300
65	66862	66867	RIGHT	Radius <300
66	66929	66989	LEFT	Radius <300
67	67072	67098	RIGHT	Radius <300
68	67145	67158	LEFT	Radius <300
69	67345	67349	RIGHT	Radius <300
70	67408	67417	LEFT	Radius <300
71	67519	67530	LEFT	Radius <300
72	67593	67602	RIGHT	Radius <300
73	67653	67690	RIGHT	Radius <300
74	67817	67833	RIGHT	Radius <300
75	67891	67904	LEFT	Radius <300
76	68009	68033	LEFT	Radius <300
77	68136	68147	LEFT	Radius <300
78	68232	68243	RIGHT	Radius <300
79	68307	68309	LEFT	Radius <300

SL. No	Design Chainage(m)		Side	Remarks
80	68482	68499	RIGHT	Radius <300
81	68698	68700	LEFT	Radius <300
82	68921	68938	RIGHT	Radius <300
83	69010	69046	RIGHT	Radius <300
84	69093	69159	LEFT	Radius <300
85	69213	69270	RIGHT	Radius <300
86	69418	69422	LEFT	Radius <300
87	69518	69528	RIGHT	Radius <300
88	69621	69671	RIGHT	Radius <300
89	69831	69871	RIGHT	Radius <300
90	69997	70073	LEFT	Radius <300
91	70238	70272	RIGHT	Radius <300
92	70472	70486	RIGHT	Radius <300
93	70702	70719	LEFT	Radius <300
94	70880	70892	LEFT	Radius <300
95	71117	71122	LEFT	Radius <300
96	71207	71278	RIGHT	Radius <300
97	71445	71464	RIGHT	Radius <300
98	71554	71592	LEFT	Radius <300
99	71659	71665	RIGHT	Radius <300
100	71737	71769	LEFT	Radius <300
101	71928	71946	RIGHT	Radius <300
102	72004	72050	LEFT	Radius <300

SL. No	Design Chainage(m)		Side	Remarks
103	72101	72155	RIGHT	Radius <300
104	72209	72248	LEFT	Radius <300
105	72344	72361	LEFT	Radius <300
106	72439	72477	RIGHT	Radius <300
107	72579	72599	RIGHT	Radius <300
108	72683	72702	LEFT	Radius <300
109	72772	72813	RIGHT	Radius <300
110	72941	72996	LEFT	Radius <300
111	73137	73173	RIGHT	Radius <300
112	73270	73290	LEFT	Radius <300
113	73378	73404	RIGHT	Radius <300
114	73526	73555	RIGHT	Radius <300
115	73622	73676	LEFT	Radius <300
116	73751	73780	RIGHT	Radius <300
117	73870	73917	LEFT	Radius <300
118	73976	73990	RIGHT	Radius <300
119	74074	74160	LEFT	Radius <300
120	74298	74303	RIGHT	Radius <300
121	74407	74420	RIGHT	Radius <300
122	74557	74598	LEFT	Radius <300
123	74629	74660	RIGHT	Radius <300
124	74708	74747	LEFT	Radius <300
125	74783	74821	RIGHT	Radius <300

SL. No	Design Chainage(m)		Side	Remarks
126	75024	75037	RIGHT	Radius <300
127	75102	75109	LEFT	Radius <300
128	75195	75197	RIGHT	Radius <300
129	75309	75312	LEFT	Radius <300
130	75426	75459	RIGHT	Radius <300
131	75647	75654	LEFT	Radius <300
132	75726	75728	RIGHT	Radius <300
133	75840	75883	LEFT	Radius <300
134	75980	75986	RIGHT	Radius <300
135	76075	76119	RIGHT	Radius <300
136	76185	76235	RIGHT	Radius <300
137	76288	76312	LEFT	Radius <300
138	76420	76451	RIGHT	Radius <300
139	76518	76703	LEFT	Radius <300
140	76922	77026	RIGHT	Radius <300
141	77077	77094	LEFT	Radius <300
142	77155	77265	RIGHT	Radius <300

3.4 Proposed Right of Way

[Refer to paragraph 2.3 of the Manual]. Details of the proposed Right of Way are tabulated below.

Sl. No	Design Chainage		Length	Width (m)
	From	To		

1.	59.363	77.363	18.000	20 m - 60 m wide for construction work.

3.4.1 The Scheduled date on which the Authority Shall provide ROW to the contractor is given in Annexure-II of Schedule A

3.5 Type of Shoulders

[Refer to paragraph 2.6.1 of the Manual and specify]

(a) In built-up sections, 1.5m wide Solid footpath has been considered as TCS-I for normal camber and TCS-III for super elevation.

(b) In open country, paved shoulders of 1.5m in width shall be provided and 1.0m earthen shoulder shall be covered with 200mm thick compacted layer of granular material as TCS-II for normal camber, as TCS-IV for super elevation, as TCS-V for pick up Bus stop & passenger shelter and as TCS-VI for Gabion wall and super elevation.

(c) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in paragraphs 5.9.9 and 5.9.10 of the Manual.

3.6 Lateral and vertical clearances at underpasses

3.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.11 of the Manual.

3.6.2 *Lateral clearance*: The width of the opening at the underpasses shall be as follows:

Sl No.	Location [Chainage (km)]		Span/Opening (m)	Remarks
	From	To		
Nil				

3.7 Lateral and vertical clearances at overpasses

3.7.1 Lateral and vertical clearances at overpasses shall be as per paragraph 2.12 of the Manual.

3.7.2 *Lateral clearance*: The width of the opening at the overpasses shall be as follows:

Sl No.	Location [Chainage (km)]	Span/Opening (m)	Remarks

	From	To		
Nil				

3.8 Service Roads

Service roads shall be constructed at the locations and for the length indicated below:[Refer to paragraph2.13 of the manual and provide details]

Sl No.	Location of Service Road (km)	Right Hand Side (RHS) / Left Hand Side (LHS) / Both Sides	Length (Km) of Services Road
.....NIL.....			

3.9 Grade Separated Structures

3.9.1 Grade separated structures shall be provided as per paragraph 2.14 of the Manual. The requisite particulars are given below:
[Refer to paragraphs 2.14.1 of the Manual and provide details]

Sl No.	Location of Structure	Length (m)	Number and Length of Spans (m)	Approach Gradient	Remarks, if any
Nil					

3.9.2 In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows: [Refer to paragraphs 2.14.2 of the Manual and specify the type of vehicular under pass/ overpass structure and whether the cross road is to be carried at the existing level, raised or lowered].

Sl No.	Location	Type of Structure/Length (m)	Cross Road at			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

3.10 Cattle and pedestrian underpass / Overpass

Cattle and pedestrian underpass/overpass shall be constructed as follows: [Refer to paragraph 2.14.3 of the Manual and specify the requirements of cattle and pedestrian underpass/overpass.

Sl No.	Location	Type of Crossing
Nil		

3.11 Typical cross-sections of the Project Highway

Typical cross-sections to be followed as per IRC: SP-73-2015 and in addition the proposed cross section for various situations are given in Fig.B-1 to B-4. These illustrate the widening proposals for the project highway. The Project Highway (length 18.000 km) shall be 2-lane carriageway with 1.5m wide paved and 1.0m wide earthen shoulders facility.

Following typical cross sections shall be provided for the Project Highway:

TCS – I	:	Typical cross section of pavement in Built up area normal camber
TCS – II	:	Typical cross section of pavement in open country area normal camber
TCS – III	:	Typical cross section of pavement in built up area super elevation.
TCS – IV	:	Typical cross section of pavement in open country area super elevation.
TCS- V	:	Typical cross section of pavement in open country area with pick up bus stop & passenger shelter.
TCS- VI	:	Typical cross section of pavement in open country area with Gabion wall super elevation.

