Schedules

Annex - I

(Schedule-A)

SCHEDULE – A FOR MITIGATION MEASURES FOR LAND SLIDES, SINKING ZONES & BRIDGE.

SITE

1. Site

i. The Site of 05 Landslide Zone, 05 Nos Sinking Zone and 1 No. Minor Bridge as mentioned below lies on NH-07 in the state of Uttarakhand;

ii. Two-Lane Bridge at Gulabkoti Village Km. 461+680 shall be constructed in the section of NH-07 in the State of Uttarakhand.

iii. The site is located along the existing NH-07 between 450+000 to 468+000. The road is under section the slope & are unstable sinking at some places has been observed. Photograph of such location are as under:

(i) Land Slide Zones

CH-452+190 – 452+340, 150m (PAKHI)

CH-453+030 – 453+310, 280m (PAKHI)

CH-453+490 – 453+610, 120m (PAKHI)

CH-454+890 – 455+020, 130m (TANGNIMALLA)

CH-455+770 – 455+870, 100m (TANGNIMALLA)

(ii) Sinking zones

CH-451+660 – 451+850, 190m (PAKHI)

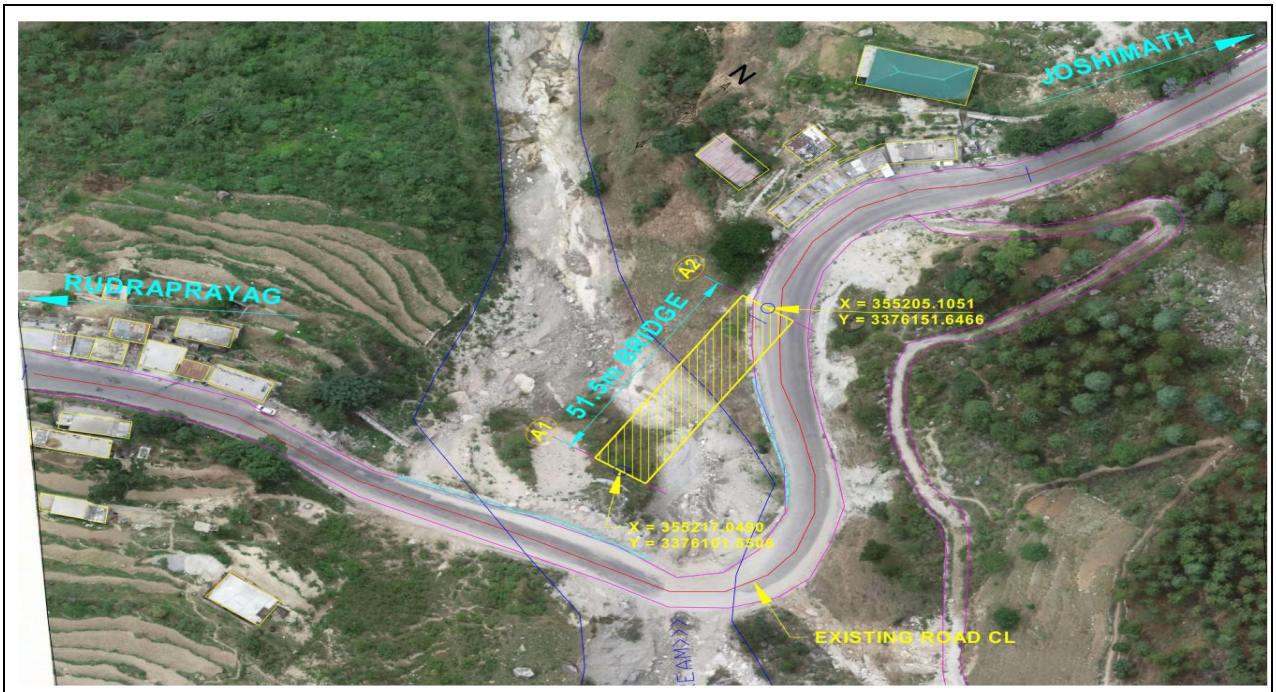
CH-451+850 – 451+940, 90m (PAKHI)

CH-451+660 – 452+170, 510m (PAKHI)

CH-460+790 – 460+910, 120m (GULABKOTI)

CH-460+790 – 460+910, 120m (GULABKOTI)

(iii) Bridge



CH-461+680, Length-51.5m (GULABKOTI)

 CH-461+680, Length-51.5m (GULABKOTI)	 CH-461+680, Length-51.5m (GULABKOTI)

2. Land

The Site of the Project Highway comprises the land (sum total of land already in possession and land to be possessed) as described below:

Sl. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
Right of Way is detailed in Annexure II of Schedule A				

3. Carriageway

The sites are located along NH-07 passing through the hilly terrain between Kameda village and Gulabkoti village. The existing highway is 2 lane or of lesser width at some locations.

4. Major Bridges

The Site includes the following Major Bridges:

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

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

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

Sl. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
Nil						

6. Grade separators

The Site includes the following grade separators:

Sl. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)
		Foundation	Superstructure		
Nil					

7. Minor bridges

The Site includes the following minor bridges:

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

8. Railway level crossings

The Site includes the following railway level crossings:

Sl. No.	Location (km)	Remarks
Nil		

9. Underpasses (Vehicular, Non-vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

Sl. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)

1	Nil

11. Bus bays

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

Sl. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
Nil				

12.Truck Lay byes

The details of truck lay byes are as follows:

Sl. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
Nil				

13. Road side drains

The details of the roadside drains are as follows:

Sl. No.	Location		Type	
	From km	to km	Masonry/cc (Pucca)	Earthen (Kutcha)
Nil				

14. Major junctions

The details of major junctions are as follows:

Sl. No.	Location		At Grade	Grade Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others
Nil								

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Location	Side	Type	
	Chainage		T -junction	Cross road

Sl. No.	Location	Side	Type	
	Chainage		T -junction	Cross road
Nil				

16. Bypasses

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

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

17.Other Structures

Sl. No	Existing Chainage (Km)	Type of Structure	Height (m)	Remarks
Nil				

18.Utilities

(i) Electrical Utilities

The site includes the following electrical utilities:

(a) High Tension/Low tension (HT/LT) lines

Sl. No	Existing Ch.		Length (in m)		No. of Crossings		Transformer	
	From	To	11 KV	LT LINE	11 KV	LT	No.	Capacity KV
Nil								

(b) Extra High Tension (EHT) lines :

HT lines Details		
Sl. No	Design Ch.	No. of Crossings
1	451+670	1
2	451+850	1
3	451+900	1

(c) Electric pole & Light poles along the existing Road:

Sl. No	Existing Ch.		Nos of Electric poles		No. of Light poles
	From	To	11 KV	LT LINE	
1	Km. 452+190	Km. 452+340	2	0	Nil
2	Km. 451+660	Km. 452+170	10	0	Nil

(ii) Public Health Utilities (Water/Sewage Pipelines)

The Site includes the following Public Health Utilities: -

Sl. No.	Chainage (Km)		Length (in Km)				Crossings			
			Water Supply Line		Sewage Line		Water Supply Line		Sewage Line	
			With Pumping	With gravity flow	With Pumping	With gravity flow	With Pumping	With gravity flow	With Pumping	With gravity flow
	Nil									

(iii) Any Other Lines:

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

The dates on which the Authority shall provide Right of Way of Construction Zone to the Contractor on different stretches of the Site are stated below:

