Initial Environmental Examination

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Nepal: Urban Resilience and Livability Improvement Project – Improvement to Road and Drains in Janakpur Sub-Metropolitan City

Prepared by the Department of Urban Development and Building Construction, Government of Nepal for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 20 May 2023)

Currency unit	-	Nepalese rupee (NPR)
NPR 1.00	=	$ 0.01
$ 1.00	=	NPR 131.91

ABBREVIATIONS

ADB	-	Asian Development Bank
BES	-	Brief Environment Study
BOQ	-	Bill of Quantities
CBD	-	Convention on Biodiversity
CBS	-	Central Bureau of Statistics
CHS	-	Community Health and Safety
CRO	-	Complaint Receiving Officer
DSC	-	Design Supervision Consultant
DOTM	-	Department of Transport Management
ECC	-	Environmental Clearance Certificate
EHSO	-	Environmental Health and Safety Officer
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EPA	-	Environment Protection Act
EPR	-	Environment Protection Rule
GoN	-	Government of Nepal
GRM	-	Grievance Redress Mechanism
IBAT	-	Integrated Biodiversity Assessment Tool
IEE	-	Initial Environmental Examination
ISCPC	-	Institutional Strengthening and Community Participation Consultant
IUCN	-	International Union for Conservation of Nature
IUDP	-	Integrated Urban Development Plans
LPG	-	Liquefied Petroleum Gas
MoFE	-	Ministry of Forests and Environment
MOM	-	Management, Operation and Maintenance
MoUD	-	Ministry of Urban Development
NWP	-	National Water Plan
OHS	-	Occupational Health and Safety
PCR	-	Physical Coordination Unit
PIU	-	Project Implementation Unit
PMCDC	-	Project Management and Capacity Development Consultant
PCU	-	Project Management Unit
PPE	-	Personal Protective Equipment
REA	-	Rapid Environmental Assessment
RM	-	Rural Municipality
RoW	-	Right of Way
RPs	-	Resettlement Plans
RUDP	-	Regional Urban Development Project
SDC	-	Supervision and Design Consultants
SECs	-	Small Ethnic Communities

SPS	-	Safeguard Policy Statement, 2009
WHO	-	World Health Organization

WEIGHTS AND MEASURES

%	–	percentage
°C	–	degree Celsius
µg/m3	–	Microgram per cubic meter
dBA	–	decibels audible
ha	–	Hectare
km	–	kilometer
m^3	–	cubic meter
mm	–	Millimeter

NOTE

In this report, "$" refers to United States dollars.

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EXECUTIVE SUMMARY

The Urban Resilience and Livability Improvement Project (URLIP) will support to improve municipal infrastructures and governance of the selected project municipalities, thereby contributing to achieve inclusive economic growth and improved livability. This will be achieved through the following three outputs: (i) Output 1: Municipal infrastructure for resilience developed; (ii) Output 2: Tourism assets revitalized, and management improved; and (iii) Output 3: Capacity of municipalities, provincial governments, and Department of Urban Development and Building Construction (DUDBC) strengthened. The DUDBC under the Ministry of Urban Development (MOUD) is the executing agency and is responsible for technical and project management matters including engineering, safeguards, and social aspects. The project will support seven municipalities (Pokhara, Janakpur, Devdaha, Lumbini Sanskirtik, Sainamaina. Siddharthanagar, and Tilottama). The Implementing Agencies are each of the project covered municipalities.

Subproject scope. This subproject covers the infrastructure improvements to be carried out under URLIP at the Janakpur Sub-Metropolitan City. This Janakpur Subproject involves improvements to roads and drains of total length of 16.251 km at 17 locations in the city.

Categorization. The proposed Janakpur subproject is classified as Environmental Category "B" as per ADB's Safeguards Policy Statement (SPS), 2009 and accordingly this initial environmental examination (IEE) assesses the environmental impacts and provides mitigation and monitoring measures to ensure that there are no significant impacts as a result of the subproject. As per Government of Nepal (GoN) regulations, Roads and Drainage components require conducting a Brief Environmental Study (BES) and obtain Environmental Clearance from the Ministry of Urban Development, the line agency.

Description of the Environment. Janakpur is a celebrated Hindu religious place that hosts the Janaki Temple that was built in 1898 to honor the Hindu Goddess, Sita. Janaki (or Ram Janaki) temple is a protected monument, and it is also on the tentative list of UNESCO World Heritage Sites in Nepal. The Janaki Temple contains the flower-covered statue of Sita. Adjacent to the Janaki Temple is the Rama-Sita Bibah Mandap, a building that marks the marriage event of Rama with Sita. Every year, a number of pilgrims visit Janakpur to not only visit the temple but also over 200 sacred ponds in and around the city. Two important ones are the Dhanush Sagar and Ganga Sagar that are located close in the centre of the city. Janakpur city is spread over a large area of 91.97 sq. km and has a population of 194,556 (Census 2021).

The Janakpur subproject roads and drainage components are located in Janakpur SMC that comprises of urban areas, peri-urban areas that are being developed into urban land uses. There are no protected zones, wetlands, mangroves, or estuaries in or near the project direct impact zones. One of the proposed road sections is located adjacent to the rear boundary wall of the Janaki Temple. The improvement of roads and roadside drainage system will be carried out within the existing road right of way. These existing roads are either earthen, damaged bituminous carpet or damaged cement concrete roads. The majority of the road lengths have suffered wear and tear with cracks, potholes, broken edges and depressions that impact the safety of the users. Stormwater drains have been constructed along certain road lengths as part of an earlier ADB funded Integrated Urban Development (IUDP) Project. In the subproject areas where the drains have not been provided, localized flooding do occur, especially in Ward Nos. 7,13 and 14, during the months of July – August every year. A survey along the road alignments revealed that there are no trees that are going to be impacted from the improvements to be carried out along the road stretches. At a few locations there are Peepal (*Ficus religiosa*), Gulmohar (*Delonix regia*),

Jacaranda (*Jacaranda mimosifolia*) and Ashoka (*Saraca asoca*) trees that are located outside the ROW, these will not be impacted.

Screening with Integrated Biodiversity Assessment Tool (IBAT) confirms that there are no protected areas or any key biodiversity area within 1km, 10km and 50km radius of the subproject locations in Janakpur. The air quality and noise levels are mainly impacted from vehicular traffic. However, secondary data available for Janakpur reveals that these levels are within the National Standards. Similarly, the secondary data on surface water and groundwater quality reveals that the concentrations of the various parameters are within the National Standards.

Assessment of Potential Environmental Impacts and Mitigation Measures. Potential negative impacts were identified, especially those concerning pre-construction, construction and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning and design process wherever possible. The existing road alignments do not impact any tree species. Additionally, the road designs are combined with improvements in drainage systems that are achieved by incorporating lateral drains and cross drainage structures to ensure safe conveyance of storm water during rainfall events. The measures taken up ensure that the environmental impacts arising due to the project design or location are not significant. Roads and roadside drainage will involve straightforward construction and is unlikely to cause significant adverse impact. Usual construction-related impacts such as noise, dust generation, silt generation, soil and water contamination from chemicals spills and leaks, construction waste generation, and occupational and community health and safety risks including the spread of COVID-19, among others, will be localized, temporary and avoidable with the implementation of mitigation measures in the Environmental Management Plan (EMP). One of the roads (Janaki Temple Bibah Mandap to Maharaj Sagar Road, 0.46 km long) proposed for improvement is adjacent to the outer boundary wall of Janaki temple. Various measures such as consultation with Department of Archeology during detailed design and incorporating measures if any, and obtaining prior permission for the works, avoiding working methods / tools that produce significant noise or vibration, and dust control etc. included in the EMP. All road works will be confined on existing road and side drains alignments, and within existing ROWs.

Environmental Management Plan. An Environmental Management Plan (EMP) has been developed and included as part of this IEE, which outlines the following: (i) mitigation measures for environmental impacts during implementation; and (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting. As mentioned earlier, trees are not impacted from the project. However, after the detailed designs are finalized, the Contractor will be required to carry out a confirmation survey and if any trees need to be cut, compensatory afforestation in the ratio of 1:10 (i.e., 10 trees to be planted for one tree cut) shall be implemented and this has been incorporated in the EMP.

Also, in accordance with this EMP, the Contractor will be required to prepare a site-specific environmental management plan (SEMP). Contractor will submit its SEMP for approval to the Project Implementation Unit (PIU). The EMP and SEMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. Copies of the EMP and SEMP shall be kept on-site during the construction phase. The Contractor will be responsible for the organization, direction, and execution of environmental management related activities during construction of the

proposed subproject. The Contractor will also undertake all activities in accordance with the relevant environmental requirements, including consent documentation and other regulatory and/or statutory and contractual requirements.

The Environmental Monitoring Program suggested in the EMP would need to be carried out by the Contractor during the construction period. The Environmental Monitoring Program would involve monitoring the air quality, surface water quality, groundwater quality, noise levels etc. The results of the Environmental Monitoring Program should be included in the periodic reports submitted by the Contractor to the PMCDC / PIU / PCU, as the case may be.

Implementation Arrangement. The Ministry of Urban Development acting through Department of Urban Development and Building Construction (DUDBC) will be the Executing Agency (EA) and the respective municipalities will be Implementing Agency (IA) of the WUC Subproject. The Project Coordination Unit (PCU) under the DUDBC will be responsible for the overall implementation of the project and ensure compliance to ADB environmental safeguards requirement. The PCU will work closely with the Project Implementation Unit (PIU) at the Janakpur Sub-Metropolitan City level. The Project Management and Capacity Development Consultants (PMCDC) and Design and Supervision Consultant (DSC) will each include an Environmental Safeguard Specialist who will support in the efficient overall implementation of environmental safeguards of the project. The PMCDC will submit quarterly monitoring reports to PCU, and the PCU will send semi-annual monitoring reports to ADB. ADB will post the semi-annual environmental monitoring reports on its website as part of its disclosure requirements.

The Contractor will be required to (i) obtain all statutory clearances (other than Environmental Clearance) prior to commencement of civil works; (ii) establish an operational system for managing environmental impacts; (iii) prepare a SEMP based on the EMP of this IEE, and submit to PIU for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved SEMP; and (v) implement any corrective or preventative actions set out in safeguards monitoring reports that the PCU will prepare from time to time to monitor implementation of this IEE, EMP, and SEMP. The Contractor shall allocate an adequate budget and resources for compliance with these EMP measures, requirements and actions.

Consultation, Information Disclosure and Grievance Redress Mechanism. The Janakpur Subproject has undertaken meaningful consultations during the project preparatory stage. Five public consultations (three in March 2022 and two in April 2023) were conducted in the Municipality with the public representatives, elected members at the ward level and the residents. As part of the process, information on the subproject components were provided to the participants at these consultations. Their views were incorporated into the IEE and in the planning and development of the subproject. This draft IEE will be made available to the public through the ADB, DUDBC / PCU websites. The consultation process will be continued during project implementation, to ensure that stakeholders are fully engaged in the project and could participate in its development and implementation. A project-specific Grievance Redress Mechanism (GRM), described in this draft IEE, will be established to receive, record, and redress public complaints in a time bound and effective manner.

Monitoring and Reporting. PCU and PIU, with support from DSC and PMCDC, will be responsible for monitoring the project implementation and compliance with EMP requirements. The Contractor will submit monthly reports to the PIU with jurisdiction over the subproject. The PIU will submit quarterly environmental monitoring reports to PCU. The PCU shall consolidate quarterly reports from the PIUs and prepare semi-annual environmental monitoring reports (SEMRs) which shall be submitted to ADB. PCU and ADB will post the cleared SEMRs on the

project website and ADB website, respectively. ADB will monitor the project on an ongoing basis until a project completion report is issued.

Conclusion and Recommendations. The proposed Janakpur subproject is unlikely to cause any significant adverse impacts to the environment and people. Potential negative environmental impacts are mainly associated with construction and can be mitigated through proper engineering practice and the mitigation measures included in the EMP. The citizens of Janakpur will be the major beneficiaries of this subproject that will result in key environmental benefits such as, but not limited to, reduction in flooding areas, improved road and pedestrian safety to users resulting from improved road infrastructure and drainage facilities. This IEE reflects the preliminary designs of the subproject, and shall be updated by the PCU, with support from PMCDC, based on final detailed design and submitted to ADB for review, clearance, and disclosure. PCU / PIU shall consult the Department of Archeology (DOA) for design of road and drainage improvement adjoining the boundary wall of Janaki temple, obtain permission, and incorporate recommendations and suggestions in the design and construction methodology. Ensure that work shall not be awarded until DOA permission is obtained. No work can commence until the final IEE is approved by ADB and provided to the Contractor, and the SEMP is approved by the PIU. Based on the findings of the IEE, the classification of the project as Category “B” is confirmed. PCU will obtain environmental clearance from the Ministry of Urban Development prior to invitation of bids or award of contract.

I. INTRODUCTION

A. Background

1. The Urban Resilience and Livability Improvement Project (the project) aims to improve livability and sustainability of urban services by project municipalities. The project is aligned with the following impact: inclusive economic growth and improved living standards.[1] The project will have the following outcome: improved resilience, livability and sustainability of urban service delivery by project municipalities. The project will develop municipal infrastructures aligned with the priorities set in the municipalities' investment plans. The project supports seven municipalities: Tilottama, Siddharthnagar, Sainamaina, Lumbini Sanskirtik, Devdaha, Janakpur and Pokhara. The Department of Urban Development and Building Construction on behalf of Ministry of Urban Development will be the Executing Agency and individual project municipalities will be the Implementing Agency. The project will support the following three outputs:

2. **Output 1: Municipal infrastructure for resilience improved.** Investments will use an integrated approach by ensuring a well-coordinated urban infrastructure system and, where feasible, employing green solutions to reduce inundation, improve mobility, and promote nonmotorized transport through cycle lanes and footpaths. Together, these investments aim to improve the livability of residents, support the sustainable growth of tourism, and enhance local economies. The project will (a) construct or rehabilitate 150 kilometers (km) of stormwater drains; (b) reconstruct 100 km of the urban roads with at least 45 km of footpaths with old age, women, children, and people with disabilities responsive features and cycle lane to promote non-motorized transport; and (c) construct cold storage in Tilottama to ensure food security during climate and disaster events.

3. **Output 2: Tourism assets revitalized, and management improved.** The project adopts a combination of strategic planning, infrastructure development and customer service to support natural, cultural, and heritage-based tourism by enacting protective zoning around natural and heritage sites, expanding tourism activities and promoting visitor's universal access and positive experience.[2] Output 2 will support to: (a) prepare and execute seven natural and heritage management plans through gender equality and social (GESI)-responsive participatory approaches, (b) improve seven cultural and natural heritage sites with GESI-responsive tourism infrastructure and recreation amenities such as cycle routes connecting seven lakes of Pokhara municipality, Bindabasini area street, Phewa organic trail, Pokhara Santiban Batik (Forest) conservation, Janakpur Ratnasagar, Lumbini global park, and Panchase eco-development, (c) improve 150,000 square meters of green spaces – Siddharthnagar Dandha River Corridor and greening initiatives of public spaces in all municipalities – with gender and climate-resilient inclusive design feature, and (d) ensure at least 30% of the socio-economic development program spend on socioeconomic infrastructure and activities related to tourism and GESI. The project will construct at least seven GESI-friendly public toilets in cultural and natural heritage sites and support Lumbini Sarus Crane Conservation and Biodiversity Awareness.

4. **Output 3: Capacity of communities, municipalities, province, and Department of Urban Development and Building Construction strengthened**. The project supports implementing prioritized reforms, municipalities' digital transformation, institutional strengthening and capacity building actions. Key actions of output 3 include increasing own source revenue by implementing a comprehensive financial management improvement plan (CFMIP) – an institutional

[1] Government of Nepal, National Planning Commission. 2020. Fifteenth Year. Kathmandu.
[2] Cultural, natural, and heritage assets under municipalities' jurisdiction.

reform measure for revenue enhancement (broadening own source revenue coverage, digital tax billing and collection, and tax administration), budgeting procedure for better expenditure management, internal and external audit, procurement and asset management, and financial management procedures. The second action is to address carbon emissions and climate and disaster-related risks by preparing decarbonization and risk-sensitive urban plans and enforcing development control[3], preparing seven heat action plans to ensure well-coordinated response actions during an extreme heat event tailored to high-risk groups, establishing Pokhara municipal emergency operation center, installing an electronic building permit system that factors in climate and disaster-risk zoning and will also support the issuance of digital tax bills. The third action is strengthening institutions and capacity by establishing and equipping O&M units in each municipality, maintaining a robust database of public assets, including infrastructure, utilities, cultural and natural heritage sites, and public land, constructing an energy-efficient and disaster-resilient municipal office building for Lumbini Sanskrithik municipality, conducting training and workshop for staff, including eligible women staff and female-elected representatives of cities, provinces, and DUDBC, on municipal finance, natural ecosystems, decarbonization, and urban resilience planning, and support internship, skill improvement in traditional and local art, and tourist guide certification programs for women and disadvantage group implemented.[4]

B. Subproject Scope and Location

5. Under the Janakpur Subproject, 16.22 km length covering 17 road sections mostly connecting “Parikrama Marga” are proposed to rehabilitate and reconstruct integrating the components of drainage and footpath. The subproject covers road sections as mentioned in Table 1 below and in the maps that follows the table.

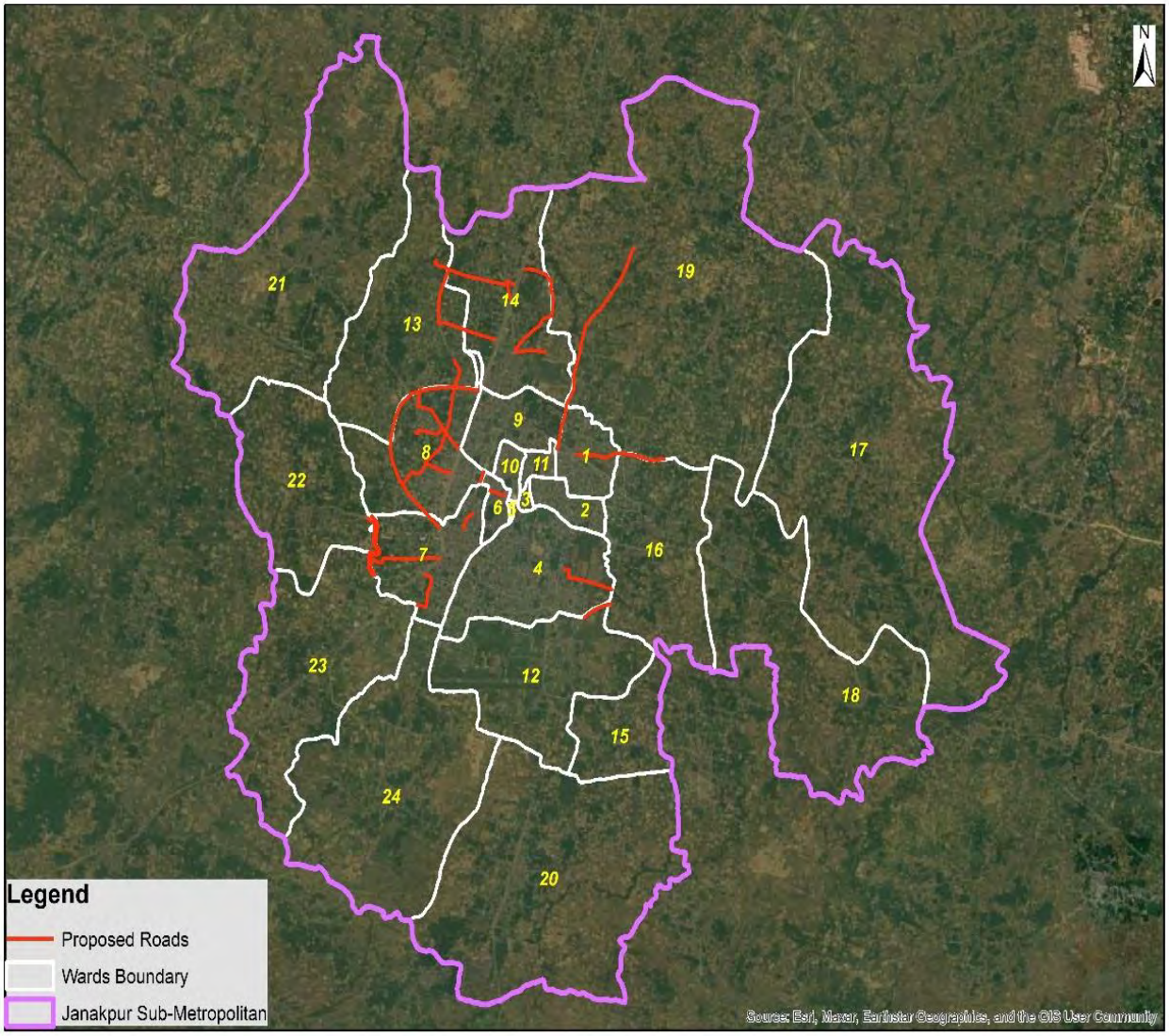
Table 1: List of Roads Proposed for Improvement in Janakpur under URLIP

No.	Road Location	Length in Kms
1	Durga Chowk to Railway Crossing	2.38
2	Sita Chowk to Pul Chowk	1.362
3	Pidari Chowk to Ratan Chowk	0.692
4	Bajrang Chowk to Balmiki Nagar	0.446
5	Ramanand Chowk to Railway Crossing Road	1.206
6	Balwa PS to Eye Hospital to Ratan Chowk	1.547
7	6 Lane Highway to Covered Hall Road	0.785
8	6 Lane Highway to Mani Mandap Road	1.384
9	Mills Area to Benga Piprari Dhanusha Road	1.361
10	R.R Campues East Pipal Bot Jalad River Kapleshwar Main Road	0.442
11	Yatri Niwas Road	0.156
12	Mujeli- Provincial Laboratory- Rajaul Road	1.636
13	Bihar Kunda Road	0.463
14	Pagala Baba Road	0.469
15	Zero Mile Bus Park east Traffic Office to Jaladh River Road	0.645
16	Napi Office Road	0.817
17	Janaki Temple Bibah Mandap to Maharaj Sagar Road	0.46

Source: Design Summary Sheet-DUDBC, 2023

[3] Including seismic microzoning and multi-hazard disaster risk assessment of Pokhara.
[4] GESI action plan (accessible from the list of linked documents in Appendix 2).

Figure 1: Proposed Road Subprojects in Janakpur Sub-Metropolitan City



Source: Google Satellites/Administrative Boundary Department of Survey

C. Purpose of Initial Environmental Examination

6. The objective of the IEE is to provide an overview of the environmental issues viz., legal compliance, environmental impacts, mitigation measures to be employed, monitoring and reporting aspects to be covered during the implementation of the Janakpur Subproject by the PCU, PIU, its Consultants and Contractors. This is to ensure that the project is implemented in an environmentally responsible manner, ensuring that all negative effects are prevented or mitigated, and positive impacts are enhanced.

D. Methodology

7. This IEE report was prepared by carrying out site visits, conducting stakeholder consultations, and primary and secondary data collection, assessing the existing environmental conditions at the subproject locations, identifying the potential environmental impacts that may occur during project implementation and developing the relevant mitigation measures including

monitoring. Baseline environmental monitoring for air quality, noise level, surface water quality and groundwater quality will be done before the start of construction activities. The Integrated Biodiversity Assessment Tool (IBAT) was used to screen potential risks on the protected areas or critical habitat that may exist around the project sites.

8. During the IEE study, public consultations were conducted with the ward representative, officials of the Janakpur SMC and community representatives and local people. Their views were incorporated into the IEE and in the planning and development of the subproject.

E. Structure of IEE Report

9. The report has been structured to include the following chapters:

(i) Introduction;
(ii) Policy, Legal, and Administrative Framework;
(iii) Description of the Project;
(iv) Description of the Environment;
(v) Anticipated Environmental Impacts and Mitigation Measures;
(vi) Environmental Management Plan;
(vii) Information Disclosure, Consultation, and Participation;
(viii) Grievance Redress Mechanism;
(ix) Monitoring and Reporting;
(x) Conclusion and Recommendations.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Safeguard Policy Statement, 2009

10. ADB requires the consideration of environmental issues in all aspects of ADB's operations and the requirements of environmental assessments are described in ADB SPS, 2009.

11. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. A project is classified based on the most environmentally sensitive component, and assigned with one of the four environmental categories (A, B, C, or FI) defined in the SPS. These categories are as follows.

(i) **Category A**: Project that is likely to have significant adverse environmental impacts which are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA), including an environmental management plan (EMP), is required.
(ii) **Category B**: Project with potential adverse environmental impacts that are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.
(iii) **Category C:** Project that is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.
(iv) **Category FI**: Project is classified as category FI if it involves the investment of ADB funds to, or through, a financial intermediary.

12. Initial screening using ADB Rapid Environmental Assessment (REA) checklist was conducted for the subproject and results of the rapid assessment show that the project is unlikely to cause any significant adverse impacts, and therefore classified under Category B per ADB SPS. Thus, this IEE report has been prepared following ADB SPS requirements for project with Category B classification.

13. **Environmental Assessment**. Environmental assessment shall include a description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analysed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration. This IEE may be used as a model document for other future roads and roadside drains subprojects.

14. **Environmental Planning and Management**. The PCU shall prepare an environmental management plan (EMP) to be included in the IEE report. The EMP shall describe and address the potential impacts and risks identified by the environmental assessment. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks. The EMP shall include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.

15. **Public Disclosure**. The PCU shall submit the following to ADB for review, clearance and disclosure. ADB will disclose acceptable reports received and endorsed by the DUDBC on ADB website so affected people, other[5] stakeholders, and the public can provide meaningful inputs into the subproject design and implementation.

(i) Draft / Updated / Final IEE upon receipt;
(ii) a new or updated IEE and corrective action plan prepared during subproject implementation, if any, upon receipt; and
(iii) environmental monitoring reports submitted during subproject implementation upon receipt.

16. **Consultation and Participation**. The PCU and PIU shall carry out meaningful consultation[6] with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

[5] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4." Upon its receipt of acceptable safeguard documents and endorsement by PCU, ADB discloses the same on ADB website.

[6] Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;1 (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

17. **Grievance Redress Mechanism**. The PCU shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject.

18. **Monitoring and Reporting**. The PCU shall monitor, measure and document the progress of implementation of the EMP. If necessary, PCU will identify the necessary corrective actions, and reflect them in a corrective action plan. PCU will prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue until ADB issues a project completion report.

19. **Unanticipated Environmental Impacts**. Where unanticipated environmental impacts become apparent during subproject implementation, PCU shall update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

20. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PCU and PIU shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the International Finance Corporation (IFC) World Bank Group's Environmental, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to subprojects. When the government regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, DUDBC through PCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

21. **Occupational Health and Safety**. The PCU shall ensure that workers are provided with a safe and healthy working environment, considering risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PCU shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

22. **Community Health and Safety**. The PCU shall ensure to identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the project, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

23. PCU shall ensure to apply preventive and protective measures for both occupational and community health and safety consistent with international good practice, as reflected in available national standards on Environmental, Health and Safety. Where national standards are not

available, internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines will be adhered to[7]. PCU shall also adhere to necessary protocols in response to emerging infectious diseases such as the corona virus disease (COVID-19) consistent with the guidelines of relevant government healthcare agencies and the World Health Organization.

24. **Physical Cultural Resources**. The PCU is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. Such resources likely to be affected by the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures shall be included in the EMP.

25. **Environmental Audit**. When the subproject involves existing activities or facilities, PCU is responsible to ensure that relevant external experts will perform environmental audits to determine the existence of any areas where the subproject may cause or is causing environmental risks or impacts. If the subproject does not foresee any new major expansion, the audit constitutes the environmental assessment for the subproject.

26. **Bidding and Contract Documents**. IEE, which contains the EMP, shall be included in bidding and contract documents and verified by PIU. The PCU and PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB[8] and (ii) to submit to PIU, for review and approval, a site specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation, among others as may be required. No work can commence prior to approval of SEMP. A copy of the EMP and/or approved SEMP will be always kept on site during the construction period. Non-compliance with, or any deviation from, the conditions set out in the EMP and/or SEMP constitutes a failure in compliance and shall require corrective actions.

27. **Conditions for Award of Contract and Commencement of Work**. PCU shall not award any works contract under the subproject until (i) relevant provisions from the EMP are incorporated into the works contract; (ii) this IEE is updated to reflect subproject's detailed design and PCU has obtained ADB's clearance of such updated IEE; and (iii) For GoN requirements MoUD approves Brief Environmental Study (BES)/IEE (i.e., compliance with EPR, 2020) and other necessary permits from relevant government agencies shall be obtained. For "design, build, and operate" type contracts, PCU shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the works contract; and (ii) this IEE is updated to reflect subproject's detailed design and PCU has obtained ADB's clearance for such updated IEE.

[7] World Bank Group, 2007. Environmental, Health, and Safety General Guidelines. Washington, DC.

[8] Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites..

B. National Environmental Legislations

28. Most of the national policies and laws of GoN are oriented towards achieving environmentally sound economic development and growth, and conservation of natural resources and cultural heritage of the country. The following are the summaries of the relevant policies, acts and regulations, and guidelines:

29. **The Constitution of Nepal, 2015.** This is the fundamental law of the country, and the sections pertaining with environmental protections are as follows:

(i) Article 30 (1) of the constitution guarantees a "clean environment'' as a fundamental right and elaborates that "every citizen shall have the right to live in a clean and healthy environment".
(ii) Article 30 (3) encourages the state to formulate necessary legal frameworks to balance environment and development.

30. Nepal has enacted comprehensive environmental policies and laws that cover a broad range of environmental and sector issues. Environmental Protection Act (EPA)of 2019 and Environmental Protection Regulations (EPR) of 2020 are two important legal frameworks for environmental protection. According to the EPA and EPR, all development projects should first be screened using criteria that are based on the scale of project stipulated in the Schedules 1, 2 and 3 of EPR to determine the level of environmental assessment required. Projects that could result in some environmental impacts are required to conduct Brief Environmental Study (BES), projects having the moderate environmental impacts are required with Initial Environmental Examination (IEE), and large projects that could result in major and adverse environmental impacts are required to go undergo an Environmental Impact Assessment (EIA) process. The EPA makes necessary arrangements to disclose EIA reports to the general public to render opinions and suggestions.

31. **Environment Protection Act 2019 (2076 BS).** The act emphasis on new aspects like provisions of BES, IEE and EIA under the jurisdiction of local authority, provincial government, and central government. This act is pre-requirement for any type of development project in the country to comply the environment safeguards. Article 2 (3) 1 of this act has given provision of environmental assessment. This clearly mentions that the environment assessment is prerequisite before implementation of any project. The detail of the criteria is indicated in Environment Protection Rules 2020.

32. **Environment Protection Rules 2020 (2077 BS).** This rule has defined thresholds and equivalent environmental assessment (i.e., BES, IEE and EIA). As per EPR 2020, for the upgrade, expansion, rehabilitation and reconstruction of 10 to 50 km length national highway or feeder road requires Initial Environmental Examination (IEE). As per EPR 2020, following requirement are necessary for IEE.

Table 2: Subprojects Requiring Environment Assessment as per GoN-EPR, 2020

S.N.	Subproject Component	Parameter	Unit	Total Quantity	Environment Study Requirement (EPR,2020)
1.	Road and Drains Component at Janakpur Sub-Metropolitan City	Length	Kms	16.251	BES

33. **Other relevant government laws and regulations.** The implementation of subprojects proposed under the project will be governed by government environmental acts, rules, policies, and regulations.

34. Table 3 summarizes the applicable national and local laws, regulations, and standards for environmental assessment and management, including applicable international environmental agreements.

Table 3: Relevant Government Laws and Regulations

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
1	**Fifteenth Five Years Plan, 2020−2024, Nepal**	• Requires all projects to be formulated and constructed based on methods that optimally utilize local skills and resources and generate employment opportunities. • Attention is paid towards minimizing the impacts of climate change and protecting environment. It aims to minimize adverse impacts on people, property, culture, environment and economy by disasters. • The policy aims to integrate disaster risk management in all development activities in order to reduce loss of people and property.
2	**National Transportation Policy, 2058 BS**	• The principal objective of the National Transport Policy is to develop a reliable, cost effective, safe facility oriented and sustainable transport system that promotes and sustains the economic, social, cultural and tourism development of Nepal as a whole. • For the attainment of the above through and objectives the following strategies will be followed: (i) The Government shall clearly indicate the limit and scope of work to be done from the central level and take responsibility of transport structure to be constructed from the central level. (ii) Making the decentralized governance system more strengthened and by maximum utilizing the source and means of local level, the development and promotion of transport system shall be done from the local level itself. (iii) Maximum private Sector involvement will be encouraged in the expansion and preservation of the transport system.
3	**Forest Act 2076 (2019)**	• Pertaining to the chapter 12, Section 42(1), if there is no other alternative to the using of forest area for the operation of a national priority project, plan of which investment is approved by the Investment Board, project of national pride and it appears from the environment examination referred to in the prevailing law that the operation of such plan does not result in significant adverse effects on the environment, the Government of Nepal may give approval, as prescribed, to use any part of the national forest for the purpose of operating such plan, • Similarly, in providing the forest area for the operation of a plan pursuant to sub-section (1), to the extent possible, a land that is adjoining to the national forest area near the project site and situated in the same geographical and ecological belt and has such landscape where forest can be developed shall be provided for the purpose of planting trees at least in the area equal to the forest area that has to be used.
4	**Forest Regulations, 2079 (2022)**	• Pertaining to Rule 87 (2) in case of the development project related to the use of forest land, the coordination has to be done with the concerned division forest office during the feasibility study and environmental study.

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
		• Rule 88, Application needs to be submitted in case of use of national forest land from the feasibility study and application need to submitted to the Ministry of Forests and Environment through the subjective ministry • Rule 89, following the Rule 88, the Ministry of Forests and Environment direct Division Forest Office through its respective department for the detail field information and the that information should also be submitted to provincial ministry. • Rule 90, following the Rule 89, Division Forest Office should submit the information with field monitoring (if necessary) to the Ministry of Forests and Environment. The ministry will ensure the use of forest land if the applicable information and letters are received, and give permission to the respective project by binding in the rule's states in the Forest Regulations. • Rule 91, following the Rule 90, after the decision made by the government of Nepal for the permission to use the forest land, development project should make the availability of the applicable land for the forest development as per the Forest Act (2076), Section 42 (2). • Rule 92, following the Rule 91, in case of failure in the availability of the applicable land, it has to go through the Land Acquisition Facilitation Committee in the district level. • Rule 93, following the Rule 92, in case failure of the land acquisition through the Committee respective department should give permission to the project for the Collection of amounts in the government fund as per the land purchases for development project specified in Shedule-51. • Rule 93 (5), the compensation of loss of 1 tree loss should be made with plantation of 10 trees with the amount base on the cost of the trees in the ratio of 1:10 and Rule 93 (5), the amount must include bi-annual production or purchase of trees, trees transportation, afforestation of 1600 trees per hectare, fencing and boundary for the protection of trees and require number of people for look after.
5	**Conservation Area Government Management Area Rules 2001**	• Contains a number of regulatory measures to minimize environmental impacts within the forests, national parks, wildlife reserves and conservation areas. Prior to implementation, the EPA 2076 B.S. (2019 AD) requires a proponent to undertake BES, IEE or EIA for a proposed project and have the report approved by the concerned ministries. The introduction of the exotic species on the specific location may requires an IEE before the implementation of the project as per the EPR, 2020 Appendixes 1, 2 and 3 Rule 3 a, b, and c.
6	**Ancient Monument Preservation Act, 2013 (1956) and Rules, 1989 (and amended till date)**	• It was enacted to integrate the conservation and protection of ancient monument and archeological properties. The act mentions any ancient monuments and artistic objects of hundred years old shall be regarded archeologically important objects and Department of Archeology (DoA) shall preserve such objects. • As per the Act and rules, works as such excavation, laying of water, sewer lines, repairing road etc., in the monument protection / conservation zone., require prior permission of Department of Archaeology. Application in the prescribed format need to be submitted to DOA.

