EXECUTIVE SUMMARY

For

Development of 4/6 lane (Greenfield)access control expressway from Varanasi to Kolkata (Package-5) from km 387+200 (near Kamalpur village, Jharkhand/west Bengal Border) to Km 622+500, NH-16, near Uluberia, Howrah District, West Bengal under Bharatmala Pariyojana Phase-II (Lot-9 Package-3) (Total length-235.300 Km) by M/s National Highways Authority of India

PROJECT PROPONENT:

National Highways Authority of India (NHAI)

DPR CONSULTANT

M/s SA infrastructure Consultant Pvt. Ltd
1101A, 11th Floor, Tower A-II, Corporate Park, Plot no. 7A/1, Sector 142, Noida, U.P

ENVIRONMENT CONSULTANT:

PMS
PRESERVING TOMORROW

CONSULTANT
P&M Solution
C-88, Sector 65, Noida -201301 – U.P
A QCI –NABET Accredited Organization

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EXECUTIVE SUMMARY

INTRODUCTION

The Government of India has taken up development of Economic Corridors, Inter Corridors, Feeder Corridors and National Corridors to improve the efficiency of Freight Movements in India under Bharatmala Pariyojana.

National Highway Authority of India has been appointed as Nodal Agency for proposed development of Purulia district to Howrah district west Bengal pkg-5.

DESCRIPTION OF THE PROJECT

The proposed highway starts from Ch. 387+200 near Kamalpur village (Jharkhand/West (Ch. 387+200 to Ch. 622+000) to Km 622.500 NH-16, near Uluberia, Howrah District, in the state West Bengal. The approx. length of proposed alignment is 235.30 Km.

This is a green field alignment, and is proposed for 4/6-Lane .The proposed length of Project Highway is about 235.300 kms. Proposed Right of Way is 70 m in non-forest Area and 60 m in Forest areas as per the requirement keeping in view the fully access controlled Highway with 4/6-lane dual carriage way configuration.

The road passes through the important talukas like Jhalda-II, Jaipur, Purulia-I, Purulia-II, Hura, Puncha in District of Purulia , talukas like Indpur, Taldangra, and Simalpal in District of Bankura, talukas like Garbeta-I, Chandrakona-II, Chandrakona-I, Ghatal in District of Pashchim Mednipur, talukas like Khanakul-I, Khanakul-II, in District of Hoogli and talukas like Amta-II, Amta-II in District of Hawrah in the state of West Bengal.

Salient features of the project:

S.no.	Parameters/Issues	Description
1.	Length (km)	235.300
2.	Total land acquired (ha)	**2078**
3.	Govt. land (ha)	673.4
4.	Pvt. Land (ha)	1294.6
5.	Forest land(ha)*	108
6.	Area under protected/ important or sensitive species of flora or fauna/Wildlife Sanctuary	The alignment does not pass through any wild life sanctuary, protected area and its eco sensitive zone.

7.	No. of trees	32000 (20000 no. of forest trees and 12000 no. of non-forest trees)
8.	No. of structure to be impacted due to proposed alignment	535 (include Semi-puca and pucca Structure)
9.	No. of families	535
10.	No. of structure to be constructed	Major Bridges – 17 Minor Bridges-191 and 11 nos. MNB at Interchange VUP-11 VOP-11 LVUP-71 SVUP-51 Wildlife Underpasses-16 ROB-04 Structure over Gas Pipe Line-2, (Flyover) at MCW-16 and 2nos. flyovers at Interchange location Elevated/Viaducts-8, Box Culverts at MCW -469 and 13 no. at Interchange Elephant Corridors-6
11.	Total water requirement	7500 KL/day. Water will be extracted from surface sources. The ground water will be abstracted for campsite after obtaining the permission from competent authority.
12.	RoW	Total length of the project is 235.300 Km (approx.). Proposed Right of Way is 70 m in non-forest Area and 60 m in Forest areas as per the requirement keeping in view the fully access controlled Highway with 4/6-lane dual carriage way configuration.
13.	Construction material	Cement (MT) - 293600, Coarse Sand (cum)- 2840,