For Land Slide Zones

Sl. No	From Km	To Km	Length (km)	Width (m)	Date of providing Right of Way*
(1)	(2)		(3)	(4)	(5)
1.	Km. 452+190	Km. 452+340	150	18.0	90% ROW will be provided on Appointed Date and 10% within 180 days.
2.	Km. 453+030	Km. 453+310	280		
3.	Km. 453+490	Km. 453+610	120		
4.	Km. 454+890	Km. 455+020	130		
5.	Km. 455+770	Km. 455+870	100		

For Sinking Zones

Sl. No	From Km	To Km	Length (km)	Width (m)	Date of providing Right of Way*
(1)	(2)		(3)	(4)	(5)
1.	Km. 451+660	Km. 451+850	190	18.0	90% ROW will be provided on Appointed Date and 10% within 180days.
2.	Km. 451+850	Km. 451+940	90		
3.	Km. 451+940	Km. 452+100	160		
4.	Km. 452+100	Km. 452+170	70		
5.	Km. 460+790	Km. 460+910	120		

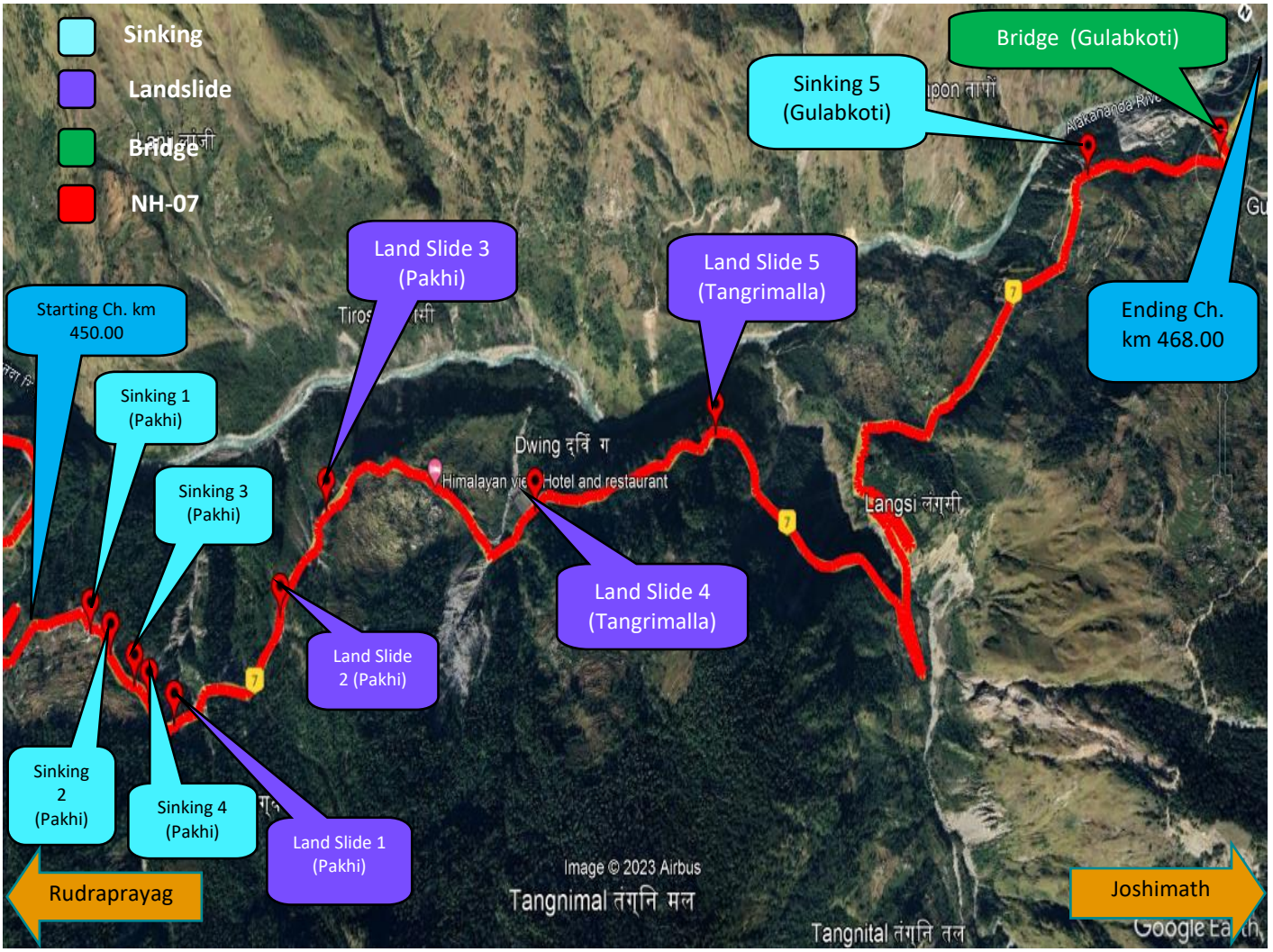
Annex - III

(Schedule-A)

Alignment Plans

Alignment plan is not required for the work of Land Slides & Sinking Zone, landslides & sinking zones, representative site photographs attached.

There is no existing bridge at Ch- 461+680 for which a new bridge has been proposed.



Annex – IV

(Schedule-A)

ENVIRONMENT CLEARANCES

The project Highway does not require Environmental Clearance as per MoEF guidelines.

MINISTRY OF ENVIRONMENT AND FORESTS
NOTIFICATION

New Delhi, the 22nd August, 2013

S.O. 2559 (E)- Whereas by notification of the Government of India in the Ministry of Environment and Forests vide number S.O 1533(E), dated the 14th September, 2006 issued under sub-section (1) and clause (v) of sub-section (2) of section (3) of the Environment (Protection) Act, 1986 read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government directed that on and from the date of its publication, the required construction of new projects or activities or the expansion or modernization of existing projects or activities listed in the Schedule to the said notification entailing the capacity addition with change in process or technology and or product mix shall be undertaken in any part of India only after prior environmental clearance from the Central Government or as the case may be, by the State level Environment Impact Assessment Authority, duly constituted by the Central Government under sub-section (3) of section 3 of the said Act, in accordance with the procedure specified therein;

And whereas the Government of India in the Ministry of Environment and Forests had constituted a High-Level Committee under the Chairmanship of Member (Environment and Forests and Science and Technology). Planning Commission, vide OM No 21-270/2008-1A II dated the 11th December, 2012 to review the provisions of Environmental Impact Assessment Notification, 2006 relating to granting Environmental Clearances for Roads, Buildings and Special Economic Zone projects and provisions under the OM dated the 7th February, 2012 issued by the Ministry of Environment and Forests regarding guidelines for High Rise Buildings,

And whereas one of the terms of reference (ToR) of the Committee was to review the requirement of Environmental Clearance for highway expansion projects upto the right of way of 60 meters and length of 200 kms under Environmental Impact Assessment notification;

And whereas the Committee has submitted Its report to the Ministry and on this ToR, the Committee has recommended exempting highway expansion projects from the requirement of scoping and that Environmental Impact Assessment or Environment Management Plan for highway expansion projects may be prepared on the basis of model ToRs to be posted on Ministry's website and in respect of requirement of environmental clearance, the Committee has recommended that expansion of National Highway projects up to 100 kms involving additional right of way or land acquisition upto 40 mts on existing alignments and 60 mts on re-alignments or by-passes may be exempted from the preview of the notification;

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 05 Land Slide Zones and 05 Sinking Zones along NH-07 in the State of Uttarakhand.

