ASIAN INFRASTRUCTURE INVESTMENT BANK

October, 2024

Sovereign-backed Financings

Approval Project Document
P000723 Republic of India: Manipur Urban Road, Drainage and Asset Management Improvement Project

Currency Equivalents

As of March 31, 2024

Currency Unit – Indian Rupee (INR)
USD1.00 = INR82.18

Fiscal year

April 1 – March 31

Abbreviations

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
CAPEX	Capital expenditures
CBM	Community-Based Maintenance
CSC	Construction Supervision Consultant
DEA	Department of Economic Affairs, India
DPR	Detailed Project Report
EAP	Externally Aided Projects
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
ENPV	Economic Net Present Value
EPC	Engineering, Procurement and Construction contract
ESF	Environmental and Social Framework
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESP	Environmental and Social Policy
ESS	Environmental and Social Standards
FDR	Full-Depth Reclamation
FM	Financial Management
FY	Fiscal Year
GAP	Gender Action Plan
GBV	Gender Based Violence
GDP	Gross Domestic Product
GOI	Government of India
GOM	Government of Manipur
GRM	Grievance Redress Mechanism
ICBP	Interlocking Concrete Block Pavement
IEE	Initial Environmental Examination
IFR	Interim Financial Report
IMF	International Monetary Fund
INR	Indian Rupee
iRAP	International Road Assessment Program
IRI	International Roughness Index
IVR	Internal Village Road
MDR	Major District Road
NER	North Eastern Region
NGO	Non-Governmental Organization
ODR	Other District Road

OPBRC	Output and Performance-based Road Contract
PDS	Procurement Delivery Strategy
PIU	Project Implementation Unit
PMU	Project Management Unit
PWD	Public Works Department
RAMS	Road Asset Management Systems
ROW	Right of Way
RP	Resettlement Plan
RPF	Resettlement Plan Framework
SH	State Highway
UN	United Nations
USD	United States Dollar
VOC	Vehicle Operating Cost
VOTT	Value of Travel Time
WB	World Bank

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(1) **Summary Sheet**

Project No.	P000723
Project Name	Manipur Urban Road, Drainage and Asset Management Improvement Project
AIIB Member	India
Borrower	Republic of India
Project Implementation Entity	Public Works Department, Government of Manipur
Sector Subsector	Transport Roads
Alignment with AIIB's thematic priorities	Green infrastructure; Connectivity and Regional Cooperation; Technology-enabled Infrastructure
Project Objective	To improve the connectivity, safety, and resilience of the urban and sub-urban road and drainage networks in Greater Imphal, and to enhance the technical capacity and budgetary sustainability of Manipur's Public Works Department.
Project Description	The proposed project will support the rehabilitation, the upgrade (without capacity expansion), and the maintenance of 547 km-long state road infrastructure, bridges and culverts in Greater Imphal. The civil works will consist of the reconstruction of existing asphalt-paved roads into more resilient rigid concrete roads, together with road safety improvement, pedestrian walkway, street lighting and utility ducts. To address frequent drainage issues that affect the living conditions of local residents and economic activities, continuous lined storm water drains and local side drains will be provided. The proposed project will strengthen PWD's capacity to manage Manipur road asset and ensure the sustainability of the infrastructure network through enhanced human and budgetary resources.
Implementation Period	01/01/25 01/01/30
Expected Loan Closing Date	03/01/30
Proposed Amount of AIIB Financing (USDm)	USD352.40
Financing Plan	Project cost: USD443.81 million Project Financing Plan: AIIB loan: USD352.4 million GoM: USD91.41 million
ES Category (or AIIB equivalent, if using another MDB's ES Policy)	B
Risk (Low/Medium/High)	Medium
Conditions for Disbursement	Road Maintenance Fund (RMF) sub-component: • the Manipur RMF has been duly established and the Manipur RMF Board has been duly constituted, in each case, in accordance with the relevant legal/regulatory framework of the Borrower and Project Implementing Entity, including the Manipur Road Maintenance Fund Act; • the Manipur RMF Manual, in form and substance in accordance with the relevant regulations of the Borrower and the Project Implementing Entity and satisfactory to the Bank, has been adopted; and

	• The Manipur RMF has been staffed and the bank account for such Fund has been opened, in each case, in a manner in accordance with the relevant regulations of the Borrower and the Project Implementing Entity and satisfactory to the Bank.
Retroactive Financing (Loan % and dates)	Up to 20% of Loan Amount and 12 months prior to Loan signing.
Policy Waivers Requested	No
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that AIIB is in compliance with the policies applicable to the project.
Economic Capital (ECap) Consumption (USDm)	USD39.10

President	Liqun Jin
Vice President	Rajat Misra
Director General	Rajat Misra
Manager	Rajat Misra
Team Leader	Jawad Bentabet, Investment Operations Specialist - Transport
Back-up Team Leader	Andres Pizarro
Team Members	Ting Wang, Project Counsel Christopher Damandl, Alternate Counsel Yogesh Malla, OSD - Financial Management Specialist Rizal Rivai, OSD - Procurement Specialist Krisnan Isomartana, OSD - Environment Specialist Parthapriya Ghosh, OSD - Social Development Specialist Alberto Alcubilla Arribas, OSD - Climate Specialist

(2) **Context**

2.1 **State and Macroeconomic Overview.** Overall macroeconomic situation in India is provided in Annex 8 – Country Credit Fact Sheet. Manipur is one of the eight landlocked states of North Eastern Region (NER) of India, bounded by Nagaland in the north, by Mizoram in the south, and by Assam in the west. In the east, the state shares international borders with Myanmar of over 398 km. The total area covered by Manipur is 22,327 km^2. The whole region is under the influence of the South-West monsoon characterized by hot and humid rainy seasons from April to October, and cool and dry seasons from November to March. Over the last 20 years, Manipur has witnessed a significant change in its climate, with more extreme and more unpredictable heavy rain events. In the next decade, these events are forecasted to be more frequent and more intense.

2.2 The state also faces economic development challenges and opportunities. The population of Manipur is around 2.8 million[1] and is projected to increase at 3.5 million in 2036[2]. According to the 2011 census, 29% of the population lives in urban areas, mainly in the Greater Imphal region. The urbanization rate is projected to reach 36% by 2036, growing twice as fast as the total population of Manipur. With a GDP per capita of USD1,200 (in 2020), almost half of the national average, Manipur is one of the least-developed states in India. The economy of the fertile Greater Imphal valley is mainly agriculture-based (employing more than 50% of the workforce), with other predominant economic activities being handloom, wool-knitting, cane and bamboo works, pottery, black smithy and carpentry, retail trade and small businesses. There are no major industrial activities except cottage and small-scale industries. Nevertheless, Manipur's remarkable culture and heritage provide a base for increasing tourism, which, together with its tradition of being the country's "powerhouse of sport", and other economic sectors, present a solid foundation for greater development potential.

2.3 The capital Imphal city sprawls in the central oval-shaped valley of Manipur, surrounded by mountains, at an elevation of 790 meters above the sea level. This geographical situation leads the city to be highly vulnerable to rainfall events, with 35% of the area being prone to floods. During the rainy season, the rapid flows of water directed to the main urban river Nambul from its tributaries cannot be contained. As a result, the failure of river dikes causes waterlogging in the low-lying areas for several weeks. This phenomenon used to be mitigated by an efficient drainage system leading to natural waterways. Nowadays, the unplanned urban sprawl, inefficient urban drainage and the ongoing climate change have led the city to be waterlogged even in case of moderate rainfalls. These devastating floods have a high impact on the mobility and living conditions of Imphal people, on economic activities, and on the environment.

2.4 **Sector Overview:** Manipur is at the crossroads of South Asia and Southeast Asia, its capital city Imphal being crossed by the Asian Highway 1 (AH1) section of the Trans-Asian Highway. The state is the gateway to North East India, giving vital and strategic importance to its transport network. The total length of Manipur road network is around 19,000 km, of which 10,300 km are State Roads, under the Manipur Public Works Department's responsibility. The

[1] As per 2011 census
[2] Population Projections for India and states, 2011 – 2036, Report of the Technical Group on Population Projections (July, 2020), National Commission on Population, Ministry of Health and Family Welfare,

State Road network is paved on approximately 7,000 km, and the pavements are exclusively of bituminous asphalt. In Imphal city, this represents more than 600 km of asphalt-paved roads.

2.5 Road transport is the most dominant mode of transport in Imphal. The city is not easily walkable, with sidewalks in poor conditions, encroached by small informal businesses, or in most cases non-existent. Imphal is not connected to the rail network and does not have any public transportation system for its residents. Commuters rely on their private cars and share auto-rickshaws that take fixed routes, adding to the congestion, air and noise pollution in the city. Congestion is aggravated by the advanced state of deterioration of the road infrastructure, preventing the development of alternative modes of transport, which would be also less harmful to the environment.

2.6 At present, a recent inventory indicates that 68% of Imphal East network, 33% of Imphal West network, and 64% of Highway South network are in poor condition. Due to low bearing capacity, low shear strength of the subgrade, combined with intense rains from March to October and lack of adequate drainage, the existing bituminous road is highly susceptible to deterioration. Pavement damage, including cracks, fraying and potholes, is noticed in the poor state of road sections, with some of the roads not even having a wearing course. In addition, lack of adequate and timely routine/periodic maintenance leads to substantial low life cycle of pavement performance.

2.7 The existing drainage in the Greater Imphal area is also not in good condition and is not properly connected to the primary drain. Drainage system links are missing along the road network. In various places, the drains are clogged and not functioning properly. The urban drainage network is an integral part of the road network for the discharge of surface and groundwater to designated locations. The structural integrity of the road depends primarily on the effective and efficient disposal of stormwater. The increased volume and velocity of runoff being caused by the city's impervious and increased urban development can easily overwhelm the city's existing conventional drainage systems. Imphal lacks decentralized stormwater management along streets and public places in different locations to help in mitigating flooding and traffic congestion issues.

2.8 As seen in many similar entities around the world, the Manipur Public Works Department (PWD) has gradually outsourced the periodic maintenance of its road network to the private sector. It has retained only a limited capacity to respond to emergency works, and has largely abandoned routine maintenance. The lack of routine maintenance is one of the main causes of the deterioration of the network and its very bad condition. This has led community groups and homeowners to clean drains and carry out some of the required maintenance by themselves. PWD expenditures on road maintenance has oscillated between 10 million USD and 17 million USD since 2014 and has seen an alarming downward trend. Indicators show that these amounts represent only 10% of what is required. Overall, the PWD budget dedicated to road and bridges is 3% of the total Government of Manipur budget, on the low end compared to international standards.

2.9 **Addressing Key Development Challenges - Project Contributions.** The proposed project will support the rehabilitation, the upgrade (without capacity expansion), and the maintenance of 547 km-long state road infrastructure, bridges and culverts in Greater Imphal. The civil works will consist of the reconstruction of existing asphalt-paved roads into more

resilient rigid concrete roads, together with road safety improvement, pedestrian walkway, street lighting and utility ducts. To address frequent drainage issues that affect the living conditions of local residents and economic activities, continuous lined storm water drains and local side drains will be provided. The proposed project will strengthen PWD's capacity to manage Manipur road asset and ensure the sustainability of the infrastructure network through enhanced human and budgetary resources.

(3) Rationale

3.1 **Project Objective.** To improve the connectivity, safety, and resilience of the urban and sub-urban road and drainage networks in Greater Imphal, and to enhance the technical capacity and budgetary sustainability of Manipur's Public Works Department.

3.2 **Expected Beneficiaries.** The primary beneficiaries will be the people and the businesses of the Greater Imphal area, by connecting to all-weather, safer roads with shorter travel time and lower vehicle operating costs. The Project will improve access to healthcare, schools and public transport services for over one million residents of Greater Imphal, particularly women and children. The Project will provide a more reliable transport infrastructure to economic activities and services and will improve accessibility to Imphal markets for agricultural goods produced in Manipur's rural areas. The Project's drainage components will reduce the impact of flash floods and extend the availability of the road infrastructure for all transport users and services during the monsoon season.

3.3 Manipur's PWD will be also one the key beneficiaries, with the implementation of a more durable infrastructure with reduced maintenance costs over its lifecycle, and the implementation of innovative and more efficient maintenance contract frameworks. The Manipur Road Maintenance Fund, the enhanced road asset management system, a modernized IT-environment, and capacity building will also enhance the PWD long-term capacity and budgetary sustainability to monitor, optimize and finance its operations.

3.4 **Expected Results.** The Project is expected to result in the improvement of the state road network of Manipur from several perspectives, including connectivity, safety, sustainability, climate resilience and technology. The Results Monitoring Framework is presented in Annex 1. The results are expected to be monitored through the following key indicators:

(i) Total population living in areas serviced by connecting roads upgraded to a climate-resilient standards (number of people/female)

(ii) Reduction in the number of fatal/non-fatal accidents in Greater Imphal (unit: number per year)

(iii) Number of days of road unavailability due to flooding (unit: number of days per year)

(iv) Length of road network covered by the Road Asset Management Systems (RAMS) (unit: km)

(v) Implementation of the Manipur Road Maintenance Fund

3.5 **Strategic Fit for AIIB.** The Project is aligned with the AIIB's corporate strategy to finance infrastructure for tomorrow and the commitment to develop environmentally, socially, and economically sustainable projects.

3.6 The Project is aligned with AIIB's **Transport Sector Strategy**. The reconstruction of 547km of existing roads, from asphalt to concrete, without capacity expansion, falls into the Banks' priority to finance the "**upgrading of existing infrastructure**", with high economic returns.

3.7 The Project is aligned with AIIB's **Sustainable Cities Strategy**, the Project is a G.R.E.A.T. project:

(i) (G) The Project will provide a **greener** infrastructure, with roads in better surface condition leading to lower consumption of fuel and spare parts per vehicle, while urban drainage and storm water management will reduce water pollution; roads will also be safer and more reliable, promoting low-emission modes of transport;

(ii) (R) The Project will improve basic road infrastructure and city **resilience** to frequent flooding that occurs after every rainfall and is expected to get worse due to climate change; the flood management study to be carried out under the Project will further explore how to improve the city resilience on a larger scale, beyond this Project;

(iii) (E) The Project will significantly enhance the urban mobility, reducing congestion and travel times, by increasing the **efficiency** of the road network without capacity expansion; the implementation of a Road Asset Management System coupled with performance-based maintenance contracts will also increase the efficiency in the use of funds allocated to road maintenance

(iv) (A) the Project will improve the residents and businesses' all-weather **accessibility** to infrastructure, public services and economic opportunities in the Greater Imphal urban area; and

(v) (T) the Project will contribute to Manipur's **thriving** economy, increasing the economic development through connections to markets. It will also create jobs during its implementation and its operation, including the implementation of Community-Based Maintenance.

3.8 The Project is well aligned with the thematic priorities of the Bank's Corporate Strategy:

(i) **Green infrastructure**: The Project will be a significant milestone in adapting the transport infrastructure to climate change, in Imphal, at the state level, and beyond. Design features, from durable concrete pavement and proper drainage system to utility conduits, will increase both infrastructure and services resilience to severe weather conditions. Lower consumption of fuel and vehicle spare parts and reduced journey time will contribute to decreasing the vehicles carbon emissions. By reducing waterlogging, the improved local roadside drainage will also contribute to limit water pollution, improving local environmental conditions and the residents' health. By improving road safety for the most vulnerable users (pedestrians and other non-motorized transport modes), and by providing Imphal with a reliable infrastructure network that would be able to pave the way for the long-term development of a public transport service, it will also promote low-emission modes of transport;

(ii) **Technology-enabled infrastructure**: the road design plans to include utility chambers that will allow optical fiber to be installed in the Greater Imphal area; The Project will also support the use of digital technologies, intelligent transport devices and IT tools such as cloud-based technology for the development of the Road Asset Management Systems to improve the PWD in monitoring the maintenance of its road network.

(iii) **Connectivity and regional cooperation**: the rehabilitated infrastructure will provide sustainable and reliable connectivity across city areas with social services, industrial centers, and economic development zones. This is particularly significant during the monsoon period where flooding reduces access and connectivity during prolonged periods of time. All-weather accessibility will directly improve urban mobility for people, transport operators and public service providers in Greater Imphal, and Manipur in general.

3.9 The Project will contribute to the following United Nations Sustainable Development Goals (SDGs):

(i) SDG 9 – "**Build resilient infrastructure**, promote inclusive and sustainable industrialization and foster innovation", targeting on the development of "quality, reliable, sustainable and resilient infrastructure (…) to support economic development and human well-being, with a focus on affordable and equitable access for all (target 9.1)

(ii) SDG 10 – "**Make cities and human settlements inclusive, safe, resilient and sustainable**", providing "access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons" (target 11.1) and "reducing the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations" (target 11.5).

3.10 **Paris Agreement Alignment (PAA) and Climate Finance.** In line with AIIB methodology for assessing the alignment with the mitigation and adaptation goals of the Paris Climate Agreement, the Project is assessed as aligned. Details on the assessment are provided in Section E/Annex 5. In line with the AIIB MDB methodology for tracking adaptation finance, it is estimated that USD 212.87 million of the project cost contributes to support adaptation.

3.11 **Value Addition by AIIB.** Beyond the provision of financing, AIIB's participation has, and will further strengthen the Project by the following aspects:

(i) AIIB's participation has resulted in a shift from the original project design consisting essentially of a road resurfacing from asphalt to concrete pavements, into a more comprehensive project, by introducing project components aiming at the long-term technical, financial and contractual sustainability of the infrastructure operation and maintenance, such as the Road Asset Management System, the Manipur Road Maintenance Fund, the performance-based and community-based maintenance contracts;

(ii) AIIB has introduced the concept of more economical pavement solutions. From the original traditional concrete-asphalt, the Project has included Interlocking Concrete Block Pavement (ICBP) and low-cost concrete slabs, to be used in the lower traffic roads;

(iii) The savings obtained from more adequate pavement solutions suggested by AIIB, has also contributed to increase and improve the drainage designs consistent with climate adaptation imperatives and risks identified in Manipur;

(iv) AIIB's participation to help develop the capacity of the implementing entity, PWD, Manipur, in terms of technical, environmental, social and project management capacities, as illustrated by the technical workshop on Road Asset Management and Community-Based Maintenance (held in Guwahati, Assam, during the project preparation) where several speakers - including PWD Assam - shared their experience and presented to PWD Manipur successful case studies;

(v) AIIB's support to PWD Manipur to enhance its asset management operations by including a full inventory of its road assets, creating a computer-based road asset management system to integrate data collected on the field, and training PWD staff. This initiative was not part of the original project concept and will help PWD Manipur evolve into a high performing and outcome-focused organization;

(vi) AIIB's involvement in obtaining a preliminary agreement with PWD and the State Chief Minister to create the Manipur Road Maintenance Fund that will be financed by taxes on fuel and purchasing of vehicles, to finance road maintenance activities and ensure the sustainability of PWD's road assets. The project team will assist in the design of the Road Maintenance Fund; inclusion of the Road Maintenance Fund was not a part of the original project design;

(vii) AIIB has introduced in the project design the inclusion of a pioneering community-based maintenance scheme to carry out routine maintenance; and

(viii) AIIB has asked to improve the economic analysis of the Project, originally confined to only monetizing the transport-related benefits, to include the benefits from the investment in the largely dimensioned drainage system.