		Coarse Agg. (cum)- 1610000, Fine Agg. (cum)- 3220000, Steel (ton)- 9470, Bitumen (ton)- 5840000, Bitumen Emulsion (ton)- 3030600, Borrow Earth/Fly Ash (cum)- 15152800
14.	Connectivity	The proposed alignment will be part of Varanasi- Kolkata 4/6 lane expressway will connect city like Varanasi, Bhabhua, Sasaram, Chatra, Hazaribagh, Ramgarh, Ranchi, Bokaro, Purliya, Bankura, Jamshedpur, Kharagpur, Kolkata etc
15.	Project cost (cr.)	9250 Cr

DESCRIPTION OF THE ENVIRONMENT

The baseline data was generated during pre-monsoon season of 2024 i.e. March to May, 2024. The baseline data has been provided in chapter 4 of this report which shows the values of almost all of the parameters are well within the prescribed limits.

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum Concentrations of PM_{10} for all the 10 AAQ monitoring stations were found to be 46.72µg/m3 (at AAQ10-khadinam-611+300) to 85.75 µg/m3 (at AAQ1-kamalpur-376+800). respectively The result of PM2.5 reveals that the minimum concentration of 22.56 µg/m3 (at AAQ10- khadinam -CH 611+300) to 49.47 µg/m3 (at AAQ1-. Kamalpur -376+800). The gaseous pollutants SO2 and NOx were within the prescribed CPCB limit of 80µg/m^3. For residential and rural areas at all stations. The minimum & maximum concentrations of SO2 were found to 6.20 µg/m3 (AAQ6-Mauladanga-476+300) to 13.14µg/m3 (AAQ4-hantard-435+900). The minimum & maximum concentrations of NOx were found to be 9.4 µg/m3 (AAQ10-khadinam -CH 611+300) to 18.39µg/m3. (AAQ7-Bhedua -496+800) respectively.

Noise Levels	Noise monitoring was carried out at 10 locations. The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS to marginal rise in PM levels some locations monitored due to increase in vehicle density
Water Quality	8 Groundwater samples were analyzed and concluded that: The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by Drinking water standards promulgated by Indian Standards IS: 10500. 8 Surface water samples were analyzed and concluded that: They were found within the limits under prescribed Standards
Soil Quality	8 Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.15 to 7.80, which shows that the soil is neutral to alkaline in nature. In the collected soil samples the conductivity ranged from 362.0 to 390.0 µmhos/cm. Water Holding capacity varied from 32.18 to 44.14 %. Magnesium was highly dominant amongst all the metals present and varied from 94.06 to 267.12mg/Kg.
Ecology and Biodiversity	There are no ecologically sensitive areas present in the study area.

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Summary of Anticipated Impacts and Recommended Mitigation Measures

Area	Impacts	Mitigation Measures
Construction Phase		
Topography and geology	▪ Disfiguration & change in existing profile of the land due to borrow pits & proposed construction ▪ Disturbance on geological setting due to quarrying. ▪ Uncontrolled digging of borrow pits resulting in water accumulation & breeding of vector disease. ▪ Establishment of construction camp.	▪ Borrow pits shall be allowed at only pre-identified locations with prior permission from competent authority ▪ Borrow pits shall be restricted to 1 m depth followed by resurfacing of pits. ▪ Road building materials shall be procured from approved and licensed quarries. ▪ Suitable seismic design of the structures shall be adopted to mitigate the earthquake impacts.
Soil	▪ Disruption & loss of productive top soil from agricultural fields ▪ Soil erosion and contamination	▪ Adequate measures like drainage, embankment consolidation & slope stabilization shall be taken to avoid soil erosion. ▪ Top soils (15 cm) of borrow pit sites shall be conserved and restored after excavation is over. ▪ Accidental spills of lubricants/oil and molten asphalt shall be avoided by adherence to good practices. ▪ Oil Interceptor shall be provided for wash down, refueling areas ▪ Vehicle parking area of the construction camp will be made impervious using 75