The cross section schedule shall be as follows:

Sl.NO.	DESIGN CHAINAGE		LENGTH (M)	TCS Type	Remarks / Location
	FROM	TO			
1	59363	59663	300	TYPE II	Reconstruction and widening
2	59663	59793	130	TYPE II	Realignment
3	59793	59833	40	TYPE II	Reconstruction and widening
4	59833	59963	130	TYPE II	Realignment
5	59963	61463	1500	TYPE II,VI	Reconstruction and widening
6	61463	61593	130	TYPE II, V	Realignment
7	61593	62613	1020	TYPE II,VI	Reconstruction and widening
8	62613	62753	140	TYPE II, VI	Realignment
9	62753	64293	1540	TYPE II,VI	Reconstruction and widening
10	64293	64443	150	TYPE VI	Realignment
11	64443	65283	840	TYPE II, VI	Reconstruction and widening
12	65283	65398	115	TYPE II	Realignment
13	65398	65663	265	TYPE II, V	Reconstruction and widening
14	65663	65873	210	TYPE II	Reconstruction and

					widening
15	65873	65983	110	TYPE II	Realignment
16	65983	66243	260	TYPE II	Reconstruction and widening
17	66243	66338	95	TYPE II	Realignment
18	66338	66663	325	TYPE II	Reconstruction and widening
19	66663	66863	200	TYPE II	Realignment
20	66863	67033	170	TYPE II, VI	Reconstruction and widening
21	67033	67103	70	TYPE VI	Realignment
22	67103	67303	200	TYPE VI	Reconstruction and widening
23	67303	67363	60	TYPE II, VI	Reconstruction and widening
24	67363	67483	120	TYPE II	Realignment
25	67483	67548	65	TYPE II	Reconstruction and widening
26	67548	67783	235	TYPE II, VI	Reconstruction and widening
27	67783	67923	140	TYPE VI	Realignment
28	67923	68913	990	TYPE II, VI	Realignment
29	68913	69063	150	TYPE II, VI	Reconstruction and widening
30	69063	69153	90	TYPE II, VI	Realignment
31	69153	71903	2750	TYPE II, VI	Reconstruction and widening
32	71903	72003	100	TYPE II, VI	Realignment
33	72003	72293	290	TYPE II	Reconstruction and widening
34	72293	72403	110	TYPE II, VI	Realignment
35	72403	72663	260	TYPE II	Reconstruction and widening
36	72663	73063	400	TYPE II, VI	Realignment
37	73063	77363	4300	TYPE II, VI	Reconstruction and widening
Total=			18000 Mtrs		

Note: The extent of cross section type is indicative and shall be reviewed in consultation with the Authority Engineer at the time of construction as per the site condition.

The alternative cross section of the Project Highway at the cross drainage structures shall follow the typical cross section in consultation with the Authority Engineer at the time of construction. The utility services, including optical fiber cables, shall be provided in the utility corridor earmarked for this purpose on the side where it is convenient to the NHIDCL or the fiber cable shall be relocated by the respective owner at a safe place as indicated by NHIDCL

in such a way that it causes least hindrances to the execution of project. In urban sections the utility connection, the utility services shall be carried through the nearest cross drainage structure/cattle crossing below its deck slab and above HFL. In absence of such a structure in the vicinity of the purposed location, it shall pass through separate underground ducts. Location and design of the cross utility ducts shall be finalized at the detailed design stage in consonance with the Authority Engineer and NHIDCL.

3.12 Longitudinal Section

As a minimum, the Construction Contractor shall achieve the proposed finished road level as indicated in the plan and profile drawings for this purpose in FFSR. However, the final finished road levels (FRL) will be finalized as per site conditions in consultation with NHIDCL.

3.13 Built-Up Areas

The alignment passes through Built up areas as tabulated below.

Sl.no	Existing Chainage		Design Chainage		Name of Village/town etc
	From (Km)	To (Km)	From (km)	To (km)	
1	70246	70826	59609	60189	New Palin
2	76119	77329	65482	66692	Old Palin

4. INTERSECTIONS AND GRADE SEPARATORS

All intersections shall be as per Section3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

[Refer to paragraphs 3.1.1, 3.1.2 and 3.3 of the Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement].

There are no intersections with cross roads having bituminous surfacing. The cross roads fall into the category VRs. The Construction Contractor has to construct the following:

i) Typical junction treatments as specified in Final Project Report shall be applied. Design types of intersections are as given below:

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

(a) At-grade Intersections

Major Intersections

Sl No.	Location of Intersection	Intersection Towards	Existing Configurations				Type of Intersection	Figure No.	Other Features
			Location	Type	Width (m)	Surface			
Nil									

Details of junction improvements shall be as per IRC SP: 73-2015.

Minor Intersections

Sl No.	Location of Intersection	Type of Intersection	Side
1	60.463	T	RHS
2	61.333	T	LHS
3	61.843	Y	RHS
4	62.373	T	RHS
5	62.663	T	RHS
6	65.363	Y	RHS
7	66.163	Y	RHS
8	66.643	Y	RHS
10	66.888	Y	LHS
11	75.963	Y	LHS

Details of junction improvements shall be as per IRC SP: 73-2015.

(b) **Grade Separated Intersections with/without Ramps**

Sl No.	Location (km)	Salient Features	Minimum Length of Viaduct to be Provided (m)	Road to be Carried Over/Under the Structures
Nil				

5. ROAD EMBANKMENT AND CUT SECTION

5.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

5.2 Raising of the existing road [Refer to paragraph 4.2.2 of the Manual and specify sections to be raised].

The existing road shall be raised in the following sections:

Sl No.	Section (km)		Length (km)	Extent of Raising*	Remarks
	From	To			
Nil					

* Difference between levels at proposed c/l and existing road/ground below proposed c/l

6. PAVEMENT DESIGN

6.1 Pavement design shall be carried out in accordance with section 5 of the Manual. The detailed pavement design including overlay and pavement characteristics requirements of the Project Highway shall be done in accordance with Schedule D. Flexible pavement shall be considered for the project road. Flexible Pavement design shall be carried out in accordance with Section 5 of the Two Lane Manual (IRC: SP 73 -2015).

6.2 Type of pavement

Flexible pavement shall be adopted for Project Highway in accordance with IRC: 37-2012. Clause 2.2 of IRC:37-2012 identifies five type of flexible pavements. The estimated cost of civil works is based on flexible pavements consisting of Granular base, Sub base, DBM and Be. Since, the successful bidders under EPC mode can use any type of five flexible pavements mentioned Clause 2.2 of IRC: 37-2012, they may carry out their own diligence to arrive at project cost before submitting bids.

6.3 Design requirements

[Refer to paragraph 5.4, 5.9 and 5.10 of the Manual and specify design requirements and strategy]

6.3.1 Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 15 years. Stage construction shall not be permitted.

6.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 20 million standard axles as follows.

PACKAGE	Design Chainage (km)		Length (km)	15Year MSA*
	From	To		
1	59+363	77+363	18	20

*As per 5.4.1 of IRC:SP:73-2015

6.3.3 Design Parameters

The flexible pavement for the main carriageway is a 2-lane carriageway having 1.5 m wide paved shoulder and 1.0 m wide earthen shoulder in some stretches. This shall be designed using the IRC 37: 2012 Method for the projected traffic levels and the following indicative design input parameters:

Indicative Design Parameters

(i)	Performance Period	15 years + Construction Period of 24 months
(ii)	Traffic on Design Lane	Minimum 20msa as per IRC-SP-73. Design should take care of the maximum wheel load derived from the axle load survey on the design lane
(iii)	Design serviceability Loss	2.0
(iv)	Reliability	90%
(v)	Overall Standard Deviation	0.49
(vi)	Effective Roadblock Soil Resilient Modulus	Corresponding to 4-day soaked CBR value of 8.0% to 10.0%
(vii)	Layer Coefficients	As per the IRC 37 : 2012 procedures
(viii)	Drainage quality of Pavement	Good

6.3.4 The Project highway will be a light-trafficked section connecting the major arterial network of the country. The design exercise should therefore duly take into account the importance of the road, the performance level and the maintenance requirements during the performance period. The provision of Wet Mix Macadam (granular base)/cement-treated base/ sub-base (crushed stone only)/ subgrade layer(s) and the use of 60/70 Bitumen in bituminous base layers and preferably polymer modified bitumen in wearing course shall be considered while deciding about the composition of the pavement structure. The design

should also accompany the Quality Assurance Plan (QAP) along with its implementation scheme for the construction of the pavement structure.

6.3.5 However, in case of a change in the pavement design at the detailed engineering stage, the same shall not be considered as a change in scope of work nor shall qualify for a variation order.

6.3.6 Paved shoulders of 1.5 m width shall have same thickness of the pavement as that of the main carriageway with same composition as that of main carriageway for monolithic construction.

6.3.7 Contractor shall design the pavement for design traffic of 20 million standard axles (msa) corresponding subgrade CBR.

6.3.8 Rigid Pavement

No rigid pavement has been considered for the Project Highway.

6.4 Reconstruction / Realignment / Bypass of sections

[Refer to paragraph 5.9.7 of the Manual and specify the sections, if any, to be reconstructed.]