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
7	**Water Resource Act, 1992**	• Water Resource Act, 1992 of clauses 3, 7, 18, 20, 22 and 24 implies state ownership of any surface/stream bodies of Nepal and stresses the utilization of water resources by any individual or organization without causing harm to others. It embodies that the Government of Nepal can fix, monitor and formulate regulations pertaining to water quality standards, pollution tolerance levels and development of water resources. It prohibits any action that may pollute water resources surpassing the threshold value. It has prioritized use of water resources in the successive order: drinking/domestic use, irrigation, fishery, electricity, water transport, and recreation. It urges that utilization of resources should be carried out without causing any considerable damage to the environment such as soil erosion, floods, landslides and other similar natural hazards. The Act fails to address the license mandatory for the extraction of water even from the land owner.
8	**Water Resource Regulation, 1993**	• Water Resources Act was published in Nepal Gazette in (2050/5/1). Persons, who interested to use the water resources on institutionalized basis, may form a consumer's association consisting of at least Seven persons as officials and members. There shall be a Water Resources Committee in each District for the purpose of issuing license pursuant to Sub-section (1) of Section 8 of the Act in order for the utilization of Water Resources contained within Nepal. Government of Nepal, may, giving due consideration for the types, structure, capacity of the project relating to utilization of wat16 of the Act, prohibit from using the house or land situated within the area of the project specifying the fixed distance for the site for a specified worker resources for the purpose of Sub-section (3)
9	**Irrigation Rules, 2000 (Amendment in 2060)**	• Irrigation Rules, 2000 Chapter 2 has the provision of the formation of the user's association in a format as prescribed in schedule –1 and the procedure for the transfer of the project. Under Rule 12, Users' association may plant trees on the side or right of way of a Canal, Branch or Secondary Canal, Minor or Tertiary Canal, Water course or Field Channel after the approval of community forest work - plan according to the prevailing Forest Act and Rules from the concerned Forest Office. In the course of determining the place for plantation there shall be coordination with concerned Irrigation Office. Until the work plan pursuant to Sub rule (1) is approved, Users' Association may sell the rotten or fallen trees lying on the side of Canal, Branch or Secondary Canal, Minor or Tertiary Canal, Water course or Field Channel and the trees which need pruning may be pruned upon the approval of committee. • Similarly, under Chapter 6, there is the provision of irrigation project which shall be constituted to implement the large-scale irrigation project as designated by the GoN. It also deals with the function, duties and power of the designated project committee, staff and the establishment of the Project Unit Office.
10	**Irrigation Policy (2013)**	• Irrigation Policy document sets out the rationale for subsector development and policy objectives and approach for project development, water user associations, irrigation service charges and irrigation system operation and maintenance
11	**Soil and Watershed Conservation Act,**	• In order to properly manage the watersheds of Nepal, the Soil and Watershed Conservation Act 1982 was enacted. Section 3 of the Act

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
	2039 BS	empowers GoN to declare any area as a protected watershed area. Section 4 of the Act provides that a watershed conservation officer has the authority to implement the following works in protected watershed areas: • Construct and maintain dam, embankment, terrace improvements, diversion channels and retaining walls, • Protect vegetation in landslide-prone areas and undertake afforestation programs, and • Regulate agricultural practices pertinent to soil and watershed conservation. • Under Section 10 of the Act, power is extended to the Watershed Conservation Officer to grant permission to construct dams, drainage ditches, canals, cut privately owned trees, excavate sand, boulders and soil, discharge solid waste, and establish industry or residential areas within any protected watershed. The Act outlines the essential parameters necessary for proper watershed management (including rivers and lakes). The Act is applicable to protected watersheds.
12	**Soil and Watershed Conservation Regulations, 2042 BS**	• In exercise of the powers conferred by Section 25 of the Soil and Watershed Conservation Act 1982, the Government of Nepal has framed Soil and Watershed Conservation Regulations, 2042 BS. Pursuant to sub-rule (1) of rule 10 natural calamity clause (a), (b), (c), (d), (e), (f), (g) of section 10 of the Act and (h) if anyone has to do the work mentioned in the reason to do so. An application has to be submitted to the Watershed Conservation Officer in the format of open schedule 4 (2) After receiving the application as per sub-rule (1), the watershed protection officer in case of any action contrary to the purpose of the Act, in the format of Schedule 5 as per schedule. will allow.
13	**Water Induced Disaster Management Policy 2015 (2072)**	• The latest policy of Government of Nepal which recognizes the climate change as one of the main causes for the water induced disaster in Nepal. • This policy is introduced to achieve the objectives of the National Water Resources Strategy and National Water Plan on water induced disaster management sector through participation and coordination of public, cooperatives and private sector institutions. It encourages people to participate with voluntary contribution of land for flood protection works. • It has the main objective of making the infrastructures sustainable and has the policy on involving communities, cooperatives and private sector. It stresses the need for medium and long-term disaster prevention and control programs and make them climate resilient and environment friendly.
14	**Land Acquisition Act, 2034 BS (1978AD)**	• Government can acquire land at any place in any quantity by giving compensation pursuant to the act for any public purposes or for operation of any development project initiated by government institutions.

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
15	**Labor Act, 2074 (2017 AD)**	• This labor Act was made under the management of parliament under sub-clause 1 of clause 296 of Constitution of Nepal. Sub-section 3 of Section 2 states that the employees should not be compelled to other work other than they are assigned for. In addition, Sub-section 5 of Section 2 states about prohibition of child labor in any organization and sub-section 6 of Section 2 states that there should not be any kind of discrimination among the employee's regard of religion, ethnicity, gender, origin, language or intelligence or other kind of characters.
16	**Child Labor (Prohibition and Regulation) Act, 2056 (2000 AD)**	• As per section 3 of this act, no child having not attained the age of 14 years shall be engaged in works as a laborer.
17	**Solid Waste Management Act, 2068 (2011 AD)**	• This act has been formulated with a goal of minimizing solid waste production from the target area by setting rules and regulation on solid waste management (SWM) in the country in order to develop better environment for the systematic and effective management of solid waste and to involve all the concern stakeholders in SWM practice. The main features of this act are discussion of 3R principle (Reduce, Reuse and Recycle). 3R principle seems to be very beneficial as it not only increases the life of landfill site but also save the money, which could be used for other infrastructure development. Section 4 of the act assign the local body to manage or use the solid waste discharged or dumped in collection center, transfer station or treatment plant or collected during cleaning.
18	**Solid Waste Management Rules, 2070 (2013 AD)**	• The solid waste management rule was formulated as per the provision made in article 50 of the Solid Waste Management Act, 2068. This regulation has emphasized the segregation of waste at source, and mentioned that the responsibility of proper disposal, and management of source belongs to the producers themselves. Section 3 of the rule describes the segregation, and management of solid waste. It has been mentioned that it is essential to segregate degradable, and non-degradable solid waste at the source.
19	**The National Parks and Wildlife Conservation Act, (1973AD)**	• This Act deals with the conservation and management of wildlife and habitat. The Act restricts entry into national parks without prior permission of the concerned authority. Hunting of animals or birds, building or occupying houses, shelters or structures, occupying, clearing or planting or growing in any part, cutting, felling, removing or overshadowing any tree and removing any quarry or any other activities in national parks are banned. • Wildlife Reserve Regulation, 1977, entry, construction of houses or sheds, clearance of forest and forest products, quarrying and overnight stay in a reserve area is prohibited unless authorized in writing by the relevant GoN authority. • Buffer Zone Management Regulation, 1994, clearance of forests and forest products, acquisition of land, use of quarry sites and hunting in buffer zones is restricted unless written approval of the relevant GoN authority is obtained.
20	**Local Self Governance Act (1999AD)**	• This Act gives Local Government the functions, duties and power to, among others; (i) conserve and protect their local environment and natural resources; (ii) plan, implement and / or operate and maintain local water supply projects; (iii) implement and / or arrange for

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
		implementation local sanitation / sewerage and drainage projects; (iv) protect cultural heritage and religious sites and / or (v) monitor project activities within their jurisdictions.
21	**National Tourism Act (1978AD)**	• This Act facilitates to increase tourist arrival in the country and encourages tourists and their handling agents in Nepal to minimize environmental impact during their visit. The Act also shows serious concerns about visitors' health, facilities and welfare and empowers the Government to generate tourism revenue and establish plough-back mechanism for tourism infrastructure development.

C. International Environmental Agreements

35. Table 4 below lists of the international environmental agreements that Nepal is party to, and their relevance with the current subproject.

Table 4: International Environmental Agreements and standards ratified by GoN

International Convention	Year*	Relevant Provisions	Remarks
World Heritage Convention	1978	Parties to ensure the protection and conservation of the cultural and natural heritage situated onterritory of, and primarily belongingto the State. World Heritage sites are identified as per this convention.	The project components will not impact physical cultural resources and natural heritageduring project implementation and operation.
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)	1987	Parties to conserve and wisely usewetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locallyand throughout the world. This convention will identify the Ramsar areas.	The project components are not located in wetlands as classified as Ramsar site.
Convention on Biodiversity (CBD)	1992	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects. The CBD also identified thebiodiversity identified the hot spot areas.	The project will not impact biodiversity hot spot area in thecountry.
UN FrameworkConvention on Climate Change	1992	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverseeffects.	The project will help the Government of Nepal comply with this agreement. Theproject will ensure implementation of resilience offarmers to climate change improved.
Basel Conventionon the Control of Trans boundary	1996	Parties to, among others, minimizethe amount and	The project will ensure implementation of its EMP

International Convention	Year*	Relevant Provisions	Remarks
Movements ofHazardous Wastes and their Disposal		toxicity of hazardous waste generated, manage the hazardous and other wastes they generate in an environmentally sound mannerand as close as possible to the source of generation.	as measure to avoid or minimize the generation and disposal ofany hazardous wastes.
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1975	Parties to control the trade of certain wildlife species to prevent further endangering of their survival. CITES classifies species according to the following criteria viz., species threatened with extinction; species which could become endangered; and species that are protected. Nepal is rich in biodiversity and has number of protected species	IBAT reports are generated for all project components to ensure the conservation and protection of endangered species of wild fauna and flora.
International Labour Organization (ILO) Convention of Indigenous and all Peoples	2007	Highlights the need to recognize indigenous and tribal people's specific knowledge, skills and technologies as the basis for their traditional economies and self-determined development process.	Applicable to projects where indigenous and tribal peoples are present.

*(Year) - Year last amended.

D. Applicable Environmental Standards

36. **National Ambient Air Quality Standards for Nepal, 2003.** As shown in the table below, the air quality standards for Nepal have set standards for 7 parameters: total suspended particles (TSP), PM_{10}, Sulphur Dioxide (SO_2), Nitrogen Oxide (NO_2), Carbon Monoxide (CO), Lead (Pb) and Benzene.

37. The World Health Organization (WHO) Air Quality Guidelines has set quality standards for 4 parameters PM_{10}, $PM_{2.5}$, SO_2 and NO_2. According to ADB SPS 2009, when host country regulations differ from international levels and measures, the project will achieve whichever is more stringent. Both policies provide guidelines and comply with the more stringent standards during construction period.

Table 5: Standards for Ambient Air Quality for both GoN and WHO

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard (µg.m^3) *	WHO Air Quality Guidelines (µg.m^3) **	
			Global Update 2005	Second Edition^ 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM $_{10}$	Annual	-	20	-
	24-hour	120	50	-
PM $_{2.5}$	1-year	-	10	-
	24-hour	-	25	-
SO2	Annual	50	-	-
	24-hour	70	20	-
	10-minutes	-	500	-
No_2	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minutes	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

Source: *National Ambient Air Quality Standard for Nepal, 2003. Obtained from Environment Statistics of Nepal, 2011, National Planning Commission Secretariat, Central Bureau of Statistics, Nepal. **Environmental, Health and Safety General Guidelines, 2007. International Finance Cooperation, World Bank Group.
^Air Quality Guidelines for Europe, Second Edition, 2000. WHO Regional Office for Europe, Copenhagen.

38. **Emission standard for diesel generator EPR-14, 2020.** The emissions standards set for new DGs imports is equivalent to Bharat Stage III standards, and for in-use DGs is equivalentto Bharat S Inventories and Black Carbon Emissions in Kathmandu Valley, Nepal. Emissions standards are set for 4 major pollutants: CO, HC, NO_x, and PM.

39. **National Noise Standard Guidelines, 2012.** The guidelines have set the standards for noise levels, measured in dBA, for industrial, commercial, rural residential, urban residential, mixed residential and quiet areas. It also has provision of standard values for the noise level generated by water pumps and DG as well.

40. For international standards, WHO Noise Level Guidelines has set the noise levelsmeasured in dBA for two areas residential and commercial areas. The project will achieve whichever is more stringent. Both policies provide guidelines to follow and comply with the morestringent standards during construction period.

Table 6: Standards for noise levels for both GoN and WHO

Receptor/Source	National Noise Standard Guideline 2012 (dBA)		WHO Guidelines Values for Noise Levels Measured Out of Doors*(One Hour LA_q in dBA	
	Day	Night	07:00-22:00	22:00-07:00
Industrial Area	75	70	70	70
Commercial Area	65	55		
Rural Settlement Area	45	40	55	45
Urban Residential Area	55	50		
Mixed Residential Area	63	55		
Quiet Area	50	40	-	-
Water Pump	65		-	

Receptor/Source	National Noise Standard Guideline 2012 (dBA)		WHO Guidelines Values for Noise Levels Measured Out of Doors*(One Hour LA_q in dBA	
	Day	Night	07:00-22:00	22:00-07:00
Diesel Generator	90		-	

**Guidelines for Community Noise, WHO, 1999*

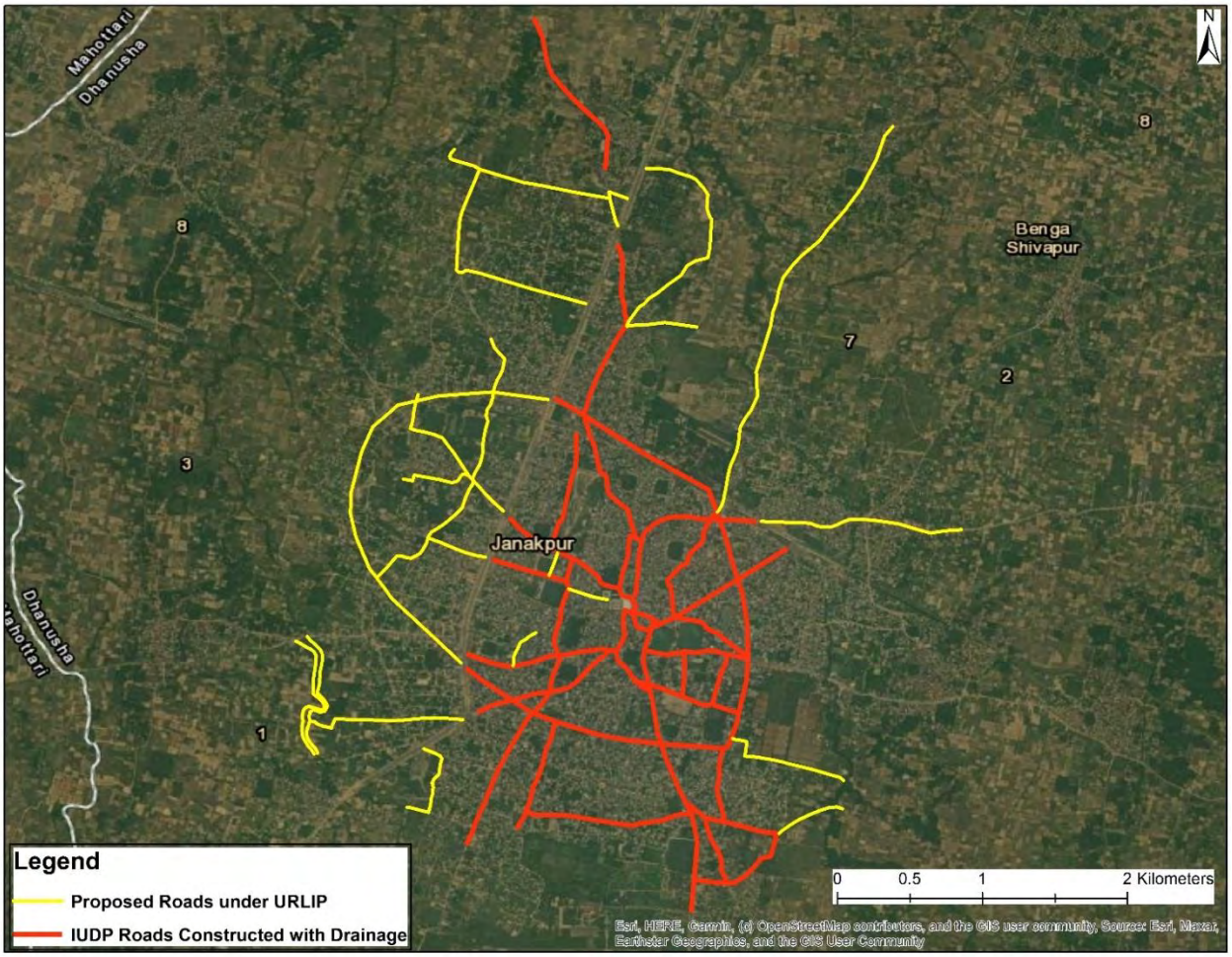
III. DESCRIPTION OF THE PROJECT

41. The subproject will rehabilitate and reconstruct 17 road sections of total length 16.22 km and integrating the components of drainage and footpath (Table 7, and Figure 2). The descriptions of all road sections are provided in the below tables (Table 8 to Table 24). Proposed typical road cross sections are provided in Figure 3 to 10. Details of proposed improvement of road section behind Janaki temple (a protected monument) is given in Table 24 (Janaki Temple Bibah Mandap to Maharaj Sagar Road), and proposed road cross section is given in Figure 10. This road will be improved within the existing 6 m road right of way.

Table 7: Detail of the Proposed Road Subprojects and Locations

S.N.	Name of Subproject	Length of Road (km)	Location	
			Municipalities	Ward No.
1.	Durga Chowk to Railway Crossing	2.380	Janakpur SMC	7,8,13
2.	Sita Chowck -Pul chowk Road	1.362	Janakpur SMC	1, 16,19
3.	Pidari Chowck -Ratan Chowk Road	0.692	Janakpur SMC	8, 13
4.	Bajrang Chowk to Balmiki Nagar Road	0.446	Janakpur SMC	8
5.	Ramanand Chowk to Railway Crossing Road	1.206	Janakpur SMC	8
6.	Balwa Police Station to Eye Hospital to Ratan Chowk Road	1.547	Janakpur SMC	8
7.	6 lane Highway to Covered Hall Road	0.785	Janakpur SMC	13
8.	6 lane Highway to Manimandap Road	1.384	Janakpur SMC	14
9.	Mills Area to Benga Piprari Danusha Road	1.361	Janakpur SMC	1
10.	R.R Campues East Pipal Bot Jalad River Kapleshwar Main Road	0.442	Janakpur SMC	4
11.	Yatri Niwas Road	0.156	Janakpur SMC	6
12.	6 lane to Mujeli- Provincial Laboratory- Rajaul Road	1.636	Janakpur SMC	14
13.	Bihar Kunda Road	0.463	Janakpur SMC	8
14.	Pagala Baba Road	0.469	Janakpur SMC	7
15.	Zero Mile Bus Park east Traffic Office to Jaladh River Road	0.645	Janakpur SMC	7, 23
16.	Napi Office Road	0.817	Janakpur SMC	4
17.	Janaki Temple Bibah Mandap to Maharaj Sagar Road	0.460	Janakpur SMC	6

Figure 2: Proposed Project Roads in Janakpur Town



42. **The Durga Chowk to Railway Crossing** is located in ward number 07,08,13, Janakpur sub- metropolitan City. The zero chainage starts from Durga Chowk and passes through Balwa police Station ends at Railway Crossing.

Table 8: Scope of work under Durga Chowk to Railway Crossing

S.N.	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	2.380 km	2.380 km
2.	Right of Way (RoW) declared by municipality	16m RoW as per land use Standard, 2076 B.S. of Janakpur SMC	From Ch: 0+000 to Ch: 2+380 (Durga Chowk to Railway Crossing), RoW is 16m.
3.	Total Road Width	16 m	16 m
4.	Carriageway	11m average	11m (including tick side drain).
5.	Pavement type	Blacktopped as well as graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and
6.	Footpath	No footpath available	2380 m footpath of 2.5 m wide provided on both sides along the road.

S.N.	Description	Existing Scenario	Proposed Scheme
7.	Median/Landscape or green land areas	No median and lack of green space.	Median is not provided. Greeneries and plantation shall be done in interval of 7 meters over sidewalks, wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	2380m Underground storm water drain	-
10.	Cross drainage	-	-
11.	Protection Works	Retaining walls at some locations	Retaining wall/slope protection measures as per requirement.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

43. **The Sita Chowck -Pul chowck Road** is located in ward number 01, Janakpur sub-metropolitan City. The zero chainage starts from Sita Chowck and passes through Pul Chowck and ends at sahidnagar Road.

Table 9: Scope of work under Sita chowck to Pulchowck Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	1.362 km	1.362 km
2.	Right of Way (RoW)-Declared by municipality	16m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 1+362 (Sita Chowck to Sahidnagar Road), RoW is 16m.
3.	Total Road Width	16 m	16 m
4.	Carriageway	11m (including tick drain) for 640m, for Remaining length 8m average.	11m (including tick side drain).
5.	Pavement type	Blacktopped as well as graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	1,362 m footpath of 1.5 m wide provided on both side along the road.

S. N	Description	Existing Scenario	Proposed Scheme
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	640m of side drain along both side of the road.	RCC surface drain of width 1.1m on both side of road.
10.	Cross drainage Structures	1 Slab Culverts	No new culvert
11.	Protection Works	Retaining walls at some locations	Retaining wall/slope protection measures as per requirement.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

44. **The Pidari Chowck -Ratan chowck Road** is located in ward number 13, Janakpur SMC. The zero chainage starts from Pidari Chowk and ends at Ratan chowck.

Table 10: Scope of work under Pidari Chowk to Ratan Chowk Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.692 km	0.692 km
2.	Right of Way (RoW)-Declared by municipality	16m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+692 (Piradi chowck to Ratan chowck), RoW is 16m.
3.	Total Road Width	16 m	16 m
4.	Carriageway	11m Average	11m (including tick drain).
5.	Pavement type	Blacktopped roads section.	Upgradation with the 1.2m Foot Path And tick drain on Both sides.
6.	Footpath	No footpath available	692 m footpath of 1.5 m wide provided on both sides along the road.
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.

S. N	Description	Existing Scenario	Proposed Scheme
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	-692m of side drain along both side of the road.	Drain is not Provided / Tick drain with catchpits are Provided
10.	Cross drainage Structures	- -	-
11.	Protection Works		-
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

45. **The Bajrang Chowk to Balmiki Nagar Road** is located in ward number 8, Janakpur sub-metropolitan City. The zero chainage starts from Bajrang Chowck and ends at Balmiki Nagar.

Table 11: Scope of work under Bajrang Chowk to Balmiki Nagar Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.446 km	0.446 km
2.	Right of Way (RoW)-Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+446 (Bajrang chowck to Balmiki Nagar), RoW is 13m.
3.	Total Road Width	13 m	13 m
4.	Carriageway	4m Average	9m (including tick drain).
5.	Pavement type	Blacktopped roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	446 m footpath of 2 m wide provided on boths side along the road.
7..	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.

S. N	Description	Existing Scenario	Proposed Scheme
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	446m Storm water drain of side drain along the road.	Drain is not Provided / Tick drain with catchpits are Provided.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	-
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

46. **The Ramanand Chowk to Railway Crossing Road** is located in ward number 8, Janakpur sub- metropolitan City. The zero chainage starts from Ramanand Chowk and ends at Railway Crossing.

Table 12: Scope of work under Ramanand Chowk to Railway Crossing Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	1.206 km	1.206km
2.	Right of Way (RoW)-Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 1+206 (Ramanand Chowk to Railway Crossing Road), RoW is 13m.
3.	Total Road Width	13 m	13 m
4.	Carriageway	4m average	9m (including tick drain).
5.	Pavement type	Blacktopped And in some parts PCC roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No Foot Path Provided.	1200 m footpath of 2.0 m wide provided on both sides along the road.

S. N	Description	Existing Scenario	Proposed Scheme
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	-1200m Storm water drain of side drain along the road.	Drain is not Provided / Tick drain with catchpits and Home inlets are Provided.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	-
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

47. **The Balwa Police station to Eye Hospital to Ratan chowk Road** is located in ward number 8, Janakpur sub- metropolitan City. The zero chainage starts from Near Balwa Police Staion and ends at Ratan chowk.

Table 13: Scope of work under Balwa Police station to Eye Hospital to Ratan chowk Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	1.547 km	1.547km
2.	Right of Way (RoW)-Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 1+547 (Balwa Police station to Eye Hospital to Ratan chowk Road), RoW is 13m.
3.	Total Road Width	13 m	13 m
4.	Carriageway	4m Average	9m (including tick drain).
5.	Pavement type	Blacktopped roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and
6.	Footpath	No footpath available	1,547 m footpath of 2.0 m wide on both sides along the road.

S. N	Description	Existing Scenario	Proposed Scheme
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	-1547m Storm water drain of side drain along the road.	Drain is not Provided / Tick drain with catchpits and Home inlets are Provided.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	-
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

48. **The 6 lane Highway to Covered Hall Road** is located in ward number 13, Janakpur sub-metropolitan City. The zero chainage starts 6 Lane Highway and ends at Cover Hall.

Table 14: Scope of work under 6 lane Highway to Covered Hall Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.785 km	0.785km
2.	Right of Way (RoW)-Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+785 (6 lane Highway to Covered Hall Road), RoW is 13m.
3.	Total Road Width	13 m	13 m
4.	Carriageway	6 m Average	9 m (including tick drain).
5.	Pavement type	Blacktopped roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and
6.	Footpath	No footpath available	785 m footpath of 1.5 m wide on both sides along the road.

S. N	Description	Existing Scenario	Proposed Scheme
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	No Existing Drain	785m Length Side Drain is provided both side of Road.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	-
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

49. **The 6 lane Highway to Manimandap Road** is located in ward number 14, Janakpur sub-metropolitan City. The zero chainage starts from 6 Lane Highway and ends at Cover Hall.

Table 15: Scope of work under 6 lane Highway to Manimandap Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	1.384 km	1.384km
2.	Right of Way (RoW)-Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 1+384 (6 lane Highway to Manimandap Road), RoW is 13m.
3.	Total Road Width	13 m	13 m
4.	Carriageway	6 m Average	9 m (including tick drain).
5.	Pavement type	Blacktopped roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	1384 m footpath of 1.5 m wide on both sides along the road.

S. N	Description	Existing Scenario	Proposed Scheme
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	No existing drain	1384m Length RCC side drain on both sides of road.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	-
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

50. **The Mills Area to Benga Piprari Danusha Road** is located in ward number 01, Janakpur sub- metropolitan City. The zero chainage starts from Millsarea Ring Road and ends at Culverts near Chinmasta Distillery.

Table 16: Scope of work under Mills Area to Benga Piprari Danusha Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	1.361 km	1.361km
2.	Right of Way (RoW)-Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 1+361 (Mills Area to Benga Piprari Danusha Road), RoW is 13m.
3.	Total Road Width	13 m	13 m
4.	Carriageway	6 m Average	9 m (including tick drain).
5.	Pavement type	Blacktopped roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and
6.	Footpath	No footpath available	1361 m footpath of 1.5 m wide on both sides along the road.

S. N	Description	Existing Scenario	Proposed Scheme
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	1361 existing drain	1361m length RCC side drain on both sides of road.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	Retaining wall/slope protection measures as per requirement.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

51. **The R.R Campues East pipal bot jalad river kapleshwar Main Road** is located in ward number 04, Janakpur sub- metropolitan City. The zero chainage starts From Pipal Bot Near RR Campus and ends at Jalad River.

Table 17: Scope of work under R.R Campuses East pipal bot jalad river kapleshwar Main Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.442 km	0.442km
2.	Right of Way (RoW)-Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+442 (R.R Campuses East pipal bot jalad river kapleshwar Main Road), RoW is 13m.
3.	Total Road Width	13 m	13 m
4.	Carriageway	6 m Average	9 m (including tick drain).
5.	Pavement type	Graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	442 m footpath of 2.0 m wide on both sides along the road.
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	No existing drain	442m length RCC side drain on both sides of road.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	Retaining wall/slope protection measures as per requirement.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

52. **The Yatri Niwas Road** is located in ward number 06, Janakpur sub- metropolitan City. The zero chainage starts From Near Yatri Niwas Entrance Gate and ends at Provincial Hospital Road.

Table 18: Scope of work under Yatri Niwas Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.156 km	0.156 km
2.	Right of Way (RoW)-Declared by municipality	9m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+156 (Yatri Niwas Road), RoW is 9m.
3.	Total Road Width	9 m	9 m
4.	Carriageway	9 m Average	9 m (including tick drain).
5.	Pavement type	Graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	156 m footpath of 1.0 m wide on both sides along the road.
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	No Existing Drain	156 m Strom Water Drain along the Road.
10.	Cross drainage Structures	No Existing Culvert	No Purposed Culverts
11.	Protection Works	No Existing Retaining wall	Retaining wall/slope protection measures not provided.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

53. **The 6 lane to Mujeli- Provincial Laboratory- Rajaul Road** is located in ward number 14, Janakpur sub- metropolitan City. The zero chainage starts from 6 Lane Highway and ends at Rajaul Cha Bato.

Table 19: Scope of work under 6 lane to Mujeli- Provincial Laboratory- Rajaul Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	1.636 km	1.636km
2.	Right of Way (RoW)-Declared by municipality	8m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub Metropolitant city	From Ch: 0+000 to Ch: 1+636 (6 lane to Mujeli- Provincial Laboratory- Rajaul Road), RoW is 10m.
3.	Total Road Width	8 m	10 m
4.	Carriageway	6 m Average	8 m (including tick drain).
5.	Pavement type	Graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	-
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	No Existing Drain	1636 m Length RCC side drain on both sides of road.
10.	Cross drainage Structures	No existing culvert	No purposed culverts
11.	Protection Works	No existing retaining wall	Retaining wall/slope protection measures as per requirement.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

54. **The Bihar Kunda Road** is located in ward number 08, Janakpur sub- metropolitan City. The zero chainage starts Near Eye Hospital and ends at Bihar Kund.

Table 20: Scope of work under Bihar Kunda Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.463 km	0.463km
2.	Right of Way (RoW)-Declared by municipality	7m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+463 (Bihar Kunda Road), RoW is 7m.
3.	Total Road Width	7 m	7 m
4.	Carriageway	6 m Average	7 m (including tick drain).
5.	Pavement type	Graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	No Footpath Provided, since it is 7m wide Road
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	463 m Underground Strom Water Existing Drain	-
10.	Cross drainage Structures	No Existing Culvert	-
11.	Protection Works	No Existing Retaining wall	Retaining wall/slope protection measures Not Provided.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

55. **The Pagala baba Road** is located in ward number 07, Janakpur sub- metropolitan City. The zero chainage starts Near Kabargaha Chowk and ends at Pagalaba Dharmasala Gate.

Table 21: Scope of work under Pagala Baba Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.469 km	0.469km
2.	Right of Way (RoW)-Declared by municipality	7m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+469 (Pagala baba Road), RoW is 7m.
3.	Total Road Width	7 m	7 m
4.	Carriageway	6 m Average	7 m (including tick drain).
5.	Pavement type	Concrete roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	469 m footpath of 1.0 m wide on both sides along the road.
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	No Existing Drain	469m underground storm water drain is Provided.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	Retaining wall/slope protection measures Not Provided.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

56. **The Zero Mile Bus Park east Traffic Office to Jaladh River Road** is located in ward number 07, 23, Janakpur sub- metropolitan City. The zero chainage starts From North side of Traffic Police Office and ends at Jalad River Back side of bus park.

Table 22: Scope of work under Zero Mile Bus Park east Traffic Office to Jaladh River Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.645 km	0.645km
2.	Right of Way (RoW)-Declared by municipality	9m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+645 (**Zero Mile Bus Park east Traffic Office to Jaladhi River Road**), RoW is 9m.
3.	Total Road Width	9 m	9 m
4.	Carriageway	8 m Average	8 m (including tick drain).
5.	Pavement type	Graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and
6.	Footpath	No footpath available	645 m footpath of 1.0 m wide on both sides along the road.
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	645 m Underground Strom Water Existing Drain	-
10.	Cross drainage Structures	No Existing Culvert	-
11.	Protection Works	No Existing Retaining wall	Retaining wall/slope protection measures Not Provided.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

57. **The Napi Office Road** is located in ward number 04, Janakpur sub- metropolitan City. The zero chainage starts From North side of Land Revenue Office and ends at Jalad River.

Table 23: Scope of work under Napi Office Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.817 km	0.817km
2.	Right of Way (RoW)-Declared by municipality	9m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+817 (**Zero Mile Bus Park east Traffic Office to Jaladh River Road**), RoW is 9m.
3.	Total Road Width	9 m	9 m
4.	Carriageway	8 m Average	8 m (including tick drain).
5.	Pavement type	Graveled roads section.	Double lane upgradation with the 50mm surface course of asphalt concrete, 200mm of base course and 225mm of subbase course with proper grade and camber.
6.	Footpath	No footpath available	817 m footpath of 1.0 m wide on both sides along the road.
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	817 m underground storm water drain	-
10.	Cross drainage Structures	No Existing Culvert	-
11.	Protection Works	No Existing Retaining wall	Retaining wall/slope protection measures Not Provided.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

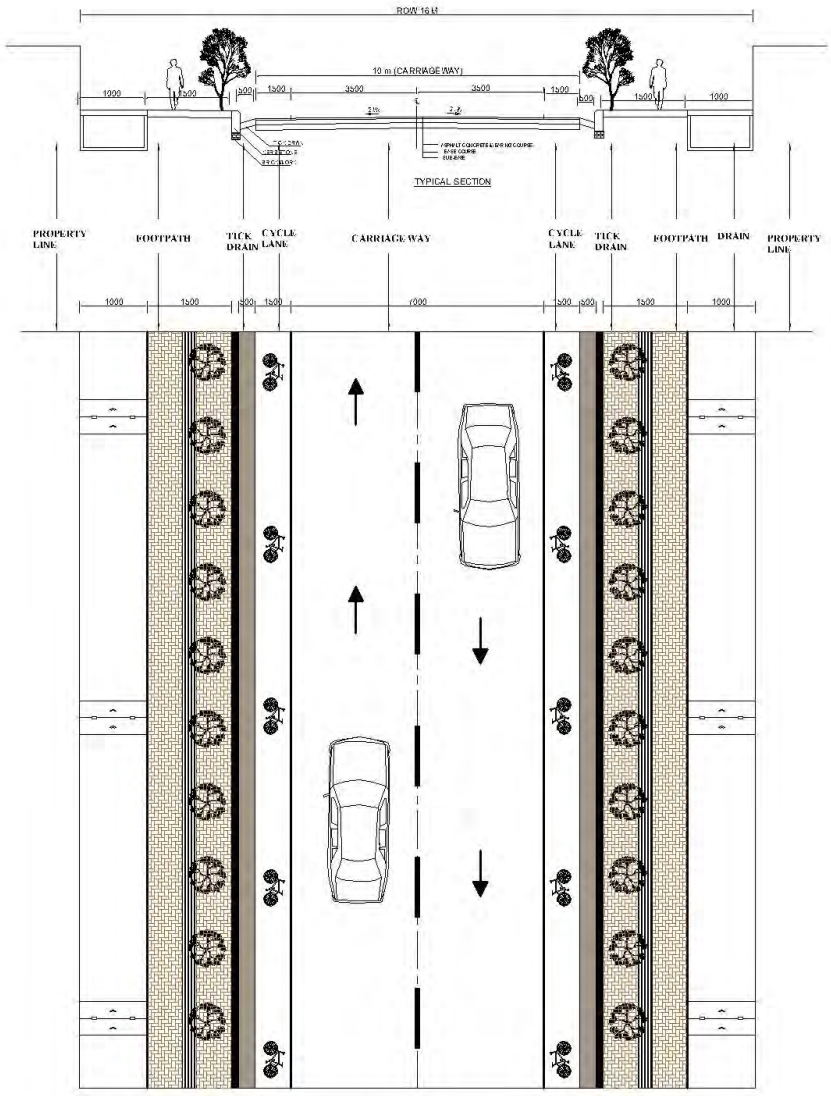
58. **The Janaki Temple Bibah Mandap to Maharaj Sagar Road** is located in ward number 06, Janakpur sub- metropolitan City. The zero chainage starts From Janaki Mandir back boundary and ends at Maharaj Sagar East Bank.

