

Schedules

For

**Construction of ROB at LC 115B (near Nastanpur)
at Km 126/150 of Nandgaon -Chalisingaon section of
NH 753J in the state of Maharashtra on EPC mode
of Maharashtra (Recall Tender)**

**Public Works Department (NH), Maharashtra
Government of Maharashtra**

**Ministry of Road Transport & Highways
(MoRT&H)**

April- 2025

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Schedules

SCHEDULE-A*(See Clauses 2.1 & 8.1)***Site of The Project Highway****1 THE SITE**

- (i) Site of the Four lane project highway shall include the land, buildings, structures and road works as described in **Annex-I** of this **Schedule-A**.
 - (ii) The dates of handing over the Right of Way to the Contractor are specified in **Annex-II** of this **Schedule-A**.
 - (iii) An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in clause 8.2 (i) of the Agreement.
 - (iv) The alignment plans of the Project Highway are specified in **Annex-III**. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be modified. The proposed profile of the Project Highway shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The contractor however, improve/upgrade the Road Profile as indicated in **Annex-III** based on site/design requirement.
 - (v) The status of the environment clearances obtained or awaited is given in **Annex IV**.
-

Annex - I
(Schedule-A)

Site for Four-Lanning ROB of Project Highway

Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the site shall be specified briefly but precisely in this **Annex - I**. All the chainages/location referred to in Annex -I to Schedule A shall be existing chainages.

1. The Site

The Site of the Project Highway comprises the section of National Highway 753J commencing from km 125+350 to km 126+843 section the Nastanpur LC Gate no 115B of Mumbai Nagpur Central railway line in the State of Maharashtra. The land, carriageway and structures comprising the site are described below.

Referencing System

Kilometre stones are existing in entire length of the project highway. It is called the "Existing Chainage". During topography survey with Lidar, observations made are referred to "Design Chainage". The relationship between the "Existing Chainage" and the "Design Chainage" as per field surveys of the location of existing km stones using the Lidar for the "**Project Highway**" is **given at Appendix A-I**. The existing and length of project road is **1.493km**.

Design Chainage Corresponding to existing Chainage

Sr. No.	Existing Chainage	Design Chainage	Remarks
1	126+150	126+150	Nastanpur ROB

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:

Sr. No.	Existing Chainage (Km)		Length (Km)	Existing Row (m)	Remark
	From	To			
1	125+350	126+843	1.493	30	

3. Carriageway

The present carriageway of the project highway is two lane in 1.430 km. The type of the existing pavement is partly flexible and partly rigid.

The details of existing carriageway and shoulders are given below:

S. No.	Existing Chainage (Km)		Length (Km)	Carriageway Width (m)	Type of Pavement	Earthen Shoulders (m)
	From	To				
1	125+350	126+100	0.75	10.00	Rigid	1.0m to 2.0m
1	126+100	126+220	0.120	7.00	Flexible	1.0m to 2.0m
1	126+220	126+843	0.623	10.00	Rigid	1.0m to 2.0m
Total Length			1.493 Km			

Note -Total Length of carriageway

Flexible - width 7.00m -0.120 km

Rigid - width 10.00 m - 1.373 km

There is level crossing at km 126/150 along the existing alignment of the project road.

4. Major Bridges: - NIL

The Site includes the following Major Bridges:

Sr. No	Existing Chainage	Type of Structure			No. of Spans with Span Length (m)	Width (m)	Condition
		Foundation	Sub Structure	Super Structure			
NIL							

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

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

S.	Existing	Type of Structure	No. of Spans	Total	ROB/R
----	----------	-------------------	--------------	-------	-------

No.	Chainage	Foundation	Sub Structure	Super Structure	with Span Length (m)	Width (m)	UB
-----NIL-----							

6. Grade separators: - Nil

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

7. Minor Bridges: - NIL.

The site includes the following Minor Bridges:

Sr. No	Existing Chainage (Km)	Type of Structure			No. of Spans with Span Length (m)	Overall Width (m)	Condition
		Foundation	Sub Structure	Super Structure			
NIL							

8. Railway level crossings

The Site includes the following Railway level crossings:

S No	Existing Chainage	Railway Chainage	Level Crossing no	Remark
1	126+150	299/724	115B	NearNastanpur

9. Underpasses (vehicular, non-vehicular):-

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

10. Culverts: -

The site includes the following slab/box culverts

(a) Slab/Box Culverts: -01 No

Sr. No.	Existing Chainage (Km)	Type Of Culvert (Box/Slab/HPC)	SPAN(m)	Existing Width (m)	Existing condition
1	125+393	Box	2x 8.5 m	16	Good

(b) HP Culverts: - 02 Nos.

Sr. No.	Existing Chainage (Km)	Type Of Culvert (Box/Slab/HPC)	SPAN(m)	Existing Width (m)	Existing condition
1	126+438	HPC	1 X 1200	16	Good
2	125+561	HPC	2 X 1200	16	Good

11. Bus Bays/Bus Shelters: - NIL

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

Sr. No.	Chainage (km)	Location	Left Hand Side	Right Hand Side
----- Nil -----				

12. Truck Lay byes: - NIL

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

13. Road side drains: - NIL

The details of the roadside drains are as follows:

Sr. No.	Location		Type	
	From Km	to Km	Masonry/CC (Pucca)	Earthen (Kutchha)
1	125+350	126+843	--	Earthen

14. Major junctions: - Nil

The details of the Major junctions are as follows:

Sr. No.	Existing Chainage (Km)	Type	Road Side	Directions	Category Of Cross Roads (NH/SH/MDR/VR/Other)
NIL					

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

15. Minor junctions: - NIL

The details of the Minor junctions are as follows:

Sr. No.	Existing Chainage	Type	Road Side	Directions	Category Of Cross Roads (VR/Other)
1	125/796	Minor	RHS	Towards Nandgaon	VR
2	126/750	Minor	LHS	Towards Nandgaon	VR

16. Bypasses: - Nil

The details of the bypasses are as follows:

S. No.	Name of bypass (town)	Chainage (km) From km__ to km	Length (in Km)	Carriageway	
				Width (m)	Type
-----Nil-----					

17. Other structures: - NIL

Sr. No	Existing Chainage	Type of Structure	No. of Spans with Span Length (m)	Width (m)
-----Nil-----				

18. Submergence Locations: - NIL

The data of flooding over existing road is shown in Table below:

Sr. No.	Existing Chainage		Overtopping above the existing road (m)
	From	To	
-----Nil-----			

Annex - II

*(Schedule-A)***Dates for providing Right of Way**

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

Sl.No	Chainage (Km)		Length (km)	Existing ROW Width(m)	Proposed ROW Width (m)	Date of providing ROW*
	From	To				
1	2	3	4	5	6	7
(i) Full Right of Way (Full width) (a) Stretch	126+090	126+240	0.150	Railway Portion		Maximum ROW to be handed over on Appointed Date and balance within 150 days from Appointed date
(ii) Part Right of Way (Part width)	125+350	125+750	0.400	30.00	54.00	
	126+240	126+843	0.603	30.00	54.00	
(iii) Balance Right of Way(width)	125+750	126+090	0.340	0.00	54.00	

Annex - III

*(Schedule-A)***Alignment Plans**

The existing alignment of the Project Highway shall be modified in the following sections as per the alignment plan indicated below:

- (i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL. In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement. (Attached)
- (ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per IRC: SP: 99 2013&IRC:67-2012.

Annex - IV

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained:

Environmental Clearance is not required as per new Notification of MoEF dated 22/08/2013.

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[Type text]

Annex - V
(Schedule-A)

(i) Electrical utilities

- 1) 33 KV S/C Line on 13 Mtr RSJ Pole- 0.7Km
- 2) 33 KV Double Pole Structure – 02 Nos
- 3) 33 KV Isolator – 01 No
- 4) 11 KV S/C HT line on 11 Mtr RSJ Pole – 0.24 Km
- 5) LT AB cable -0.65 Km
- 6) LT UG cable – 0.85 Km**

Note:- The above utilities (Electrical, Water & Others) are minimum indicative for estimate purpose. All the utilities necessary for construction of highway shall be shifted by contractor satisfying concerned Department/Authority. If any increase in electrical and water utility the contractor shall not constitute any change of scope. The cost of utilities are including supervision charges and other centages payable to concerned department. For laying underground cable of electrical utility crossing RCC pipe 300mm dia. shall be laid as per location of crossing.

Utility Shifting: Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department is part of the scope of work of the Contractor/Concessionaire*. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. If any increase in electrical utility the contractor shall not constitute any change of scope. The specifications of concerned Utility Owning Department shall be applicable and followed.

Notes:

- 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 Contractor /

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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 Contractor/Concessionaire* shall carry out joint inspection with utility owning department and get the estimates technically sanctioned from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor/Concessionaire* to utility owning department whenever asked by the Contractor/Concessionaire*. The decision/ approval of utility owning department shall be binding on the Contractor/Concessionaire*.

- b. The supervision charges at the rates/ charges applicable of the utility owning department shall be paid directly by the contractor to the Utility Owning department as and when Contractor/Concessionaire* furnishes demand of Utility Owning Department along with a copy of estimated cost given by the later.
- c. The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor/ Concessionaire* who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor /Concessionaire* is required to deposit the dismantled material to utility owning department as per the norm and practice and in that case the amount of credit for dismantled material may be availed by the Contractor/Concessionaire* as per estimate 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 liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

Appendix A- I**DESIGN CHAINAGE CORRESPONDING TO EXISTING CHAINAGE**

Sr. No.	Existing Chainage	Design Chainage	Remarks
1	125+350	125+350	Start Point
3	126+843	126+843	End Point

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[Type text]

SCHEDULE - B

(See Clause 2.1)

Development of The Project Highway**1. Development of the Project Highway**

Development of the Project Highway shall include design and construction of the Project Highway as described in this **Schedule-B** and in **Schedule-C**. The alignment plans of the Project Highway are specified in **Annex-III of Schedule A**. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be modified. The proposed profile of the Project Highway shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The contractor however, improve/upgrade the Road Profile as indicated in **Annex-III** based on site/design requirement.

2. Rehabilitation and augmentation

Rehabilitation, upgradation and augmentation shall include Four- Laning and widening/reconstruction/new construction of the Project Highway as described in Annex-I of this Schedule-B and Schedule-C.

3. Specifications and Standards

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

Annex - I
(Schedule-B)

Description of Railway Over Bridge (ROB)

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon - Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra. The site of the project in lieu of LC-115B at railway Km 299/724 on Mumbai - Bhusawal Railway Line near Pimperkhed station.

1. Rehabilitation, Upgradation & Widening of The Existing Highway

- (i) The Project Highway starts from design km 125+350 and ends at design km 126+843 in the state of Maharashtra. Total Existing & Design Length of project
- (ii) road is **1.493 Km**. The project highway Four Lane with Paved Shoulders shall be constructed as per Schedule D.

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

The Package of Proposed ROB starts at Design Ch125+350 to Design Ch. 126+843 near Pimperkhed, in the state of Maharashtra. Design length of ROB is 1.493 Km. The proposed ROB of 13m width both side shall be constructed as per "Schedule-B, C & D".

The proposed ROB shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A.

(iii) WIDTH OF CARRIAGEWAY

The ROB consist of 2 x 13.00m wide main carriageway (in Skew 18.385m) (2x 10m carriageway+ four numbers of 0.50m Crash Barrier+2x 1.5m footpath and 2 x 0.5m Railing] and median of width 1.50m in accordance with the

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[Type text]

modified typical cross section in the Manual IRC: SP:84-2019& Schedule B [Please refer attached GAD].

*Construction of ROB is to be carried out as per the attached approved GAD by the Central Railways. The cross-section features of the main carriageway are uniform across the length of the project highway. The profile of the **service road and Slip Road** is varying from section to section, and also from oneside of the carriageway to the other at the same location.*

Sr. No	Description	Remark	Standard Design Code of References
1.	Foundation	As per IRC:78-2014 (Pile Foundation)	IRC:5-2015 IRC:6-2017
2.	Sub Structure	Single Pier	IRC:78-2014 IRC:112-2020
3.	Super Structure	ROB of 2 x 10m carriageway, four numbers of 0.50m Crash Barrier+2x 1.5m footpath and 2x 0.5m Railing] and median of width 1.50m	IRC:83-2018 Part III IRC:SP:66-2016 IRC:SP:114-2018 IRC:SP:69-2011& IS:2062-2011, IS:1786-2008, IS:14268-2017, IS:2502-1963, IS:13920-2016, IS:1343-2012 MoRTHspecifications 2013 or latest
4.	Slip/Service	BHS -125/500 to	

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[Type text]

	road	126/110(Chalisgaon side)+ Along Railway line BHS-126/230 to 126/660(Nandgaon side)+Along Railway line	
5.	Widening of Box Culvert	As per attached drawing	
6.	Widening of Pipe Culverts	As per attached drawing	

Note :

1. The design of ROB is to be checked and approved from the Concerned Central Railway Authority.
2. Span Arrangement & Location should be as per attached approved GAD by the Central Railways. EPC Contractor cannot change span arrangement. However, it is clarified that any increase in cost due to change in span arrangements or change type of super structure and Sub structure will not be considered as change of scope. Cross section at approaches is to be followed matching to adjoining cross-sections with suitable transition.
3. Where cross-section changes from two lane to four lane a transition shall be provided as per the Manual (IRC:SP:73-2018).
4. Typical cross section schedule given above is indicative; it shall be consulted before finalization. Any change in TCS length / type shall not be taken as change of scope of works. Provision of toe wall to limit the PROW shall not be considered in variation.
 - (a) Provided that in the Bridge portion, the width of carriageway shall be as specified in the following table:

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[Type text]

Sr. No.	Design Chainage	Length (m)	Existing C/way width	Proposed		Remark
				CarriagewayWidth (m)		
				LHS	RHS	
	New ROB-					
1.	Km 126+240 to Km 126+090	150.00	-	13.00 m (18.385m in Skew)	13.00m (18.385m in Skew)	Refer attached GAD and TCS-

- (b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.(i) Above.

