Schedule B

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 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 designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

Annex – I

(Schedule-B)

Description of Two laning and strengthening

1. Widening of the Existing Highway

1.1 The Project Highway located in plain terrain 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 terrain to the extent land is available.

1.2 Width of carriageway

1.2.1 The paved carriageway shall be Two lane (7m) wide as per IRC: SP: 73-2015.

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway shall conform to paragraph 1.2.1.

1.2.3 Design Chainage corresponding to Existing Chainage

Kilometer stones were not found in entire length of the project highway. Therefore there is no marking of existing chainage. During topography survey with Total Station, observations could not be made to these km stones and after finalization of alignment by improving the existing geometry the chainage has been referred to “Design Chainage”. Therefore, only design chainage is available for reference.

2. Geometric Design and General Features

2.1 General

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

2.2 Design Speed

The design speed has been provided below for each stretch.

S. No.	Chainage km Location	Minimum Design Speed in km/h	Curve Type
1	0/054-0/102	50 kmph	Left
2	0/328-0/356	30 kmph	Left
3	0/443-0/473	80 kmph	Right
4	0/538-0/598	50 kmph	Right
5	0/674-0/786	50 kmph	Right
6	1/421-1/477	80 kmph	Right

2.3 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.

Design Chainage in km		Length in m	Type of Deficiency	Remarks
From	To			
NIL				

2.4 Right of Way

No land acquisition shall be taken up for the construction of work. Hence the ROW shall be same as existing ROW.

2.5 Type of Shoulders

(a) Earthen shoulder shall be 2 m and shall be provided from 0/00 to 1/660 km

2.6 Lateral and Vertical Clearances at Underpasses

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

2.6.2 Lateral clearance: The width/size of the opening at the underpasses shall be as follows:

S. No.	Existing Chainage	Design Chainage	Span (No. x length x ht.) in m	Minimum Length of RE wall	Remarks
NIL					

2.7 Lateral and vertical clearance at overpasses

2.7.1 Lateral and vertical clearances at over passes shall be as per paragraph 2.11 of the Manual.

No overpass

2.7.2 Lateral clearance: The size of the opening at the overpasses shall be as follows:

S. No.	Location (chainage) From km to km	Number and length of spans	Remarks
Nil			

2.8 Service roads/ Slip Road

Service roads, as per clause 2.12 of the manual, shall be constructed at the locations and for the lengths indicated below:

S. No.	Existing Chainage		Design Chainage		Length (m)	Width (m)	Side
	From	To	From	To			
1	Nil						

2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.13 of the Manual. The requisite particulars are given below

S. No.	Location of Structure	Design Chainage	Length (m)	Number and length of spans	Approach gradient	Remarks
NIL						

2.9.2 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:

S. No.	Location of Structure	Design Chainage	Length (m)	Number and length of spans	Approach gradient	Remarks
NIL						

2.10 Cattle and Pedestrian under pass / over pass

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

S. No.	Existing Chainage	Design Chainage	Proposed span arrangement	width in m	Minimum length of RE wall
NIL					

2.11 Typical cross-sections of the Project Highway

Different type of cross sections for different segments of Two Lane stretch shall be developed as provided in 'Manual of Specifications & Standard for two Laning of Highways through Public Private Partnership' (IRC:SP:73-2015) referred in Schedule D. The widening of the road due to land constraint and to avoid land acquisition, concentric widening has been done.

3.0 Intersections and grade separators

All intersections and grade separators shall be as per 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 types and features given in the tables below:

(a) At-grade intersections

i) Major Junction

S. No.	Design Chainage	Category of Road	Type of Junction	Remarks
1	0/00	State road	3-legged	Mirijhumala
2	1/660	State road	3-legged	Mankachar

ii) Minor Intersection

S. No.	Design Chainage	Side (Left/Right)	Carriageway Width in m	
	Left	Right	Left	Right
1	0/640	Left	3.75	
2	0/850	Right		3.75
3	0/950	Right		3.00
4	1/00	Left	3.50	

(b) Grade separated intersection with/without ramps

S. No.	Location	Salient features	Minimum length of viaduct to be provided	Read to be carried over / under the structures
NIL				

4. Road embankment and cut section

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment / cuttings shall conform to the standards and specifications 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.