		mm thick P.C.C. bed over 150 mm thick rammed brick bats.
Land use	▪ Changes in existing land use pattern of the PROW for construction of the project road ▪ Loss of agricultural land due to land acquisition	▪ Earth material generated from excavation shall be reused for embankment construction and site development. ▪ Construction debris will be disposed of in suitable pre-identified dumping areas. ▪ Dumping areas will be biologically reclaimed. ▪ Construction camp will be provided to avoid indiscriminate settlement of construction workers. ▪ Construction activities shall be kept confined to PROW only
Water use	▪ Impact on the local water sources due to use of construction water.	▪ Minimum use of water from existing sources for construction purpose ▪ The contractor shall arrange water required for construction in such a way that the water availability and supply to nearby communities remain unaffected. ▪ Wastage of water during the construction should be minimized ▪ Rainwater Harvesting Structures
Water quality	▪ Increase of sediment load in the runoff from construction sites and increase in turbidity in receiving water bodies. ▪ Water pollution due to generation of wastewater from construction camps ▪ Water pollution due to use of fly ash in the	▪ Silt fencing will be provided to reduce sediment load ▪ Oil interceptor to stop and separate the floating oils ▪ Packaged Wastewater Treatment Plant has been recommended for the construction camp ▪ All the construction activities will be carried out during dry seasons only. ▪ In line with specifications of IRC:SP:58,

	embankment	method of construction of Fly Ash embankments is proposed by alternate layers of fly ash and soil i.e. Sandwich Type Construction ▪ The fuel storage and vehicle cleaning area shall be stationed at least 500m away from the nearest water body ▪ Apart from provision of the mitigation measures, water quality shall be monitored during construction and operation phases as per environmental monitoring program to understand the effectiveness of mitigation measures suggested
Air quality	▪ Deterioration of air quality due to fugitive dusts emission from construction activities and vehicular movement along unpaved roads. ▪ Deterioration of air quality due to gaseous emissions from construction equipment & vehicular traffic. ▪ Deterioration of air quality due to emission from hot mix plants and stone crusher.	▪ Construction materials will be stored in enclosed spaces to prevent fugitive emissions. ▪ Truck carrying soil, sand and stone will be duly covered to avoid spilling. ▪ Dust suppression measures such as regular water sprinkling on haul & unpaved roads particularly near habitation ▪ Hot Mix Plant with Pollution Control Measures having Fabric Filter with multiple wet scrubber shall be installed and elevators at loading section shall be fully covered ▪ A combination of dry and wet type control system is suggested for stone crusher to minimize the impact on air quality ▪ Hot mix plants & stone crusher shall be located at least 500 m away from inhabited areas & sensitive receptors ▪ Air quality shall be monitored during construction and operation phases as per

		environmental monitoring program to understand the effectiveness of mitigation measures suggested
Flora, Fauna and Forest	▪ The proposed project involve diversion of forest land ▪ Loss of habitat of fauna due to felling of trees	▪ Vegetation clearing shall be done within PROW; it will be ensured that trees falling outside PROW will not be felled. Efforts will be made to save trees outside formation width standing on edge of the PROW. ▪ Preference to native species shall be given. These species are valuable from the socio-economic point of view. Plantation will be maintained upto 5 years and protected from cattle, wildlife and illegal felling. Dead saplings will be replaced to maintain the survival percentage of 90%. ▪ Top soil upto 15 cm depth shall be stockpiled and preserved and reused for plantation. The Contactor shall earmark the area of soil stockpiling and to be approved by Engineer in- Charge. ▪ LPG/ Kerosene shall be provided by the Contractor to the labours for cooking. Provision for community kitchen may be explored. ▪ The overall impact on flora will be concentrated within the ROW of the road and cutting of trees or clearing of vegetation outside ROW shall be strictly prohibited ▪ Wildlife awareness & environmental protection training shall be provided to the work force by the Contractor / PIU. The workers shall be made aware of the location, value and sensitivity of the natural resources

