Schedules

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

1.1 2-lane/2-lane with Paved Shoulder shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

1.2 The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

1.3 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 8.2.1 of this Agreement.

1.4 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 upgraded. The proposed profile of the Project Highways shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The contractor, however, improve/upgrade the Road Profileas indicated in Annexure-III based on site/design requirement.

1.5 The status of the environment clearances obtained or awaited is given in Annex IV.

Annex - I

(Schedule-A)

Site

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; Further, upon award of work, NDT testing of all the structural elements, if contractor feels to do so, are the obligation of Contractor, to ensure the safety and structural integrity of completed work before commencing the balance works.

1. Site

The Site of the 2-lane Creek Bridge at Middle Strait comprises the section of National Highway-223 (New NH-04) commencing from existing chainage, Km. 106.590 (***on Middle Strait Jetty Side, South Andaman Island***) and meets at existing chainage, Km. 107.762 (***on Nilambur Jetty side, Baratang Island***). The proposed Bridge lies in Andaman & Nicobar Islands. The land, carriageway and structures comprising the Site are described below.

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.	Chainage (Km)		ROW (m)	Remarks
	From	To		
1	106.590	107.762	18	Along the bridge alignment

3. Carriageway

The present carriageway of the existing Road NH- 04 on either side of Middle Strait Creek i.e., upto Middle Strait Jetty on south Andaman Island side and from Nilambur Jetty on Baratang Island side varies from single lane to intermediate lane. The type of the existing pavement is flexible.

4. Major Bridges

The present Major Bridge is partly constructed and the details of various components of the proposed Major Bridge which have been constructed and exists as on date are as described below. **The Plan and Profile & GAD of the Bridge is annexed**.

4.1 Details of existing Piles:

Completed Piles			
Sr.no.	**Bridge Component**	**Design chainage**	**No of piles**
1	Abutment-1	000+580	6
2	Pier-P1	000+640	9
3	Pier-PC 5	001+000	2
4	Pier-P6	001+060	9
5	Pier-P7	001+120	6
6	Pier-P8	001+180	6
7	Pier-P9	001+240	6
8	Pier-P10	001+300	6
9	Pier-P11	001+360	6
10	Pier-P12	001+420	6
11	Pier-P13	001+480	6
12	Abutment-A2	001+540	6

4.1 Details of existing Pile Cap:

Sr.no.	Bridge component	Design chainage
1	Pier-P1	000+640
2	Pier-P6	001+060
3	Pier-P7	001+120
4	Pier-P8	001+180
5	Pier-P9	001+240
6	Pier-P10	001+300
7	Pier-P11	001+360
8	Pier-P12	001+420
9	Pier-P13	001+480
10	Abutment-A2	001+540

4.2 Details of existing Pier Shaft:

Existing Pier shaft location				Status
Sr.no.	**No.**	**Design chainage**	**Pier shaft Done (qty)**	
	P6	001+060		Partially completed
1	P7	001+120	1	
2	P8	001+180	1	
3	P9	001+240	1	
4	P10	001+300	1	
5	P11	001+360	1	

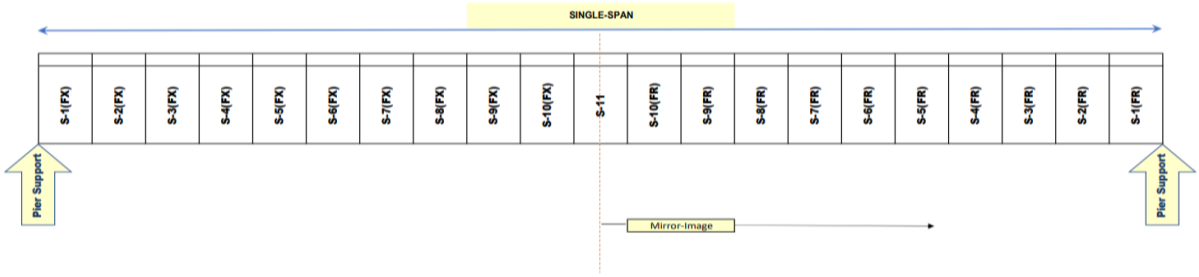
Existing Pier shaft location				Status
Sr.no.	No.	Design chainage	Pier shaft Done (qty)	
6	P12	001+420	1	
7	P13	001+480	1	
8	A2	001+540	1	

4.3 Details of existing Precast Box Girder Segments:

Segment casting Quantity			
Sr.no.	Span no.	Segment casting arrangement.	casting completed
1	Span-14	S-1FX, S-3FX	2
2	Span-15	S-1FX, S-2FX, S-3FX, S-4FX, S-5FX, S-6FX, S-8FX, S-9FX, S-10FX, S-11, S-1FR, S-2FR, S-3FR, S-4FR, S-5FR, S-6FR, S-8FR, S-9FR, S-10FR	19
3	Span-16	S-1FX, S-2FX, S-3FX, S-4FX, S-5FX, S-6FX, S-7FX, S-8FX, S-9FX, S-10FX, S-1FR, S-2FR, S-3FR, S-4FR, S-5FR, S-6FR, S-7FR, S-8FR, S-9FR, S-10FR	20

Segments nomenclature as under.

Figure 1: Reference figure for Table-04, details of typical segments arrangement, for every single span of Bridge



4.4 **Inspection Bungalow:** An inspection Bungalow (G+1 Floor) with total built up area of 238.62 Sqm (111.10 Sqm at ground floor +127.52 at first floor) as per plan attached at **Drawing-2** (Chainage 109+500) has been partially completed. Following items of work are to be completed:

(i) Plaster work

(ii) Tile work

(iii) Furnishing& Utensils

(iv) Painting work

(v) Plumbing work

(vi) Electrical work

(vii) False ceiling work

1. **Road over-bridges (ROB)/ Road under-bridges (RUB)**

   NIL

2. **Grade separators**

   NIL

3. **Minor Bridges**

   NIL

4. **Railway level crossings**

   NIL

5. **Underpasses (vehicular, non vehicular)**

   NIL

6. **Culverts**

   NIL

7. **Bus Bays**

   NIL

8. **Truck Lay byes**

   NIL

9. **Road side drains**

   NIL

10. **Major junctions**

    NIL

11. **Minor junctions**

    NIL

12. **Bypasses**

    NIL

13. **Design Chainages corresponding to Existing Chainage**

    The relationship between the "Existing Chainage" and the "Design Chainage" as per field surveys is given below.

