

## **Schedule – B**

**(See Clause 2.1)**

### **CONSTRUCTION FOR MITIGATION MEASURES OF SLOPE PROTECTION WORK & SINKING ZONES**

#### **1. Construction for Mitigation Measures**

Survey, Identification of extent of instability, investigations, detailed designing and execution/ construction of mitigation measures as per approved design and standards (duly certified/vetted by the design director, Proof Consultant and vetted by any THDC (Tehri Hydro Development Corporation Limited) or one of the IITs as stipulated under Article-10 and schedule-I) to be followed during construction and its stage and its maintenance for 10 years from the date of successful completion of the project / works with complete adherence of safety standards. Preference should be given to the hydroseeding and bioengineering in the design, wherever required, as per the ground requirement and relevant IRC Codal provisions must be followed.

#### **2. Specifications and Standards**

The Execution / Construction of Mitigation Measures shall be surveyed, investigated /explored, designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

**Annex - I**  
**(Schedule-B)**  
**DESCRIPTION**

(i) Construction for mitigation measures of 10 Land Slides, 01 Sinking Zone and 01 no. bridge along NH-07 in the State of Uttarakhand.

**1. Execution / Construction of Mitigation Measures**

(ii) The Project Highway refers to Construction for mitigation measures of 10 nos. Land Slide, 01 no. Sinking Zone and 01 no. bridge along NH-07 in the State of Uttarakhand.

(iii) Design and development of mitigation measures shall be done in accordance with the relevant codes/manual/specification of Indian Standards Institution (ISI), IRC & its special publication, MoRTH circulars and guidelines. Wherever the Indian standards are not clear and sufficient for sound and safe design, other relevant codes of US / UK / European countries shall be used for design & development of mitigation measures and works shall be carried out as per the designs and drawing approved by the Authority. General Arrangement of mitigation measures has been shown in the drawings folder.

**2. General Scope and Features**

The area is very prone to landslides and sinking. The Contractor has to carryout Survey, Identify the extent of instability, investigations, detailed designing (duly certified by the design director, Proof Consultant and vetted by THDC (Tehri Hydro Development Corporation Limited) or one of the IITs as stipulated under Article-10 and Schedule-I) and execution/ construction of mitigation measures as per approved design and standards to be followed during construction stage and its maintenance for 10 years from the date of successful completion of the project / works with complete adherence of safety standards. The investigations comprise of geological, geo-physical and geotechnical exploration works required for stability analysis and design of mitigation measures. The locations of the landslide zones and the sinking zones are as under. All the works are to be carryout as per approved design and drawings of mitigation measures and as per technical specifications as given in Annexure-I of Schedule-D.

Details of protection work is as under

S.No	Chainage Start	Chainage End	Length(m)	Height of Hill Side Protection	Height of Valley Side Protection	Reference of Drawing
<b>A</b>	<b>LandSlide Zone</b>					
1	Km. 388+030	Km. 388+150	120	59	23	VKSIMPL/P-134/NHIDCL/PL/LSZ-01/02
2	Km. 391+690	Km. 391+770	80	27	NA	VKSIMPL/P-134/NHIDCL/PL/LSZ-02/02
3	Km. 393+910	Km. 394+100	190	35	NA	VKSIMPL/P-134/NHIDCL/PL/LSZ-03/01 & 02
4	Km. 400+480	Km. 400+670	190	90	62	VKSIMPL/P-134/NHIDCL/PL/LSZ-04/02
5	Km. 400+710	Km. 400+840	130	80	17	VKSIMPL/P-134/NHIDCL/PL/LSZ-05/02
6	Km. 411+380	Km. 411+450	70	50	25	VKSIMPL/P-134/NHIDCL/PL/LSZ-06/02
7	Km. 411+870	Km. 411+930	60	68	22	VKSIMPL/P-134/NHIDCL/PL/LSZ-07/02

8	Km. 413+490	Km. 413+620	130	33	NA	VKSIMPL/P-134/NHIDCL/PL/LSZ-08/02
9	Km. 429+070	Km. 429+460	390	61	55	VKSIMPL/P-134/NHIDCL/PL/LSZ-09/03 & 04
10	Km. 432+160	Km. 432+270	110	68	9	VKSIMPL/P-134/NHIDCL/PL/LSZ-10/02
B	<b>Sinking Zone</b>					
1	Km. 386+110	Km. 386+280	170	45	74	VKSIMPL/P-134/NHIDCL/PL/SZ-01

The details provided in table are indicative in nature.

