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 Four-Laning and Strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex – I

(Schedule-B)

Description of Four-Laning and strengthening

1. Widening of the Existing Highway

(i) 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.

(ii) **Width of Carriageway**

(a) The Paved carriageway shall be 18(Eighteen) meter wide excluding the median as per IRC:SP:84-2014.

Provided that in the following built-up areas the 7.5m service road shall be provided with the main carriageway as per IRC:SP:84-2014.

Sl.No.	Built-up stretch (Township)	Location (km to km)	Remarks
1	Samaguri area	293.400 Km to 296.285	As per Fig. 2.6 of the manual

(b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.1 above.

(iii) **Design chainage corresponding to existing chainage:**

Kilometre stones are existing in entire length of the project highway. It is called the "Existing Chainage". During topography survey with Total Station, observations are made to these Km stones and after finalization of alignment by improving the existing geometry the chain age 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 using the total station for the "Project Highway" is given below.

Existing chainage (m)	Design Chainage (m)	Name of place
289930.597	290300.000	Veloguri High School

291923.971	290200.000	Baraligaon M.V. School
292900.000	290280.000	Samaguri Play Ground
293928.282	294000.000	Down Town Resort

(iv) Median shall be as per section 2.5 of Manual.

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

The ruling design speed shall be 100 km per hr for plain/rolling terrain]. The minimum design speed of 80 Km per hour shall be adopted only where site conditions are restrictive as indicated in the schedule.

Sl. No.	Restrictive Stretch	Location (km)	Minimum Design Speed
NIL			

(iii) Improvement of the existing road geometrics

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:

Sl. No.	Stretch (from km to km)	Length in Mtr	Type of deficiency	Remarks
NIL				

(iv) Right of Way

The proposed ROW is 45m as under:

Sl.No	Design Chainage	Proposed ROW (in metre)

1	288.600 km to 297.000 of NH-37	45.00m

(v) Type of shoulders

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

Sl.No	Design Chainage (km)		Reference to cross section of manual	Remarks
	From	To		
1	293.400	296.285	Fig. 2.6 of the manual	Samaguri Area

(b) In open country, [paved shoulders of 1.5 m width shall be provided and balance 1.0m width shall be covered with 150 mm thick compacted layer of granular material].

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

(vi) Lateral and vertical clearances at underpasses

(a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the paragraph 2.10 of the Manual.

(b) Lateral clearance: The width of the opening at the underpasses shall be as follows:

Sl. No	Location (Chainage) (from km to km)	Span/ opening (m)	Remarks
NIL			

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as per the provision of relevant Manual.

(b) Lateral clearance: The width of the opening at the overpasses shall be as follows:

Sl. No	Location (Chainage) (from km to km)	Span/ opening (m)	Remarks

NIL

(viii) Service roads / Slip roads

Service roads shall be constructed at the locations and for the lengths indicated below:

Sl.No.	Design chainage		Length in m	Side
	From (km)	To (Km)		
1	288.600	296.145	7785m	S/R to be provided one side / both sides as per availability of land
Total			**7785 m**	

(ix) Grade separated structures

(a) Grade separated structures shall be provided as per provision of the relevant Manual. The requisite particulars are given below:

Sl. No.	**Location of structure**	**length (m)**	**Number and length of spans (m)**	**Approach gradient**	**Remarks, if any**
NIL					

(b) 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:

Sl. No.	**Location**	**Type of structure Length (m)**	**Cross road at**			**Remarks, if any**
			Existing Level	**Raised Level**	**Lowered Level**	
As per drawing enclosed at Annexure-I						

(x) Cattle and pedestrian underpass /overpass

Cattle and pedestrian underpass/ overpass shall be constructed as follows:

Sl. No.	**Location**	**Type of crossing**
NIL		

(xi) Typical cross-sections of the Project Highway

Different types of Cross sections for different segments of four lane stretch shall be developed as provided in "Manual of Specifications and Standard for four laning of Highways through Public Private Partnership (IRC:SP:84-2014) referred in Schedule – D.

Shift of Proposed centerline with respect to existing road centre. Widening is involved at both sides.

Design Chainage		Length	Shift
From	To	M	
288+600	288+730	130	Concentric
288+730	288+800	70	LHS
288+800	288+950	150	Concentric
288+950	288+970	20	RHS
288+970	289+310	340	Concentric
289+310	290+300	990	LHS
290+300	290+950	650	Concentric
290+950	291+090	140	LHS
291+090	291+470	380	Concentric
291+470	291+530	60	RHS
291+530	292+250	720	Concentric
292+250	292+430	180	RHS
292+430	292+860	430	Concentric
292+860	293+000	140	RHS
293+000	293+630	630	Concentric
293+630	293+710	80	RHS
293+710	293+830	120	Concentric
293+830	294+060	230	LHS
294+060	294+200	140	Concentric
294+200	294+300	100	LHS
294+300	294+370	70	Concentric
294+370	294+550	180	LHS
294+550	294+670	120	Concentric
294+670	294+870	200	LHS
294+870	294+960	90	Concentric
294+960	295+040	80	RHS
295+040	295+200	160	Concentric
295+200	296+720	1520	LHS
296+720	296+840	120	Concentric
296+840	297+000	160	RHS

