Operation & Maintenance Report- FY2027

Delhi-Meerut Expressway (Section from km 0.000 to Delhi/UP Border) including 8 laning of NH-24 in the state of Delhi (Design Length - 8.716 km) under Hybrid Annuity mode: DME

SAMARTH INFRAENGG Technocrats Private Limited

May 2026

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BC	-Bituminous Concrete
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Under pass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half cell Potential Test
HPC	-Hume Pipe Culvert
HR	- Human Resources
HTMS	-Highway Traffic Management Systems

IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
MBIU	-Mobile Bridge Inspection Unit
MCB	-Metal Beam Crash Barrier
MCS	-Micro Surfacing
MCW	-Main Carriageway
MDD	-Maximum Dry Density
MHR	-Metallic Hand Rail
MJB	-Major Bridge
mm	-Millimeter
MM	-Major Maintenance
MNB	-Minor Bridge
MoRTH	- Ministry of Road Transport & Highways
Mpa	-Mega Pascal
MPRDCL	-Madhya Pradesh Road Development Corporation Ltd.
MR	-Resilient Modulus
MSA	-Million Standard Axle
NDT	-Non-Destructive Testing
NHAI	- National Highways Authority of India
NSV	-Network survey Vehicle
O&M	- Operation and Maintenance
OL	-Overlay
PF	-Provident Fund
PGR	-Pedestrian Guard Rail
PI	-Plasticity Index
PL	-Plastic Limit
PM	-Periodic Maintenance
PUP	-Pedestrian Underpass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete
RE Wall	-Reinforced Earth Wall
RHS	-Right Hand Side
RHT	-Rebound Hammer Test
RM	-Routine Maintenance

ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

1.1 INTRODUCTION

The Government of India had entrusted to the Authority (National Highways Authority of India, **NHAI**) the development, maintenance and management of National Highway No.24 including the section from km 0.000 to existing km 8.360 (approx. 8.716 km). The Authority had resolved to augment the existing road from km 0.000 to existing km 8.360 (approx. 8.716 km) on the Delhi/UP Border section of National Highway No.24 (hereinafter called the "NH 24") in the State of Delhi by Six-Laning and four laning either side of the Expressway thereof (the "Project") on design, build, operate and transfer (the "DBOT Annuity" or "Hybrid Annuity"), which shall be partly financed by the Concessionaire who shall recover its investment and costs through payments to be made by the Authority, in accordance with the terms and conditions to be set forth in a concession agreement.

The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to M/s **Welspun Enterprise Ltd** (Welspun"), Baroda. Consequent to this, M/s Welspun Enterprise Ltd, formed a Special Purpose Vehicle (SPV) in the name of M/s **Welspun Delhi Meerut Expressway Pvt. Ltd,** DME (Concessionaire) for implementation/execution of the project.

The Concessionaire has achieved PCOD on 28th June 2018 and COD on 26th Sept 2018 for the full project length of 8.716 Km by delinking non-availability of land under punch list.

This project road is acquired by **M/s Actis GP LLP** and is presently under Operation and Maintenance phase.

Nxt Infra Trust is a registered Indian infrastructure investment trust which has invested in road infrastructure assets in India with an initial portfolio for six Project SPVs. The Trust is sponsored by Actis Highway Infra - Limited (the "Sponsor"), part of the Actis Group, which is a global investor in sustainable infrastructure.

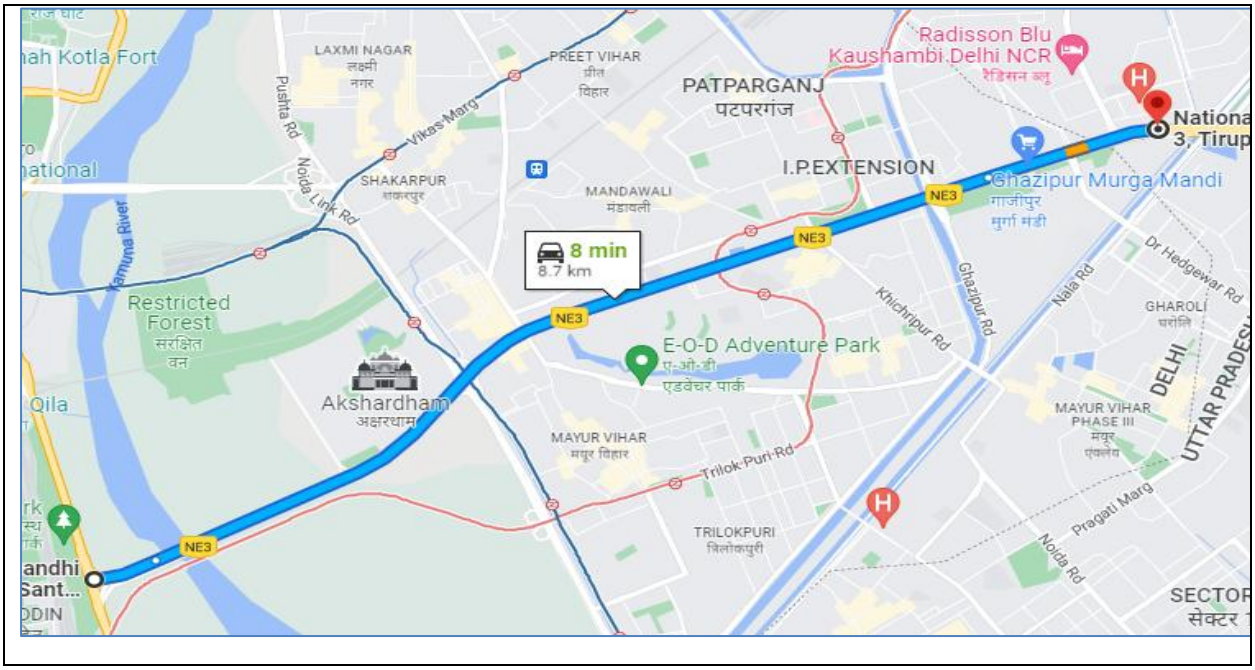
Actis GP LLP Ltd has engaged **M/s Samarth Infraengg Technocrats Pvt Ltd** to undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

This report is the updated Due diligence report incorporating the improvements and developments and then to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement work of the project during the Concession period.