The following sections of the existing road shall be reconstructed. These shall be designed as new pavement.

Sl No.	Section (km)		Remarks
	From	To	
1	59+363	77+363	Poor condition of existing pavement

7. ROADSIDE DRAINAGE

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the Manual.

The improvements in the drainage and the slope erosion shall be made as per the following norms:

7.1 Drainage Measures

Following measures shall be adopted:

i) Open side Trapezoidal drains at the hill side for widening at hill sides.

ii) Open side Trapezoidal drains at both sides in realignment stretches by hill cut.

Open side trapezoidal cross section drain shall be provided on hill sides of the project highway in order to intercept surface water from the carriageway, shoulders and hill slopes. RCC Lined drains have slopes also been proposed in urban/semi urban/intersection stretches. The concrete drains shall be covered in reaches along commercial establishments and intersections. The drains outfall into the natural water courses i.e. either in culverts or bridges. Table below gives the location of lined drains.
These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

Details of Lined Drains

Sl no	Design Chainage (Mtr)		Length (M)	Side	Remarks
	From	To			
1	59363	59473	110	One Sides	Widening
2	59473	59663	190	One Sides	Widening
3	59663	59793	130	Both Side	Realignment
10	59793	59833	40	One Sides	Widening
11	59833	59963	130	Both Side	Realignment
12	59963	60143	180	Both Side	Widening
13	60143	60164	21	One Sides	Widening
14	60164	60172	8	Both Side	Widening
15	60172	60238	66	One Sides	Widening
16	60238	60362	124	One Sides	Widening
17	60362	60384	22	One Sides	Widening
18	60384	60502	118	One Sides	Widening
19	60502	60553	51	One Sides	Widening
20	60553	60628	75	Both Side	Widening
21	60628	60636	8	One Sides	Widening
22	60636	60676	40	Both Side	Widening
23	60676	60703	27	One Sides	Widening
24	60703	60794	91	Both Side	Widening
25	60794	60819	25	One Sides	Widening
26	60819	60866	47	Both Side	Widening
27	60866	60884	18	One Sides	Widening
28	60884	60897	13	One Sides	Widening
29	60897	60949	52	One Sides	Widening
30	60949	61038	89	Both Side	Widening

31	61038	61053	15	One Sides	Widening
32	61053	61181	128	Both Side	Widening
33	61181	61225	44	One Sides	Widening
34	61225	61258	33	Both Side	Widening
35	61258	61379	121	One Sides	Widening
36	61379	61463	84	One Sides	Widening
37	61463	61593	130	Both Side	Realignment
40	61593	61695	102	Both Side	Widening
41	61695	61733	38	One Sides	Widening
42	61733	61783	50	Both Side	Widening
43	61783	61823	40	One Sides	Widening
44	61823	61864	41	One Sides	Widening
45	61864	61933	69	Both Side	Widening
46	61933	61945	12	One Sides	Widening
47	61945	61983	38	Both Side	Widening
48	61983	62046	63	One Sides	Widening
49	62046	62114	68	Both Side	Widening
50	62114	62164	50	One Sides	Widening
51	62164	62219	55	Both Side	Widening
52	62219	62331	112	One Sides	Widening
53	62331	62396	65	Both Side	Widening
54	62396	62486	90	One Sides	Widening
55	62486	62613	127	Both Side	Widening
57	62613	62753	140	Both Side	Realignment
58	62753	62942	189	One Sides	Widening
59	62942	62961	19	Both Side	Widening
60	62961	62991	30	One Sides	Widening
61	62991	63059	68	Both Side	Widening
62	63059	63128	69	One Sides	Widening
63	63128	63302	174	One Sides	Widening
64	63302	63337	35	One Sides	Widening
65	63337	63391	54	One Sides	Widening
66	63391	63420	29	Both Side	Widening
67	63420	63450	30	One Sides	Widening
68	63450	63502	52	Both Side	Widening
69	63502	63523	21	One Sides	Widening
70	63523	63538	15	One Sides	Widening
71	63538	64293	755	One Sides	Widening
72	64293	64443	150	Both Side	Realignment
73	64443	65283	840	One Sides	Widening
74	65283	65398	115	Both Side	Realignment

75	65398	65496	98	One Sides	Widening
76	65496	65572	76	Both Side	Widening
77	65572	65600	28	One Sides	Widening
78	65600	65647	47	Both Side	Widening
79	65647	65676	29	One Sides	Widening
80	65676	65720	44	One Sides	Widening
81	65720	65873	153	One Sides	Widening
82	65873	65983	110	Both Side	Realignment
83	65983	66243	260	One Sides	Widening
84	66243	66338	95	Both Side	Realignment
86	66338	66347	9	One Sides	Widening
87	66347	66415	68	Both Side	Widening
88	66415	66435	20	One Sides	Widening
89	66435	66595	160	Both Side	Widening
90	66595	66602	7	One Sides	Widening
91	66602	66624	22	One Sides	Widening
92	66624	66663	39	Both Side	Widening
93	66663	66863	200	Both Side	Realignment
96	66863	66904	41	One Sides	Widening
97	66904	66942	38	Both Side	Widening
98	66942	66996	54	One Sides	Widening
99	66996	67033	37	Both Side	Widening
100	67033	67103	70	Both Side	Realignment
101	67103	67202	99	Both Side	Widening
102	67202	67251	49	One Sides	Widening
103	67251	67307	56	Both Side	Widening
104	67307	67363	56	One Sides	Widening
105	67363	67483	120	Both Side	Realignment
106	67483	67499	16	One Sides	Widening
107	67499	68138	639	Both Side	Widening
108	68138	68783	645	One Sides	Widening
109	68783	68913	130	Both Side	Realignment
110	68913	69063	150	One Sides	Widening
111	69063	69153	90	Both Side	Realignment
112	69153	69531	378	One Sides	Widening
113	69531	69755	224	One Sides	Widening
114	69755	69868	113	One Sides	Widening
115	69868	69918	50	Both Side	Widening
116	69918	70006	88	One Sides	Widening
117	70006	70094	88	Both Side	Widening
118	70094	70293	199	One Sides	Widening

119	70293	70982	689	Both Side	Widening
120	70982	71016	34	One Sides	Widening
121	71016	71077	61	Both Side	Widening
122	71077	71159	82	One Sides	Widening
123	71159	71192	33	Both Side	Widening
124	71192	71225	33	One Sides	Widening
125	71225	71259	34	One Sides	Widening
126	71259	71374	115	Both Side	Widening
127	71374	71381	7	One Sides	Widening
128	71381	71410	29	One Sides	Widening
129	71410	71509	99	Both Side	Widening
130	71509	71517	8	One Sides	Widening
131	71517	71614	97	One Sides	Widening
132	71614	71903	289	One Sides	Widening
133	71903	72003	100	Both Side	Realignment
136	72003	72043	40	One Sides	Widening
137	72043	72093	50	Both Side	Widening
138	72093	72187	94	One Sides	Widening
139	72187	72293	106	One Sides	Widening
140	72293	72403	110	Both Side	Realignment
141	72403	72663	260	One Sides	Widening
142	72663	73063	400	Both Side	Realignment
143	73063	73235	172	Both Side	Widening
144	73235	73322	87	One Sides	Widening
145	73322	73426	104	One Sides	Widening
146	73426	73434	8	One Sides	Widening
147	73434	73680	246	One Sides	Widening
148	73680	73739	59	Both Side	Widening
149	73739	73755	16	One Sides	Widening
150	73755	73788	33	Both Side	Widening
151	73788	74077	289	Both Side	Widening
152	74077	74087	10	Both Side	Widening
153	74087	74119	32	One Sides	Widening
154	74119	74293	174	One Sides	Widening
155	74293	74307	14	One Sides	Widening
156	74307	74394	87	Both Side	Widening
157	74394	74538	144	One Sides	Widening
158	74538	74625	87	Both Side	Widening
159	74625	74703	78	One Sides	Widening
160	74703	74827	124	Both Side	Widening
161	74827	74855	28	Both Side	Widening

162	74855	74953	98	Both Side	Widening
163	74953	75011	58	Both Side	Widening
164	75011	75068	57	Both Side	Widening
165	75068	75222	154	Both Side	Widening
166	75222	75271	49	Both Side	Widening
167	75271	75469	198	Both Side	Widening
168	75469	75498	29	Both Side	Widening
169	75498	75961	463	Both Side	Widening
170	75961	75973	12	Both Side	Widening
171	75973	76014	41	One Sides	Widening
172	76014	76089	75	Both Side	Widening
173	76089	76134	45	One Sides	Widening
174	76134	76192	58	Both Side	Widening
175	76192	76279	87	One Sides	Widening
176	76279	76309	30	Both Side	Widening
177	76309	76354	45	One Sides	Widening
178	76354	76412	58	Both Side	Widening
179	76412	76435	23	One Sides	Widening
180	76435	76557	122	Both Side	Widening
181	76557	76730	173	Both Side	Widening
182	76730	76915	185	Both Side	Widening
183	76915	77084	169	Both Side	Widening
184	77084	77097	13	One Sides	Widening
185	77097	77107	10	Both Side	Widening
186	77107	77363	256	One Sides	Widening
Total=			26980 Mtrs		

Note: (The above locations shall be reviewed in consultation with the Authority Engineer at the time of construction as per the site condition).

