



Technical Assistance Report

Project Number: 53195-002
Knowledge and Support Technical Assistance (KSTA)
August 2021

Nepal: Master Plan for Road Connectivity

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 6 August 2021)

Currency unit	–	Nepalese rupee/s (NRe/NRs)
NRe1.00	=	\$0.0084
\$1.00	=	NRs118.64

ABBREVIATIONS

ADB	–	Asian Development Bank
CRN	–	core road network
DOR	–	Department of Roads
HDM-4	–	fourth highway development and management model
km	–	kilometer
MOPIT	–	Ministry of Physical Infrastructure and Transport
NHN	–	national highway network
PIP	–	priority investment plan
SASEC	–	South Asia Subregional Economic Cooperation
SRN	–	strategic road network
TA	–	technical assistance

GLOSSARY

Core road network	–	Currently proposed for additionally budgeted periodic maintenance; includes sections of the strategic road network (SRN) and/or national highway network with annual average daily traffic equal to or more than 2,000.
National highway network	–	Reconfigured from the SRN and under the jurisdiction of the Department of Roads. National highway statistics for 2020–2021 indicate that the network has 80 highways with a total length of 14,923 kilometers (km), of which 3,537 km are under construction or planned.
Strategic road network	–	First introduced and developed in 1995, the SRN was under the jurisdiction of the Department of Roads. According to the last SRN statistics published (2018), the network included 15,366 km of road, of which 1,918 km were under construction or planned.

NOTES

- (i) The fiscal year (FY) of the Government of Nepal ends on 16 July. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2022 ends on 16 July 2022.
- (ii) In this report, “\$” refers to United States dollars.

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KNOWLEDGE AND SUPPORT TECHNICAL ASSISTANCE AT A GLANCE

1. Basic Data		Project Number: 53195-002	
Project Name	Master Plan for Road Connectivity	Department/Division	SARD/SATC
Nature of Activity	Capacity Development	Executing Agency	Ministry of Physical Infrastructure and Transport
Modality	Regular		
Country	Nepal		
2. Sector	Subsector(s)	ADB Financing (\$ million)	
✓ Transport	Road transport (non-urban)		1.50
		Total	1.50
3. Operational Priorities		Climate Change Information	
✓ Addressing remaining poverty and reducing inequalities		GHG Reductions (tons per annum)	0.000
✓ Accelerating progress in gender equality		Climate Change impact on the Project	Low
✓ Promoting rural development and food security		ADB Financing	
✓ Strengthening governance and institutional capacity		Adaptation (\$ million)	0.00
✓ Fostering regional cooperation and integration		Mitigation (\$ million)	0.00
		Cofinancing	
		Adaptation (\$ million)	0.00
		Mitigation (\$ million)	0.00
Sustainable Development Goals		Gender Equity and Mainstreaming	
SDG 5.b		Some gender elements (SGE)	✓
SDG 9.1, 9.4		Poverty Targeting	
		General Intervention on Poverty	✓
4. Risk Categorization	Low		
5. Safeguard Categorization	Safeguard Policy Statement does not apply		
6. Financing			
Modality and Sources		Amount (\$ million)	
ADB		1.50	
Knowledge and Support technical assistance: Technical Assistance		1.50	
Special Fund			
Cofinancing		0.00	
None		0.00	
Counterpart		0.00	
None		0.00	
Total		1.50	
Currency of ADB Financing: US Dollar			

I. INTRODUCTION

1. The knowledge and support technical assistance (TA) for the Master Plan for Road Connectivity will help enhance the planning and programming of transport sector investments in Nepal by supporting the (i) development of the national highway network (NHN) expansion plan, (ii) preparation of the priority investment plan (PIP) for 2023–2033, and (iii) capacity building of the Department of Roads (DOR).