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Remark
1	106.590	0+000	Start of Bridge approach
2	107.762	1+963	End of Bridge approach

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:

Sr. No	From km to km (Design Chainage)	Length (km)	Width (m)	Date of providing from Appointed Date*
1	2	3	4	5
(i) Full Right of Way (Full width)	0.000 to 1.963	1.963	18	On Appointed Date

Annex - III

(Schedule-A)

Alignment Plans

The proposed alignment of the bridge shall be as per the **alignment plan** with the document.

Annex - IV

(Schedule-A)

Environment Clearances

1. The environment clearance is not required in light of circular S.O. 2559(E) dated 22.08.2013 of MOEF.

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 Middle Strait Creek Bridge including approaches on Project Highway as described in this Schedule-B and in Schedule-C.

2. Rehabilitation and augmentation

Rehabilitation and augmentation shall include Two-Laning and strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

4. Aggregates:

The contractor shall arrange the aggregates required for works from mainland India/Asian countries at his own cost. The local aggregates available in A&N shall not be allowed to use in the works. The Contractor shall not be allowed to any EoT/CoS for the non-availability of aggregates in the locality at UT of A&N. The provision of rates of aggregates from mainland India has been made in the cost put to tender therefore, bidders need to carry out due diligence while quoting the bid.

Annex - I

(Schedule-B)

Description of Two-Laning

1 WIDENING OF THE EXISTING HIGHWAY

1.1 The Project Highway shall follow the new alignment along the proposed bridge 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.

1.2 WIDTH OF CARRIAGEWAY

1.2.1 The overall width of proposed bridge shall be undertaken as 14.8 m. The carriageway of the bridge shall be 10.5 m wide in accordance with the cross sections drawings given in **enclosed GAD**. The carriageway width of the approaches on either side of the bridge portion shall be 10.5 m with 0.75m shoulders on either side.

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross- sectional features shall conform to paragraph 1.2.1 above.

2 GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

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

2.2 Design speed

The proposed bridge location of the Project road is passing through hilly terrain. For geometric design of the Bridge and approaches, design speed is used as primary index that links road function, traffic flow and terrain to the design patterns of sight distance and curvature to ensure that a driver is presented with a reasonable and consistent operating environment. The design speed should correspond to general topography and adjacent land use. The speed selected for design should also cater to travel needs and habits of nearly all the road users. The present project stretch has been designed for speed of 80 km/hr. However keeping in view, the adjacent Jarwa Reserve forest where speed restrictions have already been imposed, use of speed advisory signs is proposed at locations such as sharp curves where design speed cannot be maintained and a lower design speed up to 80

km/hr is adopted. These values are considered logical from safety point of view for driving heavy commercial vehicles over short distances.

2.3 Improvement of the existing road geometrics

In the following sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided.

2.4 Right of Way

Proposed right of way is taken as 18m. Other details of the Right of Way are given in Annex II of Schedule-A.

2.5 Type of shoulders

(a) In approaches, an earthen shoulder of 0.75 m width on both side of the pavement is proposed. Metal beam crash barrier is to be provided wherever the height of embankment is more than 3.0m.

(b) In bridge portion, footpaths of width 1.5m on both sides of the carriageway shall be provided.

2.6 Lateral and vertical clearances at Bridge Location

2.6.1 Lateral clearances at bridge portion shall be 60 m between center to center of the piers and vertical clearances shall be **22.5 m above HTL** and provision of guardrails/crash barriers shall be as shown in the GAD enclosed.

2.7 Lateral and vertical clearances at overpasses & Underpasses

NIL

2.8 Service roads

NIL

2.9 Grade separated structures

NIL

2.10 Cattle and pedestrian underpass /overpass

NIL

2.11 Typical cross-sections of the Project Highway

No.	Location (Design Chainage)		Width (m)	Length (M)	Typical Cross section (Ref. to enclosed drawing in tender documents)
	From (Km)	To (Km)			
1	0.00	0.240	12.0	240	TCS IA
2	0.240	0.390	12.0	150	TCS I B
3	0.390	0.400	14.4	10	TCS I B (Approach Slab)
4	0.400	0.415	14.8	15	TCS-III (Voided Slab)
5	0.415	1.375	14.8	960	TCS II (Bridge Proper)
6	1.375	1.390	14.8	15	TCS-III (Voided Slab)
7	1.390	1.400	14.4	10	TCS I B (Approach Slab)
8	1.400	1.550	12.0	150	TCS I B
9	1.550	1.963	12.0	413	TCS IA
Sum Total				**1963**	

2.12 Distribution of TCS type-:

Sr.NO.	TCSTYPE	LENGT (M)
1	TCS IA (New Construction of 2L+PS in approaches)	653
	TCS IB (New Construction of 2L+PS in approaches with retaining wall including approach slab)	320

2	TCS II (New Construction of 2L+Footpath at proposed bridge portion; over Precast Post-tensioned Box Girders)	960
3	TCS III (New Construction of 2L + Footpath at proposed bridge portion; over voided slab)	30
TOTAL LENGTH (M)		**1963**

3 INTERSECTIONS AND GRADE SEPARATORS

All intersections shall be as per drawings of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

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

(a) Major At-grade intersections

Sr. No.	Location of intersection	Type of intersection	Other features	Remarks
1	0.000	NH	Y	Junction of existing NH with project alignment on Middle Strait Jetty Side (within Jarwa Reserve Forest Area)
2	1.963	NH	Y	Junction of existing NH with project alignment on Nilambur Jetty Side (Baratang Island)

4. R OAD EMBANKMENT AND CUT

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in section 4 of the Manual and the specified cross sectional details. **The existing ground levels mentioned in the plan and profile & GAD drawing are indicative of nature**. The bidders may ascertain these existing ground levels at their end before bidding and variations, if any, may be taken into account in their bid.