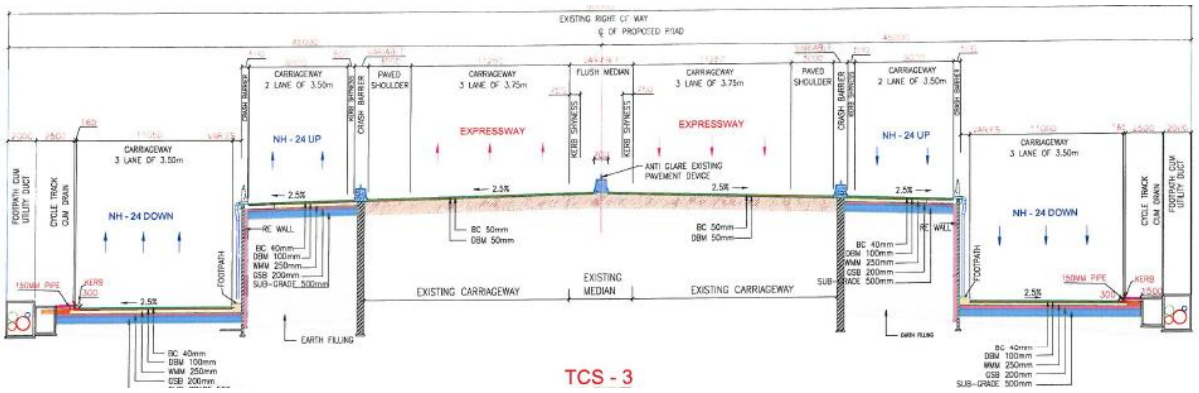
1.2 PROJECT AT GLANCE

The project road consists of elevated 6-lane expressway corridor and is attached with NH24-UP(3-lane) and NH-24-DN(2-lane) on either side of Expressway. The Project Corridor starts nearby Indraprastha park at km 0+000 of (NE-3&NH-9) ends at UP border at Km 8.716 of (NE-3& NH-9).

	From (km)	To (km)	Length (Km)
CA Design Chainage	0.000	8.716	8.716
As per Site	0.000	8.716	8.716



Typical Cross section of Expressway attached to NH-24 UP & DN on either direction as given below.



Photographs showing the various corridors of the project road are presented below:

Start point of Project Road

End point of Project Road

A view of the Project Corridor with 7.0m wide Dual Carriageway each at Km 1.000

Project Corridor with 15m Main carriageway width, at Km 7.800

Project Corridor with 5+5 lane at Km 5.500

Project Corridor with MJB at Km 1.000

Following Table highlights the total project at a glance:

Table 1: Chronology of Project Milestones

S No.	Description	Date
1.	Date of Signing the Concession Agreement	04.03.2016
2.	Appointment Date	28.09.2016
3.	Scheduled Project completion	27.06.2019
4.	Scheduled End of Concession	15 years from COD
5.	Date of issue of Provisional Completion Certificate, COD	28.06.2018
7.	Date of. Issue of Final Completion Certificate	28.09.2018
8	Scheduled End of Concession	28.06.2033

1.3 SCOPE OF SERVICES

The main objective of the study is to review the current status of project corridor including details pertaining to its construction and maintenance and to provide requisite technical due diligence for said project.

The scope of services as defined in the "terms of reference" for consultants is as below:

- ✓ Updating the inventory of Highway & Structures based on latest improvements in the project based on the discussions and data provided by project managers.
- ✓ Reviewing and updating the immediate repair works cost based on discussion with site team
- ✓ Revising the MMR based on any latest field investigation reports provided by client
- ✓ Preparation of detailed O&M & MMR cost estimate as per latest labour wages and material rates
- ✓ Preparation of detailed project report for each project
- ✓ Scope includes submission of project wise Annual Valuation Report including the revision of such reports based on discussion with your team

1.4 REVIEW OF CONCESSION AGREEMENT

1. Concession Parties and date of execution of Agreement: NHAI referred as "Authority" entered in to Agreement with M/s Welspun Delhi Meerut Expressway Pvt. Ltd (DME) referred as "Concessionaire" on 04.03.2016
2. Appointed Date, Commercial Operation Date (Article 3 & 4, Article 12): As the Concession Agreement was signed on 04 Mar, 2016, and appointed date issued by Authority on 28 Nov 2016. Accordingly, construction period is 30 months from Appointed date, and Concession period is 15 years from COD.
3. Concession Period (Clause 3): This includes Construction Period of 910 days and Operation Period of 15 years commencing from COD. As the Appointed Date is declared on 28.11.2016, considering 910days as Construction period, the scheduled construction completion date is 27.05.2019. However, PCOD achieved prior to this date, i.e., on 28.06.2018. Accordingly, 15yrs from COD, end of concession period is 27.06.2033 (scheduled date 26.05.2034)

4. Obligations of Concessionaire & Authority (Article 5 & 6): The Concessionaire and Authority have fulfilled most of the obligations.

   Due to early completion of the project, NHAI has released BONUS and the payment made on 06.06.2019 as per clause 23.5 of CA for the amount Rs 26.28Cr.

5. Representation and warranties (Article 7): The Concessionaire shall at no time undertake any change of ownership except in accordance with Clause 5.3.

6. Release of Performance Security (Article-9.3): The performance security bank guarantee (PSBG) is Rs 42.08 Cr. However, Authority released back the Performance guarantee to the Concessionaire on 20th July 2017.

7. Right of Way (Article 10): If the Authority is unable to provide the remaining site within 180 days from the Appointed Date, the remaining Site of the Project Highway shall be removed from the scope of the work under the provision of Change of Scope. Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date shall be completed on or before the Scheduled Completion Date.