3.12 **Value Addition to AIIB.** Through this Project, the Bank will further develop its expertise and knowledge in proposing complex, comprehensive and sustainable infrastructure projects in a climate-sensitive area. The Project will be AIIB's first experience in the development and the implementation of a Road Maintenance Fund , involving AIIB financial management specialists all along the implementation period. The Project will also be the first experience in the development of a community-based maintenance scheme, with a strong role expected for women's groups. This will enable technical experts, procurement and social development AIIB specialists to increase their skills and knowledge on this innovative contractual scheme. The Project will be AIIB's first experience in implementing Interlocking Concrete Block Pavement (ICBP) in a road infrastructure, a technology that is now being used as an alternative to conventional pavements such as asphalt and other concrete pavement.

3.13 **Lessons Learned.** The Project design reflects the lessons drawn from the implementation of transport sector projects, both in India and other countries, specifically MDB engagements in the following aspects:

(i) The preparation of this Project has benefited from the Bank's experience in road upgrading projects in the region, in particular the Assam Secondary Road Network Improvement Project – ASRIP (P000440). This neighboring state faces similar issues in terms of degraded road conditions, climate disasters and limited financial and

operational resources. As proposed to the Manipur Project, the modernization of PWD Assam's asset management system and capacity building was identified as a key component. AIIB organized a technical workshop on Road Asset Management Systems in Assam, inviting PWD Assam to share with PWD Manipur their lessons learned on the design, implementation and operation of a RAMS.

(ii) The Project has also benefited from similar large road projects being implemented by AIIB in the region (for instance ASRIP in Assam, or Sylhet to Tamabil Road Upgrade Project in Bangladesh – P000153), where construction programs often have implementation delays and therefore must take into consideration the local context. The works contracts have considered here the local context such as the short working season due to heavy and frequent rains, the contractors' capacity in implementing concrete pavements projects, and the availability of construction materials (such as cement…).

(iii) As observed in similar projects in the North East Region, high level government support is essential to ensure counterpart-fund availability. Government of Manipur is highly committed to counterpart fund provision and is also committed to funding post-construction maintenance under the civil works, and through the implementation of the Manipur Road Maintenance Fund. In addition the Project was added in the priority list of Externally Aided Projects (EAPs) for the State of Manipur.

(iv) The Asian Development Bank's guide for community-based maintenance of roads by women's group, and the pilot project of community-based routine maintenance of village and township roads in Dehong Prefecture, Yunnan Province, were reviewed. Other successful community-based maintenance schemes funded by the International Labour Organization in Uttarakhand, India and in Davao del Norte, Philippines, were studied.

(v) On State Road Maintenance Funds, the World Bank assessment conducted in South Asia (nine funds in India, Pakistan and Nepal) provided main lessons learned on how to ensure a successful implementation in terms of good governance and accountability, legal basis, measurable outputs and performance indicators, fund flow mechanism, source of revenues.

(vi) The World Bank experience in Interlocking Concrete Block Pavement (ICBP) in Nicaragua was taken as an example of how this technique was used to rehabilitate existing road alignments, and the various benefits. This project shows that the simplicity and reduced costs of manufacturing, installing and maintaining the blocks have led to the development of a new economic sector, with more job opportunities at the local level. Small companies were created and specialized in the fabrication of these blocks, while local communities were encouraged to form into community-based maintenance groups and recruited for the routine maintenance and the occasional replacement of blocks.

(4) Project Description

4.1 Components

4.1.1 **Component A: Road Rehabilitation and Drainage**. The objective of this component is to improve the resilience of existing pavements by paving unpaved road, switching asphalt pavements to concrete pavements, and extending and improving drainage by implementing covered drains, utility chambers and roadside drains. The component will finance the rehabilitation and upgrade of 547 kilometers (km) comprising of State Highways, Major District Road, Other District Road and Internal Village Road/Local Street, 76 pedestrian and road bridges, in the vicinity of Greater Imphal boundary, to improve connectivity and access to basic services and livelihood opportunities.

4.1.2 Rigid/concrete pavements are structurally more resistant, lasting twice as long as asphalt. Concrete roads will perform better than asphalt pavements in the high rainfall area of Imphal City. Whereas waterlogging can lead water to penetrate asphalt pavement, washing out the base underneath, causing cracking and disintegrating its structure, it has practically no effect on concrete pavement. The Project will provide a suitable and sustainable solution and will require lower life cycle maintenance cost. Small concrete slabs and paver blocks can be easily fabricated and easily replaced if damaged. ICBP is a cost-effective construction technique considering the low level of materials, labour skills and machineries that are required for routine maintenance.

4.1.3 The installation of the drainage system is the key to the long-term success of the Project and its lasting impact on the residents improved living conditions. In the proposed cross section, longitudinal storm water or local drains are provided on both sides of the alignment, on more than 80% of the network. This is a significant extension of the drainage with respect to the existing situation and the original design. As a result, the drainage system will represent up to 55% of the total construction costs. Considering the climatic conditions in Imphal, the drainage network is designed based on the total discharge that the system is required to drain off. The slope and dimensions, far above than the national standard, will ensure adequate capacity to carry the discharge. The design will also help to facilitate routine maintenance of the drains.

4.1.4 Since the roads lie in urban built-up areas, drinking water supply, fiber-optic cables and other utilities will be taken care of by providing utility chambers along the roads. The Project will also increase safety by implementing road safety measures (signs, markings), pedestrian walkways and improve streetlight.

4.1.5 This component will also finance the construction supervision consultant, whose scope of work covers a capacity building program, including training, study tours and workshops to build capacity and the knowledge base of PWD’s technical staff.

4.1.6 **Component B: Asset Management and Maintenance.** The objective of this component is to ensure the sustainability of the road network. The component will finance:

(i) The support for the creation of the Manipur Road Maintenance Fund;

(ii) The implementation of a Road Asset Management System. This includes the inventory of the network, software, and training;

(iii) The creation and operationalization of a pilot program for community-based maintenance units/groups, on selected roads;

(iv) the feasibility and design of a pilot for output performance-based road maintenance contracts (OPBRC);

(v) consultancy services for the feasibility and design of a flood management program.

4.1.7 The Manipur Road Maintenance Fund will address the issue of constrained budget resources and the low level dedicated to road maintenance. It will contribute to create additional, stable and adequate financial resources (from fiscal, road usage, or other sources), and securing such resources for road maintenance only. The Fund will enable adequate level of maintenance to be performed, under innovative, effective and tailored maintenance contracts frameworks. The Project will support the design and implementation of the Fund. The Project includes seed funds for its initiation.

4.1.8 Community-based maintenance (CBM) units will be created and operationalized for routine maintenance, encouraging their sense of ownership, enabling local communities to actively engage in the upkeep of roads, and building their capacity to improve their standard of living and alleviate poverty by an overall socio-economic development. In a first step, under the Project, these units will be implemented through a few pilot programs on selected roads.

4.1.9 Output Performance-Based Road Maintenance Contract (OPBRC) will be designed on main roads, where a higher level of skilled labour, materials, machinery are required on a large scale, for periodic maintenance, rehabilitation and strengthening, and emergency repairs. These contracts will be implemented in a subsequent loan or program ensuring the continued maintenance coverage of the whole network.

4.1.10 Implementing the Manipur Road Maintenance Fund and result-oriented type of maintenance contracts such as CBM and OPBRC will require effective and efficient performance monitoring system by PWD, Manipur. The computer-based Road Asset Management System (RAMS) will store, maintain and analyze data collected on the road physical conditions, the level of financial resources used (per maintenance task, per road, per contract, etc.), and help setting key performance indicators for both the maintenance contracts and the Manipur Road Maintenance Fund. Using the RAMS to manage the infrastructure maintenance plan will save substantial cost of rehabilitation, reconstruction, and other heavy works, as timely maintenance is largely cost-effective in the long-term.

4.1.11 The hydrology and flood risk management study will focus on the flooding issues faced by Greater Imphal residents. It will deliver a diagnosis through a study of the Imphal valley and its catchment area, conduct a vulnerability analysis in the context of climate change - also considering water pollution aspects - and provide an investment action plan with detailed design.

4.1.12 **Component C: Project Management.** The objective of this component is to provide support to the implementing agency in a number of activities necessary for the efficient implementation of the Project. This component will finance:

(i) individual project management consultants that will support the implementing agency in the setting-up and training of staff:

a. in quality audit and contract management, to assist the PIU in the implementation of the project with regards to quality auditing and assurance, scheduling of construction activities, resource planning and performance monitoring of the project to ensure its delivery on schedule and within the budget while maintaining highest quality standards,

b. in financial management and accounting, to assist the PIU in the implementation of the project with regards to financial covenants of the loan, financial management component of the Project,

c. in internal auditing, to audit the financial transactions, accounting system and utilization of funds to ensure compliance with the covenants of the loan, financial mandates of the Central and State Government and also advice the PIU on capacity building.

(ii) the installation and training of accounting and contract management software for the implementing agency, in preparation of the Manipur Road Maintenance Fund; and

(iii) Social & Resettlement Plan and External Services to Non-Governmental Organization (NGO), to support PWD in implementing the Resettlement Plan, the Indigenous People's Plan, and all other plans (Gender Equality and Social Inclusion Plan…).

4.2 **Cost and Financing Plan**

Table 1: Project Cost and Financing Plan

Item	Project Cost (USD m)	Financing (USD m and %)	
		AIIB	GOM
Component A: Road Rehabilitation and Drainage	**438.30**	**346.89 (79.75%)**	**91.41 (20.25%)**
Civil Works	357.52	338.49 (94.68%)	19.03 (5.32%)
Construction Supervision Consultant	9.08	8.40 (92.5%)	0.68 (7.5%)
Land Acquisition and Rehabilitation, Utility shifting, Forest and Environmental safeguard, Administrative charges	71.70		71.70
Component B: Asset Management and Maintenance	4.96	4.96	-
Road Maintenance Fund (incl. technical assistance and seed funds)	3.00	3.00	
Road Asset Management System (incl. technical assistance on OPBRC and CBM, software and equipment)	1.46	1.46	-
Hydrology and flood risk management study	0.50	0.50	-
Component C: Project Management and Capacity Building	0.55	0.55	-
Quality Audit and Project Scheduling Consultant	0.15	0.15	-
Financial Management Consultant	0.06	0.06	-
Internal Audit Consultant	0.04	0.04	-
Social & Resettlement Plan External Services (NGO)	0.30	0.30	-
Contingencies	Already included in the estimates		
Grand Total	443.81	352.40 (79.4%)	91.41 (20.6%)

4.3 Implementation Arrangements and Readiness

4.3.1 Implementation arrangements.

(i) **Project management office (PMO) and project implementation unit (PIU):** The PWD will be the Project Implementation Entity (PIE), and it has established a Project Management Unit (PMU) chaired by the Project Director, Externally Aided Projects. The PMU will have the overall responsibility for project preparation and implementation, such as managing technical designs, environment and social safeguards, procurement, financial management and monitoring results. It will also facilitate coordination with various units of PWD and other concerned departments of Government of Manipur. PIUs will be established at PWD's district divisions, corresponding to the locations of project roads, to mainly carry out the project implementation in their respective districts.

(ii) **Procurement arrangements.**

a. **Applicable Procurement Policy**. AIIB's Procurement Policy (November 2022) and its associated Interim Operational Directive on Procurement Instructions for Recipients (PIR, July 26, 2024) are applicable to this Project.

b. **Procurement Institutional Arrangements** All procurement will be done and contracts will be signed centrally at PWD (through Project Management Unit (PMU) for Externally Aided Projects (EAP), Public Works Department of Government), and the technical supervision of the road construction contracts will be done by respective Project Implementing Agencies (PIA, i.e. Imphal East Division, Imphal West Division and Highway South Division). The PMU has an adequate in-house procurement management capacity. The Construction Supervision Consultant (CSC) will also be hired to assist PWD and PIAs in the contract management.

c. **Project Delivery Strategy.** The Project Delivery Strategy (PDS), including the project Procurement Plan (PP), has been approved and will be updated, as necessary, from time to time during the Project implementation.

d. Civil Works. There are 4 (four) large value civil works packages for the EPC for Construction and operations maintenance of rigid pavements and lined drain. The estimated contract value of individual contract ranges from USD 74.6 million to USD 119.75 million. The Contracts cover a 3-year construction period, and 5 years of operation and maintenance (OM). It is noted that the Bank Loan will only partially cover the OM (i.e. only up to the closing date of the Loan), and the remaining contract period will be financed by the Government funding. The Bank's Standard Procurement Document (SPD) for the procurement of works through International Open Competitive Tendering procedures (two-envelope tendering process without prequalification) will be used for the Procurement of EPC contracts. The General Conditions of Contracts (GCC) and the Particular Conditions of Contracts (PCC) are slightly modified to take into account the specific

nature of the services to be provided by the Contractor, which go beyond the mere execution of pre-defined physical works.

e. Consulting Services. There are two main consulting service contracts for (i) the Construction Supervision Consultant (CSC), estimated at USD 9.4 million, and (ii) the Consultant for development of Road Asset Management System, estimated at USD 1.5 million. The selection will follow International Open Competitive Selection (IOCS) – Quality and Cost Based Selection (QCBS) method. There will be 3 other consulting firm contracts under the Project as follows: (a). The Consulting services for the Resettlement Plan and Indigenous Peoples Plan Implementation Agency (estimated at USD 0.3 million); (b). The Consulting services for the Hydrology and Flood Risk Management Study (estimated at USD 0.5 million); and (c). The Consulting services for the Internal Audit firm (estimated at USD 36,000). All three consulting contracts above will be selected following the National Competitive Selection (NCS) – Least Cost Selection (LCS) procedures. The Bank's standard Request for Proposal document will be used for the selection of consulting services (firm). There will be 2 individual consultants, as listed after, to be hired under the Project, which will follow the Open Competitive Selection of Individual Consultant: (a). Quality Audit and Project Scheduling Expert; and (b). Financial Management Expert.

f. **The e-Procurement System.** The Manipur e-procurement system (https://manipurtenders.gov.in) is commonly used for works and goods contracts in the State of Manipur. The e-procurement system software (GePNIC) was developed by the National Informatics Center (NIC) of the Ministry of Electronics & Information Technology, Government of India. It is noted that the system has been endorsed by World Bank and ADB (in years 2020 and 2022 respectively) for use in their respective financed projects. Based on the review of the e-procurement system during the DD, the Bank agreed to limited use of the Manipur e-procurement system for this Project, provided that the confidentiality principle is maintained, i.e. tenderers/consultants may only be able access their own tender proposals, and they may not be able to access the tender proposals submitted by other tenderers/consultants. In particular, the Manipur e-procurement system will be used for this Project to manage the following aspects of the Tendering process, while all other tender/proposal evaluation process is done manually: (i) Uploading the Tender opportunities, including the Specific Procurement Notice (SPN) and the Request for Expression of Interest (REOI) by the Employer, (ii) Downloading of Tender/RFP document by Tenderer, (iii) Uploading of Minutes of Pre Tender Meeting Issue of Clarifications / Addendum / Corrigendum by Employer, (iv) Uploading of Tenders/Proposals electronically by the Tenderers, (v) Opening of the Tenders/Proposals by Employer, (vi) Publishing of Award by Employer, (vii) Contract Award Notice.

g. Advance Procurement and Retroactive Financing. To minimize risk of procurement delay and making effective use of the Loan proceeds, advance procurement actions (with Bank's prior review) have been initiated

for the 4 civil works packages as well as for the selection of CSC. It is expected that all of these 5 contracts will be signed by the effectiveness date of the Loan. Retroactive financing is envisaged.

(iii) **Financial Management arrangements.** PWD shall be responsible for overall project financial management. PMU has been established to provide technical and administrative support. PMU has been staffed with qualified finance/accounts staff responsible for maintaining acceptable project financial management. In the annual Government of Manipur's budget, a separate budget head shall be included for this project reflecting the Government of Manipur counterpart and AIIB part as per loan agreement. The internal control process and procedures of PWD shall be applied in this project. The cash basis of accounting shall be followed. PWD shall maintain a separate project account and have custody of the supporting documents. The financial progress of the project shall be reported on a quarterly basis through Interim Financial Reports (IFRs) within 45 days from the end of each financial quarter. The audited project financial statement including management letter for each year of the project implementation shall be submitted within 6 months from end of the financial year.

(iv) **E&S arrangements.** PMU have dedicated staff for environment and social safeguards that will report to the Project Manager/Executive Engineer and will oversee the E&S aspect for the PIUs and will supervise the E&S staff of the Construction Supervision Consultant (CSC). Most of the EAP PWD staff had attended a 2–3-day safeguards training on Environmental and Social Assessment and Indigenous People Plan in ACSI Hyderabad in 2022/2023. They also have previous experience in handling other MDB projects and currently there is an ongoing ADB project handled by this team. The team has also attended the training of Road Asset Management and Community Based Contract arranged by PWD-Assam, which has also potential benefit for environmental aspects in term of protection of scarce natural resource (e.g., new quarry development) by a better road asset maintenance. The Construction Supervision Consultant (CSC) will supervise the E&S performance of the Contractor and subcontractors and to ensure strictly adherence to the EMP requirements. E&S staff of EAP PWD will also work together with Bank's specialist to review the E&S Report Format for contractors that will be prepared by the CSC. In addition, EAP PWD will hire an independent ES monitor to provide regular input to PMU and AIIB E&S specialist will also conduct an implementation support mission twice a year.

(v) Project implementation plans and project manual: the Project Operations Manual (POM) is being prepared. It includes the detailed arrangements for tender preparation, invitation, evaluation and approval of contract awards. The POM also defines clear procedures on financial management, contract management and implementation of E&S management plans.

4.3.2 **Implementation period.** The Project is expected to be implemented from January 2025 to January 2029

4.3.3 **Implementation readiness.**

(i) **Status of feasibility studies, procurement, land acquisition:** The Feasibility Study (FS) has been completed in 2022. The detailed project report (DPR) for the Project was completed in January 2024. The General Procurement Notice and the Expression of Interest for the Construction Supervision Consultant (CSC) were published in January 2024. The Resettlement Policy Framework (RPF), the Indigenous People Planning Framework (IPPF) were finalized and published in February 2024. The Indigenous People Plan (IPP), the Social Impact Assessment (SIA), the Resettlement Action Plan (RP) and the Initial Environmental Examination (IEE) were finalized and published in March 2024. The Special Procurement Notice and tender documents for the civil works were published in March 2024.