2. This TA is included in the country operations business plan, 2021–2023 of the Asian Development Bank (ADB) for Nepal, and its objective is identified as one of the three pillars in ADB's country partnership strategy, 2020–2024: improved infrastructure by supporting road transport and logistics to strengthen domestic, regional, and international connectivity.¹

II. ISSUES

3. **Country context.** Nepal is landlocked, bordered to the north by the People's Republic of China, and to the east, south, and west by India. The country is divided into three physiographic areas: the mountains in the north, the hill and Siwalik regions in the middle, and the Terai (lowland plains) bordering India in the south. In February 2021, the United Nations Committee for Development Policy recommended Nepal's graduation from the least-developed country category after a preparatory period of 5 years, to be effective in 2026.²

4. **Transport sector in Nepal.** Transport connectivity in Nepal is a challenging and costly undertaking because of its natural terrain and geography. The transport sector comprises roads, aviation, railways, inland waterways, and ropeways. Road transport is by far the dominant mode and, along with air travel, is considered the major mode of transport for freight and passengers. Aviation plays an important role in maintaining international connectivity but the country's terrain as well as inadequate technology and operational skills are constraining its expansion. The transport movement through waterways and ropeways is negligible, whereas the railway network is being examined for expansion with bilateral support from India and the People's Republic of China.

5. **Existing road networks.** Road transport carries about 90% of freight and passenger traffic in Nepal and is considered the only mode of transport in Kathmandu Valley.³ Previously, the road network was classified as strategic road network (SRN) or local road network.⁴ The SRN, which consisted mainly of national highways and feeder roads, was reconfigured into 80 national highways and presented as NHN in the Statistics of National Highway 2020/21 in May 2021.⁵ The NHN, covering about 14,923 kilometers (km), is under the jurisdiction of the DOR and serves as the backbone for the physical and economic integration of the country, and of Nepal with its neighbors. However, less than half of these highways have bituminous pavements, which makes road maintenance a huge challenge.

¹ ADB. 2020. [Country Operations Business Plan: Nepal, 2021–2023](#). Manila; ADB. 2019. [Country Partnership Strategy: Nepal, 2020–2024—Promoting Connectivity, Devolved Services, and Resilience](#). Manila. The TA first appeared in the business opportunities section of ADB's website on 29 June 2021.

² United Nations. 2021. [The United Nations Committee for Development Policy Plenary 2021](#). New York.

³ The Kathmandu Valley covers the districts of Bhaktapur, Kathmandu, and Lalitpur.

⁴ The local road network comprises district roads, village roads, and other minor roads with a total length of more than 57,500 km; the jurisdiction is about to be devolved from the Department of Local Infrastructure to provincial and local government agencies.

⁵ Government of Nepal, DOR. 2021. [Statistics of National Highway 2020/21](#). Kathmandu. About 3,734 km out of 14,923 km are under construction and/or planned.

6. The DOR's strategic roads are maintained mainly through the DOR's own support capacity, which plans and carries out routine maintenance, recurrent maintenance, periodic maintenance, and emergency maintenance. The practice of performance-based road maintenance was introduced in Nepal in 2003. The Roads Board Nepal was set up in 2002 with the aim of providing sustainable funding for planned road maintenance. However, funding has not been sufficient to carry out periodic maintenance successfully. The 2007 PIP (paras. 12–13) showed that Nepal was losing \$1 billion equivalent in vehicle operation and rehabilitation because of lack of maintenance works. The DOR still needs to fully establish an efficient road asset management system.⁶ In addition to the yearly maintenance budget, the DOR has proposed to earmark an annual budget for periodic maintenance of the core road network (CRN) to be funded by the Ministry of Finance for the Roads Board Nepal.⁷

7. Intermodal transport connection is inadequate in the country. Although the current NHN has provided connections to airports, nearly 85% of goods traded are transported by land and strongly rely on the Kathmandu–Birgunj–Kolkata Corridor and the East–West Highway. The Birgunj inland clearance depot is the only terminal that has rail and road connectivity with India.

8. **Sector road map.** The transport sector is guided by the (i) National Transport Policy, 2002; (ii) Strategic Plan of the Ministry of Physical Infrastructure and Transport (MOPIT), 2016–2020; (iii) sector-wide PIP; (iv) the government's Fifteenth Plan, fiscal year (FY) 2020–FY2024; and (v) South Asia Subregional Economic Cooperation (SASEC) Operational Plan, 2016–2025 Update.⁸ The government's 15th plan emphasizes the need to strengthen the transport sector, particularly road management capacity, with modern technologies and knowledge transfer.