Note:

- Cross-section at ROB approaches is to be followed matching to adjoining cross-sections with suitable transition as per attached approved GAD by the Central Railways.
- Where Cross section changes from two lanes to four lanes a transition shall be provided as per clause 2.16.2 of the Manual (IRC:SP:73-2018).
- Utilities crossing shall be constructed as per Clause 2.15 of the Manual (IRC:SP:73-2018) in consultation with Authority Engineer.
- Except as otherwise provided in this Agreement, the linear dimension and width of the paved Carriageway and cross-sectional features shall conform to paragraph 1.(ii) above & Cross Sections given at Schedule B section 2.(xii) typical cross section. Invert levels of the longitudinal drains shall be decided as per adjoining draining area and properties.
- The chainages given in above table are indicative and stretches may increase or decrease in the specified above as per design standards of IRC:SP:73-2018. This shall not constitute to Change of Scope.

2. Geometric Design and General Features

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

(i) General

Geometric design and general features of the Project Highway shall be in accordance with section 2 of manual of Two Lane with Paved Shoulder, IRC:SP:73-2018.

(ii) Design Speed

The design speed shall be the minimum design speed of 80 km per hr for plain/rolling terrain. In urban stretches, Forest Areas & deficient curves, design speed is restricted and shown under para 2.3 as the development is proposed within the extent of available land.

(iii) Improvement of the existing road geometrics

In the following sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided for safe regulation of fast moving, slow moving and pedestrian traffic:

Sr. No.	Stretch / Design Chainage (Km)		Type of Deficiency (Speed limit to... Km/hr)	Remarks
	From	To		
				nil

Details of Proposed Realignments / Curve Improvements

The below list is indicative only and any increase in number of realignments and length of the realignment shall not be considered as change of scope of work.

Realignment / curve improvement locations:

Sr. No.	Design Chainage		Length (Km)	Side	Widening Scheme
	From	To			
1	125+350	126+843	1.493	Both	Realignment & Curve Improvement

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[Type text]

	Length (km)	1.493		
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Note:

Existing stretches of highway corresponding to above mentioned bypasses/realignment shall be maintained in traffic worthy condition by contractor during construction period. Maintenance shall cover at least one overlay of renewal coat during the construction period.

(iv) Right of Way

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

(v) Median

In ROB and its Approaches with 4 lane divided carriageway the median shall be provided in accordance with the specifications given in section 2 of IRC:SP:73-2018.

Sr. No	Existing Chainage		Design Chainage		Width of Median (m)
	From	To	From	To	
1	125+500	126+660	125+500	126+600	1.50

(vi) Type of shoulders

Paved Shoulders / earthen shoulders shall be provided as per typical cross sections given in this schedule. The shoulder shall be provided in accordance with the specifications given in section 5.10 and 5.11 of IRC:SP:73-2018.

- (a) In Builtup Section Raised footpaths/ fully paved shoulder shall be provided in the following stretches:

Sr. No.	Built-Up Stretch (Service road)	Design Chainage (km)		Fully Paved Shoulder / Footpaths	Typical cross section as per section 2(xii)
		From	To	(BHS)	
1	Chalisgaonside	125+500	126+110	610 m	TCS IV

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2	Nandgaon side	126+230	126+660	430m	TCS IV
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- (b) In Open country, paved shoulder of 1.5 m width shall be provided and Earthen Shoulder of 2.0m width shall be covered with compacted layer of granular material. (As per shown in TCS/GAD)
- (c) Design and specifications of paved shoulder and granular material shall conform to the requirements specified in paragraph 5.10 and 5.11 of IRC:SP:73-2018.

(vii) Lateral and vertical clearances at underpass

- (a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.11 of the Manual (IRC:SP:73-2018).
- (b) Lateral clearance: -The width of the opening at the underpasses shall be as follows:

Sl.No.	Location (Chainage) (from Km to Km)	Span/Opening (m)	Remarks
Nil			

(viii) Lateral and Vertical Clearances at RoB / overpasses

All lateral and vertical clearances shall be as per Section 2.11 of the IRC:SP:73-2018.

Sl.No.	Location (Chainage) (from Km to Km)	Span/Opening (meter)	Remarks
1	126+150	(25.00+28.00+26.00+36.00+35.00)& vertical clearance of 6.525 m from Existing Rail top	Refer attached approved GAD by the Central Railways

Note: Approach Gradient & RE Walls: Approach and exit gradient of road crossing through underpass shall be maintained.

(ix) Service roads: -

Service roads shall be constructed at the following locations and as per cross sections shown at TCS.

Sr. No.	Location of service	Right hand side	Length (m) of	Remark
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	road (from km to km)	(RHS)/Left hand side (LHS)/ or Both sides	service road	
1	125+500 to 126+110	Both Sides	610+30m along railway line	Refer TCS-IV
2	126+230 to 126+660	Both Sides	430+30m along railway line	Refer TCS-IV

Sliproad:-

Slip Road at Grade Separated structure approaches portion shall be provided on both sides. Slip roads shall be constructed at the following locations and as per cross sections shown at TCS.

S. No.	Location of Service Road (Design Chainage)		Right hand side (RHS)/Left hand side (LHS)/or Both side	Length (Km) of Service Road	Remark
	From (km)	To (km)			
----- NIL -----					

Diversion road –

Diversion road shall be constructed at the following locations and as per cross sections shown at TCS.

Sr. No.	Location of service road (from km to km)	Right hand side (RHS)/Left hand side (LHS)/ or Both sides	Length (m) of service road	Remark
Nil				

Above length of the Service/Slip Road/ Diversion road is indicative and minimum specified. The actual length of the service/slip road/ Diversion road shall be determined by the contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any Increase in the Length specified in the clause of Schedule B shall not constitute a Change of Scope. However, the contractor shall have to plan the construction work of ROB and its approach/service roads in phases that it will be utilized for diversion of the traffic during construction, nothing extra shall be payable for construction of diversion

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[Type text]

road and its maintenance.

(x) Grade separated structures

- (a) Grade separated structures shall be constructed as per paragraph 2.14 of the Manual IRC:SP:73-2018. The requisite particulars are given below.

Sr. No.	Location of structure	Length (m)	Number and length of spans (m)	Approach gradient	Remarks, if any
Nil					

In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as per attached General Arrangement Drawings & Plan & Profile. The minimum FRL at grade separated structure shall be in accordance with attached plan & profile.

(xi) Cattle and pedestrian underpass /overpass:

Cattle/pedestrian underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.14.3 of the Manual (IRC:SP:73-2018). Under pass shall be constructed at following locations.

S. No.	Design Chainages	Location	Span Arrangement (m)	Width (m)	Remark
----- NIL -----					

(xii) Typical cross-sections of the Project Highway

Indicative typical cross section of the project highway is given below.

Sr. No.	Design Chainage		Length (m)	TCS Type	TCS Details
	From	To			
1	125+350	125+500	150		(Merging portion) As per attached approved GAD by the Central Railways

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2	125+500	126+090	590	TCS-IV	4-Lane Typical Cross Section For Approach with Service Road
3	126+090	126+240	150	GAD	As per attached approved GAD by the Central Railways (Main ROB portion)
4	126+240	126+727	487	TCS-IV	4-Lane Typical Cross Section For Approach with Service Road
5	126+727	126+843	116		(Merging portion)As per attached approved GAD by the Central Railways
Total Length (m)		1493			

Note 1: The cross section schedule given in above table is indicative and stretches may increase or decrease depending upon profile designed by contractor however, this shall not be treated as change of scope.

- Cross-section at Major/Minor Bridge approaches are to be followed matching to adjoining cross-sections with suitable transition.
- Where cross-section changes from two lane to four lane a transition shall be provided as per the Manual (IRC:SP:73-2018)
- Where Bus Bays & Truck Lay Bys constructed as per Schedule C a transition shall be provided as per the Manual (IRC:SP:73-2018)

Typical cross section schedule given above is indicative; it shall be consulted before finalization. Any change in TCS length / type shall not be taken as change of scope of works. Provision of toe wall to limit the PROW shall not be considered in variation.

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[Type text]

Typical Cross Section for Section-IV

*** All the TCS attached also in Drawing Volume.**

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3. INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per Section 3 of the Manual (IRC:SP:73-2018). Existing intersections which are deficient shall be improved to the prescribed standards. For improvement of intersections and at grade junction standards and type plan MoRT&H and IRC:SP:41-1994 shall be followed. Improvement of junctions shall be matched with design cross fall of main carriageway & within the extent of land availability. Side roads connecting to the main road shall be properly merged with existing side road with acceptable gradient as per manual.

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

(i) At-grade intersections

a. Major Intersection – Nil

At grade major intersections shall be improved at intersecting roads of the Project Highway as per details given below:

Sr. No.	Existing Chainage (Km)	Type	Road Side	Directions	Category Of Cross Roads (NH/SH/MDR/VR/Other)
NIL					

b. Minor Intersection – 2 no.

At grade minor intersections shall be improved at intersecting roads of the Project Highway as per details given below:

Sr. No.	Existing Chainage	Type	Road Side	Directions	Category Of Cross Roads (VR/Other)
1	125/796	Minor	RHS	Towards Nandgaon	VR
2	126/750	Minor	LHS	Towards Nandgaon	VR

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Rumble Strips: - The cross road junctions as mentioned above shall be provided with Rumble strips by thermoplastic paint at the approach of junctions as per IRC: 99-2013.

Note: - It is clarified that if any other deficient junctions with cross BT/CC roads is identified during development period in addition to those mentioned above shall be improved as per standard set forth in Schedule 'D'. Any Increase in the junction specified in the clause of Schedule B shall not constitute a Change of Scope.

The cross road junction shall be regraded to attain similar gradient or up to minimum length 150m, whichever is more & repaved with same specifications and crust as proposed for service roads.

For cross road drainage facility new HP culverts (No. and size of pipe) on cross roads/approach road shall be constructed as per Clause 7.(ii).(d) of this Schedule and shall be as per Manual.

(ii) Grade separated intersection with / without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
Nil				

4. Road Embankment and Cut Section

- (i) Reconstruction and up-gradation of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the Specifications and Standards given in section 4 of the Manual and the specified cross-sectional details. Deficiencies in the plan and profile of the existing road shall be corrected and any excess quantity will not constitute COS. Replacement of black cotton/unsuitable soil will not constitute COS.

(ii) Raising of the existing road:-

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Construction of new road embankment/cuttings shall conform to the Specifications and Standards given in section 4 of the IRC:SP:84-2019 and the specified cross-sectional details.

Not with standing anything to the contrary contained in this Agreement or IRC:SP:84-2019, the proposed profile of the project highway as indicated in the Annex-III of Schedule A shall be deemed to be part of this Schedule B and shall be treated as an approximate assessment. Based on site/design requirement specified in Schedule-D, the Contractor shall design the alignment plans and profiles of the project highway within the available Right of Way.

Filling of any local depression, dig and well with suitable material will not consider as COS.

Note:- Raising of existing road will comprise of pavement crust of 600 mm thickness (300mm PQC, 150mm DLC, 150mm GSB) below which there will be sub grade consisting of 500mm thickness. Remaining raising will be made-up of embankment construction in earth (compacted) of approved soil compacted in layer not less then 200mm each.

As per manual IRC:SP:84-2019 subject to minimum level specified in alignment plan mentioned in Annex-III of schedule "A".

It is economically decided to raise the embankment height to ensure that the bottom of subgrade is at least 0.60 m above the Ground Level at the Toe of Existing Road Embankment. Which in no case should be lower than the natural adjoining ground level. The raising for Reconstruction / New Construction in approaches of Major/Minor Bridges shall be carried out by contractor as per Schedule D and in consultation with the Authority's Engineer and as per availability of land, however, this shall not be treated as change of scope.

5. Pavement Design

- (i) Pavement design shall be carried out in accordance with Section 5 of the Manual of Specification & Standards for Two Laning of Highway with Paved Shoulder IRC:SP:73-2018, IRC:SP:58-2001, IRC:37-2018, IRC:81-1997, IRC:SP:76-

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2015, according to the type of the pavement and relevant IRC codes.

(ii) **Type of pavement :-**

Rigid Pavement for main carriageway and Flexible pavement for service road shall be provided in entire project length (Refer TCS-IV) including paved shoulders.

(iii) **Design requirements**

- (a) **Pavement Design shall be done as per the section 5.4&5.9 of the IRC: SP: 84-2019** IRC: SP: 58-2015, IRC: SP: 37-2012, IRC: SP: 76-2015 and IRC: 81-1997

(b) **Design Period and strategy**

Flexible pavement shall be constructed for service road. Rigid pavement shall be designed for a minimum design period of 30 (Thirty) years and minimum CBR of **subgrade should be 8%**. The stretches with Black Cotton Soil should be improved as per Manual, relevant codes and consultation with the Authority / Authority's Engineer as per site condition/ requirement should not constitute a Change of Scope. Stage construction shall not be permitted.

