



# NATIONAL HIGHWAY AUTHORITY OF INDIA

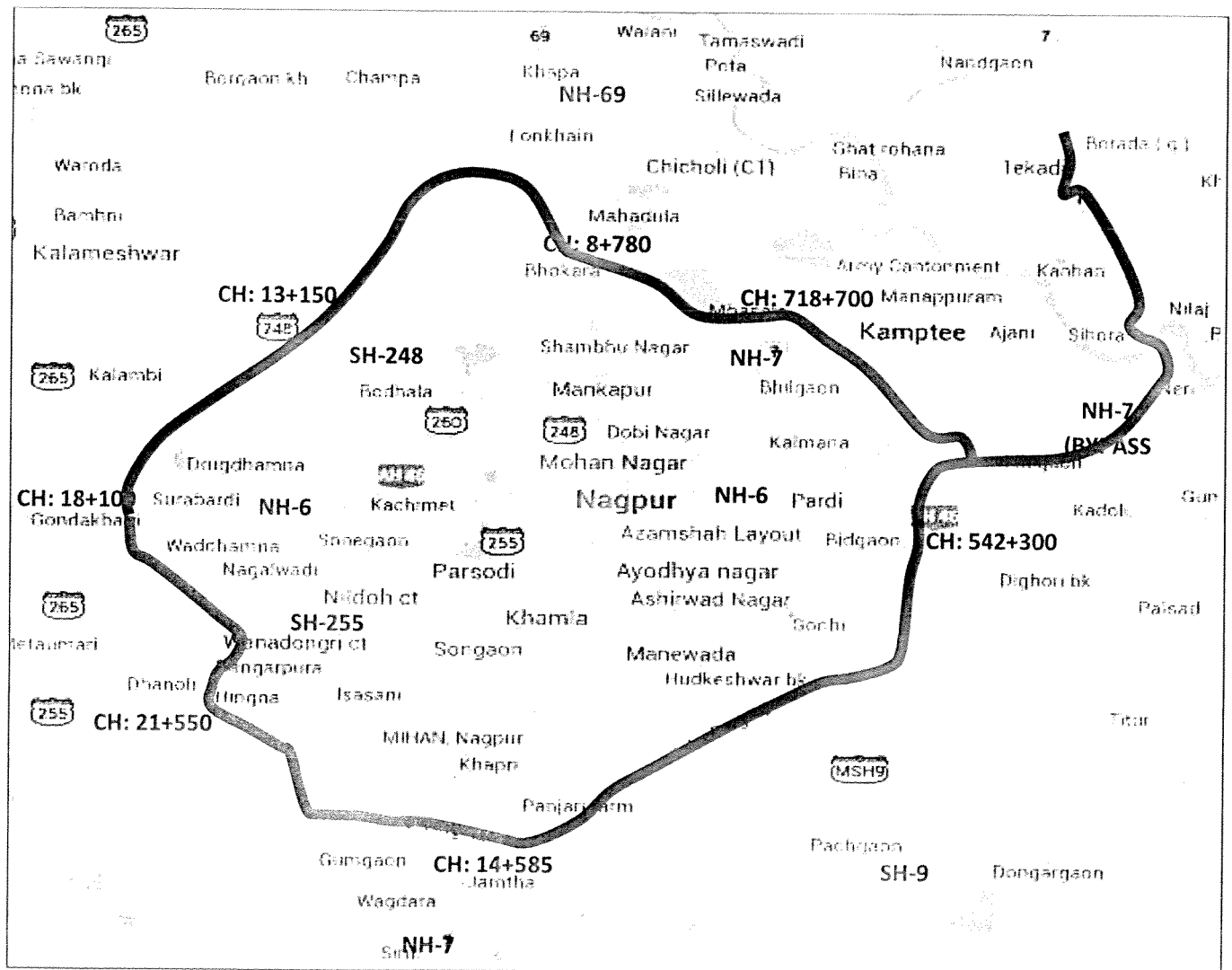
(Ministry of Road Transport & Highways)

