



Bakarpur-Manikpur Section

Pre-Feasibility REPORT

Consultancy Services for Preparation of Detailed Project Report for Development of Economic Corridors, Inter Corridors, Feeder Routes and Coastal Roads to improve Efficiency of Freight Movement in India

(Lot-VII/Boihar/Package-1)

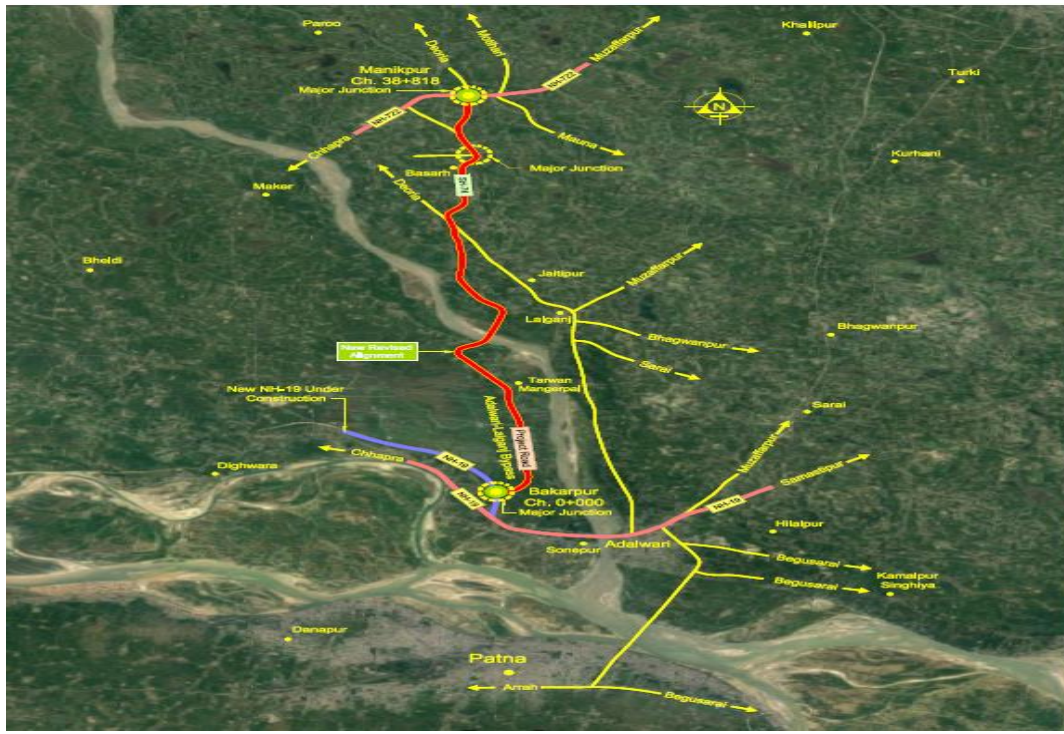
Pre-feasibility Report (PFR)

for

Environmental Impact Assessment (EIA)

for

Construction of four lane highway from Bakarpur to Manikpur section of NH-139W
(From km 0.000 to km 38.813) in the State of Bihar under Bharatmala Pariyojana.



Project Proponent

National Highway Authority of India



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Contents

1.	Executive Summary	3
2.	Introduction of the project/ Background Information.....	5
3.	Project Description	9
4.	Site Analysis	14
5.	Proposed Infrastructure.....	21
6.	Environmental Impacts	23
7.	Project Schedule and Cost Estimates.....	24



1. Executive Summary

The Bharatmala Pariyojana (BMP), is one of the biggest highway construction projects in India that focuses on optimizing efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through effective interventions like development of Economic Corridors, Inter Corridors and Feeder Routes, Coastal and Port connectivity roads and Greenfield expressways.

The NHA has entrusted with the assignment of **Development of Economic Corridors, Inter-Corridors, Feeder Routes and Coastal Road primarily to improve efficiency of freight movement in India (Lot-VII/Bihar/Package-1)**. In pursuance of the above, Lea Associates South Asia Private Limited, New Delhi, India, have been appointed as consultants to carry out the study and prepare the DPR (Detailed Project Report).

The proposed project road Bakarpur-Manikpur section is part of Patna-Shahebganj section in the state of Bihar and it is mentioned in feeder routes at S.No. 50 of Annexure II (C) of MoRT&H office memorandum dated 21.12.2017.

The project stretch is a proposed greenfield highway which starts from Bakarpur (Sitalpur Bypass) (Km 0+000) in district of Saran and terminates at Manikpur at chainage (Km 38.813) in district of Muzaffarpur. Project road is passing through Saran, Vaishali and Muzaffarpur district. Total length of stretch is 38+813 km.

The Bakarpur-Manikpur section is a part of SH-74 and nearly 40 km in length in existing road (Adalwari-Manikpur). The region of Adalwari town and villages Gadai Sarai, Ismailpur, Harauli Fatehpur, Ghatro Chaturbhuj, Basant Jahanabad and major Lalganj town comes in major habitation.

To avoid the major habitation of Adalwari, Ismailpur, Basant Jahanabad and Lalganj town, the project road has proposed from Bakarpur at Sitalpur bypass of NH-19.