4.2 Raising of existing road. The existing road shall be raised as per drawings enclosed.

S. No.	Design chainage from	Design chainage to	Average height
1	0/430	0/830	0.3-0.8 m
2	0/885	1/615	0.1-0.7 m

5. Pavement design

5.1 Pavement design shall be carried out in accordance with Section 5 of the Manual. Contractor has to provide additional performance bank guarantee of 5% of the contract price valid up to a period 5 years from completion of construction of highwayin case the Contractor intends to use any alternative material, innovative technology/method,whether patented or otherwise, that is not specifically covered in the Indian or International Standards.

5.2 Type of pavement

Flexible pavement shall be constructed.

5.3 Design requirements

5.3.1 Design Period and Strategy

Flexible pavement for new pavement and for widening and strengthening of the existing pavement shall be designed as per relevant paragraphs of Section 5 of the Manual pertaining to flexible pavements, for a minimum design period of 15 years. Stage construction shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the contractor shall design the pavement for design traffic of not less than 10 million standard axles (msa) for a design period of 15 years

5.4 Reconstruction of stretches

Construction/ Reconstruction of the Project Highway shall be as per 'Manual of Specifications & Standard for Two Laning of Highways through Public Private Partnership' (IRC: SP: 73-2015) referred in Schedule D.

6. Roadside drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the Manual. Covered Drains and lined drain shall be provided in the Mankachar junction for a length of 240 m (on all the sides of road. The drains shall terminate on the existing drains.

7. Design of structures

7.1 General

7.1.1 All bridges, culverts and 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.

7.1.2 Width of the carriageway of new bridges and structures shall be as follows:

All new structures shall have minimum carriageway as per Manual Fig. 7.2 and Fig. 7.4

7.1.3 The following structures shall be provided with footpaths

S. No.	Bridge at km	Structures	Remarks
Nil			

7.1.4 All bridges shall be high-level bridges

7.1.5 Utility services to be carried over the structures

The following structures shall be designed to carry utility services specified in the table below:

S. No.	Bridge at km	Utility service to be carried	Remarks
Nil			

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

7.2 Culverts

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

7.2.2 Reconstruction of existing culverts:

S. No.	Design Chainage	Proposed Type of Structure	Recommendation	Proposed Span (m)	Over all Width in m
Nil					

7.2.3 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 section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

S. No.	Design Chainage	Proposed Type of Structures	Recommendation	Proposed Span (m)	Overall width in m
NIL					

7.2.4 Additional new culverts shall be constructed, as per IRC SP 73-2015, particulars given below:

S. No.	Design Chainage (km)	Proposed Type of Culvert	Span Arrangement No. x Length / No. x Dia (m)
1	0/330	Box Culvert	1 x 1 x 1
2	1/080	Box Culvert	1 x 1 x 1
3	1/510	Box Culvert	1 x 1 x 1
4	1/650	Box Culvert	1 x 1 x 1
5	1/665	Box Culvert	1 x 1 x 1

7.2.5 Repairs/ replacements of railing /parapets, flooring and protection works

S. No.	Design Chainage	Type of Structures	Repair work	Length (m)	Width (m)
NIL					

7.3 Bridges

7.3.1 Existing bridges to be re-constructed/widened /Repairs

i) The existing bridges at the following locations shall be reconstructed

a) Major Bridges: NIL

b) Minor Bridges: NIL

ii) The following narrow bridges shall be widened/Repairs and Strengthened:

a) Major Bridges:

S. No.	Chainage (km)	Width (m)	Span Arrangement	Type of structure			Details of Widening
				Foundation	Sub structure	Super structure	

Note: Widening of major Bridges is not applicable due to PSC Girder & SLAB type super structures. However repairs & strengthening of the bridge shall be carried out.

b) Minor Bridges:

S. No.	Chainage (km)	Existing width (m)	Span Arrangement	Type of structure			Details of widening
				Foundation	Sub structure	Super structure	
Nil							

Note: repair /strengthening work also to be carried out along with widening.