**Consultancy Services for Preparation of Feasibility cum Preliminary Design for Construction of Stand Alone Ring Road/Bypasses for Nagpur City in the State of Maharashtra under NHDP Phase VII.**

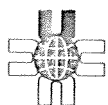
## FINAL FEASIBILITY CUM PRELIMINARY DESIGN REPORT

### SCHEDULES (A to D)

PACKAGE-II (From Km 34+000 to Km 62+035)



SEPTEMBER-2015 (HYBRID MODE)



**UPHAM INTERNATIONAL CORPORATION**

Joint Venture With

**SA INFRASTRUCTURE CONSULTANTS PVT. LTD.**



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# **Schedules (A to D)**

**SCHEDULE - A**

*(See Clause 10.1)*

**SITE OF THE PROJECT**

**1 The Site**

- 1.1 Site of the Four-Lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.
- 1.2 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 Concessionaire, and such inventory shall form part of the memorandum referred to in Clause 10.3.1 of this Agreement.
- 1.3 Additional land required for construction of works specified in the change of scope order issued under clause 16.2.3 of this Agreement shall be acquired in accordance with the provision of clause 10.3.6 of this Agreement. Upon acquisition, such land shall form the part of the site and vest in the Authority.

**Annex – I****(Schedule – A)****Site for Four-Laning Project****1. Site**

The Site of the Four-Lane Project Highway is the part of Standalone Ring Road/ Bypass for Nagpur City comprises the section of new alignment starts at Design Chainage km 34+000 near Fetari Village or after 845 m beyond the crossing with SH-248 (Katol Road) at km 13+150 of SH-248 and run 11+655 km length towards NH-69 (Bhopal Road) and cross the NH-69 at km 8+780 of NH-69 near Kodari Thermal Power Station, after that run 7+915 km length towards NH-7 (Varanasi Road) and cross the NH-7 at km 718+700 of NH-7 near Kapsi Village, again run 7+735 km length towards Kamptee Bypass for NH-7 and intersect at km 722+600 of Kamptee bypass, Trumpet Interchange has been proposed for this intersection, after approach length of 495m for loop and ramps, end at Design Chainage km 62+035 in the State of Maharashtra. The land, carriageway and structures comprising the Site are described below.

S. No.	Chainage (Km)		Total ROW (m)	Remarks
	From	To		
1	34+000	62+035	Nil	

**2. Carriageway**

The present carriageway of the Project highway is a two lane carriageway in its entire length.

S. No.	Chainage (Km)		Length (km)	Carriageway Width (m)
	From	To		
1	34+000	62+035	28+035	Nil

**3. Major Bridges**

The Site includes the following Major Bridges:

S. No	Chainage (km)	Type of Structure			No. of Spans with Span length (m)	Total Width (m)
		Foundation	Sub Structure	Super Structure		
Nil						

**4. Railway Over Bridges (ROB)**

The Site includes the following ROB (Railway Over Bridges):

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S. No.	Chainage (km)	Type of Structure		No. of Spans with Span Length (m)	Total Width (m)	ROB/ RUB
		Foundation	Super Structure			
Nil						

**5. Grade Separators**

The Site includes the following grade separators:

S. No.	Chainage (km)	Type of Structure		No. of Spans with Span length (m)	Total Width (m)
		Foundation	Super Structure		
Nil					

**6. Minor bridges**

The Site includes the following minor bridges:

S. No.	Chainage (km)	Type of Structure		No. of Spans with Span Length (m)	Total Width (m)
		Foundation	Super Structure		
Nil					

**7. Total number of structures**

The total number of structures on the Site is noted below:

(a)	No. of Major Bridges	Nil
(b)	No. of Railway Over Bridges	Nil
(c)	No. of Grade Separators	Nil
(d)	No. of Minor Bridges	Nil
(e)	No. of Vehicular and Non Vehicular Underpasses	Nil
(f)	No. of Box Culverts	Nil
(g)	No. of Pipe Culverts	Nil
(h)	No. of Slab Culverts	Nil

**8. Bus bays and Truck Lay byes**

The total number of bus bays and truck lay byes on the Project is noted below:

(a)	No. of Bus bays on LHS	Nil
(b)	No. of Bus bays on RHS	Nil

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- |     |                              |     |
|-----|------------------------------|-----|
| (C) | No. of Truck lay-byes on LHS | Nil |
| (d) | No. of Truck lay-byes on RHS | Nil |

**9. Permanent Bridge, Bye Pass or Tunnel Costing Rs. 50 crore or more**

The Site includes the following Permanent Bridge/Bypass/Tunnel which was constructed at the cost noted below:

- (a) Bridge at Km to Km of SH costing Rs. .. Crore : Nil
- (b) Bypass at Km to Km of SH costing Rs. .. Crore : Nil
- (c) Tunnel at Km to Km of SH costing Rs. .. Crore : Nil

**10. Wayside Amenities**

The site includes the following parcels of land for provision of wayside amenities:

Nil

**SCHEDULE - B**  
*(See Clause 2.1)*

**Development of the Project Highway**

**1 Development of the Project Highway**

Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.

**2 Four Laning**

**2.1** Four laning shall include the four lane project highway as described in Annex-I of this Schedule-B and Annex-I of Schedule-C.

**2.2** Four-Laning shall completed by the concessionaire in conformity with the Specifications and Standards set forth in Annex-I of Schedule-D.

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

**Description of Four Laning**

**1 Width of Carriageway**

- 1.1** The paved carriageway shall be 18.0 m (including kerb shyness and paved shoulder) wide excluding the median.

Provided that in the following urban stretches, the width of carriageway shall be:

S. No.	Name of Township	Location (Chainage)	Width (m)
Nil			

- 1.2** Except as otherwise provided in this Agreement, the width of the paved carriageway shall conform to clause 1.1 above.

**2 Project Facilities**

Project facilities shall be constructed in conformity with Annex-I of Schedule- C.

**3 Specifications and Standards**

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



Gist of Major Recommendations as per Feasibility are as below:-

**A. New Alignment / Bypasses**

S. No.	Name of New Alignment / Bypasses	Design Chainage (Km)		Length (km)
		From	To	
1	New Alignment Starts near Fetari Village or after 845 m beyond the crossing with SH-248 (Katol Road) at Km 13+150 of SH-248 and run 11+655 km length towards NH-69 (Bhopal Road) and cross the NH-69 at Km 8+780 of NH-69 near Kodari Thermal Power Station, after that run 7+915 Km length towards NH-7 (Varanasi Road) and Cross the NH-7 at Km 718+700 of NH-7 near Kapsi Village, again run 7+735 Km length towards kemptee bypass for NH-7 near Kapsi Village, again run 7+735 Km length towards Kemptee bypass for NH-7 and intersect at km 722+600 of kemptee bypass, Trumpet interchange has been proposed for this intersection, after approach length of 495m for loop and ramps.	34+000	62+035	28+035

**B. Details of Proposed Right of Way (ROW)**

Details of the proposed ROW:

Sl. No.	Design Chainage (In Km)		ROW LHS+RHS (In m)	Remarks
	From	To		
1	34+000	36+680	30+30	
2	36+680	39+070	Varies between 60 to 410	Entry & Exit Ramp, Truck Lay Bye, Rest Area with Public Facility
3	39+070	46+175	30+30	
4	46+175	46+675	110+110	Entry & Exit Ramp with Public Facility
5	46+675	54+370	30+30	
6	54+370	54+865	100+150	Entry & Exit Ramp with Public Facility
7	54+865	57+535	30+30	
8	57+535	58+330	75+75	Toll Plaza
9	58+330	59+635	30+30	
10	59+635	62+035	30+30	