4.2 R AISING OF THE EXISTING ROAD

NIL

5. PAVEMENT DESIGN

5.1 Pavement design shall be carried out in accordance with Section 5 of the manual.

5.2 Type of pavement: Pavement in approaches shall be flexible with minimum

thicknesses as proposed under

Sr. No.	Type of Pavement	Rigid Pavement Thickness (in mm) (As per IRC 58:2011)
1.	BC	40 mm
2.	DBM	50 mm
3.	WMM (with PP-biaxial Geogrid)	150 mm
4.	GSB with Geocell of 150mm	150 mm
5.	Two layered Sub-grade (with bottom 300 mm thickness with Borrowed area soil of CBR 8% & Stone Soling top layer of 200 mm thickness to achieve an effective CBR of 10% or more for further laying of crush; geotextile use for separation layer.)	500mm

5.3 Design requirements

The following parameters are required for designing of new pavement

Parameters	**Values considered for Design of New Pavement**
Design Life (Years)	30 years
Initial Traffic (Commercial Vehicles per day in 2014)	1000
Growth Rate	7.5%
Traffic Loading in Million Standard Axles (MSA) in 2030	20.0 MSA
CBR (%) of Subgrade Soil	10.0%

5.3.1 Design Period and strategy

Flexible Pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 30 years. Stage construction shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 20.0 million standard subject to minimum crust thickness of each layer as provided vide para 5.2 above.

5.4 Reconstruction of stretches

As the project stretch with Middle Strait Creek Bridge and its approaches is a new alignment, proposal being given for this project stretch has no existing road portion except at the two major junctions mentioned in para-3 (a) above, hence reconstruction of any existing stretch is not applicable. However, improvement of

junctions shall require necessary improvement/reconstruction.

6. ROADSIDE DRAINAGE

In approaches on either side of the bridge, longitudinal lined Trapezoidal drain with 0.5 -0.75 m width is proposed to be constructed all along the roadway on the hill side with a toe wall.

7. DESIGN OF STRUCTURES

7.1 General

7.1.1 All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the Manual and shall conform to the cross-sectional features and other details specified in the GAD enclosed.

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

Sr.no.	Location (Km) Design Ch.		Span	Length (m)	Width (m)	Type
	From	To				
1	0.580 (Abut.-1)	1.540 (Abut.-2)	16x60.0m	960	14.8	Post-Tensioned PSC–Box Superstructure
2	0.565	0.580	1x15.0 m	15	14.8	Voided Slab
3	1.540	1.555	1x15.0 m	15	14.8	Voided Slab

7.1.3 The structures which shall be provided with footpaths:

Width of Railing & Crash Barrier: 200 mm wide railing & 450 mm wide crash barrier on both side of carriageway of Bridge portion	**Footpath : 1500 mm (Both Sides) of carriageway of Bridge portion**

7.1.4 Bridge shall be high-level bridge.

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

Sr. No.	Name of Bridge	Utility service to be carried
1	Middle Strait Creek Bridge	Electric line , OFC Line, Water Pipe Line

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

7.2 Culverts

7.2.1 Overall width of all culverts shall be equal to the roadway width (18 m) of the approaches.

7.2.2 *Reconstruction of existing culverts* - Nil

7.2.3 *Widening of existing culverts* - Nil

7.3 Bridges

7.3.1 Existing bridges to be re- constructed/widened

NIL

7.3.2 Additional new bridge

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

Sr.no.	Location (Km) Design Ch.		Span	Length (m)	Width (m)	Type
	From	To				
1	0.580 (Abut.-1)	1.540 (Abut.-2)	16x60.0m	960	14.8	Post-Tensioned PSC–Box Superstructure
2	0.565	0.580	1x15.0 m	15	14.8	Voided Slab
3	1.540	1.555	1x15.0 m	15	14.8	Voided Slab

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

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

7.3.5 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of theManual

7.3.6 Structures in marine environment

The present project stretches which includes Middle Strait Creek Bridge and its approaches is in marine environment.

7.4 Rail-road bridges

NIL

7.5 Grade separated structures

NIL

7.6 Repairs and strengthening of bridges and structures

NIL

7.7 List of Major Bridges and Structures

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

Sr. No.	Location (Km)Design Ch.		Span	Length (m)	Width (m)	Type
	From	To				
1	0.580 (Abut.-1)	1.540 (Abut.-2)	16x60.0m	960	14.8	Post-Tensioned PSC–Box Superstructure
2	0.565	0.580	1x15.0 m	15	14.8	Voided Slab
3	1.540	1.555	1x15.0 m	15	14.8	Voided Slab

7.8 Details of Balance work:

7.8.1 Pile work:

Balance Pile Work			
Sr.no.	**Description**	**Design chainage**	**Balance (Qty)**
1	Piles under Pier-P2	000+700	9 Nos
2	Piles under Pier-PC1	000+760	9 Nos
3	Piles under Pier-PC2	000+820	9 Nos
4	Piles under Pier-PC3	000+880	9 Nos
5	Piles under Pier-PC4	000+940	9 Nos
6	Piles under Pier-PC5	001+000	7 Nos
7	Piles under Abutment (Port Blair side)-AC-1	000+565	6 Nos
8	Piles under Abutment (Baratang side)-AC-2	001+555	6 Nos