7.3.2 Additional new bridges

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

a) **Major Bridge:**

S. No.	Name of Bridge	Existing Chainage	Design Chainage	Proposed span arrangement (No. x l)	Remarks
Nil					

b) Minor Bridge:

S. No.	Name of Bridge	Existing Chainage	Design Chainage	Proposed span arrangement (No. x l)	Remarks
Nil					

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

S. No.	Location at km	Remarks
Nil		

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

S. No.	Location at km	Remarks
Nil.		

7.3.5 Drainage system for bridge decks

For rehabilitation and up-gradation of Tura-Mankachar road from Mirjumalajunction(0/00 km) toMankachar-SilcharTinali (1/660km) to two lane carriageway in the State of Assam

Nil

7.3.6 Structures in marine environment: Nil

7.4 Rail-road bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

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

S. No.	Design Chainage (km)	Span Arrangement / length of span in m	Remark
Nil			

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

S. No.	Location of level crossing	Number and length of span
NIL		

7.5 Grade separated structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9 & 3 of this Annex-I

7.6 Repairs and strengthening of structures

The existing structures to be repaired/ strengthened, and the nature and extent of repairs / strengthening required are given below:

A – Bridges

i) Major Bridges

S. No.	Location of bridge (km)		Nature and extent of repairs/ strengthening to be carried out
	Existing Chainage	Design Chainage	
1	Nil		

ii) Minor Bridge:

S. No.	Existing Chainage (km)	Design Chainage (km)	Details of Repairing/Strengthening to be carried out
Nil			

B – ROB / RUB

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

C – Overpasses/Underpasses and other structures

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

7.7 List of Major Bridges and Structures

The following is the list of the Major Bridges and structures to be constructed

S. No.	Name of Bridge	Existing Chainage	Design Chainage	Proposed span arrangement (No. x l)	Remarks
Nil					

8. Traffic control devices and road safety works

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

8.2 Specifications of the reflecting sheeting: As per the Clause 9.2 of the Manual of Specification and Standards.

9. Roadside furniture

Roadside furniture shall be provided in accordance with the provisions of section 9 of the Manual.

9.1 Overhead traffic signs: location and size

S. No.	Design Chainage (km)	Remarks
Nil		

10. Compulsory afforestation

The contractor is to plant trees as compensatory forestation as per as per IRC SP 21 and guidelines of the forest department.

The contractor is to plant double of no of trees cut for the widening of road on both sides of road.

11. Hazardous locations

The safety barriers like metal beam crash barriers shall also be provided at the following hazardous locations

S. No.	Location stretch from (km) to (km)	LHS/RHS
1	0/050 to 0/080	Both side
2	0/375 to 0/420	Both side
3	0/300 to 0/325	Both side
4	0/080 to 0/100	Both side
5	0/260 to 0/300	Both side
6	0/325 to 0/375	Both side

12. Protection work: - Construction of toe wall, retaining wall and rough stone dry pitching shall be as provided

1. **Retaining wall**

Sl no	Chainage from to to	Height	Side
1	1/000 to 1/080	2 m	Left
2	1/060 to 1/090	2.5	Right
3	0/540 to 0/570	1 m	Right

2. Stone pitching with toe wall and filter media shall be provided

Sl no	Chainage from to to	Height	Side
1	0/050-0/100	2.5-3 m	Both Side
2	0/260-0/400	0.5-3 m	Both Side
3	1/460-1/550	0.5-3.5 m	Left Side
4	1/500-1/630	1-3 m	Right Side

3. Concrete Steps shall be provided at chainage 0/090 km for approach of pedestrians to the underpass from the road.

13. Change of Scope

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