Project road initiates from Sitalpur bypass at Bakarpur area and terminates at SH-74 near Manikpur area. In between the project road stretch three highway category road connects with the project stretch.

The first one is Patna AIIMS connecting under construction road. This road starts from AIIMS, Patna and connects with NH-19 and Bakarpur-Manikpur project road through a under construction ROB.

The second one is NH-19 Sitalbari bypass under construction road. This road connects with our Bakarpur-Manikpur project road through a cloverleaf grade separated interchange.

The third one is SH-74. This road is the existing main connecting road between Adalwari as well as Patna city and Manikpur area. Bakarpur-Manikpur project road connects with SH-74 just before Manikpur area.

Table: Salient Features of the proposed project*

S No	Item	Particulars						
1.	Name of the project	Construction of four lane Highway from Bakarpur to Manikpur in district Saran, Vaishali & Muzaffarpur in the State of Bihar.						
2.	Design speed	100 km/h						
3.	Flexible/Rigid Pavement Road Length	38.813 km						
4.	Starting point	Ch 0+000 (313249.83 m E, 2846331.91 m N) at sitalpur bypass near village-Bakarpur, Saran district.						
5.	Ending point	Ch-38+813 (313057.62 m E, 2880040.02 m N). Proposed alignment merge into Sh-74 at its terminating point at Manikpur Village of Muzaffarpur district.						
6.	Right of Way (ROW)	45.0 m						
7.	Width of carriage way	Ch 0+000 to Ch 38+813: four lanes divided carriageway						
8.	Type of Terrain	<table><tr><td>Terrain</td><td>%</td></tr><tr><td>Plain</td><td>90</td></tr><tr><td>Rolling</td><td>10</td></tr></table>	Terrain	%	Plain	90	Rolling	10
Terrain	%							
Plain	90							
Rolling	10							
9.	Environment and Social aspects	- Land area requirement: 199.093 ha. - Forest land: 4.108 ha. (Vacant space at crossing major existing roads & water bodies which is notified as protected forest)						
10.	Cost Estimates, based on LAC Approval	Total Capital Cost including Land Acquisition: INR 1344.46 Cr						
11.	Revenue divisions crossed	No of Villages: 51						

The proposed project will be designed as per IRC: SP: 84:2019. Grade separated structures are proposed at all SH, NH, MDR, intersections including start & end locations.

The proposed highway would provide better infrastructure for freight and passenger movement, enhance economic development, provide employment opportunities to locals, ensure road safety and reduces the fuel consumption and pollution, in addition to decongesting the existing roads between sonpur, patna to Manikpur.

2. Introduction of the project/ Background Information

INTRODUCTION

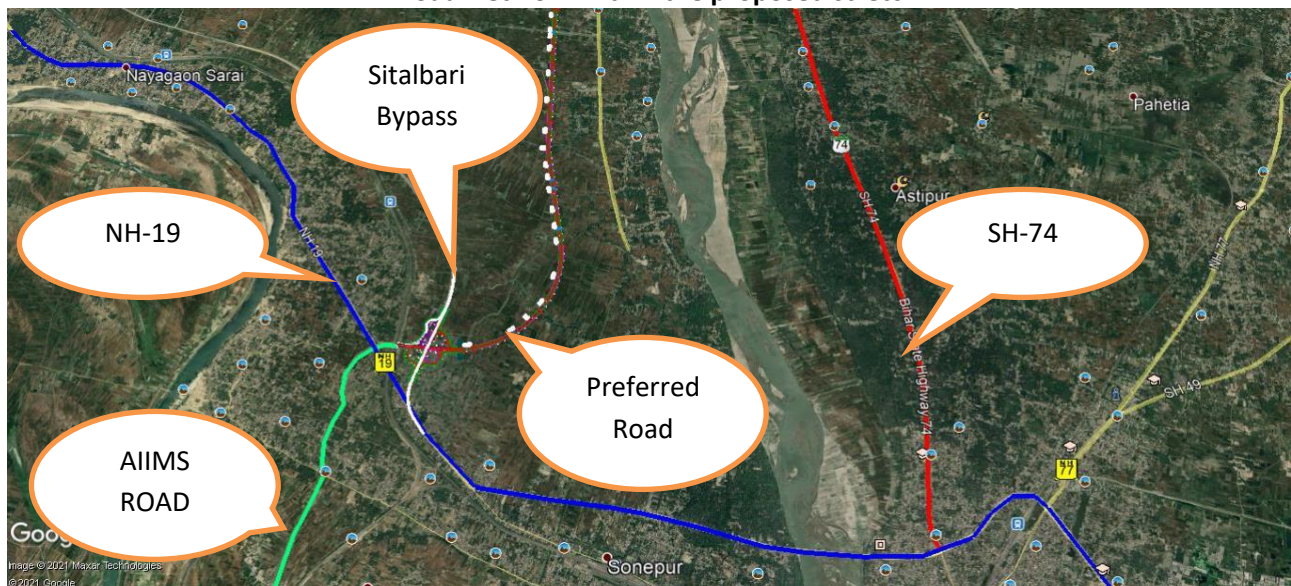
National Highways Authority of India (NHAI) under the Ministry of Road Transport & Highways (MoRT&H), Government of India has been entrusted with the Development of Economic Corridors, Inter-Corridors, Feeder Routes and Coastal Road primarily to improve the freight movement in the Country. In pursuance of the above, LEA Associates South Asia Private Limited have been appointed as Consultants by NHAI to carry out the **“Preparation of Detailed Project Report for Development of Economic Corridors, Inter-Corridors, Feeder Routes and Coastal Road primarily to improve efficiency of freight movement in India (Lot-VII/Bihar/Package-1).**