## 2.1 Improvement of the existing road geometrics

Sl. No.	Stretch (from km to km)	Type of deficiency	Remarks
NA			

## 2.2 Right of Way

Details of the Right of Way are given in Annex II of Schedule-A.

## 2.3 Type of shoulders

Sl. No.	Stretch (from km to km)	Fully paved shoulders/ footpaths	Reference to cross section
NA			

## 2.4 Applicable cross section for slope protection work

S.No	Chainage Start	Chainage End	Length(m)	Height of Hill Side Protection	Height of Valley Side Protection	TCS
<b>A</b>	<b>LandSlide Zone</b>					
1	Km. 388+030	Km. 388+150	120	59	23	TCS LS-1A
2	Km. 391+690	Km. 391+770	80	27	NA	TCS LS-2B
3	Km. 393+910	Km. 394+100	190	35	NA	TCS LS-3C
4	Km. 400+480	Km. 400+670	190	90	62	TCS LS-4D
5	Km. 400+710	Km. 400+840	130	80	17	TCS LS-5E
6	Km. 411+380	Km. 411+450	70	50	25	TCS LS-6F
7	Km. 411+870	Km. 411+930	60	68	22	TCS LS-7G
8	Km. 413+490	Km. 413+620	130	33	NA	TCS LS-8H
9	Km. 429+070	Km. 429+460	390	61	55	TCS LS-9I
10	Km. 432+160	Km. 432+270	110	68	9	TCS LS-10J
<b>B</b>	<b>Sinking Zone</b>					
1	Km. 386+110	Km. 386+280	170	45	74	SZ- 11K

The details provided in table are indicative in nature.

**Note:**

\*- start and end location of slope protection work in above table shall be as per site requirements during execution of work.

\*\* Location and height required protection shall vary as per site condition at the time of execution.

TCS wise description of Slope Protection Measures are described hereunder:

The Contractor shall provide the items as shown in the cross-section attached in Drawings.

Various treatment proposed for slope protection work is as below:

**Applicable TCS LS-1A**

- a) High tensile steel wire mesh of Rhomboidal shape
- b) Geocomposite mat
- c) Hydroseeding/ hydromulching
- d) Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes
- e) Double Twisted Hexagonal Shaped Wire mesh
- f) Drainage pipe
- g) Non-Woven Geotextile
- h) Self Drilling Anchors
- i) PCC

**Applicable TCS LS-2B**

- a) High tensile steel wire mesh of Rhomboidal shape
- b) Geocomposite mat
- c) Hydroseeding/ hydromulching
- d) Drainage pipe
- e) Non-Woven Geotextile
- f) Self Drilling Anchors
- g) PCC

**Applicable TCS LS-3C**

- a) Double Twisted Hexagonal Shaped Wire mesh
- b) High Tensile Rope Net System
- c) Dynamic Rockfall Barrier
- d) Non-Woven Geotextile
- e) Drainage pipe
- j) Non-Woven Geotextile
- k) Self Drilling Anchors
- l) PCC

**Applicable TCS LS-4D**

- a) High Tensile Rope Net System
- b) Double Twisted Hexagonal Shaped Wire Mesh
- c) Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes
- d) Gabion mattress
- e) Drainage pipes

- f) Non-Woven Geotextile
- g) Self Drilling Anchors
- h) ISA angles
- i) ISMC channel
- j) PCC

**Applicable TCS LS-5E**

- a) High Tensile Rope Net System
- b) Double Twisted Hexagonal Shaped Wire Mesh
- c) Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes
- d) Drainage pipes
- e) Non-Woven Geotextile
- f) Self Drilling Anchors
- g) ISA angles
- h) ISMC channel
- i) PCC