9. The current sources of funding are primarily the annual budget allocation and assistance from development partners. External assistance for SRN development was up by 41% in FY2017.⁹ The MOPIT envisaged expenditures on roads of NRs620 billion during 2016–2020. This spending has spilled beyond 2020 due to budgetary constraints and implementation delay.

10. **Institutional arrangements.** The DOR is the main agency responsible for the planning, design, operation, and maintenance of the NHN, or the former SRN, across Nepal. The DOR has eight sub-branches including planning and monitoring, maintenance, and bridge. The planning and monitoring branch formulates the plan and budget for investment, monitors progress of projects, and is in charge of the road safety program. The maintenance branch is responsible for coordinating, supervising, monitoring, and evaluating all maintenance activities of roads under the DOR's jurisdiction and will be accountable for the future road asset management unit.

11. **Road networks and investment plans.** First developed in 1995, the SRN consisted of 15 national highways and 51 feeder roads. It was designed to provide connectivity to all district headquarters and to enable balanced regional growth in an efficient and cost-effective manner. Additional feeder roads were proposed in the first PIP in 1997, when large areas of the country were not accessible for motorized traffic, which was followed by a program of staged construction.

⁶ ADB. 2013. [Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to Nepal for the South Asia Subregional Economic Cooperation Road Connectivity Project](#). Manila.

⁷ Ministry of Physical Infrastructure and Transport (MOPIT), DOR. 2020. *CRN Policy Note 2020*. Kathmandu. The CRN is currently proposed to include SRN and/or NHN sections with annual average daily traffic equal to or more than 2,000.

⁸ Government of Nepal, Ministry of Physical Planning and Works. 2001. *National Transport Policy*. Kathmandu; Government of Nepal, MOPIT. 2016. *Strategic Plan for 2016–2021*. Kathmandu; Government of Nepal, DOR. 2016. *Mid-term Review of Sector Wide Road Programme & Priority Investment Plan*. Kathmandu; Government of Nepal, National Planning Commission. 2020. *Fifteenth Plan, 2019/20–2023/24*. Kathmandu; and ADB. 2020. [The SASEC Operational Plan for 2016–2025 Update](#). Manila.

⁹ World Bank. 2019. [Nepal Infrastructure Sector Assessment](#). Washington, DC.

12. In 2007, a detailed study of accessibility provided by the SRN recommended progressive expansion. A second PIP (2007 PIP) was formulated for a 10-year period, with a maintenance strategy based on an analysis of the condition of the existing and committed SRN sections using the fourth highway development and management model (HDM-4). The government then expanded the SRN beyond the committed level by including additional links with strategic potential that were presented in later SRN maps.

13. A midterm review of the 2007 PIP was carried out in 2016 that extended the plan up to FY2022. The review also found that many of those additional SRN links were unsealed local roads or connected to areas with small populations. Resources were shared with these roads and other small projects. The strategic functions of these roads and the actual demand for them over the years shall be reviewed, and any proposed works should be determined independently.

14. The NHN is replacing the SRN and remains under the DOR's jurisdiction. The principal responsibility for the development and management of the NHN is vested with the DOR under the aegis of the MOPIT. As the current PIP is expiring, an up-to-date study is required to identify new critical projects and estimates for future resource allocation.

15. **Alignment with ADB's Strategy 2030.** The TA will contribute mainly to achieving three operational priorities of ADB's Strategy 2030: (i) address remaining poverty and reducing inequalities, (ii) promote rural development and food security, and (iii) foster regional cooperation and integration. This will be achieved by supporting the NHN expansion to improve Nepal's domestic and regional connectivity and to boost economic growth.¹⁰ The TA will also strengthen the DOR's governance and institutional capacity so it can identify and implement quality infrastructure investments more effectively, efficiently, and accountably. Gender equality will be assured by the participation of women staff in capacity training.