Table 24: Scope of work under Janaki Temple Bibah Mandap to Maharaj Sagar Road

S. N	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	0.460 km	0.460km
2.	Right of Way (RoW)-Declared by municipality	6m RoW as per Land Use Standard, 2076 B.S. of Janakpur sub-Metropolitan city	From Ch: 0+000 to Ch: 0+460 (Janaki Temple Bibah Mandap to Maharaj Sagar Road), RoW is 6 m.
3.	Total Road Width	6 m	6 m
4.	Carriageway	6 m Average	6 m (including tick drain).
5.	Pavement type	Graveled roads section.	Double lane upgradation with the 60mm interlock Block Pavement, and 225mm of subbase course with proper grade and camber.
6.	Footpath	No Footpath Provided.	No footpath provided, since it is 7m wide Road.
7.	Median/Landscape or Green land areas	No median provided and lack of green space.	Median is not provided/ Greeneries and plantation shall be done in interval of 7 meters over sidewalks. wherever space is available.
8.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement.	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
9.	Side Drain	No Existing Drain	460m Underground storm water drain.
10.	Cross drainage Structures	-	-
11.	Protection Works	-	Retaining wall/slope protection measures Not Provided.
12.	Traffic signs/ signage and road marking	Present at some locations	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Streetlights hanging on electric pole	Streetlights of height 9m at 20 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles; coordination with municipality and NEA.

Source: Design Summary Sheet, DUDBC 2023

Figure 3: Typical 16m ROW Plan of the Road Section



16 M ROW PLAN WITH CYCLE LANE

Figure 4: Typical 16m ROW Plan of the Road Section

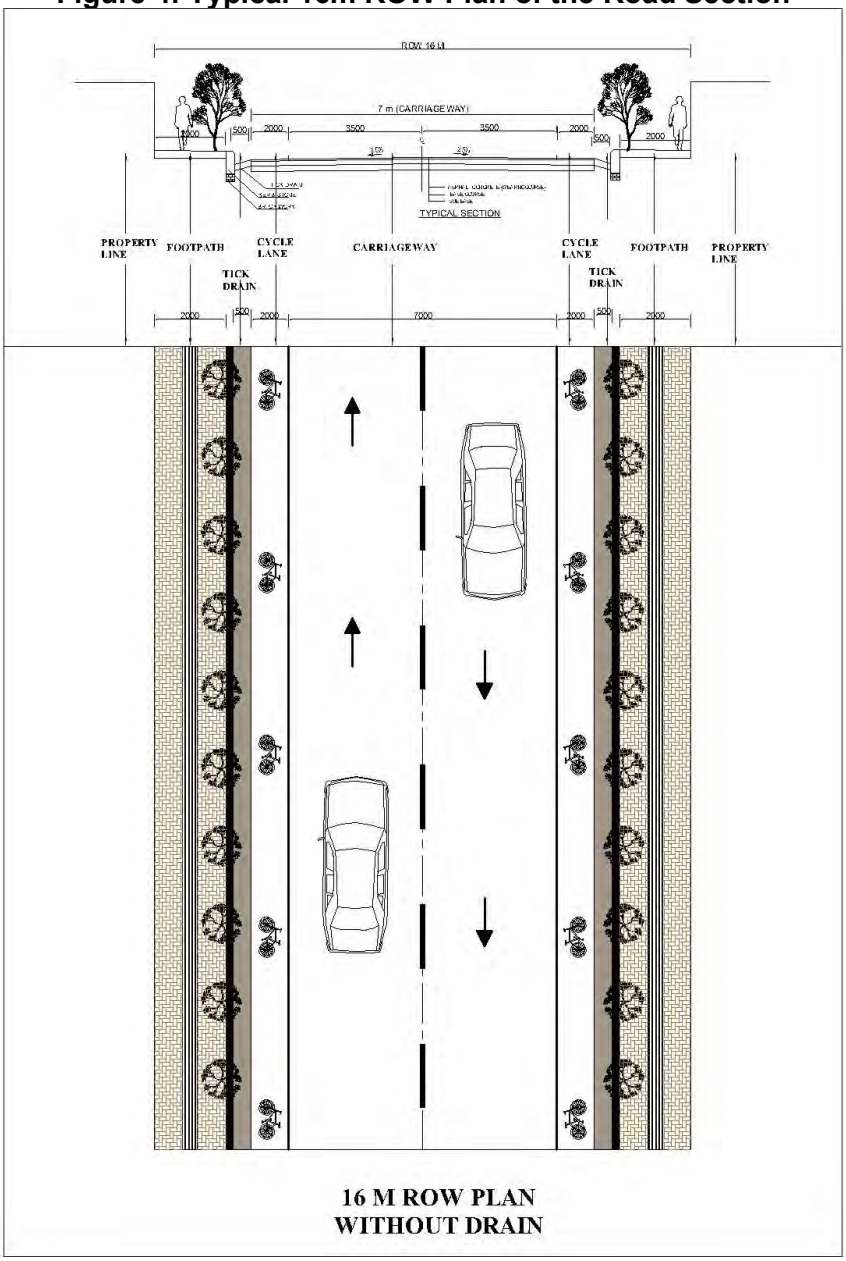


Figure 5: Typical 13m ROW Plan of the Road Section

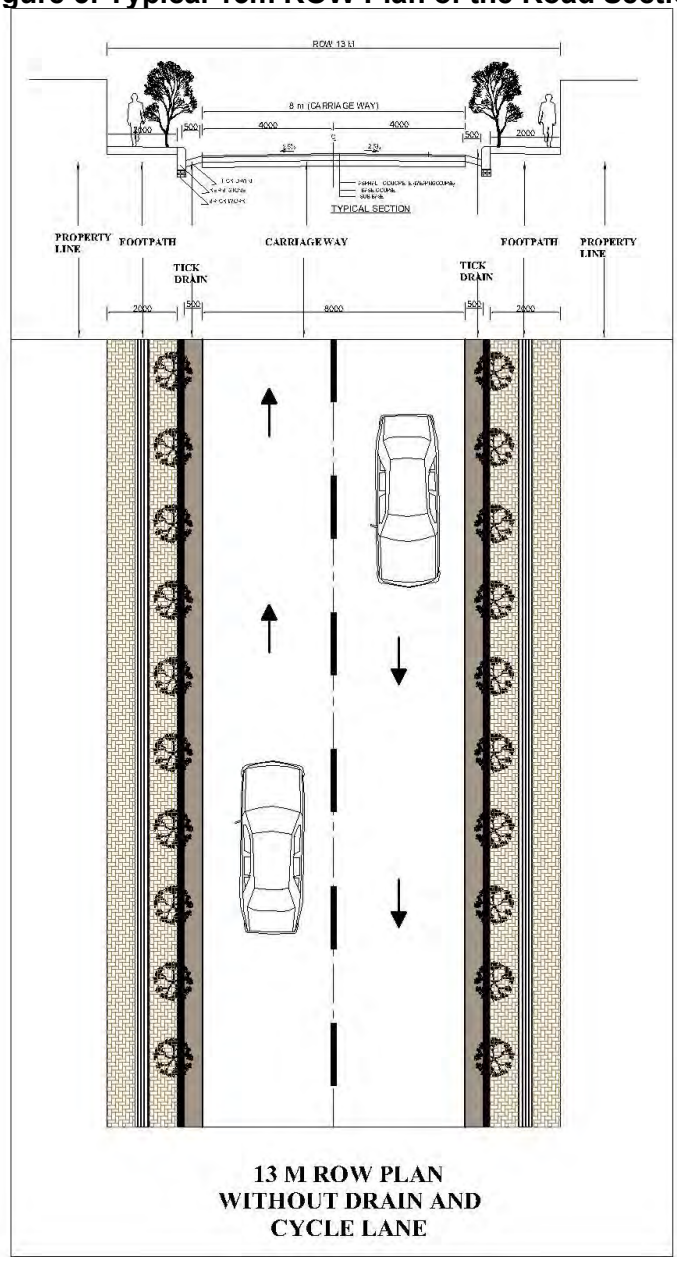


Figure 6: Typical 13m ROW Plan of the Road Section

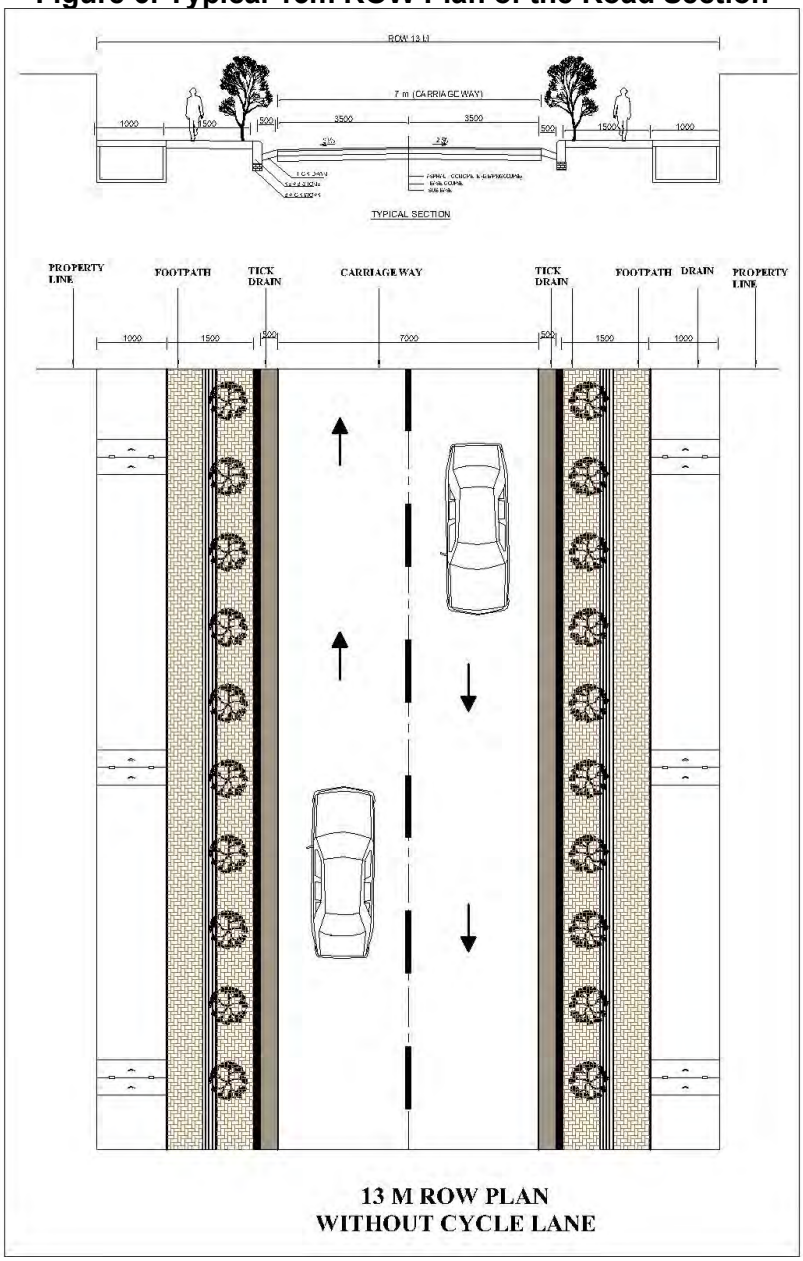


Figure 7: Typical 10m ROW Plan of the Road Section

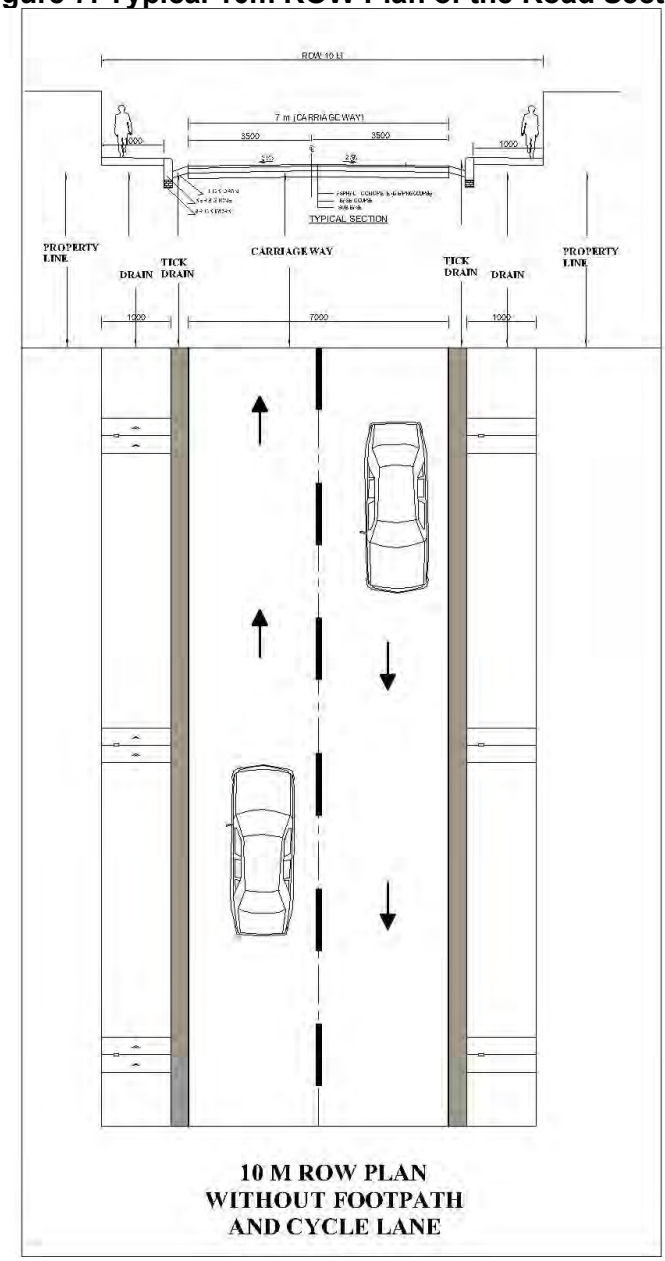


Figure 8: Typical 9m ROW Plan of the Road Section

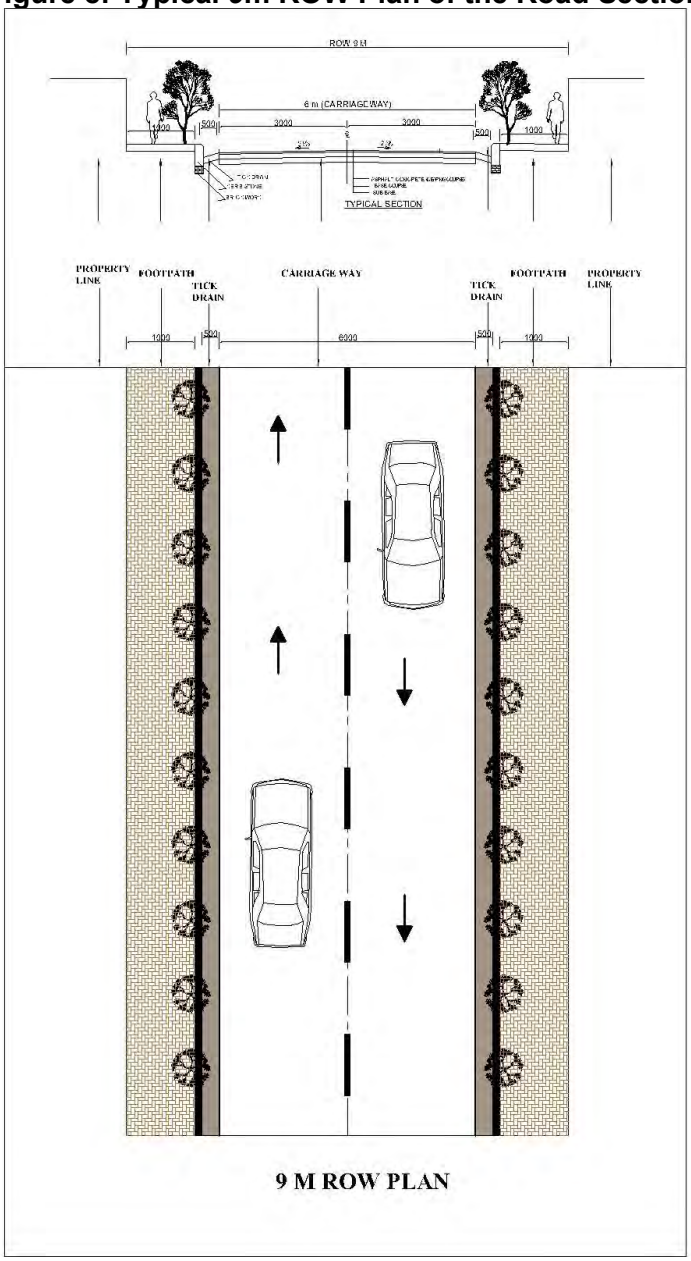
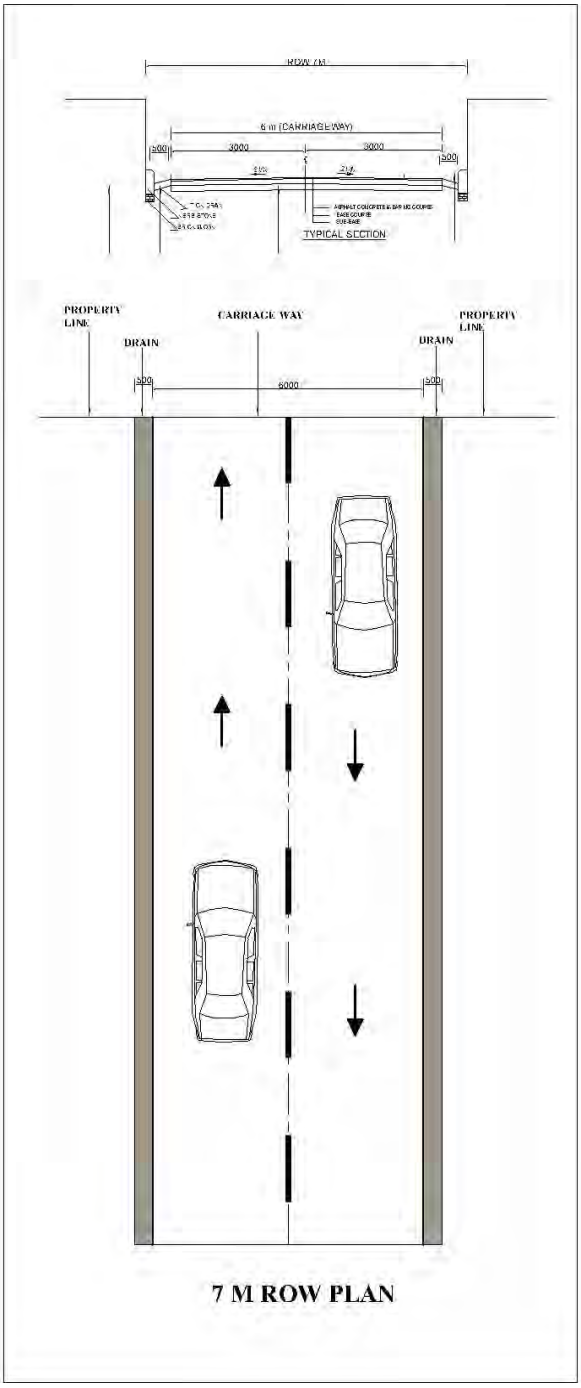
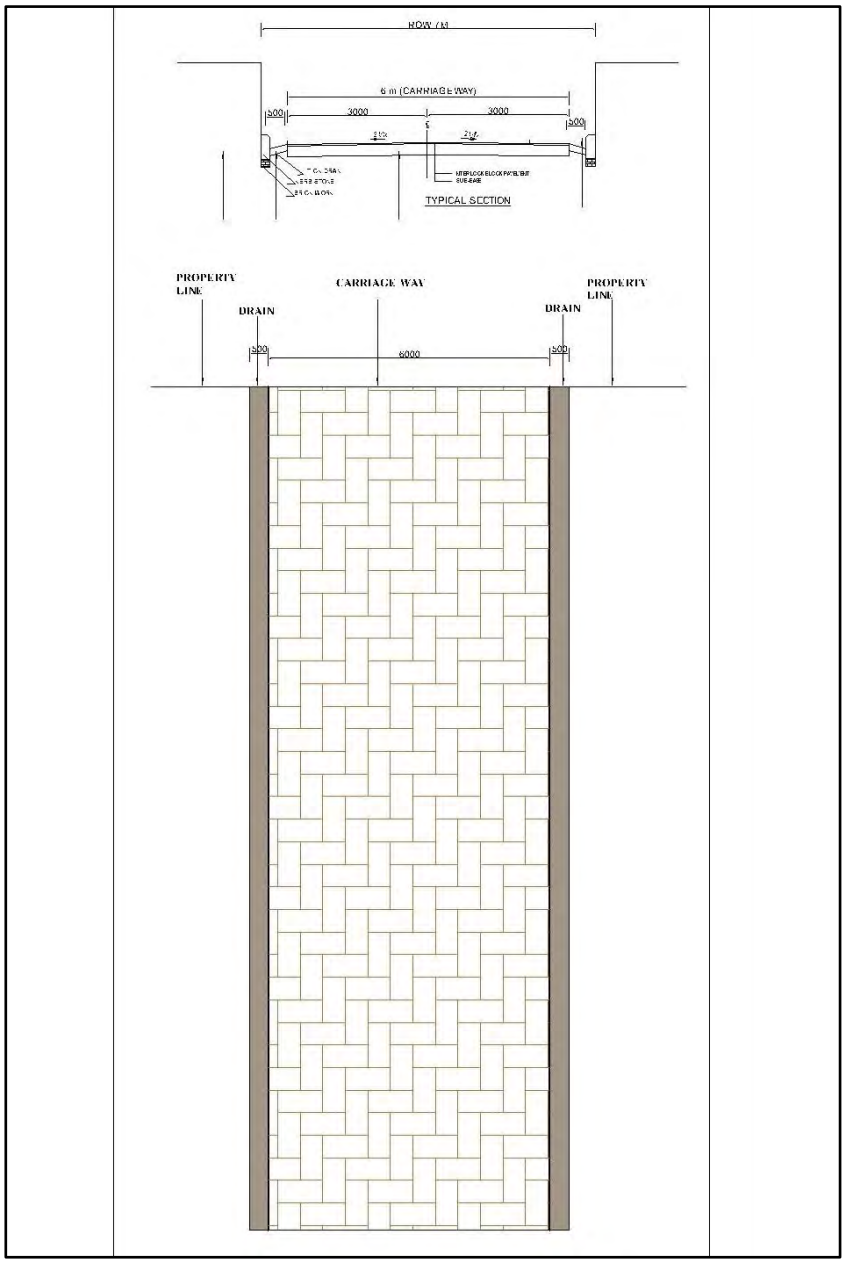


Figure 9: Typical 7m ROW Plan of the Road Section



Source: Design Summary Sheet, DUDBC 2023

Figure 10: Typical ROW Plan for Janaki Temple Bibah Mandap to Maharaj Sagar Road Section



Source: Design Summary Sheet, DUDBC 2023

IV. DESCRIPTION OF THE ENVIRONMENT

A. Baseline Information

59. The objective in this chapter is to provide an environmental baseline of the proposed subproject sites in Janakpur SMC. Baseline data includes an inventory of physical, ecological and socio-economic parameters. Baseline environmental data presented in this chapter are based on

available secondary information. No sampling for air quality, noise and water quality was conducted. Baseline environmental monitoring for such will be conducted before the start of construction.

B. Physical Environment

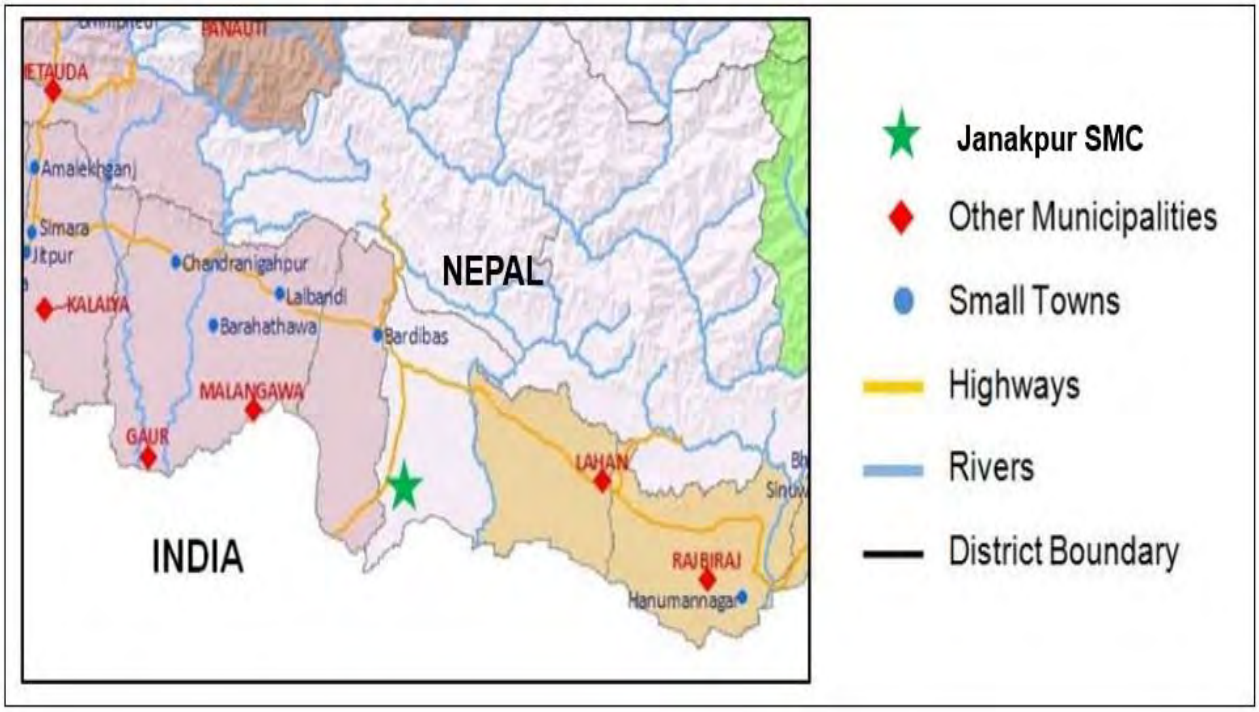
60. **Topography and Location**. Janakpur is located in the Eastern Terai, approximately 300 km from Kathmandu, at an altitude ranging from 70 to 77 m above mean sea level (msl). It is situated at latitude 26º43' N and longitude 85º 58' E, just a few kilometers away from the Indian border. The town is positioned 25 km north of the Mahendra Highway and 25 km south of the Churia Hills. Bounded by the Dudhan River to the west and the Jaladha River to the east, Janakpur is a significant economic and service center for the East/Central Terai and Hills. Its primary functions revolve around agricultural processing and serving the rural hinterland. Janakpur city is spread over a large area of 91.97 sq. km and has a population of 194,556 (Census 2021).

61. The subproject area located at the plain terrain of terai region of Nepal. Janakpur is a sub-metropolitan city lies in Dhanusha District of Madhesh Province. The city is a hub for religious and cultural tourism. Janakpur is the capital for Madhesh Province as well as the headquarter of Dhanusha District. The city was founded in the early 12th century. According to tradition and an Archeological evidence found at the site, ancient civilization indicates Janakpur Dham as the capital of the Videha dynasty that ruled the Mithila region in ancient times. It is about 23 km away from the Bhitthamore border of India. The location map of the Janakpur Sub-Metropolitan City with jurisdiction and general view of project town are shown in Figure 11 to 13.

62. **Geology and Soils**. The general geology of the Janakpur area primarily consists of alluvium deposits from the Terai plain. The Terai plain is an extension of the Gangetic plain and reaches an elevation of up to 200 meters. Geologically, it is composed of Quaternary sediments, including fine to coarse sand, silt, and clays. These sediments overlay gravel deposits within a matrix of sand and silt, and they are loosely deposited and not cemented. The main streams in the area have large alluvial fan deposits that are several meters thick and cover the entire project area. The fine sand, silt, and clays are derived from the surrounding sloping catchment, eroded during recent floods, and transported by rivers with moderate to steep gradients. Eventually, these sediments are deposited on the gentle slopes of the Terai plain as the velocity of the flood flows decreases.

63. Janakpur SMC is situated in the Terai region. The district's geology is evident in its physiography, and the rock formation is predominantly longitudinal, running from east to west throughout the district. Within the subproject area, the soil composition consists primarily of alluvial deposits, including sand, clay, silt, gravel, and coarse fragments, deposited by the Kamla River and its tributaries. Due to its location in a floodplain, the groundwater depth in this area is relatively shallow. The subproject area also contains bedrock formations such as quartzite and spathic mica schist. Based on the general soil map, Janakpur SMC has alluvial deposits of mainly sand, clay, silt, gravels and coarse fragments of the nearby rivers. The soil classification of the project area is shown in Figure 14.