The project stretch is four lane highway which starts from Bakarpur (Km 0+000) in district Saran and terminates at Manikpur village at chainage (Km 38+813) in district Muzaffarpur. The proposed alignment traverses from 3 districts in the state of Bihar of India. Proposed alignment Bakarpur-Manikpur falls in Saran, Vaishali and Muzaffarpur districts in the states of Bihar.

The project road is part of SH-74 connecting Bakarpur and Manikpur in the state of Bihar. The proposed project road starts from design chainage Km 0+000 at the junction of NH-19 (Sitalpur Bypass) near village Bakarpur where it follows the bypass section and crossed Gandhak River at design km 16.900 km travels with bypass section till design km 35.200 near village-Hapur Basant at SH-74 and terminated at SH-74 with design km 38+554 near Manikpur where it meets existing NH-722.

Total length of the proposed stretch Bakarpur-Manikpur (NH-139W) is 38+813 km.

Road Network within the proposed stretch



Study area for Bakarpur-Manikpur section

The Bakarpur-Manikpur section is a part of SH-74 and nearly 40 km in length in existing road (Adalwari-Manikpur). The region of Adalwari town and villages Gadai Sarai, Ismailpur, Harauli Fatehpur, Ghatro Chaturbhuj, Basant Jahanabad and major Lalganj town comes in major habitation. To avoid the major habitation of Adalwari, Ismailpur, Basant Jahanabad and Lalganj town, the project road has proposed from Bakarpur at Sitalpur bypass.

It starts from the junction of NH-19 with design Km 0.000, and ends at Manikpur with design km 38.554 where it touches NH-722. During several site visits, it was found that these three roads carry substantial amount of traffic which entering or existing from Patna city.

The existing road is generally 7m wide with earthen shoulders either side. Available ROW ranges between 10.0 to 20.0 m in existing. The project road is passing through plain terrain and mostly Built –up area due to which consultant provided bypass to avoid built-up section. It has been planned to prepare Detail Project Report of the above-mentioned stretches (Bakarpur-Manikpur section) under Bharatmala Scheme. The whole alignment is providing connection between Bihar and West Bengal. The details of the Package are briefed in below table.

Table Error! No text of specified style in document.-4: Packaging of the Project Road

S.No	Packaging Details	Chainage	Length
Section – III (Bakarpur to Manikpur)			
1	Bakarpur to Manikpur section	Km 0+000 to km 38+813	38+813

Necessity of the Project corridor-Bakarpur-Manikpur section

Patna city is connected with several peripheral towns like Mujaffarpur, Bettiah, Motihari, vaishali etc. through mix of two-lane highways and four lane highways. Due to huge increment of traffic, now a day's huge traffic jam is common phenomenon in this two-lane road (Adalwari-Manikpur). Hence, it becomes necessary to connect Patna city with the peripheral towns through proper four lane roads. Hence, proposal for connecting Patna city and Rampur with four lane corridors has been entrusted by the authority by several segments of road projects.

- Four lane road connecting AIIMS, Patna and Sitalbari bypass of NH-19
- Four lane road connecting NH-19 and Manikpur
- Four lane road connecting Manikpur and Areraj
- Four lane road connecting Areraj and Rampur

During site visit it was found that bypass is the only option for connecting NH-19 and Manikpur due to the presence of heavy habitation on both side of existing SH-74. Further, due to the absence of any major bridge over Gandak river in between Sitalpur and Lalganj, commuter of these areas has to travel long distance which includes involvement of long travel time. Hence, finally it was decided to connect sitalbari bypass of NH-19 to manikpur by the proposed project road Bakarpur-Manikpur project road.



Bakarpur-Manikpur Section

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(Lot-VII/Boihar/Package-1)

Pre-Feasibility REPORT

Some of the important religious and tourist destination which can be connected by proposed Bakarpur-Manikpur alignment area Gandhak River, Hariharnath Temple, Sonpur Fair, Ashok Pillar Stupa, Budh Stupa, Jain Temple, Mahatma Gandhi Setu and National Leechi Research center.

However, potentiality of finding Buddhist and Jain pilgrimages in some places is viable. The proposed Bakarpur-Manikpur project will direct connectivity to pilgrimage of ancient importance such as Budh Stupa, Jain temple, Mahatma Gandhi Setu.

Details of Employment generation (Direct and Indirect) -

Direct Employment: During the construction phase of the road project around 120 persons/day would be employed temporarily and 50 persons would be employed permanent basis for a period of 2.5 years.

During the operation & maintenance phase of the road project around 60 persons would be employed temporary and 20 persons would be employed on permanent basis for a period of 5 years. Preference will be given to local people for employment.

Indirect Employment: Ancillary units will be set up due to project which will provide employment. Local vendors/traders etc. will be benefitted through employment generated during construction and operation phase.