4.3.4 **Monitoring and Evaluation.** The PMU will be responsible for monitoring overall Project implementation, with support from the PIUs. PMU will engage construction supervision consultants to assist in timely implementation of road works (Component A). Progress will be monitored jointly by the Bank and PWD through Quarterly Progress Reports and will be furnished to the Bank not later than 45 days after the end of the period covered by such report. These will be prepared by the PMU with contribution from PIUs, contractors and consultants, covering construction progress, procurement status, social and environment compliance, financial management status, internal unaudited financial statements, field visit summaries, and disbursement forecasts. The results framework in Annex 1 will be used to monitor and evaluate the achievement of the Project Objectives and the outcomes of this project.

4.3.5 **AIIB's Implementation Support.** The Bank plans to conduct regular field visits at least twice a year to monitor progress and may conduct additional field visits as and when required. In addition, the Bank will engage local consultants for technical and social aspects to carry out more frequent supervision of design, construction, and social management activities on the ground in the early stages of Project implementation. AIIB plans to provide guidance to the client regarding the implementation of the Manipur Road Maintenance Fund, the Road Asset Management System, the Community-Based Maintenance units and the hydrology and flood-risk management study. The Bank will carry out a mid-term review between 30 and 36 months following the implementation start date.

(5) Project Assessment

A. Technical

5.1 **Project Design.** Manipur Urban Roads Project is an upgrade of the existing road network over 547 km, without capacity expansion. The existing road network connects the central part of city to other part of the Manipur.

5.2 There is no green field alignment/ road proposed under the Project. The roads have been selected based upon parameters including but not limited to existing deterioration, strategic importance, connectivity, traffic volume, and other technical, economic, environmental and social safeguards (including gender dimension), and poverty impact assessments. Major roads such as State Highways (SH), Major District Roads (MDR) and Other District Roads (ODR) have been selected as they are important road infrastructures connecting the Greater Imphal to the rest of Manipur, as well as major commercial centers, economic and commercial growth zones etc. Most of the Internal Village Roads (IVR) have been selected according to their level of traffic flow to major roads (SH, MDR and ODR), and connectivity to major hubs within Greater Imphal area. Since most of the roads are within the urban area and majority are within densely populated areas, the prioritization of roads also considered the feasibility of providing access during construction period, minimum disturbance during construction with alternative connectivity for community, present condition of road and its serviceability, and its importance of the road for maintaining serviceability of the road network.

5.3 The Project is to convert the existing asphalt, flexible pavement roads into concrete, rigid pavement along with lined drain, for almost all of the selected road network as per traffic and design bearing ratio values. Apart from conventional rigid pavement, new material and constructions methods and technologies are being implemented for reducing the construction cost, performance of the pavement and lesser impact on society as well as environment. Existing road material will be utilized (Full Depth Reclamation technique, cement treated subbase and base) reducing the use of the natural resources, reducing the carbon footprint, and reducing the impact related to the material disposal. Interlocking Concrete Block Pavements are also good alternative to conventional pavement where the traffic volume is low; they are also easily available in the market and can be easily replaced if damaged.

5.4 The roads selected for improvement are categorized as follows:

Table 2: Project road network by class of road (in km)

Road classification	Imphal West	Imphal East	Highway South	Total
State Highway Roads	10	10	0	20
Major District Roads	23	10	39	72
Other District Roads	8	11	1	20
Inter Village Roads	132	233	71	435
Sum	173	263	111	547

5.5 The selected roads can be categorized based of their lane capacity. Most are in single lane configuration, with the balance being in intermediate lane, two lane or 4-lane configuration, as summarized in the table below:

Table 3: Project road network by type of road (in km)

Road type	Imphal West	Imphal East	Highway South	Total
Single lane	131	141	79	351
Intermediate lane	27	56	22	105
2-lane	6	12	0	18
4-lane	4	5	0	10
Riverbank side roads	5	48	11	64
Sum	173	263	111	547

5.6 The choice of pavement will vary between the following options:

(i) For SH/MDR/ODR roads:

a. Short Panel Concrete of 170 mm thickness laid over the existing bituminous surface by correcting the undulations and repairing the potholes and cracks (if applicable) by providing 75 mm of Bituminous Macadam. Short panel concrete/Thin White Topping is for the roads whose existing surface is in good or fair condition, to be implemented over 52 km (10%) of the project network.

b. Short Panel Concrete of 170 mm thickness laid over 150 mm of Full Depth Reclamation Layer (FDR) used for stabilizing the road with poor conditions such as no bitumen layer, exposed aggregate layer, excessive cracks, and settlement in the road. This pavement is proposed for the roads where the surface conditions of roads have developed excessive cracks, settlements, potholes etc., to be implemented over 41 km (7%) of the project network.

c. For Important roads with heavy traffic: 200 mm of Pavement Quality Concrete of M40 grade Concrete, laid over 150 mm of Dry Concrete Layer of 150 mm. This conventional concrete pavement has been proposed on the selected roads which is used by large number of commercial vehicles, to be implemented over 7 km (1%) of the project network.

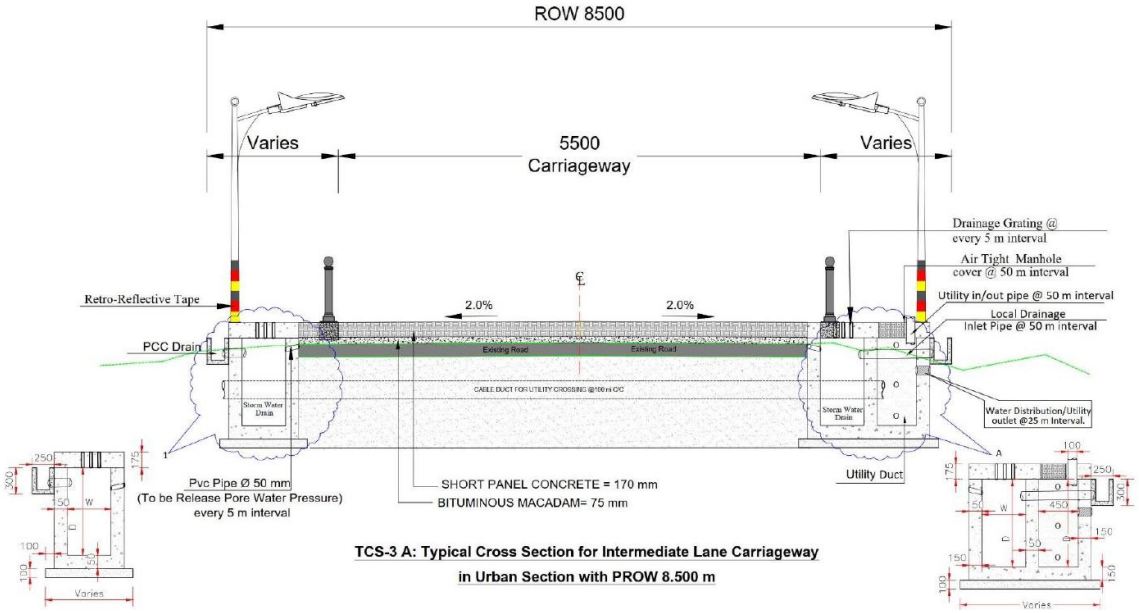

Figure 1: typical cross-section for SH/MDR/ODR roads - Short Panel Concrete pavement

(ii) For IVR roads:

a. Short Panel Concrete of 130 mm thickness laid over the existing bituminous surface by correcting the undulations and repairing the potholes and cracks (if applicable) by providing 75 mm of Bituminous Macadam. Short panel concrete/Thin White Topping has been recommended where the traffic loading and volume is less, to be implemented over 124 km (23%) of the project network.

b. Short Panel Concrete of 130 mm thickness laid over150 mm of Full Depth Reclamation Layer (FDR) used for stabilizing the road with poor conditions such as no bitumen layer, exposed aggregate layer, excessive cracks, and settlement in the road. This pavement is proposed for the roads where the surface conditions of roads have developed excessive cracks, settlements, potholes etc., to be implemented over 82 km (15%) of the project network.

c. Interlocking concrete paver blocks of 80 mm thickness having M40 grade of concrete is laid over a compacted 30 mm of sand mortar (1:10) layer. The interlocking concrete block pavement is a solution for pavement requirement for the single lane internal village roads/street roads where the construction of rigid pavement will require the complete blockage of street 2 to 3 weeks' time. The laying of concrete blocks can be easily done even in the very busy streets, the interlocking block pavement serves the speed of vehicle up to 60 kmph, the manufacturing of blocks is done in factories leading to high quality paver blocks. ICBP will be implemented over 177 km (32%) of the project network.

(iii) For roads along the riverbank: Flexible pavement having a bitumen concrete layer of 30 mm, laid over 50 mm of Dense Bound Macadam (DBM) which will be constructed over 300 mm FDR layer. A stress absorbing membrane is proposed between the DBM and FDR layer. These pavements have been proposed for the

roads that run along the riverbank, to be implemented over 64 km (12%) of the project network.

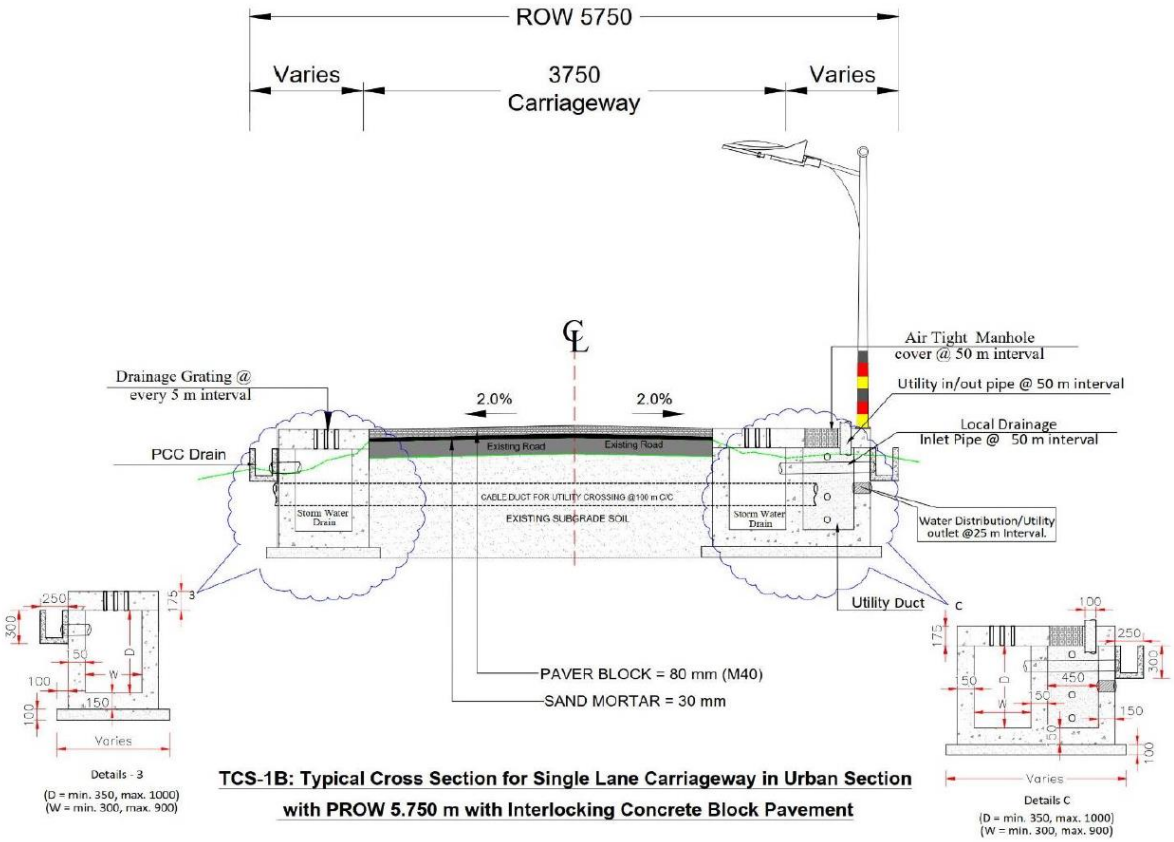

Figure 2: typical cross-section for IVR roads – ICBP pavement

5.7 Geometrical improvement (horizontal or vertical) are, for the most part, not possible as the roads pass through built areas with site-specific constraints. The alignment is fitted within the existing right of way to avoid impact on the livelihood of local communities. Minimum pavement width of 3.75m (with overall width of 5.75m) has been proposed for better mobility of urban/local transport. Only some of the roads require land acquisition where the minimum required width is not available.

5.8 Junction improvements are proposed wherever sites allow for land acquisition without any site issues. In case site constraints prevent the widening of road junctions, safety measures such as advance traffic warning signages, speed reduction measures, road markings, retroreflective tape, and railings have been proposed. Road safety measures have also been proposed at locations near schools, hospitals, religious places, etc.

5.9 Imphal's road network is highly vulnerable to extreme climatic events due to heavy rainfall, frequent flooding and landslides. To address these issues, precast concrete cement drains will be installed, on almost 90% of the Project road network, on both sides of the road and connected to a storm water management system under the sidewalks. For some sections outside the city center, these will be replaced by earthen drains. This drainage system is designed to evacuate excess water from the road and is not intended to replace the municipal sanitation network.

5.10 The design of the drainage infrastructure involved the calculation of the total discharge required to drain the road off in case of extreme meteorological events (peak hour precipitation resulting during heavy precipitation), and fixing the dimensions and slope of the drain to have adequate capacity to carry the discharge and ensure ease of its maintenance.

5.11 Other upgrading measures include utility chambers along the road, improvements on embankments, pedestrian walkway, street lighting, culverts, the repair, rehabilitation or reconstruction of 76 bridges, using the relevant standards of the Indian Roads Congress (IRC). The project network is designed with a minimum design life of 30 years.

Table 4: Civil works cost breakdown[3]

Item No.	Description	Total Cost in USD Million
General	i)Establishment For Employer/Construction Supervision Consultants/ Civil Contractor	0.48
Road Work	i)Paver Block	12.53
	ii)Short Panel Concrete / White Topping	46.55
	iii)Conventional Rigid Pavement	1.23
	iv)Flexible Pavement of Riverside Roads	8.92
	v)Junctions	2.74
Structures	i)Reconstruction Bridges, Rehabilitation and Repair of existing bridges	14.41
	ii)Cross Drainage (Culvert)	1.36
	iii)Drainage, Utility Corridors and chambers, including Dismantling of Drain	157.04
	iv)Bus stops	0.08
Traffic Management & Safety	i)Traffic Signs, Marking and Other Road Appurtenances (Cable Duct, Streetlight, Jersey Barrier and Concrete Bollard)	32.14
	ii)Road Safety & Traffic Management during construction	1.93
Finance Plus Elements	i)Community amenities structures	2.24
	ii)Procurement of Mechanical equipment for Road Maintenance	1.32
Protection Work	Toe Wall	5.67
Total Civil Work Cost		**288.64**

5.12 India has extensive experience in the construction of rigid pavement in major projects of the country, over a least 2500 km in the last two decades (Delhi-Vadodara expressway, Yamuna expressway, Agra-Lucknow expressway…). The country holds the world record for the maximum volume concrete road laid in a day as well as the maximum double lane length laid in a day. Local construction companies in Manipur have minimal experience in this technology, and this project will be the first of its kind in the State. However, the capacity of the contractors for rigid pavement (including ICBP) in the country and the North East Region is satisfactory.

[3] These costs do not include tax, contingencies, labour and administrative charges, utility shifting, maintenance, land acquisition.

5.13 India is also the world's second largest cement producer and the India's cement market accounts for 7% of the global installed capacity. Currently there is neither cement nor asphalt industry in Manipur. The state obtains the supply of cement and asphalt from the neighboring states. At present, in various projects where cement is required, it is being transported through the National Highways from the neighboring states. For this project, the required cement supply is planned to be transported directly from cement factories in neighboring states: Assam counts 10 cement factories; Meghalaya – 9 - and West Bengal – 19, which are capable of supplying the requirement of the project through the project construction life. The cement supply chain could also rely on and be increased significantly with the construction of the rail line connecting Jiribam (Assam-Manipur border) to Imphal, being targeted to be completed in the next months.

5.14 **Operational Sustainability.** A comprehensive approach has been proposed to support PWD Manipur in developing and managing an efficient, resilient, reliable, safe, and green road network in Manipur; preserving the road transport-related assets; minimizing the losses in asset value, keeping them in a state of good repair; enhancing the long-term financial sustainability of PWD's operations. It will introduce network level data-based monitoring, planning and investment decisions: focusing investments on priority needs, maximizing the benefits of the investments, linking performance with funding levels; making a sound business case for funding; mobilize political and public support for asset management. This will be based on the following measures:

(i) Develop and operationalize a **road asset management system (RAMS)** to prepare three-year rolling and annual plans to expand, improve, rehabilitate, and maintain the roads, bridges, drainage system, and other assets including to retrofit road safety and climate resilience in existing infrastructure. The plans will have relative priorities and proposed budget allocation for various work categories**. AMS (Asset management system)** will be based on an **asset information system (AIS)** containing inventory, current condition, traffic level, and other data required to develop the above plans. The plans will be developed based on scientific analysis of the AIS data and ensure optimal allocation of available resources.

(ii) **Asset Management Plan (AMP)** containing a 10-year pathway defining the existing assets, how these would grow and to be improved to meet the strategic priorities (safety, user comfort, climate resilience), how these are to be kept "in a state of good repair" over their life cycle, what funds are required to develop, improve, rehabilitate, and maintain the assets, how much is the funding gap between the required and the available funds, how the funding gaps could be narrowed, what outputs and outcomes to get with the available level of funding, the risks associated with underfunding in terms of not realizing the strategic priorities, and how to create an enabling environment for implementation of AMP. This will also include an overarching "Asset Management Strategy" under which AMS and AMP are to be developed and used by the implementing agencies for managing their assets, and the strategic priorities are to be realized.

(iii) **Feasibility and design of performance-based maintenance contracts:** Use of Output and Performance Based Maintenance Contracts (OPBRC) to deliver periodic renewal, preventive and routine maintenance for roads, bridges, and

drainage system to keep them in a state of good repair. These contracts could also include civil works for road safety improvements in isolated locations and preventive maintenance such as cleaning of underground drains. These contracts will be a significant improvement over the existing system of delivery of maintenance works using Bill of Quantities (BOQ) method.

(iv) **Implementation of pilot community-based maintenance contracts.** Use of Community based maintenance contracts to engage local communities in the monitoring of minor infrastructure works and/or their maintenance, relying on the feeling of ownership of the road that provides connectivity to their habitation, generating employment and income in the local community, and reducing the long-term maintenance costs**.**

(v) **Implementing the Manipur Road Maintenance Fund** to mobilize additional non-budgetary funds for road maintenance. The idea is to establish a sturdy, continuous, and adequate stream of maintenance funds and to holistically address the problem of inadequate maintenance funding. The main source of funds to the Road Maintenance Fund is a levy on the sale of Petrol and Diesel and one-time fee on the registration of new Vehicles. The draft Road Maintenance Fund Act has provisions of three main sources of funding (i) fuel surcharge, (ii) road tax/fees to be collected by the Transport Department, (iii) tolls on bridges and other fines to be collected by PWD, and (iv) .any other source as notified by the State government.