Figure 11: Location Map of Janakpur Sub-Metropolitan City



Source: Department of Survey-Nepal

Figure 12: Janakpur Sub- Metropolitan Area

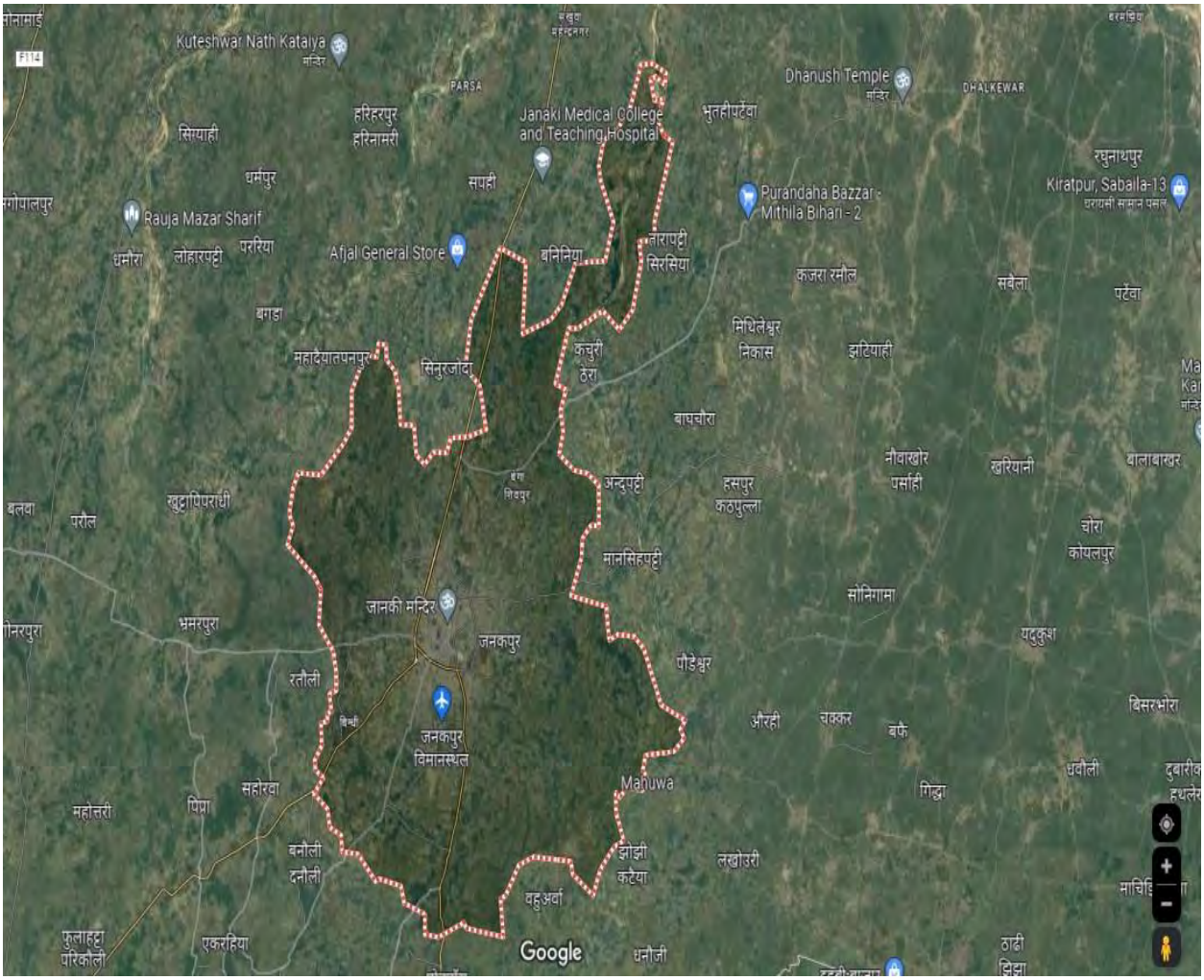


Figure 13: General View of Janakpur Town

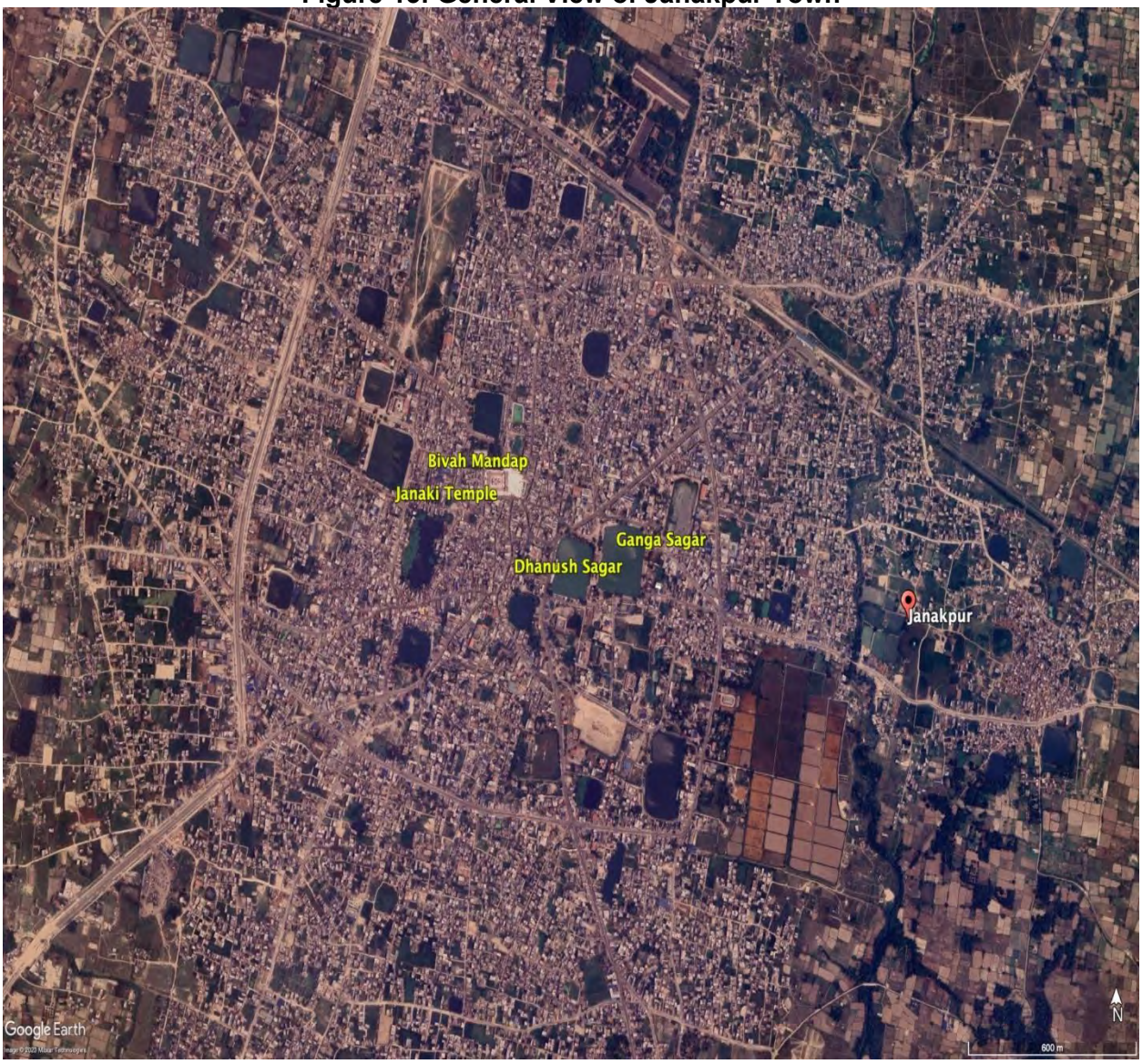
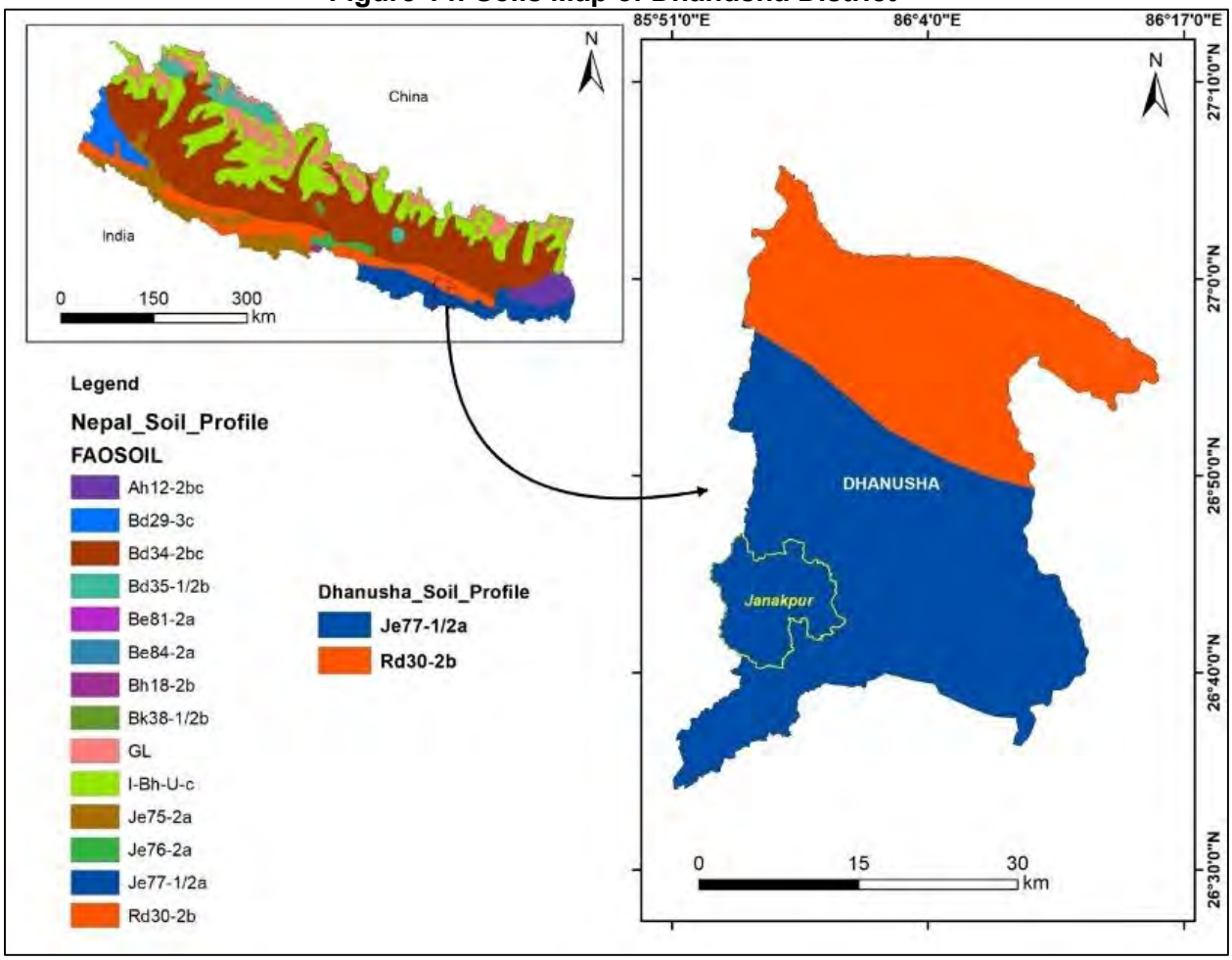


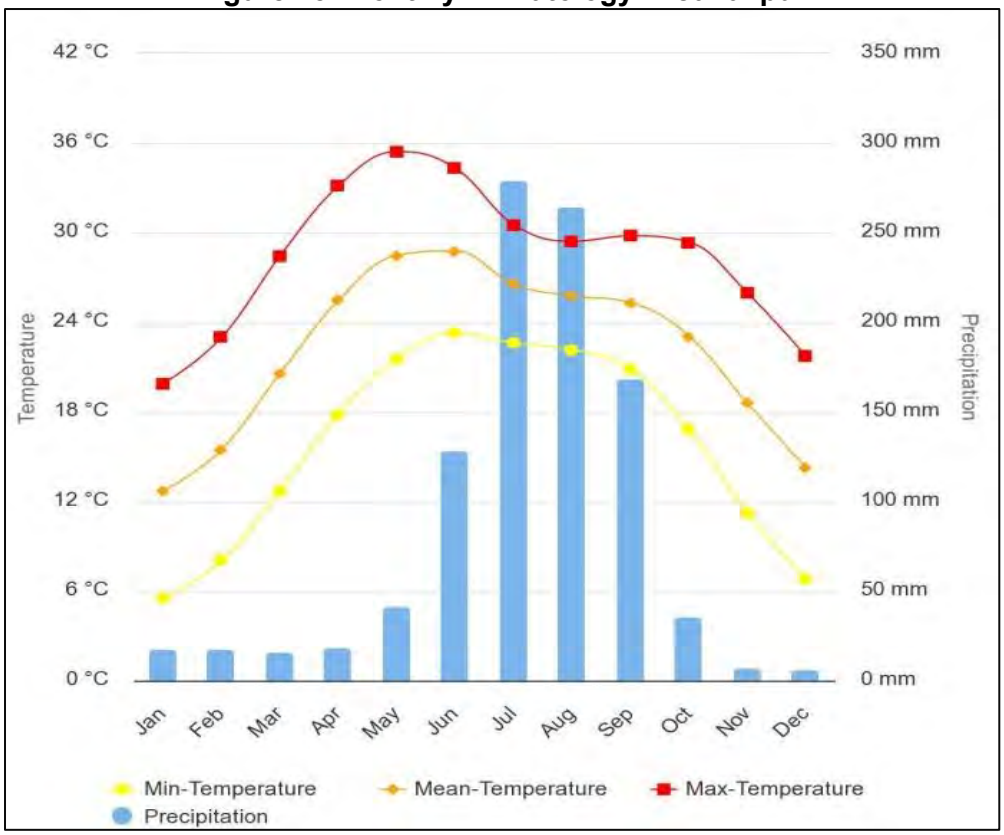
Figure 14: Soils Map of Dhanusha District



Source: FAO/UNESCO's SOTER (Soil and Terrain) database

64. **Climatic Conditions**. The proposed road subproject in Janakpur SMC is located within a tropical climatic zone. For climate analysis, data from the Janakpur Airport stations in Dhanusha have been considered, although the road project itself does not pass through these stations. These stations are in close proximity to the Dhanusha district. The area experiences an annual precipitation of 1,348 mm, with 81% of the rainfall occurring during the monsoon season. The heaviest rains typically occur in July, while November sees the lowest rainfall. Pre-monsoon activities are prevalent in April and May, which are also the hottest months. December and January, on the other hand, are the coldest months with the least amount of rainfall. The average yearly temperature is approximately 24°C.

Figure 15: Monthly Climatology in Janakpur



Sources: Climate Change Knowledge Portal, 2023

65. Air Quality. Baseline data on air quality for the subproject area is not available. The subproject location is in a mixed-use area (residential, commercial and institutional). There are no heavy polluting industries in the area. Non-point sources of air pollution in the subproject site include emissions from vehicles, and dust from loose soil. The contractor will be required to establish the baseline air quality before the start of construction.

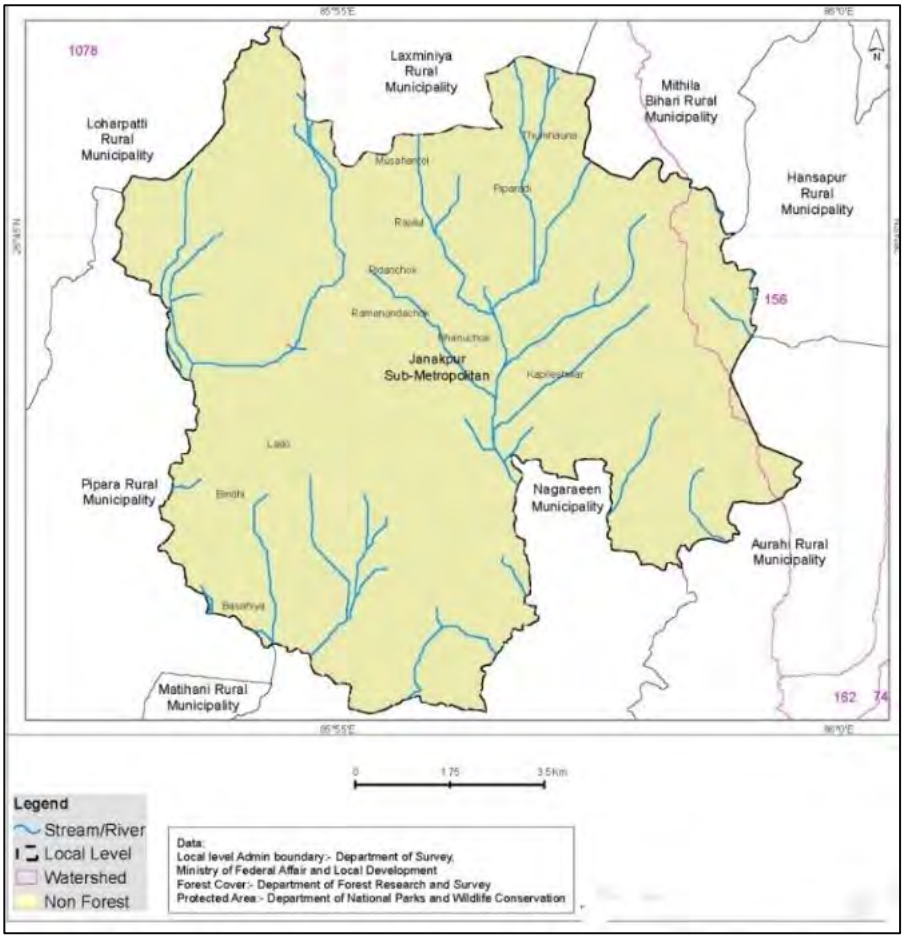
66. **Noise Level**. Baseline data on noise is not available for the subproject area. Some sources of noise pollution in the subproject site may include motor vehicles, construction work, audio entertainment systems, loudspeakers and noisy people. The contractor will be required to establish the baseline noise levels before the start of construction.

67. **Drainage**: Janakpur is located in a flat terrain with altitude varying from 85 meters in the north to 72 meters in the south. Two rivers viz. Jalad Nadi in the east and Dudhmati Nadi in the

west flow north south taking with them all the incoming drains from different parts of the Municipality. The presence of these rivers provides greater advantage in developing a storm water drainage system. In addition to that presence of hundreds of ponds helps to save many parts of Janakpur from flooding. These ponds play a role of retention ponds during heavy rain.

68. **Water Resources.** Janakpur is geographically surrounded by the Dudhan River to the west and the Jaladha River to the east. It is situated on a sizable groundwater basin that receives replenishment from streams flowing across coarse alluvial fan deposits along the northern mountain front. Throughout the region, groundwater levels typically remain within 5 meters of the surface. Due to the abundant availability of groundwater, Janakpur solely relies on this source for its water supply. The hydrogeological data confirms the presence of extensive underground water resources. Additionally, Janakpur boasts several ponds within the city, which play a vital role in fish production, catering to the needs of numerous other cities in the country. Notably, certain ponds such as Ganga Sagar, Dhanush Sagar, Ratna Sagar, and Maharaj Sagar serve as sites for religious bathing. There are no any severe flooding and inundation along the road alignment, although few unstable sites are recorded with water logged and flooding area along the road alignment. The river network of the project area is illustrated in Figure 16.

Figure 16: Drainage Pattern of Janakpur SMC



Source: Department of Forest Research and Survey; Department of Survey, 2020

C. Biological Environment

69. The project site does not lie within any protected areas and ecologically sensitive areas. There are no any ecologically sensitive areas like protected area, wildlife reserve, buffer zone, wetland along the proposed road alignment. The road subprojects will not impact to any biological components.

70. **Vegetation**. The major floras recorded within the project area *are* Sal *(Shorea robusta),* Karma *(Adina cordifolia),* Sissoo *(Dalbergia sissoo),* Khayer *(Acacia catechu),* Botdhainro *(Lagerstroemia parviflora),* Asna *(Terminalia alata),* Simal *(Bombax ceiba),* Jamun *(Syzygium cumini),* Satisal *(Dalbergia latifolia),* Aap *(Magnifera indica),* Chilaune *(Schima wallichii),* Bhorla *(Bauhinia vahlii),* Satibair *(Rhus parviflora),* Babiyo *(Eulaliopsis binata),* Bans *(Dendroclamus strictus),* Neem *(Azadirachta indica),* Gambhari *(Gmelina arborea),* Peepal (*Ficus religrosa),* Bakaino *(Melia azedarach),* Bhalayo *(Semecarpus anacardium),* Rajbriksha *(Cassia fistula*), dabdabe *(Garuja pinnata),* Gayo *(Bridelia retusa),* Siris *(Albizzia mollis),* Utanki *(Bauhinia malabarica),* Gulmohar *(Delonix regia),* Jacaranda *(Jacaranda mimosifolia),* Ashoka *(Saraca asoca) etc.* Sal *and* Bakaino are Endangered Species.

71. Herbs common in the project area are Harro (*Termnalia chebula*), Barro (*Terminalia bellirica)*, Amala (*Emblica officinalis*), and Pipala (*Piper longum)*. Harro and Barro are endangered species.

72. **Fauna**. The bird species found in the project region area are: Kalij (*Lophura leucomelana*), Mayur (*Pavo cristatus*), and Dhukur (*Streptopelia chinensis*). Birds such as mayur can be spotted in the agricultural fields. Among these, the Kalij is a protected species in Nepal (LC (least concern) per IUCN red list). Wildlife found in the region include: Chituwa (*Panthera pardus*), Bandar (*Macaca assamenius)*, Bhalu (*Ursus thibetanus*), Ratuwa (*Muntiacus muntijack*), Dumsi (*Erethizon dorsatum)*, Habre (*Ailuropoda melanolerica*), and Lokharke (*Sciurus carolinensis*). However, as per the local enquires, these are not recorded within the urban or habitation area. There are a variety of snakes in the district.

73. **Integrated Biodiversity Assessment Tool (IBAT).** As per IBAT screening of the project areas, there are no protected areas or key bodiversity areas within 10 km of Janakpur. Screening provides a total of 34 IUCN red list species in the wider 50 km area as listed below. IBAT screening also lists 10 restricted range species that may occur in 50 km region. Given that there no proteted areas or forests within the project areas which is primarily urban and peri urban in natures, and the lands are also cultivated extensively in the outer area, the occurance of these species within the subproject areas is remote.

Table 25*:* IUCN Red List of Threatened Species potentially found in 50 km radius of project area per IBAT screening

S.N.	Species Name	Common Name	IUCN Category	Biome
1	*Batagur dhongoka*	Three-striped Roofed Turtle	CR	Terrestrial, Freshwater
2	*Aythya baeri*	Baer's Pochard	CR	Freshwater
3	*Emberiz aureola*	Yellow-breasted Bunting	CR	Terrestrial, Freshwater
4	*Geoclemys hamiltonii*	Spotted Pond Turtle	EN	Terrestrial, Freshwater

S.N.	Species Name	Common Name	IUCN Category	Biome
5	*Hardella thurjii*	Crowned River Turtle	EN	Terrestrial, Freshwater
6	*Morenia petersi*	Indian Eyed Turtle	EN	Terrestrial, Freshwater
7	*Nilssonia gangetica*	Indian Softshell Turtle	EN	Terrestrial, Freshwater
8	*Nilssonia hurum*	Indian Peacock Softshell Turtle	EN	Terrestrial, Freshwater
9	*Platanista gangetica*	Ganges River Dolphin	EN	Freshwater
10	*Axis porcinus*	Hog Deer	EN	Terrestrial, Freshwater
11	*Sterna acuticauda*	Black-bellied Tern	EN	Terrestrial, Freshwater
12	*Haliaeetus leucoryphus*	Pallas's Fish-eagle	EN	Terrestrial, Freshwater
13	*Neophron percnopterus*	Egyptian Vulture	EN	Terrestrial, Freshwater
14	*Leptoptilos dubius*	Greater Adjutant	EN	Terrestrial, Freshwater
15	*Tor putitora*		EN	Freshwater
16	*Indotestudo elongata*	Elongated Tortoise	CR	Terrestrial
17	*Manis pentadactyla*	Chinese Pangolin	CR	Terrestrial
18	*Houbaropsis bengalensis*	Bengal Florican	CR	Terrestrial
19	*Sypheotides indicus*	Lesser Florican	CR	Terrestrial
20	*Vanellus gregarius*	Social Lapwing	CR	Terrestrial
21	*Gyps bengalensis*	White-rumped Vulture	CR	Terrestrial
22	*Sarcogyps calvus*	Red-headed Vulture	CR	Terrestrial
23	*Gyps tenuirostris*	Slender-billed Vulture	CR	Terrestrial
24	*Gyps indicus*	Indian Vulture	CR	Terrestrial
25	*Nardostachys jatamansi*	Indian Nard	CR	Terrestrial
26	*Sitana fusca*	Dark Sitana	CR	Terrestrial
27	*Caprolagus hispidus*	Hispid Hare	EN	Terrestrial
28	*Cuon alpinus*	Dhole	EN	Terrestrial
29	*Elephas maximus*	Asian Elephant	EN	Terrestrial
30	*Manis crassicaudata*	Indian Pangolin	EN	Terrestrial
31	*Melanochelys tricarinata*	Tricarinate Hill Turtle	EN	Terrestrial
32	*Panthera tigris*	Tiger	EN	Terrestrial
33	*Varanus flavescens*	Yellow Monitor	EN	Terrestrial
34	*Aquila nipalensis*	Steppe Eagle	EN	Terrestrial

Source: IBAT PS6 & ESS6 Report, 2023

Table 26*:* Restricted Range Species potentially found in 50 km radius of project area per IBAT screening

S.N.	Species Name	Common Name	IUCN Category	Biome
1	*Chrysomma altirostre*	Jerdon's Babbler	VU	Terrestrial, Freshwater
	Salvinia natans	Floating Fern	LC OR LR/LC	Freshwater
2	*Xenentodon cancila*		LC OR LR/LC	Freshwater
3	*Schistura multifasciata*		LC OR LR/LC	Freshwater
4	*Schizothorax progastus*	Dinnawah snowtrout	LC OR LR/LC	Freshwater
5	*Oreichthys cosuatis*		LC OR LR/LC	Freshwater
6	*Psilorhynchus nepalensis*		LC OR LR/LC	Freshwater
7	*Macrobrachium rosenbergii*	Giant River Prawn	LC OR LR/LC	Freshwater
8	*Prinia cinereocapilla*	Grey-crowned Prinia	VU	Terrestrial
9	*Liopeltis rappi*	Himalayan Stripe-necked Snake	LC OR LR/LC	Terrestrial
10	*Theloderma baibungense*	Baibung Small Treefrog	LC OR LR/LC	Terrestrial

Source: IBAT PS6 & ESS6 Report, 2023

D. Socio-economic and Cultural Environment

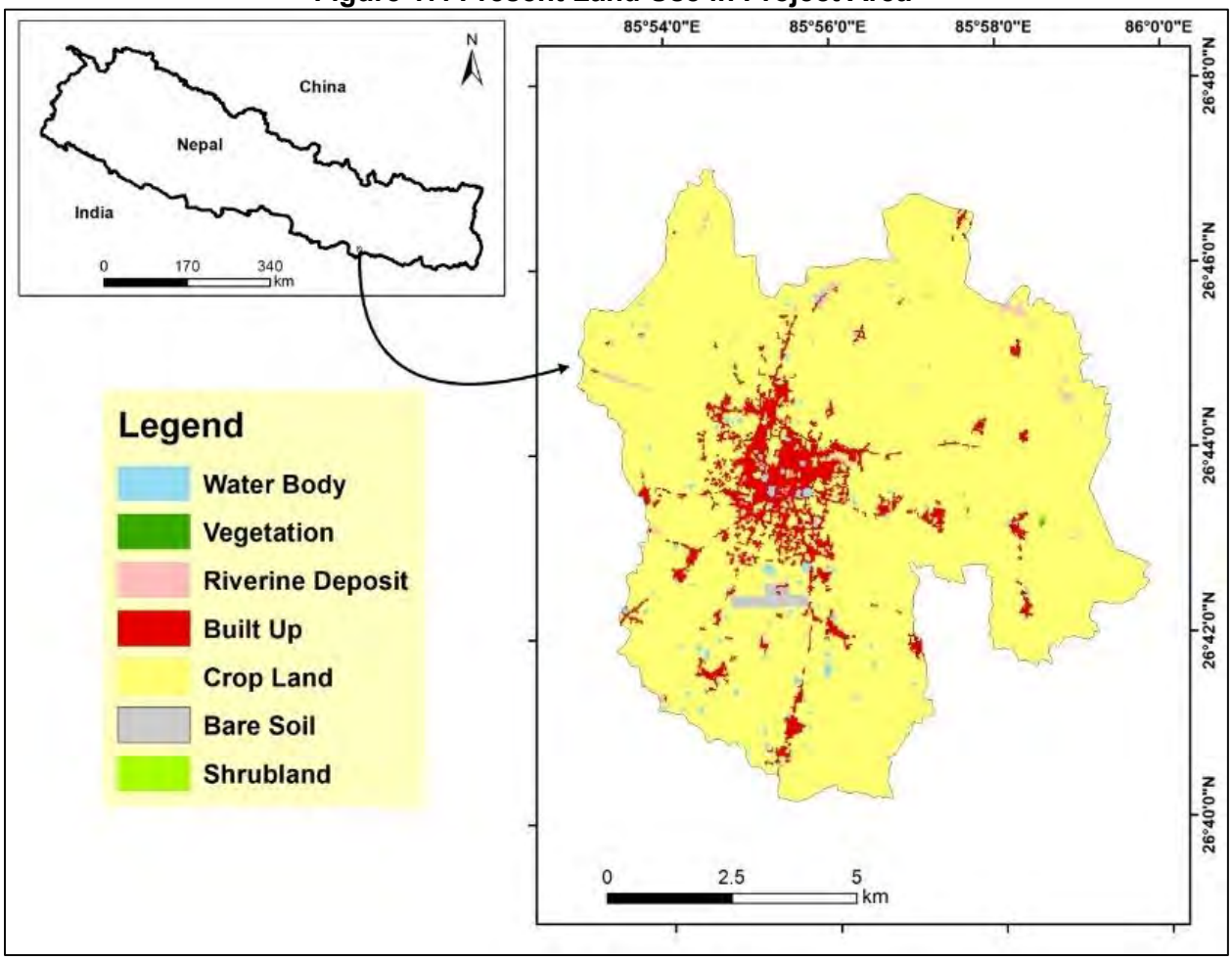
74. Land Use. The proposed roads project area consists of settlements and agricultural lands. There are few private trees along the alignment at some places. The current land use has been broadly categorized as water body, vegetation cover, riverine deposit, built up area, crop land, bare soil, and shrub land. Out of total area, crop land (90.48%) is found to be dominant land cover in the Janakpur SMC followed by built up area (7.14%) and remaining land use type are water body, vegetation cover, riverine deposit, bare soil and shrub land. The detail of land use and land cover is shown in following figure and the table.

Table 27: Present Land Use in Project area

Land Use Type	Janakpur SMC	
	Area (sq. km)	Percentage
Water Body	0.96	1.12
Vegetation	0.02	0.02
Riverine Deposit	0.55	0.64
Built Up	6.14	7.14
Crop land	77.80	90.48
Bare Soil	0.49	0.57
Shrub land	0.03	0.04

Sources: Esri Nepal and Topographic Map, Department of Survey, 2023

Figure 17: Present Land Use in Project Area



Sources: Esri Nepal and Topographic Map, Department of Survey, 2023

75. **Demography**. As per the National Population and Housing Census 2021, the population of Janakpur SMC is 194,556 where 99,764 are male and 94,792 are female. The average population density of the Janakpur SMC is 2,115 persons per square km. There are about 88.52% of population are Hindu, 11.42% Muslim, 0.03% Buddhists, 0.04% Christians and 0.02% with other religions in the project affected local bodies. The population density of Janakpur SMC has the population density with 100.17 person's square kilometers.

76. **Caste and Ethnicity**. The project affected local level has a multi-ethnic composition of different casts with Brahmin hills, Musalman, Yadav, Sundi, Brahman-Tarai, Dhanuk and Tatma/Tatma as the dominant ethnic groups. As per the National Population and Housing Census, 2021 of Nepal, Yadav is dominant caste in Janakpur SMC with 12.39% of total population followed by Musalman (10.63%), Sundi (8.32%), Brahman-Tarai (6.05%), Dhanuk (4.75%), Tatma/tatwa (3.43%) and remaining 54.37 % in other groups. The detail of the population distribution in project affected local level is presented in the following table.

Table 28: Population Distribution with Caste and Ethnicity

S.N.	Caste/Ethnicity	Janakpur SMC	
		Population	%
1	Kshetri	651	0.33
2	Brahman – Hill	998	0.51
3	Magar	190	0.10
4	Tamang	144	0.07
5	Newa:(Newar)	500	0.26
6	Gurung	14	0.01
7	Pariyar	18	0.01
8	Thakuri	171	0.09
9	Mijar	30	0.02
10	Foreigner	1363	0.70
11	Musalman	20805	10.69
12	Yadav	24111	12.39
13	Chamar/Harijan/Ram	5101	2.62
14	Kurmi	5266	2.71
15	Dhanuk	9236	4.75
16	Dusadh/Pasawan/Pasi	4615	2.37
17	Kewat	4697	2.41
18	Brahman - Tarai	11762	6.05
19	Kalwar	3903	2.01
20	Tatma/Tatwa	6671	3.43
21	Khatwe	4513	2.32
22	Sundi	16182	8.32
23	Bin	5487	2.82
24	Sonar	4782	2.46
25	Kayastha	4356	2.24
26	Bhumihar	5600	2.88

S.N.	Caste/Ethnicity	Janakpur SMC	
		Population	%
27	Other	53390	27.44

Source: National Population and Housing Census, 2021

77. **Literacy rate and educational institutions**. The literacy rate of Janakpur SMC is 76.6% with male literacy at 84.6% and female literacy rate at 68.5%. Noted educational institutions include Rajarshi Janak Campus, Janakpur Community College, Madhyamanchal Regional Engineering College, Dhanusha Science Campus, Janaki College of Management. Mithila Institute of Technology (MIT), Millenium College, Manipal Engineering College and Universal Academy College. In Janakpur, there are 115 educational institutions run by the Government and the private sector. These include 17 technical schools and 21 higher secondary schools. The illiteracy rate is about 28 % in the Municipality.

78. **Main sources of income**. The main occupations of the people in project affected local level include Elementary Workers (40%), Skilled Agriculture, Forestry and Fishery Workers (18.5%), Managers (11.25%), service and sales workers (9.6%), Craft and related trades workers (7.9%), Professionals (7.6%), Plant and machine operators and assemblers (3.1%), technical and associate professional (3.3%), Office assistance (1.7%) and armed forces (0.1%) (Nepal Housing and Population Census, 2021).

79. **Access to electricity**. All the wards of the project affected local level have electrification network. Where, 99.08% of the households used electricity for lighting purposed and 0.60% of the household used electricity for the cooking purposes.

80. **Sources of drinking water**. Sources of water in the project affected local level include Tube well/handpump (80.09%), Tap/piped water (within premises) (13.57%), Tap/piped water (outside premises) (3.49%), Jar/bottle (0.98%), spout water (0.41%), covered well/kuwa (0.15%) and other (0.97%).

81. Piped water supply in the Municipality started with the construction of a water supply system by Indian Cooperation Mission in 1967. The Japanese Government also constructed a few tube wells to supplement water supply. Initially the water supply system was operated by DWSS and this was taken over by NWSC in 1981. The present system consists of two tube wells, two OHTs and about 46 km of pipes of various material and sizes. It serves about 17% of the existing population. Groundwater is the only source of water for the town. Households and other customers not connected to the NWSC system draw water from private hand pumps (manually drilled tube wells). Some institutions/industries have their own large diameter tube wells and are completely independent of NWSC. The Municipality installs about 15 hand pumps/yr. to serve the poor. Public hand pumps are also installed at many locations.

82. **Sanitation**. About 61.62% of the household in the project affected local level used flush toilet (septic tank). Similarly, 26.37% of the households used Pit toilet, 4.31% household used flush toilet (Public sewerage), 0.48% of the household used public toilet whereas 7.22% household still without toilet facilities. Households use on-site sanitation facilities like septic tanks, and discharge septic tank outflow and sullage into existing drains and open plots/areas in the Dhanusha. Except during rains, drains mostly carry wastewater from town area.

83. **Solid Waste Management**. There is the arrangement of waste collection. There are the tractors for the collection of waste with helpers and driver in each vehicle. Segregation at source is

not in practice. Waste is collected daily in the urban areas (main road areas) while in the rest of the settlements; waste is collected once in a week. Hospital wastes are managed by the hospital themselves while the rest of the waste from supermarkets, health posts, commercial areas, hotels are collected by the SMC.

84. **Health centers**. There are 7 private nursing homes and about 100 private clinics in the Municipality. Private clinics are operating either individually or inside the pharmacy. Janakpur is also a center for health services for people from hilly districts of Central Nepal and adjoining villages. The project affected district consists of several hospitals, including Janakpur Zonal Hospital, Zonal, Janaki Eye Hospital, Shri Ram Hospital, Janakpur Trauma Hospital, Janaki Medical College Teaching Hospital, Janaki Health Care and Research Center, Kavya Hospital, Hospital and Researchs Center, Aastha Hospital Private Limited and Godavari Modern Hospital. At the ward sub-health post, the prevalent illnesses reported are gastroenteritis and diarrhea, which can be attributed to factors such as inadequate water quality, the absence of proper surface drainage systems, and insufficient management of solid waste.

85. **Industries**: Janakpur is one of the major centers of industrial activity in Nepal. In 2006, there were 12 registered industries within the Municipality. Given the favorable location and conditions for growth, the number of industrial establishments has steadily increased from 12 in 2006 to 143 industries (mostly small industries) in 2010 (Source: FNCCI Janakpur, 2011). Some 50% of total productions of the industries were exported to neighboring districts mainly to Khotang, Okhaldhunga, Ramechhap, Udayapur. Sindhuli and Kathmandu. The remaining 15% of the production was consumed locally and 15% was exported to India. The majority of industries were small scale industries such as rice mills, furniture, paper industry, timber mill, aluminum utensils, silver ornaments, battery separators and food products. Small scale industries, commercial banks, finance institutions and trading houses have created significant employment opportunities. Furthermore, there are a number of large industries north of Janakpur along Dhalkebar - Janakpur corridor, employing a significant number of people.

86. **Physical Cultural Resources**. Janakpur is an important pilgrimage site for Hindus. Janakpur, popularly known as Janakpur is named after the late King of Videha in Mithila region – Janaka and birthplace of the goddess Sita. The rulers of the Videha kingdom were accorded the title Janaka, meaning 'father' in Sanskrit, and this character is the best-known bearer of the same. All the proposed roads alignments are out of the cultural heritage sites. Furthermore, there are no PCRs designated as protected monuments along the road stretches.

87. Janakpur Dham is known for the abundance of temples and ponds full of religious faiths and beliefs, which are visited every year by millions of religious tourists. Devotees from home and abroad visit these ponds and temples to worship or to take holy baths and thus the historical and spiritual significance of these ponds remains intact. Ponds and temples have a cultural and historical significance to the people of Janakpur Dham. The pond is considered holy and is used for cultural and ritual ceremonies practiced at the many significant temples located along banks of pounds.

88. During the Bibah Panchami or Bibah festival the wedding of Rama and Sita is re-enacted in the famous Bibah Mandap temple in November or early December (after Kartik Purnima). This time of the year about 100,000 pilgrims from India and different parts of Nepal come for a procession with elephants, horses, and decorated chariots with beating drums. In project towns there are other monuments where the people from different other districts and country come to visit and worshipping the monuments. The list of monuments found within Dhanusha districts are listed in Table 29 and Figure 18.

Table 29: List of Monuments around the Project Area within Dhanusha Districts

S.N.	Name	Location and Coordinates	Monument Recognition / Project Components Distance	Image
1	Ram Janaki Temple	Janakpur SMC Latitude-26.730427° Longitude-85.925718°	National Archaeological Importance/the Bibah Mandap to Maharaj Sagar Road is nearby the outer compound wall of the temple location.	
2	Bibah Mandap Temple	Janakpur SMC Latitude- 26.760285, Longitude- 85.942188	National Archaeological Importance/ the Mills Area-Benga Piprari Road 110m distance from the temple location.	
3	Dhaush Sagar	Janakpur SMC Latitude-26.727840, Longitude-85.928304	Religious with Cultural Importance / the Bibah Mandap to Maharaj Sagar Road is 400m distance from the pond location.	