1. Construction for Mitigation Measures

(i) The Project Highway refers to Construction for mitigation measures for 05 Land Slide Zones, 05 Sinking Zones and 01 bridge along NH-07 in the State of Uttarakhand.

(ii) 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.

Sl. No.	Chainage Start	Chainage End	Length (m)
Landslide Zones			
1	Km. 452+190	Km. 452+340	150
2	Km. 453+030	Km. 453+310	280
3	Km. 453+490	Km. 453+610	120
4	Km. 454+890	Km. 455+020	130
5	Km. 455+770	Km. 455+870	100
Sinking Zones			
1	Km. 451+660	Km. 451+850	190
2	Km. 451+850	Km. 451+940	90
3	Km. 451+940	Km. 452+100	160
4	Km. 452+100	Km. 452+170	70
5	Km. 460+790	Km. 460+910	120

Improvement of the existing road geometrics

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

Right of Way

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

Type of shoulders

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

Lateral and vertical clearances at underpasses

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

Lateral and vertical clearances at overpasses

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

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.

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

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:

Land Slide Zones				
Sl No	**Change Start**	**Chainage End**	**Length (m)**	**Mitigation Measure**
1	Km. 452+190	Km. 452+340	150	As per the Desgn & Drawing approved by the Authority. The minimum mitigation measure to be carried out is shown in the drawing.
2	Km. 453+030	Km. 453+310	280	
3	Km. 453+490	Km. 453+610	120	
4	Km. 454+890	Km. 455+020	130	
5	Km. 455+770	Km. 455+870	100	
	Total Length		**780**	

Note: - The length of landslide is indicative in nature -------

Sinking Zones:

Sinking Zones				
Sl No	**Change**	**Chainage**	**Length**	**Mitigation Measure**

	Start	End	(m)	
1	Km. 451+660	Km. 451+850	190	As per the Desgn & Drawing approved by the Authority. The minimum mitigation measure to be carried out is shown in the drawing.
2	Km. 451+850	Km. 451+940	90	
3	Km. 451+940	Km. 452+100	160	
4	Km. 452+100	Km. 452+170	70	
5	Km. 460+790	Km. 460+910	120	
	Total Length		**630**	

Note:- The length of Sinking zone is indicative in nature…….

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

The length of landslide & sinking zones are specified herein above shall be treated as minimum. The actual lengths 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 constitute a Change of Scope only when it meets the provisions of Article-13 of EPC documents. Change of Scope shall not be considered when the change in length of mitigation measures is within 10% of total length and the value of the Contract shall remain unchanged.

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 of Schedule-A	
A1	Electrical Poles	Nos.		
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 Gulabkoti Village Km. 461+680 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 lunching 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
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

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
	Total	**340**

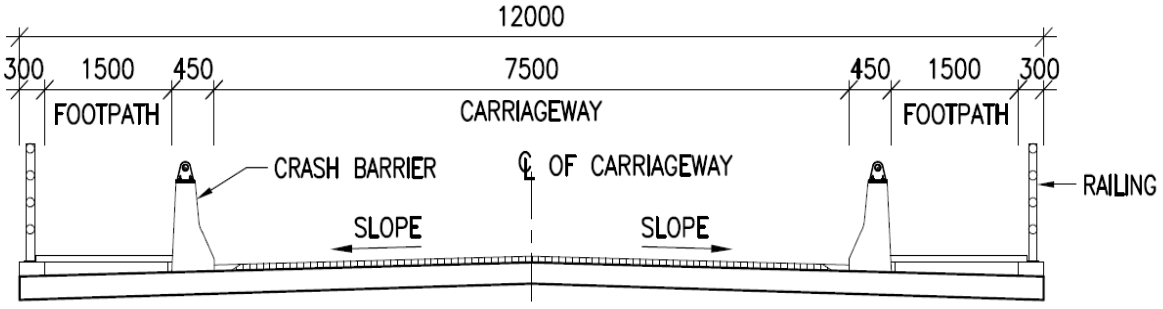
6. Roadside Drainage : -Not applicable

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

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

(ii) 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.

Sl. No.	Location (km)	Proposed Span Arrangement (No x span) (m)	Proposed Structure Type	Proposed Total Width (m)	Remarks
1	461+680	1x51.5m	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 the Manual.

Major Bridges: - Nil

Sl. 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

(i) Rail Road-bridges: Not Applicable.

(ii) Grade separated structures : Not applicable

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

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

The following is the list of the Structures:

Sl. 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

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

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

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

iii. 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 : Not Required

13. Change of Scope

The length of landslide & sinking zones are specified herein above shall be treated as minimum. The actual lengths 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 constitute a Change of Scope only when it meets the provisions of Article-13 of EPC documents. Change of Scope shall not be considered when the change in length of mitigation measures is within 10% of total length and the value of the Contract shall remain unchanged.

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			
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 tension (HT/LT) lines	452+190	1 no. of crossing
	Extra High Tension (EHT) lines	451+670	1 no. of crossing
	Extra High Tension (EHT) lines	451+850	1 no. of crossing
	Extra High Tension (EHT) lines	451+900	1 no. of crossing
	11KV Electrical pole & Light poles along the existing road	451+660	2 nos. of poles
	11KV Electrical pole & Light poles along the existing road	452+190	10 nos. of poles
B. Water Pipe Lines			
Sr. No.	Details of Utilities	Chainage	Quantity
NIL			

SCHEDULE - C

(See Clause 2.1)

PROJECT FACILITIES

1. Project Facilities

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

(a) Toll plaza[s]; (Not Applicable)

(b) Roadside furniture; (Not Applicable)

(c) Pedestrian facilities; (Not Applicable)

(d) Tree plantation / Afforestation (Applicable)

(e) Truck lay-byes; (Not Applicable)

(f) Bus-bays and bus shelters; (Not Applicable)

(g) rest areas; and (Not Applicable)

(h) Others to be specified:

(i) Street lighting & high mast lighting; (Not Applicable)

(ii) Emergency Medical Services/ Medical Aid Post; (Not Applicable)

(iii) Highway Patrol Unit/ Traffic Aid Post; (Not Applicable)

(iv) Crane Services; (Not Applicable)

(v) Communication System; (Not Applicable)

(vi) Advanced Traffic Management System (ATMS); (Not Applicable)

(vii) Rain Water Harvesting; (Not Applicable)

2. Description of Project Facilities

Each of the Project Facilities are briefly described below:

(a) Toll Plaza – Not Applicable

(b) Road side furniture

(i) Traffic Signs and Pavement Markings:

Traffic signs and pavement markings shall include, overhead signs, curve mounted signs and road marking along the project highway. The locations for these provisions shall be finalized as per Manual, IRC-67, IRC 35-2015 and other IRC codes if applicable.

(ii) Boundary Stones provide in entire length as per Manual and IRC:25. - NA

(iii) Kilometer Stones stone for entire project stretch as per Manual and IRC:8 - NA

(iv) Overhead signs: To be provided at all locations as per Manual and IRC 67 - NA

(v) Delineators and Studs: Delineators for the entire Project Highway at the locations as per Manual.