7.8.2 Pile caps:

Balance Pile cap Work			
Sr.no.	**Description**	**Design chainage**	**Balance (Qty)**
1	Pile cap under Pier-A1	000+580	1 Nos
2	Pile cap under Pier-P2	000+700	1 Nos
3	Pile cap under Pier-PC1	000+760	1 Nos
4	Pile cap under Pier-PC2	000+820	1 Nos
5	Pile cap under Pier-PC3	000+880	1 Nos
6	Pile cap under Pier-PC4	000+940	1 Nos
7	Pile cap under Pier-PC5	001+000	1 Nos
8	Pile cap under Abutment (Port Blair side)-AC-1	000+565	1 Nos
9	Pile cap under Abutment (Baratang side)-AC-2	001+555	1 Nos

7.8.3 Pier & Abutments Shaft:

Balance Pier shaft Work				
Sr.no.	**No.**	**Design chainage**	**Balance (Qty)**	**Remarks**
1	Pier -A1	0+580	1Nos	
2	Pier-P1	0+ 640	1Nos	
3	Pier-P2	0+700	1Nos	
4	Pier-PC1	0+760	1Nos	
5	Pier-PC2	0+820	1Nos	
6	Pier-PC3	0+880	1Nos	
7	Pier-PC4	0+940	1Nos	
8	Pier-PC5	1000	1Nos	
9	Pier-P6	1000+ 060	1Nos	Partially balance
10	Abutment (Port Blair side)-AC-1	000+565	1Nos	New Addition as per site requirement
11	Abutment (Baratang side)-AC-2	001+555	1Nos	

7.8.4 Pier Cap:

Balance Pier cap Work			
Sr.no.	**No.**	**Design chainage**	**Balance (Qty)**
1	Pier -A1	000+580	1 Nos
2	Pier-P1	000+640	1 Nos
3	Pier-P2	000+700	1 Nos
4	Pier-PC1	000+760	1 Nos
5	Pier-PC2	000+820	1 Nos
6	Pier-PC3	000+880	1 Nos
7	Pier-PC4	000+940	1 Nos
8	Pier-PC5	001+000	1 Nos
9	Pier-P6	001+060	1 Nos
10	Pier-P7	001+120	1 Nos
11	Pier-P8	001+180	1 Nos
12	Pier-P9	001+240	1 Nos
13	Pier-P10	001+300	1 Nos
14	Pier-P11	001+360	1 Nos

15	Pier-P12	001+420	1 Nos
16	Pier-P13	001+480	1 Nos
17	Pier-A2	001+540	1 Nos
18	Abutment Cap (Port Blair side)-AC-1	000+565	1 Nos
19	Abutment Cap (Baratang side)-AC-2	001+555	1 Nos

7.8.5 Box Girder Segment Casting

Balance Box Segment casting		
Sr.no.	**Span no.**	**casting Balance (Qty)**
1	Span-1	21 Nos
2	Span-2	21 Nos
3	Span-3	21 Nos
4	Span-4	21 Nos
5	Span-5	21 Nos
6	Span-6	21 Nos
7	Span-7	21 Nos
8	Span-8	21 Nos
9	Span-9	21 Nos
10	Span-10	21 Nos
11	Span-11	21 Nos
12	Span-12	21 Nos
13	Span-13	21 Nos
14	Span-14	19 Nos
15	Span-15	2 Nos
16	Span-16	1 Nos
17	Voided Slab between AC-1 & P-1 -15m	1 Nos
18	Voided Slab between AC-2 & P-13-15m	1 Nos

7.8.6 Box Girder Segment & Voided Slab Launching, Stressing and Fixing in all respect:

Balance Segment Launching		
Sr.no.	**Span no.**	**Balance (Nos)**
1	Span-1	21 Nos
2	Span-2	21 Nos
3	Span-3	21 Nos
4	Span-4	21 Nos
5	Span-5	21 Nos

Balance Segment Launching		
Sr.no.	**Span no.**	**Balance (Nos)**
6	Span-6	21 Nos
7	Span-7	21 Nos
8	Span-8	21 Nos
9	Span-9	21 Nos
10	Span-10	21 Nos
11	Span-11	21 Nos
12	Span-12	21 Nos
13	Span-13	21 Nos
14	Span-14	21 Nos
15	Span-15	21 Nos
16	Span-16	21 Nos
17	Voided Slab btw AC-1 & P-1 -15m	1 Nos
18	Voided Slab btw AC-2 & P-13-15m	1 Nos

7.8.7 Balance Approach work.

RCC Retaining wall				
Sr.no.	**Location (Design Chainage)**		**Length (m)**	**TCS Type**
	From	**To**		
1	000+240	000+390	150 m	TCS I (B)
2	001+400	001+550	150 m	TCS I(B)

7.8.8 Viaduct in Approaches:

Sr.no.	**Location (Design Chainage)**		**Width**	**Length**	**TCS Type**
	From	**To**			
1	000+400	000+415	14.8	15 m	Voided Slab-Cross-section
2	001+375	001+390	14.8	15 m	

7.8.9 Road work in approaches:

Balance Approach work					
Sr.no.	**Location (Design Chainage)**		**Width**	**Length**	**TCS Type**
	From	**To**			

1	000+000	000+240	12	240.00	TCS I(A)
2	001+550	001+963	12	413.00	TCS I(A)

7.8.10 Approach Slab

Sr.no.	Location (Design Chainage)		Width	Length
	From	To		
1	000+390	000+400	14.8	10 m
2	001+390	001+400	14.8	10 m

7.8.11 Other Balance Works:

Balance other works		
Sr.no.	**Description**	**Remarks**
1	Wearing coat	
2	Crash Barrier & hand rail over Bridge	
3	Painting	
4	Bearing fixing	
5	Metal Beam Crash barrier	
6	Expansion joint	
7	Road marking & Signages and other miscellaneous works	

8. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

a. Traffic control devices and road safety works shall be provided in accordancewith Section 9 of the Manual.

b. Specifications of the reflective sheeting shall as per latest MORT&H Specifications.

9. ROADSIDE FURNITURE

a. Road side furniture shall be provided in accordance with the provisions of drawings and IRC/MoRT&H Specifications. Traffic sign, Kerb, Kerb channel, road marking, metal beam barrier, crash barrier, illumination, footpath etc. shall be provided as per IRC/MoRT&H Specifications.