5.15 **Hydrology study.** The poor state of the drainage network, inadequate drainage system, improper drainage network design, rapid urbanization, large scale sealing of soil with impermeable surface, change in land use pattern, poor structural condition of the storm water drains, and sewerage network exacerbate flood risk further. It is proposed to conduct a hydrology and flood risk management study which incorporates all of the project findings, outputs, and outcomes to address the long-term management of flood risks areas focusing on (i) the reduction of potential adverse consequences and on (ii) the best combination of structural and non-structural initiatives for the flood prevention, protection, and preparedness, taking into account the characteristics of Imphal Basin incorporating sustainable land use practices, improvement of water retention, water quality at the receiving water bodies (Loktak Lake) as well as the controlled flooding of certain areas in the case of a flood event.

5.16 **Institutional capacity for project implementation.** PWD Manipur has been implementing MDB-funded projects over the last decade and has gained significant implementation experience as well as familiarity to MDB's safeguard and fiduciary procedures. However, PWD is still on the learning path to procure and implement large civil works contracts and use of new contracting models. Continued guidance and support from AIIB are essential during project implementation, including E&S management and grievance redress procedure. The project design has also included assistance to enhance the Quality and Contract Management, Financial Management and Internal Audit capacities of PWD.

B. Economic and Financial Analysis

5.17 **Economic Analysis.** The economic evaluation of the proposed investments was carried out using Highway Development and Management Model-4 (HDM-4) to assess the economic viability of the project as a whole, comparing the "with-project" scenario vis-a-vis the "without-project" scenario. The analysis is carried out over an operating life span of 30 years and a construction period of 3 years, discounted at 12.0 percent. All costs and benefits are expressed in domestic currency at constant 2022 prices.

5.18 The economic costs of the project include (i) investment costs of road upgrade (547 km); (ii) routine and periodic maintenance costs of the project roads.

5.19 The economic benefits of the project include (i) savings in vehicle operating costs (fuel, spare parts…) due to improved road conditions (higher IRI – international roughness index, from 4-6 - fair to poor, to 2 - very good); (ii) savings in travel time (increased travel speeds due to less congestion, better road geometry); (iii) reduction of injuries and casualties associated with road accidents (improvements in road safety); (iv) savings on GHG emissions; (v) savings on flood damages (installation of the road drainage network), and (vi) wider economic effects. In terms of quantitative cost-benefit analysis, benefits of (i), (ii), (iii), (iv)and (v) are calculated and included.

5.20 At a discount rate of 12 percent, the project is estimated to generate an economic net present value (ENPV) of INR 28,560 million and yield an economic internal rate of return (EIRR) 22.9 percent, exceeding the discount rate of 12 percent. Therefore, the project investment is economically justified. For details, see Annex 3.

Scenario	EIRR (%)	ENPV (INR million)
Base case	22.9	28,560
Base case + 15% increase in costs	20.2	24,000
Base case + 15% decrease in benefits	19.8	19,720
Base case + 15% increase in costs and decrease in benefits	17,3	15,160

5.21 **Financial Analysis.** The project road network, composed of State Highways, Major District Roads, Other District Roads and Internal Village Roads, is not tolled and does not lead to any revenue stream from direct road usage. Therefore, traditional financial evaluation (calculating the financial internal rate of return) is not performed.

5.22 Nevertheless, the essence of the Project is to ensure budgetary sustainability of the operation and maintenance of the urban road network of Greater Imphal:

(i) Reconstructing the existing asphalt-paved roads into more resilient rigid/concrete roads is the most economical option, when comparing the entire lifecycle of construction and maintenance over a period of 30 years between the two types of pavements. On road maintenance only, it is estimated that the annual maintenance costs required for the Project road and drainage network would be **USD 0.40 million**, compared to USD 4.2 million for the same roads in existing asphalt pavement.

(ii) As presented in 5.14 - Operational Sustainability, implementing the RAMS, eventually coupled with CBM and OPBRC (subsequently to this Project) will allow to optimize the use of PWD financial resources,

(iii) The Road Maintenance Fund will collect and channelize additional and/or existing road user fees to ensure budgetary resources dedicated to road maintenance only. Preliminary estimations of these fees, based on available data of the last few years, show that a minimum of **USD 7.13 million** could be collected every year, covering the annual maintenance costs required for the Project, and beyond.

C. Fiduciary and Governance

5.23 **Procurement Capacity Assessment.** The overall procurement risk after mitigation is Medium. The PWD has adequate procurement experience in the projects financed by MDBs and handling contract management. It has adequate procurement capability and experience in implementing similar road projects. On average PWD annually handles 3 to 5 large size contracts ranging from INR 100 to 300 Cr (USD 12.5 to 37.5 million approximately), 20 to 30 medium size contracts ranging from INR 50 to 100 Cr (USD 6.25 to 12.5 million approximately), and 50 to 100 small size contracts ranging from INR 3 to 50 Cr (USD 0.4 to 6.25 million approximately).

5.24 PWD has also implemented the following two ADB funded road projects: (a) NESRIP Project – 2 Loan no. 3073-IND: It involved improvement and upgradation of (i) Tupul to Bishnupur - 50.80 km, and (ii) Thoubal to Kasom Khullen – 47.125 km. (b) SRCIP Project Tranche – 1; Loan no. 3118: It involved construction of Imphal Kangchup Tamenglong Road in Manipur – 107.97km, and the procurement under the said projects followed the ADB Procurement Policy and Regulations. The procurement performance on these two MDBs funded projects has been satisfactory, although some delays took place for the reasons beyond control of PWD.

5.25 PWD has allocated dedicated officials for procurement processing. There are eight procurement staff allocated in the PMU: (i) Project Director (rank of Additional Chief Engineer), (ii) two Sr Project Managers (rank of Superintending Engineer), (iii) Project (rank of Executive Engineer), (iv) four Junior Engineers. All staff are satisfactorily qualified; six of them are Graduates in Civil Engineering, one person has M. Tech degree in Structures and one person has Master's degree in Geology. All procurement staff are well trained on international procurement. During the Appraisal, Procurement staff also attended the procurement training on AIIB Procurement Policy.

5.26 All procurement and contracts are audited and reviewed by the office of the Accountant General & Audit on annual basis as independent external auditor.

5.27 **Procurement Risks and Mitigation Measures.** Procurement delay and inadequate contract quality control and monitoring are the two most apparent risks for the Project. To mitigate the risk of procurement delay, advanced procurement actions have been initiated for 5 main contract packages as follows: (i) four contracts for road construction works including operations and maintenance (under EPC contracts), and (ii) a main consultancy package for the Construction Supervision Consultant. It is expected that all of these 5 main contract packages will be awarded and the contracts are signed prior to the Loan effectiveness.

5.28 To enhance the contract monitoring and control, a Construction Supervision Consultant will be hired by PWD for performing the following: Project implementation with Project monitoring software, Progress monitoring, reporting, documentation, monitor implementation of Environmental and Social Management Plans Construction Supervision, Quality, Construction Safety, Contract management & administration, Contract Compliances, HSE (Health, Safety and Environment) compliances etc. during project implementation and defect Liability period.

5.29 **Financial Management:** FM assessment focused mainly on institutional capacity, staffing, planning/budgeting, funds flow, accounting, internal controls/audit, reporting and external audits. PWD has prior experiences of implementing MDBs supported projects and familiar with the MDBs fiduciary requirements. Based on FM assessment, FM capacity is considered adequate and FM risk as “High”.

(i) **Staffing and Institutional Capacity.** One accounts/finance officer has been deputed to maintain project related accounting, recording, and reporting. Considering the large volume of project transactions, FM Consultant shall be hired on agreed ToR to support on the project accounting including preparation of withdrawal claims for disbursements and coordinating on audit issues.

(ii) **Planning and Budgeting.** The Project shall follow the existing planning and budgeting procedures of GoM. PMU shall prepare annual plans based on procurement plans and submit to GoM for approval. The Project has proposed budget demand of INR 510 million in the State Budget for FY24/25. Considering potential needs, PMU may request for increase through supplementary process, if required.

(iii) **Funds Flow.** After the loan is signed between AIIB and the Borrower, GOI shall on lend the loan proceeds to GoM and finally the funds shall be made available for the Project following domestic procedures. Considering size of the loan, there are key concerns on timely availability of the funds and project liquidity management. To mitigate this risk and support GoM liquidity management, it is suggested to use advance mode of disbursements for AIIB part of financing. For this, PMU shall open a separate project bank account. The proposed advance funds shall flow from AIIB to GOI/DEA to dedicated project bank account through State Treasury. In this regard, PMU shall seek concurrence of GOI/DEA and State Finance Department.

(iv) **Accounting and Financial Reporting.** In other project accounting, PWD was practicing manual system of accounting. This had resulted in some gaps in the accounting, bookkeeping and contract management practices in PWD. The auditors have noted some reconciliation issues between records of PWD and Accountant General (AG). PWD team acknowledged these gaps and agreed to move project accounting from manual to IT systems. PMU shall procure an accounting software and maintain Project accounting in a segregated manner. The financial progress of the Project shall be reported on a quarterly basis through IFRs to be submitted within 45 days from end of each financial quarter. During initial period of implementation, PMU shall prepare IFR format and seek concurrence of AIIB.

(v) **Internal Control/Audit.** The existing internal control system of PWD can provide reliable and adequate controls over funds/transaction. In other project’s report implemented by PWD, the auditors have raised some internal control issues related to non-reconciliation of project accounts etc. Considering this past legacy and complexity of this project, PMU shall engage a professional accounting firm to carry out internal audit of the Project activities on periodic basis and submit report to AIIB. The agreed ToR shall detail out the activities and reporting timeline.

(vi) **External Audit.** The Project financial statements shall be audited by the independent auditor based on agreed ToR with AIIB. The external audit report, which shall include an audit opinion and management letter shall be submitted to AIIB within six months after the end of each financial year.

5.30 **Disbursements.** Loan proceeds may be disbursed using standard disbursement methods of AIIB such as advance and reimbursement. However, considering potential funds flow and liquidity issues, the Project shall use advance method of disbursement. PMU through the Office of the Controller of Aid, Accounts and Audit (CAAA) shall submit applications for withdrawal to AIIB. Upon satisfactory review by AIIB, AIIB shall disburse the funds from the loan account. The eligible project expenditures such as civil works, goods and consulting services etc. shall be subject to using Statement of Expenditure format. Retroactive financing shall be permitted, subject to limit of 20 percent of the total amount of the loan and for eligible expenditure incurred and paid not earlier than 12 months prior to the expected signing date of the loan agreement. There may be some disbursement conditions proposed for activities to be disbursed against the Road Maintenance Fund . The proposed loan agreement may state appropriate conditions of disbursement mutually agreeable to AIIB and the Borrower. Disbursement Letter shall detail the authorized signatories, ceiling of Designated Account, minimum application size, process of submitting claims and other terms and procedures of disbursements.

5.31 **Governance and Anti-corruption:** AIIB is committed to preventing fraud and corruption in the projects it finances. It places the highest priority on ensuring that projects AIIB finances are implemented in strict compliance with AIIB's Policy on Prohibited Practices (2016). Implementation will be monitored regularly by AIIB staff. The Bank reserves the right to investigate, directly or indirectly through its agents, any alleged corrupt, fraudulent, collusive, coercive or obstructive practices, and misuse of resources and theft or coercive practices relating to the project and to take necessary measures to prevent and address any issues in a timely manner, as appropriate. Detailed requirements will be specified in the Loan Agreement and the Project tender documents. AIIB will monitor the work related to tender document preparation and tender/proposal evaluation under Bank financing.

5.32 **Cybersecurity:** The Project being a road transportation system (urban mobility and asset improvement project comprising of road infrastructure, secondary drainage system), the investment is identified as a critical infrastructure. The infrastructure is not likely to be targeted, and the level of exposure is considered as low.

5.33 The Road Asset Management System component will be implemented through a consultancy service. The RAMS will comply with security requirements as per GOM's Cybersecurity Policy (National Cyber Security Policy – 2013) and undertake all refinements before migrating the data either on physical data center or cloud-based server and on the web – based GIS platform. The RAMS will adopt Single Sign On (SSO) security system for authentication with appropriate encryption level for user data. The system will be covered under a five-year maintenance support after the completion of the project. Hence, the cybersecurity risk will be mitigated by complying with the requirements of the GOM's Cybersecurity Policy and periodic security audits.

5.34 The existing e-procurement system is designed, developed and hosted by the National Informatics Centre (NIC), the Government of India (Technology partner of the Government) in coordination with the Finance Department and Information Technology Department, Government of Manipur. NIC-CERT Division, is the nodal arm of National Informatics Centre for managing the cyber security incidents in NIC. As on date, there has been no instance of cyber security attacks on the system. The system is regularly scanned and audited for security risk.

5.35 Manipur has also a dedicated Cyber Security Cell under the State Police Department which deals with cybercrimes and cyber security. As of date, there has been no instance of cybersecurity attacks in the state.

D. Environmental and Social

5.36 **Environmental and Social Policy and Categorization.** AIIB's Environmental and Social Policy (ESP), including the Environmental and Social Standards (ESSs) and the Environmental and Social Exclusion List, applies to the Project. Appraisal mission has confirmed that ESS 1 (E&S assessment and management) applies to the assessment of E&S impacts of project activities. ESS 2 (involuntary resettlement) also applies as road improvement and limited amount of widening are expected to generate economic displacement and minimum physical displacement of title and non-titleholders. More than a third of the population of Manipur state is categorized as Scheduled Tribes and they are present in Imphal city and are likely to be impacted by the Project. Therefore, ESS 3 (Indigenous Peoples) is applicable. The risk classification of the Project is Category B.

5.37 **Environmental and Social Instruments.** To manage environment and social impacts, the Project caried out Initial Environment (IEE) and prepared a Resettlement Policy Framework (RPF) and an Indigenous Peoples Planning Framework (IPPF). The IEE and frameworks helped in conducting environmental and social impact assessment and preparation of an Environmental Management Plan (EMP), a Resettlement Plan (RP), and an Indigenous Peoples Plan (IPP) as environmental and social instruments. The IEE, EMP, RP and IPP have been finalized and disclosed in-country. The contractor of the project shall also prepare the Site-Specific Contractor's Environmental Social Management Plan (SSCESMP) as per the requirement in the EMP and Bidding Document. The preparation of SSCESMP and its review and clearance process has been included in the ESAP (Environmental and Social Action Plan), reflected in the Legal Agreement as one of the E&S instruments.

5.38 **Environment Aspects.** The Project will bring environmental, social, and public health benefits from improved drainage system, reduced carbon emission and travel time, reduced accidents, improved connectivity and access to basic services and livelihood opportunities. The physical works will involve upgrading selected roads to improve rigid pavement with lined drain and reconstruction or replacing temporary bridges (wooden or suspension bridge). These activities' impacts on the environment are limited to the immediate vicinity of the road alignment. Dust, vibration, noise, construction waste and earth material disposal, tree feelings, water contamination and siltation from the work at riverbank side roads to rivers, ponds, community health and safety issues such as traffic safety, workers' camp management and communicable disease transmission will be among the typical environmental impacts associated with the Project. The DPR consultant has undertaken baseline-environmental sampling program including ambient air quality monitoring, noise monitoring, ground water testing, surface water testing, soil quality testing, micro meteorological monitoring, air pollution modelling, noise quality modelling, ecological study, and avenue trees survey.

5.39 **Construction Phase Impacts.** The Environmental Management Plan (EMP) has covered all potential adverse environmental impacts during construction including the suggested measures on how to manage them. As the contractors will be the main party responsible for implementing these, the Bank's E&S specialist and EAP PWD have reviewed the Bidding Document to incorporate all the EMP requirements into the Bid Docs. As per the particular condition of the contract (clause 4.10.1) the contractor is required to prepare a Contractor's Environmental Social Management Plan (C-ESMP) to get a-no objection from the Construction Supervision Consultant. The contractor will also prepare a health safety

management plan including traffic management and community health and safety as part of the C-ESMP. Dedicated facilities for disposal and treatment of construction and demolition waste will be constructed by the Project. For avenue tree plantation after land clearing, EAP PWD with Forest Department will monitor the 85% survival target of tree-plantation for three years of operation phase as per the regulation. If the survival rate is found below 85%, additional compensatory plantation and monitoring shall continue until the target is reached. These measures will be carefully checked during the implementation mission and shall constitute as a non-compliance if not implemented.

5.40 **Biodiversity.** Since these are existing roads, the project activities are not within proximity to any protected areas or critical natural habitats. The Project will not cause habitat loss, degradation and fragmentation, invasive species, or overexploitation as per AIIB policy. Regarding interference with migratory routes or wildlife movement as per the policy, the IEE reported that the greater Manipur area - beyond the project footprint - forms part of the Central Asia Flyway and East Asia Flyway for migratory birds. However, project area itself is not part of any notified important bird area as indicated by superimposed data maps using Integrated Biodiversity Assessment Tool (IBAT) by IEE consultant and it is not a critical habitat based on the critical habitat criteria screening and from expert observation during IEE ecological study. Another department in PWD, the Water Resources Department (WRD), has a successful ongoing waterbody rehabilitation program that increases the birds count in 2024. EAP PWD will engage this agency during project implementation (see Annex 4 for more detail)

5.41 **Operations Phase Impacts.** Key potential E&S impacts during the operation phase that had been addressed in the EMP are potential traffic accidents for the maintenance workers and community due to the improved condition of the road and increased noise at community level. During appraisal, potential increase in nutrient loading to the receiving water body as potential indirect impact from improved drainage system from the Project was identified including its proposed mitigation measures (see Annex 4 for more detail).

5.42 **Social Aspects.** As per the ESIA carried out by the Project, a total of 22.8 hectares of land will be required for the purpose of road widening (where possible) and improvement of which 19.05 hectares is private land. The Project is impacting 4,843 households that includes 4,442 titleholders. Among the affected households, 704 are either socially and/or economically vulnerable. The impacts are partial, and no households will be physically relocated. An analysis of alternative was carried out to minimize adverse impacts. As a result of analysis of alternatives, total affected households have come down to 4,843 from originally estimated at 15,193. Similarly, land requirement has been reduced to 19 hectares from 78 hectares. private land required for the Project will be directly purchased on a willing seller-willing buyer basis. In case direct purchase does not work, PWD will acquire land through eminent domain following the provisions of the Right to Fair Compensation, Transparency in Land Acquisition and Rehabilitation and Resettlement (RFCTLARR) Act of 2013. A resettlement plan (RP) has been prepared in accordance with ESS 2 to minimize and mitigate impacts on the community and individuals. The RP apart from baseline information on affected households includes quantification of impacts, mitigation measures, legal framework, gender issues and gender plan, labour management plan, monitoring frequency and indicators, grievance redress mechanism, stakeholder engagement plan, institutional arrangement for implementation of RP and resettlement budget.