		in the area. The program shall be conducted before starting of construction activity. All staff of PIU, engineers, support staff and construction labour will attend the awareness program. ▪ Implementing sediment and erosion controls during construction will minimize adverse Impacts of water bodies and aquatic life. Construction activity will be avoided near rivers during rainy season.
Protected Areas	▪ There is no protected area (Wildlife Sanctuary, National Parks etc.) within 10 km radius of the proposed alignment.	▪ No impact is envisaged.
Solid Waste	▪ Waste generated during construction may impact soil, agriculture and water quality ▪ Waste generated from workers' camps may impact surface and ground water quality and agriculture.	▪ There will be "Refuse Containers" at site for the management of domestic waste generated by the construction laborers and these containers shall be emptied at least once daily and will be disposed of as per Solid Waste Management Rules, 2016 in consultation with the local authority.

Construction camp	▪ Influx of construction work-force & suppliers who are likely to construct temporary tents in the vicinity. ▪ Likely sanitation & health hazards & other impacts on the surrounding environment due to inflow of construction laborers.	▪ Temporary construction camps with adequate potable water supply, primary health facilities and fuel for cooking shall be provided ▪ Packaged Wastewater Treatment Plant has been recommended for the construction camp ▪ It will be ensured that the construction workers are provided fuel for cooking to avoid cutting of trees from the adjoining areas. ▪ Contractor to provide a full-fledged dispensary. The number of beds shall be as per the requirement of the labour license.
Occupational health & safety	▪ Health & safety related problems to construction workers due to inadequate health & safety measures.	▪ Adequate safety measures complying to the occupational safety manuals will be adopted to prevent accidents / hazards to the construction workers ▪ Contractor shall conduct monthly health check- ups of all his laborers in his camps through registered medical practitioner ▪ Contractor to conduct workshop on HIV / AIDS for all his laborers at all his camps at least once in a quarter
Road safety	▪ Increase on incidence of road accidents due to disruptions caused in existing traffic movements.	▪ The proposed project is a Greenfield alignment and there is no normal operating traffic as in the case of existing highways. Therefore, there is no specific standard requirement for traffic management plan during construction phase. It is normally the construction vehicles, which will be playing on temporary roads for the constriction works. Wherever the proposed project road is crossing any existing road, during construction phase, the Contractor shall

		provide and maintain a passage for traffic either along a part of the proposed RoW or along a temporary diversion constructed close to the crossing. The Contractor shall take prior approval of the Authority / Independent Engineer (AE / IE) regarding traffic arrangements during construction. ▪ Reduction of speed through construction zones.
Operation Phase		
Land use and Encroachment	• Change of land use by squatter/ encroachment within ROW and induced development outside the ROW.	▪ Planning agencies and Collector / Revenue Officer will be made involved for controlled development and prohibiting squatter/ encroachment within ROW.
Drainage	• Filthy environment due to improper maintenance of drainage.	▪ Shoulder drain & toe drain of sufficient capacity has been provided on both sides of the road to accommodate increased run-off. The out fall for these drains will be the nearby culverts / bridges or natural drainage channel. Silt fencing will be provided to sediment entering into the water courses.
Water quality	• Chances of contamination of water bodies from road surface run off containing oil spills due to traffic movement & accidents.	▪ Silt Adequate drains have been proposed to accommodate increased run-off. The out fall for these drains will be the nearby culverts / bridges or natural drainage channel. ▪ Silt fencing will be provided to sediment entering into the water courses. ▪ Contingent actions will be taken for speedy cleaning up of oil spills, fuel and toxic chemicals in the event of accidents. ▪ Regular maintenance of rainwater