10. COMPULSORY AFFORESTATION

The number of trees which are required to be planted by the Contractor as

compensatory Afforestation shall be five times that of the trees to be cut.

11. HAZARDOUS LOCATIONS

NIL

12. SPECIAL REQUIREMENTS FOR HILL ROADS

NIL

13. CHANGE OF SCOPE

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

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:

Balance Project facility		
Sr.no.	**Description**	**Remarks**
1	Roadside furniture;	
2	Pedestrian facilities	
3	Tree plantation;	
4	Lighting Facilities;	
5	Office cum IB	Partially completed

2 Description of Project Facilities

(a) **Roadside furniture** shall include Ordinary Km. Stone, 5th Km. stone, hectometer stone, boundary pillars, sign boards, pavement markings etc. and shall be as per relevant IRC codes and conforming to MORT&H Specifications.

(b) **Pedestrian facilities**: At all the major intersections and in built up-areas, footpaths of 1.5m width, Guard railings, Zebra-crossings, Pedestrian cross signs and flashing signals should be provided considering pedestrian safety.

(c) Tree plantation shall be done as per directions of Engineer-in- Charge

(d) Lighting: Along Middle Strait Bridge & approaches with two high mast at the at-grade junction.

(e) Office cum Inspection bungalow (G+1) of 250 sqm with all the furnishings of office & IB including 1.5 ton AC in the four rooms and lobby, Geyser, 2 sets of 36" TV, Refrigerator, Electrical power connection, all necessary plumbing & sanitary fittings and water supply tank/ tube well. (as per tender plan drawings, final working drawings shall be finalized with the approval of AE))

(f) Other Facilities: As per directions of Engineer-in-Charge

SCHEDULE - D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

5. Construction

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

6. 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 Two-Laning of Highways (IRC: SP: 73- 2015), referred to herein as the Manual & and MORTH Specifications for Road and Bridge Works. However, the overall width of proposed bridge of 14.8m shall be undertaken. The carriageway of the bridge shall be 10.5 m wide in accordance with the cross sections drawings give in GAD enclosed herewith.

Formation width of approaches shall be increased to overall width of bridge in at least for 90 m on either side of bridge followed by a transition of 1:20.

Annex - I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Two-Laning of Highways (IRC:SP:73-2015), referred to as the Manual, and MoRTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

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 The Lateral clearance between the piers of the bridge shall be minimum 60m and the vertical clearance within the waterway shall be minimum **22.5 m** above HTL for the Middle Strait Creek Bridge.

2.3 The Cross Section of the bridge portion and approach road of Middle Strait Creek Bridge shall be as per.

2.4 Anti-Corrosive/ Sulphate resistant cement shall be used for construction as per environmental conditions.

2.5 The Bridge structure need to be designed for "extreme" exposure conditions defined under section 14 of IRC:112 after following the laid down procedure in IRC:112. Besides, adequate protective measures for corrosion protection to concrete, reinforcing steel and prestressing steel should also be provided as per IRC :112 & IRC:SP:80-2008 in order to ensure adequate performance during designed service life of bridge structure.

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

1.1 The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

1.2 The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfillment 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.

1.3 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 beadopted.

[Specify all the relevant documents]

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

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.

a. 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: SP35. 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 Contractorshall 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 tothe Authority's Engineer.

b. Repairs on account of natural calamities

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

Annex - I

(Schedule-E)

Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

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

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

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**					
Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 -94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles **Minimum SN** / **Traffic Speed (Km/h)** 36 / 50 33 / 65 32 / 80 31 / 95 31 / 110		Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	IRC:SP:83-2008	180 days	IRC:SP:83-2008
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

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

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

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 > lm. Within 7days
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and

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

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

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

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

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 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	

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

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

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

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

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>100</td><td>360</td><td>180</td></tr><tr><td>80</td><td>260</td><td>130</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">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.</td><td>IRC:SP 84-2014</td></tr>
</table>

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

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

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

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

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

Table 4: Maintenance Criteria for Structures and Culverts:

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

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

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

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

Bridge-substructure	Cracks/spalling of concrete/rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.

Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
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 Balance works of Major Bridge over Middle Strait Creek between Km. 106.590 to km 107.762 of NH-04 connecting South Andaman & Baratang Island in the Union Territory of Andaman & Nicobar Islands on EPC Basis.

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

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

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

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

SCHEDULE - F

(See Clause 3.1.7(a))

APPLICABLE PERMITS

1 Applicable Permits

1.1 The Contractor shall obtain, as required under the Applicable Laws, the followingApplicable Permits:

(a) Permission of the State Government for extraction of boulders fromquarry;

(b) Permission of Village Panchayats and Pollution Control Board forinstallation of crushers;

(c) License for use of explosives;

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

(e) License from inspector of factories or other competent Authority forsetting up batching plant;

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

(g) Clearance of Village Panchayats and Pollution Control Board for settingup asphalt plant;

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

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

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

SCHEDULE – G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1.1)

[Performance Security/Additional Performance Security]

[National Highways and Infrastructure Development Corporation Ltd.New Delhi]

WHEREAS:

(A) _____ [name and address of contractor] (hereinafter

_____ [name and address of contractor] (hereinafter called the "**Contractor**") and National Highways and Infrastructure Development Corporation Ltd, 3rd Floor, PTI Building, 4, Parliament Street, New Delhi – 110001 (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "Agreement") for the **Construction of Balance works of Major Bridge over Middle Strait Creek between Km. 106.590 to km 107.762 of NH-04 connecting South Andaman & Baratang Island in the Union Territory of Andaman & Nicobar Islands on EPC Basis.** on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

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

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

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

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

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

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

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

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the

Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

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

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

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

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

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

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is

released earlier by the Authority pursuant to the provisions of the Agreement.