Flexible pavement for Service/Slip Road shall be designed for a design traffic of minimum 10 MSA and minimum CBR of subgrade should be 8%.

(c) **Design Traffic**

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 1176 CVPD considering future traffic projections for design life (30 years) or as per the actual traffic whichever is higher. **However, Minimum pavement composition should be adopted for new pavement/reconstruction of road as below:-**

a) **Main Carriageway:-**

Rigid Pavement:-

Pavement Layer Thickness (RIGID PAVEMENT)					
PQC (mm)	DLC (mm)	GSB Drainage	Sub grade	Total Thickness	Remarks

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		Layer (mm)	(mm)	(mm)	
300	150	150	500	1100	

Note:- Buffer layer of 1000 mm. shall be provided below subgrade in the stretches of BC soil area.

b) Flexible Pavement (New): - At Service road

BC (mm)	DBM (mm)	WMM (mm)	GSB (mm)	Sub grade (mm)	Total Thickness (mm)	Remarks
40	95	250	200	500	1085	As per detail mention in Section 2(xii) of Schedule B

Note : Above Crust thickness shown in above table (i.e. Table 5.(iii).b.2) is minimum, during construction for overlay section at approaches and municipal limit/forest area shall be design as per IRC:SP:76-2015.If any improvement required in subgrade /sub-base it shall be done as per relevant IRC Codes, without any change in scope of work.

- a) The Crust Composition for Truck Lay Byes shall be as per Main Carriageway Clause 5.3.2 (a) above.
- b) The Crust composition for Minor roads, Bus bay shall be as per section 5 of IRC:SP:84-2019

(iv) Widening & Reconstruction of stretches

The stretches of the existing road shall be widened & reconstructed by scarifying the existing carriageway and laying fresh pavement starting from subbase level.

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

Sr. No.	Stretch From km to km	Length	Remarks
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		(Km)	
1	Km. 125+350 to Km.126+090 and Km. 126+240 to Km.126+843 (excluding ROB)	1.343	Reconstruction as Rigid Pavement for main carriageway and Flexible Pavement for Service road As per TCS mentioned in Section 1 of Annex -I of Schedule B with RE Wall (Refer TCS-IV)
	Total Length : Km :	1.343	

(v) New Construction of Bypasses and Realignment: -

Rigid pavement shall be constructed for bypasses, realignment and geometric improvements.

1. Realignments: -

Sr. No.	Design Chainages		Design Length (km)	Remark
	From	To		
1	125+750 to 126+090		0.340	

2. Bypasses :- Nil

Sr. No.	Design Chainages		Design Length (Km)	Remark
	From	To		
NIL				

3. New Alignment (New Link) :- Nil.

Sr. No.	Design Chainages		Design Length (Km)	Remark
	From	To		
NIL				

4. Geometric improvements:-

Sr. No.	Design Chainages	Design Length	Remark
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[Type text]

	From	To	(km)	
Nil				

5. Overlay on Existing Road

Sr. No.	Stretch From km to km	Length (Km)	Remarks
Nil			

(vi) Improvement at a Glance: -

Sr. No.	Design Chainage (Km)		Design length (m)	Type of Cross Section	Remarks
	From	To			
1	125+350	126+090	740	TCS-IV	Widening and Reconstruction to four lane with paved shoulder
2	126+090	126+240	150	As per GAD	As per attached approved GAD by the Central Railways
3	126+240	126+843	603	TCS-IV	Widening and Reconstruction to four lane with paved shoulder
Total Design Length(Km)			1493		

6. Roadside Drain & Footpath

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual (IRC:SP:73-2018). RCC rectangular drain shall be provided in both side of Built-Up areas at following locations.

Sr.	Open Country	Design Chainage (km)	Typical
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No.		From	To	Along Rail line(m)	Length (m)	cross section
1	Chalisgaon side (BHS)	125+400	126+110	30	1450	TCS-IV
2	Nandgaon side (BHS)	126+230	126+800	30	1170	TCS-IV
	Total Length (Km)				2620	

In all built up areas RCC covered drains with Footpath shall be provided. FRP chambers shall be provided at minimum 5.00 m center to center or lesser interval as per design requirement. Suitable crossing shall be provided at approaches to properties etc. invert levels of drains shall be decided on the basis of ground slopes of adjoining properties and open grounds. All drains should be connected to nearest natural Nala/ Culvert/ River etc.

In cutting portions lined drain of suitable size shall be constructed in consultation with Authority Engineer.

Above length of the RCC Drains are indicative and minimum specified. The actual length of the RCC drains shall be determined by the Contractor keeping in view the drainage location and in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the length of drain as specified in above location shall not constitute a Change of Scope. Also any new location for reconstruction shall not constitute COS, and section 6 of IRC manual shall be followed.

Note: 1. The invert level of Road side drains shall be minimum 500 mm below GSB bottom level & additional weep holes of 100 mm dia @1m c/c spacing shall be provided at GSB level in inner wall of built-up drain.

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2. Drain top level shall be kept such as to suit/match the surface drainage requirements as per proposed FRL in built-up sections.

3. The cross section of earthen drain in open country section shall have minimum bottom width of 0.5m with side slopes of 1:1. Invert level of earthen side drains shall be as per hydraulic requirement & minimum 1 mt. below adjoining ground level.

7 Design of Structures

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the Manual (IRC:SP:76-2015) and shall conform to the cross-sectional features and other details specified therein. All designs shall be in conforming with is IRC and International Codes. The deviation shown in Schedule – D shall be taken in to considerations.

(b) Width of the carriageway of new Major bridges and structures shall be as follows:
The width of carriageway of new Major and Minor bridges shall be as mentioned below.

Sl. No.	Bridge at km (Design Ch.)	Width of carriageway and cross-sectional features	Remark
Nil			

Span arrangement of Major and Minor Bridge shall be designed by contractor on the basis of detailed surveys & investigations subject to minimum specified in GAD as per para 7.3.2 of this schedule. Founding levels shall be decided after detailed Geo-Technical investigation, Waterway, road top level, soffit etc. shall be decided on the basis of land survey conforming to various codal provision applicable.

(c) The following structures shall be provided with footpath on both side:

Sr. No.	Location at Km	Remarks
1	126+150	ROB

All Major / Minor Bridges shall be constructed with footpath.

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[Type text]

All bridges shall be high-level (non-submersible) bridges.

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

Sr. No.	Bridge at Km	Utility service to be carried	Remark
1	126+150	OFC cables, electric Cable, Gas Pipe lines, etc.	ROB

Note : All Major / Minor Bridges, Box Culvert, shall be designed for utility services (OFC cables, telephone wires, water supply pipe line etc.) to be carried over as per Manual section – 7 of IRC:SP:73-2018. However, any other utility to be carried over as per site condition shall be identified in consultation with Authority Engineer.

- (e) Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7 of the Manual (IRC:SP:73-2018) and deviations given at Schedule D.

(ii) **Culverts**

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

- (b) Reconstruction of Existing Culverts

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

Refer to paragraph 7.3 (i) of the Manual (IRC:SP:73-2018).

Slab Culvert: - Nil

Width of the culverts shall be as per Figure 7.1 and 7.3 of IRC:SP:73-2018 whichever is applicable.

Sl. No.	Culvert location		Existing Span Arrangement	Proposed Span/ Opening (m.)	Proposed Width (m)	Remark
	Existing Chainage (Km)	Design Chainage (Km)				
NIL						

Box Culvert: - Nil

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[Type text]

Width of the culverts shall be as per Figure 7.1 and 7.3 of IRC:SP:73-2018 whichever is applicable.

Sl. No.	Culvert location		Existing Span Arrangement	Proposed Span/ Opening (m.)	Proposed Width (m)	Remark
	Existing Chainage (Km)	Design Chainage (Km)				
NIL						

Note –

- The span/ opening given above are minimum and the proposed dimensions shall be based on hydraulic calculations and approval from Authority Engineer. Any changes shall not be constituting a Change of Scope.
- The clear height of Reconstructed culverts shall be minimum 2.0 m or more if required as per hydraulic calculations.
- In Built-up areas width of culvert shall be extent up to available ROW.
- Barrel Length may change as per Height of embankment and shall get approval from Authority Engineer, this will not be considered under change of scope.

Pipe Culverts: 00Nos.

Sl. No.	Culvert location		Existing Span Arrangement	Proposed Span/ Opening (m.)	Proposed Width (m)	Remark
	Existing Chainage (Km)	Design Chainage (Km)				
Nill						

Note: -

1) It is clarified that as per site requirement New HP Culverts if required for drainage arrangement shall be identified & constructed if any during development shall be constructed as per standard set forth in Schedule 'D' & as per instruction of Authority Engineer.

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[Type text]

2) The pipe diameter and numbers given above are minimum and the proposed dimensions shall be based on hydraulic calculations and approval from Authority's Engineer. Any Excess to above dimensions shall not constitute any change of scope.

3) Barrel Length may change as per height of embankment and shall get approval from Authority's Engineer. Any change in the length specified in this Clause of Schedule B shall not constitute any Change of Scope.

(c) Widening of existing culverts

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

Condition Survey & rehabilitation of existing structure shall be carried out before carrying out the widening.

Width of the culverts shall be as per Figure 7.1 and 7.3 of IRC:SP:73-2018 whichever is applicable.

Slab/Box Culvert(widening) :-01 No.

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Details of Proposed structure		
			Type of Structure	Span Arrangement	Width of Structure (m)	Span Arrangement	Proposed Width (m)	Remark
1	125+400	125+400	Box	1x18.50	16	2x8.50	27	5.5 m widening on BHS

Pipe Culverts(widening) :- 02 No.

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Proposed Width (m)	Remark
			Type of Structure	No. x Dia. (m)	Width of Structure (m)		
1	125+561	125+561	HPC	2x1200	16	49	16.5m

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[Type text]

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Proposed Width (m)	Remark
			Type of Structure	No. x Dia. (m)	Width of Structure (m)		
							widening on BHS
2	126+438	126+438	HPC	1x1200	16	49	16.5m widening on BHS

Repairs and strengthening of existing structures where required shall be carried out.

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

Additional new culverts shall be constructed as per particulars given in the table below Width of the culverts shall be as per Figure 7.1 and 7.3 of IRC:SP:73-2018 whichever is applicable

Slab / Box Culvert: - Nil

Sl. No.	Design Chainage (Km)	Proposed Span/Opening (m.)	Proposed Width (m)	Type	Remark
Nil					

Pipe Culverts: - Nil

Sr. No.	Design Chainage (Km)	No. x Dia.(mm)	Proposed Width (m)	Type	Remark
Nil					

Note: - It is clarified that as per site requirement New HP Culverts if required for drainage arrangement shall be identified & constructed if any during development shall be constructed as per standard set forth in Schedule 'D' & as per instruction of Authority Engineer.

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out. The existing Slab/Box/Pipe culverts are needed to verify design strength and waterway. If required as per codal provisions the culverts shall be reconstructed to meet design requirement, this will not constitute change of scope.

Pipe Culverts At Cross Road Junctions: - 02 No.

As per site requirement New HP Culvert shall be constructed for drainage arrangement at following junctions as per standard set forth in Schedule 'D' & as per instruction of Authority Engineer.

For Junction Locations Refer Clause 3.1 of this Schedule B.

Sr. No.	Type of Junction	Nos.	Details of Proposed Structure		
			No. x Dia.	Proposed Width (m)	Remark
1	Minor	1	1x1200	28	At km125+750
2	Minor	1	1x1200	12	At km125+796

Note: -

It is clarified that if any other deficient junctions with cross BT/CC roads is identified during development period shall be improved with drainage facilities with pipe culvert & as per standard set forth in Schedule 'D' & Schedule 'T'. Any changes to above dimensions shall not be constitute change of scope.

- It is clarified that as per site requirement New HP Culverts if required for drainage arrangement shall be identified & constructed if any during development shall be constructed as per standard and as per instruction of Authority Engineer. This will not be considered under change of scope.
- The pipe diameter and numbers given above are minimum and the proposed dimensions shall be based on hydraulic calculations and approval from Authority Engineer. Any changes to above dimensions shall not be constitute a change of scope.

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[Type text]

- In Built-up areas width of culvert shall be extent up to available ROW.
- Barrel Length may change as per Height of embankment and shall get approval from Authority Engineer, this will not be considered under change of scope.

(e) **Repairs/replacements of railing/parapets, flooring and protection works of the existing culverts& Embankment/Approaches shall be undertaken as per Para 7.22 of manual (IRC:SP:84-2019).**

Slab/Box Culverts – Nil

Sr. No.	Location of Structure (km)	Type	Remark
----Nil----			

Note: - It is clarified that above repairing & strengthening measures are indicative and minimum specified. The condition survey of the existing structure shall be carried out by the contractor as per IRC:SP:35-1990, &Strengthening / repairing shall be carried out as per the requirement of site and as per instruction of Authority Engineer, for pier, abutment, sub structure & super structure, replacement of bearings, expansion joints & wearing coat, providing railing on bridge, painting & protection works etc. If any Increase in the specified above shall not constitute a Change of Scope.

Pipe Culverts - Nil

Sr. No.	Location of Structure (km)	Type	Remark
--NIL--			

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

(g) **Retained HPC/Slab Culverts**

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[Type text]

S. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Remark
			Type of Structure	Span (m)	Width of Structure (m)	
Nil						

(iii) Bridges**(a) Existing Bridges to be Reconstructed/Widened**

(i) The existing bridges at the following locations shall be re-constructed as new Structures: [Refer to paragraph 7.3.2 of the Manual]

Major Bridges: - Nil

S. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Details of Proposed structure			Remark
			Type of Structure	Span Arrangement	Width of Structure (m)	Minimum Span Arrangement	Minimum Proposed Width (m)	Type of Bridge	
Nil									

Note:- Procedure for auction of material such as structural steel, reinforcement, stone, rubble available at work site before dismantling of existing old arch bridge and from any work site location shall be followed in accordance of the PWD Manual & Authority Engineer will assist the PWD(NH) for that.