8. Construction of the Project (Schedule-G, Article12): Construction period 910 days from the appointed date i.e., schedule date of completion is on 27th May 2019. And PCOD achieved earlier to this date i.e., on 28.06.2018

Milestone	Completion days	Schedule date	Actual achieved	Delay/(early) days	% Total Capital Cost (TCC) / Physical progress in %
MS-I	180	27/05/2017	28/02/2017	92 days	10% of TCC / 10% Physical Progress
MS-II	400	02/01/2018	30/04/2017	247 days	30% of TCC / 30% Physical Progress
MS-III	650	09/09/2018	07/02/2018	214 days	70% of TCC / 75% Physical Progress
MS-IV	910	27/05/2019	28/06/2018	No delay	100% of TCC /100% Physical Progress

9. Monitoring of Construction (Article 13): The Concessionaire shall, perform all the tests as per Schedule-I, with the instructions of the Independent Engineer. Half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by Authority the to the Concessionaire.

10. Completion Certificate/ Provisional Certificate (Article-14): Independent Engineer may, upon request of Concessionaire, issue a provisional certificate for completion of 100% construction site, which made available to the Concessionaire up to 182days from Appointed Date. Provisional certificate should have list of outstanding items in the punch list. These shall be completed within 90 days from issue of Provisional certificate. Authority shall recover damages for any delay in completion as per clause 14.4.1.

Note: Concessionaire to undertake the Junction development @ Ch 5+075RHS and Junction development @ 6+100 RHS (Which are delinked and undertaking taken from the concessioner that works will complete without any further claim during the O&M period)

11. Change of Scope (Article 16): Any additional works and services which are not included in scope of project shall be addressed in Change of Scope Notice. The costs thereof shall be expended by concessionaire and reimbursed by Authority with an advance payment of 20% of agreed COS cost.

12. Reduction of Scope (Article 16.6): if Concessionaire fails to complete the construction works on Force Majeure or for reasons attributable to Authority or under right-of-way clause 10.3.1. On

direction of Authority, IE shall assess the civil cost for reduced scope as per Clause 16.6.1. Thus, revised Bid Project Cost shall be calculated. Accordingly, O&M cost shall be reduced or increase in proportion to reduction or increase in the length of the Project Highway.

13. Operation & Maintenance (Article 17): Concessionaire to maintain project road as per Schedule-K requirements. The roughness value exceeding 2750mm/km in a stretch of 1km should be rectified with 180days.
14. Safety requirements (Article 18): All costs and expenses arising related to safety requirement shall be borne by Concessionaire as per scope of the project. If any not forming the scope shall be as per Article 16, change of scope.
15. Renumeration to Independent Engineer (Article 21.3): As per Schedule-M, one- half of remuneration towards the cost and expenses of the Independent Engineer during the development and construction period shall be borne by Concessionaire by do not exceeding 3% of the BPC. Payment in excess of 3% shall borne entirely by Authority. All the payments made to independent Engineer during O&M period shall be borne equally by Authority and Concessionaire.
16. Financial Close (Article 22.1): Concessionaire to achieve Financial close within 150 days from date of the agreement. In the event of delay, further extension not exceeding 120days, subject to payment of damages to the Authority in the sum calculated at a rate of 0.05% of Performance security for each day of delay. Beyond this further 95 days shall be allowed with 0.1% of Performance security for each day of delay.

    Financial Close in this project happened on 29.12.2016 with a delay of 42days. Any penalty imposed due to this delay is to be ascertained.
17. Bid Project Cost (Article-23): The cost of construction of the project (BPC) is Rs.841.50 Cr. and will be adjusted for the price index multiple. 40% of this Cost shall be payable to Concessionaire during Construction period in 5 installments of 8% each with adjusted price index multiple. Clarification sought from the Concessionaire about the total amount received against the receivable amount in the consolidated format.

    The remaining 60% of Bid Project Cost, adjusted for Price Index multiple, shall be payable in 30 biannual installments commencing from 180th day of COD with the percentage payments as suggested in the table 23.6.3 along with the interest as per Article 23.6.4.

    Bid O&M cost is Rs 3.95 Cr per annum. Any expenses in excess of O&M payments shall be borne by Concessionaire. O&M payments due payable to the Concessionaire shall be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
18. Mobilization Advance (Article 23.8): Upon request from Concessionaire, 10% of Bid Project Cost shall be paid by Authority. This shall be repaid by Concessionaire with Bank interest compounded annually in 4 equal installments from each payment made by Authority to Concessionaire.
19. Insurance (Article 26): The Concessionaire has been fulfilling this obligation.
20. Force Majeure (Article 28): As per Clause 28.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; or (b) after COD, the Concessionaire shall be entitled to receive Annuity payments plus interest due and payable under this Agreement.
21. Change in Law (Article 35): As a result of Change in Law, if Concessionaire suffers an increase in cost or reduction in the net after-tax return subject to higher of 1.82 Cr or 2% of Total Annuity

payments in any accounting year, Concessionaire may notify Authority to amend the agreement so as to place Concessionaire in same financial position as before the Change in Law.

Concessionaire has claimed Rs7.14 Cr.) due to implementation of GST

22. Dispute resolution (Article 38): Any dispute not resolved amicably by conciliation, arbitration shall be held in accordance with rules of Society for Affordable Redressal of Disputes (SAROD), New Delhi or such other rules in-line with Arbitration and Conciliation Act,1996. Place of such arbitration shall be the Delhi and the language of arbitration proceedings shall be English. There are no disputes referred so far under the article 38.

1.5 REVIEW OF PAVEMENT DESIGN

- ✓ **Manual of Specification and Standards**

The Schedule B silent on pavement design and type to be considered for the Project. However, Schedule D suggests that Six-Laning of the Project Highway shall conform to Manual of Specifications and Standards through PPP (IRC: SP: 87-2013). Whereas, for the Expressway of the Delhi-Meerut Highway shall confirm to Manual of Specifications & Standards for Expressways through PPP (IRC: SP: 99-2013)

- ✓ **Review of CA stipulations for Pavement Design**

a) National Highways

Clause 5.4.1 (i) of IRC SP: 87-2013 stipulates that the flexible pavement shall be designed for a minimum design period of 15 years or operation period, whichever is more. Stage construction is permissible subject to the requirements specified in para (ii) of Clause 5.4.1

Clause 5.4.1 (ii) of IRC SP: 87-2013 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

(a) Indicates that, the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years and the initial bituminous surfacing for a minimum design period of 10 years.