16. **ADB's contribution to transport in Nepal.** ADB's country operations business plan for Nepal, 2021–2023 (para. 2) targets more reliable, sustainable, and resilient transport infrastructure. ADB is a leading partner in Nepal's transport sector and has financed five projects in 2010–2019 to improve about 1,300 km of the NHN (formerly SRN), for \$885.8 million. ADB's strategic objectives in the sector include improving access and mobility to enhance cities' livability and expanding multimodal transport systems in the context of competitive economic corridors.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

17. The TA is aligned with the following impact: road network connectivity in Nepal improved.¹¹ It will have the following outcome: planning and programming of roads in Nepal improved.¹² To manage the rapid increase in registered vehicles and traffic demand, and to promote continuous investment in roads, the NHN and PIP need to be reevaluated, updated, and used strategically in transport planning. The NHN and all associated investments (new construction, rehabilitation, and maintenance) need to be aligned with SASEC and the government's transport policy and strategy. The TA will provide strong support for investment decision-making in the sector.

¹⁰ ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

¹¹ Defined by the TA.

¹² The design and monitoring framework is in Appendix 1.

B. Outputs, Methods, and Activities

18. **Output 1: Development of Nepal's national highway network expansion plan supported.** The TA aims to support the expansion of the NHN to improve the country's domestic and regional connectivity. The TA team will

- (i) review and assess the existing traffic data and traffic demand;
- (ii) conduct surveys of passenger and cargo traffic showing the origin and destination of movements along the roads of study;
- (iii) conduct a holistic review of the development plan of other modes of transport, such as urban transport (for Kathmandu Valley), aviation, rail, and inland waterways, paying particular attention to the promotion of the intermodal transport system;
- (iv) review and incorporate relevant sector plans, such as the SASEC economic corridor investment plan;
- (v) prepare traffic volume forecasts for the NHN, and conduct network modeling with various strategies;
- (vi) propose potential new roads to be added to the NHN and non-important roads to be excluded from it, while considering environmental and social sensitivity, and climate and disaster risk aspects; and
- (vii) review the road inventory and database, and produce road data for new segments.

19. **Output 2: Preparation of Nepal's priority investment plan for 2023–2033 supported.**

The TA team aims to propose an investment plan to support the expansion of the NHN, and will

- (i) review and collect data, e.g., vehicle operating costs, construction and maintenance costs, and road data for analysis using HDM-4; and forecast different maintenance budget scenarios;¹³
- (ii) determine an optimal investment plan, with balanced considerations including but not limited to (a) new roads, or upgrade, rehabilitation, and maintenance of the NHN; (b) resource allocation based on geographic regions and road classification; (c) economic viability; and (d) environmental and social sensitivity, and climate and disaster risks;
- (iii) compare different budget scenarios and determine suitable investments in construction and maintenance in light of local resources and absorptive capacity constraints, and probable foreign assistance in road transport from 2023 to 2033; and
- (iv) propose an appropriate PIP and budget for the NHN for 2023–2033.

20. **Output 3: Department of Roads' capacity on transport sector planning enhanced.**

The TA aims to strengthen the capacity of the DOR to plan and prioritize investments in the sector.

The TA team will

- (i) train 15 DOR engineers in network planning and maintenance using HDM-4, and in data analysis and presentation through the geographic information system;¹⁴ and
- (ii) conduct knowledge transfer sessions on road network modeling.

21. The TA encourages the DOR to consider environmental and social sensitivity, and climate and disaster risks in the planning of infrastructure projects, and during the formulation of the NHN expansion plan and the PIP.

¹³ HDM-4 is a software tool for the analysis, planning, management, and appraisal of road maintenance, improvements, and investment decisions. It has been widely used (by ADB and the World Bank) to conduct economic analyses of road projects.

¹⁴ The geographic information system has been widely used to capture, store, manipulate, analyze, manage, visualize, and present all types of data associated with geographic locations.

C. Cost and Financing

22. The TA is estimated to cost \$1,725,000, of which \$1,500,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF 7). The key expenditure items are listed in Appendix 2.