(xii) Status of balance work (Highway):

Subgrade Top Balance Quantity			
From	**To**	**Length(m)**	**Side**
288+900	289+040	140	LHS
291+820	292+040	220	LHS
292+700	292+800	100	LHS
293+100	293+200	100	LHS
293+300	293+450	150	LHS
293+760	293+770	10	LHS
294+760	294+800	40	LHS
295+150	295+220	70	LHS
295+280	295+420	140	LHS
296+150	296+290	140	LHS
289+040	289+300	260	RHS
291+070	291+080	10	RHS
291+900	293+750	1850	RHS
294+200	294+300	100	RHS
296+600	296+630	30	RHS
Total (2 Lane)		**3360**	
Total (4 Lane)		**1.680**	

Sl. No.	**WMM TOP Balance Quantity**				
	Chainage		**Length**	**SIDE**	**Scope**
	From	**To**			
1	288+600	289+360	760	LHS	New
2	289+640	289+670	30	LHS	New
3	290+400	290+600	200	LHS	New
4	290+960	290+980	20	LHS	New
5	291+780	293+500	1720	LHS	New
6	293+500	293+800	300	LHS	Rectification
7	293+800	293+860	60	LHS	New
8	293+860	294+010	150	LHS	Rectification
9	294+010	294+220	210	LHS	New
10	294+400	294+490	90	LHS	New
11	294+570	294+580	10	LHS	New
12	294+700	294+760	60	LHS	New
13	294+880	294+900	20	LHS	New
14	294+900	294+990	90	LHS	Rectification

15	294+990	295+010	20	LHS	New
16	295+010	295+140	130	LHS	Rectification
17	295+140	295+880	740	LHS	New
18	296+180	296+250	70	LHS	New
19	296+250	296+300	50	LHS	Rectification
20	296+800	297+000	200	LHS	New
21	288+600	289+700	1100	RHS	New
22	289+900	289+920	20	RHS	New
23	290+230	290+300	70	RHS	New
24	290+490	290+600	110	RHS	New
25	291+880	292+000	120	RHS	New
26	292+130	294+280	2150	RHS	New
27	294+280	294+400	120	RHS	Rectification
28	294+400	294+500	100	RHS	New
29	294+500	294+580	80	RHS	Rectification
30	294+580	294+900	320	RHS	New
31	295+050	297+000	1950	RHS	New
TOTAL (2 Lane)			**11070 Mtr**		
TOTAL (4 Lane)			**5.535 Km**		

Sl. No.	**Balance Quantity of DBM-1st Layer**			
	Chainage		**Length**	**Side**
	From	**To**		
1	288+600	289+360	760	LHS
2	289+620	290+600	980	LHS
3	291+340	291+400	60	LHS
4	291+770	293+880	2110	LHS
5	294+000	294+470	470	LHS
6	294+650	294+720	70	LHS
7	294+870	295+900	1030	LHS
8	296+190	297+000	810	LHS
9	288+600	297+000	8400	RHS
Total (2 lane)			**14690 mtr.**	
Total (4 lane)			**7.345 Km**	

Balance Quantity of DBM-2nd Layer			
From	**To**	**Length**	**Side**
288+600	297+000	8400	LHS
288+600	297+000	8400	RHS

Total (2 Lane)	**16800m**	
Total (4 Lane)	**8.400 Km.**	

Balance Quantity of BC			
From	**To**	**Length**	**Side**
288+600	297+000	8400	LHS
288+600	297+000	8400	RHS
Total (2 Lane)		**16800m**	
Total (4 Lane)		**8.400 Km.**	

Service Road			
Start	**End**	**Length(m)**	**Side**
288+600	289+900	1300	LHS
290+200	290+600	400	LHS
291+200	293+500	2300	LHS
288+600	289+900	1300	RHS
290+600	293+500	2900	RHS
Total (2 Lane)		**8200**	
Total (4 Lane)		**4.100**	

Covered Side Drain			
From	**To**	**Side**	**Length**
288+600	289+180	LHS	580
290+300	291+800	LHS	1500
292+370	293+500	LHS	1130
288+600	289+680	RHS	1080
290+400	291+800	RHS	1400
292+350	293+500	RHS	1150
295+200	296+145	RHS	945
Total (2 Lane)			**7785m**

Bus Bay with Bus Shelter			
From	**To**	**Side**	**Total Nos.**
294+940	288+902	LHS	2 Nos.
296+307	291+183	RHS	