(b) Indicates the pavement shall be strengthened by bituminous overlay as and when required to extend the pavement life to full operation period. The thickness of bituminous overlay shall be determined on the basis of relevant IRC codes.

Clause 5.9.6 (ii) of the same manual also stipulates that the initial strengthening shall be done for a minimum design period of 10 years.

Clause 5.9.6 (iv) of the same manual also stipulates that the for bituminous overlay for pavement strengthening shall not be less than 50mm bituminous concrete.

Clause 5.4.2 states that rigid pavement shall be designed for a minimum design period of 30 years.

b) Expressways

Clause 5.4.1 (i) of IRC SP: 99-2013 stipulates that the flexible pavement shall be designed for a minimum design period of 20 years or operation period, whichever is more.

Clause 5.4.1 (ii) of IRC SP: 99-2013 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".

(a) Indicates that, the pavement shall be designed to resist specific distresses in each layer and the choice of materials and mixes shall be such that the pavement remains structurally serviceable throughout the operation period without requiring any major structural strengthening. The requirement and frequency of resurfacing should not be closer than 10 years. A longer period will be desirable. The resurfacing process will be milling the existing layer to the depth of distress and replacing the same by the material that meets the characteristics of the original surface.

(b) Indicates the pavement strengthening when required shall incorporate the consideration of i) strength of existing layers as evaluated using deflection test by FWD, ii) Design period for strengthening to extend five years beyond the period of concession and iii)n specified performance requirements.

Clause 5.7.5 (ii) of the same manual also stipulates that the initial strengthening shall be done as per 5.4.1 Section.

Clause 5.7.6 (iv) of the same manual also stipulates that the for bituminous overlay for pavement strengthening shall not be less than 50mm bituminous concrete.

Clause 5.4.2 states that rigid pavement shall be designed for a minimum design period of 30 years.

- ✓ **Concessionaire's Pavement Design**

Design Considerations

The Project involves the flexible pavement for Main carriageway. Design of new flexible pavement construction was carried out in accordance with IRC 37-2012. The overlay design has been carried out in accordance with clause 7.4 as per IRC 81:1997. Overlay design is also done by IRC 115-2014, Falling Weight Deflectometer test are conducted on site and data is reviewed for analysis of Overlay Design.

Design Period

A design life of 20 years for new Pavement has been considered for the design purpose of the project and for strengthening done for 10 years

Traffic Growth Rate

The traffic Growth rate of 5% has been considered for different categories of commercial vehicles as stipulated in clause 5.5.4 of IRC: SP: 87:2013.

Design Traffic Considerations

For the calculation of Base year Traffic, CVC survey and Axle load survey was carried out at Km 1+500 and at Km 6+500.

✓ **For Expressway:**

According to the IRC: 37-2012, Thickness of carriageway of Flexible Pavement in New Construction Portion Design CBR Value of 9% and traffic MSA 120, The Pavement layer thicknesses are presented below:

Sr. No.	Traffic MSA 20 Years	Effective Soil CBR	Flexible Pavement As per IRC 37 :2012	Adopted
1	120	9%	BC = 50 mm, DBM = 116 mm, WMM = 250mm, GSB = 200 mm	BC = 50 mm, DBM = 120 mm, WMM = 250mm, GSB = 200 mm

✓ **For NH-24:**

Design of New Flexible Pavement for NH-UP & NH-DOWN as per IRC: 37-2012

Sr. No.	Location	Traffic MSA 20 Years	Effective Soil CBR	Flexible Pavement As per IRC 37:2012
1	Flexible Pavement for NH-UP & NH-DOWN	60	9%	BC = 40 mm, DGBM = 100 mm, WMM = 250mm, GSB = 200 mm

A) Strengthening of Existing Pavement

It has been done as per IRC: 115-2015 guidelines. The Concessionaire carried out the FWD tests along the existing Project Road and determined the strengthening requirements for each homogenous section for 10 years of design life according to "IRC:115-2015, Section 5.3 &IRC SP 99-2013, Section 5.4.1". The Computed Overlay thickness are presented below:

- ✓ For Expressway

As per calculations, an overlay of required along various sections of project road. LHS SIDE

S.No	Stretch		Adopted Overlay Thickness			Note
	From	To	BC	DBM	Total	
1	0+000	0+500	50	50	100	
2	1+100	1+300	50	50	100	
3	1+300	1+670	50	-	50	
4	1+670	3+080	-	-	-	When FWD test was carried out, Overlay had already been laid in km. 1+670 to km. 3+080
5	3+200	3+500	50	-	50	
6	4+100	4+300	50	50	100	
7	5+300	5+750	50	-	50	
8	6+300	7+900	50	-	50	

As per calculations, an overlay of required along various sections of project road. RHS SIDE

S.No	Stretch		Adopted Overlay Thickness			Note
	From	To	BC	DBM	Total	
1	7+900	6+300	50	50	100	
2	5+750	5+300	50	-	50	
3	4+300	4+100	50	-	50	
4	3+500	3+080	50	-	50	
5	3+080	1+670	-	-	-	When FWD test was carried out, Overlay had already been laid in km. 3+080 to km. 1+670
6	1+670	1+300	50	-	50	
7	1+300	1+100	50	-	100	
8	0+500	0+000	50	50	100	

✓ For NH-24

Recommendations Design of Overlay

Sr. No.	Location	Thickness of Pavement layers DBM (mm)	Thickness of Pavement layers BC (mm)	Total Overlay thickness
1	Km. 0.000 to Km. 1.900 (L.H.S)	50	40	90
2	Km. 1.900 to Km. 2.950 (L.H.S)	50	40	90
3	Km. 2.950 to Km. 8.716 (L.H.S)	-	40	40
4	Km. 0.000 to Km. 1.900 (R.H.S)	50	40	90
5	Km. 1.900 to Km. 2.500 (R.H.S)	50	40	90
6	Km. 2.500 to Km. 4.600 (R.H.S)	50	40	90
7	Km. 4.600 to Km. 6.900 (R.H.S)	-	40	40
8	Km. 6.900 to Km. 8.716 (R.H.S)	80	40	120