**Applicable TCS LS-6F**

- a) High tensile steel wire mesh of Rhomboidal shape
- b) Geocomposite mat
- c) Hydroseeding/ hydromulching
- d) Drainage pipes
- e) Non-Woven Geotextile
- f) Self Drilling Anchors
- g) PCC

**Applicable TCS LS-7G**

- a) Double Twisted Hexagonal Shaped Wire Mesh
- b) Geocomposite mat
- c) Hydroseeding/ hydromulching
- d) Drainage pipes
- e) Non-Woven Geotextile
- f) Self Drilling Anchors
- g) PCC

**Applicable TCS LS- 8H**

- a) Double Twisted Hexagonal Shaped Wire Mesh
- b) Drainage pipes
- c) Non-Woven Geotextile
- d) Self Drilling Anchors
- e) PCC

**Applicable TCS LS-9I**

- a) High tensile steel wire mesh of Rhomboidal shape
- b) Geocomposite mat
- c) Hydroseeding/ hydromulching
- d) Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes
- e) Gabion mattress
- f) Drainage pipes
- g) Non-Woven Geotextile

- h) Geo-jute/Coir-Mat
- i) Self Drilling Anchors
- j) PCC

**Applicable TCS LS-10J**

- a) High Tensile Rope Net
- b) Double Twisted Hexagonal Shaped Wire Mesh
- c) Geocomposite mat
- k) Hydroseeding/ hydromulching
- d) Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes
- e) Drainage pipes
- f) Non-Woven Geotextile
- g) Self Drilling Anchors
- h) ISA angles
- i) ISMC channel
- j) PCC

**Applicable TCS SZ- 11K**

- a) High tensile steel wire mesh of Rhomboidal shape
- a) Double Twisted Hexagonal Shaped Wire Mesh
- b) Geocomposite mat
- c) Hydroseeding/ hydromulching
- d) Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes
- e) Gabion mattress
- f) Uniaxial Geogrid for Soil Reinforcement
- g) CRS rod
- h) Drainage composite
- i) Drainage pipes
- j) Non-Woven Geotextile
- k) Geo-jute/Coir-Mat
- l) Multi strand prestressed cable anchors
- m) Self Drilling Anchors
- n) RCC
- o) HYSD bar
- p) PCC

**2.5 Lateral and vertical clearances at underpasses**

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	NH No.	Type of Underpass	Span/ opening (m)	Remarks
NA						

**2.6 Lateral and vertical clearances at overpasses**

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

2.7 Service/Slip roads : Not Applicable

2.8 Grade separated structures : Not Applicable

Vehicular Underpass : Not applicable

Flyovers : Not applicable

2.9 Cattle and pedestrian underpass /overpass : Not applicable

2.10 Road Over Bridge (ROB): Not applicable

2.11 Limited Height Subway : Not Applicable

2.12 Typical cross-sections of the Project Highway : Not Applicable

Project Section	From (km)	To (km)	Length (m)	TCS	Description
NA					

3. Intersections and Grade Separators: - Not applicable

4. Road Embankment and Cut Section: - Not applicable

5. Pavement :

5.1 Pavement design shall be carried out in accordance with IRC : 37- 2018

5.2 Provision for rehabilitation of sunk road stretches

**Type of Pavement**

The project highway is proposed to provide flexible pavement. The composition of proposed pavement and their corresponding minimum thickness is given in the table below conforming to IRC: 37-2018 of the Manual.

Sl. No.	Pavement Composition	Min. Thickness (mm)
1	Bituminous concrete	40
2	Treated RAP/BSM	100
3	CT Sub Base	200

	<b>Total</b>	<b>340</b>
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## 6. Roadside Drainage:

Drainage as shown in drawing are to be designed and got approved by the Authority and constructed.

## 7. Mitigation Measures

Site specific slope protection and drainage measures are proposed based on current understanding of site condition and engineering surveys.