Trapezoidal section for the drain/ditch has been proposed as it is more economical and efficient as compared to rectangular cross section V-Shaped. These road side drains have been designed of adequate capacity to carry 100% surface runoff of the drainage area of highway ROW and the adjoining land. The side slopes have been kept as 1H:1V in case of unlined drain/ditches. However, successful bidder may adopt any type of PCC drain as per IRC and accordingly they may carry out their own diligence to arrive at project cost before submitting the bid. Also the catch water drain for the project stretch is 4620 Rm.

7.2 Slope Protection Measures

7.2.1 Breast wall/Gabion Wall and Retaining Wall

Following measures shall be adopted:

Slope protection along hill slope side shall be with breast/gabion walls with PCC minimum M15 grade concrete. However, at the zones prone to sliding breast/gabion walls will be of sausage type (by stone-mesh gabions) or specialized treatment as per good engineering practices. Retaining wall has been considered at valley sides. The height of breast/gabion walls is varying from 1.5 m to 3m as per site requirement and to be finalized by consultation with Authority Engineers. The breast/gabion wall of height 3m has been considered if the height of hill cut is more than 9m and in this circumstances 3m berm with catch water drain is required to be provided. The maximum cut slope at hill side is 55^0 (0.7H to 1V). .

Location of slide prone zones:-

Sl no	Design Chainage		Remarks
	From (m)	To (m)	
1	67211	67240	Slide prone Zone
2	68477	68514	Slide prone Zone
3	68653	68705	Slide prone Zone
4	69242	69269	Slide prone Zone
5	71319	71352	Slide prone Zone
6	71926	71947	Slide prone Zone
7	72103	72133	Slide prone Zone
8	72803	72824	Slide prone Zone
9	74739	74784	Slide prone Zone
10	75723	75772	Slide prone Zone
11	75858	75888	Slide prone Zone
12	76281	76328	Slide prone Zone
13	76678	76696	Slide prone Zone

7.2.2 Embankment less than 3m in height shall be turfed as per MoRTH Specifications.

7.2.3 Vetiver Plantation, Hydro Seeding and Hydro Mulching etc or similar works is to be done for slope protection and site mitigation measure upto a height of 12-15 m all along the slopes in each cutting locations except hard rock location which needs to be protected with appropriate applicable technologies, if required.

7.3 Rip rap Protection:

The riprap protection or similar work to be provided at valley side shoulder. the following locations as special safety feature on valley side on curves.

Sl. No.	Chainage		Length(m)
	From	To	
1	59613.00	59653.00	40.00
2	59723.00	59783.00	60.00
3	60053.00	60103.00	50.00
4	60158.00	60198.00	40.00
5	64303.00	64373.00	70.00
6	64468.00	64518.00	50.00
7	71063.00	71103.00	40.00
8	74027.00	74067.00	40.00
9	74163.00	74223.00	60.00
10	75793.00	75833.00	40.00
11	75893.00	75943.00	50.00
Total=			540 Mtrs

8. DESIGN OF STRUCTURES

8.1 General

The Project road includes provision of no major bridges (span>=60m), 2 minor bridges (span<60m) and 82 box/slab culverts. All culverts and other structures shall be designed and constructed in accordance with section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein. New bridges and culverts shall be constructed wide enough to accommodate the adjacent road cross section as given in this Schedule-B. The details of existing culverts are given in Schedule–A.

The details of culverts shall be provided by the EPC Contractor and locations are given in Clause 8.2 of Schedule-B.

All the cross-drainage structures and other structures shall be designed in accordance with the design standards set out in **Schedule–D.**

The following guidelines shall be followed:

i) All the cross drainage structures for the new carriageway shall be designed in such a way so that the outer most face of railing/parapet shall be in line with the out most edge of shoulder.

ii) The existing culverts shall be extended to match the new road cross sections.

iii) The adequacy of the vent size for all culverts/bridges shall be ascertained through detailed hydrological surveys and finalized in consultation with the IC/Project Company. The highest flood level/maximum supply level shall be properly assessed after collecting flood histories form local authorities/interviews with locals/irrigation authorities.

iv) For drainage purpose the new/to be reconstructed box culverts of minimum span 2.0 m shall be provided.

v) Suitable river training works, bank protection and embankment protection works ensuring safety of bridge structure and its approaches against damage by flood water / rain water shall be provided.

The cross drainage plan of the highway shall be finalized in consultation with AE/Project Company and if required additional culverts shall be provided.

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 7 of the Manual.

8.2 Culverts

8.2.1 Overall width of all culverts shall be equal to the roadway width of the approaches.

8.2.2 Reconstruction of existing culverts

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

[Refer to paragraph 7.3 (i) of the Manual and provide details]. These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Span (m)
1	70535	59833	RCC Slab/Box	2
2	70704	59973	RCC Slab/Box	3

3	70784	60056	RCC Slab/Box	2
4	70946	60198	RCC Slab/Box	2
5	71135	60391	RCC Slab/Box	4
6	71263	60528	RCC Slab/Box	3
7	71570	60807	RCC Slab/Box	3
8	71711	60930	RCC Slab/Box	4
9	71824	61043	RCC Slab/Box	3
10	71975	61143	RCC Slab/Box	3
11	72032	61201	RCC Slab/Box	4
12	72115	61278	RCC Slab/Box	2
13	72271	61350	RCC Slab/Box	2
14	72550	61433	RCC Slab/Box	3
15	72670	61611	RCC Slab/Box	3
16	72770	61713	RCC Slab/Box	2
17	72900	61808	RCC Slab/Box	3
18	73013	61939	RCC Slab/Box	2
19	73102	62039	RCC Slab/Box	3

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20	73355	62128	RCC Slab/Box	3
21	73637	62343	RCC Slab/Box	3
22	73760	62633	RCC Slab/Box	3
23	74043	63063	RCC Slab/Box	3
24	74212	63363	RCC Slab/Box	6
25	75026	63778	RCC Slab/Box	4
26	75185	64693	RCC Slab/Box	3
27	76325	65118	RCC Slab/Box	4
28	76464	65478	RCC Slab/Box	3
29	76503	65583	RCC Slab/Box	3
30	76724	65823	RCC Slab/Box	6
31	77018	66228	RCC Slab/Box	2
32	77363	66603	RCC Slab/Box	3
33	78355	67133	RCC Slab/Box	2
34	78630	67338	RCC Slab/Box	2
35	78715	67573	RCC Slab/Box	6
36	78765	67663	RCC Slab/Box	2

37	78845	67713	RCC Slab/Box	2
38	79132	67793	RCC Slab/Box	3
39	79330	68048	RCC Slab/Box	3
40	79575	68233	RCC Slab/Box	3
41	80345	68938	RCC Slab/Box	3
42	80440	69243	RCC Slab/Box	2
43	80674	69533	RCC Slab/Box	3
44	81453	69853	RCC Slab/Box	3
45	81667	70263	RCC Slab/Box	3
46	81990	70473	RCC Slab/Box	3
47	82359	70778	RCC Slab/Box	2
48	82455	71123	RCC Slab/Box	4
49	82713	71233	RCC Slab/Box	6
50	82855	71533	RCC Slab/Box	6
51	83110	71653	RCC Slab/Box	4
52	83290	71903	RCC Slab/Box	3
53	83635	72083	RCC Slab/Box	3

54	83727	72743	RCC Slab/Box	3
55	83915	73173	RCC Slab/Box	3
56	84352	73653	RCC Slab/Box	5
57	85425	74333	RCC Slab/Box	4
58	85700	74633	RCC Slab/Box	3
59	85860	74763	RCC Slab/Box	2
60	85905	74813	RCC Slab/Box	3
61	86125	75033	RCC Slab/Box	3
62	86377	75283	RCC Slab/Box	2
63	86523	75418	RCC Slab/Box	2
64	86837	75733	RCC Slab/Box	4
65	87250	76113	RCC Slab/Box	4
66	87345	76213	RCC Slab/Box	3
67	87568	76433	RCC Slab/Box	2
68	87952	76783	RCC Slab/Box	2
69	88020	76863	RCC Slab/Box	2
70	88117	76963	RCC Slab/Box	2

71	88332	77178	RCC Slab/Box	4
72	88457	77303	RCC Slab/Box	3

* Specify modifications, if any, required in the road level etc.