*Important note

1.6 MAINTENANCE REQUIREMENTS:

Concessionaire shall undertake maintenance requirements as per Schedule-K of CA, below is the requirement

✓ **For Expressway**

S. No	Description	Length (Km)	Lanes	Test	Applicable Schedule for O&M/ Manual	Allowed value/ Testing Frequency
1	**DME Expressway**	**8.716**	6Lane	Roughness	Schedule-K / **IRC: SP:99-2013**	2750 mm/Km/ Twice a Year
				FWD	Schedule-K / **IRC: SP:99-2013**	Not Applicable/ Once in 3 years

✓ **For NH-24**

S. No	Description	Length (Km)	Lanes	Test	Applicable Schedule for O&M/ Manual	Allowed value/ Testing Frequency
1	**NH-24 (New NH-9)**	**8.716**	8Lane	Roughness	Schedule-K / **IRC: SP:87-2013**	2750 mm/Km/ Twice a Year
				FWD	Schedule-K / **IRC: SP:87-2013**	Not Applicable/ Once in 5 years

- No specific Handing Over (Divestment) requirements are mentioned under CA. It shall be same as Schedule-K

1.7 ROAD INVENTORY

The Project Road has 6-lane divided carriageway with flexible pavement over the entire length (except at Toll Plaza) having Expressway carriageway width of 14.75m including 3m wide paved shoulder in each direction. The project corridor generally runs in Plain terrain. The land use along the project road is mostly built-up areas. It passes through towns like CWG Village, Rajpath ITO, Vinod Nagar west, and Ghazipur Road etc. In general, approaches are in the range of 3.5m-5.5m height.

The view of project road at different locations is shown in the following photographs:

A view of the Project Road with 6-Lane Expressway having Lighting, & CCB at Km 6.000-LHS

A view of the Project Road CCB between NH and NE at Km 4.000

A view of the Project Road Cantilever sign board at Km 1.900

A view of the Project Road with H.T line passing Km 1.100

The Project Road has 11 Major junctions and 11 Minor junctions. Photographs showing junctions locations are presented below:

Minor Junction @ km 4.800 LHS

Minor Junction @ km 6.950 RHS

Major Junction @ Km 6.500 LHS

Major Junction with High-mast @ Km 7.000 RHS

About 16 numbers of High mast lighting is observed along the project road. Mostly they are located at Junctions. Few photos showing High mast lighting are presented below:

Single arm lighting Km 0.350 LHS

Double arm lighting at Km 2.800 Median

All together the Project Road has about 14 no's Bus Shelters on NH-Down and sample photos taken at the Bus Shelter are presented below:

Bus Shelter near km 2.050 LHS

Bus Shelter near km 8.400 RHS

1.8 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. As a part of the validation, the available as-built drawings and the inventory data received from the Concessionaire were also referred. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground

Table 2: Road Inventory details

S No.	Particulars	Length/ Nos.	Total for O&M Estimation
1	Start Chainage (Km)	Km	0.000
2	End chainage (Km)	Km	8.716
3	Length of the Project Corridor	Kms	8.716
4	Service Road / Slip Road	Kms	-
5	Flyovers	Nos.	5
6	VUPs	Nos.	4
7	LVUP's	Nos.	2
8	PUP's/CUP's	Nos.	1
9	FOBs	Nos.	4
10	Major Bridges	Nos.	1
11	Minor Bridges	Nos.	2
12	Major Junctions	Nos.	11
13	Minor junctions	Nos.	11
14	Full Height RE Wall	Kms	7.200
15	Bus Bays with Shelter	Nos.	-

S No.	Particulars	Length/ Nos.	Total for O&M Estimation
16	Bus Shelters	Nos.	14
17	Truck Lay bye	Nos.	-
18	Rest Areas	Nos.	-
19	High Mast Lights	Nos.	16
20	Highway Lighting (length only)	Kms	35.768
21	Single Arm Lightings	Nos.	174
22	Double Arm Lightings	Nos.	794
23	Antiglare	Kms	5.976
24	Road Markings	Kms	8.716
25	W-Beam Safety Barriers	Kms	1.830
26	Double faced W-Beam Safety Barriers	Kms	0.000
27	Rigid Concrete Barriers	Kms	34.934
28	Wire Rope Barriers	Kms	1.500
29	Concrete Railing	Kms	16.080
30	Pedestrian Guard Rails	Kms	14.051
31	Chain Link Fencing	Kms	0.000
32	Delineators	Nos.	436
33	Kilometer Stones	Nos.	18
34	Hectometer Stones	Nos.	70
35	Road Signs	Nos.	329
36	Gantry Sign Boards	Nos.	13
37	Cantilever Sign Boards	Nos.	12
38	Varying Message Signs (VMS)	Nos.	4
39	Emergency Call Box	Nos.	16
40	Advanced Traffic Management System (ATMS)	Nos.	-
41	Footpath cum Utility	Kms	12.186
42	Cycle Track	Kms	16.372
43	Traffic Signals	Nos.	49

1.9 STRUCTURES

List of Structures found during the inventory surveys along the corridor are as follows:

Table 3: Summary of Major Structures

S. No	Type of Structure	Schedule-B	As per Site
(a)	No. of Major Bridges	1	1
(b)	No. of Minor Bridges	2	2
(c)	No. of Flyover	5	5
(d)	No. of Vehicular Underpasses	4	4
(e)	No. of Light Vehicular Underpasses	2 (COS)	-
(f)	No. of Pedestrian Under passes	-	1
(g)	No. of FOB	4	4

Table 4: Summary of Culverts

S. No	Type of Structure	Schedule	As per Site
(a)	No. of Pipe Culverts	-	6 (COS)
(b)	No. of Box / Slab Culverts	1(Descope)/-	-