### Land Slide Zones:

<b>Land Slide Zones</b>				
Sl. No	Change Start	Chainage End	Length (m)	Mitigation Measure
1	Km. 388+030	Km. 388+150	120	As per the Design & Drawing approved by the Authority. The minimum mitigation measure to be carried out is shown in the drawing.
2	Km. 391+690	Km. 391+770	80	
3	Km. 393+910	Km. 394+100	190	
4	Km. 400+480	Km. 400+670	190	
5	Km. 400+710	Km. 400+840	130	
6	Km. 411+380	Km. 411+450	70	
7	Km. 411+870	Km. 411+930	60	
8	Km. 413+490	Km. 413+620	130	
9	Km. 429+070	Km. 429+460	390	
10	Km. 432+160	Km. 432+270	110	
<b>Total Length</b>			<b>1470</b>	

Note: - The length of landslide is minimum and indicative in nature. The contractor shall be responsible for accurate assessment as per the site condition and prepare the design for slope protection and stabilization as per specification and standard stipulated in schedule-D and submit the same to Authority's Engineer /Authority for review through the proof consultant and implement it accordingly, thereafter.

### Sinking Zones:

<b>Sinking Zones</b>				
Sl No	Change Start	Chainage End	Length (m)	Mitigation Measure
1	Km. 386+110	Km. 386+280	170	As per the Design & Drawing approved by the Authority. The minimum mitigation measure to be carried out is shown in the drawing.

Note: - The length of Sinking zone is minimum and indicative in nature. The contractor shall be responsible for accurate assessment as per the site condition and prepare the design for

sinking zone and stabilization as per specification and standard stipulated in schedule-D and submit the same to Authority's Engineer /Authority for review through the proof consultant and implement it accordingly, thereafter.

#### **8. Traffic Control Devices and Road Safety Works**

(i) Traffic control devices and road safety works shall be provided in accordance with the provision of relevant Manual as and when need arises or damaged by negligent working.

a). Traffic Signs: Traffic signs include roadside signs, overhead signs and curb mounted signs conforming to IRC:67 and section 800 of MoRTH specification.

b). Pavement Marking: Pavement markings shall cover road marking shall be provided conforming to IRC 35-2015.

#### **9. Roadside Furniture**

To be made good the damaged road side furniture during the execution.

#### **10. Compulsory Afforestation**

The number of trees which are to be planted by the Contractor as compulsory afforestation shall be as per Forest conservation Act.

#### **11. Hazardous Locations**

The safety barriers shall also be provided in accordance with the provision of relevant Manual.

**12. Special Requirement for Hill Roads:** Contractor shall follow shall be followed in accordance with hill road manual.

#### **13. Change of Scope**

##### **a) Applicable for Hill Side Slope Protection Work**

The length, slope angle and height of slope protection work, drainage system, concrete shotcrete, concrete cladding, breast wall and other items specified herein above shall be treated as tentative requirements. The actual quantities as required on the basis of detailed investigations shall be determined by the Contractor in consultation with Authority and its Engineer and in accordance with the Specifications and Standards. Any variations in quantity in terms of Sqm upto 5 % (increase or decrease) for each location mentioned in this Schedule - B shall not constitute a Change of Scope, save and except any variations in the quantities arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13 of the EPC Contract Agreement.

##### **b) Applicable for Retaining Structures**

Length and height specified in Schedule B is minimum requirement and increase in length and height as per detailed design / investigation and site requirement shall not be treated as COS.

Based on peer review outcome if Authority decided to change type of structures to viaduct the proposed retaining structures shall be descoped from the contract based on Schedule H and as per Article 13 of EPC Agreement.

In case of changes in types of structures to viaduct as per peer review report, Authority may or may not at his discretion decide to get the work done under this contract as COS under Article 13 of EPC Agreement or may carry out work through competitive bidding or any other method of procurement.

#### 14. Shifting of Utilities

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 Contractor. The details of utilities are as follows:

The shifting of utilities, to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department, and felling of trees is part of the scope of work of the Concessionaire. The cost of the same shall be borne by the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the project before submission of their bid. The specifications of concerned Utility Owning Department shall be applicable and followed. The details of utilities are as follows:

Sl. No	Type of Utility	Unit	Quantity	Location/stretch (LHS/RHS)
A	Electrical Utilities			
A1	Electrical Poles	Nos.	As per Annex-I Schedule-A	
A2	Electrical cables	meters		
A3	Transformers	Nos.		
B	Water/Sewage pipeline			
B1	Sewage	meters		
B2	Water supply	meters		
C	Felling of Tress	Nos.		