Revenue generated from auction of dismantling material shall be deposited to PWD (NH) account.

Minor Bridges: - Nil

Width of the bridges shall be as per Figure 7.6/7.8 of IRC:SP:73-2018.

S. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Details of Proposed structure			Remark
			Type of Structure	Span Arrangemen t	Width of Structure (m)	Span Arrangemen t	Proposed Width (m)	Type of Bridge	
Nil									

Note:- Span arrangement of Major and Minor Bridge shall be designed by

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[Type text]

contractor on the basis of detailed surveys & investigations & Hydraulic Calculations subject to minimum specified in GAD. Founding levels shall be decided after detailed Geo-Technical investigation, Waterway, road top level, soffit etc. shall be decided on the basis of land survey conforming to various codal provision applicable.

Length of the proposed bridge mentioned above is minimum and it shall be designed based on Hydraulic calculations and with approval from Authority Engineer. Minimum RTL for the structures shall be followed as shown in Plan & Profile drawing.

Where the Existing Bridge reconstructed as New Bridge at same place, dismantling of Existing Major/Minor Bridge shall be carried out with all lead and lifts, and disposing off on used/unsuitable material shall not constitute COS. A temporary diversion works shall be constructed as per Fig. 9.26 of manual IRC:SP:73-2018 and as per Para 112 of standards and specifications of Indian Roads Congress (MORTH) Fifth Revision-2013 with adequate cross drainage structure and traffic safety and control devices. The diversions shall be maintained in satisfactory condition till such time they are required and as directed by the Authority Engineer.

(ii) following narrow Bridges shall be widened including Strengthening & repairing of Existing Bridge.

Major Bridges: - Nil

Sr. No.	Design Chainage (Km)	Existing Width (m)	Extent of widening (m)	Cross-section at deck level for widening @
Nil				

Minor Bridges: - Nil

Sr. No.	Design Chainage (Km)	Existing Width (m)	Extent of widening (m)	Cross-section at deck level for widening	Remark
NIL					

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Note: Repair/strengthening of existing bridge shall be done as per site conditions, after detailed condition survey covering the following but not limited to these only:

- *Strengthening of substructure and foundation by RCC jacketing.*
- *Replacement of wearing coat.*
- *Replacement of expansion joints,*
- *Replacement of bearings,*
- *Replacement of Railing,*
- *Structural repairs to substructure/super structure,*
- *Repair to flooring, Quadrant pitching and protection works.*
- *M40 grade concrete shall be used for repair work.*

Note: - It is clarified that above repairing & strengthening measures are indicative and minimum specified. The condition survey of the existing structure shall be carried out by the contractor as per IRC:SP:35-1990, & Strengthening / repairing shall be carried out as per the requirement of site and as per instruction of Authority Engineer, for pier, abutment sub structure & super structure, replacement of bearings, expansion joints & wearing coat, providing railing on bridge, painting & protection works etc. If any Increase in the specified above shall not constitute a Change of Scope.

(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.

Major Bridges: - Nil

Sr. No.	Bridge at km (Design Ch.)	Total Length of bridge (m)	Total Width (m)
Nil			

Minor Bridges: - Nil

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Sr. No.	Bridge at km (Design Ch.)	Minimum Total Length of bridge (m)	Minimum Total Width (m)	Minimum Clear Height (m)	Remark
Nil					

Note: Left/Right side widening direction is with respect to start point of the project road.

(c) The railings of all existing bridges shall be replaced by crash barriers as per manual.

S. No.	Location at km	Remarks
--NIL--		

Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as per manual.

S. No.	Location at km.	Remarks
--NIL--		

(d) Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the Manual IRC:SP:73-2018.

(e) Structures in marine environment: - NIL

(iv) Rail-road bridges: -

(a) Design, Construction and detailing of ROB/RUB shall be specified in section 7 of the Manual. IRC:SP:73-2018

(b) Road Over Bridges: ROB at Nastanpur

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

Sl. No.	Location of Level crossing (Chainage km)	Length of bridge (m)
---------	------------------------------------------	----------------------

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1	Km 126+150 @ level crossing 115B	150 (Refer approved GAD by the CR)
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(c) Road under-bridges

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

S. No.	Existing Chainage (Km)	Design Chainage (Km)	Proposed span arrangement (m)	Width (m)	Track	Lane
NIL						

(v) Grade separated structures: - Nil.

The grade separator structures shall be provided at the location and of the type and length specified in paragraph 2(ix) and 3 of this Annex-I

(vi) Repairs, Retain and strengthening of bridges and structures

[Refer to paragraph 7.23 of the Manual IRC:SP:84-2019 and provide details]

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

(a) BRIDGES**(i) MAJOR BRIDGES: - Nil**

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

(ii) MINOR BRIDGES: - Nil

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

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[Type text]

Note: Repair/strengthening of existing bridge shall be done as per site conditions, after detailed condition survey covering the following but not limited to these only:

- *Strengthening of substructure and foundation by RCC jacketing.*
- *Replacement of wearing coat.*
- *Replacement of expansion joints,*
- *Replacement of bearings,*
- *Replacement of Railing,*
- *Structural repairs to substructure/super structure,*
- *Repair to flooring, Quadrant pitching and protection works.*
- *M40 grade concrete shall be used for repair work.*

Note: - It is clarified that above repairing & strengthening measures are indicative and minimum specified. The condition survey of the existing structure shall be carried out by the contractor as per IRC:SP:35-1990, & Strengthening / repairing shall be carried out as per the requirement of site and as per instruction of Authority Engineer, for pier, abutment sub structure & super structure, replacement of bearings, expansion joints & wearing coat, providing railing on bridge, painting & protection works etc. If any Increase in the specified above shall not constitute a Change of Scope.

(b) ROB/RUB

(i) **ROB:** - NIL

(ii) **RUB:** - NIL

Sr. No.	Location of RUB (km)	Remark
-----NIL-----		

(c) Overpasses/Underpasses and Other Structures: -

Sr. No.	Location of Structures (Km)	Nature and Extend of repairs / strengthening to be carried out
NIL		

(vii) List of Major Bridges:-

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[Type text]

The following is the list of the Major Bridges:

SI No.	Location	Span
1	----	-----

8 Traffic Control Devices And Road Safety Works

Traffic Signs: Traffic signs include Cautionary Board, Mandatory Board, Informatory Boards shoulder mounted/ overhead, Cautionary sign on curve, Direction Information Sign, facility Information Sign, Prohibitory Signs, Pedestrian Signs and curb mounted signs along the entire Project Highway.

- b) Pavement Marking: Pavement markings shall cover Longitudinal Markings, Diagonal and chevron Markings, Bus and Truck Lane Marking, Stop line and Give way Marking, Pedestrian Marking, Longitudinal marking to Toll Booths, and Object Marking for the entire Project Highway as per provisions of the IRC:SP:73-2018.
- c) Road Delineators: It shall include Roadway Delineators, Hazard Marker, Object Marker for the entire Project Highway as per Section 9.4 of the IRC:SP:73-2018 and IRC:67-2012 and IRC: 79 2018
- d) Reflective Pavement Markers (Road Studs): The Reflective Pavement Markers (RRPM) i.e. road studs shall be provided to improve the visibility in night time and wet weather conditions. These shall be prismatic retro reflective type conforming to ASTM D 4280 for the entire Project Highway as per Section 9.5 of the IRC:SP:73-2018
- e) Safety Barrier: Provide crash barrier along the project highway as per provisions of the IRC:SP:73-2018.
- f) Work Zone Traffic Management Plans (WTMPs): The traffic diversion plan during construction shall be prepared as per IRC:SP:55 2014 for the entire project highway. Separate traffic diversion plan shall be prepared for structures and CD works.

- (i) Specifications of the reflective sheeting.

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Retro reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956-04.

9 Roadside Furniture

- (i) Roadside furniture shall be provided in accordance with the provisions of Section 9 of the Manual.
- (ii) Overhead traffic signs: The size shall be evolved based on design of sign boards given in IRC:67-2012. The location shall be finalized in consultation with authority engineer.

The locations are mentioned in below table and size shall be evolved based on design of sign boards given in IRC:67-2012 and as per section 9 of IRC:SP:73-2018

Sr. No	Sign	Number/Sqm	Remarks
1	KM Stone	2 Nos	
3	Raised pavement marker /reflectors	2306 Nos	
5	Thermoplastic Paints	3294 Sqm	
6	Cautionary/Mandatory Signs	54	
7	Road Junction Informatory	04	Speed Limit/ Stop Sign at Junction, Bus bay and Curve location
8	Mandatory/Regulatory	10	Circular
9	Cautionary/Warning	22	Equilateral triangle

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10	Cautionary/Warning	02	Octagonal
11	Board display information	8	ROB Information board
12	Informatory sign board	15.12 Sqm	
13	NH Route marker	04	
14	Overhead Signs	21Sqm	2 No. at start and end point
15	Informatory board displaying name of work, tender cost etc	4.32Sqm	
16	Road Delineators	88	
17	Boundary stones	28	

Note:

All traffic signs for road users as mentioned above are bare minimum and if as per Manual extra over the above is required the contractor shall provide it at its own cost no change of scope will be there for excess. However contractor shall provide minimum numbers of Cautionary, Mandatory, Warning and Informatory traffic sign boards as per requirements specified in IRC:SP:73-2018, IRC:67-2012.

10 Compensatory Afforestation

[Refer to the provision of relevant Manual for number of trees which are required to be planted by the Contractor.] Plantation of no. and species of trees per Km. shall be as per IRC:SP:21-2009. Minimum avenue plantation 15m. c/c on both sides in Open Area except structures and Built-up areas.

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The number of trees which are required to be planted by the Contractor as compensatory afforestation should be as per Forest Conservation Act, Ten times the number of trees cut as compensatory afforestation shall be as finalized by the Authority's Engineer.

11 Hazardous Locations

The safety barriers shall be provided at the hazardous locations as per Clause 7.17 of the Manual (IRC:SP:73-2018). W-Beam metal crash barriers shall however be provided at all hazardous locations. All hazardous locations shall be finalized in consultation with the Authority Engineer.

Side slope shall be protected by using suitable slope protection measures like pitching works as per IRC:SP:73-2018.

The actual length of the W-Beam metal crash barriers shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority Engineer. The final length after consultation with authority engineer will be considered under scope of work.

Parapet wall shall be constructed at sharp curves in hilly areas. Retaining wall, Toe wall & stone pitching shall also be provided at the required locations as per manual.

Above length of protection works is indicative and minimum specified. The actual length of the service/slip road shall be determined by the contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any Increase in the Length specified in the clause of Schedule B shall not constitute a Change of Scope.

12 Special Requirement For Hill Roads: - NIL

13 Change of Scope

The length of Structures and bridges specified herein above are minimum. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not

constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

14 Utility Service Duct/ Corridor

Ducts for crossing of utility services shall be provided across the road at 250m interval in open areas and at 100 m interval in habitation area with RCC NP4 pipe with 600mm diameter in consultation with Authority Engineer.

A utility service corridor with 300mm dia pipe shall be provided along the length in both side of the built-up area including inspection chamber at every 10m interval.

(i) Electrical utilities

- 1) 33 KV S/C Line on 13 Mtr RSJ Pole- 0.7Km
- 2) 33 KV Double Pole Structure – 02 Nos
- 3) 33 KV Isolator – 01 No
- 4) 11 KV S/C HT line on 11 Mtr RSJ Pole – 0.24 Km
- 5) LT AB cable -0.65 Km
- 6) LT UG cable – 0.85 Km

Note:- The above utilities (Electrical, Water & Others) are minimum indicative for estimate purpose. All the utilities necessary for construction of highway shall be shifted by contractor satisfying concerned Department/Authority. If any increase in electrical and water utility the contractor shall not constitute any change of scope. The cost of utilities are including supervision charges and other centages payable to concerned department. For laying underground cable of electrical utility crossing RCC pipe 300mm dia. Shall be laid as per location of crossing.

Utility Shifting: Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department is part of the scope of work of the Contractor/Concessionaire*. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. If

any increase in electrical utility the contractor shall not constitute any change of scope. The specifications of concerned Utility Owning Department shall be applicable and followed.

Notes:

- 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 Contractor / 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 Contractor/Concessionaire* shall carry out joint inspection with utility owning department and get the estimates technically sanctioned from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor/Concessionaire* to utility owning department whenever asked by the Contractor/Concessionaire*. The decision/ approval of utility owning department shall be binding on the Contractor/Concessionaire*.
- b. The supervision charges at the rates/ charges applicable of the utility owning department shall be paid directly by the contractor to the Utility Owning department as and when Contractor/Concessionaire* furnishes demand of Utility Owning Department along with a copy of estimated cost given by the later.
- c. The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor/ Concessionaire* who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor /Concessionaire* is required to deposit the dismantled material to utility owning department as

per the norm and practice and in that case the amount of credit for dismantled material may be availed by the Contractor/Concessionaire* as per estimate 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 liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

Note - The Agreement for construction of Road Over Bridge is signed between Ministry of Railways (MOR) and Ministry of Road Transport & Highways (MoRTH) on 29th March 2023. The agreement has been attached in drawing volume for information. MoRTH has to complete railway portion work under supervision of Railway Authority, hence the EPC contractor has to follow the conditions mentioned in the agreement signed between MOR and MORTH. Design of Bridge portion shall be prepared from the reputed design consultants and proof checked by reputed Engineering institutes such as IIT/RITES before the same are submitted to Railways for approval.