S.N.	Name	Location and Coordinates	Monument Recognition / Project Components Distance	Image
4	Ram Sagar	Janakpur SMC Latitude-26.727334, Longitude-85.926782	Religious with Cultural Importance / the Bibah Mandap to Maharaj Sagar Road is 350m distance from the pond location.	
5	Ganga Sagar	Janakpur SMC Latitude-26.728089, Longitude-85.929891	Religious with Cultural Importance / the Bibah Mandap to Maharaj Sagar Road is 500m distance from the pond location.	
6	Hanuman Temple	Janakpur SMC Latitude-26.734077, Longitude-85.936711	Religious with Cultural Importance/ the RR Campus to Jallad River Kapleshwor road is 50m distance from the temple location.	

S.N.	Name	Location and Coordinates	Monument Recognition / Project Components Distance	Image
7	Shree Ram Temple	Janakpur SMC Latitude-26.728293, Longitude-85.927030	National Archaeological Importance/ the Bibah Mandap to Maharaj Sagar Road is 320m distance from the temple location.	
8	Shree Rajshri Janak Temple	Janakpur SMC Latitude-26.729276, Longitude-85.928046	National Archaeological Importance/ the Bibah Mandap to Maharaj Sagar Road is 350m distance from the temple location.	
9	Krishna Temple	Janakpur SMC Latitude-26.722431, Longitude-85.932644	National Archaeological Importance/ the Napi Road is 40m distance from the temple location.	

S.N.	Name	Location and Coordinates	Monument Recognition / Project Components Distance	Image
10	Dulaha Dulhan Temple	Janakpur SMC Latitude-26.736285, Longitude-85.918077	Religious with Cultural Importance / the Ramanand chowk -Parikrama Road is 40m distance from the temple location.	
11	Mithila Bihari	Mithila Bihari Municipality Latitude-26.778559, Longitude-85.981265	National Archaeological Importance/ the Mills Area-Benga Piprari Road is 4.5km distance from the temple location.	
12	Dhanush Temple	Dhanushadham Municipality Latitude-26.830685, Longitude-86.057014	National Archaeological Importance/ the Mills Area-Benga Piprari Road is 15km distance from the temple location.	

Source: https://en.wikipedia.org/wiki/Department of Archaeology (Nepal)

Figure 18: Monuments around the Project Area within Dhanusha District

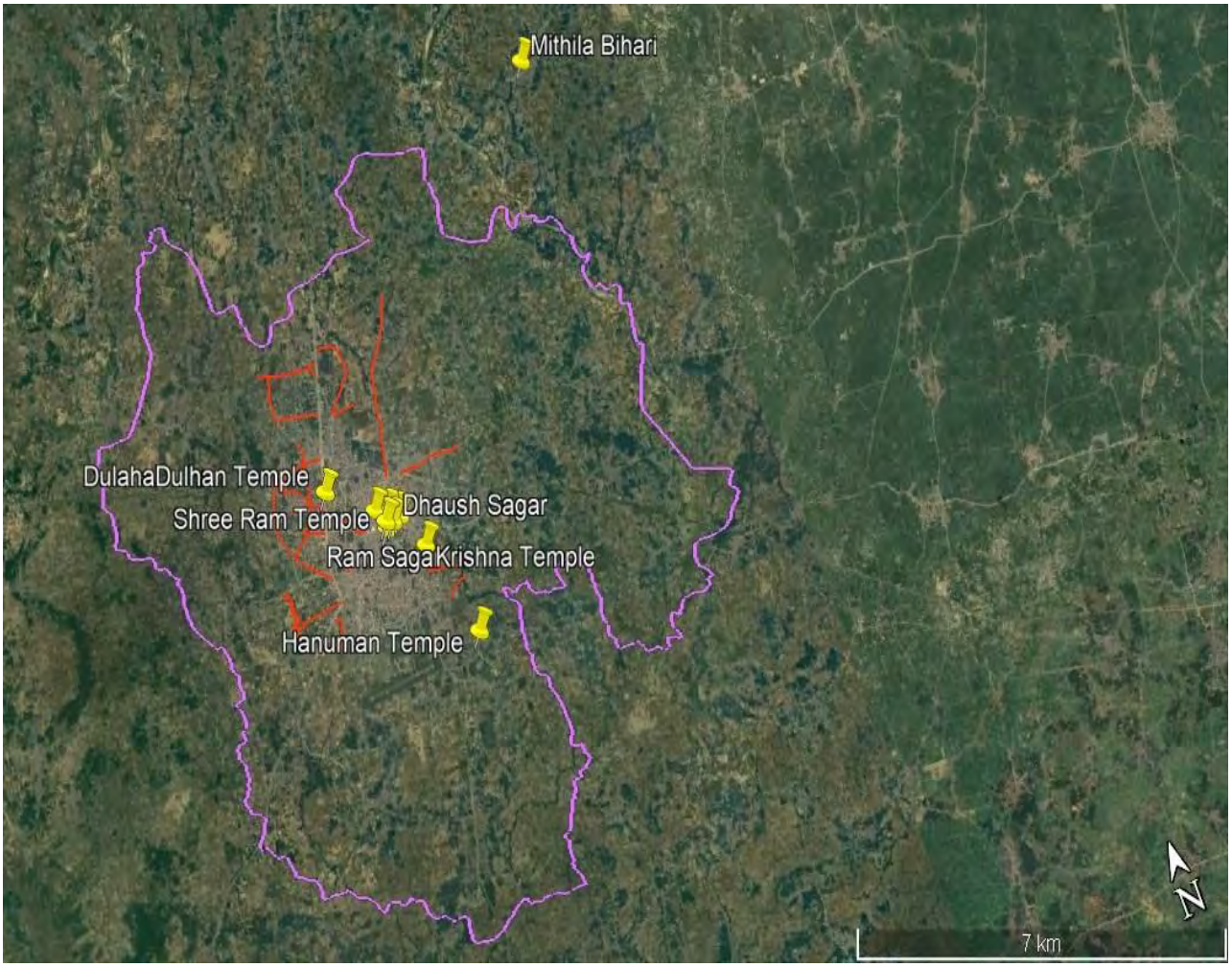
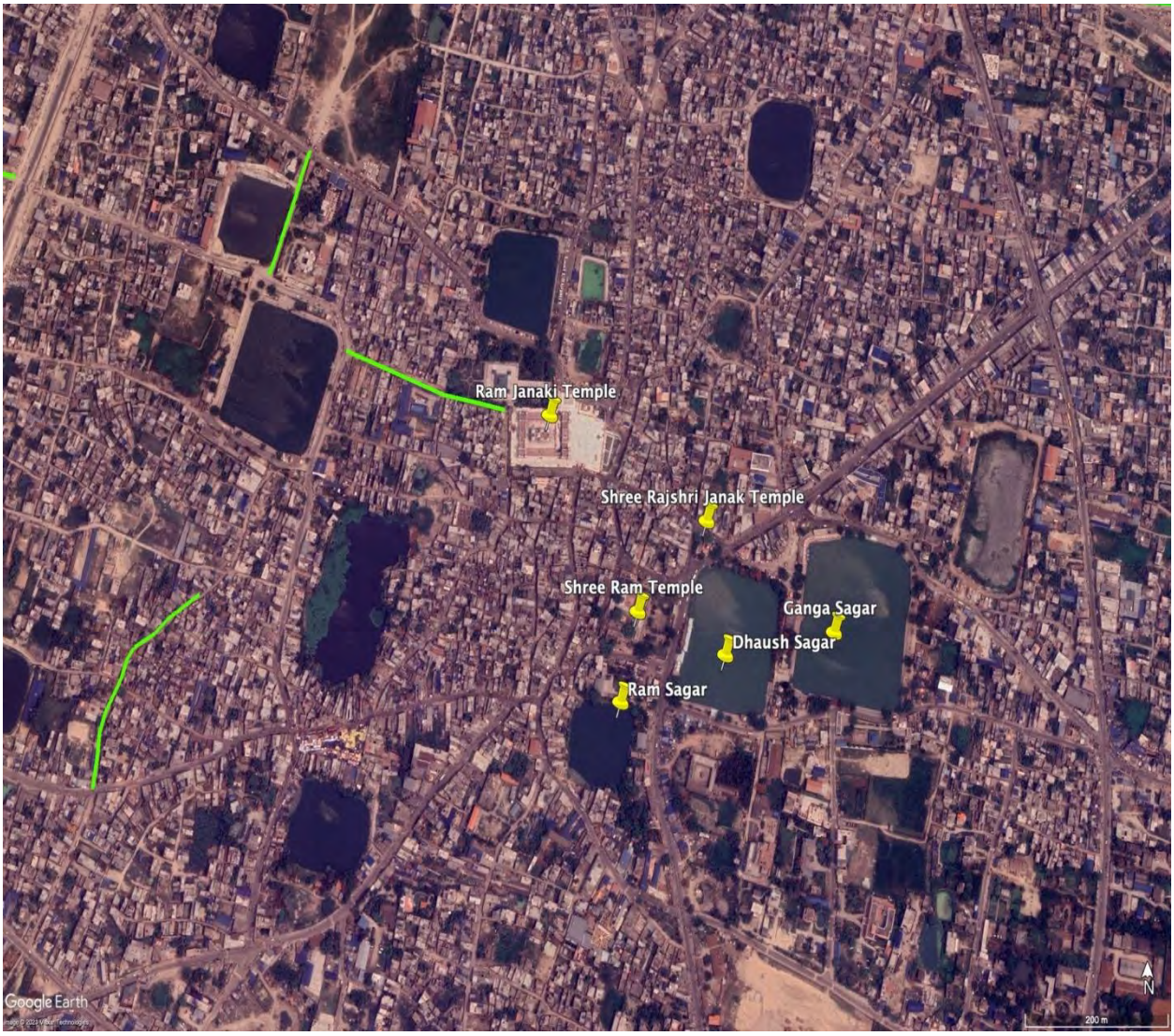


Figure 19: Monuments close to Project Roads



E. Site Environmental Features

Table 30: Site Environmental Features of Roads in Janakpur Sub-metropolitan City

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
1. **Durga Chowk to Railway Crossing:** The road starts from Durga Chowck and ends at Railway Crossing and traverses Ward Nos. 7,8 and 13. The road is 2,380m length with a Right-of-Way of 16m and a Carriage Way of 11m. The existing road has both blacktopped and graveled road sections. Stormwater Drains exist along the roads. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 2,380m and has a carriage way of 11m. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 2.5m footpath on either side. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
2. **Sita Chowck to Pul Chowck Road:** The road starts from Sita Chowck and ends at Pul Chowck Road and traverses Ward Nos. 1. The road is 1,362m length with a Right-of-Way of 16m and a Carriage Way of 11m for 640m and the rest is at 8m average. The existing road has both blacktopped and graveled road sections. Stormwater Drains of about 640m exist along both sides of the roads. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 1,362m and has a carriage way of 11m. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 1.5m footpath on either side. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
3. **Pidari Chowck to Ratan Chowck:** The road starts from Pidari Chowck and ends at Ratan Chowck Road and traverses Ward Nos. 13. The road is 692m length with a Right-of-Way of 16m and a Carriage Way of 11m for 640m and the rest is at 8m average. The existing road has blacktopped road sections. No stormwater drains are present along the roads. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 692m and has a carriage way of 11m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 1.2m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs
Janakpur	
4. **Bajrang Chowk to Balmiki Nagar Road:** The road starts from Bajrang Chowck and ends at Balmiki Nagar Road and traverses Ward Nos. 8. The road is 446m length with a Right-of-Way of 13m and a Carriage Way of 4m on an average. The existing road has blacktopped road sections. Stormwater Drains are present along both sides of the roads. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 446m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 2m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.	

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
5. **Ramanand Chowck to Railway Crossing Road:** The road starts from Ramanand Chowck and ends at Railway Crossing Road and traverses Ward Nos. 8. The road is 1,206m length with a Right-of-Way of 13m and a Carriage Way of 4m on an average. The existing road has blacktopped road in a majority of sections and PCC for certain sections. Stormwater Drains are present along both sides of the roads. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 1,206m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 2m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
6. **Balwa Police Station to Eye Hospital to Ratan Chowck Road:** The road starts from Balwa Police Station to Eye Hospital to Ratan Chowck Road and traverses Ward Nos. 8. The road is 1,547m length with a Right-of-Way of 13m and a Carriage Way of 4m on an average. The existing road has blacktopped road sections without footpath. Stormwater Drains are present along both sides of the roads. The road starts at a Peepal Tree (*Ficus benghalasis*) which is used a Tree Rounabout and passes through another tree, Jacaranda (*Jacaranda mimosifolia*). These trees will not be impacted by the project components. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 1,547m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 2m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs
Janakpur	
7. **Six Lane Highway to Covered Hall Road:** The road starts from Six Lane Highway to Covered Hall Road and traverses Ward Nos. 13. The road is 785m length with a Right-of-Way of 13m and a Carriage Way of 6m on an average. The existing road has blacktopped road sections without footpath. Stormwater Drains are present along both sides of the roads. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 785m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 1.5m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.	

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
8. **Six Lane Highway to Mani Mandap Road:** The road starts from Six Lane Highway to Mani Mandap Road and traverses Ward Nos. 14. The road is 1,384m length with a Right-of-Way of 13m and a Carriage Way of 6m on an average. The existing road has blacktopped road sections without footpath. There are no existing stormwater drains. There are a few trees along this road belongint to Jacaranda (*Jacaranda mimosifolia*), Gulmohar (*Delonix regia*) and Ashoka (*Saraca asoca)* species. However, all the trees are outside the right-of-way. The road passes through peri-urban areas and medium-dense traffic. The proposed road covers the entire length of 1,384m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 1.5m footpath on either side with a tick drain. Stormwater Drains shall be provided along the entire length of the road. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs
Janakpur	
9. **Mills Area to Benga Piprari Dhanusha Road:** The road starts from Mills Area and ends at Bengra Piprari Dhanusha Road and traverses Ward Nos. 01. The road is 1,361m length with a Right-of-Way of 13m and a Carriage Way of 6m on an average. The existing road has blacktopped road sections without footpath. Stormwater Drains are present along both sides of the roads. There are no trees on either side of the road. The road passes through peri-urban areas and low-density traffic. The proposed road covers the entire length of 1,206m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 2m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.	

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
10. **RR Campasus East Pipal bot Jalad River Kapleshwar Main Road:** The road starts from RR Campuses East Pipal Bot Jalad River Kapileshwar Road and traverses Ward Nos. 4. The road is 442m length with a Right-of-Way of 13m and a Carriage Way of 6m on an average. The existing road has graveled road sections without footpath. Stormwater Drains are not present along the road. There are no trees on either side of the road. The road passes through peri-urban areas and very low-density traffic. The proposed road covers the entire length of 442m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 2m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
11. **Yatri Niwas Road:** The road starts from Yatri Niwas and ends at Provincial Hospital Road and traverses Ward Nos. 06. The road is 156m length with a Right-of-Way of 9m and a Carriage Way of 9m on an average. The existing road has graveled road sections without footpath. Stormwater Drains are not present along the road. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. There is a small local pond named Dhornacchi along the road section. The proposed road covers the entire length of 156m and has a carriage way of 9m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 1m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs
Janakpur	
12. **Six-Lane to Mujeli- Provincial Laboratory- Rajaul Road:** The road starts from Six Lane Highway and ends at Rajaul Chau Bato and traverses Ward Nos. 14. The road is 1,636m length with a Right-of-Way of 8m and a Carriage Way of 6m on an average. The existing road has graveled road sections without footpath. There are no existing stormwater drains. There are no trees on either side of the road. The road passes through peri-urban sections and low-density traffic. The proposed road covers the entire length of 1,636m and has a carriage way of 8m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have no footpath; but the covered drain can be used as one. Stormwater Drains shall be provided along the entire length of the road. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.	
13. **Bihar Kunda Road:** The road starts from Eye Hospital and ends at Bihar Kunda and traverses Ward Nos. 08. The road is 463m length with a Right-of-Way of 7m and a Carriage Way of 6m on an average. The existing road has graveled road sections without footpath. Stormwater Drains are present along one side of the road. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The periphery of the Ratnasagar Pond exists on one side of the road. The proposed road covers the entire length of 463m and has a carriage way of 7m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of	

Subproject, Location and Environment Features	Site Photographs
Janakpur	
base course and 225mm of sub-base course with proper grade and camber. The road shall have no footpath. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.	
14. **Pagala Baba Road:** The road starts from Kabargaha Chowk to and ends at Pagal Baba Dharamshala Gate and traverses Ward Nos. 7. The road is 469m length with a Right-of-Way of 7m and a Carriage Way of 6m on an average. The existing road has graveled road sections without footpath. Stormwater tick drains are present along the road. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 469m and has a carriage way of 7m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 1m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.	

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
15. **Zero Mile Bus Park east Traffic Office to Jaladh River Road:** The road starts from North Side of Traffic Police Office and ends at Jalad River backside of Bus Park and traverses Ward Nos. 07 and 23. The road is 645m length with a Right-of-Way of 9m and a Carriage Way of 8m on an average. The existing road has graveled road sections without footpath. Stormwater Drains are present along the road. There are no trees on either side of the road. The road passes through peri-urban sections and low density traffic. The proposed road covers the entire length of 645m and has a carriage way of 8m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have a 1m footpath on either side with a tick drain. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
16. **Napi Office Road:** The road starts from Land Revenue Office and ends at Jalad River and traverses Ward Nos. 04. The road is 817m length with a Right-of-Way of 9m and a Carriage Way of 8m on an average. The existing road has graveled road sections without footpath. There are existing stormwater drains on both sides of the road. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 817m and has a carriage way of 8m with tick drain. The road shall be upgraded to double lane with 50mm surface course of asphalt concrete, 200mm of base course and 225mm of sub-base course with proper grade and camber. The road shall have no footpath; but the covered drain can be used as one. Stormwater Drains shall be provided along the entire length of the road. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

Subproject, Location and Environment Features	Site Photographs	
Janakpur		
17. **Janaki Temple Bibah Mandap to Maharaj Sagar Road:** The road starts from Janaki Mandir Back Boundary and ends Maharaja Sagar East Bank and traverses Ward Nos. 06. The rear boundary wall of the Janaki Mandir is located on one side of the road. The road is 460m length with a Right-of-Way of 6m and a Carriage Way of 6m on an average. The existing road has graveled road sections without footpath. There are existing stormwater drains on both sides of the road. There are no trees on either side of the road. The road passes through urbanized sections and medium-dense traffic. The proposed road covers the entire length of 460m and has a carriage way of 6m with tick drain. The road shall be upgraded to double lane with the 60mm interlock Block Pavement, and 225mm of subbase course with proper grade and camber. The road shall have no footpath. Underground stormwater drains shall be provided along the entire length of the road. Greeneries and Plantation shall be done in interval of 7m over sidewalks, wherever space is available. Streetlights will be provided at 9m height and 20m interval.		

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

89. Environmental impact assessment is the systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical, chemical, biological, cultural, and socioeconomic components of the total environment. ADB SPS (2009) requires the assessment of environmental impacts during the different stages of the project, including Project Planning and Design, Pre-Construction, Construction and Operation Phases and the formulation of corresponding mitigation measures to avoid, minimize or offset environmental impacts. All the project components taken up under the subproject of Improvement to roads and drains in Janakpur SMC are evaluated for its environmental impacts and accordingly mitigation measures have been developed.

A. Planning and Design Phase

90. **Design of the Proposed Components:** Technical design of all the components (roads, drains, footpath etc.), will follow the relevant national planning and design guidelines. Road designs will comply with the applicable standards to meet the needs of the road users, keeping in view the road function, type and volume of traffic, potential traffic hazards and safety, capital cost, maintenance costs, vehicle operating costs, environment impacts, aesthetics as well as convenience of the road users. The principal geometric features for fulfilment of these objectives are road classification, the horizontal alignment, vertical alignment and the road cross-section. Roads will be designed with traffic control and safety measures commensurate with the traffic. These include road markings ensuring consistency, clarity, and sufficiency; facilities for pedestrians to cross are ensured by road markings; traffic signs (mandatory/regulatory signs, cautionary/warning signs and information signs); road delineators; lighting, etc..

91. **Impacts to local hydrology**. Water logging during rainy season is a common feature in certain project areas where drains have not been incorporated. This has been corroborated during discussions with the local community. The waterlogging of the roads is often attributed to poor drainage system resulting from failure to consider the local hydrology in the planning and design phase of the project. To address these impacts, the detailed design will consider the following:

(i) Detailed assessment of the micro hydrology and topography of the project sites;
(ii) Design the roads according to the slope and elevation relative to the water bodies that may exist in the area; ensure that necessary cross drainage structures are provided to avoid water logging or flooding, and
(iii) Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded.

92. **Damage / Disturbance to physical cultural resources**. Janakpur is a historical place, and houses several temples, which are notified as protected monuments. The famous Janaki temple in the city is enlisted on the tentative list of UNESCO world heritage sites. Adjacent to the Janaki Temple is the Rama-Sita Bibah Mandap, a building that marks the marriage event of Hindu God and Goddess viz., Rama with Sita. Every year, a number of pilgrims visit Janakpur to not only visit the temple but also over 200 sacred ponds within and around the city. Two important ones are the Dhanush Sagar and Ganga Sagar that are located close to the centre of the city. There are also several other temples and temple ponds dotted all over the town, which are of local importance and visited by local people. One of the project roads (Janaki Temple Bibah Mandap to Maharaj Sagar Road) proposed for improvement is along the boundary of the Janaki Temple. The road however will be improved within the existing right of way, and no impact envisaged on the temple. Given its proximity to the boundary wall of protected monument, prior permission from the Nepal department

of archaeology (DOA) will be obtained, and measures if any recommended by NDA will be incorporated into the design. All the road improvements are proposed within the existing road right of way, and therefore damage or disturbance of physical cultural resources anticipated.

93. The following mitigation measures shall be implemented to address the above impacts:

(i) Consult with Department of Archeology (DOA) on the proposed improvement of Janaki Temple Bibah Mandap to Maharaj Sagar Road, and obtain prior permission/ no objection; integrate recommendations or suggestion of NDA into road design and/or construction methodology.
(ii) Continue conduct of meaningful consultation with stakeholders
(iii) Ensure that all works will be confined within existing road and side drains alignments, and within existing rights-of-way (ROWs).
(iv) ensure the implementation of construction phase EMP to avoid disturbance / damage to common property resources and PCRs.

94. **Chance finds**. As stated above, Janakpur is a historical place, and houses several temples, which are notified as protected monuments. Hence, there are chances of finding items of archaeological importance in certain project areas; in and around Janaki Temple, in particular. Accordingly, the Contractor, as a precautionary approach, will be required to implement the following measures in the event of a chance finds:

(i) Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology for any suspicion of chance finds during excavation works;
(ii) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
(iii) Stop work immediately to allow further investigation if any finds are suspected; and
(iv) Inform the Department of Archaeology (DOA) if a find is suspected and take any action they require to ensure its removal or protection in situ
(v) Follow the written instructions of NDA for continuation of works.
    a. Impact on Forests, Terrestrial Flora and Fauna: There are no forests in project area, which is confined to Janakpur municipal area comprising of urban semi-urban and agricultural areas, which were converted long back for human use. There are no impacts envisaged.
    b. Impact to Local Vegetation and Trees: Road side trees are limited only to few roads, and these are also located outside the road right of way (ROW). All improvements are proposed within the existing ROW and therefore no tree cutting envisaged in the project.

B. Pre-Construction Phase Impact and Mitigation Measures

95. **Consents, Permits and Clearances**. The subproject would require Environmental Clearance from the Line Agency viz., Ministry of Urban Development, Government of Nepal. Environmental clearance for the entire Project shall be obtained by the PCU from the MoUD. Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result in design revisions and work stoppage. All the necessary consents, permits, and clearances shall be obtained before the start of civil works.

96. **Integration of EMP in bidding documents and contracts**. Lack of awareness by contractors on ADB SPS requirements may result in insufficient budget and non-implementation of EMP. To ensure that EMP will be provided with sufficient budget and implemented:

(i) The PCU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document.
(ii) Once the Contractor is selected, the PIU with support from PMCDC will inform contractors on their responsibilities in EMP implementation, in compliance with ADB and government requirements, self -monitoring and reporting procedures.

97. **EMP Implementation Training**. If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and GoN environmental policies. The PCU, PIU and contractors will be required to undergo training on EMP implementation. The capacity building program will be participatory to the extent possible to make it more effective, with learning by doing, role playing, group exercises, on-the-job training, etc. Pre- and post-training assessment will be conducted to measure the effectiveness of the program.

98. **Updating of IEE**. The PCU shall update the IEE in case of change in design/based on the final detailed design and submit the same for review and clearance of ADB.

99. **Community awareness on project activities and impacts**. Lack of community awareness on project activities may result in potential community health and safety concerns and complaints. Before the start of project construction, a meaningful consultation with the affected communities will be conducted. This meaningful consultation will aim to engage community stakeholders, listen to their views, and arrive at a common understanding on the ways to implement the project. To aid in the consultation process, it is important that the community should be made aware of the details of project activities. Important information to be disseminated to the people are, among others, the following:

(i) Overview and objectives of the proposed project;
(ii) Preliminary and/or final detailed design of proposed project components;
(iii) Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and
(iv) Grievance redress mechanism and contact details of the project.

C. Construction Phase Impact and Mitigation Measures

100. The construction phase involves site preparation, transportation of materials, equipment and labor to the site and carrying out the required construction activities while adhering to the Environmental Management Plan (EMP).

101. **Construction Planning**. It has been observed that inadequate planning could lead to non-implementation of EMP during the construction phase and result in significant environmental impacts leading to non-compliance with ADB's environmental safeguard requirements. To ensure that EMP will be implemented during the construction phase, the contractor should, prior to start of construction activities undertake the following:

(i) Appoint an Environmental Health and Safety (EHS) Supervisor;
(ii) Develop a Site-Specific Environmental Management Plan (SEMP) and get it approved from the Client;
(iii) Conduct training on the rationale for and implementation of the SEMP and EMP to enhance general understanding and clarify responsibilities regarding

implementation, including monitoring and reporting, must also be provided to all relevant staff of contractors;

(iv) While the locations of all project components have been finalized, the locations for labour campsites, batching plant site etc. that would be required by the Contractor temporarily during the construction period, have not been finalized. The Contractor should select the locations for the campsites, batching plant sites etc. in consultation with local municipalities and get it approved from the PCU and PIU. The Contractor should provide all infrastructure and services necessary to ensure that the labourers' needs are addressed throughout their stay at the campsites. Also, the Contractor should deploy construction equipment, plant and machinery in good condition, provided with necessary pollution control apparatus, and operate as per standards and meet all environmental standards specified by the GoN for such operations; Contractor shall ensure necessary fitness, pollution under control certificates, and are operated by qualified / licensed drivers/operators

(v) The Contractor will be required to submit to PCU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. No works can commence prior to approval of SEMP. The SEMP will include the following, among others:
   (a) Construction Compound Management Plan;
   (b) Construction Health and Safety Plan (including COVID-19 H&S guidance);
   (c) Emergency Incident Response Plan.

102. **Site selection of sources of materials**. Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be assessed by PIU. Priority would be sites already permitted by Department of Mines and Geology (MOMG) of Nepal. If new sites are necessary, these would be located away from population centres, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approvals of DOMG and from the local revenue administration. If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of PCU/PIU. Contractor will identify sources of water for construction purposes and obtain necessary permissions as required, and approval of PIU before the use. Details of material sources and water sources will be provided in SEMP. The construction contractor will be required to:

(i) Reuse the excavated soils and road material as much as possible in the construction and minimize the need for new material.
(ii) Use material sources permitted by government(DOMG)
(iii) Avoid creation of new borrow areas as much as possible, in unavoidable cases, obtain all permissions and clearances, including conduct of environmental assessment studies and obtaining environmental clearances
(iv) Ensure that borrow areas are not located in environmentally sensitive areas,
(v) Prepare borrow area management plan and implement
(vi) Verify suitability of all material sources and obtain approval of PIU;
(vii) Ensure that the loading and unloading of the materials and the transportation of the materials from source to construction site does not cause impact on health and safety of the workers and the community; and

(viii) Submit to PIU on a monthly basis documentation of sources of materials. If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will ensure that all the parties/ suppliers necessary clearances and permission as per the Nepal law and will provide the documentary evidence to PIU/consultants.

103. **Disruption of Existing Utilities**. Along majority of the road lengths where the road improvements are being taken up in the Janakpur Sub-Metropolitan City, utilities such as electric poles, water lines, central drains etc. are present. Construction activities may disrupt the existing utilities installed. To avoid/minimize or manage the disruption of existing utilities, the following measures will be implemented:

(i) conduct investigation at site to determine all the existing utilities that are likely to be disturbed during construction phase;
(ii) all underground utilities should be marked prior to any construction works to be taken up at the locations; and
(i) coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with PCU and stakeholders at the site. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the time required and at cost of the subproject. For essential supplies like water supply, any disruption more than 24 hours, shall be minimized by providing alternative water supply, e.g. via mobile tankers.

104. **Excavation Works**. Excavations are inevitable considering that the Janakpur Subproject involves improving the drainage network along the road alignments of the Municipality. Excavations may affect local drainage patterns if surface and groundwater collect in voids as they are being dug. Further, it may cause safety issues for the local community using the road alignments for their daily commute. To mitigate, the contractor will ensure the following:

(i) All excavations shall be done to the minimum dimension as required for safety and working facility;
(ii) Excavations should be carried out after identifying the location of all utilities that exist along the project area;
(iii) The excavation shall be executed in such manner, that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost;
(iv) Explore working in off-peak hours or night on busy road sections with prior permission and with proper lighting and safety measures; however, no noisy works shall be conducted in the night
(v) Road drains and channels shall be kept free from obstructions at all times;
(vi) Excavated areas should be sufficiently demarcated so as not to affect the health and safety of workers and the people using the road alignment for their daily activities.

105. **Excavated Earth Management:** Excavations are inevitable considering that the Janakpur Subproject involves improving the drainage network along the road alignments in the Municipality. Excavation during construction will generate loose soil which can be carried through surface run-off during a rainfall. During construction phase, the Contractor shall implement the measures at all times to control soil erosion that shall include, but not be limited to the following:

(i) The Contractor shall plan the works in a way that minimizes surface excavation works during the rainy season, where practicable.
(ii) Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor.
(iii) The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered.
(iv) Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion.
(v) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.
(vi) Monitor water quality that could exist close to the working areas to ensure compliance.

106. **Impact on Surface Water Quality:** During project implementation, the Contractor shall be setting campsites, material storage areas and vehicle washing areas. Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water. There are several small ponds and water bodies in the project area, and there are ponds along few roads proposed for improvement. Solvents and vehicle maintenance fluid (oil, coolant) and diesel fuel may contaminate surface and groundwater if these are disposed of directly into the ground or washed into the streams. Human waste from construction workers may also contaminate surface water and groundwater if there are no adequate sanitary facilities. To mitigate these impacts, the contractor will be required to:

(i) Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals;
(ii) The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMCDC to control soil erosion, sedimentation, and water pollution. All temporary sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work;
(iii) All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels;
(iv) Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer;
(v) Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas;
(vi) Avoid scheduling of excavation work during the monsoon season;
(vii) Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site;
(viii) Ensure that drains are not blocked with excavated soil or other materials;
(ix) Stockyards at least 50 meters (m) away from watercourses;
(x) Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%;
(xi) Effective maintenance of machinery and vehicles to avoid leakages;
(xii) For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs; provide proper systems for collection, treatment and safe disposal

of wastewater from construction camps and facilities; no pit latrines shall be allowed; toilets. And wastewater outlets shall be connected to city sewerage systems (if available) or septic tanks and soak pit systems developed within the site. Septic tanks should be sealed from bottom and sides to prevent seepage.

(xiii) Solid waste management, as detailed in the approved SEMP, should be implemented throughout the construction period;

(xiv) Monitor water quality according to the environmental monitoring plan.

107. **Impact on Groundwater** During the construction period, there is an increased demand for groundwater arising from water required for various civil works and for personal consumption by the workers. The Contractor will be required to source the groundwater from approved sources so as to avoid impact on availability of the water to the local community, in particular, when the local community are dependent on the same aquifer. Additionally, material storage areas, equipment and vehicle maintenance areas, solid waste disposal and the like, if not managed effectively, can result in the contamination of the groundwater. Mitigation measures will include:

(i) Use the groundwater resources judiciously and with prior approval of competent authority;

(ii) All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned;

(iii) Storage of lubricants and fuel at least 50 m from water bodies and in double-hulled tanks;

(iv) Effective maintenance of machinery and vehicles to avoid leakages;

(v) Effective management of solid waste and construction debris as per an approved SEMP;

(vi) Provide uncontaminated water for dust suppression;

108. **Drainage Management**. Construction material getting into surface run off or uncontrolled disposal may cause drainage congestion. The impact of these on hydrology is expected to be more pronounced during post monsoon period with rapid movement of rainwater through existing drainage structures, which if blocked by construction waste and debris may cause flooding or waterlogging in neighbouring areas. The following mitigation measures should be adopted by the Contractor:

(i) The contractor shall adopt a site clearance procedure; dispose debris / waste soil only in designated and pre-approved locations by the PIU

(ii) Wastes and construction debris will not be disposed in a manner that these would end up in drainage canals;

(iii) The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that do not permit direct runoff into watercourses and are on land sloping at less than 1.5%.

(iv) All heaps shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized.

109. **Impact on Air Quality**. Air quality is impacted at the construction sites because of vehicle movements, operations of construction equipment, generator sets etc. and generation of dust. Dust and gaseous emissions will be generated by the construction machinery. Construction work also involves breaking up, digging, transporting, and dumping large quantities of dry material. The particulate matter from these can cause health impacts, i.e., respiratory problems, irritation in eyes

and reduction in visibility. During the construction period, the Contractor shall implement the following mitigation measures:

(i) Take every precaution to reduce the levels of dust at construction sites;
(ii) Fit all heavy equipment and machinery with air pollution control devices that are operating correctly;
(iii) Construction vehicles must travel at speeds that minimizes dust generation;
(iv) Reduce dust by spraying water on stockpiled soil, excavated materials, and spoils;
(v) Cover with tarpaulin vehicles transporting soil and sand;
(vi) Cover stockpiled construction materials with tarpaulin or plastic sheets;
(vii) Water spraying to access roads, camp sites and work sites to reduce dust emissions;
(viii) Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications;
(ix) All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant standards;
(x) Repair and maintain access roads, as necessary.
(xi) Monitor air quality according to the environmental monitoring plan.
(xii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes;
(xiii) use vehicles that have government-issued permits and registrations; and
(xiv) prohibit open burning of solid waste.