5.43 **Indigenous Peoples.** The socioeconomic survey conducted as part of preparing the social impact assessment (SIA) has identified 63 tribal households belonging to the Kubai and Naga Tribal community that will be impacted by the Project. As part of Indigenous Peoples' Plan (IPP) preparation, the project team has conducted several free, prior informed consultations with Scheduled Tribe community to better understand the concerns and aspirations of the communities. In the process project has obtained broad support of the affected tribal households. Manipur PWD along with the DPR consultants met the affected tribal households and explained about the project and adverse impact the project will have on their land. An Indigenous Peoples' Plan (IPP) has been prepared in accordance with laws and regulations of the Government of India, state Government of Manipur and AIIBs Environmental and Social Standard (ESS) 3. The plan provides information about the socio-economic characteristics of the tribal community, impact of the project and management measures to mitigate the adverse impacts; community level requirements; institutional arrangement for implementation and budget. The GRM set up for RP implementation will also be used for managing grievances of indigenous community.

5.44 **Occupational Health and Safety (OHS), Labor and Employment Conditions:** There will be OHS risks during road rehabilitation works and operation phases of the Project. Typical with any infrastructure project, construction risks such as working with heavy equipment and machineries, hazards from excavation works and falling debris, accident during transportation, working with asphalt and other heat sources, electricity and other typical risks will be present, whilst in the operational phase key risks will be present for maintenance staff working in the vicinity of roads etc. The EMP contains annexes to guide the contractor in forming an OHS Management Plan, Community Heath Safety and Traffic Management Plan. These managements plans will form a key part of the Site-Specific Contractor's ESMP (SSCESMP) as required in the Bidding Document.

5.45 The content of the SSCESMP including the OHS management plans will be reviewed by the E&S team at EAP PWD Manipur and the Bank for quality assurance. The Project will likely have numerous sub-contractors, under the main contractor, working on many different sections of the Project. OHS requirements will be cascaded down into the Contractor and sub-contractors' scope of work through inclusion into tender documentation, contracts and their policy and procedures during construction and operation. Labour and employment condition including labour influx risks have also been assessed in the Labour Management Plan (LMP).

5.46 **Stakeholder Engagement, Consultation and Information Disclosure:** Stakeholder engagement through public consultation and communication and Focus Group Discussion have been carried out with various groups of stakeholders including women and vulnerable groups as part of the preparation of the safeguard documents and will be carried out throughout the project cycle. The findings of community consultation have been incorporated in the project design and E&S risk management instruments. The mechanism to engage stakeholders during the project implementation has been described in Resettlement Plan that includes issues to be discussed, frequency and form of engagement.

5.47 **Project Grievance Redress Mechanism:** A Project-level Grievance Redress Mechanism will be established in accordance with the requirements of AIIB's ESP as described in RP. An integrated system will be established with Grievance Redressal Cell (GRC), with necessary officers, officials, and systems at PMU. Grievances, if any, may be

submitted through various mediums, including in person, in written form to a noted address, e-mail, or through direct calls to concerned officials/s. The Social Specialist within PMU shall be responsible for coordination of grievance/complaints received. The grievance redress mechanism will be in place before initiating the implementation of RP and civil construction activities in the project area. The Project, apart from web-based mechanism, will have a three-tier grievance redressal mechanism, i.e., (1) at the project site level, (2) PMU level, and (3) State level. In case the aggrieved person is not satisfied by all the three tiers, he/she has all the rights to approach the Judiciary. Locally appropriate public consultation and disclosure process will be used to disseminate information about the GRM.

5.48 **Bank's Project-Affected People's Mechanism:** The Project-affected People's Mechanism (PPM) has been established by the Bank to provide an opportunity for the independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement its ESP in situations when their concerns cannot be addressed satisfactorily through the Project-level GRM or the processes of the Bank's Management. Information on the PPM, is available at: https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html

5.49 **Monitoring and Supervision Arrangements:** The Construction Supervision Consultant (Supervision Engineer) will supervise the E&S performance of the Contractor and subcontractors and ensure strictly adherence of EMP requirements. The Supervision Engineer and EAP PWD team will arrange for regular monitoring, reporting and site inspections during the implementation phase, as detailed in the ESMP. He / She will also be responsible for monitoring RP implementing agency. The bidding documents have required the contractor to provide qualified Environmental and Social specialist also for the Supervision Engineer. Also, the Bank's specialist has worked together with the client to enhance the Schedule U-ESHS Requirements of the Bidding Documents. This schedule contains owner's ESHS policies, EMP requirements, Code of Conduct, ES monitoring hierarchy and payment for ES measures. EAP PWD will work together with Bank's specialist to review the E&S Report Format for the contactor that will be prepared by the Supervision Engineer. This will ensure contractor's adherence to EMP and E&S good practices. Further discussion on training needs assessment and capacity building plan for the EAP PWD staff, contractor, and supervision engineer to meet AIIB requirements will be undertaken after the appointment of the contractor. AIIB E&S specialist will also conduct an implementation support mission twice a year. In addition, EAP PWD has also agreed to appoint an Independent E&S monitor for concurrent monitoring of EMP, RP, and IPP implementation. This will be over and above the internal monitoring by PIU. The implementation of EMP, RP and IPP will be evaluated twice – at the mid-term and again at the end term.

E. Climate Change

5.50 **Climate Change:** The Bank has committed that it will fully align its operations with the goal of the Paris Agreement (PA) by July 1, 2023. As the Project is intended to commence implementation after this deadline, it is important to capture the potential climate considerations of the Project. To be considered fully aligned with PA, the Project must meet both PA's climate mitigation and adaptation goals.

5.51 **Climate Mitigation (BB1).** The project can be labelled as Universally Aligned for mitigation as it falls under the category of "Road upgrading, rehabilitation, reconstruction, and maintenance without capacity expansion" as per the AIIB's Methodology for the Assessment of Paris Agreement Alignment of new operations.

5.52 **Climate Adaptation (BB2).** To determine the adaptation alignment of the project, the team performed a Climate Resilient Assessment (CRA) following the 3-steps-process described in AIIB's Methodology for Paris Agreement assessment.

(i) Under the first step, the climate risk and vulnerability context has been established identifying the physical climate risks that might materially affect the project using the Aware tool. The exposure and sensitivity assessment found that the climate risks that could materially affect this project would be precipitation increase (high risk), rain-induced floods (high risk) and rain-induced landslides (high risk).

(ii) Under the second step, we assessed if adaptation and resilience measures have been identified to reduce material physical climate risks and enhance climate resilience. One of the objectives of the project is climate resilience, and different measures have been established to tackle the physical climate risks found on the first step. The main climate risk affecting the project is the increase in rainfall during the monsoon season causing flooding and landslides, so the climate resilient measures are designed to improve drainage The proposal on the detailed engineering design is to convert the existing flexible pavement road into rigid pavement alongside with lined drain, utility chambers and cross drainage culverts allowing the roads to be serviceable even during heavy precipitation and avoiding pavement damage. The conversion of impermeable bituminous pavements to a combination of more permeable pavements such as ICPB and concrete slabs, should also contribute to reducing the risks of water run-off and flooding of the road network. To address any possible landslides, roads along the riverbank (prone to landslides) will be rebuilt using flexible pavement. The road structure will also be strengthened along the river embankment.

(iii) The third step is the Assessment of Inconsistency with Climate Adaptation and Resilience Strategies Relevant for the Operation. The project is not inconsistent with the priorities set forth in national or sectorial policies/strategies/plans for climate resilience such as India's National Action Plan for Climate Change (NAPCC), the NDC of India or Manipur State Action Plan On Climate Change (SAPCC).

5.53 As a conclusion, the Project includes appropriate measures in both the design and operation phases to tackle the main physical climate risk that can materially affect it. As a result, this Project is expected to deliver climate resilience outcomes of reduced climate related disruption to road transport and should be considered as Paris Aligned under BB2 (adaptation). As the Project is both aligned with BB1 and BB2 we can conclude that the whole project is Paris Aligned

5.54 **Climate Finance Assessment.** The project does not qualify as climate mitigation finance as it does not fall in any of the categories established under the AIIB common principles for tracking climate mitigation finance. However, given the Project Objectives, the climate resilience measures adopted into the project design, oriented to tackle the physical climate hazards identified under the Climate Risk and Vulnerability Context (some of which can be considered as substantial contributors) and the climate adaptation outcome and output level indicators introduced as part of the project, a portion of AIIB's financing can be classified as climate adaptation finance under the category of enabling adaptation activities (type 2). Using the incremental approach set forth on the AIIB methodology, we have calculated the percentage of climate adaptation as the ratio between the capex of the climate adaptation activities financed by the AIIB's and AIIB's total investment in the project.

Project component	**Comment**	**CAPEX (million USD)**
Short Panel Concrete / White topping		46.55
Conventional Rigid pavement		1.23
Reconstruction Bridges, Rehabilitation and Repair of existing Bridges		14.41
Cross Drainage (Culverts)		1.36
Drainage, utility corridors and chambers including dismantling of drain		157.04
	Total Climate adaptation finance CAPEX (million USD)	220.59
	@ 96.5% of civil works financed by AIIB (million USD)	212.87
	Total AIIB finance (million USD)	352.4
	Climate finance %	60.4%

The final climate finance on this project is 60.4 percent (USD 212.87 million).

F. Gender Aspects

5.55 The gender assessment shows that India does not rank well globally in the gender inclusion indicators but has been making significant efforts to integrate international principles and instruments into legislation and policy. It has put in place institutions (The Ministry of Women and Child Development) that have been set up to foster women's empowerment and child development in India. In the labor market, India has enacted legislation to enforce legal worker-age requirements, anti-discriminatory legislation, equal pay legislation and anti-harassment legislation and maternity leave for employees.

5.56 Notwithstanding the legal and institutional framework, women's participation in the formal labor market is low (25.4%) and a large proportion of women report gender-based violence. Furthermore, studies suggest that various gender norms, stereotypes and discrimination pose mobility challenges to women, resulting in lack of access to employment, market, health care and other facilities. Sexual harassment is another major barrier that women and girls face in safe access to transport services.

5.57 In parallel, the women in Manipur are found to participate in all social, religious and socio-political gatherings, voice their issues, providing support in resolution of intra-community conflicts and also take equal part in community welfare activities along with men. Further, they carry out predominantly traditional commercial activities in terms of running shops of petty business in the markets and hold important positions of the market management and governing bodies.

5.58 A Gender Action Plan (GAP) is prepared to promote gender inclusive design and implementation of the Project. Along with providing visibility and enhancing accountability for gender mainstreaming, The GAP covers the (i) design phase of the project; (ii) construction phase of the project; (iii) the operation phase of the project; and (iv) the stakeholder engagement activities.

5.59 At present (i) the gender-sensitive design measures are street lighting, adequate pedestrian walkways, pedestrian signaling, road safety features, horizontal signaling: (ii) during the construction phase it is proposed that all tender documents include anti-discriminatory clauses in employment and wages, cover gender based violence and institutional capacity; (iii) during the operations phase community based road maintenance units/microenterprises will be created to provide routine maintenance for the road network. These units will be essentially made up of women; (iv) the stakeholder engagement activities underway and planned consult women focus groups, and other vulnerable groups specially. Furthermore. the project GRM will be gender sensitive and shall include female members in the Grievance Redress Committee and collect gender disaggregated data on complaints received and resolved. The gender equality assessment and proposed plan are presented in detail in Annex 6.

G. Risks and Mitigants

Table x: Summary of Risks and Mitigating Measures

Risk Description	Assessment (H/M/L)	Mitigation Measures
Program/Project Implementation Risks		
Implementation capacity		
▪ Implementation capacity of PWD	M	▪ PWD has implemented several ADB projects hence has gained experience of Project implementation. The same PMU is responsible for AIIB financed Project execution. ▪ Further, CSC will be mobilized to further enhance the capacity for project preparation activities. ▪ If needed, the Bank team will organize related trainings to further enhance the capacity.
Land acquisition and resettlement		
▪ Delays in Project implementation due to acquiring land and resettlement	M	▪ The Project requires the acquisition of approximately 12 hectares of private land in discrete locations. The Project is not likely to cause significant or irreversible impacts as a narrow strip of private land will be acquired, and the nature of impacts will most likely be temporary economic displacement and access restrictions. Minimal physical displacement is envisaged. ▪ Private land required for the Project will be directly purchased on a willing seller-willing buyer basis. In case direct purchase does not work, eminent domain will be followed. A resettlement plan (RP) has been prepared in accordance with ESS 2 to minimize and mitigate impacts on the community and individuals.
Financial management		
▪ Liquidity issues due to inadequate or delay in funds flow.	H	▪ The risk shall be mitigated through advance method of disbursements and opening of separate project bank account.

Risk Description	Assessment (H/M/L)	Mitigation Measures
▪ Inadequate accounting and booking may result in delays in financial reporting and reconciliation issues.	M	▪ The risk shall be mitigated through introduction of accounting software and hiring of FM Consultant.
Procurement of large and complex packages		
▪ Procurement delay	M	▪ Advance procurement action has been initiated for 4 major road construction work packages and the CSC contract package, to ensure a timely mobilization of works immediately following the effectiveness of the Loan
▪ Inadequate contract quality control and monitoring	M	▪ A construction supervision consultant will be engaged throughout construction contract period to ensure that the quality of construction works meet the contract provisions and requirements
▪ Unavailability of competent contractors for works contract and consultants for technical assistance	L	▪ The Market Survey has been conducted as part of the PDS, and the detailed Market Analysis and inputs of Executing Agency has confirmed that there are large number of qualified road contractors in the country and internationally to participate in the tender. ▪ This is a well-functioning and competitive market for road construction
▪ Although PWD has prior experience in executing other MDB financed projects, however, it does not have experience in executing AIIB financed projects following AIIB Procurement Policy	L	▪ Training has been provided to PWD on AIIB's Procurement Policy and the Procurement Instructions for Recipients (PIR), on Abnormally Low Tenders for Tender evaluation, and complaint handling. ▪ Major contract packages are prior reviewed by AIIB
Time and cost overrun		
▪ Delay in implementing the Manipur Road Maintenance Fund	M	▪ A draft version of the bill has already been prepared. The bill is to be finalized and submitted to Government of Manipur in the next

Risk Description	Assessment (H/M/L)	Mitigation Measures
		months. ▪ The Project will mobilize consultant to support PWD in implementing the Road Maintenance Fund ▪ The Project will mobilize consultant specialized in financial management to improve accounting and ensure PWD readiness to manage the Road Maintenance Fund.
▪ Implementation delay due to annual floods in the region	H	▪ The technical design of the Project is proposed to include three major aspects to address this (a) designing the roads and bridges above the highest flood level; (b) providing adequate drainage structures; and (c) careful construction planning by considering the impact of monsoon season. This would be reviewed during appraisal.
E&S risks and impacts during construction and operation		
▪ Environmental, health and safety risks such as dust, vibration, noise, water contamination, construction waste and silt disposal, land clearing, community health and safety issues such as traffic safety, workers' camp management and communicable disease transmission	M	▪ The potential impacts of the road rehabilitation works on the environment are limited to the immediate vicinity of the road alignment and they are not significant, diverse, complex, large scale and unprecedented. ▪ Risks can be managed and mitigated as per the EMP (Environmental Management Plan) including at operation stage.

(6) Annex 1: Results Monitoring Framework

Project Objective (PO):	**To improve the connectivity, safety, and resilience of the urban and sub-urban road and drainage networks in Greater Imphal, and to enhance the technical capacity and budgetary sustainability of Manipur's Public Works Department**								
Indicator Name	**Unit of measure**	**Baseline Data 2023**	**Cumulative Target Values**				**2029**	**Data source / Methodology**	**Responsibility**
			2025	**2026**	**2027**	**2028**			
Project Objective Indicators:									
1. Total population living in areas serviced by connecting roads upgraded to climate-resilient standards	Number of people / females	322,972 / 159,008					2,110,061 / 1,036,951	PWD/RAMS	PWD
2. Reduction in the number of fatal/non-fatal accidents in Greater Imphal	number per year	139 / 886					125 / 798	Statistical handbook of Manipur	PWD
3. Number of days of road unavailability due to flooding	number of days per year	21					0	PWD/RAMS	PWD
4. Length of Greater Imphal road network covered by the RAMS	km	0					2000	PWD/RAMS	PWD
5. Implementation of the Road Maintenance Fund	Y/N	N					Y	PWD/RAMS	PWD
Intermediate Results Indicators:									
1. Length of roads reconstructed according to climate-resilient design standards	km	0					547	Civil works / CSC contracts	PWD
2. Length of Greater Imphal road network meeting IRC road safety standards	km	0					547	Civil works / CSC contracts	PWD

Project Objective (PO):	**To improve the connectivity, safety, and resilience of the urban and sub-urban road and drainage networks in Greater Imphal, and to enhance the technical capacity and budgetary sustainability of Manipur's Public Works Department**								
Indicator Name	**Unit of measure**	**Baseline Data 2023**	**Cumulative Target Values**				**2029**	**Data source / Methodology**	**Responsibility**
			2025	**2026**	**2027**	**2028**			
3. Length of drainage constructed	km	No					490	Government of Manipur	PWD
4. Number PWD engineers trained to the asset management system	number	0					5	PWD/RAM\S	PWD
5. Implementation of community-based maintenance groups	number of groups	0					4	PWD/RAMS	PWD

(7) Annex 2: Detailed Project Description

7.1 **Sector context.** Road transport is the lifeline of the people of Manipur as the principal means for transportation of people and goods over both and short distances. The existing road network in Manipur has a total length of 18,437 km, including 1,724 km of national highways, 764 of state highways and 11,759 km of rural roads. Besides, there are around 10,300 km of Public Works Department (PWD) roads. Out of the total road length of 2044 km within the Greater Imphal area, 547 km has been shortlisted for the project.

7.2 The existing pavement surface of Manipur and Greater Imphal road network is in flexible, asphalt type. A survey on pavement condition carried out by visual inspection to assess the deterioration of the road pavement, shoulders and embankment in the project area (Greater Imphal), found that the network is in fair to poor condition, according to World Bank standards. Pavement damage, including cracking and pothole, were found in the poor state of road stretches, some of few roads not having wearing course. Current road conditions are presented in the table below.

Table 5: Project road - pavement conditions (in %)

Pavement condition	Imphal West	Imphal East	Highway South	Total
Poor	66%	68%	64%	67%
Fair	33%	24%	33%	29%
Good	1%	8%	3%	5%

7.3 This deterioration is caused by several factors, including the high frequency of heavy rains, the low bearing capacity of soil, the lack of proper road drainage, the asphalt pavement not very resistant to stagnant water which infiltrates and weakens its structure, and an inadequate level of routine and periodic maintenance. These have direct impacts on the traffic conditions, creating important congestion and accidents during the rainy seasons. It is estimated that, on average, Imphal road network is not available between 14 and 21 days per year due to the waterlogging.