Table 5: Details of Major Structures along Project Road

Sl No	Design chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Deck width	Remarks
1	0+000	Flyover	LHS	MCW	New	30+80+24.3+25+25+25+25+25+25+25+25+43.1+47.5+30+26+20+30+28+15+25+45+30+45	14.17	-
2	0+000	Flyover	LHS	MCW	New	25+25+25+25+25+25+25+28.6+21.4+30+30+25	12.5	COS
3	0+805	MJB	LHS	MCW	New	13 x 42.4	20.50	-
4	0+805	MJB	LHS	MCW	Old	13 x 42.4	19.10	-
5	0+805	MJB	RHS	MCW	Old	13 x 42.4	22.80	-
6	0+805	MJB	RHS	MCW	New	13 x 42.4	20.50	-
7	2+050	Flyover	LHS	MCW	New	25+30+25+25+30+25+25+30+25+25+ 30+25	10.5	-
8	2+050	Flyover	LHS	MCW	Old	25+30+25+25+30+25+25+30+25+25+ 30+25	14.5	-

Sl No	Design chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Deck width	Remarks
9	2+050	Flyover	RHS	MCW	Old	25+30+25+25+30+25+ 25+30+25+25+ 30+25	14.5	-
10	2+050	Flyover	RHS	MCW	New	25+30+25+25+30+25+ 25+30+25+25+ 30+25	10.5	-
11	3+050	FOB	BHS	MCW	New	1 x 94.7	3.20	-
12	3+288	MNB	LHS	MCW	New	3 x 5.5	25.43	-
13	3+288	MNB	LHS	MCW	Old	3 x 5.5	25.58	-
14	3+288	MNB	RHS	MCW	Old	3 x 5.5	25.58	-
15	3+288	MNB	RHS	MCW	New	3 x 5.5	23.43	-
16	3+500	FOB	BHS	MCW	New	1 x 83.5	2.75	-
17	3+823	VUP	LHS	MCW	New	2 x 12.6	12.15	-
18	3+823	VUP	LHS	MCW	New	2 x 12.6	16.10	-
19	3+823	VUP	RHS	MCW	New	2 x 12.6	11.25	-
20	3+823	VUP	RHS	MCW	Old	2 x 12.6	17.00	-
21	4+600	VUP	LHS	MCW	New	2 x 15	12.15	-
22	4+600	VUP	LHS	MCW	New	2 x 15	16.10	-
23	4+600	VUP	RHS	MCW	New	2 x 15	16.10	-
24	4+600	VUP	RHS	MCW	New	2 x 15	12.15	-
25	4+890	PUP	LHS	MCW	New	1 x 10	12.05	-
26	4+890	PUP	LHS	MCW	Old	1 x 10	16.10	-
27	4+890	PUP	RHS	MCW	Old	1 x 10	16.10	-
28	4+890	PUP	RHS	MCW	New	1 x 10	12.05	-
29	5+175	VUP	LHS	MCW	New	2 x 15	12.15	-
30	5+175	VUP	LHS	MCW	New	2 x 15	16.10	-
31	5+175	VUP	RHS	MCW	New	2 x 15	16.10	-
32	5+175	VUP	RHS	MCW	New	2 x 15	12.15	-
33	6+040	LVUP	LHS	MCW	New	1 x 15	12.15	COS
34	6+040	LVUP	LHS	MCW	New	1 x 15	16.10	COS
35	6+040	LVUP	RHS	MCW	New	1 x 15	16.10	COS
36	6+040	LVUP	RHS	MCW	New	1 x 15	12.15	COS
37	6+075	VUP	LHS	MCW	New	2 x 14.925	12.15	-
38	6+075	VUP	LHS	MCW	New	2 x 14.925	16.10	-
39	6+075	VUP	RHS	MCW	New	2 x 14.925	16.10	-
40	6+075	VUP	RHS	MCW	New	2 x 14.925	12.15	-
41	6+140	LVUP	LHS	MCW	New	1 x 15	12.15	COS
42	6+140	LVUP	LHS	MCW	New	1 x 15	16.10	COS

Sl No	Design chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Deck width	Remarks
43	6+140	LVUP	RHS	MCW	New	1 x 15	16.10	COS
44	6+140	LVUP	RHS	MCW	New	1 x 15	12.15	COS
45	6+500	FOB	BHS	MCW	New	1 x 88.976	3.10	-
46	6+930	MNB	LHS	MCW	New	35 + 26.775 + 6.5 + 6.5	17.00	-
47	6+930	MNB	LHS	MCW	Old	2 x 24	10.50	-
48	6+930	MNB	LHS	MCW	Old	4 x 12	16.38	-
49	6+930	MNB	RHS	MCW	Old	4 x 12	16.73	-
50	6+930	MNB	RHS	MCW	Old	2 x 24	10.50	-
51	6+930	MNB	RHS	MCW	New	26.775 + 10 + 10	17.00	-
52	7+000	Flyover	LHS	MCW	New	50+75+50+30	10.5	-
53	7+000	Flyover	LHS	MCW	Old	40+50+75+50+30+40+30	14.5	-
54	7+000	Flyover	RHS	MCW	Old	40+50+75+50+30+40+30	14.5	-
55	7+000	Flyover	RHS	MCW	New	50+75+50+30	10.5	-
56	7+350	FOB	BHS	MCW	New	1 x 89.635	3.10	-
57	8+047	Flyover	LHS	MCW	New	26.25+25.75+25.75+26.25+26.25+25.75+26.25+26.25+25.75+25.75+26.25	10.5	-
58	8+047	Flyover	LHS	MCW	Old	26.25+25.75+25.75+26.25+26.25+25.75+26.25+26.25+25.75+25.75+26.25	14.25	-
59	8+047	Flyover	RHS	MCW	Old	26.25+25.75+25.75+26.25+26.25+25.75+26.25+26.25+25.75+25.75+26.25	14.25	-
60	8+047	Flyover	RHS	MCW	New	26.25+25.75+25.75+26.25+26.25+25.75+26.25+26.25+25.75+25.75+26.25	10.5	-
61	8+408	Flyover	LHS	MCW	New	2 x 27.45	11.9	-
62	8+408	Flyover	LHS	MCW	New	2 x 27.45	16.15	-
63	8+408	Flyover	RHS	MCW	New	2 x 27.45	16.15	-
64	8+408	Flyover	RHS	MCW	New	2 x 27.45	10.5	-

NOTE ON EXPRESSWAY MAJOR BRIDGE ACROSS YAMUNA RIVER@ CH 0.805

- **BACKGROUND**

Old Nizamuddin Bridge, presently existing on Expressway was constructed during year 1964 to 1968. During the course of time, excessive deterioration in footpath slabs and beams etc., were noted and accordingly, repair and rehabilitation works for this bridge were carried out during year 1992 to 1993 including external pre-stressing works.