(c) Pedestrian Facilities: Not Applicable

(d) Tree Plantation: - To offset the loss of trees in the sinking and landslide zones per IRC SP-21

- Tree Plantation of Landslide & Sinking Zone shall be done on, but not limited to the following locations, should be as per IRC relevant codes and provisions.
- Road sides with maintenance of Ten years under O&M.

Landscaping and road side plantation shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule B and D. Contractor Shall be responsible for implementation of Environment management Plan (EMP) on the project. The cost of EMP shall be Bourne by Contractor

Seeding, mulching & shrub plantation: For stabilization of soil as per the soil type & condition, in accordance with the expert committee opinion.

(f) Truck lay-byes: - Not Applicable

(g) Bus-bays and bus shelters: Not Applicable

(h) Rest areas–Not Applicable

(i) Others – Not Applicable

(i) Street Lighting & High Mast Lighting: - Not Applicable

(ii) Emergency Medical Services/Medical Aid Post: - Not Applicable

(iii) Highway Patrol Unit (s)/Traffic Aid Post: - Not Applicable

(iv) Crane Services: - Not Applicable

(v) Communication System: - Not Applicable

(vi) Advanced Traffic Management System (ATMS):-Not Applicable

(vii) Rain Water Harvesting System: - Not Applicable

SCHEDULE – D

See Clause 2.1

SPECIFICATIONSANDSTANDARDS

1. Construction of Mitigation Measures

The Contractor shall comply with the Specification sand Standards set for the Annex-I of this Schedule-D.

Annex – I

(Schedule-D)

1. SPECIFICATIONS AND STANDARDS FOR CONSTRUCTION

1 .1 Specification and Standards

GENERAL:

"Specifications for Road and Bridge Works (Latest Revision) Issued By Ministry Of Road Transport & Highways" shall be adopted for works covered in this specifications. NH Specification as per IRC-SP-73-2018 and IRC-SP- 48-1998 and MoRTH circulars shall be used as per their applicability.

The standards in following priorities shall be used for design and execution & construction in order of this preference.

(i) MoRTH Specification

(ii) IRC Codes

(iii) IS & BIS codes

(iv) MoRTH guidelines

(v) Internationally applicable codes (US & European), FHWA/ ETA etc.

(vi) Highway research Bulletin

3.2 Design Standards

i) Design standard and codes for Landslides Zones

1. IRC- HRB- Special Report-23 -State of the Art: Design and Construction of Rock fall Mitigation systems, Chapter-3.

2. IRC: SP: 42 – 2014, Guidelines of Road Drainage.

3. IRC SP:116-2018 – Guidelines for Design and Installation of Gabion Structures.

4. BS 8006-1:2010+A1:2016–Code of Practice for Strengthened /Reinforced Soil& other fills.

5. BS 8081:2015+A2:2018 – Code of Practice for Grouted Anchors.

6. FHWA-NHI-14-007 – Soil Nail Walls Reference Manual (FHWA GEC 007), 2015.

7. FHWA-IF-99-015 – Ground Anchors and Anchored System (GEC No. 4), 1999.

8. Geological, geotechnical& Geophysical investigations as per IRC:78, Specifications for drilling, coring testing etc issued by ISI. BIS, MoRT&H and other relevant codes are applicable.

9. Other Indian / International Standards applicable for sound and Safe Design.

ii) Design standard and codes for Sinking Zone

1. IRC SP: 116-2018 – Guidelines for Design and Installation of Gabion Structures.

2. IS 16014:2018, Mechanically Woven, Double-Twisted, Hexagonal Wire Mesh Gabions, Revet Mattresses, Rock Fall Netting and Other Products for Civil Engineering Purposes (Galvanized Steel Wire or Galvanized Steel Wire with Polymer Coating) — Specification.

3. IRC HRB Special Report 23 (2014), —State of the Art: Design and Construction of Rockfall

Mitigation Systems‖, IRC Highway Research Board, New Delhi.

4. IRC-6 - 2017, Section-II, ―Standard Specification and Code of Practice for Road Bridges – Section II: Load and Stresses‖, Indian Road Congress.

5. IS 14268: 2017 - Uncoated Stress Relieved Low Relaxation Seven-Wire (Ply) Strand for Prestressed Concrete― Specification.

6. IRC: SP: 42 – 2014, Guidelines of Road Drainage.

7. IS: 1893-1 (2016), ―Criteria for Earthquake Resistant Design of Structures‖, Bureau of Indian Standards, and New Delhi.

8. Ministry of Road Transport and Highways (MORTH), ―Specifications for Road and Bridges Works – Fifth Revision.

9. BS 8006-1:2010+A1:2016–Code of Practice for Strengthened /Reinforced Soil and other fills.

10. BS 8081:2015+A2:2018 –Code of Practice for Ground Anchors.

11. FHWA-NHI-14-007 – Soil Nail Walls Reference Manual (FHWA GEC 007), 2015.

12. FHWA-NHI-10-24 - Design and Construction of mechanically stabilized earth walls and reinforced soil slopes-Volume-I, 2009.

13. FHWA-IF-99-015 – Ground Anchors and Anchored System (GEC No. 4), 1999.

14. Geo Report No. 175, Soil Nail Head Review by Geotechnical Engineering Office, Civil Engineering and Development Department, Government of the Hongkong.

15. Geological, geophysical and geotechnical investigation shall be carried out precisely for a safe and sound design as per standards of IRC, BIS, MoRTH and other relevant codes are applicable.

16. MORT&H 5th Revision.

1.3. MATERIALS

I. All materials should conform to the approved design by the Authority. Contractor has to take prior approval of the materials from the Authority at least 2 months before the intended date of purchases satisfying all parameters of the designs. Lot wise testing shall be done by the Independent laboratories for checking its conformity. Sample size and frequency of testing shall be got approved, while taking the approval of materials.

II. The materials should conform to the relevant specifications of Indian Standards issued by BIS and other international codes of US, Europe or British wherever applicable

1.4. Execution & Finishes

Similar to items or analogues to items covered in MORTH Specifications and other international specifications.

2. Deviation from the Specifications and Standards

I. The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively

II. Notwithstanding anything to the contrary contained in Paragraph I above, Manual, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below

Sl. No.	Clause No.	Provision as per Specification	Modified Provision
			Modified Provision shall be applicable only, when approval of the Authority is obtained duly vetted by the THDC (Tehri Hydro Development Corporation Limited) or one of the IITs

SCHEDULE – D (For Minor Bridge)

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for construction of the Project Highway.

2. Design Standards

The Project Highway including Project Facilities shall conform to design requirements set out in the following documents:

i. Manual of Specifications and Standards for Two Laning of Highways with Paved shoulder IRC: SP:73-2018 and IRC: SP:48-1998, referred to herein as the Manual for 2-Lane project road.

ii. MORTH "Specifications for Road and Bridge Works" (fifth revision) published by IRC New Delhi.

iii. IRC and special publication listed in Annex-I

iv. All the works shall be carried out to the specification laid down in Standards and Specifications of MORTH "Specifications for Road and Bridge Works" (fifth revision) published by IRC New Delhi.