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15 Typical Cross Section and Widening Scheme

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

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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:

Toll Plaza

Road side furniture;

Pedestrian facilities;

Tree plantation;

Truck lay-byes;

bus-bays and bus shelters;

Rest Areas

Street Lighting & High Mast Lighting

Others to be Specified

2. Description of Project Facilities**i. Toll Plazas: NIL**

Toll Plaza shall be designed as per the guidelines of Section 10 of the IRC:SP:73-2018 and it provided at following locations:-

Sr. no	Toll Plaza	Design Chainage	Location
Nil			

The tentative location is mentioned as above however the exact location identified shall be finalized in consultation with the Authority Engineer. Toll Plaza with minimum of 8 lanes including all other buildings and structures shall be constructed.

ii. Road side Furniture shall be provided as follows: -

The roadside furniture shall include the provision of the;

i) Traffic Signs and Pavement Markings:

Traffic signs and pavement markings shall include road side signs, Cautionary Board, Mandatory Board, Informatory Boards shoulder mounted/overhead, Cautionary sign on curve, Direction Information Sign, facility Information Sign, Prohibitory Signs, Pedestrian Signs and curb mounted signs and Road marking along the entire Project Highway as per Section 9 of IRC:SP:73-2018. Aluminium Composite Material (ACM) sheets shall be used for sign boards. The location of these provisions shall be finalized in consultation with Authority Engineer as per latest IRC standards(IRC:67-2012).

ii. Concrete Crash Barrier, Metal Beam Crash Barrier, Separators (MS Railings)

The minimum length of 2.32 **Km** Concrete crash barrier shall be provided as per table given below for safety of traffic & users. Metal beam crash barrier and MS railing to be provided as per requirement. The locations shall be finalized in consultation with Authority Engineer. Increase in length shall not be considered under change of scope.

Sr. No.	Design Chainage		Length (Km)	Side	Total Length (Km)
	From (Km)	To (Km)			
1	125+500	126+660	1.16	Both	2.32
	Total Length (Km)				2.32

iii. Reflective Pavement Markers (Road studs)

Provide road studs for the entire Project Highway at the locations as suggested in relevant IRC / as per Section 9 of Manual and in consultation with Authority's Engineer.

iv. Road Delineators:

It shall include Roadway Delineators, Hazard Marker, Object Marker for the entire Project Highway as per Section 9.4 of the IRC:SP:73-2018 and IRC:67-2012 and IRC: 79 2018

v. Boundary stones

Boundary Stones shall be placed throughout the project road as per IRC:SP:73-2018. Clause 12.2 and Latest guideline of IRC 25 1967.

vi. Hectometre / Kilometer stones

For the entire Project Highway as suggested in IRC:SP:73-2018, Clause 12.3 and latest guideline of IRC 8 1980.

vii. Solar Traffic Blinkers signal (L.E.D):

For all Pedestrian cross walks along the alignment, provided at all Major Junction locations and at Curve locations where curve radius not confirming to minimum radius as per design standards and any other locations specified in relevant manual recommended and in consultation with Authority's Engineer & Latest IRC Standard placed throughout the project road

viii Rumble strips

Rumble strip shall of Thermoplastic paint shall be provided at all cross-road junction and consultation with Authority's Engineer as per IRC: 99-2018 throughout the project road

iii. Pedestrian Facilities

The pedestrian facilities shall include the provision of the;

- i) **Pedestrian Staircase:** Provide pedestrian staircases as per attached approved GAD by the CR.

1	Location of pedestrian staircases at Km. (Design Ch.)	Remarks
1	126+150 ROB	4 numbers

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Note: Above locations of the pedestrian staircases are indicative and minimum Specified. The actual locations of the pedestrian crossings shall be determined by the Contractor as per IRC:SP:73-2018 requirements with approval from the Authorities Engineer any increase in the number of pedestrian staircases as Specified above shall not constitute a change of scope. Any new location as per site Requirement and directed by Authority Engineer will be consider under a change of Scope.

The additional pedestrians' facilities in the form of guard rails, footpath, lighting etc. shall be provided in built-up area and high embankment of structures.

For proper approaches to adjoining agricultural fields along excavated drains, 900mm dia. NP4 pipes for about minimum 7.5m length or length as per width of road with adequate cushion over pipe at an interval of 500 m on both sides & wherever required as per site requirements in consultation with Authority Engineer shall be provided.

iv. Landscaping and Tree Plantation

Landscaping of the highway shall be done as per IRC:SP:21-2009 on, but not limited to, the following:

- Median
- Grade Separated intersections
- Entry and Exit ramp
- At grade islands of intersection locations
- 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.
- In case of availability of space between proposed ROW and side drain, tree plantation shall be done as per IRC:SP:21-2009.

v. Truck Lay-byes: Nil

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Truck lay-bays on either side of the road are given below; however, suitable locations shall be decided in consultation with Authority's Engineer:

Location of Truck Lay-Byes:-

S. No	Design Chainage	Location	Remarks
Nil			

vi. Bus bays & Bus Shelters: Nil

Bus Bays & bus shelter shall be provided at locations given below. The Bays and shelter shall be designed based on IRC:SP:73-2018, Clause 12.6 and Figure 12.3.

Sr. No.	Design Chainage	Side	Village/Town Name	Remarks, if any
Nil				

Note:-The locations of Bus Lay bays with Bus shelters are tentative & shall be got approved/provided in consultation with the Authority / Authority's Engineer.

vii. Rest Area: - NIL

S. No	Design Chainage	Location	Remarks
Rest area shall be provided at toll plaza or any other location to be finalized in consultation with Authority's Engineer and state PWD with provision of parking, toilets and drinking water facilities as per Clause 12.10 of Manual IRC:SP:73-2018			

viii. Street Lighting & High Mast Lighting

i. Street/Highway Lighting:

Street light: Street lighting shall be provided at built-up sections, bus bays, toll plaza and other locations wherever necessary as per Manual (IRC:SP:73-2018).

Street lighting on decorative lamp post with LED /energy efficient lighting system of standard make with minimum **40 Lux** capacity shall be provided @ 30m interval for entire project highway. **Street lights shall be provided with dual lights on single pole on either side of ROB.** The height of street light pole shall

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[Type text]

be about 11m above FRL. The street light arrangement is given in following table:-

These shall be provided at the following locations.

Sr No.	Stretch		Length (m)	Spacing (m)	Height of Pole	Remarks (Builtup)
	From	To				
1	125+350	126+843	1493	30	11	Dual lights on single pole on either side of ROB

ii. High Mast Lighting

High mast lighting shall be provided at Major junctions, Flyovers toll plaza and Bus Bay /Truck Lay byes/VUP using LED / energy efficient lighting system. The height of high mast shall be 18m above FRL.

The High mast shall be provided at following location

Sr. No.	Design Chainage	location	Height of HM (M)
1	126+720 LHS	Nastanpur junction	18 m

Note:- Above length considered for providing street lights is indicative and minimum specified. The actual length shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in length specified in this Clause of Schedule C shall not constitute a Change of Scope.

ix. Others:

1. Retaining wall and Toe Walls -

Retaining wall and toe walls shall be constructed as per standard specification

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

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mentioned at clause no. 13.10 in IRC:SP:73-2018. The location of retaining wall and toe wall are as mentioned below.

Retaining Wall - At all Major/Minor Bridge/ROB Locations as per the following : RE Walls for ROB approaches.

Sr.No.	Design Chainage		Length of Retaining wall (m)	Side
	From	To		
1	125+565	126+090	525	Chalisgaon
2	126+240	126+590	350	Nandgaon

Note:

It shall be constructed on the both side of the ROB along the approaches on LHS & RHS. The height of the retaining wall shall be meeting with the FRL of the approach road.

Toe Wall

Sr.No.	Design Chainage		Length of Toe Wall (m)	Side
	From	To		
Nil				

The above locations of retaining wall are for guidance purpose only, however the contractor shall provide the retaining wall at the required locations as per the design. Any change in the length specified above shall not be treated as change of scope of work.

2. Emergency Medical Services / Medical Aid Posts

Emergency Medical Services shall be set up at the toll plaza location as per para 12.12 of the manual (IRC:SP:73-2018). Medical Aid Posts shall be made available at ROB location.

3. Highway Patrol Units / Traffic Aid Post – 1No.

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[Type text]

1. The contractor shall be established and maintained Highway Patrol Unit at toll plaza location as per clause 12.11 of IRC:SP:73-2018.

2. Traffic aid post shall be made available at toll plaza location.

4. Crane Services - Nil.

~~The contractor shall provide a crane of adequate capacity (minimum 20 MT) at Toll Plaza. It shall also be fitted with GPS based vehicle tracking system to monitor its movement on 24 hour x 7 days of week basis. The scope includes all costs of procurement, running and operation cost etc, in construction period and up to the end of defect liability period~~

5. Communication system- Nil

~~The contractor shall be provide a suitable communication system as per para 12.14 of the manual (IRC:SP:73-2018). The scope includes all costs of procurement, installation, Running and operation cost etc. in construction period and up to the end of defect liability period.~~

6. Advanced Traffic Management System- Nil

~~Advanced Highway Traffic Management System (ATMS) shall be provided as per para 12.15 of the Manual (IRC:SP:73-2018). The scope includes all costs of procurement, installation, running and operation cost etc. in construction period and up to the end of defect liability period~~

7. Highway Inspection Vehicle – 1 No.

The contractor shall provide well maintained Highway Inspection AC Vehicle (Swift Desire or equivalent) with the driver and fuel etc complete for client use. The scope includes all costs of procurement, installation, running and operation cost etc. in construction period and up to the end of defect liability period.

8. Operation and Maintenance Center-

O & M center at Leval crossing location or any other location along the project highway is to be established with all facilities to meet the O & M obligations. Minimum facilities provided at O & M center shall be as per Para 12.16 of Manual.

9. Rainwater Harvesting

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As per Ministry of Environment and Forests Notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 6.11.2000), the construction of Rain water, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board. Rain Water Harvesting System shall be provided at bus bay, truck lay byes, rest area and toll plaza locations.

10 Slope protection

The slope protection by lawn or any other method using green technology will be provided at locations, where embankment height is more than 1.00 m and in approaches of Viaducts / Flyover / bridges as per Manual and as directed by Authority.

11 Utility pipe ducts

The ducts shall be laid as per IRC:SP:73-2018, Clause 2.15 & as per IRC:SP:84-2019, Clause 2.16 (with chamber size 900mm X 900 mm) at a suitable depth as approved by Authority's Engineer. Passages are provided with paver blocks at 200m c/c with DLC below it in urban/ habitated areas and 500 m c/c in Open areas.

Note:

Provide adequate details of each Project Facility to ensure their design and completion in accordance with the project-specific requirements and the provisions of the Manual.

In case of any discrepancy in numbers or locations of any of the project facilities mentioned in this Schedule C, shall be constructed and provided in consultation with the Authority Engineer as per site/design requirement and shall not constitute as change of scope.

13 Utilities

Utilities to be identified at site and certified by the Authority Engineer then shifting may be taken by contractor.

Note: In case of any discrepancy in locations of any of the project facilities mentioned

in this Schedule C, shall be constructed and provided in consultation with the Authority's Engineer as per site/design requirement and shall not Constitute as Change of Scope.

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SCHEDULE – D*(See Clause 2.1)***SPECIFICATIONS AND STANDARDS****1. Four Laning**

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

2. Design Standards

The Project Highway including project facilities shall conform to design requirements set out in the following documents.

Manual of specifications and standards for Four Laning of Highways with Paved Shoulder (IRC:SP:84-2019)&Two Laning of Highways with Paved Shoulder (IRC:SP:73-2018), referred to herein as the Manuals.

The use of manufactured aggregates in National Highway works shall be governed by **Ministry's Circular No. RW/NH-34066/09/2017-S&R(B)dated21.07.2020.**

3. Construction of Rigid Pavement:

The construction of Rigid Pavement shall conform to the provisions to clause 602.9 of standards and specifications of Indian Roads Congress (MORTH) Fifth Revision-2013 with "SLIP FORM PAVER".

4. Construction of all item of work shall conform to the provisions to specifications of Indian Roads Congress (MORTH) Fifth Revision-2013.

Annex-I
(Schedule-D)

Specifications and Standards for Four Laning

1. Manual of Specifications and Standards to apply

Subject to the provisions of Paragraph 2 of this Annex-I, Four Laning of the Project Highway shall conform to the “IRC:SP:84-2019 - Manual of Specifications and Standards for Four Laning of Highways with Paved Shoulder” published by the IRC in 2019 and “IRC:SP:73-2018 Manual of Specifications and Standards for TwoLaning of Highways with Paved Shoulder” published by the IRC in 2018.

(An authenticated copy of the Manuals have been provided to the contractor as part of the bid documents.)

2. Deviations from the Manual

- 2.1 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.
- 2.2 Notwithstanding anything to the contrary contained in the aforesaid Manual, the following specifications and standards shall apply to the four lane Project Highway and for purpose of this agreement; the aforesaid manual shall be deemed to be amended to the extent set forth below.