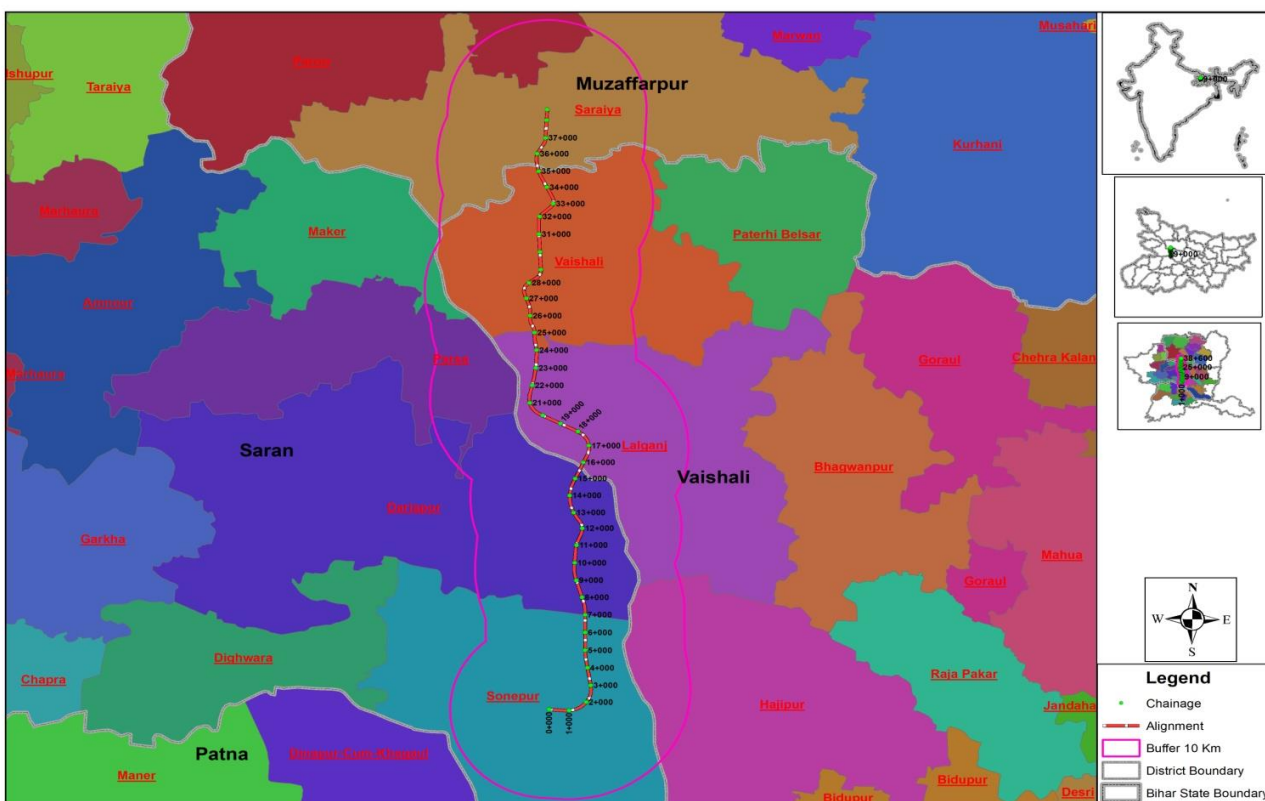
3. Project Description

DESCRIPTION OF THE PROJECT CORRIDOR

India is one of the fastest growing developing nations in the world. India's economy has grown manifolds in the recent past and likely to grow further as per the present trends registered in the past couple of years. Increase in the economy has led to increase of loading on the infrastructure corridors available within the country. Surge for better infrastructure corridor facilities for sustained growth of economy have been well realized and recognized by the Govt. of India in line with the rising trends of economy.

The Govt. of India (GoI) through Ministry of Roads & Highways (MORT&H) is contemplating to enhance the traffic capacity and safety for efficient transshipment of goods as well as passenger traffic on the heavily trafficked National Highway sections. GoI has entrusted National Highways Authority India (NHAI) with the responsibility of Development of Economic Corridors, Inter-Corridors, Feeder Routes and Coastal Road primarily to improve freight movement in the country. The project under consideration aims at developing Bakarpur –Manikpur section as Feeder Corridor in the state of Bihar.

The proposed project road starts at design chainage Km 0+000 from the junction of NH-19 (at Sitalpur Byypass) at village Bakarpur where it follows the bypass section till design km 35.200 at village-Hapur-Basant and terminated at SH-74 near Manikpur with design km 38+554. During its course it traverses through three districts- Saran, Vaishali and Muzaffarpur. The project is passing through several tehsils such as Sonpur and Dariaur tehsils of district Saran, Vaishali and Lalganj tehsils of district-Vaishali and Saraiya tehsil of district Muzaffarpur (as mentioned in below figure).