Annex – I

(Schedule-D for Minor Bridge)

SPECIFICATIONS AND STANDARDS FOR CONSTRUCTION

1. Specifications and Standards

All Materials, works and construction operations shall conform to the MoRTH Specifications for Road and Bridge Works, 2013 (Fifth Revision) or latest published MoRTH specification in vogue at the time of award of work. Manual of Specifications and Standards for Two-Laning of Highways with paved shoulder IRC:SP:73-2018 and IRC:SP:48-1998 and other relevant codes mentioned therein, referred to as the "Manual" for Road and Bridge Works shall be applicable for survey, investigations, design. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority. In addition to aforesaid specifications and standards. In addition to aforesaid specifications and standards, following standards shall also form part of this Schedule.

i. MORTH circular/ guidelines or the recommendation of AE.

The designs shall be based on the latest versions of IRC codes along with amendments, Ministry's Specifications and circulars in vogue at the time of award of work. In case details are not available in IRC Codes and Ministry's Specifications/circulars reference shall be made to other codes such as BIS, AASHTO, EURO, DIN, BS, model code, etc. with prior approval of the Authority. Treatment of joints of foundation rock shall be carried out before laying the foundation. The abutments shall be properly protected as per IRC 78 and other guidelines of IRC and MoRTH

2. Deviation from the Specifications and Standards

(i) The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively

(ii) Notwithstanding anything to the contrary contained in Paragraph 1 above, Manual, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below

Sl.no	Clause	Provision as per Manual (IRC: SP:73- 2018 and IRC: SP:48-1998)	Modified Provision
1	7.3 of IRC-SP: 73-2018	Deck width of Bridges/ Typical Cross Sections Fig 7.6 of IRC-SP: 73-2018	Deck width of Bridges shall be 12.0m as per MoRTH circular dated 21st October 2009 instead of 18m as specified the Manual. For Carriageway and footpath at deck level Para 7 (i) of schedule-B shall be followed. For Cross-section of the new bridges at deck level, refer GAD of bridges.

Annex - I

(Schedule-E)

Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	**Acceptable**					
Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like Scale, Tape, odometer etc.		2-7 days	IRC:82-2015
	Bleeding	Nil	< 1 % of area	Daily			3-7 days	MORT&H Specification 3004.4
	Ravelling/ Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRCSP 81

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily			7- 15 days	IRC:82-2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer: ASTM E950 (98) :2004 – Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014

<table>
<tr><th rowspan="2">Asset Type</th><th rowspan="2">Performance Parameter</th><th colspan="2">Level of Service (LOS)</th><th>Frequency of Inspection</th><th>Tools/Equipment</th><th>Standards and References for Inspection and Data Analysis</th><th>Time limit for Rectification/Repair</th><th>Maintenance Specifications</th></tr>
<tr><th>Desirable</th><th>Acceptable</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td rowspan="7">Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</td><td>Roughness BI</td><td>2200mm/km</td><td>2400mm/km</td><td>Bi-Annually</td><td>Class I Profilometer</td><td>ASTM E950 (98) :2004 and ASTM E1656 -94: 2000</td><td>180 days</td><td>IRC: SP:83-2008</td></tr>
<tr><td rowspan="6">Skid</td><td colspan="2">Skid Resistance no. at different speed of vehicles</td><td rowspan="6">Bi-Annually</td><td rowspan="6">SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td rowspan="6">IRC: SP:83-2008</td><td rowspan="6">180 days</td><td rowspan="6">IRC: SP:83-2008</td></tr>
<tr><td>Minimum SN</td><td>Traffic Speed (Km/h)</td></tr>
<tr><td>36</td><td>50</td></tr>
<tr><td>33</td><td>65</td></tr>
<tr><td>32</td><td>80</td></tr>
<tr><td>31</td><td>95</td></tr>
<tr><td>31</td><td>110</td></tr>
<tr><td rowspan="3">Embankment/ Slope</td><td>Edge drop at shoulders</td><td>Nil</td><td>40mm</td><td>Daily</td><td rowspan="3">Length Measurement Unit like Scale, Tape, odometer etc.</td><td rowspan="3">IRC</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Slope of camber/cross fall</td><td>Nil</td><td><2% variation in prescribed slope of camber /cross fall</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Embankment Slopes</td><td>Nil</td><td><15 % variation in prescribe side slope</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
</table>

Asset Type	**Performance Parameter**	**Level of Service (LOS)**		**Frequency of Inspection**	**Tools/Equipment**	**Standards and References for Inspection and Data Analysis**	**Time limit for Rectification/Repair**	**Maintenance Specifications**
		Desirable	**Acceptable**					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

In addition to the above performance criterion, the contractor shall strictly maintain the rigid pavements as per requirements in the following table
Table -2: **Maintenance Criteria for Rigid Pavements:**

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
CRACKING						
1	**Single Discrete Cracks Not intersecting with any joint**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L > lm. Within 7days
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m.	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
	more joints		2	w = 0.2 - 0.5 mm. discernible from slow vehicle	Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m^2	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts.
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		

Sr. No.	**Type of Distress**	**Measured Parameter**	**Degree of Severity**	**Assessment Rating**	**Repair Action**	
					For the case d < D/2	**For the case d > D/2**
	only)					Within 15days
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m^2 and deformation		
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			4	r = 25 - 50 %		
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r < **2 %**	Local repair of areas damaged and liable to be damaged.	
			2	r = 2 - 10 %		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					Within 7days	
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm i.e.10 mm more than the depth of the hole.	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	

Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length	0	Difficult to discern.	**Short Term** No action.	**Long Term** Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or stepping) in Cracks or Joints**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.
			1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate.

			3	f = 6 - 12 mm	Diamond Grinding	Within 30days
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	**Blowup or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term** No Action	**Long Term**
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic within 7 days	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level if L < 20 m.	
			5	h > 100 mm	Within 30 days	
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	**Short Term** No action.	**Long Term**
			1	h = 5 - 15 mm	Follow up.	scrabble
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		

			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**	h = vertical displacement from normal profile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term**	**Long Term**
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 dayss	
			4	f = 50 - 75 mm		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	**Ponding**	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in	Clean drains etc within 7 days, Follow	Action required to stop

				drains, but water flowing	up	water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

Table -3: Maintenance Criteria for Safety Related Items and Other Furniture Items:

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout. **Design Speed, kmph** / **Desirable Minimum Sight Distance (m)** / **Safe Stopping Sight Distance (m)** 100 / 360 / 180 80 / 260 / 130	Monthly	Manual Measurements with Odometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitabletraffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="3">Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m^2/lux
Bituminous Road - 100mcd/m^2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>
<table>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m^2/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
</table>
<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u>
Initial 7 days Retro reflectivity: 100 mcd/m^2/lux
Minimum Threshold Level: 50</td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		mcd/m^2/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35- 2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	hang of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of	RC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
						Gantry/Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012

Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measurement**	**Testing Method**	**Recommended Remedial measures**	**Time limit for Rectification**	**Specifications and Standards**
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC: SP 84-2014

Table 4: Maintenance Criteria for Structures and Culverts:

Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measurement**	**Testing Method**	**Recommended Remedial measures**	**Time limit for Rectification**	**Specifications and Standards**
Pipe/box/slab culverts	Free waterway/unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm Delamination of concrete not more than 0.25 sq.m. Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					

	Delamination	Not more than 0.50 sq.m			repairs to affected concrete portion with epoxy mortar / concrete.		
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications

	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.