		harvesting structures shall be done during the operation stage to prevent choking of these structures ▪ Monitoring of water quality at specified locations will be conducted at fixed interval
Air quality	▪ Air pollution due to vehicular emission from road traffic.	▪ Results of air quality modeling indicate that due to higher carriageway width, air turbulence and high design speed, emissions from traffic are low at receptor locations. With the introduction of BS-VI compliant fuels and vehicles, the vehicular emission is expected to further reduce and may offset the increased pollutant concentration due to increased traffic volume. Hence, the pollutant concentration is not expected to increase beyond stipulated limits in operation phase of the project road. ▪ Plantation along the project road will act as sink of air pollutants ▪ Monitoring of air quality at specified locations will be conducted at fixed interval
Noise level	▪ Noise pollution due to traffic noise.	▪ Plantation along the project road will act as a natural noise barrier. ▪ Monitoring of noise level at specified representative locations will be conducted at fixed interval. ▪ Maintenance of noise barrier
Flora & fauna	▪ Illegal felling of trees along the project road. ▪ Effect on aquatic fauna in case of accidental spill of oil, fuel & toxic chemicals into water bodies	▪ Monitoring of avenue plantation along the project road to be done. Dead sapling shall be replaced and survival rate of 90% shall be maintained. Saplings shall be provided with tree guards to protect from cattle grazing. ▪ Regular watering of plants to be done in dry

		season through drip irrigation system. ▪ Regular maintenance of the cattle underpass and culverts, which will act as animal crossing.

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

Detailed analyses of the alternatives have been conducted taking into account both with and without project. Comparative analysis of all the alternatives has also been conducted. The proposed development of the road is likely to have a positive impact on the economic value of the region. However, there are certain environment and social issues that need to be mitigated for sustainable development.

Three alternatives were studies and the first one was found out to be most suitable.

ENVIRONMENTAL MONITORING PROGRAM

Regular monitoring of important and crucial environmental parameters is of immense importance to assess the status of environment during operation of the proposed project.

With the knowledge of baseline conditions, the monitoring program can serve as an indicator for any deterioration in environmental conditions due to operation of the project and suitable mitigating steps could be taken in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficacy of control measures can only be determined by monitoring.

ADDITIONAL STUDIES

The various additional studies have been undertaken for the project including Public Consultation, Risk assessment and Social Impact Assessment/ R&R Action Plans. Public consultation is a continuous process and has been carried out at all stages throughout the project road. To ascertain the views of the affected families to be recorded and has been included in the Social Impact Assessment report.

BENEFITS OF THE PROJECT

The benefits of the Project are multi-fold. It will substantially reduce the travel time between Purulia District to Howrah District in the state of West Bengal and the other remote areas falling on the alignment. In addition to the improved connectivity, it will also provide a boost to the economic status of the villages / towns falling in the dedicated Project area.

ENVIRONMENT MANAGEMENT PLAN

Project specific environmental management plan have been prepared for ensuring the implementation of the proposed measures during construction phase of the project, implementation and supervision responsibilities. The cost for environmental management during construction has been indicated in EMP. The project impacts and management plan suggested thereof are summarized in the chapter.

The Environmental Management Plan (EMP) has been designed within the framework of various regulatory requirements on environmental and Socio-economic aspects aiming at the following:

- Minimize disturbance to native flora and fauna, if any.
- Prevent and to attenuate air, water, soil and noise pollution, if any.
- Encourage the socio-economic development.

The environmental management plan (EMP) would, therefore, consists of following main components:

- To integrate potential impacts (positive or negative), environmental mitigation measures, implementation schedule, and monitoring plans.
- To describe the potential environmental impacts and proposed management associated with each stage of the project development.
- To control environmental impacts to levels within acceptable standards, and to minimize possible impact on the community and the workforce of foreseeable risks during the construction and subsequent operational phases of the project.

CONCLUSION

Based on the EIA study and surveys conducted for the Project, it can be safely concluded that associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA Report. Adequate provisions shall be made in the Project to cover the environmental mitigation and monitoring requirements, and their associated costs as suggested in environmental budget. The proposed project shall improve Road efficiency and bring economic growth. In terms of air and noise quality, the project shall bring considerable improvement to possible exposure levels to population.