Note I:-

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

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

B. The supervision Charges at the rates/ charges applicable of the Utility Owning Department shall be paid directly by the Authority to the Utility owning Department as and when Concessionaire furnishes demand of Utility Owning Department along with a copy of estimated cost given by the latter.

C. The dismantled material /scrap of existing Utility to be shifted/ dismantled shall belong to the Concessionaire who would be free to dispose-off the dismantled material as deemed fit by them unless the Concessionaire is required to deposit the dismantled material to Utility Owning Department as per the norms and practice and, in that case the amount of credit for dismantled material may be availed by the Concessionaire as per the estimated agreed between them.

D. The utilities shall be handed over after shifting work is completed to Utility Owning Department to their entire satisfaction. The maintenance ability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

## Schedule-B (For Minor Bridge)

### DESCRIPTION OF UP-GRADATION

(i) Two-Lane Bridge at Chatwapeple Village Km. 393+985 shall be constructed in the section of NH-07 in the State of Uttarakhand.

#### 1. Construction of Two-Lane Bridges

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 in the approaches shall be corrected as per the prescribed standards for [plain/rolling] terrain to the extent land is available.

ii. Width of Carriageway: As per GAD/Cross Section

iii. Abutment Protection around Abutment & Back filling behind abutment, approach slab including lanching apron & key etc.

iv. Design shall be done in accordance with the relevant codes/manual/specification and shall be implemented as per the approved design and drawing by the competent authority. An indicative arrangement has been shown in the drawing.

v. Treatment of joints of foundation rock shall be carried out before laying the foundation.

vi. The abutments shall be properly protected as per IRC 78 and other guidelines of IRC and MoRTH.

#### 2. Geometric Design and General Features

##### General

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

##### Design speed

The design speed shall be undertaken as per the Hill manual and the Specified deviations.

##### 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)	Type of deficiency	Remarks
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NA

Right of Way

Details of the Right of Way are given in Annex II of Schedule-A.

Type of shoulders

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

Sl. No.	Stretch (from km to km)	Fully paved shoulders/ footpaths	Reference to cross section
NA			

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

Lateral and vertical clearances at underpasses

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

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	NH No.	Type of Underpass	Span/ opening (m)	Remarks
NA						

Lateral and vertical clearances at overpasses

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

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

Service/Slip roads : Not Applicable

Grade separated structures: Not Applicable

Vehicular Underpass: Not applicable

Flyovers : Not applicable

Cattle and pedestrian underpass /overpass: Not applicable

Road Over Bridge (ROB): Not applicable

Limited Height Subway: Not Applicable

Typical cross-sections of the Project Highway : Not Applicable

Project Section	From (km)	To (km)	Length (m)	TCS	Description
NA					

**3. Intersections and Grade Separators: - Not applicable**

**4. Road Embankment and Cut Section:- Not applicable**

**5. Pavement Design**

**5.1 Pavement design shall be carried out in accordance with IRC : 37- 2018**

**5.2 Provision for rehabilitation of sunk (damaged) road stretches**

**Type of Pavement**

The project highway is proposed to provide flexible pavement. The composition of proposed pavement and their corresponding minimum thickness is given in the table below conforming to IRC: 37-2018 of the manual.