Bridge-substructure	Cracks/spalling of concrete/rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
	Settlement of foundation	Movement & deformation beyond permissible limit should be made good to the design standard	14 days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	7 days	IRC/IS/ MoRTH Specification
	Tilting of Abutment	Movement & deformation beyond permissible limit should be made good to the design standard	14 days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	7 days	IRC/IS/ MoRTH Specification

	Protection work around Abutment	Movement & deformation beyond permissible limit should be made good to the design standard	14 days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	7 days	IRC/IS/ MoRTH Specification
	Apron and keys	Movement & deformation beyond permissible limit should be made good to the design standard	14 days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	7 days	IRC/IS/ MoRTH Specification

Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apronor bank revetmentnot more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC: SP:13-2004.
Slope Protection (Landslide & Sinking)	Movement & deformation in landslide & sinking zones	Movement & deformation beyond permissible limit should be made good to the design standard	14 Days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	30 days after defect observation or 2 weeks before onsetof rainy season whichever is earlier.	Refer the Schedule B and Schedule D

	Any material or defect development in workmanship used in protection work	The material and workmanship specification should be in accordance with Schedule B and Schedule D	14 Days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	Refer the Schedule B and Schedule D
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 5: Maintenance Criteria for Hill Roads

In addition to above, for hill roads the following provisions for maintenance is also to done.

Hill Roads		
(i)	Damage to Retaining wall/ Breast wall	7 (Seven) days
(ii)	Landslides requiring clearance	12 (Twelve) hours
(iii)	Dynamic Rock Fall Barrier	12 (Twelve) hours
(iv)	Snow requiring clearance	24 (Twenty-Four) hours

Note: For all tables 1 to 5 above, latest BIS & IRC standards (even those not indicated herewith) along with MoRTH specifications shall be binding for all maintenance activities.

A. Flexible Pavement

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four) hours
(ii)	Removal of fallen trees from carriageway	(four) hours

		\
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g)	**[Toll Plaza]**	
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before ssuing the bidding document, with the approval of the competent authority.]

SCHEDULE - F

(See Clause 3.1.7(a))

APPLICABLE PERMITS

1. Applicable Permits

1.1 The Contractor shall obtain, as required under the ApplicableLaws, the following Applicable Permits:

(a) Permission of the State Government for extraction ofboulders from quarry;

(b) Permission of Village Panchayats and Pollution ControlBoard for installation of crushers;

(c) License for use of explosives;

(d) Permission of the State Government for drawing water from river/reservoir;

(e) License from inspector of factories or other competentAuthority for setting up batching plant;

(f) Clearance of Pollution Control Board for setting up batching plant;

(g) Clearance of Village Panchayats and Pollution ControlBoard for setting up asphalt plant;

(h) Permission of Village Panchayats and State Governmentfor borrow earth; and

(i) Any other permits or clearances required under Applicable Laws.

1.2 Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

SCHEDULE – G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1.1)

[Performance Security/Additional Performance Security]

To
National Highways and Infrastructure Development Corporation
Ltd.
New Delhi

WHEREAS:

A. [name and address of contractor] (hereinafter called the "Contractor") and [name and address of the authority], (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for the construction of the "**Construction for Mitigation Measures of 05 Nos. Landslides, 05 Nos. Sinking Zones and 1 no. Bridge from Ch. 450.00 to Ch. 468.00 (18 Km. length) on NH-07 on EPC mode in the State of Uttarakhand (Package-III)"** on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

B. The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs….. cr. (Rupees ……..….. crore) (the "Guarantee Amount").

C. We, …….. through our branch at ……. (the "Bank") have agreed to furnish this bank guarantee (hereinafter called the "Guarantee") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and

without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in NHIDCL, that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any disputebetween them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act asif the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner theliability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

12. This guarantee shall also be operable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension/ renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [MoRT&H/NHAI/NHIDCL/State PWD/BRO], details of which is as under:

Sr. No.	Particulars	Details
1	Name of Beneficiary	MD-NHIDCL
2	Beneficiary BankAccount No	90621010002610
3	Beneficiary Bank Branch Name and Address	Canara Bank (erstwhile Syndicate Bank), TransportBhawan, 1st Parliament Street, New Delhi-110001
4	Beneficiary Bank Branch IFSC	CNRB0019062
5	Email address	cb19062@canarabank.com

Signed and sealed this ……. day of ……., 20…… at …….

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – II
(Schedule - G)
(See Clause 7.5.3)

FORM FOR GUARANTEE FOR WITHDRAWAL OF RETENTION MONEY

National Highways & Infrastructure Development Corporation Limited
New Delhi

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with the National Highways and Infrastructure Development Corporation Ltd, 3rd Floor, PTI Building, 4, Parliament Street, New Delhi – 110001, (hereinafter called the "**Authority**") for the **Construction for Mitigation Measures of 05 Nos. Landslides, 05 Nos. Sinking Zones and 1 no. Bridge from Ch. 450.00 to Ch. 468.00 (18 Km. length) on NH-07 on EPC mode in the State of Uttarakhand (Package-III)** subject to and in accordance with the provisions of the Agreement.

(B) In accordance with Clause 7.5.3 of the Agreement, the Contractor may withdraw the retention money (hereinafter called the "**Retention Money**") after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.

(C) We, …….. through our branch at.....(the "**Bank**")
have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the amount of Rs. --------- cr. (Rs.----------crore) (the "**Guarantee Amount**").

NOW, THEREFORE, the Bank hereby unconditionally and irrevocably guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in NHIDCL, that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the

Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

12. This guarantee shall also be operable at our……. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension/ renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [MoRT&H/NHAI/NHIDCL/State PWD/BRO], details of which is as under:

Sr. No.	Particulars	Details
1	Name of Beneficiary	MD-NHIDCL
2	Beneficiary BankAccount No	90621010002610
3	Beneficiary Bank Branch Name and Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi-110001
4	Beneficiary Bank Branch IFSC	CNRB0019062
5	Email address	cb19062@canarabank.com

Signed and sealed this ……. day of …….., 20…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf ofthe Bank
by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – III
(Schedule - G)
(See Clause 19.2)

FORM FOR GUARANTEE FOR ADVANCE PAYMENT

Managing Director,

NHIDCL,

3rd Floor, PTI Building,
Parliament Street, New Delhi ,110001

WHEREAS:

(A) [name and address of contractor] (here in after called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the **Construction for Mitigation Measures of 05 Nos. Landslides, 05 Nos. Sinking Zones and 1 no. Bridge from Ch. 450.00 to Ch. 468.00 (18 Km. length) on NH-07 on EPC mode in the State of Uttarakhand (Package-III).** on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest free advance payment (herein after called "Advance Payment") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in three installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second/third} installment of the Advance Payment is Rs. ------ cr. (Rupees ------ crore) and the amount of this Guarantee is Rs. ------- cr. (Rupees ------ crore) (the" Guarantee Amount")$ .We, …….. through our branch at (the "**Bank"**) have agreed to furnish this bank guarantee (*hereinafter called the* **"Guarantee"**) for the Guarantee Amount.