8.2.3 Additional new culverts shall be constructed as per particulars given in the table below:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Span (m)
1	70311	59658	RCC Slab/Box	2
2	73327	62243	RCC Slab/Box	3
3	73511	62413	RCC Slab/Box	3
4	73627	62528	RCC Slab/Box	3
5	74034	62975	RCC Slab/Box	4
6	83074	71783	RCC Slab/Box	4
7	83243	71968	RCC Slab/Box	2
8	85581	74413	RCC Slab/Box	3
9	87047	75848	RCC Slab/Box	3
10	87563	76338	RCC Slab/Box	2

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

[Refer to paragraph 7.23 of the Manual and provide details]

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Span
.....NIL.....				

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

8.3 Bridges

8.3.1 The existing bridges to be reconstructed/widened

(i) The existing bridges at the following locations shall be reconstructed as new structures (Minor Bridge)

Sl No.	Existing Chainage	Design Chainage	Proposed Span(m)	Proposed Width(m)	Remarks
1	82.559	71.383	22	16	As per Manual
2	84.585	73.453	52	16	As per Manual

Sl No	Bridge Location (km)	Salient Details of Existing Bridge					Adequacy or Otherwise of the Existing Waterway, Vertical Clearance etc.	Remarks
		Span Arrangement (m)	Carriageway Width (m)	Total Width (m)	Type of Superstructure	Type of Foundation		
1	82.559	20	3.5	5.5	Steel	Open	Inadequate	
2	84.585	30	3.35	5.5	Steel	Open	Inadequate	

8.3.2 The following structures shall be provided with footpaths:

Sl No.	Location (km)	Remarks
Nil		

8.3.3 Additional New Minor Bridges

New minor bridges at the following locations on the project highways shall be constructed

Sl No.	Bridge at km	Utility Services to be Carried	Remarks
Nil			

8.3.4 Additional new bridges

[Specify additional new bridges if required, and attach GAD]

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No new bridges at the following locations on the Project Highway shall be constructed.

Sl No.	Location (km)	Total Length (m)	Remarks
Nil			

8.3.5 The railings of existing bridges shall be replaced by crash barriers at the following locations:
[Refer to paragraph 7.18 (iv) of the Manual and provide details]

Sl No.	Location (km)	Remarks
Nil		

8.3.6 Repairs/replacements of railings/parapets of the existing bridges shall be undertaken as follows:
[Refer to paragraph 7.18 (v) of the Manual and provide details]

Sl No.	Location (km)	Remarks
Nil		

8.3.7 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the Manual

8.3.8 Structures in marine environment

[Refer to paragraph 7.22 of the Manual and specify the necessary measures / treatments for protecting structures in marine environment, where applicable]

8.4 Rail-road Bridges

8.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual. [Refer to paragraph 7.19 of the Manual and specify modification, if any]

8.4.2 Road over-bridges

Road over-bridges (road over rail) shall be provided at the following level crossings, as per GAD drawings attached:

Sl No.	Location of Level Crossing (km)	Length of Bridge (m)
Nil		

8.1.1 Road under-bridges

Road under-bridges (road under railway line) shall be provided at the following level crossings, as per GAD drawings attached:

Sl No.	Location of Level Crossing (km)	Number and Length of Span (m)
Nil		

8.5 Grade Separated Structures

[Refer to paragraph 7.20 of the Manual]
The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9 and 3 of this Annex-I.

8.6 Underpasses/Overpasses

There is no Underpass/Overpass proposed on the Project Highway.

8.7 Repairs and strengthening of bridges and structures

[Refer to paragraph 7.23 of the Manual and provide details]
The existing bridges and structures to be repaired/strengthened, and the nature and extent of repairs/strengthening required are given below:

A. Bridges

Sl No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

B. ROB / RUB

Sl No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

C. Overpasses / Underpasses and Other Structures

Sl No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

8.8 List of Major Bridges and Structures

The following is the list of Major Bridges

Sl No.	Location (km)
Nil	

9. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

9.1 General

Traffic control devices and road safety works shall be provided in accordance with Section 9 of the Manual.

Specifications of the reflective sheeting [Refer to paragraph 9.3 of the Manual and specify]

Traffic signs and pavements markings shall include roadside signs, overhead signs, curve amounted signs and road marking along the Project Highway. The design and marking for the project Highway shall be as per design standards indicated in **Schedule–D** and the location for various treatments shall be finalized in consultation with the Authority Engineer and Project Company.

The road markings shall be applied to lane lines, road center lines, edge lines, continuity line, stop lines, give way lines, directional arrows, diagonal/chevron markings, and Zebra crossings at parking areas.

PCC kerbs (duly painted) approximately 460 RM (minimum) shall be provided by EPC Contractor in busbays and Islands.

9.2 Traffic Signs

(i) A complete range of permanent retro-reflective traffic signs as per the requirements defined in but not limited to the FPR, for the safe and efficient movement of traffic. These sign are to be of regulatory, warning and informatory types and placed on the roadside except at the start and end of the project road and start and end of two bypasses where overhead directional and lane designation signs shall be mounted on the steels portals.

(ii) Temporary traffic and construction signs are to be provided during construction and maintenance operations for traffic diversion and pedestrian safety.

9.3 Pavement Marking

(i) Retro-reflective thermoplastic paint is proposed for use.
The road markings shall be applied to lane lines, road center lines, edge lines, continuity line, stop lines, give way lines, diagonal/chevron markings, Zebra crossings and at parking areas.

i) Delineators bollards and other safety devices shall be provided on entire project Highway and other locations as directed by NHIDCL.

ii) All signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. All sign boards of size more than 1.2 m and less than 0.9 m shall be provided at the locations finalized in consultation with NHIDCL.

iii) Cautionary sign boards (900mm Equilateral Triangle), stop sign (900mm Octagonal) mandatory sign boards (600mm dia), Village name boards (600X900mm), Hazard Plate (300X900mm), chevron signboard (600X750mm), Facility information sign (600X800mm), Advance direction sign (1800X1200mm), Place identification sign (1200X900mm) shall be provided by the Construction Contractor with suitable interval in consultation with NHIDCL.

The minimum quantity of Traffic signages and pavement marking are tabulated here

Traffic Signages, Road Marking and other appurtenances	**unit**	**Quantity**
5TH KM Stone	No.	4
KM Stone	No.	14
Hectometre Stone	No.	72
Providing and fixing of PCC M-15 Boundary Pillar@ every 200 m on both sides/Boundary stone (clause 13 herein)	No.	180
Centre line	sqm	630
Edge Line at Paved Shoulder	sqm	3600
At Junctions	sqm	22
Cautionary,90cm equilateral triangle	No	183
Speed limit, 60cm circular	No	60
Stop sign,90cm high octagon	No	11

Traffic Signages, Road Marking and other appurtenances	unit	Quantity
Direction and place identification signs upto 0.9 sqm size board	Sqm	486
Direction and place identification signs more than 0.9 sqm size board	Sqm	13.2
Metal beam crash barrier single faced	m	1446
Road Marker	No	4800
RCC guard post	No	624
Overhead Gantry Sign Board	tonne	4
Hazard markers 80-100 cm above GL	No	240

10. ROADSIDE FURNITURE

10.1.1 Roadside furniture shall be provided in accordance with the provisions of Section 11 of the Manual.

10.1.2 Overhead traffic signs: location and size

[Refer to paragraph 11.5 of the Manual and provide details]

The overhead signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. The retro reflected sheets of Engineering Grade and high intensity grade (ordinary) shall not be used. The height, lateral clearance, location and instillation shall be as per relevant clauses of MoRTH specifications. Overhead sign shall be installed ahead of major intersections and urban areas as per detailed design requirements. The minimum number of overhead signs shall be (01 No. of gantry) as per this manual.