S. No.	Clause No.	Description	Deviation
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1	Fig. 2.4 & Fig. 2.6 of Manual	Typical cross section for Four lane highway	<p>The construction of ROB and its approaches is to be done as per the approved alignment and GAD by the Central Railways bearing Drawing No. HQ PUCCA No. GM(W)BB/p-13460-ROB.</p> <p>The utility corridor of 3.5m width is proposed, hence, utilities are to be accommodated within available land beyond the toe of road as shown in the cross sections attached.</p>
2	Cl. 3.2	At Grade Intersections Fig. 3.1 to 3.7	Junction to be developed within extent of available ROW.
3	cl. 4.2.1	<p>The height of embankment shall be measured with respect to finished road levels. The following principles shall be kept in view while fixing road level. I) No section of road is overtopped. Top of subgrade shall be at least 0.5m above the general ground level.</p> <p>ii) The bottom of subgrade shall be 1.0m above High Flood Level(HFL) / Level of water table. The HFL should be decided by intelligent inspections, observations, enquires and studying the past records. This shall be relevant to situations where road alignment is cited within the flood plain or in the vicinity of water bodies or where ponding of water is encountered and can not be efficiently drained.</p>	<p>On new roads, the aim should be to construct the pavement as far as above the water table as economically practicable. The difference between the bottom of subgrade level and the level of water table / high flood level (i) for non flood zone should not be less than 0.6m (ii) for flood zone should not be less than 1.0m and (iii) for water logged zones should not be less than 1.50m - IRC:37-2018</p>

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Schedule - E*(See Clauses 2.1 and 14.2)***Maintenance Requirements****1. Maintenance Requirements**

- (i) The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.
- (ii) The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified there in and any failure in this behalf shall constitute non-fulfilment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.
- (iii) All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

2. Repair/rectification of Defects and deficiencies

The obligations of the Contractor in respect of Maintenance Requirements shall include repair and rectification of the Defects and deficiencies specified in Annex - I of this Schedule-E within the time limit set forth therein.

3. Other Defects and deficiencies

In respect of any Defect or deficiency not specified in Annex - I of this Schedule-E, the Authority's Engineer may, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards, and any deviation or deterioration beyond the permissible limit shall be repaired or rectified by the Contractor within the time limit specified by the Authority's Engineer.

4. Extension of time limit

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Notwithstanding anything to the contrary specified in this Schedule-E, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5. Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule-E, if any Defect, deficiency or deterioration in the Project Highway poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

6. Daily inspection by the Contractor

The Contractor shall, through its engineer, undertake a daily visual inspection of the Project Highway and maintain a record thereof in a register to be kept in such form and manner as the Authority's Engineer may specify. Such record shall be kept in safe custody of the Contractor and shall be open to inspection by the Authority and the Authority's Engineer at any time during office hours.

7. Pre-monsoon inspection / Post-monsoon inspection

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC:SP:35-1990. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

8. Repairs on account of natural calamities

All damages occurring to the Project Highway on account of a Force Majeure Event or wilful default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

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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.tfhrcc.com/pavement/ltp/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	IRC:82-2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrcc.com/pavement/ltp/reports/03031/)	15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement		2-7 days	IRC:82-2015

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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					
	Bleeding	Nil	< 1 % of area	Daily	Unit like Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling/ Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81 2008
	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	2000 mm/km	Bi-Annually			180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces	180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

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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					
	Other Pavement Distresses			Bi-Annually	Machine or equivalent)	with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC:115-2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes)	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98):2004 and ASTM E1656 -94: 2000	180 days	IRC:SP:83-2018
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation	IRC:SP:83-2018	180 days	IRC:SP:83-2018
		Minimum SN	Traffic Speed (Km/h)					

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Asset Type etc. as applicable)	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipme nt	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
		36	50		Machine or equivalent)			
		33	65					
		32	80					
		31	95					
		31	110					
Embankment/ Slope	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially	NA		7-15 days	MORT&H Specification

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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					
				During Rainy Season				

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:**

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
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 $L > 1$ m. 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 $L > 1$ m.	Staple or Dowel Bar

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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	$w > 3$ mm.	Within 7 days	Retrofit, FDR for affected portion. Within 15days
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.	Staple or Dowel Bar Retrofit.
			2	$w = 0.2 - 0.5$ mm, discernible from slow vehicle	Within 7 days	Within 15days
			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 reconstruct affected.
			5	$w > 6$ mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be fulldepth	Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
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, discernible from slow moving vehicle	Seal with epoxy, if $L > 1$ m. Within 7 days	Staple or dowel bar retrofit. Within 15 days
			2	$w = 0.5 - 3.0$ mm, discernible from fast vehicle	Route seal and stitch, if $L > 1$ m. Within 15 days	-
			3	$w = 3.0 - 6.0$ mm	Staple, if $L > 1$ m. Within 15 days	Partial Depth Repair with
			4	$w = 6.0 - 12.0$ mm, usually associated with spalling		stapling. Within 15 days
			5	$w > 12$ mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be fulldepth	Full Depth Repair Dismantle and reconstruct affected portion as per

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[Type text]

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
						norms and specifications - See Para 5.6.4 Within 15 days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 1 m.	
			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, Reinstatement 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	Seal with epoxy seal with epoxy Within 7 days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
					Within 7 days	
			3	$w < 1.5$ mm; $L < 0.6$ m, two corners broken	PartialDepth(Refer Figure 8.3 of IRC:SP:83-2018) 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) only)	w = width of crack L = length (m/m ²)	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		Within 15days
			3	$w > 1.5$ mm and $L < 3$ m/m ²		Full depth repair -
			4	$w > 3$ mm, $L < 3$ m/m ² and deformation		Cut out and replace

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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	$w > 3 \text{ mm}$, $L > 3 \text{ m/m}^2$ and deformation		damaged area taking care not to damage reinforcement. Within 30days
Surface Defects						
7	Ravelling or Honeycomb surface	$r = \text{area damaged surface/total surface of slab (\%)} \quad h = \text{maximum depth of damage}$	0	Nil, not discernible	Short Term No action.	Long Term Not Applicable
			1	$r < 2 \%$	Local repair of areas damaged and liable to be damaged.	
			2	$r = 2 - 10 \%$	Within 15 days	
			3	$r = 10-25\%$	Bonded Inlay, 2 or 3 slabs if affecting.	
			4	$r = 25 - 50 \%$	Within 30 days	
			5	$r > 50\%$ and $h > 25 \text{ mm}$	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
8	Scaling	$r = \frac{\text{damaged surface}}{\text{total surface of slab}} (\%)$ $h = \text{maximum depth of damage}$	0	Nil, not discernible	Short Term No action.	Long Term Not Applicable
			1	$r < 2 \%$	Local repair of areas damaged and liable to be damaged. Within 7 days Bonded Inlay within 15 days Reconstruct slab within 30 days	
			2	$r = 2 - 10 \%$		
			3	$r = 10 - 20\%$		
			4	$r = 20 - 30 \%$		
			5	$r > 30 \%$ and $h > 25 \text{ mm}$		
9	Polished Surface/Glazing	$t = \text{texture depth, sand patch test}$	0		No action.	Not Applicable
			1	$t > 1 \text{ mm}$		
			2 '	$t = 1 - 0.6 \text{ mm}$	Monitor rate of deterioration	
			3	$t = 0.6 - 0.3 \text{ mm}$		
			4	$t = 0.3 - 0.1 \text{ mm}$		
			5	$t < 0.1 \text{ mm}$	Diamond Grinding if affecting 50% or more slabs in a continuous	

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
					stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	$n = \text{number/m}^2$ $d = \text{diameter}$ $h = \text{maximum depth}$	0	$d < 50 \text{ mm}; h < 25 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	No action.	Not Applicable
			1	$d = 50 - 100 \text{ mm}; h < 50 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	Partial depth repair 65 mm deep.	
			2	$d = 50 - 100 \text{ mm}; h > 50 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	Within 15 days	
			3	$d = 100 - 300 \text{ mm}; h < 100 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	Partial depth repair 110mm i.e.10 mm more than the depth of the hole.	
			4	$d = 100 - 300 \text{ mm}; h > 100 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	Within 30 days	
			5	$d > 300 \text{ mm}; h > 100 \text{ mm}; n > 1 \text{ per } 5 \text{ m}^2$	Full depth repair. Within 30 days	
Joint Defects						
11	Joint Seal Defects	loss or damage	0	Difficult to discern.	Short Term	Long Term

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
					No action.	Not Applicable
		L = Length as % total joint length	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	
			2	$w = 10 - 20$ mm, $L < 25\%$	cracked portion. Within 7 days	

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	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	
			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. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f = 12 - 18 mm	Raise sunken slab.	Replace the slab as

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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	$f > 18$ mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	appropriate. Within 30days
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	Short Term	Long Term
			1	$h < 6$ mm	No Action	
			2	$h = 6 - 12$ mm		
			3	$h = 12 - 25$ mm	Install Signs to Warn Traffic within 7 days	
			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	

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			3	$h = 30 - 50 \text{ mm}$	Traffic within 7 days	
			4	$h > 50 \text{ mm}$ or $> 20\%$ joints	Strengthen subgrade. Reinstate pavement at normal level if $L < 20 \text{ m}$.	
			5	$h > 100 \text{ mm}$	Within 30 days	
16	Heave	$h = \text{positive vertical displacement from normal profile.}$ $L = \text{length}$	0	Not discernible. $h < 5 \text{ mm}$	Short Term	Long Term
					No action.	Scrabble
			1	$h = 5 - 15 \text{ mm}$	Follow up.	
			2	$h = 15 - 30 \text{ mm}$, Nos $< 20\%$ joints	Install Signs to Warn	
			3	$h = 30 - 50 \text{ mm}$	Traffic within 7 days	
			4	$h > 50 \text{ mm}$ or $> 20\%$ joints	Stabilise subgrade.	
			5	$h > 100 \text{ mm}$	Reinstate pavement at normal level if length $< 20 \text{ m}$. Within 30 days	
17	Bump	$h = \text{vertical displacement from normal profile}$	0	$h < 4 \text{ mm}$	No action	
			1	$h = 4 - 7 \text{ mm}$	Grind, in case of new	Construction Limit

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S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
					construction within 7 days	for New Construction.
			3	$h = 7 - 15 \text{ mm}$	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	$h > 15 \text{ mm}$	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	Lane to Shoulder Dropoff	$f = \text{difference of level}$	0	Nil, not discernible < 3mm	Short Term No action.	Long Term
			1	$f = 3 - 10 \text{ mm}$	Spot repair of shoulder	
			2	$f = 10 - 25 \text{ mm}$	within 7 days	
			3	$f = 25 - 50 \text{ mm}$	Fill up shoulder within 7 dayss	
			4	$f = 50 - 75 \text{ mm}$		
			5	$f > 75 \text{ mm}$		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days

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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
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	Inspect and repair sub-drainage at distressed sections and upstream.
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	
			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.	Action required to stop water damaging foundation within 30 days.
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	
			5	Ponding, accumulation of water observed	-do-	

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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:84-2019, a minimum of safe stopping sight distance shall be available throughout.			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 suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP:84-2019
		Design Speed, kmph	Desirable Minimum Sight Distance (m)	Safe Stopping Sight Distance (m)					
		100	360	180					
		80	260	130					

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pavement Marking	Wear	<70% of marking remaining	Bi-Annually	Visual Assessment as per Annexure-F of IRC:SP:35-1990	Re - painting	Cat-1 Defect - within 24 hours Cat-2 Defect - within 2 months	IRC:35-2015
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m ² /lux Bituminous Road - 100mcd/m ² /lux	Monthly	As per Annexure-D of IIRC:35-2015	Re - painting	Cat-1 Defect - within 24 hours Cat-2 Defect - within 2 months	IRC:35-2015
	Night Time Visibility	<u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>		As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect - within 24 hours Cat-2 Defect - within 2 months	IRC:35-2015
		Design Speed	(RL) Retro Reflectivity (mcd/m ² /lux)				
			Initial (7 days)	Minimum Threshold level (TL) & warranty			

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Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				period required up to 2 years					
		Up to 65	200	80					
		65 - 100	250	120					
		Above 100	350	150					
		<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 mcd/m ² /lux							
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN			Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		*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					
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

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	IRC:67-2012
Kerb	Kerb Height	As per IRC:86-2018 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	IRC:86-2018
	Kerb Painting	<u>Functionality</u> : Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC:35-2015
Other	Reflective	Numbers and Functionality as per	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Road Furniture	Pavement Markers (Road Studs)	specifications in IRC:SP:84-2019 and IRC:35-2015, unless specified in Schedule-B.					2019, IRC:35-2015
	Pedestrian Guardrail	<u>Functionality:</u> Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2019
	Traffic Safety Barriers	<u>Functionality:</u> Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2019, IRC:119-2015
	End Treatment of Traffic Safety Barriers	<u>Functionality:</u> Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2019, IRC:119-2015
	Attenuators	<u>Functionality:</u> Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2019, IRC:119-2015

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Guard Posts and Delineators	<u>Functionality:</u> Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 2018
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	<u>Functionality:</u> Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2019
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:84-2019
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2019
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2019
	Toll Plaza	Minimum 40 Lux illumination on the	Daily	The	Improvement in	24 hours	IRC:SP:84-

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Canopy Lights	road surface		illumination level shall be measured with luxmeter	Lighting System		2019
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2019
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:84-2019
	Deterioration in health of trees and	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement	Within 90 days	IRC:SP:84-2019

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	bushes	time to time			of Trees and Bushes.		
	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:84-2019
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approac	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:84-2019

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
h roads							

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:40-2019 and IRC:SP:13-2004
	Leak-proof expansion	No leakage	Bi-Annually	Physical	Fixing with	30 days or	IRC:SP:40-

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	joints if any	through expansion joints		inspection of expansion joints as per IRC:SP:35-1990 if any, for leakage strains on walls at joints.	sealant suitably	before onset of rains whichever comes earlier	2019 and IRC:SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	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:40-2019.	15 days	IRC:SP:40-2019 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than					

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		1m aggregate length					
	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:40-2019 and IRC:SP:13-2004.
Bridges including ROB's 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	Bumps	No bump at	Daily	Visual	Repairs to BC on	15 days	MORT&H

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Structure		expansion joint		inspection as per IRC:SP:35-1990	either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment		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: 5-2015, IRC:SP:84-2019 and IRC:SP:40-2019.
	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC:SP:35-	All the corroded reinforcement shall need to be thoroughly	15 days	IRC:SP:40-2019 and MORTH Specification
	Spalling of concrete	Not more than 0.50 sq.m					

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Delamination	Not more than 0.50 sq.m		1990 using Mobile Bridge Inspection Unit	cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar/concrete.		1600.
	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:40-2019 and MORTH Specification 2800.
	Rainwater seepage	Leakage - nil	Quarterly	Detailed	Grouting of deck	1 months	MORTH

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	through deck slab			condition survey as per IRC:SP:35-1990 using Mobile Bridge Inspection Unit	slab at leakage areas, waterproofing, repairs to drainage spouts		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:51-2014.
	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	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
			between 15 to 30 m				
	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:40-2019.
	Debris and dust in strip seal expansion joint	No dust or debris in	Monthly	Detailed condition	Cleaning of expansion joint	3 days	MORTH specifications

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		expansion joint gap.		survey as per IRC:SP:35-1990 using Mobile Bridge Inspection Unit	gaps thoroughly		2600 and IRC:SP:40-2019.
	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	3 days	MORTH specification 2700.