(A) We, ……..through our branch at ……. (the "Bank") have agreed to furnish this bank guarantee (hereinafter called the "Guarantee") for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first

written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in NHIDCL, that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.
3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating

to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

11. This guarantee shall also be operable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension/ renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

12. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [MoRT&H/NHAI/NHIDCL/State PWD/BRO], details of which is as under:

Sr. No.	Particulars	Details
1	Name of Beneficiary	MD-NHIDCL
2	Beneficiary BankAccount No	90621010002610

3	Beneficiary Bank Branch Name and Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi-110001
4	Beneficiary Bank Branch IFSC	CNRB0019062
5	Email address	cb19062@canarabank.com

Signed and sealed this ……. day of …….., 20…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:(Signature)

(Name) (Designation) (Code Number) (Address) NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

(iii) Bank Guarantee has been sent to authority's bank for confirmation of BG through SFMS gateway as per the details below:-

SCHEDULE - H

(See Clauses10.1 (iv) and 19.3)

CONTRACT PRICE WEIGHTAGES

1. The Contract Price for this Agreement is Rs _____ Cr.

Item	Weightage in percentage to the Contract Price	Stage for Payment		Percentage weightage	Payment Procedure
1	2	3		4	5
Mitigation Measures of Landslide Zones	**41.451 %**	**A. LANDSLIDE ZONES**			
		Chainage Start	**Chainage End**		
		Km. 452+190	Km. 452+340	20.43%	Unit of measurement is liner length. Payment of each stage shall be made on completion of a stage in square metre not less than 10% of the total length.
		Km. 453+030	Km. 453+310	36.55%	
		Km. 453+490	Km. 453+610	18.81%	
		Km. 454+890	Km. 455+020	9.32%	
		Km. 455+770	Km. 455+870	14.89%	
Mitigation Measures of Sinking Zones	**55.439 %**	**B. SINKING ZONES**			
		Chainage Start	Chainage End		
		Km. 451+660	Km. 451+850	72.04 %	Unit of measurement is liner length. Payment of each stage shall be made on completion of a stage in square metre not less than 10% of the total length.
		Km. 451+850	Km. 451+940		
		Km. 451+940	Km. 452+100		
		Km. 452+100	Km. 452+170		
		Km. 460+790	Km. 460+910	27.96 %	
				100%	
Minor Bridge	**3.110 %**	**C. Minor Bridge**			
		New Minor Bridges (Length>6m and <60m)			

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
1	2	3	4	5
		(1) **Foundation + Sub - structure:** On completion of the foundation work including foundation for wing and return walls abutments including backfill etc., piers upto the abutments/ pier cap etc.	[18.85%]	**(i) Foundation+Sub-Structure:** Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation + sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% design height, approved by Authoirty, of foundation + sub-structure of each bridge approved by Authority. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified
		(2) **Super-structure:** On completion of the super-structure in all respects including wearing coats bearings, expansion joints, handrails, crash barriers, approach slab, road signs and markings tests on completion etc. complete in all respect.	[76.76%]	**(ii) Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified in excluding any payment made in pursuance to here in under. If precast/steel girders/ segments are used, on casting/fabrication of all such girders and segments for at least one span and on

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
1	2	3	4	5
				submission of indemnity bond by the contractor, 40% of the actual cost of such precast girders/segments determined based on SOR Prevalent on the base date within 30 days of submission of the bill therefore, in case the contract price is lower/higher than the estimated project cost as per RFP, then the SOR rates shall be reduced/ increased in the same proportion accordingly, Balance payment shall be after erection of/ launching of these elements as per stage payment stipulations. In case of single span bridge payments may be made on pro rata basis of total no. of girders fabricated/erected.
		((3) **Protection and Misc. works around and near abutments:** On completion of Protection and Misc. works including, stone pitching, protection works, and other works and all mise items required for proper completion of work & fit for use.	[4.39%]	**(iii) Protection and Misc. works around and near abutments:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of protection and misc. works in all respect as specified in the column of "Stage of Payment" in this sub-

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
1	2	3	4	5
				clause.
		(4) **Guide Bunds and River Training Works**: On completion of Guide Bunds and river training works complete in all respects	[0.00%]	

2 Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.(i).

2.2 Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Article 14 and Article 19.

SCHEDULE – I

See Clause 10.2.4)

DRAWINGS

DRAWINGS

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractor shall furnish to the Authority's Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-I.

ADDITIONAL DRAWINGS

If the Authority's Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed in Annex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the Authority's Engineer, as if such drawings formed part of Annex-I of this Schedule-I.

Annex - I

(Schedule - I)

LIST OF DRAWINGS

[Note: The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.]

1. A list of minimum drawings of the various components/elements of the Project and project facilities required to be submitted by the Contractor is given below:

(a) Drawings of plan showing Mitigation Measures of all locations.

(b) Drawings of section showing mitigation measures of all locations.

(c) Drawings of details showing mitigation measures of all locations.

(a) Drawings of details of slope protection measures.

(b) Drawing of Plan showing bridge.

(a) Drawings of traffic diversions plans and traffic control measures.

(b) Drawings of General Arrangement for bridges.

(c) Drawings of dimension and reinforcement details of substructure and foundation.

(d) Drawings of dimension and reinforcement details of Super Structure for bridges.

(e) Drawings of details of approach slab, cash barrier, railing, drainage spout etc.

(f) Drawings of Retaining wall and Toe wall.

(g) Drawings of road furniture items including traffic signage, marking, safety barriers, etc.

(h) Drawings and details of hydroseeding.

(i) Drawing of plan and schedule of tree plantation and shrubs.

(j) Detailed design and drawing of all components required for project completion of works.

(k) Any other drawings as per instruction of Authority Engineer

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-J for each of the Project Milestones and the **Scheduled Completion Date**. Within 15 (fifteen) days of the date of each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **130th (One hundred and thirtieth)) day** from the Appointed Date (the "**Project Milestone- I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3. Project Milestone-II

(iii) Project Milestone-II shall occur on the date falling on the **270th (Two hundred and seventieth)** day from the Appointed Date (the "**Project Milestone- II**").

(iv) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 30% (thirty five per cent) of the Contract Price **and should have started construction of all bridges**

4. Project Milestone-III

(v) Project Milestone-III shall occur on the date falling on the **400th (Four Hundredth)** day from the Appointed Date (the "**Project Milestone- III**").

(vi) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 60% (sixty per cent) of the Contract Price and **should have started construction of all project facilities.**

5. Scheduled Completion Date

(vii) The Scheduled Completion Date shall occur on the **540th (Five Hundred Forty)** day from the Appointed Date.

(viii) On or before the Scheduled Completion Date, the Contractor shall have completedconstruction in accordance with this Agreement.

6. Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

Schedule – K

(See Clause 12.1 (ii))

TESTS ON COMPLETION

1. Schedule for Tests

(i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project Highway to Tests, and no later than 10(ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.

(ii) The contractor shall submit before the start of the work a comprehensive plan for monitoring the movement and deformation of sinking & landslide zone after completion of work. The instruments shall be installed at appropriate location and time tests shall be conducted as per the approved plan. The cost for instrumentation and conducting tests shall be borne by the Authority Engineer and the tests shall be carried out in the presence of contractor's representative.

(iii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

2. Tests

(iv) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].

(v) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipment and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometre.

(vi) Tests on Nails/anchors: Load tests should be carried out as per relevant FHWA/BS codes for checking the strength of nail/anchor after installation.

(vii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Non-destructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) meters or more shall also be subjected to load testing.

(viii) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards.

(ix) Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.

(x) Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Project Highway with the safety requirements and Good Industry Practice.

3. Agency for conducting Tests

All Tests set forth in this Schedule-K shall be conducted by the Authority's Engineer or such other agency or person as it may specify in consultation with the Authority.

4. Completion Certificate

Upon successful completion of Tests, the Authority's Engineer shall issue the Completion Certificate in accordance with the provisions of Article 12.