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

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

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

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

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

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

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

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

Form for Guarantee for Withdrawal of Retention Money

National Highways and Infrastructure Development
Corporation Ltd.New Delhi

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with the National Highways and Infrastructure Development Corporation Ltd, 3rd Floor, PTI Building, 4, Parliament Street, New Delhi – 110001, (hereinafter called the "**Authority**") for the **Construction of Balance works of Major Bridge over Middle Strait Creek between Km. 106.590 to km 107.762 of NH-04 connecting South Andaman & Baratang Island in the Union Territory of Andaman & Nicobar Islands on EPC Basis.**, subject to and in accordance with the provisionsof the Agreement.

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

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

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

1. The Bank hereby unconditionally and irrevocably 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 asthe Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in NHIDCL, that the Contractor has committed default in the

due and faithful performance of all or any of its obligations for 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 isin default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Retention Money.

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 90 (ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.

9. The Bank undertakes not to revoke this Guarantee during its currency, except

with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

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

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

12. This guarantee shall also be operable at our…..... Branch

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

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

SIGNED, SEALED AND DELIVERED

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

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

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

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

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

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

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

Form for Guarantee for Advance Payment

Managing Director, NHIDCL

3rd, PTI Building,

Parliament Street, New Delhi-110001

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the **Construction of Balance works of Major Bridge over Middle Strait Creek between Km. 106.590 to km 107.762 of NH-04 connecting South Andaman & Baratang Island in the Union Territory of Andaman & Nicobar Islands on EPC Basis.** on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing (@ Bank Rate) advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in 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")[$].

[$] The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment.We, …….. through our branch at ……. (the "**Bank"**) have agreed to furnish this bank guarantee (*hereinafter called the* **"Guarantee"**) for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably,

guarantees andaffirms 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 asthe Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in NHIDCL, that the Contractor has committed default in the due and faithful performance of all or any of its obligations 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 Contractorfor 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 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 reasonof 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 Advance Payment.

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 on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

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

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

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

12. Notwithstanding anything contained herein before, our liability under this Bank Guarantee is restricted to Rs._____(Rs._____in words) and the

[$] Insert a date being 90 (ninety) days after the end of one year from the date of payment of

the Advancepayment to the Contractor (in accordance with Clause 19.2 of the Agreement).

bank guarantee shall remain valid till_____. Unless a claim or ademand in writing is served upon us on or before___ _____all our liability under this Bank Guarantee shall cease.

13. This guarantee shall also be operable at our…Branch at New Delhi,

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

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

SIGNED, SEALED AND DELIVERED

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

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

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

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

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

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

Schedule-H

(See Clauses 10.1.4 and 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs …….. Cr.

Proportions of the Contract Price for different stages of Construction of the **Item**	**Weightage in percentage to the Contract Price**	**Stage for Payment**	**Percentage Weightage to particular item**
1	2	3	4
Road Works including Culverts, Minor Bridges, Underpasses, Overpasses, approaches to ROB/RUP/Major Bridges/Structure (but excluding Service Roads)	**3.53%**	**A- Widening and strengthening of Existing Road**	Nil
		B- New Two-Lane realignment/ bypass	-
		(1) Earthwork upto top of subgrade (including Embankment Filling)	57.38%
		(2) Granular Sub-Base with Geocell (sub-Base, Shoulders)	12.76%
		(3) Wet Mix Macadam with Geogrid (Base)	15.51%
		(4) Dense Bituminous Macadam (DBM)	7.88%
		(5) Bituminous concrete (BC)	6.47%
		C- New culverts, minor bridges, underpasses, Overpasses on existing road, realignments, bypasses	Nil
		Total	**100.00%**
Major Bridge works	**85.16%**	**A- Widening and Strengthening of Major Bridges**	Nil

		B- Widening and Strengthening of ROB/RUB	Nil
		C- New Major Bridges	
		(1) Foundation (upto Pile Cap)	33.58%
		(2) Sub-structure (upto Pier Cap)	23.42%
		(3) Super - structure (upto deck level with bearings & inspection gallery).	41.53%
		(4) Crash Barriers, Footpaths and Railings	0.39%
		(5) Final finishing with Wearing Coat and Painting)	1.07%
		C- New rail-road Bridges	Nil
			100.00%
Other engineering works	**11.31%**	(i) Road side drains	3.37%
		(ii) Road signs, marking, Km Stones, safety devices.	
		(A) Road Marking	3.37%
		(B) Road Signs, Km stone & Safety device	3.37%
		(iii) Crash Barriers	3.37%
		(iv) Project Facilities	
		(a) Inspection Bunglow250sqm (1 no.)	4.49%
		(b) Street lightning system	4.49%
		(v) Road side Plantation	6.18%
		(vi) Safety and traffic management during construction	3.00%
		(vii) Junctions	6.18%

		(viii) Retaining Wall / Toe Wall	59.52%
		(ix) Environmental Measures	2.25%
		(x) site clearance, dismantling item	0.40%
	100.00%		**100.00%**

1.2 Procedure of estimating the value of work done.

1.2.1 Road works including approaches to minor bridges, Major Bridges and Structures (excludingservice roads).

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

Table 1.3.1

Stage for Payment	**Percentage Weightage to particular item**	**Payment Procedure**
1	2	3
A- Widening and strengthening of Existing Road	Nil	
B- New Two-Lane realignment/ bypass		
(1) Earthwork upto top of subgrade (including Embankment Filling)	57.38%	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 500 m. In case of Hill Cutting, the payment procedure will be as under:
(2) Granular Sub-Base with Geocell (sub-Base, Shoulders)	12.76%	
(3) Wet Mix Macadam with Geogrid (Base)	15.51%	
(4) Dense Bituminous Macadam (DBM)	7.88%	

(5) Bituminous concrete (BC)	6.47%	
C- New culverts, minor bridges, underpasses, Overpasses on existing road, realignments, bypasses	Nil	

@ For example, if the total length of bituminous work to be done is 100 km, the cost per km ofbituminous work shall be determined as follows:

Cost per km = P x weightage for road work x weightage for bituminous workx (1/L)

Where P = Contract Price

L = Total length in km

Similarly, the rates per km for stages (1), (2) and (4) above shall be worked out.