Clearing & Grabbing work to be re-executed

From	To	Length	Side
288+600	289+350	750	LHS
289+640	289+670	30	LHS
290+440	290+600	160	LHS
291+780	293+500	1720	LHS
293+800	293+860	60	LHS
294+010	294+220	210	LHS
294+400	294+490	90	LHS
294+700	294+760	60	LHS
294+880	294+900	20	LHS
294+990	295+010	20	LHS
295+140	295+880	740	LHS
296+180	296+250	70	LHS
296+800	297+000	200	LHS
288+600	289+700	1100	RHS
290+490	290+600	110	RHS
291+880	292+000	120	RHS
292+130	294+280	2150	RHS
294+400	294+500	100	RHS
294+580	294+900	320	RHS
295+050	297+000	1950	RHS
Total (2 Lane)		**9980m**	
Total (4 Lane)		**4.990 Km.**	

3. Intersections and Grade Separators

All intersections and grade separators shall be as per the provision of Section – 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

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

(i) At-grade intersections

Major Intersections (Type – II)

Sl.No.	Location (Km)	Type	Category of Cross Road (NH/SH/MDR/Other)	Remarks

1	293.300	T	Samaguri	Left Side

(b) Minor Intersection (Type – I)

Sl no.	Location intersection	Type of intersection	Other features	Remarks
1	289+300	T	LEFT	MINOR
2	289+890	T	RIGHT	MINOR
3	290+525	T	RIGHT	MINOR
4	290+660	T	LEFT	MINOR
5	291+300	T	RIGHT	MINOR
6	292+400	T	RIGHT	MINOR
7	293+690	T	RIGHT	MINOR
8	294+000	Y	RIGHT	MINOR
9	294+600	Y	LEFT	MINOR
10	295+335	T	LEFT	MINOR
11	295+505	T	RIGHT	MINOR
12	295+891	T	RIGHT	MINOR

(ii) Grade separated intersection with/without ramps

Sl. No.	**Location**	**Salient features**	**Minimum length of viaduct to be**	**Road to be carried over/under the**
NIL				

4. Road Embankment and Cut Section

(i) 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.

(ii) Raising of the existing road [Refer to paragraph 4.2.1, 4.2.2 and 4.2.3 of the Manual

and specify sections to be raised]] as per the alignment plan & profile given in the Annexure – III of Schedule – A.

5. Pavement Design

(i) Pavement design shall be carried out in accordance with the section 5 of the Manual.

(ii) **Type of pavement**

Flexible pavement shall be adopted.

(iii) **Design requirements**

(a) 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.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for a design traffic of **70 million** standard axles.

(iv) **Reconstruction of stretches**

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

Sl. No.	**Stretch From km to km**	**Remark**
NIL		

6. Roadside Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual.
Location of covered side drain:

Sl.No.	Design chainage		Length in m
	From (km)	To (Km)	

1	288.600	296.145	7785 m
Total			**7785 m**

7. Design of Structures

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with the provision of relevant Manual and shall conform to the cross- sectional features and other details specified therein.

(b) Width of the carriageway of new bridges and structures shall be as follows:

Sl.No.	Location	Dack Width	Carriage way	Span Arrangement
1	294.438	12.50 m	8.5 m	1 x 9m

(c) The following structures shall be provided with footpaths:

Sl. No.	Location at km	Remark
All new bridges in built-up-area shall have provisions for footpath		

(d) All bridges shall be high-level bridges.

(e) The following structures shall be designed to carry utility services specified in table below:

Sl. No.	Bridge at km	Utility service to be carried	Remarks
All new bridges shall have provisions for utility services to be carried out			

(f) Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in the Section 7 of the Manual.

(ii) Culverts

(a) Overall width of all culverts shall be equal to the roadway width of the approaches.

(b) Reconstruction of existing culverts:

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

Sl.No.	New Location as per Design	Type of Culvert	Proposed Size (mtr.)	Remarks	Comments
1	289+981	(2X2) Box	1 x 2.0 x 2.0	Reconstruction	
2	291+911	(4X4) Box	1 x 4.0 x 4.0	Reconstruction	RHS Downstream
3	292+400	(2X2) Box	1 x 2.0 x 2.0	Reconstruction	
4	294+046	(2X2) Box	1 x 2.0 x 2.0	Reconstruction	

(c) **Widening of existing culverts:**

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

Sl. No.	Culvert location	Type, span, height and width of existing culvert (m)	Repairs to be carried out [specify]
NIL			

(d) Additional new culverts shall be constructed as per particulars given in the table below:

Sl.No.	New Location as per Drawing	Type of Culvert	Proposed Size (mm)	Remarks	Comments
1	289+644	Hume Pipe	1 X 1200	New Reconstruction	