Sl No.	Location (km)	Size	Remarks
1	59+413	12m x 2.1m	Overhead Gantry

11. COMPULSORY AFFORESTATION

[Refer to paragraph 12.1 of the Manual and specify the number of trees which are required to be planted by the Contractor as compensatory afforestation.]

Minimum 850 nos. trees are required to be planted.

12. HAZARDOUS LOCATIONS

iv) Metal Beam crash barrier length of minimum 10050m (single runner, heavy duty and W-shape) shall be provided at the locations of bridge approaches and high embankments (3.0m and more), at sharp curves on both sides. Heavy duty metal beam crash barriers shall be provided on this project by the Construction Contractor at the locations finalized in consultation with NHIDCL. Typical details of metal crash barrier are given in as per manual.

The safety barriers, protective works shall be provided at the hazardous location/lengths:

Sl No.	Location		Length (m)	Remarks
	From	To		
1	59483	59643	160	Radius<300m
2	60063	60183	120	Radius<300m
3	64323	64488	165	Radius<300m
4	65713	65873	160	Radius<300m
5	66593	66623	30	Radius<300m
6	66763	66813	50	Radius<300m
7	71083	71263	180	Radius<300m
8	71523	71563	40	Radius<300m
9	71618	71763	145	Radius<300m
10	74047	74183	136	Radius<300m
11	75813	75913	100	Radius<300m

The minimum quantity of protection work is presented in the following table:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
1. Gabion structure work/Breast wall	Rm	4620
2. Retaining Wall with PCC		

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
a) Cantilever retaining wall		
i) 5 m height	Rm	232
j) Counterfort retaining wall		
i) 6 m height	Rm	203
ii) 7 m height	Rm	87
iii) 9 m height	Rm	26
iv) 10 m height	Rm	379

13. ROAD LAND BOUNDARY (IRC Clause 12.2 , IRC SP 73:2015)

Road land (ROW) boundary shall be demarcated by putting RCC boundary pillars of size 60cm x 15cm x 15 cm embedded in concrete (as per IRC:25) along the Project Highway at 200 m interval on both sides. All the components used in delineating road land boundary shall be aesthetically pleasing, sturdy and vandal proof. The road land boundary shall be demarcated in consultation with NHIDCL.

14. SPECIAL REQUIREMENT FOR HILL ROADS

[Refer to paragraphs 14.5 and 14.8 of the Manual and provide details where relevant and required.]

15. CHANGE OF SCOPE

The length of Structures and bridges 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 variation in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions as per manual.

16. PRE-CONSTRUCTION ACTIVITIES

16.1 Land Acquisition (L.A.)

Existing Road is single lane road. Proposed ROW is varying from 20m to 60m to accommodate 2-lane configuration as given in clause 3.4 above.

The land is to be acquired by NHIDCL and all related costs shall be borne by NHIDCL.

17. LANDSCAPING

The finished road facility shall exhibit adequate landscaping of aesthetically pleasing view. All the borrow areas shall be properly dressed maintaining drain ability outward from the road facility. The side slopes shall be turfed.

Planting along the highway shall follow a variety of schemes depending upon location requirement as per the IRC and MoRTH guidelines. On island, planting of dust and gaseous substance absorbing shrubs such as aneurism oleander album is recommended. To ensure survival from herbivorous animals, shrubs/plants containing latex shall only be planted. Trees shall be provided with tree guards.

The treatment of highway embankment slopes shall be with vegetative turfing, hydro seeding and hydro mulching as per IRC: 56-2011, depending on the soil types involved. Pitching works along with filter material on slopes shall be as per MoRTH specifications.

18. Fixed Parameters for Design

(i) The Construction Contractor shall consider the following fixed parameters for design

(a) In general Drawings are provided for reference. The Construction Contractor can follow the same as it is with the review of AE. The Construction Contractor can also follow the alternate Design/Drawings with the prior approval of NHIDCL. However, the Construction Contractor shall be responsible for all design and Drawings and not be absolved from their liabilities even if they follow the DPR Drawings without any change.

(b) The scope of work shall be as specified in **Schedule–B** together with the provision of Project facilities as given in **Schedule–C** and in conformity with the specifications & standards set forth in **Schedule–D**.

(c) The finished top level of the road (Formation level) as shown in the P&P (Plan & Profile) drawing shall not be reduced/lowered unless there are some apparent errors / deficiencies in the DPR and the Construction Contractor is able to demonstrate sound and durable design by lowering the formation

levels with proper geometry as recommended in IRC: SP:73-2015 or other codes as applicable to the National Highways but no portion of Road should be allowed under submergence.

(d) The numbers and sizes of the culverts as well as waterway as provided in the FFSR shall not be reduced in any case, however the locations can be suitably modified in consultation & approval of the AE if required. Any additional requirement of culverts as per site conditions or increase in size due to hydrologic requirement should be assessed by the Construction Contractor and incorporated accordingly.

(e) Alternative design for structures i.e. bridges, culverts, and retaining walls etc. can be adopted by the Construction Contractor in accordance with Design Requirements subject to review of the same by Authority Engineer. However, the span length (total clear span/water way) as shown in the drawings shall be considered as minimum requirement and cannot be reduced.

(f) The length and/or the nos. of various project facilities like Drain, Bus bays, etc. as mentioned in Schedule B and Schedule C shall be minimum, however the locations can be suitably modified in consultation with the Authority Engineer.

(g) The Geometric Design Standards for the Project/Project Facilities shall be as per IRC: 73 or other codes as applicable to the National Highways. These should be adhered to and minimum requirements should be maintained for the Project Highway. The Construction Contractor may adopt better standards for enhancing the requirements of safety and mobility.

(h) Pavement Design

i) The typical cross sections shall be followed as far as possible. Alternate cross sections shall be accepted subjected to approval from the Authority Engineer without altering the pavement widths and subject to the restriction of ROW widths. Pavement of the main carriageway has been designed for a period of 15 years of construction period.

ii) The composition of Pavement Layers of the paved shoulders shall not be lower than the adjacent flexible pavement of the mainline project highway.

(i) All the slopes having embankment height more than 1.0m shall be protected by vegetation mulching. Filter material shall be provided below the pitching where ever embankment is exposed to water bodies.

(j) W- Beam crash barrier shall be provided on sections of the road
i) sharp curves having radius less than 300m

(k) All pipe culverts shall be replaced by box culverts.

(l) Reinforced Earth/RCC Retaining Wall type shall be liberally provided through areas for high fill/embankment with aesthetically pleasing appearance. These shall be of varying height constructed of several sections, located mainly between main line and where land constraint exists. Design life of reinforcing elements for earth retaining structures shall be 100 years minimum.

(m) Riprap protection to be provided at the valley side on curve as special safety features.

(n) All road signs shall be with retro-reflective sheet of high intensity grade conforming to ASTM D-4957-01/ (type VIII and type IX) and as per clause 801 of MoRTH specifications. The retro reflective sheet with engineering grade shall not be used and instead micro-prismatic shall be used.

SCHEDULE – C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

This schedule indicates the minimum spatial and functional requirements of the facilities to be provided on the Project Highway Package No. **DPR/J-K/AR-1/SARDP-NE**, start from design chainage km 59+363 to design chainage km 77+363 at Lungba(total length of 18.000 km) with an aim to cater to the envisaged demand till the end of the concession period.

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

(a) toll plaza[s]; -

(b) roadside furniture; -

(c) pedestrian facilities; -

(d) truck lay-byes; -

(e) bus-bays and bus shelters; -

(f) rest areas; and -

(g) others to be specified -

2 Description of Project Facilities

Toll Plaza

NIL

Bus Shelters

The bus bays and bus shelters shall be provided at following locations of proposed road of the hilly terrain, where there is a general constraint on space, pick up bus stops have been provided. The typical layout indicated in Fig: 12.3 of the manual may be adopted.

Details of Bus shelters

Sl No.	Project Facility	Design Chainage/Location (km)
1	Bus Shelter	61474
2	Bus Shelter	61536
3	Bus Shelter	65488
4	Bus Shelter	65593

Pedestrian Facilities

Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL. This should include (a) minimum Zebra Crossing with flashing Beacon or (b) Zebra Crossing with separate pedestrian phase or (c) any other provision as approved by NHIDCL.

Administrative, Operation and Maintenance Base Camp (in Accordance with Clause 12.16 of IRC 73-2015)

There shall be one base camp preferred as the center of the stretch within ROW.