S. No.	Pavement Composition	Min. Thickness (mm)
1	Bituminous concrete	40
2	Treated RAP/BSM	100
3	CT Sub Base	200
	<b>Total</b>	<b>340</b>

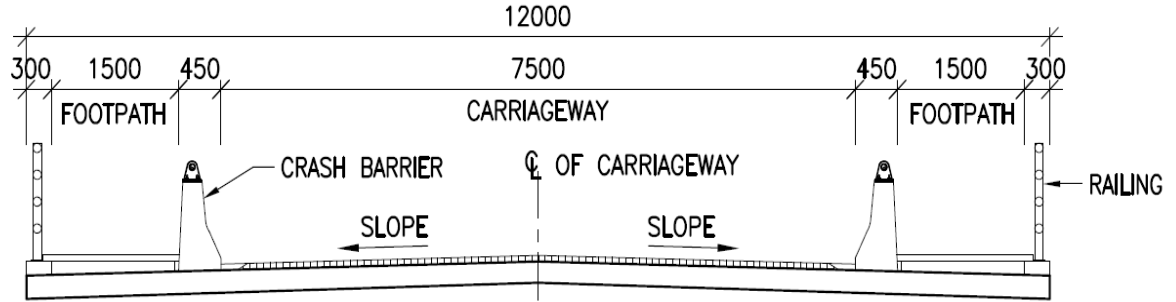
**6. Roadside Drainage : - Not applicable**

**7. Design of Structures**

(i) General

All bridges, culverts and structures shall be designed and constructed in accordance with relevant manual and relevant circulars issued by Ministry of Road Transport & highways as per applicability.

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



**Carriageway and footpath at deck level**

(As per MoRTH circular dated 21st October 2009)

All the new bridges shall be provided with footpaths as per the cross-section above

All bridges shall be high-level bridges.

All the new bridges shall be designed to carry utility services (OFC/ telephone etc.) and/ or to cater for any special requirement of the client

Cross-section of the new bridges at deck level: Refer GAD of bridges

Culverts: - Not applicable

(i) Bridges

(a) Existing bridges to be re- constructed: Not Applicable

(ii) The existing bridges at the following locations shall be reconstructed as new structures:  
Nil

(iii) The following narrow bridges shall be widened: Nil

(b) Additional new bridges

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

Minor Bridges: 01 Nos.

S. No.	Location (km)	Proposed Span Arrangement (No x span) (m)	Proposed Structure Type	Proposed Total Width (m)	Remarks
1	393+985	1x50m	Steel-Composite I-Girder	12.0m	Cross sectional features as per GAD in drawing folder. Deck width of Bridges shall be 12.0m as per MoRTH circular dated 21st October 2009 instead of 18m as specified in

S. No.	Location (km)	Proposed Span Arrangement (No x span) (m)	Proposed Structure Type	Proposed Total Width (m)	Remarks
					the Manual.

Major Bridges: - Nil

S. No.	Location (km)	Proposed Span Arrangement (No x span) (m)	Proposed Structure Type	Proposed Total Width (m)	Remarks
Nil					

(c) The railing of existing bridges shall be replaced by crash barrier at the following locations (Refer to the provision of relevant Manual): Not Applicable

(d) Repairs/ replacements of railing/parapets of the existing bridges shall be undertaken as follows (Refer to the provision of relevant Manual): Not Applicable

(e) Drainage system of bridge decks: An effective drainage system for bridge decks shall be provided as specified in the provision of relevant Manual

(f) Structures in marine environment Not Applicable

(ii) Rail Road-bridges: Not Applicable.

(iii) Grade separated structures: Not applicable

(iv) Repairs and strengthening of bridges and structures: Not Applicable

(v) List of Major Bridges and Structures: Not Applicable

The following is the list of the Structures:

S. No.	Location
NA	

## 8. Traffic Control Devices and Road Safety Works

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

a). Traffic Signs: Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway and shall be provided conforming to IRC:67 and section 800 of MoRT&H specification.

b). Pavement Marking: Pavement markings shall cover road marking for the entire Project Highway and shall be provided conforming to IRC 35-2015.

## **9. Roadside Furniture**

i. Roadside furniture shall be provided in accordance with the provision of relevant Manual.

ii. Overhead traffic signs: Overhead traffic signs shall be provided as per manual.

iii. Road Boundary Stone: For the entire Project Highway as per IRC:25

iv. Delineators: Delineators for the entire Project Highway at the locations as per Manual

## **10. Compulsory Afforestation**

The number of trees which are to be planted by the Contractor as compulsory afforestation shall be as per Forest conservation Act.