**C. New Major Bridge**

S. No.	Design Chainage (Km)	No. of Spans with Span Length (m)	Side (LHS/RHS/ Both Side)	Remarks
Nil				

**D. New Minor Bridges**

Sl. No.	Design Chainage (Km)	No. of Spans with Span Length (m)	Side (LHS/ RHS/ Both Side)	Remarks
1	35+895	2 x 8	Both side	Span arrangement can be changed without financial implication, but total bridge length cannot be reduced.
2	40+095	2 x 10	Both side	
3	41+350	1 x 10	Both side	
4	41+935	1 x 10	Both side	
5	52+890	1 x 30	Both side	
6	54+230	1 x 10	Both side	
7	55+070	1 x 45	Both side	
8	56+630	3 x 5	Both side	
9	60+420	2 x 8	Both side	

**E. New Construction of Road over Bridge (ROB)**

S. No.	Design Chainage (Km)	No. of Spans with Span Length (m)	Side (LHS/RHS)	Remarks
1	38+605	2x18 + 1x30 + 2x18	LHS + RHS	ROB
2	46+900	1x15 + 1x30 + 1x15	LHS + RHS	ROB
3	50+810	4 x 30	LHS + RHS	ROB
4	56+400	3 x 30	LHS + RHS	ROB

**F. Details of New Grade Separated Intersections / Flyover**

S. No	Design Chainage (Km)	Category of Intersecting/ Cross Road	Viaduct Length (m)	Approach Gradient		Remarks
				In	Out	
1	45+900	Crossing with NH-269	60	+2.5%	-2.5%	Project Road carried over the Structure.

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S. No	Design Chainage (Km)	Category of Intersecting/ Cross Road	Viaduct Length (m)	Approach Gradient		Remarks
				In	Out	
2	53+800	Crossing with NH-7	60	+2.5%	-2.5%	Project Road carried over the Structure.
3	61+550	Crossing with NH-7 bypass	60	+2.5%	-2.5%	Project Road carried over the Structure.

**SCHEDULE – C**

**(See Clause 2.1)**

**PROJECT FACILITIES**

**1 Project Facilities**

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

- (a) Toll Plaza[S];
- (b) Roadside furniture;
- (c) Pedestrian Facilities;
- (d) Tree Plantation;
- (e) Truck Lay-Bys;
- (f) Bus-Bays and Bus Shelters;
- (g) Buildings For Traffic Aid Posts;
- (h) Buildings For Medical Aid Posts;
- (i) Cattle Crossings;
- (j) Development of site for wayside amenities and
- (k) Others

**2 Project Facilities for Four-Laning**

Project Facilities forming part of Four-Laning and to be completed on or before the Project completion Date have been described in Annex-I of this Schedule-C.

**Annex – I**  
**(SCHEDULE – C)**  
**PROJECT FACILITIES**

**3 Project Facilities**

The Concessionaire shall construct the Project Facilities described in this Annex-I to form part of the Four Lane Project highway. The Project Facilities shall include:

- (a) Toll plaza[S];
- (b) Roadside furniture;
- (c) Pedestrian facilities;
- (d) Tree plantation;
- (e) Truck Lay-Bys;
- (f) Bus-Bays and Bus Shelters;
- (g) Buildings for Traffic Aid Posts;
- (h) Buildings For Medical Aid Posts; And
- (i) Others
  - i. Service Road
  - ii. Vehicular Underpass
  - iii. Light Vehicular Underpass

**4 Description of Project Facilities**

Each of the Project Facilities is briefly described below:

**(a) Toll Plaza**

Toll plaza shall be designed as per the guidelines of manual and it is provided at following locations:-

Sl. No	Toll Plaza Location (Design Chainage in km)
1	Toll Plaza at km. 57+935

**(b) Roadside Furniture**

The roadside furniture shall include the provision of the;

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### **i. Traffic Signs**

Traffic signs include roadside signs, overhead signs, curb mounted signs etc. provided for the entire Project Highway.