1.2.2 Major Bridge works

Procedure for estimating the value of Major Bridge works shall be as stated in table 1.3.2:

Table 1.3.2

Stage for Payment	**Percentage Weightage to particular item**	**Payment Procedure**
1	2	3
A- Widening and Strengthening of Major Bridges	Nil	
B- Widening and Strengthening of ROB/RUB	Nil	
C- New Major Bridges		
(1) Foundation		Cost of each foundation shall be determined from cost of all foundations as under: Cost of one foundation of depth 'd'= (d/D) * Cost of all foundations

		D= sum of depth of all foundations; Depth of foundations shall be as per approved designs & drawings by AE. Payment against foundations shall be made on pro-rata basis on completion of a stage as under:
a. Piling	23.51%	Weightage shall be 70 % of total cost of one foundation. Unit of measurement is no. of piles completed till bottom of Pile cap. Payment shall be made on pro rata basis on completion of a stage in nos. of not less than 50 % of total piles.
b. Pile cap	10.07%	Weightage shall be 30 % of total cost of one foundation. Payment shall be on completion of a stage i.e. completion of Pile cap.
(2) Sub-structure (upto Pier Cap)	23.42%	Cost of one Sub-structure of the Bridge shall be determined from total cost of sub-Structures of a Bridge divided by total nos. of Substructures. Payment shall be on completion of a stage i.e. completion of atleast one substructure upto abutment/pier cap level of each structure.
(3) Super - structure (upto deck level with bearings & inspection gallery).		
(a) Super structure : Casting of segments	16.6 %	(a) **Super structure (Casting of segments):** Unit measurement is numbers. Payment against casting of segments shall be made on pro rata basis with respect of total numbers of segments required in the structure on completion of a stage i.e. not less than completion of casting at least 10 (ten) segments of the structure.
(c) Super structure : erection of girders, deck slab and bearings	24.93 %	(c) **Super structure (Erection of girders, deck slab and bearing):** Payment shall be made on pro rata

		basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified.
(4) Crash Barriers, Footpaths and Railings	0.39%	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(5) Final finishing with Wearing Coat and Painting)	1.07%	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
C- New rail-road Bridges	Nil	

1.2.3 Structures

Nil

1.2.4 Other engineering works.

Procedure for estimating the value of other engineering works done shall be as stated in Table 1.3.4

:Table 1.3.4

Stage for Payment	**Percentage Weightage to particular item**	**Payment Procedure**
1	2	3
(i) Road side drains	3.37%	Unit Measurement is linear length in meters. Payment shall be made on prorata basis on completion of a stage in a length of not less than 10 % (ten percent) of the total length.
(ii) Road signs, marking, Km Stones, safety devices. (12.00%)		
(A) Road Marking (6.05%)	3.37%	
(B) Road Signs, Km stone & Safety device (6.05%)	3.37%	

(iii) Crash Barriers	3.37%	
(iv) Project Facilities		
(a) Inspection Bunglow250sqm (1 no.)	4.49%	Payment shall be made on prorata basis 25 % on foundation, 25 % GF Structure, 25% 1st Floor Structure & 25% on Finishing work
(b) Street lightning system	4.49%	Payment shall be made on prorata basis for completed facilities.
(v) Road side Plantation	6.18%	Unit of Measurement is linear length in meters. Payment shall be made on prorata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(vi) Safety and traffic management during construction	3.00%	Payment shall be made on prorata basis every six months.
(vii) Junctions	6.18%	Payment shall be made on prorata basis for completion of each junction
(viii) Retaining Wall / Toe Wall	59.52%	Unit of Measurement is linear length in meters. Payment shall be made on prorata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(ix) Environmental Measures	2.25%	Payment shall be made on prorata basis every six months.
(x) site clearance, dismantling item	0.40%	Unit of Measurement is linear length in meters. Payment shall be made on prorata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.

2. Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.1.

1.2 Payment for Maintenance shall be made in quarterly installments in accordance with the provisions of Clause 19.7.

SCHEDULE - I

(See Clause 10.2.4)

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 inAnnex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractorshall promptly prepare and furnish such drawings to the Authority's Engineer, asif such drawings formed part of Annex-I of this Schedule-I.

Annex - I

(Schedule - I)

List of Drawings

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

1. Following drawings for unexecuted works shall be responsibility of the Contractor. A minimum list of the drawings of the various components/elements of the project highway and project facility required to be submitted by the Contractor is given below:

   (a) Drawings of unexecuted Pile, Pile Cap

   (b) Drawings of unexecuted Piers and abutments, Pier cap and abutment cap

   (c) Drawings of Retaining wall and Toe wall

   (d) Drawings of Superstructure items including PSC segments

   (e) Launching Girder drawings

   (f) Other incidental drawings of bridge structure

   (g) Drawings of inspection bungalow

   (h) Drawing of horizontal alignment, vertical profile and detailed crosssections of approach road

   (i) Drawings of cross drainage works i.e., Bridges/Culverts/Flyovers and Other Structures.

   (j) Drawings for River Training works, if any

   (k) Drawings of interchanges, major intersections

   (l) Drawing of control center

   (m) Drawings of road furniture items including traffic signage, marking, safetybarriers, etc.

   (n) Drawings of traffic diversions plans and traffic control measures

   (o) Drawings of road drainage measures

   (p) Drawings of typical details slope protection measures

   (q) Drawings of landscaping and horticulture

   (r) Drawings of pedestrian crossing

   (k) Drawings of street lighting

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

SCHEDULE - J

(See Clause 10.3.2)

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 necessaryparticulars thereof.

2 Project Milestone-I

2.1 Project Milestone-I shall occur on the date falling on the 230th (one hundred and Ninety) day from the Appointed Date (the "**Project Milestone-I**").