5. The Authority Engineer will carry out tests with following equipment at his own cost in the presence of contractor's representative.

Sr. No.	**Key metrics of Asset**	**Equipment to be used**	**Frequency of condition survey**
1	Surface defects pavement	Network Vehicle Survey (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Strength pavement	Falling Weight Deflectometer (FWD)	At least once a year
3	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
4	Road signs	Retro-Reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

The first testing with the help of NSV shall be conducted at the time of issue of Completion Certificate.

Schedule – L

(See Clause 12.2)

Completion Certificate

Completion Certificate

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated……(the "**Agreement**"), for [construction of the ****section (km ** to km **) of National Highway No. ***] (the "**Project**") on Engineering, Procurement and Construction (EPC) basis through ……(Name of Contractor), hereby
certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the …… day of …… 20… , Scheduled Completed
Date for which was the ……. day of ……..20…..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineer by:

(Signature)

(Name)

(Designation) (Address)

Schedule – M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

1. Payment reduction for non-compliance with the Maintenance Requirements

(i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.

(ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.

(iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

2. Percentage reductions in lump sum payments on monthly basis

(i) The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, rain cuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Hill Roads and Special Geotechnical Works for Landslide Rehabilitation / treatment**	
(i)	Non-strengthening of Defective Polymeric Reinforcement	15%
(ii)	Non-replacement of Defective PVC Pipes	5%
(iii)	Non-strengthening / Non-replacement of Defective Facia	5%
(iv)	Non-replacement of Defective Gabion Mattress	5%
(v)	Non-replacement of Defective Erosion Control Mat	5%
(c)	**Bridges and Culverts**	

(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage tofoundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, roadmarkings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles,fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

(ii) The amount to be deducted from monthly lump-sum payment for non- compliance ofparticular item shall be calculated as under:

$$R = {}^{P}/_{100} \times (M1 \text{ or } M2) \times {}^{L1}/_{L}$$

Where,

P= Percentage of particular item/Defect/deficiency for deduction

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule M2= Monthly lump-sum payment in accordance para 1.2 above of this Schedule L1= Non-complying length L = Total length of the road,

R= Reduction (the amount to be deducted for non-compliance for a particular item/Defect/deficiency

The total amount of reduction shall be arrived at by summation of reductions for such items/Defects/deficiency or non-compliance.

For any Defect in a part of one kilometer, the non-conforming length shall be taken asone kilometer.

Schedule – N

(See Clause 18.1 (i))

SELECTION OF AUTHORITY'S ENGINEER

1. Selection of Authority's Engineer

(i) The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.

(ii) In the event of termination of the Technical Consultants appointed in accordance with the provisions of Paragraph 1.1, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordancewith the provisions of Paragraph 3 of this Schedule-N.

2. Terms of Reference

The Terms of Reference for the Authority's Engineer (the "**TOR**") shall substantially conform with Annex 1 to this Schedule N.

3. Appointment of Government entity as Authority's Engineer

Notwithstanding anything to the contrary contained in this Schedule, the Authority may in its discretion appoint a government-owned entity as the Authority's Engineer; provided that such entity shall be a body corporate having as one of its primary functions the provision of consulting, advisory and supervisory services for engineering projects; provided further that a government-owned entity which is owned or controlled by the Authority shall not be eligible for appointment as Authority's Engineer.

Annex – I

(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated..... (the "**Agreement**), which has been entered into between the [name and address of the Authority] (the "**Authority**") and…….....(The "**Contractor**") for **Construction for Mitigation Measures of 05 Nos. Landslides, 05 Nos. Sinking Zones and 1 no. Bridge from Ch. 450.00 to Ch. 468.00 (18 Km. length) on NH-07 on EPC mode in the State of Uttarakhand (Package-III)** Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

- In case the bid of Authority's Engineer is invited simultaneously with the bid of EPC project, then the status of bidding of EPC project only to be indicated

(ii) The TOR shall apply to construction and maintenance of the Project Highway.

2. Definitions and interpretation

(i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaningrespectively assigned to them in the Agreement.

(ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.

(iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to this TOR.

3. General

(i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

(ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

(e) any other matter which is not specified in (a), (b), (c) or (d) above and whichcreates a financial liability on either Party.

(iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority'sprior approval in accordance with the provisions of Clause 18.2.

(v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.

(vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

4. Construction Period

(i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

(ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

(iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within aperiod of 21 (twenty one) days stating the modifications, if any, required thereto.

(iv) The Authority's Engineer shall complete the review and approve of the

methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) ofthe Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

(vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

(vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

(viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

(x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance withGood Industry Practice.

(xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

(xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

(xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

(xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

(xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

(ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a

Maintenance Inspection Report to the Authority and the Contractor.

(iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

(v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

6. Determination of costs and time

(i) The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

(ii) The Authority's Engineer shall determine the period of Time Extension that is requiredto be determined by it under the Agreement.

(iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

7. Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineerin accordance with the provisions of Clause 10.2 (iv) (d).

(ii) Authority's Engineer shall -

(a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and

(b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an

Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.

(iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.

(iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

8. Other duties and functions

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

9. Miscellaneous

(i) A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

(ii) The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

(iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as- built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

(iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.

(v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

Schedule – O

(See Clauses 19.4 (i), 19.6 (i), and 19.8 (i))

FORMS OF PAYMENT STATEMENTS

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;

(b) amounts reflecting adjustments in price for the aforesaid claim;

(c) the estimated amount of each Change of Scope Order executed subsequent tothe last claim;

(d) amounts reflecting adjustment in price, if any, for (c) above in accordance withthe provisions of Clause 13.2 (iii) (a);

(e) total of (a), (b), (c) and (d) above;

(f) Deductions:

i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

ii. Any amount towards deduction of taxes; and

iii. Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor upto the last claim:

i. For the Works executed (excluding Change of Scope orders);

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(i) the monthly payment admissible in accordance with the provisions of the Agreement;

(j) the deductions for maintenance work not done;

(k) net payment for maintenance due, (a) minus (b);

(l) amounts reflecting adjustments in price under Clause 19.12; and

(m) amount towards deduction of taxes

3. Contractor's claim for Damage

Note: The Contractor shall submit its claims in a form acceptable to the Authority.

Schedule – P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

(i) The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and

(b) insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

(ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover of not less than 15% of the Contract Price for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

3. Insurance against injury to persons and damage to property

(iii) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit onthe number of occurrences.

The insurance cover shall be not less than: Rs. [*****]

(iv) The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:

(a) The Authority's right to have the construction works executed on, over,

under, in or through any land, and to occupy this land for the Works; and

(b) Damage which is an unavoidable result of the Contractor's obligations to execute the Works.

4. Insurance to be in joint names

The insurance under paragraphs 1 to 3 above shall be in the joint names of theContractor and the Authority.

Schedule-Q

(See Clause 14.10)

TESTS ON COMPLETION OF MAINTENANCE PERIOD

1. Visual and physical test:

The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include all tests to be checked required for the performance of structure & mitigation measures.

Schedule-R

(See Clause 14.10)

TAKING OVER CERTIFICATE

I, …….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated ……. (the "**Agreement**"), for [construction of the ****section (km ** to km **) of ****] (the "**Project**") on Engineering, Procurement and Construction (EPC) basis through…….(Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

***** End of the Document *****