The main administrative base camp shall be provided to cater to the requirement of the project implementation unit having offices of Authority Engineer, Project Company, its Supervision Consultant and representative of NHIDCL associated with the Project.

The Administrative building shall primarily house the Main Offices in addition to other secondary facilities such as computer room, office space, stores, sanitary facilities, canteen etc. The main base camp shall have adequate parking space for staff and visitors.

The camps shall have adequate lighting during dark periods and night.

The base camps shall not have more than one entry and one exit point. Both of these shall be manned by security personnel at all times.

The camps shall be landscaped so as to protect the area from dust and noise from the Project Highway.

The laboratory facility to be established for testing of various materials related to road construction and maintenance during implementation period shall be located at the main base camp.

Landscaping

Landscape treatment of the Project Highway shall be undertaken through planting of trees and ground cover of appropriate varieties and landscaping on surplus land in the ROW. The Construction Contractor should plant at least 800 nos. of trees of minimum 6 ft. height with tree guard made up of MS sections.

Plantation scheme shall be prepared in consultation with the Forest Department of the Government of Arunachal Pradesh, and the Authority Engineer/ NHIDCL.

Environment

The Project Highway during design, construction and maintenance during implementation period shall conform to the environmental rules and regulations in force. The Construction Contractor shall be responsible for the same.

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 confirm to design requirements set out in the following documents:

Two Lane Manual (IRC: SP 73 – 2015) of Specifications and Standards for Two Laning published by IRC and Hill Road Manual IRC SP 48:1998

Annex – I

(Schedule – D)

Specifications and Standards for Construction

1 Specifications and Standards

All materials, works and construction operations shall confirm to the Two Lane Manual (IRC: SP 73 – 2015) of Specifications and Standards for Two Laning (IRC: SP: 73 – 2015), referred as the Two Lane Manual (IRC: SP: 73 – 2015), 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.

2 Deviations from the Specifications and Standards

2.1 The terms 'Concessionaire', 'Independent Engineer' and 'Concession Agreement' used in the Two Lane Manual (IRC: SP 73- 2015) shall be deemed to be substituted by the terms **'Contractor', 'Authority's Engineer' and 'Agreement'** respectively.

2.2 NIL

8SCHEDULE - H

(See Clauses 10.1.4 and 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs. ...../-

1.2 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specified below:

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures (but excluding service roads)	68.14%	**A- Widening and strengthening of existing road**		
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	29.93%	20.40%
		(2) Granular work (sub- base, shoulders)	13.65%	9.30%
		(3) Bituminous work		0.00%
		a)DBM With Prime coat & Tack coat.	11.24%	7.66%
		b)BC with Tack coat.	5.84%	3.98%
		(4) Rigid Pavement	0.00%	0.00%
		(5)Widening and repair of culvert	0.00%	0.00%
		(6)Protection of existing works	0.00%	0.00%
		(7)Widening and repair of minor bridges	0.00%	0.00%
		B - New 2-Lane alignment		
		Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	5.40%	3.68%
		(2) Granular work	2.46%	1.67%

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ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		(sub- base, shoulders)		
		(3) Bituminous work	0.00%	0.00%
		a)DBM With Prime coat & Tack coat.	2.03%	1.38%
		b) BC with Tack coat.	1.05%	0.72%
		(4) Rigid Pavement	0.00%	0.00%
		(5)Protection work	0.00%	0.00%
		(6)RCC/Reinf. Earth retaining Wall in approaches of ROB	0.00%	0.00%
		(7)Drainage Works	0.00%	0.00%
		(8)Protection Work	0.00%	0.00%
		C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:		
		(1)Box / Slab Culverts	23.72%	16.16%
		(2) HP Culvert	0.00%	0.00%
		(3) Embankment Protection(New Lane)	0.00%	0.00%
		(4) Grade separated structures	0.00%	0.00%
		(5) Overpass	0.00%	0.00%
		(6) Elephant Underpass	0.00%	0.00%
		(7) Approaches to ROB and Viaduct	0.00%	0.00%
		(8) Minor Bridges	4.67%	3.18%
		(9) Cattles/Pedestrian Underpasses	0.00%	0.00%
		(10) Vehicular Underpass	0.00%	0.00%
Major Bridge works and ROB/RUB	0.00%	**A- Widening and repairs of Major Bridges**		
		(1) Foundation	0.00%	0.00%
		(2) Sub-structure	0.00%	0.00%
		(3)Super-structure(including wearing coat,crash barrier etc. complete in all respect)	0.00%	0.00%
		B- Widening and repair of		

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		(a) ROB	0.00%	0.00%
		(b) RUB	0.00%	0.00%
		C- New Major Bridges		
		(1) Guide Bundh	0.00%	0.00%
		(2) Foundation	0.00%	0.00%
		(3) Sub structure	0.00%	0.00%
		(4) Super-structure (including wearing coats, crash barriers etc. complete)	0.00%	0.00%
		(5) Protection works	0.00%	0.00%
		D- New rail-road bridges including viaduct		
		(a) ROB	0.00%	0.00%
		(b) RUB	0.00%	0.00%
Structures(Elevated sections, reinforced earth)	0.00%	(1) Foundation	0.00%	0.00%
		(2) Sub-structure	0.00%	0.00%
		(3) Super-structure (including crash barriers etc. complete)	0.00%	0.00%
		(4) Reinforced Earth Wall (includes Approaches of ROB, Underpasses, Overpasses, Flyover etc.)	0.00%	0.00%
Other Works	31.86%	**Other Engineering Works**		
		Major Junction	0.00%	0.00%
		Road Appurtenances	0.18%	0.06%
		Road side plantation	0.00%	0.00%
		Protection Work (Provision of Rip-Rap or similar work in valley side of the curves as special safety features)	0.03%	0.01%
		Service roads/Slip roads	0.00%	0.00%
		Toll Plaza	0.00%	0.00%
		Road side drain & toe wall	26.61%	8.48%
		Project facilities	0.00%	0.00%
		Safety and traffic management during	0.00%	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		const.		
		Traffic Sign	0.41%	0.13%
		Pavement Marking	0.52%	0.16%
		Crash barrier/W metal crash barrier	0.86%	0.28%
		Road Land Boundary stone, km Stone,5th km stone and hectometer stone	0.02%	0.01%
		Traffic blinker LED delineator,stud,reflective payment marker, tree reflector	0.52%	0.17%
		Traffic Island	0.00%	0.00%
		Median Kerb	0.00%	0.00%
		Bus bays and Bus Shelter	1.18%	0.38%
		Road side plantation and median plantation	0.00%	0.00%
		Protective work of guide bund including construction of flexible aprons,boulder pitching and filter media on slope	0.00%	0.00%
		Minor Junction	0.53%	0.17%
		Median filling shrub plantation and maintanance for 1 year	0.00%	0.00%
		Overhead signboard	0.12%	0.04%
		Painting on kerb	0.00%	0.00%
		Footpath and separator	7.05%	2.25%
		Interlocking concrete block pavement	0.00%	0.00%
		Junctions	0.00%	0.00%
		CC Kerb	0.00%	0.00%
		Painting	0.00%	0.00%
		cable duct	0.00%	0.00%
		Solar stud and solar blinking LED	0.00%	0.00%
		Rest area with development of site including one no bus bay and bus shelter, landscaping and tree	0.00%	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		plantation		
		Plantation (Vetiver, Hydro seeding and Mulching or similar techniques etc.) for slope protection on exposed hill slopes as slide mitigation measure.	7.53%	2.40%
		Catch water Drain	1.63%	0.52%
		Traffic control devices and road safety works	0.00%	0.00%
		Road furniture	0.00%	0.00%
		Road side drain I/C chute drain	0.00%	0.00%
		Repair for protection work	0.00%	0.00%
		Traffic diversion, Safety and traffic management during construction	0.00%	0.00%
		Miscellaneous item	0.06%	0.02%
		Breast Wall and RCC retaining wall	0.00%	0.00%
		Junction improvement	0.00%	0.00%
		Site Clearance	0.00%	0.00%
		M-20 Kerb with channel	0.00%	0.00%
		Prefabricated railing over kerb in median	0.00%	0.00%
		safety barrier	0.00%	0.00%
		(v)Project facilities		
		(a)Truck lay-byes	0.00%	0.00%
		(b) Others	0.26%	0.08%
		(vi)Repairs to bridges/structures		
		Other items(Junctions)	0.00%	0.00%
		Providing wearing coat	0.00%	0.00%
		Replacement of bearing joints	0.00%	0.00%
		Providing crash barrier	0.00%	0.00%
		(vii)Protection Works		