Bakarpur-Manikpur section: Taluka wise alignment

Table -1: GPS Co-ordinates (in UTM) of Project Take-off & Terminal Point

Start Chainage (Km)	End Chainage (Km)	GPS Co-Ordinate (UTM)	
		Start Point	End Point
Design Ch 0+000 at sitalpur bypass near village-Bakarpur in district Saran	Design 38+813 merged into SH-74, near village-Manikpur in district Muzaffarpur.	45 R, 313249.83 m E, 2846331.91 m N	45 R, 313057.62 m E, 2880040.02 m N

PROJECT TAKE OFF AND TERMINATE POINT

Take Off Point:



Bakarpur-Manikpur Section

Pre-Feasibility REPORT

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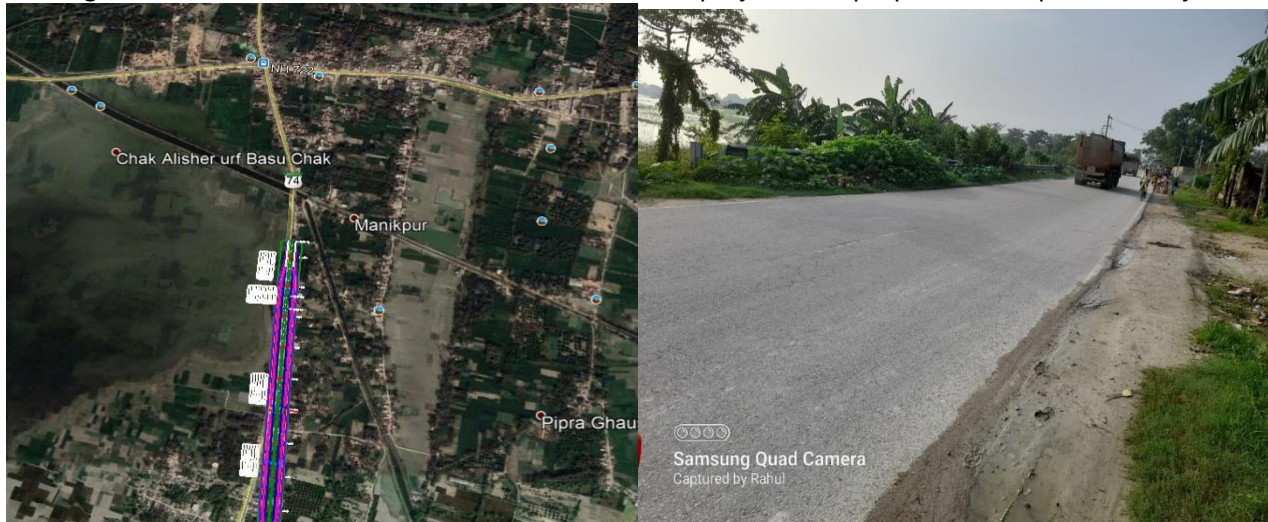
(Lot-VII/Boihar/Package-1)

The Project corridor is initiated from Sitalbari Bypass of NH-19 by connecting existing under construction ROB through cloverleaf grade separated interchange. Grade separated interchange proposed to connect under construction ROB on AIIMS road and Sitalbari bypass of NH-19 for carrying conflict free traffic movement.



Terminate point

The Project corridor traverse through mostly cultivated land and after Km 35+200 it meets with existing SH-74 near under construction RUB on SH-74. Then it mostly run parallel to the SH-74 and finally meets with existing SH-74 near Km 38+300 and it meets with another project road proposal Manikpur to Areraj.



Proposed project road is passing through three tehsils viz. such as Sonpur and Dariaur tehsils of district Saran, Vaishali and Lalganj tehsils of district-Vaishali and Saraiya tehsil of district Muzaffarpur in the state of Bihar.

Details of the Villages involve in the project: -

The Bakarpur-Manikpur greenfield highway traverses through 51 villages like Akilpur, Baqarpur, Chitarsenpur, Dariyapur, Gobind Chak, Ismail Chak, Makhdumpur, Parmanandpur, Shikarpur in **sonepur tehsil** and Barwa, Darihar Bhualpur/538, Darihara Nisakh, Darihara Chaturbhuji, Konhwa, Belhar Janki, Belhar Fattu, Khushihal pur, Mangarpal Murtuza, Mangarpal Nuran, Manpur, Saraia, Sarnarayan in **Dariyapur teshil in district Saran**, and Etwarpur Jagir, Etwarpur Nizamat, Jalalpur Gopi Mal, Jalalpur Gopi Milki/109, Jalalpur urf Bishunpur Gamhir/ 113, Jalalpur/112, Khanjahan Chak urf Saidanpur/ 102, Pirapur Urf Shahabad, Tajpur / 105, Sararia Urf Saranthi Chhapra B, Yusufpur in **Lalganj tehsil** and Bailka, Basarh urf Vaishali/43, Basra urf Chak Ramdat, Bhagwanpur, Harpur Basant, Jafraha, Keshopur, khijirpur, Manpura, Munimchak, Parsurampur, Rukanpur/18 in **Vaishali Tehsil in Vaishali district** and Abu Chak, Anandpur Singh, Chak Abdul Rahim, Manikpur, Manikpur, Pipra Ghaus in Saraiya block in **Mujaffarpur district** in the state of Bihar.