Further, due to continued increase in heavy traffic in recent past along with usual aging effects, this bridge once again started showing visible signs of deterioration, distresses and damages which includes cracking and spalling of concrete from the girders, deck slab and piers, deterioration in metallic bearings, damages and deterioration in external pre-stressing, deterioration in expansion joints, damages in wearing coats etc. Keeping in view of importance of the bridge and the recent deterioration, again PWD, Govt of Delhi has initiated detailed investigations during year 2013-14 and appropriate rehabilitation measures as suggested for repair and strengthening of various elements and durability make up measures were proposed. Few distresses noted were related to external prestressing cables, and the PVC pipe on PSC cables were damaged at few locations, strands were corroded at some locations and some wires snapped in some cables.

1.10 COSTING

Cost Component for various items and activities have been worked out by considering the Best Industry practice and most appropriate methods. Detailed quantities for work items have been estimated based on the details presented in previous chapters for various heads.

The gist of the cost components considered are presented below:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

1.10.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 6: Summary of Unit Rates (excluding GST)

S. No	Type of Material	Units	Source	Average Lead in Kms	Market Rates including lead
1	**Aggregate**				
a)	40 mm	Cum	Crusher	124.64	1,729
b)	20 mm	Cum	Crusher	124.64	1,729
c)	12 mm	Cum	Crusher	124.64	1,709
d)	6 mm	Cum	Crusher	124.64	1,690
e)	Dust	Cum	Crusher	124.64	1,690
2	Gravel/Moorum				
	Embankment	Cum	Borrows Area	12.0	288
	Subgrade	Cum	Borrows Area	12.0	288
3	Other Major Material				
	Bitumen 60/70	tone	Mathura	174.0	41,309
	Bitumen 80/100	tone	Mathura	174.0	40,625
	CRMB	tone	Mathura	174.0	26,425
	Emulsion	tone	Mathura	174.0	51,218
	Steel	tone	Outlet	23.00	52,604
	HTS Strands	tone	Delhi	23.00	75,104
	Cement	tone	Delhi	23.00	7,704
	Structural Steel	tone	Delhi	23.00	76,004
	VG-40 (For FY2027)	tone	Mathura	174.00	87,091
	VG-40 (FY28 onwards)	tone	Mathura	174.00	51,061

Table 7: Summary of Major Material Rates (excluding GST)

S No	Activities	Unit	Rate (Rs)	Remarks
1	BC (For FY27)	Cum	17,454	VG-40
	BC (FY28 onwards)	Cum	12,010	VG-40
2	Tack Coat	Sqm	14	
3	DBM	Cum	10,996	VG-40
4	PC	Sqm	39	
5	WMM	Cum	3,027	
6	GSB	Cum	2,772	
7	Embankment	Cum	624	
8	Subgrade	Cum	673	
9	Shoulder Filling	Cum	673	
10	Thermoplastic Paint	Sqm	452	
11	Road Studs	Nos	196	
12	DLC	Cum	4,802	
13	PQC	Cum	9,655	
14	RE panel	Sqm	3,983	
15	M-15	Cum	8,227	
16	M-20	Cum	8,296	
17	M-25	Cum	8,891	
18	M-30	Cum	8,908	
19	M-35	Cum	9,857	
20	M-40	Cum	11,203	
21	M-45	Cum	11,492	
22	M-50	Cum	13,198	
23	Reinforcement steel	MT	74,186	
24	1.2m Dia pile	Rm	14,139	
25	HT strands	MT	1,31,913	

Note:

1) For Major Maintenance in FY27, the prevailing market rate of bitumen has been considered. However, for the remaining concession period from FY28 onwards, FY25 rates have been adopted and escalated at 5% per annum for a period of 2 years, considering that the cost estimates are presented at FY27 base-year prices.

2) Labour: Central Minimum Wages as on April'2026 for "C Area" Category of construction workers Rates

1.10.2 IMMEDIATE REPAIR COST

Costs associated with immediate repairs shall be estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Following items shall be mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

There is no immediate cost associated with this project for FY27.

1.10.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

1.10.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines Etc
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc

1.10.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

1	Providing treatment for sealing of road surface / isolated cracks at scattered locations
	i) covered with 6.7 mm size stone chipping @ 0.1 cum/ 10 sqm.
	ii) covered with dry coarse sand passing through 2.36 mm sieve and retained on 180 micron sieve @ 0.03 cum/10 sqm heated to 600 C
	iii) filling discrete cracks with slow curing bitumen emulsion as per Technical Specification Clause 3004.3.3
2	Providing treatment to bleeding bituminous surface at scattered locations
3	Providing localized repair to rutted portion and edge breaking of bituminous surface
4	Providing treatment and repair to pot-holes and patch work
5	Providing and laying dense bituminous macadam using bitumen grade VG 40 complete as per Technical Specification Clause 507
6	Proving and laying bituminous concrete (asphaltic concrete)
	(a) Using bitumen (VG-40) as per IRC: SP: 53
7	Road Roughness survey
8	Turfing on embankment slopes and at all other Project Facilities
9	Providing repair to stone pitching/apron at scattered locations
10	Rain Cuts Maintenance: Restoration of rain cuts soil, moorum, gravel or a mixture of these
11	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
14	Filling in median island with approved materials with all leads and lifts complete as per TS Clause No. 407
15	Replacing damaged / broken railing with new pre-cast / cast-in-situ, concrete railing to match with existing design and pattern.
24	Carrying out repair to road signs including strengthening resetting or otherwise repairing signs and delineators
	a) Road sign board mounted on single post
	b) Road sign board mounted on double post
	c) Overhead/ Gantry Sign boards
	d) Delineator
25	Supplying and fixing at site retro-reflectorized type **sign boards/signs**
	90cm Equilateral triangle
	60cm circular
	90 cm circular
	90cm high octagon
	80cm x 60cm rectangle
	Chevron signs 60cm x 45cm
	Place identification signs (Fig 15.7 of IRC 67)
	Providing and fixing Object Markers
	Providing and fixing of retro-reflectorized Route Marker signs (size 450mm x 600mm)