110. **Noise**. Noise-emitting construction activities include earthworks, road cutting, concrete mixing, concrete formation works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates, among others. All the road alignment locations in Janakpur sub-metropolitan city are located in primarily residential areas and hence the local communities are susceptible to construction noise. Sensitive receptors such as hospitals and schools are also located on some of the road alignments. Additionally, the onsite workers are also exposed to noise levels that may be higher than the permitted levels due to their proximity to the noise sources. The significance of noise impact will be higher at the immediate vicinity of the subproject site where sensitive receptors is situated. Mitigation measures to reduce the noise impacts off-site at the nearest sensitive receptors include the following:

(i) Arrive at the construction schedule upon discussions with the nearby stakeholders, especially when works are carried out near sensitive receptors such as hospitals, schools, places of worship etc.;
(ii) Install noise barriers between the source and receptor, as necessary;
(iii) Enclose and locate generators away from sensitive receptors;
(iv) Operate construction machines / conduct noise operations sequentially rather than all together;
(v) spread out the schedule of material, spoil and waste transport;
(vi) minimize drop heights when loading and unloading coarse aggregates;
(vii) avoid use of horns unless absolutely necessary;
(viii) Select electrically powered plant that is quieter than diesel or petrol-driven plant, if interchangeable;
(ix) Use modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensure they are maintained to manufacturers' specifications;
(x) Noise-generating equipment must be fitted with silencers;

(xi) Optimize the use of noisy construction equipment and turn off any equipment if not in use;
(xii) Regular maintenance of all equipment and vehicles;
(xiii) Stop all construction activities during at night;
(xiv) Implement a complaint handling system;
(xv) Workers should be provided with Ear muffs / protective hearing equipment in noise critical areas;
(xvi) Place visually clear instructions in areas where noise levels are significant;
(xvii) Measure noise levels periodically as per the Environmental Monitoring Plan;

111. **Construction Wastes Management**. Solid wastes will include construction wastes (solid wastes: piece of rods, woods, bricks, stones, containers, electric wire, pipes etc. liquid waste: paint, bitumen, oil etc.) and general wastes (solid wastes: papers, plastic containers, residues of food, fruits etc. and liquid waste: from kitchen and bathroom etc.). These wastes will be generated due to construction camps, construction activities and materials used for construction. Inadequate management of construction wastes will result in negative impact on the soil, surface water, groundwater, aesthetic beauty of area and workers' health and safety. To mitigate the impacts, the contractor will implement the following to manage wastes:

(i) Prepare Construction Waste Management Plan as part of the SEMP;
(ii) Identify and seek approval for the areas where construction waste could be disposed;
(iii) The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators.
(iv) Contractor shall implement waste segregation on site.
(v) Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed properly;
(vi) Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material.
(vii) Waste auditing. The contractor will record the quantity in tons and types of waste and materials leaving site during the construction phase;
(viii) Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by relevant parties;
(ix) All construction waste should be managed as per the approved SEMP.

112. **Impact on Terrestrial Flora and Fauna:** A preliminary tree survey along the 17 road alignments indicated that no tree will be impacted from the project. At a few locations, outside the right-of-way, presence of Mango (*Mangifera indica*), Peepal (*Ficus religiosa*), Gulmohar (*Delonix regia*), Jacaranda (*Jacaranda mimosifolia*) and Ashoka (*Saraca asoca*) have been noticed. However, these trees are not impacted, as well. In the event, the final designs indicate any possible impacts on trees, the following actions are proposed to mitigate the impact of tree removal and promote tree conservation:

(i) The first priority is to avoid cutting of trees through changes in design and road alignments. This is in particular important when the tree species is protected or considered sacred by the community and / or houses nests for birds;
(ii) Do not cut any protected tree species; retain the tree / alter the alignment / layout of road/ drain locally to preserve the trees;
(iii) after the finalization of the designs and layout of the project components, the trees within proposed construction areas will be marked;

(iv) trees within area required for construction will be felled after prior approval;
(v) replacement of the tree shall be undertaken by the project i.e., PIU at the replacement ratio of ten trees for every tree that is cut (i.e., 1:10 ratio as per Forest Regulations[9],2022) Indigenous/native species will be preferred in tree planting;
(vi) only trees that will require removal within the proposed construction areas of the sites will be cut;
(vii) For trees that will not be cut, take all precautions to protect them from any damage from construction activities
(viii) Conduct survey of trees for bird nests prior to cutting; if any active nests, ensure that trees are not disturbed until young birds fly away from the nests; do not cut trees during the breeding season
(ix) prevent workers from removing / damaging any other flora and fauna found in the project vicinity; and
(x) prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the construction sites.

113. Impacts on aquatic ecology. Some of the subproject alignments such as Yatri Niwas Road and Bihar Kunda Road are near or adjacent to ponds viz., Dhornacchi and Ratnasagar Pond, respectively. The construction of the subproject may affect these water bodies due to siltation and chemical spills, and improper waste disposal, and therefore may impact the quality of the water and any thriving aquatic species. To mitigate this impact, contractor will be required to:

(i) Provide temporary protection at sections near the ponds to avoid sliding of soils;
(ii) Store spoils away from the side of the river/pond;
(iii) Implement proper storage/disposal of materials, chemicals and waste
(iv) Implement mitigation measures for excavation, soil erosion and sediment mobilization, surface water pollution, and construction waste generation;
(v) prohibit employees and workers from fishing in any of the ponds;
(vi) Conduct sampling and analysis of the surface water near to the construction sites as part of the Environmental Monitoring Plan.

114. **Impact on Traffic and Access**. Improvements to the road alignments in Janakpur sub-metropolitan city will impact the regular traffic movements during the construction period. This can create traffic congestion and disturbance to pedestrians and motorists in the vicinity of the affected area if not properly managed. Majority of the construction activities in the Janakpur sub-metropolitan city are in residential areas where the local community need to have access to their properties. However, public access along these road alignments may be disrupted during construction activities. Janakpur is a tourist place and receives tourist throughout the year, especially April-May, and October – November/December. The peak tourist season is in the months of November-December, especially during the Bibah Panchami festival (the wedding of Rama and Sita is re-enacted in the famous Bibah Mandap temple). Large number of tourist visit during this time, and construction works, especially near the temple, parikrama route (religious procession around Janakpur in the defined road) and other places tourist visit may disturb / inconvenience the tourists and may also pose safety risks. In project towns there are other monuments where the people from different other districts and country come to visit and worshipping the monuments. Mitigation measures to ensure safe access shall be implemented by the contractor. A generic Traffic Management Plan can be presented in the SEMP which can be updated in consultation with the

[9] Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees and Rule 93 (5), the amount must include bi-annual production or purchase of trees, trees transportation, afforestation of 1600 trees per hectare, fencing and boundary for the protection of trees and require number of people for look after.

local stakeholders to incorporate the site-specific needs at each site. The Contractor should carry out the following activities as part of the mitigation measures:

(i) Schedule road works in consultation with temple authorities and traffic police; works that may affect the tourist places shall not be conducted during the tourist seasons
(ii) Complete the works and clear the sites prior to start of peak tourist seasons;
(iii) Plan roads and drain works minimizing traffic disturbance/blockades; work planning is crucial to minimize the inconvenience to public due to road works; provide diversions / alternative roads where required
(iv) A Site-Specific Traffic Management Plan should be drawn up in consultation with the local community on construction operations and work schedules.;
(v) Coordinate with traffic police for temporary road diversions and for provision of traffic aids;
(vi) Notify public and provide sign boards informing nature and duration of construction works and contact numbers for concerns/complaints;
(vii) Maintain sufficient access to houses and shopkeepers (commercial establishments) during works; provide proper and safe pedestrian access.
(viii) Awareness should be built amongst the community on the implementation of the Site-Specific Traffic Management Plan;
(ix) Emergency response plan must be prepared for any traffic accident during construction and should be included in the SEMP.
(x) As necessary, increase workforce for speedy completion;
(xi) Schedule material deliveries on low pedestrian traffic hours;
(xii) Restore damaged properties and utilities;
(xiii) Erect and maintain barricades if required;
(xiv) Pedestrian access will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained.
(xv) Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the SEMP.

115. **Impacts on socio-cultural resources, tourism and chance finds**. The project area, especially Janakpur, attracts large number of tourists during April – May and October – November/December. Works may disturb the tourism activity; however, it is unlikely to be significant as works are mostly located outside the tourism areas. Janaki Temple is one of the most holy places for Hindus. Various vestiges of the 11th and 12th Century AD can be found. The temple architecture is of a much later period; however, its style is unique; a blend of classical and neo-classical design with elements of fortification within a unique environmental setting. Hence, there are chances of finding items of archaeological importance in the area. Accordingly, the Contractor, as a precautionary approach, will be required to implement the following measures in the event of a chance finds.

(i) Prior to commencement of construction, consult with concerned religious authorities of these temples, nearby people and devotees and explain the work method and duration of proposed works, take their suggestions and comments in scheduling and conducting the works
(ii) Schedule road works in consultation with temple authorities and traffic police; works that may affect the tourist places shall not be conducted during the tourist seasons

(iii) No construction camps (workers accommodation, material / waste / soil storage) should be established within 1 km of the monuments in Lumbini
(iv) Put in place proper dust and noise control measures
(v) Adjacent to religious/social/historical buildings, undertake excavation and construction work in such a way that no structural damage is caused to the structures
(vi) Schedule and plan works considering the tourist season and tourist areas
(vii) Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrance/obstacles during such time to the religious places
(viii) Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.
(ix) Ensure proper traffic management planning to minimize the disruption to the normal traffic flow in the area and ensure the safety of the people.
(x) Clear the work site of unnecessary material, equipment, and debris / surplus soil; do not stock material / soil at the sites
(xi) Conduct continuous consultations with the local people during the works
(xii) Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology for any suspicion of chance finds during excavation works;
(xiii) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
(xiv) Stop work immediately to allow further investigation if any finds are suspected; and
(xv) Inform the Nepal Department of Archaeology (NDA) if a find is suspected and take any action they require to ensure its removal or protection in situ;
(xvi) Follow the written instructions of NDA for continuation of works.

116. **Impacts on socio-economic activities**. All the project components in the Janakpur sub-metropolitan city are located in residential areas with significant economic activities taking place on a daily basis. The impacts that will result from construction works including excavation, stockpiling, construction equipment and vehicle operation and accidental damage to utilities are significant, but temporary. The potential impacts include disturbance to economic activities, particularly to the businesses operating along the alignments of construction works. Contractor will be required to:

(i) Develop the construction schedule in discussions with the community so that movement of construction vehicles can be avoided during school travel timings, festival times and /or any other local events that would require local communities to travel;
(ii) Implement the traffic management plan in collaboration with local authorities;
(iii) Where traffic congestion will likely occur, place traffic flagmen during working hours;
(iv) Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods;
(v) If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities;
(vi) Provide convenient access to pedestrians when works occur in front of residential, commercial or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas.

(vii) At all points of time, ensure that the local communities have at a minimum, access to their households;
(viii) Manage stockpile;
(ix) Manage pumped water from excavations either to drains or drums for later use;
(x) Relocate the affected power supply poles, and
(xi) Advise the concerned authority during accidental damage to utilities.

117. **Occupational health and safety risks**. Safety risks and health issues arise from storage, handling and transport of hazardous construction material. Construction workers are also at risk of accidents due to moving vehicles, and other construction related activities. Workers are also exposed to high level of pollution from dust, exhaust of vehicles and machinery and noise exposed to pathogens contained in wastewater and untreated sewage and septic tank effluents flowing through the roadside drains. Further, if workers do not keep to regulated working hours, the risk of accident events will be higher due to fatigue. Insufficient supply and improper use of personal protective equipment (PPE) and lack of safety procedures may cause injuries or fatal accidents. Spread of COVID-19 is also a risk to manage among workers. There is also a risk of transmitting COVID-19 to the residents. The contractor will be required to implement the following measures:

(i) Contractor to prepare Health and Safety Plan prior to commencement of works as a part of SEMP;
(ii) All relevant provisions of the National Health Care Waste Management Standards and Operating Procedure[10]-2020 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase;
(iii) Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities; and EHS Guidelines on Waste Management Facilities[11]. These practices include recommended measures to prevent, minimize and control pathogens from inflicting workers through training and use of appropriate PPEs, clothing and equipment when working along the drainage system, and immunization and health monitoring (e.g. hepatitis B and tetanus).
(iv) Existing drains may present hazardous working conditions in some places due to lack of oxygen and flammable nature of methane emissions which will be detrimental to the health and safety of workers. Put in place standard operating procedures with appropriate equipment, and workers are provided with necessary training and personnel protection equipment to safeguard health and safety
(v) Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19). See **Appendix 2** for a sample guidance note in responding to COVID-19;
(vi) A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital;
(vii) Other first aid medical equipment and nursing staff will be made available or arranged on-call;

[10] National Health Care Waste Management Standards and Operating Procedures-2020-Document developed based on the "Health Care Waste Management Guideline 2014", "The Public Health Service Act, 2018, Public Health Service Regulation 2020 and National Health Policy, 2019.

[11] IFC World Bank Group. 2007. Environmental, Health and Safety (EHS) Guidelines – General EHS Guidelines: Environmental – Noise Management.

(viii) The contractor will conform to all disease prevention instructions as may be given by PCU/PIU;
(ix) Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce;
(x) The contractor shall provide all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site;
(xi) Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;
(xii) Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any;
(xiii) Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and
(xiv) Provide adequate insurance to the workers that is current throughout the construction period;
(xv) Conduct Health and safety training periodically and Daily Toolbox Training for all site personnel.

118. **Community health and safety risks**. Communities will be moderately exposed to threats due to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; accesses to properties, economic activities, and social services; service disruptions, etc. To mitigate these impacts, the contractor should implement the following measures:

(i) Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work;
(ii) Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities[12].
(iii) Follow established community health and safety protocol on any emerging infectious diseases such as COVID19;
(iv) Implement measure to prevent proliferation of vectors of diseases at work site;
(v) Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (URLIP);
(vi) Schedule transportation activities by avoiding peak traffic periods;
(vii) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
(viii) Educate drivers, enforce speed limits in settlements and avoid use of horn;
(ix) Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement;
(x) Provide prior information to local people, particularly the Temples and other places of worship nearby about work schedules;
(xi) Noise barriers must be installed in between the construction site and any community halls or places of worship to reduce the noise level;

[12] IFC World Bank Group. 2007. Environmental, Health and Safety (EHS) Guidelines – General EHS Guidelines: Environmental – Noise Management.

(xii) Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and
(xiii) Ensure contractor has staff trained on emergency response.

119. **Post-construction clean-up and reinstatement.** Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction. The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The following generic measures should be taken:

(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;
(ii) All excavated roads shall be reinstated to original condition;
(iii) All disrupted utilities restored;
(iv) All affected structures rehabilitated/compensated;
(v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up;
(vi) All hardened surfaces within the construction camp area shall be ripped;
(vii) All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document;
(viii) The contractor must arrange the cancellation of all temporary services;
(ix) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.

D. Operational Phase Impacts and Mitigation Measures

120. **Impact from O&M of Roads and Drains**. In the operations and maintenance (O&M) phase, the roads will operate with routine maintenance, which should not affect the environment. Routine repairs will be very small in scale, to be conducted manually by small teams of men with simple equipment (shovels, wheelbarrows, etc.) and works will be very short in duration thus will not cause significant physical impacts. Traffic may be interrupted temporarily but this work will be very small in scale, infrequent, and short in duration, so there will be no economic or other implications. The infrastructures will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

121. To maintain the safety of workers and road-users, such work should be coordinated with the local traffic department so that adequate warning signs and traffic diversions can be set up when necessary. Debris need to be collected and disposed at designated sites. Community participation will be encouraged in ensuring drainage canals are clog-free through information and behaviour change campaigns and incentives, if possible.

122. **Air pollution and noise**. Improved roads may result in elevated noise level and air emissions from increased vehicular traffic over time. However, the extent of air pollution will depend upon i) the rate of vehicular emission and ii) the prevailing meteorological conditions. Air quality is likely to improve in the initial years after commissioning because of saving of fuel in the vehicular traffic riding on smooth and improved roads with much less interruption.

123. **Community safety**. Improved roads may give way to faster vehicle speeds which could endanger people and households along the road alignments. Damage in roads may also cause accidents to motorists. To mitigate these impacts, the PIU will be required to:

(i) Conduct regular inspection of the roads to check for damages, and undertake rehabilitation measures for any damages found;
(ii) Inspect and maintain the integrity of road barriers, especially at critical curves or locations that are prone to vehicular accidents;
(iii) Inspect and maintain speed limiters such as humps installed on road sections near residential areas, schools, and religious establishments.
(iv) Inspect and maintain all road signages, including appropriate warning signages at silent zones, and ensure that these are reflectorized and visible even during night time; and
(v) Ensure pedestrian crossings are maintained.

E. Cumulative Impacts and Mitigation Measures

124. There are no notable other construction or project activities in the area that would result in cumulative environmental impacts. Direct impacts during construction phase, including, among others, increase in noise levels, fugitive dust, and common air emissions near the construction areas, are temporary in nature and will not result in cumulative adverse impacts to people and environment with the implementation of mitigation measures discussed in this IEE report.

F. Unanticipated Impacts during Construction and Operation

125. In the event of unanticipated environmental impacts not considered as significant during implementation and not considered in the IEE and EMP, the PCU shall prepare a corresponding time-bound and budgeted corrective action plan acceptable to ADB and ensure that these are implemented by the contractor/s and reported accordingly in environmental monitoring reports to ADB. If unanticipated environmental impacts deemed as significant become apparent during project implementation, the PCU will: (i) inform and seek ADB's advice, wherever necessary; (ii) assess the significance of such unanticipated impacts; (iii) evaluate the options available to address them; and (iv) update the IEE including EMP.

VI. ENVIRONMENTAL MANGEMENT PLAN

126. This Environmental Management Plan (EMP) has been prepared in accordance with the ADB's SPS 2009. This EMP identifies the minimum requirements with regard to the appropriate mitigation, monitoring, inspection and reporting mechanisms that need to be implemented throughout design, construction and operation periods of the project, to avoid, minimize or mitigate the potential environmental impacts identified in the chapter on Anticipated Environmental Impacts and Mitigation Measures of this IEE. This chapter also discusses the institutional arrangement, roles, and responsibilities for the effective implementation of the EMP.

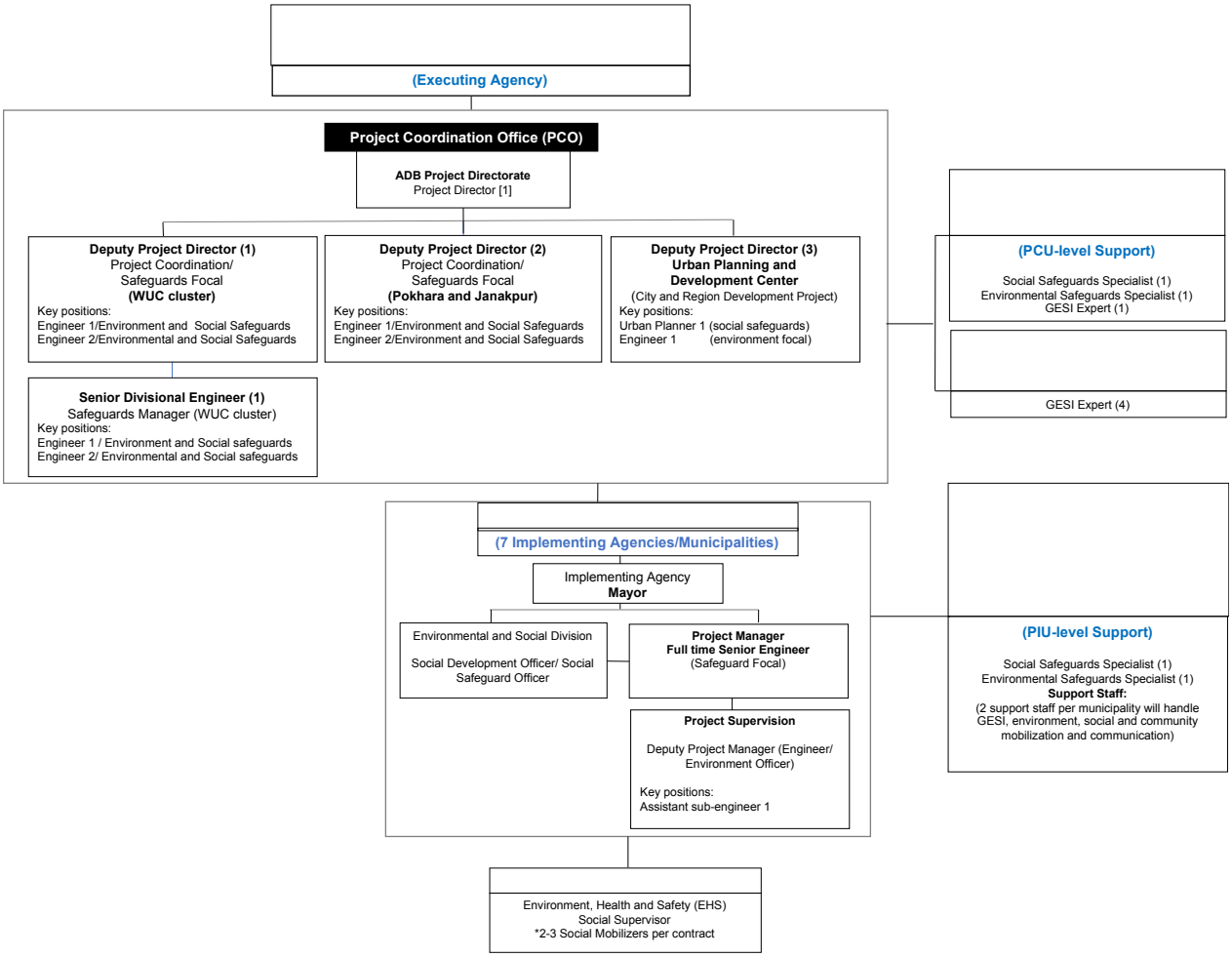
A. Institutional Arrangements

127. The Ministry of Urban Development through the Department of Urban Development and Building Construction will be the executing agency of the project, which will be supported by the Project Management and Capacity Development Consultant (PMCDC), and Institutional Strengthening and Community Participation Consultant (ISCPC). The PCO will be responsible for the overall management of the project. The municipalities will be the key implementing units of the project. The PIU with the support of the Supervision and Design Consultant (SDC) will be responsible for social safeguards compliance, monitoring, and reporting to ADB.

B. Safeguards Implementation Arrangement

128. **Project Coordination Office (PCO).** The PCO will be headed by a Project Director, who will be responsible for the overall project management. The Project Director shall be supported by three Deputy Project Directors (DPDs) – DPD WUC cluster, DPD Pokhara and Janakpur cluster, and DPD for Urban Planning and Development. The PCO will have an environment safeguards officers of engineer rank, who will be responsible for environmental safeguards compliance, planning, and implementation as per the agreed environmental assessment and review framework, IEEs and EMPs prepared consistent with the ADB's SPS and GON rules and regulations. Implementation arrangements for safeguards in implementation in URLIP presented in Figure 3.

Figure 20: Implementation Arrangement for Safeguard Implementation



129. **Project Coordination Office (PCO).** Roles and responsibilities of PCO (environmental safeguards) are:

(i) Ensure subprojects comply with the national and local statutory and legal environmental requirements, ADB SPS 2009, EARF and environmental safeguards provisions of the ADB loan covenants;
(ii) Ensure subprojects conform to exclusion criteria and subproject selection guidelines as stipulated in this EARF;
(iii) Review and approve the environmental categorization of future subprojects;
(iv) Engage additional experts (heritage and biodiversity experts) if project conditions warrant such expertise to prepare safeguard documents
(v) Review and approve subproject IEE reports, including EMPs, and ensure that subproject IEEs and EMPs are updated based on final detailed designs and submit to ADB for review, clearance, and disclosure prior to bid invitation;
(vi) Ensure that robust chance-find protocol is put in place and implemented properly;
(vii) Ensure that updated/final IEEs based on final detailed design are provided to the construction contractor prior to start of construction;

(viii) Ensure that the IEEs including EMPs are updated in case of changes in detailed design that may occur during implementation phase, and submitted to ADB for review, clearance and disclosure;
(ix) Ensure that IEEs with EMPs are included in bidding documents and civil works contracts;
(x) Ensure that the requirement for contractors to prepare their respective Health and Safety (H&S) Plans including COVID-19 H&S Plans is included in bidding documents and civil works contracts;
(xi) Review and approve site-specific EMP (SEMP) of selected contractor;
(xii) Provide oversight on environmental management aspects of the project, and ensure EMP and SEMP is implemented by contractors;
(xiii) Establish a system to monitor environmental safeguards of the Project including monitoring the indicators set out in the monitoring plan of the IEE;
(xiv) Facilitate timely and ensure overall compliance with all national and local government rules and regulations regarding site and environmental permits/clearances/approvals as well as any other environmental requirements as relevant;
(xv) Review, monitor and evaluate effectiveness with which the EMP, SEMP, and Health and Safety Plan are implemented, and recommend necessary corrective actions to be taken;
(xvi) With support from PMCDC, consolidate quarterly monitoring reports from the PIUs and submit semi-annual environmental monitoring reports (SEMRs) to ADB;
(xvii) Ensure availability of budget for safeguards activities;
(xviii) Ensure adequate awareness campaigns, information disclosure among affected communities and timely disclosure of final IEEs/EMPs and SEMRs, including corrective action plans, if any, in project website and in a form accessible to the public;
(xix) Address any grievances brought through the grievance redress mechanism (GRM) described in this IEE report in a timely manner;
(xx) Undertake regular review of safeguards-related loan covenants, and the compliance during project implementation; and
(xxi) Organize periodic capacity building and training programs on safeguards for stakeholders, PIUs and contractors.

130. **Project Coordination Unit (PCU).** The municipalities will act as the implementing agencies of the project, under the guidance and overall management of the PCO. The roles and responsibilities of the PIU (Environmental Safeguards) are as follows:

(i) Ensure subprojects comply with the national and local statutory and legal environmental requirements, ADB SPS 2009, EARF and environmental safeguards provisions of the ADB loan covenants;
(ii) Ensure subprojects location and design confirms with exclusion criteria and subproject selection guidelines as stipulated in this EARF; closely work with design teams to ensure compliance
(iii) Review subproject IEE reports, including EMPs, and ensure that subproject IEEs and EMPs are updated based on final detailed designs and submit to ADB for review, clearance, and disclosure prior to bid invitation;
(iv) Ensure compliance with government and ADB requirements on environmental safeguards;
(v) With support from SDC, review and approve SEMPs prepared by contractor;

(vi) Conduct regular site visits, including spot checks, to ensure the proper implementation of EMP;
(vii) Review monthly reports from contractor;
(viii) Prepare Quarterly Reports on all aspects concerning environmental assessment, management, and monitoring obtain approval from PIU and submit approved reports to the PCU;
(ix) Address any grievances brought about through the GRM as described in the IEE report in a timely manner; and
(x) Support all other environmental safeguards-related activities and tasks of the PCU as may be needed.

131. **Project Management and Capacity Development Consultants (PMCDC)**. PMCDC will provide capacity building support on safeguards, and safeguards compliance in line with ADB procedures. PMCDC will appoint an environmental safeguards specialist to carry out all environmental safeguards related tasks and provide support to PCO safeguards team to oversee the implementation of the safeguards framework/safeguards planning documents. The environmental safeguards specialist will guide the safeguards officers at the PCO and shall coordinate with the SDC's Environmental Safeguards Specialist (PIU-support) for carrying out all social safeguards related tasks. The Environmental Safeguards Specialist (PMCDC) will be responsible for carrying out following tasks:

(i) Support PCU and PIUs in selecting the output 2 components in compliance with subproject selection criteria; ensure that no components falling under exclusion criteria are considered for implementation under the project
(ii) Screen and categorize output 2 subprojects based on this EARF;
(iii) Guide PIUs / prepare the initial environmental examination (IEE) reports including environmental management plans (EMPs) based on design of the subprojects and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
(iv) Advise PCO in engaging additional experts (heritage and biodiversity) where required if the project conditions warrant
(v) Support PCU/PIU in obtaining clearances and permissions per GON regulations
(vi) Update/Finalize the IEE report including EMP based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
(vii) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;
(viii) Conduct of meaningful consultations and ensure issues/concerns/suggestions raised are incorporated in the design and updated/final IEE report;
(ix) Ensure relevant provisions from the updated/final IEE report and EMP are incorporated in the bid and contract documents;
(x) Establish grievance redressal mechanism and ensure members of the grievance committee have the necessary capacity to resolve project-related issues/concerns;
(xi) Together with the social safeguard experts, conduct safeguards capacity building to ensure PCU and PIU have the capacity to implement, monitor, and report on implementation of EMP, resettlement plans and indigenous peoples plans (if any); and
(xii) Monitor implementation of EMP at all work sites, including all potential safeguard issues identified in the safeguard documentation mentioned above;
(xiii) Monitor any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the subproject that were not considered in the IEE report and EMP. Prepare corrective action plans and ensure that these

are implemented by the contractor and reported accordingly in environmental monitoring reports to ADB; and

(xiv) Undertake all other tasks to ensure the subproject complies with ADB SPS and national environmental laws, rules, and regulations.

132. **Supervision and Design Consultant (SDC).** Two SDCs will be established – (i) the WUC cluster, covering Devdaha, Siddharthnagar, Tilottama, Sainamaina and Lumbini; and (ii) Janakpur. SDCs will be responsible to support the PIU in the implementation and monitoring of safeguards compliance. They will also be responsible to prepare Output 2 designs, prepare safeguards documents in line with the EARF for Output 2 components. The SDCs will be supported by two support staff per municipality who will handle gender, environment and social safeguards, community mobilization, and communication.

133. **Design Supervision Consultant (DSC).** The DSC will support Pokhara municipality in the design and supervision of infrastructure and greens solutions, implementing heritage and cultural improvement plans, and design of tourism infrastructure components. The DSC environmental safeguards specialist will be involved in detailed design and safeguards documents preparation of output 2 components.

134. The key environmental safeguards tasks of SDC and DSC include:

(i) Work closely with technical teams, and assist PIUs in selecting the output 2 components in compliance with subproject selection criteria; ensure that no components falling under exclusion criteria are considered for implementation under the project
(ii) Prepare categorization checklists and assist in categorization of the project output 2 components in respective municipality
(iii) Update/Finalize the initial environmental examination (IEE) report including environmental management plans (EMP) based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
(iv) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;
(v) take proactive action to anticipate and avoid delays in implementation;
(vi) under the guidance of PMCDC, develop system of indicators to monitor implementation of resettlement activities and ensure corrective actions are undertaken, if and as required;
(vii) obtain environmental safeguard related information with the help of field support staff and consolidate them; prepare periodic environmental safeguard monitoring reports;
(viii) compile all monitoring inputs at PIU level for quarterly progress reports, for onward transmission to PCU and PMCDC;
(ix) assist PIUs in conducting public consultation and disclosure activities related to social safeguards; and
(x) actively participate, assist in resolving all grievance redress activities; and support ISCPC in all training and capacity building activities.

135. **Civil Works Contract and Contractor.** The IEE with EMP will form part of bidding and contract documents and verified by PMU. The Contractor will be required to designate an Environment, Health and Safety (EHS) Officer (or equivalent) with relevant qualifications and adequate experience to ensure implementation of EMP during construction period. Contractor is to carry out all environmental mitigation and monitoring measures outlined in their contract and the

IEE. The Contractor will be required to submit to PIU, for review and approval, a SEMP including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program per EMP; and (iv) budget for SEMP and EMP implementation. No works can commence until SEMP is approved by PIU.

136. Specifically, the Contractor will have the following responsibilities, among others that will be included in the bid and contract documents.

(i) Ensure that the infrastructure development works are carried out in an environmentally friendly manner, minimizing environmental impacts while ensuring the health and safety of all its workers and the minimizing disturbance to the surrounding environment and communities;
(ii) Consideration of ADB SPS, national regulations and the EMP during bid preparation and cost estimation;
(iii) Appoint a full time EHS Officer with relevant qualifications and adequate experience to carryout responsibilities for complying with the ADB SPS requirements, national regulations and the EMP. The officer/staff must have a clear term of reference and responsibilities to ensure proper management of environmental issues;
(iv) Ensure regular reporting to the PIU on work progress and alert management on any potential issues or delays;
(v) Strictly follow COVID 19 protocols and other COVID-19 related instructions issued by the GoN at all construction sites and campsites and provide periodic reports to PIU on its compliance;
(vi) Obtain the necessary permits and clearances, if any is required for the contractor, to implement the subproject;
(vii) Ensure that all worker recruitment and OHS requirements are complied with;
(viii) Take necessary corrective action to rectify any non-conformance, including actions related to grievances;
(ix) Institute an emergency plan for natural calamities/disasters and accidents at the site; and
(x) Follow chance finds procedures to discovery of any physical cultural artifact.

137. A copy of the EMP/approved SEMP will be kept on-site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP/SEMP constitutes a failure in compliance and will require corrective actions.

138. PCU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the proposed project sites

C. Environmental Management Plan (EMP)

139. The EMP is necessary on the grounds that it will manage the environment by offsetting the negative impacts with possible mitigation measures and enhancing the positive impacts within the allocated fund from the project. Thus, the main objectives of the EMP for the construction of the access road project are:

(i) Define the responsibilities of the project proponents in accordance with all project phases viz., (design, pre-construction, construction and operation);
(ii) Facilitate the implementation of the mitigation measures by providing the technical details of each project impact, and proposing an implementation schedule of the proposed mitigation measures;
(iii) Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
(iv) Identify training requirements at various levels and provide a plan for the implementation of training sessions;
(v) Identify the resources required to implement the EMP and outline corresponding financing arrangements; and providing a cost estimate for all proposed EMP actions.

140. The EMP Matrix for Construction Phase and EMP Matrix for the Operational Phase of the Janakpur Subproject is presented in Table 31 and 32 provides the EMP Matrix for Operational Phase to cover Janakpur Subproject.