4. Site Analysis

Connectivity

The project road is part of SH-74 connecting Bakarpur and Manikpur in the state of Bihar. The proposed project road starts from design chainage Km 0+000 at the junction of NH-19 (Sitalpur Bypass) near village Bakarpur where it follows the bypass section and crossed Gandhak River at design km 16.900 km travels with bypass section till design km 35.200 near village-Hapur Basant at SH-74 and terminated at SH-74 with design km 38+554 near Manikpur where it touches NH-722. The list of roads which are being crossed by the proposed alignment and the respective chainages are given in Table 4.1.

Table: Connectivity of the proposed alignment

S No.	Item	Details
1	National Highways	Nil
2	State Highways	SH- 74 (Adalwari-Manikpur road)
3	Major roads	Sonepur-Darihara-Rewaghat road
4	Bus Stands	Nil
5	Railway Lines	1. Sairaiya halt-vaishali at (Ch35+855)



6	Nearest Airport	2. Jai Prakash International airport, Patna from Ch 0.000 km (25 km distance)
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Land Form, Land use and Land ownership

The area falling under the proposed Right of Way (ROW) majorly passes through agricultural land. For the built-up areas, the land use will change from private to Government land. A number of settlements are present along the road. The major settlements along the project corridor are Tarwan Mangerpal Manpur , Bailka , Bhagwanpur, Keshopur, Khijirpur, Basarh, Chowmukhi, HarpurBasant, Birpur, *and finally terminate at* Manikpur. Land use along the project road is predominantly agricultural land, followed by vegetation Details of Land use breakup will be described in EIA.

Topography of the Project –

The project area is intersected by few water bodies like as 3 canals and Single River which is Gandak etc. The elevation profile of Bakarpur-Manikpur section is shown in Figure. The map indicates that elevation level is increasing towards north side and variation of elevation is about 11 meters.

Maximum: 58 mtrs. Above mean sea level

Minimum: 48 mtrs. Above mean sea level

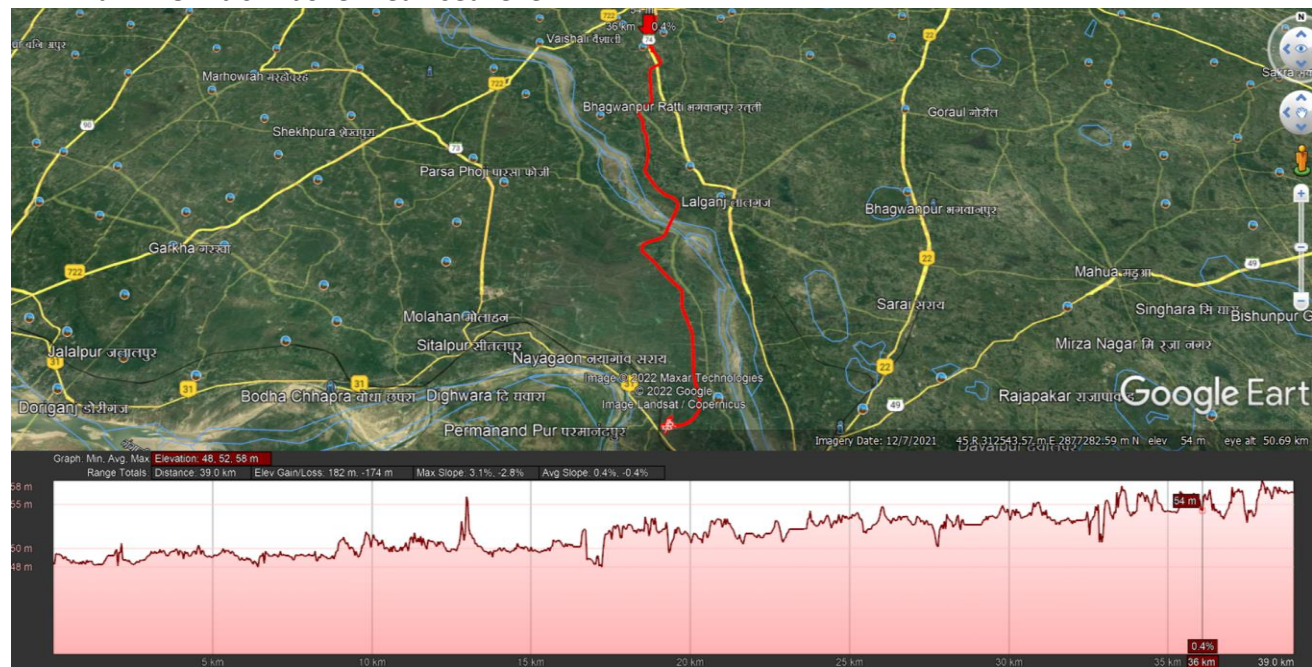


Figure: OGL for the Proposed Road in state of Bihar

Distances of the proposed alignment from ecologically sensitive areas

S No	Item	Details
1	Water bodies	Crossing alignment 1. Gandak River (Ch. 16+800)
	Areas under CRZ	• Nil
3	Eco-sensitive areas	The proposal alignment is not passing through Eco-sensitive zone of any wildlife Sanctuary, National Park and Protected area.
4	Wildlife Sanctuary, National Park	The proposed Bakarpur-Manikpur greenfield alignment is not passing through any Wildlife sanctuary.
5	Reserved / Protected areas / Other Forests	Project alignment is not passing through any reserve Forest land area.

Soil Classification

The two broad soil groups are available in the district.