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					any leakages observed.		
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:40-2019 and MORTH specification 2800.

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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:40-2019.
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	Suitable protection works around pier/abutment	1 month	IRC:SP:40-2019, IRC:83-2018 Part III, MORTH specification 2500

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Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.			
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not	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:40-2019 and IRC:SP:13-2004.

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		more than 1 sq.m					
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.							

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalishaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

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)	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	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment

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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 Approachroads		
(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
(e) Joints		
(i)	Malfunctioning of joints	15 (fifteen) days

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[Type text]

Nature of Defect or deficiency		Time limit for repair/ rectification
(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 issuing the bidding document, with the approval of the competent authority.]

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

Schedule - F*(See Clause 4.1 (vii)(a))***Applicable Permits****1. Applicable Permits**

- (i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:
 - (a) Permission of the State Government for extraction of boulders from quarry;
 - (b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;
 - (c) Licence for use of explosives;
 - (d) Permission of the State Government for drawing water from river/reservoir;
 - (e) Licence from inspector of factories or other competent Authority for setting up batching plant;
 - (f) Clearance of Pollution Control Board for setting up batching plant;
 - (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
 - (h) Permission of Village Panchayats and State Government for borrow earth; and
 - (i) Any other permits or clearances required under Applicable Laws.
- (ii) 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.

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

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Schedule – G*(See Clauses 7.1 and 19.2)***Annex-I***(See Clause 7.1)***Form of Bank Guarantee****[Performance Security/Additional Performance Security]**

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “**Contractor**”) and Chief Engineer, PWD(NH), 5th Floor, KokanBhavan, CBD Belapur, Navi Mumbai, hereinafter called the “**Authority**” have entered into an agreement hereinafter called the “**Agreement**” for the Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalishaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra, 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

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalishaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

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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 the National Highways Authority of India], 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, not withstanding 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 forth compliance with, fulfilment 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

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

Contractor, and either to enforce or for bear 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 fulfilment, 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 here under may be sent by

\$ Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

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.

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.

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 19.2)***Form for Guarantee for Advance Payment**

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New
Delhi] WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “Contractor”) has executed an agreement (hereinafter called the “Agreement”) with the **Chief Engineer, PWD(NH), 5th Floor, KokanBhavan, CBD Belapur, Navi Mumbai,** hereinafter called the “Authority” for **Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra** 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 bearing @ $Bank\ Rate + 3\%$ advance payment (herein after called “**Advance Payment**”) equal to 10% (ten percent) of the Contract Price; and that the Advance Payment shall be made in two 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} installment of the Advance Payment is Rs.-----cr. (Rupees-----crore) and the amount of this Guarantee is 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**”) for the Guarantee Amount.

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[Type text]

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 repayment on time of the aforesaid instalment of the Advance Payment 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.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment 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.

2. 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.
3. 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.

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[Type text]

4. 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 Advance Payment or to extend the time or period of its repayment 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.
5. 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 Advance Payment.
6. 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.
7. The Guarantee shall cease to be in force and effect on****.\$Unlessademand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
8. The Bank undertakes not to revoke this Guarantee during its currency, except

§Insertadatebeing90(ninety)daysaftertheendofoneyearfromthethedateofpaymenttotheAdvance payment to the Contractor (in accordance with Clause 19.2 of theAgreement).

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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.

9. 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.
10. This Guarantee shall come into force with immediate effect and shall remain in force and effect 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.

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

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letter of issuing branch.

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SCHEDULE - H

See Clauses 10.1 (iv) and 19.3

Contract Price Weightages

- 1.1 The Contract Price for this Agreement is **Rs. (..... Cr.)**
- 1.2 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specified below:-

Item	Weight-age in percentage to the Contract Price	Stage for Payment	Percentage weight-age
1	2	3	4
Road works including Culverts, widening and repair of culverts.	8.33%	A- Widening and strengthening of existing road.	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) <u>Sub-base Course</u>	0.00%
		(3) Non bituminous base course	0.00%
		(4) Bituminous base course	0.00%
		(5) Bituminous Wearing course	0.00%
		(6) DLC Dry Lean Concrete	0.00%
		(7) PQC Pavement Quality Concrete	0.00%
		(8) White topping	0.00%
		(9) Widening, and repair of culverts	0.00%
		i) Box culvert	1.36%
		ii) Hume Pipe Culverts	0.63%
		B.1 Reconstruction/New 2/4 - lane realignment/ bypass(Flexible pavement)	

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		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub base course	0.00%
		(3) Non-Bituminous base course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing course	0.00%
		B.2 Reconstruction/New 2/4 - lane realignment/ bypass(Rigid pavement)	
		(1) Site Clearance and Dismantling of existing road	0.00%
		(2) Earthwork up to top of the sub grade	0.00%
		(3) Sub base course	0.00%
		(4) Dry lean concrete (DLC) Course	0.00%
		(5) Pavement Quality Control (PQC) Course	0.00%
		C.1 Reconstruction/New Service road (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	0.28%
		(2) Sub base course	1.06%
		(3) Non-Bituminous base course	1.33%
		(4) Bituminous Base Course	2.13%
		(5) Wearing course	1.17%
		C.2 Reconstruction/New Service road (Rigid pavement)	

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		(1) Earthwork up to top of the sub grade	0.00%
		(2) Sub base course	0.00%
		(3) Dry lean concrete (DLC) Course	0.00%
		4) Pavement Quality Control (PQC) Course	0.00%
		D -Re-Construction and New Culvert on existing road, realignment, junctions, bypass.	
		Hume Pipe Culverts	0.37%
Minor Bridges/ Underpass/ overpass/VUPs	0.00%	A.1 Widening and Repair of Minor Bridges (length > 06 m and < 60 m)	
		(1) Minor Bridges	0%
		A.2 New Minor Bridges (length >6m and <60m).	
		(1) Foundation + Substructure on completion of foundation work including foundation for wing and return walls, abutment and piers up to the abutment /pier cap.	0.00%
		(2) Super-structure On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and marking tests on completion etc. Complete in all respect.	0.00%
		(3) Approaches On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.00%
		(4) Guide Bunds and River Training Works on completion of guide bunds and river training works complete in all respect.	0.00%

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		B.1 Widening and Repair of underpass/overpass	
		underpass/overpass	0.00%
		B.2 New underpass/overpass/VUP	
		(1) Foundation + Substructure on completion of foundation work including foundation for wing and return walls, abutment, piers up to the abutment/ pier cap.	0.00%
		(2) Super-structure On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and marking tests on completion etc. Complete in all respect.	0.00%
		Wearing coat (a) in case of overpass wearing coat including expansion joints complete in all respect as specified b) in case of underpass rigid pavement including drainage facility complete in all respect as specified.	0.00%
Major Bridge (length >60m) works and ROB/RUB/ elevated sections/ flyovers viaducts if any including approaches	83.99%	(3) Approaches On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.00%
		A-1 Widening and repairs of major bridges	
		(1)Foundation	0.00%
		(2)Sub-structure	0.00%
		3)Super structure (including Bearings)	0.00%
		(4)wearing coat including expansion joints	0.00%

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

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		5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%
		6) wing wall/return wall	0.00%
		7) Guide bunds, River Training work etc.	0.00%
		8) Approach (including Retaining walls, stone pitching and protection works)	0.00%
		A.2-New Major Bridges	
		(1)Foundation	0.00%
		(2)Sub-structure	0.00%
		3) Super structure (including bearing)	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		5) Miscellaneous items like hand rails, crash barriers, road marking etc.	0.00%
		6) wing wall/return wall	0.00%
		7) Guide bunds, River Training work etc.	0.00%
		8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		B.1-Widening and repair of a)ROB b)RUB	
		(1)Foundation	0.00%
		(2)Sub-structure	0.00%
		3)Super structure (including bearing)	0.00%
		(4) wearing coat including (a)in case of ROB wearing coat including expansion joints complete in all respect as specified and(b) in case of RUB rigid pavement under RUB including drainage facility complete in all respect as specified .	0.00%

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

	5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%
	6) wing wall/return wall	0.00%
	7) Approach (including Retaining walls, stone pitching and protection works)	0.00%
	B.2 New ROB/RUB a)ROB b)RUB	
	(1) Foundation	8.76%
	(2)Sub-structure	3.53%
	3)Super structure (including bearing)	24.99%
	(4) wearing coat including (a)in case of ROB wearing coat including expansion joints complete in all respect as specified and(b) in case of RUB rigid pavement under RUB including drainage facility complete in all respect as specified .	0.66%
	5) Miscellaneous items like (Staircase)	0.28%
	7) Approach (including Retaining walls, stone pitching and protection works)	
	Clearing & Grubbing, Excavation	0.52%
	Embankment & Subgrade	11.77%
	Sub Base Course	1.21%
	Dry Lean Concrete (DLC)	2.04%
	Pavement Quality Concrete(PQC)	12.66%
	RE Wall	8.58%
	Friction Slab of crash barrier of approaches	6.45%
	Crash Barrier of approaches	2.45%
	Approach slabs	0.10%

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

		C.1-Widening and repair of Elevated section /flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		3) Super structure (including bearing)	0.00%
		(4) Wearing coat including(a)in case of ROB wearing coat including expansion joints complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respect as specified .	0.00%
		5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%
		6) wing wall/return wall	0.00%
		7) Approach (including Retaining walls, stone pitching and protection works)	0.00%
		C.2-New Elevated section /flyovers/Grade Separators	
		(1)Foundation	0.00%
		(2)Sub-structure	0.00%
		3) Super structure (including bearing)	0.00%
		(4) wearing coat including a)in case of ROB wearing coat including expansion joints complete in all respect as specified and b) in case of RUB rigid pavement under RUB including drainage facility complete In all respect as specified.	0.00%
		5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%
		6) wing wall/return wall	0.00%
		7) Approach (including Retaining walls, stone pitching and protection works)	0.00%
Other Work (a) Slip Roads	7.68%	1) Toll Plaza and rest area	0.00%

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

(b) Diversion (c) Transition (d) Others.	2) Drain	
	a) Unlined	0.00%
	b) RCC box type drain for service road	4.71%
	c) Drain side/RE wall side kerb	0.34%
	3) Road signs, marking, km stones, safety device ,road delineators, cat eyes , rumble thermoplastic etc.	0.51%
	a) Overhead Sign boards	0.03%
	4) Toe Wall	0.00%
	5) Project facilities	
	a)Bus Bays	0.00%
	b)Truck lay-byes	0.00%
	c)Others (Street Lighting)	0.99%
	iv)Road side plantation	0.00%
	v) Repair of protection works other than approaches to the bridges, elevated sections/flyovers/grade separators and ROB's/RUBs.	
	4) Diversion, Safety and traffic management during construction.	0.62%
	(5) Dismantling of existing structures	0.00%
	(6) Utility Shifting	0.48%

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Stage for Payment	Percentage weight-age	Payment Procedure
1	2	3
Road works including Culverts, widening and repair of culverts.		
A- Widening and strengthening of existing road.		
(1) Earthwork up to top of the sub-grade	0.00%	--