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis OVERALL PROJECT
1	2	3	4	5
		Retaining Wall	44.68%	14.23%
		Gabion Wall/Breast wall	7.77%	2.48%
		Parapet	0.00%	0.00%
		Total %		**100.00%**

1.3 **Procedure of estimating the value of work done**

1.3.1 Road works including approaches to minor bridges, Major Bridges and Structures (excluding service roads).

Procedure for estimating the value of road work done shall be as follows:

TABLE 1.3.1

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
A-Widening and Strengthening		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	20.40%	
(2) Granular work (sub- base, base, shoulders)	9.30%	
(3) Bituminous work	0.00%	
a) DBM with prime coat and Tack coat	7.66%	
b) BC with Tack coat	3.98%	
(4) Concrete Pavement	0.00%	
(6) Widening and repair of culverts	0.00%	Cost of five completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of five culverts.
(7) Protection of existing works	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(8) Widening and repair of minor bridges	0.00%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of a minor bridge.
B- New 2-lane alignment		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock including Cleaning & grubbing with required site clearance etc.	3.68%	
(2) Granular work (sub- base, base, shoulders)	1.67%	
(3) Bituminous work	0.00%	
a) DBM with prime coat and Tack coat	1.38%	
b) BC with Tack coat	0.72%	
(4) CC Pavement	0.00%	

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
(5) Protection Works	0.00%	
(6) RCC / Reinf. Earth ret wall in approaches of RoB	0.00%	
(7) Drainage Works	0.00%	
(8) Protection works	0.00%	
C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:		
(1) Box / Slab Culverts	16.16%	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of five culverts.
(2) HP Culverts	0.00%	
(3) Embankment Protection (New Lane)	0.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(4) Grade Separated structures	0.00%	Cost of each structure shall be determined on pro rata basis with respect to the total number of structures. Payment shall be made on the completion of each number of structures specified.
(5) Overpasses	0.00%	
(6) Elephant underpasss	0.00%	
(7) Approaches to ROB and Viaduct	0.00%	
(8) Minor bridges	3.18%	Cost of each minor bridge/Culvert shall be determined on pro rata basis with respect to the total linear length of the minor bridges/culvert. Payment shall be made on the completion of a minor bridge/culvert.
(9) Cattles/Pedestrian Underpasses	0.00%	Cost of each structure shall be determined on pro rata basis with respect to the total number of structures. Payment shall be made on the completion of each number of structures specified.
(10) Vehicular Underpasses	0.00%	

@. For example, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows:

Cost per km = P x weightage for bituminous work x (1/L)

Where P= Contract Price

L = Total length in km

Similarly, the rates per km for stages (1), (2) and (4) above shall be worked out.

1.3 Procedure of estimating the value of work done

1.3.2 Major Bridge works and ROB/RUB.

Procedure for estimating the value of Major Bridge works and of ROB/RUBshall be as stated in table **1.3.2**:

TABLE 1.3.2

STAGE OF PAYMENT	WEIGHTAGE	PAYMENT PROCEDURE
A- Widening and repairs of Major Bridges		Cost of each Major Bridge (widening and repairs) shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges (widening and repairs). Payment shall be made on completion of each stage of a Major Bridge as per the weightage given in this table.
(1) Foundation	0.00%	
(2) Sub-structure	0.00%	
(3) Super-structure (including wearing coat, crash barriers etc. complete in all respect)	0.00%	
B- Widening and repair of		Cost of each ROB/RUB (widening and repairs) shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB (widening and repairs). Payment shall be made on completion of an ROB/RUB
(a) ROB	0.00%	
(b) RUB	0.00%	
C- New Major Bridges		Payment shall be made on pro rata basis on completion of 25 (twenty five) percent of each stage of a Major Bridge as per the weightage given in this table.
(1) Guide Bund	0.00%	
(2) Foundation	0.00%	
(3) Sub-structure	0.00%	
(4) Super-structure (including wearing coat, crash barriers etc. complete in all respect)	0.00%	
(5) Protection Works	0.00%	
D- New rail-road bridge		Payment shall be made on pro rata basis on completion of 25 (twenty five) percent of each stage of a ROB/RUB as per the weightage given in this table.
(a) ROB	0.00%	
(b) RUB	0.00%	

TABLE: 1.3.3

STAGE OF PAYMENT	WEIGHTAGE	PAYMENT PROCEDURE
(1) Foundation: On completion of the foundation works including foundations for wing and return walls	0.00%	Cost of each structure shall be determined on pro rata basis in respect to the total linear length (m) of all the structures. Payment shall be made on completion of each stage of a structure as per the weightage given in this table.
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap	0.00%	
(3) Super-structure: On completion of the Structure along with super structure, including hand rails/crash barriers, wing walls, return walls, tests on completion etc., elevated structure complete in all respects and fit for use.	0.00%	
(4) Reinforced earth work	0.00%	Payment shall be made on pro rata basis on completion of 20 (twenty) percent of total area.

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1.3.4 Other works.

Procedure for estimating the value of other works done shall be as stated in table 1.3.4:

TABLE 1.3.4

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
Other Engineering Works		
Major Junction	0.00%	Payment shall be made on pro rata basis for completed facilities.
Road Appurtenances	0.06%	
Road Side plantation	0.00%	Unit of measurement is linear length in km. Cost per km shall be determined on pro rata basis with respect to the total length of the service roads/slip roads. Payment shall be made for completed service roads/slip roads in a length of not less than 20 (twenty) percent of the total length of service roads/slip roads.
Service roads/slip road	0.00%	
Toll Plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
Road side drains & toe wall	8.48%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
Project facilities	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
Safety & traffic mgmt. During construction	0.00%	
Traffic Sign	0.13%	
Pavement marking	0.16%	
Protection works(Riprap)	0.01%	
Crash barrier/ W matel crash barrier	0.28%	
Road Land Boundary stone, km stone,5th km stone, & hectometre stones	0.01%	
Traffic blinker LED Delineator, stud, reflective payment marker, tree reflector	0.17%	
Traffic Island	0.00%	

STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
Median Kerbs	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
Bus Bays & Bus shelter	0.38%	Payment shall be made for completed items.
Road side plantation & medium Plantation.	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
Protection works of guide bund including construction of flexible aprons , boulder pitching and filter media on slopes	0.00%	
Minor junction	0.17%	Payment shall be made for completed items.
Median filling shrub plantation & maintenance for 1 year	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
Overhead signboard	0.04%	
painting on kerb	0.00%	
Footpath &Separator	2.25%	
Interlocking concrete block payment junctions	0.00% 0.00%	
CC kerb	0.00%	
Painting	0.00%	
Cable duct	0.00%	
Solar stud & solar blinking LED	0.00%	
Rest area with development of site including One no Bus bay and Bus shelter, landscaping and tree plantation	0.00%	
Plantation (vetiver, Hydro seeding and Mulching or similar techniques etc) for slope protection on exposed hill slopes as slide mitigation measure.	2.40%	
Catch water drain	0.52%	

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STAGE OF PAYMENT	PERCENTAGE WEIGHTAGE vis a vis overall Project	PAYMENT PROCEDURE
Traffic control devices and road safety works	0.00%	
Road furniture	0.00%	
Roads side drains I/C Chute drain & toe wall	0.00%	
Repair of protections works	0.00%	
Traffic diversion, Safety and traffic management during construction	0.00%	
Miscellaneous items	0.02%	
Breast wall and RCC retaining wall	0.00%	
Junction improvement	0.00%	
Site Clearance	0.00%	
M-20 kerb with channel	0.00%	
Prefabricated railing over kerb in median	0.00%	
Safety Barrier	0.00%	
(v) Project facilities		
(a) Truck lay-byes	0.00%	Payment shall be made for completed items.
(b) others	0.08%	
(vi) Repairs to bridges/structures		
Other items (Junctions)	0.00%	Payment shall be made for completed items.
Providing wearing coat	0.00%	
Replacement of bearing joints	0.00%	
Providing crash barriers	0.00%	
(vii) Protection works		
Breast wall	0.00%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
Retaining wall	14.23%	
Gabion wall/Breast wall	2.48%	
Parapet	0.00%	

2 Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.1.

2.2Payment for Maintenance shall be made in quarterly installments in accordance with the provisions of Clause 19.7.