- Recent Alluvium non-calcareous non-saline groups found over major part of the district. It is mostly light to medium textured and acid to neutral in nature. It also formed layered sediments having no horizontal differentiation.
- Recent Alluvium-Tarai soils found as a small patch in the northeast corner of the district. It is mixture of highly disturbed recent alluvium along the course of river. It is light to heavy textured and poorly drained.

Total 33 soil series have been identified and mapped in Saran, Vaishali and Muzaffarpur districts of Bihar state. More than 84.64% area of the district are cultivated (82.51% area comes under multiple crop cultivation whereas 2.13% area under single crop cultivation) followed by plantation (0.36%) Flood plain (68.50%) is the major physiography of the district followed by alluvial plains (7.82%), stream bank (4.25%), muddy land (2.13%), paleo channel (1.10%), pointbar complex (0.71%) & Levees (0.49%).

Soil of the districts Saran, Vaishali and Muzaffarpur is light, sandy loam to loam and its pH varies from 5.8 to 8.0 (mostly natural soil but some are slightly acidic and some saline). The nutrient status in soil is low to medium with deficiency of zinc and phosphorous pent oxide Sand and silt are deposited in the middle of the river whereas fine sand and soil are deposited at the fringe of the riverbanks. Soil/ alluvium varying in thickness from 0.20 m to 0.60 m constitute the top horizons in the area suitable for agriculture. River Gandak



Bakarpur-Manikpur Section

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(Lot-VII/Boihar/Package-1)

Pre-Feasibility REPORT

meanders through the area exposing the alluvium and soil at the banks. Sand is found in the river bed up to a depth of more than 4.0 m.

Climatic data from secondary sources

Climate science is the scientific study of climate, scientifically defined as weather conditions averaged over a period of time. This modern field of study is regarded as a branch of the atmospheric sciences and a subfield of physical geography, which is one of the Earth sciences. Climatology now includes aspects of oceanography and biogeochemistry.

Saran District- The climate of this district is characterized by a mild winter, hot dry summer, humid and hot monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till early March. This is followed by summer season from March to about mid-June. The southwest monsoon season is from June to September. The succeeding period upto end of November is the post monsoon or transition period.

Vaishali District- The climate of this district is characterized by mild winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

Muzaffarpur District- The climate of this district is characterized by mild cold season, hot dry summer, hot and moist monsoon season. The cold season starts from about end of November to the end of February. This is followed by the summer season from March to about second week of June. Southwest monsoon sets in from second week of June and lasts till September. October to November is a transition period from monsoon to winter season.

Land use planning (breakup along with green belt etc).

The proposal is for the development of four lane Greenfield highway with 45 m RoW. Agro-climatically suitable species will be recommended for plantations along the highway alignment, including the medians, as per the IRC: SP: 21-2009 (Guidelines on Landscaping and Tree Plantation) during the construction and operation phase. Details will be provided in the EIA report.

Assessment of Infrastructure Demand (Physical & Social)

Only basic infrastructure facilities are available in the vicinity of in the study area. The proposed road is essential for improving faster and economical transportation facilities in Bihar.



Design Standards and Specifications

The provisions of “Manual of Specifications and Standards for four laning of Highways” (IRC: SP: 87-2019), “Manual on Road Safety Audit” (IRC: SP: 88) and various relevant standards published by Indian Road Congress, shall be followed wherever required in the project preparation activities. All laboratory and field tests for soil and other materials, etc. shall be performed in accordance with the relevant IRC, MORT&H Specifications and BIS Codes.

Amenities/Facilities.

The following amenities/facilities are proposed along the alignment.

- Proper site services such as First Aid, Rest Shelter, toilet with soak pits & drinking water will be provided to the workers in the construction stage.
- Necessary numbers of wayside amenities with facilities like First Aid, Rest Shelter, toilet with soak pits & drinking water etc will be provided to the road users during the operation phase.
- Other project facilities like bus bays/bus shelters, truck lay-by-bays etc will be constructed on the proposed highway.
- There will be 24x7 services like ambulance, cranes, highway patrolling vehicles etc on the proposed highway
- Toll Plaza will be provided with facilities like First Aid, Rest Shelter, drinking water & toilet with soak pits etc.

5. Proposed Infrastructure

Industrial Area (Processing Area)

There are no industries located along the proposed Greenfield Highway project.

Residential Area (Non-Processing Area)

The project alignment will be crossing agricultural lands and near from the built-up areas with some residential areas. The residential areas are expected to have better economic growth due to improved infrastructure.



Bakarpur-Manikpur Section

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(Lot-VII/Boihar/Package-1)

Pre-Feasibility REPORT

Green Belt

Agro-climatically suitable species will be recommended for plantations along the highway alignments, including medians, as per the IRC: SP: 21-2009 (Guidelines on Landscaping and Tree Plantation). Detailed plantation scheme will be provided in the EIA report.

Social Infrastructure

The project envisages development of better road connectivity.