2.2 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

3.1 Project Milestone-II shall occur on the date falling on the 396th (three hundred and Ninety Six) day from the Appointment Date (the "Project Milestone-II").

3.2 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 per cent) of the Contract Price.

4 Project Milestone-III

4.1 Project Milestone-III shall occur on the date falling on the 561st (five hundred and twenty eight) day from the Appointed Date (the "**Project Milestone-III**").

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

5 Scheduled Completion Date

5.1 The Scheduled Completion Date shall occur on the 660th (Six Hundred and

Sixty only) day from the Appointed Date.

5.2 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 beenamended accordingly.

SCHEDULE - K

(See Clause 12.1.2)

Tests on Completion

1 Schedule for Tests

1.1 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.

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

2 Tests

2.1 Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment formingpart thereof conform to the provisions of this Agreement. The physical tests shall include (to be decided in consultation with Authority's Engineer as per relevant IRC codes/manual).

2.2 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 2,000 (two thousand) mmfor each kilometer.

2.3 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 withthe 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.

2.4 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.

2.5 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.

2.6 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 theAuthority.

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.

SCHEDULE - L

(See Clause 12.2 and 12.4)

PROVISIONAL 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 Balance works of Major Bridge over Middle Strait Creek between Km. 106.590 to km 107.762 of NH-04 connecting South Andaman & Baratang Island in the Union Territory of Andaman & Nicobar Islands on EPC Basis.** (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 undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

2 Works that are incomplete on account of Time Extension have been specified in the Punch List appended hereto, and the Contractor has agreed and accepted that it shall complete all such works in the time and manner set forth in the Agreement. In addition, certain minor works are incomplete and these are not likely to cause material inconvenience to the Users of the Project Highway or affect their safety. The Contractor has agreed and accepted that as a condition of this Provisional Certificate, it shall complete such minor works within 30 (thirty) days hereof. These minor works have also been specified in the aforesaid Punch List.

3 In view of the foregoing, I am satisfied that the Project Highway from **Km.106.590 to Km. 107.762 of NH-223** can be safely and reliably placed in service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the …… day of …….. 20…...

ACCEPTED, SIGNED, SEALED AND DELIVERED	SIGNED, SEALED AND DELIVERED
For and on behalf of	For and on

behalf of CONTRACTOR by: AUTHORITY's

ENGINEER by:

(Signature) (Signature)

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 Balance works & Additional works (due to design default of EPCC) of Major Bridge over Middle Strait Creek between Km. 106.590 to km 107.762 of NH-04 connecting South Andaman & Baratang Island in the Union Territory of Andaman & Nicobar Islands on EPC Basis. (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 forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the …… day of …… 20…..

SIGNED, SEALED AND
DELIVERED

For and on behalf of the Authority's Engineer

by:

(Signature)

(Name)(Designation)(Address)

SCHEDULE - M

(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

1.2 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.

1.3 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

2.1 The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surfacedefects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetationgrowth, pruning of trees	5%
(c)	**Bridges and Culverts**	

(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course,footpaths, any damage to foundations	20%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(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/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallentrees, 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%

2.2 The amount to be deducted from monthly lump-sum payment for non complianceof particular item shall be calculated as under:

R=P/IOO x M x L1/L

Where P = Percentage of particular item/Defect/deficiency for deductionM = Monthly lump-sum payment in accordance with the Bid

L1 = Non complying lengthL = Total length of the road,

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

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

For any Defect in a part of one kilometer, the non-conforming length shall betaken as one kilometer.

SCHEDULE - N

(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

1.1 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.

1.2 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

1.1 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 National Highways and Infrastructure Development Corporation Ltd, 3rd Floor, PTI Building, 4, Parliament Street, New Delhi – 110001 (the "**Authority**") and ..... (the "**Contractor**") for ***Construction of Balance works & Additional works (due to design default of EPCC) of Major Bridge over Middle Strait Creek between Km. 106.590 to km 107.762 of NH-04 connecting South Andaman & Baratang Island in the Union Territory of Andaman & Nicobar Islands on EPC Basis.***, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

1.2 The TOR shall apply to construction and maintenance of the Project Highway.

2 Definitions and interpretation

2.1 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.

2.2 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.

2.3 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, *mutatis mutandis*, to this TOR.

3. General

3.1 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.

3.2 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) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).

3.3 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.

3.4 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.

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

3.6 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

4.1 During the Construction Period, the Authority's Engineer shall review 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 10.1.6. The Authority's Engineer shall complete such review 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.

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

4.3 The Authority's Engineer shall review 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.

4.4 The Authority's Engineer shall complete the review 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.

4.5 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.

4.6 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.

4.7 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.

4.8 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.

4.9 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 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

4.10 The Authority's Engineer shall test check at least 20 (twenty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

4.11 The timing of tests referred to in Paragraph 4.9, 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.

4.12 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.

4.13 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.

4.14 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.

4.15 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 12.4.

4.16 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.

4.17 In the event that the Contractor carries out any remedial measures to secure the

safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

4.18 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 or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph

4.18 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

5.1 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.

5.2 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.

5.3 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.

5.4 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.

5.5 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

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

6.2 The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

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

7. Payments

7.1 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 10.2.4 (d).

7.2 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.

7.3 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.

7.4 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 specifiedin the Agreement.

9 Miscellaneous

9.1 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.

9.2 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 safecustody.

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

9.4 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.

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

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

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

19.3.1 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 subsequentto the last claim;

(d) amounts reflecting adjustment in price, if any, for (c) above in accordancewith the provisions of Clause 13.2.3 (a);

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

(f) Deductions:

(i) Any amount to be deducted in accordance with the provisions ofthe 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:

(a) the monthly payment admissible in accordance with the

provisions of theAgreement;

(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

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

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

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

1.2 The insurance under paragraph 1.1 (a) and (b) 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 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

3.1 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.

The insurance cover shall be not less than value of the contract price.

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

(a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. 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 kilometer.

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 potholes 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**"), (Project Name) (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

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