## **11. Hazardous Locations**

The safety barriers shall also be provided in accordance with the provision of relevant Manual.

**12. Special Requirement for Hill Roads:** Contractor shall follow Shall be followed in accordance with hill road manual.

## **13. Change of Scope**

### **a. Applicable for Hill Side Slope Protection Work**

The length, slope angle and height of slope protection work, drainage system, concrete shotcrete, concrete cladding, breast wall and other items specified herein above shall be treated as tentative requirements. The actual quantities as required on the basis of detailed investigations shall be determined by the Contractor in consultation with Authority and its Engineer and in accordance with the Specifications and Standards. Any variations in quantity in terms of Sqm upto 5 % (increase or decrease) for each location mentioned in this Schedule -

B shall not constitute a Change of Scope, save and except any variations in the quantities arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13 of the EPC Contract Agreement.

**b. Applicable for Retaining Structures**

Length and height specified in Schedule B is minimum requirement and increase in length and height as per detailed design / investigation and site requirement shall not be treated as COS.

Based on peer review outcome if Authority decided to change type of structures to viaduct the proposed retaining structures shall be descoped from the contract based on Schedule H and as per Article 13 of EPC Agreement.

In case of changes in types of structures to viaduct as per peer review report, Authority may or may not at his discretion decide to get the work done under this contract as COS under Article 13 of EPC Agreement or may carry out work through competitive bidding or any other method of procurement.

**14. Shifting of Utilities**

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 Contractor. The details of utilities are as follows:

The shifting of utilities, to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department, and felling of tress is part of the scope of work of the Concessionaire. The cost of the same shall be borne by the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the project before submission of their bid. Copy of utility relocation plan is enclosed. The specifications of concerned Utility Owning Department shall be applicable and followed. The details of utilities are as follows:

Sr. No	Type of Utility	Unit	Quantity	Location/stretch (LHS/RHS)
A	Electrical Utilities		As per Annex-I Schedule-A	
A1	Electrical Poles	Nos.		
A2	Electrical cables	meters		
A3	Transformers	Nos.		
B	Water/Sewage pipeline			

Sr. No	Type of Utility	Unit	Quantity	Location/stretch (LHS/RHS)
B1	Sewage	meters		
B2	Water supply	meters		
C	Felling of Tress	Nos.		

Note I:-

A. The type/spacing/size/specifications of poles/towers/ lines/cables to be used in shifting work shall be as per the guidelines of Utility Owning Department and it is to be agreed solely between the Concessionaire and the Utility Owning Department. No change of scope shall be admissible and no cost shall be paid for using different type/spacing/ size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of Utility Owning Department and/or construction of project highway. The Concessionaire shall carry out joint inspection with Utility Owning Department and get the estimates from Utility Owning Department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Concessionaire to Utility Owning Department whenever asked by the Concessionaire. The decision/ approval of Utility owning Department shall be binding on the Concessionaire.

B. The supervision Charges at the rates/ charges applicable of the Utility Owning Department shall be paid directly by the Authority to the Utility owning Department as and when Concessionaire furnishes demand of Utility Owning Department along with a copy of estimated cost given by the latter.

C. The dismantled material /scrap of existing Utility to be shifted/ dismantled shall belong to the Concessionaire who would be free to dispose-off the dismantled material as deemed fit by them unless the Concessionaire is required to deposit the dismantled material to Utility Owning Department as per the norms and practice and, in that case the amount of credit for dismantled material may be availed by the Concessionaire as per the estimated agreed between them.

D. The utilities shall be handed over after shifting work is completed to Utility Owning Department to their entire satisfaction. The maintenance ability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

Schedule-(B-1)

Sr. No.	Details of Utilities	Chainage	Quantity
A. Electrical Utilities			
	11KV High Tension/Low (HT/LT) Tension lines	386+110	1 no. of crossing
	Extra High Tension (EHT) lines	386+190	1 no. of crossing
	11KV Electrical pole & Light poles along the existing road	386+110	2 nos. of poles
B. Water Pipe Lines			
Sr. No.	Details of Utilities	Chainage	Quantity
NIL			