Connectivity (Traffic and Transportation Road/ Rail/ Waterways etc)

Project road initiates from Sitalpur bypass at Bakarpur area and terminates at SH-74 near Manikpur area. In between the project road stretch three highway category road connects with the project stretch. The first one is Patna AIIMS connecting under construction road. This road starts from AIIMS, Patna and connects with NH-19 and Bakarpur-Manikpur project road through a under construction ROB. The second one is NH-19 Sitalbari bypass under construction road. This road connects with our Bakarpur-Manikpur project road through a cloverleaf grade separated interchange. The third one is SH-74. This road is the existing main connecting road between Adalwari as well as Patna city and Manikpur area. Bakarpur-Manikpur project road connects with SH-74 just before Manikpur area. It will improve the connectivity of the 51 villages alongside.

Drinking Water Management (Source & Supply of water)

Water requirement for construction activities (1250 KL) will be sourced from surface water bodies through water tankers after obtaining necessary approvals. The drinking water required for the construction workers will be sourced from nearby drinking water suppliers. Ground water will not be extracted. Drinking water facilities will be provided at Toll Plaza and way side amenities during the operation phase.

Sewerage System

During construction phase sewage will be generated from labor camps. However, these will be provided with septic tank and soak pit. Other effluents from site will be collected in sedimentation tank and proposed to be reused after checking parameters.

In the operation phase, soak pits shall be provided at project facilities such as wayside amenities, Toll Plaza etc where toilet and washrooms facilities are proposed.



Bakarpur-Manikpur Section

Consultancy Services for Preparation of Detailed Project Report for Development of Economic Corridors, Inter Corridors, Feeder Routes and Coastal Roads to improve Efficiency of Freight Movement in India

(Lot-VII/Boihar/Package-1)

Pre-Feasibility REPORT

Toilet block shall also provide near the bus shelters.

Solid Waste Management

Construction and Demolition wastes will be managed as per Construction and Demolition Wastes Management Rules, 2016 and other Solid Wastes will be managed as per the Solid Waste Management Rules, 2016 by Concessionaire/Contractor.

Power Requirement & Supply / source

D.G. sets and temporary electric connections from Bihar State Electricity Board will be used to meet the power requirement of construction activities. Power requirement at labour camps will be arranged by prospective contractor. Fuels (Diesel) for vehicles will be obtained from local fuel Depots.

BRIEF DETAIL OF STRUCTURES

Summary of proposals for improvement of existing bridges and new proposed bridges / structures is given below.

S no.	Particulars	Total
1	Culverts	81
2	Minor Bridges	7
3	Major Bridges	1
4	ROB	1
5	Cloverleaf	1
6	Toll Plaza	1
Summation		92

6. Environmental Impacts and preliminary study

The proposed alignment is passing through mostly greenfield land and there's no any protected area and wildlife sanctuary along the proposed project road Bakarpur-Manikpur.

About 1678 trees are likely to be affected due to proposed RoW of 45 m out of which approx. 540 nos. of trees fall in protected forest land (link road side plantation notified as protected forest) and remaining 1138 nos. of trees falls in the private agriculture field. The actual no. of trees proposed to be cut will be provided in the EIA after joint enumeration with appropriate authorities of respective State Government. Efforts will be made to minimize the trees loss by restricting trees cutting within formation width/toe lane. Avenue plantation shall be carried out as IRC: SP: 21:2009 "Guidelines on Landscaping and Tree Plantation" on available RoW apart from statutory requirements.



DETAILS OF LAND FOR ACQUISITION WITH IN THE PROPOSED PROJECT -

Total 199.093 ha. Land is required for acquisition in the entire project-Bakarpur-Manikpur highway. Out of 199.093 ha., 105.065 ha. Land is required in district Saran, 80.941 ha. Land is required in district Vaishali and 13.087 ha. Land will be required in district Mujaffarpur for Acquisition.

Statutory Clearances in the proposed project

Environment Clearance: - The proposed project is a mostly greenfield alignment except of 1.4413 km length out of 38.813 km.

Therefore, as per Environment Impact Assessment 2006 and its amendment, Environment Clearance will be applicable in case of new greenfield national highway.

Forest Clearance: - The proposed project is traverse from mostly greenfield area and there's no block protected and reserve forest along the proposed project road. Few water bodies such as canal & river and few major roads & state highways (SH-74) are crossing the proposed project road at some location. the vacant space on both sides of existing crossing roads has been notified as protected forest as per the Forest Gazette notification- state Bihar (no. 50/97-927-E dated 28/1997). Therefore, widening of existing road requires diversion of affected Forest land. Hence as per Forest Conservation act, 1980, Forest clearance will be applicable for **4.108 ha.** Protected forest land in case of this project road. The forest proposal shall be prepared after consultation with concerned forest officer.

7. Project Schedule and Cost Estimates

Likely date of start of construction and likely date of completion

The construction work will start after approval of DPR and Environmental Clearance from MoEF&CC which is likely to start by April 2023. The completion period is estimated of about 30 months from the start of construction.

Estimated project cost along with analysis in terms of economic viability of the project.

- The Estimated Civil Cost Including Centages: Rs 1152.622 Cr
- Estimated Land Acquisition Cost: Rs. 182 Cr
- Other Pre-Construction Cost: Rs. 9.84 Cr
- Total Estimated Capital Cost: Rs **1344.46 Cr**
- Civil Construction Cost (in Rs. Crores/km): Rs 29.70 Cr / km
- Total capital cost, including the pre-construction cost (Rs. Crores/km): Rs 34.64 Cr/km