7.4 **Road maintenance in Manipur.** The actual amount on road maintenance expenditure in the past few years is far less than the required amount for maintenance which needed to maintain the good condition of road. The budget for maintenance provided for the year 2021 was USD 12.5 million against the requirement of USD 113.8 million which is 9% of the required fund. Similarly, less than 10% of the required fund for maintenance were provided during the year 2020 and 2019.

Table 6: PWD Manipur annual maintenance budget (Manipur road network)

Item	FY 2017-2018	FY 2018-2019	FY 2019-2020	FY 2020-2021	FY 2021-2022
Length of Road maintained by PWD	9158.31 km	9158.31 km	9158.31 km	10305.31 km	10305.31 km
Estimated Budget requirement (in MUSD)	85.26	91.65	98.52	105.90	113.85
Road maintenance budget (in MUSD)	19.75	15.62	13.62	10.62	12.50
Road maintenance expenditure (in MUSD)	13.00	15.00	9.37	10.25	10.25
Percentage of Actual Expenditure vs Estimated Budget Requirement	15.25%	16.37%	9.50%	9.68%	9.00%

7.5 **Pavement design.** Concrete road construction offers several benefits. Firstly, concrete roads have a longer lifespan, lasting 20-40 years on average, compared to asphalt which has a shorter lifespan of around 10 years, requiring more frequent re-laying or repairs. Concrete roads are also better suited for high truck volumes as they can withstand the weight and pressure more effectively, avoiding pavement rutting. Concrete is a resilient material that is more resistant and durable than asphalt, which tends to become brittle over time. Additionally, concrete is considered a greener option as its production creates less environmental pollution, and vehicles tend to have better fuel efficiency on concrete. Moreover, concrete is made from limestone, a widely available resource.

7.6 **Concrete vs asphalt lifecycle costs.** Although costs associated with concrete roads, both in terms of installation and repair, are generally higher compared to asphalt, the gap tends to diminish and even reverse as oil costs increase. Considering the entire lifecycle of construction and maintenance over a period of 30 years, concrete is a more economical option for road pavement in Manipur, as illustrated in the table below.

Table 7: Asphalt and concrete pavement lifecycle costs - Manipur

Type of pavement	Initial construction cost (per lane/km)	Maintenance cost for 30 years (per lane/km)	Lifecycle cost for 30 years (per lane/km)
Asphalt	$ 0.136 million	$ 0.196 million	$ 0.332 million
Concrete rigid pavement (average)	$ 0.134 million	$ 0.019 million	$ 0.153 million
Saving	$ 0.002 million	$ 0.177 million	$ 0.179 million

7.7 Based on these data, the total annual cost of maintenance for the project network would raise at USD 0.4 million, to be compared with the current USD 4.2 million, corresponding to an annual saving of USD 3.8 million.

7.8 **Project road maintenance plan.** The main drawback of concrete roads remain that repairing is a more challenging task as holes or cracks cannot be simply patched; instead, entire slabs must be replaced, except for ICBP (Interlocking Concrete Block Pavement). The following maintenance plan will be closely monitored with the Road Asset Management System that will be implemented under the project:

(i) **Routine Maintenance**: The following task/activities which do not require any skilled workmanship or special tools come under this subcategory.
   a. Routine cleaning of the pavement and shoulders, removal of debris or garbage and vegetation growth on pavement and shoulders. Cutting/ trimming of grass, plants on the shoulders or medians etc. including disposal of the refuge/garbage at suitable pre-defined locations.
   b. Cleaning of open drains, inlets to covered drains / chambers, culvert points etc. Removal of objects blocking/ clogging the entry point/ inlets (any earth, stone, vegetation, garbage, or other material). Restoration of drains to their proper shape so water can flow easily,
   c. Cleaning and removal of any obstructions to the road signages ensuring clear visibility of the signages,
   d. Painting of Road Furniture like Railings, Parapets, Kerbs etc. with normal synthetic/emulsion paint.
   e. Planting and maintenance of roadside tree/vegetations.
   f. Updating / information to the road agency of any hazardous or potentially dangerous damages, obstructions on the road which require immediate attention of the road agency including arrangement of temporary barricades for warning of the road users.

(ii) **Periodic/ Special Maintenance.** This category shall comprise of those activities which require skilled workmanship, heavy machinery, and special tools and plants. The items of task and activities to be included under this category and tools and plants required shall comprise of the following.
   a. Joint resealing
   b. Crack repair and cross stitching
   c. Spall repair:
   d. Full depth and whole slab replacement repairs
   e. Drain maintenance:

7.9 **Maintenance Contracts.** Two main options of performance-based maintenance contracts could be implemented in Manipur: Output and Performance Based Road Contracts (OPBRC) and Community Based Road Maintenance Contracts. Both contracts have advantages in implementing timely maintenance, saving substantial amounts of maintenance expenses that would otherwise be spent on rehabilitation and reconstruction. To ensure the successful implementation of these contracts, an effective Road Asset Management system (RAMS) will be established immediately after the construction of the road network. This system will facilitate the management and maintenance of the road assets. Under the project, the feasibility and design of performance-based contracts, and the implementation of pilot community-based maintenance contracts will be carried out in parallel of the development and implementation of the RAMS. Eventually, both OPBRC and CBM could be applied in combination after the lapse of maintenance period of main works contract, not only on the project roads, but eventually on the entire PWD road network as well. The scope of work and

contracting arrangement for both these contracts would have to be clearly defined to ensure there will be no overlapping.

7.10 **Community-based maintenance contracts.** Based on the proposed maintenance plan, community-based contracts would be appropriate for routine roadside maintenance (as detailed before) and minor repair, including the maintenance of concrete paver blocks (defective, broken, cracked paver blocks are removed and replaced and restored to original performance level). These maintenance tasks do not require a high level of technical knowledge nor heavy machinery. The community groups shall be provided basic tools for cleaning like shovels, pickaxes, hoes, wheelbarrows, brooms, rakes and bush knives etc. It may include customized tools like crowbars, rakes for side drains, axes, paint brushes and sandpaper. Safety equipment includes traffic cones, safety vest, first aid kit, boots, gloves and hats for workers.

7.11 The development of community-based maintenance contracts will be developed during the project implementation, as a pilot program on selected roads. The program first will confirm the choice of contracting option, likely to be “Community as contractor”, where the community, as a Community Contracting Agency (CCA), takes responsibility of organizing and implementing the works as would a contractor. The CCA as legally registered signs the contract / MOU directly with the road agency/department (here PWD Manipur), this latter providing adequate training and tools. The organization of the CCA, the financial mechanisms aspects related to payment and the link with the Manipur Road Maintenance Fund, and the final form of the contract will be defined during the project implementation.

7.12 **Output and Performance Based Road Contracts.** OPBRC would apply on periodic maintenance and where heavier works require appropriate level of skilled labour, materials and machinery: cracking, surface defect, joint defect, and other miscellaneous defects on conventional concrete slabs for instance. OPBRC contractors are paid on output basis (maintaining road at well-defined performance levels, in compliance with the contract) rather than on an input basis (item rate). The payment and incentive system is designed to promote compliance and performance. Payment is in general on a lumpsum basis, with exceptional cases where it is based on unit prices, such as for emergency work. This design delivers sustainable value for money road network and encourage contractors to develop innovative solutions to realize required output standards while minimizing inputs. Under the project, only feasibility and design of the OPBRC will be developed.

7.13 **Manipur Road Maintenance Fund.** One of the key sector issues in Manipur is inadequate maintenance funding for its road network. Actual maintenance funding for the FY2023-24 is barely 10 percent of the requirements. Due to this most part of the network is not adequately maintained and there is a “build-neglect-and rebuild” scenario prevailing. The big investments made in developing the network are not showing the intended benefits to road users due to premature failures and high travel costs and consequently offsetting the competitiveness of agriculture and businesses.

7.14 Recognizing the above issue, the Government of Manipur has taken the decision to set-up a “Manipur Road Maintenance Fund” to mobilize additional non-budgetary funds for repair, routine and periodic maintenance of roads in the State. The main source of funds to the Road Fund is a levy on the sale of Petrol and Diesel and one-time fee on the registration of new

Vehicles. The Road Maintenance Fund Act has provision of three main sources of funding (i) fuel surcharge, (ii) road tax/fees to be collected by the Transport Department, and (iii) tolls on bridges and other fines to be collected by PWD. A preliminary estimation of these fees is provided in the table below:

Item	Quantity	Cess on item	Amount in Millions INR (per/year)	Amount in Millions USD
Annual Sales of Petrol & Diesel 2022-23				
Petrol (liter)	151.15 (million/year)	₹ 2.00	₹ 302.30	
Diesel (liter)	206.77 (million/year)	₹ 1.00	₹ 206.77	
		Subtotal	**₹ 509.07**	**$6.36**
Annual sales of vehicles (2019)				
		Subtotal	**₹ 61.41**	**$0.77**
Resource monetization from Taxes & collection of Violation of MV Rules @30% of Total Calculation				
		Subtotal	**₹ 1.50**	**$0.02**
		Total	**₹ 570.50**	**$7.13**

7.15 The Road Maintenance Fund will be administered by a “Manipur Road Maintenance Fund Board” headed by the Honorable Chief Minister of the State and having representatives from key government departments as well as stakeholders such as transport operations and Non-Governmental Organizations (NGOs). The Board will be supported by a Secretariat. The Board will allocate funds under the Road Maintenance Fund based on the investment priorities under the rehabilitation and maintenance plans to be prepared through the Road Asset Management System (RAMS) to be established under the project.

7.16 The Road Maintenance Fund and Road Board will be set-up through an Act to be passed by the State Assembly and will be supported by Road Maintenance Fund Rules to be finalized during the project implementation.

(8) Annex 3: Economic and Financial Analysis

8.1 The objective of the cost benefit analysis is to identify and quantify the benefits and costs associated with the project with respect to the improvement of the selected urban roads of Greater Imphal and assess the economic viability comparing with and without project scenarios over an operating lifespan of 30 years and a construction period of 3 years. The cost – benefit analysis is carried out by using the discounted cash flow technique to obtain the economic internal rate of return (EIRR) and economic net present value (ENPV) for the proposed investments linked with the project. This is followed by a 'sensitivity analysis' carried out by increasing or decreasing the critical factors affecting the cost and benefit streams of the proposed project, in order to ascertain their effect on the economic feasibility indicators i.e. ENPV, EIRR. This cost benefit study is carried out using the overall guidelines stipulated by the Indian Roads Congress (IRC) and World Bank in Economic Evaluation of Highway Projects in India (SP – 30, 2009) and HDM - 4 Version 2 (World Bank) respectively.

8.2 **Methodology.** The project network is analyzed for the two situations: (i) without project situation, where the existing single, intermediate, two and four lane bituminous pavement project roads are considered as such in its present condition and without improvement. In this case the future traffic volume is assumed to continue to flow along the existing road only, (ii) with project situation, corresponding to the upgradation of existing road sections from bituminous pavement to concrete pavement with lined drain and appropriate other improvement works like alignment correction, pavement reconstruction, streetlights, traffic, signs lights, etc.

8.3 **Main parameters.** The project cost and benefits have been estimated for the project analysis period of 33 years, including 3 years construction period. At the end year of the analysis period, a residual value of 20% is considered. The discount rate is taken at 12%. Constant base year prices are used for economic evaluation. Since the project costs such as capital, vehicle, consumables, etc., are based on the market prices, these costs have been converted into economic costs by applying appropriate factors established for resource costs. For this, all the costs items (under 'with' and 'without' project cases) estimated at base year prices are adjusted for transfer payments such as taxes, duties and subsidies on materials and equipment. Standard conversion factor (SCF) of 0.9 for road construction and 0.98 for road maintenance has been used for converting the cost estimates at market prices to economic prices. The existing pavement characteristics have been used as input for the HDM4 model. These include road length, carriageway width, width of paved shoulders, existing pavement composition, climatic zone, speed flow type, Sub-grade CBR (California Bearing Ratio), roughness of the existing road (IRI), structural number and cracking, raveling and other pavement distress parameters.

Table 8: construction and operation program – main parameters

Item	Year/Value
Cost Estimation	December-2022
Total Evaluation Period (Years)	33 (3+30)
Construction Period (Months)	36 Months (03 Years)
Construction Start Year	1st April 2024
Construction End Year	31st March 2027

Operation Period (Months)	360 Months (30 Years)
Open to Traffic	1st April 2027
Operation End Year	31st March 2056
Phasing of Construction Cost (%)	
Year 1 (2024-2025)	30%
Year 2 (2025-2026)	40%
Year 2 (2026-2027)	30%

8.4 **Traffic.** To understand the characteristics and the volume of traffic using the project network, traffic volume on existing road network were collected through primary surveys and projection has been made. Through traffic counts, data were collected, processed and analyzed to estimate the average daily traffic, annual average daily traffic, hourly variations, directional distribution and traffic composition per mode. Origin/Destination surveys were carried out to understand the travel demand pattern in the project area (using a zoning system), and the distribution by purpose and frequency. Turning movement counts surveys were also carried out.

8.5 The traffic demand assessment relies on applying elasticities of economic and demographic indicators to the transport demand based on the historical growth in vehicle registration. These indicators include: (i) Population of Manipur, (ii) Gross State Domestic Product (GSDP), (iii) Net State Domestic Product (NSDP), (iv) Per capita income (PCI). A relation was established between the vehicle registration data, the population, the PCI, the NSDP and the GSDP, and trends were analyzed using regression tools. This resulted in traffic growth rates to be adopted for the traffic demand forecasts.

Table 9: Adopted growth rates estimates (in %)

Mode	2021-25	2026-30	2031-35	2036-40	2041-45	> 2045
Tractor + Trailer	5.73	5.15	4.64	4.17	3.76	3.38
Three-Wheeler	5.73	5.15	4.64	4.17	3.76	3.38
Two-wheeler	5.51	4.96	4.46	4.02	3.62	3.25
Minibus	1.13	1.01	0.91	0.82	0.74	0.67
Car	6.67	6.01	5.40	4.86	4.38	3.94
2 axle Truck	6.09	5.48	4.93	4.44	4.00	3.6
3 axle truck	6.09	5.48	4.93	4.44	4.00	3.6
Bus	1.13	1.01	0.91	0.82	0.74	0.67
MAVs	6.09	5.48	4.93	4.44	4.00	3.6
LCV	5.73	5.15	4.64	4.17	3.76	3.38
Mini LCV	5.73	5.15	4.64	4.17	3.76	3.38

8.6 **Capital cost.** The total capital costs (including road works, bridges, culverts and utilities, land acquisition, resettlement and rehabilitation, environment cost, utility shifting, quality and project development charges) at current prices with contingency costs for road works and structures have been considered. The financial costs of the project road have been converted into economic costs by using a standard conversion factor of 0.90, to construction costs (road works and structures), land acquisition, R & R, environment cost and utility shifting. The total project costs amounts to **INR 26,500 million.**

8.7 **Routine and periodic maintenance.** The various maintenance costs have been divided into two parts: routine and periodic maintenance. The salient features and construction policy for both types of are mentioned below.

Table 10: maintenance plan of the existing road network

Type	Description	Cost Per km (INR)	Frequency
Routine Maintenance	Potholes repairs, sealing of cracks	450,000	Yearly
Periodic maintenance (Renewal coat)	Base correction, Potholes repairs, and renewal coat with SDBC (semi-dense bituminous concrete)	530,000	Every 5th Year

Table 11: maintenance plan of the proposed road network

Project Component	Maintenance Type	Description	Cost Per lane km (INR)	Frequency
Interlocking Concrete Block Pavement	Routine	Storage Maintenance	21,665	Yearly
	Periodic	Damaged Maintenance	106,785	Every 5th Year
Rigid Pavement/ Short Panel Concrete Pavement/ White topping	Periodic	Sealing of Contraction/ construction and longitudinal joint; Crack sealing, joint spalling	79,404	Every 5th Year
	Periodic	Repair of damaged Rigid pavement	68,775	Every 10th Year
Drain Maintenance	Routine	Cleaning of obstruction, debris and blockage, Desilting, Clearing of weeds	10,271	Yearly
	Periodic	Repairing of lining immediately at the commencement of damage or deterioration / replacement of grating	46,970	Every 10th Year
Misc. Maintenance item	Periodic	Road safety signage	19,010	Every 10th Year
	Periodic	Road lighting	42,469	Every 10th Year
	Routine	Road cleaning	678	Yearly

8.8 **Economic benefits** of the project investment include (a) savings in vehicle operating costs; (b) savings in travel time due to increased travel speeds; (c) reduced injuries and casualties associated with road accidents, due to improvements in road width and geometry, pavement and signage on project roads; (d) savings on Green House Gases (GHG) emissions (CO_2) by the road traffic, (e) savings in flood damage, and (f) wider economic effects. In terms of quantitative cost-benefit analysis, only benefits of (a), (b), (c), (d) and (e) are calculated and included.

(i) **Savings in vehicle operating cost.** By widening (to 3.75m-IRC standard lane, when required/possible – no additional lane is planned) and improving the physical conditions of the project roads (higher IRI – international roughness index, from 4-6 -fair to poor, to 2 - very good), the investment will reduce congestion, improve

vehicle fuel efficiency, and reduce vehicle wear-and-tear while traveling on the project roads. HDM-4 model estimates the VOC of for each type of motorized vehicle based on estimates of their speed, travel time, fuel efficiency based on speed and road surface quality.

For non-motorized traffic, road condition can affect the amount of effort and energy required by the human- or animal-drawn vehicles. Rougher roads demand greater exertion, time and additional energy intake by the operators of the vehicle. VOC savings are estimated based on market price differentials levied on good and poor condition roads.

(ii) **Savings in travel time.** Road width and condition have a major impact on traffic speed. The model estimates the value of travel time (VOTT) for passengers and goods in transit for both motorized and non-motorized vehicles. Travel time, or journey time, savings are generally considered to be the most important component of transport projects designed to improve transport route and network efficiency. Reduction in congestion and lower travel times therefore represent the majority of road infrastructure benefits. The time value per passenger is estimated based on per capita income of the employed population in the project area. The value of cargo delay is valued as the opportunity cost of capital of the cargo.