2	294+736	Hume Pipe	1 X 1200	New Reconstruction	
3	295+483	Hume Pipe	1 X 1200	New Reconstruction	

7.2.4. (A). Status of Hume Pipe Culvert executed and Balance Quantity:

Sl. No	Chainage	Type of Culvert	Proposed size	Width of culvert (mtr.) (Scope)	Execution Status (Work Executed)	Side	Balance	Remarks
1	289+644	Hume Pipe	1 x 1200 mm	24.50	7.50	LHS	Head wall 1 no protection work	
2	294+736	Hume Pipe	1 x 1200 mm	32.00	12.50	LHS	Head wall 2 no protection work	
3	295+483	Hume Pipe	1 x 1200 mm	30.50	22.50	BS	Head wall 1 no protection work	

(e) Repairs/replacements of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as per site condition.

(f) Floor protection works shall be as specified in the relevant IRC Codes and MoRTH Specifications.

(iii) Bridges

(a) Existing bridges to be re- constructed/widened

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

Sl.No.	Design Chainage	Span Arrangement	Remarks
1	294.438	1 X 9	New 2 lane Bridge

(ii) The following narrow bridges shall be widened:

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

(b) **Additional new bridges**

New bridges at the following locations on the Project Highway shall be constructed.

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

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

Sl.No.	Location at Km	Type of Bridge
1	294.438	R.C.C. Solid Slab

(d) Repairs / replacements of railing/parapets of the existing bridges shall be undertaken as follows:

Sl.No.	Location at Km	Type of Bridge
1	294.438	R.C.C. Solid Slab

(e) **Drainage system for bridge decks**

An effective drainage system for bridge decks shall be provided as specified in Paragraph 7.2 of the Manual

(f) **Structures in marine environment**

NIL

(iv) **Rail-road bridges**

(a) Design, construction and detailing of ROB/RUB shall be as specified in the provision of relevant Manual.

(b) 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 (Chainage km)	Length of bridge (m)
NIL		

(c) **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 (Chainage km)	Length of bridge (m)
NIL		

(v) Grade separated structures

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

(vi) Repairs and strengthening of bridges and structures

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
1	294.438	Sealing of cracks in foundation Sub structure, Super Structure etc. Repair/ Replacement of Bearing & Expansion joint & Replacement of wearing coat, drainage spout, waterway and Painting of bridge

(b) **ROB / RUB**

Sl. No.	Location of ROB/RUB (km)	Nature and extent of repairs /strengthening to be carried out

NIL

(c) **Overpasses/Underpasses and other structures**

Sl. No	Location of Structure (km)	Nature and extent of repairs /strengthening to be carried out
NIL		

(vii) **List of Major Bridges and Structures**

The following is the list of the Major Bridges and Structures:

Sl. No.	Location
NIL	

8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety works shall be provided in accordance with the section – 9 of the Manual.

(ii) Specifications of the reflective sheeting shall be provided as per Manual.

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provision of Section – 09 of the Manual.

(ii) Overhead traffic signs: location and size

Sl. No.	Location stretch from (km) to (km)	LHS/RHS
1	294+200	4 Lane with Both side sheeting

10. Compulsory Afforestation

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

11. Hazardous Locations

The safety barriers shall also be provided at the following hazardous locations:

Sl. No.	Location stretch from (km) to (km)	LHS/RHS
NIL		

12. Special Requirement for Hill Roads

13. 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 or any deviation thereof.

(Schedule B-1)

1. The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the same shall be borne by the Authority. The details of utilities are as follows:

Sr. No	Type of Utility	Unit	Quantity	Location/stretch (LHS/RHS)
A	Electrical Utilities			
A1	Electrical Poles	Nos.	727	290+650 TO 296+000 = 10.70 KM BHS (LT & HT)
A2	Electrical cables	meters	LT = 21,400 m & HT = 32,100 m	
A3	Transformers 25 KVA	Nos.	4	
-	Transformers 100 KVA	Nos.	5	
-	Transformers 250 KVA	Nos.	2	
B	Water/Sewage pipeline			
B1	Sewage	meters		
B2	Water supply	meters	6140	289+890 to 291+140=1250m RHS, 291+140 to 293+770 =2630m RHS, 294+700 to 296+960 =2260m LHS.
-	Street Tap	Nos.	60	Sonaibali PWSS, Samaguri PWSS
-	-------	--		
C	Felling of Tress	Nos.	13 Nos.	
1	291+765	No	1	LHS
2	291+800	No	1	LHS
3	292+400	No	1	LHS
4	292+440	No	1	RHS
5	292+590	No	1	RHS
6	292+600	No	1	RHS
7	292+650	No	1	RHS
8	292+720	No	1	LHS
9	293+020	No	1	RHS
10	293+450	No	1	RHS
11	293+500	No	1	RHS
12	293+710	No	1	RHS
13	295+880	No	1	RHS