26	**Hazard Marker Sign:**
	a) size 90 x 30 cm
	b) size 30cm triangular side cluster of red reflectors (screen printed)
27	Cats Eyes/Raised pavement marker (NMC Nails Less)
28	Painting two coats on old surface after minor repairs to give an even and smooth surface and printing letters and figures with synthetic enamel paint
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
29	Providing painting lettering and fixing of distance measurement stones including dismantling of old damaged/ broken ones, confirming to TS Clause 804
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
30	Providing and fixing road delineators conforming to TS Clause No. 805 as directed by the Engineer.
31	Repainting the kerb stones and separation barrier with first quality synthetic enamel paint of approved brand
32	Painting all types of pavement markings including lines, dashes, arrows etc. on roads as per relevant IRC/MOST standards after cleaning the surface complete in all respects as directed by the Engineer.
	a) Hot applied Thermoplastic compound
	(i) Lane / Centre Line / Edge Line
	(ii) Direction Arrows
	(iii) Diagonal Chevrons Markings
33	Supplying and laying cast-in-situ cement concrete kerb without channel section
	a) by Manual/machine including formwork
34	Major repair / replacement of metal beam crash barrier (W profile guard rails)
35	Providing and fixing chain link/ welded mesh fencing / square bars fencing
36	Dismantling the old damaged chain link/welded mesh / square bars fencing and replacing it with new chain link/ welded mesh/square bars fencing
37	Provision of rumble strips
38	Shoulder Maintenance:
39	synthetic enamel paint of approved brand on metal pedestrian guard rail
40	Dismantling of wearing course

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labor etc.
10. Carrying out 50 to 60 mm thick shotcrete using a mix proportion of 1:2:2 (cement: sand:6 mm down aggregate) added with Polypropylene fibers at a dosage rate of 125 gms/bag of cement including cost of labor, material, scaffolding, equipment etc complete.
11. Repair of Floor Aprons, pitching and other protection works
12. Cleaning of Drainage Spouts
13. M-25 Concrete

1.10.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations.
- ✓ Regular patrolling & reaching accident/incident site.
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.).
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labors including deployment of crane and all works shall be done as per requirement and as directed by Client representative and as per Relevant Specifications as applicable.

1.10.4 OPERATIONS COSTS

Cost towards Operations include the following:

- SPV Costs
- Electricity Bill of lighting
- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- Survey Costs
- IE Fee
- Insurance
- Audit Charges
- Administrative Cost

Following table depicts the cost of operations for the project:

Table 8: 1st year O&M Cost

S No	Description	Amount in Lakhs.
	SPV - Expenditure	
1	SPV staff	96.60
2	Highway lighting - Power Charges	194.76
3	Highway lighting - Maintenance charges	9.74
4	Tolling and HTMS AMC/ Spare Parts	151.44
5	Surveys & Investigations (BBD, Roughness)	1.73
6	IE fees	24.00
7	Insurance Charges	36.60
8	Audit Charges	10.68
9	LIE Fee	87.00
10	Admin cost - Board Meeting Expenses, valuation etc.	
	Agency - Expenditure	
11	Toll Operation - Agency	-
12	Route patrolling	186.57
13	Route patrolling – Periodic Vehicle replacement cost	
14	Routine maintenance	279.02
15	Repair of Road - BOQ Items	155.50
16	Repair of Structures	15.98
	1st year O&M cost (including GST)	1,249.61

Note: *The cost is inclusive of GST@18% without escalation and the amount is in Lakhs considering FY27 rates*

1.10.5 PERIODIC MAINTENANCE COSTS

Cost towards major maintenance include following:

- ✓ Cost of Periodic maintenance of Pavement based on Finalized MM schedule
- ✓ Cost of Periodic Maintenance of Structures
- ✓ Cost of Periodic replacement of ATMS and TMS

Following table includes the cost of Major Maintenance works for the project:

Table 9: Summary of Periodic Maintenance Costs

Year	Functional +Structural overlay MCW+ S/R	Replacement of ATMS @ every 7 Years	Replacement of TMS @ every 5 years	Structure specified repairs
2026-2027	5,984.76	183.43	-	209.40
2027-2028	-	-	-	16.61
2028-2029	-	-	-	-
2029-2030	67.43	-	-	-
2030-2031	-	-	-	-
2031-2032	-	-	-	-
2032-2033	4,321.68	183.43	-	1,155.98
2033-2034	-	-	-	-
TOTAL	**10,373.87**	**366.85**	**-**	**1381.99**

Note: *The cost is inclusive of GST@18% without escalation and the amount is in Lakhs considering FY27 rates.*

1.10.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 10: Cost Summary

Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Toll Collection Expenses	Routine Maintenance + Incident management	Periodic Maintenance (Functional +Struc Overlay+ Toll collection system)	Total Cost
2026-2027		-	1,263.68	6,377.59	7,641.28
2027-2028		-	1,249.52	16.61	1,266.13
2028-2029		-	1,249.52	-	1,249.52
2029-2030		-	1,249.52	67.43	1,316.95
2030-2031		-	1,251.99	-	1,251.99
2031-2032		-	1,293.18	-	1,293.18
2032-2033		-	1,249.52	5,661.09	6,910.61
2033-2034		-	391.87	-	391.87
Total Cost:	**-**	**-**	**9,198.82**	**12,122.71**	**21,321.53**

Note: *The cost is inclusive of GST @ 18% without escalation and the amount is in lakhs considering FY27 rates.*