Table 31: Environmental Management Plan Matrix (Construction Phase) – Applicable to Janakpur Subproject

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
1. Design phase				
Design of project components	Improper design leading to safety, environmental pollution and health concerns during operation phase	• Ensure that technical design of all the components (roads, drains, footpath, etc., follow the relevant national planning and design guidelines. • Ensure that road designs comply with the applicable standards to meet the needs of the road users, keeping in view the road function, type and volume of traffic, potential traffic hazards and safety, environment impacts, aesthetics as well as convenience of the road users. • Ensure that roads are designed with traffic control and safety measures commensurate with the traffic. These include road markings ensuring consistency, clarity, and sufficiency; facilities for pedestrians to cross are ensured by road markings; traffic signs (mandatory/regulatory signs, cautionary/warning signs and informatory signs); road delineators; lighting, etc.,	PIU, DSC	PCU, PMCDC
Impacts to Local hydrology	Local waterlogging problems and obstruction of natural water flows in the vicinity	• Conduct detailed assessment of the micro-hydrology and topography of the project site to design drainage. • Design the roads according to the slope and elevation relative to the water bodies that may exist in the area; ensure that necessary cross drainage structures are provided to avoid water logging or flooding, and • Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded;	PIU, DSC	PCU, PMCDC
Damage / Disturbance of physical cultural resources.	Disturbance of private and common properties (such as ramps, drainage, boundary walls, houses, soak well, lamp post), and physical cultural resources such as Temples (eg. Janaki	• Consult with Department of Archeology (DOA) on the proposed improvement of Janaki Temple Bibah Mandap to Maharaj Sagar Road, and obtain prior permission/ no objection; integrate recommendations or suggestion of DOA into road design and/or construction methodology. • Conduct meaningful consultation with stakeholders; • Ensure that all works will be confined within existing road and side drains alignments, and within existing ROWs;	PIU, DSC	PCU, PMCDC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	Temple) and sacred trees (eg. Peepal Tree (*Ficus religiosa*) will be avoided. Also, there are over 200 sacred ponds in and around the city.	• ensure the implementation of construction phase EMP to avoid disturbance / damage to common property resources and PCRs.		
Chance Finds	Janaki Temple is in the list of monuments considered for inclusion in the UNESCO Heritage List. In addition, there is a Ram-Sita Bibaha Mandap that marks the marriage of Hindu God and Goddess Rama and Sita. Hence, there are chances of finding items of archeological importance in certain project areas; in and around Janaki Temple, in particular.	• Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology (NDA) for any suspicion of chance finds during excavation works; • Create awareness among the workers, supervisors and engineers about the chance finds during excavation work; • Stop work immediately to allow further investigation if any finds are suspected; • Inform the NDA if a find is suspected and take any action they require to ensure its removal or protection in situ; and • Follow the written instructions of NDA for continuation of works.	PIU, DSC	PCU, PMCDC
2. Pre-Construction Phase				
Consents, permits and clearances	Failure to obtain necessary consents, permits, and clearances can result in design revisions and/or stoppage of the Works.	• All necessary local clearances and no objection certificates will be obtained prior to award of contract. • Environmental clearance will be obtained prior to award of contract.	PCU, PIU, PMCDC	EA, ADB
Integration of EMP in bidding	Lack of awareness by contractors on ADB SPS requirements	• The PCU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring	PCU, PMCDC	EA, ADB

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
documents and contracts	may result in insufficient budget and non-implementation of EMP	contractors to comply with all other conditions required by ADB into the bidding and contract document. • Once the Contractor is selected, the PCU/PIU with support from PMCDC will inform contractors of their responsibilities in EMP implementation, in compliance with ADB and government requirements, self -monitoring and reporting procedures.		
EMP Implementation Training	If the contractors and their staff are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and GoN environmental policies.	• The PCU, PIU and contractors will be required to undergo training on EMP implementation.	PCU, PIU, PMCDC	EA, ADB
Updating of IEE	IEE and EMP out of date due to changing conditions or design	• The PCU shall update the IEE in case of change in design/based on the final detailed design and submit the same for review and clearance of ADB.	PCU, PMCDC	EA, ADB
Community Awareness on Project Activities and Impacts	Lack of community awareness on project activities may result in potential community health and safety concerns and complaints.	• Before the start of project construction, a meaningful consultation with the affected communities will be conducted. This meaningful consultation will aim to engage community stakeholders, listen to their views, and try to come to a common understanding about the need for an improved drainage system and the sacrifices that need to be made to achieve it. To aid in the consultation process, it is important that the community should be made aware of the details of project activities. Important information to be disseminated to the people are, among others, the following: • Overview and objectives of the proposed project; • Preliminary and/or final detailed design of proposed project components; • Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and	PIU, Contractor	PCU, PMCDC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Grievance redress mechanism and contact details of the project.		
Construction schedule	Impact on tourism activities	• Schedule road works in consultation with temple authorities and traffic police; works that may affect the tourist places shall not be conducted during the tourist seasons • Complete the works and clear the sites prior to start of peak tourist seasons;	PIU, Contractor	PCU, PMCDC
Construction materials	Impacts due to mining and borrow areas	• Reuse the excavated soils and road material as much as possible in the construction, and minimize the need for new material. • Use material sources permitted by government(DOMG) • Avoid creation of new borrow areas as much as possible, in unavoidable cases, obtain all permissions and clearances, including conduct of environmental assessment studies and obtaining environmental clearances • Ensure that borrow areas are not located in environmentally sensitive areas, • Prepare borrow area management plan and implement • Verify suitability of all material sources and obtain approval of PIU; • Ensure that the loading and unloading of the materials and the transportation of the materials from source to construction site does not cause impact on health and safety of the workers and the community; and • Submit to PIU on a monthly basis documentation of sources of materials. . If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will ensure that all the parties/ suppliers necessary clearances and permission as per the Nepal law and will provide the documentary evidence to PIU/consultants.	PIU, Contractor	PCU, PMCDC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
3. Construction phase				
Construction Planning	Inadequate planning could lead to non-implementation of EMP during the construction phase and result in significant environmental impacts leading to non-compliance with ADB's environmental safeguard requirements.	• Appoint an Environmental Health and Safety (EHS) Supervisor; • Develop a Site-Specific Environmental Management Plan (SEMP) and get it approved from the Client; • Conduct training on the rationale for and implementation of the SEMP and EMP to enhance general understanding and clarify responsibilities regarding implementation, including monitoring and reporting, must also be provided to all relevant staff of contractors; • While the locations of all project components have been finalized, the locations for labour campsites, batching plant site etc. that would be required by the Contractor temporarily during the construction period, have not been finalized. The Contractor should select the locations for the campsites, batching plant sites etc. in consultation with local municipalities and get it approved from the PCU and PIU. The Contractor should provide all infrastructure and services necessary to ensure that the labourers' needs are addressed throughout their stay at the campsites. Also, the Contractor should deploy construction equipment, plant and machinery in good condition, provided with necessary pollution control apparatus, and operate as per standards and meet all environmental standards specified by the GoN for such operations; Contractor shall ensure necessary fitness, pollution under control certificates, and are operated by qualified / licensed drivers/operators • The Contractor will be required to submit to PCU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. No works can commence prior to approval of SEMP. The SEMP will include the following, among others; (i) Construction Compound Management Plan; (ii) Construction Health and	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		Safety Plan (including COVID-19 H&S guidance) and (iii) Emergency Incident Response Plan.		
Disruption of Existing Utilities	Disruption of infrastructure and services	• conduct investigation at site to determine all the existing utilities that are likely to be disturbed during construction phase; • all underground utilities should be marked prior to any construction works to be taken up at the locations; and • coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with PCU and stakeholders at the site. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the time required and at cost of the subproject. For essential supplies like water supply, any disruption more than 24 hours, shall be minimized by providing alternative water supply, e.g via mobile tankers.	Contractor	PCU, PMCDC
Excavation Works	Excavations may affect local drainage patterns if surface and groundwater collect in voids as they are being dug.	• All excavations shall be done to the minimum dimension as required for safety and working facility; • Excavations should be carried out after identifying the location of all utilities that exist along the project area; • The excavation shall be executed in such manner, that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost; • Explore working in off-peak hours or night on busy road sections with prior permission and with proper lighting and safety measures; however, no noisy works shall be conducted in the night • Road drains and channels shall be kept free from obstructions at all times; • Excavated areas should be sufficiently demarcated so as not to affect the health and safety of workers and the people using the road alignment for their daily activities.	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
Excavated Earth Management	Excavation during construction will generate loose soil which can be carried through surface run-off during a rainfall.	• The Contractor shall plan the works in a way that minimizes surface excavation works during the rainy season, where practicable. • Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor. • The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered. • Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion. • The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows. • Monitor water quality that could exist close to the working areas to ensure compliance.	Contractor	DSC, PIU, PMCDC, PCU
Impact on Surface Water Quality	Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water.	• Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals • The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMCDC to control soil erosion, sedimentation, and water pollution. All temporary sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work. • All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels. • Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer. • Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas.	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Avoid scheduling of excavation work during the monsoon season. • Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site. • Ensure that drains are not blocked with excavated soil • Stockyards at least 50 meters (m) away from watercourses. • Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%. • Effective maintenance of machinery and vehicles to avoid leakages; • No obstruction in flowing water. • For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs; provide proper systems for collection, treatment and safe disposal of wastewater from construction camps and facilities; no pit latrines shall be allowed; toilets. And wastewater outlets shall be connected to city sewerage systems (if available) or septic tanks and soak pit systems developed within the site. Septic tanks should be sealed from bottom and sides to prevent seepage. • Solid Waste Management, as detailed in the approved SEMP, should be implemented throughout the construction period; • Monitor water quality according to the environmental monitoring plan.		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
Impact on Groundwater	Increased groundwater demand for construction and consumption use can deplete the Groundwater Table; Unscientific Solid Waste and Construction Waste Disposal can lead to contamination of ground water,	• Use the groundwater resources judiciously and with prior approval of competent authority; • All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned; • Storage of lubricants and fuel at least 50 m from water bodies and in double-hulled tanks; • Effective maintenance of machinery and vehicles to avoid leakages; • Effective management of solid waste and construction debris as per an approved SEMP; • Provide uncontaminated water for dust suppression; • Monitor ground water according to the environmental monitoring plan.	Contractor	DSC, PIU, PMCDC, PCU
Drainage Management	Construction material getting into surface run off or uncontrolled disposal may cause drainage congestion, flooding or waterlogging in neighboring areas.	• The contractor shall adopt a site clearance procedure; dispose debris / waste soil only in designated and pre-approved locations by the PIU • Wastes and construction debris will not be disposed in a manner that these would end up in drainage canals; • The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that they do not permit direct runoff into watercourses and are on land sloping at less than 1.5%. • All heaps shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized.	Contractor	DSC, PIU, PMCDC, PCU
Impact on Air Quality	Construction activities including transport and storage of raw materials will likely create dust and emissions that could deteriorate ambient air quality in the area.	• Take every precaution to reduce the levels of dust at construction sites; • Fit all heavy equipment and machinery with air pollution control devices that are operating correctly; • Construction vehicles must travel at speeds that minimizes dust generation; • Reduce dust by spraying water on stockpiled soil, excavated materials, and spoils;	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Cover with tarpaulin vehicles transporting soil and sand; • Cover stockpiled construction materials with tarpaulin or plastic sheets; • Water spraying to access roads, camp sites and work sites to reduce dust emissions; • Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications; • All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant standards; • Repair and maintain access roads, as necessary. • prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes; • use vehicles that have government-issued permits and registrations; and • prohibit open burning of solid waste • Monitor air quality according to the environmental monitoring plan.		
Impact on Noise	Noise generation may disturb nearby sensitive receptors	• Arrive at the construction schedule upon discussions with the nearby stakeholders, especially when works are carried out near sensitive receptors such as hospitals, schools, places of worship etc.; • Install noise barriers between the source and receptor, as necessary; • Enclose and locate generators away from sensitive receptors; • Operate construction machines / conduct noise operations sequentially rather than all together; • spread out the schedule of material, spoil and waste transport; • minimize drop heights when loading and unloading coarse aggregates; • avoid use of horns unless absolutely necessary;	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Select electrically powered plant that is quieter than diesel or petrol-driven plant, if interchangeable; • Use modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensure they are maintained to manufacturers' specifications; • Noise-generating equipment must be fitted with silencers; • Optimize the use of noisy construction equipment and turn off any equipment if not in use; • Regular maintenance of all equipment and vehicles; • Stop all construction activities during at night; • Implement a complaint handling system; • Workers should be provided with Ear muffs / protective hearing equipment in noise critical areas; • Place visually clear instructions in areas where noise levels are significant; • Measure noise levels periodically as per the Environmental Monitoring Plan;		
Construction Waste Management	Inadequate management of construction wastes will result in negative impact on the soil, aesthetic beauty of area and workers' health and safety.	• Prepare Construction Waste Management Plan as part of the SEMP; • Identify and seek approval for the areas where construction waste could be disposed; • The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators. • Contractor shall implement waste segregation on site. • Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed properly; • Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material. • Waste auditing. The contractor will record the quantity in tons and types of waste and materials leaving site during the construction phase; • Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by relevant parties; • All construction waste should be managed as per the approved SEMP.		
Impact on terrestrial flora and fauna	The subproject sites do not impact any trees, or birds or animals in the area. At a few locations, outside the ROW, presence of Mango (*Mangifera indica*), Peepal (*Ficus religiosa*), Gulmohar (*Delonix regia*), Jacaranda (*Jacaranda mimosifolia*) and Ashoka (*Saraca asoca*) have been noticed. However, these trees are not impacted, as well. Nevertheless, in the event the final designs reveal any impact on trees, appropriate mitigation measures should be adopted.	• The first priority is to avoid cutting of trees through changes in design and road alignments. This is in particular important when the tree species is protected or considered sacred by the community and / or houses nests for birds; • Do not cut any protected tree species; retain the tree / alter the alignment / layout of road/ drain locally to preserve the trees; • after the finalization of the designs and layout of the project components, the trees within proposed construction areas will be marked; • trees within area required for construction will be felled after prior approval; • replacement of the tree shall be undertaken by the project i.e., PIU at the replacement ratio of ten trees for every tree that is cut (i.e., 1:10 ratio as per Forest Regulations,2022) Indigenous/native species will be preferred in tree planting; • only trees that will require removal within the proposed construction areas of the sites will be cut; • For trees that will not be cut, take all precautions to protect them from any damage from construction activities • Conduct survey of trees for bird nests prior to cutting; if any active nests, ensure that trees are not disturbed until young birds fly away from the nests; do not cut trees during the breeding season • prevent workers from removing / damaging any other flora and fauna found in the project vicinity; and • prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the construction sites.	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
Impact on Aquatic Ecology	There are over 200 ponds in the Janakpur area some of these are considered sacred as well. A couple of project areas viz., Yatri Niwas Road and Bihar Kunda Road and located adjacent to ponds, as well. Siltation, chemical spills, improper waste disposal may affect the water quality of nearby ponds and any thriving aquatic species.	• Provide temporary protection at sections near the ponds to avoid sliding of soils; • Store spoils away from the side of the river/pond; • Implement proper storage/disposal of materials, chemicals and waste • Implement mitigation measures for excavation, soil erosion and sediment mobilization, surface water pollution, and construction waste generation; • Prohibit employees and workers from fishing in any of these ponds; • Conduct sampling and analysis of the surface water near to the construction sites as part of the Environmental Monitoring Plan.	Contractor	DSC, PIU, PMCDC, PCU
Impact to Traffic and Access	Road rehabilitation works will render some portions of the road unusable at periods of time resulting in traffic congestion and inconveniences to pedestrians and motorists in the vicinity of the affected area.	• Schedule road works in consultation with temple authorities and traffic police; works that may affect the tourist places shall not be conducted during the tourist seasons • Complete the works and clear the sites prior to start of peak tourist seasons; • Plan roads and drain works minimizing traffic disturbance/blockades; work planning is crucial to minimize the inconvenience to public due to road works; provide diversions / alternative roads where required • A Site-Specific Traffic Management Plan should be drawn up in consultation with the local community on construction operations and work schedules.; • Coordinate with traffic police for temporary road diversions and for provision of traffic aids; • Notify public and provide sign boards informing nature and duration of construction works and contact numbers for concerns/complaints;	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Maintain sufficient access to houses and shopkeepers (commercial establishments) during works; provide proper and safe pedestrian access. • Awareness should be built amongst the community on the implementation of the Site-Specific Traffic Management Plan; • Emergency response plan must be prepared for any traffic accident during construction and should be included in the SEMP. • As necessary, increase workforce for speedy completion; • Schedule material deliveries on low pedestrian traffic hours; • Restore damaged properties and utilities; • Erect and maintain barricades if required; • Pedestrian access will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained. • Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the SEMP		
Impact on Socio-Cultural Resources, Tourism and Chance Finds	There is a reputed cultural resources viz., Janaki Temple beside one the road stretches taken up for improvement. Hence, chances of finding items of archeological importance are high in the town. Also, tourism place an important role in the local economy.	• Prior to commencement of construction, consult with concerned religious authorities of these temples, nearby people and devotees and explain the work method and duration of proposed works, take their suggestions and comments in scheduling and conducting the works • Schedule road works in consultation with temple authorities and traffic police; works that may affect the tourist places shall not be conducted during the tourist seasons • No construction camps (workers accommodation, material / waste / soil storage) should be established within 1 km of the any of the monuments; • Put in place proper dust and noise control measures • Adjacent to religious/social/historical buildings, undertake excavation and construction work in such a way that no structural damage is caused to the structures	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Schedule and plan works considering the tourist season and tourist areas • Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrance/obstacles during such time to the religious places • Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works. • Ensure proper traffic management planning to minimize the disruption to the normal traffic flow in the area and ensure the safety of the people. • Clear the work site of unnecessary material, equipment, and debris / surplus soil; do not stock material / soil at the sites • Conduct continuous consultations with the local people during the works • Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology (NDA) for any suspicion of chance finds during excavation works; • Create awareness among the workers, supervisors and engineers about the chance finds during excavation work; • Stop work immediately to allow further investigation if any finds are suspected; and • Inform the NDA if a find is suspected and take any action they require to ensure its removal or protection in situ; • Follow the written instructions of NDA for continuation of works		
Impact on socio-economic activities	Disturbance to economic activities may result from excavation works, stockpiling, the operation of construction vehicles and equipment, and	• Develop the construction schedule in discussions with the community so that movement of construction vehicles can be avoided during school travel timings, festival times and /or any other local events that would require local communities to travel; • Implement the traffic management plan in collaboration with local authorities;	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	accidental damage to utilities	• Where traffic congestion will likely occur, place traffic flagmen during working hours; • Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods; • If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities; • Provide convenient access to pedestrians when works occur in front of residential, commercial or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas. • At all points of time, ensure that the local communities have at a minimum, access to their households; • Manage stockpile; • Manage pumped water from excavations either to drains or drums for later use; • Relocate the affected power supply poles, and • Advise the concerned authority during accidental damage to utilities.		
Occupational Health and Safety	Construction activities could create health and safety risks to construction workers	• Contractor to prepare Health and Safety Plan prior to commencement of works as a part of SEMP; • All relevant provisions of the National Health Care Waste Management Standards and Operating Procedure -2020 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase; • Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities; and EHS Guidelines on Waste Management Facilities. These practices include recommended measures to prevent, minimize and control pathogens from inflicting workers through training and use of appropriate	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		PPEs, clothing and equipment when working along the drainage system, and immunization and health monitoring (e.g. hepatitis B and tetanus). • Existing drains may present hazardous working conditions in some places due to lack of oxygen and flammable nature of methane emissions which will be detrimental to the health and safety of workers. Put in place standard operating procedures with appropriate equipment, and workers are provided with necessary training and personnel protection equipment to safeguard health and safety • Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19). • A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital; • Other first aid medical equipment and nursing staff will be made available or arranged on-call; • The contractor will conform to all disease prevention instructions as may be given by PCU/PIU; • Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce; • The contractor shall provide all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site; • Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any; • Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and • Provide adequate insurance to the workers that is current throughout the construction period; • Conduct Health and safety training periodically and Daily Tool Box Training for all site personnel.		
Community Health and Safety	Construction activities could create health and safety risks to community people.	• Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work; • Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities. • Follow established community health and safety protocol on emerging infectious diseases such as COVID19; • Implement measure to prevent proliferation of vectors of diseases at work site; • Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (URLIP); • Schedule transportation activities by avoiding peak traffic periods; • Clean wheels and undercarriage of haul trucks prior to leaving construction site; • Educate drivers, enforce speed limits in settlements and avoid use of horn; • Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement; • Provide prior information to local people on work schedule, particularly the Temples and other places of worship;	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		• Noise barriers must be installed in between the construction site and any community halls or places of worship to reduce the noise level; • Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and • Ensure contractor has staff trained on emergency response.		
Post-construction clean-up and reinstatement	Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction.	• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; • All excavated roads shall be reinstated to original condition; • All disrupted utilities restored; • All affected structures rehabilitated/compensated; • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up; • All hardened surfaces within the construction camp area shall be ripped; • All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document; • The contractor must arrange the cancellation of all temporary services; • Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.	Contractor	DSC, PIU, PMCDC, PCU

Table 32: Environmental Management Plan – Operational Phase – Janakpur Subproject

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring / Supervision
Routine Maintenance	Traffic may be interrupted temporarily but this work will be very small in scale, periodic, and short in duration, so there will be no economic or other implications. Also, the environmental impacts will be much less than those during the construction period.	• To maintain the safety of workers and road-users, such work should be coordinated with the local police department so that adequate warning signs and traffic diversions can be set up when necessary • Debris need to be collected and disposed at designated sites; • Continue to encourage community participation in ensuring drainage canals are clog-free through information and behavior change campaigns and incentives, if possible.	Janakpur sub-metropolitan city	PCU, DUDBC
Community Safety	Improved roads may give way to faster vehicle speeds which could endanger people and households along the road alignments. Damage in roads may also cause accidents to motorists.	• Conduct regular inspection of the roads to check for damages, and undertake rehabilitation measures for any damages found; • Inspect and maintain the integrity of road barriers, especially at critical curves or locations that are prone to vehicular accidents; • Inspect and maintain speed limiters such as humps installed on road sections near residential areas, schools, and religious establishments; • Inspect and maintain all road signages, including appropriate warning signages at silent zones, and ensure that these are reflectorized and visible even during night time; and • Ensure pedestrian crossings are maintained.	Janakpur sub-metropolitan city	PCU, DUDBC

D. Environmental Monitoring Program

141. Monitoring of mitigation measures during construction is the responsibility of the PIU and PCU, supported by the PMCDC Environmental Specialist. However, monitoring of mitigation measures during operation phase is the responsibility of Janakpur sub-metropolitan city. Table 33 shows the proposed Environmental Monitoring Program for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility.

Table 33: Environmental Monitoring Program

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
PRE-CONSTRUCTION					
Secure Environmental Clearance Certificate (ECC) from MoUD	PCU office	PCU, PMCDC	Copy of approved ECC	Before construction activities	PCU, PMCDC
IEEs and EMPs are included in bid and contract documents	PCU office	PCU, PMCDC	Copies of bid and contract documents	Before approval tender document	PCU, PMCDC
Site-specific EMP (SEMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SEMP	Before construction activities commence	PCU, PMCDC
Spoil management plan (SMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SMP	Before construction activities commence	PCU, PMCDC
Traffic management plan (TMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved TMP	Before construction activities commence	PCU, PMCDC
Secure all other necessary permits and licenses from relevant government agencies		Contractor	Copies of permits and licenses	Before construction activities commence	PCU, PMCDC
CONSTRUCTION					
Implementation of SEMP; including implementation of community and occupational health and safety measures.	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PCU, PIU, PMCDC
Implementation of SMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMCDC
Implementation of TMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMCDC
Tree Removal and Replacement	Subproject site and planting site	Contractor	Site visits, Contractor records,	Monthly, or as needed	PCU, PIU, PMCDC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
Develop and apply archaeological protocol to protect chance finds	Subproject site	Contractor, PCU, PIU, PMCDC	Contractor records	Once until protocol is approved	PCU, PIU, PMCDC
Provide EHS training for all personnel	Subproject site	Contractor	Contractor records; Interviews to workers	Monthly	PIU, PMCDC
Keep accident reports and records	Subproject site	Contractor	Contractor records; Interviews to workers and community people	Monthly	PIU, PMCDC
Employ workforce from communities near sites	Subproject site	Contractor	Contractor records	Monthly	PIU, PMCDC
Implementation of EHS measures at construction camps	Construction camp site	Contractor	Site visits; Interviews to workers at camp	Monthly	PIU, PMCDC

Table 34: Environmental Monitoring Plan (Sampling & Analysis)

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
Ambient air quality	3 locations for each quarterly sampling viz., one baseline and another two near / at construction sites.	PM10, PM2.5, NO2, SO2, CO	Once before start of construction and quarterly (yearly 4-times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor
Ambient noise	3 locations for each quarterly sampling viz., one baseline and another two near / at construction sites.	Day time and night time noise levels	Once before start of construction and quarterly (yearly 4-times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor
Surface water quality	3 locations for each quarterly sampling	pH, Oil & grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD,	Once before start of construction and quarterly	Contractor	Cost for implementation of monitoring measures

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
	viz., one baseline and another two near construction sites.	COD, DO, Total Alkalinity	(yearly 4-times) during construction		responsibility of contractor

E. Capacity Development Training

142. The PMCDC Environment Specialist will be responsible for training the PCU, PIU and contractors. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below.

(i) sensitization on ADB's safeguard policy on environment;
(ii) introduction to environment and environmental considerations in urban infrastructures;
(iii) review of IEEs and integration into the project detailed design;
(iv) improved coordination within nodal departments; and
(v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

143. **Methodology**. Capacity building activities will be achieved through combination of practical methodologies available such as lecture and workshop training by experts, on-the-job training and mentoring, and continuing team meetings and exercises. The PMCDC Environment Specialist will spearhead the designing of specific programs appropriate for the target participants or stakeholders, including the execution of these programs during the different implementation phases of the URLIP, which includes the subproject. Pre-training and post-training assessment will be an integral part of the overall program to measure its effectiveness, and identify any other needed interventions to improve effectiveness, if necessary.

144. As fundamental component for the capacity building program, basic lectures and seminar training sessions will be provided by the PMCDC Environment Specialist to strengthen the awareness of project stakeholders on the requirements of ADB SPS and government environmental laws, rules and regulations. Modules will be prepared and customized based on the skills set and needs of the different stakeholders. The entire training will cover basic principles of environmental assessment and management mitigation plans and programs, implementation techniques, monitoring methods and tools. A proposed lecture and seminar training program along with the frequency of sessions is presented in the following table.

Table 35: Sample Lecture and Seminar Training Program for Environmental Management

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and Government of Nepal and how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and Government of Nepal	Improving implementation of EMP
Contents	Module 1: Orientation ADB Safeguards Policy Statement Government of Nepal Environmental Laws and Regulations Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts	Roles and responsibilities of officials/contractors/consultants towards protection of the environment Environmental issues during construction Implementation of EMP Monitoring of EMP implementation Reporting requirements	Experiences on EMP implementation – issues and challenges
Duration	1day	1day	Best practices followed
Participants	PCU and PIU staff (technical and environmental) involved in the project implementation	PCU, PIU, Contractors	PCU, PIU, Contractors

F. Environmental Management and Monitoring Plan Implementation Cost (Indicative)

145. Most of environmental mitigation and enhancement measures are integrated into the design and cost are included as part of the civil works contract. Some items need to be incorporated in the Bill of Quantities (BOQ) of this subproject including the environmental monitoring costs. The environmental costs presented in table below are tentative provisions based on experience of undertaking similar works under different DUDBC projects. For the details of environmental costs under civil works contract, individual contract package bid document may be consulted. Contractors will bear the direct costs of all mitigation measures during construction, which will be included in the tender and contract documents; this includes features built into facility designs to prevent environmental impacts from arising. The PIU will bear the costs related to mitigation measures

during operation. Costs related to environmental supervision during construction will be borne by the PIU, the PCU (for the activities of the environmental consultants) and by the contractors (for monitoring work carried out by the EHS Supervisors). During the operation phase, monitoring costs will be borne by the Janakpur sub-metropolitan city and/or the PIU.

Table 36: Indicative Environmental Management Plan Budget for Bill of Quantities (BOQ)

S. No.	Description of Items	Unit	Qty	Unit of Rate	Item Total
i.	Environmental Monitoring Cost a) Air Quality, b) Noise level, and c) Water Quality	Lumpsum	57	NPR 4,94,000	NPR 4,94,000
ii.	Insurance Cover for the following: (a) Workmen Compensation and (b) Damages to Third Party	Lumpsum			Part of civil works contract
iii.	Tree Replacement (Providing, Planting containerised tree and shrub seedlings, including pitting, transplanting, composting and placing tree guards, curing and maintenance) *Compensatory plantation as per Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees*	Nos.(as per actual loss of trees)	0	NPR 3,000	NPR 0
iv.	**Environmental Mitigation and Enhancement Measures at Construction Sites (3 sites) and Campsites (1 site) as per below to the satisfaction of engineer-in-charge:** -Providing and maintaining adequate potable water supply facilities at camp site and work site -Personal Protective Equipment (PPE) -Traffic management during construction (barricade with green nets, visible warning and danger signs in construction sites) -Dust suppression measures by spraying water (excluding watering for compaction) (3 times a day at 3 construction sites for 1.5 years excluding monsoon and planning period)	Lumpsum			NPR 21,50,000

S. No.	Description of Items	Unit	Qty	Unit of Rate	Item Total
	-Debris disposal and waste management on camp sites -Restoration of ancillary sites including stockpile sites, borrow areas, workforce camp (assuming 6 locations) -Maintain First aid box and fire extinguisher (campsite, construction site and storage site) -Separate male and female toilet facilities -Implementation of additional occupational health and safety measures related to prevention of COVID-19				
	Indicative Cost (Total Amount)				**NPR 26,44,000**

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Consultation and Participation

146. Meaningful consultation is an essential part of the environmental assessment process which enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, and the sharing of development benefits and opportunities, and implementation issues. The process also helps avoid potential conflicts with stakeholders for smooth project implementation. The findings from the public consultations are documented and considered in the development of the EMP, especially in identifying the significant impacts of the proposed Project and developing the corresponding mitigation measures. The key stakeholders consulted were:

(i) Project beneficiaries;
(ii) Elected representatives, community leaders and representatives of community-based organizations;
(iii) Local government and relevant government agency representatives, including local authorities responsible for land acquisition, protection and conservation of forests and environment, archaeological sites, religious sites, and other relevant government departments.

B. Public Consultation Conducted

147. Consultations were conducted with key stakeholders and community members in line with ADB's requirements pertaining to environmental and social considerations. These consultations helped in identifying the felt needs, concerns and apprehensions of the communities related to the project and their priorities and likely environmental and social safeguards issues and mitigation measures. The summary of consultation date, place and number of participants is given in the following table.

Table 37: Details of Public Consultation at Janakpur Sub-metropolitan City

S. N	Date and place	Number of Participant			Key discussion points/issues raised
		Male	Female	Total	
1	18, 19 & 22 April 2023 (ADB pre fact finding Mission) Three meetings with road section	55	2	57	- Shared overall scope of the project to municipal authorities. - Jointly observed the proposed road alignment. - Discussed likely issues of land resettlement. - Discussed heritage site and redevelopment scope, agreed on preparing the supporting document for safeguard requirements

S. N	Date and place	Number of Participant			Key discussion points/issues raised
		Male	Female	Total	
2	March 2, 2022 and March 4 2022 Two meeting with Heritage site and Municipality by design consultant	29	5	34	- provision of pedestrian walkways around the pond areas, - moving of the main road a few meters away from Ratna Sagar Pond as an option, - development of walkways on the front part of the temple in patterns of a peacock's feather to - represent Mithila Art, - provision of recreational spaces and separate parking spaces - provision of public restrooms - development of water-logged areas as water bodies for fish farming and other income - generating activities, - provision of cremation areas along with storerooms and shops related to funerary rituals.
		84	**7**	**91**	

148. During the consultations, the project, its benefits, social and environmental impacts were presented to the community. The participants were encouraged to be open and make known their concerns and claims. The meeting minutes of the consultations held at Janakpur are presented in **Appendix 3**. Following are the general issues observed from the minutes of meetings of mass consultation:

(i) Project affected people expressed their willingness to provide consent for the demolition of likely affected private structures with the improvement of proposed road subprojects.
(ii) The meeting with municipality and district office of DUDBC culminated that there will not be any impact upon land, structure and livelihood due to the improvement and upgrading of the proposed road sections.
(iii) Further, the consultation meeting decided that there will not be any impact upon dalits, backward people and indigenous nationalities with its implementation.
(iv) It is further, decided that there will not be severe impact upon environment with the implementation of the road sections.

149. After the presentations, the community was given opportunity to give their views, comments, and queries. The following lists the topics, issues and concerns discussed during the consultations:

(i) Awareness of the local community about the Project;
(ii) Community benefits realized as a result of the road schemes;
(iii) Opinion of the local people about its need;
(iv) Community support and participation;
(v) Prospects of jobs and income generating activities;
(vi) Road connectivity and access;
(vii) Construction impacts such as dust and noise;
(viii) Resettlement and social issues and mitigation measures;
(ix) Roles and responsibilities of different stakeholders for realizing desired outcome; and
(x) Construction and maintenance of the roads

Figure 21: Public Consultation in Janakpur Sub-Metropolitan

Consultations and Project Readiness Presentation by DUDBC division Sr. Engineer Pradeep Khanal in Janakpur Sub-metropolitan City during ADB mission

ADB mission with Janakpur Sub-Metropolitan and DUDBC team at proposed road sections in Janakpur

Mission team and Stakeholders at Janakpur Sub-Metropolitan Office

C. Future Consultations during Detailed Design Stage

150. Stakeholder consultations will continue during the project implementation. PCU, PIU, DSC and PMCDC will ensure that consultations will be conducted as meaningful per definition of ADB SPS 2009. The summary of IEE will be locally disclosed in an accessible place and in a form and language(s) understandable to affected people and other stakeholders before consultations to give stakeholders a chance to read it and consult experts.

D. Information Disclosure

151. Information shall be disclosed through public consultation and making available relevant documents in public locations. The following documents will be submitted by the PCU to ADB for review and disclosure on its website. ADB will disclose upon receipt of acceptable reports and endorsement from the PCU:[13]

(i) IEE report (including subproject EMP);
(ii) Updated IEE (including EMP); and
(iii) Semi-annual environmental monitoring reports, and corrective action plans prepared during project implementation, if any

152. The EA/IA will send a written endorsement to ADB for disclosing these documents on the ADB website. The PIUs will provide relevant safeguard information in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. For the benefit of the community, the summary of the IEE will be translated in Nepali and made available at: (i) office of PCU; and (ii) offices of the contractors. Hard copies of the IEE report will also be available at the PCU and accessible to citizens as a means of disclosing the document and at the same time creating wider public awareness. On demand, the person seeking information can obtain a hard copy of the complete IEE document at the cost of photocopy from the office of the Project Office, on a written request and payment for the same. Electronic version of the IEE will be placed in the official website of DUDBC after approval of the documents by Government and clearance from ADB. Disclosure will follow ADB's Access to Information Policy, 2018.

[13] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4." Upon its receipt of acceptable safeguard documents and endorsement by PCU, ADB discloses the same on ADB website.

VIII. GRIEVANCE REDRESS MECHANISM

153. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate resolution of affected persons' concerns, complaints, and grievances related to social, environmental, and other concerns on the project. The project adopts a three- tier GR and will ensure greater accountability of the project authorities towards affected persons. Grievances may be routed through letters, emails, text messages, verbal narration, grievance box and registers. The GRM is not intended to bypass the government's own legal process, but to provide a time-bound and transparent mechanism to resolve such concerns that is readily accessible to all segments of the affected persons and community. The aggrieved party shall be free to approach the national legal system at any given time. All costs involved in resolving the complaints (meetings, consultations, communications, and reporting/information dissemination) will be borne by the project.

154. PIU will ensure local community meetings are held to notify users and affected persons and other stakeholders about grievance redress mechanism of the project. Awareness of grievance redress procedures will be created through the public awareness campaign, with the help of print and electronic media and radio. The key functions of the GRC are to (i) provide support for affected persons or any aggrieved party to lodge their complaints; (ii) record the complaints; (iii) facilitate grievance resolution in consultation with affected persons and concerned authorities; (iv) report to the aggrieved parties about the decision/solution; and (v) forward the unresolved cases to higher levels.

155. Grievance redress committees (GRCs) will be formed at three levels viz. ward/field level, PIU level and PCO level as under:

156. **First Level GRC (Field/Ward-Level):** The contractors, PIU safeguards personnel can immediately resolve issues on-site in consultation with each other with the support of the designated municipal ward chairperson and will be required to do so within seven days of receipt of a complaint/grievance. In addition, contractors will place complaint boxes at prominent places viz. public places, contractor camp site etc. where local community members can put their complaints/grievances and contractor's personnel should be in charge to collect and process the complaints/grievances as necessary. The PIU safeguards personnel, SDC safeguards consultants and contractor can immediately resolve the complaint on site. If the grievance remains unresolved within the stipulated time, the matter will be referred to the next GRC level. The field/ward-level GRC will comprise of the following:

(i) Ward Chairperson (Committee Chairperson)
(ii) PIU Engineer
(iii) Ward Member representing vulnerable community (one women and one *janjanati* representative, if required)
(iv) Contractor's Representative
(v) SDC Safeguards Specialist
(vi) Ward Chairperson's secretary will act as complaint receiving office and provide secretarial services to GRC.

157. The ward-level GRC shall have at least one women member. For project-related grievances, representatives of affected persons, and community-based organizations will be invited as observers during GRC meetings. In case of impact on indigenous peoples, the grievance team must have representation of the affected indigenous peoples, and or CSOs/NGOs working with the indigenous peoples' groups.