### **ii. Pavement Markings**

Pavement markings shall cover road marking provided for the entire Project Highway.

### **iii. LED Traffic Blinkers**

LED Traffic Blinker signal provided for entire project.

### **iv. Crash barrier**

Provide W-beam crash barrier along the project highway at the locations as suggested in manual recommended in Schedule D.

### **v. Delineators**

Delineators for the entire Project Highway at the locations as suggested in relevant IRC Manual recommended in Schedule D.

### **vi. Boundary stones**

For the entire Project Highway as suggested in relevant IRC Manual recommended in Schedule D.

### **vii. Hectometer / Kilometer stones**

For the entire Project Highway as suggested in relevant IRC Manual recommended in Schedule D.

## **(c) Pedestrian Facilities**

The pedestrian facilities shall include the provision of the;

- i. Pedestrian guardrail: Provide pedestrian guardrail at each bus stop location.
- ii. Pedestrian Crossings: Provide pedestrian crossing facilities on service roads and other locations as recommended in Schedule D.

## **(d) Tree Plantation**

Tree plantation shall be provided. The location for these provisions shall be finalized in consultation with Independent Engineer.

## **(e) Truck Lay-byes**

Truck lay byes shall be provided at the following locations for a capacity of minimum 50 trucks at each location.

<b>S. No.</b>	<b>Design Chainage (km)</b>
1	37+500 (LHS)

**Bid Document: Schedules****(f) Bus bays including Bus Shelters**

Bus Lay byes including Bus Shelters shall be provided at locations given below:

Sr. No.	Design Chainage (km)	Side	Locations/ Built-up Area Name
Nil			

**(g) Buildings for Traffic Aid Posts**

The Concessionaire shall, in accordance with the type designs prescribed for such police outpost buildings by the State Government or a substitute thereof, construct buildings not exceeding 25 (twenty five) square meters of plinth area, for each of the Traffic Aid Posts, and hand them over to the Authority no later than 30 (thirty) days prior to the Scheduled Completion Date. The Traffic Aid Post(s) shall be deemed to be part of the Site and shall vest in the Authority.

**(h) Buildings for Medical Aid Post**

The Concessionaire shall, at its cost and in accordance with the type designs prescribed for such buildings by the State Medical Department (or a substitute thereof to be designated by the Authority), construct an aid post building and hand it over to the Authority, no later than 30 (thirty) days prior to the Scheduled Completion Date. The Medical Aid Post(s) shall be deemed to be part of the Site and shall vest in the Authority.

**(i) Others****1. Service Road**

Service Road shall be provided as flexible pavement at given below locations.

S. No	Service Road Location/ Design Chainage (Km)		Service Road Length (km)	Carriage way Width (m)	Shoulder width Both Side of Carriageway (m)	Side (LHS/RHS/ Both Side)
	From	To				
1	35+620	36+590	0+970	7.0	1.5	RHS
2	37+700	38+570	0+870	7.0	1.5	Both Side
3	38+650	39+030	0+380	7.0	1.5	Both Side
4	40+890	40+960	0+070	7.0	1.5	RHS
5	42+170	44+520	2+350	7.0	1.5	LHS
6	44+520	45+880	1+360	7.0	1.5	Both Side
7	45+880	46+230	0+350	10.0	1.5	Both Side
8	46+630	46+880	0+250	7.0	1.5	Both Side

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S. No	Service Road Location/ Design Chainage (Km)		Service Road Length (km)	Carriage way Width (m)	Shoulder width Both Side of Carriageway (m)	Side (LHS/RHS/ Both Side)
	From	To				
9	53+830	54+380	0+550	10.0	1.5	Both Side
10	59+000	59+380	0+380	7.0	1.5	LHS
11	60+370	60+990	0+620	7.0	1.5	LHS
12	60+990	61+540	0+550	7.0	1.5	Both Side