Table 12: socio-economic parameters – motorized vehicles– HDM4 model

Vehicle Costs at Economic Prices									
Vehicle type	Unit cost (Rs.)			Percent	Time value (per hour) in Rs				
							Passenger*		Cargo time (INR/hr)
	Vehicles	Tires	Annual Overhead	Annual Interest	Maintenance Labour (INR/hr)	Crew cost (INR/hr)	Working	Non-working	
Car	405000	3330	20250	9%	46.00	0.00	117.0	35.0	0
2-Wheeler	43200	1530	2160	9%	32.00	0.00	84.0	25.0	0
Minibus	720000	4050	36000	9%	42.00	120.00	67.0	20.0	0
Bus	1350000	7000	67500	9%	42.00	120.00	67.0	20.0	0
LCV	495000	4050	24750	9%	42.00	50.00	0	0	3.0
2 Axle Truck	1440000	8730	72000	9%	42.00	60.00	0	0	7.0
3 Axle Truck	1620000	8730	81000	9%	42.00	60.00	0	0	7.0
Multi Axle Truck	2250000	8730	112500	9%	42.00	60.00	0	0	16.0
Three-Wheeler	70000	1530	3500	9%	32.00	50.00	84.0	25.0	0
Tractor - Trailer	600000	10000	30000	9%	42.00	50.00	0	0	3.0
Petrol or Fuel (Rs/ltr.)	48.28								
Diesel (Rs/ltr.)	49.2								
Lubricant (Rs/Litre)	102								

Table 13: socio-economic parameters – non-motorized vehicles– HDM4 model

Vehicle Type	Purchase Cost	Crew Wages (hr)	Passenger Time (per (hr)	Cargo Holding (hr)	Energy Used (MJ)	Annual Interest (%)
Cycle/Bicycle	2700	50	0	0	0	9
Cycle Rickshaw	10000	40	30	0	0	9
Animal Drawn	20000	40	0	5	0	9

(iii) **Reduced road accidents.** Road widening, correction of geometrics, speed controls through imposition of traffic calming measures, all lead to reduction in accidents on roads. It is therefore important to quantify the same for inclusion in the analysis, as the project cost includes the investments made towards ensuring safer roads for traffic.

Table 14: statistics on road safety - Manipur

Accident data	Imphal West	Imphal East	HSD
Fatal	55	19	17
Injury	161	121	72

The table below provides the costs estimates due to road traffic crashes in India across various studies. Accident costs comparison based on the; 1) IRC SP-30 2019, 2) iRAP Tool Kit, and 3) Socio Economic Costs of Road Accidents in India – A Study undertaken by the IIT (Indian Institute Of Technology), Delhi, and DIMMTS (extract of costs were taken from the presentation made at CSIR-CRRI in Oct 2020).

Table 15: Economic cost for different types of accidents

Economic Cost for Different Types of Accidents per Victim in INR					
Sr. No.	Category of Accident	Economic Cost of Accidents (As per IRC: SP:30-2019	Economic Cost of Accidents (As per iRAP Equations)	Socio-Economic Cost of Road Accidents in India - DMITS and IIT, presented at CSIR-CRRI -Oct 2020.	Adopted Accident Costs for ECA (with 5% escalation each year)
		2019-2020	2019-2020	Oct-2020	Year 2022
1	Fatalities	13,25,049	68,74,230	91,16,363	100,50,790
2	Major /Serious Injury	4,32,651	-	3,64,398	4,01,748

(i) **Savings in Greenhouse Gases (GHG) emissions.** Annual GHG emissions (in ton equivalent CO_2) are estimated with the HDM4 model, for both with and without project scenario. Emissions depend on several parameters, including vehicle speed, fuel consumption, traffic volume and composition and geometry of the road.

(ii) **Savings in flood damage.** In Imphal, floods are among the most common and destructive natural hazards, causing extensive damages to infrastructure, public and private services, environment, and economy. The project road is spread over the Imphal valley and as per hydrology study, it was found that about 187.5 km of road from proposed road length (which is about 35% of total road length) is used to be submerged during heavy precipitations. The poor drainage system led to spread over the storm water on the road and in the vicinity causing flood. The following is the direct and indirect damages due to the flood situation in the project area: (i) Damages of the houses/ buildings (ii) Income loss of resident and from business, (iii) Increase in health expenses of residents due to water prone disease.

The construction of 547 km of both side stormwater covered drains will address issues related to recurrent floods by managing flood intensity. The stormwater cover drain to be implemented along with the proposed road will channelize the storm water during precipitation and led it to the out fall (river), resulting savings in the flood damage cost incurred. The benefits are estimated at a total of INR 566 million per year, broken down as follows:

Table 16: Savings in resident flood maintenance costs (in INR)

Factors	Value	Unit	Comment
Annual residential flood maintenance cost per household due to flood	121	72	Includes the cleaning of debris, maintenance & painting of damp area. The cost is based on local enquiry along the road alignment.
Length of road network affected by flood	187.50	km	
Number of affected houses			On average 50 houses as per Topography Survey for per km of road
Total amount of residential building maintenance work such as debris removal, plastering, painting and cleaning	**234**	**million INR/year**	

Table 17: Savings in additional road maintenance costs (in INR)

Factors	Value	Unit	Comment
Length of road network affected by flood	187.50	km	
Routine and periodic maintenance (without project scenario) on the affected network	104	million INR/year	From Government yearly budget for road maintenance.
Additional cost incurred in routine maintenance due to after-flood damage	25	million INR/year	Estimated at 30% of the initial cost
Routine and periodic maintenance (with project scenario) on the affected network	**75**	million INR/year	
Savings in maintenance costs (without vs with project scenarios)	**55**	million INR/year	

Table 18: Reduced income loss to residents and businesses (in INR)

Factors	Value	Unit	Comment

Manipur NSDP per capita income	84,746	INR per year	
Manipur per capita daily income	235	INR/day	
Imphal per capita daily income	471	INR/day	Taken as twice as much
Average household daily Income	942	INR/HH/day	Considering 2 per family
Number of affected households	9,375	per year	
Average working days lost	30	Days/year	
Estimated annual income loss	**265**	**Million INR/year**	
Number of affected businesses	1000	shops	
Average daily profit	471	INR/day	1 person per family
Average working days lost	30	Days/year	
Percentage of profit affected during flood	50%		
Income business losses during the flood period	**7**	**Million INR/year**	
Total economic losses	**272**	**Million INR/year**	

Table 19: Savings in health expenses for residents (in INR)

Factors	Value	Unit	Comment
Number of affected households	9,375	per year	
Number of affected households affected by water-borne diseases	4,688	per year	Taken as 50%
Doctors fee including medicine	1000	INR	INR 500 + INR 500
Annual loss due to health issues	**5**	**Million INR/year**	

(iii) **Wider economic effects.** The project will bring better connectivity of the adjacent villages and settlements, better access to market, health care, education, business centers, livestock market, dairying, agriculture, shopping, and religious and cultural places. The proposed project road is expected to bring positive benefits and act as a development stimulant for the community in overall socioeconomic development.

8.9 **Results of the Economic Analysis.** At a discount rate of 12 percent, the project is estimated to generate an economic net present value (ENPV) of INR 28,560 million and yield an economic internal rate of return (EIRR) 22.9 percent, exceeding the discount rate of 12 percent. Therefore, the project investment is economically justified.

Table 20: Outcome of the Economic Analysis

Scenario	EIRR (%)	ENPV (INR million)
Base case	22.9	28,560
Base case + 15% increase in costs	20.2	24,000
Base case + 15% decrease in benefits	19.8	19,720
Base case + 15% increase in costs and decrease in benefits	17,3	15,160

Table 21: summary of economic costs and benefits

Year	Capital Costs	Maintenance costs	VOC/VOTT	Road safety	GHG savings	Flood savings	Net benefits
2024	7,731	(267)	-	-	-	-	(7,464)
2025	10,693	(267)	(273)	-	(0)	-	(10,699)
2026	8,085	(267)	(280)	-	(1)	-	(8,100)
2027	0	(241)	6,713	70	3	566	7,592
2028	0	(241)	7,731	73	5	594	8,645
2029	(317)[4]	(241)	7,600	77	5	624	8,864
2030	0	(241)	6,858	82	4	655	7,840
2031	677	(267)	6,453	88	3	687	6,822
2032	-	(241)	6,380	95	3	715	7,435
2033	-	(241)	6,259	102	3	744	7,349
2034	(317)	(241)	6,060	110	3	773	7,504
2035	-	(241)	5,665	117	3	804	6,830
2036	638	(267)	5,358	126	2	836	5,951
2037	-	(241)	4,959	134	2	862	6,198
2038	-	(241)	4,451	142	1	887	5,723
2039	(317)	(241)	4,257	151	1	914	5,881
2040	-	(241)	3,953	159	1	941	5,296
2041	677	(267)	3,565	168	1	970	4,294
2042	-	(241)	3,457	176	1	989	4,864
2043	-	(241)	3,359	183	0	1,009	4,793
2044	(317)	(241)	3,266	190	0	1,029	5,044
2045	-	(241)	3,043	198	(0)	1,050	4,532
2046	638	(267)	2,731	206	(1)	1,071	3,635
2047	-	(241)	2,690	214	(1)	1,081	4,225
2048	-	(241)	2,589	221	(1)	1,092	4,143
2049	(317)	(241)	2,422	229	(1)	1,103	4,311
2050	-	(241)	2,138	235	(2)	1,114	3,727
2051	677	(267)	1,695	242	(2)	1,125	2,651
2052	-	(241)	1,578	248	(3)	1,136	3,201
2053	-	(241)	1,370	252	(3)	1,148	3,009
2054	(317)	(241)	1,170	257	(3)	1,159	3,141
2055	-	(241)	779	262	(4)	1,171	2,449
2056	(2,044)	(267)	(483)	267	(5)	1,183	3,273
Total	**25,870**	**(8,197)**	**117,512**	**5,076**	**14**	**28,031**	**132,959**

[4] Recurrent capital expenditure during the operation period correspond to savings (positive sign) or additional cost (negative sign) in heavy maintenance or renewal.

(9) Annex 4: Environmental and Social

9.1 **Biodiversity and Ecosystem Services Considerations in the Project. Background.** AIIB policy on ESS 1 para 29 stipulates that any project funded by AIIB financing shall consider direct, indirect, and cumulative project related impacts on biodiversity and ecosystem services, for example, habitat loss, interference with migratory routes or wildlife movement, degradation and fragmentation, invasive species, overexploitation, hydrological changes, nutrient loading, pollution, and accidental take, as well as projected climate change impacts.

9.2 MURDAMIP project, as stated in the IEE and based on the site visits, had confirmed that the proposed road rehabilitation project will not involve any construction of new alignment of the road, expansion of road network/capacity and there will be no proposed development at the notified/protected areas like reserved forest, wetlands, wildlife sanctuaries or national parks and will not require diversion or clearance of the forest area. The impacts of these activities on the environment are limited to the immediate vicinity of the road alignment in the urban and peri-urban area and the land use pattern of the project area is predominantly built-up urban area (86.4%), along with some stretches passing through agricultural or open area (13.35%) including 'neglected' waterbody such as at Lampelphat and Hiengangpat. No expansion or acquisition of land is proposed to be undertaken in the waterbody or wetland for this project. The road rehabilitation in this area will only be occurred at the existing intervillage road perimetric to the waterbody. The land clearing that will affect avenue plantations will be revegetated in cooperation with Forest Department and its survival rate will be monitored. There are no heritage trees found in the project area as per IEE. In summary, there will be no habitat loss or degradation and fragmentation of habitats as per the policy.

9.3 **Migratory Birds and Ecosystem Services.** With regards to the interference with migratory routes or wildlife movement as per the policy, the IEE reported that the greater Manipur area -beyond the project footprint- forms part of the Central Asia Flyway and East Asia Flyway for migratory birds. However, project area itself is not part of any notified important bird area as indicated by superimposed data maps using IBAT (Integrated Biodiversity Assessment Tool) by IEE consultant. And the project is not impacting any critical habitat based on the critical habitat criteria defined by other MDBs, also from the expert observation during IEE ecological study. The criteria are: a) Habitat of significant importance to Critically endangered or Endangered species, as listed in the IUCN (International Union for Conservation of Nature) Red List of threatened species or equivalent national approach b) Habitat of significant importance to endemic or restricted – range species c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species d) Highly threatened of unique ecosystem e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity valued described above in (a) to (d).

9.4 In project are there is a road rehabilitation project at an existing perimetric road of the waterbody named Lampelphat in Imphal city that is reported to be visited by resident and migratory birds. However, Lampelphat waterbody is not a notified wetland as per the Indian regulation and this area is already occupied with other physical infrastructures such as sewage treatment plants and other buildings. There are around 9 other similar waterbody or wetlands in the vicinity of Greater Imphal valley area. The migratory bird is not a land based or terrestrial animal so that they can find another waterbody quickly without limitation as in land. Therefore, Lampelphat area is not habitat significant importance to migratory birds as per the critical

habitat screening above. The project will only rehabilitate the existing intervillage road within this area and will not involve new development that will be impacting natural habitats.

9.5 On the other hand, there is an opportunity for the project to contribute positively to this regard. Currently there is an ongoing Rs 650 crore Lampelphat Waterbody Project (LWP) in Imphal Valley undertaken by the state's Water Resources Department (WRD) to rehabilitate the wetland area there. The primary objective of LWP is to develop an Integrated Flood Risk Management, to ensure water security, catchment area management and to promote eco-tourism activities. This is a good example of nature as infrastructure considering the ecosystem services provided by the waterbody. Also, there have been already promising results of ecological revival, with increased sightings of birds flocking to the water body cited in several articles. The project activities will not construct new road alignment or expansion within the waterbody area; and EAP PWD will coordinate with the LWP project when undertaking rehabilitation works on the road passing through Lampelphat area to minimize impact. And as per the EMP it will be scheduled in a way to avoid the period of the arrival of these birds in the area. This will become part of the capacity building plan of the project for the EAP_PWD staff and the contractor. In summary, the project has considered its interference with possible migratory routes and ecosystem services as per the policy.

9.6 **Potential Nutrient Loading**. The project has also considered the potential increased in the nutrient loading to the receiving water body as potential indirect impact from improved drainage system from the Project. This was found and discussed during appraisal. The storm water will flow to Imphal River downstream then to the Loktak Lake National Park 16 km southwest of the Imphal City.

9.7 The IEE study had collected water quality sampling to more than 10 locations in project area in Imphal city as a baseline condition and most of the water quality parameters analyzed are quite good shown by below polluted level of BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), Nitrate and Phosphate. Water quality sampling at the Upstream area of Loktak Lake is not reported in the IEE report but it must be available at State's Environmental Agency.

9.8 Although Loktak Lake is not located at the project footprint, it is considered as a project's area of influence of the MURDAMIP project. The Flood Management Plan Study under component B of the project during implementation phase will incorporate water quality considerations into the Feasibility Study and Detailed Engineering Design report by collecting more comprehensive water quality sampling or data from the catchment/watershed area, from Imphal City and from the upstream area of the Loktak Lake. The TOR for The Flood Management Plan Study has incorporated this aspect.

9.9 The study could also formulate the proposed mitigation measures such as by installing a sedimentation basin or a basic water treatment plant facility downstream of Imphal City main drainage system. The Flood Management Plan study shall also collaborate with the State's Water Resources Department (WRD) of PWD who has on ongoing Integrated Flood Risk Management project in Lampelphat area as a good example of Nature as Infrastructure project.

(10) Annex 5: Paris Agreement Alignment

10.1 The Bank has committed that it will fully align its operations with the goal of the Paris Agreement (PA) by July 1, 2023. As the Project is intended to commence implementation after this deadline, it is important to capture the potential climate considerations of the Program. The AIIB's PA methodology for the road sector provides an approach to assess the mitigation (labeled BB1, in the Joint MDB methodology) and adaptation (labeled BB2, in the Joint MDB methodology) alignment of the Program. To be considered fully aligned with PA, the Program must meet both PA's climate mitigation and adaptation goals.

10.2 **PA Alignment in Climate Mitigation (BB1).** The Project falls under the Framework's 'universally aligned' list of activities as it is not a greenfield infrastructure (road reconstruction project), and it will not contribute to an increase in transport capacity.

10.3 **PA Alignment in Climate Adaptation (BB2).** The AIIB's methodology for assessing the investment's climate adaptation alignment with the PA consists of the following steps:

(i) Step 1: Climate risk and vulnerability assessment. Identify and assess physical climate risk to determine whether the railway infrastructure and its users are vulnerable to climate hazards;

(ii) Step 2: Climate adaptation and resilience measure definitions. Propose measures to address the identified physical climate risks and support the delivery of climate-resilient road infrastructure; and

(iii) Step 3: Consistency with broader and national context for climate resilience. Ensure that the road operation is consistent with the policies/strategies/plans for climate adaptation and resilience at the national, regional, local, city, level as considered relevant and/or with private sector or community-driven priorities.

10.4 **Step 1: Climate risk and vulnerability assessment.** The climate risk and vulnerability assessment has been carried out using the Aware tool. The exposure and sensitivity assessment found that the climate risks that could materially affect this project would be precipitation increase (high risk), rain-induced floods (high risk) and rain-induced landslides (high risk).

10.5 This climate risk scenario may damage the Project's infrastructure or render it unusable during certain periods. Accordingly, the Project plans to implement features and technologies to adapt to such risks.

10.6 **Step 2: Climate adaptation and resilient measures.** The Detailed Design (DPR) of the Project has considered climate change adaptation measures to address increased risks of increased precipitation, flooding, and landslide. Design measures that have been considered to address such risks are the following:

(i) Extreme precipitation, flooding: reconstruction of the existing asphalt-paved roads into rigid concrete pavements more resistant and more permeable to rainfall, installation of a storm water management system.

(ii) Landslide: unlike other sections that will be reconstructed into rigid pavement, roads along the riverbank (prone to landslide) will be rebuilt in

flexible pavement. The road structure will also be strengthened along the river embankment.

10.7 **Step 3: Consistency with Broader and National Context for Climate Resilience.** The project contributes to India's NDC (Nationally Determined Contributions) goals on adaptation by considering climate change risks (e.g., extreme precipitation, flooding) and incorporating adaptation measures into the design of the program.

10.8 In line with the NDC recommendations, the State of Manipur has prepared the Manipur State Action Plan On Climate Change (SAPCC) with an objective to address the adaptation challenges by improving the adaptability of the public through developing suitable infrastructure. According to SAPCC, "lack of connectivity has made the population in Manipur very much vulnerable and reduced their preparedness against disaster. The traditional land routes and inland waterways are lying defunct due to lack of public investment. High transportation cost has discouraged private investment in the state making it more resource starved and underdeveloped."

10.9 The SAPCC Manipur key strategy targets to enhance adaptive capacity for climate change impacts in urban sector as well to create sustainable habitat. Moreover, this mission also targets to enhance adaptive capacity for climate change impacts in urban sector like integrated rain water harvesting, recycling and reuse of waste water, waste recovery and disaster management, etc. as well as create sustainable habitat under the state mission. As more frequent rainstorms will overload the capacity of sewer systems, SAPCC encourages plans to install drainage systema and collection network.

10.10 Climate Mitigation (BB1) and Adaptation (BB2) alignment: The project team concludes that the Project is Paris-aligned.

(11) Annex 6: Gender Equality and Social Inclusion

11.1 With a value of 0.488 and above the world average, India ranks 123 (2019) in the United Nations' gender inequality index (GII)5, below neighboring Nepal and Sri Lanka but above Bangladesh and Pakistan. Similar to the Gini coefficient6, the GII indicates male and female inequality across health, empowerment and labor market dimensions. India, however, performed lower than the world average (0.943) in the UN Gender Development Indicator (GDI) where it measured 0.820 in 2019. The GDI is a ratio of the UN female and male human development indicators; if above 1 the human development indicator is higher for women than for men. With a score of 0.625, India also ranks 140 (2020) in the World Economic Forum's Global Gender Gap Index which measures gender gap across economic participation and opportunity, educational attainment, health and survival and political empowerment7.