158. **Second Level GRC (Municipality/PIU-Level):** Any unresolved issues at ward level will be referred to the second level GRC chaired by Mayor/Deputy Mayor. The complainant will be notified by the ward-level GRC that the grievance is forwarded to the municipality (PIU) level. All evidence submitted while lodging the complaint by the affected will also be forwarded. After proper examination and verification of the grievances, the committee will facilitate affected persons, and concerned parties to agree on a time-bound action plan to resolve the grievance if found to be valid. The GRC at this level will have to respond to its decision within 14 days of receipt of complaint from first level. The second level GRC will comprise the following:

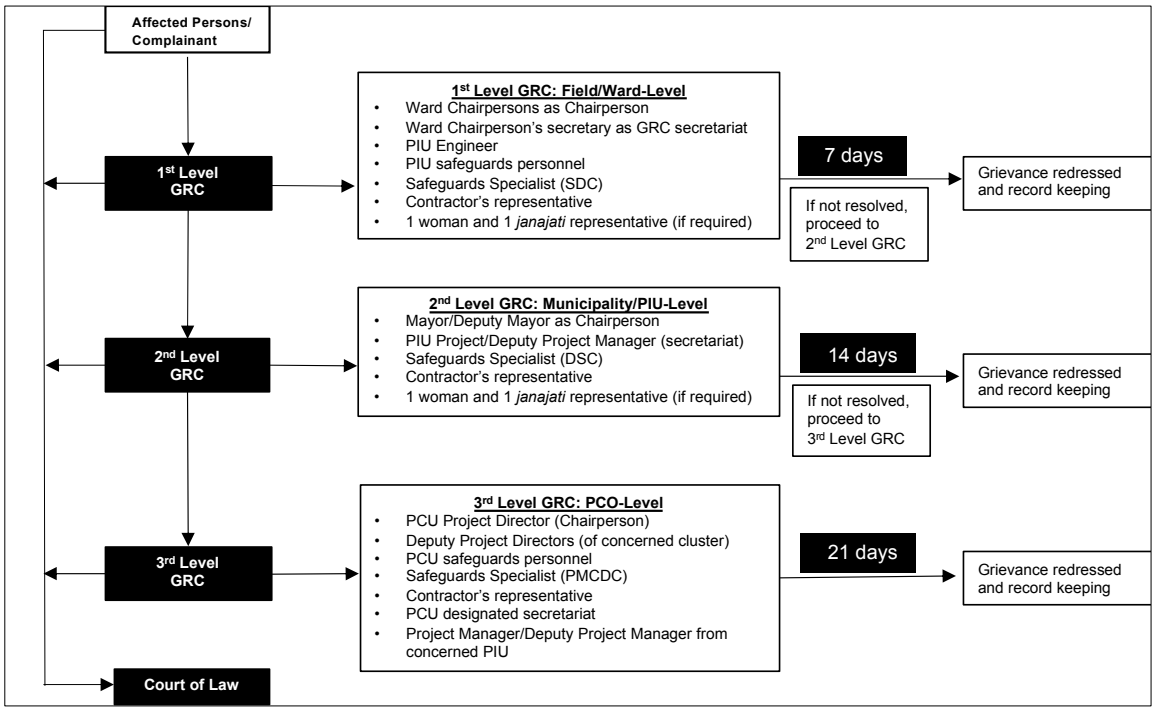
(i) Mayor/Deputy Mayor (Committee Chairperson)
(ii) PIU safeguard personnel
(iii) SDC social/environment specialist
(iv) Contractor's representative
(v) Ward member representing vulnerable community (one women and one *janjanati* representative, if required)
(vi) Project manager of the PIU will act as a secretariat.

159. **Third Level GRC (PCO-Level**): If the grievance remains unresolved within the stipulated time, the matter will be referred to the PCO level. The PIU safeguards team will refer any unresolved or major issues to the PCO-level GRC. The PCO-level will comprise the following:

(i) Project Director (Committee Chairperson)
(ii) Deputy Project Directors
(iii) PCO Safeguards Personnel
(iv) Safeguards Specialist
(v) Contractor's Representative
(vi) Project Manager/Deputy Project Manager from concerned PIU/municipality
(vii) PCO-designated personnel who will act as secretariat.

160. The grievance redress process is represented in Figure 2.

Figure 22: Grievance Redress Procedures – URLIP



161. **Record-keeping.** The PIU/PCO/ PMCDC will keep records of grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were affected and final outcome. All complaints should be signed with complete information on name, contact address, phone number if any so that the person can be contacted when required. A sample template is provided in Appendix 4. An acknowledgement to the effect that the complaint has been received by the coordinator's office should be promptly sent to the complainants. All complaints received should be first registered, categorized and prioritized. They should be analysed and assessed the concerns raised by the affected parties and have discussion and consultation with them. Records of all such proceedings should be maintained, for future reference, and the attendance of all participants with their signature, in particular the complaints and affected groups should be recorded. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PCO, PIU offices, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis.

162. **Periodic review and documentation of lessons learned**. The PCO project officers (Social and Environment) will periodically review the functioning of the GRM in each municipality and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

163. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PCO and concerned PIU.

164. **Accountability Mechanism.** Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. In the event that the established GRM is not in a position to resolve the issue, the affected person also

can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission (NRM).[14] Before submitting a complaint to the Accountability Mechanism, it is necessary that an affected person makes a good faith effort to solve the problem by working with the concerned ADB operations department and/or NRM. Only after doing that, and if they are still dissatisfied, will the Accountability Mechanism consider the complaint eligible for review. The ADB Accountability Mechanism information will be included in the project-relevant information to be distributed to the affected communities, as part of the project GRM.

[14] ADB. Accountability Mechanism. https://www.adb.org/who-we-are/accountability-mechanism/main

IX. MONITORING AND REPORTING

165. PCU will monitor the overall progress of EMP implementation of the entire URLIP through the different subproject jurisdictions, including the roads subproject in Janakpur Sub-Metropolitan City. The PCU, and PIU will undertake their respective roles in site inspections and document review to verify compliance with the EMP and SEMP, and progress toward the final outcome. The contractor will conduct day to day implementation of the SEMP.

166. The contractor will submit monthly reports to the PIU. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the contractor's EHS Supervisor (or equivalent) on a daily basis. The SEMP should cover the procedure to be used by the Contractor to conduct the daily monitoring and submission of the Monthly reports.

167. The PIU will submit quarterly environmental monitoring reports to PCU, which will include summary of monthly monitoring activities of contractor and results of any independent monitoring or inspection activities of the PIU. In the conduct of these independent inspection activities, PIU will be supported by PMCDC in this regard. A sample of the Site Environmental Inspection checklist is in **Appendix 3**. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction site.

168. PCU shall consolidate quarterly reports from the PIUs including PIU in Tilottama Municipality, and results of its independent monitoring or inspection activities. PCU shall accomplish semi-annual environmental monitoring report (SEMRs) starting from the effectivity date up to the end of construction phase, which shall be submitted to ADB for review and disclosure on ADB website. The PCU shall prepare and submit annual environmental monitoring report during the operation phase until ADB issues a project completion report. Submission of these reports to ADB will be within thirty (30) days from the end date of reporting period.

X. CONCLUSION AND RECOMMENDATION

169. The process described in this document has assessed the environmental impacts of all elements of the roads and drainage subproject proposed in the town of Janakpur under the ADB funded Urban Resilience and Livability Improvement Program (URLIP). The infrastructure improvements include construction of 16.251 kms of roads and drains across 17 locations in Janakpur sub-metropolitan city.

170. All potential impacts were identified in relation to planning / design, pre-construction, construction, and operation phases. Potential environmental impacts were assessed based on secondary data, stakeholder consultations, and field visits. The Janakpur subproject components are located in built-up/mixed use area (residential and commercial) and there is no sensitive ecological area (protected area or critical habitats or forests) within at least 10-km radius of the subproject locations. Janaki Temple in the city, is culturally important Centre which is on the list of monuments on the tentative list of UNESCO Heritage Sites in Nepal. One road component is located behind the rear wall of the Janaki Temple. Works will not encroach or disturb the monument zone. Prior permission from Department of Archaeology will be obtained and necessary measures are incorporated into EMP to avoid any construction phase impacts. Given the historical and cultural significance of Janakpur, chance finds procedures are put in place and will be implemented during the construction.

171. Road improvements in the proposed subproject are combined with drainage improvement, and necessary lateral drains and cross drainage structures already included in the feasibility / preliminary designs. During the detailed design, local hydrology will be further assessed and accordingly the designs of the drainage system should be finalized to mitigate water logging and the flooding on project roads. There are no trees within the proposed roads right of way and therefore the project does not impact any trees or other vegetation.

172. Most of the predicted impacts during construction. Road and drain will be conducted on the public roads in urban areas, some of which are congested with people, activities and traffic, and therefore likely to significant impacts during construction. Janakpur being a famous religious place, attract large number of tourists throughout the year, and particularly in the tourist seasons of March – April and October – November / December. Bivaha Panchami festival celebrated in November end or early December attracts very large number of pilgrims. Measures included in EMP to schedule works with due consideration to tourist activities in consultation with temple authorities. Construction-related impacts include noise, dust, construction waste generation, disturbance to residents, businesses, traffic by the construction work, construction material sourcing, hauling of material and equipment, and occupational and community health and safety risks including the spread of COVID-19, among others. These are localized and temporary and can be readily mitigated through the measures indicated in the EMP. Other construction activities will be confined to the selected sites, and the interference with the general public and community around is minimal.

173. During the project operation phase, roads and drains are not expected to have any significant impacts. Regular maintenance will be ensured to avoid operational issues. Drains will be regularly cleaned, and awareness programs will be conducted to prevent disposal of solid and liquid waste into the roadside drains.

174. An Environmental Management Plan (EMP) that defines the mitigation measures to be implemented across all project phases, the institutions responsible for its implementation and monitoring has been developed. Additionally, an Environmental Monitoring Program has been

incorporated as part of the EMP to measure the impact of the project on the environmental media viz., air, noise, water, groundwater during the construction period.

175. The EMP will assist the PMU, PIU, Consultant and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between PIU/ULB, PMU, consultants and contractor. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

176. Public consultation was conducted as part of the environmental assessment process. The stakeholders expressed support for the improvement of the roads in the subproject site. Results of the consultation were documented and considered in the formulation of the environmental management plan. Public consultation will continue throughout the project implementation. The project's Grievance Redress Mechanism (GRM) will provide the citizens with a platform for redress of their grievances, and describes the channels, time frame, and mechanisms for resolving complaints about environmental performance.

177. PCU and PIU, with support from DSC and PMCDC, will be responsible for monitoring the project implementation and compliance with the EMP. Also, the periodic reporting requirements would enable meeting the disclosure needs as per ADB SPS 2009, as well.

178. The Janakpur Subproject will result in key environmental benefits such as, but not limited to, reduction in flooding areas, improved road and pedestrian safety to users resulting from improved road infrastructure and drainage facilities. The subproject is unlikely to cause any significant adverse impacts to environment and community. Potential negative environmental impacts associated with construction and operation are being mitigated through proper engineering practice, incorporation of recommended mitigation measures in the EMP and implementing the same effectively.

179. Therefore, as per ADB SPS, 2009, this subproject is classified as environmental category B and does not require further environmental impact assessment. This IEE has been prepared based on preliminary designs of the subproject. The PCU, with support from PMCDC, shall update this draft IEE based on final detailed design and submit to ADB for review, clearance and disclosure. To conform to government guidelines, subproject components require environmental clearance from the Ministry of Urban Development. This will be obtained prior to invitation of bids.

180. Recommendations. The following are recommendations applicable to the subproject to ensure no significant impacts:

(i) Obtain all statutory clearances timely;
(ii) consult with Department of Archaeology and obtain permission / no objection for the proposed road improvement work adjacent to the boundary wall of Janaki Temple, a protected monument; integrate suggestions and recommendations into the design and construction methodology
(iii) Obtain environmental clearance prior to award of contract
(iv) Procedures for Chance Finds should be incorporated right from the initial stage of the project considering that certain areas of the town, around Janaki Temple in particular, is among the list of monuments being studied for inclusion as an

UNESCO Heritage List. And, chances of finding ancient artefacts are quite high in the region;

(v) Trees are not impacted from the project activities. However, after final designs, the impact on trees should be investigated and priority should be given to tree protection and conservation activities. The mitigation measures suggested in the EMP should be implemented for the same;

(vi) Include this IEE in bid and contract documents;

(vii) Update/revise this IEE based on detailed design and/or, change in scope, alignment, or location;

(viii) Conduct safeguards induction to the contractor upon award of contract;

(ix) Strictly supervise EMP implementation;

(x) Ensure contractor appoints qualified EHS supervisor prior to start of works;

(xi) Documentation and reporting on a regular basis as indicated in the IEE;

(xii) Continuous consultations with stakeholders;

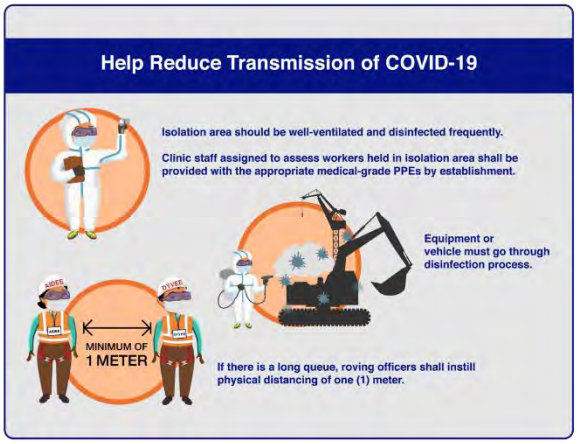
(xiii) Timely disclosure of information and establishment of grievance redressal mechanism (GRM);

(xiv) Involvement of contractors, including subcontractors, in first level GRM; and

(xv) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation.

Appendix 1: COVID 19 Guideline

A. PREPARATION BEFORE WORK



- Worksite and camp will be secured with gated fence
- Photo Identity Card will be issued to all workers with unique identification number
- Preparation will be made for daily medical screening (thermal check and symptoms assessment) of all workers and report to H&SO
- COVID Marshal will measure temperature by wearing facemask and gloves for their gang of workers before leaving camp
- Worker with high fever and frequent cough will not be allowed to work. The worker will be asked to stay in quarantine (for residential worker) or sent back home (non-residential worker).

COVID-19 लक्षणहरू		
सबैभन्दासामान्यलक्षणहरू: – ज्वरोआउने – सुक्खाखोकीलाग्ने – थकाइलाग्ने	**सामान्यतयाकमैदेखिनेलक्षणहरू:** – पीडाहुनेवादुख्ने – घाँटीदुख्ने – पखालालाग्ने – आँखापोल्ने – टाउकोदुख्ने – स्वादवागन्धथाहानहुने – छालामादागहुनेवाहातवाखुट्टाकाऔँलाकोरङउड्ने	**गम्भीरलक्षणहरू:** – सासफेर्नगाह्रोहुनेवापटकपटकसासफेर्नुपर्ने – छातीदुख्नेवाछातीमादबाबपर्ने – बोल्नवाहिँडडुलगर्ननसक्ने –
तपाईंमागम्भीरलक्षणहरूदेखिएमातुरुन्तैचिकित्साजाँचगराउनुहोस्। **जहिलेपनिआफ्नोडाक्टरवास्वास्थ्यसुविधाप्रदायककहाँजानुअघिकलगर्नुहोस्**		

- COVID Test (PCR Test) will be conducted for thestaff and workerswho have the symptom related to covid-19 (if required)
- Register record will be maintained
- Quarantine and isolation tents will be established at sufficient distance in the camp from regular shelters

- Specific and separate worksite will be assigned to the new group of workers away from regular workers for a minimum of 14 days to minimize risk
- Work will be arranged in shifts to avoid crowding of workers. Teams will be divided based on (i) workers residing in the same camp (ii) workers residing outside the camp (iii) new group of workers etc.
- Consumption of liquor and chewable like Khaini, Surti, Paan etc. (those generating urge for frequent spitting) will be strictly restricted inside office and work areas

B. PROCEDURE AT ENTRY

- Guards will be oriented by the H&SO on (i) checking temperature, (ii) observing health symptoms, (iii) record personal details and travel history, and (iv) taking emergency procedure, if required
- Unauthorized person and visitors will not be allowed to enter
- All new group of workers will be allowed to enter the site only after showing COVID Test certificate from authorized government hospital issued within the last 7 days, which will be checked by the Assistant Health Worker at the Medical Center
- Guards will wear prescribed PPEs at all the times and regularly disinfect their hand
- Visitor having COVID symptoms will be sent back, and immediately call HW from Medical Center for staff and worker showing symptoms
- Personnel should maintain a distance of 1 meter at all times following the floor-marking wherever queue is required
- Guard will direct vehicles supplying materials to the delivery zone

Guard will inform the visitors on fulltime use of mask and hand washing/sanitizing

C. MINIMIZEWORKER AND COMMUNITY CONTACT

The Contractor will be fully responsible to ensure taking all preventive measures and safety precautions for COVID-19 risks such as following:

- Project Manager will work closely with the Site In-charge and Resident Engineer for planning special measures and expedite work implementation at high risk areas and areas requiring work in close proximity with the communities
- Physical barricades will be made mandatory to separate and minimize contact between workers and local people
- Arrangements will be made to minimize movement of workers from barricaded work areas and camps and visiting settlement areas
- Work sites will be separated into working zones to keep the groups of workers physically separated. Not more than 20 workers will be allowed to work in one group.

A group leader will be identified as COVID Marshal and given orientation to keep close watch of workers and trigger emergency protocol in emergency case

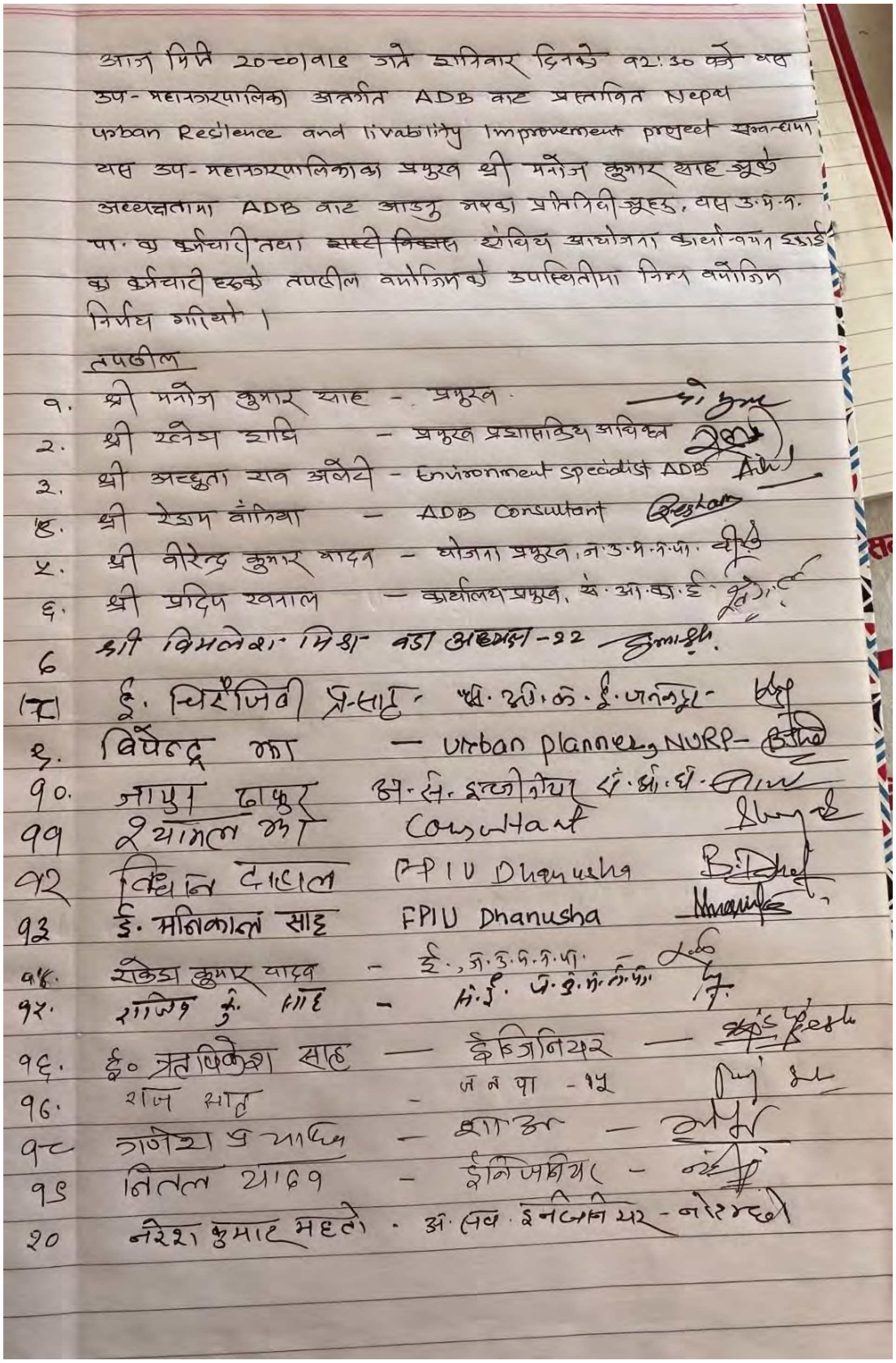
- Emphasis will be given to establish sufficient size of labor camp to keep all workers inside the camp to minimize contact with community.

D. TRAVEL TO WORK SITE

The workers will observe precaution and the contractor will arrange following measures for arranging transport for workers to the worksite:

- Travel between sites and labor camps will be arranged through official vehicle
- All workers will wear facemask when travelling in a shared vehicle, including the driver who will wear mask and glove
- Driver will sanitize had regularly and before & after every trip
- Only 40% capacity of vehicle will be used and a seat will be kept empty in between passengers
- Windows will be opened for natural ventilation
- Workers will stay facing away from each other while in the vehicle
- Vehicle will be cleaned and disinfected thoroughly after every shift- with emphasis on handles, steering wheel, gear etc.
- All workers prior to entering the vehicle and exiting will sanitize their hands
- Prior to entering the vehicles all nonresidential staff and workers must self-certify that they do not have any COVID-19 symptoms

Appendix 2: Minutes of Consultations at Janakpur Sub-Metropolitan City



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आज मिति २०८० वैसाख १३ गते जनकपुर उप-
महानगरपालिको अन्तर्गत प्रदेश अस्पताल परिसर सुधार
तथा विकास को लागि तर्जुमा गरिएको तत्कालिक कार्यक्रम एवं तथा
विकास कार्यक्रमले सामाजिक तथा वातावरणीय वातावरण
मा पर्ने असरको विषयमा स्थानीय जनप्रतिनिधि
सहित विकास कार्यालयका प्राविधिक, नगरपालिकाका
प्राविधिक कर्मचारी तथा (अस्पताल) विकास बोर्डका
परामर्शदाता बीच छलफलको उपस्थितीमा छलफल
तथा जानकारी आदानप्रदान गरियो।

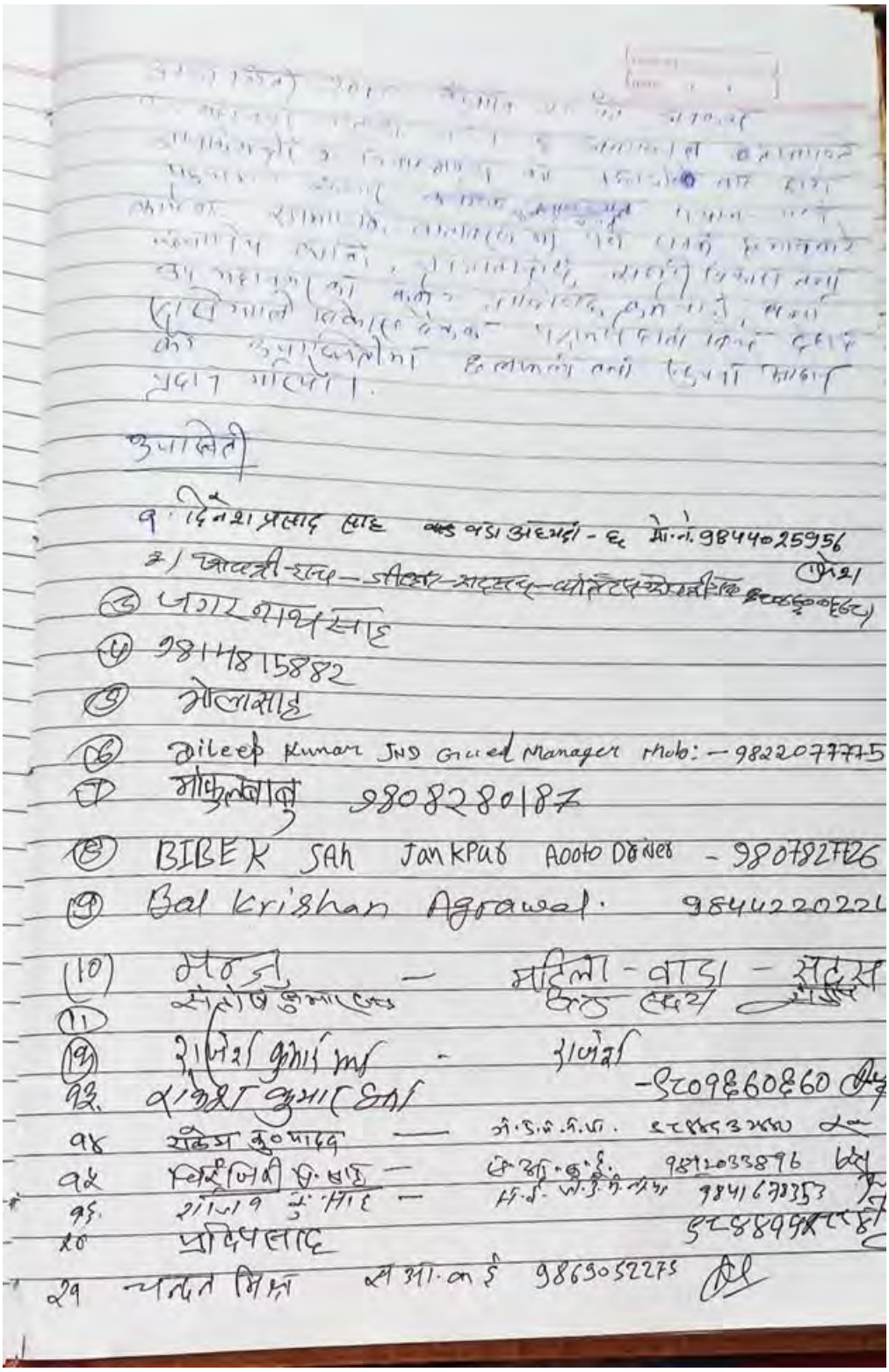
उपस्थिती

१ जित बहादुर राउत वडा अध्यक्ष-वडा नं.-१३
२ संजु दास कार्यपालिका सदस्य ९८४४११४८० ९८१९८६६२८६
३ गंगा महरा ९८०६८९११२४
४ ईस्लाम कबारी ९८०३६३५६७४
५ उज्ज्वला प्रसाद देवकोटा ९८२४८३४०४४ उज्ज्वला

मनमोहन वडा नं. १३

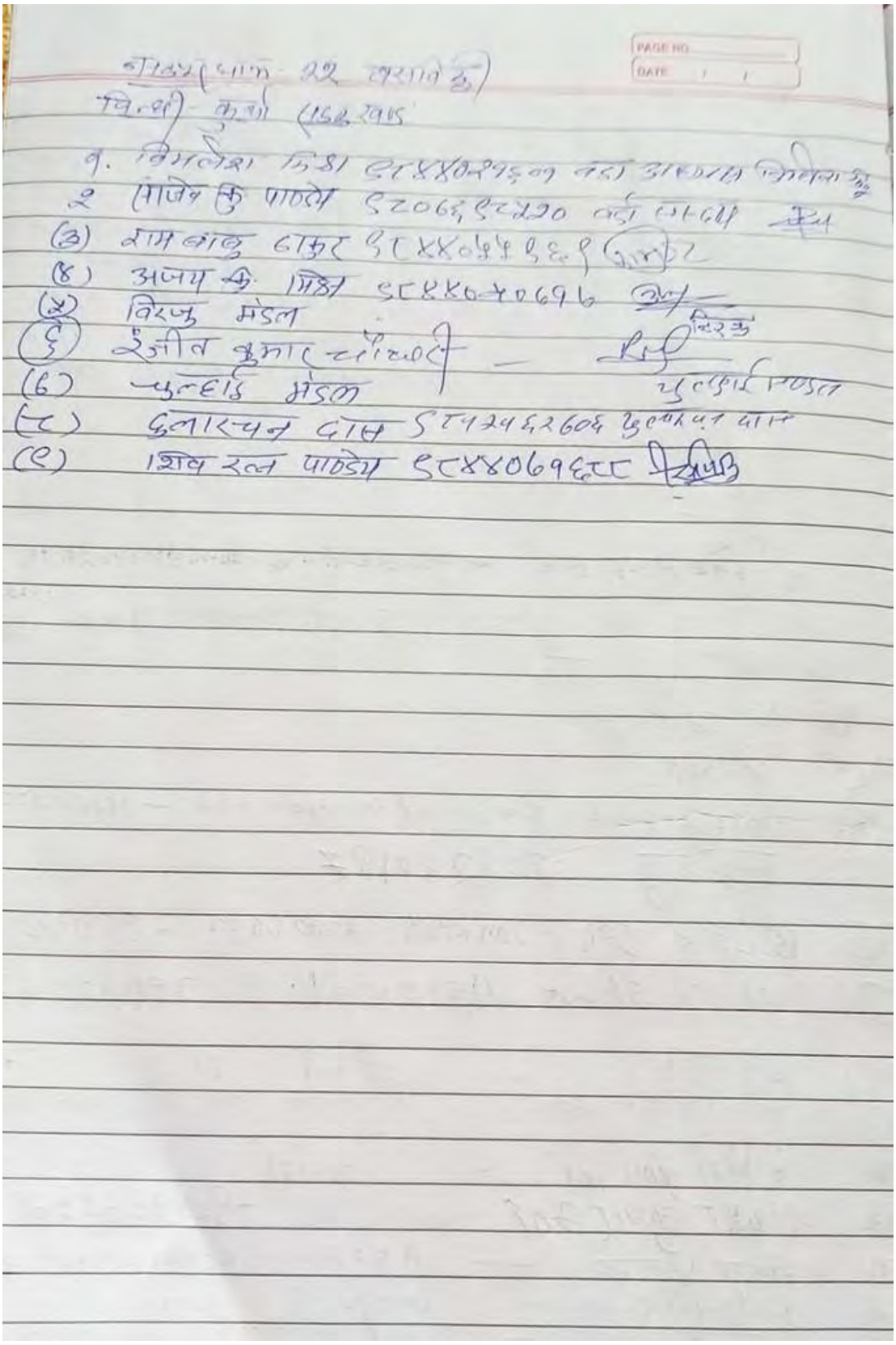
१. पुण्य प्रताप यादव वडा अध्यक्ष - ९८२४०२८४४४
२ रामदिन्ध यादव मो 9817639010
(३.) प्रदीप कुमार साह म.न.पा.-१४ - ९८१२९८६६६० प्रदीप साह
(४) कैलाश कुमार राउत -१३ ९८१४८४२३६६
(५) बिमल राउत -१३ - ९८०३८३६६३४ Bimal

(८) राकेश कु. यादव - प्र.उ.म.न.पा.- शाकिरिया - ९८४४१३६५०
(९) राजीव कुं साह - जं.उ.म.न.पा. - 9841678353
(१०) चिरंजिवी कु. साह - ए.डा.कं.ई. - 9812033876
११) चन्दन मिश्रा - सं.आ.क.ई - 9869052275



उपस्थिति

१. दिनेश प्रसाद साह वडा अध्यक्ष - ९ मो.नं. 9844025956
२. [illegible]
३. जगदीश साह
४. 9841815882
५. भोलासाह
६. Dileep Kumar Jha Guest Manager Mob:- 9822077775
७. मोफुलबाबु 9808280187
८. BIBEK SAH Jankpur Aooto Drivers - 9807827126
९. Bal Krishan Agrawal. 9844220224
१०. [illegible] — महिला - वडा - सदस्य
११. [illegible]
१२. [illegible] -
१३. [illegible] -९८०९६०८६० [illegible]
१४. [illegible] — [illegible]
१५. [illegible] — [illegible] 9841673353
१६. [illegible]
१७. प्रदिपसाह
१८. चन्दन मिश्र [illegible] 9869052275



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आज मिति २०८० वैशाख २० गते सौभाग्य निर्माण सहरी विकास मन्त्रालय सहरी विकास तथा भवन निर्माण विभाग संघीय आयोजना कार्यालय जनकपुर का प्रावधान कम-चार्ज तथा सहयोगी निकाय नवका परामर्शदाताहरु बीच URLIP अन्तरगत [illegible] DPR आयोजनाहरुको ^अन्तर्गत पश्चात दुई खण्डका ~~समस्या~~ सरकारले समस्या (मुद्दा) हरु बारे छलफल गरियो।

उपस्थिति

१. इन्जिनियर - घनश्याम ठाकुर
२. " श्रवण कुमार यादव
३. " लक्ष्मण यादव
४. " चिरंजिवी प्र. साहि.
५ " मनोज प्रसाद मंडल
६ ~~[illegible]~~ भरत यादव
७) " शितल प्रसाद यादव
(८) उ.सञ्चालक: विश्वनाथ यादव
९) सु. चन्दन मिश्रा
१०. नी. [illegible] ठाकुर
११) प्रमोद राउत
१२ दिपक राज पाण्डेय
१३ ज्ञ्यानिस आनबु

Appendix 3: Sample Grievance Registration Form

(To be available in Nepali and English)

The _____Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.
Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date	Place of registration	Project Town Project:			
Contact information/personal details					
Name		Gender	* Male * Female	Age	
Home address					
Place					
Phone no.					
E-mail					
Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)	
Mode of communication: Note/letter E-mail Verbal/telephonic	
Reviewed by: (Names/positions of officials reviewing grievance)	
Action taken:	
Whether action taken disclosed:	Yes No
Means of disclosure:	

Appendix 4: Sample Environmental Site Inspection Report

Project Name
Contract Number

NAME: _____ DATE: _____
TITLE: _____ DMA: _____
LOCATION: _____ GROUP: _____

WEATHER:
_____

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

MONITORING ITEMS	COMPLIANCE
Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI)	
EHS supervisor appointed by contractor and available on site	
Construction site management plan (spoils, safety, schedule, equipment etc.,) prepared	
Traffic management plan prepared	
Dust is under control	
Excavated soil properly placed within minimum space	
Construction area is confined; no traffic/pedestrian entry observed	
Surplus soil/debris/waste is disposed without delay	
Construction material (sand/gravel/aggregate) brought to site as & when required only	
Tarpaulins used to cover sand & other loose material when transported by vehicles	
After unloading , wheels & undercarriage of vehicles cleaned prior to leaving the site	
No chance finds encountered during excavation	
Work is planned in consultation with traffic police	
Work is not being conducted during heavy traffic	
Work at a stretch is completed within a day (excavation, pipe laying & backfilling)	
Pipe trenches are not kept open unduly	
Road is not completely closed; work is conducted on edge; at least one line is kept open	
Road is closed; alternative route provided & public informed, information board provided	
Pedestrian access to houses is not blocked due to pipe laying	
Spaces left in between trenches for access	
Wooden planks/metal sheets provided across trench for pedestrian	
No public/unauthorized entry observed in work site	

MONITORING ITEMS	COMPLIANCE
Children safety measures (barricades, security) in place at works in residential areas	
Prior public information provided about the work, schedule and disturbances	
Caution/warning board provided on site	
Guards with red flag provided during work at busy roads	
Workers using appropriate PPE (boots, gloves, helmets, ear muffs etc)	
Workers conducting or near heavy noise work is provided with ear muffs	
Contractor is following standard & safe construction practices	
Deep excavation is conducted with land slip/protection measures	
First aid facilities are available on site and workers informed	
Drinking water provided at the site	
Toilet facility provided at the site	
Separate toilet facility is provided for women workers	
Workers camps are maintained cleanly	
Adequate toilet & bath facilities provided	
Contractor employed local workers as far as possible	
Workers camp set up with the permission of PIU	
Adequate housing provided	
Sufficient water provided for drinking/washing/bath	
No noisy work is conducted in the nights	
Local people informed of noisy work	
No blasting activity conducted	
Pneumatic drills or other equipment creating vibration is not used near old/risky buildings	

Signature

_____

Sign off

_____ _____

Name **Name**
Position **Position**