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

(2) <u>Sub-base Course</u>	0.00%	--
(3) Non bituminous base course	0.00%	--
(4) Bituminous base course	0.00%	--
(5) Bituminous Wearing course	0.00%	--
(6) DLC Dry Lean Concrete	0.00%	--
(7) PQC Pavement Quality Concrete	0.00%	--
(8) White topping	0.00%	--
(9) Widening, and repair of culverts	0.00%	
i. Box culvert	1.36%	Payment shall be made on the completion of culvert
ii. Hume Pipe Culverts	0.63%	Payment shall be made on the completion of culvert
B.1 Reconstruction/New 2/4 - lane realignment/ bypass(Flexible pavement)		
(1) Earthwork up to top of the sub-grade	0.00%	--
(2) Sub base course	0.00%	--
(3) Non-Bituminous base course	0.00%	--
(4) Bituminous Base Course	0.00%	--
(5) Wearing course	0.00%	--
B.2 Reconstruction/New 2/4 - lane realignment/ bypass(Rigid pavement)		
(1) Site Clearance and Dismantling of existing road	0.00%	--
(2) Earthwork up to top of the sub grade	0.00%	--
(3) Sub base course	0.00%	--
(4) Dry lean concrete (DLC) Course	0.00%	--

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

[Type text]

(5) Pavement Quality Control (PQC) Course	0.00%	--
C.1 Reconstruction/New Service road (Flexible pavement)	0.00%	
(1) Earthwork up to top of the sub-grade	0.28 %	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 25 (twenty five) percent of the total length.
(2) Sub base course	1.06%	
(3) Non-Bituminous base course	1.33%	
(4) Bituminous Base Course	2.13%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 50 (fifty) percent of the total length.
(5) Wearing course	1.17%	
C.2 Reconstruction/New Service road (Rigid pavement)		
(1) Earthwork up to top of the sub grade	0.00%	--
(2) Sub base course	0.00%	--
(3) Dry lean concrete (DLC) Course	0.00%	--
4) Pavement Quality Control (PQC) Course	0.00%	--
D -Re-Construction and New Culvert on existing road, realignment, junctions, bypass.		
Hume Pipe Culverts	0.37%	Payment shall be made on the completion of culvert
Minor Bridges / Underpass / overpass / VUPs		
A.1 Widening and Repair of Minor Bridges (length > 06 m and < 60 m)		

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[Type text]

(1) Minor Bridges	0%	--
A.2 New Minor Bridges (length >6m and <60m)		
(1) Foundation + Substructure on completion of foundation work including foundation for wing and return walls, abutment and piers up to the abutment / pier cap.	0.00%	--
(2) Super-structure On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and marking tests on completion etc. Complete in all respect.	0.00%	--
(3) Approaches On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.00%	--
(4) Guide Bunds and River Training Works on completion of guide bunds and river training works complete in all respect.	0.00%	--
B.1 Widening and Repair of underpass/overpass		
underpass/overpass	0.00%	--
B.2 New underpass/overpass/VUP		
(1) Foundation + Substructure on completion of foundation work including foundation for wing and return walls, abutment, piers up to the abutment/ pier cap.	0.00%	
(2) Super-structure On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and marking tests on completion etc. Complete in all respect.	0.00%	

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[Type text]

Wearing coat (a) in case of overpass wearing coat including expansion joints complete in all respect as specified b) in case of underpass rigid pavement including drainage facility complete in all respect as specified.	0.00%	--
(3) Approaches On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.00%	--
Major Bridge (Length > 60m) works and ROB / RUB / elevated sections / fly overs viaducts if any including approaches		
A-1 Widening and repairs of major bridges		
(1)Foundation	0.00%	--
(2)Sub-structure	0.00%	--
3)Super structure (including Bearings)	0.00%	--
(4)wearing coat including expansion joints	0.00%	--
5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%	--
6) wing wall/return wall	0.00%	--
7) Guide bunds, River Training work etc.	0.00%	--
8) Approach (including Retaining walls, stone pitching and protection works)	0.00%	--
A.2-New Major Bridges		
(1)Foundation	0.00%	--
(2)Sub-structure	0.00%	--
3) Super structure (including bearing)	0.00%	--

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[Type text]

(4) Wearing Coat including expansion joints.	0.00%	--
5) Miscellaneous items like hand rails, crash barriers, road marking etc.	0.00%	--
6) wing wall/return wall	0.00%	--
7) Guide bunds, River Training work etc.	0.00%	--
8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	--
B.1-Widening and repair of a)ROB b)RUB		
(1)Foundation	0.00%	--
(2)Sub-structure	0.00%	--
3)Super structure (including bearing)	0.00%	--
(4) wearing coat including (a)in case of ROB wearing coat including expansion joints complete in all respect as specified and(b) in case of RUB rigid pavement under RUB including drainage facility complete in all respect as specified .	0.00%	--
5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%	--
6) wing wall/return wall	0.00%	--
7) Approach (including Retaining walls, stone pitching and protection works)	0.00%	--
B.2 New ROB/RUB a)ROB b)RUB		
(1) Foundation	8.76%	Unit of measurement is number. Payment of each stage shall be made on pro rata basis on completion of a stage in number of not less than one number.
(2)Sub-structure	3.53%	
3)Super structure (including bearing)	24.99%	Unit of measurement is linear length. Payment of each stage

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[Type text]

		shall be made on pro rata basis on completion of a stage in a length of not less than 20 (twenty) percent of the total length.
(4) wearing coat including (a) in case of ROB wearing coat including expansion joints complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respect as specified .	0.66%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 50 (fifty) percent of the total length.
5) Miscellaneous items like (Staircase)	0.28%	Payment shall be made on the completion of staircase
7) Approach (including Retaining walls, stone pitching and protection works)		
Clearing , Grubbing&Excavation	0.52%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 20 (twenty) percent of the total length.
Embankment & Subgrade	11.77%	
Sub Base Course	1.21%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 25 (twenty five) percent of the total length.
Dry Lean Concrete (DLC)	2.04%	
Pavement Quality Concrete (PQC)	12.66%	
RE Wall	8.58%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 20 (twenty) percent of the total length.
Friction Slab of crash barrier of approaches	6.45%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 25 (twenty five) percent of the total length.
Crash Barrier of approaches etc.	2.45%	

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[Type text]

Approach slab	0.10%	Payment shall be made on the completion of approach slab
C.1-Widening and repair of Elevated section /flyovers/Grade Separators		
(1) Foundation	0.00%	--
(2) Sub-structure	0.00%	--
3) Super structure (including bearing)	0.00%	--
(4) Wearing coat including(a)in case of ROB wearing coat including expansion joints complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respect as specified .	0.00%	--
5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%	--
6) wing wall/return wall	0.00%	--
7) Approach (including Retaining walls, stone pitching and protection works)	0.00%	--
C.2-New Elevated section /flyovers/Grade Separators		
(1)Foundation	0.00%	--
(2)Sub-structure	0.00%	--
3) Super structure (including bearing)	0.00%	--
(4) wearing coat including a)in case of ROB wearing coat including expansion joints complete in all respect as specified and b) in case of RUB rigid pavement under RUB including drainage facility complete in all respect as specified.	0.00%	--
5) Miscellaneous items like (hand rails, crash barriers, road marking etc.)	0.00%	--
6) wing wall/return wall	0.00%	--
7) Approach (including Retaining walls, stone pitching and protection works)	0.00%	--

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[Type text]

Others		
1) Toll plaza and rest area	0.00%	
2) Drain		
a) Unlined	0.00%	
b) RCC box type drain for service road	4.71%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 25 (twenty five) percent of the total length.
c) Drain /RE wall side kerb	0.34%	Payment shall be made on the 100% completion of work
3) Road signs, marking, km stones, safety device	0.51 %	Payment shall be made on the 100% completion of work
a) Overhead Sign boards	0.03%	Payment shall be made on the 100% completion of work
4) Toe Wall	0.00%	--
5) Project facilities		
a)Bus Bays	0.00%	--
b)Truck lay-byes	0.00%	--
c)others (Street Lighting)	0.99%	Payment shall be made on the 100% completion of work
iv)Road side plantation	0.00%	--
v) Repair of protection works other than approaches to the bridges, elevated sections/flyovers/grade separators and ROB/RUBs.		
4) Diversion, Safety and traffic management during construction.	0.62%	Payment shall be made on the 50 % completion of work
(5) Dismantling of existing structures	0.00%	
(6) Utility Shifting (Electrical)	0.48%	Unit of measurement is as per completed activities. Cost per activity shall be determined on Pro-rata basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed

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[Type text]

		activity. (The average weightage of major activities(Only for payment purpose) in shifting work is (i)Erection of poles- 20%, (ii)Conductor stringing including laying of cable-30%, (iii)DTR erection (if involved)- 15% and (iv) charging of line including dismantling and site clearance-35% (With DTR) and 50% without DTR.
--	--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

2. Procedure for payment for Maintenance

- 2.1 The cost for maintenance shall be as stated in Clause 14.1.1.
- 2.2 Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Clause 19.7.

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[Type text]

Schedule - I*(See Clause 10.2 (iv))***Drawings****1. 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.

2. 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**

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

- a) Drawings of horizontal alignment, vertical profile and cross section.
- b) Drawings of drainage plan and profile.
- c) Drawing of cross drainage works.
- d) Drawings of major intersections and ROB.
- e) Drawing of toll plaza layout, toll collection systems and roadway near toll plaza
- f) Drawings of bus-bay and bus shelters with furniture and drainage system.
- g) Drawing of road furniture items including traffic signage, markings, safety barriers, etc.
- h) Drawings of traffic diversion plans and traffic control measures.
- i) Drawings of road drainage measures
- j) Drawing of typical details slope protection measures.
- k) Drawing of a landscaping and horticulture.
- l) Drawings of pedestrian crossings
- m) Drawings of street lighting.

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- n) General arrangement of Base camp and Administrative Block
- o) Drawings of catch water drains check drains.
- p) Any other drawings which Authority's Engineer may review.

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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 **189th (One hundred and eighty Nine) days** 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

- (i) Project Milestone-II shall occur on the date falling on the **324th (Three Hundred Twenty Four) days** from the Appointed Date (the “**Project Milestone- II**”).
- (ii) 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 **35% (thirty-five percent)** of the Contract Price **and should have started construction of all bridges**

4. Project Milestone-III

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalishaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

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- (i) Project Milestone-III shall occur on the date falling on the **459th (Four Hundred Fifty Nine) days** from the Appointed Date (the “**Project Milestone- III**”).
- (ii) 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 **70% (seventy percent)** of the Contract Price and **should have started construction of all project facilities.**

5. Scheduled Completion Date

- (i) The Scheduled Completion Date shall occur on the Scheduled Construction Period **540th days** from the Appointed Date.
- (ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction 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 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 there upon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

2. Tests

- (i) **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 [***].
- (ii) **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 equipments and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometre.
- (iii) **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) metres or more shall also be subjected to load testing.

- (iv) **Pavement Strength:** The pavement strength is to be measured using Falling Weight Deflectometer (FWD), at least once a year upon Completion of Project.
- (v) **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, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.
- (vi) **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.
- (vii) **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 of pavement	Network Survey Vehicle(NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Survey Vehicle(NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	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.

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Schedule - L*(See Clause 12.2)***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 ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon - Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra on EPC mode.(the "**Project Highway**") 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 form in 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)

Construction of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra

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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, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	Bridges and Culverts	

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S. No.	Item/Defect/Deficiency	Percentage
(i)	Desilting, cleaning, vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	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, road markings, 200 m/km/5 th km stones	5%
(f)	Miscellaneous Items	
(i)	Removal of dead animals, broken down/accident 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 of particular item shall be calculated as under:

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

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

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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 as one kilometer.

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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 accordance with 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 of ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisingaon section of NH 753J in the state of Maharashtra on EPC mode (Recall Tender) 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 meaning respectively 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

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- (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 which creates 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 ensure that NSV survey shall be conducted at the following intervals: (13.11.2019)
 - (a) Before start of the work,
 - (b) Before issue of provisional/ final completion certificate,
 - (c) Every 6 months after completion of work
 - (d) The NSV reports shall be uploaded on PMIS and RAMS portal (<http://nsvsurvey.nhai.org/NSVsurvey/>)
 - (v) The Authority's Engineer in consultation with the Authority shall update PMIS Portal of the Ministry (<https://pmis.morthedisha.gov.in/>) and also ensure uploading Monthly and Quarterly Progress Report along with Strip Chart on PMIS Portal. Such updations shall be done on the last date of every month/ quarter and if required, on a weekly basis as advised by the Authority.

Monthly invoices towards services of the Authority's Engineer shall not be admitted for payment in case of non-compliance of the above.

- (vi) 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's prior approval in accordance with the provisions of Clause 18.2.
- (vii) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.
- (viii) 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 a period 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) of the 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

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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 with Good 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 forth with, 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 required to 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 Engineer in 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 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 - 0

(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 to the last claim;
- (d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the 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:

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- (a) the monthly payment admissible in accordance with the provisions of the Agreement;
- (b) the deductions for maintenance work not done;
- (c) net payment for maintenance due, (a) minus(b);
- (d) amounts reflecting adjustments in price under Clause 19.12; and
- (e) amount towards deduction of taxes

3. Contractor's claim for Damages

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 to 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 on to 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

- (i) 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 on the number of occurrences.
- (ii) The insurance cover shall be not less than: Rs. [*****]
- (iii) 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 the Contractor and the Authority.

Schedule-Q*(See Clause 14.10)***Tests on Completion of Maintenance Period****1. Riding Quality test:**

Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,200 (Two Thousand and Two Hundred only)] mm for each kilometre.

2. 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 measurement of cracking, rutting, stripping and pot holes and shall be as per the requirement of maintenance mentioned in Schedule-E.

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 ROB at LC 115B (near Nastanpur) at Km 126/150 of Nandgaon -Chalisgaon section of NH 753J in the state of Maharashtra on EPC mode of Maharashtra [on EPC mode \(Recall Tender\)](#) 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)

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