23. The government will provide counterpart support in the form of counterpart staff; access to TA-relevant data, information, and maps; staff time to review the outputs of consultants; necessary coordination with stakeholder agencies; staff support for organizing committee meetings, workshops, and training sessions; and other in-kind contributions.

D. Implementation Arrangements

24. ADB will administer the TA, and the MOPIT will be the executing agency. The implementation arrangements are summarized in the table.

Implementation Arrangements			
Aspects	Arrangements		
Indicative implementation period	October 2021–June 2023		
Executing agency	MOPIT		
Implementing agency	DOR		
Consultants	To be selected and engaged by ADB		
	Firm: QCBS selection with a 90:10 quality–cost ratio	18.5 international and 129.75 national person-months	\$1,500,000
Procurement	To be procured by consultants		
	Request for quotation for office and survey equipment, software, or software license	10 contracts	\$50,000 ^a
	Request for quotation for survey services	10 contracts	\$440,000 ^b
Disbursement	Disbursement of TA resources will follow ADB's <i>Technical Assistance Disbursement Handbook</i> (2020, as amended from time to time).		
Asset turnover or disposal arrangement upon TA completion	All assets and equipment procured under the TA will be handed over to the executing agency after completion of the TA activities.		

ADB = Asian Development Bank; DOR = Department of Roads; MOPIT = Ministry of Physical Infrastructure and Transport; QCBS = Quality- and cost-based selection; TA = technical assistance.

^a Software purchase is part of the consulting firm's \$1.5 million contract, and include but are not limited to computer-aided drawing tool, traffic demand modeler, fourth highway development and management model (HDM-4), and geographic information system tools.

^b Survey services are part of the consulting firm's \$1.5 million contract. They include but are not limited to traffic counting, road condition survey, origin and destination survey, road user survey, and axle load survey.

Source: Asian Development Bank estimates.

25. **Consulting services.** ADB will engage consultants following the ADB Procurement Policy (2017, as amended from time to time) and its associated project administration instructions and/or staff instructions.¹⁵ An international consulting firm will conduct training, surveys, workshops, and seminars; and procure the required software or software license to deliver the TA outputs.

IV. THE PRESIDENT'S DECISION

26. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$1,500,000 on a grant basis to the Government of Nepal for the Master Plan for Road Connectivity, and hereby reports this action to the Board.

¹⁵ Terms of Reference for Consultants (accessible from the list of linked documents in Appendix 3).

DESIGN AND MONITORING FRAMEWORK

Impact the TA is Aligned with Road network connectivity in Nepal improved ^a			
Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
Outcome Planning and programming of roads in Nepal improved	By 2023: a. Proposed expansion of NHN and investment plan endorsed by MOPIT (2020 baseline: Not applicable) (OP 1.3.1, OP 5.1.4, OP 7.1.2)	a. MOPIT strategic plan	R: Changes in political leadership and priorities delay preparation of NHN expansion and PIP.
Outputs 1. Development of Nepal's NHN expansion plan supported	By 2022: 1a. NHN expansion proposal prepared (2020 baseline: Not applicable) (OP 1.3.1) 1b. Comprehensive review of the development plans of other modes of transport, including urban transport (for Kathmandu Valley), aviation, rail, and inland waterways, and intermodal transport system in Nepal prepared (2020 baseline: Not applicable) ^b (OP 1.3.1) 1c. Traffic demand forecasts and transport network models developed (2020 baseline: Not applicable) ^b (OP 1.3.1)	1a.–c. Consultants' reports	R: Continuous prevalence of the COVID-19 pandemic could affect the mobilization of experts and the implementation of consulting services. A: Funds to implement PIP is available.
2. Preparation of Nepal's PIP for 2023–2033 supported	By 2023: 2a. Prioritized list of projects for (i) construction and upgrade of the NHN, and (ii) rehabilitation and maintenance of the network's roads and bridges prepared (2020 baseline: Not applicable) (OP 1.3.1)	2a. Consultants' reports	
3. DOR capacity on transport sector planning enhanced	By 2023: 3a. At least 15 DOR engineers (20% of them women) trained and report increased knowledge of HDM-4, geographic information system, and road project planning (2020 baseline: 0) (OP 2.3.1, OP 6.1.1)	3a. Pre- and post-workshop surveys, consultants' reports	