**2. New Vehicular Underpass**

S. No	Design Chainage (Km)	Lateral Clearance (Span/Opening) (m)	Vertical Clearance (m)	Approach Gradient		Category of Intersecting/ Cross Road
				In	Out	
1	42+190	12	5.5	+1.75%	-2.50%	MDR
2	55+710	12	5.5	+2.5%	-2.5%	SH-341

**3. New Light Vehicular Underpasses**

S. No	Design Chainage (Km)	Lateral Clearance (Span/Opening) (m)	Vertical Clearance (m)	Approach Gradient		Type of Underpass
				In	Out	
1	34+545	10.5	3.5	+2.50%	-2.50%	Light Vehicular
2	36+580	10.5	3.5	+0.073%	-2.095%	Light Vehicular
3	40+910	10.5	3.5	+0.88%	-2.50%	Light Vehicular
4	44+520	10.5	3.5	+2.00%	-1.00%	Light Vehicular
5	49+115	10.5	3.5	+1.50%	-2.50%	Light Vehicular
6	52+000	10.5	3.5	+2.50%	-2.50%	Light Vehicular
7	59+015	10.5	3.5	+0.57%	-2.50%	Light Vehicular
8	60+375	10.5	3.5	+1.00%	-2.00%	Light Vehicular

**4. Highway Lighting**

Lighting shall be provided at the following locations:

- Lighting shall be provided at approach to bridges, Built up areas, Toll plaza, Bus stops, truck Lay-byes, and as per manual recommended in Schedule D.
- High Mast Lighting shall be provided at all Major Junctions, Toll plaza



locations.

**5. Development of site for wayside amenities**

Development of site for wayside amenities shall be provided.

**6. Vehicle Rescue Posts**

Vehicle Rescue Posts shall be provided.

**7. Highway Patrol**

1 (one) number of Highway Patrol unit per toll plaza shall be provided.

**8. Ambulances**

1 (one) number of Ambulance unit per toll plaza shall be provided.

**9. Cranes**

1 (one) number of Crane unit per toll plaza shall be provided at each vehicle Rescue Post.

**10. Highway Traffic Management System (HTMS)**

Highway Traffic Management System shall be provided.

**SCHEDULE – D**  
***(See Clause 2.1)***

**SPECIFICATIONS AND STANDARDS**

**1 Four –Laning**

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

**Annex – I  
(Schedule-D)**

**Specifications and Standards for the Project**

**1 Manual of Specifications and Standards to apply**

Subject to the provisions of Paragraph 2 of this Annex-I Four-Laning of the Project Highway shall conform to the Manual of Specifications and Standards for Four-Laning of Highways through DBFOT road projects manual published by the Indian Road Congress (IRC No. IRC: SP: 84-2014).

**2 Deviations from the Manual**

Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Four-Lane Project highway, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below:-

Clause Referred in Manual	Item	Provision as per Manual	Modified Provision	Remarks
2.2	Design Speed	Ruling Design Speed (100 km/h)	Minimum Design Speed (80km/h) at chainage km 45+120, 46+777 & 53+397 locations. as per clause 2.1 and 2.2.2 of IRC :SP :84-2014	Site condition are restrictive and adequate land width is not available
2.3	Radius of Horizontal curves	Desirable minimum radius (400 m)	Radius 260 m at 38+360 and 300 m at following location – 45+120, 46+777 & 53+397 locations as per clause 2.9.4 of IRC :SP :84-2014	Site condition are restrictive and adequate land width is not available
2.12.2	Service Road	7m	width of Service Road has been kept 10 m at following locations – 45+880 to 46+230 & 53+830 to 54+380	The services roads carriageway width has been kept 10 m at these locations to cater both way traffic through exit and entry ramp with loop arrangement