11.2 India has signed Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) in 1980 and ratified it in 1993; it has not yet ratified the Optional Protocol to CEDAW8. India has endorsed the Beijing Platform for Action (BPFA) and committed to the Sustainable Development Goals (SDGs) in 2015. Government of India has made significant efforts to integrate the international principles and instruments into legislation and policy. In 1985, GOI established the Department of Women and Child Development as a part of the Ministry of Human Resource Development. Effective 16 February 2006, the Department has been upgraded to the Ministry of Women and Child Development. Within the Ministry, there are four autonomous organizations: i) National Institute of Public Cooperation and Child Development (NIPCCD); ii) Central Adoption Resource Agency (CARA); iii) Central Social Welfare Board (CSWB); iv) Rashtriya Mahila Kosh (RMK). They have been set up to foster women's empowerment and child development in India. Likewise, two Statutory Commissions: i) National Commission for Women (NCW); and ii) National Commission for Protection of Child Rights (NCPCR), have been established to safeguard the constitutional and legal rights of women and children, redress deprivation of their rights and promote gender justice and equality.9

11.3 In terms of labor market regulations, India's Equal Remuneration Act 1976 stipulates equal remuneration for same work or work of similar nature without discrimination of gender, caste or any other categories. The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 provides protection against Sexual Harassment and Abuse (SEA) of women at workplace and for the prevention and redressal of complaints of sexual harassment. Furthermore, the Child and Adolescent Labor (Prohibition and Regulation) Act, 1986 stipulates a minimum legal employment age as well as prohibits the engagement of adolescents in hazardous occupations. The Maternity Benefit (Amendment) Act 2017 raised the maternity leave from 12 weeks to 26 weeks—one of the highest in the world. However, the law is applicable to only those who work in a company with at least 10 employees.

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[5] United Nations Development Program; Human Development Report 2020; http://hdr.undp.org/sites/default/files/hdr2020_technical_notes.pdf
[6] A statistical measure to calculate economic inequality in a nation.
[7] World Economic Forum (2021); Global Gender Gap Report 2021: Insight Report, March 2021
[8] Optional Protocol is a separate treaty open to ratifications by States who are party to CEDAW Convention. OP-CEDAW creates access to justice for women at the international level, if justice is denied at the national level.
[9] https://sustainabledevelopment.un.org/content/documents/13091India_review_Beijing20.pdf

11.4 The National Family Health Survey-5 (NHFS) (2019-2021) demonstrates that women's participation in the formal economy is poor—among the surveyed women, only 25.4 percent worked in the last 12 months and were paid for their labor. In terms of women's political representation, only 14.4 percent of seats in parliament were held by women in 2021. GBV is another major policy reform area with almost one-third of the women in India between the age of 18-49 stated experiencing GBV (NHFS, 2021). Though mobility is the fulcrum connecting women to economic independence10, studies suggest that various gender norms, stereotypes and discrimination pose mobility challenges to women, resulting in lack of access to employment, market, health care and other facilities. Sexual harassment is another major barrier that women and girls face in safe access to transport services—in a 2019 survey of almost 10,000 women and girls in India, only less than 10 percent felt completely safe on public transport.11 The survey shows that women face high levels of sexual harassment while waiting for or using public transport.

11.5 Achieving gender equality and empowering women and girls is one of the 17 sustainable development goals (SDG 5) and foundational drivers of inclusive and sustainable development. In India, 83.3 percent of legal frameworks that promote, enforce and monitor gender equality under the SDG indicator, with a focus on violence against women, are in place (UN Women, 2021). However, only 44.3 percent of indicators needed to monitor the SDGs from a gender perspective are available, with data gaps in key areas such as unpaid care and domestic work and key labour market indicators (e.g., gender pay gap).

11.6 The Periodic Labor Force Survey (2019-2020) estimates the female-worker population ratio in Manipur to be approximately 26.8 percent (National Sample Survey Office India). Hence, proportion of women aged 15 and above involved in the labor market is above the national average. Moreover, the women in Manipur are found to participate in all social, religious, and socio-political gatherings, voice their issues, provide support in resolving intra-community conflicts and participate in community welfare activities along with men and exhibit strong identity and decision-making power. It is noted that women are also involved in traditional commercial activities in terms of running shops of petty businesses in the markets. In the Greater Imphal City, several big Ima markets (Mothers' market) have women managing all commercial activities. They are even found to hold important positions in these markets' management and governing bodies.

11.7 AIIB is committed to enhancing its contribution to gender equality by "increasingly incorporating gender considerations into projects, which can be mapped against SDG 5".12 The updated Environmental and Social Framework (ESF) has elevated the importance of gender equality and included new commitments to address gender-based-violence, amongst others. Consistent with AIIB's ESF, the Bank supports clients seeking to identify gender-specific opportunities, risks and impacts under its projects. In this respect, infrastructure projects present four areas where gender-specific issues may be identified: (i) in the design of the project, and its individual elements: (ii) in the construction of all the infrastructure components of the project; (iii) in the operation of the services supported by the project: (iv) in

[10] https://sutp.org/publications/approaches-for-gender-responsive-urban-mobility-gender-and-urban-transport-smart-and-affordable/
[11] https://safetipin.com/report/safety-audit-of-8-cities-safety-audit-reports-of-8-cities/
[12] https://www.aiib.org/en/policies-strategies/strategies/.content/index/_download/AIIB-Corporate-Strategy.pdf

the stakeholder engagement and consultation process carried out for the development of the design and for the definition of impact mitigation measures to be applied to the project.

11.8 The gender assessment for the Project has determined the possibilities of including gender-specific actions as part of the Project to improve outcomes and mitigate related risks in each area, the proposed, but not finalized, actions are the following:

11.9 For the introduction of gender specific designs, the Project will be adding street lighting, horizontal signaling, including pedestrian crossings, pedestrian walkways and vertical signing. All of these features, while not being specifically gender-sensitive will greatly contribute to a more equitable mobility for women as they are more predominantly proportionally pedestrians.

11.10 For the introduction of gender-specific actions applicable to the construction stages of the Project, the possible actions envisaged are linked to employment opportunities for women in the contracts associated with the construction. As mentioned above, the AIIB loan covers the construction and consulting supervision contracts related to the road network, and although the Indian legal framework affords some guarantees to women in the labour market, nonetheless, provisions will be included in the tender documents of the contracts financed by AIIB to preclude any employment or wage gender discrimination.

11.11 For the introduction of gender-specific actions applicable to the operation stage of the Project, community-based maintenance units/microenterprises will be created, trained and paid to perform the routine maintenance of the road network. These entities will have a mandate beyond the life of the loan and will be subsequently financed by the State’s budget through the Road Maintenance Fund. These entities will be largely composed of women, who will be trained not only on road maintenance activities but also on organization, management and accounting providing possible future opportunities in other businesses or activities.

11.12 For the stakeholder engagement, the Project has carried out culturally appropriate and meaningful consultations with women and vulnerable groups during the preparation and will carry out future targeted sessions with these groups during the implementation. The RP includes an analysis of potential impacts of the project on women and other vulnerable groups and recommend actions to mitigate impacts related to loss of livelihoods and safety and Gender Based Violence (GBV) related concerns.

11.13 The consultations will continue during implementation as the community-based road maintenance units/microenterprises are designed.

(12) Annex 7: Member and Sector Context

12.1 **Indian Economy.** India boasts the second-largest road network in the world, spanning approximately 6.3 million km, which includes 141,000 km of national highways, 171,000 km of state highways, and more than 6 million km of district roads and rural roads. This extensive network ensures seamless connectivity across various regions of the country. National Highways (NH) play a crucial role in India's economic and social development by facilitating efficient movement of goods and people and improving market access. Despite constituting only 2% of the total road network, they handle over 40% of the total traffic. The construction pace of NHs has consistently increased, with a notable rise from around 12 km/day in 2014-15 to about 28.3 km/day in 2022-23, thanks to the corridor-based National Highway development approach.

12.2 India roughly spends 4.5 percent of GDP on infrastructure, of which investment in roads and railways comprise of 54 percent and 41 percent respectively[13]. Earlier in FY2021, the government allocated USD 52 billion under the National Infrastructure Pipeline (NIP), apart from the traditional sources like the budgetary and extra-budgetary resources as well as private sector investment. The government unveiled a National Monetization Pipeline (NMP) to unlock the value of investments in public sector assets by tapping private sector capital and efficiencies. The FY2023 Union Budget continued the stimulus to the infrastructure sector by increasing capital expenditure in infrastructure investment by 33 percent, elevating the allocation for the Ministry of Road Transport and Highways by a substantial 68%. Projects in the real estate sector, connectivity, smart cities are also expected to benefit from the proposed budgetary allocations.

12.3 The Indian Government has been actively investing in the development of road infrastructure. Major initiatives like the Bharatmala Pariyojana aim to upgrade and expand the road network, including the construction of expressways, economic corridors, and feeder routes. The first phase of the program focuses on developing 34,800 km of highways, featuring 27 Greenfield corridors and India's longest expressway, the 1,386 km Delhi-Mumbai Expressway. Under the Pariyojana, 60% of projects are envisioned under the Hybrid Annuity Mode (HAM), 10% under the BOT (Toll) Mode, and 30% under the EPC mode. The roads and highways sector has pioneered several innovative public-private partnership (PPP) models and possesses a robust contractual framework compared to other sectors. These factors have attracted significant investments from private players. To further encourage private sector participation and foreign direct investment, the government has introduced several incentives, including covering the cost of project feasibility studies, providing land for the right of way and way-side amenities, facilitating utility shifting, and expediting environmental clearances.

12.4 **State of Manipur.** Transport infrastructure in Manipur plays a crucial role in connecting the state with the rest of the country and facilitating economic development. The state has been making efforts to improve its transport network, including roadways and railways, as planned in the strategic development plan Vision 2047.

12.5 Roadways are the primary mode of transportation in Manipur. The state has an extensive road network that connects various towns, villages, and districts. The National Highways, state highways, and district roads ensure connectivity within Manipur and with neighboring states.

[13] Global Infrastructure Hub. Accessed on May 04, 2023.

However, the challenging terrain and hilly regions pose significant challenges for road construction and maintenance. The government has been investing in the development and improvement of road infrastructure, including widening of highways, construction of bridges, and upgrading of rural roads to enhance connectivity and ease transportation.

12.6 Some major road projects recently/currently implemented, or in the pipeline, are as follows:

(i) Construction of Imphal Kangchup Tamenglong Road, under SASEC (South Asia Subregional Economic Cooperation) Road Connectivity Investment Program, constitutes a part of the Imphal-Tameglong-Haflong Road, connecting Manipur to Assam, which could be extended to Bangladesh. The first portion, constructed by PWD and financed by ADB, of the road (Imphal Kangchup Tamenglong) shortens the connectivity to Tamenglong by 42 km. The second portion (Tamenglong Haflong) is constructed by NHIDCL (National Highways & Infrastructure Development Corporation Limited) and financed by the Ministry of Road Transport and Highways (MoRTH). The two portions of the road provides the shortest connectivity to the East-West Expressway of the MoRTH, reducing the distance by 79.50 km.

(ii) Construction of the Imphal Ring Road (51.23 km), to match the exponential development of Imphal. The Ring Road will address the traffic congestion by providing rapid transport corridors with access to all major administrative institution and commercial centers. This project also aims to introduce electric buses/low floor green buses to promote economical, affordable Public Transport System.

(iii) Trans-Manipur Highway (803 km), to provide interior districts accessibility to the international border with Myanmar,

(iv) Liklang Pareng (322 km), providing direct and shortest connectivity among hill districts,

(v) Peripheral Road (310 km), connecting major tourist hotspots in the foothills areas to develop the tourism sector.

12.7 The state is also working towards improving its railway connectivity. Currently, Manipur does not have its own railway network, but plans are underway to connect the state through the proposed Jiribam-Imphal railway line. Once completed, this railway line will provide a vital link to the rest of the country and boost trade and tourism in Manipur. The project is expected to enhance connectivity and facilitate the transportation of goods and passengers.

12.8 However, the transport infrastructure in Manipur still faces challenges. The hilly terrain, frequent landslides, and inclement weather conditions can affect road and air travel. The state government is actively working on addressing these challenges by investing in infrastructure development, improving road maintenance, and enhancing connectivity to remote areas. Overall, the transport infrastructure in Manipur is gradually improving, with ongoing efforts to enhance road connectivity, and develop railway links. These developments are expected to contribute to the economic growth of the state, facilitate trade and tourism, and improve the overall quality of life for the people of Manipur.

(13) Annex 8: Country Credit Fact Sheet

13.1 **Recent Economic Development**. India is a lower-middle-income country, with a GDP per capita at USD 2500 and a population of ~1.4 billion in 2023.14 India's economy grew at an average annual rate of 7.4 percent between FY2014-15 and FY2018-19 but slowed down in the years before the pandemic following disruptions due to demonetization, rollout of goods and services tax, rural distress and stress in the financial sector.1516 India's GDP contracted by 5.8 percent in FY2020-21 (year ending March 2021) on account of stringent lockdown restrictions imposed during the first half of the year. With increased mobility and favorable base effect, the Indian economy grew by 9.7 percent in FY2021-22 and 7.0 percent in FY2022-23.17 The economy posted a strong growth of 8.2 percent during the first three quarters of FY2023-24. However, waning of the pent-up demand from the lockdown, weakening of exports and tighter fiscal and monetary policy impacting aggregate demand may generate some headwinds to the growth momentum.

13.2 Retail inflation averaged 6.7 percent in FY2022-23, well above the 4±2 percent inflation targeting band. Elevated food and fuel prices have contributed significantly to the rise in inflation which led the RBI (Reserve Bank of India) to increase the repo rate by a cumulative 250 basis points between May 2022 and February 2023. Inflation moderated to 5.4 percent in FY2023-24 leading the RBI to maintain a pause in the tightening cycle since April 2023.

13.3 Overall deficit moderated to 8.6 percent of GDP in FY2021-22 from a pandemic-induced deficit of 12.9 percent in FY2020-21, on the back of strong revenue collection, which allowed capital expenditure to overshoot its target. The deficit increased in FY2022-23 as expenditure growth outpaced revenue. During April 2023 to February 2024, the fiscal deficit of the central government reached 86.5 percent of the annual target, lower than previous year. Public debt inched up marginally to 82.7 percent in FY2023-24.

13.4 After posting a surplus in FY2020-21, the current account reverted to a deficit of 1.2 percent of GDP in FY2021-22 as merchandise imports surged while services exports remained stagnant. In FY2022-23 the current account deficit rose to 2.0 percent of GDP mainly due to higher merchandise trade deficit. The current account deficit reduced sharply in the first three quarters of FY2023-24 to around 1.2 percent of GDP mainly due to a contraction of merchandise trade deficit and improvement in services export. Remittances remained stable over this period. A drop in foreign direct investment was offset by a surge in foreign portfolio inflows. External debt stood at USD 648.2 billion (18.7 percent of GDP) in December 2023. India's reserve holdings stood at USD 643.2 billion as of April 12, 2024. Reserves remain adequate according to conventional measures.

13.5 In January 2024, Fitch affirmed India's outlook as stable, while retaining the BBB- rating, similar to S&P's rating in May 2023. In June 2020, Moody's downgraded India's rating to Baa3 with a negative outlook but revised the outlook to stable in October 2021 and retained the same rating and outlook in August 2023.

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[14] The income group classification is based on World Bank criteria. Data from WEO, April 2024.
[15] Data are based on fiscal years. Fiscal year 2021-22 (FY2021-22) begins on 1 April 2021 and ends on 31 March 2022.
[16] On Nov. 8, 2016, India's government announced withdrawal of the legal tender of INR500 and INR1,000 notes, which accounted for 86 percent of the value of currency in circulation, and introduction of new INR500 and INR2,000 notes.
[17] These numbers were revised by the IMF in its April 2024 WEO and may differ from Government of India's estimates released in February 2024.

13.6 **Economic Indicators.**

Economic Indicators	FY2020-21	FY2021-22	FY2022-23	FY2023-24*	FY2024-25*
Real GDP growth	-5.8	9.7	6.9	7.8	6.8
CPI Inflation (average, % change)	6.2	5.5	6.7	5.4	4.6
Current account balance (% of GDP)	0.9	-1.2	-2.0	-1.2	-1.4
General government overall balance (% of GDP)	-12.9	-8.6	-9.2	-8.6	-7.8
General government gross debt (% of GDP)	88.4	83.5	81.7	82.7	82.5
Public gross financing needs (% of GDP)	18.7	15.6	15.8	15.1	15.2
External debt (% of GDP)	21.5	19.7	18.4	18.7	18.5
Gross international reserves (USD billions) 1/	579.3	617.6	578.4	643.2	-
Exchange rate (INR/USD, EOP) 1/	73.5	75.8	82.2	83.4	-

Note: FY2022-23 ran from April 1, 2022, to March 31, 2023
* Denotes projected figures
1/Reserves and exchange rate are sourced from RBI and pertain to mid-April 2024.
Source: IMF World Economic Outlook April 2024, Reserve Bank of India, and IMF Country Report 23/426.

13.7 **Economic Outlook and Risks.** The economy is expected to grow at 7.8 and 6.8 percent in FY2023-24 and FY2024-25, respectively according to IMF. A weakening of the global economy and lagged effect of monetary tightening as a response to fighting domestic inflation would curb demand in the medium term. The government's subsidized food, fertilizer and gas distribution will help offset some of the effects of high inflation. High policy rates may constrain investment spending, although a robust public capital expenditure target can bolster growth. Agriculture growth may be subdued due to uneven monsoon and lower sown area while higher borrowing cost and commodity prices may impact the manufacturing sector.

13.8 Overall inflation is expected to moderate to ~4.6 percent in FY2024-25 due to the easing of commodity prices, past monetary tightening and softening of growth. In response to sustained inflation, the RBI continues to maintain a 'withdrawal of accommodation' stance, as of April2024.

13.9 General government fiscal deficit in FY2023-24 is expected to moderate slightly to 8.6 percent of GDP and further to 7.8 percent in FY2024-25 as tax revenues increase on the back of improved economic activity. Central government deficit is projected to moderate to 6.0 percent of GDP. Fiscal pressures could strengthen due to rising subsidy burden, hikes in policy rate increasing the cost of borrowing and roll out of populist measures in a pre-election year.

13.10 Public debt is expected to slightly moderate to around 82.5 percent of GDP in FY2024-25. In an environment of moderating nominal growth and higher interest rates, fiscal consolidation will be key to reduce public debt. Despite being high, India's public debt remains sustainable given favorable aided by having a long and medium maturity, being denominated

in domestic currency, and primarily held by residents. India's external debt is expected to remain stable.

13.11 The current account deficit is projected at 1.2 percent and 1.4 percent of GDP for FY2023-24 and FY2024-25 respectively. Resilient services exports, especially software services and lower commodity import bill will drive the improvement. Remittances may remain strong driven by a stable exchange rate.