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
	3b. At least 15 DOR engineers (20% of them women) trained and report increased knowledge of road network modeling (2020 baseline: 0) (OP 2.3.1, OP 6.1.1)	3b. Pre- and post-workshop surveys	
<p>Key Activities with Milestones</p> <p>1. Development of Nepal’s NHN expansion plan supported</p> <p>1.1 Mobilize consultants (by January 2022) 1.2 Review all relevant studies and information, and complete the inception plan (by February 2022) 1.3 Conduct traffic forecast and network analysis (by July 2022) 1.4 Formulate proposal to expand the NHN (by December 2022)</p> <p>2. Preparation of Nepal’s PIP for 2023–2033 supported</p> <p>2.1 Collect data required by HDM-4 for the NHN (by December 2022) 2.2 Formulate the PIP for 2023–2033 (by June 2023)</p> <p>3. DOR capacity on transport sector planning enhanced</p> <p>3.1 Conduct training programs, seminars, workshops, or other capacity building activities (at appropriate times within the TA implementation period)</p> <p>TA Management Activities Throughout the life of the TA: Manage consultants regularly through assessments of completed outputs and approval of timesheets and expenses; conduct annual TA reviews to monitor the utilization of TA funds and progress against TA performance indicators; and monitor the implementation of capacity development activities.</p>			
<p>Inputs</p> <p>ADB: \$1,500,000 from the TASF 7.</p> <p>Note: The government will provide counterpart support in the form of counterpart staff; access to TA-relevant data, information, and maps; staff time to review outputs of consultants; necessary coordination with stakeholder agencies; staff support for organizing committee meetings, workshops, and training; and other in-kind contributions.</p>			

A = assumption; ADB = Asian Development Bank; COVID-19 = coronavirus disease; DOR = Department of Roads; HDM-4 = fourth highway development and management model; MOPIT = Ministry of Physical Infrastructure and Transport; NHN = national highway network; OP = operational priority; PIP = priority investment plan; R = risk; TA = technical assistance; TASF = Technical Assistance Special Fund.

^a Defined by the TA.

^b The need for additional surveys, if any, will be selectively assessed within the given time frame and budget.

Contribution to Strategy 2030 Operational Priorities

The expected values and methodological details for all OP indicators to which this TA will contribute results are detailed in Contribution to Strategy 2030 Operational Priorities (accessible from the list of linked documents in Appendix 3 of the TA report).

Source: Asian Development Bank.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Amount
Asian Development Bank^a	
1. Consultants	
a. Remuneration and per diem ^b	
i. International consultants	459.0
ii. National consultants	101.4
iii. National consultants (non-key) and support staff	98.0
b. Out-of-pocket expenditures	
i. International and local travel	108.0
ii. Office space rental and related facilities ^b	14.4
iii. Reports and communications ^b	20.0
2. Goods (rental and/or purchase) ^c	50.0
3. Training, seminars, and conferences	85.0
4. Surveys	440.0
5. Contingencies	124.2
Total	1,500.0

Note: The technical assistance (TA) is estimated to cost \$1,725,000, of which contributions from the Asian Development Bank are presented in the table. The government will provide counterpart support in the form of counterpart staff; access to TA-relevant data, information, and maps; staff time to review outputs of consultants; necessary coordination with stakeholder agencies; staff support for organizing committee meetings, workshops, and training; and other in-kind contributions. The value of the government contribution is estimated to account for 15% of the total TA cost.

^a Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF 7).

^b Disbursement as progress payment of deliverables.

^c Includes office equipment, software and software license, and survey equipment. All assets and equipment procured under the TA will be handed over to the executing agency after completion of the TA activities.

Source: Asian Development Bank estimates.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/LinkedDocs/?id=53195-002-TARreport>

1. Terms of Reference for Consultants
2. Contribution to Strategy 2030 Operational Priorities